## 2026-31 HCC RNI Project

# Attachment 5.9

## Risk and Contingency Report

16 May 2025

Ausgrid

## Contents

# 1 Project overview and purpose of report

The Hunter-Central Coast Renewable Energy Zone (Hunter-Central Coast REZ) was formally declared on 9 December 2022 and comprises a specified geographical area which lies within the Ausgrid distribution network. NSW EnergyCo as the infrastructure planner has nominated that planned, new and existing network infrastructure within the geographical area is specified as REZ infrastructure.

The Hunter-Central Coast REZ is expected to accommodate renewable energy generation and storage projects and become a hub for low-emission industrial development in the region. The Hunter-Central Coast Renewable Energy Zone Network Infrastructure Project (HCC RNI Project) involves the major augmentation of Ausgrid's network in the Upper Hunter to deliver 1GW of renewable energy transfer capacity.

This will be achieved through the rebuild of existing overhead line corridors with new transmission lines of a higher capacity, the construction of new switching stations and the upgrade of existing substations to facilitate the expected connection of new renewable generation. Associated with this, primary, secondary and telecommunications augmentations are required at various existing sites in the region to integrate with this new infrastructure.

The purpose of this report is to demonstrate to the Australian Energy Regulator (AER) that Ausgrid's risk contingency costs have been determined in accordance with the AER's Guidance Note for Regulation of actionable ISP Projects dated March 2021 (the Guidelines) and the economic regulatory framework set out in the National Electricity Rules (NER). This report also demonstrates that the risk contingency costs are prudent and efficient and relate to risks that cannot be efficiently transferred to another party, avoided, or mitigated further without incurring these costs.

# 2 Scope of risk assessment

Ausgrid has developed a Project specific Risk Register for the HCC RNI Project which identifies potential risks and Ausgrid's intended approach for risk management of these. The Risk Register was initially established during Ausgrid's tender to EnergyCo through a series of risk workshops, and since that time has been reviewed, workshopped and updated as risk evolves through the development of this live project. From early 2025 onwards, the Risk Register has been reviewed monthly and will continue to be regularly reviewed and updated in line with the process set out in section 11.

Ausgrid has, with the support of its specialist advisor, Infrastructure Advisory Group (IAG), undertaken:

- a qualitative process to identify and assess all Project risks
- a quantitative review of the residual Project risks which have a financial impact as their primary consequence category
- a Monte Carlo analysis using @Risk and Acumen software to model a probabilistic contingency value for all residual project risks where it is not efficient to fully mitigate, avoid or transfer the residual risk to another party or the cost of mitigation exceeds the expected cost impact, should the risk eventuate.

# 3 Project compliance with AER Guidelines

Table 1 outlines where the requirements of the Guidelines have been addressed in this report.

**Table 1: AER Guidelines compliance**

| Guideline Reference | Guideline Details | Location in this Report |
|---|---|---|
| 2.6 | We **expect** TNSPs to comprehensively and transparently identify and assess the different project risks for which it is seeking a cost allowance | Section 5<br>Appendix C |
| 2.6 | We **expect** that risk will be allocated to the party that is best placed to manage that risk | Section 7 |
| 2.6.1 | We **expect** the TNSP to clearly identify the risk events for which it seeks a risk cost allowance | Section 8 |
| 2.6.1 | We **expect** the TNSP to take into account the following guidance and only allow for residual risks which affect cost of project and cannot be easily transferred, avoided or mitigated. | Section 8 |
| 2.6.2 | We **expect** the TNSP to demonstrate how its risk assessment represents reasonable and realistic expectations of risks that could be realistically encountered | Section 5<br>Section 8<br>Appendix C |
| 2.6.2 | We **expect** the TNSP to demonstrate the outcomes of each risk assessment | Section 5<br>Section 8<br>Appendix C |
| 2.6.2 | We **expect** the TNSP to explain where and why it has transferred risks to contractors as part of its scope of work | Section 7 |
| 2.6.3 | We **expect** the TNSP to identify, establish and maintain a risk management framework for all project risks | Section 4<br>Section 11 |
| 2.6.3 | We **expect** the TNSP to explain the factors impacting project delivery that have been taken into account in its management of risks | Section 5<br>Section 8<br>Appendix C |

# 4 Approach to risk management and the HCC RNI Project risk assessment

Ausgrid's approach to risk management seeks to ensure that uncertain events are understood, assessed and appropriately managed to improve the likelihood of achieving project objectives. Risk management is approached by Ausgrid as an ongoing discipline that must be continually applied throughout the life of the project.

The attributes of our effective risk management process include providing:

- a clear definition of the expectations relating to risk management across all levels of the project
- control and oversight of risk management activities within delegated responsibilities
- authorisation to efficiently manage risks at the appropriate level, e.g. by the Project team
- a balance of risk management performance rights with appropriate reporting, supervisory and assurance checks.

Ausgrid facilitates its risk management process through the use of risk forums (such as risk workshops and risk update/review sessions) as well as risk management tools (including the Risk Register, risk management systems; and risk reports).

Additionally, Ausgrid has ensured the principles set out in the Guideline have been incorporated into its assessment of risk costs for the Project. Namely, Ausgrid has:

- ensured each risk cost allowance reflects the best estimate of risk costs, given reasonable and realistic expectations of the likelihood and consequence of each identified risk (i.e., the expected cost of the risk)
- only considered residual risks that affect the cost of the project and cannot be efficiently transferred, avoided or mitigated, and are not addressed in revenue adjustment events
- considered the examples provided by the AER of generally acceptable risks to carry contingency for, including risks that relate to a realistic latent condition with the site; risks associated with the actions or requirements of a third party not under contract to Ausgrid which cannot be addressed through enforcing contract terms; and risks associated with events outside Ausgrid's control, such as extended wet weather or changes in market conditions.

# 5 Qualitative Risk Analysis

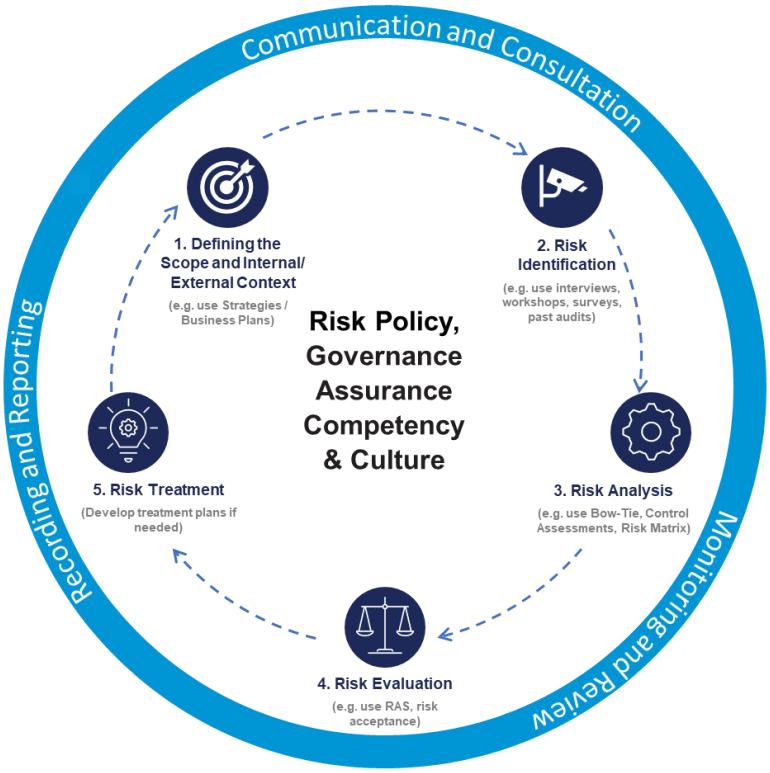
The risk assessment the HCC RNI Project was undertaken in accordance with Ausgrid's Risk Management Framework, which is aligned to ISO 31000:2018 Risk Management – Guidelines. This provides a consistent and effective methodology for conducting risk assessments and developing risk management maturity through robust governance and assurance mechanisms. It also guides our training and awareness activities and requires all levels of Ausgrid to regularly review risk management activities as part of a continuous improvement process.

In line with recognised risk management guidance and principles, successful execution of the Project requires risk owners to consider and develop risk treatment plans that relate to the key risks faced. The qualitative risk management process is outlined in Figure 1, and improves the likelihood of achieving the Project objectives by assisting the Project team to:

- understand the risks associated with the delivery of the Project
- comply with laws, policies, and regulations
- be proactive in how risks are addressed
- be transparent in how risks are identified and considered
- prioritise resources to activities that will best achieve the Project Objectives.

Qualitative risk assessment also enables the rapid prioritisation of risk and opportunities to assist project teams to achieve their objectives. It involves the approach set out in sections 5.1 to 5.5 below to define risk in terms of its impact (the effect that a risk will have on the Project if it occurs) and likelihood (the extent to which risk effects are likely to occur) to ensure that uncertain events which could have varied outcomes on a project are identified, assessed, treated and monitored on an ongoing basis.

**Figure 1: Risk management process**




## 5.1 Context for risk assessment

In planning for a risk assessment, it is important to understand the circumstances surrounding the assessment, the objectives of the assessment, and the context in which the assessment is being undertaken.

The first step in compiling the HCC RNI Project Risk Register involved the Project Director, Project Managers and Risk Advisor discussing the contextual elements of the Project. The key elements considered for the HCC RNI Project were:

- Inform all parties who were to be involved what their role in the risk and uncertainty workshops is
- Understand that risks were to be assessed from a whole of Project lifecycle perspective, i.e. all project phases: Development, Delivery, and Operations and Maintenance, which incorporate planning, design, construction, commissioning, and operation and maintenance activities
- Explain the process for qualitative and quantitative reviews, and the timeframes in which the risk register and Monte Carlo analysis were to be developed
- Confirm that for risks with a primary consequence category of financial impact, Ausgrid would need to demonstrate the financial impact and risk contingency values in line with the AER Guidelines.

The risk workshops showed that the key risks to delivery of the HCC RNI Project are:

- Program Risks [redacted]
- Market Risks [redacted]

- Community Risks [redacted]
- Design Risks [redacted].

## 5.2 Risk identification

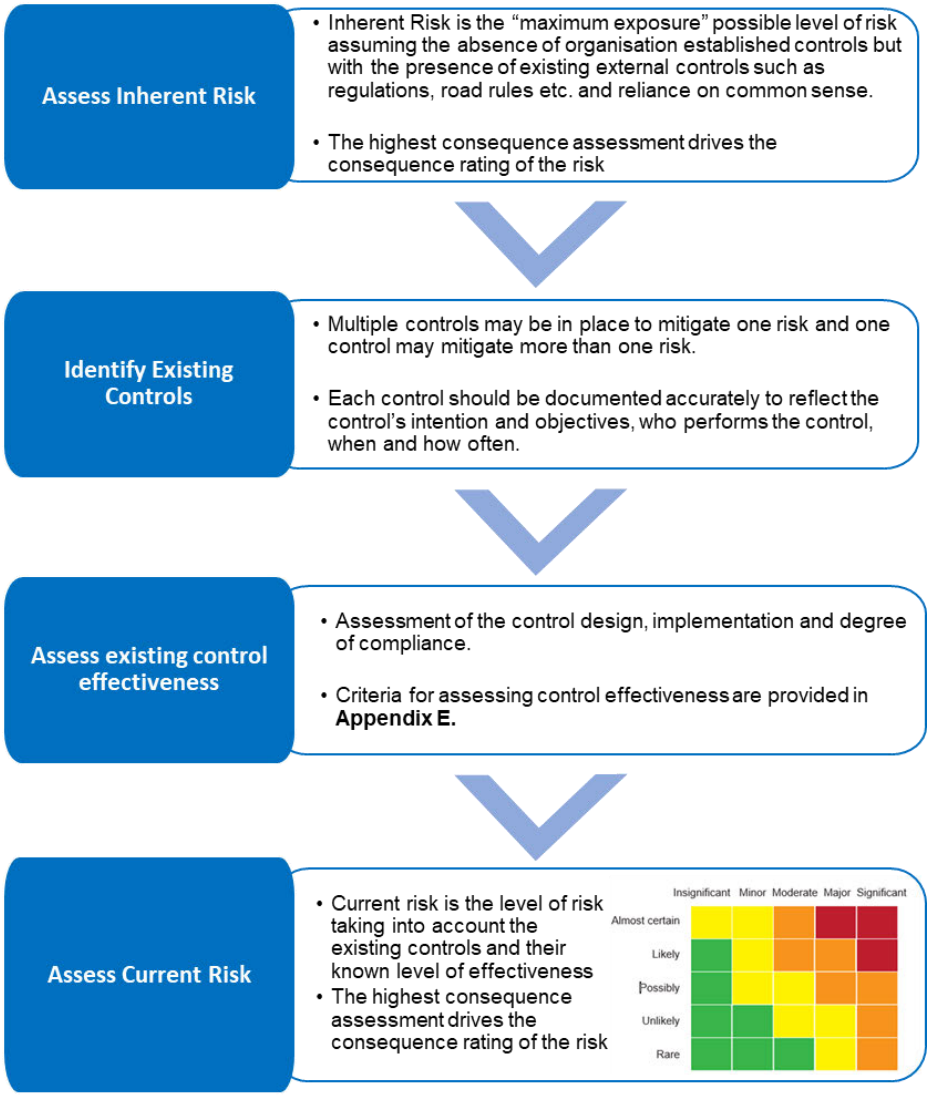
A series of workshops were undertaken with subject matter experts (SMEs) to identify the risks that have the potential to impact the Project. The workshops were facilitated by the Risk Specialist and attended by the Project Director, Project Managers and subject matter experts (SMEs) appropriate to each risk theme. Risks were also identified through the review of existing documentation, historical information and lessons learned on past projects.

Appendix A shows the details of the risk workshops undertaken to date.

## 5.3 Risk analysis

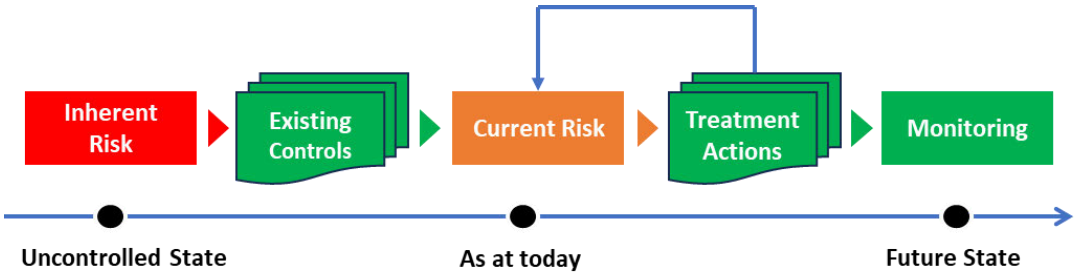
Following each workshop, Ausgrid undertook comprehensive risk analysis by following the steps set out in Figure 2 below. Ausgrid's risk analysis established the Inherent Risk and Current Risk rating, which considers the existing controls in place and the effectiveness of those controls.

**Figure 2: Risk Analysis Process**



The Project Risk Register reflects the outcome of this analysis for each risk identified, and shows the inherent risk rating, as well as the current risk rating after controls are identified and rated for effectiveness. The progression from Inherent Risk to monitoring of Current Risk is shown in Figure 3.

**Figure 3: Risk Analysis Process progression**




### 5.4 Risk evaluation

Following analysis of the risks, the Current Risks were evaluated to determine which could be accepted by Ausgrid with the implementation of specific treatment plans, which risks could be transferred to another party (i.e. Ausgrid's subcontractors) and which risks would need to have a specific time or cost provision allowed for in order to be able to effectively mitigate or avoid the risk.

Throughout 2024, Ausgrid's ability to liaise with landowners, key stakeholders and local communities to address risks was limited due to binding confidentiality obligations during this competitive market engagement phase. Consequently, many risks were not able to be adequately controlled during this period. Following execution of the Commitment Deed, EnergyCo enabled Ausgrid to progressively commence landowner and stakeholder engagement throughout early 2025, however this engagement is still in its infancy, and accordingly there has been only small changes in the assessment of some Current Risks from the inherent, untreated risks.

### 5.5 Risk treatment actions

Each controlled and current risk was considered in light of any future treatment plans that could be implemented to mitigate and manage the risks over and above the current control measures. This included any actions identified to improve weaknesses within the identified control measures. Ausgrid has ensured that the Treatment Plans are specific, discrete and achievable, with a nominated owner for the risk treatment plan and target date for the completion of the treatment plan, which is regularly and continually monitored and updated throughout the Project.

The risk treatment actions applied to each risk contain a mix of both financial and non-financial actions, based on the balance of a cost-benefit analysis to Ausgrid, as is set out in further detail in section 8 below.

Considering the HCC RNI Project is in its planning phase, many of the proposed Treatment Actions are activities that will occur during the Project Delivery phase.

## 6 Quantitative Risk Analysis

### 6.1 Cost risk analysis

Following the qualitative risk process, Ausgrid then carried out a quantitative risk assessment to improve the accuracy of risk contingency allowance, assist in the early identification of possible

cost overruns, inform decisions regarding future release of contingency and provide additional rigour in the evaluation of risk mitigation and treatment strategies.

Key cost inputs for the quantitative risk analysis are outlined in Table 2.

**Table 2: Key cost inputs**

| Column | Purpose/Description |
|---|---|
| Optimistic case (P10) | Positive outcome that 1 in 10 projects would achieve, i.e. 10% confident the project can be delivered to the amount or less. |
| Likely (P50) | The expected outcome, as likely to be above the value as below, i.e. 50% the project can be delivered to the amount or less. |
| Pessimistic case (P90) | Adverse outcome that 1 in 10 projects would face, i.e. 90% confident the project can be delivered to the amount or less. |
| Probability (%) | A single percentage value from within the likelihood range established during the qualitative risk assessment. |
| $ Assessment (Prob. x $ P50) | The likelihood multiplied by the likely (P50) cost impact. |

The cost risk analysis was performed during a series of further risk workshops, focused on those risks with a financial consequence, using cost estimates provided by Ausgrid SMEs which represent the extent of likely financial outcome of each risk after the identified controls and treatment actions have been undertaken, illustrating the contingency required to manage the residual risk.

The Project Risk Register also contains cost rationale information, setting out what costs have been allowed and how they were derived. This is set out in more detail in section 8 below for each risk with a financial consequence.

## 6.2 Risk modelling and Monte Carlo analysis

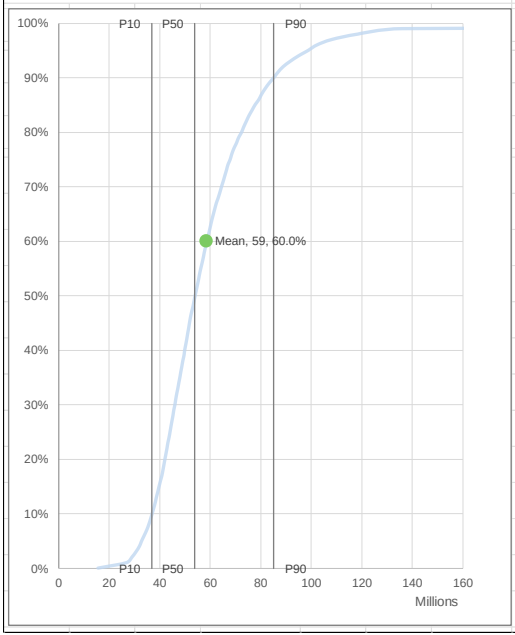
Following the Cost Risk Analysis, the Risk Register was run through @Risk software to undertake a Monte Carlo analysis to inform the prudent selection of the project cost contingency allowance as shown in Figure 4.

**Figure 4: Monte Carlo analysis output**

**MC Report: Ausgrid HCC REZ**

Report Run: 19-Mar-25

**Chart A: Probabilistic Distribution and Values**




| Cost Estimate | 552,939,714 |
|---|---|
| Mean | 58,536,426 |
| Mean Confidence | 60.0% |
| Mean (% of Estimate) | 10.6% |

| Conf. | Value ($) | % of Estimate |
|---|---|---|
| P5 | 32,720,130 | 5.92% |
| P10 | 36,866,228 | 6.67% |
| P20 | 41,933,938 | 7.58% |
| P30 | 45,888,523 | 8.30% |
| P40 | 49,757,350 | 9.00% |
| P50 | 53,888,941 | 9.75% |
| P60 | 58,532,668 | 10.59% |
| P70 | 64,333,751 | 11.63% |
| P80 | 72,274,581 | 13.07% |
| P90 | 85,024,382 | 15.38% |
| P95 | 98,622,430 | 17.84% |
| P99 | 135,867,494 | 24.57% |

The @Risk Monte Carlo analysis uses 10,000 iterations. Ausgrid's model adopts a standard approach to distribution selection and dashboard reports. Standardising distribution selection removes some of the subjectivity that can be adopted in apply Monte Carlo analysis. The Ausgrid model preferences distributions that are:

- Unbounded, particularly for downside exposures. Note that Ausgrid does not seek to capture, or model, minimum or maximum values as it is unrealistic for these scenarios to be accurately captured or considered, especially at maximum exposures
- Reflect skewness and heaviness of tails using distribution developed from real life data sets
- Developed based on three-point inputs, being P10, P50 and P90.

The Ausgrid model automates the distribution selection, applying the following order of precedence:

1) Use LogNormal distribution if the inputs fit. This is typically when there is a right-skewed distribution. LogNormal is one of the best unbounded, right-skewed distributions and has long tails to reflect uncertainty.

2) Use Pert distribution if the inputs fit. This is typically where there is a left skewed distribution or shorter tails (i.e. LogNormal doesn't fit).

3) Use Normal distribution if the inputs are evenly spread on either side of the P50.

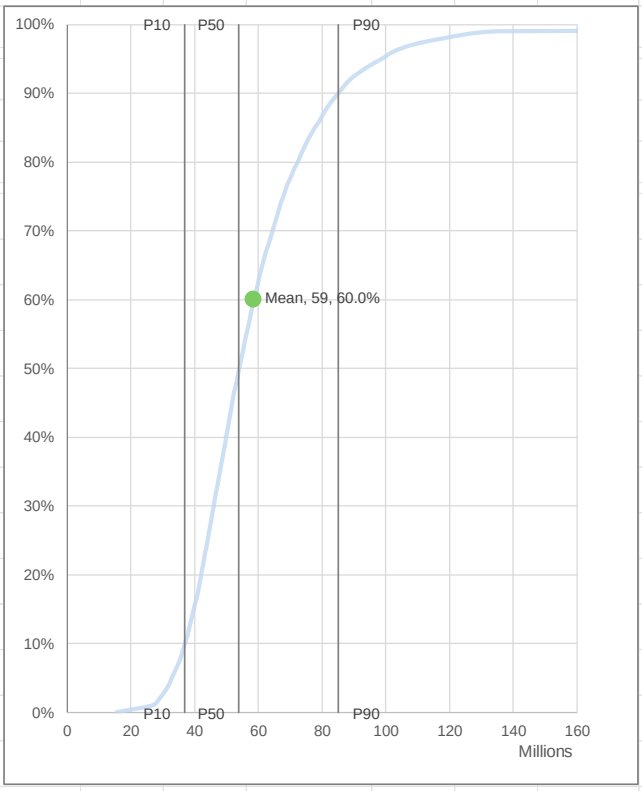
4) If all the above fail, use Trigen. Trigen fits nearly all inputs, but is not a distribution type that reflects real datasets. It typically understates risk and should rarely be used. If the automated distribution selection process identifies Trigen as the distribution type, this is often a signal to revisit the inputs; e.g. the P10 and P50 may be the same, which doesn't mathematically hold, or there is a large spread between the P50 and the P90, which may mean the P90 contemplates a scenario that could be better treated as a different risk event.

Chart A: Probablistic Distribution and Values (Figure 5) displays the percentage of confidence of being able to deliver the project of up to the corresponding contingency value; i.e. the higher the percentage of confidence, the higher the contingency value.

The percentage of confidence is typically expressed as a P level, where the level equals the confidence percentage; e.g. a P70 means that according to the model, there is 70% level of confidence of being able to deliver to that amount of contingency or less.

**Figure 5: Chart A: Probabilistic Distribution and Values**

**Chart A: Probabilistic Distribution and Values**

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| P99 | 135,867,494 | 24.57% |

For the HCC RNI Project, the Monte Carlo results shows the following key observations:

- The model suggests contingency is required, even at the most optimistic of scenarios; the P0 is above $0 and the P5 at approximately $33m
- The P50, which represents the mid-point, where the contingency amount used is just as likely to be above this value as it is to be below this value, is approximately $53.9m
- The P90 value of $85.4m (15.12% of the estimate) is at the lower end of the expected range for a project at this level of maturity
- The spread between P10 and P90 is within normal ranges, but also slightly tighter than expected. A reason for this is that all of the items modelled are risk events, rather than opportunities (although Ausgrid note that some risk events have negative P10 values, which lead to some opportunity in the model). Opportunities will often increase the spread at lower confidence limits, however for this Project only a few opportunities are included in the model as they have been realised in the base position.

In the capex estimate, Ausgrid has selected a contingency value of $46.9m ($real 2025-26) which represents a balanced contingency position and is less than the P50 value. It is noted that Ausgrid

selected the amount of $46.9m when submitting its final bid to EnergyCo, which was aligned to the P50 value derived from the risk analysis undertaken at that time. Further refinement of the risk analysis has increased the amount required to align to P50, but Ausgrid has not increased its selected contingency amount.

Chart B – Top 10 Expected/Mean Values (Figure 6) sets out the top 10 contributors to the mean value in a tornado chart format. The inputs include the different uncertainty ranges, discrete risk register items and prolongation cost components (arising out of the Schedule Risk Analysis). The mean may not represent the contingency included in the budget, however it is used in this chart because it is the only distribution value where the sum of the values for each input equals the total value.

**Figure 6: Chart B – Top 10 Expected/Mean Values**

The key risk items are discussed in further detail in section 8 below.

Key observations from this dataset include that the following areas are notable contributors to the contingency value at the mean:

- Prolongation costs/delay claims, including the potential for subcontractor EOT claims and additional owner's costs, make-up four of the top five items [redacted] These have been calculated per main subcontractor, as well as for Ausgrid costs, recognising that not all risk impacts each party equally
- Design development risks including additional pads being required for poles arising from ground conditions, as well as scope refinement/growth in relation to transmission lines
- Changes to the methodology for stringing works to a helicopter stringing solution
- Increased cost of materials, excluding poles and conductors, above assumed positions allowed for in the estimate
- Health and safety event risk
- Clearing and access works required around aviation facilities.

Chart C – Sensitivity Items (Figure 7) displays the top 10 sensitivity items, based on the sensitivity co-efficient determined by the @Risk software package (this chart shows the regression co-efficient). These items are ones where there is greatest correlation between a variance in this item and an impact on the model output; i.e. which inputs influence the distribution shape and spread of the curve, including at the tails or extreme outcomes. These items are not always the biggest contributor to the contingency value (or at the mean) but are typically material value items with a large spread.

**Figure 7: Chart C: Sensitivity Items**

These items demonstrate the inputs that management attention should be focused on as managing the outcome of these items can have a major influence on the final project costs.

For the HCC RNI Project, they include:

- Nearly all items are also shown on Chart B; these are generally due to the significant value of these items and therefore any change in the input will affect the output
- Only one item appears that is not on Chart B: [redacted] This is included in the sensitivity ranking due to it having high values and a significant spread, albeit due to its low probability of occurrence [redacted] is does not show in Chart B.

## 6.3 Schedule risk analysis

Ausgrid engaged a specialist consultant (TBH) to develop its master schedule and undertake a Schedule Risk Analysis (SRA), attached as Appendix B. For the HCC RNI Project, TBH adopted a hybrid methodology that provides the “top-down” risk factors coupled with the “top-down” first principle’s technique. This approach incorporates objective data inputs applied holistically rather than generalised assumptions. The method accounts for both the inherent uncertainties and contingent risks using a three-point estimate to produce probability distributions for each when then form the inputs into the risk modelling software Acumen Risk.

Acumen Risk employs a Monte Carlo simulation to produce a distribution of completion dates based on different combinations and permutations of input risk profiles. In this case the model was run through 5000 iterations to produce the risk exposure histogram. This risk exposure histogram displays both cumulative and non-cumulative distributions of the potential completion dates for the milestone ‘HCC RNI Program Complete’ as well as the Completion dates for each of the four subcontracts.

The SRA summary shows the P50 date of 17 November 2028, indicating that 50% of all simulations results have landed on or before this date and the P50 date would be considered to have a 50% probability of being achieved, along with the likely duration of the overrun. The SRA summary also contains a tornado chart which sets out the top 10 risk drivers for the Program Complete Milestone, the activities affected by the risk and their contribution to the total impact of that risk.

### 6.4 Determination of contingency for delays

Where risks with a potential consequence of delaying Ausgrid's program have been identified, Ausgrid have undertaken a deliberate two-step assessment process, to ensure the contingency held for delay costs is only included once in our overall submission and is as accurate as possible based on Monte Carlo analysis undertaken using @Risk and Acumen software to model probabilistic time and contingency values should the delay(s) occur. The process involved the following steps:

- Identifying all risks with a time impact.
- Assessing the P10, P50 and P90 values for each risk with a time impact and mapping this against the applicable activities in the Project Program as shown in Appendix D.
- Running Acumen software with the data from step 2 above input into the software so that Ausgrid could obtain a probabilistic analysis of the aggregate time impacts of all risks that impact the Project program, taking account of Ausgrid's construction methodology, float and actual critical path impact. The outcome of this Monte Carlo analysis included the P10, P50 and P90 dates for the completion of each of the four subcontracts and Ausgrid's overall completion date after analysing the delay risk time impacts.
- The number of days delayed for each of the P10, P50 and P90 outcomes for the four subcontracts and Ausgrid's completion date were used as the basis for calculating delay risk costs and were multiplied by the relevant subcontractor or Ausgrid daily delay cost.
  The daily delay costs for each subcontractor were obtained by using the preliminary cost figures from their submissions to Ausgrid, which have undergone a thorough competitive procurement process. Ausgrid have also used an average of its monthly preliminary costs determined by adding up each month's costs over the period of construction from January 2025 through to July 2028, averaged over the cumulative number of months.
  These calculations are included in five different risks within the risk register with one being for Ausgrid delay costs, and the other four for each of the subcontractor delay costs. See the table below for further details.
- The figures set out in risks 64, 65, 79, 80 & 81 were then modelled using the @Risk software, so that the contingency amounts reflect a probabilistic outcome for delay costs. Specifically, the number of days used is reflective of a Monte Carlo analysis, along with further Monte Carlo analysis of the prolongation costs associated with the number of days outputs.

The cost impact of delays have been included in the risk register as shown in

Table 3.

**Table 3: Cost impact of delays**

| Risk ID | Delay cost Calculation based on Acumen Monte Carlo | @Risk Contingency outcome |
|---|---|---|
| #64 – Delays affecting Ausgrid scope | P10 = [redacted]<br>P50 = [redacted]<br>P90 = [redacted] | [redacted] |
| #65 – Delays to Greenfield Switching Station Subcontractor scope | P10 = [redacted]<br>P50 = [redacted]<br>P90 = [redacted] | [redacted] |
| #79 – Delays to Transmission Line Rebuild Subcontractor scope | P10 = [redacted]<br>P50 = [redacted]<br>P90 = [redacted] | [redacted] |
| #80 – Delays to Kurri Kurri STS Augmentation Subcontractor scope | P10 = [redacted]<br>P50 = [redacted]<br>P90 = [redacted] | [redacted] |
| #81 – Delays to Underground Fibre Laying Subcontractor scope | P10 = [redacted]<br>P50 = [redacted]<br>P90 = [redacted] | [redacted] |

For any other risk which has both a time and cost impact, the risk register notes that the delay costs are included in one or some of risks 64, 65, 79, 80 and 81 as applicable, and any additional costs incurred which are not prolongation, are then calculated as explained in the cost rationale column, with the delay cost only being captured in risks 64, 65, 79, 80 or 81.

# 7 Risk transfer to subcontractors

There are two major and two minor subcontracts:

- John Holland – Greenfield Switching Stations (major subcontract)
- Genus – Transmission Line Rebuild (major subcontract)
- Service Stream – Underground Fibre Laying (minor subcontract)
- Gongues – Kurri STSS Augmentation (minor subcontract).

## 7.1 Major subcontracts

Ausgrid will engage John Holland Pty Ltd for the Greenfield Switching Stations scope in the HCC RNI Project under an NEC4 Engineering and Construction Contract (ECC). The parties' agreement will be documented in the ECC comprising the:

- NEC4 – Engineering and construction contract – Option A: Priced contract with activity schedule;
- NEC4 – Y(Aus)1
- Contract Instrument setting out the Contract Data and terms amending or supplementing the NEC4 terms.

Ausgrid will engage Genus Infrastructure (NSW) Pty Ltd (Contractor) for the Transmission Line Rebuild scope under an NEC4 Engineering and Construction Contract (ECC). The parties' agreement will be documented in the ECC comprising the:

- NEC4 – Engineering and construction contract – Option B: Priced contract with bill of quantities;
- NEC4 – Y(Aus)1
- Contract Instrument setting out the Contract Data and terms amending or supplementing the NEC4 terms.

The minor subcontracts will be based on Ausgrid template agreements, that have been previously agreed between Ausgrid and the proposed subcontractor, and on similar terms to the major subcontracts.

## 7.2 Entitlements

The subcontractors are entitled to both time and cost entitlements for the following events under the major subcontracts:

[redacted]

[redacted]

The minor subcontracts entitle those subcontractors to similar entitlements.

### 7.3 Early warning requirements

The subcontracts contain obligations for the subcontractors to provide early warning of any matter which could increase the Price, delay Completion or meeting a key date, impair the performance of the works, put them in breach of the subcontract or result in the subcontractor being entitled to any claim under the subcontract, [redacted].

### 7.4 Risk allocation gaps

The subcontracts have been negotiated on a 'best available terms for project' basis with a view to minimising risk allocation gaps. Where appropriate and agreed during the negotiation phase with each subcontractor, a number of risks have been transferred to Ausgrid's subcontractors, however this transfer does not eliminate all risk and results in some risk allocation gaps.

Risk allocation gaps include:

[redacted]

[redacted]

## 8 Detailed explanation of quantification of risk mitigation and contingency costs

A general outline of the key risks with a residual risk contingency is summarised below, noting that the Risk Register is the document that informs all risks identified for the Project, and will be updated throughout design development, Early Works and the construction phases of the Project.

Ausgrid has identified and qualified 96 risks. Of these, 13 have been retired throughout our ongoing review and updating process. There are 35 risks with a contingency value attached where a financial impact is the primary consequence category, and carrying contingency to meet the costs of the risk occurring is the most efficient and prudent way to address the risk. That is, it cannot be further mitigated, avoided or transferred to another party.

There are 25 risks which have time as their primary consequence category, and the impact of the risks on the construction program has been input into the SRA and modelled as set out in section 6.3 above.

There are 12 risks with primary consequence categories that are not either financial or time. These are risks that Ausgrid is best placed to control and hold treatment actions for. For further detail, see the Risk Register attached at Appendix C.

## 9 Top 10 expected/mean risk items

### 9.1 Risk ID #65 – Delays to greenfield substation subcontractor scope

#### Description of the risk

This item addresses the risk of Ausgrid being responsible for payment of delay costs for compensable delay claims made by its greenfield substation subcontractor. [redacted]

Controls currently in place for this risk are:

- Selection of an experienced Tier 1 contractor
- Ausgrid's experienced and dedicated project team for the Project

- Subcontract terms are agreed
- A Schedule Risk Analysis has been performed to inform contingency allowances [redacted].

While Ausgrid has the above controls in place and have identified treatment plans for the residual risk, it is prudent and efficient that Ausgrid carries risk contingency to manage the impacts and outcomes of this risk occurring [redacted].

### Approach to calculating the expected risk cost

The forecast contingency associated with this risk from the Monte Carlo analysis output is [redacted]. This is calculated based on [redacted]

[redacted]

Given the nature and complexity of large infrastructure projects, the delays experienced by other TNSPs in Australia on similar projects and the schedule of compensable events competitively negotiated with our subcontractor, the probability of the residual risk occurring is almost certain. Additionally, as work does not stop on the Project during prolongation i.e. the same work continues to happen over a longer period and the resources and plant cannot easily be diverted to other projects, we have considered some probability deduction for where staff may be redeployed to other projects. However, given prolongation usually occurs at the peak manning period of the project and project management resources will be managing the issue that caused the delay, along with Ausgrid offering a discount in the values used by applying an average rate, the probability allowed is prudent and realistic.

Accordingly, Ausgrid have accepted that [redacted] of the John Holland resources associated with their preliminary costs may be reallocated to other projects, however the majority will be completing the same work over a longer period of time. For this reason, the probability of this risk occurring and Ausgrid being required to pay John Holland prolongation costs is [redacted]

This data was then run through @Risk to determine the contingency value associated with this risk.

### Applicability of mitigate, transfer or avoid

This is the cost of all delay risks which affect the Contractor throughout this register that cannot be avoided, transferred or completely mitigated.

The final negotiated subcontract position with John Holland is that Ausgrid has accepted the risk for time and costs associated with a number of delay events as set out in section 7 above, and John Holland will be entitled to claim from Ausgrid the costs associated with those delays. Were Ausgrid to have transferred this risk to the Contractor, it would have resulted in a much larger contract lump sum, thus reducing the potential benefit/savings to customers if these events were not to occur as expected.

[redacted]

It is not possible to fully mitigate the occurrence of delays affecting John Holland's scope, given the nature of these delays as set out above being outside of Ausgrid's control and the actual effect of prolongation being that John Holland will require the same level of management and oversight for its scope albeit over a longer period and to manage the impact of the delay events themselves. It is not efficient, or possible, to transfer resources to another project when delay events occur. Additionally, it is also not time or cost effective to be moving plant and equipment across sites and they will most likely be stood down and claimed as a delay cost.

## 9.2 Risk ID #64 – Delays affecting Ausgrid costs

### Description of the risk

This risk anticipates delays to the program throughout the project delivery phase which result in Ausgrid incurring prolongation costs. Ausgrid have an experienced and dedicated project team for the HCC RNI Project that are skilled in minimising, and where possible avoiding, delays. However, despite these controls, it is highly likely that Ausgrid will incur prolongation costs arising out of the potential delays to the program from all of the risks set out in the Risk Register with a time impact as its primary consequence.

Ausgrid have performed a SRA to inform contingency allowances with daily rates based on the Owner's team estimate, as set out in more detail in section 6.4 above.

### Approach to calculating the expected risk cost

The forecast contingency associated with this risk is [redacted] This is calculated based on Ausgrid's average monthly preliminary costs during the delivery phase of [redacted] which is taken from the allowance made in our base cost estimate for preliminaries.

The per day cost has then been multiplied by the SRA outputs against HCC RNI Program Complete which show the aggregate impact of all potential delays to the Project, taking into account concurrency, float and actual critical path impact – [redacted]

Given the nature of large infrastructure projects, the delays experienced by other TNSPs in Australia on similar projects, the probability of the residual risk occurring is almost certain. Accordingly, Ausgrid has accepted that [redacted] of its resources associated with our preliminary costs may be reallocated to other Ausgrid projects, however the majority of resources will be completing the same work over a longer period of time. For this reason, the probability of this risk occurring and Ausgrid incurring prolongation costs is [redacted]

This data was then run through @Risk to determine the contingency value associated with this risk.

### Applicability of mitigate, transfer or avoid

This allowance is for the cost of all delay risks which affect Ausgrid as detailed throughout this register that cannot be avoided, transferred or completely mitigated.

As these costs are those that will be directly incurred by Ausgrid when delays occur, Ausgrid is unable to transfer the costs associated with this risk to other parties.

Ausgrid cannot avoid this risk, it is almost certain that the Project will experience delays which Ausgrid cannot avoid incurring.

It is not possible to fully mitigate the occurrence of delays affecting Ausgrid's scope, given the nature of these delays as set out above being outside of Ausgrid's control and the actual effect of prolongation being that the Project will require the same level of Ausgrid management and oversight for its scope, albeit over a longer period and to manage the impact of the delay events themselves. It is not efficient, and often not possible, to transfer resources to another project when delay events occur.

## 9.3 Risk ID #80 – Delays to Kurri Kurri STSS augmentation subcontractor scope

### Description of the risk

This item addresses the risk of Ausgrid being responsible for payment of delay costs for compensable delay claims made by brownfield substation civil subcontractor performing works at both the Kurri Kurri and Rothbury sites. [redacted]

Controls currently in place for this risk are:

- Ausgrid have an experienced and dedicated project team for the Project;
- Subcontract terms are agreed; and
- A Schedule Risk Analysis has been performed to inform contingency allowances [redacted].

While Ausgrid has the above controls in place and has identified treatment plans for the residual risk, it is prudent and efficient that Ausgrid carries risk contingency to manage the impacts and outcomes of this risk occurring as Ausgrid is the party who will be responsible for payment of the delay claims when they arise.

### Approach to calculating the expected risk cost

The forecast contingency associated with this risk is [redacted]. [redacted] Gongues have advised their price at Kurri Kurri alone will increase by at least [redacted] We have calculated the per day delay cost with reference to Gongues' submitted preliminary costs (which were accepted by Ausgrid following a competitive market process) with a [redacted] increase applied to account for the known increase in subcontract sum.

The per day cost has then been multiplied by the SRA outputs against 'Contract 4 Program Complete' milestone which show the aggregate impact of all potential delays to Gongues' scope, taking into account concurrency, float and actual critical path impact – [redacted].

Given the nature of large infrastructure projects and the delays experienced by other TNSPs in Australia on similar projects the probability of the residual risk occurring is almost certain. Accordingly, Ausgrid have accepted that [redacted] of the Gongues resources associated with their preliminary costs may be reallocated to other projects, however the majority will be completing the same work over a longer period of time. For this reason, the probability of this risk occurring and Ausgrid being required to pay Gongues prolongation costs is [redacted]

This data was then run through @Risk to determine the contingency value associated with this risk

### Applicability of mitigate, transfer or avoid

This is the cost of all delay risks which affect Gongues throughout the Risk Register that cannot be avoided, transferred or completely mitigated.

While the final negotiated subcontract is not executed, the position in relation to delay costs is known, with Ausgrid accepting the risk for time and costs associated with a number of delay events. Accordingly, Gongues will be entitled to claim from Ausgrid the costs associated with those delays. Were Ausgrid to transfer this risk to the Contractor, it would result in a much larger contract lump sum, thus reducing the potential benefit/savings to customers if these events were not to occur as expected.

[redacted]

It is not possible to fully mitigate the occurrence of delays affecting Gongues' scope, given the nature of these delays as set out above being outside of Ausgrid's control and the actual effect of prolongation being that Gongues will require the same level of management and oversight for its scope albeit over a longer period and to manage the impact of the delay events themselves. It is not efficient, or possible, to transfer resources to another project when delay events occur. Additionally, it is also not time or cost effective to be moving plant and equipment across sites and they will most likely be stood down and claimed as a delay cost.

## 9.4 Risk ID #79 – Delays to transmission line rebuild subcontractor scope

### Description of the risk

This item addresses the risk of Ausgrid being responsible for payment of delay costs for compensable delay claims made by the transmission line subcontractor. Our subcontract with Genus allows the subcontractor to claim delay costs for several delay events as set out in section 7 above.

Controls currently in place for this risk are:

- Ausgrid have an experienced and dedicated project team for the Project;
- Subcontract terms are agreed; and
- A Schedule Risk Analysis has been performed to inform contingency allowances [redacted]

While Ausgrid has the above controls in place and have identified treatment plans for the residual risk, it is prudent and efficient that Ausgrid carries risk contingency to manage the impacts and outcomes of this risk occurring as Ausgrid is the party who will be responsible for payment of the delay claims when they arise.

### Approach to calculating the expected risk cost

The forecast contingency associated with this risk is [redacted] This is calculated based on Genus's preliminary costs of [redacted], which have been accepted by Ausgrid following a competitive market tender process to select the subcontractor for the Transmission Line Rebuild scope.

The per day cost has then been multiplied by the SRA outputs against 'Contract 1 Program Complete' milestone which show the aggregate impact of all potential delays to this scope, taking into account concurrency, float and actual critical path impact – [redacted]

Given the nature of large infrastructure projects and the delays experienced by other TNSPs in Australia on similar projects, the probability of the residual risk occurring is [redacted]. Accordingly, Ausgrid have accepted that [redacted] of the Genus resources associated with their preliminary costs may be reallocated to other Genus projects, or to other locations lineally along the project, however the majority will be completing the same work over a longer period of time. For this reason, the probability of this risk occurring and Ausgrid being required to pay prolongation costs is [redacted]

This data was then run through @Risk to determine the contingency value associated with this risk

### Applicability of mitigate, transfer or avoid

This is the cost of all delay risks which Genus throughout this register that cannot be avoided, transferred or completely mitigated.

The final negotiated subcontract position with Genus is that Ausgrid has accepted the risk for time and costs associated with a number of delay events, and Genus will be entitled to claim from Ausgrid the costs associated with those delays. Accordingly, Ausgrid is unable to transfer this risk to its subcontractor. Were Ausgrid to have transferred this risk to the Contractor, it would have resulted in a much larger contract lump sum, thus reducing the potential benefit/savings to customers if these events were not to occur as expected.

Ausgrid cannot avoid this risk, [redacted], and given this is the agreed subcontract position, Ausgrid cannot avoid payment of these costs.

It is not possible to fully mitigate the occurrence of delays affecting Genus' scope, given the nature of these delays as set out above being outside of Ausgrid's control and the actual effect of prolongation being that Genus will require the same level of management and oversight for its scope albeit over a longer period and to manage the impact of the delay events themselves. It is not efficient, or possible, to transfer resources to another project when delay events occur. Additionally, it is also not time or cost effective to be moving plant and equipment across sites and they will most likely be stood down and claimed as a delay cost.

## 9.5 Risk ID #76 – Additional pads required

### Description of the risk

There is a risk that the ground conditions at each pole site will be inadequate for construction works to be performed upon, and additional pads will be required to be constructed in order to have an appropriate base for construction plant used for the transmission line rebuild works. This risk exists because while Ausgrid possesses the easements for the construction corridor, it has yet to complete designs or environmental assessment, resulting in uncertainty of precise pole locations. Furthermore, Ausgrid was restricted from engaging with landowners prior to the Commitment Deed execution, precluding complete scoping of works on each property. Finally, the ultimate quantum of pads can be impacted by geotechnical conditions at each pole location, and weather conditions at the time of construction.

Ausgrid has carried out a desktop review of pole locations during the preliminary design phase, with intent to rationalise the number of poles and pads required, however this is a poor control, and it is likely that a number of additional pads will be required.

Additionally, Ausgrid has planned to proactively survey each pole site to determine suitability once it gains access to the construction corridor, and to have Genus perform Dynamic Cone Penetrometer (DCP) tests at each location to determine ground conditions. However, while the treatment actions will allow Ausgrid early understanding of ground conditions, they do not mitigate the risk that additional pads will be required. Therefore, it is prudent and efficient that Ausgrid carries risk contingency to manage the impacts and outcomes of this risk occurring as Ausgrid is the party who will be responsible for paying Genus to carry out the additional work due to the rates-based subcontract agreement between the parties.

### Approach to calculating the expected risk cost

The forecast contingency associated with this risk is [redacted] This is calculated based on a price of [redacted] per pad as per Genus rates. This rate is then applied as follows:

[redacted]

- Pads will be installed based on DCP testing at each pole location which determines ground bearing pressure. Should the bearing pressure be insufficient, a pad is required. To date Ausgrid has performed [redacted] geotechnical bore holes at accessible locations across the transmission line route to quantify subsurface conditions.
- P10 – [redacted] as the best-case outcome is that we require less pads than allowed for.
- P50 – [redacted] pads being [redacted] out of a potential additional 925 pads
- P90 – [redacted] pads being [redacted] out of a potential additional 925 pads.

Given the limited testing that we have been able to undertake, it is likely that this risk will occur, requiring Ausgrid to meet the cost of the additional pads.

This data was then run through @Risk to determine the contingency value associated with this risk.

The delay costs associated with this risk are included in Risks 65, 79, 80 and 81 and further detail of Ausgrid's approach to calculating the delay costs are contained above in section 7.

### Applicability of mitigate, transfer or avoid

The Genus subcontract for transmission line works is a bill of quantities contract and Ausgrid would be required to pay the additional costs associated with the additional pads that are not currently accounted for in our base cost estimate at the rates set out in the subcontract. Accordingly, Ausgrid is unable to transfer this risk to its subcontractor.

Ausgrid cannot avoid this risk. Should actual ground conditions be different from those expected and priced for, based on the limited geotechnical investigations that have been allowed to date, those conditions will not be able to be avoided.

It is not possible to mitigate the occurrence of the actual ground conditions; however, Ausgrid has Treatment Actions ready to be carried out once full site access is provided, which will allow for

early detection of poor ground conditions and ground bearing pressure, giving Ausgrid early notice and the ability to mitigate the time impact of this risk, but not the cost impacts.

## 9.6 Risk ID #75 – Stringing methodology changes

### Description of the risk

Ausgrid's transmission line subcontractor has proposed a methodology that will use helicopters to install aerial draw wires to enhance construction productivity. There is a risk that this methodology is precluded for some or all of the linear project length, resulting in higher costs. Ausgrid was precluded from engaging with third parties during the phase of the project where construction market pricing was obtained. There is further risk that third party influences, such as the Singleton military area, coal mines and some community groups, may oppose helicopter stringing. This will result in traditional stringing methods being undertaken, which are slower and less cost effective than helicopter stringing.

Therefore, it is prudent and efficient that Ausgrid carries risk contingency to manage the impacts and outcomes of this risk occurring as Ausgrid will be responsible for any additional cost in carrying out any such additional work under the subcontract agreement between the parties.

### Approach to calculating the expected risk cost

The forecast contingency associated with this risk is [redacted]. This is calculated as follows:

- Ausgrid's base estimate cost is based on [redacted] of all stringing work to be carried out via helicopter stringing. If helicopter stringing was carried out across the whole route, there would be an uplift of [redacted].
- The P values below are the estimated difference between the amount allowed for in the base cost estimate and the additional costs that would be incurred if this risk materialises.
- P10 – [redacted]
- P50 – [redacted]
- P90 – [redacted]

Taking into account discussions with Genus, it is possible that the stringing methodology will change, resulting in Ausgrid paying additional costs to Genus for the longer, more costly stringing methods based on a reimbursable subcontract with agreed rates.

This data was then run through @Risk to determine the contingency value associated with this risk.

The delay costs associated with this risk are included in Risks 65, 79, 80 and 81 and further detail of Ausgrid's approach to calculating the delay costs are contained above in section 7 above.

### Applicability of mitigate, transfer or avoid

The Genus subcontract for transmission line works is a bill of quantities contract and Ausgrid would be required to pay the additional costs associated with changes to the stringing construction methodology. Accordingly, Ausgrid is unable to transfer this risk to its subcontractor.

If Ausgrid is required to direct Genus to exceed its assumptions on stringing methodology in response to third party stakeholder input, it will be subject to the additional cost associated with this change.

## 9.7 Risk ID #78 – Increased material costs

### Description of the risk

There is a risk that materials being supplied by Ausgrid (excluding poles and conductors) increase in cost from the allowances in our estimate. Australia is in a relative high inflation economy at present, and the tenders for materials have been carried out over 12 months prior to execution of the Commitment Deed with EnergyCo. Ausgrid's material supply contracts are all subject to pricing volatility in line with defined formulae in each contract linked to market indices. Furthermore, Ausgrid's material's supply contracts periodically expire and are re-established following market engagement. This could result in Ausgrid needing to purchase different products with different prices, or the same materials escalating notably beyond the current cost estimate.

While Ausgrid has implemented controls to address this, which include requesting longer validity periods where possible, agreeing adjustment mechanisms for defined market indices (steel and copper prices) and have tested our suppliers' programs against our Project productivity assumptions, it is still likely that material prices will escalate.

Treatment actions relating to this risk have been identified and Ausgrid's procurement team will ensure larger quantity items will be forecasted for the duration of Project against agreed FOREX rates/indices; and open and detailed communication with suppliers to minimise the circumstances in which prices can change will occur. However, Ausgrid cannot prevent material prices from escalating, and accordingly it is prudent and efficient that Ausgrid carries risk contingency to manage the impacts and outcomes of this risk occurring.

Note that this risk item does not carry any contingency related to Ausgrid's two largest materials procurement elements under the project, steel poles and conductors, with both of these items proposed to be included as a separate Adjustment Event.

### Approach to calculating the expected risk cost

The forecast contingency associated with this risk is [redacted]

Our current equipment costs in our base estimate are:

[redacted]

A review of historical material undertaken by Ausgrid's procurement team pricing data shows increases over the last 3 to 4 years for all equipment types. Therefore, the P-values below reflect the best, likely and worst-case percentage increase on total equipment price that could occur if this risk occurs:

- P10 – [redacted]
- P50 – [redacted]
- P90 – [redacted]

This data was then run through @Risk to determine the contingency value associated with this risk.

### Applicability of mitigate, transfer or avoid

As Ausgrid is providing all major equipment under its subcontracts, Ausgrid is the party who would incur these increases. It is not possible to transfer this risk to another party.

Further, market prices for materials are not within Ausgrid's control, so the impact of this risk cannot be avoided, or completely mitigated beyond the proposed treatment actions given the time between pricing the estimate and the future date for ordering. The contingency associated with this risk is in addition to the treatment actions identified.

## 9.8 Risk ID #22 – Health and safety event

### Description of the risk

Given the scale and nature of the construction works for the HCC RNI Project, there is a risk that there will be a change to a Code of Practice, industry standard or Ausgrid Electrical Safety Rules in response to a safety incident during construction of either the HCC RNI or a parallel project in the wider industry. This will result in changes to work methodologies and increased costs to meet the new/additional standards.

Ausgrid has many controls in place to address safety risks including:

- Use of existing Ausgrid Health & Safety Management System (HSMS) that personnel are familiar with in place to provide a basis for safety management
- Engaging established major subcontractors as Principal Contractors (and requiring use of their established and proven safety systems)
- All impacted staff are trained in electrical induction controls and Ausgrid will undertake engineering analysis of every stage of construction to identify induction mitigations
- Ausgrid have structured assessment and authorisation processes for any helicopter stringing activities
- Where there are interfaces between contractors and/or Ausgrid operational network, Ausgrid has clearly defined who has Principal Contractor responsibilities, with this reflected in downstream subcontracts
- Each contractor will have a dedicated safety advisor, who reports up to Ausgrid dedicated safety advisor to ensure alignment of safety and health procedures and management for the project.

Additionally, Ausgrid has identified treatment actions that can be carried out during the Delivery Phase to address safety requirements, being that the Ausgrid safety team will undertake robust monitoring of subcontractor compliance with safety requirements throughout delivery of works, ensuring our subcontractors meet (or exceed) required KPIs regarding observations, risk assessments and toolbox talks as well as ensuring any resources that commence site work after the initial mobilisation phase meet all induction requirements prior to commencing work on site.

However, these controls will not address the risk of changes being made to the code of practice requirements, and accordingly it is prudent and efficient that Ausgrid carries risk contingency to manage the impacts and outcomes of this risk occurring.

### Approach to calculating the expected risk cost

The forecast contingency for this risk is [redacted] and has been calculated on the basis that a major WHS incident would bring substantial disruption, delay and additional cost to the Project, and require personnel to review and understand the changes to the Code of Practice, preparation

of safety briefings, tool box talks and revised inductions as well as the rolling out of such materials, along with productivity losses due to parts of scope likely being suspended pending investigations and revised work methodologies.

The total combined delay costs [redacted] and the estimated time to address a change to the safety code of conduct considering severity of incident is estimated as:

- P10 – [redacted]
- P50 – [redacted]
- P90 – [redacted]

This data was then run through @Risk to determine the contingency value associated with this risk.

### Applicability of mitigate, transfer or avoid

Ausgrid is required to comply with all Code of Practice and relevant industry standards applicable to the works, and as such cannot avoid this risk.

If a change to a Code of Practice or industry standard occurs, then based on the subcontracts Ausgrid has with our four subcontractors, this would result in a cost claim being made under each subcontract that Ausgrid would be liable to pay. As such, this risk cannot be transferred to the subcontractors.

Further, changes to Codes of Practice and industry standards are not within Ausgrid's control, particularly if they arise from an incident arising on a parallel project, so the impact of this risk cannot be completely mitigated beyond the proposed treatment actions. The contingency associated with this risk is required in addition to the treatment actions identified.

## 9.9 Risk ID #12 – Design development

### Description of the risk

Given the Project's design maturity, there is a risk that changes in design which occur through design development result in scope growth. This is caused by our design being preliminary at the time of pricing, and approximations being used for the transmission line quantities due to an incomplete design and not being able to engage with landowners or other third-party asset owners until after execution of the Commitment Deed with EnergyCo. This could result in scope creep which can delay the program, and result in increases to materials supply quantities and/or subcontractor costs.

Ausgrid has controls in place to address the consequences of this risk, being the use of an additional design consultant AECOM to expedite design activities during the development phase; using skilled internal resources to perform review designs; facilitation of design coordination between all design disciplines throughout the development phase; use of Ausgrid's existing library of design standards; performance of geotechnical and contamination studies early in the development phase at accessible locations, use of Ausgrid's available geotechnical information along the project corridor; separation of all underlying distribution assets off transmission structures to be replaced under the scope in an early works construction phase; and location of new distribution assets away from the intended alignment of new transmission assets.

Through the above, Ausgrid produced a preliminary tender design that was provided to prospective transmission line and substation subcontractors for the formation of market pricing and the development of project cost estimates.

For the fibre laying scope of work, Ausgrid recognised that this scope lies outside of core expertise and sourced the design of this scope via a design and construct market engagement to appropriately experienced suppliers from the telecommunications industry.

These treatment actions are limited in nature and will not affect the cost impact of our design changing which is why it is prudent and efficient that Ausgrid carries an appropriate risk contingency to manage the impacts and outcomes of this risk occurring.

### Approach to calculating the expected risk cost

The forecast contingency for this risk is [redacted] and has been calculated with reference to the price of each design package (excluding any preliminaries) and applying a best, likely and worst-case percentage to represent the likely change to design and corresponding increase in cost based on current design maturity. The table below summarises our calculations:

**Table 4: Calculating expected risk cost**

| Design area | Cost rationale |
|---|---|
| Greenfield Substation Design | Contractor price is based on concept design undertaken prior to tender. Detailed design may result in changes to civil quantities, wiring volumes, number of terminations, etc. It is not expected that such changes will cause extension of program.<br><br>[redacted] |
| Transmission Lines | Contractor price and quantities are based on concept designs formulated from sites that could be accessed and limited geotechnical information available during the tender period. Detailed design will assess all sites and consider further geotechnical information that may increase equipment quantities, strength/sizing of poles, or result in additional tracks.<br><br>[redacted] |
| Brownfield Substation Design | Detailed design may identify interface issues, technical challenges with existing aged substations.<br><br>[redacted] |
| Underground Fibre Design | D&C contract. Risk is transferred to subcontractor who is better placed to manage this technical scope than Ausgrid. |

| Design area | Cost rationale |
|---|---|
| Enabling Works Design | Price based on desktop design only. Not able to talk to stakeholders in the estimating phase, scope may require adjustments e.g. (undergrounded in some sections). [redacted] |
| Ancillary Works | Zero contingency allowance as this is an adjustment event |
| Telecommunications Design | [redacted] |
| Secondary System Design | Detailed design may identify interface issues, technical challenges with existing aged substations. [redacted] |
| Harmonic Filter Design | This component of the design has not been subjected to system studies or design, as we do not yet know which generators will connect to the REZ nor the inverter technology that each will use. [redacted] |

This data was then run through @Risk to determine the contingency value associated with this risk.

### Applicability of mitigate, transfer or avoid

Ausgrid is responsible for providing designs for its subcontractors. Changes to design will constitute a valid subcontract claim that Ausgrid will be required to pay. Accordingly, it cannot transfer this risk to another party.

Similarly, the design must be developed, and the resulting changes cannot be avoided, as the Project must be built in line with the final design.

While Ausgrid has some limited treatment actions in place, the best mitigation for design changes and scope growth is for Ausgrid to pay the cost of subcontractor claims, so that the Project design is completed efficiently, and constructed in a timely manner.

## 9.10 Risk ID #47 – Aviation risk

### Description of the risk

Ausgrid has identified two airfields withing the vicinity of the HCC RNI Project footprint, including the Dochra military airbase. Existing transmission lines in the vicinity of these airfield will be demolished and replaced with slightly taller transmission lines under the scope of the project. Ausgrid anticipates a risk that operators of these airfield may have issues with the increased height

of new lines and/or the proposed transmission line construction methodology. There is a chance that airport operations may [redacted]

[redacted]

Additionally, Ausgrid will engage a specialist to undertake a detailed review of our design from an aviation perspective across the entire transmission route to find any further no fly zones, additional airports etc, change design where possible to be compatible with landing trajectories and landing zones, develop appropriate construction methodologies within aviation areas and liaise with appropriate authorities to obtain design approval and construction methodology approval within aviation areas. These treatment actions are limited in nature, and will not affect the cost impact of our design changing which is why it is prudent and efficient that Ausgrid carries risk contingency to manage the impacts and outcomes of this risk occurring

### Approach to calculating the expected risk cost

The forecast contingency for this risk is [redacted] and has been calculated by considering 3 types of associated cost outcomes for this risk:

[redacted]

This data was then run through @Risk to determine the contingency value associated with this risk.

### Applicability of mitigate, transfer or avoid

The subcontract for transmission line works is a bill of quantities contract and Ausgrid would be required to pay the additional costs associated with changes to the stringing construction methodology. Accordingly, Ausgrid is unable to transfer this risk to its subcontractor.

[redacted]

## 10 Top 10 sensitivity risk items

Risks 65, 64, 22, 79, 12, 80, 78 75 and 76 are nine of the top 10 Sensitivity items in our risk modelling outputs and are addressed above as also they sit within the Top 10 Expected/Mean Risk Items.

In addition to these, Risk #29 in relation to Subcontractor Failure is a Top 10 sensitive Risk Item and is detailed below:

### 10.1 Risk ID #29 – Subcontractor failure

### Description of the risk

This risk relates to one or more of Ausgrid's subcontractors being unable or unwilling to complete their scope. This could be caused by a number of factors, including:

- Subcontractor insolvency and/or liquidation
- Subcontract repudiation/collapse due to poor performing project performance, either in this or parallel industries
- Corporate strategy realignment
- Subcontractors do not complete works, including resolution of defects in a timely manner causing Ausgrid to complete works or engage another contractor, and subcontract relief does not adequately reimburse Ausgrid for the actual costs incurred
- Resources, including stringing crews move on to next job due to another subcontractor's failure.

The consequences of this risk occurring include Ausgrid incurring significant additional costs in completing works and/or rectifying defects which are difficult to recover from its subcontractors, reputational damage, EnergyCo stepping in to rectify and passing costs down which cannot be equally recouped from subcontractors and which exceed the costs that Ausgrid could complete the works for using its own resources.

Ausgrid have a number of controls which are currently in place to address this risk:

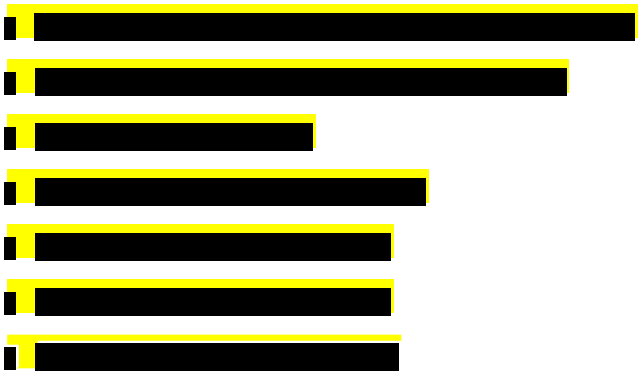
- Prudent selection of delivery partners
- A KPI regime that incentivises prompt rectification of defects

- Dedicated resources in Project team to manage quality throughout the construction and commissioning phases
- Ausgrid has hold and witness points embedded throughout all subcontracts
- Ausgrid has quality systems to facilitate the recording and uploading of asset quality information
- Defects liability period in place and security held for all subcontractors
- Using subcontractors with appropriate skills and experience to deliver this type of infrastructure
- Ausgrid is strategically retaining the components of scope with greatest technical complexity.

While Ausgrid have a wide range of effective controls in place and have identified treatment plans for the residual risk, it is prudent and efficient that Ausgrid carries risk contingency to manage the impacts and outcomes of this risk occurring, as while the probability of the risk occurring is rare, the financial impact is extreme if it does occur.

### Approach to calculating the expected risk cost

The contingency for this risk has been calculated by noting that Ausgrid is likely to pay more than the current price of subcontracted works due to criticality of works and warranties being given for work not performed by replacement subcontractors. Ausgrid has taken the average of the sum of two major subcontracts and calculated the best, likely and worst cases with regard to the proportion of the combined price that Ausgrid would likely pay to re-subcontract part of the works during the delivery phase, including likely markup of pricing as follows:



While the likelihood of this risk occurring is very low, it has happened in recent large infrastructure projects such as Project Energy Connect and Snowy Hydro 2.0, and the costs incurred would be substantial, which is why it is a top ten sensitivity item. Accordingly, Ausgrid has used a [redacted] probability of occurrence.

This data was then run through @Risk to determine the contingency value associated with this risk.

### Applicability of mitigate, transfer or avoid

Ausgrid cannot determine if or when a subcontractor will be unable to perform works, fall into liquidation or fail to rectify defects. However, it is not unheard of for subcontractors to fail during the construction of large infrastructure projects. As Ausgrid has contracted with EnergyCo to deliver the HCC RNI Project, it cannot effectively transfer the effects of this risk to another party or avoid it if it occurs.

Nor can Ausgrid completely mitigate this risk, as we are unable to control whether our subcontractors fail. While Ausgrid and ultimately EnergyCo retain step in rights, these do not fully

consider the costs of Ausgrid performing these works itself, particularly if the works are towards the end of the project after a substantial part of the subcontract sum has been paid. Additionally, it always costs more to engage a new subcontractor to complete part of another subcontractor's scope, especially if warranties are required to be provided.

## 11 Other risk items contributing to contingency

In addition to the above risks which make up the top ten contributors to the mean value and sensitivity items, there are 24 additional risks which contribute to Ausgrid's risk contingency value. Table 5 summarises the risk identified, the current controls Ausgrid has undertaken and proposed future treatment plans, along with the cost rationale, likelihood and probability that was then run through @Risk to determine the contingency value associated with this risk. We note that while there are a range of controls and treatment tasks for each of the identified risks below, these do not completely mitigate the effects of this risk, and due to the allocation of risk under each of the subcontracts between Ausgrid and its subcontractors, it is both prudent and efficient that Ausgrid carry contingency for these risks.

**Table 5: Other risk items contributing to contingency**

| Risk ID | Risk Description | Current Controls | Future Treatment Tasks | Cost Rationale | Likelihood and Probability | Reason why risk cannot be effectively transferred, mitigated or avoided |
|---|---|---|---|---|---|---|
| 4 | Unexpected or differing geotechnical conditions across the transmission line and substation foundation sites which delay the project and impact the price. | Early geotechnical investigations have been undertaken at substations. [redacted]. Desktop geotechnical info obtained from University of Newcastle (regionally based, not conducted at discrete locations). Have obtained a range of costs from contractors, so understand spread of costs. | Each subcontract Project Manager to undertake further, detailed, location specific geotechnical testing in each of the construction locations. | Delay costs included in Risks 65, 79, 80 and 81 Different ground conditions found – then a different approach to foundations will be required. [redacted] Plus standdown costs of stringing crews. According to Genus' program, [redacted] Say that Genus can mitigate delay damages by [redacted] Given inability to get to site and carry out further geotechnical testing, there is a reasonably high chance some rock will be found. | [redacted] | [redacted] |

| Risk ID | Risk Description | Current Controls | Future Treatment Tasks | Cost Rationale | Likelihood and Probability | Reason why risk cannot be effectively transferred, mitigated or avoided |
|---|---|---|---|---|---|---|
| | | | | [redacted] | | |
| 15.01 | Unexpected contamination/ground conditions found, or contamination over and above allowances found. | Early geotechnical investigations have been undertaken at substations.<br>[redacted].<br>Ausgrid have nominated a tip site at Muswellbrook STSS (old power station cut) to move/contain contaminated product.<br>Relocated Muswellbrook STSS away from contaminated Site in response to geotechnical results | Further environmental/hazardous testing to be undertaken at Muswellbrook throughout Early Works phase.<br>Transmission Line and Kurri site to undertake environmental/hazardous testing prior to commencing construction works.<br>Transmission and Kurri site to obtain schedule of rates for disposal of contaminated rates prior to commencement of construction works so cost is known | Adjustment Event for excluded contamination in corridor only as Ausgrid's doesn't own this land.<br>[redacted]<br>Cost is to remove rock from all other sites and contamination from sites<br>[redacted]<br>P10 – [redacted]<br>P50 – [redacted]<br>P90 – [redacted] | [redacted] | Ausgrid responsible for removal of rock and contamination from sites, to allow subcontractors to carry out works. |
| 15.02 | As above | As Above | As Above | [redacted] | [redacted] | As Above |

| Risk ID | Risk Description | Current Controls | Future Treatment Tasks | Cost Rationale | Likelihood and Probability | Reason why risk cannot be effectively transferred, mitigated or avoided |
|---|---|---|---|---|---|---|
| | | | | This is based on [redacted] of total spoil for P10 value, [redacted] for P50 value and [redacted] for P90 value | | |
| 15.03 | As above | As Above | As Above | [redacted]<br>This is based on [redacted] of total spoil for P10 value, [redacted] for P50 value and [redacted] for P90 value | [redacted] | As Above |
| 15.04 | As above | As Above | As Above | [redacted]<br>P10 – [redacted]<br>P50 – [redacted]<br>P90 – [redacted]<br>This is based on [redacted] of total spoil for P10 value, [redacted] for P50 value and [redacted] for P90 value | [redacted] | As Above |
| 15.05 | As above | As Above | As Above | [redacted]<br>P10 – [redacted]<br>P50 – [redacted]<br>P90 – [redacted]<br>This is based on [redacted] of total spoil for P10 value, [redacted] for P50 value and [redacted] for P90 value | [redacted] | As Above |
| 15.06 | As above | As Above | As Above | [redacted]<br>P10 – [redacted]<br>P50 – [redacted] | [redacted] | As Above |

| Risk ID | Risk Description | Current Controls | Future Treatment Tasks | Cost Rationale | Likelihood and Probability | Reason why risk cannot be effectively transferred, mitigated or avoided |
|---|---|---|---|---|---|---|
| | | | | P90 – [redacted]<br>This is based on [redacted] of total spoil for P10 value, [redacted] for P50 value and [redacted] for P90 value | | |
| 16 | Inclement weather affects the Project Program causing rework to be carried out | Detailed review and analysis of BOM data for the site locations undertaken and incorporated into Program.<br>Schedule of rates obtained to enable Ausgrid to allow for additional access (tracks, waterway crossings and bog mats) | Undertaking an informed SRA and have informed project durations and weather calendars informing schedule.<br>Carry out transmission line activities to enable completion of activities ahead of schedule to maximise productive construction if affected by inclement weather. | Cost to rebuild access tracks:<br>P10 – [redacted] (based on [redacted] access tracks)<br>P50 – [redacted] (based on [redacted] access track<br>P90 – [redacted] (based on [redacted])<br>Rate is [redacted] to build access tracks<br>Claims from subcontractors included in risks 65, 79, 80 & 81. | [redacted] | Ausgrid responsible to provide access, including rebuilding of damaged access tracks due to weather events. |
| 17.01 | Easements not satisfactory to complete construction works | Ausgrid have partial easements in place across the Project locations.<br>Ausgrid have existing relationships with landowners where easements are and access is required.<br>Ausgrid has existing legacy arrangements and formal access tracks.<br>Construction methodology allows | Community and Stakeholder management team to build community relationships and consult with local communities following Commitment Deed, before construction commences to minimise refusals of access.<br>Ausgrid to Obtain legal advice from external lawyers regarding operation of Electricity Supply Act 1995 and the rights it holds under the Act. | [redacted] | [redacted] | Ausgrid responsible to provide access, including ensuring easements are satisfactory to complete construction works. |

| Risk ID | Risk Description | Current Controls | Future Treatment Tasks | Cost Rationale | Likelihood and Probability | Reason why risk cannot be effectively transferred, mitigated or avoided |
|---|---|---|---|---|---|---|
| | | construction to continue in other easements while property and access rights are obtained, reducing the overall impact on critical path of access difficulties. | | | | |
| 17.02 | As Above | As Above | As Above | Cost to remove access tracks – in base cost<br><br>Being unable to consult with landowners about their requirements, we made the cost assumption that we could leave the access tracks to facilitate Ausgrid's future maintenance and operation of the line. However, now we are encountering landowners who will seek the access track to be removed. We have an allowance of [redacted] | [redacted] | As Above |
| 18 | Increase to subcontractor Prices from what was allowed for in the estimate | Ausgrid have implemented a structured evaluation and clarification process | Ausgrid has infrastructure in place within project team to mitigate contractual claims (Ausgrid maintains as-built | [redacted] | [redacted] | [redacted] |

| Risk ID | Risk Description | Current Controls | Future Treatment Tasks | Cost Rationale | Likelihood and Probability | Reason why risk cannot be effectively transferred, mitigated or avoided |
|---|---|---|---|---|---|---|
| | Design maturity lead to increased costs for Transmission line reimbursable priced contract | to increase the identification of errors in subcontractor pricing.<br>Ausgrid has undertaken tender designs with a focus on clarifying detail in areas with the greatest possibility of causing tangible price fluctuations.<br>Ausgrid commenced our RFP pricing ahead of EnergyCo's RFP, enabling Ausgrid to extended subcontractor tender period of 8 weeks to decrease the chances of errors in pricing.<br>For works with complex staging, Ausgrid have extensively scoped those components of work to ensure contract has made appropriate allowances | program and dedicated contract administrator) | [redacted] | | [redacted] |
| 21.01 | Delays to Procurement of key items from overseas or damage to procured items | Early interfacing and price establishment with supply chain to secure factory slots and delivery dates.<br>Requested realistic delivery timeframes from | Secure supply chain at Commitment Deed stage.<br>Undertake a thorough evaluation of preferred supplier resourcing plans to ensure they can meet, or | Manufacturing times and shipping delays outside of Ausgrid control are built in to SRA and time is costed in risk 64 below for Ausgrid.<br><br>Damaged Equipment impact: | [redacted] | Ausgrid is responsible for providing equipment under each subcontract. |

| Risk ID | Risk Description | Current Controls | Future Treatment Tasks | Cost Rationale | Likelihood and Probability | Reason why risk cannot be effectively transferred, mitigated or avoided |
|---|---|---|---|---|---|---|
| | | contractors to program accurately.<br>Procurement lead times are written into contracts to provide contractual rights for Ausgrid to enforce. | better, the Program dates required.<br>Allocate a dedicated resource to manage project procurement through internal and client systems.<br>Procurement Team to establish a process for reviewing order reports and tracking orders monthly to inform Program (with additional reporting by exception). | P10: Small defects. [redacted] rectifications fixed in parallel with other activities. Minor patching, grinding and re-galvanising – alternatively draw down on [redacted]<br>P50: standard defect. [redacted] Return item to vendor supplier, or local vendor attends site for rectification. [redacted]<br>P90: Major defect. [redacted] time. If there is a significant defect causing re-ordering insulators (insufficient galvanising coating – this occurred with Flowline supplied insulators on HumeLink after they were installed on the towers), poles or conductor – potential that there is a 3 month lead time for re-ordering. [redacted]<br>Not included in SRA or risk 64 below. | | |
| 21.02 | As Above | As Above | As Above | Equipment damage is covered by insurance Deductable is [redacted] | [redacted] | As Above |
| 21.03 | As Above | As Above | As Above | Catastrophic delays due to a complete reorder due to severe damage or failure to be delivered (e.g. equipment falling off ships, insufficient galvanising coating – this | [redacted] | As Above |

| Risk ID | Risk Description | Current Controls | Future Treatment Tasks | Cost Rationale | Likelihood and Probability | Reason why risk cannot be effectively transferred, mitigated or avoided |
|---|---|---|---|---|---|---|
| | | | | occurred with Flowline supplied insulators on HumeLink after they were installed on the towers), poles or conductor – potential that there is a [redacted] lead time for re-ordering.). [redacted]<br><br>[redacted] | | |
| 24 | Uncertainty of final bioconservation requirements that will be directed by Minister resulting in increased costs and delays | No Controls in place – cannot control ministerial decision making. | Establish and continue open dialogue with Department regarding potential risks from Commitment Deed phase.<br>Commence approval process as soon as possible following Commitment Deed | Potential bioconservation approval time delays included in SRA and cost included in risks 65, 79, 80 and 81.<br>Costs for:<br>Additional supervision [redacted]<br>Rationale for numbers – Minor amendment to scope, get Ministers delegate approval, likely to need extra supervision (Ausgrid standby person at hourly rate [redacted])<br>Plus extra fencing, signage etc for safety is an allowance of [redacted] for P50 and P90 – unable to | [redacted] | Ausgrid is unable to accurately cost what measures the Minister will request in relation to preserving bioconservation, or how long they will take to implement. Accordingly, cannot avoid this risk.<br><br>Agreed subcontract position is that Ausgrid is responsible for access to land and approvals, therefore cannot [redacted] |

| Risk ID | Risk Description | Current Controls | Future Treatment Tasks | Cost Rationale | Likelihood and Probability | Reason why risk cannot be effectively transferred, mitigated or avoided |
|---|---|---|---|---|---|---|
| | | | | accurately assess unless know what Minister will direct | | |
| 26 | Noise complaints arising from construction works or installed equipment. | Ausgrid undertaking noise studies of both pre-construction and post construction noise levels.<br>Noise generating works will be confined to hours stated in Construction Noise Guidelines.<br>Ausgrid are largely confining works to constructed corridors | Project Manager for each scope/subcontract to monitor subcontractors to ensure compliance with noise requirements throughout construction phase.<br>Hold discussions with landowners from Commitment Deed onwards regarding potential noise near their properties.<br>Provide landowners with Landowner Information Packs | Overall, the total material hire rate is approximately [redacted] metre/week, which includes the cost of the fence panels. Other associated costs, such as labour and delivery, are estimated at around [redacted]. Total is [redacted] metre or [redacted] | [redacted] | Ausgrid cannot determine if or when a stakeholder will make a noise complaint, or require additional fences installed to block noise.<br>Ausgrid is responsible for responding to stakeholder complaints, and dealing with them effectively, so cannot transfer or avoid this risk. |
| 39 | Stakeholders are dissatisfied | Developing engagement plan to implement at Commitment Deed.<br>Developing property acquisition process and plan.<br>Developing complaints management system, with appropriate points of escalation.<br>Stakeholder and community governance structure being | Liaise with local communities and stakeholders at earliest opportunity (hopefully Commitment Deed).<br>Community consultative committee to be established.<br>Developing consistent key messages and use these for all engagement with stakeholders.<br>Collaborate with EnergyCo re Community and | Potential to pay disturbance costs to affected landowners and businesses<br>Disturbance costs over whole site is [redacted] | [redacted] | Project is ultimately being performed by Ausgrid and Ausgrid's brand. Impact on stakeholders is held by Ausgrid, this cannot be efficiently transferred or avoided, and additional mitigation will require contingency. |

| Risk ID | Risk Description | Current Controls | Future Treatment Tasks | Cost Rationale | Likelihood and Probability | Reason why risk cannot be effectively transferred, mitigated or avoided |
|---|---|---|---|---|---|---|
| | | implemented and resourced.<br>Construction route is mostly within existing easements, limiting the impact on local residents. | Stakeholder Management Plan.<br>Identification of key influencers. Opinion leaders and undertake comprehensive engagement to inform as well as roll out a wider education program and campaign to explain the need for energy transformation. | | | |
| 45 | Network modelling undertaken is inaccurate, causing re-work (including re-design) due to Transgrid only providing a subset of the transmission line data required for NSW. | Discussed with NSW EnergyCo – advised to provide general modelling.<br>Ausgrid has completed best-endeavours modelling.<br>Preliminary assessment of how lines should be designed and constructed undertaken taking into account geographical context.<br>Retained expert advice regarding main grid impacts. | Obtain specialist expertise to build scenarios to be modelled (with Transgrid experience).<br>Final design to be agreed and final conductor types resulting in modelling interdependences.<br>Obtain support from specialist consultant with ongoing modelling requirements (as required). | Cost of network modelling consultancy cost [redacted]<br>Time included in SRA and risk 64 | [redacted] | Ausgrid is responsible for providing network modelling to inform its design drawings/IFCs to subcontractors. Changes to design constitute a subcontract claim. |
| 46 | third party asset owners cost Ausgrid more to address than allowed in price due to significant additional work and | Ausgrid has a structured third party Interface Plan. | Effectively execute third Party Interface Plan throughout Project. | Relocate or rebuild Telstra asset/ARTC asset.<br>Low probability, but big cost.<br>[redacted] | [redacted] | The works associated with relocating third party assets is not associated with any scope that Ausgrid |

| Risk ID | Risk Description | Current Controls | Future Treatment Tasks | Cost Rationale | Likelihood and Probability | Reason why risk cannot be effectively transferred, mitigated or avoided |
|---|---|---|---|---|---|---|
| | costs to relocate or protect the asset. | Ausgrid will engage with third parties as early as possible.<br>For all crossings of major infrastructure, Ausgrid will locate a strain structure either side to enable work to continue unencumbered, with crossing completed at later date amenable to third party. | Once engagement with third parties commences, Ausgrid will structure construction program to align crossings into their outages/possessions | [redacted] | | has delegated to its subcontractors via subcontract. It would be an Ausgrid cost to carry out these works, and these works are required in order for the Project to proceed. |
| 56.01 | Berowra to Somersby scope results in additional work and program delays due to restringing activities across water and existing structures and ageing poles in area. | Ausgrid has structured assessment and authorisation process for any helicopter stringing activities.<br>Only use qualified, experienced contractors to undertake stringing, preferably previously tested by Ausgrid (meets safety risk but not cost risk).<br>Each contractor will have a dedicated safety advisor, who reports up to Ausgrid's dedicated safety advisor to ensure stringing safety requirements are in | Ausgrid Safety team to undertake robust monitoring of subcontractor compliance with safety requirements throughout delivery of works. Meet (or exceed) required KPIs regarding observations, risk assessments and toolbox talks.<br>Ensure any resources that commence site work after initial mobilisation phase meet all induction requirements prior to commencing work on site.<br>Ausgrid has plans to carry out inspection and identify scope. | Costs for additional poles:<br>P10: 15 poles are located on established access track and easy to get to – Allowance for 10 poles included. Need to replace 5 poles at [redacted]<br>P50: 15 Poles are located down a light vehicle access track – Allowance for 10 poles included. Cost for 5 additional poles is [redacted]<br>Access track needs to be re-built through goat country.<br>5km of rugged access track work @ $40 lineal metres + building pads = [redacted]<br>P90 – 20x Poles are located down a light vehicle access track. Additional 10 poles at [redacted] per pole supply and install. | [redacted] | Cannot access easements prior to Project Deed being executed to asses condition of poles and cost accurately.<br>The Genus contract for transmission line works is a bill of quantities contract – Ausgrid would be required to pay the additional costs associated with changes to construction methodology. |

| Risk ID | Risk Description | Current Controls | Future Treatment Tasks | Cost Rationale | Likelihood and Probability | Reason why risk cannot be effectively transferred, mitigated or avoided |
|---|---|---|---|---|---|---|
| | | place for all stringing activities. | | Access track needs to be re-built through goat country.<br>7km of rugged access track work @ [redacted] lineal metres + building pads = [redacted] | | |
| 56.02 | As Above | As Above | As Above | We are working on an existing circuit that has poles on it that are up to 50 or more years old (in come cases). It is likely that we will need at least two outages. First for preparation/repair/maintenance works. The second for restringing conductor. There is a risk that, during the restringing works that another defect is identified more outages are required, or require stringing each section in a single outage. There are 5 sections, so worst case say 6 outages (including preparation outage)<br>Outages require 2 operators for 4 hours twice (i.e. off and on). Total 2 operators for 8 hrs each.<br>P10: 2 × 2 operators for 8 hrs.<br>P50: 3 × 2 operators for 8 hrs + 2 × [redacted]<br>P90: 6 x 2 operators for 8 hrs + 5 x [redacted] | [redacted] | As Above |
| 58 | Ausgrid's planned staging results in remobilisation costs for | Hold detailed discussions with proposed subcontractors | Project managers to review subcontractors programs monthly for status of | Use JHG rates to quantify additional mob/de-mob [redacted] | [redacted] | Obligation to provide access, including managing interfaces |

| Risk ID | Risk Description | Current Controls | Future Treatment Tasks | Cost Rationale | Likelihood and Probability | Reason why risk cannot be effectively transferred, mitigated or avoided |
|---|---|---|---|---|---|---|
| | testing and commissioning of John Holland subcontract. | regarding Program and staging.<br>Subcontracts explicitly set out interface requirements, and require cooperation between subcontractors, including clear definitions of battery limits. | construction works and alignment to staging requirements. | [redacted]<br>JHG demobilisation cost is [redacted] and mobilisation cost is [redacted] | | is held by Ausgrid under subcontracts. Subcontractor has entitlement to claim additional mobilisation and demobilisation costs under subcontract. |
| 59 | Delayed property access at Antiene STS due to unresolved Aboriginal Land Claim | Ausgrid has obtained external legal advice and engaged with Crown lands Office and Local Aboriginal Land Council (LALC). | Commence works in areas where there is no claim while waiting for claim to be resolved. | Unresolved Native Title Claim: Ausgrid to pay to finalise claim<br>Value of land [redacted]<br>Probability rationale – will have to pay at least the value of the land, and likely with a [redacted] due to volume of construction for renewables in area and precedent for payment of land compensation claims.<br>Contingency amount may also be required to cover additional legal, engagement, valuation and cultural engagement costs to resolve | [redacted] | Ausgrid obligation under all subcontracts to provide access. Ausgrid only party with responsibility to settle Native Title Claim so Project can be constructed as planned. Cost of paying out Native Title Claim less than cost to redesign project works for this land. |
| 61 | Delays to construction Works result in equipment needing to be stored | Ausgrid has undertaken detailed communication with proposed | Extended Warehouse hire.<br>Consider early relocation to site where possible. | [redacted] in base cost (JHG only). Genus hiring yard at their cost. [redacted] | [redacted] | Ausgrid are responsible for major procurement and supply to Site for |

| Risk ID | Risk Description | Current Controls | Future Treatment Tasks | Cost Rationale | Likelihood and Probability | Reason why risk cannot be effectively transferred, mitigated or avoided |
|---|---|---|---|---|---|---|
| | | subcontractors regarding Program and staging.<br>Subcontracts explicitly set out interface requirements, battery limits and obligation of cooperation between subcontractors | | [redacted]<br>Lease costs are [redacted] for warehouse and security | | subcontractors which means the payment for additional storage of procurement items if construction is lagging is one that Ausgrid cannot transfer or avoid. |
| 67 | Additional costs incurred due to Ausgrid's project management team requirements changing (including Owner's team, Legal costs, Environmental costs, consultants, travel and accommodation) | Ausgrid have an experienced and dedicated project team for the Project.<br>Clearly defined interfaces between all contracts and interfaces are structured such that the party that will finish second, completes the interface scope.<br>Subcontract terms for most subcontractors agreed, or based on risk position previously agreed. | Ausgrid are looking to compress critical path activities from Commitment Deed stage by completing as many activities as possible as part of the Early Works program.<br>Dedicated contract admin resource, supported by Project Management Team, to manage each subcontract. | [redacted] | [redacted] | These are costs that Ausgrid will incur directly and cannot transfer or avoid. The cost is also those reasonably expected to be incurred after mitigation measures have been carried out. |
| 71 | AIPP requirements are not satisfied by the Project IPP and/or exemption applied for re AIPP is not obtained, requiring additional work/costs | Seek departure | Detailed Project IPP Plan and training for all Ausgrid project management team. | Should we fall behind IAPP targets our recovery plan would be to increase apprentice/disadvantaged employee utilisation on the project to manage to the targets increasing the total resource cost. | [redacted] | While Ausgrid can use best endeavours to meet the Project IPP, it does not have direct control over the availability of resources. This requirement is an |

| Risk ID | Risk Description | Current Controls | Future Treatment Tasks | Cost Rationale | Likelihood and Probability | Reason why risk cannot be effectively transferred, mitigated or avoided |
|---|---|---|---|---|---|---|
| | | | | Subcontractor variation to meet revised targets [redacted]<br>Potentially incur consultation costs if Plan is not approved. [redacted] | | Ausgrid responsibility that cannot be transferred, avoided or mitigated.<br>Requirements have been subcontracted, but Ausgrid could still fail plan through its own resources. |
| 72 | Legal and/or valuation costs associated with acquisition of land are higher than estimate due to unforeseen issues | No controls as Ausgrid could not engage with community until Commitment Deed signed. | Engage with Lawyer to secure a reasonable price per advice. | Approx: [redacted] individual landowners affected.<br>Approx: [redacted] individual land parcels affected.<br>[redacted]. Risk of uplift due to other challenges and unsatisfactory agreements and legal/valuation rework.<br>P10 – [redacted] being [redacted]<br>P50 – [redacted] being [redacted]<br>P90 – [redacted] being [redacted] | [redacted] | Ausgrid is responsible for payment of legal costs and valuations where it wants to access more or additional easements |

| Risk ID | Risk Description | Current Controls | Future Treatment Tasks | Cost Rationale | Likelihood and Probability | Reason why risk cannot be effectively transferred, mitigated or avoided |
|---|---|---|---|---|---|---|
| 77 | Additional public safety earthing requirements identified in Lidar | Ausgrid publicly facing guidelines for safe earthing. | Ausgrid to modify fences to meet requirements as required at Ausgrid's cost | Allowance for additional requirements [redacted] Cost : earth stakes – [redacted] Isolation panels – [redacted] Combined cost is [redacted] | [redacted] | The Genus contract for transmission line works is a bill of quantities contract – Ausgrid would be required to pay the additional costs associated with changes to construction methodology.<br><br>Unable to accurately forecast number of fences that will require earthing, so cannot allow for this in base cost. |
| 81 | Payment of delay costs for delay claims from Service Stream that are payable by Ausgrid | Ausgrid have an experienced and dedicated project team for the Project.<br>Subcontract terms for most subcontractors agreed, or based on risk position previously agreed.<br>Schedule Risk Analysis performed to inform contingency allowances with daily rate based on subcontractor's | Dedicated contract admin resource, supported by Project Management Team, to manage each subcontract. | Service Stream daily rate for preliminaries is [redacted] [redacted] | [redacted] | This is the cost of all delay risks that are claimable by Service Stream throughout this register that Ausgrid are liable to pay delay costs for. |

| Risk ID | Risk Description | Current Controls | Future Treatment Tasks | Cost Rationale | Likelihood and Probability | Reason why risk cannot be effectively transferred, mitigated or avoided |
|---|---|---|---|---|---|---|
| | | estimate, factoring in potential for approved EOT claims. | | | | |
| 82 | Occurrence of a Probity Event | Internal legal team to complete due diligence as part of Ausgrid onboarding process.<br>Each subcontractor to sign Deed of Confidentiality and disclosure of conflicts. | Ausgrid internal governance processes (e.g. for payments to suppliers).<br>Ausgrid internal policies on preventing fraud, bribery and corruption, including regular training.<br>Implementation of Ausgrid's External Partner Code of Conduct.<br>Downstream subcontracts, based on NEC4, include processes and procedures for managing changes, payment and quality to reduce the risk of fraud.. | P10 – [redacted] investigation<br>P50 – [redacted] investigation, stopping work, replacing workers, providing evidence etc [redacted]<br>P90 – as per P50 but [redacted] | [redacted] | Ausgrid holds all responsibility for probity on the Project, and while probity obligations will be passed down to subcontractors, this responsibility cannot be fully transferred to subcontractors given the requirements in Ausgrid's Project Deed. |
| 83 | Ausgrid is required to pay higher premiums for insurances | Ausgrid has sought updated price from specialist advisor.<br>Ausgrid has undertaken extensive negotiation with EnergyCo to agree to best value for money insurance regime. | Unable to mitigate further, Ausgrid will need to pay value of policies | Premiums increase on policies from [redacted] by percentages below:<br>P10 – 5% reduction<br>P50 – 10% increase<br>P90 – 20% increase | [redacted] | Ausgrid is responsible for payment of its own insurance premiums and cannot transfer this risk to another party. Additionally, it is unable to mitigate or avoid this risk on the basis it must hold appropriate insurances and is the party responsible for |

| Risk ID | Risk Description | Current Controls | Future Treatment Tasks | Cost Rationale | Likelihood and Probability | Reason why risk cannot be effectively transferred, mitigated or avoided |
|---|---|---|---|---|---|---|
| | | | | | | payment of those policies. |
| 84 | Additional costs arising from Planning approval (REF) submissions and additional mitigation measures | Perform specialist site investigations to extent permitted by EnergyCo Confidentiality Agreement during bid phase.<br>Maximise use of existing corridors to minimise environmental impact.<br>Leverage off existing environmental information/databases along proposed corridor.<br>Prudent allowances for offset planting and screening, management of contamination, relocation of indigenous artefacts along corridor.<br>Associated Social Benefits program. | Prompt engagement with impacted stakeholders upon award of project by EnergyCo.<br>Maintain continued engagement with impacted landowners/stakeholders over the life of the project.<br>Contingent allowances for potential excess scope above base cost. | P10 – [redacted] increase in amount allowed for offset planting and trees for Muswellbrook Site<br>P50 – [redacted]<br>P90 – [redacted]<br><br>Vegetation screening at Muswellbrook is [redacted] | [redacted] | Ausgrid is responsible for payment of planning approval costs and cannot transfer this risk to another party. Additionally, it is unable to mitigate or avoid this risk on the basis it must hold appropriate planning approvals and is the party responsible for payment of those policies. |
| 85 | Additional commercial and legal costs arising from a dispute with major subcontractor/supplier | John Holland contract (NEC4) promotes collaboration. Other subcontracts have been used between Ausgrid and subcontractors previously. | Ausgrid to engage additional contract management staff for Project.<br>Regular status meetings with each subcontractor throughout Project duration to manage all issues and potential disputes. | P10 – [redacted] over and above the estimate for legal contracted services for minor claims<br>P50 – [redacted] based on proportion Ausgrid would pay in a costs claim for a major dispute<br>P90 – [redacted] | [redacted] | Adjustment event for unavoidable contractor costs does not extend to legal costs of dispute.<br><br>Defend dispute position |

| Risk ID | Risk Description | Current Controls | Future Treatment Tasks | Cost Rationale | Likelihood and Probability | Reason why risk cannot be effectively transferred, mitigated or avoided |
|---|---|---|---|---|---|---|
| | | Dedicated Project Manager and Contract Manager per subcontract to manage relationship and early indication of issues.<br>Experienced Commercial Director with large-scale infrastructure dispute avoidance/resolution experience. | Engagement of legal counsel to review claims/EOTs and contractual issues where arising to mitigate risk of escalation. | If Claims are valid – spend legal costs to substantiate claim. | | Contingency amount is the net position with an assumption that not all costs will be recovered from the claimant. |

Further detail in relation to each risk, including possible causes and consequences, likelihoods, inherent and current ratings, can be found in the Risk Register at **Appendix C.**

## 12 Validation and verification of risk costs

Validation and verification of Ausgrid's risk costs has been undertaken through a series of reviews by peers, external advisors and the Ausgrid Executive leadership, including Board approval.

Ausgrid has utilised subject matter experts from across its business to contribute to and review the qualitative and quantitative risk processes undertaken for the Project, with key contributions from several third-party consultants who have supported Ausgrid throughout the project including Turner & Townsend and TBH. The final version of the Risk Register was also submitted to Ausgrid's executive leadership team for review and endorsement.

Additionally, Ausgrid have engaged external risk advisors from Infrastructure Advisory Group to facilitate all risk workshops and run the Monte Carlo analysis using @Risk software.

Following this, the Risk Register and @Risk outputs were reviewed independently by GHD who noted in its Independent Verification and Assessment report that "Ausgrid has been transparent in the development of risk provisions and has applied an appropriate combination of deterministic and quantitative analysis utilising Monte Carlo analysis to create a risk provision based upon P50 estimates. Given that the base estimate is free of generalised risk provisioning, provision for identified risk is considered prudent".

## 13 Other risks with no risk contingency

As noted above, there are 12 risks with primary consequence categories that are neither financial nor time related. These are risks for which Ausgrid is best placed to control and hold treatment actions. For further detail, see the Risk Register attached at Appendix C.

## 14 Ongoing risk management and governance

The ongoing and continual monitoring of risk exposures, including the effectiveness of the controls in place to positively manage the risk exposures, is an important component of qualitative risk management and provides Ausgrid with the ability to test and refine the control activities as circumstances change throughout the Project phases. As part of risk monitoring, the Project Risk Register, including risk treatment plans, are updated on a monthly basis as a minimum. Individual risks with a high or extreme current risk rating, or which are due to materialise or pass, are updated on a more frequent basis, in line with the requirements of the Ausgrid Risk Management Framework.

Monitoring of risks involves:

- updating progress of risk treatment actions, including reviews of onsite activities (where considered appropriate) to validate actions reported, and reforecasting completion dates for activities, if applicable
- monitoring the effectiveness of risk treatment actions by exploring whether actions that have been performed are influencing the likelihood and/or consequence of the risk or opportunity occurring
- reviewing the risk status, including:
  - ongoing challenge of assumptions and existing practices

- considering whether changes to the internal or external environment have altered the likelihood and/or consequence of an event occurring and the identification of new causes to an event
- using the results of reviews and safe design reviews where the risk outcome has a material impact on the delivery of the project

- retiring risk events that have been effectively mitigated or passed, which requires approval by the Project Director
- identifying new or emerging risks by engaging the project team to understand:
- how the project risk profile has changed
- any issues or concerns
- the next phase of the project.

### 14.1 Communication and consultation

Communication and consultation includes:

- communicating the Project Risk Register with the project team, customer, suppliers and subcontractors, as applicable
- conducting regular risk forums and meetings, including monthly risk update meetings and workshops; and
- communicating with local communities and other affected stakeholders on key risk management activities.

## 15 Conclusion

Throughout this Report, Ausgrid has demonstrated the processes undertaken to identify, qualify and quantify the risks affecting the HCC RNI Project, along with the application of a probabilistic risk analysis and detailed explanation of the approach taken to quantifying each risk with a risk contingency attached to it.

Ausgrid's risk contingency costs have been determined in accordance with the AER's Guidelines and the economic regulatory framework set out in the NER. Further, the risk contingency costs that Ausgrid is requesting are prudent and efficient and relate to risks that cannot be efficiently transferred to another party, avoided, or mitigated further without incurring these costs.

Ausgrid has selected a contingency value of $46,850,000 ($real 2025-26) which represents a balanced contingency position and is less than the P50 value. The selected contingency value represents approximately 8% of the overall project cost, which Ausgrid considers to be a prudent risk contingency for a project of this scope and complexity.

2026-31 HCC RNI Project

# Appendix A
## Risk Workshops

16 May 2025

Ausgrid

## Appendix A – Risk Workshops

| Date | Workshop Topic |
|---|---|
| 21/11/2023 | Technical/O&M |
| 21/3/2023 | Property/Environment/Safety |
| 21/3/2023 | Program |
| 21/3/2023 | Market & Supply Chain |
| 21/3/2023 | Legal & Finance |
| 22/3/2023 | Stakeholder/Public/Government |
| 4/12/2023 | Risk Ratings |
| 12/12/2023 | Risk Rating and Control Plans |
| 12/12/2023 | IAPP |
| 18/12/2023 | Transmission Line ratings and control plans |
| 18/12/2023 | Environment risk rating and control plans |
| 18/12/2023 | Stakeholder Risk Rating and controls |
| 19/12/2023 | All risk ratings and controls review |
| 19/12/2023 | Procurement risk ratings and controls |
| 19/12/2023 | Legal/Commercial risk ratings and controls |
| 20/12/2023 | Generator Connection ratings and controls |
| 11/1/2024 | Determine Modelling inputs and Uncertainties |
| 11/1/2024 | Discuss Risk Model inputs/uncertainties |
| 15/1/2024 | Contract 1 risk modelling workshop |
| 15/1/2024 | Contract 2 risk modelling workshop |
| 15/1/2024 | Distribution Works modelling workshop |
| 15/1/2024 | Land & Property and Enviro/REF modelling workshop |
| 15/1/2024 | Commercial/Regulatory/Funding modelling workshop |
| 16/01/2024 | Contract 3 risk modelling workshop |
| 16/01/2024 | Contract 4 & 5 modelling workshop |
| 16/01/2024 | Procurement |
| 22/01/2024 | Risk Model first iteration review |
| 23/01/2024 | Procurement (including Forex/indices) risk modelling |
| 24/01/2024 | Refine model/analysis |
| 24/01/2024 | Subcontractor price changes |

| Date | Workshop Topic |
|---|---|
| 29/01/2024 | Time & Risk workshop (Review SRA & Register) |
| 29/01/2024 | Procurement Risk modelling |
| 29/01/2024 | SRA review and workshop |
| 01/02/2024 | Review Model and cross check ranges |
| 09/02/2024 | Assumptions/exclusions review |
| 12/02/2024 | Review of Risk Register |
| 16/02/2024 | Contingency review |
| 19/02/2024 | Bid assumptions and contingency review |
| 20/2/2024 | Time, Cost and Risk review |
| 27/02/2024 | SRA Review |
| 04/04/2024 | Opportunity workshops – technical, procurement, supply chain, stakeholder, property, environment, commercial, legal and regulatory |
| 06/04/2024 | Risk Register review based on Addenda 20 and 21 |
| 07/06/024 | Market Index modelling |
| 13/06/2024 | Contingency Review |
| 27/06/2024 | Risk register review |
| 01/10/2024 | Risk register review (amended scope) |
| 24/01/2025 | Risk Register review |
| 04/02/2025 | Full Risk Register review |
| 05/02/2025 | Risk Contingency Review |
| 12/02/2025 | Risk Register review – Land & environment |
| 12/02/2025 | Risk Register Review – substation scope |
| 12/02/2025 | Risk register review – Procurement |
| 12/02/2025 | Risk Register Review – Commercial |
| 12/02/2025 | Risk Register Review – Stakeholder and Social Licence |
| 12/02/2025 | Risk Register Review – Design |
| 12/02/2025 | Risk register Review – Transmission Line Scope |
| 18/02/2025 | Risk Contingency Review |
| 20/02/2025 | Risk Contingency Review |
| 21/02/2025 | Schedule Risk Analysis review |
| 26/02/2025 | Schedule Risk Analysis – update time impacts of risks |
| 07/03/2025 | Risk Register review workshop |

| Date | Workshop Topic |
|---|---|
| 11/03/2025 | Risk register contingency review |
| 14/03/2025 | Transmission Line risk review and update |

2026-31 HCC RNI Project

# Appendix B
## Schedule Risk Analysis

16 May 2025

Ausgrid

# Ausgrid

# Hunter Central Coast REZ

# QSRA Report

15 April 2025

Final

## Contents

# Appendices

### Appendix A

Inherent Time

### Appendix B

Contingent Risks

### Appendix C

Benchmarking

### Appendix D

Technical Report

### Appendix E

Assumptions and Change Register

# 1 Executive Summary

TBH has undertaken an update of the Quantitative Schedule Risk Assessment (QSRA) on the Hunter Central Coast (HCC) Renewable Energy Zone (REZ) project with the aims of:

a) Developing an appropriate time contingency allowance;

b) Validating the probability of meeting the deterministic finish dates for key milestones;

c) Identifying the high-risk areas; and

d) Proposing alternative options and measures to aid in achieving the desired objectives and outcomes of the project.

The QSRA will form part of Ausgrid's submission for Funding Approval to the AER and will also be used as inputs into a separate QCRA being performed by the cost team.

TBH have based this assessment on the updated Project Schedule and Master Risk Register received 12 March 2025 developed by the project team and subject matter experts (SMEs) as inputs to the exercise.

This Master Risk Register has been updated through a set of risk workshops facilitated by Ausgrid's consultant Infrastructure Advisory Group (IAG) in preparation for the QSRA with a final risk workshop facilitated by TBH with the senior project team to conclude the process and confirm a number of quantifications and related assumptions.

Further details on assumptions, including the rationale concerning inherent uncertainty profiles, can be found in **Section 1.1** below.

The QSRA has been undertaken using a ''hybrid" methodology that combines the "top-down" risk factors and the "bottom-up" first-principles techniques. The methodology and technical considerations are discussed in more detail in **Section 3.**

A comprehensive approach has been conducted considering all the inputs to the QSRA Model, inherent uncertainties, contingent risks, and weather conditions. The inputs and other technical considerations are discussed in more detail in **Section 3**.

## 1.1 Assumptions

The assumptions and exclusions made in this assessment are as follows:

a) The analysis is based on the schedule provided by Ausgrid received 12 March 2028 with a 20 July 2028 completion date;

b) The exercise serves as an update to the QSRAs undertaken in June and February 2024, and thus;

   i. The inherent uncertainties of each activity were compared to the previous analysis completed in June 2024;

   ii. The uncertainty ranges for new activities added post June 2024 analysis have been determined based on the uncertainty ranges of existing activities within the same respective Work Breakdown Structure (WBS) sections; and

   iii. The risk register was reviewed to identify any changes to quantifications and status as well as to quantify any new risks.

c) The inherent uncertainty assumptions from the June and February 2024 QSRAs are still considered to be valid and are recorded in **Appendix E**;

d) Inclement weather allowances where present in the deterministic schedule, have been set to zero for both client and contractor works;

e) Contingency allowances where present in the deterministic schedule were removed from the to ensure that the resulting allowances are derived from objective data, thereby preventing redundancy;

f) The three separate inclement weather calendars have been utilised produced as part of this analysis with further details of these calendars provided in **Section 3.6**; and

g) Inclement weather calendars have not been applied to electrical tasks such as “Remote Ends”, including feeder works, as these activities predominantly take place indoors.

## 1.2 Summary Results

Based on the inputs into this QSRA, TBH's detailed findings are provided in **Section 4** of this Report, with a summary of the time contingency results provided in the table below:

*Table 1 - Overall Time Summary Results.*

| Name | Deterministic | | P 50 | | | P 90 | | |
|---|---|---|---|---|---|---|---|---|
| | Date | D | Date | D | % | Date | D | % |
| KM-1150- Project Deed (Delivery) | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| KM-1190- Distribution Works Complete | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| KM-1180- Remote End Secondary Systems Telecommunications Works Complete | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| KM-1210- Contract 3 - Underground Fibre Laying Complete | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| KM-1200- Contract 4 - Kurri STSS Augmentation Complete | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| KM-1230- Contract 1 - Transmission Line Rebuilds Complete | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| KM-1220- Rothbury STS Augmentation Complete | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| KM-1250- Remote End Secondary Systems Feeder Works Complete | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| KM-1260- Contract 2 - Greenfield Switching Stations Complete | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| KM-1270- HCC REZ - Programme Complete | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |

The key takeaways from the above results are as follows:

a) The P50 contingency allowances for the "Programme Complete" milestone is positioned within the 5-15% range, typical for projects in the delivery readiness phase. Overall, the P50 contingency allowances for the other key milestones also fall within this range with the exception of the Contract 4 milestone which lies slightly above this range;

b) The results are considered acceptable as these values reflect the general greater level of certainty expressed by the project team regarding the most likely durations for work packages within the schedule which for the most part aligned with the deterministic durations;

c) The P90 contingency allowance for the "Programme Complete" milestone lies outside of the upper bound of the typical benchmark range of 10-20% for projects in the delivery readiness

phase. Overall the P90 contingency allowances for the other key milestones also fall outside of the typical range.

The values recorded and are more consistent a project in the concept phase, which have a typical benchmark range of 20-40%. This is thought to be consistent with a project transitioning between the concept and delivery readiness phase;

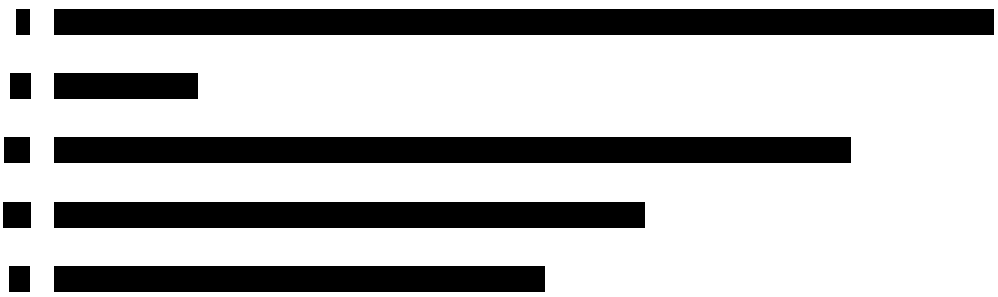
d) The P90 contingency allowances are deemed acceptable, reflecting the higher uncertainty and risks affecting the construction period, which contribute to elevated P90 values. Where P90 values fall below benchmark ranges, it typically results from fewer risks affecting the early stages of the program, with the majority impacting later stages and requiring more substantial quantifications;

e) Uncertainty is the top risk driver across the majority of milestones and represents:

   i. Variability of the duration introduced by Ausgrid related activities, e.g. design reviews etc., or external factor beyond the contractor's control; and

   ii. Non Workdays: which reflects the activities pushing across non-work periods such as Christmas shutdowns etc., due to the uncertainty and risks. Considering the program's duration spanning a number of Christmas periods, numerous public holidays, breaks, and weekends, the cumulative effect is substantial. Weather conditions, and varying productivities amplifies the complexity and intensifies these impacts.

f) Overall, the top contributing factors impacting the P50 completion of the project are:



## 1.3 Summary Recommendations

Based on the analysis conducted, the following recommendations have been put forth:

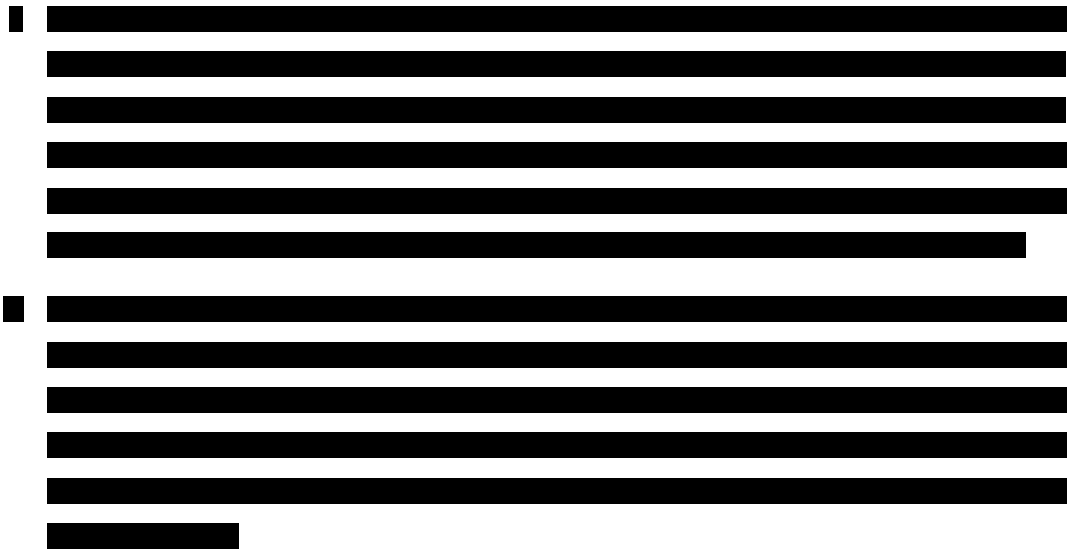
a) Adopting the probabilistic P50 time contingency allowances generated from this exercise. Doing so will support successful navigation through the AER funding approval process and provide sufficient contingency to address risks, including interface challenges, the first-time delivery of a project of this scope and nature, and managing relationships with EnergyCo and other stakeholders;

b) One of the primary factors affecting P50 contingency allowances are the inclusion of non-working days part of the uncertainty resulting from the rescheduling of activities across multiple Christmas periods, public holidays, and weekends. Therefore, the following recommendations are proposed:

   i. Ausgrid to collaborate with contractors to review the list of highly impacted activities, and devise strategies to minimise or prevent significant delays; and

   ii. Ausgrid to consider rescheduling or resequencing of works around non-working periods like Christmas, public holidays, and weekends and being where not practical, ensuring the impacts from non-work periods are considered well in advance.

c) Some other primary factors affecting P50 allowances and their proposed recommendations as follows:



d) Lastly, a full rerun of the QSRA is recommended at regular intervals throughout the life of the project, particularly following the transition into project delivery or other significant changes to the project scope of delivery timeframes.

# 2 Project Overview

## 2.1 The Project

The Hunter Central-Coast (HCC) Renewable Energy Zone (REZ) is broken into four packages which include secondary systems upgrade works, construction of new substations and transmission lines and is currently in the early planning stages.

The REZ will be located in the Hunter and Central Coast regions covering the lands of the Awabakal, Bahtabah, Biraban, Darkinjung, Mindaribba, Wanaruah and Worimi people.

The Hunter and Central Coast regions have unique features which make them ideal locations for a REZ. These regions have excellent renewable energy resources and can utilise existing power stations, rehabilitated mining land, electricity network infrastructure, port and transport infrastructure and a skilled workforce. Some of the specific site locations are shown in Figure 1.


*Figure 1 - Indicative map of the Hunter Central Coast Renewable Energy Zone Geographical Area/Overview.*

The project aims to:

a) Provide the Hunter-Central Coast REZ regions to have a key role in a renewable energy future;

b) Powering existing industries; and

c) Supporting economic growth, including emerging technology in green hydrogen, ammonia and metal production, offshore wind, electric vehicle fleet operators and electrification of industrial processes.

# 3 Methodology

## 3.1 Overview

In this section, TBH provides details of the methodology it has adopted in undertaking the QSRA.

TBH has adopted a "hybrid" methodology that provides the "top-down" risk factors coupled with the "top-down" first principle's technique. This approach essentially incorporates objective data inputs applied holistically rather than generalised assumptions. The method accounts for both the inherent uncertainties and contingent risks.

The inherent uncertainty, which represents the variability in the estimated duration is applied at the Work Breakdown Structure (WBS) Level 3 in general, and by exception, to certain activities, using predefined factors. The impact of the contingent risk is assessed using the first principle techniques and applied to the relative activities of the schedule.

The process is outlined below:

a) Data collection and validation includes acquiring the Base Schedule and conducting risk assessment workshops to quantify the risk register events;

b) Model simulation involves encompassing the application of inherent uncertainties, establishing the correlation matrix, and mapping the contingent risk to their respective activities; and

c) Outputs validation and verification involves scrutinising the results.

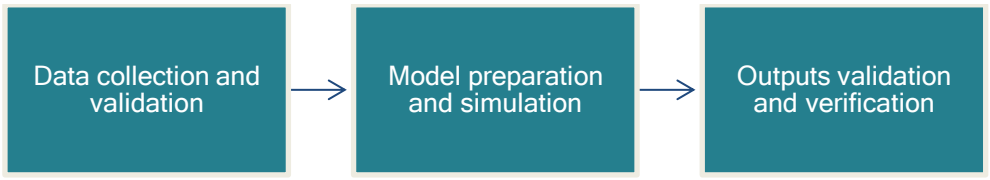



*Figure 2 - QSRA Process.*

A comprehensive approach has been undertaken, which considers the following inputs:

a) Project schedule titled "HCC Hunter Central Cost REZ (Close Out Submission)" from P6 received 12 March 2025;

b) Contingent risks – "Ausgrid's HCC Project Register post award 26Feb25" received 26 February 2025;

c) Inherent uncertainty – these reflect the inherent variability in the duration of activities in the schedule. These are discussed in more detail in **Section 3.4** below; and

d) Contingent Risks and Opportunities – These events have the potential to occur and are discussed in more detail in **Section 3.5** below.

It should be noted that the above is not an exhaustive list of the inputs with received, with some inputs receiving multiple iterations throughout the course of the analysis.

The probabilistic simulation modelling analysis yields the following outputs:

a) The project probabilistic dates of the project, P1,…, P5,……, P90,……, P99, etc.; and

b) The different factors affecting the project finish dates are ranked according to their impact on the project timeline.

Further details of the schedule risk analysis process are outlined below.

***Disclaimer***

TBH notes that it is normal industry risk practice to use absolute terms such as '0%', '100%', 'min', 'max', 'best case', 'most likely' and 'worst case'. These are descriptive terms to be used for modelling purposes only and are not to be read, e.g. 'worst case' does not mean that the actual risks cannot exceed the nominal value stated.

The results are derived from the information provided and discussed with the project team during the assessment. Any modifications to the inputs after completing the analysis are likely to influence the results, requiring a reassessment.

## 3.2 Risk Workshops

A number of risk workshops were facilitated by IAG in preparation for the QSRA which provided updated quantifications including likelihoods and estimated impacts using a 3-point estimate.

A final risk workshop facilitated by TBH with the senior project team to conclude the process and confirm a number of quantifications and related assumptions and validate the suitability of the information for input into the risk modelling software.

More detailed information including quantifications of these risks can be found in **Appendix B**.

## 3.3 Bias Considerations

TBH has considered the measures to avoid/minimise the influence of the different types of bias, such as strategic misrepresentation, anchoring bias, availability heuristic, group thinking, confirmation bias and overconfidence. This is achieved through selecting the hybrid risk assessment methodology and ensuring a progressive approach via a multilayer of assurance. This includes:

a) Carrying out an independent desktop exercise to estimate the time impact of the contingent risk profile and the ranges for the inherent uncertainty;

b) Ensuring a balanced representation of the leadership team in the room;

c) Examining the list of potential topics/ elements which often suffer from bias, e.g., internal approvals; and

d) Using the uncertainty matrix to ensure the different individuals have a common understanding of the uncertainty.

## 3.4 Inherent Uncertainty Profile

It represents the variability in the activities' durations due to the availability of information, design maturity, or assumptions. It includes the following considerations:

a) Project scope definition;

b) Project size and complexity;

c) Project estimate approach, e.g., aggressive, conservative, etc.;

d) Project status, e.g., ahead or behind Schedule; and

e) Assumptions.

The inherent uncertainty covers the following aspects:

a) Scope maturity;

b) Resource availability, quantities and norms;

c) Non-uniform construction techniques; and

d) Logic.

TBH approach to inherent uncertainty includes the following:

a) Developing the following Uncertainties Factors Matrices to standardise how the uncertainties are mapped. The Matrix was based on the assumptions, quantities and rates that were used when the base schedule was prepared. The Matrix provides uncertainty ranges in terms of the Best Case (BC), the Most Likely Case (ML), and the Worst Case (WC). The Matrix values regarding schedule durations are provided in **Table 2** below:

*Table 2 - Schedule Inherent Uncertainty Factors Matrix.*

| Uncertainty Factor | Best Case | Most Likely Case | Worst Case |
|---|---|---|---|
| [redacted] | [redacted] | [redacted] | [redacted] |
| [redacted] | [redacted] | [redacted] | [redacted] |
| [redacted] | [redacted] | [redacted] | [redacted] |
| [redacted] | [redacted] | [redacted] | [redacted] |
| [redacted] | [redacted] | [redacted] | [redacted] |
| [redacted] | [redacted] | [redacted] | [redacted] |
| [redacted] | [redacted] | [redacted] | [redacted] |

## 3.5 Contingent Risk Profile

Contingent risk is the potential for a negative outcome that depends on the occurrence of a certain contingency or event. This type of risk is often associated with specific scenarios or conditions and can be managed or avoided through careful planning and preparation. The considerations detailed below form the basis of the contingent risk profile.

TBH conducted the following analysis to ensure the risk register is fit for the exercise:

a) Assessing the risk register's completeness involves evaluating the extent to which the risk register includes all necessary information and details about the identified risks. This assessment typically includes reviewing the risk description, likelihood and impact, mitigation strategies, and monitoring and review processes to ensure that all relevant information has been included in the risk register. The finding includes:

   i. The risk register includes sufficient details and covers the themes applicable to the type of project, including:

      - Environmental;
      - Stakeholder Engagement;
      - Heritage Discovery;
      - Design and Studies; and
      - Etc.

b) Assessing the risk register's comprehensiveness involves evaluating the extent to which the register includes all potential risks that could affect the project. This assessment typically includes reviewing the risk categories, risk sources, and risk likelihood and impact to ensure that all relevant risks have been identified and included in the register. The findings include:

   i. The risk register is comprehensive; and

   ii. Time related risks as detailed in **Appendix B** of this Report.

c) Assessing the risk register concurrency involves evaluating the timeliness and relevance of the information included in the risk register. This assessment typically includes reviewing the risk register to ensure that it is regularly updated with the latest information and that the risks included in the register are still relevant and applicable to the current project or organisational situation. The finding includes the following:

   i. The risk register is current; and

   ii. The risk register has been updated to most current version.

d) Assessing consistency across the previous QSRAs.

The Contingent risk register has been provided in **Appendix B** of this Report.

## 3.6 Weather Model

A weather model based on the nearest BOM data points of Williamstown and Scone has been used along with a number of variations on this calendar to model the impacts of inclement weather for the purposes of this QSRA. The different calendars are recorded in greater detail in **Section 3.6**;

The weather model provides a range of percentages of lost time due to weather to allow for this variability and also the variability in yearly rainfall based on all years of historical data (typically >30 years' data). The range is typically for the monthly percentage lost time due to weather, which can be used to calculate the number of days lost during any month.

The weather model is based on actual weather delays and includes:

a) Actual weather delays sourced from a range of projects across different locations and industries;

b) Comparisons of actual lost time data with BOM data for the nearest BOM location; and

c) A statistical model correlating actual rain and heat data with recorded delays.

Additional considerations to note in regard to this model include:

a) A certain mm of rainfall does not directly cause X days of delay. When considering actual data, the same mm of rain can fall during the day or at night and, therefore result in different delays;

b) Weather can be very localised and can, therefore differ from BOM records;

c) There are typically a range of possible delays even when considering the same BOM data; and

d) Lost time due to heat are based on historic data to predict what time of day temperatures will exceed 35 degrees and calculate the remainder of the working day as lost time.

For this particular model, BOM data from two adjacent weather monitoring station along the project route have been used. These are:

a) Williamstown; and

b) Scone.

From this base weather model a number of variations have created to model the different effects and impacts of inclement weather on the different work packages and types of work.

[redacted]

- [redacted]
- [redacted]
- [redacted]

[redacted]

- [redacted]
- [redacted]
- [redacted]

# 4 Time Contingency Results

Based on the inputs into this QSRA, TBH's findings are provided below:

*Table 3 - Overall Summary Results P50 and P90.*

| Name | Deterministic | | P 50 | | | P 90 | | |
|---|---|---|---|---|---|---|---|---|
| | Date | D | Date | D | % | Date | D | % |
| KM-1150- Project Deed (Delivery) | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| KM-1190- Distribution Works Complete | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| KM-1180- Remote End Secondary Systems Telecommunications Works Complete | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| KM-1210- Contract 3 - Underground Fibre Laying Complete | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| KM-1200- Contract 4 - Kurri STSS Augmentation Complete | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| KM-1230- Contract 1 - Transmission Line Rebuilds Complete | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| KM-1220- Rothbury STS Augmentation Complete | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| KM-1250- Remote End Secondary Systems Feeder Works Complete | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| KM-1260- Contract 2 - Greenfield Switching Stations Complete | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| KM-1270- HCC REZ - Programme Complete | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |

A detailed analysis of each of the major milestones is provided in the following sections.

## 4.1 Project Deed (Delivery)

Project Deed (Delivery), represented by the milestone of the same name with activity ID KM-1150, has the following risk exposure:

a) The deterministic schedule has the earliest finish date of [redacted]

b) The P50 schedule has a probabilistic finish date of [redacted]. The P90 schedule has a probabilistic finish date of [redacted]; and

c) The driving factors of the P50 results are below:

i. [redacted]

ii. [redacted]

## 4.2 Distribution Works Complete

Distribution Works Complete, represented by the milestone of the same name with activity ID KM-1190, has the following risk exposure:

a) The deterministic schedule has the earliest finish date of [redacted];

b) The P50 schedule has a probabilistic finish date of [redacted] which is [redacted] calendar days later than the deterministic date. The P90 schedule has a probabilistic finish date of [redacted] adding [redacted] calendar days as a contingency; and

c) The driving factors of the P50 results are below:

i. [redacted]

ii. [redacted]

iii. [redacted]

## 4.3 Remote End Secondary Systems Telecommunications Works Complete

Remote End Secondary Systems Telecommunications Works Complete, represented by the milestone of the same name with activity ID KM-1180, has the following risk exposure:

a) The deterministic schedule has the earliest finish date of [redacted], [redacted];

b) The P50 schedule has a probabilistic finish date of [redacted], which is [redacted] calendar days later than the deterministic date. The P90 schedule has a probabilistic finish date of [redacted], adding [redacted] calendar days as a contingency; and

c) The driving factors of the P50 results are below:

[redacted]

[redacted]

[redacted]

## 4.4 Contract 3 – Underground Fibre Laying Complete

Contract 3 – Underground Fibre Laying Complete, represented by the milestone of the same name with activity ID KM-1210, has the following risk exposure:

a) The deterministic schedule has the earliest finish date of [redacted] which has a low probability of being met;

b) The P50 schedule has a probabilistic finish date of [redacted], which is [redacted] calendar days later than the deterministic date. The P90 schedule has a probabilistic finish date of [redacted] adding [redacted] calendar days as a contingency; and

c) The driving factors of the P50 results are below:

[redacted]

## 4.5 Contract 4 – Kurri STSS Augmentation Complete

Contract 4 – Kurri STSS Augmentation Complete, represented by the milestone of the same name with activity ID KM-1200, has the following risk exposure:

a) The deterministic schedule has the earliest finish date of [redacted];

b) The P50 schedule has a probabilistic finish date of [redacted]. The P90 schedule has a probabilistic finish date of [redacted]

c) The driving factors of the P50 results are below:

[redacted]

[redacted]

## 4.6 Contract 1 – Transmission Line Rebuilds Complete

Contract 1 – Transmission Line Rebuilds Complete, represented by the milestone of the same name with activity ID KM-1230, has the following risk exposure:

a) The deterministic schedule has the earliest finish date of [redacted];

b) The P50 schedule has a probabilistic finish date of [redacted], which is [redacted] calendar days later than the deterministic date. The P90 schedule has a probabilistic finish date of [redacted], adding [redacted] calendar days as a contingency; and

c) The driving factors of the P50 results are below:

[redacted]

d) Additional commentary:

i. Negative values for inherent uncertainty represent potential time savings against the deterministic schedule which may indicate conservative deterministic durations.

## 4.7 Rothbury STS Augmentation Complete

Rothbury STS Augmentation Complete, represented by the milestone of the same name with activity ID KM-1220, has the following risk exposure:

a) The deterministic schedule has the earliest finish date of [redacted], which has a low probability of being met;

b) The P50 schedule has a probabilistic finish date of [redacted], which is [redacted] calendar days later than the deterministic date. The P90 schedule has a probabilistic finish date of [redacted], adding [redacted] calendar days as a contingency; and

c) The driving factors of the P50 results are below:

- [redacted]
- [redacted]
- [redacted]
- [redacted]

d) Additional commentary:

   i. Negative values for inherent uncertainty represent potential time savings against the deterministic schedule which may indicate conservative deterministic durations; and

   ii. Delays to completion of pre-requisite transmission lines works impact the final cutover and commissioning stages of related substation works which is why weather impacts from transmission line works are impacting this milestone.

## 4.8 Remote End Secondary Systems Feeder Works Complete

Remote End Secondary Systems Feeder Works Complete, represented by the milestone of the same name with activity ID KM-1250, has the following risk exposure:

a) The deterministic schedule has the earliest finish date of [redacted]

b) The P50 schedule has a probabilistic finish date of [redacted] The P90 schedule has a probabilistic finish date of [redacted] calendar days as a contingency; and

c) The driving factors of the P50 results are below:

- [redacted]
- [redacted]
- [redacted]
- [redacted]

d) Additional commentary:

   i. Negative values for inherent uncertainty represent potential time savings against the deterministic schedule which may indicate conservative deterministic durations; and

ii. Delays to completion of pre-requisite transmission lines works impact the final cutover and commissioning stages of related substation works which is why weather impacts from transmission line works are impacting this milestone.

## 4.9 Contract 2 – Greenfield Switching Stations Complete

Contract 2 – Greenfield Switching Stations Complete, represented by the milestone of the same name with activity ID KM-1260, has the following risk exposure:

a) The deterministic schedule has the earliest finish date of [redacted], [redacted]

b) The P50 schedule has a probabilistic finish date of [redacted], which is [redacted] calendar days later than the deterministic date. The P90 schedule has a probabilistic finish date of [redacted], adding [redacted] calendar days as a contingency; and

c) The driving factors of the P50 results are below:

- [redacted]
- [redacted]
- [redacted]
- [redacted]

d) Additional commentary:

i. Negative values for inherent uncertainty represent potential time savings against the deterministic schedule which may indicate conservative deterministic durations; and

ii. Delays to completion of pre-requisite transmission lines works impact the final cutover and commissioning stages of related substation works which is why weather impacts from transmission line works are impacting this milestone.

## 4.10 HCC REZ - Programme Complete

HCC REZ – Programme Complete, represented by the milestone of the same name with activity ID KM-1270, has the following risk exposure:

a) The deterministic schedule has the earliest finish date of [redacted]

b) The P50 schedule has a probabilistic finish date of [redacted] which is [redacted] calendar days later than the deterministic date. The P90 schedule has a probabilistic finish date of [redacted] adding [redacted] calendar days as a contingency; and

c) The driving factors of the P50 results are below:

- [redacted]
- [redacted]
- [redacted]
- [redacted]

d) Additional commentary:

   i. Negative values for inherent uncertainty represent potential time savings against the deterministic schedule which may indicate conservative deterministic durations.

# 5 Summary and Recommendations

The assessment has provided P50 and P90 values for schedule and cost that are determined to be reasonable and achievable.

Adoption of the probabilistic P50 time contingency allowances produced from the exercise is recommended to help with successfully navigating the AER funding approval process and ensure adequate contingency to mitigate risks such as interface challenges, first-time delivery of a project of this nature and scope and managing relationships with EnergyCo and other stakeholders.

Given that the contractor's schedules incorporate contingency based on the project team's past experiences, these results are deemed feasible, provided that robust measures are implemented to ensure adherence to the delivery timeline and to manage the built-in/invisible contingency effectively.

Additionally, the following recommendations should be considered:

a) Including the P50 and P90 contingencies should be incorporated into the schedule as discrete contingency bars and not built into activity durations as this will allow greater visibility project progress and management of contingency drawdown as well as identification of the causes;

b) Confirming the assumptions made by TBH regarding the qualification and quantification of adjustments made to the inherent uncertainty profile is required to validate the results of this report. Key assumptions regarding inherent uncertainties are included in **Appendix E**;

c) Confirming the assumptions and uncertainties made as part of this assessment, specifically around the quantification and inclusion/exclusion of contingent risks made by the project team;

d) The primary factors affecting P50 allowances and their proposed recommendations are per the following:

[redacted]

f) Lastly, a full rerun of the QSRA is recommended at regular intervals throughout the life of the project, particularly following the transition into project delivery or other significant changes to the project scope of delivery timeframes.

In addition to the above the following general recommendations should also be considered:

a) Reviewing of respective activity paths leading to key milestones may be beneficial;

b) Establishing a robust contingency monitoring protocol, with governance and early warning notice to ensure the project remains on track to meet commitments to key milestone completion dates;

c) Engaging early with the New South Wales (NSW) authorities is recommended to identify and address any specific requirements or regulatory aspects that may impact the project. By initiating discussions with the relevant authorities at an early stage, potential delays or complications can be proactively addressed, leading to a smoother project execution;

d) Engaging early with the suppliers of LLE to confirm required inputs and minimise potential delays; and

e) Investigating alternate secondary supply chains to spread and mitigate the risk of a potential impact to a primary supply chain.

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# TBH Report

## *Appendix A*
### *Inherent Time*

16 May 2025

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# TBH Report

## *Appendix B*
### *Contingent Risks*

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# TBH Report

## *Appendix C*
### *Benchmarking*

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# Appendix C
## Benchmarking

| Project Phase | Type of Estimate | P50 Ranges | P90 Range |
|---|---|---|---|
| Initial & Strategic Assessment | Preliminary Business case | 20-40% | 30-70% |
| Concept | Full Business Case | 10-15% | 25-40% |
| Delivery Readiness | Pre-Tender | 5-15% | 10-20% |
| Delivery | Construction | 1-5% | 6-10% |

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# TBH Report

## *Appendix D*
### *Technical Report*

16 May 2025

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2026-31 HCC RNI Project

# TBH Report

## *Appendix E*

### *Assumption and Change Register*

16 May 2025

# HCC REZ QSRA Assumptions/Change Register

17/06/2024

| Assumptions | | |
|---|---|---|
| Inherent Uncertainty | Action | Previous |
| The initial realistic uncertainty factor used in the workshop was later adjusted to a more suitable range to reflect the view from the project team that activities with "realistic" durations should have the possibility of completing in less time. | BC 85%<br>ML 100%<br>WC 125% | BC 100%<br>ML 105%<br>WC 120% |
| An additional uncertainty factor named '3.1 Realistic 2 – Contractor has been applied to construction works for Contract 1 - "Transmission Line Works" and Contract 2 - "Greenfield Switching Stations".<br><br>This is due to there being no contingency or inclement weather allowances present within the contractor's programs and it has be assumed that these allowances have been built into activity durations resulting in the contractor's programs being considered to be conservative. | BC 75%<br>ML 90%<br>WC 105% | BC 85%<br>ML 100%<br>WC 125% |
| The uncertainty factor for WBS 'Land & property Acquisition.', Contract 1, 2 and 3, have been reduced to a conservative rating.<br><br>It has been assumed that the compulsory acquisition timeframes allowed for are a conservative timeline and represent the worst case circumstances. | Changed to conservative rating<br>BC 70%<br>ML 100%<br>WC 125% | Realistic rating |
| Contract 3 - We have assumed a larger uncertainty range for Contract 3 - "Underground Fibre Laying" works due to Ausgrid's relative inexperience in fibre works. | BC 85%<br>ML 100%<br>WC 125% | BC 100%<br>ML 105%<br>WC 120% |
| The inherent uncertainty range for Rothbury STS civil works has been changed to conservative. This is due to the Rothbury STS schedule having been based on the schedule for the Kurri Kurri STSS. However the scope of works at Rothbury STS is smaller and less complex in addition to Ausgrid having extensive experience in delivering works of a similar scope. | BC 50%<br>ML 100%<br>WC 115% | BC 100%<br>ML 105%<br>WC 120% |
| For Remote End Secondary Systems - Feeder Works it was understood from feedback from the project team that the initial 4 week duration for the feeder upgrades was a conservative estimate. To reflect this the ML duration was reduced to 3 weeks and the WC duration reduced to 4 weeks. These changes in durations were then converted to percentages. | BC 95%<br>ML 100%<br>WC 105% | BC 100%<br>ML 105%<br>WC 120% |
| For" Distribution Works (Early Works) - Procurement" the uncertainty range was reduced to reflect a more realistic distribution based on feedback from the project team. | BC 90%<br>ML 100%<br>WC 130% | BC 100%<br>ML 105%<br>WC 120% |

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# Appendix C
## Risk Register

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Ausgrid

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# Appendix D

## Schedule Risk Analysis Time inputs

Ausgrid

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