Meeting System Strength Requirements NSW

Hybrid Revenue Proposal

Transgrid

31 March 2026

→ **The Power of Commitment**

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Executive summary

System strength is defined by Australian Energy Market Operator (AEMO) as “the ability of the power system to maintain and control the voltage waveform at any given location in the power system, both during steady state operation and following a disturbance”[1]. System strength is a key component of power system security, particularly as the grid accommodates increasing levels of Inverter-Based Resources (IBRs). Recognising this, the Australian Energy Market Commission (AEMC) introduced a new system strength framework under the National Electricity Rules (NER). This framework requires Transmission Network Service Providers (TNSPs) to meet a System Strength Planning Standard at designated nodes on their networks using “reasonable endeavours”. This obligation means TNSPs must proactively plan and take appropriate steps to procure system strength prudently and efficiently.

In NSW, Transgrid has been designated as the System Strength Service Provider (SSSP) responsible for meeting these obligations. Planning for meeting this obligation is summarised in Transgrid's System Security Roadmap[2] and is evidenced in the progression of the project to deliver system strength services in NSW has progressed through the Regulatory Investment Test for Transmission (RIT-T) process. Transgrid published their Meeting System Strength Requirement in NSW Project Assessment Conclusions Report (PACR) in July 2025, which represents the final stage of the RIT-T process.

The NSW Electricity Infrastructure Roadmap, released in November 2020, sets out a 20-year plan to transform the State’s electricity system and enable the transition to renewable energy. The roadmap is supported by the Electricity Infrastructure Investment Act 2020 (EII Act), which establishes the regulatory framework for planning, authorising, and funding major transmission projects.

The Australian Energy Regulator (AER), as the appointed regulator under the EII Act, is responsible for determining whether the costs associated with non-contestable network infrastructure projects are prudent, efficient, and reasonable.

In September 2025, by Ministerial Order the System Strength Project (SSP) was declared as a Priority Network Infrastructure Project (PNIP) bringing the project under the EII Act. This allows the acceleration of the procurement of Synchronous Condensers (Syn Cons), to be delivered at five of Transgrid substation sites across NSW as a PNIP.

Under the AER’s Revenue Determination Guideline for NSW Contestable Network Projects August 2022, reliance is placed upon the conduct of a competitive assessment process. Where the AER are satisfied that the process was genuine and appropriate, Transgrid can submit a Revenue Proposal (Hybrid Revenue Proposal) consistent with the outcome of that competitive assessment process. In this case the procurement of Syn Cons was overseen by NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW).

[1] AEMO. (2022, September). System Strength Requirements Methodology
[2] Transgrid. (2023, July). System Security Roadmap

The contestable scope is defined by the Ministerial Order, but in summary includes the procurement of the Syn Cons. The non-contestable scope, as defined in the Ministerial Order (12 September 2025[3]), comprises the following functions:

– Procurement and management of the contestable elements
– Other works necessary to commission the Syn Cons, and owning, operating and performing day-to-day maintenance functions for the Syn Cons as the network operator

The project fulfils SSSP obligations, supports economic stability and is a complex, technically novel (in NSW) at this scale and the work will take place on live substations which are important nodes on Transgrid's network.

Transgrid engaged GHD to perform an independent verification and assessment of the non-contestable Capex and Opex forecast of the Hybrid Revenue Proposal. This considered whether the capital costs forecast for development and construction for the SSP and the operating costs forecast are prudent, efficient and reasonable

Capex

The non-contestable forecast and pre-period labour costs aligns with the Ministerial Order, and represents a prudent, efficient, and reasonable forecast based upon the best information available at the time of the Hybrid Revenue Proposal submission. Further detail is provided in the table below.

Table 1 Summary of GHD's Capex assessment of non-contestable scope ($M Real 2025-26)

Forecast component	GHD's considerations	Section reference	$M
Labour and indirect costs	**Pre-period costs** Pre-period costs $35.7M ($ Real 2025-26) include RIT-T and project development activities. RIT-T costs include the work involved in the identification of the investment need and the analysis of credible options to determine the preferred portfolio solution. These costs align with the Ministerial Order and are required to progress the project and mitigate risks. Similarly, project development costs are also required to progress the project and represent prudent Front-End Loading (FEL) activities design to develop the project definition and reduce risk. They align with the Ministerial Order and represents expenditure that would normally be capitalised. GHD considers that this expenditure was prudent as it was required to progress the project, reduce risk, and is usually incurred by project proponent at this stage to develop the project and to demonstrate regulatory investment approval. Benchmarking the labour and indirect costs component against comparative projects supports efficiency demonstration, please refer to section 0. The expenditure aligns with the Ministerial Order, related to the carrying out of the network infrastructure project, which qualified as pre-period costs. **Forecast** The labour forecast is based upon Full Time Employee (FTE) roles required to deliver the projects stream objectives with the FTE profile phased to align with the projects schedule. Labour rates applied to roles benchmark well against the Electrical Power Industry Award.	Section 7	215.4[4]

[3] State of New South Wales. (2025, September), NSW Government Gazette No 376 of 18 September 2025
[4] Excludes real labour cost escalation

Forecast component	GHD's considerations	Section reference	$M
	Oncosts applied are consistent with past Transgrid Integrated System Plan (ISP) projects and Renewable Energy Zone (REZ) Network Infrastructure Projects (RNIP) projects. Benchmarking was performed by GHD, however, because of the unique nature of a project, greater reliance was placed on the robustness of the bottom-up build. The bottom-up build includes the FTE numbers and roles required to deliver the project and reduce risk during delivery, supporting prudency. The rates applied to FTE roles are based upon Transgrid's current costs that align with the Electrical Power Industry Award demonstrating efficiency. Reasonableness is supported by the prudency and efficiency demonstration detailed above and by the fact that Transgrid is the SSSP in NSW and is obliged to fulfil this jurisdictional role. GHD notes that Transgrid's workforce determination ends on the 1 of March 2027. Resulting outcomes may exceed current assumption underpinning wage indexing. **Other costs** The other support and corporate forecast include $5M for shared portfolio-level support costs that enable project delivery but not directly attributable to a single project. These are improvement initiatives associated with Class B projects. The forecast also includes an additional $7.3M for training and capability uplift, commissioning, and testing support functions proportioned to the Syn Con project. Whilst these provisions are considered prudent given market capacity risks related to specialist resources, these costs have been highlighted.		
Risk allowance costs	The total provision of $18.4M represents an efficient and proportionate allowance for residual risks that remain after applying feasible controls. This provisioning approach aligns with the AER's guidance on prudent risk allocation and ensures that the delivery of the SSP can proceed with an appropriate level of cost and schedule protection while maintaining value for consumers. The overall risk allowance aligns well with other suitable benchmarking of risk allowances for project of similar characteristics. The P50 risk allowance created represent residual risks allowances estimated based upon the best available information at the time of forecasting. This includes commissioning and integration risks, adverse weather beyond contract allowances, additional network modelling and noise attenuation. Risk allowance of residual risks is prudent and in line with risk allowance methodologies used on other ISP projects. Efficiency is supported by the by the assessment of the assumptions and inputs used in determining the allowance for residual risk. Reasonableness is supported using similar provision and benchmarking alignment with other ISP and PNIP projects.	Section 5	18.4
Equipment	The incremental need for equipment (substation & secondary systems) is supported by Single Line Diagrams (SLD)s and Basis of Design (BoD)s with costings supported by issued Purchase Orders (PO)s under existing panel agreements. The step-up transformers (between the Syn Con and the transmission substation) are included within the Syn Con package (OEM Scope of works) and are considered contestable and outside the scope of this review. As are the following costs associated with the D&C contractor's scope, considered to be contestable: – Busbars, droppers, civil platforms, drainage, foundations, and primary structures associated with the switching bays required to connect the Syn Con at the substation	Section 4.1	10.3

Forecast component	GHD's considerations	Section reference	$M
	– Cabling (within the control room and between the control room and primary plant), ancillary materials, panel integration, inter-panel wiring, and integration with existing secondary systems at the relevant substations. Excluding equipment provided by the (OEM Scope of works) and items that fall under the D&C contractor, the residual equipment identified in the estimate are prudent as they are required to implement the acquired Syn Cons, required to satisfy SSSP obligations. Efficiency is supported as the estimate is based upon supplier panel rates that were established through procurement processes. The expenditure is considered to be reasonable as it is required to complete the project and required to satisfy SSSP obligations.		
Buildings	Additional storage yard space at Newcastle, with the capex estimate supported by market quotes. Based upon the work that GHD is supporting on the development of the capital plan for 2028-33 we understand that building / storage requirements for large projects needs be to be reflected within the project's capex estimate. We also know that additional building / storage is required given present capacity constraints and the additional demand that will flow from the 2028-33 capital plan. As such the expansion is considered prudent from a risk perspective to preserve spares in an acceptable condition with efficiency supported by the independent cost estimates used. Reasonableness is supported by the demonstration of prudency and efficiency and the need to warehouse spares in a way that reduces risk.	Section 4.2	7.1
Fleet acquisition	Vehicle requirements (below materiality threshold).	Section 4.3	0.6
Infrastructure planner fees	Payments required under the Underwriting Agreement, reflecting the cost of Infrastructure Planner's statutory role in coordinating and overseeing delivery of the Project.	Section 6	**7.8**
Total			**259.6**

Opex

Transgrid have provided transparent bottom-up build of the Opex to support the Syn Con installation and ongoing prudent management over its asset life cycle. Noting that Transgrid have utilised their existing systems and standards to develop these forecasts which are underpinned by their existing management systems including accreditation to ISO 55001.

The bottom-up build is robust, based upon incremental activities required and are needed to manage life cycle risks and regulatory obligations. Cost components are based on current rates and past material requirements. Reasonableness demonstration is supported by the need to undertake these activities to manage risk and regulatory obligations and by the robustness of the bottom-up build supporting the forecasts.

Table 2 Summary of GHD's Opex assessment ($M Real 2025-26)

Forecast component	GHD's considerations	$M
Maintenance costs	The material elements of maintenance costs, (substation maintenance $9.5M which represents 87.2% of the total maintenance forecast) is supported by workforce planning projections that indicate ongoing shortages in specialist resource requirements. This supports the need for incremental FTEs included within the estimates bottom-up build. The activities in the bottom-up build of the maintenance forecast are considered prudent as they are required to manage lifecycle risks and protect system security outcomes.	10.9

Forecast component	GHD's considerations	$M
	Efficiency is reflected in the bottom-up build by forecasting by identified tasks at current costs with the activities required to support availability of the added equipment. Reasonableness is supported by need to adhere to OEM requirements to periodically inspect and maintain the machine, and to achieve the service value across the asset life cycle.	
Operating costs	The operating cost forecast is based on the following elements: **Asset management $5.8M** – This represents the establishment costs of an asset management framework for the Syn Cons. This work is necessary to ensure the assets are managed safely and reliably in accordance with Transgrid's ISO55001-certified Asset Management System, their licence and regulatory obligations and the obligations under the LTSA. This is prudent because they establish the minimum governance, asset data, strategies and monitoring required to manage lifecycle risks and protect system security outcomes. This is efficient because it prioritises preventative and condition-based practices that reduce avoidable defects, unplanned outages and reactive maintenance costs over time. This is reasonable because it is limited to incremental tasks created by the Syn Cons. GHD notes the estimate build assumes approximately the same cost for the first framework establishment and the following four sites. As this is a new competency, the assumption of incremental FTEs is supportable. **Delivery maintenance $6.9M** The bottom-up build includes reasonable assumptions and views the resources as incremental and required to support the delivery of the works programs associated with the Syn Con asset, management of corrective works, outage obligations and LTSA obligations that fall under Transgrid's responsibility. These activities reduce risk and are therefore considered prudent. Given these are new tasks spread across five sites the assumption of incremental resources is reasonable. Efficiency is supported by the robustness of the bottom-up build based upon identified activities and application of current costs. Reasonableness is supported by the resulting risk reduction and the robust estimate build. **Network planning $0.8M** – These costs relate to the development and delivery of GPS compliance frameworks. Most of these costs would be consumed in the framework development and given the specialised nature of these they are typically outsourced as Transgrid has done on other complex assets. This supports the incremental nature of the bottom-up build of the forecast. The costs forecasted are considered prudent as GPS compliance represents a regulatory obligation, which in this case, also supports system security outcomes. Demonstration of efficiency has been assessed against what GHD would normally bill for the provision of a GPS compliance framework and a view of the costs required to perform manual testing required within that framework. **Network operations $1.9M** – This estimate includes outage management, alarm investigation and reporting activities. Based upon the work GHD has been delivering on development of the 2028- 33 revenue submission, outages represent a key risk to program delivery. In GHD's opinion the function is under resourced for the risk present based upon interviews with the function. This supports the incremental nature of the bottom-up build. The activities are considered prudent as they support network stability. The forecasts efficiency is supported using current costs. **Regulatory submissions $3.7M** – Additional costs associated with regulatory requirements. **Overall** The bottom-up build is transparent, robust, based upon incremental activities required and are needed to manage life cycle risks and regulatory obligations. Cost components are based on current rates and past material requirements. Reasonableness demonstration is supported by the need to undertake these activities to manage risk and regulatory obligations and by the robustness of the bottom-up build supporting the forecasts.	18.9

Forecast component	GHD's considerations	$M
Insurance costs	Incremental insurance costs	2.8
Real labour cost escalation	-	0.8
Total Opex excluding debt raising costs		**33.4**

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.3 and the assumptions and qualifications contained throughout the Report.

Glossary

Term	Description
A	Ampere
AC	Alternating Current
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
ANS	Ancillary Network Services
BC	Best Case
BoD	Basis of Design
Capex	Capital expenditure
CPA	Contingent Project Application
CPI	Consumer Price Index
D&C	Design and Construct
DC	Direct Current
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DNSP	Distribution Network Service Provider
EBA	Enterprise Bargaining Agreements
EII Act	Electricity Infrastructure Investment Act 2020
FTE	Full Time Equivalent
FEL	Front End Loading
GPS	Generator Performance Standard
GW	Gigawatt
HRIS	Human Resources Information System
IBR	Inverter Based Resources
IP	Infrastructure Planner
ISP	AEMO's Integrated System Plan
IT	Information Technology
kV	Kilovolts
LTSA	Long Term Service Agreement
m	Metres
m2	Square Metres
ML	Most Likely
MW	Megawatt
NER	National Energy Rules
NSW	New South Wales
OEM	Original Equipment Manufacturer
Opex	Operational expenditure
p.a	Per Annum

Term	Description
PACR	Project Assessment Conclusions Report
PADR	Project Assessment Draft Report
PNIP	Priority Network Infrastructure Project
PO	Purchase Orders
RAV	Replacement Asset Values
REZ	Renewable Energy Zone
RIT-T	Regulatory Investment Test for Transmission
RNIP	REZ Network Infrastructure Projects
SLD	Singal Line Diagrams
SSP	System Strength Project
SSSP	System Strength Service Provider
Syn Cons	Synchronous Condensers
TET	Transmission Efficiency Test
TNSP	Transmission Network Service Providers
VA	Volt-ampere
WC	Worse Case
WPI	Wage Price Index

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1. Introduction

System strength is defined by AEMO as “the ability of the power system to maintain and control the voltage waveform at any given location in the power system, both during steady state operation and following a disturbance” [5]. System strength is a key component of power system security, particularly as the grid accommodates increasing levels of IBRs. Recognising this, the AEMC introduced a new system strength framework under the NER. This framework requires TNSPs to meet a System Strength Planning Standard at designated nodes on their networks using “reasonable endeavours.” This obligation means TNSPs must proactively plan and take appropriate steps to procure system strength without incurring unnecessary or excessive costs.

In NSW, Transgrid has been designated as the SSSP responsible for meeting these obligations. Planning is summarised in Transgrid's System Security Roadmap 2023 and evidenced in the progression of the project to deliver system strength services in NSW. This has progressed through the RIT-T process, detailed below:

– Project Specification Consultation Report published in December 2022
– Project Assessment Draft Report (PADR) published in June 2024
– Supplementary PADR published in October 2024
– Project Assessment Conclusions Report published in July 2025

The PACR is the final stage of the RIT-T process. In summary the PACR:

– Concludes that the forecast retirement of NSW coal generators in the coming decade and the growth of IBRs is driving an urgent need to add new sources of system strength. As the SSSP for NSW, Transgrid has system strength obligations under the NER, Section 5.1.14, to provide the minimum and efficient levels of system strength forecast by AEMO at each of the NSW system strength nodes, from December 2025 into the future.
– Identified a preferred credible portfolio option from more than 100 individual system strength solutions. The preferred option contains:
    - Ten Transgrid Syn Cons
    - Modifications to and redispatch of synchronous generators
    - Five Gigawatt (GW) of grid-forming batteries
    - Four smaller Syn Cons or 200 Megawatt (MW) of grid-forming batteries for the Hunter-Central Coast REZ

For the purposes of clarity, the Syn Cons required for Central West Orana and Hunter Central Coast REZ will be included in their separate Revenue Proposals, with the analysis identifying the preferred solution factoring into account their presence.

The following figure presents the credible portfolio option identified in the PACR (Figure 1).

[5] AEMO. (2022, September). System Strength Requirements Methodology

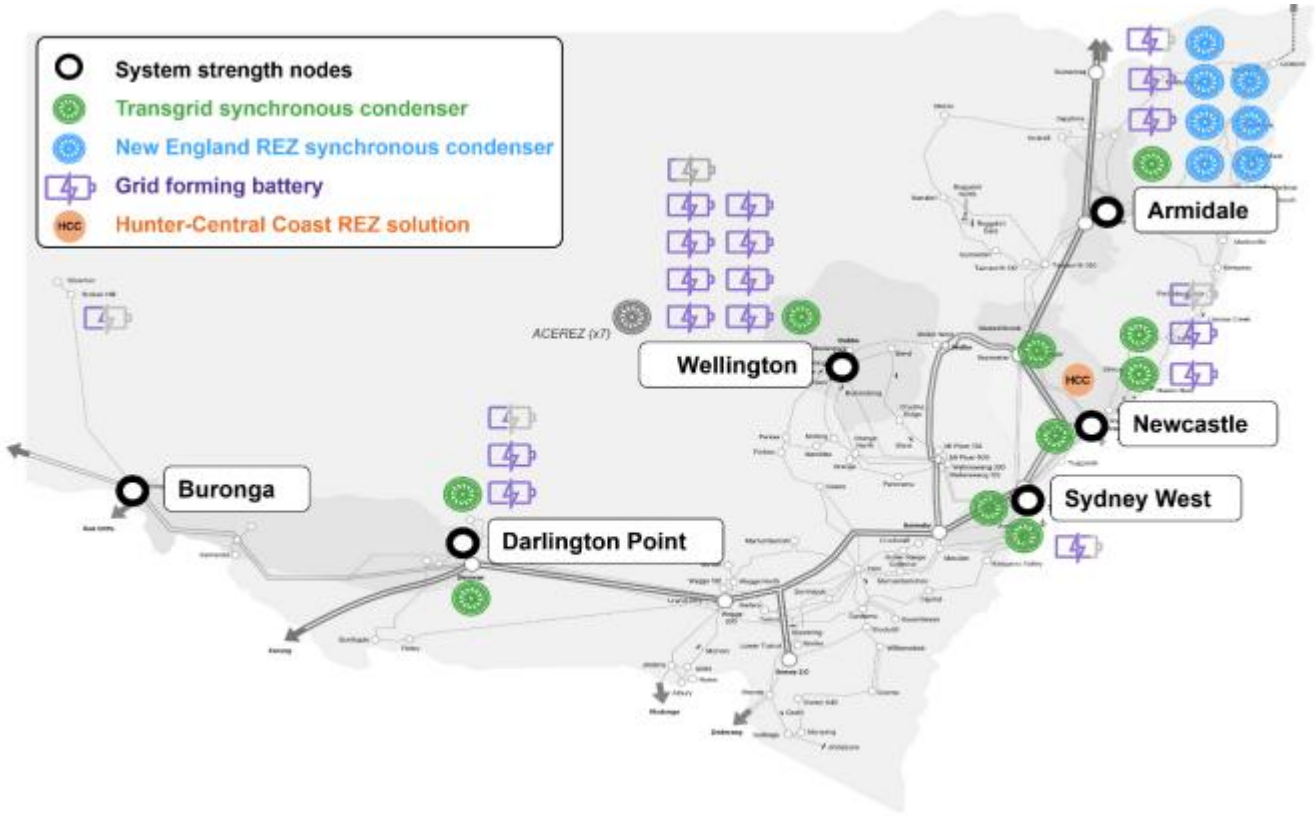


Figure 1 Option 2 Enhanced portfolio (Meeting System Strength Requirements in NSW PACR)

The NSW Electricity Infrastructure Roadmap, released in November 2020, sets out a 20-year plan to transform the State's electricity system and enable the transition to renewable energy. This roadmap is supported by the EII Act, which establishes the regulatory framework for planning, authorising, and funding major transmission projects.

The AER, as the appointed regulator under the EII Act, is responsible for determining whether the costs associated with non-contestable network infrastructure projects are prudent, efficient, and reasonable.

In September 2025, the SSP was declared as a PNIP by Ministerial Order, bringing the project under the EII Act. This allowed the acceleration of the procurement of five synchronous condensers, to be delivered at five of its substation sites across NSW as a PNIP.

Transgrid will submit a Hybrid Revenue Proposal to the AER which will include contestable and non-contestable elements. The contestable element will include the procurement of Syn Cons.

Under the AER's Revenue Determination Guideline for NSW Contestable Network Projects August 2022, reliance is placed upon the conduct of a competitive assessment process. Where the AER are satisfied that the process was genuine and appropriate, Transgrid can submit a Hybrid Revenue Proposal consistent with the outcome of that competitive assessment process.

In this instance the tender process pertaining to the procurement of Syn Cons (i.e., contestable element) was overseen by DCCEEW. For these reasons the contestable element of the Hybrid Revenue Proposal is considered outside of GHD's scope.

Non-contestable elements fall under AER guidelines for non-contestable projects. The AER's Guideline – Transmission Efficiency Test and Revenue Determination Guideline for Non-contestable Network Infrastructure Projects (July 2024) sets out that:

– The AER's role in EII Act assessment is narrower than under the NER revenue determination processes under Chapter 6A. The AER within the EII Act will not consider the prudency of the authorised network option against other potential network options
– The Transmission Efficiency Test (TET) is used to assess the capital forecast, requiring that capital costs for development and construction must be prudent, efficient and reasonable. The AER defines efficiency and prudency as follows:

"*We consider that the notion of efficient costs complements the costs that a prudent operator would require to achieve the expenditure objectives. Prudent expenditure is that which reflects the best course of action, considering available alternatives. Efficient expenditure results in the lowest cost to consumers over the long term. That is, prudent and efficient expenditure reflects the lowest long-term cost to consumers for the most appropriate investment or activity required to achieve the expenditure objectives".* [6]

"In assessing whether the capital costs are reasonable, we will assess whether the costs, and the calculation of those costs, are based on reason or reasonably open based on the facts before us." [7]

Under the Guidance Note on the AER's EII Act Assessment Approach for Non-contestable Revenue Determinations September 2025: "*In assessing whether a proposal, or an element of a proposal, is reasonable given the circumstances of the project, we would have regard to the extent to which sound judgment, explanation and best practice is applied to the relevant facts, assumptions and evidence to arrive at logical and supported conclusions"* [8]

1.1 Purpose of this report

This report documents findings from GHD's independent verification and assessment of Transgrid's non-contestable elements within their Hybrid Revenue Proposal for Meeting System Strength requirement in NSW to support their submission to the AER covering the non-contestable Capex and Opex forecast.

1.2 Scope

GHD's scope of works is limited to independent verification of:

Capex

– Non-contestable components
  - Verify that proposed capital costs and pre-period costs are prudent, efficient, and reasonable, and align with:

[6] AER, *Expenditure Forecast assessment guideline for transmission*, 2013, p. 9. The Expenditure Assessment Guideline is framed around an assessment against the National Electricity Objective. In applying the guideline, we will have reference to the objectives of the EII Act.
[7] Guideline – Transmission Efficiency Test and Revenue Determination Guideline for Non-contestable Network Infrastructure Projects July 2024 P25
[8] In assessing whether a proposal, or an element of a proposal, is reasonable given the circumstances of the project, we would have regard to the extent to which sound judgment, explanation and best practice is applied to the relevant facts, assumptions and evidence to arrive at logical and supported conclusions P20

- Ministerial Orders and Consumer Trustee directions
- AER's TET and associated guidelines

– Contestable components

- The scope excludes contestable elements where the AER accepts the competitive procurement process.

Opex

– Non-contestable components

- Verify whether the Opex forecast costs are prudent, efficient, and reasonable, and align with AER's EII Act Assessment Approach for Non-contestable Revenue Determinations

– Contestable components

- The scope excludes contestable elements where the AER accepts the competitive procurement process

1.3 Limitations

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.

Accessibility of documents

If this report is required to be accessible in any other format, this can be provided by GHD upon request and at an additional cost if necessary.

Section A

Capex assessment

2. Capex verification and assessment approach

2.1 Capex methodology

GHD has applied several approaches to verify the capital costs included in the Hybrid Revenue Proposal, supported by Transgrid's' Capex Forecasting Methodology to determine whether the expenditure is prudent, efficient, and reasonable.

In considering the Capex forecast, GHD relied upon a bottom-up verification of forecast elements to determine the extent to which it is supported by appropriate evidence (to test reasonableness), verifying the course of project development, risk mitigations, foresight and decision taken (to test prudency), and verifying of the resulting estimate is the lowest cost to end consumer over the long term (to test efficiency).

This approach considered the reliability of evidence used to support forecast elements and the approach applied depended on the nature of the cost element which included a combination of the following.

Table 3 *Capex assessment methodology*

	Evidence-based verification of the following materials provided by Transgrid: – Competitive tendering outcomes and contract negotiations, where considered appropriate – Supporting contracts and purchase orders and variations – Validation against BoD and SLDs representing the definition of the non-contestable scope – Evidence supplied to support alignment with regulatory requirements.
	Recalculation and validation against supporting evidence supplied by third parties, where required, including: – Verification of actual and forecasted costs through selective review of supporting documentation to confirm: • Amounts • Timeframes and scope • Relevance to the SSP – Recalculation of estimates and validation of assumptions, including: • Regulatory charges where relevant • Cost estimates provided by third parties • Cost estimates which can be verified through benchmarking – Benchmarking where appropriates benchmarking references were available
	– Internal labour costs: assessment of prudency and efficiency based on team structure, stream objectives, role descriptions, scheduled hours, number of FTE roles, and applied position rates.

	– Benchmarking against comparative sources where available.
$	Comparison of Transgrid's' cost forecasts against scope definitions and assumptions outlined in its Capex Forecasting Methodology.

Across this approach, GHD has considered whether the:

– Costs would be incurred by another prudent operator.

– Costs relate to activities required to achieve project timeframes, reduce the final projects costs, and / or reduce schedule and cost risks to assess whether they were lowest in longer term.

– Costs were accurately compiled using transparent inputs, based on facts, without error, latest available information and robust assumptions.

2.2 Materiality

GHD defines individual cost elements under $1M (representing 0.4% of total capital forecast) as immaterial. For costs that are supported by a large number of cost items, GHD may select the most material items for review. Where this approach has been applied, it is noted in the body of the report.

3. Non-contestable scope

The non-contestable scope, as defined in the Ministerial Order (12 September 2025[9]), comprises the following functions:

– Procurement and management of the contestable elements

– Other works necessary to commission the Syn Cons, and owning, operating and performing day-to-day maintenance functions for the Syn Cons as the network operator.

The non-contestable capital forecast must therefore reflect only those that are incremental to delivering the project and are necessary to meet the requirements for prudence, efficiency, and reasonableness under the TET.

The scope of each site is captured in technical specifications, BoD documents and SLDs, not reproduced here but referenced in the table below.

Table 4 Non-contestable scope definition

Site	Basis of design	Single line diagrams	Secondary system
Kemps Creek	Kemps Creek Basis of Design Rev5	KCR-165799_30G_SLD (2) KCR-815138_19E_ES (1)	*
Newcastle	Newcastle Basis of Design Rev 5	NEW-171533_37N_SLD NEW-171534_29B_ES	15 Change requests*

[9] State of New South Wales. (2025, September), NSW Government Gazette No 376 of 18 September 2025

Site	Basis of design	Single line diagrams	Secondary system
Armidale	Armidale Basis of Design Rev4	AR1-813687_17C_ES AR1-PYD-SKT-300001- 01B (SLD)	*
Darlington Point	Darlington Point Basis of Design Rev4	DNT-814904_15B_ES DNT-PYD-SK-001-1_K_SLD	*
Wellington	Wellington Basis of Design Rev 4	WL1-813390_28B_ES WL1-PYD-SKT-100001_2G_SLD	*

* Note that the Protection & Control design drawings have not been completed at the time of report drafting and the work on Newcastle has been used to inform the Capex forecast.

3.1 Scope alignment with Ministerial Order

The Ministerial Order was made on the 12 of September 2025. The Ministerial Order:

– Designates the project as a PNIP

– Defines the contestable elements as the provision of Syn Cons and associated works

– Defines the Syn Con package as the design, manufacture, supply, installation, commissioning and long-term servicing (including operational support and asset maintenance) of Syn Cons at the locations detailed below.

  The Syn Con package (i.e., contestable elements):

  - Must provide at least 950 MVA fault level at the point of connection at each location
  - Must provide at least 1500 MWs of inertia and have a continuous reactive power capability of 40 per cent of MVA rating.

– Defines the non-contestable elements as:

  - The procurement and management of the contestable elements; and
  - Other works necessary to commission the Syn Cons, and owning, operating and performing day-to-day maintenance functions for the Syn Cons as the network operator.

– Defines the locations as Transgrid substations at:

  - Kemps Creek
  - Newcastle
  - Armidale
  - Darlington Point
  - Wellington.

– Requires the Hybrid Revenue Proposal to be submitted to the AER by March 2026 and connect and commission each of the Syn Cons by September 2028.

The following table sets out GHD's consideration of the alignment with the Ministerial Order.

Table 5 Scope alignment with Ministerial Order

Ministerial Order element	GHD's considerations
Syn Con package	As the non-contestable scope includes the procurement and management of the contestable elements, the alignment of the Syn Con package needs to be agreed.

Ministerial Order element	GHD's considerations
	Based upon a review of Transgrid's Technical Specifications, the specifications in schedule 1.2 states that it is required that each synchronous condenser provides: – ≥950MA of fault level. This aligns with the Ministerial Order. – ≥1500MWs of inertia. This aligns with the Ministerial Order. – A rating at the PCC 330kV at 1p.u. of "~40% of SC overexcited rating" and "~40% of SC underexcited rating". This aligns with the ministerial order.
Locations	As the non-contestable scope includes the procurement and management of the contestable elements, the alignment with locations needs to be agreed. Based upon a review of Transgrid's Schedule 7 Technical Specifications: – Transgrid's specification states in section 2.2 on Page 12, and in Table 2 on Page 20, the Synchronous Condensers will be at Armidale, Newcastle, Kemps Creek, Wellington and Darlington Point. This aligns with the ministerial order. – Only those sites covered under the Ministerial Order have been included in the scope definition.
Non-contestable scope	The Ministerial Order states on page 3 that the non-contestable elements mean "Transgrid carrying out: (a) the procurement and management of the Contestable Elements; and (b) the other works necessary to commission the Syn Cons, and owning, operating and performing day-to-day maintenance functions for the Syn Cons as the network operator".
Milestones	The Ministerial Order states that "Transgrid must, taking all reasonable steps, complete the planning, design and construction of the SSP by achieving the Transgrid Delivery Milestones by the required Milestone Dates identified in the System Strength Delivery Plan." The Transgrid PACR shows delivery at the specified locations by 2029/30. The specification sets out milestones in Schedule 2 to have all Syn Cons energised by 6/12/2028 which is 4 weeks before project practical completion. Full project completion for all locations, including documentation, by 15/3/2029. The milestones provided in the specification align with the ministerial order.

3.1.1 Scope alignment with Ministerial Order conclusion

Based upon the work detailed above and the verification completed in the following sections the non-contestable scope aligns with the Ministerial Order.

4. Non-contestable capital forecast

The non-contestable capital forecast presented below outlines all capital costs that fall outside the scope of the Syn Con tenders. Given the definitions of contestable and non-contestable works share areas of overlap, this forecast has been developed on the basis that any activity, asset, or expenditure not explicitly included within the contestable Syn Con tender scope is treated as non-contestable. This forecast comprises all remaining project elements required for delivery, such as labour and indirect costs, risk allowance, equipment (substations & secondary systems) outside the tendered scope, and the fleet acquisition component.

The following table provides a summary of the non-contestable capital costs. Actual from 31 December 2022 to 30 January 2026 and forecast from 1 February 2026 to 30 September 2031.

Table 6 Non-contestable capital forecast summary ($M Real 2025-26)

Forecast element	Section reference	$M
Labour and indirect costs	Section 7	215.4
Risk allowance	Section 5	18.4
Equipment	Section 4.1	10.3
Buildings	Section 4.2	7.1
Fleet Acquisition	Section 4.3	0.6
Infrastructure planner fees	Section 6	7.8
Total		**259.6**

4.1 Equipment

When considering equipment (substations & secondary systems) GHD has considered whether the equipment is incremental through an examination of BoD and SLD and supported by appropriate evidence to support the cost forecast.

The following table summarises the forecast.

Table 7 equipment (substations & secondary systems) forecast summary ($M Real 2025-26)

Forecast element	Section reference	$M
Substations	Section 4.1.1	5.2
Secondary systems	Section 4.1.2	5.1
Total		**10.3**

4.1.1 Substations

The following table summarises GHD in verifying the support for the capital estimate. This involved verification of all sub cost elements over $100K to Transgrid issued POs to assess cost support and against SLDs and BoDs to verify incremental need.

Table 8 Primary equipment forecast verification

Description	Base cost $ Real 30 June 2025	Agreed to Transgrid purchase order	BoD / SLD / Aurecon Equipment Schedule supports incremental requirements	Number at Armidale	Number at Darlington Point	Number at Kemps Creek	Number at Newcastle	Number at Wellington	Total $M Real 30 June 2025
Current transformer 1 – 362kV,3150A, 50kA	[redacted]	Yes	Yes			3			[redacted]
Current transformer 2	[redacted]	Yes	Yes		3			3	[redacted]
Current transformer 3 – 362kV,3150A, 50kA	[redacted]	Yes	Yes	3					[redacted]

Description	Base cost $ Real 30 June 2025	Agreed to Transgrid purchase order	BoD / SLD / Aurecon Equipment Schedule supports incremental requirements	Number at Armidale	Number at Darlington Point	Number at Kemps Creek	Number at Newcastle	Number at Wellington	Total $M Real 30 June 2025
Current transformer spare – 362kV,3150A, 50kA	[redacted]	Yes	#			3			[redacted]
Voltage transformer 1 – 362kV,2*25VA	[redacted]	Yes	Yes	3	3		3	3	[redacted]
Voltage transformer spare – 362kV,2*25VA	[redacted]	Yes	@			6			[redacted]
Circuit breakers	[redacted]	Yes	Yes			1	1		[redacted]
Circuit breakers spare	[redacted]	Yes	Yes			1			[redacted]
Circuit breakers with PIR – LTCB, 420kV, 4811A, 63KA	[redacted]	Yes	Yes	1	1			1	[redacted]
Circuit breakers with PIR spare	[redacted]	Yes	Yes			1			[redacted]
Earth switches – 362kV,63KS	[redacted]	Yes	Yes	1	1	1	1	1	[redacted]
Independent earth switches – 362kV, 63KA,3PO SVB STD	[redacted]	Yes	Yes	1		1	1	1	[redacted]
Switching relays -	[redacted]	Yes	Yes	1	1	1	1	1	[redacted]
Disconector	[redacted]	Yes	^	1	1	2	1	1	[redacted]
Insulator 16kV	[redacted]	Yes	Not applicable	62	62	18	48	90	[redacted]
Items <100K									-
Total $M Real 30 June 2025									*4.3*
Conversion to 30 June 2026									**4.5**
Additional not considered material									0.7
Total									**5.2**

Spares which is a matter of risk tolerance. Given the low-cost holding spares for the portfolio and their long lead time this is considered prudent.

@ Includes 3 spares.

^ Includes 1 spare

The transformers are bi-directional and only one connection point is required.

The step-up transformers (between the Syn Con and the transmission substation) are included within the Syn Con package (OEM Scope of works) – contestable and outside the scope of this review.

The costs associated with busbars, droppers, civil platforms, drainage, foundations, and primary structures associated with the switching bays required to connect the Syn Con at the substation are included in the scope and pricing from the D&C contractor.

4.1.2 Secondary systems

The following table summarises GHD in verifying the support for the capital estimate. This involved verification of all sub cost elements over $100K to Transgrid issued POs.

Table 9 Secondary equipment forecast verification

Description	Base cost $ Real 30 June 2025	Agreed to Transgrid purchase order	Number at Armidale	Number at Darlington Point	Number at Kemps Creek	Number at Newcastle	Number at Wellington	Total $M Real 30 June 2025
HMI Gateway Server	[redacted]	Yes	2	2	2	2	2	[redacted]
QoS Monitor	[redacted]	Yes	1	1	1	1	1	[redacted]
Disturbance Recorder	[redacted]	Yes	1	1	1		1	[redacted]
HMI Clients	[redacted]	Yes	1	1	1	1	1	[redacted]
REC670/5	[redacted]		5	4	6	1	3	[redacted]
REC670/10	[redacted]		2	3	2	4	2	[redacted]
7SJ85 Protection Relay	[redacted]	@	5	5		4	4	[redacted]
Substation Switch (50VDC)	[redacted]		2	2	2	2	2	[redacted]
DCON GRS	[redacted]	#	2	2	2	2	2	[redacted]
AC DC Converter	[redacted]	@	3	2	4	0	2	[redacted]
Catalogued Secondary Spares	[redacted]	@	1	1	1	1	1	[redacted]
XTRAN - Syncon Sub MCR	[redacted]	@	1	1	1	1	1	[redacted]
XTRAN - SCADA Site MCR	[redacted]	@	1	1	1	1	1	[redacted]
XTRAN - SCADA RM	[redacted]	@	1	1	1	1	1	[redacted]
XTRAN - Contingency Spare	[redacted]	@	1	1	1	1	1	[redacted]
Duel Zenon HMI Dongles & Licence	[redacted]	@	1	1	-	1	1	[redacted]
RAD Converter	[redacted]	@	1	1	-	2	1	[redacted]
Siemens No.2 Protection + POW Relays	[redacted]	@	-	1	-	1	1	[redacted]
Items <100K								1.1
Conversion to 30 June 2026								**5.1**

Estimate only with reference to estimate source provided – Not considered material from a total forecast perspective.

@ Purchase orders have not yet been placed by Transgrid, costs have been based on panel rates.

The costs associated with cabling (within the control room and between the control room and primary plant), ancillary materials, panel integration, inter-panel wiring, and integration with existing secondary systems at the relevant substations are included in the scope and pricing of the D&C contractor.

4.1.3 Equipment conclusion

The incremental need for equipment (substations & secondary systems) is supported by SLDs and BoDs with costings supported by issued POs under existing panel agreements or use of panel rates. The step-up transformers (between the Syn Con and the transmission substation) are included within the Syn Con package (OEM Scope of works) and are considered contestable and outside the scope of this review. As are the costs associated with:

- Busbars, droppers, civil platforms, drainage, foundations, and primary structures associated with the switching bays required to connect the Syn Con at the substation are included in the scope and pricing from the D&C contractor
- Cabling (within the control room and between the control room and primary plant), ancillary materials, panel integration, inter-panel wiring, and integration with existing secondary systems at the relevant substations are included in the scope and pricing of the D&C contractor.

Excluding equipment provided by the (OEM Scope of works) and items that fall under the D&C contractor, the residual identified above is required to implement the acquired Syn Cons and given the procurement process to establish supplier panels the forecast is considered prudent. Efficiency is supported by panels established through appropriate procurement process. Both these attributes support reasonableness demonstration.

4.2 Buildings

Additional storage yard space to cover Syn Con spares.

Table 10 Building costs ($M Real 2025-26)

Item	Estimate $M	GHD considerations
Newcastle Warehouse Construction	5.0	Based on warehouse size of ~2,000m2 and rate of $2,500/m2 by ASSET Building Systems Australia which GHD has sighted.
Storage improvements to Yass and Eastern Creek Warehouses	1.8	Based on estimate from Logistics Institute which GHD has sighted.
Telehandler/forklift	0.3	Not material
Total	**7.1**	

Based upon the work that GHD is supporting on the development of the capital plan for 2023-28 we understand that building / storage requirements for large projects needs be to be reflected within the project's capex estimate. We also know that additional building / storage is required given present capacity constraints and the additional demand that will flow from the 2028-33 capital plan. As such the expansion is considered prudent from a risk perspective as the spares need to be preserved in an acceptable condition, with efficiency supported by the independent cost estimates used. These represent the best available estimate at this stage of the protects development. Reasonableness is supported by the demonstration of prudency and efficiency and the need to store spares in an appropriate manner to preserve their value.

4.3 Fleet acquisition

As indicated above, Transgrid's capital planning process also requires that fleet requirements for large projects needs be to be reflected within the project's capex estimate. This estimate represents seven additional vehicles to support the projects requirements.

Overall, this cost is not considered material.

5. Risk allowances

The AER's guidance note on the regulation of actionable ISP projects states that it can accept a project risk allowance for a contingent project where[10]:

- Residual risks have been identified
- The associated cost estimates of the residual risk are efficient i.e., the consequential cost adjusted to reflect the likelihood of occurrence.

To inform its assessment, the AER requires a comprehensive and transparent explanation of how the risks have been identified and costed, including[11]:

- Risk identification, i.e., clearly identifying the risk events
- Risk cost assessment, i.e., estimating the potential cost impacts, the likelihood of occurrence, the consequential costs, and any mitigation/management strategies.

Whilst the SSP is not classed as an actionable ISP project, the guidance is still applicable.

Further to this guidance, the AER's Guidance note on the AER's EII Act Assessment Approach for Non-Contestable Revenue Determinations September 2025 provides – "we would expect the Network Operator to:

- Comprehensively and transparently identify and define the different project risks
- Identify and justify reasonable and realistic potential cost impacts (including potential cost reductions) and likelihoods of occurrence, accounting for controls or mitigations
- Show that the residual consequential cost is weighted to reflect the likelihood of occurrence
- Show why the risk cannot be efficiently transferred, avoided or mitigated
- Show that the cost of mitigation measures exceeds the expected weighted cost impact should the risk eventuate
- Show that risk will be allocated to the party that is best placed to manage that risk".[12]

Transgrid has prepared a separate Risk Allowance Cost Forecasting Methodology to support its submission. This document outlines "Under clause 6A.5.4 of EII Chapter 6A", Transgrid's revenue can include compensation for

[10] AER, Guidance Note, Regulation of actionable ISP project, March 2021
[11] AER, *Regulation of actionable ISP projects,* Guidance note, March 2021, p 17
[12] AER's Guidance note on the AER's EII Assessment Approach for Non-contestable Revenue Determinations September 2025 P22

risks that the AER considers are necessary to compensate a Network Operator for risks that are not otherwise compensated for in the return on capital".[13]

The same document notes the division of risks retained by Transgrid and those held by the Original Equipment Manufacturer (OEM) supplier or Design and Construct (D&C) contractors.

[13] Risk Allowance Cost Forecasting Methodology P 3

The following table summarises the risk allowances included in the capital forecast. GHD has not reviewed the underlining Monte-Carlo model in detail, rather relying upon assessing material items and top-down benchmarking of risk allowances.

Comments within the table relating to each provision cover the elements of prudency and efficiency. Reasonableness is covered in the conclusion to this section.

Table 11 Non-contestable risk alowance breakdown ($M Real 2025-26)

Risk name	Description	Risk category	GHD assessment	Risk cost $M
Commissioning and integration challenges	The integration and commissioning of the accelerated synchronous condensers into the Transgrid network may result in additional uprating or upgrading of equipment being required to deal with issues such as increased fault levels or changes being required to control systems.	Commissioning	The commissioning and integration challenges risk cost is the sum of key technical risks including Syn Con control interactions, increased fault levels, SCADA system expansion, OEM-related changes, and AEMO-driven requirements. Individual P50 cost and delay impacts were calculated for each risk, then aggregated to provide a category-level P50 allowance. The combined P50 exposure across these risks reconciles to Transgrid's reported $6M risk allowance for this category (Real 2025–26). There are seven components to this provision, with the two largest representing 80% of the total provision: 1. There is a risk that changes to key design parameters may impact control loops, leading to a cascade of downstream impacts. These may require revisions to the design, adjustments during delivery, and additional testing to ensure system stability and performance. Increased modelling etc. This risk is solely for the OEM (Syn Con) and its control. Basis of Assessment Control loops and logic for the controllers in the syn con can cause large time impacts. These impacts for time are on the contractor. Additional Transgrid costs for staff on site and PM team being extended longer is captured in the risk for delay. This risk quantification is for re-doing of modelling and re-mobilisation of Transgrid commissioning staff to re-do works. Minor control logic issue = 4 staff for 3 months to rectify, including 1 x planner, 1 x designer, 1 x commissioning engineer Major control logic issue requiring 8 staff for 6 months to rectify as the Worse Case (WC) Cost for 1 staff = $40k/month Best Case (BC): 1 site with minor issue = $40k x 4 x 3 = $480k Most Likely (ML): 5 sites with minor issue = BC x 5 = $2.4 million WC: 5 sites with major issues = $40k x 8 x 6 x 5 = $9.6 million	6.08

Risk name	Description	Risk category	GHD assessment	Risk cost $M
			Provision for cost $1.6M, for time $0.6M = $2.2M based upon the Monte-Carlo calculation 2. Changes to existing proprietary reactive plant systems may require redesign, rework, and integration adjustments. These changes can lead to additional costs, increased risk of integration failures, extended commissioning periods, and potential regulatory compliance issues. Basis of Assessment Each site requiring modification to reactive plant systems. Minor change is $500k. Major change is $1 million. Assuming each site has proprietary equipment and needs changes TG cannot work around, an assumption noted by GHD Quantification of Risk BC: 1 site, minor changes = $500k ML: 2 sites, minor changes = $1 million contingent cost WC: 3 sites, major changes = $3 million Provision for cost $1.1M contingent time $1.3M = $2.4M based upon the Monte-Carlo calculation As described above there is a residual risk that changes may require additional Transgrid activities. It is considered prudent to create a P50 provision for these activities potentially required to ensure that objectives related to Transgrid's SSSP obligations are met. The underlying cost estimation is robust and based upon the best information available at the time of estimation which supports efficiency demonstration.	
Extended inclement weather	Project delays caused by inclement weather such as heavy rainfall or heat (over and above contracted allowance) which prevents the safe and effective completion of works	Construction	The Inclement Weather risk cost represents the potential for weather conditions (such as heavy rainfall, storms, or extreme heat) to exceed the contracted allowance and cause delays to construction activities. The assessment reflects the likelihood and duration of weather-related stoppages and the associated cost of extended project overheads, contractor standing time, and reduced productivity. This figure reconciles to Transgrid's reported $2.6M risk allowance for the category. As detailed in Transgrid's Risk Cost Allowance Forecasting Methodology, the OEM and D&C Contractors have inclement weather allowance embedded in the contracts. Where this allowance is exceeded, the contractor is entitled to an extension of time for a critical path delay only. Transgrid has recalculated inclement weather allowance with reference to the average inclement weather days, as reported by the Bureau of Meteorology for each Separable Proportion. Provision for contingent time of $2.6M is based upon the Monte-Carlo calculation.	2.69

Risk name	Description	Risk category	GHD assessment	Risk cost $M
			The P50 provision of this risk over contracted allowance is considered prudent and consistent with how this has been treated on other ISP projects. The underlying cost estimation is based upon the best information available at the time of estimation which supports efficiency demonstration.	
Third party interfaces	Third party interfaces with government departments and utilities result in additional management effort and cost to Transgrid to minimise delays to OEM supplier and D&C contractors.	Construction	The Third-Party Interfaces risk cost reflects the potential cost for delays and additional management effort arising from interactions with government departments, utilities, landowners, and Distribution Network Service Provider (DNSP)s. These risks include delays or redesigns due to Crown land acquisition outcomes, unexpected land acquisition requirements, and extended timeframes for Essential Energy approvals and DNSP accreditation. The resulting P50 exposure consists of direct contingent cost (e.g., redesign, land access changes) and time-related delay cost. This figure reconciles with the $1.1M risk allowance reported for Third-Party Interfaces in the Transgrid table (Real 2025–26). There are two primary risks that make up this provision: 3. There is a small portion of land at Armidale owned by Crown Lands. This piece is required to enable construction of the syn cons. Basis of Assessment Impacted scope includes legal costs, design, land acquisition, and delivery cost impacts. Design rework impact: 20% of $5,500,000 (Sycon design) = $1,100,000. 20% of $19,000,000 (related design scope) = $3,800,000. Land acquisition cost impact: 20% of $19,000,000 = $3,800,000. Total impacted cost = $8,700,000 at a 10% probability. 4. There is a risk that additional or unexpected land acquisition may be required due to minor alignment changes to relocate the 132kV transmission line. These changes may arise during detailed design development, necessitating adjustments to the project site layout. Basis of Assessment Total Cost of Impacted Parts: AUD 2 million (assumed cost for additional land acquisition) Quantification of Risk Best Case (25%): AUD 500,000 – No additional land acquisition required; existing land footprint is sufficient. Most Likely Case (50%): AUD 1,000,000 – Minor alignment changes at WL1 require partial additional land acquisition.	1.13

Risk name	Description	Risk category	GHD assessment	Risk cost $M
			To satisfy Transgrid's SSSP obligations additional activities may be required to address third party interface requirements. Given this residual risk it is considered prudent to create a P50 provision. The underlying cost estimation is robust and based upon the best information available at the time of estimation which supports efficiency demonstration.	
Additional network modelling	Additional or more complex modelling required for the project resulting in additional Transgrid resources or consultant support	Commissioning	The network modelling risk cost reflects the potential for additional or more complex network modelling to be required during commissioning. This includes risks such as inexperienced contractor modelling or testing teams requiring additional Transgrid support, and parameter changes that necessitate further R1 modelling effort. The resulting P50 exposure consists of direct contingent effort (e.g., additional modelling, SME support) and time-related delays (e.g., extended testing cycles). There are two components to this provision: 1. Risk of additional modelling required $3.3M (which equates to GHD rates over the time required) by 50% = $1.6M 2. Risk that changes in parameters will require additional R1 model development at each site to ensure accurate system modelling. This will result in increased cost and time for model development and validation activities. These changes could come from needing to remodel due to changes in orders of sites, different load input data from planning, logic blocks not aligning to the Syn Con actuals or simple inability to model some functions. Basis of Assumptions: $100k per model to be done. Most Likely Case (4 models): AUD 400,000 & 16 weeks – Moderate parameter changes require 4 additional models, leading to increased rework effort and moderate delays, by 85%. Worst Case (8 models): AUD 800,000 & 32 weeks – Significant parameter changes necessitate the development of 8 additional models, causing major time and cost impacts Provision for cost $0.4M contingent time $0.3M = $0.7M based upon the Monte-Carlo calculation GHD confirms that additional modelling may be required to support commissioning. Given this residual risks it is considered prudent to create a P50 provision for these uncertainties as they may be required to pass the commissioning phase. Without this Transgrid cannot demonstrate satification of their SSSP obligations. The underlying cost estimation is robust and based upon the best information available at the time of estimation which supports efficiency demonstration..	2.31

Risk name	Description	Risk category	GHD assessment	Risk cost $M
Environment and community	Additional construction noise and operational noise may result in increased community complaints or the potential to require additional sound mitigation.	Construction	The Environment & Community risk cost reflects the potential cost for community-related impacts or environmental constraints to require additional mitigation during construction. Key risks include excessive combined site noise levels post-construction requiring modification works, and community disturbance during major construction activities. The resulting P50 exposure includes both direct contingent cost (e.g., noise attenuation modifications) and time-related impacts where relevant. This reconciles with the $1.7M risk allowance reported for Environment and Community in the Transgrid table (Real 2025–26). There are two components to this provision, with the largest representing 94% of the total provision: Risk that combined site noise levels generated by machinery during construction and operational phases may exceed 95 decibels. If this occurs, design modifications and additional noise attenuation measures may be required. Basis of Assessment Impacted scope includes additional costs to design and construction activities after core scope has been completed. Additional works impact = 1 month = Claim from contractor = $1 million by 35% BC: No additional sound walls or controls needed for operation Additional works impact = 1 month = Claim from contractor = $1 million ML: 1 site needs insulation in Syn Con building walls Additional works impact = 1 month (x 2 sites) = $2 million Insulation = $200k Total = $2.2million WC: 5 sites need insulation in Syncon walls. 5 sites need tx noise walls. Additional works impact = 1 month (x5 sites) = $5 million Insulation = 5 x $200k = $1 million Sound walls = 4 walls (design and construct) = $400k ... times 5 sites = $2 million Total = $7 million Provision for cost $1.3M contingent time $0.4M = $1.7M based upon the Monte-Carlo calculation	1.82

Risk name	Description	Risk category	GHD assessment	Risk cost $M
			This is a potential risk associated with many infrastructure projects. The expenditure may be required to reduce the risk associated with schedule slippage associated with any orders. The potential expenditure is therefore considered prudent. The underlying cost estimation is robust and based upon the best information available at the time of estimation which supports efficiency demonstration.	
Equipment issues	Delays to supply of Transgrid supplied equipment due to unanticipated global supply chain delays and issues with existing equipment within a brownfield environment.	Procurement / Construction	The Equipment Failure / Delay risk cost reflects the potential for delays or additional controls resulting from issues with principal-supplied and existing equipment. Key risks include supply chain constraints, scope growth, defects or failures in principal-supplied equipment requiring rework by D&C and OEM contractors, and the additional controls needed when working in brownfield environments around existing installations. The resulting P50 exposure consists of both direct contingent cost (e.g. replacement, redesign, re-inspection) and time-based delay impacts (e.g., OEM rework time, constrained brownfield access). This figure reconciles with the $2.4M risk allowance reported for Equipment Issues in the Transgrid table (Real 2025–26). There are four components to this risk: 1. There is a risk of programme delays due to the late placement of major equipment orders, which may lead to supply chain disruptions and late deliveries. To mitigate impacts, acceleration measures such as airfreighting and resequencing works may be required, increasing delivery costs. These delays may also create interface risks with other dependent construction or commissioning activities. Basis of Assessment The assumption is that although multiple equipment types may be late, the remobilisation and demobilisation will be once - i.e. wait till all equipment here then install at once. As such, the variance is how long they need to come back for based on number of items to install. Assume 2 weeks per item, per site. Demob = $250k/site Remob = $250k/site Per week cost = $100k/site Quantification of Risk Best Case: 2 sites missing equipment on time. 1 item missing per site = ($250k + $250k + $200k) x 2 = $1.4 million Most Likely Case: 2 sites missing equipment on time. 2 items = ($250k + $250k +$400k) x 2 = $1.8 million Worst Case: 5 sites missing equipment on time. 4 items (CB, CT, CVT, disco) = ($250k + $250k + $800k) x 5 = $6.5 million	2.47

Risk name	Description	Risk category	GHD assessment	Risk cost $M
			2. Contingent time associated with above $0.5M based upon the Monte-Carlo calculation 3. Maintenance activities conducted ensures continuity of project site access and progress (no cost to project). ML: $250k per site for project related costs such as monitoring devices (e.g. Online Condition Monitoring devices to detect oils / gases), Transgrid project site supervision, scheduling support, installation of walls or arranging alternative project access. Minor disruptions to delivery, amounting to two weeks of cumulative impact over life of project. WC: 8 - 10 weeks standdown of project as a result of existing equipment failure requiring site shutdown and remediation (assuming spares are in stock), plus allowance for remediation works (0 - 3 months), nominal total impact of ~4 months. Potential injury / harm to personnel and property (not costed). Assumes damage to already installed project equipment to be covered by Insurances. 4. Contingent time associated with above $0.5M based upon the Monte-Carlo calculation This represents an inherent risk for projects that require equipment with lead time requirements. The impacts can include schedule slippage or cost escalation including additional transport costs. As such it is considered prudent to create a P50 provision. The underlying cost estimation is robust and based upon the best information available at the time of estimation which supports efficiency demonstration.	
Changes to commissioning approach	Changes to commissioning approach by OEM supplier or D&C contractors result in greater resource requirements for Transgrid to oversee and coordinate, where not covered by proposed adjustment mechanisms.	Commissioning	The Changes to Commissioning Approach risk cost reflects the potential for additional Transgrid resourcing as a result of the OEM changing the commissioning approach. For example, this could result in extended working hours (up to 24h days). The resulting P50 exposure consists of the P50 contingent cost and reconciles with the $1.3M risk allowance reported for the risk in the Transgrid table (Real 2025–26). Resources required: 1 x SM full time, 1 x Control Tech full (days) at a rate of $200h + $50h misc costs for vehicle hire, additional over time loading etc. + $50h weekend rate. Currently assuming: BC: Minimal Acceleration - extended days (Sat + Sun) only for 3 months. ML: 7 Days per week for 6 months + 1 month per site 24hr shifts WC: 7 days per week for 6 month + 2 month per site 24hr shifts BC: $230k (2x shifts per day over 12 weekends for 2x FTE) ML: $2.8M (2x FTE for 6 month for whole of project (regular hours) + 2x FTE per site for single month (24 hours)) = $2.8M by 50% = $1.4M ~ $1.3M	1.33

Risk name	Description	Risk category	GHD assessment	Risk cost $M
			WC: $5.04M (2x FTE for 6 month for whole of project (regular hours) + 2x FTE per site for two months (24 hours)) Changes to commissioning approach by OEM supplier or D&C contractors are possible. This may trigger the need for additional Transgrid activity required to commission the Syn Cons. This is considered to be prudent as it may be required to support SSSP obligation satisfaction. The underlying cost estimation is robust and based upon the best information available at the time of estimation which supports efficiency demonstration.	
Contractor industrial action	Additional resourcing required as a result of delays arising from contractor industrial action	Construction	The Contractor Industrial Action risk cost consists of a P50 contingent time cost and reconciles with the $0.6M risk allowance reported for the risk in the Transgrid table (Real 2025–26). The provision of this risk is considered below our materiality threshold.	0.57
Total				**18.4**

5.1 Risk allowances conclusion

Total risk allowance as a percentage of the total Capex is $18.4M / $251.8M = 7.3%. Which is under most of the benchmarks provided below.

To provide some context, benchmarking of project risk allowances is provided below, noting that:

- Smaller projects are more likely to carry higher risk allowances as a percentage of capital costs
- Integrated System Plan projects and RNIPs carry different risk profiles related to easement acquisition and biodiversity offset cost estimation, whereas the SSP carries greater brownfield and integration risks
- HumeLink carries higher provisions given the nature of the terrain, management of centrally retained risks under the incentivised target cost contract and the compressed schedule
- The North West Transmission Development also requires the management of centrally retained risks under the contract.

Table 12 Risk and contingency benchmarking

Project	Total project estimate $M	Contingency estimate $M	% of total project Capex
Meeting System Strength Requirements in NSW	$251.8 (Non-contestable scope only, excludes IP fee))	18.4	7.3%
HumeLink CPA-2	4,279.1	599.1	14.0%
North West Transmission Development	977.6	131.5	13.5%
HCC RNIP	600.9	48.0	8.0%
CWO enabling works (Transgrid scope only)	437.9	17.1	3.9%

The risk allowance assessment demonstrates that the proposed non-contestable risk allowance has been developed in a manner consistent with the AER's expectations for transparent, evidence-based risk identification and costing. Although the SSP is not an actionable ISP project, the principles outlined in both the AER's Guidance Note on the Regulation of Actionable ISP Projects and the AER's EII Act Assessment Approach for Non-contestable Revenue Determinations (September 2025) have been applied to ensure that the allowance is robust, proportionate, and justified.

Across the categories identified in Table 11, residual risks have been clearly defined, with each risk event linked to realistic potential cost and time consequences. The cost estimates reflect an efficient P50 view, incorporating the likelihood of occurrence and recognising where inherent uncertainties—such as commissioning complexity, network modelling dependencies, weather delays, and third-party interfaces—cannot be fully avoided or transferred.

The analysis confirms that:

- Key risk events have been identified, with articulation of the causal drivers and consequential impacts.

- Cost impacts and likelihoods have been assessed using reasonable, defensible assumptions, supported by current project controls and mitigation strategies.
- The residual cost allowances reflect those risks that cannot be efficiently mitigated, transferred, or avoided, and where the cost of further mitigation would exceed the expected weighted cost impact.
- Risk has been allocated to the party best positioned to manage it, with the remaining residual risks appropriately retained within the non-contestable scope.

On this basis, the total provision of $18.4M (Real 2025–26) represents an efficient and proportionate allowance for residual risks that remain after applying feasible controls. This provisioning approach aligns with the AER's guidance on prudent risk allocation and ensures that the delivery of the SSP can proceed with an appropriate level of cost and schedule protection while maintaining value for consumers.

The provisions relate to potentialities that may be required to complete Syn Con installation or may be incurred because of external factors. Provisioning for these residual risks is considered to be reasonable as they may be required to complete the project intended to provide system strength for the market.

6. Infrastructure planner fees

These are payments required under the Underwriting Agreement, reflecting the cost of Infrastructure Planner's statutory role in coordinating and overseeing delivery of the Project. The forecast is based on the Infrastructure Planner's notified and forecast cost profile and represents an obligation under the governance framework established for the Project.

Table 13 Infrastructure planner fees

Sub-category	Pre-period costs $M	2027 $M	2028 $M	2029 $M	2030 $M	2031 $M	Total $M
IP fees	2.0	2.0	1.9	1.9	-	-	7.8

7. Labour and indirect costs

As detailed above, the SSP involves installation and commissioning of ten synchronous condensers at five sites. Transgrid's Labour and Indirect Capex Forecast Methodology identifies the following division between contestable and non-contestable costs:

Contestable

– Syn Cons Package OEM contract

– Long Term Service Agreement contract

– Associated Works Package D&C contract(s)

Non-contestable

– Transgrid internal delivery costs (labour, associated contingency, equipment, insurance, biodiversity, land acquisition)

The following table provides a summary of labour and indirect costs.

Table 14 Labour and indirect cost summary ($M Real 2025-26)

Category	Report reference	$M
Labour (internal and outsourced, direct)		
Project Delivery Management	Section 7.5	75.9
Other Support & Corporate Roles	Section 7.6	15.9
Transaction Procurement Support	Section 7.7	1.4
Project Development	Section 7.8	13.4
Land and Environment	Section 7.9	3.7
Regulatory Approvals	Section 7.10	0.8
Community and stakeholder engagement	Not material	0.1
Rounding		0.1
Sub total		***111.3***
Labour-related (direct)		
Project Delivery Management	Section 7.5	8.9
Other Support & Corporate Roles	Section 7.6	0.1
Transaction Procurement Support	Section 7.7	-
Project Development	Section 7.8	2.1
Land and Environment	Section 7.9	-
Regulatory Approvals	Section 7.10	-
Sub total		***11.1***
Indirect		
Indirect proportion of labour	Section 7.11	47.7*
Indirect proportion of labour-related costs	Section 7.11	4.8
Project Delivery Management	Section 7.5	1.8

Category	Report reference	$M
Other Support & Corporate Roles	Section 7.6	25.2
Transaction Procurement Support	Section 7.7	2.4
Project Development	Section 7.8	9.6
Land and Environment	Section 7.9	0.5
Regulatory Approvals	Section 7.10	1.1
Sub total		***93.0***
Total		**215.4**

*Transgrid has split labour costs on a 70% basis, as shown in the table with 30% being allocated to the indirect proportion of labour 30% included in section 7.11

7.1 Historical labour

Transgrid's Labour and Indirect Capex Forecasting Methodology details that Transgrid incurred costs between December 2022 to December 2025. These costs were recorded in Ellipse (ERP System). The same document details that Transgrid has allocated and attributed historical Capex to SSAP in accordance with their AER-approved cost allocation methodology[14].

Transgrid's Labour and Indirect Capex Forecasting Methodology details that historic actual pre-period costs for the Project primarily relate to:

– Regulatory Investment Test for Transmission (Discussed further below)
– Development of a procurement strategy for the project
– Procurement of the OEM and D&C contractors
– Development of relevant procurement plans, including the OEM procurement report
– Negotiation and execution of the Underwrite with DCCEEW
– Initial concept design work for the project
– Identification and procurement of the Transgrid supplied equipment for the project
– Interface and management of DCCEEW
– Ongoing project management, project controls and internal reporting
– Initial preparation of the regulatory submission
– Environmental approvals for all five sites
– Land management and easement acquisition
– Community engagement activities.

GHD confirms that these costs are consistent with the non-contestable definition.

Transgrid has further advised that all project labour is recorded through the Human Resources Information System (HRIS). This is TransGrid's enterprise system for capturing employee time worked. Employees record their time against specific projects in the HRIS time writing module with finance performing a high-level review of total project labour costs to confirm alignment with approved budgets.

[14] Transgrid, Cost Allocation Methodology, 2023

In parallel, the Project Control team monitors project costs in detail, including labour expenditure, to ensure costs remain within budget and any variances are identified and addressed in a timely manner.

The following table summarises historical labour costs.

Table 15 Summary of historical labour costs ($M Real 2025-26)

Capex category	RY2022 $M	RY2023 $M	RY2024 $M	RY2025 $M	31 January 2026 $M	Total $M
Labour (internal and outsourced, direct)						
Project Delivery Management	-	-	0.2	1.5	2.1	3.8
Other Support & Corporate Roles	-	-	-	0.3	0.2	0.5
Transaction Procurement Support	-	-	-	0.3	0.2	0.5
Project Development	-	1.5	2.6	5.0	0.4	9.5
Land and Environment	-	-	-	0.4	0.1	0.5
Regulatory Approvals	-	-		0.2	0.2	0.4
Community and Stakeholder Engagement	-	-	-	-	-	0.1
Rounding	-	-	0.1	-	(0.1)	-
Sub total	***-***	***1.5***	***2.9***	***7.7***	***3.1***	***15.2***
Labour-related (direct)						
Project Delivery Management	-	-	-	-		-
Other Support & Corporate Roles	-	-	-	0.1		0.1
Transaction Procurement Support	-	-	-	0.1		0.1
Project Development	-	-	-	-		-
Land and Environment	-	-	-	-		-
Regulatory Approvals	-	-	-	-		
Transaction Procurement Support	-	-	-	-	-	0.1
Rounding						(0.1)
Sub Total	***-***	***-***	***-***	***0.2***		***0.2***
Indirect						
Indirect proportion of labour	-	0.6	1.2	3.3	1.3	6.4*
Indirect proportion of labour related costs	-	-	-	0.1	-	0.1
Indirect proportion of labour-related costs						
Project Delivery Management	-	-	-	0.3	-	0.3
Other Support & Corporate Roles	-	-	-	0.7	1.0	1.7
Transaction Procurement Support	-	-	-	1.4	0.9	2.3
Project Development	-	1.0	1.8	4.6	0.8	8.3
Land and Environment	-	-	-	0.4	0.1	0.5
Regulatory Approvals	-	-	-	0.1	0.6	0.7

Capex category	RY2022 $M	RY2023 $M	RY2024 $M	RY2025 $M	31 January 2026 $M	Total $M
Rounding		0.1	0.2	(0.2)		
Sub total	**-**	***1.7***	***3.2***	***10.7***	***4.7***	***20.3***
Total	**-**	**3.2**	**6.1**	**18.6**	**7.8**	**35.7**

*Transgrid has split direct and indirect on a 70%/30% basis. Ie ($15.2M/70%) * 30% = $6.4M

Transgrid supplied GHD with two files representing a transaction data extract to support these historical costs totalling $33.7M ($1.9M difference to $35.7M related to cost escalation from nominal to $September $2026).

Data Set 1 RIT-T costs $15.7M

Analysis of this file indicates the following.

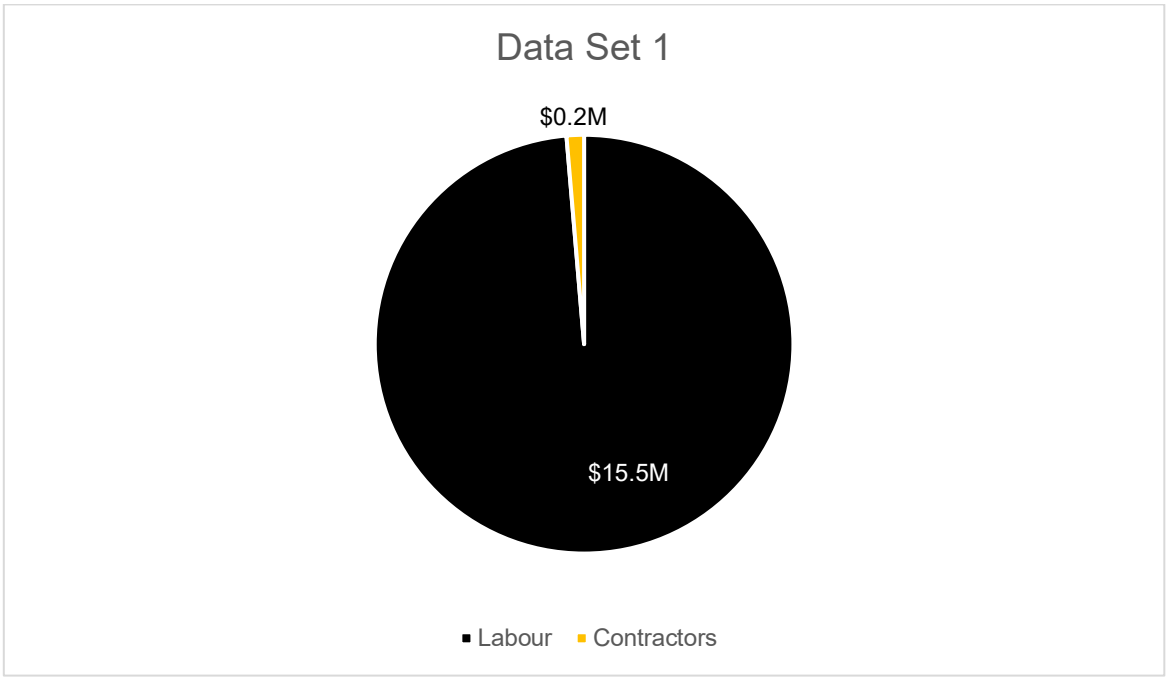


Figure 2 Composition of data set 1

Analytical review of labour indicates payroll postings and journals.

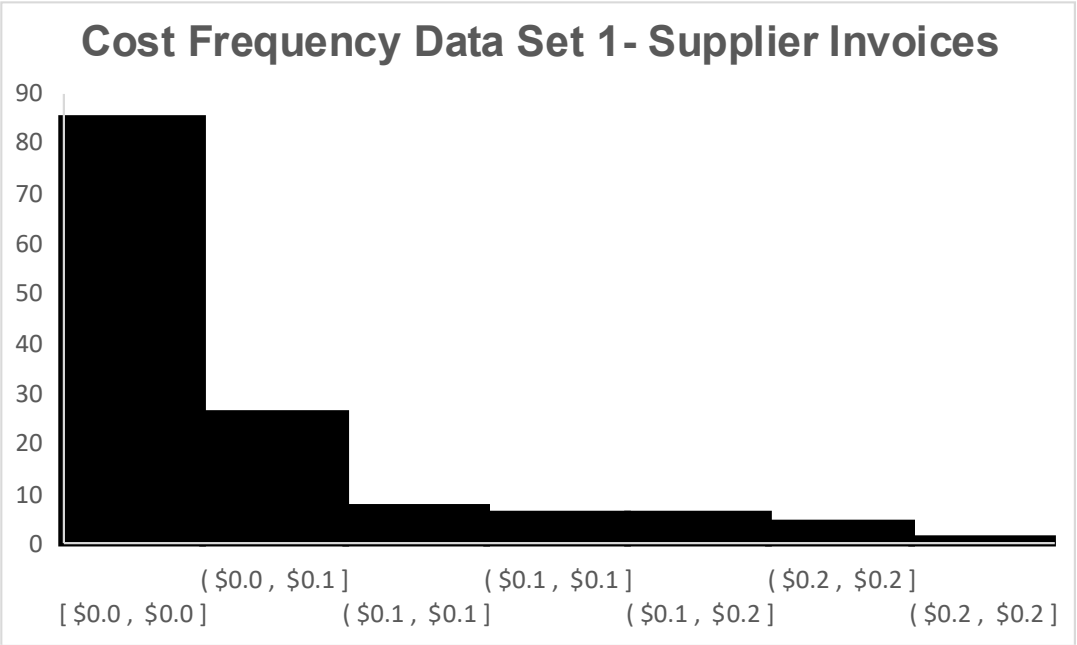


Figure 3 Cost frequency data set 1

There are no single material items in supplier invoices.

Data Set 2 actual costs $18.0M

Analysis of this file indicates the following.

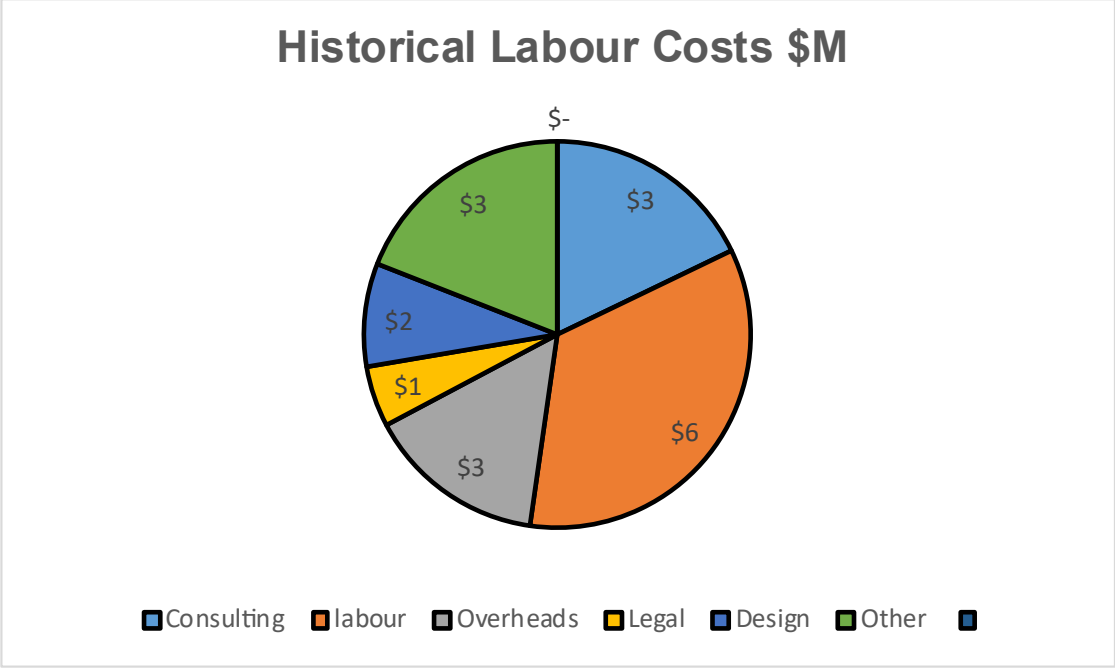


Figure 4 Historical Labour Costs ($ Nominal)

Analytical review of labour indicates payroll postings, analysis of consulting costs representing the next largest category shown no single material individual transactions.

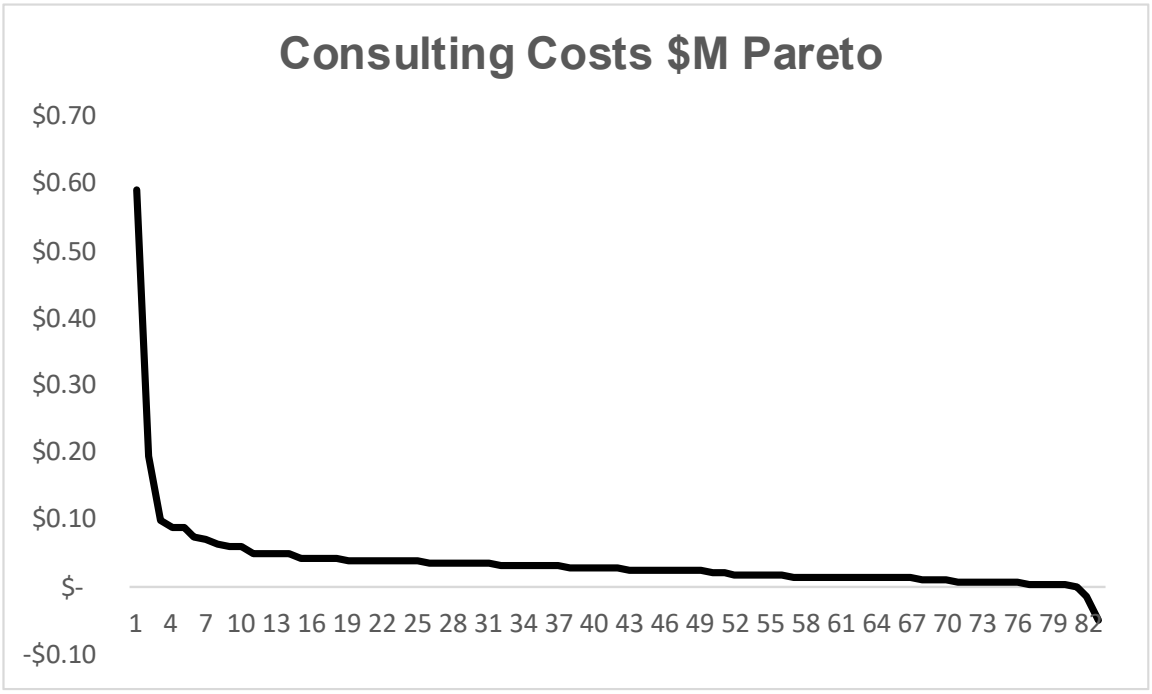


Figure 5 Pareto analysis of historical consulting costs ($ Nominal)

7.1.1 Pre-period costs

Pre-period costs can include labour costs associated with past RIT-T phases and project development.

The AER's Guidance note on the AER's EII Act Assessment Approach for Non-contestable Revenue Determinations September 2025 provides – "The Network Operator will need to provide justification that the costs are:

- Consistent with the relevant authorisation or Ministerial direction
- Related to the carrying out of the network infrastructure project
- Prudent, efficient and reasonable". [15]

In addition, any pre-period costs should be:

- Directly related to project delivery
- Not recovered elsewhere
- Appropriately capitalised or expensed.

Pre-period costs are $35.7M in total until the end of January 2026. They include $16.9M related to the RIT-T process, and $18.8M related to project development costs.

Major activities included:

- Early project analysis and development steps:
  - Establishing and undertaking project management, project controls and internal reporting
  - Detailed system strength need and option development analysis

[15] AER's Guidance note on the AER's EII Assessment Approach for Non-contestable Revenue Determinations September 2025 P 21

- Market and economic analysis to select a viable option with the highest net benefit
- Consulting widely throughout via the RIT-T process
- Scoping and optioneering
- Initial concept design work.
- Estimating costs of the multiple options.

– Procurement:

- Identification and procurement of Transgrid-supplied equipment
- Development and approval of procurement strategy and developing related plans
- Procurement of the OEM contract (including LTSA) and the two D&C contractors
- Procurement Report processes.

The other activities contributing to pre-period costs included:

– Consultation with the DCCEEW (as the IP) and negotiation of the Underwrite agreement
– Environmental approvals for all sites, and land management and easement acquisition where required
– Community engagement activities.

From GHD's perspective, the work leading to the PACR has identified the investment need and the preferred solution which includes Syn Cons, grid-forming batteries and the Hunter-Central Coast REZ requirements. These historical labour costs qualify as pre-period costs.

Without the project development activities, the project could not proceed without incurring additional costs as they represent FEL activities designed to reduce risks in latter project phases. As such the expenditure is considered prudent, required to progress the project and efficient given the forward risk reduction. In addition, these historical labour costs qualify as pre-period costs.

7.1.1.1 RIT-T and project development costs benchmarking

RIT-T costs

The table below performs RIT-T cost benchmarking. Only the actuals or forecast have been considered as a comparison of RIT-T costs as a percentage of the capex forecast would not produce a useful result. Whilst project size may indicate complexity, all projects are different and the cost of regulatory approval processes are not directly correlated to the capex forecast.

Table 16 RIT-T cost benchmarking

Project	GHD considerations	RIT-T costs $M
SSP	The SSP project progressed through the RIT-T process reaching the PACR which represents the end of the RIT-T process. The project was then covered to a PNIP project under the EII Act which would have resulted in additional costs to achieve the conversion.	$16.9
VNI West	Extracting information from the GHD independent verification and assessment of VNI West CPA-1 early works: – RIT-T costs incurred $7.8M – Forecast for CPA-2 costs $4.2M	$12.0

Project	GHD considerations	RIT-T costs $M
HumeLink	The AER determination on HumeLink provides that the RIT-T costs for CPA-1 and CPA-2 are $11.9M	$11.9

Project development costs

The same approach as indicated above were used in benchmarking project development costs.

Table 17 Project development costs benchmarking

Project	GHD considerations	Project development costs $M
SSP	Project development costs $18.8M per the above.	$18.8
VNI West	Extracting information from the GHD independent verification and assessment of VNI West CPA-1 early works project development costs are $37.7M which include $28.9M in external legal costs. As the CPA-1 only covers early works, its suitability for benchmarking project development costs needs to be discounted.	Total $37.7 After external legal costs $8.8
HumeLink	The AER determination on HumeLink indicates that project development costs are $32.9M. Extracting information from the GHD independent verification and assessment of HumeLink CPA-1 this includes $16.6M in external legal costs.	Total $32.9 After external legal costs $16.3

Regulatory Investment Test for Transmission costs for the SSP align with VNI West actual and forecasted costs when considering the likely costs associated with EII Act conversion. It is likely that the forecasted costs for VNI West are understated based upon the project's current status. HumeLink has not incurred EII Act conversion costs that are thought to be material.

Project development costs align with those on the HumeLink project.

Given these results, there is support to indicate that pre-period costs are efficient.

7.1.2 Historical labour conclusion

Pre-period costs $35.7M ($ Real 2025-26) include RIT-T and project development activities.

RIT-T costs include the work involved the identification of the investment need and the analysis of credible options to determine the preferred portfolio solution. These costs align with the Ministerial Order and are required to progress the project and mitigate risks.

Similarly, project development costs are also required to progress the project, represent prudent FEL activities design to reduce risk, align with the Ministerial Order and represents expenditure that would normally be capitalised.

From GHD's perspective the expenditure was prudent as it was required to progress the project and reduce risk. Benchmarking against comparative projects supports efficiency demonstration. The expenditure aligns with the Ministerial Order, related to the carrying out of the network infrastructure project, which qualified as pre-period costs.

7.2 Internal labour rates

Transgrid internal labour costs are updated based upon information provided by their finance function. The finance function regularly updates this information and places the data set within an internal portal that can be accessed by Transgrid staff for different purposes. The data identifies all staff through their job description category. By job description category salaries are averaged and converted to an hourly rate. This provides the number of positions by job description category and its averaged hourly rate.

The following histogram shows the spread of hourly base rate excluding inflation extracted from the supporting spreadsheet underpinning the labour and indirect cost forecast.

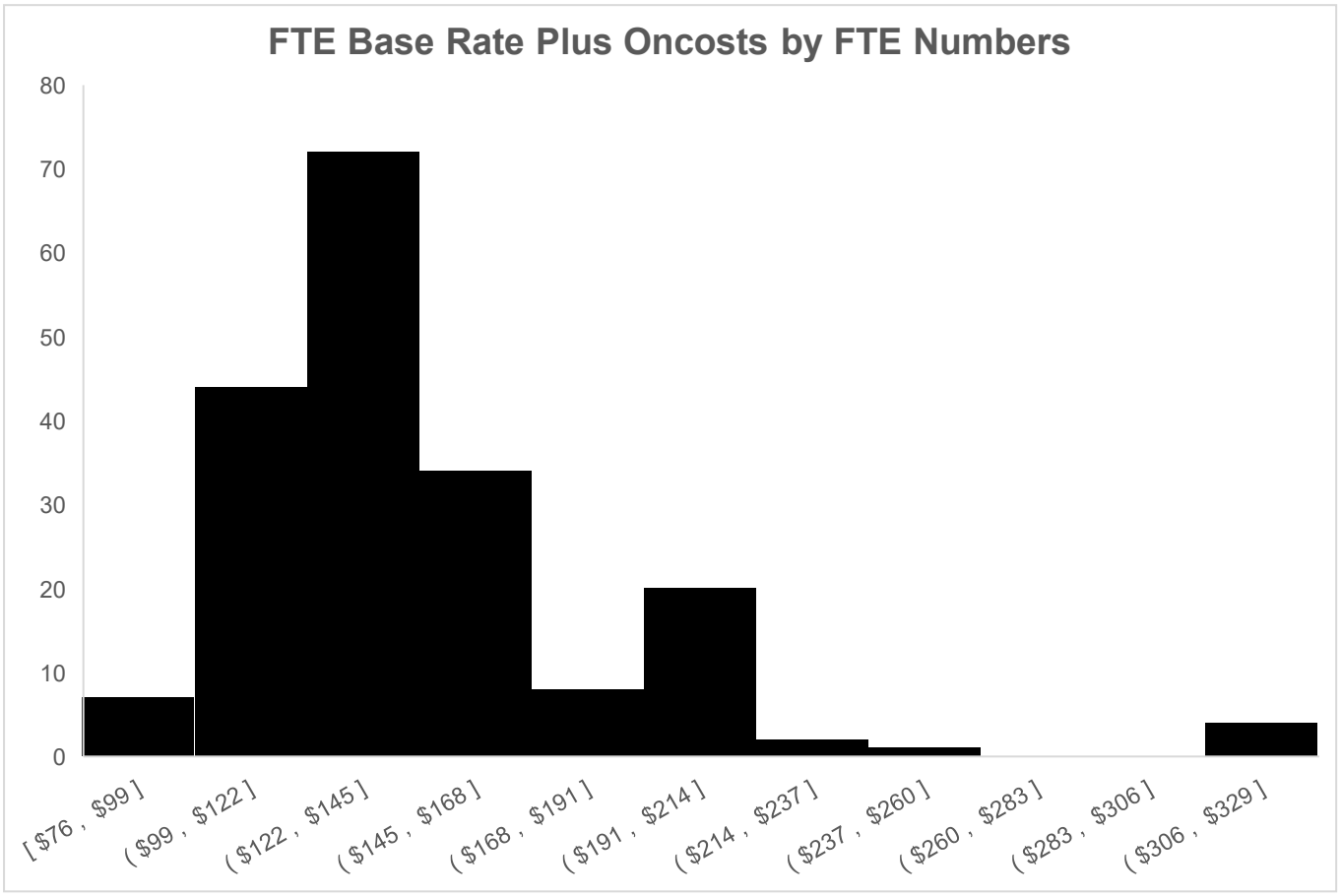


Figure 6 Histogram of base labour rates plus oncosts, excluding inflation

Two benchmarking sources have been used to assess the distribution of rates used in labour cost forecasting. The first compares against ANS labour rates and the second compares to the Electrical Power Industry Award.

7.2.1 ANS benchmarking

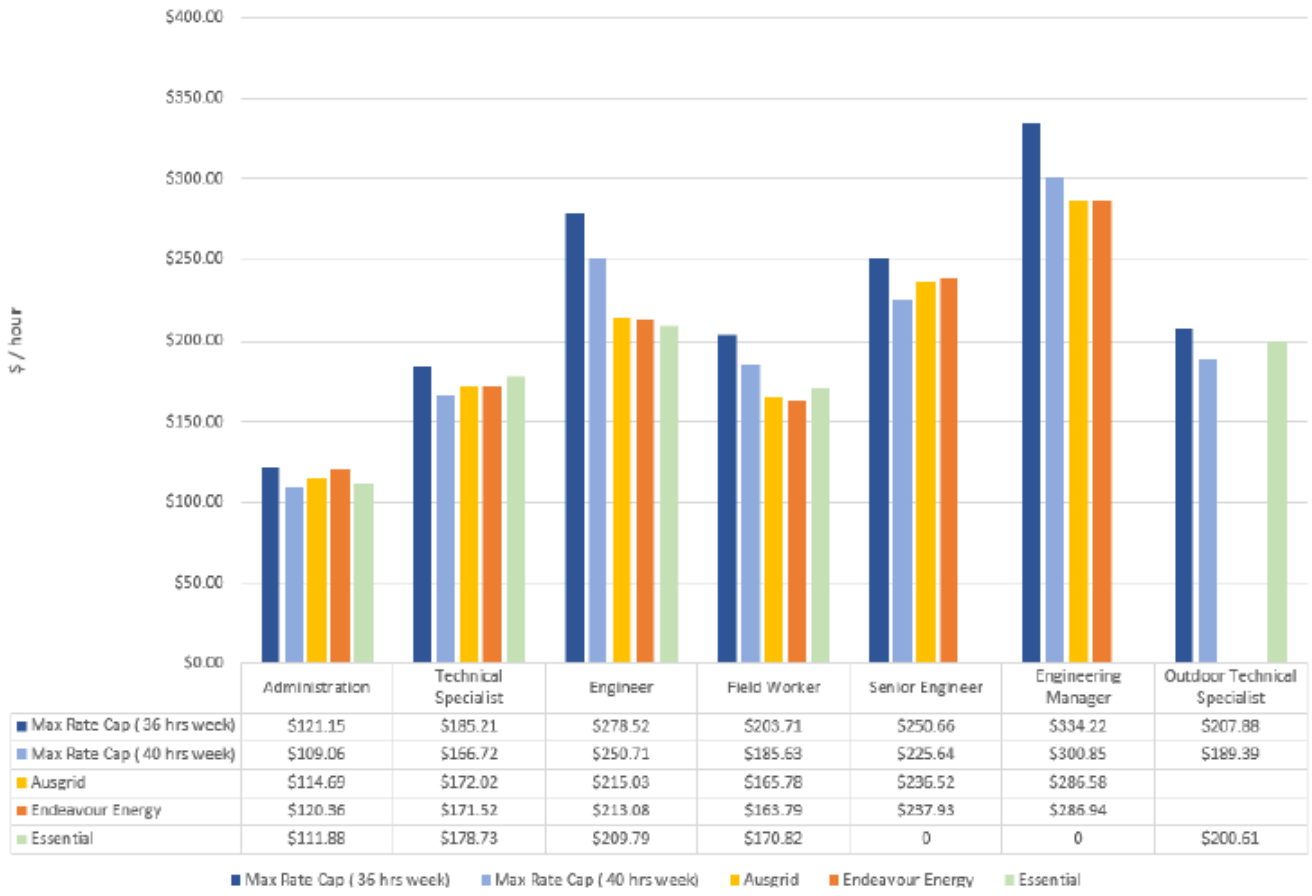
In July 2022, CutlerMerz performed a benchmarking exercise of NSW DNSP ANS labour rates. The rates include:

- Basic hourly salary
- On-costs consisting of leave, superannuation, workers compensation, payroll tax, annual leave loading and long service leave loading

- Overheads.

ANS rates have been used for benchmarking purposes as these are the only publicly available comparison.

The following figure provides an all-inclusive labour rate comparison of DNSP rates.



	Administration	Technical Specialist	Engineer	Field Worker	Senior Engineer	Engineering Manager	Outdoor Technical Specialist
Max Rate Cap (36 hrs week)	$121.15	$185.21	$278.52	$203.71	$250.66	$334.22	$207.88
Max Rate Cap (40 hrs week)	$109.06	$166.72	$250.71	$185.63	$225.64	$300.85	$189.39
Ausgrid	$114.69	$172.02	$215.03	$165.78	$236.52	$286.58	
Endeavour Energy	$120.36	$171.52	$213.08	$163.79	$237.93	$286.94	
Essential	$111.88	$178.73	$209.79	$170.82	0	0	$200.61

Figure 7 All-inclusive labour rates cap comparison ($2022/23)

Source - July 2022, CutlerMerz benchmarking exercise of NSW DNSP ANS labour rates

Ancillary Network Services include activities that require less senior supervision than a project of this nature (i.e. public lighting and metering services). Transgrid's labour classification system also does not align with the classification system used by CutlerMerz, as a result GHD has considered averages across all project roles, including on-costs and overhead allocations.

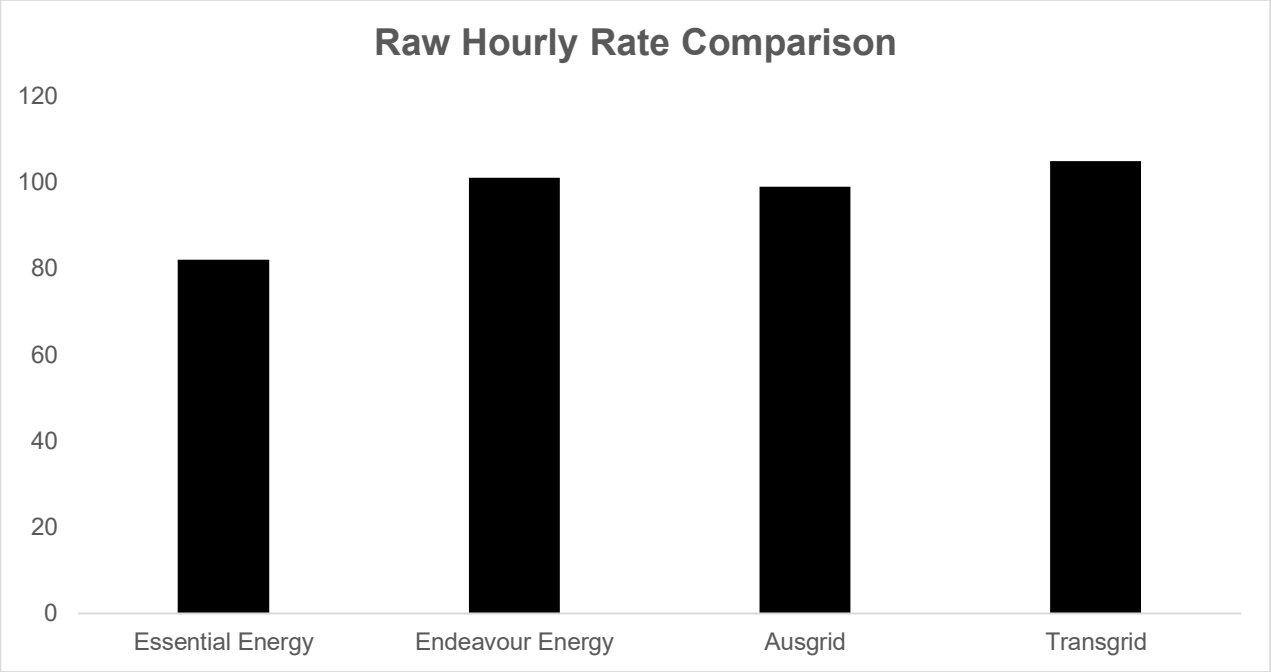


Figure 8 ***Comparison of NSW DNSP ANS labour rates extracted from the Cutler Merz report, excluding Admin Staff and indexed by the NSW WPI to labour rates used by Transgrid in labour cost estimates***

This analysis has its limitations as Transgrid's labour classification system also does not align with the classification system used by CutlerMerz. As a result, the comparative benchmarks are based upon a simple average of raw labour rates by category, which would not factor into account the weighted average of different roles. Whereas the Transgrid comparison reflects an average across all roles which would equate to a weighted average result. This would tend to elevate the comparative benchmarks.

7.2.2 Electrical Power Industry Award benchmark

To provide additional support, we have compared wage rates included in the spreadsheet underpinning the labour forecast, plus labour oncosts, to the Pay Guide – Electrical Power Industry Award (MA000088) published by the Fair Work Ombudsman 31 October 2025.

The results are detailed below –

Project delivery management

The average project delivery management (Refer Figure 9) is less that the award comparison (Refer Figure 10).

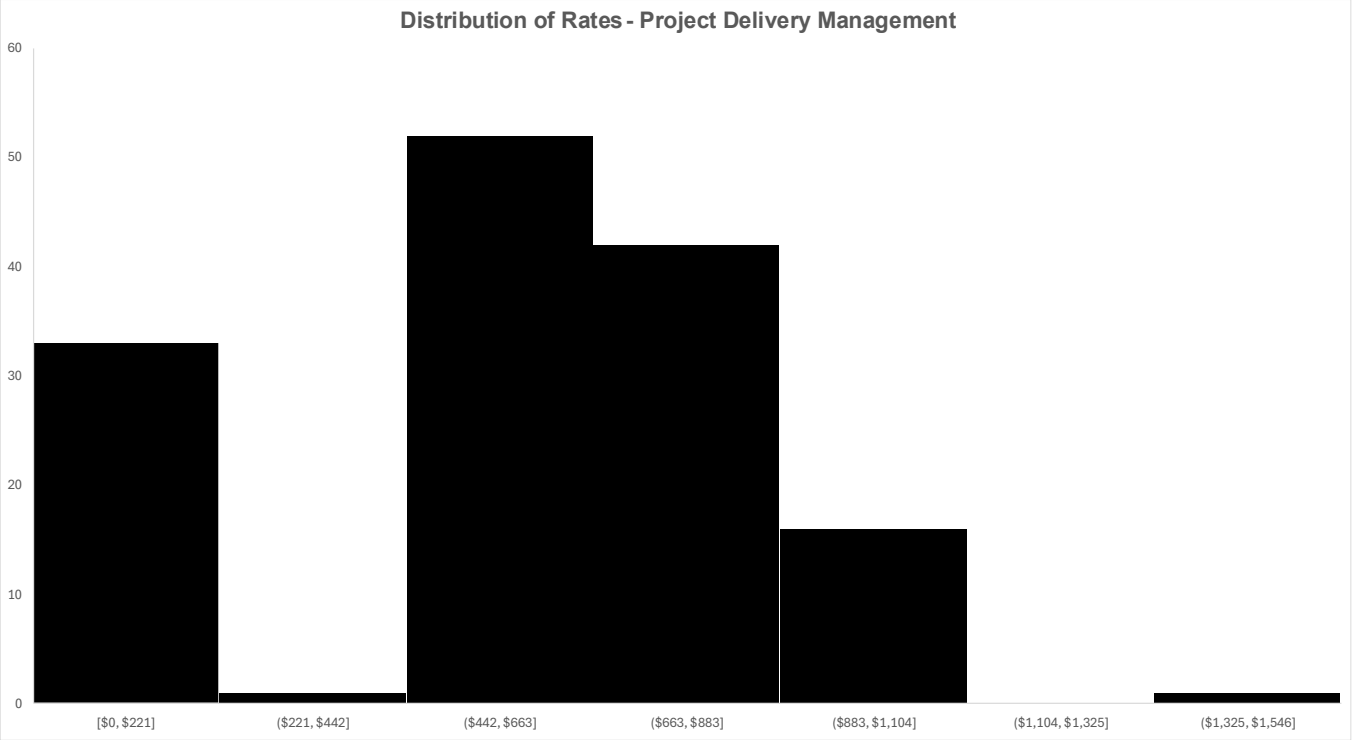


Figure 9 Distribution of internal weekly rates - project delivery management

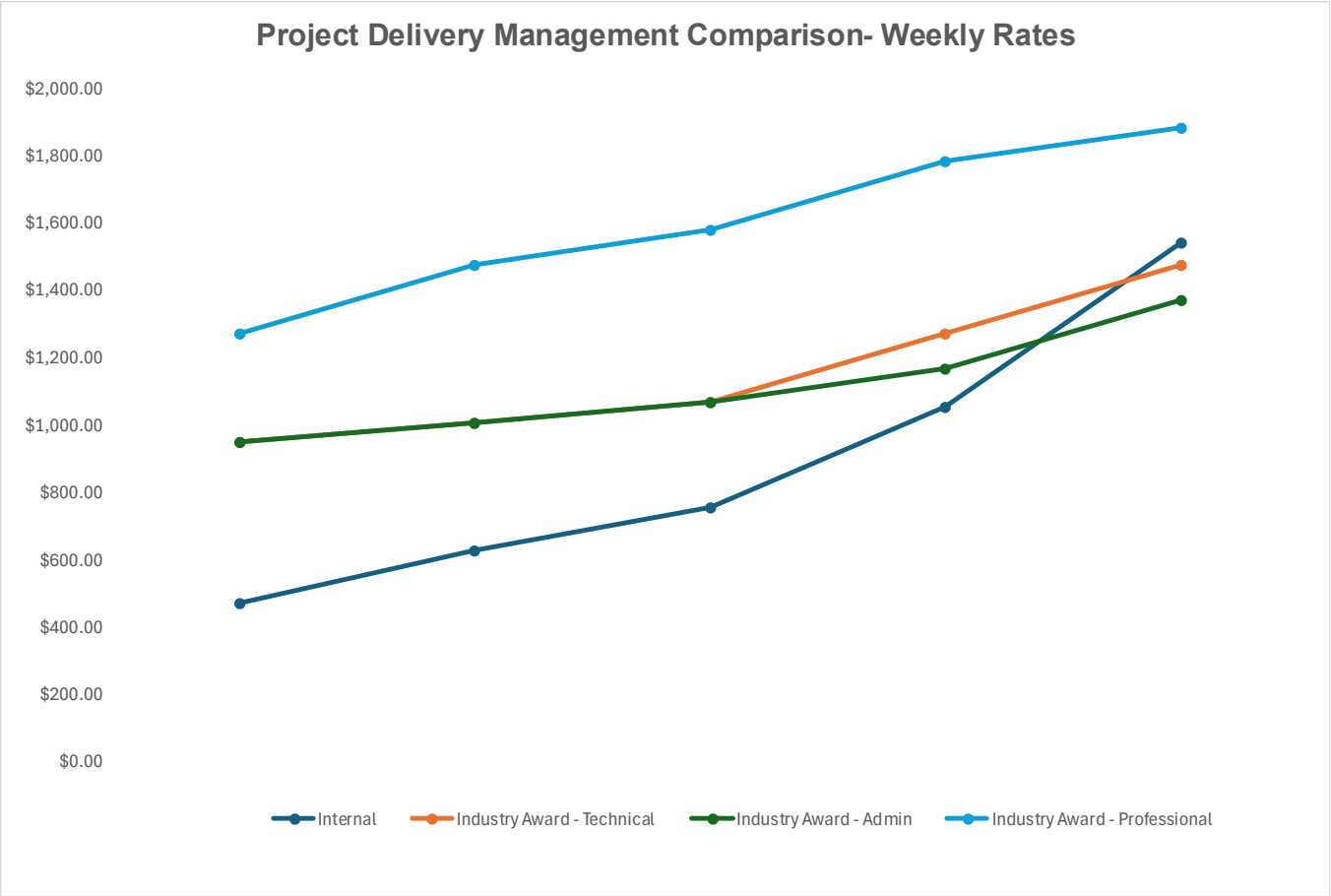


Figure 10 *Project delivery management comparison - weekly rates*

Land and environment

The same conclusion can be reached for land and environment.

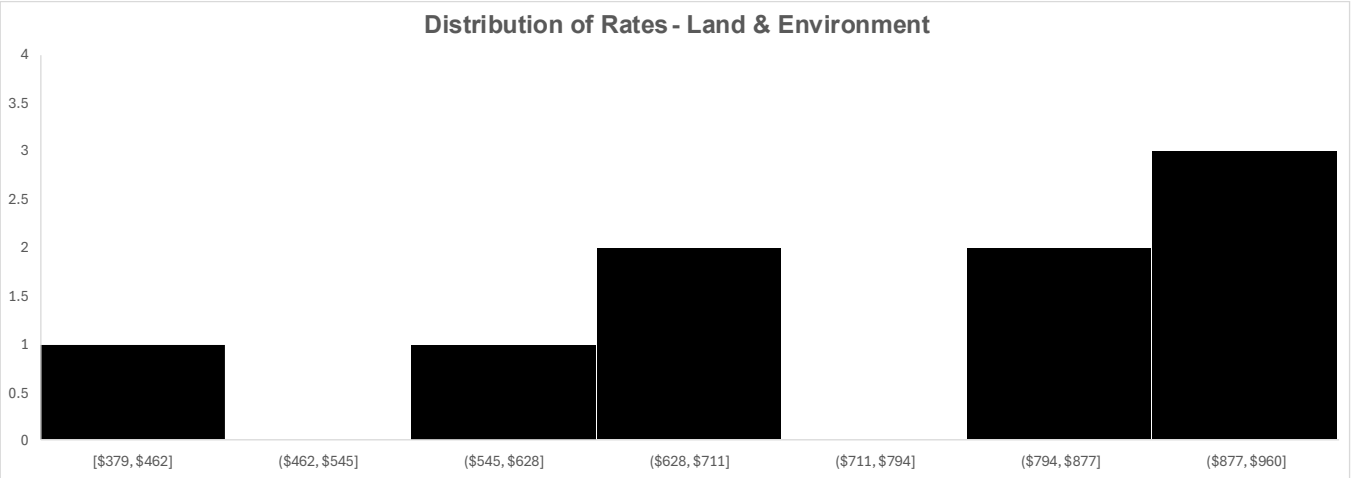


Figure 11 *Distribution of internal labour rates - land and environment*

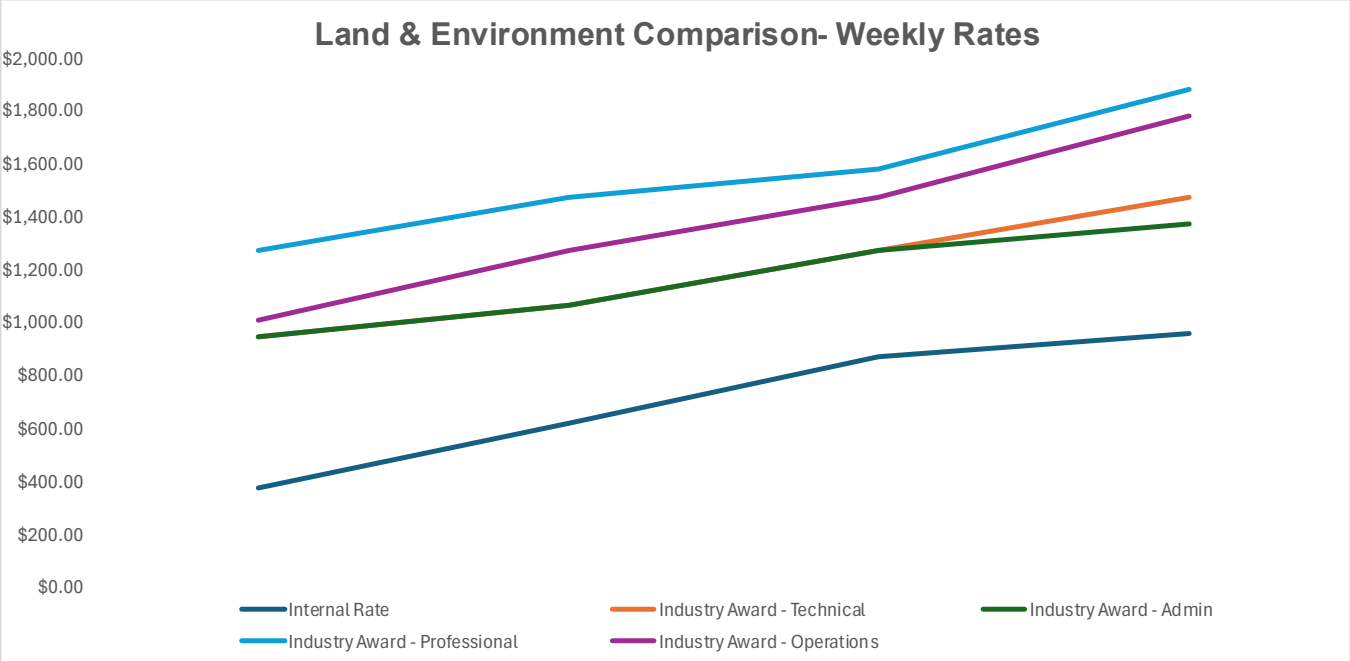


Figure 12 Land and environment comparison - weekly rates

Project development

The same conclusion can be reached for project development also.

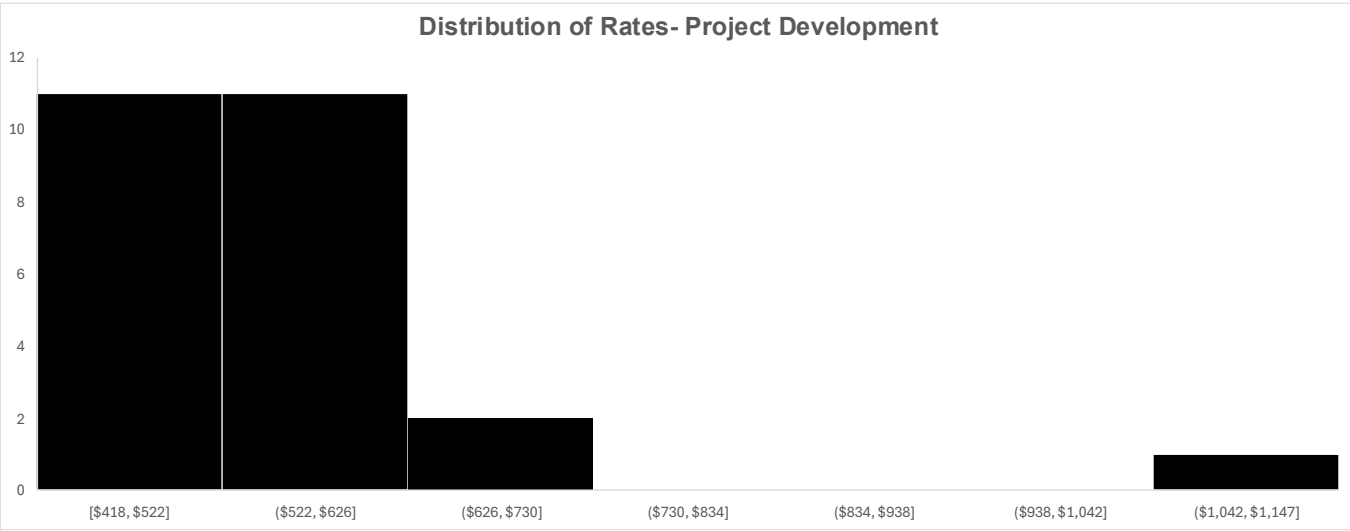


Figure 13 Distribution of internal labour rates - project development

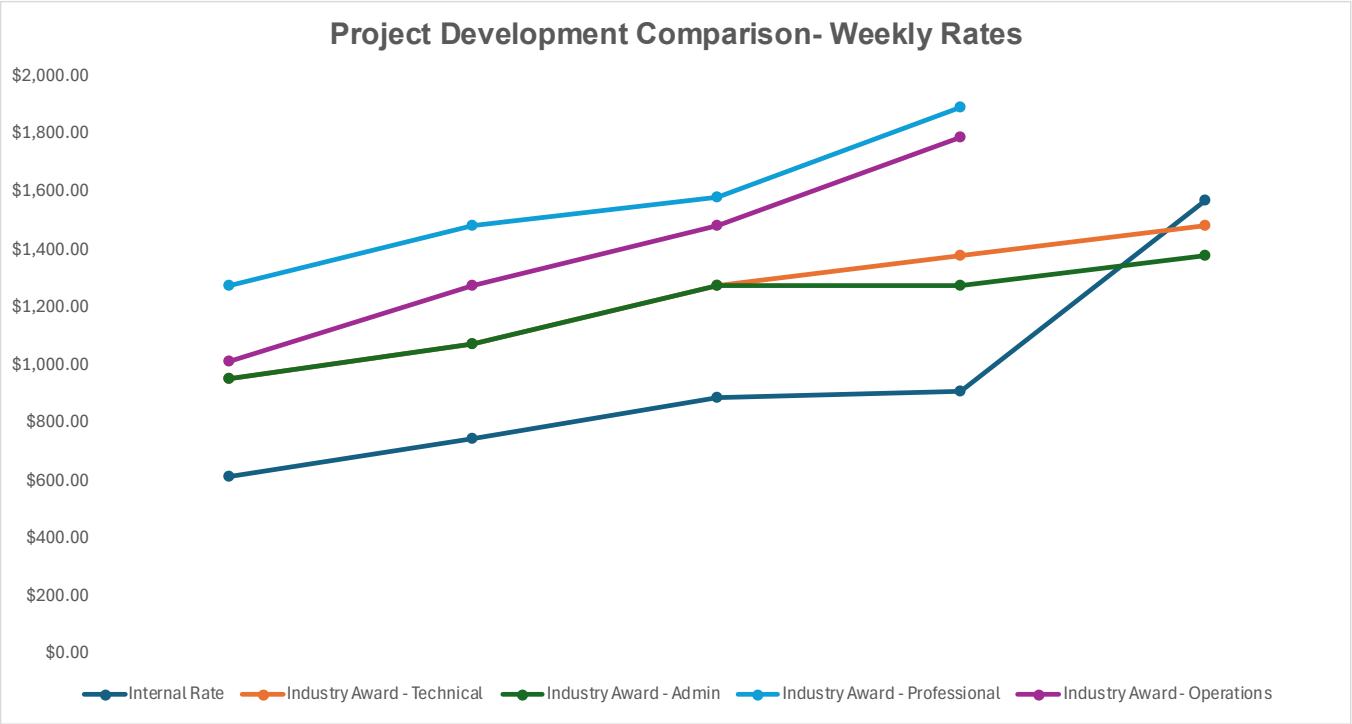


Figure 14 Project development comparison - weekly rates

7.2.3 Internal labour rates conclusion

ANS – Benchmarking - Given the limitations of the benchmarking exercise, a ballpark view indicates general alignment noting that Transgrid's team is likely to have a higher proportion of supervisory staff compared to ANS activities.

Award – Benchmarking – The analysis generally supports that the average range of labour costs is below the Electrical Power Industry Award.

7.3 Labour oncosts

Transgrid has consistency applied oncost assumptions across past ISP projects and this project, detailed in the table below.

Table 18 Breakdown of labour on-costs

Type	Rate (%)	Breakdown
Employees under Award EBAs	36.8%	– Annual leave 8% – Long service leave 5.8% – Payroll tax 5.5% – Superannuation 16.5% – Worker's compensation 1%
Employees on individual employee contracts – Contract Officers	32.2%	– Annual leave 8% – Long service leave 5.8% – Payroll tax 5.5% – Superannuation 12.0% – Worker's compensation 1%

7.3.1 Labour oncosts conclusion

Oncosts are consistent with previous Transgrid ISP projects / RNIP submissions and align with tax obligations.

7.4 Labour escalation

Labour rate escalation will likely be driven by the Enterprise Bargaining Agreement which tends to lag inflation. The escalation factors have been provided by Oxford Economics.

Based upon the Australian Bureau of Statistics (Reference period October 2025) inflation is currently 3.8% for the 12 months to October 2025, with Transgrid's forecast lighted in blue in the table below. The forecast trends back to the Reserve Bank of Australia CPI target range of 2 to 3%.

Real 2026 to Mid Period = Inflation based to 2026 / (1+ Actual / Forecast Inflation)$^{0.5}$

Nominal Deflator to Real 2026, highlighted in grey in the table below is used to escalate labour rates = 1 / Real 2026 to Mid Period

Table 19 Labour escalation rates

Item	Unit	2025	2026	2027	2028	2029	2030	2031
Actual / Forecast Inflation	%	6.03%	3.81%	2.09%	3.70%	2.60%	2.60%	2.60%
Inflation based to 2026	factor	0.9633	1	1.0209	1.0587	1.0862	1.1144	1.1434
Real 2026 to Mid Period	factor	0.9355	0.9815	1.0104	1.0396	1.0723	1.1002	1.1288
Nominal Deflator to Real 2026	factor	1.069	1.019	0.990	0.962	0.933	0.909	0.886

7.5 Project delivery management

This category includes project management, construction management, commissioning, commercial and contract management, as well as project controls.

The following table summarises the historical and forecasted project delivery management labour costs.

Table 20 Project delivery management cost summary ($M Real 2025-26)

Category	Report reference	$M
Labour direct		
Historical to 31 January 2026	Section 7.1	3.8
Forecast	Section 7.5.1	72.1
Subtotal		*75.9**
Labour related direct		
Historical to 31 January 2026	-	-
Forecast	Section 7.5.2	8.9

Category	Report reference	$M
Subtotal		*8.9*
Indirect labour		
Historical to 31 January 2026	Section 7.1	0.3
Forecast	Section 7.5.1	1.5
Subtotal		*1.8*
Total		**86.8**

* Transgrid has split labour costs on a 70% basis, as shown in the table with 30% being allocated to the indirect proportion of labour 30% included in section 7.11.

7.5.1 Project delivery management team

This stream is responsible for oversight and coordination from early development to commissioning. Transgrid's Labour and Indirect Capex Forecasting Methodology breaks this team into separate streams related to project management, project engineering management, construction management, commissioning, commercial management and project controls.

GHD has analysed these streams separately.

Project management

Across the five sites, project management refers to managing the following issues:

- Brownfield sites, with majority of work occurring in vicinity of operating Transgrid assets
- Integration requirements with existing network infrastructure
- Multiple contractors
- Contractor supervision requirements
- Multiple downstream contracts to manage with complex interfaces between OEM supplier and D&C contractors.

- Activities spread across multiple geographically dispersed sites
- Transport requirements.

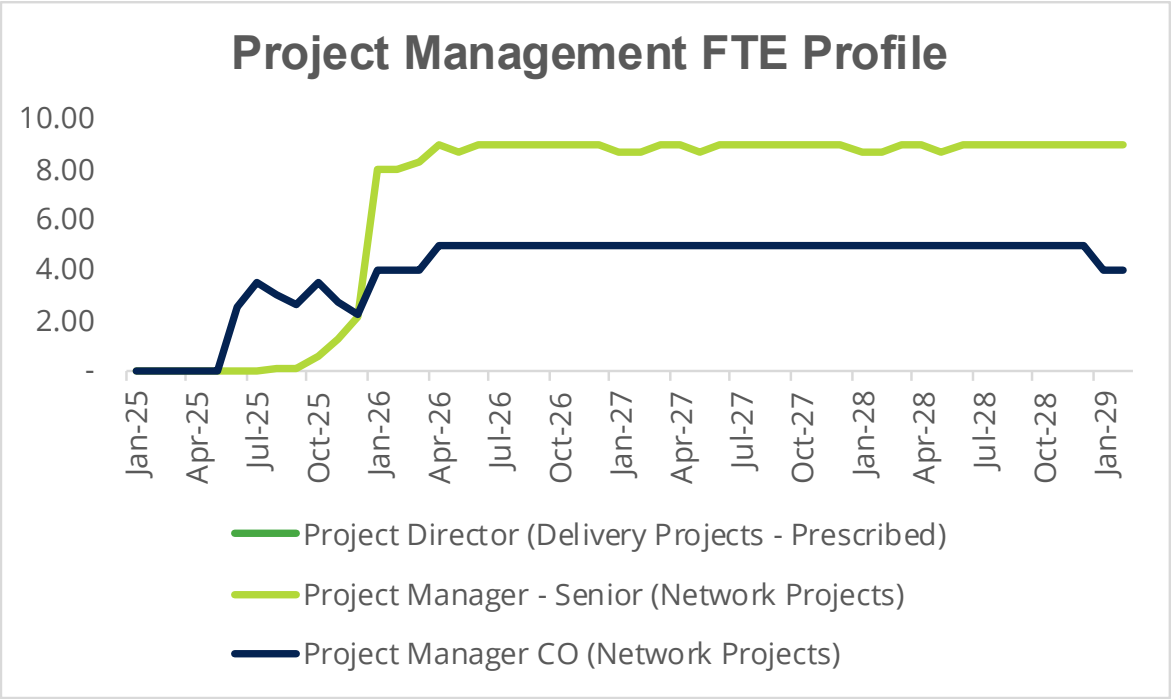


Figure 15 Project delivery management stream FTE profile

Construction management and commissioning

Construction management stream responsibilities are detailed in section 5.4.3 of Transgrid's Labour and Indirect Capex Forecasting Methodology. In summary, across five sites construction management includes contractor supervision, safety, coordination of network outages and community engagement.

Commissioning is detailed in section 5.4.4 of Transgrid's Labour and Indirect Capex Forecasting Methodology. In summary, across five sites, it involves onsite support for brown field integration, installation/upgrade/commissioning of new telecommunications equipment and compliance with GPS requirements.

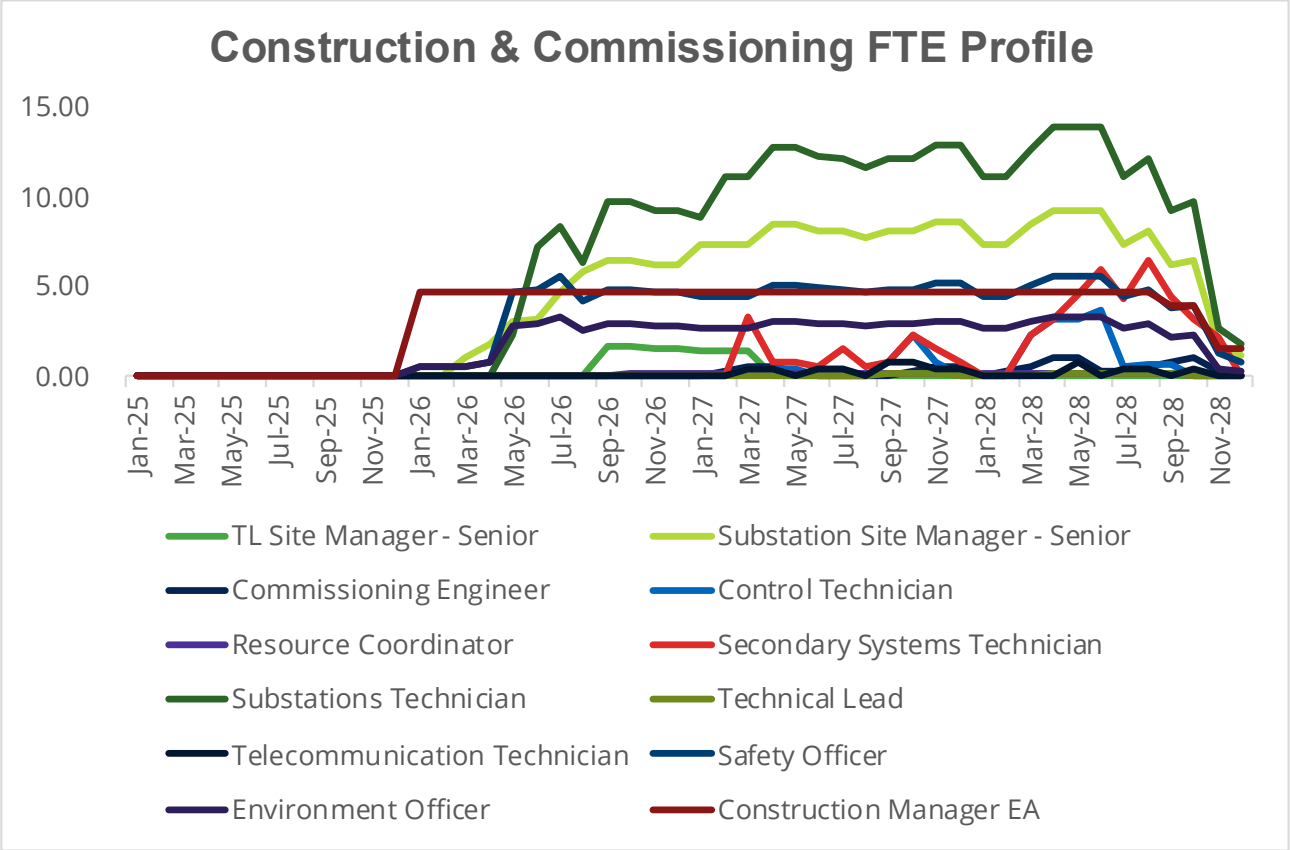


Figure 16 ***Project development construction and commissioning stream FTE profile***

Project engineering management

Activities associated with project engineering management include:

- Review of designs for OEM and D&C
- Coordination of ensure all designs between OEM and D&C
- Detailed design associated with protection, automation and communications to integrate the Syn Cons with the network
- Site support during commissioning
- Change management.

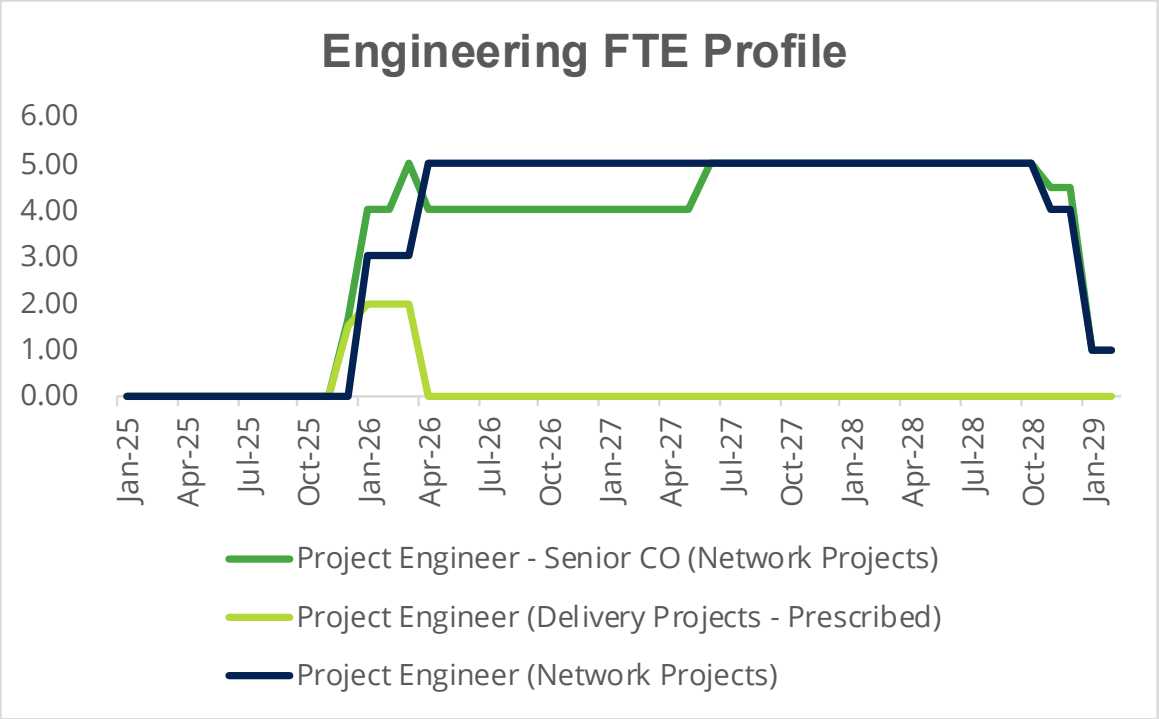


Figure 17 ***Project delivery project engineering management stream FTE profile***

The consolidated FTE profile is shown in the figure below.

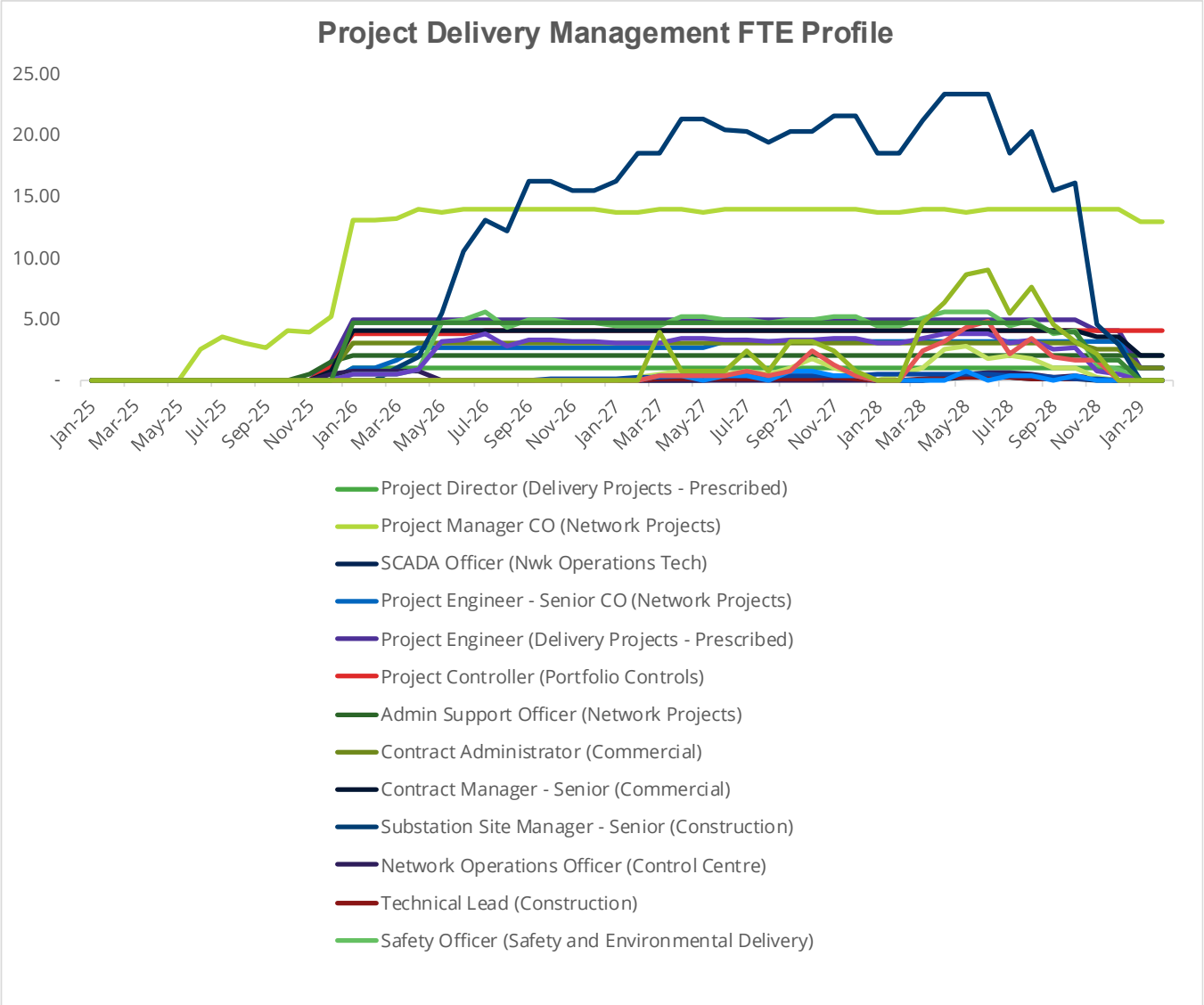


Figure 18 Consolidated project delivery management FTE profile

7.5.2 Project delivery management labour related direct forecast

Labour related direct costs are based on assumptions presented in the table below with GHD checking the integrity of spreadsheet formulas.

These assumptions are consistent with those GHD assessed on other Transgrid projects.

Table 21 Assumptions included in project development management labour related costs ($M Real 2025-26)

Assumptions	$M
Training assumption The number of FTE roles * training costs p.a per FTE $1,952	0.4
Recruitment assumption 50% of roles use external recruiters with recruitment fee of 15% of annual salary	0.5
IT hardware assumptions	0.1

Assumptions	$M
Incremental new FTEs * IT hardware costs $3,721 p.a	
Travel assumptions Based upon a detailed breakdown of required trips per role, by the number hours per trip, daily allowances. Daily allowances are based upon salary bands which align with of fall under ATO allowance values.	8.1
Total	**9.1**

7.5.3 Project delivery management forecast conclusion

Labour forecasts are based upon FTE roles required to deliver the projects stream objectives with the FTE profile phased to align with the projects schedule. GHD has broken down the streams into project management, project engineering management, construction management, commissioning, commercial management and project controls to perform this analysis. The profile of the teams is considered prudent as activities need to be coordinated between the OEM supplier, D&C contractors and Transgrid across five sites. The design, site supervision and commissioning activities are required to complete the project with a reduced risk profile with respect to scope slippage and cost increase.

The resources are also required to meet Transgrid's contractual obligations under various contracts.

7.6 Other support and corporate roles

Includes general project delivery support through functions such as regulatory compliance, health and safety, legal, risk and audit, and network operations.

Table 22 Other support and corporate roles cost summary ($M Real 2025-26)

Category	Report reference	$M
Labour direct		
Historical to 31 January 2026	Section 7.1	0.5
Forecast	Section 7.6.1	15.4
Subtotal		*15.9**
Labour related direct		
Historical to 31 January 2026		-
Forecast		-
Subtotal		-
Indirect labour		
Historical to 31 January 2026	Section 7.1	1.7
Forecast	Section 7.6.2	23.5
Subtotal		*25.2*
Total		**41.1**

*Transgrid has split labour costs on a 70% basis, as shown in the table with 30% being allocated to the indirect proportion of labour 30% included in section 7.11.

7.6.1 Other support and corporate roles team profile

The distribution of other support & corporate role FTEs are outlined below, capturing the competencies required to support projects.

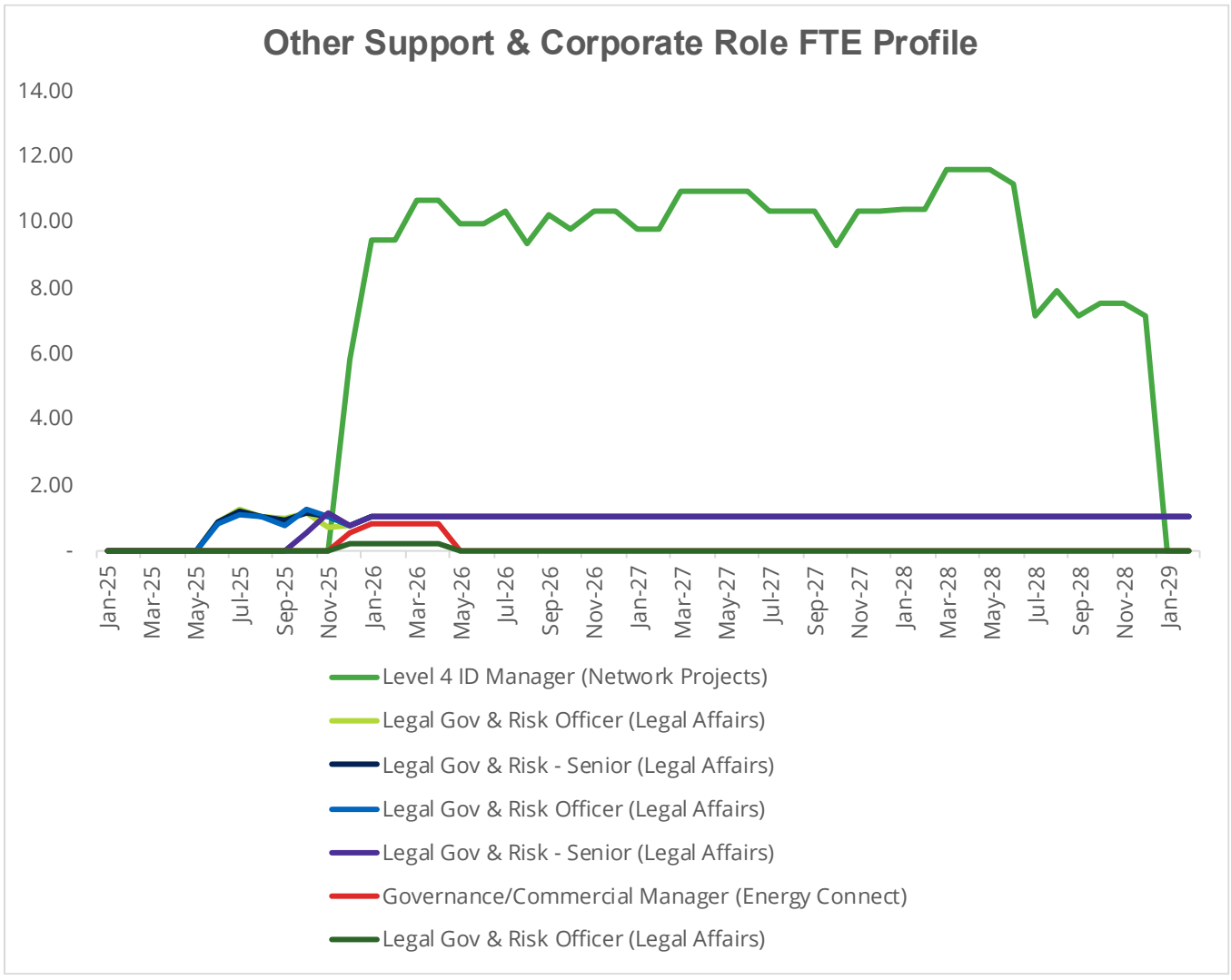


Figure 19 Other support & corporate roles FTE profile

7.6.2 Other support & corporate roles labour related indirect forecast

The following table provides a breakdown of the forecast.

Table 23 Other support & corporate roles labour related indirect forecast ($M Real 2025-26)

Description	Total $M
Insurance – agreed to external insurance quote	7.5
Transgrid has advised that this estimate represents its proportionate share of the broader Class B portfolio's process and system improvement initiatives that directly support project delivery capability. These initiatives include enhancements to the project management system, source-system transitions, governance and close-out processes, quality-assurance uplift, and workforce-capability development. The allocation has been applied based on Syn Con's relative scale and utilisation of these improvements, generally at 40% across core initiatives.	5.0
Transgrid has advised that these overarching business costs include training and capability uplift, commissioning, and testing support functions proportioned to the Syn Cons project: – Commissioning Lab – Testing and commissioning services for all equipment going into substations for secondary systems. – Fleet-related expenses – Procurement management cost.	7.3
Outsourced material & equipment	1.7
Items below $1M individually	2.2
Total	**23.7**

7.6.3 Other support & corporate roles conclusion

Commercial, contract and risk management and legal support and network operators are required to manage risk to an acceptable level, comply with regulatory obligations and manage / monitor the network. Such activities are considered to be prudent as they reduce commercial risk, drive contract performance and support regulatory compliance.

Other support and corporate roles includes $5M for shared portfolio-level support costs that enable project delivery but not directly attributable to a single project. These include training and capability uplift, commissioning, and testing support functions, as well as broader business governance and coordination activities. Such initiatives directly support project delivery or provide governance for effective delivery and are thus considered prudent.

The forecast also includes an additional $7.3M for training and capability uplift, commissioning, and testing support functions proportioned to the Syn Con project. Again, such initiatives directly support project delivery for effective delivery and are thus considered prudent

7.7 Transaction procurement support

This category includes all resourcing to support the procurement and engagement of the OEM and D&C Contractors.

Transgrid's Labour and Indirect Capex Forecasting Methodology details that these costs includes:

– OEM procurement costs, associated with procuring GE Vernova as the OEM supplier.

– D&C procurement costs associated with procuring contractors for the delivery of the D&C scope of works.

– Equipment procurement costs associated with procuring the Transgrid supplied substation and secondary systems equipment from Transgrid's existing panel agreements.

– Minor ongoing procurement costs to support the ongoing procurement activities, engagement of consultants and other support for the duration of the project.

Again, these activities are consistent with the definition of the non-contestable scope.

Table 24 Transaction procurement support cost summary ($M Real 2025-26)

Category	Report reference	$M
Labour direct		
Historical to 31 January 2026	Section 7.1	0.5
Forecast	Section 7.7.1	0.9
Subtotal		*1.4**
Labour related direct		
Historical to 31 January 2026	-	-
Forecast	-	-
Subtotal		-
Indirect labour		
Historical to 31 January 2026	Section 7.1	2.3
Forecast	Not material	0.1
Subtotal		*2.4*
Total		**3.8**

* Transgrid has split labour costs on a 70% basis, as shown in the table with 30% being allocated to the indirect proportion of labour 30% included in section 7.11.

7.7.1 Direct labour forecast

The direct labour cost forecast presented below has been extracted from the spreadsheet underpinning the forecast. This applies base labour rates described in section 7.2 and applies that rate to phased FTE roles which have been based upon the projects schedule.

7.7.2 Transaction procurement support conclusion

The costs and forecast for procurement and engagement of the OEM and D&C Contractors is considered prudent as these activities are required to progress the project in an efficient way as they represent FEL activities.

7.8 Project development

This category includes engineering and design activities carried out from the concept phase through to construction. This encompasses design reviews, coordination with OEM and D&C contractors, and provision of design support during construction.

Transgrid's Labour and Indirect Capex Forecasting Methodology details that these costs reflect scoping and initial engineering and design activities, including approvals, required to support the successful delivery of the Project during early development, up to contract award.

Key activities driving these costs are:

– Detailed scoping of the project for all five substations

– Early works activities such as geotechnical site investigations, mine subsidence assessments for Newcastle, survey, coordination of procurement of Transgrid supplied equipment
– Concept design associated with protection, automation and communications to integrate the Syn Cons with the network such as reactive plant, secondary systems and automation design
– Review of concept designs prepared by the OEM and D&C contractors
– Development and review of concept automation, protection and control systems design and specifications required at each substation
– Completion of environmental approvals
– Technical review of OEM and D&C tenders
– Development of basis of designs for technical specifications (OEM and D&C)
– Provision of development support during the construction stage.

Again, these activities are consistent with the definition of the non-contestable scope.

Table 25 Project development cost summary ($M Real 2025-26)

Category	Report reference	$M
Labour direct		
Historical to 31 January 2026	Section 7.1	9.5
Forecast	Section 7.8.1	3.9
Subtotal		*13.4**
Labour related direct		
Historical to 31 January 2026	-	-
Forecast	-	-
Subtotal		-
Indirect labour		
Historical to 31 January 2026	Section 7.1	8.2
Forecast	Section 7.8.2	1.4
Subtotal		*9.6*
Total		**23.0**

* Transgrid has split labour costs on a 70% basis, as shown in the table with 30% being allocated to the indirect proportion of labour 30% included in section 7.11.

7.8.1 Project development team profile

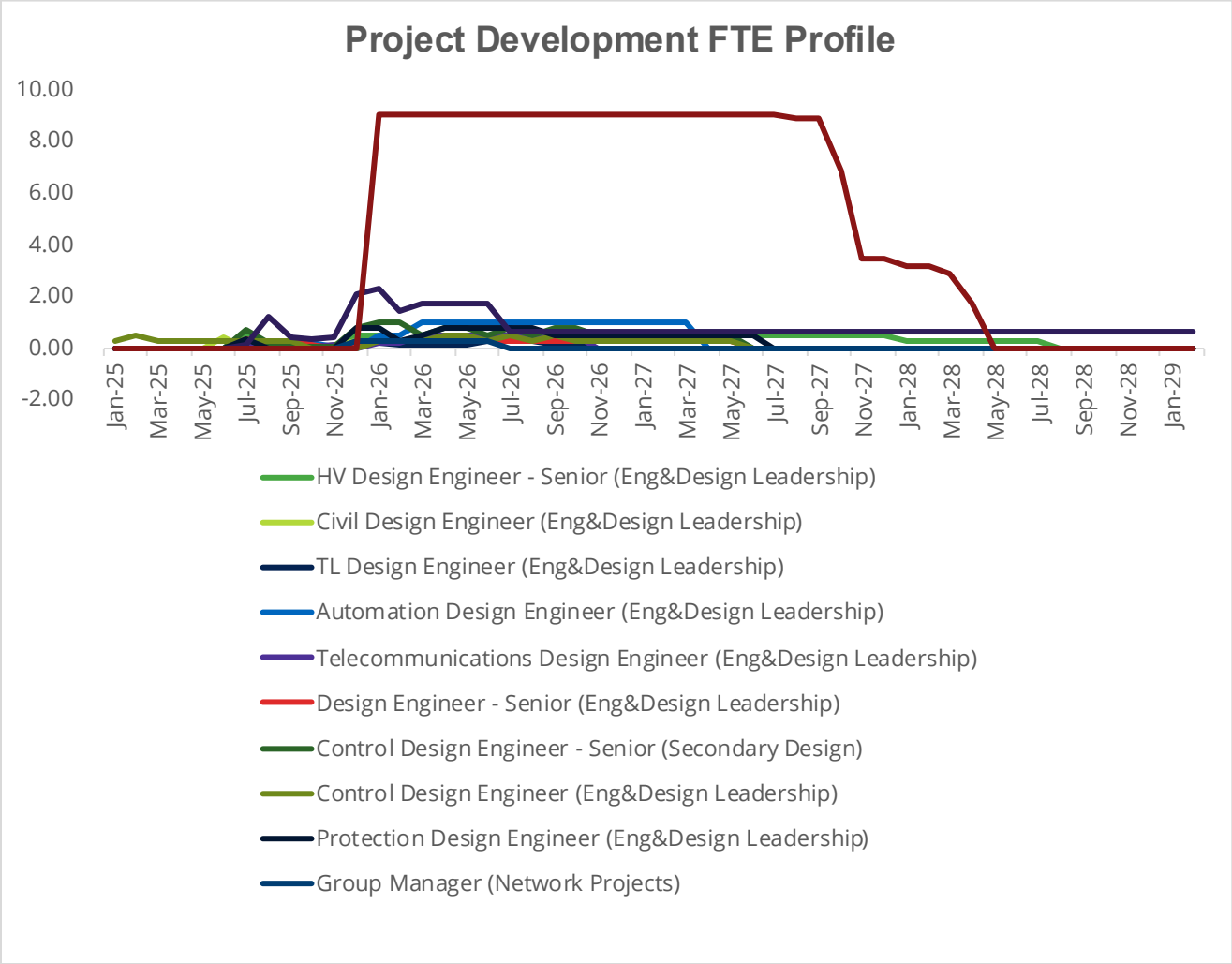


Figure 20 Project development FTE profile

7.8.2 Project development consultants

Whilst these forecasts are just above the materiality threshold, individually they fall under the threshold and consist of the following estimates.

Table 26 Project development consultants ($M Real 2025-26)

Details	$M
HV design consultant	0.1
LV design consultant	0.1
Control systems design consultant	0.3
Regulatory and underwriting assistance	0.8
Items under $100K	0.1
Total	**1.4**

7.8.3 Project development conclusion

Labour forecasts are based upon FTE roles required to deliver the projects stream objectives with the FTE profile phased to align with the projects schedule. The design related activities are considered to be prudent as again they represent the FEL activities that lower the risk profile during construction and commissioning. The other activities, including environmental approvals represent activities required to progress the project without future delay, with project completion required to support SSSP obligation satisfaction.

7.9 Land and environment

This category includes resources dedicated to environmental assessments and approvals, stakeholder consultation, easement acquisition, and ongoing site-based environmental and property management.

Table 27 Land and environment cost summary ($M Real 2025-26)

Category	Report reference	$M
Labour direct		
Historical to 31 January 2026	Section 7.1	0.6
Forecast	Section 7.9.1	3.1
Subtotal		*3.7**
Labour related direct		
Historical to 31 January 2026	-	-
Forecast	-	-
Subtotal		-
Indirect labour		
Historical to 31 January 2026	Section 7.1	0.5
Forecast	-	-
Subtotal		*0.5*
Total		**4.2**

* Transgrid has split labour costs on a 70% basis, as shown in the table with 30% being allocated to the indirect proportion of labour 30% included in section 7.11.

7.9.1 Land and environment team

Site based safety and environment detailed below.

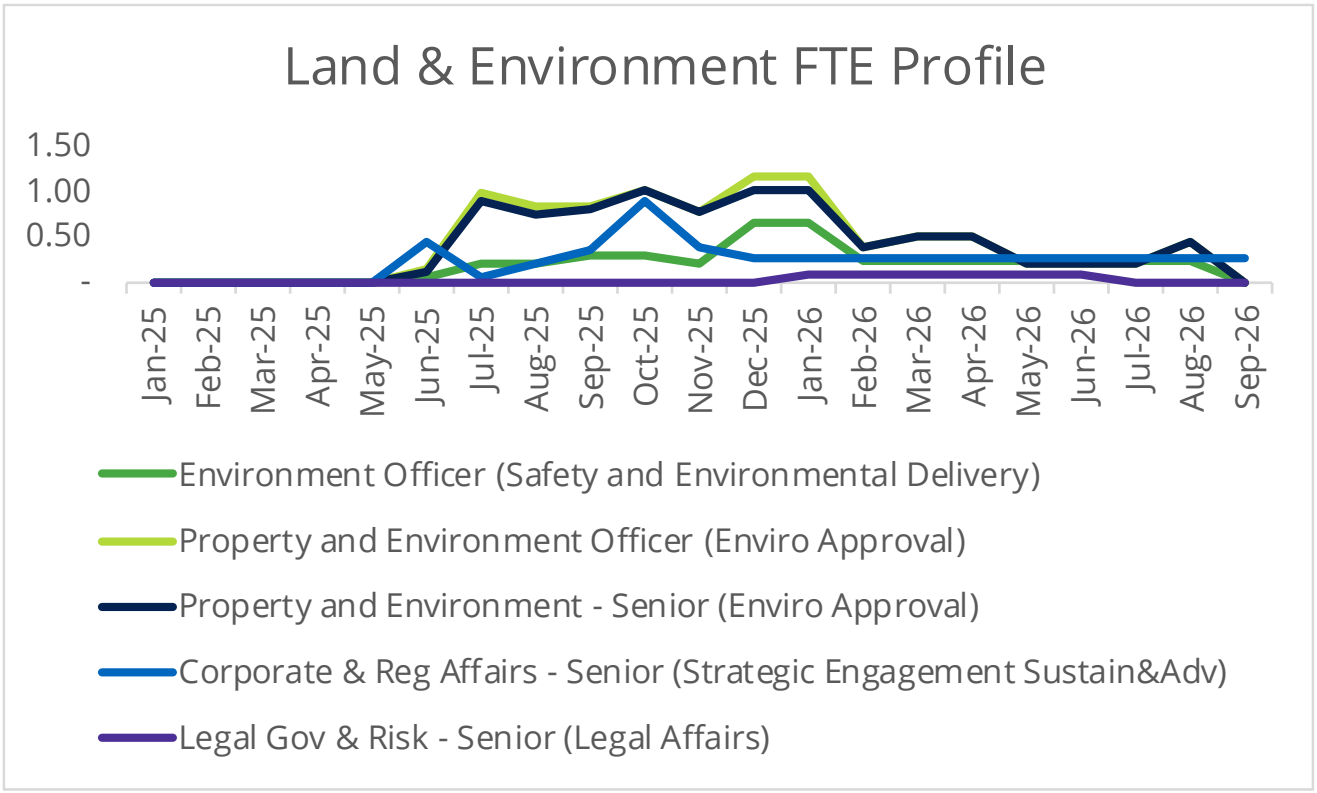


Figure 21 Land and environment FTE profile

7.9.2 Land and environment conclusion

Small team required to support safety and environment outcomes and reduce the risk of stoppages caused through safety and environmental events.

7.10 Regulatory approvals

This includes all activities to prepare this Revenue Proposal for SSP. This includes costs to support the AER review and determination process.

Table 28 Regulatory approvals cost summary ($M Real 2025-26)

Category	Report reference	$M
Labour direct		
Historical to 31 January 2026	Section 7.1	0.4
Forecast	Not material	0.4
Subtotal		*0.8**
Labour related direct		
Historical to 31 January 2026	-	-
Forecast	-	-
Subtotal		-
Indirect labour		
Historical to 31 January 2026	Section 7.1	0.7
Forecast	Not material	0.4

Category	Report reference	$M
Subtotal		*1.1*
Total		**1.9**

* Transgrid has split labour costs on a 70% basis, as shown in the table with 30% being allocated to the indirect proportion of labour 30% included in section 7.11.

7.11 Indirect proportion of labour

Transgrid in their Labour and Overhead Spreadsheet underpinning the labour forecast have included an assumption to allocate 30% of labour costs to this indirect proportion.

The following table details validation of this allocation.

Table 29 Validation of allocation of labour costs to indirect proportion of labour ($M Real 2025-26)

Category	Section reference	$M
Total	Table 14	111.2
Gross up to obtain the total $111.2 / 70%		158.9
Indirect proportion of labour-related costs $158.9M		**47.7**

7.11.1 Indirect costs labour and overhead conclusion

No issues this is simply a reclassification of costs.

7.12 Labour and indirect costs benchmarking

The following table provides some benchmarking against other CPAs / RNIP submissions given the lack of publicly available information.

Benchmarking can add additional assurance where like-for-like comparisons are possible. Where these are lacking because of the unique nature of a project, greater reliance is placed on the robustness of the bottom-up build. This is reflected in the table below with the comparison not seen as useful.

With respect to the SSP bottom-up build, the phased profile of FTEs in project streams aligned with the resources required to deliver stream objectives, are required to deliver the project and manage risk exposures. The cost estimate of FTEs are based upon current rates and consistent on-cost assumptions, that align with rate benchmarking performed above and are indexed by CPI trending to the RBA's target band.

Table 30 Labour and indirect cost benchmarking

Project CPA or RNIP	$M Labour and indirect	$M Capex	%
SSP	215.4 (non-contestable)	1,200.0 (As advised by Transgrid)	17.9%
Waratha Supper Battery	57.0 (non-contestable)	254.8 (non-contestable)	23.0%
HumeLink	407.1	4,279.1	9.5%

Project CPA or RNIP	$M Labour and indirect	$M Capex	%
Central West Oriana	182.0 (non-contestable)	437.9	41%

7.13 Labour and indirect costs conclusion

Pre-period costs

Pre-period costs $35.7M ($ Real 2025-26) include RIT-T and project development activities.

These costs relate to the work involved the identification of the investment need and the analysis of credible options to determine the preferred portfolio solution. They are also required to progress the project, represent prudent FEL activities design to reduce risk, align with the Ministerial Order and represents expenditure that would normally be capitalised.

From GHD's perspective the expenditure was prudent as it was required to progress the project and reduce risk. Benchmarking against comparative projects supports efficiency demonstration. The expenditure aligns with the Ministerial Order, related to the carrying out of the network infrastructure project, which qualified as pre-period costs.

Forecast

The labour forecast is based upon FTE roles required to deliver the projects stream objectives with the FTE profile phased to align with the projects schedule.

Labour rates applied to roles benchmark against NSW ANS rates noting that there are some limitations to the methodology used, noting ball-park alignment.

Oncosts applied are consistent with past Transgrid ISP and RNIP projects.

Having broken down the team into stream roles and considering the activities required across the five sites, the roles and FTE profiles are considered required to deliver the project and to reduce risk. Combining this assessment with our above views on labour rates and oncosts, the forecast is considered prudent, efficient, and reasonable.

Because benchmarking of such a bespoke project lacks appropriate comparatives, GHD has place reliance upon the robustness of the bottom-up build of the forecast.

Section B

Opex assessment

8. Opex assessment approach

8.1 Opex methodology

In considering the Opex forecast, GHD relied upon a bottom-up assessment of forecast elements to determine the extent to which it is supported by appropriate evidence.

The bottom-up approach considered the reliability of evidence used to support forecast elements. The approach applied depended on the nature of the cost element and included a combination of:

Table 31 *Opex assessment methodology*

	Evidence-based review of the following materials provided by Transgrid: – Bottom-up build for maintenance and operating requirements based upon requirements currently in place to manage specific asset classes not covered by the LTSA. – Bottom-up build for maintenance and operating requirements based upon what would be required to manage new asset classes not covered by the LTSA. – Assessment of Transgrid roles in management and oversight of the LTSA – Evidence supplied to support alignment with regulatory requirements and the associated costs.
	Recalculation and validation against supporting evidence supplied by third parties, where required, including: – Benchmarking where appropriate benchmarking references were available
	– Internal labour costs: assessment of prudency and efficiency based on team structure, stream objectives, scheduled hours, number of FTE roles, and applied position rates. – Benchmarking against comparative sources where suitable
	Comparison of TransGrid' cost forecasts against scope definitions and assumptions outlined in their Opex Forecasting Methodology.

8.2 Materiality

GHD defines individual cost elements under $300K (representing 0.7% of total Opex forecast) as immaterial. For costs that are supported by a large number of cost items, GHD may select the most material items for review. Where this approach has been applied, it is noted in the body of the report.

9. Opex regulatory requirements

As set out in the AER's Guidance note on the AER's EII Act Assessment Approach for non-contestable revenue determinations, the AER's role is to decide whether to accept a Network Operator's Opex forecast for the non-contestable REZ network infrastructure project.

Under EII Chapter 6A Clause 6A.6.6(c) - "*Subject to paragraph (c1), the AER must accept the forecast of required operating expenditure of a Network Operator that is included in a Revenue Proposal if the AER is satisfied that the total of the forecast operating expenditure for the regulatory control period reasonably reflects each of the following (the operating expenditure criteria):*

(1) the efficient costs of achieving the operating expenditure objectives;

(2) the costs that a prudent operator would require to achieve the operating expenditure objectives; and

(3) a realistic expectation of the cost inputs required to achieve the operating expenditure objectives". [16]

In making this consideration the AER may benchmark operating expenditure that would be incurred by an efficient Network Operator.

Under EII Chapter 6A Clause 6A.5.6 – "The AER may specify guidelines (the Expenditure Forecast Assessment Guidelines) and the approach the AER proposes to use to assess the forecasts of operating expenditure and capital expenditure that form part of Network Operators' Revenue Proposals and the information the AER requires for the purposes of that assessment". [17]

The Expenditure Forecast Assessment itself indicates – "The assessment techniques we can use to test the prudency and efficiency of a network business' expenditure proposal include:

- Economic benchmarking—productivity measures used to assess a business's efficiency overall
- Category level analysis—comparing how well a business delivers services for a range of individual activities and functions, including over time and with its peers
- Predictive modelling—statistical analysis to predict future spending needs, currently used to assess the need for upgrades or replacement as demand changes (augmentation Capex) and expenditure needed to replace aging assets (replacement Capex)
- Trend analysis—forecasting future expenditure based on historical information, particularly useful for Opex where spending is largely recurrent and predictable
- Cost benefit analysis—assessing whether the business has chosen spending options that reflect the best value for money
- Project review—a detailed engineering examination of specific proposed projects or programs

[16] Appendix A (EII Chapter 6A): Transmission Efficiency Test and revenue determination guideline for NSW non contestable network infrastructure projects - Draft amendments P 18 & 19
[17] Appendix A (EII Chapter 6A): Transmission Efficiency Test and revenue determination guideline for NSW non contestable network infrastructure projects - Draft amendments P 10

- Methodology review—examining processes, assumptions, inputs and models that the business used to develop its proposal
- Governance and policy review—examining the business's strategic planning, risk management, asset management and prioritisation". [18]

In the AER's Guidance note on the AER's EII Act Assessment Approach for non-contestable revenue determinations there is a specific section covering initial revenue determinations which is relevant to this review as outlined below.

"In establishing a base from which to assess a Network Operator's proposed Opex allowance, we will rely on a bottom-up forecasting approach. During this bottom-up assessment process, we will consider the following factors in addition to our usual assessment approach:

- Input costs, metrics and benchmarks associated with any other networks that the Network Operator or other similar businesses may own and operate (if applicable)
- Any elements of a contestable project that may impact the relevant non-contestable project's Opex costs
- The outcome of any detailed project review, if required
- Our approach to setting regulated Opex for other network projects with similar characteristics (e.g. growth projects undertaken by Network Operators).

We expect that a Network Operator's initial proposed Opex allowance should at a minimum adopt the general expectations set out in our expenditure forecast assessment guideline and be in accordance with the approved cost allocation methodology for the Network Operator, and should identify and quantify:

- The number and cost of permanent and casual staff engaged to operate and/or maintain EII regulated network assets either exclusively or on a pro rata basis as appropriate
- The cost of external contractors, consultants and other service providers providing operating and/or maintenance services in relation to the regulated network assets
- The cost-of-service contracts, insurance and other ongoing expenses exclusively associated with the EII regulated network assets". [19]

10. Opex forecast

The non-contestable Opex forecast reflects the incremental costs required to operate, maintain and manage the new assets once commissioned to provide prescribed transmission services to customers, and to meet contractual, licence and regulatory obligations. It does not include the cost associated with the LTSA with the OEM of Syn Cons as this was part of the contestable tender.

The following table summarises the Opex forecast.

[18] AER Expenditure Forecast Assessment Guidelines – NEO Review – Final Decision P 6
[19] Guidance note on the AER's EII Assessment Approach for Non-contestable revenue determinations P 26 & 27

Table 32 Opex forecast summary ($M Real 2025-26)

Opex component	Report reference	$M
Maintenance costs	Section 10.1	10.9
Operating costs	Section 0	18.9
Insurance costs	Section 10.3	2.8
Real labour cost escalation	-	0.8
Total Opex excluding debt raising costs		**33.4**

10.1 Maintenance costs forecast

The maintenance forecast represents incremental costs that relate to maintenance activities not included in the LTSA and apply to primary plant, switchbays, secondary systems, Syn Con buildings, operational technology and network property management such as fire and security systems.

Transgrid's Non-Contestable Opex Forecasting Methodology indicates that a bottom-up build methodology has been applied.

Further, ISO 55001 Asset Management systems and have been maintained for over 10 years and used to develop a mature set of maintenance standards for this network. Following this standard ensures strong links to corporate risk management frameworks and strategic goals, while following a robust system to develop maintenance and life-cycle asset management at acceptable risks and lowest life-cycle cost performance.

The following table provides a summary of the forecast elements.

Table 33 Breakdown of maintenance costs forecast ($M Real 2025-26), excludes labour escalation

Sub-category	Reference	2027 $M	2028 $M	2029 $M	2030 $M	2031 $M	Total $M
Substations	Section 10.1.1	-	1.5	2.3	2.9	2.9	9.5
Property	Section 10.1.3	-	-	0.2	0.3	0.3	0.8
Operational technology cyber	Below materiality threshold	-	-	0.1	0.1	0.1	0.3
Automation		-	-	0.1	0.1	0.1	0.3
Communication		-	-	-	-	-	0.1
Rounding							(0.1)
Total			**1.2**	**2.9**	**3.6**	**3.4**	**10.9**

Transgrid's Non-Contestable Opex Forecasting Methodology outlines that – "While the LTSA transfers responsibility for Syn Con OEM maintenance to the LTSA service provider, Transgrid retains responsibility for a range of residual maintenance, access and site-based activities that are necessary to ensure the ongoing safety, reliability and availability of the transmission network. Accordingly, our forecast maintenance Opex includes only those activities that are not covered by the LTSA" [20]

[20] Transgrid's Non-Contestable Opex forecasting Methodology P 12

Further, “Under the LTSA, we are required to perform a range of access and safety-related maintenance activities to enable the LTSA service provider to complete its works under the LTSA. These activities are not included in the LTSA pricing and give rise to incremental maintenance costs for Transgrid” [21]

[21] Transgrid’s Non-Contestable Opex forecasting Methodology P 13

10.1.1 Substation maintenance

The substation maintenance forecast is based upon a bottom-up build. The supporting spreadsheet that provides the bottom-up build indicates that the forecast has the following elements:

- The identification of maintenance activities not covered by the LTSA
- The application of maintenance frequencies to determine the quantity of tasks, or FTEs required
- The application of labour-hour rates by existing Transgrid labour codes or estimate where a reference code is absent, multiplied by the number of tasks required plus any material required, or the number of FTEs required.

The tasks forecasted relate to Transgrid's retained responsibilities and LTSA support detailed above.

The following table provides transparency over the application of the assumptions with GHD checking the formulas performing the estimate calculation. These activities are considered incremental.

Table 34 Substation maintenance forecasting assumptions

Requirements	Rationale for resources or materials to deliver requirements	Frequency	Units	Qty / FTE Jan 27- Dec 27	Qty / FTE Jan 28- Dec 28	Qty / FTE Jan 29 – Dec	Qty / FTE Jan 30-Dec 30	Qty / FTE Jan 31 – Dec31	Tansgrid labour code or basis of estimate	Labour rate $	Materials $
[redacted]											

Requirements	Rationale for resources or materials to deliver requirements	Frequency	Units	Qty / FTE Jan 27- Dec 27	Qty / FTE Jan 28- Dec 28	Qty / FTE Jan 29 – Dec	Qty / FTE Jan 30-Dec 30	Qty / FTE Jan 31 – Dec31	Tansgrid labour code or basis of estimate	Labour rate $	Materials $
[redacted]											

Requirements	Rationale for resources or materials to deliver requirements	Frequency	Units	Qty / FTE Jan 27- Dec 27	Qty / FTE Jan 28- Dec 28	Qty / FTE Jan 29 – Dec	Qty / FTE Jan 30-Dec 30	Qty / FTE Jan 31 – Dec31	Tansgrid labour code or basis of estimate	Labour rate $	Materials $
[redacted]											

Requirements	Rationale for resources or materials to deliver requirements	Frequency	Units	Qty / FTE Jan 27- Dec 27	Qty / FTE Jan 28- Dec 28	Qty / FTE Jan 29 – Dec	Qty / FTE Jan 30-Dec 30	Qty / FTE Jan 31 – Dec31	Tansgrid labour code or basis of estimate	Labour rate $	Materials $

Incremental resource requirement

Transgrid has developed a new workforce planning tool. This can compare the current FTE profile extracted from their HRIS system and compare this against project demand. The figure below compares this base FTE profile against the resource loaded project requirement from Major Projects and Lumea (internal resource requirement only) and the current Repex and Augex capital program.

GHD has been following the development of this tool and can indicate that it has the accuracy to support workforce planning analysis.

The analysis indicates a shortage in substation technicians supporting the need for incremental resources.

Figure 22 Substation technician workforce planning

10.1.2 Substation maintenance forecast conclusion

Transgrid has developed a robust forecast of substation maintenance based upon existing experience and new requirements for the LTSA that fall under Transgrid's responsibility.

Workforce planning analysis indicates a shortage in substation technicians supporting the need for incremental resources.

The tasks are considered incremental and prudent as they are required to manage lifecycle risks and protect system security outcomes. Efficiency is reflected in the bottom-up build by forecasting by identified tasks and current cost application with the activities required to support availability. Reasonableness is supported the prudency drivers, the cost build-up and the need to reduce availability risks to an acceptable level.

10.1.3 Property

Property costs use the same bottom-up forecasting methodology as described above.

These costs are considered incremental as they represent new activities associated with building maintenance and other Syn Con related activities that require property involvement to conduct. These activities are prudent as they are required to support system security outcomes and other regulatory obligations. The estimates are based upon the best available information at the time of forecasting.

Table 35 Property forecasting assumptions

Tasks	2027	2028	2029	2030	2031	Labour rate	Cost per activity
[redacted]							

10.2 Operation costs forecast

These costs reflect the incremental activities and labour necessary to manage the expanded assets, oversee LTSA performance, operate the network with the new Syn Cons and meet new compliance and performance standards associated with system strength.

The following table provides a breakdown of the forecast elements.

Table 36 Breakdown of the operation costs forecast ($M Real 2025-26), excludes labour escalation

Sub-category	Reference	2027 $M	2028 $M	2029 $M	2030 $M	2031 $M	Total $M
Asset management	Section 10.2.1	-	0.6	1.7	1.7	1.7	5.8
Delivery maintenance	Section 10.2.2	-	1.6	1.7	1.8	1.8	6.9
Network planning	Section 10.2.3	-	0.2	0.2	0.2	0.2	0.8
Network operations	Section 10.2.4	-	0.2	0.5	0.5	0.5	1.9
Regulatory submissions	Section 10.2.5	0.5	0.5	0.5	1.3	0.9	3.7
Total		**0.5**	**3.0**	**4.6**	**5.6**	**5.2**	**18.9**

10.2.1 Asset management

Table 4.6 of Transgrid's Non-Contestable Opex Forecasting Methodology outlines the following which we have structured as bullet points:

1. "These activities reflect the incremental effort required to incorporate the Syncons and associated digital infrastructure as a new asset class within our asset management framework and systems. This work is necessary to ensure the assets are managed safely and reliably in accordance with our ISO55001-certified Asset Management System, our licence and regulatory obligations and the obligations under the LTSA.
2. This is prudent because they establish the minimum governance, asset data, strategies and monitoring required to manage lifecycle risks and protect system security outcomes.
3. This is efficient because it prioritises preventative and condition-based practices that reduce avoidable defects, unplanned outages and reactive maintenance costs over time.
4. This is reasonable because it is limited to incremental tasks created by the Syncons fleet and does not duplicate existing business-as-usual asset management functions" [22]

The estimate build assumes approximately the same cost for the first framework establishment and the following four sites. Whilst GHD has raised question regarding efficiency, based on potential efficiency gains across sites in the development of appropriate asset management frameworks. This needs to be balanced against the need to train and reestablish the competencies for maintaining complex rotating equipment.

Given current market demand, especially for specialised resources, any potential efficiency gain is likely to be absorbed by recruitment and training costs. GHD acknowledges that this is Transgrid's first operations at this scale alongside the introduction of the SSSP obligations. As there is no historical operating baseline, the forecast has appropriately been developed using a bottom-up approach rather than a base-step-trend methodology.
The asset management forecast uses a similar bottom-up build methodology based upon:

- The identification of tasks required
- The application of FTE numbers required
- The application of labour rates by existing Transgrid labour codes, multiplied by the FTEs.

The following table provides transparency over the application of the assumptions with GHD checking the formulas performing the estimate calculation.

This will be a critical period for onboarding the new assets ensuring asset data is accurately captured and early improvements are established within the asset management system. The tasks described below are consistent with the onboarding and early improvement phase of a major infrastructure investment.

[22] Transgrid's Non-Contestable Opex forecasting Methodology P 16

Table 37 Asset management forecast assumptions

Requirements	Rationale for resources and materials to deliver requirements	FTE Jan 27-Dec 27	FTE Jan 28-Dec 28	FTE Jan 29 – Dec 29	FTE Jan 30-Dec 30	FTE Jan 31 – Dec 31	Code	Labour rate annual $
[redacted]								

Requirements	Rationale for resources and materials to deliver requirements	FTE Jan 27-Dec 27	FTE Jan 28-Dec 28	FTE Jan 29 – Dec 29	FTE Jan 30-Dec 30	FTE Jan 31 – Dec 31	Code	Labour rate annual $
[redacted]								

As indicated above, this forecast represents the incremental costs to establish the minimum governance, asset data, strategies and monitoring required to manage lifecycle risks and protect system security outcomes. These activities are considered prudent as they mitigate risks and efficient based upon task identification and application of current costs.

Reasonableness is supported by the resulting risk reduction and the robustness of the bottom-up build.

10.2.2 Maintenance delivery

These costs relate to the operational oversight and coordination of delivery of the works programs associated with the Syn Con asset, management of corrective works, management of LTSA obligations and deliverables, outage coordination, governance and quality review of program, spares management to LTSA obligations and spares plans, contract administration of the LTSA, support for site works aspects of GPS compliance facilitation and associated health, safety and environmental support required for the delivery of site works.

The incremental effort is required to manage the growth in rotational plant assets compared to existing fleet, and the associated secondary and technological systems that need to be managed are markedly different to current asset base. The additional assets also have a high availability requirement and hence related priority LTSA expectations internally to manage and respond to corrective or condition events, the management of spares across the new fleet efficiently whilst complying to LTSA availability expectations, performance monitoring and reporting, related first and corrective internal responses, quality oversight of the LTSA and non LTSA maintenance, and outage arrangements to suit all annual services across the 10 new rotating plant assets.

The delivery maintenance forecast uses a similar bottom-up build methodology based upon:

- The identification of tasks required
- The application of task frequencies
- The application of FTE roles with labour rates by existing Transgrid labour codes.

The following table provides transparency over the application of the assumptions with GHD checking the formulas performing the estimate calculation.

Table 38 Maintenance work program management forecast assumptions

Role	FTE Jan 27-Dec 27	FTE Jan 28-Dec 28	FTE Jan 29 – Dec 29	FTE Jan 30-Dec 30	FTE Jan 31 – Dec 31	Hourly rate $	Labour code	Annual cost $	Costs $
[redacted]									

Given the specialist nature of the equipment, their spread across five sites and high availability requirements the assumption of incremental resources is considered reasonable.

The bottom-up build includes reasonable assumptions and views the resources as incremental and required to support the delivery of the works programs associated with the Syn Con asset, management of corrective works, outage obligations and LTSA obligations that fall under Transgrid's responsibility. These activities reduce risk and are therefore considered prudent.

Efficiency is supported by the robustness of the bottom-up build based upon identified activities and application of current costs. Reasonableness is supported by the resulting risk reduction and the robust estimate build.

10.2.3 Network planning

This forecast relates to GPS compliance. This requires the development of a GPS compliance framework, typically $80K per site, based upon what GHD has charged for the development of such frameworks, ongoing monitoring of continuous data and the completion of manual testing procedures and breach reporting if required. Per GHD's experience with drafting GPS compliance frameworks both the monitoring of continuous data and cyclic manual testing is required. The balance of the forecast would be consumed on the development of manual testing programmes and test conduct.

The costs forecasted are considered prudent as GPS compliance represents a regulatory obligation, which in this case, also supports system security outcomes. Demonstration of efficiency has been assessed against what GHD would normally bill for the provision of a GPS compliance framework and a view of the costs required to perform manual testing required within that framework.

10.2.4 Network operations

The network operations forecast uses a similar bottom-up build methodology as described above.
The following table provides transparency over the application of the assumptions with GHD checking the formulas performing the estimate calculation.

An allowance for network operations is key to ensuring the new Syn Con performance is monitored through the control room, while also having operators available to plan and coordinate outages for safe access during the on-boarding and settling-in phases of this program. This will provide diligent oversight of their performance allowing early intervention if needed, and ensuring system availability continues to meet the high standards of performance expected.

The ongoing costs associated with monitoring are considered immaterial with the majority $600K relating to additional SCADA data points and modelling considered to be establishment costs.

Table 39 Network operations forecasting assumptions

Task	FTE Jan 27-Dec 27	FTE Jan 28-Dec 28	FTE Jan 29 – Dec 29	FTE Jan 30-Dec 30	FTE Jan 31 – Dec31	Hourly rate	Labour code	Annual cost $
[redacted]								

These activities are considered prudent as they are required to fulfill regulatory GPS obligations, which in this case, also supports system security outcomes.

The estimate calculated at $1.9M is close to the network operation forecast included in ElectraNet's 2019 Main Grid System Strength Project CPA at $1.8M supporting efficiency.

10.2.5 Regulatory activities

The $3.7M forecast includes provisions for:

- Years 1–3, these costs relate to annual updates / adjustment proposals submitted to the AER
- Years 4–5, these costs relate to preparation of the revenue proposal for the subsequent regulatory period (from 2031 onwards)

This Hybrid Revenue Proposal falls under the EII Act framework which is unique to NSW and has its own regulatory asset base. This also includes incremental costs to address adjustment mechanisms under the EII Act framework and for which there are multiple in the proposal.

10.3 Insurance costs

Insurance costs are incremental to Transgrid's wider assurance coverage.

Table 40 Insurance costs forecast ($M Real 2025-26)

Sub-category	2027 $M	2028 $M	2029 $M	2030 $M	2031 $M	Total $M
Insurance	-	-	0.3	0.9	0.9	2.9

10.4 Opex benchmarking

There are limited sources of publicly available Syn Con Opex benchmarks. Those that are available include:

- ElectraNet's 2019 Main Grid System Strength Project CPA and subsequent AER determination (Provides a 5 year view)
- PowerLink's Equipment Strategy for Synchronous Condensers & Auxiliaries [23] (Provides an annual view)

As such there are limited benchmarking reference sources. Use of these comparatives is problematic as:

- The estimates are old and potentially don't reflect activities required to demonstrate fulfilment of SSSP obligations
- Each organisation will have different capacity constraints impacting their ability to absorb tasks into their resource base
- The assets are not like-for-like comparatives.

Given the problems of creating a like-for-like comparison, GHD has placed a greater degree of reliance on the bottom-up build of the forecast detailed above.

Issues related to a like-for-like comparison are detailed in the table below.

Table 41 Benchmark attributes

Benchmarking attributes	ElectraNet's 2019 Main Grid System Strength Project CPA and subsequent AER determination	PowerLink's Equipment Strategy for Synchronous Condensers & Auxiliaries
Opex reflects set up costs or represents ongoing operation	Reflects set up stage	Reflects ongoing operation
Benchmark contains LTSA	No evidence, but unlikely given the magnitude of the Opex included in the CPA	No evidence
Benchmark includes asset management establishment costs	Unlikely given the magnitude of the Opex included in the CPA and lack of transparency over what costs were included in their Revenue Proposal.	No based upon operation rather than establishment
Asset / site attributes	Four high inertia synchronous condensers each with 575 MVA nominal 275 kV fault capability and 1,100 MWs to be installed at two sites. Rather than across five sites with a wide geographic spread.	"Covers synchronous condenser(s) and associated auxiliaries, with capability to deliver a nominal total output (at point of connection) of up to 240MVA (at Point of Common Coupling). Review of the strategy would be required if higher capacity installations are required. It includes switchgear, the step-up power transformer and all associated

[23] Equipment Strategy for Synchronous Condensers and Auxiliaries

Benchmarking attributes	ElectraNet's 2019 Main Grid System Strength Project CPA and subsequent AER determination	PowerLink's Equipment Strategy for Synchronous Condensers & Auxiliaries
		control systems, protection and monitoring systems associated with synchronous condenser, synchronous condenser auxiliary equipment such as lubrication systems, pony motor, excitation system, cooling banks, etc." [24] One site as opposed to five sites with a wide geographic spread.
Other issues	The ElectraNet CPA is incremental to the costs included in their Revenue Proposal. To what extent this includes some costs related to Syn Cons is unknown and lack transparency in the CPA and Revenue Proposal.	-

10.5 Operation costs forecast summary and conclusion

Transgrid have provided transparent bottom-up build of the Opex costs to support the Syn Con installation and ongoing prudent management.

10.5.1 Maintenance costs

The material elements of maintenance costs, (substation maintenance $9.5M, 87.2% of the total maintenance forecast) is supported by workforce planning projections that indicate ongoing shortages in specialist resource requirements. This supports the need for incremental FTEs included within the estimates bottom-up build.
The activities in the bottom-up build of the maintenance forecast are considered incremental and prudent as they are required to manage lifecycle risks and protect system security outcomes. Efficiency is reflected in the bottom-up build by forecasting by identified tasks and current cost application with the activities required to support availability. Reasonableness is supported the prudency drivers, the cost build-up and the need to reduce availability risks to an acceptable level.

10.5.2 Operating costs

The operating cost forecast is based on the elements:

Asset management $5.8M – This represents the establishment costs of an asset management framework for the Syn Cons.

This work is necessary to ensure the assets are managed safely and reliably in accordance with Transgrid's ISO55001-certified Asset Management System, their licence and regulatory obligations and the obligations under the LTSA.

This is prudent because they establish the minimum governance, asset data, strategies and monitoring required to manage lifecycle risks and protect system security outcomes.

[24] Equipment Strategy for Synchronous Condensers and Auxiliaries P 3

This is efficient because it prioritises preventative and condition-based practices that reduce avoidable defects, unplanned outages and reactive maintenance costs over time.

This is reasonable because it is limited to incremental tasks created by the Syn Cons.

GHD notes the estimate build assumes approximately the same cost for the first framework establishment and the following four sites.

As this is a new competency, the assumption of incremental FTEs is supportable.

Delivery maintenance $6.9M

The bottom-up build includes reasonable assumptions and views the resources as incremental and required to support the delivery of the works programs associated with the Syn Con asset, management of corrective works, outage obligations and LTSA obligations that fall under Transgrid's responsibility. These activities reduce risk and are therefore considered prudent.

Efficiency is supported by the robustness of the bottom-up build based upon identified activities and application of current costs. Reasonableness is supported by the resulting risk reduction and the robust estimate build.

Network planning $0.8M – These costs relate to the development and delivery of GPS compliance frameworks. The majority of these costs would be consumed in the framework development and given the specialised nature of these they are typically outsourced as Transgrid has done on other complex assets. This supports the incremental nature of the bottom-up build of the forecast.

The costs forecasted are considered prudent as GPS compliance represents a regulatory obligation, which in this case, also supports system security outcomes. Demonstration of efficiency has been assessed against what GHD would normally bill for the provision of a GPS compliance framework and a view of the costs required to perform manual testing required within that framework.

Network operations $1.9M – This estimate includes outage management, alarm investigation and reporting activities. Based upon the work GHD has been delivering on development of the 2028- 33 revenue submission, outages represent a key risk to program delivery. In GHD's opinion the function is under-resourced for the risk present based upon interviews with the function. This supports the incremental nature of the bottom-up build.
The activities are considered prudent as they support network stability. The forecasts efficiency is supported using current costs.
$0.7M of the forecast is related to SCADA set up which is viewed as capex.
Regulatory activities $3.7M – Additional costs associated with regulatory requirements.
The bottom-up build is transparent, robust, based upon incremental activities required and are needed to manage life cycle risks and regulatory obligations. Cost components are based on current rates and past material requirements. Reasonableness demonstration is supported by the need to undertake these activities to manage risk and regulatory obligations and by the robustness of the bottom-up build supporting the forecasts.
Reliance has been primarily placed upon the robustness of the bottom build because of the difficulties associated with sourcing a like-for-like comparative for such equipment.

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