Western Australia

Economic Regulation Authority

FLOOR AND CEILING COSTS TO APPLY TO THE WESTNET RAIL GRAIN LINES

DETERMINATION OF THE ECONOMIC REGULATION AUTHORITY

5 JULY 2004

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1. Introduction

At the request of the Australian Wheat Board Ltd. (AWB), the Economic Regulation Authority ("the Authority") has made a Determination of the floor and ceiling costs to apply from 1 January 2004 of the following four (4) grain route sections:

- Avon to Goomalling;
- Katanning to Tambellup;
- Yilliminning to Kulin;
- Mullewa to Narngulu.

The selection of these route sections, which was agreed by AWB, WestNet Rail (WNR) and the Authority, is intended to provide a representative sample of the grain network for the establishment of ceiling and floor costs.

Only two classifications of grain lines, 16 total axle load (tal) and 19tal, were deemed necessary. The Authority understands that gross tonnes over the grain network range from 0.3 to 2 million gross tonnes per annum and maintenance effort within this range on a Modern Equivalent Asset (MEA) track structure will not vary to any material extent.

By determining the floor and ceiling costs of these four route sections, the Authority has established the MEA standard for the WA grain network and what it considers are the acceptable capital, operating, maintenance and overhead costs. The same methodology and unit costs will be applied in future determinations of other grain route sections adjusting for differences in infrastructure such as turnouts, bridges, culverts, level crossings, etc., on a case by case basis where they are materially different from these four grain lines.

PricewaterhouseCoopers (PwC) and Hughes Consulting Services Pty Ltd. (HCS) were engaged to provide advice to the Authority on costing and engineering issues in the calculation of the floor and ceiling costs. The consultants provided recommendations on what is to be an acceptable MEA standard for each of the four grain route sections to meet current and projected levels of demand, and conducted a review of the proposed capital, maintenance, operating and overhead costs to assess what are acceptable rates, that can be substantiated and/or benchmarked, to ensure that operating and technical efficiencies are achieved at the MEA standard.

In preparing their advice, PwC and HCS reviewed and considered the AWB and Co-operative Bulk Handling Ltd. (CBH) submissions and met with both stakeholders to discuss their concerns. AWB's submission is available on the Economic Regulation Authority's website (www.era.wa.gov.au). CBH has requested that the contents of its submission be kept confidential.

To obtain a better understanding of the current condition of the nominated route sections to enable comparative benchmarking with other rail operator's lines of

similar usage and topography, track inspections were also carried out by HCS on all four lines.

In the main, the PwC/HCS report recommendations have been adopted by the Authority. Because of the commercially sensitive information relating to WNR's current operation that has been referenced in the report, the Authority considers the PwC/HCS report to be confidential and has not made it publicly available on the Authority's website.

Bovis Lend Lease (BLL) was contracted to provide a second independent engineering perspective on the maintenance costs proposed by WNR. BLL's recommendations have been incorporated into the Authority's Determination. The Authority also considers the BLL report to be confidential.

Although both the PwC/HCS and BLL reports are confidential, references have been made to these reports, where appropriate, in support of the Authority's Determination.

2. Authority under which the Determination is made

The Authority's Determination of the floor and ceiling costs of the four grain route sections was undertaken under the general powers of the Authority provided by the *Railways (Access) Act 1998* and *Railways (Access) Code 2000*.

3. Discussion of Issues

Issues pertaining to WNR's floor and ceiling determination that were considered significant are discussed under the headings:

- Level of service and modern equivalent assets, if appropriate;
- Capital costs;
- Maintenance costs;
- Operating costs, overhead cost and working capital.

The following discussion commences with a summary of WNR's proposal under each of the above headings. This is followed by comments received from AWB and CBH, recommendations from the Authority's consultants, and the Authority's views and comments.

3.1 Level of Service and Modern Equivalent Assets, if appropriate

3.1.1 WNR's proposal

WNR has defined a Modern Equivalent Asset (MEA) as a total package of items, which leads to an operating standard, to include:

- Track standard for tangent operations (speed and axle load);
- The effect of curve and gradient (noting that the Regulator has already determined the existing track alignment is what should be used);
- The capacity and capabilities of the signalling system;
- The prevalence and level of protection provided at level crossings;
- Other public safety issues such as fencing.

While WNR considers that the majority of its main track configuration can be adopted as the MEA, it proposes the following exceptions in calculating the Gross Replacement Value (GRV) for its grain lines:

- Formation height is generally averaging 0.5m in height. The MEA standard assumed height shall be 1.0m (including capping layer);
- Ballast depth is currently from 100mm to 150mm below the base of the sleeper depending on whether continuous welded rail or jointed rail is used. The MEA will formalize these depths for axle loading and ballast type used;
- Sleepers are currently fully timber or 1 in 4 steel on most lines with some recently upgraded lines 1 in 2 steel. The MEA standard shall be 1 in 4 steel at 1320/km minimum throughout;
- Rail used currently ranges in various sizes and to various standards applicable at the time of original installation or upgrade. The MEA standard shall be 31kg/m for 16tal lines (if available otherwise 41kg/m rail) and 41kg/m for 19tal lines.

3.1.2 Stakeholders' comments

CBH suggested that the Authority should consider whether it is appropriate to use the MEA approach for grain lines as opposed to the existing infrastructure approach when determining the floor and ceiling prices. Of particular concern was the proposed formation depth. CBH suggested that the formation depth should be reviewed on whether the proposed structure is representative of actual conditions, and whether the existing structures are appropriately engineered.

CBH further pointed out that it would be appropriate to include loaded and empty speeds for the four route sections as each has different speed and axle load profiles, and has also suggested a more detailed MEA specification which includes operational information such as ruling grades, speed restrictions, and crossing loop lengths.

3.1.3 Consultants' comments

The recommended MEA standard for the grain lines has been developed from evaluating the WNR proposed MEA, the latest design practices for low tonnage narrow gauge lines, the WNR grain line typical terrain characteristics, existing track standard and a suitable maintenance regime to enable rail traffic operations to be maintained under all typical weather conditions.

Consideration was also made of the standards that have been used as the design, construction and maintenance standards to achieve acceptable levels of safety and service on all grain lines forming the WNR network, which includes the earlier Determinations by the Regulator that the existing alignment of the lines shall constitute and be adopted as the MEA.

This standard was developed from the information submitted and after discussion on approaches to achieve a suitable result between WNR, HCS and the Authority. The rated loadings for the various grain lines have been agreed as having a tal of either 16 or 19 tonnes, as these are the current gross loadings of the train wagon sizes operating on the grain lines.

PwC and HCS agree that the WNR's proposed MEA for the grain lines meets the Authority's requirements for a MEA for the assessment and determination of the GRV.

3.1.4 Authority's comments

The Authority agrees that a full application of MEA would be inappropriate for the grain lines. It has utilised a practical and "fit-for-purpose" approach to developing the GRV specifications, and applied MEA, if appropriate, based on recommendations from PwC and HCS.

For example, the Authority has not assumed the use of modern optic fibre communications or an electrically operated signalling system, and has assumed a

1:4 steel/timber sleeper mix which cannot be placed efficiently in practice in one laying process. It needs to be pointed out that the use of an existing infrastructure approach is also problematic for some capital items which are no longer available (eg. lighter weight rail sizes).

The Authority also supports an assumed formation height of 1.0m as it is uniform for all lines, balances out the potential for formation failure due to bog-holes, water table variations and expansive soil movements and land slips, and lessens the required maintenance expenditure allocation required to cover these costs.

With regard to a more detailed MEA specification which includes operational information such as ruling grades, speed restrictions, and cycle times, the Authority is of the view that this information is line specific and best provided to access seekers using the proposal for the access process under Section 7 of the Code. WNR is required to report on the status of permanent and temporary speed restrictions as part of its performance reporting to the Authority on a quarterly basis, and this information is made publicly available on the ERA website.

The Authority agrees with CBH's suggestion that loaded and empty speeds should be specified for the four nominated route sections.

The MEA specifications for the four route sections are outlined in Attachment 1.

3.2 Capital Costs

3.2.1 WNR's proposal

WNR's proposed capital costs have been drawn from the equivalent MEA standard with applicable unit rates being applied for the items of construction to determine a GRV for each route section. These unit cost figures are generally comparable to items that were included in the Regulator's previous Determinations for the main lines and Worsley line.

3.2.2 Stakeholders' comments

AWB has indicated that from their modelling of the construction cost, the WNR GRV for the four lines appeared to be up to 14.6 percent higher than should be. It believes that this variance could be greater if the margin to cover contingency factors that may be related to the WA grain belt specific regional issues was not assumed in AWB's own modelling, and if a detailed review of the scope of works for signalling and communications was also undertaken.

3.2.3 Consultants' comments

The unit rate costs for supply and/or construction of earthworks, ballast, culverts, sleepers, rail and turnout installation should be generally similar whether it is a main line or branch/grain line for a particular MEA standard. On the other hand, unit rate costs for manufacture, supply and installation of signals, communications, train

control, level crossings and like items for the four grain route sections would be expected to be considerably less than the equivalent main line costs, due to slower trains speeds, use of "train order" control, lesser MEA standard and the infrequency of train services affecting operations as well as the consequential standard of level crossings.

WNR has utilised the same capital item unit rates for grain lines as were used in the Regulator's Determination for NG (narrow gauge) main lines with the exception of five variations which are listed in Table 1. These have been compared for reference with the cost of similar items as accepted in the Regulator's Determination for the main line network.

Generally, due to the lower population counts of turnouts, bridges, level crossings, track signs, and signals and the lack of fencing and major communication infrastructures as compared with the main lines, as well as the use of lighter rail, the capital costs of grain lines per km are lower vis-à-vis main lines. However, some unit rates can be marginally higher in cost due to smaller quantities required and transport cost differences.

Table 1: Unit Costs for Grain Lines compared to NG Main Lines

Capital Items	NG Main Line Cost (as per previous Determinations)	19 tal NG Grain Line Cost (as per WNR's proposal)
Earthworks incl. 230mm capping layer	$17.00/m^3	$17.70/m^3
Ballast – 150mm metal	$14.60/tonne	$16.00/tonne
Sleepers – NG 1 in 4 steel, timber type B complete	$72.00 ea (concrete)	$74.50 ea (1 in 4 steel)
Rail	$103,240/km (50 kg/km)	$94,000/km (41 kg/km)
Track Laying	$94,000/km	$93,000/km

Capital costs cannot be benchmarked against low volume grain or branch lines in other rail networks in Australia as no new NG grain or branch lines have been constructed in the past 40+ years. Instead, a general comparison as a GRV at the comparable MEA standard was made with the GRV of the Kalgoorlie to Esperance and Kalgoorlie to Leonora main lines, both of which are located in generally similar terrain.

A proportional cost reduction was applied to the GRV for these main lines to provide a relevant GRV cost for the two classifications of grain lines. These comparatively lower volume main lines are MEA 50kg rail SG (standard gauge) and constructed on a 1.5m formation with 250/200mm of ballast under the SG steel and timber sleepers with more sleepers/km, against the lesser MEA standard of the grain lines tracks.

Tables 2 and 3 summarise the typical volumes/quantities on which the discount percentage was calculated.

Table 2: Comparative Unit Quantities – Esperance Main Line vs 19tal Grain Line

Item	Proportion of GRV	Esperance (SG)		19tal (NG)		Reduction
		Dimension	Unit	Dimension	Unit	
Formation	21%	1.5m	10.5m^3/m	1.0m	4.5m^3/m	57%
Sleepers	13%	1 in 2, SG 1640/km	$88ea	1 in 4, NG 1340/km	$82ea	25%[1]
Ballast	7%	250mm	0.75m^3/m	150mm	0.45m^3/m	40%
Rail, turnouts	28%	50kg	$206/m	41kg	$188/m	10%
Track Laying	18%		$94/m		$93/m	0%
Culverts, bridges	6%		WNR rate		WNR rate	0%
Signals, level crossings, communications	7%		WNR rate		WNR rate	0%
Weighted average cost reduction						20%

Note 1 – The 25 percent reduction in sleeper costs is driven by the greater spacing on the grain lines (19tal NG requiring 18.3 percent fewer sleepers), the lower steel component on the grain lines and NG timber and sleeper unit prices being slightly cheaper than SG

Table 3: Comparative Unit Quantities – Leonora Main Line vs 16tal Grain Line

Item	Proportion of GRV	Leonora (SG)		16tal (NG)		Reduction
		Dimension	Unit	Dimension	Unit	
Formation	21%	1.5m	10.5m^3/m	1.0m	4.5m^3/m	57%
Sleepers	13%	1 in 4, SG 1500/km	$94ea	1 in 4, NG 1340/km	$84ea	31%
Ballast	7%	200mm	0.63m^3/m	150mm	0.45m^3/m	29%
Rail, turnouts	28%	50kg	$206/m	31/41kg	$188/m	10%
Track Laying	18%		$94/m		$85/m[1]	10%
Culverts, bridges	6%		WNR rate		WNR rate	0%
Signals, level crossings, communications	7%		WNR rate		WNR rate	0%
Weighted average cost reduction						23%

Note 1 – 16tal lines are non continuously welded and are slightly cheaper to construct

The GRV for the 16tal and 19tal lines are estimated at 77 and 80 percent respectively of the indicated main lines. No reductions have been applied to communications, signals, level crossings, bridges and culverts as a similar standard is applicable to both line types. The comparative capital costs are shown in Table 4.

Table 4: Comparative Calculated Capital Cost for Grain Lines

Line	tal	WNR Track Asset Cost ($/km)	WNR Signals & Communications Asset Cost ($/km)	WNR Total Asset Cost ($/km)	Comparable Main Line Asset Cost ($/km)
Avon - Goomalling	19	$ 718,040	$ 23,967	$ 742,007[1]	$ 692,213[2]
Katanning -Tambellup	19	$ 665,625	$ 6,718	$ 672,343	
Yilliminning - Kulin	16	$ 640,401	$ 1,471	$ 641,871[1]	$ 644,990[3]
Mullewa - Narngulu	16	$ 580,048	$ 12,165	$ 592,214	

Note 1 - Significant Drainage Structures

Note 2 - 80% of the Esperance main line and adjusted by CPI Inflator of 1.94%

Note 3 - 77% of the Leonora main line and adjusted by CPI Inflator of 1.94%

PwC and HCS are of the view that the capital cost as provided by WNR for the grain route sections are similar to the previously approved main lines after adjustments were made to quantities applicable in the MEA standard.

3.2.4 Authority's comments

The Authority agrees with WNR's proposed capital costs for the four grain route sections.

3.3 Maintenance Costs

3.3.1 WNR's proposal

WNR has retained its original "bottom-up" maintenance model in the Access Pricing Model (APM) previously submitted to the Regulator to calculate the maintenance costs under the Regulator's Determinations for the main lines and Worsley line. This is an activity based costing approach incorporating a large number of maintenance activities. Consistent with the provisions of a MEA, major periodic maintenance activities that alter the asset lives of the infrastructure have not been included.

Table 5 below gives a breakdown of the line by line maintenance costs proposed by WNR.

Table 5: WNR Grain Line Maintenance Costs

Line	tal	Section Length	Track Mtce Cost ($/km)	Signals & Communications Mtce Cost ($/km)	Total Mtce Cost ($/km)
Avon - Goomalling	19	57.69 km	$ 8,215	$ 515	$ 8,729
Katanning - Tambellup	19	46.71 km	$ 7,722	$ 352	$ 8,074
Yilliminning - Kulin	16	99.81 km	$ 5,906	$ 40	$ 5,946
Mullewa - Narngulu	16	103.09 km	$ 5,635	$ 206	$ 5,841

3.3.2 Stakeholders' comments

CBH expressed concern that the maintenance costs for Avon to Goomalling and Katanning to Tambellup appear high when compared with the Kalgoorlie to Leonora and Brunswick to Ewington routes. It also pointed out that the maintenance cost relativity between the ceiling and floor costs for the grain network routes are different from the relativities coming from other Determinations eg. the maintenance component in the floor price was typically 15 to 20 percent of the maintenance component in the ceiling price, but for 3 of the 4 route sections the proposed maintenance costs in the floor cost are well below the 15 to 20 percent range.

3.3.3 Consultants' comments

As a general observation, it would appear that the maintenance model has been modified for the grain lines to reflect recommendations contained in the Regulator's

Determination for the timber sleeper section of the Worsley line between Hamilton, Worsley and Collie. These route sections form a scheduled service line used on a regular basis by trains carrying coal or alumina and requires a level of inspection and maintenance to reflect the scheduled service train numbers and tonnages. The grain lines, however, do not carry, in most instances, the tonnage of freight nor the scheduled services and do not require the same full year intensity of inspection and maintenance service level as does the Worsley line.

Furthermore, because of the irregular train operations on the grain lines, more efficient maintenance patrols can be provided where lost time caused by train operations can be kept to a minimum and an all inclusive track maintenance regime can be achieved, thus reducing the maintenance costs substantially in comparison with the main lines or branch lines with scheduled services.

On a more specific note, the maintenance model is a “bottom-up” model in that individual activity unit costs are applied to estimated activity levels. The strength of this technique is that all activities are identified for the estimate ensuring that all activities are represented. The weakness of this technique is that the accuracy depends on the estimated activity level and this can be problematic particularly where previous history on that activity in the specific circumstance does not exist. This is the most important characteristic of the WNR approach. Activities have never been undertaken with an MEA construction base and the range of activities have never been undertaken in conjunction as separable activities.

Observing that with the right inputs the “bottom-up” method provides the most accurate output, the best approach to this problem is to ensure the inputs are accurate. The input data can have a dramatic effect on the output. In some cases, individual pieces of input data can have a disproportional effect on the output because certain maintenance activities are orders of magnitude greater than other activities in cost terms.

The following observations have been made about certain activities showing unit costs beyond what could be expected in the maintenance model, as well as certain tasks being performed to a level that would be unnecessary if the other activities were performed as stated.

(i) Corrections Following Patrol

This is one of the greatest expense areas in the APM, collectively representing over 36 percent of maintenance costs. These costs are significantly overstated due to:

- Many of the activities that are likely to be represented in these costs are covered specifically in other areas such as cross-boring, turnout maintenance, firebreaks and drainage;
- With an MEA track and the tonnage forecast, track corrections of any material nature would not be expected to be required for at least the first 5 years;

- The APM assumes step increases in the cost of corrections following patrol due to increased age and deterioration of the track condition. However given that mechanised resurfacing has been allowed for at regular intervals, depending on traffic levels, there is not expected to be an increased requirement for corrections following patrol with track age;
- The APM assumes that cost of correction following patrol is only due to track length with no regard for tonnage. Thus low tonnage lines are assumed to require the same level of corrections following patrol per kilometre as higher tonnage lines. It is usual for track corrections to be primarily driven by tonnage.

The WNR provisions for corrections after patrolling are over-estimated because the WNR program contains all the elements of maintenance used to reduce the amount of this ad-hoc corrective activity.

If corrections following patrol are not undertaken for the first 5 years and costs are not increased with time, the model costs for corrections following patrol will reduce by 40 percent. Further reductions should be possible due to many of the activities being duplicated in other aspects of the APM and reduced tonnages on some track sections driving lower costs than applied in the APM.

(ii) Scheduling of Maintenance Activities

There is a need to review the frequency of cyclic maintenance activities to achieve a more efficient outcome by reducing a number of maintenance cycles over the asset life.

In some instances, the first maintenance period is scheduled earlier than should be required. For example, level crossings are stated in the APM to have a life of 20 years with a maintenance cycle of once every ten years. Thus it would be reasonable to expect one maintenance period at year 10. However, the APM schedules maintenance of level crossings in years 5 and 15, resulting in two maintenance cycles over the asset life instead of one.

A number of activities also receive corrective maintenance in the last year of their life, a practice that is not efficient.

(iii) Incidents

The allowance for incidents is significantly overstated given that:

- Many of the activities likely to result in repairs or maintenance activities following ‘incidents’ have been covered specifically elsewhere such as callouts, storm, heat and corrections following patrol;
- If the operator is the cause of the incident then the access provider is entitled to recover the cost of repairs from the operator;

- In other incident events the access provider will be able to claim the cost of incidents on insurance that is expected to be included in overhead costs. The cost of performing the activities and the cost of insurance is double counting.

(iv) Access Roads

The model allows for annual maintenance of access roads, which is considered excessive given the nature of these tracks. It is also expected that in practice maintenance of access tracks would occur in conjunction with firebreak maintenance generating efficiencies and reducing overall cost.

(v) Drainage

The annual costs of drainage related activities are again overstated given that:

- No maintenance of this type should be required for the first 5 years;
- When this maintenance becomes necessary it can be undertaken in conjunction with firebreak maintenance, using the same machine, reducing the effective annual cost given an integrated maintenance plan.

(vi) Insulated Joints

The maintenance of main line insulated joints is inconsistent with MEA standards and overstated due to:

- The frequency of maintenance does not consider gross tonnage on each line. As a result maintenance is scheduled more frequently than required for the low tonnage lines;
- There is also no consideration of axle loads on each line with lower axle loads expected to result in less wear on insulated joints;
- It appears that maintenance costs have been allocated on the basis of older style mechanical joints rather than MEA standards, as explained in more detail below;
- Insulated joint maintenance activities for an MEA line should be readily addressed within corrections following patrol but in any event is a minor activity.

Given that most if not all maintenance for MEA insulated joints is performed by other maintenance programs such as resurfacing or correction after inspection, the level of expenditure is more aligned to non-MEA construction.

(vii) Culverts

Costs associated with culvert inspections and maintenance are overstated in that:

- Inspections should be able to be performed in conjunction with other inspections and so is significantly overstated;

- Maintenance of culverts should not be required given that the activity is adequately covered under other activities such as drainage, scrub slashing, weed spray and formation repair.

WNR's maintenance program also includes firebreaks attention, scrub slashing and weed control, all of which can be orientated to include partial preventative maintenance measures.

(viii) Bridges

Allocated bridge maintenance costs of $100,000 per bridge every 10 years is excessive. This in effect replaces each bridge more than once over the asset life. This allowance of $100,000 takes no account of the bridge construction cost or traffic tonnage over the bridge.

There is one bridge on the Kulin to Yilliminning section and this has been assigned an MEA capital cost of $83,247 in the WNR Model and yet cyclical maintenance costs of $100,000 every 10 years has still been applied. It is unreasonable to expect each event of cyclical maintenance to exceed the capital value of the bridge.

(ix) Others

Small and large level crossings are stated in the maintenance model to have a maintenance period of every 10 years and yet the first maintenance is scheduled for year 5. Given a 10 year maintenance cycle the first maintenance should not be required until year 10. Thus given the 20 year asset life stated, only one maintenance incident would be required rather that the two accounted for in the model, one at five years and another at 15 years.

In a couple of instances cyclical maintenance costs have continued to be allocated beyond the asset life, with Avon to Goomalling and Katanning to Tambellup incurring costs for rail defect removal until years 144 and 295 respectively despite an asset life of 50 years.

To provide a benchmark for efficient maintenance costs, a general reference was made by PwC and HCS to HCS' Freight Line Maintenance Review (unpublished) to Queensland Rail (QR) in September 1998 which provided a methodology for the dissection of all maintenance costs for low trafficked freight lines. This methodology was used by HCS to assess the maintenance costs for the WA main lines and Worsley line Determinations, and provided a structured maintenance cost regime that could be benchmarked against other operators on similar usage lines in Australia.

In providing its advice to the Authority, BLL referred to the Essential Services Commission Victoria Determination RA 2/2002 of the applicable maintenance costs for comparable grain lines in Yaapeet and Hopetoun, Victoria. BLL considered that the selected Victorian grain lines represent a fair comparison for these WA grain line determinations given that:

- They are carrying similar commodities and tonnages, with a particularly good match between Hopetoun and Mullewa-Narngulu lines at 0.35 and 0.33 million gross tonnes (MGT) pa respectively;
- They are both similar construction standards of timber track, although the MEA standards for WA specifying 1:4 steel/timber sleepers is expected to reduce the WA maintenance costs;
- The topography for the selected grain lines in Victoria and WA both have similar flat to slightly undulating topography typical of grain growing areas;
- Both the Western Australian and Victorian grain tracks are similarly remote with similar issues associated with access and travel to and from these remote lines in a maintenance context;
- Both tracks represent privatised operators with shareholder needs and motivations to drive efficient maintenances costs.

BLL has also based its estimation of maintenance costs using QR's maintenance costs as outlined in Queensland Competition Authority Working Paper 2, Usage related infrastructure maintenance costs in railways, December 2000. This analysis has assessed infrastructure maintenance costs for 1998-99 and was gathered across 10 different lines in Queensland with traffic levels ranging from 0.1 to 29.2 MGT pa and tal from 16 to 26 tonnes.

Table 6 below summarises the benchmarked maintenance costs identified by the consultants.

Table 6: Summary of Benchmarked Maintenance Costs

State	Railway line	MGT	Based on efficient or actual costs	Cost per km
Victoria	Yaapeet [1]	0.16	efficient	$2,673
	Hopetoun [1]	0.35	efficient	$2,970
Queensland	1[2]	<2.00	efficient	$3,500
	2 [3]	0.00	actual	$4,373
	3 [3]	1.00	actual	$6,119
	4 [3]	2.00	actual	$8,074

Note 1 – ESC Victoria Determination RA 2/2002

Note 2 – HCS Freight Line Maintenance Review, September 1998

Note 3 – QCA Working Paper 2, Usage related infrastructure maintenance costs in railways, December 2000

Table 7 compares the maintenance costs proposed by WNR and those recommended by the Authority's consultants for the four route sections.

Table 7: A Comparison of Proposed and Recommended Maintenance Costs

Line	tal	MGT	WNR proposed Costs ($/km)	PwC and HCS recommended Costs ($/km)	BLL recommended Costs ($/km)
Avon – Goomalling	19	1.98	$ 8,729	$4,600	$5,900
Katanning – Tambellup	19	0.96	$ 8,074		$4,050
Yilliminning –Kulin	16	0.26	$ 5,946	$3,500	$2,800
Mullewa – Narngulu	16	0.33	$ 5,841		$2,950

3.3.4 Authority's comments

The WNR methodology to calculate the estimate for maintenance costs, as was previously indicated in the Regulator's Clause 9 Determination for the main lines, uses a "bottom-up" approach in the maintenance model of the APM where individual activity unit costs are applied to estimated activity levels. This approach, while capturing every item, has an inherent weakness as it does not consider technical and time efficiency and hence overestimates the maintenance cost.

The Authority is of the view that, based on the findings of the consultants, WNR has over-estimated the maintenance costs for the four route sections. These costs when benchmarked against comparable maintenance costs reported in Queensland and Victoria are similarly high.

Although PwC/HCS and BLL recommendations are not significantly different in the magnitude of their recommended reductions, the Authority has decided to accept the PwC/HCS figures based on the following reasons:

- The Authority agrees that maintenance costs do increase with increase tonnage, but believes that it is not the only variable that affects the level of maintenance that is required.

  For example, PwC and HCS has noted that in the WA grain area, the predominant drainage paths flow in a southerly direction towards the Southern Ocean in the eastern grain region and in a westerly direction towards the Indian Ocean in the northern grain region, accordingly an increase in drainage structures such as bridges and culverts will be found on those grain lines running generally east-west in the eastern grain region and on those lines running north-south in the northern grain region. Accordingly, the GRV and maintenance costs will vary depending on terrain and topography.
- While BLL has demonstrated a trend of increasing maintenance costs with increase tonnage, the data set used in the analysis was small and the resulting variance was unacceptably high.
- The WNR proposed maintenance costs did not demonstrate a similar variation for the lines within each of the two classifications as suggested by BLL.
- It is not the Authority's intention to vary maintenance costs by tonnage in this Determination, but, similar to its Determinations of the main lines and Worsley line, to determine a cost per kilometre for maintenance by the two classifications of 16 tal and 19 tal.

Accordingly, WNR will need to reduce its maintenance costs in line with the costs recommended by PwC and HCS.

Prior to the next review of the floor and ceiling costs, the Authority will reassess the availability of data from other rail regimes to ascertain the merit of setting maintenance costs by tonnages as recommended by BLL.

In response to CBH's comments on the proposed maintenance cost, the Authority does not assess maintenance cost relativity between ceiling and floor costs as it is of the view that the same relationship would not hold between the different lines with different types and levels of use.

3.4 Operating Costs, Overhead Costs and Working Capital

3.4.1 WNR's proposal

WNR has followed a similar approach to calculate operating costs, overhead costs and cost of working capital that was previously approved by the Regulator in the Determinations for the main and Worsley lines.

3.4.2 Stakeholders' comments

No comments on WNR's proposed operating and overhead costs, and working capital, were received in the public consultation process.

3.4.3 Consultants' comments

The Regulator approved the WNR proposed total operating costs in the Determinations for the main lines and the Worsley line, and allocated a share of the total operating costs to each of these lines on the basis of train movements. WNR has adopted the same calculation for the four route sections.

With regard to overhead costs, the formulae of a 50:50 split of train movements and gross tonne kilometres that was previously approved by the Regulator should be adopted for the grain lines. WNR has adopted the same calculation for the four route sections.

Working Capital has been calculated on the basis of 50 percent of the weighted average cost of capital multiplied by the annual capital value, which is consistent with the approved WNR Costing Principles.

3.4.4 Authority's comments

The Authority agrees with WNR's proposed operating and overhead costs, and working capital, for the four grain route sections.

4. Determination

The Determination of the floor and ceiling costs to apply to the four nominated grain route sections, as detailed in Attachments 1 and 2, has been made after balancing the differing needs and interests of the community, access seekers and WNR as required under Section 20(4) of the *Railways (Access) Act 1998*.

It is also consistent with the Rail Access Regulator's Costing Principles Determination dated 27 September 2002, and the Floor and Ceiling Costs Determinations dated 24 September 2003, and 15 October 2003.

The review has indicated that, in general, an acceptable level of uniformity exists in the model which is similar to that used on the previous main lines analysis. The one exception is the maintenance costs and alterations required are provided in the Attachments of this Determination.

The following table summarises the WNR's proposed and approved floor and ceiling costs for the four route sections.

Proposed and Approved Floor and Ceiling Costs for the Four Route Sections

Route Sections	Section Length	Proposed Floor Cost	Proposed Ceiling Cost	Approved Floor Cost	Approved Ceiling Cost
Avon-Goomalling	57.69 km	$117,920	$3,869,984	$60,957	$3,621,996
Katanning -Tambellup	46.71km	$54,571	$2,831,867	$30,499	$2,662,278
Yilliminning - Kulin	99.81km	$46,486	$5,520,450	$26,843	$5,264,827
Mullewa - Narngulu	103.09km	$47,939	$5,279,674	$28,179	$5,026,657

The larger difference between the proposed and approved floor costs as compared to the ceiling costs is due to the maintenance cost being a major component of the floor costs and the Authority has recommended a significant reduction in maintenance costs.

WNR will be required to amend its proposed floor and ceiling costs for the four route sections in a manner that is consistent with the Authority's determined levels as outlined in Attachments 1 and 2 to apply as from the date of this Determination. As the costs are calculated as at January 2004, WNR will be entitled to apply the appropriate CPI-X and 2004-05 WACC adjustments as approved by the Authority.

LYNDON ROWE
CHAIRMAN

5 July 2004

Attachment 1 – Summary as at 1 January 2004

Approved MEA Standard for the calculation of the Gross Replacement Value for the Grain Lines

Track Element	16 Total Axle Load (tal)	19 Total Axle Load (tal)
Rail gauge	narrow	narrow
Rail weight (kg)	31 (if 31 is unavailable, 41 is to be substituted)	41
Sleeper type and pattern	1:4 steel/timber “A” type 2100mmx225mmx115mm	1:4 steel/timber “B” type 2100mmx225mmx130mm
Average number of sleepers per kilometre	1320	1320
Fasteners	Plated curves<800 radius, non-elastic fasteners in timber	Plated timber sleepers, elastic fasteners throughout
Ballast type and depth (mm) for continuously welded rail	Gravel/Metal, 150	Metal, 150
Ballast type and depth (mm) for mechanically jointed rail	Gravel/Metal, 100	Not applicable
Average formation height (m)	1.0 including capping layer	1.0 including capping layer
Max operating speed freight (kph) loaded/empty	50/60 (subject to operating requirements)	70/80 (subject to operating requirements)

Approved Floor and Ceiling Costs

Route Sections	Total Axle Load (tal)	Gross Replacement Value	Ceiling Price	Floor Price
Yilliminning to Kulin	16	64,063,905	5,264,827	26,843
Mullewa to Narngulu	16	61,051,900	5,026,657	28,179
Avon to Goomalling	19	42,806,388	3,621,996	60,957
Katanning to Tambellup	19	31,406,473	2,662,278	30,499

General Route Section Information

Route Sections	Route Section Lengths in Km	Track Distance Lengths in Km	Number of Level Crossings	Gross Tonnes Km ‘000 (actual)		Train Movements (actual)	
				2001	2003	2001	2003
Yilliminning to Kulin	95.7	99.8	57	25,888,624	27,803,075	90	208
Mullewa to Narngulu	96.1	103.1	37	34,395,114	26,037,050	210	175
Avon to Goomalling	53.9	57.7	34	114,015,536	77,518,709	984	707
Katanning to Tambellup	43.3	46.7	22	44,610,137	65,194,851	618	814

Route Sections	Culverts	Crossing Loops in Km	Turnouts	Train Order Cabins	Self Restoring Points	Bridges	
						Quanty	Length in M
Yilliminning to Kulin	195	4.15	14	6	0	1	9.1
Mullewa to Narngulu	72	1.33	7	3	3	3	162.0
Avon to Goomalling	118	3.75	7	3	3	9	448.0
Katanning to Tambellup	57	3.38	8	6	0	8	133.0

28 June 2004

Attachment 2.1 – Route Section: Yilliminning to Kulin

	WNR proposed levels as at January 2004	Adjustments to correct errors found in the APM	Determined by Authority as at January 2004
GRV (dollars)			
Signalling cost	91,046	91,046	91,046
Communications cost	55,762	55,762	55,762
Track cost	62,375,764	63,917,097	63,917,097
Total	62,522,572	64,063,905	64,063,905
Progressive percentage change		2.5	0
Ceiling Price Schedule			
Capital cost	4,601,202	4,738,468	4,738,468
Maintenance cost	611,879	604,951	349,328
Cost of Working Capital	158,741	163,477	163,477
Operating cost	2,107	2,107	2,107
Overhead cost	11,447	11,447	11,447
Total	5,385,376	5,520,450	5,264,827
Progressive percentage change		2.5	(4.6)
Floor Price Schedule			
Capital cost		0	0
Maintenance cost		46,486	26,843
Operating cost		0	0
Total	54,852	46,486	26,843
Progressive percentage change		(15.3)	(42.3)

Note: Numbers in brackets represent reductions

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Attachment 2.2 – Route Section: Mullewa to Narngulu

	WNR proposed levels as at January 2004	Adjustments to correct errors found in the APM	Determined by Authority as at January 2004
GRV (dollars)			
Signalling cost	1,155,987	1,155,987	1,155,987
Communications cost	98,135	98,135	98,135
Track cost	59,027,111	59,797,778	59,797,778
Total	60,281,233	61,051,900	61,051,900
Progressive percentage change		1.3	0
Ceiling Price Schedule			
Capital cost	4,417,890	4,488,407	4,488,407
Maintenance cost	621,000	613,836	360,818
Cost of Working Capital	152,417	154,850	154,850
Operating cost	4,916	4,916	4,916
Overhead cost	17,666	17,666	17,666
Total	5,213,889	5,279,675	5,026,657
Progressive percentage change		1.3	(4.8)
Floor Price Schedule			
Capital cost		0	0
Maintenance cost		47,939	28,179
Operating cost		0	0
Total	58,458	47,939	28,179
Progressive percentage change		(18.0)	(41.2)

Note: Numbers in brackets represent reductions

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Attachment 2.3 – Route Section: Avon to Goomalling

	WNR proposed levels as at January 2004	Adjustments to correct errors found in the APM	Determined by Authority as at January 2004
GRV (dollars)			
Signalling cost	1,174,573	1,174,573	1,174,573
Communications cost	208,098	208,098	208,098
Track cost	40,653,050	41,423,717	41,423,717
Total	42,035,721	42,806,388	42,806,388
Progressive percentage change		1.8	0
Ceiling Price Schedule			
Capital cost	3,089,340	3,158,248	3,158,248
Maintenance cost	517,469	513,362	265,374
Cost of Working Capital	106,582	108,960	108,960
Operating cost	23,034	23,034	23,034
Overhead cost	66,380	66,380	66,380
Total	3,802,805	3,869,984	3,621,996
Progressive percentage change		1.8	(6.4)
Floor Price Schedule			
Capital cost		0	0
Maintenance cost		117,920	60,957
Operating cost		0	0
Total	137,746	117,920	60,957
Progressive percentage change		(14.4)	(48.3)

Note: Numbers in brackets represent reductions

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Attachment 2.4 – Route Section: Katanning to Tambellup

	WNR proposed levels as at January 2004	Adjustments to correct errors found in the APM	Determined by Authority as at January 2004
GRV (dollars)			
Signalling cost	80,881	80,881	80,881
Communications cost	232,925	232,925	232,925
Track cost	30,211,906	31,092,667	31,092,667
Total	30,525,712	31,406,473	31,406,473
Progressive percentage change		2.9	0
Ceiling Price Schedule			
Capital cost	2,242,503	2,320,575	2,320,575
Maintenance cost	387,742	384,464	214,875
Cost of Working Capital	77,366	80,060	80,060
Operating cost	14,466	14,466	14,466
Overhead cost	32,302	32,302	32,302
Total	2,754,379	2,831,867	2,662,278
Progressive percentage change		2.8	(6.0)
Floor Price Schedule			
Capital cost		0	0
Maintenance cost		54,571	30,499
Operating cost		0	0
Total	67,720	54,571	30,499
Progressive percentage change		(19.4)	(44.1)

Note: Numbers in brackets represent reductions

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