# WIRP Users: Submission to the Queensland Competition Authority

# Addendum to WIRP Users' Submission of September 2015 in Response to QCA's Supplementary Draft Decision: Reference Tariffs for Wiggins Island Rail Project

**November 2015**

**Public Version**

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# EXECUTIVE SUMMARY

The Wiggins Island Rail Project ('**WIRP**') User Group welcomes the opportunity to provide further information on its submission ('**WIRP User Group SDD Response'**) to the Queensland Competition Authority ('**QCA'**) provided in September 2015 on Aurizon Network's ('**AN's**') Reference Tariffs for WIRP Train Services ('**2015 WIRP SDD'**).

The WIRP User Group comprises Washpool Coal Pty Ltd, Caledon Coal Pty Ltd, Wesfarmers Curragh Pty Ltd, Colton Coal Pty Ltd, Cockatoo Coal Pty Ltd, Yarrabee Coal Company Pty Ltd and Glencore Coal Assets Pty Ltd ('**WIRP User Group**').

This addendum is provided following a request from the QCA for clarification of certain matters in the WIRP User Group SDD Response. Specifically, the QCA sought:

- Explanation of assessing the relative benefits of capacity modelling approaches;
- Clarification of capacity modelling results i.e. systems throughput outcomes etc; and
- Clarification of the benefits associated with the final two duplications and allocations.

The WIRP User Group has addressed these matters through additional capacity modelling. The key conclusions of this analysis being:

- The determination of relative operational benefits is an appropriate methodology. Further, there is a close correlation between 'relative' outputs (as originally established) and 'absolute' outputs (established through further modelling). Therefore, regardless of whether capacity modelling applies an incremental approach or an absolute approach, it does not change the fundamental outcomes that the WIRP Users have put forward;
- The modelling results have been consolidated, with the following key conclusions:
    - the WIRP infrastructure increases the throughput capacity of the non-WIRP volumes;
    - the WIRP infrastructure improves the Blackwater System BRTT, with the final two duplications in scenario 3b delivering benefits to all Blackwater System users; and
- The final two duplications of the WIRP infrastructure minimises the cycle time of all train services in the Blackwater System and improves BRTT by de-bottlenecking the remaining single line sections. This delivers benefits to all Blackwater System users.

If you have any questions relating to the information attached or our submission, please contact our representative Mr Jamie Freeman (jfreeman@balanceadvisory.com).

This submission is public (noting a paragraph in section 2.3 has been redacted in this public version for confidentiality reasons).

# 1. Background

The QCA has requested further points of clarification to the content of the WIRP User Group SDD Response to assist in its deliberations. Specific points of clarification sought by the QCA include:

- Why the results of capacity modelling scenarios excluding a track maintenance closure program were used;
- Clarification that the relative benefits of system performance should be considered in lieu of absolute throughput value benefits;
- Further explanation of certain modelling results associated with WIRP scenarios; and
- Clarification of the benefit to all users of two sets of track duplication combinations identified in the submission.

# 2. Capacity Modelling

## 2.1 Process

The purpose of this capacity modelling was not to establish an absolute throughput and incremental dollar value benefit to users from each infrastructure enhancement. Rather, its purpose was to determine the position from an operational perspective of which all users would benefit from the WIRP scope.

In this context it is argued that the actual or absolute throughput value is of no greater relevance than the relative incremental benefits. This absolute value can be validated against further detailed capacity modelling. It is our view that an absolute throughput value is not required to establish the benefit to all system users of the WIRP scope in the context of capacity modelling underpinning the WIRP User Group SDD Response.

The tables and graphical representations in this paper are provided to support the argument that the relative incremental benefits remain consistent regardless of the output values produced.

The process undertaken during the capacity modelling task underpinning the WIRP User Group SDD Response has been largely determined by the time made available, and more importantly, the operating information available outside of the bounds of Aurizon's confidentiality and ring-fencing obligations. Regardless of these limitations, based on experience there is confidence in the results obtained.

The capacity simulation model used in the process is designed to simulate events from each part of the "pit to port" supply chain. This requires inputs to be made available through either documented operating procedures, contracted volume demands or assumptions derived from expert experience and system knowledge.

Several model calibration runs were conducted. Base case inputs were sourced from publicly available information and operating parameters associated with WIRP without track closures. Fine tuning of the

model was undertaken to ensure alignment with tolerable variances when compared to commensurate static analysis. This process is typical in capacity simulation modelling.

Modelling was also conducted using an assumed track unavailability program.

In both cases the modelling results demonstrate that there is a close correlation between the scenarios generating relative results when compared to those generating absolute results.

**Effects of track closure regime**
The challenge with the available data was determining an appropriate track maintenance closure regime that would have been representative of the planning at the time representing the base case. A triangular distribution of track unavailability was selected.

Based on past knowledge and experience, the decision was taken in the context of identifying relative benefits to all users of the WIRP scope to model all scenarios using both a “no track closure” paradigm that included an allowance for speed restrictions, as well as an assumed track unavailability for pre-WIRP. A comparison of impact and benefit relativity was undertaken as a secondary validation technique. Given the uncertainty of the pre-WIRP track closure program, the “without closures” results only had been presented to avoid confusion.

**Clarification**
It should be noted in the WIRP User Group SDD Response, a typographical error indicated speed restrictions were not applied in the scenarios used to present the results. This is incorrect as an allowance for speed restrictions has been applied in all of the modelled scenarios.

For clarity and to address the point of clarification from the QCA, the results of both modelling techniques in so far as the key network performance criteria are presented below. The results also demonstrate the relative incremental throughput benefit using both modelling techniques.

## 2.2 Comparison of Results with and without Track Unavailability

The following tables (Table 2 and Table 3) provide a comparison of the consolidated outputs of each scenario presented in the WIRP User Group SDD Response. For reference a comparison table of performance and throughput criteria between the “without closures” and “with track unavailability” applicable to the non-WIRP users is provided to support the relative benefits.

**Table 2 – Modelled Scenarios without Track Closure Program and Speed Restriction Allowance**

| Scenario | 1a - Base | 2a - Base + 5mtpa Export | 2b - Base +5mtpa Export | 3a - Minimum WIRP Scope | 3b - Full WIRP Scope |
|---|---|---|---|---|---|
| **Description** | Pre-WIRP infrastructure 30 minute paths BW | Scenario 1a + 3 Additional consists | Scenario 2a + 2xDuplications Rocklands – Gracemere Parnabal – Umolo | 5xDuplications 2xHolding Roads Kabra 15 / 20 minute Paths | Scenario 3a + last 2 duplications Dingo – Umolo Parnabal – Walton |
| **Target Tonnes Mtpa** | Blackwater 63 Moura 12.5 Domestic 10.5 | Blackwater 68 Moura 12.5 Domestic 10.5 | Blackwater 68 Moura 12.5 Domestic 10.5 | Blackwater 68 Moura 12.5 Domestic 10.5 Blackwater WIRP 23.5 Moura WIRP 3.5 | Blackwater 68 Moura 12.5 Domestic 10.5 Blackwater WIRP 23.5 Moura WIRP 3.5 |
| **Blackwater Export Delivered** | 60.5 Mtpa | 66.1 Mtpa | 67.2 Mtpa | 68.3 Mtpa | 71 Mtpa |
| **Moura Export Delivered** | 12.1 Mtpa | 12.0 Mtpa | 12.0 Mtpa | 11.5 Mtpa | 11.4 Mtpa |
| **Domestic Delivered #** | 12.1 Mtpa | 12.1 Mtpa | 12.2 Mtpa | 11.8 Mtpa | 12.0 Mtpa |
| **Blackwater WIRP Delivered** | | | | 23.4 Mtpa | 20.4 Mtpa |
| **Moura WIRP Delivered** | | | | 3 Mtpa | 3 Mtpa |
| **Avge cycle time Export Blackwater (hrs)** | 22’26” | 23’39” | 23’11” | 23’09” | 23’04” |
| **Avge cycle time Export Moura (hrs)** | 13’48” | 14’00” | 14’01” | 14’41” | 14’45” |
| **Avge cycle time Blackwater WIRP (hrs)** | | | | 19’16” | 19’05” |
| **Avge cycle time Moura WIRP (hrs)** | | | | 25’05” | 24’50” |
| **Avge Delays / cycle Export Blackwater** | 35 mins | 49 mins | 46 mins | 44 mins | 41 mins |
| **Avge delays / cycle Export Moura** | 18 mins | 20 mins | 19 mins | 31 mins | 30 mins |
| **Avge Delays / cycle Blackwater WIRP** | | | | 33 mins | 24 mins |
| **Avge delays / cycle Moura WIRP** | | | | 51 mins | 49 mins |
| **Avge BRTT Blackwater System** | 119.9% | 125.6% | 121.1% | 123.1% | 111.9% |
| **Avge BRTT Moura System** | 108.9% | 108.9% | 108.9% | 118.4% | 112.1% |

# As discussed in the WIRP User Group SDD Response (p. 20), the over-achievement of domestic tonnes is related to the disproportionate allocation of rollingstock capacity to demand of the East End limestone traffic and the way in which the model logic operates. This is not considered a material issue, and further calibration of rollingstock allocations would address this anomaly.

With regard to the above, the key scenarios to compare are 2a and 3a and 3a and 3b. The following key observations/clarifications can be made:

- Blackwater and Moura non-WIRP volumes are maintained in both scenario comparisons. However, it is noted that the non-WIRP Moura volumes decline slightly in spite of the Moura track upgrades. The loss of tonnes is due to a technical modelling anomaly associated with the Barney Point Coal Terminal, which is not intended for ongoing use for coal exports. As such, the results arising from this anomaly are not considered relevant in the context of the analysis undertaken. Further modelling could be undertaken to remedy this anomaly for completeness;
- The WIRP infrastructure increases the throughput capacity of the Blackwater System non-WIRP volumes in both scenario comparisons;
- The WIRP infrastructure improves the Blackwater System BRTT performance, and with the addition of the final two duplications in scenario 3b, delivers additional benefit to all Blackwater System users beyond the minimum WIRP scope;
- The WIRP infrastructure minimises cycle time of all train services in the Blackwater System (30 minutes between scenario 2a and 3a), and with the addition of the final two duplications in scenario 3b, delivers further benefit to all Blackwater System users above the minimum WIRP scope. Section 2.3 further discusses the quantifiable benefits of cycle time reductions;
- Moura System performance reflecting increased BRTT and cycle time is to be expected when additional train services are added to a single line network, however such increases are within acceptable limits and the system continues to achieved desired performance levels; and
- The Blackwater System demand of 91.5Mtpa is met regardless of export demand delivered in excess of target. The under delivery of WIRP volumes in scenario 3b reflects the behaviour of the model in allocating services on a system basis to meet demand. This is not considered a material issue, and further calibration of rollingstock allocations would address this anomaly.

Further analysis of the modelling results produced for both the “without closures” and “with track unavailability” scenarios has been conducted to confirm a close correlation of the incremental benefits delivered with each scenario. Table 3 below presents these comparative performance outcomes.

**Table 3 – Comparison of Blackwater System Users Performance Summary without Closures vs Track Unavailability Scenarios**

| Scenario 1a – 2a | Without Closure | With Track Unavailability |
|---|---|---|
| **Throughput** | 8.5% improvement | 9% improvement |
| **Cycle Time** | 73 minute increase | 65 minute increase |
| **Average Delays / Cycle** | 28.6% increase | 27.9% increase |
| **Scenario 1a – 2b** | **Without Closure** | **With Track Unavailability** |
| **Throughput** | 10% improvement | 10.1% improvement |
| **Cycle Time** | 45 minute increase | 43 minute Increase |
| **Average Delays / Cycle** | 24% increase | 16.7 % increase |
| **Scenario 1a – 3a** | **Without Closure** | **With Track Unavailability** |
| **Throughput** | 11.4% improvement | 9% improvement |
| **Cycle Time** | 43 minute increase | 37 minute Increase |
| **Average Delays / Cycle** | 20.5% increase | 16.7% increase |
| **Scenario 2a – 3a** | **Without Closure** | **With Track Unavailability** |
| **Throughput** | 3.3% improvement | 1% improvement |
| **Cycle Time** | 30 minute reduction | 18 minute reduction |
| **Average Delays / Cycle** | 10.3% reduction | 14.5% reduction |

From this table it can be seen that in most cases, the relative changes to each criteria remains constant, particularly throughput. This suggests the incremental benefits to non-WIRP users of the infrastructure nominated are linear and evident in either technique. The widening gap between scenario 1a and 3a is expected as more traffic operates on the network and the impact of unavailability impacts queuing.

It is notable in scenario 3a with track unavailability, the benefits associated with cycle time and delays per cycle are more evident, confirming the WIRP infrastructure does benefit all users.

Furthermore the benefits to non-WIRP Users realised from WIRP is shown in the comparison between scenarios 1a and 3a and 2a and 3a.

## 2.3 Benefits of Cycle Time Improvement

The tables above demonstrate the incremental benefits to the operational performance metrics of cycle time, average delays per cycle and BRTT.

Table 5 below, by example, compares the results from a static capacity model identifying the benefit of a thirty minute reduction in cycle time.

**Table 5 – Results of a 30 Minute Cycle Time Reduction**

| Consists | Payload (t) | Days per Year | Cycle Time (hrs) | Trains per day | Mt per Month | Trains per year | Mtpa Delivered |
|---|---|---|---|---|---|---|---|
| 29 | 8100 | 350 | 24.5 | 28.4 | 6.7 | 9,943 | 80.5 |
| 29 | 8100 | 350 | 24.0 | 29.0 | 6.9 | 10,150 | 82.2 |

The benefits of improvement to cycle times are socialised throughout the rail supply chain to all supply chain participants, and generally take the form of greater asset productivity (i.e. more throughput with the same assets deployed) and/or reduced cost per GTK (i.e. less assets achieving the same throughput).

For example, the half hour reduction in the cycle time observed in the modelling outcomes between scenarios 2a and 3a for consists in the Blackwater System (non-WIRP) will manifest itself in the form of any of the following benefits (or combination thereof):

- The achievement of approximately 2Mtpa of additional throughput capability for the system, or providing greater ability to recover from system losses/outages (i.e. providing greater certainty of contracted volumes being achieved in the medium to long term), whilst maintaining constant the likes of the number of consists deployed and BRTT;
- An approx. 2.5 – 5% reduction in BRTT, keeping constant other factors; and
- Approximately one (1) less consist in the system (approx. $48m), keeping constant other factors.

[redacted]

[redacted]

Excluding the loading and unloading activities of the supply chain, there are several contributing operational factors to cycle time increases. These primarily include:

- Delays crossing trains on single line sections, made worse as more rollingstock is added to the system creating more dense traffic and congestion;
- Delays caused by speed restrictions; and
- Delays caused by above rail operations such as out of course crew changes.

Reduction in cycle time will produce benefits to all system users in the form of reliability, cost reduction and productivity increases.

## 2.4 Infrastructure Benefits Summary

In the context of this section it is important to understand that in the CQ Coal Systems, 'capacity' of the network is allocated and managed on the basis of daily train paths. The number of train paths that are available for allocation is a function of the following key attributes:

A. The level of installed capacity to meet contract, absent of network (or greater supply chain) outages;
B. The level of planned network (or greater supply chain) outages; and
C. The level of sufficient 'buffer' to absorb out of course (unplanned) network (or greater supply chain) outages.

Whilst 'capacity' is generally considered in the context of "A" above, the **reliable and sustainable** delivery of this capacity can only be achieved if proper consideration is given to, and allowance made for, "B" and "C". The latter being a measure of the 'robustness' of the network (or greater supply chain).

The WIRP User Group SDD Response identifies a benefit to the non-WIRP users in reliably delivering the additional 5Mtpa arising from two of the required five WIRP track duplications. Those two duplications being Rocklands – Gracemere and Parnabal – Umolo.

These were selected based on the level of track delays observed in scenario 2a. It is noted that QR Network in its 2008 and 2009 CRIMP identified Rocklands – Gracemere and Walton – Bluff as being required to deliver their SBB76 (UT3) and SBB82 scenarios. Scenario 2a and 2b are equivalent to QR Network's SBB82 scenario.

This scenario tests the benefit of these two duplications in reliably delivering an additional 5Mtpa exclusive of WIRP, through a network that appeared to be degrading in its capability as outlined in the performance data provided in section 2.2.3 of the WIRP User Group SDD Response.

These two duplications are included in the minimum WIRP scope as they were part of the five critical sections requiring duplication to provide the additional train paths required each day to schedule the increased number of trains required by WIRP and existing demand including the additional pre-WIRP 5Mtpa.

Therefore without WIRP it is a reasonable position that the modelled two duplications identified above, or two duplications identified by QR Network previously in CRIMP publications would have been required to reliably deliver the increased demand - not specifically because capacity in the form of available train paths was unavailable.

The QCA should satisfy itself in regard to the timing of commitment of this additional 5Mtpa in establishing the basis of allocating costs for these first two duplications. The WIRP Users do not hold a firm view whether such costs are allocated to the non-WIRP volumes or socialised across the WIRP and non-WIRP volumes. The WIRP Users do however hold a firm view that it is unreasonable for these duplications to be solely allocated to WIRP volumes.

Similarly the final two of the seven duplications delivered under WIRP are not required specifically for capacity as the minimum five duplications provided the required capacity in the form of additional train paths.

The benefit to all system users of duplicating the Dingo – Umolo and Parnabal – Walton single line track sections is to eliminate single line section bottlenecks for train crossing. This is evident in the modelling outcomes of cycle time and BRTT improvements.

The benefit to all system users is that the final two duplications address the remaining key points of network degradation. These are single line sections and crossing loops, which could reasonably be expected to be either subjected to accelerated end of life and increasing failure rates or require greater levels of maintenance thus reducing system availability to all users.

To summarise:

- Five duplications are required to provide the number of train paths necessary to deliver the system total of 108Mtpa (81Mtpa + 27Mtpa);
- Had the timing of WIRP not coincided so closely to the contracting of an additional 5Mtpa through RGTCT, two of these five duplications, nominally Rocklands – Gracemere and Parnabal – Umolo (or Walton – Bluff as identified by QR Network) would have been required to **reliably and sustainably** deliver the pre-WIRP 81Mtpa (76Mtpa + 5Mtpa) due to the number of available train paths being exhausted and the declining condition of the track infrastructure. The modelling has clearly demonstrated the benefits of these duplications to the non-WIRP users; and
- The last two duplications of the WIRP scope being Dingo – Umolo and Parnabal – Walton are required to **reliably and sustainably** deliver the system total of 108Mtpa (81Mtpa + 27Mtpa) by smoothing system velocity and de-bottlenecking the remaining single line sections – ensuring an adequate level of robustness in the network.

As noted in the WIRP User Group SDD Response, these last two duplications predominantly establish a sustainable level of robustness in the Blackwater System that facilitates the reliable delivery of overall contracted volumes (i.e. 108Mtpa). This benefits both WIRP and non-WIRP users equally.

It is on this basis that the WIRP Users have allocated the cost of these duplications equitably across all Blackwater System users. By allocating these costs solely to WIRP Users suggests the non-WIRP Users would not realise the benefit of a practical and sustainable level of robustness to deliver the non-WIRP contracted volumes, without which the non-WIRP volumes could not be adequately serviced.