Review of Aurizon Network's Maintenance Cost Index proposed for the UT4 period

QUEENSLAND COMPETITION AUTHORITY

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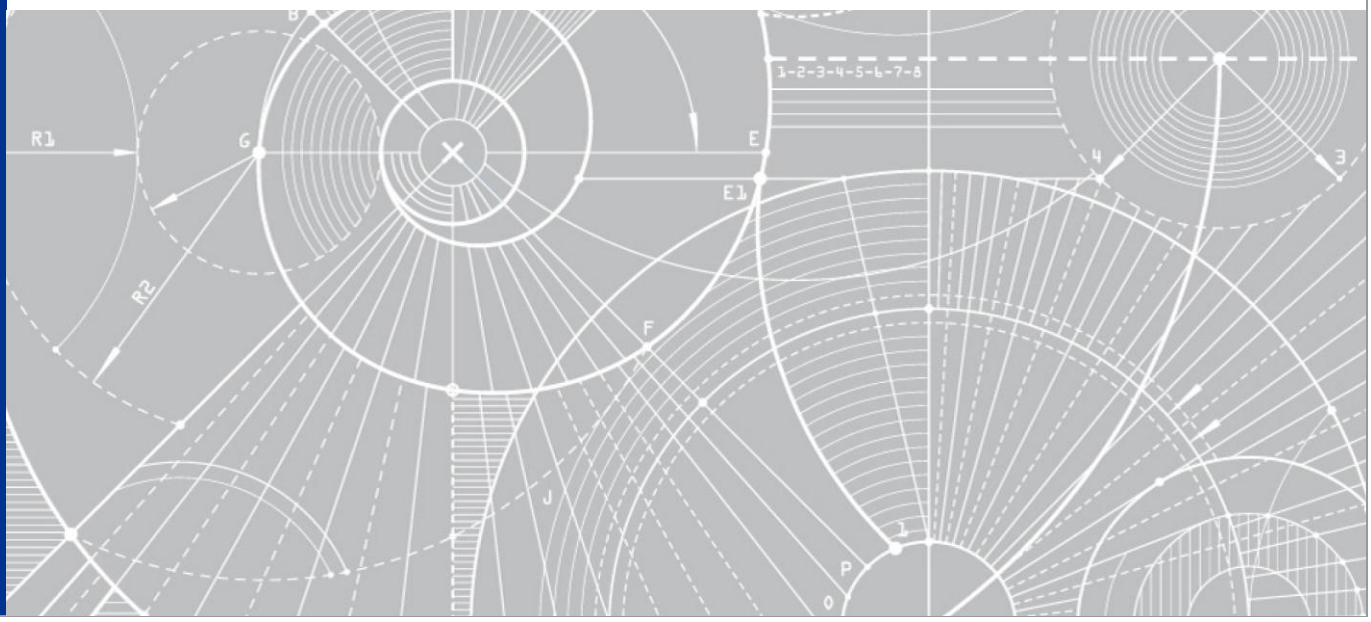
25 Sep 2014



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Document history and status

Revision	Date	Description	By	Review	Approved
0	20 January 2014	Draft for Client review.	Hope Stevens	Darron Cook	Benjamin Wells
1	7 February 2014	Final Report incorporating Client comments.	Hope Stevens	Darron Cook	Benjamin Wells
2	20 March 2014	Final Report incorporating depreciation component from the Maintenance Cost Index, as requested by the Client.	Hope Stevens	Darron Cook	Benjamin Wells
3	23 September 2014	Final Report revised to remove depreciation and other indirect-cost components from the Maintenance Cost Index, as requested by the Client.	Hiresh Devaser	Hope Stevens	Benjamin Wells
4	25 September 2014	Final Report incorporating Client comments.	Hope Stevens	Hiresh Devaser	Benjamin Wells

Glossary

Abbreviations and definitions used in this document are listed in

Glossary Table 1 Abbreviations and Terminology

Abbreviation, acronyms and terminology	Description / definition
AAA	Australian Automobile Association
ABS	Australian Bureau of Statistics
AIP	Australian Institute of Petroleum
AIP TGP	Australian Institute of Petroleum Terminal Gate Prices
AM	Asset Management
Aurizon Network	On 3 December 2012, QR Network Pty Ltd changed its name to Aurizon Network Pty Ltd.
AWOTE	Average weekly earnings / Average weekly ordinary time earnings
CPI	Consumer Price Index
CQCN	Central Queensland Coal Network
FY	Financial year
FY10	2009/10 financial year
FY11	2010/11 financial year
FY12	2011/12 financial year
FY13	2012/13 financial year
FY14	2013/14 financial year
FY15	2014/15 financial year
FY16	2015/16 financial year
FY17	2016/17 financial year
GAPE	Goonyella to Abbot Point
MCI	Maintenance cost index
N/A	Not applicable
PDF	Portable Document Format
PPE	Personal Protective Equipment
ROA	Return on Assets
RFI	Request for Information
STA	Survey of Tourist Accommodation
STS	Specialised track services
The Authority	Queensland Competition Authority
UT3	2010 access undertaking
UT4	2013 access undertaking
WPI	Wage price index

Contents

Important note about your report

The sole purpose of this report and the associated services performed by Jacobs is to review Aurizon Network's proposed maintenance cost index for the UT4 period and make recommendations for adjustment as necessary, in accordance with the scope of services set out in the contract between Jacobs and the Client. That scope of services, as described in this report, was developed with the Client.

In preparing this report, Jacobs has relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by the Client and/or from other sources. Except as otherwise stated in the report, Jacobs has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

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1. Introduction

Jacobs was engaged by the Queensland Competition Authority (the Authority) to review the reasonableness of Aurizon Network's proposed maintenance cost index (MCI) for the Aurizon Network 2013 Draft Access Undertaking (UT4) period (2013/14 to 2016/17). This report presents Jacobs' analysis of, and recommendations on, this matter.

1.1 History of and application of the MCI

The MCI was proposed by Aurizon Network in 2008 to provide a more relevant measure of pricing pressures of undertaking the maintenance task on the Central Queensland Coal Network (CQCN). The MCI is developed to represent a 'basket' of goods and services that closely aligns with cost drivers for Aurizon Network's maintenance task, consistent with the types of activities undertaken[1]. Its intended purpose is to safeguard Aurizon Network from significant maintenance-cost fluctuations during the regulatory period.

Aurizon Network's proposed MCI approach was approved by the Authority, with some minor adjustments, during the assessment of the 2010 Access Undertaking (i.e. UT3).

At the beginning of each undertaking period, Aurizon Network submits a proposed MCI to the Authority for review and approval (subject to any changes required). The MCI is updated at the end of each financial year to account for differences between actual cost changes and the forecast; any revenue differentials are adjusted in arrears. While the individual indices are adjusted for actual cost changes, the cost composition (weighting for each MCI category) remains fixed for the regulatory period.

1.2 Background to this report and task description

Jacobs was previously engaged by the Authority to conduct an Engineering Technical Assessment of Maintenance, Operating and Capital Expenditure Forecast for Aurizon Network's 2013 Draft Access Undertaking (UT4). This report has been prepared as a separate assessment, and therefore does not incorporate any of the recommendations from Jacobs' review of forecast maintenance expenditure, as those recommendations are still being reviewed by the Authority and a draft decision is yet to be released. Thus, the cost base and escalation amounts provided in this report are based on Aurizon Network's proposed UT4 expenditure.

As part of this review, Jacobs has reviewed the following elements of the proposed MCI for the UT4 period:

- the reasonableness of Aurizon Network's MCI methodology for the UT4 period, including assessing the relevant calculations and indices supporting those calculations;
- the reasonableness of a system-wide MCI;
- the reasonableness of fixed weightings over the regulatory period; and
- the report prepared by BIS Shrapnel (Confidential), which provides forecasts for the indices used by Aurizon Network to determine the UT4 period's MCI.

Jacobs has undertaken its assessment using information provided by Aurizon Network, including the forecast costs and methodology utilised to derive the MCI. Therefore, each individual assessment outlined above is conducted exclusively of any of Jacobs' findings or recommendations in this report (and others), i.e. each section is assessed relative to Aurizon Network's MCI proposal and not relative to the findings presented in individual sections of this report.

Section 7 provides Jacobs' consolidated list of recommendations from this report and proposed MCI figures for the Authority's consideration.

[1] The consumer price index was utilised historically.

1.3 Changes to this report

The final report reflects a number of iterations proposed by the Authority during Jacobs' review of Aurizon Network's proposed MCI. The changes which impact on this report structure are summarised below.

Report revision	Date of submission to the Authority	Description of approach	Implications for this report
0, 1	Draft issued 20 January 2014 Final issued 7 February 2014	The Authority requested that Jacobs remove the return on working capital from the cost base used to derive the total MCI.	**Section 4** of this report provides Jacobs' review of the reasonableness of the approach to calculating the MCI. The review has been adjusted to remove the return on working capital.
3, 4	Update to final report above, issued 25 September 2014	In addition to removing the return on working capital (requested as part of revision 1), the Authority requested that Jacobs remove the following cost components from Aurizon Network's proposed MCI cost base: • return on assets (ROA) for the Asset Management (AM) and Specialised Track Services (STS) divisions; • return on inventory held; and • corporate overheads. The Authority also confirmed with Jacobs that depreciation would not be part of the MCI cost base.	As agreed with the Authority, Jacobs has not re-evaluated **Section 4** of this report to account for the Authority's preference to exclude all indirect costs from Aurizon Network's proposed MCI cost base. The Authority's preferred approach has been accounted for in Section **5** and subsequent sections of this report. **Section 5** of this report describes the new changes in this version. **Section 6** of this report includes Jacobs' assessment of the reasonableness of indices assigned by Aurizon Network. The assessment has been updated to incorporate all of the Authority's requested exclusions from the cost base. **Section 7** summarises the conclusions of the report and the proposed MCI for the UT4 period.

1.4 Adequacy of information provided

Jacobs issued Aurizon Network a request for information (RFI) to obtain:

- detailed information on the yearly maintenance cost composition for the UT4 period on a system basis;
- a definition of the cost composition for underlying indices comprising the maintenance cost drivers;
- supporting information for BIS Shrapnel's report which outlines historical actual index data sources utilised by BIS Shrapnel; and
- historical cost weightings for the 2011/12 financial year (i.e. FY12).

Additional information which Jacobs has relied on for this review is outlined below:

- historical MCI adjustment models for the UT3 period provided by the Authority on 11 October 2013; and
- information contained within a presentation (on 6 December 2013) to Jacobs by Aurizon Network detailing the methodology applied in deriving the MCI for the UT4 period.

1.5 Accuracy of data provided

In December 2013, Jacobs undertook an initial review of information provided by Aurizon Network's Network Finance and Regulation division and Network Asset Management Projects division to determine the accuracy of data which informed the MCI forecast determination.

Jacobs noted, at the time, that the most recent cost composition provided by the Network Asset Management Projects division to the Network Finance and Regulation division (which was responsible for supplying the forecasts in the UT4 Maintenance Submission) was not consistent with the numbers in the UT4 Maintenance Submission.

Jacobs notified Aurizon Network about these data discrepancies. In response, Aurizon Network said the values utilised by the Network Finance and Regulation division did not represent the most recent maintenance cost forecast. Therefore, the MCI proposed by Aurizon Network in the UT4 Maintenance Submission did not reflect its proposed maintenance expenditure for the UT4 period. Jacobs was thus unable to review the MCI proposed in the UT4 Maintenance Submission since the data utilised was inaccurate. Jacobs notified the Authority that Aurizon Network would be required to re-submit an updated MCI forecast before a pricing decision for the UT4 period could be finalised.

Aurizon Network provided Jacobs an updated MCI forecast based on the most recent maintenance cost estimates. **Table 1.1** presents the aggregate MCI weightings, as provided by Aurizon Network on 11 December 2013 compared with the forecast which informed the UT4 Maintenance Submission. Aurizon Network has indicated that the changes in the MCI weightings occur from:

- transference of 'trade services' from the consumer price index (CPI) account to the labour account; and
- changes in the assumptions about resourcing for the additional ballast cleaning scope, which altered the mix of labour and heavy plant and equipment. This decision had not been finalised until April 2013 and the MCI in the UT4 Maintenance Submission was not updated to reflect the changes.

Table 1.1 Changes in the aggregate MCI weightings – Aurizon Network's updated forecast compared with the UT4 submission

MCI category	UT4 Submission	Updated Forecast
Accommodation	2.3%	2.3%
Balance of Costs (CPI)	23.6%	20.7%
Consumables	29.5%	29.8%
Fuel Price	2.1%	2.1%
Labour	42.5%	45.1%

Source: Jacobs table based on information provided by Aurizon Network on 6 December and 11 December 2013

Table 1.2 provides the updated forecast MCI provided by Aurizon Network to Jacobs on 12 December compared to the UT4 Maintenance Submission, which reflects changes in the aggregate weightings noted above. The MCI is applied to the price year of FY12. That is, the FY14 MCI reflects 2 years of escalation, the FY15 MCI reflects 3 years of escalation, and so forth.

The updated MCI forecast indicates that pricing pressures will be greater than anticipated at the time of the UT4 submission due to increased labour costs as a proportion of total costs, which occurs since trade services were originally allocated to the CPI account. Jacobs considers that this re-allocation is reasonable since trade services costs would be aligned with pricing pressures for the labour market rather than for the CPI's 'general basket of goods and services'.

Table 1.2 Aurizon Network's updated MCI forecast compared with the UT4 submission

Year	UT4 Submission	Updated Forecast
FY14	7.8%	8.0%
FY15	12.2%	12.5%
FY16	16.6%	17.0%
FY17	21.4%	21.9%

Source: Jacobs table based on information provided by Aurizon Network on 6 December and 12 December 2013

2. Review of the BIS Shrapnel report

Aurizon Network engaged BIS Shrapnel to review the historic cost base and assist with assigning Australian Bureau of Statistics (ABS) indices to key maintenance cost drivers. BIS Shrapnel also provided a series of forecasts for these indices, which Aurizon Network used to derive its proposed MCI for the UT4 period.

2.1 Review of forecast indices

Jacobs has reviewed the appropriateness of the indices proposed by BIS Shrapnel, with consideration of the Authority's requirement that indices be independently verifiable during the MCI revenue adjustment process.

Jacobs notes the following issues which arise from a review of the BIS Shrapnel approach and the indices proposed by Aurizon Network for the UT4 period:

- average weekly earnings (AWOTE) indices for a State's individual sectors are no longer published by the ABS due to a high standard error, and therefore the forecasts cannot be compared to actual cost changes on a yearly basis;
- the wage price index (WPI) for the mining and construction industries for Queensland is not published by the ABS, as the ABS does not publish industry-specific indices at a state level. It appears that BIS Shrapnel has derived this proprietary index through analysis of movements in industries at a national level and movements in the Queensland wage prices. Detailed information that would allow for replication / verification of this approach has not been provided. Aurizon Network will not be able to track actual changes in Queensland wages and, thus, the proposed index will not be independently verifiable;
- the hire of heavy plant and equipment index has been derived by BIS Shrapnel based on the Rawlinsons Construction Cost Guide[2] and therefore cannot be independently verified and it would be difficult for Aurizon Network to track actual cost changes for the hire of heavy plant and equipment; and
- the fabricated metal product price index is published by the ABS. However, BIS Shrapnel has advised that 'historical actuals' have been derived within its model. Despite this, it will be possible to compare actual cost changes if the historical actuals are updated during the adjustment process to correspond with ABS data.

For those indices which continue to be published by the ABS, Jacobs was unable to reconcile some of the historical actuals in the BIS Shrapnel report with the publically available data. Specifically, it was difficult to clarify the index which Aurizon Network would use to update the actual cost changes on a yearly basis. In some circumstances, the difficulties arose from BIS Shrapnel's approach of utilising average annual values instead of end-of-financial-year values. In other circumstances, Jacobs was unable to reconcile the indices based on the sources provided by BIS Shrapnel, as they were not sufficiently clear to discern the actual index used.

Overall, Jacobs was unable to verify historical actuals outlined in BIS Shrapnel's report with ABS data for the following indices (that is, the historical actuals provided by BIS Shrapnel do not appear to match ABS data):

- non-residential building producer price index (Queensland); and
- average room rate for Fitzroy[3] and Mackay. Jacobs requested detailed information from BIS Shrapnel on how it derived historical actuals. However, this information was not provided.

[2] http://www.rawlhouse.com/aust_construction_cost_guide.html
[3] Based on average room rates for Central Queensland.

Jacobs finds that there is a reasonable chance that Aurizon Network could use the incorrect index or approach (for example average annual compared to end of financial year) without clearer instructions. This would have implications for the escalation rates assumed, since they would potentially be compared to the historical actuals provided by BIS Shrapnel and not verified against historical actuals published by the ABS. Therefore, Jacobs recommends that more clarity be provided on the source of indices for the MCI adjustment model, specifically:

- ABS catalogue number;
- name of publication;
- table number within publication;
- index name;
- series ID;
- calculation approach (for example, average annual from September quarter to June quarter, end of financial year values etc.); and
- link to source document.

It will be important that the Authority monitors whether the base (historical) index applied by Aurizon Network is correct to ensure that actual cost changes are being measured correctly. Jacobs has found there is a significant potential for error occurring if the:

1. index reference year is updated by the ABS. Jacobs has identified the following indices for which the reference year has been updated by the ABS subsequent to BIS Shrapnel's forecast[4]:
    a. CPI;
    b. transport equipment (and parts) producer price index; and
    c. non-residential building producer price index (Queensland).
2. actual cost change is compared to a different base index; and/or
3. method of application differs from the method utilised by BIS Shrapnel (for example, average annual values in comparison with annual values).

2.2 Accuracy of the BIS Shrapnel forecast

The BIS Shrapnel report outlines (in a qualitative sense) a number of assumptions about future macroeconomic conditions. However, the extent to which the assumptions impact on the economic modelling is unclear. In addition, a lack of quantitative information underpinning future macroeconomic assumptions[5] means that Jacobs has been unable to review the validity of the assumptions applied.

Jacobs has therefore selected a sample of indices to review as part of this assessment, to identify the extent to which the forecast indices deviate from actual cost changes observed. Specifically, the BIS Shrapnel report was prepared based on actual data from June 2012 and forecasts were provided for June 2013 to June 2017. In this regard, Jacobs is able to review the extent to which the forecast for June 2013 aligns with actual data released by the ABS since BIS Shrapnel's engagement. While it is noted that the indices are updated yearly to reflect actual cost changes and revenue implications are adjusted in arrears, it is appropriate to consider that any significant known deviations from the forecast could warrant an additional forecast being undertaken.

[4] Appendix A details the source files which outline conversion factors to compare indices with the historical actuals outlined in the BIS Shrapnel report.

[5] Which represents intellectual property held by BIS Shrapnel

Table 2.1 provides forecast June 2013 indices provided by BIS Shrapnel compared to the actual data published by the ABS for the following indices, which were selected based on the indices proposed by Aurizon Network and any changes recommended by Jacobs, as well as the availability of ABS data.

- fuel;
  - AAA pricing unleaded petrol (retail, cents per litre)
  - AIP TGP for Brisbane (wholesale, cents per litre) unleaded and diesel fuel
- consumables;
  - Fabricated metal price index
  - Transport equipment and parts producer price index; and
- CPI (Brisbane).

For the indices Jacobs has been able to verify, the data show that the forecasts for June 2013 consistently exceed actual cost changes (excluding transport equipment and parts, for which the actual cost change was slightly greater than forecast). However, Jacobs does not consider that the difference in actuals compared to forecast is sufficiently significant to warrant an additional forecast being undertaken for the UT4 period. The revenue adjustment will cater for any difference in actual cost changes compared to forecast cost changes.

Table 2.1 Comparison of BIS Shrapnel forecasts to actual observed

Index	Source	BIS Shrapnel Method[6]	June 2013 Forecast (BIS Shrapnel)	June 2013 Actual	Difference to forecast (%)
AAA pricing unleaded petrol (retail, cents/litre) Emerald	Queensland AAA Pricing Summary Unleaded Petrol (cents per litre), based on average price and average over financial year	Average annual of monthly data, July to June	154.7	152.0	-1.75
AAA pricing unleaded petrol (retail, cents/litre) Gladstone	Queensland AAA Pricing Summary Unleaded Petrol (cents per litre), based on average price and average over financial year	Average annual of monthly data, July to June	152.6	147.8	-3.15
AAA pricing unleaded petrol (retail, cents/litre) Mackay	Queensland AAA Pricing Summary Unleaded Petrol (cents per litre), based on average price and average over financial year	Average annual of monthly data, July to June	152.4	148.5	-2.56
AIP TGP for Brisbane (wholesale, cents/litre), unleaded	Australian Institute of Petroleum Terminal Gate Prices Calendar Year & Financial Year Averages for Petrol and Diesel	Financial year estimate	141.3	134.1	-5.10
AIP TGP for Brisbane (wholesale, cents/litre), diesel	Australian Institute of Petroleum Terminal Gate Prices Calendar Year & Financial Year Averages for Petrol and Diesel	Financial year estimate	150.4	136.8	-9.04

[6] Observed by Jacobs through an analysis of June 2012 historical actuals. The method was not detailed in BIS Shrapnel's report.

Index	Source	BIS Shrapnel Method[6]	June 2013 Forecast (BIS Shrapnel)	June 2013 Actual	Difference to forecast (%)
Fabricated metal price index	• Australian Bureau of Statistics Cat. 6427.0 Producer Price Indices, Australia, Table 12 Series ID A2305805K • Australian Bureau of Statistics Cat. 6427.0 Output of the Manufacturing industries, division index numbers and percentage changes and index numbers for subdivisions, groups and classes and conversion factors (Table 12)	Year average (average of quarterly values from September to June)	173.9	169.0	-2.82
Transport equipment and parts index	• Australian Bureau of Statistics Cat. 6427.0 Producer Price Indices, Australia, Table 12 Series ID A2305907X • Australian Bureau of Statistics Cat. 6427.0 Output of the Manufacturing industries, division index numbers and percentage changes and index numbers for subdivisions, groups and classes and conversion factors (Table 12)	Year average (average of quarterly values from September to June)	131.5	132.1	0.46
CPI (All groups, Brisbane)	• Australian Bureau of Statistics Cat. 64010.0 Consumer Price Index Tables 1 and 2 • Australian Bureau of Statistics Cat. 64010.0 CPI conversion factors, from index reference period 1989-90 to 2011-12.	June quarterly index	192.2	189.5	-1.40

3. Review of Aurizon Network's approach for determining the MCI for the UT4 period

Section 5.10 (Cost Indexation) of the UT4 Maintenance Submission outlines the approach undertaken by Aurizon Network to determine the proposed MCI for the UT4 period. In addition, Aurizon Network provided Jacobs with an overview of the approach to deriving the MCI at a presentation attended by Jacobs on 6 December 2013.

The key tasks undertaken by Aurizon Network to determine a forecast MCI for the UT4 period can be summarised as below:

1. identification of cost drivers to determine appropriate cost indices; and
2. input of cost drivers into revenue calculations.

Aurizon Network undertook a review of actual costs incurred for FY12 by product year (49 products in total) to provide an indication of cost categories for which appropriate indices could be assigned. The main cost categories were identified as:

- labour (primarily internal but with some level of external hire);
- fuel used for track maintenance machines and motor vehicles;
- staff accommodation;
- plant and machinery hire (consumables);
- track components (consumables);
- track machine components (consumables); and
- balance of costs which were not significant enough to assign a major cost category (office related costs, utility charges, other hire costs, freight charges, safety equipment including personal protective equipment (PPE), security, licence fees and other costs which are not outlined above).

Aurizon Network then mapped the indices to each general ledger account used within the maintenance function at an individual product level in FY12 dollars. The sum of the exercise represents the MCI cost groupings or weightings for individual cost drivers.

Aurizon Network's FY12 cost base was subsequently updated to reflect the scope of work proposed for each year of the UT4 period. The actual costs were then aggregated by product code to determine the proportion of total maintenance costs relevant to each category. Finally, weighted indices were constructed based on the forecasts provided by BIS Shrapnel and the MCI was applied to real maintenance costs (FY12 dollars).

Table 3.1 shows how Aurizon Network's proposed MCI varies over the UT4 period. The MCIs are applied to a single cost base of FY12; they do not reflect annual rates but escalations from the base year. For example, the MCI for FY14 reflects two years of cost changes from FY12 dollars, while the MCI for FY15 reflects three years of cost changes from FY12 dollars.

Table 3.1 BIS Shrapnel indices and Aurizon Network's MCI calculation

Cost driver	Accommodation	Balance of Costs (CPI)	Consumables	Fuel Price	Labour	Weighted Index	MCI Estimate from FY12
Weight	**2%**	**21%**	**30%**	**2%**	**45%**		
FY12	100.0	100.0	100.0	100.0	100.0	100.0	-
FY14	104.4	106.6	99.9	108.2	114.1	108.0	8.0%
FY15	101.7	110.1	99.4	111.7	122.8	112.5	12.5%
FY16	96.5	113.3	99.6	113.2	131.5	117.0	17.0%
FY17	93.5	116.2	102.6	111.6	139.2	121.9	21.9%

Source: Jacobs table based on information provided by Aurizon Network on 12 December 2013

3.1 Calculation approach

Jacobs has also reviewed the Microsoft Excel worksheet (see **Appendix A** for source documents) provided by Aurizon Network which shows the maintenance cost breakdown and the formulae utilised to calculate the proposed MCI.

Table 3.2 overleaf outlines the data Aurizon Network used to derive its proposed MCI. It shows that Aurizon Network uses direct costs (less depreciation) and indirect costs[7] to derive the MCI.

Total costs are provided on a system-wide basis, and the MCI is derived based on the following steps:

1. the product cost components (see column A and column F overleaf) were divided by total costs less depreciation to derive the weightings in column G[8];

2. the aggregate MCI weightings were calculated based on the weightings outlined in column G, with the exception of the following:

    a. the CPI category is equal to the sum of the CPI category in direct costs, plus return on assets (ROA), corporate overheads[9] and working capital; and

    b. the consumables category is equal to the sum of heavy plant and equipment, track components and transportation equipment; and

3. the weighted index (the MCI) for each year was derived based on the aggregate MCI weightings, the indices forecast by BIS Shrapnel and the information outlined in **Table 1.1**.

[7] Return on assets (Asset Management (AM) & Specialised Trade Services (STS)), Return on Working Capital and Corporate Overheads, but less the Return on Inventory Held

[8] The product cost component weightings were calculated based on the total cost for the UT4 period. This method of deriving product cost components was as per the methodology previously approved by the Authority.

[9] Note that this differs from Aurizon Network's UT4 Maintenance Submission which indicates in Table 24 on Page 122 that corporate overheard and working capital costs are indexed as per the operating expenditure submission, not at CPI. Jacobs has utilised the estimates provided by Aurizon Network on the 12 December 2013, not the UT4 Maintenance Submission, since these estimates represent the MCI that Aurizon Network intends to re-submit to the Authority.

Table 3.2 Product cost components

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
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[redacted]

When considering **Table 3.2** and Aurizon Network's approach outlined above, two points are observed:

1. the MCI for the UT4 period is based on the average cost composition for the UT4 period (i.e. weightings do not fluctuate on a yearly basis) as shown by the 'total column' (column F); and

2. the MCI is derived on a system-wide rather than an individual-system basis, which may have pricing implications for different users. This is based on the extent to which the maintenance task varies for individual systems as well as the extent to which costs such as labour and accommodation are different across systems, even in the context of a similar maintenance scope.

In addition, Jacobs notes that while indices are adjusted on a yearly basis by Aurizon Network and approved by the Authority based on actual cost changes, the weighted cost composition is fixed for the regulatory period. In this regard, alterations by Aurizon Network to the planned maintenance scope may impact on the cost composition which could have one or two implications:

1. the cost composition alters such that Aurizon Network earns a profit from the MCI (i.e. if actual maintenance cost increases are less than growth of the MCI due to a favourably changing cost base); or

2. the cost composition alters such that the MCI will not serve its intended purpose to safeguard Aurizon Network from significant maintenance-cost increases (i.e. actual increases are greater than MCI growth due to an unfavourably changing cost base).

While it is noted that the approach utilised by Aurizon Network has previously been approved by the Authority, the Authority agreed that Jacobs should consider the implications of the issues above (see **Section 4**).

4. Assessment of the reasonableness of the proposed MCI

4.1 Working capital

As previously outlined in **Section 3**, Aurizon Network has developed its proposed MCI based on a maintenance cost base derived from total direct costs less depreciation, plus indirect costs less the return on inventory held. The indirect costs incorporated in Aurizon Network's MCI cost base are ROA (AM & STS), corporate overheads and return on working capital.

As part of Jacobs' original engagement, the Authority asked Jacobs to exclude the return on working capital from Aurizon Network's proposed cost base for calculating the MCI. Jacobs' assessment of the reasonableness of the MCI, contained within **Section 4** of this report, excludes the return on working capital[10].

As noted in **Section 1.3**, the Authority subsequently requested that Jacobs also exclude other indirect costs from Aurizon Network's MCI cost base. This change was necessary to accommodate the Authority's revised modelling approach for determining the UT4 reference tariffs. The analysis in **Section 4** has been retained to only exclude a return on working capital. However**, Section 5** and its following sections have been updated to reflect the Authority's request to also exclude other indirect costs.

4.2 Reasonableness of a system-wide MCI

Jacobs has calculated the MCI which would apply on an individual-system basis to assess the reasonableness of a system-wide MCI. The indices are calculated based on Aurizon Network's methodology (but excluding the return on working capital).

This assessment outlines the pricing implications associated with socialising the escalation across all systems. Socialisation impacts occur when the cost composition differs across systems, since cost-change impacts are not equal for all cost drivers. Therefore, while the total escalation cost estimated as the sum of all systems will equal the total escalation cost forecast by the system-wide MCI, some users may be paying more while others pay less escalation than required.

Table 4.1 provides Jacobs' estimated system-specific MCIs compared to Aurizon Network's system-wide MCI for the UT4 period. Jacobs has utilised the following approach to estimate system-specific MCIs:

1. the system-specific MCIs exclude the impacts of Jacobs' recommendations for changes to the index composition in **Table 6.1** in **Section 6** of this report, since the purpose of this exercise is to assess the distributional impacts. The existing indices will allow for a reasonable indication of impacts whilst considering that Jacobs' recommendations are subject to the Authority's pricing decisions;

2. the system-specific MCIs exclude the return on working capital, as per the Authority's advice;

3. Aurizon Network provided a breakdown of the maintenance cost composition by system per year. The breakdown included costs titled 'N/A' (not applicable to a system) for which Jacobs has assumed represent system-wide costs. These costs have been allocated to individual systems for the purpose of this review based on total costs per system as a proportion of the sum of total costs for all systems. **Table B 2** in **Appendix B** provides this breakdown, and also provides Jacobs' allocation of costs to individual systems;

4. the system-specific MCIs were calculated by Jacobs based on the MCI model provided by Aurizon Network and the cost composition by year by system. However, the cost breakdown by system provided by Aurizon Network did not include corporate overheads or return on assets. Therefore Jacobs has apportioned these costs based on the proportion of direct costs (less depreciation) from total costs for each system. These proportions include Jacobs' allocation of 'not applicable' costs.

[10] The exception is the assessment of actual cost composition from FY12, since the value of working capital is unknown to Jacobs. However, the assessment is intended to provide an indicative guide only rather than a definitive value and is therefore appropriate.

Jacobs' estimated MCIs on a system-specific basis indicate that, for the UT4 period, users on the Blackwater system will likely pay a greater level of escalation than would be justified, while users on all other systems will potentially pay less escalation than would be justified. **Table 4.2** provides the MCI cost composition, which shows that these impacts occur due to a greater proportion of labour costs for all other systems compared to Blackwater. Since labour costs are forecast to increase at a greater rate than other costs, users on the Blackwater system will effectively subsidise the inflationary impacts of a greater cost of labour for other systems.

Table 4.1 System-specific MCIs

Financial year	Aurizon Network	Jacobs			
	System-wide MCI Forecast	Blackwater	Goonyella	Moura	Newlands[11]
FY14	7.96%	7.79%	8.10%	8.12%	8.01%
FY15	12.47%	12.20%	12.70%	12.75%	12.51%
FY16	17.06%	16.71%	17.37%	17.45%	17.05%
FY17	21.94%	21.55%	22.29%	22.37%	21.83%

Source: Jacobs table based on information provided by Aurizon Network on 6 December and 12 December 2013

Table 4.2 System-wide and system specific MCI weightings

Financial year	Aurizon Network	Jacobs			
	System-wide	Blackwater	Goonyella	Moura	Newlands
Accommodation	2%	2%	2%	2%	3%
Balance of costs (CPI)	20%	20%	20%	21%	21%
Consumables	30%	31%	29%	29%	28%
Fuel	2%	2%	2%	2%	2%
Labour	45%	44%	46%	46%	45%
Total	100%	100%	100%	100%	100%

Source: Jacobs table based on information provided by Aurizon Network on 6 December and 12 December 2013

In terms of the monetary impact from socialisation of maintenance cost escalation, **Table 4.3** provides the extent to which individual systems will under or overpay escalation costs during the UT4 period based on the MCIs forecasts outlined in **Table 4.1**[12]. When considered on an individual-user basis per system[13], the monetary impacts of socialisation are not significant. Therefore, Jacobs finds that a system-wide MCI is reasonable.

Table 4.3 Monetary impact from socialising

Financial year	Blackwater	Goonyella	Moura	Newlands
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[redacted]

[11] Includes the Goonyella Abbot Point Expansion (GAPE).
[12] It is noted that the difference in system under/over paying does not net to zero. However, this is likely due to Jacobs' approach to allocating return on assets, corporate overheads 'not applicable' costs across systems. In practice, socialisation of costs will net to zero where detailed information is provided.
[13] The Blackwater system services 15 mines carrying 60 million tonnes of coal from sources operated by BMA, Glencore Xstrata, Rio Tinto, Curragh, Ensham, Felix, and Jellinbah (UT4 Maintenance Submission, p. 129).

4.3 Reasonableness of fixed cost composition (weightings) for the regulatory period

When considering the purpose of the MCI (to safeguard Aurizon Network from significant cost fluctuations during the regulatory period), it is reasonable to assess the historical actual cost composition compared to the approved MCI weightings to determine if the approach satisfies the purpose of the MCI.

Table 4.4 compares Aurizon Network's actual cost base for FY12 against the approved MCI weightings. It is recognised that there may be some variation across the four years of the regulatory period and therefore one year may not provide an exact indication of the overall suitability. However, Jacobs has utilised the data available at the time of preparing this report.

It is also noted that FY12 actual weightings provided by Aurizon Network are based on the category definitions for the UT4 period, while the approved MCI weightings have been obtained by Jacobs from the historical MCI adjustment models and are based on the category definitions for the UT3 period (see **Table 6.1** in **Section 6**). Therefore, comparisons for the labour, consumables and CPI categories (in particular) are difficult due to changes in the category definitions for the UT4 period.

Table 4.4 Historical actual cost composition (FY12)

Cost category	FY12 Actual Weightings	FY12 Approved MCI Weightings
Labour	53%	44.5%
Fuel	2%	3.2%
Accommodation	3%	1.5%
Consumables	34%	34.9%
Balance of costs (CPI)	8%	15.9%[14]

Source: Jacobs table based on information provided by Aurizon Network on 13 January 2014 and information provided by the Authority on 10 October 2013

Table 4.5 provides the outputs from the MCI adjustment model for FY12, which were based on the Authority's approved weightings and adjusted by Aurizon Network for actual cost changes, less the productivity x-factor which was applied during the UT3 period. **Table 4.5** also provides an adjustment by Jacobs which would have applied based on the actual weightings for FY12 (noting the issues from changes in category definitions), which has been calculated within the historical adjustment model and therefore includes the productivity x-factor. Based on this review, it appears that users may have under-paid inflation costs for FY12. However, this should be viewed in light of category changes which occurred since the Authority's approved weightings, particularly to the labour category (trade services were transferred from the CPI category to the labour category).

Table 4.5 MCI adjustment model – fixed compared to variable weightings

	FY12 Adjustment	Jacobs' adjustment based on actual weightings
Nominal QCA Allowance (incl. x-factor)	$174,915,020	$174,915,020
Nominal QCA Allowance (incl. x-factor) Actual	$174,604,798	$177,301,781
Difference	-$310,222	$2,386,761

Source: Jacobs table based on information provided by Aurizon Network on 13 January 2014 and information provided by the Authority on 10 October 2013

It is difficult to determine the extent to which the difference in adjustments occurs from changes in category definitions as opposed to a structural change in the composition of maintenance costs. To address this, Jacobs recommends the Authority seek further information from Aurizon Network about the historical cost base to determine whether Aurizon Network should be required to update the MCI category weightings on a yearly basis as part of the MCI adjustment model.

[14] Previously labelled the 'assets' category

Jacobs has reviewed the process by which Aurizon Network assigns maintenance costs to MCI categories and finds that it would allow for yearly adjustment of the MCI category weightings during the UT4 period. For ease of implementation and approval, the cost category definitions and indices for the forecast could be approved at the beginning of the regulatory period but the actual cost composition could be adjusted in arrears on a yearly basis. In determining if this process would be justified, it is recommended the Authority consider (based on an analysis which should be provided by Aurizon Network) the:

- potential magnitude of the impact and the purpose of the MCI; and
- impact on users from a lack of certainty around MCI category weightings.

4.4 Reasonableness of a forecast MCI derived from the total cost for the UT4 period

It is also useful to consider the cash flow implications for users of MCI category weightings which are based on the total forecast expenditure for the UT4 period. **Table 4.6** provides the cost composition on a yearly basis compared to the UT4 total, which shows that there is some variation in the cost composition each year.

Table 4.6 MCI weightings per year

Aggregate MCI Weightings	FY14	FY15	FY16	FY17	Total for UT4 period
Accommodation	2%	2%	2%	2%	2%
Balance of costs (CPI)	21%	20%	20%	20%	20%
Consumables	28%	30%	30%	31%	30%
Fuel Price	2%	2%	2%	2%	2%
Labour	47%	45%	45%	45%	45%
TOTAL	100%	100%	100%	100%	100%

Source: Jacobs table based on information provided by Aurizon Network on 6 December 2013 and 12 December 2013

Table 4.7 shows the actual MCI which would apply on a yearly basis (based on Aurizon Network's methodology but excluding the return on working capital) and the escalation cost compared to a fixed weight MCI. It also provides the difference in total escalation costs for the UT4 period, which shows that users will pay slightly more escalation under a fixed weight scenario where the MCI is based on the total expenditure for the UT4 period[15]. The rate of return is also important to consider when assessing cash flow implications; **Table 4.8** provides the difference in escalation costs for various discount rates, the outcomes of which would depend on the cost composition in earlier and later years.

Table 4.7 Escalation costs - fixed vs. variable MCI weights

	FY14	FY15	FY16	FY17	Total
Weighted Index (variable weights)	108.2	112.5	117.0	121.8	**N/A**
MCI (variable weights)	8.21%	12.47%	17.00%	21.76%	**N/A**
Total Maintenance Cost	**$196,490,879**	**$208,363,600**	**$212,214,877**	**$215,603,711**	**N/A**
Escalation Cost (variable weights)	$16,137,850.50	$25,981,097.62	$36,069,541.15	$46,916,954.75	**$125,105,444.01**
Escalation Cost (fixed weights)	$15,641,925.03	$25,988,919.87	$36,211,728.01	$47,293,021.92	**$125,135,594.83**
Difference (fixed weights - variable weights)	**-$495,925.47**	**$7,822.24**	**$142,186.86**	**$376,067.18**	**$30,150.82**

[15] This outcome may not always eventuate and, in some instances, the total cost escalation paid could be lower.

Source: Jacobs table based on information provided by Aurizon Network on 6 December 2013 and 12 December 2013

Table 4.8 Net present value of escalation costs - fixed vs. variable weights

Discount rate	Escalation Cost (variable weights)	Escalation Cost (fixed weights)	Difference (fixed weights - variable weights)
10%	$95,287,246.2	$95,206,555.6	-$80,690.6
9%	$106,561,228.4	$106,482,548.0	-$78,680.4
8%	$175,244,635.7	$175,642,474.6	$397,838.9
7%	$250,130,438.1	$250,489,384.6	$358,946.6
6%	$378,788,472.6	$379,352,424.5	$563,951.9
5%	$544,569,769.4	$545,060,530.2	$490,760.8
4%	$905,928,505.1	$906,941,155.3	$1,012,650.2
3%	$1,342,961,877.2	$1,344,559,920.2	$1,598,043.0
2%	$2,134,648,372.0	$2,137,338,159.4	$2,689,787.4
1%	$3,328,853,372.4	$3,332,770,334.2	$3,916,961.8

Source: Jacobs table based on information provided by Aurizon Network on 6 December and 12 December 2013

Overall, it appears that the difference in escalation costs for the UT4 period would potentially only be significant for required rates of return below 6%. While network users' required rates of return are not publically available, Jacobs notes the difference in escalation costs, which would be spread across all of a coal system's users, is small relative to the system allowable revenues proposed under UT4. Jacobs finds that an MCI based on the total cost for the regulatory period is appropriate *in the context of the forecast expenditure*. However, when considering Jacobs' earlier findings which indicate that actual costs which differ from forecast costs, a yearly adjustment to the MCI cost categories would be appropriate.

5. ROA and Corporate Overheads

This report provides an update to the proposed MCI which Jacobs originally submitted to the Authority (in February 2014). This revision incorporates removal of ROA (AM and STS) as well as corporate overheads from the cost base. This is in addition to the exclusion of return on working capital, which was previously omitted from the cost base.

The result is a proposed MCI which is developed based on a cost base which includes direct costs less deprecation. Indirect costs are omitted from the cost base. **Section 6** (Reasonableness of assigned indices) has been updated to reflect this approach. **Section 7** sets out Jacobs' proposed MCI in a manner consistent with the Authority's preferred approach.

6. Reasonableness of assigned indices

Jacobs considers that Aurizon Network's approach to assigning forecast costs to individual categories or 'drivers' (see **Section 3**) is a robust and reasonable approach with the information Aurizon Network has available at the time of the forecast. However, it is important that the index selected for escalation of individual drivers is appropriate.

It is noted that BIS Shrapnel only provided a series of forecasts for the individual cost categories; therefore, Aurizon Network has utilised some discretion in selecting indices and weightings for each cost component for the UT4 period. For example, BIS Shrapnel's forecasts for the labour category include the:

- WPI for the mining and construction industries; and
- average weekly earnings (AWOTE) for the mining and construction industries (the average weekly earnings index was recommended by BIS Shrapnel as a more appropriate measure of pricing pressures for the labour market);

while the maintenance consumables categories include the following indices:

- Basic Metals and Fabricated Metal Products Price Index;
- Transport Equipment and Parts Producer Price Index;
- Hire of Heavy Plant and Equipment; and
- Non-Residential Building Construction Price Index.

Aurizon Network has the discretion from the BIS Shrapnel report to select both the index utilised and the weighting within each cost driver, since BIS Shrapnel provided a suite of possible indices but did not recommend weightings or derive the proposed MCI.

Table 6.1 provides the maintenance cost categories identified by Aurizon Network, and the corresponding ABS indices adopted by Aurizon Network from the options set out in BIS Shrapnel's report. It also contains Jacobs' views on the reasonableness of Aurizon Network's proposed indices (see last column).

Table 6.1 Maintenance cost categories and corresponding ABS indices

Maintenance cost component	UT4 MCI category	UT3	UT4 proposed	Jacobs assessment of reasonableness
Labour	Labour	Average weekly earnings (AWOTE) Construction, Mining and Qld All industries (balanced composition)	Average weekly earnings (AWOTE) Mining (100%)	Jacobs does not consider Aurizon Network's proposal to link labour costs to AWOTE for Mining reasonable. As Aurizon Network does not compete with the mining industry for *all* types of labour, anchoring labour costs to an index only covering the mining sector is not appropriate. While some of Aurizon Network's labour requirements for the maintenance task are impacted by demand in the mining industry (such as general track labour and un-skilled work hands, excavator machine operators, and crane operators), positions such as track-maintenance supervisors and specialist plant operators (for resurfacing and grinding) would not necessarily have equivalent roles in the mining industry. To account for this, Jacobs considers a balanced industry composition (similar to the UT3 period) would better reflect labour cost pressures for Aurizon Network. Jacobs notes a similar sentiment was expressed in the BIS Shrapnel report, which recommended that a balanced index between mining and construction was appropriate. As highlighted elsewhere in this report, two labour-cost indices commonly used in Australia are the: AWOTE; and WPI. While using Queensland-specific balanced indices is preferable, the ABS no longer publishes Queensland-specific indices for Mining and Construction. Therefore the MCI would not be independently verifiable as part of the annual revenue adjustment process. As an alternative, Jacobs proposes that the balanced index should instead reflect the: national index for Mining; national index for Construction; and the Queensland index for all industries (which is still published by the ABS). Jacobs considers using either the AWOTE or WPI for this purpose is appropriate. Of these two options, the Authority has advised Jacobs that the WPI is its preferred index for the MCI calculations. Therefore this report

Maintenance cost component	UT4 MCI category	UT3	UT4 proposed	Jacobs assessment of reasonableness
				proposes the WPI balanced index approach be adopted.
Fuel	Fuel	• AAA Pricing Unleaded Petrol (retail) Gladstone, Emerald and Mackay (a total of 60%) • AIP TGP wholesale diesel (20%) • AIP TGP wholesale unleaded (20%)	AAA Pricing Unleaded Petrol (retail) Gladstone, Emerald and Mackay (equal weighting for a total of 100%)	Jacobs does not consider that it is reasonable for Aurizon Network to assume that fuel would be purchased entirely from retail sources. Further, much of the maintenance equipment / machinery still require the use of diesel fuel and the wholesale diesel price movements would more accurately reflect the maintenance cost base. Jacobs finds that the fuel index should be represented by price changes in the AIP TGP wholesale diesel forecast (100% weighting).
Accommodation	Accommodation	ABS average room rate per occupied night (equal weighting for Mackay and Fitzroy)	No change	Jacobs considers that Aurizon Network's allocated indices for accommodation costs are appropriate, including the weightings.
Consumables	Consumables	• Non-building construction (18%) • Basic metal products (18%) • Transport equipment and parts (18%) • Fabricated metal products (18%) • CPI, all groups, Brisbane (28%)	• Hire of heavy plant and equipment index (46%) for hire of heavy plant and equipment • Fabricated metal producer price index (35%) for track and track machine components and parts • Transport equipment and parts producer price index (20%) for transport equipment and parts	• Jacobs has noted previously that the *hire of heavy plant and equipment index* is not appropriate since it was constructed by BIS Shrapnel and is not independently verifiable and hence Aurizon Network will be unable to track costs. Jacobs recommends that the producer price index for the *Mining and construction machinery manufacturing* is more appropriate. • Jacobs finds that the *fabricated metal producer price index for track and track machine components and parts* is appropriate. • Jacobs finds that the *transport equipment and parts producer price index* is appropriate. It is noted that the balance of costs (CPI) from the UT3 period has been removed from consumables and included in the CPI category. Jacobs' assessment of this amendment is provided below.

Maintenance cost component	UT4 MCI category	UT3	UT4 proposed	Jacobs assessment of reasonableness
Balance of costs (CPI)[16]	CPI – this category was contained within the assets and consumables category for the UT3 period.	CPI, all groups, Brisbane (100%)	No change to the index allocation although the cost composition has changed slightly due to more detail within the consumables and labour categories. The CPI category within Aurizon Network's MCI model for the UT4 period includes: • balance of costs; • return on assets; • return on working capital; and • corporate overheads (this differs to the UT4 submission document, which provides a different index for corporate overheads).	Jacobs considers that the balance of costs category could potentially include a more detailed basket of goods and services (similar to consumables). In particular, freight charges could be indexed based on the producer price index for road freight. However, Jacobs has reviewed the general ledger accounts for the UT4 period and noted that freight charges are not significant as a proportion of total costs. Therefore, using the CPI is not a material issue since individual costs within this category are not significant. It has been noted above that the 'balance of costs' account has been updated to remove the impact of trade services, which Jacobs considers is reasonable. In addition, the Authority has requested that Jacobs remove indirect costs as a contributing factor to the MCI. The analysis in this report reflects that position.

Source: Jacobs table based on information provided by Aurizon Network on 6 December 2013 and 12 December 2013 and information provided by the Authority on 10 October 2013.

[16] Primary office-related costs, utility charges, other hire costs, freight charges, safety equipment, security, licence fees etc.

7. Conclusion and recommendations

Jacobs has reviewed the following factors which influence the MCI for the UT4 period:

- the report prepared by BIS Shrapnel, which provides forecasts for the underlying indices used by Aurizon Network to determine the MCI for the UT4 period;
- the reasonableness of Aurizon Network's methodology for determining the MCI for the UT4 period, including the calculations and adopted indices;
- the reasonableness of a system-wide MCI; and
- the reasonableness of fixed weightings over the regulatory period.

Jacobs recommends that the following adjustments be approved by the Authority for the UT4 period:

1. indirect costs are removed from the cost base and associated MCI weightings (as requested by the Authority). The MCI cost base is therefore derived from direct costs less depreciation;

2. labour costs are escalated using equal proportions of the: national WPI for Mining; national WPI for Construction; and Queensland WPI for all industries. To generate a forecast MCI for the UT4 period, Jacobs has relied on the forecast indices provided by BIS Shrapnel. These indices are summarised below:

    a. to represent the national WPIs for Mining and Construction, Jacobs has adopted BIS Shrapnel's forecasts for the Queensland labour price escalation for Mining and Construction, which is referred to as the labour price index in BIS Shrapnel's report to Aurizon Network. Jacobs notes this index was constructed by BIS Shrapnel as part of its engagement; there is no equivalent index published by the ABS. Therefore, it will be necessary, as part of the annual review, to update the historical index base to reflect ABS' national WPI for Mining and Construction; and

    b. to represent Queensland WPI for all industries, in the absence of available forecasts for that index, Jacobs has adopted BIS Shrapnel's forecast for CPI (Brisbane) as a proxy. It will be necessary to update this index, as part of the annual review, to reflect ABS' latest Queensland WPI for all industries.

    Jacobs recognises that adopting national indices for mining and construction may not reflect cost pressures unique to the relevant Queensland sectors. However, in the absence of ABS sector-specific indices for Queensland, Jacobs considers using a balanced index that draws from Queensland WPI figures for all industries and national WPI figures for the mining and construction sectors is a reasonable alternative.

    Separately, as requested by the Authority, Jacobs has provided an analysis of revenue adjustments that would have applied for the UT3 period if the WPI for mining, construction and Queensland private sector had been utilised, rather than the AWOTE index (see **Appendix C**);

3. fuel costs are escalated based on the wholesale price of diesel (AIP TGP); and

4. hire of heavy plant and equipment costs are escalated based on the producer price index for mining and construction machinery manufacturing, since the index proposed by Aurizon Network (which was derived by BIS Shrapnel) cannot be independently verified. In the absence of a forecast for Jacobs' recommended index, Jacobs has adopted the forecast for hire of heavy plant and equipment index.

Table 7.1 provides Jacobs' recommended forecast MCI on a system-wide basis, which incorporates the recommendations outlined above[17]. The recommended MCI is based on the available information provided by BIS Shrapnel, including forecasts and historical actuals. The MCI is provided for a base year of FY12 for regulatory modelling purposes to reflect Aurizon Network's maintenance cost estimate.

Table 7.1 Jacobs' proposed adjusted MCI (system-wide)[18]

Cost driver	Accommodation	Balance of Costs (CPI)	Consumables	Fuel Price	Labour	Weighted Index	MCI Estimate
Weight	**3%**	**11%**	**33%**	**2%**	**51%**		
FY12	100.0	100.0	100.0	100.0	100.0	100.0	
FY14	104.4	106.6	99.7	115.1	109.1	105.7	5.7%
FY15	101.7	110.1	99.2	118.4	113.9	108.4	8.4%
FY16	96.5	113.3	99.6	120.3	118.5	111.1	11.1%
FY17	93.5	116.2	103.2	118.9	123.0	114.8	14.8%

Source: Jacobs table based on information provided by Aurizon Network on 6 December and 12 December 2013 and information sources outlined in Appendix A.

Table 7.2 provides the corresponding annual cost changes for each MCI component, with the weighted-average annual cost change presented in the last column.

Table 7.2 Yearly inflation

Year	Accommodation	Balance of Costs (CPI)	Consumables	Fuel Price	Labour	Weighted Annual Cost Change
Jun 12 - Jun 13	2.8%	3.4%	0.7%	9.2%	4.3%	3.1%
Jun 13 - Jun 14	1.6%	3.0%	-1.0%	5.4%	4.6%	2.5%
Jun 14 - Jun 15	-2.6%	3.3%	-0.5%	2.9%	4.4%	2.4%
Jun 15 - Jun 16	-5.0%	2.9%	0.4%	1.6%	4.0%	2.4%
Jun 16 - Jun 17	-3.2%	2.5%	3.7%	-1.2%	3.8%	3.3%

Table 7.3 provides the indices and weightings which underpin Jacobs' forecast MCI. Jacobs finds that utilising the average cost composition for the UT4 period is appropriate in the context of the forecast MCI. However, the actual cost composition could be updated yearly as part of the MCI adjustment model. More information is required from Aurizon Network to determine if this is necessary to enable the MCI to more closely serve its intended purpose (i.e. to safeguard Aurizon Network from significant price fluctuations relevant to maintenance).

Table 7.3 Forecast MCI weightings and indices

Cost category	Proportion of total costs	Category Composition
Accommodation	3%	Average room rate per occupied night • Mackay (50%) • Central Queensland (50%)
Balance of Costs (CPI)	11%	CPI (all groups, Brisbane)
Consumables	33%	• Fabricated metal producer price index (35%) • Transport equipment and parts producer price index (20%) • Hire of Heavy Plant and Equipment Price Index (46%)
Labour	51%	• WPI Mining, Queensland (33%)

[17] Jacobs's adjusted MCI is based on the forecasts provided by BIS Shrapnel and has not been adjusted for actual cost changes in FY13 since Aurizon Network will be required to re-submit an adjusted MCI model on an annual basis. Rather, the focus for this adjustment is the weightings applied and the individual indices which drive the cost base.

[18] Due to rounding, the sum of all category weightings may not add to 100%.

Cost category	Proportion of total costs	Category Composition
		• WPI Construction, Queensland (33%) • CPI, all groups, Brisbane (33%)
Fuel	2%	• AIP TGP diesel, Brisbane (100%)

Source: Jacobs table based on information provided by Aurizon Network on 6 December and 12 December 2013 and information sources outlined in Appendix A

It will be important to ensure that historical indices are updated to ABS actuals and that the method for tracking actual cost-change data is the same across all years. As part of the revenue adjustment process, some changes will be required to replace indices not published by the ABS, as well as to incorporate more appropriate indices. **Table 7.4** (overleaf) provides Jacobs' recommended index composition for the MCI revenue adjustment process. Changes from the forecast are identified by italicised text.

Table 7.4 Recommended indices for MCI revenue adjustment

Cost category	Proportion of total costs	Category Composition	Jacobs' recommended method	Recommended ABS source	Notes
Accommodation	3%	*Average room rate per occupied night* • *Mackay (50%)* • *Central Queensland (50%)*	End of financial year (June) indices	ABS Catalogue No. 8635.3.55.001 - Tourist Accommodation, Small Area Data, Queensland, Table 3, Hotels, Motels and Serviced Apartments, by tourism region – Queensland	• The Central Queensland rate is used as a proxy for Fitzroy. • *From 1 July 2013, the collection frequency of the Survey of Tourist Accommodation (STA) moved from quarterly to annual, on a financial year basis. The next release of STA data will be on 19 December 2014 and will include the four quarters of the 2013-14 financial year, that is September quarter 2013, December quarter 2013, March quarter 2014 and June quarter 2014 (ABS, 2013)*
Balance of Costs (CPI)	11%	CPI (all groups, Brisbane)	End of financial year (June) indices	ABS Catalogue No. 6401.0 Consumer Price Index, Australia, TABLES 1 and 2. CPI: All Groups, Index Numbers and Percentage Changes, Series ID A2325816R	-

Cost category	Proportion of total costs	Category Composition	Jacobs' recommended method	Recommended ABS source	Notes
Consumables	33%	• Fabricated metal producer price index (35%) • Transport equipment and parts producer price index (20%) • *Mining and construction machinery manufacturing (46%)*	End of financial year (June) indices	• ABS Catalogue No. 6427.0 Producer Price Indices, Australia, Table 12. Output of the Manufacturing industries, division, subdivision, group and class index numbers, Fabricated Metal Product Manufacturing, Series ID A2305805K • ABS Catalogue No. 6427.0 Producer Price Indices, Australia, Table 12. Output of the Manufacturing industries, division, subdivision, group and class index numbers, Transport Equipment Manufacturing, Series ID A2305907X • ABS Catalogue No. 6427.0 Producer Price Indices, Australia, Table 12. Output of the Manufacturing industries, division, subdivision, group and class index numbers, Mining and construction machinery manufacturing, Series ID A2307785X	Jacobs notes that Aurizon Network may seek to demonstrate a methodology for which its proposed Hire of Heavy Plant and Equipment Index could be independently verified.

Cost category	Proportion of total costs	Category Composition	Jacobs' recommended method	Recommended ABS source	Notes
Labour	51%	• *WPI Mining, National (33%)* • *WPI Construction, National (33%)* • *WPI (Queensland) (33%)*	End of financial year (June) indices	• ABS Catalogue No. 6345.0 Wage Price Index, Australia, Table 5a. Total Hourly Rates of Pay Excluding Bonuses: Sector by Industry, Original (Financial Year Index Numbers for year ended June quarter), Series ID A2705076L • ABS Catalogue No. 6345.0 Wage Price Index, Australia, Table 5a. Total Hourly Rates of Pay Excluding Bonuses: Sector by Industry, Original (Financial Year Index Numbers for year ended June quarter), Series ID A2705060V • ABS Catalogue No. 6345.0 Wage Price Index, Australia, Table 3a. Total Hourly Rates of Pay Excluding Bonuses: Private Sector by State, Original (Financial Year Index Numbers for year ended June quarter), Series ID A2704548F	• Jacobs finds that total hourly rates of pay is a better measure than total ordinary hours since maintenance staff are often required to work overtime. • Jacobs also notes that Aurizon Network intends to approach the ABS to generate the AWOTE index, although it is noted that these indices will tend to converge over time[19].
Fuel	2%	• AIP TGP diesel, Brisbane (100%)	End of financial year (June) prices	• Australian Institute of Petroleum, Terminal Gate Prices, Calendar Year and Financial Year Averages for Petrol and Diesel[20]	-

Source: Jacobs table based on information provided by Aurizon Network on 6 December and 12 December 2013 and information sources outlined in Appendix A

[19] The Authority (June 2010) Draft Decision, QR Network's 2010 DAU – Tariffs and Schedule F, p.19
[20] http://www.aip.com.au/pricing/tgp.htm, AIP annual data

Appendix A. Information sources

This review is based on information sourced from documents as shown in the tables below.

Table A 1 Information sources – task specific

Owner	Document Name	Electronic File Name	Document Type	Version and date
Aurizon Network	UT4 Maintenance Submission	R-Aurizon-QR2013DAU-ExMatMaint-0513	PDF	Confidential Version 30 April 2013
Australian Automobile Association	Queensland (Gladstone, Emerald and Mackay), AAA Pricing Summary Unleaded Petrol (cents per litre), www.aaa.asn.au/petrol/qld.xls	Copy of AAA Pricing unleaded petrol- Emerald-Gladstone-Mackay	Microsoft excel	2013
Australian Bureau of Statistics	Cat No. 6345.0, Wage Price Index, Australia, Table 3a. Total Hourly Rates of Pay Excluding Bonuses: Private Sector by State, Original (Financial Year Index Numbers for year ended June quarter)	Copy of 634503a	Microsoft excel	Updated quarterly
Australian Bureau of Statistics	Cat No. 6345.0, Wage Price Index, Australia, Table 5a. Total Hourly Rates of Pay Excluding Bonuses: Sector by Industry, Original (Financial Year Index Numbers for year ended June quarter)	Copy of 634505a	Microsoft excel	Updated quarterly
Australian Bureau of Statistics	Cat. 64010.0 Consumer Price Index Tables 1 and 2	Copy of 640101	Microsoft excel	Updated quarterly
Australian Bureau of Statistics	Cat. 64010.0 CPI conversion factors, from index reference period 1989-90 to 2011-12.	Copy of 64010do001_201209	Microsoft excel	2013
Australian Bureau of Statistics	Cat. 6427.0 Output of the Manufacturing industries, division index numbers and percentage changes and index numbers for subdivisions, groups and classes and conversion factors (Table 12)	Copy of 6427012	Microsoft excel	Updated quarterly
Australian Bureau of Statistics	Cat. 8635.3.55.001 - Tourist Accommodation, Small Area Data, Queensland, Table 3, Hotels, Motels and Serviced Apartments, by tourism region – Queensland	8635355001do001_201306	Microsoft excel	2013
Australian Institute of Petroleum	Terminal Gate Prices, Calendar Year and Financial Year Averages for Petrol and Diesel, http://www.aip.com.au/pricing/tgp.htm, AIP annual data	Copy of AIP_Annual_TGP_Data	Microsoft excel	2013
BIS Shrapnel, prepared for Aurizon Network	Maintenance Cost Escalation Forecasts to 2017	Maintenance Cost Escalation Forecasts to 2017_Final Report.pdf – Adobe Reader	PDF	Final, 2012

Owner	Document Name	Electronic File Name	Document Type	Version and date
The Authority	MCI Adjustment Model 09-10	MCI Adjustment Model 09-10 (365910_1)	Microsoft excel	-
The Authority	MCI and CPI Adjustment Model 10-11	MCI and CPI Adjustment Model 10-11(411395_1)	Microsoft excel	-
The Authority	MCI and CPI Adjustment Model 11-12	MCI and CPI Adjustment Model 11-12(471020_1)	Microsoft excel	-
The Authority	MCI and CPI Adjustment Model 12-13	MCI and CPI Adjustment Model 12-13(642329_1)	Microsoft excel	-

Table A 2 Information sources – general

Owner	Referenced in	Document Name	Electronic File Name	Document Type	Version and date
Aurizon Network	Volume 1 of 3 – The Access Undertaking and Schedules	Schedule E – Regulatory Asset Base	R-Aurizon-QR2013DAU-Vol1-0513	PDF	April 2013
Aurizon Network	Volume 1 of 4 – UT4 Explanatory Materials	Overview and Summary	R-Aurizon-QR2013DAU-ExMatOvr-0513	PDF	30 April 2013
Aurizon Network	Volume 2 of 4 – UT4 Explanatory Materials	The 2013 Undertaking Proposal	R-Aurizon-QR2013DAU-ExMatSub-0513	PDF	30 April 2013
Aurizon Network	Volume 3 of 4 – UT4 Explanatory Materials	Maximum Allowable Revenue and Reference Tariffs	R-Aurizon-QR2013DAU-ExMatBB-0513	PDF	30 April 2013

A.1 RFIs

The following information was provided by Aurizon Network in response to RFIs issued by Jacobs.

Table A 3 Information provided by Aurizon Network

Owner	Document Name	Electronic File Name	Document Type
Aurizon Network	UT4 MCI Forecast	131212 - UT4 Maintenance & Opex Costs (Jacobs)	Microsoft Excel
Aurizon Network	UT4 - Below Rail Coal Maintenance Consolidated P&L	Copy of Cost by MCI Category - by system - by year 11 December 2013	Microsoft Excel
Aurizon Network	UT4 – Maintenance	Copy of Consolidated PL - FY14 $189 5m - FY14-17 – Jacobs	Microsoft Excel
Aurizon Network	Approach to UT4 MCI	Summary of MCI Approach for Jacobs - Dec 2013	Microsoft Word

Appendix B. System breakdown of costs

Table B 1 provides the system breakdown of costs provided by Aurizon Network.

Table B 1 System breakdown of costs[21]

Financial Year	FY14	FY14	FY14	FY14	FY14	FY14
Coal system	Blackwater	Goonyella	Moura	Newlands	N/A	Total
[redacted]						

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Table B 2 provides Jacobs' allocation of 'not applicable' costs to individual systems.

Table B 2 Jacobs' distribution of 'not applicable' costs, consistent with the analysis in Section 4.2 of this report

Financial Year	FY14	FY14	FY14	FY14
Coal system	Blackwater	Goonyella	Moura	Newlands

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Financial Year	FY16	FY16	FY16	FY16
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Appendix C. Analysis of impacts of the wage price index (WPI)

Jacobs has utilised the historical MCI models provided by the Authority to assess the impact of utilising the Australian WPI for the construction and mining industries and the Queensland private sector WPI.

Table C 1 provides the difference in the revenue adjustment utilising the labour price index for construction and mining compared to the approved adjustment for the UT3 period. It is important to note that this exercise does not represent a comparison of how well each index tracks actual costs incurred by Aurizon Network. Due to the uncertainty (described in this report) around the specific indices adopted by BIS Shrapnel, it is possible that the indices utilised by Jacobs to track actual cost changes may not correspond to the forecast provided by BIS Shrapnel for the UT3 period, could introduce error in Jacobs' values below.

Table C 1 UT3 adjustment, WPI compared with AWOTE index

Financial Year	FY10	FY11	FY12	FY13
UT3 adjustment (AWOTE)	1,543,404	2,838,683	(310,222)	(2,726,492)
Adjustment which would have applied utilising the WPI for mining and construction	2,403,088	2,516,933	467,564	(7,773,986)