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5 February 2002

Mr Robert Campbell
Acting Executive Director
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Dear Robert

Capacity or Demand Analysis of the W. Kalgoorlie to Esperance Railway

Further to our discussion of 31 January 2002, I am pleased to provide the above report titled "Capacity -v- Demand, Analysis of the Kalgoorlie to Esperance Railway" as requested. The report draws on the methodology developed in the previous report titled "Capacity of the Kalgoorlie to Esperance Railway" January 2002.

This report reaches conclusions on the pathway capacity versus pathway demand and offers an opinion on the question of whether the Portman Iron Ore Ltd (PIOL) access application will preclude "other entities" from gaining access to the railway.

I believe it provides a sound basis for the Regulator to use when fulfilling his obligations under Section 10 of the Railways (Access) Code 2000.

Thank you for the opportunity to undertake this particular project and I look forward to having an opportunity to perform further work in the future.

Yours faithfully

John Goodall
Strategic Consultant

Attach

Office of the Rail Access Regulator

Capacity -v- Demand

Analysis of the Kalgoorlie to Esperance Railway

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Appendix 1

Kalgoorlie-Esperance Pathway Capacity (Scadden incl)

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1.0 OUTLINE

This report sets out to review the pathway capacity and pathway demand on the Kalgoorlie-Esperance railway as a result of the rail access application made by Portman Iron Ore Ltd (PIOL) in accordance with Section 8 of the Railway (Access) Code 2000 (Code). The route defined in the application is PIOL's Koolyanobbing siding - West Kalgoorlie West-Esperance Port Siding. The report only focusses its attention on the W. Kalgoorlie to Esperance section of this route, as WestNet have advised the Regulator that "there (are) no material constraints to other users in terms of Section 10" for the Koolyanobbing-W. Kalgoorlie section of the route.

The report references an earlier report titled "Capacity of the Kalgoorlie to Esperance Railway", January 2002, which developed the methodology to determine the theoretical and practical pathway capacity of a railway.

Sections 2 and 3 assess the existing and adjusted pathway capacity of the W. Kalgoorlie-Esperance section and Section 4 compares the capacity of the railway with the demand stemming from the two tonnage forecasts contained in PIOL's access application dated 26 September 2001.

Section 5 briefly considers aspects raised in public submissions to the Regulator.

Section 6 draws a conclusion from the analysis and makes a recommendation on the question of whether this application meets the requirements of Section 10b) of the Code.

2.0 ESTABLISHING CAPACITY OF THE KALGOORLIE-ESPERANCE PATHWAY

2.1 Existing Infrastructure

The report titled "Capacity of the Kalgoorlie to Esperance Railway" established a methodology to determine the theoretical pathway capacity of railway and suggests a practical pathway capacity for the Kalgoorlie-Esperance Railway.

The formula:

$$\text{Pathway (Th. Max.)} = \frac{24}{\text{MaximumSectionRunningTime}}$$

calculates the maximum number of pathways available over a 24 hour period where the *Maximum Section Running Time* equals the longest time to travel between any two crossing points on the route.

The location of the crossing points are defined and detailed in the report referred to above but to establish the existing capacity it is also necessary to establish an average travel time of trains travelling over the Kalgoorlie-Esperance route.

Existing WestNet Train Pooling Diagrams submitted to the Regulator identify current individual section travel times and route travel times.

Data extracted from diagrams indicates route travel times measured in hours are as follows:

SERVICE	DIRECTION	RUNNING TIME Hrs	SAFeworking TIME Hrs	TRAVEL TIME Hrs
Iron Ore	Down	9.50	0.50	10.00
	Up	7.50	0.50	8.00
Freighter	Down	9.00	0.50	9.50
	Up	9.00	0.50	9.50

Use of this data results in a weighted average travel time of 9.13 hours. For assessment purposes, a more conservative figure of 9.50 hours has been used. Individual section or travel times can be important for the overall capacity however for simplicity, the weighted average travel time has been prorated to determine the section times.

The theoretical pathway capacity of the W. Kalgoorlie-Esperance route then becomes 9.6 pathways per day or 67 pathways per week based on the *Maximum Section Running Time* of 2.53 hours for the Salmon Gums-Esperance Section.

Establishing a practical pathway capacity is not simple and in the end depends on judgement as to whether the quality of pathway access (the overall travel time of the pathways) still gives access users reasonable travel times. As discussed in the report "Capacity of the Kalgoorlie to Esperance Railway", it has been assessed that this point is reached when 70% of the theoretical capacity is reached for this particular route. Using this figure results in a practical pathway capacity on the Kalgoorlie-Esperance route of 47 pathways per week.

Current weekly pathway demand is:

PIOL	32
Freighter	12
Grain	10 (seasonal)
Total	54

Therefore the existing situation is that the railway is being used below its theoretical capacity (67 pathways/week) and just above its practical capacity (47 pathways/week) when grain trains are operating (54 pathways/week), and below its practical capacity when grain trains are not operating (44 pathways/week).

So if "other entities" as described in the Code refers to "other potential entities", then these entities are already precluded from access given the existing infrastructure and while grain services are operating. It is also the case that the increases made by PIOL over recent years (from 18 to 32 pathways/week) plus doubling the pathways for the freighter service in the past 6 months (from 6 to 12 pathways/week) has meant the quality of the access provided has deteriorated. This explains why concerns have been raised by PIOL and freighter service clients plus the grain industry (requirements have remained unchanged), in relation to poor on time performance for trains travelling over the route.

So, in summary, to date WestNet have allowed increased usage of the railway to the detriment of all current access users without initiating any corrective infrastructure related improvements. There have been some changes to the Safeworking System that have assisted train movements in some situations but the absolute capacity of the route has not changed.

2.2 Infrastructure Changes

Work is now in hand for the construction of a new crossing loop at Scadden. This crossing loop will provide additional theoretical and practical pathway capacity to, firstly, return pathway availability and quality to levels that existed 6-12 months ago and, secondly, will provide additional pathways to be taken up by future access seekers.

It is reasonable to argue that the base case for considering PIOL's application is to consider the network with the Scadden crossing loop in place.

WestNet have recently completed a significant maintenance programme between Kambalda and Esperance. Work included sleeper replacement, replacing rail on curves and formation rectification work. This is a cyclic maintenance type program aimed at restoring the overall condition of the railway and should have resulted in some overall improvement in average travelling time as a number of localised condition related speed restrictions would have been removed. It could be expected that average travel time has improved slightly which may have assisted on time performance for trains over recent months.

During the recent maintenance programme, additional sleepers were inserted in the Kambalda-Esperance section of the railway to increase the overall density of sleepers. This initiative will have improved the bearing capacity and beam strength of the track structure for this section. It can realistically be expected that either the maximum allowable speed or maximum allowable axle load, or both, can be increased as a result of the work.

From the current access users' perspective, an increase in speed would be the most beneficial. The work is insufficient to increase the axle load to 23 tonnes (part of PIOL's access application) but a maximum speed increase of say 10km/hour in both the loaded and empty directions would have a significant impact on average travel times over that section which would translate into increased theoretical and practical pathway capacity for the Kalgoorlie-Esperance railway.

This matter needs to be raised with WestNet and if the maximum allowable speed has not been increased then it should be and the additional theoretical and practical pathway capacity made available to users.

At the very least and as with the Scadden crossing loop, the speed related capacity improvement should be factored into the capacity assessment before considering PIOL's access application.

3.0 ADJUSTED CAPACITY OF THE KALGOORLIE-ESPERANCE RAILWAY

3.1 Adding A Crossing Loop At Scadden

Adding a crossing loop at Scadden results in the existing section of 102km between Salmon Gums-Esperance being split in two. The longest section on the railway then becomes the Higginsville-Norseman section at 73km.

On a distance prorata basis, the 9.5 hours' travel time results in a travel time over this section of 1.81 hours and the theoretical capacity becomes 13.26 pathways per 24 hours or 93 pathways per week, and practical capacity would then be 65 pathways per week. The graph at Appendix 1 diagrammatically illustrates the theoretical pathway capacity.

3.2 Increased Maximum Train Speed

If the maximum train speed over the Kambalda-Higginsville section was increased by 10km/hour in both directions and this increase resulted in a 5km/hour increase in the average speed of trains over the section then the theoretical and practical capacity would increase to 104 and 72 respectively. Average travel time would be 1.62 hours in either direction.

It should be noted that from a pathway capacity perspective, it is only a speed increase on the Kambalda-Higginsville section that affects pathway capacity as this is clearly the longest section. The next longest section is the Higginsville-Norseman section at 56km.

A check of WestNet's Train Pooling Diagram suggests that even without a speed increase, the average travel time is less than this figure at 1.54 hours, so the above figures are conservative.

3.3 Summary

In summary, adding a crossing loop at Scadden improves the route capacity by 39% (ie: 67 to 93 pathways per week), and achieving a travel time of 1.62 hours or better for the Kambalda-Higginsville section would add another 16% capacity (93 to 104 pathways per week) to the railway. It is this theoretical capacity and the resultant practical capacity that should be the basis of assessing PIOL's current access application.

4.0 PIOL'S ACCESS APPLICATION

To assess PIOL's application against the test of whether it has the potential to "preclude other entities from access", the only test that is required is whether the application is likely to make full utilisation of available pathways. In its application, PIOL also refer to higher maximum axle loads and train speeds for the Kalgoorlie-Esperance Railway. While this is important to PIOL in its discussions with WestNet to determine the best way to meet its potential future task of 8,000,000 tonnes per annum, it is irrelevant in relation to the question of pathway availability and usage.

Their request for increased speeds and axle loads forms the basis of a debate between PIOL and WestNet on which is the best capital investment strategy to allow PIOL to meet the proposed higher tonneages. Investment can be made in track improvements, train consists or some combination of both to provide a system that would meet the projected task.

As a matter of interest, it is possible to invest in train consists only to meet the future demand and not have to make any investment in the track to further upgrade speed and axle loads.

Returning to the question of pathway availability and usage, PIOL are seeking 48 pathways/week to meet their 5,500,000 tonnes per annum task and 60 to meet 8,000,000 tonnes per annum.

Other weekly pathway demands are:

- Freight Services - 12
- Grain (Seasonal) - 10

Total weekly demand for the two tonnage services is therefore as follows:

Client	PIOL Project Task	
	5,500,000t	8,000,000t
PIOL	48	60
Freight Services	12	12
Grain (Seasonal)	10	10
TOTAL	70	82

The following table compares theoretical and practical pathway availability (described in Sections 2 and 3) with pathway demand.

Pathways - Capacity or Demand
(measured on a weekly basis)

Capacity	Theoretical Maximum	Practical (70% of Maximum)
Current	67	47
Adjusted	104	72
Adjusted plus second crossing loop	135	95
Demand	With Grain	Without Grain
Current Demand	54	44
PIOL at 5,500,000	70	60
PIOL at 8,000,000	82	72

Note:

- 5,500,000 tonnes demand from PIOL is based on the existing train configuration - net load 4,927 tonnes, and the existing track structure
- 8,000,000 tonnes demand from PIOL is based on the proposed train configuration - net load 5,684 tonnes
- if net load increased to 7,299 tonnes (based on 121 wagons and 20.5 tonnes axle load), then PIOL's pathway requirement would be the same as for the 5,500,000 tonnes task

It can be seen that at PIOL's 5,500,000 tonnes pathway requirement, the adjusted capacity (both practical and theoretical) exceeds demand.

At PIOL's 8,000,000 tonnes demand requirement as outlined in their application (net train loads of 5,684 tonnes), and excluding seasonal grain, practical capacity is the same as demand. The demand including grain is well below theoretical capacity.

Should negotiations between PIOL and WestNet result in PIOL using higher net load trains (7,299 tonnes) than currently envisaged, then the adjusted capacity (both practical and theoretical) would exceed demand.

The table also shows capacity figures should a second crossing loop be constructed and be located between Kambalda and Higginsville. With this crossing loop in place, capacity would exceed demand by a large margin.

5.0 PUBLIC SUBMISSIONS

The following comments address the technical pathway capacity aspects of the submissions made to the Regulator.

5.1 Alcoa World Alumina Australia and PIOL

Both submissions comment on the ability to incrementally increase pathway capacity of a railway. The methodology developed for determining pathway capacity and the examples used to increase pathway capacity demonstrate the validity of the points raised.

Elsewhere in this report (Section 4), it is argued that while axle load and speed improvements do increase the capability of the railway they are not issues in relation to comparing current pathway capacity and demand resulting from PIOL's application.

5.2 WMC Resources Ltd

WMC raised concerns in relation to the capacity of the W. Kalgoorlie-Kambalda section of the railway.

The weekly theoretical pathway capacity of the two sections concerned is as follows:

W. Kalgoorlie- Hampton	423
Hampton-Kambalda	178

These sections have individual capacities well above the overall route capacity, therefore the PIOL application will not preclude WMC's access to these sections.

WMC's submission also makes reference to the deteriorating "on time" performance of the freighter service. This issue is addressed in Section 2.1 of the report.

6.0 CONCLUSION

The availability versus demand analysis should be based on the Kalgoorlie-Esperance Railway's pathway capacity after Scadden is included and an average travel time over the Kambalda-Higginsville section of 1.62 hours is recognised.

At the resulting capacity levels, there are sufficient pathways available to meet the project demand when PIOL's 5,500,000 tonnes task is included. Pathways would be available for other access seekers.

At the demand level when PIOL's 8,000,000 tonnes task is included, sufficient pathways (practical) would exist to meet demand excluding the seasonal grain pathway demand. The grain task is only a seasonal requirement for approximately 10 weeks which has not been required each year over past grain seasons and only occupies the Salmon Gums-Esperance sections. It can therefore be readily accommodated within the overall theoretical capacity of the two particular sections (133 pathways per week).

At the 8,000,000 tonnes PIOL demand level, there would not be any spare pathways available for other access seekers. Within their demand, PIOL has sought a contingent pathway requirement of 11% above actual demand. Should this contingent requirement be less or the final export tonnage reduce below the target of 8,000,000 tonnes per annum, then pathways would be available to other access seekers.

It is therefore assessed that pathways will be available for other access seekers at the 5,500,000 tonnes per annum task level for PIOL and spare pathways are very likely to exist at the 8,000,000 tonnes per annum task level with the existing infrastructure in place.

Should WestNet elect to install a second crossing loop and locate it between Kambalda and Higginsville, then there would be an additional 31 pathways per week available for new access seekers.

Should PIOL and WestNet negotiations result in the Kalgoorlie-Esperance railway being upgraded as an outcome of this application, then a further 10-15 pathways would become available.

It is the view of the author of this report that, having regard for the requirements of the Code and the details of PIOL's access application and the ability to readily and cheaply increase pathway capacity, there is no likelihood that other entities will be denied access to the W. Kalgoorlie-Esperance in a manner contemplated in Section 10 of the Code. If anything, negotiations will result in an increased number of pathways becoming available for others.

APPENDIX 1

Kalgoorlie-Esperance Pathway Capacity (Scadden incl)

