

2018 Interstate Network Access Undertaking Renewal

Explanatory Guide

March 2018

ARTC



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1 Executive Summary

The Access Undertaking (IAU) covering access to ARTC's interstate rail network commenced in 2002. The current version expires in August 2018. The IAU has contemplated significant changes in the interstate freight market from the initial separation into above and below rail and the expansion to include New South Wales and into Queensland.

1.1 IAU Approach

The approach contained in these historical IAU's was to meet the following objectives:

- Published reference pricing is open and simple – promotes usage and market confidence, enhancing above rail competition
- Pricing is non-discriminatory – promotes market confidence in equitable treatment, enhancing above rail competition
- Indicative pricing is market based – promotes rail competitiveness
- Indicative pricing – provides pricing certainty promoting investment and market entry enhancing above rail competition
- Two part pricing – encourages more efficient above rail operations, and set at less than fixed cost levels so as not to inhibit market entry
- Pricing promotes market growth, improving cost recovery and long term asset sustainability

1.2 Customer Engagement

In its proposed 2018 IAU, ARTC is focussed on maintaining all of the above objectives. However, during the process of engaging with its customers, a common request was for greater flexibility in services; whilst ensuring there was pricing certainty on market based services.

In considering these requests and contemplating the impact of competition from other modes of transport, but principally road, in the supply of interstate freight, ARTC considers that changing the current IAU negotiate-arbitrate model from a prescriptive, reference tariff approach to one constraining negotiations within a floor and ceiling price band would deliver better outcomes. Critically, the commitments to transparent and non-discriminatory pricing will be maintained with the outcomes of all customer negotiations published on ARTC's website.

1.3 Intermodal Competition

The historic under recovery of economic cost through the term of the 2008 IAU is evidence of the significant competitive constraint provided by other modes of transport and ARTC's commitment to meeting the pricing objective of being market based. Such pricing reflects the competitive position of rail which addresses both price and non-price terms and is therefore a function of negotiation between above rail operators and ARTC based upon the end value of the market.

1.4 Banded Negotiate-Arbitrate Model

ARTC is proposing to implement a banded negotiate-arbitrate model to improve the flexibility of services agreed with customers to reflect their market needs whilst ensuring the pricing objectives are maintained with a fundamental commitment to transparency and non-discriminatory pricing.

The negotiate-arbitrate model proposed by ARTC within the 2018 IAU provides that access pricing will be the result of direct negotiation between ARTC and its customers within a framework that delivers a unique level of transparency for infrastructure access by defining for each segment:

- The direct cost of operating that segment, as defined in the published floor price;
- The full economic cost of that segment, as defined in the ceiling price;
- Historic prices for the provision of services being on the public record; and
- Commercially agreed terms and conditions being published for all existing and potential users to access such prices.

The ACCC has acknowledged in public submissions that such a commitment to transparency provides a balanced negotiating framework. This is before the oligopsonistic structure of the above rail market and its consequent impact on the countervailing power of ARTC's customers is accounted for. The banded negotiate-arbitrate model proposed by ARTC will therefore ensure a balanced negotiation framework, through the provision of full cost and price transparency which removes any information asymmetry on behalf of ARTC.

1.5 Amendments to IAU and ITAA

The amendments required to implement the negotiate-arbitrate model are mainly focused on the removal of references to Indicative Tariffs as well the definition of the floor and ceiling by segment and their ongoing escalation over the term of the 2018 IAU. Other amendments to the Indicative Track Access Agreement (ITAA) reflect amendments required to align the ITAA with standard customer agreements negotiated under the 2008 IAU as well as some changes to simplify the operation of various clauses. Finally, the application of a five year term removes the need for mid IAU reviews and hence clauses relevant to such reviews are deleted. These are discussed in detail in Appendix 2.

1.6 Ceiling and Floor Calculation Methodology

The approaches to define the ceiling and floor limits are outlined in the document, but reflect the application of a WACC to the Regulated Asset Base (RAB) of each segment, where that RAB is assessed on the basis of the previous RAB approved in the 2008 IAU plus additional capital expenditure on the segment during that term.

A WACC of 8.97% (post-tax, nominal) has been utilised for the 2018 IAU.

The 2018 IAU continues with the concept that the interstate network exists in perpetuity. Therefore no depreciation allowance is included in the economic ceiling calculation.

Operating costs, including overhead, are provided on an ex-ante basis and reflect the forecast costs required to accommodate the assumed network utilisation.

The ceiling and floor revenue limits are converted into \$/GTK rates based on the following process:

- The ceiling and floor limits applicable to the Indicative Service is established based on the proportion of total network usage by intermodal freight;
- This proportion is converted into a \$/GTK rate for statement in the IAU by dividing the revenue limits applicable to the Indicative Service by the assumed GTK associated with those services by line segment.

ARTC is committed to two part pricing and believes that the flagfall component incentivises more efficient use of network capacity. Although provided as a full \$/GTK rate for reference

purposes, the ceiling will operate for a 2 part tariff by providing a maximum revenue per service against which any Indicative Service agreement can be tested. The test requires the negotiated segment revenue (sum product of the negotiated variable and flagfall charges based on contracted GTK's and Train Kms) to fall below the approved ceiling revenue (the product of the ceiling rate and the contracted GTK).

1.7 Term

The other significant change to the 2018 IAU is a limitation of the term to approximately 5 years based on an expiry date of 30 June 2023. The announced Inland Rail project will have a substantial impact on the operation and utilisation of the interstate network, the precise nature of which is difficult to estimate at the start of the project. With project completion likely by 2025, ARTC is proposing a 5 year term to allow for Inland Rail to be accommodated in the next version of the IAU.

1.8 ATMS

The implementation of ATMS will potentially require an adjustment in the access charges paid by Operators which ARTC will negotiate with its customers within the constraints of the proposed revenue ceilings. Should ARTC choose to include the capital associated with the development and implementation of ATMS into the RAB and consequent ceiling calculations, it will seek a variation to this 2018 IAU or, alternatively, include ATMS capital in the 2023 IAU following the expiry of this 2018 IAU.

2 ARTC's Role and Objectives

Australian Rail Track Corporation Ltd is a company under the Corporations Act, whose shares are held by the Commonwealth of Australia.

ARTC was created in 1998 through an Inter-Governmental Agreement (IGA) signed by the Commonwealth, Victoria, South Australia, NSW, Western Australia and Queensland. ARTC was established as a consolidated interstate rail track owner to create a single process for access, consistent with the Competition Principles Agreement and the National Rail Summit Heads of Agreement. ARTC's charter at inception was to:

- Improve performance and efficiency of interstate rail infrastructure
- Increase capacity utilisation
- Listen, understand and respond to the market
- Operate on sound commercial principles
- Provide shareholders with a sustainable return on capital invested

The objectives of ARTC under the Inter-Governmental Agreement are to provide efficient and seamless access to the interstate rail network by:

- operating the business on commercially sound principles;
- pursuing a growth strategy for interstate rail;
- improving interstate rail infrastructure through better asset management and a program of investment; and
- promoting operational efficiency and uniformity on the interstate network.

The IGA provided for ARTC to have commercial performance incentives and the capacity to price, market and manage supply of its services flexibly in the context of a competitive transport market.

ARTC currently has responsibility for the management of around 8,500 route kilometres of standard gauge track, in South Australia, Victoria, NSW and Western Australia. ARTC owns the following rail corridors:

- Adelaide – Wolseley
- Adelaide – Pt Augusta – Kalgoorlie
- Pt Augusta – Whyalla
- Broken Hill – Crystal Brook
- Tarcoola – Alice Springs (long term lease to Asia Pacific Transport, operators of the Alice Springs – Darwin Railway)
- Parts of the Adelaide metropolitan track between Dry Creek and Outer Harbour.

In Victoria, the ARTC lease consists primarily of the two mainline interstate standard gauge corridors from the Victorian Government, being:

- Melbourne – Wolseley
- Melbourne – Albury

ARTC also manages access to the connection from the interstate mainline network to the Port of Melbourne.

In NSW, ARTC leases the following parts of the NSW rail network:

- Albury – Macarthur
- Woodville Junction (Newcastle) – Queensland Border
- Cootamundra – Broken Hill
- Parkes – Werris Creek/Ulan
- Macarthur to Chullora (Southern Sydney Freight Line)
- Chullora to Port Botany (Metropolitan Freight Network)
- Narrabri to North Star
- Hunter Valley rail network (Newcastle ports – Narrabri/Ulan)

The Sydney Metropolitan Freight Network (MFN) has been defined as the Chullora to Port Botany section which reflects the dedicated segment for freight haulage into Port Botany. The section from Sefton Park to Flemington Junction which is included in the MFN for the current IPART regulatory review has been incorporated into the Southern Sydney Freight Line (SSFL) to reflect its primary use for intermodal traffic in the north south corridor.

This 2018 IAU reflects the inclusion of the MFN into the network covered by the IAU.

In Queensland, ARTC leases the section from the Queensland Border to the Acacia Ridge Terminal. This section has previously not been included in the IAU and so the 2018 IAU represents its inclusion into the Access Agreement for the first time.

Over these corridors, ARTC is responsible for:

- Selling access to train operators
- Development of new business
- Capital investment
- Operational management
- Management of infrastructure maintenance

The sections of the network identified above as being added to the coverage of the 2018 IAU were not leased by ARTC in 2008 and hence were not included in the 2008 IAU.

2.1 Status of This Guide

This Guide is intended as a public document and ARTC believes publishing of this Guide will aid the comprehension of the application to vary the 2018 IAU. To the extent of any inconsistency under the 2018 IAU, the 2018 IAU prevails.

3 History of the Undertaking

From its inception to the approval of the first Access Undertaking (2002 IAU) by the ACCC in May 2002, ARTC operated under state based access regimes in South Australia and Victoria. Following that approval, the 2002 IAU provided for open access to tracks on the interstate network managed by ARTC in Victoria and South Australia, extending to Broken Hill in NSW and to Kalgoorlie in Western Australia.

The 2002 IAU codified critical underlying principles acknowledged by the ACCC in accepting the IAU:

- Intermodal competition exists;
- ARTC is not vertically integrated;
- Charges set by ARTC in the marketplace result in revenues that fall significantly below a level that would allow for the business to earn an adequate long term economic rate of return. To mitigate against this, ARTC seeks to grow volumes on the network;
- ARTC has adopted the concepts of equity and openness as key elements of its pricing policy, in order to stimulate market confidence and growth in the rail industry; and
- ARTC's cost structure will reflect efficient practice
- ARTC could not achieve full recovery of its economic costs due to the competitive constraints on below rail pricing provided by road transport.

The 2002 IAU was an essential development in the establishment of the commercial framework for rail access; entrenching the separation of the above and below rail markets and enhancing competition in the contestable above rail market. A high level of prescription on key commercial and access process issues was therefore required to provide certainty plus a commitment to transparency and non-discrimination to promote competition and growth of rail freight. The 2002 IAU provided for the appropriate allocation of liability between ARTC and above rail operators, as well as pricing certainty to encourage competition in a developing market; especially where the above rail market incorporated both public and private ownership.

The 2002 IAU addressed:

- Access negotiation process - including dispute resolution)
- Pricing Principles – including indicative access charge
- Capacity Management of the network;
- Network connections and additions;
- Network Transit Management – codifying the passenger priority/;
- Performance Indications – commitment by ARTC to publish performance statistics
- Indicative Access Agreement

Following the initial expiry of the 2002 IAU in May 2007, the 2008 IAU was approved on 30 July, 2008 by the ACCC with the addition of tracks in NSW. This application provided for the potential for full CPI escalation of the Indicative Service tariff. Whilst the 2008 IAU therefore allowed for the potential for a constant real price for the 10 year term, it also retained significant prescription on price and other key matters. This has constrained ARTC's flexibility to respond to Customer

requests; a key issue raised in the engagement process undertaken as part of the 2018 IAU renewal process.

3.1 Pricing Methodology

The approach to pricing contained in the 2002 and 2008 IAU's was based on meeting the following objectives:

- Published reference pricing is open and simple – promotes usage and market confidence, enhancing above rail competition
- Pricing is non-discriminatory – promotes market confidence in equitable treatment, enhancing above rail competition
- Indicative pricing is market based – promotes rail competitiveness
- Indicative pricing – provides pricing certainty promoting investment and market entry enhancing above rail competition
- Two part pricing – encourages more efficient above rail operations, and set at less than fixed cost levels so as not to inhibit market entry
- Pricing promotes market growth, improving cost recovery and long term asset sustainability

The 2008 IAU defines the tariff associated with the indicative access service, being the transport of general freight on a super freighter train; a service defined as Super Freight. The tariffs associated with non-indicative services are not prescribed in the IAU, and are therefore subject to negotiation between ARTC and the Operators.

The current two part tariff structure applying to the Interstate network is applied to every path booked by an operator and has two parts:

- A flagfall component based on \$/km;
- A variable component based on \$/gtkm.

The flagfall component is effectively the take or pay component of charging and persists for up to 12 months or more beyond the cancellation of a path.

Some customers have expressed a position that they believe the combination of the flagfall and its continued payment for 12 months in the event of a path being cancelled are potential barriers to rail's competitiveness against other modes of transport. Countering this, the flagfall also incentivises more efficient utilisation of capacity by encouraging ore freight on a given path. ARTC's proposed approach provides the ability for customers to negotiate a different weighting dependent on the individual business requirements of that customer and ARTC.

Within the pricing constraints provided by competition from road and other modes of transport, the main driver for both the structure and the level of ARTC tariffs has therefore been the promotion of above rail competition. ARTC, therefore, has been prepared to accept the volume risk represented in highly variable charges to promote above rail competition to drive more freight on rail resulting in higher volumes. Market analysis, both domestically and internationally, has suggested intermodal markets are also sensitive to non-price issues as well as absolute price levels.

3.2 Commercial Model

The commercial model utilised by ARTC on the Interstate network is to enter into an Access Agreement with above rail operators using the Indicative Service Track Access Agreements outlined in the IAU as a template, but allowing for negotiation and amendment on key points.

The pricing model defined in the 2008 IAU is replicated in the existing commercial contracts with operators, but the price is explicitly defined in the contract rather than referencing the price path in the IAU. Although there is no direct contractual link, there is no incentive for ARTC to negotiate this tariff as it cannot increase it above the IAU prescribed level for the Indicative Service which reflects the majority of services on the interstate network.

3.3 Interaction between IAU and Access Agreements

Although the Indicative Tariff is defined in the IAU, the actual tariff agreement between ARTC and the Operator is defined in the Access Agreement between them. Therefore, although the tariff clauses reflect the prescription in the IAU, they are not dependent upon the IAU. The Access Agreements on the Interstate Network, unlike the Hunter Valley Coal Network, are therefore standalone agreements that are not conditional on an approved IAU for their performance.

The Interstate Network generally competes in the market for the transport of freight and is subject to significant competition from road transport and, to a lesser extent, coastal shipping. The asset risk of the Interstate network is therefore significant given this competition from other modes of transport.

3.4 IAU Compliance Process

The 2008 IAU established an Indicative Tariff per segment which was approved by the ACCC on the basis that it fell below the calculating ceiling limits for each segment. Once approved, that Indicative Tariff (as escalated) reflected the maximum that can be charged for the Indicative Service by ARTC with no ongoing annual compliance.

No change to the current ACCC compliance process is therefore expected under a renewed IAU given that positioning of the tariff compared to the ceiling is easily verifiable, in the same way tariffs are currently compared to the Indicative Tariff, and any disputes can be referred to the ACCC.

4 Intermodal Market

4.1 Background

The rail industry faces significant competition from other modes of transport, particularly road and sea. Australia has one of the most efficient trucking industries in the world and is one of the most intensive users of road freight in the world on a tonne – kilometre per person basis. Technological improvements by the road industry, such as the introduction of B-doubles, has driven significant productivity gains in the road freight sector; further increasing the competitive pressure under which rail operates. This competition from road is exacerbated by the lack of a transparent, user pays road access charging mechanism for heavy vehicles, ensuring that road freight enjoys a legislative competitive advantage against rail.

The competitive nature of these key markets necessitates various elements of the rail industry to closely coordinate activities along supply chains. As ARTC does not control the entirety of the below rail service provision in many interstate markets, ARTC continues to coordinate its activities (such as train planning and management) with other track managers, both on the interstate network and regional networks. This cooperation and coordination has occurred because of recognition by

participants that a coordinated approach is necessary either for rail to compete and sustain itself, or because it is the most efficient or effective method to arrange paths between the track managers.

ARTC recognises that rail performance in competitive markets is not just a function of the performance of the train operator, or the track manager, but is a joint effort, aided by coordination and communication between parties. To this end, ARTC recognises that its activities and those of its customers need to be coordinated to the extent that a multi-user environment will permit in order to achieve and maintain competitive rail performance levels. Developing a 2018 IAU structure that further enhances commercial flexibility will only benefit this coordination.

In its approval of the 2008 IAU, the ACCC highlighted the competition the Australian rail industry faces from road freight as well as the service flexibility sought by rail customers covering different mixes of speed, reliability, service flexibility and/or the management of safety issues (for example those carrying dangerous or volatile products). Further, it was found that broader freight services, such as road and sea, affect the rail industry in a number of ways, including potentially providing competitive pressure that affects the service standards and prices rail needs to offer its customers.

The competition from road was found to constrain ARTC from simply increasing access pricing in order to recover its investment, which is highlighted by the charts below demonstrating ARTC has failed to approach recovery of its full economic cost. The ACCC highlighted ARTC's strategy for long term asset sustainability in this competitive environment included strategic investment in, and management of, its assets to improve rail competitiveness in the longer term. It was noted however, that ARTC's financial success and sustainability relies heavily on the recovery of long term acceptable returns from investment

Section 5 below highlights the extent of this strategic capital investment, especially on the east-west corridor. Section 6 also highlights the investment and introduction of ATMS to further benefit the operation of the rail network.

This need for flexibility has been a recurring theme in ARTC's customer engagement to improve rail's competitive position. Given the significant strategic investment made by ARTC on the interstate network under the 2008 IAU, amending the approach of the 2018 IAU to a negotiate-arbitrate model allows ARTC the commercial flexibility to match the service improvements provided by this investment and improve rail's competitive position against road.

4.2 Role of Ceiling and Floor Prices

The value of changes in service quality is customer specific and ARTC believes that the IAU should provide ARTC and its customers the flexibility to negotiate arrangements that accurately reflect the needs of each customer, but within a regulatory framework that provides the principles of:

- Transparency of the negotiating framework through a statement of the floor and ceiling within which the negotiation will occur;
- Transparency of the negotiated outcomes, such that the prices that relate to specific services are published and the competitive position of all players is understood; and
- Non-discrimination of terms and conditions between customers such that customers which contract for the same service will pay the same price.

The 2018 IAU is therefore based on an amended role of the ceiling in the IAU whereby this document defines the Indicative Service Tariff range that reflects the ceiling and floor calculations. ARTC's commitment within this IAU is that, in the negotiations with customers for Indicative Services, it will not contract for that service which results in revenue above that resulting from the ceiling price (or below that resulting from the floor price).

The ceiling and floor prices therefore define the negotiation range for below rail access prices between ARTC and its customers. The final price will be a reflection of the allocation of risk between the parties within the overall constraint provided by the competitiveness of road.

ARTC is therefore committing to transparency in respect of its full economic return and variable cost recovery through the definition of the floor and ceiling, and is further committing to a negotiation framework for the Indicative Service that will not result in revenue from that service outside those defined boundaries for the term of the IAU.

By developing the 2018 IAU in this fashion, ARTC believes that it is promoting the negotiation of more flexible services by providing explicitly for this negotiation framework; and is further constraining itself to conduct that negotiation within a floor and ceiling boundary. This framework is a critical constraining factor on any exercise of market power by ARTC compared to the current IAU.

4.3 Constraints on Market Power

The current IAU allows for the negotiation of amendments to the Indicative Service which, once completed implies that such a service is not subject to the Indicative Tariff constraints provided within the IAU. Therefore, ARTC could provide more flexibility to customers than that implied by the Indicative Service in the manner of changes discussed below, but it would not be price constrained in any fashion if it exercised that discretion.

This 2018 IAU imposes a significant constraint on ARTC by highlighting that it will not charge more than the ceiling price for any intermodal super freighter service; no matter the flexibility it negotiates with its customers.

The Ceiling definition therefore has a substantially greater role to play in the negotiation of flexible arrangements as translated to a ceiling price for Indicative Services between ARTC and its customers by limiting the price it will charge for flexibility. This is a significant constraint on any market power which ARTC may hold; which is already substantially constrained by the competitiveness of road.

4.4 Countervailing Power

The structure of its customers also impacts on the market power of ARTC.

ARTC is negotiating for access with an oligopsony of above rail providers which ensures there is counter veiling power to ensure that any market power which ARTC may possess as a provider of monopoly below rail services is further constrained by the buying power of its customers (in addition to the substantial competitive constraint provided by competing road services).

This highlights that, notwithstanding the substantial competitive forces to which rail is exposed from road; even within the rail segment of the interstate freight market, ARTC faces significant countervailing negotiation power from its customers.

ARTC's pricing power is therefore constrained by the competition from road and is then further constrained by the counter veiling negotiation power in its customers who are few and well informed.

In the 2007 decision to revoke regulatory coverage of the Moomba to Adelaide Pipeline System (MAPS), the National Competition Council and then South Australian Energy Minister Conlan, held that the bargaining strength of major customers was an effective restraint on market power (<https://www.aer.gov.au/system/files/Minister%27s%20revocation%20letter.pdf>):

1.3.6 Even in the markets along the mainline north of Adelaide and the two major laterals (that depend solely on services provided by the MAPS) the scope for Epic Energy to apply its market power to the detriment of competition is constrained by the bargaining strength of its major customers.

4.5 Information Asymmetry

As detailed in Section 7 below, ARTC’s regulatory approach provides for extensive cost transparency in highlighting the ceiling and floor limits, as well as the transparency of negotiated agreements (and commitment to non-discrimination). This addresses any potential issues with information asymmetry, especially given that past indicative tariffs are already known and published.

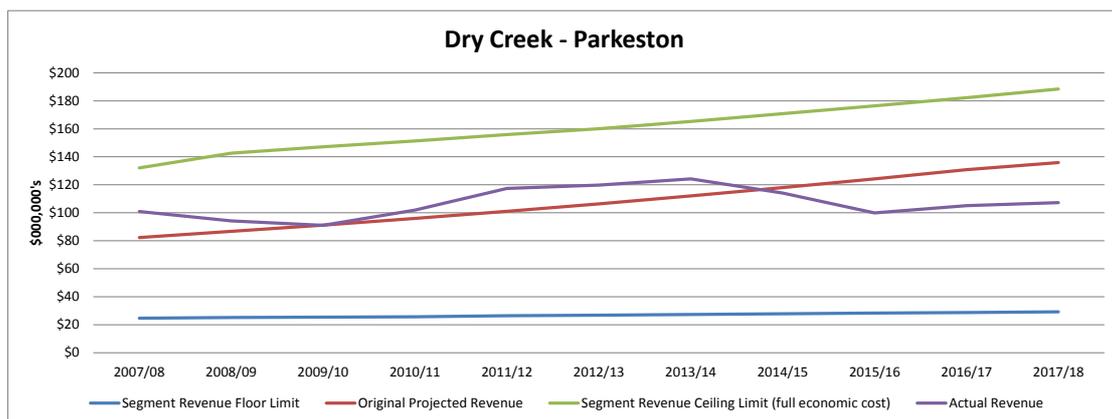
ARTC’s existing and potential customers therefore are fully informed of all information required to negotiate an Access Agreement.

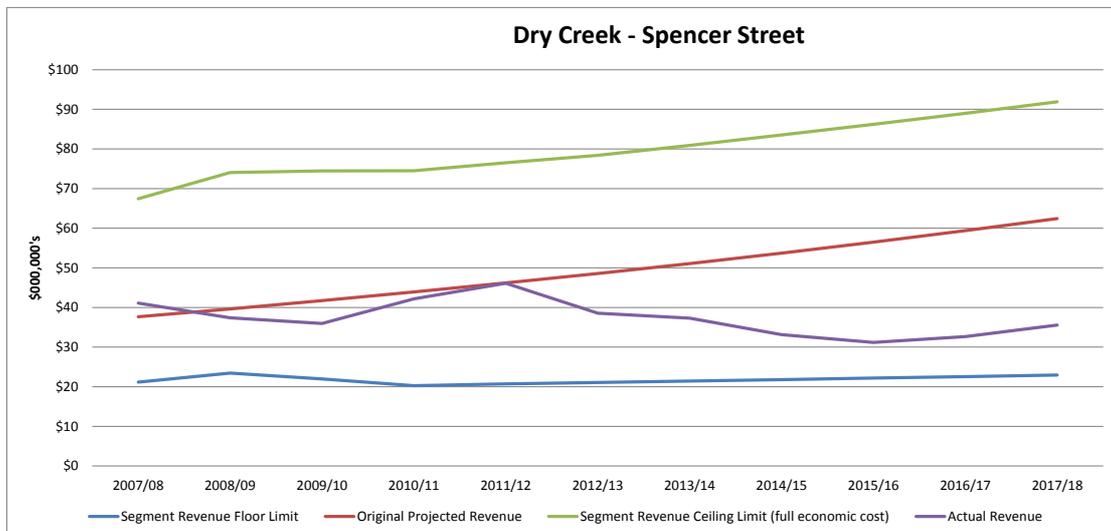
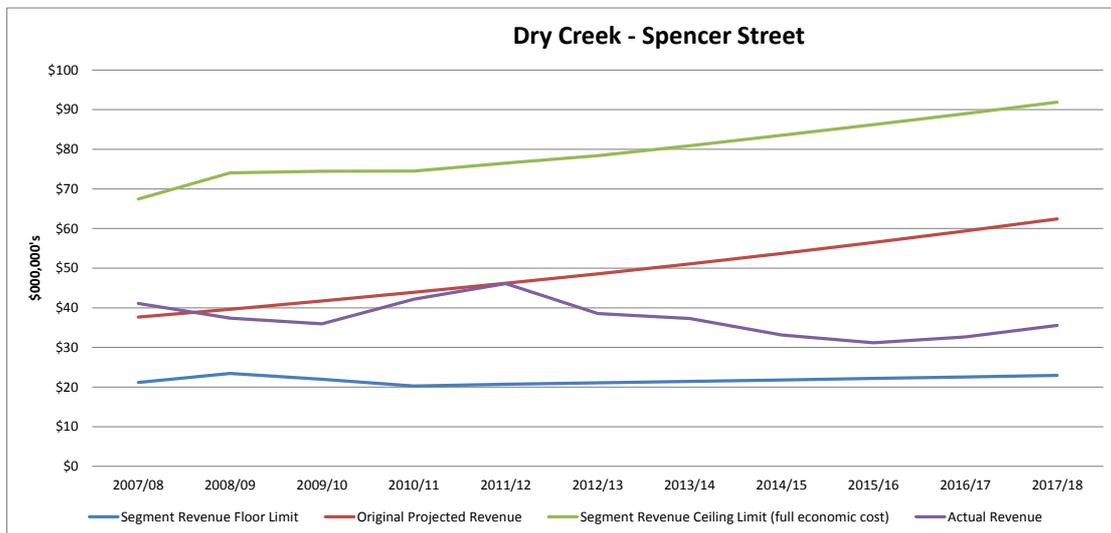
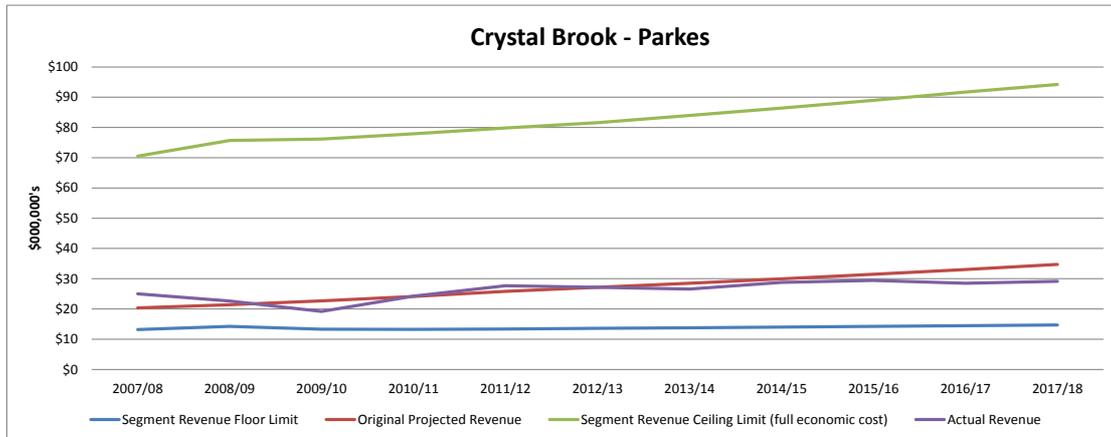
It could be said that, given the oligopolistic nature of the rail segment, ARTC is itself exposed to the information asymmetry as it has no direct access to similar information in respect of its customers’ costs and the value derived from its service.

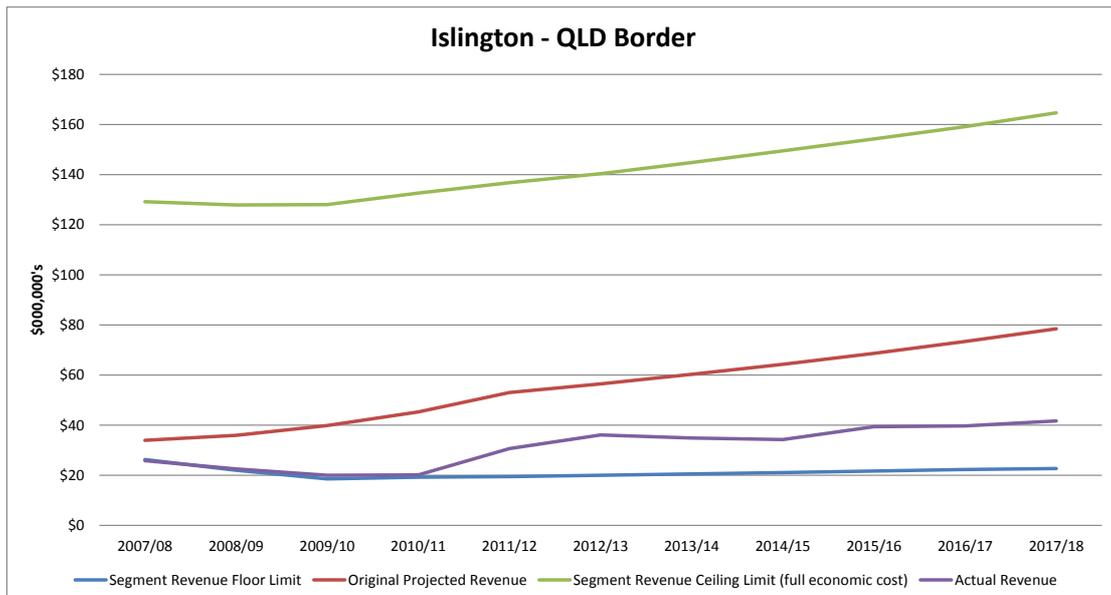
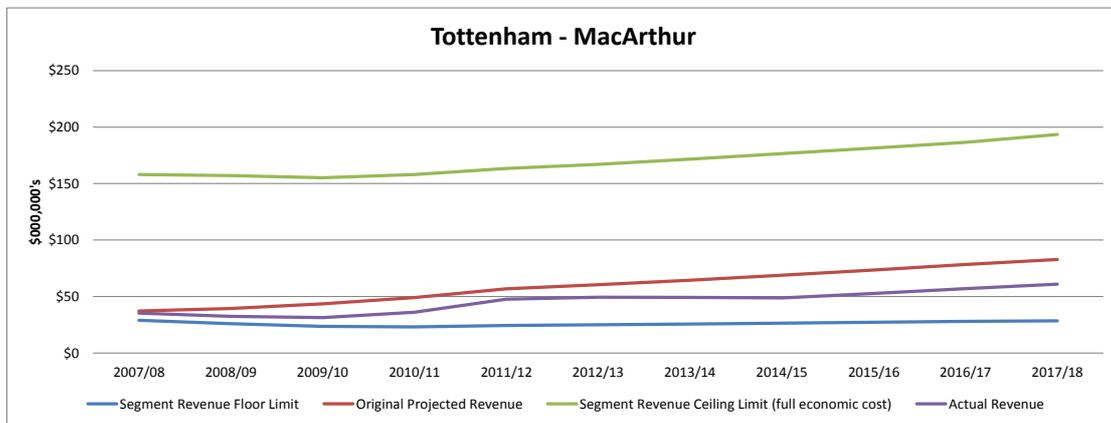
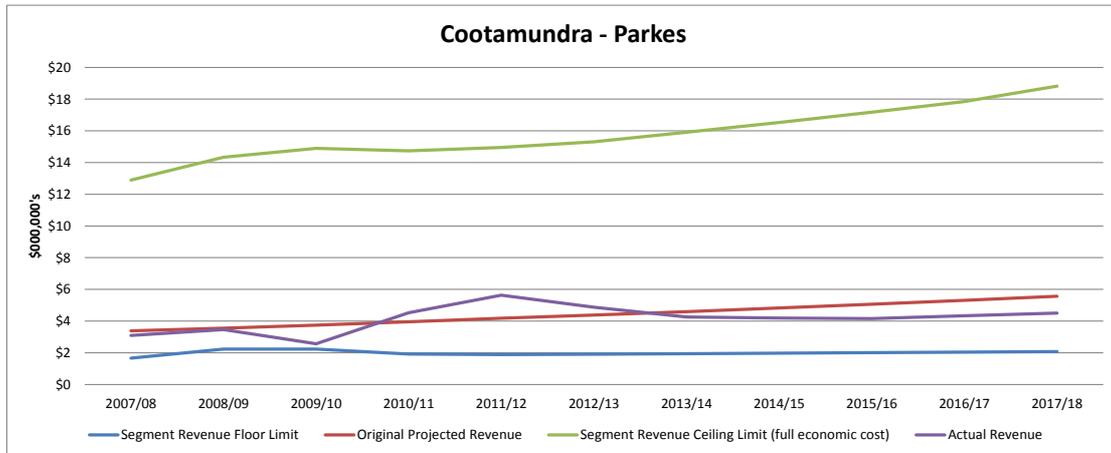
ARTC’s commitment to transparency therefore promotes an information asymmetry in the access negotiations, but this exists with customers possessing the full industry information given their access to ARTC’s ceiling, floor and negotiated prices; whilst ARTC has no similar access to its customers cost information.

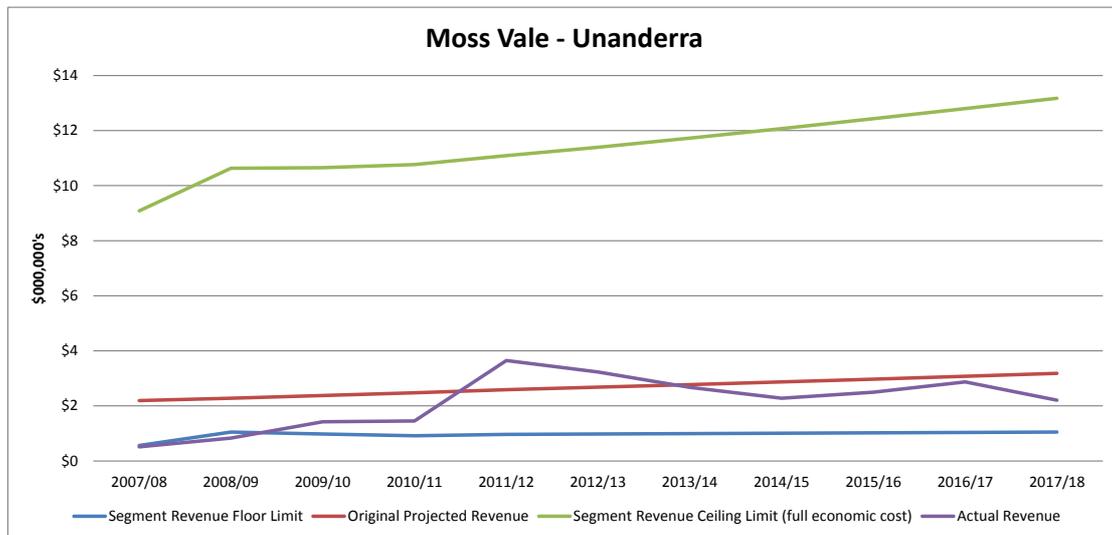
4.6 History of Access Pricing

The following charts highlight the actual revenue earned during the term of the 2008 IAU compared to the approved ceiling and floor limits and forecast revenue for each segment covered by the 2008 IAU:









These charts, all sourced from ARTC internal analysis, highlight the strength of the competitive constraints on ARTC’s pricing power given the position of revenue below the projected ceiling

4.7 Access Pricing Power Conclusion

The Interstate Rail Network can therefore be defined as a below rail asset servicing the interstate market for freight transport and as such is subject to intense competitive pressure from road which restricts ARTC’s access pricing power. This competitive constraint is then further constrained by the heavily concentrated, oligopsonistic nature of the above rail market ensuring that ARTC’s customers have substantial counter veiling power to further constrain ARTC’s pricing power.

ARTC’s commitment to transparency and non-discrimination ensures that ARTC’s customers have an understanding of both the direct and full economic costs of the network, and the outcomes of any completed negotiations which will be applied to those customers seeking access. Given that existing customers are aware of their current prices and the past Indicative Tariffs which apply; this further constrains any negotiating power by highlighting where in the band of floor and ceiling existing prices are.

The above charts highlight that the historical revenue position in all IAU segments is clearly below the ceiling, demonstrating the effect of the constraints on ARTC’s access pricing.

5 Key Project Initiatives under 2008 IAU

As outlined in Section 11 below, the methodology for rolling the RAB forward from the 2008 IAU to the 2018 IAU is to include the capital expenditure arising from projects commissioned (or near completion) during the term of the 2008 IAU. The methodology therefore reflects an ex-post capital addition based on actual project cost.

The methodology of the 2018 IAU continues this approach whereby there is no capital allowance for projects commissioned during the term of the 2018 IAU. The impact of this methodology on the ATMS project is specifically addressed in Section 6 below.

During the course of the 2008 IAU, an investment program of significant capital works was undertaken to improve the operational efficiency and capacity of the network allowing for, inter alia, longer trains, higher axle loads, less heat related speed restrictions and improved traffic flow through the Sydney metropolitan region. This programme has, to date, delivered benefits to the North-South corridor of:

- A dedicated freight line in the South of Sydney;
- Expansion of double track and construction of passing lanes between Melbourne and Sydney;
- Full concrete re-sleeping and major rail upgrade for the entire Melbourne to Brisbane corridor;
- Extension and construction of crossing loops to enable full 1500m train operation between Sydney and Brisbane; and
- Major improvements in signalling and control systems on the corridor.

Benefits to the east-west corridor reflect:

- Additional loops between Melbourne and Kalgoorlie to allow 1800m trains to operate and improve capacity availability;
- Additional loops between Parkes and Cootamundra to enhance capacity and improve operational efficiency of the network;
- Rerailing between Adelaide and Tarcoola to accommodate heavier axle loads and greater capacity;
- Resleeping in Western Victoria and between Broken Hill and Adelaide to allow for higher axle loads and reduction in heat related speed restrictions on the network; and
- Major improvements in signalling and control systems on the corridor.

The impact of this expenditure has been to increase the value of the RAB significantly in key sections of the network as well as introduce complete new segments into the network such as the SSFL and MFN.

The impact of investments on the RAB of this capital programme is therefore best demonstrated on the highly utilised east-west corridor, which analysis is in the table below. Given the ex-post adjustment to the RAB for capital inclusion, Indicative Service access charges have been held constant in real terms despite the on-going program of capital works:

East-west segments	Percent Increase in RAB
Adelaide-Kalgoorlie	26%
Melbourne-Adelaide	88%
Parkes-Crystal Brook	52%

6 Automatic Train Management System (ATMS)

ATMS is a train control system which ARTC has been developing in conjunction with Lockheed Martin with the goal to install it as the standard operational system across all ARTC operated networks and, through discussions in industry forums, to establish ATMS as the standard system for Australian rail networks. As an automated train control system, ATMS is targeted to ultimately replace the existing signal and communication systems, providing significant safe working, network capacity and Above Rail operational benefits through the efficiencies which it brings.

The ATMS system has been in development since 2006 and a live run deployment on a test section of the network (Tarcoola to Parkeston) is planned for implementation in parallel with the existing signaling and train control systems. This will occur during the term of the Undertaking but will not be in place when the Undertaking starts.

The costs associated with ATMS reflect:

- the trainborne unit, being equipment which forms part of the locomotive and hence is an above rail asset. Operators will source this equipment direct from a supplier, so is a contestable service. ARTC may contemplate a role in sourcing the units for operators although the units would still be above rail assets; and
- the cost of the infrastructure to provide the service, incorporating the overall system development.

As an above rail asset, the costs of the trainborne units are not contemplated within the IAU.

The structure of the 2018 IAU reflects an approach whereby capital projects are rolled into the ceiling price on an ex-post basis at the commencement of a new undertaking. In this fashion, the network capital improvements undertaken under the 2008 IAU are reflected in the proposed ceiling rates to apply for the term of the 2018 IAU. The Regulated Asset Base (RAB) incorporated into the ceiling calculations for this 2018 IAU therefore does not include any allowance for a return on the development and implementation costs of ATMS.

The implementation of ATMS will potentially require an adjustment in the access charges paid by Operators which ARTC will negotiate with its customers within the constraints of the proposed revenue ceilings. Should ARTC choose to include the capital associated with the development and implementation of ATMS into the RAB and consequent ceiling calculations, it will seek a variation to this 2018 IAU or, alternatively, include ATMS capital in the 2023 IAU following the expiry of this 2018 IAU.

7 Customer Engagement

7.1 Background

Management has engaged with key customers in respect of their perceptions of the operation of the current IAU and sought their input into key changes they would like to see in a 2018 IAU. The key issues arising from this initial round of customer engagement are customers are seeking an IAU which delivers:

- Pricing Certainty for the term of the undertaking;
- Pricing that is market based, allowing rail to compete for contestable freight; and
- All customers receiving the same tariff structure.

Other concerns raised by customers relate to their individual circumstances and reflect the need for flexibility in providing a more bespoke service to accommodate greater levels of both intermodal and above rail competition. The requirement for such flexibilities underpin the shift to a banded negotiate-arbitrate model.

ARTC met with the ACCC on December 18, 2017 and outlined its proposed approach based upon the customer feedback received. No commentary was provided by the ACCC on that proposal.

8 Term

Inland Rail will have a significant impact on the provision and competitiveness of interstate services with full operations expected by 2025. At this stage, it is difficult to state with any certainty what the impact of Inland Rail will be in respect of the operation and utilisation of the interstate network.

ARTC therefore believes that it would not be possible to develop an Undertaking that reflects this uncertainty at this time and is therefore proposing a term for this IAU that expires prior to the commencement of Inland Rail which will allow greater certainty in managing it in the next IAU post this one.

The term of this 2018 IAU is defined to expire on 30 June, 2023.

9 ARTC Proposal for the IAU

The analysis and customer feedback above highlights five fundamental issues in respect of the provision of below rail services in the intermodal freight market:

- The historic development of the IAU has resulted in a prescriptive approach which limits the flexibility of ARTC and customers in negotiating Access Agreements which can respond to market conditions;
- The competitive constraint provided by competition from road and sea is substantial and significantly constrains ARTC's ability to earn an economic return on its asset;
- ARTC's above rail customers are seeking a more flexible access service with greater focus on service quality; and
- ARTC's above rail customers are effectively an oligopoly resulting in significant counter veiling power in the negotiations for track access.

ARTC's operational charter is instructive in responding to the above issues:

- Improve performance and efficiency of interstate rail infrastructure
- Increase capacity utilisation
- Listen, understand and respond to the market
- Operate on sound commercial principles
- Provide shareholders with a sustainable return on capital invested

In order to meet its charter, ARTC must understand and respond to the requests of its customers which will improve rail's overall competitiveness against road; which in turn increases capacity utilisation. ARTC's response to the customers' requests is contained in the proposed changes for this 2018 IAU.

In such an environment, given the competitive constraint of road pricing, there is a question as to whether an IAU is needed at all; however ARTC believes an IAU is necessary for the key reasons of:

- It provides simplicity and certainty in the access negotiation process;
- Given rail is covered by relevant state based regulation, a single undertaking with the ACCC is more efficient than dealing individually with all mainland state economic regulators; and
- It is envisaged that the economic regulation of the interstate road network will become a reality during the term of this undertaking; providing a framework to negotiate within a floor and a ceiling is therefore most likely to deliver regulatory neutrality when economic regulation of the road network is introduced in the future.

ARTC's IAU proposal reflects the evolution of the rail market and the regulatory requirements to ensure its growth and competitiveness against road. ARTC believes that the ability to deliver market growth with the flexibility requested by customers is best achieved via a banded negotiate-arbitrate model, combined with full transparency of negotiated outcomes. Such a model provides for the direct negotiation of access prices between ARTC and its customers within a floor and ceiling price band. The model is designed to maximise the flexibility of commercial negotiations whilst delivering confidence to its customers that the tariff it is negotiating is transparent, non-discriminatory and below the level that represents full economic cost recovery. Such an approach therefore provides greater certainty to customers on the competitive neutrality of their position and the boundaries within which the negotiation will be held.

ARTC has noted the development of the transparency and arbitration framework to assist in delivering negotiated outcomes in access to non-regulated natural gas transmission pipelines, and the ACCC's public references to the benefits of that process. ARTC believes its approach improves upon this approach in that it:

- Is subject to a formal regulatory approval of the proposed ceiling and floor calculations;
- Provides absolute transparency up front of the tariff ceiling to apply to the Indicative Service, and hence on the full economic cost of the segment;
- By defining the floor price for each segment, reflecting the direct cost of operating that segment, full transparency of the direct cost base is provided;
- Provides transparency, clarity and certainty on all negotiated contracts to assist in the understanding of the competitive position of each player in the negotiation process; and
- Provides an ex ante price cap on the Indicative Service.

The presence of the ex-ante price cap ensures that this process is superior to the regulation of ports and also other lightly regulated infrastructure under the ACCC's coverage.

ARTC's approach in defining the ceiling and floor prices attributable to each segment within which it will negotiate access agreements reflects acceptance of the negotiate-arbitrate model of regulation; an approach which has historically been supported by the ACCC. With its commitments to non-discrimination and transparency via the publishing of any concluded agreements, ARTC believes this approach is similar to that of an Indicative Tariff model whilst removing the constraints on its ability to deliver flexible agreements to its customers. This approach therefore will deliver transparent and balanced negotiations, as supported by the ACCC in its submission to the WA Rail Access Regime on 2 January 2018.

The specific changes proposed by ARTC are addressed in the section below; all of which are designed to provide the flexibility requested by customers within a construct of a negotiated price outcome which is non-discriminatory and transparent between the floor and ceiling.

10 Changes to the IAU

The 2018 IUA represents a renewal of the 2008 IAU. The evolution of the IAU into a banded negotiate-arbitrate model requires amendments to both the IAU and the Indicative Track Access Agreement (ITAA) to implement this methodology. Some additional changes to the ITAA are also being proposed to import clauses which have been negotiated with customers over the term of the 2008 IAU; and also to provide greater clarity on the risk allocations that exist between ARTC and its customers.

These amendments are discussed in detail in Appendix 2 with the relevant principles behind the amendments discussed below:

10.1 Specific Document Changes to the IAU

The following are the changes being proposed to the renewed IAU and associated:

10.1.1 Network Expansions

The renewal of the IAU will include the two network segments which are not contained in the 2008 IAU:

- The Sydney Metropolitan Freight Network (MFN); and
- The Queensland Border Loop to Acacia Ridge which will be incorporated into an expanded segment of Newcastle to Acacia Ridge

The section from Sefton Park to Flemington Junction of the MFN segment which operates as part of the north-south intermodal corridor has been included as part of the Southern Sydney Freight Line (SSFL) segment with the line from Chullora to Port Botany reported as a stand-alone MFN segment.

The SSFL was rolled into the IAU in 2013 on its completion. The requirement in the scope of the 2008 IAU to extend it to incorporate the IAU has therefore been deleted.

10.1.2 Term

The 2018 IAU is proposed to expire on 30 June 2023, providing effectively a 5 year term, compared to the 10 year 2008 IAU. This is to allow for any changes reflecting the full operation of the Inland Rail project to be reflected in a future IAU rather than attempting to accommodate them in this version when final completion is at least 7 years away.

This reduction in term implies that no mid-term review of the operation of the IAU is required; therefore the review clauses in the 2008 IAU require deletion.

10.1.3 Contact details

Changes will be made to the contact details for access requests to reflect the ARTC's structural changes since the 2008 IAU.

10.1.4 Provision of Information

The requirement for ARTC to provide DORC values, incremental and economic costs to Access Seekers is replaced by the provision of the approved ceiling and floor rates for each segment.

10.1.5 Charge Differentiation

ARTC's operational risk has been included as a specific factor supporting charge differentiation. This reflects the fact that different customers may request different level of service flexibility which can support varied pricing. This is implied in the definition of opportunity costs for ARTC as a factor, however addition of operational risk ensures that there is no doubt on its application;

10.1.6 Capital Expenditure Approvals

ARTC is not proposing to review and adjust the proposed ceilings during the course of the IAU and hence avoid any ACCC compliance processes with such adjustments. Therefore the definition of future capital projects (and proposed budgets) as reflected in Schedule H to the current IAU is not provided for in the 2018 IAU such that all relevant clauses to this issue have been deleted.

10.1.7 Structure of Charges

The IAU will retain two part pricing, although the ceiling price will be defined with the flagfall (\$/Tkm) set at zero.

The Excess Network Occupancy Charge component will be deleted as this charge has never been applied in the operation of the IAU.

The floor and ceiling prices applicable to the Indicative Service replace the Indicative Access Charge, which also requires an additional clause to reflect that Access Charges for the Indicative Service will be negotiated between the floor and ceiling rates by ARTC with its customers on a non-discriminatory basis with agreed terms and conditions published by ARTC;

The escalation clause will be amended to reflect that the floor and ceiling rates will escalate annually by 100% of the CPI change from the previous year. Currently the clause provides that ARTC may vary rates by up to the CPI change, which provides scope for disputes on annual escalations as well as requiring a complex variation clause in both the IAU and ITAA.

The proposed ceiling and floor prices are:

Segment	Floor \$/GTK	Floor Flagfall (\$/TKm)	Ceiling \$/GTK	Ceiling Flagfall (\$/TKm)
Dry Creek - Parkeston	\$0.979	\$0.00	\$7.959	\$0.00
Tarcoola – Asia Pacific Interface	\$1.225	\$0.00	\$29.158	\$0.00
Dry Creek – Spencer St (Melb)	\$2.363	\$0.00	\$14.666	\$0.00
Appleton Dock Jct – Footscray Rd	\$2.226	\$0.00	\$212.166	\$0.00
Melbourne (Tottenham) – Macarthur	\$1.493	\$0.00	\$15.987	\$0.00
Newcastle – Acacia Ridge	\$1.648	\$0.00	\$17.629	\$0.00
Crystal Brook - Parkes	\$1.343	\$0.00	\$15.561	\$0.00
Cootamundra - Parkes	\$0.878	\$0.00	\$21.878	\$0.00
Dry Creek – Pelican Point	\$6.040	\$0.00	\$37.908	\$0.00
Port Augusta - Whyalla	\$0.230	\$0.00	\$134.208	\$0.00
Moss Vale – Unanderra	\$3.983	\$0.00	\$40.963	\$0.00
Southern Sydney Freight Line incl Sefton Park Junction – Flemington South	\$0.880	\$0.00	\$85.728	\$0.00
Metropolitan Freight Network Chullora Junction – Port Botany	\$7.655	\$0.00	\$70.991	\$0.00

10.1.8 WACC

The IAU applies a post-tax, nominal WACC which, although not directly stated in the 2008 IAU as it is not directly relevant to Access Pricing, is defined in the IAU as the ACCC approved figure. The approved WACC for the 2008 IAU is 11.76%.

With the change to a banded negotiate-arbitrate model, and the publication of the floor and ceiling prices for each segment, the WACC has a more visible role to play in the operation of the IAU and is therefore directly defined in the IAU which figure is approved by the ACCC.

Appendix 1 is the Independent Experts report from Synergies which proposes a WACC applicable for ARTC's Interstate Network as 9.86%. ARTC accepts the logic of the Synergies proposal, however has amended certain key parameters as below to arrive at its proposed WACC of 8.97%

10.1.8.1 Market Risk Premium (MRP)

The draft decision in respect of the 2017 HVAU published by the ACCC in April 2017 proposed an MRP of 6.0% (noting this reflected a backdated application to June 2016). Since that time there

have been MRP estimates published by the AER in respect of electricity distribution and transmission assets, IPART and, in rail specific applications, ERA and QCA. All of these findings demonstrate an MRP above 6.0% and reflect an increase in the estimates derived from both market survey estimates and historical methods.

Synergies propose an MRP of 7.69% based on the use of the Ibbotson and Wright averaging methods and notes that the latest edition of the Fernandez survey shows an increase to 7.3% from its historical assessment of 6%.

ARTC accepts the theoretical basis for the Synergies recommendation but notes its substantial increase above recent regulatory benchmarks. ARTC is therefore proposing an MRP consistent with the most recent regulatory benchmark of 7.0% as determined by the QCA and believes this reflects a very conservative position given it is below both survey and the Ibbotson and Wright averaging method results.

10.1.8.2 Asset beta

The Synergies report recommends use of an asset beta of 0.80 based on an increase in the betas of the comparator set used previously by the ACCC as well as the increase in volume risk faced by ARTC given the Aurizon exit from the intermodal market. ARTC accepts this recommendation which is an increase from the 0.65 previously approved by the ACCC in the 2008 IAU decision.

The specific circumstances arising in respect of the risks of the interstate network warrant an increase in the asset beta, however in the interests of providing a parameter value that is more readily acceptable to the ACCC, ARTC is proposing 0.75 reflecting the 10 year average (as compared to median) value of the comparator set.

10.1.8.3 Gamma

Synergies recommend use of a gamma of 0.25 based upon an extensive review of the evidence from academic literature and financial practice. Whilst ARTC accepts this logic, it is also aware of the recent ACCC and, more importantly, Australian Competition Tribunal and Federal Court decisions on this particular parameter supporting the use of 0.40.

In the interests of providing a parameter value more readily acceptable to the ACCC, ARTC is proposing a gamma of 0.40 based upon the most recent Tribunal and Court decisions on this matter.

The WACC for the 2018 IAU is proposed to be 8.97% (post-tax, nominal) as per the following table

WACC Parameter	ARTC lodgement Proposal
Rf (nominal)	2.78%
Debt	52.5%
Equity	47.5%
D/E	1.11
Debt margin (nominal)	1.73%
Debt raising costs	0.095%
MRP	7.00%
Inflation	2.45%
Gamma	0.40
Tax rate	30%
Domestic tax	18%
Asset beta	0.750
Debt beta	0.00
Equity beta	1.572
ke	13.79%
kd	4.61%
Post tax nominal (vanilla) WACC	8.97%
Pre tax nominal WACC	10.40%
Pre tax real WACC	7.76%

10.2 Changes to the ITAA

Amendments to the ITAA reflect a combination of administrative changes and clarification of the allocation of risk between each party. .

Changes reflecting the clarity of risk allocation are amendments which:

- Translate the amended escalation and removal of Network Occupancy Charges from the IAU into the ITAA;
- Ensure that statements in the manner of network control of ARTC cannot be construed as a warranty;
- Provide clarity that Trains used by Operators are fit for purpose for the entire train journey;
- Strengthen ARTC's ability to immediately action removal of rolling stock;
- Ensure that the network fit for purpose definition includes speed conditions and other necessary operating restrictions;
- Provide a timeline for Operator reports for their investigation of incidents
- Increase in liability limits to \$350m given the current limit has not changed since 2000;
- Remove negligence as a mechanism to dispute Force Majeure (FM) claims. This does not remove the common law inclusion of negligence in FM.

Administrative changes to the ITAA are amendments which:

- Amend the definition of Rail Safety Acts to reflect the current National Safety Laws regime;
- Delete the requirements of Operators to provide Environmental Manuals as this is not required in practice given the operation of other clauses;

- Update the notice provision clauses to include email notification and delete reference to faxes and post.

11 Ceiling Cost Methodology

11.1 Introduction

In support of ARTC's submission of the "Interstate Access Undertaking 2018" to the ACCC, an operational and financial model has been developed.

The primary purpose of the model is to demonstrate to the ACCC that, with respect to each of the Segments in the Interstate Access Undertaking 2018 (IAU2018), the principles in the Undertaking are being applied correctly in the determination of the Revenue Limits for each segment. Key outputs from the model for the IAU2018 include:

- determination of the Floor and Ceiling Revenue Limit;
- details with respect to maintenance costs, allocated overhead costs, asset values, depreciation and return on assets

Broadly, ARTC expenditures have been based on forecasts of ARTC's task, pricing, maintenance and operating expenditure for the 2018/19 period and escalated by CPI over the 5 year period of the Undertaking. Forecasted expenditures have been assigned to the IAU segments in accordance with the provisions of the Access Undertaking. Capital costs, including depreciation and a return on the regulatory asset base have been based on ARTC's determination of the asset value reflecting valuations established under ARTC's 2008 IAU for segments contained within that undertaking, asset values for the Southern Sydney Freight Line (SSFL) as submitted to the ACCC in September 2012, an estimate of the asset values for the Metropolitan Freight Network, and cost of capital as provided for in the Access Undertaking.

The following sections provide:

- a description of the structure of the model
- an outline of the methodology and assumptions made in the calculation of the major components of access revenues and revenue limits.

ARTC has provided the detailed models to the ACCC for their review on a confidential basis.

11.2 Model Structure

The ARTC IAU2018 Financial Model consists of two Excel workbooks which bring together segment level overhead and maintenance cost data and values for return on assets, in order to derive Revenue floor and ceiling limits for each segment over the period of the Undertaking.

11.2.1 Forecasted Weekly Train numbers and Gross Tonnes

ARTC maintains within Track Access Agreements with each rail operator, a Schedule of Train Paths which each operator has agreed to contract over a specified and often substantial period. These "contracted" services represent the long term, recurring weekly train path requirements for each rail operator carried out over long distances, and for high gross tonne services which are the major contributors to ARTC's revenue.

ARTC use these “contracted” services as the basis for determining our volume forecasts as they represent a significant proportion of traffic movements on the ARTC network.

Volume forecasts for 2018/19 have been determined following an assessment of historical trends, general economic growth forecasts, modal share trends and specific industry trend knowledge.

11.3 Operating Expenditure Forecasts

Forecasted expenditure (other than capital costs) has been incorporated in the model in 2 areas, being:

- Maintenance Expenditure being Routine Corrective Reactive Maintenance (RCRM) and Major Period Maintenance (MPM); and,
- Operating Expenditure being all other expenditure incurred by ARTC operational and corporate divisions (e.g. Executive, Strategy & Corporate Development, Finance etc).

The primary reason for this differentiation is the Maintenance Expenditure includes all expenditure that has been directly identified with a part of the physical infrastructure such as a segment of track. Operating Expenditure cannot be identified with particular parts of the infrastructure, but in many cases can be identified with a location or region. The sum of Maintenance Expenditure and Operating Expenditure is all ARTC working expenditure (non-capital related).

11.3.1 Maintenance Expenditure

11.3.1.1 Routine Corrective Reactive Maintenance

RCRM activities are normally completed more often than once a year and include different track inspection cycles, track patrolling, fettling (replacing broken track components), corridor maintenance, fence maintenance and signal testing. RCRM costs incur a 10% margin reflecting the efficient market price of maintenance services. This is consistent with the previous Alliancing cost arrangement which formed the basis of the 2008 IAU maintenance services and regulatory decisions in other infrastructure networks.

11.3.1.2 Major Periodic Maintenance (MPM)

MPM refers to activities which restore the infrastructure facilities to retain functional condition. MPM is completed on segments on a cyclical basis with intervals of generally greater than one year. MPM can be categorised into two types:

- Variable MPM: programs mainly driven by volume usage. Includes such activities as re-railing, rail grinding and re-surfacing.
- Fixed MPM: depends more on time than usage and includes re-signaling, communications upgrades, renovating structures, ballast cleaning and re-sleeping.

11.3.1.3 Fixed and Variable Maintenance

ARTC forecasts maintenance activity scope and expenditure at a detailed level by type of activity, and track, signals and communications routine maintenance. Each activity is identified as either RCRM or MPM and accumulated into an overall maintenance expenditure forecast for the various line segments.

The cost for each activity is then classified as either 100% Fixed Maintenance, 100% Variable Maintenance or a combination of Fixed and Variable Maintenance.

11.3.2 Operating Expenditure

Operating expenditure includes expenditure in the following divisions of the business:

- Executive
- Finance
- Strategy & Corporate Development
- Corporate Services and Safety
- Corporate Affairs and People
- General Counsel

Operating Expenditure is identified separately from Maintenance Expenditure as it is not directly identifiable with specific Segments.

Operating expenditures have been allocated to the IAU based on the same methodology applied in the HVAU to ensure there is no double counting of such costs across ARTC's operational businesses. The allocation descriptions below detail how the resulting shares of costs are allocated to the individual segments defined by the IAU.

11.3.2.1 Asset Management (Shared Maintenance)

Expenditure incurred includes maintenance contract management and administration (SA/Vic); maintenance support, administration and corridor management (NSW); project management and strategic infrastructure planning and infrastructure performance management.

Asset Management expenditure, being essentially related to maintenance activity has been allocated on the basis of GTKs to pricing Segments, in accordance with the provisions of the Access Undertaking.

11.3.2.2 Network Control

Expenditure incurred primarily includes labour related costs associated with ARTC's train control, path scheduling, customer and access contract management functions.

Because of the centralised nature of train control, planning and contract management, expenditure has been allocated on the basis of train kilometres to Segments, in accordance with the provisions of the Access Undertaking.

11.3.2.3 Corporate Overhead

Expenditure incurred largely includes labour related costs associated with ARTC's IT, property management, legal services, human resources and training, billing/credit and financial management, security and property management, safety and risk management, executive, research and regulation and Board. Expenditure also includes some non-labour related expenditure such as insurance and external consultancies.

Expenditure has been allocated on the basis of train kilometres to pricing Segments, in accordance with the provisions of the Access Undertaking.

11.4 Asset Related Capital Forecasts

Forecasted capital costs included in the calculation of the ceiling revenue limits includes:

- Depreciation
- Return on assets employed

In order to forecast these two elements of the capital costs, two other important elements are required, namely the method of asset valuation for regulatory purposes and the determination of an appropriate regulatory rate of return.

11.4.1 Asset Valuation

In the 2008 IAU, ARTC adopted the Depreciated Optimised Replacement Cost (DORC) value as the initial regulatory asset base value for the purpose of determining Full Economic Cost. An independent assessment of the optimised replacement cost of the ARTC network, and the extent of consumption of the current asset base in accordance with the provisions of the Access Undertaking was undertaken as the asset had been in existence for a number of years.

In this 2018 IAU, the valuation from 2008 IAU has been retained for those relevant segments in the model. The valuation for the Southern Sydney Freight Line (SSFL) is consistent with ARTC's September 2012 submission to the ACCC in relation to varying the 2008 IAU to incorporate the SSFL.

As ARTC has not undertaken a formal valuation for the Sydney Metropolitan Freight network, ARTC has developed an indicative value for these assets with reference to RAB benchmarks for similar assets previously accepted for regulatory purposes in other jurisdictions including other parts of the ARTC network. This indicative value has been accepted by the Independent Pricing and Regulatory Tribunal in compliance assessments under the NSW Rail Access Undertaking.

11.4.2 Rate of Return

The Rate of Return applied in the modelling for the 2018 IAU is 8.97% on a post-tax, nominal basis as defined in Section 8.18 above.

11.4.3 Depreciation

Depreciation is a cost related to the asset base established to compensate an entity for any decline in the economic value of its asset base over time, as the useful life becomes shorter. In an accounting context, such a charge is designed to match the decline in asset value to the period over which revenue associated with the asset is generated. However economic depreciation and accounting depreciation are not necessarily reflective of one another.

In the main, ARTC's asset base is made up of long life assets, which are renewed with a view to further extending life.

With respect to the useful physical life of the Network, it is often considered that railway tracks are generally maintained to a steady-state standard, through the application of major periodic maintenance which is generally expensed by the track owner. As an expense the customer is effectively paying for the up-keep of the asset at a steady state standard in this way, and charging depreciation as well, means that the customer is paying twice for the same asset. Where sufficient MPM is applied to achieve a steady state standard in perpetuity, the depreciation charge should be zero.

On the basis of the above, ARTC has not included any depreciation with respect to track, formation and structures related assets.

Other assets, related to the signaling, train control and communications functions, could be expected to have a limited life, irrespective of the extent of maintenance of business life, due to the likelihood of becoming technically obsolete. In this context, ARTC has assumed economic lives for these types of assets due to reasons of obsolescence as follows:

- Signaling and train control related assets 30 years
- Communications related assets 30 years

Based on these lives and the relevant asset values, a depreciation charge has been included in Full Economic Cost for the segments during the period of the 2018 IAU.

11.4.4 Return on Assets

The economic return with respect to the Network is determined by applying ARTC's nominal, pre-tax rate of return to the opening asset value in accordance with the provisions of the Access Undertaking. Asset inflation is then deducted from the economic return to calculate the return on assets to be included in the determination of Full Economic Cost for each Segment.

11.4.5 Tax expense

An allowance for tax expense has not been incorporated into modeling as the Rate of Return is pre-tax.

11.5 Regulatory Revenue Limits

The Access Undertaking defines the Floor revenue limit, with respect to a Segment or group of Segments as sufficient revenue to cover the incremental cost of that Segment or group of Segments. The Access Undertaking defines the Ceiling revenue limit, with respect to a Segment or group of Segments as sufficient revenue to cover the Economic Cost of that Segment or group of Segments.

11.5.1 Incremental Costs

The Access Undertaking defines incremental costs as the costs that could have been avoided if a Segment was removed from the Network excluding Depreciation and a return on assets employed.

Because of the relatively linear nature of ARTC's network, the question of removing Segments from the network is purely hypothetical. In most cases, removal of a segment would break the rail transport link between the east and west (or north and south of the east coast) of Australia. It is unlikely that the relevant ARTC business on either of these national corridors would continue in each case.

Avoidable costs associated with the removal of a Segment would normally include some or all of the maintenance cost directly associated with that Segment, some or all of the indirect maintenance cost allocated to that Segment and some or all of the indirect train control and management cost allocated to that Segment.

In the 2008 IAU, ARTC developed a set of assumptions in relation to the avoidable costs for each segment. In this submission in relation to the 2018 IAU, ARTC has applied a consistent approach as applied in the 2008 IAU and accepted by the ACCC.

11.5.2 Full Economic Cost

The Access Undertaking defines the Economic Cost associated with a pricing Segment as including:

- All costs specific to the Segment
- Depreciation
- Return on assets specific to the Segment
- An allocation of non-Segment specific costs including Depreciation and a return of non-Segment specific assets
- ARTC overheads

Each of the specific cost areas have been dealt with in previous sections of this report.

Full Economic Cost for each of the Segments has been calculated in accordance with the provisions of the Access Undertaking.

ARTC has determined the Full Economic Cost for each segment and has provided an assessment of the floor and ceiling limits for each applicable segment. These are defined in Section 8.1.7 above.

Historical charts of revenue versus floor and ceiling limits are also provided to detail the historic under recovery of economic cost of the network and have been provided in Section 4.9 above.

11.5.3 Floor Limit

The floor limit represents the direct costs of operating the segment of the network. It is calculated as the sum of all of the forecast direct costs (i.e. volume related) for that segment plus a proportion of the network control costs allocated to that segment which reflects the traffic intensity of that corridor.

Proportion of expenditure (by type of expenditure) included in incremental cost (Revenue Floor Limit):

Segment	Maintenance	Maintenance Overhead	Network Control
Adelaide (Dry Creek) - Parkeston	100%	20%	80%
Tarcoola - Asia Pacific Interface	50%	0%	20%
Adelaide (Dry Creek) - Melbourne (Spencer Street)	100%	20%	80%
Appleton Dock Junction - Footscray Road	50%	0%	20%
Melbourne (Tottenham) - Macarthur	80%	30%	70%
Newcastle (Islington Junction via mains) - Acacia Ridge	75%	40%	60%
Crystal Brook - Parkes	80%	30%	80%
Cootamundra - Parkes	50%	20%	50%
Adelaide (Dry Creek) - Pelican Point	50%	0%	20%
Port Augusta - Whyalla	75%	20%	20%
Moss Vale - Unanderra	50%	0%	20%
SSFL including Sefton Park Junction to Flemington South	100%	30%	70%
MFN including Port Botany	100%	30%	70%

11.5.4 Ceiling Limit

The Ceiling Limit is defined as the full economic cost for each segment and is calculated as per Section 9.5.2 above.

12 Comparison of IAU Approach to other Regulatory Regimes

As discussed above, the need for an access undertaking for the Interstate Network is questionable given that recoveries are below ceiling and the strong competition from road and shipping modes of transport. In these circumstances, ARTC considers that the 2018 IAU should be based on a more flexible negotiate – arbitrate model rather than prescriptive economic regulation which applies to the Hunter Valley, electricity networks or fully regulated pipelines.

The negotiate – arbitrate model is a well-recognised regulatory approach that has been accepted by Australian regulators for a number of types of infrastructure, particularly where “full” regulation is considered to be overly burdensome. As highlighted by the Vertigan enquiry into gas pipelines¹ and the ACCC’s submission into the Western Australian Rail Access Regime Review,² there is a growing focus on disclosure in the context of negotiate – arbitrate regimes to remove the information asymmetry between the infrastructure owner and the prospective user to ensure a balanced negotiation.

In ARTC’s view, the proposed 2018 IAU provides a negotiate – arbitrate regime which gives a much greater degree of disclosure of relevant information and protection to prospective users than other similar regimes (as demonstrated in the table below) because:

- the 2018 IAU includes an ex ante ACCC approved capital base; the other regimes do not;
- the 2018 IAU includes an ex ante approved ACCC pricing range which reflects ARTC’s efficient direct costs (the floor) and ARTC’s efficient economic costs (the ceiling) while the other regimes do not involve any ex ante approval or review of pricing;
- while the 2018 IUA will not include an indicative tariff as such, it will provide for actual disclosure of negotiated outcomes which provide a better reference point for users than indicative tariffs in the other regimes which only have ex poste regulatory oversight ; and
- the 2018 IAU will include a full form indicative access agreement which has ex ante regulatory review while the other regimes only have ex post regulatory oversight.

In terms of information asymmetry, it is relevant to note that with the level of disclosure proposed, the prospective user will understand ARTC’s costs and contracting position but ARTC will be at an information disadvantage in any arbitration as it will be less likely to understand a prospective user’s ability to contribute to costs above direct costs on the network.

¹ Examination of the current test for the regulation of gas pipelines, Report by Dr Michael Vertigan AC, 14 December 2016.

² Letter to Michael Barnes, Department of Treasury from Christina Cifuentes, 2 January 2018.

Feature	Port Access (Wheat) Code	Light pipeline regulation	Non-scheme pipelines	2018 IAU
Regulatory basis	Competition and Consumer (Industry Code – Port Terminal Access (Bulk Wheat) Regulation 2014	Part 7, National Gas Rules	Part 23, National Gas Rules	Part IIIA, CCA
Regulator	ACCC	AER	AER	ACCC
Disclosure of asset value	x	x	✓	✓
Ex ante regulatory approval of asset value	x	x	✓	✓
Disclosure of costs	x	x	✓	✓
Ex ante approval of costs	x	x	x	✓
Transparency of Negotiated Access Arrangements	x	x	x	✓
Disclosure of indicative tariff	✓	✓	✓	x Indicative tariff range being regulator approved floor and ceiling
Ex ante approval of pricing	x	x	x	✓ Indicative tariff range being regulator approved floor and ceiling
Disclosure of actual pricing outcomes	✓	✓	✓	✓
Publication of standard terms	✓	✓	✓	✓
Negotiation regime	✓	✓	✓	✓
Independent arbitration	✓ (chosen by parties or selected by ACCC if dispute)	✓ (AER)	✓ (chosen by parties or selected by AER if dispute)	✓ (ACCC)

13 Attachment 1 – Synergies Report



The Rate of Return to Apply to ARTC's Interstate Network

A report prepared for the 2018 Interstate Access Undertaking (IAU) lodgement

February 2018

Synergies Economic Consulting Pty Ltd
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Executive Summary

Synergies has been engaged by the Australian Rail Track Corporation (ARTC) to estimate the weighted average cost of capital (WACC) for its 2018 Interstate Access Undertaking (IAU). The following sections provide an overview of the various WACC parameters and Synergies' proposed approach, before presenting our overall estimate of ARTC's WACC.

Capital structure

We have proposed a gearing level of 52.5% for ARTC. While the gearing level of the comparator set is lower in comparison, 52.5% was the value adopted for the ARTC HVAU draft decision in 2017, and is supported by other Australian regulator precedent in the vicinity of 50%.

Return on equity

Risk free rate

The risk free rate (as at 31 January 2018) has been estimated to be 2.78% (annual effective rate). This estimate has been based on a 20 day average of the yield on 10 year Commonwealth Government bonds.

Beta

An asset beta for ARTC of 0.80 has been estimated based on a comparator set comprised of North American Class I railroads and Aurizon. This is in line with the approach adopted by the ACCC in the 2008 IAU, and is also largely consistent with the methodology employed in ERA rail decisions. Our quantitative analysis has been supported by a qualitative first principles analysis, which identifies key determinants for systematic risk for ARTC. Using the gearing estimate of 52.5%, an asset beta of 0.80 translates to an estimated equity beta of 1.675.¹

¹ The Monkhouse formula was used for de-levering and re-levering purposes.

Market risk premium

We have proposed a market risk premium (MRP) of 7.69%.² This has been derived from an equal weighting of the Ibbotson and Wright MRP methodologies. The Wright methodology assumes that the overall return on equity remains stable over time, and does not fluctuate in-step with the risk-free rate. A number of regulators, including the ERA and QCA are now having increasing regard to the Wright methodology in their determinations.

Return on debt

To generate an estimate for the return on debt, we have adopted the methodology used by the ACCC in the 2017 HVAU draft decision. An average of adjusted bond yield estimates from the RBA and Bloomberg results in a DRP of 1.73%. In line with the most recent ARTC precedent, we have assumed a level of 0.095% for debt raising costs. With a risk free rate of 2.78%, this leads to an estimated return on debt of 4.61%

Gamma

For our estimate of gamma, we have adopted a value of 0.25 based on extensive evidence from academic literature and financial practice. However, we understand that ARTC proposes to follow the current regulatory precedent of the ACCC, AER and ERA, and adopt a gamma value of 0.4. This being said, we note that IPART in its recent draft methodology review proposes to remain with a gamma of 0.25.

² The MRP estimate depends on the utilisation rate (or theta), a term in the gamma calculation. Our MRP estimate assumes a theta of 0.35, consistent with a distribution rate of 0.7 and a gamma of 0.25. If a theta of 0.57 is assumed (consistent with a distribution rate of 0.7 and a gamma of 0.4), the estimated MRP would be 7.78%.

Synergies' proposed WACC estimate

Based on the parameter estimates listed above, the estimated WACC for ARTC is provided below.

Proposed WACC

Parameter	2008 IAU	2018 Estimate
Risk free rate	6.39%	2.78%
Capital structure (debt to value)	50%	52.5%
Debt risk premium	2.85%	1.73%
Debt raising costs	0.125%	0.095%
Market risk premium	6.00%	7.69%
Gamma	0.5	0.25
Tax rate	30%	30%
Asset beta	0.65	0.80
Debt beta	0.00	0.00
Equity beta	1.292	1.675
Return on equity	14.14%	15.66%
Return on debt	9.37%	4.61%
Post-tax nominal (vanilla) WACC	11.76%	9.86%
Pre-tax nominal WACC	13.00%	12.02%

Source: Synergies calculations

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1 Introduction

Synergies has been engaged by the Australian Rail Track Corporation (ARTC) to estimate the weighted average cost of capital (WACC) for its 2018 Interstate Access Undertaking (IAU). This WACC update is being conducted at a time of substantial uncertainty for the rail industry, especially for intermodal services. Most significantly, Aurizon announced in August 2017 that it would be exiting its intermodal business. The exact implications of this for ARTC are yet to become clear, but volume risk is likely to be a key concern. Above all, these developments serve to highlight the significant competitive pressures from road, which elevate ARTC's risk profile.

The remainder of this report is structured as follows:

- Chapter 2 - WACC formulation
- Chapter 3 - assumed capital structure for ARTC
- Chapter 4 - estimates the return on equity (comprising risk-free rate, beta and market risk premium)
- Chapter 5 - estimates the return on debt
- Chapter 6 - presents evidence on the appropriate determination of gamma
- Chapter 7 - concludes by presenting our WACC estimate for ARTC
- Attachment A - First principles analysis
- Attachment B - Beta diagnostics
- Attachment C - ERA regulatory precedent on beta for rail entities
- Attachment D - Supplementary evidence on the market risk premium

2 WACC formulation / approach

2.1 Post tax nominal WACC

The approach most commonly applied to estimate WACC in Australian regulatory regimes is the post-tax nominal 'vanilla' WACC. In other words, the rate of return estimate is expressed as a weighted sum of the returns on equity and debt in inflation-adjusted and after-tax terms. Under the post-tax nominal 'vanilla' WACC formula, tax is modelled as a cost in the cash flows rather than forming part of the WACC calculation. It is expressed as follows:

$$\text{Nominal post-tax WACC} = R_e \frac{E}{E+D} + R_d \frac{D}{E+D}$$

Where:

Re = post-tax return on equity

Rd = post-tax return on debt

D = proportion of debt (gearing) within the assumed capital structure

E = proportion of equity within the assumed capital structure

2.2 Pre-tax nominal WACC

The WACC formula can also be expressed in pre-tax nominal terms. The pre-tax nominal formulation adjusts for taxation and dividend imputation in the WACC formula rather than the cash flows of the business. It is expressed as follows:

$$\text{Nominal pre-tax WACC} = \frac{R_e}{(1-t_c[1-\gamma])} * \frac{E}{E+D} + R_d \frac{D}{E+D}$$

Where:

Re = pre-tax return on equity

Rd = pre-tax return on debt

D = level of debt within the capital structure

E = level of equity within the capital structure

t = corporate tax rate (assumed to be 30%)

γ = gamma (value of imputation credits)

2.3 Estimating the return on equity

2.3.1 Sharpe-Lintner CAPM

To date, the model that Australian regulators (including the ACCC) have applied to estimate the return on equity is the Sharpe-Lintner Capital Asset Pricing Model (SL CAPM). According to the CAPM framework, risk can be divided into two components, being systematic (or non-diversifiable) risk and non-systematic (or diversifiable risk). Systematic risk refers to those risks that will tend to impact the whole market and cannot be avoided by investors through diversification.³ It is only these risks that are assumed to be compensated by the WACC.

The SL CAPM is expressed as follows:

$$R_e = R_f + \beta_e * [E(R_m) - R_f]$$

Where:

R_f = the risk-free rate of return

$E(R_m)$ = the expected return on the market

$[E(R_m) - R_f]$ = the market risk premium

β_e = equity beta (measures systematic risk)

The equity beta measures systematic business risk, as well as the financial risk of a company. This can be contrasted with the asset beta, which reflects only the business risk of a company's assets (and in turn cash flows) and can be calculated by de-levering the observed equity beta. A company's equity beta is calculated by taking the asset beta (observed from a comparable set) and then "re-levering" the asset beta by applying the company's assumed capital structure to finally arrive at an estimated equity beta measurement for the company.

2.4 Estimating the return on debt

The return on debt has been estimated following the methodology set out by the ACCC in its 2017 HVAU draft decision. This involves an 'on the day' estimated calculated by averaging 10 year BBB bond yield estimates from the RBA and Bloomberg, which are favoured on the basis of their transparency and robustness. Combining estimates from these two data sources will, in our opinion, form the best estimate of the prevailing return on debt.

³ Non-systematic risk, on the other hand, refers to risks that are unique to a particular firm or project. As non-systematic risks can be eliminated by diversification, investors cannot expect to receive any compensation for these risks via a higher rate of return. Instead, they will tend to be modelled in the cash flows.

3 Capital structure

3.1 Objective

The purpose of this section is to identify an appropriate long-term target gearing ratio for ARTC based on domestic and international entities with comparable risks, and having regard to relevant regulatory precedent.

In a perfect capital market, finance theory provides that the valuation of a firm is unaffected by its capital structure. However, in practice, the assumptions underpinning a perfect capital market do not hold and as such capital structure can have valuation impacts. Clearly, this is relevant to a consideration of the capital structure applying to ARTC.

The assessment of capital structure (or gearing) in the WACC calculation is therefore based on an assessment of an 'optimal' long-term target capital structure for ARTC given its risk profile and the industry within which it operates. In practice, we see numerous and sometimes disparate factors affecting the capital structure adopted by firms within the same industry (for example, different financing strategies, investment needs, owner preferences, tax treatments).

Of all of the WACC parameters, determining the optimal benchmark capital structure is especially imprecise. In theory, we would expect to observe the gearing levels of firms in the same industry to cluster within a range, although in practice this range could be quite wide. The capital structure assumption is similarly based on establishing what the maximum efficient long-term gearing level for the business might be. It is not based on the firm's actual gearing. This also ensures that the firm is not rewarded for maintaining an inefficient capital structure.

Over time, we tend not to observe material changes in benchmark gearing levels, particularly in a regulated context. We begin by looking at evidence from comparable entities followed by relevant regulatory precedent.

3.2 Comparable listed companies

Firstly, we examined the average gearing levels from a comparator set of listed North American Class I railroads (as well as Aurizon Holdings). The debt-to-value ratios over 5 and 10 year timeframes are presented in Table 1. The observed gearing levels over five years range from 12% to 32%, with an average of 20% and a median of 21%. The average and median over 10 years are slightly higher, at 23% and 24%, respectively.

Table 1 Comparable companies gearing summary

Company	5 year estimates	10 year estimates
CSX Corporation	24%	27%
Genesee & Wyoming Inc.	32%	29%
Kansas City Southern	16%	24%
Norfolk Southern Corporation	23%	24%
Union Pacific Corporation	13%	16%
Canadian National Railway Company	12%	15%
Canadian Pacific Railway Limited	19%	25%
Aurizon Holdings	23%	20%
Average	20%	23%
Median	21%	24%
Minimum	12%	15%
Maximum	32%	29%

^a Aurizon Holdings was listed only in 2010 – data presented in the 10-year estimate column is for the previous 7 years only.

Note: The gearing estimates presented here are expressed in terms of debt-to-value ratios.

Source: Bloomberg, Synergies calculations

3.3 Regulatory precedent

Consistent with the other WACC parameters, Australian regulators apply a benchmark capital structure (gearing) that would apply to an efficient benchmark entity in the same industry with the same risk profile. This is reflected in relatively stable gearing ratios once established.

Under this benchmark approach, the regulated entity’s actual gearing level is given limited weight. This is consistent with the objective of incentive regulation, which bases costs on efficient benchmark targets. The gearing assumption also influences the notional credit rating assumption used to estimate the return on debt.

Table 2 shows recent regulatory decisions relating to the regulated Australian transport sector. The highest observed gearing assumption is 60% (debt to total value) for Dalrymple Bay Coal Terminal, Australia’s most heavily regulated port asset. In contrast, for rail entities, gearing assumptions have generally been lower, including the lowest of 20% for the dedicated iron-ore terminal operated by The Pilbara Infrastructure.

Table 2 Recent Australian regulatory gearing decisions for transport entities

Company	Regulator	Year	Gearing Ratio
Aurizon Network	QCA (Rail)	2017	0.55
Dalrymple Bay Coal Terminal	QCA (Ports)	2016	0.60
Public Transport Authority - urban	ERA (Rail)	2015	0.50
ARC Infrastructure (formerly Brookfield rail) - freight	ERA (Rail)	2015	0.25
The Pilbara Infrastructure	ERA (Rail)	2015	0.20
V/Line	ESC (Rail)	2012	0.50
Pacific National	ESC (Rail)	2012	0.50
Vic Track	ESC (Rail)	2012	0.50
Metro Trains Melbourne	ESC (Rail)	2011	0.55
ARTC (Hunter Valley Coal Network)	ACCC (Rail)	2011 & 2017	0.525
Queensland Rail	QCA (Rail)	2010	0.55
ARTC Interstate Rail Network	ACCC (Rail)	2008	0.50

Source: Synergies database.

The basis of Australian regulator’s gearing assumption is generally an analysis of internationally comparable companies, an approach we have adopted in our report.

In its 2008 decision for ARTC’s interstate freight network, the ACCC accepted ARTC’s proposed gearing ratio of 50 per cent. The gearing levels of the sample of firms examined at the time were generally higher in the pre-GFC environment than currently observed.

For ARTC, we consider the two most relevant regulatory gearing assumptions are for:

- ARTC’s interstate freight network, which was assigned 50 per cent gearing in 2008.
- ARTC’s Hunter Valley Coal Network, which currently has gearing of 52.5 per cent.

3.4 Conclusion

Having regard to the evidence from comparable listed entities as well as from regulatory precedent, we consider that a gearing level of 52.5% is appropriate. The considerations that inform this view are as follows.

- There is comprehensive support in the Australian regulatory context for gearing in the vicinity of 50%.
- 52.5% is ARTC’s gearing level for the HVCN.

4 Return on equity

This chapter presents the way in which we have estimated the various parameters in the SL CAPM model.

The three parameters requiring estimation in this model are as follows:

- Risk free rate
- Beta
- Market risk premium

Our approach is discussed in the following sections.

4.1 Risk free rate

The risk-free rate is used in estimating both the return on equity and debt. Currently, the ACCC calculates the risk-free rate based on a 20 day averaging period of the yield to maturity on 10 year Commonwealth Government bonds, and this is the approach that we adopt. Our estimate is based on data from the RBA.

There are three key considerations when determining an appropriate estimate:

- the proxy used
- the term to maturity
- the averaging period.

4.1.1 Proxy

The Commonwealth Government bond yield is most commonly used as a proxy for the risk-free rate in Australia, including by the ACCC.

Concerns have been expressed as to whether it remains the best proxy during highly volatile or uncertain market conditions, where a 'flight to quality' is often observed reflecting increased demand for Commonwealth Government bonds as a safe haven for investors, resulting in a compression of the yield.

However, we consider the Commonwealth Government bond yield remains the best proxy for the risk-free rate in an Australian context. In our view, the downward compression of WACC values that have emerged due to its application in recent years relate more to the rigidity of Australian regulators estimation of the market risk premium than to the risk-free rate itself.

4.1.2 Term to maturity

In an Australian context, the term to maturity most commonly applied for investors in infrastructure with long economic lives is ten years. This is consistent with the long-term forward-looking horizon over which it is assumed investors are forming their return expectations under the SL CAPM.

In Australia, the ten year bond is the longest liquid maturity currently available. This is also the most commonly used proxy for the risk-free rate in regulatory decisions, including by the ACCC. We have therefore assumed a ten year term to maturity, balancing the liquidity of available long term bond instruments in the Australian market, and ARTC's long-term investment horizon.

4.1.3 Averaging period

The length of averaging period for the risk-free rate will depend amongst other things on whether a contemporary rate reflecting current market expectations is preferred to a longer-term average rate that will also incorporate the effects of historical market expectations.

In general, Australian and International corporate finance, academic and regulatory practice uses short averaging periods close to the commencement of each regulatory period.

This is intended to mitigate problems that may occur if there is a spike in yields on the day that the rate is applied. It is therefore common practice to average the rate over a short horizon, which typically ranges from between ten and forty days, noting that over such a short horizon the choice of averaging period is likely to be of little consequence. The Independent Pricing and Regulatory Tribunal (IPART) in NSW is the only Australian regulator that takes into consideration longer term averages, which it does in conjunction with short term estimates.

Our estimates are produced over a twenty-day period to 31 January 2018. As the quoted rates are semi-annual, we have converted them to annual effective rates⁴. The resulting estimate is 2.78%.

4.2 Beta

There are three key sources of information for the assessment of an entity's systematic risk, namely:

⁴ Annual effective rate = $(1 + \text{semi-annual rate}/2)^2 - 1$

- Benchmark results from comparable entities
- First principles analysis
- Regulatory precedent.

In undertaking an empirical analysis of beta estimates, reference needs to be made to an appropriate set of listed comparators for whom equity betas can be estimated. Using share price information for these companies, their equity betas are estimated using regression analysis. As the companies will have different gearing levels (and hence different levels of financial risk), these equity betas must be 'de-levered' to produce an asset beta. This approach is generally applied for the assessment of asset betas under the SL CAPM.

The comparator analysis will typically produce a range of estimates for beta, necessitating an assessment of where ARTC's asset beta might sit relative to these other comparators. This assessment is facilitated by a first principles analysis, which is a qualitative assessment of ARTC's systematic risk profile. This approach analyses the key factors that impact the sensitivity of the firm's returns to movements in the economy or market.

Accordingly, in practice, we see a first principles analysis helping to inform where a particular firm is likely to sit in the range generated from an empirical assessment. Accordingly, we turn first to an empirical assessment of rail-related betas and then a first principles assessment of ARTC.

Finally, we consider relevant regulatory precedent.

4.2.1 Comparable companies analysis

There are relatively few comparable listed businesses to ARTC operating in Australia and consequently it is necessary to rely on international comparators. This is the approach commonly adopted by regulators in the transport and telecommunications sectors.

The first step in a comparable companies analysis involves identifying an appropriate set of listed companies. Freight railroads (in particular, North American Class I railroads) are considered a primary comparator set due to their freight-focussed business model, strong market position and below rail infrastructure services. Aurizon Holdings is also added to this sample.

Overall, and notwithstanding the differences noted above, the international sample collectively includes companies with sufficiently comparable systematic risks that will enable a robust beta estimate to be developed for ARTC.

4.2.2 Beta estimation

Betas have been estimated based on five years of monthly returns, regressed against the relevant domestic share market index using Ordinary Least Squares. We also eliminated any firms with:

- a t-statistic of less than 2 (this is considered particularly important)
- an R² less than 0.1.

The resulting equity betas from this procedure were de-levered to produce an asset beta using the Monkhouse approach, which is applied by the ACCC:

$$\beta_e = \beta_a + (\beta_a - \beta_d) * \left\{ 1 - \left[\frac{R_d}{(1 + R_d)} \right] * [T_c * (1 - \gamma)] \right\} * \frac{D}{E}$$

Where:

β_a = beta of assets

β_d = beta of debt

R_d = the cost of debt capital

T_c = corporate tax rate

γ = gamma

D/E = value of debt divided by the value of equity.

The ACCC typically adopts a debt beta of 0.

4.2.3 Results

The average asset beta across the full sample of comparable companies was 0.85, based on a 5 year sample, while the median was also 0.85. We consider a 5 year sample is likely to provide a robust contemporary beta estimate based on a relatively short historical data set that is reflective of contemporary market conditions.

As the period of the analysis lengthens a richer data set emerges but the contemporary relevance of the estimates diminishes. Longer sample periods risk incorporating data on market conditions that is less likely to be relevant to contemporary beta estimates. However, as a robustness check, we have also generated 10 year estimates. The average asset beta over 10 years is 0.78, while the median is 0.89.

Table 3 Comparable companies asset beta summary

Company	5 year estimates	10 year estimates
CSX Corporation	0.96	0.95
Genesee & Wyoming Inc.	1.16	0.96
Kansas City Southern	0.70	0.96

Company	5 year estimates	10 year estimates
Norfolk Southern Corporation	0.99	0.88
Union Pacific Corporation	0.73	0.91
Canadian National Railway Company	0.75	0.41
Canadian Pacific Railway Limited	1.12	0.73
Aurizon Holdings	0.39	0.44 ^a
Average	0.85	0.78
Median	0.85	0.89
Minimum	0.39	0.41
Maximum	1.16	0.96

^a Aurizon Holdings was listed only in 2010 – data presented here is for the previous 7 years

Note: Equity betas were de-levered using the Monkhouse formula. Regulators such as the AER and ERA have previously considered weekly, rather than monthly, returns to evaluate beta. While this provides more observations, it can also have the adverse effect of capturing greater volatility in returns. In any case, the results using weekly returns remain robust, with a 5-year average (median) of 0.91 (0.93) and a 10-year average (median) of 0.86 (0.89).

Source: Bloomberg, Synergies calculations

The asset beta for Aurizon Holdings is well below that of the other rail comparators, and can possibly be considered an outlier, particularly on account of its customer base and the relatively low proportion of its revenue being related to intermodal traffic. When Aurizon Holdings is removed from the sample, the 5 year average (median) increases to 0.91 (0.96), while the 10 year average (median) is 0.83 (0.91).

Additional beta diagnostics, including portfolio betas, are presented in Attachment B.

4.2.4 First principles analysis

The comparator analysis in Section 4.2.3 establishes a point estimate for beta, which necessitates an assessment of where ARTC's beta may sit relative to these comparators. The key objective of the first principles analysis is to inform this decision through qualitatively assessing the sensitivity of the ARTC's cashflows relative to movements in the general economy.

The nature of the demand for ARTC's services is a key determinant of its systematic risk. ARTC's operations are subject to significant competitive pressure from road transport. The exit of Aurizon from its intermodal business only serves to highlight this and will lead to heightened uncertainty over the coming regulatory period.

Intermodal is the dominant business area for ARTC and traffic volumes are likely to be correlated with domestic economic conditions. Operating leverage is another key consideration. ARTC is likely to have materially higher operating leverage relative to the listed comparators, owing to its substantial infrastructure component. Holding all other factors constant, this will lead to an increase in systematic risk.

A detailed first principles assessment is contained in Attachment A.

4.2.5 Relevant regulatory precedent

Six Australian regulators have considered regulated revenues of transport infrastructure:

- ACCC – rail
- IPART – rail
- ERA (WA) – rail
- QCA – rail and coal terminal
- ESC – rail
- ESCOSA – rail.

All regulators have acknowledged the specific challenges the sector presents to identify comparators given the paucity of listed Australian transport entities. However, the ESC and ESCOSA have not engaged in a detailed review of comparable companies for many years and hence they have not been included in this review.

For rail businesses, Australian regulators have generally adopted an international sample of rail businesses (ERA for a freight rail network and ACCC for the ARTC Interstate network).

These approaches (to varying degrees of analysis) conclude that the absence of enough Australian transport comparators forces international comparison to ensure robust beta estimates, without the need for the intervening step of a detailed analysis of a broader set of Australian comparators.

The following section reviews the approach that the ACCC adopted in the 2008 IAU. An overview of the ERA's approach to rail beta determination is located in Attachment C.

4.2.6 ACCC – ARTC's Interstate network (2008)

In the ACCC's beta assessment of ARTC's interstate network (2008) it determined that the asset betas of Australian trucking, shipping and other non-rail service providers are not suitable proxies for ARTC's asset beta.⁵

Although these firms are observable and have the desirable quality that they are Australian based transport businesses, the systematic risks of these types of transport investments is likely to differ markedly to that of a below rail service provider. For this

⁵ ACCC (2008). Access Undertaking - Interstate Rail Network Australian Rail Track Corporation, Final decision, April.

reason, the ACCC has focussed on non-regulated below rail operators operating overseas to determine whether ARTC's requested beta seems reasonable. In its view, the use of overseas firms was necessitated by the lack of non-regulated below rail operators in Australia to use as proxy companies.

Despite the fact these firms operate overseas, the ACCC identified these companies as the best proxy companies to use to estimate ARTC's exposure to systematic risk. The proxy companies chosen by the ACCC, principally operating in North America, typically had asset betas estimated at over 0.65 as shown in Table 4.

Table 4 ACCC 2008 IAU equity and asset beta estimates

	Equity Beta	D/E ratio %	Asset Beta
Burlington Santa Fe Corporation	0.969	41	0.69
Canadian National Railway Company	0.62	46	0.43
Canadian Pacific Railway Limited	0.793	32	0.60
CSX Corporation	0.822	72	0.48
Genesee & Wyoming Inc	1.54	28	1.21
Kansas City Southern	1.241	72	0.73
RailAmerica	1.498	133	0.65
Union Pacific Company Limited	1.097	38	0.80
Simple Average	1.0725	57.75	0.70

Note: Equity Betas were estimated using Bloomberg using 5 years of monthly data. The debt to equity ratio is the estimated average debt to equity ratio over the beta estimation period and was the debt to equity ratio used for delevering the equity betas. Equity betas were delivered using the Monkhouse formula.

Source: Bloomberg

Finally, the ACCC noted that ARTC operates under some market demand and price constraints due to intermodal competition. This is the principal reason it operates well below its revenue ceiling on major segments. As such, it bears some market risk and if the economy does badly (or well) ARTC will lose (or gain) business and profits. This is different to a typical regulated business, such as electricity distribution or transmission, that can raise prices if demand drops and, therefore, bears far lower market risk.

While the ACCC considered that an asset beta of 0.65 per cent was broadly acceptable for ARTC's interstate network at the time of the assessment, it noted this conclusion would not necessarily apply to other rail networks nor would it necessarily hold for a future regulatory review.

4.2.7 Conclusion

Overall, we consider that an asset beta value of 0.80 is reasonable for ARTC. This estimate is substantiated by the following:

- the empirical evidence appears to directly support an asset beta of at least 0.80 and possibly as high as 0.85.
- ARTC is exposed to significant volume risk, and the exit of Aurizon from its intermodal business also generates material uncertainty.
- The asset beta estimate has been generated using a similar comparator set that the ACCC adopted for the 2008 IAU.⁶

4.3 Market risk premium

The Market Risk Premium (MRP) is the amount an investor expects to earn from a diversified portfolio of investments (reflecting the market as a whole) that is above the return earned on a risk-free investment. The key difficulty in estimating the MRP arises from it being an expectation and therefore not being directly observable.

Whilst the MRP is an inherently forward-looking parameter, the difficulty with observing or inferring it from market data means that there is valuable information in historical data (historical averages of excess returns from the market above the relevant risk-free rate).

A range of methods have been developed to estimate the MRP falling broadly into two approaches – historical and forward looking. In its draft decision for the 2017 HVAU, the ACCC stated that does not consider the results from dividend growth models when determining the MRP.⁷ Therefore, Synergies draws solely on historical estimates in calculating the MRP for ARTC.

In evaluating approaches to determining the MRP we have had regard to the approaches adopted by financial practitioners, academic literature and Australian regulators in their assessment of the MRP.

⁶ The comparator set now includes Aurizon Holdings and Norfolk Southern Corporation, but no longer includes BSNF or RailAmerica.

⁷ ACCC (2017). Draft Decision – Australian Rail Track Corporation’s 2017 Hunter Valley Access Undertaking, 20 April, p.148.

4.3.1 Historical average methodologies

Within the historical average methodologies, there is a range of approaches that can be adopted. However, we consider the most informative measures are at two ends of a spectrum as follows:⁸

- the Ibbotson approach, which reflects the long term historical average of the difference between the return on the market and the risk-free rate (and has been the preferred method of certain Australian regulators). It assumes that the MRP remains relatively constant through time;
- the Wright approach, which assumes that the overall return on equity remains reasonably stable over time rather than the MRP. It therefore estimates the MRP as the difference between a long-term average of the (real) return on the market and the current risk-free rate. Since the GFC, this approach has gained greater regulatory acceptance.

The post-GFC evidence supports the Wright approach to the determination of the MRP. This point was implicitly made by the Governor of the Reserve Bank of Australia in a speech to the Australian American Association:⁹

But another feature that catches one's eye is that, post-crisis, the earnings yield on listed companies seems to have remained where it has historically been for a long time, even as the return on safe assets has collapsed to be close to zero (Graph 2). This seems to imply that the equity risk premium observed *ex post* has risen even as the risk-free rate has fallen and by about an offsetting amount. Perhaps this is partly explained by more sense of risk attached to future earnings, and/or a lower expected *growth rate* of future earnings.

Or it might be explained simply by stickiness in the sorts of 'hurdle rates' that decision makers expect investments to clear. I cannot speak about US corporates, but this would seem to be consistent with the observation that we tend to hear from Australian liaison contacts that the hurdle rates of return that boards of directors apply to investment propositions have not shifted, despite the exceptionally low returns available on low-risk assets.

The possibility that, *de facto*, the risk premium being required by those who make decisions about real capital investment has risen by the same amount that the riskless

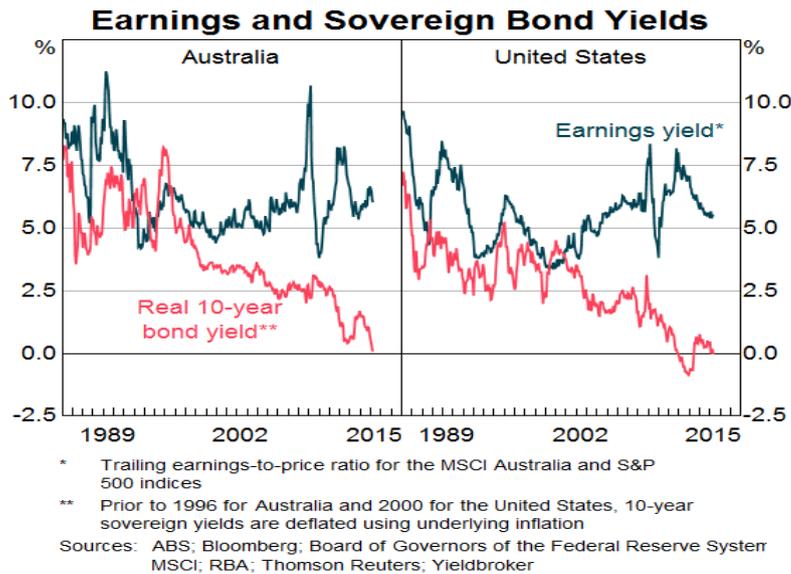
⁸ Other methods involve other parameters in the estimation. For example, the Siegel method incorporates inflationary expectations into the analysis. However, in our opinion, this undermines the very strength of historical approaches to the assessment of the MRP.

⁹ Glenn Stevens, Address to The American Australian Association Luncheon, New York, USA – 21 April 2015.

rates affected by central banks have fallen may help to explain why we observe a pick-up in financial risk-taking, but considerably less effect, so far, on ‘real economy’ risk-taking.

The graph the Reserve Bank Governor referred to is reproduced below.

Figure 1 Earnings and sovereign bond yields



Source: RBA

Based on this recent evidence, to the extent that an historical market return informs the MRP (which fundamentally is a forward-looking parameter), the Wright approach should be given more weight than the Ibbotson approach, at least in recent history. Indeed, the fact that the Governor of the Reserve Bank of Australia has specifically commented favourably on the very premise that underpins Wright approach lends support to its acceptance.

Nevertheless, we have averaged the two approaches here to provide a robust and in our view conservative estimate of the MRP based on historical excess returns.

4.3.2 Relevant Australian regulatory decisions on the MRP

Table 5 summarises the most recent MRP estimates derived by Australian economic regulators. Most regulators have adopted values for the MRP greater than 6%.

Table 5 Most recent MRP estimates applied by Australian regulators

Regulator	Date	Sector	MRP (per cent)
QCA	December 2017	Rail	7.0%
ERA	October 2017	Rail	7.2%

Regulator	Date	Sector	MRP (per cent)
IPART	August 2017	Biannual WACC update	7.8% based on the August 2017 range from 6.0% - 9.5%.
AER	April 2017	Electricity Distribution	6.5%
AER	April 2017	Electricity Transmission	6.5% based on a range from 5% to 7.5% set out in its Rate of Return Guideline
ACCC	April 2017	Rail	6%
QCA	November 2016	Ports	6.5%
ERA	June 2016	Gas Transmission	7.4%
ESCOSA	June 2016	Water	6%
ESC	July 2016	Water	6%

Source: Synergies based on Australian regulatory determinations

Key points to note in terms of Australian regulators' recent approved MRPs are as follows (refer to Attachment D for a more detailed review):

- IPART derives its feasible MRP range based on long run averages and current market data. The latter value is derived from the DDM. IPART applies the mid-point of its MRP range. However, IPART's MRP estimate as a margin above the contemporary risk free rate is greater than its reported value (7.8%) because of the higher risk free rate assumed in its approach.¹⁰
- ERA's determination of an MRP range is also based on historical averages (using the Ibbotson and Wright averaging methods) and current market data using the DDM. ERA selects an MRP point estimate from within its range at each regulatory determination based on judgement and has not been transparent about the weighting it applies in reaching this position.
- The QCA has applied four main methods to estimate the MRP, being two forms of historical averaging (the Ibbotson and Siegel averaging methods), survey evidence (including independent expert reports) and the Cornell DGM. In its December 2017 UT5 Draft Decision for Aurizon Network, the QCA has also stated that it will now have greater regard to the Wright MRP in its determinations, to which it has previously given only a low weight.¹¹
- ESCOSA and ESC appear to solely rely on historical long-term averages based on the Ibbotson averaging approach.

¹⁰ IPART (2017). WACC Biannual Update, August.

¹¹ QCA (2017). Aurizon Network's 2017 draft access undertaking, December, p.492.

4.3.3 Estimating MRP using Market Surveys

To varying degrees, Australian regulators have referenced the outcomes of market surveys to support their preferred MRP values.

Lally (2013) notes that “the respondents to these surveys are academics, analysts, and managers rather than investors per se.”¹² Hence it is unlikely that the overwhelming majority of any of the survey respondents would be employing their estimate of the MRP to reach real-world investment decisions.

The Australian Competition Tribunal has raised concerns about the use of market surveys:¹³

Surveys must be treated with great caution when being used in this context. Consideration must be given at least to the types of questions asked, the wording of those questions, the sample of respondents, the number of respondents, the number of non-respondents and the timing of the survey. Problems in any of these can lead to the survey results being largely valueless or potentially inaccurate

When presented with survey evidence that contains a high number of non-respondents as well as a small number of respondents in the desired categories of expertise, it is dangerous for the AER to place any determinative weight on the results.

In our view, market surveys are not a transparent or robust approach to guiding determination of the MRP and therefore we consider that minimal weight should be attributed to them. Furthermore, the methodologies employed by respondents can depart from the conventional theory and ad hoc adjustments are common. Attachment D of our report provides more information on market surveys.

4.3.4 International evidence on estimating the MRP

Ofgem’s consultants, Wright and Smithers (2014)¹⁴, made the following comments in regards to establishing a value for the MRP:

... the [UK’s Competition Commission] has given at least some weight to a model in which the expected market return is assumed to have been pulled down by falls in the risk-free rate... We argued against this model, pointing to the lack of any historical stability in the risk-free rate, and hence in estimates of the market equity premium.

¹² Lally, M. (2013). Response to submission on the risk-free rate and the MRP, 22 October, p.23.

¹³ Application by Envestra Ltd (No. 2), ACompT 3, para 162-163.

¹⁴ Wright, S. and Smithers, A. (2014). The cost of equity for regulated companies: A review for Ofgem, p.2.

We believe that recent events have simply added to the weight of evidence against this approach.

A counter-cyclical equity premium is consistent with some more recent academic research, and with recent patterns in observable proxies for risk premia such as corporate bond spreads. It also has the advantage of providing stability in the regulatory process.

We conclude that there is no plausible case for any further downward adjustment in the assumed market cost of equity based on recent [downward] movements in risk-free rates.

Wright and Smithers conclude:¹⁵

Thus both historical and more recent evidence point to the same conclusion: in contrast to the stock return there is no evidence of stability in the risk-free rate, at any maturity. As a direct implication, there is no evidence of stability of the market equity premium. Without such evidence, there is no empirical basis for the assumption that falls in risk-free rates should translate to falls in expected market returns.

The US Federal Energy Regulatory Commission (FERC) has adopted a similar stance. It was previously FERC's practice to adjust the return on equity with a 1:1 correspondence between the return on equity and changes in US Treasury bond yields. However, in light of the GFC, they have decided that this methodology may no longer "produce a rational result":¹⁶

The capital market conditions since the 2008 market collapse and the record in this proceeding have shown that there is not a direct correlation between changes in U.S. Treasury bond yields and changes in ROE... U.S. Treasury bond yields do not provide a reliable and consistent metric for tracking changes in ROE.

Dobbs, Koller and Lund (2014) from McKinsey Inc. have also contributed to the debate about the MRP:¹⁷

... a "rational expectations" investor who takes a longer-term view should regard today's ultra-low rates as temporary and therefore likely will not reduce the discount rate used to value future cash flows. Moreover, such investors may assign a higher risk premium in today's environment. Our conversations with management teams

¹⁵ Wright, S. and Smithers, A. (2014), p.15.

¹⁶ FERC Opinion 531, Docket EL11-66-001, June 2014, pp 77-78.

¹⁷ Dobbs, R., Koller, T. and Lund, S. (2014). "What effect has quantitative easing had on your share price?" McKinsey on Finance, Winter (49), p.16.

and corporate boards suggest that they take a similar approach when they consider investment hurdle rates. None of those with whom we spoke have lowered the hurdle rates they use to assess potential investment projects, reflecting their view that low rates will not persist indefinitely.

4.4 Conclusion on the MRP

It is clear that the majority of regulators have acknowledged the limitations of solely relying upon the Ibbotson approach to assess the MRP. Concerns have also been raised regarding excessive reliance on surveys.

Several regulators (including the ERA and QCA), the Governor of the Reserve Bank and international regulatory bodies and financial experts have explicitly or implicitly adopted the Wright approach to the formulation of the MRP. It is arguable that forward-looking approaches based on the DDM are also acceptable, although in this instance we have not incorporated them given their inherent instability and the ongoing disagreement over transition and terminal growth discount rates.

Accordingly, for the purposes of estimating the MRP we have averaged the outcomes of applying the Wright and Ibbotson approaches. Our simple weighted average estimate of the MRP (as at 31 January 2018) based on these approaches is a value of 7.69% (assuming a gamma of 0.25) as follows.¹⁸ This MRP value is similar to the most recent IPART update (7.8%).

Table 6 MRP estimate using historical approaches

Methodology	Estimate	Weighting
Ibbotson Historical Excess Returns	6.56%	50%
Wright Historical Excess Returns	8.82%	50%
Weighted Average MRP	7.69%	

Note: Calculations assume a utilisation rate (theta) of 0.35, consistent with a distribution rate of 0.7 and a gamma of 0.25.

Source: Synergies calculations

¹⁸ A gamma of 0.4, holding the distribution rate constant, would imply a utilisation rate of 0.57. This would lead to a revised Ibbotson MRP of 6.65%, and a Wright MRP of 8.90%, resulting in an overall MRP of 7.78%.

5 Return on debt

In simple terms, the return on debt calculation is the sum of the risk-free rate and an estimate of the debt risk premium consistent with the risk profile of the entity in question.

This approach is underpinned by the concept of credit spreads reflecting credit and liquidity risks associated with government and corporate bonds. A credit spread is the difference in yield (return to the investor) between two bonds of similar maturity but with different credit quality due to the different underlying risks associated with each bond. The difference in yields between a long-term government bond (assumed to be the risk-free rate) and an equivalent term corporate bond is an example of the credit spread concept.

The return on debt calculation can be expressed as follows:

$$R_d = R_f + \text{DRP} + \text{DRC}$$

Where:

R_f = risk free rate

DRP = debt risk premium

DRC = debt raising costs

In applying the above return on debt formula, there are several underlying assumptions that are required including in regards to the:

- risk-free rate
- notional credit rating assumption
- term to maturity
- debt management approach
- method used to estimate the debt risk premium (DRP)
- assumed debt raising costs.

Each of these parameters is estimated in the sections below after we have summarised Australian regulatory precedent regarding estimation of the return on debt.

5.1 Australian regulatory precedent

Given the CAPM is intended to reflect expectations as of the day of analysis, it is theoretically correct to base the risk-free rate on the prevailing yield on the date of the valuation. This means that the return on debt is based on prevailing rates, set over a very short averaging period prior to the point at which prices are reset. It then remains fixed during the regulatory period, with the regulated business managing the risk of interest rate movements.

However, problems may occur if there is a spike in yields on the day that the rate is applied. It is therefore now common regulatory practice to average the rate over a short horizon, which typically ranges from between ten and forty days, noting that over such a short horizon the choice of averaging period is likely to be of little consequence. The Independent Pricing and Regulatory Tribunal (IPART) in NSW is the only Australian regulator that has looked at longer term averages in conjunction with short term estimates.

Until relatively recently, Australian regulators always applied an 'on the day' approach to estimate the return on debt. This is the approach adopted by the ACCC, most recently in its April 2017 HVAU Draft Decision.

The AER, however, now applies a 10-year 'trailing average' approach as explained in its Rate of Return Guideline.¹⁹ This approach emanated from the recognition that in practice, a more efficient debt management strategy may be to maintain a staggered debt maturity profile and progressively refinance debt through time. This in turn means that the return on debt set in the WACC will therefore reflect the cost at which debt was raised or refinanced historically, resulting in a return on debt that reflects historical rates. The trailing average approach involves 'averaging in' a portion of the prevailing return on debt each year, meaning that the regulated return on debt, and hence tariffs, will vary throughout the period.²⁰

The 2012 rule changes made by the AEMC allowed for the return on debt to be estimated based on one of: the trailing average approach; the current on the day approach; and a hybrid of the two. In its 2013 Rate of Return Guideline, the AER determined that its preferred approach is the trailing average. It has employed a simple averaging approach, which means that each year, one-tenth of the prevailing ten year bond yield would be

¹⁹ AER (2013). Rate of Return Guideline, December, p.28.

²⁰ Alternatively, they could be adjusted via a 'true up' mechanism at the end.

‘averaged in’ to the return on debt estimate.²¹ The AER also determined that this must be implemented over a ten year transition period.²²

Other economic regulators that have accepted the trailing average approach include Victoria’s Essential Services Commission (ESC) for Melbourne Water, allowing an immediate transition but based on a data series that excluded the ‘GFC years’ (2008-09 to 2012-13).

WA’s Economic Regulation Authority (ERA) has accepted the trailing average approach in recent gas network decisions²³, although based on a ‘hybrid’ approach, allowing an immediate transition for the DRP and a ten year transition for the base rate.

In its recent decision for SA Water, the Essential Services Commission of South Australia (ESCOSA), determined that it will immediately transition to this approach in the first year of its new regulatory control period.²⁴

The only Australian regulator that has explicitly rejected the trailing average approach outright is the Queensland Competition Authority (QCA).

5.1.1 Synergies’ proposed approach

While the application of a long-term trailing average approach is more likely to approximate the debt management practices of an entity that has been subject to deterministic price regulation for an extended period of time, this does not invalidate the application of the on the day approach. This is because a regulated entity could choose to adopt a debt management practice that reflects the on the day approach.

In the 2017 draft decision for the HVAU, the ACCC calculated the return on debt using an on the day approach that was based on an average of adjusted RBA and Bloomberg bond yield estimates.²⁵ This is the approach that we adopt in this report.

²¹ We would consider that a more effective approach would be to adjust the changes in the benchmark debt balance, as this recognises the lumpy capital expenditure profiles that are typical of regulated businesses, that is, in a year when capital expenditure is high, more weight would be given to the prevailing return on debt in that year.

²² This is seen as particularly relevant at the current time given the recent contraction in debt margins, that is, the estimate that would be produced using the ‘on the day’ approach would be lower than the trailing average, which would reflect the significant expansion in debt margins following the global financial crisis.

²³ Refer: ATCO Gas Australia, Dampier to Bunbury Pipeline.

²⁴ Refer: Essential Services Commission of South Australia (2016). SA Water Regulatory Determination 2016, Final Determination, June. In making this conclusion it noted that over the previous ten years, ESCOSA noted that there would have been an immaterial difference had there been a gradual transition to the trailing average compared to the on the day approach.

²⁵ Full details of the methodology are provided in Appendix A of the 2017 HVAU draft decision.

5.2 Risk free rate

As outlined in Chapter 4, we have estimated the risk-free rate based on a 20-day average of the ten-year Commonwealth Government bond yield as at 31 January 2018.

The resulting estimate is 2.78% (annual effective rate).

5.3 Notional credit rating assumption

ARTC’s return on debt has previously been estimated based on a BBB credit rating. The ACCC has previously determined that a BBB rating is appropriate for ARTC and similarly we see no reason to change that assessment. Therefore, we have maintained this assumption for the current review. Furthermore, Table 7 shows that the majority of Class I railroads, as well as Aurizon, have been assigned ratings of BBB or equivalent.²⁶

Table 7 Credit ratings for comparable companies

Company	Moody’s Credit Rating	S&P Credit Rating
CSX Corporation	Baa1	BBB+
Genesee & Wyoming Inc.	Ba2	BB
Kansas City Southern	Baa3	BBB-
Norfolk Southern Corporation	Baa1	BBB+
Union Pacific Corporation	A3	A
Canadian National Railway Company	A2	A
Canadian Pacific Railway Limited	Not rated	BBB+
Aurizon Holdings	Baa1	BBB+

Note: A Moody’s credit rating of Baa is equivalent to an S&P credit rating of BBB.

Source: Bloomberg

5.4 Term to maturity

Consistent with our calculation of the risk-free rate, we have assumed a ten year term to maturity for BBB bonds, the longest available tenor (with appropriate liquidity) in an Australian context. This is also consistent with past ACCC decisions for ARTC.

5.5 Debt risk premium

The DRP is estimated based on the difference between the yield on ten year BBB corporate bonds and the risk-free rate (averaged over the same twenty day period). The

²⁶ In the RBA and Bloomberg published bond yield estimates, BBB+, BBB and BBB- are grouped into a broad BBB credit rating.

key issue is the data source and methodology used to estimate the ten year BBB corporate bond yield.

In the 2017 HVAU draft decision, the ACCC's approach was to take an average of yield estimates calculated from RBA and Bloomberg data. This approach was adopted on the basis that neither method is clearly superior in terms of bond selection or curve fitting method, and because there is no clear indication that one estimate has been consistently higher or lower over time. The following sections provide an overview of these two data sources.

5.5.1 RBA data series

The RBA dataset contains estimated bond yields for broad A and BBB rated bonds over 3, 5, 7 and 10 year target tenors. One advantage of the RBA data series is its transparency, as the methodology used to derive the estimates is publicly available. However, the RBA approach also has limitations that need to be addressed:

- *single day end of month estimate*: as the estimates are currently only produced on the last day of each month, there is a risk that this day was 'atypical' or influenced by a one-off event or perturbation in the market. This is addressed by interpolating daily bond yield estimates between observed end of month bond yields;
- *average tenor less than ten years*: to the extent that the 'ten year' estimate reflects an average bond tenor of less than ten years, it is not a ten year estimate. Accordingly, it should be extrapolated to a ten year estimate. We have done this by using the RBA's seven year estimates to approximate the slope of the RBA's yield curve.

5.5.2 Bloomberg BVAL data series

Bloomberg provides estimates of BBB-rated Australian corporations under its Bloomberg Valuation service, also referred to as 'BVAL'. The BVAL curves use a proprietary algorithm to derive bond prices which are then used to construct a yield curve. The inputs to the BVAL models include direct observations of bond prices through trading and historical tracking of the bond compared to comparable firms if there is thin data available for the given security. Another method used to address thin trading is that the data can be supplemented using the historical correlation of price movements with observed comparable bonds. Unlike the RBA, Bloomberg does not publish its methodology for deriving the BVAL series.

5.6 Debt raising costs

The debt risk premium reflects a premium for credit and liquidity risk. However, it does not include any allowance for the actual costs of raising debt. In practice, transaction and administration costs will be incurred when raising and managing debt.

5.6.1 Regulatory precedent

PwC relatively recently undertook market research of Australian debt raising transaction costs, which have been applied in an Australian energy economic regulation context.²⁷ Incenta have subsequently applied PwC's findings in recent energy regulatory processes. PwC's study built on earlier work undertaken by Allen Consulting Group.²⁸ We regard this collective body of work prepared in an Australian regulatory context to provide the most authoritative evidence of debt raising costs for Australian corporates based on surveys and interviews with legal firms, banks and credit rating agencies that are involved in the corporate bond raising process.

PwC noted that during the past decade a benchmark of 12.5 basis points per annum (bppa), representing direct costs of debt raising, was developed and applied by several Australian regulators. However, from 2004 the AER applied a methodology based on empirical observations of direct debt raising costs, which resulted in lower benchmark values in the range of 8 to 10 bppa depending on the size of the regulated network business.²⁹

PwC's breakdown of direct debt transaction costs are as follows:

- Legal counsel – Master program – legal costs for the preparation of a Master Program, which becomes the base document for multiple issuances over 10 years;
- Legal counsel – Issuer's – legal fees for the preparation of documents under the Master Program;
- Credit rating agency – Initial credit rating – a fee to establish the credit rating;
- Credit rating agency – Annual surveillance – a rating agency fee for the maintenance of the credit rating each year;
- Credit rating agency – Up front bond issue – a fee charged by the rating agency when a new bond is issued;

²⁷ PwC (2013). Energy Networks Association: Debt financing costs, June.

²⁸ Allen Consulting Group (2004). Debt and Equity Raising Transaction Costs, Final Report, December.

²⁹ PwC (2013), p.6.

- Registrar – Up front – an initial set-up fee charged by a bond registry organisation;
- Registrar – Annual – the annual fee charged by the registry service; and
- Investment bank’s out-of-pocket expenses – the fees charged by the agents of a bank for travel, accommodation, venue hire, printing etc.

Using the above cost components, PwC derived an estimate for total debt raising transaction costs for Australian bond issues, based on the standard issue size (\$250 million) and benchmark term to maturity (10 years), of 10 bppa. This estimate combines the base arrangement fee with ‘other’ costs in terms of an equivalent bppa.

In the 2017 HVAU, the ACCC allowed for debt raising costs of 0.095 per cent. Based on the evidence presented above, we see no reason to deviate from this value.

5.7 Return on debt estimate

Table 8 presents our estimate of the return on debt following the ACCC on the day methodology set out in Appendix A of the HVAU 2017 draft decision. Accordingly, we apply an equal weighting to the estimates derived from the RBA and Bloomberg.

We believe that the use of publicly available datasets provides for an open and transparent estimation of the DRP. The RBA’s data and methodology is openly available, and Bloomberg’s data service is one of the most common platforms for the access of robust and independent market data. Combining estimates from these two data sources will, in our opinion, form the best estimate of the prevailing return on debt.

Table 8 Return on debt estimate for ARTC

Parameter	Value
RBA DRP	1.75%
Bloomberg DRP	1.70%
Average of RBA and Bloomberg DRP	1.73%
Risk free rate	2.78%
Debt raising costs	0.095%
Return on debt	4.61%

Note: Return on debt calculations assume a BBB credit rating using a 20-day averaging period ending 31 January 2018.

Source: RBA, Bloomberg, Synergies calculations

6 Gamma

Gamma (γ) is the value of imputation credits to investors, where some part of corporate tax paid by this entity can be claimed as a tax credit against personal income tax. To the extent it can be accessed by investors, it forms part of the assumed equity return to investors.

Following an introductory section on the components of gamma, the remainder of this chapter outlines the different approaches to determining gamma, before proceeding to an overview of Australian regulatory precedent.

6.1 Introduction

Under a dividend imputation system, corporate tax paid prior to the distribution of dividends can be credited against the tax payable on the dividends at a shareholder level. In other words, corporate tax is a prepayment of personal tax withheld at a company level. Under Australia's dividend imputation system, only domestic shareholders can avail themselves of imputation credits.

Gamma is the product of two inputs which must be estimated:

- the proportion of tax paid that has been distributed to shareholders as franking credits (the distribution rate); and
- the value the marginal investor places on \$1 of franking credits, referred to as the value of franking credits or the utilisation rate (usually denoted by theta).

Gamma must take a value between zero and one depending on the assumptions made in regards to the distribution rate and theta.

Imputation credits are only available in respect of company tax paid on income subject to Australian taxation. For gamma to equal one all income must be domestically taxable. What is clear is that different shareholders value franking credits differently, as their tax status determines whether their credits can be redeemed.

If the shareholder is an Australian taxpayer, then they are subject to Australian personal income tax and can offset the prepayment of this tax at the corporate level against their own personal liabilities. If they are not subject to Australian personal income tax, such as non-residents and tax-exempt individuals or entities, then the company tax paid cannot be offset, and no additional value is therefore derived. In other words, the value of gamma is zero.

6.2 Gamma approaches

Australian regulatory precedent is a highly contested area with ongoing disagreement over the value of imputation credits (θ) in the hands of investors, one of the two critical inputs into the gamma calculation.

Consequently, there are several approaches that have been applied in Australian regulatory practice. This has been reflected in a large range of gamma values from 0.25 to 0.65 that have been adopted by Australian regulators in recent years. However, what is common to all these regulatory decisions is the assumption that the marginal investor is either a resident Australian or that the identity of the marginal investor is not relevant to the assessment of the valuation of imputation credits.

In this regard, the distribution rate is relatively non-contentious and has settled around 70%. In contrast, the value of θ continues to be highly contentious and in broad terms can be estimated using the following non-market and market-based approaches:

- the equity ownership approach, which is the proportion of Australian equity held by Australian residents (given only domestic investors can utilise franking credits), or taxation approach using statistics drawn from the Australian Taxation Office on the utilisation of franking credits
- market value studies, which seek to ascribe the value that investors place on θ using techniques, such as dividend drop-off studies (i.e. pre- and post-dividend share prices)

Each of these approaches establishes a broad range of θ values and in turn a gamma value. The equity ownership approach has been applied by some regulators. It provides a θ value of around 0.6 to 0.7 resulting in a gamma value of 0.4 to 0.5. This approach assumes an investor that is eligible to fully utilise imputation credits they receive has a utilisation rate of 1 (i.e. they gain 100 percent of the “value” of the imputation credits); whereas an investor that is ineligible to redeem imputation credits has a utilisation rate of 0 (i.e. they gain no “value” from the imputation credits). However, this approach fails to recognise the potential for individual eligible investors to value imputation credits at less than their nominal dollar value, notwithstanding evidence to the contrary. Moreover, the equity ownership approach does not reflect a market based approach despite every other relevant parameter informing the WACC being based on a market proxy.

In contrast, market value studies estimate the value of imputation credits based on observed financial market data. Dividend drop-off studies are the most commonly applied form of market value study, and have been endorsed by IPART. The most recent

dividend drop-off study from 2017 maintains support a theta value of 0.35 and hence a gamma value of 0.25 (assuming a 70% distribution rate).³⁰

There is also substantial evidence that imputation credits are not considered by independent experts in a valuation context. Australian economic policy makers have questioned the value of imputation credits in an economy that is small by international standards and characterised by open capital markets. Furthermore, academic literature strongly indicates that the gamma for a security where the marginal investor is foreign should be zero given the marginal investor is an international investor and hence, in an Australia context, unable to utilise any accrued imputation credits.

We now turn to an examination of Australian regulatory precedent.

6.3 Australian regulatory precedent

Determining an appropriate value for gamma has proven highly contentious in economic regulation and most of this debate has played out under the Australian national energy framework.

Historically, most Australian regulators applied a value of 0.5. In its 2009 WACC guidelines review, the *Statement of Regulatory Intent* (SoRI), the AER increased the value of gamma to 0.65. Energex, Ergon Energy and ETSA Utilities (now SA Power Networks) appealed the AER's application of a gamma of 0.65 in their revenue determinations.³¹

In that review, it was accepted that the distribution rate applied should be 0.71 (reflecting the proportion of corporate tax paid that has been distributed to shareholders as franking credits), which is directly observable from Australian tax statistics. A distribution rate of 0.7 has generally been adopted by Australian regulators and is not contentious.

In contrast, the key issue of contention in the SoRI process and in subsequent regulatory proceedings is the value of theta (the value of franking credits). As part of the review process, the Tribunal commissioned a 'state of the art' dividend drop-off study³² from SFG Consulting to estimate theta, which was subject to intense scrutiny. This study arrived at a value of theta of 0.35, which results in a gamma of 0.25. The Tribunal

³⁰ Cannavan, D. & Gray, S. (2017). Dividend drop-off estimates of the value of dividend imputation tax credits. *Pacific-Basin Finance Journal*, 46, pp.213-226.

³¹ Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9

³² The dividend drop off study is one of the most common empirical approaches used to estimate the value of theta. The estimate is based on an analysis of the change in share price following the payment of a dividend. One of the key difficulties with this is attributing the change in share price to the value of the dividend and the value of the franking credit that is attached to it. This leads to the statistical problem of multicollinearity.

accepted this value and overturned the AER's decision. The AER subsequently applied a value of 0.25 in decisions made under its SoRI.³³

In 2013, the AER completed its review of its WACC guidelines, resulting in the replacement of the SoRI with the Rate of Return Guideline. In that review, the AER reverted to a value of 0.5, which was revised down to 0.4 in subsequent revenue determinations using updated data. This hinged on a review of the 'conceptual definition' of theta and a dismissal of market value studies as being of any relevance in valuing theta.

The AER's approach to gamma was one of the matters successfully appealed by the NSW and ACT network businesses in the most recent revenue determination processes. The Tribunal concluded that the AER's gamma was too high and that the upper bound for the value of theta should be no more than 0.43, which reflects the utilisation rates from ATO tax statistics (which would equate to a gamma of 0.3 at a distribution rate of 0.7). It highlighted that the AER's equity ownership approach arrives at a value that is above this upper bound and therefore "the equity ownership approach overstates the redemption rate."³⁴ It stated that:³⁵

Given that two of the three approaches adopted by the AER [the equity ownership approach and tax statistics] are considered no better than upper bounds, it follows that the assessment of theta must rely on market studies. The Tribunal considers that, of the various methodologies for estimating gamma employed by the AER, market value studies are best placed to capture the considerations that investors make in determining the worth of imputation credits to them. [words in brackets added]

The Tribunal remitted the decision back to the AER to remake with guidance consistent with the above quote implying that gamma should be set at a value no higher than 0.3 based on utilisation rates taken from ATO tax statistics. The AER subsequently made an application for judicial review of this decision to the Federal Court.

The Full Federal Court upheld the AER's judicial review of the Tribunal's decision on theta. The Full Federal Court found that:³⁶

...the Tribunal assumed other parameters in the WACC calculations were market values that already incorporated investors' tax positions and transactions but that

³³ A gamma of 0.65 continued to be applied to electricity transmission network businesses because it was prescribed in the National Electricity Rules. The value of gamma is no longer prescribed in the National Electricity Rules.

³⁴ Applications by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1, para.1093.

³⁵ Applications by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1, para.1096.

³⁶ *Australian Energy Regulator v Australian Competition Tribunal* (No 2) [2017] FCAFC 79, para 755.

misconstrued the 'post tax' framework [used in the NER]. The rules required gamma to be determined consistently with the return on equity.

The AER is likely to continue with its equity ownership approach to determining gamma following the Full Federal Court's judgment, which based on data as at 2015 suggests a gamma of 0.4.

However, it is unclear whether special leave will be sought to appeal the Full Federal Court's judgment in the High Court and the Full Federal Court is yet to determine another judicial review of the Tribunal's decision in Application by South Australian Power Networks where one of the grounds of review is the Tribunal's formulation on gamma (the Tribunal in this decision found that the AER was not in error).

Furthermore, central to the Full Federal Court's judgment is the belief that the WACC calculated in accordance with the NER is calculated using face values rather than market values.³⁷ To the extent that the WACC methodology adopted considers market values, then consistent with the Full Federal Court's judgment, a gamma that reflects market values would be appropriate. In particular, we note that whether the Officer framework used to determine the WACC under the NER adopts face or market values is disputable given the Tribunal finding:³⁸

Moreover, the AER's reasoning ignores the fact that other parameters in the WACC calculations are market values that already incorporate the effects of the differences in investors' tax positions and transaction costs. As noted by Professor Gray of SFG Consulting, Estimating gamma for regulatory purposes, 6 February 2015 at 9:

In my view, gamma is no different from any other WACC parameter in this respect. For example, when estimating beta, the AER uses traded stock prices, which reflect the value of those shares to investors. That value reflects any "personal costs" that the investors bear. There is no process of adjusting share prices to reverse some of the reasons why investors value shares the way they do. The same applies to the traded bond prices that the AER uses to estimate the cost of debt. All of these prices reflect the value to investors – *all* of the considerations that are relevant to how investors value the stock are reflected in the price. [italicised emphasis in the original]

³⁷ Differences between face values and market values emerge when investors cannot redeem the full value of imputation credits.

³⁸ Applications by Public Interest Advocacy Centre Ltd and Ausgrid [2016] ACompT 1, para.1073-4.

Consequently, there is no inconsistency between the use of market studies to estimate the value of imputation credits and the methods used to calculate other parameters of the costs of debt and equity from market data.

It is true that the estimation of theta under market based approaches is not without controversy (with measurement and estimation issues arising in part because of the restricted window of analysis). However, all other WACC parameters are set having regard to market values. Accordingly, the assessment of the value of gamma should be informed by approaches assessing market values.

Furthermore, the market value interpretation is more compatible with the concept of the marginal investor, whereas the redemption proportion interpretation relies on the concept of an average investor. In the context of price setting in financial markets, especially in Australia, the former is likely to be a more realistic representation. This approach is consistent with the academic findings and equity market data presented in earlier sections of this chapter.

Approaches applied by other Australia economic regulators

Australian economic regulators' positions on gamma remain mixed, with both market and non-market approaches being applied. Table 9 summarises the current status of regulatory precedent.

Table 9 Current Australian regulatory status of gamma

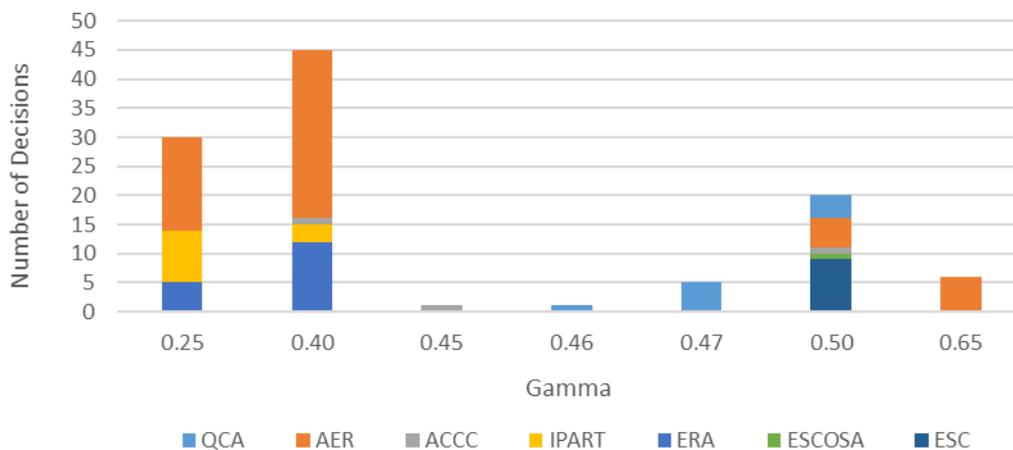
Regulator	Current value applied	Comments
QCA	0.46	Previously revised down from 0.5.
AER	0.4	A gamma value of 0.5 is specified in the AER's Rate of Return Guideline. However, it has applied a value of 0.4 in all its energy revenue determinations since 2013. Several of these decisions have been subject to merits review. Depending on the out-workings from these merits review processes, there is the potential for different values of gamma to apply across revenue determinations (0.4 and something between 0.25 and 0.4).
ACCC	0.4	This was applied in the draft ARTC Hunter Valley Access Undertaking
IPART	0.25	Arrived at under a specific review of gamma concluded in 2012. Not revisited in its 2013 WACC methodology review. October 2017 draft WACC methodology proposes retaining 0.25.
ERA	0.4 and 0.25	Has aligned with the AER's approach of 0.4 for the rail entities it regulates. This value was also maintained in its June 2016 Final Decision for the Dampier to Bunbury pipeline. However, in July 2016 the Tribunal overturned a previous ERA decision for ATCO Gas Australia, which resulted in a gamma of 0.25 being applied for this entity.
ESCOSA	0.5	As per 2016 Final Decision for SA Water.
ESC	0.5	As per most recent Melbourne Water decision. The ESC has not provided its rationale, other than noting in the Guidance Paper that this was consistent with its previous review.

Source: Synergies based on Australian regulatory decisions

It is possible that other regulators will be influenced by the outcome of the current appeals for energy network businesses. In saying this, we note that some of the State-based regulators also gave no recognition to the Tribunal’s previous determination made for Energex, Ergon Energy and SA Power Networks in 2011.

Figure 2 shows the diversity of gamma values approved by Australian regulators between 2010 and 2017. Although a number of gamma decisions have resulted in a value of 0.25, 0.4 is the most frequently adopted value.

Figure 2 Australian regulatory gamma decisions (as at December 2017)



Data source: Synergies based on Australian regulatory decisions

Note: The AER and ESC gamma values are applied across multiple decisions for the energy (AER) and water (ESC) entities that they regulate.

6.4 Conclusion

Synergies contends that there is substantial financial market and academic evidence to support a gamma value of 0.25 (and in fact even zero). However, we understand that ARTC proposes a gamma value of 0.4 in line with recent regulatory decisions from the ACCC, AER and ERA.

We note that the regulatory approach to gamma differs from the approach taken in financial markets and academic literature. There is extensive evidence that independent expert valuations do not place a value on imputation credits when establishing required rates of return. Findings from the financial literature also question the value of imputation credits. Academic research analysing market data indicates strong support for a gamma value of zero based on the assumption that in open capital markets like Australia, the marginal investor will be an international investor who gains no value from imputation credits and hence whose expected return on equity is not affected by the operation of the Australian tax imputation system.

There is also evidence in the regulatory sphere that an appropriate value for gamma could be less than 0.4. In its October 2017 draft report for its WACC methodology review, IPART proposed retaining its current gamma value of 0.25.³⁹ IPART contends that the value of gamma should be interpreted as a market value, with dividend drop-off studies currently deemed the best method to estimate the market value of gamma. Although several regulators favour a gamma of 0.4, this suggests that the value of gamma in the regulatory context will continue to be contested.

³⁹ IPART (2017). Review of our WACC method – draft report. October.

7 Conclusion

Based on the parameter estimates presented in this report, the estimated WACC for ARTC is provided in Table 10.

Table 10 Proposed WACC

Parameter	2008 IAU	2018 Estimate
Risk free rate	6.39%	2.78%
Capital structure (debt to value)	50%	52.5%
Debt risk premium	2.85%	1.73%
Debt raising costs	0.125%	0.095%
Market risk premium	6.00%	7.69%
Gamma	0.5	0.25
Tax rate	30%	30%
Asset beta	0.65	0.80
Debt beta	0.00	0.00
Equity beta	1.292	1.675
Return on equity	14.14%	15.66%
Return on debt	9.37%	4.61%
Post-tax nominal (vanilla) WACC	11.76%	9.86%
Pre-tax nominal WACC	13.00%	12.02%

Source: Synergies calculations

This proposed WACC is materially lower than the value accepted in the 2008 IAU. This has been driven by a substantial reduction in the risk-free rate and return on debt. On the other hand, our estimate of the asset beta has increased owing to an increase in the empirical estimates from the comparator set. The estimated market risk premium is also higher as a result of the lower risk free rate. Meanwhile, our estimate of gamma at 0.25 is lower than the value of 0.5 adopted in the 2008 IAU.

A First principles analysis

The key objective of the first principles analysis is to assess the extent to which the firm's net cashflows (revenues less costs) have some sensitivity to movements in the general economy. Lally identifies a number of factors to be considered here, including: nature of the product or service; nature of the customer; pricing structure; duration of contracts; market power; nature of regulation; growth options; and operating leverage.⁴⁰

The first principles analysis is largely contextual and can inform an assessment of where beta might sit within a range (that is, does a factor put upward or downward pressure on the beta for the firm). However, this remains qualitative. Noting the inherent uncertainty in beta estimation, it is not feasible to reliably quantify the impact of a particular factor on beta in isolation of other factors.⁴¹

A number of these factors are also interrelated – that is, the impact of one factor on beta could either be increased or lessened by another factor. Hence, while the impact of each factor can be considered in isolation, the overall assessment will reflect the net impact of the factors in combination. The first two factors are inextricably linked and so will be considered together.

A.1 Nature of the product / nature of the customer

When assessing the market for rail services, it is important to consider the underlying demand for these services and the customers utilising them. The key issue to establish here is the extent to which there is some correlation between the cashflows from these activities and domestic economic activity.

These cashflows comprise both revenue and costs. As most of the costs faced by the owner of a rail network are fixed, the main driver will be revenues (this will be discussed further as part of the analysis on operating leverage), and this will therefore be the focus here. However, of those costs that are variable, generally operating and maintenance there will be some relationship between these costs and general movements in the domestic economy. Overall, the impact of variable costs on ARTC's systematic risk profile is expected to be relatively small, although the impact of having a high fixed costs base is likely to be significant (this is discussed further below under operating leverage).

ARTC's interstate revenues are dominated by intermodal traffic, with the balance of revenue accounted for by steel, grain, passenger and minerals. Each of these traffic types

⁴⁰ Lally, M. (2004). The cost of capital for regulated entities, Report prepared for the Queensland Competition Authority.

⁴¹ This would necessitate being able to have two samples, where the firms in the samples are largely identical other than for the relevant factor.

will now be considered (with the exception of minerals traffic, which is currently relatively marginal and is therefore unlikely to have an impact on ARTC's risk profile).

A.1.1 Intermodal

As discussed throughout the report, the market for intermodal traffic is very competitive, with road particularly dominant for shorter hauls. While ARTC is undertaking significant investment to improve the performance of rail relative to road, competition is likely to remain intense into the future.

Intermodal transport generally involves the carriage of containers, most of which are likely to contain manufactured goods or inputs for production processes (some commodities such as rice are also carried via container). It is understood that intermodal traffic is dominated by goods destined for the domestic market, with the balance ultimately destined for export markets.

This composition is to be expected, given that producers of manufactured goods destined for export are more likely to be located near a major industrial centre and export port facility. There may be some movements intrastate, however, this is likely to be only over short distances. It is also noted that most of the domestic traffic is interstate, rather than intrastate. This is likely to reflect the difficulties that rail currently faces in competing with road over shorter distances.

The demand for goods in the domestic market will have a high correlation with domestic economic activity, irrespective of whether these goods are imported or produced domestically. When the economy is buoyant, incomes rise, as does the consumption of a range of goods and services, albeit to varying degrees (with the exception of less income-sensitive commodities, such as essential food items, but these are less likely to be transported by rail). As the economy contracts, consumption patterns will tend to exhibit a similar trend. Hence, the demand for manufactured goods is likely to broadly follow movements in the domestic economic cycle.

Because rail is a relatively marginal player compared to road on some parts of the network, any reduction in the demand for transport services (which could be purely cyclical) is likely to result in rail having to compete more intensely in order to retain market share. This intensity of competition means that prices cannot necessarily be set at a level that fully recovers costs. As a result, implementation of any further reductions in prices to maintain market share (or increase it) are not feasible.

A further issue that needs to be considered here is the number of buyers on the demand side. The more concentrated the market on the demand side (that is, fewer buyers), the greater that party's countervailing market power. Aurizon's exit from its intermodal

business is likely to have significant implications for ARTC. To the extent that Pacific National gains market share (noting the leakage that may continue to road), freight forwarders will be keen to avoid concentration of supply chain power, preferring instead to maintain competitiveness between transport options.

A.1.2 Steel

Steel is used in a variety of applications, including manufacturing and construction. Steel for domestic use is sourced from domestic producers but is also imported. Manufacturing activity will have a strong correlation with domestic economic activity. Construction activity will also have a strong correlation with the domestic economic cycle, whether this is in the residential, commercial or industrial sectors. For example, it is widely recognised that residential building approvals are often relied upon as a leading indicator of economic activity in Australia.

As outlined above, we would expect that export-oriented producers are likely to locate reasonably close to port facilities.⁴² Hence we would not expect that a significant proportion of steel hauled on the interstate network is likely to be destined for export markets; any haulage is likely to involve shorter interstate movements between capital cities. Increasingly, steel producers also have their own trucking networks, which reduce their reliance on rail transport.

A.1.3 Passenger

Passenger transport only accounts for a relatively small share of ARTC's interstate network revenues and hence while it will have some impact on ARTC's risk profile, it will not be a significant driver. Passenger travel undertaken on ARTC's interstate network will be for travel between regional centres, as well as long-distance leisure travel.

The market for passenger travel is very competitive. With increasing competition in the aviation industry, it is increasingly difficult for rail to compete with domestic airlines for market share. There are also other substitutes for rail travel, such as cars and buses. The overall demand for passenger travel services will have some sensitivity to income and will therefore be correlated with domestic economic activity.

The long-distance train travel market is a niche market. It not only competes with other transport alternatives, but it is also part of the broader tourism industry, competing with coach tours, cruising, island or resort holidays, and travel to overseas destinations.

⁴² The key steel-making facilities in Australia are located at Port Kembla, Whyalla, Melbourne, Sydney and Newcastle.

Demand for this service will be particularly sensitive to income, particularly at the luxury end of the market.

A.1.4 Grain

Demand for grain transport services can be quite variable and is highly seasonal. The demand for grain transport services is increasingly impacted by changes in climate variability (arising from more frequent and more severe droughts, storms and floods). This leads to variability in yields, as the area of land devoted to grain production is typically fixed in the short to medium term. Furthermore, the majority of grain production is destined for export markets, which increases exposure to currency fluctuations, international competitive forces, and global economic conditions more generally.

Competition with road transport is also intensifying as grain facilities on branch rail lines consolidate in favour of new, state-of-the-art grain facilities being constructed on main lines. Road transport is now estimated to account for 50% of all grain movements on a total kilometre-tonne basis.⁴³ Fuel costs remain a key driver of road-rail competitiveness.

Thus, despite their relatively small share of total revenues, fluctuations in grain traffics do have the potential to contribute to ARTC's systematic risk.

A.1.5 Summary: implications for systematic risk

The underlying demand for ARTC's interstate network services has a significant systematic risk element. This is dominated by intermodal traffic, the majority of which is destined for domestic markets and is likely to have a strong correlation with domestic economic activity. This is further augmented by the demand for services to transport steel, as well as passenger travel (particularly in terms of the leisure travel market), both of which are also related to the domestic economy. These drivers will lead to a higher value for beta.

A.2 Pricing structure

Pricing structure refers to the extent to which the firm's pricing arrangements either mitigate or increase its exposure to systematic risk. For example, if a firm's cost structure comprises fixed and variable costs, an important consideration here will be the extent to which prices have a fixed and variable component that reflect this cost structure.

⁴³ GrainGrowers (2016). State of the Australian Grains Industry 2016.

Consistent with other capital-intensive infrastructure businesses, ARTC's tariff structure has a fixed and variable component. To the extent that a greater proportion of the tariff (and hence revenues) is fixed, this gives ARTC some protection in the event of economic shocks, provided that fixed tariff component is largely aligned with its fixed cost base. The other risk is that ARTC incurs costs which are subsequently not approved by the regulator and hence cannot be passed through to customers. This is a source of regulatory risk.

Given the competition from road transport, ARTC is currently unable to price its intermodal services to recover the full economic costs of the services (based on a DORC valuation). Hence, even if it could do so, it is unlikely to be able to increase its prices in response to an increase in variable costs induced by an economic shock. This competition with road transport will only become more pronounced with the exit of Aurizon from its intermodal business.

This is also likely to be the case with respect to grain and passenger services. Prices for the former tend to be constrained due to capacity to pay (at least relative to other traffics). The demand for passenger services is also likely to be relatively elastic, so if ARTC sought to increase prices to these service providers, they may be unable to pass them onto customers and remain competitive.

A.3 Duration of contracts

ARTC generally enters into long term contracts with customers. We expect that this is typical of the industry, including the US Class I railways that are used as comparators in the beta analysis.

On the one hand, the existence of long term contracts provides ARTC with revenue certainty. However, this also depends on the extent to which the contracts provide surety in relation to prices and/or volumes. ARTC remains highly exposed to volume risk in the medium to long term, with the exit of Aurizon from its intermodal business adding to uncertainty. Term contracts can also constrain the business from varying certain provisions that it might have otherwise sought to review due to a change in the market or its risk profile (unless customers agree to re-open the contracts).

A.4 Market power

Most regulated businesses tend to possess some market power, which tends to be a key rationale for the declaration of a service, as well as the degree of prescription in the regulatory framework. The existence of market power tends to have a mitigating effect on systematic risk and therefore suggests a lower value for beta.

ARTC is in a unique position relative to many other regulated industries in that it faces competition from road transport on a substantial part of the interstate network. This competition is particularly intense on the Sydney to Melbourne and Brisbane to Melbourne corridors. The exception is for those transport services where ARTC has more market power (due to fewer substitutes), such as steel, minerals and grain. However, these traffics account for around 30% of ARTC's revenues.

Overall, therefore, the 'dampening' effect that market power has on systematic risk, and consequently beta, is substantially reduced in this circumstance. On this basis, to the extent that the comparator firms used to determine a range for beta also have limited market power, ARTC could be seen to be no different.

A.5 Form of regulation

Regulatory frameworks are either based on:

- a revenue cap, which insulates the regulated entity against volume risk, providing relative revenue certainty for the term of the regulatory period;
- a price cap, where prices are set for the term of the regulatory period based on forecast volumes, hence exposing the regulated entity to differences between these forecast volumes and actual throughput. While there is a downside risk if volumes fall, the regulated entity is generally able to retain the benefit of any upside; or
- some form of 'hybrid', which sits somewhere in between (for example, a price cap with volume triggers, where prices are reset if actual volumes move beyond a certain threshold relative to the forecast).

The effects of regulation on beta are unclear. In the first instance, regulatory risk is not necessarily in itself systematic as it could be avoided through diversification. However, the issue of relevance here is the extent to which regulation mitigates, or increases, ARTC's exposure to systematic volume risk.

Regulation can reduce risk if it increases revenue certainty over a period. Conversely, regulatory risk can be seen as a source of risk to the extent that there is uncertainty as to how it will be applied and/or it reduces the firm's ability to adjust prices in response to changes in costs.

The general practice of Australian regulators is to assume that regulation reduces risk and accordingly will have a dampening effect on beta. However, this is unlikely to be the case for ARTC as it is likely to have its revenues significantly affected by levels of economic activity throughout the regulatory period. The regulatory framework impedes

ARTC's ability to respond to emerging economic challenges, thereby increasing systematic risk.

A.6 Growth options

Growth options refer to the potential to undertake significant new investment, particularly in new areas or products. ARTC's capital requirements reflect investment in growth assets as well as the replacement of aging network infrastructure. Chung and Charoenwong (1991) argue that businesses that have a number of valuable growth opportunities, in addition to their existing assets, will tend to have higher systematic risk compared to firms that don't have these opportunities.⁴⁴

This can be illustrated if we consider two firms of the same value. One business has few growth opportunities, so that the value of the business will largely reflect the earning capacity of the assets already in place. The other business has the same value, however has fewer assets in place but a number of growth opportunities which have some value.

Of the two firms, the one that would be most affected by economic shocks is the one that has the greater portion of its value represented by growth opportunities. This is due to the fact that assets not yet invested in are at greater risk of being deferred or mothballed in economic downturns. This will be reflected in the company's equity beta, which would be higher. Overall, Chung and Charoenwong's empirical results strongly support this hypothesis.

A.7 Operating leverage

Operating leverage is measured as the ratio of fixed to variable costs. A high degree of operating leverage will increase the volatility of a firm's returns relative to the market, which can increase its beta.

ARTC's cost base is largely fixed, with only a relatively small proportion of its costs sensitive to volumes. This is typical for a rail infrastructure provider. High operating leverage is associated with higher systematic risk, as these fixed costs will still be incurred irrespective of actual volumes (and revenues). We would expect that ARTC's operating leverage remains largely unchanged since its previous review.

As this first principles analysis is being used to determine where ARTC would be positioned with respect to a range of beta estimates sourced from comparators, the

⁴⁴ K. Chung and C. Charoenwong (1991). Investment Options, Assets in Place and the Risk of Stocks. Financial Management, Vol.3.

impact of operating leverage on this decision will depend on ARTC's operating leverage relative to these comparators.

We understand that ARTC's operating leverage is similar to that of other rail network providers with a significant infrastructure component. However, its comparator group comprises US Class I railways, who we expect would have lower operating leverage, due to their above rail businesses. As operators primarily of trains and rollingstock, their ratio of fixed to variable costs will tend to be lower, holding all else equal. This is because their operating costs will exhibit a stronger relationship with actual volumes. This in turn tends to reduce systematic risk of US Class I railways relative to ARTC (since ARTC does not have lower operating leverage above rail operations).

A.8 Conclusions from first principles analysis

ARTC is exposed to relatively high systematic risk on its interstate network, especially when compared to other rail infrastructure providers. One of the key determinants of this is the existence of volume risk that is largely systematic in nature, driven by the strong relationship between the demand for intermodal services and the domestic economy. A relationship also exists between domestic economic activity and the demand for services to carry steel, as well as leisure-based passenger travel, although they are less significant in terms of their overall influence on ARTC's revenues.

The presence of market power is often seen as having a dampening effect on the systematic risk of regulated entities relative to other businesses. However, given the intensity of competition from road transport, this effect is substantially lessened here, to the extent that ARTC's market power is likely to be similar to the other transport firms used as comparators.

B Beta diagnostics

The purpose of this attachment is to present estimates that reinforce the robustness of our beta analysis. To this end, we have estimated portfolio betas for our comparator set of railroads, and we have also experimented with different monthly starting days for the monthly returns used in our beta estimates.

B.1 Portfolio betas

An informative robustness test for our beta estimates is to evaluate the beta for each sector using a value-weighted portfolio of the comparable companies, rather than averaging across the firms in each sector. The returns of each stock in the portfolio were weighted by market capitalisation in each month. In a similar way, the monthly market return was calculated as the weighted average of the monthly returns for each company's home country benchmark. Likewise, each company's gearing ratio was also weighted by its market capitalisation. The results from these estimates are presented in Table B.1.

Table B.1 Portfolio asset beta estimates

Portfolio	Portfolio asset beta	Averaged asset beta
5 Year Portfolio	0.93	0.85
10 Year Portfolio	0.86	0.78

Source: Bloomberg, Synergies calculations

The estimated portfolio asset betas compare favourably to the conventional averaged asset betas that we calculated in Section 4. These results provide further support to our proposed asset beta of 0.80. The difference between the two sets of estimates likely stems from the respective market capitalisations of the firms in the sample.

B.2 Monthly starting day robustness checks

By default, the monthly returns used in our beta analysis are calculated at the end of each month. To add robustness to our beta estimates, we have compiled supporting beta estimates using every other day of the month, and have averaged across these individual estimates. Results over both a five-year and ten-year time frame are displayed in Table B.2, and reinforce an asset beta estimate of at least 0.80.

Table B.2 Beta estimates averaged across different starting days

Timeframe	31-day Average	31-day Median
5 Years	0.95	1.00
10 Years	0.83	0.89

Note: To accommodate different month lengths throughout the year, we have also taken averages over 28 days. This causes a difference of only 0.01 for the 5 year estimates, and causes no change in the 10 year estimates.

Source: Bloomberg, Synergies calculations

The results presented in the table above are based on 31 day averages. If the given starting date falls on a weekend or public holiday in a particular month, we use the most recent trading day as an approximation. For example, where the starting day is set to be the 15th of the month, if the 15th falls on a weekend, the value from the previous trading day is used as an approximation. To accommodate different month lengths throughout the year, we have also taken averages over 28 days. This leaves the estimates virtually unchanged.

C ERA regulatory precedent on rail sector beta determination

The purpose of this attachment is to set out in more detail relevant regulatory precedent from the ERA for the assessment of an asset beta for rail sector determinations where revenues and earnings are affected, to varying degrees, by levels of economic activity.

C.1 ERA – Arc Infrastructure, The Pilbara Infrastructure (TPI) and Public Transit Authority

The ERA establishes WACC estimates for Arc Infrastructure (formerly Brookfield Rail), the Public Transit Authority and TPI.⁴⁵

The Authority notes that choosing a relevant benchmark sample for these three entities is difficult due to the lack of close comparators of rail infrastructure trading on the Australian Stock Exchange. Only one directly comparable company is available in Australia, Aurizon, which was floated on the ASX in July 2010 as QR National. A single comparable firm leaves the Authority with an insufficient sample on which to estimate regulated cost of capital parameters.

The Authority is of the view that estimates of asset beta based on benchmark samples should ideally be relevant to the regulated rail businesses in Western Australia. In this context, the Authority considers that two aspects of relevance to a benchmark entity should be considered.

First, estimates of asset beta from the benchmark samples should provide some relevance to the economy in which the efficient benchmark entity is operating (in this case, the Australian economy). Second, these estimates should also provide some relevance to the industry/sector in which the efficient benchmark entity is operating (in this case, the rail industry).

The Authority considers that a benchmark sample including only Australian businesses that are comparable with rail is preferred for the purposes of its empirical studies. However, the Authority's analysis indicates that there are insufficient rail businesses comparators operating in Australia. Given empirical estimates are the only viable option for estimating the asset beta for rail businesses, the Authority is of the view that a benchmark sample including both Australian and developed countries in Europe and America is appropriate.

⁴⁵ ERA (2014a). Review of the method for estimating the weighted average cost of capital for the regulated railway networks, Revised draft decision, November.

In this context, the ERA follows the same structured process to determine its beta comparators for each of these regulated entities, which entails first identifying Australian comparators and then due to an insufficiently small sample, extending its search to include the most comparable international entities.

C.1.1 Arc Infrastructure

The Arc Infrastructure network in the south-west of Western Australia is a freight rail network that primarily transports commodities such as iron ore, grain, coal, alumina and interstate freight.

The Authority considered that a firm must satisfy the following conditions in order to belong to the Arc Infrastructure benchmark sample:

- primarily involved in the transportation of goods across comparable distances;
- located in Australia or a similar developed economy;
- involved in the transportation of similar commodities to those transported on the Arc Infrastructure network (that is, bulk goods, but also general freight).

The ERA indicated that it applied the following filters in the Bloomberg terminal using the Equity Screening function, such that the comparator firm must:

- operate in an OECD country that has similar political, economic and geographical similarities to Australia;
- belong to the ICB Subsector: Railroads; and
- provide sufficient pricing data to allow calculation of its equity beta and gearing.

In addition, the Authority included comparator companies that were included in its previous WACC determinations for the Arc Infrastructure network.

The Authority considered that Aurizon is the closest comparator company to the Arc Infrastructure network in respect of its Australian operations and transport task. It is also listed. However, the regulatory regime differs between Arc Infrastructure and Aurizon in that Arc Infrastructure is subject to a negotiate-arbitrate regulatory regime, while the Aurizon network is subject to a revenue cap system. In addition, the use of only one comparator company may not adequately capture the risks faced by the Arc Infrastructure network.

The Authority has previously accepted advice that Australian and New Zealand transport companies are relevant to inform the required equity beta, credit rating and gearing for the Arc Infrastructure network. However, it considered non-rail operators to

be less relevant proxy companies compared to rail network operators. Nevertheless, they provide some information of value, particularly given the small size of the sample, so are retained.

ERA’s beta comparators are presented in the following table.⁴⁶ This sample of 11 comparators was reduced from the 15 comparators used in its rate of return decisions prior to 2015. The Authority removed Auckland Airports and Infratil (a NZ investment fund with investments in energy, transport and social infrastructure businesses) from the pre-2015 benchmark sample, as well as Macquarie Infrastructure Group. Aurizon Holdings has been added to the sample.

Table C.1 Comparator companies for Arc Infrastructure

Company Name	Country	Ticker	Company Description
Genesee & Wyoming	United States	GWR US Equity	Genesee & Wyoming Inc., through its subsidiaries, owns and operates short line and regional freight railroads and provides related rail services. The company also provides railroad switching and related services to United States industries with extensive railroad facilities within their complexes. Genesee operates in the United States and Australia.
Union Pacific Corporation	United States	UNP US Equity	Union Pacific Corporation is a rail transport company. The Company's railroad hauls a variety of goods, including agricultural, automotive, and chemical products. Union Pacific offers long-haul routes from all major West Coast and Gulf Coast ports to eastern gateways as well as connects with Canada's rail systems and serves the major gateways to Mexico.
Norfolk Southern Corporation	United States	NSC US Equity	Norfolk Southern Corporation provides rail transportation services. The Company transports raw materials, intermediate products and finished goods primarily in the Southeast, East and Midwest and, via interchange with rail carriers, to and from the rest of the United States. Norfolk Southern also transports overseas freight through several Atlantic and Gulf Coast ports.
Kansas City Southern	United States	KSU US Equity	Kansas City Southern, through its subsidiary, is the holding company for transportation segment subsidiaries and affiliates. The Company operates a railroad system that provides shippers with rail freight services in commercial and industrial markets of the United States and Mexico.
CSX Corporation	United States	CSX US Equity	CSX Corporation is an international freight transportation company. The Company provides rail, intermodal, domestic container-shipping, barging, and contract logistics services around the world. CSX's rail transportation services are provided principally throughout the eastern United States.
Canadian Pacific Railway	Canada	CP CN Equity	Canadian Pacific Railway Limited is a Class I transactional railway, providing freight and intermodal services over a network in Canada and the United States. The Company's mainline network serves major Canadian ports and cities from Montreal to Vancouver, and key centers in the United States Midwest and Northeast.
Canadian National Railway	Canada	CNR CN Equity	Canadian National Railway Company operates a network of track in Canada and the United States. The Company transports forest products, grain and grain products, coal, sulphur, and fertilizers, intermodal, and automotive products. Canadian National operates a fleet of locomotives and rail cars.
Toll Holdings Limited	Australia	TRH NZ Equity	Toll NZ Ltd. Provides freight transport and distribution services. The Company offers transportation, long-haul bulk freight, warehousing and freight forwarding services. Toll NZ also operates passenger and freight

⁴⁶ ERA (2014a), pp 28-30.

Company Name	Country	Ticker	Company Description
			transport vehicles that provides relocation and priority delivery services. Toll NZ conducts its business in New Zealand and Internationally.
Aurizon Holdings	Australia	AZJ AU Equity	Aurizon Holdings Ltd. is a rail freight company. The Company provides coal, bulk and general freight haulage services, operating on the Central Queensland Coal Network (CQCN) and including specialised track maintenance and workshop support functions.
Asciano Limited	Australia	AIO AU Equity	Asciano Limited is a provider of essential transport services in the rail and ports and stevedoring industries in Australia and New Zealand. The Company operates container terminals, bulk export facilities and container and bulk rail haulage services.
Port of Tauranga	New Zealand	POT NZ Equity	Port of Tauranga Limited activities include the provision of wharf facilities, back up land for the storage and transit of import and export cargo, berthage, cranes, tug and pilotage services for exporters, importers and shipping companies and the leasing of land and buildings. The Group also operates a container terminal and has bulk cargo marshalling operations.

Source: Bloomberg, ERA Analysis.

The Authority indicated it will therefore employ significant regulatory discretion when determining appropriate benchmark parameters for the Arc Infrastructure network, with a view that its risks are at the lower end of overseas railway operators, and at the higher end of Australian and New Zealand transport companies.

The Authority estimates the asset beta for the Arc Infrastructure network as being 0.7. Utilising the estimated gearing of 25 per cent, this corresponds to an equity beta of 0.9.

C.1.2 TPI

The TPI railway transports iron ore from Fortescue Metal Groups (FMG) Cloud Break iron ore mine in the East Pilbara to TPI’s port facilities at Anderson Point, Port Hedland.

Of the three Western Australian rail networks, TPI has the least number of direct comparators. Unlike, the PTA and Arc Infrastructure, TPI lacks diversification and exclusively services the mining industry exposing it to the relatively high volatility of minerals markets.

The Authority notes that TPI’s reliance on a single commodity – iron ore – transported across one large distance, significantly differentiates it from the Arc Infrastructure network. As a consequence, not all of the companies in the Arc Infrastructure sample are appropriate as comparators to TPI. The Authority considers that only Aurizon in Australia supplemented by overseas railway operators are able to adequately capture the risks faced by the TPI rail network.

Furthermore, the Authority considers that due to TPI’s exposure to only a limited number of potential users in the mining industry, TPI’s risks are likely to be at the upper end of those faced by the companies contained in the benchmark sample. At the same time, the Authority considers that the US short-line rail operator Genesee & Wyoming

Inc. is likely to be the best comparator for TPI. This is primarily due to Genesee & Wyoming Inc. operating class II/III short railway lines, including a number of similar lines in Australia.

ERA’s beta comparators are presented in the Table C.2

Table C.2 Comparator companies for TPI Network

Company Name	Country	Ticker	Company Description
Aurizon Holdings	Australia	AZJ AU Equity	Aurizon Holdings Ltd is a rail freight company. The Company provides coal, bulk and general freight haulage services, operating on the Central Queensland Coal Network (CQCN) an including specialised track maintenance and workshop support functions.
Genesee & Wyoming Inc.	United States	GWR US Equity	Genesee & Wyoming Inc., through its subsidiaries, owns and operates short line and regional freight railroads and provides related rail services. The company also provides railroad switching and related services to United States industries with extensive railroad facilities within their complexes. Genesee operates in the United States and Australia.
Union Pacific Corporation	United States	UNP US Equity	Union Pacific Corporation is a rail transportation company. The Company's railroad hauls a variety of goods, including agricultural, automotive, and chemical products. Union Pacific offers long-haul routes from all major West Coast and Gulf Coast ports to eastern gateways as well as connects with Canada's rail systems and serves the major gateways to Mexico.
Norfolk Southern Corporation	United States	NSC US Equity	Norfolk Southern Corporation provides rail transportation services. The Company transports raw materials, intermediate products, and finished goods primarily in the Southeast, East, and Midwest and, via interchange with rail carriers, to and from the rest of the United States. Norfolk Southern also transports overseas freight through several Atlantic and Gulf Coast ports.
Kansas City Southern	United States	KSU US Equity	Kansas City Southern, through its subsidiary, is the holding company for transportation segment subsidiaries and affiliates. The Company operates a railroad system that provides shippers with rail freight services in commercial and industrial markets of the United States and Mexico.
CSX Corporation	United States	CSX US Equity	CSX Corporation is an international freight transportation company. The Company provides rail, intermodal, domestic container-shipping, barging, and contract logistics services around the world. CSX's rail transportation services are provided principally throughout the eastern United States.
Canadian Pacific Railway	Canada	CP CN Equity	Canadian Pacific Railway Limited is a Class I transcontinental railway, providing freight and intermodal services over a network in Canada and the United States. The Company's mainline network serves major Canadian ports and cities from Montreal to Vancouver, and key centres in the United States Midwest and Northeast.
Canadian National Railway	Canada	CNR CN Equity	Canadian National Railway Company operates a network of track in Canada and the United States. The Company transports forest products, grain and grain products, coal, sulphur, fertilizers, intermodal, and automotive products. Canadian National operates a fleet of locomotives and railcars.

Source: Bloomberg Terminal, ERA Analysis

The Authority considers that an asset beta of 1.05 reflects the higher risks associated with the returns of the TPI network. When combined with the estimated gearing of 0.2, this results in an equity beta of 1.3.

C.1.3 Public Transit Authority (PTA)

The Authority considers that a firm must satisfy the following in order to belong to the PTA benchmark sample:

- provide a service similar to passenger rail, for example toll road or commercial passenger transportation companies;
- be located in Australia or a similar OECD economy;
- be mature, hence have limited growth opportunities;
- be of similar size to the PTA.

The Authority has used the Bloomberg terminal in order to identify comparable companies for the PTA. The following filters were applied in the Bloomberg terminal using the Equity Screening function. Selected companies will:

- provide a reference service similar to that of the PTA (toll roads and/or commercial passenger transportation across suburban areas);
- be well established with limited growth opportunities; and
- have sufficient pricing data in order to estimate equity beta and gearing.

ERA’s beta comparators for the PTA are presented in Table C.3

Table C.3 Comparator companies for PTA as returned by Bloomberg

Company Name	Country	Bloomberg Ticker	Company Description
Transurban Group	Australia	TCL AU Equity	Transurban Group is involved in the operation of the Melbourne City Link and the Hills Motorway M2 toll roads. The Group is also involved in developing an operating electronic toll systems.
Atlantia SPA	Italy	ATL IM Equity	Atlantia S.P.A is a holding company with responsibility for portfolio strategies in the transport and communications infrastructures and network sectors.
Vinci SA	France	DG FP Equity	Vinci SA builds roads, offers electrical, mechanical and civil engineering and construction services, and operates toll roads. The Company builds and maintains roads and produces road construction materials, builds electricity and communications networks, installs fire protection and power and ventilation systems, and operates toll highways, bridges, parking garages, and a stadium.
Abertis Infraestructuras S.A	Spain	ABE SM Equity	Abertis Infraestructuras S.A is an international group which manages mobility and telecommunications infrastructures through three business areas: toll roads, telecommunications infrastructure and airports. The group is present in Europe and the Americas.
Macquarie Atlas Roads Group	Australia	MQA AU Equity	Macquarie Atlas Roads Group manages toll roads. The Company operates toll highways in the United Kingdom, France and the United States.

Source: Bloomberg Terminal, ERA Analysis.

Given the low level of systematic risk for the PTA rail network, the Authority considers that an asset beta of 0.3 is appropriate. Utilising the estimated gearing of 50 per cent, this corresponds to an equity beta of 0.6.

C.2 ERA's pre-2015 beta comparators for Arc Infrastructure (freight)

Based on advice from Allen Consulting Group, ERA used the following sample of Australian and international beta comparators in its rate of return decisions between 2008 and 2015.⁴⁷ A key difference in the comparator set adopted in 2008 relative to 2015 was the inclusion of airports in the former sample.

Table C.4 Relative asset and equity betas of US comparator firms

Company	Country	Raw Equity Beta	Debt/assets ratio	Asset beta
Kansas City Southern	US	1.23	0.70	0.74
Union Pacific Corporation	US	0.81	0.38	0.59
RailAmerica Inc	US	1.61	1.32	0.69
CSX Corporation	US	1.15	0.77	0.65
Burlington Northern Santa Fe	US	1.07	0.43	0.75
Average				0.69

Source: Bloomberg, ACG Analysis

Table C.5 Relative asset and equity betas of Canadian comparator firms

Company	Country	Raw Equity Beta	Debt/assets ratio	Asset beta
Canadian Pacific Railway Ltd	Canada	0.956	0.48	0.65
Canadian National Railway Company	Canada	1.023	0.28	0.80
Average				0.73

Source: Bloomberg, ACG Analysis

Table C.6 Relative asset and equity betas of Australian comparator transport sector firms

Company	Country	Raw Equity Beta	Debt/assets ratio	Asset beta
Adsteam Marine Limited	Australia	1.238	0.90	0.65
Macquarie Infrastructure Group	Australia	0.745	0.31	0.57
Patrick Corporation Ltd	Australia	1.056	0.07	0.99
Toll Holdings Limited	Australia	0.869	0.22	0.71
Average				0.73

Source: Bloomberg, ACG Analysis

Table C.7 Relative asset and equity betas of New Zealand comparator transport sector firms

Company	Country	Raw Equity Beta	Debt/assets ratio	Asset beta
Auckland International Airport Ltd	New Zealand	0.944	0.26	0.75

⁴⁷ Allen Consulting Group (2007). Railways (Access) Code 2000: Weighted average cost of capital, 2008 WACC determinations, October, pp.28-29.

Company	Country	Raw Equity Beta	Debt/assets ratio	Asset beta
Infratil Ltd	New Zealand	1.29	0.65	0.78
Port of Tauranga Ltd	New Zealand	0.873	0.31	0.67
Toll NZ Ltd	New Zealand	0.773	0.72	0.45
Average				0.66

Source: Bloomberg, ACG Analysis

D Market risk premium – Supplementary information

The purpose of this attachment is to provide further details of regulatory precedent and market survey evidence in regards to the market risk premium.

D.1 Regulatory decisions on the MRP

Brief summaries of Australian regulators' approaches to estimating the MRP are presented below.

D.1.1 IPART

IPART derives its feasible WACC range from a range based on long run averages and a range based on current market data.

Under this approach, it will still use long run historical averages of the MRP, which it values at between 5.5% and 6.5%, to estimate its long run average WACC range. Its current WACC range reflects the current implied MRP, which is derived from DGM estimates.

In its most recent semi-annual update for August 2017, IPART's range for the MRP extends from 6.0% (mid-point of long term average range) to 9.5% (mid-point of current range), with a mid-point of the two ranges of 7.80%.⁴⁸

However, IPART's MRP estimate as a margin above the contemporary risk free rate is likely to be greater than this reported value because of the higher risk free rate assumed in its approach (3.4%, due to its 50% weighting on the 10-year risk free rate estimate).

D.1.2 ERA (WA)

In 2015, the ERA completed a review of the methodology it applies to estimate the WACC for rail networks. In its first Draft Determination for this review released in June 2014, the ERA's assessment of the MRP was primarily informed by historical averages and the DGM.⁴⁹ It arrived at a range of 5% to 7.5% and stated that it will apply judgement as to where it will select the point estimate at any point in time. For that Draft Determination, it proposed a value of 6%.

⁴⁸ IPART (2017). WACC Biannual Update, August, p.2.

⁴⁹ ERA (2014b). Review of the method for estimating the weighted average cost of capital for the freight and urban rail networks, Draft determination, 5 June.

Subsequently, the ERA fundamentally changed its approach to estimating the MRP for rail networks. In a revised Draft Decision issued in November 2014, it proposed to solely rely on the Wright approach.⁵⁰ The ERA further revised its position in the Final Decision issued in September 2015 and took into consideration estimates informed by historical excess returns (Ibbotson and Wright) and DGMs.⁵¹ It stated it is more inclined towards the Wright approach as “a strong indicator for the likely return on equity for the next 50 years, given the statistical evidence for the mean reversion of the return on equity.”⁵² It arrived at a final estimate of 7.3%.

It took a similar approach in its assessment for ATCO Gas, where it applied a MRP of 7.6%.⁵³ It applied an updated value of 7.4% in its most recent determination for the Dampier to Bunbury Pipeline.⁵⁴ In its June 2015 decision for ATCO, the ERA commented on its approach as follows:⁵⁵

Most significantly, the Authority has now concluded that it is not reasonable to constrain the MRP to a fixed range over time. The erratic behavior of the risk-free rate in Australia to date, and more particularly, its pronounced decline in the current economic environment, leads to a situation where the combination of a fixed range for the MRP and prevailing risk free rate may not result in an outcome which is consistent with the achievement of the average market return on equity over the long run.

The results indicated the market return on equity was stationary [consistent with the Wright approach for estimating the MRP] ... with the analysis supporting a conclusion that the MRP is non-stationary. This finding led the Authority to the important conclusion that the long run historical estimate of 6 per cent could be a poor predictor of the MRP prevailing in future regulatory periods.

We note that the changing values applied by the ERA primarily reflect changes in the DGM estimates, which are more volatile through time (compared with comparatively stable historical excess returns).

⁵⁰ ERA (2014a).

⁵¹ ERA (2015a). Final decision on the review of the method for estimating the weighted average cost of capital for the regulated railway networks, 18 September.

⁵² ERA (2015a). p.145.

⁵³ ERA (2015b). Final decision on proposed revisions to the Access Arrangement for the Mid-West and South-West gas distribution systems, Submitted by ATCO Gas Australia Pty Ltd, 30 June.

⁵⁴ ERA (2016). Final decision on proposed revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline 2016-2020, 30 June.

⁵⁵ ERA (2015b), p.249.

D.1.3 AER

Under the AER's Rate of Return Guideline, the AER is proposing to estimate the MRP having regard to historical excess returns, DGM estimates, survey evidence and conditioning variables.⁵⁶ The key difference from previous approaches is that it may place some weight on forward-looking DGM estimates, which could see more variability in the MRP estimate through time. Unlike previously, the AER has not stipulated the value of the MRP in the Guideline but will review it at the time of each revenue determination.

In its Explanatory Statement accompanying its Final Decision on the Guideline⁵⁷, the AER arrived at a range for the MRP of 5% to 7.5% (with historical averages informing the lower bound and DGM estimates the upper bound). It arrived at a point estimate of 6.5%, which was consistent with its post-GFC uplift previously applied under its Statement of Regulatory Intent. It set out its reasons based on the consideration of the relative strengths and weaknesses of each piece of evidence. It did not stipulate weights but stated that "greatest consideration" was given to historical averages, followed by the DGM estimates and then surveys.⁵⁸

Unlike previously, the AER has not prescribed the MRP in its guideline, which reflects a view that it is likely to vary through time (although this does not imply that it is considered highly variable or volatile). However, it has consistently applied a MRP of 6.5% in all decisions made under that guideline since it was finalised in December 2013.

D.1.4 QCA

The QCA has applied four main methods to estimate the MRP, being three forms of historical averaging (the Ibbotson, Siegel and Wright methods), survey evidence (including independent expert reports) and the Cornell DGM.

It had previously applied equal weights to each approach but similar to the AER, proposes a more flexible approach based on judgement. It concluded that 6.5% was the most appropriate value at the time and it has continued to apply this value in decisions made since then, including its most recent Draft Decision for DBCT, where it rejected DBCT Management's proposed MRP of 8%.⁵⁹

⁵⁶ The AER does not explain what it means by 'conditioning variables'.

⁵⁷ AER (2013b). Better regulation: Explanatory statement, Rate of return guideline, December.

⁵⁸ AER (2013b), p.95.

⁵⁹ QCA (2016). DBCT Management's 2015 draft access undertaking, Draft decision, April.

However, in its UT5 draft decision for Aurizon Network in December 2017, the QCA approved Aurizon Network's proposed MRP of 7%. The QCA stated that in light of stakeholder submissions, it reviewed its position on the Wright approach and will now give "more regard to estimates from the Wright method".⁶⁰ In reaching this conclusion, the QCA noted that its analysis suggesting greater stability in the MRP than the return on equity over time was "not determinative, given the limitations identified."⁶¹

D.1.5 ESCOSA

In its June 2016 for SA Water, ESCOSA applied a MRP of 6%, expressing a preference for historical excess returns. It considers that the DGM approach is "potentially volatile and unreliable." It also notes that this is the value it has applied to SA Water in previous determinations.

D.1.6 Essential Services Commission (Vic)

The ESC does not have any formal guidelines in place that outline its approach to assessing WACC.

We note that in its June 2016 Melbourne Water decision it applied a MRP of 6%, which was originally contained in a Guidance Paper.⁶² The reasoning behind this was not provided. It reflects a preference for relying on historical excess returns to estimate the MRP.

D.2 Market surveys

D.2.1 Fernandez's surveys

Of the surveys frequently cited by regulators is one conducted by the Spanish academic Pablo Fernandez. Frontier Economics (2016) raises the concern that this source consistently reports an MRP in the range of 6%, regardless of the conditions in financial markets.⁶³

⁶⁰ QCA (2017). Aurizon Network's 2017 draft access undertaking, Draft decision, December, p.493.

⁶¹ QCA (2017), p.493.

⁶² ESC (2015). Melbourne Water 2016 price review, Guidance paper, March. We note that 6% was also applied to Goulburn Murray Water in its June 2016 decision, although for a different reason, which was the need for consistency with the ACCC's Pricing Principles for Price Determinations and Approvals under the Water Charge (Infrastructure) Rules 2010. These Pricing Principles prescribe an MRP of 6%.

⁶³ Frontier Economics (2016). The market risk premium: Report prepared for Aurizon Network, November.

However, in the 2017 Fernandez et al. survey, the average (median) MRP was estimated to be 7.3% (7.6%) for Australia.⁶⁴ However, in a report for the QCA, Lally (2017) argued that this Australian MRP estimate was higher than any other developed country in the survey (other than Portugal) and that the sample size was relatively small (26 responses, roughly one third of the previous year's responses).⁶⁵ Thus, there are substantial issues regarding how much weight can be placed on evidence from market surveys.

Respondents were identified as finance and economics professors, analysts and managers of companies obtained from previous correspondence, papers and webs of companies and universities, but there is no further information presented about the specific qualifications of these respondents. The survey does not ask respondents for what purpose they are using their estimate of the MRP.

Lally (2003) notes that "the respondents to these surveys are academics, analysts, and managers rather than investors per se."⁶⁶ Hence it is unlikely that the overwhelming majority of any of the survey respondents would be employing their estimate of the MRP to reach real-world investment decisions.

Another issue relates to response rates. Emails were sent to 22,500 email addresses with 2,396 emails received in reply. Whilst this is probably a reasonable response rate for an international survey, there is no real indication of how the non-response may impact upon the results.

On top of this, there is evidence that many respondents may simply base their estimates on textbooks or historical data, meaning that there is often no real value added compared to other measurements.

D.2.2 Asher and Hickling Surveys

Regulators including the ACCC also rely upon the Asher and Hickling *Equity Risk Premium Surveys*. In a summary of the survey results, Asher and Carruthers (2016) discuss the methods that survey respondents use for determining their MRP estimates:⁶⁷

Most people (52%) used a variety of methods for determining the equity risk premium, with forward looking measures (21%) more prevalent than historical data

⁶⁴ Fernandez, P., Pershin, V. & Acin, I.F. (2017). Discount rate (risk-free rate and market risk premium) used for 41 countries in 2017: a survey.

⁶⁵ Lally, M. (2017). Review of submissions from Frontier Economics on the WACC for Aurizon Network. 8 November, p.19

⁶⁶ Lally M. (2013). Response to submissions on the risk-free rate and the MRP, p.23.

⁶⁷ Asher A. and Carruthers, D. (2016). Equity risk premium survey 2015, Actuaries Digital, Available from: <https://www.actuaries.digital/2016/05/26/equity-risk-premium-survey-2015/> [Accessed 4 May 2017].

(17%) for the rest. The methodology for determining the ERP ranged from detailed modelling to “gut feel based on 40 years’ experience”. Gut feel has a bad name in some quarters ... but only time will tell which method proves to be most accurate.

KPMG Australian Valuation Practices Survey

With regard to the *KPMG Australian Valuation Practices Survey*, 40% of participants state that they ‘always’ adjust the CAPM rate of return by a premium, to reflect unique risks that are not modelled in the forecast cash flows.⁶⁸ The remaining 60% report doing this at least ‘sometimes’, while no respondent stated that they ‘never’ make an adjustment. In terms of the methodology used to adjust the CAPM rate of return, 13% of respondents relied solely on the historic equity bond spreads, 26% relied solely on the expected premium, while the majority (61%) used a combination of the two.

The Australian Competition Tribunal has also raised concerns about the use of market surveys:⁶⁹

Surveys must be treated with great caution when being used in this context. Consideration must be given at least to the types of questions asked, the wording of those questions, the sample of respondents, the number of respondents, the number of non-respondents and the timing of the survey. Problems in any of these can lead to the survey results being largely valueless or potentially inaccurate.

When presented with survey evidence that contains a high number of non-respondents as well as a small number of respondents in the desired categories of expertise, it is dangerous for the AER to place any determinative weight on the results.

In a report to Corrs Chambers Westgarth, McKenzie and Partington list several shortcomings associated with surveys:⁷⁰

- Selecting an appropriate survey group that is representative of actual investors.
- Low response rates, and the extent to which survey authors deal with response bias.
- The lack of justification for respondents’ claims
- The effect of question wording on responses – ambiguity can lead to diverse responses

⁶⁸ KPMG (2015). Australian valuation practices survey 2015, May, p.21.

⁶⁹ *Application by Envestra Ltd (No 2)* [2012], ACompT 3, para. 162-163.

⁷⁰ McKenzie, M. and Partington, G. (2011). Equity market risk premium: Report to Corrs Chambers Westgarth, p.19.

- How respondents adjust their opinions in relation to changing market conditions

D.2.3 Synergies' view

Based on the above expert opinions, we surmise that surveys need to meet three broad criteria to provide an informed estimate of the MRP:

- they must be timely;
- there must be clarity around what question the respondents were asked to answer; and
- the survey must gauge the market's view of the MRP and not the view of a small, unrepresentative sample.

Whilst open to interpretation, there appear to be very limited circumstances where a survey would meet all three criteria and therefore would be eligible for inclusion in a robust regulatory determination on MRP.

Appendix 2 – Summary of drafting ~~Changes~~changes

All capitalised terms in this Appendix 2 have the same meaning given to them in the 2018 IAU and the 2018 TAA.

To the extent there is any inconsistency between this Appendix 2 of the EG and the 2018 IAU and the 2018 TAA, the 2018 IAU and the 2018 TAA will prevail.

1 2018 Interstate Access Undertaking

Item	Clause reference	Type of change	Specific drafting change	Reason for change
1	Various	Deletion and insertion	Updates from “Trade Practices Regulations 1974” to “Competition and Consumer Regulations 2010”, “TPA” to “CCA”, and other various pieces of legislation throughout the 2018 IAU.	These changes are made to reflect the current titles of legislation.
2	1.1(e) (Introduction)	Insertion	<u>(e) To facilitate growth and enable flexible negotiations with customers, this Undertaking provides for an Indicative Access Charges Range for Indicative Services. The range comprises a floor charge equivalent to the direct cost, and a ceiling charge equivalent to the full economic cost, of providing Indicative Services. Access charges for Indicative Services will be negotiated by ARTC and its customers between these two limits reflecting the requirements of the customer and risks accepted by ARTC in the non-price terms, subject to the key principles of equity and transparency.</u>	This inclusion in the preamble provides context as to the move to an Indicative Access Charges Range for Indicative Services.
3	1.1(g) (Introduction)	Insertion	<u>(g) At the time of entering into this Undertaking, ARTC is progressing the implementation of the ATMS on the Network which will eventually replace the existing signal and communication systems on the Network. The ATMS will be initially deployed on specific Segments. During the implementation phase of the ATMS on specific Segments, ARTC</u>	This inclusion in the preamble provides context as to the ATMS and its interaction with the 2018 IAU.

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			<u>will operate both the existing systems and the ATMS. Given the implementation of the ATMS will not have commenced before the commencement of this Undertaking, the ATMS does not form part of the Services subject to this Undertaking. ARTC will negotiate with Applicants potential adjustments to the charges associated with implementing ATMS as it is implemented on particular Segments within the constraints of the revenue ceiling defined in this Undertaking. ARTC reserves the right to seek a variation to this Undertaking to include ATMS related capital.</u>	
4	2.3(a) (Term)	Deletion and insertion	This Undertaking will continue to be binding upon ARTC until: (a) the tenth (10th) anniversary of the Commencement Date <u>30 June 2023</u> ; or (b) the date upon which the ACCC consents to the withdrawal of the Undertaking by ARTC, whichever is the earlier.	The term of the 2018 IAU is proposed as 5 years to allow for any changes reflecting the full operation of the Inland Rail project to be reflected in a future IAU. ARTC proposes a fixed date to align with financial years.
5	2.4(b) (Review of Undertaking)	Deletion	(b) — By 31 December 2011, ARTC will develop and submit to the ACCC, Capital Expenditure in the form of an extended Schedule H, applicable to the period 1 July 2012 to 30 June 2018.	This has been deleted to reflect that future capital projects (and proposed budgets) as set out in Schedule H will not be provided for as ARTC is not proposing to review and adjust the proposed ceilings during the course of the IAU. If it is necessary to recognise additional capital during the term of the 2018 IAU, ARTC will submit a variation.
6	2.4(e)	Deletion	(e) — As soon as practicable after the fifth (5th) anniversary of the	This has been deleted to reflect the

Item	Clause reference	Type of change	Specific drafting change	Reason for change
	(Review of Undertaking)		Commencement Date, ARTC will undertake a review of the Undertaking, in consultation with Operators, potential Operators and other stakeholders. The review will consider any material impact that changes to industry circumstances or Government legislation, rules or regulations may have on the extent to which the Undertaking reasonably meets its intent as prescribed at clause 1.2.	reduction in term from 10 years to 5 years which means no mid-term review of the operation of the 2018 IAU is required.
7	2.6 (Insurance)	Deletion and insertion	<p>2.6 Insurance</p> <p>ARTC will take out and maintain a liability insurance policy with a limit of not less than \$250350,000,000 for any one occurrence which provides an indemnity in respect of:</p> <p>(a) loss of, loss of use of, and destruction or damage to, real or personal property;</p> <p>(b) injury to, or disease or death of, persons; and</p> <p>(c) ARTC's liability to the Operator under clause 15 of Schedule D to the extent coverable by insurance.</p>	This amount has been amended to reflect that ARTC has public liability insurance with a limit of \$350 million.
8	2.7(a)(i) & (iii) (Contact Details)	Deletion and insertion	<p>(i) Attention: Chief Executive Officer Manager, Commercial and Contractual Engagement</p> <p>Telephone: (08) 8217 43664557</p> <p>Facsimile: (08) 8217 4578</p> <p>(iii) _____ secretary@artc.com.au InterstateAccessEnquiries@artc.com.au</p>	These changes are minor to reflect updated contact details.
9	2.7(b)(iii) & (iv) (Contact Details)	Deletion and insertion	<p>(iii) the Indicative Access Charges Range published each year, as escalated, for Indicative Services;</p> <p>(iv) prices for which Access has been granted to Services other than Indicative Services, together with a general description of the</p>	These changes reflect the move to a tariff range for Indicative Services.

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			Services to which such prices relate;	
10	3.3(a)(viii) (Provision of Information)	Deletion and insertion	(viii) — DORC values in relation to the Segment to which Access is being sought; (viii) the incremental cost in accordance with clause 4.4(b) and the Economic Cost in accordance with clause 4.4(f) for the Segment to which Access is being sought published charges for similar Services requested ; and	These deletions reflect that the requirement for ARTC to provide DORC values, incremental and economic costs to Access Seekers is replaced by the provision of the approved ceiling and floor rates for each segment.
11	3.8(c)(iv) (Indicative Access Proposal)	Insertion	(iv) a reference to the Indicative Access Agreement and a reference to published charges for similar Services requested the current available market terms and conditions as published on ARTC's website;	This change ensures the provision of published charges for similar Services requested by the operator and provides transparency to the market on negotiations of similar services within the range.
12	4.2(a) (Charge Differentiation)	Insertion	In formulating its Charges, ARTC will have regard to a range of factors which impact on its business including, but not limited to, the following: (a) in particular, the Indicative Access Charges Range for Indicative Services set out in clause 4.6;	These changes reflect the move to a tariff range for Indicative Services.
13	4.2(c)(viii) & (ix) (Charge Differentiation)	Insertion	(c) the commercial impact on ARTC's business, which without limitation includes factors such as: (viii) previously negotiated Charges agreed under the terms of this Undertaking, where relevant, as published by ARTC as set out in clause 2.7(b); and (viii)(ix) changes requested by the Applicant to the Indicative Access Agreement.	This change captures the changes requested by an Applicant to the Indicative Access Agreement which are to form part of ARTC's formulation of its Charges.

Item	Clause reference	Type of change	Specific drafting change	Reason for change
14	4.2 (Charge Differentiation)	Deletion and insertion	For the purpose of Clause <u>clause</u> 4.2-(c)(iv), ARTC will have regard to the predominant usage of the Network being for Indicative Services to which <u>the</u> Indicative Access Charges <u>Range</u> apply <u>applies</u> . ARTC will also recognise that investment in the development of the Network is primarily to improve utilisation and performance of Indicative Services. As such, Capacity consumption in relation to Trains operating with characteristics other than that of Indicative Services will be determined having regard to the Capacity consumption of Indicative Services on a Network utilised by Indicative Services.	These changes reflect the move to a tariff range for Indicative Services.
15	4.4(e) (Revenue Limits)	Deletion	For the purpose of this clause, ARTC will obtain the approval of the ACCC, having regard to the factors in this clause, for any increase to Capital Expenditure exceeding 20% of Capital Expenditure on the Network in any single year.	This has been deleted to reflect that future capital projects (and proposed budgets) is not provided for as ARTC is not proposing to review and adjust the proposed ceilings during the course of the IAU.
16	4.4(f) (Revenue Limits)	Deletion	(f) For the purposes of this Part 4, Economic Cost of a Segment means: (i) Segment Specific Costs; (ii) Depreciation of Segment Specific Assets;	This deletion is made to reflect that ARTC does not depreciate Segment Specific Assets.
17	4.4(h) (Revenue Limits)	Deletion and insertion	The Rate of Return for the purposes of this Part will be equivalent to ARTC's weighted average cost of capital (" WACC ") <u>of 8.97% (post-tax, nominal)</u> . as accepted by the ACCC after consideration of all risks with the commercial environment in which ARTC operates on the Network, the elements of which will comprise: (i) a capital asset pricing model ("CAPM") method of determining	This change reflects that the WACC for the 2018 IAU is proposed to be 8.97% (post-tax, nominal). Refer to the body of this Explanatory Guide for further discussion on the WACC and its parameters.

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			<p>the cost of equity;</p> <p>(ii) — a debt to equity ratio which would be considered prudent for ARTC's business in relation to the Network by reputable lenders; and</p> <p>(iii) — an appropriate adjustment (beta) factor to the equity risk margin appropriate for investment in railway infrastructure forming part of the Network.</p>	
18	4.5 (Structure of Charges)	Deletion and insertion	<p>(a) Access charges will comprise:</p> <p>(i) a variable component, which is a function of distance and gross mass (\$/gtkm); and</p> <p>(ii) a flagfall component, which is fixed and specific to each Train service type and Segment (\$/km).⁵⁷</p> <p>and may comprise,</p> <p>(iii) — an excess network occupancy component, which is a function of time (\$/hr or part thereof) sought by an Applicant for a Train Path on the Network, which is in excess of:</p> <p>(A) — a reasonable allowance for section run times for the applicable Train service type as determined by ARTC;</p> <p>(B) — dwells for crossing and passing other Trains as determined and made available by ARTC for the Train Path; and</p> <p>(C) — an allowance for the reasonable requirements for operational activities whilst the Train occupies the Network as specified at clause 4.6(c).</p> <p>(b) — Subject to clause 4.5(c), the application of the excess network occupancy component relates only to the contracted Train path, and not</p>	This deletion has been made as this charge has not been applied by ARTC in the operation of the current IAU.

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			<p>the utilisation of the Train Path.</p> <p>(c) — In determining the excess network occupancy component, ARTC will pro-rata the flagfall component back to an amount per hour by reference to the total of section run times applicable to the relevant Segment to which the flagfall component applies.</p> <p>(d)<u>(b)</u> Except as otherwise provided in the Access Agreement, the flagfall component and excess network occupancy component of the Charges, as applicable, are <u>is</u> levied from the date ARTC grants access to the Train Path to the Operator until the expiry of that Train Path irrespective of whether such Train Path is utilised.</p> <p>(e) — The excess network occupancy component will only apply where the Applicant seeks to contract a Train Path on the Network, which is in excess of:</p> <p>(i) — a reasonable allowance for section run times for the applicable Train service type as determined by ARTC;</p> <p>(ii) — dwells for crossing and passing other Trains as determined and made available by ARTC for the Train Path; and</p> <p>(iii) — an allowance for the reasonable requirements for operational activities whilst the Train occupies the Network as specified at clause 4.6(e).</p> <p>(f) — In relation to utilisation of a contracted Train Path, the excess network occupancy component will not be charged in instances where ARTC is not able to provide the contracted Train Path or an agreed substitute Train Path except where the failure to provide the contracted Train Path is a result of an Incident, Third Party Works or an emergency.</p>	

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			<p>(g) (c) Notwithstanding the structure described above, all elements of the Charge are open to negotiation. Any variation to the structure described above will be agreed between ARTC and the Applicant.</p>	
19	<p>4.6(a) <i>(Indicative Services and Indicative Access Charges Range)</i></p>	Deletion and insertion	<p>4.6 Indicative <u>Services and Indicative Access Charges Range</u></p> <p>(a) As part of this Undertaking, ARTC will offer the Indicative Access Charges described in clauses 4.6(b) and 4.6(c) below for Applicants seeking Access for <u>An Indicative Service</u> is a Service with the following <u>contracted</u> characteristics (Indicative Services):</p> <p>(i) maximum <u>an</u> axle load of 21 tonnes;</p> <p>(ii) <u>capability to operate at least at</u> maximum speed of 110 km/h; and</p> <p>(iii) length not exceeding:</p> <p>(A) 1800 metres west of Adelaide and Parkes</p> <p>(B) 1500 metres east of Adelaide and Parkes (until Capital Expenditure is commissioned on the Segments Melbourne – Macarthur and Parkes – Cootamundra);</p> <p>(C) 1800 metres on the Segments Melbourne – Macarthur and Parkes– Cootamundra (following commissioning of Capital Expenditure on the Segments Melbourne – Macarthur and Parkes - Cootamundra) and Southern Sydney Freight Line.</p> <p><u>and does not include the use of the ATMS.</u></p>	<p>These changes are to give greater specificity to the Indicative Service, being the Freightliner service.</p> <p>The Undertaking does not apply to the ATMS and so it is excluded from the Indicative Service. See discussion of ATMS in the Explanatory Guide.</p>

Item	Clause reference	Type of change	Specific drafting change	Reason for change
20	4.6(b) <i>(Indicative Services and Indicative Access Charges Range)</i>	Deletion and insertion	<p>(b) <u>Subject to clause 4.6(d), the Indicative Access Charges Range for a requested Indicative Service on a Segment will include</u> comprises the sum of the flagfall and variable components as follows:</p> <p>(i) <u>the charges (in \$) for that Indicative Service on a Segment being the sum of the Charges determined using the minimum \$/GTK and minimum flagfall tariffs set out for that Segment in the table below; and</u></p> <p>(ii) <u>the charges (in \$) for that Indicative Service on a Segment being the sum of the Charges determined using the maximum \$/GTK and maximum flagfall tariffs set out for that Segment in the table below,</u></p> <p><u>for each year (or part year) within the term of this Undertaking for which the Indicative Service is sought.</u></p> <p>Note: Effective as at 1 February [] 20082018</p>	<p>These changes reflect the move to an Indicative Service Tariff range. The floor and ceiling prices applicable to the Indicative Service replace the Indicative Access Charge.</p> <p>These changes also reflect that Access Charges for the Indicative Service will be negotiated between the floor and ceiling rates by ARTC with its customers on a non-discriminatory basis with agreed terms and conditions published by ARTC.</p>

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Segment [□]	Variable \$/kgtkm (exclusive of GST) [□]	Flagfall \$/km (exclusive of GST) [□]																										
Southern Sydney Freight Line [□]	8.564 [□]	3.426 [□]																										
22	4.6(c) <i>(Indicative Services and Indicative Access Charges Range)</i>	Deletion	<p>(c) — Where applicable, the Indicative Access Charge will include an excess network occupancy component as follows:</p> <p>Note: Effective as at 1 February 2008</p> <p>Note: These Charges are exclusive of GST.</p> <table border="1"> <thead> <tr> <th>Segment</th> <th>Excess network occupancy charge \$/hr or part thereof (exclusive of GST)</th> <th>Allowance for reasonable requirements for operational activities (hr)</th> </tr> </thead> <tbody> <tr> <td>Adelaide — Parkes</td> <td>264</td> <td>1.2</td> </tr> <tr> <td>Adelaide — Melbourne</td> <td>124</td> <td>0.7</td> </tr> <tr> <td>Melbourne — Macarthur</td> <td>69</td> <td>0.2</td> </tr> <tr> <td>Newcastle — Queensland Border</td> <td>55</td> <td>0.2</td> </tr> <tr> <td>Crystal Brook — Parkes</td> <td>80</td> <td>0.6</td> </tr> <tr> <td>Gootamundra — Parkes</td> <td>54</td> <td>0.1</td> </tr> <tr> <td>Tarcoola — Asia Pacific Interface</td> <td>150</td> <td>0.1</td> </tr> </tbody> </table>	Segment	Excess network occupancy charge \$/hr or part thereof (exclusive of GST)	Allowance for reasonable requirements for operational activities (hr)	Adelaide — Parkes	264	1.2	Adelaide — Melbourne	124	0.7	Melbourne — Macarthur	69	0.2	Newcastle — Queensland Border	55	0.2	Crystal Brook — Parkes	80	0.6	Gootamundra — Parkes	54	0.1	Tarcoola — Asia Pacific Interface	150	0.1	This deletion has been made as the network occupancy charge is being removed. See above in item 18.
Segment	Excess network occupancy charge \$/hr or part thereof (exclusive of GST)	Allowance for reasonable requirements for operational activities (hr)																										
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23	4.6(c)	Insertion	<p><u>(c) ARTC must offer tariffs and a charging structure to an Applicant for Indicative Services which, when applied to the Indicative</u></p>	This insertion is to reflect that the ceiling and floor prices define the																								

Item	Clause reference	Type of change	Specific drafting change	Reason for change
	<i>(Indicative Services and Indicative Access Charges Range)</i>		<p><u>Services requested, results in total Charges falling within the Indicative Access Charges Range for that Indicative Service for that Segment for the relevant year (or part year). ARTC and an Applicant may agree a charging structure (which may or may not be a two part tariff) where the tariffs for an Indicative Service can exceed the minimum and maximum \$/GTK and flagfall tariffs provided that the Charges for each Segment resulting from that charging structure for the Indicative Service requested fall within the Indicative Access Charges Range for that Indicative Service for each Segment.</u></p>	negotiation range for below rail access prices between ARTC and its customers. Irrespective of the charging structure agreed (eg a one part tariff or two part tariff), the actual charges for a Segment need to fall within the range that would have applied using the floor and ceiling prices specified for that Segment.
24	4.6(d) <i>(Indicative Services and Indicative Access Charges Range)</i>	Deletion and insertion	<p>(d) ARTC may <u>will</u> annually vary the <u>tariffs in clause 4.6(b) Indicative Access Charges</u> for Indicative Services <u>on 30 June of each year (“Review Date”)</u> by up to an amount determined in accordance with the following formula:</p> $AC_t = AC_{t-1} * (1 + TVI \frac{CPI\ Index_t}{CPI\ Index_{t-1}})$ <p>Where</p> <p>AC_t is the <u>relevant Indicative Access Charges tariff</u> for Indicative Services following the relevant Review Date;</p> <p>AC_{t-1} is the <u>relevant Indicative Access Charges tariff</u> for Indicative Services immediately preceding the relevant Review Date;</p> <p>TVI is the maximum variation to Indicative Access Charges (measured as a percentage) that may be applied from 1 July 2008 and thereafter from each 1 July during the Term (“Determination Date”) and is to be determined in accordance with the following formula;</p> <p>TVI is the greater of</p>	This is amended to reflect that the floor and ceiling rates will escalate annually by 100% of the CPI change from the previous year.

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			<p>(A) ———— $\left(\frac{\text{CPI Index}_i}{\text{CPI Index}_0} / \text{CVi-1} - 1 \right) * 100$</p> <p>(B) ———— Zero</p> <p>Where</p> <p>CPI Index_i Index_i is the All groups <u>Groups</u> Consumer Price Index, Weighted Average of Eight Capital Cities, Index Number for the March quarter preceding <u>last published by the Australian Bureau of Statistics before</u> the relevant Determination <u>Review</u> Date;</p> <p>CPI Index_0 Index_{t-1} is the All groups <u>Groups</u> Consumer Price Index, Weighted Average of Eight Capital Cities, <u>last published by the Australian Bureau of Statistics before the Review Date preceding the relevant Review Date except that in the case of the first Review Date, Consumer Price Index All Groups Weighted Average for the Eight Capital Cities last published before the Commencement Date; Index Number for the March quarter of the year 2007, being 155.6.</u></p> <p><u>except that if $\text{AC}_{t-1} < \text{AC}_t$, then AC_{t-1} is deemed to equal AC_t.</u></p> <p>CVi-1 is the cumulative effect of the variations actually applied by ARTC to the Indicative Access Charges for Indicative Services from 1 July 2008 to the relevant Determination Date (“i”). The cumulative effect is to be determined in accordance with the following formula:</p> <p>$\text{CVi-1} = (1 + \text{V1}) * (1 + \text{V2}) * \dots * (1 + \text{Vi-1})$</p> <p>Where</p> <p>$\text{V1}, \text{V2} \dots \text{Vi-1}$ are the actual % variations which have been applied to the Indicative Access Charges for Indicative Services from 1 July 2008 to the relevant Determination Date.</p>	

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			<p>For the purpose of determining TV_i for the sixth Determination Date, CPI Index₀ will be reset to CPI Index₅ and CV₅ will be reset to 1.</p> <p>ARTC will publish:</p> <p>(a) $(CV_i - 1) \times 100$; and</p> <p>(b) $\left(\frac{CPI\ Index_i}{CPI\ Index_0} / CV_i - 1\right) * 100$</p> <p>following each Review Date.</p>	
25	4.7 <i>(Automated Train Management System (ATMS))</i>	Insertion	<p><u>4.7 Automated Train Management System (ATMS)</u></p> <p><u>(a) This Undertaking does not apply to the ATMS.</u></p> <p><u>(b) ARTC is not required under this Undertaking to offer or provide services using the ATMS.</u></p> <p><u>(c) ARTC will negotiate with Applicants potential adjustments to the Access Charges to implement ATMS within the constraints of the proposed revenue ceilings in clause 4.6.</u></p> <p><u>(d) ARTC reserves the right to seek a variation to this Undertaking to incorporate the development and implementation of capital associated with ATMS.</u></p>	The Undertaking does not apply to the ATMS. See discussion of ATMS in the Explanatory Guide.
26	6.3(a) & (d) <i>(Additional Capacity sought by ARTC for the benefit of the rail industry)</i>	Insertion	<p>(a) ARTC may make an application to the ACCC to provide Additional Capacity, including a variation to <u>the</u> Indicative Access Charges <u>Range</u> to reflect the cost of that Additional Capacity, at any time during the Term.</p> <p>(d) The ACCC may also have regard to expenditure incurred efficiently in providing the Additional Capacity, where approving a variation to Indicative Access Charges <u>Range</u> to reflect the</p>	These changes reflect the move to a tariff range for Indicative Services.

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			cost of that Additional Capacity.	
27	9.1 (Definitions and Interpretation)	Insertion	“Associated Facilities” means all associated track structures, over and under track structures, supports (including supports for equipment or items associated with the use of the Network), tunnels, bridges, train control systems, signalling systems, communication systems and associated plant, machinery and equipment from time to time but only to the extent that such assets are related to or connected with the Network but does not include any sidings or yards or the ATMS ;	The Undertaking does not apply to the ATMS. See discussion of ATMS in the Explanatory Guide.
28	9.1 (Definitions and Interpretation)	Insertion	“ATMS” means the automated train management system including the infrastructure and systems associated with the Network for the operation of that system;	The Undertaking does not apply to the ATMS. See discussion of ATMS in the Explanatory Guide.
29	9.1 (Definitions and Interpretation)	Deletion	“ Capital Expenditure ” means annual expenditure as incurred by ARTC incorporated in annual re-valuation of the Network and Associated Facilities as contemplated in clause 4.4(d) and as estimated in Schedule H ;	See above in item 5.
30	9.1 (Definitions and Interpretation)	Insertion	“CCA” means the Competition and Consumer Act 2010 (Commonwealth);	See above in item 1.
31	9.1 (Definitions and Interpretation)	Deletion and insertion	“ Director of Public Transport ” means the Director of Public Transport under the Transport Act Transport (Compliance and Miscellaneous) Act 1983 (Vic), his successors, permitted substitutes and permitted assigns;	See above in item 1.

Item	Clause reference	Type of change	Specific drafting change	Reason for change
32	9.1 (Definitions and Interpretation)	Deletion and insertion	“Indicative Access Charges” mean the Access Charges described in clause 4.6 as varied from time to time in accordance with clause 4.6(d); “Indicative Access Charges Range” has the meaning give in clause 4.6(b) ;	These changes reflect the move to a tariff range for Indicative Services.
33	9.1 (Definitions and Interpretation)	Deletion and insertion	<p>“Rail Safety Acts” means the Acts passed by the Commonwealth, the States, the Northern Territory and the Australian Capital territory, which relate to rail safety, including the:</p> <p>(a) Rail Safety National Law (WA) Act 2015Act 1998 (WA);</p> <p>(b) Rail Safety Act 1996 (SA)Rail Safety National Law (South Australia) Act 2012 (SA);</p> <p>(c) Rail Safety Act 2006Rail Safety National Law Application Act 2013 (Vic); and</p> <p>(d) Rail Safety (Adoption of National Law) Act 2012Rail Safety Act 2002 (NSW);</p>	See above in item 1.
34	9.1 (Definitions and Interpretation)	Deletion	“TPA” means the Trade Practices Act, 1974 (Commonwealth);	See above in item 1.
35	Schedule C (Essential Elements of Access Agreement)	Deletion and insertion	<ul style="list-style-type: none"> Customers paying an access charge based on flagfall, and gtkm and, where applicable, the excess network occupancy component of Charges; 	See above in item 18.

Item	Clause reference	Type of change	Specific drafting change	Reason for change
36	Schedule D (<i>Indicative Access Agreement as at Commencement Date</i>)	Deletion and insertion	(see attached fifty six sixty five seven (57 65) pages)	
37	Schedule E (<i>Network</i>)	Deletion and insertion	<p>** To the extent that such railway lines are leased by RIC and SRA Transport for NSW to ARTC.</p> <p>Metropolitan Freight Network Lease</p> <p>Freight Corridors</p> <p>Sefton Park Junction – Chullora Junction</p> <p>South Flemington - North Enfield</p> <p>North Enfield – South Enfield via main lines</p> <p>South Enfield – Loftus Street Campsie</p> <p>Marrickville Junction – Port Botany</p> <p>Shared Corridor</p> <p>Loftus Street Campsie – Marrickville Junction</p> <p>Queensland Lease</p> <p>Border Loop to Acacia Ridge</p>	These changes are made to include the Metropolitan Freight Network and the South Sydney Freight in the list of Networks.
38	Schedule H (<i>Capital</i>)	Deletion	SCHEDULE H (Capital Expenditure)	See above in item 18.

Item	Clause reference	Type of change	Specific drafting change	Reason for change
	<i>Expenditure)</i>			
39	Schedule H (<i>Segments</i>)	Deletion and insertion	<ol style="list-style-type: none"> 1. Adelaide (Dry Creek) – Parkes 2. <u>Tarcoola – Asia Pacific Interface</u> 3. Adelaide (Dry Creek) – Melbourne (Spencer Street St (Melbourne)) 2.4. <u>Appleton Dock Jct – Footscray Rd)</u> 3.5. <u>Melbourne (Tottenham) – Macarthur</u> 4.6. Newcastle (Islington Junction via mains) – Acacia Ridge Queensland Border (Border Tunnel) 5.7. <u>Crystal Brook – Parkes</u> 6.8. <u>Cootamundra - Parkes</u> 7.9. Adelaide (Dry Creek) – Pelican Point 8.10. <u>Port Augusta – Whyalla</u> 9.11. <u>Moss Vale – Unanderra</u> 12. <u>Southern Sydney Freight Line incl Sefton Park Junction – Flemington South</u> 10.13. <u>Metropolitan Freight Network Chullora Junction – Port Botany</u> 	This are minor amendments to reflect the updates to the segments.

2 2018 Schedule D Indicative Access Agreement

Item	Clause reference	Type of change	Specific drafting change	Reason for change
1	Various	Deletion and insertion	Updates from “Trade Practices Regulations 1974” to “Competition and Consumer Regulations 2010” and “TPA” to “CCA”, and other various pieces of legislation throughout the 2018 IAU.	These changes are made to reflect the current titles of legislation.
2	1.1 (Definitions)	Insertion	<u>“ATMS” means the automated train management system including the infrastructure and systems associated with the Network for the operation of that system;</u>	See discussion of ATMS in the Explanatory Guide.
3	1.1 (Definitions)	Deletion	“Charges” means the charges set out in Schedule 3 and includes, without limitation, the Indicative Access Charges, except where expressly excluded;	These changes reflect the move to a charge within the Indicative Service Tariff range rather than linking to a specific Indicative Tariff. This is consistent with the 2018 IAU.
4	1.1 (Definitions)	Deletion	“Indicative Access Charges” means those access charges for Indicative Services specified in Schedule 3;	See above in item 3.
5	1.1 (Definitions)	Deletion and insertion	<p>“Indicative Services” means Services with the following <u>contracted</u> characteristics:</p> <ul style="list-style-type: none"> (i) maximum <u>an</u> axle load of 21 tonnes; (ii) <u>capability to operate at least at</u> maximum speed of 110 km/h; <p>and</p> <ul style="list-style-type: none"> (iii) length not exceeding: (A) 1800 metres west of Adelaide and Parkes; 	<p>These changes are to give greater specificity to the Indicative Service, being the Freightliner service.</p> <p>The Undertaking does not apply to the ATMS and so it is excluded from the Indicative Service. See discussion of ATMS in the Explanatory Guide.</p>

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			<p>(B) 1500 metres east of Adelaide and Parkes (until capital expenditure is commissioned on the segments Melbourne – Macarthur and Parkes - Cootamundra;</p> <p>(C) 1800 metres on the segment Melbourne – Macarthur and Parkes – Cootamundra (following commissioning of capital expenditure on the segments Melbourne – Macarthur and Parkes - Cootamundra) and Southern Sydney Freight Line.</p> <p>and does not include the use of the ATMS;</p>	
6	1.1 (Definitions)	Deletion and insertion	<p>“Rail Safety Acts” means the Acts passed by the Commonwealth and the States and any successor enactments, which relate to rail safety, including without limitation the:</p> <p>(a) Rail Safety National Law (WA) Act 2015 Rail Safety Act 1998 (WA);</p> <p>(b) Rail Safety National Law (South Australia) Act 2012 Act 1996 (SA);</p> <p>(c) Rail Safety National Law Application Act 2013 Act 2006 (VIC);</p> <p>(e)(d) Rail Safety (Local Operations) Act 2006 (VIC); and</p> <p>(e) (d) ———— Rail Safety (Adoption of National Law) Act 2012 Act 2002 (NSW);</p> <p>(f) Rail Safety National Law (Queensland) Act 2017 (Qld).</p>	See above in item 1.
7	1.1 (Definitions)	Deletion	<p>“RIC” means the Rail Infrastructure Corporation ABN 21 298 300 693 of Level 3, 237 Wharf Road Newcastle NSW 2300 as renamed, reconstituted, dissolved, replaced or restructured from time to time;</p> <p>SRA” means the State Rail Authority of New South Wales ABN 73 997</p>	The RIC and SRA are no longer in place and are replaced by Transport for NSW.

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			983-198 of Level 6/18 Lee Street, Chippendale, NSW as renamed, reconstituted, dissolved, replaced or restructured from time to time;	
8	2.7 <i>(Manner of Control of the Network by ARTC)</i>	Insertion	<p><u>So far as is reasonably practicable</u>, ARTC agrees at all times during the Term to control the Network in a manner which facilitates:</p> <p>(a) compliance by the Operator with the relevant Scheduled Train Paths applicable to the Services; and</p> <p>(b) the use by the Operator of the relevant Scheduled Train Paths applicable to the Services, and in so doing to ensure (subject to the matters in clause 2.1(b)) that an Operator's Train which enters the Network on schedule or is early will exit the Network no later than the scheduled time.</p>	This change is to ensure that ARTC's agreement to control the Network is not construed as an ARTC warranty to always provide the service with the exact scheduled slot timing noting that it would be impossible in practice to achieve this.
9	4.3 <i>(Excess Network Occupancy Charges)</i>	Deletion	<p>4.3 — Excess Network Occupancy Charges</p> <p>(a) — Subject to 4.3(b), the Operator will pay all excess network occupancy Charges specified in Schedule 3 in respect of each Train Path or any part of such Train Paths in accordance with clause 4.4(b) (as amended, if applicable, in accordance with clause 4.5) irrespective of whether or not the Operator uses all or any such Train Paths.</p> <p>(b) — The Operator is not required to pay the excess network occupancy Charges specified in Schedule 3 where ARTC is not able to provide the Train Path or an agreed substitute Train Path except where the failure to provide the Train Path is a result of an Incident, Third Party Works or an emergency.</p>	<p>This deletion has been made as this charge has not been applied by ARTC in the operation of the IAU.</p> <p>This is consistent with the 2018 IAU.</p>
10	4.3 <i>(ATMS)</i>	Insertion	<p><u>4.3 ATMS</u></p> <p><u>(a) If either party requests that ATMS forms part of the services to be provided under this Agreement, then the parties will negotiate in good</u></p>	See discussion of ATMS in the Explanatory Guide.

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			<p><u>faith to amend this Agreement to include ATMS and an adjustment in the relevant Charges.</u></p> <p><u>(b) In negotiating the amendment under clause 4.3(a), the parties will have regard to any increase in the top end of the Indicative Access Charges Range (as defined in the Access Undertaking) resulting from the ATMS.</u></p>	
11	4.4(b) <i>(Invoices and Monthly Statement)</i>	Deletion	(b) The Operator will pay to ARTC in full the amount shown in the monthly statement issued by ARTC (such statements specifying the flagfall and variable components of the Charges, together with the excess network occupancy Charges under clause 4.3), such payment to be received by ARTC within twenty one (21) days from the date of issue of the statement unless the payment is in dispute.	See above in item 9.
12	4.5(a) <i>(Variation of Charges - Consumer Price Index)</i>	Deletion and insertion	<p>(a) Subject to clause 4.5(c) of this Agreement, ARTC may at any time after the Commencement Date vary the Charges Indicative Access Charges for Indicative Services on 1 July of each year (“Review Date”) by up to an amount determined in accordance with the following formula:</p> $AC_t = AC_{t-1} \times (\text{CPI Index}_t / \text{CPI Index}_{t-1} + TV_i)$ <p>Where</p> <p>AC_t is the relevant Indicative Access Charges tariff payable by the Operator following the relevant Review Date.</p> <p>AC_{t-1} is the relevant Indicative Access Charges tariff payable by the Operator immediately preceding the relevant Review Date.</p> <p>TV_i is the maximum variation to Indicative Access Charges (measured as a percentage) that may be applied from the Commencement Date and thereafter from each 1 July during the Term (“Determination Date”) and is to be determined in accordance with the following formula:</p>	<p>This is amended to reflect that the floor and ceiling rates will escalate annually by 100% of the CPI change from the previous year.</p> <p>This is consistent with the 2018 IAU.</p>

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			<p>TVi = is the greater of:</p> <p>(i) $\frac{((CPI\ Index_i / CPI\ Index_0) / CVi-1) - 1}{1} \times 100$; or</p> <p>(ii) Zero;</p> <p>Where,</p> <p>CPI Index_i is the All Groups Consumer Price Index, Weighted Average of Eight Capital Cities, <u>Index Number for the March quarter preceding last published by the Australian Bureau of Statistics before</u> the relevant <u>Determination Review</u> Date.</p> <p>CPI Index_{t-1,0} is the All Groups Consumer Price Index, Weighted Average of Eight Capital Cities, <u>last published by the Australian Bureau of Statistics before the Review Date preceding the relevant Review Date except that in the case of the first Review Date, Consumer Price Index All Groups Weighted Average for the Eight Capital Cities last published before the Commencement Date;</u></p> <p><u>except that if ACt-1 < ACt, then ACt-1 is deemed to equal ACt.</u></p> <p>Index Number for the March quarter of the year 2007, being 155.6. CVi-1 is the cumulative effect of the variations actually applied by ARTC to the indicative access charges specified in the Access Undertaking from 1 July 2008 to the relevant Determination Date (“i”). That cumulative effect is to be determined in accordance with the following formula:</p> <p>$CVi-1 = (1 + V1) \times (1 + V2) \times \dots \times (1 + Vi-1)$</p> <p>where</p> <p>V1, V2... Vi-1 are the actual % variations which have been applied to the indicative access charges specified in the Access Undertaking from the 1</p>	

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			<p>July 2008 to the relevant Determination Date.</p> <p>For the purpose of determining TVi for the sixth Determination Date, CPI0 will be reset to CPI5 and CV5 will be reset to 1.</p> <p>(b) Notwithstanding any other provision of this Agreement, except for clause 4.5(c) of this Agreement, ARTC may vary some or all of the Indicative Access Charges more than once in between Determination Dates during the Term, provided that the total of the variations do not exceed TVi from the first of those two (2) relevant Determination Dates.</p> <p>(c) ARTC will give the Operator at least sixty (60) days notice of any proposed increase of the Charges under clause 4.5(a) and such notice may be given at any time. The Operator may, within the period of sixty (60) days from the date of the notice, make written submissions to ARTC on the proposed increase in Charges. Such written submissions will be considered by ARTC. The increase in Charges proposed by ARTC will become effective and payable on the earlier of:</p> <p>if no subsequent notification is given by ARTC to the Operator, the date specified in the notice of the proposed increase of the Charges is given under this clause; or</p> <p>if a subsequent notice is issued by ARTC to the Operator, such date as specified in that notice, in which case, the Charges will be increased by the amount specified in such notice.</p>	
13	4.8 (Interest)	Deletion and insertion	<p>If the Operator defaults in the due payment of any amount due to ARTC under this Agreement (including all amounts in an Invoice), the Operator will pay interest on that amount, or the outstanding balance, until it is paid in full. The interest rate will be 2 percentage points above the:</p> <p>(a) bench mark lending rate charged by the National Australia Bank</p>	Updating for new methods of publication and titles.

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			<p>or its successors (“NAB”) as published in the Australian Financial Review newspaper at the time of such default; or</p> <p>(b) if the lending rate specified in clause 4.8(a) does not exist at the time of such default, then the base business overdraft lending rate at that time on overdrafts of \$100,000.00 or more as determined in writing by or on behalf of the senior <u>business banking</u> manager of the South Australian head office of the NAB, currently known as the General Senior Business Banking Manager Business and Premium, at his <u>their</u> discretion.</p> <p>That interest will accrue and be recoverable from day to day.</p>	
14	5.4 (Rolling Stock)	Deletion and insertion	<p>The Operator agrees as at the Commencement Date and at all material times during the Term to maintain each Train operated by the Operator on the Network <u>so that at all times each Train is:</u></p> <p>(a) in a condition which is fit <u>and proper</u> for use on the Network; <u>and</u></p> <p>(b) <u>operated by properly trained and qualified personnel who exercise due diligence and care during the operation of each Train on the Network.</u></p> <p>having regard to the terms of this Agreement.</p>	<p>These changes provide clarity that Trains used by Operators are fit for purpose for the entire train journey.</p> <p>It also ensures that personnel operating the train are properly qualified so as to minimise any issues/disruptions on the Network.</p>
15	5.6(a) & (b) (Conduct of ARTC)	Insertion	<p>(a) In formulating its Indicative Access Charges, ARTC will not differentiate between operators in circumstances where:</p> <p>(i) the characteristics of the Indicative Services are alike; and</p> <p>(ii) the operators are operating within the same end market.</p> <p>In determining whether the characteristics of two Indicative Services are alike ARTC may have regard to matters including but without limitation <u>the</u></p>	This is consistent with the 2018 IAU.

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			<p>applicable non-price terms, location, duration and quality of the Train Path, nature of Train consist, characteristics of the Indicative Service, longevity of access, arrival and departure times of the day and week.</p> <p>(b) Without limiting clause 5.6(a), if:</p> <p>(i) ARTC sells a train path for an Indicative Service to a third party (“Third Party Train Path”); and</p> <p>(ii) the Operator considers, acting reasonably having regard to the matters in clause 5.6(a), that the Third Party Train Path is a like train path when compared to a Train Path for an Indicative Service purchased by it under this Agreement (“Like Train Path”); and</p> <p>(iii) the Operator has evidence to suggest that the Third Party Train Path has been sold by ARTC for a price less than that charged by ARTC to the Operator for the Like Train Path,</p> <p>then the Operator may make a written submission to ARTC claiming that the Indicative Access Charges payable by it under this Agreement for the Like Train Path should be reduced to that charged by ARTC for the Third Party Train Path, such submission detailing at least the following:</p>	
16	5.7 <i>(Removal of Rolling Stock from Network)</i>	Deletion and insertion	<p>(a) (a) — If ARTC reasonably considers that a Train operated by the Operator is obstructing the Network, ARTC may issue a notice to the Operator will upon being notified in writing or by electronic mail of that obstruction and requesting the Operator to arrange for the Train operated by the Operator to be moved, by or at the time specified in such the notice, off or to another part or parts of the Network nominated by ARTC.</p> <p>(b) (b) — Subject to clause 5.7(c), if the Operator does not so</p>	<p>These changes give ARTC the right request an Operator to remove or transfer a Train it is operating that is obstructing the Network.</p> <p>It also gives ARTC the right to expeditiously remove or move the Train to another part of the Network if the Operator does not oblige with</p>

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			<p>remove or move the Train operated by the Operator under clause 5.7(a), the Operator consents to:</p> <p>(i) _____ ARTC arranging for the Train operated by the Operator to be removed from or moved to another part or parts of the Network, at the cost and expense of the Operator in all things; <u>and</u></p> <p>(ii) _____ <u>ARTC or its servant, agent, employee, contractor or volunteer accessing the Network to remove from or move to another part or parts of the Network the Train operated by the Operator.</u></p>	ARTC's request to remove the Train in turn minimising any obstruction to the Network caused by the Operator.
17	6.1 (ARTC to Repair and Maintain the Network)	Insertion	Subject to clauses 6.2, 9.3 and 9.4 ARTC agrees at all times during the Term to maintain the Network (but only in so far as the Network is relevant to the Operator's Scheduled Train Paths) in a condition which is fit for use by the Operator to provide rail transport services <u>in accordance with all proper restrictions or Instructions issued from time to time by ARTC.</u>	This change is to ensure that the obligation to maintain the Network recognises restrictions and instructions, particularly in relation to safety.
18	11.4 (Investigation of Incidents)	Deletion and insertion	<p>(a) ——— Incidents will be investigated as required by law.</p> <p>(b)(a) <u>On request, E</u>each party will co-operate <u>reasonably</u> with an investigation under this clause and make available records and personnel relevant to the incident.</p> <p>(c)(b) The parties will consult with each other to determine any action to be taken as a result of any investigation.</p>	This change is a tidy-up as the obligation to co-operate with an investigation which will in of itself be required by law.
19	13.8 (Environmental Manual)	Deletion	13.8 The Operator will implement and comply with the environmental management system manual developed by ARTC, as amended from time to time, ("the Manual"), and will also maintain, implement and comply with the Operator's own environmental management plan (which will not be	This is deleted as ARTC does not maintain an environmental management system manual in practice. In practice the Operators

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			inconsistent with the Manual).	are providing their own plan for dealing with environmental effects of its operations on the Network to ARTC.
20	15.1 (General)	Insertion	<p>(a) The purpose of this clause 15 is to establish a regime in which the liability of ARTC and the Operator to each other for loss or damage to their own property arising out of an Incident is clearly defined, and is determined only by reference to this clause 15.</p> <p>(b) ARTC and the Operator release each other from all Claims for loss or damage to their own property resulting from an Incident, including where the Incident is caused or contributed to by the negligence of one or both parties, except Claims that each party to this Agreement may make against the other pursuant to this clause 15.</p> <p>(c) The provisions of this clause should be interpreted to give effect to the intention that where ARTC and/or the Operator are in breach of this Agreement, and any such breach is the cause or a contributing factor to loss or damage to ARTC's property or the Operator's property arising from an Incident;</p>	<p>These changes are made so that the contract based liability regime (which seeks to streamline claims between ARTC and operators in cases of incidents) in clause 15 is limited to property damage.</p> <p>It is consistent with changes agreed with a number of interstate operators and the Hunter Valley Indicative Access Holder Agreement.</p>
21	15.2 (Definitions)	Deletion and insertion	<p>In this clause 15:</p> <p>(a) (a) 'Claim Period' means each and every twelve month period during the Term of this Agreement, such that the first Claim Period commences on the Commencement Date and expires at midnight on the day before the first anniversary of the Commencement Date, the second Claim Period commences on the first anniversary of the Commencement Date and expires at midnight on the day before the second anniversary of the</p>	See above in item 18.

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			<p>Commencement Date, and so on;</p> <p>(b) (b) — 'loss 'Loss or damage' Damage' (other than in sub-clause (f)) <u>means includes</u> loss or damage to property belonging to <u>or leased by</u> a party to this Agreement, any liability to or claim made by a third party, and the costs of recovery of any property damaged or affected by the relevant Incident and legal expenses on a full indemnity basis;</p> <p>(c) (c) — 'Prohibited Claim' means, subject to clause 15.5(b), a Claim arising from an Incident where the total value of the loss or damage suffered by a party to this Agreement is less than \$50,000.00;</p> <p>(d) (d) — A reference to ARTC or the Operator includes a reference to any servant, agent, employee, contractor, supplier to, or volunteer of or associated with, or a related entity (as defined in the Corporations Act 2001) of ARTC or the Operator;</p> <p>(e) (e) — A reference to a "breach" includes a breach arising from the acts or omissions of a servant, agent, employee, contractor, supplier to, or volunteer of or associated with or a related entity (as defined in the Corporations Act 2001) of, ARTC or the Operator.; and</p> <p>(e) (e) — <u>"Third party liability" mean the liability of ARTC and/or the Operator to any third party (not being a related entity as defined in the Corporations Act 2001) who suffers any personal injury, property or economic loss or damage as a consequence of an Incident.</u></p>	
22	15.3 (<i>Indemnity</i>)	Deletion and	Various amendments to capitalise "Loss" and "Damage" in accordance	See above in item 18.

Item	Clause reference	Type of change	Specific drafting change	Reason for change
	& 15.4 (<i>No Claim for Consequential Loss</i>) & 15.9 (<i>Obligation to Pay</i>)	insertion	with the amendments to clause 15.2(b).	
23	15.6 (<i>Third Party Liabilities</i>)	Insertion	<p><u>(a) Where any third party seeks to recover a third party liability from ARTC or the Operator, ARTC and the Operator shall take the benefit of any statute or other law or contractual provision that limits, or may limit, the liability of ARTC or the Operator to any proportion of loss and damage suffered.</u></p> <p><u>(b) ARTC and the Operator shall only be entitled to seek contribution from the other in respect of any third party liability on the basis of the negligence, or breach of statutory duty of the other party, but not because of any breach or alleged breach of this Agreement by the other party.</u></p> <p><u>(c) ARTC and the Operator release each other from all Claims for contribution from the other in respect any third party liability except to the extent that such third party liability has been caused or contributed to by the negligence or breach of statutory duty of the other party to this Agreement.</u></p> <p><u>(d) To the extent that ARTC or the Operator shall have incurred legal costs in defending a claim by a third party arising out of an Incident which is caused by a breach of this Agreement by ARTC or the Operator, those legal costs (to the extent that they are not recovered by the party who defends the claim, after taking all reasonable steps to recover the same) shall be indemnified by the party in breach of this Agreement to the</u></p>	This provides mutual protections for both parties (ie ARTC and the operator) in relation to their exposure of third party claims brought against the other party.

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			<u>extent that that breach contributed to the Incident.</u>	
24	16.1(b)(ii) (Operator's Insurance Policies)	Deletion and insertion	(b) The liability insurance policy referred to in clause 16.1(a) will: (i) be with an insurer approved by ARTC (and ARTC will not unreasonably withhold such approval); (ii) have a limit of liability of not less than \$ 250 <u>350</u> ,000,000 (or such other amount as ARTC may reasonably require and notify to the Operator from time to time) for any one occurrence; (iii) contain provisions that are standard industry terms for railway operators.	This amount has been amended to reflect that the industry generally has, or should have, public liability insurance with a limit of \$350 million and as committed to by ARTC.
25	16.1(d) (Operator's Insurance Policies)	Deletion	(d) — The liability limit referred to in clause 16.1(b)(ii) may at ARTC's absolute discretion be reduced to such other amount as ARTC expressly authorises in writing from time to time.	Redundant clause noting that it was always at ARTC's discretion.
26	16.2(b) (ARTC's Insurance Policies)	Deletion and insertion	The liability insurance policy referred to in clause 16.2(a) will have a limit of liability of not less than \$ 250 <u>350</u> ,000,000 for any one occurrence.	This amount has been amended to reflect that ARTC has public liability insurance with a limit of \$350 million.
27	16.2(c)(ii) & (d) (ARTC's Insurance Policies)	Deletion	(ii) — publish annually the amounts paid by it by way of premiums for the insurance referred to in clause 16.2(a). (d) — In the event that there is a substantial reduction in the amounts paid by way of premiums as disclosed under clause 16.2(c)(ii), ARTC will, in consultation with all operators granted access to the Network, apply any such savings towards repairs, maintenance or upgrading of the Network or as otherwise agreed between the parties.	This is no longer appropriate where ARTC also now has the Hunter Valley and takes out insurance for all its networks. It does not separate by reference to networks and with an ex poste opex regime, actual insurance costs (including decreases) will be passed through to customers of its

Item	Clause reference	Type of change	Specific drafting change	Reason for change
				networks.
28	20.3 ("Force Majeure")	Deletion	In this clause 20 "Force Majeure" means a circumstance beyond the reasonable control of a party which occurs without the negligence of that party and includes inevitable accident, storm, flood, fire, earthquake, explosion, peril of navigation, hostility, war (declared or undeclared), insurrection, sabotage, terrorism and security matters, nuclear ionisation, executive or administrative order or act of either general or particular application of any government prohibition or restriction by domestic or foreign laws, regulations or policies (other than laws specifically for that purpose passed by the Commonwealth), quarantine or customs restrictions, strike, lockout or industrial dispute, break-down or damage to or confiscation of property but does not include breakdown or delay of any Trains or Rolling Stock operated by the Operator.	This change is to ensure that an FM event is only in respect of an event caused by a circumstance out of the party's control. It ensures the clause has objective operation without the parties seeking to incorporate arguments about negligence and giving primacy to the test of excluding events which are outside a party's control.
29	24.1 (Notice)	Deletion and insertion	A notice or other communication required or permitted to be given by a party to another will be in writing and: (a) delivered <u>to an address or a personally; or</u> (b) sent to an address in Australia by security post or certified mail, postage prepaid; or (c)(b) sent by facsimile transmission, to the facsimile number described below <u>email to the address set out in clause 24.3.</u>	These changes are to update the notice obligations to include email notification and remove outdated use of fax and post.
30	24.2 (Deemed Notice)	Deletion and insertion	A notice or other communication is deemed given if: (a) personally delivered <u>to an address or a person</u> , upon delivery; (a) mailed to an address in Australia, on actual delivery to the addressee, as evidenced by Australia Post documentation; (b) sent by facsimile email; (and is other than a notice of termination	See above in item 27.

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			<p>or suspension of this entire Agreement), on the next Business Day after being sent if following transmission the sender receives a transmission confirmation report or if the sender's machine is not so equipped to issue a transmission confirmation report then upon the sender receiving acknowledgment of receipt.</p> <p><u>(i) _____ when the sender receives an automated message confirming delivery; or</u></p> <p><u>(ii) _____ four hours after the time sent (as recorded on the device from which the sender sent the email) unless the sender receives an automated message that the email has not been delivered,</u></p> <p>(b) _____ <u>whichever occurs first.</u></p>	
31	24.3(a) & (b) (Addresses for Service)	Deletion and insertion	<p>Attention: <u>Manager, Commercial and Contractual Engagement</u> <u>Telephone: (08) 8217 4557</u> Chief Executive Officer Facsimile: (08) 8217 4578 <u>Email: InterstateAccessEnquiries@artc.com.au</u></p> <p>Attention: # Facsimile <u>Telephone:</u> # <u>Email:</u> #</p>	See above in item 27.
32	Schedule 1 (Network)	Deletion and insertion	<p>** To the extent that such railway lines are leased by RIC and SRA <u>Transport for NSW</u> to ARTC</p> <p><u>Metropolitan Freight Network Lease</u></p> <p><u>Freight Corridors</u></p> <p><u>Sefton Park Junction – Chullora Junction</u></p> <p><u>South Flemington - North Enfield</u></p>	These changes are made to include the Metropolitan Freight Network and the South Sydney Freight in the list of Networks.

Item	Clause reference	Type of change	Specific drafting change	Reason for change
			North Enfield – South Enfield via main lines South Enfield – Loftus Street Campsie Marrickville Junction – Port Botany Shared Corridor Loftus Street Campsie – Marrickville Junction Queensland Lease Border Loop to Acacia Ridge	