Inquiry into Progress in Rail Reform

Submission to the Productivity Commission

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1. INTRODUCTION

This submission is mainly concerned with freight, and updates submissions made by this writer to the inquiry of the role of rail by the House of Representatives Standing Committee on Communication, Transport, and Microeconomic Reform (HORSC CTMR, 1998).

At the outset, the 16 recommendations of this Committee are strongly supported. It is considered that the work of this Committee, and their staff, produced a report that is of value to the nation. It is now up to the Federal Public Service and Parliament, and the rail industry, to ensure that the recommendations are implemented without undue delay.

As shown by the weight of evidence presented to this Committee by the 117 organisations and individuals who made submissions to the 1997-98 rail inquiry, the most pressing issue facing rail in Australia is the condition of the mainline interstate track in Eastern Australia. Competitive neutrality with road transport is an issue that also demands attention.

The need for investment in mainline intercity rail track, and major intercity road links, was addressed by the National Transport Planning Taskforce (NTPT) in 1994-95. A key recommendation (No. 2) of the NTPT was **the need for a more balanced approach to road, rail, port and airport infrastructure investments**. A similar recommendation was made in 1991 by the Ecologically Sustainable Development working group on Transport.

The NTPT report did not canvass all major issues relevant to rail, and this includes the major discrepancy between rail track access pricing for freight trains, and road track pricing for heavy articulated trucks. These growing issues are addressed in more detail later. At the outset, it is worth noting the comment of Prof Hilmer (William Fraser Commemorative Address, Chartered Institute of Transport, Sydney, 29 September 1995) re the road freight industry. ***"The road sector does not fully pay for the road damage and externality costs (Inter-State Commission 1990) and this may affect potential intermodal competition with rail especially."***

1.1 Progress in rail since the 1991 rail report

The 1991 inquiry of the Industry Commission and the comprehensive report 'Rail Transport' are considered as helpful. In respect to improving rail freight efficiency and competitiveness in Australia, reference is made to a recent article of this writer in Transport Reviews, Taylor and Francis, London, Vol 18, No 3, p241 - 256. In summary:

In 1994-95, the Australian rail freight task was approximately 100 billion tonne kilometres (btkm). This freight task included some 37 btkm for the haulage of iron ore in Western Australia, 28 btkm for coal haulage in Queensland and New South Wales, and about 16 btkm for interstate rail freight. The paper is mainly concerned as to how improvements can be made to the efficiency and competitiveness of interstate rail freight services through the upgrading of sections of mainline track that currently have severe speed - weight restrictions.

Recent improvements in rail freight efficiency are discussed, with emphasis on two indicators: average unit revenues (cents per net tonne km), and average energy efficiency (net tonne km per MJ). Rail freight efficiency is high for the Western Australia iron ore operations, Queensland coal operations and Adelaide - Perth general freight operations. However, between Australia's three largest cities of Melbourne, Sydney and Brisbane, some 36 per cent of the mainline track fails to meet basic Fast Freight Train standards with a ruling grade of 1 in 66 and no curve radius less than 800 metres. The constraints on efficient rail freight operations imposed by severe terrain, and how the effects of terrain may be reduced by improved track alignment, are discussed. Some economically warranted rail track investment measures are outlined, including those identified for a National Transport Planning Taskforce. These measure have the potential to reduce liquid fuel use by over 250 million litres a year.

Factors affecting competitive neutrality between road and rail freight that are outside of the present scope of Australia's National Competition Policy are broadly considered. These factors include the extensive upgrading of the National Highway System with full Federal funding, and low levels of road cost recovery from heavy trucks operating over long distances.

1.2 What is new in rail and road since 1991?

A summary of some of the changes since the Commission's 1991 rail report follows.

1. The application of National Competition Policy and disaggregation plus some privatisation of rail systems (eg parts of Australian National).

2. Queensland Mainline Upgrade $590 m completed - with benefits to Brisbane-Cairns track plus freight and passenger train operations, including a new tilt train due October 1998.

3. Adelaide Melbourne standard gauge by 1995 with 3 'new' freight train operators.

4. National Rail formed in 1991, has acquired 120 new locomotives since 1996, now offers better rail freight services, but struggles with market share and to make a real profit.

5. NRTC charges determined in 1992, plus growth in road freight with B -Doubles etc.

6. The Australian Rail Track Corporation formed in 1998.

7. New Megaprojects supported in principle: Sydney - Canberra, Alice Springs to Darwin, or, Melbourne to Darwin.

8. Rail Inquiries: Senate 1997, House of Reps 1997-98, and now this inquiry 1998-99.

9. In the six years from 1991-92 to 1997-98, the Australian rail freight task has grown from 89 to 110+ billion tkm, this task is performed with less staff and less energy inputs in a more efficient manner, and, rail freight deficits have all but gone.

10. Some Government rail freight systems offering rail freight services are now paying dividends to their Government (eg Freight Corp, Queensland Rail, Westrail).

Note also that Tranz Rail (ex New Zealand Railways that was privatised in 1993), albeit in a much different policy environment to Australia, **now pays dividends to shareholders and taxes to Government.**

1.3 Some general observations

A. Both public and private rail freight services have a vital role in sustaining coal, iron ore, and wheat exports. The total value of these exports amounted to $14 billion in 1995-96 (Australian Bureau of Statistics (ABS), 1996). The associated rail freight task in 1995-96 included 27.9 billion tonne km (btkm) for coal and

39.8 btkm for iron ore. This was part of a total rail freight task of 104.3 btkm (63.5 btkm Govt. (Steering Committee on National Performance Monitoring (SCNPM), 1997) and 40.8 btkm private (BTCE Indicators).

This 104.3 btkm rail freight task compares with an articulated truck road freight task of 89.4 btkm in 1995, and a domestic sea freight task of 109.2 btkm in 1994-95 (ABS, 1997).

B. Contrary to 'conventional wisdom' about Australian rail operations being inefficient, it is worth noting that some of our freight railways are the most efficient in the world (see HORSC CTMR, 1998, p25, BHP evidence). One such operation is the movement of more than 55 million tonnes of iron ore a year from Mt. Newman to Port Hedland using trains with 240 wagons (with a total payload of 25 200 tonnes) over 426 km of well aligned and maintained track with high axle loadings. Using modern locomotives with such trains, the average unit cost of this operation, including track costs, is understood to be less than one cent per net tonne kilometre. This compares favourably with the 'best observed' rates in America for 1993-94 of an 'average price to industry' from Burlington Northern (BN) at 1.86 cents per net tonne km (Bureau of Industry Economics (BIE) 1995).

C. In recent years, there has been significant progress in reducing Government rail freight deficits from a broad estimate of $525 million in 1989-90 (Industry Commission, 1991a) to possibly less than $200 million in 1993-94 (BIE, 1995). During this time, overall rail deficits fell from about $2.1 billion to $1.4 billion (BTCE, 1995a, Table 2.3) and then $1.36 billion in 1996-97 (HORSC CTMR, 1998, p). There has also been a reduction in average unit rail freight costs for each system. This has been due to many factors.

One factor is declining staff numbers for each rail system. Total employee numbers for the Government rail systems were over 110 000 in 1979, and less than 48 000 as of 30 June 1996; also, rail freight employee numbers fell from an average of 56 217 in 1987-88 to 26 263 in 1995-96 (SCNPM data to 1997) leading to an increase in freight output from 0.89 million tkm per freight employee in 1987-88 to 2.42 million tkm per freight employee in 1995-96. More details are given in Tables 1, 2 and 3.

D. Despite our world class iron ore operations, and commendable Central Queensland coal operations under electric traction saving over 100 million litres of diesel a year (Read and Drake, 1989), our intercity rail track, with the exception of Adelaide-Perth, is nothing short of a **national disgrace**. Whilst the Adelaide - Perth section is our closest match to United States and Canadian Class 1 Railroad standards (capable of fast and heavy freight trains with double

TABLE 1 GOVERNMENT RAIL FREIGHT NET TONNE KILOMETRES billion net tonne kilometres

YEAR	QR	SRA	PTC	Westrail	AN	NR	Total
1987-88	20.452	14.213	3.378	4.203	7.647		49.893
1992-93	24.391	14.837	3.678	4.970	8.480		56.356
1993-94	25.011	16.203	4.212	5.447	9.159	(13.916)	60.032
1994-95	26.492	9.000	1.790	6.235	1.500	16.6	61.617
1995-96	26.368	10.067	1.970	6.804	1.379	16.9	63.488

1996-97	28.754	12.138	2.267	7.496	1.517	16.00	68.172

References: Steering Committee on National Performance Monitoring of Government Trading Enterprises (SCNPM -1994 to 1998), with data up to 1993-94 including interstate freight whilst 1994-95 and 1995-96 data gives intrastate freight tasks along with NR interstate freight. * NOTE The number in brackets is not included in the total.

TABLE 2 GOVERNMENT RAIL FREIGHT EMPLOYEE NUMBERS

YEAR	QR	SRA	PTC	Westrail	AN	NR	Total
1987-88	18 705	19 786	6458	4707	6561		56 217
1992-93	12 767	11 461	3685	3846	3882	378	36 019
1993-94	11 817	10 306	2635	2870	3286	712	31 626
1994-95	10 942	9308	2102	2204	2934	1087	28 577
1995-96	10 467	8643	1822	1896	2275	1235	26 263
1996-97	9 407	3525?	1687	1429	1455	1308	?

References: SCNPM (1994 to 1998). Note these numbers are the average for each financial year and differ from end of financial year data given in some rail Annual Reports.
Note SRA FreightCorp data shows 3525 employees, but this raises questions.

TABLE 3 GOVERNMENT RAIL FREIGHT OUTPUT PER EMPLOYEE thousand net freight tonne-kilometres per employee

YEAR	QR	SRA	PTC	Westrail	AN	NR	Total
1987-88	1093	718	523	893	1166		888
1992-93	1910	1295	998	1292	2184		1565
1993-94	2117	1572	1598	1898	2787	19 545	1898
1994-95	2421	1642	852	2829	511	15 271	2156
1995-96	2519	1885	1081	3589	550	13 684	2411
1996-97	3057	3302*	1344	5246	1043	12 232	3624 ?

References: Tables 1 and 2. See also SCNPM (1994 to 1998) for each system.
NB Westrail 1996-97 figure derived using Tables 1 and 2 Some revision of older data to 1996-97 from the SCNPM for 1998. * Total for 1996-97 with SRA freight employees doubled (ie. 7050) to reflect former FreightRail track employees now with Rail Services Authority/Corporation.

container stacking capabilities), the section from Adelaide via Melbourne to Sydney and Brisbane is grossly deficient. As succintly described by the Hon Diana Laidlaw MP, South Australian Minister for Transport, in her keynote speech on 28 April 1995 for the Rail 2000 Conference in Adelaide: *"The Adelaide-Melbourne standard gauge program has been done on the cheap - the sharp curves and grades through the Adelaide Hills remain as an impediment to efficient operation. The standard gauge Melbourne to Albury line is slowly disintegrating, with only minimal funds for rehabilitation. The Albury-Sydney line retains its steam engine alignment and the Sydney to Brisbane line remains the most difficult line in the country to operate, despite the high level of freight traffic between the two Pacific seaboard capitals. "*

E. There are real problems with transport data, and if the Commission notes in the course of its inquiry some problems with transport data, consideration of a recommendation for **more and better data on freight and passenger movements that is accurate, up to date, and published quickly** would be much appreciated. To quote from an editorial from Rail Digest, December 1997:*"Both road and rail would benefit from more and better data on freight and passenger movements. Such data needs to be accurate, up to date, and published quickly. Transport data is an important area where the Australian Bureau of Statistics is struggling with other demands on its resources (it ceased its publication Rail Transport years ago and more recently its Interstate Freight Statistics). Other Government agencies analysing land transport data have either gone (the Inter-State Commission 1990, the Bureau of Industry Economics in 1996; and now the Energy Research and Development Corporation) or, been down sized (Bureau of Transport and Communications Economics in 1996, and now our Universities)."*

2. RAIL TRANSPORT AND GREENHOUSE

Some citations for the value of rail in reducing transport greenhouse gas emissions in freight transport were given in references, including:

* Industry Commission (1991b) *Costs and Benefits of Reducing Greenhouse Gas Emissions*

* ERDC *Land Freight Transport Energy Evaluation*, (Laird and Adorni-Braccesi, 1993) and,

* Bureau of Transport and Communications Economics 1996 report *Transport and Greenhouse Costs and options for reducing emissions.*

The Industry Commission (1991b, Vol II, p F50-53) noted that rail investment in Benchmark levels would lead to a modal shift in long distance freight from road to rail by 1998-99 of 4.2 million net tonnes (corresponding to 7 billion tonne km - with estimates due to Australian National), and, there would be a fuel saving in the order of 100 million litres of diesel a year if rail was to gain 50 per cent of modal share of land freight on shorter corridors, 65 per cent on intermediate length corridors, and 80 per cent on corridors in and out of Perth (see also Laird and Adorni-Braccesi, 1993).

The assumption that rail could attain such modal shares is open to question, and was considered as "unlikely" by Gupte (1994). However, as shown by the Auckland - Wellington corridor in New Zealand (where rail is understood to be winning about half of the intercity freight on a corridor of some 640 km in length (albeit with a basic two lane road away from the cities)), such modal shares for rail could well be realistic. They would however require improvement of the rail track alignment to NTPT competitive goal 2 standards in Eastern Australia, and, heavy vehicle demand management through improved road pricing. It is of note that these goals were effectively adopted by the Australian Transport Council in 1997.

The BTCE (1996a) report examines 16 measures that could be taken to reduce energy use, and hence greenhouse gas emissions, in transport. Of these, 'shifting some intercapital city freight from road to rail' was identified as one of five 'no regrets' measures. This was despite a conservative approach to the benefits of rail track upgrading.

With the current global concern about greenhouse gas emissions, some 'big picture' items on energy use in land transport now warrant Government attention. These include:

A. Australia has the **world's highest road freight** in net tonne kilometres (ntkm) per capita (Austroads, 1997). As noted 12 years ago by one overseas commentator (Nash, 1985) there is a 'surprising incursion' of long distance trucking into rail traffics in Australia.

B. Some mainline intercity rail freight operations have **low energy efficiency** (eg. Sydney - Melbourne due to steep ruling grades and a "curve for every kilometre" within NSW). In turn, and coupled with a reconstructed Hume Highway, more and more Sydney-Melbourne freight goes onto road. This pushes up fuel use - estimated (Laird and Adorni-Braccesi, 1993) at some 32 million litres a year; also, construction of a new Pacific Highway without rail upgrading was estimated (loc.cit) to cost an extra 45 million litres a year.

The "inefficient" interstate track contrasts with the world's most energy efficient freight trains in the Pilbara. The Mt Newman-Pt Hedland iron ore trains in 1991 were operating at about 10 net tkm per megajoule (MJ) where one litre of diesel is equivalent to 38.6 MJ of end use energy (Laird and Adorni-Braccesi, 1993). This level of energy efficiency corresponds to the use of a little more than one litre of diesel fuel to move one tonne of iron ore 426 km.

C. By any objective indicators, Australia's Federal Government is a **big spender on roads and highways at the expense of rail and urban public transport**. This imbalance is quantified in Section 5, and extends to research funding.

D. There is a need to move to full 'user-pays' pricing of energy and transport infrastructure use. At present, Australian governments pay **large hidden subsidies** to heavy truck operations through under-recovery of road system costs, and there are probable hidden subsidies to urban car commuters in peak hours in our major cities.

In Government intercity rail operations, when considering terrain, alignment, axle loadings and speed factors, good energy efficiencies of about 4 net tkm per MJ are gained with both Central Queensland electric coal trains and Adelaide - Perth line-haul fast general freight trains. However, Sydney - Melbourne freight trains having to traverse older 'steam age' aligned track (see Table 6, Laird, 1998) with steep ruling grades and excessive curvature show about 2 net tkm/MJ. Even when allowance is made for road pick up and delivery, Sydney - Melbourne rail line haul is more efficient than road line haul using B-Doubles at some 1 net tkm per MJ.

With improvements to mainline interstate trail track to reasonable **Fast Freight Train** (FFT) standards, the energy efficiency of Sydney - Melbourne freight train operations would significantly increase (see, for example, Laird, 1998). This would require construction of a series of deviations to realign the worst sections, in a manner similar to Queensland's Main Line Upgrade that included 118 km of deviations being constructed between Brisbane and Cairns.

It is estimated (Laird, 1996) that upgrading mainline rail track to FFT standards, along with improved road cost recovery, would lead to reduced rail freight operational costs, reduced road system costs, fewer road crashes, and an annual saving of 262 million litres of diesel by 2015. This estimate of diesel fuel savings was based on:

* A 4 per cent growth rate on the 1994-95 corridor tonnages given in Table 2 (see page 13 - the average annual growth rate of the Melbourne - Sydney - Brisbane inter-capital city freight task from 1974 to 1995 was about 4.5 per cent);

* Energy efficiencies of 1.0 tkm/MJ for line haul road freight, 2.0 tkm/MJ for rail over the existing track, 2.7 tkm/MJ for rail over track rebuilt to FFT standards, and 84 MJ per tonne for road pick up and delivery; and,

* Diesel use in the year 2014-15 for two scenarios noted by the BTCE (1995b) "With all growth to road" and "With all growth to rail", is about 810 million litres and 548 million litres, respectively.

The Commission's attention is invited to the 1991 report of the Senate Standing Committee on Industry Science and Technology 'Rescue the future - reducing the impact of the greenhouse effect' that notes, inter alia, in regards to rail (p78) *"...it is essential that greater emphasis be given to improving the interstate rail system ..."* and found *"...considerable evidence that much could be done to improve the rail system, both in terms of energy use and overall efficiency, if sufficient attention is paid to grades, curves and track standards."*

This Senate Committee also found that an efficient rail system could result in *"...significant reductions in carbon dioxide emissions and large savings in Australian consumption of liquid fuels for transport services."*

After noting many reports canvassing the need for change, and then recent Government initiatives (including National Rail), the Committee urged that further action be taken to significantly improve the rail system. The Committee also held (p79) *"...an effective public transport system is essential to any strategy to reduce transport sector carbon dioxide."*

In summary, an upgraded rail system - both for freight and urban passengers - would make a useful contribution to reducing Australian transport related greenhouse gas emissions.

3. PAST INTERCITY TRACK UPGRADING

In Australia, and overseas, there are numerous examples of upgrading the worst sections of a mainline rail track to improve efficiency and competitiveness. Australian examples include the following, adapted and updated from Laird (1995).

3.1 The Chifley Government

This Government made substantial efforts to implement part of the 1945 report of Sir Howard Clapp into gauge standardisation, with agreements and offers of financial assistance.

3.2 The Menzies Government

Completed a new standard gauge route on improved alignment in the 1950s to facilitate the movement of millions of tonnes of coal from Leigh Creek to Port Augusta.

Completed, in 1968, the upgrading and gauge standardisation between Perth to Kalgoorlie under the Railway Agreement (Western Australia) Act 1961. This included the construction of two major deviations (Bayley, 1973). One was a dual gauge route through the Avon Valley from Midland to Northam, with high clearances and easy ruling grades of 1 in 200 to replace an older section with ruling grades of 1 in 40. The second deviation was from Southern Cross to Kalgoorlie, through Koolyanobbing. This work allowed freight train transit times to be reduced from 31 hours to 13 hours, and passenger train times from 14 to 8 hours.

The conversion of Port Pirie to Broken Hill to standard gauge also involved major deviations to gain a ruling grade of 1 in 120 for the loaded westbound trains along with a new standard gauge line between Cockburn and Broken Hill on an improved alignment.

Prime Minister Menzies when introducing the Railway Agreement (Queensland) Bill 1961 (Hansard, Oct 19) noted, in regards to the Townsville - Mt Isa railway that ***"...the existing railway has become increasingly deficient in many respects"*** and that ***"Rehabilitation of the railway to the standard now required includes extensive reconstruction of the permanent way to achieve better grades and curves ..."***

Thirty seven years later, Sir Robert Menzie's comment is now relevant to parts of the Adelaide-Melbourne-Sydney-Brisbane track with its 'steam age' alignment combining steep ruling grades and/or too many tight radius curves to allow for efficient and competitive rail freight operations.

3.3 The Whitlam Government

The Whitlam Government was responsible for the passage of the Tarcoola - Alice Springs Railway Act 1974 (completed in 1980). Another advance was the making of agreements, funding, and legislation leading to the formation of Australian National.

These rail initiatives were complemented by the historic formation, with full Federal funding, of the National Highway System in 1974 along with the provision of Federal funds for urban public transport.

3.4 The Fraser Government

The Fraser Government was responsible for completion of the new standard gauge line between Tarcoola and Alice Springs in 1980. It had also made a fresh start on the Alice Springs- Darwin rail link. After some delay, conversion of a broad gauge line to standard gauge from Crystal Brook near Port Pirie to Adelaide

was finally effected in 1982, with freight services starting in 1983 (Stevenson, 1987, p21). This project was promoted by Australian National, who found that the benefits would exceed the costs over 25 years by a factor of 2.8, and used loan funds. As well as construction of a bogie changing facility at Dry Creek (replacing facilities at Port Pirie and Peterborough), dual gauge track was extended to Adelaide's Outer Harbour (Stevenson, 1987, p23). The opportunity was also taken to improve the alignment of the old line, with a deviation between Crystal Brook and Red Hill.

The Fraser Government in its last term of office had approved Commonwealth expenditure for providing standard gauge access to the main ports of Brisbane, Geelong and Melbourne (Stevenson, 1987, p26). However, with the change of government, the net effect was the production of a report by the Bureau of Transport Economics.

Other railway initiatives of the Fraser Government were provision of limited loan funds under the *National Railway Network (Financial Assistance) Act 1978* to the States that then owned rail systems for the upgrading of mainline interstate track; the support of the formation of an Australian Railway Research and Development Organisation; and, an offer in 1980 to assist in electrifying the Sydney-Melbourne railway. Efforts were also made to place Australian National on a more commercial basis and to reduce its deficits.

3.5 The Hawke Government

The Hawke Government, encouraged by a Labor Party National Transport Policy (Media Release, Peter Morris, 23 February, 1983) brought new expectations for rail. These included *"Grants to States to continue gauge standardisation of intercapital rail links..."*, and*"Construction of Alice Springs-Darwin rail line with target completion date of 1988."* However, not one kilometre of gauge standardisation took place under the Hawke Government. This was despite the interest of the former Government in standard gauge access to ports and AN in extending standard gauge from Adelaide to Melbourne.

Moreover, work was stopped on the Alice Springs-Darwin railway, the State systems were starved of capital funds for rail, the former Australian Railway Research and Development Organisation was closed down in the mid 1980s, and, some rail fuel excise was diverted to road works. A valuable initiative of the Hawke Government, to reconstitute the Inter-State Commission in 1984, was undone, with its effective abolition in 1990. As seen by Stevenson (1987, p94) the Hawke Government ***"...was apparently much more interested in highway freight transport."***

The major rail achievement of the Hawke Government had to wait until 1991, with the formation of yet another rail system, the National Rail Corporation. This was to operate interstate rail freight services.

3.6 The Keating Government

The next major advance in gauge standardisation followed the formation of National Rail with the Keating Government's 'One Nation' program announced in February 1992. After deciding that standard gauge from Adelaide to Melbourne should proceed through Geelong, and not Ballarat, work proceeded quickly after agreement was reached with the Victorian Government in early 1993 and was officially opened on 4 June 1995. Standard gauge access to Brisbane's main port at Fisherman Islands had to wait until 1997.

As part of the $430 million 'One Nation' program, two small deviations on the NSW North Coast line north of Grafton at Lawrence Rd and Rappville were completed in mid 1995. The older track alignment with 1 in 50 grades and many tight radius curves was replaced by well aligned track with 1 in 70 ruling grades

using 60 kg/metre rail laid on concrete sleepers. The combined length of the two deviations at 9.8 km was 0.9 km shorter than that of the original track, with a saving of about 5 minutes in time and 90 litres of fuel per locomotive trip along with reduced maintenance costs. The overall cost, including new or extended crossing loops, was some $13 million. This gives an average cost of $1.3 million per km.

Other benefits included the lifting of overhead clearances to allow the movement of double stacked containers between Adelaide and Perth.

A further Keating Government initiative, along with National Competition Policy, was the commissioning of the NTPT reports which were the result of an extensive effort to provide a strategy to improve Australia's transport network with a view to increasing international competitiveness. It is of regret that the Keating Government did not make a formal response to the report, and failed to continue the momentum of the "One Nation" capital upgrading program.

3.7 The Howard Government

Whilst Australian National was broken into components, with three parts sold to the private sector in 1997, and an Australian Rail Track Corporation was finally formed in 1998, the three Howard - Costello budgets were harsh ones for rail. They included just $35 million for new rail capital works on the interstate rail network, as part of a restricted $250 m package over four years. This compared with 1996, 1997 and 1998 budget outlays of $2082 million for upgrading and maintaining the National Highway System (NHS).

The Minister for Transport in the Howard Government of the day, in reply to a Question on Notice (no 1382), indicated on 2 June 1997, that his Government did not intend to make a formal response to the reports and recommendations of the NTPT. Instead, it supported a House of Representatives Standing Committee inquiry into rail, and now the present inquiry. Support in principle was given during 1997 for an Alice Springs - Darwin railway with an offer of $100 million, and support in principle was given in 1998 to two further large rail projects to be funded by the private sector: a Melbourne - Darwin link, and, a Sydney - Canberra Very Fast Train. On VFT proposals in NSW, see the 1991 Report on Rail, Vol I, p224.

3.8 The Queensland Government Mainline Upgrade (MLU)

In 1997, Queensland Rail completed a five year $590 million Mainline Upgrade Project (MLU) that includes 118 km of high quality rail deviations with easy grades and curves between Brisbane and Cairns. The combined result of MLU track works has been to:

* Increase axle loadings;
* Increase the trailing load behind a locomotive (from 760 tonnes to 1200 tonnes with Mainline Electrification in the 1980s, then to 1500 tonnes with MLU); and,
* reduce transit times for both freight and passenger trains (with Brisbane - Rockhampton tilt trains due in Oct.1998). Some data on the track alignment is given by Laird (1998,Table 8).

The main work in MLU from 1992 to 1997 along with the acquisition of 250 new container wagons in 1995 and 40 new generation 2380 kW locomotives, has been rail deviations and the upgrading of hundreds of bridges for heavier axle loads.

The main reasons for the MLU project (Hunter, 1994) were: *"Without substantial upgrading, the quality of rail freight services possible could not keep pace with the quantum improvements enjoyed by our major competitor, road transport. Rail would continue to lose market share, compounding the losses from having to retain services. The Mainline Upgrade Project is targeted at improving services and picking up market share, and reducing the costs of providing these services to enable rail to compete more effectively on price."*

QR is already gaining benefits from MLU in the form of faster and heavier freight trains. A further gain, with a partnership with National Rail from July 1997, was provision of a premium Melbourne - Townsville freight train.

In a media release dated 8 September 1997 "AUSTRALIAN GOVERNMENTS FAILING THE RAIL INDUSTRY" the then Queensland Transport Minister, Hon V Johnson MLA noted that MLU and other Queensland rail capital works programs were producing results *"...with productivity growth in the 1990's averaging 12 per cent (per annum)."*

3.9 Some overseas examples

United States and Canadian Class I railways are often used to 'benchmark' Australian government freight railways (for example, BIE, 1995). These railways have some wagons carrying grain, coal, or steel with a gross weight of 268,000 lb (about 30 tonne axle loading) moving at up to 100 km per hour. In Eastern Australia, grain and steel trains are limited to 25 tonne axle loads at 80 km per hour. During the 1980s, Canadian Pacific made track investment of over $C500 million to secure a ruling gradient of 1 in 100 for loaded commodity trains moving from Alberta to Vancouver. Although this work was privately funded, Federal Government support for improved grain freight rates with enabling legislation was crucial; also the Canadian Government made a similar investment during the 1980s into upgrading Canadian National mainline track in Western Canada. More recent outlays have been made by CP and CN to allow for passage of double stacked containers on their mainline track.

New Zealand's North Island Main Trunk (NIMT) line linking Wellington and Auckland was extensively upgraded in the 1970s and 1980s to give an improved alignment with higher clearances. Part of the

civil engineering work was done in connection with electrification. Whilst the economics of electrification have since been questioned, there is no question that improvements in track alignment were cost effective.

The civil engineering work included projects of a major nature, as well as replacement of several narrow bore tunnels by cuttings, and the easing of numerous tight radius curves. These changes gave improved grades, curvature and clearances, along with much reduced bridge maintenance costs. Coupled with an increase in load to 1200 tonnes for 3000 kW locomotives, the overall result (Railnews, special edition, c 1988) was ***"shortened transit times, reduced track and vehicle maintenance and greater track reliability."***

The overall upgrading has been essential to allow New Zealand Railway freight services to remain competitive in a deregulated freight market. It is understood that rail continues to win about 50 per cent of the Auckland - Wellington freight market.

3.10 Summary re track upgrading

The Commonwealth has played a role in the past in mainline rail track upgrading, and has a ongoing role to play. Unlike the Canadian, New Zealand and Queensland Governments, the Commonwealth lost valuable time during the 1980s in mainline rail track upgrading.

There is also a limit to the gains than from competition policy. As seen by Kain (1995), *"...rail is probably fast reaching the point where the scope for marginal productivity improvements from operational (eg. work practice) reforms may be limited. Future significant gains in productivity will rely increasingly on effective track investment initiatives."*

4. THE SCOPE FOR INTERCITY TRACK UPGRADING

In Australia, there is considerable variation in the performance of interstate rail freight between various corridors. The Adelaide - Perth corridor generally performs well. This, in part, is due to Australian National management drive during the 1980s towards commercial operations, along with easy ruling grades, good track alignment (generally straight including some 478 km of tangent track in the Nullarbor Plain, or easy curves), a major concrete resleepering program (completed in 1995 by AN at a cost exceeding $500 million), and, the ability to move double stacked containers.

The Adelaide - Melbourne - Sydney - Brisbane corridors are currently poor. This is due to various factors including steep ruling grades and poor track alignment with many tight radius curves (see Table 1) and leads to higher unit operating and maintenance costs. Rail's modal share of inter - capital city land freight on the North - South corridor (Melbourne to Brisbane) is appreciably lower than the corridor in and out of Perth, as shown elsewhere (see, for example, Laird, 1998, Table 3).

There is a strong relationship between higher rail efficiencies, lower unit costs and higher modal shares for rail. As noted by a National Transport Planning Taskforce (NTPT, 1995, p11): *"A comparison between the Melbourne - Brisbane and Adelaide - Perth corridors illustrates some of the factors in determining modal splits. Rail moves some 80 per cent of the freight on the Adelaide - Perth corridor where the longer distance favours rail and the quality of the rail infrastructure is relatively good. Double stacking is possible. The road length between Melbourne and Brisbane is 1 570 km, a distance over which rail should be competitive. However, rail only carries 21 per cent of the long-distance freight. Rail traffic has to pass over more difficult terrain than road, through Sydney, and over a distance 24 per cent longer than road. Road*

traffic travels along the Newell Highway, covering the door-to door distance in 22 hours, compared with rail which requires 37 hours from terminal to terminal."

It is also of note that the combination of good quality track and new 'private' Melbourne - Adelaide - Perth train operators under the current access pricing has resulted in a reduction in rail freight costs, as claimed by Specialised Container Transport in mid 1997. However, until 1998, none of the new 'private' interstate train operators have shown much interest in operating trains on the North-South corridor.

4.1 Intercity rail corridor upgrading options

Over the last twenty years, there has been no shortage of reports for rail upgrading. As noted by this writer (Laird, 1996) for the Sydney-Melbourne corridor alone, we have:

1977 Public Transport Commission (PTC), Sydney - Canberra High Speed Passenger Train
1980 Commonwealth Electrification offer to NSW and Victoria
1981 Institution of Engineers, Australia Bicentennial Rail High Speed Proposal
1981 Hogan, M. Main South grade easing
1988 State Rail study re Main South Line: Reduced Transit Times
1989 High Speed Rail Engineers (HSRE) Fast Freight Train
1990 State Rail study re Curve Straightening on Main South
1984 -1991 Very Fast Train (VFT) proposal and reports
1991 National Rail Freight Initiative (NRFI), and Jacana Study
1993 BTCE economic evaluation
1993 ERDC project report (Laird and Adorni-Braccesi, 1993)
1994 NRC Railway Infrastructure Plan
1995 BTCE Report for the NTPT

Hogan (1981) found *"...most conclusively that it is economical to carry out a regrading of the line..."* between Goulburn and Junee with benefit cost ratios (BCRs) of at least 1.4. The HSRE (1989) report examined upgrading of the rail corridor between Sydney and Melbourne so that rail could be more efficient and compete better with road transport. Their report found that a 9 hour transit time, as against the best 1980s time of 14 hours, could be achieved by means including the improving of track alignment to FFT standards. A State Rail 1990 examination of curve easing to 1200 metres and grade easing to 1 in 60 on the Main South line gave priority to three locations between Goulburn and south of Yass.

The extent of the problem of the present early 20th Century alignment is shown by M-Train computer simulation indicating that for train operations with an AA type Superfreighter with two 81 Class locomotives hauling a 1600 trailing tonne load (Laird and Adorni-Braccesi, 1993), **Whitton's 19th Century alignment between Goulburn and Yass is 12 per cent quicker and about 12 per cent more energy efficient than the present alignment that was constructed in the 1910s.**

There are three basic approaches to upgrading interstate mainline track alignment.

A. Just minimal upgrading, so as to improve the worst aligned track.
B. Some deviations close to the existing line, built to Fast Freight Train (FFT) standards.
C. New routes in some sections, with other sections brought to FFT standards.

Two competitive goals for line haul rail freight in Australia were identified by the NTPT (1995). The first was to improve reliability and transit times, and to reduce interstate full rail freight unit costs down to 3 cents per net tonne km (tkm) over a few years (i.e. including track maintenance costs as well as train operational costs). The second competitive goal was to further reduce these costs to 2 cents per net tonne km at a total cost of about $3 billion. This includes about $1 billion for the Sydney Melbourne corridor, and another $1 billion for the Sydney Brisbane corridor. More detail is given in Table 4, which also includes the benefit-cost ratios for the various corridor upgrading options for the NR bid and NTPT goals. The first NTPT goal includes lifting the average speed of intermodal freight trains to an average of 80 km per hour, and this was adopted by the Australian Transport Council in 1997 as a five year goal. Currently, these train speeds (terminal to terminal) are only about 50 km per hour between Adelaide and Melbourne, about 54 km per hour between Sydney and Brisbane (see Appendix A), and about 70 km per hour between Sydney and Melbourne.

TABLE 4 RAIL CORRIDOR UPGRADING OPTIONS

$ millions (benefit cost ratios in brackets)

Corridor	NR Bid		Comp. Goal 1		Comp. Goal 2	
Sydney - Melbourne	368	(1.3)	455	(1.4)	980	(1.8)
Sydney - Brisbane	163	(1.1)	535	(1.1)	970	(1.3)
Brisbane - Cairns	-		445	(1.1)	445	(1.1)
Adelaide - Melbourne	152	(4.0)	170	(3.2)	540	(1.1)
Adelaide - Perth	28	(2.7)	38	(1.1)	288	(1.1)
Total	711	(1.9)	1643	(1.1)	3223	(1.1)

References Laird (1998) National Rail (NR) Bid and Competitive Goal estimates cited by NTPT (1995, page 76), and for the basic program, Laird (1996a). Note Comp. Goal 1 effectively includes the NR Bid projects, and that Comp. Goal 2 investments include the upgrading projects for Comp.Goal 1.
The costings to the sub-total are noted from the NTPT (1995) BTCE report as projects excluding terminals, Adelaide - Alice Springs and 60 kg/m rail for Adelaide - Perth. The total NR bid includes $69 million for a nation wide first level automatic train control system.

The Adelaide - Melbourne standard gauge track has some sections in Victoria with old, worn out wooden sleepers (complete with concrete sleepers that have been sitting by the track from 1995 to 1998), and severe grades and curvature in the Adelaide Hills. Also, in Victoria, the Melbourne - Albury standard gauge track for most of its length is in need of rerailing and resleepering, or, rationalising with the adjacent broad gauge track.

Mainline intercity track realignment projects that need progressing in Australia include:

1. Caboolture - Landsborough (Qld),
2. Sydney - Hunter Valley (Short North),
3. Maitland - Brisbane,
4. A major Menangle - Mittagong deviation,
5. Mittagong - Albury - isolated sections, and,
6. Murray Bridge - Mt. Lofty, and,
7. Waterfall - Thirroul.

Some brief comments follow on each item. Other useful work includes minimal deviations on the North - South rail corridors, and to lift Melbourne - Adelaide overhead clearances so as to allow for double stacking of containers with some selected grade and curve easing east of Adelaide.

1. **Caboolture - Landsborough** duplication, with some realignment, would be helpful for present train operations and almost essential if a rail link to the Sunshine Coast is to be built. Consistent with a progressive approach to rail development, the 1997 Queensland State Budget included an allowance for detailed planning of part of this section.

2. The worst aligned sections of track linking **Sydney and Newcastle** are also long overdue for realignment. More details, including 'red sectors' with tight radius curves (less than 800 m) on steep grades (> 1 in 66) are given by Laird and Adorni-Braccesi (1996).

3. Between **Maitland and Brisbane**, it is open to question whether it would be better to have a major upgrade of existing track, or, to build an inland route (BTCE, 1996b, Laird, Michell and Adorni - Braccesi 1998). At the least, the worst track should be realigned. As observed by the NTPT (1995, p 63) BTCE report in respect of Sydney - Brisbane rail, "Transit *times, reliability and costs are so poor that the corridor may not survive as a commercial freight alternative unless improvements are implemented."* This situation would be exacerbated by large scale upgrading of the Pacific Highway without rail track upgrading.

4. Most, but not all, of the bad curvature between **Glenlee and Goulburn** is confined to Menangle - Aylmerton near Mittagong. As proposed by Mr. W. Wentworth in 1991 to the Industry Commission's inquiry into Rail Transport (1991a), this 60 km section of track could be replaced for most of its length by a major deviation near the Hume Highway. Such a deviation could reduce the point to point distance by some 18 km.

5. From **Mittagong to Goulburn**, whilst there are no 'red sectors', there are sections such as near Exeter that could usefully be realigned. To improve minimum curve radius to 800 metres would require realignment of, at most, 14 km or 15 per cent of the 93 km of track.

The **Goulburn - Yass** section was discussed extensively by Laird and Adorni-Braccesi (1994) that estimated that the cost of bringing this section to Fast Freight Train (FFT) standards was $95 million - some 20 per cent of Hume Highway upgrading costs.

Other sections, including **Junee - Albury** are discussed by Laird and Adorni-Braccesi (1993), who note that to bring this section to basic FFT standards, a total of 23.5 km of track at five locations between Junee and Uranquinty would require realignment.

6. The section of track over the **Adelaide Hills** has some of the worst gradient/curvature characteristics not only between Melbourne and Perth, but also the North-South corridor between Melbourne, Sydney and Brisbane. In the 122 km from Murray Bridge to Adelaide, no less than 67 km (55 per cent) fails to meet basic FFT standards.

A proposal of M. Michell (1997) advocates realignment of the 65 km Murray Bridge - Mt. Lofty section to ease the present severe ruling gradients for West bound trains, and so eliminate the need for banking locomotives for the heavier west bound freight trains. This would include minor work between Murray Bridge and Callington, followed by a major deviation from Callington and Nairne, and smaller deviations between Nairne and Mt. Lofty. Other benefits would include easier curvature, higher clearances with faster freight trains and lower freight costs. The proposal at a cost of under $100 million could well be cost effective, and the benefits would probably outweigh those of the new road tunnels in the Adelaide Hills.

7. The section of track between Waterfall and Thirroul, on the Wollongong - Sydney route has severe curvature and geotechnical problems in need of upgrading to improve the efficiency of freight movements to and from Port Kembla, and to reduce passenger transit times.

A further example of the need for intercity track upgrading is the lack of a triangle in Parkes, NSW to allow through running of Sydney - Cootamundra - Broken Hill - Adelaide/Perth trains (see Railway Digest, July 1998) The absurdity of this situation, which has persisted for some years, is frequently shown. Take for example, the progress of SP5 (NR's Sydney - Perth container train) at Parkes on the Friday afternoon of May 29, 1998 (after the official opening of F.C.L. Interstate Transport Services Pty Ltd's new intermodal interstate freight terminal at Goobang Junction near Parkes).

The 1100 metre long Sydney - Perth container train, with two NR locomotives hauling in front, was coming up from Cootamundra via Forbes and heading west. However, at Parkes, it could not turn to the west but instead had to come into and then past Parkes Station. Because of the length of the train, two FreightCorp locos then had to haul the train into Goobang Junction. The NR locos, then followed, and using the longer Goobang loop, moved to the front of the train. After the loss of nearly an hour, the train proceeded to Broken Hill. During some of this shunting operation, the Newell Highway was blocked, and for some time, another road was also blocked (two level crossings affected).

Perth/Adelaide trains moving to Sydney/Brisbane via Cootamundra also face the same problem of not being able to proceed directly via Parkes. This has been going on ever since the mid 1990s, when NR took a reasonable operating decision to run these trains via Cootamundra to avoid the steep grades and rail congestion of the Blue Mountains.

That such basic infrastructure could be denied to NR operations for so long is an indictment on vertical disaggregation of rail systems. It is suggested that if one tenth of the effort, and expense, that had gone into disaggregation of rail systems had instead gone into track upgrading, the Parkes triangle would have been built long ago.

4.2 Export rail corridor upgrading options

This written submission shall not canvass the Alice Springs-Darwin rail proposal, the various Melbourne via Queensland to Darwin rail proposals, or completion of the Maldon - Port Kembla rail link. However, asabove, it is considered that the Melbourne - Brisbane 'inland route' rail proposal does warrant detailed economic investigation, and it is of note that Queensland Rail has undertaken recent studies for a new Helidon - Toowoomba rail track to be built to modern engineering standards. If the Melbourne - Brisbane 'inland route' was constructed, it could also serve Sydney-Brisbane freight if a new tunnel was to be constructed under the Liverpool Ranges in NSW. A new tunnel was the subject of comment in a 1998 report into the Hunter Valley of the NSW Legislative Council State Development Committee.

In addition, the rail haulage of export coal in the Hunter Valley which uses new diesel electric locomotives and an upgraded wagon fleet is of interest because of the high tonnages involved, and the scope for increased efficiency through easing ruling gradients for the loaded coal trains. One location of interest is the Whittingham Bank east of Singleton, that requires (in wet weather, and so in all weather) three new 90 class locomotives to haul just 84 loaded coal wagons (95 tonne payloads) instead of the originally planned 91 wagons.

4.3 Public or private funding ?

Up to 1994, there was a general expectation that if there was going to be any upgrading of mainline interstate track, it would require Federal and/or State Government funding. The NTPT in 1994, in the knowledge that some $3 billion of investment was economically warranted, suggested that such investment should be paid for by the users. Now, there is an increasing expectation, encouraged by the present Federal Government, that it is more up to the private sector to fund such track upgrading.

Just as intercity rail freight competes with road freight, intercity rail track upgrading has to compete with intercity highway upgrading. Such highway upgrading has been facilitated by full Federal funding of the National Highway System (NHS), and now Roads of National Importance including the Pacific Highway. The NHS has been much upgraded since its inception in 1974, with an estimated outlay since then to 30 June 1999 of **$17.89 billion** in 1999 terms. Given that the Australian Constitution does not mention roads at all, one may question a significant Federal outlay on roads, currently at some $1.6 billion per year, with nearly half to the NHS. As seen by the Federal Department of Transport (Federal Department of Finance, 1997) to the House of Reps SC CTMR in its road's inquiry: *"Successive Federal Governments have taken a view than an interstate road network is required to serve national objectives and that Federal funding is necessary to construct and maintain it adequately.... States traditionally underinvested in major interstate links because, generally, they are of greatest benefit to road users travelling to other jurisdictions "*

With the present high levels of "highway subsidisation", an expectation of private funding of intercity lines at 'no net cost to the taxpayer' is probably unrealistic. These lines do not have tens of millions of freight a year (such as Calgary - Vancouver, or the iron ore railways of Australia). If the view that private sector funding is unlikely to be forthcoming in the present policy environment appears harsh, one need only wait to see if full private funding is made available for the proposed Sydney - Canberra high speed train.

The ways public funding could be provided include:

A. Use of the full Federal fuel excise paid by the Government rail systems - some $160 million a year on the current use of some 480 million litres a year of diesel (alternatively, grant rail an exemption or a rebate (ISC, 1990) and IC (1991a, 1994)).

B. Fund ongoing rail upgrading based on a 18 cents a litre of the fuel excise paid by the rail systems (at a level of $86 million a year). This would accord with Coalition transport policy that provides, inter alia, *"...users of transport systems will get a better deal for the charges collected from them through funding for maintenance and improvement of infrastructure."*

A level of 18 cents a litre is the level officially determined by the National Road Transport Commission (NRTC, 1992) as a partial road user charge for the use of heavy trucks.

C. As suggested at the Sydney - Canberra High Speed Conference in June 1997 by the Victorian Minister for Transport, the Hon R. Cooper, the Federal Government should agree to allocate the proceeds from the proposed 1998 sale of National Rail to track upgrading.

D. Use State Government funding. However, except for track near the capital cities, this is probably unrealistic (as was found for the NHS in the 1960s and early 1970s).

There is also the issue of why users of freight services should invest in rail track, when there are ongoing road improvements and advances in truck productivity, with road track access to heavy trucks

provided at rates much cheaper than rail track access. In turn, this opens up the subject of whether there is a hidden subsidy to road freight operations. We examine this aspect in the next section.

The HORSC CTMR (1998) favoured a total of $1 billion of **Commonwealth** (rather than States or the private sector) funding for interstate rail upgrading over the next three years, to be followed by $2 billion from 2001.

4.4 The cost of not upgrading intercity rail track

It is instructive to consider the costs of intercity highway upgrading without rail track upgrading and 'user-pays' road pricing. By way of example, from 1970 when road and rail had 50-50 shares of line haul Sydney - Melbourne intercity freight to the present time where road has nearly 80 per cent and rail only 20 per cent, the cost has been high and includes:

* Some $3 billion in Hume Highway upgrading in today's prices, with an appreciable amount being applied to build a "Very Fast Truck" (VFT) route by reason of extended dual carriageways for roads with less than 10,000 AADT, extra climbing lanes, and concrete pavements, as opposed to more basic road upgrading primarily for cars.
* Hundreds of millions of litres of diesel fuel (running at an extra 30 millions of litres a year on 1994-95 data as the difference between present arrangements and an upgraded rail system carrying 50 per cent of intercity freight),
* Over a hundred lives lost in fatal crashes involving articulated trucks on the Hume Highway (including 22 in 1988 and 81 since then to 31 December 1996 on the NSW section alone).

As seen by the House of Representatives Standing Committee on Transport, Communications and Infrastructure (1987): *"Road transport may be encouraged by the hidden subsidy into areas for which rail would be better suited. The railway systems, with their subsidies more open to public view may be starved of investment funds, even though this investment may have the potential to greatly increase operational efficiency. . . . .A failure to invest and modernise the rail network and improve its operational efficiency has restricted rail's ability to compete. . . (with). . an imbalance between road and rail transport in funding, in research and in pricing. . . (leading to). . a dramatic improvement in the national highway network but no comparable improvement in the national rail network.*

This Committee, in 1989 bluntly stated that :*"...The plain fact is that a greatly increased amount of freight could be carried across the continent by rail more efficiently and with greater safety than it ever could be by road. Road has been preferred because it is seen as providing reliable transit times. If rail were more efficient and carried the amount of freight it should, lives would be saved, less non-renewable resources would be used and less pollution would be generated.....Australia is paying the price of neglect and bandaid solutions in an endeavour to solve problems in its rail systems. ... Rail has been starved of funds and rendered inefficient."*

The Industry Commission (1991a, Vol 1, p115,116) also had a good discussion on the cost to the States and local Government of road freight displacing some rail freight.

5. COMPETITIVE NEUTRALITY

In Australia, there is no shortage of influential people who consider that road based transport is the way to go. In turn, this translates to a view within the Federal Government that rail and urban public transport need not consistently receive Federal funding, as shown in Table 5 with data released by former Federal Transport Minister, John Sharp throughout 1996-97.

Further information on relative expenditure on road and rail, and urban public transport from 1973-74 to 1993-94 is given in a 1994 Parliamentary Library Research Paper (No 12), and updated for road and rail (Laird, 1996). In constant 1993-94 prices, the total revenue

TABLE 5 COMMONWEALTH EXPENDITURE ON RAIL, URBAN PUBLIC TRANSPORT AND ROADS

Current values in millions of dollars

YEAR	RAIL PUBLIC TIED	URBAN TRANSPORT UNTIED	ROADS TOTAL	ROADS	ROADS TRANSPORT
1986-87	71.32	32.5	1217.4	-	1217.4
1987-88	75.14	49.2	1198.4	-	1198.4
1988-89	61.01	24.7	1196.9	-	1196.9
1989-90	86.42	nil	1340.9	-	1340.9
1990-91	116.38	42.1	1524.9	-	1524.9
1991-92	94.47	86.2	1253.4	352.7	1606.1
1992-93	374.11	93.2	1700.7	362.6	2063.3
1993-94	242.79	nil	1023.7	508.3	1532
1994-95	281.91	nil	825.2	686.8	1512
1995-96	119.60	nil	840.7	729	1569.7
1996-97	391.04	nil	845.6	757.9	1603.5
1997-98	*40.2*	nil	*845*	*761*	*1607*

Reference: For rail, an answer to Question No 1385 given 14 May 1997 and for urban public transport, an answer to Question No 1384 given 27 June 1997 in the House of Representatives from the Minister for Transport and Regional Development, the Hon John Sharp, MHR. Note urban public transport excludes funds allocated under the Building Better Cities program that terminated in 1996.
For roads, Hon John Sharp MP, Media Statements TR87/96, August 21, 1996 except for 1997-98 from the Minister's road budget statement TR58/97 dated 13 May 1997.

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supplements for Australian National from 1 July 1974 to 30 June 1994 amounted to $2.34 billion, and total rail outlays were $3.88 billion. This left other rail expenditure at $1.54 billion which was dwarfed by a total Commonwealth roads outlay of $30.07 billion - of which some $12.56 billion was for the National Highway System or NHS. Note that, as above, **from 1974 to 30 June 1999, the total NHS outlay, in 1999 dollars using a non-farm price deflator, was $17.89 billion.** As noted (Laird, 1996, p19) "*The disparity between NHS funding and rail capital works over the last twenty years is highlighted by the important Sydney-Melbourne corridor. The total amount expended on Hume Highway construction by the Federal Government*

to 30 June 1994 was approximately $2.7 billion in today's terms, and, the net Commonwealth expenditure on the Sydney - Melbourne railway since 1974 was estimated to be less than $30 million. "

"The Federal outlays from 1974 to 1995 in improving the NHS between Melbourne, Sydney, Brisbane and Cairns is estimated, in present day terms, to be in the order of $6000 million. The net Federal outlay in improving the main railway lines linking these cities, over this period of time, is estimated not to exceed $200 million. The relative outlay of 30 to 1 is not a good example of "competitive neutrality" and shows the problems that the Federal Government has had in attempting to treat competing transport modes on an even handed basis. These include the observations in the 1984-85 Annual Report of the Department of Transport that the Australian Land Transport Program would ensure ***"...a comprehensive approach towards land transport investment"*** *including interstate mainline railways, and, a 1994-95 Annual Report (p3) statement that the Department will be* ***"adopting a multi-modal, corridor based approach to maximising returns from Commonwealth funding in land transport"*** *"*

5.2 Fuel Excise

A major impact on rail finances was the imposition of fuel excise as of August 1982. The Industry Commission (1991a,1994) has consistently argued that the Government rail systems should receive a full exemption for their use of diesel fuel. A similar recommendation was made by the former Inter-State Commission (1990). In 1994-95, all Government rail systems were making some use of light fuel oil which had an excise rate of about 7 cents a litre, with an aggregate saving estimated at some $40 million by James (1995). However, the 1995 Federal Budget raised the excise rate for light fuel oil to that of diesel.

Based on the 1993-94 use by the Government rail systems of some 480 million litres, revenue of some $162 million will be generated in 1995-96. Added to these excise payments will be some $20 million a year of loan repayments from the various rail systems.

The Senate Rural and Regional Affairs and Transport Reference Committee (1997) in its 1996-97 Rail Inquiry examined rail fuel excise. Some data, that updates an aggregate amount cited by the Senate Committee, is given in Table 5. **The bottom line is that in 1997 constant dollars, the Government rail systems, by the end of 1997, the had paid $2 billion in Federal fuel excise in 1997 terms.**

In addition, the Government rail systems had paid some $612 million, in 1994 constant dollars, in Federal loan repayments with interest from 1 June 1974 to 30 June 1994 (Laird, 1996). Thus, the total gross Federal Government revenue from the Government rail systems, in fuel excise and loan repayments with interest from 1 June 1973 to 30 June 1997, in 1997 constant dollars, is over $2.6 billion.

The road freight industry is also subject to the diesel fuel excise. However, this industry receives a massive Federal outlay on roads. As well, 18 cents a litre is effectively rebated to the industry, by the NRTC as a road user charge to allow for lower annual registration fees. The NRTC in August 1998 proposed that this road user charge be lifted to 20 cents a litre.

Clearly, the interstate mainline track needs upgrading, and, it is unjustified to tax diesel fuel for rail at the road rate when so little rail fuel excise is returned to rail track upgrading and the mining, farming and fishing sectors enjoy large diesel rebates. This is one area that also warrants further consideration in tax reform.

TABLE 6 ESTIMATES OF COMMONWEALTH REVENUE FROM RAIL FUEL EXCISE

YEAR	Estimated fuel use (million litres)	Excise rate c/L	Rail fuel excise Current dollars ($ million)	Inflation indices	Rail fuel excise Constant dollars (1997 $ million)
1982-83	600	5.2	31.2	1.862	58.1
1983-84	614	9.0	55.3	1.745	96.4
1984-85	600	9.5	57.0	1.646	93.8
1985-86	590	12.3	72.6	1.537	111.5
1986-87	589	19.7	116.0	1.431	166.0
1987-88	602	20.5	123.3	1.340	165.3
1988-89	553	21.8	120.6	1.236	149.1
1989-90	536	23.5	125.9	1.162	146.3
1990-91	492	25.2	123.9	1.114	138.1
1991-92	455	25.9	117.9	1.094	129.0
1992-93	460	26.2	120.6	1.082	130.5
1993-94	491	*	137.0	1.070	146.6
1994-95	474	**	111.3	1.055	117.5
1995-96***	468	33.7	157.7	1.027	162.0
1996-97***	468	34.6	162.0	1.000	162.0
Total					**1963**

References: Updated from Laird (1994, 1996).

Fuel excise in cents per litre is an estimate of the average rate for each financial year derived from James (1995)

* For 1993-94, the rail systems (excluding STA) used some 441 million litres of diesel and 43 million litres of light fuel oil (total 484 ML - James 1995). In 1993-94, the respective average excise rates were then 29.63 and 7.83 cents per litre.

** For 1994-95, James (1995) notes that rail systems were estimating the use of some 304 million litres of diesel and 162 million litres of light fuel oil (total 466 ML). In 1994-95, respective average excise rates were 32.164 and 6.691 cents per litre. On 1 July 1995, light fuel excise was raised to the diesel rate - an average in 1995-96 was 33.711 cents / litre.
Inflation indices based on the Gross Non-Farm product price deflators as supplied in November 1996 by the Parliamentary Research Service, Canberra.

*** The 1995-96 fuel use estimate is due to ABARE .
The 1996-97 fuel use and fuel excise figures are simply the 1995-96 estimates.

5.2 Road cost recovery from heavy trucks

This is a contentious area, and one in which it is suggested that much mis-information is being purveyed. Whilst this may be understandable from various interested parties, one would expect that the Department of Transport and Regional Development would provide

TABLE 7 ESTIMATES OF ROAD SYSTEM COSTS ATTRIBUTABLE TO ARTICULATED TRUCKS

Study	Year	Road System	Road System Costs $ million	Costs attributable to articulated trucks $ million	Percentage
NRFII	1981-82	Arterial	1276	389	30.5
NSW	1984-85	All roads	1595	369	23.1
BTCE	1985-86	Arterial	4200	1963	46.7
ISC	1989-90	Arterial	2630	563	21.4
NRTC	**Early 90s**	**Arterial**	**4515**	**702**	**16.9**

References: NRFII (National Road Freight Industry Inquiry) report (1983), Laird (1990), BTCE (1988), ISC (1990), and NRTC (1993).

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competent and consistent advice on this topic. However, there has been several statements by the Minister and/or Departmental Officials (for example, at hearings conducted by the Senate Rural and Regional Affairs and Transport Reference Committee on February 5, 1997) suggesting that under National Road Transport Commission (NRTC) charges now implemented throughout Australia, and/or according to the NRTC, there is full road cost recovery from heavy trucks. There are three main points to note here:

1. The NRTC openly acknowledged in a 1993 publication "Investigation of Fuel Only Charges for Heavy Vehicles" page 9, that there is **"under-recovery from six axle and larger articulated trucks."** The six axle articulated truck, or semitrailer, remains the main competitor to rail transport for linehaul as well as certain bulk freight.

The problems with the current NRTC charges were well summarised by the Industry Commission (1991-92 Annual Report, p197-198): *"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.*** *[emphasis added] ... 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...."*

2. The NRTC methodology for calculating charges for the heavier articulated trucks results in lower charges than almost all studies conducted during the 1990s, as per Table 7.

3. The NRTC charges fall far short, in total revenue, and structure, from what was recommended by the Inter-State Commission (1990). This included a mass-distance option.

The Application lodged by Carpenteria Transport Pty Limited to the National Competition Council for line-haul services operated by Queensland Rail between Brisbane and Cairns, notes, inter alia, (page 13) *"there is no certainty that road transport in Australia is appropriately cost recovered to provide a proper economic comparison"* (with rail).

If it is accepted by the Committee that the present NRTC road charges do provide some distortion in road - rail competition (as stated by the Industry Commission in 1992 -a point noted by the National

Competition Council in 1997 in its decision on the Carpenteria application), and if it is accepted that road cost recovery from heavy trucks is not going to quickly change, **then there is a strong case for much more Government support for upgrading mainline track than is currently envisaged by the Commonwealth.**

Numerous reports on road cost recovery published during the 1980s found under-recovery of road system costs from the heavier articulated trucks (for citations see, for example, Laird, 1990, and, Laird and Lander, 1997). Of note is that a 1988 review of the New South Wales State's taxation system found under-recovery of road system costs, with conservative estimates of about $2000 for each six axle articulated truck on the basis of a GVM of 38 tonnes.

New Zealand has a system of road user charges for heavy trucks which is based on mass-distance charging. This system was introduced in 1978 as a considered decision to put into place full road cost recovery from heavy trucks before lifting rail protection. The NZ road user charges were a necessary condition for rail freight profitability and the successful NZR privatisation in the 1993. During 1995-96, these charges raised a total of $NZ425 million out of Transit New Zealand's road revenue of $NZ888 million - that is, about 48 per cent of the main source of road funds (New Zealand Ministry of Transport, 1997, p61).

A six axle articulated truck hauling at maximum legal GVM (42.5 tonnes) in NSW as of 1 July 1996 would pay an annual NRTC charge of $4000 (it was about $8000 until 1 July 1996), plus a Federal road user charge on diesel at 18 cents a litre and a NSW fuel franchise of about 7 cents a litre. Based on intercity haulage at say 160,000 km per year and ABS average fuel use in 1991 at 51.5 litres per 100 km, this works out to about 15.375 cents per kilometre. **The road system cost in NSW would then be about one third of the charge for such a truck in New Zealand** of 49 cents (Australian) cents per kilometre in 1996 (see Table 8).

New Zealand road pricing is expected by this writer to increase, following a recent review of options for road funding (New Zealand Ministry of Transport, 1997).

The NRTC has also undertaken a Mass Limits Review (with conditional increases recommended in 1996) and indicated, with a January 1997 circular, its intention to review charges in 1997. A report finally appeared in August 1998, and now no changes are expected until mid 1999. In determining road user charges for heavy trucks in the future, it is recommended that a fully transparent process be used by the NRTC, including the procedures adopted by the Inter-State Commission in the 1980s of having all written evidence on the public record, along with public hearings and transcripts.

TABLE 8 AUSTRALIAN AND NEW ZEALAND 1996 ROAD USER CHARGES

(Australian cents per truck kilometres with GST removed for NZ charges)

	NRTC	Old MassLimits	Option A	Option C	Option F
	Aust	NZ charges	NZ	NZ	NZ
- 6 axle articulated truck:	15.4	36.0	42.1	48.8	58.3
- 8 axle B-Double	17.0	52.4	58.5	71.3	83.2

Reference Option C are current mass limits and Option F are as proposed by the NRTC for vehicles with road friendly suspension (after some bridge upgrading).For a six axle articulated truck in Australia, the annual NRTC charge of $4000, plus the NRTC road user charge on diesel at 18 cents a litre and a fuel franchise of about 7 cents a litre is used along with haulage at 160,000 km per year and ABS average fuel use in 1991 at 51.5 litres per 100 km.

For an 8 axle B - Double, the annual NRTC charge of $5500, plus the NRTC road user charge on diesel at 18 cents a litre and in most states a fuel franchise of about 7 cents a litre is used along with haulage at 275,000 km per year and average fuel use of 60 litres per 100 km.

NZ Road User Charges as per New Zealand Land Transport Safety Authority, 1996 with charges for half tonnages found by averaging charges for adjacent whole tonnages. with GST at 12.5 per cent and currency conversion at $A1=$NZ1.1. Note, in New Zealand, diesel is not subject to excise but certain other minor levies.

5.3 Regulation of road and rail freight regulations

Throughout the 1980's, with the assistance of the former Inter-State Commission, some progress was made in harmonisation of the multiplicity of regulations affecting road transport in Australia. The reform process has been continued in the 1990s by the NRTC. For rail, the problems are perhaps worse, although an Inter-governmental rail safety agreement was made in 1996. As recognised by the House of Representatives Standing Committee on Communication, Transport, and Microeconomic Reform (1998), much work needs to be done to improve and harmonise regulations affecting rail freight operations and track access.

5.4 What is the cost of disaggregation of rail systems in Australia ?

The House of Representatives Standing Committee on Transport, Communications and Infrastructure (1989) its landmark report "Rail - Five Systems - One Solution" noted that there were five Government rail systems involved in the supply of rail freight services. The solution would appear to have been to contract the number of systems, and instead, a new one, National Rail, was created. If that was not enough, we now have an even greater number when the new rail track authorities are included.

At the end of the day, the main question is: **Have the new arrangements assisted rail to win a larger share of the nation's land freight task ?** Given that Australia continues to have the largest road freight (net tonne km) per capita in the world, the answer could be negative.

The difficulty faced by rail in competing in Australia for medium sized land freight tasks is highlighted by the ongoing annual losses of National Rail (NR) which has worked hard in the area of rail reform. The failure of NR to make an operating profit is now mainly a reflection of Australia's unique land transport policy environment.

6. CONCLUSIONS

In recent years the rail industry has improved its performance and reduced its deficits, despite under investment in productive rail infrastructure. However, Australia's rail freight operations are mixed in performance, ranging from the most efficient freight trains in the world operating in the Pilbara down to intercity rail freight trains with modern locomotives operating between Adelaide and our three largest cities over mainline interstate track that is a national disgrace.

This state of affairs is, in part, due to the pre-occupation of the Federal Government in developing the National Highway System during the 1980s at the expense of rail, and now during the mid 1990s, Roads of National Importance, again at the expense of rail. During this time, Australia has granted numerous concessions to the road freight industry in the form of a much improved highway system, approval to operate heavier and faster trucks, and failing to recover the full road system costs from the heavier - long distance articulated trucks.

As a result, Australia has encouraged the expansion of energy - intensive form of land freight transport, so that we now have the highest road freight per capita in the world. Much valuable time has

recently been lost in planning for mainline interstate track upgrading so that the worst of the track, in terms of grades, curvature, and clearances can be improved. In addition, even the most basic of work has been delayed, such as completion of the 'One Nation' rail upgrading program to insert concrete sleepers that have since 1995 been sitting by the side of the track with old worn out wooden sleepers between Geelong and Ararat.

As seen by the Government Senators of the Senate Rural and Regional Affairs and Transport Reference Committee (1997, p11 and 12 of Minority report) there is a ***"...need to ensure an appropriate balance between road and rail investments..."*** and, it is a commendable aim to ensure ***"...that rail transport for general freight and bulk commodities is made as efficient and competitive as possible. "***

The United States *Intermodal Surface Transportation Efficiency Act 1991* requires intermodal planning to *"...reduce energy consumption and air pollution while promoting economic development"* by developing:*"...a National Intermodal Transportation System which is economically efficient and environmentally sound, provides the foundation for the nation to compete in global economy and will move people and goods in an energy efficient manner."* The United States Transportation Equity Act 1998 continues this balance, with reports of a $203 billion allocation over six years providing for a minimum of $36 billion for mass transit.

It is appropriate that in Australia, the Federal Government allocates land transport infrastructure funding in a more balanced way, and allows mainline interstate track upgrading to commence without further delay. This should be in a manner similar to the commendable 1992-97 Queensland Mainline Rail upgrading program.

Rather than a Government pre-occupation with rail- rail competition for thin non - bulk markets, the real rail issues for Australia, along with competitive neutrality with road, are upgrading intercity and export rail tracks. This is necessary so as to allow rail to perform towards world best practice for **all** significant rail freight tasks.

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REFERENCES

Australian Bureau of Statistics -(1996) *International Mercantile Trade* Cat. No 5422.0
-(1997) *Australian Transport and the Environment* Cat. No 4605.0

Austroads (1997) *Australia at the crossroads: summary*

Bayley, W (1973) *Standard Gauge Railway across Australia*, Austrail Publications, Bulli

Bureau of Industry Economics (1995) *Rail Freight 1995 International Benchmarking.*

Bureau of Transport and Communications Economics

- (1990) *Freight flows in Australian Transport Corridors*
- (1995a) *Analysis of rail deficits*, Information Paper 40
- (1995b) *Adequacy of transport infrastructure, Rail* Working, Paper 14.2
- (1996a) *Transport and Greenhouse Costs and options for reducing emissions*
- (1996b) *Economic effects of a Brisbane - Melbourne inland railway* , Working Paper 18.

Federal Department of Finance (1997) Submission to the House of Representatives Standing Committee on Communications, Transport, and Microeconomic Reform Inquiry into Federal Road Funding

Gupte, V (1994) Review of paper 'Energy use in Australian land freight', published in 'Policy Perspective's' 94 Institute of Transport Studies, University of Sydney page 189-194

Hilmer, F (1995), William Fraser Commemorative Address, Chartered Institute of Transport, Sydney, 29 September 1995.

Hogan, M (1981) Benefit/Cost Analysis on Grade Improvements along the main Southern Railway Line in the Down Direction Between Goulburn and Junee, - unpublished thesis, NSW Institute of Technology.

House of Representatives Standing Committee on Communication, Transport, and Microeconomic Reform (1998) *Tracking Australia*

House of Representatives Standing Committee on Transport, Communications and Infrastructure
- (1987) *Constructing and restructuring Australia's public infrastructure*
- (1989) *Rail: Five systems, One Solution*

Hunter, R. (1994) Queensland Rail's Mainline Upgrade Project, Tenth International Rail Track Conference Proceedings, pp 107-115

Industry Commission
- (1991a) *Rail Transport*
- (1991b) *Costs and Benefits of Reducing Greenhouse Gas Emissions*
- (1992) *1991-92 Annual Report*
- (1994) *Petroleum Products*

Inter-State Commission (1990) *Road Use Charges and Vehicle Registration: A National Scheme.*

James, D (1995) *Revenue before Rhetoric: A critique of fuel taxation in Australia*, Current Issues Brief, No 50, 1994-95) Parliamentary Research Service, Canberra

Kain, J (1995) *A Spirit of Progress? Assessing Australian Rail Transport Policy*, Research Paper No 31, Commonwealth Department of the Parliamentary Library, Canberra

Laird, P G (1990) Road cost recovery in Australia and New Zealand, *Transport Reviews*, Vol 10, pp215-227
- (1995) Sir Harold Clapp's 1945 report - fifty years on, *Australian Rail Historical Society Bulletin*, Australian Railway Historical Society Bulletin, Vol 46 p363-382
- (1996) *Intercity land freight transport in Eastern Australia* Working Paper 1996/6, Centre for Resource and Environmental Studies, Australian National University: Canberra
- (1998) 'Rail freight efficiency and competitiveness in Australia', *Transport Reviews*, Taylor and Francis, London, Vol 18, No 3, p241 - 256

Laird, P G and Adorni-Braccesi, G (1993) *Land Freight Transport Energy Evaluation*, Energy Research and Development Corporation, Canberra
- (1994) *Access, capacity and efficiency, the changing challenges for rail freight*, Tenth International Rail Track Conference, September 1994, Brisbane, Proceedings, p47-58.
- (1996) *Rail track and the elusive level playing field* , 11th International Rail Track Association Conference

Laird P G and Lander, F (1997) *Land freight subsidies in Australia'* Australasian Transport Research Forum, Adelaide, Papers

Laird, P G Michell, M and Adorni-Braccesi, G (1998) *Melbourne - Brisbane rail upgrading options - Inland or Coastal* Australasian Transport Research Forum

Michell, M (1997) Paper re Adelaide Hills presented to the Rail 2000 Conference, May 1997

Nash, C (1985) Rail policy and performance in Australia, *Transport Reviews*, Vol 5, p289-300

National Road Freight Industry Inquiry (1983) Report (May, Mills and Scully).

National Road Transport Commission -(1992) *Heavy Vehicle Charges Determination*
- (1993) Fuel only charges ... (1996) *Mass Limits Review*

National Transport Planning Taskforce (1995) *Commissioned Work Vol 1:BTCE Report.*

New Zealand Ministry of Transport (1997) *Options for the Future:Land Transport Pricing Study*

Read, R G and Drake, A M (1989) *Queensland Railways Main Line Electrification Project*, Proceedings, Fourth International Heavy Haul Railway Conference, Brisbane.

Senate Rural and Regional Affairs and Transport Reference Committee (1997) Report on the Brew Report and on the continuing role of the Commonwealth in the Australian rail industry

Senate Standing Committee on Industry Science and Technology (1991) 'Rescue the future - reducing the impact of the greenhouse effect'

Steering Committee on National Performance Monitoring to 1998 *Government Trading Enterprises Performance Indicators 1989-90 to ...1996-97.*

Stevenson, G (1987) Rail Transport and Australian Federalism, ANU, Canberra.

APPENDIX A.

TABLE A. 1 TRANSIT TIMES FOR SECTIONS WITH AVERAGE SPEEDS, ROUTE EFFICIENCIES, RUNNING EFFICIENCIES BETWEEN STRATHFIELD AND ACACIA RIDGE

NORTHBOUND NR SB7 FREIGHT TRAIN

SECTION	DISTANCE (km)	TRAIN TRANSIT TIMES (hours) Without stops	AVE. SPEED (km/hr)	SPEED BOARD AVE (km/hr)	ROUTE EFFIC. (per cent)	RUNNING EFFIC. (per cent)	LOWEST SPEED (km/hr)
Strath-Hornsby	21.15	0.53	40.0	81.7	71	49	70
Hsby-Gosford	47.27	0.82	57.6	69.8	61	83	55
Gos-Broadmeadow	81.98	1.23	74.8	88.1	71	85	60
Brdmdw-Maitland	29.51	0.47	62.8	79.1	69	79	30
Maitland-Dungog	52.68	0.87	60.6	75.1	65	81	65
Dung-Gloucester	64.06	1.03	62.2	69.6	61	89	65
Glouc-Taree	69.06	1.23	56.1	67.7	59	83	40
Taree-Wauchope	76.18	1.22	62.4	74.0	64	84	55

Wauch-Kempsey	49.02	0.70	70.0	73.6	64	95	30
Kemp-Macksville	48.87	0.85	57.5	73.9	64	78	60
Mack- Glenreagh	99.43	1.57	63.3	74.2	65	85	60
Glen-Grafton	47.02	0.72	65.3	76.9	67	85	50
Grafton-Banyabba	43.97	0.72	59.7	72.5	63	82	60
Banyabba-Casino	62.22	0.78	79.8	81.2	71	98	60
Casino-Acacia Rd.	169.43	2.65	63.9	77.72	68	82	60
TOTAL	961.85	15.39	62.5	75.5	66	83	30

References Kilometrage from SRA Computer File c 1991, see also ERDC Report (Laird and Adorni-Braccesi, 1993, Table 10.4, p 107) which also has route efficiencies. Note there has been two smaller deviations and other track work to 1995 that have shortened a few sections up to one kilometre.
Train transit times from SRA Standard Working Timetable Freight Services from 19 October 1997, and are for trains in motion and excluding the following stops:
* For passing trains on crossing loops (Stroud Rd (37m), Melinga (20m), Eungai (12m) and Kungala (44m))
* For signalling stops (Loadstone, Glenapp, Bromelton, and Greenbank (5 min each)
* For crew change Taree (10m); Total time for stops 2.38 hours

The trains passes through North Strathfield Junction on weekdays at 13h 05m and arrives at Acacia Ridge the next day at 06h 51m - total time 17h 46m The average speed without stops is 62.5 km per hour, and with stops, 54.1 km per hour.