



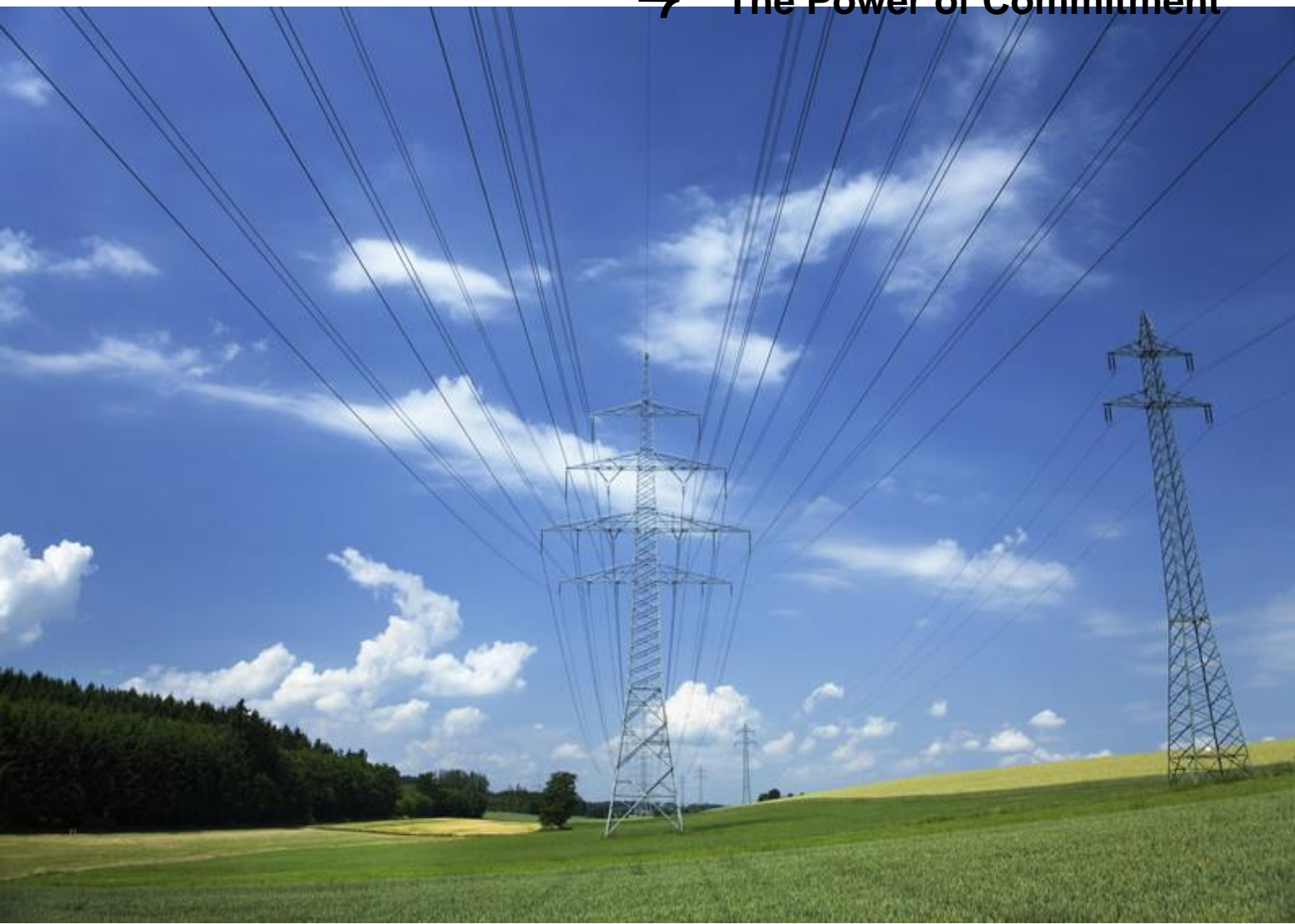
# 330KV Low Spans - Duty of Care Demonstration





**2023-28 Revenue Proposal**

Transgrid

7 November 2022

→ **The Power of Commitment**



<b>Project name</b>		2023-28 Revenue Proposal					
<b>Document title</b>		330KV Low Spans - Duty of Care Demonstration   2023-28 Revenue Proposal					
<b>Project number</b>		12591700					
<b>File name</b>		2023-28 Revenue Proposal					
<b>Status Code</b>	<b>Revision</b>	<b>Author</b>	<b>Reviewer</b>		<b>Approved for issue</b>		
			<b>Name</b>	<b>Signature</b>	<b>Name</b>	<b>Signature</b>	<b>Date</b>
Draft	1	Bruce Clarke	Dennis Stanley		Bruce Clarke		22/9/22
Final	2	Bruce Clarke	Dennis Stanley		Bruce Clarke		07/11/22

**GHD Pty Ltd 39 008 488 373**

180 Lonsdale Street

Melbourne, Vic 3000, Australia

**T** +61-3-8687-8000 | **F** +61-3-8687- 6522 | **E** maelmail@ghd.com | **ghd.com**

© GHD 2022

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

# Executive summary

Transgrid operates 330kV lines with high utilisation that were built to a less stringent ground clearance of 7.6m compared to the 8.0m clearance specified in AS/NZS 7000:2106 - Overhead line design.

Transgrid analysed the separation distances on these lines and have identified instances where the separation distance to ground breaches 7.6m based upon the Low Span Risk Assessment Methodology.

To reduce the risk associated with these lines, Transgrid developed Option Evaluation Reports (OER) N2609 that assesses two options against a base case of business as usual. The preferred option remediates 330KV identified low spans with high utilisation at a cost of \$19.3M and an NPV of \$0.8M.

N-1<sup>1</sup> was used to determine the prioritisation of the investment which is considered reasonable.

GHD understands that the AER question the analysis on the basis that N-1 was not applicable to AS/NZS 7000:2106 - Overhead line design.

GHD's independent assessment of OER N2609 indicates:

- The recommendation of remediation of 330KV lines with high utilisation that breach their original design clearance of 7.6m is less than the 8.0m recommended under AS/NZS 7000:2106 - Overhead line design. Whilst AS/NZS 7000:2106 only applies to new designs, the recommendation brings the identified spans back to their original design specification and knowledge that this is below current standards further supporting duty of care obligations demonstration.
- The analysis has been conducted at the maximum design temperature which is consistent with section 2.4 of AS/NZS 7000 which states the overhead line shall be designed for the maximum operating temperature of the line (and its conductors).
- N-1 is not relevant to the application of AS7000, what is relevant is the maximum operating temperature which clearances are assessed against. The N-1 utilisation operating temperature is within the maximum operating temperature and therefore covered by the AS7000 clearance requirements.

GHD considers that the OER analysis and objectives defensible.

---

<sup>1</sup> "N-1" means that the grid shall be capable of experiencing outage of a single transmission line, cable, transformer or generator without causing losses in electricity supply

# Contents

<b>1.</b>	<b>Introduction</b>	<b>1</b>
1.1	Purpose of this report	1
1.2	Scope and limitations	1
<b>2.</b>	<b>Background</b>	<b>2</b>
<b>3.</b>	<b>330KV low span assessment</b>	<b>2</b>

# 1. Introduction

Transgrid submitted its 2023-28 Revenue Proposal in January 2022. According to the AER regulatory timetable, Transgrid can submit a Revised Revenue Proposal in December 2022.

Transgrid has engaged GHD to perform several independent assessments of Repex projects to support the development of the Revised Revenue Proposal.

## 1.1 Purpose of this report

This report outlines an independent assessment of OER N2609 which Transgrid submitted to the AER for funding associated with remediation of 330KV low spans.

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 the funding request for remediation of identified 330KV low spans.

The scope of this report includes an assessment of whether the business case detailed in OER N2609 and the available supporting documentation detailed in Appendix A-1, is in alignment with:

- The AER's Asset replacement planning note<sup>2</sup>
- AS/NZS 7000:2106 - Overhead line design

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.

---

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

## 2. Background

Transgrid operates 330kV lines with high utilisation that were built to a less stringent ground clearance of 7.6m compared to the 8.0m clearance specified in AS/NZS 7000:2106 - Overhead line design.

Transgrid analysed the separation distances on these lines and have identified instances where the separation distance to ground breaches 7.6m based upon the Low Span Risk Assessment Methodology.

To reduce the risk associated with these lines, Transgrid developed OER N2609 that assesses two options against a base case of business as usual. The preferred option remediates 330KV identified low spans with high utilisation at a cost of \$19.3M and an NPV of \$0.8M.

N-1 was used to determine the prioritisation of the investment.

GHD understands that the AER question the analysis on the basis that N-1 was not applicable to AS/NZS 7000:2106 - Overhead line design.

## 3. 330KV low span assessment

The OER identifies older 330kV lines with high utilisation that were built to a less stringent ground clearance of 7.6m compared to the 8.0m clearance specified in AS/NZS 7000:2106 - Overhead line design.

The OER seeks to bring these lines back in line with their original design specifications.

Transgrid has analysed the separation distances on these lines and have identified instances where the separation distance to ground breaches 7.6m based upon the Low Span Risk Assessment Methodology.

In prioritising remediation activities, four main factors were taken into consideration in determining the overall risk level of a particular low span which were:

1. Land use – Purpose to which the land cover is committed to determine potential exposure.
2. Violation temperature – the percentage of required operating temperature when the span first starts to go below the required minimum clearances. In this case clearance breach to the original design standards is assessed at the maximum design temperature which is consistent with section 2.4 of AS/NZS 7000:2106 - Overhead line design states the overhead line shall be designed for the maximum operating temperature of the line (and its conductors).

N-1 is not covered by AS/NZS 7000 and in this case the use of N-1 has only been used to determine prioritisation.

3. Violation amount – how far below the minimum clearances a particular span is at the required operating temperature of the line as recorded by the analysis.
4. Violation area – the size of the land/ground that is exposed to conductors below their minimum clearances at the required operating temperature.

Awareness of higher clearance as specified in AS/NZS 7000:2106 - Overhead line design further supports the case for remediation when considering duty of care.

It is true that AS/NZS 7000:2106 - Overhead line design only applies to the design of new lines. However, the OER is seeking to bring compliance back to the original design specification. Knowledge of higher requirements only further supports demonstration of duty of care obligations.

## A-1 Documentation considered

The following documentation was considered during our independent assessment:

- Safe Work Australia, "How to determine what is reasonable practicable to meet a health and safety duty", May 2013
- Australian Energy Regulator, "Industry practice application note, Asset replacement planning", January 2019
- TL-613883 - TRANSMISSION LINES - CONSTRUCTION - DESIGN - STANDARD MINIMUM CONSTRUCTION CLEARANCES FROM GROUND AND OTHER SERVICES - DESIGN STANDARD.pdf
- Transgrid - OER-N2609 Rev 2 Main Grid Low Spans - 31 Oct 2022 - PUBLIC.pdf
- Transgrid - OER-N2609 Rev 0 Main Grid Low Spans - 9 Nov 2021 - PUBLIC.pdf
- AS/NZS 7000:2106 - Overhead line design
- TransGrid, "Electricity Network Safety Management System (ENSMS) Description", Rev 4, May 2020





[ghd.com](http://ghd.com)

→ **The Power of Commitment**