

Aurizon Network

FY2019 Maintenance Cost Report

31 October 2019



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Executive Summary

Aurizon Network is focussed on delivering a prudent and effective maintenance programme that ensures the Central Queensland Coal Network (**CQCN**) is fit for purpose, having regard to the operational paradigm achieves and promotes the economically efficient operation of the CQCN.

The Queensland Competition Authority's (**QCA's**) Final Decision on Aurizon Network's 2017 Draft Access Undertaking (**UT5 Final Decision**) set a forecast maintenance allowance and scope for the purpose of determining FY2019 Reference Tariffs. The maintenance allowance was then reduced through the Reference Tariff Variation Draft Amending Access Undertaking (**DAAU**), approved by the QCA on 24 June 2019.

Aurizon Network's direct maintenance expenditure for FY2019 was \$207.6 million, representing an over-spend of \$1.9 million (0.9%) against the DAAU direct maintenance allowance of \$205.7 million. This outcome was primarily due to the following activities:

- \$5 million over-spend on track maintenance works;
- \$5 million over-spend on general maintenance;
- \$4.5 million under-spend on ballast undercutting works; and
- \$2 million under-spend on structures maintenance.

Aurizon Network exceeded its scope targets for resurfacing and turnout rail grinding. Full ballast undercutting production could not be achieved due to wet weather and the reprioritisation of scope between systems.

The operational performance remained strong during FY2019. The CQCN delivered record volumes of 232.7 million tonnes. In the last six months of the year, record monthly volumes were achieved in all four systems while in June 21.5 million tonnes were railed; the first-time monthly volumes have exceeded 21 million tonnes.

Overview of Report

Background

Aurizon Network is the access provider of a declared service for the purposes of Queensland's third-party access regime, established under Part 5 of the *Queensland Competition Authority Act 1997 (QCA Act)*. The declared service is defined under s.250 of the QCA Act as “the use of a coal system for providing transportation by rail”.

The Rail Infrastructure required to provide the declared service is collectively referred to as the CQCN and forms the basis of a Regulated Asset Base (**RAB**) valued in excess of \$6 billion. The CQCN is comprised of approximately 2,670 kilometres (**km**) of track (1,945 km of which is electrified) that links over forty (40) mines to five (5) coal export terminals.

Aurizon Network’s asset management regime strives to create value for all supply chain participants by emphasizing long-term, sustainable asset management practices. These practices:

- > are delivered in accordance with standards and processes that are appropriate for a narrow gauge, heavy haul railway;
- > promote the resilience of Rail Infrastructure to the climatic extremes prevalent in Central Queensland; and
- > are regularly reviewed and refined to provide the appropriate balance between safety, asset availability and the efficient whole-of-life costs for the CQCN.

Maintenance tasks and the corresponding level of expenditure cannot be considered independently of the other factors, such as:

- > the level of investment in CQCN Rail Infrastructure;
- > the way in which the CQCN is operated; and
- > climatic / geographic factors, which can be highly variable.

Regulatory requirements and assumptions

This report is provided to the QCA in accordance with Aurizon Network’s 2017 Access Undertaking (**UT5**); clause 10.3.3.

It provides transparency around Aurizon Network’s maintenance performance by comparing FY2019 scope delivered and costs incurred to the forecasts approved by the QCA in their UT5 Final Decision, and subsequently varied through Aurizon Network’s Reference Tariff Variation DAAU Undertaking, approved by the QCA on 24 June 2019.

This information is provided for the four (4) coal systems in the CQCN; Blackwater, Goonyella, Moura and Newlands.

It should be noted that while the UT5 Access Undertaking contains individual Reference Tariffs and Allowable Revenues for the Goonyella to Abbot Point Expansion (**GAPE System**), the GAPE System is not a geographically distinct coal system. Rather, it is akin to an expansion tariff required to facilitate the pricing arrangements attributable to GAPE Train Services. The scope of the GAPE project included significant infrastructure upgrades in the Newlands system, which are utilised by all GAPE and Newlands Train Services.

Similarly, all GAPE Train Services utilise existing Newlands system infrastructure. As a result, Newlands and GAPE are treated as a single system for this report.

Maintenance Cost Index (MCI)

Clause 10.3.3 (c)(iv) of UT5 requires Aurizon Network to report:

"the actual MCI and the forecast MCI accepted by the QCA for the purposes of determining Reference Tariffs for the relevant Year (including the indices, if any, comprised in the MCI) and provide an explanation of how any significant differences have or will impact on Aurizon Network's maintenance costs"

This report compares the impact of forecast and actual inflation on each index within the MCI outlined in the UT5 Final Decision.

Structure of Report

Section 1 outlines Aurizon Network's safety performance during FY2019 and identifies the number of derailments where the cost of recovery exceeded AU\$100,000;

Section 2 details Aurizon Network's maintenance expenditure and scope delivered during FY2019;

Section 3 outlines the impact of actual inflation on the sub-indices which underpin the forecast MCI; and

Appendix A provides the Below Rail Transit Times (**BRTT**) and the Overall Track Condition Index (**OTCI**) for FY2019.

Aurizon Network confirms that this report contains no confidential information and may be considered a public document.

1. Safety

Safety is Aurizon Network’s core value. Aurizon Network aspires to be world class in safety through its journey to ZEROHARM, which has delivered tangible benefits in terms of safety performance and safety culture. ZEROHARM comprises:



- ZERO incidents;
- ZERO injuries;
- ZERO work-related illnesses; and
- ZERO environmental incidents.

Injury Reporting Metrics

Aurizon Network’s strong safety performance directly benefits the coal supply chain by:

- > reducing the number of unplanned system interruptions; and
- > allowing Aurizon Network to maximise productive time within maintenance track possessions.

This ultimately promotes greater network reliability through a more effective and productive asset maintenance regime.

Aurizon’s primary injury reporting metrics include the:

- > Total Recordable Injury Frequency Rate (**TRIFR**), which measures the number of incidents per million person-hours worked; and
- > Lost Time Injury Frequency Rate (**LTIFR**), which measures the number of lost time injuries occurring in a workplace per million hours worked.

Figure 1 below illustrates both the TRIFR and LTIFR for Aurizon staff since June 2011. Since that time, there has been a noticeable improvement in Aurizon’s safety performance.

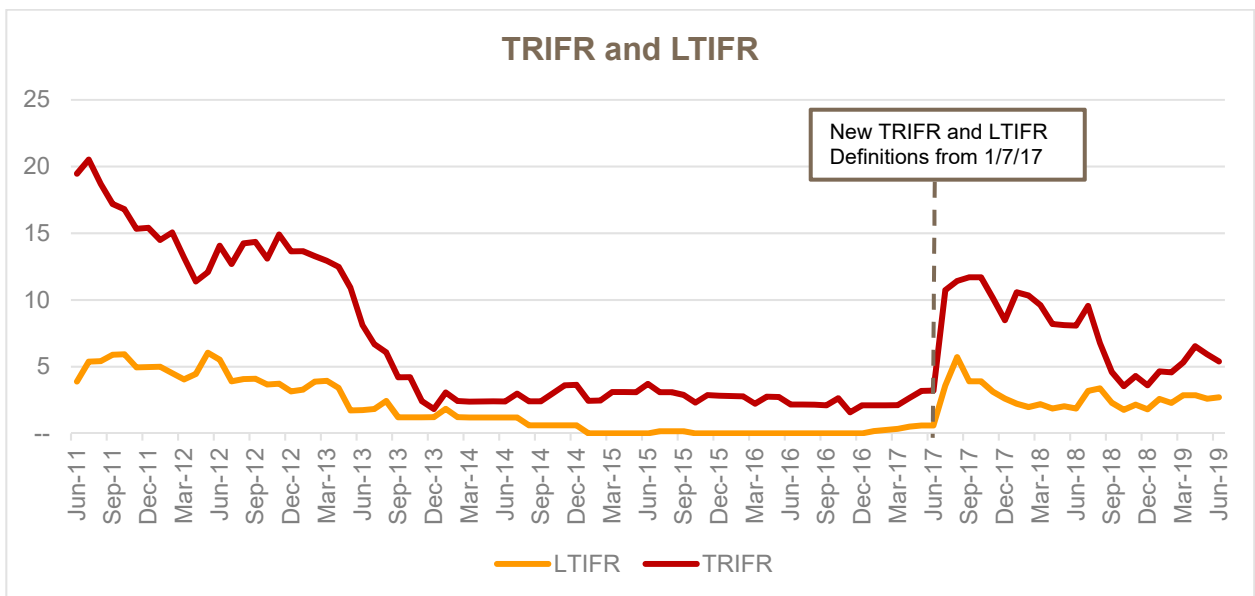


Figure 1: TRIFR and LTIFR

Derailments Exceeding \$100,000

A Derailment is an event where one or more rollingstock wheels leave the rail or track during railway operations.

Table 1 below lists the number of derailments where the cost to Aurizon Network of recovery from the derailment exceeded AUD\$100,000¹.

Derailment Incident	Date	Location	Cost
D1019244	24/01/2018	Duaringa	2,073,272
D1109439	09/06/2018	Waitara	146,527
D1200068	24/11/2018	Marmor	327,818
	10/03/2019	Dalrymple Bay	1,405,296
D1177754	6/10/2018	Dakenba	270,453

Table 1: Derailment Incidents and costs exceeding \$100,000

It should be noted that during FY2019, Aurizon Network incurred financial 'settlement' costs in relation to two derailments, which occurred during FY2018.

¹ As required by clause 10.3.3 (vi) of the 2017 Access Undertaking.

Major Reportable Safety Incidents

Figure 2 below presents the number of major reportable safety incidents reported to the Safety Regulator during FY2019.

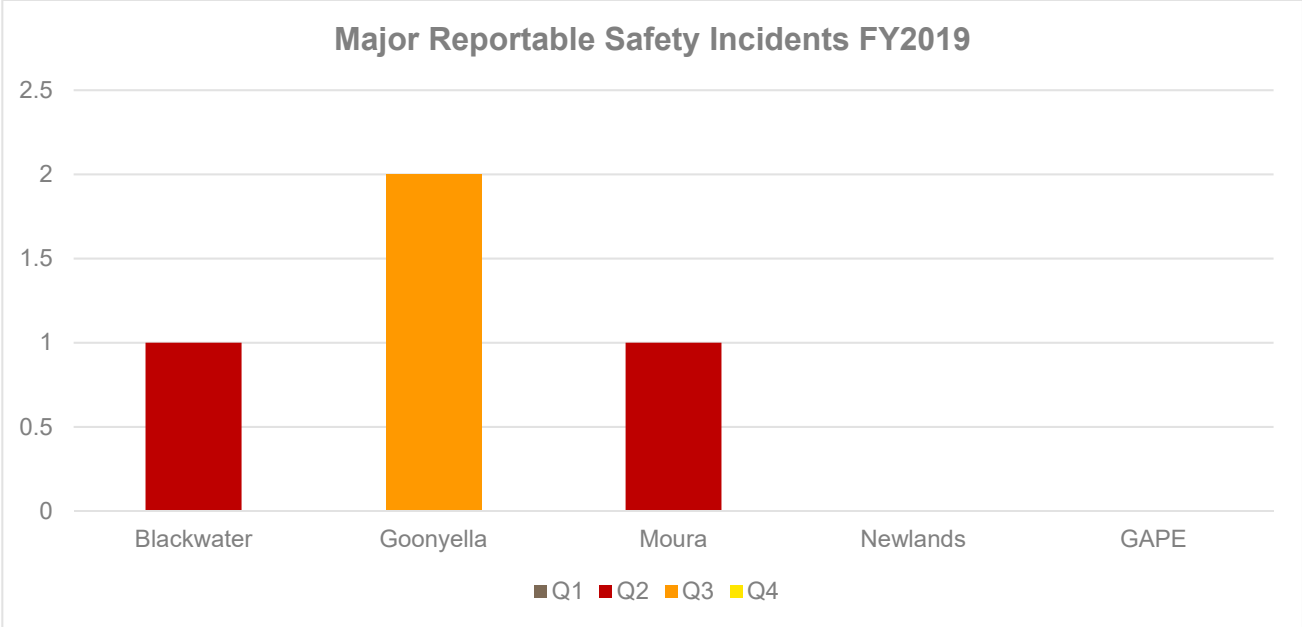


Figure 2: Number of major reportable safety incidents reported to the Safety Regulator

2. Maintenance Expenditure and Scope

This section outlines Aurizon Network’s actual maintenance performance for FY2019 in terms of costs incurred for CQCN maintenance activities and scope delivered for mechanised maintenance activities.

This report compares Aurizon Network’s actual maintenance cost and scope to the QCA-approved forecasts and provides commentary on material variations.

Volumes

Net Tonnes Railed compared to Final Decision

During FY2019 the network operational performance remained strong and a number of monthly raiiling records were achieved. Highlights include:

- > The supply chain delivered a record year with volumes in the CQCN of 232.7mt. In the last six months of the year, record monthly volumes were achieved in all four systems while in June overall tonnes were 21.5mt, the first-time monthly volumes have exceeded 21mt;
- > Performance to plan decreased 2.5ppt to 87.8%;
- > Cancellations due to Network increased marginally from 1.5% to 1.7%; and
- > Cycle velocity averaged 23.09km/hr, an improvement from the prior year.

By way of comparison, the regulatory forecast for FY2019 (as per the Reference Tariff Variation DAAU) was 233.8 million tonnes.

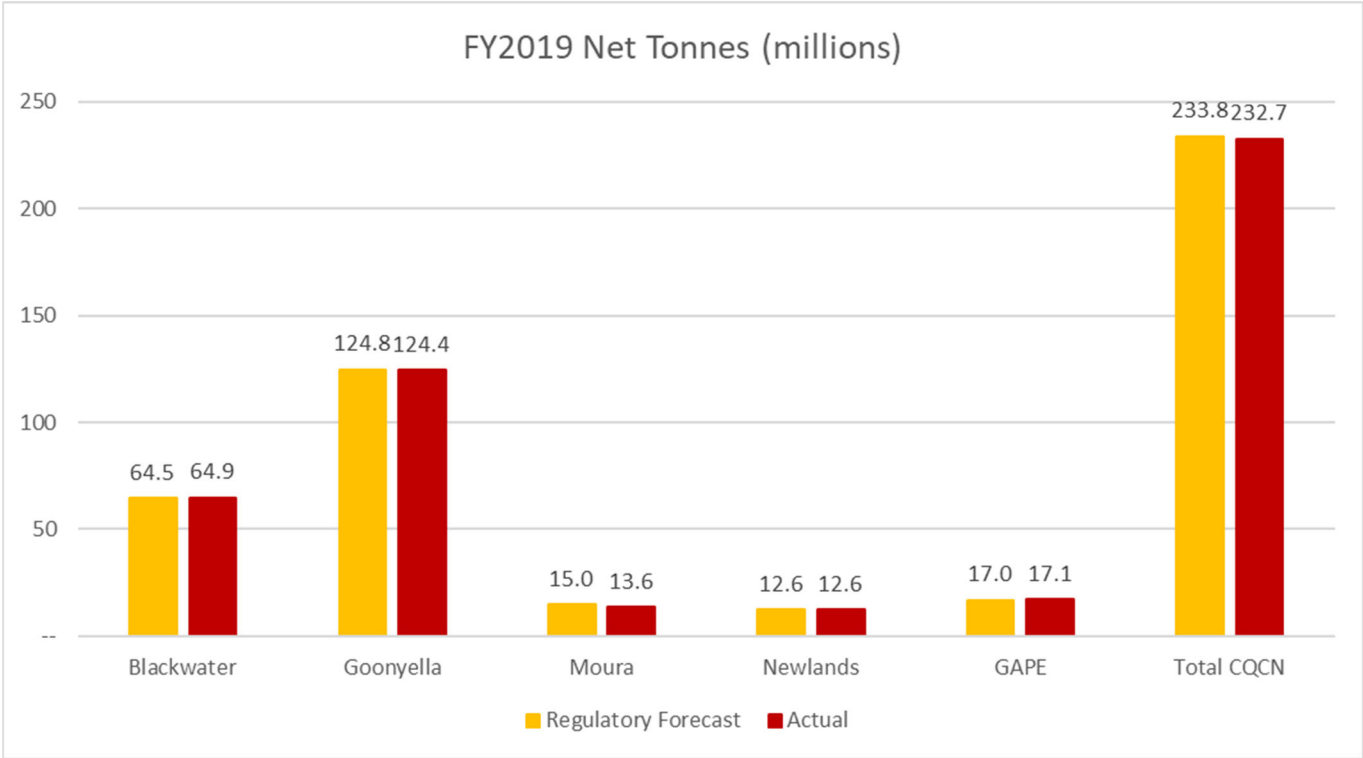


Figure 3: CQCN - Total Net Tonnes

CQCN Maintenance Costs

FY2019 Cost Forecast

The Reference Tariff Variation DAAU provides a total maintenance allowance for FY2019 of \$215.2 million. The composition of this amount includes:

- > \$205.7 million for direct maintenance costs; and
- > \$9.5 million for indirect costs, which provides a return on inventory holdings and maintenance assets that are not part of Aurizon Network's RAB, e.g. ballast undercutting machine, trucks, excavators, welding trucks, etc

To provide an accurate comparison to actual costs incurred, the QCA's forecast allowance is adjusted to reflect the:

- > removal of indirect costs (including return on assets and inventory) which do not form part of Aurizon Network's maintenance spend;
- > Inflationary impact on input costs, which is forecast through the MCI and reconciled through the Access Undertaking's Revenue Adjustment Amount (Revenue Cap) process; and
- > AT1 revenue impact resulting from volume variations relative to forecast.

As a result of the above, Aurizon Network's adjusted maintenance allowance for FY2019 is:

FY2019 Maintenance Allowance	\$m
Allowance	215.2
Adjustments	
- Indirect Costs	(9.5)
Direct Cost Allowance	205.7
- MCI impact	(0.8)
- AT ₁ impact	(0.2)
Adjusted Maintenance Allowance	204.6

Table 2: Adjusted Maintenance Allowance

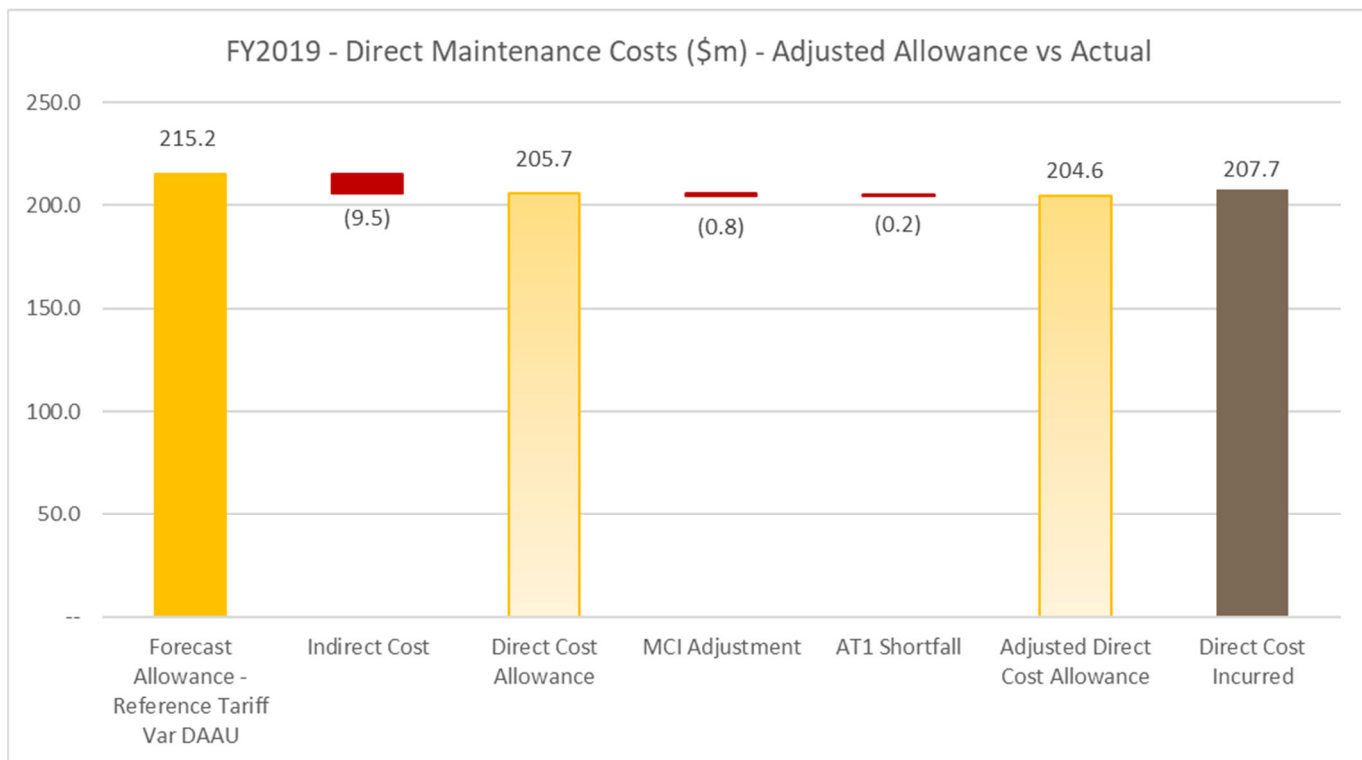


Figure 4: Adjusted Allowance vs Actual Cost Incurred

FY2019 Cost Incurred - Actuals

Aurizon Network’s direct maintenance expenditure for FY2019 was \$207.7 million, representing an over-spend of \$3 million (1.5%) against the adjusted direct maintenance allowance of \$204.6 million.

Maintenance Costs by Activity

The contribution of each maintenance activity to total direct maintenance costs is outlined in **Figure 5** and **Figure 6** below.

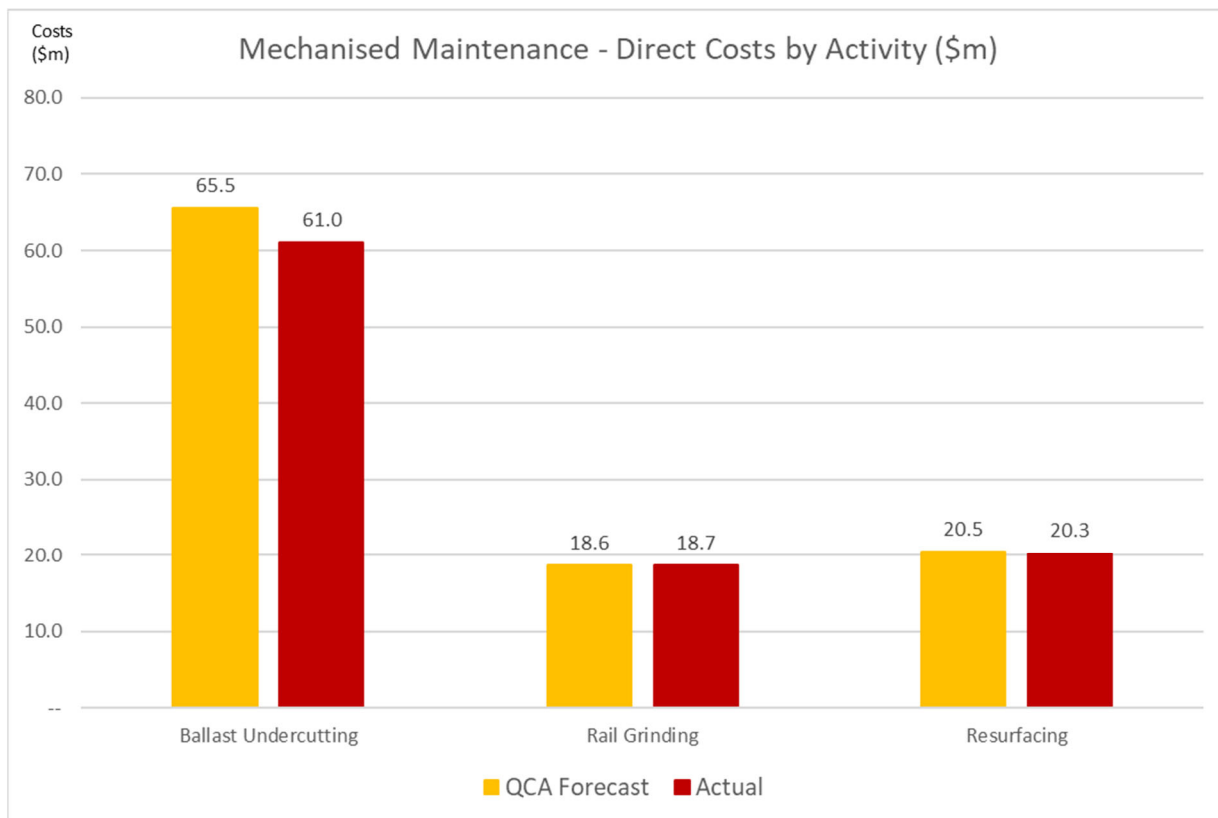


Figure 5: Mechanised Maintenance - Direct Costs by Activity

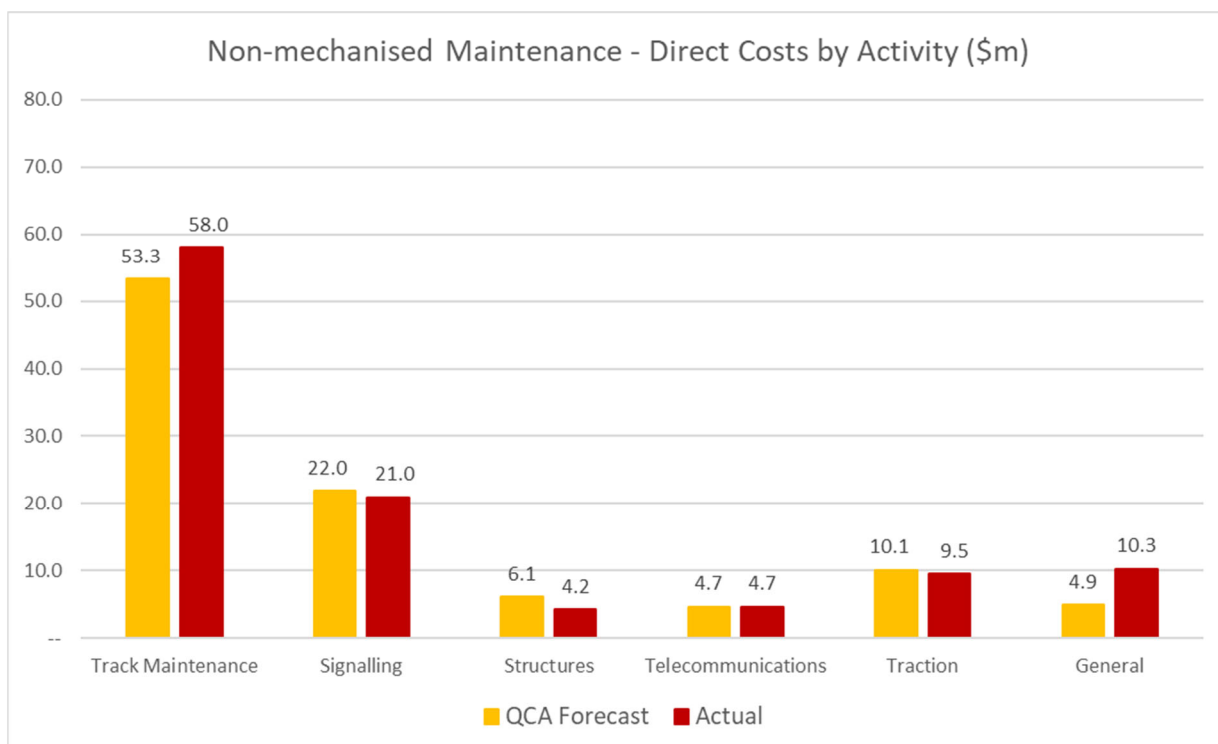


Figure 6: Non-mechanised Maintenance - Direct Costs by Activity

Note: The 'General' category in Figure 6 relates to support activities for maintenance including asset & inventory management, planning and administration.

The variance in the 'Track Maintenance category relates to:

- Approximately \$3M of FY18 restress scope being completed in FY19; and

- Approximately \$2M of overspend in relation to maintenance ballast. This was partially due to increased freight charges resulting from a change in service provider and an increase in the number of services used. Maintenance ballast also increased due to mandated changes in ballast profile / depth requirements.

The variance in the 'General' category relates to the introduction of the second phase of the Network Asset Management System (**NAMS**). With costs of the "on-call" maintenance teams being captured separately in the 'General' category. Previously, these costs were held at the activity (i.e. Signalling) level. The introduction of a new resource management and planning tool in Network Asset Management has identified certain team tasks directly associated with maintenance reliability and support, fault investigation and repair, with these costs for internal labour being re-categorised to the 'General' category.

Maintenance Costs by Coal System

As part of the development of a new Access Undertaking, Aurizon Network submits a forecast of both maintenance cost and scope to the QCA for approval. The distribution of scope, and therefore cost, between individual coal systems is based on a "best estimate" of where system closures, and subsequently, production would take place at that point in time.

During the regulatory period, Aurizon Network considers multiple sources of information when developing the detailed maintenance program for execution. This includes:

- > Qualitative information, including specific advice from Aurizon Network's District Engineering Team, Infrastructure Maintenance Supervisors and Track Inspectors, who together, have substantive site-specific experience through managing track infrastructure within their respective defined geographical zones. This advice provides evidence of degradation at specific locations throughout the network; and
- > Quantitative data, sourced from three specific data sets, namely:
 - GPR;
 - Resurfacing history; and
 - Track Geometry (sourced from the track recording vehicle).

The executable asset maintenance plans are ultimately based on the needs of the network infrastructure. It is therefore reasonable to expect that scope variances will exist at a system level between scope delivered and the scope forecast during the development of the Access Undertaking. Figure 7 shows the FY2019 maintenance cost by coal system.

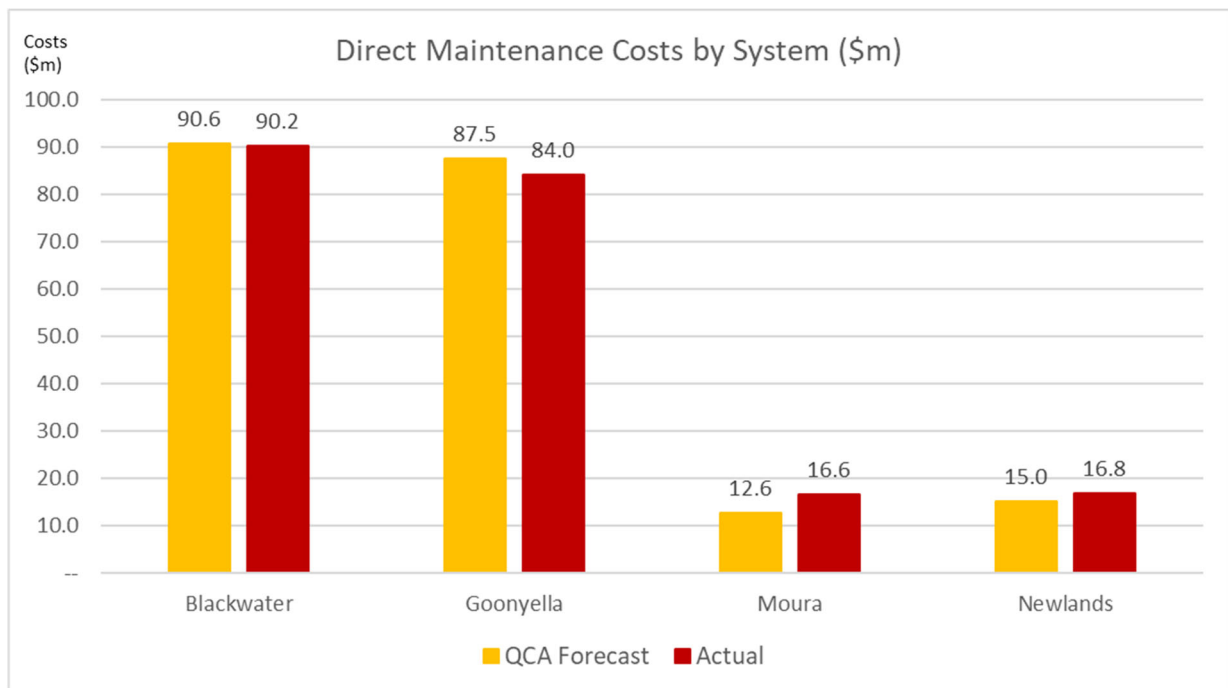


Figure 7: Direct Maintenance Costs by System

The over-spend in the Moura and Newlands system were primarily attributable to:

- > A reprioritisation of Resurfacing and Ballast Undercutting work to address high priority defects in the Moura and Newlands systems.

The under-spend in the Goonyella system was primarily attributable to:

- > Resurfacing scope being prioritised in other systems and Ballast Undercutting in Goonyella, which achieving lower unit rates through improved access during closure and single-line running.

Maintenance Costs by Activity by System

Direct maintenance costs by activity for each Coal System are as follows.

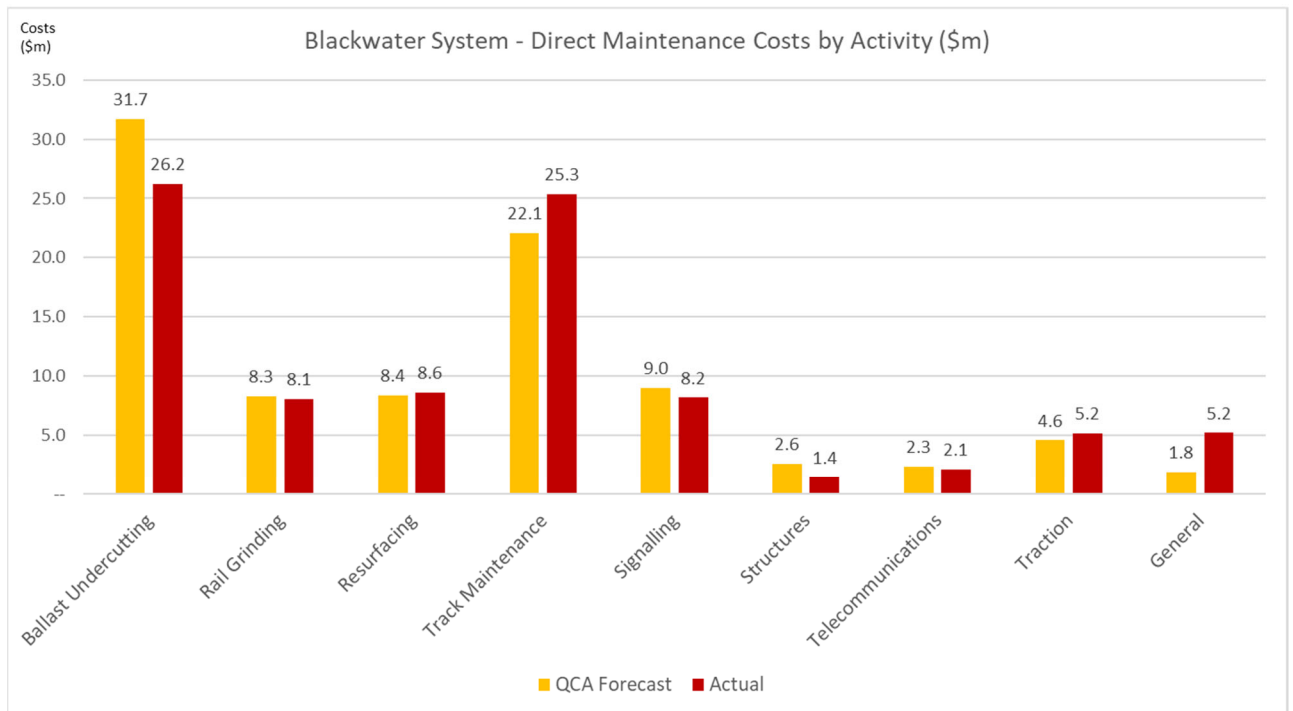


Figure 8: Blackwater System - Direct Maintenance Costs

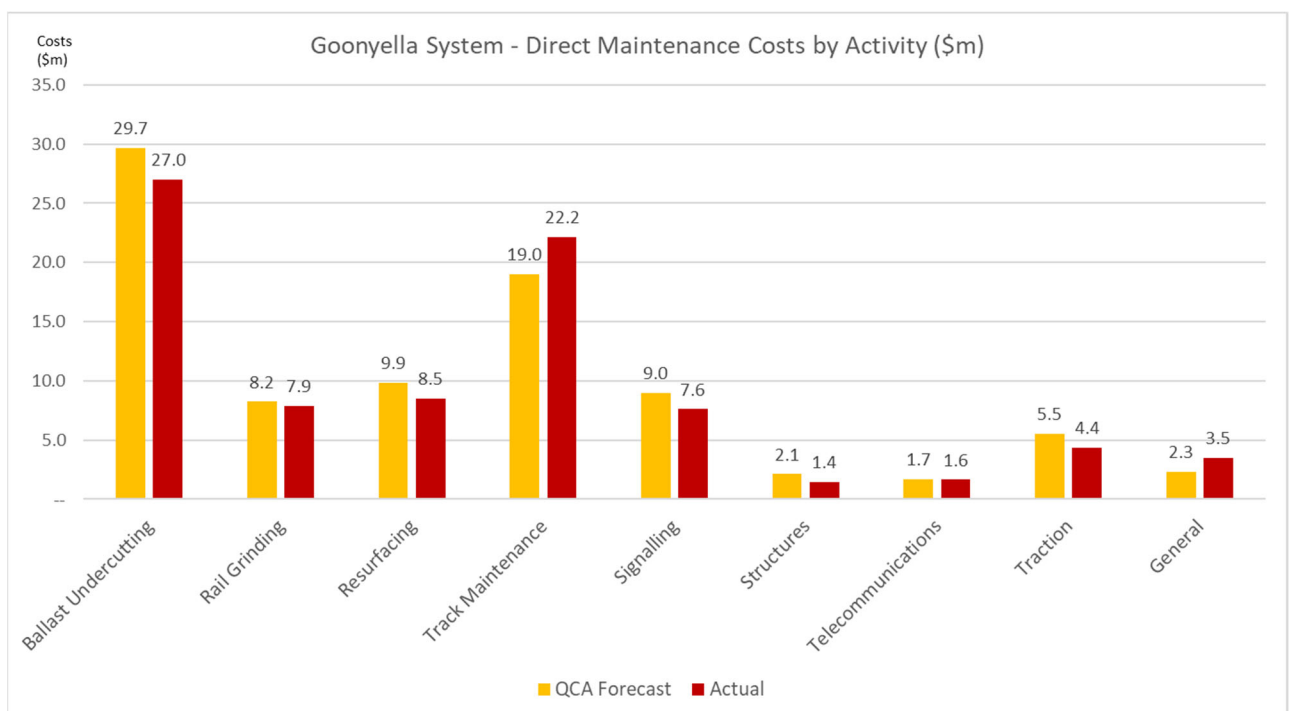


Figure 9: Goonyella System - Direct Maintenance Costs

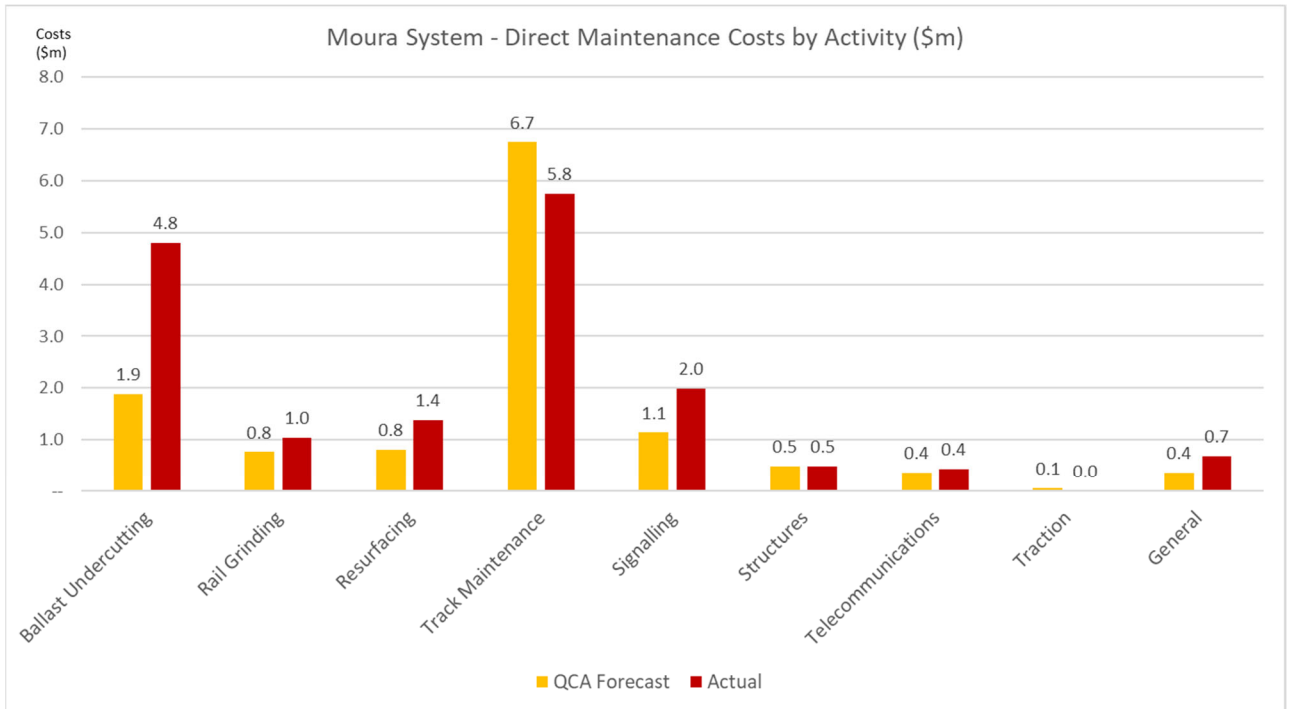


Figure 10: Moura System - Direct Maintenance Costs

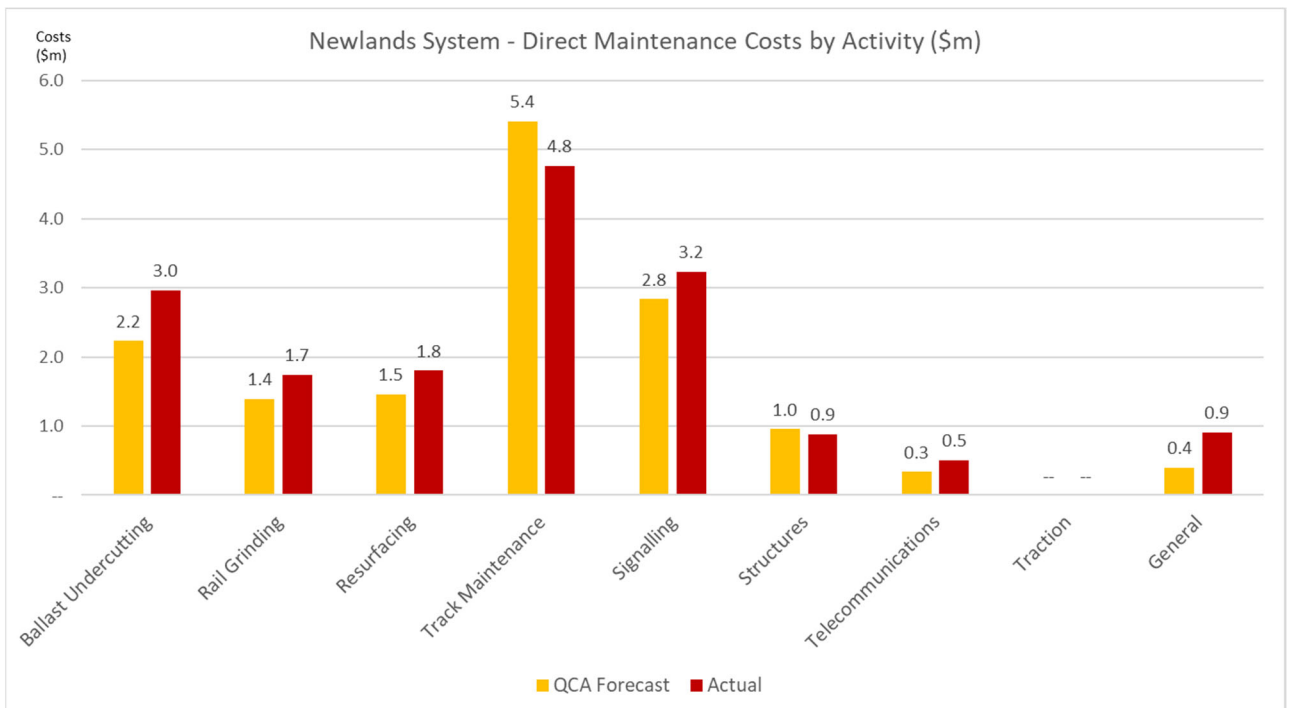


Figure 11: Newlands System - Direct Maintenance Costs

Mechanised Maintenance Scope

Mechanised maintenance includes the following activities:

- Ballast undercutting;
- Rail grinding; and
- Resurfacing.

Ballast Undercutting – forecast vs actual scope

For FY2019, the UT5 Final Decision provided for:

- > a mainline undercutting scope of 140 linear kilometres (km); and
- > a turnout undercutting scope of 42 turnouts.

By comparison, Aurizon Network delivered:

- > 133km of mainline ballast undercutting in linear² terms; a 5% decrease relative to the UT5 Final Decision; and
- > 39 turnouts, a 7% decrease relative to the UT5 Final Decision.

A comparison of mainline and turnout scope for each coal system is outlined in **Figure 12** and **Figure 13** below.

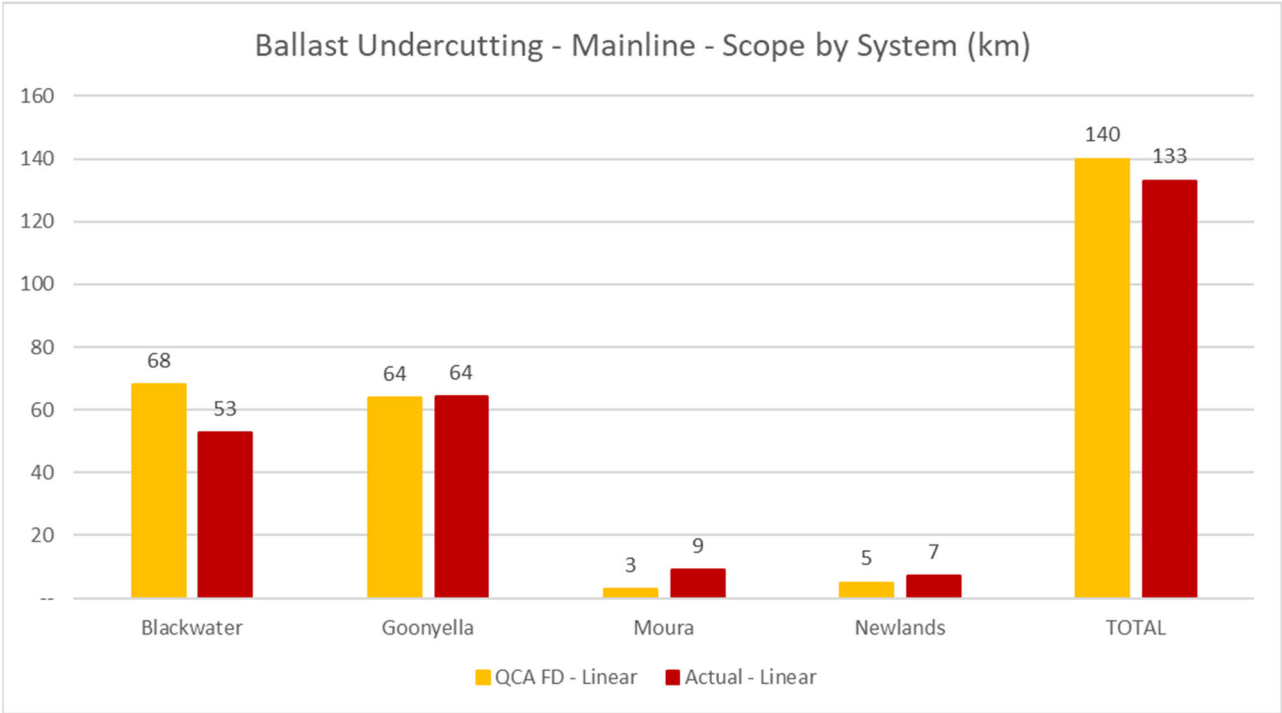


Figure 12: Scope of Mainline Ballast Undercutting completed by System

² The linear measure assumes a consistent ballast depth of 300 millimetres.

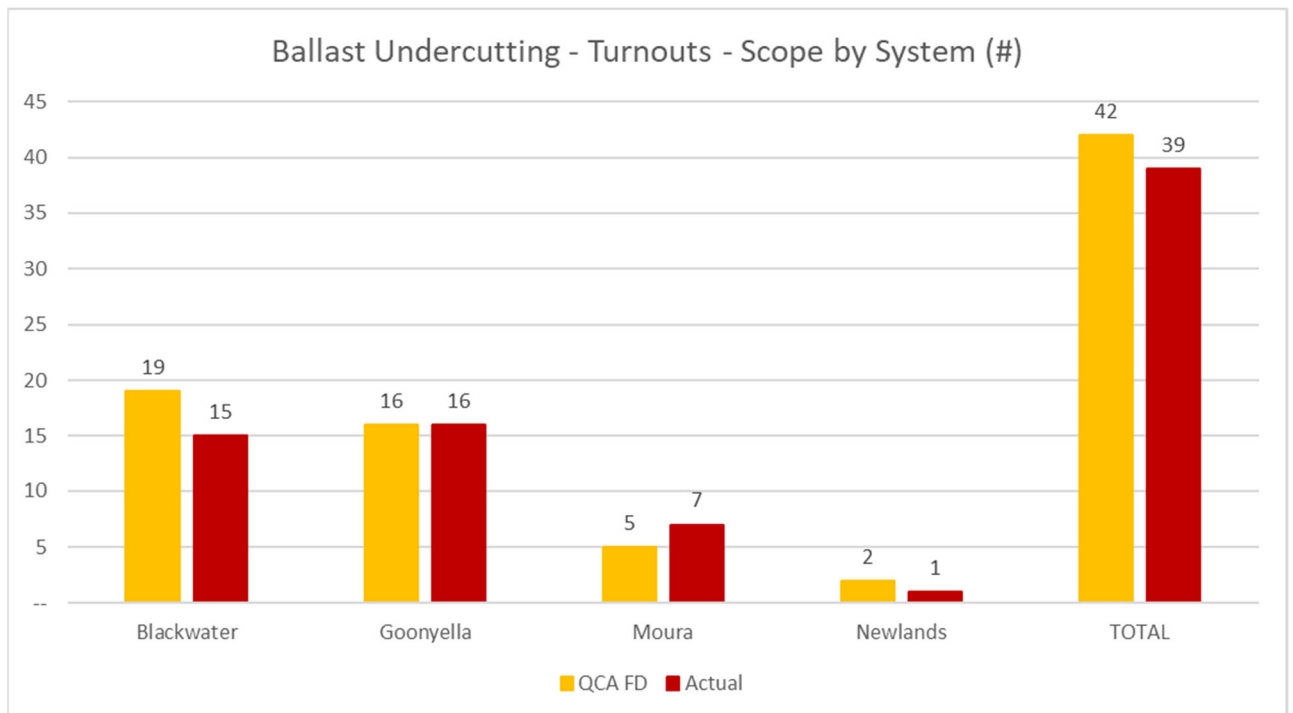


Figure 13: Scope of Turnout Ballast Undercutting completed by System

It should be noted that the distribution of forecast scope between systems was developed well in advance of Aurizon Network’s 2017 Draft Access Undertaking (UT5) submission. Consequently, with a planning horizon of 4-years, scope forecasts between systems represent Aurizon Network’s best estimate of where network possessions, and subsequently, production would be at that point in time.

During FY2019, mainline undercutting production in the:

- > Blackwater system was 15km below forecast;
- > Goonyella system was in line with forecast;
- > Moura system was 6km greater than forecast; and
- > Newlands system was 2km greater than forecast.

During FY2019, turnout undercutting production in the:

- > Blackwater system was 4 turnouts lower than forecast;
- > Goonyella system was in line with forecast;
- > Moura system was 2 turnouts greater than forecast; and
- > Newlands system was 1 turnout lower than forecast.

During the regulatory period, Aurizon Network analyses multiple sources of information when refining the strategic maintenance plan into a detailed program for execution. Aurizon Network’s Asset Managers analyse qualitative and quantitative data sources to assess the needs of the network infrastructure. This is then ranked and prioritised based on the condition and criticality of the asset. The scope delivered in each year is an output of this condition and criticality exercise, taking account of any logistical constraints.

Specifically, during FY2019, data collected by Aurizon Network’s track recording vehicle identified defects in the Moura system, which required remediation. This was the primary driver for the variances between systems, as Moura system work was prioritised.

Rail Grinding – forecast vs actual scope

For FY2019, the UT5 Final Decision provided for:

- > a mainline rail grinding scope of 4,139 km; and
- > a turnout grinding scope of 756 turnouts.

By comparison, Aurizon Network delivered:

- > 3,814 km of mainline rail grinding, an 8% decrease relative to the UT5 Final Decision; and
- > 761 turnouts, a 1% increase relative to the UT5 Final Decision scope.

A comparison of mainline and turnout scope for each coal system is outlined in **Figure 14** and **Figure 15** below.

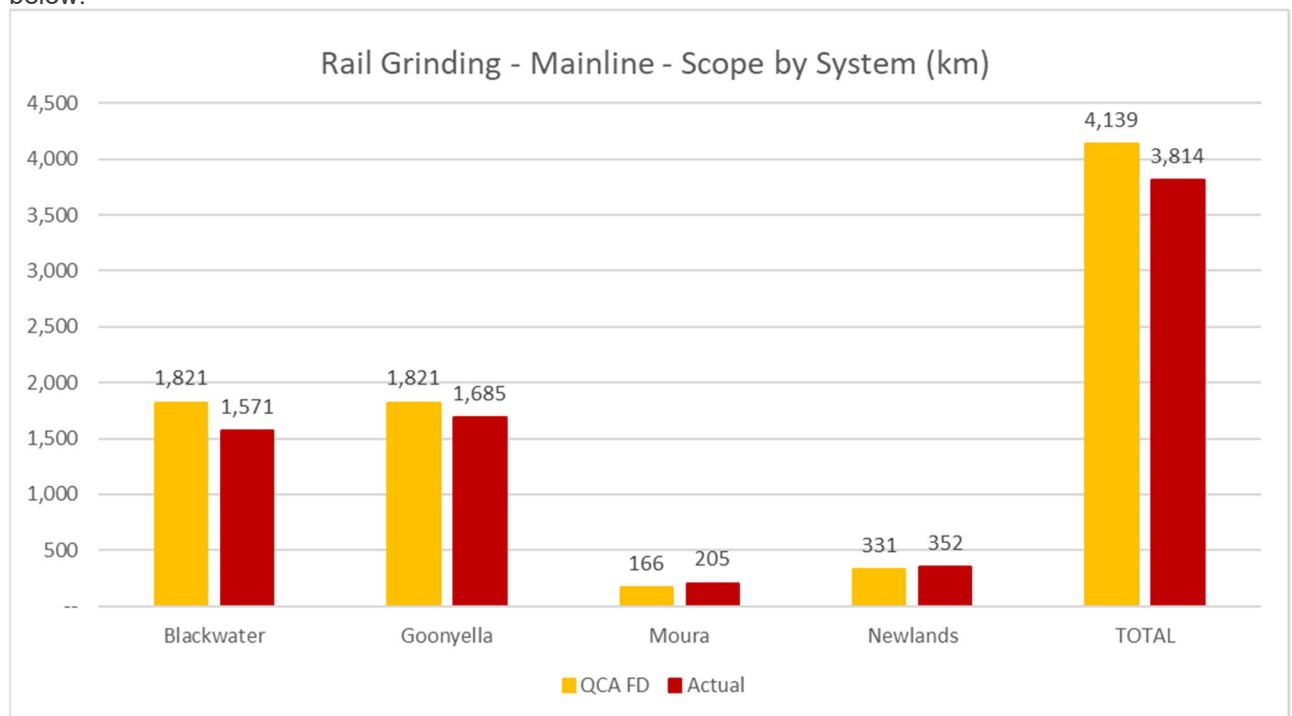


Figure 14: Scope of Mainline Rail Grinding completed by System

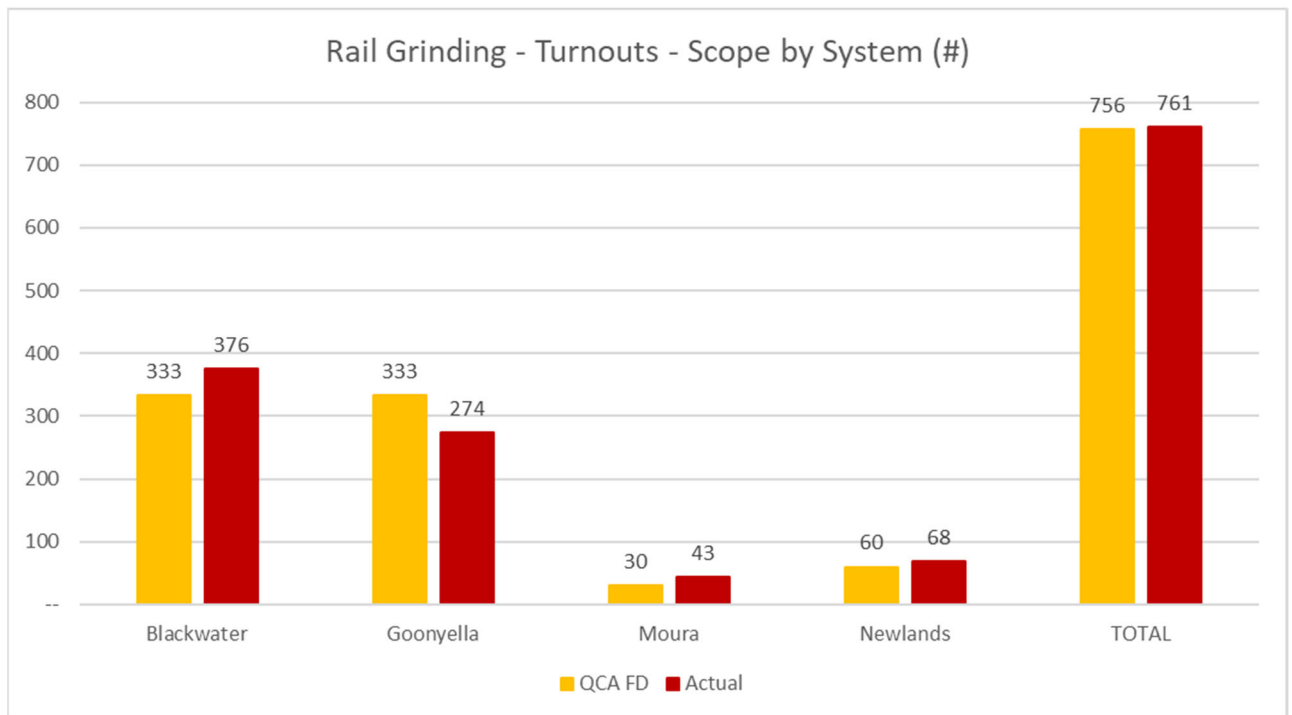


Figure 15: Scope of Turnout Rail Grinding completed by System

It should be noted that the distribution of forecast scope between systems was developed well in advance of Aurizon Network’s UT5 submission. Consequently, scope forecasts between systems represent Aurizon Network’s best estimate of where network possessions, and subsequently, production would be at that point in time.

During FY2019, mainline rail grinding production in the:

- > Blackwater system was 250km (14%) below forecast;
- > Goonyella system was 136km (7%) below forecast;
- > Moura system was 39km (24%) greater than forecast; and
- > Newlands system was 21km (6%) greater than forecast.

During FY2019, turnout rail grinding production in the:

- > Blackwater system was 43 turnouts (13%) above forecast;
- > Goonyella system was 60 turnouts (18%) below forecast;
- > Moura system was 13 turnouts (42%) above forecast; and
- > Newlands system was 8 turnouts (14%) above forecast.

During the regulatory period, Aurizon Network analyses multiple sources of information when refining the strategic maintenance plan into a detailed program for execution. Aurizon Network’s Asset Managers analyse qualitative and quantitative data sources to assess the needs of the network infrastructure. This is then ranked and prioritised on the basis of the condition and criticality of the asset. The scope delivered in each year is an output of this condition and criticality exercise, taking account of any logistical constraints.

The key determinants of turnout rail grinding scope variation reported at a system level were the timing differences between development of the scope for the undertaking submission and scope execution.

Resurfacing - forecast vs actual scope

For FY2019, the UT5 Final Decision provided for:

- > a mainline resurfacing scope of 2,159 km; and
- > a turnout resurfacing scope of 389 turnouts.

By comparison, Aurizon Network delivered:

- > 2,213 km of mainline resurfacing, a 2% increase relative to the UT5 Final Decision; and
- > 416 turnouts, a 7% increase relative to the UT5 Final Decision scope.

A comparison of mainline and turnout scope for each coal system is outlined in **Figure 16** and **Figure 17** below.

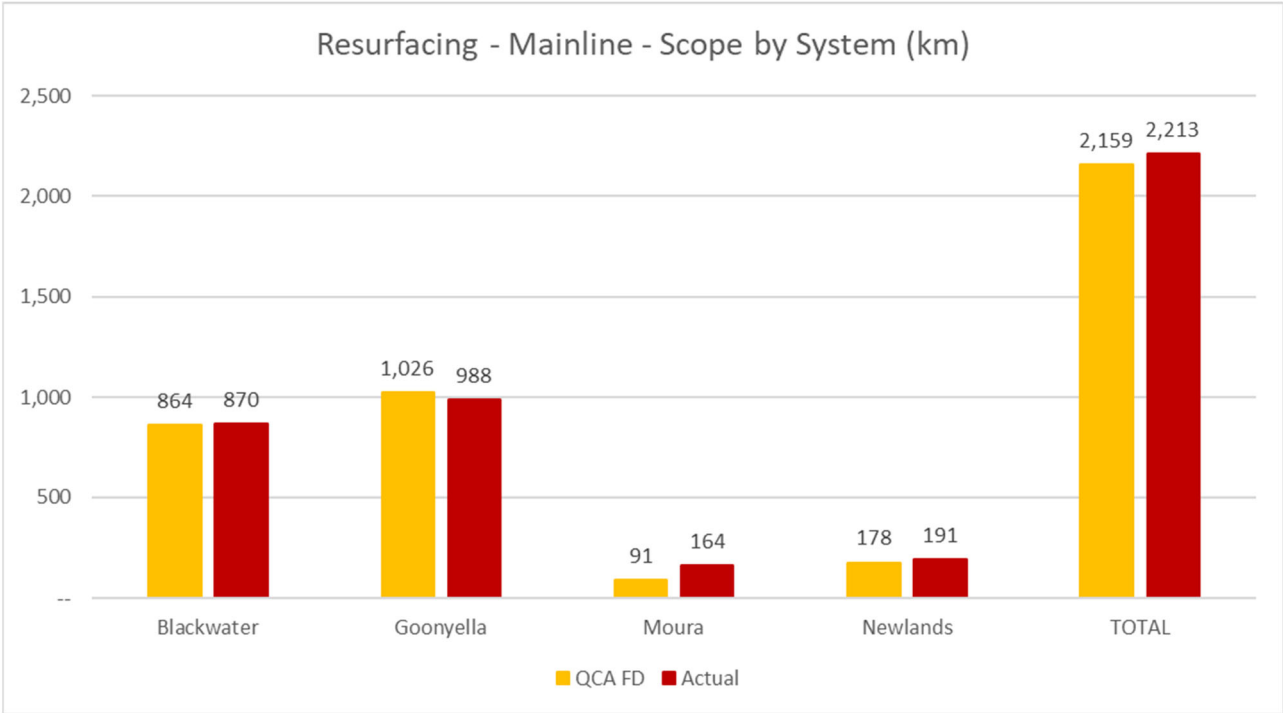


Figure 16: Scope of Mainline Resurfacing completed by System

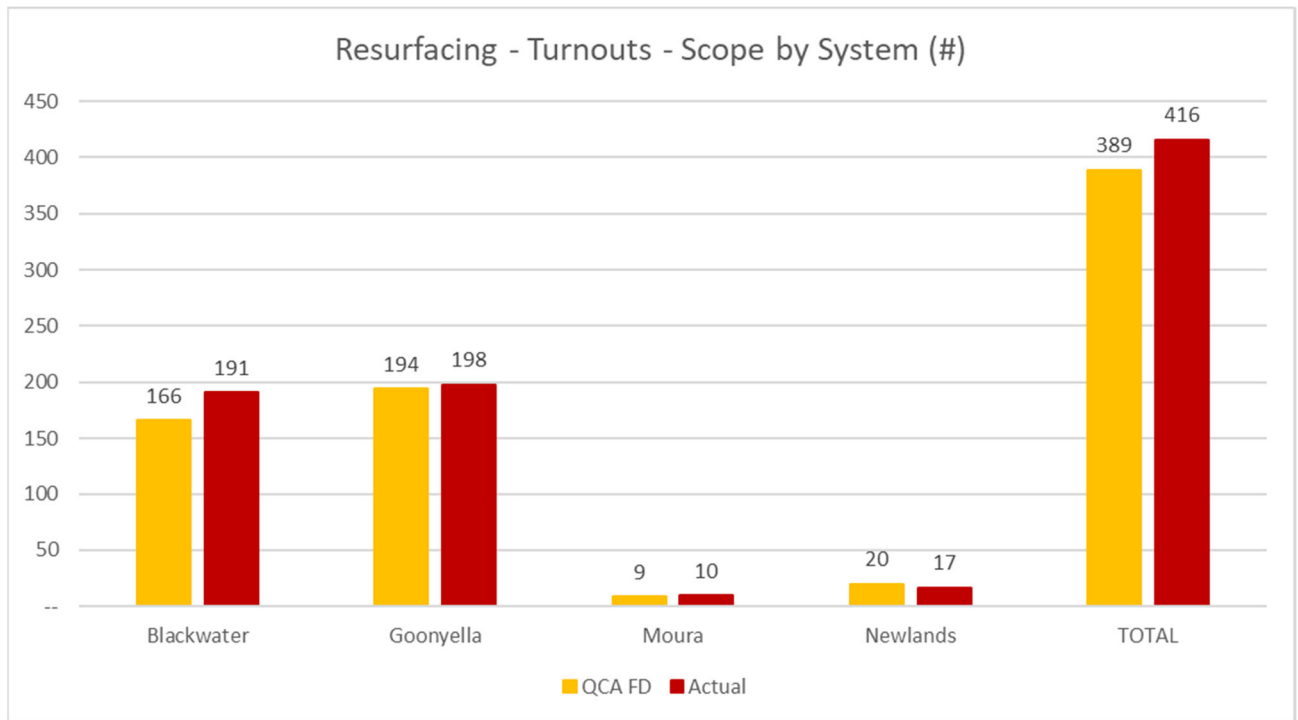


Figure 17: Scope of Turnout Resurfacing completed by System

It should be noted that the distribution of forecast scope between systems was developed well in advance of Aurizon Network’s UT5 submission. Consequently, with a planning horizon of 4-years, scope forecasts between systems represent Aurizon Network’s best estimate of where network possessions, and subsequently, production would be at that point in time.

During FY2019, mainline resurfacing production in the:

- > Blackwater system was 6km (1%) greater than forecast;
- > Goonyella system was 39km (4%) lower than forecast;
- > Moura system was 73km (80%) greater than forecast; and
- > Newlands system was 13km (7%) greater than forecast.

During FY2019, turnout resurfacing production in the:

- > Blackwater system was 25 turnouts (15%) greater than forecast;
- > Goonyella system was 4 turnouts (2%) greater than forecast;
- > Moura system was 1 turnout (11%) greater than forecast; and
- > Newlands system was 3 turnouts (15%) lower than forecast.

During the regulatory period, Aurizon Network analyses multiple sources of information when refining the strategic maintenance plan into a detailed program for execution. Aurizon Network’s Asset Managers analyse qualitative and quantitative data sources to assess the needs of the network infrastructure. This is then ranked and prioritised on the basis of the condition and criticality of the asset. The scope delivered in each year is an output of this condition and criticality exercise, taking account of any logistical constraints.

Specifically, during FY2019, track geometry data collected by Aurizon Network’s track recording vehicle identified several defects in the Moura system, which required remediation within the year. This was the key driver of the scope variation in the Moura system, particularly with respect to turnout resurfacing.

3. Maintenance Cost Index

Table 5 presents the forecast and actual values for each sub-index used to construct the MCI. It should be noted that the index values presented below are based on the UT5 Final Decision and are indicative only. Aurizon Network expects the final MCI values to be confirmed as part of the UT5 Final Decision.

MCI		FY2019	
Index	Forecast	Actual	Change (%)
Accommodation	117	120	2.6%
CPI	106	107	0.9%
Consumables	106	108	1.9%
Fuel	89	108	21.3%
Labour	110	107	(2.7%)
MCI Weighted Index	107	108	0.9%

Table 5: Forecast & Actual MCI and Sub-Indices

Appendix A: OTCI and BRTT

This appendix provides information relating to the overall condition of track as well as the below-rail transit time in each rail system in the CQCN over FY2019.

Overall Track Condition Index (OTCI)

The OTCI provides a measure of quality of the network for each Coal System.

The OTCI provides a general indicator of track geometry variation over time. The index is calculated from data captured by track recording vehicles and is used by Aurizon Network to monitor trends in track condition.

An OTCI that is trending downwards is indicative of improving track quality. Conversely, an OTCI that is trending upwards may indicate that the track condition is deteriorating or is being managed in a way that is 'fit for purpose' as determined by the Rail Infrastructure Manager.

Below Rail Transit Time (BRTT)

BRTT provides an indicator of operational performance of each Coal System. The BRTT includes the following:

- > Section Running Times;
- > Delays from scheduled train path in the daily train plan that can be directly attributed to Aurizon Network but excludes:
 - Cancellations;
 - delays resulting from compliance with a passenger priority obligation; and
 - delays resulting from a force majeure event.
- > Time taken in crossing other trains; and
- > Delays due to operational constraints:
 - directly caused by the activities of Aurizon Network in maintaining the CQCN; or
 - due to a fault or deficiency in the CQCN provided such delays are not contributed to by a railway operator or force majeure events.

The BRTT for all coal systems was within the respective requirement during FY2019. This outcome is indicative of a well performing, fit for purpose network.

Blackwater System

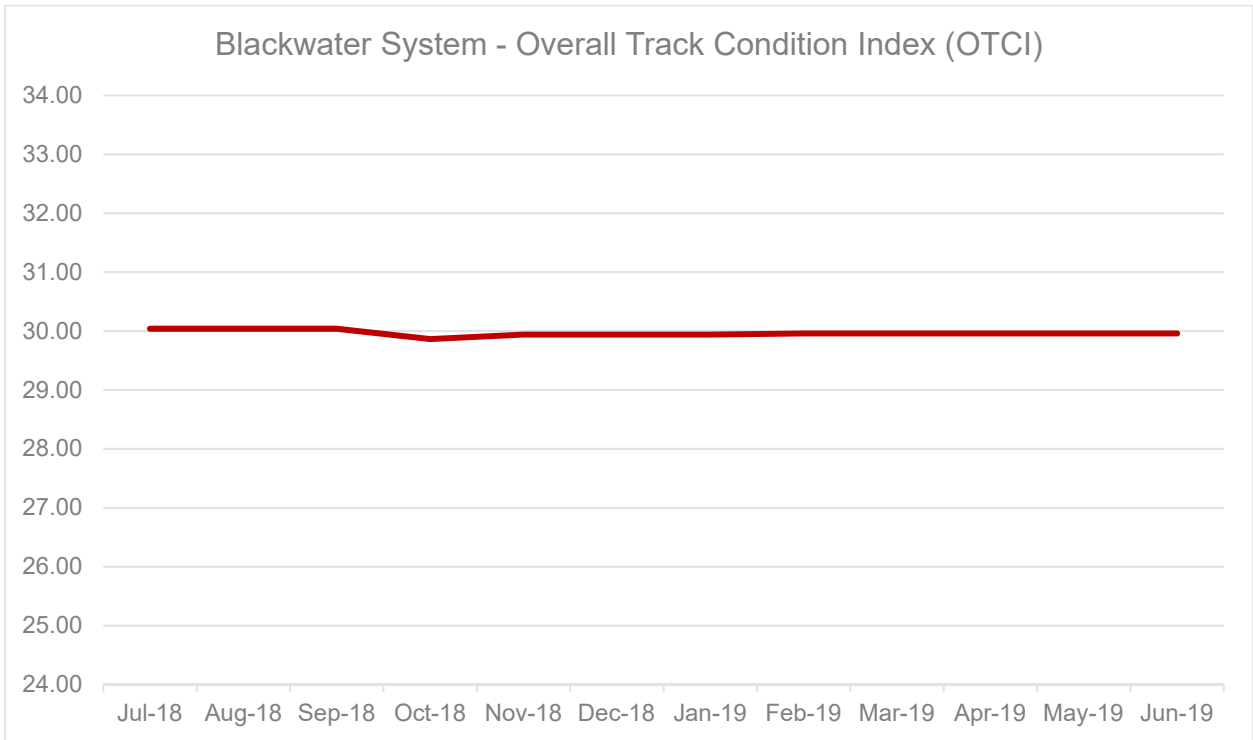


Figure 18: Blackwater System OTCI

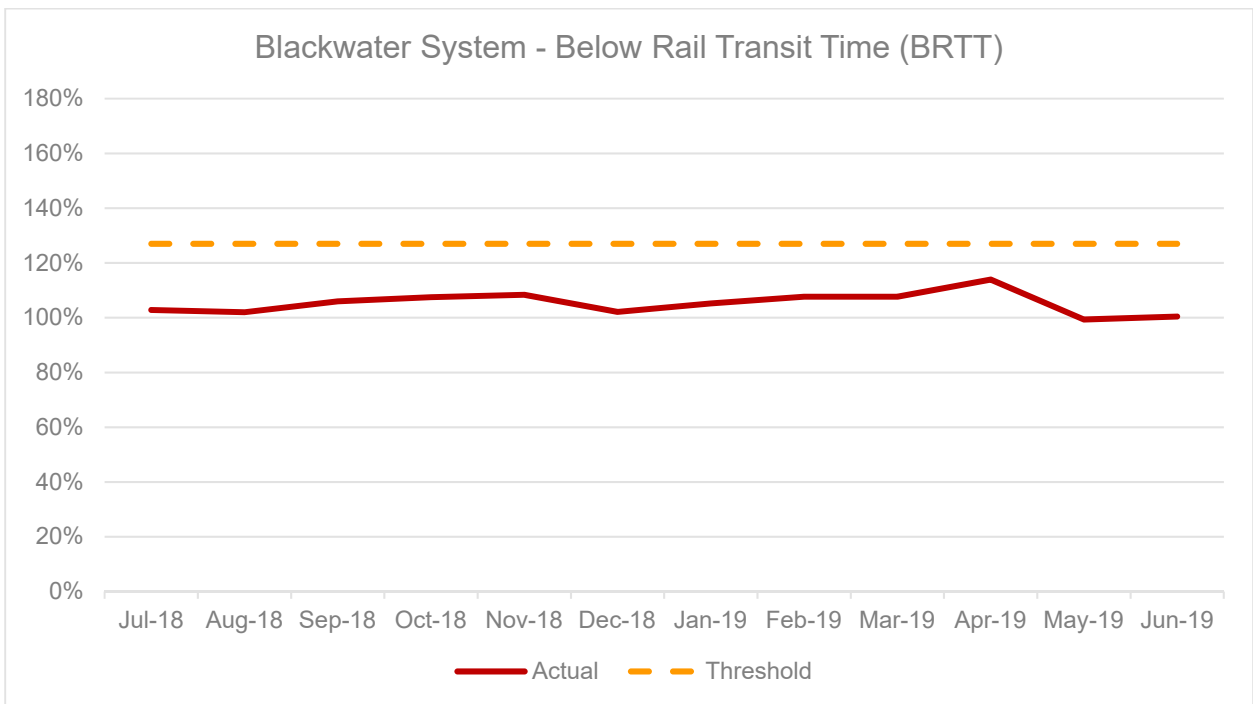


Figure 19: Blackwater System BRTT

Moura System

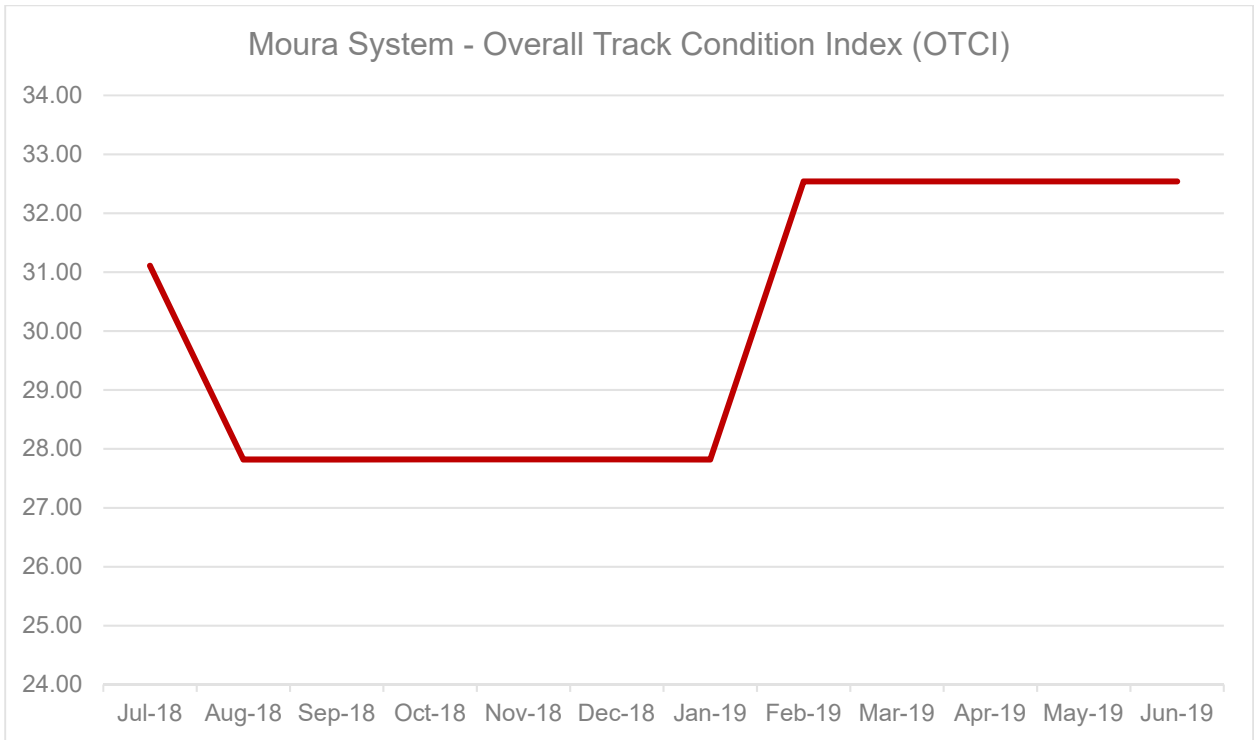


Figure 20: Moura System OTCI

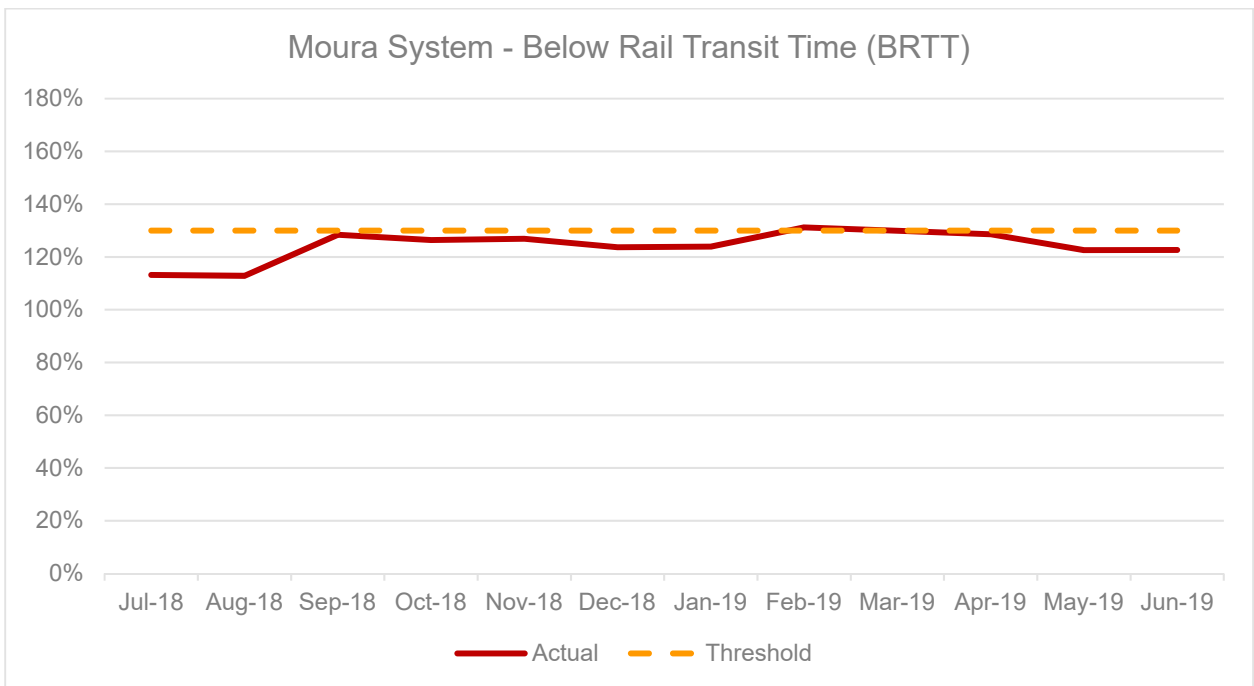


Figure 21: Moura System BRTT

Goonyella System

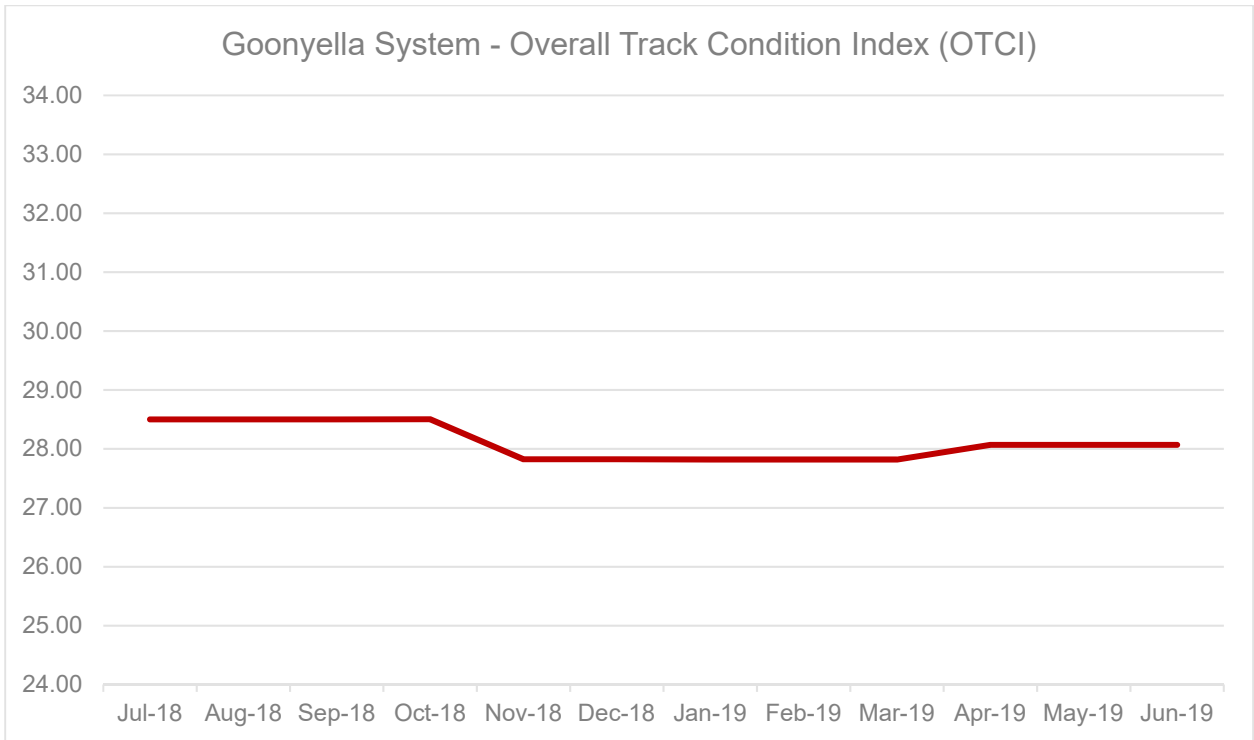


Figure 22: Goonyella System OTCI

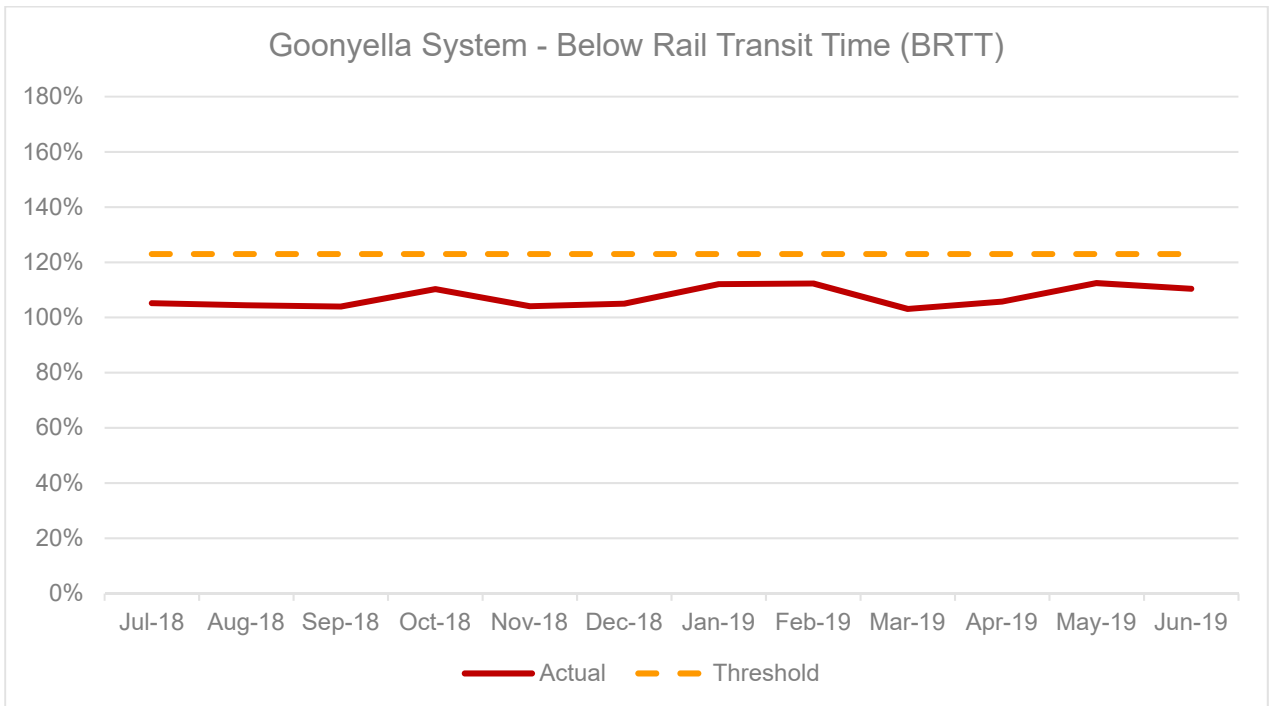


Figure 23: Goonyella System BRTT

Newlands System

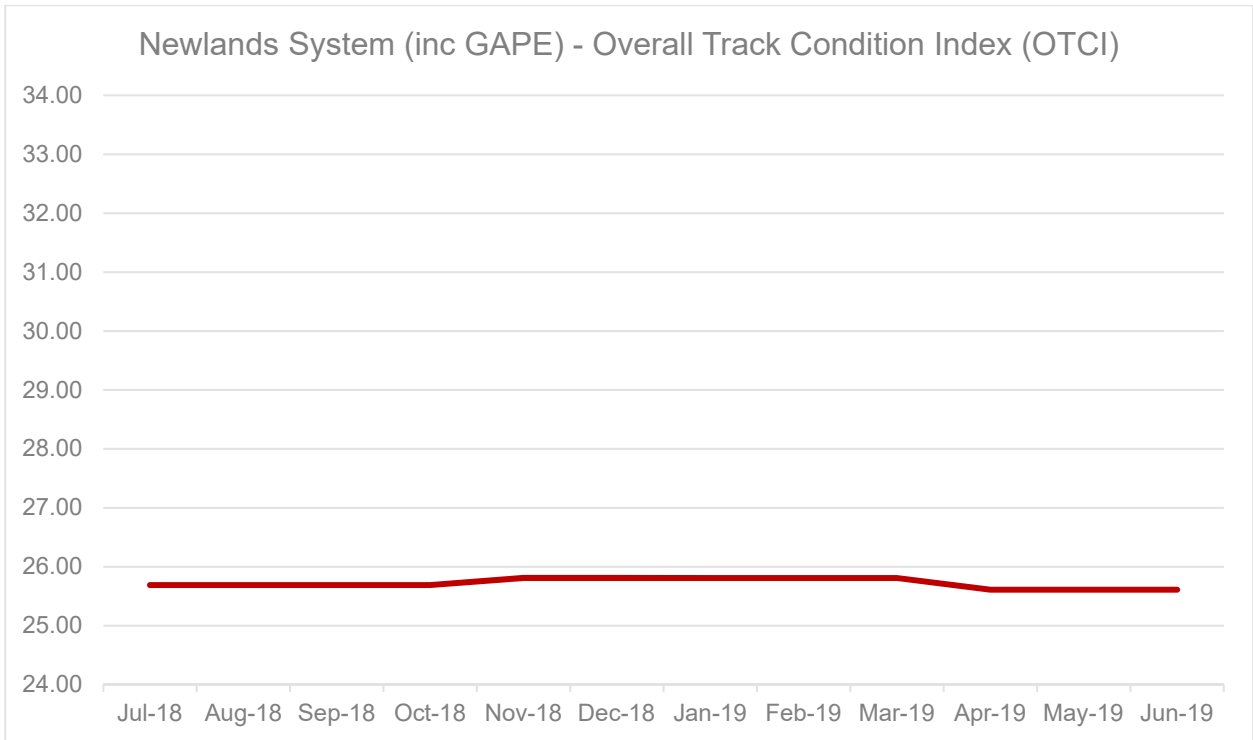


Figure 24: Newlands System (including GAPE) OTCI

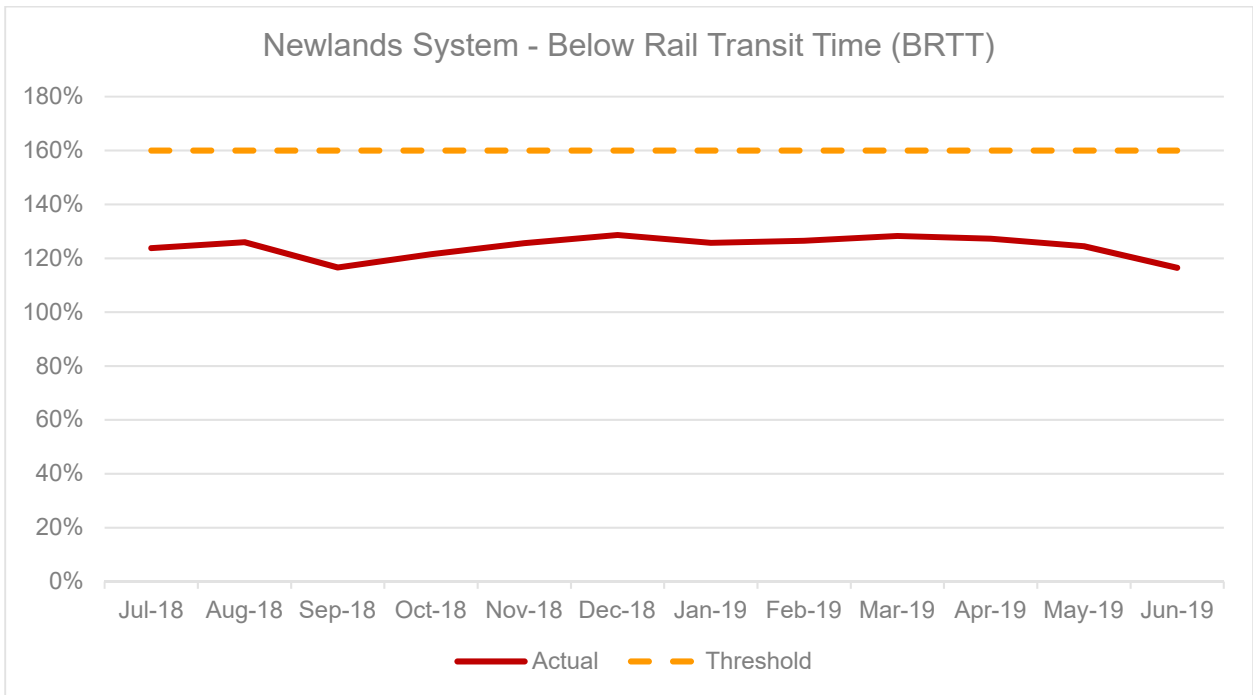


Figure 25: Newlands System BRTT

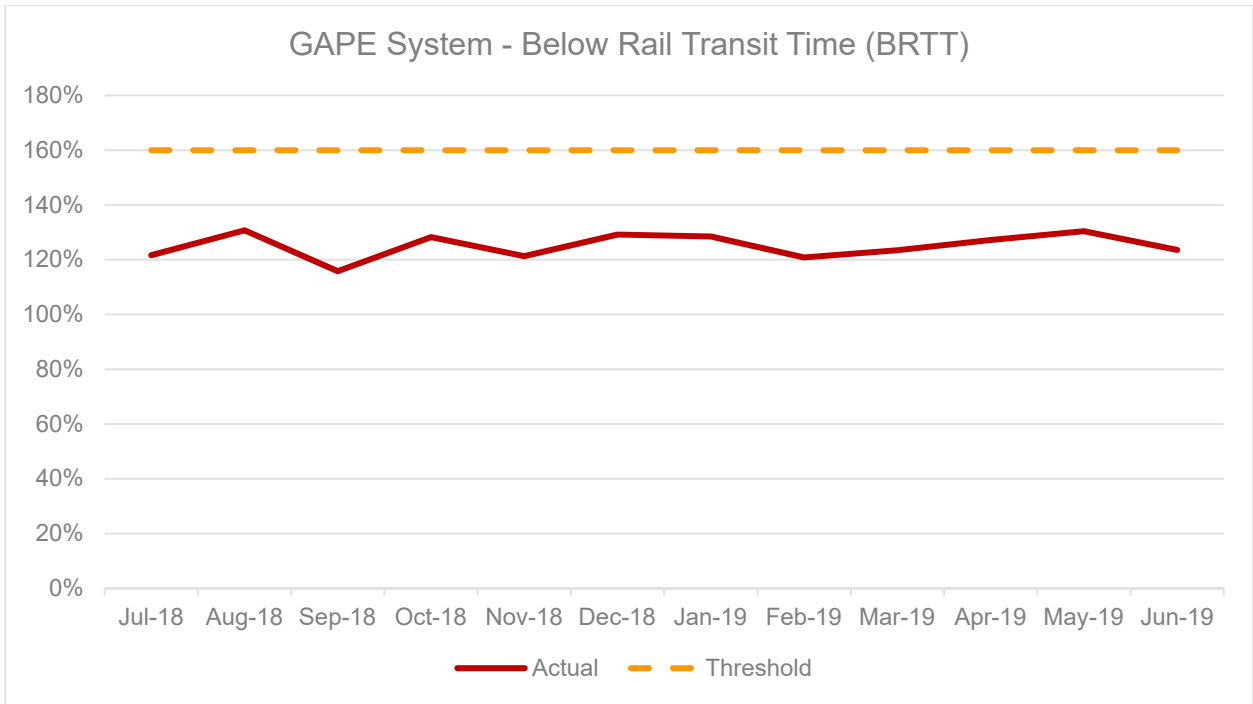


Figure 26: Goonyella to Abbot Point Expansion BRTT