ACIL ALLEN

# Verification and assurance of Inland Rail scope, design, delivery and cost

## Final report

20 November 2025

## About ACIL Allen

ACIL Allen is a leading independent economics, policy and strategy advisory firm, dedicated to helping clients solve complex issues.

Our purpose is to help clients make informed decisions about complex economic and public policy issues.

Our vision is to be Australia's most trusted economics, policy and strategy advisory firm. We are committed and passionate about providing rigorous independent advice that contributes to a better world.


## Acknowledgements

ACIL Allen would like to thank the following organisations for their assistance in this verification:

— Department of Infrastructure, Transport, Regional Development, Communications, Sport and the Arts

— Inland Rail Pty Ltd

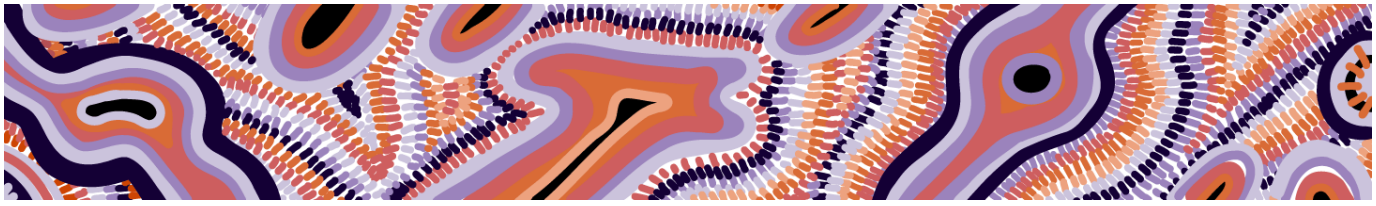
— Australian Rail Track Corporation


## Report to:

### Department of Infrastructure, Transport, Regional Development, Communications, Sport and the Arts



ACIL Allen acknowledges Aboriginal and Torres Strait Islander peoples as the Traditional Custodians of the land and its waters. We pay our respects to Elders, past and present, and to the youth, for the future. We extend this to all Aboriginal and Torres Strait Islander peoples reading this report.



Group, by Jarni McGuire

# Glossary

| Abbreviations | Definitions |
|---|---|
| A2I | Albury to Illabo |
| A2P | Albury to Parkes |
| APW | Approved Project Works |
| ARTC | Australian Rail Track Corporation |
| B2A | Beveridge to Albury |
| B2A T1 | Beveridge to Albury, Tranche 1 |
| B2A T2 | Beveridge to Albury, Tranche 2 |
| B2G | Border to Gowrie |
| B2P | Beveridge to Parkes |
| bcm | Bulk cubic metres |
| BITRE | Bureau of Infrastructure and Transport Research Economics |
| BoE | Basis of Estimate |
| BoQ | Bill of Quantities |
| BoS | Basis of Schedule |
| C2K | Calvert to Kagaru |
| CoA | Conditions of Approval |
| D&C | Design and construct |
| Data Pack | The set of documents that was provided to us for this verification and assurance. |
| Department | Department of Infrastructure, Transport, Regional Development, Communications, Sport and the Arts |
| DJC | Direct job costs |
| DPHI | Department of Planning, Housing and Infrastructure (New South Wales) |
| DTP | Department of Transport and Planning (Victoria) |
| EAC | Estimate at completion |
| EIS | Environmental Impact Statement |
| EPBC | Environment Protection and Biodiversity Conservation Act |
| ETC | Estimate to completion |
| FTE | Full time equivalents |
| G2H | Gowrie to Helidon |
| G2K | Gowrie to Kagaru |
| GJL | Goobang Junction Link |
| H2C | Helidon to Calvert |
| I2S | Illabo to Stockinbingal |
| IJC | Indirect job costs |
| IRP | Inland Rail Project |
| IRPL | Inland Rail Pty Ltd |
| IRSOW | Inland Rail scope of work |
| ITC | Incentivised Target Cost |
| K2ARB | Kagaru to Acacia Ridge and Bromelton |

| Abbreviations | Definitions |
|---|---|
| MCA | Multi-Criteria Analysis |
| N2G | Narromine to Gowrie |
| N2K | Narromine to Kagaru |
| N2N | Narromine to Narrabri |
| N2NS | Narrabri to North Star |
| NDRG | Network Design Review Group |
| Northern sections | The seven Sections between Narromine in New South Wales and Kagaru in Queensland |
| North Projects | A consultancy providing cost estimation services to IRPL |
| NS2B | North Star to NSW/QLD Border |
| OCG | Office of the Coordinator General (Queensland) |
| P2N | Parkes to Narromine |
| PDA | Project Development Agreement |
| PIAR | Preferred Infrastructure Amendment Report – reflects the impacts of specific flood modelling and hydrological conditions which must be satisfied and hence impact the drainage and bridge spans |
| Primary approvals | State based EIS and Commonwealth EPBC approvals |
| PPP | Public private partnership |
| Section | Each of the 12 Sections making up the Inland Rail Project |
| QR | Queensland Rail |
| RDSO | Ready for double-stacked operations |
| S2P | Stockinbingal to Parkes |
| Schott Report | Schott, K. (2023) The Delivery of Inland Rail: An Independent Review. January 2023 |
| Secondary approvals | Other approvals required following receipt of Primary approvals |
| IRSO | Inland Rail Service Offering - as set out in the Inland Rail – Project Development Agreement between the Commonwealth, ARTC and IRPL |
| SME | Subject Matter Expert |
| Southern sections | The four Sections between Beveridge in Victoria and Parkes in New South Wales |
| T2B | Tottenham to Beveridge |
| TAL | Tonne axle load |
| TOTC | Total out-turn cost |
| TOTC model | The total out-turn cost model provided by IRPL |
| VSRD | Victoria State Requirements Document |
| Work package | Each of the identified Work packages within the 12 IRP Sections |

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# 1 Introduction

*This section outlines the background and context, and the scope for our verification and assurance work.*

In late 2024, the Department of Infrastructure, Transport, Regional Development, Communications, Sport and the Arts (the Department) engaged ACIL Allen to undertake an independent verification and assurance of the Inland Rail Project (IRP) scope, design, delivery schedule and cost estimation processes.

Freight transport serves a critical underpinning function in the Australian production structure and economy, supporting industries by moving bulk export commodities, raw materials, semi-processed materials, and finished products. Effective and efficient freight transport requires extensive infrastructure that is fit -for -purpose and appropriately planned.

Rail freight is a significant proportion of the total domestic freight task, accounting for 433.2 billion tonne-kilometres of freight movement (56.4%) in 2020. However, according to forecasts by the Bureau of Infrastructure and Transport Research Economics (BITRE), Australia is close to a peak in rail freight transport, with an expected plateau of further growth and a predicted increase in road transport.

Demand for freight transport in the Melbourne to Brisbane corridor is expected to grow significantly over the coming decades, requiring additional capacity in the freight corridor. The existing rail link via Sydney is slow, faces capacity constraints, and does not meet the requirements of the freight industry. The IRP is designed to provide additional freight capacity on this corridor, which aligns with the freight industry's required transit times and reliability.

The IRP commenced in 2018 following the preparation of the 2015 Inland Rail business case. Some Sections of track for the Inland Rail route are existing railway lines, so the construction is a combination of building new Sections of track and upgrading some Sections of existing track.

The IRP is being developed and built by Inland Rail Pty Ltd (IRPL). IRPL was established as a wholly owned subsidiary of the Australian Rail Track Corporation (ARTC) and from 1 May 2024 is formally responsible for delivery of the IRP. The establishment of IRPL aligns with the Australian Government's response in April 2023 to the Independent Review of Inland Rail conducted by Dr Kerry Schott AO.

In March 2025, IRPL provided an updated schedule and cost estimate for the IRP in response to a request from the Commonwealth. The updated schedule and cost estimate are current as of December 2024. The update covers two scenarios (Target and Stretch). The Stretch scenario assumes shorter times for development, gaining approvals, establishing tender processes and executing contracts to build the Sections between Narromine and Kagaru. Otherwise, the construction and commissioning durations of the two scenarios are the same. As the Stretch scenario occurs more quickly, it has a lower Total Out-turn Cost (TOTC) as IRPL's operating period is shorter and there is less escalation. In this report, our assessment focuses on the Target scenario.

## 1.1 Context

Construction of IRP is divided into twelve (12) Sections and the proposed Goobang Junction Link (GJL), from Beveridge, Victoria to Kagaru, Queensland.[1] Several Sections are further separated into manageable Work packages. The earlier proposed Tottenham to Beveridge (T2B), and Kagaru to Acacia Ridge and Bromelton (K2ARB) are no longer included in the IRP.

The current Approved Project Works (APW) provide IRPL funding to complete the four Sections between Beveridge and Parkes (B2P or Southern sections), with a target date to be ready for commencement of double-stacked operations from December 2027. Parkes to Narromine (P2N) and the Narrabri to North Star (N2NS) Phase 1 Work package have been completed. The current APW also provides IRPL funding to secure the necessary environmental planning approvals between Narromine and Kagaru (N2K or Northern sections) by December 2027, with earlier dates for some Sections and to secure land by June 2028, with earlier dates for some Sections. No funding has been provided for the proposed GJL.

Most of the work on the Southern sections involves upgrading existing and operating railway lines. A new track (39 km) will be constructed between Illabo to Stockinbingal (I2S) in New South Wales. The upgrades are primarily improving clearances on existing tracks to support double-stacked trains (includes track slews and lowering, replacement and enhancement of bridges, underpasses and overpasses, moving utilities and signalling structures, and upgrading level crossings). The new line between I2S bypasses the existing winding track at the Bethungra Spiral.

The Sections still to be constructed north of Narromine are predominantly greenfield developments involving the construction of new track, apart from part of the line between North Star to Border (NS2B) and some parts between the Border to Gowrie (B2G) west of Toowoomba, where new track to the Inland Rail Service Offering (IRSO) standard will be constructed within an existing rail corridor. The Queensland Sections will be dual-gauge track (standard and narrow), apart from the 7 km track connecting the NS2B Section to the Queensland Rail (QR) South Western system. Several Sections have been subdivided into smaller Work packages to enable the delivery of the Northern sections and to open/increase market access for contractors to tender for and construct the IRP.

The schedule and cost estimates developed by IRPL include provisions for the works needed to enable 1,800 metre double-stacked trains to travel between Stockinbingal to Parkes (S2P) and the main East-West line at Parkes, and between the S2P and P2N of the IRP (including the proposed GJL).

The Inland Rail alignment map is provided in Figure 1.1 below.

[1] The report uses the same acronyms to refer to each Section, as is used by IRPL. The three letter acronym for each Section is denoted by the first letter of the starting location, a middle character "2" and the first letter of the ending location. For example, the acronym for the Beveridge to Albury Section is B2A. A complete list Section acronyms are included in the Glossary. A similar approach has been used in the report to refer to multiple Sections, e.g., Gowrie to Kagaru (G2K).

`Figure 1.1 Inland Rail alignment map


*Source: Inland Rail Pty Ltd*

## 1.2 IRPL updated delivery schedule and cost estimates

As noted above, in March 2025, IRPL provided updated schedules and cost estimates for the IRP in response to a request from the Department. The updated schedules and cost estimates are current as of December 2024. The update covers two scenarios (Target and Stretch), and for each scenario includes:

- scheduling for all activities to complete the IRP between Beveridge in Victoria and Kagaru in Queensland
- a cost estimate for all activities to complete the IRP (including activities required to deliver the proposed Goobang Junction Link)
- a risk assessment and contingency estimate for each package to be delivered
- an estimate of costs covering escalation based on the scheduled timing of each Work package and the IRP as a whole
- a maturity assessment for each of the Work packages.

The core assumptions behind the IRP schedule and cost estimates are:

- commencement of the respective delivery schedules from 30 June 2025
- unconstrained funding (quantum and timing) by 30 June 2025, including the current APW.

Other key assumptions in the development of the schedule and cost estimates are:

- IRPL's capacity to manage and deliver multiple Work packages concurrently
- market capacity to supply the required labour and materials
- supply chain capacity to handle and store materials.

Schedule and cost estimates for Gowrie to Kagaru (G2K) were developed from the preferred Public Private Partnership (PPP) bid by Regionerate Rail, provided in 2022. IRPL updated the preferred PPP bid budget for escalation and contingency.

The Stretch and Target scenarios were developed using the same methodology. The difference between the two scenarios lies in the time allocated for each Work package to achieve the release of the Request for Tender (RFT) milestones. The activities scheduled beyond the release of the RFT are the same for both scenarios. As the Target scenario is later, it involves more Client costs for IRP delivery and higher contingency and escalation. Table 1.1 below highlights the differences between the two scenarios.

Table 1.1 Key differences between the Stretch and Target scenario schedules

| IRP Aspect | Stretch scenario | Target scenario |
|---|---|---|
| Timing of IRP commencement | Notionally, 2 major RFTs are released every 3 months. | Notionally, 2 major RFTs are released every 6 months. |
| Mobilisation | Immediate mobilisation of the client team for G2K. | 12-month period for mobilisation of the client team and Environmental Impact Statement (EIS) update for Gowrie to Kagaru. |
| NSW environmental approval conditions | Biodiversity Offsets acquittal is not a condition precedent for construction in NSW. | Biodiversity Offsets acquittal is a condition precedent for construction in NSW. |
| Estimated Total Cost of IRP | Estimate at Completion (P90) = $44.7 billion. | A higher Estimate at Completion (P90) = $45.6 billion, which includes additional costs:<br>– $90.6 million in IRP Delivery Client costs<br>– $43.7 million in contingency (P90)<br>– $715.2 million in escalation. |
| Estimated completion | Construction finished by December 2034.<br>Completions finalised by June 2035. | Construction finished by November 2035.<br>Completions finalised by May 2036. |

*Source: Inland Rail Pty Ltd*

ACIL Allen notes that the core assumptions have not been met, and the schedule and cost estimation provided by IRPL are now subject to change. This is likely to result in an increase in the estimated cost due to the prolongation of the delivery of the IRP and resulting escalation, with consequential impacts (delay) to the forecast IRP completion dates.

Throughout this report, our assessment has focused on the Target scenario. A summary of the update by Section/Work package[2] for the Target scenario is provided in Table 1.2 below. An assessment of the complexity of each Work package has been included. The complexity was independently assessed by ACIL Allen using Multi-Criteria Analysis (MCA). Details of the MCA are included in Appendix A.

[2] Throughout the report, IRP refers to the full Inland Rail Project, Section refers to the 12 sections (B2A, A2I, etc.) and Work package refers to the one or more packages of work making up each project section.

Table 1.2 IRP Work package summary – Target scenario (based on a full IRP commencement date of 30 June 2025)

| Section | Work package | Nature of works | Status | Estimated completion date | Estimate at completion (EAC) ($million) | Contingency as % of EAC (P90) | Maturity | Complexity |
|---|---|---|---|---|---|---|---|---|
| T2B | | Preliminary works | No longer included in IRP scope | N/A | 7 | N/A | N/A | N/A |
| B2A | Tranche 1 | Existing track – enhancements to support Double-Stacked Operations | In Completion | September 2025 | 478 | 20.0% | Class 1* | Not Rated |
| | Tranche 2 | Existing track – enhancements to support Double-Stacked Operations | In Construction | June 2027 | [redacted] | [redacted] | Class 2* | Not Rated |
| A2I | | Existing track – enhancements to support Double-Stacked Operations | In Construction | December 2027 | [redacted] | [redacted] | Class 2* | Not Rated |
| I2S | | New standard gauge track | Contract awarded<br>Detailed design and secondary approvals are underway | December 2027 | [redacted] | [redacted] | Class 2* | High |
| S2P | | Existing track – enhancements to support Double-Stacked Operations | In Construction | December 2026 | [redacted] | [redacted] | Class 1* | Not Rated |
| Proposed GJL | | Connection between S2P and P2N to support IRSO | Scoping | August 2032 | 618 | 32.7% | Class 5 | Not Rated |
| P2N | | Existing track (brownfields) – upgrade to support Double-Stacked Operations | Operational | Completed | 715 | 0.0% | N/A | Low |
| N2N | S1 | New standard gauge track | Primary approvals achieved<br>Preliminary design underway | April 2032 | 2,820 | 27.1% | Class 3 | Moderate |
| | S2 | New standard gauge track | Primary approvals achieved<br>Preliminary design underway | August 2032 | 3,134 | 26.2% | Class 3 | High |
| | S3 | New standard gauge track | Primary approvals achieved<br>Reference design underway | November 2032 | 2,409 | 25.9% | Class 3 | Moderate |
| | S4 | New standard gauge track | Primary approvals achieved<br>Reference design underway | November 2031 | 1,481 | 26.0% | Class 3 | Low |
| N2NS | SP1 | Existing track (brownfields) – upgrade to support Double-Stacked Operations | Operational/Completion | June 2026 | 1,434 | 3.8% | N/A | High |
| | SP1 NHO | Newell Highway Overpass | Reference design underway | March 2031 | 351 | 32.6% | Class 4 | Not Rated |
| | SP1 (Moree 2C Only) | New standard gauge track | Primary approvals achieved<br>Preliminary design underway | July 2030 | 145 | 34.8% | Class 4 | Moderate |

| Section | Work package | Nature of works | Status | Estimated completion date | Estimate at completion (EAC) ($million) | Contingency as % of EAC (P90) | Maturity | Complexity |
|---|---|---|---|---|---|---|---|---|
| | SP2 C1 | Existing track (brownfields) – upgrade to support Double-Stacked Operations | Awaiting primary approvals Preliminary design underway | April 2031 | 938 | 29.7% | Class 4 | Moderate |
| North Star to Border | C2 | Upgrade non-operational rail corridor | Primary approvals achieved. Market readiness underway | January 2031 | 1,978 | 27.0% | Class 3 | Moderate |
| | C3 | New standard gauge track | Primary approvals achieved. Market readiness underway | September 2033 | | | Class 3 | Moderate |
| Border to Gowrie | C4 | New standard gauge track | Awaiting Primary approvals Pre-tender design underway | August 2033 | 1,679 | 27.0% | Class 4 | Low |
| | N4 | Brownfield dual gauge track (Standard and narrow Gauge) | | April 2034 | 1,974 | 35.3% | Class 4 | Low |
| | N1 | Brownfield dual gauge track (Standard and narrow Gauge) | | April 2034 | 2,248 | 27.0% | Class 4 | Moderate |
| | N2 | New dual gauge track (Standard and narrow Gauge) | | December 2033 | 2,256 | 32.2% | Class 4 | Low |
| | N3 | Brownfield dual gauge track (Standard and narrow Gauge) | | November 2033 | 2,092 | 32.3% | Class 4 | Low |
| Gowrie to Kagaru | Gowrie to Helidon | New dual gauge track and tunnelling (Standard and narrow Gauge) | Additional information being prepared for Primary approvals | May 2035 | 14,679 | 23.2% | Class 4* | Very High |
| | Helidon to Calver | | | November 2035 | | | Class 4* | Very High |
| | Calvert to Kagaru | | | May 2036 | | | Class 4* | Very High |
| MDC | | Material Distribution Centres | Preliminary or Reference design | | 754 | 35.7% | Class 3 | Not Rated |
| IRP Total | | | | | 45,586 | 24.9% | | |

** ACIL Allen assessment*

*Notes:* Contingency as % of Estmate at Completion (EAC) is calculated before escalation.
The individual Work package costs do not sum to the total because of rounding.
Maturity Classes are IRPL's self-assessment, except as estimated by ACIL Allen.
IRPL excluded the proposed GJL from the TOTC, but costing worksheets were included within the model.
ACIL Allen acknowledges that funding for the Beveridge to Parkes Sections has been approved and can be classed as approved budget rather than estimates.

*Source: IRPL and ACIL Allen*

## 1.3 This report

### Scope

In late 2024, the Department engaged ACIL Allen to undertake an independent verification and assurance of IRPL's scope, design, delivery schedule and cost estimation for the IRP. The verification and assurance work is to assist the Department in addressing Australian Government responses to Recommendations 13 and 18 of the Schott Report.[3]

Consistent with the agreed scope of work with the Department, our verification and assurance has focused on the *processes and methodologies* of IRPL in planning and delivering the IRP. Our overarching goal is to assess the processes and methodologies of IRPL to determine whether they are fit-for-purpose and consistent with industry best practice. Our assessment is undertaken holistically, assessing the IRP as a whole rather than on an aggregated Section-by-Section basis. Our verification and assurance included consideration of detailed information as part of this holistic assessment, where needed.

As part of the agreed scope, our verification and assurance work is based exclusively on:

1. The Data Pack provided by IRPL, containing:
    a) Commonwealth requirements for the IRP, including requirements to achieve the IRSO
    b) Materials setting out the scope, design, delivery schedule and cost estimations developed by IRPL for the IRP
    c) Materials setting out the ARTC updated cost estimate for the IRP
    d) Materials setting out the IRPL cost estimation methodologies.
2. Any supplementary clarifications on materials in the Data Pack
3. Any additional materials requested from IRPL.

The complete list of limitations and conditions associated with our verification and assurance are included in Appendix B.

A complete list of materials used in our verification and assurance (including documents in the Data Pack) is set out in Appendix D. Stakeholder engagement was not part of the verification and assurance work. Our verification and assurance are based exclusively on the materials stated.

Reference is made to primary and secondary approvals throughout the report:

— Primary approvals refer to EIS (or equivalent) approvals by state governments and Environment Protection and Biodiversity Conservation Act (EPBC) approvals by the Commonwealth Government.

— Secondary approvals refer to various conditions that may be imposed by the Commonwealth or state governments when giving Primary approvals and additional matters that state government statutory authorities and local councils may impose.

[3] The scope of our work covers aspects of the requirements of the Schott report, but we make no claim to having fully covered the requirements of the recommendations in that report. The scope of our work has been set by the Department.

# Report structure

Our findings are provided throughout the report and summarised in the next section **(Chapter** 2 – **Key Findings)**. To properly assess the process and methodologies of the IRPL, we have undertaken an independent assessment of the maturity of each Section of the IRP **(Chapter** 3 **- IRP maturity assessment)**. This independent maturity assessment informs our later analysis of the scope and design, delivery schedule and cost estimation by IRPL. The IRP scope and design are considered together **(Chapter** 5 **- IRP scope and design)**, due to the interactive nature of scope requirements, consequent high-level design choices, and resulting secondary requirements imposed by the design (e.g., the required approvals to implement the design). We then consider the scheduling model for the IRP and the resulting delivery schedule (**Chapter** 6 **- Schedule**), the cost estimation model for the IRP and the resulting cost estimates **(Chapter** 7 **– Cost estimation)** and the unaddressed risks in the IRP **(Chapter** 8 **- Risks)**. Additional details of our analysis are provided in the Appendices.

# 2 Key Findings

*This section summarises ACIL Allen's key findings for verifying and assuring the Inland Rail processes for developing scope, design, schedule and cost estimates.*

Consistent with the agreed scope of work with the Department, our verification and assurance has focused on the *processes and methodologies* of IRPL in planning and delivering the IRP. Our overarching goal is to assess the processes and methodologies of IRPL to determine whether they are fit-for-purpose and consistent with industry best practice. Our assessment was undertaken holistically, assessing the IRP as a whole, rather than merely on an aggregated Section-by-Section basis.

Our findings are set out in the following sections.

## 2.1 IRPL processes and methodologies

The processes and methodologies used by IRPL in developing the schedules and cost estimates for the Stretch and Target scenarios are well documented and flow logically from the IRP scope through to preliminary and then detailed design. The detailed design was then used to develop a complete set of activities by Work package.

These activities were then costed based on Bill of Quantities (BoQ) and unit rates. Allowances for risk and contingency were added for each Work package through a qualitative risk identification process followed by quantitative modelling to calculate the risk contingency. Finally, the Work Package risk models were correlated to develop a consolidated risk profile for P50 and P90, with the P90 assessment used in the final cost estimate.

The activities were assembled into a schedule using a work breakdown structure. The timing of activities in the schedule was used to develop escalation for each Work package, which was added to the costs to determine the final cost estimate.

Finding 1 Verification of IRPL processes and methodologies

The processes and methodologies used by IRPL in developing the schedules and cost estimates for the IRP flow logically from the scope through preliminary and detailed design to detailed costed and scheduled activities and include appropriately calculated allowances for risk contingency and escalation.

The processes and methodologies used by IRPL are considered fit for purpose and consistent with industry best practice.

## 2.2 IRP maturity

The maturity of cost estimates for building rail projects improves as the design and development progress, moving from conceptual and screening processes to detailed design and associated detailed unit rates and bill of quantities. ACIL Allen has provided a maturity assessment for each Section of IRP using the AACE98R-18 classification system, with Class 1 as the most mature and Class 5 as the least mature.

ACIL Allen's assessment of the maturity of the Sections between Beveridge and Kagaru is shown in Table 4.2 in section 3 below.

Finding 2 IRP maturity assessment

The Sections from Beveridge to Parkes are assessed as Class 1 or 2, as they are under contract to complete, are either in the detailed design or construction phases and have all key approvals in place. Funding has been approved for these Sections.

The Sections between Narromine to Kagaru are assessed as being less mature (Class 3 or 4). The Class 3 Sections have key approvals in place and are in the preliminary design phase. The Class 4 Sections are in various phases:

— Some have not yet received key approvals

— Some have approvals and are in the preliminary design phase.

The proposed Goobang Junction Link is assessed as Class 5, as it is based on a high-level desktop study.

## 2.3 Scope and Design

This report has focused on verifying and assuring the process for developing the IRP scope and design. The IRP scope is driven by the specifications in the IRP Development Agreement, Schedule 1, Project Scope. Review and verification of IRP-specific scope items and designs were not called to be included. The specifications were revised in 2023.

Finding 3 IRP scope

The current IRP scope is consistent with Schedule 1 of the IRP Development Agreement and is considered fit-for-purpose.

The Sections from NSW/QLD Border to Kagaru do not yet have key approvals. The majority of Sections between Narromine to the NSW/QLD Border have Primary approvals in place (Narrabri to North Star Phase 2 is at the final stage of the Primary approval process), but are likely to face pressure from New South Wales government departments, local councils and communities for additions or changes to items of scope (as has been the case for the Sections from Beveridge to Parkes).

Additional scope beyond freight requirements will potentially emerge during the approvals processes for Sections/Work packages (environmental and construction), where approvals have yet to be achieved.

IRPL has a detailed project development process, including six gated stages with design progressing through five stages from Concept Design to Detailed Design. During the Close Out and Operations Stage, documentation must be updated as built.

The Sections and Work packages across the IRP are at various design stages, from Reference Design to Detailed Design. The design for the Southern sections is mostly complete. Design for each work package making up the Northern sections ranges from Reference Design (Newell Highway overpass as part of the N2NS Phase 2 Work package) to Preliminary Design, where key approvals are in place.

IRPL has made significant provisions for design-related contingencies in the total cost estimates. This reflects contingencies for:

— environmental approvals

— community and stakeholder engagement

— interfaces with existing rail networks and operators, and other infrastructure owners

— lack of definition concerning ground conditions, geotechnical and hydrological assessments.

IRPL has not identified explicit design contingencies beyond Gowrie, as the G2K costings are based on the preferred PPP bid in 2022.

### Finding 4 IRP design

IRPL has well-documented design processes that are fit-for-purpose and consistent with industry best practice. A significant design contingency allowance for the Sections from Narromine to Gowrie has been provided. There is no explicit design contingency for the Sections from Gowrie to Kagaru.

IRPL has established a process for value engineering on yet-to-be-finalised Sections. The process involves planning and selecting whole-of-life solutions to deliver the IRP objectives. This involves the input of all parties (project owner, designers, contractors, IRPL corporate), who make use of:

— A Value Management Register

— An Innovation Register

— A Lessons Learnt Register.

IRPL has advised that value engineering was applied, where possible, to the Southern sections (these Sections were well-advanced before the changes took effect, which limited opportunities to gain from the changes).

IRPL's TOTC model and schedule show that project-level value engineering scope initiatives have been included in some Work packages between Narromine and Kagaru. Further work is required to incorporate these changes into the Work packages north of Narromine.

### Finding 5 Value engineering

IRPL has commenced the process of considering the application of value-engineering to some of the Northern sections' Work packages to incorporate scope initiatives that would allow narrower formation width, wider sleeper spacing, shallower ballast, increases to allowable gradients of 1:64 (from 1:80) and short-steep gradients, particularly to ramp up over rivers and roads.

IRPL intends to incorporate these changes into the Work packages as they progress through Preliminary Design and Detailed Design.

IRPL's latest total cost estimates suggest that the value engineering scope initiatives referred to above have been applied, where applicable, to some Sections.

## 2.4 Schedule

IRPL has provided a delivery schedule for the proposed Goobang Junction Link (GJL) between S2P and the completed P2N and Northern sections. IRPL has documented the process and methodology for developing and managing the delivery schedule. IRPL has stated that the delivery schedule phases the Design and Construct packages over time to smooth the overall IRPL and contractor resource profile.

IRPL's Prioritisation of the Work package sequence was based on:

- The Primary approvals status
- the anticipated completion of land acquisition
- the assessed level of engineering challenges to be resolved before engaging a contractor to undertake design and construction
- enhancing connectivity for the ARTC network and operational benefits for ARTC customers
- the earliest completion of N2G and N2K.

The timing of the package sequences was based on several factors, including:

- the assessed time required for IRPL to onboard the necessary personnel and service providers
- the assessed capacity of the contracting market to optimally respond to a given level of capital expenditure at a given time
- the assessed capacity of the Office of the Coordinator-General in Queensland to assess and approve the outstanding environmental and planning approvals for G2K.

The schedules for Southern sections have been developed with the entities contracted to undertake design and construction. IRPL entered into contracts for in each case after a competitive tendering process.

Finding 6 IRP schedule

IRPL has well-documented processes for developing and managing the IRP schedule, individual Sections, and Work packages. The process appears fit-for-purpose and consistent with industry best practice.

Although these processes are fit-for-purpose, the IRP schedules developed by IRPL for its scenarios as at December 2024 are based on the assumption that IRP delivery would commence from 30 June 2025. This assumption has lapsed and as such IRPL will need to update the scenarios and associated cost estimates at a future time.

## 2.5 Cost estimation

IRPL's total cost estimate was based initially on bill of quantities and unit rates. However, because of the varied maturity of each of the Sections/Work packages, different approaches were used by IRPL in developing the total cost estimate:

- Some Sections and Work packages have been completed, and the final out-turn cost is known.
- Some Sections and Work packages are under contract, and the final out-turn cost is based on contracted prices plus incurred and estimated-to-completion Client costs, contingencies and escalation.
- The proposed GJL is based on a high-level desktop study.
- Some Sections and Work packages (most between N2G) are at various design stages, and the cost estimates are based directly on bill of quantities and unit rates.
- The work to be undertaken in and around Moree as part of N2NS Phase 2 is a redesigned estimate based on an existing bill of quantities.
- G2K is based on escalating the preferred PPP bid (assumed to have included bill of quantities and unit rates) and developing a high-level contingency estimate.

IRPL's costing approach is based on five elements:

- **APW:** Costing **i**ncorporates all work up to December 2028 and is based on the approved budget, with no further estimating or review undertaken as part of IRPL's total cost estimate update.
- **Proposed GJL:** Costing for the proposed GJL is based on a high-level desktop study to establish a preferred link option.
- **Bottom-up calculation of Design and Construction costs:** Costing is based on a first principles estimate using expert estimation software standardised across the Work packages between N2G. IRPL has stated that prevailing market rates for staff, labour, plant and materials have been incorporated in the estimate. The estimates have been developed using available design information, which, in some cases, is associated with value-engineering and adjustments for flood modelling and hydrological conditions (potentially impacting drainage and bridge spans).
- **Bottom-up calculation of Inland Rail Client costs:** Costing includes estimates for Client costs associated with Project Delivery costs, Materials (incl. Delivery) costs, Design Services costs and Land and Biodiversity costs.
- **G2K:** Costing is based on the 2022 estimate (including the tender price submission) derived from the preferred PPP bid in late 2022, with recalculation of escalation, based on the revised schedule.

Contingency is included at a Work package level for the Sections between B2G. For the three Sections between G2K, IRPL applied a top-down approach as the preferred PPP bid details were unavailable.

Escalation was applied to all Northern sections, consistent with the escalation factors supplied by Oxford Economics to IRPL in August 2024.

ACIL Allen's findings concerning the cost estimation process are set out below.

Finding 7 Unit rates

ACIL Allen considers that the unit rates used by IRPL in the development of the estimate are reasonable, consistent and fit -for -purpose across the various Work packages. Where there are variations, these can largely be explained by the complexity of the respective Work packages.

### Finding 8 Contractor indirect costs

For Work packages between Narromine and Gowrie, the approach used to assign Contractor indirect costs using targets for Indirect Job Costs as a percentage of Direct Job Costs and specified allowances for Off-Site Indirects and Profit and Design costs based on design status, appears to be reasonable and fit -for - purpose for developing these costs for each Work package.

The specification of allowances for the Gowrie to Kagaru Work packages appears low for both Indirect Job Costs and Design costs when benchmarked against the approach used by IRPL for Narromine to Gowrie. Increasing these allowances to the minimum benchmark of other Work packages would add significantly to the Base cost estimate for those Work packages.

However, IRPL has stated that the Contractor cost used to develop the Gowrie to Kagaru cost estimate includes some contractor indirect costs, which are not separable from the offer amount. IRPL has stated that the allowance they have included is a provision on top of the allowance the Contractor is assumed to have already included.

### Finding 9 Client costs

IRPL's approach to estimating Client costs appears to be a reasonable process for developing these costs for each Work package.

Costs for Sections south of Narromine are based on completed Work packages or commitments under the Approved Project Works to complete Work packages that are in progress.

For the Sections between Narromine and Gowrie, estimates of Client costs are based on a bottom-up process for activities to complete the delivery of the Sections, plus Client costs associated with activities under the current Approved Project Works.

For Gowrie to Kagaru, Client costs are based on the 2022 budget estimate, updated to 2024 and escalated based on the revised schedule.

ACIL Allen considers IRPL’s approach to estimating Client costs reasonable and fit for purpose.

### Finding 10 Contingency

The process used for the Beveridge to Parkes Sections is considered fit for purpose, as they are part of the Approved Project Works and are under contract. The process used to develop the bottom-up risk assessments for Narromine to Gowrie appears reasonable and fit-for-purpose.

The contingency allowance appears low for the Gowrie to Kagaru Sections compared to the assessed maturity of these Sections. However, IRPL has stated that the preferred PPP bid used to develop the Gowrie to Kagaru cost estimates includes some contingency allowance, which is not separable from the offer amount. IRPL has stated that the allowance they have included is considered a conservative addition on top of the allowance the preferred bidder is assumed to have already included.

It is noted that IRPL is undertaking a bottom-up, discrete risk-by-risk analysis for the Gowrie to Kagaru Sections, similar to the process used for the Narromine to Gowrie Sections.

Finding 11 Escalation

IRPL applied escalation for the Approved Project Works Sections from Beveridge to Parkes as hardcoded numbers. The escalation for the three Sections between Albury and Parkes aligns with the November 2024 cost reports provided.

IRPL assigned additional escalation in the Approved Project Works to the Northern sections. The formulas assigning the escalation are hardcoded and are not supported with evidence.

For the Northern sections, the cost modelling analysis confirms IRPL used the Oxford Economics outputs, developed for IRP, as intended for the costs beyond the Approved Project Works.

The approach to escalation is considered fit-for-purpose.

## 2.6 Risk

The significant risks to the IRP are associated with one or more of the following factors:

- Delays to, or unfavourable conditions of, approval from statutory bodies, including for environmental, design, planning and construction works approvals.
- Pressure from state and local government agencies, local communities, environmental groups and private property owners to enhance or modify the scope or the design of various aspects of each Work package.
- Delays in access to parts of the alignment to undertake construction works.
- Unexpected technical matters.
- Timing for the delivery of the IRP beyond the APW.

Some of these factors will likely affect scope, design, or both and will have flow effects on the schedule and estimation of costs. Factors that directly impact the schedule will also flow to the estimation of costs through the impacts of prolongation and escalation.

Finding 12 Scope and design risk

Scope and design risks are primarily associated with gaining environmental and detailed design approvals and maintaining social licences with communities, interest groups and private property owners. Southern sections' experience provides examples of how these processes and interactions can add to or change the scope and design of parts of a Work package.

The most significant risk to scope and design is for the four Sections in Queensland, as they are still subject to Primary approval processes.

### Finding 13 Schedule risk

The main schedule risks are delays in gaining environmental and detailed design approvals. An associated risk is land acquisition, as in some cases, compulsory acquisition depends on approvals. The most significant schedule risks are expected in each Work package's Pre-Construction phase. These include:

- settling agreements with and the policy settings of key state agencies and local governments
- securing outstanding environmental and planning approvals in the New South Wales N2NS Phase 2 Work packages and all Sections in Queensland, and the possible impacts of approval conditions set by the Commonwealth and the respective state agencies
- land acquisition in all Sections in Queensland
- timing for delivery of the IRP beyond the current Approved Project Works.

Several threshold issues for Gowrie to Kagaru require resolution and may cause significant delays in completing those Sections.

### Finding 14 Cost estimation risk

IRPL developed risk and contingency measures for each Work package through a structured qualitative assessment to identify and address potential IRP risks. The most significant risks to the cost estimates are associated with:

- Delays to gaining approvals or unfavourable conditions of approval are likely to lead to changes in scope and design, and delays to schedule and will ultimately flow through to increases in cost estimates.
- Delays in accessing the alignment to undertake construction will likely cause increased mobilisation costs and other project costs as dependent activities are delayed.
- Unexpected technical matters: even with the best planning, unknown technical issues with a significant cost impact will potentially arise throughout the IRP.
- Timing and schedule for delivery of the IRP beyond the current Approved Project Works.
- Prolongation of the IRP delivery schedule.

# 3 IRPL processes and methodologies

The IRP is a complex linear infrastructure project crossing three state jurisdictions with design and construction projected to occur over a long time (earliest likely completion is 2035). Developing robust schedules and cost estimates for such an undertaking is complex and remain subject to significant risk and uncertainty because of the potential "unknowns" that may eventuate as it moves through approvals into detailed design and then construction phases. Cost estimates are also subject to additional escalation where delays or changes to the planned schedule occur.

IRPL has developed updated schedules and cost estimates for two scenarios, Stretch and Target as outlined in section 1.2 above. These scenarios are based on the key assumptions including commencement date, funding envelope, and various assumptions about the capacity of the market and supply chains to supply the required labour and materials to deliver the IRP.

The processes and methodologies used by IRPL in developing the schedules and cost estimates for the Stretch and Target scenarios are well documented and flow logically from the IRP scope through to preliminary and then detailed design. The detailed design was then used to develop a complete set of activities by Work package.

These activities were then costed based on BoQ and unit rates. Allowances for risk and contingency were added for each Work package through a qualitative risk identification process followed by quantitative modelling to calculate the risk contingency. Finally, the Work Package risk models were correlated to develop a consolidated risk profile for P50 and P90, with the P90 assessment used in the final cost estimate.

The activities were assembled into a schedule using a work breakdown structure. The timing of activities in the schedule was used to develop escalation for each Work package, which was added to the costs to determine the final cost estimate.

Finding 1 Verification of IRPL processes and methodologies

The processes and methodologies used by IRPL in developing the schedules and cost estimates for the IRP flow logically from the scope through preliminary and detailed design to detailed costed and scheduled activities and include appropriately calculated allowances for risk contingency and escalation.

The processes and methodologies used by IRPL are considered fit for purpose and consistent with industry best practice.

# 4 IRP maturity assessment

*This section provides ACIL Allen's maturity assessment for each of the 12 Sections, including the proposed GJL.*

ACIL Allen has assessed each of the twelve Sections making up the IRP. The assessment was based on the AACE98R-18 Cost Estimate Classification System. A summary of the classification system used in the assessment is provided in Table 4.1 below. More details are provided in Table C.1 in Appendix C.

Table 4.1 AACE98R-18 maturity assessment system

| Project maturity class | Maturity level of project definition deliverables | End usage | Methodology | Expected Accuracy Range |
|---|---|---|---|---|
| Class 5 | 0% to 2% of the full project definition | Concept screening | Cost/length factors, parametric models, judgment, or analogy | Low: -20% to -50%<br>High: +30% to +100% |
| Class 4 | 1% to 15% of the full project definition | Study or feasibility | Cost/length, factored or parametric models | Low: -15% to -30%<br>High: +20% to +50% |
| Class 3 | 10% to 40% of the full project definition | Budget authorisation or control | Semi-detailed unit costs with assembly-level line items | Low: -10% to -20%<br>High: +10% to +30% |
| Class 2 | 30% to 75% of the full project definition | Control or bid/tender | Detailed unit cost with forced detailed take-off | Low: -5% to -15%<br>High: +5% to +20% |
| Class 1 | 65% to 100% of the full project definition | Check estimate or bid/tender | Detailed unit cost with detailed take-off | Low: -3% to -10%<br>High: +3% to +15% |

*Note:* The AACE High band represents the typical percentage variation at an 80% confidence interval of actual costs from the cost estimate after application of appropriate contingency (typically to achieve a 50% probability of project cost overrun versus underrun) for a given scope.

*Source: AACE98R-18 Cost Estimate Classification System.*

ACIL Allen's maturity assessment of the twelve Sections is provided in Table 4.2 below. G2K was assessed as a group because the estimate is based on the preferred PPP proposal. The proposal has been escalated, and the contingency has been adjusted.

Table 4.2 IRP maturity assessment by Section and proposed GJL

| Section/ Work package | Key Deliverables and Target Status | End Usage | Methodology | Maturity Assessment | Comments |
|---|---|---|---|---|---|
| B2A | 30% to 75% of full project definition | Check estimate or bid/tender | Detailed unit cost with detailed take-off | Class 2 | B2A Tranche 1 and 2 are in construction and detailed design stages, respectively. Estimates are based on awarded delivery contracts, which were competitively procured. The P90 contingency allowance ([redacted]) appears reasonable for a Class 2 estimate. |
| A2I | 30% to 75% of full project definition | Check estimate or bid/tender | Detailed unit cost with detailed take-off | Class 2 | A2I is in the detailed design stage, with the estimate based on an awarded delivery contract that was competitively procured. The P90 contingency allowance [redacted] appears reasonable for a Class 2 estimate. |
| I2S | 30% to 75% of full project definition | Check estimate or bid/tender | Detailed unit cost with detailed take-off | Class 2 | I2S is in detailed design, with the estimate based on an awarded delivery contract, which was competitively procured. The P90 contingency allowance ([redacted] appears excessive for a Class 2 estimate. |
| S2P | 65% to 100% of full project definition | Check estimate or bid/tender | Detailed unit cost with detailed take-off | Class 1 | S2P is in construction, with the estimate based on an awarded delivery contract, which was competitively procured. The P90 contingency allowance[redacted]) appears reasonable for a Class 1 estimate. |
| Proposed GJL | 0% to 2% of the full project definition | Concept screening | Cost/length factors, parametric models, judgment, or analogy | Class 5 | IRPL has not provided a maturity estimate for GJB. The estimate was based on a high-level desktop study. The P90 contingency allowance (32.7%) appears on the low side of the expected range against the ACIL Allen maturity assessment of Class 5. |
| P2N | NA | NA | NA | NA | N/A - Construction has been completed for this Section. |
| N2N | 10% to 40% of full project definition | Budget authorisation or control | Semi-detailed unit costs with assembly-level line items | Class 3 | IRPL has self-rated their estimate for N2N as a Class 3. This seems appropriate given the design maturity and estimating methodology used. The P90 contingency allowance (25.9% – 27.1%) appears reasonable. |

| Section/ Work package | Key Deliverables and Target Status | End Usage | Methodology | Maturity Assessment | Comments |
|---|---|---|---|---|---|
| N2NS SP1 | NA | NA | NA | NA | N/A - Construction has been completed for this Work package.. |
| N2NS SP2 | 1% to 15% of full project definition | Budget authorisation or control | Semi-detailed unit costs with assembly-level line items | Class 4 | IRPL has self-rated their estimate for N2NS as a Class 4. This seems appropriate given the design maturity and estimating methodology used. The P90 contingency allowance (29.7% – 34.8%) appears reasonable. |
| NS2B | 10% to 40% of full project definition | Budget authorisation or control | Semi-detailed unit costs with assembly-level line items | Class 3 | IRPL has self-rated their estimate for NS2B as a Class 3. This seems appropriate given the design maturity and estimating methodology used. The P90 contingency allowance (27.0%) appears reasonable. |
| B2G | 1% to 15% of full project definition | Budget authorisation or control | Semi-detailed unit costs with assembly-level line items | Class 4 | IRPL has self-rated their estimate for B2G as a Class 4. This seems appropriate given the design maturity and estimating methodology used. The P90 contingency allowance (27.5% – 35.3%) appears reasonable. |
| G2K (three Sections – G2H, H2C and C2K) | 1% to 15% of full project definition | Study or feasibility | Cost/length, factored or parametric models | Class 4 | IRPL has not provided a maturity estimate for G2K. While the estimate is based on the preferred PPP bid, there are apparent solution uncertainties and limited visibility into the estimate. The P90 contingency allowance (23.2%) appears underestimated against the ACIL Allen maturity assessment of Class 4. |

Notes:

The AACE High band represents the typical percentage variation at an 80% confidence interval of actual costs from the cost estimate after application of appropriate contingency (typically to achieve a 50% probability of project cost overrun versus underrun) for a given scope. P90 contingency estimates are shown as they are used in the TOTC.

ACIL Allen acknowledges that funding for Beveridge to Parkes has been approved and can be classed as approved budget rather than estimates.

N2NS SP1 is Phase 1 of the N2NS Section and has been completed. N2NS Phase 2 is yet to be completed and includes new track through the town of Moree (SP1 2C), an upgrade and renewal of existing ARTC track across the Gwydir Floodplain (SP2 C1) and a significant realignment of the Newell Highway (SP1 NHO).

*Source: AACE98R-18 and ACIL Allen*

# Discussion

The four Sections between Beveridge and Parkes are assessed as having either a Class 1 or Class 2 maturity assessment. These Sections are under contract following a competitive tender process. Sections that are in construction are considered Class 1, and those in detailed design are considered Class 2. The P90 contingency allowance for B2A, A2I and S2P appears reasonable and consistent with the assessed maturity classification. [redacted]

Construction has been completed for P2N, and it is operational. The maturity classification is not relevant for this Section.

The proposed GJL estimate was developed based on a high-level desktop study[4] for the preferred bypass option, Option 1A. IRPL was required to provide a proposed alignment and cost estimate for the bypass for indicative costing purposes and to gain approval to proceed to a more detailed options analysis. The GJL estimate has been assessed as Class 5.

N2N is in the preliminary design phase and has been assessed as Class 3. The P90 contingency allowance across the four Work packages S1 to S4 is between 25.9% and 27.1%. These allowances appear reasonable and consistent with the maturity classification.

Construction has been completed for N2NS SP1, and it is operational. The maturity classification is not relevant for this Section.

N2NS SP2 (now including SP1 NHO, SP1 2C, and SP2 C1) are in the Reference Design or Preliminary Design and have been assessed as Class 4. The P90 contingency allowance across the three Sections is between 29.7% and 34.8%. These allowances appear reasonable and consistent with the maturity classification.

NS2B has Primary approvals in place, is preparing to issue tenders, and has been assessed as Class 3. The P90 contingency allowance of 27.0% appears reasonable and consistent with the maturity classification.

B2G is in the pre-tender phase and has not yet received Primary approvals. The five Work packages (C4 and N1-N4) making up this Section have been assessed as Class 4. The P90 contingency allowances of between 27.0% and 35.3% appear reasonable and consistent with the maturity classification.

G2K comprises three Sections (G2H, H2C and C2K). The cost estimate for these Sections relies on the preferred PPP bid, which has been subject to a contingency estimate and then escalated based on the Target schedule. IRPL has stated that the preferred PPP bid was subject to a competitive bid process (three bids) and that the three bids were quite close. ACIL Allen notes the Sections have not yet received Primary approvals. Pre-tender design is underway in the first Section between Gowrie and Helidon. ACIL Allen has assessed the three Sections as Class 4. The P90 contingency allowance of 23.2% is on the low end of the range for Class 4 (+20% to +50%).

[4] 0-0000-900-PEN-00-RP-0009 Goobang Junction Bypass Options Report

Finding 2 IRP maturity assessment

The Sections from Beveridge to Parkes are assessed as Class 1 or 2, as they are under contract to complete, are either in the detailed design or construction phases and have all key approvals in place. Funding has been approved for these Sections.

The Sections between Narromine to Kagaru are assessed as being less mature (Class 3 or 4). The Class 3 Sections have key approvals in place and are in the preliminary design phase. The Class 4 Sections are in various phases:

— Some have not yet received key approvals

— Some have approvals and are in the preliminary design phase.

The proposed Goobang Junction Link is assessed as Class 5, as it is based on a high-level desktop study.

# 5 IRP scope and design

*This section provides ACIL Allen's assessment of the process for developing the scope and design.*

## 5.1 Scope and Design process review

### How is the IRP designed?

IRPL defines the design of the IRP as "translating the desired outcomes of the Project into a set of definitive artefacts", which allows for the construction of physical infrastructure to occur. IRPL documentation states that an extensive, gated design process occurs at the project level, which is aligned to the stage gates of the IRP's maturity and lifecycle (Table 5.1).

Table 5.1 IRP design stages vs other stage gates

<table>
<tr><th>IRP Stage Gate</th><th>Engineering Assurance Stage</th><th>Engineering Lifecycle Design Development Stage</th><th>Configuration Control Gate</th><th>ARTC Project Management Phase</th></tr>
<tr><td>Stage 1: Concept</td><td>1: Concept Requirement Review (CRR)</td><td>Concept Design</td><td>Configuration Control Gate 1</td><td>Phase 1 – Concept Assessment</td></tr>
<tr><td>Stage 2: Reference Design</td><td>2: Pre-feasibility Design Review (FDR)</td><td>Pre-feasibility Design</td><td>Configuration Control Gate 2</td><td rowspan="2">Phase 2 – Project Feasibility</td></tr>
<tr><td>Stage 3: Market Readiness</td><td>3: System Definition Review (SDR)</td><td>Feasibility Design</td><td rowspan="4">Configuration Control Gate 3</td></tr>
<tr><td>Stage 4A: Delivery Readiness (A) / Procurement</td><td>4: Preliminary Design Review (PDR)</td><td>Preliminary Design</td><td rowspan="2">Phase 3 – Project Assessment</td></tr>
<tr><td>Stage 4B: Delivery Readiness (B) / Detailed Design</td><td>5: Detailed Design Review (DDR)</td><td>Detailed Design</td></tr>
<tr><td rowspan="4">Stage 5: Construction & Commissioning</td><td>6: Critical Design Review (CDR)</td><td rowspan="3">Issued for Construction (IFC) Design</td><td>Configuration Control Gate 4</td><td>Phase 4 – Project Approval</td></tr>
<tr><td>7: Installation Readiness Review (IRR) – Subsystem Verification and Validation</td><td rowspan="3">Configuration Control Gate 5</td><td rowspan="2">Phase 5 – Project Implementation</td></tr>
<tr><td>8: Integration Test Readiness Review (ITRR) – System Integration, Verification, and Validation)</td></tr>
<tr><td>9: System Operational Readiness Review (SORR)</td><td rowspan="2">As-built Documentation</td><td rowspan="2">Phase 6 – Project Close Out</td></tr>
<tr><td>Stage 6: Close Out & Operations</td><td>10: System Performance Review (SPR)</td><td>Configuration Control Gate 6</td></tr>
</table>

*Source: ACIL Allen*

Sections of the alignment are designed in six steps, with a seventh step (As-built Documentation) as the statement of record of what has been built and is in situ after the construction phase.

The IRP's six design steps reflect the level of maturity of the designs, measured in terms of the contingency set aside to account for potential changes and variations as the definition and resolution of the design increases. The critical steps are reaching the final Preliminary Design (up to 50% Design Maturity) and the final Issued for Construction (IFC) Design (up to 95% Design Maturity).[5] Where Sections reach these stages,

[5] 0-0000-900-PMP-00-PL-0004_1 Engineering Design and Assurance Management Plan, p. 31.

it is expected that contingencies related to design will be progressively reduced and eliminated to reflect the level of maturity.

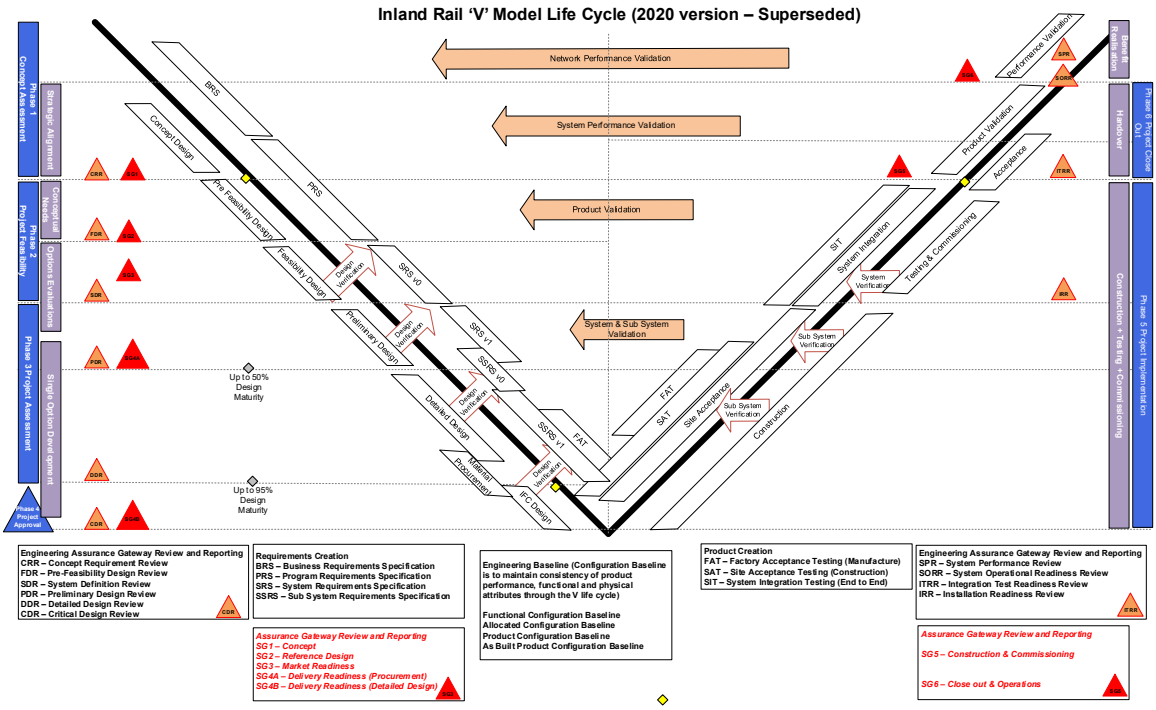
IRPL engages third-party design teams to undertake design work per its overall Program Delivery Strategy.[6] These third parties must adhere to policies and procedures established by IRPL, with IRPL maintaining overall oversight around contractor management, governance, assurance and integration of outputs. Design packages are contracted and required to be delivered to an agreed schedule, which is managed by the appointed lead contractor of each Section. This approach is considered fit-for-purpose.

As designs progress, IRPL operates an engineering assurance process based on ten steps (as outlined in the second column of Table 5.1). The assurance process is deliberately designed to progressively drill down to matters of detail concerning designs, aligned to the Design Development Stages. These are stage-gate style processes, where accountability for allowing a Section to proceed beyond a particular gate is assigned to the relevant project team (the IRPL Project Director is assigned as the accountable party).

These items come together in the "Inland Rail 'V' Model Life Cycle (Figure 5.1). As implied by the figure, Sections/Work packages reach 95% Design Maturity at the trough of the V, where the following occurs/has occurred:

— A single option has been selected for the Section/Work package alignment and is in development
— The Detailed Design Review (DDR) gate is cleared in the Engineering Assurance framework
— The Section/Work package reaches Phase 4 of the ARTC Project Management framework (Project Approval)
— Material procurement activities are underway or completed.

Figure 5.1 IRP 'V' model life cycle




*Source: IRPL*

This process should ensure all critical design artefacts and materials are progressed to a level where design risk can be managed within the bounds of a typical construction contract.

[6] IRPL uses Program Delivery Strategy in the various Project Management Plans provided in the Data Pack – we have retained the terminology to maintain consistency with the IRPL documentation.

### Role and impacts of design review processes and Primary approvals

IRP Sections are submitted for environmental approval to the required Commonwealth and State approval agencies at the Concept Design stage. This is because this level of design is sufficient to provide information to agencies to inform them of the critical features of a rail alignment and the associated infrastructure as follows:

- The location of infrastructure, including the identification of built and natural environment impacts.
- The location and type (concept) of supporting infrastructure such as bridges, culverts and tunnels.
- The need for temporary supporting infrastructure, such as quarries, work camps, and laydown areas.

Design work continues to progress during the environmental approvals processes, as these review processes generally require multiple years and iterations to receive approval to proceed. This approach allows IRPL to progressively address feedback, issues and concerns of approvals agencies as and when they arise without needing to work backwards through the design process.

However, the process can create risks to cost estimation and schedule development where environmental approval processes are protracted and result in substantial changes to the proposed design, requiring rework. Typically, this approach would be managed through the availability of a specific design contingency within the cost estimate and schedule. The contingency should reduce over time as risks diminish (e.g., gaining approvals) or it is drawn down (where changes are required to meet requirements imposed by a specific approval).

For example, none of the Queensland Sections (B2G, G2H, H2C and C2K) has achieved Primary Approval outcomes. In the case of B2G, the Office of the Coordinator General – Queensland (OCG) is currently assessing the revised draft EIS following a public consultation period. Regarding the three Sections between G2K, the OCG has requested that additional information be provided for the EIS.[7] It is not possible to progress to a Detailed Design or Issued for Construction Design stage until the Sections are assessed and potential changes to scope and design to meet EIS requirements are known and incorporated.

Beyond statutory approvals, the role of State agencies, Local Governments and other interested parties in the design process also significantly influences design risk and cost. The outcomes of the Southern sections provide examples of how the approval process can add to or change the design. For example, the Network Design Review Group in Victoria and design reference groups in New South Wales influenced design choices, resulting in significant scope beyond freight requirements and additional costs.[8]

IRPL is yet to establish working groups of this kind for sections in Queensland due to the relatively less advanced nature and the lack of approved funds for their construction. In New South Wales, this process is managed through a group comprising the Department of Planning, Housing and Infrastructure and Transport for New South Wales.

## 5.2 Verification of Scope

As this report is focused on verifying the process for developing the design, schedule and cost estimates, verification of the IRP-specific scope items was not called to be included. During the approvals processes for the Southern sections, several significant scope beyond freight requirements were included to satisfy the approving authorities' conditions. While not exhaustive, the following potential scope beyond freight requirements have been included within contingencies in the TOTC:

[7] Details of the EIS processes can be viewed at https://www.statedevelopment.qld.gov.au/coordinator-general/assessments-and-approvals/coordinated-projects/current-projects

[8] ACIL Allen. 2025. *Inland Rail Project: Verification and Assurance of Scope, Design, Delivery and Cost (Interim Report), p. A-2.*

- Grade separated level crossings at N2N S1, N2N S2, N2N S3: [redacted] S1 (4 LX), [redacted] S2 (2 LX), [redacted] S3 (1LX)
- Fauna crossings at N2NS and B2K (i.e. whole of Queensland Sections): $100m
- Tie-in works to SP1 at N2NS C1: [redacted]
- Substantial works at Yelarbon as part of B2G C4, including:
  - Yelarbon Levee: $9.2m
  - Yelarbon Township and Streetscape Impact Mitigation Works with Legacy Benefit: $3.5m
  - Yelarbon Grade Separation: unclear impact, between $7.5m and $57.5m
  - IOS-057 - B2G - Yelarbon recreation ground upgrade - Legacy Benefit: $0.6m
- Existing QR South-West Line to B2G C4 Turn Outs: $9.2m
- Goondiwindi Airport Upgrade in B2G N1: $10m
- MIRDA/Road Compliance in B2G: $52.2m (N1), $0 (N2), $25.3m (N3), $45.7m (N4)

Additional scope beyond freight requirements will likely emerge during the approvals (environmental and construction) processes for Sections where approvals have yet to be achieved. This is due to the IRPL's approach, which involves the creation of systems and processes that empower State and Local Government agencies and community members to seek additions to a Section's scope, which may result in additional scope beyond the freight requirements. ACIL Allen has provided an overview of this project risk in the Interim Report. [9]

Finding 3 IRP scope

The current IRP scope is consistent with Schedule 1 of the IRP Development Agreement and is considered fit-for-purpose.

The Sections from NSW/QLD Border to Kagaru do not yet have key approvals. The majority of Sections between Narromine to the NSW/QLD Border have Primary approvals in place (Narrabri to North Star Phase 2 is at the final stage of the Primary approval process), but are likely to face pressure from New South Wales government departments, local councils and communities for additions or changes to items of scope (as has been the case for the Sections from Beveridge to Parkes).

Additional scope beyond freight requirements will potentially emerge during the approvals processes for Sections/Work packages (environmental and construction), where approvals have yet to be achieved.

[9] ACIL Allen. 2025. *Inland Rail Project: Verification and Assurance of Scope, Design, Delivery and Cost (Interim Report).*

## 5.3 Current Status of Design

IRPL's reporting of the current design status of each Section is contrasted against its current schedule and environmental approvals status in Table 5.2 below.

Table 5.2 Design status and approvals pathways, by Section

| Section | RDSO Scheduled[1] | Documented Design Status | Approval Status | Scheduled Primary approvals Achieved |
|---|---|---|---|---|
| GJL | Feb-32 | Scoping | Not commenced | May-28 |
| P2N | Operational | As-built Documentation | N/A | N/A |
| N2N | May-32 | Preliminary design underway | Primary approvals achieved | Jan-24 |
| N2NS SP1 | Operational | As-built Documentation | N/A | N/A |
| N2NS SP1 Stage 2C | Jan-30 | Preliminary design underway | Primary approvals achieved | N/A |
| NSN2 SP2 C1 | Oct-30 | Preliminary design underway | Awaiting Primary approvals | Oct-25 |
| NS2B | Mar-33 | Feasibility Design | Primary approvals achieved | N/A |
| B2G | Oct-33 | Feasibility Design | Awaiting Primary approvals | Oct-25 |
| G2H | Nov-34 | Preliminary Design | Additional information is being prepared for Primary approvals | Apr-29 |
| H2C | May-35 | Preliminary Design | Additional information is being prepared for Primary approvals | Oct-29 |
| C2K | Nov-35 | Preliminary Design | Additional information is being prepared for Primary approvals | Apr-30 |

Note 1: Dates presented are Scenario 2 (Target)

*Source: IRPL*

As it stands, IRPL is carrying $1,237 million (P50) to $2,062 million (P90) of design-related contingency in the TOTC model. In this context, design-related contingency reflects contingencies that are included that reflect risk and uncertainty regarding the IRP progress through the IRPL design process, which in turn reflects the status of items such as:

- Primary approvals
- community and stakeholder engagement
- interface with existing rail networks and operators, and other infrastructure owners
- lack of definition concerning geotechnical or other ground conditions.

It is worth noting that no explicit design contingencies are included for the IRP beyond Gowrie, reflecting the costing and contingency methodology per the TOTC model being top-down for G2K. The implied design contingencies may range from 6-12% of P90 project costs, based on the explicit design contingencies derived for the Sections where this is in place. Some Sections/Work packages have high-level design contingencies factored in, while others have no explicit design contingency.

Where there are explicit contingencies identified, these are explicitly costed in the TOTC model on an itemised basis that reflect specific risks centred on uncertainty associated with design as a function of:

- broad assumptions around contractor Tender Advice Notice and Drawings suitability vs final design (based on project experience) – noting this is where the majority of design contingency is placed
- uncertainty concerning the final design of level crossings
- expected Primary approvals conditions where IRPL awaits final determination (examples being expected requirements for fauna crossings, township and heritage protections and enhancements)
- global allocation to Primary approvals condition compliance risk, which is generally set on Work packages where no current approval application is active
- contingencies for track integration, where final agreements are yet to be settled on scope and design with third parties
- compliance with emerging construction standards (set as a global allowance).

ACIL Allen has not identified specific design contingencies incorporated in the TOTC model for Sections and Work packages where environmental assessment precedents are yet to be set, being B2G (C2 and N1-N4) and G2K. For B2G (C2 and N1-N4), a fixed percentage of direct costs is added to the contingency line item in the TOTC for these Sections. For G2K, no design contingencies are incorporated, with values instead exogenously imposed on the model.[10] This may present a significant risk to the estimates for B2G, G2H, H2C and C2K, where there has been limited feedback from the OCG regarding the environmental approval conditions. When received, the conditions could impact the final scope and design of the IRP in Queensland.

We judge that this is not an explicit contingency due to the relatively low level of definition in the cost estimates prepared for G2K compared to the Sections where environmental approval precedents have been set.

Based on the above, the overall design maturity of the Northern sections of IRP is considered appropriately aligned to each Section's status. It is noted that there are some Sections (NS2B, N2N) where designs may be expected to be more advanced, given that they have achieved environmental approvals. By contrast, some Sections (G2H, H2C, C2K) are sitting at design levels, which are more advanced than may be implied by not yet receiving environmental approvals.

Finding 4 IRP design

IRPL has well-documented design processes that are fit-for-purpose and consistent with industry best practice. A significant design contingency allowance for the Sections from Narromine to Gowrie has been provided. There is no explicit design contingency for the Sections from Gowrie to Kagaru.

[10] ACIL Allen notes IRPL has advised that the preferred PPP bid costings included a design growth allowance above the line that cannot be separated from the offer amount. ACIL Allen has not received information to be able to verify this statement.

# Identification of Value Engineering Opportunities

IRPL has established a process for value engineering on yet-to-be-finalised Sections and Work packages, as documented in its Engineering Design and Assurance Management Plan (0-0000-900-PMP-00-PL-0004), denoted as *Innovation and Value Management*.[11] This process involves planning and selecting whole-of-life solutions to deliver the IRP objectives. This involves the input of all parties (project owner, designers, contractors, IRPL corporate), who make use of:

— A Value Management Register

— An Innovation Register

— A Lessons Learnt Register

This includes a paper made available to the Delivery, Engineering and ARTC Operational Business teams, identifying initiatives to be taken forward.

## Value Engineering Delivered

IRPL has advised that value engineering was applied, where possible, to the Southern sections. For example, IRPL has advised that the Minimum Viable Railway Steering Committees 6-8, held between May and July 2023, considered and endorsed several value engineering matters in relation to sleeper spacing, ballast depth, formation width and formation design to a 25TAL maximum axle load.

The relatively early stages of design for the Northern sections means the scope optimisation initiatives (1:64 ruling gradient, reduction in formation width, 667 mm sleeper spacing, relaxation of ballast depth and reduction of the required maximum axle load from 30TAL[12] to 25TAL) may not have been fully incorporated in modifications to the design and cost of these Sections at this stage. IRPL notes in its Scope and Battery Limits Report that these matters will be considered at the appropriate design stage and may be reflected in corresponding changes in scope at that time – and that effectively, the estimates presuppose the scope optimisation items are in place (i.e., there is no identified cost impact).[13] P2N and N2NS SP1 Work package were completed before the commitment to these scope optimisation items.

IRPL's costing model suggests that the value engineering scope initiatives referred to above have been applied to its latest cost estimate in some Sections. A series of notations that refer to these value engineering opportunities is included in the cost model (see Figure 5.2 below).

[11] 0-0000-900-PEN-00-PR-0016 (Innovation and Value Management Procedure)

[12] IRPL has advised that Inland Rail will be capable of accommodating 30TAL trains as all structures are designed to AS5100 300LA loading. The 25TAL requirement is relevant to design life considerations.

[13] 0-0000-900-PEN-00-RP-0009 (Pakes to Kagaru – Scope and Battery Limits Summary Report, p. 45).

Figure 5.2 Notation from TOTC model reflecting incorporation of value engineering into cost estimates

**Civil Works**

| Segment | Start | End | Length (km) | Package | Comments |
|---|---|---|---|---|---|
| | | | | | |
| B2G | 166.98 | 206.95 | 40 | N3 | Utilised designer's BOQ with adjusted 1:64 Value Engineering and 6.5m embankment. |
| B2G | 137.98 | 166.98 | 29 | N2 | Contractor's BOQ with subsequent adjustment for 1:64 Value Engineering, and 6.5m embankment. |
| B2G | 95.00 | 137.98 | 43 | N1 | Utilised designer's BOQ with adjusted 1:64 Value Engineering and 6.5m embankment. |
| B2G | 45.00 | 95.00 | 50 | N4 | Utilised designer's BOQ with adjusted 1:64 Value Engineering and 6.5m embankment. |
| B2G | - | 45.00 | 45 | C4 | Utilised designer's BOQ which incoporated 1:80 Value Engineering and 6.5m embankment. |
| NS2B | 760.00 | 797.00 | 37 | C3C2 | Utilised designer's BOQ with adjusted 1:64 Value Engineering and 6.5m embankment. |
| N2NS | | | | SP1 (Moree 2C only) | Adopted ARTC line diagram and 2C Concept Arrangement civil BoQ V01. |
| N2NS | 666.00 | 681.00 | 15 | C1 | Utilised designer's BOQ with adjusted 1:64 Value Engineering and 6.5m embankment. |
| N2N | 821.00 | 852.86 | 32 | S4 | Utilised Contractor's BOQ with adjusted PIAR spreadsheet and QDL. |
| N2N | 745.00 | 821.00 | 76 | S3 | Utilised Contractor's BOQ with adjusted PIAR spreadsheet , 6.5m embankment and QDL. |
| N2N | 647.70 | 745.00 | 97 | S2 | Utilised Contractor's BOQ with adjusted PIAR spreadsheet , 6.5m embankment and QDL. |
| N2N | 546.86 | 647.70 | 101 | S1 | Utilised Contractor's BOQ with adjusted PIAR spreadsheet and QDL. |

*Source: IRPL cost model — 01.01.01.05 Inland Rail TOTC 2024 v16 (Target) IV Rev02*

B2G has $278.5 million of value engineering estimates[14] assumed in the TOTC model, which are input as negative costs for the following items (Table 5.3). IRPL confirmed verbally that these deductions are value engineering deductions based on analysis by IRPL, specifically the change from 1:80 ruling gradient to 1:64 ruling gradient and the reduction of formation width from 7 m to 6.5 m wide.

ACIL Allen has identified small amounts of value engineering-related cost savings applied to the estimates for N2N (S2 and S3 Work packages) and NS2B (C2/C3 Work package), totalling $3.6 million and $0.7 million, respectively. These savings are for reduced earthworks associated with narrowing the formation width to 6.5 metres. No other explicit value engineering estimates appear incorporated in the TOTC.

IRPL has advised that Work package N2N S1 was based on a non-compliant design at the time it was developed and, therefore, includes many value engineering initiatives and cost estimate reductions that are not explicit; they are hard-coded into the base cost quantities.

[14] These savings apply to DJC. Where IJC costs are calculated as a percentage of DJC (e.g., Contractor Design Costs are estimated as 14.25% of DJC for most work packages) additional savings are incorporated in the TOTC.

Table 5.3 B2G scope adjustment value engineering outcome, by Work package and item ($m contractor cost basis, ex-escalation, ex-contingency)

| | C4 | N1 | N2 | N3 | N4 | Total (item) |
|---|---|---|---|---|---|---|
| 022 - Public Utilities | $0.0 | $0.0m | $2.5m | $0.0m | $0.0m | $2.5m |
| 031 - Earthworks | $0.8 | $34.5m | $26.7m | $133.3m | $14.3m | $209.6m |
| 032 - Retaining Walls | $0.0 | $0.0m | $1.7m | $0.0m | $0.0m | $1.7m |
| 033 - Capping | $0.0 | $2.0m | $0.0m | -$0.6m | $0.2m | $1.5m |
| 034 - Drainage | $0.0 | $2.5m | -$4.8m | $9.4m | $5.4m | $12.5m |
| 044 - Roadworks | $0.0 | -$0.2m | $13.9m | -$0.1m | $0.2m | $13.8m |
| 062 - Bridges | $0.0 | -$3.2m | $18.9m | $18.5m | -$3.2m | $31.0m |
| 065 - Crossings | $0.0 | $0.0m | $2.0m | -$1.6m | $2.0m | $2.4m |
| 085 - Roads + Landscaping | $0.0 | $0.6m | $0.8m | $1.2m | $0.3m | $2.8m |
| 091 - Delivery Regime | $0.0 | $0.0m | $2.4m | -$1.7m | $0.0m | $0.7m |
| Total (Work package) | $0.8 | $36.1m | $64.0m | $158.5m | $19.0m | $278.5m |
| *% of estimated DJC* | *0.2%* | *8.1%* | *10.7%* | *29.5%* | *3.8%* | *11.3%* |

*Source: IRPL TOTC (note: negative values = cost increase)*

Finding 5 Value engineering

IRPL has commenced the process of considering the application of value-engineering to some of the Northern sections' Work packages to incorporate scope initiatives that would allow narrower formation width, wider sleeper spacing, shallower ballast, increases to allowable gradients of 1:64 (from 1:80) and short-steep gradients, particularly to ramp up over rivers and roads.

IRPL intends to incorporate these changes into the Work packages as they progress through Preliminary Design and Detailed Design.

IRPL's latest total cost estimates suggest that the value engineering scope initiatives referred to above have been applied, where applicable, to some Sections.

# 6 IRP schedule

*This section provides ACIL Allen's assessment of the IRP Target scenario schedule.*

IRPL has provided a Level 1 (Work package) and Level 2 (Phase) schedule within their Basis of Schedule (BoS) Report. Within the BoS Report, IRPL has documented the process and methodology used to develop and manage the delivery schedule. IRPL has stated that the Schedule is governed by the Program Overlay,[15] which phases the Design and Construct (D&C) packages over time to smooth the overall resource profile.

Prioritisation of the package sequence was based on:

- the EIS Approval status
- the anticipated completion of Land Acquisition
- the assessed level of engineering challenges to be resolved before engaging a D&C Contractor
- enhancing connectivity for the ARTC Network and operational benefits for ARTC customers
- the earliest completion of N2G and N2K.

The timing of the package sequences was based on several factors, including the following:

- The assessed time required for IRPL to onboard the necessary personnel and service providers
- The assessed capacity of the contracting market to optimally respond to a given level of Capital Expenditure at a given time
- The assessed capacity of the OCG to assess and approve the outstanding Primary approvals on G2K.

IRPL's schedule development approach is evidenced in Section 2 of the BoS, which outlines the four steps used in the Schedule development, which are detailed in Table 6.1 below.

Table 6.1 Schedule development approach[16]

| | |
|---|---|
| **Step 1** Unwinding legacy delivery strategies and constraints | The most appropriate existing IRPL schedule formed the exercise's starting point in this step. The inherent delivery strategies and approaches for the original schedules for North of Narromine were removed, including:<br>– Staged 'drip-fed' release of Commonwealth funding<br>– Hold points for Commonwealth approval of procurement activities<br>– Limits on IRPL's organisational capacity to manage multiple Sections concurrently<br>– Limits on market capacity to supply materials and labour<br>– Limits on supply chain capacity to handle and store materials<br>– Preference for no 'stranded assets' for the period during construction<br>– The need to improve cost certainty by completing an IRPL-led Preliminary Design before engaging a Contractor<br>– Strategy for rail construction materials to only be handled from rail-to-rail with minimal truck movements<br>– Strategy for a sole Track Laying Machine (TLM) and associated On-Track Vehicles (OTV) to build track, launched from Narwonah or Whetstone<br>– Strategy to horizontally package track construction and signalling construction<br>– Strategy for IRPL is to select standard long lead items and commence procurement of pre-cast or quarry products before engaging with a constructor. |

[15] The BoS refers to Program Overlay.

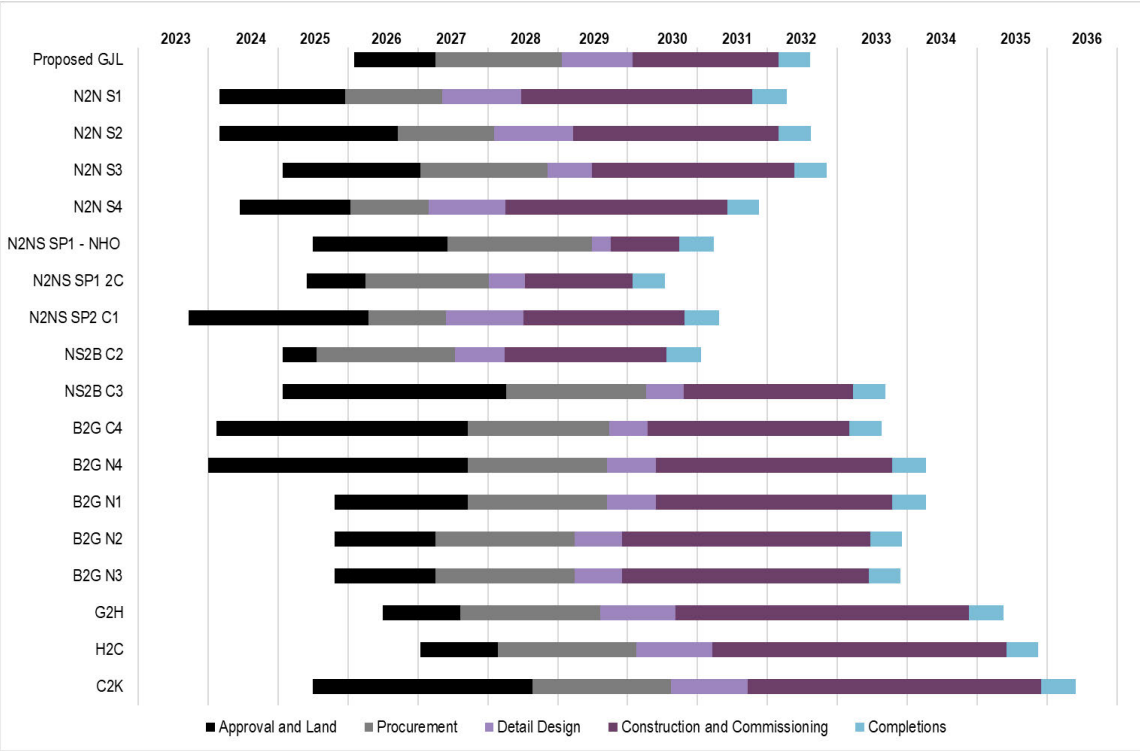
[16] Program was retained over Project in various sections of the table to maintain consistency with the IRPL documentation provided in the Data Pack

| | |
|---|---|
| **Step 2**<br>Updating the schedule | This step reviewed the changed business conditions since the time of the previous schedule. Where updated or more reliable information was available, the duration of key activities was reviewed and updated.<br>Preference was given in the following order:<br>1. IRPL internal schedule forecasts of January 2025 (APW scope items)<br>2. Preferred PPP bid, in the case of G2K<br>3. Market-tested Incentivised Target Cost (ITC) Package Offers, where accessed as suitable<br>4. Market-tested ITC Package Offers from comparable packages were assessed as appropriate<br>5. IRPL developed durations (for non-APW scope items). |
| **Step 3**<br>Workshop to arrive at Unconstrained package-level schedules | This step included workshops led by the Executive Director of Engineering Integration and Project Performance and the Chief Operating Officer. The attendees of these workshops included the Program Scheduling Manager, key leaders and Subject Matter Experts ( SME) from both the North of Narromine and South of Narromine teams. Personnel from the South of Narromine team brought their current delivery project experiences and challenged the North of Narromine team to support testing assumptions.<br>Each of the 18 Work packages was reviewed individually, with assumptions and logic being tested for each package. The key activity was challenging prior constraints and identifying the optimal critical path to construction commencement, whilst removing barriers that had previously dictated sequencing and scheduling. The Unconstrained Schedule demonstrates the most efficient pathway to construction for each Work package in isolation from each other. |
| **Step 4**<br>Workshop to stage the Program and produce Scenarios 1 and 2 | This step included developing and confirming a Program Overlay, using a Best -for -Program prioritisation approach, which would be applied to the Unconstrained 'Earliest Start' package schedules.<br>Each Work package was staggered and sequenced as part of two alternative scenarios:<br>– Scenario 1 Stretch Target dates<br>– Scenario 2 Target dates.<br>These two scenarios acknowledge that some of the limitations in Step 1 are genuine but not yet quantifiable, thus using a global overlay to smooth resource profiles across all key activities. The outcome of this method provides substantial float being built within the latter or lower priority packages, which permits a balancing of resources. |

*Source: IRPL*

Figure 6.1 below shows the total duration of each Section/Work package as per the Target Schedule.

Figure 6.1 Target schedule for Northern sections




*Source: IRPL*

## 6.1 Assessment

IRPL has documented the schedule assumptions, along with relevant commentary where specific items may differ, and used them in the delivery schedule in the BoS report (*Section 4.3* and *Appendix A – Schedule Assumptions*). The assumptions appear logical and reasonable for the scopes of work and have been tested for reasonableness, where the durations appear significantly longer or shorter than other packages for similar activity types.

Table 6.2 compares the durations (in months) for each stage for each Section/Work package, with any outliers highlighted and further discussed in the sections below. All other durations for activities appear to be consistent with their assumptions across all the packages. For comparison, Table 6.2 also includes durations taken from the December 2024 Shareholder Department Report, where available, for the Southern sections and P2N.

Table 6.2 Target schedule durations (calendar months) by stage and Section/Work package

| Work package | Land Acquisition | Current APW Scope | Biodiversity Offsets | Procurement | Enabling Works | Reference Design | Preliminary Design | Detailed Design | Long Lead Items | Primary approvals | Secondary Approvals | Construction & Commissioning | Completions | Total Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Southern sections** | | | | | | | | | | | | | | |
| B2A – Tranche 1 | | | | | | | | | | | | | | |
| B2A – Tranche 2 | | | | | | | | | | | | | | |
| A2I | | | | | | | | | | | | | | |
| I2S | | | | | | | | | | | | | | |
| S2P | | | | | | | | | | | | | | |
| **Proposed GJL** | | | | | | | | | | | | | | |
| Proposed GJL | 24 | - | - | 22 | - | - | 18 | 9 | 12 | 28 | 14 | 26 | 6 | 86 |
| **P2N** | | | | | | | | | | | | | | |
| Parkes to Narromine | | | | | | | | | | | | | | |
| **Northern sections** | | | | | | | | | | | | | | |
| N2N S1 | 42 | 43 | 24 | 22 | 12 | 16 | - | 20 | 17 | - | 14 | 41 | 6 | 99 |
| N2N S2 | 51 | 43 | 24 | 22 | 12 | 16 | - | 20 | 17 | - | 14 | 36 | 6 | 103 |
| N2N S3 | - | 50 | 48 | 18 | 48 | 18 | 9 | 14 | 17 | - | 14 | 36 | 6 | 95 |
| N2N S4 | 39 | 39 | 24 | 18 | 12 | 18 | - | 20 | 17 | - | 14 | 39 | 6 | 90 |
| N2NS SP1 NHO | | | | | | | | | | | | | | |
| N2NS SP1 Stage 2C | | | | | | | | | | | | | | |
| N2NS SP2 C1 | 42 | 45 | 24 | 18 | 12 | 18 | - | 20 | 17 | - | 14 | 29 | 6 | 92 |
| NS2B C2 | - | 12 | 24 | 22 | 35 | - | 8 | 12 | 17 | - | 14 | 29 | 6 | 73 |
| NS2B C3 | 70 | - | 28 | 22 | 12 | - | 9 | 13 | 17 | - | 14 | 29 | 6 | 105 |
| B2G C4 | 39 | 18 | 24 | 22 | 12 | - | 9 | 13 | 17 | - | 14 | 35 | 6 | 116 |
| B2G N4 | 39 | - | 24 | 22 | 12 | - | 8 | 9 | 17 | - | 12 | 41 | 6 | 125 |
| B2G N1 | 39 | - | 24 | 22 | 12 | - | 8 | 9 | 17 | - | 12 | 41 | 6 | 102 |
| B2G N2 | 39 | - | 24 | 22 | 12 | - | 8 | 9 | 17 | - | 12 | 43 | 6 | 99 |
| B2G N3 | 39 | - | 24 | 22 | 12 | - | 8 | 9 | 17 | - | 12 | 43 | 6 | 98 |
| G2H | 15 | | 24 | 24 | - | - | - | 24 | 17 | 34 | - | 51 | 6 | 108 |
| H2C | 15 | | 24 | 24 | - | - | - | 24 | 17 | 34 | - | 51 | 6 | 108 |
| C2K | 15 | | 24 | 24 | - | 20 | - | 24 | 17 | 34 | - | 51 | 6 | 132 |

*Note: Outliers are highlighted in the table above.*

*Source: IRPL and ACIL Allen*

## Land acquisition

The durations used by IRPL for the Northern sections' land acquisition range between 15 and 70 months, with the outliers identified in Table 6.3 below.

Table 6.3 Land acquisition outliers

| Work package | Comment |
|---|---|
| NS2B C3 (70 months) | Negotiated acquisitions are ongoing, with the Preliminary Design process informing the overall acquisition strategy. The schedule provides a 2-year duration between compulsory acquisition and construction works to ensure no delays.<br>Achieving this compulsory acquisition timeframe requires alignment of the process with TfNSW and appropriate TfNSW resourcing. |
| G2K (15 months) | It is understood that this duration has been based on applying the Acquisition of Land Act 1967 (QLD) for completing the Compulsory Acquisition Process. IRPL is undertaking land acquitions under the APW . |

*Source: ACIL Allen*

Apart from the outlier above, the duration range for land acquisition is comparable to the information available for the Southern sections, with land acquisition reported to take:

— 33 months for B2A Tranche 2

— 44 months for I2S.

## Current APW

The durations used by IRPL for the Northern sections' APW range between 12 and 50 months, with the outliers identified in Table 6.4 below.

Table 6.4 APW outliers

| Work package | Comment |
|---|---|
| N2N S3 (50 months) | Borrow Pit GI works, engage ecologist supplier, biodiversity data capture and validation. |
| NS2B C2 (12 months) | Aboriginal Cultural Heritage Excavation Fieldworks, Pre-contract field studies, Department of Planning, Housing and Infrastructure (New South Wales) (DPHI), and Registered Claimant approvals. |

*Source: ACIL Allen*

## Biodiversity Offsets

The durations used by IRPL for the Northern sections' Biodiversity Offsets range between 9 and 48 months, with the outliers identified in Table 6.5 below.

Table 6.5 Biodiversity offsets outliers

| Work package | Comment |
|---|---|
| N2N S3 (48 months) | N2N alignment traverses the Pilliga Forest (5 State Forests). Acquisition of this railway corridor through the State Forests requires a State Forest Revocation under the *Forestry Revocation and National Park Reservation Act 1996* (NSW). Therefore, acquitting biodiversity obligations is reasonable and expected to take 48 months due to the complex conditions. |

*Source: ACIL Allen*

This range is comparable to the information available for the Southern sections, with Biodiversity Offsets reported to take:

— 11 months for B2A Tranche 2

— 44 months for A2I

— 9 months for I2S.

ACIL Allen notes that the time required to purchase the credits will be subject to availability in the market, which may vary over time, and have a significant effect on the time to acquire Biodiversity Offsets across each Section.

## Procurement

The durations used by IRPL for the Northern sections' procurement range between 18 and 24 months.

Based on the available information for the Southern sections, it is noted that the Procurement of I2S (a greenfield Section) is reported to have taken 33 months. It is understood that this extended period was due to the delayed contract award, due to environmental approval and lack of geotechnical information, due to the inability to access some parts of the alignment before land acquisition.

## Enabling Works

The durations used by IRPL for the Northern sections' Enabling Works range between 12 and 48 months, with the outliers identified in Table 6.6 below.

Table 6.6 Enabling works outliers

| Work package | Comment |
|---|---|
| N2N S3 (48 months) | Telstra tower will support Train Operations and early completion by enhancing the contractor's communications and mitigating some costs and the impact of the contractor's use of communications on the local community. |
| NS2B C2 (35 months) | Additional communications support to enable construction will be required. This may be permanent Telstra towers to support construction communications, or an alternative temporary solution. |

| Work package | Comment |
|---|---|
| G2K | Initial enabling works have already been performed in the previous PPP strategy. |

*Source: ACIL Allen*

No comparative data were available for the Southern sections.

## Reference Design

The durations used by IRPL for the Northern sections' Reference Design range between 18 and 20 months, with the outliers identified in Table 6.7 below.

Table 6.7 Reference design outliers

| Work package | Comment |
|---|---|
| Packages with blank durations | In some packages, the duration of the Reference Design is included with the preliminary design. |
| C2K (20 months) | Following the Schott Report, the preferred PPP bid was demobilised, thus leaving no service provider engaged in the work required for the revised draft EIS.<br>Requires revising the Concept Design for Procurement and updating the Reference Design to submit a revised draft EIS. |

*Source: ACIL Allen*

No comparative data were available for the Southern sections, as these Sections are now under the construction contracts, which occur after the Reference Design.

## Preliminary Design

The durations used by IRPL for the Northern sections' (plus GJL) Preliminary Design range between 5 and 18 months, with the outliers identified in Table 6.8 below.

Table 6.8 Preliminary design outliers

| Work package | Comment |
|---|---|
| GJL (18 months) | Concept Development and Stakeholder Consultation, Reference Design |
| N2NS SP1 Stage 2C (5 months) | Per assessment by IRPL SME, a combined total of 12 months is required for Preliminary and Detailed design. |
| G2K | Preliminary and Detailed Design have been allocated a joint duration of 24 months, as this is included in the Main Work D&C. |

*Source: ACIL Allen*

No comparative data were available for the Southern sections, as these Sections are now under the construction contracts, which occur after Preliminary Design.

## Pre-Tender Design

The duration used by IRPL for the Northern sections' Pre-Tender Design was 32 months and only for the following package as shown in Table 6.9 below.

Table 6.9 Pre Tender Design outliers

| Work package | Comment |
|---|---|
| B2G N4 (32 months) | Included in the Main Works D&C. Duration as per the BHQ JV CFA Packaging Strategy schedule. |

*Source: ACIL Allen*

No comparative data were available for the Southern sections, as these Sections are now under the construction contracts, which occur after Pre-Tender Design.

## Detailed Design

The durations used by IRPL for the Northern sections' Detailed Design range between 6 and 20 months, with the outliers identified in Table 6.10 below.

Table 6.10 Detailed Design outliers

| Work package | Comment |
|---|---|
| N2N S3 (14 months) | Included in the Main Works D&C. Duration as per the Acciona CPB CFA schedule for S1, weighted 40% Preliminary Design and 60% Detailed Design. |
| N2NS SP1 (6 months) | Per assessment by IRPL SME a combined total of 14 months is required for Preliminary and Detailed design. |
| N2NS SP1 Stage 2C (8 months) | Per assessment by IRPL SME a combined total of 12 months is required for Preliminary and Detailed design. |

*Source: ACIL Allen*

This range is comparable to the information available for the following two Southern sections, with Detailed Design reported to take:

— 25 months for B2A Tranche 2

— 17 months for I2S

The timeframe for the following Southern sections was longer than the estimated range, with an understanding that these longer durations were driven by scope changes caused by state EIS approvals and required state and local government design approvals processes, stakeholder engagement and contracting separable portion commencement dates.

— 27 months for A2I

— 51 months for S2P

## Long lead items

The durations used by IRPL for the Northern sections' (plus GJL) Long Lead items range between 12-17 months, with the outliers identified in Table 6.11 below.

**Table 6.11** Long lead items outliers

| Work package | Comment |
|---|---|
| Proposed GJL (12 months) | Based on material lead times with a 12-month allowance. Construction can commence once this is 50% completed. |

*Source: ACIL Allen*

No comparative data were available for the Southern sections.

## Primary approvals

The duration used by IRPL for the Northern sections' (plus GJL) Primary approvals varies by Work package as identified in Table 6.12 below.

**Table 6.12** Primary approvals durations

| Work package | Comment |
|---|---|
| Proposed GJL (28 months) | EIS typically takes 13 months to complete the fieldwork and document the draft of the EIS.<br>12 months for approval by DPHI and the DCCEEW.<br>In the schedule, there is an additional 3 months for the EIS process in addition to the above. |
| N2N, N2NS SP1 2C and NS2B | Already achieved. |
| N2NS SP2 C1 | Primary approvals are forecast for August 2025. No duration has been provided. |
| B2G | Primary approvals are forecast for October 2025. |
| G2K | The Primary approvals for the G2K Sections include the following allowances:<br>– 6 months for procurement of an EIS Service Provider<br>– 12 months to prepare the Revised Draft EIS<br>– 12 months to complete Adequacy Review, Exhibition, and Gain OCG Approval<br>– 3 months for Commonwealth EPBC approval<br>The allowance for the EPBC approval appears low; however, the Environment Protection and Biodiversity Conservation Act 1999 (Cth) allows bilateral agreements between the Australian and Queensland governments to run the EPBC and EIS processes in parallel. ACIL Allen has therefore assumed that IRPL have allowed a total 15-month period for the EPBC approval process, which appears reasonable. |

*Source: ACIL Allen*

The timeframe for the following Southern sections was significantly longer than the estimated range for the Northern sections, with an understanding that the complexity of the EIS approval process drove these longer durations:

— 76 months for A2I

— 79 months for S2P.

## Secondary approvals

The durations used by IRPL for the Northern sections' Secondary Approvals range between 8-14 months, with the outliers identified in Table 6.13 below.

**Table 6.13** Secondary approvals outliers

| Work package | Comment |
|---|---|
| N2NS SP1 2C (8 months) | Low risk for secondary approvals. 8 months is a typical duration. |
| G2K | It is not included in the schedule at this stage due to threshold issues still to be resolved, which affect the Primary approvals. |

*Source: ACIL Allen*

No comparative data were available for the Southern sections.

## Construction & Commissioning

The durations used by IRPL for the Northern sections' Construction and Commissioning range between 12 and 51 months, with the outliers identified in Table 6.14 below.

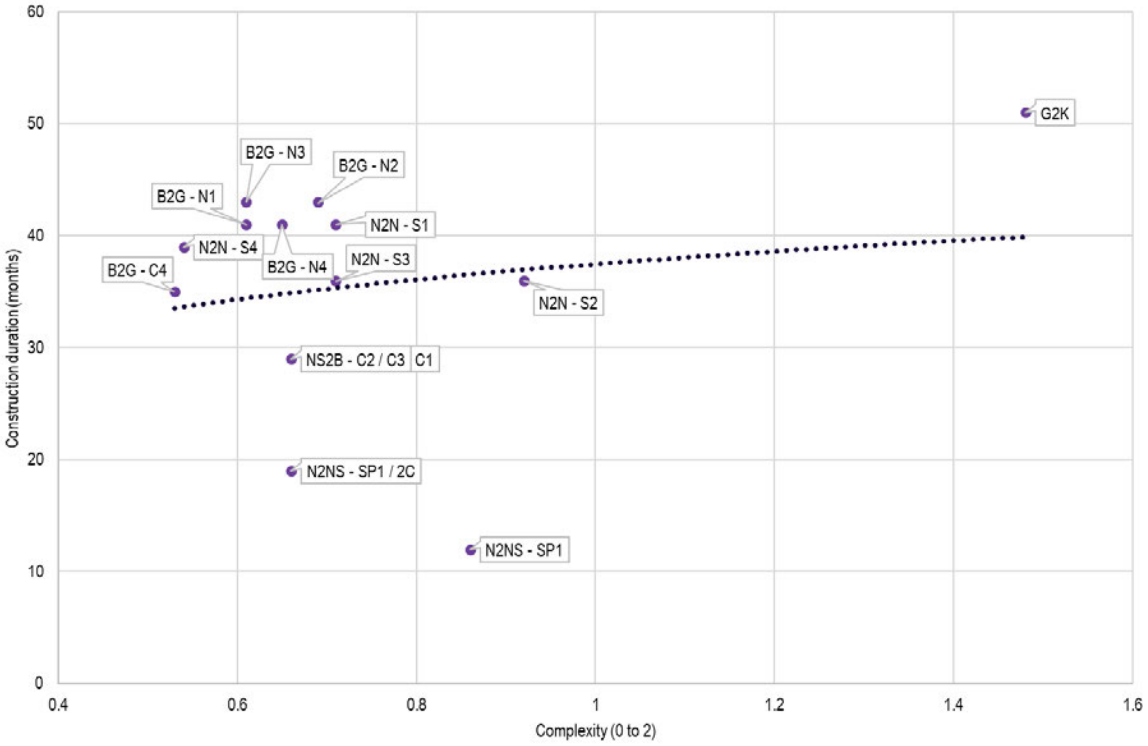
Table 6.14 Construction and commissioning outliers

| Work package | Comment |
|---|---|
| N2NS SP1 (12 months) | 12 months allowed per assessment by IRPL SME. |
| N2NS SP2 C1 (29 months) | 24 months for civil, 2 months for track and 2 months for signalling construction per assessment by IRPL SME. |
| B2G C4 - (34 months) | Civils, Track and signaling durations as per IRPL Scenario 8 basis of June 2024 (refer to *Section 4.4.1 of* BoS *report*). Scenario 8 was an internally accessed evolution from the received construction contractor schedules, which include more recent information available to IRPL as of early 2024. This allowed for a reassessment of the risks and uncertainties identified in the original contractor submissions. |

*Source: IRPL*

To further assess these durations, Figure 6.2 below shows the general relationship between complexity rating (as detailed in Appendix A) and the construction period of each package. Generally, the trend shows that the more complex packages have a longer construction duration.

Figure 6.2 Relationship between complexity and construction duration




*Source: ACIL Allen*

## Completions

The durations used by IRPL for the Northern sections' Completions are 6 months across all packages.

The only comparative data available for the Southern sections was 57 months for P2N. Given that this Section has now been completed, it is assumed that this extended closeout period is related to contract closeout and does not affect operations.

# 6.2 Schedule Risks

IRPL notes in section 9 of the BoS that a Quantitative Schedule Risk Analysis (QRSA) has yet to be conducted for the Northern sections. IRPL have indicated that the following are the most significant schedule risks, which are expected to impact the Pre-Construction phase:

— **Agreements with and the policy settings of key state agencies and local governments:** IRPL has identified several agreements outstanding with state agencies and policy positions that need to be revisited to meet the timeframes identified in the schedule. The Schedule assumes these agreements will be in place at the right time to meet the schedule.

— **Securing Primary approvals in QLD:** The OCG has issued extensions of time for the QLD EIS, with the G2K Sections now sharing a lapse date of 1 February 2026. IRPL has identified a risk that insufficient progress on the G2K EIS could result in the OCG not extending lapse dates, causing the Primary approvals processes to restart. The Primary approvals for B2G are scheduled for October 2025; however, IRPL has identified a risk that this may be prolonged due to additional requirements imposed by regulator/s and undefined timeframes for statutory processes.

- **Land acquisition in QLD:** [redacted] IRPL have stated that the position of the Queensland Department of Transport and Main Roads (TMR) remains that it will not progress with compulsory acquisition until after EIS approval and construction funding is certain. Voluntary acquisition is restricted under the terms of the ARTC Deed with TMR; however, this is under review.
- **Resolution of threshold Issues on G2K:** IRPL identified the following threshold issues on the G2K Sections:[17]
  - Conditions of Approval (CoA) are unknown until EIS is approved, which may impact scope or design amendments necessary to satisfy these conditions.
  - An interface agreement with Queensland Rail to facilitate the passage of the Inland Rail route alignment through the existing Queensland Rail corridor.
  - Additional complexity with the CoA associated with groundwater is anticipated for G2H due to the Toowoomba range tunnel bisecting multiple water courses along its alignment.
  - [redacted]
  - Lockyer Valley Regional Council have strongly advocated modifying the Inland Rail route to bypass the town of Gatton (the Gatton Bypass). The design and construction work of modifying the H2C route to include the Gatton Bypass presents a significant source of potential scope escalation for the Section and remains an open risk.
  - Following the 2023 Inland Rail Review by Dr Kerry Schott AO**,** the interface between the Inland Rail alignment and the proposed Ebenezer Intermodal Terminal is an emerging threshold issue. As of March 2025, IRPL did not have access to this proposed facility's projected scope and delivery timing and, therefore, could not assess scope impacts on C2K.

IRPL has stated that while these issues remain under consideration, they will impact engagement with the key stakeholders on the threshold issues required to finalise the G2K Primary approvals strategy.

The Target schedule for G2K has allowed for a 12-month client team and EIS mobilisation period. Given the schedule risks identified by IRPL, ACIL Allen considers this 12-month period necessary to resolve threshold issues before commencing development of the revised EIS for G2K. This 12-month allowance has not been included within the Stretch Target schedule, putting this version of the schedule at significant risk.

## 6.3 Float[18]

IRPL have developed their Target and Stretch Target schedules to a Class 3 Schedule (per the AACE RP 27R-03), which is based on a 10%-40% Project Definition and is noted to be suitable for Budgeting and Authorisation. The scheduling method used for a Class 3 schedule is "*Package" top-down planning using key elements. Semi-detailed*."[19] A top-down approach will typically lead to the overestimation of activity durations and thus embed float within each activity's duration. As the schedule matures, these durations will be refined, and float will become more viable within the schedule.

As detailed in Table 6.1 above, to account for overall Program Float (Program Reserves), IRPL has developed their Target schedule by applying a Program Overlay across each Work package's schedule to smooth the overall IRP's resource profile. The Program Overlay for the Target schedule assumes:

- Notionally, two major RFTs are released every 6 months (every 3 months for the Stretch Target Schedule)

[17] 03.01.01 Parkes to Kagaru - Scope and Battery Limits Summary Report (0-0000-900-PEN-00-RP-0008), p.54.

[18] The BoS refers to Program Overlay where used in this section.

[19] AACE RP 27R-03 Schedule Classification System, p.3.

— The acquisition of biodiversity offsets is a condition precedent for construction on N2N S2 Pilliga (not a condition for the Stretch Target Schedule)

— A 12-month client team and EIS update mobilisation period is allowed for on G2K (not allowed for in the Stretch Target Schedule)

This approach provides significant float throughout the Program Overlay, which acts as a non-explicit buffer within the Stretch Target and Target schedule dates. Given the level of schedule development, ACIL Allen considers this a reasonable approach to incorporate schedule float within the Target Schedule. As detailed above, the absence of the G2K client team and EIS update mobilisation period within the Stretch Target schedule reduces the float for G2K and puts the completion date at risk.

## 6.4 Critical Path

The BoS report outlines the Critical Path for the current Delivery Schedule for each Work Package. All Non-AWP Critical Path activities are predicated on IRPL's assumption that they would have access to the unconstrained funding from 30 June 2025. By linking the critical paths to this milestone, any amendment to the milestone date will proportionally extend the completion dates of each critical path.

The following two APW activities form part of the Target Schedule's critical path:

— N2NS SP2 C1 – Gwydir Floodplain: Flood and Hydrology Ground Analysis Works (scheduled finish date 6 May 2027)

— B2G C4 – Kurumbul Corridor: Geotechnical Investigations (scheduled finish date 10 July 2025).

Any change in IRPL's assumption regarding the unconstrained funding will have no negative impact on these APW activities within the critical path.

The G2K Sections beyond APW are scheduled to commence on 1 July 2025 and are the last to be completed by May 2036 (Target schedule). The schedule allows 12 months to resolve threshold issues[20] with Procurement to commence in August 2027. Therefore, the schedule can be considered to hold at least 12 months of float. However, IRPL's assumption on unconstrained funding for the remaining Northern sections by 30 June 2025 has lapsed, with the threshold issues likely to take some time to resolve.

Figure 6.1 above provides the total duration of each Section as per the Target Schedule based on these critical paths.

Finding 6 IRP Schedule

IRPL has well-documented processes for developing and managing the IRP schedule, individual Sections, and Work packages. The process appears fit-for-purpose and consistent with industry best practice.

Although these processes are fit-for-purpose, the IRP schedules developed by IRPL for its scenarios as at December 2024 are based on the assumption that IRP delivery would commence from 30 June 2025. This assumption has lapsed and as such IRPL will need to update the scenarios and associated cost estimates at a future time.

[20] Threshold issues include status of the EIS which currently lapses early 2026, agreement to be reached between ARTC and QR, Queensland Government passenger rail requirements, Ebenezer intermodal terminal and interface, Gatton bypass, and packaging of works and delivery strategy.

# 7 Cost estimation

*This section provides ACIL Allen's assessment of the cost estimation process.*

Box 7.1 A note on market rates and industry standards

Comparing market rates or BoQ unit prices across different rail construction projects is challenging and can lead to misleading conclusions. This is because:

- Rates obtained through competitive tendering are treated as commercially sensitive, so contractors' bids remain confidential and are not directly comparable (Prices cannot be accessed).
- Each rail project's scope and design specifications vary (e.g., heavy rock excavation through mountains, tunnelling, bridge construction over floodplains, interaction with third-party assets, etc.). Therefore, unit costs reflect site-specific geotechnical conditions, access constraints and engineering requirements.
- Market dynamics at the time of tender (material price fluctuations, labour availability, equipment mobilisation costs and prevailing inflation) mean that rates from projects awarded even months apart will not align.
- Economies of scale and project durations influence unit pricing: larger, longer-duration packages can spread fixed overheads more thinly than shorter, specialist packages.

These factors render direct comparisons of market rates or BoQ figures between rail projects unreliable without extensive normalisation for scope, timing, contract form and site conditions.

*Source: ACIL Allen*

IRPL's TOTC is initially based on BoQ and unit rates for each Work package. However, because of the varied status of the Work packages, different approaches were used by IRPL in developing the TOTC:

- Some Work packages have been completed, and the final out-turn cost is known (these are incorporated within the APW worksheets).
- Some Work packages are under contract, and the out-turn cost is based on contracted prices plus incurred and estimated to-completion Client costs, contingencies and escalation (these are incorporated within the APW worksheets).
- Some Work packages (most between N2G) are at various design stages, and the cost estimates are based directly on BoQ and unit rates.
- The work to be undertaken in and around Moree is a redesigned estimate based on an existing BoQ.
- G2K is based on escalating the preferred PPP bid (assumed to have included BoQ and unit rates) and developing a high-level contingency estimate.

The granularity of data provided by IRPL varied across the Sections/Work packages:

- Sections included in the APW were categorised at a high level based on function or type of activity (e.g., Access Roads, Signalling, Roads and Landscaping, Design Services, major types of Materials, Land Acquisition, Contingency, Escalation, etc.)
- G2k was included at the same level of granularity as the APW Sections using the preferred PPP bid data. IRPL also provided a more detailed BoQ and unit rates that is understood to have been sourced from Regionerate Rail. However, many of the BoQ items are presented as lump sums with a single or small number of units to be supplied (not broken down to unit labour rates, etc.)

— Sections between N2G that are not included in the APW have summary sheets similar to the APW and G2K Sections, but also include a more detailed breakdown of contractor costs by BoQ and an assessment of risk and escalation.

To verify and assure the cost estimation process, benchmarking key cost items across Work packages was used to confirm consistency and credibility in the cost estimates. However, because of the limited level of data granularity provided, benchmarking was undertaken at a functional level for key items (e.g., bridging, earthworks, etc.). Where benchmarks for one or more Work packages varied significantly from the norm, the MCA complexity assessment results were used to potentially explain the outcome.

## 7.1 IRPL Costing approach

The "2025 Beveridge to Kagaru Estimate Update, Basis of Estimate" report details the four elements used to develop IRPL's TOTC:

**Approved Project Works:** incorporates approved works based on the approved budget of [redacted] with no further estimating or review undertaken as part of the TOTC update

**Bottom-up calculation of Design and Construction costs:** First Principles estimate using Expert Estimation software standardised across the Work packages between N2G. These estimates are for activities not included within the APW. IRPL has stated that prevailing market rates for staff, labour, plant and materials have been incorporated in the estimate. The estimates have been developed using available design information (design drawings, Technical Advice Notices, BoQ and previous CWC / RCP works). In some cases, the estimates include value engineering (1:64 grade and 6.5m embankment widths) and adjustments for flood modelling and hydrological conditions (potentially impacting drainage and bridge spans).

**Bottom-up calculation of Client Costs:** Costing includes estimates for Client costs associated with Project Delivery costs, Materials (incl. Delivery) costs, Design Services costs and Land and Biodiversity costs.

**G2K estimate:** Based on the 2022 Budget estimate of [redacted] derived from the preferred PPP bid, add on Client costs and contingency in late 2022, and the approved funding under the APW. The estimate includes escalation reflecting the Target schedule.

ACIL Allen notes that the **Proposed GJL**, while not included in the Basis of Estimate, has been separately costed by IRPL based on a high-level desktop study to establish a preferred link option.

The table below outlines the costing estimate methodology for the various Sections of Inland Rail.

Table 7.1 Costing methodology by Section

| Section | Package | State | Estimate Method |
|---|---|---|---|
| T2B | | VIC | Incorporate APW Reset 23 |
| B2A | T1 | VIC | Incorporate APW Reset 23 |
| | T2 | VIC | Incorporate APW Reset 23 |
| A2I | | NSW | Incorporate APW Reset 23 |
| I2S | | NSW | Incorporate APW Reset 23 |
| S2P | | NSW | Incorporate APW Reset 23 |
| GJL | | NSW | High-level desktop study |
| P2N | | NSW | Incorporate APW Reset 23 |
| N2N | S1 | NSW | Bottom-up estimate (BoQ & unit rates) |
| | S2 | NSW | Bottom-up estimate (BoQ & unit rates) |

| Section | Package | State | Estimate Method |
|---|---|---|---|
| | S3 | NSW | Bottom-up estimate (BoQ & unit rates) |
| | S4 | NSW | Bottom-up estimate (BoQ & unit rates) |
| N2NS | N2NS - SP1 | NSW | Incorporate APW Reset 23 |
| | SP1 (Moree 2C only) | NSW | Redesigned estimate of existing BoQ |
| | C1 | NSW | Bottom-up estimate (BoQ & unit rates) |
| NS2B | C3C2 | NSW | Bottom-up estimate (BoQ & unit rates) |
| B2G | C4 | QLD | Bottom-up estimate (BoQ & unit rates) |
| | N4 | QLD | Bottom-up estimate (BoQ & unit rates) |
| | N1 | QLD | Bottom-up estimate (BoQ & unit rates) |
| | N2 | QLD | Bottom-up estimate (BoQ & unit rates) |
| | N3 | QLD | Bottom-up estimate (BoQ & unit rates) |
| G2H | Gowrie to Helidon | QLD | Escalation of preferred PPP bid |
| H2C | Helidon to Calvert | QLD | Escalation of preferred PPP bid |
| C2K | Calvert to Kagaru | QLD | Escalation of preferred PPP bid |

*Source: ARTC*

The IRP estimated TOTC for the Target scenario is shown in Table 7.2 below split by APW and Estimate to Completion (ETC). The total cost estimate includes estimated costs for GJL and sunk costs for T2B and K2ARB.

Table 7.2 IRP total estimated cost – Target scenario

| Cost element | Approved Budget (APW Reset-23) ($ million) | Estimate beyond APW ($ million) | Total ($ million) | % of Total |
|---|---|---|---|---|
| Design | [redacted] | [redacted] | 2,099 | 5% |
| Materials | [redacted] | [redacted] | 1,323 | 3% |
| Construction | [redacted] | [redacted] | 19,887 | 44% |
| Client costs | [redacted] | [redacted] | 6,289 | 14% |
| Land + Biodiversity | [redacted] | [redacted] | 1,413 | 3% |
| Risk & Contingency (P90) | [redacted] | [redacted] | 7,766 | 17% |
| Escalation | [redacted] | [redacted] | 6,809 | 15% |
| IRP Total | [redacted] | [redacted] | 45,586 | 100% |

*Note:* Totals may differ from the aggregate of the elements because of rounding error.

*Source: IRPL*

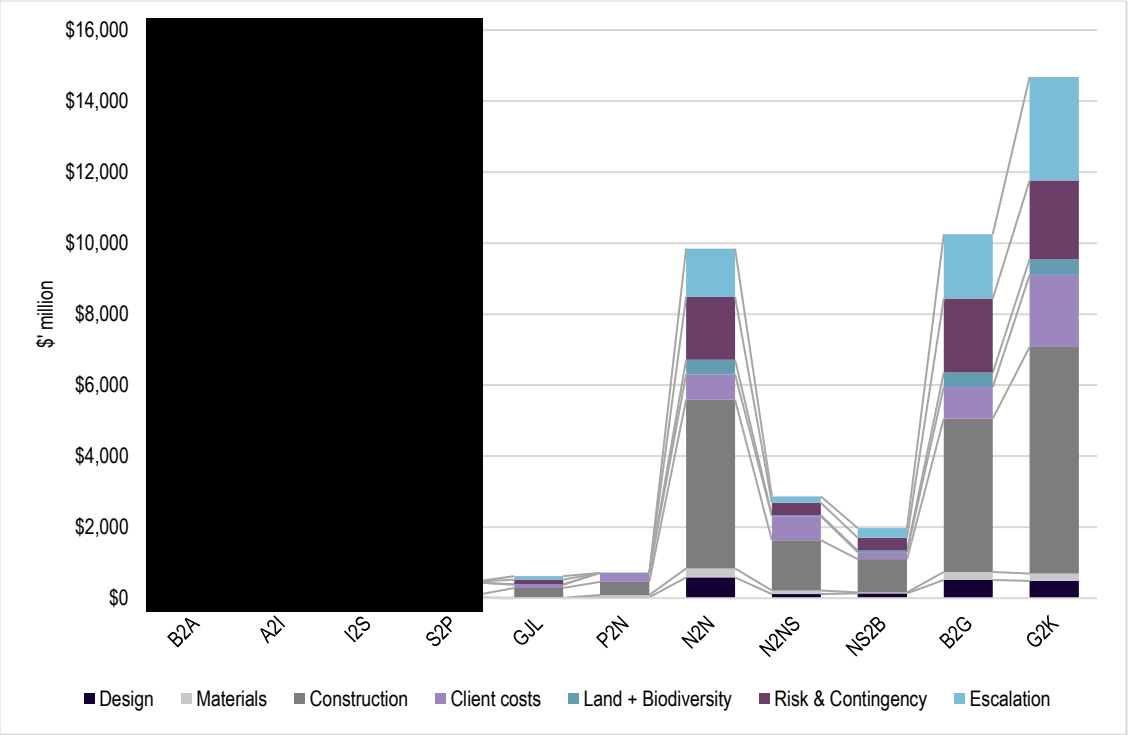
Figure 7.1 below shows the EAC for each Section by cost element. Figure 7.2 below shows the percentage split by cost element by Section (as a percentage of each Section's total). The most significant Sections in terms of cost are the N2N and G2K. N2N is the longest Section, involves around 16 km of bridging, and is assessed as having relatively high complexity. G2K is assessed as highly complex because of tunnelling and significant bridging, including bridging down the range from G2H.

Some of the Sections have cost element splits that differ significantly. S2P has a large proportion of Client costs, but it has the smallest total cost of all Sections in the IRP. Client costs appear higher proportionally for the brownfield Southern sections. The higher ratio can partially be explained by the additional coordination,

mobilisation, and management costs per dollar of expenditure for delivering smaller non-contiguous scope items.

The Northern sections have relatively consistent cost element splits, with escalation making up a larger proportion for Sections scheduled later in the IRP. The contingency allowance as a proportion of estimated costs for G2K appears low compared with the others, considering that it is rated highly complex.

Figure 7.1 EAC by cost element for each Section



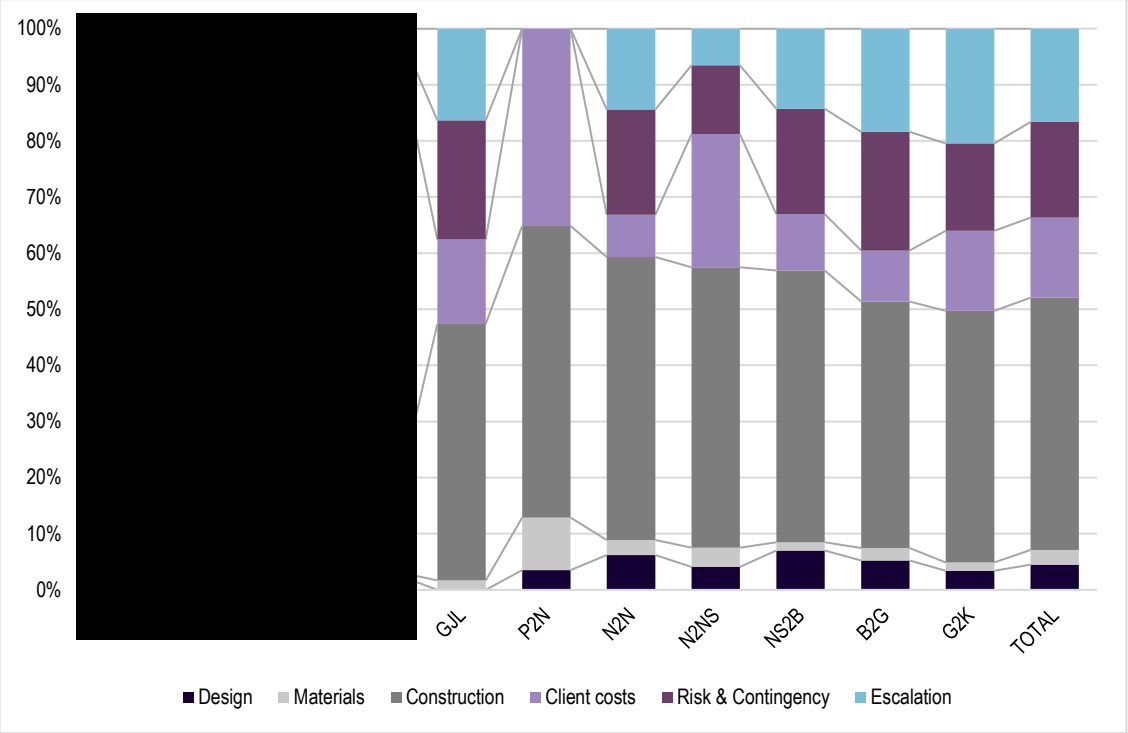

Notes:

T2B and K2ARB costs and the MDC estimates have been excluded, but are included in the total.

Risk and contingency is based on a P90 assessment.

*Source: IRPL*

Figure 7.2 Split (%) of EAC by cost element for each Section




Notes:

T2B and K2ARB costs and the MDC estimates have been excluded, but are included in the total.

Risk and contingency is based on a P90 assessment.

*Source: IRPL*

## 7.2 Benchmarked costs

ACIL Allen has attempted to estimate unit costs for several major items (as a means of verifying the estimation process). These include:

- costs per unit length of rail network
- costs per km of new bridging
- cost of earthworks per bcm of topsoil removed
- cost of earthworks per bcm of excavation
- costs per level crossing.

Costs were captured from each Section's Contractor Cost in the Target scenario TOTC workbook. This generally involved isolating the various cost component codes (as listed in column B of each Contractor Cost worksheet) and summing the total cost in column K for a Section where BoQ and unit rates are provided. Unless otherwise specified, these are direct job costs only. The Benchmarking covers the Work packages between Narromine and Gowrie. For all Work packages assessed (apart from N2NS SP1 2C), the cost codes were consistent and allowed for a reasonable comparison. In a meeting with IRPL, ACIL Allen was informed that SP1 2C Work package was being redesigned and that the costings represented IRPL's best estimate for the items.

The G2K Sections were not included in the detailed benchmarking because they did not include bottom-up estimates with BoQ and unit rates. IRPL provided ACIL Allen with a workbook[21] that we understand was

[21] 01.01.01.04 Gowrie to Calvert (G2H H2C) RR priced BoQ

developed by Regionerate Rail for the preferred PPP bid, which included BoQ and unit rates. However, the data coding system was not easily reconcilable with that used in the TOTC model, and was not feasible for benchmarking purposes.

## Track length

Figure 7.3 below shows the cost per track km, excluding escalation, for each Section (the three G2K Sections are combined). There is a wide disparity in the ratios across the IRP.

The three non-rated Sections are brownfields using existing track, with the main effort being to improve clearances to support ready for double-stacked operations (RDSO). They also have the lowest cost per track km.

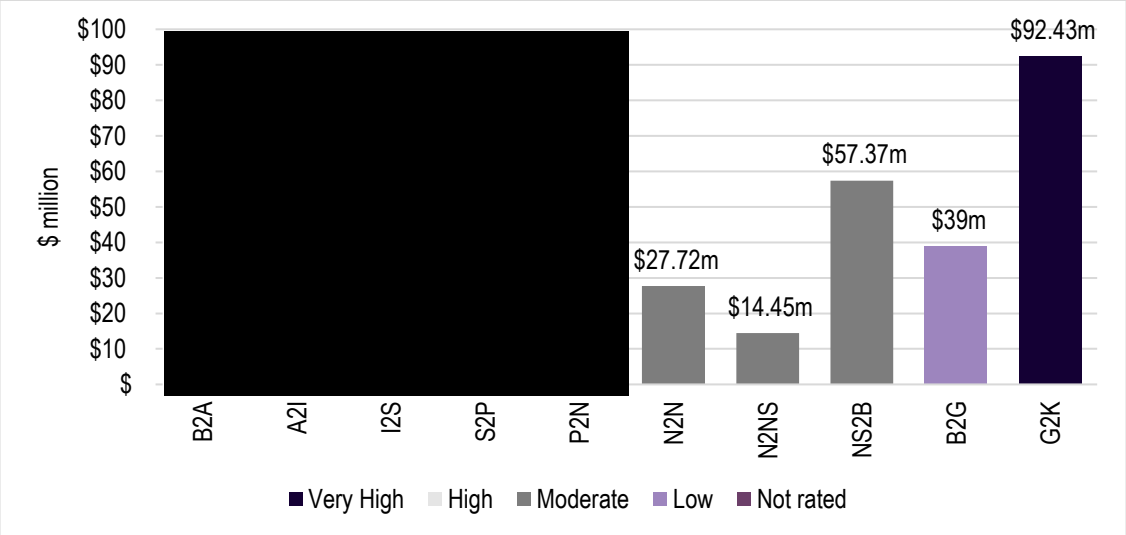
The highest costs per track km are the G2K Sections, which involve tunnelling, a new dual-gauge track and some significant bridging.

I2S is assessed as highly complex but has a modest cost per track km. It is a relatively short greenfield development connecting to existing railway track.

P2N was completed in 2020 and has not been escalated to current costs, so care must be applied if it is used as a benchmark. N2N and N2NS are rated as having moderate complexity but have a lower cost per track km than B2G, which is rated low complexity. However, B2G involves more greenfield track and more bridging.

NS2B is rated moderate and is the second-highest cost per track km. It is a relatively short brownfield replacement track (25 km) and greenfield track (5 km). However, it includes a large amount of bridging and road-rail interfaces.

Figure 7.3 Estimated cost per track km by Section




Note: Rating refers to assessed complexity. Costs do not include escalation.

*Source: IRPL*

## New bridges

Most Work packages did not specify the length of new bridges to be built. However, where available, it was determined that half of the estimated handrail length aligned almost exactly with the length of the new bridge. Therefore, this was used as a proxy to estimate the length of any new bridges being built. These

estimates were compared with the lengths of bridges in the Scope and Battery Limits report (at the Section level) and found to be consistent with minor variations.

Table 7.3 below details new bridges and the calculated cost/bridge-km for each Work package. There is relative consistency across the Work packages. Some explanations for the observed variation include:

— the total number of bridges to be built

— the type of bridges to be constructed

— the number of bridges required to cross large rivers and floodplains

— the average length of bridges.

Notably, the high average cost for NS2B C2/C3 is associated with a significant number of bridges and the proportion of bridges crossing rivers and flood plains (Mobbindry, Whalan, Macintyre River, and Boonal Floodplains). Building over floodplains increases the cost per track kilometre due to the need for additional engineering measures to achieve the required 1:100 flood resilience, including elevated structures, drainage systems, and ground stabilisation to mitigate flood risk. Due to these factors, the higher-than-average cost per bridge kilometre is justifiable.

The benchmarked costs appear reasonably consistent with variations attributable to the abovementioned factors. All estimates are provided by Preliminaries, Concrete Bridge Piling, Concrete Bridge, Superstructure and Bridge Finishing Works. Moree 2C is the exception, as it includes a large lump sum for the bridges, as this Work package is currently being redesigned.

Table 7.3 New bridge length estimation and costs

| Work package | No. of bridges | No. over creek/ river/floodplain | Total estimated length (m) | Total cost ($ million) | Cost/bridge ($ million/km) |
|---|---|---|---|---|---|
| Proposed GJL | 5 | | 950 | | |
| N2N S1 | 12 | 9 | 2,596 | | |
| N2N S2 | 22 | 10 | 2,949 | | |
| N2N S3 | 23 | 12 | 2,499 | | |
| N2N S4 | 10 | 6 | 4,853 | | |
| N2NS C1 | 8 | 8 | 768 | | |
| N2NS 2C | 1 | | - | | |
| NS2B C3C2 | 18 | 17 | 3,909 | | |
| B2G C4 | 1 | | - | | |
| B2G N4 | 6 | 5 | 1,150 | | |
| B2G N1 | 8 | 4 | 1,559 | | |
| B2G N2 | 7 | 4 | 6,296 | | |
| B2G N3 | 11 | 2 | 1,369 | | |

*Note:* The estimated total length was unavailable for Work packages 2C and C4.

*Source: IRPL & ACIL Allen*

# Earthworks

Earthworks is a significant cost item for the IRP, estimated to cost around $2,589 million before contingencies and escalation. Topsoil removal and General Earthworks – Excavation was selected for benchmarking purposes. Topsoil removal includes stripping topsoil for subsequent reuse and on-site and off-site disposal.

Table 7.4 below shows that costs appear reasonably consistent for Work packages within Sections. However, there is a substantial increase in Work packages N1-N4 and for GJL. The increase for N1-N4 is partly explained by the fact that less topsoil is planned to be reused; therefore, more must be disposed of

off-site (more costly on a unit basis). The increase for GJL appears to be an outlier and would be expected to be further refined as a more detailed options analysis is undertaken.

Table 7.4 General earthworks cost estimation – Topsoil removal

| Section | Quantity (bcm) | Total cost ($ million) | Cost/unit quantity ($/bcm) |
|---|---|---|---|
| Proposed GJL | 18,882 | $0.50 | $26.68 |
| N2N S1 | 210,210 | $3.52 | $16.77 |
| N2N S2 | 992,705 | $8.31 | $8.37 |
| N2N S3 | 797,549 | $6.74 | $8.45 |
| N2N S4 | 13,349 | $0.18 | $13.68 |
| N2NS C1 | 89,357 | $1.19 | $13.36 |
| N2NS 2C | 37,050 | $0.46 | $12.50 |
| NS2B C3C2 | 58,912 | $0.49 | $8.32 |
| B2G C4 | 218,241 | $3.01 | $13.78 |
| B2G N4 | 272,100 | $5.59 | $20.53 |
| B2G N1 | 207,109 | $4.25 | $20.53 |
| B2G N2 | 364,965 | $8.21 | $22.49 |
| B2G N3 | 431,630 | $8.86 | $20.53 |

*Source: IRPL*

**General Earthworks – Excavation** involves major excavation and movement of material from cut and fill locations. Table 7.5 below provides benchmarked costs from Work package S1 to N4. Excavation costs appear generally consistent except for Work package S3. In the case of S3, the unit rate cost for "Win, Load, haul general/structural material from borrow" is higher than other Sections ($24/bcm compared to $18.45/bcm in others). S3 is the Work package through the Piliga and is likely explained by more stringent requirements on excavation works.

Table 7.5 General Earthworks cost estimation – Excavation

| Work package | Quantity (bcm) | Total cost ($ million) | Cost/unit quantity ($bcm) |
|---|---|---|---|
| Proposed GJL | 18,673 | $0.33 | $17.79 |
| N2N S1 | 1,915,957 | $33.63 | $17.55 |
| N2N S2 | 1,802,194 | $32.19 | $17.86 |
| N2N S3 | 1,241,158 | $32.35 | $26.06 |
| N2N S4 | 1,061,118 | $19.55 | $18.42 |
| N2NS C1 | 144,654 | $2.49 | $17.18 |
| N2NS 2C | N/A | N/A | N/A |
| NS2B C3C2 | 13,745 | $0.28 | $20.53 |
| B2G C4 | 550,814 | $9.53 | $17.30 |
| B2G N4 | 2,365,695 | $40.10 | $16.95 |
| B2G N1 | 1,821,026 | $32.47 | $17.83 |
| B2G N2 | 1,535,507 | $26.28 | $17.12 |
| B2G N3 | 6,303,850 | $113.08 | $17.94 |

*Source: IRPL*

# Level crossings

Table 7.6 below shows the cost per level crossing by level crossing type and by Work package between N2G. The number of level crossings per track km is also included. No cost data was provided for N2NS SP1 2C.

The number of level crossings per track km is included for G2K. Still, no granular cost data was provided (the estimate for G2K was based on summarised data from the preferred PPP bid).

The analysis shows that the costs used are consistent across all Sections.

Moree has the highest number of crossings per track km. This is not surprising as it represents a small Section of track through an urban centre.

C1 also has many crossings per track km (one crossing every 1.8 per track km). It is also a relatively short length of track (around 15 km).

Table 7.6 Cost per level crossing and number of level crossings per track km

| Work package | Active ($ million/level crossing) | Passive ($ million/level crossing) | Private ($ million/level crossing) | Number of crossings per track km |
|---|---|---|---|---|
| N2N S1 | [redacted] | [redacted] | [redacted] | 0.24 |
| N2N S2 | [redacted] | [redacted] | [redacted] | 0.23 |
| N2N S3 | [redacted] | [redacted] | - | 0.22 |
| N2N S4 | - | [redacted] | [redacted] | 0.13 |
| N2NS C1 | [redacted] | [redacted] | - | 0.55 |
| N2NS 2C | - | - | - | - |
| NS2B C3C2 | [redacted] | [redacted] | - | 0.24 |
| B2G C4 | [redacted] | [redacted] | - | 0.15 |
| B2G N4 | [redacted] | [redacted] | - | 0.17 |
| B2G N1 | [redacted] | [redacted] | - | 0.29 |
| B2G N2 | [redacted] | - | - | 0.07 |
| B2G N3 | [redacted] | [redacted] | - | 0.15 |
| G2K (G2H, H2C, C2K) | - | - | - | 0.10 |

*Source: IRPL*

## Tunnelling

G2K involves three tunnels as follows:

— G2H – 6.36 km of tunnel, of which 6.25 km is to be constructed with a tunnel boring machine

— H2C – 0.91 km conventional horseshoe-shaped tunnel constructed using mining techniques

— C2K – 0.99 km conventional horseshoe-shaped tunnel constructed using mining techniques.

The tunnelling cost estimates are based on the preferred PPP bid, which was part of a process that involved three competing bids. The estimates have been escalated by the Oxford Economics escalation factors (Qld below ground).

The TOTC allows $1,074 million to construct tunnels for the three Sections ($130 million per km). Tunnel costs depend on a range of factors, including the geological conditions, the depth of the tunnel, the size of the tunnel (diameter), the location (urban vs rural), the requirement for and extent of tunnel lining, and the range of services and safety systems to be included. Uncertain geological conditions create significant risks when estimating tunnelling costs.

ACIL Allen considers the process for estimating tunnelling costs for the current TOTC estimate to be reasonable. However, significant uncertainty exists as the geological conditions of basalt lavas covering underlying sedimentary rocks create known slope stability challenges.

## Assessment of approach

ACIL Allen considers that the unit rates used in the development of the estimates are reasonable and consistent across the various Work packages. Where there are variations, these can largely be explained by the complexity of the respective Work package. ACIL Allen also notes that IRPL engaged the consultancy

North Projects[22] to develop the cost estimates between Narromine and Gowrie. North Projects have a wide range of experience in cost estimation for infrastructure projects, and their involvement adds credibility to the cost estimation process.

ACIL Allen recognises that the estimating process IRPL used for G2K is not as rigorous as the process used for the N2G sections.

Finding 7 Unit rates

ACIL Allen considers that the unit rates used by IRPL in the development of the estimate are reasonable, consistent and fit -for -purpose across the various Work packages. Where there are variations, these can largely be explained by the complexity of the respective Work packages.

## 7.3 Contractor indirect costs

This section of the report considers the reasonableness of the process for developing indirect cost estimates. Contractor indirect costs and Client costs are considered in the sections below.

Contractor indirect costs include:

— Contractor's On-Site Indirects and Management
— Contractor's Off-Site Indirects and Profit.

### Contractor's On-Site Indirects and Management costs

IRPL's Basis of Estimate document[23] states that the allowance for Contractor's On-site Indirect and Management costs relies on the following factors:

— The duration of the construction of a Work package under the schedule
— Consideration of the anticipated Inland Rail Owners team
— Estimated full-time equivalent (FTE) hours.

The estimating process targets Indirect Job Costs (IJC) between [redacted] of Direct Job Costs (DJC) based on comparison with pricing received from CWC and against comparable projects.

The percentage ratio of Contractors On-Site Indirects and Management to DJC is shown in Table 7.7. The ratio for most Work packages is within or close to the target range [redacted] The Work packages between Beveridge and Narromine (B2N) and the N2NS SP1 Work package combine the Contractors' On-Site Indirects and Management costs and Contactor's Off-site Indirect and Profit and are not directly comparable with the other Work packages. [redacted] which is low against the target.

S2P is an outlier on the high side with a ratio of [redacted] It is a small Work package involving 8 separate sites. The higher ratio can partially be explained by the additional coordination, mobilisation, and management costs per dollar of expenditure for delivering smaller scope items.

B2G N1 is on the high side at 66%. There is no apparent reason from the data provided why these indirect costs should be higher relative to other Work packages, especially those within B2G.

[22] North Projects acquired Fission in 2023.
[23] IRPL, (2025), *Beveridge to Kagaru Estimate Update: Basis of Estimate*.

P2N is very low compared with most other Work packages.[24] However, this Section has been completed, and it is unclear from the information provided how indirect contractor costs were incorporated into the contract.

G2K is also very low at 24%. These estimates are drawn from the preferred PPP bid. However, the complexity of these Sections, coupled with ACIL Allen's maturity assessment of Class 4, suggests that Contractor's On-Site Indirects and Management costs may be significantly higher than currently estimated (an increase to a ratio of 50% would add more than $1,100 million to the Gowrie to Kagaru estimate, before contingency and escalation).

Table 7.7 Contractors On-Site Indirects and Management costs as a % of DJC

| Work package | Contractors On-Site Indirects and Management ($ million) | Direct Job Cost ($ million) | Contractors On-Site Indirects and Management costs /Direct Job Costs (%) |
|---|---|---|---|
| B2A T1 | [redacted] | | |
| B2A T2 | | | |
| A2I | | | |
| I2S | | | |
| S2P | | | |
| Proposed GJL | $78.3 | $150.6 | 52% |
| P2N | [redacted] | | |
| N2N – S1 | $437.3 | $804.0 | 54% |
| N2N - S2 | $478.2 | $912.0 | 52% |
| N2N - S3 | $348.3 | $662.8 | 53% |
| N2N - S4 | $222.1 | $399.6 | 56% |
| N2NS - SP1 | $209.8 | $541.3 | 39% |
| N2NS - SP1/2C | $55.4 | $100.6 | 55% |
| Newell Hwy Overpass | $12.7 | $30.1 | 42% |
| N2NS SP2 - C1 | $149.9 | $250.7 | 60% |
| NS2B - C2/C3 | $287.6 | $551.7 | 52% |
| B2G - C4 | $221.3 | $385.7 | 57% |
| B2G - N4 | $281.3 | $501.3 | 56% |
| B2G - N1 | $291.1 | $443.4 | 66% |
| B2G - N2 | $311.0 | $599.3 | 52% |
| B2G - N3 | $311.5 | $538.2 | 58% |
| G2K (G2H, H2C, C2K) | $1,042.7 | $4,419.5 | 24% |
| MDC | $20.7 | $33.7 | 62% |
| IRP | $5,227.7 | $12,373.1 | 42% |

*Source: IRPL*

# Contractor's Off-site Indirects, Profit and Design

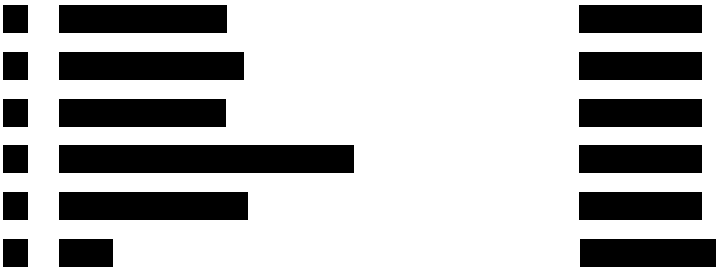
## Contractor's Off-site Indirect and Profit

[redacted] (DJC plus Contractor's On-Site Indirects and Management costs). This is consistent with the current and anticipated contractor commercial position. This parameter is applied to all Work packages based on the bottom-up cost estimation approach, except for B2G N1; which is set to 10.8%. While not materially different (it would add around $4 million to the estimate), it has not been explained based on the data provided.

[24] P2N was completed in 2020 and the costs have been reported as incurred – not escalated.

### Contractor's Design

The Basis of Estimate document states that the allowance for each design phase is as follows:



The assigned allowance depends on the design status of each Work package. The allowances in the estimate are higher than the Basis of estimate allowance, where it is provided. The allowance for the G2K sections appears low compared with the other Work packages. Increasing the G2K allowance to 15% would add around $255 million to the base cost estimate (before contingency and escalation).

Table 7.8 Contractor's Design costs as a % of DJC

| Work packages | Design costs ($ million) | Direct Job Cost ($ million) | Design costs/DJC cost | Basis of estimate allowance |
|---|---|---|---|---|
| B2A T1 | | | | |
| B2A T2 | | | | |
| A2I | | | | |
| I2S | | | | |
| S2P | | | | |
| Proposed GJL | $20.4 | $150.6 | 13.56 | N/A |
| P2N | | | | |
| N2N – S1 | $91.8 | $804.0 | 11.4% | 10.75% |
| N2N - S2 | $103.9 | $912.0 | 11.4% | 10.75% |
| N2N - S3 | $100.2 | $662.8 | 15.1% | 14.25% |
| N2N - S4 | $61.1 | $399.6 | 15.3% | 14.25% |
| N2NS - SP1 | $23.4 | $541.3 | 4.3% | N/A |
| N2NS - SP1/2C | $15.3 | $100.6 | 15.2% | 10.75% |
| Newell Hwy Overpass | $5.1 | $30.1 | 16.9% | Not provided |
| N2NS SP2 - C1 | $29.7 | $250.7 | 11.9% | 10.75% |
| NS2B - C2/C3 | $83.7 | $551.7 | 15.2% | 14.25% |
| B2G - C4 | $59.0 | $385.7 | 15.3% | 14.25% |
| B2G - N4 | $76.1 | $501.3 | 15.2% | 14.25% |
| B2G - N1 | $67.5 | $443.4 | 15.2% | 14.25% |
| B2G - N2 | $90.7 | $599.3 | 15.1% | 14.25% |
| B2G - N3 | $81.6 | $538.2 | 15.2% | 14.25% |
| G2K (G2H, H2C, C2K) | $396.9 | $4,419.5 | 9.0% | N/A |
| MDC | $19.0 | $33.7 | 56.4% | N/A |
| IRP | $1,482.7 | $12,523.9 | 11.8% | |

*Source: IRPL*

## Assessment of Approach

The approach used to assign Contractor indirect costs is:

- of DJC
-
-

The approach appears to be reasonable and fit for purpose for developing these costs for each Work package.

The specification of allowances for G2K appears low for both IJC and Design costs. Increasing these allowances to the minimum benchmark would add around $1,420 million to the Base cost estimate for those Work packages.

Finding 8 Contractor indirect costs

For Work packages between Narromine and Gowrie, the approach used to assign Contractor indirect costs using targets for Indirect Job Costs as a percentage of Direct Job Costs and specified allowances for Off-Site Indirects and Profit and Design costs based on design status, appears to be reasonable and fit -for -purpose for developing these costs for each Work package.

The specification of allowances for the Gowrie to Kagaru Work packages appears low for both Indirect Job Costs and Design costs when benchmarked against the approach used by IRPL for Narromine to Gowrie. Increasing these allowances to the minimum benchmark of other Work packages would add significantly to the Base cost estimate for those Work packages.

However, IRPL has stated that the Contractor cost used to develop the Gowrie to Kagaru cost estimate includes some contractor indirect costs, which are not separable from the offer amount. IRPL has stated that the allowance they have included is a provision on top of the allowance the Contractor is assumed to have already included.

## 7.4 Client costs

IRPL's Basis of Estimate document states Client costs consist of:

- Project Delivery costs
- Materials (incl. Delivery) costs (not benchmarked)
- Design Services costs
- Land and Biodiversity costs.

The costs include APW-funded costs to the end of 2027 and projected costs beyond the APW to deliver the complete IRP. For estimates beyond the APW, the consultancy North Projects received estimates from IRPL and undertook forecasts to fill in any missing data.

### IRP Delivery and Design Services

Table 7.9 below shows the IRP Delivery and Design Services costs as a percentage of the Base cost for each Work package.

The Client costs for the Northern sections have a lower ratio than the Southern sections, except for the Newell Highway Overpass (likely fixed costs have a greater proportional impact on this lower-cost Work package) and N2NS SP1 (operational and in completion). The Client costs for the remaining range between 12% and 23%. The overall IRP ratio is 22%.

Table 7.9 Client costs (IRP Delivery and Design Services) as a % of Base cost

| Work package | Client costs* ($ million) | Base cost ($ million) | Client costs/Base cost (%) |
|---|---|---|---|
| B2A T1 | | | |
| B2A T2 | | | |
| A2I | | | |
| I2S | | | |
| S2P | | | |
| Proposed GJL | $90.8 | $391.4 | 23% |
| P2N | | | |
| N2N – S1 | $255.3 | $1,934.3 | 13% |
| N2N - S2 | $258.2 | $2,126.0 | 12% |
| N2N - S3 | $237.8 | $1,626.8 | 15% |
| N2N - S4 | $184.6 | $1,027.6 | 18% |
| N2NS - SP1 | $508.2 | $1,368.5 | 37% |
| N2NS - SP1/2C | $32.5 | $232.3 | 14% |
| Newell Hwy Overpass | $38.3 | $91.1 | 42% |
| N2NS SP2 - C1 | $137.6 | $640.6 | 21% |
| NS2B - C2/C3 | $246.8 | $1,339.0 | 18% |
| B2G - C4 | $159.2 | $987.8 | 16% |
| B2G - N4 | $214.6 | $1,292.3 | 17% |
| B2G - N1 | $199.9 | $1,197.6 | 17% |
| B2G - N2 | $233.7 | $1,465.3 | 16% |
| B2G - N3 | $225.8 | $1,412.8 | 16% |
| G2K (G2H, H2C, C2K) | $2,112.6 | $9,549.8 | 22% |
| MDC | $36.1 | $497.5 | 7% |
| IRP | $6,835.3 | $30,619.6 | 22% |

*Sum of IRP Delivery and Design Services costs.

*Source: IRPL*

# Land and Biodiversity

Land and biodiversity costs include:

— land acquisition costs

— noise mitigation costs

— biodiversity offset costs.

Land acquisition costs are based on valuations of land required to construct and operate IRP. Biodiversity costs are the costs developed by IRPL following a biodiversity assessment for each Work package north of Narromine. Biodiversity costs between B2N are based on established offset obligations.

Noise mitigation costs are based on mitigations from noise assessments provided by IRPL.

The land acquisition and biodiversity Client costs range between 0% and 7.6% and depend on the value of the land to be acquired, the assessed environmental loss in constructing each Work package, and the proximity of the Inland Rail alignment to inhabited dwellings and communities.

Table 7.10 Client costs (Land and biodiversity as a % of Base cost)

| Work package | Client costs* ($ million) | Base cost ($ million) | Client costs/Base costs (%) |
|---|---|---|---|
| B2A T1 | [redacted] | | |
| B2A T2 | | | |
| A2I | | | |
| I2S | | | |
| S2P | | | |
| Proposed GJL | N/A | $391.4 | - |
| P2N | [redacted] | | |
| N2N – S1 | $120.1 | $1,934.3 | 6.2% |
| N2N - S2 | $133.8 | $2,126.0 | 6.3% |
| N2N - S3 | $98.9 | $1,626.8 | 6.1% |
| N2N - S4 | $62.8 | $1,027.6 | 6.1% |
| N2NS - SP1 | $8.5 | $1,368.5 | 0.6% |
| N2NS - SP1/2C | N/A | $232.3 | - |
| Newell Hwy Overpass | N/A | $91.1 | - |
| N2NS SP2 - C1 | $16.7 | $640.6 | 2.6% |
| NS2B - C2/C3 | $44.7 | $1,339.0 | 3.3% |
| B2G - C4 | $45.8 | $987.8 | 4.6% |
| B2G - N4 | $77.3 | $1,292.3 | 6.0% |
| B2G - N1 | $71.1 | $1,197.6 | 5.9% |
| B2G - N2 | $112.0 | $1,465.3 | 7.6% |
| B2G - N3 | $99.5 | $1,412.8 | 7.0% |
| G2K (includes G2H, H2C and C2K) | $446.7 | $9,549.8 | 4.7% |
| MDC | N/A | $497.5 | - |
| IRP | $1,398.6 | $30,619.6 | 4.6% |

* Land and Biodiversity costs.

*Source: IRPL*

## Ramp up and demobilisation

IRPL has explicitly assessed ramp-up and ramp-down requirements for the Work packages between N2G. An average monthly employee cost of around $23k is applied to labour FTE for each employee category. Staffing is projected to peak towards the end of 2030 and then ramp down through the end of 2034.

Ramp up and ramp down for G2K is taken from an analysis undertaken in 2022 as part of the G2K preferred PPP bid assessment. G2K staffing requirements are shown extending to 2037in the *Client Cost Summary* worksheet, but the staffing numbers are not used to determine costs. Costs are provided in a summarised form in the *G2K – Summary* worksheet.

Staffing numbers, including ramp down, are shown for the APW activities in the *Client Cost Summary* worksheet, but the staffing numbers are not used to determine costs. Costs are incorporated through the [redacted]

ACIL Allen queried IRPL about asset disposal and lease exit costs. IRPL's response was as follows:

— For B2P, these costs are incorporated through a part of the Pass-Through Costs in the [redacted]

— For N2B, these costs are incorporated through ARTC Corporate Allocations in the *Client Costs excl. G2K* worksheet.

— *For G2K,* these costs are incorporated as part of the Pass-Through Costs in the *G2K – Summary* worksheet.

## Assessment of approach

The approach to estimating Client costs appears to be a reasonable process for developing these costs for each Work package. Costs south of Narromine are based on completed Work packages or commitments under the APW to complete Work packages that are in progress. The process for estimating Client costs north of Narromine is reasonable, and the various Client-based activities needed to complete those Sections are considered.

Finding 9 Client costs

IRPL's approach to estimating Client costs appears to be a reasonable process for developing these costs for each Work package.

Costs for Sections south of Narromine are based on completed Work packages or commitments under the Approved Project Works to complete Work packages that are in progress.

For the Sections between Narromine and Gowrie, estimates of Client costs are based on a bottom-up process for activities to complete the delivery of the Sections, plus Client costs associated with activities under the current Approved Project Works.

For Gowrie to Kagaru, Client costs are based on the 2022 budget estimate, updated to 2024 and escalated based on the revised schedule.

ACIL Allen considers IRPL's approach to estimating Client costs reasonable and fit for purpose.

# 7.5 Contingency

## APW estimate

The APW incorporates contingency for the Southern sections and the N2NS – SP1 Work package. The contingency is hardcoded in the model, representing 16.4% of the total cost for these Sections/Work packages. The Southern sections have a maturity assessment of either Class 1 or Class 2, and the N2NS – SP1 Work package is operational. AACE98R-18 has the upper bound for Class 1 estimates at 15% and Class 2 estimates at 20%. The Contingency allowance is consistent with the assessed maturity.

## Narromine to Gowrie

For the Sections/Work packages between Narromine and Gowrie (except N2NS SP1), the process to estimate contingency for Work packages using a bottom-up estimation approach is described below.

IRPL developed risk and project contingency through a structured qualitative assessment to identify project risks, itemised for each Work package. Identified risks were categorised using a standardised format across all Work packages. The risk categories are shown in Table 7.11 below.

Table 7.11 Risk categories

| Category | Description | Owner | Type | Exclusions* |
|---|---|---|---|---|
| Design Detail Development | Design creep and/or discrete design risks associated with design status. The risk ranging also considers rate risk within the estimate and standards changes over time | Contractor | Planned | Material scope changes, additional Queensland Rail requirements and specifications, Future proofing alternate train plans, objections from DPHI in respect of hydrology design. |
| Productivity Risk | Relates to Contractor productivity risks. | Contractor | Planned | |
| Methodology | Relates to risks associated with Contractor methodology | Contractor | Contingent | Impacts of major cultural heritage finds, non-achievement of CH agreements |
| Program[25] | Relates to risks associated with project delays | Contractor | Contingent | |
| Insurable Risks | Relates to risk of insurable event occurrence | Contractor | Contingent | |
| Escalation | Relates to risks associated with escalation above that allowed | Contractor | Contingent | |
| Client Budget | Relates to risks associated with Inland Rail owners cost estimate | Client | Planned | Southern Queensland Rail Network acquisition, non-achievement of biodiversity offset obligations, Primary approvals process |
| Property | Relates to risks associated with property costs | Client | Planned | Property acquisition exceeding the budget as all within existing APW budget |
| Approvals | Relates to risks associated with delays in Approvals | Client | Contingent | Pilliga, Whetstone and Bringalily State Forrest revocation non-approval |
| Utility Services | Relates to price and scope surety associated with utility services | Client | Contingent | |
| Residual Master | Relates to residual risks associated with the IRP | Client | Contingent | Major Horizontal alignment changes, B2P additional scope to achieve service offering |

**Risk has not been priced for the exclusions.*

*Source: IRPL*

Following categorisation, IRPL and Northern sections SMEs prepared estimates of consequence, likelihood, and range for each discrete risk. This was then developed into a contingency for each discrete risk against a base value. This provided the input to @Risk software, which was used to model the risk contingency using probabilistic Monte Carlo simulations.

[25] Terminology used by IRPL in *2025 Beveridge to Kagaru Estimate Update: Basis of Estimate.*

Finally, the discrete risk models went through a correlation process to establish a consolidated risk profile for the P50 and P90 scenarios covering:

— the timing of funding for the IRP
— escalation variation
— standards Change
— design development.

The TOTC uses the P90 consolidated risk profile.

## Gowrie to Kagaru

A bottom-up risk assessment using the same process described for N2G was not completed for G2K. This is because the G2K estimates are based on the preferred PPP bid and are not a bottom-up estimate. A dollar figure from a column headed 2022 budget provided three components of risk cost as follows:

— Contingency (Allocated to Contractor - see above)
— QRA Project output - Risk (P90)
— Project Trends.

An adjustment was made to subtract the contingency accounted for in the APW to provide risk contingency for the scope beyond APW. These three items were then scaled up by 153% (with some other adjustments), which is the proportional difference between the P50 and P90 risk contingencies for the correlated model for N2G.

IRPL has stated that a bottom-up process will be undertaken in the future for the G2K Work packages.

Table 7.12 Contingency P50 and P90 as % of Base costs

| Work package | Maturity | Method | P50 /Base costs | P90/Base costs |
|---|---|---|---|---|
| B2A T1 | | | | |
| B2A T2 | | | | |
| A2I | | | | |
| I2S | | | | |
| S2P | | | | |
| Proposed GJL | Class 5 | High-level desktop study | 18.8% | 32.7% |
| P2N | | | | |
| N2N – S1 | Class 3 | Bottom-up | 17.8% | 27.1% |
| N2N - S2 | Class 3 | Bottom-up | 16.5% | 26.2% |
| N2N - S3 | Class 3 | Bottom-up | 15.9% | 25.9% |
| N2N - S4 | Class 3 | Bottom-up | 16.8% | 26.0% |
| N2NS - SP1 | N/A | Bottom-up | 3.8% | 3.8% |
| N2NS - SP1/2C | Class 4 | Redesigned Bottom-up | 25.6% | 32.6% |
| Newell Hwy Overpass | Class 4 | SME | 16.9% | 34.8% |
| N2NS SP2 - C1 | Class 4 | APW | 20.4% | 29.7% |
| NS2B - C2/C3 | Class 3 | Bottom-up | 17.6% | 27.0% |
| B2G - C4 | Class 4 | Bottom-up | 27.3% | 39.3% |
| B2G - N4 | Class 4 | Bottom-up | 21.4% | 32.3% |
| B2G - N1 | Class 4 | Bottom-up | 24.6% | 35.3% |
| B2G - N2 | Class 4 | Bottom-up | 17.3% | 27.0% |
| B2G - N3 | Class 4 | Bottom-up | 21.8% | 32.2% |
| G2K (G2H, H2C, C2K) | Class 4* | preferred PPP bid | 15.4% | 23.2% |
| MDC | Class 3 | Bottom-up | 14.6% | 35.7% |
| IRP | | | 17.2% | 24.9% |

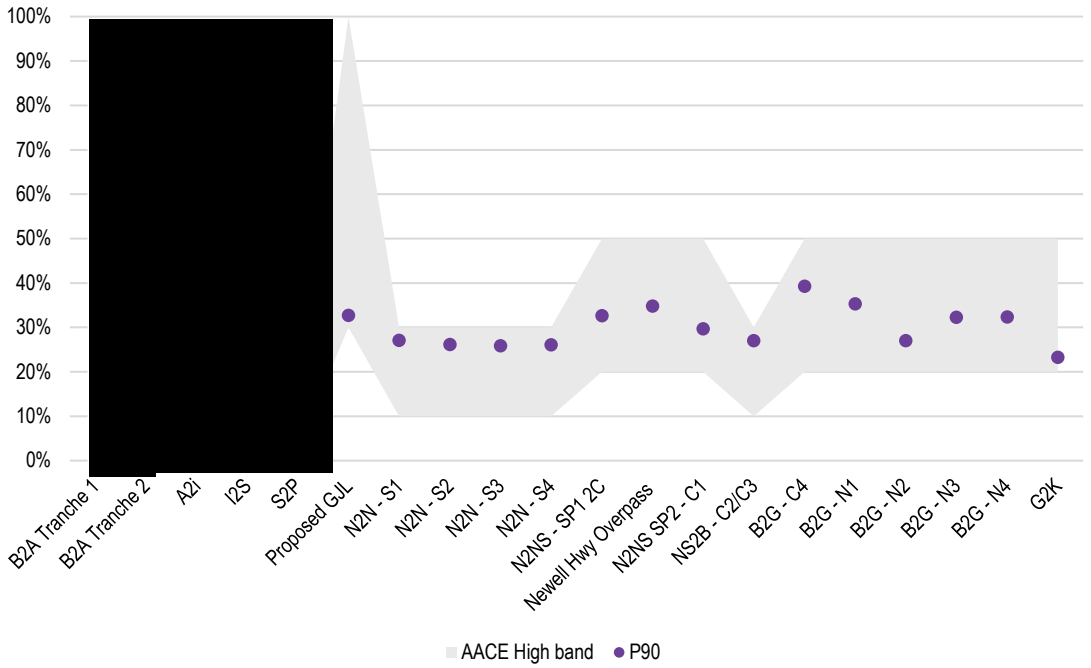
** ACIL Allen maturity assessment*

Note: ACIL Allen acknowledges that funding for Beveridge to Parkes has been approved and can be classed as approved budget rather than estimates.

*Source: IRPL and ACIL Allen*

The P90 total risk cost estimates as a percentage of the base cost mostly fall within the ACEE High band for the relevant maturity classification, as shown in Figure 7.4 below.

Figure 7.4 P90 contingency estimates as % of base costs




Note: The AACE High band represents the typical percentage variation at an 80% confidence interval of actual costs from the cost estimate after application of appropriate contingency (typically to achieve a 50% probability of project cost overrun versus underrun) for a given scope. P90 contingency estimates are shown as they are used in the TOTC.

*Source: IRPL*

## Assessment of process

The process used to develop the bottom-up risk assessments for the N2G Work packages appears reasonable and fit for purpose. The process used for the Southern sections is considered sound, as they are part of the APW. The process used for G2K is less sound and lacks appropriate rigour, noting that IRPL intends to undertake a bottom-up discrete risk analysis, similar to the process used for N2G.

Finding 10 Contingency

The process used for the Beveridge to Parkes Sections is considered fit for purpose, as they are part of the Approved Project Works and are under contract. The process used to develop the bottom-up risk assessments for Narromine to Gowrie appears reasonable and fit-for-purpose.

The contingency allowance appears low for the Gowrie to Kagaru Sections compared to the assessed maturity of these Sections. However, IRPL has stated that the preferred PPP bid used to develop the Gowrie to Kagaru cost estimates includes some contingency allowance, which is not separable from the offer amount. IRPL has stated that the allowance they have included is considered a conservative addition on top of the allowance the preferred bidder is assumed to have already included.

It is noted that IRPL is undertaking a bottom-up, discrete risk-by-risk analysis for the Gowrie to Kagaru Sections, similar to the process used for the Narromine to Gowrie Sections.

# 7.6 Escalation

## Escalation Process

Escalation is applied in two parts in the TOTC, APW plus ETC (Narromine to Kagaru)

Escalation of the APW costs are hardcoded numbers entered into the APW Reset-23 worksheet [redacted] It is assumed the escalation estimates for the Southern sections are taken from the detailed budgets for the four Sections (all under contract). Total escalation for the Southern sections is [redacted]

An additional hardcoded $150 million is included in the APW allocated to the yet-to-be-constructed Northern sections. It is allocated as a fixed amount of $10.6 million to each Work package (total of $127.2 million) and a variable amount each year (total of $22.8 million).

Escalation of the Work packages, staff, labour, materials, plant and subcontractors is undertaken using annual escalation factors developed by Oxford Economics for IRPL in August 2024. The escalation outputs of the modelling include Client and Contractor Index values and annual percentage changes for FY2025-FY2040 for NSW Aboveground, QLD Aboveground, and QLD Underground.

Escalation estimates for the P90 estimate are based on applying annual escalation factors to annual estimated costs (aggregated from monthly estimated costs).

Escalation estimates for P50 are estimated by scaling P90 escalation estimates down based on the ratio of (Base costs + P90 Contingency)/(Base costs + P50 Contingency).

Table 7.13 Escalation P50 and P90 as % of Base costs

| Work package | Projected completion | P50 /Base costs | P90/Base costs |
|---|---|---|---|
| B2A T1 | [redacted] | | |
| B2A T2 | | | |
| A2I | | | |
| I2S | | | |
| S2P | | | |
| Proposed GJL | August 2032 | 22.6% | 25.2% |
| P2N | Completed | 0% | 0% |
| N2N – S1 | April 2032 | 17% | 19% |
| N2N - S2 | August 2032 | 20% | 21% |
| N2N - S3 | November 2032 | 20% | 22% |
| N2N - S4 | November 2031 | 17% | 18% |
| N2NS - SP1 | June 2026 | 1% | 1% |
| N2NS - SP1/2C | March 2031 | 17% | 18% |
| Newell Hwy Overpass | July 2030 | 21% | 24% |
| N2NS SP2 - C1 | April 2031 | 15% | 17% |
| NS2B - C2/C3 | September 2033 | 19% | 21% |
| B2G - C4 | August 2033 | 28% | 31% |
| B2G - N4 | November 2033 | 27% | 30% |
| B2G - N1 | April 2034 | 27% | 30% |
| B2G - N2 | April 2034 | 24% | 26% |
| B2G - N3 | December 2033 | 25% | 27% |
| G2K (G2H, H2C, C2K) | May 2036 | 28% | 30% |
| MDC | N/A | 13% | 16% |
| IRP | | 14% | 22% |

*Source: IRPL*

## Assessment

For the Southern sections, IRPL applied escalation as hardcoded numbers. The escalation is consistent with the November 2024 cost reports, except for B2A [redacted] compared with [redacted] in the relevant cost report).

Without supporting evidence, an additional $150 million is hardcoded in the APW for the Northern sections. The round number suggests it was incorporated as an imposed assumption rather than developed methodically.

For the Northern sections, the cost modelling analysis confirms IRPL used the Oxford Economics outputs as intended. The calculation for FY2025 used Oxford Economics outputs divided by 2[26] instead of the original outputs. This is consistent with the cost estimates based on December 2024 dollars (halfway through the financial year).

### Finding 11 Escalation

IRPL applied escalation for the Approved Project Works Sections from Beveridge to Parkes as hardcoded numbers. The escalation for the three Sections between Albury and Parkes aligns with the November 2024 cost reports provided.

IRPL assigned additional escalation in the Approved Project Works to the Northern sections. The formulas assigning the escalation are hardcoded and are not supported with evidence.

For the Northern sections, the cost modelling analysis confirms IRPL used the Oxford Economics outputs, developed for IRP, as intended for the costs beyond the Approved Project Works.

The approach to escalation is considered fit-for-purpose.

[26] Technically the calculation should have been $\sqrt{(1 + esclation\ rate)} - 1$ but diving by 2 is a close approximation.

# 8 Risks

*This section assesses risks to scope, design, schedule, cost or a combination of these risks that IRPL has not explicitly covered.*

## 8.1 Scope

The requirement to gain approvals from state-based statutory authorities creates a significant risk that scope beyond freight requirements will be added to the IRP. Experience to date has shown that this can occur during both primary and secondary approval processes.

The Sections between Beveridge and Parkes have been subjected to significant scope beyond freight requirements through the approval processes, but these are well documented and incorporated into the schedule and costs. These Sections are under contract and well-advanced.

Most of the Work packages in New South Wales have key approvals in place, and IRPL appears to have considered risks to the scope in the schedule and cost estimates.

None of the Queensland Sections (B2G, G2H, H2C or C2K) have achieved primary approval outcomes. In the case of B2G, the OCG is currently assessing the revised draft EIS following a public consultation period. Regarding the three Sections between G2K, the OCG has requested that additional information be provided for the EIS. It is not possible to progress to a Detailed Design or Issued -for -Construction Design until the Section is assessed and potential changes to scope and design to meet EIS requirements are known and incorporated. The relatively low level of contingency provided for the Sections beyond Gowrie (compared with its assessed maturity) indicates that risks to scope may not have been fully incorporated into the schedule and cost estimates.

## 8.2 Design

Like scope risks, design risks are primarily linked to the primary and secondary approvals processes. This is particularly where the IRP interfaces with roads, communities and private property. Cultural heritage matters may also lead to requirements to change the design of aspects of the Work packages.

Southern sections' experience provides examples of how the approval process can add to or change the design of parts of Work packages. For example, the Network Design Review Group in Victoria and design reference groups in New South Wales influenced design choices, resulting in significant additional costs.

Some examples of risks include:

— overpasses or underpasses at level crossings instead of simpler gated crossings
— sealing of approach roads that were historically unsealed
— lengthening approaches to overpasses and underpasses to reduce the slope
— wider and higher bridge spans to avoid disturbing areas below
— increased drainage in flood-prone areas
— protection for fauna, including the requirement for fauna crossings.

Finding 12 Scope and Design risk

Scope and design risks are primarily associated with gaining environmental and detailed design approvals and maintaining social licences with communities, interest groups and private property owners. Southern sections' experience provides examples of how these processes and interactions can add to or change the scope and design of parts of a Work package.

The most significant risk to scope and design is for the four Sections in Queensland, as they are still subject to Primary approval processes.

## 8.3 Schedule

The main schedule risks are delays in gaining primary and secondary approvals. An associated risk is land acquisition, as in some cases, compulsory acquisition depends on approvals. The most significant schedule risks are expected in each Work package's Pre-Construction phase.

These include:

- settling agreements with and the policy settings of key state agencies and local governments
- securing outstanding Primary approvals in NSW (N2NS SP2) and QLD (NSW/QLD Border to Kagaru), and the possible impacts of approval conditions set by the Commonwealth and the respective state agencies
- securing the corridor in QLD (NSW/QLD Border to Kagaru)
- timing for delivery of the IRP beyond the current APW.

There are several schedule threshold issues on G2K:

- Gaining EIS approvals for all three Sections
- Development of an interface agreement with Queensland Rail to facilitate the passage of the Inland Rail route alignment through the existing Queensland Rail corridor
- There are additional issues on each of the G2K Sections:
- G2H:
  - Additional complexity associated with groundwater is anticipated for G2H due to the Toowoomba range tunnel bisecting multiple artesian basins along its alignment.
  - [redacted]
- H2C
  - Lockyer Valley Regional Council have strongly advocated modifying the Inland Rail route to bypass the town of Gatton (the Gatton Bypass). This presents a significant source of potential scope escalation and schedule delay.
- C2K
  - The interface between the Inland Rail alignment and the proposed Ebenezer Intermodal Terminal is an emerging Threshold Issue. As of March 2025, IRPL did not have access to this proposed Work package's projected scope and delivery timing and, therefore, cannot assess impacts on C2K.

The Target Schedule for the G2K assumes 12 months are required to resolve these threshold issues. There is a significant chance the issues will take much longer to resolve.

The target schedule assumes a significant ramp-up of IRPL capacity when the relevant skills are in high demand. Delays in the ramp-up of capacity will lead to delays in completing pre-construction and all dependent activities. Even if IRPL is successful in its plans to ramp up its workforce, it will likely take some

time for the new workforce to familiarise itself with the IRP and relevant procedures and processes. This will likely cause delays in the pre-construction activities of the IRP and all dependent activities.

At its peak, the Target schedule plans for all Sections from NS2B C3 through C2K (9 Work packages) to be in construction mode at the same time from late 2031 through the first half of 2033. There is a risk that resourcing may not be available to undertake such an intensive construction effort.

Finding 13 Schedule risk

The main schedule risks are delays in gaining environmental and detailed design approvals. An associated risk is land acquisition, as in some cases, compulsory acquisition depends on approvals. The most significant schedule risks are expected in each Work package's Pre-Construction phase. These include:

— settling agreements with and the policy settings of key state agencies and local governments
— securing outstanding environmental and planning approvals in the New South Wales N2NS Phase 2 Work packages and all Sections in Queensland, and the possible impacts of approval conditions set by the Commonwealth and the respective state agencies
— land acquisition in all Sections in Queensland
— timing for delivery of the IRP beyond the current Approved Project Works.

Several threshold issues for Gowrie to Kagaru require resolution and may cause significant delays in completing those Sections.

## 8.4 Cost estimation

Major risks to cost estimation can be grouped in five areas:

— **Delays to gaining approvals or unfavourable conditions of approval:** While these factors are likely to lead to changes in scope and design and delays to schedule, they will ultimately flow through to increases in cost estimates. The range of potential risks is discussed in the above sections.
— **Delays in accessing the alignment to undertake construction works:** This is likely to be associated with delays in acquiring land and establishing the necessary agreements with QR to facilitate the passage of the Inland Rail route alignment through the existing QR corridor. Also, delays or difficulties in gaining track possessions for brownfield developments and dual-gauge track.
— **Unexpected technical matters:** For example, the tunnelling work on G2H is expected to be challenging because of geological instability and water courses along its alignment. Resolving unexpected technical difficulties may add significant cost. IRPL may be able to enter contracts with highly controlled costs, but history has shown that contractors are usually tempted to pursue deep-pocketed government clients in such circumstances.
— **Timing for delivery of the IRP beyond the current APW:** Delays in timing for delivery of the IRP beyond the current APW will likely lead to additional Client costs (demobilisation and then remobilisation of resources, loss of expertise, etc.) and delays in the schedule that will flow through to increases in cost estimates.
— **Prolongation of the IRP delivery schedule:** Prolongation of the delivery schedule may result in some loss of efficiency concerning Client costs and will increase escalation.

Finding 14 Cost estimation risk

IRPL developed risk and contingency measures for each Work package through a structured qualitative assessment to identify and address potential IRP risks. The most significant risks to the cost estimates are associated with:

- Delays to gaining approvals or unfavourable conditions of approval are likely to lead to changes in scope and design, and delays to schedule and will ultimately flow through to increases in cost estimates.
- Delays in accessing the alignment to undertake construction will likely cause increased mobilisation costs and other project costs as dependent activities are delayed.
- Unexpected technical matters: even with the best planning, unknown technical issues with a significant cost impact will potentially arise throughout the IRP.
- Timing and schedule for delivery of the IRP beyond the current Approved Project Works.
- Prolongation of the IRP delivery schedule.

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# Appendices

# A Complexity assessment

*This appendix provides some details about the complexity assessment.*

## A.1 Assessing Complexity

One of the underlying explanations for variations in the expected cost of construction of a Section of the IRP is thought to be the inherent complexity of what IRPL has been asked to deliver. Complexity can manifest in several outcomes, including (but not limited to):

- More intensive infrastructure solutions to address a given part of an alignment or terrain
- Longer design and approval processes
- More complex delivery methodologies.

ACIL Allen has observed some variations in the cost of the IRP on a Section-by-Section basis, which cannot be explained by differences in the selected infrastructure solution alone. The underlying complexity of the Sections, relative to each other, may help explain part of this variance.

No single measure of complexity or absolute measure can be applied consistently and reliably across the IRP. ACIL Allen has developed its complexity benchmark score, which is then compared to Section costs, on a whole-of-Section and function basis, to assist in explaining variations in costs.

### Assessment Approach: Multicriteria assessment

ACIL Allen has developed a Multicriteria Assessment (MCA) framework, which uses actual data on IRP infrastructure and other features (such as the alignment location, number of interfaces, and number of agencies involved in design and approvals) to measure relative complexity. The MCA is based on ten criteria, which have been unequally weighted to reflect the ACIL Allen team's broad consensus of what may be expected to make a Section more complex than another.

The criteria are generally a function of the built infrastructure solutions required to deliver the Service Objective across the selected alignment. The existence of more non-track investments and assets, third-party interfaces, interaction with existing rail operations, and tunnelling are considered appropriate measures of the complexity of a Section by the ACIL Allen team. A secondary overlay relates to the potential impact and implications of the design interface and approval processes with Commonwealth, State and Local Government authorities.

The criteria weightings were determined on a category and item basis. The first seven criteria are in the "Build/Delivery" category and were assigned a total weighting of 80%; the last three are "Planning/Scope / Approvals" criteria and were assigned a total weighting of 20%. The Total Weighting reflects the Item Weighting multiplied by the Category Weighting. This process ensures the weightings are directly required to assess the impact of aspects of the IRP that are generally unrelated (i.e., avoiding having to make a value judgement between several agencies involved in approvals and level crossings).

Table A.1 MCA: Assessment Criteria and Weightings

| Indicator | Measure | Item Weighting (in Category) | Total Weighting |
|---|---|---|---|
| Existence of tunnelling | Binary - Yes or No | 30% | 24% |
| Length of bridges per length of Section | Estimated length of bridges as share of total length of alignment | 15% | 12% |
| Number of culverts per length of Section | Gross number of culverts to be installed per kilometre of length of the alignment | 15% | 12% |
| Number of level crossings per length of Section | Gross number of level crossings to be installed or modified (enhanced or removed) per kilometre of length of the alignment | 5% | 4% |
| Gross number of third-party interface/asset impacts | Total number of third-party interfaces determined across the alignment as per IRPL's estimate | 20% | 16% |
| Establishment of enabling infrastructure, (concrete batching plant, quarry, work camps) | Subjective rating of level of ancillary enabling investment required to deliver Section (score manually applied) | 5% | 4% |
| Brownfield modification as share of alignment | Estimated length of brownfield corridor as a share of the total length of the alignment. | 10% | 8% |
| Number of Government agencies involved in permitting and approvals (scope, design, construction permit) | Estimated count of individual State and Local Government agencies with statutory role or participation in the design and approvals process. | 45% | 9% |
| Interface with existing rail services and operators / asset owners | Subjective rating of number of rail service interfaces and impact on existing rail operators required to deliver the alignment | 45% | 9% |
| Number of statutorily sensitive overlays to alignment | Count of number of protected environmental areas traversed in the alignment | 10% | 2% |

*Source: ACIL Allen*

ACIL Allen has assessed all Sections in scope north of Parkes and have included I2S as a comparison in the Southern sections.

Data is collected and processed for each Section on each of the criteria. The scoring system within the MCA is simple:

— Section is 20$^{th}$ percentile or less compared to other Sections: 0

— Section is greater than 20$^{th}$ percentile, but less than 80$^{th}$ percentile, compared to other Sections: 1

— Section is at least 80$^{th}$ percentile compared to other Sections: 2

A Section's score in the MCA is between 0-2. The relative score is more important than the absolute score, as the scores are standardised to the available data across Sections rather than absolute values in and of themselves. Therefore, Sections that receive a higher score are deemed more complex, and those that receive a lower score are deemed less complex.

The results of the MCA by Section are provided in the table below.

Table A.2 Complexity Assessment using MCA framework — Results

| | Existence of tunnelling | Length of bridges per length of Section | Number of culverts per length of Section | Number of level crossings per length of Section | Gross number of third party interface / asset impacts | Establishment of enabling infrastructure, (concrete batching plant, quarry, work camps) | Brownfield modification as share of alignment | Number of Government agencies involved in permitting and approvals (scope, design, construction permit) | Interface with existing rail services and operators / asset owners | Number of statutorily sensitive overlays to alignment | Total Score | Classification |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Weighting | 24% | 12% | 12% | 4% | 16% | 4% | 8% | 9% | 9% | 2% | | |
| P2N | 0 | 0 | 1 | 2 | 1 | 0 | 2 | 0 | 1 | 0 | 0.61 | Low |
| N2N - S1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 2 | 0 | 0.71 | Moderate |
| N2N - S2 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 2 | 2 | 0 | 0.92 | High |
| N2N - S3 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 1 | 2 | 2 | 0.71 | Moderate |
| N2N - S4 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0.54 | Low |
| N2NS - SP1 | 0 | 0 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 0 | 0.86 | High |
| N2NS - SP1 / 2C | 0 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 1 | 0 | 0.66 | Moderate |
| N2NS SP2 - C1 Gwydir Floodplain | 0 | 1 | 2 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 0.69 | Moderate |
| NS2B - C2 / NS2B - C3 | 0 | 1 | 0 | 1 | 1 | 2 | 1 | 2 | 0 | 0 | 0.66 | Moderate |
| B2G - C4 | 0 | 0 | 0 | 1 | 2 | 2 | 0 | 1 | 0 | 0 | 0.53 | Low |
| B2G - N1 | 0 | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 0 | 0 | 0.61 | Low |
| B2G - N2 | 0 | 2 | 1 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0.69 | Moderate |
| B2G - N3 | 0 | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 0 | 0 | 0.61 | Low |
| B2G - N4 | 0 | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 0 | 2 | 0.65 | Low |
| G2K (G2H, H2C, C2K) | 2 | 2 | 0 | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 1.48 | Very High |
| I2S | 0 | 1 | 2 | 1 | 1 | 1 | 0 | 2 | 1 | 2 | 0.91 | High |

*Source: ACIL Allen*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Low | <0.65 | Moderate | 0.65-0.8 | High | 0.8-1.0 | Very High | >1.0 | |

# B Verification and Assurance - Limitations and Conditions

*This appendix provides limitations and conditions on the verification and assurance process agreed between ACIL Allen and the Department (included in the Service Order)*

1. Where verifying matters, the Service Provider will confirm the validity of those matters in the context of the revised service standard to be met by the completed Inland Rail and as limited by the information provided to the Service Provider by IRPL.
2. When providing assurance on matters, the Service Provider will provide reasonable confidence to the Agency based on the information provided by IRPL to the Service Provider.
3. IRPL will provide the Service Provider with all information as a Data Pack for the review. The Data Pack will be provided to the Service Provider by IRPL in a timely manner following the Order Commencement Date and the Service Provider agreeing confidentiality requirements with IRPL.
4. Where required, the Service Provider will interact and consult with relevant IRPL staff to assist in understanding the information supplied in the Data Pack.
5. The Service Provider is not required to consult with any ARTC officers or employees to undertake the review and provide verification and assurance.
6. The Service Provider is not required to consult with other organisations and individuals, including other Commonwealth and state government departments, existing and past contractors to IRPL (and its predecessors and staff), in undertaking the verification and assurance other than as explicitly set out in this Order in relation to reporting.
7. The Service Provider is not required to undertake research and investigations beyond the information provided in the Data Pack or information gathered through interaction and consultation with relevant IRPL staff. Where relevant, the Service Provider will draw on its existing industry knowledge and experience in providing verification and assurance for specific IRSOW elements.
8. Where the Service Provider considers the provided data insufficient to complete an element of the IRSOW, the Service Provider will further request IRPL for all information the Service Provider considers necessary to complete that IRSOW element. If the requested information is not provided within a reasonable timeframe, the verification and assurance will be finalised (including reporting) with the IRSOW element being noted as incomplete because of insufficient information. In such circumstances, the Service Provider will be deemed to have met its obligations and completed the required verification and assurance to the Agency for that IRSOW element of the services.
9. Where components of the data supplied in the Data Pack or through further data requests are, in the Service Provider's reasonable opinion, overly detailed, IRPL will provide the Service Provider with a summarised version of the components in a form reasonably specified by the Service Provider.
10. If the Service Provider reasonably requires components of the provided data to be supplied in a specific format, IRPL will convert the data and provide it to the Service Provider in the specified format.
11. In providing verification and assurance to the Agency, the Service Provider will rely only on the following sources of information:
    a) the information provided by IRPL in the Data Pack
    b) any responses to additional requests for information
    c) follow up consultations with relevant IRPL staff.

12. The Service Provider will not undertake an independent value engineering assessment of parts or all of the Inland Rail Project.
13. The Service Provider will not undertake an assessment of any future proofing of the Inland Rail Project.
14. In assessing risks, the Service Provider will review and consider the reasonability of IRPL risk assessments and proposed mitigation actions/strategies provided in the Data Pack. The review will draw on the Service Provider's existing industry knowledge and experience. The Service Provider will not undertake an independent risk assessment.
15. The Service Provider will provide each of the reports in draft form. The Agency will provide a single round of consolidated comments (combining Agency and other stakeholder comments) to the Service Provider. The Service Provider will either amend each report or provide the Agency with reasons why amendments were not made in response to each comment.

# C AACE98R-18 maturity assessment

This appendix provides a more detailed summary of the Maturity Assessment matrix that ACIL Allen adapted from AACE98R-18.

Table C.1 Maturity Assessment matrix adapted from AACE98R-18

| Class | Maturity Level of Project Definition Required<br>Key Deliverable and Target Status | End Usage<br>Typical purpose of estimate | Methodology<br>Typical estimating method | Expected Accuracy Range |
|---|---|---|---|---|
| Class 5 | 0% to 2% of full project definition<br>Assumed capacity or load factor, general design and technology concepts and routing alternatives agreed by business stakeholders. | Concept screening<br>Estimates prepared for any number of strategic business or regional planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, routing studies, evaluation of resource needs and budgeting, long-range capital planning, etc. | Cost/length factors, parametric models, judgment, or analogy<br>Estimates generally use stochastic estimating methods such as gross unit costs (cost/length), factoring and other parametric and modelling techniques. | Low:<br>-20% to -50%<br>High:<br>+30% to +100% |
| Class 4 | 1% to 15% of full project definition<br>Preliminary technology selection, preliminary road or rail design and geometry, routing corridors defined with optimisation underway, and other system concepts defined. | Study or feasibility<br>Estimate prepared for a number of purposes, such as but not limited to, detailed strategic planning, business development, project screening at more developed stages, alternative scheme analysis, confirmation of economic and/or technical feasibility, and preliminary budget approval or approval to proceed to next stage or to establish binding contracts with shippers. | Cost/length, factored or parametric models<br>Estimates generally use stochastic estimating methods such as adjusted gross unit costs (cost/length) with adjustment for specific design elements or approximate unit or assembly costs for major structures and systems, factored design and installation costs, and other parametric and modelling techniques. | Low:<br>-15% to -30%<br>High:<br>+20% to +50% |
| Class 3 | 10% to 40% of full project definition<br>Completed road, rail, structure concept design, confirmed and optimised route and conditions confirmed by survey; all ROW title holders identified and ready to begin negotiations though some<br>negotiation may be complete, major permit applications prepared, license applications and EIS prepared, and execution plans agreed. | Budget authorisation or control<br>Estimate typically prepared to support full project funding requests and become the first of the project phase control estimates against which all actual costs and resources will be monitored for variations to the budget. They are used as the project budget until replaced by more detailed estimates. | Semi-detailed unit costs with assembly level line items<br>Estimates generally involve more deterministic estimating methods than stochastic methods. They usually involve detailed quantity surveying and predominant use of unit cost line items, although these may be at an assembly level of detail rather than individual components. Factoring and other stochastic methods may be used to estimate less significant areas of the project. | Low:<br>-10% to -20%<br>High:<br>+10% to +30% |
| Class 2 | 30% to 75% of full project definition<br>Detailed design well advanced, rolling stock in detailed design, most ROW obtained, permits and licenses obtained, and supply and installation contracts issued. | Control or bid/tender<br>Estimate typically prepared as the detailed contractor control baseline (and update the owner control baseline) against which all actual costs and resources will now be monitored for variations to the budget and form a part of the change management program. | Detailed unit cost with forced detailed take-off<br>Estimates generally involve a high degree of deterministic estimating methods. Estimates are prepared in great detail and often involve tens of thousands of unit cost line items. For those areas of the project still undefined, an assumed level of detail takeoff (forced detail) may be developed to use as line items in the estimate instead of relying on factoring methods. | Low:<br>-5% to -15%<br>High:<br>+5% to +20% |

| Class | Maturity Level of Project Definition Required<br>Key Deliverable and Target Status | End Usage<br>Typical purpose of estimate | Methodology<br>Typical estimating method | Expected Accuracy Range |
|---|---|---|---|---|
| Class 1 | 65% to 100% of full project definition<br>All deliverables in the maturity matrix complete or near complete with rolling stock in fabrication. | Check estimate or bid/tender<br>Estimate is generally used by owners and EPC contractors to support their change management process. They may be used to evaluate bid checking, to support vendor/contractor negotiations, or for claim evaluations and dispute resolution. Construction contractors may prepare the estimate to support their bidding and to act as their final control baseline against which all actual costs and resources will now be monitored for variations to their bid. | Detailed unit cost with detailed take-off<br>Estimates generally involve the highest degree of deterministic estimating methods and require a great amount of effort. Estimates are prepared in great detail and thus are usually performed on only the most important or critical areas of the project. All items in the estimate are usually unit cost line items based on actual design quantities. | Low:<br>-3% to -10%<br>High:<br>+3% to +15% |

*Source: AACE98R-18 and ACIL Allen*

# D Documents used

*This appendix lists all documents that were used in our review.*

As noted in our methodology and limitations, our verification and assurance work is based on information provided in a Data Pack supplied by IRPL. We have supplemented this with a few additional documents that give relevant context or necessary information to understand the material in the Data Pack. In Table D.1 below, we give a list of all documents in the Data pack for the Inland Rail Project. In Table D.2 we give a list of additional documents used in our verification and assurance.

Table D.1 Data Pack – Inland Rail Project

| ID. | Document |
|---|---|
| 01 | Whole of Program[27] |
| | |
| 01.01 | Updated Estimate |
| 01.01.01 | Estimating |
| 01.01.01.01 | V16 TOC S1 priced BoQ and Risk register |
| 01.01.01.02 | Inland Rail TOTC 2024 v16 (Stretch Target) IV |
| 01.01.01.03 | Inland Rail TOTC 2024 v16 (Target) IV |
| 01.01.01.04 | Gowrie to Calvert (G2H H2C) RR priced BoQ |
| 01.01.01.05 | Inland Rail TOTC 2024 v16 (Target) IV Rev01 |
| 01.01.01.06 | Inland Rail TOTC 2024 v16 (Target) IV Rev02 |
| 01.01.01.07 | Fully Allocated support pack [redacted] |
| 01.01.02 | Escalation |
| 01.01.02.01 | Inland Rail_Cost Escalation_OEA_23.08.24 |
| 01.01.02.02 | NSW Aboveground RCOCI_23.08.24 |
| 01.01.02.03 | QLD Aboveground RCOCI_23.08.24 |
| 01.01.02.04 | QLD Belowground RCOCI_23.08.24 |
| 01.03 | Schedule / Basis of Schedule |
| 01.03.01 | APW |
| 01.03.01.01 | 240809 - PDA Master Schedule July 2024 |
| 01.03.01.02 | 241112 - IR Schedule Data for IV |
| 01.03.01.03 | 241112 - PDA Master Schedule October 2024 |
| 01.03.02 | APW |
| 01.03.02.01 | 250417 - Draft BoS for Issue |

[27] Program used in the Ansarada Data Pack index.

| ID. | Document | |
|---|---|---|
| 01.03.02.02 | | 250321 - NoN Delivery Schedule All Activities |
| 01.04 | Value Management Report | |
| 01.04.01 | | Value management report for period Dec 2022 - April 2024 v0.0 |
| 01.04.02 | | 0-0000-900-PEN-00-PR-0016_1 Innovation and Value Management Procedure |
| 01.05 | Operational Modelling (Service Offering) Report | |
| 01.05.01 | | 0-0000-900-IOM-00-ME-1014_0 Inland Rail Base Operational Model Updates |
| 01.05.02 | | 0-0000-900-IOM-00-ME-1015_0 Operational Modelling Results Summary – Verification Design Stage |
| 01.05.03 | | 0-0000-900-IOM-00-RP-1000_2 Operational Modelling Assumptions Parameters and Methodology Report - Verification Operational Model |
| 01.05.04 | | 0-0000-900-IOM-00-RP-1001_1 Concept of Service Capability and Feasibility Report - Verification Operational Model |
| 01.07 | Project Development Agreement | |
| 01.07.01 | | Project Development Agreement (Final version 21.03.24)(67250996.2) |
| 01.08 | IRPL Program Performance Report to Shareholder | |
| 01.08.01 | | Inland Rail - Program Performance Report - May 2024 v1.0 |
| 01.08.02 | | IRPL Program Performance Report - August 2024 Shareholder Department Report |
| 01.08.03 | | IRPL Program Performance Report - July 2024 Shareholder Department Report |
| 01.08.04 | | IRPL Program Performance Report for Shareholders - October 2024 FINAL |
| 01.08.05 | | IRPL Program Summary Report for Shareholders - September 2024 |
| 01.08.06 | | IRPL Program Performance Report - Shareholder Report June 2024 |
| 01.08.07 | | IRPL Program Performance Report for Shareholders - November 2024 FINAL |
| 01.08.08 | | IRPL Program Performance Report - December 2024 Shareholder Department |
| 01.08.09 | | IRPL Program Performance Report - February 2025 Shareholder Department |
| 01.08.10 | | IRPL Program Performance Report - January 2025 Shareholder Department |
| 01.09 | Management plans and procedures | |
| 01.09.01 | | 0-0000-900-PSC-00-PR-0010_1 Schedule management procedure |
| 01.09.02 | | 0-0000-900-PSC-00-PR-0011_1 Cost management procedure |

| ID. | Document |
|---|---|
| 01.09.03 | Project Management Plan Border to Gowrie |
| 01.09.04 | Project Management Plan Gowrie to Kagaru |
| 01.09.05 | Project Management Plan Narromine to Border (NNSW) |
| 01.09.06 | 0-0000-900-PER-00-TR-0001_1 Change Management Board ToR |
| 02 | Beveridge to Parkes |
| 02.01 | Scope & Battery Limits Summary Report |
| 02.01.01 | Beveridge to Parkes Scope and Battery Limits Summary Report |
| 02.01.02 | Reference information |
| 02.01.02.01 | 0-0000-214-PSR-00-SP-0002_1 |
| 02.01.02.02 | 0-0000-900-PEN-00-AD-0001_2 |
| 02.01.02.03 | 0-0000-900-PEN-00-DR-1000_2 |
| 02.01.02.04 | 0-0000-900-PEN-00-MX-0001_20 |
| 02.01.02.05 | 0-0000-900-PEN-00-RP-0006_1 |
| 02.01.02.06 | 0-0000-900-PEN-00-SP-0006_1 |
| 02.01.02.07 | 0-0000-900-PEN-00-ST-0001_4 |
| 02.01.02.08 | 2-0000-110-PUP-00-RG-0003_B |
| 02.01.02.09 | 2-0000-110-PUP-00-RG-0005_A |
| 02.01.02.10 | 3-0000-110-PMA-00-RP-0002-ANA_8 |
| 02.01.02.11 | 3-0000-110-PMA-00-RP-0007_0 |
| 02.01.02.12 | 3-0000-220-PCM-00-SW-0001_0 |
| 02.02 | Design Summary Report |
| 02.02.01 | Beveridge to Parkes Design Summary Report |
| 02.02.02 | Reference information |
| 02.02.02.01 | 0-0000-900-PAS-00-PR-0001_0 |
| 02.02.02.02 | 0-0000-900-PEN-00-MX-0001_20 |
| 02.02.02.03 | 0-0000-900-PEN-00-PR-0004_1 |
| 02.02.02.04 | 0-0000-900-PEN-00-PR-0013_0 |
| 02.02.02.05 | 0-0000-900-PEN-00-SP-0006_1 |
| 02.02.02.06 | 0-0000-900-PEN-00-SP-0008[2] |
| 02.02.02.07 | 0-0000-900-PGV-00-PR-0013[0] |
| 02.02.02.08 | 0-0000-900-PIG-00-PR-0001_1 |
| 02.02.02.09 | 0-0000-900-PMP-00-PL-0004_1 |
| 02.02.02.10 | 2-0000-112-PEN-00-RP-0001_0 |
| 02.02.02.11 | 3-0000-220-PEN-00-RP-0001_0 |
| 02.02.02.12 | 3-0000-230-PEN-00-RP-0001_0 |
| 02.02.02.13 | 5-0000-110-PEN-00-RP-0002_1 |
| 02.02.02.14 | 5-0000-230-PEN-06-RP-0001_A |
| 02.02.02.15 | 5-0052-214-PMA-00-PL-0015_0 |
| 02.03 | Updated Cost Estimates |
| 02.03.01 | B2A T1 Estimate - IRPL Financial Report - Jun-24 |

| ID. | Document |
|---|---|
| 02.03.02 | B2A T2 Estimate - IRPL Financial Report - Jun-24 |
| 02.03.03 | A2I Estimate - IRPL Financial Report - Sep-24 |
| 02.03.04 | I2S Estimate - IRPL Financial Report - Sep-24 |
| 02.03.05 | S2P Estimate - IRPL Financial Report - Sep-24 |
| 02.03.06 | A2P Board Pack |
| 02.03.07 | Change Register - A2P Projects |
| 02.03.08 | A2I Oct-24 Detailed Cost Report |
| 02.03.09 | A2I Oct-24 Detailed Cost Report |
| 02.03.10 | I2S Oct-24 Detailed Cost Report |
| 02.03.11 | I2S Oct-24 Detailed Cost Report |
| 02.03.12 | S2P Oct-24 Detailed Cost Report |
| 02.03.13 | S2P Oct-24 Detailed Cost Report |
| 02.03.14 | B2A Board Pack |
| 02.03.15 | Change Register - B2A Projects |
| 02.03.16 | B2A T1 Oct-24 Detailed Cost Report |
| 02.03.17 | B2A T1 Oct-24 Detailed Cost Report |
| 02.03.18 | B2A T2 Oct-24 Detailed Cost Report |
| 02.03.19 | B2A T2 Oct-24 Detailed Cost Report |
| 02.03.20 | B2AT1N~1 |
| 02.03.22 | B2AT2N~1 |
| 02.03.23 | B2A T1 Nov-24 Detailed Cost Report |
| 02.03.24 | B2A T2 Nov-24 Detailed Cost Report |
| 02.03.25 | A2INOV~1 |
| 02.03.26 | I2SNOV~1 |
| 02.03.27 | S2PNOV~1 |
| 02.03.28 | A2I Nov-24 Detailed Cost Report |
| 02.03.29 | I2S Nov-24 Detailed Cost Report |
| 02.03.30 | S2P Nov-24 Detailed Cost Report |
| 02.03.31 | A2I Jun-25 Detailed Cost Report |
| 02.03.32 | A2I Jun-25 Detailed Cost Report |
| 02.03.33 | B2A T1 Jun-25 Detailed Cost Report |
| 02.03.34 | B2A T1 Jun-25 Detailed Cost Report |
| 02.03.35 | B2A T2 Jun-25 Detailed Cost Report |
| 02.03.36 | B2A T2 Jun-25 Detailed Cost Report |
| 02.03.37 | I2S Jun-25 Detailed Cost Report |
| 02.03.38 | I2S Jun-25 Detailed Cost Report |
| 02.04 | Basis of Estimates |
| 02.04.01 | B2A T1 BoE Contract (MCD) |
| 02.04.02 | B2A T1 MCD DC Cost Plan_July 22 |
| 02.04.03 | B2A T2 BoE Contract (JHG) |
| 02.04.04 | A2I-S2P - 14.07.01.02 ATTACHMENT 2 |
| 02.04.05 | A2I-S2P - 14.07.01.04 ATTACHMENT 2 |
| 02.04.06 | A2I-S2P - 14.07.01.05 ATTACHMENT 2 |

| ID. | Document | |
|---|---|---|
| 02.04.07 | | A2I-S2P Basis of Estimate |
| 02.04.08 | | I2S JH Basis of Estimate |
| 02.05 | Updated Schedules | |
| 02.05.01 | | B2A T1 EoM Schedule - Jun24 |
| 02.05.02 | | B2A T1 EoM Schedule - MCD Jun24 |
| 02.05.03 | | B2A T2 EoM Schedule - IRPL |
| 02.05.04 | | B2A T2 EoM Schedule - JHG |
| 02.05.05 | | A2I & S2P (Contractor) Contract Program Update |
| 02.05.06 | | A2I (IRPL) - Remaining Works - 202409 |
| 02.05.07 | | I2S (Contractor )Baseline program - 20Sept2024 |
| 02.05.08 | | I2S (IRPL) - Remaining Works - 202409 |
| 02.05.09 | | S2P (IRPL) - Remaining Works - 202409 |
| 02.05.10 | | A2I - Remaining Works - 202410 |
| 02.05.11 | | A2I Oct24 Update |
| 02.05.12 | | I2S - Remaining Works - 202410 |
| 02.05.13 | | I2S Oct24 Update |
| 02.05.14 | | S2P - Remaining Works - 202410 |
| 02.05.15 | | S2P Oct24 Update |
| 02.05.16 | | B2A T1 and T2 |
| 02.05.17 | | B2A T1 and T2 - EoM Oct24 |
| 02.06 | Basis of Schedules | |
| 02.06.01 | | B2A T1 Basis of Schedule - MCD |
| 02.06.02 | | B2A T2 Basis of Schedule - JHG |
| 02.06.03 | | A2I & S2P Contract Program - Basis of Schedule |
| 02.06.04 | | I2S Basis of Schedule 20sept 24 |
| 02.08 | Key Approvals Status Report | |
| 02.08.01 | | Third Party Assurance Review - Key Approvals Status Report Tranche 1 |
| 02.08.02 | | Third Party Assurance Review - Key Approvals Status Report Tranche 2 |
| 02.08.03 | | Third Party Assurance Review - Key Approvals Status Report I2S |
| 02.08.04 | | Third Party Assurance Review - Key Approvals Status Report S2P |
| 02.08.05 | | Third Party Assurance Review - Key Approvals Status Report A2I |
| 02.09 | Property Acquisition Report | |
| 02.09.01 | | B2A T2 Property Dashboard |
| 02.09.02 | | I2S Property Dashboard |
| 02.10 | Onerous Third-Party Requirements Cost Impact Report | |
| 02.10.01 | | B2A Additional Scope Detailed Assessment 24June2024 |
| 02.10.02 | | B2A Tranche 1 Board Presentation - May 24 final |
| 02.10.03 | | A2P Additional Scope Detailed Assessment_FINAL |

| ID. | Document |
|---|---|
| 02.11 | Questions responses |
| 02.11.01 | Inland Rail - Cost estimation and schedule - Questions Log |
| 02.11.03 | Q2 documents |
| 02.11.03.01 | Detailed contractor schedules |
| 02.11.03.01.01 | A2I Contract Program Update - Detail view (PDF) |
| 02.11.03.01.02 | B2A T1 MCD EoM Nov 24 |
| 02.11.03.01.03 | B2A T2 JHG EoM Nov24 |
| 02.11.03.01.04 | I2S Contract Program - I2S- Nov 24 |
| 02.11.03.01.05 | S2P Contract Program Update - Detail view (PDF) |
| 02.11.03.02 | IRPL remaining works schedules |
| 02.11.03.02.01 | Albury to Illabo November 2024 |
| 02.11.03.02.02 | Beveridge to Albury_Tranche 1 November 2024 |
| 02.11.03.02.03 | Beveridge to Albury_Tranche 2 November 2024 |
| 02.11.03.02.04 | Illabo to Stockinbingal November 2024 |
| 02.11.03.02.05 | Stockinbingal to Parkes November 2024 |
| 02.11.04 | Q4 documents |
| 02.11.04.01 | Inland Rail - IRPL Clarification Question 4 |
| 02.11.05 | Q1 documents |
| 02.11.05.01 | 0-0000-900-PIG-00-PR-0001_1 |
| 02.11.05.02 | 01-1100-PD-T00-DE-0001_2 |
| 02.11.05.03 | 13.02.01 Vol 4 Schedule 12 - 01 Third Party Agreement_Junee Shire Council (3) |
| 02.11.05.04 | 13.02.02 Vol 4 Schedule 12 - 02 Third Party Agreement_Cootamundra Gundagai City Council (3) |
| 02.11.05.05 | 15.12.02 Junee Shire Council_ Letter of agreed amendments_12 Dec 2023 |
| 02.11.05.06 | 2-9000-PEN-00-PR-1000-Basis of Design Rev 2 (002) |
| 02.11.05.07 | 20200304 Letter Peter Winder IRP Functional Designs (1) |
| 02.11.05.08 | 206293 - EOT for Approval in Principle (signed) |
| 02.11.05.09 | 5-0019-220-PMA-00-PL-0017_B (1) |
| 02.11.05.10 | A2P PEP 0-0000-900-PMA-00-TE-0011 |
| 02.11.05.11 | ACIL Allen Independent Review_B2A Input |
| 02.11.05.12 | EXECUTED Inland Rail Master Framework Deed - TfNSW, TAHE & ARTC - 09052024 |
| 02.11.05.13 | I2S - Stage Gate 3 - PEP_vFinal |

| ID. | Document |
|---|---|
| 02.11.05.14 | Inland Rail & DTP Requirements Framework |
| 02.11.05.15 | Inland Rail - IRPL Clarification Question 1 |
| 02.11.05.16 | Inland Rail Project - VSRD version 2.1 - NDRG endorsed_26022021 |
| 02.11.05.17 | S2P-LCB-CCB-1 - Configuration Change Request Form LRB CCB Gate 4 |
| 02.11.05.18 | VSRD Revisions Summary |
| 02.11.06 | Q3 documents |
| 02.11.06.01 | A2P Additional Scope Detailed Assessment_DRAFT |
| 02.11.06.02 | B2A Additional Scope Detailed Assessment 24June2024 |
| 02.11.06.03 | Inland Rail - IRPL Clarification Question 3 |
| 02.11.09 | Q7-9 documents |
| 02.11.09.01 | Inland Rail - IRPL Clarification Questions 7-9 |
| 02.11.12 | Q10 documents |
| 02.11.12.01 | Inland Rail - IRPL Clarification Question 10 |
| 02.11.13 | Q11 documents |
| 02.11.13.01 | Inland Rail - IRPL Clarification Question 11 |
| 02.11.14 | Q12 documents |
| 02.11.02 | Q12 Support Data |
| 02.11.16 | Q14 documents |
| 02.11.16.01 | 20200304 Letter Peter Winder IRP Functional Designs (1) |
| 02.11.16.02 | Inland Rail - IRPL Clarification Question 14 |
| 02.11.17 | Q15 documents |
| 02.11.17.01 | DAF-145 - Benalla Options approved (for IRPL reference) |
| 02.11.17.02 | Inland Rail - IRPL Clarification Question 15 |
| 02.11.17.03 | Paper - Benalla Options Assessment v2.0 |
| 02.11.22 | Q20 documents |
| 02.11.22.01 | A2I stacking summary |
| 02.11.22.02 | Inland Rail - IRPL Clarification Question 20 |
| 02.11.23 | Q21 documents |
| 02.11.23.01 | 0-0000-900-PEN-00-SP-0008[2] |
| 02.11.23.02 | 0-0000-900-PMP-00-PL-0004_1 |
| 02.11.23.03 | DMP 5-0052-214-PMA-00-PL-0015_0 |
| 02.11.23.04 | EXECUTED Inland Rail Master Framework Deed - TfNSW, TAHE & ARTC - 09052024 |
| 02.11.23.05 | Inland Rail - IRPL Clarification Question 21 |
| 02.11.25 | Q23 documents |
| 02.11.25.01 | 0-0000-900-PEN-00-SP-0008[2] |
| 02.11.25.02 | 0-0000-900-PMP-00-PL-0004_1 |

| ID. | Document |
|---|---|
| 02.11.25.03 | 13.02.01 Vol 4 Schedule 12 - 01 Third Party Agreement_Junee Shire Council (3) |
| 02.11.25.04 | 13.02.02 Vol 4 Schedule 12 - 02 Third Party Agreement_Cootamundra Gundagai City Council (3) |
| 02.11.25.05 | 15.12.02 Junee Shire Council_ Letter of agreed amendments_12 Dec 2023 |
| 02.11.25.06 | 206293 - EOT for Approval in Principle (signed) |
| 02.11.25.07 | 5-0019-220-PMA-00-PL-0017_B |
| 02.11.25.08 | EXECUTED Inland Rail Master Framework Deed - TfNSW, TAHE & ARTC - 09052024 |
| 02.11.25.09 | Inland Rail - IRPL Clarification Question 23 |
| 02.11.26 | Q24 documents |
| 02.11.26.01 | 2-0008-230-PEN-05-RP-0002_0 |
| 02.11.26.02 | Inland Rail - IRPL Clarification Question 24 |
| 02.11.27 | Q25 documents |
| 02.11.27.01 | 3-0008-230-PEN-06-RP-2001_5 |
| 02.11.27.02 | Forbes Council meeting minutes 180820 |
| 02.11.27.03 | Inland Rail - IRPL Clarification Question 25 |
| 02.11.27.04 | Meeting Notes Forbes Shire Council 110919 |
| 02.11.28 | Q26 documents |
| 02.11.28.01 | A2P PEP 0-0000-900-PMA-00-TE-0011 |
| 02.11.28.02 | Inland Rail - IRPL Clarification Question 26 |
| 02.12 | Goobang Junction |
| 02.12.02 | 0-0000-900-PEN-00-RP-0009 Goobang Junction Bypass Options Report |
| 03 | Parkes to Kagaru |
| 03.01 | Scope & Battery Limits Summary Report |
| 03.01.01 | Parkes to Kagaru - Scope and Battery Limits Summary Report (0-0000-900-PEN-00-RP-0008) |
| 03.02 | Design Summary Report |
| 03.02.01 | Parkes to Kagaru - Design Summary Report (0-0000-900-PEN-00-RP-0007) |
| 03.02.02 | Parkes to Kagaru - Design Summary Report (0-0000-900-PEN-00-RP-0007)_(1038802) |
| 03.02.03 | 0-0000-900-PEN-00-MX-0001_20 System Architecture Framework |
| 03.02.04 | 0-0000-900-PEN-00-PR-0013_0 Program Requirements Management Procedure |
| 03.02.05 | 0-0000-900-PGV-00-PR-0013[0] Stage Gate Management Procedure |
| 03.02.06 | 0-0000-900-PMP-00-PL-0004_1 Engineering Design and Assurance Management Plan |

| ID. | Document | |
|---|---|---|
| 03.02.07 | | 0-0000-900-PAS-00-PR-0001_0 Program Engineering Assurance Procedure |
| 03.02.08 | | 2-0000-250-PAS-00-CL-0001_0 Pre-feasibility design review |
| 03.02.09 | | 2-0000-270-PAS-00-RP-0001_0 NS2B Stage Gate Assurance Report SG2 |
| 03.02.10 | | 2-0001-310-PCM-00-SB-0002_0 B2G Stage Gate Assurance Report |
| 03.02.11 | | 3-0000-390-PEN-00-RP-0002_0 Engineering Assurance Report G2K Stage 3 |
| 03.09 | Property Acquisition Report | |
| 03.09.01 | | Property Briefing Note (002) |
| 03.09.02 | | Property list request 202505 |
| 03.11 | Gowrie to Kagaru | |
| 03.11.01 | | 01.03.02 PPP - R2.1.1_REGR_Program_of_Works |
| 03.11.02 | | 01.03.03 PPP - R2.1.1_REGR-Appendix_A_D_and_C_Phase_Program |
| 03.11.03 | | 01.03.04 PPP - R2.1.1_REGR-Appendix_B_Time_Chainage |
| 03.11.04 | | 01.03.05 PPP - R2.1.1_REGR-Appendix_C_Basis_of_Schedule |
| 03.11.05 | | 01.03.08 PPP - R2.2.1_REGR-Appendix A_Mass_Haul_Diagram |
| 03.11.06 | | 01.03.09 PPP - R2.2.1_REGR-Appendix B_Jump_Form_Construction_Staging |
| 03.11.07 | | 01.03.12 PPP - R2.2.2_REGR_Construction_Risks |
| 03.11.08 | | 01.03.17 PPP - R2.3.1_REGR_Tunnel_Construction_Methodology |
| 03.11.09 | | Board workshop presentation - 11 Feb 2022 |
| 03.11.11 | | Gowrie to Kagaru CAPEX Estimating Plan June 2025 |

*Source: List of documents supplied from IRPL to ACIL Allen*

Table D.2 Additional documents and sources

| ID | Project | Document name | Author | Link (if applicable) |
|---|---|---|---|---|
| A.1 | All | Inland Rail alignment | Inland Rail | https://inlandrail.com.au/wp-content/uploads/2024/01/Inland-Rail-Full-Alignment-Map-Updated-24-Oct-2024-Doc-241021.pdf |
| A.2 | All | Environmental Management Framework | ARTC | https://inlandrail.com.au/wp-content/uploads/2023/05/inland-rail-environmental-management-framework.pdf |
| A.3 | A2I | Albury to Illabo Preferred Infrastructure Report: Summary of Findings | ARTC | https://inlandrail.com.au/wp-content/uploads/2023/11/a2i-pir-summary-of-findings-1.pdf |

| ID | Project | Document name | Author | Link (if applicable) |
|---|---|---|---|---|
| A.4 | I2S | Instrument of approval I2S DPHI | NSW DPHI | |
| A.5 | I2S | Notice of Decision- I2S DPHI | NSW DPHI | |
| A.6 | S2P | Project Overview – Stockinbingal to Parkes | Inland Rail | https://inlandrail.com.au/wp-content/uploads/2024/06/D-0633-Project-Overview-Stockinbingal-to-Parkes-nov-24.pdf |
| A.7 | S2P | Lachlan River Bridge Modification Project | ARTC | https://inlandrail.com.au/wp-content/uploads/2022/06/s2p-review-of-environmental-factors-lachlan-river-bridge-2.pdf |
| A.8 | S2P | Inland Rail completes major work blitz | Inland Rail | https://inlandrail.com.au/stockinbingal-to-parkes-100-hour-track-possession-september-2024-wrap/ |
| A.9 | All | Feedback to ACIL Allen based on Draft Final Report, dated 20 June 2025 | Inland Rail | Provided under cover of email |

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