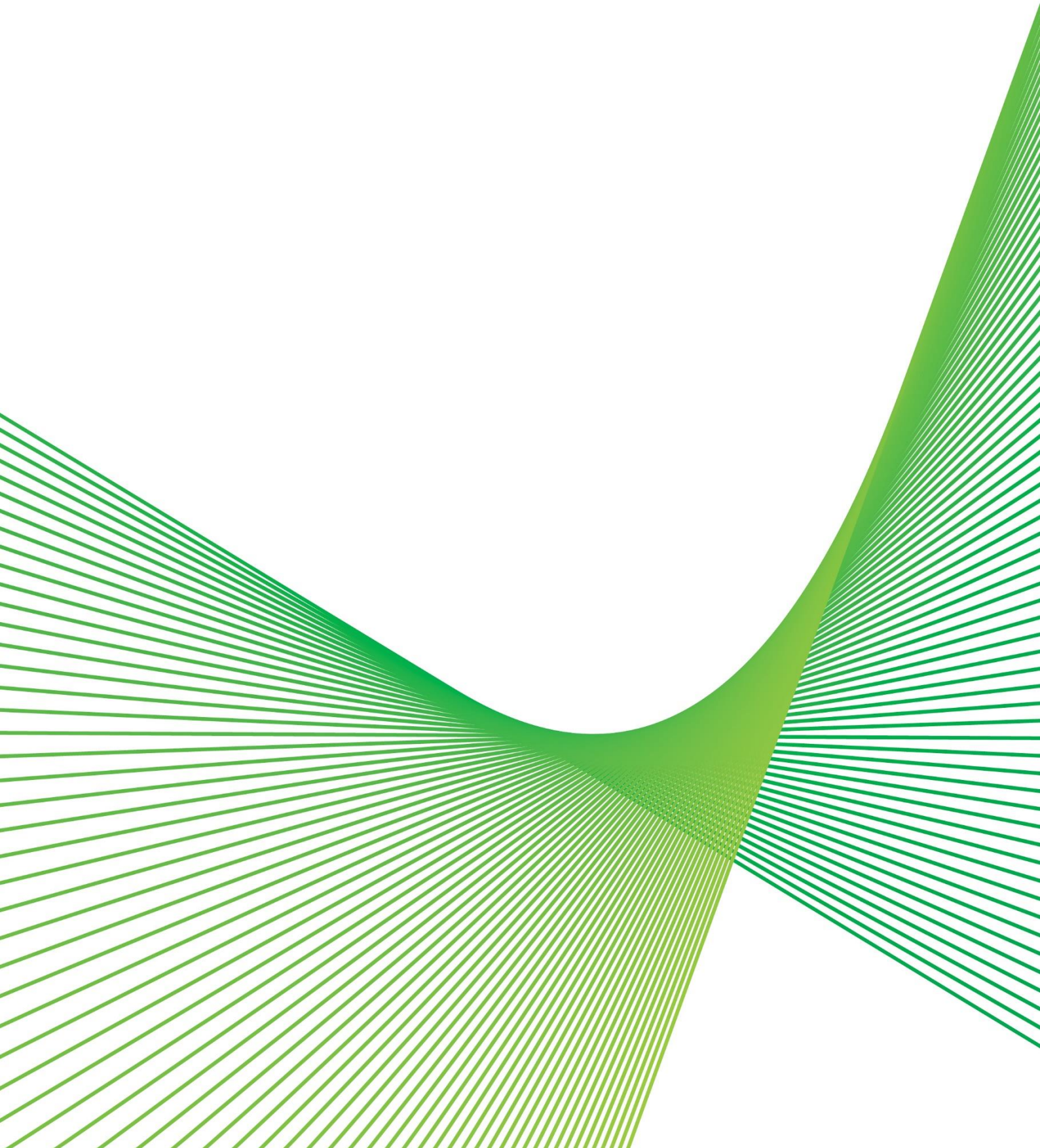
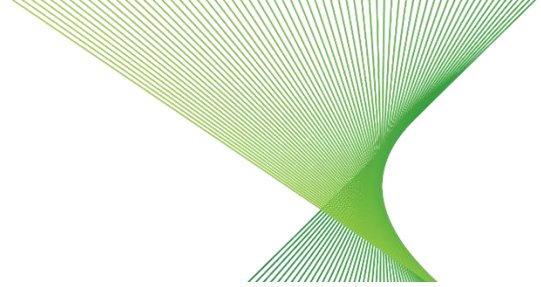


A.3 Humelink – Stage 2 (Delivery) – Capex Forecasting Method

Humelink Draft Contingent Project Application – Stage 2 (Delivery)

8 December 2023





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1. Purpose, structure and scope of this document

1.1. Purpose and scope of this document

The Australian Energy Market Operator's (AEMO's) Final 2022 Integrated System Plan (2022 ISP), has defined Humelink as a staged actionable ISP project, without decision rules.¹ The project stages and target timing identified in the 2022 ISP are:²

- Stage 1 – complete the early works by approximately 2024, and
- Stage 2 – deliver the Project by July 2026, subject to feedback loop confirmation by AEMO.

On 5 April 2022, we submitted to the AER our Stage 1 (Part 1) Contingent Project Application (CPA-1 (Part 1) or Stage 1 (Part 1) Application) to undertake Stage 1 activities including project design, stakeholder engagement, land-use planning and approvals and acquisition, securing production slots for LLE and project management. In August 2022, the AER approved our Stage 1 (Part 1) capex forecast of \$380.83 million.³ These works are expected to be completed by July 2024.

On 22 May 2023, we submitted to the AER our Stage 1 (Part 2) CPA (CPA-1 (Part 2) or Stage 1 (Part 2) Application) to purchase LLE for transformers, reactors, conductor and steel as part of our Stage 1 activities. On 25 August 2023, the AER approved our Stage 1 (Part 2) Application capex forecast of \$227.90 million.⁴

We are progressing our Stage 1 activities and have been keeping the AER and our TAC updated with our progress as well as the key learnings and outcomes from these activities.

In order to meet the target delivery date of July 2026, we are required to commence Stage 2 activities which will deliver the Project. These activities have been carefully scoped and resourced through our stage 1 activities to ensure that they are efficient and prudent and will deliver the Project at the lowest sustainable cost. We are seeking the AER's approval for the costs of these activities, which comprise both direct and labour and indirect activities.

This document sets out the direct Stage 2 activities and the associated forecast capex for these activities. Our indirect and labour capex activities are explained in our Labour and Indirect Capex Forecasting Methodology.

This document is our Stage 2 Direct Capex Forecasting Methodology for Humelink and forms part of our Contingent Project Application for Stage 2 (CPA-2 or Stage 2 Application) for the Project. It should be read in conjunction with our Principal Application document and other supporting documents, in particular our Labour and Indirect Capex Forecasting Methodology.

- The purpose of this document is to explain and justify the methodologies we have used to determine our Stage 2 direct capex forecast, and
- explain how we verified and validated our actual and forecast direct capex.

¹ AEMO, [2022 Integrated System Plan](#) (2022 ISP), June 2022, p.13.

² AEMO, [2022 ISP](#), June 2022, p. 67 and 68

³ AER, [Hemelink Early Works Contingent Project Determination](#) (Hemelink CPA-1 Part 1 Decision), August 2022

⁴ AER, [Hemelink Early Works Stage 1 \(Part 2\) Contingent Project Determination \(Hemelink CPA-1 Part 2\)](#), August 2023

Unless otherwise stated, all actual and forecast capex values in this document are presented in real 2022-23 dollars and include real input cost escalation.⁵

This document has been developed in accordance with:

- the actionable ISP framework under the National Electricity Rules (NER or Rules), and
- AER's Guidance Note for Regulation of actionable ISP projects.⁶

1.2. Structure of this document

The remainder of this document is structured as follows:

- section 2 overviews our forecast Stage 2 capex
- section 3 explains our procurement approach for design and construction
- section 4 overviews our forecast capex for design and construction (D&C) that will be undertaken by our delivery partners.
- Section 5 explains our Other Construction costs and the methodologies we have used to determine these costs
- Section 6 explains our long lead equipment costs and the method for calculating these costs
- Section 7 sets out our forecast capex and for biodiversity offset costs and the methodology for determining this cost
- section 8 set out our forecast capex for land and easements and the methodology we have used to determine this cost, and
- section 9 describes the independent verification process and outcomes.

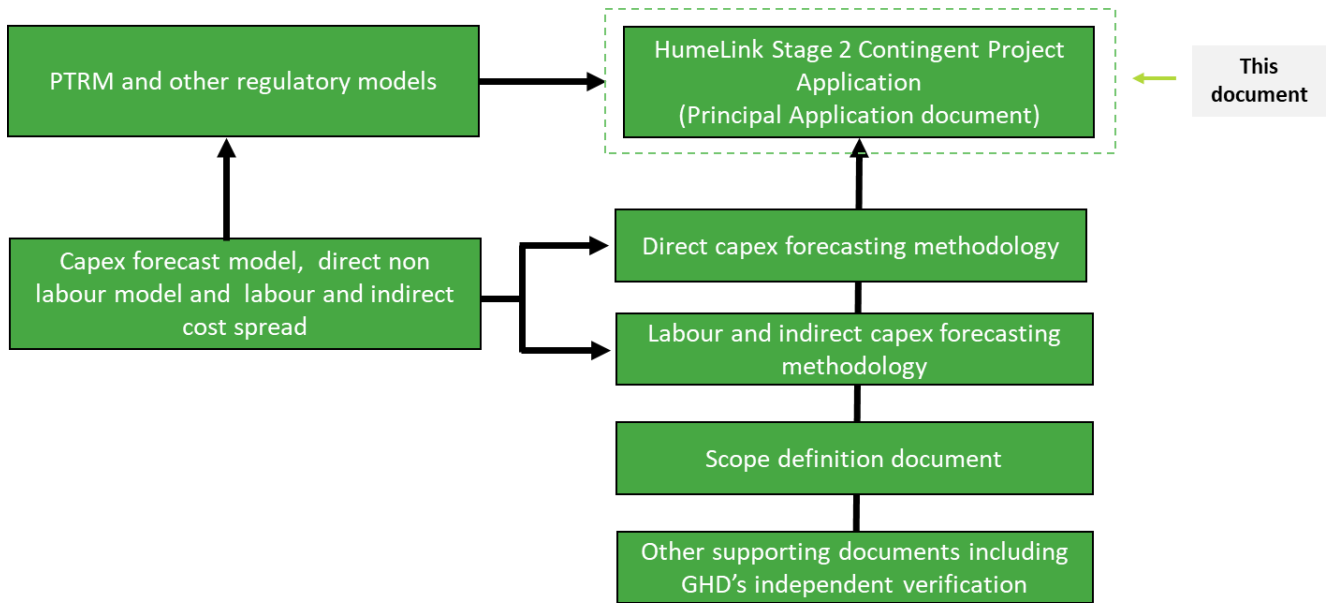
1.3. Structure of our Stage 2 Application for HumeLink

Our Stage 2 Application comprises the attachments and models illustrated in Figure 1-1 as well as other supporting documents and models. This Capex Forecasting Methodology document references these attachments, models and other supporting documents and should be read in conjunction with them.

⁵ The financial values exclude both inflation and any real input cost escalation (e.g. labour) from 30 June 2023 onwards.

⁶ AER, [Guidance Note for Regulation of actionable ISP projects](#), March 2021.

Figure 1-1: Humelink Stage 2 CPA document structure



Attachments and supporting models comprising our Stage 2 Application are also detailed in section 1 of our Principal Application document.

2. Summary of forecast Stage 2 capex for HumeLink

Table 2-1 shows that our total Stage 2 capex is \$4,279.14 million, excluding equity raising costs, by direct and labour and indirect capex. The anticipated practical completion date for the Project is July 2026. We will therefore incur most of this capex in the 2023-24 to 2025-26 regulatory years. This forecast capex to deliver HumeLink is incremental to our business-as-usual (BAU) capex approved by the AER in its 2018-23 Revenue Determination and would not be incurred if the delivery of HumeLink does not proceed.

Table 2-1 HumeLink Stage 2 Capex (\$M Real 2022-23)

	2023-24	2024-25	2025-26	2026-27	2027-18	Total
Direct capex	-	1,939.30	1,830.78	97.48	-	3,867.55
Labour and Indirect capex	42.79	160.31	159.64	48.85	-	411.59
Total Forecast capex	42.79	2,099.61	1,990.42	146.33	-	4,279.14

Our Stage 2 forecast capex, which reflects the bulk of the Project's costs, has been carefully scoped and resourced through our Stage 1 activities, which we have been progressing in line with the AER's Decisions on our Stage 1 (Part 1) and (Part 2) Applications. More than 61 per cent of our Stage 2 forecast capex is based on market prices obtained through competitive tender processes. We have also relied on pricing from suppliers and independent specialists. Our Stage 1 activities have resulted in our Stage 2 capex forecast being in line with an AACE class 2 to 3 cost estimate, to provide the necessary cost certainty that consumers will not be over- or under-investing in the Project.

This provides confidence to the AER, our customers and other stakeholder that the stage 2 forecast capex in this Application is prudent and efficient and will deliver the Project at the lowest sustainable cost for consumers. Our forecast capex for HumeLink reflects \$412 million of cost savings across Stage 1 and 2 of the Project, comprising:

- \$85 million for securing LLE through our PTT program (Stage 1 forecast capex), and
- \$237 million from adopting a variable ITC D&C contract rather than a fixed price D&C contract to deliver the design and construction for substations and transmission lines including access tracks (Stage 2 forecast capex), and
- \$90 million for undertaking the Gugaa integration as part of VNI West Stage 1 activities.

The AER's approval of Other Construction costs of included in this Stage 2 Application are critical to enable us to deliver HumeLink on time and on budget, given:

- the uncertain and challenging operating environment – the construction market is grappling with materials inflation, strained global supply chains, local labour market shortages, and unprecedented local demand for local civil construction and high voltage expertise, and
- contractors not being able or willing to enter into fixed price D&C contracts. We have therefore adopted an ITC D&C contract model for the D&C component of delivery.

Table 2-2 details our Stage 2 total capex by sub-category of capex.

Table 2-2 Stage 2 Capex by sub-category of capex

Category of capex	Forecast capex	% of total capex
Direct costs	3,867.55	90.38%
Tendered works	3,232.80	75.55%
West – Design, substations and transmission lines including access track	████████	████████

Category of capex	Forecast capex	% of total capex
East – Design, substations and transmission lines including access track	████████	████████
Long-lead equipment (excluding towers)	█ ██████	█ ██████
Other Construction Costs ¹	599.07	14.00%
Easements and biodiversity offsets	634.76	14.83%
Easement acquisition	█ ██████	█ ██████
Biodiversity offset costs	█ ██████	█ ██████
Labour and indirect costs	407.14	9.51%
Labour costs	204.66	4.78%
Indirect costs	202.48	4.73%
Labour escalation and equity raising costs	37.58	0.88%
Labour escalation	4.44	0.10%
Equity raising costs	33.14	0.77%
Total capex (excluding equity raising costs)	4,279.14	100.00%
Total capex	4,312.28	N/A

Notes: 1. These costs are the 'Other Construction costs' that we expect to incur in the construction of HumeLink, but that are not included in the tender prices.

Our Stage 2 activities and the associated capex relating to:

- labour and indirect capex (D&A) are explained in our Labour and Indirect Capex Forecast Methodology.
- direct capex activities are explained in Chapters 4 to 5 of this document.

2.1. Basis for direct capex forecast

We developed the capex forecasts based on a detailed scope of works using methods that reflect the specific nature of the costs, as shown in Table 2-3.

Table 2-3 Forecast Stage 2 capex by key category

Category of capex	Forecast capex	Basis of capex forecast
Direct costs	3,867.55	
Tendered works	3,232.80	
West – Design, substations and transmission lines including access track	████████	The outcome of the competitive two-stage ECI tender process (i.e., the successful D&C contractors' tender prices).
East – Design, substations and transmission lines including access track	█ ██████	
Long-lead equipment (excluding towers)	█ ██████	Agreements with suppliers.
Other Construction Costs ¹	599.07	Detailed probabilistic risk assessment (Monte Carlo analysis) using rates included in the D&C contractors' responses where activities are the same

Category of capex	Forecast capex	Basis of capex forecast
		or similar, and our independent cost estimator Fission.
Easements and biodiversity offsets	634.76	
Easement acquisition	██████████	Options agreements and an independent report from JLL.
Biodiversity offset costs	██████████	An independent report from Niche, which has been verified by WSP.
Labour and indirect costs	407.14	
Labour costs	204.66	Internal resource requirements and market labour rates.
Indirect costs	202.48	Current available market rates and recent historical data.
Escalators and equity raising costs	37.58	
Real input escalators	4.44	Calculated using the AER's Post Tax Revenue Model (PTRM).
Equity raising costs	33.14	Calculated by multiplying the projected labour components of forecast capex by the real labour cost escalators approved in the AER's 2023-28 Revenue Determination for Transgrid.
Total capex (excluding equity raising costs)	4,279.14	
Total capex including equity raising costs	4,312.28	

Our Stage 2 forecast capex for Humelink is prudent and efficient. This is demonstrated by:

- the rigorous, well-defined and transparent capex forecasting methodology set out in sections 3 to 8.
- the delivery contract model that we have adopted – this is discussed in section 3
- the reliance on market testing and expert reports – this is discussed in sections 3 to 8, and
- external validation of both the capex – this is discussed in section 9.

3. Our procurement approach for design and construction

This section provides a summary of the procurement process for HumeLink. It provides:

- a high-level overview of the Humelink procurement process
- a summary of the preparatory work undertaken in 2022, before the formal tender process commenced, and
- a summary of the formal tender process, which is in the final stage.

It should be read in conjunction with the more-detailed procurement documents being submitted with the Application:

- Transgrid, Market Sounding Report, May 2022
- Humelink Transaction Management Plan, August 2022
- EOI Evaluation Plan, August 2022
- EOI Evaluation Report, October 2022
- ECI Stage 1 Tender Evaluation Report, February 2023
- O'Connor Marsden & Associates, Probity Report, March 2023

In addition, GHD has provided an independent review of the procurement process.

3.1. Operating environment and delivery approach

Humelink will be the single largest project that we have delivered and will form an integral part of the National Electricity Market once completed. It involves the design, construction and operation of approximately 360 kilometres of new high voltage transmission lines and connection to:

- a new Wagga Wagga substation
- upgraded infrastructure at Transgrid's Bannaby substation
- upgraded infrastructure at Transgrid's Maragle substation which will be constructed as part of the Snowy 2.0 project, and
- augmentation of the existing substation at Wagga Wagga.

We are delivering Humelink at a time where the construction market is grappling with materials inflation, strained global supply chains, local labour market shortages, and unprecedented local demand for local civil construction and high voltage expertise. In particular:

- there is currently significant demand for infrastructure delivery in the Australian market, particularly in NSW, leading to a shortage in available labour and construction resources
- construction costs are increasing at a pace greater than inflation. Since mid-2021 increases in the cost of construction in Australia has outpaced changes in the CPI. This recent divergence is particularly evident with the change in the Input to Manufacturing Producer Price Indexes (PPIs).⁷ Over the 12 months ending June 2022:

⁷ Transgrid, Revised Revenue Proposal, 2 December 2022

- headline CPI increased by 6.1 per cent over the 12 months ending June 2022, the highest year-ended CPI inflation since the early 1990s.⁸ The Reserve Bank of Australia forecasts CPI inflation of 6.3 per cent for the year to June 2023, which is even higher⁹
- the inputs PPI for the manufacturing sector increased by 17.7 per cent,¹⁰ and
- the outputs PPI for heavy and civil engineering construction increased by 9.0 per cent.¹¹
- increases in real construction costs will likely intensify due to a surge in committed projects which will compete for increasingly scarce resources. The pipeline of transmission line projects as per the 2022 ISP alone which are needed to deliver the energy transition, currently exceeds \$20 billion (comprising Actionable projects totalling \$13 billion and several Renewable Energy Zones (REZs), Copper String 2.0, and Central-West Orana). This number and size of committed energy projects presents a significant challenge to the capacity of the industry. Combine with new infrastructure in other sectors including road, rail and hospitals has led Infrastructure Partnerships Australia to project that:¹²

To deliver [NSW's infrastructure pipeline], the infrastructure labour force in NSW will be required to grow by 56 per cent by 2024. The growth in labour demand is largely driven by the high volume of energy projects entering the State's pipeline and a very strong pipeline of hospital projects across NSW and Australia.

- the price of raw materials, which are set by international markets, are forecast to increase.
- government and other stakeholders have tight timing expectations for the delivery of these projects.

We are committed to delivering Humelink at the lowest sustainable, whole of lifecycle cost to maximise benefits to customers. The nature of a procurement process can impact the ability to leverage synergies and establish efficient cost structure and therefore impact the prudence and efficiency of the total cost of delivering a project.

Our procurement process for the design and construction of Humelink reflects the:

- lessons we learned from our procurement and risk management of Project EnergyConnect (PEC or EnergyConnect)
- outcomes of our extensive engagement with industry and market to understand the challenges and how we can best address these including through careful project packaging
- outcomes of the Early Contractor Involvement (ECI), which was critical to refine the design and approach to scope, work packages and commercial model based on contractor feedback.

3.1.1. Contract work packages

We have adopted a packaged approach to deliver HumeLink, which involves splitting Humelink into two geographic packages of similar sizes that will be delivered by two separate delivery contractors. This approach:

- provides a more manageable scope for contractors, aligned with market sounding feedback

⁸ Reserve Bank of Australia, Statement on Monetary Policy, August 2022, p. 43.

⁹ Reserve Bank of Australia, Statement on Monetary Policy, May 2023, Table 5:1.

¹⁰ ABS, 6427.0 Producer Price Indexes, Australia, Table 13. Input to the Manufacturing industries, division and selected industries, index numbers and percentage changes, June 2022.

¹¹ ABS, 6427.0 Producer Price Indexes, Australia, Table 17. Output of the Construction industries, subdivision and class index numbers, June 2022.

¹² Infrastructure Partnerships Australia, *New South Wales Red Book,| Infrastructure dynamics*, March 2023, p 6.

- best positions us to select contractors with capabilities best suited to the varied works required for the overall project.

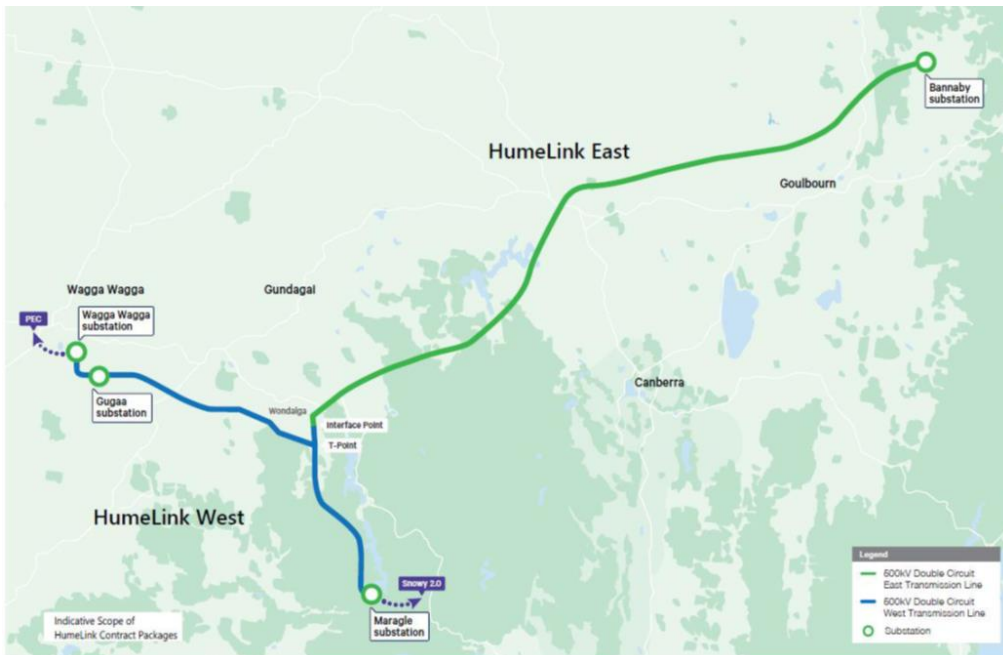
The D&C Contractors will be responsible for the design, construction, and pre-commissioning of the works under the relevant contract package. Transgrid will be responsible for obtaining the planning approvals, obtaining access to the site, and (after completion) the energisation, operation and maintenance of the asset. Construction is expected to commence in 2024 and take about 2.5 years to complete.

The two contract packages are:

- Humelink East: consists primarily of the transmission line works from the interface point to the eastern Humelink terminus at Bannaby. This package spans a greater geographical area, with double the length of HV transmission lines (compared to West), while the substation works are relatively small (and predominately civil works rather than electrical works).
- Humelink West: consists of the lines from the interface point south to the Snowy 2.0 connection at Maragle, and west to the Humelink western terminus at Wagga Wagga. This package involves more substation works, including interfaces at brownfield sites and construction of a new substation near Wagga Wagga, named Gugaa. The route involves more works within alpine regions, state forests and national parks.

Figure 3-1 identifies the indicative scope and interface point between the Contract Packages. The following sections provide an overview of the scope of Humelink East and Humelink West.

Figure 3-1: Overview of the Humelink alignment



3.1.2. Contract methodology

We carefully considered contract options for the D&C works required to deliver HumeLink. We adopted an incentivised D&C contracting approach, based on:

- feedback from the market from our extensive market sounding and early contractor involvement (ECI) process,
- lessons learned from past project experience (Project EnergyConnect), and
- our focus on affordability – delivering HumeLink at the lowest sustainable cost for consumers.

Box 3-1 overviews the key principles for the commercial contracting framework and risk allocation.

Box 3-1: Key principles for commercial contracting and risk allocation



Balanced approach between Transgrid's and Market's Risk Appetite

- Positions aligned with Transgrid's Major Projects Risk Appetite Statement
- Positions must be capable of market acceptance and will secure capability and capacity (ahead of CWO REZ contract award)



Time is Key Driver

- Transgrid to "own the float", with extension of time to be assessed against Date for Practical Completion
- Cost relief provided ahead of time relief.



Avoid inefficiency of Delivery Partner incorporating high levels of contingency

- High certainty elements priced on lump sum basis. Elements likely to be impacted by change priced on reimbursable/target cost basis with transparency provided on actual costs
- Shared risks to have a clear allocation of responsibility
- Risks allocated to the Delivery Partner must be able to be quantified (including if items are outside its control)



Encourage Transgrid and Delivery Partner to work together to achieve Project Objectives

- Encourage collaborative behaviours to allow issues resolution and dealing with change during delivery
- Incentive regime to encourage cost savings, earlier completion and high performance in other project objectives
- Incentive regime to be mainly self-funding

To attract partners of choice, we have adopted a contracting model that incorporates a fair risk allocation with a collaborative approach that is incentive-based to motivate delivery. This involves a combination of fixed and reimbursable components.

The reimbursable component allows D&C contractors to safeguard against potential losses (i.e., risk costs) caused by labour shortages, increasing materials costs and supply chain disruption. This allows them to offer a lower contract price than they otherwise would if they were forced to price in the Other Construction costs though a fixed price contract. The significant 'unknowns' relating to materials cost inflation, inflation pressures on other costs, and skills shortages will result in contractors adopting very high-risk premiums in fixed price contract. In addition, tier one contractors indicated an unwillingness to participate, in the procurement process if they would be forced to offer in fixed price contract, which in turn increases our overall cost and timing risk for the program.

The fixed and variable cost components are structured as follows:

The fixed and variable cost components are structured as follows:

- fixed costs (i.e., lump sum) relates to scope elements for which the cost certainty is relatively high. For Humelink this relates to design, preliminaries and substations, which comprise 50 per cent of the contract cost, and
- reimbursable component relates to scope elements for which there is less cost certainty. For HumeLink, this relates to transmission lines, which comprises 50 per cent of the contract costs. The reimbursable component includes agreed target cost with incentive arrangements to encourage collaborative behaviours to drive contractor performance and ensure the successful delivery of the Project. The incentive structure includes:
 - a cost incentive, known as a pain share/gain share mechanism whereby the contractor shares with us the risk of total costs being lower (gain-share) or higher (pain-share) than the total target cost, with the contractor risk capped at its margin fee
 - a program incentive up to 2.5 per cent of the total contract cost, payable where practical completion is achieved ahead of the target date
 - KRA incentives up to 1 per cent of the total contract cost for achievement of key performance indicators in safety, retention of key personnel, and community/stakeholder outcomes, and
 - standardised design, contract and commercial structures to achieve efficiencies across the program that are internationally recognised and used in Australia.

3.2. Overview of the procurement process

Our process for procuring delivery contractors for each work package is based on a collaborative procurement approach. Our tender process commenced with preparatory work in 2021, ahead of the formal competitive tender process which commenced with formal market sounding in April 2022. The formal tender process involved four phases:

- Phase 1 - Market sounding from April 2022 to July 2022
- Phase 2 - Expression of Interest (EOI) from August 2022 to October 2022
- Phase 3 - Early Contractor Involvement (ECI) Stage 1 October 2022 to February 2023
- Phase 4 – ECI Stage 2 March 2023 to August 2023

The collaborative procurement process mitigates delivery risk by addressing upfront points of commercial engineering and operational tension between us and the D&C contractors. The ECI phase of the process, facilitated early contractor involvement in the Project, ensures that the Project scope is refined, key project risks and opportunities are addressed and commercial and technical requirements are optimised prior to the award of contracts. This ensures better project outcomes and increased value-for-money. It also promotes the development of innovative solutions and provides a higher degree of program and cost certainty. The outcome of ECI stage 2 is the award of Delivery Contracts for Humelink East and Humelink West to the successful delivery

Box 3-2 provides an overview of our procurement approach.

Box 3-2 Overview of our procurement approach for D&C aware

Overview:

Our competitive approach to appointing Delivery Partners for the D&C of Humelink was as follows:

1. Establish a Transaction Team - we engaged a Transaction Team (Connell Griffin) to manage the transaction process from commencement of the formal Market Sounding through to the award of the major contract package(s)
2. Engage an external probity adviser, O'Connor Marsden & Associates to ensure the integrity of the process
3. Develop a Tender Evaluation Plan to ensure that all tenders were evaluated fairly, in accordance with Transgrid's requirements and objectives and the Humelink probity framework
4. Set up a tender evaluation team, comprising a Review Panel, Evaluation Panel and external evaluation advisors and specialist reviewers (including financial, legal, engineering and delivery)
5. Undertake formal market sounding, over the period April 2022 to July 2022 to:
 - inform the market about key aspects of HumeLink, including the proposed project program, delivery strategy, regulatory approval strategy and planning status
 - obtain industry feedback to validate the packaging and delivery strategy for the project, and
 - identify bona-fide delivery contractors, capable of undertaking the Project to participate in the next stage of the procurement process.
 - A total of 18 entities participated in the early market sounding and nine of these entities registered to participate in the Expression of Interest (EOI) Phase of the procurement process.
6. Undertake EOI Phase over the period August to October 2022, to identify the shortlist of suitably qualified and experienced Applicants to participant in the two-stage ECI Phase. The EOI Phase commenced with the release of the Invitation for Expressions of Interest. Five compliant EOI Applications were received and in October 2022, three EOI Applications were shortlisted to participate in the ECI Phase as ECI Tenderers.
7. Undertake ECI Stage 1 over the period from October 2022 to February 2023. The purpose of this phase was to provide the three ECI Applicants with information on the Project including the design

Overview:

and scope, innovation, statutory approvals, land access technical and commercial requirements as well as the tender submission and evaluation process. The three ECI Applicants submitted initial tender responses in December 2022. In February 2023, the two ECI Tenderers, who best responded to the Evaluation Criteria (i.e., demonstrated the ability deliver the best value for money), were selected to become the Preferred ECI Tenderers (one for each of the East and West Contract Packages) and proceed to ECI Stage 2.

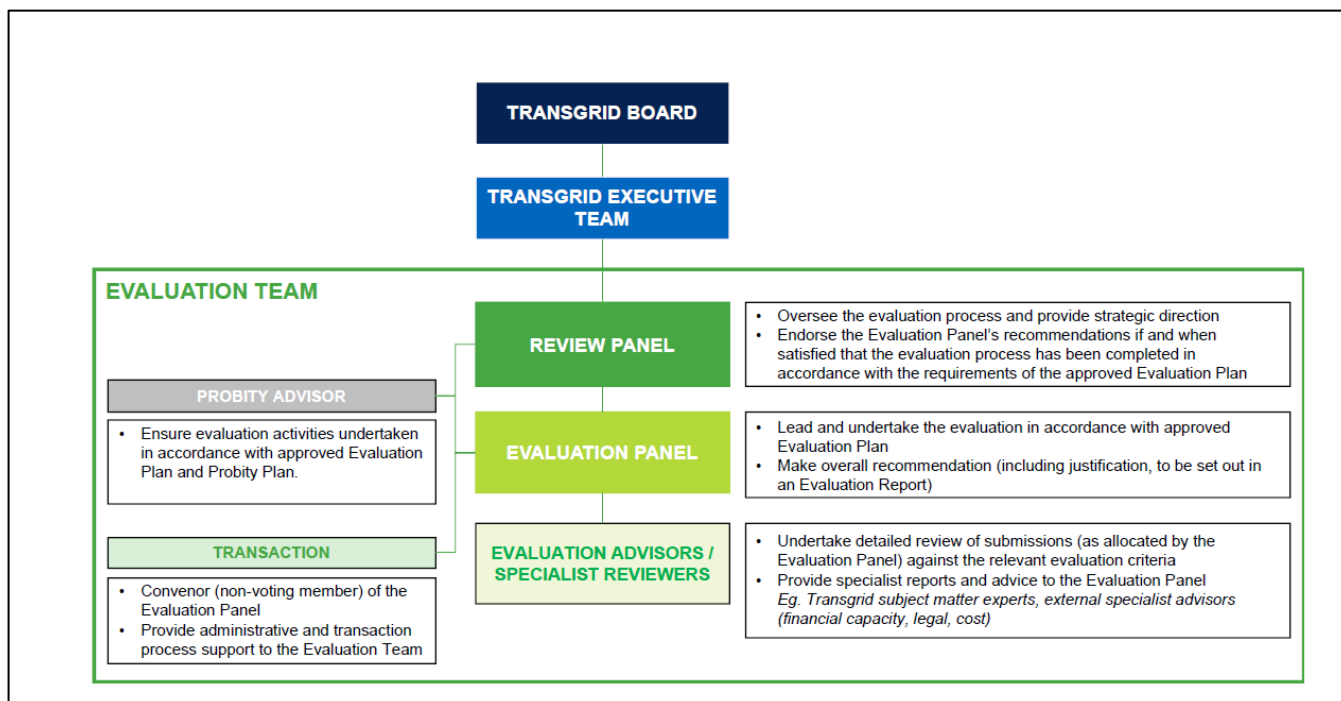
- Undertake ECI Stage 2 over the period from February to August 2023. The purpose of this phase was to ascertain commitment of preferred ECI Tenderers to achieve the agreed outcomes for the Project and program, optimise their offers for one construction package only – either the East or the West – and to finalise delivery contracts. At the conclusion of this stage, we received their final bids and undertook a detailed final tender evaluation

Each of these four phases in the formal tender process are explained in sections 3.2.1 to 3.2.4.

Box 3-3 overviews the governance structure overseeing the evaluation process. The tender evaluation process was conducted in accordance with:

- (a) Transgrid's evaluation plan
- (b) the requirements of the ECI RFT documents, and
- (c) the probity framework.

Box 3-3 ECI Stage 1 Evaluation Team



3.2.1. Formal Market sounding (April to July 2022)

Formal market sounding was undertaken from March to April 2022. This followed on from the informal market sounding conducted in 2021 and early 2022, which gathered initial feedback and insights from the construction market on procurement and packaging strategies and risk allocation. The formal market sounding focused on:

- informing the market about key aspects of HumeLink, including the proposed project program and delivery strategy, the regulatory process and planning status

- seeking market feedback on the proposed procurement process, delivery strategy and other key delivery and commercial matters, and
- understanding the capacity and capability of the contractor market to participate in the Humelink procurement process.

To raise awareness of the market sounding process, invitations were sent to 23 organisations and advertisements were posted on Transgrid's website. A total of 18 entities registered to participate in the market sounding process and all entities were subsequently invited to participate in the market sounding process activities. A summary of the key activities and dates are shown in Table 3-1.

Table 3-1: Market sounding key activities and timeframes

Market sounding activity	Date
Commence registration process for the Market Sounding	21 March 2022
Registration process closed	8 April 2022
Transgrid notifies entities selected to participate in the Market Sounding	21 March – 8 April 2022
Project information distributed (includes questionnaire and other collateral information)	4 April – 8 April 2022
Market sounding briefing session with participants (online)	12 April 2022
Questionnaire responses submitted to Transgrid	14 April 2022
One-on-one sessions held with select participants to clarify specific aspects of their responses (online).	2 May 2022 – 3 May 2022
Market Sounding Findings Report	6 May 2022

The key outcomes of the early market sounding were:

- the preferred delivery model is two contract packages based on a geographic split
- the key Project delivery milestones and timeframes are achievable
- we should retain flexibility throughout the procurement process to procure a single contractor to deliver the Project, subject to an assessment of value for money, including risk
- the key project challenges are expected to be obtaining social licence, availability of skilled resources, material and labour cost increases, supply chain constraints and cost escalation, alpine terrain and weather constraints, potential delays due to cultural heritage approvals and unexpected site conditions, and
- the key project opportunities (that could be realised during the tender process) include early engagement with contractors on design inputs and studies to optimise constructability, minimise rework, minimise project risk and uncertainty, optimise staging of works to enable early completion of portion of works, and securing early procurement and commitment of long lead time materials and equipment.

3.2.2. Expression of Interest (EOI) (August to October 2022)

The primary objective of the EOI Phase was to shortlist suitably qualified and experienced applicants to participate in the two-stage ECI process (Phase 3 and 4). During this phase:

- ‘Bona-fide’ contractors were required to register their interest to receive the Invitation for EOI documentation¹³
- EOI Applicants were invited to submit Applications demonstrating their capability and capacity to deliver the project and provide details to establish their participation in the ECI procurement stage
- we undertook further market interactions to inform EOI Applicants on matters relevant to the project’s further development and the proposed procurement process, and
- sought feedback from EOI Applicants on issues, queries, and opportunities to optimise the project development.

The EOI phase commenced on 4 August 2022, with the release of the EOI invitation. Applicants were required to submit their EOI Application in two separate parts:

- Part 1 EOI – Application – due on the 23 August 2022, and
- Part 2 EOI – Application – due on the 9 September 2022.

On 23 August 2022, we received six Part 1 Applications and on 9 September 2022, we received five Part 2 Applications. This means only 5 EOI Applicants provided both Part 1 and Part 2 of the EOI Applications.

The Evaluation Team assessed the Part 1 and Part 2 EOI Applications based on the three-step evaluation:

- **Step 1** - Compliance check against the Mandatory Information. All EOI applicants were assessed by the Evaluation Convenor, in consultation with the Probity Advisor, to confirm with the mandatory information requirements and were able to proceed to Step 2.
- **Step 2** – ‘Pass/Fail’ assessment against the pass/fail Evaluation Criteria, including:
 - relevant experience
 - financial capacity, and
 - management systems

Five EOI applicants passed this assessment and one did not.

- **Step 3** – a comparative evaluation against the comparative Evaluation Criteria including:
 - relevant experience
 - financial capacity
 - management systems
 - scope appreciation
 - capability of leadership team and continuity planning
 - approach to critical resources and sourcing security, and
 - commitment to delivery partner panel and objective and commercial alignment.

All EOI Applications, which passed Step 1 and 2, were subject to Step 3 evaluation. The objective of Step 3 was to identify the Applicants that have demonstrated the best experience and capability to deliver the contractor’s scope for HumeLink. Consequently, as a general principle, the evaluation process focused on undertaking a comparative evaluation to identify or accentuate the differences between Applicants.

¹³ These registrants were required to demonstrate that they have the capability and experience to play a significant role in a consortium, or to act as a head contractor in their own right, to deliver the relevant Humelink scope

In total, the Evaluation Panel convened five (5) times between 29 August and the 23 September 2022, to discuss and reach consensus on the score and ranking of each Applicant's response to the comparative Evaluation Criteria (1, 2, 4, 5, 6 and 7) along with reach consensus of the overall ranking of the Applicants response to the Evaluation Criteria.

On the 4 October 2022, the Evaluation Panel with the support of the relevant Evaluation Sub-Panels recommended to the Executive Review Panel for their endorsement that three EOI Applications be shortlisted to participate in the ECI Phase of the procurement process.

The Executive Review Panel endorsed the Evaluation Panel's recommendation and endorsed the proceeding to commence ECI Stage 1 once the successful Application were notified. The successful Applications were formally notified of the EOI outcome on 5 October 2022.

Table 3-2: Evaluation Panel's summary and shortlisting recommendation

EOI Applicant	1	2	3	4	5	6
EOI – Part 1 (Pass/Fail) Assessment	Pass	Pass	Pass	Pass	Pass	Fail
EOI – Part 1 (Comparative)						
Relevant Experience	1 st	3 rd	2 nd	4 th	5 th	No further evaluation
Financial Capability	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	
Management Systems						
EOI – Part 2 (Comparative)						
Scope Appreciation	2 nd	1 st	3 rd	4 th	5 th	No further evaluation
Capability of Leadership Team and Continuity Planning	1 st	2 nd	3 rd	4 th	5 th	
Approach to Critical Resources and Sourcing Security	1 st	3 rd	2 nd	4 th	5 th	
Commitment to Delivery Partner Panel objectives and Commercial Alignment	4 th	1 st	3 rd	2 nd	5 th	
RECOMMENDATION						
Shortlist Consensus Recommendation	Shortlist for ECI	Shortlist for ECI	Shortlist for ECI	Not Selected	Not Suitable	

The Humelink Expression of Interest (EOI) Evaluation Report¹⁴ provided as an Attachment to this Application provides further details on the EOI evaluation process and outcomes.

3.2.3. ECI stage One (October 2022 to February 2023)

The purpose of the ECI Stage 1 phase is to work collaboratively with the ECI Tenderers in an intensive, competitive and highly collaborative process to:

- provide the three ECI Applicants with information on the Project and opportunity to seek and obtain information and clarification from Transgrid, to enable them to develop their initial tender responses for the design and construction of both the East and West packages in the context of the Project's requirements
- assess ECI initial tenderer responses against a set of price and non-price evaluation criteria, and

¹⁴ Transgrid, Humelink Expression of Interest (EOI) Evaluation Report, October 2022

- select the two best ECI Tenderers to become the Preferred ECI Tenderers, one for each of the East and West Contract Packages, to proceed to ECI Stage 2. The preferred ECI Tenderers will demonstrate the best value for money and capability to meet the accelerated timeframe.

The ECI Interactive Process was observed by the Probity Advisor to ensure that the process was undertaken in adherence to the probity framework.

Box 3-4 overview the ECI objectives.

Box 3-4 ECI Objectives



facilitate open and effective two-way communication including positive guidance – provide a forum for the ECI Tenderer to discuss and seek feedback and positive guidance on the development of their Tender and communicate clearly with Transgrid about key Project matters;



achieve understanding and alignment of objectives – facilitate the transfer of information between parties to ensure that all parties clearly understand the requirements and are aligned with the Project objectives;



identify opportunities, challenges and test solutions – support the collective identification and investigation of key Project opportunities, risks and issues and allows potential solutions and innovations to be tested;



expedite the finalisation of contracts – discuss and resolve commercial issues and departures to key documentation upfront to minimise time and effort required to execute the Delivery Contract;



maximise the quality and competitiveness of Tenders – provide a structured process to review the progress of the development of each ECI Tenderer's Tender and obtain assurance regarding the quality of all Tenders; and



maintain probity and integrity – at all times during the Strategic Market Engagement, by enforcing a well-defined and fair probity framework.

The ECI Stage 1 commenced on 17 October 2022, with the release of the ECI Request for Tender. This was followed by a 10-week intensive and interactive process with the three shortlisted ECI Tenderers. This involved:

- a series of knowledge transfer workshops to ensure all ECI contractors have a firm understanding of the project objectives, scope, issues, and requirements, followed by
- a series of specific workshops whereby Transgrid and the ECI contractors worked collaboratively to optimise the project outcomes and maximise value-for-money for the project. This involved specific workshops to:
 - refine base contract documents and commercial risk allocation
 - optimise the design and technical requirements, including testing innovative proposals and options
 - ensure the Site Access Schedule and Planning Approvals process facilitates an optimal delivery approach
 - maximise the social license outcomes including with respect to workforce development and industry participation
 - identify and collaboratively develop solutions to mitigate key project risks and realise opportunities, and

- review the emerging price, including to discuss any value-for-money opportunities.

These workshops culminated in each of the three ECI Applicants submitting their initial tender response covering both the East and West contract packages.

This Interactive Process was:

- observed by the Probity Advisor to ensure that the process was undertaken in adherence to the probity framework, and
- supported by an electronic ECI Data Room for the ECI Phase to facilitate written communication and electronic document management between us and the ECI Tenderers.

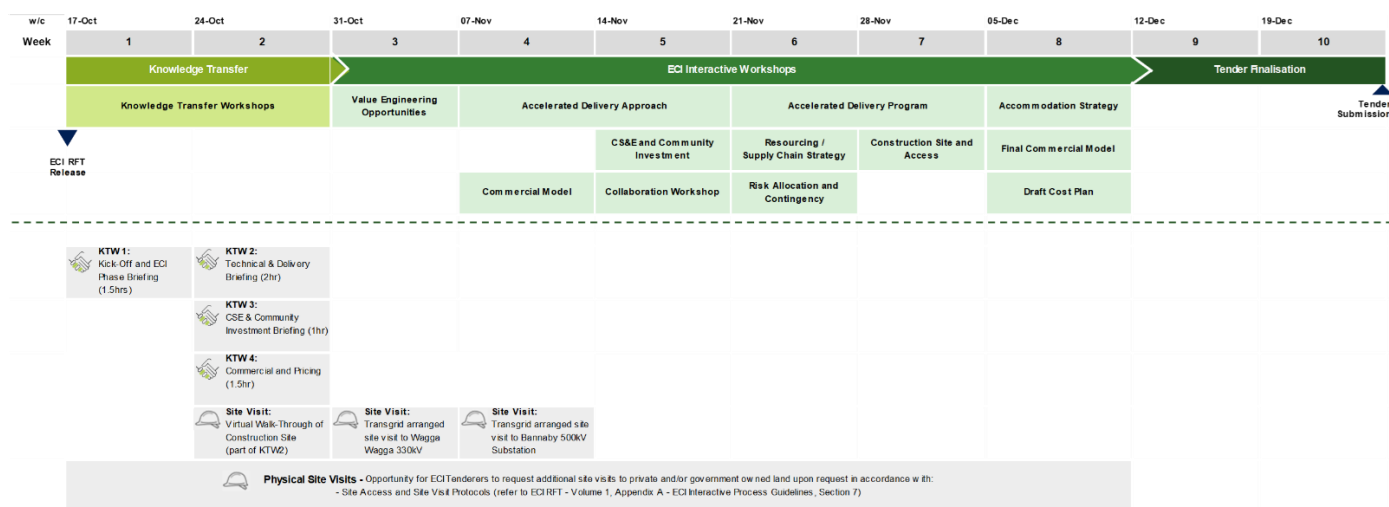
Figure 3-2 overviews the ECI Stage 1 program. This shows that:

- October 17 to 30 October 2022 – We held four knowledge transfer works and a virtual work through of the construction site were undertaken. The knowledge transfer workshops covered: a kick-off and ECI phase; technical and delivery; community and stakeholder engagement and community investment; and commercial and pricing.
- 31 October to 6 November 2022 – We held interactive workshops on value engineering and hosted a site visit to Wagga Wagga 330kV substation site.
- 7 November to 20 November 2022 – We held interactive workshops on the accelerated delivery approach and a site visit to Bannaby 500kV substation. The interactive workshops covered: community, stakeholder engagement and community investment; the commercial model and collaboration workshops.
- 21 November to 4 December 2022 – We held interactive workshops on the accelerated delivery program, which covered: resourcing / supply chain strategy; risk allocation and contingency and construction site and access.
- 5 December to 11 December 2022 – we held interactive workshops on: accommodation strategy; final commercial model; and draft cost plan

From 9-19 December 2023, the ECI tenderers finalised and then submitted their initial tender responses.

Figure 3-2 overviews the ECI stage 1 program.

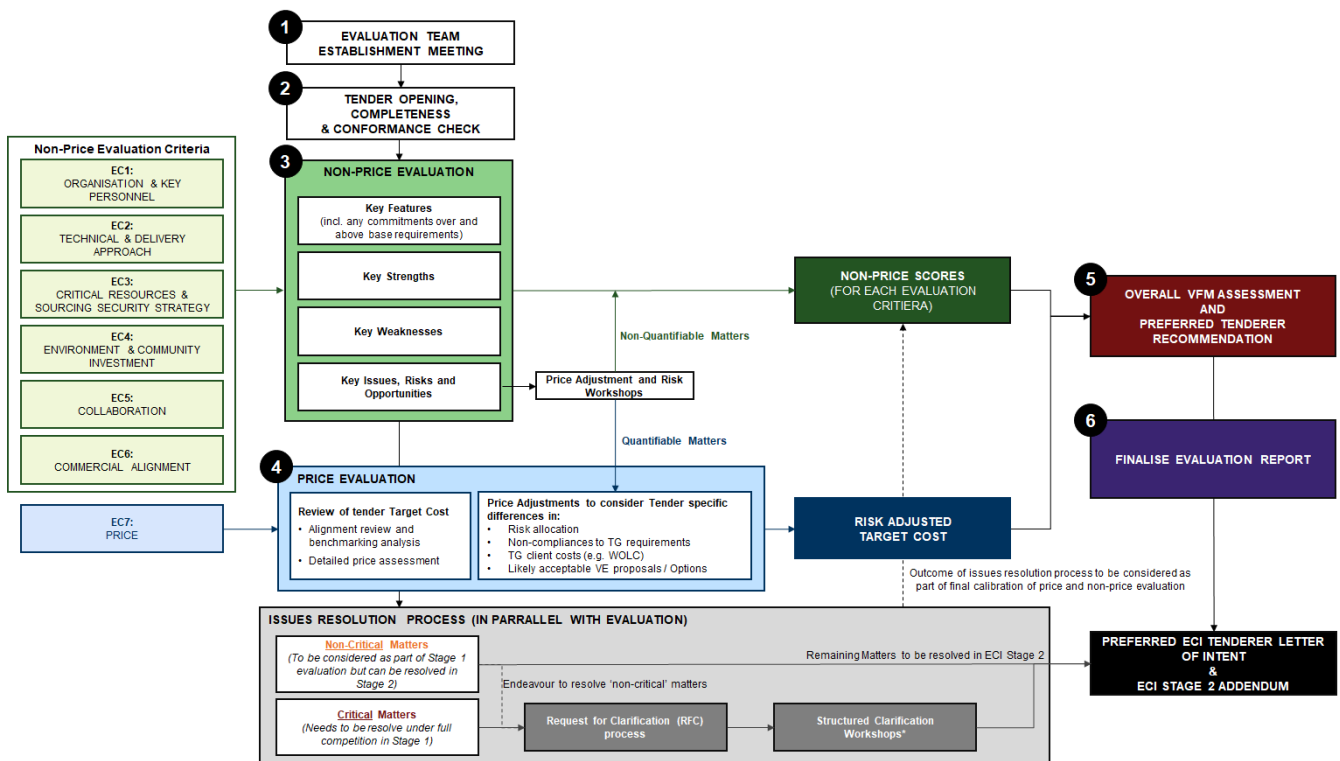
Figure 3-2: ECI Stage 1 Program overview



ECI Stage 1 Tenders were received on 23 December 2022. An Evaluation Team was appointed to evaluate Tenders in accordance with the approved Humelink ECI Stage 1 – Tender Evaluation Plan (provided as an

Attachment to this Application). A high-level overview of the evaluation methodology is provided at ECI Stage 1 evaluation methodology is provided at Figure 3-4.

Figure 3-3: ECI Stage 1 evaluation methodology



All Evaluation Team members attended an Establishment Meeting and completed all probity requirements (e.g., completing Conflict of Interest Declaration) prior to being provided access to the Tender documents and commencing evaluation activities.

All three ECI Tenderers submitted compliant Tenders. The Evaluation Panel (with support from the Evaluation Advisors) evaluated Tenders against the six non-price criteria and one price comparative evaluation criteria. This process included the following key activities:

- 8 formal Evaluation Panel meetings
- numerous Sub-Panel Meetings with the Evaluation Advisors (subject matter experts and external advisors)
- a formal Q&A process with Tenderers through the electronic data room
- in-person presentations and interviews with Tenderers, and
- three briefing sessions to the Executive Review Panel.

The Evaluation Panel identified recommended Preferred ECI Tenderers for each contract package based on each Tenderer’s assessed performance against the comparative evaluation criteria. This recommendation was endorsed by the Executive Review Panel.

The outcome of the ECI Stage 1 comparative evaluation process is outlined in Table 3, and further details are provided in the ECI Stage 1 Tender Evaluation Report (provided as an Attachment to this Application).

Table 3: Overview of ECI Stage 1 Comparative Evaluation Outcomes

ECI Tenderer	WEST			EAST		
	A	B	C	A	B	C
Non-Price Criteria						
Organisation & Key Personnel	8 (Very Good)	5 (Marginal)	7 (Good)	8 (Very Good)	5 (Marginal)	7 (Good)
Technical & Delivery Approach	4 (Unacceptable)	7 (Good)	8 (Very Good)	6 (Adequate)	8 (Very Good)	7 (Good)
Critical Resources & Sourcing Security	6 (Adequate)	8 (Very Good)	7 (Good)	7 (Good)	8 (Very Good)	7 (Good)
Environment & Community	8 (Very Good)	7 (Good)	6 (Adequate)	8 (Very Good)	7 (Good)	6 (Adequate)
Collaboration	8 (Very Good)	5 (Marginal)	7 (Good)	8 (Very Good)	5 (Marginal)	7 (Good)
Commercial Alignment	7.5 (Very Good)	5 (Marginal)	7 (Good)	7.5 (Very Good)	5 (Marginal)	7 (Good)
Non-Price Ranking	3rd	2nd	1st	1st	3rd	2nd
Price Criteria						
Adjusted Comparative Price - Ranking	2nd	3rd	1st	2nd	3rd	1st
OVERALL RECOMMENDATION						
Preferred ECI Tenderer Recommendation:	Not selected	Not selected	Preferred Tenderer (WEST)	Preferred Tenderer (EAST)	Not selected	Not selected

Table 4 summarises the ECI Phase 1 key dates.

Table 4: ECI Phase 1 key milestones and dates

Key milestone	Date
Release of ECI RTF documentation	17 October 2022
Briefing to ECI Tenderers	Commencing 17 October 2022
ECI interactive workshops	October-December 2022
Q&A closed for new questions from ECI Tenderers	16 December 2022
Tender closing date	23 December 2022
Evaluation and approval of preferred ECI Tenderers	January 2023
Preferred ECI Tenderers announced for each Contract Package	February 2023

3.2.4. ECI Stage Two

The ECI Stage 2 involved us working collaboratively with the Preferred ECI Tenderers on their allocated contract package to:

- refine and further develop their initial tender responses including with respect to design, program, price, and commercial matters. This ensured that their responses maximised value-for-money, will achieve

the Project objectives and are compliant with tender requirements to enable the finalisation of Delivery Contracts for each Contract Package; and

- progress other project development activities such as:
 - participating in community and stakeholder consultation activities
 - providing input and support to the Planning Approval process
 - providing input to the land acquisition process
 - undertaking site investigation activities
 - progressing development and implementation of resourcing and accommodation strategies, and
 - booking production slots for key plant, equipment and materials.

To enable us to provide effective feedback and facilitate collaborative discussions during the ECI Stage 2, the Preferred ECI Tenderers were required to periodically submit interim submissions containing elements of their emerging draft Tender Confirmation.

The Tender Confirmation submission was provided by both preferred ECI tenderers in June 2023 and contained the following deliverables developed specifically for the relevant contract packages (East and West):

- Confirmation of Key Personnel committed for the delivery phase
- Tender Design
- Initial Contractor Management Plans
- Initial Delivery (D&C) Programme
- Commercial proposal to finalise the terms and conditions of the Delivery Contracts, and
- Price, including the proposed Target Cost.

We have received final bids from the preferred D&C contractors and have undertaken a detailed final tender evaluation. In parallel, our independent external cost estimator, Fission, has assessed the quantities and pricing against the ECI stage 1 bids and has developed their own independent cost build up based on the delivery scope.

Table 3-5 summarises the ECI Phase 1 key dates.

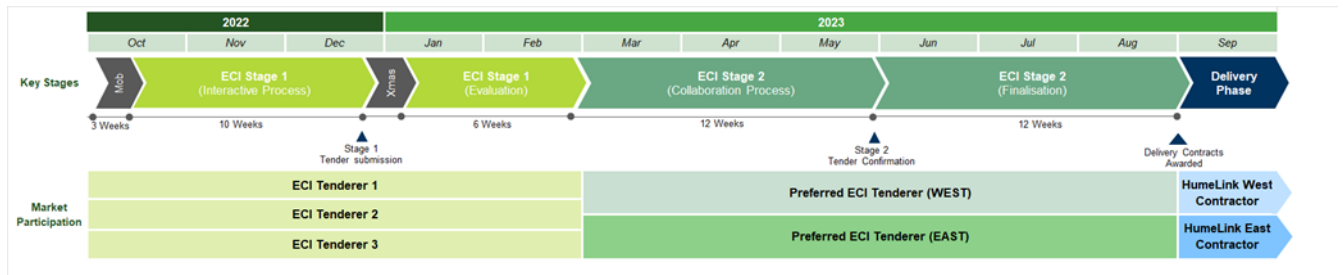
Table 3-5: ECI Stage 2 key milestones and dates

ECI Stage 2	Date / Time
Addendum to ECI RFT for ECI Stage 2 released	March 2023
Commence ECI Stage 2 collaboration period	March to June 2023
Tender Confirmation Closing Date and Time	June 2023
Evaluation and Approvals of Tender Confirmation	June to September 2023
Execute Delivery Contracts for each Contract Package	End of August 2023

3.3. ECI Tender timeline

Figure 3-4 overviews the key milestones and dates in ECI Stages 1 and 2.

Figure 3-4: Overview of ECI Stages 1 and 2



4. Design and construction

4.1. Overview

The uncertain and challenging operating environment means that contractors are not able or willing to enter into traditional fixed price D&C contracts. We have therefore adopted an incentivised target cost (ITC) D&C contracting model to deliver the east and west packages for HumeLink. The D&C ITC commercial model achieves an appropriate balance between:

- fixed pricing, for components of the scope that are well defined and have high-cost certainty, and
- reimbursable pricing with shared risk, for components of the scope which demonstrate scope and cost uncertainty.

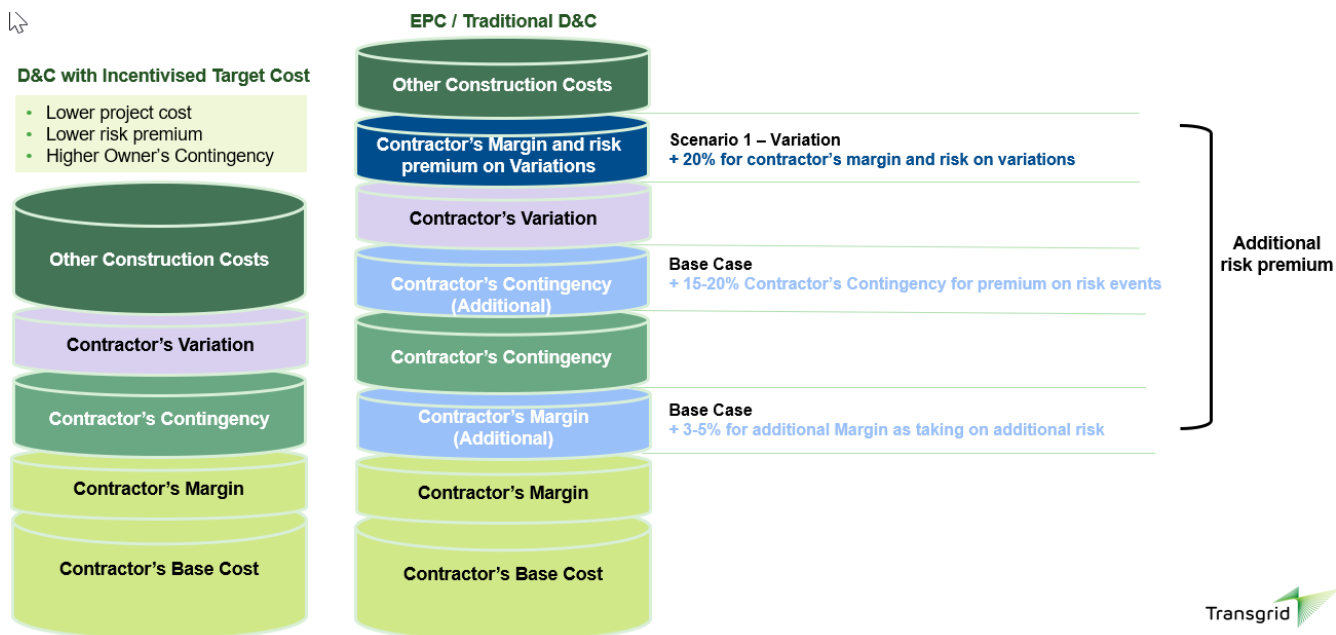
This approach assists to safeguard contractors against potential losses (i.e., risk costs) caused by costs or elements of scope that are subject to high levels of uncertainty. This approach is in the long-term interests of consumer because it enables the contractor to offer a lower contract price than they otherwise would if they were forced to price in the Other Construction costs through a fixed price D&C contract. This model balances our focus on affordability with the need to ensure a sustainable level of capex to safely deliver HumeLink.

The ITC D&C contract cost of █████ million included in this Stage 2 Application reflects a variable contract cost. If, however, the D&C contractors were required to offer a fixed price contract, then the D&C contract cost is expected to increase by around █████ million █████ per cent. The variable contract cost in this Revenue Proposal therefore provides consumers with a higher probability of a lower price outcome.

4.2. Context

A traditional fixed price D&C contract model includes contingency premiums in the overall fixed price to cover the contractor's potential exposure to risks in the delivery phase of the project. In an uncertain operating environment, the contractor's risk and contingency premiums are higher to protect them against the likelihood of potential risk costs emerging. In the case of a fixed price D&C contract, the Other Construction costs are expected to be relatively lower, however the actual cost of the project is expected to be higher to account for contractor risk premiums. This is illustrated in Figure 4-1.

Figure 4-1: D&C ITC vs traditional D&C contract model



In an ITC D&C contract model, elements of the contract price that are subject to high level of scope or cost uncertainty are based on a variable price such that they can be updated to reflect the actual costs of undertaking the work. This allows the contractor to offer:

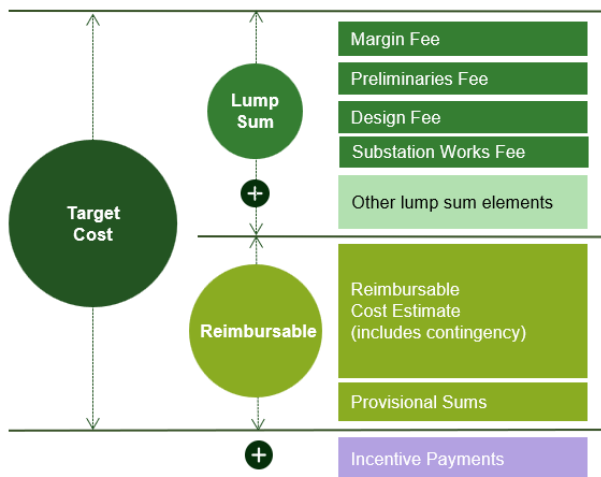
- a fixed price (or lump sum) for components of the scope that are well defined and have high-cost certainty, and
- reimbursable components with shared risk, for element of the scope which are uncertain. Uncertainty may arise due to a range of factors including an inflationary operating environments, resourcing and supply chain challenges, intense global competition, macro challenges, the geographical span of the works, terrain and the level of investigation and design undertaken at the time the contract is entered into.

This contract model enables the contractor to offer a lower overall contract price than they otherwise would if they were forced to price in the risk costs through a fixed price. It also requires us to price the residual risk that we retain (i.e., which has not been priced into the D&C contract). As such, our risk and contingency costs are relatively higher under an ITC D&C contract model compared a fixed price D&C contract model. The actual delivery cost under ITC D&C contract model is expected to be comparatively lower than under a fixed price D&C contract model, due to the collaborative approach on the reimbursable component, whereby contractors are incentivised to achieve cost savings.

Recent examples of major projects being delivered under a D&C ITC contract model include Western Harbour Tunnel, North East Link Program, (subcontract to PPP), Warringah Freeway Upgrade, Sydney Metro City & Southwest Line-wide Works, Central Station, West Eastern Tunnelling Package.

Figure 4-2 and section 4.2.1 explain the D&C ITC contract model and how this achieves lower cost outcomes for consumers.

Figure 4-2: D&C ITC contract model



4.2.1. D&C ITC contract model

The key components of the D&C ITC contract model are:

- The target cost – this cost comprises the lump sums and the estimate of reimbursable costs to deliver the entire scope of work for each contract package, based on the information available at the time of entering into the contract.
- The lump sum component – this is the largest component of the cost includes the following fees:
 - margin fee, which includes margins and overhead costs
 - preliminary fees, which includes management and supervision staff costs, survey work, personnel, site vehicles, site facilities establishment, IT and communication systems, finance, management system and plans
 - design fees, which includes costs for design work required to complete to meet the contractors' design obligations including the independent verification, and
 - substation work fees, which relates to substation and all related temporary works. This includes labour, construction plant and equipment, materials, consumables, commissioning spares and instruments.
- The reimbursable component – this relates to:
 - transmission line works – the costs for labour, plant and equipment associated with access tracks, clearing, tower foundations, steel towers and stringing, and
 - provisional sum items – the cost for unknown contamination, substation noise mitigation, architecture acoustic treatment works, post-practical completion support, unforeseen landholder costs, cultural heritage works, registered Aboriginal party costs, community options, local area works and insurance top ups.
- The incentive regime – this relates to the reimbursable component only (not the lump sum component) and is intended to adjust the value of contractor's payments against the target cost based on the following three incentives:
 - Cost Incentive – this applies where the contractors' actual cost is higher or lower than the target cost and is known as the pain/gain share regime
 - Program Incentive – this applies where the practical completion date occurs before or after the target practical completion date, and
 - KRA Incentive – this applies where the works are completed in accordance with various safety, cultural, environmental, community and stakeholder engagement and other objectives.

Each element of the incentive regime these is explained below:

Cost Incentive

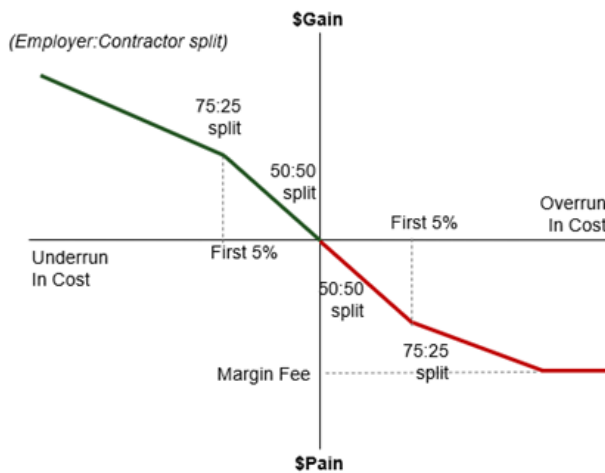
The contractor is incentivised, through a gain/pain share mechanism, to efficiently manage within the Target Cost, their performance in relation to the delivery of the reimbursable component of the contract. To this end, we share with the contractor, the gain/pain of total costs being either lower (gain-share) or higher (pain-share) than the target cost in the following way:

- if the over or under-spend against the target cost is less than 5 per cent, the sharing is 50:50 between us and the contractor, and
- if over or under-spend against the target cost is greater than 5 per cent of the target cost, then the sharing between us and the contractor is 75:25, and the contractors pain-share is capped at the margin fee of 11 per cent of the target cost.

The contractor is incentivised, via the pain/share mechanism, to drive performance of the reimbursable cost elements within the target cost allowance to avoid paying in the overrun for these costs which would unnecessarily increase capex and reduce the margin fee they earn for the project.

This is illustrated in Figure 4-3.

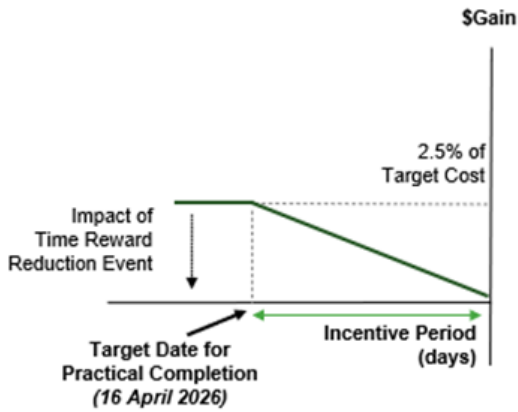
Figure 4-3: Cost incentive payment



Program Incentive

The program incentive is intended to reward the contractor for delivering the project in the shortest possible duration and by AEMO's target completion date of July 2026 at the latest. The time reward percentage is determined based on the number of days that the project is delivered between the practical completion target date of 16 April 2026 and the AEMO's target completion date of July 2026. The maximum gain is capped at 2.5 per cent of the target cost. This is illustrated in Figure 4-4.

Figure 4-4: Program incentive payment



Key Results Area (KRA) Incentive

The KRA incentive Payment is intended to reward or penalise the contractor for their performances against certain KRAs (other than cost and program). This incentive is intended to promote high standards in certain areas whilst achieving improvements in cost and program outcomes.

A reward is provided up to a maximum of 1 per cent of the target cost for the following:

- KRA 1 – Community, Social License and Community Benefits (40% of KRA reward)
- KRA 2 – Workforce, Workforce Development and Industry Participation (40% of KRA reward)
- KRA 3 – Collaboration and culture (20% of KRA reward)

The contractor can incur a financial penalty of up to 1 per cent of the target cost for poor performance against the following KRAs:

- KRA 4 – Safety & Environment Lead Indicators (40% of KRA risk)
- KRA 5 – Retention of Key Personnel (40% of KRA risk)
- KRA 6 – Compliance with Open Book Basis (20% of KRA risk)

The final total KRA reward or risk amount is calculated and paid/deducted in the final payment schedule. This is illustrated in Figure 4-5.

Figure 4-5: KRA incentive payment



4.2.2. Our stage 1 activities and costs

Our stage 1 Application included costs to support activities needed to engage the contract market through the ECI process. These Stage 1 activities were critical to:

- promote competition and innovation to lower costs including costs for risks for the construction works in Stage 2, and
- enable the successful contractors undertake detailed design and other pre-construction activities in to ensure construction can commence as soon possible following approval of our Stage 2 Application to meet the 2026-27 completion date.

Our Stage 1 Application did not include any forecast capex required to enter into contracts with the preferred suppliers, as we expected this to occur subject to the AER’s approval of our Stage 2 Application. The ECI activities that we undertook in Stage 1 to select the preferred D&C contractors is described in section 3.

4.3. Capex forecasting method and assumptions

The D&C contract costs from the preferred contractors for each of the East and West contract packages are set out in Table 4-1 and Table 4-2. The forecasting methodology used to determine our forecast capex is the competitive procurement approach discussed in section 3.

Table 4-1: D&C contract costs – East (\$M Real 2022-23)

D&C contract cost - East		
Target costs		
Transmission lines	Reimbursable	
Substations	Fixed	
Preliminaries Fee	Fixed	
Margin fee	11% of target cost including margin	
Design Fee	Fixed	
Provisional Sums	Provisional	
Total target cost		
KRA incentive		
1% of Target Cost		
Pre-agreed variations		
OSR2 at Gadara Sub		
Total D&C contract cost		

Table 4-2: D&C contract costs – West (\$M Real 2022-23)

D&C contract cost – West		
Target cost		
Transmission Lines	Reimbursable	

D&C contract cost – West		
Substation Works	Fixed	██████████
Preliminaries Fee	Fixed	██████████
Margin fee	11% of target cost including margin	██████████
Design Fee	Fixed	██████████
Provisional Sums	Provisional	██████████
Total target cost		██████████
KRA incentive		
1% of Target Cost		██████████
Pre-agreed variations		
PAV4 & PAV11A		██████████
Total		██████████

5. Project risks

5.1. Overview

Humelink is a large-scale high voltage transmission project with a unique set of delivery challenges driven by the uncertain operating environment and delivery challenges including the accelerated delivery program. The operating environment challenges are discussed in section 4. The delivery challenges arise from, amongst other things, the specialised sector with limited delivery capacity, a high volume of impacted property, difficult terrain and strong community opposition. Further, the number of internal and external interfaces and complexities contribute to the inherent risk of major projects, like HumeLink.

The D&C tender process and outcomes discussed in sections 3 and 4 have revealed:

- activities with risks that the D&C contractors are not willing to accept and or it is more cost effective for us to undertake, and
- activities / scope elements that are uncertain and which the D&C contractor has agreed to share with us the risk of any cost under or over-spends against the target cost. These relate to the reimbursable component of the D&C ITC contract and are discussed in section 4.

These risks are referred to as Other Construction costs. Our Stage 1 Application includes forecast capex of \$599.07 million for Other Construction costs associated with the delivery of HumeLink. This section provides an overview of the top ■ Other Construction Costs that may arise during the delivery phase of the Project. The top ■ risks comprise \$537.14 million or 90 per cent of the total Other Construction costs.

Our forecast capex for Other Construction costs is, to the extent possible, based on advice from external parties, the rates included in the contractors' responses where activities are the same or similar, and our independent cost estimator fission. The forecast Other Construction costs for Humelink appropriately reflects the complexity, uncertainty, contract model selection and large variety of risks the Project is exposed to and are necessary to ensure the successful delivery of the Project within the delivery timeframes and budget.

5.2. Context

The AER's guidance note on the regulation of actionable ISP projects (Guidance Note on ISP Projects)¹⁵ states that it can accept a project risk allowance for a contingent project where:¹⁶

- residual risks have been identified, and
- 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:¹⁷

- risk identification, i.e., clearly identifying the risk events, and

¹⁵ AER, [Guidance Note, Regulation of actionable ISP project](#), March 2021

¹⁶ AER, *Regulation of actionable ISP projects*, Guidance note, March 2021, pp 16-17.

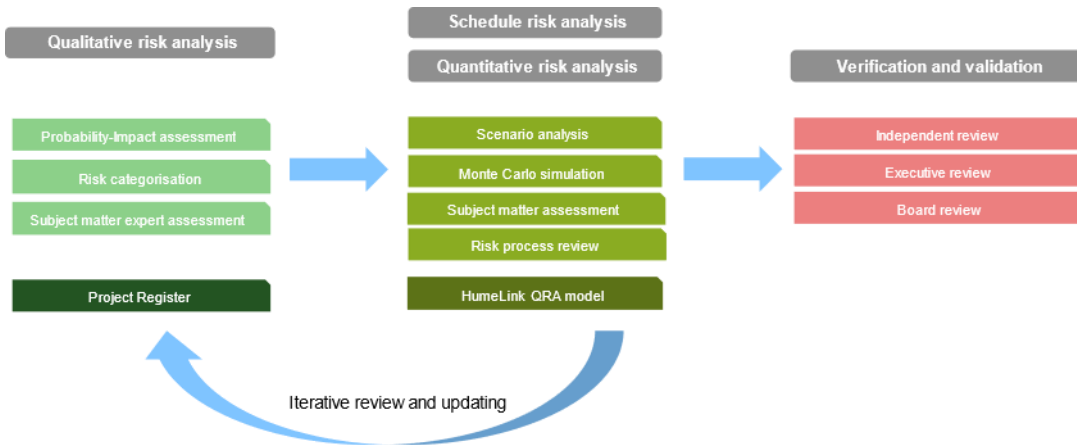
¹⁷ AER, *Regulation of actionable ISP projects*, Guidance note, March 2021, p 17.

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

5.3. Capex forecasting method and assumptions

We have undertaken a thorough assessment of our residual risks. We have adopted an integrated probabilistic approach to risk allocation and modelling, including inherent, contingent and schedule risk assessment. This is consistent with industry best practice, noting that over the past decade the infrastructure industry has matured its contingency estimating approach considerable.

Figure 5-1: Risk identification and quantification process



Sections 5.3.1 to 5.3.3 overview our approach to identifying, quantifying and modelling risks associated with the delivery phase of HumeLink.

5.3.1. Risk management process

Our risk management framework and project risk management procedure are well developed and align with AS ISO 31000:2018 Risk Management Guidelines. The key steps in our risk approach involve:

- Step 1 – understand and establish the context for the potential risk events that could arise
- Step 2 – identify expected risks and establish a risk register, and
- Step 3 – analyse and evaluate potential risks, and
- Step 4 – mitigate/manage potential risks.

We consult both internally and externally on these risks and continually monitor and review changes arising from updated information or a change in circumstances. We have applied our well-established risk management processes to identify the risk costs associated with the delivery of HumeLink, noting that this process commenced with the publication of the PADR and will be ongoing through to the completion of the Project.

The risk information developed as part of this process forms the basis of our Other Construction costs capex forecast.

5.3.2. Identify risks and establish risk register

Once we understand the context for potential risks (i.e. step 1) we proceed to step 2, which involves identifying potential risks that are likely to present themselves within the specific context to develop our risk register.

This includes thoroughly examining the D&C contracts to identify any additional risks that are expected to impact the Project's delivery cost or schedule. We have assigned each risk a 'risk owner' who is responsible for developing and maintaining the risk treatment plan for each individual risk.

Once we have established a comprehensive list of risk, we review and qualify these through a series of risk workshops which are attended by internal and independent subject matter experts (SMEs) and risk specialists from different disciplines related to the Project including environment, land, stakeholder, commercial, planning and construction, transaction and procurement.

For each risk, we undertake a qualitative assessment to determine the following:

- potential causes
- consequences and scenarios
- mitigation measures and controls, and
- risk rating.

We maintain our risk register established through this process in our CAMMS database and regularly update it as new risks are identified, and existing risks are treated or closed.

5.3.3. Quantifying risk costs

We use Monte Carlo probability analysis to quantify our risk costs. Based on our risk register for HumeLink, we have identified and focused on those risks that are expected to materially impact the Project's delivery cost or schedule to determine our forecast capex for risks.

Likelihood of occurrence and expected cost

Individual risk owners and specialists have quantified each risk by assessing the likelihood of occurrence as well as the expected cost impact. In doing so, they have drawn on a range of available information including experience from similar projects, SME experience, independent estimates, supplier, contract, design and program information.

In most case, we consider a range of possible risk cost outcomes including:

- best case outcome
- worst case outcome, and
- most likely outcome.

Each possible risk cost outcome is based on supporting evidence. This approach is often referred to as a 'three-point estimate' of the cost impact and is a well-accepted and robust industry method. However, not every risk can be described using 'three-point estimate'. For some risk, only a best case and a worst case can be determined because there is no concentration around a most likely outcome. In these cases, the analysis is based on a two-point estimate.

The representation of the range of probable cost impacts is described in the risk models as a probability distribution. A probability distribution represents the likelihood that an indefinite quantity will take on any value within the range of values that can arise. The simplest way to describe a three-point estimate is to use a triangular distribution. This means that the best case and worst case are the absolute extremes, i.e., there is no possibility outside this range. Based on advice from Broadleaf Capital and as reviewed by KPMG risk experts, the 'Trigen' distribution offers a better distribution approach because it considers the best and worst cases as a 1 in 10 type of outcome, i.e., if we performed the project many times, then:

- one in ten would have an outcome as good as the best case, and
- one in ten would have an outcome as bad as the worst case.

We have adopted Trigen distribution for the three-point estimates to remove distortion of distribution driven by extreme events (absolute best and worst cases). As a result, during the workshops and discussions to determine the uncertainty data for each risk, we considered a 1 in 10 plausible best case and 1 in 10 plausible worst case. These results are then reflected in the modelling.

In one case there was no concentration of outcomes around a most likely value. The range was simply between a best case and a worst case. For this risk a 'uniform' distribution was used as it was a better representation of the input information. A uniform distribution means that the outcome is equally as likely anywhere between the best and worst cases.

Where the risk is associated with an uncertain event, we have analysed the risks and determined their range of impacts and the probability that these impacts will occur. In contrast, where the risk is associated with the uncertainty of the cost item estimated or the duration of an activity in the schedule, i.e., not arising due to an 'event', this risk is referred to as an inherent risk. The inherent uncertainty of the cost or schedule item usually has a most likely outcome as the estimated value or planned duration but may be both better and worse. Again, where appropriate we have considered this inherent uncertainty in the items costed or activity durations estimated.

Monte Carlo analysis

The primary method we have used to combine the outcomes from the outcomes from the Trigen distribution is a Monte Carlo probability analysis. We have developed a cumulative cost risk model, 'Humelink QRA Register', for the Project with assistance of E3 Advisory, Fission and Broadleaf Capital. This includes:

- a qualitative analysis of each risk and inherent uncertainty
- a quantified cost risk analysis of both inherent cost uncertainty sourced from our owner estimator (Fission) and SMEs, and contingent risks sourced from our risk register; and
- an assessment of the Project's schedule delay risk, based on the schedule risk analysis developed by independent experts TBH.

The Monte Carlo analysis also considers risks that are positively and negatively correlated. Risks that positively correlated have a common driver. As an example, the risk of design growth of the towers resulting in increased quantities of steel, is likely to move in coordination with the total cost of the steel. However, the relationship is not 100 per cent correlated, as the market steel price per tonne can also result in an increase or decrease in the cost of steel so they are still two separate risks. The Monte Carlo analysis software used for both the cost and schedule analysis takes these dependencies into account by correlating the risks.

- The result is a more realistic prediction of how the complete portfolio of risks may eventuate.
- The schedule risk analysis outcomes informs the time dependent costs such as the Owner's labour costs and included in the cost risk analysis.

The Monte Carlo analysis uses a model that depicts each risk and the range of plausible impacts. The analysis starts with the software randomly selecting a value from each of the risk ranges in accordance with the three-point, two point or other distribution used to represent the risk. These values are totalled. The software then repeats the selection and summation process. This selection and summation process is repeated many times (the cost model uses 10,000 iterations). The sum from each iteration produces an output distribution of the likely schedule or cost outcomes as though the project itself was conducted many times.

The outcome of the Monte Carlo analysis is a range of likely cost and schedule outcomes for the project. The range can be examined to determine the central value where there is both a 50 per cent chance it will be exceeded and a 50 per cent chance it will not be exceeded, sometimes referred to as the P50. The

value that represents a good outcome where 1 in 10 times the project may achieve this value or better, can be determined; often referred to as the P10. At the other extreme, where things have tended towards a worst case outcome, we can determine a value where 90 per cent of the time the outcome will be better, but 10 per cent of the time it may be worse. Nine times out of ten, the project outcomes should be better than this number. It is often referred to as the P90.

Hollman model – verify and validate Monte Carlo analysis

To cross check the outcomes of the Monte Carlo analysis, we have also used a separate method of contingency analysis developed based on an empirical database of many projects and their outcomes in the power transmission sector. This model is known as the Hollmann model.

The Hollman model determines where in the database the project falls based on the answers to a detailed questionnaire. It also considers the top risks and uses a similar Monte Carlo analysis to ensure that larger risks specific to the project being analysed are not ignored. The Hollmann analysis outcome is considered more valuable when the project definition and associated risk identification is still in its infancy. Hollmann model was used during the early phase of Humelink for the purpose of RIT-T PACR estimates.

The risk analysis has also been used to prioritise risk treatments and allocation of risk to the organisation most able to manage the risk.

We have continually reviewed and updated the data used in our modelling to ensure it reflects the latest and best available information including the outcomes D&C ITC contract packages for the east and west.

Outcomes of our analysis

As a result of our analysis, we have identified risk costs that are:

- required to deliver Humelink on time and within budget – these risk costs form part of the overall cost of the project, and
- reflect the probability-weighted calculation of ‘expected costs’

We have grouped our Other Construction costs into the following three categories:

- reimbursable risk costs – these relate to the reimbursable component of the D&C contract described in section 4.2 whereby we are required to adjust the contractor’s payment against the target cost based on the incentive arrangements that apply under the contract
- variation risk costs – these relate to scope changes that may emerge during the delivery phase. These costs are not related to the reimbursable component of the project and are wholly our risk costs
- time (delay) risk costs – these relate to timing delays that may emerge during the delivery phase as a result of planning or secondary approval delays and construction delays, which result in additional labour resources and corporate overhead costs. These costs are not related to contractor and are wholly our risk costs.
- Inherent risks costs – these relate to activities for which there is cost uncertainty due to the completeness of information available at this stage of the Project. These costs are not related to contractor and are wholly our risk costs.
- Biodiversity risks costs – this relate the possibility that our actual biodiversity offset liability is materially different to our forecast based on the assumptions in our biodiversity strategy not prevailing.

Table 5-1 overviews the top 25 Other Construction costs which comprises \$537.14 million or 89.66 per cent of the total forecast capex for Other Construction costs of \$599.07 million.

Table 5-1: Top 22 Other Construction Costs for Humelink delivery (\$Million, Real 2022-23)

Risk name	Description	Forecast capex (M)
Reimbursable		
ID47 – productivity	Lower productivity levels than planned and increased rework required in tower foundations and stringing for the Project. The Project is within a specialised sector where the current workforce is less experienced and amid skills shortage.	17.86
ID42 – Increase in Plant	Reimbursable plant and equipment costs above estimate for Transmission Line Works	12.87
ID57 – Tower Design Growth	Design refinement and growth of towers occurs during detailed design	11.01
ID40 – Increase in labour	Increase in Contractor reimbursable labour costs above EBA for Transmission Line Works	9.59
ID41 – Local Area Works	Additional Local Area Works during construction leads to increase in reimbursable costs. High construction road use could result in damage and repair requirements and issues in dealing with Councils and non-project contractors	5.78
Total reimbursable		57.11
Variation		
ID68 – Delay Escalation	Contractor repricing arising from an employer driven delay to NTP2	52.50
ID13 – Inclement Weather	Claims for delay due to exceeding the inclement weather allowance in Contract plus disputes over what is inclement weather and what sites were impacted	41.71
ID65 – Tower Foundations	Increase in costs associated tower footings with Geotechnical conditions being substantially different from the conditions expected following investigation works leading to increased costs and adjustment event under the Delivery Contract	33.08
ID19 – Variations	Claims for variations due to changes in scope due to changes in design and construction manuals or Transgrid requirements	31.28
ID33 – Interface Contractor	Lack of coordination with Interface Contractors (OEM, East/West) resulting in design delays, construction delays, scope gaps, responsibility gaps and additional costs.	15.12
ID59 – Condition of Approval	Changes to Conditions of Approval from the baseline conditions are more onerous	11.58
ID22 – Fabricated Steel	Increase in supply cost for fabricated steel (Evaluated as an inherent risk with a range from possible cost reduction to cost increases)	10.09
Total variation risk		195.37
Time		
ID2 – EIS Delay	Delay and cost claims from the Contractors due to delay in receiving planning approval	77.08
ID49 – Owner's Cost	Transgrid Owner's Costs increase due to project duration extension. Note: contractor costs dealt with in specific risks.	72.11
ID5 – Site Access	Delays to and claims by the Contractor due to being unable to access the Site	24.79

Risk name	Description	Forecast capex (M)
ID35 – Reactor and Transformer Delays	Delays to Transgrid supplied reactors and transformers due to delayed overseas manufacturing and shipping timeframes	11.81
ID56 – Conductor Delay	Delays to Transgrid supplied conductor and OPGW from delayed overseas manufacturing and shipping timeframes	11.81
ID37 – Social License	Project loses support (social licence) that results in disruptions such as blockades, protests, legal challenges and other means of obstruction including councils	11.81
ID27 – Exceptional Events	Exceptional Events such as lockdowns, war, terrorism or natural disaster	9.63
ID6 – Reliance Info	Variation claims by Contractor due to changes in substation reliance information included in the Contract eg (General Arrangements, Single Line Diagrams, Existing assets, geotech substation sites UGL)	8.80
ID80 – Insolvency of a JV member	Insolvency of one of the JV members of the Delivery Partner	6.88
Total time risk		234.73
Inherent		
71 – Uncertainty in the estimate of Owner’s non-labour costs for support, travel, legal, etc.	Owner’s non-labour costs that vary substantially depending on of events, time of year events occur, etc.	9.49
70 – Uncertainty in the estimate of Owner’s cost for labour and consultants	Uncertainty of the rates, numbers and employment ramp up and down rates.	6.06
72 – Uncertainty in the cost of OEM Transformers, reactors and conductor	Orders were placed for the transformers but not for reactors or conductors. Modifications to design may increase the costs of each unit and transportation costs may be incurred due to changed directions from Transgrid	5.32
Total inherent risk		20.86
Biodiversity		
74 – Uncertainty of final biodiversity offset cost	There are many variables in the Delivery Strategy and market that can vary the biodiversity offset cost substantially.	29.07
Total biodiversity		29.07
Total top 25 risks		537.14
Other 43 risks (Combined)	These remaining risks account for 10% of the contingency value.	61.93
Total Contingency		599.07

6. Long-lead Equipment

6.1.1. Overview

Long-lead time equipment (LLE) has a 12-18 month delivery time following placement of orders. The timing of this step is critically linked to the awarding of work packages in the procurement process and subsequently the confirmation of specifications and designs as part of the pre-construction works. Production and delivery of these long lead time purchases is required for construction to begin sufficiently early to meet the [REDACTED] delivery date.

The equipment and quantities are as follows:

- [REDACTED] x 500kV shunt reactors
- [REDACTED] x 500kV single phase power transformers
- [REDACTED] kms of aluminium conductors

Our Stage 2 capex forecast for reactors is [REDACTED] million, for transformers is [REDACTED] million and [REDACTED] million for conductors. Our total Stage 2 forecast capex for LLE is [REDACTED] million. [REDACTED]

The image shows two redacted tables. Each table has a yellow highlight on the first column header and a yellow highlight on the first row of data. The rest of the tables are completely blacked out.

6.1.2. Context

Our Stage 1 (Part 2) application explains that the delivery of Major Projects, such as Humelink, are subject to rapidly evolving external factors. These factors include inflationary pressure, a heated construction market, increasing demand for capital and an extremely competitive global supply chain. Collectively, these factors are resulting in unprecedented cost increases for labour and materials as well as significant extensions on lead times for critical equipment.

In light of these conditions, we have worked with Commonwealth Government to establish a programmatic approach to:

- accelerate the delivery of transmission infrastructure
- drive down costs through economies of scale and scope, and
- improve certainty of deliverability in a highly constrained labour and equipment supply chain market.

This is known as the Powering Tomorrow Together (PTT) program, which involves the integrated delivery of EnergyConnect, Humelink and VNI West. Through the PTT program we are securing the lowest risk-adjusted price for LLE for VNI West. This has involved:

- in February 2023, we entered into agreements with suppliers to purchase transformers and reactors, and
- in August 2023, we expect to execute an agreement with the preferred supplier for conductors, and
- we are currently progressing similar procurement activities for tower steel.

Our procurement process for transformers and reactors highlighted the capacity challenges in the market and that large-scale equipment orders require extensive lead time due to factory order books nearing capacity. We found that near-term capacity outside of China is exhausted. A letter from a key supplier

received through the recent procurement process, provided as an Attachment to this Application, evidences the current market capacity challenges. It states that:

As TransGrid would be aware, the increase in both global and local demand for power transformers is growing exponentially and we cannot forecast what will happen in the next 6 or more months. Our manufacturing slots are booked on a first come first served basis and those organisations that have secured factory capacity in binding agreements will meet their targeted project dates. As a local example, Central West Orana which has a larger demand than [sic] the Humelink project for this portfolio and also requires delivery at the same time as HumeLink.

6.1.3. Our stage 1 activities and costs

Our 2022 contingent project application for Stage 1 (Part 1) included LLE costs of \$22.80 million (\$ Real 2017-18), which the AER approved in August 2022. We also submitted a further Stage 1 (Part 2) contingent project application for a further \$213.23 million (\$ Real 2017-18) in LLE costs. Collectively, these cover most of the LLE costs that we expect to incur for the full Humelink project.

However, there are some additional long-lead equipment for transformers, reactors, and conductors that is required as part of Stage 2 that are not covered by our Stage 1 (Part 1) and Stage 1 (Part 2) applications. These costs relate to:

[REDACTED]

[REDACTED]

That additional equipment is described in section 6.2.

6.2. Capex forecasting method and assumptions

Our forecast capex for long lead equipment for Stage 2 is [REDACTED] million, including [REDACTED] million for reactors, [REDACTED] million for transformers, and [REDACTED] million for conductors.

6.2.1. Transformers and reactors

Our forecast capex for transformers and reactors is [REDACTED] million, and is calculated based on purchase order agreements with suppliers, which contain the number of transformers and reactors as well as the associated unit rates. These agreements are provided as Attachments to this Application along-side our procurement strategy, which demonstrates how we maximised the responsiveness of the supplier market to ensure that costs for transformers and reactors is prudent and efficient:

- [REDACTED] x 500kV 120 MVA shunt reactors
- [REDACTED] x single phase 500MVA 500 kV single phase power transformers

At the time of our Stage 1 Part 2 Application, the preferred suppliers would design, manufacture and deliver the equipment directly to the Maragle, Gugaa, Bannaby substation sites and our D&C contractors would manage the installation and commissioning of the equipment. We now propose that the preferred suppliers oversee the installation and commissioning of the equipment.

During the purchase order negotiations with the supplier, we reassessed the transportation costs. This is because, in order to avoid delays to project timeline, it was agreed that we would need to transport the equipment via the Port of Newcastle rather than through the Port of Melbourne given the recent difficulties that suppliers have experienced when seeking to obtain heavy equipment transport approvals from the Port of Melbourne.

Additional storage costs are also needed so that the equipment can arrive in country sooner thereby mitigating project delays.

The forecast capex for the transformers and reactors is calculated as follows:

- Reactors [REDACTED] + Transformers [REDACTED] = [REDACTED] (\$ Real 2022-23)

6.2.2. Conductors

Our forecast capex for conductor is [REDACTED] million and is calculated based on supplier proposals, which contain the unit costs for various conductor types and estimated delivery quantities. These proposals are provided as Attachments to this Application along-side our procurement strategy, which demonstrates how we maximised the responsiveness of the supplier market to ensure that costs for conductor is prudent and efficient.

We have estimated that the following conductor quantities will be needed:

- [REDACTED] kms of ACSR/GZ lemon conductor, and
- [REDACTED] kms of Earthwire SC/AC - 19/4.25 conductor.

Our agreement with the supplier estimates that these quantities translate into the following shipping quantities:

- [REDACTED] containers for the maximum length ACSR/GZ lemon conductor, and
- [REDACTED] containers for the maximum length Earthwire SC/AC - 19/4.25 conductor.

This provides a total of [REDACTED] containers.

Our stage 2 capex relates to the procurement and transportation of earth-wire and securing land for a laydown facility location for all conductors.

Based on these quantities and the unit rates in the supplier agreement, the forecast capex for conductor is calculated as follows:

- ACSR/GZ lemon conductor [REDACTED] *plus* Earthwire SC/AC - 19/4.25 conductor [REDACTED]
[REDACTED] *plus* delivery cost [REDACTED] *plus* [REDACTED]
[REDACTED] (\$ Real 2022-23).

7. Biodiversity offset costs

7.1. Overview

This section explains our forecast capex required for biodiversity offset costs for delivering HumeLink. This covers the residual impact on plant communities and threatened species and comprises both ecosystem and species offset credit liabilities.

Typically, the credit liability for a project needs to be retired following planning approval and before construction commences. However, due to the complexity of large linear infrastructure projects, we are, in consultation with the NSW Department of Planning and Environment (DPE), planning to adopt the same approach as for other major projects:

- obtain planning approval conditions that will allow us to defer our offset obligation for two years from the date of planning approval and
- provide a bank guarantee to meet our offset obligations based on the upper limit of our offset liabilities to enable construction to commence to meet the delivery timeframe.
- This approach was adopted in planning approval conditions for other Critical State Significant Infrastructure (CSSI) projects including PEC and Snowy 2.0 and supports the delivery of HumeLink at the lowest sustainable cost to consumers.

The forecast capex in this Application of █████ million is based on the expected cost from:

- implementing our Biodiversity Offset Delivery Strategy (BODS) to acquit our offset liabilities at the lowest possible cost. This includes establishing Biodiversity Stewardship Agreement Sites (BSAs) over the period from July 2024 to July 2026, and
- establishing and maintaining the bank guarantee to the NSW DPE based on the upper limit of our offset liabilities of █████ million. This would enable construction to commence to meet the delivery timeframe.

7.2. Context

7.2.1. Stage 1 activities and costs

Our Stage 1 Applications (Part 1 and Part 2) did not include any forecast capex required for biodiversity offsets costs for delivering HumeLink. We have therefore not received any funding approval to meet our biodiversity offset costs.

7.2.2. Our biodiversity offset costs

HumeLink has been declared by the NSW Minister for Planning and Public Spaces as CSSI, which requires us to prepare and publicly exhibit an Environmental Impact Statement (EIS). The EIS in turn requires a comprehensive assessment of biodiversity impacts from the construction and operation of HumeLink. Our biodiversity offset obligations are contained in:

- NSW Environmental Planning and Assessment Act 1979 (EP&A Act)
- NSW Biodiversity Conservation Act 2016 (BC Act), and
- the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

Under these Acts, we are required to establish an 'offset' area of land to be protected. The protection prevents development of the land in perpetuity, thereby protecting the vegetation and/or animal species. The area of land that needs to be protected is determined using a credit system whereby credits are generated when land is disturbed and resolved when a protection area is established. Under this approach projects which disturb a larger area of land generate more credits, which must be offset by protecting larger

areas of land. The area of land required to be protected must also contain the same species of flora and fauna as the impacted land. The credit system therefore ensures that more is preserved than disturbed by the development, factoring in the current condition of the land.

The BC Act requires that as part of our EIS we prepare and submit a Biodiversity Development Assessment Report (BDAR), which:

- documents the methods and results of the biodiversity assessment undertaken for the project; and
- assesses the project footprint and indicative disturbance area, based on the application of the avoid, minimise, offset hierarchy. This means that in delivering the Project we:
 - **avoid** biodiversity impacts in the first instance
 - **minimise** the extent of the biodiversity impacts, where impacts cannot be avoided, and
 - **offset** the residual impacts, once avoidance or minimisation steps are exhausted.

Determining which of these credit offset approaches will apply requires careful consideration of the trade-offs between our biodiversity outcomes and other social and economic objectives. For example, in some cases the need to secure social licence means that avoiding or minimising biodiversity impact may take a lower priority, resulting in a higher offset liability. Our Route Selection Guideline explains how we have carefully balanced biodiversity impacts and outcomes with other environmental, land-use and community aspects and in our route selection decisions.

The resultant residual biodiversity impacts give rise to a biodiversity credit liability which are classified as:

- ecosystem credits - plant community types (threatened and non-threatened) and threatened fauna habitat that can be predicted to occur in an area
- species credits – individual threatened species and their habitat that require targeted surveys to show presence/absence.

There are three main approaches by which credit liabilities can be satisfied or “acquitted”. In order of most to least expensive, these are:

- paying directly into the Biodiversity Conservation Fund (BCF), noting payment into the fund in accordance with a credit price quote from the Biodiversity Conservation Trust (BCT) is almost always the most expensive option to satisfy an offset obligation and therefore upper cost limits are informed by this option
- purchasing existing credits from the biodiversity credit register or via the Biodiversity Credits Supply Fund and Taskforce. These are subject to market availability and can be more expensive than establishing BSSs.
- establishing BSAs on lands with like-for-like biodiversity values to those impacted by the project, noting these can take several years to identify, assess, seek approval for and establish.

It is generally accepted that despite best efforts to establish BSAs to minimise project costs, some credits will need to be purchased and or payment into the fund will be necessary for particular credits. r.

7.2.3. Our BDAR, credit liability and BODS

In August 2021, Niche Environment and Heritage (Niche) were engaged to develop the BDAR for Humelink as part of the EIS. We provided our EIS and BDAR to DPE for ‘soft-lodgement’ in June 2023. Following receipt of feedback from the Biodiversity Conservation Division within DPE, an updated BDAR was submitted to DPE as part of formal EIS lodgement on 25 August 2023.

The development of the BDAR was informed by surveys undertaken between January 2020 – November 2022 to assess the project footprint. Due to the challenges of gaining site access, we have been able to

survey only 75 per cent of the EIS project footprint. Site access limitations arose due to a range of reasons including lack of landowner consent, poor weather and/or flooding. Consistent with the requirement of NSW biodiversity assessment policy, we have therefore adopted an “assumed presence” for a number of species across large portions of the project footprint.¹⁸

The BDAR in the EIS finds that based on the indicative disturbance area the construction of Humelink could potentially impact 670.14 hectares of native vegetation. This includes potential direct impacts on:

- six threatened ecological communities listed under the BC Act and/or EPBC Act
- 61 threatened flora species under the BC Act and/or EPBC Act
- 11 critically endangered species under the BC Act and/or EPBC Act
- 33 threatened fauna species under the BC Act and/or EPBC Act
- two endangered fauna populations listed under the BC Act.

The top three flora species contribute 21 per cent and the top three fauna species contribute 15.44 per cent of the biodiversity offset costs.

Based the indicative disturbance area and impacted flora and fauna, the current BDAR has assessed the offset credit liability to be [REDACTED] ecosystem credits and [REDACTED].

In September 2022, we engaged Niche to prepare a BODS to explain how we propose to reduce our offset liabilities in the most cost-efficient way. The BODS sets out the key concepts, methodologies, processes, timeframes, and the roadmap of activities that we propose to undertake over the period from 2023 to 2026. The BODS is provided as an Attachment to this Application.

7.3. Capex forecasting methodology and assumptions

We have based our biodiversity offset forecast capex on an independent expert cost estimation report from Niche, which is provided as an Attachment to this Application (Niche Cost Estimate Report). Niche’s Cost Estimate Report includes forecast capex for two scenarios:

- **Scenario 1** – an upper estimate for biodiversity offset costs of [REDACTED], which assumes that we acquit of all credit liabilities through payment into the Biodiversity Conservation Fund (BCF). This scenario also includes a reasonable contingency of 16 per cent, and
- **Scenario 2** – a lower estimate of [REDACTED], which assumes successful implementation of the key BODS initiatives, including feasible measures to:
 - first reduce the offset requirement, then establish BSAs, and
 - use of offset acquittal options to retire where certainty or time constraints means that this would be comparatively the cheapest option.

This scenario also includes and allowance for reasonable contingency of 16 per cent.

The capex forecast in this application [REDACTED] million reflects:

- [REDACTED] million based on scenario 2, and

¹⁸ This approach is required by the NSW Department of Planning and Environment (DPE) who oversees the CSSI assessment process under the EP&A Act as well as the EPBC Act

- [REDACTED] for the establishment and maintenance costs associated with providing the bank guarantee. This is based on the cost of the establishment, drawn and interest charges associated with the upper limit cost estimate under Scenario 1.

Sections 7.3.1 and 7.3.2 explains Niche’s approach to determining forecast capex for scenarios 1 and 2.

7.3.1. Forecast capex for Scenario 1 (upper limit)

Scenario 1 is based on the clearing scenario in our EIS and BDAR, which assumes:

- vegetation clearing within an easement typically of 70m width but up to 130m in width
- An indicative disturbance footprint being an area that would be temporarily or permanently cleared during project construction and operation. This includes land within and adjacent to the proposed transmission line corridor subject to varying levels of physical disturbance (which influences offset requirements), as follows:
 - Total Clearing Zone (TCZ) – lands subject to total clearing and ground disturbance. Permanent structures such as transmission line structures, access tracks and substations would be situated within these lands as well as temporary brake and winch sites.
 - Easement Clearing Zone (ECZ) – includes lands within the proposed transmission line easement where clearing and ongoing maintenance of tall growing vegetation would be undertaken. Earthworks are not required within this zone except in limited circumstances.
 - Hazard Tree Zone (HTZ) – includes lands within and immediately adjacent to the transmission line easement where selective tree removal, trimming or lopping would be undertaken to manage any risk of damage to transmission lines and structures in the event of tree fall.

The different clearing zones and their extent of native vegetation clearing are tabled below.

Table 7-1: Clearing zones and their extent in relation to impacts on native vegetation

Clearing type/zone	Hectares of native vegetation cleared (ha)	Proportion of total clearing
HTZ	142	18%
ECZ	180	22%
TCZ	487	60%
Total	809	100%

Niche has been provided with price estimates from the BCT for the relevant credit types (species and ecosystem) required Humelink based on BDAR.

Table 7-2: Offset liability based on paying into the BCF

Cost components for payment into BCF	Forecast capex
Total species credit cost BCT estimate (base credit price)	[REDACTED]
Total ecosystem credit BCT estimate (base credit price)	[REDACTED]
Addition of risk premium (11.1%) current standard	[REDACTED]
Addition of delivery fee (10.5%) average of quotes to date	[REDACTED]
Total	[REDACTED]
Addition of contingency from key risks (add 16%)	[REDACTED]

Niche has been provided with price estimates from the BCT for the relevant credit types (species and ecosystem) required based on the impact footprint in the BDAR. The BCT’s price estimates have been

used to calculate the expected total cost of meeting the project's final offset liability through payment into the BCF, after factoring in:

- A 6% reduction in credit liabilities resulting from adopting the Green Hills route option (NB - not assessed in the current BDAR; will be assessed in the revised BDAR for the 2024 Amendment Report)
- A 20% increase in credit liabilities (and associated costs) due to additional clearing impacts beyond those assessed in the BDAR, resulting from the need to accommodate additional access tracks, compounds and expansion of Hazard Tree Zones into Easement Clearance Zones,
- A 16% contingency for events that could increase our credit liabilities, or the cost of meeting credit liabilities including:
 - 6 per cent increase for credit prices increasing after EIS submission, comprising:
 - > 3 per cent increase for the removal of any price caps on credits that were >\$5,000/credit within the BOPC prior to its removal. These credits have been capped at a 20 per cent increase until October 2023. The 3 per cent assumes 50 per cent increase for the 6 per cent of credits affected by the cap. The 50 per cent increase is based on average observed increases in credit costs for PCTs that were not limited by the cap
 - > 3 per cent increase to allows for some credits to fluctuate in price based on updated data used by the BCT in their credit pricing models. A select number of species may experience changes in their categorisation or weighting values which are variables that feed into the pricing model used by the BCT. The percentage increase reflects Niche's knowledge of the proportion of species likely to be impacted by change of categorisation and weighting within a relatively short time period of 6 months.
 - 10 per cent increase to address the BCD not accepting our approach to count species and indirect impacts. The 10 per cent reflects a
 - > 6 per cent of the current offset requirement being attributable to count plant species for which credit calculation methods are identified as particularly subjective.
 - > recognition that there may some requirement to provide additional credits, including or predominantly ecosystem credits, based on indirect impacts from the project.

Niche has based the 10 per cent increase on its previous experience, noting that these impacts are difficult to quantify.

Table 8-3 shows how the upper forecast cost limit has been built up from each of the inputs above:

Table 7-3: Offset liability based on paying into the BCF

Cost components for payment into BCF	Forecast capex
Total species credit cost (August BDAR)	██████████
Total ecosystem credit cost (August BDAR)	██████████
Revised species credit cost - Green Hills route (6% reduction)	██████████
Ecosystem credit - Green Hills route reduction (6% reduction)	██████████
Revised species credit cost - additional clearing (add 20%)	██████████
Ecosystem credit - additional clearing (add 20%)	██████████
Revised species credit cost - contingency (add 16%)	██████████
Total ecosystem credit - contingency (add 16%)	██████████
Addition of risk premium (11.1%) current standard	██████████
Addition of delivery fee (10.5%) average of quotes to date	██████████

Cost components for payment into BCF	Forecast capex
Total	██████████

7.3.2. Forecast capex for Scenario 2 (lower limit)

Scenario 2 reflects the successful implementation of the liability acquittal strategy set out in our BODS. This is expected to reduce our credit liabilities including by prioritising lower cost approaches to meeting credit liabilities, including:

- Pre-planning approval review of existing data, consultation and further survey – 10 per cent reduction. This assumes that additional survey and consultation will confirm the absence of a range of species from target areas within the alignment, which could result in complete or partial removal of certain species from the offset requirement. The survey effort and consultation would focus on high-cost species representing a large portion of the overall offset cost. These measures would be coupled with a review of offset calculations expected to reduce the overall credit liability
- Post-planning approval review of existing data, consultation and further survey. The approach to additional surveys after EIS approval will be similar to pre-approval, however due to the extended timeframes and the certainty of complete access to all land from October 2024 (based on compulsory acquisition timetable) it is anticipated that a further 15% reduction in species credit costs will be achievable.
- Establishment of 5 BSAs - ██████████ net reduction – This reflects the cost of establishing 5 stewardship sites via purchase of land then site setup. It is assumed that the average cost for site setup and payment of the site’s total fund deposit is \$6 million compared to the average equivalent cost of ~\$10 million for paying into the BCF (i.e., scenario 1) – resulting in a cost saving of approximately ~\$4 million per stewardship site. The \$12.4 million net reduction also allows for \$7 million additional outlay for unavoidable purchase of surplus lands associated with the 5 BSAs. This is shown in Table 7-4 and Table 7-5.
- Purchase of credits from the market - ██████████ net reduction – This reflects a 25 per cent discount from the market for 5% of the remaining credits, compared with the cost of paying into the BCF. This cost-reduction strategy is currently of limited utility given the immature state of the biodiversity credit market in regional NSW.
- Acquittal of remaining offset liability by paying into the BCF.

Table 7-4: Guide to Stewardship site cost based on land purchase

Stewardship site purchase and establishment costs as well as allowance for credit retirement to full TFD amount	Cost per site	Assumptions/notes
Purchase of relevant site area: a ██████████ (average land value across forest/grazing land)	██████████	Based on recommendation by Transgrid for land value. Note that this does not account for the requirement to purchase additional hectares that are not part of the Stewardship site area. It is assumed that these areas will maintain their market value and eventually be sold so are not accounted for.
Premium 30%	██████████	This premium is added to address paying above- market price for highly desirable properties

Stewardship site purchase and establishment costs as well as allowance for credit retirement to full TFD amount	Cost per site	Assumptions/notes
TFD cost	██████████	This is an estimate of the TFD value for the entire Stewardship site.
BSA establishment cost (include provision for preliminary and BSAR survey)	██████████	This includes an allowance for preliminary assessments carried out over additional sites that are not considered viable.
Targeted survey additions	██████████	Additional survey required to inform species credit species.
Real estate fees etc.	██	No allowance has been made for this as cost is unknown.
Stamp duty @ approximately 5%	██████████	Work has not been done to refine this estimate.
Capital gains	██	This should be investigated by Transgrid based on their specific tax situation. Timing of signing of agreements and credit retirement can influence CGT costs significantly.
Total cost	██████████	
Average equivalent cost per site for payment into BCF (for credits directly relevant to Humelink project)	██████████	Average predicted fund payment cost across each of ten x 370 ha stewardship sites. This is based on assumptions regarding the presence and extent of species within future Stewardship sites.

Table 7-5 shows the cost build-up of Scenario 2.

Table 7-5: Scenario 2 cost build up

Stage of offset strategy	Liability – BCF values (\$)	Budget outlay required (\$)	Description
Starting obligation with contingency (16% for species and 6% for ecosystem credits)	██████████	N/A	Maximum value calculation based on BCF quote and payment to fund plus contingency fee.
Revised obligation based on pre-consent survey	██████████	Not allocated to offset budget	10% reduction from above number
Revised obligation based on post-consent survey	██████████	Not allocated to offset budget	15% reduction from above number
After Stewardship site creation (5 x sites)	██████████	██████████	██████████ ██████████ ██████████

Stage of offset strategy	Liability – BCF values (\$)	Budget outlay required (\$)	Description
After market purchases at discount rates			
Payment to BCF			The residual amount to be paid into fund.
Total			

7.3.3. WSP Peer Review of Niche’s assessment

We commissioned ecological consultant WSP to undertake a Peer Review of the BODS and the Cost Estimate Report focusing on the evidence-base and integrity of the assumptions underpinning the credit liability and associated cost estimate. On 9 August, WSP completed an initial Peer Review of these documents, noting that:

“Based on the review of the BODS and the comments provided, it is considered likely that the offset costs for the project under the Scenario 1, calculated at \$827M and Scenario 2 calculated at \$600M are reasonable upper limit costs associated with the difference in delivery options under both scenarios.”

WSP also endorsed the reasonableness of the contingencies identified, however identified a number of areas for improvement:

“It is recommended that further clarification is provided on the make-up of the calculated \$520M species liability based on known species habitat vs ‘assumed habitat’. This will help substantiate the applied likely 25% discount proposed following further surveys.”

WSP’s initial Peer Review is attached as Attachment C.

Importantly, WSP has reviewed versions of the BODS and Cost Estimate Report. These were based on credit liabilities and offset assumptions from the June BDAR, whereas the current cost estimate is based on significantly lower credit liability and associated costs because it adopts:

- the BDAR of 25 August 2023 and
- the Green Hills route refinement.

Nonetheless, the majority of WSP’s Peer Review comments remain relevant despite these changes and have been responded to by Niche in the final versions of the BODS and the cost estimate memo at Attachments A and B.

In relation to the makeup of the calculated species credit liability (\$520 million at the time of WSP’s Peer Review, but which is now significantly lower) Niche has confirmed that the calculated liability is comprised of:

- Known information on species presence from surveys undertaken over almost three quarters of the project area – noting that targeted survey for threatened fauna or restricted season species has been limited within these areas to date.
- Assumed presence of threatened species habitat over the remainder of the project area

Niche also confirmed in the updated Cost Estimate Report that the 25 per cent credit reduction is built up of the following components:

- Activities between now and planning approval – 10% reduction, split across:
 - A review of existing survey data and methods to calculate offset requirements for threatened plant species – expected 3% reduction.
 - Consultation with species experts (BCD or others) to remove or partially remove target species – expected 2% reduction.
 - Upcoming spring surveys (September – October 2023) focusing on high-cost species within lands that were previously inaccessible or lacked targeted survey opportunity) – expected 5% reduction.
- Further species absence surveys undertaken post-approval – 15% reduction.

On 8 September 2023, WSP completed its follow-up peer review of the final versions of the BODS and the Cost Estimate Report, acknowledging the updates made in response to the finding from the initial review and concluding that:

Based on the review of the BODS and the comments provided, it is considered likely that the offset costs for the project under the Scenario 1, calculated at \$582M and Scenario 2 calculated at \$428M are reasonable conservative upper limit costs associated with the different delivery options under both scenarios.

WSP's final Peer Review is provided as Attachment D.

7.4. Timing of payment of bank guarantee

Under Part 7.14 of the BC Act, retirement of a proponent's biodiversity credit liability is required prior to construction or any impact on biodiversity values. Practically, it is not feasible for complex major project developments to comply with this requirement. This is particularly the case given the immature state of the biodiversity credit market within regional NSW, where credit demand is typically driven by one or two projects only. If made to comply with this requirement, projects such as Humelink would be forced to acquit most, and potentially all, of its biodiversity credit liability via payment to the BCF, the highest-cost acquittal option. It is acknowledged by NSW DPE, the regulator of the Biodiversity Offset Scheme, that this likely outcome is not in the interests of:

- biodiversity (for which offsets are not and may not be secured);
- the regulator itself (who is responsible for offsetting the entire credit liability paid to the BCF);
- the consumer (to whom highest-cost liability acquittal is passed).

In response to this critical constraint, NSW DPE are allowing a two-year deferral of credit retirement as part of major project consent conditions. DPE have made this allowance for a number of NSW major projects development approvals to date, including Australian Rail Track Corporation's Inland Rail project, PEC, and the Snowy 2.0 Transmission Connection Project (refer condition C25 of Project EnergyConnect and B19 of Snowy 2.0 Transmission Connection Project conditions of approval).

As part of this consent condition, we are required to provide a bond or bank guarantee for an amount equal to that required to pay the total credit liability to the BCF. In line with Part 7.14 of the BC Act, the bond/guarantee must be secured prior to construction. This amount is determined by the NSW Biodiversity Conservation Trust (BCT), who become responsible for acquitting the credit liability, via a quote following the Biodiversity Conservation Fund Charge System. This credit acquittal pathway accounts for risk and cost-recovery to the BCT and is typically the highest-cost option.

The contractors enabling works program commencing immediately after Planning Approval will prioritise construction activities which meet the definition of 'low impact works.' Low impact works in accordance with the conditions of approval, do not allow impacts to threatened species or threatened ecological communities (within the meaning of the BC Act). That work is construction, unless otherwise determined by

the Planning Secretary and as such, would first require approval of the Construction Environment Management Plan (CEMP).

- The CEMP is scheduled for approval by DPE December 2024. Therefore, the bank guarantee would need to be paid in December 2024, or any other date aligning with approval of the CEMP and prior to impacts on threatened species or threatened ecological communities.
- The bond or bank guarantee required to secure deferral of HumeLink's credit liability would be maintained for the duration of the project construction period. We will seek provision in the consent conditions for Humelink to periodically review and revise the bond amount downward as biodiversity credits are retired against the project liability. As the bond amount provides security for DPE against HumeLink's outstanding credit liability, it would necessarily sit as separate to the budget required to deliver offsets against the same liability. From this perspective Humelink require two discrete budget allocations to acquit its credit liability – a bank guarantee; and an offset delivery budget. As the bond amount represents the highest-cost acquittal option, the final offset delivery budget is likely to be a substantially lower amount.

7.5. Next steps in biodiversity approval process

Following lodgement of our Stage 2 Application, we will undertake an array of activities leading up to anticipated approvals under the EP&A Act and EPBC Act in the second half of 2024.

7.5.1. Upcoming actions to support the EIS and CSSI planning process

The EIS exhibition period was held from 30 August 2023 to 10 October 2023. We received 154 EIS submissions from the DPE from the community, agency and other stakeholders to Transgrid for response in the form of a Submissions Report. Impacts on biodiversity values are likely to represent a significant proportion of the feedback received.

In parallel with the Submissions Report, we will also prepare an Amendment Report outlining a number of changes which have occurred concurrent with finalisation of the EIS, but have not yet been assessed.

Further survey will be undertaken over a 4-6-week period commencing 4 September 2023 to inform the Amendment Report, specifically targeting:

- new project footprint areas (Green Hills, new accommodation facilities and construction compounds, access tracks etc.) not included in the original environmental impact statement (EIS) and BDAR.
- areas of project footprint which have remained the same but have previously been inaccessible (recently acquired consents to enter).
- areas of project footprint which contribute significantly to the extent of assumed presence for candidate species subject to serious and irreversible impact and matters of national environmental significance. This may mean revisiting some areas of the project footprint previously assessed from a biodiversity perspective.

The Submissions Report and Amendment Report are scheduled to be submitted to DPE in April 2024. A new BDAR will be included in the Amendment Report.

During the construction and delivery phase, biodiversity impacts for the project would be offset in accordance with the Biodiversity Assessment Method (BAM, DPE, 2020) calculations for both ecosystem and species credits and through implementation of the BODS (refer previous section and Attachment B).

Concurrently with the development of the Amendment Report, Transgrid will engage with property owners along the project footprint where previous site surveys have indicated the broader property is potentially suitable for the establishment of Biodiversity Stewardship Sites (BSSs). High priority properties potentially suitable for the establishment of BSSs within a 5km radius will also be identified and contacted.

7.6. Post-approval activities to optimise environmental performance

Following receipt of CSSI planning approval we will continue to undertake activities through the BODS to efficiently discharge our offset obligations in the interests of electricity consumers and maximising our environmental performance. The effect of surveys of previously inaccessible lands has already been factored into the cost estimates. Other actions, such as use of the Ancillary Rules¹⁹ could potentially become available to Transgrid. However, it is highly uncertain at this stage whether this will transpire, given it is dependent on several factors including planning approval conditions and the position of the Commonwealth Government around offsetting species “like-for-like”. As such, Transgrid has not accounted for potential post-approval activities beyond further survey work in our cost estimates.

Attachments

Attachment A – Biodiversity Offsets Delivery Strategy (BODS)

Attachment B – Niche Cost Estimate Report

Attachment C – WSP Initial Peer Review of BODS and Cost Estimate Report

Attachment D – WSP Final Peer Review of BODS and Cost Estimate Report

Attachment E – Bank Guarantee

¹⁹ <https://www.environment.nsw.gov.au/research-and-publications/publications-search/ancillary-rules-impacts-on-threatened-species-and-ecological-communities>

8. Easement acquisition

8.1. Overview

The development of Humelink requires the acquisition of easements over a substantial amount of land that impacts many landholders' properties. Land access and acquisition is a critical predecessor step to project construction.

Our easement negotiation and acquisition process is consistent with the Land Acquisition (Just Terms Compensation) Act 1991 (NSW) (JTC Act). We commenced activities to secure land and easements as part of our Stage 1 activities, which were approved by the AER in its CPA-1 (Part 1) Determination for HumeLink. We have focused on undertaking valuations and establishing options agreements with 280 impacted private landholders as well as acquiring land for the Gugaa substation.

Our Stage 2 capex forecast for property and easements is █████ million, based on an independent expert report from Jones Lang LaSalle (JLL). Our Stage 2 forecast capex relates to the payment of compensation to public and private land holders and other costs including stamp duty, the value of timber taken, substitute forest land, disturbance costs, construction camps and laydown areas and overhead costs.

Our Stage 2 forecast capex reflects the route through the Green Hills State Forest (Green Hill deviation), which has been chosen through the route selection process that concluded in August 2023. This route was selected after consultation with landowners and Forestry Corporation NSW (FC NSW) and uses public land where possible.

This route also best addresses our social, environmental and land use considerations as well as network resilience and cost. Based on this route alignment, there are approximately 270 private landowners and 50 public land parcels, involving government and local authorities.

8.2. Context

8.2.1. Stage 1 activities and costs

In its CPA-1 (Part 1) Determination for HumeLink, the AER approved \$26.17 million to enable us to secure access to land for survey activities and negotiate option for easement agreements so that construction can start as soon as possible following the approval of Stage 2. The AER's CPA-1 (Part 1) capex allowance relates to the following activities:

- undertaking surveys to identify and protect places of cultural heritage significance along the route
- meeting the obligations under the JTC Act in relation to reimbursement of reasonable profession fees such as legal and valuation fees
- determining the compensation to be paid to each landholder and entering into an option agreements that sets out the compensation and conditions of entry onto the land
- commencing the compulsory acquisition process where we have not been able to reach negotiated agreements with landholders, and
- securing land for the Gugaa substation so that designs can be undertaken to match the available site location, size and geotechnical conditions.

These activities are progressing well. Our efforts have focussed on undertaking valuations and establishing options agreements with private landholders. Options agreements involve establishing an agreement with landholders for the overall level of compensation that we will pay them upfront to secure the required property right to allow construction to proceed, with full compensation only paid if the project achieves CPA-2 approval and the land is required. Option agreements will be exercised in Stage 2.

Valuations for public landholdings are yet to be completed.

As at 30 June 2023, in relation to the Green Hills Alignment, we:

- have achieved, for consent to enter, 92 per cent of the target for landowners and 95 per cent of the target for the line length. Consent to enter is where the landholder has given written consent for us to access the land for site investigations (including environmental, cultural heritage and geotechnical surveys)
- have completed 270 desktop valuations and 124 further detailed valuations for private landholdings
- have presented offers to all but one private landowner on the alignment due to this being a deceased estate
- have 111 Agreements in Principle (AIP) (or 41 per cent) for private landowners impacted by the Greenhills alignment with some 46 of these fully executed. We are targeting to achieve agreements with all landholders by June 2024
- will continue to work with the remaining 159 private landholders to seek a negotiated settlement on these properties
- submitted eight applications to the Office of Energy and Climate Change (OECC) for compulsory acquisition status. We anticipate a total of 110 will be submitted in the coming months in line with discussions with the OECC on how they want to manage this process.
- achieved in-principle agreement to acquire 105.89 hectares for the Gugaa substation. This is currently with the landowners' solicitor for review. The settlement has been deferred until after 1 July 2023 to allow the landowner to obtain capital gains tax rollover relief.

In addition, private landowners have engaged their own independent valuers and legal representation to act on their behalf. This demonstrates that landholders are engaging in the easement acquisition process:

- 209 (or 77.4per cent) of have engaged their own independent valuer or accepted the Transgrid valuation, and
- 231 (or 85.6 per cent) engaged a legal representative or have elected not to require one and 39(or 14.4 per cent) are yet to decide.

Table 8-1: Landholdings with the original route and Green Hill deviation

Route	Original		Greenhill	
Private	280	83.6%	270	84.4%
Public	55	16.4%	50	15.6%
Total	335	100%	320	100%

Table 8-2 shows the current status of the number of percentage of option agreements for private landholders as at 30 June 2023 for both the original and Green Hills deviation

Table 8-2: Status of option agreements with price land holders, by route, at 30 June 2023

Status of agreement	Original route		Green Hills deviation	
	\$	%	\$	%
Agreed	112	40.0	111	41.1
Not agreed (in negotiation)	158	56.4	150	55.6
Early engagement	10	3.6	9	3.3
Total	280	100	270	100

8.2.2. Our land and easement acquisition obligations

In NSW, acquiring authorities including government agencies, some state-owned corporations, and local councils have the power to acquire privately owned property for public purposes. This may be all or part of a property or an interest in a property, for example easements for power lines, sewerage, or water. The powers of acquiring authorities to acquire property are contained in legislation specific to those authorities.

The JTC Act provides the overarching regulatory framework for us (as the acquiring authority) to acquire property and easements from private and public landholders to construct transmission infrastructure. The NSW JTC Act provides two pathways:

- by agreement between the property owner, and
- by compulsory acquisition by the acquiring authority.

Our commitment to maintain a social licence to operate in the areas in which HumeLink, and other Major Projects, are being constructed means that we will only use our compulsory acquisition rights as a last resort to meet the challenging timeframe for HumeLink. As a result, we may be required to pay closer to landowner valuation assessments to reach timely agreement with landholders to meet the challenging project timeframes. In the majority on instances, we have both our valuation assessment and the landowner's assessment. Notwithstanding that these valuation may differ materially, they are both based on valuation principles.

Section 55 of the NSW JTC Act sets out the principles of compensation that need to be considered in determining the amount of compensation to be paid including:

- the market value of the land on the date of its acquisition
- any special value of the land to the person on the date of its acquisition
- any loss attributable to severance
- any loss attributable to disturbance
- the disadvantage resulting from relocation
- any increase or decrease in the value of any other land of the person at the date of acquisition which adjoins or is severed from the acquired land by reason of the carrying out of, or the proposal to carry out, the public purpose for which the land was acquired.

Section 10A of the JTC Act requires us to enter into negotiation for acquisition by agreement for a minimum period of 6 months before initiating the compulsory acquisition process.

8.3. Capex forecast method and assumptions

The forecast capex of █████ million for easement acquisition relating to the cost of acquiring easements along the █████ Greenhills deviation. Our stage 2 forecast land and easement capex is based on an independent expert report from JLL that sets out the estimated compensation payable, and other costs, to acquire easements for HumeLink. JLL's assessment is:

- a desktop assessment of compensation only
- in accordance with the JTC Act 1991
- based on deviation through Green Hills using project land date as at 30 June 2023. We note that JLL's report also includes as assessment of the Humelink original route alignment, however we have not used this assessment
- based on a final easement width of 70 meters and a total of 320 land holdings comprising 270 private land holdings and 50 public land holdings for the Green Hill Route. In comparison, the original route has 342 landholding comprising 280 private land holder and 62 public landholdings

- based on valuation data that we supplied through our valuer, Knight Frank, and valuation advice provided by landowners' independent valuers, and
- based on timber and forest land valuation estimates provided by our specialist forestry consultant.

In accordance with the JCT Act, JLL's report determines the following compensation costs that comprise the total Stage 2 capex forecast of [REDACTED]:

- compensation payments to private and public landholders – see section
- stamp duty on land acquisition costs
- compensation for timber plantations
- substitute forestry land
- disturbance costs
- construction camps and laydown areas, and
- statutory fees, valuations and legal costs.

Each of these is discussed below in sections 8.3.1 to 0.

8.3.1. Compensation payments

Our forecast compensation payments are [REDACTED] million for private and public landholdings comprising:

- [REDACTED] million for agreed compensation to private land holders
- [REDACTED] million for forecast compensation to private land holders, and
- [REDACTED] million for forecast compensation to Government landholder.

8.3.1.1. Agreed compensation – private land holders

Our forecast capex for agreed compensation is \$33.42 million. This is based on the value of the compensation we have agreed to pay landholders and (and landholder have accepted these offers). These payments are therefore certain and will not change.

JLL found that the premium above the assessed value averages 33.8 per cent across 111 agreements as shown in Table 8-3.

Table 8-3: Agreed compensation apaid above the assessed value

Landholder type	Agreements	Assessed value	Agreed compensation	Premium above assessed value
Private	111	[REDACTED]	[REDACTED]	[REDACTED]

JLL found that the absolute number of compensation agreements and proportion within clustered premium bands are:

- 58 agreements (52%) negotiated at or within 25% of assessed compensation,
- 23 agreements (21%) negotiated within 25% - 50% of assessed compensation,
- 15 agreements (13.5%) negotiated within 50% - 100% of assessed compensation, and
- 15 agreement (13.5%) negotiated above 100% of assessed compensation.

8.3.1.2. Forecast compensation - private land holders

Our Stage 2 forecast capex for compensation expected to be paid to private land holders is [REDACTED] million.

There are 150 private landholders for the Green Hills deviation where there is no agreement on compensation. Of these landholdings, there are 112 initial offers of compensation where a response is pending and the remaining 38 landholdings where counteroffers have been received.

JLL explains that the tight project delivery timeframes directly impact the agreed compensation amount to be paid to landholders, stating:

It follows that the tighter the delivery timeframe for access to land for construction purposes, the less time is allocated to negotiating voluntary commercial agreements with directly impacted landowners and subsequently agreed compensation will be inflated to a greater degree above valuation.

Landowners and their advisors in the current environment are very astute and are more cognisant of their ability to drive a higher compensation amount if proponents are under pressure to achieve access to land in a short timeframe.

This is particularly evident in instances where a proponent has insufficient time to acquire land and easements by compulsion. There are a number of case studies and examples where this has been the case.

This is evidenced by the average counter-offer of 209.75 per cent above the initial assessed value of the easement. Table 8-4 shows that this equates to a premium of [REDACTED] above the assessed initial offer of [REDACTED].

Table 8-4: Analysis of counteroffer for private land holdings

Landholder type	No. of counter offers	Assessed value	Counter offer value	Offer above assessed value	
				%	\$
Private	38	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

JLL has extensive experience negotiating land access agreements and compensation on large scale linear infrastructure projects and eventual commercial outcome over and above the valuation. JLL has determined the percentage increase above the minimum compensation for the acquisition of easements in order to reach agreement with private landholders through commercial negotiations. This is based on a landholder-sentiment approach which considers:

- Sentiment-based premiums (above the assessed compensation) using evidence from Project Energy Connect (PEC) indicates the voluntary agreements could be negotiated as follows:
 - 'unlikely' sentiment - premium of 185.7%,
 - 'possible' sentiment - premium of 118.7%, and
 - a 'likely' sentiment - premium of 60%.
- Other context specific factors to forecast private landholder compensation, including:
 - high proportion of detailed assessments that have been conducted on Humelink
 - there is less variation in property types along the alignment
 - setting a maximum premium before proceeding with compulsory acquisition after meaningful engagement has not resulted in agreement.

Based on the above, JLL has adopted the sentiment-based premiums for private landholdings set out in Table 8-5:

Table 8-5: JLL assessment of compensation premiums for Humelink CPA-2

Landholder sentiment - HumeLink	Premium
Unlikely	118.70%
Possible	118.70%
Likely	60.06%

Using these sentiment-based premiums to forecast compensation for those private land holders who are still in negotiations, JLL has determined forecast capex of [REDACTED] for the Greenhills deviation as set out in Table 8-6.

Table 8-6: Capex forecast calculations for forecast private landholder compensation

Landholder sentiment – HumeLink	No	Initial offer	Forecast value	Premium
Unlikely	78	[REDACTED]	[REDACTED]	[REDACTED]
Possible	36	[REDACTED]	[REDACTED]	[REDACTED]
Likely	36	[REDACTED]	[REDACTED]	[REDACTED]
Total	150	[REDACTED]	[REDACTED]	[REDACTED]

8.3.1.3. Forecast compensation - Government landholder

Our forecast capex for compensation payments to Government landholders is [REDACTED]. It is based on JLL’s report which draws on our estimates for non-forest land and specialist forestry consultant, Indufor for forest land. Valuations for non-forest public landholdings are yet to be completed. Given the early stage of easement acquisition, a 118.7% premium has been applied to the estimate.

8.3.2. Stamp duty

Our forecast capex for stamp duty on private and public landholdings is [REDACTED] based on JLL’s report. JLL has estimated stamp duty costs based on agreed and forecast compensation using NSW Government 2023 rates in Table 8-7.

Table 8-7: NSW Government stamp duty rates (effective from 1 July 2023)

Property value	Transfer duty rate
\$0 to \$16,000	\$1.25 for every \$100 (minimum \$10)
\$16,000 to \$35,000	\$200 plus \$1.50 for every \$100 over \$16,000
\$35,000 to \$93,000	\$485 plus \$1.75 for every \$100 over \$35,000
\$93,000 to \$351,000	\$1,500 plus \$3.50 for every \$100 over \$93,000
\$351,000 to \$1,168,000	\$10,530 plus \$4.50 for every \$100 over \$351,000
Over \$1,168,000	\$47,295 plus \$5.50 for every \$100 over \$1,168,000

The stamp duty amount is the sum of stamp duty applicable to public and private landholdings.

JLL notes that escalation is appropriate given that we may not exercise option agreements for at least another financial year (and possibly two).

Stamp duty is calculated using the NSW Government rates set out in Table 8-7 for each of the 270 private landholdings and each of the 50 public landholdings based on agreed and forecast compensation payments as summarised in Table 8-8. Stamp duty for private landholdings is calculated based on the agreed or forecast compensation for each property. Stamp duty for public landholdings is based on estimated forest and non-forest land values.

Table 8-8: Stamp duty estimates by landholding type

Landholding	Compensation	Stamp duty
Private	██████████	██████████
Government	██████████	██████████
TOTAL		██████████

8.3.3. Timber

Our forecast capex for timber, taken as a result of constructing HumeLink, is █████ million based on specialist forestry consultants estimated plantation value which is adopted in JLL’s cost estimate

8.3.4. Substitute forest land

Our forecast capex █████ (inclusive of stamp duty) for substitute forest land is based on JLL’s report, which in turn reflect the land valuation from a specialist forestry consultants. This estimate reflects the cost to meet the possible legal requirement under s59 *Forestry Act 2012 (NSW)* to provide a substitute forest land area at least twice as large as the area used for transmission infrastructure. The substitute area must:

- be of similar locational advantage to timber processors,
- have the same or greater productivity and average annual rainfall.

The forecast capex consists of a broad estimate for replacement land for plantations only and not native forest. A plantation productive area of 397.5 hectares was used to estimate the replacement land value of █████. An approximate compensation rate per hectare does not apply as the actual value of forest land properties varies depending on size, location, utility, land use and other factors. A provision of █████ for stamp duty also been allowed based on the value of existing forest landholdings.

8.3.5. Disturbance

Our forecast capex of █████ for permanent and temporary disturbance costs is based on JLL’s report.

JLL explains that permanent disturbance is otherwise known as “general disturbance” for which compensation relates to the disturbance and inconvenience caused by the acquisition. It recognises the time and effort required of landholders to review documents, meet with representatives of Transgrid as the acquiring authority and attend to other matters relating to the acquisition. JLL considers that for:

- for Private land, █████ per landholding is appropriate compensation based on comparable rates used for comparable major linear infrastructure projects, noting that negotiations may become protracted
- for Public land, █████ per landholding is appropriate compensation to account for permanent disturbance as an estimate for Government administrative charges

Permanent disturbance costs for public and private landholdings total █████ landholdings at █████. The █████ landholdings’ permanent disturbance cost at █████.

JLL explains that ‘temporary disturbance is otherwise known as construction disturbance. JLL has assumed that losses from construction disruption to farm operation activities will continue for up to 2 years. The lost productivity allows for 2 growing seasons due to construction impacts including reinstatement over the whole easement area. JLL has assumed:

- an implied lease over the easement affected land for a period of up to 2 years.

- the lease amount is based on an annual fee, calculated at 8% of the underlying value of land directly impacted by the proposed easement, before any adjustments have been made to the detrimental impacts caused by the proposed transmission line.

The temporary disturbance [REDACTED] is calculated as an annual rental payment for each of the 270 private landholdings. It is calculated at 8 per cent of the underlying value of the corridor affected land over 2 years as follows:

- Temporary disturbance = easement area (hectare) x land rate (\$ per hectare) x 8% annual fee x 2 years
- The permanent disturbance costs of [REDACTED] and temporary disturbance costs of [REDACTED] million makes a total disturbance cost of [REDACTED].

8.3.6. Construction camps and lay downs

Our Stage 2 forecast capex for construction camps and laydown [REDACTED] million has been reviewed and validated by JLL. Our forecast capex:

- is based on early site access date of 1 July 2024 for up to a total three (2+1) year period with a 5% rent review allowance and provision to rehabilitate sites to pasture.
- has been benchmarked to consider the annual cost of laydown and campsite rentals from comparable linear infrastructure projects.

Table 8-9 summarises successfully negotiated and in-negotiation annual licence fees for laydown areas. JLL confirms that our forecast capex for construction camp and laydown area licences fall within the typical range noting rates are dependent upon size, location, utility, land use, rehabilitation requirements and lease term.

Table 8-9: Annual laydown and land lease costs from linear projects in NSW

Location	Area	Annual Fee	Commencement
Milbrulong NSW	10 ha	[REDACTED]	Under Negotiation 2023
Lockhart NSW	10 ha	[REDACTED]	Under Negotiation 2023
Upper Lachlan, NSW	12 ha	[REDACTED]	Circa 2023
Booroorban NSW	25 ha	[REDACTED]	September 2021

The construction camp and laydown forecast capex is calculated at [REDACTED] million as detailed in Table 8-10.

Table 8-10: Annual laydown and land lease costs from linear projects in NSW

Site	Area (ha)	Year 1	Year 2	Year 3	Rehab	TOTAL
Gregadoo Rd Laydown	5	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Tarcutta Accommodation	10	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Ellerslie Rd Laydown	5	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Ardrossan Laydown	5	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Lower Bago Rd Accommodation	10	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Memorial Av Laydown	5	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Snubba Rd Laydown	5	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Maragle Laydown	5	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Bannaby Laydown	5	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Site	Area (ha)	Year 1	Year 2	Year 3	Rehab	TOTAL
Crookwell Accommodation and Laydown	12					
Yass Laydown	5					
Binalong Accommodation	10					
Gundagai Accommodation	10					
Red Hill laydown	5					
Tumut Laydown	5					
Total	102					

8.3.7. Overhead costs

Our Stage 2 forecast capex for overhead costs, which relate to statutory fees, valuation and legal costs is [REDACTED]. Our forecast capex is based on JLL's report, which assumes:

- 70 per cent of private landholdings will require a Valuer General assessment. These assessments typically cost [REDACTED] each. JLL also assumes an unlikely sentiment toward voluntary agreement to compensation
- where voluntary agreements are not possible after the statutory period of meaningful engagement, legal proceedings may be required to acquire land or an easement which is estimated considering:
 - evidence from other large linear infrastructure projects where 5% -10% of the total number of landholders are unable to reach a voluntary agreement
 - the original Humelink route has a total of 280 private landholders where 168 private landholders are not agreed, or in negotiations
 - NSW Centre for Property Acquisitions summary data shows 80 per cent voluntary and 20 per cent compulsory acquisitions based on a total of 466 acquisitions for FY2021/223
 - Typical costs for legal proceedings is [REDACTED] per case

Table 8-11 presents the calculations for Stage 2 forecast capex for overhead costs.

Table 8-11: Overhead cost items

Cost item	Qty	Rate	Cost estimate
Valuer General fees	60	[REDACTED]	[REDACTED]
Risk of court action	14	[REDACTED]	[REDACTED]
Total			[REDACTED]

8.3.8. Summary of land and acquisition costs

Table 8-12: Summary of land and acquisition costs

acquisition cost items	Original route	Green Hills route
Agreed compensation	[REDACTED]	[REDACTED]
Private landholders - forecast compensation	[REDACTED]	[REDACTED]
Government landholders - forecast compensation	[REDACTED]	[REDACTED]
Stamp duty	[REDACTED]	[REDACTED]

acquisition cost items	Original route	Green Hills route
Timber		
Substitute forest land		
Disturbance costs		
Construction camps and laydowns		
Statutory fees, valuations, and legal costs		
Total forecast capex		

9. External verification of forecast capex

We engaged GHD to undertake an independent engineering verification and assessment of the scope of our Stage 2 activities and our Stage 2 capex forecast. GHD's assessment:

- verified the scope of our Stage 2 activities is realistic to meet the investment need and that our forecast capex is efficient and is consistent with that which would be incurred by a prudent and efficient business
- found that our overall Project timeline is reasonable to meet the July 2026 project completion date
- confirmed that our procurement process and outcomes are reasonable
- found that our indirect and external labour costs are reasonable and are supported by tender outcomes, quotations and benchmarking, and
- found that our actual and forecast internal labour costs are reasonable, noting that our actual labour costs are from Ellipse and our forecast labour costs benchmark in line with other ISP projects.

Overall, GHD concluded that our Stage 2 (delivery) costs are within a reasonable margin of its comparative estimates. GHD's independent review therefore supports the consistency of our forecast capex with that which would be incurred by a prudent and efficient business. GHD's report is provided as an attachment to our draft Application.