QueenslandRail

Queensland Rail
GPO Box 1429
Brisbane Qld 4001

T 07 3072 0781
E ceoqueenslandrail@qr.com.au
W queenslandrail.com.au

QR Ref: MCR-23-638

Professor Flavio Menezes
Chair
Queensland Competition Authority
GPO Box 2257
Brisbane Qld 4001

Dear Professor Menezes

Queensland Rail's Draft Access Undertaking 3

I am pleased to provide Queensland Rail's Draft Access Undertaking 3 (**DAU3**) and accompanying explanatory material including the DAU3 Model. A redacted version of DAU3 will also be provided for publication.

Queensland Rail forecasts that the West Moreton System coal volumes will reach a record 9.6Mtpa during the Term of DAU3.

This record tonnage forecast, compares to the 2.1Mtpa coal forecast for the West Moreton System in Queensland Rail's Access Undertaking 2 (**DAU2**) and 2.17Mt of coal railed in FY2022-23. The higher forecast coal railings will benefit the West Moreton System and broader industry. However, this will require increased capital investment and maintenance and operating expenditure in the West Moreton System to ensure that the higher tonnages can be reliably railed.

The capital underpinning the proposed DAU3 West Moreton System Reference Tariff is subject to Queensland Rail Board and Government approvals as part of Queensland Rail's FY25 Integrated Planning cycle as required by Queensland Rail's governance processes.

Should your officers have any questions in relation to this matter they can contact Queensland Rail's Manager Policy and Regulation Mr Douglas Jasch on 0488 314 741 or by email at douglas.jasch@qr.com.au.

Yours sincerely

[redacted]

Kat Stapleton
Chief Executive Officer

10 November 2023

Queensland Rail's Draft Access Undertaking 3 (DAU3) Explanatory Document

10 November 2023

Commercial-In-Confidence

Table of Contents

1. Background

1.1 Queensland Rail's network

Queensland Rail is a statutory authority established by the Queensland Government under the Queensland Rail Transit Authority Act 2013 (Qld).

Figure 1: Queensland Rail's Systems

Queensland Rail's purpose is to provide a safe, reliable, on-time, value for money and customer focussed rail service that benefits the community, supports industry and is integrated with the public transport system.

Queensland Rail's network extends more than 6,600 kilometres across the state and consists of the regional network and the Metropolitan System. The regional network spans more than 5,700 kilometres of track and comprises seven rail systems that convey passenger and freight services across Queensland to support the state's economy in the tourism, mining, agriculture, construction, wholesale and retail sectors.

The most significant volumes of freight are carried on the West Moreton System (thermal coal), the Mount Isa Line System (metals, minerals concentrate, fertiliser and chemicals) and the North Coast Line System (intermodal freight and sugar).

The regional systems connect to the Metropolitan System, which provides metropolitan passenger train services in Brisbane. Queensland Rail's Citytrain primarily services the commuter passenger market in South East Queensland, with more than 42.86 million passenger trips undertaken in the 2022-23 financial year.

The operators currently providing freight transportation services on Queensland Rail's systems are:

- **Aurizon Operations**, which provides transportation of all types of freight on each of Queensland Rail's systems except the Tablelands System;
- **Pacific National**, which provides transportation of general freight on the North Coast Line and Metropolitan Systems;
- **Qube** which provides transportation of bulk and intermodal freight on the Mount Isa Line; and
- **Watco** which provides rail transport of agricultural and livestock freight across all systems.

Queensland Rail does not provide any above rail freight services or compete with third party above rail passenger services. The key passenger operations on Queensland Rail's systems are:

- Citytrain service on the Metropolitan System; and
- long distance passenger services on the North Coast Line System.

Regular passenger and tourist services operate on the Mount Isa Line System, West Moreton System, Western System, Central Western System and the Tablelands System, and a small number of heritage tourist services operate on various short segments of the network.

Each of Queensland Rail's systems, with the exception of the Mount Isa Line System, are supported by Queensland Government transport service payments in respect of its below rail infrastructure services.

The characteristics of Queensland Rail's systems are diverse and vary greatly due to differing supply chain dynamics, geography, rail corridor characteristics, interactions with other rail traffic and the substitutability of rail freight for road freight. Queensland Rail maintains fit for purpose capital and maintenance programs for each of its systems that are designed around that system's particular characteristics.

1.2 Queensland Rail's Approach to DAU3

Queensland Rail's AU2 was approved on 1 July 2020 and expires on 30 June 2025. Queensland Rail worked closely with customers/stakeholders in agreeing to key elements of AU2. Reflecting this, the QCA stated in its Final Decision on AU2:

> *"Stakeholders endorsed Queensland Rail's approach of only proposing to change a limited number of matters from the 2016 undertaking, and its efforts to reach agreed positions during the collaborative process after our draft decision.*
>
> *We also welcome Queensland Rail's desire to continue many of the policies we considered appropriate to approve in the final decision on the 2015 DAU in October 2016, and to find common ground with its customers….."*
>
> *….Throughout the 2020 DAU assessment process, we have encouraged open communication between stakeholders as a way to improve regulatory outcomes. We have strongly supported stakeholders collaborating and, where possible, providing joint submissions on agreed positions. We therefore welcome the common ground on several issues that Queensland Rail and a number of its stakeholders have found through the collaborative submission process."*

Queensland Rail has taken the same collaborative approach to its new access undertaking, DAU3, and has consulted with customers, only seeking changes from AU2 on an exception basis, that is, where an improvement can be made. Customers have supported this approach for non-West Moreton Reference Tariff matters. Queensland Rail considers that the provisions of AU2 have been tried and tested, and to provide business certainty to Queensland Rail's customers, only minor changes have been proposed to AU2's overall provisions.

Queensland Rail held presentations of its proposed changes as well as holding additional meetings. Queensland Rail appreciates the opportunity to meet with its key stakeholders as well as the valuable feedback provided by stakeholders.

Queensland Rail has consulted with New Hope, Yancoal, New Wilkie Energy, Glencore, Aurizon, Watco, Pacific National, QUBE, Cairns Karanda Steam Train, Linfox, Wilmar Sugar, Incitec Pivot MMG, Centrex and Graincorp. This consultation will continue throughout the QCA's AU3 approval process, seeking agreement on DAU3's provisions.

1.3 Queensland Rail's declared service

The use of Queensland Rail's below rail network is currently a 'declared service', except for the Tablelands System, under the Queensland Competition Authority Act 1997 (**QCA Act**). Third party access to the declared network is subject to '*Queensland Rail's Access Undertaking 2*' (**AU2**), which was approved by the Queensland Competition Authority (**QCA**) on 1 July 2020 and expires on 30 June 2025.

Once declared, the QCA can require Queensland Rail to submit a 'Draft Access Undertaking' to it for approval, and have it approved by the QCA in accordance with the QCA Act. Queensland Rail may also submit a 'Voluntary Draft Access Undertaking' to the QCA.[1] Queensland Rail is lodging a Voluntary Draft Access Undertaking (**DAU3)** to the QCA accompanying this Explanatory Document. Queensland Rail proposes to replace AU2 with DAU3, effective from July 1, 2025, to June 30, 2030.

[1] The QCA supported Queensland Rail lodging a Voluntary Draft Access Undertaking in correspondence dated 21 September 2022: https://www.qca.org.au/wp-content/uploads/2022/10/qca-letter-re-queensland-rail-access-undertaking-timeline-21-sep-2022.pdf

1.4 The West Moreton System

This submission has been developed under circumstances where coal volumes along the West Moreton System are forecast to increase to record coal tonnage levels during DAU3.

Total coal railings in 2022-23 in the West Moreton System for AU2 were 2.2 million tonnes per annum (**Mtpa).** The forecast for Queensland Rail's Access Undertaking 1 (**AU1**) was 6.25Mtpa. This contrasts with the higher forecast coal volumes for DAU3 which are expected to ramp up to 9.6Mtpa during the DAU3 period as shown in **Table 1** below.

Table 1: West Moreton System Coal Tonnages by Financial Year (Mtpa)

	2025-26	2026-27	2027-28	2028-29	2029-30
Annual Throughput	8.2	9.5	9.6	9.6	9.6

1.5 Structure of submission

This Explanatory Document supports Queensland Rail's DAU3, which has been submitted to the QCA for approval. This Explanatory Document sets out the rationale for the proposed changes Queensland Rail has put forward in DAU3. It is structured as follows:

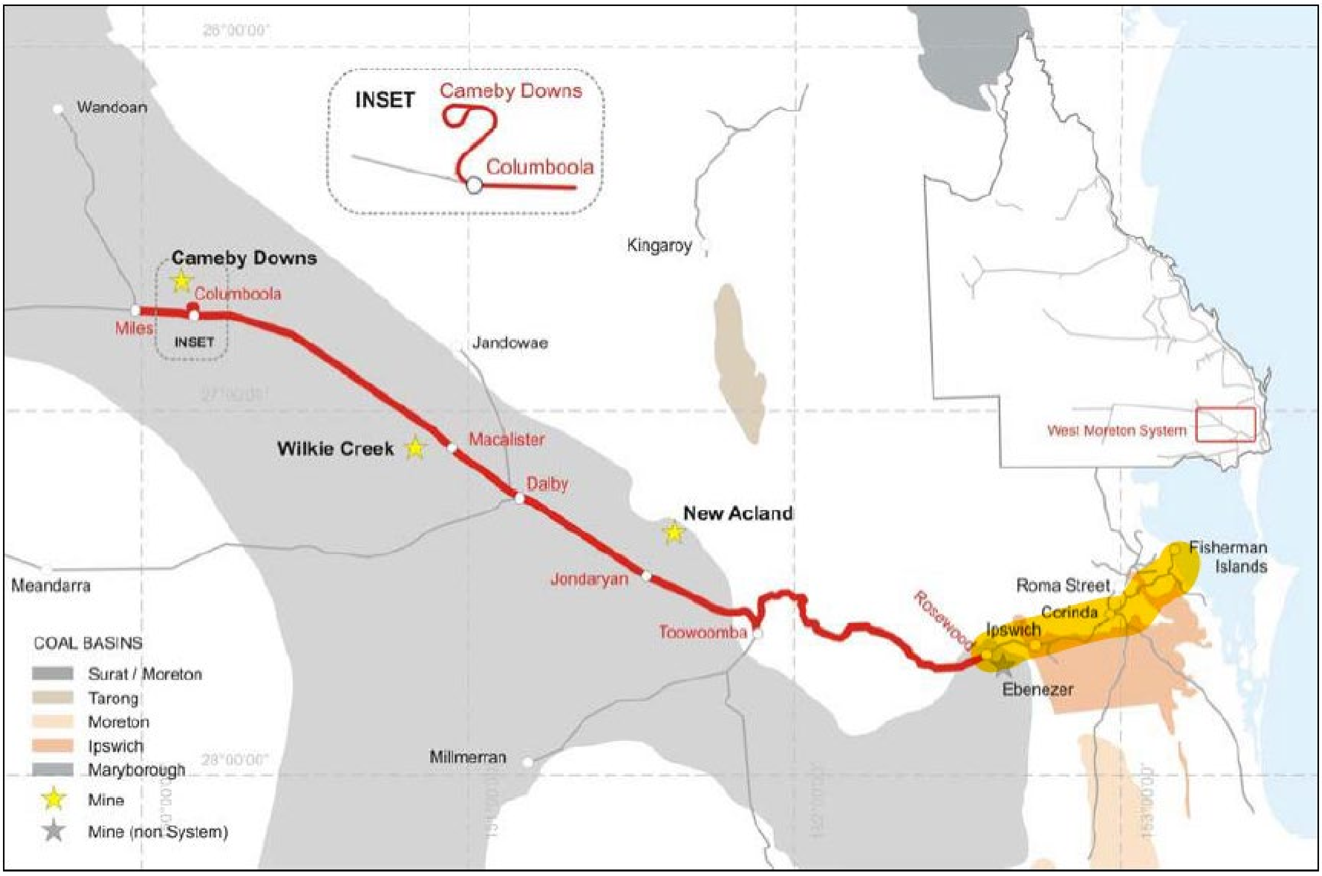
- **Section 1** discusses the characteristics of Queensland Rail's network the regulatory regime applicable to it and Queensland Rail's approach to DAU3.
- **Section 2** discusses the proposed reference tariffs for coal services on the West Moreton System, including the methodology Queensland Rail has used to develop these tariffs.
- **Section 3** discusses the proposed reference tariffs for coal services on the Metropolitan System, including the methodology Queensland Rail has used to develop these tariffs.
- **Section 4** discusses proposed other non-reference tariff specific changes.
- **Attachment 1**: HoustonKemp Economists Expert Report on WACC.
- **Attachment 2**: Queensland Rail's Detailed West Moreton System DAU3 Capital Expenditure Submission.
- **Attachment 3**: AECOM Engineer's Expert Peer Review of Queensland Rail's West Moreton System Capital Investment Plan for DAU3 (2025 26 to 2029 30).
- **Attachment 4**: AME Expert Report - Coal Throughput Analysis.
- **Attachment 5**: HoustonKemp Expert Report - Regulatory Treatment of Coal Related Assets.
- **Attachment 6**: Queensland Rail's Detailed West Moreton System DAU3 Maintenance Expenditure Submission.
- **Attachment 7:** AECOM Engineer's Expert Peer Review of Queensland Rail's West Moreton System Maintenance Investment Plan for DAU3 (2025 26 to 2029 30).
- **Attachment 8**: Example of the UT3 (2008AU) QCA Quarterly Report.
- **Attachment 9**: Example of the AU2 QCA Quarterly Report.

2. West Moreton System Reference Tariff

2.1 Introduction

Coal carrying train services traverse Queensland Rail's West Moreton System, which spans approximately 321 route kilometres from Rosewood to Miles, and through the Metropolitan System[2] along approximately 80 route kilometres from Rosewood to the Port of Brisbane (Fisherman Islands). Both the West Moreton System and the Metropolitan System have QCA approved reference tariffs for coal carrying train services.

Figure 2: Map of Miles to the Port of Brisbane



2.1.1 The West Moreton System history and characteristics

Historically the West Moreton System catered for passenger, livestock, freight and agricultural products (e.g. grain and cotton) with the first section of railway line in Queensland, between Ipswich and Grandchester, opening in 1865 the railway reaching Toowoomba in 1867 and Roma in 1880.

While coal carrying train services commenced in 1982 from mines located just west of Ipswich (in the Metropolitan System), heavy haul coal railings began on the West Moreton System from the Wilkie Creek mine in 1994, with Macalister as the loading point. The Wilkie Creek mine ceased railing in 2013 during a

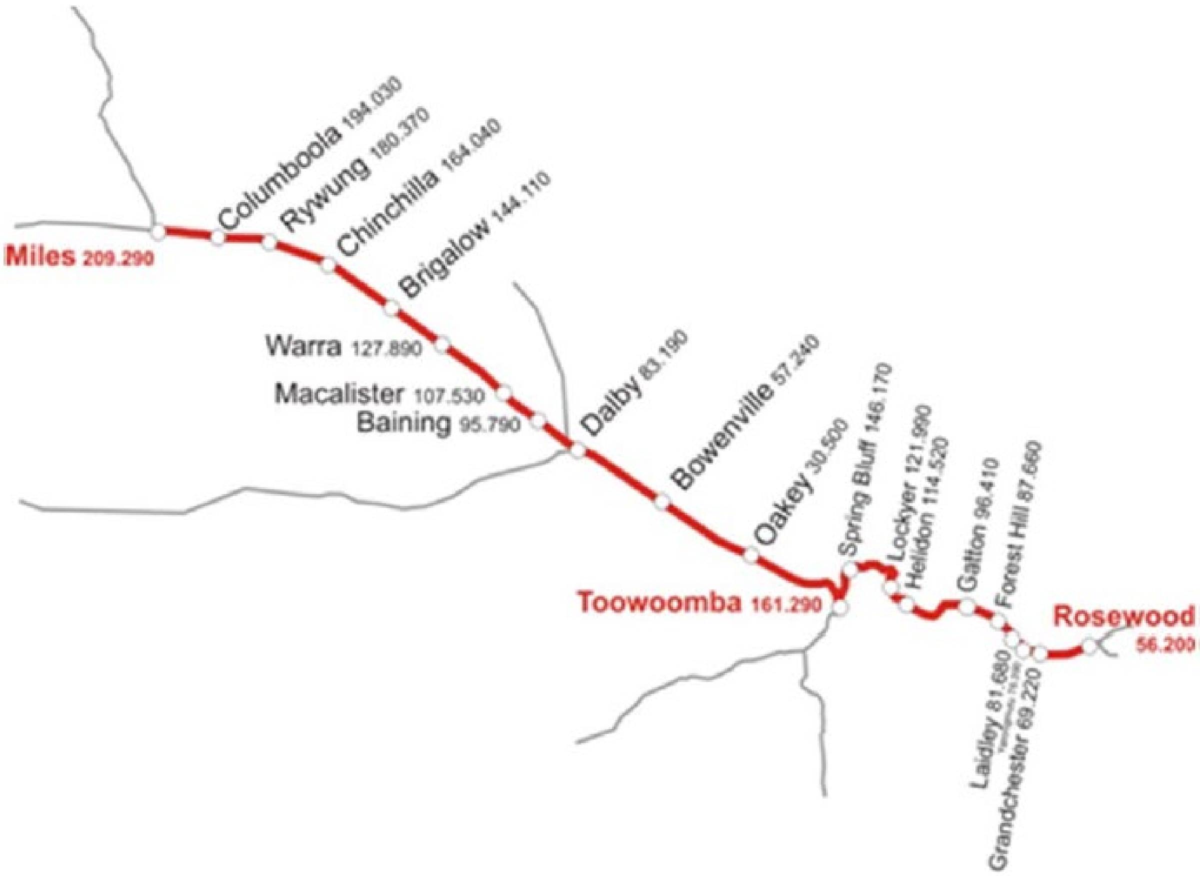
[2] The Metropolitan System means that part of the Network bounded to the north by (and including) Nambour station and to the west by (and including) Rosewood and including all branch lines comprised in that part of the Network. Coal trains travel on the System between Rosewood and the Port of Brisbane.

time of low international thermal coal prices but was reopened by New Wilkie Energy in 2023. Following the development of the New Acland mine, railings from Jondaryan commenced in 2002. The final Surat Basin mine utilising the West Moreton System, Cameby Downs, began operations in late 2010 transporting coal from Columboola.

The West Moreton System is unique as a coal system, with the Toowoomba Range section, originally constructed in the 1880s, and the majority of the railway from Rosewood to Columboola, being founded on expansive black clays which, if not addressed through effective maintenance and capital strategies at a time of increasing tonnages, will remain unstable requiring mitigation such as speed restrictions.

As the West Moreton System was initially designed to cater for non-coal traffics, this environment has meant that investment in infrastructure improvements, by both Queensland Rail and West Moreton System end-users, has been necessary to accommodate coal carrying train services. It also requires a substantial maintenance effort. Queensland Rail maintains fit for purpose maintenance and capital programs that take account of the West Moreton System's unique characteristics, and tonnage levels, ensuring a safe and reliable network.

Figure 3: Map of the West Moreton System



2.1.2 West Moreton System rail capacity

Current traffics on the West Moreton System include train services carrying thermal coal from the three mines, freight trains carrying grain (and sometimes livestock) and the Westlander long distance passenger services.

The Toowoomba Range is the capacity constraint on the West Moreton System, with a maximum capacity of 113 return train paths per week on average over a year. Of these, 14 return train paths per week are preserved for non-coal freight[3] and two return train paths per week are preserved for the Westlander[4]. The coal mines and their rail operators can contract up to 97 return train paths per week across the range (as these are not preserved) and can also run ad hoc train services for the remaining 16 return preserved paths (if they are not being used by freight and passenger train services).

The Metropolitan System is not capacity constrained and can accommodate the 113 train services as well as any coal or freight services that originate in the Metropolitan System and travel between Rosewood and the Port of Brisbane.

2.2 Development of the West Moreton System coal reference tariff

2.2.1 QCA Building Blocks approach

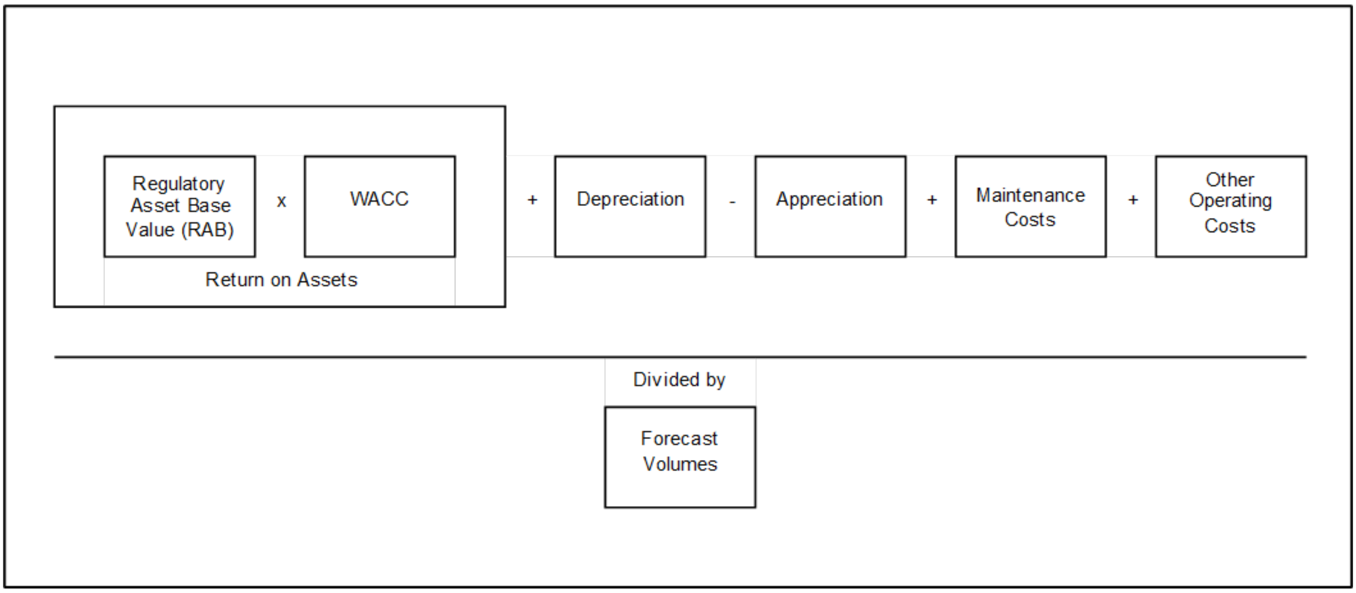
Reference tariffs are approved by the QCA for coal carrying services on both Queensland Rail's West Moreton System and the Metropolitan Systems, and for Aurizon Network's systems. Except for Queensland Rail's Metropolitan System coal reference tariff, these reference tariffs are calculated by the QCA through a 'building block' methodology where the QCA assesses the:

- Opening Asset Value for the System;
- Capital Expenditure over the period of the undertaking;
- Weighted Average Cost of Capital (**WACC**) (e.g. return on asset);
- Asset Depreciation;
- Asset Indexation (appreciation);
- Maintenance Costs;
- Other Operating Costs;
- Gamma Adjusted Tax Payable; and
- Coal tonnages during the access undertaking period (i.e. volumes).

The approved reference tariff is then derived as a function of the forecast or contract volumes for the regulatory period. The following diagram provides a high level summary outlining the calculation of a reference tariff:

[3] These train paths are preserved under section 266A of the *Transport Infrastructure Act 1994*.
[4] These train paths are preserved under section 266A of the *Transport Infrastructure Act 1994*.

Figure 4: Reference Tariff Build Up



2.2.2 History of coal reference tariff development – A 'Building Block' approach

Coal reference tariffs in Queensland were first developed in 2001 for the central Queensland Coal region (**CQCR**) as part of the QR Limited's access undertaking (**UT1**) based upon the 'building block' methodology.

Coal reference tariffs for the "Western System" (part of which is the West Moreton System) were first developed as part of QR Limited's second access undertaking (**UT2**), which was approved in 2006. In this instance, the reference tariffs were agreed with industry though the QCA approval process.

The QCA approved the West Moreton System coal reference tariffs using the building block methodology for the:

- 2008 Access Undertaking (30 June 2010).
- AU1 (11 October 2016).
- AU2 (1 July 2020).

Queensland Rail has continued using the building block methodology for the West Moreton reference tariff for DAU3. This provides business continuity and certainty for its customers.

Queensland Rail's current coal reference tariffs are summarised in **Table 2**.

Table 2: Queensland Rail coal reference tariffs (headline one-part) as at 1 July 2023

The West Moreton System and Metropolitan System Reference Tariffs		
Reference Tariffs	West Moreton System Ceiling Reference Tariff	\$42.24/000 gtk
	West Moreton System Incremental (Affordable Reference Tariff)	\$24.90/000 gtk
	Metropolitan System Reference Tariff	\$20.67/000 gtk

2.2.3 Derivation of the DAU2 West Moreton System coal reference tariff

The following sections of Part 2 of this Explanatory Document set out the derivation of the DAU2 West Moreton System coal reference tariff including:

- Coal Volumes [Part 3.6];
- Opening asset value – RAB [Part 3.7];
- WACC [Part 3.8];
- Capital expenditure [Part 3.9]:
- Accelerated Depreciation [Part 3.10];
- Appreciation [Part 3.11];
- Maintenance Expenditure [Part 3.12];
- Operational Expenditure [Part 3.13];
- Loss Capitalisation [Part 3.14];
- AU2 4.1Mtpa trigger - reference tariff reset [Part 3.15]; and
- The West Moreton System reference tariff [Part 3.16].

2.3 Summary - West Moreton System DAU3 reference tariff Inputs

Following is a summary of the reference tariff inputs with detailed explanations and the expert reports provided in the following sections.

Table 3: Summary - West Moreton System DAU3 reference tariff Inputs

Topic	Value	Comment
DAU3 Reference Tariff Strategy	N/A	The DAU3 Reference Tariff is a significant change from AU2. The forecast tonnage profile for DAU3 is 9.6Mtpa as compared to AU2's lower forecast of 2.1Mtpa. Queensland Rail and industry are experiencing a time of record forecast tonnages. Queensland Rail has proposed a West Moreton System capital and maintenance investment strategy that will reduce operational risk, optimise maintenance costs and increase the confidence of the supply chain to deliver the full record coal railing demand during DAU3. With a maximum of 9.6Mtpa expected over the DAU3 period, maintaining the system to enable efficient movement of services, minimising closures, and speed restrictions, will be critical. Customer requirements from the West Moreton System are primarily driven by: • Reliability – transit times that allow above rail operators to achieve efficient cycle time, increasing above rail capacity at a time where this is most needed; • Availability – minimal unplanned delays and manageable speed restrictions and

Topic	Value	Comment
		• Affordability – competitive rail supply chain price for services. Queensland Rail's capital and maintenance programs for DAU3 aim to meet the requirements of access holders by reasonably limiting the number of speed restrictions and section closures and therefore increase reliability with the aim of an associated throughput improvement which is required to be able to rail 9.6Mtpa.
Coal Volumes	**9.6Mtpa**	Record tonnages are forecast for the West Moreton System during DAU3 reaching 9.6Mtpa. This is based on expected contracted tonnages from the system's three operating mines: Cameby Downs, New Wilkie and New Acland (Stage 3). This compares to the 2.1Mtpa forecast that applied to DAU2.
Opening Regulatory Asset Base	**$446.2M** ($2025-26)	The DAU3 opening RAB value as at 1 July 2025 for the entire West Moreton network (including no-coal) is $535.2 million. The opening RAB value for coal services (and therefore the reference tariff RAB) after applying the QCA's cost allocation methodology to coal costs is projected to be $446.2 million as at 1 July 2025.
Weighted Average Cost of Capital (**WACC**)	**7.39%**	The Weighted Average Cost of Capital is 7.39%. International and domestic financial conditions have changed compared to those experienced when prices were set at the start of the AU2 period. As a consequence, the DAU3 coal reference tariff is being reset in an environment of noticeably higher interest rates and inflation, which has resulted in a material increase in the estimated benchmark WACC. Queensland Rail has set the DAU3 West Moreton System WACC based on the QCA's principles. The WACC estimate is consistent with both the regulatory precedent set in AU2 for Queensland Rail and the most recent guidance of the QCA's preferred methodology for estimating the WACC for regulated businesses in its July 2023 Rate of Return Review Report[5].
Capital Expenditure	**$346.9M** ($2025-26)	The West Moreton System proposed Capital expenditure is $346.9M excluding Interest During Construction. The West Moreton System is experiencing the highest level of forecast tonnages compared to previous access undertakings, with AU1 being based on a forecast of 6.25mtpa and AU2 having a forecast of 2.1mtpa. Queensland Rail's proposed capital expenditure is required to allow 9.6Mtpa to traverse the network by assisting to reduce operational risk, optimise maintenance costs and increase the confidence of the supply chain to deliver full coal railing demand.
Accelerated Depreciation Stranded Assets and Applying Equity Principles to Adjusted Asset Lives	**Asset lives of** • **19 years for existing assets; and**	Queensland Rail proposes to shorten the economic life for existing assets to a maximum of 19 years and shorten the economic life for future assets to a maximum of 14 years from the start of the DAU3 period. The economic life for new capital investment is proposed to be reduced further for each year of

[5] QCA's Rate of return review, Final Report, July 2023.

Topic	Value	Comment
	• **14 years for new assets**	the undertaking period that the expenditure occurs in, with existing and future assets to be fully written down by 30 June 2044. This approach will result in an equitable distribution of costs to the West Moreton System miners. The shorter accelerated depreciation period is equitable as it will ensure that all mines pay for the new assets required for the record 9.6Mtpa as it is mainly during a time when the New Acland Stage 3 mine will be operational. The longer period for existing assets will ensure the remaining mines continue paying for the service that they alone will be using. This provides an equitable relationship of the costs attributed to the individual mines which protects the legitimate business interests of Queensland Rail's customers. While being an equitable distribution of costs to the West Moreton System miners, the shorter economic lives of assets will mitigate Queensland Rail's stranding risk. The QCA indicated in its Final Decision on AU2 that it will consider accepting an appropriate accelerated depreciation profile stating: *"Our decision is to not implement accelerated depreciation as part of this DAU process; however, we would be amenable to accepting an appropriate accelerated depreciation profile, should Queensland Rail propose it as part of a DAAU. We consider that an appropriate accelerated depreciation profile would likely be sufficient to address the longer-term stranding risks that West Moreton coal faces."* The environment for thermal coal is changing. Economic experts HoustonKemp advise that the transition towards a net zero carbon emissions future means that global production of thermal coal is likely to decline significantly over the next 20 to 30 years. The misalignment between technical life and remaining life of coal mines on the West Moreton System creates stranded asset risk for Queensland Rail. In other words, Queensland Rail is at risk of not being able to recover its efficient investments on the West Moreton System. Accelerated depreciation assists to mitigate this stranding risk.
Appreciation	N/A	The RAB is escalated by inflation. Queensland Rail's economic advisors HoustonKemp have recommended 3% for annual increases for the next five years up to and including DAU3, with 2.5% for the final two years of DAU3 period.
Maintenance Expenditure	**$172.5M** ($2025-26)	Queensland Rail has proposed a maintenance allowance of $172.5M (or the West Moreton System over the DAU3 period. The program seeks to maximise West Moreton supply chain efficiency and deliver safety, reliability, and availability to its customers.
Operational Expenditure	**85.3M** ($2025-26)	Proposed West Moreton System operating expenses are $85.3M. Queensland Rail has proposed operating expenditure includes allowances for the direct costs of train control, management and infrastructure administration expenses, corporate

Topic	Value	Comment
		overhead (enabling governance), and a return on buildings, plant, software, and inventory.
West Moreton System Reference Tariff (headline one-part)	**$32.63/000 gtk** ($2025-26)	This compares to the current AU2 ceiling reference tariff of $44.82/000 gtk (the Reference Tariff that would be charged in AU2 at the 2.1mtpa system tonnage level, but for the establishment of an incremental (affordable) Reference Tariff and a loss capitalisation account to reflect the difference between the two).

Note: Queensland Rail notes that the cost of labour and materials in the rail/construction industry is growing at a higher rate than the underlying forward inflation projection and may be updated during the process.

2.4 Coal volumes

AU3 Coal volume summary – 9.6Mtpa

Queensland Rail forecasts that the West Moreton System coal volumes will reach a record 9.6Mtpa during the Term of DAU3.

2.4.1 Volume forecasts - Contracted up to 9.6Mtpa

Queensland Rail forecasts that West Moreton System coal volumes will build up to a total of 9.6Mtpa during the course of DAU3. This estimate is based on Queensland Rail's acceptance of the advice from the West Moreton System miners i.e. Yancoal (Cameby Downs mine), New Wilkie Energy (New Wilkie mine) and New Hope (New Acland Stage 3 mine) of volumes they wish to contract and/or renew.

Cameby Downs Coal Mine

The Cameby Downs mine, operated by Yancoal, underwent a mine expansion in 2021 - 2022 [redacted] Railings from Cameby Downs are [redacted] for the duration of DAU3.

New Wilkie Coal Mine

[redacted] and the first coal train operated out of the reinstated Macalister siding on 20 July 2023. Railings from Macalister siding are expected to [redacted]

New Acland Stage 3 Coal Mine

The New Acland Stage 3 project has now obtained all final approvals to develop and operate the mine. However, the Oakey Coal Action Alliance (**OCAA**) is appealing the decision of the Queensland Government to grant New Acland Coal a water licence. The water licence appeal is scheduled for early 2024 with a decision likely in mid-2024.

[redacted]

[redacted] First railings from the New Acland Stage 3 development occurred on 16 October 2023 with the coal train being loaded on the company's private rail siding at Jondaryan.

Assuming that the appeal against the water licence is not successful, it is envisaged that New Acland Coal [redacted] The New Acland Stage 3 project has an environmental condition that requires it to construct a spur and balloon loop to the mine site to remove coal haulage trucks from local roads.

Table 4 below provides details on the assumed contracted West Moreton coal capacity during the course of AU3.

Table 4: West Moreton System Coal Contracts

Mine	Access Agreement	Contract Capacity During AU3	Expiry Date
Cameby Downs	[redacted]		
Wilkie Creek			
New Acland Stage 3[6]			

[6] Assumes that New Acland Coal is successful with the legal proceedings brought against it by OCAA [redacted]

The forecast West Moreton System coal tonnage ramp-up and contracted capacity (including the 2024 New Acland Coal Access Agreement capacity) is shown in **Figure 5** below.

Figure 5: Contracted and Forecast West Moreton Coal Tonnages

Contracted and Forecast West Moreton Coal Tonnages during Remainder of AU2 and AU3

[redacted]

All of the above mines have lives extending well beyond the expiry of DAU3 (i.e. 30 June 2030) and the assumption is that all of the access agreements that expire during AU3 will be recontracted at the contracted capacity at the time. Therefore, the forecast West Moreton coal system tonnage, which is assumed for DAU3 planning purposes increases from 7.4Mtpa at 1 July 2025 (i.e. following expiry of AU2) to 9.6Mtpa by October 2026, and remains at this level until 30 June 2030 (i.e. at the expiry of DAU3).

The annual West Moreton System coal tonnages are provided below in **Table 5** by financial year.

Table 5: West Moreton System Coal Tonnages by Financial Year (Mtpa)

	2025/26	2026/27	2027/28	2028/29	2029/30
Annual Throughput	8.2	9.5	9.6	9.6	9.6

2.5 DAU3 Opening Regulatory Asset Base (RAB)

2.5.1 Capital investment in the West Moreton System

Summary: DAU3 opening coal RAB value is $446.2 million (at 1 July 2025)

The DAU3 opening RAB value has been calculated in accordance with QCA precedence and QCA current practices. The opening RAB has been estimated based upon the following:

- **an opening AU2 common network asset value of $374.4 million as at 1 July 2020;**
- **$14.5 million related to coal only sidings/balloon loop as at 1 July 2020;**
- **for 2020-21 and 2021-22, capital expenditure as assessed and approved by the QCA;**
- **for 2022-23 to 2024-25, capital expenditure as per the AU2 Capital Indicator; and**
- **applied corresponding inflation and depreciation amounts.**

The resulting DAU3 opening RAB value as at 1 July 2025 for the entire West Moreton network is $535.2 million.

Applying the QCA approved allocations to the coal network results in a DAU3 opening RAB value of $446.2 million as at 1 July 2025.

Queensland Rail's RAB is made up of the assets required for the efficient provision of access to the declared service.

Originally based on a 2013 Depreciated Optimised Return on Capital (**DORC**) valuation, the RAB value is rolled forward each year at CPI escalation, depreciated, and the value of prudent capital investments, approved by the QCA as part of its ex-post annual capital approvals process.

2.5.2 West Moreton System common network and coal specific assets

In August 2021, as part of the 2019-20 West Moreton RAB roll forward process, the QCA confirmed (via letter) its agreement with an AU2 opening RAB value of $388.9 million for the entire West Moreton network between Columboola and Rosewood. This comprised of a common network value of $374.4 million and a coal only sidings/balloon loop value of $14.5 million.

In determining a coal allocated network value for DAU3, Queensland Rail has continued to apply the same train path allocations between coal and non-coal services adopted in AU2 to their respective asset groups. More specifically this is 97/137 for pre-1995 common network assets, 97/113 for post-1995 common network assets and 1/1 for coal specific assets.

2.5.3 AU2 Capital Indicator and RAB Roll Forward

AU2 included an estimate of the capital expenditure (the AU2 Capital Indicator) likely to be spent over the period 1 July 2020 to 30 June 2025 as approved by the QCA.

Clause 1.3, Schedule E of AU2 requires Queensland Rail to submit an annual report to the QCA regarding the capital expenditure Queensland Rail considers should be added to the RAB (roll forward). Submission of annual Capital Expenditure Reports during the term and the subsequent approval process by the QCA progresses estimated capital expenditure (as per the AU2 Capital Indicator) to actual capital expenditure to be added to the RAB. If Queensland Rail has spent more on capital, than for example allocated to AU2 in the Capital Indicator, then it will recover this in subsequent undertakings, or if it has underspent, it will be required to refund the relevant portion of access charges as approved for the next undertaking term.

The 2020-21 and 2021-22 Capital Expenditure Reports have already been assessed and approved by the QCA. However, as considerable time remains until AU2 expires on 30 June 2025, Queensland Rail has assumed for the purposes of estimating the DAU3 opening RAB value that it will meet its capital expenditure estimates (as per the AU2 Capital Indicator) for the remaining years of AU2.

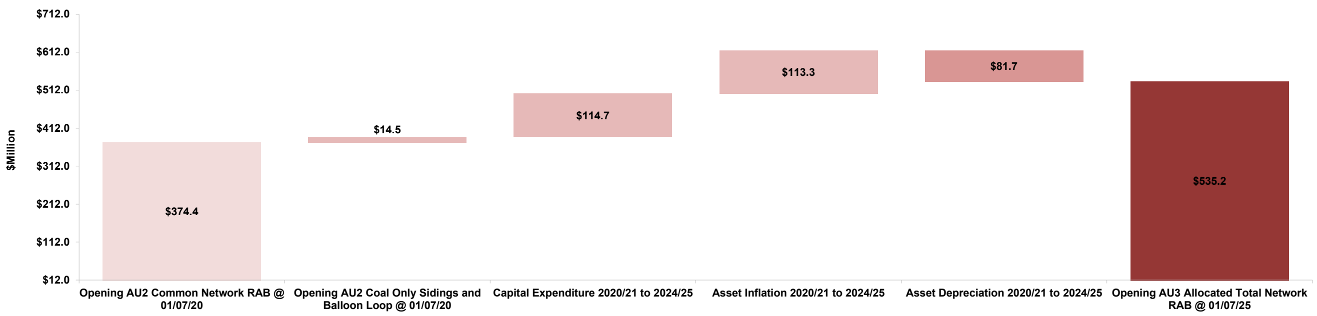
2.5.4 Calculation of DAU3 opening RAB value

The DAU3 opening RAB value has been estimated as follows:

- started with the opening AU2 common network asset value of $374.4 million as at 1 July 2020;
- added $14.5 million related to coal only sidings/balloon loop as at 1 July 2020;
- added, for 2020-21 and 2021-22, capital expenditure as assessed and approved by the QCA;
- added, for 2022-23 to 2024-25, capital expenditure as per the AU2 Capital Indicator; and
- applied corresponding inflation and depreciation amounts.

The resulting DAU3 opening RAB value as at 1 July 2025 for the entire West Moreton network is $535.2 million. See **Figure 6** below.

Figure 6: Waterfall of West Moreton RAB from AU2 to DAU3



The parameters for the calculation are summarised in **Table 6** below.

Table 6: RAB Parameters

Parameter Method	
CPI Indexation	The AU2 RAB is rolled-forward each year and escalated in line with actual inflation: 2020-21—4.93% 2021-22—7.30% 2022-23—6.33% For 2023-24 and 2024-25, the RAB has been rolled forward using a forecast inflation rate of 3.0%, the geometric mean of 2023-24 to 2027-28 following the QCA's inflation forecasting approach.
Depreciation	Consistent with the approach applied in the QCA's AU2 Final Decision, straight line depreciation based on detailed QCA regulatory asset class lives for already approved RAB assets and a 35-year weighted average life for 2022-23 to 2024-25 capital expenditure.
Capital Expenditure	Capital expenditure has been included as approved by the QCA for 2020-21 and 2021-22 with 2022-23 to 2024-25 as per the AU2 Capital Indicator. 2022-23 to 2024-25 capital expenditure will be subject to prudency assessments as part of the capital expenditure claim process.

Table 7: Asset Roll Forward—Rosewood to Columboola

$000's	2020-21	2021-22	2022-23	2023-24	2024-25
Opening asset value	388,912	419,083	469,185	506,476	521,000
Capex	23,582	33,348	23,595	16,937	17,242
Inflationary gain	19,746	31,783	30,450	15,446	15,887
Less Depreciation	(13,157)	(15,029)	(16,754)	(17,860)	(18,899)
Closing asset value	419,083	469,185	506,476	521,000	535,230

2.5.5 Calculation of coal allocated network DAU3 opening RAB value

The RAB value used to determine West Moreton System reference tariffs is a combination of an allocation of the common network value and the value of all coal specific assets.

The allocations used to determine the coal allocated network RAB value remain unchanged from those approved in AU2 and are presented in **Table 8**.

Table 8: Assets/Asset Allocators

	Proportion	Percentage
Pre-1995 Common Network	97/137	70.8%
Post 1995 Common Network	97/113	85.8%
Coal Specific	1/1	100.0%

Applying these allocations produces a coal allocated network DAU3 opening RAB value of $446.2 million as at 1 July 2025.

2.6 Weighted Average Cost of Capital (WACC)

Summary: Estimated WACC is 7.39%

WACC Bottom up and top-down adjusted WACC for DAU3 as at 30 April 2023 is 7.39%. Queensland Rail followed the QCA AU2 decision as well as the QCA's Rate of return review, Final Report, July 2023 in determining this rate.

Parameter	DAU3 Estimate
Credit rating	BBB
Risk free rate	3.37%
MRP	6.50%
Asset beta	0.48
Gearing	40%
Corporate tax rate	30%
Gamma	0.484
Equity beta	0.71
Debt beta	0.12
Cost of equity	8.02%
Debt margin (incl. refinancing and uplift)	n/a
Debt financing cost	0.10%
Cost of debt	4.95%
Bottom-up WACC	6.79%
Plus Top-down adjustment (1.5% to the debt margin)	0.60%
WACC after top-down adjustment	**7.39%**

Prevailing international and domestic financial conditions are tighter than those experienced when prices were set at the start of the last AU2 period. As a consequence, the DAU3 coal reference tariff is being reset in an environment of noticeably higher interest rates and inflation, which has resulted in a material increase in the estimated benchmark WACC.

Queensland Rail QCA precedent and practice, which is why Queensland Rail has adopted a WACC estimate that is consistent with both the regulatory precedent set in AU2 for Queensland Rail and the most recent guidance of the QCAs preferred methodology for estimating the WACC for regulated businesses.[7]

For its proposal, Queensland Rail has adopted the indicative DAU3 WACC estimated by HoustonKemp (refer to **Attachment 1**) using the QCA's new preferred WACC methodology, and updated time variant parameters (e.g. risk free rate and cost of debt). HoustonKemp's estimated bottom-up WACC for Queensland Rail is otherwise consistent with the AU2 final decision.[8]

Queensland Rail has also accepted HoustonKemp's top-down adjustment to this WACC estimate, which was applied using a methodology from AU2 to provide an uplift to the cost of debt to account for Queensland Rail's specific regulatory and commercial risks.

[7] QCA's Rate of return review, Final Report, July 2023.
[8] QCA, *Queensland Rail 2020 draft access undertaking* | *Decision*, February 2020, pp 33.

The parameters making up Queensland Rail's WACC are shown alongside the AU2 parameters in **Table 9** below. These indicative values are estimated for the period ending 30 April 2023 and would apply to assets in the West Moreton System.

Table 9: Bottom up and top-down adjusted WACC assessments from AU2 and for DAU3 as at 30 April 2023

Parameter	AU2	DAU3 estimate
Credit rating	BBB	BBB
Risk free rate	1.18%	3.37%
MRP	6.50%	6.50%
Asset beta	0.5	0.48
Gearing	40%	40%
Corporate tax rate	30%	30%
Gamma	0.484	0.484
Equity beta	0.71	0.71
Debt beta	0.12	0.12
Cost of equity	5.82%	8.02%
Debt margin (incl. refinancing and uplift)	3.74%*	n/a
Debt financing cost	n/a	0.10%
Cost of debt	4.92%*	4.95%
Bottom-up WACC	**5.46%**	**6.79%**
Top-down adjustment (1.5% to the debt margin)	n/a	0.60%
WACC after top-down adjustment	**5.46%**	**7.39%**

Source: QCA, Queensland Rail 2020 draft access undertaking | Decision, February 2020, p 33; HoustonKemp analysis.
**Note: Debt financing costs and the cost of debt for AU2 include the effect of an adjustment so that they are not based off a benchmark business with a BBB credit rating, but instead a business that has a BBB credit rating, and additional risks.*

Between the AU2 and the DAU3, the WACC has increased from 5.46 per cent to 7.39 per cent, i.e., an increase of 193 basis points. A key driver of this change is a 219 basis point increase in the market driven risk free rate, which contributed 113 per cent of the estimated increase in the WACC. The increase to the WACC from the change in the risk free rate was in part mitigated by Queensland Rail's decision to:

- adopt the QCA's preferred approach of immediately adopting a trailing average 10-year cost of debt; and
- to accept HoustonKemp's re-estimation of the required risk adjustment for volume risk on the West Moreton System, with the updated estimate reducing the uplift to the benchmark cost of debt, from 160 basis points to 150 basis points, (as discussed in section 2.6.1).

2.6.1 Consistency in bottom-up approach with QCA's preferred approach

Determining an appropriate bottom-up estimate of the WACC is critical to the development of DAU3. Notably, the QCA has updated its preferred methodology for calculating a bottom-up WACC since Queensland Rail's AU2.

Of the changes to the preferred methodology, the most significant as compared to the methodology applied in the AU2, were the statements that the QCA prefers:

- the immediate adoption of a trailing average 10-year cost of debt, which at the time would give rise to a return on debt that is substantially higher than the on-the-day approach;[9] and
- the use of a market risk premium (MRP) based on an arithmetic average of excess returns on the market portfolio since 1958, which the QCA most recently estimated as equal to 6.5 per cent, with no weight to be placed on other estimates of the MRP including geometric average historical excess returns, the Wright approach, surveys of market practitioners or the dividend growth models.[10]

Queensland Rail has sought to be consistent with the QCA's new preferred approach, and has adopted a bottom-up WACC estimate that HoustonKemp has calculated by:

- adopting the QCA's new preferred methodology in full;
- maintaining parameters specific to Queensland Rail from the AU2, including:
  - the benchmark equity beta;
  - the benchmark gearing ratio;
  - the benchmark credit rating; and
- updating the time variant parameters, noting that the resulting indicative WACC reflects the market conditions for the period in April 2023 and will need to be updated closer to the start of DAU3.

Note that the decision to maintain the benchmark equity beta from AU2, rather than maintaining the asset beta, is consistent with the advice from HoustonKemp that:[11]

> *"… we do not expect a change in the QCA's approach to delivering and levering to result in a change in Queensland Rail's approved equity beta. Consequently, we retain the equity beta of 0.71 from the QCA's determination for Queensland Rail in AU2 and backsolve for its asset beta, by which we get an asset beta of 0.48."*

[9] QCA, *Rate of return review Final report*, November 2021, p 39.
[10] QCA, *Rate of return review | Final report*, November 2021, p 61.
[11] HoustonKemp, *Queensland Rail's Weighted Average Cost of Capital*, August 2023, p 9.

Estimates of the parameters in this WACC estimate for the West Moreton line over the period ending 30 April 2023 are summarised in **Table 10** below.

Table 10: Bottom up WACC assessment as at 30 April 2023

Parameter	AU2	DAU3 estimate
Credit rating	BBB	BBB
Risk free rate	1.18%	3.37%
MRP	6.50%	6.50%
Asset beta	0.5	0.48
Gearing	40%	40%
Corporate tax rate	30%	30%
Gamma	0.484	0.484
Equity beta	0.71	0.71
Debt beta	0.12	0.12
Cost of equity	5.82%	8.02%
Debt margin (incl. refinancing and uplift)	3.74%*	n/a
Debt financing cost	n/a	0.10%
Cost of debt	4.92%*	4.95%
Bottom-up WACC	**5.46%**	**6.79%**

Source: HoustonKemp analysis.

Queensland Rail observes that:

- the cost of debt increases from the AU2 by only three basis points, despite risk free rate increasing by 219 basis points. This is because:
  - the AU2 cost of debt included a 160-basis point uplift to account for Queensland Rail's regulatory and commercial risk, while the DAU3 cost of debt does not include this, so if the AU2 cost of debt had not included this uplift, there would have been a 163-basis point increase in the cost of debt; and
  - the AU2 cost of debt was calculated using a 20-day trailing average, while the DAU3 cost of debt was calculated using a 10-year trailing average, meaning that while the cost of debt did increase, the effect was not as evident as it may otherwise be; and
- the risk-free rate increased from AU2 by 219 basis points, which has the effect of increasing both the cost of equity (which increased by 220 basis points) and the cost of debt (which increased by 163 basis points when excluding the uplift of 160 basis points).

The increase in the risk-free rate, which is determined by the broader financial market and reported by the Reserve Bank of Australia, is the main driving factor of the increase in the WACC.

Queensland Rail also adopts HoustonKemp's estimates of inflation, which were developed to be consistent with the QCA's preferred methodology. These estimates are 3.00 per cent for the five-year period ending 30 June 2028 and 2.50 per cent for the years 2028/29 and 2029/30.

2.6.2 Adjustments for risk

In AU2, the QCA accounted for Queensland Rail's regulatory and commercial risks associated with volume uncertainty on the West Moreton line by uplifting the cost of debt by the difference between a US BBB-rated corporate bond (that of a benchmark efficient firm) and a US BB-rated corporate bond (which the QCA said is a lower bound approximation for the increased risk of West Moreton coal).[12]

However, the QCA's new preferred methodology states that it will now consider if the broader WACC estimate is reasonable given risks faced by the firm, and where the QCA does not think the WACC is reasonable, the QCA will make a top-down adjustment.[13]

Queensland Rail still faces the same volume uncertainty on the West Moreton line that it faced in the AU2, and so there remains a need for an uplift to the benchmark bottom-up WACC. For example, contracts will require resigning during DAU3's term. Queensland Rail's position is that the top-down adjustment should be consistent with the QCA's AU2 decision. Consequently, Queensland Rail has taken HoustonKemp's advice to use an updated estimate of the method used in the AU2 to determine the required risk adjustment.

Specifically, HoustonKemp has calculated the margin of difference between US BBB and BB corporate stocks to find a debt risk premium adjustment of 1.5 percentage points, which converts to a top-down WACC adjustment of 0.6 percentage points.[14]

The top-down adjusted WACC estimate of Queensland Rail's WACC for the West Moreton line for the period ending 30 April 2023 in presented in **Table 11** below.

Table 11: Top-down adjusted WACC assessment as at 30 April 2023

Parameter	Estimate
Bottom-up WACC	6.79%
Top-down adjustment (1.5% to the debt margin)	0.60%
WACC after top-down adjustment	**7.39%**

Source: HoustonKemp analysis.

[12] QCA, *Queensland Rail 2020 draft access undertaking | Decision*, February 2020, pp 41, 43-45.
[13] QCA, *Rate of return review, Final report*, November 2021, pp 18-19.
[14] HoustonKemp, *Queensland Rail's Weighted Average Cost of Capital*, August 2023, p 13.

2.7 Capital expenditure

Summary – Forecast DAU3 Capital Expenditure: $346.9M ($FY2025-26) excluding Interest During Construction (IDC)

The West Moreton System's historical origins present continuing challenges for its operation. The West Moreton System was initially constructed on black soil plains with no engineered formation; resulting in regular failures requiring reconstruction to ensure suitable track geometry is maintained.

Queensland Rail and the West Moreton System mines have been investing in the network over time to increase its reliability. However, DAU3 is being developed at a time of record forecast tonnages of 9.6Mtpa. The system faces 30mm rainfall events that close the Toowoomba Range and extreme heat from mid-November to mid-March which results in temporary speed restrictions and the closure of the track.

These result in a decrease in above rail throughput at a time where maximum above rail throughput is required and impedes Queensland Rail's below rail network's ability to carry 9.6Mtpa.

To address the risk that the full forecast volume for DAU3 does not eventuate, or remain at the 9.6mtpa (i.e. because New Acland is not successful in defending the appeal, contracts are not renewed, mines cease to operate or do not achieve planned capacity, unavailability of haulage services or for any other reason), Queensland Rail has included in DAU3 triggers permitting Queensland Rail and the QCA to seek a reference tariff reset during the term of AU3 each time a contract is up for renewal if it is not renewed.

Queensland Rail's DAU3 investment strategy is to reduce operational risk, reduce maintenance costs and increase confidence of the supply chain to deliver full coal railing demand at an efficient cost.

Queensland Rail's investment strategy targets planned capital investment east of Macalister due to a peak system volume of 9.6Mtpa in FY27. The investment strategy considers the timing of projects within the shared corridor as critical in the near term to reduce the risk of taking possessions for track upgrades at a time when maximum railings are required.

The West Moreton System's historical origins present continuing challenges for its operation. The West Moreton System was initially constructed on black soil plains with no engineered formation; resulting in regular failures requiring reconstruction to ensure suitable track geometry is maintained.

Early track standards have resulted in an alignment that is lower than contemporary standards for stand-alone heavy haul railway built specifically for coal carrying services. As a consequence of the network's age and track standard, the section between Rosewood and Miles in particular requires a higher level of intervention than would be required for a more modern, stand-alone heavy haul railway in order to deliver contracted tonnages safely and reliably. The age and history of the West Moreton System has an impact on the condition and fitness for purpose of the network.

The Macalister to Columboola section of the network is predominately comprised of 41kg/m rail on timber sleepers on non-engineered track formation. This track is susceptible to track misalignment or buckling at high temperatures with the potential consequence of a train derailment. To address the derailment risk, Queensland Rail's control is to slow the trains down and potentially suspend operation on the network as the temperature increases. This action increases above rail transit times and reduces supply chain capacity. Treating it will enable greater above rail at a time where this is a material factor.

The West Moreton Summer Heat Restrictions apply from mid-November to mid-March and all trains on the Malu (near Jondaryan) to Miles (near Columboola) section are slowed to a maximum of 40kph at temperatures equal or greater than 32°C and are being stopped at all temperatures equal or greater than 35°C. In general train movements during summer are planned to run within the lower temperature window of night and early morning from 1900hrs to 1000hrs from the further western mines. From 1 October 2022 until 26 September 2023 heat restrictions were applied in the West Moreton System on 72 days over the summer period.

Reducing the maximum track speed from 60kph to 40kph increases the transit time between Macalister and Columboola and return by 8 hours, which increases the overall cycle time to the Port of Brisbane by approximately 30%. This reduces the above rail capacity by a similar amount, which puts overall supply chain capacity at risk during the summer months. Improvement in this capacity consumption is essential. If appropriate investment is not undertaken during the AU3 Term, the full forecast 9.6Mtpa will not be able to be railed.

The West Moreton System is experiencing the highest level of forecast tonnages compared to previous access undertakings, with AU1 being based on a forecast of 6.25mtpa and AU2 having a forecast of 2.1mtpa. Queensland Rail's proposed capital expenditure is required to allow 9.6Mtpa to traverse the network by assisting to reduce operational risk, optimise maintenance costs and increase the confidence of the supply chain to deliver full coal railing demand.

For the DAU3 period, Queensland Rail has proposed efficient capital costs for the West Moreton System having regard to the age and condition of the network, and the volumes proposed to be hauled over a network that was not originally designed for this purpose.

Queensland Rail's DAU3 investment strategy is to reduce operational risk, optimise maintenance costs and increase confidence in the supply chain to deliver full coal railing demand. In both AU1 and AU2, track age and condition were considered for both the capital and maintenance programs. Queensland Rail has been slowly improving the quality of the track through its capital program, however, there are still issues associated with the age of the network that are affecting the delivery of services.

Queensland Rail's proposed West Moreton System capital expenditure allowance for the five-year DAU3 term is **$346.9M** ($FY2025-26) excluding Interest During Construction (**IDC**).

Attachment 2 – Queensland Rail's *West Moreton System DAU2 Capital Expenditure 2025-26 to 2029-30* submission provides the full detail for Queensland Rail's capital expenditure program.

2.7.1 Asset programs

The primary asset strengthening and resilience programs that are targeted in the capital plan include:

- Formation strengthening of the remaining black soil sections;
- Toowoomba Range slope stabilisation works for high-risk embankments;
- Track reconditioning to 50kg rail on concrete sleepers east of Macalister mine;
- Timber pier and bridge eliminations east of Jondaryan mine; and
- Toowoomba Range track strengthening at curve transitions.

These programs are targeted at increasing resilience, addressing asset failure risks and reducing current operational restrictions that limit the confidence that the required capacity can be maintained, including:

- 30mm rainfall events that currently require closure of the Toowoomba Range;

- Heat restrictions on light track and black soil sections that currently require onerous speed restrictions and closure periods during the summer season to prevent the track buckling under trains; and
- 60kph speed limit on loaded coal trains (normal speed 80kph).

The investment strategy targets planned capital investment east of Macalister in view of peak system volumes in FY2026-2027 and FY2027-2028. It considers the timing of projects within the shared corridor as critical in the near term to reduce the risk of taking possessions for track upgrades at a time when maximum railings are required.

While shared corridor works (east of Macalister) are accelerated in the near term, the largest pipeline program in the outer years (west of Macalister), being tack reconditioning between Macalister and Columboola, has also been brought forward under the strategy for targeted spend within the DAU3 period.

Queensland Rail has included the capital expenditure projects identified in this submission in the capital indicator for DAU3.

2.7.2 Capital expenditure by line

Table 12: Proposed capital expenditure by year and corridor ($FY2025-26 million), excluding IDC

Corridor	2025-26	2026-27	2027-28	2028-29	2029-30	Total
Rosewood—Jondaryan	$66.6	$70.0	$10.1	$15.4	$7.5	**$169.6**
Jondaryan—Macalister	$32.4	$33.9	$11.1	$9.5	$3.2	**$90.2**
Macalister - Columboola	$6.9	-	$21.7	$24.4	$33.9	**$87.0**
Total	**$105.9**	**$104.0**	**$43.0**	**$49.3**	**$44.6**	**$346.9**

2.7.3 Capital expenditure by project and year

Queensland Rail has proposed 20 capital expenditure projects [redacted] for the West Moreton System over the DAU3 period. The proposed capital forecast for FY2025-26 to FY2029-30 (the DAU3 period), excluding Interest During Construction (IDC) is $346.9M ($FY2025-26) to support the movement of 9.6Mtpa.

Table 13 sets out the proposed capital expenditure projects by year for the DAU3 period ($FY2025-26). **Table 14** sets out the proposed capital expenditure by year and project ($FY2025-26).

Table 13: Proposed DAU3 capital expenditure by project ($FY2025-26 million), excluding IDC

Project Name	Tonnage dependent	Regulatory driver	Total
Civil projects			
Slope Stabilisation	No	Level of Service	[redacted]
Culvert Renewals	No	Asset Renewal	[redacted]
Sub-total			**$40.4**
Track projects			
Reconditioning	Yes	Asset Renewal	[redacted]
Formation Strengthening	Yes	Asset Renewal	[redacted]
Curve Transitions	No	Asset Renewal	[redacted]
Re-sleepering	No	Asset Renewal	[redacted]
Re-railing	Yes	Asset Renewal	[redacted]
Level Crossing Transitions	No	Asset Renewal	[redacted]
Ballast Undercutting	Yes	Level of Service	[redacted]
Sub-total			**$224.7**
Signalling projects			
Signalling Cables	No	Asset Renewal	[redacted]
Digital Telemetry	No	Asset Renewal / Compliance	[redacted]
SER / PER Upgrade	No	Asset Renewal	[redacted]
LED Upgrade	No	Asset Renewal	[redacted]
Re-signalling	No	Asset Renewal	[redacted]
Interlocking Renewal	No	Asset Renewal	[redacted]
Sub-total			**$11.8**
Bridges			
[redacted] Replacement	No	Asset Renewal	$68.4

Project Name	Tonnage dependent	Regulatory driver	Total
Sub-total			**$68.4**
Facilities			
Refurbishment	Yes	Asset Renewal / Compliance	[redacted]
Sub-total			**$1.6**
Total			**$346.9**

Table 14: Proposed capital expenditure by year and project –($FY2025–26 million)

Project	2025-26	2026-27	2027-28	2028-29	2029-30	Total
Civil						
Slope Stabilisation	[redacted]					
Culvert Renewals						
Sub-total	**$9.5**	**$16.6**	**$4.8**	**$4.8**	**$4.8**	**$40.4**
Track						
Reconditioning	[redacted]					
Formation Strengthening						
Curve Transitions						
Re-sleepering						
Re-railing						
Level Crossing Transitions						
Ballast Undercutting						
Sub-total	**$80.5**	**$68.3**	**$25.3**	**$25.3**	**$25.3**	**$224.7**
Signalling						
Signalling Cables	[redacted]					
Digital Telemetry						
SER / PER Upgrade						

Project	2025-26	2026-27	2027-28	2028-29	2029-30	Total
LED Upgrade	[redacted]					
Re-signalling						
Interlocking Renewal						
Sub-total			**$0.2**	**$8.1**	**$3.5**	**$11.8**
Bridges						
[redacted] Replacement	$15.9	$19.1	$11.1	$11.1	$11.1	$68.4
Sub-total	**$15.9**	**$19.1**	**$11.1**	**$11.1**	**$11.1**	**$68.4**
Facilities						
Refurbishment			$1.6			$1.6
Sub-total			$1.6			**$1.6**
Total	**$105.9**	**$104.0**	**$43.0**	**$49.3**	**$44.6**	**$346.9**

2.7.4 Volume risk mitigation

To address the risk that the full forecast volume for DAU3 does not eventuate, or remain at the 9.6mtpa (i.e. because New Acland is not successful in defending the appeal, contracts are not renewed, mines cease to operate or do not achieve planned capacity, unavailability of haulage services or for any other reason), Queensland Rail has included in DAU3 triggers permitting Queensland Rail to seek a reference tariff reset during the term of AU3 each time a contract is up for renewal if it is not renewed. While Queensland Rail will be required to submit a Draft Amending Access Undertaking (**DAAU**), unlike a typical DAAU where both Queensland Rail and the QCA have to agree to the changes for them to apply, in this instance the QCA will have the same powers as if it had issued an initial undertaking notice.

The reset gives Queensland Rail an opportunity to reset its capital and maintenance program to reduce the capital expenditure which would otherwise be brought forward to meet capacity requirements and protects our customers from paying for capacity that is not required.

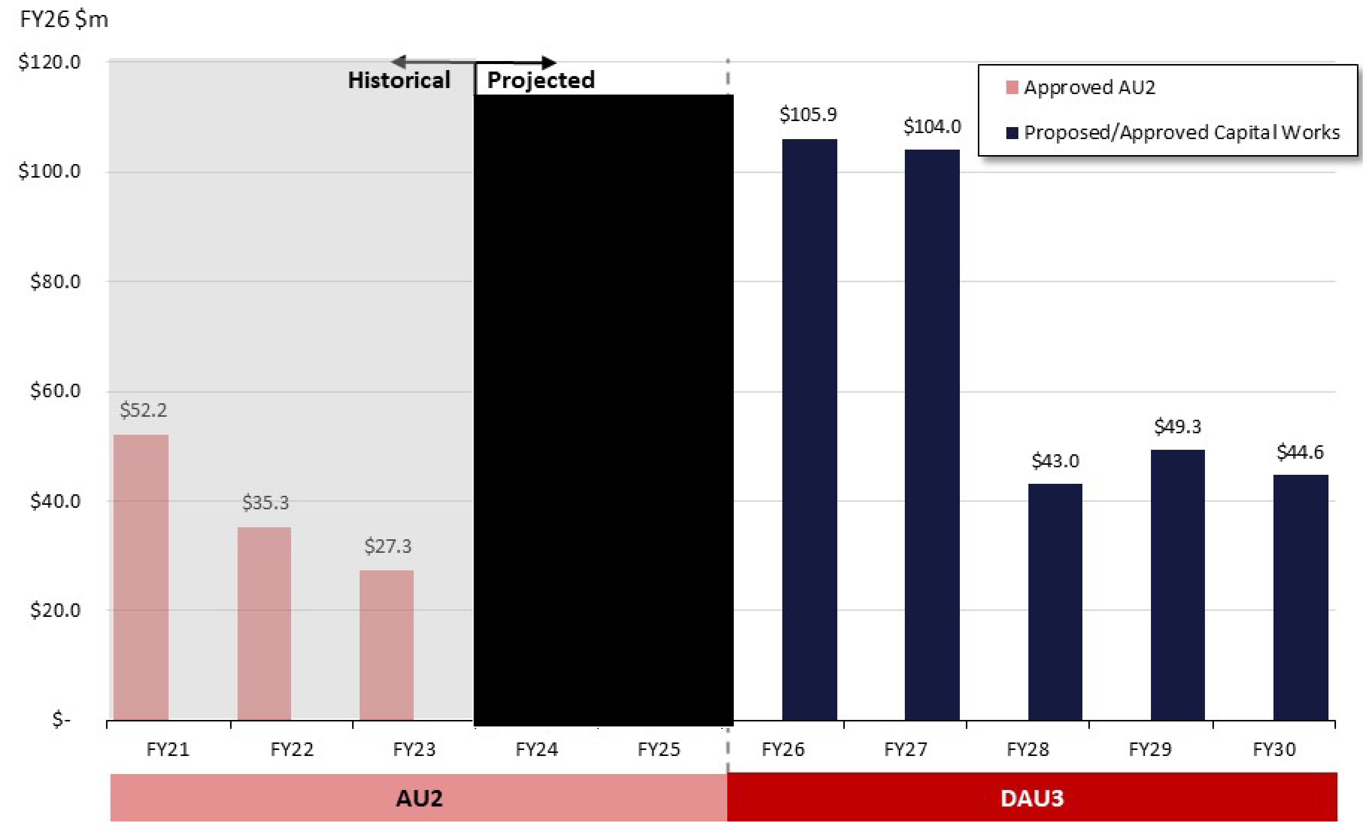
This estimate is based on Queensland Rail's acceptance of the advice from the West Moreton System miners i.e. Yancoal (Cameby Downs mine), New Wilkie Energy (New Wilkie mine) and New Hope (New Acland Stage 3 mine) of volumes they wish to contract and/or renew.

2.7.5 Comparison to capital expenditure in AU2

Proposed capital expenditure of $346.9 million ($FY2025-26) to facilitate 9.6Mtpa is 127 per cent higher than the capital expenditure allowance for FY2021-22 to FY2024-25 of $153 million ($FY2025-26). However, as discussed earlier, AU2 capital expenditure is based upon a forecast of 2.1Mtpa, whereas the DAU3 forecast is based upon a record tonnage forecast of 9.6Mtpa. The additional tonnes will significantly increase the stress on the network and the forecast capital investment is required so that the mines can achieve their tonnages and Queensland Rail can provide a fit for purpose, efficient cost network.

The comparison of capital expenditure FY2020-21 to FY2029-30 to the proposed DAU3 capital expenditure is shown in **Figure 7** below.

Figure 7: Proposed capital expenditure AU2 and DAU3, by year — ($FY2025-26, million)



Note: AU2 Investment Strategy currently under review by Queensland Rail will be detailed in a future Draft Amending Access Undertaking.

2.7.6 Increased AU2 capital expenditure

This is discussed in section 2.12.2 "*AU2 4.1Mtpa Trigger – additional AU2 capital*" in this Explanatory Document.

2.7.7 Independent peer review

Independent engineering consultants AECOM Australia (**AECOM**) have completed a peer review of a sample of Queensland Rail's proposed West Moreton capital program representing 79% of the total capital expenditure over the DAU3 Reference Tariff period (i.e. FY26 to FY30). AECOM found that the DAU3 proposed capital program was prudent in terms of cost, standard and scope in all aspects except their assessment of the standard of project B.04763 Digital Telemetry Rollout – West Moreton where the assessment was not able to be completed as AECOM require additional information. This assessment is ongoing with Queensland Rail currently addressing this concern and will provide a supplementary response subsequent to the lodgement of DAU3. AECOM determined that:

> *"Our review has concluded that the proposed capital expenditure meets the conditions of DAU3, and in our view QR may proceed with the submission."*

Refer to **Attachment 3**: AECOM's *Review of Queensland Rail's West Moreton Capital Investment Plan for DAU3* for AECOM's peer review of Queensland Rail's DAU3 capital plan.

2.8 Accelerated depreciation, stranding risk and mine equity

Summary: Accelerated Depreciation, Stranding Risk and Mine Equity

Queensland Rail is proposing to undertake significant investment in the network to accommodate the expected increase in coal volumes during the DAU3 period. In addressing this, Queensland Rail proposes an accelerated depreciation approach that reflects its risk and incentive for investment and promotes an equitable approach for the three West Moreton System mining companies' cost contributions.

Proposed is that new assets be largely depreciated by 2034 (New Acland Stage 3 mine is expected to cease production by 2034), and existing capital be fully deprecated by 2044 (a longer period). The shorter accelerated depreciation period will ensure that all mines pay for the new assets required for the record 9.6Mtpa as it is during a time that New Acland Stage 3 mine will operational. The longer period for existing assets will ensure the remaining mines continue paying for the service that they alone will be using. This is to provide an equitable relationship of the costs attributed to the individual mines.

Queensland Rail's Stranding Risk

The transition towards a net zero carbon emissions future means that global production of thermal coal is likely to decline significantly over the next 20 to 30 years. For example, IEA's net zero by 2050 scenario suggests that thermal coal production will decline by more than 90 per cent in 2050 when compared to production levels in 2021.[1] It follows that coal mines on the West Moreton System could cease to operate by or before 2050, which is only 25 years away from 2025.

AME has advised that New Acland is expected to cease operations by 2034 and that it is reasonably possible that the closure of all of the coal mines in the Surat basin will occur between 2042 and 2050. The expected decline and then cessation of coal traffic from now and between 2042 and 2050 means Queensland Rail faces significant asset stranding risk under existing regulatory arrangements.

HoustonKemp has provided advice on the appropriate regulatory treatment for new capital investment and the existing RAB on the West Moreton System given the potential for asset stranding risk. HoustonKemp considered that it is appropriate for Queensland Rail to recover its existing RAB over the weighted average remaining mine life for the West Moreton System.

After considering the advice provided by HoustonKemp and AME and the equitable approach discussed above, Queensland Rail proposes the following for DAU3:

- That depreciation for new capital investment be calculated with reference to the weighted average remaining mine life for the Western Moreton System, estimated to be 14 years on 1 July 2025 and progressively decreasing by a year, each financial year for new capital insertions to the RAB;
- That depreciation for existing capital be calculated with reference to the weighted average remaining mine life for the Western Moreton System, estimated to be 19 years on 1 July 2025 and progressively decreasing by a year, each financial year for new capital insertions to the RAB; and
- That the remaining mine life be reviewed periodically so that it continues to reflect realistic expectations of remaining life of mines on the West Moreton System.

2.8.1 An equitable approach to shortened asset lives

Queensland Rail proposes to shorten the economic life for existing assets to a maximum of 19 years, and shorten the economic life for future assets to a maximum of 14 years, both from the start of the DAU3 period.

The economic life for new capital investment is proposed to be reduced further for each year of the undertaking period that the expenditure occurs in, with existing and future assets to be fully written down by 30 June 2044.

This approach results in an equitable distribution of costs to each West Moreton System miner. The shorter accelerated depreciation period is equitable as it will ensure that all mines pay for the new assets required for the record 9.6Mtpa tonnage forecast, as it is mainly during a time when the New Acland Stage 3 mine will be operational (i.e. New Hope, Yancoal and New Wilkie Energy will all pay the costs of the shortened economic life of new assets as the New Acland Stage 3 mine life is forecast to have a 12 year mine life).

At the same time, post 2034 the remaining mines will continue to pay for the service they are still using. As stated above the depreciated asset life for sunk costs of 19 years will be at a time after New Acland Stage 3 mine is expected to have closed.

Queensland Rail is proposing an equitable relationship of the costs attributed to the individual mines which protects the legitimate business interests of Queensland Rail's customers.

2.8.2 Stranded asset risk on the West Moreton System

While being an equitable distribution of costs to the West Moreton System miners, the shorter economic lives of assets will mitigate Queensland Rail's stranding risk. The QCA indicated in its Final Decision on AU2 that it will consider accepting an appropriate accelerated depreciation profile stating:

> *"Our decision is to not implement accelerated depreciation as part of this DAU process; however, we would be amenable to accepting an appropriate accelerated depreciation profile, should Queensland Rail propose it as part of a DAAU.* ***We consider that an appropriate accelerated depreciation profile would likely be sufficient to address the longer-term stranding risks that West Moreton coal faces."***[15] (our emphasis)

Under existing arrangements, new capital investment and the existing RAB are recovered over the remaining technical life of the underlying rail asset. As rail assets are long life assets, adopting technical lives when calculating depreciation means that capital expenditure is typically recovered over 50 or more years. For example, an investment made in a 50 year asset in 2025-26 would be recovered over a 51 year period between 2025-26 and 2075-76 under existing arrangements, with half a year of recovery occurring in both 2025-26 and 2075-76. That is, it's a 50-year period spanning 51 financial years as the first and last financial years are only half years as RAB additions are mid-year.

[15] QCA Decision on Queensland Rail 2020 draft access undertaking, February 2020, p.50.

Table 15: West Moreton System asset lives

Asset Lives	Years
Track (inc Turnouts)	35
Roads	38
Fences	20
Signals	20
Bridges	100
Tunnels	100
Culverts	100
Earthworks	100
Other	20
Land acquisition costs	50
Telecommunications	20
Land	0

Queensland Rail will need to undertake significant investments in the network to accommodate the expected increase in coal volumes during AU3 period. Overall, Queensland Rail expects to invest $346.9 million ($FY2025-26 excluding IDC) in assets with a technical life of up to 100 years or more during AU3.

However, the transition towards a net zero carbon emissions future means that global production of thermal coal is likely to decline significantly over the next 20 to 30 years. For example, IEA's net zero by 2050 scenario suggests that thermal coal production will decline by more than 90 per cent in 2050 when compared to production levels in 2021.[16] It follows that coal mines on the West Moreton System could cease to operate by or before 2050, which is only 25 years away from 2025.

The misalignment between technical life and remaining life of coal mines on the West Moreton System creates stranded asset risks for Queensland Rail. In other words, Queensland Rail is at risk of not being able to recover its efficient investments on the West Moreton System.

AME was engaged to help Queensland Rail understand the stranded asset risk it faces on the West Moreton System. AME was asked to provide advice on the remaining life of the three mines that are expected to use the West Moreton System during AU3. AME's advice is that (refer to **Attachment 4**):

> *"It is reasonably possible that closure of all coal mines would fall between the years 2042 and 2050."*[17]

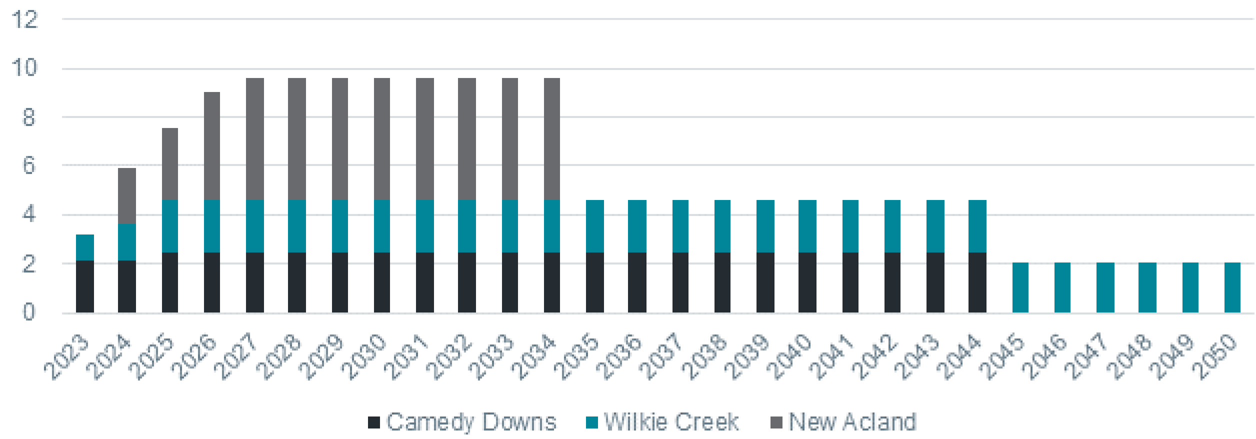
[16] International Energy Agency, *World Energy Outlook 2022*, p 412.
[17] AME, Coal Throughput Analysis, 6 October 2023, pp 3 – 4.

AME's advice on remaining life on individual mines can be summarised as follows:

- New Acland is expected to cease production by 2034. The short remaining life means that its closure date is unaffected by carbon policy scenarios;
- the potential closure of Cameby Downs is expected to occur around 2044 based on prospective life of the mine – this is consistent with AME's advice that closure of all coal mines could occur between 2042 and 2050; and
- Wilkie Creek is expected to experience resource depletion by around 2050 but given the transition towards net zero by 2050, a reasonable estimation of mine life is between 2042 and 2050.

Figure 8 below presents AME's forecast coal volumes on the West Moreton System based on reserves available at each mine. The forecast show that coal volumes are expected to decline significantly in 2035 with the closure of New Acland, and then again in 2045 with the closure of Cameby Downs. Coal volumes are expected to be zero after 2050, following the closure of Wilkie Creek.

Figure 8: Forecast coal volumes on the West Moreton System by mine, 2023 to 2050



However, as all coal mines using the West Moreton System could be closed by or before 2042, it is possible that coal volumes become zero by 2042. AME's advice that Cameby Downs and Wilkie Creek could close by 2042 is consistent with the ACCC's decision for the Hunter Valley coal network. In its final decision, the ACCC approved ARTC's proposed weighted average mine life of 21 years commencing from 1 July 2021, which implies a terminal date of 30 June 2042.

The expected decline and then cessation of coal traffic from now and between 2042 and 2050 means Queensland Rail faces significant asset stranding risk under existing regulatory arrangements. Queensland Rail estimates that it will have only recovered 39.2% and 45.1% per cent of its proposed capital expenditure for AU3 and existing AU3 opening RAB value by 2050, which would be unrecoverable without coal traffic. In total, Queensland Rail estimates that $521.8 million of its investment is at risk of becoming stranded under existing regulatory arrangements.

2.8.3 Advice from HoustonKemp on appropriate regulatory arrangements to mitigate asset stranded risk

Queensland Rail has asked HoustonKemp to provide advice on the appropriate regulatory treatment for new capital investment and existing RAB on the West Moreton System given the potential for asset stranded risk (refer to **Attachment 5** - HoustonKemp's Report: *Regulatory treatment of coal related assets*).

In developing their advice, HoustonKemp considered the relevant factors set out in the QCA Act and regulatory decisions and guidance provided by the ACCC, IPART, the AER and the QCA. HoustonKemp made the following recommendations:

- depreciation should be calculated with reference to the weighted average remaining life of mines on the West Moreton System rather than the technical life of the assets;
- the remaining life should be calculated based on lower bound of realistic expectations of remaining mine life as this will help mitigate asset stranding risk;
- the remaining mine life should be reviewed periodically, so that it continues to represent realistic expectations of remaining life of the mines on the West Moreton System;
- new capital investment should be recovered over the weighted average remaining mine life, or by 2039 - not doing so would mean that Queensland Rail is at risk of not recovering new capital investment; and
- the existing RAB should also be recovered over the weighted average remaining mine life, but only if it does not lead to premature closure of any of the mines.

HoustonKemp also assessed the affordability of its recommendation to change how depreciation is calculated. Analysing production, revenue and cost forecasts prepared by AME, HoustonKemp concluded that:

- a reasonable lower bound estimate of weighted average remaining mine life for the West Moreton System is 14.4 years commencing from 1 July 2025;
- recovering deprecation over 14 years increases below rail costs for mines by 0.5 – 9.1 per cent when compared to existing charges; and
- the proposed change in how depreciation is calculated will not lead to early exit of any of the three mines operating on the West Moreton System.

Given the above, HoustonKemp considered that it is appropriate for Queensland Rail to recover its existing RAB over the weighted average remaining mine life for the West Moreton System.

2.8.4 Existing and new assets: accelerated depreciation and mine equity

HoustonKemp has estimated that the weighted average mine life for the West Moreton System ranges from between 14.4 to 19.1 years based on advice provided by AME. The expected remaining life for each of the individual mines operating on the West Moreton System is expected to be:[18]

- New Acland to cease operation by 2034;
- Cameby Downs to cease operations between 2042 and 2044; and
- Wilkie Creek to cease operations between 2042 and 2050.

Further, HoustonKemp indicates that there are different economic considerations for recovering new capital investment compared with recovery of the existing RAB. The existing RAB represents a sunk cost and its recovery should balance the interest of coal users and Queensland Rail.

In contrast, new capital investment is not a sunk cost and Queensland Rail will only have a financial incentive to undertake these investments if it can recover these costs with reasonable certainty.[19]

18 HoustonKemp Economists, Regulatory treatment of coal related assets, 5.1.1 The weighted average mine life ranges from 14.4 to 19.1 years, 3 November 2023, p.19

[19] HoustonKemp Economists, Regulatory treatment of coal related assets, 3 November 2023, p.17.

Queensland Rail is seeking the following for DAU3:

- that depreciation for new capital investment be calculated with reference to the lower bound estimate of the weighted average remaining mine life for the Western Moreton System, estimated to be 14 years on 1 July 2025, and progressively decreasing by a year each financial year;
- that depreciation for the existing RAB be calculated with reference to the upper bound estimate of the weighted average remaining mine life for the Western Moreton System, estimated to be 19 years on 1 July 2025, and progressively decreasing by a year each financial year; and
- the remaining mine life be reviewed periodically so that it continues to reflect realistic expectations of the remaining life of the mines on the West Moreton System.

The QCA Act requires that the QCA consider when approving a draft access undertaking, among other things, the following:

- the legitimate business interests of the owner or operator of the service, being Queensland Rail; and
- the interests of persons who may seek access to the service, being coal mine owners.

Queensland Rail considers that its proposed depreciation for new capital of 14 years:

- reflects the risk to Queensland Rail and the financial incentive to undertake these investments; and
- provides an equitable outcome for the three mines, that is, it ensures that all mines pay their fair share of costs as the assets will be largely depreciated while all three mines are operating, including New Acland Stage 3.

At the same time, post 2034 the remaining mines should pay for the service they are still using. A depreciated asset life for sunk costs of 19 years will be at a time after New Acland Stage 3 mine is expected to have closed.

Adopting Queensland Rail's approach means proposing a tariff of $32.63/000 gtk ($2025-26), which compares to the current incremental (affordable) reference tariff of $26.42/000 gtk ($2025-26) without nominating any changes to remaining life.

2.9 Appreciation

Appreciation – 3% for five years to 2027-28 with 2.5% for last the two years of DAU3

The RAB, maintenance and operating expenditure is escalated by inflation. Queensland Rail's economic advisors HoustonKemp have recommended 3% for annual increases for the next five years up to and including DAU3, with 2.5% for the final two years of the regulatory period.

Queensland Rail notes that the cost of labour and materials in the rail/construction industry is growing at a higher rate than the underlying forward inflation projection and may be updated during the process.

2.10 Maintenance Expenditure

Summary – Forecast DAU3 Maintenance Expenditure: $172.5M ($FY2025-26)

The program seeks to maximise West Moreton supply chain efficiency and deliver safety, reliability, and availability to its customers.

Some of the key considerations for maintenance of the West Moreton System over the DAU3 period include:

1. **Tonnage Forecast Impacts:** The large projected increase in tonnage up to 9.6 Mtpa over the period will increase wear on the track and therefore increase the level of maintenance required on the network to minimise speed restrictions and closures. Conversely, this will likely also decrease the amount of time available to deliver planned maintenance.
2. **Possession Constraints:** A higher level of maintenance is also projected to increase the possession time required to undertake the works, potentially acting as a limit to the paths available and therefore risking the tonnage that the system can safely carry. If the required maintenance is not carried out, the system is at increasing risk of events occurring that require reactive (unplanned) maintenance, which would impact customer service by reducing availability and result in higher costs.
3. **Capital Program Dividends:** Queensland Rail has proposed a capital program which responds to the specific requirements of the network, addresses existing issues on the system, and targets resilience. Queensland Rail's proposed maintenance costs have considered the reduction in maintenance that will result from the proposed capital program, noting that upgraded or recently refurbished track is unlikely to require extensive maintenance in the period following the upgrade.

A core objective of Queensland Rail's approach to asset management is reaching a balance of levels of service, management of risk and efficient whole of life costs. Both maintenance and capital expenditure contribute to maintaining the availability and reliability of the network and need to be considered together to identify efficient costs of doing so.

Attachment 6 – Queensland Rail's *West Moreton System DAU2 Maintenance Expenditure 2025-26 to 2029-30 submission* provides the full detail for Queensland Rail's maintenance expenditure program.

Queensland Rail has proposed a maintenance allowance of **$172.5M** ($FY2025-26) for the West Moreton System over the DAU3 period. The program seeks to maximise West Moreton supply chain efficiency and deliver safety, reliability, and availability to its customers.

Table 16: West Moreton coal maintenance costs by major activity—DAU3 ($FY2025–26 million)

	2025-26	2026-27	2027-28	2028-29	2029-30	Total DAU3
Track	$25.9	$28.0	$28.0	$27.7	$27.4	**$137.1**
Structures	$1.7	$1.7	$1.7	$1.7	$1.7	**$8.4**
Trackside systems	$4.4	$4.4	$4.4	$4.4	$4.4	**$21.8**
Facilities/other	$1.0	$1.0	$1.0	$1.0	$1.0	**$5.2**
Total	**$33.0**	**$35.1**	**$35.1**	**$34.8**	**$34.4**	**$172.5**

A core objective of Queensland Rail's approach to asset management is reaching a balance of levels of service, management of risk and efficient whole of life costs. Both maintenance and capital expenditure contribute to maintaining the availability and reliability of the network and need to be considered together to identify efficient costs of doing so.

The DAU3 maintenance cost estimates are based on Queensland Rail's FY2020-21 to FY2022-23 maintenance expenditure actuals for the West Moreton System with the exclusion of outliers and non-recurring expense. The maintenance base has then been adjusted with the considerations provided within **Attachment 6 –** *Queensland Rail Detailed Report on the West Moreton System DAU3 Maintenance Costs* to support forecast peak tonnage levels during the period.

Costs have been developed in current $FY2023-24 terms and escalated by forecast inflation for this summary into submission terms ($FY2025-26).

Some of the key considerations for maintenance of the West Moreton System over the DAU3 period include:

1. **Tonnage Forecast Impacts:** The large projected increase in tonnage up to 9.6 Mtpa over the period will increase wear on the track and therefore increase the level of maintenance required on the network to minimise speed restrictions and closures. Conversely, this will likely also decrease the amount of time available to deliver planned maintenance.
2. **Possession Constraints:** A higher level of maintenance is also projected to increase the possession time required to undertake the works, potentially acting as a limit to the paths available and therefore risking the tonnage that the system can safely carry. If the required maintenance is not carried out, the system is at increasing risk of events occurring that require reactive (unplanned) maintenance, which would impact customer service by reducing availability and result in higher costs.
3. **Capital Program Dividends:** Queensland Rail has proposed a capital program that responds to the specific requirements of the network, addresses existing issues on the system, and targets resilience. Queensland Rail's proposed maintenance costs have considered the reduction in maintenance that will result from the proposed capital program, noting that upgraded or recently refurbished track is unlikely to require extensive maintenance in the period following the upgrade.

2.10.1 Tonnage forecast impacts

The West Moreton System transports coal loaded at Columboola, Macalister and Jondaryan to Rosewood, interfacing with the Brisbane Metropolitan System. The historical gross tonnage loaded at these three corridor locations is represented in the grey shaded area in the figure below for periods FY2011-12 to FY2022-23.

When considering the Jondaryan to Rosewood shared corridor, the gross tonnage transported in 2018-19 was 6.4mtpa, decreasing to 2.2mtpa by FY2022-23. This represents a 66% decrease in tonnage over that timeframe.

When forecasting future tonnage, a key consideration is the expectation that the production of coal will increase from current levels. This has been evidenced by the recent opening of Wilkie Creek and New Acland Stage 3 mines which will be operating at full production within the next three years. When considering the Jondaryan to Rosewood section in this period, the gross tonnage is forecasted to increase by 74 % from 2.2mtpa in FY2022-23 to 8.4mtpa by the start of FY2025-26 and later to 9.6mtpa.

An increase in tonnage will impact Queensland Rail's variable maintenance costs by increasing costs proportionally to the increased usage of the system. This is driven primarily by wear and degradation of the track and is attributed to three key factors including; compression damage, centrifugal force and acceleration (braking) force. Detailed discussion of these three key drivers and projections of variable maintenance costs are provided in **Attachment 6**.

Figure 9 below shows the expected increase in tonnage to the system forecast of 9.6 mtpa as compared to AU1 and AU2.

Figure 9: Tonnage Projection on the West Moreton System by Line Section/Corridor

[redacted]

2.10.2 Possession constraints

Analysis of Queensland Rail's historical employee billed hours between FY2020-21 to FY2022-23 compared to available track possession windows found that the track possession required for maintenance works will be greater than the possession actually available during the DAU3 period (a higher number of paths is required for the higher tonnage expected). Possession time avoided as a result of projected capital works (which also require track possession) will be insufficient to offset this shortfall, and by itself, will not allow for the required track possessions to fit within the possession windows available.

Queensland Rail will therefore be required to increase the minimum number of crew members (or number of teams deployed) to complete required track works to overcome the constraints and fit within allowable possession windows. These increases have the effect of increasing projected maintenance costs.

With focus on Jondaryan to Rosewood (due to the section being most impacted by the expected increased tonnages) **Figure 10** demonstrates that the total employee billed hours are projected to increase from [redacted] in FY2023-24 to [redacted] by FY2029-30, which is a 98% increase over this period.

Figure 10: Total Employee Hours Billed (per annum) on the Jondaryan to Rosewood Section

[redacted]

The implication of this analysis demonstrates the need to increase minimum crew size (or teams) deployed to align with possession windows, consequently decreasing the number of possessions required.

Figure 11 demonstrates the forecast decreasing window of availability. It's important to emphasise that the hours reflected in Figure 11 are based on the minimum number of crew members (indicated by the blue line) needed to be deployed to complete works within the possession windows available and does not represent the crew size that might actually be deployed.

Figure 11: Minimum Crew Size Required to Fit Within Possession Window on the Jondaryan to Rosewood Section

[redacted]

2.10.3 Maintenance avoided due to capital program

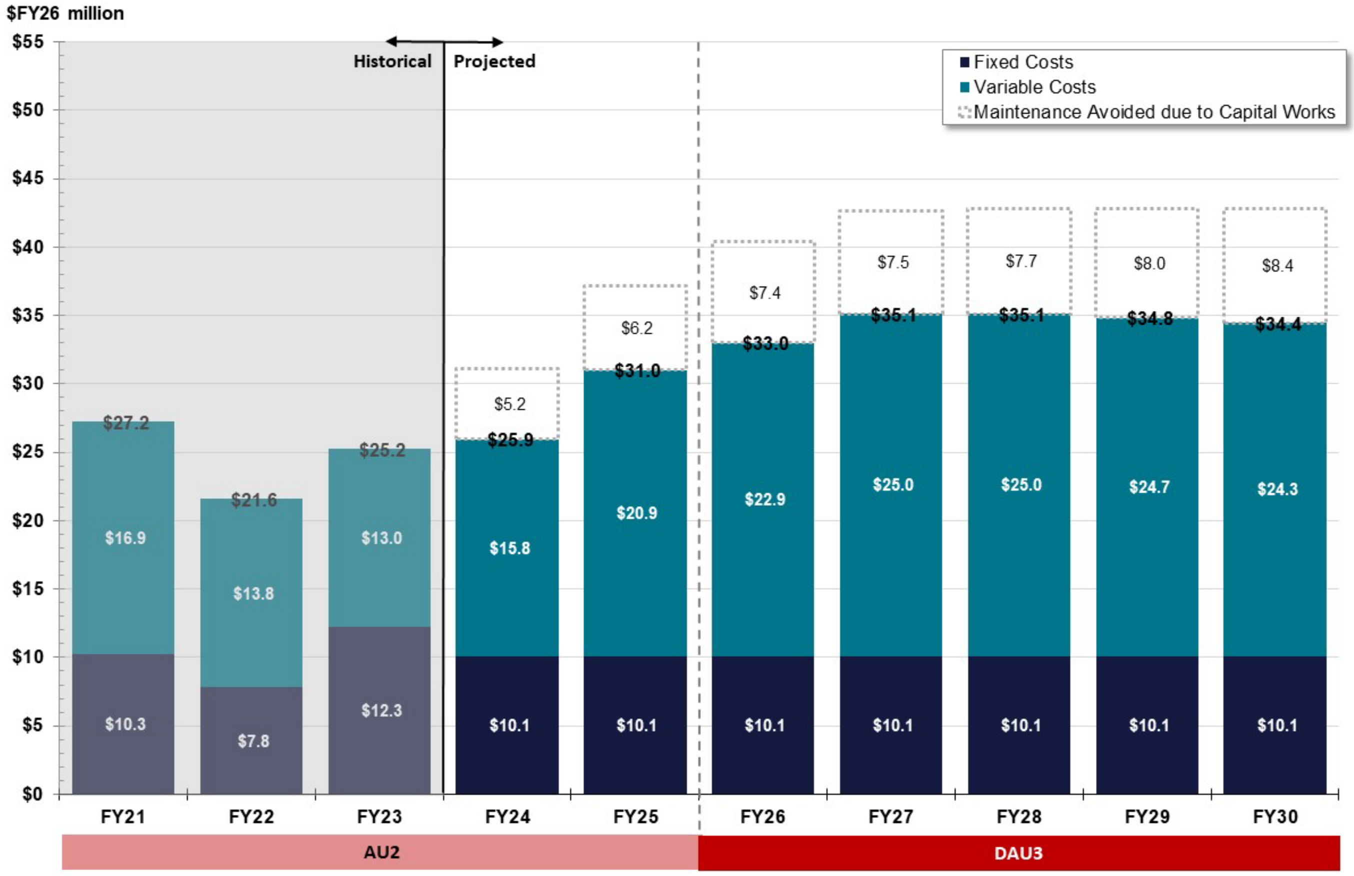
For the DAU3 period, Queensland Rail has proposed efficient capital costs for the West Moreton System having regard to the age and condition of the network, and the volumes proposed to be hauled over a network that was not originally designed for this purpose.

The priority of these project works is aligned with the need to address track stability, structural integrity, and geotechnical risks inherent to these assets. These programs are targeted at addressing asset failure risks and reducing current operational restrictions that limit the confidence that the required capacity can be maintained.

In addition to the condition and performance of the system and the expected throughput increases, some categories of maintenance cost may reduce or be avoided for a period of time as a result of investments included in the proposed DAU3 Capital Program.

Queensland Rail's estimate of maintenance avoided as a result of capital is shown in the below **Figure 12.**

Figure 12: West Moreton Total Maintenance Cost Projects net of Maintenance Avoided due to Capital Works—DAU3 ($FY2025-26 million)

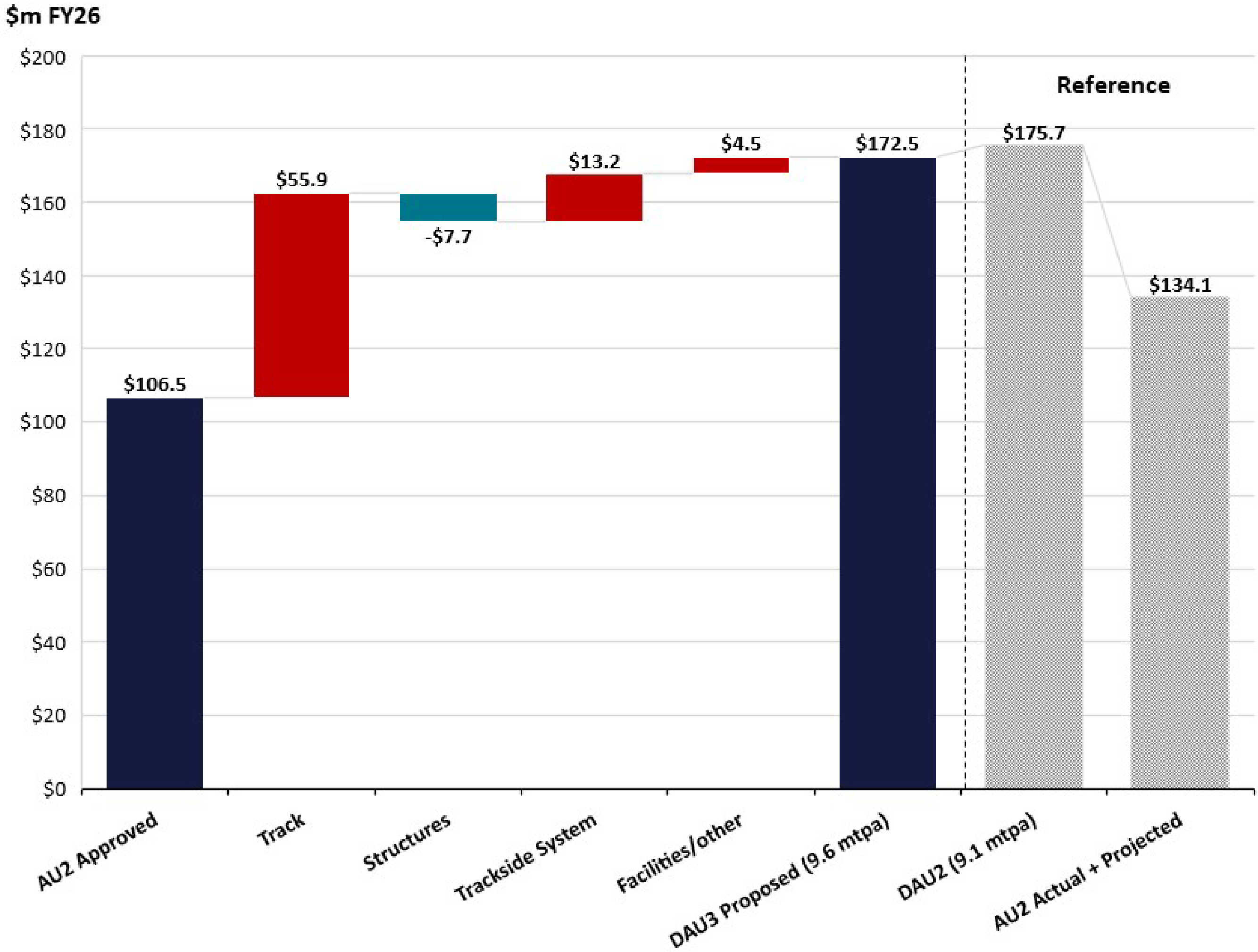


Note: AU2 Investment and Maintenance Strategy currently under review by Queensland Rail will be detailed in a future Draft Amending Access Undertaking.

2.10.4 Comparison to AU2

As shown in **Figure 13** below, with the West Moreton System projected to increase haulage to a maximum of 9.6mtpa for the DAU3 period, overall maintenance costs are estimated to be, on average 62 per cent higher per annum in real terms than the AU2 maintenance allowance approved by the QCA.

Figure 13 – Comparison between AU2 approved maintenance expenditure with DAU3 ($FY2025–26 million)



2.10.5 Corridor allocations

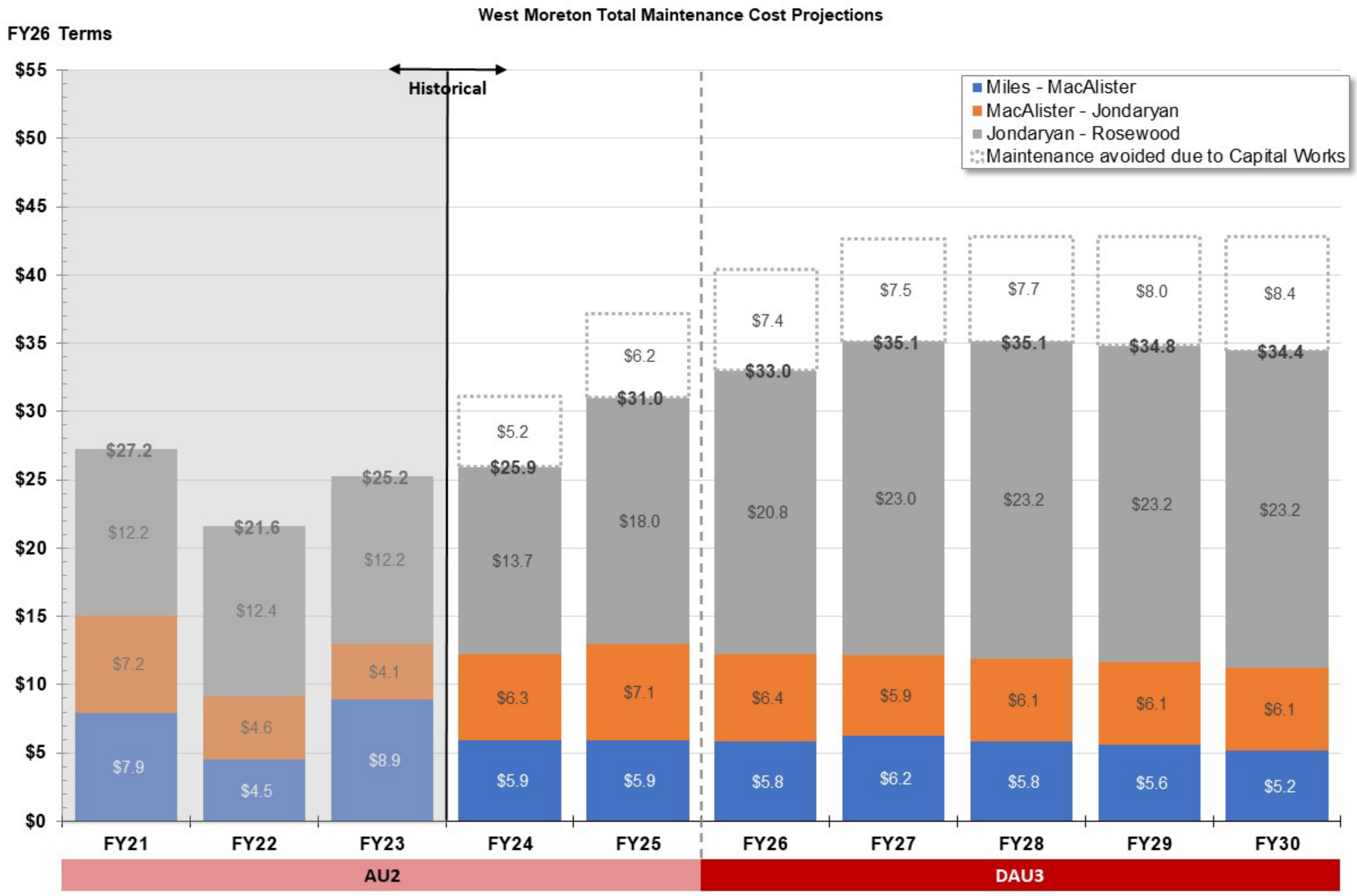
For AU1, total maintenance costs for the West Moreton System were split by each corridor's forecast percentage of gtks operated on the system. For AU2 and DAU3, with the use of the Enterprise Asset Management System (**EAMS**) and the capacity to identify maintenance more definitely by corridor, the allocation of maintenance costs is proposed to be amended to reflect the location of forecast costs by corridor.

The percentage allocation of costs by corridor for AU1, AU2 and DAU3 is shown in **Table 17**, while **Figure 14** shows total maintenance costs split between the three corridors. The difference in cost allocation between the three corridors impacts the maintenance forecast for DAU3, as the Rosewood to Jondaryan corridor has the most significant changes with tonnage.

Table 17: West Moreton total maintenance, allocation by corridor, AU1, AU2 and DAU3

	AU1 % of gtks	AU2 Corridor Maintenance	DAU3 Corridor Maintenance
Miles - Macalister	21-24%	39%	16.6%
Macalister - Jondaryan			17.7%
Jondaryan - Rosewood	76-79%	61%	65.7%

Figure 14: West Moreton Total Maintenance Cost Projects by Corridor—DAU3 ($FY2025-26 million)



2.10.6 Allocation of maintenance costs to coal

To allocate the maintenance cost forecast between coal and non-coal traffics, Queensland Rail proposes to carry over the AU1 (and AU2) methodology of splitting maintenance costs into fixed and variable categories. The fixed component of costs to coal will be allocated based on coal's share of train paths, and the variable component on the basis of coal's share of gross tonne kilometres.

Queensland Rail's proposed costs (by category) have been overlayed onto the original assessment by B&H Strategic Services[20]using the same fixed (and variable) percentage assessments to derive a

[20] B&H Strategic Services Pty Ltd Supplementary Report Part 4, Discussion relating to Categorisation of Maintenance Costs (May 2016), p.12

weighted average percentage of 44.8 per cent fixed for the DAU3 period. This compares to 72.1 per cent in AU2 and 57.3 per cent in AU1.

2.10.7 Independent peer review

Queensland Rail engaged AECOM to undertake a review of its Maintenance Submission for the West Moreton System (refer to **Attachment 7**), which forecasts maintenance for the DAU3 period. AECOM's review of Queensland Rail's maintenance costs concluded that:

> *"Overall, we consider that Queensland Rail's Maintenance Submission demonstrates consideration for the key drivers of maintenance costs over DAU3 and is reflective of prudent and efficient practices. Based on our review of the proposed activities combined with our understanding of the age and condition of the network, we consider that the activities and associated costs, as well as Queensland Rail's delivery approach, supports the achievement of prudent and efficient outcomes."*

2.11 Operational expenditure

Summary: DAU3 Operational Expenditure - $85.3 million ($2025-26)

The DAU3 Operational Expenditure forecast includes allowances for:

- Direct costs of Train Control;
- Management and infrastructure administration expenses including:
  - Network Management;
  - Telecommunications Backbone;
  - Program on-costs;
  - Other administrative;
- Corporate overhead (enabling governance); and
- Return on Buildings, Plant, Software, and Inventory.

The operating expenditure proposed for DAU3 is 89 per cent higher per annum in real terms than the annual operating expenditure allowance included in AU2 following coal volume increases on the West Moreton System.

With the substantial uplift in West Moreton System coal volume through the DAU3 period, Queensland Rail has revisited its approach to forecasting operating costs. Queensland Rail's goal is to produce a proposal for a sustainable operating allowance which will support the reasonable planning, control, and management of the West Moreton System in the long-term.

Queensland Rail has proposed operating expenditure of **$85.3 million** ($2025-26) for the DAU3 period. The proposal includes allowances for:

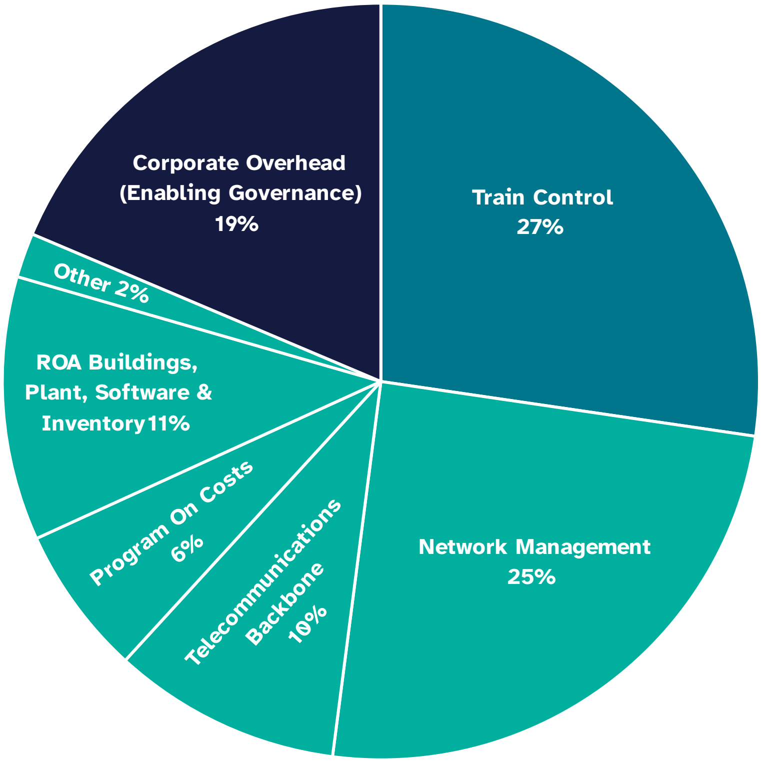
- Direct costs of Train Control;
- Management and infrastructure administration expenses including:
  - Network Management;
  - Telecommunications Backbone;
  - Program on-costs;
  - Other administrative;

- Corporate overhead (enabling governance); and
- Return on Buildings, Plant, Software, and Inventory.

Table 18: West Moreton System proposed DAU3 operating costs—DAU3 ($2025–26 million)

	2025-26	2026-27	2027-28	2028-29	2029-30	Total DAU3
Train Control	4.7	4.7	4.7	4.7	4.7	**23.3**
Corporate Overhead	3.2	3.2	3.2	3.2	3.2	**15.9**
Other	9.2	9.2	9.2	9.2	9.2	**46.1**
Total	**17.1**	**17.1**	**17.1**	**17.1**	**17.1**	**85.3**

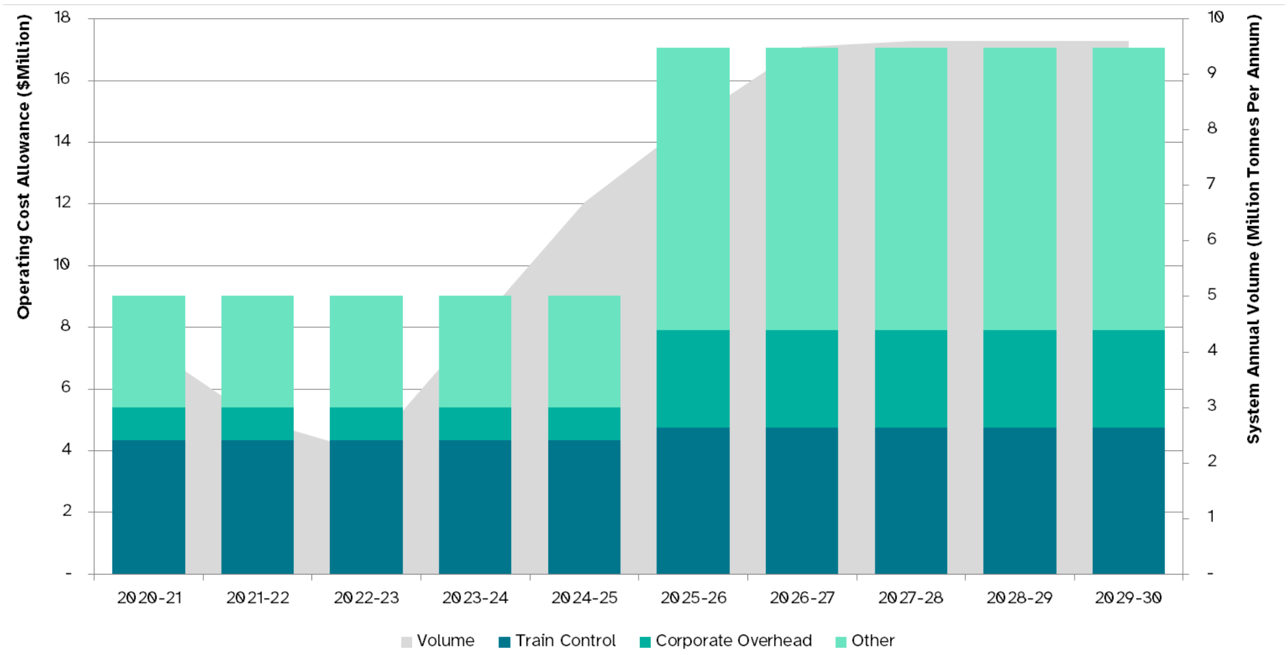
Figure 15: Breakdown of West Moreton System operating expenditure—DAU3



2.11.1 Comparison to AU2 West Moreton System operating expenditure allowance

The operating expenditure proposed for DAU3 is 89 per cent higher per annum in real terms than the annual operating expenditure allowance included in AU2 (see below Figure) following coal volume increases on the West Moreton System.

Figure 16: Comparison of West Moreton operating expenditure—AU2 to DAU3 over system volume net tonnes per annum ($FY2025–26 million)



2.11.2 Operating allowances in the West Moreton System

With the substantial uplift in West Moreton System coal volume through the DAU3 period, Queensland Rail has revisited its approach to forecasting operating costs. Queensland Rail's goal is to produce a proposal for a sustainable operating allowance that will support the reasonable planning, control, and management of the West Moreton System in the long-term.

In both AU1 and AU2, final approved operating allowances have underestimated ongoing long-term costs for Queensland Rail. This has been in despite falling volumes, relative reductions in networkwide expenses, and subsequent reductions in the system's share of those networkwide costs.

Table 19 : West Moreton AU1 and AU2 QCA Allowance versus Operating Costs actuals ($nominal - million)

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
QCA Allowance	7.2	7.4	7.6	7.7	7.2	7.5
Operating Costs	8.1	11.7	16.0	12.3	12.4	11.4
Difference	**(0.9)**	**(4.3)**	**(8.4)**	**(4.6)**	**(5.2)**	**(3.9)**

Source: Queensland Rail's QCA Annual Performance Reports 2016-17 to 2021-22

AU2 was developed in a unique environment of uncertainty, where there was a concurrent declaration review and a potential West Moreton coal volume forecast spread between 2.1Mtpa and 9.1Mtpa.

To capture a stand-alone cost profile under different scenarios, the QCA's consultant SYSTRA proposed a change to the way other operating expenditure was assessed for the period. A selected percentage allowance across all activities was used as a proxy for the development of an efficient operating cost basis, over the use of actual and adjusted cost.

In the interests of achieving regulatory certainty, Queensland Rail ultimately did not challenge the QCA's methodology on the interim approach but noted:

> *"the application of the 9.25% underestimates the true costs of providing the service and is inconsistent with the methodology approved by the QCA for Aurizon Network's UT5, where the equivalent corporate overheads percentage is 37.6% of total costs"*[21].

And further that:

> *"it does not consider that this methodology adequately compensates for the efficient operating costs of providing coal services on the West Moreton System and Queensland Rail will seek to have the QCA's methodology for estimating operating expenditure be reviewed for the next undertaking"*[22].

In September 2022, the Australian Competition and Consumer Commission (**ACCC**) released an independent report it commissioned from ARUP Australia (**ARUP**), to among other things produce a benchmarking exercise to inform the ACCC's review of Australia Rail Track Corporation's (**ARTC**) operating costs of the Hunter Valley Coal Network (**HVCN**).

ARUP's analysis showed that Queensland Rail's (West Moreton System) AU2 calculated total overheads (business management + corporate overheads) fell in the bottom quartile against rail comparators (including ARTC), comparing favourably only to ARC Infrastructure (WestNet), and (outside of rail) water and gas network providers[23]. Percentage changes from Queensland Rail (2020) AU2 benchmarked overhead costs to rail comparators calculated from the ARUP's study is provided in the table below.

Table 20: Queensland Rail versus benchmarked rail network providers ARUP 2022 study (calculated percentage change)

Provider	Percentage Increase/Decrease
ARTC (Calendar Year 2020)	+283%
ARTC (Calendar Year 2019)	+269%
UK Network Rail (2019)	+242%
Aurizon (Network) Updated (2017)	+209%
Aurizon (Network) (2017)	+142%
Queensland Rail (2020)	-
ARC Infrastructure (WestNet) (2013)	(60%)

Source: ARUP, ACCC ARTC - Hunter Valley Operating costs benchmarking Final Report (September 2022)[24]

ARUP's analysis used network kilometres as the basis for relativity, finding that it was the most appropriate way to examine cost for lower volume providers such as Queensland Rail, or those that have primarily passenger networks with some freight volume such as UK Network Rail[25].

[21] Queensland Rail, Queensland Rail's DAU2 Wet Moreton System low volume coal reference tariff (November 2019), page 15
[22] Queensland Rail, Queensland Rail's DAU2 Wet Moreton System low volume coal reference tariff (November 2019), page 16
[23] ARUP, ACCC ARTC – Hunter Valley Operating cost benchmarking Final Report (September 2022), page.31
[24] ARUP, ACCC ARTC – Hunter Valley Operating cost benchmarking Final Report (September 2022), Appendix D, page 50
[25] ARUP, ACCC ARTC – Hunter Valley Operating cost benchmarking Final Report (September 2022), Appendix A, page 39

On this basis, the report also found that there were economies of scale present when assessable overheads were normalised by network length, favouring high volume network providers (such as Aurizon (Network))[26]:

> *"The evidence suggests that there are some economies of scale due to the materially higher freight volumes and length of the network that are realised by comparators when costs are normalised on a per track KM basis"*[27].

Though the report was developed on relativities to ARTC's HVCN, with the potential benefit of inherent economies of scale present within the results, the delta between Queensland Rail's existing (West Moreton) AU2 assessed total overheads (at low volume coal and relatively small network size) and other benchmarked providers may be even more profound than can be initially suggested by the study. A summary of the assessed network relativities are provided in Appendix D of ARUP's report[28].

2.11.3 Methodology for development of DAU3 operating expenditure

For DAU3, Queensland Rail has sought to extrapolate its predicted operating costs based on adjusted reported expenditure for the West Moreton System during the 2021-22 financial year (the **Base Year**).

The use of an efficient base year for forecasting operating expense paths is an established regulatory practice used in several industries including electricity, water, and rail. The 2021-22 financial year has been selected to represent an efficient level of base expenditure, on the basis that:

1. It is the most recent year of audited, actual operating expenditure[29];
2. With reasonable adjustment, it most closely represents Queensland Rail's overall expected costs which are required to sustainably operate the business through the next regulatory period;
3. It demonstrates a decrease in real terms from the previous financial years in the corporate overhead and other expenses categories for whole of network. See table below:

Table 21: Queensland Rail Actual Corporate Overhead and Other Expenses—DAU3 ($2025-26 - million)

	2018-19	2019-20	2020-21	2021-22
Other Expenses	110.3	86.7	90.8	84.9
Corporate Overhead	61.5	44.3	35.9	27.6
Total Below Rail	**171.8**	**131.0**	**126.8**	**112.5**

Source: Queensland Rail's Below Rail Financial Statements 2018-19 to 2021-22

The Base Year has been escalated by actual and forecast inflation to $2025-26 terms, and adjusted as follows:

- Consistent with Queensland Rail's approach in AU2, train control costs have been re-developed using a 'bottom-up' methodology. See section (Train Control) below.
- Management and infrastructure administration expenses, including Regional Delivery Support, Train Operations Management, and Program Oncosts, which are directly attributable to the West Moreton System are carried over.
- The allocated 2021-22 QCA Fee of $214,830 has been removed as these costs are recovered separately through the QCA levy.

[26] ARUP, ACCC ARTC – Hunter Valley Operating cost benchmarking Final Report (September 2022), page 35
[27] ARUP, ACCC ARTC – Hunter Valley Operating cost benchmarking Final Report (September 2022), page 33
[28] ARUP, ACCC ARTC – Hunter Valley Operating cost benchmarking Final Report (September 2022), Appendix D, page 50
[29] While submitted in October 2023, the audited 2022-23 Below Rail Financial Statements were not available at the time of this proposal.

- The West Moreton statistical allocator "C" (2022-23 financial year as calculated in accordance with Schedule C of the Queensland Rail Cost Allocation Manual 2020) is adjusted with the expected average coal volume of West Moreton and Metropolitan systems as well as expected passenger services in the Metropolitan system over the DAU3 period, all other things being equal (**Revised Allocator**).
  - Other and corporate expenses which costs are common between Queensland Rail's regional systems (network-wide costs) are reallocated to the West Moreton System via the Revised Allocator.

Consistent with previous submissions, a return on Buildings, Plant, Software and Inventory at the estimated WACC is also added as these assets are not included within the Regulatory Asset Base. Asset totals are restated from Base Year terms with assets relevant to the Revised Allocator reallocated.

Table 22: Summary Operating Expenditure Categories and Forecast Methodology Used

Expenditure Category	Functional Area	Proposed Forecast Method
Train Control	Train Control	Bottom up-escalate
Network Customer Service	Train Operations Management	Base-escalate
Regional Asset Delivery	Regional Delivery Support	Base-escalate
Program on Costs	Management and infrastructure administration expenses	Base-escalate
Control and Monitoring Systems	Management & infrastructure administration expenses	Base-escalate-allocate
Engineering Support	Management and infrastructure administration expenses	Base-escalate-allocate
Network Business Management and Support	Management and infrastructure administration expenses	Base-escalate-allocate
Network Infrastructure Material Logistics	Management and infrastructure administration expenses	Base-escalate-allocate
Asset Support	Management and infrastructure administration expenses	Base-escalate-allocate
Telecommunication Backbone Network	Telecommunications	Base-escalate-allocate
Corporate Overhead	Enabling Governance	Base-escalate-allocate
Return on Buildings, Plant, Software, and Inventory	Return on Buildings, Plant, Software, and Inventory	Base-escalate-allocate

Table 23: Comparison of DAU3 proposed operating expenditure to West Moreton System operating expenses Below Rail Financial Statements 2021-22 ($2025-26 terms)

	Proposed DAU3 Operating Expenditure	Operating Expenditure 2021-22	Difference
Train Operations Management			
Train Control	4,662,091	5,951,829	(1,289,737)
Operations administration	76,677	76,677	-
Sub-total	***4,738,768***	***6,028,505***	***(1,289,737)***
Other Expenses			
Network Business	4,220,380	2,515,106	1,705,274
Program On Costs	1,090,358	1,090,358	-
Other regional	247,818	247,818	-
Telecommunications backbone	1,665,736	1,636,223	29,512
Sub-total	***7,224,292***	***5,489,505***	***1,705,274***
Corporate Overhead	**3,179,455**	**1,702,413**	**1,477,041**
Total Operating Expenses	**15,142,514**	**13,220,424**	**1,922,091**
Return on Buildings, Plant, Software & Inventory			
Buildings (excluding land and stations)	3,348,862		
Plant	10,817,684		
Software	3,087,618		
Current Inventory	6,840,962		
Non-Current Inventory	1,965,306		
Asset value as at 30 June 2022	*26,060,433*		
WACC Estimate	7.39%		
Total Return on Buildings, Plant, Software & Inventory	**1,925,866**		
Grand Total	**17,068,380**		

The proposed operating expenditure from 2021-22 base has been indexed by actual inflation for 2022-23 and forecast inflation to derive the $2025-26 proposed DAU3 operating expenditure.

2.11.4 Train control

The proposed DAU3 train control costs are nine per cent higher than those approved by the QCA for inclusion in reference tariffs for the AU2 period.

Queensland Rail's train control function for the southern part of regional Queensland (Business Operations South, located in the Brisbane CBD) is located separately to the train control of the suburban passenger network for SEQ (the Rail Management Centre), which is located at Bowen Hills. The clear separation of the two control centres is longstanding and pre-dated the separation of QR Ltd into Queensland Rail and Aurizon.

Business Operations South is responsible for train control for the West Moreton System (west of Rosewood), South Western System, Western System, and North Coast Line (South). Train control responsibilities included for the West Moreton System are:

- Train control (two control boards cover the West Moreton System and are operated 24/7, 365 days per year).
- Operational planning, including Daily Train Plans/Master Train Plan and possession planning.
- Network performance monitoring and miscellaneous network safety issues.

<u>Build-up of DAU3 train control costs</u>

For DAU3, Queensland Rail has undertaken a 'bottom-up' assessment of its train control costs, with proposed costs of $4.7 million ($2025-26) as set out in the table below**.**

Table 24: West Moreton proposed operating costs—DAU3 ($2025-26 million)

Function	No.	Cost	On-costs	Total West Moreton
Far West Network Control Officer (NCO)	[redacted]	[redacted]	[redacted]	[redacted]
West Network Control Officer (NCO)	[redacted]	[redacted]	[redacted]	[redacted]
Train Control Supervisor	[redacted]	[redacted]	[redacted]	[redacted]
Shift Safeworking Coordinator	[redacted]	[redacted]	[redacted]	[redacted]
Network Planning and Performance	[redacted]	[redacted]	[redacted]	[redacted]
Network Operational and Possession Planning	[redacted]	[redacted]	[redacted]	[redacted]
Consumables	[redacted]	[redacted]	[redacted]	[redacted]
Total				**4,662,091**

Notes:

1. West NCO covers Rosewood to Toowoomba (Willowburn), Far West NCO covers Toowoomba (Willowburn) to Quilpie.
2. [redacted] full time equivalent (**FTE**) NCOs are required for each control board to run a full shift rotation. This takes into account the operation of the boards 24/7 plus allowing for staff relief / training and other non-control time.
3. Train Control Supervisors in the Business Operations South Train Control Centre oversee [redacted] NCOs per shift, including the Far West and West train control board. The equivalent of [redacted] FTE supervisors has been allocated for the West Moreton System consistent with AU2.
4. A separate Shift Safeworking Coordinator line item is also included. This position oversees safeworking and provides rest/pause periods for the NCOs in the room in accordance with the relevant enterprise agreement. Assume [redacted] of the role.
5. For DAU3 on-costs include overtime and penalties which a resulted in an increase in percentage over DAU2. These costs were factored into the base cost in DAU2.

The 'bottom-up' assessment estimates train control costs of $4.7 million in 2025-26, with this number proposed for DAU3 rather than the $6.0 million for train control (as escalated) reported in the 2021-22 Below Rail Financial Statements.

2.11.5 Fixed/Variable split of cost

To allocate the operating cost forecasts between coal and non-coal traffics, Queensland Rail proposes to carry over the AU1 (and AU2 methodology) of splitting operating costs into fixed and variable categories. The fixed component of costs to coal will be allocated based on coal's share of train paths, and the variable component on the basis of coal's share of gross tonne kilometres.

Queensland Rail's proposed costs (by category) have been overlayed onto the original assessment by B&H Strategic Services[30] using the same fixed (and variable) percentage assessment to derive a weighted average percentage of 82 per cent fixed and 18 per cent variable costs between coal and non-coal traffic.

Table 25: Weighted Average Fixed proposed operating costs ($2025-26 million)

	'$000	Fixed %	Fixed Contribution
Train Operations Management			
[redacted]			
Operations Administration	77	70.0%	54
Sub total	***4,739***		***4,107***
Other Expenses			
Network Business			
[redacted]			
Program On Costs	1,090	79.0%	861
Other Regional Costs	248	100.0%	248
Telecommunications Backbone	1,666	95.0%	1,582
Sub total	***7,224***		***5,444***
Corporate Overhead			
Corporate Overhead	3,179	80.0%	2,544
Sub total	***3,179***		***2,544***
TOTAL OPERATING EXPENSES	**15,143**		**12,094**
Return on Buildings, Plant, Software & Inventory	1,926	95.0%	1,003
GRAND TOTAL OPEX	**17,068**		**13,097**
Weighted Average Fixed		**82%**	

Source: Queensland Rail, B& H Strategic Services Estimate of Queensland Rail's Fixed Operating Costs

Working capital allowance

Queensland Rail has proposed no change to the methodology for the working capital allowance applied for AU2, forecast at 0.3 per cent of the proposed total revenue for the DAU3 period.

2.12 Loss Capitalisation Account

AU2 was developed in an environment of high uncertainty around future tonnage levels. International coal prices were low and it was uncertain whether New Acland Stage 3 mine would gain the required Government approvals to proceed with the mine. Due to this, Queensland Rail submitted to the QCA reference tariffs for both 2.1Mtpa and 9.1Mtpa.

[30] B&H Strategic Services Pty Ltd, Review of Queensland Rail's DAU 2015 (September 2015), p.31 - 32

Towards the end of the QCA's assessment of AU2, it became apparent that the uncertainty remained around New Hope's operations and it was clear that New Hope would not be contracting when AU2 was going to be approved.

To support continuing railing on the system, Queensland Rail submitted an incremental (affordable) reference tariff as well as the ceiling reference tariff for 2.1mtpa. Queensland Rail proposed that a Loss Capitalisation Account be included in AU2 which would keep record of the difference between the ceiling reference tariff and what is actually paid at the affordable reference tariff. The QCA would approve the Loss Capitalisation Account balance annually. Queensland Rail also proposed that if tonnages were expected to reach 4.1Mtpa during AU2's term this would trigger a reset of the reference tariff.

In proposing this approach Queensland Rail bore the risk that the New Acland Stage 3 mine would not be approved, and that Queensland Rail would not be able to recover its efficient revenue, i.e. to not be able to recover the balance in the Loss Capitalisation Account.

This approach was supported by the mines and the QCA. The QCA approved the following in their AU2 Final Decision:

- a ceiling Reference Tariff: $36.46/000 gtk ($FY21); and
- an incremental (affordable) Reference Tariff: $21.50/000 gtk ($FY21) ($26.42 / 000 gtk in $FY26).

As at 30 June 2023, the Loss Capitalisation Account is expected to have a balance of [redacted], owed to Queensland Rail. However, the 2022/23 financial year numbers are not due to be submitted to the QCA until 31 December 2023.

The Loss Capitalisation Account has been retained in DAU3 minus the AU2 4.1Mtpa reference tariff reset trigger (the trigger is discussed below). This is because it will not be known if there is a carryover amount from AU2 to AU3 until the full reset of the AU2 reference tariff.

2.12.1 AU2 4.1Mtpa trigger - reference tariff reset

AU2 included a mandatory reset of the coal reference tariffs if contract tonnages were expected to reach 4.1 Mtpa. The 4.1Mtpa reference tariff reset has triggered and Queensland Rail expects tonnages in the West Moreton System will exceed 4.1 million tonnes in FY24. The reset is to be done in the form of a Draft Amending Access Undertaking (**DAAU**) and the QCA will have the same power as an initial undertaking notice under the QCA Act when assessing the DAAU.

Queensland Rail has not dealt with the recovery of the outstanding Loss Capitalisation Account in DAU3 (as discussed above). This is because it is first necessary for Queensland Rail to develop its DAU2 submission (DAAU for the 4.1Mtpa trigger) to gain an understanding of the level of the revised reference tariff and consider whether it is affordable to include Loss Capitalisation Account recovery in only AU2 or, alternatively depending on the numbers, spread it across AU2 and DAU3. Queensland Rail intends to make a submission by the end of FY24 on the AU2 4.1Mtpa tariff reset and proposed treatment of the Loss Capitalisation Account.

As it stands the QCA will undertake two separate regulatory processes, including two consultation processes, two draft decisions, two final decisions etc. Queensland Rail and industry are seeking a way to combine these processes for greater efficiencies.

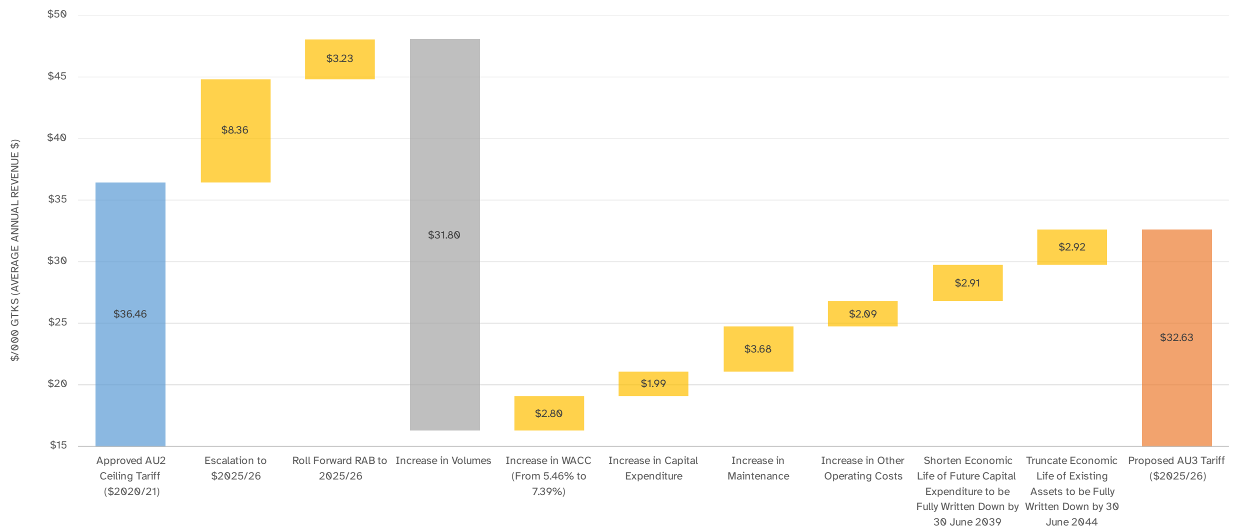
2.12.2 AU2 4.1Mtpa Trigger – additional AU2 capital

Queensland Rail plans to include additional capital in FY24 and FY25 which will result in total AU2 capital being above the AU2 capital indicator. This is to ramp up the capital for the increased West Moreton System coal tonnages. Waiting until AU3 starts will affect lead times and the DAU3 capital works required for 9.6Mtpa will not be achieved.

2.13 The DAU3 West Moreton System reference tariff

As stated earlier, the actual reference tariff that was meant to be paid was the ceiling reference tariff. Below is the comparison between the AU2 ceiling reference tariff and the DAU3 proposed reference tariff.

Figure 17: Indicative West Moreton System Reference Tariff Movements from AU2 Tariff



Queensland Rail is seeking QCA approval of the following reference tariffs:

- West Moreton System coal reference tariff (headline one-part): **$$32.63/000gtk** ($2025-26); and
- Metropolitan System reference tariff (headline one-part): **$21.93/000 gtk** ($2025-26).

Queensland Rail has developed the DAU3 West Moreton System reference tariff at a time of record forecast future volumes and high international coal prices. The development of the reference tariff has involved preparing detailed capital, maintenance and operational programs for the 9.6Mtpa forecast and provided external peer review on the capital and maintenance programs from AECOM. Queensland Rail has also provided expert reports from HoustonKemp on WACC, accelerated depreciation and stranding asset risk - HoustonKemp/AME have provided advice that the volume weighted remaining life of mines in the West Moreton System is between 14.4 years and 19.1 years, as at 1 July 2025.

The projected Metropolitan System reference tariff has assumed 3% escalation per annum for the next two years. However, the actual reference tariff will be updated by actual CPI post release of ABS CPI in April 2025.

3. Metropolitan System Reference Tariffs

Summary: The Metropolitan System Reference Tariff is 21.93 gtk ($2025-26)

The DAU3 (and AU2) Metropolitan System reference tariff is calculated under the below methodology:

- CPI to apply to the Metropolitan System reference tariff; and
- a separate Metropolitan System incremental capacity charge was to apply to recover coal-specific investment and a share of relevant freight-specific investment on the network.

As neither AU3 does not propose any new coal-specific investment the projected Metropolitan System reference tariff has assumed 3% escalation per annum for the next two years. However, the Metropolitan System tariff will be updated post release of ABS CPI in April 2025.

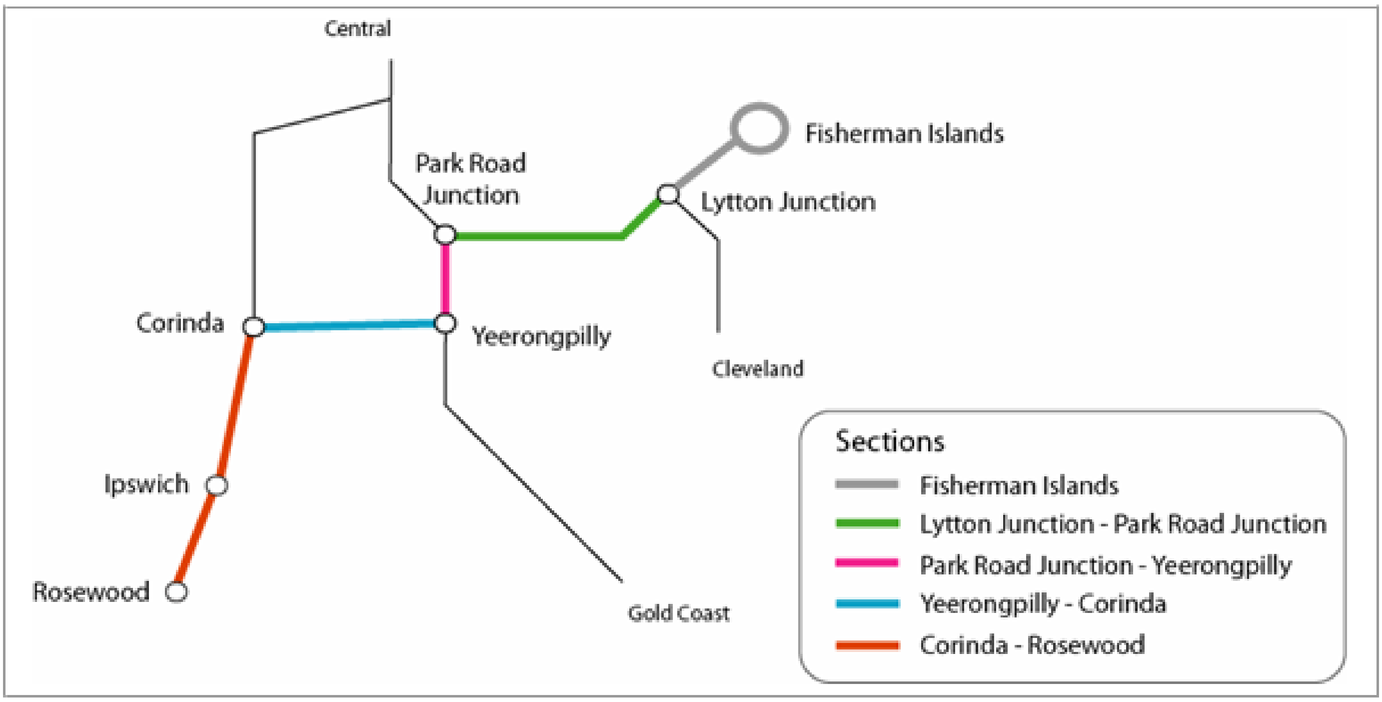
This methodology is used due to the difficulty in determining a RAB in a system that has passenger train services, coal train service and non-coal fright services.

3.1 Metropolitan System Characteristics

Coal carrying train services originating in the West Moreton System traverse Queensland Rail's Metropolitan System[31] along approximately 80 route kilometres from Rosewood to the Port of Brisbane (Fisherman Islands). They traverse the Ipswich, Beenleigh and Cleveland suburban lines and then the dedicated dual gauge freight and coal (from Lytton Junction) lines to reach Fisherman Islands. The Metropolitan System has a QCA approved reference tariff for coal carrying train services.

[31] The Metropolitan System means that part of the Network bounded to the north by (and including) Nambour station and to the west by (and including) Rosewood and including all branch lines comprised in that part of the Network. Coal trains travel on the System between Rosewood and the Port of Brisbane.

Figure 18: Metropolitan System Coal Route: Rosewood to Fisherman Islands (Port of Brisbane)



3.2 Metropolitan System reference tariff

3.2.1 AU2 approach to the Metropolitan System reference tariff

Fisherman Islands to Rosewood is dominated by metropolitan passenger services and hence the track quality is higher than that required for coal carrying train services. Assessing a cost for coal carrying train services for this section of track would be a sizeable task likely requiring a valuation, optimisation (in relation to track quality) and allocation (in relation to traffic type).

While previous DORC valuation exercises have been carried out on the Rosewood to Macalister and Macalister to Columboola sections, by both the QCA and QR Network, no such exercise has been attempted for Fisherman Islands to Rosewood. A valuation exercise would require a considerable amount of time and incur significant costs with the likely outcome of an appraisal appreciably more than that for assets west of Rosewood. Subsequent optimisation and allocation processes would act to reduce the magnitude of the DORC but would be complex and difficult to carry out.

To avoid this complexity, Queensland Rail had previously applied the coal reference tariff derived from Rosewood to Columboola building blocks to the entire route through to Fisherman Islands as this would see an appropriate contribution being made to costs and assets in the Brisbane Metropolitan System. That is, the West Moreton System was considered to be a reliable proxy of the cost for freight services and so was also applied to the Metropolitan System.

The proxy methodology means that the coal contribution to common costs on the Metropolitan System is based on costs assessed on a network where the specific costs that apply to coal services are easier to identify and assess (i.e. the West Moreton System). This is because, among other things, the West Moreton System costs reflect coal's share of fixed costs and a share of the wear and tear (i.e. variable costs) that the coal trains originating in the West Moreton System impose on rail infrastructure.

In its 2016 Final Decision on AU1, the QCA decided that the reference tariff developed for the West Moreton System that would have applied from 1 July 2013 should apply to the Metropolitan System as well. From that date:

- CPI was to apply to the Metropolitan System reference tariff; and
- a separate Metropolitan System incremental capacity charge was to apply to recover coal-specific investment and a share of relevant freight-specific investment on the network.

For AU2 the AU1 Metropolitan System reference tariff was escalated via CPI. No coal-specific capital expenditure is anticipated to be spent for the AU2 period, so there is no incremental capital charge.

Queensland Rail is not proposing coal-specific capital expenditure for DAU3 for the Metropolitan System and is seeking to continue to Metropolitan System reference tariff by CPI.

4. Summary of Variations Between DAU2 and DAU3

AU2 Clause	Issue	Proposed Change
Part 1 - Application and Scope		
1.1	Duration	No change - A Term of five years being the same Term as AU2
Part 2 - Negotiation Process		
2.9.2	Mutually exclusive access applications (**Queuing**).	No change to process Due to the complexity of the AU2 drafting in relation to queuing, Queensland Rail has revised and simplified the drafting. In doing this all of the current principles have been retained, which will provide business continuity if there is a current capacity constraint.
Part 5 – Reporting		
5.1.1(a)	Obligation to publish Quarterly Report by the date which is the last day of the month subsequent to the subject Quarter.	Increase approval time to six weeks after the last day of the Subject Quarter. The requirement to publish the Quarterly Report by the date, which is the last day of the month subsequent to the subject Quarter, was first introduced in QR's 2006 Access Undertaking (**AU**).

AU2 Clause	Issue	Proposed Change
		The timeframe was subsequently included in: • QR Network's 2008; • Queensland Rail Ltd's AU1 (2020 AU): and • Queensland Rail Ltd's AU2 (2020AU). However, the reporting in AU1, AU2 and AU3 is materially more complex (and informative) than in previous AU's. Previously, reporting primarily included only healthy and unhealthy trains, whether delays affected 'Bulk Coal and Minerals', 'Other Freight Services' or 'Long Distance Passenger Services'. Reporting was not done on a system basis. Reporting included five quarters of information but with no analysis (refer to **Attachment 8** for a copy of the reporting information in the, "QCA Quarterly Performance Report – Q4 2012/13" produced under the 2008AU). The current reporting is far more complex than this. The 'four week' current reporting requirements did not envisage the complexity of the current quarterly reporting. Reporting now includes performance information, for example, broken down by the following Systems: Coal, Bulk Minerals, Freight and Long Distance Passenger Trains, and is undertaken for the following systems: West Moreton, Mount Isa, the North Coast Line and the Metropolitan System. Additionally, Queensland Rail provides analysis and explains material differences between the current quarter and the previous quarter which is time consuming and

AU2 Clause	Issue	Proposed Change
		requires the involvement of numerous Queensland Rail personnel. Queensland Rail's Vizirail System does not produce the required data until eight to ten days in the month the report is produced. The current timeframe is not sufficient for the detailed task that is required. (Refer to **Attachment 9** for a copy of an AU2 Quarterly Report).
5.1.1(c)	Quarterly Report must be accompanied by a responsibility statement signed by the Chief Executive Officer.	Responsibility Statement to be signed by Head of Regional (or person with equivalent title).
5.1.2(a)(2)(D)	Requirement to report on the number of times during the subject Quarter that Network Controllers made a decision to deviate from a Daily Train Plan if it is reasonably necessary to do so to remedy, mitigate or avoid the operation of network congestion.	Queensland Rail has removed this requirement. Queensland Rail is the only regulated entity to report on a Train Control KPI in this level of detail and complexity. Queensland Rail's Vizirail System does not have the ability to record this KPI and Queensland Rail considers that Train Controllers need to be fully focused on the task of network control, including the task of managing network congestion. Train control is a safety critical function. It is not appropriate to impose any unnecessary administrative burden on train controllers. In addition, there is already a Train Control KPI being AU2's Clause 5.2(a)(viii) being: "*the number of written complaints by Access Holders that are verified by Queensland Rail (acting reasonably) as correct in connection with any of the following:………..(E) the application of the Network Management Principles*"

AU2 Clause	Issue	Proposed Change
		The Network Management Principles specify the Train Control obligations. Therefore, the AU2 clause already includes a Train Control KPI. Train control is a safety critical function.
5.1.2(a)(x) – (xi)	Requirement to report on Possession start and end times, number and duration. Includes 'Ad Hoc Possession' (a Possession which is not entered into the Master Train Plan).	Remove obligation to report on Ad Hoc Possessions. Queensland Rail's Systems do not have the capacity to report on Ad Hoc Possessions. Start and end times for these possessions are not recorded in Vizirail which would require expensive enhancements by an external company to change, and Queensland Rail would not be able to recover these costs from customers. Ad Hoc Possessions only have a minor effect on delays with these works often only having a single digit delay. Planned Possessions are the overarching cause of any delays that may occur, and these are reported on.
5.1.2(b) & 5,12(a)(x) – (xi)5.1.2	An amendment has been made so that this KPI does not apply to Overall Track Condition (**OTCI**), Temporary speed restrictions (**TSRs**) & possessions. These cannot be reported by train type. ".....(b) the information referred to in clauses 5.1.2(a)(ii) to 5.1.2(a)(xi), will be limited to, and aggregated by, Train Services operated for the purpose of: (i) transporting coal; (ii) transporting bulk minerals (other than coal); (iii) transporting freight products; and long distance passenger services	An amendment has been made so that this KPI does not apply to Overall Track Condition (**OTCI**), Temporary speed restrictions (**TSRs**) & possessions. These cannot be reported by train type as required by the provisions. This was a drafting error. The requirement will continue to apply to the other KPIs covered by the provision.

AU2 Clause	Issue	Proposed Change
Part 7 – Definitions and Interpretation		
Definition of 'Network Controller'		Change defined term to 'Network Control Officer'. This term is now used within Queensland Rail.
Schedule F – Network Management Principles		
2.4 Disputes	Possession (other than an Emergency or Urgent Possession) cannot proceed if an affected third party makes a bona fide Dispute. *"Disputes* (a) *Subject to **clause 2.4(b)** and except in relation to Emergency Possessions and Urgent Possessions, if there is a bona fide dispute between an Access Holder, Rolling Stock Operators and Queensland Rail in relation to any proposed changes or modifications to the MTP or the scheduling of an Ad Hoc Planned Possession, the proposed change will not take effect until the dispute has been resolved using the dispute resolution provisions of the Undertaking.* (b) *A dispute in relation to a Regular Planned Possession or an Ad Hoc Planned Possession must be commenced in accordance with the dispute resolution provisions of the Undertaking within 30 days of:* (i) *in the case of a Regular Planned Possession, the date of publication of the MTP which includes that*	No other rail infrastructure provider in Australia is subject to this requirement. It is inconsistent with established precedent that has been set in Queensland and other states. For example, there is no equivalent provision in ARTC's Hunter Valley undertaking or in Aurizon Network's undertaking (an integrated rail organisation). It has also not been applied in the ARTC interstate undertaking. Similar to the other rail network providers, Queensland Rail's undertaking has a Dispute mechanism that applies equally to all relevant matters covered by the undertaking. This is the mechanism that should apply to prevent overregulation.

AU2 Clause	Issue	Proposed Change
	Possession; and (ii) *in the case of an Ad Hoc Planned Possession, the date of notification of the Possession in accordance with* ***clause 2.1(a)*** *ofthis* ***schedule F****.*"	
Schedule G – Operating Requirements Manual		
	General.	Update all references to legislation to ensure currency. Update of all references to Queensland Rail Standards and Procedures to ensure currency.
4.4.1	Detailed Investigations into Category A Notifiable Occurrences may be undertaken jointly by Queensland Rail and the Operator.	Should the parties not agree on Terms of Reference within the Instrument of Appointment, Queensland Rail will conduct an independent investigation and supply the final report to the Operator.
4.4.1	Requirement for Queensland Rail and Operator to have a representative and investigation at the site of a Notifiable Occurrence within four hours, or as soon as practicable, after notification of the Notifiable Occurrence.	Change to require a representative only on site within four hours (not investigators).
4.4.1	Where Operator is the lead agent for an investigation, the Operator's investigation process will apply, subject to the requirements of the access agreement and Operating Requirements Manual.	Queensland Rail may still undertake a separate incident investigation.
4.4.1	Routine investigations into Category B Notifiable Occurrences may be undertaken jointly by Queensland Rail and the Operator.	Remove this requirement. Only Category A investigations will be jointly run.
4.4.5	Sharing of Information and evidence relevant to an investigation.	Queensland Rail has clarified in in DAU3 that information sharing is not limited to joint investigations. Any information

AU2 Clause	Issue	Proposed Change
		requested relating to an incident should be provided by both parties in a timely manner.
Schedule H – Standard Access Agreement		
Clause 16	Insurance Requirements. Operator's public liability policy must cover agents/consultants/subcontractors.	Remove this requirement. Replace with a requirement for the Operator to ensure that agents/consultants/subcontractors take out their own insurance.
Clause 22	New assignment clause Add a new clause to apply in circumstances where Queensland Rail ceases to have a right to operate all or part of the Network.	Add clause 22.1 22.1 Assignment (a) if Queensland Rail no longer has or expects to no longer have a right to operate the Network or any part of the Network, it may Assign all or part of its rights or obligations under this agreement to an Assignee who has the expertise, the financial resources and other relevant resources to enable it to provide the relevant Access Rights without the prior consent of the other Parties provided that Queensland Rail procures the Assignee to covenant by deed with the other Parties to provide the Access Rights to the extent of the rights and obligations Assigned to the Assignee. (b) Queensland Rail may Assign all or part of its rights or obligations under this agreement to an Assignee

AU2 Clause	Issue	Proposed Change
		who has the expertise, the financial resources and other relevant resources to enable it to discharge the obligations of Queensland Rail under this agreement without the prior consent of the other Parties provided that Queensland Rail procures the Assignee to covenant by deed with the other Parties to be bound by and to perform the obligations of Queensland Rail under this agreement to the extent of the rights and obligations Assigned to the Assignee. (c) On the Assignee entering into a deed required under clause 22.1(a) or 22.1(b), and subject to that deed becoming effective in accordance with its terms, Queensland Rail is released and discharged from further liability under this agreement in respect of the obligations which the Assignee has undertaken to be bound by and to perform.

Attachment 1 HoustonKemp Economists Expert Report on WACC

Queensland Rail’s Weighted Average Cost of Capital

Expert report for Queensland Rail

16 August 2023

HoustonKemp.com

Report authors

Brendan Quach

Martin Chow

Claire Rollinson

Contact Us

Sydney
Level 40
161 Castlereagh Street
Sydney NSW 2000

Phone: +61 2 8880 4800

Disclaimer

Contents

Contents

Figures

Tables

Executive summary

This report has been written for Queensland Rail in the context of its submission to the Queensland Competition Authority (QCA) for its second Access Undertaking (AU2) reference tariff reset and third Draft Access Undertaking (DAU3).

This report sets out our estimated weighted average cost of capital (WACC) for the West Moreton line and forecast inflation. We have calculated the WACC in a manner consistent with the QCA's current preferred WACC methodology. We have also adopted assumptions used to calculate the WACC in Queensland Rail's current access undertaking determination and adjusted the WACC to reflect current market environment.

The QCA updated its preferred WACC methodology in July 2023.[1] We completed a full review of the report as well as recent QCA decisions to identify the QCA's current preferred approach. We have adopted the QCA's current preferred approach in full to derive our WACC estimate.

We have also adopted the following parameters from Queensland Rail's AU2 WACC determination:

- the benchmark equity beta;
- the benchmark gearing ratio; and
- the benchmark credit rating.

Finally, we have included a top-down adjustment to the WACC to account for volume risks based on QCA's new top-down assessment of the reasonableness of the overall WACC.

We summarise our estimate of Queensland Rail's WACC for the West Moreton line the period ending 30 April 2023 in table 1 below.

Table 1: Bottom-up WACC assessment as at 30 April 2023

Parameter	Estimate
Credit rating	BBB
Risk free rate	3.37%
MRP	6.5%
Asset beta	0.48
Gearing	40%
Equity beta	0.71
Debt beta	0.12
Cost of equity	8.02%
Debt financing costs	0.10%
Cost of debt	4.95%
Gamma	0.484
Bottom-up WACC	**6.79%**

[1] QCA, *Rate of return review*, Final report, November 2021.

Parameter	Estimate
Top-down adjustment (1.5% to the debt margin)	0.60%
WACC after top-down adjustment	**7.39%**

Further, we estimate forecast inflation of 3.00 per cent for the five year period ending 30 June 2028 using an approach consistent with the QCA's methodology. For the years 2028/29 and 2029/30 we recommend that Queensland Rail adopt a forecast annual inflation rate of 2.50 per cent, consistent with the QCA's preferred forecasts for inflation beyond the fifth year ahead.

1. Introduction

This report has been written for Queensland Rail in the context of its submission to the Queensland Competition Authority (QCA) for its second Access Undertaking (AU2) reference tariff reset and third Draft Access Undertaking (DAU3).

In this report, we provide an indicative updated weighted average cost of capital (WACC) estimate for Queensland Rail for the West Moreton line. This estimate relies on parameters consistent with the QCA's current preferred WACC methodology, as described in its WACC report[2] and indicated by decisions it made following the release of this report.

The primary updates we made to Queensland Rail's estimated WACC were changes to the time-variant parameters (ie, risk free rate and debt margin). However, we have also updated other parameters where the QCA altered its preferred approach in recent decisions.

The resulting indicative WACC estimate is reflective of the 30 April 2023 market environment, which we anticipate will be updated closer to the AU2 reset and the start of DAU3, using the averaging period nominated by Queensland Rail.

Finally, we estimate forecast inflation for the five year period ending 30 June 2028 using an approach consistent with the QCA's methodology, and for the years 2028/29 and 2029/30, consistent with the QCA's preferred forecasts for inflation beyond the fifth year ahead.

The structure of this report is as follows:

- section 2 sets out a summary of QCA's preferred approach to estimating the rate of return for regulated businesses as detailed in its 2023 Rate of return review[3] and recent regulatory determinations, specifically highlighting any differences in the QCA's preferred approach compared to that previously used in determining Queensland Rail's AU2 WACC;
- section 3 sets out the underlying parameters underpinning our proposed WACC estimate, which are updated where applicable;
- section 4 sets out our WACC estimate, including top-down adjustments; and
- section 5 sets out our inflation estimates, which we derive using an approach consistent with the QCA's methodology.[4]

[2] QCA, *Rate of return review*, Final report, July 2023.

[3] QCA, *Rate of return review*, Final report, July 2023.

[4] QCA, *Inflation forecasting*, Final position paper, October 2021, p 41.

2. Summary of the QCA's current WACC approach

The QCA completed its rate of return review in 2021, in which it reconsidered its approach to determining rates of return for businesses subject to its regulatory regimes. The final report was published on 9 November 2021, following publication of a draft report on 28 June 2021.[5] A further updated final report was published by the QCA in July 2023.[6]

The most significant changes to the rate of return were the statements that the QCA prefers:

- the immediate adoption of a trailing average 10 year cost of debt, which at the time would give rise to a return on debt that is substantially higher than the on-the-day approach; and
- the use of a market risk premium (MRP) based on an arithmetic average of excess returns on the market portfolio since 1958, which the QCA most recently estimated as equal to 6.5 per cent, with no weight to be placed on other estimates of the MRP including geometric average historical excess returns, the Wright approach, surveys of market practitioners or the dividend growth models.

Further, the QCA also indicated that it would undertake a top-down assessment to determine if the bottom-up WACC value (where individual WACC parameters are estimated) provides an overall rate of return that is appropriate in the circumstances.

Since the release of the QCA WACC report, the QCA released guidelines for rural irrigation pricing proposals in March 2023. In these guidelines, the QCA confirmed that it will apply the methodology set out in its November 2021 WACC report, ie:[7]

> We apply a nominal post-tax WACC in our regulatory reviews. Our latest considerations of how we apply our WACC methodology are set out in our final report of our rate of return review in November 2021.

We set out our approach to estimating individual WACC parameters and factors that would likely affect a top-down assessment of Queensland Rail's WACC in the remainder of this report.

[5] See https://www.qca.org.au/project/rate-of-return-matters/rate-of-return-review-2021/, accessed 30 May 2023.

[6] QCA, *Rate of return review*, Final report, July 2023.

[7] QCA, *Rural irrigation price review 2025–29*, Guidelines for pricing proposals, March 2023, p 24.

3. WACC parameters

3.1 Risk free rate

The QCA explained that it will calculate the risk free rate input to the cost of equity by:[8]

- using 10-year Australian Government nominal bond yields
- averaging the yields over a period nominated by the regulated entity that is between 20 and 60 business days in length, ending as close as reasonably possible to the commencement of the regulatory period.

The QCA's approach still reflects its historical practice of estimating the risk free rate over a short period that ends as close as reasonably possible to the start of the access period. The QCA similarly explained that:[9]

> If a final decision is delayed, we do not consider it is necessary for an entity to nominate a revised averaging period. In particular, where the delayed determinations are made as if they were in effect from the original commencement of the regulatory period, the original averaging period would remain appropriate. This approach is consistent with our past practice and regulatory practice in Australia.

However, the QCA allowing the regulated entity to select an averaging period of between 20 and 60 days represents a departure from the QCA's previous application of applying a 20-day averaging period. The QCA explained that its change in approach may smooth the effects of temporary data shocks by allowing regulated entities to select longer averaging periods.[10]

Queensland Rail must prospectively nominate an averaging period of between 20 and 60 days for its AU2 regulatory reset and DAU3 – this must be done in advance of the averaging period commencement date, to reduce the potential for 'cherry picking' of an averaging period.[11]

In its November 2021 rate of return review, the QCA stated that it would use 10-year daily Australian Government bond rates published by the RBA (F16 table),[12] but this table was discontinued on 31 March 2023.[13] the QCA's final report (July 2023) states that it will now use 10-year Australian Government nominal bond yields published in the RBA's table F2 to estimate the risk-free rate.[14]

Consistent with Queensland Rail's AU2, we adopt a risk-free rate using a 20-business day averaging period for our WACC estimates. Our indicative estimate of the 10-year risk free rate using Australian bond yields ending April 2023 is 3.37%.[15] This rate will need to be updated closer to the AU2 reset and the start of DAU3, using an averaging period nominated by Queensland Rail.

[8] QCA, *Rate of return review*, Final report, July 2023, p 83.

[9] QCA, *Rate of return review*, Final report, July 2023, p 85.

[10] QCA, *Rate of return review*, Final report, July 2023, p 85.

[11] QCA, *Rate of return review*, Final report, July 2023, p 85.

[12] QCA, *Rate of return review*, Final report, July 2023, p 84.

[13] *https://www.rba.gov.au/statistics/tables/changes-to-tables.html, accessed* 5 June 2023.

[14] Available at *https://www.rba.gov.au/statistics/tables/,* accessed 5 June 2023. See QCA, *Rate of return review*, Final report, July 2023, p 84.

[15] HoustonKemp analysis of RBA table F2, available at *https://www.rba.gov.au/statistics/tables/,* accessed 5 June 2023.

3.2 Market risk premium

The QCA explained in its WACC review that it has emphasised providing a simpler and more transparent approach to calculating the market risk premium (MRP). By consequence, the QCA stated in the WACC report that:[16]

> …we will use the Ibbotson method as the basis for setting the MRP as part of our future reviews.

The QCA noted that:[17]

> We do consider that estimates from the dividend growth model remain relevant. However, given the limitations of these methods, we will use their estimates to provide directional guidance when considering the overall cost of equity (see below). We will not use the dividend growth model estimate or the Wright method for directly determining the MRP…
>
> However, in some economic conditions—such as when there is heightened investor risk aversion, market volatility or abnormal interest rates—we recognise that our [Ibbotson method] approach may not result in a reasonable estimate of the cost of equity parameters. In these instances, rather than adjusting individual parameters, we will instead adjust our overall cost of equity estimate as part of our top-down analysis.

The Ibbotson approach is one of the five estimation methodologies by reference to which the QCA estimated the MRP in previous decisions. The QCA explained that:[18]

> The Ibbotson method assumes that the average historical excess return over an appropriate historical period is a relevant estimate of the forward-looking MRP. For a long time series of historical returns, the resulting average will only change slowly over time.

The QCA further explained that it would continue to use the same historical data, estimation period and averaging methodology that it did in previous decisions,[19] which includes only using the 1958 series.

In its 2020 decision for Queensland Rail, the QCA derived an estimate of the MRP equal to 6.5 per cent using the Ibbotson Approach,[20] on a gamma of 0.484 and a utilisation rate of 0.55.[21] This is also consistent with the MRP it derived for Seqwater in 2022.[22]

We apply the approach described above, and derive an indicative MRP of 6.5 per cent, with data to December 2022, which is consistent with the QCA's decision for Queensland Rail in AU2.

3.3 Gearing

The QCA notes that the gearing for a regulated entity is likely to be relatively stable over time, due to relatively stable cash flows and low demand elasticity. The QCA stated that it will use a firm's gearing ratio for the current regulatory period as a starting point for its assessment of the efficient level of gearing for the next regulatory period.[23]

[16] QCA, *Rate of return review*, Final report, July 2023, p 55.

[17] QCA, *Rate of return review*, Final report, July 2023, p 55.

[18] QCA, *Rate of return review*, Final report, July 2023, p 56.

[19] QCA, *Rate of return review*, Final report, July 2023, pp 56-60.

[20] QCA, *Queensland Rail 2020 draft access undertaking*, Decision, February 2020, p 48.

[21] We discuss gamma and utilisation rate parameters further in section 3.6.

[22] QCA, *Seqwater Bulk Water Price Review 2022–26*, Final report, March 2022, p 64.

[23] QCA, *Rate of return review*, Final report, July 2023, p 22.

On this basis, we adopt a gearing ratio of 40 per cent consistent with the QCA's decision for Queensland Rail's AU2.[24]

3.4 Equity beta

The QCA did not specify the equity beta applying to the Queensland Rail's service in its rate of return review final report, explaining that:[25]

> At this time, we have not specified a reasonable beta for the firms subject to our regulatory regime. Also, we have not sought to undertake a comparison of the relative risk features against listed comparator firms. These tasks will be undertaken in the regulatory decision specific to each regulated entity.

The QCA explained that its methodology for estimating equity beta:[26]

> … involves a two-step process—generating industry samples by identifying relevant firms and then estimating the betas for the firms that make up these industry samples.

That said, the QCA did provide some guidance on how the equity beta should be measured including:[27]

- removing firms with a market capitalisation below $150 million United States dollars;
- calculating the beta for any given firm by regressing its returns data against the returns of a proxy for the market portfolio in the home economy;
- using 10-year data as the primary means to calculate betas, although the QCA will use five-year betas as a tool to identify changing risk profiles for businesses in certain sectors;
- adopting rolling average weekly beta estimates (ie, an average of estimates generated by all five reference day combinations);
- using the Brealey-Myers levering formula (with a 0.12 debt beta); and
- performing ordinary least squares (OLS) regressions.

In its determination for Queensland Rail in AU2, the QCA used two comparator sets, being regulated energy and water businesses, and toll roads. The QCA concluded that the asset beta for Queensland Rail was likely to be less than the asset beta for toll roads but greater than the asset beta for regulated energy and water businesses.[28]

In its rate of return review, the QCA provided an updated set of regulated energy and water and toll roads comparator firms it will use. For the purpose of calculating Queensland Rail's equity beta, we calculate 10-year and 5-year rolling average asset betas for the sample of firms contained in Appendix E of the QCA's rate of return review.[29]

We note that since the release of the QCA's rate of return review, three of its comparators have been acquired, ie:

- Spark Infrastructure Group, ticker SKI AU Equity, was acquired on 24 December 2021;
- AusNet Services, ticker AST AU Equity, was acquired on 18 February 2022; and
- Atlantia Spa, ticker ATL IM Equity, was acquired on 9 September 2022.

[24] QCA, *Queensland Rail 2020 draft access undertaking*, Decision, February 2020, pp 38-39.

[25] QCA, *Rate of return review*, Final report, July 2023, p 66.

[26] QCA, *Rate of return review*, Final report, July 2023, p 82.

[27] QCA, *Rate of return review*, Final report, July 2023, pp 74-80.

[28] QCA, *Queensland Rail 2020 draft access undertaking*, Decision, February 2020, p 35.

[29] QCA, *Rate of return review – Appendix E*, Final report, November 2021, pp 105-107.

As a result of the Atlantia Spa acquisition, the QCA's sample of toll roads for comparison has reduced from four to three. Consequently, it is possible that the QCA will reconsider the comparator set for determining the upper bound of Queensland Rail's equity beta. Nevertheless, we adopt the sample of three toll roads for the purposes of our equity beta estimates.

We present 10-year weekly asset beta estimates in table 3.1, which are our preferred estimates, and are very similar to the QCA's estimates in its WACC review. Alongside these we include our five-year asset beta estimates, which indicate that asset betas have marginally increased recently for regulated electricity and water firms, and have increased recently for toll road comparators.

Table 3.1: Weekly asset beta estimates

	Count	Mean	Median	Mean	Median	Count	Mean	Median
	HK estimates – 5 year to 30 April 2023			*HK estimates – 10 year* to 30 April 2023		*QCA WACC review – 10 year*		
Electricity and water	37	0.41	0.40	0.39	0.38	39	0.39	0.39
Toll roads	3	0.66	0.64	0.59	0.58	4	0.57	0.54

Source: HoustonKemp analysis of Bloomberg data; QCA, Rate of return review – Appendix E, Final report, November 2021, pp 105-107.

For cross-checking, we present our estimates of the mean of 10-year weekly asset betas alongside those determined in Queensland Rail's AU2 and presented in the QCA WACC review in table 3.2 below. These estimates demonstrate that an asset beta of 0.50, consistent with Queensland Rail's AU2 decision, still lies within the range of regulated electricity and water businesses (as a lower bound) and toll roads (as an upper bound).

Table 3.2: Mean of 10-year weekly asset betas

Industry	Queensland Rail AU2	QCA WACC review	HK estimate, 30 April 2023
Electricity and water	0.38	0.39	0.39
Toll roads	0.51	0.57	0.59
Queensland Rail	0.50	N/A	0.50

Source: HoustonKemp analysis of Bloomberg data; QCA, Queensland Rail 2020 draft access undertaking, Decision, February 2020, p 35; QCA, Rate of return review – Appendix E, Final report, November 2021, pp 105-107.

In terms of converting asset betas to equity betas, the QCA stated that it was moving away from its historical methodology of levering and delevering using the Conine formula, in favour of the Brealey-Myers levering formula, set out below:[30]

$$\beta_E = \beta_A\left(1+\frac{D}{E}\right) - \beta_D\frac{D}{E}$$

Where:

β_E = equity beta

β_A = asset beta

β_D = debt beta

[30] QCA, *Rate of return review*, Final report, July 2023, pp 79-80.

D = value of debt

E = value of equity

The QCA derived its asset beta of 0.5 and an equity beta of 0.71 for Queensland Rail in AU2 using the Conine formula. Under the Brealey-Myers formula and an asset beta of 0.50, the equity beta would be approximately 0.75, representing an increase of 0.04 compared to the 0.71 determined by the QCA for Queensland Rail in AU2.

However, we do not expect a change in the QCA's approach to delevering and levering to result in a change in Queensland Rail's approved equity beta. Consequently, we retain the equity beta of 0.71 from the QCA's determination for Queensland Rail in AU2 and backsolve for its asset beta, by which we get an asset beta of 0.48.[31] We note that this still lies within the range of 0.39 and 0.59, in accordance with our estimates presented in table 3.2.

3.5 Cost of debt

The QCA requires that a 'benchmark' cost of debt be estimated, which considers the following factors:[32]

- the benchmark entity's credit rating, which we note for Queensland Rail DAU2 was BBB;
- 10-year corporate bond yields reported by the RBA; and
- an unweighted (simple) 10-year trailing average (with no transition), applied to the entire cost of debt, with annual debt tranche refinancing.

Further, the QCA indicated that the timing of updates to allowable revenue for the trailing average cost of debt could occur either annually or through a true-up at the beginning of the next regulatory period.[33]

This represents a departure from the QCA's previous approach of taking the 20-day prevailing rate for the debt risk premium as at 15 November 2019.[34] Consequently, we apply a 10-year trailing average to calculate Queensland Rail's cost of debt.

In addition, we note that the QCA applied an adjustment to Queensland Rail's debt risk premium to account for potential short-term volume uncertainty, reflecting that its assessment of Queensland Rail's credit rating under a high level of contracted tonnes yielded a BBB rating. The QCA did this by taking the difference between US corporate bonds rated BBB and BB using Bloomberg data, which over the 20-day averaging period resulted in a debt risk premium uplift of 1.6 percentage points.[35]

Where top-down adjustments are required, the QCA has amended its approach to no longer apply adjustments to individual WACC parameters, but instead to amend a business' overall WACC.[36] Converting the 1.6 percentage point debt risk premium uplift results in an overall WACC adjustment of 0.64 percentage points.[37]

For our analysis, we:

- continue to adopt a BBB benchmark credit rating;
- provide ten annual cost of debt estimates ending 30 April 2023 (ie, 1 May 2013 to 30 April 2014, 1 May 2014 to 30 April 2015 and 1 May 2022 to 30 April 2023), from which an indicative trailing average cost of

[31] We round these numbers to two decimal places for our report but perform the calculations without rounding.

[32] QCA, *Rate of return review*, Final report, July 2023, p 28.

[33] QCA, *Rate of return review*, Final report, July 2023, pp 44-45.

[34] QCA, *Queensland Rail 2020 draft access undertaking*, Decision, February 2020, p 43.

[35] QCA, *Queensland Rail 2020 draft access undertaking*, Decision, February 2020, pp 43-45.

[36] QCA, *Rate of return review*, Final report, July 2023, p 19.

[37] 1.6 percentage points × 40% debt gearing = 0.64 percentage points.

debt can be estimated, noting that this would need to be updated at a date closer to the AU2 reset and the start of DAU3;

- outline the advantages and disadvantages to Queensland Rail of proposing an annually updating WACC and end of period true-up; and
- apply an overall WACC adjustment to Queensland Rail's WACC to account for volume uncertainty, on the presumption that this still exists.

We present our ten annual cost of debt estimates to 30 April 2023 for a BBB credit rating in table 3.3 below. This results in a 10-year trailing average cost of debt of 4.85 per cent, excluding any uplift for volume uncertainty or refinancing costs.

Table 3.3: Cost of debt – 1 May 2013 to 30 April 2023

Start date	End date	Cost of debt
1/05/2013	30/04/2014	7.18%
1/05/2014	30/04/2015	5.09%
1/05/2015	30/04/2016	5.27%
1/05/2016	30/04/2017	4.69%
1/05/2017	30/04/2018	4.48%
1/05/2018	30/04/2019	4.65%
1/05/2019	30/04/2020	3.35%
1/05/2020	30/04/2021	2.78%
1/05/2021	30/04/2022	4.03%
1/05/2022	30/04/2023	6.95%
10-year trailing average		4.85%

Source: HoustonKemp analysis of RBA and Bloomberg data.

Consistent with the QCA's approach detailed in its rate of return review, we apply a 10 basis point uplift to the cost of debt for debt raising/refinancing costs.[38] Consequently, we estimate a cost of debt excluding any volume uncertainty uplift of 4.95 per cent. This compares to a cost of debt of 3.62 per cent (excluding the 1.6 percentage point uplift) approved for Queensland Rail in AU2.[39]

We note that Queensland Rail's DAU2 decision included an uplift for the whole access period of 1.6 percentage points to Queensland Rail's cost of debt to account for potential short-term volume uncertainty faced by West Moreton coal.[40] Under the QCA's new framework, any volume uncertainty risks and associated adjustments to Queensland Rail's WACC would now likely be included in the QCA's top down assessment of the reasonableness of bottom-up WACC estimates and are discussed below in section 4.2.

[38] QCA, *Rate of return review*, Final report, July 2023, p 50.

[39] QCA, *Queensland Rail 2020 draft access undertaking*, Decision, February 2020, p 45.

[40] QCA, *Queensland Rail 2020 draft access undertaking*, Decision, February 2020, pp 43-44.

3.6 Gamma and debt raising costs

In its rate of return review, the QCA determined the following values:[41]

- debt raising costs of 10 basis points which are included in the regulated cost of debt; and
- a gamma value of 0.484, based on a distribution rate of 0.88 (the average distribution rate of relevant top 50 companies on the ASX by market capitalisation) and a utilisation rate of 0.55 (the equity ownership of Australian listed companies).

The QCA noted that it would consider proposals for higher debt raising costs by individual businesses on a case-by-case basis, should they be able to demonstrate that they face efficient debt-raising costs that are higher than this amount.[42]

The QCA stated that it will base the utilisation rate on the equity ownership of Australian-listed companies using ABS data, and that its preliminary view is that a gamma of 0.484 calculated on a distribution rate of 0.88 and a utilisation rate of 0.55 is appropriate. It further observes that the gamma is similar to those adopted by other regulators, being 0.585 for the AER, and 0.5 for the ERA, ACCC and ESCOSA.

Since the release of the QCA rate of return review, the AER has marginally decreased the gamma in its rate of return instrument to 0.57,[43] and the ERA has maintained a gamma of 0.5 in its 2022 final gas rate of return instrument.[44] We did not observe any updated gamma values for the ACCC or ESCOSA.

We note that the gamma value of 0.484 is consistent with the QCA's determination for Queensland Rail's AU2. We are not aware of any further guidance released by the QCA since the rate of return review. Consequently, we adopt these values in our calculation of Queensland Rail's WACC.

[41] QCA, *Rate of return review*, Final report, July 2023, pp 28, 87-88.

[42] QCA, *Rate of return review*, Final report, July 2023, p 50.

[43] AER, *Rate of return instrument*, February 2023, cl 27.

[44] ERA, *2022 final gas rate of return instrument*, 16 December 2022, para 136.

4. WACC estimates

4.1 Bottom-up assessment

Table 4.1 summarises our prevailing estimate of the bottom-up WACC for Queensland Rail for the West Moreton line.

Table 4.1: Bottom-up WACC assessment as at 30 April 2023

Parameter	Estimate
Credit rating	BBB
Risk free rate	3.37%
MRP	6.5%
Asset beta	0.48
Gearing	40%
Equity beta	0.71
Debt beta	0.12
Cost of equity	8.02%
Debt financing costs	0.10%
Cost of debt*	4.95%
Gamma	0.484
Bottom-up WACC	**6.79%**

4.2 Top down assessment

The QCA indicated that it will assess whether the value estimated in the bottom-up exercise provides an overall WACC value that is reasonable given the risks faced by the firm.[45] The QCA continued:[46]

> …having the top-down approach allows us to exercise our judgement in circumstances where we consider the bottom up WACC value may not provide a reasonable overall rate of return for an entity. In circumstances where we apply a discretionary adjustment, we would provide our reasoning for the adjustment and for its size.

Whilst the QCA indicated that it will apply a degree of judgement in this assessment, it suggested that factors that it could consider include:

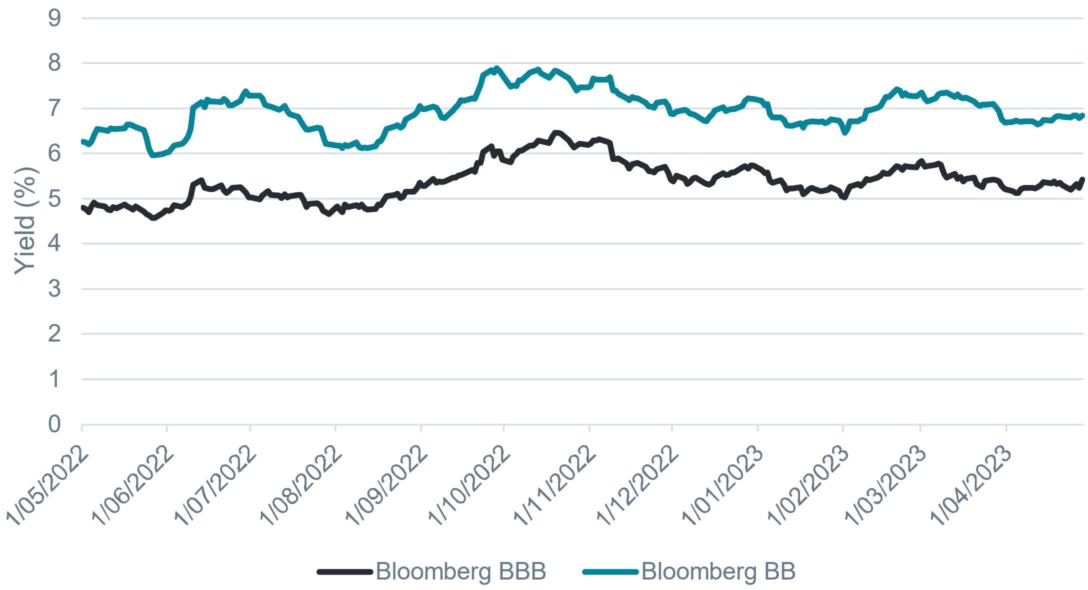
- heightened investor risk aversion and/or market volatility or abnormal interest rates;
- WACC values of other regulated entities with similar risk; and
- risks that are not captured in the WACC estimation framework.

[45] QCA, *Rate of return review*, Final report, July 2023, p 18.

[46] QCA, *Rate of return review*, Final report, July 2023, p 20.

For volume uncertainty, we have replicated the QCA analysis of the difference between US BBB and BB corporate bond yields. We find a debt risk premium adjustment of 1.5 percentage points using updated data, which converts to a top-down WACC adjustment of 0.6 percentage points (see figure 4.1, below).

Figure 4.1: Bloomberg BBB and BB corporate debt yields in the United States



Source: HoustonKemp analysis of Bloomberg data.

Table 4.2 sets out the impact of these adjustments on Queensland Rail's prevailing WACC for the West Moreton line.

Table 4.2: Bottom-up and top down WACC assessment

Parameter	Current BBB to BB margin
WACC before top-down adjustment	**6.79%**
Top-down adjustment	0.60%
WACC after top-down adjustment	**7.39%**

5. Inflation

The QCA stated that its final position paper aims to assist future regulatory submission by providing them with greater transparency and confidence in its inflation forecasting approach.[47] On this basis, the QCA developed a position in relation to how it will forecast inflation for future regulatory determinations.

The QCA's position is that forecast inflation will be calculated as follows.[48]

> Our position is to use short-term RBA forecasts for the first two years of the regulatory period and derive forecasts up to the fifth year ahead, using a linear glide path — from the RBA's short term forecast in year 2 to a rules-based anchor-point forecast in the fifth year ahead. Specifically, if the second-year forecast of headline inflation is:
>
> - less than or equal to 2 per cent, the anchor point would be set at 2.25 per cent
> - between 2 per cent and 3 per cent, the anchor point would be set at 2.5 per cent
> - greater than or equal to 3 per cent, the anchor point would be set at 2.75 per cent.

Since the release of its final position paper, the QCA has released guidelines for pricing proposals for rural irrigation prices. In these guidelines, the QCA reiterated its position in its final position paper, ie:[49]

> In the context of our inflation forecasting review, our position was to:
>
> - estimate expected national CPI inflation using short-term RBA forecasts for the first two years and then a linear glide path from the RBA's short-term forecast in year 2 to a rules-based anchor-point forecast
> - use a single approach to estimate expected CPI inflation, but base the term over which it is estimated on the relevant purpose of the analysis — in particular
>   - in calculating the return on capital under a RAB-based approach, use a term for expected inflation equal to the length of the price path period
>   - in calculating renewals annuities as an indexed annuity, use a 10-year term for expected inflation as the indexation rate
>   - to escalate opex and capex categories for which underlying cost drivers are not materially different from CPI inflation, use annual rates of expected inflation
>   - in smoothing revenue or prices over the price path period, use a term for expected inflation equal to the length of the price path period.

We are not aware of any further guidance or determinations by the QCA since the release of its final position paper.

Table 5.1 presents indicative inflation forecasts for the five years from 2023/24 to 2027/28, adopting the QCA's approach detailed above. This results in a geometric mean of 3.00 per cent of the five year period. We note that this estimate of forecast inflation would be updated close to the start of DAU3.

---

[47] QCA, *Inflation forecasting – Executive Summary*, Final position paper, October 2021, p ii.

[48] QCA, *Inflation forecasting*, Final position paper, October 2021, p 41.

[49] QCA, *Rural irrigation price review 2025–29*, Guidelines for pricing proposals, March 2023, pp 23-24.

Table 5.1: Indicative inflation forecasts

	2023/24	2024/25	2025/26	2026/27	2027/28
CPI inflation forecasts	3.50	3.00	2.92	2.83	2.75

Source: HoustonKemp analysis of RBA, Statement on Monetary Policy, May 2023, Table 5.1, p 70; QCA, Inflation forecasting, Final position paper, October 2021, p 41.

We understand that Queensland Rail also requires forecasts of inflation for 2028/29 and 2029/30. We recommend that Queensland Rail adopt an annual inflation rate of 2.50 per cent for these years consistent with the QCA's preferred forecasts for inflation beyond the fifth year ahead.[50]

[50] QCA, *Inflation forecasting*, Final position paper, October 2021, p 17.

HOUSTONKEMP
Economists

Sydney
Level 40
161 Castlereagh Street
Sydney NSW 2000

Phone: +61 2 8880 4800

Attachment 2: Queensland Rail's Detailed West Moreton System DAU3 Capital Expenditure Submission

DAU3 Capital Expenditure Submission

West Moreton System – 10 November 2023

Table of Contents

Glossary

Term	Definition
DAU	Draft Access Undertaking
IDC	Interest During Construction
LED	Light Emitting Diode
Mtpa	Million tonne per annum
OTR	On time running
QCA	Queensland Competition Authority
QR	Queensland Rail
RAB	Regulated Asset Base
SER/PER	Signalling Equipment Room / Power Equipment Room
tal	Tonne Axle Load
WM	West Moreton

1 Overview

1.1 Context

Queensland Rail's West Moreton System runs over 322 kms between Rosewood and Miles, adjoining the Brisbane Metropolitan System at Rosewood and the Western System at Miles. The system links Brisbane to the west and south-west of Queensland and is a major artery to Darling Downs.

The predominant commodity hauled along the West Moreton System is thermal coal, and the system currently services the Cameby Downs, Wilkie Creek and New Acland Stage 3 mines. The reinstated Wilkie Creek Mine at Macalister commenced railings in July 2023 and New Acland Stage 3 commenced railing in October 2023 out of the Jondaryan loading siding.

The West Moreton System is regulated under the Queensland Competition Authority Act 1997 (**QCA Act**). Under the QCA Act, the services provided using rail infrastructure can be 'declared' by the Queensland Treasurer. Once declared an infrastructure provider is required to provide access to third parties to the declared infrastructure. The majority of Queensland Rail's network is declared, including the West Moreton System.

Once declared, the Queensland Competition Authority (**QCA**) can require Queensland Rail to submit a 'Draft Access Undertaking' to it for approval, and have it approved by the QCA in accordance with the QCA Act. Queensland Rail may also submit a 'Voluntary Draft Access Undertaking'. Queensland Rail has lodged a Voluntary Draft Access Undertaking (**DAU3**). The QCA has supported this approach.[1] If approved by the QCA, DAU3 will become the Queensland Rail Access Undertaking 3 (**AU3**).

This submission has been developed under the circumstances where coal volumes along the West Moreton System are forecast to increase significantly (to 9.6Mtpa) over the remainder of Queensland Rail's Access Undertaking 2 (**AU2**) and into the DAU3 period.

Total coal railings in FY23 in the West Moreton System were 2.2 million tonnes, mainly from the Cameby Downs mine. This contrasts to forecast coal volumes which are expected to ramp up to 9.6 million tonnes per annum (**Mtpa)** before and during the DAU3 period as shown in the Table below.

Table 1: West Moreton System Coal Tonnages by Financial Year (Mtpa)

	FY26	FY27	FY28	FY29	FY30
Annual Throughput	8.2	9.5	9.6	9.6	9.6

The historical and forecast capacity and tonnage requirements for the West Moreton System are discussed in section 3.4.

[1] QCA correspondence to the Queensland Rail CEO dated 21 September 2022. The QCA file reference number 1478389, http://www.qca.org.au/wp-content/uploads/2022/10/qca-letter-re-queensland-rail-access-undertaking-timeline-21-sep-2022.pdf.

1.2 Proposed DAU3 West Moreton System Capital Expenditure

Queensland Rail has proposed 20 capital expenditure projects for the West Moreton System over the DAU3 period. The proposed capital forecast for FY26 to FY30 (the DAU3 period), excluding Interest During Construction (**IDC**) is $326.9m ($FY24) [redacted] to support the movement of 9.6Mtpa. The distribution of capital expenditure is summarised in Table 2 and Table 3. These are the total costs for all common network assets, before allocation between coal and non-coal services.

Table 2 Proposed capital expenditure by year

Capital Work Type	FY26	FY27	FY28	FY29	FY30	Total
Trackwork	$68.8	$49.2	$23.7	$23.7	$23.7	**$210.0**
Civil Works	$15.0	$30.6	$4.5	$4.5	$4.5	**$38.1**
Bridges	$15.0	$18.0	$10.5	$10.5	$10.5	**$64.5**
Signalling	$0.0	$0.0	$0.2	$7.6	$3.3	**$11.1**
Facilities	$0.0	$0.0	$1.5	$0.0	$0.0	**$1.5**
Sub-Total	***$98.8***	***$97.8***	***$40.3***	***$46.3***	***$41.9***	***$325.2***
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	**$99.9**	**$98.0**	**$40.6**	**$46.5**	**$42.1**	**$326.9**

Table 3 Proposed capital expenditure by year and corridor [redacted] - ($m FY24), excluding IDC

Corridor	FY26	FY27	FY28	FY29	FY30	Total
Rosewood to Jondaryan	$62.8	$66.0	$9.5	$14.5	$7.1	**$159.9**
Jondaryan to Macalister	$30.5	$32.0	$10.5	$9.0	$3.0	**$85.0**
Macalister to Columboola	$6.5	$0.0	$20.5	$23.0	$32.0	**$82.0**
Total	**$99.9**	**$98.0**	**$40.6**	**$46.5**	**$42.1**	**$326.9**

Queensland Rail has proposed that these capital expenditure projects identified in this submission be included in the capital indicator for DAU3 (as escalated). The efficient actual capital expenditure will be included in the Regulated Asset Base (**RAB**) on an ex post basis after the QCA has reviewed the projects for prudency of scope, scale and cost.

For the purpose of developing the proposed reference tariffs for DAU3, Queensland Rail has assumed that all of the individual projects (including individual projects that are part of a larger program of works) will be completed within a single year, and as a result forecast expenditure is capitalised in the year it is spent.

1.3 Capital Projects for DA3 Period

Table 4 sets out the capital projects for the DAU3 period [redacted] The capital projects proposed are primarily asset renewals.

Table 4 Total proposed DAU3 capital expenditure by project - ($m FY24), excluding IDC

Project ID	Project Name	Tonnage Dependent	Regulatory Driver	DAU3 Capital Expenditure
Bridges				
B.06162	West Moreton Bridge/Pier Replacement (Rosewood-Jondaryan)	No	Asset renewal	[redacted]
B.04804	West Moreton Bridge/Pier Replacement (Jondaryan - Columboola)	No	Asset renewal	[redacted]
Subtotal				***$64.5***
Civil Works				
B.06507	West Moreton Ranges Slope Stabilisation	No	Level of service	[redacted]
B.04823	West Moreton Culvert Renewals	No	Asset renewal	[redacted]
Subtotal				***$38.1***
Facilities				
B.06509	[redacted] Refurb	Yes	Asset renewal / Compliance	$1.5
Subtotal				***$1.5***
Signalling				
B.05592	Grandchester to Laidley Signal Cable	No	Asset renewal	[redacted]
B.04763	Digital Telemetry Rollout - West Moreton	No	Asset renewal / Compliance	[redacted]
B.05593	Rangeview SER/PER Upgrade	No	Asset renewal	[redacted]
B.05601	Signalling LED Upgrade	No	Asset renewal	[redacted]
B.06508	Dalby Yard and OLCs Re-signalling	No	Asset renewal	[redacted]
B.04778	Gatton Interlocking Renewal	No	Asset renewal	[redacted]
Subtotal				***$11.1***
Trackwork				

Project ID	Project Name	Tonnage Dependent	Regulatory Driver	DAU3 Capital Expenditure
B.06155	WM Reconditioning Koomi - Dalby	Yes	Asset renewal	[redacted]
B.06156	Formation Strengthening Rosewood-Toowoomba	Yes	Asset renewal	
B.04546	West Moreton Formation Strengthening Toowoomba – Jondaryan	Yes	Asset renewal	
B.06366	West Moreton Reconditioning Dalby - Macalister	Yes	Asset renewal	
B.05578	West Moreton Toowoomba Range Curve Transitions	No	Asset renewal	
B.05945	West Moreton Re-sleepering FY26	No	Asset renewal	
B.04798	Reconditioning Macalister to Columboola	Yes	Asset renewal	
B.04817	West Moreton Re-railing	Yes	Asset renewal	
B.04898	West Moreton Level Crossing Transitions (Up Road)	No	Asset renewal	
Subtotal				***$210.0***
Grand Total				**$325.2**

1.4 Track Lowering (Ballast Undercutting)

Queensland Rail's capital expenditure proposal also includes [redacted] ($FY24) for track lowering (ballast undercutting) costs over the DAU3 period.

Queensland Rail's track lowering maintenance activities are associated with managing excessive ballast depth, which affect track stability and poor vertical alignment. Track lowering includes all works involved in either:

- undercutting of track sections
- lowering of excessively ballasted sections of track.

Undercutting works are performed in the district by the use of an excavator mounted under cutter bar. Track lowering is generally carried out in large sections and is done by removing the track and grading ballast away and then replacing the track. Ballast during track lowering exercises is generally reused, some new ballast is required for undercutting works.

Track lowering is part of the routine maintenance costs for Queensland Rail, required to provide safe and reliable services on the West Moreton System. This routine maintenance is included in the full proposed capital program for the purposes of DAU3.

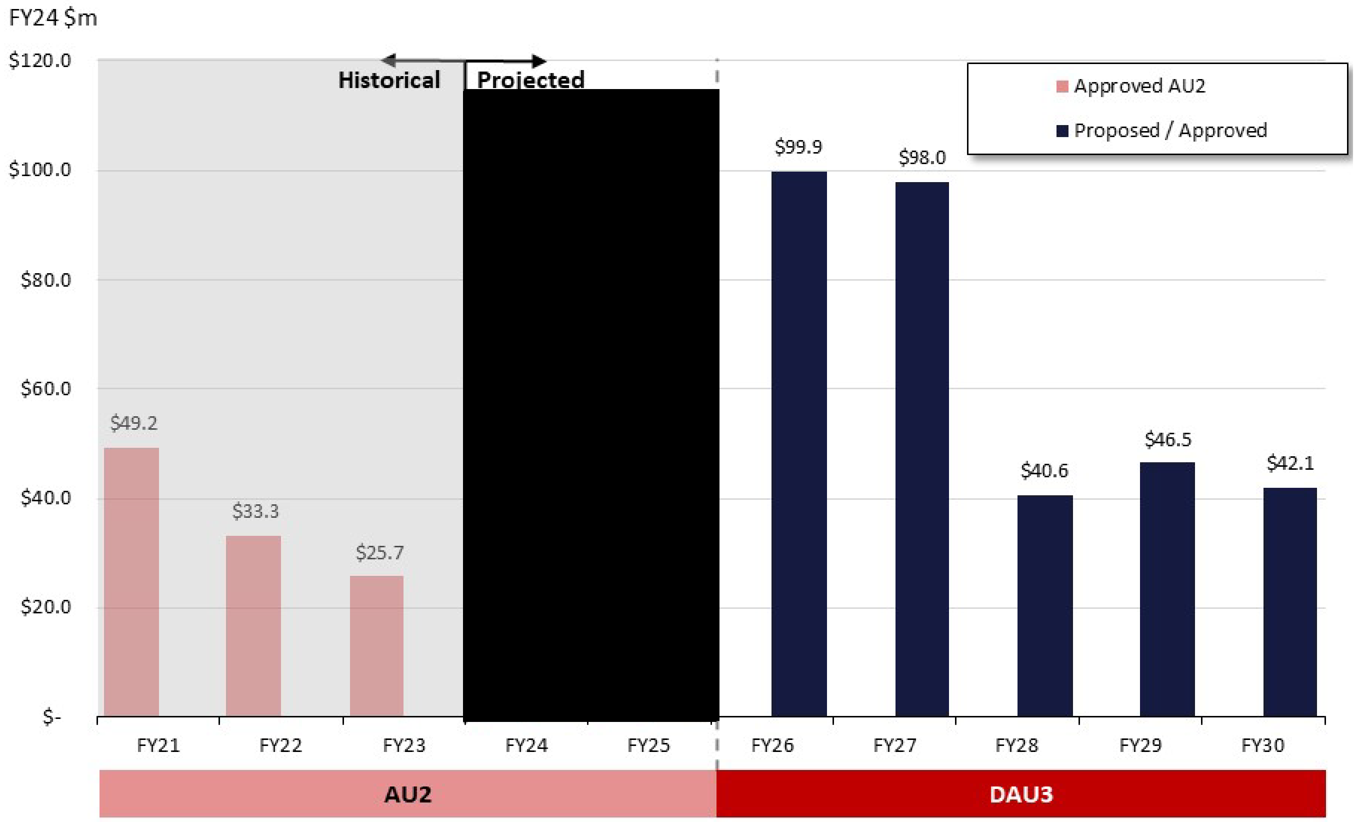
Table 5 Total proposed DAU3 capital expenditure by project - ($m FY24), excluding IDC

	Project Works	[redacted]	Total
DAU3 Capital Proposal	$325.2	[redacted]	**$326.9**

1.5 Comparison to Capital Expenditure in AU2

Proposed capital expenditure of $326.9 million ($FY24) to enable 9.6Mtpa is 127% higher than the capital expenditure allowance for FY21 – FY25 of $144.3 million ($FY24). This comparison is shown in Figure 1.

Figure 1 Comparison of Capital Expenditure between AU2 and DAU3



Note: AU2 Investment Strategy currently under review by Queensland Rail will be detailed in a future Draft Amending Access Undertaking.

1.6 DAU3 Investment Strategy

Queensland Rail's DAU3 Investment Strategy is to reduce operational risk, reduce maintenance costs and to increase the confidence of the supply chain to deliver full coal railing demand.

The investment strategy targets planned capital investment east of Macalister in view of a peak system volume of 9.6Mtpa in FY27. The investment strategy considers the timing of projects within the shared corridor as critical in the near term to reduce the risk of taking possessions for track upgrades at a time when maximum railings are required.

Queensland Rail's revised AU2 Investment Strategy includes additional investment in the lead up to the DAU3 period. This will involve the full reset of the AU2 reference tariff through a Draft Amending Access Undertaking 2 (**DAAU2**) to be lodged with the QCA in the first half of 2024.

While shared corridor works (East of Macalister) are accelerated in the near term, the largest program in the outer years, Tack Reconditioning between Macalister and Columboola (B.04798) has also been brought forward for targeted spend within the DAU3 period.

The Macalister to Columboola section of the network is predominately comprised of 41kg/m rail on timber sleepers on non-engineered track formation. This track is susceptible to track misalignment or buckling at high temperatures with the potential consequence of a train derailment. To address the derailment risk, Queensland Rail's control is to slow the trains down and potentially suspend operation on the network as the temperature increases. This action increases above rail transit times and reduces supply chain capacity.

The West Moreton Summer Heat Restrictions apply from mid-November to mid-March and all trains on the Malu (near Jondaryan) to Miles (near Columboola) section are slowed to a maximum of 40kph at temperatures equal or great than 32ºC and are being stopped at all temperatures equal or greater than 35ºC. In general train movements during summer are planned to run within the lower temperature window of night and early morning from 1900hrs to 1000hrs from the further western mines.

From 1 October 2022 until 26 September 2023, despite there being overcast weather and raining conditions, heat restrictions were applied in the West Moreton System on 72 days over the summer period.

Reducing the maximum track speed from 60kph to 40kph increases the transit time between Macalister and Columboola and return by 8 hours, which increases the overall cycle time to the Port of Brisbane by approximately 30%. This reduces the above rail capacity by a similar amount, which puts overall supply chain capacity at risk during the summer months.

2 Background

2.1 Overview of System Characteristics and Infrastructure

The West Moreton System is critical to supply chains that export coal and agricultural products from Southwest Queensland through the Port of Brisbane. It is a multi-use system with coal, grain, livestock, and long-distance passenger services utilising paths; however, coal dominates traffic from west of Toowoomba and is a key driver for asset strategies for the system.

Figure 2 presents a map of the West Moreton System.

Figure 2 Map of West Moreton System

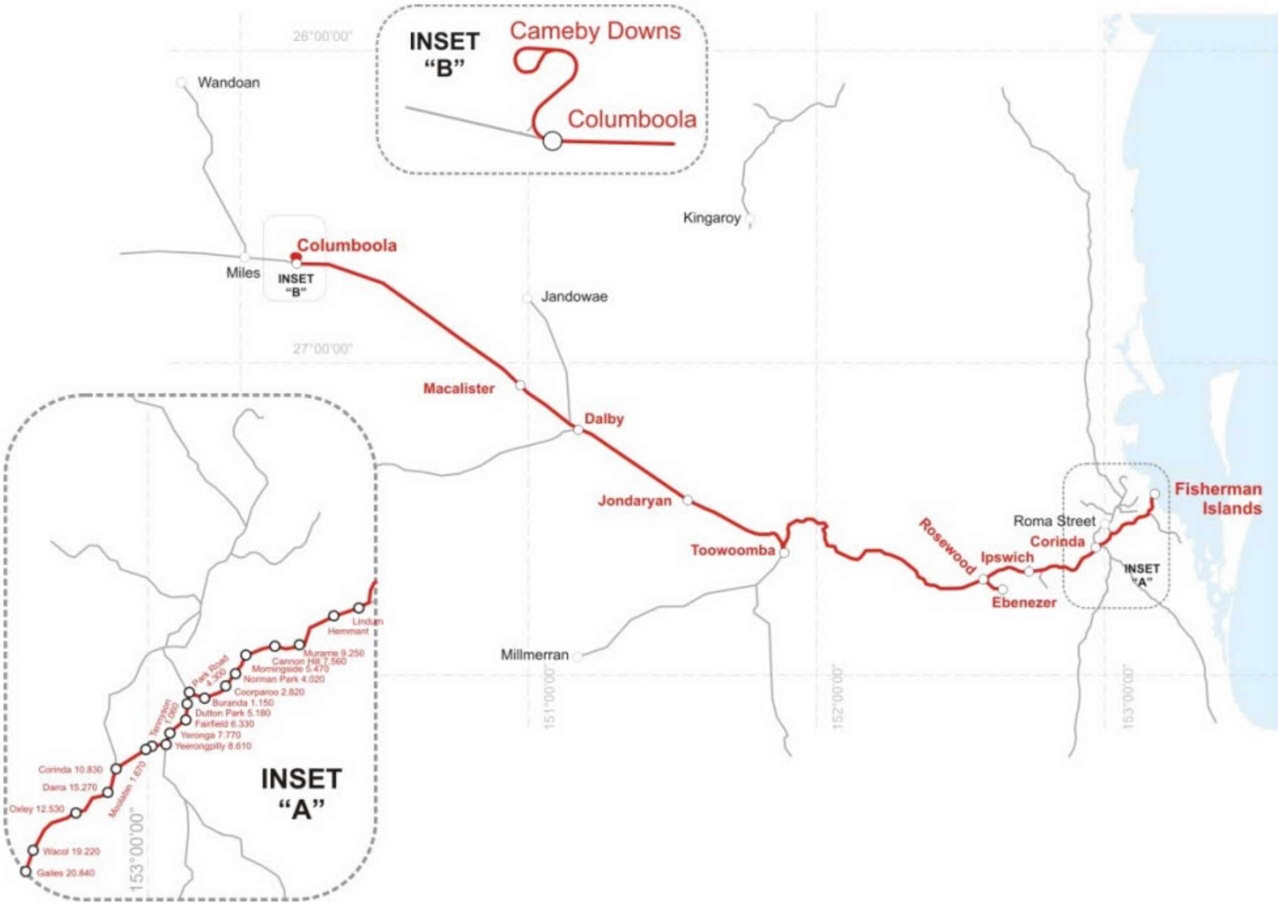


Table 6 presents some key characteristics of the assets on the West Moreton System.

Table 6 West Moreton System key characteristics

Item	Details
Length	Route Length 322km Track Length 413km narrow gauge
Reference Train Length	675m
Maximum operating speed	80km/hr
Track Assets	258km of 50kg/m continuously welded rail on single line sections and loaded Down Road Rosewood – Kingsthorpe and Oakey – Jondaryan. 154km of 41kg/m rail remains on Up Road between Yarongmalu – Helidon, Kingsthorpe –Oakey, Malu – Miles and most passing loops.
Sleeper Type	269km of concrete sleepers Down Road and Rosewood - Jondaryan. 143km of interspersed steel and timber sleepers, typically 1 in 2 pattern, Up Road between Yarongmalu - Helidon and single line Malu - Miles.
Ballast and Formation	Ballast is quality crushed rock. The black soil formation increases ballast fouling causing poor drainage and loss of top and line.
Turnouts	60kg/m RBMs on concrete with trailable facing points. Derailment risk, if these heavy trailable facing points TFP's do not reset for next train passage. Remaining 41kg/m turnouts on timber remain in yards and loops.
Structures	Bridges: 127 - 71 timber bridges (2,841m), 24 concrete (893m) and 32 steel (1,122m). Timber bridges originally constructed 1865 and 1880. Culverts: 700 - A number are life expired cast in situ drains and deformed corrugated metal pipes. Tunnels: 11 - 1860's construction and limit dimensional capacity of freight
Signalling Assets	RCS and DTC - Signal interlockings at Gatton, Rangeview and Dalby require refurbishment or replacement to provide ongoing reliability and supportability. Signal cabling Grandchester to Laidley requires replacement. Level Crossings: Older level crossings require ongoing electrical equipment refurbishment & upgrade of priority sites.
Telecommunications	Direct buried optical cable between Harlaxton and Toowoomba requires replacement. The microwave network is end of support life. The telecoms rectifier and digital telemetry require upgrade.

2.2 Traffic Types, Operators and Key Customers

The West Moreton System is a multi-use system, with the following services utilising train paths:

- Coal – Coal is the predominant commodity hauled along the West Moreton System. Aurizon is the primary above rail operator of coal on the system. With the re-instatement of the Wilkie Creek Mine, and the approval of New Acland Stage 3 there are three export coal mines located in the region.

- Grain – grain trains access the Port of Brisbane through the system from the connecting Glenmorgan Branch at Dalby, and from the South-Western System at Toowoomba.
- Livestock – seasonal livestock services are provided by Watco out of Morven and connect into the system at Miles for transport through to the Brisbane Metropolitan System.
- Passengers – Queensland Rail's long distance passenger service The Westlander runs twice weekly between Brisbane and Charleville.

Thermal coal dominates traffic from west of Toowoomba and is a key driver for asset strategies for the system. Trains operate up to 15.75 tal with a maximum train length of 675m and a maximum speed of 80km/hr.

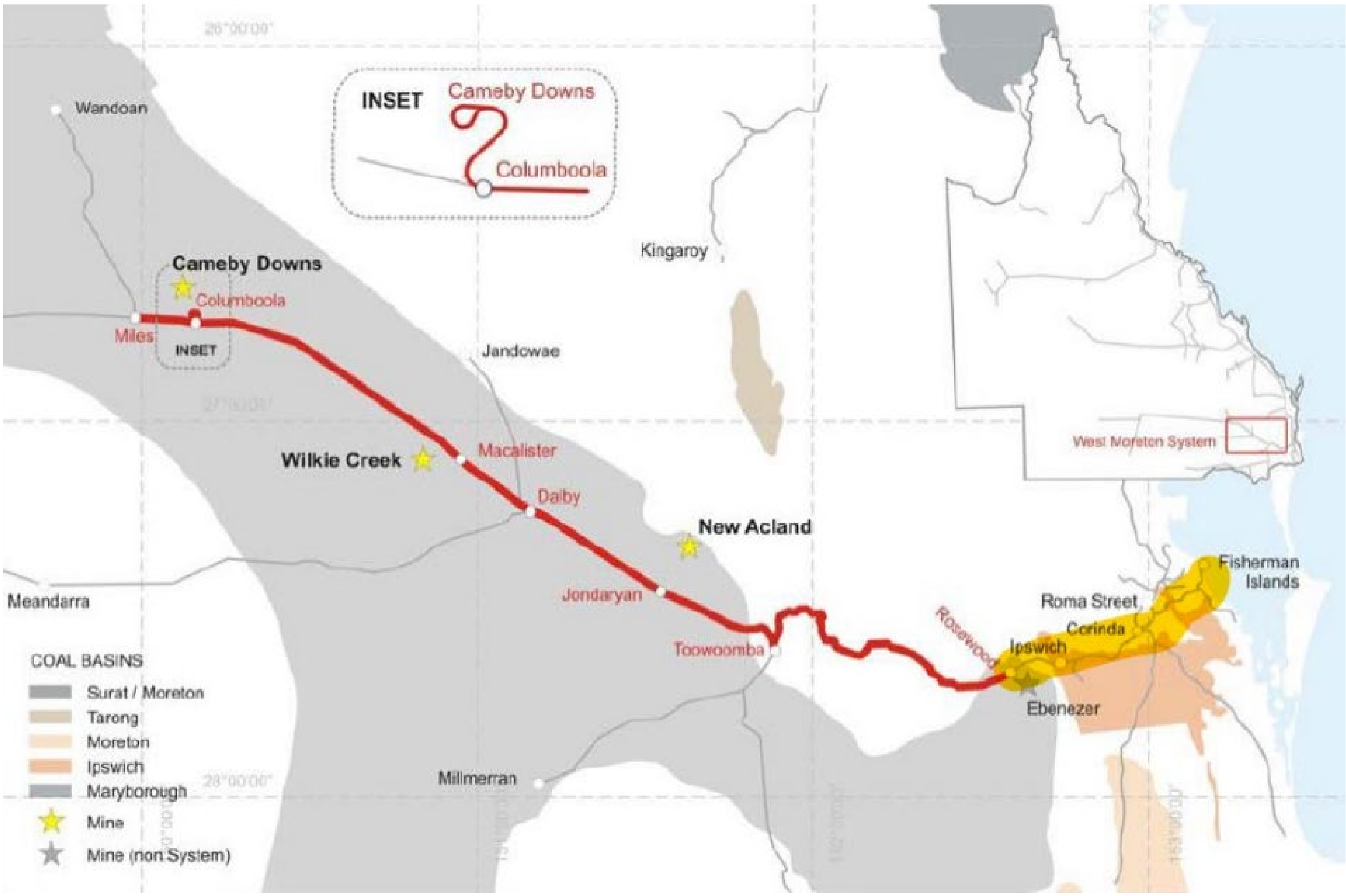
2.3 Future Usage of the Network

The future rail traffic will drive the long-term strategies for the system. Coal freight forecasts for the system are the highest they have ever been with the additional mines becoming operational:

- [redacted]
- [redacted]
- [redacted]

Figure 3 presents a map showing the mines that will be serviced by the West Moreton System over the DAU3 Period.

Figure 3 Map of Mines serviced by the West Moreton System



With a maximum of 9.6Mtpa expected over the DAU3 period, maintaining the system to enable efficient movement of services, minimising closures, and speed restrictions, will be critical.

3 Key Drivers for DAU3 Capital Program

3.1 History of the West Moreton System and Relationship to Capital Costs

The West Moreton System originally opened in 1865 between Ipswich and Grandchester, catering for passenger, livestock, freight, and primary products. The system began supporting the transport of coal in 1982. Rail export commenced via rail from Macalister in 1994 (closing in 2013), Jondaryan in 2002 and from Columboola in 2010.

The network's historical origins present continuing challenges for its operation. The West Moreton System was initially constructed on black soil plains with no engineered formation; resulting in regular failures requiring reconstruction to ensure suitable track geometry is maintained.

Early track standards have resulted in an alignment that is lower than contemporary standards for stand-alone heavy haul railway built specifically for coal carrying services. As a consequence of the network's age and track standard, the section between Rosewood and Miles in particular requires a higher level of intervention than would be required for a more modern, stand-alone heavy haul railway in order to deliver contracted tonnages safely and reliably.

The age and history of the West Moreton System has an impact on the condition and fitness for purpose of the network. In both AU1 and AU2, track age and condition were considered for both the capital and maintenance programs. Queensland Rail has been slowly improving the quality of the track through the capital program, however there are still issues associated with the age of the network that are affecting the delivery of services.

For the DAU3 period, Queensland Rail has proposed efficient capital costs for the West Moreton System having regard to the age and condition of the network, and the volumes proposed to be hauled over a network that was not originally designed for this purpose.

3.2 Access Holder Requirements

Customer requirements from the West Moreton System are primarily driven by:

- Reliability – transit times that allow operators to achieve efficient cycle times
- Availability – minimal unplanned delays and manageable speed restriction impacts
- Affordability – competitive rail supply chain price for services.

Queensland Rail endeavours to minimise below rail transit time for access holders. Access holders also seek:

- a known cap on the number, location, and time interval between track possessions and advanced discussions with customers around future possessions
- best possible response times to any network disruption (including force majeure events)
- some spare capacity for peak production rates, or catch up capacity
- coordinated supply chain shutdowns and track possessions.

Queensland Rail's capital and maintenance programs for DAU3 aim to meet the requirements of access holders by reasonably limiting the number of speed restrictions and section closures and therefore increase reliability with the aim of an associated throughput improvement which is required to be able to rail 9.6Mtpa.

3.3 Condition and Performance of the System

Queensland Rail's capital program is driven by the current and expected future performance of the assets in the context of increased tonnage over the network.

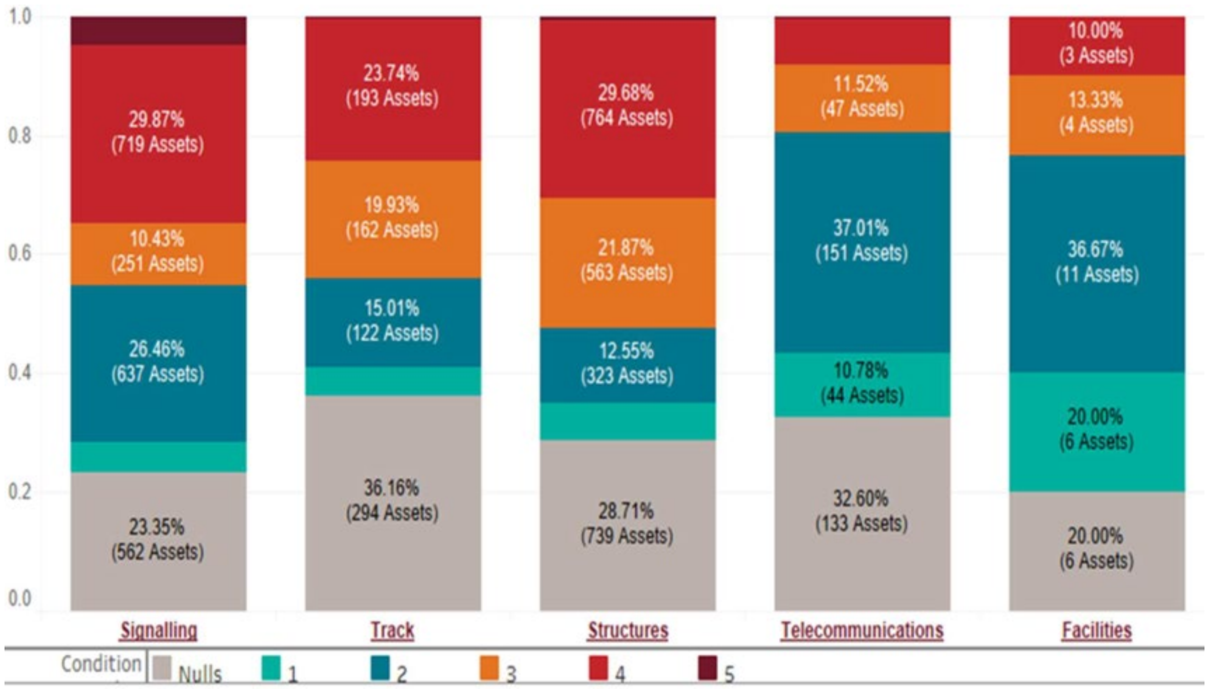
3.3.1 Condition of the Assets

Queensland Rail's capital program responds to several factors, including anticipated throughput, the maintenance program, as well as the age, condition, and performance of the system in meeting the requirements of users.

Condition of an asset informs the likelihood of failure of the asset and can be indicative of the asset risk. Figure 4 presents a summary of the condition of the assets in the West Moreton System. The condition assessment used the following ratings:

- Condition 1 – very good (teal)
- Condition 2 – good (blue)
- Condition 3 – average (orange)
- Condition 4 – poor (red)
- Condition 5 – very poor (dark red)
- Not assessed (grey)

Figure 4: Current Condition of the West Moreton System assets



QueenslandRail

The following observations can be made from this assessment:

- **Track:** While the graph shows that 23.7% of all track assets are in a poor condition state, this value represents nearly 40% of the assets assessed. This suggests that a significant proportion of track assets are in need of renewal or refurbishment.
- **Structures:** While the graph shows that 29.7% of structures assets are in a poor condition state, this represents nearly half of the total number of structures assets assessed.
- **Signalling:** While the graph shows that 29.9% of signalling assets are in a poor condition state, this represents nearly 40% of the signalling assets assessed. In addition, there is also a proportion of assets in condition state 5 – very poor.
- **Telecommunications and Facilities:** These assets are in a better average condition state than track, structures and signalling assets.

The condition of the track, structures and signalling assets present a risk to maintaining service levels as assets in a poor condition are at higher risk of failure. Asset failure could result in unplanned outages to services which impact reliability and availability of the system. A program of renewal is necessary to prevent further degradation of the assets and

3.3.2 Asset Performance

In addition to asset condition, performance of the assets can also be a driver for maintenance costs. Key performance issues are presented in Table 7, as detailed in Queensland Rail's Service Investment Plan.

Table 7 Performance issues on the West Moreton System

Issue	Description
Track Infrastructure	• Existing timber and steel structures are limited to 15.75 tal. • Majority of the formation was not engineered and is considered under-strength for 15.75 tal. • The Toowoomba Range single line sections limit the number of train paths • The current axle loads and train lengths limit train payload. • Tunnel clearances are a limiting factor, although a recent project increased the clearance at a number of tunnels to accommodate 9'6" (2.9m) containers through the West Moreton System. • The steep grades of the Toowoomba Range and the Little Liverpool Range and the single line through both of these range alignments causes capacity constraints.
Range Resilience	• The Toowoomba Range is subject to landslides in extraordinary rain events with major reconstruction repairs to the track required in past years. Rock falls and embankment movement are also common each wet season, and this impacts on services during assessment and repair. • Geotechnical assessments have been undertaken which show that further investment is required to reduce the risk of major landslides. Investment in remediation work at the highest risk sites, plus the installation of monitoring equipment with specialised survey and assessment of other risk sites will provide greater certainty to Queensland Rail's supply chain partners that service disruptions will be minimised.
Speed Restrictions	• Temporary and blanket speed restrictions due to poor track alignment (top and line) and track stability of the lightweight track structure during summer months.

Queensland Rail's priority is to address the asset risk and performance issues affecting the network while building resilience to manage future throughput and delivering reliability and availability to customers.

3.3.3 Operational Constraints

Speed Restrictions

During the summer months of high temperatures, hot weather precautions for track stability are observed to reduce the risk of incident in accordance with Safety Management Standard MD-10-143 Hot Weather Precautions for Track Stability, as shown in Table 8.

Table 8 Speed Restrictions

Temperature	Speed Restriction
Air temperature 38 degrees Celsius and above	• On a timber sleepered track, restrict all trains to 60km/h • On concrete sleepered track, restrict all trains to 120km/h
Air temperature 40 degrees Celsius and above	• On a timber sleepered track, restrict all trains to 40km/h • On concrete sleepered track, restrict all trains to 60km/h

As demonstrated by the restrictions, transit times have the potential to be much more affected when there is timber sleepered track on the network. With a maximum speed on the West Moreton System of 80km/hr, concrete sleepered track is only affected when the air temperature reaches 40 degrees or above, whereas the timber sleepered track sees reductions if temperatures reach above 38 degrees.

The proposed DAU3 Capital Program includes significant investment in track reconditioning and re-sleepering, including the replacement of timber sleepers with concrete sleepers, in an effort to improve resilience in warmer weather and reduce maintenance costs on the network.

Track Closures

Track closures can occur for a number of reasons including: planned maintenance, reactive maintenance, safety management etc.

Due to the nature of the black soil and sloping terrain, wet weather has the potential to create significant disruption on the network. Geotechnical failures in the Toowoomba Range have resulted in temporary closures of six weeks or more on multiple occasions in the past decade, with the most recent extended closure lasting 19 days after a wet weather event in February/March 2022. The Toowoomba Range Wet Weather Guidelines MD-16-731 detail the track access and rail traffic operations that need to be following in the event of wet weather and storm events. 30mm rainfall events currently require closure of the Toowoomba Range. During the 16-month period beginning January 2020, there were 17 events resulting in the cancellation of 143 services and delay of a further 154 services on the Toowoomba Range for over 100,700 minutes. The average service delay was 11 hours.

Heat restrictions on the light track and black soil sections also require closure periods during summer, in addition to the speed restrictions discussed in the previous section.

The existing sensitivity of the West Moreton System to both heat and wet weather will not be achievable once coal traffic ramps up and reaches peak in October 2026, with the system being less and less able to tolerate unplanned closures without significant disruption. The DAU3 Capital Program has been developed with a view to minimise unplanned closures.

3.4 Capacity and Tonnage Forecasts

3.4.1 Capacity

The West Moreton System is currently constrained by five aspects:

- All timber and steel structures are limited to 15.75tal, noting that a network is only as strong as its 'weakest link'.
- Much of the formation material was not engineered and is considered under-strength for 15.75tal.
- Without additional infrastructure investment, the Toowoomba Range capacity is restricted to 113 return paths per week; and
- Passing loops at Fisherman Islands and Kingsthorpe are 690 metres long, which restricts the maximum length of trains on the system (a coal reference train is 675 meters long).
- The steep grades of the Toowoomba Range and the Little Liverpool Range cause trains to traverse these sections slowly, which combined with single line workings in both locations causes capacity constraints.

3.4.2 Tonnage Forecasts

Figure 5 presents the tonnage forecasts for the remainder of the AU2 Period and the DAU3 Period. As demonstrated, there is a significant increase in the anticipated throughput on the system due to the addition of two new mines – the Wilkie Creek and the New Acland Stage 3.

Figure 5 Tonnage Forecasts for Remainder of AU2 and DAU3

[redacted]

This increase means that it is essential that Queensland Rail's targeted capital program be implemented to ensure that the network can accommodate the uplift in tonnage. Queensland Rail's capital program is efficient at 9.6Mtpa and has been designed for 9.6Mtpa.

These tonnage actuals and projections are illustrated by line section in Figure 6.

Figure 6 Tonnes of coal carried on the West Moreton System

[redacted]

Queensland Rail engaged AECOM to review the reasonableness of the capital program in the context of increased tonnage on the network, also considering the trade-off between capital and maintenance programs (refer **Attachment 3** in this DAU3 Explanatory Document).

4 DAU3 Proposed Capital Expenditure

4.1 Approach to Developing the Capital Program

The capital program and investment strategy are focused on delivering confidence that the increased tonnage, which is forecast to reach 9.6 Mtpa and remain at that level for the remainder of DAU3, can be achieved.

Queensland Rail has taken the following approach to development of the capital program for the DAU3 period:

- Review existing 10-year base capital plan.
- Identify and bring forward those priority works within the previous plan to deliver these before the October 2026 deadline when the network reaches its peak tonnage. These projects include those that would upgrade the asset to a standard requirement for a coal traffic corridor transporting 9.6 Mtpa, that is, a 50kg rail on concrete sleepers over engineered formation and concrete structures.
- The key accelerated projects include:
    - Formation strengthening on black soil sections;
    - Toowoomba Range Slope Stabilisation for high-risk embankments;
    - Track reconditioning to 50kg rail on concrete sleepers;
    - Timber bridge and pier eliminations; and

○ Toowoomba Range curve transitions track strengthening.

The priority of these project works is aligned with the need to address track stability, structural integrity, and geotechnical risks inherent to these assets. These programs are targeted at addressing asset failure risks and reducing current operational restrictions that limit the confidence that the required capacity can be maintained.

The acceleration of investment also aligns with the availability of track access for the shutdowns necessary to deliver these major programs, which may not be achievable once peak coal traffic begins from October 2026.

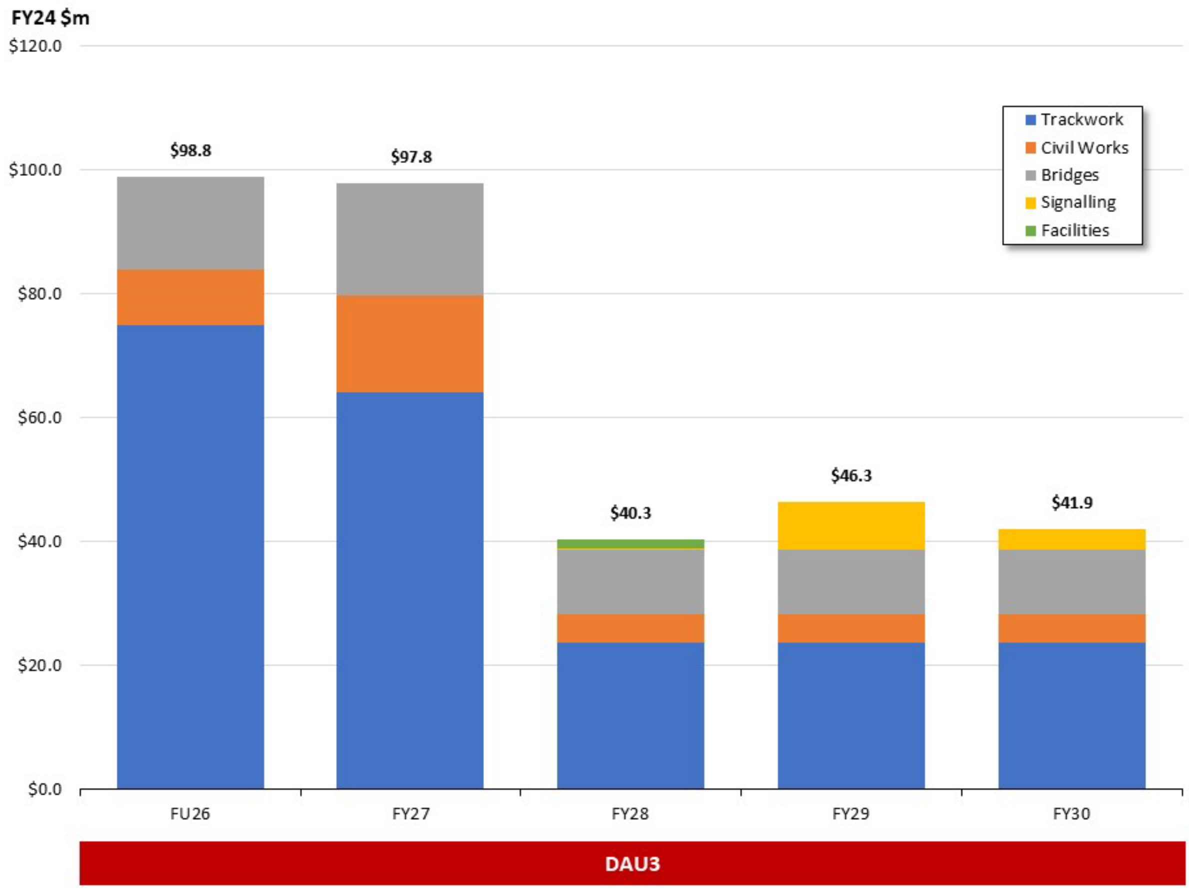
4.2 Capital Expenditure by Year

During the DAU3 period, a total of $325 million [redacted] is planned for capital expenditure across 20 projects, which were categorised into five areas:

- Trackwork;
- Civil Works;
- Bridges;
- Signalling; and
- Facilities.

Figure 7 and Table 10 provides a summary of all the proposed capital projects and the distribution over the DAU3 period.

Figure 7 DAU3 Proposed Capital Expenditure ($m FY24)



QueenslandRail

Table 9 Proposed Capital Expenditure by year and project ($m FY24)

Project ID	Project Name	FY26	FY27	FY28	FY29	FY30	Total
Trackwork							
B.06155	West Moreton Reconditioning Koomi - Dalby	[redacted]					
B.06156	Formation Strengthening Rosewood-Toowoomba						
B.04546	West Moreton Formation Strengthening Toowoomba - Jondaryan						
B.06366	West Moreton Reconditioning Dalby - Macalister						
B.05578	West Moreton Toowoomba Range Curve Transitions						
B.05945	West Moreton Re-Sleepering FY26						
B.04798	Reconditioning Macalister to Columboola						
B.04817	West Moreton Re-railing						
B.04898	West Moreton Level Crossing Transitions (Up Road)						
Subtotal		***$74.8***	***$64.2***	***$23.7***	***$23.7***	***$23.7***	***$210.0***
Civil Works							
B.06507	West Moreton Ranges Slope Stabilisation	[redacted]					
B.04823	West Moreton Culvert Renewals						
Subtotal		***$9.0***	***$15.6***	***$4.5***	***$4.5***	***$4.5***	***$38.1***
Bridges							
B.06162	West Moreton Bridge/Pier Replacement (Rosewood-Jondaryan)	[redacted]					
B.04804	West Moreton Bridge/Pier Replacement (Jondaryan - Columboola)						
Subtotal		***$15.0***	***$18.0***	***$10.5***	***$10.5***	***$10.5***	***$64.5***

Project ID	Project Name	FY26	FY27	FY28	FY29	FY30	Total
Signalling							
B.05592	Grandchester to Laidley Signal Cable	[redacted]					
B.04763	Digital Telemetry Rollout - West Moreton						
B.05593	Rangeview SER/PER Upgrade						
B.05601	Signalling LED Upgrade						
B.06508	Dalby Yard and OLCs Re-signalling						
B.04778	Gatton Interlocking Renewal						
Subtotal				***$0.2***	***$7.6***	***$3.3***	***$11.1***
Facilities							
B.06509	[redacted] Refurb			1.5			1.5
Subtotal				***$1.5***			***$1.5***
Grand Total		**$98.8**	**$97.8**	**$40.4**	**$46.3**	**$41.9**	**$325.2**

5 Track Projects

The following section summarises capital works assigned to trackwork, which account for 65% of all proposed capital works in the DAU3 period [redacted] totalling $210 million. These projects include:

- Reconditioning
- Formation strengthening
- Curve transitions
- Re-sleepering
- Re-railing

Figure 8 and Table 11 summarises the capital expenditure distribution for Trackwork Projects over the DAU3 period.

Figure 8 DAU3 Proposed Capital Expenditure – Track Projects ($m FY24)

[redacted]

Table 10 DAU3 Proposed Capital Expenditure – Track Projects ($m FY24)

Track Project Type	FY26	FY27	FY28	FY29	FY30	Total
Reconditioning	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Formation Strengthening	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Curve Transitions	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Re-sleepering	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Re-railing	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Level Crossing Transitions	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	**$74.8**	**$64.2**	**$23.7**	**$23.7**	**$23.7**	**$210.0**

5.1 Reconditioning

Capital expenditure distribution over the DAU3 period for Reconditioning is summarised in Table 12 and a project overview is summarised in Table 13.

Table 11 Proposed DAU3 West Moreton capital project costs – Track Reconditioning ($m FY24)

Project Name	FY26	FY27	FY28	FY29	FY30	Total
B.06155 West Moreton Reconditioning Koomi - Dalby	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
B.06366 West Moreton Reconditioning Dalby - Macalister	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Project Name	FY26	FY27	FY28	FY29	FY30	Total
B.04798 Reconditioning Macalister to Columboola	[redacted]					
Total	**$30.5**	**$32.0**	**$19.0**	**$19.0**	**$19.0**	**$119.5**

Table 12 Proposed DAU3 West Moreton capital project overview – Track Reconditioning

Project Overview	
Project Background	The West Moreton System spans 407km of narrow gauge track which consists of 41kg, 50kg and 60kg rail. The 41kg rail is interspersed with timber and steel sleepers. This section has been systematically upgraded, targeting priority sections of track. Track reconditioning works involves the reconstruction of the track and its formation. Frequency of track reconditioning is dependent upon tonnage, typically performed by Queensland Rail with limited use of external contractors. This program of reconditioning has been accelerated within the DAU3 period in preparation for the increased tonnage expected across the system. B.06155 Track reconditioning Koomi to Dalby and B.06366 Track Reconditioning Dalby to Macalister will recondition the remaining 49km of light track structure east of Macalister Mine, comprising 41kg on interspersed steel and timber sleepers over black soil formation, to 50kg rail on concrete sleepers over engineered formation. B.04798 covering the light track between Macalister and Columboola will be reconditioned between 2028 and 2033 after the coal tonnages have peaked, as the tonnage profile is lower for this section of track.
Scope	• Track deconstruction • Formation reconstruction from the subgrade • Replacement of fastenings, rail line (41 kg/m to 50 kg/m) • Replacement of timber sleepers with concrete sleepers • Welding and stressing • Tamping and resurfacing • Quality components (NDT of welds, formation compactness, etc.) • Inspections following completion of works, as needed.
Project Drivers	Asset renewal: Required to maintain both service provision and safety standards of the track.
Project Benefits	• Improvements in the reliability of heavy use sections, reducing the likelihood of derailment. • Improvements in track geometry, stability, and a reduction in significant creep, limiting pull aparts and buckles. • Reduction in future maintenance requirements such as rail repair and rail joint maintenance, reducing labour and improving trackside safety. • Improved safety via replacement with heavier track structure, reducing risk of buckles / misalignment. • Reduced potential for Temporary Speed Restrictions (TSRs) and impacts to operations such as derailment via improved track stability and improved formation strength (eliminated risk of sleeper / rail failure; improved top and line). • Improved track condition and track quality as measured by the Overall Track Condition Index (OTCI). • Track standards compliance via track realignment.

Project Overview	
Alternative Options Considered	Options to replace ballast or rail only would only provide limited track stability, alignment improvement and operational maintenance savings.
Relevant Standards	MD-10-575 QR Civil Engineering Track Standards (CETS)

5.2 Formation Strengthening

Capital expenditure distribution over the DAU3 period for Formation Strengthening is summarised in Table 14 and a project overview is summarised in Table 15.

Table 13 Proposed DAU3 West Moreton capital project costs – Formation Strengthening ($m FY24)

Project Name	FY26	FY27	FY28	FY29	FY30	Total
B.06156 Formation Strengthening Rosewood-Toowoomba	[redacted]					
B.04546 West Moreton Formation Strengthening Toowoomba - Jondaryan						
Total	**$24.0**	**$22.8**				**$46.8**

Table 14 Proposed DAU3 West Moreton capital project overview – Formation Strengthening

Project Overview	
Project Background	Formation strengthening repairs are an ongoing issue for the West Moreton System due to the dated original construction between 1865 and 1880. The reactive black soil has poor formation strength and drainage issues requiring higher resurfacing efforts to maintain alignment. Renewing the formation and ballast reinstates track stability, top and line. B.06156 Formation Strengthening of the remaining black soil sections on the loaded Down Road between Yarongmalu (76km) and Helidon (114.520). This loaded route was relayed with 50kg rail on concrete sleepers around 15 years ago over the existing black soil formation. This 38km section demonstrates poor track stability and requires significant resurfacing intervention to maintain top and line, particularly during summer and wet seasons. This section will have >10MNT with coal and non-coal traffic east of Toowoomba and is currently limited to 60kph maximum for loaded traffic with hot weather restrictions imposed over summer.
Scope	Repairs to formation failure, mud holes and ballast pockets along track. The work method requires the track to be removed and an engineering foundation constructed before the track is reinstated.

Project Overview	
Project Drivers	Levels of service: Safety is the primary driver in addition to accommodating tonnage increases by maintaining the track speed, and reducing closures and restrictions due to heat.
Project Benefits	• Reduced risk of temporary speed restrictions and unplanned closures due to heat and/or rainfall. • Reduced ballast contamination, reducing the risk of speed restrictions and derailments. • Reduced top and line deterioration, reducing the risk of speed restrictions and derailments. • Reduced need for reactive maintenance and repetitive resurfacing treatment.
Alternative Options Considered	Track reconditioning is an alternative option, however this activity incurs additional track costs.
Relevant Standards	MD-10-586 QR Civil Engineering Structures Standards (CESS)

5.3 Curve Transitions

Capital expenditure distribution over the DAU3 period for Curve Transitions is summarised in Table 16 and a project overview is summarised in Table 17.

Table 15 Proposed DAU3 West Moreton capital project costs – Curve Transitions ($m FY24)

Project Name	FY26	FY27	FY28	FY29	FY30	Total
B.05578 West Moreton Toowoomba Range Curve Transitions	[redacted]					

Table 16 Proposed DAU3 West Moreton capital project overview – Curve Transitions

Project Overview	
Project Background	On parts of the West Moreton System (Toowoomba Range), there is challenging track geometry with steep grades and sharp curves, presenting derailment risks and high emergency repair considerations. The Toowoomba Range Curve Transitions (B.05578) project is to upgrade the track, formation, and drainage of the worst transition tangents between sharp curves. The scope totals around 7km over the Grandchester Range and between Murphy's Creek to Toowoomba. Past projects have focused on upgrading the sharpest curves, including recent rail and sleeper renewals to address rail wear and crushed spacers on old style sleepers. Some tangents and transition zones between sharp curves are now exhibiting poor track stability with the forces exerted at these zones and the drainage and formation issues through the cutting to embankment transitions.
Scope	Recondition track transition on approach to level crossings to improve alignment and stability.

Project Overview	
Project Drivers	Managing safety risks and risks to service.
Project Benefits	• Improvements to track safety • Improved ride comfort with reduced risk of track buckling at approach
Alternative Options Considered	These curves have been maintained in the past through repairs and adjustments to address track stress and regular resurfacing to correct alignment but this alternate maintenance approach will not keep track fit for higher tonnage demands into the future.
Relevant Standards	MD-10-575 QR Civil Engineering Track Standards (CETS)

5.4 Re-sleepering

Capital expenditure distribution over the DAU3 period for Re-sleepering is summarised in Table 18 and a project overview is summarised in Table 19.

Table 17 Proposed DAU3 West Moreton capital project costs – Re-sleepering ($m FY24)

Project Name	FY26	FY27	FY28	FY29	FY30	Total
B.05945 West Moreton Re-sleepering FY26	[redacted]					

Table 18 Proposed DAU3 West Moreton capital project overview – Re-sleepering

Project Overview	
Project Background	Parts of the West Moreton System are experience track stability issues for light interspersed timber sleeper track structure and defective sleepers. The extent of required sleeper renewals within each cycle is determined by condition testing and analysis of deterioration rates to scope a program of works. Typically, the scope within each cycle will comprise the replacement of a minimum of 25% of the total timber population. This ensures the network performs safely and reliably to a condition that meets engineering standards for a period of three years without further significant maintenance intervention.
Scope	B.05945 West Moreton Resleepering FY26 will replace around 25% of the timber sleeper population remaining with new timber sleepers on the unloaded Up Road between Yarongmalu and Helidon and from Macalister to Columboola Mine. This is a track safety and compliance requirement with the mechanised resleepering work carried out in daylight hours between traffic and during available closures over 4 months in 2026 ahead of the tonnage increases
Project Drivers	Asset renewal to manage safety risks, achieve compliance requirements and deliver service levels.

QueenslandRail

Project Overview	
Project Benefits	• Improved defective sleeper percentage. The project will ensure that each of these lines remain compliant with CETS limits for sleeper condition for the next five to six years. • Improve track top and line, improvements in Overall Track Condition Index (OTCI). • Reduced risk of spread gauge derailment due to clusters of ineffective sleepers. Reduced requirement for Temporary Speed Restrictions to manage safety risk on corridors with poor top and line and poor/marginal sleeper condition. • Reduced need for regular spot maintenance/cluster management on these corridors.
Alternative Options Considered	Alternative options include reducing the number of sleepers replaced in the project, which would not fully address the risks, or performing the activity over a longer period of time, which has the potential to increase costs, and Queensland Rail would be exposed to risk for longer. .
Relevant Standards	All track upgrade work will comply with Queensland Rail safety rules and procedures. MD-10-575 QR Civil Engineering Track Standards (CETS)

5.5 Re-railing

Capital expenditure distribution over the DAU3 period for Re-railing is summarised in Table 20 and a project overview is summarised in Table 21.

Table 19 Proposed DAU3 West Moreton capital project costs – Re-railing ($m FY24)

Project Name	FY26	FY27	FY28	FY29	FY30	Total
B.04817 West Moreton Rerail	[redacted]					

Table 20 Proposed DAU3 West Moreton capital project overview – Re-railing

Project Overview	
Project Background	Some rail on the West Moreton System is at end of life, and a program for replacement is needed to manage the risk of failure and service disruption on the network.
Scope	• Replacement of end-of-life rail in the West Moreton System. Sections of 41kg/m rail is showing increased susceptibility to rail wear and defect discovery rates. This 41 kg/m rail is to be replaced with 50 kg/m rail. • Replacement of end-of-life 50 kg/m rail where the rail wear will result in gauge related defects.
Project Drivers	Asset renewal: Ability to uphold service requirements under increased tonnages.

Project Overview	
Project Benefits	• Reduces the likelihood of broken rail derailments • Reduced exposure to service defects which require shutdowns to remove defective rail and expensive welding in, and match grinding of, the inserted closure rails • Improvements to the safety and reliability of the track
Alternative Options Considered	No alternative options have been considered.
Relevant Standards	MD-10-575 QR Civil Engineering Track Standards (CETS)

5.6 Level Crossing Transitions

Capital expenditure distribution over the DAU3 period for Level Crossing Transitions is summarised in Table 22 and a project overview is summarised in Table 23.

Table 21 Proposed DAU3 West Moreton capital project costs – Level Crossing Transitions ($m FY24)

Project Name	FY26	FY27	FY28	FY29	FY30	Total
B.04898 West Moreton Level Crossing Transitions (Up Road)	[redacted]					

Table 22 Proposed DAU3 West Moreton capital project overview – Level Crossing Transitions

Project Overview	
Project Background	The improved track structure at level crossings consists of 50kg/m rail on concrete sleepers. An increase in junction weld failures has been experienced where this improved structure has been implemented in areas of 41kg/m rail on timber sleepers. Increases to tonnages
Scope	To reduce the frequency of failure, it is proposed to extend the concrete sleepers and 50kg/m for a minimum of 20 sleepers past the level crossings.
Project Drivers	Asset renewal: manage risk of failure and service disruption under increased tonnages.
Project Benefits	• Reduces the likelihood of broken rail derailments • Track safety and ride comfort improvement with reduced risk of track buckling at approach. • Improvements to the safety and reliability of the track
Alternative Options Considered	No alternative options have been considered.
Relevant Standards	MD-10-575 QR Civil Engineering Track Standards (CETS)

6 Civil Works Projects

The following section summarises capital works assigned to Civil Works, which account for 11.7% of all proposed capital works [redacted] in the DAU3 period, totalling $38 million. These projects include:

- Slope Stabilisation
- Culvert Renewals

Figure 9 and Table 24 summarises the capital expenditure distribution for Civil Works projects over the DAU3 period.

Figure 9 DAU3 Proposed Capital Expenditure - Civil Works ($m FY24)

[redacted]

Table 23 DAU3 Proposed Capital Expenditure – Civil Works ($m FY24)

Civil Works Project Type	FY26	FY27	FY28	FY29	FY30	Total
Slope Stabilisation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Culvert Renewals	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	**$9.0**	**$15.6**	**$4.5**	**$4.5**	**$4.5**	**$38.1**

6.1 Slope Stabilisation

Capital expenditure distribution over the DAU3 period for Slope Stabilisation is summarised in Table 25 and a project overview is summarised in Table 26.

Table 24 Proposed DAU3 West Moreton capital project costs – Slope Stabilisation ($m FY24)

Project Name	FY26	FY27	FY28	FY29	FY30	Total
B.06507 West Moreton Ranges Slope Stabilisation	[redacted]					

Table 25 Proposed DAU3 West Moreton capital project overview – Slope Stabilisation

Project Overview	
Project Background	The Toowoomba Range experiences significant issues regarding land instability which impacts various cuttings and embankments, which can impact on the safe operation of the railway. There has been a history of rock falls in the past, and these can result in derailment or wagon discharge if release levers are struck. Queensland Rail has previously engaged a number of geotechnical studies to assess the geotechnical and hydrological risks to the ranges.
Scope	• The slope stabilisation project will remediate the highest priority failing embankments, as well as undertaking geotechnical analysis across several high priority embankments, to better inform future investment. • Sites will be monitored to determine the extent of movement change to enable decisions regarding their remediation treatment and timing within future slope stabilisation program stages.
Project Drivers	Levels of service: Alignment with Queensland Rails service requirements to improve safety outcomes, sustain on-time operations and reliability and improve customer satisfaction.
Project Benefits	• Reduction in the risk of derailment • Reduced risk of passenger and staff injuries caused by embankment failures and/or rock falls. • Increased supply chain reliability and confidence in the management of geotechnical risk.
Alternative Options Considered	Options considered included stabilisation of all identified sites, stabilisation of high-risk sites and monitoring of other sites, or track realignment. Other options considered did not meet business objectives or could not be justified due to the excessive cost.
Relevant Standards	MD-10-586 QR Civil Engineering Structures Standards (CESS)

6.2 Culvert Renewals

Capital expenditure distribution over the DAU3 period for Reconditioning is summarised in Table 27 and a project overview is summarised in Table 28.

Table 26 Proposed DAU3 West Moreton capital project costs – Culvert Renewals ($m FY24)

Project Name	FY26	FY27	FY28	FY29	FY30	Total
B.04823 West Moreton Culvert Renewals	[redacted]					

Table 27 Proposed DAU3 West Moreton capital project overview – Culvert Renewals

Project Overview	
Project Background	The deterioration rate of culverts is increasing the requirement for speed restrictions and unplanned closures for repairs which adversely impacts OTR performance.
Scope	Replacement of end-of-life culverts along the West Moreton System. Culverts have been identified as requiring replacement as part of regular track inspections. These structures are at increased risk of failure during high rainfall events.
Project Drivers	Asset renewal: Ability to uphold service expectations and safety requirements.
Project Benefits	• Avoid the necessity for temporary support or filling of failing culverts. • Improved safety and reliability of the network by reducing risk of derailments and network outages due to culvert collapse. • Reduced risk of flood damage to adjacent properties due to blocked or restricted culverts • Reduced risk of service delays caused by speed restrictions posed due to culverts failing prior to renewal
Alternative Options Considered	Asset renewal is in line with Queensland Rails Civil Asset Strategy Policy. Alternative design options include: • Concrete Box Culverts which should be designed in accordance with AS1597.1:2010 and AS1567.2:2013. • Concrete Reinforced Pipes which should be designed in accordance with AS3725:2007 and manufactured in accordance with AS4508:2007.
Relevant Standards	• AS1597.1:2010 • AS1567.2:2013 • AS3725:2007 • AS4508:2007
Procurement Approach	Work for this project will be undertaken by Queensland Rail, supplemented by external contractors where required.

7 Bridges Projects

The following section summarises capital works assigned to Bridges, which account for 19.8% of all proposed capital works [redacted] in the DAU3 period, totalling $64.5 million. Two projects are captured in this category and are both bridge pier replacements. Figure 10 and Table 29 summarises the capital expenditure distribution for these two projects over the DAU3 period. The scope of the projects are summarised in Table 30.

Figure 10 DAU3 Proposed Capital Expenditure - Bridges ($m FY24)

[redacted]

Table 28 Proposed DAU3 West Moreton capital project costs – Bridge Pier Replacement ($m FY24)

Project Name	FY26	FY27	FY28	FY29	FY30	Total
B.06162 WM Bridge/Pier Replacement (Rosewood-Jondaryan)	[redacted]					
B.04804 WM Bridge/Pier Replacement (Jondaryan - Columboola)						
Total	**$15.0**	**$18.0**	**$10.5**	**$10.5**	**$10.5**	**$64.5**

Table 29 Proposed DAU3 West Moreton capital project overview – Bridge Pier Replacement

Project Overview	
Project Background	Queensland Rail has over 1,000 timber bridges across Regional Queensland requiring a significant maintenance budget each year. These aging timber bridges have structural elements that have life-expired components including piers and girders. Condition inspections of all timber bridges on the West Moreton System have been carried out by Queensland Rail's inspectors to identify the existing defects. The inspection data has been used to undertake a comprehensive condition analysis which enabled a replacement priority list to be produced. The condition of these bridges requires intensive maintenance and renewal programs to keep the West Moreton System operational. In recent years an approximate average of [redacted] has been spent on replacement of aged timber components and top and line issues at these bridges. This maintenance cost is expected to reduce to [redacted] for concrete/steel bridge structures (effectively for inspections) as timber bridges are replaced; resulting in an operational saving of [redacted] In many instances speed restrictions have been put in place in order to continue operations across these bridges. These speed restrictions impact on sectional running times. Some bridges are also prone to flooding which further affects the structural integrity of these aging structures. If a bridge were to be damaged by flooding it would close the line for a considerable period while repairs are undertaken.
Scope	This project proposes to undertake replacement works i.e. bridge pier replacement and full bridge structure replacement on the next tranche of priority timber bridges in the West Moreton System. Defects on these bridges include bridge/rail misalignment, termite damage, cracked girders, perishing girders, loose screws, split spans, rotten transoms and rotten headstocks.
Project Drivers	Asset renewal to reduce safety risk and risk of service disruption.
Project Benefits	• Reduced maintenance costs • Improved asset reliability • Transit time reliability and improved structural integrity in regard to risk of hidden failure of piers underground. • Lower unplanned closures for emergency inspections and reactive repairs. • Avoids the risk of major operational disruption due to critical structures becoming unserviceable.
Alternative Options Considered	Full replacement of timber bridges as an alternative consideration would require increase initial capital and extensive track closures.
Relevant Standards	MD-10-586 QR Civil Engineering Structures Standards (CESS)

8 Signalling Projects

The following section summarises capital works assigned to signalling, which account for 3.4% of all proposed capital works [redacted] in the DAU3 period, totalling $11 million. These projects include:

- Signalling Cables
- Digital Telemetry
- SER/PER Upgrade
- LED Upgrade
- Re-signalling
- Interlocking Renewal

Figure 11 and Table 31 summarises the capital expenditure distribution for Signalling projects over the DAU3 period.

Figure 11 DAU3 Proposed Capital Expenditure - Signalling ($m FY24)

[redacted]

Table 30 DAU3 Proposed Capital Expenditure - Signalling ($m FY24)

Signalling	FY26	FY27	FY28	FY29	FY30	Total
Signalling Cables			[redacted]	[redacted]	[redacted]	[redacted]
Digital Telemetry			[redacted]	[redacted]	[redacted]	[redacted]
SER/PER Upgrade			[redacted]	[redacted]	[redacted]	[redacted]
LED Upgrade			[redacted]	[redacted]	[redacted]	[redacted]
Re-signalling			[redacted]	[redacted]	[redacted]	[redacted]
Interlocking Renewal			[redacted]	[redacted]	[redacted]	[redacted]
Total			**$0.2**	**$7.6**	**$3.3**	**$11.1**

8.1 Signalling Cables

Capital expenditure distribution over the DAU3 period for the Signalling Cables project is summarised in Table 32 and a project overview is summarised in Table 33.

Table 31 Proposed DAU3 West Moreton capital project costs – Signalling Cables ($m FY24)

Project Name	FY26	FY27	FY28	FY29	FY30	Total
B.05592 Grandchester to Laidley Signal Cable	[redacted]					

Table 32 Proposed DAU3 West Moreton capital project overview – Signalling Cables

Project Overview	
Project Background	Signalling cable between Grandchester and Laidley reaching end of life.
Scope	Renewal of this caballing is required before it becomes unserviceable, in order to enable continued operational reliability for West Moreton and the serviceability of the signalling systems.
Project Drivers	Asset renewal: requirement of continued service delivery.
Project Benefits	• Improved reliability and maintainability of the signalling infrastructure on the West Moreton System • Reduced maintenance interventions and impact on OTR
Alternative Options Considered	Both alternative technology solutions and construction options will be considered in this project.
Relevant Standards	MD-13-550 QR Signalling and Operational Systems Asset Governance and Assurance Principle (SAGA)

8.2 Digital Telemetry

Capital expenditure distribution over the DAU3 period for the Digital Telemetry project is summarised in Table 34 and a project overview is summarised in Table 35.

Table 33 Proposed DAU3 West Moreton capital project costs – Digital Telemetry ($m FY24)

Project Name	FY26	FY27	FY28	FY29	FY30	Total
B.04763 Digital Telemetry Rollout - West Moreton	[redacted]					

Table 34 Proposed DAU3 West Moreton capital project overview – Digital Telemetry

Project Overview	
Project Background	The Universal Traffic Control (UTC) system is used to manage train movements within Queensland Rail's remote controlled signalling territory. For the West Moreton network, UTC is used from Rosewood to Willowburn. The existing telemetry used to provide communications between the UTC system and the signalling system is based on a life-expired analogue based system that requires an upgrade.
Scope	This project includes development of the core UTC system to support the new telemetry system. It will replace end of life Siemens S2 SOF and Scanner hardware with a digital telemetry product operating over Ethernet/IP.
Project Drivers	Asset renewal Compliance
Project Benefits	• Maintain reliable operations in the remote-controlled signalling territory in the West Moreton System. • Replacement assets will have ongoing support from manufacturer for spare replacements.
Alternative Options Considered	No alternative options have been considered.
Relevant Standards	MD-15-549 QR Telecommunications Maintenance Standard

8.3 SER/PER Upgrade

Capital expenditure distribution over the DAU3 period for the SER/PER Upgrade project is summarised in Table 36 and a project overview is summarised in Table 37.

Table 35 Proposed DAU3 West Moreton capital project costs – SER/PER Upgrade ($m FY24)

Project Name	FY26	FY27	FY28	FY29	FY30	Total
B.05593 Rangeview SER/PER Upgrade	[redacted]					

Table 36 Proposed DAU3 West Moreton capital project overview – SER/PER Upgrade

Project Overview	
Project Background	The existing signal and power equipment rooms at Rangeview passing loop are identified as outdated with several assets reaching end-of-life. The replacement building and equipment will be more reliable, have improved access and increased levels of safety for maintenance staff.

Project Overview	
Scope	This project will replace the existing wooden station building containing vital signalling equipment with a new Signalling Equipment Room (SER)and Power Equipment Room (PER). A new alternator will also be installed with the PER.
Project Drivers	Asset renewal
Project Benefits	• Reduced reactive maintenance • Improved reliability • Reduced system down time • Improvement to safety
Alternative Options Considered	No alternative options have been considered due to the likelihood of the building being condemned should a 'Do Nothing' strategy be instated.
Relevant Standards	MD-13-550 QR Signalling and Operational Systems Asset Governance and Assurance Principle (SAGA)

8.4 LED Upgrade

Capital expenditure distribution over the DAU3 period for the LED Upgrade project is summarised in Table 38 and a project overview is summarised in Table 39.

Table 37 Proposed DAU3 West Moreton capital project costs – LED Upgrade ($m FY24)

Project Name	FY26	FY27	FY28	FY29	FY30	Total
B.05601 Signalling LED Upgrade	[redacted]					

Table 38 Proposed DAU3 West Moreton capital project overview – LED Upgrade

Project Overview	
Project Background	Incandescent lamps have become obsolete and have a number of inherent failure modes that the LED signal module system has designed out. The train driver signal interface relies on the signal aspect indicating a clear and unambiguous indication. LEDs have far greater intensity than incandescent signals and have a greater life expectancy therefore improving signal sighting and driver response.
Scope	This project involves the replacement of incandescent signals with LED signals. Project work includes installing LEDs and necessary location changes including relays.
Project Drivers	Asset renewal: Improvement to asset performance in line with service requirements.
Project Benefits	• Reduce reactive maintenance • Gain in reliability • Reduced system down time • Improvement for safety driver visibility and LED alarms

Project Overview	
Alternative Options Considered	No alternative options have been considered.
Relevant Standards	MD-13-550 QR Signalling and Operational Systems Asset Governance and Assurance Principle (SAGA)

8.5 Re-signalling

Capital expenditure distribution over the DAU3 period for the Re-signalling project is summarised in Table 40 and a project overview is summarised in Table 41.

Table 39 Proposed DAU3 West Moreton capital project costs – Re-signalling ($m FY24)

Project Name	FY26	FY27	FY28	FY29	FY30	Total
B.06508 Dalby Yard and OLCs Re-signalling	[redacted]					

Table 40 Proposed DAU3 West Moreton capital project overview – Re-signalling

Project Overview	
Project Background	Increased fault, repair, and performance issues are encountered as this equipment exceeds service life. Signalling and communications equipment can become unserviceable once supplier support and spares cease.
Scope	Renewal of signalling equipment before it becomes unserviceable will enable continued operational reliability for West Moreton and the serviceability of the signalling systems will be maintained.
Project Drivers	Asset renewal to manage risk to service disruption.
Project Benefits	• Upgrade to modern equipment • Reduce reactive maintenance • Gain in reliability • Enables maintainability due to lack of spare parts for existing equipment • Reduced system down time
Alternative Options Considered	Due to obsolescence of equipment no other alternatives have been considered.
Relevant Standards	MD-13-550 QR Signalling and Operational Systems Asset Governance and Assurance Principle (SAGA)

8.6 Interlocking Renewal

Capital expenditure distribution over the DAU3 period for the Interlocking Renewal project is summarised in Table 42 and a project overview is summarised in Table 43.

Table 41 Proposed DAU3 West Moreton capital project costs –Interlocking Renewal ($m FY24)

Project Name	FY26	FY27	FY28	FY29	FY30	Total
B.04778 Gatton Interlocking Renewal	[redacted]					

Table 42 Proposed DAU3 West Moreton capital project overview – Interlocking Renewal

Project Overview	
Project Background	The signal interlockings are a key component of the RCS system. Relay interlockings have a planned service life of 35 to 45 years. There is potential to extend these interlockings through refurbishment programs. Processor-based interlockings have a planned service life of 10 to 15 years, though a mid-life upgrade can generally be employed to extend this to 25 years.
Scope	This project renews life expired Westrace Mk1 interlockings at Gatton.
Project Drivers	Asset renewal
Project Benefits	• Maintain network performance and integrity • Enhance reliability • Enhance capacity for future upgrades • Maintain reliability of the signalling system, thereby supporting safe and reliable operations • Reduction in unplanned maintenance interventions and service disruptions due to equipment failure.
Alternative Options Considered	Both alternative technology solutions and construction options will be considered in this project.
Relevant Standards	MD-13-550 QR Signalling and Operational Systems Asset Governance and Assurance Principle (SAGA)

QueenslandRail

9 Facilities Projects

The following section summarises capital works assigned to facilities, which account for 0.5% of all proposed capital works [redacted] in the DAU3 period, totalling $1.5 million. A single project, [redacted] is captured in under facilities projects during DAU3. Distribution of costs over the DAU3 period can be found in Table 44 and project summary can be found in Table 45.

Table 43 Proposed DAU3 West Moreton capital project costs – [redacted] Refurbishment ($m FY24)

Project Name	FY26	FY27	FY28	FY29	FY30	Total
B.06509 [redacted] Refurbishment			$1.5			**$1.5**

Table 44 Proposed DAU3 West Moreton capital project overview – [redacted] Refurbishment

Project Overview	
Project Background	Ongoing maintenance of stations and remaining maintenance depots will be refurbished on a condition priority basis.
Scope	The project involves a refurbishment of [redacted], based on the asset's condition.
Project Drivers	Asset renewal: Maintain fit for purpose facilities. Compliance: Maintain compliant facilities.
Project Benefits	Refurbished facilities will require lower levels of repair and maintenance
Alternative Options Considered	Due to deterioration, refurbishment is the only practical option
Relevant Standards	The National Construction Code 2022 (NCC 2022)

10 Volume Risk

To address the risk that the full forecast volume for DAU3 does not eventuate, or remain at the 9.6Mtpa (i.e. because New Acland Stage 3 is not successful in defending the appeal, contracts are not renewed, mines cease to operate or do not achieve planned capacity, unavailability of haulage services or for any other reason), Queensland Rail has included triggers permitting Queensland Rail to seek a reference tariff reset during the term of DAU3 each time a contract is up for renewal if it is not renewed. This reset will provide the QCA with the same powers that they would have under an initial undertaking notice under the QCA Act and is necessary to protect the legitimate interests of all West Moreton System coal stakeholders. This will protect Access Holders', Access Seekers' and Queensland Rail's legitimate business interests.

The reset gives Queensland Rail an opportunity to rebalance its capital and maintenance program to reduce the capital expenditure which would otherwise be brought forward to meet capacity requirements and protects our customers from paying for capacity that is not required.

11 Delivery

11.1 Procurement Approach

Queensland Rail has established material supply contracts, contractor panel arrangements and internal resource capability for track construction and formation renewal, which represent a significant proportion of the upgrade program.

The existing track construction resource base will be extended by building additional teams and capacity through engagement of external labour and plant to supplement internal capability. Coordinated material distribution and stockpiling will be arranged ahead of the delivery workface. Bridge construction and range stabilisation works will be delivered through external contract arrangements.

There are a number of specialised contractors currently undertaking similar projects in West Moreton, and tender arrangements will be targeted to attract current recommended contractors, as well as other suitable companies for the planned project works. Queensland Rail currently provide project management resources to support internal and external delivery of programs and these existing teams will be redirected or supplemented to focus on delivery of the West Moreton accelerated capital program.

11.2 Applicable Standards

- MD-14-781 Project Management Methodology Framework,
- MD-18-191 Procurement Procedure, and
- MD-10-926 Procurement Standard.

12 Peer Review

The capital program and expenditure in this document have been subject to internal peer review and have been externally reviewed by AECOM. AECOM have undertaken a detailed assessment of the prudency of scope, standard and cost of DAU3's capital program. AECOM's report is provided separately for the QCA's consideration (refer **Attachment 3** in this DAU3 Explanatory Document).

13 Conclusion

This submission has been developed under the circumstances where coal volumes along the West Moreton System are forecast to increase significantly (to 9.6Mtpa) over the remainder of Queensland Rail's Access Undertaking 2 (**AU2**) and into the DAU3 period. The capital program and investment strategy outlined in this document is focused on delivering confidence that the increased tonnage can be achieved.

For the DAU3 period, Queensland Rail has proposed efficient capital costs for the West Moreton System having regard to the age and condition of the network, and the volumes proposed to be hauled over a network that was not originally designed for this purpose. The capital program and expenditure have been subject to an internal peer review and an external review conducted by AECOM for prudency and efficiency.

Attachment 3: AECOM Engineer's Expert Peer Review of Queensland Rail's West Moreton System Capital Investment Plan for DAU3 (2025-26 to 2029-30)

Prepared for
Queensland Rail
ABN: 43 812 633 965

AECOM

Review of Queensland Rail's West Moreton Capital Investment Plan for DAU3

03-Nov-2023
West Moreton Line
Doc No. 60710802_Peer-Review

Review of Queensland Rail's West Moreton Capital Investment Plan for DAU3

Client: Queensland Rail

ABN: 43 812 633 965

Prepared by

AECOM Australia Pty Ltd
Turrbal and Jagera Country, Level 8, 540 Wickham Street, PO Box 1307, Fortitude Valley QLD 4006, Australia
T +61 7 3056 4800 www.aecom.com
ABN 20 093 846 925

03-Nov-2023

Job No.: 60710802

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 and ISO45001.

Quality Information

Document	Review of Queensland Rail's West Moreton Capital Investment Plan for DAU3
Ref	60710802
	https://aecomaus.sharepoint.com/sites/60710802-qrregsupport/shared documents/general/500_deliverables/503_deliverable_capital submission/aecom peer review/aecom_engineering review of qr dau3 capital submission_final_v0.docx
Date	03-Nov-2023
Originator	AECOM Project Team
Checker/s	Lucy Harrington; Stuart Lawton; Gary McDonald; Mike Stoke
Verifier/s	Susheel Prabhakar

Revision History

Rev	Revision Date	Details	Approved	
			Name/Position	Signature
A	13-Oct-2023	Draft for Review	Susheel Prabhakar Project Manager	-For Final-
B	25-Oct-2023	Updated Draft for Review	Susheel Prabhakar Project Manager	-For Final-
0	03-Nov-2023	Final Report	Susheel Prabhakar Project Manager	

Table of Contents

List of Tables

Glossary

Acronym	Description
QR	Queensland Rail
QCA	Queensland Competition Authority
RBDF	Risk Based Decision Framework
SIP	Service Investment Plan
DAU	Draft Access Undertaking
AU	Access Undertaking
TMR	Transport and Main Roads
WM	West Moreton

Standards, Codes and Regulations

The following standards, codes and regulations have been used in the review.

- Queensland Rail Telecommunications Maintenance Standard (MD-15-549)
- Queensland Rail Civil Engineering Track Standard (MD-10-575)
- Queensland Rail Civil Engineering Structures Standard (MD-10-586)
- Queensland Rail Asset Management Plan (MD-19-222)
- Queensland Rail Civil Engineering Standard Specification Part 6 – Earthwork (2021)
- Transport and Main Roads Geotechnical Design Standard – Minimum Requirements (2020)
- Transport and Main Roads Technical Specification – MRTS03 Drainage Structures, Retaining Structures and Embankment Slope Protections (2021)
- Transport and Main Roads Technical Specification – MRTS04 General Earthworks (2023)
- Transport and Main Roads Technical Specifications – MRTS27 Geotextiles Separation and Filtration (2020)
- Transport and Main Roads Technical Specifications – MRTS58 Geosynthetics for Subgrade and Pavement Reinforcement (2022)

Executive Summary

Queensland Rail’s (QR) regional network facilitates freight and passenger services, subject to third party access regulations under the Queensland Competition Authority (QCA) Act 1997.

An Access Undertaking, authorised by the QCA in accordance with the Act, outlines the guidelines for granting access to QR's rail network. Within this framework, QR is accountable for providing, maintaining, and overseeing access and operations on its rail network and related infrastructure. The current Access Undertaking (AU2), approved by the QCA on 1 July 2020, is in effect until 30 June 2025. QR proposes to replace it with Draft Access Undertaking 3 (DAU3), effective from 1 July 2025 to 30 June 2030.

QR engaged AECOM to review its proposed capital expenditure on the West Moreton (WM) system under DAU3 prior to submission for approval by the QCA. The conditions of QCA’s approval are outlined in DAU3, which stipulates that capital expenditure must be prudent in scope, standard and cost.

This document presents AECOM’s assessment of QR’s WM Capital Investment Plan. We examined the scope, compliance with standards and cost estimate for a sample of 9 projects selected from the 20 included in the plan for DAU3 [redacted] The sample projects were chosen to cover four broad asset categories (Trackwork, Civil Works, Signalling, Bridge) and together account for about 80% of total capital expenditure.

AECOM deployed a specialised team for this review, including rail and geotechnical engineers, coordinated by its Advisory group. This review was conducted as a desktop assessment, with requests for additional documentation, where possible, to clarify issues related to the projects being reviewed. A standardised review template was used by our reviewers to ensure consistency, where the template was closely aligned with the criteria required by DAU3.

The review identified that eight of the nine sample projects satisfy QCA’s prudency of works assessment; however, AECOM noted the lack of documentation for project B.04763.

Our review has concluded that the proposed capital expenditure meets the conditions of DAU3, and in our view, QR may proceed with the submission.

1.0 Introduction

1.1 Background

Queensland Rail's (QR) regional network comprises major rail systems that convey freight and passenger services across the state and are declared for third party access under the Queensland Competition Authority (QCA) Act 1997. An Access Undertaking, approved by the QCA and developed in accordance with the Act, provides a framework for the provision of access to QR's rail network. Under the framework, QR is responsible for providing, maintaining, and managing access to and operations on its rail network and associated infrastructure.

The current Access Undertaking (AU2) was approved by QCA on 1 July 2020 and expires on 30 June 2025. QR will propose to replace AU2 with a Draft Access Undertaking 3 (DAU3) to apply from 1 July 2025 to 30 June 2030.

QR has engaged AECOM to undertake a review of the forecasted capital expenditure on its West Moreton (WM) system for DAU3. It is acknowledged that the capital expenditure will be subject to review by the QCA, who may seek public and/or industry feedback on its draft decision on the DAU3.

1.2 Scope of Review

Schedule E of AU2 details the conditions upon which the capital expenditure (CAPEX) proposed by QR should be accepted by the QCA. The scope of the review, therefore, covers a prudency assessment of the CAPEX in relation to its scope, standard and cost based on Schedule E of the Undertaking.

To assess the prudency of QR's DAU3 Capital Expenditure Plan, AECOM has examined a sample of projects from the WM Capital Investment Plan.

1.3 Report Structure

The structure of the report is outlined in Table 1

Table 1 Report Structure

Main Report	
Section 1	Introduction
Section 2	Queensland Rail's Capital Investment Plan
Section 3	Assessment Methodology
Section 4	Overall Capital Program
Section 5	Summary of Assessment of Proposed Projects
Section 6	Conclusion

2.0 Queensland Rail's Capital Investment Plan

2.1 Overview

QR's Capital Investment Plan over DAU3 includes 20 projects totalling $325.2m ($FY24), [redacted]. The projects are categorised into asset types, namely Trackwork, Civil Works, Bridges, Signalling and Facilities. A breakdown of the plan is provided in Table 2.

Table 2 QR's Proposed Capital Projects for DAU3 ($m FY24)

Asset Type	No. of Projects	FY26	FY27	FY28	FY29	FY30	Total
Trackwork All assets related to track infrastructure, including rail formation, sleepers, ballast, curve transitions and level crossing transitions.	8	$74.8	$64.2	$23.7	$23.7	$23.7	$210.0
Civil Works Works related to slope stabilisation and culverts.	3	$9.0	$15.6	$4.5	$4.5	$4.5	$38.1
Bridges Works related to the replacement of existing timber bridges, including bridge structures and piers.	2	$15.0	$18.0	$10.5	$10.5	$10.5	$64.5
Signalling Assets related to track signalling, including associated power equipment, cabling and housings, and level crossing protection.	6	$0.0	$0.0	$0.2	$7.6	$3.3	$11.1
Facilities Maintenance Depot Refurbishment.	1	$0.0	$0.0	$1.5	$0.0	$0.0	$1.5
Total	**20**	**$98.8**	**$97.8**	**$40.3**	**$46.3**	**$41.9**	**$325.2**

2.2 Extent of Review

This review involved a sample of nine projects submitted in the Plan, representing over 79% of the total value of the Plan.

The sample was selected based on the asset type (trackwork, civil works, bridges and signalling) and project size (value). To gain a broader understanding during the assessment, similar projects in each asset type were assessed together. The full list of proposed projects for DAU3 is presented in Table 3, with the projects included in this review highlighted in green.

This report addresses the projects in decreasing order of cost, reporting in the following order:

- Trackwork – track reconditioning and formation strengthening[1]
- Civil works – slope stabilisation
- Bridges – timber bridge pier/structure replacement
- Signalling – digital telemetry

[1] Formation strengthening projects in the WM Capital Investment Plan are categorised into two asset categories. For this assessment, both projects are classified under "Trackwork".

Table 3 QR's Capital Investment Plan during DAU3

Asset Type	Project No	Description	Value of Projects in Claim over DAU3 ($FY24)	Included in review	% of total Claim
Trackwork	B.06155	West Moreton Reconditioning Koomi - Dalby	[redacted]	Y	[redacted]
	B.06156	Formation Strengthening Rosewood-Toowoomba	[redacted]	Y	[redacted]
	B.06366	West Moreton Reconditioning Dalby - Macalister	[redacted]	Y	[redacted]
	B.05578	West Moreton Toowoomba Range Curve Transitions	[redacted]		
	B.05945	West Moreton Re-sleepering FY26	[redacted]		
	B.04798	Reconditioning Macalister to Columboola	[redacted]	Y	[redacted]
	B.04817	West Moreton Re-rail	[redacted]		
	B.04898	West Moreton Level Crossing Transitions (Up Road)	[redacted]		
	B.04546	West Moreton Formation Strengthening Toowoomba - Jondaryan	[redacted]	Y	[redacted]
Civil Works	B.06507	West Moreton Ranges Slope Stabilisation	[redacted]	Y	[redacted]
	B.04823	West Moreton Culvert Renewals	[redacted]		
Bridges	B.06162	West Moreton Bridge/Pier Replacement Rosewood-Jondaryan)	[redacted]	Y	[redacted]
	B.04804	West Moreton Bridge/Pier Replacement (Jondaryan - Columboola)	[redacted]	Y	[redacted]
Signalling	B.05592	Grandchester to Laidley Signal Cable	[redacted]		
	B.04763	Digital Telemetry Rollout - West Moreton	[redacted]	Y	[redacted]
	B.05593	Rangeview SER/PER Upgrade	[redacted]		
	B.05601	Signalling LED Upgrade	[redacted]		
	B.06508	Dalby Yard and OLCs Re-signalling	[redacted]		
	B.04778	Gatton Interlocking Renewal	[redacted]		
Facilities	B.06509	[redacted] Refurb	[redacted]		
Total			**$325,181,384**		**79%**

3.0 Assessment Methodology

3.1 Methodology of Assessment

For this assessment of QR's WM Capital Investment Plan, the evaluation of a selected sample of projects was undertaken by a rail engineer in consultation with relevant technical specialists. This review has been a desktop review, with requests for additional documentation, where possible, to clarify issues related to the projects being reviewed.

A high-level outline of the review methodology is presented in Figure 1.

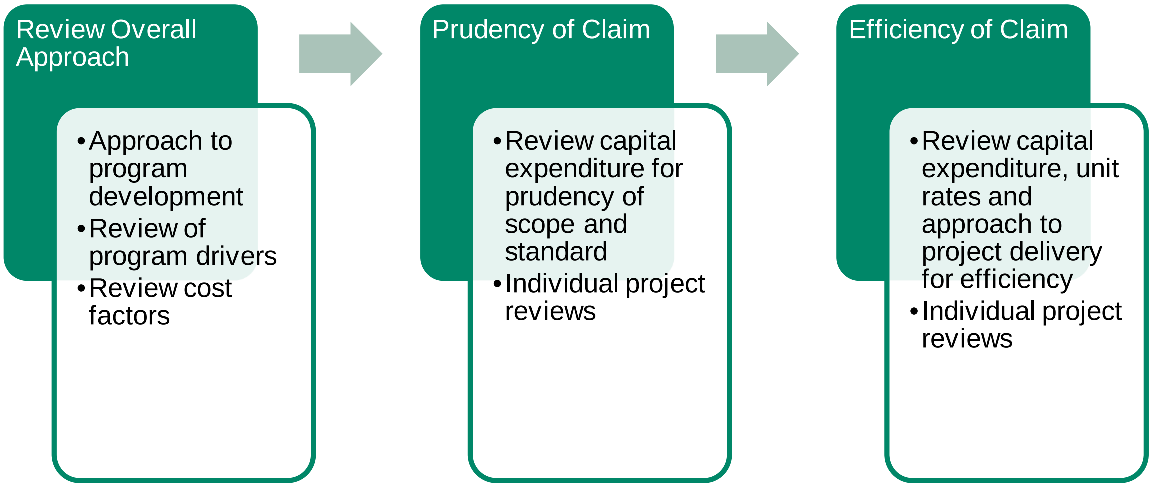


Figure 1 Capital Expenditure Review Methodology

3.2 Assessment Format

In order to establish consistency in the technical assessment, a standard project assessment format was developed using the criteria based on Schedule E of the Undertaking, which contains the conditions under which QR's capital expenditure can be accepted into the regulatory asset base. It stands that a preliminary assessment of the proposed projects against these criteria can assist in demonstrating the prudency and efficiency of the forward capital plan.

These criteria are outlined in the sections below. In addition to ensuring a consistent approach to the assessments by all reviewers, the standard assessment format is a key mechanism by which AECOM has demonstrated transparency in its review.

3.2.1 Scope

The assessment of prudency of scope of works involves assessing whether the works are reasonably required. The criteria for this assessment are as follows:

Has consultation with affected Access Holder/s been undertaken?	• *Has reasonable consultation been undertaken with any Access Holder who may be adversely affected?*
Is the project relevant?	• *Is the project for a branch line to a mine?*
Were the works reasonably required and appropriately evaluated?	• *Reasonably required to accommodate Access Agreements?* • *Reasonably required to accommodate Reasonable Demand?* • *Reasonably required considering the asset condition?* • *Reasonably required to comply with health, safety and environmental* • *Are QR's processes appropriate to evaluate and select the project?* • *Was the evaluation of the project subjected to QR's processes?* • *Has consultation been undertaken with relevant stakeholders?*

3.2.2 Standard

The assessment of prudency of the standard of works involves assessing whether the works are of a reasonable standard to meet the requirements of the scope of the Capital Investment Plan. It further assesses whether the project is not overdesigned such that they are beyond the requirements of that scope. The criteria for this assessment are as follows:

Were the works:	• *Consistent with existing standard and configuration of adjacent or existing infrastructure has been accepted as reasonable?*
Were the works of a reasonable standard to meet the requirements of the Scope with regards to:	• *Requirements of Rolling Stock Operators and compliance with Access Agreements?* • *Current and likely future usage levels?* • *Rail Industry Safety and Standards Board?* • *With regards to the requirements of other relevant Australian design and construction standards.* • *QR's design standards contained within its Safety Management System?* • *All relevant legislation, including requirements of any authority?*

3.2.3 Cost

The assessment of prudency of cost Involves assessing whether the costs are reasonable for the scope and standard of work to be done. The criteria for this assessment are as follows:

Does the project have an approved procurement strategy?	
Reasonable for the Scope and Standard of works done?	• *Do the costs align to scale, nature and complexity of the project?*
Does the project cost estimates demonstrate value for money?	• *With regards to the circumstances prevailing in the market and locality for engineering, equipment supplies and construction?* • *With regards to sourcing of labour?* • *With regards to sourcing of equipment?* • *Were alternatives considered to minimise whole of life costs?* • *Is the proposed procurement methodology consistent with approved procurement?*
Does the capital program/project consider:	• *Appropriate governance structure for size and nature of project?* • *Safety during construction and operation?* • *Environmental approvals and compliance?* • *Compliance with legal and authority requirements* • *Minimising disruption to operation of train services during construction?* • *Were access holder requests appropriately managed?* • *Minimising whole of life costs, including future maintenance & operating costs?* • *Minimising total project costs?*
Does the proposed project estimates and program seem reasonable with regard to the following:	• *Contingency allowed for?* • *Project Management Costs?* • *Risk allowances?* • *Timing/delivery programs?*

3.3 Project Documentation Assessment

Each project has been evaluated for prudency in terms of scope, standard and cost, and recommendations made based on a review of project documentation supplied for QR or the professional judgement of our technical reviewers, where the information available was insufficient. In this context, the use of project documentation is the preferred and best practice, but not the sole, means of evaluating project prudency.

A list of documentation that AECOM would expect to be available to support recommendations of prudency of proposed capital projects is listed in Table 4. AECOM notes that the list provided should be seen as identifying topics that require adequate documentation rather than a requirement for specific documents.

Table 4 Documents (or equivalent information expected to support a sound recommendation)

Prudency of Scope	Prudency of Standard	Prudency of Cost
Business Case	QR Standard Specifications and Drawings	Approved business cases with cost estimates
Project Plan	QR Policy documents	Project Management Plan
Condition assessment report	Business Case	Evidence of risk allocations/contingencies
Asset Management Plan		Procurement Policy
Access Holder Request		

AECOM assessed and reported the quality and Range of documentation provided by QR for each project in the review. The criteria for the assessment are outlined summarised in Table 5.

Table 5 Project Documentation Assessment

Quality and Range of documentation	Legend	Description
High		Sufficient documentary evidence to support and demonstrate a recommendation.
Medium		Incomplete documentation evidence but informal documentation and/or professional judgement support a recommendation.
Low		Limited documentary evidence, but professional judgment supports a recommendation.

3.4 Interpreting this Report

An example of a review summary for a project is provided in Table 6. As demonstrated, prudency of scope, standard and cost are denoted by ticks, and as mentioned in the previous section, the level of documentation quality for the assessment is represented by the colours of the cells.

In the example, the project is found to be:

- Prudent in scope with a high level of documentation quality
- Prudent in standard with a low level of documentation quality
- Prudent in cost with a medium level of documentation quality.
- There are no recommended amendments to the claimed amount.

Table 6 Review Summary Example

Review Summary	Scope	✓
	Standard	✓
	Cost	✓

Capital Expenditure Claim	[redacted]
Impact of findings on Claim	$-
Total accepted	[redacted]

4.0 Overall Capital Program

4.1 Approach to Program Development

4.1.1 Drivers

Table 7 presents a summary of the key drivers of the proposed capital program for the DAU3 period.

Table 7 Capital Program Drivers

Capital Program Drivers	Description
Increased Network Tonnage	QR are expecting peak tonnage to increase significantly from the commencement of AU2 to DAU3 as a result of two new mines becoming operational – New Acland Stage 3 and Wilkie Creek. The addition of these mines will increase the tonnage on the network to 9.6 mtpa from a current tonnage of 2.5 mtpa.
Network Asset Age and Condition	Recent condition assessments of the network assets have revealed that, at a minimum, approximately 25% of track, signalling and structures assets are in a poor or very poor condition state, with a proportion of non-assessed assets suggesting that this number may actually be larger. Assets in poor or very poor condition are described as being at or beyond the end of useful life and in need of significant refurbishment or replacement. Assets in a poor or very poor condition state can present significant risks to safety and service levels.
Network Capacity	The West Moreton System is currently constrained by four aspects: • All timber and steel structures are limited to 15.75tal, noting that a network is only as strong as its 'weakest link'. • Much of the formation material was not engineered and is considered under-strength for 15.75tal. • Without additional infrastructure investment, the Toowoomba Range capacity is restricted to 113 return paths per week. • Passing loops at Fisherman Islands and Kingsthorpe are 690 metres long, which restricts the maximum length of trains on the system (a coal reference train is 675 meters long). • The steep grades of the Toowoomba Range and the Little Liverpool Range cause trains to traverse these sections slowly, which, combined with single line workings in both locations, causes capacity constraints.

Performance against Service Levels	QR notes that their customer requirements for the West Moreton System are driven by reliability, availability and affordability.
	
	There have been several issues with the delivery of the service standards, notably:
	• **Track Closures** – track closures on the system have been the result of various issues:
	  - Rainfall in the Toowoomba Range – currently, if more than 30mm of rain falls in this area, the track must be closed and assessed for safety
	  - Asset failures have resulted in unplanned closures
	• **Speed Restrictions** – there is a top speed on the network of 80km/h; however, based on the condition of the network, there is a speed restriction on coal loaded trains of 60km/h. In addition, there are restrictions required on the network when the air temperature reaches certain limits. These restrictions are more significant in timber-sleepered areas.

Capital Program Drivers	Description
Possession Management	QR must be able to deliver its capital and maintenance programs within the available possession windows. With traffic expected to increase significantly, this requires careful planning to achieve a balance between providing a resilient network capable of accommodating the required tonnages and limiting the planned track closures to reduce service disruption.
Maintenance Program	QR's approach to asset management is reaching a balance of levels of service, management of risk and efficient whole of life costs. Both maintenance and capital expenditure contribute to maintaining the availability and reliability of the network.

4.1.2 Approach

QR has developed its capital program in response to the tonnage increases expected on the network over the DAU3 period, with the view that existing issues on the network will need to be resolved prior to the tonnage reaching its peak in order to have the best chance at minimising risk to service levels. With this in mind, QR has proposed an aggressive capital program over the first two years of DAU3, accelerating the delivery of many works, which will strengthen the resilience of the network in preparation for increased tonnages.

The approach QR has taken to developing its capital program is outlined below:

1. Review the existing 10-year base capital plan

1. Identify and bring forward those priority works within the previous plan to deliver these before the network reaches its peak tonnage. These projects include those that would upgrade the asset to a standard requirement for a coal traffic corridor transporting 9.6 mtpa, i.e. a 50kg rail on concrete sleepers over the engineered formation and concrete structures.
2. The key accelerated projects include:
   a) Formation strengthening on black soil sections
   b) Toowoomba Range Slope Stabilisation for high-risk embankments
   c) Track reconditioning to 50kg rail on concrete sleepers
   d) Timber bridge and pier eliminations
   e) Toowoomba Range curve transitions track strengthening

The approach appears to be reasonable to accommodate the increased tonnages across the system and manage and mitigate the existing risks to service delivery. It is reasonable to assume that a network with existing issues with speed restrictions and unplanned closures would require additional capital works to improve the standard of the network to both reduce these disruptions and accommodate a significant increase in tonnage.

4.2 Procurement

AECOM has reviewed the following QR procurement documentation:

- MD-18-191 Procurement Procedure,
- MD-10-926 Procurement Standard, and
- MD-14-781 Project Management Methodology Framework.

AECOM also reviewed a sample of capital business cases, which include an outline of the approach to project delivery.

QR's procurement approach is based on a number of best practice principles, including a value for money principle. The value for money principle addresses a number of the factors that contribute to efficiency in costs, including consideration of whole of life costs, management of risks (including safety and environmental), and achievement of outcomes sought.

QR has in place various existing arrangements that have been established through previous sourcing projects, for example, a panel arrangement. QR has stated that *'wherever possible, the goods and services required must be purchased through these arrangements.'* These arrangements can include both panel arrangements with QR or the whole of government panel arrangements.

Where a new contract is required to be let, QR has set thresholds for the minimum number of suppliers invited to tender. These are outlined in Table 8.

Table 8 Procurement of New Contracts Thresholds

Value of Expenditure	Minimum number of suppliers to be invited to respond
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

The tiered approach reflects an efficient approach for the following reasons:

- For larger levels of expenditure, a competitive procurement approach with a higher number of suppliers can encourage price competition and help to achieve market rates for QR
- For lower levels of expenditure, the smaller numbers of suppliers help to reduce the cost of procurement. QR's procurement effort is commensurate with the value of expenditure.

We consider that QR's approach to procurement of projects reflects an efficient approach.

4.3 Delivery

AECOM has reviewed several of QR's business cases to confirm its delivery approach to major capital projects. QR clearly identify the planned delivery methodology within its business cases, and this varies depending on the scope of works required. A review of delivery methods demonstrate the following:

- QR uses internal resources where the internal capability and capacity exists within the organisation
- QR supplement internal resources with external contractors where necessary
- Where external contractors are expected to deliver a significant portion of the work, the procurement process for the contractor is provided within the business case and aligns with the requirements of the Queensland Rail Procurement Procedure.
- QR considers the delivery constraints within its business case and project plans, including possession windows, availability of staff and materials and seasonal weather conditions.

QR consider critical issues relating to delivery at the planning phase, which helps to reduce risk and unforeseen costs in later stages.

4.4 Factors Affecting Costs

QR has used historical actual costs to deliver its capital works to inform the DAU3 capital program expenditure. These costs have been adjusted to reflect inflationary factors extant in the market. The construction industry has experienced significant cost inflation over recent years. Of particular relevance to QR's capital costs are the increases to[2]:

- Materials Costs – materials costs in the construction industry have risen significantly. In the 12-month period leading up to July 2022, the following increases were observed by the Australian Constructors Association:
  - Structural Steel: experienced increases in prices of up to 70%.
  - Rail Steel: experiences price increases of up to 50%
  - Concrete experienced price increases of up to 30-40%
  - Excavator and bulk haulage costs increased by up to 40%
- Labour – labour costs in the construction industry have also risen, although not as significantly as materials prices. In the 12-month period leading up to July 2022, the following increases were observed by the Australian Constructors Association:
  - Skilled tradespeople – costs for skills tradespeople increased by up to 15%
  - General labour – costs for general labour increased by up to 15%

QR's cost estimates reflect current market conditions.

[2] Australian Constructors Association, Construction cost inflation: Ways to address an escalating issue, July 2022

5.0 Proposed Projects

This review involved a sample of nine projects submitted in the Plan, representing over 79% of the total value of the Plan.

The sample was selected based on the asset type (trackwork, civil works, bridges and signalling) and project size (value). To gain a broader understanding during the assessment, similar projects in each asset type were assessed together.

5.1 West Moreton Reconditioning Projects (B.06155, B.06366 and B.04798)

Summary

The projects form part of a broader reconditioning program on the West Moreton system due to the deteriorating condition of the existing track infrastructure. The system is deteriorating at an accelerated rate, which is significantly reducing the asset's life. If the reconditioning works are not completed when required, the risk of failure increases. The works are therefore required to maintain safety and reliability to service existing and future traffic.

The broader program has been developed to recondition all the track infrastructure on the system. The eastern part (east of Jondaryan) has been prioritised due to higher tonnage demands, and the upgrade was completed in 2017. A program was developed to undertake works on the remaining western section, west of Jondaryan, which services coal mines, livestock and agricultural products, and the Westlander passenger service. It is worth noting that some sections of this western section are built on highly reactive soils, which have exacerbated the track performing poorly. This emphasises the need for the reconditioning works. The objective is to recondition the loaded Down Road, identified as the target priority section of the track. The works to renew the [redacted] of highest priority sections of the western section commenced in 2020 as part of Project B.05650 and is due to be completed in FY24. Spanning over [redacted], these projects represent the ongoing efforts to recondition the western part of the system, upgrading the remaining network between Koomi and Columboola to ensure continued functionality and reliability.

The scope of reconditioning works includes:

- Track deconstruction, including dismantling, relocation and/or scrapping of existing materials,
- Formation reconstruction, including replacement of black soil, 700mm capping layer 4m wide with a layer of geofabric and geogrid,
- Replacement of rail (41 kg/m to 50 kg/m), sleepers (interspersed timber and Steel to concrete) and A Grade ballast,
- Project planning and project documentation,
- Environmental approvals as required, and
- Progress and handover inspections.

Review Summary	Scope	✓
	Standard	✓
	Cost	✓

Capital Expenditure Plan	[redacted]
Impact of findings on Plan	$-
Total accepted	[redacted]

QR has proposed the following costs for the reconditioning projects in DAU3 (refer to Table 9).

Table 9 QR's Forecasted Expenditure for Reconditioning ($m FY24)

Project	Location	Estimated length of track (km)	FY26	FY27	FY28	FY29	FY30	Total
B.06155	Koomi – Dalby	[redacted]						
B.06366	Dalby – Macalister							
B.04798	Macalister to Columboola							
Total								

In DAU3, QR proposes to recondition approximately [redacted] of track, costing [redacted]. Commencing in Koomi, the program will recondition the remaining light track on the western section upon completion of the current Project B.05650 in FY24.

Assessment of Scope

Track reconditioning involves the replacement of existing assets with an entirely new section of the track. The original infrastructure, which was implemented 20 years ago, consisted of a 41kg/m rail (light) on 1 in 2 interspersed steel and timber sleepers. At that time, this infrastructure was deemed suitable for the service demands in the Jondaryan to Columboola corridor. However, over the years, the service demands in this corridor have increased significantly, especially with the commissioning of a new mine in 2010, which increased the traffic services from Columboola.

The increased traffic and service demands have led to accelerated track deterioration, raising concerns about safety. Between 2018 and 2019, three major derailments occurred on the main line (Rosewood to Toowoomba), causing substantial disruptions to the network's capacity and performance. These incidents prompted QR to undertake a detailed corridor assessment, which identified areas of black soil formation that accelerate alignment deterioration. The existing track structure, in combination with the reactive soil formation, contributes to track instability, particularly during the higher temperatures and heavier rainfall events through Summer.

Overall, it indicated that it is unreasonable to expect the current 41kg/m rail to be serviceable beyond 2032 and concluded that undertaking routine maintenance is inadequate to address the accelerated deterioration. As such, it proposed a major renewal program, including upgrading to a heavier 50kg/m rail to increase track structure strength. The benefits of reconditioning all light tracks are twofold: it ensures the best asset performance and cost-benefit for future traffic levels, and it reduces reactive maintenance works, which reduces unplanned track closures. The investigations and findings were supported by an external reviewer (Rhomberg Rail) and are documented in the Far West Moreton Asset Strategy.

The necessity for a comprehensive track reconditioning plan is evident. However, in light of other concurrent projects necessary to maintain the network, QR has developed a Service Investment Plan (SIP) spanning the 10-year period from FY2023/24 to FY2032/33. This plan used a Risk Based Decision Framework (RBDF), which is designed to allocate capital investments based on the criticality and condition of the asset. The outputs are used to inform the prioritisation of options for investment planning, which have determined track renewal as a primary capital investment required to service the increased demands.

These projects represent the three reconditioning projects (Pipeline) in the SIP, aimed at reconditioning the corridor between Koomi and Columboola. They form part of a broader program commenced in 2019 to recondition the western part of the network from Jondaryan to Columboola. The current Project B.05650, approved in the FY24 Investment Plan, is due to finish in FY24. Spanning around 125km, the project's scope is consistent with previous reconditioning projects and has been planned until FY2032/33. It is also noted that the works have been undertaken regularly by QR, which lends to the robustness of the scope.

The timeframe for these projects spans both AU2 and DAU3; however, works are in the AU2 period primarily to prevent any adverse impact on DAU3.

The scope of works is considered prudent with a medium level of documentation quality, given the findings of the Asset Strategy were developed for the corridor from Jondaryan to Columboola, not specific to these projects.

Assessment of Standard

The reconditioning program for this project aligns with the approach taken in previous reconditioning works. The program entails several key components, including upgrading to 50kg/m rails, reconstructing the track formation, upgrading to concrete sleepers, and implementing Grade A ballast.

As mentioned above, the existing track infrastructure was not originally designed to handle the current service demands, which are exerting a load that accelerates rail deterioration. As such, the decision to transition to more robust 50kg/m rails, in accordance with QR's Track Standard Module 7 (MD-10-575), is justified. These rails have greater load-bearing capacity, reducing the risk of excessive wear and deformation. Furthermore, their enhanced structural integrity reduces the likelihood of developing defects that could lead to derailments.

The transition to concrete sleepers aligns with the growing traffic demands. As per QR's Track Standard Module 3 (MD-10-575), concrete sleepers are considered the most superior sleeper type, while the existing interspersed sleepers are ranked as the second least favourable option. Module 3 further specifies to not intersperse timber alternates and/or Steel when constructing a new track. Concrete sleepers can support heavier loads, making them suitable for accommodating the increased tonnage on the network. This upgrade is also consistent with the network's long-term strategy to reduce the need for re-sleepering works, which can disrupt network operations. The asset life of a concrete sleeper exceeds 50 years and further contributes to this strategy. Their resistance to track movements further enhances the safety and efficiency of rail operations.

When upgrading to concrete sleepers, QR's Track Standard Module 4 mandates upgrading the ballast to Grade A. Compared to the existing ballast (Grade B), it distributes rail loads more evenly to the underlying subgrade, a crucial element in supporting increased services and tonnage. This maintains track stability by reducing lateral and longitudinal movements, ensuring precise track alignment and geometry.

According to the SIP, the original network formation was not designed for the current axle loadings and tonnages, resulting in uneven settling and detrimental effects on-track performance. An engineered formation is presented as a solution designed to provide superior stability and load-bearing capacity. The reconstruction efforts will also address areas with highly reactive black soils along the corridor. Given the potentially high costs of repair, an investigation is underway to determine the most practical and cost-effective construction methods.

The standard of works is reasonable and consistent with previous reconditioning works and is considered prudent. The documentation quality to inform the assessment is high.

Assessment of Cost	*Unit Rate*	QR has determined costs for its reconditioning projects based on a unit rate of [redacted] of track reconditioned. This rate has been estimated based on historical costs for the same scope and escalated to account for market changes and inflation. The unit rate includes the removal of existing rail and formation to 700mm deep and the replacement of formation materials 700mm deep, as well as new track. **We consider that the unit rate estimated for reconditioning is reasonable and consistent with the conditions prevailing in the market.**
	Consideration for whole of life costs	We have reviewed the B.05650 Reconditioning West Moreton Business Case, which demonstrates a clear consideration for both the capital and operating costs for the project life of 20 years. Contingency has also been included within cost estimates to account for project risks. **We would expect that similar consideration would be given to future capital projects.**
	Other considerations	QR's business case demonstrates consideration for different options, with the selected option based on the ability to deliver the expected service standards at the least cost. Delivery is proposed through internal resources where available, supplemented by external resources. QR procures its external resources through panel arrangements or tender processes in line with its procurement rules. **We consider that this reflects an efficient approach to delivery.**

5.2 Formation Strengthening (B.06156 and B.04546)

Summary

The projects form part of a broader track renewal program aimed at reconstructing sections of the existing track formation that are causing significant network performance issues. A large portion of the current network was built on undesirable black soil, which has poor load-bearing capacity and drainage problems. These issues have not only reduced operational speeds but also increased the risk of derailment due to accelerated deterioration. Strengthening the track formation is essential to ensure network reliability and safety.

These projects are integral to the broader effort to reconstruct sections of the track that were originally built on black soil. The proposed projects will focus on critical sections between Rosewood and Jondaryan, covering over [redacted] of track. The works west of Jondaryan will be addressed as part of proposed track reconditioning projects.

The scope of bridge replacement works includes:

- Temporary removal of track,
- Excavating failed formation,
- Formation reconstruction, including replacement of black soil, 700mm capping layer 4m wide with a layer of geofabric and geogrid, and
- Reinstatement of track.

Review Summary	Scope	✓
	Standard	✓
	Cost	✓

Capital Expenditure Plan	[redacted]
Impact of findings on Plan	$-
Total accepted	[redacted]

QR has proposed the following costs for the formation strengthening projects in DAU3 (refer to Table 10).

Table 10 QR's Forecasted Expenditure for Formation Strengthening in DAU3 ($m FY24)

Project	Location	Estimated length of track (km)	FY26	FY27	FY28	FY29	FY30	Total
B.06156	Rosewood – Toowoomba	[redacted]						
B.04546	Toowoomba – Jondaryan							
Total								

In DAU3, QR will strengthen track formation considered critical, particularly on highly reactive formation, at a proposed cost of [redacted] The program will undertake works on the remaining high critical sections between Rosewood and Jondaryan.

Assessment of Scope

Formation strengthening involves the reconstruction of track formation to a new and engineered formation.

As per the SIP, the original formation of the system, constructed between 1865 and 1880, predominately consists of black soil, except for the Range areas, which typically comprise sandstone and rock materials. Highly reactive black soils are undesirable due to poor load-bearing capacity and drainage issues, which have had adverse effects on the network performance.

The SIP further states that the original track was not designed for the current axle loadings or tonnages, compounded by the black soil formation, resulting in alignment issues in various sections of the track. These alignment issues have led to speed restrictions, impacting the system's operational efficiency. For instance, loaded trains are restricted to a maximum of 60kph over the remaining light rack structure, and black soil formation sections are unable to maintain the intended operational speed of 80kph, necessitating a speed restriction to 60kph. These undesirable track conditions have the potential to accelerate the deterioration of both the tracks and locomotive components over time. Consequently, this elevates the risk of derailment, underscoring the need for the works to maintain a safe and reliable network.

These unfavourable circumstances have prompted regular maintenance works on the system. These reactive works are not only costly but also disrupt operational services due to track closures. To minimise these operational impacts, a capital works project focused on strengthening the track formation has been identified as a more long-term effective solution.

Given the major impacts, the capital works have been incorporated into QR's SIP, which allocates investments based on asset criticality and condition. These two projects represent the formation strengthening projects (Pipeline) in the investment plan, aimed at strengthening critical sections between Rosewood and Jondaryan. These form part of a broader track renewal program to upgrade track formation on the network. The scope of works is consistent with the formation reconstruction works involved within the ongoing track reconditioning project (B.05650), approved in the FY24 Investment Plan.

Track formation works become necessary when the track system itself doesn't require a complete upgrade but has already undergone a previous upgrade. This is demonstrated in the proposed project B.06156, which aims to reconstruct track formation between Yarongmalu and Helidon. This section was relayed with a 50kg/m rail with concrete sleepers over the black soil formation around 15 years ago. The project aims to address the remaining 38km of highly reactive soil.

The timeframe for these projects spans both AU2 and DAU3; however, works are in the AU2 period primarily to prevent any adverse impact on DAU3.

The works are considered prudent with a medium level of documentation, given the limited scope of Project B.04546 relative to Project B.06156.

Assessment of Standard

As discussed above, formation strengthening forms part of a broader track renewal program on the network. This broader program was developed to address critical sections, and as a result, separate upgrade efforts such as re-sleepering and re-railing have occurred throughout the network.

Formation strengthening works are necessary when the existing track has already undergone upgrades and requires improvements specifically to the track formation. This aligns with the approach employed for formation works in the ongoing track reconditioning projects, which involve a complete reconstruction of the track infrastructure. These works encompass several key components, including the construction of a 700mm capping layer topped with a layer of geofabric and geogrid.

In accordance with QR's Specifications Standard on Earthworks (QR-CTS-Part 6), capping layers distribute loads to the subgrade at a safe level. Unlike black soil, it is composed of materials with superior load-bearing properties, such as crushed stone, gravel, or specially engineered ballast. These materials have a higher bearing capacity than black soil, which is susceptible to deformation and settlement under heavy loads. Given the expected tonnage increase, the upgrade to a more robust material is considered necessary. Furthermore, its enhanced load-distributing properties reduce stress on the track components on which it is constructed, including rails and ties, thereby decreasing wear and tear. This, in turn, reduces the maintenance works required, aligning with QR's strategic objective to reduce reactive maintenance works.

Geofabric is a permeable textile material made from synthetic fibres. As outlined in TMR's Technical Specification on Geotextile (MRTS27), geofabrics are designed to be placed within the layers of the track formation to prevent mixing, which can lead to deformation and settlement. Moreover, they act as a filter to allow water to pass through without disturbing fine soil particles, thus ensuring proper drainage and stability. Improved drainage mitigates potential track failure during significant rainfall events. Similarly, geogrids are used in the track formation to reinforce the subgrade, as specified in TMR's Technical Specification on Geosynthetics (MRTS58). Geogrids provide tensile strength to distribute loads more effectively and reduce the potential for settlement or deformation of the track structure. It provides the strength to allow interlocking with surrounding soil, rock or earth to function as reinforcement.

Overall, the standard of formation strengthening works align with the approach in current track renewal projects and is considered prudent. A medium level of documentation quality was used for this assessment, given the absence of specific work locations in Project B.04546.

Assessment of Cost	*Unit Rate*	QR has determined costs for its formation strengthening projects based on a unit rate of [redacted]. This rate has been estimated based on historical costs for the same scope and escalated to account for market changes and inflation. Formation strengthening works reflect a scope similar to the track reconditioning but without the track materials costs. The unit rate includes removal and replacement of formation and reinstating the existing rail and sleepers. **We consider that the unit rate estimated for the scope outlined for formation strengthening is reasonable and consistent with the conditions prevailing in the market.**
	Other considerations	QR's business case demonstrates consideration for different options, with the selected option based on the ability to deliver the expected service standards at the least cost. **Delivery is proposed through internal resources where available, supplemented by external resources. We consider that this reflects an efficient approach to delivery.**

5.3 WM Bridge/Pier Replacement Projects (B.06162 and B.04804)

Summary

The project forms part of a broader bridge replacement program on the West Moreton system to replace its aging timber bridges, which have reached the end of their service life. The deteriorated conditions have necessitated speed restrictions, negatively impacting operational services. The failure to replace or adequately maintain these bridges not only decreases the safety of the network but also the reliability of its operations.

The broader program has been developed to address high-priority timber bridges on the network. This project will upgrade the remaining bridges from Rosewood to Jondaryan, encompassing both the Main and Western Lines of the network. Notably, the gross tonnage of the Main Line (Rosewood to Toowoomba) has increased almost three-fold (4.7 MGT to 12.5 MGT) in 20 years. Recent growth projections have forecasted further growth beyond 2024, emphasising the importance of ensuring the existing infrastructure can accommodate future line tonnage.

The scope of bridge replacement works includes:

- Bridge replacement of design and construction works; and
- Project handover report.

Review Summary	Scope	✓
	Standard	✓
	Cost	✓

Capital Expenditure Plan	[redacted]
Impact of findings on Plan	$-
Total accepted	[redacted]

QR has proposed the following costs for the timber bridge replacement projects in DAU3 (refer to Table 11).

Table 11 QR's Forecasted Expenditure for Timber Bridge Replacement ($m FY24)

Project	Description	FY26	FY27	FY28	FY29	FY30	Total
B.06162	Rosewood – Jondaryan	[redacted]					
B.04804	Jondaryan – Columboola						
Total							

In DAU3, QR will strengthen the remaining timber bridges on the system at a proposed cost of [redacted]. Commencing in Rosewood, the program will eliminate the bridges upon completion of the current renewal project in FY24.

Assessment of Scope

The West Moreton system currently includes ageing timber bridges, some of which are more than a century old. These structures contain components that have reached the end of their service life and are unable to meet the current operational demands of the network.

Consequently, due to the deteriorating condition of these bridges, safety measures, such as speed restrictions, have been implemented. However, these restrictions have negatively impacted the efficiency of sectional running times. This situation fails to meet the expectations of rail operators, who rely on avoiding track speed restrictions to maintain smooth operations. Additionally, several of the timber bridges are vulnerable to flooding, posing a significant operational risk in the event of severe flooding, which would necessitate major disruptions for repair work. The need to replace the existing timber structure is reinforced by QR’s Civil Engineering Standard (MD-10-586), which requires all (unless a separate approval is sought) new bridges to be built in durable materials such as concrete or Steel due to rigorous monitoring and maintenance required for timber bridges.

The need for replacement work on these bridges has been acknowledged as a critical asset requirement within the SIP; it has allocated capital investments based on the criticality and condition of the asset. Timber bridge elimination has been determined as a primary investment necessary to maintain operational services and accommodate increased service demands.

The projects have been proposed to replace the remaining timber bridges with concrete structures between Rosewood and Jondaryan. It forms part of an ongoing, broader, long-term strategy to eliminate the bridges reaching the end of their asset life throughout the system with concrete and steel structures that are better suited to current demands. The program was developed by assessing all timber bridges on the system and formulating packages of work that provide cost-effective solutions for addressing the highest priority sites. To ensure an efficient approach, a staged approach was devised, concentrating on structures with limited remaining service life and the highest maintenance costs.

QR’s commitment to providing a reliable and safe network is evident in the extensive planning and execution of this ongoing project. It is noted that the current bridge replacement project has been ongoing since 2016 and is due to finish in FY24. It is noted that the works have been undertaken regularly by QR over the years, which lends to the robustness of the scope.

Overall, the scope of works is considered prudent with a high level of documentation.

Assessment of Standard

The program involves the replacement of existing timber bridges with new and resilient concrete structures. This upgrade is essential because the original track infrastructure was not originally designed to meet the current service demands, necessitating a shift to more robust construction material and compliance with modern safety standards.

According to QR's Structures Standard (MD-10-586), concrete structures are more durable than timber structures, which enables them to bear heavier loads. This increased structural integrity can eliminate the need for speed restrictions that are currently imposed due to concerns about the safety and stability of the existing bridges.

As mentioned above, several of the timber bridges are vulnerable to flooding, which poses a significant operational risk in the case of a major rainfall event. Upgrading to concrete structures will improve resilience to flood-related issues. Given their stronger robustness, as stated in QR's Standard, concrete structures can better withstand the forces exerted by flooding, such as the impact of debris carried by floodwater or the hydraulic pressures caused by fast-flowing water. Furthermore, the susceptibility of timber to water absorption can lead to swelling and warping, undermining the loading capacity of the bridge. Concrete, in contrast, is impervious to water, making it less vulnerable to water-related damage, including decay and deterioration.

Moreover, the upgrade to a concrete structure aligns with the network's long-term strategy of reducing disruptions through planned capital works programs. Concrete bridges have a longer service life and require less maintenance than timber bridges. The reduced need for maintenance and repairs will lead to reliable and on-time operations, ensuring that QR meet operational performances.

The replacement to a modern-day concrete structure is consistent with QR's strategy outlined in the Asset Management Plan (MD-19-222). This strategy aims to eliminate timber bridges throughout the system to ensure ongoing safe and reliable operations and to replace sub-optimal, life-expiring assets with infrastructure more suited to the prevailing traffic task.

The standard of works is reasonable and is considered prudent. The documentation quality to inform the assessment is medium, primarily due to the absence of information regarding the design life of the new concrete bridges.

Assessment of Cost

Unit Rate

An examination of the cost estimates for the replacement of timber bridges and piers suggests an approximate unit rate per m replacement of [redacted].

We consider this unit rate to be reasonable, comparable with similar projects, and consistent with conditions prevailing in the market.

Consideration for whole of life costs

This project is a program of works continued on from AU2. We have reviewed the B.05649 Brisbane Renewal West Moreton Business Case, which demonstrates a clear consideration for both the capital and operating costs for the project life and demonstrates value for money through savings in maintenance costs on renewed bridges - maintenance cost reduction from [redacted] to [redacted] on average. Contingency has also been included within cost estimates to account for project risks.

We would expect that similar consideration would be given to future capital projects of the same scope.

Other considerations	QR’s business case demonstrates consideration for different options, with the selected option based on the ability to deliver the expected service standards at the least cost. Further, the business case clearly identifies priority bridges and reflects a prioritisation approach that allows funding to be directed to the most critical assets. Delivery is proposed through internal resources where available, supplemented by external resources. QR procures its external resources through panel arrangements or tender processes in line with its procurement rules. **We consider that this reflects an efficient approach to delivery.**

5.4 B.06507 WM Ranges Slope Stabilisation

Summary

The Toowoomba Range rail corridor forms part of the West Moreton system, which carries up to 113 return paths each week. This corridor serves as a major link for coal transport to the Port of Brisbane and supports passenger services running from Brisbane to South-West Queensland via the Westlander service. The Range is situated in a challenging geographical environment characterised by steep natural terrain, and the track is located on numerous cuts and fills.

These unfavourable conditions have led to major service disruptions. A notable instance occurred in 2011 when the track corridor was closed for three months due to a slope failure. The project forms part of a broader remediation program that commenced in 2019 to address slope instability issues to ensure safety and reliability on the network. A site investigation identified seven high critical sites on the Range, and previous projects have addressed the sites on a priority basis; this project aims to stabilise the two remaining risk embankments between Spring Bluff and Harlaxton.

The scope of slope stabilisation works includes:

- Extensive design development and planning process,
- Resolve embankment and large-scale cutting risks,
- Include additional drainage,
- Scour protection,
- Soil nailing and shotcreting
- Monitoring high priority sites.

Review Summary		
	Scope	✓
	Standard	✓
	Cost	✓

Capital Expenditure Plan	[redacted]
Impact of findings on Plan	$-
Total accepted	[redacted]

QR has proposed the following costs for the slope stabilisation projects in DAU3 (refer to Table 12).

Table 12 QR's Forecasted Expenditure for Slope Stabilisation Works ($m FY24)

Project	Description	FY26	FY27	FY28	FY29	FY30	Total
B.06507	WM Ranges Slope Stabilisation	[redacted]					

In DAU3, QR proposes to stabilise the two remaining high critical embankments, costing [redacted]. The works are to commence upon completion of the current project (B.06154) in FY24.

Assessment of Scope

The project objective is to address slope instability issues on the Toowoomba Range to enhance the safety and reliability of the West Moreton system. The unfavourable geographical conditions on the Range have led to temporary track closures in recent years. In 2011 and 2013, the track corridor was closed for 3 months and 6 weeks, respectively, due to slope failures. Most recently, a major wet weather in 2022 resulted in a 19-day closure, underscoring the need for slope stabilisation works.

The instability of the slope has severely disrupted network operations. Between January 2020 and April 2021, a total of 17 events (wet weather, slips and rock falls) resulted in the cancellation of 143 services and delays for an additional 154 on the Range. These significant delays have prompted QR to conduct a comprehensive geotechnical analysis, which identified several high-risk sites prone to large slips or landslides, particularly during a major rainfall event.

The analysis highlighted the importance of extensive slope stabilisation works to improve network reliability and, most importantly, ensure the safety of both railway services and all users of the network. These objectives are consistent with QR's Strategic Plan and Asset Management Plan (MD-19-222). The remediation works were categorised into three stages, with Stage 1 completed in 2020 and Stage 2 scheduled for completion in FY24. It is noted that the project budget of Stage 2 has increased from its initial estimate of [redacted] to [redacted] due to continued embankment slippage during the project's design and delivery phases. Detailed information on Stage 2 is documented in Toowoomba Range Slope Stability Stage 2 – Business Case.

Commencing in [redacted], this project (Stage 3) aims to address the two highest remaining embankments between Spring Bluff and Harlaxton. A notable risk in the project's execution is the possibility of ground conditions being worse than anticipated, requiring a change in methodology and additional costs. Nevertheless, the consequences of not undertaking works are critical to maintain the network's operation. It is also noted that the works have been undertaken previously by QR, which lends to the robustness of the scope.

The timeframe for these projects spans both AU2 and DAU3; however, works are in the AU2 period and the first half of DAU3 primarily to prevent any adverse impact on the remainder of DAU3.

A medium level of documentation has been used for the assessment, primarily because the specific remediation treatment can't be determined until site work and planning commence.

Overall, the scope of works is considered prudent.

Assessment of Standard

This scope of the project is consistent with previous slope stabilisation works, encompassing key components including additional drainage, scour protection, soil nailing and shotcreting and continued monitoring of high priority sites. The current instability issues have adversely affected services and will continue to do so unless the slopes are stabilised. According to the Transport and Mains Roads (TMR) Geotechnical Design Standard, which forms part of QR's Specifications Manual as per QR-CTS-Part 6, embankments and their foundations must remain stable and free from movements along any surface over their design life. Recent slope failures demonstrate that the current slopes and embankments do not satisfy this performance standard, necessitating stabilisation works. As such, the decision to undertake these stabilising projects is well-founded.

Providing additional drainage plays a crucial role in improving slope stability. Effective drainage helps manage the flow of water within and around the slope. Excess water can saturate the soil, increasing its weight and reducing its resisting strength, which can lead to landslides. Proper drainage channels water away from the slope, preventing it from deteriorating the slopes' stability. Furthermore, TMR's Technical Specification on General Earthworks (MRTS04) specifies the protection of earthworks by maintaining drainage to ensure runoff of water is safely diverted into the natural water streams away from critical elements. This is because surface runoff, particularly during heavy rainfall, erodes the slope's surface, leading to further instability. Drainage systems, such as ditches and culverts, divert runoff and assist in maintaining slope integrity.

Furthermore, TMR's Technical Specification on Embankment Slope Protections (MRTS03) outlines scour protection, soil nailing and shotcreting as effective measures to enhance slope stability. Scour protection mitigates erosion caused when water flows over or alongside a slope, preventing the loss of slope stability and shape. Scour protection measures, such as riprap or erosion control blankets, create a protective barrier on the slope's surface, maintaining the integrity of the slope by reducing the erosive effects of water. Soil nailing involves the installation of closely spaced, reinforcing elements (nails or bars) into a slope to enhance its structural integrity and resistance to sliding. These reinforcing elements provide additional shear strength to the slope, which increases the frictional resistance of the soils and reduces failure potential and collapsing. Shotcreting, also known as sprayed concrete, forms a durable and highly adhesive surface layer on the slope. It effectively bonds to the soil, provides structural resistance at the nail head and shields it from erosive forces of rainfall and wind, contributing to overall slope stability.

Monitoring of the sites will inform the extent of movement change to guide and inform remediation treatments.

This assessment was completed with a medium level of documentation quality, given the absence of specific remediation treatment that cannot be determined until works commence.

The standard of works aligns with previous slope stabilisation works and is considered a prudent and essential activity to identify and prioritise remediation.

Assessment of Cost	*Unit Rates*	Historical actual costs are a strong indicator of future costs, but with consideration required for the conditions prevailing in the market, specifically the significant increases in construction costs over recent years. **The works are not typical rail works, and therefore, standard unit rates are not available; however, costs for slope stabilisation have been developed based on historical costs, both internal and delivered by external contractors, and we consider the costs to be reasonable.**
	Consideration for the whole of life costs	This project is a program of works continued on from AU2. We have reviewed the Toowoomba Range Slope Stability Stage 2 Business Case, which demonstrates a clear consideration for both the capital and operating costs for the project life. Contingency has also been included within cost estimates to account for project risks. **As this project is a continuation of the program, we would expect that similar consideration would be given to future capital projects of the same scope.**
	Other considerations	QR’s business case demonstrates consideration for different options, with the selected option based on the ability to deliver the expected service standards at the least cost. Delivery has typically been undertaken through external geotechnical contractors and constructors. **Procurement is proposed to be through an open tender process, which is reflective of an efficient process.**

5.5 B.04763 Digital Telemetry Rollout – West Moreton

Summary

The digital telemetry systems on the system facilitate the transmission of real-time data, monitoring and control capabilities. These systems use digital technology to collect, transmit and analyse data from various sensors and devices installed on trains, tracks and railway infrastructure.

To maintain a safe and reliable network, it is crucial to maintain telemetry equipment. This project aims to renew telemetry equipment before it becomes unserviceable to address compliance with relevant standards. This includes the renewal of its componentry and power sources, such as batteries. Additionally, it aims to rollout new and improved equipment before the current equipment and its associated componentry required for maintenance become obsolete.

Review Summary	Scope	✓
	Standard	
	Cost	✓

Capital Expenditure Plan	[redacted]
Impact of findings on Plan	$-
Total accepted	[redacted]

QR has proposed the following costs for the rollout of digital telemetry in DAU3 (refer to Table 13).

Table 13 QR's Forecasted Expenditure for Digital Telemetry Rollout ($m FY24)

Project	Description	FY26	FY27	FY28	FY29	FY30	Total
B.04763	Digital Telemetry Rollout – West Moreton	[redacted]					

In DAU3, QR proposes to renew and maintain telemetry equipment on the system, costing [redacted]. The works are to commence in FY28 and continue beyond the DAU3 period until FY31.

Assessment of Scope

Digital telemetry systems are essential components of the WM system, providing real-time data and communication capabilities that improve safety, efficiency and reliability. These systems have the capacity to enable predictive maintenance, optimise energy usage, enhance passenger experience, and support overall network management.

It has been identified that the equipment on the system will reach the end of its service life, necessitating maintenance or replacement. Presently, precise information regarding the current lifespan of these assets is lacking. However, the fact that the works are to commence in FY28 suggests that the assets are not currently at the end of the service life. Instead, they are expected to gradually deteriorate and potentially lose their functionality due to the wear and tear associated with regular use, reaching the end of their lifespan in the coming years.

This assessment relies on a limited level of documentation due to the absence of key data. Specifically, the specific telemetry assets, which determine the asset life, have not been identified. Moreover, the maintenance records, which provide details of previous inspections and their impact on its lifespan, have not been provided. It is noted that not all assets reaching the end of the service life need to be replaced. Instead, the functionality and purpose of it should be understood and assessed whether its role can be undertaken by another system. If no alternative exists, it can be made redundant. Should a renewal of equipment and/or system be deemed necessary, a specific maintenance procedure is important to guide the process.

To maintain network safety and reliability, the project is considered prudent with regard to the Scope.

Assessment of Standard

The available information makes it difficult to determine the specific telemetry systems that are to be renewed in the project. Due to this limited information, it is challenging to determine whether these planned works will align with the established standards of adjacent or existing infrastructure within the network.

QR’s standard on maintenance of telecommunications equipment (MD-15-549) requires that all installed telecommunications are to be maintained to ensure the functionality provided by the system is maintained throughout its operational life. Furthermore, the standard emphasises that alterations or additions to the telecommunications systems should only occur following authorisation in accordance with the Telecommunications change management process.

Overall, it is difficult to assess the prudency of standard with the available information.

Assessment of Cost

Information to support an assessment of the efficiency of the proposed costs for the Project has been limited.

We understand that project cost estimates have been developed based on historical actual costs, which is a reasonable approach.

6.0 Conclusion

AECOM was tasked to review QR's proposed capital expenditure on the West Moreton (WM) system under DAU3. The assessment examined Scope, compliance with standards and cost for a sample of nine projects from a total of 20 in DAU3, which accounts for 79% of the total capital expenditure over this period. The review identified that eight of the nine sample projects satisfy QCA's prudency of works assessment, and it found that QR has a prudent and efficient allocation of its resources. Our review has concluded that the proposed capital expenditure meets the conditions of DAU3, and in our view, QR may proceed with the submission.

AECOM Australia Pty Ltd
Level 8, 540 Wickham Street,
PO Box, 1307, Fortitude Valley
QLD 4006, Australia

T +61 7 3056 4800
www.aecom.com

ABN 20 093 846 925

Attachment 4: AME Expert Report - Coal Throughput Analysis

HOUSTONKEMP PTY LTD

COAL THROUGHPUT ANALYSIS

06 October 2023

Mr. Martin Chow
Houston Kemp Pty Ltd
Level 40
161 Castlereagh Street
Sydney, NSW 2000
AUSTRALIA

Dear Mr. Chow,

RE: Coal Throughput Analysis

AME Mineral Economics Pty Ltd ("AME") has been engaged by Houston Kemp Pty Ltd ("Houston Kemp", or the "Client") for a coal through-put analysis and associated mine site data for the West Moreton and Metro lines (the "Report"). We understand and acknowledge that Houston Kemp Pty Ltd ("Houston Kemp", or the "Client") will use this report, in whole or part, for the purposes of advising Queensland Rail ("QR") on their draft access undertaking submission to the Queensland Competition Authority ("QCA"). The report will remain confidential between Houston Kemp, QR and the QCA. The report will not be distributed to any third party without the written permission of AME Mineral Economics Pty Ltd.

Please do not hesitate to contact us should you require any further information.

Best wishes,

AME Mineral Economics Pty Ltd

AME Mineral Economics Pty Ltd
342 Kent Street
Sydney, NSW, AUSTRALIA

www.amegroup.com
T: +61 2 9262 2264
F: +61 2 9262 2587

Table of Contents

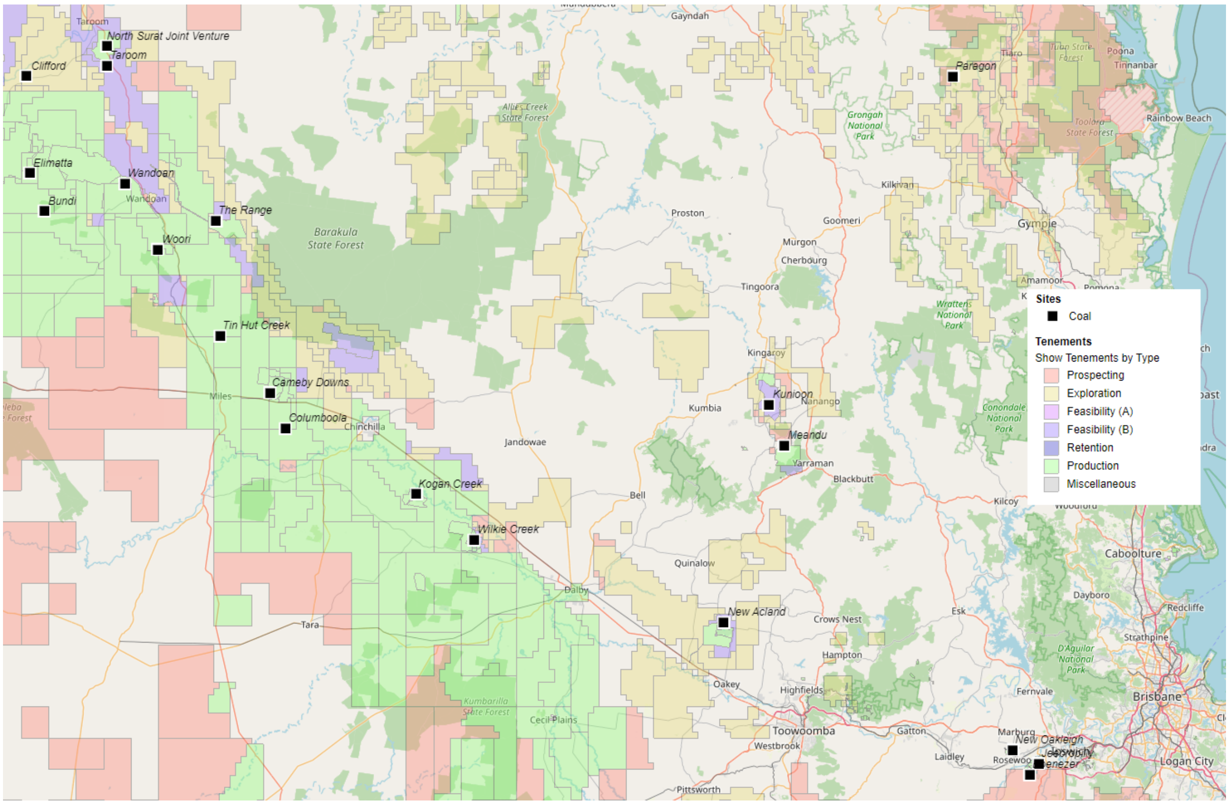
1.0 The West Moreton and Metro Line Throughput Analysis

The West Moreton rail line runs 314km from Miles to Rosewood, from where it joins the Metro line, linking coal mines in the Surat and Clarence-Moreton Basins with the Port of Brisbane, allowing for the export of coal through the Queensland Bulk Handling (QBH) Terminal. QBH is a 10Mtpa bulk handling facility for the export of coal to overseas customers.

During the ongoing energy transition, energy costs would surge, which will subsequently drive up the expenses associated with coal mining. Coal prices are likely to also rise as a result. However, the depletion of coal reserves will introduce an additional layer of cost to coal mining operations. Consequently, expenses related to coal mining operations will surpass the increase in coal prices as the transition unfolds, rendering coal mining economically unviable in the long-term.

There are currently three operating export mines in the catchment area of the rail line: Yanzhou's Cameby Downs, New Wilkie Energy's Wilkie Creek project, and New Hope's New Acland coal mine. Wilkie Creek was idled in 2012 and Peabody closed the site at the end of 2013. Peabody sold the mine to New Wilkie Energy in July 2021. Operations resumed in early 2023 and is anticipated to ramp up to 2.5Mtpa. New Hope's New Acland operation commenced coal production from its Stage 3 expansion in September 2023 after a 16-year period of maintenance and care. Additionally, there is also New Hope's closed New Oakleigh mine and Jeebropilly, both of which have previously utilised the rail line to export coal through QBH. New Hope completed mining operations at the Jeebropilly mine at the end of 2019 as reserves are exhausted.

Figure 1: The West Moreton and Metro Line Catchment Area



Source: AME

The catchment area of the rail line also includes CS Energy's captive Kogan Creek mine, which feeds around 2.8Mtpa of coal to the Kogan Creek Power Station, and it is unlikely that this mine would become an exporting mine. Additionally, there are also two projects adjacent to the Cameby Downs mine, Metromining's Columboola project and Baralaba Coal's Tin Hut Creek project. Both of these projects are on hold and intend to use the Wiggins Island Coal Export Terminal (WICET) as there is no available capacity at QBH. Columboola is a joint venture between Metro Mining and SinoCoal Resources with an estimated thermal coal resource of around 1,200Mt. Tin Hut Creek is currently in the feasibility stage. The Ebenezer coal mine, which was closed in 2002, remains closed as the reopening of the mine is heavily disputed on social and environmental grounds.

In the medium term, up to 2030, throughput is anticipated to reach approximately 9.6Mtpa as New Acland resumes operations in conjunction with Wilkie Creek and Cameby Downs. However, looking ahead to the long term, a decline in throughput expected. By 2034, due to resource depletion, New Acland is expected to close, causing throughput to drop to roughly 5.0Mtpa. Furthermore, a further throughput reduction to about 2.1Mtpa is estimated with the likely closure of Cameby Downs after 2044 in the AME base case. In the longer term, AME's base case anticipates the closure of Wilkie-Creek around the year 2050 due to resource depletion. It is reasonably possible that closure of all coal mines in the Surat basin would fall between the years 2042 and 2050.

Table 1: Estimated Throughput of the West Moreton and Metro Line

Project	Operator	Status	Export Coal Production (Mt)										
			2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Camedy Downs	Yancoal	Production		0.56	1.31	1.54	1.47	1.73	1.84	1.92	1.72	2.16	2.16
Wilkie Creek	New Wilkie Energy	Production	1.52	1.11	2.09								
New Acland	New Hope	Production	4.51	3.60	4.73	4.39	4.93	4.56	4.54	4.31	4.11	3.68	1.93
New Oakleigh	New Hope	Closed	0.26	0.38	0.36	0.10							
Jeebropilly	New Hope	Closed	0.90	0.76	0.85	0.82	0.65	0.69	0.64	0.69	0.64	0.70	

Project	Operator	Status	Export Coal Production (Mt)										
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Camedy Downs	Yancoal	Production	2.16	2.16	2.16	2.16	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Wilkie Creek	New Wilkie Energy	Production			1.08	1.44	2.10	2.10	2.10	2.10	2.10	2.10	2.10
New Acland	New Hope	Production	1.22			2.33	2.98	4.43	5.00	5.00	5.00	5.00	5.00
New Oakleigh	New Hope	Closed											
Jeebropilly	New Hope	Closed											

Project	Operator	Status	Export Coal Production (Mt)										
			2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Camedy Downs	Yancoal	Production	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Wilkie Creek	New Wilkie Energy	Production	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
New Acland	New Hope	Production	5.00	5.00	5.00								
New Oakleigh	New Hope	Closed											
Jeebropilly	New Hope	Closed											

Project	Operator	Status	Export Coal Production (Mt)							
			2043	2044	2045	2046	2047	2048	2049	2050
Camedy Downs	Yancoal	Production	2.50	2.50						
Wilkie Creek	New Wilkie Energy	Production	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
New Acland	New Hope	Production								
New Oakleigh	New Hope	Closed								
Jeebropilly	New Hope	Closed								

Source: AME

Cameby Downs

Yanzhou's Cameby Downs, situated in the Surat Basin, Queensland, Australia, is a notable open-pit thermal coal mine. It distinguishes itself by extracting coal from multiple seams at a relatively higher strip ratio of 6 bank cubic metres per run-of-mine tonne (Bcm/ROMt).

The coal extracted from Cameby Downs boasts a high heating value and exhibits low sulphur and ash content, allowing some coal seams to bypass the washing process. However, this higher strip ratio, combined with a small mine size and a substantial transport distance of 380km, contributes to a slightly elevated FOB cash cost compared to the global average.

In a significant development, Yanzhou received approval from the Queensland Government in May 2019 for an expansion project. The project is expected to boost the mine's capacity to approximately 3.5Mtpa but necessitates substantial infrastructure upgrades, including the development of Stage II of the Wiggins Island Coal Terminal and the Surat Basin Railway.

In 2009, mine operator Syntech Resources initially estimated a prospective mine life spanning 35 to 40 years, hinting at a potential mine conclusion somewhere in the vicinity of 2044. A net-zero scenario would see thermal coal demand decline significantly between 2040 – 2050, which is consistent with the Cameby Downs mine closure date estimations. Despite the challenges faced, AME anticipates that the mine will maintain profitability in the foreseeable future.

Wilkie Creek

Wilkie Creek, another player in the Surat Basin of Queensland, Australia, has a history of producing around 2Mtpa of thermal coal for export until end of 2012. Notably, the mine's strip ratio has fluctuated between 2:1 and 9:1, resulting in a yield as low as 50% and escalating processing costs.

With the added challenge of being located more than 300km from the point of export and a strip ratio of 7:1 in 2012, operational difficulties prompted Peabody to idle the mine. However, in July 2021, Peabody sold Wilkie Creek to New Wilkie Energy. Subsequently, mining operations recommenced in early 2023, with an expected production of 2.1Mtpa of thermal coal for export.

As part of their strategic vision, New Wilkie Energy has outlined plans to scale up production to 6Mtpa by 2025 and 10Mtpa by 2028. The company asserts that the mine boasts sufficient reserves to sustain production for approximately another 30 years. Given the global pressure to push towards net-zero by 2050, it is a reasonable estimation for the mine life to end between 2042 and 2050, especially when the product is considered a premium product and would be much more difficult to replace.

New Acland

The New Acland coal mine, located in southern Queensland, Australia, has been under care and maintenance since November 2022. However, New Hope Corporation has outlined plans for a restart in the first quarter of 2024, forming part of its Stage 3 expansion.

AME is confident in the resumption of operations as the Queensland government has granted mining leases and water resource usage licences for the new mining area. New Acland, known for its open-cut mining approach, typically produces 4-5Mtpa of thermal coal for both domestic and export markets, boasting a low strip ratio of less than 3:1.

Export coal from New Acland is transported 18km by truck and 227km by rail to the export terminal at Brisbane. Despite average freight costs for Queensland mines, the mine contends with a low yield of approximately 52%, which affects mining and processing expenses. With the final approval from the Queensland Government, the mine's production capacity is set to increase to approximately 5.0Mtpa, extending its mine life to 2034. The company has outlined its strategy to achieve initial coal sales from this expansion by the fiscal year ending in July 2024, and anticipates full ramp-up by the fiscal year ending in July 2027. Given the short remaining life of the mine, its closure date is unlikely to be impacted by carbon policy scenarios. From an environmental perspective, New Acland is classified as a 'low gas mine' according to relevant legislation and guidelines.

Jeebropilly

Jeebropilly, a compact open-cut mine located 7km southwest of Ipswich, Queensland, Australia, maintains a production rate of less than 1Mtpa of thermal coal for export. Owned by New Hope, this mine operates with a strip ratio of approximately 8:1 and exhibits a relatively modest processing yield of around 53%. These factors contribute to higher mining and processing costs.

Jeebropilly benefits from its close proximity to the Port of Brisbane, a mere 83km away. In December 2019, New Hope concluded production at the mine after 38 years of operations, shifting focus towards the mine site's rehabilitation and post-mining land use.

New Oakleigh

New Oakleigh, formerly an active thermal coal mine in the Clarence-Moreton Basin of Queensland, Australia, had an annual production of less than 1Mtpa for both domestic and export markets. Under the ownership of New Hope, the mine ceased operations in 2013 due to the depletion of reserves.

2.0 Report Limitations and Restraints

Disclaimer

Queensland Rail has commissioned AME Mineral Economics Pty Ltd (AME) to provide certain information for inclusion in this document. Information provided by AME is referred to in this document as 'AME'. This document uses market data, statistics and third-party estimates, projections and forecasts relating to the industries, segments and end markets in which Queensland Rail operates. Such information includes, but is not limited to statements, statistics and data relating to product segment and market share, estimated historical and forecast market growth, market sizes and trends, and Queensland Rail's estimated market share and its industry position. Queensland Rail has obtained significant portions of the market data, statistics and other information from databases and research prepared by third parties, including reports and information prepared by the AME and other third parties, and other sources. AME has advised that (i) information in their databases is derived from their estimates, subjective judgements, and third-party sources, (ii) the information in the databases of other coal industry data collection agencies will differ from the information in their databases, (iii) that forecast information is highly speculative and no reliance may be placed on this data. In the compilation of the AME statistical and graphical information will be unreliable, inaccurate and will contain errors of fact and judgement. It is subject to full validation and the provision of such information requires investors to make appropriate further enquiries. Investors should note that market data and statistics are inherently predictive, subject to uncertainty and not necessarily reflective of actual market conditions. There is no assurance that any of the third-party estimates or projections contained in this information, including information provided by AME, will be achieved. HoustonKemp and Queensland Rail have not independently verified and cannot give any assurances to the accuracy or completeness of, these market and third-party estimates and projections. Estimates involve risks and uncertainties and are subject to change based on various known and unknown risks, uncertainties, and other factors.

Production and Cost Analysis

Available data varies greatly between operations and projects. Certain information is unreliable due to language difficulties, the confidential nature of the information, the inability to estimate the reliability of AME's sources and general lack of data. Consequently, much information has to be estimated and the quality, accuracy and completeness of the resulting cost comparisons will reflect this and cannot be guaranteed. Furthermore, forecast costs embody a number of significant assumptions with respect to exchange rates and other technical variables. Because of these factors, direct comparability between individual projects may be limited and, as such, our supply and cost estimates must be treated with caution and cannot be relied upon.

Supply/Demand Analysis

In addition, AME has supplied tables of historical data and estimated future supply, demand and market trends by compiling, interpreting and analysing engineering, supply, economic, statistical and technical information from many third-party sources. Such company and country statistics usually contain inconsistencies and utilise sampling data techniques and, thus, should not be relied upon.

Data Accuracy

AME has prepared this Report using information from its in-house database as well as a wide range of public domain and industry data sources for which assessment cannot be made in regard to accuracy. This is because AME does not have access to confidential company information to verify our data quality. Therefore, reliance can only be provided where we have data of sufficient quality that is acceptable to an international commercial court.

Forward-Looking Statements

Statements in this document may contain forward-looking information identified by words such as 'estimates', 'intends', 'expects', 'believes', 'may' and 'will' and include, without limitation, statements regarding companies' plans of business operations, supply levels and costs, potential contractual arrangements and the delivery of equipment, receipt of working capital, anticipated revenues, mineral reserve and mineral resource estimates, and projected expenditures. There can be no assurance that such statements will prove to be accurate—actual results and future events could differ materially from such statements. Factors that could cause actual results to differ materially include, among others, changes to metal prices, risks inherent in the mining industry, changes in the economic environment, financing risks, labour risks, uncertainty of mineral reserves and resource estimates, equipment and supply risks, regulatory risks and environmental concerns. Caution is needed and no reliance on forward-looking information can be made. Except as otherwise required by applicable securities statutes or regulation, AME expressly disclaims any intent or obligation to update publicly forward-looking information, whether as a result of new information, future events or otherwise.

Third-Party Sources

AME's research is undertaken through both primary and secondary research from various sources. Primary sources include contact with market participants and industry experts, such as producers, industry consultants and associations. Secondary research involves desktop research of government departments and statistics, trade data, industry journals, company reports, public domain information, and data from the AME proprietary research database. AME makes attempts to obtain information from multiple sources to cross-reference and ensure consistency. Information and data collected has been analysed, assessed, and reasonably validated using the in-house techniques of AME.

Attachment 5: HoustonKemp Expert Report - Regulatory Treatment of Coal Related Assets

HOUSTONKEMP
Economists

Regulatory treatment of coal related assets

A final report for Queensland Rail

3 November 2023

Report authors

Martin Chow

Brendan Quach

Dylan Frangos

Contact Us

Sydney
Level 40
161 Castlereagh Street
Sydney NSW 2000

Phone: +61 2 8880 4800

Disclaimer

Contents

Figures

Tables

Executive summary

Queensland Rail faces significant asset stranded risk on the West Moreton system

Under existing arrangements, Queensland Rail recovers its new capital investment and existing regulatory asset base (RAB) over the remaining technical life of the underlying rail asset. As rail assets are long life assets, adopting technical lives would mean some investments are recovered over a 100 year period.

However, the transition towards a net zero carbon emissions future means that coal volumes on the West Moreton system is expected to cease by or before 2050. Advice from AME indicates that New Acland is expected to cease operation by 2034 due to resource depletion, and it is reasonably possible that closure of remaining coal mines in the Surat basin would occur between 2042 and 2050. In other words, the coal volumes could decline to zero as early as 2042, or 17 years from the commencement of AU3.

AME's advice that Cameby Downs and Wilkie Creek could close by 2042 is consistent with the ACCC's decision for the Hunter Valley coal network. In its final decision, the ACCC approved ARTC's proposed weighted average mine life of 21 years commencing from 1 July 2021, which implies a terminal date of 30 June 2042.

The misalignment between the technical life of the asset (which can be up to 100 years) and the remaining life of coal mines using the West Moreton system (which could be closed by or before 2042) will create stranded assets for Queensland Rail. In other words, there is significant risk that Queensland Rail will be unable to recover its capital investment under existing arrangements.

New capital investment and existing RAB should be recovered over the economic life of the asset

Queensland Rail has asked HoustonKemp to provide advice on the appropriate regulatory treatment for new capital investment and existing RAB on the West Moreton system given the potential for asset stranded risk. In developing our advice, we have considered the relevant factors in the QCA Act, and relevant decisions and guidance published by the QCA, AER, ACCC and IPART.

Our advice can be summarised as follows:

- depreciation should be calculated with reference to the weighted average remaining life of mines on the West Moreton system rather than the technical life of the assets;
- remaining life should be calculated based on lower bound of realistic expectations of remaining mine life as this will help mitigate asset stranded risk;
- the remaining mine life should be reviewed periodically, so that it continues to represent realistic expectations of remaining life of the mines on the West Moreton system;
- new capital investment should be recovered over the weighted average remaining mine life, or by 2039 – not doing so would mean Queensland Rail is at risk of not recovering new capital investment; and
- existing RAB should also be recovered over the weighted average remaining mine life, but only if it does not lead to premature closure of any of the mines.

Calculating depreciation over weighted average remaining mine life is affordable for users

We have recommended that existing RAB should only be recovered over the weighted average remaining mine life if it does not lead to premature closure of any of the mines that use the West Moreton system. Given this, we have assessed the affordability of calculating depreciation with reference to weighted average remaining mine life, assuming that New Acland ceases operations in 2034 and Cameby Downs and Wilkie Creek cease operations in 2042.

Our analysis was informed by:

- Queensland Rail's estimated below rail costs by mine under different approaches to calculating depreciation; and
- AME's volume, revenue and costs forecasts by mine.

We conclude that:

- a reasonable lower bound estimate of weighted average remaining mine life for the West Moreton system is 14.4 years commencing from 1 July 2025;
- recovering deprecation over 14 years increases below rail costs for mines by 0.5 – 9.1 per cent when compared to existing charges; and
- the proposed change in how depreciation is calculated will not lead to early exit of any of the three mines operating on the West Moreton system.

Given the conclusions above, we consider that it is appropriate for Queensland Rail to recover its existing RAB over 14 years for the West Moreton system.

[redacted]

1. Introduction

The rail service provided by Queensland Rail on the West Moreton system is a declared service for the purposes of Queensland's third party access regime established under Part 5 of the Queensland Competition Authority (QCA) Act. Under this access regime, Queensland Rail is required to submit a draft access undertaking (DAU) for consideration and approval by the QCA.

Queensland Rail is preparing its 2025 DAU for the third access undertaking period (AU3), which is due for submission to the QCA by the end of October 2023. To assist with the preparation of the DAU, Queensland Rail has asked us to consider the appropriate regulatory treatment of its new and existing coal related assets in the context of asset stranding risk. Appropriate regulatory treatment in this context refers to application of the factors affecting approval of a DAU set out in section 138 of the QCA Act.

This report sets out our opinion on the appropriate regulatory treatment of Queensland Rail's new and existing coal related assets in the context of asset stranding risk. It explains that Australian regulators have adopted accelerated depreciation as the preferred approach to managing asset stranding risk. Applying accelerated depreciation under the QCA framework requires balancing the interests of coal users with the interests of Queensland Rail. This involves:

- providing Queensland Rail with the opportunity to recover its efficient historical and future costs; while
- ensuring that the resulting reference tariff does not undermine the economic viability of coal mine operations.

Appropriately balancing these interests will provide Queensland Rail with the incentive to continue invest in its network, while ensuring that coal mines continue to use the rail infrastructure to compete in global coal markets.

The remainder of this report explains our opinions and conclusions in greater detail. It is structured as follows:

- section 2 provides an overview of the West Moreton system and expected coal volumes during AU3;
- section 3 explains the source of asset stranding risk for Queensland Rail's coal related assets;
- section 4 details the approaches to asset stranding risk that have been employed by other regulators to manage asset stranding risk, as well as the relevant factors under the QCA framework; and
- section 5 sets out our assessment of the affordability of switching from technical lives to economic lives for each mines that uses the West Moreton system.

[redacted]

2. Overview of the West Moreton system

This section provides an overview of the West Moreton system and the regulatory framework that currently applies to it.

2.1 West Moreton system principally transports thermal coal

The West Moreton system runs over 314 kilometres and adjoins south-east Queensland in the east at Rosewood and the far west section of the Western system in the West at Miles. It has historically catered for passenger trains and freight trains carrying livestock and agricultural products. However, thermal coal is now the predominant product originating from and being hauled on the West Moreton system. By way of example, in 2021-22 coal trains accounted for:[1]

- 80.4 per cent of total revenue on the West Moreton system;
- 71.8 per cent of train paths on the West Moreton system; and
- 80.8 per cent of net tonnes on the West Moreton system.

We understand that there are three thermal coal mines that are expected to use the West Moreton system to export their coal via the Port of Brisbane during AU3. These are:[2]

- the Cameby Downs mine, which is an open cut mine owned by Yancoal located in the Surat Basin approximately 360 kilometres north-west of Brisbane;[3]
- the New Acland mine, which is an open cut mine owned by New Hope Group located 35 kilometres north-west of Toowoomba;[4] and
- the Wilkie Creek coal mine, which is owned by New Wilkie Energy Group Limited located west of Dalby, approximately 250 kilometres west of Brisbane.

Figure 2-1 shows that these mines have produced an average of [redacted] million tonnes per annum of thermal coal over the period 2015-16 to 2021-22. Declining volumes over this period reflect the exhaustion of coal reserves at the New Acland mine, which ceased operations in November 2021.[5] Further, Wilkie Creek was not in operation during this period.

[1] Queensland Rail, *Financial statements for the year ended 30 June 2022 below rail services provided by Queensland Rail,* p 4; and Queensland Rail, *2021-22 annual performance report,* December 2022, p 9.

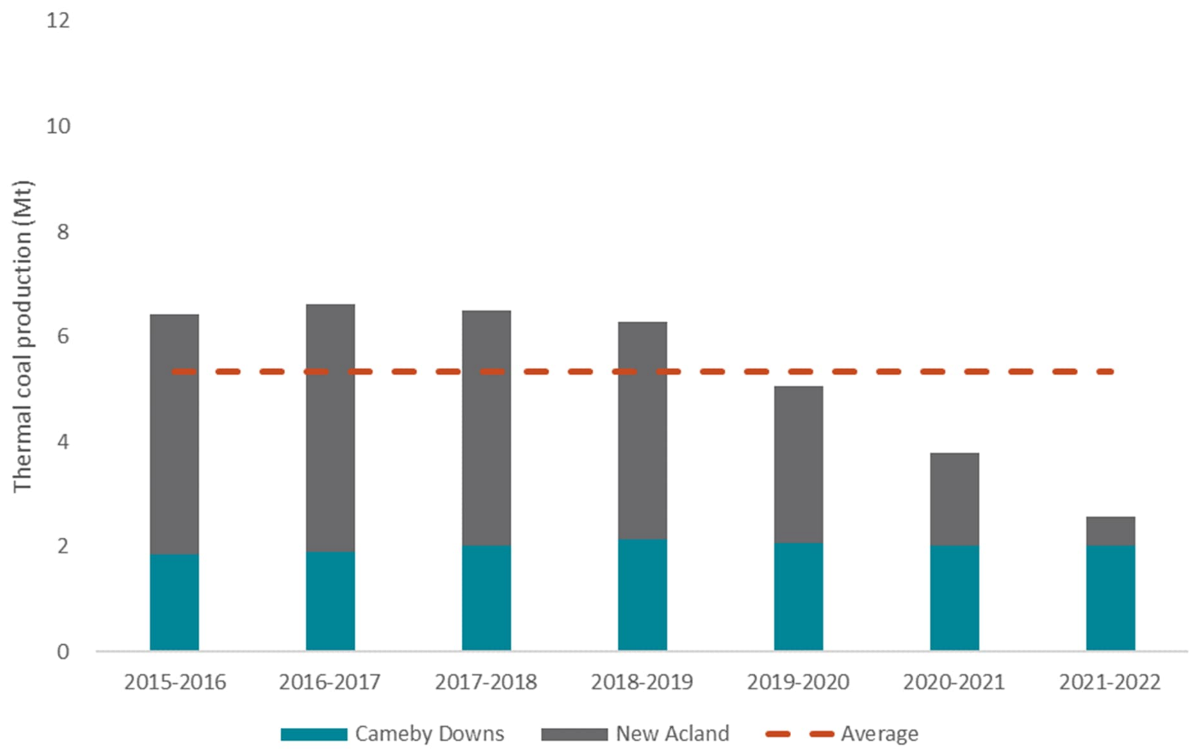
[2] Queensland Rail, *West Moreton system information pack,* October 2016, p 5.

[3] Yancoal, *Cameby Downs,* available at: https://www.yancoal.com.au/page/en/assets/mine-sites/cameby-downs/, accessed 1 September 2023.

[4] Queensland Government, *New Acland coal mine stage 3 project,* available at: https://www.statedevelopment.qld.gov.au/coordinator-general/assessments-and-approvals/coordinated-projects/completed-projects/new-acland-coal-mine-stage-3-project, accessed 1 September 2023.

[5] Environmental Law Australia, *New Acland coal mine case,* available at: http://envlaw.com.au/acland/, accessed 1 September 2023.

Figure 2-1: Thermal coal production along the West Moreton system, 2015-16 to 2021-22



Source: HoustonKemp analysis of Department of Resources coal industry review statistical tables

2.2 Volume of coal is expected to increase significantly during AU3 period

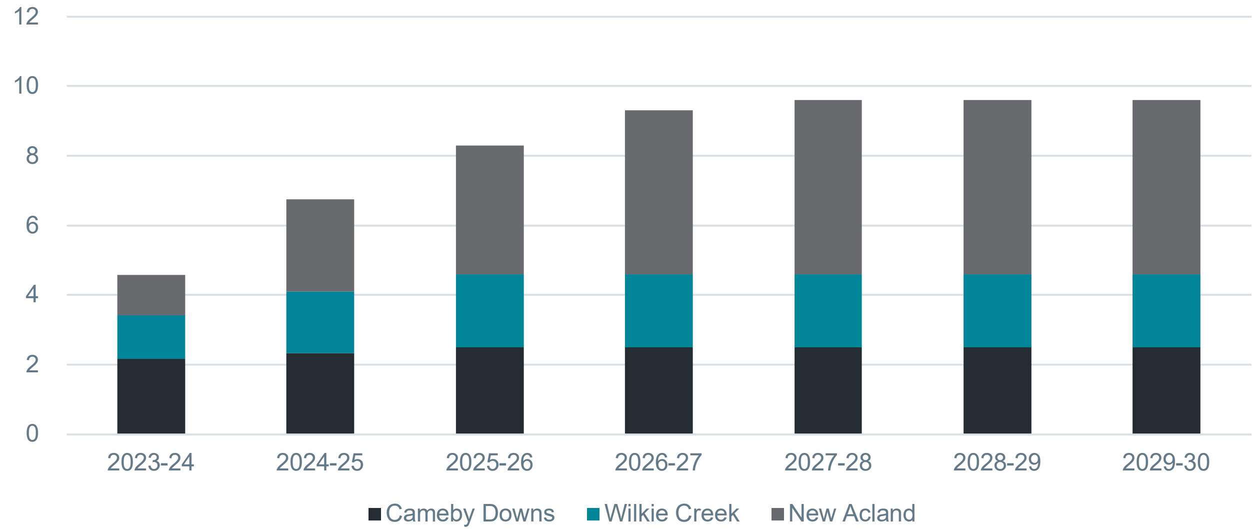
We understand that New Hope Group is currently proceeding with the stage three expansion of the New Acland mine, which will see it produce between [redacted] million tonnes per annum over an approximately 12-year period.[6] We further understand that Wilkie Creek is expected to recommence operations during AU2.

The renewed operations of the New Acland and Wilkie Creek mines, coupled with the continued operation of Cameby Downs, are such that forecast volumes for the West Moreton system are expected to increase in AU3 period relative to the 2015-16 to 2021-22 period. Figure 2-2 shows that forecast volumes on the West Moreton system is expected to increase to 9.6 million tonnes per annum between 2023-24 and 2027-28, with volumes stabilising at 9.6 million tonnes per annum for the remaining years in AU3.

We understand that Queensland Rail is about to invest significantly into the West Moreton system so that it can accommodate the expected increase in coal volumes.

[6] Queensland Coordinator-General, *New Acland coal mine stage 3 project: Coordinator-General's change report No. 4 – amendment to the stated conditions following Land Court (2021) proceedings,* May 2022, pp 2-3.

Figure 2-2: West Moreton system forecast volumes, 2023-24 to 2029-30



Source: AME forecast volumes of coal transported on the West Moreton system. Note that AME's forecasts are for calendar years. To calculate volume by financial year, we have taken the average of the two relevant calendar year. For example, volumes for 2023-24 is calculated as average volumes in 2023 and 2024.

[redacted]

3. Asset stranding risk for coal related assets

In this section we explain the source of Queensland Rail's asset stranding risk, ie, the risk of a change or changes that lead to insufficient demand such that a firm is unable to recover the costs of their efficient investments. Specifically, we explain that Queensland Rail's asset stranding risk arises from the misalignment between:

- the time period over which its costs are typically recovered under the existing regulatory framework, because costs are typically recovered over the technical life of the asset, which may be up to 100 years; and
- the economic life of these assets, which are expected to be shorter than the technical life as coal volumes on the West Moreton system are expected to decline to zero between 2042 and 2050.

The QCA has previously acknowledged the asset stranding risk borne by Queensland Rail on the West Moreton system, while also forming the view that Queensland Rail should be compensated for this risk.

3.1 Capital costs are currently over the technical life of the asset, which may be up to 100 years

The rail service provided by Queensland Rail on the West Moreton system is a declared service for the purposes of Queensland's third party access regime established under Part 5 of the QCA Act. Under the existing regulatory regime, the QCA approves a reference tariff that applies to coal-carrying train services on the West Moreton system. The established methodology for determining the reference tariff comprises:[7]

- a building block approach to determining the appropriate total revenue requirements, which provides for an price based on:
  - recovery of efficient maintenance and operating costs;
  - return on capital, based on a weighted average cost of capital (WACC) applied to a regulated asset base (RAB), and a return of capital (ie, depreciation); and
  - forecast volumes over the term of the undertaking; and
- a common network asset base allocated between coal and non-coal services to reflect the shared nature of the system; and
- a two-part tariff structure, with weight/distance (gross tonne kilometre) and train path components each recovering half of the revenue requirement.

Under the standard building block approach, depreciation is calculated by reference to the technical life of the asset, meaning capital costs are recovered over the technical life of the asset. This can be a substantial time period for Queensland Rail and may be up to 100 years. Table 3.1 sets out the regulatory asset lives applicable to the AU2 period.

[redacted]

[7] QCA, *Queensland Rail 2020 draft access undertaking,* Decision, February 2020, p 10.

Table 3.1: West Moreton system asset lives for the AU2 period

Asset Lives	Years
Track (inc Turnouts)	35
Roads	38
Fences	20
Signals	20
Bridges	100
Tunnels	100
Culverts	100
Earthworks	100
Other	20
Land acquisition costs	50
Telecommunications	20
Land	0

Source: Queensland Rail, DAU2 West Moreton System Low Volume Coal Reference Tariff (Public Release), *22 November 2019, p 13.*

3.2 Asset stranding risk due to uncertainty regarding future of thermal coal

Asset stranding risk in the context of the West Morton system refers to the risk of a change or changes that lead to insufficient demand such that Queensland Rail is unable to recover the costs of their efficient investments. Declining demand may be a result of either changes in technology, regulation, market conditions or a combination of these factors.

Demand for Queensland Rail's West Moreton system is principally derived from the demand for thermal coal exports from the Surat Basin. It follows that a central driver of asset stranding risk is declining coal haulage volumes against the backdrop of a regulatory framework that recovers costs by reference to the technical – as opposed to economic – life of assets. In other words, the economic life of the asset is shorter than the period over which costs are recovered.

There are two key factors that will contribute to declining coal-carrying services on the West Moreton system in the future:

- first, the reserves available at each mine:[8]
  - the New Acland expansion is expected to be depleted by 2034, or around 9 years from the commencement of AU3;
  - Cameby Downs mine life is expected to end in the vicinity of 2044; and
  - Wilkie Creek is expected deplete its resources by around 2050;
- second, the phasing out of thermal coal globally as part of the transition to net zero carbon emissions by [redacted]

With respect to the latter source of declining demand, the International Energy Agency (IEA) publishes an annual World Energy Outlook (WEO) report. Among other things, the WEO report covers global and country-

[8] AME, *Coal Throughput Analysis*, 6 October 2023, p 3.

specific production and demand for coal under various scenarios. In the most recent report published in 2022, the WEO considered three scenarios:[9]

- the stated policies scenario (STEPS), which is based on a detailed sector-by-sector review of the policies and measures in place or under development in a variety of areas. This scenario provides a view on where the energy system may be heading in the absence of specific new policy initiatives;
- the announced pledges scenario (APS), which assumes that government will meet, in full and on time, all of the climate-related commitments that they have announced; and
- the net zero emissions by 2050 scenario (NZE), which is a normative scenario that sets out a pathway to the stabilisation of global average temperatures at 1.5 degrees Celsius above pre-industrial levels.

Table 3.2 summarises the reduction in thermal coal production that is expected to occur by 2030 and 2050 under each scenario considered by the IEA relative to 2021 production levels. It shows that thermal coal production is expected to decline significantly as the world transitions to net zero carbon emissions.

Table 3.2: Reduction in thermal coal production relative to 2021 under each IEO WEO scenario

WEO scenario	2030	2050
STEPS	11.7%	35.2%
APS	22.4%	74.2%
NZE	50.2%	91.1%

Source: HoustonKemp analysis of global coal production figures in the IEA's 2022 WEO. See: International Energy Agency, World energy outlook 2022, p 412

The WEO also includes country-specific projections of coal production. With respect to Australia:

- under the STEPS scenario, Australian production plateaus between 2021 and 2030 due to a slight fall in domestic demand being partially offset by an increase in exports;[10]
- under the APS scenario, thermal coal production falls by approximately 40 per cent between 2021 and 2030 due to demand declining quickly in key importing countries,[11] with overall production falling by a further 55 per cent between 2030 and 2050;[12]
- under the NZE scenario, there are no country-specific projections, but the overarching projection is that there is no need for any new coal mines or mine lifetime extensions.[13]

We note that Queensland Treasury released a paper in November 2022 outlining the implications of the 2022 WEO for Queensland's coal industry. In relation to thermal coal, the Queensland Treasury concluded that:[14]

> …the potential long-term demand for Queensland's thermal coal will largely be driven by electricity generation trends in the State's key export markets and potential markets…Queensland Treasury analysis of the announced policies of key thermal coal export markets (including Japan and Korea) indicates that those countries are expected to reduce coal-fired power generation in order to meet carbon reduction and neutrality goals…the long-term global demand for thermal coal remains challenging and is likely to decline more substantially [redacted]

[9] International Energy Agency, *World energy outlook 2022,* pp 106-107.

[10] International Energy Agency, *World energy outlook 2022,* p 419.

[11] International Energy Agency, *World energy outlook 2022,* pp 419-20.

[12] International Energy Agency, *World energy outlook 2022,* p 421.

[13] International Energy Agency, *World energy outlook 2022,* p 420.

[14] Queensland Treasury, *Queensland's coal industry and long-term global coal demand,* November 2022, p 29.

3.3 Mines using West Moreton system are expected to all exit before or by 2050

AME has been engaged to help understand the asset stranded risk specific to the West Moreton system. The advice provided by AME includes:

- production forecast by mine between 2023 and 2050;
- costs and revenue forecasts by mine; and
- analysis of when each mine on the West Moreton system is expected to cease operation.

AME advice on remaining life of mines is that:[15]

> It is reasonably possible that closure of all coal mines would fall between the years 2042 and 2050.

In other words, volume of coal transported on West Moreton system can reasonably be expected to decline to zero between 2042 and 2050. In coming to this conclusion, AME noted the following: [16]

- New Acland would cease operation by 2034 due to resource depletion;
- Cameby Downs is expected to close in the vicinity of 2044, based on comments made by mine operator Syntech Resources on the prospective life of the mine – closing by 2042 would be consistent with these comments and transition towards net zero by 2050; and
- Wilkie Creek is expected to experience resource depletion by around 2050 but given the transition towards net zero by 2050, a reasonable estimation of mine life is between 2042 and 2050.

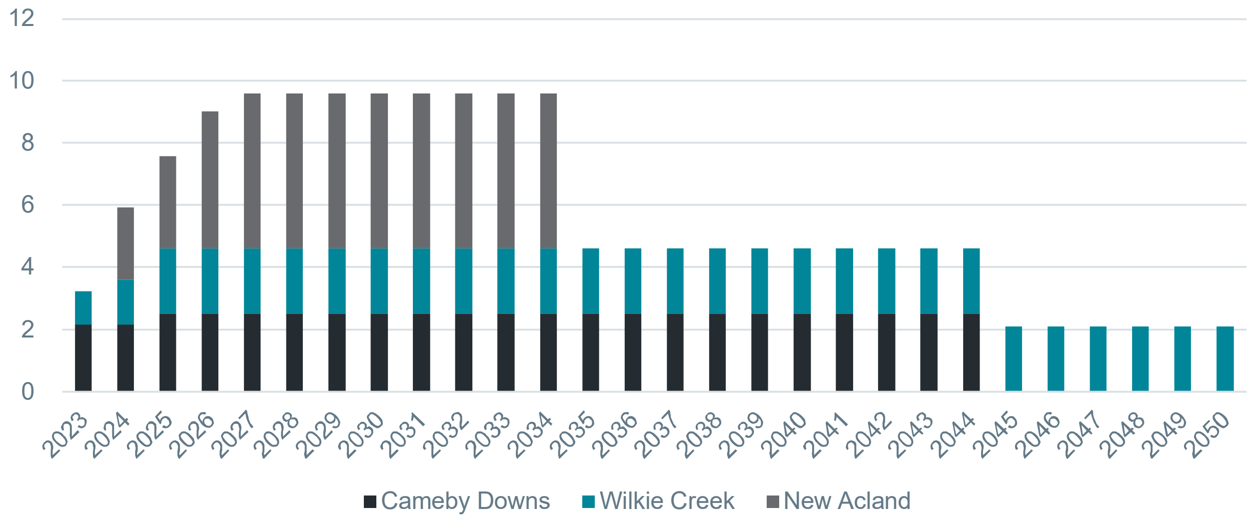
Figure 3-1 presents AME's forecast volumes on the West Moreton system based on resource available at each mine. These forecasts show that coal volumes are expected to decline significantly in 2035, when New Acland ceases operation, and then decline again in 2045, when Cameby Downs is expected to close. All three mines are expected to cease operation by 2051, meaning that coal volumes are expected to decline to zero in 28 years.

[redacted]

[15] AME, *Coal Throughput Analysis*, 6 October 2023, p 3.

[16] AME, *Coal Throughput Analysis*, 6 October 2023, pp 3 – 4.

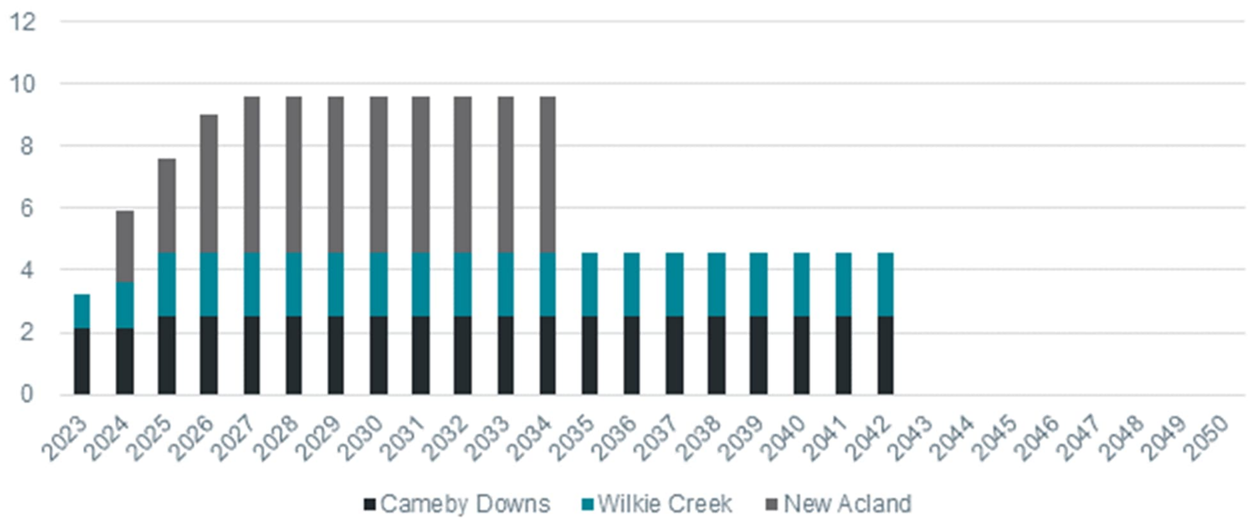
Figure 3-1: Forecast volumes on the West Moreton system by mine based on resources available at each mine, 2023 to 2050



Source: AME forecasts

Figure 3-2 presents AME's forecast volumes assuming that all mines close by or before 2042. Coal volumes are expected to decline significantly in 2035, when New Acland ceases operation, and then go to zero when the two other remaining mines cease operation in 2042. Under this scenario, coal volumes are expected to decline to zero in 20 years.

Figure 3-2: Forecast volumes on the West Moreton system by mine assuming that mines cease operation by or before 2042, 2023 to 2050



Source: AME forecasts

3.4 QCA has acknowledged Queensland Rail's asset stranding risk

The QCA considered asset stranding risk as part of Queensland Rail's 2020 DAU final decision in the context of the weighted average cost of capital (WACC). In particular, the QCA explained that it had provided an uplift to Queensland Rail's cost of debt due to short-term volume uncertainty, but that this approach does not account for the longer term stranding risk of the West Moreton system.[17] This longer term stranding risk stems from:[18]

- the expected mine life of the New Acland expansion being only 12 years;
- the contracted capacity on the network being limited to 97 train paths per week, meaning there is limited opportunity for new investment that might replace the volumes of the New Acland expansion as and when it ceases operation;
- the development of a coal mine involving large infrastructure costs and long lead times, meaning there is a material possibility that rail volumes do not recover for an extended period of time even if additional customers or investment do eventuate; and
- the development of Inland Rail potentially leading to some sections of the West Moreton system being bypassed and becoming obsolete.

The QCA notes that there are aspects of the regulatory regime applying to the West Moreton system that serve to lower the level of asset stranding risk borne. These include the fact that users:[19]

- may be required to provide capital underwriting for new investments;
- are required to pay relinquishment fees if they terminate a contract; and
- typically have long term take-or-pay contracts.

Notwithstanding, the QCA concluded that:[20]

> …on balance, we consider that West Moreton coal is still likely to be exposed to a material level of stranding risk, particularly where the remaining life of infrastructure is significantly greater than the term of contracting.

We note that the QCA has previously explained that its preferred approach to dealing with Queensland Rail's asset stranding risk is to introduce some form of accelerated depreciation of assets.[21] Specifically, while Queensland Rail did not propose accelerated depreciation as part of its 2020 DAU, the QCA expressed that it would be amenable to accepting an appropriate accelerated depreciation profile should one be proposed.[22]

[redacted]

[17] QCA, *Queensland Rail 2020 draft access undertaking,* Decision, February 2020, p 49.

[18] QCA, *Queensland Rail 2020 draft access undertaking,* Decision, February 2020, p 49.

[19] QCA, *Queensland Rail 2020 draft access undertaking,* Decision, February 2020, pp 49-50.

[20] QCA, *Queensland Rail 2020 draft access undertaking,* Decision, February 2020, p 50.

[21] QCA, *Queensland Rail 2020 draft access undertaking,* Decision, February 2020, p 50.

[22] QCA, *Queensland Rail 2020 draft access undertaking,* Decision, February 2020, p 50.

4. Managing asset stranding risk

Asset stranding risk is emerging in various regulated network contexts, particularly those related to resources that are being phased out as part of the transition to net zero carbon emissions. Australian regulators have typically assessed two broad approaches to provide a reasonable expectation of cost recovery in the context of asset stranding risk:

- removing, or substantially reducing, the prospect of under-recovery of costs; or
- compensating the regulated business for carrying this risk.

The former approach has principally been endorsed by regulators, since asset stranding risk is non-systematic and therefore should not be compensated for in the rate of return. The preferred approach for addressing prospect of cost under-recovery is amending the depreciation profile, ie, recover capital costs based on economic life of the asset.

4.1 Approach to asset stranding risk in other regulatory contexts

4.1.1 AER's guidance on managing asset stranded risk

The transition to net zero carbon emissions has led to considerable uncertainty regarding the future of gas demand, with many factors placing downward pressure on gas demand. In light of this uncertainty, the AER released an information paper regarding the regulation of gas pipelines under uncertainty.[23] In the information paper, the AER identifies two broad approaches to restoring a reasonable expectation of cost recovery on the context of asset stranding risk, ie:[24]

- removing, or substantially reducing, the prospect of under-recovery of costs; or
- compensating the regulated business for carrying this risk.

The AER notes that each of these approaches would raise prices for gas consumers as compared to doing nothing to address asset stranding risk.[25] Accordingly, its approach in addressing asset stranding risk is a:[26]

> …balancing act between preserving the right incentives for network investments and maintaining price affordability of gas network services…

We note that the gas network provides an essential service to households. It is therefore appropriate that affordability is a focus of the AER given that its decisions relate to impact on residential customers. In contrast, users of the West Moreton system are corporate entities and, as such, the considerations of affordability differ. In particular, affordability in the context of the West Moreton system relates to the operations of the coal users remaining economic and, by consequence, continuing to efficiently use the network in competing in global coal markets.

In general, the AER views adjusting regulatory depreciation as being more appropriate (compared to alternatives) to manage asset stranding risk under the regulatory regime.[27] Compensating a regulated business via a higher return on capital is not preferred because asset stranding risk is generally considered [redacted]

[23] AER, *Regulating gas pipelines under uncertainty,* Information paper, November 2021.

[24] AER, *Regulating gas pipelines under uncertainty,* Information paper, November 2021, p 28.

[25] AER, *Regulating gas pipelines under uncertainty,* Information paper, November 2021, p 28.

[26] AER, *Regulating gas pipelines under uncertainty,* Information paper, November 2021, p 28.

[27] AER, *Regulating gas pipelines under uncertainty,* Information paper, November 2021, p 28.

non-systematic, ie, it can be diversified away.[28] Table A 1 in the appendix summarises the advantages and disadvantages of the various options the AER assessed to address the implications of falling gas demand.

4.1.2 Managing stranded asset risk for the Hunter Valley coal network

Similar to the West Moreton system, the main freight carried on the Hunter Valley Coal Network (HVCN) is thermal coal. The two relevant regulators for the HVCN are the Independent Pricing and Regulatory Tribunal (IPART) and the Australian Competition and Consumer Commission (ACCC). Both regulators have recognised stranded asset risk for the HVCN, allowing capital investment to be recovered over the remaining mine life rather than technical life of the asset.

IPART's estimated remaining life is 21 years from 1 July 2019, based on a terminal date of 2040

Adjusting the depreciation profile is also evident in the economic regulation of below-rail operators, particularly in the Hunter Valley Coal Network (HVCN). For instance, IPART explains that RailCorp's undertaking for its HVCN requires IPART to:[29]

> …estimate the useful life of a rail sector or group of sectors by reference to the remaining life of Hunter Valley coal mines that use those sectors. It is used as a proxy to calculate depreciation to determine compliance with the ceiling test and roll forward the Regulatory Asset Base (RAB).

IPART considered a number of factors when estimating remaining mine life. These factors include demand side considerations, such as demand for coal from BlueScope Steel and coal-fire generators, and supply side considerations, such as marketable reserves and production levels of each mine. [30]

In its final decision, IPART's estimate of remaining mine life from 1 July 2019 was 21 years, based on a terminal date of 2040. [31] This estimate represented a four year reduction from the previous terminal date of 2044. [32]

In coming to its decision to shorten its estimated remaining mine life, IPART noted that: [33]

> While a number of mines could continue to supply coal to the power stations up to and beyond the current terminal date of 2044, this is likely to be limited by the economic life of the power stations. As such, we have decided to reduce our estimate of the remaining mine life to 2040.

In other words, IPART considered that the remaining mine life was constrained by the economic life of power plants rather than the reserves available at the mines.

Further, IPART also noted the need to shorter the estimated remaining mine life in this review, rather than wait until its next review in 2024 when there could be more certainty regarding the economic life of mines. IPART rationale was that while:

> There may be more certainty when we next undertake this review in 2024. At that stage, we can adjust the estimated remaining mine life and depreciation schedule to reflect the longer or shorter remaining life. However, if we wait until our next review, in 2024, when there may (or may not) be more certainty about the future of coal-fired generation, we would create substantial price shocks for access seekers if we reduce our terminal date.
>
> Alternatively, reducing our estimate of the remaining mine life now spreads the price increase over a longer period. If we find at the next review that the power stations are likely to continue beyond the terminal date then we can adjust the depreciation schedule at that time.

[redacted]

[28] AER, *Regulating gas pipelines under uncertainty,* Information paper, November 2021, p 28.

[29] IPART, *Rate of return and remaining mine life 2019-2024,* Final report, July 2019, p 14.

[30] IPART, *Rate of return and remaining mine life 2019-2024,* Final report, July 2019, p 14.

[31] IPART, *Rate of return and remaining mine life 2019-2024,* Final report, July 2019, p 14.

[32] IPART, *Rate of return and remaining mine life 2019-2024,* Final report, July 2019, p 24.

[33] IPART, *Rate of return and remaining mine life 2019-2024,* Final report, July 2019, p 24.

ARTC uses a remaining life of 21 years on and from 1 July 2021 to calculate depreciation, which implies a terminal date of 2042

Similarly, the ACCC has also approved the adoption of remaining life of coal mines as the basis of calculating depreciation. The ACCC explains in relation to the Australian Rail Track Corporation's (ARTC's) HVCN that:[34]

> Under the current HVAU [Hunter Valley Access Undertaking] annual depreciation allowance is based on the useful life of the assets, using a straight-line method. The useful life is determined having regard to the remaining life of coal mines in the Hunter Valley, as well as mine production levels and coal reserves. That is, the HVAU has tied the useful life of the Hunter Valley rail network to the operation of coal mines, and not the remaining useful life of the rail assets themselves.

ARTC's current HVCN access undertaking sets useful life as 21 years commencing 1 July 2021, on and from 1 July 2021 onwards. [35] In other words, capital investments undertaken by ARTC on the HVCN would be recovered by 30 June 2042. This represented an extension of three years when compared to version 7 of the HVCN Access Undertaking, which had a terminal date of 30 June 2039. [36]

This terminal date was based an agreement between ARTC and its customers that the assumed weighted average mine life should be 21 years commencing 1 July 2021.[37] The ACCC's final decision was to approve ARTC's proposed change to its remaining useful life. However, the ACCC noted that: [38]

> depreciation of ARTC's rail assets should be calculated using defined factors that reflect the useful economic life of coal mining in the Hunter Valley.

4.1.3 QCA's decision on Aurizon Network's 2017 draft access undertaking

The QCA considered Aurizon Network's exposure to a long term structural decline in demand for coal from the Central Queensland Coal Network (CQCN) as part of the 2017 draft access undertaking.[39] In particular, the QCA formed the view that the asset stranding risk faced by Aurizon Network is minimal due to:

- the strong market outlook for coal from the CQCN coupled with the global competitiveness of mines serviced by the CQCN; and
- the regulatory framework, which mitigates asset stranding risk through:
  - accelerated depreciation – Aurizon Network is able to recover a greater proportion of the depreciation of its assets during the initial years of the asset life for investments made after 2009, as well as truncated asset lives implemented in the 2006 access undertaking;
  - access conditions – Aurizon Network has the ability to seek access conditions for expansion projects;
  - limited asset optimisation; and
  - security requirements for access holders and relinquishment fees.

The above suggests that the QCA acknowledges the risk of asset stranding in the context of Aurizon Network, but that existing features of the regulatory framework mitigate this risk, including the use of accelerated depreciation.

[redacted]

[34] ACCC, *Australian Rail Track Corporation's March 2021 variation to the Hunter Valley Coal Network access undertaking*, Draft decision, April 2021, p 45.

[35] ARTC, *Hunter Valley Coal Network Access Undertaking*, 2 June 2021, p 145.

[36] ARTC, *HVCN Access Agreement Version 8 Explanatory Guide*, December 2020, p 19.

[37] ARTC, *HVCN Access Agreement Version 8 Explanatory Guide*, December 2020, p 19.

[38] ACCC, *Australian Rail Track Corporation's March 2021 variation to the Hunter Valley Coal Network access undertaking*, Draft decision, April 2021, p 47.

[39] QCA, Aurizon Network's 2017 draft access undertaking, Decision, December 2018, pp 23-26.

In contrast, Queensland Rail's current regulatory framework does not help Queensland Rail mitigate asset stranded risk through change in depreciation profile. Further, West Moreton system is more vulnerable to asset stranded risk as it transports thermal coal, compared with CQCN which primarily transports metallurgical coal.

4.2 Promoting economic efficiency and balancing the interests of coal users and Queensland Rail

4.2.1 Relevant factors in the QCA Act

Queensland's third party access regime provides for implementing a QCA-approved access undertaking, ie, the terms on which an owner or operator of the service undertakes to provide the service. The QCA may approve a DAU only if it considers it appropriate to do so having regard to the matters mentioned in section 138(2) of the QCA Act. The matters that the QCA must have regard to that are of particular relevance to addressing asset stranded risk include:[40]

- the object of Part 5 of the QCA Act, ie, to promote the economically efficient operation of, use of and investment in, significant infrastructure by which services are provided, with the effect of promoting effective competition in upstream and downstream markets;
- the legitimate business interests of the owner or operator of the service, being Queensland Rail;
- the public interest, including public interest in having competition in markets (whether or not in Australia);
- the interests of persons who may seek access to the service, being coal mine owners;
- the pricing principles in section 168A of the QCA Act which, in relation to the price of access to a service, that price should:
  - generate expected revenue for the service that is at least enough to meet the efficient costs of providing access to the service and include a return on investment commensurate with the regulatory and commercial risks involved;
  - allow for multi-part pricing and price discrimination where it aids efficiency;
  - not allow a related access provider to set terms and conditions that discriminate in favour of the downstream operations of the access provider or a related body corporate of the access provider, except to the extent the cost of providing access to other operators is higher; and
  - provide incentives to reduce costs or otherwise improve productivity.

In our opinion, the factors in the QCA Act that are relevant to stranded asset risk can be summarised as follows:

- **promote efficient investment in the West Moreton system** – promoting efficient investment requires:
  - users' willingness to pay for the investment being higher than the associated cost of investment – otherwise investment would be inefficient as the costs of the investment are higher than the associated benefits to users; and
  - Queensland Rail having the incentive to undertake efficient investment, which turns on having sufficient opportunity to recover its costs;
- [redacted] implications for competition in the thermal coal market if it leads to the premature closure of coal mines on the West Moreton system; and
- **the legitimate business of Queensland Rail** – declining demand will increase the prospect that the revenue generated by Queensland Rail is not sufficient to recover the efficient costs of fixed assets.

[40] Queensland Competition Authority Act 1997, section 138(2).

4.2.2 Our advice on the appropriate regulatory approach to mitigate asset stranded risk on the West Moreton system

Depreciation should be calculated over the weighted average remaining mine life

We have had regard to the above factors and relevant decisions and guidance published by the QCA, AER, ACCC and IPART. In our opinion, the most appropriate regulatory approach to mitigating asset stranded risk is to move from calculating depreciation over the technical life of the asset to calculating depreciation over the economic life of the asset. In the context of the West Moreton system, we consider that the weighted average remaining life for mines on the West Moreton system is a reasonable estimate of the economic life of the asset. The existing RAB and new capex proposed in DAU3 would then be recovered within the economic life of the asset.

Calculating depreciation with reference to weighted average remaining mine life also has the following advantages:

- it provides Queensland Rail with the opportunity to recover its efficient costs of providing services, without the potential to over-recover;
- it provides the QCA and users transparency over price impacts and how it has been calculated;
- it is a methodological approach and incorporates expected production levels of each mine;
- it can be adjusted in the future if there is a change in market conditions; and
- it would be consistent with approaches used in other regulatory contexts.

Given the uncertainty regarding the future of the thermal coal industry, we recommend that the estimated remaining mine life be reviewed periodically, so that it continues to represent realistic expectations of remaining lives of the mines on the West Moreton line.

Advice on regulatory treatment of new capital investment and existing RAB

In our opinion, the regulatory considerations differ for new capital investment and recovery of the existing RAB. This is because existing RAB represents sunk costs. As such, promoting efficient investment in the West Moreton system is not a relevant consideration. It follows that the recovery of existing RAB over a shorter time period should balance the legitimate interest of Queensland Rail with the legitimate interest of users. Put another way, Queensland Rail should aim to recover its existing RAB over the estimated weighted average remaining mine life, but only if it is affordable, and so does not lead to premature closure of mines.

New capital investment is not a sunk cost and should only proceed if it is an efficient investment, where benefits of the investment weigh out costs of the investment. In other words, investment should only proceed if the value of the investment to the users (which can be measured through user's willingness to pay) are higher than the efficient costs of the investment. Further, Queensland Rail will only have a financial incentive to undertake new capital investment if it has reasonable prospects of recovering these costs.

Given the above, we recommend that new capital investment should be recovered over the estimated weighted average remaining mine life. Not doing so would mean Queensland Rail is at risk of not recovering new capital investment, or that new capital investment is an inefficient investment if users are unwilling to [redacted]

The highly uncertain future of the thermal coal industry means there is also significant uncertainty regarding the remaining life of coal mines. Consistent with this, AME's advice is that it is reasonably possible that the closure of all coal mines on the West Moreton system could occur between 2042 and 2050, or around 17 to 25 years from the start date of AU3.

The uncertainty in remaining life raises the question of how weighted average remaining life should be calculated. That is, should weighted average remaining life be calculated based on upper bound or lower bound estimate of remaining life, or somewhere in between.

In our opinion, weighted average remaining life should be calculated based on lower bound estimate of remaining life because doing so will help mitigate asset stranded risks. Adopting a shorter life means recovering capital over a shorter period. In the event where expected mine life is longer than assumed, then recovery of capital can be adjusted to be recovered over a longer period, which in turn will lead to reduce charges.

In contrast, adopting a remaining life estimate that is higher than the lower bound estimate increases asset stranded risk for Queensland Rail. Adopting a longer life reduces the amount of capital that is recovered in the short term. If expected mine life is shorter than assumed, then remaining mine life will need to be shortened in future so that Queensland Rail can recover its new capital investment and existing RAB. It follows that a higher proportion of capital will need to be recovered over a shorter period of time, while demand will also be lower than expected. This would increase the risk that Queensland Rail does not recover its new capital investment and existing RAB, and could lead to affordability issues for users.

By way of summary, adoption of useful life that is higher than the lower bound estimate increases asset stranded risk because:

- there is an increased risk that Queensland Rail is unable to recover new capital investments and reduces the likelihood that the existing RAB can be recovered; and
- could lead to affordability issues for users.

Given this, we recommend that Queensland Rail calculate weighted average remaining life based on realistic lower bound estimate of remaining life of each mine.

[redacted]

5. The affordability of recovering investments over the economic life of mines

In section 4, we recommend that Queensland Rail recover new capital investment over realistic lower bound estimate of weighted average remaining mine life. The recovery of existing RAB should balance the interest of Queensland Rail and users. We recommend that Queensland Rail recover existing RAB over the weighted average remaining mine life only if it does not lead to premature closure of coal mines.

In this section, we estimate the weighted average mine life for the West Moreton system and assess the affordability of calculating depreciation with reference to weighted average mine life.

5.1 The weighted average remaining life of mines

5.1.1 The weighted average mine life ranges from 14.4 to 19.1 years

In section 3.3, we discuss AME’s advice on expected remaining life for each of the mines operating on the West Moreton system. Based on this advice, we have assumed that:

- New Acland will cease operation by 2034;
- Cameby Downs will cease operations between 2042 and 2044; and
- Wilkie Creek will cease operations between 2042 and 2050.

We note that AME’s advice that Cameby Downs and Wilkie Creek that could cease operation by 2042 is consistent with the terminal date of 30 June 2042 assumed for thermal coal on the Hunter Valley coal network, which has been approved by the ACCC.

Based on AME’s advice on potential range of closure dates and volume forecasts for each mine, we have calculated a lower and upper bound estimate of weighted average remaining life for the West Moreton system – Table 5.1 and Table 5.2. Our estimated weighted average remaining remine life is between 14.4 and 19.1 years from 1 July 2025, which is the start date for AU3. This implies a terminal date of between 2039 and 2044.

Table 5.1: Estimated volume weighted remaining life based on lower bound estimate of remaining mine life – at 1 July 2025

	Year of last production	Estimated tonnes from 1 July 2025 onwards (million tonnes)	Remaining life on 1 July 2025
Cameby Downs	2042	42.5	17
Wilkie Creek	2042	35.7	17
New Acland	2034	45.9	10
Weighted average			14.4

Source: HoustonKemp analysis of AME forecasts. Note that AME’s forecasts are for calendar years. To calculate volume by financial year, we have taken the average of the two relevant calendar year. For example, volumes for 2023-24 is calculated as average volumes in 2023 and 2024.

Table 5.2: Estimated volume weighted remaining life based on upper bound estimate of remaining mine life – at 1 July 2025

	Year of last production	Estimated tonnes from 1 July 2025 onwards (million tonnes)	Remaining life on 1 July 2025
Cameby Downs	2044	48.8	20
Wilkie Creek	2050	53.6	26
New Acland	2034	45.9	10
Weighted average			19.1

Source: HoustonKemp analysis of AME forecasts. Note that AME's forecasts are for calendar years. To calculate volume by financial year, we have taken the average of the two relevant calendar year. For example, volumes for 2023-24 is calculated as average volumes in 2023 and 2024.

5.2 Estimated below rail costs under different approaches to calculating depreciation

Queensland Rail has estimated the below rail costs per tonne for each of the three mines operating on the West Moreton system based on:

- current rail access charges;
- proposed DAU3 access charges, with depreciation calculated based on technical life of the asset (status quo); and
- proposed DAU3 access charges, with capital recovered over a 14 year period (recovery by 30 June 2039).

Table 5.3 presents the estimated below rail cost per tonne under the different access charges. Overall, depreciation with reference to a lower bound estimate of weighted average remaining mine life will:

- lead to 22.5 to 24.5 per cent increase in below rail costs when compared to calculating depreciation based on technical life of asset; and
- result in below rail costs that are 0.5 to 9.1 per cent higher when compared to current access charges.

Table 5.3: Estimated below rail costs per tonne by mine (1 July 2023 dollars)

	Current access charges	Proposed DAU3 access charge – status quo	Proposed DAU3 access charge – recover capital by 30 June 2039
[redacted]			

5.3 Increase in charges are expected to be affordable

We estimate the financial implications of moving from calculating depreciation based on technical life to weighted average remaining mine life below. We have used AME's forecast of revenue and costs as an input into our analysis. For the three mines expected to use the West Moreton system in AU3, AME has produced the following forecasts:

- production volumes;

- revenue, adjusted for discount or premium for coal quality produced at each mine;
- cost of production, which includes:
  - [redacted]
  - [redacted][41]
  - [redacted]
  - [redacted]
  - [redacted]
- earnings before interest and tax.

Revenue and costs forecasts are undertaken in US dollars, which we have converted into Australian dollars using an exchange rate of 1 Australian dollar = 0.64 US dollar.

Figure 5-1, figure 5-2 and figure 5-3 overleaf show the estimated earnings before interest and tax (EBIT) for each mine without changes to how depreciation is calculated and with the adoption of a 14 year remaining mine life, and so capital is recovered by 2039.

[redacted]

[redacted]

41 [redacted]

Figure 5-2: Estimated earnings before interest and tax by year – Wilkie Creek ($1 July 2023)

[redacted]

Figure 5-3: Estimated earnings before interest and tax by year – New Acland ($1 July 2023)

[redacted]

We have calculated the net present value (NPV) associated with each mine to understand whether the reduction in EBIT per year may lead to a premature closure of any of the mines. We have calculated the NPV based on:

- assuming that required return on investment for a coal mine is 15 per cent, which we consider to be a conservatively high estimate;

- 2023 as the base year; and
- EBIT during the mine life, assuming that Cameby Downs and Wilkie Creek ceases operation in 2042.

The NPV measures the financial value of the mine to owners given the required return on investment. The result of our analysis is shown table 5.4. Our analysis indicates that moving from the status quo approach of calculating depreciation to recovery of capital by 2039 reduces the NPV of all three mines by between $40 to $62 million but all three mines remain financially viable.

Table 5.4: Estimated NPV associated with each mine ($1 July 2023)

Mine	Status quo	Recovery by 2039
Cameby Downs	$531.9	$470.0
Wilkie Creek	$370.0	$330.1
New Acland	$949.8	$895.4

Further, figure 5-1, figure 5-2 and figure 5-3 show that all three mines generate positive EBIT from 2025 onwards even with recovery of capital over a shorter period of time. This suggests that the proposed change in how depreciation is calculating will not lead to early exit of any of the three mines, as keeping the mines open provide a positive EBIT to the owners.

The analysis above assumes that Cameby Downs and Wilkie Creek closes by 2042. If it becomes clear that these mines will continue to operate after 2042, then the weighted average mine life should be recalculated. Doing so would lead to lower access charges as capital is recovered over a longer period of time, which would in turn improve the profitability of all three mines.

Given the analysis above, we consider that it is appropriate for Queensland Rail to recover its existing RAB over weighted average remaining mine life (or 14 years) for the West Moreton system.

[redacted]

A1. AER assessment of options to address declining gas demand

This section sets our AER’s assessment of options to address decline in gas demand.

Table A 1: AER assessment of options to address implications of falling gas demand

Option	Description	Advantages	Disadvantages
Adjusting regulatory depreciation	Bringing forward the cost recovery of the efficient investments that regulated businesses have already made by either shortening the period over which assets are depreciated or increasing the rate at which the assets are depreciated over time	• Changes timing of cash flows but does not change the value (in net present value terms) of the costs that the regulated business recovers • Can be reviewed at each regulatory review and adjusted as circumstances change • Recover greater proportion of sunk costs when there are more customers to share the costs	• Prices may increase in the short term • Intergenerational implications of adjusting cost recovery profile • Creation of expectation of potentially large or repeated increases in future gas prices
Compensating for asset stranding risk	Providing ex-ante compensation to network businesses for the expected loss from a stranded asset risk in the form of a business-specific cash payment	• May maintain the expectation that the business will have an opportunity to recover its efficient costs	• Practically difficult to estimate probability and consequence of asset being stranded, potentially leading to windfall gains or losses
Removing capital base indexation	Remove indexation of the RAB to speed up cost recovery of investments	• Avoids deferring cost recovery of required revenues into future periods where there may be fewer customers • Net present value neutral	• RAB would be maintained in nominal terms and its real value would be reduced through time due to inflation • Network charges would not move with inflation • RAB values and real prices may be hard to predict given uncertainty of inflation • Implications for consistency of the treatment of inflation across regulated networks
Sharing costs under capital redundancy provisions	Regulated businesses and their users negotiate an allocation of the asset stranding risk between them by using the capital redundancy provisions of the NGR	• Provides certainty over cost recovery, even if only partial cost recovery • Greater flexibility in dealing with costs as opposed to regulatory assessment • Likely to involve a more consultative and transparent engagement between regulated businesses and their users	• Asset may first need to become materially under-utilised or obsolete in order to be declared redundant and removed from the RAB • Regulated businesses may forgo opportunity to recover some costs from consumers • Establishing cost-sharing mechanism may be time consuming
Revaluation of asset base	Reflect changing demand conditions in the RAB in the form of a period revaluation	• Places the risk of demand changes on the network business while retaining stable prices for customers	• Requires fundamental changes to legal and regulatory framework • Challenging to estimate the probability of future changes in demand for a gas network • Future prices may be decoupled from the costs incurred for the purpose of providing network services [redacted]
Introducing exit fees	Levying exit fees on customers who disconnect from the network	• Promotes equity among customers	• Increasing switching costs for consumers • Perceptions of unfairness given previous disconnections would not have paid • May not provide clear price signals

Option	Description	Advantages	Disadvantages
			• Administratively burdensome to calculate exit fees
Increasing fixed charges	Amend pricing structures so that the fixed costs of supply would be recovered more through fixed charges rather than variable charges	• May be more equitable since fixed charges apply to all customers	• Relies on little to no decline in customer numbers • May encourage consumers to disconnect from network • May have greater impact on vulnerable or low-income families

Source: AER, Regulating gas pipelines under uncertainty, Information paper, November 2021, pp 29-39

[redacted]

HOUSTONKEMP
Economists

Sydney
Level 40
161 Castlereagh Street
Sydney NSW 2000

Phone: +61 2 8880 4800

Attachment 6: Queensland Rail's Detailed West Moreton System DAU3 Maintenance Expenditure Submission

DAU3 Maintenance Expenditure Submission

West Moreton – 10 November 2023

Table of Contents

Glossary

Term	Definition
DAU	Draft Access Undertaking
IDC	Interest During Construction
LED	Light Emitting Diode
Mtpa	Million tonne per annum
OTR	On time running
QCA	Queensland Competition Authority
QR	Queensland Rail
RAB	Regulated Asset Base
SER/PER	Signalling Equipment Room / Power Equipment Room
tal	Tonne Axle Load
WM	West Moreton

1 Overview

1.1 Context

Queensland Rail's West Moreton System runs over 322 kms between Rosewood and Miles, adjoining the Brisbane Metropolitan System at Rosewood and the the Western System at Miles. The system links Brisbane to the west and south-west of Queensland and is a major artery to Darling Downs.

The predominant commodity hauled along the West Moreton System is thermal coal, and the system currently services the Cameby Downs, Wilkie Creek and New Acland (Stage 3) mines. The reinstated Wilkie Creek Mine at Macalister commenced railings in July 2023 and New Acland Stage 3 commenced railing in October 2023 out of the Jondaryan siding.

The West Moreton System is regulated under the Queensland Competition Authority Act 1997 (**QCA Act**). Under the QCA Act, the services provided using rail infrastructure can be 'declared' by the Queensland Treasurer. Once declared an infrastructure provider is required to provide access to third parties to the declared infrastructure. The majority of Queensland Rail's network is declared, including the West Moreton System.

Once declared, the QCA can require Queensland Rail to submit a 'Draft Access Undertaking' to it for approval, and have it approved by the QCA in accordance with the QCA Act. Queensland Rail may also submit a 'Voluntary Draft Access Undertaking'. Queensland Rail has lodged a Voluntary Draft Access Undertaking (**DAU3**). The QCA has supported this approach.[1]

This submission has been developed under the assumption that coal volumes along the West Moreton System will increase significantly over the remainder of Queensland Rail's Access Undertaking 2 (**AU2**) and into the DAU3 period.

Total coal railings in FY23 in the West Moreton System was 2.2 million tonnes, mainly from the Cameby Downs mine. This contrasts to forecast coal volumes which are expected to ramp up to 9.6 million tonnes per annum (**mtpa)** early within the DAU3 period as shown in the Table below.

Table 1: West Moreton System Coal Tonnages by Financial Year (mtpa)

	FY26	FY27	FY28	FY29	FY30
Annual Throughput	8.2	9.5	9.6	9.6	9.6

[1] QCA correspondence to the Queensland Rail CEO dated 21 September 2022. The QCA file reference number 1478389, http://www.qca.org.au/wp-content/uploads/2022/10/qca-letter-re-queensland-rail-access-undertaking-timeline-21-sep-2022.pdf.

1.2 Proposed DAU3 West Moreton System Maintenance Costs

Queensland Rail is proposing a maintenance cost allowance for FY26 to FY30 (the DAU3 period) comprising of $162.6 million ($FY24) to support the movement of 9.6mtpa by FY30.

Table 2 West Moreton System maintenance costs - DAU3 ($m FY24)

	FY26	FY27	FY28	FY29	FY30	Total DAU3
Miles - Macalister	$5.49	$5.88	$5.50	$5.26	$4.89	**$27.0**
Macalister - Jondaryan	$6.04	$5.56	$5.75	$5.72	$5.73	**$28.8**
Jondaryan - Rosewood	$19.56	$21.66	$21.85	$21.84	$21.84	**$106.7**
Total	**$31.09**	**$33.10**	**$33.10**	**$32.82**	**$32.46**	**$162.6**

2 Background

2.1 Overview of System Characteristics and Infrastructure

The West Moreton System is critical to supply chains that export coal and agricultural products from Western and South Western Queensland through the Port of Brisbane. It is a multi-use system with coal, grain, livestock and long-distance passenger services utilising paths; however coal is the predominant product and is a key driver for asset strategies for the system.

Figure 1 presents a map of the West Moreton System below.

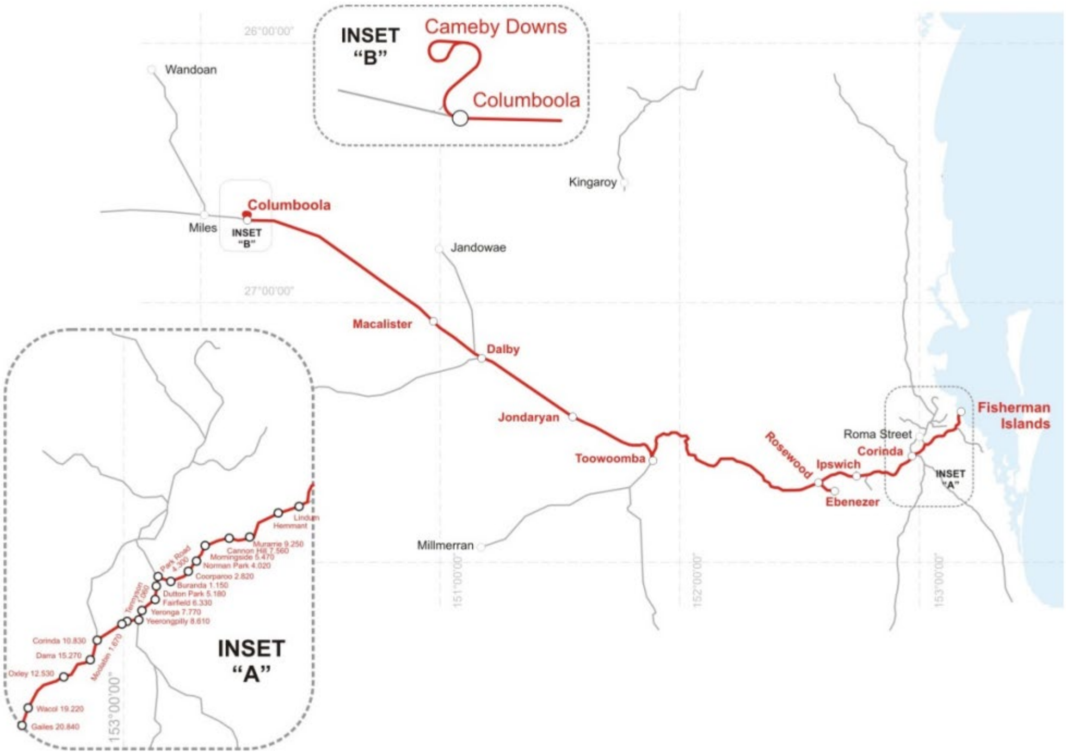


Figure 1 Map of West Moreton System

QueenslandRail

Table 3 presents some key characteristics of the assets on the West Moreton System.[2]

Table 3 West Moreton System key characteristics

Item	Details
Length	Route Length 322km Track Length 413km narrow gauge
Reference Train Length	675m
Maximum operating speed	80km/hr
Track Assets	258km of 50kg/m continuously welded rail on single line sections and loaded Down Road Rosewood – Kingsthorpe and Oakey – Jondaryan. 154km of 41kg/m rail remains on Up Road between Yarongmalu – Helidon, Kingsthorpe – Oakey, Malu – Miles and most passing loops.
Sleeper Type	269km of concrete sleepers Down Road and Rosewood - Jondaryan. 143km of interspersed steel and timber sleepers, typically 1 in 2 pattern, Up Road between Yarongmalu - Helidon and single line Malu - Miles.
Ballast and Formation	Ballast is quality crushed rock. The black soil formation increases ballast fouling causing poor drainage and loss of top and line.
Turnouts	60kg/m RBMs on concrete with trailable facing points. Derailment risk, if these heavy trailable facing points TFP's do not reset for next train passage. Remaining 41kg/m turnouts on timber remain in yards and loops.
Structures	Bridges: 127 - 71 timber bridges (2,841m), 24 concrete (893m) and 32 steel (1,122m). Timber bridges originally constructed 1865 and 1880. Culverts: 700 - A number are life expired cast in situ drains and deformed corrugated metal pipes. Tunnels: 11 - 1860's construction and limit dimensional capacity of freight
Signalling Assets	RCS and DTC - Signal interlockings at Gatton, Rangeview and Dalby require refurbishment or replacement to provide ongoing reliability and supportability. Signal cabling Grandchester to Laidley requires replacement. Level Crossings: Older level crossings require ongoing electrical equipment refurbishment & upgrade of priority sites.
Telecommunications	Direct buried optical cable between Harlaxton and Toowoomba requires replacement. The microwave network is end of support life. The telecoms rectifier and digital telemetry require upgrade.

[2] Queensland Rail Service Investment Plan FY24

2.2 Traffic Types, Operators and Key Customers

The West Moreton System is a multi-use system, with the following services utilising train paths:

- Coal – coal is the predominant commodity hauled along the West Moreton System. Aurizon is the primary coal operator on the system. With the re-instatement of the Wilkie Creek Mine, and the approval of New Acland Stage 3 there are three export coal mines located in the region.
- Grain – grain trains access the Port of Brisbane through the system from the connecting Glenmorgan Branch at Dalby, and from the South-Western line at Toowoomba.
- Livestock – seasonal livestock services are provided by Watco out of Morven and connect into the system at Miles for transport through to South-East Queensland.
- Passengers – Queensland Rail's long distance passenger service The Westlander runs twice weekly between Brisbane and Charleville.

Thermal coal dominates traffic from west of Toowoomba and is a key driver for asset strategies for the system. Trains operate up to 15.75 tal with a maximum train length of 675m and a maximum speed of 80km/hr.

2.3 Future Usage of the Network

The future rail traffic will drive the long-term strategies for the system. Coal freight forecasts for the system are the highest they have ever been with the additional mines becoming operational:

[redacted]

Figure 2 presents a map showing the mines that will be serviced by the West Moreton System over the DAU3 Period.

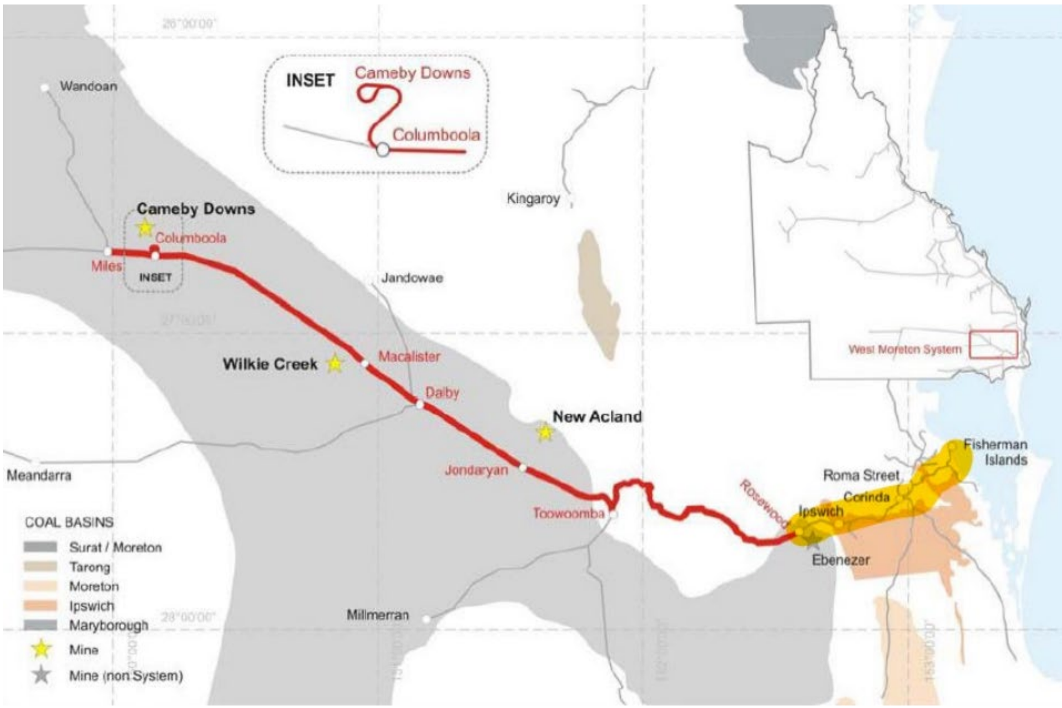


Figure 2 Map of Mines serviced by the West Moreton System

With a maximum of 9.6 Mtpa expected over the DAU3 period, maintaining the system to enable efficient movement of services, minimising closures and speed restrictions is considered to be critical.

3 Maintenance Strategy

3.1 Customer Driven Maintenance Approach

Queensland Rail's network maintenance approach serves as a fundamental element of the overall asset management strategy to enable efficient movements across the system and deliver a standard of service that is expected by its customers.

Customer requirements from the West Moreton System are primarily driven by:

- Reliability – transit times that allow operators to achieve efficient cycle times;
- Availability – availability of train paths, minimal unplanned delays and manageable speed restriction impacts; and
- Affordability – competitive rail supply chain price for services.

The first two drivers reflect a standard of service expected by customers. Both reliability and availability can be impacted if the network is not effectively maintained. This could be through speed restrictions, or disruptions to network availability due to incidents, inclement weather or unplanned possessions, all of which could impact an operator's ability to achieve efficient cycle times.

Planned possessions to undertake maintenance and capital works can also impact on service quality and paths availability, and it is important that possession management forms part of the overall maintenance strategy, particularly as available train paths reduce with the expected uplift in throughput. Queensland Rail is committed to reducing possession impacts where possible, while also noting that increased throughput will increase wear and tear on the network, and therefore increase the maintenance required.

The final driver, affordability, demonstrates that a balance needs to be met between costs and service performance, while also managing risks. Queensland Rail has developed a maintenance program which responds to customer requirements while also considering the costs of the program.

3.2 Balancing Performance, Risk and Cost

A core objective of asset management is reaching a balance of levels of service, management of risk and efficient whole of life costs. Both maintenance and capital expenditure contribute to maintaining the availability and reliability of the network and need to be considered together to identify efficient costs of doing so.

Key considerations for maintenance of the West Moreton System over DAU3 in achieving this balance include:

- The projected increase in tonnage up to 9.6 Mtpa within the period will increase wear on the track and therefore increase the level of maintenance required on the network in order to minimise speed restrictions and closures. Conversely, this will likely also decrease the amount of time available to deliver planned maintenance and capital works.

- A higher level of maintenance may also increase the possession time required to undertake the works, potentially acting as a limit to the paths available and therefore the tonnage that the line can carry. If the maintenance is not carried out, the line is at increasing risk of events occurring that require reactive (unplanned) maintenance, which would impact customer service by reducing availability and result in higher costs.
- Queensland Rail has proposed a capital program which responds to the specific requirements of the network, targets existing system issues and delivers measures to strengthen the system in anticipation of the increased throughput. Queensland Rail's proposed maintenance costs have considered the reduction in maintenance that will result from the proposed capital program, noting that upgraded or recently refurbished track is unlikely to require extensive maintenance in the period following the upgrade.

Queensland Rail has proposed a maintenance expenditure program that seeks to maximise supply chain efficiency and deliver safety, reliability and availability to its users.

3.3 Maintenance Planning

Queensland Rail develops forecasts of expected works required based on several factors, including condition of the network, expected throughput and available possession time. The annual System Maintenance Plan forecasts work to be undertaken each year, while the Service Investment Plan considers a 10 year time horizon.

Queensland Rail's revised AU2 Maintenance Strategy which covers the lead up to the DAU3 period will be the subject of a future Draft Amending Access Undertaking 2 (DAU2) submission.

3.4 Asset Monitoring and Analysis

Asset monitoring and analysis is an important part of maintenance planning and delivery. Asset monitoring technology and the associated analytical tools are becoming increasingly sophisticated; delivering more accurate and robust data that is then directly fed into the maintenance planning process. More accurate monitoring of potential defects enables a more proactive maintenance program, which should also generate efficiencies over the longer term. In 2014 Queensland Rail implemented an Enterprise Asset Management System which enables Queensland Rail to better understand and monitor the actual condition and degradation of the network, which in turn informs Queensland Rail's prioritisation approach for works.

4 Key Drivers for DAU3 Maintenance Costs

4.1 The Original Purpose of the West Moreton System

The West Moreton System originally opened in 1865 between Ipswich and Grandchester, catering for passenger, livestock, freight and primary products. The system began supporting the transport of coal in 1982. Rail export commenced via rail from Macalister in 1994 (closing in 2013), Jondaryan in 2002 and from Columboola in 2010.

The network's historical origins present continuing challenges for its operation. The West Moreton System was initially constructed on black soil plains with no engineered formation; resulting in regular failures requiring reconstruction to ensure suitable track geometry is maintained.

Early track standards have resulted in an alignment that is lower than contemporary standards for stand-alone heavy haul railway built specifically for coal carrying services. As a consequence of the network's age and track standard, the section between Rosewood and Miles in particular requires a higher level of intervention than would be required for a more modern, stand-alone heavy haul railway in order to safely and reliably deliver contracted tonnages.

The age and history of the West Moreton System has an impact on the condition and fitness for purpose of the network. In both AU1 and AU2, track age and condition were considered for both the capital and maintenance programs. Queensland Rail has been slowly improving the quality of the track through the capital program, however there are still issues associated with the age of the network that are affecting the delivery of services.

For the DAU3 period, Queensland Rail has proposed what it considers to be efficient maintenance costs for the West Moreton System having regard to the age and condition of the network, and the tonnage proposed to be hauled over a network that was not originally designed for this purpose.

4.2 Current Condition and Performance

4.2.1 Condition of the Assets

Queensland Rail's proposed maintenance costs respond to several factors, including anticipated throughput, capital program and the age, condition, and performance of the system in meeting the requirements of users.

Condition of an asset informs the likelihood of failure of the asset and can be indicative of the asset risk. Figure 3 presents a summary of the condition of the assets in the West Moreton System. The condition assessment used the following ratings:

- Condition 1 – very good (teal)
- Condition 2 – good (blue)
- Condition 3 – average (orange)
- Condition 4 – poor (red)
- Condition 5 – very poor (dark red)
- Not assessed (grey)

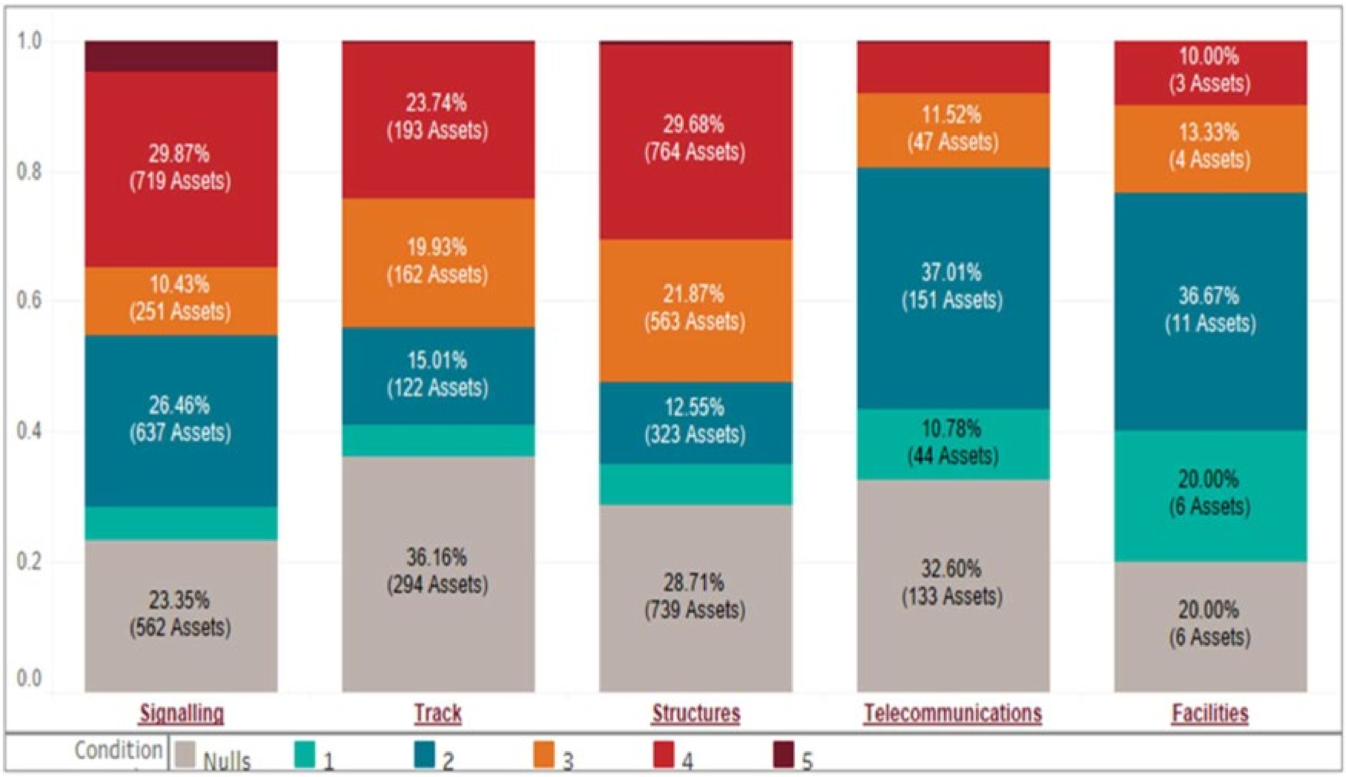


Figure 3: Current Condition of the West Moreton System assets (Service Investment Plan)

The following observations can be made from this assessment:

- **Track:** While the graph shows that 23.7% of all track assets are in a poor condition state, this value represents nearly 40% of the assets assessed. This suggests that a significant proportion of track assets are in need of renewal or refurbishment.
- **Structures:** While the graph shows that 29.7% of structures assets are in a poor condition state, this represents nearly half of the total number of structures assets assessed.
- **Signalling:** While the graph shows that 29.9% of signalling assets are in a poor condition state, this represents nearly 40% of the signalling assets assessed. In addition, there is also a proportion of assets in condition state 5 – very poor.
- **Telecommunications and Facilities:** these assets are in a better average condition state than track, structures and signalling assets.

The condition of the track, structures and signalling assets present a risk to maintaining service levels as assets in a poor condition are at higher risk of failure. Asset failure could result in unplanned outages to services which impact reliability and availability of the system.

4.2.2 Overall Track Condition Index

The overall track condition index (OTCI) represents the track condition that impacts on train performance (speed). Significant attention is applied to maintaining top and line beyond that required to meet OTCI thresholds for the West Moreton System to reduce the dynamic loading deterioration over the light track structure and black soil formation.

Table 4 presents the current OTCI ratings for the different corridors within the West Moreton System. [3]

Table 4 OTCI Current Ratings

System	Lower Threshold	Upper Threshold	Current Rating
Rosewood to Toowoomba	61	64	28
Toowoomba to Jondaryan	50	54	26
Jondaryan to Dalby	50	54	24
Dalby to Macalister	52	56	26
Macalister to Miles	52	56	26

Legend:
- On or Better than target (Below / = Lower Threshold)
- Breached Target (Above Upper Threshold)
- Near Target (Between Lower and Upper Thresholds)

Queensland Rail's OTCI ratings are comparable with the average ratings for Aurizon Network over FY21 and FY22[4].

Table 5 Aurizon Network OTCI ratings

System	FY22	FY21
Blackwater	21.5	23.9
Goonyella	21.0	22.3
Moura	25.0	26.6
Newlands / GAPE	18.3	20.0

OTCI is a metric for the overall condition of the track across the system, and therefore does not reflect all variations within a system.

4.2.3 Asset Performance

In addition to asset condition, performance of the assets can also be a driver for maintenance costs. Key performance issues are presented in Table 6, as detailed in Queensland Rail's Service Investment Plan.

Table 6 Performance issues on the West Moreton System

Issue	Description
Track Infrastructure	• Existing timber and steel structures are limited to 15.75 TAL. • Majority of the formation was not engineered and is considered under-strength for 15.75 TAL. • The Toowoomba Range single line sections limit the number of train paths. • The current axle loads and train lengths limit train payload.

[3] Queensland Rail Service Investment Plan FY24

[4] Aurizon Network FY22 Maintenance Submission

Issue	Description
	• Tunnel clearances are a limiting factor, although a recent project increased the clearance at a number of tunnels to accommodate 9'6" (2.9m) containers through the West Moreton System. • The steep grades of the Toowoomba Range and the Little Liverpool Range and the single line through both of these range alignments causes capacity constraints.
Range Resilience	• The Toowoomba Range is subject to landslides in extraordinary rain events with major reconstruction repairs to the track required in past years. Rock falls and embankment movement are also common each wet season, and this impacts on services during assessment and repair. • Geotechnical assessments have been undertaken which show that further investment is required to reduce the risk of major landslides. Investment in remediation work at the highest risk sites, plus the installation of monitoring equipment with specialised survey and assessment of other risk sites will provide greater certainty to Queensland Rail's supply chain partners that service disruptions will be minimised.
Speed Restrictions	• Temporary and blanket speed restrictions due to poor track alignment (top and line) and track stability of the lightweight track structure during summer months.

Queensland Rail's priority is to address the asset risk and performance issues affecting the network while building resilience to manage future throughput and delivering reliability and availability to customers.

4.3 Tonnage Forecasts

Figure 4 presents the tonnage forecasts for the remainder of the AU2 Period and the DAU3 Period. As demonstrated, there is a significant increase in the anticipated throughput on the system due to the addition of two new mines – the Wilkie Creek and New Acland Stage 3.

[redacted]

Figure 4: Tonnage Forecasts for Remainder of AU2 and DAU3 (mtpa)

This increase means that there needs to be particular consideration for the maintenance activities and costs which are expected to vary with tonnage.

These tonnage actuals and projections are illustrated by line section in Figure 5.

[redacted]

Figure 5 Tonnes of coal carried on the West Moreton System

Queensland Rail engaged AECOM to review the reasonableness of the approach to determining fixed and variable splits for the maintenance activities on the West Moreton System.

4.4 Possession Availability

As a result of increasing tonnage on the West Moreton System, the time available for track possession to undertake works are projected to decrease, most significantly for the Jondaryan to Rosewood corridor. This is shown in Figure 6.

[redacted]

Figure 6 Possession Availability (hours p.a.)

There are two key strategies that can be adopted to ensure that the possession required to undertake track works fits within the window of available possession.

1. Undertaking capital works to reduce the amount of maintenance required. This is explored in further detail in Section 6.3, whereby capital works results in a portion of maintenance avoided, and thus reducing the time required to possess the line for track work.
2. Increase the number of crew members or teams deployed during track works. Crews working parallel during track closures will allow for the required trackwork to be completed within the possession window. This is also explained in further detail in Section 6.3.

Possession availability is a key driver for considering the number of crew members or teams that must be deployed to complete the required track work and has an impact on the amount of variable maintenance that can be completed.

4.5 Fixed vs Variable Costs

Maintenance activities are defined as Fixed where the amount of work (and therefore cost) required does not vary according to the number of trains on the line or the tonnage carried.

The maintenance activities defined as Variable are considered to increase as the number of trains or the tonnage carried increases. DAU3 is expected to involve an increasing demand for coal transportation, so the definition and rate of increase of these variable activities is crucial to establishing reliable cost projections associated with the higher tonnage.

Queensland Rail's categorisation of maintenance activities differs slightly from the list developed for AU2: two forms of Inspection are not considered Variable (the work involved is not proportional to tonnage transported) and have therefore been redefined as Fixed).

Fixed maintenance costs are due to activities that are considered to be independent of the number of trains or the tonnage carried (and are therefore not variable). All but one of these activities involve assets that are not part of the track – the *Assets Comp Insp/Svc activity* is fixed but requires track blocking in order to be carried out, so it has been included in possession calculations.

These activities cost an average of $9.5 million per annum over the past three years, as indicated in Table 7.

Table 7 Fixed Costs incurred during FY21-23 ($m FY24)

Fixed Maintenance Activity	FY21	FY22	FY23	Avg FY21-23
Asset Compliance Insp/Svc	[redacted]	[redacted]	[redacted]	[redacted]
Repairs	[redacted]	[redacted]	[redacted]	[redacted]
Fire & Vegetation Management	[redacted]	[redacted]	[redacted]	[redacted]
Renewals	[redacted]	[redacted]	[redacted]	[redacted]
Asset Inspections Non-Compliance	[redacted]	[redacted]	[redacted]	[redacted]
Consulting/Technical Advice	[redacted]	[redacted]	[redacted]	[redacted]
Lubrication	[redacted]	[redacted]	[redacted]	[redacted]
Earthworks – Non-Formation	[redacted]	[redacted]	[redacted]	[redacted]
Turnout Maintenance	[redacted]	[redacted]	[redacted]	[redacted]
Electrical	[redacted]	[redacted]	[redacted]	[redacted]
Signalling	[redacted]	[redacted]	[redacted]	[redacted]
Telecoms	[redacted]	[redacted]	[redacted]	[redacted]
Other	[redacted]	[redacted]	[redacted]	[redacted]
Total Fixed Costs	**$9.7**	**$7.3**	**$11.6**	**$9.5**

These fixed costs can be allocated to the line sections used in this analysis as indicated in Table 8.

Table 8 Fixed costs incurred during FY21-23 by line section ($m FY24)

Fixed Maintenance Activity	FY21	FY22	FY23	Avg FY21-23
Miles - Macalister	$2.6	$1.5	$2.6	$2.2
Macalister - Jondaryan	$1.8	$1.3	$2.1	$1.8
Jondaryan - Rosewood	$5.3	$4.5	$6.8	$5.5
Total	**$9.7**	**$7.3**	**$11.6**	**$9.5**

Track inspection (primarily 'Assets Comp Insp/Svc') requires the track to be blocked for safety reasons, so this activity has been included in the calculation of possession time to enable track-related maintenance work to be completed. Since this activity is classified as 'fixed cost', its cost has been kept separate from the variable maintenance analysis. Variable maintenance activities are considered to vary according to the mass of trains using the track, and since the system carries a 'standard' (reference) coal train (with a consistent mass), these activities can be considered to vary with total tonnage carried.

These activities cost an average of $13.7 million per annum during the FY21-23 period as indicated in Table 9.

Table 9 Variable costs incurred during FY21-23 by line section ($m FY24)

Variable Maintenance Activity	FY21	FY22	FY23	Avg FY21-23
Mechanised Resurfacing	[redacted]			
Rail Stress Adjustment				
Repairs				
Sleeper Management				
Maintenance Ballasting				
Rail Joint Management				
Top & Line Spot Resurfacing				
Other				
Total	**$16.0**	**$13.0**	**$12.2**	**$13.7**
Net Tonnes	4.1M	2.8M	2.3M	

These variable costs are allocated to each line section as indicated in Table 10.

Table 10 Variable costs incurred during FY21-23 by line section ($m FY24)

Variable Maintenance Activity	FY21	FY22	FY23	Avg FY21-23	Avg Tonnes
Miles - Macalister	$4.9	$2.8	$5.8	$4.5	2.12
Macalister - Jondaryan	$4.9	$3.0	$1.7	$3.2	2.12
Jondaryan - Rosewood	$6.2	$7.2	$4.7	$6.0	3.08
Total	**$16.0**	**$13.0**	**$12.2**	**$13.7**	

There is significant variability in maintenance costs by line segment, as shown by Figure 7, which also shows the current posted maximum speeds by line segment (for the Rosewood – Jondaryan section of the line).

[redacted]

Figure 7 Maintenance Costs by Line Segment per km (with speed restrictions overlaid)

It is expected that variable costs will generally be higher for curved line segments and for sections at a gradient. Figure 7 uses the speed restrictions to indicate the location of these segments (noting that there are other reasons for speed restrictions, so there can also be restrictions posted on straight flat sections of track). It should also be noted that Queensland Rail is well aware of the significance of these sections and has been actively managing its track in those locations.

There is a delay between the impact of the coal trains on any segment of track and the notification of maintenance required, and a further delay until the works required are funded and able to be delivered. The annual tonnage carried during the FY21-23 period varied by year (this topic is addressed in Section 4.3). Queensland Rail considers that the historical variable costs are a reliable indicator of future costs, once adjusted for tonnage and one-off costs.

4.6 Factors that Influence Track Degradation and the Need for Maintenance

Wear and degradation of the track as a result of usage is mainly caused by three factors, which are cumulative where they apply (a tight curve on a steep gradient would be affected by all three factors) and impact variable maintenance. These factors are summarised in Table 11.

Table 11 Key drivers of variable maintenance on rail lines

Factor	Commentary	Conclusion
Compression due to the movement of trains on the track.	Compression damage is considered to vary with train mass, and there are standard approaches to estimating the impact of each train on the rail and formation. The mass of a coal train is significantly greater than a passenger train, so the impact of the latter can be assumed to be immaterial.	The impact of a single 'standard' train can be determined by examination of Queensland Rail's

Factor	Commentary	Conclusion
	In practice, the coal freight trains running on the line are assumed to be fully loaded and therefore have a standard mass (2,008 tones net or 2,835 tonnes gross). The trains must comply with posted speed restrictions, so it can also be assumed that they all travel at the same speed on any given section of track. These assumptions mean that damage to the track increases in line with the number of coal trains using it (each train causes the same damage). The damage and the cost of maintaining the track is can therefore be estimated by establishing the damage and maintenance cost associated with one train and multiplying that by the number of (fully-loaded) trains running on the track.	historical costs associated with straight, flat sections of track. The total impact increases with the number of 'standard' trains, so total costs will be proportional to the tonnage carried.
Centrifugal force caused by trains moving on a curve (which is generally mitigated by canting the track).	*Centrifugal force = mv²/r* (m = mass of the train, v = velocity, r = radius). The centrifugal force and therefore the wear or degradation of the track on a curved segment is inversely proportional to the curve radius and increases at the square of the train's velocity. The force (and wear) on a curve of 200m radius with a posted maximum speed of 40km/hr is [redacted] the force on a curve of 400m radius with a posted maximum speed of 70km/hr (the speed is the dominant factor). For a given curve and for fully-loaded 'standard' trains complying with the posted maximum speed rating, the degradation caused by each train will be the same. The maximum allowed speed of a coal train on this line is 80km/hr, so flat canted curves with radius of 600m or greater (which generally have a speed restriction of 80km/hr) do not require deceleration.	Degradation and maintenance costs on curves are higher on curved segments for the 'standard' train. The total impact increases with the number of 'standard' trains, so total costs will be proportional to the tonnage carried.
Acceleration (braking) of trains travelling on track at a gradient (or on sections which require changes in train speed).	Acceleration (braking) forces increase as the track gradient increases. *Braking force = mg sin(θ)* (m = mass of the train, g = gravity, θ = angle of slope). For a 'standard' train, the impact varies with the sin() of the slope. The force (and wear) on a gradient of 1 in 80 is [redacted] the force on a gradient of 1 in 120. Queensland Rail has imposed gradient-based speed restrictions on track segments where the gradient exceeds 1 in 120, so braking is required on steeper slopes and track degradation (formation damage) will occur at increasing rates as the gradient increases.	Degradation and maintenance costs are higher on steeper segments for the 'standard' train. The total impact increases with the number of 'standard' trains, so total costs will be proportional to the tonnage carried.

These factors affect each line differently, depending on its physical characteristics. A line that has a substantial steep section will incur track degradation at a higher rate than other lines. Attempts to benchmark freight lines without accounting for these physical differences are therefore unreliable.

Evidence shows that the rate of track degradation increases the longer the track segments affected are left in use before remediation works are carried out.[5] This is a maintenance planning (and funding) issue, but cost projections made based on tonnage increases would have to be increased further if maintenance backlogs are allowed to occur.

4.7 Capital Program

In addition to the condition and performance of the system and the expected throughput increases, some categories of maintenance cost may reduce or be avoided for a period of time as a result of investments included in the proposed DAU3 Capital Program.

Section 5.1 demonstrates how Queensland Rail has considered the impact of the capital program on the maintenance activities and costs. Possession may be required to undertake some of these investments, and this issue has been addressed in Section 6.3.

5 DAU3 Maintenance Costs Development

5.1 Overall Approach to developing Maintenance Costs

The approach taken in projecting the DAU3 maintenance costs takes the following key steps:

1. **Tonnage forecast:** Multipliers are developed in line with expected tonnage increases. These multipliers serve the purpose of adjusting variable costs in direct proportion to the increase in loads. A more detailed description of tonnage increases can be found in Section 4.3. The multipliers, as presented in Table 13, are derived in proportion to the projected gross tonnage (FY24 to FY30) and the average gross tonnage observed between FY21 and FY23, as indicated in Table 12.

Table 12 Projected Gross Tonnage

Gross Tonnage (mtpa)										
Corridor	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30
Miles - Macalister	[redacted]									
Macalister - Jondaryan										
Jondaryan - Rosewood										

[5] Prescott and Andrews, 2013.

Table 13 Gross Tonnage Multipliers for Variable Maintenance Escalation

Gross Tonnage (mtpa)		Multipliers						
Corridor	FY21-FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30
Miles - Macalister	[redacted]							
Macalister - Jondaryan								
Jondaryan - Rosewood								

2. **Classification**: Maintenance work orders, covering FY21 to FY23, are categorised into fixed and variable classifications and by rail corridor. This is summarised in Section 4.5.

3. **Fixed Costs**: Historical fixed costs are a strong indicator of the future fixed costs required, and so historical costs from FY21 to F23 have been used to derive a representative base year of fixed costs for the DAU3 period. The data shows differences year by year as Queensland Rail planned specific forms of maintenance to make efficient use of its resources and take advantage of weather conditions during the three-year period shown. In developing a base year for fixed maintenance costs for DAU3, the following approach was taken:

    a. Non-recurring costs were identified and removed from the historical costs between FY21-23. These included flood and natural disaster repair costs over the period, amounting to approximately $5.5m.

    b. An average of the three past years was used to establish a base year (excluding non-recurring costs), noting that the need for maintenance may be identified a year or more after the original cause of the damage.

4. **Variable Costs**: To establish a base year before escalation for tonnage, the following process was undertaken:

    a. Variable costs were reviewed for non-recurring costs and non-recurring costs were identified and removed. These included anomalous costs incurred for sleeper management and Mechanised Resleepering.

    b. An average of the remaining costs was calculated by line section to establish a base cost by line section.

    c. The base cost is escalated for each year for the DAU3 using the multipliers determined in step 1.

5. **Maintenance Avoided due to Capital Works**: Calculate the extent and value of maintenance avoided by the past and planned capital works program.

The approach taken to project variable maintenance costs is:

a. Establish the geometry of the line, labelling all segments with curve radius and / or gradient where they exist, and note the speed restrictions allocated to each segment.

b. Associate historical maintenance activity and costs with each segment, and note the tonnage transported over the periods covered by the data. The track possessions needed to carry out the maintenance works have also been determined and associated with each segment.

c. Derive a 'standard' maintenance cost avoided unit rate by segment type per standard fully-loaded coal train utilising the percentage maintenance avoided assumptions outlined in Section 5.2.

d. Allocate the cost avoided to sections of track where capital works has occurred.

5.2 Maintenance Planning Assumptions

Queensland Rail's maintenance data generally includes chainage documented in a text field. This data has been extracted from the records to enable costs to be allocated to the line segments. Each line segment has been defined with a start and an end chainage, so all maintenance costs have been allocated using the chainage data extracted to the relevant segments to establish the recent history of maintenance works by each segment type (curve radius and gradient band). There are maintenance costs that could not be allocated to specific segments, and these have been added to multiple segments based on descriptive information provided.

As the duration for various maintenance activities and requirements, for the track blocking and possessions required to enable the track-related maintenance to be completed is very specific to the job and location, a set of assumptions have been developed related to crew size, rates of doing work and duration and length of planned capital works in order to estimate the length of possession needed to carry out track-related maintenance. These assumptions are presented in Table 14 and Table 15.

It is assumed that a proportion of costs related to variable maintenance can be avoided as a result of capital works. This reduction is expected for the first 5-6 years after the capital works in line with the % maintenance avoided presented in Table 16. For the majority of capital works, the maintenance costs begin to return 6 years after the capital works. However, it's been assumed that Resleepering results in a permanent avoidance in maintenance due to the replacement of 41kg rail on timber/steel sleepers with 50kg rail on concrete sleepers. After 5-6 years, the maintenance avoided due to capital works reduces and maintenance costs gradually returns to its original value before the capital works took place, this is shown in Table 17.

Table 14 Employment Assumptions

Employment Assumptions	
Total Crew Members	[redacted]
Hrs per day	[redacted]
Days per year	[redacted]
Average Crew size	[redacted]
% Working in field	[redacted]

Employment Assumptions	
% Training	[redacted]
% Administrative Duties	
Labour hours per employee	

Table 15 Future Capital Works Assumptions

Project No,	$m/km	Days/km
B.05651	[redacted]	
B.05650		
B.06159		
B.06155		
B.06156		
B.06366		
B.05578		
B.05945		
B.04798		
B.04817		

Table 16 Percentage of Variable maintenance Avoided Due to Capital Works

		% Maintenance works avoided							
		Past Capital Works	Future Capital Works						
			Recondition of Curve Transitions	Formation Strengthening	Gauge issue and range rerail	Level Crossing Transitions	Recondition	Rerail	Resleepering
Maintenance Activity	Lubrication	[redacted]							
	Maintenance Ballasting								
	Mechanised Resleepering								
	Mechanised Resurfacing								
	Rail Grinding								
	Rail Joint Management								
	Rail Stress Adjustment								
	Renewals								
	Repairs								
	Sleeper Management								
	Top & Line Spot Resurfacing								
	Turnout Maintenance								

Table 17 Reduction in Maintenance Avoided X Years Post Capital Works[6]

	Capital Works	
Years post capital works	Resleepering	All Other Capital Works
0	[redacted]	
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

6 DAU3 Maintenance Costs

Section 6 sets out in detail Queensland Rail's proposed maintenance costs for the DAU3 period to deliver a reliable and safe network up to and including a 9.6mtpa forecast, with increased tonnage due to the opening and operation of the New Acland mine, the Wilkie Creek mine and the Cameby Downs mine.

The maintenance costs forecasts are for the movement of all coal and non-coal (including passenger) services on the network between Rosewood and Miles.

6.1 Variable Maintenance

As mentioned in Section 4.3, the maintenance activities defined as variable are considered to increase as the number of trains or the tonnage carried increases. The main variable related activities performed are:

- Mechanised Resurfacing
- Rail Stress Adjustment
- Repairs
- Sleeper Management
- Maintenance Ballasting
- Rail Joint Management
- Top & Line Spot Resurfacing
- Other

[6] In this table, a 100% value indicates a complete restoration to the initial maintenance cost before the capital works took place

6.1.1 Mechanised Resurfacing

Mechanised resurfacing is a standard railway maintenance function applied to keep track within design geometry parameters. It assures correct levelling and lining, which keeps vertical and lateral forces and accelerations within acceptable limits by shifting the track into the correct position.

Mechanised resurfacing is performed at intervals depending on numerous conditions, including but not limited to speed, tonnage and deterioration rate of the track. The task is completed using self-propelled on-track machines that are able to lift and line the track to a pre-determined level and compact the ballast under the rail seat to support the new track position.

Scope of the resurfacing products has been forecast based on the historical performance of the asset whilst taking into account new capital investments that will reduce the maintenance demand over the duration of the DAU3. The scope for mechanised resurfacing is generally driven by:

- gross tonnes across the track
- the standard of track construction (e.g. rail size, sleeper type, etc.)
- the current condition of the track and formation components
- the historical performance of the infrastructure in service
- weather events (i.e. high rain fall).

The planning of track maintenance works, particularly to maintain track geometry, requires considerable skill and experience to achieve cost-effective outcomes. Long term resurfacing programs have been developed based on fixed protocols to minimise changes.

Mechanised resurfacing is considered tonnage dependent with costs adjusted from 2.2 mtpa cost levels to reflect the 9.6 mtpa scenario. Capital works reduce the costs associated with Mechanised resurfacing, in line with % reductions shown in Table 16 and Table 17.

6.1.2 Rail Stress Adjustment

This activity includes tasks such as rail stress testing, creep marker monitoring, and the complete process of rail stress adjustment, for example additional rail and anchors. Due to the nature of the task, track closure is necessary to carry out the works. The costs included in this product include restressing of sections where track works and modifications have occurred.

Rail Stress Adjustment is considered tonnage dependent with costs adjusted from the 2.2 mtpa cost levels to reflect the 9.6 mtpa scenario. Capital works reduce the costs associated with Rail stress adjustment, in line with % reductions shown in Table 16 and Table 17.

6.1.3 Repairs

Rail repair includes all activities associated with spot renewal or repair of rail due to identified defects. Failures or defects in rail such as wheel burns, defective welds, internal rail defects, defect glued joints, broken bolts and other associated activities such as distribution, unloading rail, and flagging are all concerned with this activity. This product also includes the repair of running rail by maintenance or arc welding.

Rail repair is tonnage dependent with costs adjusted from the 2.2 mtpa cost levels to reflect the 9.6 mtpa scenario. Capital works reduce the costs associated with Rail repair, in line with % reductions shown in Table 16 and Table 17.

6.1.4 Sleeper Management

In the interspersed timber and steel sections of track the sleeper management task encompasses activities such as spot insertion of sleepers, reboring, regauging, plating, respacing and fastener installation by local track teams.

Typically, the most significant task is sleeper cluster management. Due to the nature of the task, track closures are necessary to carry out the works.

In the concrete sleeper sections of track, particularly in tight radius curves, the sleeper management task includes replacing warn and crushed rail seat pads, gauge foot spacers and clip fastenings to maintain gauge and toe load.

Heavy duty spacers have been developed to reduce crushing, and options have been developed to facilitate adjusting gauge in as rail wears in 3mm increments.

Sleeper management is tonnage dependent with costs adjusted from the 2.2 mtpa cost levels to reflect the 9.6 mtpa scenario. Capital works reduce the costs associated with sleeper management, in line with % reductions shown in Table 16 and Table 17.

6.1.5 Maintenance Ballasting

This activity involves the purchase, freight and running out of ballast for restoration of ballast profile only. The majority of maintenance ballast costs are associated with the deploying of ballast trains. Ballast maintenance is tonnage dependent with costs adjusted from the 2.2 mtpa cost levels to reflect the 9.6 mtpa scenario. Capital works reduce the costs associated with Ballast maintenance, in line with % reductions shown in Table 16 and Table 17.

6.1.6 Rail Joint Management

Rail joint management includes all activities associated with the maintenance of a rail joint. This encompasses welding of joints, bolt and fish plate maintenance, glue joint maintenance, joint lifting, top and lining joints.

This product takes into account the cost associated with the works currently being done and planned for welding of 220m lengths through the timber and steel sleepered sections.

Rail joint management is tonnage dependent with costs adjusted from the 2.2 mtpa cost levels to reflect the 9.6 mtpa scenario. Capital works reduce the costs associated with rail joint management, in line with % reductions shown in Table 16 and Table 17.

6.1.7 Top & Line Spot Resurfacing

Top and line spot resurfacing encompasses all activities associated with restoring top and line to track using manual or mechanically assisted processes. It involves restoring top and line on bridge ends, open track, using manual processes or small spot tampering machinery (e.g. modified bobcat, portable tamper, mini excavator etc.). Top and line resurfacing excludes activities undertaken by major production resurfacing machines.

Top and line resurfacing is tonnage dependent with costs adjusted from the 2.2 mtpa cost levels to reflect the 9.6 mtpa scenario. Capital works reduce the costs associated with Top and line resurfacing, in line with % reductions shown in Table 16 and Table 17.

6.1.8 Other

Other variable maintenance activities, accounting for approximately [redacted] over the DAU3 period, include:

- Lubrication
- Rail Grinding
- Renewals
- Turnout Maintenance
- Mechanised Resleepering

6.1.9 Variable Maintenance Cost Summary

Queensland Rail has proposed for $114.9m for track related works for the 9.6 mtpa scenario, ~71% of the total maintenance costs proposed for the DAU3 period. Track maintenance costs for the entire network under the 9.6mtpa scenario is shown in Table 18 and Table 19.

Table 18 Forecast variable maintenance costs, by activity ($m FY24)

Variable Maintenance Activity	FY26	FY27	FY28	FY29	FY30	Total DAU3
Mechanised Resurfacing	[redacted]					
Rail Stress Adjustment						
Repairs						
Sleeper Management						
Maintenance Ballasting						
Other						
Top & Line Spot Resurfacing						
Rail Joint Management						
Total	**$21.6**	**$23.6**	**$23.6**	**$23.3**	**$22.9**	**$114.9**

Table 19 Forecast variable maintenance costs, by corridor ($m FY24)

Corridor	FY26	FY27	FY28	FY29	FY30	Total DAU3
Miles - Macalister	$3.3	$3.7	$3.3	$3.0	$2.7	**$15.9**
Macalister - Jondaryan	$4.3	$3.8	$4.0	$4.0	$4.0	**$20.0**
Jondaryan - Rosewood	$14.0	$16.1	$16.3	$16.3	$16.3	**$79.0**
Total	**$21.6**	**$23.6**	**$23.6**	**$23.3**	**$22.9**	**$114.9**

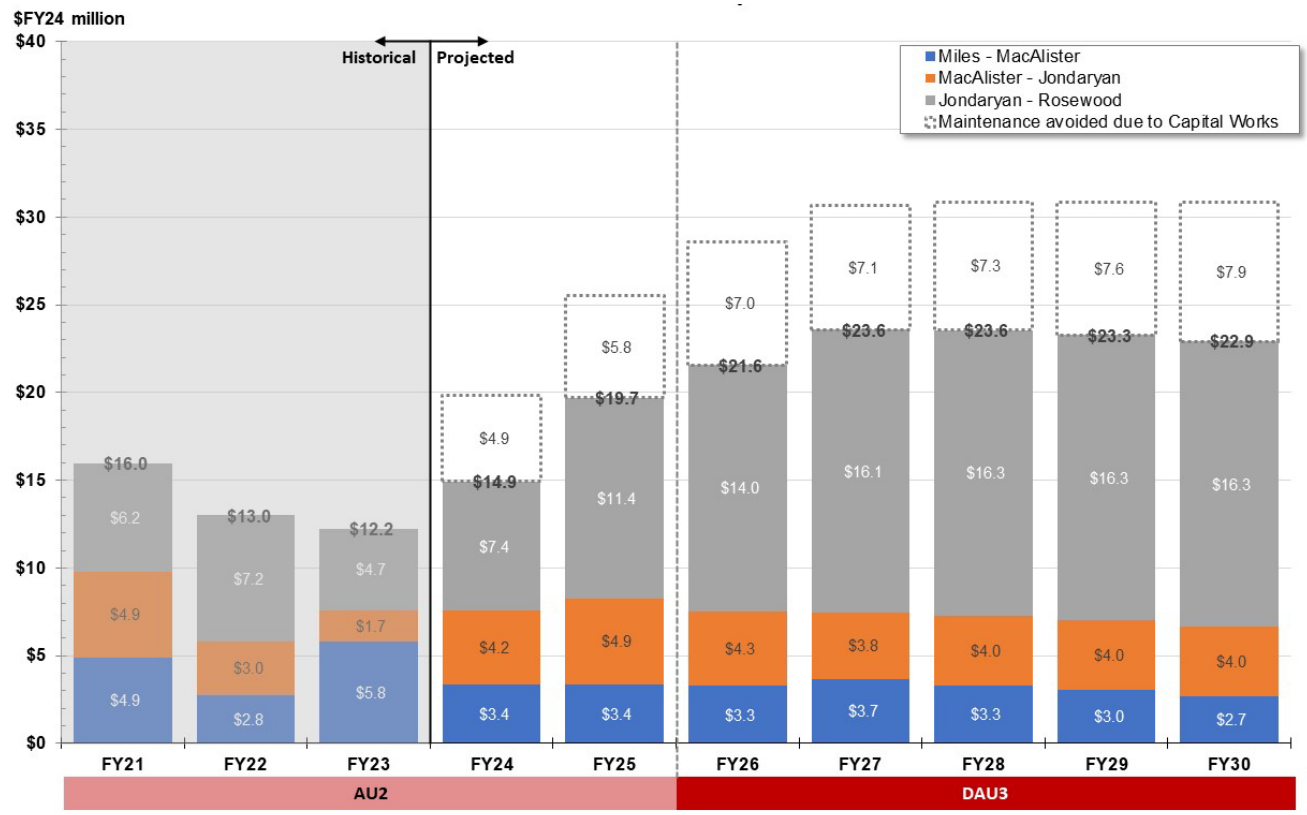


Figure 8 Forecast variable maintenance costs, by corridor ($m FY24)

Note: AU2 Maintenance Strategy currently under review by Queensland Rail will be detailed in a future Draft Amending Access Undertaking.

6.2 Fixed Maintenance

6.2.1 Fixed Activities

A summary of the fixed maintenance activities that Queensland Rail does not consider to vary with tonnage is presented in Table 20.

Table 20 Summary of Fixed Maintenance Activities

Fixed Maintenance Activity	Description of Activity
Signalling	Activities included under signalling maintenance are those that relate to the overall performance of the signalling infrastructure. These activities ensure that the signalling system is maintained to a safe and appropriate operating level.

Fixed Maintenance Activity	Description of Activity
	Queensland Rail does not consider this activity to vary with tonnage, and therefore the cost for signalling maintenance has remained stable over the DAU3 Period.
Assets Comp Insp/Svc	Inspections and testing of buildings and associated assets as required by statutory authorities or Queensland Rail standard/policy. This includes plumbing, electrical, fire, asbestos, height, pole and confined space compliance.
Fire & Vegetation Management	Fire and vegetation management activities involve the control of vegetation by chemical and mechanical means; burn offs to eliminate vegetation interference with train running and track maintenance. This includes the following processes: vegetation control around bridges, slashing, brush cutting, hi rail and manual herbicide treatment, tree surgery, fire and vegetation management, fire breaks, burning off, tree planting, firefighting and pest management plans. This activity does not typically require track closures. Queensland Rail does not consider this activity to vary with tonnage, and therefore the cost for signalling maintenance has remained stable over the DAU3 Period.
Repairs	This includes repairs to tunnel, timber bridges, steel bridges, concrete bridges and other civil and structural assets.
Renewals	Long term or one-off maintenance programs/upgrades.
Asset Inspections Non-Compliance	All inspections of track. CETS inspections such as engineering inspections, road patrols, engine inspections, turnout, walking, track stability, track clearance, level crossings, hot weather, yard inspections, trackmaster audits, construction audits, ZET.
Consulting/Technical Advice	This relates to the provision of specialist advice, implementation of systems (e.g. SAMS), coordinating warranty type work, design, providing technical advice or specific business improvement initiatives to satisfy customer requirements.
Telecoms	Upgrades and improvements to the assets supporting the telecommunications function on the network.
Other	Other includes all other maintenance which does not form a significant proportion of total costs.
Earthworks – Non-Formation	Includes all non-formation related earthworks and drainage construction and maintenance. Involves access roads, disposal of surplus materials, walkways, cleaning out, reshaping surface drains, reshaping cess drains, widening cuttings, building up embankment
Turnout Maintenance	Any maintenance associated with turnout where activities include the repair or replacement of components such as switches, vees, guard rails, associated jewellery including bolts, chair lubrication, spot tie replacement (manual), maintenance welding.
Electrical	All activities associated with maintenance of the electrical assets, such as cabling, feeder stations, and the overhead network.
Lubrication	All activities associated with rail lubrication. Involves the lubrication of track on straights and curves, maintenance & filling of any lubrication systems or devices.

6.2.2 Fixed Maintenance Cost Summary

Table 21 presents a summary of the forecast fixed maintenance costs over the DAU3 period by maintenance type. Table 22 & Figure 9 provides these by corridor.

Table 21 Forecast fixed maintenance costs, by activity ($m FY24)

Fixed Maintenance Activity	FY26	FY27	FY28	FY29	FY30	Total DAU3
Signalling	[redacted]					
Assets Comp Insp/Svc						
Fire & Vegetation Management						
Repairs						
Renewals						
Asset Inspections Non Complian						
Consulting/Technical Advice						
Telecoms						
Earthworks - NonFormation						
Turnout Maintenance						
Electrical						
Lubrication						
Other						
Total Fixed Costs	**$9.5**	**$9.5**	**$9.5**	**$9.5**	**$9.5**	**$47.7**

Table 22 Forecast fixed maintenance costs, by corridor ($m FY24)

Corridor	FY26	FY27	FY28	FY29	FY30	Total DAU3
Miles - Macalister	$2.2	$2.2	$2.2	$2.2	$2.2	**$11.1**
Macalister - Jondaryan	$1.8	$1.8	$1.8	$1.8	$1.8	**$8.8**
Jondaryan - Rosewood	$5.5	$5.5	$5.5	$5.5	$5.5	**$27.7**
Total	**$9.5**	**$9.5**	**$9.5**	**$9.5**	**$9.5**	**$47.7**

QueenslandRail

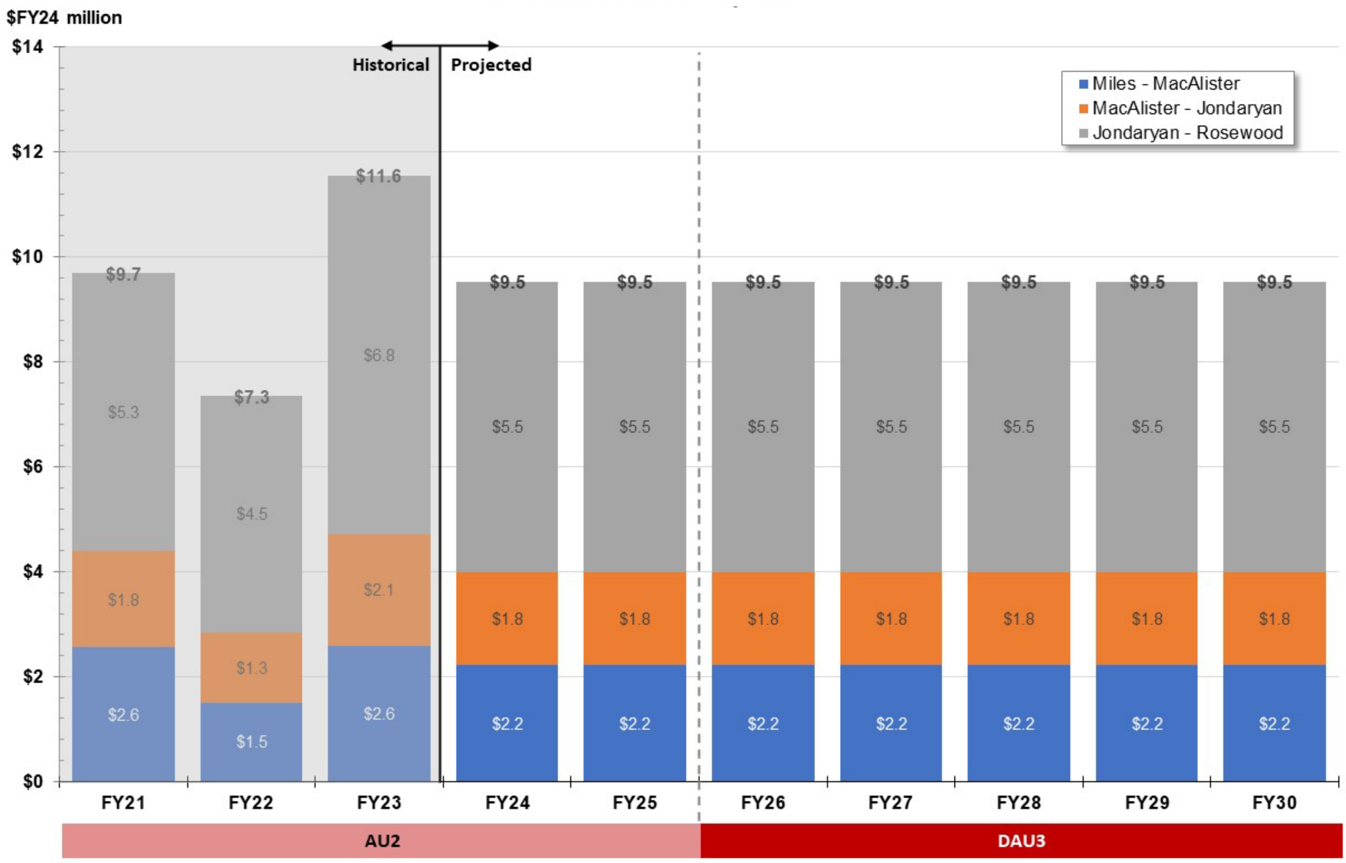


Figure 9 Forecast fixed maintenance costs, by corridor ($m FY24)

Note: AU2 Maintenance Strategy currently under review by Queensland Rail will be detailed in a future Draft Amending Access Undertaking.

6.3 Impact of Possession Availability on Maintenance

As indicated in Section 4.4, the availability of track possession is a key driver for the number of crew members or teams deployed during a track closure to complete track works. This also has implications on the amount of variable maintenance that can be completed.

The approach taken for future track possession looks at the billed hours for track specific maintenance, maintenance which would result in track possession, and creates assumptions related to crew size and rates of doing work in order to estimate the length of possession needed to carry out track-related maintenance.

Track Possession assessment follows the following approach:

1. **Billed Hours:** Calculate Billed hours for each line, escalate in line over the DAU3 period and account for maintenance avoided. Utilise approach and assumptions for maintenance and maintenance avoided set out in Section 4.7.
2. **Vary Crew member number/teams deployed:** Based on the standard employment assumptions detailed in Section 4.7, the analysis calculates the track possession duration for two scenarios: one with a constant (unchanged) number of crew members and the other with the minimum number of crew members required to fit within the possession window.

6.3.1 Billed Hours

Analysis of historical employee billed hours, between FY21-FY23 indicates an increase over the DAU3 period. With focus on Jondaryan to Rosewood, due to the line being most impacted by the expected increased tonnages, Figure 10 demonstrates that the total employee billed hours is projected to increase from [redacted] in FY24 to [redacted] by FY30, which is a [redacted] increase over this period.

As discussed in Section 4.7, capital works results in a portion of variable maintenance to be avoided. This is represented in both Figure 10, Figure 11 and Figure 12, reducing overall maintenance required.

[redacted]

Figure 10 Total Employee Hours Billed – Jondaryan - Rosewood (per annum)

6.3.2 Varying Crew Members/Teams Deployed

Assuming [redacted] members deployed during any one closure, possession required surpasses the possession window available, shown in Figure 11. The possession window available is described in further detail in section 4.4.

[redacted]

Figure 11 Possession required assuming constant number of crew members deployed, Jondaryan - Rosewood (hrs p.a.)

Assuming constant crew size, as shown in Figure 11, the possession avoided as a result of capital works will be insufficient to offset this shortfall, and by itself, will not allow for the required track possession to fit within the possession window available. Therefore, Queensland Rail will be required to increase the crew size or the number of crews deployed (and associated equipment and tools) to complete the required track works to fit within possession window. This outcome is shown in Figure 12.

[redacted]

Figure 12 Minimum Crew Size Required to Fit Within Possession Window on the Jondaryan to Rosewood Section

6.4 Total Maintenance Costs

Queensland Rail proposes a maintenance cost of $162.6 million ($FY24) over the DAU3 period, to support the movement of an expected maximum of 9.6mtpa across the network (Table 23, Table 24, Table 25, Figure 13, Figure 14). These costs have been developed using the approach described in section 5.

Table 23. West Moreton coal maintenance costs by cost type - DAU3 ($m FY24)

Cost Type	FY26	FY27	FY28	FY29	FY30	Total DAU3
Variable Costs	$21.6	$23.6	$23.6	$23.3	$22.9	**$114.9**
Fixed Costs	$9.5	$9.5	$9.5	$9.5	$9.5	**$47.7**
Total	**$31.1**	**$33.1**	**$33.1**	**$32.8**	**$32.5**	**$162.6**

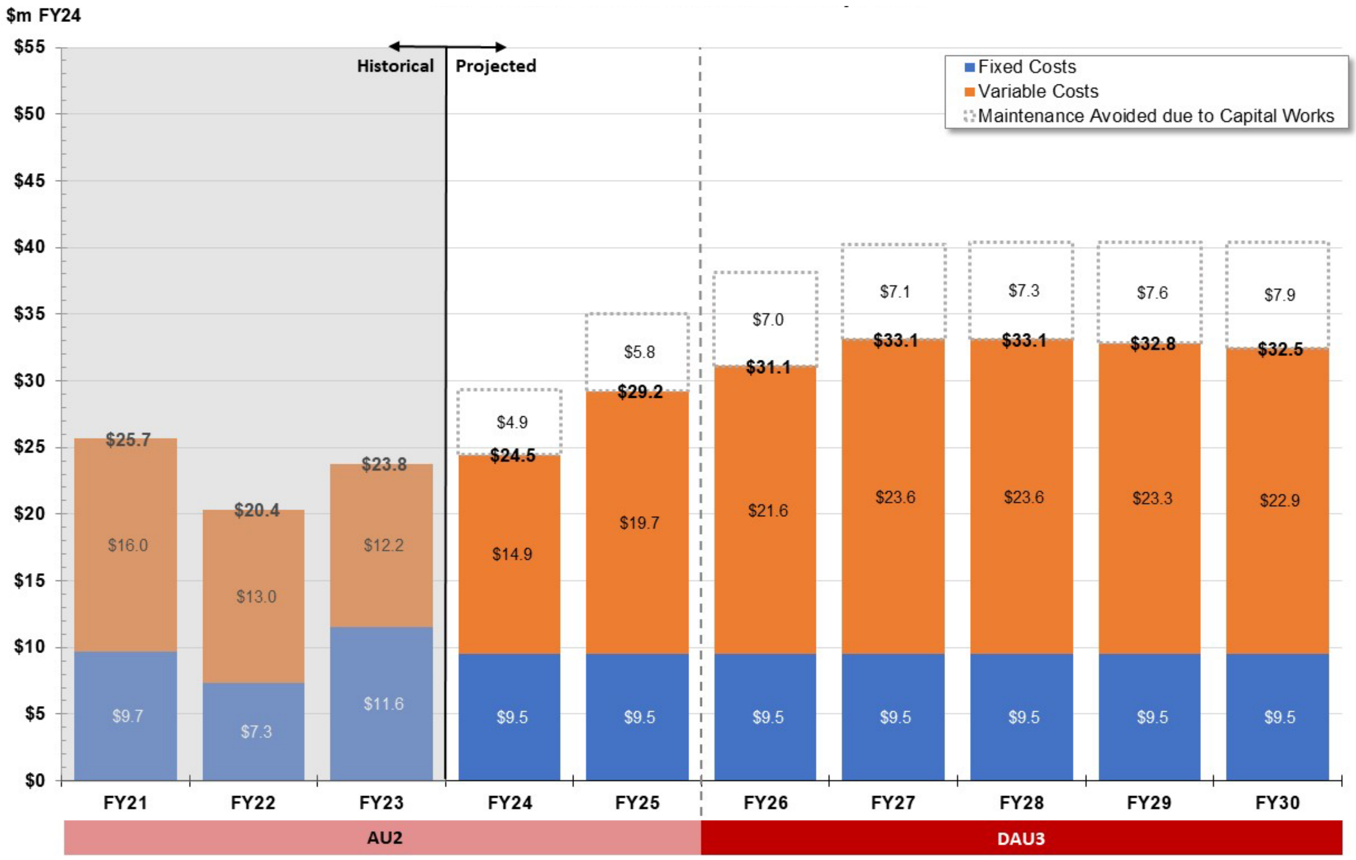


Figure 13 West Moreton coal maintenance costs by cost type - DAU3 ($m FY24)

Note: AU2 Maintenance Strategy currently under review by Queensland Rail will be detailed in a future Draft Amending Access Undertaking.

Table 24 West Moreton coal maintenance costs by cost type - DAU3 ($m FY24)

Maintenance Activity	FY26	FY27	FY28	FY29	FY30	Total DAU3
Variable Maintenance						
Mechanised Resurfacing	[redacted]					
Rail Stress Adjustment						
Repairs						
Sleeper Management						
Maintenance Ballasting						
Other						
Top & Line Spot Resurfacing						
Rail Joint Management						
Subtotal	**$21.6**	**$23.6**	**$23.6**	**$23.3**	**$22.9**	**$114.9**
Fixed Maintenance						
Signalling	[redacted]					
Asset Compliance Insp/Svc						
Fire & Vegetation Management						
Repairs						
Renewals						
Asset Inspections Non-Compliance						
Consulting/Technical Advice						
Telecoms						
Earthworks – Non-Formation						
Turnout Maintenance						
Electrical						
Lubrication						
Other						
Subtotal	**$9.5**	**$9.5**	**$9.5**	**$9.5**	**$9.5**	**$47.7**
Total Costs	**$31.1**	**$33.1**	**$33.1**	**$32.8**	**$32.5**	**$162.6**

Table 25. West Moreton coal maintenance costs by corridor - DAU3 ($m FY24)

Corridor	FY26	FY27	FY28	FY29	FY30	Total DAU3
Miles - Macalister	$5.5	$5.9	$5.5	$5.3	$4.9	**$27.0**
Macalister - Jondaryan	$6.0	$5.6	$5.8	$5.7	$5.7	**$28.8**
Jondaryan - Rosewood	$19.6	$21.7	$21.9	$21.8	$21.8	**$106.7**
Total	**$31.1**	**$33.1**	**$33.1**	**$32.8**	**$32.5**	**$162.6**

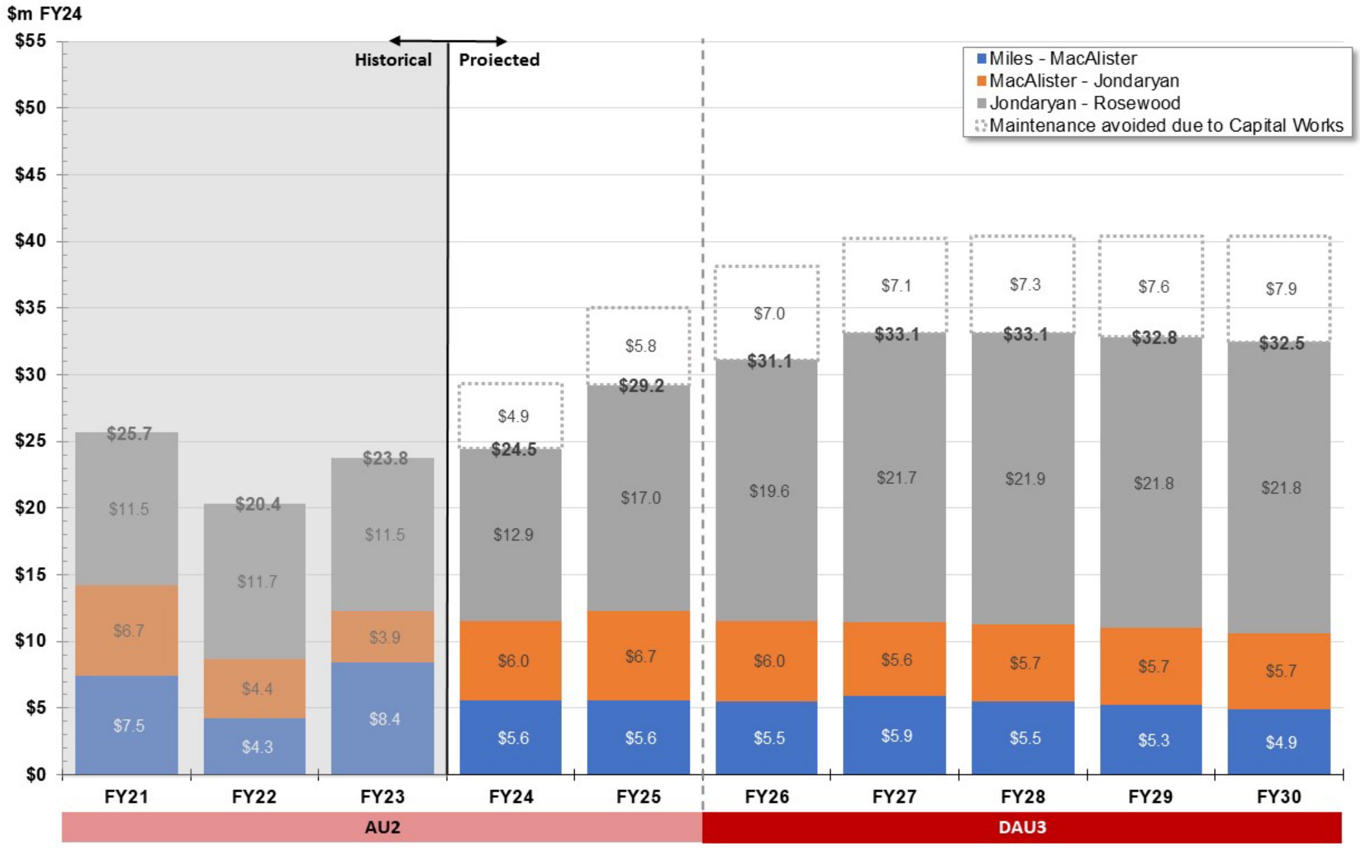


Figure 14 West Moreton coal maintenance costs (inc. fixed and variable) by corridor - DAU3 ($m FY24)

Note: AU2 Maintenance Strategy currently under review by Queensland Rail will be detailed in a future Draft Amending Access Undertaking.

7 Peer Review

The maintenance activities and costs in this document have been subject to internal peer review and have been externally reviewed by AECOM. AECOM's report is provided separately for the QCA's consideration.

8 Conclusion

This submission has been developed under the circumstances where coal volumes along the West Moreton System are forecast to increase significantly (to 9.6Mtpa) over the remainder of Queensland Rail's Access Undertaking 2 (AU2) and into the DAU3 period. Queensland Rail's proposed maintenance costs for the DAU3 period is intended to deliver a reliable and safe network for the forecast period to a 9.6mtpa scenario, which assumes increased tonnage due to the opening and operation of the New Acland (Stage 3), Wilkie Creek and Cameby Downs mines.

Consideration has been given to potential maintenance cost reductions, stemming from the avoidance of maintenance requirements as a result of the planned capital program.

For the DAU3 period, Queensland Rail has proposed efficient maintenance costs for the West Moreton System having regard to the age and condition of the network, and the volumes proposed to be hauled over a network that was not originally designed for this purpose.

Attachment 7: AECOM Engineer's Expert Peer Review of Queensland Rail's West Moreton System Maintenance Investment Plan for DAU3 (2025-26 to 2029-30)

Prepared for
Queensland Rail
ABN: 68 598 268 528

AECOM

Review of Queensland Rail's DAU3 West Moreton Maintenance Submission

03-Nov-2023
West Moreton Line
Doc No. 60710802_Peer-Review-M

aecom.com

Delivering a better world

Review of Queensland Rail's DAU3 West Moreton Maintenance Submission

Client: Queensland Rail

ABN: 68 598 268 528

Prepared by

AECOM Australia Pty Ltd
Turrbal and Jagera Country, Level 8, 540 Wickham Street, PO Box 1307, Fortitude Valley QLD 4006, Australia
T +61 7 3056 4800 www.aecom.com
ABN 20 093 846 925

03-Nov-2023

Job No.: 60710802

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 and ISO45001.

Quality Information

Document	Review of Queensland Rail's DAU3 West Moreton Maintenance Submission
Ref	60710802
	https://aecomaus.sharepoint.com/sites/60710802-qrregsupport/shared documents/general/500_deliverables/502_deliverable_maintenance submission/aecom peer review/aecom engineering review of qr dau3 maintenance submission_final_v0.docx
Date	03-Nov-2023
Originator	AECOM Project Team
Checker/s	Lucy Harrington; Mike Stoke
Verifier/s	Susheel Prabhakar

Revision History

Rev	Revision Date	Details	Approved	
			Name/Position	Signature
A	10-Oct-2023	Draft for Review	Susheel Prabhakar Project Manager	-For Final-
B	25-Oct-2023	Updated Draft for Review	Susheel Prabhakar Project Manager	-For Final-
0	03-Nov-2023	Final Report	Susheel Prabhakar Project Manager	

Table of Contents

List of Tables

List of Figures

Glossary

Term	Definition
AU2	Queensland Rail's 2020 Access Undertaking
AU3	Queensland Rail's 2025 Access Undertaking
DAU2	Queensland Rail's 2020 Draft Access Undertaking
DAU3	Queensland Rail's 2025 Draft Access Undertaking
GTK	Gross Tonne Kilometres
mtpa	Megatonnes per annum
QCA	Queensland Competition Authority
QR	Queensland Rail
TAL	Tonne Axle Load
UT5	Aurizon Network's 2017 Access Undertaking
WM	West Moreton

Executive Summary

Queensland Rail (QR) engaged AECOM (us/we) to undertake a peer review of its proposed maintenance costs for the West Moreton System during the Draft Access Undertaking 3 (DAU3) period, covering 2025-26 (FY26) to 2029-30 (FY30). The West Moreton System is broken up into three key segments, namely Rosewood to Jondaryan, Jondaryan to Macalister, and Macalister to Miles (Columboola). The network is approximately 413km long (314 km route) and is an aged, narrow-gauge network from the 1860s with steep gradients, tight curves, and non-engineered formations on key parts of the network.

Queensland Rail is proposing a single 9.6 million tonnes per annum (mtpa) scenario as part of our commission, which assumes the full operation of Wilkie Creek and New Acland Stage 3 mines.

Queensland Rail has asked us to undertake our peer review based on an assessment of whether the current maintenance practices demonstrate prudency (the necessity of the maintenance activities) and efficiency (the optimal delivery of those maintenance activities) as an indicator of whether the proposed costs for the DAU3 period align with these factors.

After consultation with Queensland Rail, we assessed 10 fixed maintenance activities and 12 variable maintenance activities, which account for more than 90% of the total maintenance costs for the DAU3 period.

Of these activities, three track-related maintenance activities account for almost 45% of QR’s proposed maintenance spending:

1. **Mechanised resurfacing** uses specialised machinery to restore track shape and smoothness, reducing track degradation. For QR to maintain the West Moreton System safety and network capacity from a geometry standpoint, resurfacing is a necessity and prudent.
2. **Rail stress adjustment** helps mitigate thermal expansion and contraction, minimising the risk of track stress. As rail stress adjustment is driven mainly by the management of risk, it is considered a prudent practice.
3. **Rail renewal and repairs** are important for replacing deteriorated components to maintain the integrity and safety of the rail network. As rail renewal and repairs methodology is in alignment with asset management best practices, it is considered a prudent practice for QR.

Given the maintenance activities that QR anticipated for the DAU3 period, along with our understanding of the West Moreton System's current condition and structure, it is our opinion that QR takes a prudent approach to its maintenance planning.

We undertook a comparative analysis, which can be found in Section 4.3.1 of this report, between QR’s maintenance expenditure and similar networks in Australia. Aurizon’s Newlands and Moura systems were selected due to their similarities:

- Geography (Queensland), to account for similar weather conditions
- Tonnage, to account for similar stresses on the network
- Cargo
- Track Length to account for economies of scale and scope.

Aurizon’s, Newlands and Moura tracks were compared with the West Moreton System. When comparing the $/GTK per annum, the Newlands and Moura track has been found to have an average maintenance spend of 14% and 45% of the West Moreton track, respectively. This difference can largely be attributable to the track construction. Aurizon’s has been largely designed for its purpose and tonnage. In contrast, the West Moreton System is an aged, narrow-gauge network from the 1860s with steep gradients, tight curves, and non-engineered formations on key parts of the network. The Aurizon Network system is able to achieve additional efficiencies due to the track construction that is not available to QR on the West Moreton System.

1.0 Introduction

Queensland Rail (QR) has engaged AECOM (we/us) to undertake a peer review of its proposed maintenance expenditure for the DAU3 period, covering FY2025-26 (FY26) to FY30. This peer review includes identifying efficient costs for the forecast maintenance tasks, noting the throughput scenario to be considered is for 9.6 million tonnes per annum (mtpa).

Our peer review acknowledges that QR's proposed maintenance expenditure for the DAU3 period will be subject to review and adjustment by the Queensland Competition Authority (QCA) and its consultants in the QCA's draft decision on the DAU3. Hence, our assessment has been undertaken in the context of an economic-regulation expenditure review.

1.1 Context

The West Moreton line transports coal loaded on at Columboola (Miles), Macalister and Jondaryan to Rosewood (and the coal is moved from there to the Port of Brisbane).

Production is currently expected to increase during the coming planning period (DAU3), with both Wilkie Creek and New Acland mines planning to ramp up to full production over the next 12 months and over approximately 3 years, respectively. During the AU2 determination period, tonnage decreased to 2.2mtpa by FY23; with the new mines opening, it is expected to increase to 9.6mtpa by FY28, as shown in Figure 1.

[redacted]

Figure 1 Tonnage on the West Moreton Line

As a result, the summary of QR's proposed maintenance expenditure for a 9.6mtpa throughput scenario is presented in Table 1.

Table 1 West Moreton System Maintenance Costs - DAU3 ($m FY24) - 9.6mtpa

	FY26	FY27	FY28	FY29	FY30	Total
Miles – Macalister	$5.5	$5.9	$5.5	$5.3	$4.9	**$27.0**
Macalister – Jondaryan	$6.0	$5.6	$5.7	$5.7	$5.7	**$28.8**
Jondaryan – Rosewood	$19.6	$21.7	$21.9	$21.8	$21.8	**$106.7**
Total	**$31.1**	**$33.1**	**$33.1**	**$32.8**	**$32.5**	**$162.6**

Under the 9.6mtpa scenario, total maintenance costs over the period are $162.6m (in $FY24). Table 2 sets out QR's maintenance categories for the DAU3 period, separated into fixed and variable maintenance activities based on whether QR considers them to be tonnage dependent.

Table 2 Queensland Rail's Fixed and Variable Maintenance Activities

Fixed Maintenance	Variable Maintenance
Assets Comp Insp/Svc	Lubrication
Repairs	Maintenance Ballasting
Fire & Vegetation Management	Mechanised Re-sleepering
Renewals	Mechanised Resurfacing
Asset Inspections Non-Compliance	Top & Line Spot Resurfacing
Consulting/Technical Advice	Rail Grinding
Lubrication	Rail Joint Management
Earthworks – Non-Formation	Rail Stress Adjustment
Turnout Maintenance	Renewals
Electrical	Repairs
Signalling	Sleeper Management
Telecoms	Turnout Maintenance
Other	

1.2 Scope

AECOM was engaged by QR to undertake a desktop review to assist QR in determining the prudency and efficiency of QR's maintenance costs with respect to the West Moreton System over the DAU3 (FY26-FY30) determination period. Within the scope of this document, activities undertaken during this review include:

- Review actual operating expenditure incurred over the FY21-FY23 period and forecasted maintenance expenditure for the DAU3 determination period and assess its prudency.
- Compare the West Moreton System against similar networks to benchmark QR's performance and relative efficiency. Identify the potential for and recommend any efficiency savings during the DAU3 period.
- Assess the efficiency of QR's procurement and delivery processes and the factors that may affect cost over the DAU3 period.

1.3 Purpose

The purpose of this report is to conduct a peer review of QR's maintenance expenditure submission to the QCA. The primary objective is to assess the prudency and efficiency of QR's proposed maintenance activities and expenditure, utilising the methodology outlined in Section 2.0. Our analysis aims to provide an evaluation of the QR's maintenance practices, confirming the underlying regulatory drivers and alignment with efficient industry practices.

2.0 Methodology

2.1 Prudency and Efficiency Test

Prudency relates to whether a maintenance activity is needed. What needs to be established is whether a maintenance activity is required for QR to deliver the rail service and what regulatory driver supports that expenditure, for example:

- Replacement and refurbishment of assets to maintain foreseeably required capacity and conformance with performance standards.
- Compliance with applicable legislation (e.g., for rail, Transport (Rail Safety) Act 2010 (Qld) (TRSA Act) and Transport (Rail Safety) Regulation 2010 (Qld) (TRSA Regulation), the Professional Engineers Act 2002 (Qld) and mandatory standards and operating licenses)
- Maintenance of regulated assets to achieve planned service life, typically on a least life-cycle-cost basis, hence allowing for capital expenditure and maintenance trade-offs.

Our assessment considers whether QR's proposal provides a clear link between maintenance activities and the provision of the rail service.

An efficient expenditure is one that is the most cost effective for delivering the required standard of service. This could relate to the maintenance activity selected to meet the service requirement, the unit costs being assumed, the quantity of materials used and/or labour forecasts for the relevant period. To assess whether a cost estimate for the maintenance activity is efficient, we would seek to consider whether the costs are:

- In keeping with the appropriate scope for the required task,
- The least costs (considering asset lifecycle cost),
- In keeping with market rates,
- Comparable with industry benchmarks (considering locational and operating factors that may impact costs), and
- In keeping with those costs that an operator would have incurred if it were subject to competitive pressures to retain market share. We note that this is a subjective assessment that requires engineering and commercial judgment.

Where possible, trade-offs with capital expenditure are also considered.

2.2 Review Methodology

AECOM's methodology for the review is presented in Figure 2.

Identify the top fixed and variable maintenance activities over the DAU3 period
(accounting for >85% total maintenance spend)

Assess the Prudency of each maintenance activity by identifying the key regulatory driver for the activity and assessing whether the activity is required given the current understanding of the West Moreton System.

Assess the Efficiency of the network by comparing the maintenance spend against a similar network. Considering a network with similar geography, tonnage, load type and overall track length. Efficiency is evaluated by assessing any underlying reasons for differences between the networks

Figure 2 Methodology for Review

3.0 Summary of QR's DAU3 Maintenance Submission

As mentioned in section 1.1, QR has proposed a total maintenance expenditure of $162.6m ($FY24), considering a 9.6mtpa throughput scenario. This is made up of $114.9m (in $FY24) of variable costs (shown in Table 3 and Figure 3, which are costs that are impacted by tonnage on the line; and $47.7m (in $FY24) of fixed costs (shown in Table 4 and Figure 4), which are not impacted by tonnage.

Table 3 Summary of Proposed Variable Maintenance for DAU3 ($m FY24)

Variable Maintenance Activity	FY26	FY27	FY28	FY29	FY30	Total
Mechanised Resurfacing	[redacted]					
Rail Stress Adjustment	[redacted]					
Rail Renewal and Rail Repairs	[redacted]					
Sleeper Management	[redacted]					
Maintenance Ballasting	[redacted]					
Top & Line Spot Resurfacing	[redacted]					
Rail Joint Management	[redacted]					
Turnout Maintenance	[redacted]					
Other	[redacted]					
Total	**$21.6**	**$23.6**	**$23.6**	**$23.3**	**$22.9**	**$114.9**

[redacted]

Figure 3 Summary of Proposed Variable Maintenance for DAU3 ($m FY24)

Table 4 Summary of Proposed Fixed Maintenance for DAU3 ($m FY24)

Fixed Maintenance Activity	FY26	FY27	FY28	FY29	FY30	Total
Signalling	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Assets Comp Insp/Svc	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Fire & Vegetation Management	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Repairs	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Renewals	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Asset Inspections Non Compliant	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Consulting/Technical Advice	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Telecoms	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Earthworks – Non Formation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Turnout Maintenance	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Electrical	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Lubrication	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Other	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	**$9.5**	**$9.5**	**$9.5**	**$9.5**	**$9.5**	**$47.7**

[redacted]

Figure 4 Summary of Proposed Fixed Maintenance for DAU3 ($m FY24)

3.1 Summary of Maintenance Cost Using AU2 Submission Categories

For comparative purposes, the maintenance cost breakdown using categories from the AU2 submission is provided in Table 5 and Figure 5.

Table 5 DAU3 Maintenance Expenditure, by AU2 Determination Categories ($m FY24)

Total	FY26	FY27	FY28	FY29	FY30	Total
Facilities/Other/Asset Management	[redacted]					
Trackside System	[redacted]					
Structures	[redacted]					
Track (excluding Mechanised Re-sleepering)	[redacted]					
Total	**$31.1**	**$33.1**	**$33.1**	**$32.8**	**$32.5**	**$162.6**

[redacted]

Figure 5 DAU3 Maintenance Expenditure, by AU2 Determination Categories ($m FY24)

3.2 Comparison with AU2 Actual & Projected, and 9.1mtpa Scenario from DAU2 Submission

Figure 6 illustrates the DAU3 determination maintenance expenditure against the Approved AU2 maintenance expenditure. Two reference points are also provided:

- the actual and forecasted data from the AU2 determination period, and
- the proposed 9.1mtpa scenario from the DAU2 submission.

The DAU2 9.1mtpa scenario serves as the closest reference point for tonnage comparison with the current DAU3 determination period.

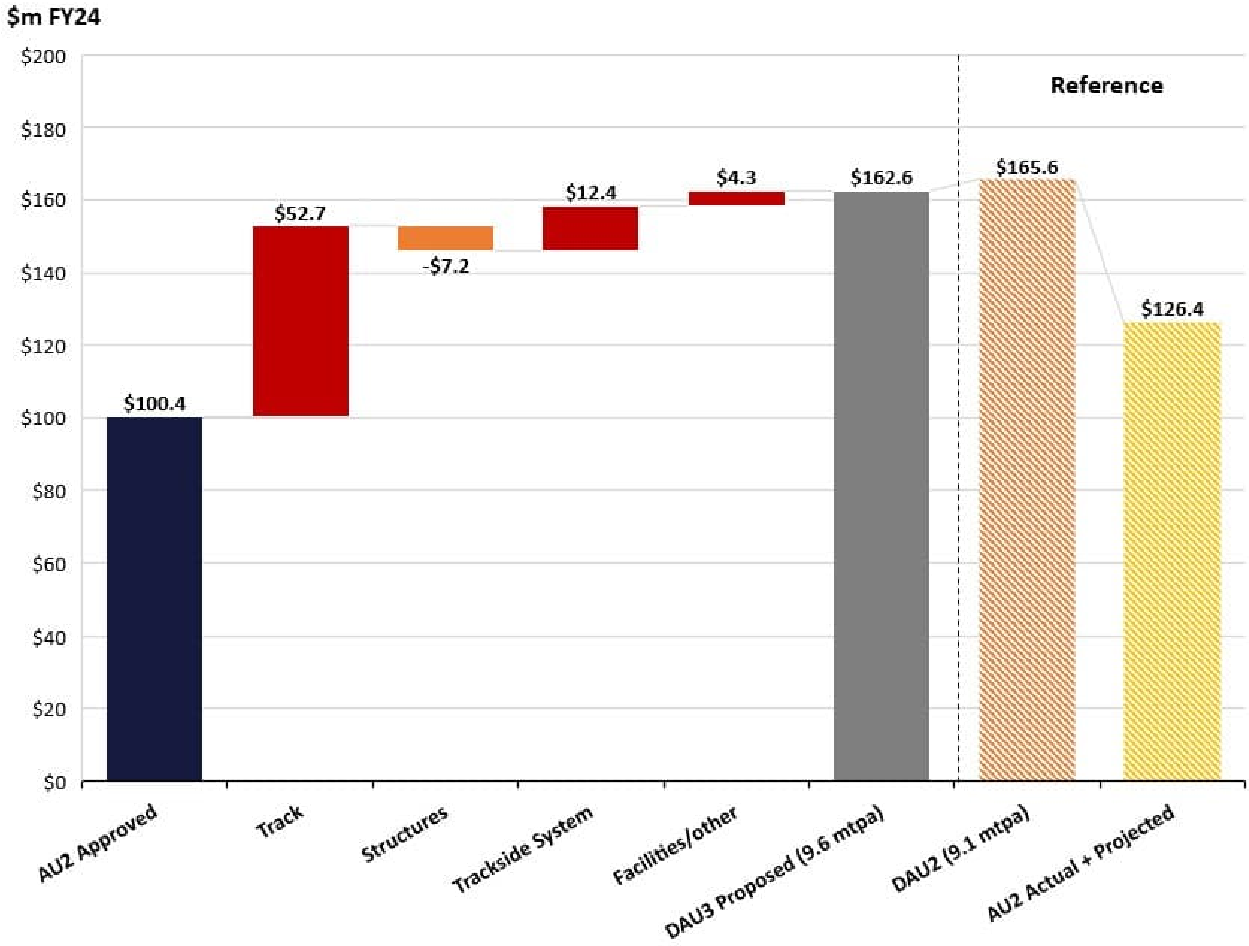


Figure 6 Comparison Between AU2 Approved Maintenance Expenditure with DAU3 ($m FY24)[1]

The notable increase in track maintenance costs can be primarily attributed to the expected increase in tonnage from 2.1mtpa to 9.6mtpa by FY28. A corridor assessment conducted between Jondaryan and Columboola (Miles), as documented in the Far West Moreton Asset Strategy, indicated that certain sections are likely to become unserviceable beyond 2032, especially if coal freight volumes continue to increase. The heightened tonnage exacerbates the rate of track deterioration, necessitating a significant increase in maintenance efforts to sustain current operational standards.

Furthermore, maintenance costs related to structures, trackside systems, and other/facilities have changed due to observed values during AU2. These changes may be attributed to a more precise

[1] *All values have been escalated to FY24 dollars to allow for comparison.*

scope of work, reflecting the actual conditions of the infrastructure compared to when AU2 was initially forecasted and approved by the QCA. Conditions on the track have likely evolved due to usage and environmental factors.

Notably, there was a reduction in proposed maintenance costs for structures. A long-term strategy was formulated to phase out all timber bridges across the system, involving a comprehensive evaluation of each structure's condition and the planning of a prioritised replacement program of the timber structures (bridges and piers) with Steel, which are expected to reduce maintenance costs of bridges across the network significantly.

4.0 Review

4.1 Queensland Rail's Approach

In its submission, QR determined fixed maintenance costs by establishing a 'base year', which was assumed to remain constant throughout the DAU3 period. To derive this base year figure, QR conducted an analysis of maintenance work orders, averaging the actual costs incurred between FY21 and FY23, excluding any work orders considered anomalous or irregular.

Variable costs were determined using a similar approach, where a base year was established. However, in this case, the costs were escalated proportionally to account for the expected increase in tonnage (measuring against the tonnage experienced in the same 'base year') on a line by line basis.

A proportion of variable maintenance costs were eliminated following planned capital works, resulting in a reduction of the overall variable costs.

4.2 Prudency of Proposed Maintenance Activities

As discussed in Section 2.1, prudency relates to whether a maintenance activity is needed. Our assessment considers whether QR's proposal provides a clear link between maintenance activities and the provision of the rail service.

4.2.1 Fixed Maintenance

Fixed maintenance costs are due to activities that are considered to be independent of the number of trains or the tonnage carried (and are therefore not variable). During the FY21 to FY23 period, there appear to be significant differences in costs year by year because QR planned specific forms of maintenance to make efficient use of its resources and take advantage of weather conditions. Given these circumstances, an average of the costs during the FY21-FY23 period has been used to project the DAU3 period, as discussed in Section 4.1.

The following sections offer an overview of key fixed maintenance activities and evaluate the prudency associated with these tasks.

4.2.1.1 Signalling

Activities included under signalling maintenance are those that relate to the overall performance of the signalling infrastructure. These activities ensure that the signalling system is maintained at a safe and appropriate operating level.

Signalling activities include:

- Preventative maintenance of field equipment associated with signalling control, including cabling. This activity takes up approximately [redacted] of the time of the trackside system teams and primarily involves the maintenance of signalling systems assets.
- Corrective maintenance of field equipment associated with signalling control, including cabling. A significant proportion of signalling equipment is maintained on a 'fix on failure' basis; as a result, there is a requirement to have a 24/7 callout roster in place.
- Scheduled maintenance and repair of level crossing protection installations, including pedestrian gates.
- Maintenance and repair of cableways, markers, troughing, cable pits and cables, with the exception of fibre testing and repairs.
- Investigations into performance issues in relation to the Automatic Train Protection (ATP), replacement of faulty transponders and adjustment of radio levels.
- Maintenance and repair of trackside monitoring and measuring equipment such as Dragging Equipment Detectors (DEDs), Hot Bearing Detectors (HBDs), Wheel Impact Load Detectors (WILDs), weather monitors, out-of-gauge detectors and level crossing monitors.

QR does not consider this activity to be tonnage dependent as maintenance of signalling equipment is mainly driven by safety and legislative compliance drivers. It is considered a prudent practice for QR to ensure the safe and compliant operation of the West Moreton System.

Table 6 presents the proposed maintenance expenditure attributable to signalling.

Table 6 Projected DAU3 Costs for Signalling ($m FY24)

FY26	FY27	FY28	FY29	FY30	Total
[redacted]					
			% Fixed Maintenance		[redacted]
			% Total Maintenance		

4.2.1.2 Asset Compliance Inspection / Servicing & Non-Compliance

Inspections are undertaken to maintain both the civil and track infrastructure. These inspections ensure that the infrastructure operates safely and effectively. These inspections are carried out in accordance with Queensland Rail's Civil Engineering Track Standards Module CETS 1—Track Monitoring.

Defects found during these inspections are entered into the EAMS for action and repair. From EAMS, work programs are developed to remove/repair the defects within the timeframes that are specified. QR targets zero overdue repairs in line with its business principles.

The following inspections are typically undertaken to maintain track and civil infrastructure:

- Patrol Inspection
- General inspection
- Detailed inspection—unscheduled
- Detailed inspection—scheduled
- Deck/ground level inspection
- Stage inspection
- Visual inspections under traffic
- Scheduled hi-rail patrol inspection every 96 hours (twice a week)
- Front of train general inspection every four months
- Planner hi-rail patrols at six-week intervals
- Track recording car inspections every 4 months
- Asset Manager hi-rail Inspection every six months
- Engineering hi-rail Inspection yearly
- Hot weather/flood hi-rail inspection when the ambient temperature exceeds 38^0C or when local flooding is evident.
- Sleeper inspections: every timber sleeper is inspected every 5 years.
- Periodic walking inspection by the planner
- Points and crossings inspection by the planner
- Other inspections/events that generate defect identification (e.g., driver reports, noise complaints, derailments).

Conducting asset inspections and servicing in adherence to regulatory compliance is a prudent practice for QR, ensuring QR's commitment to regulatory standards and safety.

Table 7 presents the proposed maintenance expenditure attributable to asset compliance inspection and servicing.

Table 7 Projected DAU3 Costs for Asset Compliance Inspection / Servicing and Non-Compliance ($m FY24)

	FY26	FY27	FY28	FY29	FY30	Total
Inspection / Servicing	[redacted]					[redacted]
Non-compliance.						
				% Fixed Maintenance		
				% Total Maintenance		

4.2.1.3 Fire & Vegetation Management

Fire and vegetation management is the control of vegetation predominantly by mechanical slashing but also chemical and burning off operations to eliminate interference with train running and track maintenance. This includes vegetation control around bridges, slashing, and brush cutting.

Conducting fire and vegetation management is driven by the management of risk and is considered a prudent practice for QR, ensuring QR's commitment to levels of service, risk, and safety.

Table 8 presents the proposed maintenance expenditure attributable to fire & vegetation management.

Table 8 Projected DAU3 Costs for Fire & Vegetation Management ($m FY24)

FY26	FY27	FY28	FY29	FY30	Total
[redacted]					
			% Fixed Maintenance		
			% Total Maintenance		

4.2.1.4 Asset Repair and Renewal

Repair and renewal of assets that are not impacted by tonnage of the West Moreton System. These include trackside systems and structures.

Conducting asset repairs and asset renewals in alignment with asset management best practices is a prudent practice for QR, ensuring QR's commitment to levels of service and safety.

Table 9 presents the proposed fixed maintenance expenditure attributable to asset repair and renewal.

Table 9 Projected DAU3 Costs for Asset Repair and Renewal ($m FY24)

	FY26	FY27	FY28	FY29	FY30	Total
Repair	[redacted]					
Renewal						
				% Fixed Maintenance		
				% Total Maintenance		

4.2.1.5 Consulting/Technical Advice

This relates to the provision of specialist advice, implementation of systems (e.g., SAMS), coordinating warranty type work, design, providing technical advice or specific business improvement initiatives to satisfy customer requirements.

Seeking consulting and Technical Advice is driven by the management of risk and is considered a prudent practice for QR, ensuring QR's commitment to levels of service and risk.

Table 10 presents the proposed maintenance expenditure attributable to consulting / technical advice.

Table 10 Projected DAU3 Costs for Consulting / Technical Advice ($m FY24)

FY26	FY27	FY28	FY29	FY30	Total
[redacted]					
			% Fixed Maintenance		
			% Total Maintenance		

4.2.1.6 Telecommunications

Telecommunication maintenance involves activities that relate to the overall performance of the telecommunications infrastructure. Telecommunications activities include:

- Preventative maintenance of the major bearer systems and infrastructure providing bandwidth for voice and data services as well as the base network for train control and maintenance radio systems.
- Corrective maintenance of the major bearer systems and infrastructure providing bandwidth for voice and data services as well as the base network for train control and maintenance of the radio system.
- Installation, moves or changes to phone and fax services, including horizontal cabling installation, moves or changes to tail modem links, horizontal cabling and dumb terminal equipment for mainframe and Local Area Network (LAN) services.

QR does not consider this activity to be tonnage dependent as maintenance of telecommunications equipment is mainly driven by safety and compliance drivers. It is considered a legislative requirement and, therefore, prudent practice for QR to ensure the safe and compliant operation of the West Moreton System.

Table 11 presents the proposed maintenance expenditure attributable to telecommunications.

Table 11 Projected DAU3 Costs for Telecommunications ($m FY24)

FY26	FY27	FY28	FY29	FY30	Total
[redacted]					
			% Fixed Maintenance		[redacted]
			% Total Maintenance		

4.2.1.7 Earthworks – Non-Formation

The railway is designed to manage surface and groundwater flows through the use of drains along the side of the railway (known as cess drains) and across ridges and spurs on slopes above the railway (known as diversion drains), and culverts diverting water flow below the railway.

This activity comprises of all non-formation related earthworks and drainage construction and maintenance. Other tasks include the maintenance of access roads, walkways, disposal of surplus material, the reshaping and cleaning of surface drains, reshaping cess drains, widening cuttings, building up embankments, widening cesses, and maintaining cuttings and embankments by the removal of rocks and loose materials. In recent years, there have been significant experiences relating to landslips/slides, rock falls, embankment failures, and washouts.

The majority of the challenges relating to non-formation earthworks are on the Toowoomba and Little Liverpool Ranges, where there is a need for a continual program of drainage and access road maintenance.

The close proximity (typically 1.5-2 meters) between the railway and the cut slopes and the tight radius curves required to manage the steep topography limits the opportunity to re-align the track further away from the toe of the cut slope to create a buffer to geotechnical hazards.

Vegetation and surface water drainage have a significant influence on contributing to small scale slope instability and rock fall. If not diverted into adjacent gullies, water run-off shedding down the spurs and ridges above the railway will wash over the cutting face and recharge these slopes, increasing the potential of circular-type slumping failure in weathered rock.

The West Moreton System requires regular re-establishment of the original diversion drains across the topography upslope of railway cuttings to effectively minimise the flow of surface water run-off away from the cuttings. This reduces the risks associated with elevated pore water pressures that cause slumps and scouring of surface water that aggravates the dislodgement of rocks. This work involves accessing the slopes to clear the diversion drains of re-growth vegetation and re-establishing the flow of water along the drains by removing silt and rock build-up.

Conducting non-formation earthworks is driven by the management of risk and is considered a prudent practice for QR, ensuring QR's commitment to levels of service, risk, and safety.

The railway was constructed to historical design requirements that do not meet current standards, hence the requirements for additional inspections and maintenance requirements for the West Moreton System when compared against other rail networks.

Table 12 presents the proposed maintenance expenditure attributable to earthworks that are non-formation.

Table 12 Projected DAU3 Costs for Earthworks – Non-Formation ($m FY24)

FY26	FY27	FY28	FY29	FY30	Total
[redacted]					
			% Fixed Maintenance		
			% Total Maintenance		

4.2.1.8 Turnout Maintenance

Turnout maintenance ensures safety by preventing derailments and accidents at critical junctions where tracks diverge or merge. Well-maintained turnouts enable smooth train movements, reducing delays and enhancing operational efficiency. Moreover, maintenance minimises wear and tear, extending the lifespan of turnout components and reducing reactive maintenance costs.

On the West Moreton System, damage and wear of turnout switchblades have been regarded as one of the most common component replacement requirements. As such, maintaining emergency spares of switchblades and other common turnout componentry has been noted as a priority.

Undertaking turnout maintenance is mainly driven by asset management best practices to extend asset service life and the least lifecycle cost and to ensure turnouts are not a cause for derailment. It is considered a prudent practice for QR, ensuring QR's commitment to levels of service.

Table 13 presents the proposed fixed maintenance expenditure attributable to turnout maintenance.

Table 13 Projected DAU3 Fixed Costs for Turnout Maintenance ($m FY24)

FY26	FY27	FY28	FY29	FY30	Total
[redacted]					
			% Fixed Maintenance		
			% Total Maintenance		

4.2.1.9 Electrical

The maintenance of electrical systems is crucial for ensuring the reliability and safety of the network. This maintenance encompasses regular inspections and testing to detect faults and wear in components such as overhead lines and substations. It also involves the upkeep of consumables like fuses, batteries, and light bulbs, which tend to degrade over time due to use and environmental factors. Regular replacements of these consumables prevent potential failures that could disrupt rail operations.

In addition, scheduled maintenance of equipment like circuit breakers, switches, and transformers is essential to maintain reliability. Faulty electrical equipment poses significant safety risks to personnel, and routine maintenance serves to identify and address issues before they escalate into safety concerns.

Undertaking maintenance of electrical systems is driven by the safety and compliance drivers and is considered a prudent practice for QR, ensuring QR's commitment to levels of service, risk, and safety and the need for electrical systems to ensure safe Signalling and Telecommunications.

Table 14 presents the proposed maintenance expenditure attributable to electrical.

Table 14 Projected DAU3 Costs for Electrical ($m FY24)

FY26	FY27	FY28	FY29	FY30	Total
[redacted]					
			% Fixed Maintenance		
			% Total Maintenance		

4.2.1.10 Other

These fixed costs are made up of the following maintenance activities:

- 3rd Party Damage Repairs
- Audits/Investigation/RCA
- Calibration/Testing
- Carpentry
- Cleaning/Clean up
- Commissioning
- Derailments, Collisions
- Design
- Disposal / Decommissioning
- Estimates/Quotes
- Graffiti Management
- Installation
- Legislative compliance
- Maintenance Ballasting
  (Fixed portion, see section 4.2.2.5 for assessment)
- Mechanised Resurfacing
  (Fixed portion, see section 4.2.2.1 for assessment)
- Monitoring Systems & Perf
- Painting
- Pest Control
- Plumbing
- Programming/Configuring
- Project Management & Services
- Property Mgt &Utilities Search
- Refurbishment / Overhaul
- Rollingstock Support
- Security
- Signage Management
- Support
- Top & Line Spot Resurfacing
  (Fixed portion, see section 4.2.2.7 for assessment)
- Track Geometry Recording
- Vandalism Management

The remaining fixed maintenance activities are driven by various drivers, including risk, compliance, safety, and asset management best practices. These maintenance activities are considered prudent to ensure QR continues the safe and compliant operation of the West Moreton System.

Table 15 presents the proposed maintenance expenditure attributable to the above maintenance activities.

Table 15 Projected DAU3 Costs for Other Fixed Maintenance ($m FY24)

FY26	FY27	FY28	FY29	FY30	Total
[redacted]					
			% Fixed Maintenance		
			% Total Maintenance		

4.2.2 Variable Maintenance

4.2.2.1 Mechanised Resurfacing

The geometry of the rail line facilitates the interface between the track and the above-rail operators. It represents the final element of the track structure extending from the subgrade through to the rail. The integrity of the track geometry is a critical component of operational safety and efficiency. Poor geometry results in an increased risk of derailment and the implementation of speed restrictions. As a result, geometry is susceptible to misalignment from two primary avenues: changes to each component in the track system that arise from deterioration and wear and from general wear and tear due to standard operation of the line.

As the track geometry deteriorates from the specifications set out in the maintenance standards, it is necessary to resurface the track. The purpose of the mechanised resurfacing activity is to reinstate the designed track geometry top and line. In order to achieve this, the resurfacing activity aims to ensure the integrity of the ballast component through tamping and to adjust the geometry by aligning the track line to pre-determined coordinates and also the track top via track lifting.

Mechanised resurfacing is undertaken via on-track equipment such as tampers and regulators. The characteristics of this resurfacing activity surround production line work and are generally deployed for significant resurfacing distances.

The need for resurfacing coincides with the need to maintain line safety and the desire for network capacity. Consequences of improper resurfacing maintenance involve speed restrictions and increased risk of derailments. The geometry changes arise through several factors, such as network usage, formation conditions and weather events. Significant portions of the West Moreton System are subject to seasonal track movements as a result of the track being constructed directly on expansive black soils. This substantially increases the need for resurfacing when compared to similar systems.

General track usage causes wear and tear on the geometry as a result of the forces exerted through the train wheel interface with the rail. This stress wears members of the track structure system, such as the sleeper alignment (particularly around curves), ballast and formation.

Another contributing factor identified arises from the formation. As the QR West Moreton System was developed in the nineteenth century, the formation has offered challenges of late due to factors such as:

- Cumulative tonnage
- Out-dated formation design
- General formation age and deterioration

Given normal wear and tear and the formation condition, it is clear that for Queensland Rail to maintain the West Moreton System safety and network capacity from a geometry standpoint, the resurfacing activity is a necessity and prudent.

Table 16 presents the proposed maintenance expenditure attributable to mechanised resurfacing.

Table 16 Projected DAU3 Costs for Mechanised Resurfacing ($m FY24)

FY26	FY27	FY28	FY29	FY30	Total
[redacted]					
			% Variable Maintenance		[redacted]
			% Total Maintenance		

4.2.2.2 Rail Stress Adjustment

Rail stress adjustment involves the management of thermal expansion and contraction of track infrastructure. A neutral temperature represents the point at which the rail experiences neither tension nor compression due to temperature fluctuations. Deviations from this point can lead to rail stress, which in turn may result in issues such as rail buckling and warping.

There are various methods to adjust the rail stress at differing temperatures. These include pre-stressing the rail before installation, which minimises the impact of temperature changes on the rail. The use of continuous welded rail with fully restrained ballast can also minimise temperature-related stress, ensuring more uniform expansion and contraction. To a lesser extent, rail lubrication can lower thermal stress by reducing friction and transfer of heat from braking between the rail and wheels.

The neutral temperatures of the track on the West Moreton System were increased from 37°C to 40°C in 2020 to enhance track stability during higher summer temperatures.

Conducting rail stress adjustment as a maintenance activity is driven mainly by the management of risk and is considered a prudent practice for QR, ensuring QR’s commitment to levels of service, risk, and safety.

Table 17 presents the proposed maintenance expenditure attributable to rail stress adjustment.

Table 17 Projected DAU3 Costs for Rail Stress Adjustment ($m FY24)

FY26	FY27	FY28	FY29	FY30	Total
[redacted]					
			% Variable Maintenance		[redacted]
			% Total Maintenance		

4.2.2.3 Rail Renewal and Rail Repairs

The process of rail renewal is a crucial component in optimising the lifespan of railway tracks. It involves the management of rail wear rates through practices like rail husbandry and ongoing monitoring, which are instrumental in ensuring both safety and commercial objectives are met. Rail wear can manifest as table wear, side wear, or a combination of both, with the specific type and rate of wear influenced by various factors, including wheel and rail profiles, rail size, rail metallurgy, track structure, track geometry, traffic type, loading, and the composition of traffic.

QR's civil maintenance staff conducts regular examinations of the rail head profile to identify excessive wear. Measurements of side and table wear on the rail head are taken, and the percentage of headwear loss is calculated. Rail replacement programs are planned to prevent wear from exceeding the limits specified in the Civil Engineering Track Standard. Curves and tangent tracks are monitored at minimum intervals, with the need for measurement determined based on factors such as rail age, tonnage, results from ultrasonic testing, and walking inspections. QR maintains a comprehensive rail wear database to ensure accurate records are kept, allowing for predictions regarding rail life and facilitating timely replacement of worn rail sections.

In recent practice, 50kg/m head-hardened rail is employed on tight radius curves to extend rail life and reduce the frequency of remedial grinding. It's worth noting that head-hardened rail does not yield the same advantages on tangent and larger radius curves, as there have been instances where defects propagated more quickly in such applications.

Rail repair encompasses all activities related to the selective renewal or repair of rail segments identified as defective. This includes addressing issues like wheel burns, defective welds, internal rail defects, defect glued joints, broken bolts, and associated tasks such as rail distribution, unloading, and flagging. Additionally, it involves the repair of running rail through maintenance or arc welding. Overall, rail repair is essential to ensure the safety, reliability, and efficiency of rail transportation while preserving infrastructure and reducing overall operational costs.

Assets impacted by rail renewal and rail repairs are assets categorised as variable and encompass exclusively track-related assets, as detailed in Section 2.2.

Conducting rail renewal and rail repairs in alignment with asset management best practices is a prudent practice for QR, ensuring QR's commitment to levels of service and safety.

Table 18 presents the proposed maintenance expenditure attributable to rail renewal and rail repairs.

Table 18 Projected DAU3 Costs for Rail Renewal and Rail Repairs ($m FY24)

	FY26	FY27	FY28	FY29	FY30	Total
Renewals	[redacted]					[redacted]
Repairs						
				% Variable Maintenance		
				% Total Maintenance		

4.2.2.4 Sleeper Management

Sleeper management aims to ensure the safety and stability of the network by planning, maintaining and replacing current timber sleepers. This process involves inspections to detect signs of wear and damage, routine maintenance activities such as regrading and re-tamping, and the replacement of the existing aging timber sleepers. The objective is to effectively manage and execute the mechanised re-sleepering works as defined in Section 4.2.2.10 to ensure it meets established expectations and standards.

Completing sleeper management maintenance activities is primarily guided by the effective management of risk and the best practices in asset management. It is considered a prudent practice for QR, ensuring QR's commitment to levels of service, risk, and safety. Additionally, it contributes to the extension of asset lifespan and the attainment of reduced overall lifecycle costs.

Table 19 presents the proposed maintenance expenditure attributable to sleeper management.

Table 19 Projected DAU3 Costs for Sleeper Management ($m FY24)

FY26	FY27	FY28	FY29	FY30	Total
[redacted]					
			% Variable Maintenance		
			% Total Maintenance		

4.2.2.5 Maintenance Ballasting

Key activities in ballast maintenance include tamping to maintain track geometry and ensure a level surface, as well as regulating the ballast to enhance stability. Inspections are required to identify areas where ballast is worn, contaminated, or displaced, necessitating repairs to ensure appropriate drainage and adequate support of the track structure. Maintaining proper drainage is essential to prevent water accumulation and subsequent track damage. Neglecting the maintenance can lead to uneven tracks, compromised safety, and increased maintenance expenses over time. Regular inspections and repairs not only reduce track maintenance costs but also reduce the need for extensive track closures.

Undertaking maintenance ballasting is mainly driven by safety and asset management best practices to achieve planned service life. It is considered a prudent practice for QR, ensuring QR's commitment to levels of service and safety.

Table 20 presents the proposed maintenance expenditure attributable to maintenance ballasting.

Table 20 Projected DAU3 Costs for Maintenance Ballasting ($m FY24)

FY26	FY27	FY28	FY29	FY30	Total
[redacted]					
			% Variable Maintenance		
			% Total Maintenance		

4.2.2.6 Rail Joint Management

The longitudinal rail movement resulting from thermal initiated expansion and contraction needs to be allowed for in the remaining timber sleeper sections. Poor joint management in the remaining timber sleeper sections can result in rail buckling caused by compression and excessive gaps caused by contraction.

Conducting rail joint management as a maintenance activity is driven mainly by the management of risk and is considered a prudent practice for QR, ensuring QR's commitment to levels of service, risk, and safety.

Table 21 presents the proposed maintenance expenditure attributable to rail joint management.

Table 21 Projected DAU3 Costs for Rail Joint Management ($m FY24)

FY26	FY27	FY28	FY29	FY30	Total
[redacted]					
			% Variable Maintenance		
			% Total Maintenance		

4.2.2.7 Top & Line Spot Resurfacing

Resurfacing is required when the track is uneven, either longitudinally or laterally, resulting in poor line and level. The cause is often due to the ballast and/or subgrade formation being in poor condition, e.g., worn or unstable ballast and mud holes.

The Top and Line spot resurfacing approach focuses on specific localised areas of the track. Instead of addressing the entire or extended lengths of the track, it targets sections that exhibit wear, irregularities, or defects.

It involves the use of specialised equipment suitable for localised repairs, such as rail grinding machines or other maintenance tools. This method is primarily a corrective maintenance strategy, aiming to address identified issues and extend the service life of the rail. It is an efficient way to maintain track integrity while minimising the disruption and cost associated with comprehensive track maintenance.

Undertaking top & line spot resurfacing is mainly driven by asset management best practices to extend asset service life and least lifecycle cost. It is considered a prudent practice for QR, ensuring QR's commitment to levels of service.

Table 22 presents the proposed maintenance expenditure attributable to top & line spot resurfacing.

Table 22 Projected DAU3 Costs for Top & Line Spot Resurfacing ($m FY24)

FY26	FY27	FY28	FY29	FY30	Total
[redacted]					
			% Variable Maintenance		
			% Total Maintenance		

4.2.2.8 Turnout Maintenance

As discussed in Section 4.2.1.8, turnout maintenance ensures safety by preventing derailments and accidents at critical junctions where tracks diverge or merge. Well-maintained turnouts enable smooth train movements, reducing delays and enhancing operational efficiency. Moreover, maintenance minimises wear and tear, extending the lifespan of turnout components and reducing reactive maintenance costs.

Undertaking turnout maintenance is mainly driven by asset management best practices to extend asset service life and least lifecycle cost. It is considered a prudent practice for QR, ensuring QR's commitment to levels of service.

Table 23 presents the proposed variable maintenance expenditure attributable to turnout maintenance.

Table 23 Projected DAU3 Variable Costs for Turnout Maintenance ($m FY24)[2]

FY26	FY27	FY28	FY29	FY30	Total
[redacted]					
			% Variable Maintenance		
			% Total Maintenance		

4.2.2.9 Rail Grinding

Rail grinding is an important track maintenance process, utilising specialised machines to restore and maintain railway track shape, profile, and smoothness. Its primary goals are to improve safety, minimise track and rolling stock wear and tear, and facilitate a seamless transport of freight by eliminating irregularities such as corrugations, surface cracks, and imperfections. Regular grinding prevents the development of severe defects and rolling contact fatigue on train wheels, which extends the lifespan of both rails and wheels.

The different types of rail grinding work carried out are as follows:

- Profile establishment (i.e., modification of rail head shape to establish a new shape),
- Profile maintenance (i.e., grinding of rail to maintain rail profile shape),
- Corrective profiling (i.e., rails with surface defects),
- Profile modification (i.e., stress reduction to allow increased axle loads), and
- Removal of rail corrugations.

Conducting rail grinding as a maintenance activity is driven mainly by the management of risk and is considered a prudent practice for QR, ensuring QR's commitment to levels of service, risk, and safety.

Table 24 presents the proposed maintenance expenditure attributable to rail grinding.

Table 24 Projected DAU3 Costs for Rail Grinding ($m FY24)

FY26	FY27	FY28	FY29	FY30	Total
[redacted]					
			% Variable Maintenance		
			% Total Maintenance		

4.2.2.10 Mechanised Re-sleepering

Re-sleepering involves the replacement of the remaining existing timber sleepers, which are deteriorating at an accelerated rate as these now exceed 100 years in places with more durable concrete sleepers. The process utilises specialised machinery and equipment to efficiently lift and extract old sleepers, and the ballast bed is prepared to ensure proper alignment and compaction. Concrete sleepers, characterised by their durability, are then securely fastened to the rails. This replacement not only improves the structural integrity of the track but also reduces the need for ongoing maintenance and repairs associated with timber sleepers.

Undertaking mechanised re-sleepering is mainly driven by asset management best practices to achieve an improved asset service life and the least lifecycle cost. It is considered a prudent practice for QR, ensuring QR's commitment to levels of service.

[2] Aurizon Network's 2017 Draft Access Undertaking Decision December 2018, escalated to FY24.

Table 25 presents the proposed maintenance expenditure attributable to mechanised re-sleepering.

Table 25 Projected DAU3 Costs for Mechanised Re-sleepering ($m FY24)

FY26	FY27	FY28	FY29	FY30	Total
[redacted]					
			% Variable Maintenance		[redacted]
			% Total Maintenance		

4.2.2.11 Lubrication

Lubrication is essential for reducing friction between moving components, such as wheels and rails. Its primary role is to improve safety. Lubrication minimises wear and tear and, therefore, extends the lifespan of these components and ultimately lowers maintenance expenses. Lubrication also aids in reducing noise and dissipating heat. Moreover, it enhances fuel efficiency, which not only reduces environmental impacts but also promotes safer rail operations by ensuring smooth starts, stops and manoeuvring curve transitions.

Lubrication as a maintenance activity is mainly driven by asset management best practices to achieve planned service life and is considered a prudent practice for QR, ensuring QR's commitment to levels of service, risk, and safety.

Table 26 presents the proposed maintenance expenditure attributable to lubrication.

Table 26 Projected DAU3 Costs for Lubrication ($m FY24)

FY26	FY27	FY28	FY29	FY30	Total
[redacted]					
			% Variable Maintenance		[redacted]
			% Total Maintenance		

4.3 Efficiency of Proposed Maintenance

4.3.1 Comparison with Similar Networks

In order to assess the efficiency of QR's maintenance expenditure, a comparative analysis between the West Moreton System maintenance expenditure and Aurizon's Newlands and Moura Systems was undertaken due to system similarities, as highlighted in Table 27.

Table 27 Comparison between Queensland Rail's West Moreton System and Aurizon's Newlands and Moura system

Criteria	West Moreton System	Newlands System	Moura System
Geography	Queensland	Central Queensland	Central Queensland
Tonnage	9.6mtpa	13.2mtpa	16.5mtpa
Load	Coal	Coal	Coal
Track Length	413km	311km	315km
Route Length	314km	207km	TBC
Construction	~37% on 41kg/m rail ~63% on 50kg/m rail ~35% on interspersed steel and timber sleepers ~65% on concrete sleepers	~72% on 53kg/m rail ~28% on 60kg/m rail All Concrete Sleepers	Predominantly 60kg/m rail on Concrete Sleepers
Total Axle Load (TAL)	15.75	26.5	26.5

Aurizon's UT5 maintenance allowance was escalated to FY24 values and is presented in Table 28. This maintenance allowance assumed a 13.2mtpa tonnage for the Newlands system and 16.5mtpa for the Moura system.

Table 28 QCA's UT5 maintenance allowance, Newlands, and Moura System - Aurizon ($m FY24)

Network	FY18	FY19	FY20	FY21	Total
Newlands System	$5.1	$4.5	$3.9	$3.8	$17.3
Moura System	$14.0	$15.9	$14.3	$13.9	$58.2

In order to allow for a direct comparison, the $/GTK per annum was calculated based on the assumptions provided in Table 27. The $/GTK per annum is presented in Table 29.

Table 29 $/GTK per annum Comparison ($FY24)

Network	Total ($m)	Period (years)	Tonnage (mtpa)	Track Length (km)	Total ($m p.a.)	$/GTK (p.a.)
West Moreton System	$162.6	5	9.6	413	$32.5	$8,200
Newlands System	$17.3	4	13.2	311	$4.3	$1,092
Moura System	$58.2	4	16.5	315	$14.5	$3,667

The Newlands track has an average maintenance spend of ~$1,100/GTK p.a.. In contrast, the Moura System has an average maintenance spend of $3,700/GTK p.a. The West Moreton System, on the other hand, has a higher average maintenance spend of ~$8,200/GTK p.a.

This difference can largely be attributable to:

- **Type of Construction:** The Newlands system track is largely made up of 53kg/m rail on concrete sleepers (~28% on 60kg/m). The Moura System is largely constructed on 60kg/m rail on concrete sleepers. Whereas West Moreton is an aged narrow-gauge network from the 1860s with steep gradients, tight curves, and non-engineered formations on key parts of the network. Therefore, the Newlands and Moura network can achieve additional efficiencies due to the track construction. It should be noted that the West Moreton System more closely resembles the Moura system due to both of them being constructed on black soil and being non-electrified.
- **Not Business as Usual**: The DAU3 period is not considered business as usual. The network requires additional strengthening in order to manage the additional tonnage and maintain/improve service standards (i.e., reducing unplanned closures and Temporary speed restrictions).
- **Age of the network**: The West Moreton System was constructed in the late 19th century, and portions of the track have not been replaced. As such, increased maintenance requirements are expected for ageing infrastructure.

As the assessment for the Newlands and Moura system was conducted in 2017, there may be additional factors affecting cost. These are outlined in section 4.3.2.

QR also seeks to reduce maintenance spend and increase efficiency by completing various capital projects. For example, re-sleepering results in a permanent reduction (~70%) in maintenance due to the replacement of 41kg/m rail on timber/steel sleepers with 50kg/m rail on concrete sleepers.

In evaluating the efficacy of QR's maintenance projections, AECOM assessed QR's approach towards future maintenance projections. QR's method involves an assessment of actual maintenance expenses, with the deliberate exclusion of non-recurrent and anomalous expenditures. Furthermore, QR factors in the expected increase in tonnage from 2.1mtpa to 9.6mtpa, recognising the impact of growth on variable maintenance requirements. In order to refine cost estimates, QR's approach also incorporates adjustments based on savings realised from the capital program. By adjusting their forecast in this manner, QR ensures cost projections are reflective of the operational context. As historical costs are generally robust and a good indicator of future spending, this approach is suitable.

4.3.2 Factors affecting costs

Queensland Rail has used historical actual costs to deliver its maintenance works to inform the DAU3 maintenance expenditure. These costs have been adjusted to reflect inflationary factors extant in the market. The construction industry has experienced significant cost inflation over recent years. Of particular relevance to Queensland Rail's maintenance costs are the increases to[3]:

- Materials Costs – materials costs in the construction industry have risen significantly. In the 12-month period leading up to July 2022, the following increases were observed by the Australian Constructors Association:
  - Structural Steel: experienced increases in prices of up to 70%.
  - Rail Steel: experienced price increases of up to 50%
  - Concrete: experienced price increases of up to 30-40%
  - Excavator and bulk haulage costs increased by up to 40%
- Labour – labour costs in the construction industry have also risen, although not as significantly as materials prices. In the 12-month period leading up to July 2022, the following increases were observed by the Australian Constructors Association:
  - Skilled tradespeople – costs for skills tradespeople increased by up to 15%
  - General labour – costs for general labour increased by up to 15%

We have assessed that Queensland Rail's cost estimates reflect market conditions.

---

[3] Australian Constructors Association, Construction cost inflation: Ways to address an escalating issue, July 2022

4.3.3 Procurement

AECOM has reviewed Queensland Rail's procurement documentation:

- MD-18-191 Procurement Procedure
- MD-10-926 Procurement Standard
- MD-14-781 Project Management Methodology Framework

Queensland Rail's procurement approach is based on a number of best practice principles, including a value for money principle. The value for money principle addresses a number of the factors that contribute to efficiency in costs, including consideration of whole of life costs, management of risks (including safety and environmental), and achievement of outcomes sought.

Queensland Rail has in place various existing arrangements that have been established through previous sourcing projects, for example, a panel arrangement. Queensland Rail has stated that *'wherever possible, the goods and services required must be purchased through these arrangements.'* These arrangements can include both panel arrangements with Queensland Rail or the whole of government panel arrangements.

Where a new contract is required to be let, Queensland Rail has set thresholds for the minimum number of suppliers invited to tender. These are outlined in Table 30.

Table 30 Procurement of new contracts thresholds

Value of Expenditure	Minimum number of suppliers to be invited to respond
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

The tiered approach reflects an efficient approach for the following reasons:

- For larger levels of expenditure, a competitive procurement approach with a higher number of suppliers can encourage price competition and help to achieve market rates for Queensland Rail
- For lower levels of expenditure, the smaller numbers of suppliers help to reduce the cost of procurement. Queensland Rail's procurement effort is commensurate with the value of expenditure.

We consider that Queensland Rail's approach to procurement of projects reflects an efficient approach.

4.3.4 Delivery

AECOM has reviewed several of Queensland Rail's business cases to confirm its delivery approach to capital and maintenance activities. A review of delivery methods demonstrates the following:

- Queensland Rail uses internal resources where the internal capability and capacity exist within the organisation.
- Queensland Rail supplements internal resources with external contractors where necessary.
- Where external contractors are expected to deliver a significant portion of the work, the procurement process for the contractor is provided within the business case and aligns with the requirements of the Queensland Rail Procurement Procedure.
- Queensland Rail considers the delivery constraints within its business case and project plans, including possession windows, availability of staff and materials and seasonal weather conditions.

Queensland Rail considers critical issues relating to delivery at the planning phase, which helps to reduce risk and unforeseen costs in later stages.

5.0 Conclusion

AECOM has reviewed Queensland Rail's DAU3 Maintenance Expenditure Submission and provides the following findings:

- Maintenance costs are expected to be significantly higher than the AU2 period due to the significant increase in expected tonnages across the network.
- Queensland Rail's approach to determining the estimated maintenance expenditure for the DAU3 period is reasonable and takes into account the expected increases in tonnage, the impact of capital works on maintenance activities and costs, and the available possession windows.
- Cost estimates are based on actual costs, with a base year developed based on the average of three years of actual maintenance costs, adjusted for both one-off costs and the additional tonnages likely to affect variable maintenance.
- Queensland Rail's maintenance costs are higher per GTK than Aurizon Network. Potential reasons for the difference include the nature of the infrastructure, with Aurizon Network's systems largely concrete sleepered with heavier rail.
- Queensland Rail takes a prudent and efficient approach to works delivery, using internal resources where available and supplementing with external resources as needed.

AECOM Australia Pty Ltd
Level 8, 540 Wickham Street,
PO Box, 1307, Fortitude Valley
QLD 4006, Australia

T +61 7 3056 4800
www.aecom.com

ABN 20 093 846 925

Attachment 8: Example of the UT3 (2008AU) QCA Quarterly Report

Queensland Rail

QCA Quarterly Performance Report

4th Quarter 2012/13
April - June 2013

Contents Page

1. Introduction

The Performance Measures contained in this report have been prepared in accordance with the 2008 Access Undertaking and attached in Appendix A.

2. Performance Measures

2.1 Performance Measure 1 – Paragraph 9.1(e)(i-iii)

Healthy Train Services – Information on the Reliability of Train Services

This Performance Measure reports the number and percentage of Healthy Train Services that reached their destination within the Agreed Threshold. The threshold is agreed between the Operator (or Access Holder) and Queensland Rail, and is set out in the Access Holder's access agreement.

Above Rail Delays include delays arising from train break downs and delays arising during loading and unloading passengers/freight at stations/terminals. Unallocated Delays include matters such as floods and delays due to congestion of the network.

Out of the Train Services that remain healthy the indicator examines the number and percentage that exit the network within an agreed threshold, not the number of Train Services that arrive at their destination on time.

2.2 Performance Measure 2 – Paragraph 9.1(e)(iv-viii)

Unhealthy Train Services - Information on the Reliability of Train Services

This Performance Measure reports the number and percentage of Unhealthy Train Services that do not experience additional delays (i.e. deteriorate further) within an agreed threshold.

An Unhealthy Train Service is a Train Service that during its journey falls behind its scheduled time in the Daily Train Path (DTP) by greater than a certain amount. The delay is due to an Above Rail or unallocated reason.

This indicator examines how many Train Services become unhealthy on the network and do not experience additional deterioration. Additional deterioration would result in the Train Service falling further behind the DTP schedule.

2.3 Performance Measure 3 – Paragraph 9.1(f)(i-iii)

Transit Times – Information on the Transit Time of Train Services

This Performance Measure reports the average lateness of Train Services. The delay is divided by 100 Train Kilometres in recognition that a 10 minute delay would be more significant to a short train journey than, for example, a two-day train journey. Dividing the delay by 100 Train Kilometres enables this measure to take account of journey distance.

2.4 Performance Measure 4 – Paragraph 9.1(g)(i-iii)

The number and percentage of Train Services cancelled that can be directly attributable to Queensland Rail as Rail Manager, an Access Holder or another reason

This Performance Measure reports the number and percentage of Train Services that are cancelled, identifying the cause of the cancellation (i.e. whether it is directly attributable to Queensland Rail as rail manager, an Access Holder, or to another reason).

2.5 Performance Measure 5 – Paragraph 9.1(h)

The number of Major Reportable Safety Incidents to the Safety Regulator that occurred in relation to Train Services

This Performance Measure reports the number of safety incidents in relation to Train Services that were reported to the Safety Regulator during the relevant quarter. It does not include all safety incidents reportable to the Safety Regulator, but only those directly related to Train Services. This measure also includes those reported incidents that once investigated, are downgraded and no longer considered a major incident.

2.6 Performance Measure 6 – Paragraph 9.1(i)

The average percentage and kilometres of Queensland Rail track under temporary speed restrictions

This Performance Measure reports the average percentage and kilometres of Queensland Rail track under temporary speed restrictions for the relevant quarter. It is reported for South Western, Western, Central, Maryborough, North Coast, Mt Isa and Tablelands systems. Temporary speed restrictions are put in place to ensure levels of operational safety are maintained during, for example, track maintenance work.

2.7 Performance Measure 7 – Paragraph 9.1(j)

The number of instances where an Access Holder has made a complaint to Queensland Rail about a billing calculation where the complain is verified by an investigation held by Queensland Rail

This Performance Measure reports the number of complaints made to Queensland Rail by an Access Holder in relation to the amount billed for access to Queensland Rail's track. Billing complaints are only included where they have been investigated by Queensland Rail and found to be verified.

2.8 Performance Measure 8 – Paragraph 9.1(k)

Treatment of Train Services

This Performance Measures reports the number of instances where an Access Holder has made a complaint to Queensland Rail about Queensland Rail's Train Control decision making being in breach of Queensland Rail's Train Control's Traffic Management Decision Making Matrix (as detailed in Schedule G, Part B, Appendix 2 of the 2008 Access Undertaking).

3.0 Definitions

Above Rail means those activities required to provide and operate Train Services such as rolling stock provision (i.e. trains, carriages, etc.), rolling stock maintenance, train crewing, terminal provision, freight handling and the marketing and administration of the above services.

Above Rail Delay means a delay that can be attributed directly to a fault in rolling stock or to the actions of an Operator in operating or maintaining that rolling stock.

Access means use of a section of the rail network for the operation of Train Services on Queensland Rail's rail infrastructure.

Access Agreement means an agreement between Queensland Rail and an Access Holder for the provision of access.

Access Holder means a party who has the right to operate Train Services on Queensland Rail's rail infrastructure.

Access Seeker means a party who is seeking to operate Train Services on Queensland Rail's network.

Agreed Deterioration Threshold means the threshold allowance for deviations from a scheduled train path within which a Train Service is considered to be on time, as agreed between Queensland Rail and the Access Holder.

Agreed Exit Threshold means the threshold allowance for deviations from a scheduled exit time within which a Train Service is considered to be on time, as agreed between Queensland Rail and the Access Holder.

Below Rail Delay means a delay to a Train Service from its scheduled train path, where that delay is directly attributable to Queensland Rail acting as Railway Manager, but excludes cancellations and delays resulting from a Force Majeure Event.

Below Rail Transit Time means, for a Train Service travelling between its origin and destination, the sum of:

(i) The relevant nominated section running times (in the direction of travel) as specified in the Train Service entitlement;

(ii) Identified Below Rail Delays for that Train Service;

(iii) Time taken in crossing other trains to the extent that such time is not contributed to by Above Rail causes or Force Majeure Events or otherwise included in paragraph (i) of this definition; and

(iv) Delays due to operational constraints directly caused by the activities of Queensland Rail in maintaining the rail infrastructure or due to a fault or deficiency in the rail infrastructure provided such delays are not contributed to by Above Rail causes or Force Majeure Events or otherwise included in Paragraph (ii) or (iii) of this definition.

Daily Train Plan (DTP) means Queensland Rail's schedule for all Train Services running on a particular day on Queensland Rail's rail infrastructure.

Force Majeure Event means any cause, event or circumstance which is beyond the reasonable control of the affected party such a flood or other natural disaster.

Healthy Train Service means a Train Service that has experienced no cumulative delay, within an Agreed Threshold, attributable to an Above Rail Delay or Unallocated Delay, either on entry or whilst on the rail infrastructure.

Major Reportable Safety Incidents means safety incidents that are required to be reported to the Safety Regulator.

Metropolitan Region means the part of Queensland Rail's network on which metropolitan passenger services (Citytrain) operate, which is bounded to the north by Nambour and to the west by Rosewood.

Operator means an entity that runs rolling stock (e.g. trains and carriages) on Queensland Rail's network.

Quarter means the periods of three (3) months commencing 1 July, 1 October, 1 January and 1 April.

Railway Manager has the meaning given to that term in the *Transport Infrastructure Act 1994* and refers to the person accredited for managing the railway under Chapter 7, Part 3 of that Act.

Standard Gauge means the part of Queensland Rail's network between the New South Wales border and Fisherman Islands, which has a nominal gauge of 1,435mm.

Safety Regulator means the Chief Executive of Queensland Transport (or his delegate) operating in accordance with Chapter 7 of the *Transport Infrastructure Act 1994* (Qld).

Train Control means the management and monitoring of train movements on Queensland Rail's track as well as the allocation and scheduling of train paths.

Train Kilometres means the actual distance travelled by a Train Service.

Train Service means the operation of a train between specified origins and destinations on the rail infrastructure.

Transit Time means the time schedule for the relevant Train Service type from origin to destination or from destination to origin which comprises the relevant Sectional running times, delay for passing of other trains on the nominated network, operational constraints relating to the infrastructure, operational constraints attributable to a railway operator, Force Majeure Events and planned dwell times.

Unallocated Delay means a delay to a Train Service from its train path scheduled in the DTP that is neither an Above Rail Delay nor a Below Rail Delay.

Unhealthy Train Service means a Train Service that has experienced a cumulative delay, outside an Agreed Threshold, attributable to an Above Rail Delay or an Unallocated Delay, either on entry or whilst on the Queensland Rail's rail infrastructure.

2008 Access Undertaking means the document created by Queensland Rail and approved by the Queensland Competition Authority, which provides a framework to manage negotiations with Access Seekers for Access to Queensland Rail's rail infrastructure for the purpose of operating Train Services.

Appendix A
Queensland Rail Performance Measures (1 April to 30 June 2013)

			Train Services Operated for:		
		Measure	**Bulk Coal and Minerals**	**Other Freight Services**	**Long Distance Passenger Services**
1. Healthy Train Services (a)					
That reach their destination within the Agreed Exit Threshold		Number	3034	1319	287
		%	93.70	93.55	96.63
That do not reach their destination within the Agreed Exit Threshold	Attributable solely to Queensland Rail as Railway Manager	Number	73	36	3
		%	2.25	2.55	1.01
	Not solely attributable to Queensland Rail as Railway Manager	Number	131	55	7
		%	4.05	3.90	2.36
Total number of Healthy Train Services		Number	3238	1410	297
2. Unhealthy Train Services (a) (b)					
That do not deteriorate further, beyond the Agreed Deterioration Threshold		Number	3760	1353	62
		%	85.90	86.07	92.54
That deteriorate beyond the Agreed Deterioration Threshold	Delays attributable solely to Queensland Rail as Railway Manager	Number	173	46	1
		%	3.95	2.93	1.49
	Delays attributable solely to the Access Holder or an unallocated reason	Number	506	183	3
		%	11.56	11.64	4.48
	Not solely attributable	Number	40	22	1
		%	0.91	1.40	1.49
Total number of Unhealthy Train Services		Number	4377	1572	67
That do not reach their destination within the Agreed Exit Threshold		Number	2545	805	35
		%	58.14	51.21	52.24
3. Transit Times					
The average Above Rail delays		Minutes/100 train KMs	22.92	9.50	0.59
The average Below Rail delays			3.82	3.64	1.23
The average Unallocated delays			19.13	2.30	3.30
4. Cancellations (a)					
Attributable to Queensland Rail as Railway Manager		Number	200	61	0
		%	1.55	0.47	0
Attributable to the Access Holder		Number	1587	804	0
		%	12.26	6.21	0
Not clearly assignable as attributable to Queensland Rail - Network Business or Access Holder		Number	558	112	1
		%	4.31	0.87	0.01
5. Major Reportable Safety Incidents					
Major reportable safety incidents reported to the Safety Regulator		Number	3	6	1

<table>
<tr><td colspan="2"></td><td></td><td colspan="3">Train Services Operated for:</td></tr>
<tr><td colspan="2"></td><td>Measure</td><td>Bulk Coal and Minerals</td><td>Other Freight Services</td><td>Long Distance Passenger Services</td></tr>
<tr><td colspan="6">6. Temporary Speed Restrictions (c)</td></tr>
<tr><td colspan="2">Average % of Track under temporary speed restrictions</td><td colspan="4">0.26%</td></tr>
<tr><td colspan="2">Average kilometres of track under temporary speed restrictions</td><td colspan="4">20.85316</td></tr>
<tr><td colspan="6">7. Billing Performance</td></tr>
<tr><td colspan="2">Instances where an Access Holder has made a complaint that has been substantiated in relation to an incorrectly calculated Queensland Rail bill</td><td>Number</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td colspan="6">8. Treatment of Train Services</td></tr>
<tr><td rowspan="5">Complaints from Access Holders that Queensland Rail - Network Business Train Control has made a decision in breach of Queensland Rail's traffic management decision making matrix</td><td>Complaints received by Queensland Rail.</td><td>Number</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Complaints received by Queensland Rail which are currently being assessed</td><td>Number</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td rowspan="3">Complaints received by Queensland Rail that were verified</td><td>Number</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>3rd Party Complaints per 100 train paths</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Queensland Rail Complaints per 100 train paths</td><td>0</td><td>0</td><td>0</td></tr>
</table>

Notes:

(a) Due to the separation of the train running system (known as Vizirail) on 12 November 2011, Queensland Rail is unable to distinguish which portion of below rail cancellations and delays are attributable to Queensland Rail versus Aurizon. This only relates to the data prior to 12 November 2012 and consequently, all cancellations and delays from 1 October 2011 to 12 November 2011 have been assigned to Queensland Rail. This slightly distorts the data to be unfavourable towards Queensland Rail. From 13 November 2011 onwards, responsibility is correctly assigned and therefore this issue will not occur in subsequent reports.

(b) Percentages for these performance measures do not add to 100%. This is due to the fact that, whilst services "that deteriorate" and services "that do not deteriorate" can be added together to make 100%, the allocations for breaching the Agreed Thresholds "solely attributable to "Queensland Rail - Network Business" and "solely attributable to Access Holder" are not mutually exclusive. The result is that in some instances these percentages represent calculations of the same services that have appeared in both categories. The number of these services is immaterial.

(c) These figures exclude the Metropolitan Region and the Standard Gauge.

(d) Since the organisational split on 1 July 2010, changes have been made to the calculation method to determine 'Service Health' and 'Service Cancellations'. Previously, these measures were reported only by train type. As there are now two distinct 'networks', the allocation of each organisations' trains are now determined by the majority of distance traveled by a service on either network e.g. A freight train traveling from Brisbane to Cairns would travel on the Queensland Rail network for 95% of the journey, therefore it is allocated to Queensland Rail.

(e) With the organisational split central Queensland coal fields are not managed by Queensland Rail.

Appendix B - Queensland Rail Comparative Data - Subject Quarter and Preceding Four Quarters

			Train Services Operated for:														
		Measure	Bulk Coal and Minerals					Other Freight Services					Long Distance Passenger Services				
			2011/12	2012/13				2011/12	2012/13				2011/12	2012/13			
Quarter			Q4	Q1	Q2	Q3	Q4	Q4	Q1	Q2	Q3	Q4	Q4	Q1	Q2	Q3	Q4
1. Healthy Train Services																	
That reach their destination within the Agreed Exit Threshold		Number	2997	3090	2892	2825	3034	1247	1943	1939	667	1319	425	451	350	171	287
		%	91.04	93.21	93.23	95.41	93.7	93.06	92.44	94.72	93.81	93.55	96.37	96.99	98.87	95.53	96.63
That do not reach their destination within the Agreed Exit Threshold	Attributable solely to Queensland Rail as Railway Manager	Number	74	71	65	51	73	27	28	24	23	36	4	3	3	1	3
		%	2.25	2.14	2.1	1.72	2.25	2.01	1.33	1.17	3.23	2.55	0.91	0.65	0.85	0.56	1.01
	Not solely attributable to Queensland Rail as Railway Manager	Number	221	154	145	85	131	66	131	84	21	55	12	11	1	7	7
		%	6.71	4.65	4.67	2.87	4.05	4.93	6.23	4.1	2.95	3.9	2.72	2.37	0.28	3.91	2.36
Total number of Healthy Train Services		Number	3292	3315	3102	2961	3238	1340	2102	2047	711	1410	441	465	354	179	297
2. Unhealthy Train Services																	
That do not deteriorate further, beyond the Agreed Deterioration Threshold		Number	3058	3345	3394	2704	3760	1158	1857	1624	824	1353	133	121	45	98	62
		%	86.34	84.9	83.89	85.06	85.9	84.59	87.1	86.11	74.57	86.07	89.26	87.68	91.84	86.73	92.54
That deteriorate beyond the Agreed Deterioration Threshold	Delays attributable solely to Queensland Rail as Railway Manager	Number	133	134	218	169	173	33	50	62	81	46	2	1	0	2	1
		%	3.75	3.4	5.39	5.32	3.95	2.41	2.35	3.29	7.33	2.93	1.34	0.72	0	1.77	1.49
	Delays attributable solely to the Access Holder or an unallocated reason	Number	384	473	540	368	506	174	220	213	243	183	15	13	4	12	3
		%	10.84	12.01	13.35	11.58	11.56	12.71	10.32	11.29	21.99	11.64	10.07	9.42	8.16	10.62	4.48
	Delays not solely attributable to Queensland Rail or the Access Holder	Number	45	73	32	30	40	20	31	27	16	22	1	3	0	3	1
		%	1.27	1.85	0.79	0.94	0.91	1.46	1.45	1.43	1.45	1.4	0.67	2.17	0	2.65	1.49
Total number of Unhealthy Train Services		Number	3542	3940	4046	3179	4377	1369	2132	1886	1105	1572	149	138	49	113	67
That do not reach their destination within the Agreed Exit Threshold		Number	1851	2371	2643	1838	2545	673	1233	1029	650	805	76	73	16	85	35
		%	52.26	60.18	65.32	57.82	58.14	49.16	57.83	54.56	58.82	51.21	51.01	52.9	32.65	75.22	52.24
3. Transit Times																	
The average Above Rail delays		Minutes/100 train KMs	18.4	30.55	32.48	23.59	22.92	6.47	9.33	8.57	6.26	9.5	1.13	0.99	0.51	0.72	0.59
The average Below Rail delays			4.75	5.56	3.96	4.64	3.82	3.62	3.73	3.27	1.76	3.64	1.6	1.53	1.04	1.3	1.23
The average Unallocated delays			8.83	10.11	15.68	15.87	19.13	2.03	3.51	4.09	6.14	2.3	1.14	0.87	1.03	4.91	3.3
4. Cancellations																	
Attributable to Queensland Rail as Railway Manager		Number	234	305	93	183	200	71	53	32	148	61	0	0	0	8	0
		%	1.87	2.11	0.66	1.47	1.55	0.57	0.37	0.23	1.19	0.47	0.00	0.00	0.00	0.06	0.00
Attributable to the Access Holder		Number	1804	1529	1780	1565	1587	1140	1046	1005	1002	804	3	3	19	28	0
		%	14.42	10.56	12.62	12.57	12.26	9.11	7.22	7.12	8.05	6.21	0.02	0.02	0.13	0.22	0.00
Not clearly assignable as attributable to Queensland Rail - Network Business or Access Holder		Number	285	383	420	1376	558	96	284	572	1152	112	1	5	2	39	1
		%	2.28	2.64	2.98	11.05	4.31	0.77	1.96	4.05	9.26	0.87	0.01	0.03	0.01	0.31	0.01
5. Major Reportable Safety Incidents																	
Major reportable safety incidents reported to the Safety Regulator		Number	5	4	1	5	3	4	3	3	1	6	1	1	1	0	6
6. Billing Performance																	
Instances where an Access Holder has made a complaint that has been substantiated in relation to an incorrectly calculated Queensland Rail bill		Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7. Treatment of Train Services																	
Complaints from Access Holders that Queensland Rail - Network Business Train Control has made a decision in breach of Queensland Rail's traffic management decision making matrix	Complaints received by Queensland Rail.	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Complaints received by Queensland Rail which are currently being assessed	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Complaints received by Queensland Rail that were verified	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		3rd Party Complaints per 100 train paths	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Queensland Rail Complaints per 100 train paths	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8. Temporary Speed Restrictions																	
Quarter				**Q4_11/12**			**Q1_12/13**			**Q2_12/13**			**Q3_12/13**			**Q4_12/13**	
Average % of Track under temporary speed restrictions		Other		4.02%			3.33%			3.54%			5.09%			0.26%	
Average kilometres of track under temporary speed restrictions		Other		318.11			263.34			280.69			403.11			20.85	

Attachment 9: Example of the AU2 QCA Quarterly Report

Queensland Rail's
Public Quarterly Performance Report

First Quarter 2022/2023

1/07/22 to 30/09/22

QueenslandRail

Chief Executive Officer Responsibility Statement

Public Quarterly Performance Report

Quarter 1 2022-23 Financial Year

Clause 5.1.1 of *Queensland Rail's Access Undertaking 2* (**AU2**), approved by the Queensland Competition Authority on 1 July 2020, requires Queensland Rail to publicly report, on a quarterly basis, on train performance on its network and associated matters. Clause 5.1.1(c) requires that each public quarterly performance report (the **Report**) be accompanied by a responsibility statement signed by the Chief Executive Officer of Queensland Rail.

Queensland Rail has completed the Report for Quarter 1 of the 2022-23 financial year.

I confirm that Queensland Rail has used reasonable endeavors to ensure that all information contained in the Report is accurate, as required by clause 5.1.1(b) of AU2.

[redacted]

Kat Stapleton
Chief Executive Officer
Queensland Rail
30 October 2022

Queensland Rail Performance Measures

Queensland Rail Performance Measures

Quarterly Data - 1/07/22 to 30/09/22

2022/2023 1/07/22 to 30/09/22

Q1 30/09/2022

System

		Product Group	Measure	West Moreton (a)	Mt Isa (b)	North Coast (c)	Metropolitan (d)
1. On-time Running							
Services that reached heir destination within Allotted Time Threshold		Coal	Number	682	0	0	445
			%	82.17	0.00	0.00	80.62
		Bulk Minerals	Number	0	61	63	0
			%	0.00	58.65	59.43	0.00
		Freight	Number	222	530	2,338	1,015
			%	72.31	66.67	72 5	72 86
		Long Distance Passenger	Number	44	31	328	328
			%	84.62	73.81	66.4	67.77
Services that did not reach their destination wi hin Allotted Time Threshold.	Attributable solely to Queensland Rail as Railway Manager	Coal	Number	0	0	0	0
			%	0.00	0.00	0.00	0.00
		Bulk Minerals	Number	0	0	0	0
			%	0.00	0.00	0.00	0.00
		Freight	Number	0	0	1	0
			%	0.00	0.00	0.03	0.00
		Long Distance Passenger	Number	0	0	0	0
			%	0.00	0.00	0.00	0.00
	Attributable solely to an Access Holder or Nominated Rolling Stock Operator	Coal	Number	0	0	0	0
			%	0.00	0.00	0.00	0.00
		Bulk Minerals	Number	0	0	8	0
			%	0.00	0.00	7.55	0.00
		Freight	Number	0	0	30	0
			%	0.00	0.00	0.93	0.00
		Long Distance Passenger	Number	0	0	0	0
			%	0.00	0.00	0.00	0.00
	Due to any other reason	Coal	Number	148	0	0	107
			%	17.83	0.00	0.00	19 38
		Bulk Minerals	Number	0	43	35	0
			%	0.00	41.35	33.02	0.00
		Freight	Number	85	265	856	378
			%	27.69	33.33	26.54	27.14
		Long Distance Passenger	Number	8	11	166	156
			%	15.38	26.19	33.6	32 23
Total Train Services (excluding Cancelled)		Coal	Number	830	0	0	552
		Bulk Minerals	Number	0	104	106	0
		Freight	Number	307	795	3225	1393
		Long Distance Passenger	Number	52	42	494	484

2022/2023 1/07/22 to 30/09/22

Q1 30/09/2022

System

	Product Group	Measure	West Moreton (a)	Mt Isa (b)	North Coast (c)	Metropolitan (d)
2. Transit Time Delay						
The average Above Rail Delay	Coal	Minutes per 100 KMS	8.29	0.00	0.00	22.92
	Bulk Minerals		0.00	12.01	226.53	0.00
	Freight		194.9	9.31	12.93	13.32
	Long Distance Passenger		-2 89	-0.66	1.36	-0.73
The average Below Rail Delay	Coal		-0 25	0.00	0.00	2.92
	Bulk Minerals		0.00	3.21	7.91	0.00
	Freight		6.45	2.46	4.41	2.39
	Long Distance Passenger		8.25	5.85	1.49	-1.57
The average Unallocated Delay	Coal		3.57	0.00	0.00	11.02
	Bulk Minerals		0.00	1.96	443.58	0.00
	Freight		49.83	6.93	4.53	25.06
	Long Distance Passenger		2.4	-0.86	3.43	7.12

Queensland Rail Performance Measures

Quarterly Data - 1/07/22 to 30/09/22

30/09/2022	Product Group	Measure	West Moreton System	Mt Isa System	North Coast System	Metropolitan System
3. Train Cancellations						
Attributable solely to Queensland Rail as Railway Manager	Coal	Number	124	0	0	82
		%	9.39	0.00	0.00	9.14
	Bulk Minerals	Number	0	0	0	0
		%	0.00	0.00	0.00	0.00
	Freight	Number	42	4	50	77
		%	7.51	0.38	1.17	4
	Long Distance Passenger	Number	0	0	22	22
		%	0.00	0.00	3.87	4.11
Attributable solely to the Access Holder or Nominated Rolling Stock Operator	Coal	Number	347	0	0	253
		%	26.29	0.00	0.00	28.21
	Bulk Minerals	Number	0	18	18	0
		%	0.00	13.24	13.04	0.00
	Freight	Number	200	179	872	415
		%	35.78	17.13	20.45	21.58
	Long Distance Passenger	Number	0	2	35	28
		%	0.00	3.85	6.15	5.23
Not clearly attributable to Queensland Rail or Access Holder	Coal	Number	19	0	0	10
		%	1.44	0.00	0.00	1.11
	Bulk Minerals	Number	0	14	14	0
		%	0.00	10.29	10.14	0.00
	Freight	Number	10	67	118	38
		%	1.79	6.41	2.77	1.98
	Long Distance Passenger	Number	0	8	18	1
		%	0.00	15.38	3.16	0.19

30/09/2022		Measure	West Moreton System	Mt Isa System	North Coast System	Metropolitan System
4. Safety						
Category A major reportable safety incidents reported to the Safety Regulator		Number of Instances	1	1	1	0
5. Temporary Speed Restrictions						
Average % of track under temporary speed restrictions		%	3.28	9.93	1.54	Not applicable
Average kilometres of track under temporary speed restriction		Number	12.07	103.09	25.36	
6. Quality						
Overall Track Condition Index (OTCI)		Number	27.00	28.00	23.62	23.00
7. Complaints						
Written complaints by Access Holder verified by Queensland Rail in relations to	The Operating Requirements Manual	Number	0	0	0	0
	An IRMP	Number	0	0	0	0
	Any environmental investigation and/or risk management negotiation process or report	Number	0	0	0	0
	A Rolling Stock authorisation	Number	0	0	0	0
	Application of Network Management Principles	Number	0	0	0	0

Queensland Rail Performance Measures

Quarterly Data - 1/07/22 to 30/09/22

		Measure	West Moreton System	Mt Isa System	North Coast System	Metropolitan System
8.1 Planned Normal Possession						
(A) Possession Started Ended within 15 min	of the time scheduled for the relevant Planned Possession in the MTP	Number	38	20	72	197
		%	45.78	48.78	54.55	67.01
(B) Possession started between 15-120 min		Number	36	9	39	68
		%	43.37	21.95	29.55	23.13
(C) Possession ended earlier 15-120 min		Number	44	8	49	163
		%	53.01	19.51	37.12	55.44
(D) Possession ended later 15-120 min		Number	5	10	9	17
		%	6.02	24.39	6.82	5.78
(E) Possession started after 120 min		Number	6	1	13	13
		%	7.23	2.44	9.85	4.42
(F) Possession ended earlier 120 min		Number	13	4	32	35
		%	15.66	9.76	24.24	11.9
(G) Possession ended later 120 min		Number	1	4	5	5
		%	1.2	9.76	3.79	1.7

	Measure	West Moreton System	Mt Isa System	North Coast System	Metropolitan System
8.2 Planned Urgent Possessions					
Total Urgent Possessions	Number	0	4	49	34
Average Duration per Possession	Minutes	0.00	396.75	727.73	639.71

	Measure	West Moreton System	Mt Isa System	North Coast System	Metropolitan System
8.3 Planned Emergency Possessions					
Total Emergency Possessions	Number	3	9	10	2
Average Duration per Possession	Minutes	323.33	9,786.67	284.7	166

Notes

(a) Bulk Mineral services do not currently run on the West Moreton System.

(b) Coal services do not currently run on the Mount Isa Line System.

(c) Coal services do not currently run on the North Coast Line System.

(d) Bulk Mineral services do not currently run on the Metropolitan System.

General Comments

Where a Train Service is running late on its journey across more than one network (e.g. North Coast, Metropolitan and the West Moreton Networks) that service is reported as late in each of those Systems.

A Train Service that has multiple legs will be considered as one service for reporting. For example, coal services on the West Moreton System on the Mine to Port and Port to Mine cycle have three distinct services (refer below), which are considered to be one service for the purposes of this report:

1. Toowoomba to Mine;
2. Mine to Port; and
3. Port to Toowoomba.

Queensland Rail Comparative Data - First Quarter 2022/2023 and Preceding Four Quarters

Quarter		Product Group	Measure	System																			
				West Moreton					Mt Isa Line					North Coast Line					Metropolitan				
				2021/ 2022	2021/ 2022	2021/ 2022	2021/ 2022	2022/ 2023	2021/ 2022	2021/ 2022	2021/ 2022	2021/ 2022	2022/ 2023	2021/ 2022	2021/ 2022	2021/ 2022	2021/ 2022	2022/ 2023	2021/ 2022	2021/ 2022	2021/ 2022	2021/ 2022	2022/ 2023
				Q1	Q2	Q3	Q4	Q1	Q1	Q2	Q3	Q4	Q1	Q1	Q2	Q3	Q4	Q1	Q1	Q2	Q3	Q4	Q1
1. On Time Running																							
Services that reached their destination within Allotted Time Threshold		Coal	Number	1,332	768	631	606	682	0	0	0	0	0	0	0	0	0	0	890	485	402	379	445
			%	86.55	75.59	84.81	70.63	82.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	86.74	71.64	81.05	66.26	80.62
		Bulk Minerals	Number	0	0	0	0	0	99	124	109	78	61	117	140	128	80	63	0	0	0	0	0
			%	0.00	0.00	0.00	0.00	0.00	64.71	72.94	70.78	67.83	58.65	62.23	72.54	68.82	67.8	59.43	0.00	0.00	0.00	0.00	0.00
		Freight	Number	183	104	182	249	222	546	416	377	222	530	2,557	2,079	1,095	1,343	2,338	1,045	826	797	939	1,015
			%	92.89	67.1	74.29	68.78	72.31	70.27	65.2	57.21	63.43	66.67	70.67	71.1	64.6	70.98	72.5	80.63	67.93	71.03	68.94	72.86
		Long Dist Passenger	Number	44	32	7	41	44	45	47	5	15	31	472	347	263	219	328	468	324	234	241	328
			%	95.65	94.12	100	95.35	84.62	91.84	94	35.71	37.5	73.81	87.57	65.1	61.16	47.61	66.4	87.97	64.41	63.59	53.44	67.77
Services that did not reach their destination within Allotted Time Threshold.	Attributable solely to Queensland Rail as Railway Manager	Coal	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Bulk Minerals	Number	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
			%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Freight	Number	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0
			%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00
		Long Dist Passenger	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Attributable solely to an Access Holder or Nominated Rolling Stock Operator	Coal	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Bulk Minerals	Number	0	0	0	0	0	0	1	0	1	0	17	12	12	3	8	0	0	0	0	0
			%	0.00	0.00	0.00	0.00	0.00	0.00	0.59	0.00	0.87	0.00	9.04	6.22	6.45	2.54	7.55	0.00	0.00	0.00	0.00	0.00
		Freight	Number	0	0	1	0	0	0	0	0	0	0	46	32	18	17	30	0	0	0	0	0
			%	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.27	1.09	1.06	0.9	0.93	0.00	0.00	0.00	0.00	0.00
		Long Dist Passenger	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Due to any other reason	Coal	Number	207	248	113	252	148	0	0	0	0	0	0	0	0	0	0	136	192	94	193	107
			%	13.45	24.41	15.19	29.37	17.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.26	28.36	18.95	33.74	19.38
		Bulk Minerals	Number	0	0	0	0	0	54	45	45	36	43	53	41	46	35	35	0	0	0	0	0
			%	0.00	0.00	0.00	0.00	0.00	35.29	26.47	29.22	31.3	41.35	28.19	21.24	24.73	29.66	33.02	0.00	0.00	0.00	0.00	0.00
		Freight	Number	14	51	62	113	85	231	222	282	128	265	1,013	813	582	532	856	251	390	325	423	378
			%	7.11	32.9	25.31	31.22	27.69	29.73	34.8	42.79	36.57	33.33	28	27.8	34.34	28.12	26.54	19.37	32.07	28.97	31.06	27.14
		Long Dist Passenger	Number	2	2	0	2	8	4	3	9	25	11	67	186	167	241	166	64	179	134	210	156
			%	4.35	5.88	0.00	4.65	15.38	8.16	6	64.29	62.5	26.19	12.43	34.9	38.84	52.39	33.6	12.03	35.59	36.41	46.56	32.23
Total Train Services (excluding Cancelled)		Coal	Number	1539	1016	744	858	830	0	0	0	0	0	0	0	0	0	0	1026	677	496	572	552
		Bulk Minerals	Number	0	0	0	0	0	153	170	154	115	104	188	193	186	118	106	0	0	0	0	0
		Freight	Number	197	155	245	362	307	777	638	659	350	795	3618	2924	1695	1892	3225	1296	1216	1122	1362	1393
		Long Dist Passenger	Number	46	34	7	43	52	49	50	14	40	42	539	533	430	460	494	532	503	368	451	484

Quarter	Product Group	Measure	System																			
			West Moreton					Mt Isa					North Coast Line					Metropolitan Network				
			2021/ 2022	2021/ 2022	2021/ 2022	2021/ 2022	2022/ 2023	2021/ 2022	2021/ 2022	2021/ 2022	2021/ 2022	2022/ 2023	2021/ 2022	2021/ 2022	2021/ 2022	2021/ 2022	2022/ 2023	2021/ 2022	2021/ 2022	2021/ 2022	2021/ 2022	2022/ 2023
			Q1	Q2	Q3	Q4	Q1	Q1	Q2	Q3	Q4	Q1	Q1	Q2	Q3	Q4	Q1	Q1	Q2	Q3	Q4	Q1
2. Transit Time Delay																						
The average Above Rail Delay	Coal	Minutes per 100 KMS	9.7	20.2	7.97	13.13	8.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.56	24.96	16.49	15.63	22.92
	Bulk Minerals		0.00	0.00	0.00	0.00	0.00	16.36	7.4	11.2	9.55	12.01	309.4	467.98	478.52	-137.6	226.53	0.00	0.00	0.00	0.00	0.00
	Freight		2.45	19.62	46.72	93.07	194.9	9.27	7.88	9.43	7.09	9.31	12.53	12.33	7.96	10.27	12.93	4.88	12.86	13.42	25.02	13.32
	Long Dist Passenger		-1.96	-2.04	-2.34	-1.77	-2.89	-1.47	-1.77	-1.54	-1.04	-0.66	0.13	1.1	0.46	1.24	1.36	-1.33	-1.15	0.37	-0.33	-0.73
The average Below Rail Delay	Coal		-4.13	0.14	-2.13	5.41	-0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.97	1.97	16.05	13.62	2.92
	Bulk Minerals		0.00	0.00	0.00	0.00	0.00	8.53	4.57	4.89	6.13	3.21	10.09	6.75	8.75	2.34	7.91	0.00	0.00	0.00	0.00	0.00
	Freight		-0.07	71.12	5.66	-8.9	6.45	4.05	3.59	4.84	5.96	2.46	3.46	3.77	3.02	4.44	4.41	2.67	1.5	1.35	3.78	2.39
	Long Dist Passenger		7.59	7.8	9.79	8.5	8.25	5.92	5.15	5.85	7.44	5.85	1.14	1.69	2.16	2.47	1.49	-2.2	-1.33	-2.66	-1.65	-1.57
The average Unallocated Delay	Coal		7.17	63.9	89.01	38.81	3.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.86	49.46	33.14	45.3	11.02
	Bulk Minerals		0.00	0.00	0.00	0.00	0.00	-3.08	-0.91	0.78	0.21	1.96	206.29	115.33	188.04	317.32	443.58	0.00	0.00	0.00	0.00	0.00
	Freight		-1.27	171.52	238.5	109.18	49.83	5	5.21	7.93	5.57	6.93	5.89	4.14	8	5.96	4.53	24.39	23.77	20.77	25.16	25.06
	Long Dist Passenger		2.85	3.96	3.56	2.21	2.4	-0.56	-0.04	1.32	-0.68	-0.86	3.1	4.16	4.55	4.47	3.43	4.48	5.19	7.06	6.86	7.12
3. Train Cancellations																						
Attributable solely to Queensland Rail as Railway Manager	Coal	Number	142	156	107	141	124	0	0	0	0	0	0	0	0	0	0	95	103	74	94	82
		%	7.61	9.55	8.78	9.7	9.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.62	9.37	9	9.58	9.14
	Bulk Minerals	Number	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0
		%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.39	0.00	0.00	0.00	0.00	1.31	0.00	0.00	0.00	0.00	0.00	0.00
	Freight	Number	2	0	2	4	42	0	6	20	151	4	12	35	171	177	50	9	33	150	62	77
		%	0.75	0.00	0.43	0.65	7.51	0.00	0.66	2.48	17.68	0.38	0.25	0.84	7.43	6.52	1.17	0.59	2	9.13	3.3	4
	Long Dist Passenger	Number	4	6	4	4	0	0	0	0	10	0	10	17	39	60	22	14	23	34	43	22
		%	7.41	11.32	7.84	7.69	0.00	0.00	0.00	0.00	19.23	0.00	1.81	3	7.2	10.77	3.87	2.55	4.2	7.23	8.13	4.11
Attributable solely to the Access Holder or Nominated Rolling Stock Operator	Coal	Number	185	259	122	373	347	0	0	0	0	0	0	0	0	0	0	125	180	91	260	253
		%	9.91	15.85	10.01	25.67	26.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.02	16.38	11.07	26.5	28.21
	Bulk Minerals	Number	0	0	0	0	0	13	20	22	25	18	17	28	28	30	18	0	0	0	0	0
		%	0.00	0.00	0.00	0.00	0.00	7.83	10.53	12.5	17.36	13.24	8.29	12.67	13.02	19.61	13.04	0.00	0.00	0.00	0.00	0.00
	Freight	Number	61	144	87	163	200	142	256	125	348	179	1,083	1,125	385	560	872	207	266	215	314	415
		%	22.85	37.8	18.79	26.33	35.78	15.47	28.32	15.49	40.75	17.13	22.92	26.94	16.72	20.64	20.45	13.6	16.16	13.09	16.74	21.58
	Long Dist Passenger	Number	4	5	37	3	0	4	2	36	0	2	4	14	55	29	35	4	14	54	29	28
		%	7.41	9.43	72.55	5.77	0.00	7.55	3.85	69.23	0.00	3.85	0.72	2.47	10.15	5.21	6.15	0.73	2.55	11.49	5.48	5.23
Not clearly attributable to Queensland Rail or Access Holder	Coal	Number	1	203	246	81	19	0	0	0	0	0	0	0	0	0	0	1	139	161	55	10
		%	0.05	12.42	20.18	5.57	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	12.65	19.59	5.61	1.11
	Bulk Minerals	Number	0	0	0	0	0	0	0	0	2	14	0	0	1	3	14	0	0	0	0	0
		%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.39	10.29	0.00	0.00	0.47	1.96	10.14	0.00	0.00	0.00	0.00	0.00
	Freight	Number	7	82	130	90	10	0	4	3	5	67	14	92	52	84	118	10	131	157	138	38
		%	2.62	21.52	28.08	14.54	1.79	0.00	0.44	0.37	0.59	6.41	0.3	2.2	2.26	3.1	2.77	0.66	7.96	9.56	7.36	1.98
	Long Dist Passenger	Number	0	8	3	2	0	0	0	2	2	8	0	2	18	8	18	0	8	14	6	1
		%	0.00	15.09	5.88	3.85	0.00	0.00	0.00	3.85	3.85	15.38	0.00	0.35	3.32	1.44	3.16	0.00	1.46	2.98	1.13	0.19

Quarter	Product Group	Measure	System																			
			West Moreton					Mt Isa					North Coast Line					Metropolitan Network				
			2021/ 2022	2021/ 2022	2021/ 2022	2021/ 2022	2022/ 2023	2021/ 2022	2021/ 2022	2021/ 2022	2021/ 2022	2022/ 2023	2021/ 2022	2021/ 2022	2021/ 2022	2021/ 2022	2022/ 2023	2021/ 2022	2021/ 2022	2021/ 2022	2021/ 2022	2022/ 2023
Quarter			Q1	Q2	Q3	Q4	Q1	Q1	Q2	Q3	Q4	Q1	Q1	Q2	Q3	Q4	Q1	Q1	Q2	Q3	Q4	Q1
4. Safety																						
Category A major reportable safety incidents reported to the Safety Regulator		Number of Instances	0	2	0	0	1	0	0	1	1	1	0	2	1	0	1	0	0	0	0	0
5. Temporary Speed Restrictions																						
Average % of track under temporary speed restrictions		%	3.26	3.46	3.44	3.36	3.28	16.58	15.35	13.27	15.56	9.93	1.9	1.9	1.86	1.81	1.54	Not applicable				
Average kilometres of track under temporary speed restriction		Number	12.01	12.76	12.69	12.39	12.07	172.07	159.32	137.72	161.48	103.09	31.24	31.28	30.65	29.83	25.36					
6. Track Quality																						
Overall Track Condition Index (OTCI)		Number	39.00	39.00	34.00	27.00	27.00	29.00	28.00	28.00	28.00	28.00	23.17	23.17	21.10	22.90	23.62	23.00	23.00	23.00	23.00	23.00
7. Complaints																						
Written complaints by Access Holder verified by Queensland Rail in relations to	The Operating Requirements Manual	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	An IRMP	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Any environmental investigation and/or risk management negotiation process or report	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	A Rolling Stock authorisation	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Application of Network Management Principles	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Quarter	Product Group	Measure	System																			
			West Moreton					Mt Isa					North Coast Line					Metropolitan Network				
			2021/2022	2021/2022	2021/2022	2021/2022	2022/2023	2021/2022	2021/2022	2021/2022	2021/2022	2022/2023	2021/2022	2021/2022	2021/2022	2021/2022	2022/2023	2021/2022	2021/2022	2021/2022	2021/2022	2022/2023
Quarter			Q1	Q2	Q3	Q4	Q1	Q1	Q2	Q3	Q4	Q1	Q1	Q2	Q3	Q4	Q1	Q1	Q2	Q3	Q4	Q1
8.1 Planned Normal Possession																						
(A) Possession Started Ended within 15 min	of the time scheduled for the relevant Planned Possession in the MTP	Number	32	18	12	13	38	58	17	4	7	20	80	80	45	64	72	204	179	155	133	197
		%	49.23	41.86	34.29	39.39	45.78	51.33	54.84	57.14	63.64	48.78	50.63	55.56	52.33	47.41	54.55	66.45	71.03	71.76	61.86	67.01
(B) Possession started between 15-120 min		Number	20	16	12	13	36	31	8	0	2	9	52	43	33	45	39	58	56	41	57	68
		%	30.77	37.21	34.29	39.39	43.37	27.43	25.81	0	18.18	21.95	32.91	29.86	38.37	33.33	29.55	18.89	22.22	18.98	26.51	23.13
(C) Possession ended earlier 15-120 min		Number	22	13	8	7	44	29	10	0	3	8	65	48	33	42	49	116	109	96	97	163
		%	33.85	30.23	22.86	21.21	53.01	25.66	32.26	0	27.27	19.51	41.14	33.33	38.37	31.11	37.12	37.79	43.25	44.44	45.12	55.44
(D) Possession ended later 15-120 min		Number	13	3	10	7	5	20	7	3	1	10	10	13	6	21	9	20	9	13	9	17
		%	20	6.98	28.57	21.21	6.02	17.7	22.58	42.86	9.09	24.39	6.33	9.03	6.98	15.56	6.82	6.51	3.57	6.02	4.19	5.78
(E) Possession started after 120 min		Number	5	5	1	0	6	1	1	0	0	1	17	10	2	11	13	27	10	9	21	13
		%	7.69	11.63	2.86	0	7.23	0.88	3.23	0	0	2.44	10.76	6.94	2.33	8.15	9.85	8.79	3.97	4.17	9.77	4.42
(F) Possession ended earlier 120 min		Number	19	9	8	6	13	9	4	2	3	4	31	37	25	44	32	35	30	28	22	35
		%	29.23	20.93	22.86	18.18	15.66	7.96	12.9	28.57	27.27	9.76	19.62	25.69	29.07	32.59	24.24	11.4	11.9	12.96	10.23	11.9
(G) Possession ended later 120 min		Number	1	4	3	1	1	14	5	0	1	4	9	7	2	3	5	21	5	2	4	5
		%	1.54	9.3	8.57	3.03	1.2	12.39	16.13	0	9.09	9.76	5.7	4.86	2.33	2.22	3.79	6.84	1.98	0.93	1.86	1.7
8.2 Planned Urgent Possessions																						
Total Urgent Possessions		Number	6	3	1	1	0	29	14	8	38	4	29	35	25	28	49	25	22	41	33	34
Average Duration per Possession		Minutes	1,024.17	1,363	177	392	0.00	585.24	710.36	271.25	505.03	396.75	757.1	693.03	1,090.36	651.57	727.73	298.92	438.68	20,509.46	447.3	639.71
8.3 Planned Emergency Possessions																						
Total Emergency Possessions		Number	5	2	4	1	3	9	10	14	25	9	17	14	12	23	10	4	5	6	6	2
Average Duration per Possession		Minutes	345.2	443.5	3,667.25	202	323.33	330	203	294.36	3,758.48	9,786.67	526.12	360.14	954.58	383.91	284.7	269	206.8	274	278.33	166

Queensland Rail Comparative Data - First Quarter 2022/2023 and Preceding Four Quarters

Commentary:

General Comments

Train services are counted on the date they leave their origin. If a train service is delayed after midnight at the end of a quarter and does not reach its destination within the Allotted Time Threshold, the prior period count will be adjusted in the following quarter, including adjustments to the transit time delay.

On Time Running

West Moreton System: A key material change between Q4 2021-22 and Q1 2022-23 is a decrease in the Services that did not reach their destination within the Allotted Time Threshold due to a reason other than a Queensland Rail, Access Holder or Nominated Rolling Stock Operator cause. This is because Q1 2022-23 had significantly fewer Force Majeure Events. The result of this is that the number of Coal services that did not reach their destination within the Allotted Time Threshold due to an 'unallocated' cause decreased from 252 to 148 and the number of Freight services decreased from 113 to 85. The lower numbers are due to higher impacts from Force Majeure Events in Q4 2021-22 compared to Q1 2022-23.

West Moreton System: The total number of Coal services (excluding cancellations) has been decreasing over the past five quarters due to an initial reduction in Coal service orders from New Hope's Jondaryan mine and then the subsequent closure of the mine.

Mount Isa Line System: The number and percentage of Long Distance Passenger services on the Mount Isa Line System that reached their destination within the Allotted Time Threshold increased to 73.8% (31 services) in Q1 2022-23 as compared to 37.5% (15 services) in Q4 2021-22. This improved number was influenced by a ten day closure at the end of June 2021-22 which reduced the total length of Temporary Speed Restrictions on the Mount Isa Line System by 94 km, thereby reducing Transit Times.

North Coast Line System: The number and percentage of Bulk Mineral services on the North Coast Line System that reached their destination within the Allotted Time Threshold decreased in Q1 2022-23 from 80 (67.8%) in Q4 2021-22 to 63 (59.43%). The reasons for this were an increase in waiting for train connections and an increase in loading delays and train crew delays.

Metropolitan System: The number and percentage of train services that reached their destination within the Allotted Time Threshold increased in Q1 2022-23 as compared to Q4 2021-22 for all train service types. The reasons for this increase are fewer Force Majeure Events and fewer transit delays in Q1 2022-23.

Transit Time Delays

West Moreton System: The average Unallocated Delay for Coal and Freight services was lower in Q1 2022-23 as compared to Quarter 4 2021-22 due to fewer Force Majeure Events in Q1 2022-23.

North Coast Line System: The average Above Rail Delay for Bulk Mineral services materially decreased in Quarter 4 2021-22 as compared to Quarter 3 2021-22 due to a train service departing Stuart 16 hours earlier than its scheduled time.

Metropolitan System: The average Unallocated Delay for Coal services was higher in Q4 2021-22 (45.3) than in Q1 2022-23 (11.02) as 42 Coal services arrived more that 60 minutes prior to their Scheduled Transit time after unloading which has brought the average delays down and improved transit times.

Train Cancellations

West Moreton System: Cancellations of Freight services that were attributable solely to Queensland Rail as Railway Manager increased in Q1 2022-23 due to a train collision.

West Moreton System: Cancellations of Freight services that were attributable solely to the Access Holder or Nominated Rolling Stock Operator increased in Q1 2022-23 as compared to Q4 2021-22 from 163 to 200 due to above rail actions such as a change in loading location.

West Moreton System: Cancellations of Coal services that were not clearly attributable to Queensland Rail or Access Holders decreased in Q1 2022-23 compared to Q4 2021-22 from 81 to 19 as there was a Force Majeure Event in Q4 2021-22 while a Force Majeure Event did not occur in Q1 2022-23.

Mount Isa Line System: Cancellations of Freight services that were attributable solely to Queensland Rail as Railway Manager were higher in Quarter 4 2021-22 (51 cancellations) as compared to Q1 2022-23 (4 cancellations) due to Queensland Rail implementing Possessions which were undertaken to allow for repair and maintenance work.

Mount Isa Line System: The number and percentage of cancellations for Long Distance Passenger services attributable solely to the Access Holder or Nominated Rolling Stock Operator was higher in Q4 2021-22 (10 cancellations) than in Q1 2022-23 (0 cancellations) due to a possession and covid impacts.

Mount Isa Line System: The number and percentage of cancellations for train services not clearly attributable to Queensland Rail or an Access Holder was higher in Q1 2022-23 compared to Q4 2021-22 due to a derailment at Nonda and a Collision between trains at Oonoomurra to Cloncurry.

North Coast Line System: The number and percentage of cancellations of Freight services where the cancellations were not clearly attributable to Queensland Rail or Access Holders were higher in Q1 2022-23 (118 cancellations) as compared to Q4 2021-22 (84 cancellations) due to a derailment at Nonda.

Metropolitan System: The number and percentage of cancellations for Freight services attributable solely to the Access Holder or Nominated Rolling Stock Operator was higher in Q1 2022-23 (415 cancellations) than in Q4 2021-22 (314 cancellations) due to the repositioning of Metropolitan Shunts (e.g. Acacia Ridge to Rocklea) due the change of orders and loading locations.

Queensland Rail Performance Measures

Quarterly Data - 1/04/22 to 30/06/22

Performance Measures

Performance Measure 1 – Clause 5.1.2(a)(ii)(A, B & C)

On-time Running - Information on the reliability of Train Services that have operated in the subject Quarter

This performance measure reports the number and percentage of Train Services that reach their destination on- time, and the number and percentage of Train Services that do not reach their destination on-time, against their scheduled arrival times.

For those services that don't reach their destination on time, the KPI identifies whether it is solely due to Queensland Rail, an Access Holder/Nominated Rolling Stock Operator or some other reason. Train Services that don't reach their destination on-time include any services terminated during their journey. The measure is reported on a system-by-system basis (i e. the West Moreton, Mt Isa, North Coast Line and Metropolitan Systems) as well as by product groups (i.e. Coal, Bulk Minerals, Freight and Long Distance Passenger services).

Each Train Service is scheduled to undertake its journey at a specified time. The schedule for all Train Services on a particular day is called the Daily Train Plan (DTP). Where a Train Service arrives after the scheduled time in the DTP, but is within the following 'on-time thresholds', then that Train Service is reported as being on-time:

- 30 minutes for coal services;
- 60 minutes for bulk mineral (other than coal) services;
- 60 minutes for freight services; and
- 20 minutes for Long Distance Passenger services.

The measure also reports the total number of Train Services that ran in each system in a subject Quarter.
AU2 also included "the number of times during the subject Quarter that Network Controllers applied the principle in clause 3(i)(i)(B) of schedule F to manage a deviation from a DTP. Queensland Rail's IT systems currently are unable to report on this measure. Queensland Rail is currently reviewing its IT systems.

Performance Measure 2 – Clause 5.1.2(a)(iii)

Transit Time Delay - Information on the transit time delay against aggregate Train Services that have operated in the subject quarter

This performance measure reports the average delay of Train Services. The delays are reported in the following categories: Above Rail Delay, Below Rail Delay and Unallocated Delays and are reported on a system-by-system basis (i e. the West Moreton, Mt Isa, North Coast Line and Metropolitan Systems) by product lines groups (i.e. Coal, Bulk Minerals, Freight and Long Distance Passenger services). The delays are divided by 100 train kilometres in recognition that a 10 minute delay would be more significant to a short train journey than, for example, a two day train journey. Dividing the delay by 100 train kilometres takes account of journey distance.

Performance Measure 3 – Clause 5.1.2(a)(iv)

Train Cancellations - The number and percentage of Train Services cancelled that can be directly attributed to Queensland Rail as Railway Manager, an Access Holder or to another reason.

This performance measure reports the number and percentage of Train Services that are cancelled, separately identifying the cause of the cancellation (i e. whether it is directly attributable to Queensland Rail as Railway Manager, an Access Holder, or to another reason). This performance indicator is reported on a system-by-system basis (i.e. the West Moreton, Mt Isa, North Coast Line and Metropolitan Systems) by product lines groups (i.e. Coal, Bulk Minerals, Freight and Long Distance Passenger services).

Performance Measure 4 – Clause 5.1.2(a)(v)

Safety - The Number of category A major incidents reported to the Safety Regulator in relation to Train Services that operated in the subject Quarter.

This performance measure reports the number of category A safety incidents in relation to Train Services that were reported to the Safety Regulator during the relevant Quarter. It does not include all safety incidents reportable to the Safety Regulator, but only those directly related to Train Services, reported on a system-by-system basis (i.e. the West Moreton, Mt Isa, North Coast Line and Metropolitan Systems).
This measure can also include reported incidents that once investigated, are either;

- downgraded and are no longer considered a major incident; or
- have one or more characteristics reclassified.

In such cases, subsequent Quarterly reports may show prior Quarter results which may vary from previously published Quarterly reports.

Performance Measure 5 – Clause 5.1.2(a)(vi)

Temporary Speed Restrictions - The average percentage and average kilometres of Queensland Rail track under temporary speed restrictions in the subject Quarter

This performance measure reports the average percentage and average kilometres of Queensland Rail track by network (excluding the Metropolitan Network) under temporary speed restrictions for the relevant quarter. Temporary speed restrictions are put in place to ensure levels of operational safety are maintained during, for example, track maintenance work.

Performance Measure 6 – Clause 5.1.2(a)(vii)

Track Quality - The Overall Track Quality Index for Queensland Rail's Below Rail network for each System in the subject quarter.

This index reports on the quality of Queensland Rail's track. The lower the indicator, the better the track quality. This performance indicator is reported on a system-by-system basis (i e. the West Moreton, Mt Isa, North Coast Line and Metropolitan Systems).

The OTCI should only be used as an indicator of abnormality. A single number which is an average over a defined length cannot reflect all the variations within a system.

Performance Measure 7– Clause 5.1.2(a)(viii)

Complaints - The number of verified written complaints in relation to Access in the subject Quarter

The number of written complaints by Access Holders that are verified by Queensland Rail (acting reasonably) as correct in connection with any of the following:

- the Operating Requirements Manual;
- an IRMP;
- any environmental investigation and/or risk management negotiation process or report created during negotiations;
- a Rolling Stock authorisation; and
- the application of the Network Management Principles.

This performance indicator is reported on a system-by-system basis (i.e. the West Moreton, Mt Isa, North Coast Line and Metropolitan Systems).

Performance Measure 8 – Clause 5.1.2(a)(x)

Planned Possessions

This performance report provides the total number and percentage of Planned Possessions on a System by System basis. This report additionally reports on Planned Possessions that:

- started within 15 minutes of the scheduled time and finished within 15 minutes of the scheduled time;
- started between 15 minutes and two hours later than the scheduled time;
- finished between 15 minutes and two hours earlier than the scheduled time;
- finished between 15 minutes and two hours later than the scheduled time;
- started more than two hours later than the scheduled time;
- inished more than two hours earlier than the scheduled time; and
- finished more than two hours later than the scheduled time.

Performance Measure 8 – Clause 5.1.2(a)(xi)

Urgent Possessions

This measure reports on the number and average duration of Urgent Possessions for the subject Quarter on a system-by-system basis (i.e. the West Moreton, Mt Isa, North Coast Line and Metropolitan Systems) for the subject Quarter.

AU2 also included the number of Train Services that were cancelled or rescheduled as a result of this type of Possession. Queensland Rail's IT Systems are currently unable to report on this information. Queensland Rail is currently reviewing its IT systems.

Performance Measure 8 – Clause 5.1.2(a)(xi)

Emergency Possessions

This measure reports on the number and average duration of Emergency Possessions for the subject Quarter on a system-by-system basis (i.e. the West Moreton, Mt Isa, North Coast Line and Metropolitan Systems) for the subject quarter.

AU2 also included the number of Train Services that were cancelled or rescheduled as a result of this type of Possession. Queensland Rail's IT Systems are currently unable to report on this information. Queensland Rail is currently reviewing its IT systems.

Definitions

Access means the non-exclusive right to use a specified part of the Network for the purpose of operating Train Services.

Access Agreement means an agreement between Queensland Rail and an Access Holder for the provision of Access.

Above Rail Delay means a delay to a Train Service from its scheduled Train Path in the DTP, where that delay can be solely attributed directly to an Access Holder (or its Nominated Rolling Stock Operator) in operating its Train Services, but excludes:
(a) cancellations;
(b) delays resulting from compliance with a Passenger Priority Obligation; and
(c) delays resulting from a Force Majeure Event.

Above Rail Services means those activities, other than Below Rail Services, required to provide and operate Train Services, including Rolling Stock provision, Rolling Stock maintenance, non-Network Control related communications, train crewing, terminal provision and services, freight handling and marketing and the administration of those activities and Above Rail has a similar meaning.

Access Holder means a person who holds Access Rights under an Access Agreement;

Access Rights means an entitlement to Access in accordance with a specified Train Service Entitlement;

Access Seeker means a person who is seeking new or additional Access Rights from Queensland Rail including, for clarity, the rights of an Access Holder or Rolling Stock Operator that are to expire;

Ad Hoc Planned Possession means a Possession (other than an Urgent Possession, or an Emergency Possession) that is not entered into the MTP because it is not a Regular Planned Possession, and adversely affects the operation of Train Services.

Allotted Time Threshold means the threshold within which a Train Service is considered to be on time as follows, for a Train Service operated for the purpose of:
(a) transporting coal, 30 minutes;
(b) transporting bulk minerals (other than coal), 60 minutes;
(c) transporting freight products, 60 minutes; and
(d) transporting passengers over long distances.

Authority means:
(a) the Crown or any minister of the Crown;

(b) any government, federal, state or local government department or other governmental, semi-governmental or judicial body or authority including local government, a court or a tribunal;

(c) any corporation, authority body or force constituted for a public purpose (including any police service or force);

(d) any holder of an office for a public purpose;

(e) any governmental, semi-governmental or judicial person; and

(f) any person (whether autonomous or not) who is charged with the administration or enforcement of a Law,

including any officer or agent of the foregoing acting in that capacity but excluding the authority established under section 6 of the Queensland Rail Transit Authority Act 2013 (Qld).

AU2 means the document created by Queensland Rail and approved by the Queensland Competition Authority on 1 July 2020 which provides a framework to manage negotiations with Access Seekers for Access to Queensland Rail's rail infrastructure for the purpose of operating train services.

Below Rail Delay means a delay to a Train Service from its scheduled Train Path in the DTP, where that delay can be solely attributed directly to Queensland Rail in its capacity as the Railway Manager, but excludes:

(a) cancellations;
(b) delays resulting from compliance with a Passenger Priority Obligation; and
(c) delays resulting from a Force Majeure Event.

Below Rail Services means the activities associated with the ownership, provision and management of the Network, including:

(a) the construction, maintenance and renewal of Network assets including to ensure that the Network is provided to the standard required to meet Queensland Rail's obligations to each Network Participant; and

(b) the network management services required for the safe operation of Train Services on the Network including:
- Network Control; and
- the implementation of procedures and systems, including supporting communications systems, for the safe operation of Train Services and protection of work sites on the Network,

and Below Rail has a similar meaning.

Daily Train Plan or DTP means a plan that details the scheduled times for all Train Services and any Regular Planned Possessions, Ad Hoc Planned Possessions, Urgent Possessions and Emergency Possessions for a particular day on a specified part of the Network.

Force Majeure Event means any cause, event or circumstance or combination of causes, events or circumstances which:
(a) is beyond the reasonable control of the affected party; and
(b) by the exercise of due diligence, the affected party was not reasonably able to prevent or is not reasonably able to overcome,
and includes:

(c) compliance with a lawful requirement, order, demand or direction of an Authority or an order of any court having jurisdiction other than where that requirement, order, demand or direction results from any act or omission of the affected party;

(d) a strike, lockout, boycott, stoppage, go slow, labour disturbance or other such industrial action, whether or not the affected party is a party to such industrial action or would be able to influence or procure the settlement of such industrial action;

(e) an act of God;
(f) war, invasion, act of terrorists, act of foreign enemies, hostilities (whether war be declared or not), civil war, rebellion, revolution, insurrection, military or usurped power, blockade, civil disturbance or public disorder;

(g) equipment failure or breakdown where such failure or breakdown could not have been prevented by Prudent Practices or accident or accidental damage to any thing;
(h) malicious damage or sabotage;
(i) ionising radiations or contamination by radioactivity from any nuclear fuel or from any nuclear waste;
(j) failure of electricity supply from the electricity grid;
(k) delay, restraint, restriction, embargo or other material adverse effect arising from any act or omission of any Authority;
(l) fire, flood, storm surge, cyclone, tornado, tsunami, earthquake, washaway, landslide, explosion, hail, lightning, severe weather conditions or other catastrophe or natural calamity;
(m) any act or omission of any person other than the affected party or Queensland Rail (including the presence of any such person on or near the Network), without the express authorisation of Queensland Rail, that results in damage to the Network or the use or operation of the Network being prevented or impeded;

(n) epidemic or quarantine restriction; and
(o) delay of a supplier due to any of the foregoing whenever arising.

IRMP means an interface risk management plan prepared jointly by the Access Seeker and Queensland Rail in accordance with the Operating Requirements Manual which incorporates the outcomes of the relevant Interface Risk Assessment.

Law includes:
(a) any statute, ordinance, code, law, by-law, proclamation, rule or regulation or any other subordinate legislation, whether State, Commonwealth or otherwise;
(b) the terms of any Authorisation;

(c) common law and equity;

(d) AU2; and

(e) any order, circular, requirement, condition, notice, decree, decision, direction or guidelines of any Authority with which Queensland Rail, an Access Seeker, an Access Holder or other relevant person (as the case may be) is legally required to comply including any requirement to pay fees and charges, whether nor, or at any time in the future, in effect.

Master Train Plan or MTP means a plan detailing the scheduled times as advised by Queensland Rail from time to time for all Train Services and any Regular Planned Possessions on a specified part of the Network, where such scheduled times remain unchanged from week to week.

Metropolitan System means that part of the Network bounded to the north by (and including) Nambour station and to the west by (and including) Rosewood and including all branch lines comprised in that part of the Network.

Mt Isa System means that part of the Network bounded to the east by (and including) Stuart and to the west by (and including) Mt Isa and including all branch lines comprised in that part of the Network.

Network means the rail transport infrastructure (as defined in the ***Transport Infrastructure Act 1994*** **(Qld)**) the use of which is taken, pursuant to section 250(1)(b) of the ***Queensland Competition Authority Act 1997*** **(Qld)**, to be a service declared under Part 5, Division 2 of the ***Queensland Competition Authority Act 1997*** **(Qld)** (but excluding any rail transport infrastructure (as defined in the ***Transport Infrastructure Act 1994*** **(Qld)**) the use of which is referred to in section 249(2) of the ***Queensland Competition Authority Act*** **1997 (Qld)**).

Operational Constraint means any temporary or permanent constraint on the operation or use of any part of the Network imposed by Queensland Rail (acting reasonably) as it considers necessary in relation to the proper, efficient or safe operation or management of the Network (including speed restrictions, load restrictions, Regular Planned Possessions, Ad Hoc Planned Possessions, Urgent Possessions, Emergency Possessions and signalling or overhead restrictions);.

Passenger Priority Obligations means the obligations of a Railway Manager pursuant to sections 265 and 266 of the Transport Infrastructure Act 1994 (Qld).

Planned Possession means a Possession (other than an Urgent Possession or an Emergency Possession) where such Possession is entered into the MTP or DTP and adversely affects the operation of Train Services.

Quarter means the periods of three (3) months commencing 1 July, 1 October, 1 January and 1 April.

Railway Manager means an accredited rail infrastructure manager (as defined in the RSNL).

Regular Planned Possession means a Possession (other than an Ad Hoc Planned Possession, Urgent Possession or an Emergency Possession) where such Possession is entered into the MTP and DTP and adversely affects the operation of Train Services.

Rolling Stock Operator means a rolling stock operator (as defined under the RSNL) who operates or will operate Rolling Stock on the Network.

RSNL means the *Rail Safety National Law (Queensland)* as defined in the *Rail Safety National Law (Queensland) Act 2017 (Qld)* .

Train Service means a Train operating on the Network from a specified origin to a specified destination.

Train Service Entitlement means an Access Holder's entitlement under an Access Agreement to operate, in accordance with that Access Agreement, a specified number and type of Train Services over the Network within a specified time period and in accordance with specified scheduling constraints for the purpose of either carrying a specified commodity or providing a specified transport service.

Unallocated Delay means a delay to a Train Service from its Train Path scheduled in the DTP that is neither an Above Rail Delay nor a Below Rail Delay.

Urgent Possession means a Possession:

(a) that is required to correct problems in relation to the Network that are considered by Queensland Rail to be potentially dangerous to persons or property; and
(b) that Queensland Rail intends to carry out within less than three months after the detection of the problem,
other than an Emergency Possession;

West Moreton System means that part of the Network comprising the rail corridor from (and including) Rosewood to Miles, excluding all branch lines not directly connecting coal mine loading facilities to that rail corridor.

References

For further information on the definitions contained in this report, please refer to AU2. A copy of this document is available at **http //www.queenslandrail.com.au/forbusiness/access/access-undertaking**