

Queensland Competition
Authority

**ENGINEERING
ASSESSMENT
OF AURIZON
NETWORK'S
CAPITAL
EXPENDITURE
CLAIM 2014-15**

04 February 2016



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EXECUTIVE SUMMARY

In October 2015, Aurizon Network submitted a formal claim for \$530,197,183 of capital expenditure (excluding interest during construction) to be included in the RAB for 2014-15. This amounted to \$379,846,441 of major projects and \$150,350,742 of non-major projects.

The QCA commissioned CMT Solutions, supported by Jacobs and Marsden Jacob Associates, (known forthwith as the Review Team) to undertake a prudency review of specified major projects and a sample of non-major projects.

It is the Review Team's opinion that projects submitted by Aurizon Network in the 2014-15 Capital Expenditure Submission are generally found to be prudent in scope, standard and cost, as summarised in Table E1 and E2 below.

Table E1 Major Projects Prudency Assessment Summary

REF No. PROJECT	System	Claimed expenditure 2014-15	Scope	Standard	Cost	Comments and summary of assessment
A.01552 WIGGINS ISLAND BALLOON LOOP	Blackwater	\$188,501,416	✓	✓	✓	The requirement for significant earthworks and realignment of North Coast Line (NCL) increased the capital unit rates on this project.
A.01631 ROCKLANDS TO STANDWELL DUPLICATIONS	Blackwater	\$162,422,586	✓	✓	✓	Capacity analysis undertaken by an external consultant hired by Aurizon Network and, subsequently, by Aurizon Network itself supported and confirmed that works were considered reasonable to demand at the time
A.03735 BAUHINA NORTH UPGRADE	Blackwater	\$ 14,733,398	✓	✓	✓	Overall, considered prudent in cost, standard and scope.
A.03742 MOURA EAST UPGRADE	Moura	\$ 14,189,041	✓	✓	✓	Overall, considered prudent in cost, standard and scope.
Total expenditure claim major projects recommended (\$)		\$379,846,441				Customer approval of the projects above was evidenced by the WIRP deed

Table E2 Non-major projects prudency assessment summary

REF No. PROJECT	System	Claimed expenditure 2014-15	Scope	Standard	Cost
A.02628: COAL SYSTEM: COAL LOSS MANAGEMENT	System Wide	\$242,552	✓	✓	✓
A.03323: ROLLESTON: UPGRADE SPUR LINE 9.75 MTPA	Blackwater	\$8,441,686	✓	✓	✓
A.03465: CQ COAL TRANSFORMER REFURBISHMENTS	System Wide	\$645,198	✓	✓	✓
A.03477: CQ COAL TRAIN CONTROL SIMULATOR	System Wide	\$396,072	✓	✓	✓
A.3892: HATFIELD ACCESS ROAD – KOUMALA – BOLINGBROKE	Goonyella	\$144,119	✓	✓	✓
A.03931: TRAIN CONTROL DISASTER RECOVERY	System Wide	\$1,091,559	✓	✓	✓
A.04017: LAKE VERMONT BALLOON LOOP EXTENSION	Goonyella	\$9,707,397	✓	✓	✓
A.04111: DUAL TELEMETRY UPGRADE	System Wide	\$3,561,144	✓	✓	✓

REF No. PROJECT	System	Claimed expenditure 2014-15	Scope	Standard	Cost
A.04112: CALLEMONDAH YARD TURNOUT UPGRADE PROJECT	Blackwater	\$389,569	✓	✓	✓
A.04155: CONCRETE SLEEPER UPGRADE GN PHASE 2	Goonyella	\$497,379	✓	✓	✓
A.04187: CSEE TRACK UPGRADE – ROCKLANDS TO ALDOGA	System Wide	\$512,875	✓	✓	✓
A.04199: MIDDLEMOUNT RAIL CONNECTING INFRASTRUCTURE	Goonyella	\$14,943,921	✓	✓	✓
A.04297: AzS600 AXLES COUNTERS REPLACEMENT	System Wide	\$308,761	Deferred		
A.0429: CULVERT REHABILITATION AT 113.900km MSL	Moura	\$1,538,988	✓	✓	✓
A.04307: CULVERT ASSET RENEWAL PROJECT BLACKWATER	Blackwater	\$2,950,279	✓	✓	✓
A.04313: GAUGE FACE LUBRICATION ASSET RENEWAL	System Wide	\$2,342,027	✓	✓	✓
A.04321: CENTRAL COAL UPS UPGRADE PROJECT	System Wide	\$910,887	✓	✓	✓
A.04339: TURNOUT RENEWAL PROGRAM 2014-15	System Wide	\$12,242,309	✓	✓	✓
A.04355: UTC ENHANCEMENT for DISASTER RECOVERY	System Wide	\$2,277,832	✓	✓	✓
A.04366: LEVEL CROSSING UPGRADES 13/14 FY	System Wide	\$4,612,028	✓	✓	✓
A.04367: POST WIRP1 ASSET RENEWAL PROJECT	Blackwater	\$1,541,092	✓	✓	✓
A.04369: MINE BALLOON LOOPS UPGRADE	Goonyella	\$1,295,000	✓	✓	✓
A.04433: NETWORK BILLING SYSTEM	System Wide	\$2,672,955	✓	✓	✓
A.04434: PS CAPITAL DEVELOPMENT	System Wide	\$667,063	✓	✓	✓
A.04446: FEEDER STATION PROTECTION UPGRADE	System Wide	\$230,286	✓	✓	✓
A.04484: SANDHURST CREEK BRIDGE (LIFE EXTENSION WORKS)	Blackwater	\$335,000	✓	✓	✓
A.04547: TRACK UPGRADE PROGRAM FY15	System Wide	\$24,308,900	✓	✓	✓
A.04548: WEIGHBRIDGE RENEWAL	System Wide	\$820,820	✓	✓	✓
A.04563: CQC STRUCTURES RENEWAL PROGRAM FY15	System Wide	\$11,053,088	✓	✓	✓
A.04568: TRACK UPGRADE FY14	System Wide	\$319,415	✓	✓	✓
A.04591: NAETWORK SAP PS ENHANCEMENTS	System Wide	\$371,947	✓	✓	✓
A.04612: FORMATION STRENGTHENING FY15	System Wide	\$8,510,218	✓	✓	✓
A.04621: OH EQUIPMENT RENEWAL FY14 to FY17 – GOONYELLA	Goonyella	\$2,917,815	✓	✓	✓
IV.00002: SLEEPER RENEWAL PROGRAM FY15	System Wide	\$12,092,760	✓	✓	✓
Total expenditure claim non-major projects (\$)		\$150,350,742			
Total expenditure claim non-major projects recommended (\$)		\$150,041,981			

The assessment has been undertaken in accordance with criteria agreed with the QCA, and in alignment with Schedule A of the Access Undertaking.

As noted in Table E1 and E2 the Review Team recommends the following capital expenditure to be prudent:

- \$379,846,441 for Stage 1 investments in the Wiggins Island Rail Project (WIRP)
- \$150,041,981 for non-major projects (a deduction of \$308,761 from the \$150,350,742 claim).

PRUDENCY OF SCOPE

Based upon the information provided, and in the Review Team's opinion, the projects submitted by Aurizon Network as part of the 2014-15 capital expenditure claim are prudent in scope.

The 2014-15 submission included a number of major expansion projects relating to the development of the Wiggins island Coal Export Terminal (WICET). These totalled around \$380M. A comprehensive market analysis undertaken assessed that, in consideration of the market forecasts and circumstances relevant at the time, Aurizon Network had reasonable justification to proceed with these works. From the information provided it is evident that Aurizon Network considered both independent and in-house capacity analysis in the development of the scope for these projects, and a majority customer approval was evidenced by the Wiggins Island Rail Project (WIRP) signed and approved Deed.

PRUDENCY OF STANDARD

Based upon the information provided, and in the Review Team's opinion, the projects submitted by Aurizon Network for inclusion in the 2014-15 capital expenditure claim are prudent in standard.

PRUDENCY OF COST

Based upon the information provided, and in the Review Team's opinion, the projects submitted by Aurizon Network for inclusion in the 2014-15 capital expenditure claim are prudent in cost.

A thorough review of the prudence applied in the procurement processes for major track components, such as sleepers, revealed that Aurizon Network's stage gate process appears to be a sound and thorough process for identifying necessary actions which should be implemented for major procurements. However the review also identified that the application of sensitivity testing in the Total Cost Ownership modelling would minimise any risks that the worst case scenario has been overlooked.

It was noted that high unit cost rates were encountered for a number of track and civil projects. These high costs were found to be a product of the flooding and adverse weather conditions experienced by much of the network in 2013.

1. INTRODUCTION

1.1. BACKGROUND

Aurizon Holdings Limited is a national provider of rail- and road-based freight transport. Aurizon Network Pty Ltd (Aurizon Network), a wholly owned subsidiary of Aurizon Holdings Limited, is the Rail Infrastructure Manager of the 2,670km Central Queensland Coal Network (CQCN). Aurizon Network is responsible for operating, maintaining and expanding the CQCN (Figure 1¹).

The *Queensland Competition Authority Act 1997* (QCA Act) and the *Queensland Competition Authority Regulation 2007* (QCA Regulation) regulate access to the CQCN. The QCA Act and Regulation are supplemented by Aurizon Network's 2010 Access Undertaking (the Access Undertaking), as approved by the QCA.

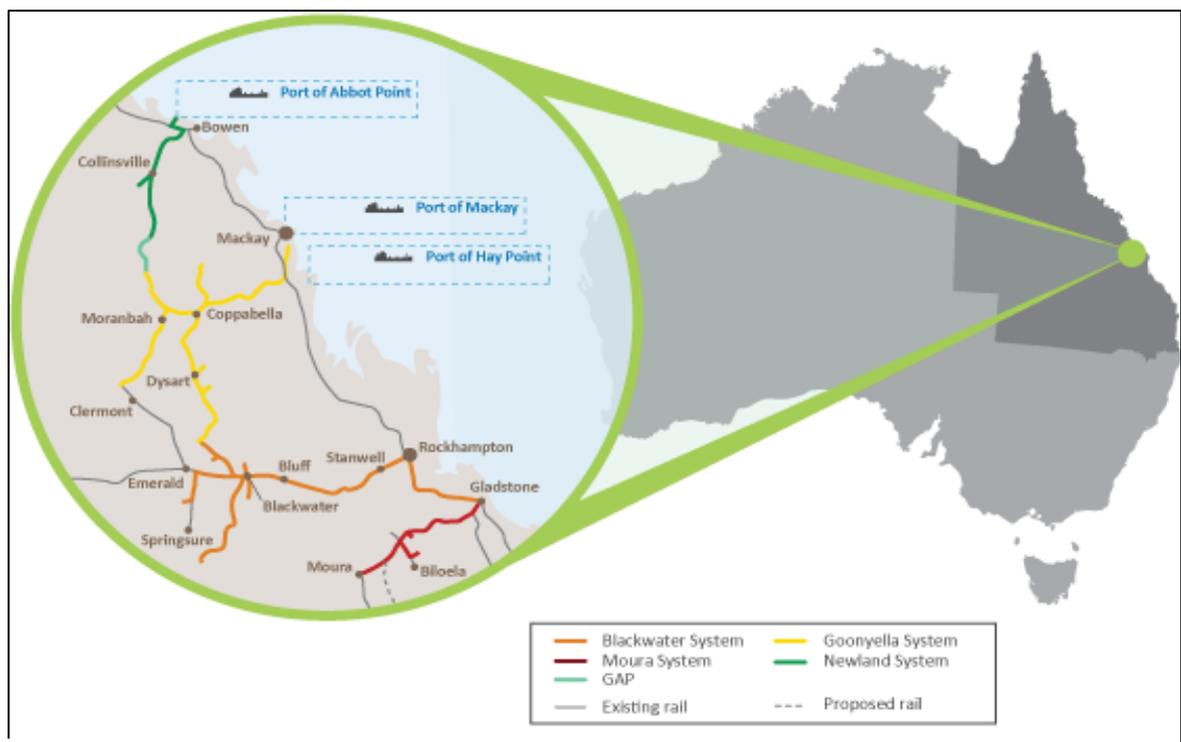


Figure 1: Aurizon Network's CQCN

The Access Undertaking provides a framework for access to the CQCN, including pricing principles and tariff-setting processes. It sets out the mechanisms by which Aurizon Network can recover its infrastructure investment costs, operating expenditure and maintenance costs.

The resulting tariffs determine the access charges Aurizon Network can levy on access holders. Reference tariffs are derived from, among other things, the size of Aurizon Network's Regulatory Asset Base (RAB). During the course of an Undertaking, the RAB is rolled forward each year by including capital expenditure commissioned during the year and allowing for a return of capital through regulatory depreciation. Capital expenditure therefore influences the size of reference tariffs, and any capital expenditure Aurizon Network proposes to add to its RAB must first be approved by the QCA.

Under the terms of the Access Undertaking, QCA is required to review and, if appropriate, approve additions to the RAB with reference to prudence and efficiency. As part of the approval process, Aurizon Network must submit evidence to the QCA that clearly demonstrates and substantiates prudence in terms of scope, standard and cost of selected infrastructure project works.

In July 2015, the QCA commissioned CMT Solutions, supported by Jacobs and Marsden Jacob Associates (henceforth referred to as the Review Team), to provide technical advice to determine whether the:

- work undertaken with respect to customer approved projects (or projects for which regulatory pre-approval had been granted) was consistent with the scope of works approved by customers
- scope of projects not approved by customers (or for which regulatory pre-approval had not been sought), mostly asset replacement, was prudent

¹ Source: <http://www.qca.org.au/Rail/Aurizon/Aurizon-rail-systems>

- standard of projects was prudent
- cost of projects was prudent.

1.2. EXTENT OF THE REVIEW

As directed by the QCA's Terms of Reference, the Review Team assessed Aurizon Network's capital expenditure claim with particular regard to *Schedule A – Maintenance of Regulatory Asset Base* (Schedule A) - of the Access Undertaking.

The Review Team's assessment included a preliminary review of a number of projects put forward for consideration by Aurizon Network. This list included a number of major projects as well as a number of minor projects. As not all the projects reviewed were included in the claim, some of the completed assessments have not been included in this report.

The major projects included:

- Wiggins Island Rail Project (WIRP) Stage 1, which included the following sub-projects, costing approximately \$380 million:
 - Wiggins Island Balloon Loop (\$189 million)
 - Rocklands to Stanwell track duplication (\$162 million)
 - Bauhinia North upgrade: construction works for passing loop, access roads, and easements into rail corridor (\$15 million)
 - Moura East rail formation upgrade (\$14 million).

The non-major projects included a sample of projects totalling \$131,180,974 (out of \$150,350,742 total submitted value). The Review Team's methodology for determining the sample of projects is provided in Section 3. A full list of projects submitted by Aurizon Network for the 2014-15 capital expenditure claim is provided in Appendix 1.

1.3. STRUCTURE OF THIS REPORT

This report is structured as follows:

Section 1:	Provides an introduction and overview of the report
Section 2:	Provides an overview of Aurizon Network's 2014-15 capital expenditure claim
Section 3:	Describes the methodology and criteria adopted for the assessment
Section 4:	Provides a summary of the overall assessment results and recommendations
Section 5:	Provides the economic review of sleeper procurement across major, and track and civil non-major, projects and a review of ongoing alliance contracts
Section 6:	Provides the overall assessment results and recommendations for major projects
Section 7:	Provides the overall assessment results and recommendations for non-major projects
Section 8:	Conclusion
Appendix 1:	Summary of Claim (Major and Non-Major Projects).
Appendix 2:	Index to Major Project Review Forms
Appendix 3:	Major Project Review Form Summary Sheets
Appendix 4:	Index to Non-Major Review Forms
Appendix 5:	Non-Major Project Review Form Summary Sheets

1.4. SUPPLEMENTARY REPORT

A supplementary report, namely: Aurizon Network CAPEX Review 2014-15: Prudency Assessment Forms accompanies our main report. It includes the full assessment forms, inclusive of the comments and analysis that form the basis upon which the final prudency outcomes in this report were developed.

2. AURIZON NETWORK'S 2014-15 CAPITAL EXPENDITURE CLAIM

2.1. BACKGROUND

Aurizon Network's total 2014-15 capital expenditure claim submission is valued at \$530,197,183 or \$614,641,350, including interest during construction (IDC).

Major projects are valued at \$379,846,441 or \$457,504,771, when including IDC.

Non-major projects are valued at \$150,350,742 or \$157,136,579, when including IDC.

Aurizon Network has structured its 2014-15 capital expenditure claim into the following:

- | | |
|------------|---|
| Schedule 1 | Claim summary workbook: a summary of Aurizon Network's 2014-15 capital expenditure claim. |
| Schedule 2 | IDC claim model: the IDC summary 2014-15 capital expenditure claim spreadsheet. For the purposes of the engineering assessment, the Review Team has assessed project costs exclusive of IDC. |
| Schedule 3 | Expansion and post-commissioning projects: these are the projects that add capacity to the existing network, such as track capacity or additional electrical capacity, and ongoing expenditure for any projects which have been commissioned and approved in the claims from previous years. In contrast to previous years, major and non-major projects were considered separately for this review. Four expansion projects were nominated as major projects, with a combined value of \$379,846,441. The remaining projects in this section were subsequently deemed non-major and treated accordingly. For the 2014-15 claim, Aurizon Network is seeking \$10,088,871, excluding IDC, in capital expenditure for non-major system expansion and post commissioning projects. |
| Schedule 4 | Track and civil assets (TACA): all assets related to the rail formation, corridor civil works, ballast, sleepers, rail and structures such as culverts and bridges are classified as 'TACA'. The original 2014-15 claim was made up of 32 projects totalling \$108,425,632 excluding IDC, and this was unchanged in the revised claim. TACA projects include eight asset classes: structures, formation/ballast, sleepers, rail, turnouts, corridor access, civil and track upgrades. |
| Schedule 5 | Electrical assets: this category includes all elements of the electrical supply and distribution network that provides power for electric traction on the systems. Electrical projects include three types: network distribution, power systems and supervisory systems. The electrical assets total for the 2014-15 claim was \$7,765,491, excluding IDC, for a total of seven projects. |
| Schedule 6 | Signalling and track side systems (S&TSS) assets: these assets are required to control train movements, identify train location, operate rail points, operate active level crossing protection, and to monitor and protect the below-rail assets from rolling stock defects, to reduce the risk of derailment or infrastructure damage. The S&TSS total for the 2014-15 claim was \$7,749,422, excluding IDC, for 16 projects. |
| Schedule 7 | Telecommunications assets: these assets provide data linkages between field equipment and network control, the network control systems, digital and microwave radio systems, and the IT system and are critical to Aurizon Network's operations. This asset class also includes projects that build network control resilience and disaster recovery ability. The telecommunications 2014-15 claim includes eight projects at a total cost of \$6,369,205, excluding IDC. |
| Schedule 8 | Corridor assets: these are all assets within, or that access, the rail corridor, but which are not directly part of the track structure, signalling or telecoms networks, or the electrical overhead systems. These assets include fencing and corridor security, environmental protection, corridor access, and level crossings. The corridor assets total for the original 2014-15 claim was \$6,093,558, excluding IDC, for six projects. This schedule also includes projects that relate to IT upgrades for application across the Aurizon Network business. The system total for the 2014-15 claim includes four projects at a total cost of \$3,858,565, excluding IDC. |

2.2. SUPPORTING INFORMATION

For each project, Aurizon Network provided the Review Team the following documentation, as applicable:

- SAP ZPS project cost report
- funding requests
- completion certificates
- standard practice variation reports
- project plans
- feasibility investment approval requests (IARs)
- tender assessments
- studies.

During the course of the assessment, the Review Team sought additional data from Aurizon Network and developed a request for information (RFI) list to track the queries raised and responses received. Where information requests remain outstanding and the final prudency assessment is reliant on receipt of the information requested, the outcomes of the review have been marked accordingly.

The Review Team acknowledges the effort Aurizon Network made to provide additional requested data as quickly and efficiently as possible.

3. PRUDENCY ASSESSMENT METHODOLOGY AND CRITERIA

Aurizon Network’s total 2014-15 capital expenditure claim, as formally submitted in October 2015, is valued at \$530,197,183 (excluding IDC). It includes 4 major projects and 80 non-major projects.

3.1. OVERALL METHODOLOGY FOR PRUDENCY ASSESSMENT

3.1.1. Overview

Figure 2 summarises the flow of tasks and considerations undertaken in the assessment of prudency for each project reviewed. For the major projects, the Review Team omitted step 1, where a representative project sample is selected, as the major project selection was as requested.

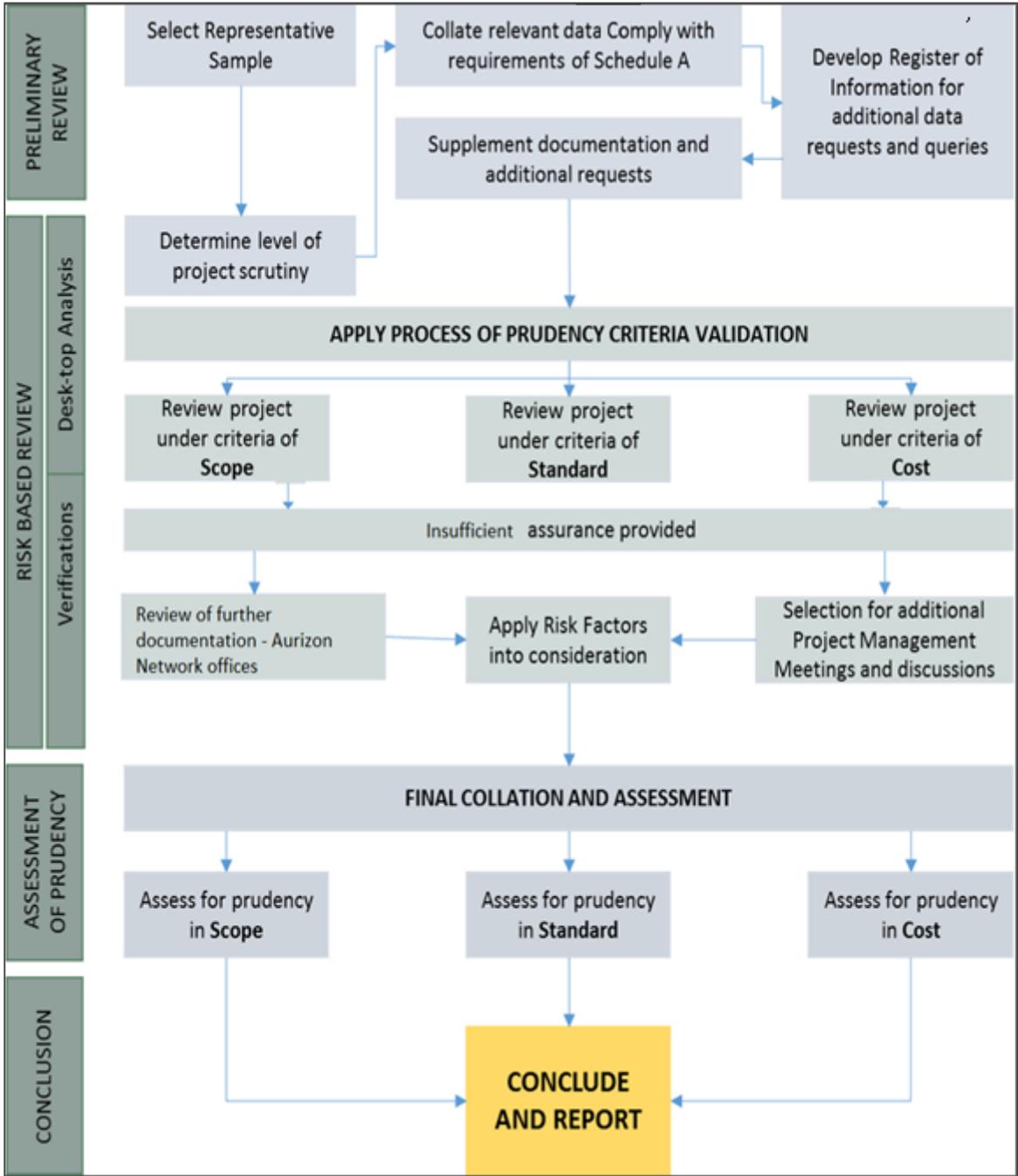


Figure 2 Project Methodology Flowchart

To ensure a consistency of approach in the test for prudency, the Review Team developed a risk matrix and structured assessment format. This approach ensured the assessment process was rigorous, and provided assurance that all prudency criteria were considered across each project.

3.2. ASSESSMENT SAMPLE SELECTION

Figure 3 shows the split based on project claimed value as submitted in the formal 2014-15 Aurizon Network capital expenditure claim as submitted in October 2015. More than 24% of projects included in the claim exceed \$5,000,000 in value. The Review Team considered it inefficient to assess all of these non-major claims and therefore selected a representative sample of projects from the total submission.

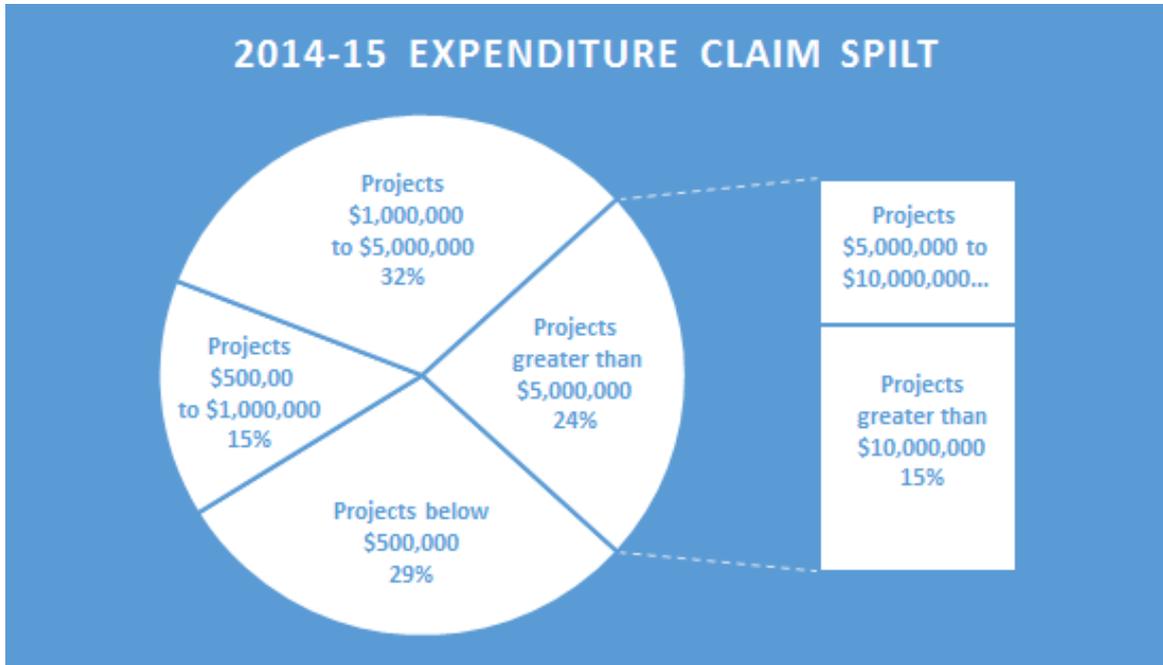


Figure 3 Summary of 2014-15 expenditure split

The process undertaken is summarised in the following steps, acknowledging that projects reviewed by the same team in previous claims were generally not re-reviewed as part of this claim:

- The projects submitted by Aurizon Network were initially sorted by system
- From this sorted list a selection was made to ensure that for each system (wherever possible) at least one example per discipline was selected. This ensures that different management approaches to scope programming, costing structures and application of standards inherent across different systems and disciplines are captured, giving priority to projects which had not been previously reviewed and accepted by the team in previous capital expenditure claims.
- Where there was only a small number of projects overall in a system, typically all or the majority of projects were selected to optimise consistency of assessment across all systems
- Where there was a number of projects of the same type in one system, projects of higher value were selected (i.e. over \$10,000,000)
- The “preliminary” sample developed from the above was then reviewed at a high level. Both the projects selected and omitted were reviewed at this level to ensure that high value projects, or projects which may be of specific interest or risk, were considered. This risk approach is based upon using professional knowledge and experience to identify potential issues. At that stage additional projects were added or omitted as appropriate to develop the draft sample.
- The Review Team then submitted its draft sample to the QCA for discussion and approval. Any additional projects identified as being of interest to the QCA were then added to the sample and the final selection completed.
- Finally, from the approved sample, the percentage of value from all projects to be considered was calculated to ensure an adequate representation cost wise from the whole claim. From previous experience over the years a sample of around 70-80% is aimed for although this has been higher or lower depending on the individual values and types of projects submitted.

The summary of the final sample selection, including total percentages, values and types of projects selected from the 2014-15 claim is shown in Table 1 below. This sample, for the purposes of this

report, is hereto referred to as the projects, in that it is the total of the projects assessed and discussed in this report.

Table 1 Summary of representative sample of non-major projects selected for assessment

Category		Total projects claimed	Total projects assessed by the Review Team	% from total number in category	Total value of projects selected *	% of value from total non-major submission value
Type	Corridor	6	3	50%	\$4,998,699	3%
	Electrical	7	3	43%	\$3,793,299	3%
	Expansion	7	1	14%	\$8,441,686	6%
	S&TSS	16	6	38%	\$5,227,247	3%
	TACA	31	16	52%	\$104,067,340	69%
	Telecoms	8	2	25%	\$4,652,703	3%
TOTAL projects assessed			31		\$131,180,974	87%

*Based on original submission figures to accurately represent sample size on selection

3.2.1. Risk-based approach

The Review Team assessed each individual project to meet the prudence criteria as outlined in Schedule A of the Access Undertaking. Table 2 highlights the process for assessing prudence, which involves evaluating each individual project under a set of approved criteria within the parameters of:

- Scope
- Standard
- Cost.

Table 2 Key Criteria in Assessment of Prudency of Scope, Standard and Cost²

Scope	<p>The projects are:</p> <ul style="list-style-type: none"> • below-rail infrastructure, • commissioned in 2014-15, • capital expenditure and not maintenance, • approved by a majority of the relevant customer group (weighted by Reference Tonnes³), • not excessive to Reasonable Demand, • consistent with the Network Asset Management Plan, • funded by Aurizon Network, or the proportion funded by Aurizon Network is clearly stated; and • implemented with reasonable grounds to proceed, given the circumstances relevant at the time of the decision⁴. <p>An assessment of the appropriateness of processes used to evaluate alternatives. The asset replacement expenditure was consistent with asset age and composition. Customer-specific capital expenditure was approved by the customer concerned.</p>
Standard	<p>The projects are:</p> <ul style="list-style-type: none"> • of a reasonable standard to meet the scope, and not overdesigned, • consistent with existing standard and configuration of adjacent infrastructure (to the extent that the existing infrastructure has been accepted as reasonable⁵); and • compliant with appropriate approved processes in circumstances where there is a departure from existing standards⁶.
Cost	<p>The project costs are reasonable for the scope and standard considering:</p> <ul style="list-style-type: none"> • scale, nature and complexity, • market conditions, • procurement policies, • project management aspects; and • commissioning is completed and asset is actively fit for service.

3.2.2. Criteria

Table 2 (above) lists the key criteria from Schedule A (and the QCA's Terms of Reference) that the Review Team has applied in assessing prudency of scope, standard and cost.

Within each element of scope, standard and cost criteria, an assessment was made based upon the data submitted in the claim, professional judgement and the risk profile of the individual project. The risk profile was determined based on a combination of the criticality of the financial, network supply chain, and safety risks associated with the project.

² Derived from Schedule A of Aurizon Network 2010 Access Undertaking, and the QCA's Terms of Reference to CMT

³ Aurizon Network's 2010 Access Undertaking, Schedule A, Clause 3.2.2 (f)

⁴ Aurizon Network's 2010 Access Undertaking, Schedule A, Clause 3.3.2 b (ii)

⁵ Aurizon Network's 2010 Access Undertaking, Schedule A, Clause 3.3.3 b (iii)

⁶ Aurizon Network's 2010 Access Undertaking, Schedule A, Clause 3.3.3 c

3.2.3. Assessment of scope

The Review Team assessed the scope of the works against achieving appropriate discretionary scope while ensuring the works were reasonably required. In particular:

- the need for the capital expenditure to accommodate demands at the time of approval;
- the evaluation process adopted by Aurizon Network and the overall effectiveness of the selection process in terms of value for money to the customer;
- the specifics around the capital evaluation process and any limitations or strengths of the process to achieve a value-for-money outcome; and
- that work undertaken and commissioned in respect of customer pre-approved scope projects was consistent with the scope of works approved by the customer vote.

Where applicable, additional data to support the scope was requested and reviewed, for example:

- future forecasts/demand generators;
- current condition reports and engineering recommendations; and
- safety/accident reports with specific information on regulatory requirements and capital expenditure investment.

In assessing the scope, the Review Team considered the process of capital project selection and evaluation in relation to the process adopted by Aurizon Network and its overall effectiveness in achieving value for money.

3.2.4. Assessment of standard

The Review Team assessed the standard of the works within a project focusing on the function/capacity of the delivered infrastructure against the planned outcome. This included:

- ensuring, as far as is reasonably practicable, that works were consistent in all material aspects with existing and adjacent infrastructure
- where possible, comparing current and likely future usage levels
- where it was evident that works had been altered sufficiently from standards, the engineering justification for any departures from the standard was reviewed for its appropriateness and prudence
- where there may be additional requirements of operators or forecasted current and future usage levels requiring augmented capacity or heightened standards (e.g. safety)
- compliance with National Australian Standards, Codes of Practice, or other relevant design and construction standards
- compliance with Aurizon Network design standards
- all relevant legislation, including requirements by any authority (e.g. the Safety Regulator and the EPA).⁷

3.2.5. Assessment of cost

The Review Team focused cost reviews on capital expenditure for prudence in terms of scale of costs, nature of the costs and complexity of the projects at hand. The Review Team's detailed cost evaluation considered the separation of above- and below-rail costs where applicable, and strove to identify any situation where costs included in the current claim may have been approved in a previous period.

The Review Team applied a risk-based approach and used experienced professional judgement in each circumstance to decide the depth to which a project cost review would be taken.

In addition to the review of project costs, the Review Team undertook a comprehensive assessment of the procurement process for sleepers. The assessment focused on checking that the procurement arrangements supported the achievement of the capital works outcomes in a least cost manner (referred to by the Australian National Audit Office as 'Getting the right outcome at the right price').

⁷ 3.3.3 Prudence of Standard of Works Schedule A, 2010 Access Undertaking (consolidated version prepared June 2014)

The fundamental criteria applied for this assessment are shown Figure 4.

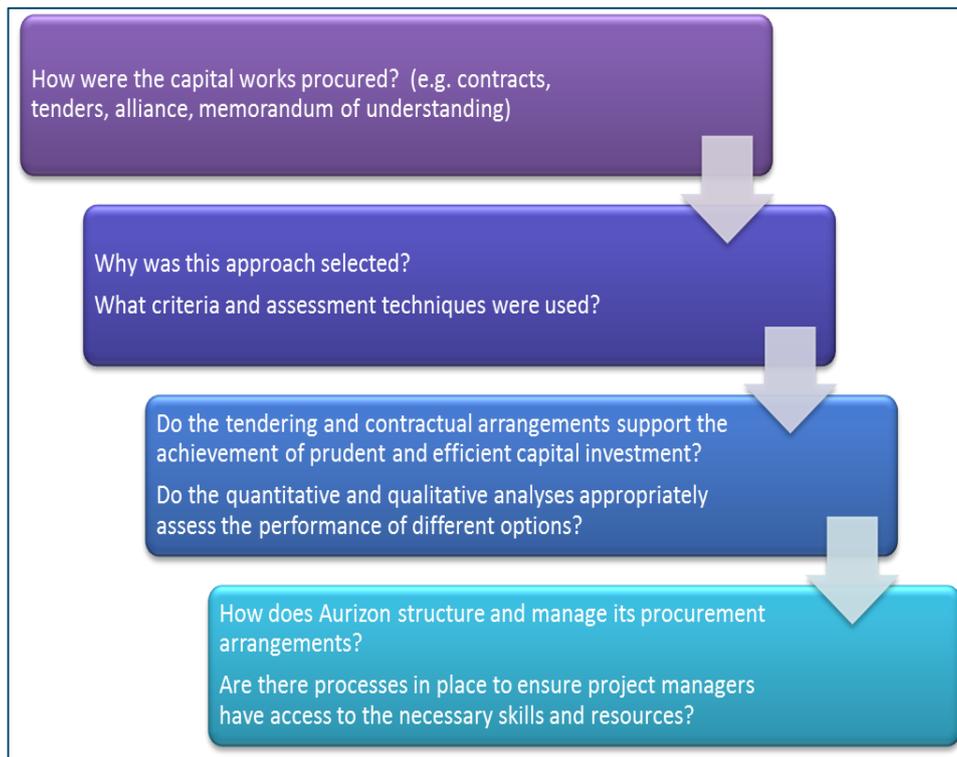


Figure 4 Basic criteria for assessment of procurement process

3.3. ASSESSMENT FORMS

To ensure consistency of assessment, the Review Team developed a form for each project, to be reviewed under the criteria defined in Table 2.

The assessment form was originally developed for previous capital expenditure reviews and found to be successful as a way to ensure consistency across projects, regardless of the scale, nature and level of complexity of the project. The format of the form has been refined in accordance with experience and feedback from previous assessments.

A summary of each project assessed (the first page of the assessment form) is provided in Appendix 3 of this report for Major Projects and Appendix 5 for Non-Major Projects. These summaries report the main details of the overall assessment of cost, standard and scope. The full assessment form and details of the individual prudency assessments for all 38 (4 major and 34 non-major) representative sample projects assessed is provided in the supplement to this report, Aurizon Network CAPEX Review 2014-15: Prudency Assessment Forms.

The supplementary report is structured as follows:

- Part 1: Schedule 3 – Expansion projects
- Part 2: Schedule 4 – Track and civil assets (TACA) projects
- Part 3: Schedule 5 – Electrical systems projects
- Part 4: Schedule 6 – Signalling and track side systems (S&TSS) projects
- Part 5: Schedule 7 – Telecommunications asset projects
- Part 6: Schedule 8 – Corridor asset projects (including System projects)

3.4. RISK MATRIX

The Review Team notes that the terms of prudency can still be generally accepted even if specific individual criteria are not fully satisfied. For example, a project may still be prudent in scope even if it cannot be demonstrated that the work has been the subject of a rigorous priority assessment, or all variations from the scope have been authorised using a standard process.

Similarly, prudence of standard may still be possible if a suitable piece of equipment which has been installed in the network does not meet the usual norms of the company or system. Finally, costs may still be deemed as prudent, depending upon the individual circumstances, even if a disproportionate amount of the approved budget has been expended on the work delivered up to a given point in time or the calculated unit rate for the provision of the asset is higher (or lower) than might normally be expected.

Under these conditions the Review Team used the risk matrix shown in Table 3 to guide its assessment of prudence.

By implementing the rigour of applying the risk matrix around the criteria detailed in Table 2, the Review Team was able to ensure that each identified risk was documented by applying a simple score rating of 1 to 3. The scoring is based on the premise that omissions in relatively minor low-risk or low-value activities have a lesser effect on overall prudence, relative to those with high risks or values, and the scores allocated to each project take this into account.

Table 3 Risk Matrix

Assessment of information supporting the element	Project is of high cost (\$10m+)1	Project is of medium cost (\$5 to 10m+)2	Project is of low cost (<\$5m)3
Project appears to fulfil requirement – information fully supportive	1	1	1
Project fulfils overall prudence requirement but: <ul style="list-style-type: none"> information not supplied; or some issues identified 	2	2	1
Project fulfils overall prudence requirement but: <ul style="list-style-type: none"> information not supplied; and some issues identified 	3	2	1

Key:

- 1) Project is of high cost (\$10m+) and/or commercial/safety critical, with high risks to supply chain if standards/scope/cost are compromised. Project is comprised of components not familiar to Aurizon Network's operations, or is outsourced to Alliance or other major contract
- 2) Project or components of project are of medium cost (\$5-10m), and are comprised of components considered as 'business as usual' for Aurizon Network
- 3) Project or components are low cost (less than \$5m), and of low commercial/safety risk to supply chain – 'business as usual'.

Projects (or components thereof) costing less than \$5m, which are also of low commercial or safety risk to the 'business as usual' operation of the supply chain, are allocated a score of 1 for the criterion under consideration. This score is allocated even if some information is not available for review or issues have been identified with the management or delivery of the project works.

As the value of the project under consideration increases, so does the potential effect of any issues identified as part of the review. For projects with a value of \$5–10m, and which are comprised of components considered as 'business as usual' for Aurizon Network, a score of 2 is awarded for criteria where the project does not fully meet a requirement or where the information supplied for review does not fully support the works delivered and/or cost expended.

When considering projects which have a cost in excess of \$10m and/or include other high risk elements, however, there is a clear steep increase in the scores awarded for the review of each criterion. Where a project is fully documented and appears to fulfil the identified requirements, a score of 1 will be awarded. Where the project fulfils the overall requirement but there are deficiencies in the documentation provided for review or some issues were identified, a score of 2 is awarded.

Finally, where a project of high cost value fulfils the overall requirement but there is some information absent **and** issues are identified, then a score of 3 is awarded.

Large groupings of 2 or 3 scorings within a number of criteria indicate potential major issues concerning prudence in any specific parameter (i.e. scope, standard or cost).

In the Review Team's assessment the risk matrix, in combination with the use of the assessment forms detailed in Section 3.3, acted as a guide and provided assurance that equal rigour was being applied to each project regardless of its nature.

3.5. LIMITATIONS OF THE BRIEF – AURIZON NETWORK

The basis of the assessment made in this report is the information provided to the QCA as substantiation of Aurizon Network's 2014-15 Capital Expenditure Claim. The information was provided in various forms including spreadsheets detailing cost summaries and estimates, consultant reports (in some cases redacted), technical documentation including general arrangement and other drawings, and details provided verbally during discussions with relevant project personnel.

Structural changes within Aurizon Network and the completion and commissioning of a number of major projects have meant that many of the project management staff involved in the major projects have moved to other organisations.

Where this has been the case, this assessment has been reliant wholly upon the initial information provided by Aurizon Network in its 2014-15 submission and on available information received in a number of forms in response to queries raised on the Request for Information Register.

3.6. SITE ASSESSMENTS

As part of the review process, representatives from Aurizon Network, the QCA and the Review Team conducted a site visit for selected projects. These projects were selected using a risk-based approach and consisted of those projects with any significant cost, standard or scope concerns. The Review Team found the additional opportunity to discuss any concerns with relevant Aurizon Network engineers to be informative and effective in gaining a greater understanding of the individual project claims and any identified issues.

4. ASSESSMENT RESULTS AND RECOMMENDATIONS

4.1. GENERAL

Aurizon Network's 2014-15 capital expenditure claim totals \$530,197,183 excluding IDC. Of this, \$379,846,441 was claimed for major projects (these being the 4 segments of the WIRP1 project).

The claim also included a total of 80 non-major projects with a combined value of \$150,350,742. Table 4 summarises the capital expenditure claim against the total value of the assessed expenditure. The revisions to both major and non-major projects, described in detail in the relevant sections of this report, are summarised in Table 4 and 5 below.

Table 4 Summary of total value of claim and assessments undertaken by the Review of Team

	Values excluding IDC
Value of Claim	\$ 530,197,183
Value of Projects Assessed for Prudency	\$ 514,739,382
Total Percentage of Claim Assessed in this Report	97.1%

Table 5 Major projects prudency assessment summary

REF No. PROJECT	System	Claimed expenditure 2014-15	Scope	Standard	Cost	Comments and summary of assessment
A.01552 Wiggins Balloon Loop	Blackwater	\$188,501,416	✓	✓	✓	Information provided for review indicates significant bulk earthworks and re-modelling of the North Coast Line being undertaken in addition to the standard balloon loop construction activities.
A.01631 Rocklands to Stanwell Duplications	Blackwater	\$162,422,586	✓	✓	✓	Capacity analysis undertaken by an external consultant hired by Aurizon Network and, subsequently, by Aurizon Network itself confirms works were reasonable to demand at the time. Customer approval was supported by the WIRP Deed.
A.03735 Bauhinia North Upgrade	Blackwater	\$ 14,733,398	✓	✓	✓	Installation of non-electrified passing loop with electrification funded by the Bauhinia Electrification Project.
A.03742 Moura East	Moura	\$ 14,189,041	✓	✓	✓	Overall, considered prudent in cost, standard and scope.
Total expenditure claim major projects assessed (\$)		\$379,846,441				
Total expenditure claim major projects recommended (\$)		\$379,846,441				

Table 6 Non-major projects prudency assessment summary

REF No. PROJECT	System	Claimed expenditure 2014-15	Scope	Standard	Cost	Comments and summary of assessment
A.02628 COAL SYSTEM: COAL LOSS MANAGEMENT	System Wide	\$242,552	✓	✓	✓	Refer Appendix 5 Form 1
A.03323 ROLLESTON: UPGRADE SPUR LINE 9.75 MTPA	Blackwater	\$8,441,686	✓	✓	✓	Refer Appendix 5 Form 7
A.03465 CQ COAL TRANSFORMER REFURBISHMENTS	System Wide	\$645,198	✓	✓	✓	Refer Appendix 5 Form 4
A.03477 CQ COAL TRAIN CONTROL SIMULATOR	System Wide	\$396,072	✓	✓	✓	Refer Appendix 5 Form 8
A.3892 HATFIELD ACCESS ROAD – KOUMALA – BOLINGBROKE ROAD	Goonyella	\$144,119	✓	✓	✓	Refer Appendix 5 Form 2
A.03931 TRAIN CONTROL DISASTER RECOVERY	System Wide	\$1,091,559	✓	✓	✓	Refer Appendix 5 Form 33
A.04017 LAKE VERMONT BALLOON LOOP EXTENSION	Goonyella	\$9,707,397	✓	✓	✓	Refer Appendix 5 Form 17
A.04111 DUAL TELEMETRY UPGRADE	System Wide	\$3,561,144	✓	✓	✓	Upgrades of this type represent best practice among railway operators seeking to enhance the reliability of their systems. The costs are considered high but accepted as prudent given the local market conditions at the time the project entered the execution phase. Refer Appendix 5 Form 34
A.04112 CALLEMONDAH YARD TURNOUT UPGRADE PROJECT	Blackwater	\$389,569	✓	✓	✓	Refer Appendix 5 Form 18
A.04155 CONCRETE SLEEPER UPGRADE GN PHASE 2	Goonyella	\$497,379	✓	✓	✓	Refer Appendix 5 Form 19

REF No. PROJECT	System	Claimed expenditure 2014-15	Scope	Standard	Cost	Comments and summary of assessment
A.04187 CSEE TRACK CIRCUIT UPGRADE – ROCKLANDS TO ALDOGA	System Wide	\$512,875	✓	✓	✓	Project scope was prudent at the time of inception but the type approval exercise for new equipment was unsuccessful. The supply contract was therefore cancelled before any additional equipment was procured. Refer Appendix 5 Form 9
A.04199 MIDDLEMOUNT RAIL CONNECTING INFRASTRUCTURE	Goonyella	\$14,943,921	✓	✓	✓	Refer Appendix 5 Form 20
A.04297 AzS600 AXLES COUNTERS REPLACEMENT	System Wide	\$308,761	Deferred			As this project was yet not commissioned this has been deferred. Refer Appendix 5 Form 10
A.04298 CULVERT REHABILITATION AT 113.900km MSL	Moura	\$1,538,988	✓	✓	✓	Targeted intervention for a life expired culvert on the Moura line using R & D technology. Refer Appendix 5 Form 21
A.04307 CULVERT ASSET RENEWAL PROJECT BLACKWATER	Blackwater	\$2,950,279	✓	✓	✓	Refer Appendix 5 Form 22
A.04313 GAUGE FACE LUBRICATION ASSET RENEWAL	System Wide	\$2,342,027	✓	✓	✓	Refer Appendix 5 Form 23
A.04321 CENTRAL COAL UPS UPGRADE PROJECT	System Wide	\$910,887	✓	✓	✓	Overall project is to upgrade 41 UPS and 1 power conditioner across the Blackwater, Goonyella and Newlands systems. Refer Appendix 5 Form 11
A.04339 TURNOUT RENEWAL PROGRAM 2014-15	System Wide	\$12,242,309	✓	✓	✓	Refer Appendix 5 Form 24
A.04355 UTC ENHANCEMENT for DISASTER RECOVERY	System Wide	\$2,277,832	✓	✓	✓	Project works commenced before disaggregation of QR Limited. The project was completed by Queensland Rail which then invoiced Aurizon Network, in accordance with the conditions agreed in Project Thomas. Refer Appendix 5 Form 12
A.04366 LEVEL CROSSING UPGRADES 13/14 FY	System Wide	\$4,612,028	✓	✓	✓	Refer Appendix 5 Form 3

REF No. PROJECT	System	Claimed expenditure 2014-15	Scope	Standard	Cost	Comments and summary of assessment
A.04367 POST WIRP1 ASSET RENEWAL PROJECT	Blackwater	\$1,541,092	✓	✓	✓	Project to replace near life expired assets on newly duplicated sections of track ahead of the increased tonnages created by WICET. Refer Appendix 5 Form 25
A.04369 MINE BALLOON LOOPS UPGRADE	Goonyella	\$1,295,000	✓	✓	✓	Refer Appendix 5 Form 26
A.04433 NETWORK BILLING SYSTEM	System Wide	\$2,672,955	✓	✓	✓	Refer Appendix 5 Form 14
A.04434 PS CAPITAL DEVELOPMENT	System Wide	\$667,063	✓	✓	✓	Refer Appendix 5 Form 15
A.04446 FEEDER STATION PROTECTION UPGRADE	System Wide	\$230,286	✓	✓	✓	Refer Appendix 5 Form 5
A.04484 SANDHURST CREEK BRIDGE (LIFE EXTENSION WORKS)	Blackwater	\$335,000	✓	✓	✓	This is a legacy timber structure carrying traffic along the Springsure Branch line to Minerva Mine. The mine has limited life expectancy so bridge repair was chosen over replacement. Refer Appendix 5 Form 27
A.04547 TRACK UPGRADE PROGRAM FY15	System Wide	\$24,308,900	✓	✓	✓	Refer Appendix 5 Form 28
A.04548 WEIGHBRIDGE RENEWAL	System Wide	\$820,820	✓	✓	✓	Refer Appendix 5 Form 13
A.04563 CQCN STRUCTURES RENEWAL PROGRAM FY15	System Wide	\$11,053,088	✓	✓	✓	Refer Appendix 5 Form 29
A.04568 TRACK UPGRADE FY14	System Wide	\$319,415	✓	✓	✓	Refer Appendix 5 Form 30
A.04591 NAETWORK SAP PS ENHANCEMENTS	System Wide	\$371,947	✓	✓	✓	Refer Appendix 5 Form 16
A.04612 FORMATION	System Wide	\$8,510,218	✓	✓	✓	Refer Appendix 5 Form 31

REF No. PROJECT	System	Claimed expenditure 2014-15	Scope	Standard	Cost	Comments and summary of assessment
STRENGTHENING FY15						
A.04621 OH EQUIPMENT RENEWAL FY14 to FY17 – GOONYELLA	Goonyella	\$2,917,815	✓	✓	✓	Refer Appendix 5 Form 6
IV.00002 SLEEPER RENEWAL PROGRAM FY15	System Wide	\$12,092,760	✓	✓	✓	Refer Appendix 5 Form 32
Total value of non-major projects assessed for prudence (\$)		\$134,892,941				
Total expenditure claim non-major projects (\$)		\$150,350,742				
Total expenditure claim non-major projects recommended (\$)		\$150,041,981				

5. IDC, MARKET ANALYSIS AND REVIEW OF SLEEPER PROCUREMENT AND SIGNALLING ALLIANCES

The Review Team used a risk-based approach to select a number of major projects which were subject to an economically focused prudency assessment in addition to the technically focused review. This included an assessment of market (i.e. procurement and contractual efficiencies) and non-market conditions as appropriate.

The economically focused review specifically involved:

- a review of the IDC calculations for the major projects,
- a review of the coal market status at the time of decision,
- sleeper procurement across major and non-major projects; and
- signalling alliances across major and non-major projects.

5.1. IDC

The Project Team has reviewed the IDC calculations for a sample of projects that are included in this capital expenditure claim. The review of the IDC calculations focused on four projects (see Table 7).

Table 7 IDC Calculation projects

Project No.	Project
A.01552	Wiggins Island Balloon Loop
A.01631	Rocklands to Stanwell Duplications
A.03735	Bauhinia North Upgrade
A.03742	Moura East

Aurizon Network and the QCA have an agreed methodology for calculating the IDC. This methodology ensures that Aurizon Network can recover the cost of financing construction and capital-related feasibility studies (referred to as 'interest during construction' or IDC) which it incurs prior to when it starts to receive regulated revenue from its investments. Using the methodology agreed between Aurizon Network and QCA, capital expenditures in Aurizon Network's submission are inflated or discounted to the middle of the 2014-15 financial year to reflect the time value of money.

For a sample of projects, our review has found that Aurizon Network's IDC calculations are consistent with the agreed methodology.

The review tested the following key aspects of the calculations for these five projects:

- the use of the correct weighted average cost of capital (WACC), in accordance with the WACC at the time that the claimable expenditure occurred,
- the sum of the capital monthly expenditure used to estimate the IDC equals Aurizon Network's total capital expenditure (pre IDC) for each project,
- the monthly WACC (W_m) is calculated correctly (as per the agreed formula) – that is for 2014/15 (UT4 period), $W_m = ((1+0.0716855)^{(1/12)}) - 1 = 0.58\%$,
- the sum of the monthly IDC calculations equals the total IDC for each project; and
- the monthly capital expenditures for projects begin at approximately the right time, for example that the first monthly capital expenditures for a project to have occurred at around the project concept stage.

The Review Team also notes that the IDC calculation in the 2014-15 capital expenditure claim resolves an issue with the IDC calculation that was identified in the 2013-14 capital expenditure claim.

5.2. FEASIBILITY AND BUSINESS CASE DEVELOPMENT – MARKET ANALYSIS

5.2.1. Outlook for rail demand and its influence on capital expenditure

When considering prudence of scope, specifically for progress of works in the capital expenditure claim, it must be assessed whether Aurizon Network had reasonable justification to proceed with an investment, given the circumstances relevant at the time.

One of the key reasons underpinning some of Aurizon Network's investments was preparation for a projected increase in the demand for its rail services. Aurizon Network's capital expenditure submission includes a range of projects that were undertaken based on expected future growth in coal production and export, also known as expansion projects. Expansion projects involve the development and construction of new track related infrastructure.

For example, two of the largest projects in the 2014-15 capital expenditure claim were the Wiggins Island Balloon Loop and the Rocklands to Stanwell Duplications. Both of these projects involved the development of track related infrastructure to support growth in demand for the system. These projects were undertaken by Aurizon Network taking into consideration future growth expectation and undertakings⁸ from coal mines.

5.2.2. Queensland market conditions

Assessment of market conditions requires consideration of the timing of historical market development and investments. That is, in order to assess whether the expenditure was prudent it is necessary to understand the market demands and customer needs at the time when the expenditure decisions were being made.

In particular, it is noted that many of the projects in Aurizon Network's submission were undertaken over several years. This is typically because the investments incorporate the different stages of a project – from concept to pre-feasibility to investment approval and then construction and commissioning.

For example, expenditures associated with the planning for the Wiggins Island Balloon Loop commenced in 2005 and construction of the loop ramped up in earnest in 2011-12.

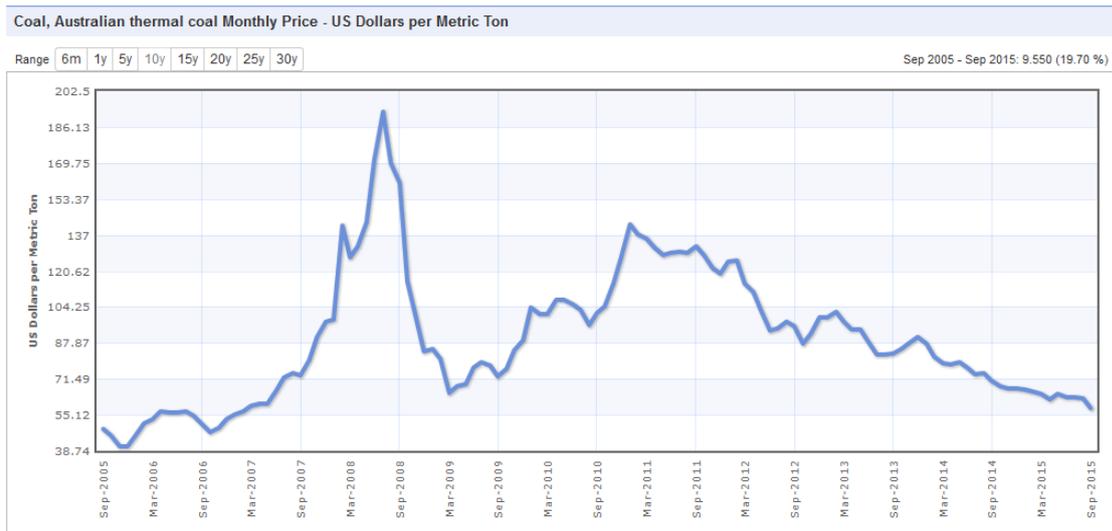
From the available documentation and publicly accessible information it appears that Aurizon Network's investment decisions, particularly for projects that commenced in the mid to late 2000s to 2011-12, were a logical response to strong and increasing demand for its services, development of related infrastructure (such as WICET) and that Aurizon Network's growth related investment decisions were made at times when there were expectations that demand for coal would continue to rise.

5.2.3. Coal market

The coal market changed considerably during the 2012-13 and 2013-14 financial years, as prices fell significantly below those witnessed in 2010, 2011 and the first half of 2012 (see Figure 6). However, during the 2013-14 financial year there was some uncertainty around the outlook, particularly with the price rise that was witnessed in November and December of 2013.

Since the end of 2013, however, there have been ongoing coal price declines during 2014-15. These reductions in price have placed further pressure on coal mining margins which will likely have consequences for future coal mining production growth, particularly if prices do not recover to 2011 and 2012 levels.

⁸ An undertaking in this case refers to any agreement which obliges Aurizon Network to carry out or honour specific contractual arrangements in relation to future forecasts or anticipated growth expectations.



Description: Coal, Australian thermal coal, 12000- btu/pound, less than 1% sulfur, 14% ash, FOB Newcastle/Port Kembla, US Dollars per Metric Ton

Figure 6 Thermal Coal Prices

Source: <http://www.indexmundi.com>; Coal, Australian thermal coal monthly Price – US Dollar per Metric Ton.

Despite the downturn in the coal market, Aurizon Network has needed to service increasing throughput volumes. For instance, during the 2014-15 financial year, coal exports reached a record level of 219.4-million tonnes, up 5% on the 2013-14 record level.

Recent analysis of port data released by the Queensland Resources Council (QRC) confirms that three ports broke coal export records during the 2014-15 year, namely Dalrymple Bay Coal Terminal, with exports of 71.6 million tonnes, Hay Point Coal Terminal, with 43.4 million tonnes, and Abbot Point, with 28.7 million tonnes. The Port of Gladstone, which exported 68.5 million tonnes, was just short of last year’s record, and preliminary advice from Port of Brisbane indicated that it shipped 7.2 million tonnes of coal in 2014-15.⁹

Thus, the downturn in commodity markets is yet to translate into a reduction in the tonnage of coal being transported on the Aurizon Network. However, discussions with Aurizon Network confirmed that a number of new and expansion-related mine projects have been deferred as a result of the downturn in coal markets.

5.3. PROCUREMENT

5.3.1. Sleeper procurement

Following on from the 2013/14 capital prudency review when the Review Team reviewed the procurement of steel rail supply options, the same team has this year reviewed Aurizon Network’s sleeper procurement process. Sleeper procurement is a significant capital expenditure item which impacts numerous capital expenditure projects, including both system renewal and growth projects. Consequently, the procurement of sleepers was considered to be a major influencing item in the prudency of cost in these projects.

Aurizon Network uses a four-stage decision process to identify whether alternative supply options can deliver a reduced total cost of ownership:

- Engagement Pack #1 – Understanding the scope
- Engagement Pack #2 – Analysis and strategies
- Engagement Pack #3 – Engagement with the market and negotiation with suppliers
- Engagement Pack #4 – Implementation and category management

The review was informed by interviews with Aurizon Network management and the following key ‘commercial-in-confidence’ reports and models:

⁹ <http://www.miningweekly.com/article/queensland-coal-exports-reach-record-high-2015-07-08>

- Aurizon (June 2012) Stakeholder sign on (Hypothesis) Engagement Pack #1 (Part B – Hypothesis): Concrete Sleepers and E-Clips Best Cost Country Sourcing
- Aurizon (March 2012) Supplier Profiles – Concrete Sleepers
- Aurizon (March 2014) Concrete Sleeper and Loose Fastening Approval to Close
- Aurizon (August 2012) Sourcing Strategy Approval Engagement Pack #2: Concrete Sleeper and E-Clip Fastening Materials
- Aurizon (March 2012) Supplier Interaction Plan: Austrak Site Visits
- 20120705_Sleeper Supply Chain Cost_v1.xls
- 20120730_Concrete Sleeper_Cleansheet_v1.xls
- Austrak NC2701 Price Review July 2015.xlsx

5.3.2. Background

In 2012, Aurizon Network commenced a process to review suppliers of sleepers and e-clips (Engagement Pack #1). The Review Team understands that the engagement review was initiated because:

- at the time of the review QR National was in the 7th year of an alliance with the agreement term ending in May 2013 and a further extension of 3 years being optional;
- QR National was bearing the majority of the financial risks, because there were no rise and fall clauses;
- bottlenecks and storage limitations were affecting supply;
- reimbursement under the Alliance Agreement needed to be reviewed; and
- other rail network providers were procuring sleepers but costs were not being appropriately split between customers.

Engagement Pack #1 identified that where concrete sleepers were concerned:

- approximately 265,000 mainline concrete sleepers were acquired with a total spend of approximately \$18.3 million over the period 1 June 2011 to 31 May 2012 and the estimated spend was to be \$76 million over the coming three financial years;
- at the time, 28 tonne mainline concrete sleepers represented 89% of the total spend;
- Turnouts and splay sets were procured outside the Alliance Agreement, under a 12 month fixed price contract with Austrak;
- QR Network (now Aurizon Network) owns the preliminary design and technical specification of narrow gauge sleepers to 28 tonne axle load (TAL), and this specification is based on Australian Standard; and
- Austrak owns the detailed concrete sleeper design including drawings and steel moulds.

Where e-clip fastening materials are concerned:

- approximately \$5.8 million spend on e-clip fastening materials had been undertaken in the past 12 months (1 June 2011 to 31 May 2012);
- e-clip fastening materials were procured via the current concrete sleeper alliance agreement with a fixed margin applied and supplied directly to the sleeper manufacturer for assembly; and
- The e-clip patent of the original manufacturer had expired, hence opening up opportunities for non-OEM-suppliers in the global market.

This review has focused on the procurement of mainline sleepers as they represent 89% of the total sleeper spend and on the related e-clip system procurement which is arranged via the Austrak Alliance Agreement.

5.3.3. Engagement Review Findings

Engagement Pack #2 reported that four sourcing options had subsequently been analysed, namely:

- extend the current Alliance Agreement;
- establish a new Standing Offer Agreement with Austrak;
- explore Austrak Dubai factory option for importing sleepers under Alliance or Standing Offer; and
- alternative domestic or international supplier.

The Engagement Pack #2 analysis identified that sourcing sleepers from Austrak is considerably more cost-effective than the international alternatives considered.

The review concluded that sourcing from alternative domestic and international suppliers does not provide competitive cost (cost savings), mainly because transportation costs are high (over \$10 per sleeper, NPV) and concrete sleeper prices are cheaper from Austrak than from the alternative suppliers assessed. See Figure 7.

The review also noted that there are currently no alternative 'off the shelf' 28 TAL narrow gauge concrete sleepers available from alternative suppliers.

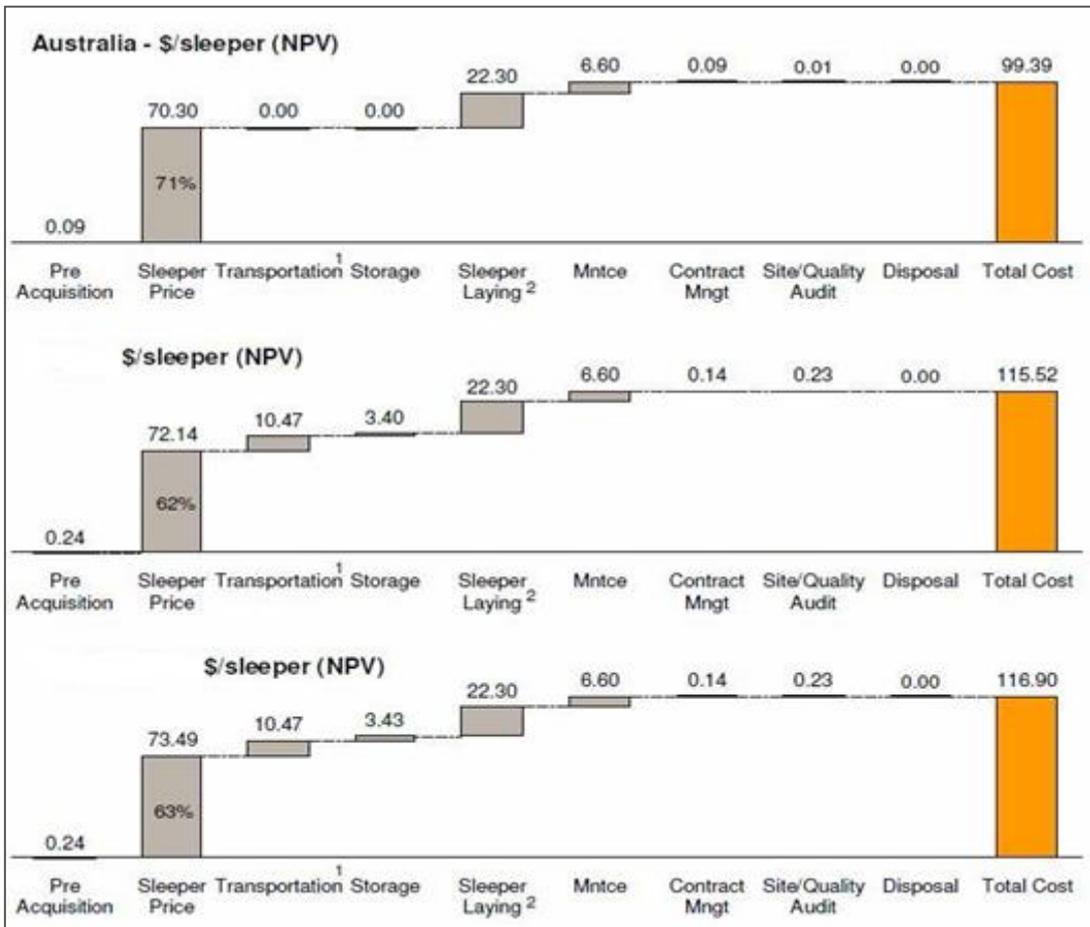


Figure 7 Sleeper NPV comparisons

The Engagement Pack #2 assessment concluded that in the short to medium term Austrak should continue to be the preferred source, however, a new set of contract Terms and Conditions should be established to include flexibility to exit the agreement if market conditions change. The global market should continue to be monitored to determine the right timing and strategy to engage alternative domestic and overseas suppliers.

5.3.4. New Sleeper Procurement Arrangements

As a consequence, the Alliance Agreement with Austrak for supply of concrete sleepers ended on 31 March 2014 and a Standing Offer Agreement (SOA) was negotiated in its place. The Review Team

understands that the new SOA includes an initial 2-year term, a range of sleeper types (mainline, low profile, transition and concrete bearers) and improved purchasing arrangements.

5.3.5. Review Findings

As part of the cost prudency assessment for this major item the Review Team considered the procurement process and Aurizon Network’s TCO (total cost of ownership) analysis.

As with the rail procurement review (undertaken for the 2013-14 cost prudency assessment), a similar set of issues has been identified with the TCO analysis. However, none of these issues affect the overall conclusion which was to continue with the current sleeper supplier. The issues identified include:

- The NPV calculation in the spreadsheet was incorrect. The NPV calculation in the TCO spreadsheet on which the calculation is performed requires that all cells relating to the calculations contain a value, even if that value is zero (0). If the cell is simply left blank that year is missed in the NPV calculation and the result is incorrect.
- Exchange rate changes are a key risk to projects involving international transactions, because exchange rates can be highly volatile. Their inclusion in the TCO modelling needs to be rigorously assessed, using a range of exchange rate projections to confirm that exchange rate risk does not undermine project outcomes. This is essential because otherwise an international supplier could be selected and exchange rate falls could materially affect Aurizon’s financial position. For instance, the recent 25%+ fall in the AUD: USD exchange rate could increase the cost of imported product by an equivalent amount. (Refer Table 8 for comparison with current exchange rates).

Table 8 Example of currency rate averages 2012

Currency	Rate against AU\$	Daily average
USD	1.0095	3 months daily average 04 April - 04 July 2012
RMB	6.3941	3 months daily average 04 April - 04 July 2012
EURO	0.7883	3 months daily average 04 April - 04 July 2012

- No sensitivity tests appear to have been undertaken in the TCO analysis. It is important that sensitivity testing is undertaken to determine how sensitive the outcome is to changes in key assumptions, test that worst case scenario analysis does not alter the outcome and to check for optimism bias in the analysis. For this analysis the following sensitivity tests should have been undertaken (as a minimum):
 - exchange rates,
 - operating and maintenance costs,
 - capital costs,
 - high and low WACCs, and
 - worst case scenario.

Discussions with Aurizon Network confirmed that the analysis was undertaken prior to our feedback, and review mechanisms have been implemented to ensure that TCO analysis is now being accurately undertaken. Because these issues were discussed in detail for the 13-14 capital expenditure review, they are only discussed in summary below.

5.3.6. Key Conclusions and recommendations

Key conclusions from this review:

1. Aurizon Network's stage gate process, involving up to 4 Engagement Packs, appears to be a sound and thorough process for identifying actions which should be implemented for major procurements.
2. The TCO modelling that underpinned the sleeper procurement decision-making is an important and necessary component of the assessment process, but unfortunately it suffered from calculation errors. It is, however, understood that processes have been implemented to avoid this happening in the future.
3. The lack of sensitivity tests in the model means that a worst case scenario has not been tested; instead a single scenario is considered in isolation.

5.4. SIGNALLING ALLIANCES

As part of this cost prudence project, the Review Team has reviewed how Aurizon Network is using two of its signalling alliance arrangements for major projects: Aspect 3 and Synergy.

The Aspect 3 alliance involves Invensys (Siemens) and Aurizon. The Synergy Alliance involves Aurizon, Ansaldo STS and United Group Ltd. Both Alliances were established in 2008 when the coal market was in an expansion phase and Aurizon needed to secure resources to support growth project initiatives.

Both Alliances have supported a number of signalling projects (including this year's major project submissions and signalling and telecommunications non-major projects) across the central Queensland coal network. Of relevance to the 2014-15 cost prudence assessment, discussions with Aurizon identified that:

- both the Aspect 3 Alliance and Synergy Alliance were invited to tender for the Wiggins Island Rail Project (WIRP);
- the Aspect 3 Alliance was selected to deliver the signalling for WIRP; and
- because the Synergy Alliance lost the bid it was wound up due to the lack of other signalling projects to sustain it.

This analysis focuses on the cost prudence of Aurizon continuing to use Alliances to support capital projects.

5.4.1. Alliance – Key Features

Key features of the signalling Aspect 3 Alliance, include:

- collective responsibility – which means that unless expressly agreed all risks associated with the performance of work are a collective responsibility, with a 'no blame' liability framework.
- governance – three levels of management: Alliance Leadership Team, Alliance Program Management Team and Project Management Team.
- target outturn cost (TOC) framework – under this project framework at project commencement the responsible teams work in a collaborative (alliance) culture to develop the project design and estimate the cost at completion of the project.
- tendering costs – project definition costs are reimbursed in line with the initial budget that is set by Aurizon Network (previously QRN) in the project referral notice. Importantly, even if the project definition is rejected these costs are still payable.
- payment types comprise: reimbursable expenses, project fees and pain share/gain share.

5.4.2. Review Findings

The Review Team believes that when the alliances were established expediency of development was critical both to Aurizon Network and many of its customers (coal mines across central Queensland). Subsequently, the key issue was around having adequate resource to facilitate project development, so Aurizon Network was justified in its decision to establish alliances to address development related risks.

However, more recently commodities markets have suffered from a structural decline in demand which is affecting prices and growth. As a result many of Aurizon Network's growth related projects have been placed on hold. Consequently it is questionable whether Aurizon Network needs to continue to maintain an alliance to support signalling works, particularly given that under an alliance:

1. Target outturn cost (TOC) estimates (proposal costs) to Aurizon Network are higher than under tendered contract arrangements.
These costs are higher for two reasons:
 - Under the Alliance Agreement tendering (project definition costs) are reimbursed; and
 - Because of the lack of competitive tension in the model Aurizon Network engages an “Independent Estimator” to review the TOC estimate. For this project Evans and Peck were engaged to undertake this review. The cost of engaging an independent estimator further increases the cost to Aurizon Network associated with the proposal and design stage of projects.
2. Lack of competitive tension in the tendering model: Project scope costing can no longer be competitively tendered, because Aurizon Network only has one signalling alliance. This means there is no competitive tension in the tendering process. Previously (for instance when the WIRP project was issued) there was limited competitive tension because there were two bidders (Aspect 3 and Synergy), however, we understand that the Synergy Alliance has subsequently been closed. As a result this means that the alliance partner could overload the costs when bidding for future projects, thereby exploiting a monopoly position. This conclusion was also reached by RSMBC who reviewed five alliances for the 2011-12 Aurizon Network capital expenditure claim “There is a risk of overstatement of claims or excessive cost build-ups from these external parties¹⁰”.
3. Market conditions have changed. Recent discussions with heavy rail service providers have confirmed that the downturn in commodities markets has resulted in a corresponding downturn in market activity for heavy rail service providers.
4. Financial risk sharing is imbalanced. While there are pain and gain share arrangements in the Alliance Agreement it appears that Aurizon Network are shouldering the majority of the financial risk, because there are incentives to maximise project scope.
5. Numerous internal and external reviews have identified transparency issues, financial cost and decision making anomalies involving Alliances. For instance:
 - Aurizon Network (EP#1) “Terms and conditions under current Alliance Agreement are not implemented or being well managed” and “Queensland Rail is now procuring sleepers directly from Austrak, however, costs incurred by the Alliance are not split between QRN and QR”¹¹;
 - RSMBC¹² identified that several Alliances have been utilised for delivering works on Aurizon Network’s projects and in particular the Coal Connect Alliance had received over \$9 million in funding that “was not formally approved by the ALT (Alliance Leadership Team)” ; and
 - RSMBC¹³ identified that Alliance related “documentation was not easily accessible for Aurizon Network, and, in some cases, could not be located. As a result requests were required to be made from third parties to obtain documentation which Aurizon Network should have maintained within its files”.

Subsequently, the Review Team concludes that Aurizon Network should review the merit of and, where possible, move away from Alliances arrangements for signalling given:

- the significant change in rail services market conditions over the last few financial years; and
- the significant reduction in the number of expansion projects that Aurizon is planning to develop.

5.4.3. Information sources

This review of signalling alliances has been informed by:

- Aspect 3 Alliance (27 August 2012) Program Alliance Agreement: Rail Signalling Projects (from 2012) The Aspect 3 Alliance
- Evans and Peck (September 2012) Aspect3 Alliance – Signalling – Rocklands to Warren (RGKW) Duplication: Independent Estimator – Target Outturn Cost Estimate Review Report (Draft 3)

¹⁰ Cost Review of Aurizon Networks Capital Expenditure Claim 2011/12, RSM Bird Cameron for the Queensland Competition Authority p.21

¹¹ Evans and Peck (September 2012) Aspect3 Alliance – Signalling – Rocklands to Warren (RGKW) Duplication: Independent Estimator – Target Outturn Cost Estimate Review Report (Draft 3), p.12

¹² Cost Review of Aurizon Networks Capital Expenditure Claim 2011/12, RSM Bird Cameron for the Queensland Competition Authority p.5

¹³ Cost Review of Aurizon Networks Capital Expenditure Claim 2011/12, RSM Bird Cameron for the Queensland Competition Authority p.7

- QRN (2012) Interlocking Technology Evaluation: Westrace Mark II
- Aurizon (2015) Wiggins Island Rail Project: Stage 1 Scope Book
- RSM Bird Cameron (n.d.) Queensland Competition Authority, Cost Review of Aurizon Networks Capital Expenditure Claim 2011/12
- Aurizon (June 2012) Stakeholder sign on (Hypothesis) Engagement Pack #1 (Part B – Hypothesis): Concrete Sleepers and E-Clips Best Cost Country Sourcing

6. MAJOR PROJECT ASSESSMENT SUMMARIES

The Review Team's analysis on each project is separated into an:

- Overview
- Assessment of project scope
- Assessment of project standards
- Assessment of project costs.

6.1. WIGGINS ISLAND COAL EXPORT TERMINAL (WICET) AND THE WIGGINS ISLAND RAIL PROJECT (WIRP)

WICET

According to Aurizon Network¹⁴, the Wiggins Island Coal Export Terminal (WICET) is a major infrastructure project including the construction of a new export terminal which will become an integral part of the existing infrastructure at the Port of Gladstone. This private terminal facility will be constructed in stages to match forecast coal export demand. The first stage aims to deliver 27 million tonnes per annum (mtpa) of new export capacity, with longer term plans to create further capacity.

WIRP

WIRP consists of the staged development of new rail lines and upgrading of existing lines to service WICET.

Stage 1 of WIRP was broken into a number of segments, as shown in Figure 8 below:

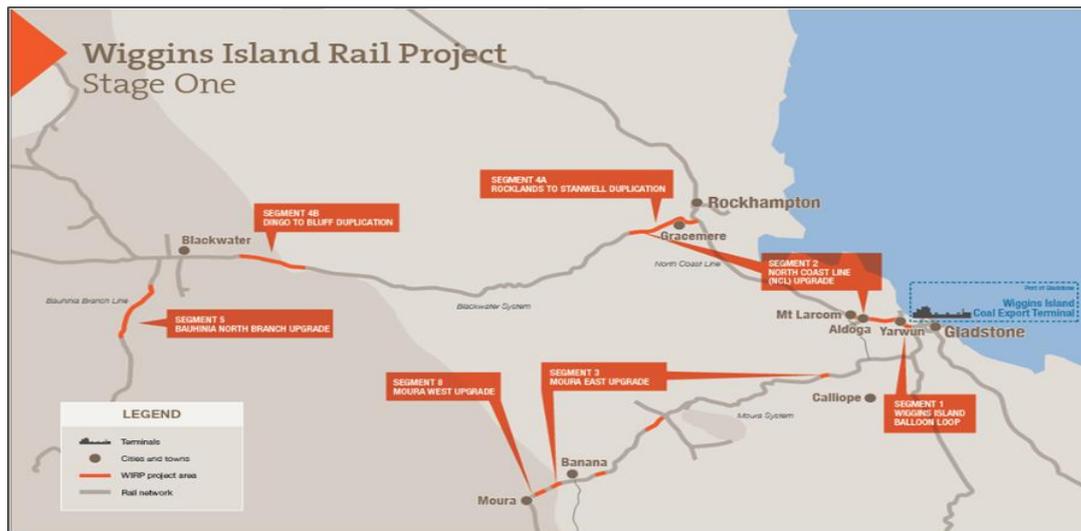


Figure 8 Location of WIRP (Stage 1) Construction Works

The Stage 1 segments are:

- Segment 1 Wiggins Island Balloon Loop
- Segment 2 North Coast Line (NCL) Upgrade
- Segment 3 Moura East Upgrade
- Segment 4a Rocklands to Stanwell Duplications
- Segment 4b Dingo to Bluff Duplications
- Segment 5 Bauhinia North Branch Upgrade
- Segment 8 Moura West Upgrade.

¹⁴ Aurizon Network Access Undertaking (2010) Proposed New Reference Tariff Train Services to Wiggins Island Coal Export Terminal

This scope involves constructing new infrastructure and upgrades to existing coal rail infrastructure in the Blackwater and Moura systems both to support the initial WICET capacity of 27mtpa and improve the operational performance of these systems. These rail projects were planned and approved via a process of agreements (the WIRP Deeds) between Aurizon Network and its eight customers. Signatories to the Deeds pay a monthly WIRP Fee to Aurizon Network, in addition to the access charges arising from their normal reference tariff arrangements.

Construction commenced in March 2012, with completion aligned to the WICET coal terminal works. As part of WICET's financing, eight equity owners with related coal mining projects (refer Table 9) are understood to have signed rail and port take-or-pay (ToP) contracts.

Table 9 WICET Shareholders and Port ToP Estimated Exposures¹⁵

Company	Port ToP mtpa	Coal Mines
Glencore Xstrata Plc	10.9	Rolleston Coal upgrade to 17mtpa
Wesfarmers	1.5	Curragh Coal 1.5mtpa expansion to 10mtpa for WICET
Yancoal Australia	1.5	Yarrabee Mine
Aquila Resources Ltd	1.6	Washpool, Eagle Downs
Bandana Energy Ltd	4.0	Springsure Creek
Cockatoo Coal Ltd	3.0	Baralaba expansion to 3.5mtpa
Caledon Resources	4.0	Minyango Coal
New Hope Corporation	0.5	Colton Coal Mine
TOTAL (Stage 1)	27.0mtpa	

QCA approved the WIRP Deed in May 2012¹⁶.

Part of the project was the duplication of key sections of the Blackwater system to increase capacity along that corridor. This work was broken down into two separate segments of the overall project, Segments 4a and 4b, and it should be noted that only the Segment 4a works are included as part of the current capital expenditure claim. The Segment 4b works are expected to be included in a forthcoming claim.

During the WIRP1 project development phase Aurizon Network commissioned an external consultant to undertake an independent capacity-modelling analysis which recommended five Blackwater duplications and NCL triplication to provide the required capacity with tolerable levels of congestion.

However, the Review Team understands that Aurizon Network's final scope of works for WIRP1 segments 4a and 4b comprised seven Blackwater duplications, inclusive of the five recommended by the consultant (as discussed in section 6.1.2 below).

¹⁵ IEEFA Briefing Note – WICET May 2014

¹⁶ <http://www.aurizon.com.au/investors/asx-announcements>, announced 28/5/2012

6.1.1. A.01552 Wiggins Island Balloon Loop

Overview

Wiggins Island Balloon Loop comprised a new 13.2km Balloon Loop from the NCL near Yarwun to enable unloading of coal for the new port facility. Works at the Balloon Loop project site included earthworks and drainage, track infrastructure, overhead electrical equipment, power systems, signals and telecommunications.

Although the constructed project works included overhead line electrification, the Review Team notes that in the WIRP Scope Book these works were not endorsed by the WIRP1 customers who planned to transport coal to this facility using diesel traction. Electrification of the loop was, therefore, proposed by Aurizon Network¹⁷ to ensure supply chain robustness. Further, Aurizon Network notes that electric traction offers a lower cost alternative to diesel traction for the Blackwater system under heavy electric utilisation scenarios.

Notwithstanding the undertaking that the cost of electrifying the balloon loop would not be included in the cost of the works, the review revealed that a sum of \$591k has been included in SAP for Traction Distribution/Overhead. Following discussions with Aurizon Network, the Review Team understands that these costs are associated with the re-modelling of the crossover on the overhead electrified NCL. As such, the Review Team considers these costs to be prudent.

The works, once completed, were to enable coal trains to travel along Aurizon Network's infrastructure from mines in the Southern Bowen Basin (SBB) to the Balloon Loop where the coal could be unloaded onto the WICET conveyor for transfer to the port for export.

The chronology and costs of the project are shown in Table 10 below.

Table 10 Chronology and Costs – Wiggins Balloon Loop

Stage	Date	Project Cost or Estimate \$	Comments
IAR	August 2011	\$1.012b	Approved by WIRP Deed – includes prefeasibility and total of WIRP projects
RAB Submission 2014-15	July 2015	\$188,501,416	
RAB Submission IDC		\$45,016,180	
Total RAB Submission 2014-15		\$233,517,596	

Assessment of Project Scope

The balloon loop is designed for 26.5 TAL, in line with the current Civil Engineering Track Standard (CETS), with minimum 1:16 turnouts (that is, turnouts with a divergence of 16 units of length for every unit of separation) and 4-metre wide access roads.

Lend Lease (formally Abigroup) was responsible for delivering civil works, whilst Aspect 3 Alliance discharged all signalling works.

The scope included providing a level grade for a whole train length on the approach to the unloading facility and a maximum grade of 1:200 (that is, a rise or fall of 1 unit for every 200 units travelled) thereafter. This is appropriate for the heavy haul nature of the facility, but achieving these gradients required significant earthworks around the length of the loop. The extent of the earthworks undertaken was considered reasonable in view of the topography of the site.

A project plan and feasibility Investment Analysis Report was provided with Aurizon Network's 2014-15 capital expenditure claim submission and these provide further details on the as-built standards.

From the information provided, and on completion of a site inspection, the Review Team considers that, in general, the works are assessed as being of a reasonable standard to meet the scope, and were not overdesigned in any way that they could be considered as being beyond the requirements of the scope.

¹⁷ Capital Expenditure Feasibility Investment Approval Request, Wiggins Island Rail Project Stage 1, 10th August 2011

As such, the Review Team considers the standard as prudent.

Assessment of Project Costs

Most elements of this project were completed by external specialist contractors, namely: LendLease (formerly Abigroup) for civil works; and Aspect 3 alliance¹⁸ for signalling works. The appointment of these bodies was the result of a seemingly rigorous tender, evaluation and award process, with the relevant documentation being provided for review.

Consideration of the overall project costs reveals a figure of \$14.28M per kilometre of facility delivered. Upon initial consideration, this figure sits outside the normal cost range found and approved on similar Aurizon projects consisting of this type of work. Against this, the site visit undertaken by the Review Team demonstrated the magnitude of the immediate and adjacent earthworks required to construct the facility, thereby enabling a more informed conclusion to be reached. In addition, the per-km track cost of \$1,116,704 is within the expected range for new build works.

The overall costs are within the approved funding and are consistent with the project scope, taking into account the large amount of earthworks required and signalling and crossover interface requirements between the Wiggins Island Balloon Loop and the NCL.

Accordingly, the Review Team's opinion is that the project should be considered prudent in terms of cost.

6.1.2. Rocklands to Stanwell Duplications

Overview

The Rocklands to Stanwell duplication project involved duplicating 18km of track between Rocklands and Stanwell on the Blackwater System. This project will enable the passage of 1.7km long trains to the Wiggins Island Balloon Loop for unloading and the work contributes to ensuring the servicing of WICET's initial 27 mtpa capacity requirement.

The chronology and costs of the project are shown in Table 11 below.

Table 11 Chronology and Costs – Rocklands to Stanwell Duplications

Stage	Date	Project Cost or Estimate \$	Comments
IAR	August 2011	\$1.012b	Approved by WIRP Deed – includes prefeasibility and total of WIRP projects
RAB Submission 2014-15	July 2015	\$162,422,586	
RAB Submission IDC		\$29,478,036	
Total RAB Submission 2014-15		\$191,900,622	

Assessment of Project Scope

The project works comprised of:

- duplication of a total of 18km of single track between passing loops from Rocklands to Stanwell, including:
 - earthworks
 - drainage
 - track infrastructure
 - overhead electrical equipment

¹⁸ Aspect 3 alliance consists of Siemens Rail Automation and internal contractors – refer to Section 5.4 for detailed discussion in relation to costs associated with using the signalling alliances throughout Aurizon Network projects.

- power systems
- signals, and
- telecommunications.
- construction of three rail bridges, at:
 - the Burnett Highway
 - Four Mile Creek and
 - Neerkol Creek.

The IAR¹⁹ (p. 3) states the project's purpose is to service the additional 27 mtpa of port capacity coming 'on line' with the opening of the WICET facility in 2014. It also briefly discusses alternatives to the executed scope.

In addition the IAR includes a synopsis of work undertaken by an independent consultant on considering how the additional WICET capacity could be serviced. The consultant's report is understood to have concluded that duplication of five separate sections of track would be sufficient to meet the demands created by WICET.

However, Aurizon Network has stated that the consultant's report considered the operational situation from a static modelling perspective and that further analysis, which included dynamic capacity modelling, concluded that while five duplications would achieve capacity, the Below Rail Transit Time (BRTT²⁰) would be at an unacceptable threshold of above 127%. Hence, the scope ultimately proposed consisted of seven section duplications:

1. Rocklands to Gracemere
2. Gracemere to Kabra
3. Walton to Bluff
4. Kabra to Stanwell; and
5. Dingo to Walton (3 sections)

The Review Team notes the Rocklands to Stanwell duplication project only duplicates three of those sections (i.e. sections number 1, 2 and 4). However, it is also understood that a further four sections have been duplicated as part of a separate project not included in the current year's claim. The Review Team has therefore not considered those duplications.

The Review Team was briefed on the considerations given to appropriate duplications in the consultant's report. Following this briefing, it is noted that Segment 4a, which includes the three duplications included in the current year's capital expenditure claim, alone, does not introduce any additional capacity into the existing network. However, despite this, the logic of completing the duplications in the order implemented by Aurizon Network is considered reasonable in terms of efficiencies in constructability. The Review Team also considers that Aurizon Network had reasonable grounds to proceed, given the circumstances at the time of the decision.

The planned capacity enhancement will only be realised upon completion of Segment 4b. The Segment 4a duplications are, however, understood to be commissioned and available for use by rail traffic.

Aurizon Network has advised the Review Team that the WIRP deed, which included the signatures of the eight major WICET shareholders, indicated approval of the works from the customers concerned. As this group represent an approximate 60% of the Customer Group (as assessed by weighting members in accordance with their Reference Tonnes)²¹ using the Blackwater network it is concluded that the project is approved by the relevant Customer Group. The project was not considered excessive to reasonable demand at the time that the decision to proceed with the project was being made.

Accordingly, the Review Team considers the scope of the project to be prudent.

¹⁹ Capital Expenditure Feasibility Investment Approval Request, Wiggins Island Rail Project Stage 1, 10th August 2011

²⁰ Below Rail Transit Time means, for a Train Service travelling between its origin and destination, the sum of; of the nominated section running times plus identified below rail delays for that service plus time taken in crossing other trains and delays due to operational constraints directly caused by Aurizon Network.

²¹ Aurizon Network Access Undertaking October 2010, Schedule A, Clause 3.2.2 (f)

Assessment of Project Standard

Aurizon Network have stated that all alignment and track grading is consistent with Aurizon Network's CETS and adjacent works.

From the information provided the Review Team understands that structures have been designed and constructed to 300A loading in accordance with AS5100 - 2004 and relevant wind design loads in accordance with AS1170.2. Track infrastructure is built to accepted standards including:

- 60kg head hardened rail installed as continuous rail
- Grade A ballast to a 300mm under-sleeper depth, and 350mm under-sleeper depth on curves
- 28 TAL Pandrol Fast clip concrete sleepers at 685mm spacing

A project plan and Feasibility Investment Analysis Report were provided with the 2014-15 submission providing further details on the as-built standards.

The project plan did not detail any deviations from the specified standards.

From the information provided, the Review Team considers that the project elements align with current standards and practices. Accordingly, the Review Team considers the standard to be prudent.

Assessment of Project Costs

It is noted that the civil works were the subject of a competitive tendering process and, as such, this element of the overall project costs is considered to be prudent. As a result of this tendering process, Leighton contractors delivered the civil works and the Aspect 3 alliance undertook the signalling works.

Experience has shown that a collective approach to assessing and managing risk will produce a better outcome, for example where the preservation of safety to the public/project, is best served through the collaborative process of an alliance. This application provides prudent justification for Aurizon Network's choice in using an alliance model, full advantage of Aurizon Network's in house knowledge, skills and preference can be taken to ensure safe delivery and in the development of the design solution for this safety critical area.

From the information provided for review, the Review Team calculates the per-km cost of the duplication works to be \$9.023M. However, a breakdown of the total costs is provided in Table 12.

Table 12 Breakdown of costs Rocklands to Stanwell

Element	Cost(\$M)
Project Delivery	18.6
Civil (including bridge construction)	59.8
Signaling	39.5
Power Systems	0.2
Traction Distribution/Overhead	13.9
Telecommunications	1.2
Track	22.2
Property, Environment and other works (includes elements of design and feasibility)	7.0
TOTAL (Stage 1)	162.4

As can be seen from the table above, the overall per kilometre cost is inclusive of the civil and structural costs incurred in constructing three reinforced concrete 2-3 span bridge structures and all signalling works

undertaken by the alliance. The cost breakdowns for each of the elements appears to be within expectations for the scope and standard of the works delivered with project delivery, concept design and feasibility being considered reasonable at approximately 11% of the total costs. Taking these considerations into account, in the Review’s Team opinion, the overall cost is prudent for the scope and standard of the works delivered.

6.1.3. Bauhinia North Upgrade

Overview

The project works included the construction of a 1.9km non-electrified passing loop, complete with RCS ‘lite’ signalling, and the upgrade of a construction haul road to access road standard.

The chronology and costs of the project are shown in Table 13 below.

Table 13 Chronology and Costs – Bauhinia North Upgrade

Stage	Date	Project Cost or Estimate \$	Comments
IAR	August 2011	\$1.012b	Approved by WIRP Deed – includes prefeasibility and total of WIRP projects
RAB Submission 2014-15	July 2015	\$14,733,398	
RAB Submission IDC		\$1,426,931	
Total RAB Submission 2014-15		\$16,160,329	

Assessment of Project Scope

The project works comprised of:

- construction of a 1.9km non-electrified passing loop with RCS ‘lite’ signalling
- upgrade of an existing haul road to access road standard.

Although this inclusion of a non-electrified passing loop within the limits of a newly electrified corridor seems counter- intuitive it should be noted that the loop is electrified, with the costs of that element of the work being included within the Bauhinia Electrification Project.

The IAR (p. 29) notes that static capacity modelling had identified that the pre-existing asset layout at this location would not provide the capacity required to service the additional throughput generated by WICET-bound traffic.

The solution as provided in the 2014-15 submission appears to accommodate reasonable market demand estimates given the prevailing trading conditions when the investment decisions were being made. The Investment Analysis Report, which was provided to the Review Team, included a TCO table for five options considered for the project. The report indicates that appropriate processes were implemented to evaluate any alternatives.

Aurizon Network has advised the Review Team that the WIRP deed, which included the signatures of the eight major WICET shareholders, indicated approval of the works from the customers concerned. As this group represent an approximate 60% of the Customer Group (as assessed by weighting members in accordance with their Reference Tonnes)²² using the Blackwater network, the Review Team considers the project to have been approved by the relevant Customer Group. The project was not considered excessive to reasonable demand at the time that the decision was being made to proceed with the project.

From the information provided, and in the opinion of the Review Team, the project is considered prudent in scope.

²² Aurizon Network Access Undertaking October 2010, Schedule A, Clause 3.2.2 (f)

Assessment of Project Standard

As the project works use standard materials and conform to the Aurizon CETS, the Review Team considers the works are consistent with existing infrastructure and purpose.

A project plan and Feasibility Investment Analysis Report were provided with the 2014-15 submission giving further details regarding the as-built standards. The project plan did not detail any deviations from the specified standards.

In consideration of the results of the extensive static capacity modelling, the Review Team considers the works to be fit for purpose for current and known future requirements.

From the information provided, the Review Team consider the standard of the works to be prudent.

Assessment of Project Costs

The civil works were competitively tendered with review of the tender submissions, and subsequent recommendation of award, demonstrated to have followed a rigorous assessment process. As such, this element of the project costs is considered to be prudent.

A breakdown of the total costs (Table 14) demonstrates the split of costs over the design stages and within the project.

Breakdown of costs Bauhinia North – all portions

Table 14 Breakdown of costs Bauhinia North – all portions

Element	Cost(\$M)
Project Delivery	2.7
Concept and Feasibility	0.4
Signalling	2.1
Power Systems	.3
Civil	6.1
Track	3.1
TOTAL	14.7

From the information provided signalling costs include implementation and assurance testing of a new interlocking system and, in consideration of this the Review Team believe the overall cost for these works to be prudent. The overall cost for track and civil work is considered prudent and within the expected range for similar works.

From the assessment of the information provided, therefore, the Review Team considers the cost of works to be prudent.

6.1.4. Moura East

Overview

This project consists of the formation strengthening of 800m of track plus the construction of a 2km non-electrified track deviation. The IAR (p. 27) notes that the formation strengthening work was required to support the additional traffic expected to be generated by Stage 1 of WICET, but that the track deviation would only be required once WICET Stage 2 became operational.

The chronology and costs of the project are shown in Table 15 below.

Table 15 Chronology and Costs – Moura East

Stage	Date	Project Cost or Estimate \$	Comments
IAR	August 2011	\$1.012b	Approved by WIRP Deed – includes prefeasibility and total of WIRP projects
RAB Submission 2014-15	July 2015	\$14,189,041	
RAB Submission IDC		\$1,737,183	
Total RAB Submission 2014-15		\$15,926,224	

Assessment of Project Scope

The project works comprised two discrete elements:

- formation strengthening of 800m of track
- construction of a 2km non-electrified track deviation

Aurizon Network has stated that “The Moura East Upgrade improves the existing track structure to accommodate additional tonnage on the Moura Short Line as part of WIRP Stage 1 using 106t wagons with 26.5 TAL”.

The IAR includes a TCO analysis which shows that the scope of works for Moura East upgrade includes some formation strengthening on the existing alignment plus construction of 2km of new track on a deviated alignment.

Aurizon Network has stated that its rationale for adopting the deviation over the other options such as formation strengthening works on the existing alignment, undertaken during a track possession, was due to a number of factors. These included the length of existing corridor affected, the amount of disruption to rail traffic caused by on line works, and productivity issues. The key factor, however, was the location of the affected section of track between two creeks, both of which were known to be flood prone. Construction of a new off line solution facilitated the inclusion of enhanced flood protection measures, which have subsequently been tested and found to be fit for purpose during recent flood events.

The information provided in the IAR would indicate that Aurizon Network has implemented appropriate processes in the evaluation of the scope and the scope of works is considered to be within what is considered Reasonable Demand.

The overall project scope was approved by WIRP customers (as contained in the WIRP Deeds), taking into consideration that the works were not considered excessive to reasonable demand at the time that the decision was being made to proceed with the project.

From the information provided and assessed, the Review Team considers that the project scope is prudent.

Assessment of Project Standard

Formation strengthening is an activity which has been undertaken widely across the CQCN in recent years. Standard drawings were provided for the Review Team, and from the information given it appears that the methods applied for this work align with standard and previously approved methods approved by the QCA. Aurizon Network has also stated that the works were carried out in line with previously approved formation works and in compliance with Aurizon Network’s CETS.

Similarly, the adoption of a 26.5 TAL standard for the WIRP Stage 1 works suggests that the track deviation would have been constructed in compliance with the requirements of the CETS.

From the information provided and assessed, the Review Team considers that the project standard is prudent.

Assessment of Project Costs

Analysis of Aurizon Network’s SAP data revealed that the track and civil costs for Separable Portion 2 (construction of track on new alignment) represented 74.9% of the overall total for these classes of work. Applying a 25% factor to the overall project cost, to remove the cost of Separable Portion 2 leaves a figure of \$2,936,682 as the combined cost of Separable Portions 1, 3 and 4.

A breakdown of the total costs (Table 16) demonstrates the split of costs over the design stages and within the track and civil disciplines.

Table 16 Breakdown of costs Moura East – all portions

Element	Cost(\$M)
Project Delivery	3.2
Concept	0.1
Feasibility	0.2
Civil	8.4
Track	3.4
TOTAL	15.4

From the information provided it is evident that civil costs for the project included formation strengthening through black soil areas and in isolated areas with challenging access. The majority of the worksites were located on high embankments, where significant embankment stabilisation works to ensure the integrity of the formation strengthening.

Wet weather during the construction of the track deviation created significant delays and construction issues, the works being completely disrupted by flooding which caused a complete washout prior to commissioning. While the majority of the reparation was insured, there was still an element of cost borne directly by Aurion Network and this forms an integral part of the project valuation included in the current capital expenditure claim.

From the information provided, and in consideration of these setbacks and the construction issues inherent within black soils, the Review Team consider the costs of the project are prudent.

7. NON-MAJOR PROJECT ASSESSMENT SUMMARIES

7.1. PROJECT ASSESSMENTS – SCHEDULE 3 EXPANSION

7.1.1. Overview

Projects falling into the expansion category are shown in Table 17 below.

The details of the assessment of these projects are provided in Appendix 5 and Table 6. As the major portion of the expansion projects was included in the major project assessments, only one expansion project was assessed in the non-major projects group; this was Rolleston: Upgrade Spur line.

In assessing this project, the Review team identified a discrepancy in the size of the claim for this work. Information from the FY13-14 submission showed a current year claim of \$2,894,490 in addition to previous claim amounts approved by the QCA of \$7,686,953, bringing the total value of the approval for this work up to \$10,581,444, which would leave a balance of \$886,626 against the approved budget of \$11,468,070 shown in SAP. This compared with an FY14-15 claim for \$8,441,686.

Aurizon Network has confirmed that there was an error in the previous year's claim and the amount of \$7,686,953 shown against this project in the FY13-14 submission had, in fact, not previously been claimed. Thus, a balance of \$8,573,580 remains available for approval; the size of the 2014-15 claim falls within this value.

Table 147 Total claim value of expansion non-major projects assessed

Project name	Project number	Location	Capital expenditure (\$, excludes IDC)
Rolleston Upgrade Spur line 9.75T	A.03323	Blackwater	8,441,686

7.2. PROJECT ASSESSMENTS – SCHEDULE 4 TRACK AND CIVIL ASSETS (TACA)

7.2.1. Overview

Projects falling into the TACA category are shown in Table 18 below.

The details of the assessment of these projects are provided in Appendix 5 and Table 6.

7.2.2. Prudency of Scope

It is considered that in many circumstances assessment of scope would have been facilitated if full details of the full works achieved within the assessment period had been provided at the beginning of the assessment, especially in relation to projects which form part of extensive renewal programs such as culvert asset renewal project on the Blackwater system, track upgrades and sleeper renewal programs. However the Review Team acknowledges that once this information was requested, Aurizon Network made significant effort in providing the requested data as quickly and efficiently as possible.

It is the Review Team's general opinion that the projects included in the Track and Civil assets categories were developed to meet reasonable demand levels at a fit for purpose level. It is the general opinion of the Review Team that projects were considered prudent.

7.2.3. Prudency of Standard

In general the projects assessed were appropriately consistent with the Civil Engineering Track standards (CETS) and relevant construction and national standards.

7.2.4. Prudency of Cost

As part of the cost prudency assessment the Review Team undertook a review of the procurement processes for a major track and civil component; sleepers. This review complemented a similar assessment involving a review of procurement processes for rail undertaken as part of the 2013-14 expenditure claim. The review identified that the procurement processes applied by Aurizon Network were sound, and resulted in a prudent procurement result for this major component.

In general the Review Team assessed that unit cost rates for these projects aligned with industry expectations and previously approved costs for similar works undertaken by Aurizon Network. From the information provided the projects were generally considered prudent in cost.

Table 18 Total claim value of TACA non-major projects assessed

Project name	Project number	Location	Capital expenditure (\$, excludes IDC)
Lake Vermont Balloon Extension	A.04017	Goonyella	9,707,397
Callemondah Yard Turnout Upgrade Project	A.04112	Blackwater	389,569
Concrete Sleeper Upgrade GN Phase 2	A.04155	Goonyella	497,379
Middlemount Rail Connecting Infrastructure	A.04199	Goonyella	14,943,921
Culvert Rehabilitation at 113.9km MSL	A.04298	Moura	1,538,988
Culvert Asset Renewal Project Blackwater	A.04307	Blackwater	2,950,279
Gauge Face Lubrication Asset Renewal	A.04313	System Wide	2,342,027
Turnout Renewal Program 2014-15	A.04339	System Wide	12,242,309
Post WIRP1 Asset Renewal Project	A.04367	Blackwater	1,541,092
Mine Balloon Loops Upgrade	A.04369	Goonyella	1,295,000
Sandhurst Creek Bridge (Life Extension Works)	A.04484	Blackwater	335,000
Track Upgrade Program FY15	A.04547	System Wide	24,308,900
CQC Structures Renewal Program FY15	A.04563	System Wide	11,053,088
Track Upgrade FY14	A.04568	System Wide	319,415
Formation Strengthening FY15	A.04612	System Wide	8,510,218
Sleeper Renewal Program FY15	IV.00002	System Wide	12,092,760
Total			104,067,432

7.3. PROJECT ASSESSMENTS – SCHEDULE 5 ELECTRICAL ASSETS

7.3.1. Overview

Projects falling into the electrical assets category are shown in Table 19.

The details of the assessment of these projects is provided in Appendix 5 and Table 6 however in general the Review Team considers these projects prudent in scope, standard and cost.

Table 159 Total claim value of electrical non-major projects assessed

Project name	Project number	Location	Capital expenditure (\$, excludes IDC)
CQ Coal Transformer Refurbishments	A.03465	System Wide	645,195
Feeder Station Protection Upgrade	A.04446	System Wide	230,286
OH Equipment Renewal FY14 to FY17 Goonyella	A.04621	Goonyella	2,917,815
Total			3,793,296

7.3.2. Prudency of Scope

It is the Review Team's general opinion that the projects included in the electrical assets categories are considered prudent.

7.3.3. Prudency of Standard

In general the projects assessed were appropriately consistent with the relevant organisational and national standards.

7.3.4. Prudency of Cost

In general the Review Team assessed that unit cost rates for these projects aligned with industry expectations. From the information provided the projects were generally considered prudent in cost.

7.4. PROJECT ASSESSMENTS – SCHEDULE 6 SIGNALLING AND TRACKSIDE SYSTEMS (S&TSS) ASSETS

7.4.1. Overview

Projects falling into the signalling and trackside systems (S&TSS) category are shown in Table 20 below.

The details of the assessment of these projects are provided in Appendix 5 and Table 6. In general the Review Team considered these projects to be prudent in cost, standard and scope.

The exception to this was AzS600 Axle Counters Replacement. This project will not be commissioned until 2015-16 and therefore was considered not prudent for the 2014-15 claim.

Table 20 Total claim value of STSS non-major projects assessed

Project name	Project number	Location	Capital expenditure (\$, excludes IDC)
CQ Coal Train Control Simulator	A.03477	System Wide	396,072
CSEE Track Circuit Upgrade – Rocklands to Aldoga	A.04187	Blackwater	512,875
AzS600 Axle Counters Replacement	A.04297	System Wide	Withdrawn
Central Coal UPS Upgrade Project	A.04321	System Wide	910,887

UTC Enhancement for Disaster Recovery	A.04355	System Wide	2,277,832
Weighbridge Renewal	A.04548	System Wide	820,820
Total			4,918,486

7.4.2. Prudency of Scope

From the information provided it appears evident that these projects mainly involved the upgrading of technologies to newer more efficient solutions. This involved the installation of new equipment which can be more easily supplied and serviced (if relevant) nationally.

It is the Review Team's general opinion that the projects included in the trackside systems assets categories are considered prudent.

7.4.3. Prudency of Standard

Most of these projects were undertaken by outsourced specialists who applied recognised industry standards and regulatory procedures, In general the projects assessed were appropriately consistent with the relevant organisational and national standards.

7.4.4. Prudency of Cost

In general the Review Team assessed that unit cost rates for these projects aligned with industry expectations. From the information provided the projects were generally considered prudent in cost.

7.5. PROJECT ASSESSMENTS – SCHEDULE 7 TELECOMMUNICATION ASSETS

7.5.1. Overview

Projects falling into the telecommunication category are shown in Table 21 below.

The details of the assessment of these projects are provided in Appendix 5 and Table 6, however in general the Review Team considers these projects prudent in scope, standard and cost.

Table 216 Total claim value of telecommunication non-major projects assessed

Project name	Project number	Location	Capital expenditure (\$, excludes IDC)
Train Control Disaster Recovery Project	A.03931	System Wide	1,091,559
Dual Telemetry Upgrade	A.04111	System Wide	3,561,144
Total			4,652,703

7.5.2. Prudency of Scope

It is the Review Team's general opinion that the projects included in the telecommunications systems assets categories are considered prudent.

7.5.3. Prudency of Standard

In general the projects assessed were appropriately consistent with the relevant organisational and national standards.

7.5.4. Prudency of Cost

In general the Review Team assessed that unit cost rates for these projects aligned with industry expectations. From the information provided the projects were generally considered prudent in cost.

7.6. PROJECT ASSESSMENTS – SCHEDULE 8 CORRIDOR ASSETS

7.6.1. Overview

Projects falling into the corridor assets category are shown in Table 22 below.

The details of the assessment of these projects are provided in Appendix 5 and Table 6. The Review Team considers these projects prudent in scope, standard and cost.

Table 22 Total claim value of corridor non-major projects assessed

Project name	Project number	Location	Capital expenditure (\$, excludes IDC)
Coal System: Coal Loss Management	A.02628	System Wide	242,552
Hatfield Access Road – Koumala – Bolingbroke Road	A.03892	Goonyella	144,119
Level Crossing Upgrades 13/14 FY	A.04366	System Wide	4,612,028
Network Billing System	A.04433	System Wide	2,072,953
PS Capital Development	A.04434	System Wide	667,063
Network SAP PS Enhancements	A.05591	System Wide	371,947
Total			8,710,664

7.6.2. Prudency of Scope

The Network billing project was a development to enhance the network billing projects completed and approved by QCA in the 2008-09 and 2009-10 expenditure claims. The system continues to be SAP based and although this choice is considered prudent in view of the decisions in previous years to install SAP it is noted that the resulting costs are expected to be high.

It is the Review Team's general opinion that the projects included in the corridor assets categories are considered prudent.

7.6.3. Prudency of Standard

In general the projects assessed were appropriately consistent with the relevant organisational and national standards.

7.6.4. Prudency of Cost

The Network billing project was a development to enhance the network billing projects completed and approved by QCA in the 2008-09 and 2009-10 expenditure claims. The system continues to be SAP based and although this choice is considered prudent in view of the decisions in previous years to install SAP it is noted that the resulting costs are expected to be high. However, SAP is a widely used information technology platform and as such its selection, especially when the existing platform is founded on SAP, is considered prudent.

From the information provided the projects were generally considered prudent in cost.

8. CONCLUSION

CMT, supported by Marsden Jacob and Jacobs (the Review Team), was commissioned by the QCA to assess Aurizon Network's 2014-15 capital expenditure claim.

This report focuses on the review of:

- four major projects, with a combined value of \$379,846,441 (excluding IDC)
- 34 non-major projects, with a combined value of \$134,892,941 (excluding IDC).

The Review Team has applied a structured and rigorous risk-based process, developed in compliance with the Access Undertaking's requirements of prudence, to assess these projects.

On the basis of the information Aurizon Network has provided for this assessment, the Review Team considers the prudence of expenditure for the projects which were selected for review to be generally demonstrated, and therefore recommends the QCA approve the full value of the claim minus \$308,761.

Appendix 1

Summary of Claim (Major and Non-Major Projects)

<u>Project Number</u>	<u>Project Name</u>	<u>Capital Expenditure (excluding IDC)</u>	<u>Interest During Construction (IDC)</u>	<u>Capital Expenditure (including IDC)</u>
Major Projects				
A.01552	Wiggins Island Balloon Loop	188,501,416	45,016,180	233,517,596
A.01631	Rocklands to Stanwell Duplications	162,422,586	29,478,036	191,900,622
A.03735	Bauhinia North Upgrade	14,733,398	1,426,931	16,160,329
A.03742	Moura East	14,189,041	1,737,183	15,926,224
TOTAL		379,846,441	77,658,331	457,504,772
Non-Major Projects				
A.02222	Raglan Feeder Station	41,390	1,088	42,478
A.02273	Coal System: Turnout Replacements St 2	109,642	2,869	112,510
A.02517	Daunia: Millennium Balloon Loop Extension	6,688	182	6,869
A.02602	Bluff Feeder Station	96,185	1,549	97,734
A.02604	Wycarbah Feeder Station	11,285	293	11,578
A.02628	Coal System: Coal Loss Management	242,552	807	243,359
A.02816	CQ Coal: Level Crossing Investigations	926,188	-22,996	903,193
A.02827	South Goonyella (Lilyvale) Passing Loop	833,385	7,397	840,782
A.03323	Rolleston: Upgrade Spur Line 9.75 MTPA	8,441,686	2,252,890	10,694,575
A.03465	CQ Coal Transformer Refurbishments	645,198	-16,608	628,590
A.03473	GAP 50	658,252	1,226	659,477
A.03477	CQ Coal Train Control Simulator	396,072	35,251	431,323
A.03673	UTC Enhance: Supervisor Console Alarms	7,956	228	8,184
A.03678	Derailment Sensors at Loadouts	2,437	33	2,471
A.03843	Rail Replacement Program	5,372	-109	5,264
A.03863	GIS Re-Establishment	95,248	13,448	108,696
A.03892	Hatfield Access Road	144,119	2,719	146,838
A.03931	Train Control Disaster Recovery	1,091,559	19,630	1,111,189
A.03960	ION Meter Installation Upgrade Final	506	13	519
A.03961	Operational Network LAN WAN Architecture	329,763	-7,368	322,395
A.03978	Optical Fibre Transmission Network Upgrades	876,177	-18,046	858,130
A.03979	Installation of Weather Stations – Blackwater	538	11	549
A.04017	Lake Vermont Balloon Extension	9,707,397	1,247,798	10,955,195
A.04044	Upgrade CQ Coal System Fencing (2012/13)	82,230	-931	81,298
A.04066	BW Model 10/Harmon Boom Mech. Replacement	13,128	267	13,395
A.04074	POSS Points Condition Monitors	161,322	1,745	163,067
A.04111	Dual Telemetry Upgrade	3,561,144	74,451	3,635,595
A.04112	Callemondah Yard Turnout Upgrade Project	389,569	11,579	401,147
A.04114	Blackwater and Goonyella Turnout Upgrade 2	170,618	4,406	175,024
A.04124	S1 to S2 Telemetry Upgrade	236,041	2,942	238,983
A.04145	Newlands Culvert Upgrade Project	117,339	2,615	119,955
A.04150	Standby Power Upgrade	1,911	-22	1,889
A.04155	Concrete Sleeper Upgrade GN Phase 2	497,379	8,262	505,641
A.04187	CSEE Track Circuit Upgrade – Rocklands to Aldoga	512,875	34,140	547,016
A.04199	Middlemount Rail Connecting Infrastructure	14,943,921	1,975,108	16,919,029
A.04203	Formation Eng. Assessment and GPR Record	28,560	445	29,005
A.04254	Section Insulator Renewal	2,887,826	19,374	2,907,200
A.04259	SST HBD/HWD Goonyella	26,117	562	26,679
A.04283	12/13 Formation Strengthening Project	5,407	172	5,579
A.04292	Rocklands Top of Rail Lubricator	10,404	333	10,737
A.04293	Bad Order Siding Access Upgrade	55,591	1,751	57,342
A.04296	CDS Rail Points Condition Monitoring	188,802	3,451	192,254
A.04297	AzS600 Axle Counters Replacement	308,761	37,057	345,818
A.04298	Culvert Rehabilitation at 113.9km MSL	1,538,988	41,666	1,580,654
A.04307	Culvert Asset Renewal Project Blackwater	2,950,279	69,384	3,019,663
A.04308	Culvert Asset Renewal Project Goonyella	771,248	6,056	777,303
A.04313	Gauge Face Lubrication Asset Renewal	2,342,027	15,239	2,357,265
A.04321	Central Coal UPS Upgrade Project	910,887	-17,038	893,849
A.04322	CQ Access Roads – Accelerated Program	1,011,988	-28,321	983,667
A.04338	IAMPS Upgrade	266,060	2,308	268,367
A.04339	Turnout Renewal Program 2014 – 15	12,242,309	65,353	12,307,663
A.04345	Sleeper Renewal Program 2013/14	1,326,382	29,303	1,355,685
A.04355	UTC Enhancement for Disaster Recovery	2,277,832	359,150	2,636,982
A.04366	Level Crossing Upgrades 13/14 FY	4,612,028	61,703	4,673,731

A.04367	Post WIRP1 Asset Renewal Project	1,541,092	118,875	1,659,966
A.04368	Formation Renewal Wallaroo to Dingo, Dow	59,435	1,367	60,802
A.04369	Mine Balloon Loop Upgrades	1,295,000	204,185	1,499,185
A.04390	Track Upgrade Project 13/14 – Newlands	19,554	395	19,950
A.04421	Powerhouse Roads 1, 2 and Loop Track Upgrade	420,413	6,737	427,150
A.04422	13/14 Formation Strengthening Project	36,951	991	37,942
A.04423	OH Equipment Renewal – Goonyella System	895,101	26,197	921,297
A.04424	OH Equipment Renewal - Blackwater System	187,354	4,566	191,920
A.04433	Network Billing System	2,672,955	37,981	2,710,937
A.04434	Network System & Business Process Changes	667,063	34,881	701,944
A.04446	Feeder Station Protection Upgrade	230,286	4,519	234,804
A.04479	Callemondah Arrival Roads 4 and 5 Renewal	1,763	-4	1,759
A.04480	Dysart Road Relocation	642	13	655
A.04484	Sandhurst Creek Bridge (Life Extension Works)	335,000	4,988	339,988
A.04511	Accelerated Culvert Asset Renewal Project	1,219,612	-40,752	1,178,860
A.04516	Aurizon Network Customer Portal	146,600	3,107	149,707
A.04547	Track Upgrade Program FY15	24,308,900	96,755	24,405,656
A.04548	Weighbridge Renewal	820,820	14,354	835,174
A.04563	CQCN Structures Renewal Program FY15	11,053,088	-120,694	10,932,394
A.04568	Track Upgrade FY14	319,415	10,291	329,706
A.04591	Network SAP PS Enhancements	371,947	1,059	373,006
A.04612	Formation Strengthening FY15	8,510,218	13,258	8,523,476
A.04621	OH Equipment Renewal FY14 to FY17 Goonyella	2,917,815	3,234	2,921,049
IV.00001	Asset Protection Systems: Braeside WILD	516,304	5,160	521,463
IV.00002	Sleeper Renewal Program FY15	12,092,760	68,054	12,160,814
IV.00014	UTC Program Upgrade	592,091	-18,497	573,595
TOTAL		150,350,742	6,785,837	157,136,580

Appendix 2 Index to Major Project Review Forms

Number	Name	Discipline (colour code)	System	Claim excluding IDC (\$)	No
A.01552	Wiggins Island Balloon Loop	Expansion (Major)	System Wide	242,552	M1
A.01631	Rocklands – Stanwell Duplications	Expansion (Major)	Goonyella	144,119	M2
A.03735	Bauhinia North Upgrade	Expansion (Major)	System Wide	4,612,028	M3
A.03742	Moura East Upgrade	Expansion (Major)	System Wide	645,198	M4

Appendix 4 Index to Non-Major Review Forms

Number	Name	Discipline (colour code)	System	Claim excluding IDC (\$)	No
A.02628	Coal System: Coal Loss Management	Corridor	System Wide	242,552	1
A.03892	Access Road Hatfield Koumala - Bolingbroke Road	Corridor	Goonyella	144,119	2
A.04366	Level Crossing Upgrades 13/14 FY	Corridor	System Wide	4,612,028	3
A.03465	CQ Coal Transformer Refurbishments	Electrical	System Wide	645,198	4
A.04446	Feeder Station Protection Upgrade	Electrical	System Wide	230,286	5
A.04621	OH Equipment Renewal FY14 to FY17 – Goonyella	Electrical	Goonyella	2,917,815	6
A.03323	Rolleston: Upgrade Spur Line 9.75MTPA	Expansion	Blackwater	8,441,686	7
A.03477	CQ Coal Train Control Simulator	S&TSS	System Wide	396,072	8
A.04187	CSEE Track Circuit Upgrade Rocklands to Aldoga	S&TSS	System Wide	512,875	9
A.04297	AzS600 Axle Counters Replacement	S&TSS	System Wide	308,761	10
A.04321	Central Coal UPS Upgrade Project	S&TSS	System Wide	910,887	11
A.04355	UTC Enhancement for Disaster Recovery	S&TSS	System Wide	2,277,832	12
A.04548	Weighbridge Renewal	S&TSS	System Wide	820,820	13
A.04433	Network Billing System	System (included in Corridor)	System Wide	2,672,955	14
A.04434	Network System and Business Change Processes	System (included in Corridor)	System Wide	667,063	15
A.04591	Network SAP PS Enhancements	System (included in Corridor)	System Wide	371,947	16
A.04017	Lake Vermont Balloon Extension	TACA	Goonyella	9,707,397	17
A.04112	Callemondah Yard Turnout Upgrade Project	TACA	Blackwater	389,569	18
A.04155	Concrete Sleeper Upgrade GN Phase 2	TACA	Goonyella	497,379	19
A.04199	Middlemount Rail Connecting Infrastructure	TACA	Goonyella	14,943,921	20
A.04298	Culvert Rehabilitation at 113.9km MSL	TACA	Moura	1,538,988	21
A.04307	Culvert Asset Renewal Project Blackwater	TACA	Blackwater	2,950,279	22
A.04313	Gauge Face Lubrication Asset Renewal	TACA	System Wide	2,342,027	23

A.04339	Turnout Renewal Programme 2014-15	TACA	System Wide	12,242,309	24
A.04367	Post WIRP1 Asset Renewal	TACA	Blackwater	1,541,092	25
A.04369	Mine Balloon Loop Upgrades	TACA	Goonyella	1,295,000	26
A.04484	Sandhurst Creek Bridge (Life Extension Works)	TACA	Blackwater	335,000	27
A.04547	Track Upgrade Programme FY15	TACA	System Wide	24,308,900	28
A.04563	CQCN Structures Renewal Programme FY15	TACA	System Wide	11,053,088	29
A.04568	Track Upgrade FY14	TACA	System Wide	319,415	30
A.04612	Formation Strengthening FY15	TACA	System Wide	8,510,218	31
IV.00002	Sleeper Renewal Programme FY15	TACA	System Wide	12,092,760	32
A.03931	Train Control Disaster Recovery Project	Telecoms	System Wide	1,091,559	33
A.04111	Dual Telemetry Upgrade	Telecoms	System Wide	3,561,144	34

Appendix 5 Non-Major Project Review Form Summary Sheets

