

# Engineering Technical Assessment of Maintenance, Operating and Capital Expenditure Forecast in Aurizon Network's Draft 2013 Access Undertaking

QUEENSLAND COMPETITION AUTHORITY

Updated benchmarking analysis and summary of maintenance cost findings

Rev 0

30 April 2014

## Document history and status

| Revision | Date       | Description     | By                   | Review   | Approved |
|----------|------------|-----------------|----------------------|----------|----------|
| 0        | 30/04/2014 | Issue to client | H. Stevens, A. Henry | B. Wells | B. Wells |
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## Distribution of copies

| Revision | Issue approved | Date issued | Issued to     | Comments |
|----------|----------------|-------------|---------------|----------|
| 0        | 30/04/2014     | 30/04/2014  | The Authority |          |
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## Project Name

Project no: QB10535  
Document title: Ballast Undercutting and the Maintenance Task – Summary of Findings  
Revision: 0  
Date: 30 April 2014  
Client name: Queensland Competition Authority  
Project manager: Project Manager  
Author: H. Stevens, A. Henry  
File name: \\skmconsulting.com\BNEProjects\QBIF\Projects\QB10535\Deliverables\Reports\12 - Update to Benchmarking Exercise\QB10535\_Update to Benchmarking and Summary of Mtce Conclusions.docx

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## Important note about your report

The sole purpose of this report and the associated services performed by Jacobs SKM is to update Jacobs SKM's benchmarking assessment for the CQCN maintenance cost forecast in accordance with the scope of services set out in the contract between Jacobs SKM and the Client. That scope of services, as described in this report, was developed with the Client.

In preparing this report, Jacobs SKM 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 SKM 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**

The Queensland Competition Authority (the Authority) requested that Jacobs SKM update the benchmarking review of maintenance costs for the Central Queensland Coal Network (CQCN) to review the impact of the ballast undercutting task on the relative cost from the historical UT3 costs and the forecast UT4 costs, as well as the comparative cost between the CQCN and the Hunter Valley Coal Network (HVCN).

This file note documents the outcome of this review, for which Jacobs SKM has adjusted the benchmarking exercise to consider:

- Aurizon Network's forecast maintenance costs compared to historical actual expenditure for the UT3 period with and without the ballast undercutting task; and
- adjustments to the ballast undercutting cost for the CQCR to bring it to a comparable ballast undercutting cost which may apply for the HVCN.

In addition, Jacobs SKM has provided further detail as to the points from which reasonableness of maintenance costs were determined, since the benchmarking exercise does not comprise the basis from which the assessment of reasonableness was determined.

### **1.1 Background**

This file note should be read in conjunction with all previous documents submitted to the Authority, including:

- Engineering Technical Assessment of Maintenance, Operating and Capital Expenditure Forecast in Aurizon Network's Draft 2013 Access Undertaking, dated 21 January 2014
- Review of Aurizon Network's Historical Maintenance Scope for the UT3 period, dated 4 February 2014
- Review of Aurizon Network's proposed Maintenance Cost Index for the UT4 period, dated 7 February 2014
- Engineering Technical Assessment of Maintenance, Operating and Capital Expenditure Forecast: Addenda 1, dated 14 February 2014
- Response to Stakeholder Submissions, dated 8 April 2014

## 2. Historical and forecast maintenance costs by activity type

Table 1 provides the historical and forecast maintenance costs by maintenance activity between 2010 and 2017, in real \$2012 dollars. The values exclude corporate overheads, internal margins and return on assets.

Table 1 Maintenance cost breakdown

|                                      | 2010   | 2011   | 2012   | 2013   | 2014   | 2015   | 2016   | 2017   |
|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| Ballast Undercutting                 | \$29.4 | \$37.6 | \$41.9 | \$43.3 | \$62.8 | \$73.2 | \$74.6 | \$75.3 |
| Mechanised Resleepering              | \$0.7  | \$0.1  | -      | -      | -      | -      | -      | -      |
| Mechanised Resurfacing               | \$18.2 | \$17.4 | \$17.2 | \$18.7 | \$19.0 | \$19.0 | \$20.9 | \$20.9 |
| Rail Grinding - Mainline             | \$8.4  | \$7.6  | \$8.1  | \$8.3  | \$9.7  | \$10.6 | \$11.0 | \$11.5 |
| Rail Grinding - Turnouts             | \$2.1  | \$1.5  | \$1.6  | \$1.5  | \$2.9  | \$2.9  | \$2.9  | \$2.9  |
| Track Geometry Recording (RRV /UGMS) | \$0.6  | \$0.7  | \$0.9  | \$1.1  | \$0.4  | \$0.4  | \$0.4  | \$0.4  |
| Track Geometry Recording (UGMS)      | -      | -      | -      | -      | -      | -      | -      | -      |
| Ultrasonic Testing Ontrack Machine   | \$0.9  | \$1.6  | \$1.7  | \$2.4  | \$1.4  | \$1.5  | \$1.6  | \$1.5  |
| Track, structures and facilities     | \$59.0 | \$50.2 | \$48.2 | \$52.2 | \$55.9 | \$58.0 | \$59.9 | \$61.8 |
| Trackside systems                    | \$24.9 | \$26.1 | \$27.9 | \$27.2 | \$28.0 | \$29.0 | \$29.5 | \$29.9 |
| Traction                             | \$11.3 | \$12.0 | \$9.9  | \$10.3 | \$9.6  | \$9.6  | \$9.6  | \$9.6  |

A review of Table 1 and Figure 1 below shows that the majority of maintenance activities are forecast by Aurizon Network to remain relatively stable on a total cost basis compared to the UT3 period, except for ballast undercutting. For other maintenance tasks, the change in costs is not substantial and in some circumstances, declining. Given increasing volumes each year, the cost fluctuations are reasonable and in some circumstances directly attributable to introduction of new technology such as the ground penetrating radar.

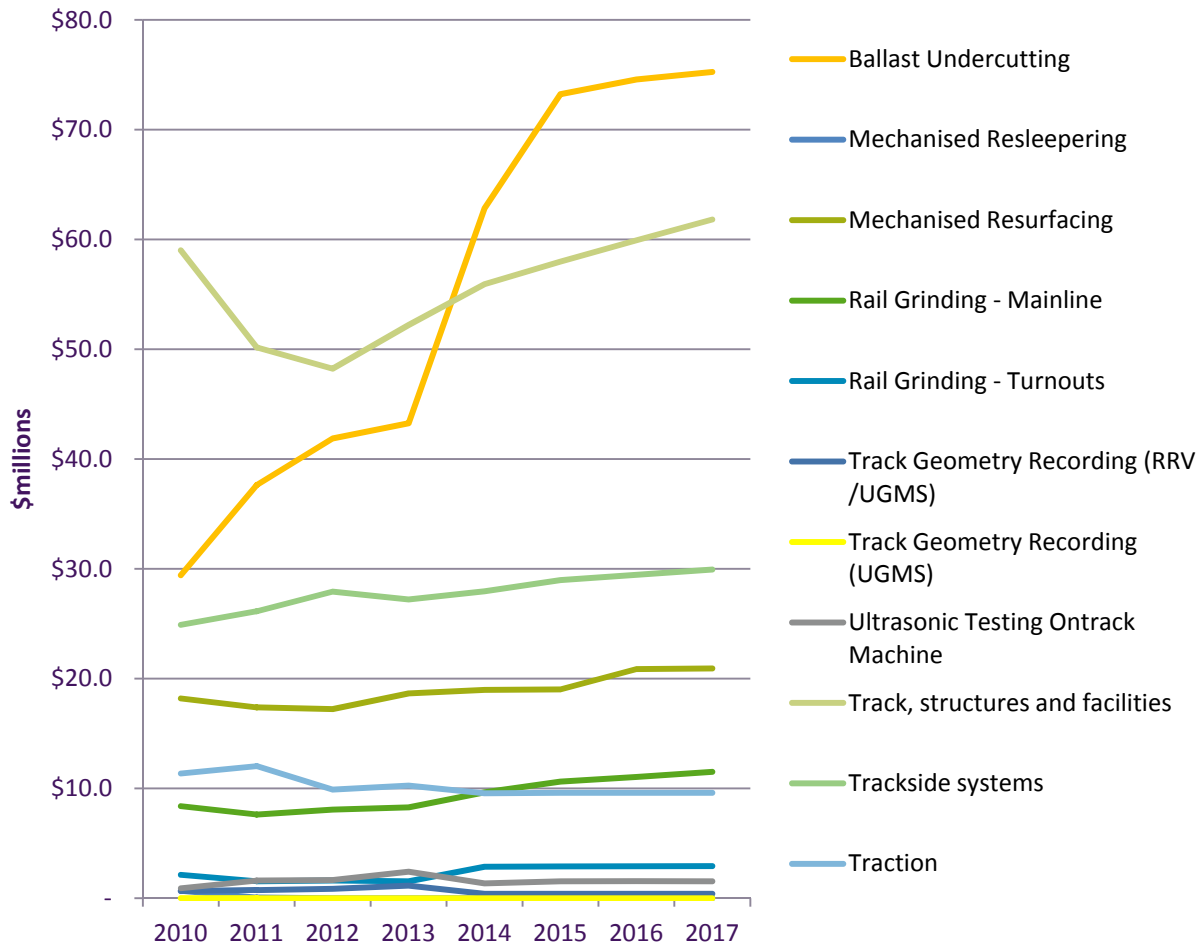


Figure 1 Total maintenance costs by activity (\$FY12)

Conversely, the increase in ballast undercutting costs indicates that the increase in scope and/or cost is greater than what would be required to address new volumes. This is demonstrated by reviewing the unit cost of maintenance per gtk with and without the ballast undercutting task (see Figure 2 below), which shows that efficiency improvements for the UT4 period are more substantial when the ballast undercutting task is removed, although overall the unit cost is still declining. Additionally, the unit cost for all maintenance tasks is declining on a gtk basis for all maintenance tasks except for ballast undercutting<sup>1</sup>.

<sup>1</sup> As well as turnout rail grinding, although the change is not significant and has not been reviewed further.

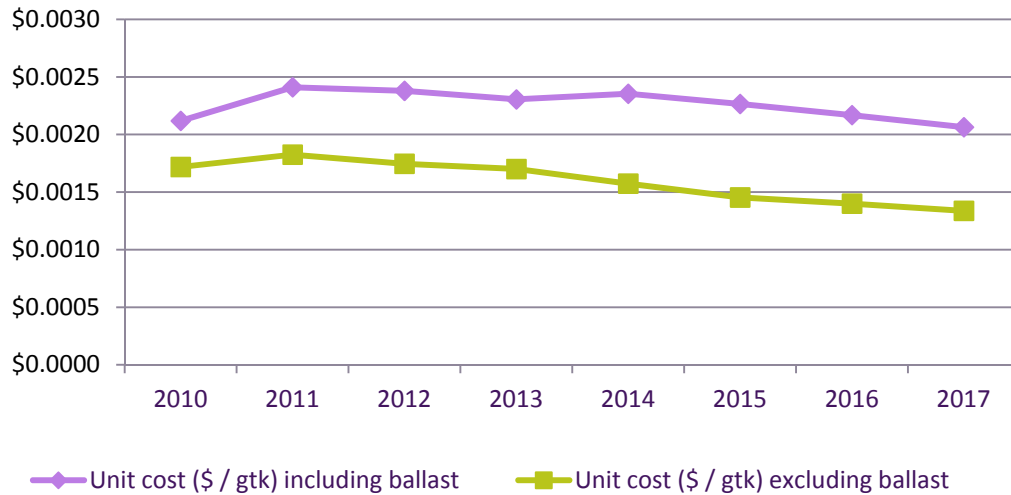
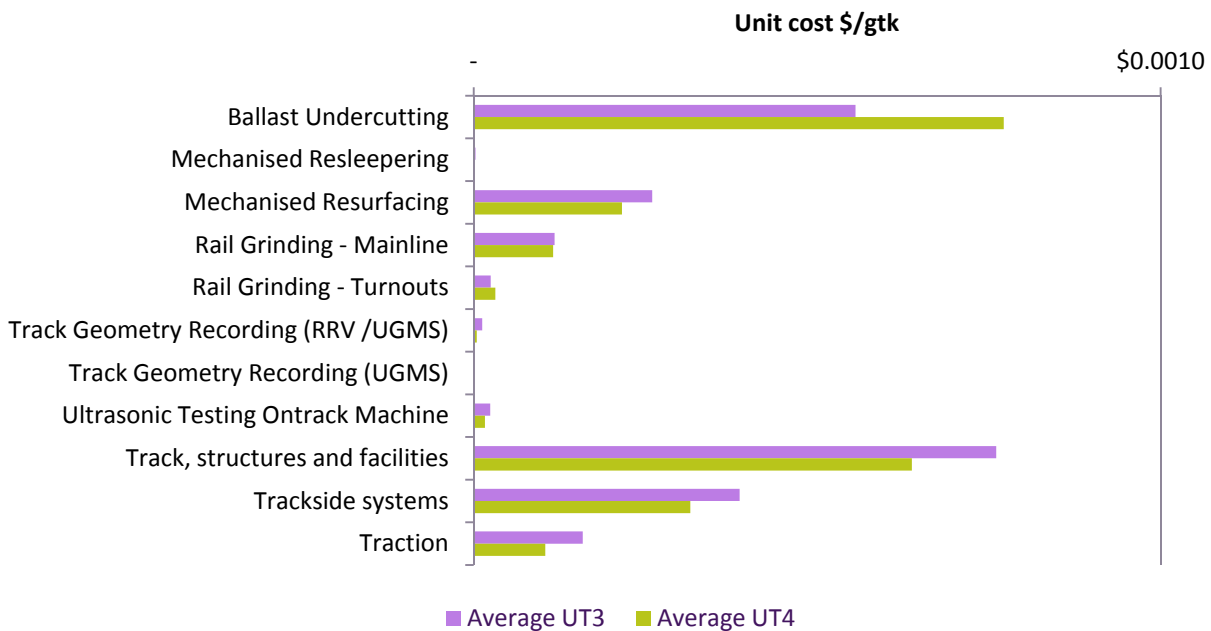


Figure 2 Unit cost of maintenance per gtk



As the level of ballast undercutting appears high compared to other maintenance tasks, Jacobs SKM has reviewed in previous documents submitted to the Authority:

1. the process by which the ballast undercutting scope is determined;
2. the actual and forecast scope for the UT3 and UT4 period; and
3. the unit cost of ballast undercutting on a per kilometre basis (i.e. the unit cost per kilometre of ballast undercutting), including the process by which the costs are derived and the underlying production assumptions.

Based on the outcomes of the review documented above, Jacobs SKM has found that:



1. the process by which the ballast undercutting scope is forecast is sound (including introduction of GPR technology), and intervention levels are appropriate. However it is recommended that Aurizon Network provide information to the Authority on locations where the ballast undercutting is to be undertaken, compared to:
  - a. GPR outputs for the relevant location;
  - b. historical and forecast volume estimates for the relevant location; and
  - c. historical maintenance records for the relevant location.

This would provide more certainty that the process described in the UT4 Maintenance Submission, and during presentations made to Jacobs SKM is in fact applied in practice.

2. the actual scope of works is higher than what would be required due to under-delivery of the forecast ballast undercutting task during the UT3 period (see Figure 3). This is further supported by Aurizon Network’s assumptions about the level of ballast which can be cleaned and re-used compared to replaced, which indicates the presence of ongoing fouling in some locations;
3. the process by which the costs are determined is robust, and the production assumptions are appropriate; and
4. the unit cost of ballast on a scope basis is increasing due to a number of issues documented in Jacobs SKM’s response to the QRC submission, and Jacobs SKM finds these increases to be reasonable.

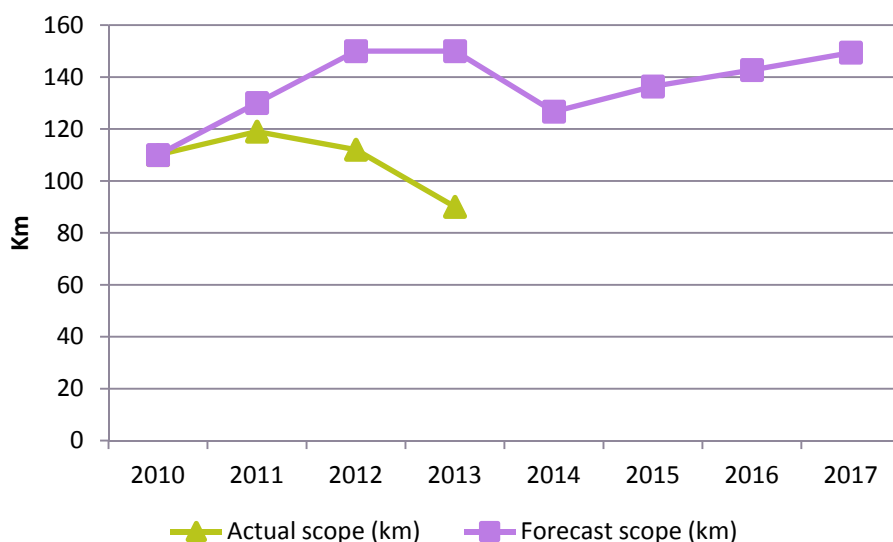


Figure 3 Ballast undercutting scope

Jacobs SKM has not undertaken a review of why the scope of works for the ballast undercutting task was below what was forecast for the UT3 period, since Jacobs SKM’s task is to review the reasonableness of the UT4 forecast. However, it is understood that the Authority is working with Aurizon Network to address the issue of why the scope was lower than forecast for the UT3 period.

Jacobs SKM has found that the ballast undercutting scope and cost forecast for the UT4 period is reasonable, however that existing machinery does not have the capacity to deliver the forecast scope. Jacobs SKM has therefore proposed that the Authority consider an adjustment to the allowable maintenance cost to address this issue and ensure that users do not pay for maintenance activities which cannot be delivered. However it is

recommended that the Authority approves additional maintenance expenditure once the upgrade to the RM900 is acquired and capacity is improved, since Jacobs SKM finds that the forecast scope of works is necessary.

In addition, Jacobs SKM considers that ongoing monitoring of the maintenance task is important to ensure that forecast scope is achieved, since Jacobs SKM does not consider that re-allocation of funding to other maintenance tasks is appropriate or necessary. In addition, if the ballast undercutting scope declines from forecast levels but the total cost remains stable, the unit cost will worsen. Since Jacobs SKM finds that the process by which Aurizon Network has forecast maintenance costs is robust, there is no foreseeable reason which would justify under-delivery of the ballast undercutting task for the UT4 period.

### 3. Maintenance cost benchmarking – CQCN and HVCN

Jacobs SKM provided an update to the benchmarking exercise which compares the CQCN with the HVCN in the response to the QRC’s submission. Subsequent to this exercise, the Authority requested that Jacobs SKM adjust the benchmarking exercise to consider the impact of the significant ballast undercutting task on the CQCN compared to the HVCN.

As the level of ballast undercutting expenditure for the HVCN is unknown, the Authority provided Jacobs SKM a report titled “A Comparison of CQCR and Hunter Valley Ballast Cleaning Activities” dated 4 December 2009 which indicates that the ARTC undertakes half the rate of ballast undercutting per track kilometre compared to CQCN.

Based on this information, Jacobs SKM has adjusted the ballast undercutting expenditure for the CQCN in the benchmarking exercise by half, to assess the relative maintenance cost for the CQCN compared to the HVCN when the rate<sup>2</sup> of ballast undercutting is assumed as equal.

Figure 4 shows that when applying this assumption, Aurizon Network’s costs are approximately 12 per cent higher than the ARTC. On a gtk basis, the cost differential is approximately 17 per cent (see Figure 5)<sup>3</sup>.

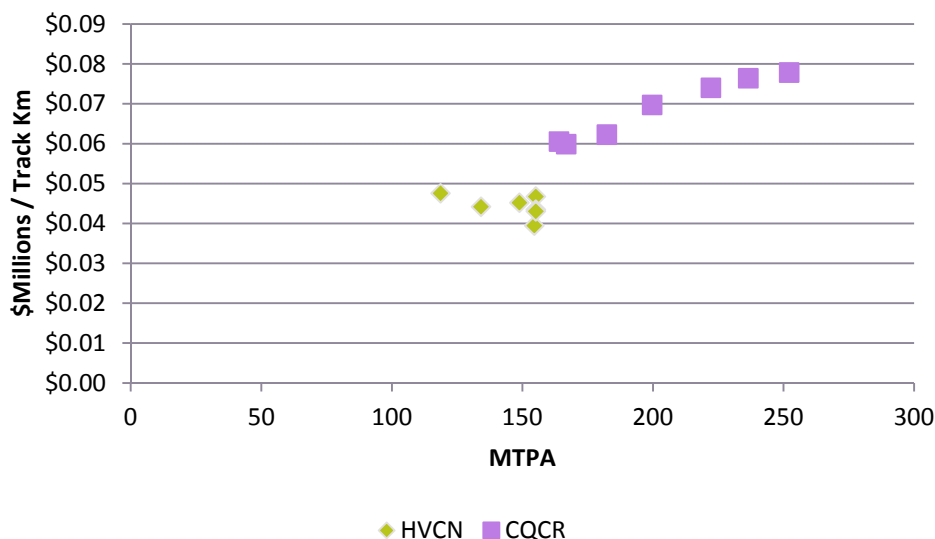


Figure 4 Benchmarking - Adjusted Ballast Undercutting Expenditure (mtpa compared to cost / track km)

<sup>2</sup> It is important to note that the assumption that the ‘rate’ of ballast undercutting is equal to the HVCN does not mean that the total cost will be equal. Rather it assumes that (in this exercise), Aurizon Network would do half the level of ballast undercutting if they were applying ARTC’s approach.

<sup>3</sup> It is noted that the QRC raised concern that the network size factor applied by Jacobs SKM in the updated benchmarking exercise was too high. Jacobs SKM has therefore undertaken a sensitivity assessment which indicates that when the network size factor is reduced by half, the Aurizon Network’s costs are approximately 30 per cent higher than the ARTC’s forecast cost for the HVCN.

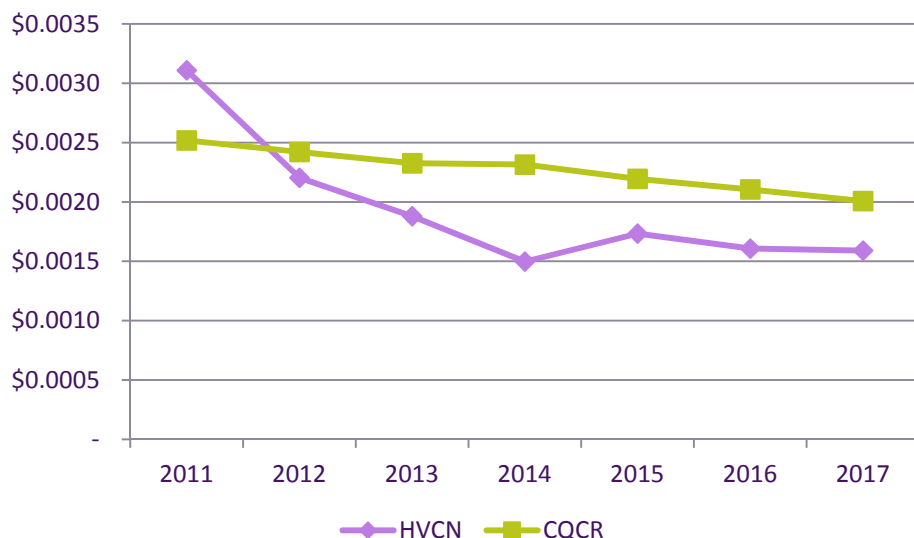


Figure 5 Benchmarking - Adjusted Ballast Undercutting Expenditure (\$ / gtk)

On the basis of the benchmarking exercise, it would appear that the maintenance costs forecast for the CQCN are too high. However, the adjustment to ballast undercutting assumes that the same unit cost is incurred, which is not accurate since:

- Aurizon Network incurs costs associated with disposal of spoiled ballast; and
- Aurizon Network undertakes ballast cleaning at a greater depth than the ARTC for some portions of scope.

Therefore, the comparable maintenance cost compared to the ARTC may be lower than what is presented here. In response to a request from Jacobs SKM for this file note, Aurizon Network provided Jacobs SKM with an estimate of the costs of ballast disposal each year. These costs are provided below and have been reduced by half based on the assumption that half the rate of ballast undercutting is undertaken for this exercise.

Table 2 Cost of ballast spoil disposal

|   | FY14        | FY15        | FY16        | FY17        |
|---|-------------|-------------|-------------|-------------|
| Aurizon Network Estimate                                      | \$2,000,000 | \$1,770,000 | \$1,700,000 | \$1,800,000 |
| Jacobs SKM reduction for assumed rate of ballast undercutting | \$1,000,000 | \$885,000   | \$885,000   | \$885,000   |

When these costs are accounted for in the benchmarking exercise, the impact is not significant and the cost differential is in the range described above. The impact of ballast undercutting to a greater depth on overall costs is unknown, however Aurizon Network’s assumptions about when a greater depth is required are reasonable.

It is also important to note that it is Jacobs SKM’s opinion that benchmarking, even with appropriate normalisation of benchmark costs, can only give an indication of the likelihood of inefficiencies of one regulated entity over another, particularly where a detailed breakdown of benchmark data (such as breakdown of

maintenance activity and actual forecast scope) is unknown. Therefore, Jacobs SKM's conclusions are not heavily weighted by the outcome of the benchmarking exercise, but rather the unit cost and scope information reviewed by Jacobs SKM. The following summarises Jacobs SKM's conclusions, including why/how the conclusions have been drawn.

## 4. Jacobs SKM conclusions

This file note has provided an overview of the impact of ballast undercutting on the maintenance task, considering both historical costs incurred by Aurizon Network as well as a benchmarking exercise against forecast costs for the HVCN.

Two clear points have been drawn from this review:

1. the unit cost of maintenance for the CQCN is declining compared to historical levels both with and without the ballast undercutting task, but the impact is more pronounced when the ballast undercutting task is excluded from the cost estimate; and
2. the maintenance cost for the CQCN is higher than for the HVCN, by approximately 12 per cent<sup>4</sup> on a track kilometre basis and 17 per cent on a gtk basis.

Although costs are higher for the CQCN than for the HVCN, it cannot definitively be determined that Aurizon Network's costs are too high. Specifically, Jacobs SKM does not have information about the breakdown of scope for the HVCN to determine if the maintenance levels are appropriate. Nor is there detailed information to support the forecast which can be reviewed to determine if the process for estimating future costs is robust. In addition, parts of the CQCN are much older than the HVCN, and therefore it would not be appropriate to suggest that costs should be equal.

Jacobs SKM has not based its conclusions of reasonableness of maintenance costs purely on the outcome of the benchmarking exercise. Rather, Jacobs SKM's conclusions of reasonableness are documented below:

1. Jacobs SKM has reviewed the process by which Aurizon Network plans the maintenance task forecast and finds that the process is sound, and that Aurizon Network is implementing processes which will enable them to gain a better understanding about network condition;
2. Jacobs SKM has reviewed Aurizon Network's Asset Management Strategy and finds that maintenance intervention levels are sound;
3. Jacobs SKM has reviewed the bottom up approach to the development of the maintenance cost forecast and finds that the process is robust and the production assumptions are reasonable;
4. Jacobs SKM does not consider that the differential in benchmark values are significant to justify a reduction in forecast expenditure considering the limitations associated with benchmarking, particularly since a breakdown of ARTC's costs is unknown, and also considering the differences in network asset age;
5. The ballast undercutting task is high due to existing fouling which was not addressed in the UT3 period, and this is contributing to high costs. Jacobs SKM finds that the rate of ballast undercutting should reduce in the UT5 period; and
6. It is not recommended that the allowable maintenance cost is reduced, since this will only result in a reduction in the scope of maintenance tasks which will have longer term impacts on network quality, but that ongoing monitoring will be important in ensuring users receive value for money.
7. Jacobs SKM recommends that Aurizon Network provide information about the location of planned maintenance works each year. In addition, it is recommended that the Authority require that this information is provided for future regulatory / Access Undertaking reviews.

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<sup>4</sup> Or 30 per cent assumed a sensitivity analysis where the network size factor is reduced by half.