



# Asbestos Paint on Towers





## Duty of Care Demonstration

Transgrid

7 November 2022

→ The Power of Commitment



<b>Project name</b>		Transgrid Repex Support					
<b>Document title</b>		Asbestos Paint on Towers   Duty of Care Demonstration					
<b>Project number</b>		12591700					
<b>File name</b>		Asbestos Paint on Towers					
Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
Draft	1	Bruce Clarke	Dennis Stanley		Bruce Clarke		07/10/22
Final	2	Bruce Clarke	Dennis Stanley		Bruce Clarke		07/11/22

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# Executive Summary

Transgrid has identified the presence of asbestos on towers and has embarked upon a program of removal to fulfil their duty of care obligations. Their prioritisation of remediation has been based upon a report prepared by GHD that details the results of field sampling and a risk assessment.

The GHD risk assessment considers the accessibility of towers which is a public access perspective. The exposure to workers is covered by the following quote included in the executive section to the GHD report.

*“Maintenance, demolition, refurbishment or domestic activities have the potential to deteriorate the condition of the assessed paint coatings, thereby increasing the risk of harmful exposure. If any activity whatsoever is planned that may damage the paint coatings, the risk assessment is to be reviewed by a Competent Person and, if required, appropriate risk reduction measures implemented”.*

Transgrid has already removed asbestos from affected structures that were rated as very high risk and high risk over the 2019-2023 period. Transgrid’s Option Evaluation Report (OER) 1164 Rev 0 Asbestos Paint on Towers in Various Loc - 1 Nov 2021 proposes to continue with the program, remediating affected structures rated medium and below.

The Australian Energy Regulator (AER) draft determination has proposed a 34% reduction to the funding request on the basis that GHD’s report recommended that low rated affected structures should be “maintained in good condition”. Transgrid’s OER 1164 changes the GHD recommendation to “maintain in good condition or greater than 5 years”. This change better reflects the potential exposure to workers from inspection cycle and preventative and reactive maintenance activities which is considered prudent.

OER 1164 considers two options against a base case of do nothing. The preferred option “Option B” remediates all asbestos affected structures with medium risk and low risk prioritisation categorisation in 2024-2028” at a capital cost of \$33.57M and a Net Present Value (NPV) of \$128.46M.

The analysis aligns with the AER’s Asset Replacement Planning Note<sup>1</sup> with a positive NPV indicating proportionality when assessing As Low As Reasonably Practicable (ALARP).

This report is subject to, and must be read in conjunction with, the limitations set out in section 1 and the assumptions and qualifications contained throughout the Report.

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<sup>1</sup> Industry practice application note, Asset replacement planning, January 2019, AER

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# 1. Introduction

Transgrid, supported by an assessment performed by GHD of paint coatings on transmission tower legs suspected of containing asbestos, elevated concentrations of lead and elevated levels of chromium has embarked upon a program of asbestos removal. Based upon a risk assessment and remediation prioritisation detailed in GHD's October 2021 Transmission Tower Hazardous Coating Analysis - Overarching Report, Transgrid removed asbestos from affected structures classified as very high risk and high risk over the 2019-2023 period.

After completing this program, Transgrid has prepared OER-1164 that proposes to remove asbestos from affected structures classed as medium risk and low risk.

The AER has proposed a 34% reduction to the proposed program on the basis that the GHD report only recommended remediating structures with a risk rating of medium and above, whilst maintaining all low-risk structures in good condition. Further, the AER noted that Transgrid has stated that it has not assessed 370 of the 1,072 structures that it classifies as medium risk, and that upon inspection "there is a possibility that these structures exhibit a risk profile classified as medium/low risk."

The AER have assumed that the condition profile of the towers that have not been assessed is the same as the towers that have been assessed. Taking this approach, the AER estimate that a total of 912 structures should be classified as medium risk and 692 as low risk (or 57% medium risk and 43% low risk based on current available information).

Transgrid has engaged GHD to consider the AER's draft determination comments and the adequacy of their demonstration of duty of care.

## 1.1 Purpose of this report

This report outlines an independent assessment of Transgrid's OER 1164 submitted to the AER for funding associated with asbestos remediation.

This report may be used to support Transgrid's Revised Revenue Proposal to be submitted at the AER.

## 1.2 Scope and limitations

GHD has been engaged by Transgrid to perform an independent assessment of the OER prepared to support asbestos remediation.

The scope of this report includes an assessment of whether the business case detailed in OER 1164 and the available supporting documentation detailed in Appendix A-2, is in alignment with the AER's Asset replacement planning note<sup>2</sup> as well as demonstrating the requirements of a person conducting a business or undertaking under the Work Health and Safety Act.

*This report: has been prepared by GHD for Transgrid and may only be used and relied on by Transgrid for the purpose agreed between GHD and Transgrid as set out in section 1.1 of this report.*

*GHD otherwise disclaims responsibility to any person other than Transgrid arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.*

*The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.*

*The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.*

*The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.*

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<sup>2</sup> Industry practice application note, Asset replacement planning, January 2019, AER

## 2. Background

In line with their regulatory obligations Transgrid engaged GHD to undertake an assessment of paint coatings on transmission tower legs suspected of containing asbestos, elevated concentrations of lead and elevated levels of chromium. The outcome of the assessment is detailed in GHD's October 2021 Transmission Tower Hazardous Coating Analysis - Overarching Report.

Testing was undertaken on paint samples on a number of suspected transmission lines in three stages:

- Stage 1: Conducted early to mid-2016, testing covered Lines 8, 11, 16, 23, 27, 28 and 959/92Z, and sections of Lines 76/77 and 39.
- Stage 2: Conducted in late 2016 to mid-2017, testing primarily covered sample towers on the large majority of lines constructed prior to 1980, based on historical and anecdotal evidence of the asbestos paint use.
- Stage 3: Conducted in 2019 to mid-2021, testing covers the remaining transmission line towers on the network that have not been tested, with those suspected of containing asbestos paint based on inspection information and other anecdotal evidence prioritised.

The October 2021 report contains a risk assessment detailed in Appendix A-1. In summary, the report outlines a risk assessment based upon:

- Extent of damage / deterioration “friable” or “non- friable”
- Extent / amount of asbestos
- Accessibility / frequency of use of area

The resulting assessment, detailed in the table below, is summarised as a remediation priority which was adopted by Transgrid.

*Table 1 Priority for remediation*

Risk rating	Category	Remediation priority
No paint/insufficient paint to sample	Negligible	n/a
0 – 250	Low	Maintain in good condition
250-375	Medium	3 – 5 years
375-500	High	1 – 3 years
500-600	Very high	As soon as reasonably practical (<1 year)

The above accessibility criteria consider public access but does not consider operational needs for tower inspection and preventative and reactive maintenance. Importantly, the executive summary of the October 2021 report contains the following statement.

*“Maintenance, demolition, refurbishment or domestic activities have the potential to deteriorate the condition of the assessed paint coatings, thereby increasing the risk of harmful exposure. If any activity whatsoever is planned that may damage the paint coatings, the risk assessment is to be reviewed by a Competent Person and, if required, appropriate risk reduction measures implemented”.*

## 3. Asbestos exposure

### 3.1 Public

The above analysis considers the risk of public exposure based upon the results of sampling taking into account the presence of asbestos, the extent of damage / condition and degree of accessibility.

## 3.2 Transgrid staff / contractors

In addition to the possibility of exposure to members of the public, Transgrid staff and contractors may be potentially exposed during inspection and preventative and reactive maintenance activities.

AS 3995-1994 Design of steel lattice towers and masts Appendix A – Maintenance and Inspections sets out the scope of maintenance and inspection activities indicating that inspections should take place in an interval of between two to five years.

Transgrid’s Generic Maintenance Plan indicates a five-year frequency and Transgrid’s Maintenance Plan - Transmission Line Assets sets out typical tower defects that can occur including those classed as “Banned Equipment” or other conditions which could affect the integrity, security or safety of the line.

From an operational safety perspective, Transgrid’s OER 1164 redefines the remediation priority in GHD’s report relating to those towers rated 0 – 250 (Refer Table 1) as “Maintain in good condition or greater than 5 years”. This change better reflects inspection cycle and preventative and reactive maintenance requirements.

## 4. Duty of care demonstration

Based upon the details included on OER 1164, Transgrid has already removed asbestos in affected structures classified as very high risk and high risk over the 2019-2023 period. The same OER assesses two options relating those remaining towers rated 0 – 250 against a base case of do nothing, identifying Option B “Remediate all asbestos affected structures under medium risk and low risk prioritisation categories in 2024-2028” at a capital cost of \$33.57M and an NPV of \$128.46M.

This option does contrast with the GHD October 2021 report which recommends remediating only the medium-risk structures and maintaining all low-risk structures in good condition. This is considered appropriate in relating to public exposure, but it would appear that the potential exposure to workers is covered by the warning provided in the report’s executive summary (refer above quotes) rather than embedding this potential in the risk analysis.

In May 2013, Safe Work Australia published guidance materials covering, how to determine what is reasonably practicable to meet a health and safety duty. The guide outlines five factors that need to be demonstrated to satisfy duty holder obligations, detailed below.

*Table 2 Factors required to demonstrate duty of care*

Factor	Relevance	GHD considerations
The likelihood of the hazard or the risk concerned occurring	The greater the likelihood of a risk occurring, the greater the significance this will play when weighing up all matters and determining what is reasonably practicable. If harm is more likely to occur, then it may be reasonable to expect more to be done to eliminate or minimise the risk.  The frequency of an activity or specific circumstances will be relevant to the likelihood of a risk occurring. The more a worker is exposed to a hazard, the more likely they are to suffer harm from it.	The likelihood of public exposure to asbestos is embedded within GHD’s risk scoring. The potential exposure to worker is covered by the warning paragraph controlled in the October 2021 reports executive summary.
The degree of harm that might result from the hazard or the risk	The greater the degree of harm that could result from the hazard or risk, the more significant this factor will be when weighing up all matters to be taken into account and identifying what is reasonably practicable in the circumstances. Clearly, more would be	The risk associated with asbestos are well documented.

Factor	Relevance	GHD considerations
	<p>expected of a duty holder to eliminate or minimise the risk of death or serious injury than a lesser harm.</p>	
<p>What the person concerned knows, or ought reasonably to know, about the hazard or risk, and ways of eliminating or minimising the risk</p>	<p>The knowledge about a hazard or risk, and any ways of eliminating or minimising the hazard or risk, will be what the duty holder actually knows, and what a reasonable person in the duty holder's position (e.g. a person in the same industry) would reasonably be expected to know. This is commonly referred to as the state of knowledge.</p> <p>The courts have consistently stated a duty holder must consider all reasonably foreseeable hazards and risks when identifying what is reasonably practicable.</p>	<p>Transgrid are aware of the risk and have commenced a program of removal.</p>
<p>The availability and suitability of ways to eliminate or minimise the risk</p>	<p>This requires consideration of not only what is available, but also what is suitable for the elimination or minimisation of risk. A risk control that may be effective in some circumstances or environments may not be effective or suitable in others, because of things such as the workplace layout, skills of relevant workers or the particular way in which the work is done.</p> <p>Equipment to eliminate or minimise a hazard or risk is regarded as being available if it is provided on the open market, or if it is possible to manufacture it.</p> <p>A work process or change to a work process to eliminate or minimise a hazard or risk is regarded as being available if it is feasible to implement.</p> <p>A way of eliminating or minimising a hazard or risk is regarded as suitable if it:</p> <ul style="list-style-type: none"> <li>- is effective in eliminating or minimising the likelihood or degree of harm from a hazard or risk</li> <li>- does not introduce new and higher risks in the circumstances, and</li> <li>- is practical to implement in the circumstances in which the hazard or risk exists.</li> </ul>	<p>Asbestos removal is desirable given public accessibility and the potential exposure to workers.</p>
<p>The cost associated with available ways of eliminating or minimising the risk, including whether the cost is grossly disproportionate to the risk.</p>	<p>Although the cost of eliminating or minimising risk is relevant in determining what is reasonably practicable, there is a clear presumption in favour of safety ahead of cost.</p> <p>The cost of eliminating or minimising risk must only be taken into account after identifying the extent of the risk (the likelihood and degree of harm) and the available ways of eliminating or minimising the risk.</p> <p>The costs of implementing a particular control may include costs of purchase, installation, maintenance and operation of the control</p>	<p>As indicated in this reports executive summary a positive NPV result for the preferred option demonstrates proportionality when considering ALARP.</p>



Factor	Relevance	GHD considerations
	<p>measure and any impact on productivity as a result of the introduction of the control measure.</p> <p>A calculation of the costs of implementing a control measure must take into account any savings from fewer incidents, injuries and illnesses, potentially improved productivity and reduced staff turnover.</p>	

# A-1 Appendix – GHD’s risk assessment methodology

## 4.1 Material scoring tool

Each tower was categorised in the material scoring tool by analysing the extent of damage / deterioration of the paint and the extent / amount of asbestos identified in the tower. The extent of damage / deterioration was given a higher weighting to reflect its importance when assessing the overall risk of the towers. The material scoring tool analysis is outlined in the table below.

**Table 3** Material scoring tool

Sample variable	Scoring matrix	Score	Comments
Extent of damage / deterioration	Good / very good condition (no visible damage or flaking)	0	Towers for asbestos analysis in Stage 0 works were categorised as either “friable” or “non-friable”. Towers ranked friable were given a rating of 4-6 and towers ranked non-friable were given a rating of 0.
	Low damage: minor scratches on surface marks, minor peeling of paint	2	
	Medium damage: moderate damage and flaking of paint	4	
	High damage and significant flaking of paint (poor condition)	6	
Extent / amount of asbestos	No asbestos paint identified in the tower	0	For Stage 0, asbestos samples were composited and not analysed on each leg. Therefore, if a tower returned a positive asbestos result in Stage 0, it was given a score of 3.  All towers from Stages 1, 2 and 3 were given a score based on the risk matrix.
	Asbestos paint in 1 to 2 legs of the tower	1	
	Asbestos paint in 3 to 4 legs of the tower	2	
	Asbestos paint in all 4 legs of the tower	3	
<b>TOTAL</b>		<b>9</b>	

Any tower that did not report asbestos was given a risk rating of “low” and any tower that did not contain paint or had insufficient paint to sample was given a risk rating of “negligible”. No further analysis was undertaken on those towers as they do not require remediation or management.

The overall scores from the material scoring tool were tallied and categorised into risk categories as presented in the table below.

**Table 4** Material risk rating

Score	Description of risk levels
No paint / insufficient paint to sample	Negligible - No further action required on these towers.
No asbestos	No asbestos present. No further action required on these towers.
1- 4	Asbestos present in 1 to 2 legs of the tower, in good condition/low damage

Score	Description of risk levels
5 - 7	Medium to high damage and significant flaking of paint, asbestos present in at least 1 to 2 legs of the tower.
8 - 9	High damage and significant flaking of paint, asbestos present in 3 to 4 legs of the tower.

## 4.2 Priority scoring tool

Following analysis of the material scoring, towers with reported asbestos were analysed using the priority scoring tool which is outlined in Table 5-3. The following variables were used in the scoring tool included:

- Material risk – based on the scoring results as determined by the material risk rating in Table 5-2.
- Location – based on location of tower with regards to land use types within a 200 m radius.
- I.e. schools, residential areas, national parks.
- Accessibility/frequency of use – based on how easily the site could be accessed. i.e. if the site was locked or not.

**Table 5** *Priority scoring tool*

Sample variable	Scoring matrix	Score	Comments
Material risk	As per Table 5-2	1-9	Risk ranking of 0 was not included as no further action is required on these towers.
Location	Inaccessible or remote sites	0	Analysis undertaken using GIS mapping with a 200 m buffer.
	Unmanned sites with least sensitivity / difficult to access (remote bush land)	1	
	Sites with easy public access (national parks, main roads, sporting and recreational areas)	2	
	Highly sensitive areas (schools, residential areas, sensitive environmental receptors)	3	
Accessibility / frequency of use of area	Usually inaccessible or unlikely to be disturbed / infrequently used/ locked or fenced	0	
	Occasionally likely to be disturbed / accessed on a monthly basis	1	
	Easily disturbed / accessed on a weekly basis	2	
	Routinely disturbed / accessed on a daily basis	3	

The parameters were then given a weighting for the priority risk assessment as summarised in the table below.

**Table 6** *Risk matrix weighting*

Score	Risk rating	Weighting	Total score
Material risk	1 – 9	50%	50 - 450
Location	0 – 3	25%	0 – 75
Accessibility / frequency of use of area	0 – 3	25%	0 – 75
<b>TOTAL</b>			<b>50 - 600</b>

The priority score will be used to assist TransGrid with their future remediation works planning. Remediation works can be planned based on the material risk assessment and the overall priority score. The priority for remediation categories are presented in the table below.

*Table 7 Priority for remediation*

Risk rating	Category	Remediation priority
No paint/insufficient paint to sample	Negligible	n/a
0 – 250	Low	Maintain in good condition
250-375	Medium	3 – 5 years
375-500	High	1 – 3 years
500-600	Very high	As soon as reasonably practical (<1 year)

## A-2 Documents considered

- Transgrid - OER-1164 Rev 0 Asbestos Paint on Towers in Various Loc - 1 Nov 2021 - PUBLIC.pdf
- Generic Maintenance Interval transgrid.pdf
- 1164 - Asbestos Condition Assessment Report-CONFIDENTIAL.pdf
- Transgrid - OER-1164 Rev 2 Transmission Line Asbestos Paint - 31 Oct 2022 - PUBLIC.pdf
- AER - Transgrid 2023-28 - Draft Decision - Attachment 5 - Capital expenditure - September 2022.pdf
- AS 3995-Design of Steel Lattice Tower Masts.pdf
- Maintenance Plan - Transmission Line Assets.pdf
- HSE Notice - Updated transmission line asbestos register.pdf



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