SAMROM

Rail Operations, Planning and Management

COWRA RAIL LINE NETWORK REVIVAL STUDY

STAGE 2 REPORT

Review of the freight traffic task available for transport by rail in the Cowra district, a strategy for rehabilitating the track and structures to a fit-for-purpose standard and an economic assessment of the benefits accruing to the community associated with the resumption of rail freight services.

Report prepared for the
Shires of Blayney, Cowra, Harden, Young and Weddin
by
SAMROM and Associates

SAMROM Pty Ltd
ABN 11 069 687 841
P.O. Box 279
Potts Point, NSW, 1335

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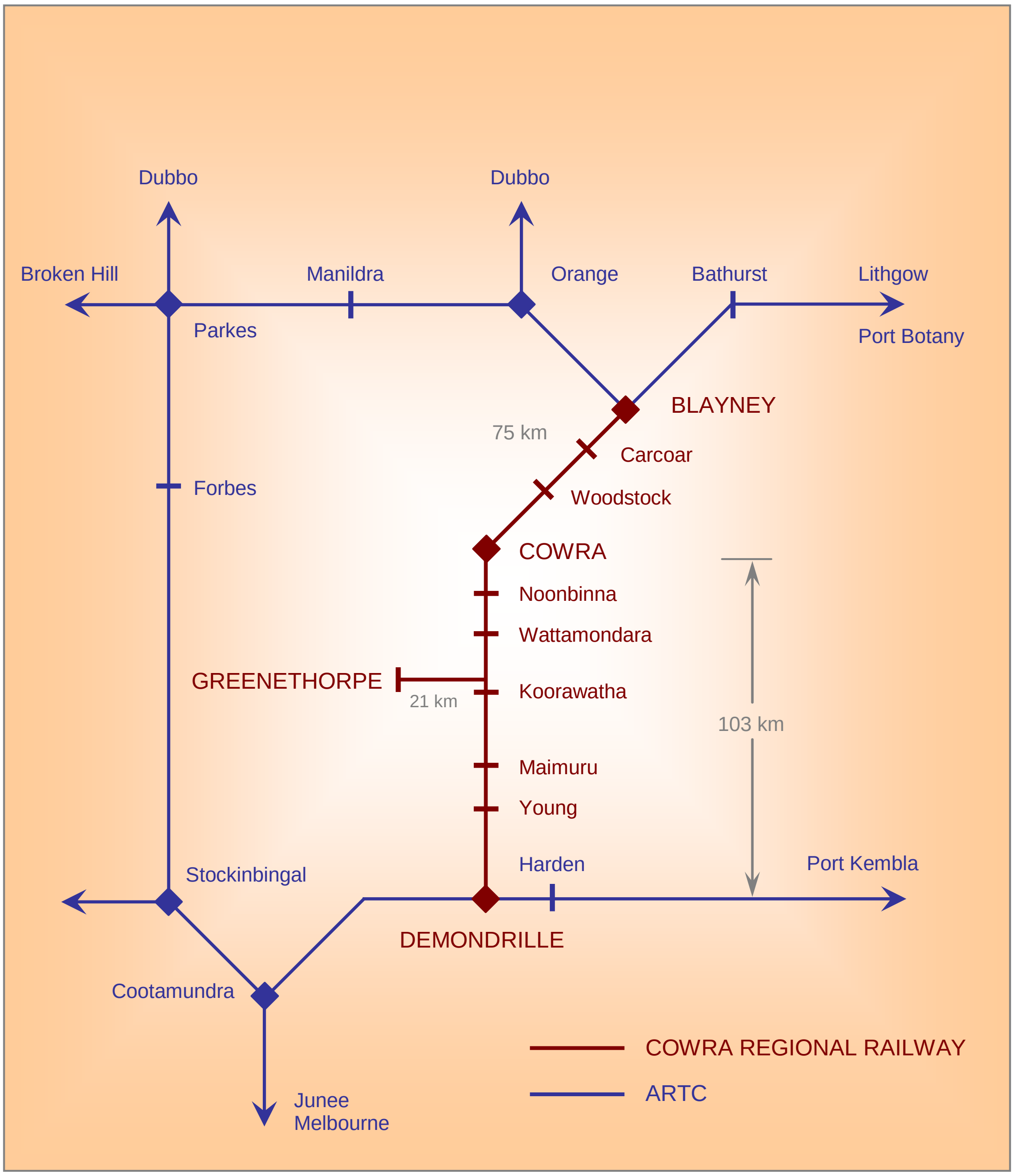

Location of Proposed Cowra Regional Railway

Front cover: Belubula River bridge near Carcoar

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EXECUTIVE SUMMARY

The Shires of Blayney, Cowra, Harden, Young and Weddin commissioned SAMROM Pty Ltd and associates to undertake a preliminary study of the prospects for revival of the Cowra Rail Network early in 2009. The Stage 1 report, delivered in May 2009 identified sufficient traffic, other than the traditional grain task, to provide some confidence that a viable regional rail operation might be possible. This report was largely based on a desktop approach with relatively little investigation or validation of issues such as business potential, infrastructure condition and operational issues.

Stage 2 was commissioned late July 2009 and was directed towards substantiation of the initial findings and a much more comprehensive evaluation of the project as a whole.

A site visit to the region by the project team early in September was undertaken with the dual function of thoroughly inspecting the whole of the rail network (all of which to the south of Cowra was ‘service suspended’ from the start of September) and conducting a detailed and wide ranging series of interviews with industry and other potential rail users in the region. From this, a detailed inventory of the infrastructure was compiled along with a restoration program and a longer term plan to reduce infrastructure costs to a sustainable level appropriate to the traffic on offer.

The major physical issues for revival of the railway are the condition of several timber bridges, substitution of steel for a proportion of timber sleepers (which currently comprise 80% of the sleepers on the line), clearance for containers through the Carcoar tunnel and level crossing sight lines. Of these, the bridges and sleepers represent the major issues, both for initial restoration and ongoing maintenance costs.

There are 17 timber structures on the line ranging from small single span structures to the impressive 10 span bridge over the Belubula River. Some of these are in poor condition and three would need significant restoration or replacement before train services could resume. From then on there should be a program, based on condition, to restore or replace all the timber structures on the line with structures of more durable material (steel and/or concrete), or culverts and inverts, as appropriate. Such a program has been proposed in a capital plan over a ten year period.

An initial infusion of steel sleepers will be required to restore the Cowra – Blayney section, but after that, replacement of a further 32,000 timber sleepers with steel every five years for the next twenty years would retain the track in a ‘fit for purpose’ condition whilst concurrently reducing recurrent maintenance costs to a sustainable level.

The Carcoar tunnel is reputed to have inadequate clearance for standard height (9 ft 6 in) shipping containers carried on conventional container wagons. This issue has yet to be fully assessed and it is important that a tunnel survey be undertaken at an early date to determine the extent of the problem and best method of clearance enhancement. A provisional capital allocation has been included for potential remediation of the tunnel issues pending the survey being undertaken.

Level crossings on the line are numerous, but the majority are for local access to private property. A capital allocation has been included to improve sight lines at crossings and ensure they comply with current standards in all other respects.

The business analysis indicated that two major traffic flows could be confidently expected to shift to rail if the appropriate terminals and train services were provided. A critical factor will be for train services to operate under conditions of maximum practical efficiency. This is essential in order that price competitiveness can be achieved on an ongoing basis relative to the road alternative. In turn, this will require effective utilisation and productivity of key operational resources, especially rolling stock and train crew.

A potential bulk grain task of 100,000 tonnes per (average) year for export and 155,000 tonnes per year for mainly local domestic consumption (for flour and stock food) was identified. In addition an achievable container task involving almost 12,000 loaded containers per year, primarily for export, was identified. The grain task would involve a single train set which would run from storage facilities on the line to Port Kembla, Young, Blayney, Bathurst and Manildra. This train would run over all sections of the Cowra rail network. A second train, for containers, would shuttle between Cowra and Blayney to interchange with existing export container trains to Port Botany in Sydney. This train would run on weekdays from a terminal to be established in the Cowra area. In time it is anticipated that the train would be extended to run from Young to pick up output from the revived Young Mill.

A survey of suitable sites for a container terminal at Cowra identified a startup site at the north end of the existing Cowra rail yard, with longer term higher capacity site options both north and south of the town. The startup site would suffice to get the container traffic operational and to a level where the operation is viable overall. The container terminal would need to be a commercial operation from the outset on a standalone basis, including provision of appropriate container handling equipment.

Rail operations would initially require a relatively low level of resources. A small fleet of five leased 2000 HP class locomotives, along with 24 bulk grain wagons would enable train services to operate. Containers would be handled on wagons provided by the main line interchange operator, with a suitable adjustment to the revenue split to reflect cost sharing.

Evaluation of the proposed train operation indicates that this aspect of the business should be able to return a modest profit, even after paying higher than normal track access fees designed to cover the recurrent costs of “best practice” routine infrastructure maintenance. The capital costs of major bridge rehabilitation or replacement, track upgrading by way of initial and periodic steel sleeper insertion, Carcoar tunnel clearance enhancement and level crossing upgrading would need to be funded by government by way of initial and subsequent capital grants.

After bringing these together, along with externality benefits (social costs such as crash trauma, environmental hazards etc which cannot be collected through freight rates or track access fees) the Net Community Benefit is quite substantial – an Net Present Value (NPV) of $4.9 million (evaluated at a discount rate of 10%), Internal Rate of Return (IRR) of 22.5% and a Benefit Cost Ratio (BCR) of 1.28. Given the conservative nature of the evaluation these results are considered to be reasonably robust.

The conclusion from this more detailed study of the potential of the Cowra Rail network is that, appropriately restored and operated, the revived railway has good prospects of being a viable low volume ‘fit for purpose’ operation that has a long term future. It is suspected that the Cowra railway has considerably greater freight business potential than other regional lines that are primarily reliant on the movement of export grain.

The next steps need to be the development of a full Business Plan and an engineering survey of the Carcoar tunnel, both of which will require support of Government. At a slightly later stage, a full engineering survey of all bridges and level crossings will also be required.

In parallel, a representative steering group should be established to oversee development of the Business Plan, a restoration plan and appropriate processes leading to the establishment of suitable rail and terminal operators.

1. INTRODUCTION

This report seeks to extend and quantify the opportunities for rail freight traffic to and from the Cowra region uncovered in our earlier Stage 1 report[1]. This has required a detailed survey in the area, interviewing prospective rail freight providers, undertaking field inspections of the rail network and development of a practical basis for implementing a revived rail operation.

Discussions have indicated that retention of infrastructure ownership in State hands would avoid many potential risks and costs whilst the demanding requirements of the Rail Regulator would also be a major issue should ownership or effective control of the infrastructure shift away from the existing arrangements. As a consequence, this report has followed a more conservative line in regard to infrastructure, with emphasis on the above rail operations and what we regard as an appropriate business model for the Cowra regional railway.

Release of the much anticipated NSW Grain Freight Review[2] by the Commonwealth Department of Infrastructure, Transport, Regional Development and Local Government late in October 2009 contained a number of specific recommendations in regard to the Cowra rail network which have been taken on board and are consistent with the approach taken in this report. Many of the Grain Review recommendations (in regard to regional rail in general) also have an affinity with the objectives of this study and as such provide synergy with this report.

This report details the state of the infrastructure, identifies a range of rail freight opportunities and proposes an operating and business model that would be appropriate to the revival of the Cowra rail network. Staging of capital works required to revive and stabilise the infrastructure, such that it minimises risk to the track owner while providing a workable rail operation to prove the concept, is a fundamental to the strategy outlined in this report.

Consultants engaged in this study are Max Michell (Operations and Planning), John Hearsch (Management and Government; peer group review), Prof. Philip Laird (Externalities), Geoff Smith (Terminals, loading and track) and Frank Lander (Business and Analysis). This group was coordinated through SAMROM Pty Ltd, the company associated with Max Michell.

Rebuilt Waugoola bridge

[1] Rail Line Revival Proposal – Blayney to Demondrille – Stage 1: High level review, analysis and proposals – Samrom Pty Ltd and Associates, May 2009 for the Shires of Blayney, Cowra, Harden, Young and Weddin.

[2] New South Wales Grain Freight Review – September 2009 – Department of Infrastructure, Transport, Regional Development and Local Government, Canberra ACT.

2. STAGE 1 REPORT OUTCOME

Stage 1 of this study was completed during May 2009, and reported that there is sufficient potential rail traffic, other than the traditional grain traffic, to warrant a more detailed investigation. The Executive Summary to Stage 1 summarised the situation at that time – an edited version is reproduced below to set the scene as it was at the start of the Stage 2 investigation.

> *Five Shires in the Central West of NSW commissioned this study to look for viable options that would allow the local regional railway centred around Cowra to continue to operate as a valuable contributor to regional transport requirements.*
>
> *The rail network located in the Cowra area between Blayney in the north and Harden in the south comprises almost 200 km of operating track, including a 21 km branch line. All but the branch line have been constructed and generally maintained to a higher standard than normally applies on secondary regional lines and as such has a higher capability than might normally be expected.*
>
> *The only remaining freight traffic on this network is grain from a cluster of GrainCorp silos near the mid-section of the line. The branch line serves a single silo that has a relatively large throughput. In an average year rail would carry around 90,000 tonnes off this line, running via Harden to access either Port Kembla or any one of a number of domestic mills or stockfeed manufacturers. Recent harvests have been poor, mainly due to drought, so the immediate prognosis for the line is not good*
>
> *The status of this line as 'grain only' is a result of a deliberate policy of some years ago. This policy was basically an easy way out for the then incumbent operator and ignored the fact that there are a number of quite substantial freight traffic movements from within the area which should be able to be carried on rail with the right alignment of circumstances. The relatively quick overview provided in the very short time available for this stage of this Stage of the Study indicates that somewhere between 20 and 110 container loads per day move out of the area, all of which could be attracted to rail with the right combination of facilities, service and pricing. There is also some prospect of bulk traffic which could be amenable to bulk train operation.*
>
> *The track is owned by the State through the Country RIC, it is managed and maintained by ARTC and is operated by Pacific National (although other operators can and have run on the line). None of these entities have any permanent presence in the area – they are all basically 'fly in, fly out' as required and have no particular allegiance to or empathy for the issues involved. The only direct local involvement is from the Lachlan Valley Tourist Railway, based in a potentially very useful facility at Cowra and who operate tourist trains around 70 days each year. Their contribution of tourist income to the township and track access fee income to the track owners is quite substantial.*
>
> *This report examines a "fit for purpose" approach to track and train operations which would require a changed concept for managing and operating the railway, inclusive of much greater local involvement. Given the prospect of additional, non seasonal freight and the essential requirement to operate the line at the lowest practicable cost consistent with safety and good customer service, a concept structured around these principles appears likely to be the appropriate way forward in order to give the rail line a sustainable future.*
>
> *Three graduated but practical options have been developed, ranging from relatively quick and easy but high risk through to difficult, but with greater certainty of success. The option favoured by the consultants is one that essentially creates a Community Railway that would be effectively owned and operated by the people with potentially the most to gain and hence what should be the greatest interest in retaining the line.*

> *The issues involved in getting to an operating Community Railway should not be underestimated, with a number of legislative, regulatory, operational, financial and cultural hurdles that will need to be resolved over a period of time. A staged Project Managed approach is recommended as the most likely way to achieve a sustainable Community Railway outcome.*

Since Stage 1 was completed there have been a number of developments which have refined the organisational and operating proposals contained in this report – key among these has been the NSW Grain Freight Review with its recommendations that proposes a policy approach to grain lines that aligns effectively with the objectives of this study.

3. INFRASTRUCTURE REVIEW

3.1 LINE SURVEY

Arrangements were made with CountryRail (Country RIC) to inspect all of the lines concerned over two days – 2nd and 3rd September 2009. Inspection was by hi-rail vehicle (4WD fitted with rail guide wheels) with stops at locations of interest for a closer view. Timber bridges were a particular issue and all but a couple of very minor openings were inspected. The Carcoar tunnel was likewise inspected by walking through using the lights of the following hi-rail to illuminate the way. The following sections are largely based on these inspections and on site appraisal of track and structure condition.

It should be noted that the conclusions drawn from the inspection need to be treated with caution. For some assessments, such as track condition and the positioning of steel sleepers, the issues are clear cut, but for others, particularly the condition of timber elements in timber bridges, there will need to be a far more detailed and intrusive survey of the structures to be confident of the conclusions. Having said that, the assessed condition of bridges was reinforced by the prior local knowledge of the accompanying CountryRail engineer (Geoff Clark), backed up by a general visual assessment of the bridge structure and wing walls – where these were looking decidedly in need of repair or replacement or patched with expedient non standard 'band-aid' work, the assumption was made that these were representative of the condition of the structure concerned as a whole.

At the time of the inspection, the Blayney – Cowra section had been out of use for more than two years, whilst the remainder of the line south of Cowra to Demondrille and from Koorawatha to Greenethorpe had been placed on 'service suspended' status from 1st September 2009 (the day prior to the inspection)

3.2 INFRASTRUCTURE CONDITION

3.2.1 Track

In general the track between Blayney and Demondrille is in reasonable condition. Rail is predominantly 80 lb/yd (40 kg/m) in 12.2 metre (40 foot) lengths with staggered joints. There is a small amount of 47 kg/m rail (mainly at bridges and through the Carcoar tunnel) and only a small length of track is welded into longer rail sections. Rail on the Greenethorpe branch is 60 lb/yd (30 kg/m) rail as is normal for Class 5 lines. Track condition is adequate with a reasonable number of steel sleepers and some ballast along the length of this line.

Track with mixed steel and timber sleepers

All track was almost entirely timber sleepered until the late 1990's but since then a considerable number of steel sleepers have been inserted, particularly south of Cowra and on the Greenethorpe line. The estimated numbers of steel sleepers installed so far is shown in Table 3.1 below.

Overall, the track is in fair to good condition and generally fit for purpose, with relatively little degradation evident even on the Blayney – Cowra section which has been out of use for over two years.

Table 3.1: Summary of Steel Sleepers In Track and Future Requirements

Section	Length (km)	Total No. Sleepers (a)	No. Steel Sleepers (c)	% of Steel Sleepers	No. steel @ each 5 yr cycle (d)	No. Joint Sleepers (f) (g)
Blayney-Cowra	75.0	120,000	17,500 (b)	14.5%%	11,000 (e)	27,760
Cowra-Koorawatha	28.6	45,760	8,400	18.4%	5,400	10,580
Koorawatha-Demondrille	74.4	119,040	27,600	23.2%	12,700	27,540
Koorawatha-Greenethorpe	21.4	34,240	11,000	32.1%	2,900	7,920
TOTAL LINE	**199.4**	**319,040**	**64,500**	**20.2%**	**32,000**	**73,800**

Note:
- (a) Estimate based on actual average of 1600 sleepers/km (standard is 1666/km).
- (b) No accurate records available – estimate based on inspection of line.
- (c) Majority of steel sleepers installed in 5 year period 2004 – 2009.
- (d) Based on 32,000 timber sleepers being replaced with steel sleepers in each 5 year cycle.
- (e) Excludes 17,500 steel sleepers proposed to be installed as part of track restoration
- (f) Sleepers either side of each rail joint – required to be timber at present.
- (g) Assumed to be the last timber sleepers replaced by steel.

3.2.2 Bridges

The line generally runs across the lie of the land (the Western Slopes) and so encounters quite a number of watercourses, streams and rivers. There are a number of bridges but it would appear that a number cross gullies that have relatively small catchments – a bridge presumably being the cheapest option at the time the line was constructed as compared to a large amount of fill to form an embankment if some form of culvert or pipe had been used.

Virtually all bridges, apart from the main span over the Lachlan River at Cowra, were originally of ballasted deck timber construction and a considerable number remain in that configuration, with some in relatively poor condition. There has been a program of bridge replacement in steel and concrete, mainly focused on the Cowra – Demondrille section, with a combination of bridging and pipes being used. The remaining timber bridges are listed in Table 3.2 below. Of the 17 timber bridges noted, 10 were in the Blayney – Cowra section, including the largest bridge on the line. However the general observation was that considering the line's location astride the Western Slopes, the number and size of bridges was less than might be expected.

Poor condition of bridge at 349.6 km

Table 3.2: Summary of Timber Bridges and Priority for Replacement

Location (km post)	Spans	Height (b)	Condition	Priority for rehabilitation or replacement	If Renew, then as ...
BLAYNEY TO COWRA					
293.51	1	Low	poor	Short term	Pipe
301.57	6 (400 m curve)	High	very poor	Immediate	Multi layer pipes
308.3 Belubula River	10	High	Good to fair	Medium term	Bridge
313.56	5 (800 m curve)	Medium	poor	Immediate	Bridge
317.37	5	Medium	3 sp fair, 2 sp poor	Short term	Bridge
320.65	1	Low	fair	Medium term	Pipe
324.82	4	Medium	fair	Medium term	Bridge
326.46 (a)	2 (propped mid span)	Medium	poor	Short term	Bridge
349.62	4	Low	Poor	Short term	Bridge
352.49 (a)	3 + 1 (steel on brick)	Low	Transoms poor, rest good	Transoms now	n/a
COWRA TO KOORAWATHA					
369.93	1 (road opening)	Low - 2 m clear	Poor	Short term	Invert (140 m south of L/Xing)
382.68	3	Low	poor	Short term	Pipes
KOORAWATHA TO DEMONDRILLE					
423.38	7 (incl road under)	High	poor	Immediate	Multi layer pipes
439.4	3 (road opening)	Medium	unknown	Medium term	Bridge (or inverts?)
KOORAWATHA TO GREENETHORPE					
395.9 (a)	7 (many piles spliced)	Medium	Good but improve lateral stability.	Medium term	Bridge or multi layer pipes
406.7	1 (longitudinal log supports)	Low	reasonable	Short term	Pipe
409.8	1 (timber on concrete)	Low	fair	Medium term	Pipe

Note (a) Transom top
(b) Indicative Bridge height – **low** = up to 4 m; **medium** = 5 – 9 m; **high** = 10 m or more.

3.2.3 Over Bridges

There are only eight overbridges with all but one being in the short section between Young and Demondrille. The 'stray' is at 313 km between Carcoar and Mandurama. Two bridges in Young are newly rebuilt in concrete, the Young Road bridge at Demondrille is masonry, while the remainder are standard timber structures in varying condition. These are listed in Table 3.3 below.

Table 3.3: Summary of Road over Rail Bridges

Location (km post)	Construction	Road
313.00	timber	Local access
440.44	concrete and steel	Olympic Way (Young)
440.65	concrete and steel	Boorowa Road
448.00	timber	Kingsvale Road
453.70	timber (high)	Bonnington Road
461.50	timber (high)	Chappell farm access
464.90	timber	O'Keefe's farm access
467.40	masonry	Young Road (Demondrille)

Maintenance of road over rail bridges is a railway responsibility. Each of the above structures, albeit in varying condition, is currently in use for road traffic, some with weight restrictions. As such, for this report they have been deemed to be fit for purpose.

3.2.4 Carcoar Tunnel

There is one tunnel on the line piercing the ridge just south of Carcoar. This tunnel, at 310.6 km, is on a rising grade of 1 in 88 southbound and on a 480 metre radius curve. It is 281 metres long. Track in the tunnel is 47 kg/m rail on good (relatively new) timber sleepers that look to have been installed on a face possibly 8 - 10 years ago. The interior of the tunnel is concrete lined and looks to be quite dry.

Carcoar tunnel
North entrance

3.2.5 Sidings and Loops

The Cowra line has a very limited range of intermediate sidings and loops that remain intact, apart from Cowra itself which has an elaborate and mainly operational yard and servicing facilities. In recent years the only places where trains could meet were at Blayney, Cowra, Koorawatha and the main line at Demondrille. The facilities at Koorawatha are primarily related to the junction for the Greenethorpe branch (and the need to reverse grain trains there) rather than for trains to actually meet there. The limited train running involved with 'grain only' activities and the Lachlan Valley Railway tourist operations did not require any greater facilities than this.

Table 3.4 below sets out the existing facilities as they were at the time of the inspection.

Table 3.4: List of Locations with Sidings or Loops

Station	Location (km post)	Facility	Condition
Blayney	290.4	Junction	Functioning
Carcoar	309.8	Loop and goods siding	Mostly disabled
Woodstock	347.0	Grain loop	Out of use
Holmwood	359.2	Grain loop and goods siding	Out of use
Cowra	365.5	Large yard and facilities	Mostly operable
Cowra Silo	369.5	Several sidings	Operable
Cowra Stockyard	370.2	Twin loops	Mostly removed
Noonbinna	374.9	Grain loop	Operable
Wattamondara	381.7	Grain loop	Out of use
Koorawatha	393.6	Grain loop and junction	Operable
Bendick Murrell	409.9	Grain loop	Out of use
Maimuru	432.9	Grain loop	Operable
Young, Roller Mill	440.0	Dual mill sidings	Disabled
Young, Causmag	440.8	Dead end siding	Operable
Kingsvale	456.9	Grain loop	Out of use
Demondrille	468.0 (a)	Single turnout from northbound main line	Functional
Harden	473.9 (a)	Small yard	Operational junction for Cowra line
Greenethorpe	414.9	Grain loop	Operable

Note (a) Demondrille is 391.5 km via the southern line, equivalent to 468.0 km via Cowra
Harden is 385.6 km via the southern line, equivalent to 473.9 km via Cowra.

3.2.6 Level Crossings

There are a large number of level crossings that officially exist on the Cowra line although not all are likely to remain in use or still be required. Table 3.5 sets out the numbers of level crossings on each line section, sub-divided according to whether they are public roads or for access to private property. Public road level crossings are further sub-divided into those with active protection (generally flashing lights and bells automatically actuated by the approach of trains) or passive protection only in the form of standard signage including either stop or give way signs.

Table 3.5: Details and numbers of Level Crossings

Line section	Public roads with passive protection	Public roads with active protection	Private property access
Blayney – Cowra	18	2	40
Cowra - Demondrille	28	3	21
Koorawatha - Greenethorpe	11	nil	12

Prior to the Cowra – Demondrille line being classed as 'service suspended' there were a large number of level crossing sighting speed restrictions in force. At the time of the inspection the speed restriction signs had been removed so there was no visible evidence of the restrictions and their location. On the other hand temporary speed signs on the long closed Blayney – Cowra line were still in place but the ravages of time had played a part in moving and even removing some such that it was impossible to discern any sighting issues on that section.

Level crossing sighting distances are determined in relation to train speeds and road orientation and sighting lines to the rail track. There are 52 level crossings between Cowra and Demondrille and there are notionally 60 between Blayney and Cowra. The majority of these crossings are listed as farm access type crossings, but 20 in total are now proper public roads with maybe 10 being sealed roads.

Resumption of train running will require an audit of all level crossings with the objective of establishing an action plan to remove or ease the restrictions on train running arising from sub-standard level crossing sight lines. Level crossings at the foot of hills and dips, and in other places where momentum is important to train running, will need to be given priority.

3.3 INFRASTRUCTURE CONDITION AND RECTIFICATION

3.3.1 Track

Whilst the track overall is in generally fair condition, steel sleepers have been inserted according to need and not in any set pattern. This has resulted in some areas where there a large numbers of steel sleepers over short distances, whilst in other locations (particularly in hard to get at places such as narrow cuttings) there are few if any steel sleepers. Across the whole line an average of 1 in 5 sleepers are now steel, but in a random distribution rather than any pattern.

The advantage of steel sleepers is that they have a very long life and will hold gauge much more reliably than timber sleepers. However to get the best advantage they should be placed in a regular pattern (usually 1 in 4 sleepers) to hold gauge at consistent intervals leaving the intermediate timber sleepers as bearers to support the rail until such time as they too are replaced.

It would be desirable to progressively complete the process of inserting steel sleepers on a 1 in 4 pattern as early as reasonably practicable, with priority given to the Blayney – Cowra section which requires more attention than the track to the south of Cowra. This would allow a relatively low cost and fairly predictable maintenance program to be implemented. To this end, it is proposed that a minimum 1 in 4 pattern be created by insertion of additional steel sleepers to achieve this result - in effect the plan would be to have no more than three timber sleepers between adjacent steel sleepers.

In some cases (such as narrow cuttings and in the tunnel) where there is a face of timber sleepers in consistent condition, it is proposed that existing sleepers be replaced by a 'face' of steel sleepers when the existing timber sleepers have deteriorated. This is to avoid having to return to these difficult locations once any steel sleepers have been installed.

3.3.2 Timber Bridges

There are several timber bridges which are in a sufficiently poor condition that they will need major repair or replacement prior to reopening of the railway for freight traffic. The three bridges in this category are at 301.57 km (near Stanfield), 313.56 km (between Carcoar and Mandurama) and 423.38 km (south of Monteagle). Based on site evidence, survey maps and Google Earth searches it would appear that the bridge at 313.56 km would best be replaced by a new structure, while the other two appear to have small upstream catchments and look to be appropriate for a multi-layered pipe or suitably sized invert treatment.

All three bridges are on curves. A new bridge at 313.56 km may be able to be relocated slightly upstream of the present bridge and straightened (using sharper curves on each approach), while the other two would become embankments where the curvature would be of no consequence. The bridge at 423.38 km has an unmade access road underneath which should be able to be retained using an invert section or large diameter pipe.

The curious small opening at 352.49 km (near Westville) has direct rail fixation to timber transoms on steel girders. The 30 transoms are in poor condition and it is recommended that these be fully replaced prior to recommencement of train running, setting this structure up for minimal maintenance for a long period of time. This work is estimated to be in the order of $40,000 which is minor in the overall scheme of things.

Typical small timber opening at 293.5 km

Beyond the initial work to the above four bridges there should be an ongoing program of bridge replacement over a number of years to eliminate all of the remaining timber structures. Five or six of these remaining structures look to be relatively simple installations of a pipe or invert, which leaves around 7 or 8 structures that should involve a bridge replacement. The recommended approach would be to deal with the pipe/invert issues when they become due for attention, while the remaining bridges would ideally be replaced with a rolling program of (nominally) one replacement per year. The alternative would require ongoing maintenance effort involving progressive replacement of individual timber structural components.

Condition of the existing structures may well require a change in priority and/or timing but this can only be determined with more detailed analysis of the existing bridges.

3.3.3 Carcoar Tunnel

The tunnel and track within it look to be in good condition. However there are indications that the tunnel dimensions are inadequate for standard height shipping containers (9 ft 6 in) when conveyed on normal flat wagons – estimated to be a clearance deficiency of around 70 - 100 mm. The actual detail of the tunnel clearances can only be confirmed with a tunnel survey (estimated cost in the region of $10,000), after which a strategy to achieve adequate clearance can be developed.

The reported infringement is sufficiently small that a solution is likely to be found that is relatively low cost if the survey confirms the scale of the issue. It is recommended that a detailed tunnel survey be given high priority, since the tunnel issue has the potential to be a 'show stopper', containers being the potential core business for a regular freight service on this section of line.

3.3.4 Sidings and Loops

The remaining facilities are a function of the type and intensity of traffic operated over the line in the last 10 years or so. Establishment of 'daily' freight operations would require a review of these facilities, although this can only be determined in detail when actual train timetables are established – a matter for the future.

There are a number of locations where crossing loops and/or goods sidings might usefully be retained and/or installed but at this stage these would depend on getting a firm commitment to traffic on rail. However there certainly would be a need for terminal (loading and unloading) facilities at Cowra and in the short term this is likely to involve some minor track alterations in Cowra station yard.

It is possible that some form of crossing facility will become desirable, both north and south of Cowra. Some sidings that are now derelict may need to be revived (e.g. the Young Roller Mill Sidings), while in other cases some additional trackage may be required to make existing track functional (e.g. a run round loop is likely to be required in the Young area to allow shunting of the Causmag Siding).

Disused sidings at Young Mill

3.3.5 Level Crossings

It would be advisable to have an early level crossing audit so that a remediation plan can be developed to remove or ease the previous sighting speed restrictions and to ensure compliance with current standards. These restrictions played havoc with efficient train running in the recent past and if a future scheduled service, interfacing with other services at Blayney or Harden, is to be reliable, level crossing speed restrictions will have to be minimised.

3.4 LOW COST MAINTENANCE PLANNING

At present the high proportion of timber sleepers and the considerable number of timber bridge structures mean the line is relatively high cost to maintain. In fact, the progressive closure of the line has been driven by deterioration of key bridges. At the same time, a large number of steel sleepers have been installed in the 5 years since 2004 amounting to around 20% of the total sleepers on the line. This has been a significant factor in retaining reasonable quality of track. The ideal railway of this type would have 100% steel sleepers and all of the timber bridges would have been replaced with bridges in more durable materials, pipes (culverts) or inverts, as appropriate to each particular situation.

The existing recorded maintenance cost is confused by including accrued maintenance as a result of a long period of under-funding regional lines. However based on a 'best practice' approach it is likely that fit for purpose maintenance on this line, after accrued maintenance has been discounted, would currently be in the order of $12,000 / km / year or approximately $2.4 million per annum. Progressive installation of steel sleepers, along with eventual replacement of all the timber bridges, would most likely bring this figure down to around $5,000 / km / year, mainly as a result of eliminating the major recurrent expenditure on repairs and ad hoc renewals.

The financial evaluation of future "below rail" operations (see Section 11) adopts the latter figure for ongoing routine maintenance on the basis that the early insertion of sufficient steel sleepers and reconstruction or major rehabilitation of bridge structures are treated as capital expenditures. It will be noted that progressive addition of steel sleepers to the track in an affordable cyclic program will leave only an average of 1 in 3 sleepers in timber by 2030 – a tolerable situation for a 'fit for purpose' regional line. Ongoing insertion of steel sleepers will in time provide a 100% steel sleepered railway.

The future low maintenance railway would retain the existing rail (which at low traffic volumes should require minimal replacement), have 100% steel sleepers and long life bridge structures and level crossings. The basis for the restoration and stabilisation plan and follow on progressive improvement is to reach this low cost status.

3.5 MANAGEMENT AND OWNERSHIP ISSUES

In the Stage 1 report, the view was expressed that a lease or ownership of the track by a regional railway might be an appropriate strategy. Since then there have been a number of developments, including release of the NSW Grain Freight Report, which have tended to point to an alternative strategy.

It became evident as this Stage of the study progressed that there would be a large number of property management, legal, financial and regulatory issues which would make excision of the track from its existing owner a relatively risky and drawn out process with possible unexpected and undesirable consequences. Hence, it was concluded that it would be prudent to leave the track with the current owner (CountryRail) and concentrate on the operational and commercial aspects of the project. Suspension of services on the remaining trafficable part of the network from the beginning of September 2009 brought the timing of the revival of the Cowra rail network into sharper focus.

A key issue for infrastructure will be coordination between that function and the operation of trains. It is proposed that a general line speed of (say) 60 km/h be adopted, with speed ramps to a higher speed (70 or 80 km/h) at the bottom of dips where momentum can be used to conserve fuel and save on brake wear. Temporary speed restrictions and sighting speed restrictions approaching difficult level crossings will need to be managed to avoid disrupting train schedules any more than absolutely necessary.

Work on track involving major work, such as bridge replacement or renewals, should be coordinated so that as many tasks as possible are completed during the time that the line is disrupted by major work . This close linkage between infrastructure, operations and business requirements is critical to achieving the reliability and efficiency that is fundamental to the survival of the regional rail business.

4. TRAFFIC REVIEW

4.1 FREIGHT BUSINESS

For a decade or more the Cowra railway has been categorised as 'grain only' and has handled varying quantities as determined by seasonal conditions and domestic grain requirements. A recent succession of drought years has resulted in minimal rail activity and has been a contributor to the decision to 'suspend services' on the line.

Trains have been run by FreightCorp and Freight Australia in the past, both now being part of the Pacific National enterprise owned by the Asciano Group. None of the operators in the last two decades have actually had a presence 'on line' – rather they have worked trains from remote depots onto the line as required to the order of grain management companies that were also generally based remotely from the region[3].

4.2 ANALYSIS OF FREIGHT MARKET

4.2.1 Potential Customer Perceptions

During the period 1st – 8th September the study team visited a large number of businesses and key people in the district extending from Harden and Cootamundra in the south to Blayney and Bathurst in the north and east. These represented local manufacturing enterprises, those involved in the grain and primary produce industries, the minerals industry and local government.

All expressed a keen desire to see an effective railway established in the Cowra region. There were two main reasons for this:

Transport Costs

Rail was perceived to be able to exert a downward pressure on transport rates thereby improving the competitiveness of business in the region.

More than this, it was acknowledged that road rates would be rising in real terms. Most were aware of the superior fuel efficiency of rail (actually a factor of about three) and that the inevitable future fuel price rises would impact road transport more severely than rail.

There was also an awareness that the long term trend for truck driver shortages would continue. This would also drive road transport rates upward as drivers would be able to negotiate pay rises and reduced working hours to bring them into line with the rest of the community.

Community Impact

However the overwhelming concern expressed related to the increasing size and numbers of large articulated trucks on country roads. This was widely seen to have adverse impacts by way of increasing road maintenance costs, road accidents and loss of amenity in rural townships.

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3 The last use of Cowra based train crew on regular freight services occurred on 27 October 1989 whilst the last Traffic Officer to be employed at Cowra station finished duty on 15 December 1989 – at that time all were employed by the former State Rail Authority.

4.2.2 Criteria for Competitiveness

Notwithstanding their social concerns, businesses also stated that they would support a rail service only if it provided a competitive service on the basis of door-to-door cost effectiveness (the primary issue) and reliability.

Interestingly, very few indicated that transit time or frequency would be an issue and a daily service was not seen as essential. As the study progressed it became apparent that a daily service for intermodal traffic would be required but this was mainly because of the potentially large volume of containers to be transported rather than from service considerations.

4.2.3 Classification of Potential Traffics

Not all businesses interviewed could generate business suitable for rail. In general, traffics amenable for rail would meet the following requirements:

- Bulk grain traffics would be from on-rail silos and be delivered to Port Kembla export terminal or to local mills with rail unloading facilities;
- Intermodal (containerised) freight would be primarily be for export commodities delivered to Port Botany. The exception was minerals traffic for domestic usage which could be delivered to destinations with established intermodal facilities.

On the basis of their likelihood of being attracted to rail, traffics were classified as either:

- High probability: Rail could provide a cost effective service; Able to transfer to rail relatively quickly and easily.
- Medium probability: More difficult for rail to provide a cost effective service; Includes speculative traffic with a reasonable probability of being attracted to rail but some years in development.
- Low probability: Difficult for rail to handle cost effectively and not likely to transfer from road.

The business potential for the railway is summarised in Table 4.1 below.

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BUSINESS	PRODUCT	ORIGIN	DESTINATION	RAIL ACCESS LOCATION	FREIGHT TASK tonnes / yr	FREIGHT TASK TEU / yr	PROBABILITY	COMMENT
A	Export grain	Cowra	Pt. Kembla	Cowra	25,000		High	GrainCorp promoting export grain.
		Noonbinna	"	Noonbinna	15,000		High	
		Koorawatha	"	Koorawatha	10,000		Medium	Overflow in good years.
		Maimuru	"	Maimuru	20,000		High	
		Greenethorpe	"	Greenethorpe	40,000		High	
B	Export Grain	Cowra	Pt. Botany	Cowra		800	High	New business, commence 2010.
C	Export Grain	Grenfell	"	Cowra		2,000	High	Currently road to Blayney.
D	Domestic grain	Silos on line	Local mill	Silos	50,000		High	Customer currently uses rail.
		"	"	Silos	15,000		High	Customer using rail until recently.
		"	"	Silos	14,000		High	Customer using rail until recently.
E	Domestic grain	Cowra	Sydney Metro	Cowra	10 - 20,000		High	Customer prefers rail delivery.
F	Domestic Grain	Silos on line	Blayney	Silos	14,000		High	Represents 40% of total grain deliveries.
G	Domestic Grain	Silos on line	Young	Silos	60,000		High	Will come from Cowra line and other silos
H	Aggregate	Quarry	Riverstone	Wattamondara	100,000		Medium	Depends on competitive rate.
I	Mallee Eucalypt	Region	Wallerang	Various sites	300,000		Medium	Depends on project approval.
J	Processed minerals	Cowra	Interstate & local	Cowra		200 - 320	Low	Minimal export.
K	Dolomite	NW Young		Cowra		0	Low	Current stockpile growing at 500 tonnes / month.
L	Alumina	Parkes	Cowra	Cowra		0	Low	Currently trucked from Parkes.
M	Gypsum	Ivanhoe	Cowra	Cowra		0	Medium	Not a start-up traffic, but long term potential for rail.
N	Stock food	Young	Pt. Botany	Cowra		4,500	High	Load containers at Young at a future stage.
O	Frozen food	Cowra	Capital city distrib.	Cowra		12	Low	
P	Glue	Pt. Botany	Cowra	Cowra		100	High	
Q	Kaolin clay	Quarry	Rutherford	Cowra		0	Medium	Requires effective transport chain to customer.
	Silica quartz	Quarry	Pt. Botany	Cowra		400 - 1,600	High	Export commodity.
R	Materials imports	Pt. Botany	Cowra	Blayney		200	High	Currently railed to Blayney, then road to Cowra.
S	Magnetite	Broula	Hunter Valley	Cowra		2,000	Medium	Depends on logistics at Hunter Valley.
T	Frozen food containers	Melbourne	Blayney	Demondrille		9,000	High	Trains with Tasmanian produce via Melbourne for distribution from Blayney. Some return traffic plus empty containers.
	Frozen food containers	Blayney	Melbourne	Blayney		2,000	High	
	Emty frozen food conts.	Blayney	Melbourne	Blayney		7,000	High	

Table 4.1: Summary of Interviews and Business Potential

4.2.4 Export Grain Task

The potential export grain task of 100,000 tonnes / year shown in Table 4.1 is larger than experienced in recent years, which has been depressed as a result of persistent drought. The assumption in this study, supported by the Grain Review, is that this is not a long term effect and that grain production will return to near normal levels.

There will, however, be greater fluctuations in the annual grain production and the 100,000 tonnes figure represents average availability of grain for export from the Cowra region after domestic grain needs have been satisfied. Catering for these wide fluctuations from year to year will be a challenge to be confronted by all players in the transport industry, both road and rail. Almost all bulk export movements from the region are destined for Port Kembla.

The volatility in the export grain task will be further influenced by the removal of the single desk and consequent recent granting of a significant number of export licences. This has resulted in substantial disaggregation of the export grain market and will almost certainly reduce deliveries to traditional rail-served bulk receival facilities. However, an offsetting factor is the substantial growth in the movement of export grain and related products in containers (see Section 4.2.5, below),

4.2.5 Domestic Grain

Indications are that domestic grain customers have relatively stable requirements across the year and look to relatively large deliveries that are well suited to a small train concept ('small' compared to main line trains and main line operators). In excess of 150,000 tonnes of grain has been identified in this category. There are a number of current and proposed domestic grain customers on or near the Cowra region and these would provide a traffic task similar to the export grain task, albeit with more certainty of volume and less seasonal variation.

4.2.6 Container Traffic

This segment of potential traffic predominantly comprises export commodities running to Port Botany, although it is understood that the Port of Melbourne might have a competitive interest in the right circumstances. Some of this traffic is already on rail from Blayney to Botany so it would be a matter of capturing the containers at Cowra and using rail over the intervening distance to Blayney. Other traffic would be new business for rail altogether. A total of almost 12,000 TEU (20 foot equivalent containers) are likely to be available to rail in the early part of this project, most of which would be loaded in the region for haulage to Sydney or other destinations. A similar number of empty containers will need to be railed in to balance the movement.

4.3 OTHER LONGER TERM AND SPECULATIVE TRAFFICS

There are a number of longer term prospects that could use the railway if it is operational at the time they come to fruition. These include bio-mass fuel pellets, reefer containers from Melbourne and Tasmania to a cold store at Blayney and, albeit unlikely, a possible prospect of logs and/or wood chips using the line as a cross country link. None of these have been relied on as start-up traffics although the reefer traffic has been included in the longer term analysis.

5. PRICING ISSUES

A rate structure which is competitive with road transport on a door-to-door basis will be essential for the traffics outlined in Section 4 to be attracted to a rail operation.

5.1 BULK EXPORT GRAIN

The current road and rail rates for grain transported from the Cowra region to Port Kembla for export are in the range $32 - $35 / tonne. However grain growers are able to achieve lower overall rates by trucking their grain over relatively long distances to the larger grain receival sites such as Stockinbingal.

This has led to a significant leakage of grain away from the natural catchment area of those grain sites which would be served by the regional railway.

Discussions with local grain industry staff indicate that this leakage could be substantially reversed by reducing the rail rate for export grain to around $29 / tonne.

While this rate is still higher than the current rates from other major grain sites it becomes competitive when the cost of trucking the grain over the greater distances to other sites is factored into the total cost.

5.2 DOMESTIC GRAIN

There are large consumers of grain for domestic purposes at Manildra, Blayney, Bathurst and Young as well as the Weston Milling site at Enfield in Sydney and the recently constructed major Allied Mills flour mill at Maldon, south of Sydney. All of these mills are either currently rail served or may be re-connected at minimal cost.

The prevailing road rates for the transport of domestic grain for the nearer facilities is about 15 cents / NTK. Logistical and handling considerations mean that rail is generally the preferred mode for most milling operations and there would be no need for rail to offer a significant discount over the road rate to be competitive.

This report has assumed a rail rate of 13 cents / NTK based on the road distance for all domestic grain applications.

5.3 INTERMODAL FREIGHT

The main freight flows which would be handled via an intermodal terminal at Cowra are:

- Containerised grain for export
- Containerised stockfeed and flour for export
- Minerals traffics (domestic and export) which would be handled in containers.

All of these are dense products and would be handled in 20' containers (= 1 TEU) using rail wagons each loaded with 2 containers.

At this stage, it is assumed that all intermodal traffic would be railed to Blayney where another rail operator would haul the wagons through to the final destination, most likely in conjunction with the current Blayney intermodal service. With the wagons supplied by others the revenue available to the rail operator for the Cowra – Blayney section of the overall task is assumed to be $190 / container.

6. RAIL OPERATIONS FOR POTENTIAL TRAFFIC

6.1 TRAIN OPERATIONS

For the purposes of this analysis, all of the above freight movements will be assumed to be managed by two train sets.

6.1.1 Bulk Grain Train Set

The domestic and the export grain would be transported by one dedicated train set comprising 2 x 2000 HP locomotives (eg ‘422’ class or equivalent) hauling 22 x 19 tonne axle load (TAL) grain wagons. Each grain wagon will tare at 22 tonnes giving a payload of 54 tonnes per wagon and 1,188 tonnes per train.

This train set would be available for hauling train loads of export or domestic grain as required throughout the year.

For the bulk grain tonnages assumed in this report the train set would undertake 87 and 135 round trips per year for the export and domestic grain tasks respectively, 222 in total. This represents good rolling stock utilisation by current Australian grain fleet standards.

The operation of this grain train would involve the lease of 2 locomotives and 24 wagons (2 spare). A spare locomotive would also be leased and this cost would be shared with the intermodal traffic (below).

An alternative would be to use lower power locomotives, typically the 900 HP ‘48’ class. Four would be required to haul the same train that could be hauled by two of the higher powered locomotives. The use of these lower powered locomotives would incur fuel and maintenance cost penalties but this may be offset if the lease charges are very low.

If the heavier 2000 HP locomotives were to be authorised to run on the branch line to Greenethorpe, one of these locomotives could be substituted for two of the 900 HP locomotives which would be capable of hauling a full train back to the mainline at Koorawatha. Alternatively, there may be a leasing arrangement with Lachlan Valley for the use of their lighter locomotives when required for this purpose.

However, this report has assumed an option for 2000 HP locomotives to be allowed to run to Greenethorpe as would be accepted practice elsewhere in Australia.

6.1.2 Intermodal Traffic Train Set

All intermodal traffic would be handled via the intermodal terminal at Cowra with a round trip each week day to Blayney.

The average number of containers per train would be 48. This would vary but not excessively as the major traffics are not seasonal. With two TEU per wagon, the average train would comprise 24 container wagons and will require 2 x 2000 HP locomotives for the haul to Blayney. A third locomotive (probably a branch line unit) would be required for larger trains.

Two locomotives would be leased for this traffic with the lease cost of a spare locomotive shared with the grain traffic (above).

It is assumed for this analysis that the wagons will be supplied by a third party. There would be no lease or maintenance charge for the Cowra railway operator associated with their use between Blayney and Cowra and this would be reflected in the lower rate per container allocated to the Cowra regional railway.

6.2 OPERATIONAL RESOURCES

In the initial stages there would be a need for relatively few resources to operate trains. It is anticipated that traffic will grow over time and that additional or longer trains may need to run to cater for the volume of traffic offering. In order to facilitate train planning a table of locomotive loads and running times (based on 60 km/h maximum) has been developed using simulation and these are presented in the Table at Appendix B.

It is noted that the loads are higher than those notified in the 2004 Train Operating Conditions (TOC) manual, but they are within the notified performance specifications for locomotives using the track profile dated 1999. Data for additional locomotive types and or short sections within the sections listed in the Table are able to be readily assessed using the SimTrain model.

6.2.1 Locomotives

At present the only suitable locomotives based in the area are a number of branch line units belonging to the Lachlan Valley Railway. These units would be suitable to handle the Greenethorpe branch trains and provide support when needed for trains on the cross country line to Blayney or Demondrille. The container train in particular is likely to fluctuate in size and mass on a day to day basis and having suitable locomotives near at hand will be a valuable resource. Early indications are that LVR would be interested in being involved with the freight operation.

Trains on the Greenethorpe branch would preferably (if authorised) by operated with a single 2000 HP locomotive but otherwise would need to be run with a pair of branch line locomotives. All other trains (both grain and inter-modal) would normally be able to be operated by pairs of reliable 2000 HP locomotives. It would be prudent practice to have a fifth locomotive so that there is a spare for when loading is high, a locomotive needs servicing or there is a failure. There are a number of suitable 2000 HP locomotive types in running but only a small number are in leasing fleets – the rest are with main line operators and may be hard to acquire for the Regional railway. There is a group of lightweight 3000 HP locomotives that are available for hire, but these are likely to be at a considerably higher leasing charge than the 2000 HP units.

6.2.2 Rolling Stock

Bulk grain wagons would be required to form the 22 wagon grain train. Since the line effectively has a 19 tonne axle load limit, new wagons with up to 25 tonne axle loading, would be inappropriate. Older grain wagons in reasonable repair would be appropriate and should be able to be obtained on the second hand market or from a wagon leasing concern.

Market research shows that the vast majority of containers handled at the proposed container terminal in Cowra would be single TEU (20 ft), empty inwards, and heavy (25 to 30 tonne gross) outwards. There would be a small quantity of loaded and empty 40' containers.

The most efficient rolling stock to handle this traffic would be 2 slot container wagons 13/14 metres in length with a tare of 16 to 18 tonnes. The small number of 40' containers can be adequately handled on these wagons.

The other main container traffic prospect is the refrigerated container business between Melbourne (Tasmania) and Blayney. This is most likely to be handled in 46' 6" x 9'10" containers fitted with satellite controlled self-contained refrigeration units. These containers would be handled by a separate train (possibly operated by a main line operator) and would probably use a fixed consist of specialised wagons. The most suitable wagons would be low profile five packs that could handle 48' containers and would meet loading height restrictions applying to the Carcoar tunnel.

6.2.3 Crewing

It has been assumed that two person crewing would be used for all the local trains. This is based on the accepted practice that the train crew are the rail operators and will between them be able to do all things necessary to run the train - driving the train, attaching and detaching wagons, doing the 'safeworking' (safety system for train running) and, with careful planning, be able to handle minor repairs and breakdowns. Apart from export grain trains to Port Kembla, all normal train running could quite easily be operated out of Cowra. Port Kembla services would require support from an off line crew (most likely to operate Harden or Goulburn to Port Kembla and return) which would most easily be covered by using a crew hire provider which serves that area.

It is estimated that five sets of Cowra based crew (10 persons) would be required to operate the train services proposed in this study.

6.2.4 Servicing And Repair Facilities

Cowra is fortunate in that the LVR have leased and retained the former locomotive depot and workshop facilities. It has been assumed that an arrangement would be established with LVR to share these facilities – the details of any such arrangement would be influenced by the extent that LVR wish to be directly involved in train operations or servicing and maintenance. It is likely that the maintenance facility for the regional railway would be operated by, or allied to an established rolling stock maintenance organisation.

6.2.5 Availability Of Heavy Maintenance

The facilities at Cowra would be suitable for light maintenance but periodic heavy overhaul or repair would need to be undertaken at a different site, if only to limit the out of service time of the resource. Downer EDI has a well set up facility at Kelso (Bathurst) whilst United Rail (now UGL) have a smaller facility at Goulburn. The roundhouse at Junee is home to the Junee Railway Workshop which is both a wayside servicing point and a maintenance facility.

Alternatively, to the extent that rolling stock is provided by a rail leasing company, any heavy maintenance requirements would form part of the lease package and substitute vehicles would normally be provided for those requiring such attention.

7. TERMINAL RESOURCES

At the time of writing there is no rail activity on the Cowra lines, and apart from bulk grain, there has been very little other rail traffic for a long time. As a result there are few usable facilities that might be drafted into use for the traffic prospects identified in this report.

7.1 GENERAL REQUIREMENTS

The bulk grain traffic identified as part of the revival plan will generally be able to be handled though existing or revived facilities but container traffic will need a terminal in the Cowra area, and at a later date at Young, if it is to be rail hauled out of the district. The initial need is for a simple and relatively low capacity terminal with a larger facility at a suitable site being provided when demand outstrips capacity of the initial terminal. Possible terminal sites are identified in the following sections.

At the moment around 4000 truck movements annually are run through Cowra to Blayney with traffic that would in future be railed from Cowra. An additional 9000 truck movements per annum could be running after the Young Roller Mill starts stockfeed production, whilst a further 9000 annual truck movements could be generated by frozen freight from Melbourne to Blayney. There is potential for all of these to be diverted to rail, with only the existing 4000 truck movements running into Cowra to the rail terminal. The other two truck hauls would be railed from further south and would not require any trucking in the vicinity of Cowra.

It is envisaged that the initial intermodal terminal would be equipped with a large 35 tonne forklift with suitable container spreaders. A single machine would be provided. If traffic should build up to beyond the capacity of a single fork then a second machine could be brought in, but at that stage a larger more permanent terminal would probably be required.

The capital and operating costs of establishing either an interim start-up intermodal terminal or a subsequent permanent facility have not been factored into this analysis on the basis that it would be operated from the outset on a commercial basis. It is expected that the facility will be fully funded by the private sector – very likely by an existing established transport operator – but with the possibility of some initial “in kind” assistance and facilitation from local government.

7.2 START UP INTERMODAL TERMINAL

7.2.1 Potential site at north end of existing Cowra yard

As a short to medium term option, a temporary intermodal terminal should be located in the old freight yard to the north of the Cowra goods shed. The work required to set up this area as a temporary terminal would be relatively minor. A surplus 47 kg/m left hand turnout could be removed from the yard and relocated to south of the goods shed and connected to the existing road through the goods shed which extends to the northern end of the yard. This track would require some reconditioning.

The ground frame on the western side of this track would need to be relocated to the eastern side of the crossing loop. This ground frame now only works one crossover. Other work required would be removal of the wool loading dock track and grading of the area. Also some minor levelling of the site would be required.

An assumption is that as the site has been used for many years as a freight yard, the ground has been well compacted over those years.

Factors supporting the choice of this location:

- It will provide a 'quick start' site but with sufficient capacity for the start up operation until business grows sufficiently to require a larger more efficient site.
- Low capital expenditure required to set up with most track already in place.
- Office space and toilet facilities in goods shed.
- Main road access.
- Sufficient capacity for start up operation.

Factors against the choice of this location:

- Most trucks serving the site will drive through the town centre (although it needs to be noted that these trucks already do so on their way to Blayney).
- Small site with limited amount of space for storing containers.
- A maximum of only 150 metres of track where containers will be able to be loaded / unloaded at any one time (approx half a train at a time) although the siding should hold the complete train.
- Site close in the northern fringe of town.
- Access ramp from the main road (Mid Western Hwy.) impinges on loading area. Due to the access ramp angle it would be dangerous for a forklift with an elevated fully loaded container to travel north-south or vice versa over this ramp.

View from the north of proposed temporary intermodal terminal site

7.2.2 Capacity

The Grenfell grain and the Young stock food could generate up to 50 to 60 container movements a day after allowing for empty as well as loaded containers. Other traffic is unlikely to exceed 10 to 20 container movements a day, but this could change dramatically if more grain is exported in containers. This terminal should be able to handle the expected volumes in the short to medium term, bearing in mind that it is likely that the containers ex Young would be loaded on rail at Young in the future. The loss of the Young traffic would mean that the Cowra facility would have spare capacity.

The site is estimated to have potential storage capacity of around 200 TEU.

7.3 LONG TERM INTERMODAL TERMINAL – SOUTH OF COWRA

7.3.1 Location and Suitability

The site for this location is between the Olympic Highway and the railway line south of Fishburn St / Bulkhead Rd., approximately 2 km south of the town centre. The land is currently partly occupied by the Council Depot, which we have been advised is likely to be relocated. To the south of the Council Depot is vacant land and part of the stockyards including the old rail stock loading ramp. The old stockyard sidings have been removed but the earthworks remain making it relatively simple to construct a 500 metre siding.

Factors supporting the choice of this location:

- Most trucks using this facility will not have to travel through the centre of town as they will enter Cowra from the south or west.
- Many of the local industries are located near this location.
- Good access to Olympic Highway.
- Part of the site is already owned by the Council.
- There are few houses nearby.
- Possible 400m rail access to hardstand.

Factors against the choice of this location:

- Future extension of the loop would be constrained by the road underpass to the north and the rising grade to the south.
- Extensive earthworks would be required to level the site.
- Westward expansion of the terminal would require relocating a high tension power line 25 metres to the west of the railway due to the operation of high machinery and the requirement that terminals stack containers three high.

North end of proposed South Cowra intermodal terminal site

7.3.2 Capacity

The capacity of this terminal will be determined by limitations caused by the location of the high tension power lines. If these lines were relocated the storage capacity of the terminal could be in excess of 3000 TEU, considerably in excess of what might be required for the foreseeable future.

Throughput capacity on this site (after removal of the power lines) would be determined by the number of machines available, rather than the space available.

7.4 LONG TERM INTERMODAL TERMINAL – NORTH OF COWRA

7.4.1 Location and Suitability

The site is 1.5 to 2.0 km north of the level crossing on the Mid Western Highway at Cowra. The proposed site is between the highway and the railway and bounded to the north by Packs Grant Rd and to the south by a private access road about 0.5 km south of Packs Grant Rd.

Factors supporting the choice of this location:

- Flat site requiring minimal earthworks.
- Room for a 500 metre loop with extension to 1500 metres if required. (500 metres each end)
- Possible 500m access to hardstand
- Good access to Mid Western Highway.
- There are few houses nearby.

Factor against the choice of this location:

- Most trucks would have to travel through the centre of town to access this location.

7.4.2 Capacity

This site is likely to be the best for rail access when volumes exceed the capacity of the proposed "temporary" site at the Cowra rail yards.

Storage capacity should be in excess of 2000 TEU and throughput at this site would be determined by the number of machines available rather than the space available.

8. INFRASTRUCTURE RESOURCES

8.1 REQUIREMENTS

8.1.1 Operational Considerations

The concept for revival is based on the establishment of a low cost, fit for purpose railway appropriate to a relatively low volume traffic task. The cross country part of the network (Blayney to Demondrille) is Class 3 standard which implies train speeds of up to 100 km/h, and it would appear, axle loading of 20 tonnes. All types of 2000 HP and lower powered locomotives are allowed to operate on the line, together with the lightweight 3000 HP locomotives of the EL class that are owned by CFCLA.

For successful operation of the proposed railway for freight, a track speed of 60 km/h would be sufficient, although speeds ramping at up to 80 km/h at critical locations to allow effective use of momentum to reduce fuel use and improve train handling would be desirable. This particular aspect needs further evaluation but would seem to be appropriate at 308.3 km, 313.6 km, 317.4 km, 372.5 km, 379.5 km, 382.5 km and 423.4 km. A number of these locations involve timber bridges which would have to be replaced or rehabilitated before speed ramping could be introduced.

The branch to Greenethorpe is Class 5 standard and is allowed up to 70 km/h empty and 30 km/h loaded with 19 tonne axle loads. The empty speed could be reduced to 50 km/h but the loaded speed should be retained at 30 km/h. Only light lines locomotives in the 900-1000 HP range (47, 48, 49 and T classes) are allowed on this line despite the 19 tonne axle load limit. In time it would be desirable for lighter 2000 HP locomotives to be allowed on this branch to allow more efficient operation of grain from Greenethorpe, but it is expected that gaining approval for such an approach (despite something similar being successfully done in other states) could take both time and effort. This is discussed further in the next Section.

8.1.2 Sleeper Requirements

It would be desirable to progressively complete the process of inserting steel sleepers on a consistent 1 in 4 pattern as early as reasonably practicable, with the remaining timber sleepers being replaced based on condition over their remaining life. To this end, priority should be given to the Blayney – Cowra section line which requires more attention than the track south of Cowra. There are nominally around 332,000 sleepers installed in the track, although it is suspected that the real number is closer to 320,000. An estimated 64,500 steel sleepers have already been installed, which represents an average of 1 in 5 (although not in any regular pattern). It is estimated that around 17,500 additional steel sleepers would be required to bring the line back to a satisfactory standard for resumption of train running. From that point on it would be possible to replace an average of around 32,000 degraded timber sleepers every 5 years so that in twenty years time the whole line would average 66% steel. The remaining timber sleepers at that stage would be isolated between steel sleepers providing a track which could progressively be converted to 100% steel in following maintenance cycles. By then the ongoing maintenance cost would have dropped dramatically.

At present sleepers under rail joints are all timber due to the better support they provide. There are an estimated 74,000 joint sleepers. These sleepers will eventually need to be replaced with more durable material – steel would be ideal but alternatively low profile concrete might be acceptable. It is likely that durable timber sleepers will become increasingly hard to acquire and in time will price themselves out of the market although there is some possibility that treated softwood sleepers may become a viable alternative. Doing nothing is not a realistic option. Assuming the remainder of the track was steel sleepered first, it would not be necessary to replace the timber joint sleepers with steel until the third sleeper replacement cycle in 15 years time.

8.1.3 Bridges

There are 17 identified timber underline bridges on the line. Ten are between Blayney and Cowra (almost 60%) while 4 are between Cowra and Demondrille and 3 between Koorawatha and Greenethorpe. There are 8 structures that are relatively minor and should be no more than $500,000 each to replace, a further 8 that are estimated to cost between $0.9 million and $1.5 million each to replace and the Belubula River bridge which would possibly cost $3 million to replace. Desirably, all 17 timber structures would ultimately be replaced with new structures using more durable materials such that the maintenance costs for bridges drops to almost zero once the program is complete. Obviously, those in worst condition will most likely need to be done immediately with the remainder following based on condition.

Based on the inspection in September there are four bridges that need immediate attention to allow the line to reopen, another seven that will need to be done in the next three years and six that can be replaced based on subsequent assessment. The Belubula River bridge is in good condition and would probably be the last bridge to be done.

The alternative to reconstruction would be to continue to maintain the timber structures in more or less their present form involving ongoing replacement of individual timber members based on regular inspection results. This work is both labour intensive and increasingly costly due to scarcity of suitable durable species timber in required sections and lengths and also to ensure conformity with current OH & S legislation for personnel working on such structures.

8.1.4 Carcoar Tunnel

The tunnel at Carcoar is 281 metres long and is reputed to be slightly under size for standard height shipping containers on normal flat wagons. The first priority is to survey the tunnel, and from the results of that to develop a plan to improve clearances. This issue is a ‘show stopper’ for the proposed intermodal operation and will need to be resolved prior to restoration of freight services on the line. In the absence of any quantitative data on this issue and arbitrary amount of $1.0 million has been nominated, although this could be much less or a somewhat more depending on the survey results.

Other infrastructure such as level crossings, sidings and loops and overbridges are generally able to be handled as individual small projects based on condition, and in some cases need (e.g.. minor trackwork changes for the interim container terminal at Cowra).

8.2 CAPITAL PROGRAM

A capital program for track, bridges, level crossings and the tunnel, based on the above would extend out 20 - 25 years and involve the following estimated expenditure.

Table 8.1: Capital Program for Track, Tunnel and Bridges ($ million).

ITEM	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020	2025	2030
Track	3..50					6.00				6.00	6.00	6.00
Bridges	5.00	0.50	0.50	0.50	0.50	3.00				3.00		
Level crossings	1.00											
Tunnel	1.00											
TOTAL	10.50	0.50	0.50	0.50	0.50	9.00				9.00	6.00	6.00

At the end of the above program the bridge and track maintenance costs would have dropped to a sustainable low level compared to now.

In line with the Grain Report it is proposed that the upfront expenditure in 2010 be based on a 'restoration grant' basis. The subsequent period through to 2020 is an extension of the restoration (more aligned to stabilisation) such that the line is then free of all timber bridges and more than half of the timber sleepers in track. The reason for extending the restoration period is in recognition that the Blayney – Cowra line was restored to serviceable condition previously in 1999 and achieved almost nothing in the way of usage. In this case it is proposed that the line be progressively upgraded over a period of time in line with traffic activity.

8.3 INVOLVEMENT OF RAIL REGULATOR

The Rail Regulator in NSW now employs 80 staff to handle the various issues associated with rail safety. In general terms, anything that is different to what went before will be scrutinised by the Regulator and more than likely will be resolved only after the passage of time and a significant amount of paperwork. For this reason it is recommended that ownership of the Cowra rail network be retained in the current owner's hands (CountryRail), and that an accredited niche operator be a key part of the Cowra based operation.

It may be that issues such as operation of a terminal and revised train running arrangements will be subject to scrutiny by the Regulator. At an early date after some indication of agreement to proceed has been given, it would be prudent to consult with the Regulator to ensure that there are no 'show stoppers' unexpectedly thrown up by that organisation. The potential for the Regulator to delay or stop a rail project or any rail operation should not be underestimated.

9. EXTERNALITIES

9.1 THE RATIONALE FOR EXTERNALITIES

As a general rule, it is difficult for railway undertakings to capture all of their benefits simply by way of revenues, and at present there are no mechanisms in Australia for road operations to meet all of their attributable costs simply by way of registration fees and fuel surcharges.

The net effect of a railway freight operation is to remove heavy vehicles from the roads and thereby reduce the extent of un-recovered road maintenance and accident costs and the environmental externalities borne indirectly by the community.

> *It has been said that because measurements of these avoided road costs and externalities are imprecise they should be ignored. However, by ignoring these costs we have set a value on them – we have set a value of zero.*
>
> *Therefore the best values available, although imprecise, are better than no values.*
>
> *R.R. Allen, Submission 1996*

The issue of avoided road costs and other externalities is discussed in depth by Professor Philip Laird of the Wollongong University in Appendix C.

9.2 DISTRICT AWARENESS OF EXTERNALITY ISSUES

During the course of the study a wide range of people representing local businesses and government were interviewed. Almost without exception they expressed strong support for the implementation of an effective rail service.

The reason for this was not that they wanted the trains *per se* (there were very few train enthusiasts) but because of universal concern about the ever increasing size and number of trucks on the local road network. Their primary concerns were the costs to repair the roads, accidents involving articulated vehicles and the loss of amenity in the local townships.

The conclusion was that the externality issue is in fact the key driver behind the very strong community support for the railway proposal and must be factored into the analysis.

9.3 THE MAGNITUDE OF AVOIDED ROAD COSTS AND EXTERNALITIES

9.3.1 Externality Parameters and Rates

The net values (road externality costs less the corresponding rail externality costs) to be used in this study are derived in Appendix C and are summarised below.

Externality	Rate (cents / NTK)
Road maintenance	1.00
Accident costs	0.78
Environmental externalities:	
Greenhouse	0.12
Air pollution	0.09
Noise pollution	0.03
Total Net Externality Costs	**2.02 cents / NTK**

Appendix C provides a range of figures for externalities but the above figures represent a conservative approach generally in the middle of the accepted range.

9.3.2 Calculation of Avoided Road Costs and Externalities

Externality costs are based on the net tonne kilometres (NTK) associated with the freight task which is the product of the tonnage and the distance that would otherwise have been travelled on road.

In calculating the avoided road distance this report will make the following assumptions:

- For export grain transported by rail to Port Kembla, the alternative road distance is calculated assuming that 50% of the grain from the district would be trucked directly to Port Kembla and 50% would be trucked to Stockinbingal and then railed to Port Kembla. This gives an average road distance of 248 km.
- For domestic grain the alternative road distance is taken to be the rail distance with the exception of Manildra where the average road distance is 100 km (the rail distance via Blayney is 190 km).
- Intermodal traffic could potentially be transferred to rail at Blayney instead of Cowra and the avoided road distance is therefore 75 km. The exception is the stockfeed and flour traffic originating from Young to Port Botany in which case the full distance would be 310 km.

These distances, the corresponding tonnages and the calculated avoided road and externality and costs are set out in Table 9.1 below.

9.3.3 Koorawatha – Greenethorpe Road

The above avoided road maintenance cost of 1.0 cents / NTK represents a general figure for freight carried by articulated vehicles when averaged over time. However, if rail services are permanently withdrawn from the region, the road between Greenethorpe and Koorawatha will require immediate upgrade works to handle the increased freight task.

This immediate upgrade task was estimated at $4 million by the local council engineers responsible for the road.

9.4 REDUCED TRANSPORT COSTS

The second benefit for the community associated with resumption of rail freight services will be reduced transport costs for local industry.

Put simply, if the rail is not cheaper than the current road rates by 5 - 10 %, then it will not attract sufficient freight from road to be viable.

This study will assume that an annual benefit equal to 5% of the transport cost of traffics attracted to rail will be realised by local industry. On the assumed traffic projects and freight rates this is $0.36 million / year.

9.5 TOTAL EXTERNALITY AND COMMUNITY BENEFITS

The total benefit associated with the resumption of rail services is $1.97 million / year as set out in Table 9.1 below.

COMMODITY		Export Grain	Domestic Grain	Export Grain (containerised)	Stockfeed & Flour	Minerals	TOTAL (Average)
Mode		Wagon load		Intermodal			
Loading / access point		Local sites	Regional sites	Cowra terminal	Cowra terminal	Cowra terminal	
Destination / interchange		Note 1	Local mills	Blayney	Blayney	Blayney	
Alternative road haul distance (km, avge)		248	113	75	310	75	(174)
FREIGHT TASK							
tonnes (bulk) / year		100,000	155,000				255,000
containers (TEU) / year				2,800	4,500	4,600	11,900
NTK (000's) / year		24,800	17,520	5,040	38,502	8,280	94,142
NET AVOIDED COSTS	Rate cents / NTK	$ / year					$ / year
Road maintenance	1.00	248,000	175,200	50,400	385,020	82,800	941,420
Accident costs	0.78	193,440	136,656	39,312	300,316	64,584	734,308
Other externality costs :							
Greenhouse	0.12	29,760	21,024	6,048	46,202	9,936	112,970
Air pollution	0.09	22,320	15,768	4,536	34,652	7,452	84,728
Noise pollution	0.03	7,440	5,256	1,512	11,551	2,484	28,243
TOTAL NET AVOIDED COSTS		500,960	353,904	101,808	777,740	167,256	**1,901,668**

Note 1. For the export grain, the average alternative road distance has been calculated assuming that 50% of the grain from the district would be trucked directly to Port Kembla and 50% would be trucked to Stockinbingal and then railed to Port Kembla.

Table 9.1: Summary of Avoided Road Costs and Other Externality Benefits

It should be noted that the externality benefits derived in Appendix C are somewhat higher than those in Table 9.1.

This is attributable to two reasons. Firstly the refrigerated traffic to and from Melbourne has been omitted from this study on the assumption that this traffic would be on rail (via Parkes) if the Cowra railway did not eventuate and the substantial biomass traffic has also been omitted from this study on the basis that it is a future traffic which has not been confirmed.

The second reason is that the externality benefits calculated in Appendix C were based on the current situation in which all freight is on road for the entire distance to its destination, the assumption being that if the railway service were not reinstated then this situation would continue.

While this is probably true for much of the traffic, this study has taken a more conservative approach and assumed that most traffics could be potentially trucked to Blayney and transferred to rail at that intermodal terminal in the event that an intermodal terminal was not established at Cowra.

10. EVALUATION – ABOVE RAIL

This section will review the financial sustainability of the Above Rail operations for the Cowra Regional railway. This includes all revenues and operating costs associated with the running of trains. Operating costs include access charges payable to the infrastructure provider but exclude the actual costs of providing and maintaining the track.

Below Rail operations refer to the provision and maintenance of the track by the infrastructure provider and are reviewed in Section 11.

This evaluation of the proposed Cowra branch lines assumes a base freight task, a competitive rate structure and the costs associated with a simplified short line operation using currently available locomotives, rolling stock and efficient operating practices.

10.1 FREIGHT TASK TO BE EVALUATED

Only the high volume *High Probability* freight tasks outlined in Table 4.1 will be included in this preliminary analysis. These will be grouped as per Table 10.1 below.

COMMODITY	Loading (Access point)	Destination (Interchange)	Mode	Annual Freight Task	
				Tonnes / year	Containers / year
Export grain	Local sites	Port Kembla	Wagon load	100,000	
Domestic grain	Local sites	Local mills	Wagon load	155,000	
Export grain (containerised)	Cowra	Blayney (for Pt. Botany)	Intermodal		2,800
Stockfeed / flour	Cowra	Blayney (for Pt. Botany)	Intermodal		4,500
Minerals	Cowra	Blayney (various dest.)	Intermodal		4,600
			TOTAL :	255,000	11,900

Table 10.1: Summary of Traffic Projections

10.2 REVENUE AVAILABLE TO A RAIL OPERATION

As indicated earlier a rate structure which is competitive with road transport on a door-to-door basis is essential for the above traffics to be attracted to a railway operation.

Bulk export grain would require a rate of $29 / tonne from local silos to Port Kembla to be able to compete with the combined road/rail movement via large lower cost grain receival points.

Domestic grain on rail would be directly competing with road haulage and a rate of $0.13 / NTK based on the road distance for the haul is the basis for pricing this segment of traffic.

Based on the majority of traffic being heavy and loaded in single TEU (20 ft) containers, a rate of $190 per TEU has been assessed as competitive for the haul between Cowra and Blayney using wagons provided by the main line operator running between Blayney and Botany.

10.3 TRAIN OPERATIONS

As recorded earlier all of the prospective rail traffic can be handled with two train consists.

All bulk grain, export and domestic, could be handled by a single train consist of 22 grain wagons with a tare of approximately 22 tonnes and a carrying capacity of 54 tonnes of grain.

Two x 2000 hp locomotives would be required (422 class or equivalent). The Greenethorpe branch should be able to take these locomotives (as is done in other states with similar light weight infrastructure) but in the interim two x 1000 hp locomotives can be utilised from local resources to run that branch with the 22 wagon train set. A total of 222 train trips per year would be required to handle the grain task identified in the traffic review.

For inter-modal traffic there would be an average of 48 containers per day. These would comfortably fit on 24 x two slot wagons and would require two x 2000 hp locomotives for the haul to Blayney. It is anticipated that wagons would be from a pool operated by the main line operator and therefore would not be part of the Regional Railway fleet.

10.4 OPERATING COSTS

This report will assume industry standard operating costs as summarised in Table 10.2 below. A typical regional operator could be expected to improve on most of these cost items.

10.4.1 Train Operating Hours

Line haul transit times in both the forward (loaded) and return (empty) directions have been calculated by the SimTrain rail operations package based on the grain train and intermodal train consists outlined in Sections 6.1.1 and 6.1.2 above. To these have been added:

- Shunting and train preparation tasks assumed to require two hours per train;
- Unloading empty containers from the train and reloading with full containers at Cowra requiring five hours per train;
- Loading bulk grain wagons at silos and discharging at Port Kembla or local mills. This varies between 3 to 9 hours depending on the loading rates at each site.

10.4.2 Train Crew Cost

Train crew are assumed to cost $60 per operating train-hour per crew member. With two person crewing this becomes $120 / hour. This crew cost is applied to all of the train line haul, shunting and loading hours defined in Section 10.4.1 above.

Crew costs based on the above practices comprise a significant component of the total operating costs, typically about 11%. The longer term options available for a regional operator to reduce this cost would be:

- The second crew member would be competent in safeworking (including how to stop a train in an emergency) but would not be a fully qualified driver;
- Driver only operation (DOO) which is established practice elsewhere in Australia on trains where there is no intermediate shunting.

10.4.3 Fuel Cost

Smaller train operators generally do not have the bulk purchasing power of the larger operators and are currently paying about $1.00 / litre for diesel fuel.

Line haul fuel consumption was calculated by the SimTrain train rail operations modelling program. To this has been added the fuel consumed while idling or at low throttle settings during shunting and loading outlined in Section 10.4.1. This is assumed to be 15 litres / hour.

Fuel consumption comprises a major component of the total cost structure. Two observations are:

- The use of more modern locomotives could be expected to reduce this fuel consumption cost by 10 – 20%.
- It is expected that the price of fuel will increase significantly in the medium and long term. However fuel presents a proportionately larger component of road transport costs with the result that rail will be able to pass on these increased fuel costs while at the same time increasing its competitive position against road transport.

10.4.4 Rolling Stock Maintenance

Locomotives and grain wagons would be supplied on a long term lease and are assumed to be received in serviceable condition. Typical maintenance costs for older equipment would be:

- Locomotives: Fixed rate $20,000 / year, plus
  Variable rate $0.60 / km
- Grain Wagons: Fixed rate $2,000 / year, plus
  Variable rate $50 / 1000 km
- Container wagons: No maintenance charge.

For the purposes of this analysis, it is assumed that container wagons would be supplied by others and the Cowra regional railway operator would only provide “hook-and-pull” services between Blayney and Cowra. Wagon maintenance costs would therefore not be directly incurred by the Cowra operator and the container rate payable to the Cowra operator would be adjusted downwards (by about $4 / container) to reflect this.

10.4.5 Track Access on the ARTC Mainline

Trains with export grain to Port Kembla and domestic grain to Manildra, Blayney, Bathurst and the Sydney region will travel on the ARTC network and will incur access charges accordingly. The published rate for the Albury – Macarthur section for seasonal grain trains is the “Standard Rate”:

- Flagfall: $0.610 / train-km
- Variable: $2.477 / 1000 GTK

10.4.6 Track Access Demondrille - Blayney

Track access charges for rural branch lines which have been set at a similar level to nearby ARTC mainlines generally incur a substantial under recovery of track maintenance costs due to the much lower traffic density on the branch lines.

The position taken in this study is that branch line track access charges may be set at a higher rate on the basis that for most traffics the major portion of the transport task will be on the ARTC mainline at the lower rate.

As considered in Section 11.5, access charges should cover the routine railway maintenance costs which would be about $1 million / year, equivalent to $5,000 / year per km.

In order to recover this amount from train operations the level of access charging would need to be raised by a factor of about 2.5 over the ARTC rate. The access charge used for the Demondrille – Blayney section used in this study is:

- Flagfall: $1.50 / train-km
- Variable: $6.00 / 1000 GTK

The impact of these relatively high access charges is considered in Section 10.5.1 below.

10.4.7 Rolling Stock Lease Charges

This study has assumed that locomotives and wagons would be acquired on a long term lease basis. The reason for a using a leasing strategy initially is to overcome the entry barrier for a smaller operator associated with high up front capital costs while the effect of the lease being long term would be to reduce the lease rate.

The lease charges assumed for this report are:

- Locomotives: $220,000 / year (equivalent to $600 / day)
- Grain wagons: $15,000 / year (equivalent to $40 / day)

The locomotive rate is at the low end of what is currently available. However the impending advent of low priced Chinese locomotives in the 2000 – 2500 HP range will place downwards pressure on the lease rates for the older equipment.

10.4.8 Fixed Costs and Overheads

Apart from the direct running of trains, a Cowra based railway operator would incur corporate costs comprising:

	$ / year	
Management & staff salaries, accommodation	300,000	
Legal and accounting fees	50,000	
Insurance	350,000	
Allowance for other expenses & contingencies	400,000	
TOTAL:	**$ 1,100,000**	**/ year**

10.4.9 Start-up Costs

The leasing strategy would eliminate the need for large capital borrowings for locomotives and rolling stock. However there will be a requirement for up-front capital associated with normal start-up costs such as legal fees, accreditation and purchase of sundry equipment.

Similarly, although all of the traffics included in this preliminary study are categorised as high probability and should be expected to come on line relatively quickly, nevertheless it can be expected that there will be some delays with some traffic which will result in a revenue shortfall.

In order to cover these situations and to provide working capital for the operation, it is assumed that $2 million will be provided at the commencement and this will incur an annual interest charge of $240,000.

10.4.10 Summary of Operating Costs

The operating cost inputs above are summarised in Table 10.2 below.

COST ITEM	VALUE	VALIDITY
Crew	$ 60 / train-hour per crew member	All trains 2 person crewing.
Fuel	$ 1.00 / litre	Fuel cost currently available to small operators.
Fuel consumption	Calculated by SimTrain train operations modelling program	Based on 19 TAL operation. Grain trains: 22 wagons Intermodal trains: 24 wagons
Loco maintenance	Fixed cost: $ 20,000 / year Variable: $ 0.60 / km	Long term lease contract. Assumes locomotives received in serviceable condition.
Wagon maintenance	Fixed cost: $ 2,000 / year Variable: $ 50 / 1000 km	Long term leasing contract in place for grain wagons. No maintenance charge paid for container wagons.
Train control	No train control charge	Included in access charge.
Track access (ARTC mainline)	Flagfall: $ 0.610 / train-km Variable: $ 2.477 / 1000 GTK	ARTC published access charges for “Standard Freight”.
Track access (Demondrille- Blayney)	Flagfall: $ 1.500 / train-km Variable: $ 6.000 / 1000 GTK	Higher than ARTC standard rates (above) in order to achieve more realistic recovery of below rail costs.
Locomotive lease	$ 220,000 / year	Long term lease for a 2000 HP locomotive in serviceable condition.
Wagon lease	$ 15,000 / year	Long term lease for second hand 19 TAL grain wagons. No lease charge for container wagons.
Fixed & o/head costs	$ 1,100,000 / year	Standard small business costs.
Interest on funds borrowed	$ 240,000 / year	Funds borrowed to cover start-up costs and working capital

Table 10.2: Cost Inputs used for Financial Analysis

10.5 FINANCIAL ANALYSIS OF COWRA REGIONAL RAILWAY

The annual tonnages, revenues and operating costs which have been developed in the preceding sections are consolidated in Table 10.3 below.

COMMODITY	Export Grain	Domestic Grain	Export Grain (containerised)	Stockfeed & Flour	Minerals	TOTAL
Mode	Wagon load		Intermodal			
Loading / access point	Local sites	Local sites	Cowra terminal	Cowra terminal	Cowra terminal	
Destination / interchange	Pt. Kembla	Local mills	Blayney	Blayney	Blayney	
Average haul distance (km)	378	113	75	75	75	
Trains per year	87	135	←	250	→	473
Freight task						
tonnes (bulk) / year	100,000	155,000				255,000
containers (TEU) / year			2,800	4,500	4,600	11,900
REVENUE						
$ / tonne (average)	29.00	12.50				
$ / container			190.00	190.00	190.00	
Total Revenue ($ / year)	2,900,000	1,937,500	532,000	855,000	874,000	7,098,500
OPERATING COSTS						
	$ / tonne	$ / tonne	$ / container	$ / container	$ / container	
Crew	2.24	1.55	26.29	26.29	26.29	777,158
Fuel	5.40	1.88	42.51	42.51	42.51	1,337,389
Loco maintenance	0.96	0.42	25.02	25.02	25.02	459,503
Wagon maintenance	0.87	0.38	-	-	-	146,244
Rolling stock lease	3.52	3.52	46.01	46.01	46.01	1,445,400
Access charge - ARTC mainline	1.93	0.16	-	-	-	218,391
Access charge - Branch lines	1.30	1.39	33.06	33.06	33.06	739,336
Total cost per unit	16.22	9.32	172.89	172.89	172.89	
Total Train Operating Costs	1,621,648	1,444,397	484,089	778,000	795,289	5,123,422

FINANCIAL SUMMARY	$ / year
Annual revenue	7,098,500
Less:	
Operating costs	5,123,422
Overhead & fixed costs	1,100,000
Interest on start-up costs	240,000
OPERATING SURPLUS	635,078

Note 1. ARTC access charges are based on the "Standard Freight" flagfall and variable charges for mainline running beyond Demondrille and Blayney.

2. Cowra 'Branch Line' access charges are the sum of the assumed flagfall and variable charges for train operations between Demondrille and Blayney.

Table 10.3: Summary of Above Rail Operating Revenues and Costs

10.5.1 Impact of Branch Line Track Access Charges

If the branch line access charge were set at the ARTC rate then the cost of bulk grain transport would reduce by about $0.80 / tonne and containers delivered to Cowra would reduce by about $20 / container.

Table 10.3 above indicates that the suggested higher access charges are not insignificant but the operation is viable even at these higher charges.

However, the Grain Report recommends the phasing in over a 5 year period of a branch line access regime for higher cost recovery. That is, at start-up the lower access charges will prevail. This will have the effect of assisting the railway to be more cost competitive from the outset and to be able to achieve a greater traffic base. Within five years it is likely that the access charging regime for branch line cost recovery will be very similar to the ARTC mainline charges.

10.5.2 Conclusions from the Financial Analysis

From the foregoing sections and Table 10.3 above it may be concluded that the proposed regional rail operation would be viable and able to achieve an operating surplus provided the following key conditions can be met:

- The projected volumes of freight are available to rail within a short time of the commencement of operations.
- Competitive haulage rates available to a regional railway operator are close to what has been assumed.
- Realistic “short line” operating practices and costs can be achieved.
- The track access charges do not exceed those assumed.

The operating outcome is likely to be improved further by the following:

- Increasing fuel costs will impact road costs more than rail and therefore improve the competitive position of rail transport.
- Implementing driver only operation will reduce operating costs significantly.
- The advent of low priced medium powered locomotives with modern technology from China will reduce fuel and maintenance costs and possibly the overall cost of providing locomotives.
- In the medium to long term the tonnages are likely to increase considerably over those assumed in this study thereby lowering the level of track access charges and the impact of fixed and overhead costs.

11. EVALUATION – BELOW RAIL

This study assumes that below rail operations will be provided by an entity such as (but not necessarily) ARTC which is separate to the above rail operator, as outlined in Section 10. The below rail operator will be partly funded by access charges received from the above rail operator and, where there is a shortfall, partly from government funding.

Below rail operations refer to the provision and maintenance of the infrastructure required to support the operation of the trains. This infrastructure involves the track including ballast and formation, bridges and other structures, level crossings and the Carcoar tunnel.

These have been outlined in Section 8 but for the purposes of this analysis may be grouped into three categories, namely:

- Initial capital investment to return the railway to an operable condition;
- Ongoing annual routine maintenance costs;
- Periodic major capital investment in infrastructure renewal, primarily replacement of life expired timber sleepers with steel sleepers and replacement of life expired timber bridge structural members with new members (or complete bridge replacement).

11.1 GENERAL MAINTENANCE STRATEGY

For lightly trafficked railways it is essential that infrastructure management be carried out efficiently and in a cost effective manner. In practice this will mean that:

- The task must be restricted to only what is required to maintain a fit-for-purpose standard (no “gold-plating”).
- Work must be carried out using safe and efficient work practices.
- The inclusion of overhead and profit margins must be restricted to those directly associated with the job (no third party “dipping”).

One of the largest costs associated with track maintenance will be the replacement of life expired timber sleepers by steel sleepers. Best practice currently being realised in Australia under competitive tendering would indicate that $170 per sleeper (including the cost of insertion in the track) is achievable.

It is acknowledged that the maintenance regime currently in place for the NSW branch line network is resulting in a sleeper replacement charge considerably higher than this.

11.2 INITIAL CAPITAL INVESTMENT

11.2.1 Replacement of Life Expired Timber Sleepers

As discussed in Section 3.3.1, the replacement of life expired timber sleepers in order to achieve an initial 1:4 pattern on average will ensure the integrity of the track for the projected traffic levels at 19 TAL.

Much of the track south of Cowra is now almost at this level and so would require only steel sleeper insertion at critical places. The track between Cowra and Blayney contains a lower proportion of steel sleepers and a higher proportion life expired timber sleepers. This is where the initial rehabilitation effort needs to be concentrated.

A sum of $3.5 million has been allocated for the initial track rehabilitation.

11.2.2 Bridge Rehabilitation

Sections 3.2.2. and 3.3 detail the condition of bridges on the line. As with the track, there is more work required north of Cowra. Pending a more detailed engineering assessment, it has been assumed that a sum of $4 million will be required to be spent at the outset to return bridges in this track section to a serviceable condition, together with a further $1 million spend to the south of Cowra..

11.2.3 Carcoar Tunnel

The Carcoar tunnel is structurally sound but some innovative work (possibly coupled with a speed restriction to minimise the requirement for a larger kinematic envelope) may be required to permit the passage of 9' 6'' containers on standard container wagons. A sum of $1 million has been allocated for this work, pending clarification of the actual scope of this issue.

11.2.4 Summary of Capital Investment Required for Initial Rehabilitation

The budget allowance for the capital works required to return the Cowra lines to service in a safe but fit-for-purpose condition at the commencement of operations is summarised from the previous sections:

	$ million
Track works (primarily steel sleeper replacement)	3.5
Bridges	5.0
Level crossings	1.0
Carcoar tunnel	1.0
Total Initial Rehabilitation	**$ 10.5 million**

11.3 ROUTINE CORRECTIVE AND REACTIVE MAINTENANCE (RCRM)

Routine Corrective and Reactive Maintenance involves activities including routine track, bridge and level crossing inspections, vegetation and easement management, and emergency maintenance. It excludes items such as periodic track renewal (primarily replacing life expired timber sleepers), major bridge rehabilitation work and periodic ballasting and tamping work which are reviewed in Section 11.4 below.

A typical annual budget for this work would be $5,000 / km, or $1 million / year over the track from Demondrille to Blayney and Koorawatha to Greenethorpe.

11.4 MAJOR PERIODIC MAINTENANCE (MPM) AND CAPITAL UPGRADE

The timber sleepers remaining in the track after the initial upgrade (approximately 240,000) will be in varying condition ranging from near new to those nearing the end of their economic lives. These will need to be replaced by steel sleepers. The initial strategy, based on retaining a 'fit for purpose' standard of track with an affordable rate of sleeper replacement has been to replace around 32,000 sleepers each 5 year cycle. This will leave the timber sleepers as 1 in 3 on average at the end of 20 years – a situation where every timber sleeper is between two adjacent steel sleepers. This strategy will allow the remaining timber sleepers to be removed in subsequent cycles, even where their condition is more degraded than would normally be tolerable.

Sleeper replacement work is best undertaken in larger "chunks" approximately every five years rather than as a continuous process every year.

Other works that should be undertaken concurrently with this periodic maintenance include ballasting and tamping, bridge rehabilitation (or replacement) and major level crossing upgrades.

The total amount allocated on a subsequent five yearly basis for this work is:

		$ million	
Track renewal (primarily sleeper replacement)		6.0	
Timber bridge upgrade / replacement		3.0	(Years 5 and 10 only)
Total MPM and Capital Upgrade	**– Years 5 & 10**	**$9.0**	**million**
	– Year 15 onwards	**$6.0**	**million**

Note that following the initial rehabilitation work the combined RCRM, MPM and Capital budgets average out at about $12,000 / km per year. This is consistent with good practice branch line track maintenance elsewhere in Australia.

11.5 BELOW RAIL COST RECOVERY

This report recommends that the costs of providing the below rail maintenance by the infrastructure provider should be recovered in two ways, namely access charges and periodic capital grants.

11.5.1 Access Charges – Local Train Operations

Routine maintenance (RCRM, Section 11.3) should be recovered by way of access charges to the above rail operators using the track. These access charges will comprise a Flagfall rate ($ / train-km) and a variable rate ($ / 1000 GTK) as per the current ARTC charging regime.

The annual amount to be recovered is $1 million (Section 11.3). For the traffic levels and numbers of trains projected for this study this would be raised by an access charge of $1.5 / train-km and $6.00 / 1000 GTK.

This is about 2.5 times the level of ARTC access charges on the mainlines and the impact of this has been discussed in Section 10.5.1. These charges are not insignificant, but do not jeopardise the financial viability of the above rail operations. As the level of traffic increases, these access charges would be reduced.

11.5.2 Access Charges – Through Train Operations

Other revenue will be available to the infrastructure provider by way of access charges to through train operators. The route to Blayney from Melbourne is 140 km shorter via Cowra than via Parkes and this would provide train operating cost and time savings.

The study has identified a new business based in Blayney which intends to operate a three times weekly dedicated container train service between Melbourne and Blayney. (This is expected to grow to five trains/week but this report assumes three). It is assumed that this service would not be operated by the Cowra based regional railway, although this would not necessarily be so.

The Demondrille to Blayney line would be available to this operator who would pay access charges in the same manner as the Cowra based regional railway.

11.5.3 Periodic Government Grants

With the routine maintenance component covered by access charges, the funding shortfall comprising the initial rehabilitation and the five yearly MPM works and capital upgrades would need to be funded by way of government assistance.

This study maintains that avoided road maintenance and accident costs and other externality benefits associated with the resumption of rail services will be greater than the periodic injections of funding for the railway, thereby resulting in a net community benefit.

This strategy is developed in Section 12.

11.6 SUMMARY OF BELOW RAIL OPERATIONS

The below rail operating costs outlined in the foregoing sections are summarised in Section B of Table 12.1 on page 52.

It is evident that the proposed access regime will provide a modest operating surplus over annual routine maintenance costs in years when there is no major periodic track maintenance.

However the substantial initial track rehabilitation and the subsequent five yearly MPM works and capital upgrades will require supplementary funding from other sources, presumably government. This will be offset by the avoided road costs and other externality benefits.

12. CALCULATION OF NET COMMUNITY BENEFIT

12.1 THE CALCULATION OF NET COMMUNITY BENEFIT

The Net Community Benefit deriving from the establishment of a regional railway operation at Cowra will be sum of:

- The above rail operator surplus available for further investment (Section 10.5);
- The reduced road maintenance and accident costs, environmental externalities and transport costs borne by the community (Section 9.5);

Less:

- The below rail operator's shortfall in the recovery of infrastructure maintenance costs from track access charges (Section 11.6).

The resultant figure represents a net surplus available for investment in the community.

12.2 RESULTS

The three categories above are set out as a 15 year cash flow analysis in Table 12.1

At the end of 15 years the track would be in very good condition comprising over 65% steel sleepers and all bridges would have been fully maintained or changed out with culverts. The next major capital upgrade decision would be made at that time.

The "bottom line" shows a positive net benefit of $2.3 million for most years with a shortfall (as expected) in years 0, 5 and 10 where there are substantial capital investments.

Applying a discounted cash flow analysis to the projected cash flows yields the following:

- Net Present Value (NPV) (15 years, 10%) $ 4.9 million
- Internal Rate of Return (IRR) 22.5 %
- Benefit Cost Ratio (BCR) (10%) 1.28

The BCR reflects the fact that a substantial injection of capital is required at the commencement of the project in order to remediate many years of deferred maintenance, whereas the net benefits occur later in the project.

12.3 SUMMARY

Given the conservative volumes of freight projected to be able to use the proposed rail service, it may be concluded that:

- The above rail operator will be able to provide a sustainable rail service without the requirement for any government assistance or other subsidy.
- The below rail operator (infrastructure provider) will be able to undertake all routine annual maintenance on the track and associated structures solely from the revenue provided by the track access charges.
- There will be a requirement for a $10.5 million initial grant as catch-up for the deferred track and bridge maintenance and further $10 million injections of capital at 5 yearly intervals for major track renewal works.
- When the externality and other community benefits are included, there is an overall net benefit associated with the implementation of the project.

Year :	0	1	2	3	4	5	6	7	8	9	10	11
A. ABOVE RAIL OPERATIONS								$ (000's)				
Revenue from Operations		7,099	7,099	7,099	7,099	7,099	7,099	7,099	7,099	7,099	7,099	7,099
Less :												
Train Operating Costs		4,384	4,384	4,384	4,384	4,384	4,384	4,384	4,384	4,384	4,384	4,384
Cowra Line Access Charges		296	473	562	651	739	739	739	739	739	739	739
Overhead & Fixed Costs		1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100
Interest on Start-up Costs		240	240	240	240	240	240	240	240	240	240	240
ABOVE RAIL OPERATOR SURPLUS		1,079	901	813	724	635	635	635	635	635	635	635
B. BELOW RAIL OPERATIONS								$ (000's)				
Infrastructure Investment :												
Initial Track Rehabilitation	3,500											
Bridge Rehabilitation	5,000	500	500	500	500	3,000					3,000	
Carcoar Tunnel	1,000											
Level Crossing Upgrade	1,000											
Periodic Sleeper Renewal + MPM						6,000					6,000	
Routine Track Maintenance		1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Less :												
Revenue from Cowra Operations		296	473	562	651	739	739	739	739	739	739	739
Revenue from Through Operations		125	199	237	274	312	312	312	312	312	312	312
NET BELOW RAIL SURPLUS (cost)	(10,500)	(1,080)	(827)	(701)	(575)	(8,949)	51	51	51	51	(8,949)	51
C. AVOIDED ROAD & EXTERNALITY BENEFITS								$ (000's)				
Upgrade Koorawatha - Greenthorpe Road	4,000											
Annual Road Maintenance Costs		941	941	941	941	941	941	941	941	941	941	941
Accident Costs		734	734	734	734	734	734	734	734	734	734	734
Other Externalities		226	226	226	226	226	226	226	226	226	226	226
Reduced Transport Costs		355	355	355	355	355	355	355	355	355	355	355
TOTAL ROAD & EXTERNALITY BENEFITS	4,000	2,257	2,257	2,257	2,257	2,257	2,257	2,257	2,257	2,257	2,257	2,257
D. NET COMMUNITY BENEFIT (cost) [= A + B + C]	(6,500)	2,256	2,330	2,368	2,405	(6,057)	2,943	2,943	2,943	2,943	(6,057)	2,943

E. FINANCIAL ANALYSIS:	
Net Present Value (NPV) Benefits (10%)	4,894
Project Internal Rate of Return (IRR)	22.5 %

Table 12.1: Summary of Net Community Benefit

13. BUSINESS MODEL

13.1 STAKEHOLDERS

The successful implementation and subsequent viability of the proposed railway will depend on the efficient management of the interfaces between the major stakeholders. These are illustrated in Figure 13.1 below.

13.1.1 Customers

The customers of the railway will be the local manufacturing and processing industries and grain shippers. For containerised products this will involve the coordination of locally based road hauliers to transport their containers to the intermodal terminal, the terminal operator to load the containers on to the train and the rail operators to undertake the line haul to the destination (usually Port Botany).

In actual practice, a seamless service will be offered by a "one-stop-shop" point of contact who will manage the entire transport task for the customer.

The goal is for customers to see minimal difference between the former road service and the new rail service. In either case they will see only a truck loading product at their premises and the remainder of the delivery, whether by road or by rail, will be transparent to them – only the price will be different.

13.1.2 Terminal Operator

This study has assumed that the operation of the terminal will be independent of the railway although this need not be the case in practice.

There have been several instances elsewhere in NSW and Australia where a road freight forwarder (either a smaller locally based company or a larger interstate operator) has managed the terminal. These have generally achieved only partial success as the terminal manager has tended to regard the rail operation as a subsidiary of the road operation and given preference to the latter. In addition, other road operators have shown reluctance to support the terminal as they are, in effect, bringing business to their competitor.

The most successful regional intermodal terminals are those which have been operated by local independent operators who regard their primary business as maximising the volume of freight through the terminal but are not seen as a competitor by any of the other trucking companies operating in the region.

Figure 13.1 shows a linkage between the rail and terminal operators. Successfully managing this interface will be critical to the success of the railway undertaking.

13.1.3 Above Rail Operator

As a general observation, it must be acknowledged that in the Australian scene railways serving country regions (as distinct from the larger inter-capital operations and the very large scale minerals haulage railways) have generally enjoyed partial success at best.

This contrasts with the very successful North American "shortline" phenomenon which can provide an example of how railway companies can undertake the relatively small regional task.

From the 1950's onwards the large North American railway companies had been finding it increasingly difficult to manage their branch line networks profitably. However, since the early 1980's, they have been able to divest these secondary lines to smaller locally based companies – the "shortlines". With few exceptions, these smaller railway undertakings have been able to develop more appropriate work practices and cost structures while providing an outstanding level of customer service. The result is that business has been won back to rail and most companies are now operating very profitably.

The lesson for Australia is the privatisation *per se* is not the panacea for the rail industry's problems. The other factor which must be addressed is *organisation structure*.

That is, large national companies are necessary to operate on the high volume long distance corridors, but smaller locally based companies are required for the smaller regional markets.

This is the primary consideration in this study, namely that a successful outcome is critically dependant on a suitable "shortline" operator being identified and then given assistance to establish an operation at Cowra.

This above rail operator will be responsible for procuring suitable locomotives and rolling stock, managing maintenance contracts with maintainers, undertaking all rail safety and accreditation requirements and, most importantly, developing the business by attracting sufficient business to rail.

The above rail company will not be responsible for maintaining the track but will contribute to routine maintenance by way of access charges payable to the below rail operator. The shortline operator will however have considerable input in the overall track maintenance strategy.

13.1.4 Below Rail Operator

The below rail operator will be responsible for the provision and maintenance of the track and structures forming the railway infrastructure. It is essential for the viability of the railway as a whole that this be carried out in a cost effective manner and to a fit-for-purpose standard (no "gold-plating"). Similarly, overhead and profit margins must be restricted to those directly associated with the job (no third party "dipping")

The ongoing routine maintenance (RCRM as defined in Section 11.3) should be recovered by way of access charges paid by the above rail operators. Initially these will be set at a higher rate than the access charges on the ARTC mainlines due to the smaller freight task, but the rate will reduce as the freight task increases over time.

Capital costs associated with major capital upgrades (MPM as defined in Section 11.4) should be recovered by way of periodic grants. However as the track is rehabilitated to a low maintenance state over time these should eventually reduce to the point where the entire railway is self funded for all of its infrastructure requirements. This strategy has been developed in Section 11.5.

13.1.5 Government

There are three tiers of Government that are relevant to this project. Local Government has a vital interest in the well being (economically and socially) of their region, although they have no direct responsibility, under current arrangements, for rail. Local government has a responsibility for local roads and they stand to gain from revival of the regional rail network to the extent that road freight activity is reduced. In this particular project the various Shires have an interest in revival and survival of the local rail network (as demonstrated by their commissioning of this study) and they may collectively or individually be willing to be involved in support activities to do with the railway (e.g. coordination of advisory groups; facilitation of planning issues). It is much less likely that Local Government would have the resources or incentive to become directly involved in ownership or operation of the railway. The State Government has prime responsibility for rail, both under the constitution and in more practical terms as the current owner of the rail infrastructure involved in this project. The State is responsible for decisions relating to line closure and opening, funding issues, and legislation relating to rail in general (e.g. Rail regulation and accreditation) as well as in specific circumstances (e.g. legislative changes that might facilitate a new paradigm for regional railways that do not fit comfortable into the existing main line freight / urban passenger regime). The State Government has, and will continue to have the final say in regard to the future of this line. It is highly desirable that the State (presumably through its Rail Infrastructure arm) should be closely involved in the aligning the infrastructure and the business aspects of the regional railway operation. Financing the rehabilitation and ongoing capital upgrading will primarily fall to the State and this is probably the most important aspect of their involvement. The benefit to the State Government, apart from resolution of a political issue, will arise from the offset in various trauma and environmental issues that will arise as a result of freight on rail as compared to freight on road. It is also possible that the 'Cowra' model may provide a precedent for other regional rail lines that are similarly placed.

The National Government at this stage has no direct authority or financial interest in regional rail, although there is some regional road funding trickling down from the Federal Government. Most regional rail lines trade in export traffic to a greater or lesser extent (for instance Cowra rail traffic potential is predominantly export) and this may provide a trigger to provide Commonwealth support for particular cases. Other than that, just as main line freight, and now progressively Urban passenger rail have been recognised and part funded by the National Government, so in time might deserving parts of the regional rail network. However at this stage regional rail remains firmly in the domain of the State.

Coordination of the work to be done to restore the Cowra railway funding and development of a viable freight operation on the line is essential if the risks in this project are to be equitably shared and trust developed between the various interested parties. This is the major issue for the State and a significant issue for the Shires involved in this region.

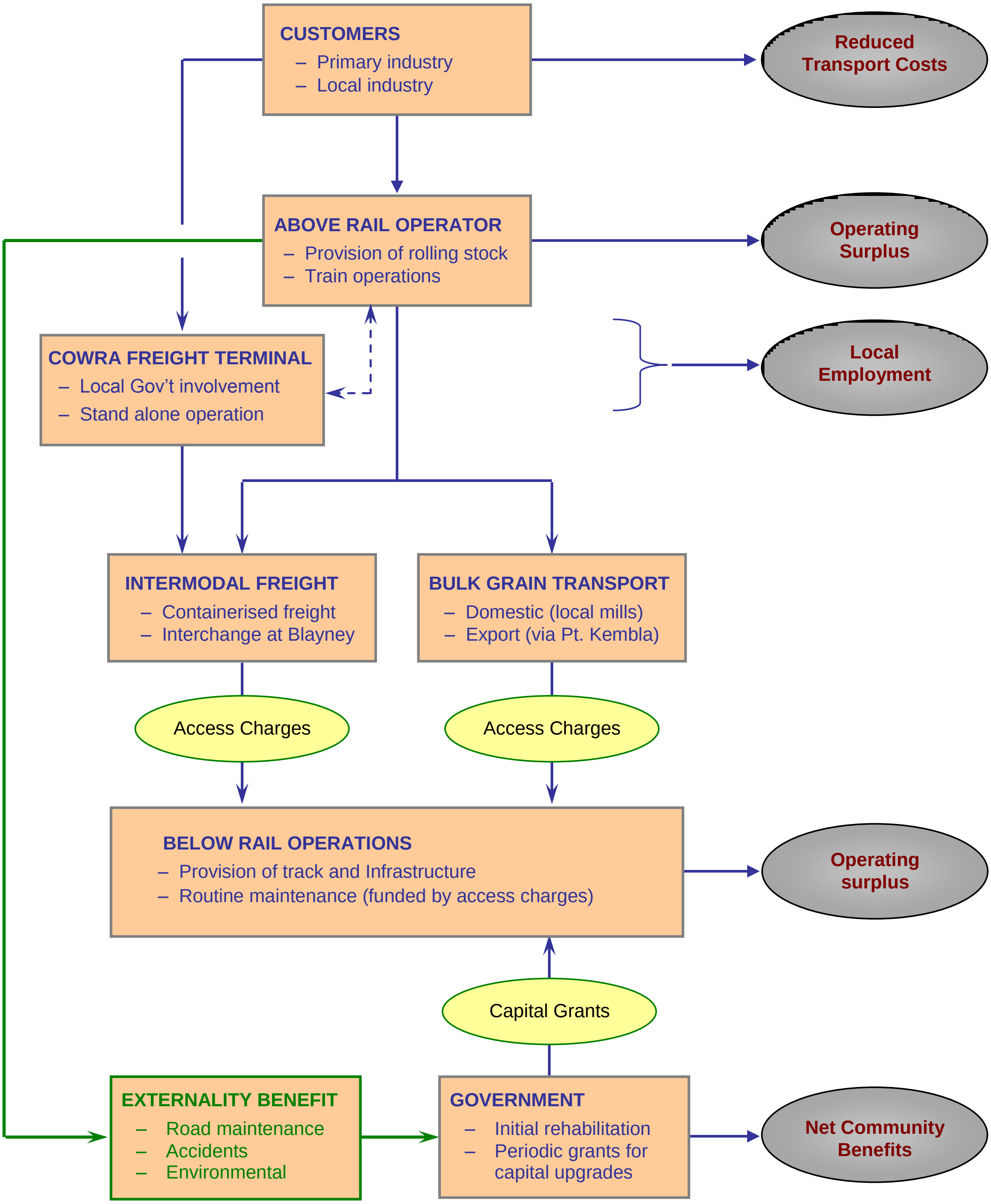

Figure 13.1: Business Model

13.2 KEY SUCCESS FACTORS

Assuming that there is Government agreement to progress the Cowra railway project, the following issues must be addressed in order to achieve a successful outcome:

- Securing a rail operator willing and able to provide regularly scheduled and other services on the line (initially for grain and container traffic) that meets customer needs, is competitive with road transport and who has the incentive and capacity to develop and grow a viable business.
- Securing an independent terminal operator or owner who is prepared to work in close collaboration with the rail operator, who can provide appropriate equipment, provide a customer-focussed service and who also has a strong incentive and capacity to develop and grow a viable business.
- Agreement on an acceptable allocation of business risk between above and below rail operators and the terminal operator.
- The ability to secure commitments from customers to provide the necessary volume throughput to make both the rail and terminal operations viable standalone businesses.
- Agreement from Government to fund the initial rehabilitation and restoration works sufficient for services to resume, including clearance works on the Carcoar tunnel.
- Agreement from the Track Manager to institute an appropriate maintenance regime consistent with the Rail Operator's and customer requirements and which is in line with "best practice" for comparable regional railways.

14. START UP STRATEGY

An early action should be to develop a business plan which sets out the detail of the proposed operation and its business components along with financial projections and steps that are needed to develop the business over time. The business plan would provide the necessary information to allow operators, investors, freight generators and the various arms of Government to have confidence in the outcome of the revival of the Cowra rail group. The business plan would need to be developed in advance of infrastructure restoration so that all issues that need to be addressed before service commencement can be undertaken concurrently with the initial infrastructure works.

The line between Cowra and Blayney has been out of use for over two years and was closed at a time when at least one bridge was in very poor condition. The southern half of the Cowra network was in rather better condition when it was put into 'service suspended' status in September 2009, although it has one bridge that warrants attention. The basic approach in this report is fairly similar to that in the NSW Grain Review – restore and stabilise track at a condition appropriate to its nominal previous standard and appropriate to its anticipated future traffic.

In basic terms this would require replacement or rehabilitation of four poor condition bridges to enable resumption of services along with some remedial work on others as a holding measure. Some track work would be required to ensure it is in adequate condition to run freight trains at up to 60 km/h (subject to specific speed ramp proposals identified earlier). A particular issue is to ensure that the Carcoar tunnel has clearance for standard (9 ft 6 in) height containers on normal flat wagons.

It is acknowledged that the Blayney to Cowra section of line was restored and reopened once before (in December 1999) but resulted in very limited use being made of it. As a result it is assumed that the track owner would want some form of risk sharing in regard to track restoration as a hedge against a similar outcome.

The strategy proposed is to replace or rehabilitate the three deficient bridges (along with a couple of other minor bridgeworks more easily undertaken prior to traffic recommencing) along with tunnel clearance work and basic track restoration to allow trains to run, and then complete the restoration and condition stabilisation program once services are established. It is recognised that leaving some of the significant works, particularly bridges, until after trains are running will present some cost and access issues and it may be that the program will need to be tweaked once detailed cost estimates are known.

The longer term objective would be to replace all timber bridges with more durable structures (steel or concrete bridges, pipes or inverts in extended formation), establish a 1 in 4 steel sleeper pattern early and then progressively replace all remaining steel sleepers in a series of periodic maintenance cycles. A capital plan and timelines of proposed expenditure is shown earlier in Section 3.3.

A terminal is a pre-requisite for the railway. If the north end of Cowra yard is deemed suitable, and council approval is forthcoming, the work to establish the terminal will be relatively quick and simple. Complementary minor works will need to be undertaken in Cowra yard to facilitate provision of interim container handling facilities. A suitably experienced operator needs to be identified who is willing to provide the necessary handling equipment and operate the facility on a commercial basis.

A rail operator also needs to be set up. The most practical way to achieve this would be to interest an accredited existing niche operator in becoming the operator, either directly or preferably in partnership with local interests, including a prospective terminal operator. Issues of accreditation and the type of rail equipment that they have or can access will play a part in the establishment of a suitable operator. The appointment of a new (previously non-accredited) operator is also a possibility however the hurdles and timelines involved in gaining accreditation for the first time should not be underestimated.

15. SUMMARY OF PROPOSED OPERATIONS AND INFRASTRUCTURE

In summary, the proposed operational and infrastructure concept would be based upon:

- The identified traffic, once fully established, being able to cover the costs of operation of the trains as well as contribute sufficient access fees to cover the routine costs of track maintenance
- A bulk grain task averaging 255,000 tonnes per annum, both for domestic customers and export.
- An intermodal terminal being established at Cowra and operated by the private sector on a commercial basis.
- An intermodal train which would operate five times per week to and from Blayney, mainly for export traffic.
- The equivalent of two train consists to handle bulk grain and intermodal traffic.
- Provision of four operating 2000 HP locomotives plus a backup unit.
- Provision of 22 operating bulk grain wagons plus a backup of two.
- Provision of the equivalent of 24 intermodal wagons (minimum 48 TEU capacity).
- The grain train being run by the regional railway to all destinations.
- Intermodal wagons being interchanged with an appropriate main line operator at Blayney.
- Locomotives being leased at commercial rates to limit exposure to debt.
- Grain wagons being leased or acquired depending on availability and the going leasing rates or purchase price.
- Intermodal wagons coming from the pool of wagons run by the main line operator.
- Infrastructure remaining with the current owner.
- A capital program to eliminate the degraded and high cost items of infrastructure (primarily timber bridges and timber sleepers) which will need to come from Government.
- Track between Blayney and Demondrille being maintained to a 60 km/h standard with a number of speed ramps to a higher speed at key locations.
- Track between Koorawatha and Greenethorpe being maintained to a standard enabling grain trains to operate at 50 km/h empty and 30 km/h loaded.
- A progressive plan to ultimately achieve 100% steel sleepers in track.
- All timber bridges being ultimately replaced with durable alternatives.
- The tunnel at Carcoar having clearance for standard containers on normal flat wagons.
- Level crossings as far as possible being free from rail speed restrictions.
- Infrastructure maintenance being managed to integrate with needs of the business

- An operator being established with a base at Cowra to employ train crew, manage and operate freight trains on the line and with strong formal and informal links to local freight customers and community groups.
- Community benefits arising from this project having the potential to be quite substantial. A proportion of these benefits (externalities) cannot be collected by the railway in freight revenue or track access charges – this is one reason why Government needs to be involved to achieve an economic outcome.
- An overriding objective for the rail infrastructure to become low maintenance whilst remaining fit for purpose on a sustainable basis.
- An overriding objective to have a low operating cost rail freight service with high reliability, a strong customer focus and close contact with regional business and local communities.

16. ACTIONS TO PROGRESS PROJECT

Recommended sequential actions to allow this project to progress include:

- Shires to consider the report and endorse the general strategy to restore the infrastructure and rail service.

- Submit the report to Government with appropriate recommendations from the Shires, noting that at some stage CountryRail will need to be involved.

- Set up a steering group comprising interested representatives from the regional community (including Shires, freight producers, LRTC and LVR), and one or two from the study team. Initially this group would need to argue the case and deal with the issues involved in getting a suitable agreement to restore and stabilise the line.

- Pursue urgent early action to get the Carcoar tunnel surveyed so the scope of the clearance problem is fully understood. (A suitable tunnel surveyor is available at Bathurst and has indicated this part of the work would cost in the order of $10,000).

- Seek support for preparation of a Business Plan for the railway, both in respect of above and below rail applications. This should be the final vehicle for achieving Government agreement to support restoration of the infrastructure and to facilitate resumption of train operations.

- Once initial agreement is reached to proceed, a representative of CountryRail, and at a later date the chosen Operator, should join the group. The steering group (which should be kept to as small a number as possible) would be responsible for progressing the project once some sort of agreement has been achieved.

- Once agreement is reached the restoration program will need to be refined with reliable costings and timelines. As far as possible solutions for bridges should have regard to upfront cost but also the longer term maintenance cost. Likewise the steel sleeper program should be undertaken with the aim of minimising installation cost. These are technical issues that are likely to be the responsibility of the track owner.

- Negotiate the issue of access pricing with the track owner and, if necessary, with other Government bodies.

- Undertake discussion and subsequent negotiation with prospective rail operators.

- Seek Expressions of Interest for the appointment of a suitable Terminal Operator.

- Consult with the Rail Regulator to ensure that the objectives of the project are understood and there are no unidentified issues that may arise to stop or delay matters.

APPENDIX A

GLOSSARY OF TERMS

Above rail	Train operations and associated functions (e.g. train crewing, locomotive and rolling stock maintenance) taking place on rail infrastructure
ARTC	Australian Rail Track Corporation
Below rail	Fixed railway infrastructure and associated functions (e.g. track and structure maintenance, train control and access)
CFCLA	Chicago Freight Car Leasing Australia – a major rail leasing company
CountryRail	Rail Infrastructure Corporation of NSW – owner of the NSW regional rail network
Cowra Rail Network	The lines from Blayney to Demondrille via Cowra and from Koorawatha to Greenethorpe
GTK's	Gross tonne-kilometres
Hook and pull	Where an operator provides locomotives and crew to haul another operators train
Intermodal	Traffic loaded in containers which is exchanged between rail and road modes at a terminal specially equipped for this purpose
IRR	Internal Rate of Return
LRTC	Lachlan Regional Transport Committee
LVR	Lachlan Valley Railway Society
MPM	Major periodic (planned) maintenance
NPV	Net Present Value
NTK's	Net tonne-kilometres
Rail Regulator	NSW Independent Transport Safety and Reliability Regulator (ITSRR)
RCRM	Routine corrective and reactive maintenance
Reefer container	Insulated container with internal or external refrigeration unit
Short lines	North American term for branch lines operated by small locally based companies which exchange traffic at junctions with main lines operated by major railway companies
SimTrain	A simulation model for assessing train operating performance
TAL	Axle load in tonnes
TEU	Twenty foot equivalent container – mostly for import/export traffic
Transoms	Specially cut timbers to which the rail is directly fixed on open deck bridges
Turnout	Points for diverting trains from one track to another

APPENDIX B

TABLE OF TRAIN LOADS AND TIMES

Section From	Section To	Loaded Times	Empty Times	Loco Loads	Loco Loads
				"1000 HP" 48 class	**"2000 HP" 422 class**
		(minutes)	**(minutes)**	**(tonnes)**	**(tonnes)**
Blayney	**Swan Ponds**	65	47	490	830
Swan Ponds	**Cowra**	45	35	750	1300
Cowra	**Koorawatha**	40	36	600	900
Koorawatha	**Young**	52	50	490	830
Young	**Demondrille**	50	31	490	830
Demondrille	**Young**	50	31	490	830
Young	**Koorawatha**	52	50	490	830
Koorawatha	**Cowra**	40	36	600	900
Cowra	**Swan Ponds**	60	38	490	830
Swan Ponds	**Blayney**	72	52	490	830
Koorawatha	**Greenethorpe**	38	37	750	Na
Greenethorpe	**Koorawatha**	62	60	1140	Na

APPENDIX C

LAND FREIGHT EXTERNAL COSTS AND ENERGY USE

Philip Laird FCILT Comp IE Aust

C.1 BACKGROUND

External costs may be regarded as "costs imposed outside market transactions and they fall on a number of individuals or groups ...other than those individuals who give rise to the costs" (Inter-State Commission, 1990, *Road Use Charges and Vehicle Registration: A National Scheme* p89). Reports published in Australia during the 1990s touching on external costs in transport include those of the National Transport Planning Taskforce, the Victorian Environment Protection Authority and the Bureau of Transport and Regional Economics (BTRE) with its definitive 1999 report *Competitive Neutrality between road and rail.*

With the growing land freight task and projections for future growth, accounting for external land transport costs have been of increasing interest to government. Related reports during the current decade include the 2000 and 2003 Austroads reports *Valuing Environmental and Other Externalities,* Australian Transport Council's 2004 *National Guidelines for Transport System Management* (updated in 2006) along with two BTRE reports *Land Transport Infrastructure Pricing: An Introduction*, Working Paper 57 in 2004 and *Health Impacts of Transport Emissions in Australia*: Economic Costs Working Paper 63 in 2005. A New Zealand Ministry of Transport *Surface Transport Cost and Charges* study released in 2005 is also of note.

A 2006 Australasian Transport Research Forum (ATRF) paper *Valuing Transport Externalities - A Mechanism to Promote Sustainable Development* by Caroline Evans of ARRB Group Ltd gives a good account of the difficulties involved in an Australian context of identifying "…environmental externality costs and estimating their value in monetary terms"; and also on reliance on overseas studies. The paper also notes from the above 2004 BTRE report "…that externalities vary on many dimensions, including by location and time of day (congestion, local pollution and noise), weather conditions (pollution), engine efficiency (local pollution and climate change) and fuel use (climate change). Additionally, environmental impacts are exacerbated in urban areas compared to regional areas of Australia. This is due to higher populations in these areas, increased levels of travel, mobility, and congestion."

Six external costs of road and rail freight operations in both metro and non-urban areas were identified in a 2001 Track Audit prepared for the Australian Rail Track Corporation (ARTC). These external costs are accidents, air pollution, noise pollution, greenhouse gas emissions, congestion, and incremental road damage. For each external cost, estimates (mostly based on the BTE 1999 report *Competitive Neutrality between road and rail*) were given in terms of cents per net tonne km for both metro and non-urban areas. Comment on energy use and greenhouse gas emissions is given C.2.

The ATRC Track Audit estimates were updated in two studies conducted for Queensland Transport in 2001 and 2004. Further information can be found in a 2005 ATRF paper by this writer, *Revised Land Freight External Costs In Australia,* and a summary of this paper appears as Section C.3, with notes on under-recovery of road system costs in Section C.4 and C5. Comment on road crashes is given in Section C.6. The aggregate revised aggregate estimates of unit external costs for accidents, air pollution, noise pollution, greenhouse gas emissions, congestion, in year 2000 values, are in cents per net tonne km:

1.75 for road haulage in urban areas,
0.98 for road haulage in non - urban areas,
0.43 for rail haulage in urban areas, and
0.17 for rail haulage in non - urban areas.

Five of the updated 2001 Track Audit values (noise, air, greenhouse, congestion and accident for non urban areas) obtained for Queensland Transport in 2001 are noted in Table 6 of the 2004 Final Report of the NSW Grain Industry Infrastructure Committee (GIAC). The GIAC report also noted (p24), inter alia, "… that while the external costs of road transport are greater than for rail the overall size of external costs is not significant in comparing road and rail modes for this task."

Significantly, the GIAC report whilst noting the cost of improving roads to accommodate more grain trucks did not include the external cost of under-recovery of road system costs from articulated trucks. Amongst the organizations who made detailed submissions to the NSW Grain Industry Infrastructure Committee was a committee based at Boree Creek that had been active in attempting to persuade the NSW Government to not only retain their branch line (57 km from The Rock) but also upgrade it for heavier axle loads. After the GIAC report had been published, the Boree Creek Committee had found errors in the GIAC report of under-estimating tonnages and the cost of road upgrades in event of closure of the line.

The Victorian Rail Freight Network Review in its 2008 report *Switchpoint: The template for rail freight to revive and thrive!* considered (pages 27 and 28) externality costs in terms of cents per net tonne km for both road and rail based on the unit values given in the 2006 ATC *National Guidelines for Transport System Management*. (See Section C.7). As noted in the Victorian report "… the ratio of road to rail costs in the rural environment is around 6.4:1. This is less than the ratio of around 10:1 evidenced in the values calculated by Queensland Transport, as used in the NSW Grain Industry Advisory Council (GIAC) Report into grain branch lines. A truly accurate analysis would need to be based on measurements taken along the key road and rail routes under deliberation here, and would include consideration of locomotives and truck types (and ages) as well as congestion and road safety measures on key routes under specific freight task parameters."

The Victorian report also notes measures in Western Australia to keep certain freight traffic on rail (see also Section C.8 below) and after noting the need for a holistic approach and the objective of "Triple bottom line outcomes" made 29 recommendations. These were in the spirit that the "the Government provides a fit-for-purpose regional rail freight system at reasonable cost, which is capable of efficiently transporting known freight volumes at prices competitive with road, providing a platform for future growth which is economically, socially and environmentally responsible."

The 2009 *New South Wales Grain Freight Review* considered external costs and stated that they used a mixture of ATC values and crash costs (road and rail) adjusted for inflation. The unadjusted unit rail crash rate used in this review is from the 1999 BTE report *Competitive Neutrality between road and rail* of 0.03 cents per net tonne km, which is the same at the ARTC Track Audit. Although the costs of upgrading roads is addressed by the NSW Grain Freight Review, the external costs they refer to do not include under-recovery of road system costs from heavy truck operations.

Following the NSW GIAC approach, this report shall use the 2001 Track Audit/Queensland Transport values above, but with the inclusion of under-recovery of road system costs (which is treated in Section C.4). The average unit costs for noise, air, greenhouse, congestion and accident for non urban areas (year 2000 terms) when adjusted to 2009 values (using CPI multiplier 1.33 from the RBA inflation calculator from March 2000 to March 2009) are approximately, in cents per net tonne km,

2.33 for road haulage in urban areas,

1.30 for road haulage in non - urban areas,

0.57 for rail haulage in urban areas, and

0.22 for rail haulage in non - urban areas.

C.2 ENERGY USE AND GREENHOUSE GAS QUESTIONS

From the Survey of Motor Vehicle Usage conducted annually by the Australian Bureau of Statistics (ABS cat. no 9208.0) articulated trucks in Australia travelled an estimated 6.9 billion kilometres in the 12 months ended 31 October 2007, with a freight task of 143.6 billion tonne kilometres (where one net tonne km results when one tonne of freight moves one km, so a container weighing 20 tonnes moving 410 km from Young to Botany has a freight task of 8400 tonne km). All articulated trucks in Australia consumed 3781 million litres of diesel fuel in the 12 months ended 31 October 2007, giving an average road freight output of 37.98 net tonne km per litre. In terms of *energy efficiency* this is about 0.98 net tkm per MegaJoule (MJ - where the combustion of one litre of diesel releases 38.6 MJ of energy).

Overall, Australia's hire and reward railways had in 2006-07 an energy efficiency of about 3.33 net tkm per MJ (from Australasian Railway Association (2008) *Australian Rail Transport Facts 2007* page 18 that notes the energy intensity as 0.3 MJ/ntkm).

This gives rise to an oft quoted rule of thumb that the average freight train will use about one third of the diesel that articulated trucks will use for a given freight task. (Note that the iron ore trains have a much higher energy efficiency of about 15 ntkm/MJ and do not form part of the hire and reward freight task).

Using the above cited energy efficiencies for road and rail freight (0.98 and 3.33 net tkm per MJ respectively and 38.6 MJ from one litre of diesel) then moving the freight task from road to rail (112.1 million tonne kilometres as given in Table 9.1) by rail will consume some 0.88 million litres of diesel. However, if it all goes by road, some 2.96 million litres of diesel will be used per annum. **The difference is about 2 million litres of diesel per annum. This translates to about 5400 tonnes per annum of CO2 of greenhouse gases.**

Taking a longer term view, there is the potential need in the near future to reduce dependence on imported oil. In this regard, the 2008 Garnaut Climate Change review final report noted (Chapter 21 'Transforming transport', p 503) that "Governments have a major role in lowering the economic costs of adjustment to higher oil prices, an emissions price and population growth, through planning for more compact urban forms and rail and urban public transport. Mode shift may account for a quarter of emissions reductions in urban public transport, [also p511] … an assessment by the Bureau of Transport and Communications Economics (1996) estimated that upgrading rail lines between cities to support the transfer of some freight from truck to rail would be a no-regrets measure, providing economic benefits and reducing emissions. …"

C.3 LAND FREIGHT EXTERNAL COSTS

Executive Summary of an Australasian Transport Research Forum Paper *Revised Land Freight External Costs in Australia* Sydney September 2005 Philip Laird, University of Wollongong

This paper outlines some estimates of external costs of land freight transport published in Australia since 1990. The earlier reports include those of the former Inter-State Commission, the National Transport Planning Taskforce, the Victorian Environment Protection Authority and the Bureau of Transport and Regional Economics with its 1999 report *Competitive Neutrality between road and rail.*

With the increasing land freight task and projections for future growth, estimates of external land transport costs have been of increasing interest to government. Recent examples include Queensland Transport, the Victorian Department of Infrastructure, the NSW Department of Transport study of grain transport options, the Australian Transport Council's 2004 *National Guidelines for Transport System Management*, and, the 2003 Austroads report *Valuing Environmental and Other Externalities.* A New Zealand Ministry of Transport *Surface Transport Cost and Charges* study released in 2005 is also of note.

The paper gives particular attention to six external costs of road and rail freight operations in both metro and non-urban areas identified for the Australian Rail Track Corporation's 2001 Track Audit. These external costs are accidents, air pollution, noise pollution, greenhouse gas emissions, congestion, and incremental road damage. The results of two studies conducted for Queensland Transport in 2001 and 2004 that provided updated estimates for each of the Track Audit externalities are discussed. The revised estimates of unit costs include:

1. Australia wide accident costs of 0.6 cents per net tonne kilometre (ntkm) for road freight moved by articulated trucks and 0.03 cents per ntkm for rail freight.

2. An average cost of air pollution in capital cities of 0.65 cents per ntkm for freight moved by articulated trucks and 0.22 cents per ntkm for rail freight moved by diesel electric locomotives. These estimates are based on PM10 emissions as discussed in two BTRE reports *Health Impacts of transport emissions in Australia: Economic costs* (2005) and *Urban pollutant emissions from motor vehicles: Australian trends to 2020* (2003).

3. Noise in capital cities - 0.22 cents per ntkm for road, 0.12 cents per ntkm for rail.

4. A greenhouse gas cost (based on $25 per tonne of carbon dioxide) of 0.18 cents per ntkm for road freight moved by articulated trucks and 0.06 cents per ntkm for rail freight.

5. Road congestion (metro only) 0.10 cents per ntkm for road. -

6. Pending the third determination of road user charges for heavy vehicles of the National Transport Commission, under-recovery of road system costs from articulated trucks at 1.0 cents per ntkm.

Table C.1 Recommended revised Australian land freight externality costs

Externality Measure	**Road (c/ntk)**	**Rail (c/ntk)**
Accident Costs	0.60	0.03
Air pollution		
– Metro	0.65	0.22
– Rural	0.13	0.04
Noise pollution		
– Metro	0.22	0.12
– Rural	0.07	0.04
Greenhouse gases	0.18	0.06
Congestion (Metro only)	0.10	
Increased road maintenance	1.00	
TOTALS		
Metro	**2.75**	**0.43**
Rural	**1.98**	**0.17**

Reference: As per text. Note that road maintenance costs for roads of light construction are higher, also that any rail track subsidies may need to be taken into account.

It may be noted that, excluding unrecovered road system costs, the metro articulated truck road external cost of about 1.75 cents per net tonne km is less than half the approximate value cited in the above Austroads report of some 4 cents per net tonne km.

Lower unit costs are given for air pollution and noise for road and rail haulage in non-urban areas.

Even if the users of land freight transport are not required to meet their full external costs, such costs should be fully accounted for when major infrastructure investment decisions are being made. Based on the information in this report, the values in Table 1 are recommended.

It is also of note that road vehicle operators using petrol pay an appropriate de facto externalities charge through fuel excise without rebates, and the assigned average health costs from car use (1.3 cents per km) in the state capital cities equates to about 12 cents per litre of petrol used.

However, following introduction of the New Tax System in 2000, the operators of heavy vehicles were granted conditional rebates for the use of diesel, which have since been further extended to effectively require no payment of external costs (cf about 20 cents per litre prior to 2000.

C.4 UNDER-RECOVERY OF ROAD SYSTEM COSTS

The largest component of the road freight external costs is a year 2000 estimate of the average cost of unrecovered road system costs in Australia from the operation of articulated trucks at 1 cent per net tonne km. Subsection C.5 has further comment on the calculation of this estimate. In the meantime, there are six points of note:

1. A series of Government reports in the 1970s and 1980s, also the 1999 report of the Bureau of Transport Economics *'Competitive Neutrality between Road and Rail',* acknowledged under-recovery of road system costs from certain heavy truck operations. This report (page xi) noted *"Under the current road user charging system, trucks overall are undercharged for their use of the road system. Moreover, larger more heavily laden vehicles and those travelling larger distances are charged the least (per tonne kilometre) while smaller, less heavily laden vehicles and those travelling shorter distances cross-subsidise them."* The BTRE (1999 p 58) suggested that *"Mass-distance based road use charges offer greater scope to reflect the avoidable cost of heavy vehicle road use."*

2. In the 7 years to 2006-07 from 1999-00, the Bureau of Transport and Regional Economics (BTRE) Road Construction Price Index increased by a factor of 1.38. This is more than the CPI. However, this study will use the estimate of 1.0 cents per net tonne km for un-recovered road system costs.

3. The National Transport Commission (NTC) in its 2005 *Draft Regulatory Impact Statement* Third Heavy Vehicle Road Pricing Determination (page 33) conservatively estimated that the subsidy in the second determination of charges for 9-axle B Doubles amounted to $8400 per annum. These subsidies are being reduced by current NTC charges but not eliminated.

From the NTC (2005, *Technical report* Third Heavy Vehicle Road Pricing Determination Table 45) data, the number of the 9 or more axle B Doubles significantly increased from 707 in 1997 to 5976 in 2003. It appears that the appreciable subsidies one of many factors in the rapid growth in numbers of these trucks, quite possibly into inappropriate applications (eg lightly constructed rural roads).

4. An example of road cost shifting to Local Government, as a result of a Federal or State Government action, was noted by the Industry Commission in its 1991 report into rail. To quote from the Industry Commission, Rail Transport, Report No 13, 21 August 1991 p 115

> **"5.4.3 Local government road expenditure and road externalities**
>
> Branch line closures (or service reductions) can result in more heavy vehicles on local roads; the consequent pavement damage can add significantly to local government road expenditure. Heavy vehicles travelling through country towns can also impose large noise and pollution costs on the local residents. The ALGA, taking a national perspective, commented as follows:

In looking at the economies of closing the branch line, the cost of upgrading the road alternative to a standard where it can do the same job efficiently need to be taken into account. From the perspective of developing a rational transport system, the economies of saving public expenditure by closing a branch line might be illusionary if the net result is a requirement to increase public expenditure on roads. (Submission 81)

"The issue is well illustrated by AN's closure of the Gladstone to Wilmington line in South Australia. AN operates as a commercial business and is unable to take into account increased damage to local roads when deciding upon rationalisation of its network. When AN lost the contract to transport grain there was a large increase in the number of trucks travelling on local roads such that the District Council of Mount Remarkable estimated a doubling of the maintenance cost of a 21 km length of local road. The estimated additional costs were $140,000 (in 1990 prices) every four to five years (ALGA, Submission 81). If the cost of such road damage had been included in the cost of road transport, sufficient traffic may have been retained on the rail line to warrant keeping it open…."

5. As noted above, under-recovery of road system costs from many heavy truck operations have persisted for many years. The option of mass-distance pricing for heavy trucks has also been under consideration for decades with Australia (and has been in successful use in New Zealand since 1978). Its adoption in Australia is long overdue.

6. For roads of light construction, as previously recommended by the NSW Roads and Traffic Authority in 1990 (see Industry Commission 1991 report on rail, p116) an amount of 3 cents per net tonne km would be an appropriate indicator for road system costs for trucking operations when significant damage is done to local roads.

Support for the view that Local Government should be able to recover road pavement costs and other externalities was also given by the Industry Commission, which in their final 1991 report on Rail Transport recommended, inter alia:

"... that State and Territory laws be amended to provide local governments with effective capacity to impose specific pavement damage and externality charges on heavy vehicles. Such charges should be levied the principals for whom the road haulage is provided. A process of appeal should be set up to settle disputes between the local authority and the principles responsible for the pavement damage or externalities." (Vol I, p117).

Moreover, the Industry Commission, in its 1991-92 Annual Report (p197-198) noted, inter alia: *"Annual fixed charges are not efficient because costs vary with the distance travelled and the mass of the vehicle. The result is that some vehicles - the heaviest travelling long annual distances - will meet less than 20 per cent of their attributed costs. Charges for heavy vehicles that reflect costs they impose are essential to ensure best use is made of the nation's road and rail infrastructure, and that industry location decisions are appropriate in terms of minimising the overall cost of economic activity. Differences between the recommended charges and road-related costs are greatest for vehicles competing with rail. The charges, as recommended, will therefore potentially distort the long-haul freight market as rail reforms take effect."*

The estimate of 3 cents per net tonne km for under-recovery of road system costs from heavy truck operations, along with the fourth power law, was accepted in a series of decisions in the New South Wales Land and Environment Court (Justice Stein, 1989, Transcript of Judgement re Baulkam Hills Shire Council and another party, New South Wales Land and Environment Court.). This Court has upheld in a number of cases the right of Local Government Councils under the New South Wales Environmental Protection and Assessment Act, 1979 to impose additional road use charges on heavy truck haulage as a condition of development consent where road haulage is involved.

Further comment is given in a 1990 Report of the Wollongong City Council Coal Transportation Task Force. This report noted, inter alia, that the NSW Roads and Traffic Authority had then suggested that an average external cost of pavement wear and tear due to bulk haulage is 3 cents per net tonne kilometre.

C.5 ROAD SYSTEM COSTS ATTRIBUTABLE TO HEAVY VEHICLES

The approach adopted in this sub section is that used by McDonell (Report of the Commission of Enquiry into the NSW Road Freight Industry, 1980, Vol. IV, Appendix 3.1) to calculate road system costs due to heavy trucks for 1997-98. An outline of the methodology was given by the Inter-State Commission (1986, p267) *Cost recovery arrangements for interstate transport.*

In brief, the approach used by the NSW Commission was a pay-as-you-go one to gain an estimate of the cost to improve and maintain the NSW road system for various categories of vehicle. These included light rigid trucks with less than 4.1 tonnes carrying capacity, heavier rigid trucks, articulated trucks and all other vehicles. Costs were identified as separable pavement costs (trucks), separable other costs (trucks), separable costs (non trucks), and common costs. For heavy vehicles, including buses, separable pavement costs were allocated using unit costs for equivalent standard axle kilometres or ESA kms. Other separable costs for trucks such as easier grades, overtaking lanes and stronger bridges were found by using broad estimates provided by the NSW Government; as suggested by the ISC, these other separable costs may be allocated on the basis of gross/ average vehicle weight kilometres. After making an allocation for separable costs for the various classes of vehicles, all other costs are regarded as common costs, which are allocated on the basis of "passenger car equivalent" distances.

It is stressed that the estimates gained, like the ones that follow, are approximations based on limited data. A modified version methodology developed by McDonnell is now applied for 2005-06 using data released by the NTC during the third determination. The seven step process we use is as follows.

1. Determine the total expenditure T for the given financial year for expenditure on all roads, and, the combined figure R for arterial road maintenance and construction costs, by all levels of government.

2. Allocate separable pavement costs P due to all heavy vehicles using ESA kms.

3. Find 'other separable costs of heavy vehicles' Q for the larger roads, stronger bridges, extra passing lanes plus easier grades to accommodate heavy vehicles. Take Q as 15 per cent of R with allocation between each class of vehicle on the basis of AGM kms.

4. Assign separable costs S of all other vehicles as 11 per cent of T.

5. Evaluate the remaining costs as common costs, C = T - P - Q - S.

6. Allocate these common costs to various classes of vehicles on the basis of passenger car unit equivalent kilometres using 1 for a car, 2 for rigid truck, 3 for an articulated truck, 4 for B-Doubles and smaller road trains and 5 for larger road trains (NRTC, 1998).

7. Calculate the total attributable costs to each class of truck and other vehicles.

The NTC (2005a, p7) data shows that an estimated $5206m (R) was applied to construction and maintenance of arterial roads (rural and urban). According to the NTC (2005b, p13) urban and rural road agency expenditure (Federal, State and Local Governments) was $10,395m (in 2005-06 terms). This is the amount T.

An important question is that of an average unit cost for an equivalent standard axle kilometre (ESA km). It is understood that the NTC's Third Heavy Vehicle Road Pricing Determination process did not derive a unit cost (which depends on the type of road) from first principles or on advice from the road construction authorities but rather the NTC (2005b, p47) found it (3.22 cents per ESA-km for arterial roads and higher for local roads) as a result of 'working backwards. In this case, we use the unit cost of 8.75 per ESA km, based on a mid range estimate from Vuong B and Mathias C (2004) *Estimates of unit road wear cost* ARRB Transport Research Report No 361

Using these assumptions, the methodology outlined above and detailed NTC (2005b, Tables 46 and 47) data, it is found that attributable road system costs in 2005-06 amounted to approximately $2436m for all articulated trucks and $956m for all rigid trucks. In addition, attributable road system costs of $1111m for six axle articulated trucks, $692m for 9 or more axle B-Doubles and $391m for all road trains are estimated.

C.6 THE ROAD SAFETY QUESTION

Estimates of the total annual costs of accidents in Australia involving either articulated trucks or freight trains are gained from updated data from the Australian Transport Safety Bureau (ATSB) along with BTRE (2003, *Rail accident costs in Australia*). The BTRE estimated that the average economic cost of a fatality in a rail accident was $1.9 million in 1999 (as an 'average economic cost' as opposed to a 'willingness to pay' basis). This is an increase from the BTRE (2000) estimate of the cost of a road fatality in 1996 as $1.5 million. For the average cost of a road crash requiring hospitalisation, and the average cost of other (minor) injuries, the BTRE (2000) gave estimates of $325,000, and $12,000 respectively.

Extensive data for fatal road crashes involving articulated trucks and other vehicles in Australia is given by the ATSB. However, data from the ATSB for serious and other injuries due to road crashes involving articulated trucks is limited.

In the five years to 2003, 950 lives were claimed on Australian roads in road crashes involving articulated trucks over the. If we assume that say 50 per cent of the cost of road crashes involving articulated trucks in Australia is due to fatalities, and use the above cost of a fatality at $1.9 million, the total cost of these road crashes was $3610 million. The ABS (2004) estimates of the Australian freight task due to articulated trucks (ranging from 101 btkm in 1999 to 115.7 btkm 2003) show 529.1 btkm for the five years to 2003. Thus the average unit cost in the five years to 2003 for road crashes in Australia involving articulated trucks is about 0.68 cents per net tkm.

Clearly this is an area warranting better data and more research, and it would be appropriate to provide estimates for average accident costs involving articulated trucks for both urban and non - urban areas.

In the absence of further data, it is proposed to use 0.6 cents per net tkm as an Australia wide average accident cost for freight moved by articulated trucks in the year 2000. This is about half way between older estimates of 0.5 cents per net tkm, and, the above findings.

It is of note that Austroads (2003, *Valuing Environmental and Other Externalities* p75) found a derived road crash cost of $15.58 per 1000 tkm (ie 1.56 cents per net tkm) for road crashes involving articulated trucks. This was determined by noting that during 1996, a total of 193 fatalities involving articulated trucks formed 8.2 per cent of all road fatalities, then allocating this percentage to the BTRE (2000) estimate of the cost of all road crashes (inflation adjusted to 2000 values), and dividing by the articulated truck freight task.

In the five years from 2004 to 2008, the number of persons killed in road crashes involving articulated trucks was 801 (2008 Statistical Summary Road Deaths Australia, Department of Infrastructure, Transport, Regional Development and Local Government, 2009, Table 21). The total number of deaths from road crashes over these five years in Australia was 7879, with articulated trucks involved in 10.2 per cents of this loss of life. Typically, articulated trucks are about involved in about 3 per cent of vehicle kilometres travelled by all vehicles on Australian roads. Such vehicles are accordingly over-represented in road crash fatalities.

C.7 ATC DEFAULT VALUES FOR EXTERNAL COSTS

From Appendix 2 of the 2004 ATC publication, *National Guidelines for Transport System Management In Australia* Default Externality Values (Austroads) are given. These follow in Table C.2 for articulated trucks and rail.

TABLE C.2 UNIT EXTERNAL COSTS - ATC DEFAULT VALUES

	Articulated trucks		(Rail)
Externality	**Urban**	**Rural**	**(both)**
Air pollution (primarily diesel)	0.60	0.0035	0.30
Greenhouse/Climate change	0.07	0.07	0.03
Noise	0.23	0.00	0.004
Water	0.01	0.00	0.005
Nature and landscape	0.33	0.003	0.068
Urban separation	0.20	0.00	0.069

All costs are in cents per net tonne km and are in 2001 terms, except water pollution 2002 Rail calculations are also given (in brackets). Note this data differs in some aspects from that given on page 298 of the Victorian RFNR report.

Note also that the ATC values do not include crash costs and do not include the unrecovered road system costs from the operation of articulated trucks.

C.8 SOME WESTERN AUSTRALIAN APPROACHES

The appreciably high external costs for road are one reason for governments regulating certain bulk traffic to rail. It is of note that the Government of Western Australia in a December 2006 submission "Comment on the Discussion Draft of the Productivity Commission's Inquiry into Road and Rail Freight Infrastructure Pricing" stated, inter alia, that

> *"In WA, there are a number of examples of the movement of bulk material by road where attributable costs are clearly not being covered. There are situations where increases in heavy vehicle charges could have a significant benefit on rail's modal share. There are also a number of cases in WA of mineral ore and grain movement where there is direct competition between road and rail services."*

State Governments, by a combination of carrots and sticks can assist in moving bulk freight from road to rail. By way of example, in Western Australia (see below) as noted on 15 August 2006 by Planning and Infrastructure Minister the Hon Alannah MacTiernan MP, a new $30m facility would cater for plantation timber and woodchips, resulting in a significant reduction in road freight.

On 14 June 2007 Ms MacTiernan announced that the WA Government will regulate the haulage of woodchips and logs in the South-West to ensure that the movement of timber products by rail destined for the Port of Bunbury is economically viable. To quote from her Media Release of that day *"We want to provide the best balance between road and rail freight, to ensure the impacts of freight on communities are minimized."* Ms MacTiernan said.