

Disclaimer

The details presented and findings contained within this report are based on current information, assumptions, and available data, made available to E3 Advisory at the time of preparation. They are intended to be used as an Independent Verification of the cost estimate of the biodiversity offset cost component of their CWO RRZ Revenue Submission to the Australian Energy Regulator (AER). Actual costs may vary due to changes in market conditions, project scope, design modifications, unforeseen site conditions, regulatory changes, and other factors.

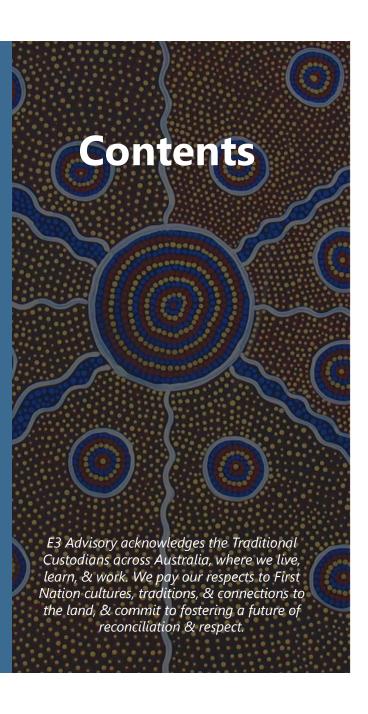
Central West Orana REZ Revenue Submission Non-contestable works

Biodiversity offset cost estimate Independent Verification



Transgrid

16 April 2025



Executive Summary

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Executive Summary

Project Overview

The Central-West Orana (CWO) Renewable Energy Zone (REZ) transmission project involves the construction of new transmission lines, energy hubs, switching stations and related infrastructure. The new REZ network infrastructure will enable renewable energy from solar, wind and storage projects to be distributed to energy consumers across the State via the existing NSW transmission network.

Transgrid has been appointed to deliver the non-contestable scope of the CWO REZ. Non-contestable projects fall under the Transmission Efficiency Test (TET) issued by the AER in April 2023.

The Scope of the Services

Transgrid has engaged E3 Advisory to perform an Independent Verification of the cost estimate of the biodiversity offset cost component of their CWO RRZ Revenue Submission to the Australian Energy Regulator (AER). The objective is to assess:

- · The approach and processes used by Transgrid in developing the cost estimate,
- · Provide comments regarding the cost estimate reasonableness and any limitations.

Transgrid Cost Estimate Summary



Review Findings

The Augmentation cost estimate is based on a more mature design with site investigations, while the Transposition estimate relies solely on a desktop survey. This distinction is considered in the review.

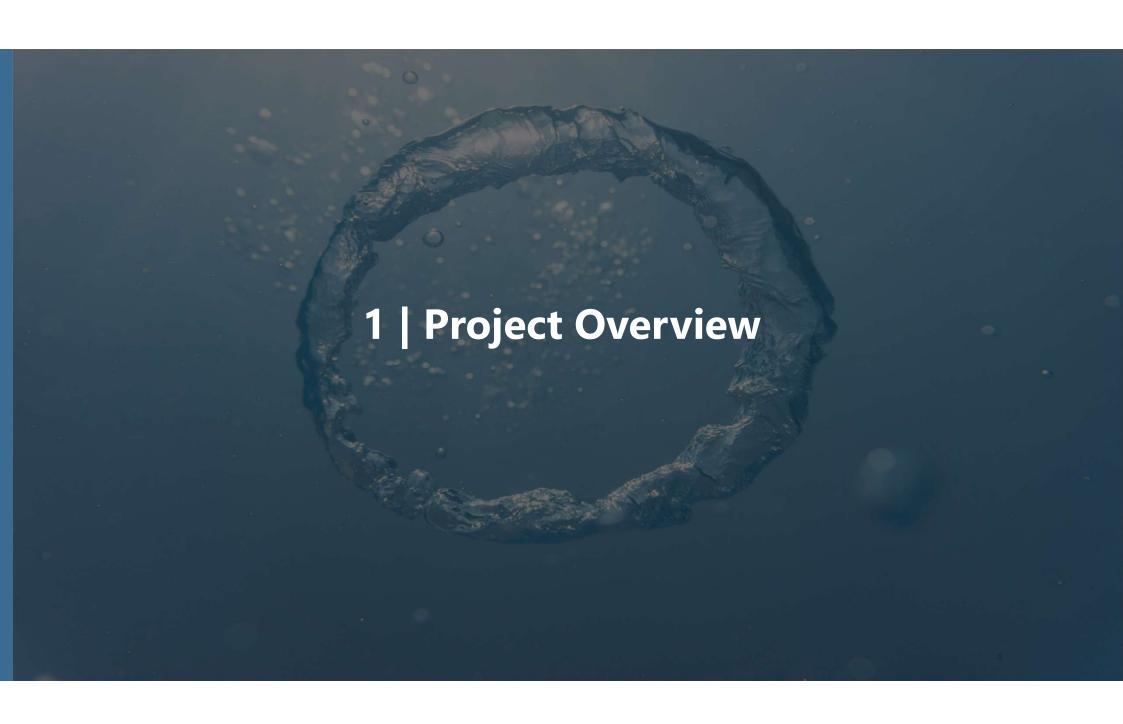
The design envelope used to determine the area of disturbed land that may require biodiversity offsets is considered appropriate for the construction activities, however for access tracks 10m width may be more suitable than the designated 6m to accommodate plant access.

The cost estimation methods are generally well-documented, and selecting the expected case scenario for Augmentation biodiversity offset costs is reasonable given Transgrid's requirement to recover only prudent and efficient costs. The approach adopted to allocating credit prices was to select the closest matching OTG or species and closest subregion to the subject land and most recent BC Charge quote available.

The RFI process has substantiated the costings in the Expected Case Scenario, with justifications based on offset BSA land requirements, past project experience, and regional land price variations. While minor inconsistencies were identified, the calculation values in the spreadsheets and tables produce an accurate total cost estimate with minimal errors.

Transgrid has included appropriate contingencies for additional impacted area, additional offset credits and credit price escalation the Augmentation works. Transgrid have not included contingencies for the Transposition works because of the conservative nature of the estimate and alternative approval pathway for the works.





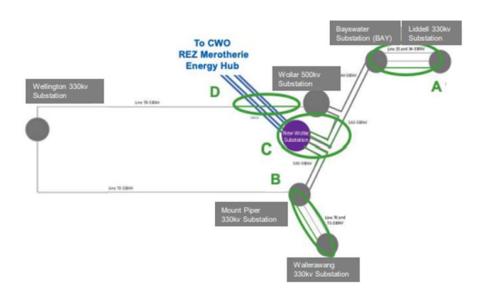
Part 1: Project Overview

Introduction and Project Scope Details

The Central-West Orana (CWO) Renewable Energy Zone (REZ) transmission project involves the construction of new transmission lines, energy hubs, switching stations and related infrastructure. The new REZ network infrastructure will enable renewable energy from solar, wind and storage projects to be distributed to energy consumers across the State via the existing NSW transmission network.

The CWO REZ was formally declared by the Minister for Energy and Environment under section 19(1) of the Electricity Infrastructure Investment Act 2020 (the Act) and published in the NSW Gazette on 5 November 2021. The REZ declaration was the first step in formalising the REZ under the Act and establishes EnergyCo as the Infrastructure Planner responsible for coordinating the development of the REZ. Transgrid has been appointed to deliver the non-contestable scope of the CWO REZ. Non-contestable projects fall under the Transmission Efficiency Test (TET) issued by the AER in April 2023.

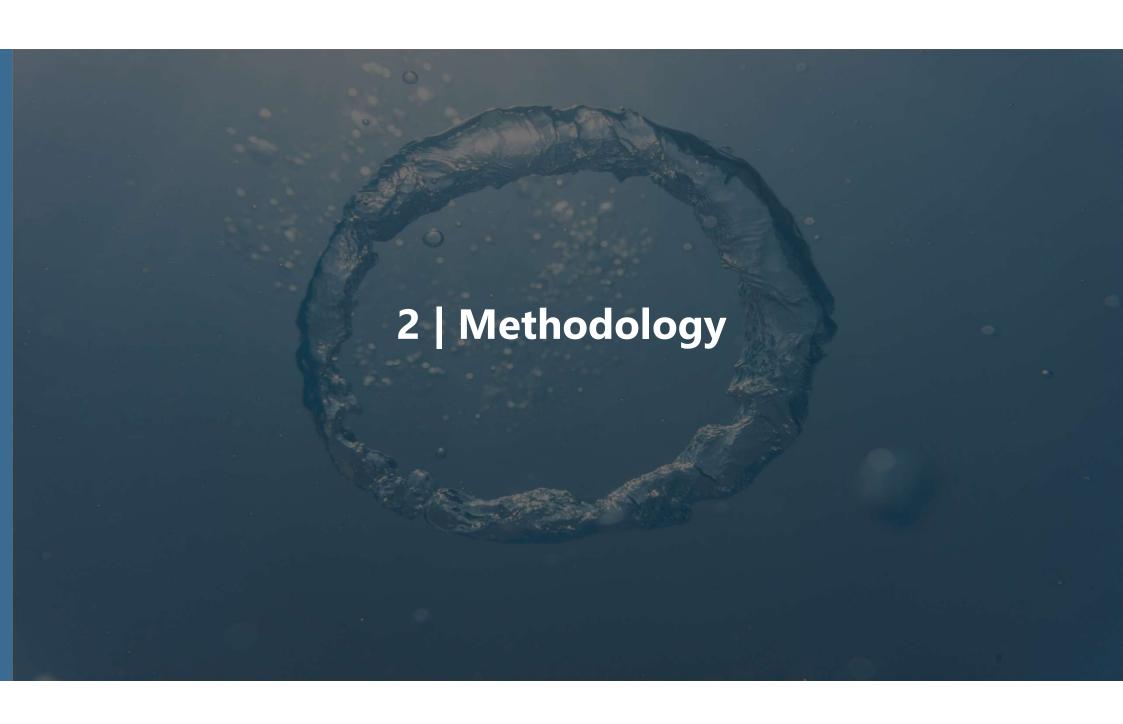
Transgrid has engaged E3 Advisory to perform an Independent Verification of the cost estimate of the biodiversity offset cost component of their CWO RRZ Revenue Submission to the Australian Energy Regulator (AER).



The Non - Contestable works is defined as:

- A. 330kV Transmission Line arrangement works from Transgrid's existing Bayswater Substation to Transgrid's existing Liddell Substation, consisting of modifications to existing transmission lines and new assets at the substation.
- B. 330kV Transmission line from Transgrid's existing Mt Piper Substation to Transgrid's existing Wallerawang Substation, consisting of a new transmission line and augmentations at the substations.
- C. Wollar Cut In Works, including modifications to existing 500kV transmission line as well as remote ends works at Bayswater, Mt Piper and Wollar 500/330kV substations
- D. Facilitation of construction outages for TL79 overcrossings (no <u>construction works</u> <u>by Transgrid as part of this scope</u>)





Part 2: Methodology

The Scope of the Services

Transgrid engaged E3 Advisory to carry out an independent verification of the biodiversity offset costs for the CWO REZ Project.

The objective of the review is to assess:

- The approach and processes used by Transgrid in developing the cost estimate
- Provide comments regarding the cost estimate reasonableness and any limitations

The review does not include an assessment of whether the biodiversity offsets proposed comply with the applicable legislation and guidelines.

Cost Review Approach

E3 Advisory used a systematic approach comprising the following key steps:

- Review Project Documentation: Gather and review all relevant project documentation, including cost estimate, reports, project plans and specifications.
- **2. Review the Land Area Requiring Offsets:** Check that the area needed for biodiversity offsets is the land area needed for both the final installed infrastructure and construction activities.
- **3. Review Offset Unit Rates:** Check the basis for the unit rates for both ecosystem and species credits.
- **4. Cost Estimate Calculation Review:** Check the basis for the cost estimate calculations.
- **5. Review Contingency and Escalation:** Evaluate the reasonableness of contingency and any proposed escalation factors.
- **6. Document Findings:** Document the findings of the cost review, including any discrepancies or areas of concern.

Source Data used in E3 Advisory's review

The source data provided by Transgrid containing the cost inputs used in E3 Advisory's review are summarised in table below.

Document / filename	Description of data
BIO1_12612502-REP-0_Mt Piper AER Biodiversity offset cost estimate_Item1	Augmentation biodiversity offset cost report for Mount Piper to Wallerawang transmission network project
BIO2_Rapid Desktop Assessment ARM Trial Biodiversity_20250304_Item1	Transposition biodiversity offset cost desktop study-CWOREZ ARM trial works Access Tracks
BIO5_Rapid Desktop Assessment_Str169_Biodiversity_20250304_Item1	Transposition biodiversity offset cost desktop study-CWOREZ 5A3/5A4 Structu 169 & Access Tracks
BIO7_Rapid Desktop Assessment_Str356_Biodiversity_20250304_Item1	Transposition biodiversity offset cost desktop study-CWOREZ Line 5A3/5A5 Structure 356 & Access Tracks
BIO8_Rapid Desktop Assessment_Str432_Biodiversity_20250304 final_Item1	Transposition biodiversity offset cost desktop study-CWOREZ Line 5A3/5A5 Structure 432 & Access Tracks
BIO9_Rapid Desktop Assessment_Str82_Biodiversity_20250304_final_Item1	Transposition biodiversity offset cost desktop study-CWOREZ Line 5A3/5A4 Structure 82 & Access Track
BIO10_Rapid Desktop Assessment_WOL_Biodiversity_20250303_Item1	Transposition biodiversity offset cost desktop study-CWOREZ "WOL, Line 5A4/5A5 Structure 263A & Access Track
Mt Piper_Offset cost estimate_V2.4	Augmentation cost basis of estimate calculation sheet
web-report-bcf-charge-quotes-to-march-2025	BCF Charge Report V8-March 2025 used to extract credit costs
Attachment 1-Direct Non-Labour Model-Biodiversity	Summary for Augmentation and Transposition costs with relevant indexation multipliers applied (24-26 or 25-26)
CWOREZ_BCF_evidence_20250326	Transposition BCF Credit Cost mapping quote IDs to the BCF Charge Report
CWOREZ_V2.1_20250213-for Biodiversity Offset Calculation	GIS file highlighting the relevant Transposition envelope areas basis of estimat
ProjectFootprint_20250228	GIS file highlighting the relevant Augmentation envelope areas basis of estima
SubjectLand_202410	GIS file highlighting the relevant Augmentation envelope areas basis of estima





Project Description

The project scope for review is divided into two main categories: Augmentation and Transposition.

The Augmentation works involve significant upgrades to the transmission line network between Mount Piper and Wallerawang substations, which include the construction of a new 330kV transmission line and the installation of double-circuit transmission structures. These upgrades increase the capacity and reliability of the transmission system, requiring substantial planning and environmental assessments, including the calculation of biodiversity offset costs to mitigate any environmental impact caused by the construction activities.

Additionally, the Transposition works involve the relocation and modification of transmission infrastructure across six separate locations. The biodiversity offsets for these works are distributed across these locations, each requiring specific environmental management and mitigation measures to address the impact on local ecosystems. These offsets are a critical part of ensuring that the project complies with environmental regulations and minimizes ecological disturbances.

The Augmentation cost estimate was developed by GHD, with detailed summary costs provided in the report titled "BIO1_12612502-REPO-0_Mt Piper AER Biodiversity Offset Cost Estimate_Item1," dated 17th December 2024. The underlying basis for these calculations is provided in the accompanying spreadsheet, "Mt Piper_Offset Cost Estimate_V2.4." This document outlines the assumptions, methodologies, and data sources used to calculate the biodiversity offset costs for the Augmentation works.

For the Transposition works, the cost estimate was completed through a Desktop Survey conducted by TransGrid, covering the nine separate locations identified in the reports **BIO2** through **BIO10**. The mapping of Biodiversity Credit Fund (BCF) credit charges associated with the biodiversity offset costs is further explained in the spreadsheet titled "**CWOREZ_BCF_Evidence_20250326**." This spreadsheet details the data and assumptions used in the estimation of the biodiversity offset costs for the Transposition works, including the relevant environmental factors specific to each of the locations.



Cost Estimate Summary (Indexation for 2026)

Description	Estimate \$ (2026 dollars)	% of Total cost

Description of main cost elements

The Augmentation cost estimate accounts for ecosystem and species credit costs and includes several contingencies: impact contingency applied to the subtotal of ecosystem and species credits assessment contingency compounded on the combined total of ecosystem credits, species credits, and the impact contingency. Additionally, a indexation is applied to the BCF portion of credits to reflect increases in the BCF charge rate.

The Augmentation estimated biodiversity offset costs for the expected case scenario in 2024 (Transgrid have applied a conversion to provide a 2026 estimate

The Transposition cost estimate consists of a number of desktop studies which include ecosystem & species credit costs and involves no contingency.

Transposition estimated biodiversity offset costs in 2025

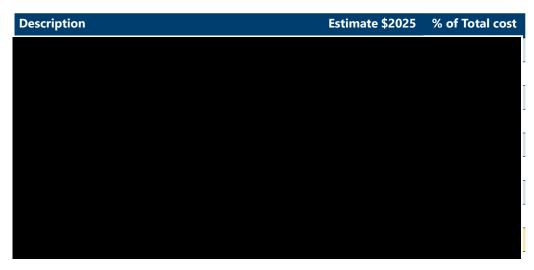
Transposition estimated biodiversity offset costs in 2025

Conversion to provide a 2026 estimate

Augmentation Cost Estimate Summary



Transposition Cost Estimate Summary





Review the Land Area Requiring Offsets

The design envelope area refers to the physical area of the CWO Transgrid works (for both the Augmentation and Transposition) where biodiversity offsets may be required to compensate for species and ecosystems impacted by land disturbance and removal. To reflect the total cost of the biodiversity offsets the envelope needs to include the spatial footprint of not only the installed transmission infrastructure (towers, access tracks and easements) but also the spatial footprint of construction activities and any temporary works.

The design envelope areas for both Augmentation and Transposition are contained within the following KMZ files-CWOREZ_V2.1_20250213-for Biodiversity Offset **Calculation**, ProjectFootprint_20250228, **and** SubjectLand_202410.

The design envelope areas were individually verified using the "polygon" and "path" measuring functions in ArcGIS to ensure accuracy in the basis of estimate. This validation process involved cross-checking the reported areas against geospatial data to confirm consistency with the design specifications. During independent validation, the measured tolerance of the values stated in the reports, and the Augmentation areas differed by which is considered an acceptable margin of error for this analysis.

The design envelope areas include offset land envelopes and access tracks, with each design envelope referenced against the State Vegetation Type Map (SVTM) prepared by the Department of Planning and Environment under Part 5A of the Local Land Services (LLS) Act. The SVTM's categorisation of each land parcel, as referenced within each BIO report, is clearly stated in the build-up of the ecosystem credit basis of estimates.

Finding/s:

1. The design envelope is considered reasonable. The envelope is consistent with a 60m wide 330kV transmission line easement and 6m width for access tracks. The design envelope also makes allowance for crane and EWP pads. More area may be disturbed with the creation of the access tracks (10m width may be necessary) then the 6m with allows however a contingency for additional disturbed land is included in the estimate.



Review Offset Unit Rates

The cost estimate is built up with biodiversity credits for ecosystems and species with the unit rates from the BCF (Biodiversity Conversation Fund) Credit Charge Report. The Report contains all Biodiversity Conservation Fund (BCF) charge quotes provided to applicants during the period of the report (every quarter). Therefore, it represents the most accurate estimated unit cost for each credit type for a proponent such as Transgrid.

The BCF Charge Report prices do not include a risk premium or delivery fee. The BCT applies a risk premium of between 9% and 18% to most credit types, intended to cover the potential risk of not being able to deliver credits at the predicted charge. Additionally, the BCT charges a delivery fee of 5% or \$120, whichever is greater, to help cover its delivery costs. To account for this, both GHD and Transgrid have applied premium to each raw credit price.

Transposition

For the Transposition works, pf the credit costs were allocated to purchasing credits, which is considered a conservative approach.

Additionally, for the Transposition works, an Offset Trading Group (OTG) credit price

average was applied by TransGrid due to the absence of a specific credit price for the IBRA sub-region in which the Mt Piper project is located in the BCF charge report.

Augmentation

For the Augmentation works, there is a high case estimate

and an expected case scenario

Transgrid has clarified that the high case

scenario is designed to provide a worst-case scenario, offering a framework for assessing biodiversity offset delivery risks. In contrast, the expected case scenario aims to provide a realistic, best point-in-time estimate of likely offset delivery costs, while identifying the approach and constraints necessary for prudent and efficient offset delivery. The expected case scenario was used for the Transgrid overall cost estimate. It is anticipated that Transgrid would include the difference between the high case and expected case scenario as a risk allowance.

High Case Scenario

The high case scenario assumes that

the affected ecosystem and species credits have been matched with the corresponding BCF Charge Report prices

estimated envelopes to determine the final subtotal biodiversity offset cost. Impact, Assessment, and Credit Price indexation contingencies are then applied to this subtotal.



Review Offset Unit Rates

Expected	Case	Scen	ario
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The expected case scenario aims to	
TransGrid explained that the	was determined based on several key assumptions. Major linear projects like the Mt Piper project typically affect various landscapes and
ecosystems, making it challenging to	ofully offset liabilities with land-based offsets alone

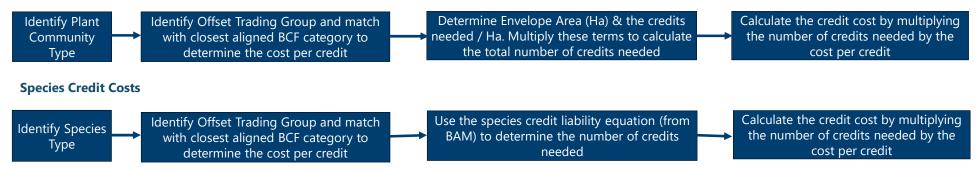
Finding/s:

- 1. The use of BCF Credit Charge Report for biodiversity offset credit rates is considered a reasonable basis for determining the total biodiversity offset costs. The rate of change of these credit rates is relatively stable for most ecosystem and species credit charges.
- 2. Transgrid has provided justification for the between BSA/Credit Price costings in the Expected Case Scenario (based on past project experience and land prices in the west of NSW versus the east).

Cost Estimate Calculation Review - Transposition

Transgrid have used the following parameters to calculate the offset credits for ecosystem and species.

Ecosystem Credit Costs



The following sources were used by Transgrid to determine the values for these parameters:

- Envelope Area: Based on the design envelope drawings supplied. In each Transgrid report the distinct area in Ha is given.
- Plant Community Types: Based on State Vegetation Type Maps (SVTM) which allows classification of offset ecosystem credits per hectare.
- **Credit unit rates:** Based on the BCF Charge Report
- Species Credit Liability Equation: The Biodiversity Assessment Method (BAM) is used for envelopes with an identified species.

The Species Credit Liability equation is: $SCL = \sum_{i=1}^{n} HC_{i} \times HL_{i} \times BRW_{i} \times C$

Hci = Habitat Condition Score; HLi Habitat Loss Score, BRWi – biodiversity Restoration Work Factor, C = Species Threat Factor

- Assumptions and clarifications for ecosystem credits: Based on the Biodiversity Conservation Act 2016 and the Biodiversity Conservation Act 1999

Finding/s:

1. The calculation methods and sources used to develop the Transposition cost estimate is clearly stated and the relevant source material has been provided.



Cost Estimate Calculation Review - Augmentation

Sources

The sources for these Augmentation calculations align with those used for the Transposition calculations in the preceding slide, except for a few referenced in Mt_Piper_Offset_cost_estimate_V2.4: "Industry advice about price for species credits" and "GHD Client BC Fund quote".

Cost Component Methodology-High Case Scenario

The High Case Scenario adopts the same methodology as the Transposition calculations in the previous slide, where both ecosystem and species credit costs are determined using

The High Case Scenario is considered the more conservative option, as it accounts for potential cost escalations and uncertainties associated with biodiversity credit markets, with additional contingency applied, as explained in the subsequent slides.

Cost Component Methodology-Expected Case Scenario

The Expected Case Scenario adopts a blended approach to the cost estimation, combining elements from both the High Case and BSA models. In this scenario, of the credits are allocated using the High Case Scenario methodology, which incorporates the conservative assumptions and cost component breakdowns of the BCF credit charges. This ensures that a portion of the land is accounted for with higher cost considerations, reflecting the potential for escalations and market uncertainties.

By blending these two approaches, the Expected Case Scenario seeks to offer a balanced and realistic estimate that reflects both the potential for higher costs in some areas and the stability offered by the BSA model.

Finding/s

- 1. Transgrid has selected the expected case scenario for the augmentation biodiversity offset costs. This is considered a reasonable approach given Transgrid is only able to recover costs that are considered prudent and efficient. Transgrid should consider inclusion of the difference in costs between the high case and expected case as a risk allowance in its overall cost estimate.
- 2. The calculation methods and sources used to develop the Augmentation cost estimate is clearly stated and the relevant source material has been provided.



Detailed Calculation Review-Augmentation & Transposition

Detailed Calculation Checks

The following minor discrepancies in calculations has been identified from a detailed review of the documents as highlighted below:

- **-BIO3_Rapid Desktop Assessment_MTP_Biodiversity_20250304_Item1:** There is an omission of the **Eucalyptus cannonii / Capertee Stringybark.** This approach is inconsistent with the methodology applied to the other transposition BCF credit cost rates.
- -Attachment 1-Direct Non-Labour Model-Biodiversity: The equation in Cell H39 of the Summary Tab should read sum (H36:H38) to provide an accurate subtotal of transposition species credit costs.

CWOREZ_V2.1_20250213-for Biodiversity Offset Calculation: It is recommended that the substantiation be reviewed to confirm that the BCSS Winch Site Area, encompassing five zones as delineated in the GIS data, is unequivocally located outside the designated envelope area within the Wollar-Disturbance Area (BIO10).

Finding/s:

- 1. Several minor inconsistencies were identified, however the calculations in the provided spreadsheets and tables produce the correct total cost estimate with minimal errors.
- 2. For the augmentation works, the approach adopted to allocating credit prices was to select the closest matching OTG or species and closest subregion to the subject land and most recent BC Charge quote available if there were multiple matching quotes over time as listed in the BCF Charge Report V5 July 2024.



Review Contingency and Escalation

Augmentation

The following contingencies have been applied by GHD in report BIO1_12612502-REP-0_Mt Piper AER Biodiversity offset cost estimate_Item1:

	applied to the subtotal of the ecosystem and species credit costs).
-	for changes to vegetation zone or species polygon mapping, threatened species listings, survey and assessment guidelines or associated BAM calculator metrics that increase the credit obligation. is compounded on the subtotal of the ecosystem and species credit costs, and
-	based upon the BCT's published rate to pay into the BCF via a BCF Charge Quote. A Charge Quote will be sought from the BCT prior to project
	approval in order to inform calculation of the bank guarantee required to secure two-year deferral of the offset liability. Accordingly, a total of two year's indexation has been
	applied to the High Case estimate. Transgrid has justified the Annual Index by referencing the BCT guidance, attributing it to a combination of Management Cost Index of
	(based on ARS indices over the 10 years to March 2024) and a Land Value Index of (derived from Rural Rank's 20-year data on rural property values in NSW)

for additional credits for indirect **impacts**, prescribed impacts or impacts on key fish habitat (as required under the NSW Fisheries Management Act 1994).

Transposition

Transgrid have not applied any contingencies for the Transposition works providing the following justification:

- Transposition works are subject to an alternate approval pathway to the augmentation works, whereby Transgrid self-approve the project as an Authorised Network Operator (ANO) under the Electricity Network Assets (Authorised Transactions) Act 2015. Clause 3(3) and Schedule 1(4) of the EP&A Regulation prescribes ANOs to be Part 5 determining authorities for development for the purposes of an electricity transmission or distribution network. This means Transgrid can self-assess and self-determine activities that are not likely to significantly affect the environment and are conducted by or on behalf of the ANO for the purpose of electricity transmission or distribution.
- Transposition contingencies would thus only be required if the works are likely to significantly affect biodiversity values (and thus required to be assessed under the NSW Biodiversity Offset Scheme). The likelihood of a significant impact upon any entity because of the proposed Transposition works is highly unlikely. However, as no field assessment has been conducted, the chance of a significant impact can not be ruled out entirely. Subsequently, we have provided high-level (desktop) assessment of likely worst-case biodiversity offset cost scenarios for the Transposition works to cover this risk. Given the low likelihood of the risk occurring at any single location (let alone all locations), the proposed biodiversity offset budget is considered as sufficient to cover any cost-escalation should the project be pushed into the NSW Biodiversity Offset Scheme.

<u>Finding/s</u>

- 1. Transgrid has included appropriate contingencies for additional impacted area, additional offset credits and credit price escalation the Augmentation works.
- 2. Transgrid have not included contingencies for the Transposition works because of the conservative nature of the estimate and alternative approval pathway for the works.



Review Findings

A summary of the findings and recommendations for the CWO REZ biodiversity cost estimate is presented in the table below

Review Area	Finding Description
Review the Land Area Requiring Offsets	The design envelope is considered reasonable. The envelope is consistent with a 60m wide 330kV transmission line easement and 6m width for access tracks. The design envelope also makes allowance for crane and EWP pads. More area may be disturbed with the creation of the access tracks (10m width may be necessary) then the 6m with allows however a contingency for additional disturbed land is included in the estimate.
Review Offset Unit	The use of BCF Credit Charge Report for biodiversity offset credit rates is considered a reasonable basis for determining the total biodiversity offset costs. The rate of change of these credit rates is relative stable for most ecosystem and species credit charges.
Rates	Transgrid has provided justification for the prices in the west of NSW versus the east).
	The calculation methods and sources used to develop the Transposition cost estimate is clearly stated and the relevant source material has been provided.
Cost Estimate Calculation Review	Transgrid has selected the expected case scenario for the augmentation biodiversity offset costs. This is considered a reasonable approach given Transgrid is only able to recover costs that are considered prudent and efficient. Transgrid should consider inclusion of the difference in costs between the high case and expected case as a risk allowance in its overall cost estimate.
	The calculation methods and sources used to develop the Augmentation cost estimate is clearly stated and the relevant source material has been provided.
Detailed Calculation	Several minor inconsistencies were identified, however the calculations in the provided spreadsheets and tables produce the correct total cost estimate with minimal errors.
Check	For the augmentation works, the approach adopted to allocating credit prices was to select the closest matching OTG or species and closest subregion to the subject land and most recent BC Charge quote available.
Paviou Contingen	Transgrid has included appropriate contingencies for additional impacted area, additional offset credits and credit price escalation the Augmentation works.
Review Contingency and Escalation	Transgrid have not included contingencies for the Transposition works because of the conservative nature of the estimate and alternative approval pathway for the works.

Appendices

Appendix A – Transgrid Easement Areas

Appendix A: Cost Estimate Review

TransGrid-Easement Guidelines-Living and working with electricity transmission guidelines

Figure 1 Represents the easement widths for varying voltage levels and tower types.

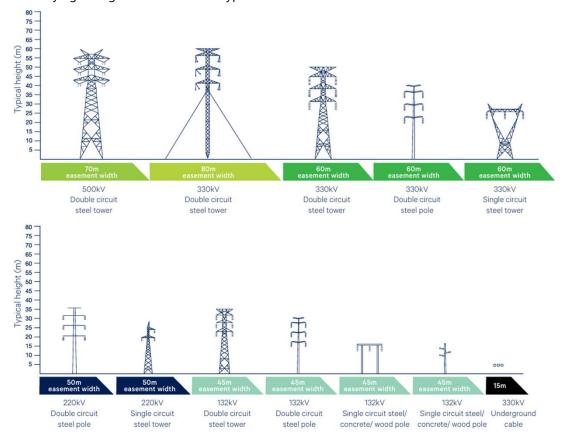


Figure 1: Figure not to scale. Typical easement widths only, may vary on a case-by-case basis. Typical height to be considered in the graph, actual size of tower can vary based on topography, location and conditions. It is best practice to engage a solicitor to check your land title for the exact location of an easement on your property.





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