



NEWCASTLE - SYDNEY – CANBERRA – MELBOURNE

FAST FREIGHT AND PASSENGER TRAIN OPTIONS

Railway Technical Society of Australasia February 2003

1. The Railway Technical Society of Australasia (RTSA) is a technical society of the Institution of Engineers, Australia with over 820 members. The RTSA has active programs based in mainland State Capital cities and maintains an ongoing program of Continuing Professional Development activities including technical presentations and study tours. The Society is hosted a major biennial Conference on Railway Engineering (CORE) at Wollongong in November 2002 and is now planning for CORE 04 in Darwin.

Along with making submissions to all levels of Government, the Society has published "Fix the rails", "Up to Speed", "On Track" and "Getting Sydney Back on Track" brochures.

2. In May 2001, the Australian Rail Track Corporation (ARTC) released a detailed **National Track Audit**.

In May 2002 a Phase I report was released from the **East Coast Very High Speed Train (VHST) network study**.

The Society urges that Melbourne - Sydney - Brisbane freight trains be brought 'up to speed' with basic track improvements, updated safeworking systems, and some track straightening. It suggests that regional intercity passenger services need improving in New South Wales, and, that Canberra deserves a better rail service.

To this end, the Society puts forward in this submission a case for a *new study to encompass 'freight and passenger track' options where full consideration is given to substantially upgrading existing tracks to allow for the effective use of fast modern trains.*

FAST FREIGHT TRAINS

3. There are economic imperatives to improve rail freight services between Australia's three largest cities of Melbourne, Sydney and Brisbane. As established by several Federal Government and Parliamentary inquiries (Neville, 1998 and 2001, Smorgon (Prime Ministers Task Force) 1999, and the Productivity Commission, 1999) significant investment in mainline interstate track is needed to remove adverse speed - weight restrictions for intermodal freight trains.

4. As noted above, the Australian Rail Track Corporation (ARTC) released a detailed National Track Audit in May 2001. This Track Audit includes a summary and final report with appendices by Booz.Allen & Hamilton, and a report on the Melbourne - Sydney and Sydney - Brisbane corridors by Maunsell McIntyre Pty Ltd (MMPL).

In brief, the Track Audit examined minimum freight market improvements (the S1 scenario), significant track improvements (the S2 "stretch" target scenario), and after economic analysis, recommended optimised investment of \$507 million with a combined benefit cost ratio of 3.2.

Of the proposed optimal investment, \$398 million was recommended for works on the North - South Corridor. The main works were \$146 million for Stage 1 of a Sydney Freight Priority Project, \$73 million for Main South rail track deviations, \$63 million for crossing loops, \$30 million for a Southern Control optimisation project, and \$16 million to replace the 1880 bridge over the Murrumbidgee River near Wagga Wagga.

The ARTC Track Audit [summary, p 11] identifies present terminal to terminal times of 13 hr 30 min for Melbourne - Sydney, 21 hrs for Sydney - Brisbane, with 36 hrs for Melbourne - Brisbane. These transit times are too long to be competitive for intercity land freight. On completion of the optimal capital works, the transit times would be expected to be reduced, to 10 hrs 30 min, 17 hrs 30 min and 29 hrs 30 min, respectively.

The track audit found that *'significant track upgrades on the Melbourne - Adelaide corridor have reduced transit times considerably'* and such upgrades, with improved reliability, have allowed rail to attract freight traffic. The relatively good track condition and length of the Adelaide - Perth corridor has now allowed rail to carry about 80 per cent of interstate land freight on this corridor. However, rail's modal share of inter capital city land freight on the Melbourne - Sydney and Sydney - Brisbane corridors is a very low 10 to 20 per cent.

Completion of the basic track works will allow rail to reduce its transit times as noted above, and hence increase its modal share of intercity land freight. The ARTC track audit estimated that there would be a reduction of some 128,000 truck trips per annum (Exec Summary page 13) with appreciable environmental and social benefits.

5. An inland Melbourne - Brisbane railway through Parkes has been proposed for some years. In July 1999, the Federal Government contributed \$300,000 towards a pre-feasibility study into a Melbourne - Brisbane inland railway proposed as part of a Melbourne - Darwin link by the Australian Transport and Energy Corridor Pty Ltd (ATEC). This pre-feasibility study was reviewed in the year 2000 by the Bureau of Transport Economics (BTE) who undertook an economic analysis of an A2/A2M option. This option envisaged use of the existing track between Melbourne and Moree with some upgrading, plus substantial new construction between Moree and Brisbane, at a combined cost of about \$1.5 billion. The BTE report assumed that trains would operate at a maximum speed of 115 km per hour, and suggested that a benefit cost ratio of 2 could result.

The ARTC Track Audit found that the optimal Melbourne - Sydney - Brisbane investment works at a cost of about \$398 million would be economically justified and should be completed, whether or not the inland route proceeds.

An upgraded Melbourne – Cootamundra track (including replacement of the 1880 rail bridge over the Murrumbidgee River at Wagga Wagga as recommended in the ARTC Track Audit, and conversion of a Melbourne – Albury broad gauge track to standard gauge) would assist any Melbourne – Parkes – Brisbane freight train service as well as tilt train operations.

6. This study proposal shall not give detailed consideration of track upgrades north of Newcastle except to suggest that consideration should be given to a Fassifern-Hexham rail link and a Liverpool Ranges tunnel that were proposed for feasibility studies by the “Action for Transport 2010” statement, and, some upgrading of the North Coast line (eg a major rail deviation from Taree to Johns River as noted in the ARTC Track Audit).

Over the next decade, the North Coast of NSW is expected to show significant population growth. The existing railway line, unless it is upgraded, will become increasingly irrelevant for both freight and passengers.

The optimal scope of upgrading between Hexham and Brisbane is problematic, and to some extent, the amount of upgrading and the timing of such upgrading will depend on whether an Inland Route for Melbourne- Brisbane freight is developed.

7. On 31 January 2002, the sale of National Rail and Freight Corp (now Pacific National) to Toll and Patrick was announced. The terms of sale included a commitment by the new owners to invest \$50 million in mainline track upgrades, subject to the ARTC and NSW Government reaching agreement on access and management issues.

In June 2002 the ARTC put a formal proposal to the NSW government, which was stated by Minister Anderson on 31 July 2002 as costing \$870 million. This proposal would include the Hunter Valley coal lines.

In November 2002, the NSW Government was reported as seeking "clarification" of the offer. This was followed by expressions of concern by Pacific National, Specialised Container Transport, and the RTSA in the media (The Australian November 13 and 20, The Age November 22) on track quality and outmoded safeworking (between Casino and Acacia Ridge, plus Queanbeyan - Canberra). Further concerns were expressed in a consultant's report (NSW rail plan 'too simplistic' Aust Fin Review, 17 Dec 02).

8. On 7 November, Minister Anderson released the Commonwealth Government's Green Paper on proposals for a national integrated transport policy called 'AusLink'.

Whilst AusLink was welcomed when initially announced in May 2002 by the Australian Automobile Association (AAA) and the Australian Local Government Association (ALGA), both major groups expressed reservations about funding arrangements in the Green Paper (AAA

media release 15 November and ALGA 'Transport plan's fine but where's the money?', Australian Financial Review 12 December). Serious reservations had been expressed by State Transport Ministers at the meeting of the Australian Transport Council at Sydney on 8 November 2002. These reservations included the proposed cut backs in funding for the National Highway System, and the lack of any provision for public transport.

9. The Prime Minister in a speech given on 20 November 2002 in Sydney to the Committee for Economic Development of Australia notes, inter alia, transport as one of 9 strategic concerns, the AusLink proposals, and in regards to rail *"We are also pursuing major reform of the national rail system by offering the New South Wales Government a package under which the state's mainline track would become integral to the national track. The Commonwealth would contribute to establishing a dedicated freight route through Sydney. This could cut freight rail transit times between Sydney and Melbourne by three hours, and between Sydney and Brisbane by three-and-a-half hours."*

10. The RTSA has serious reservations as to whether the optimal scope of works outlined in the ARTC Track Audit will in fact be sufficient to deliver the promised reduction in Sydney - Melbourne freight trains by three hours from 13.5 hours to 10.5 hours.

Accordingly, the Society recommends that further consideration be given to NSW Main South line track straightening.

11. Under the "stretch" target scenario S2, at a cost of \$908 million, the Melbourne - Sydney terminal to terminal time for freight trains was expected to fall to 9 hrs. The S2 scope of works is larger than the optimal package, and the S2 package included a new 93.3 km line between Bowning and Frampton suggested by Mr John Hoare of Concord CE Pty Ltd to the University of Wollongong.

The "Hoare" Deviation is noted [MMPL, p65] with a broadly estimated cost of \$300 million. It would reduce route length by about 23 km and reduce transit times for southbound freight trains by an estimated 51 minutes when compared with the existing track.

A promising variation of the "Hoare" Deviation is a direct line from Bowning to North Cootamundra (some 76 km) with about 10 km of track improvements from Cootamundra to Frampton (a total of about 86 km of new track). This variation, which is called the '**Sesqui-centennial line**' (as construction could be underway in time for the sesqui-centennial of NSW railways in 2005) could be constructed at lower cost than a deviation between Bowning and Frampton. A North Cootamundra - Bowning line would carry wheat hauled via Cootamundra along with Sydney - Perth intermodal freight and passenger trains.

12. The "**Wentworth**" rail deviation was proposed by the Hon Bill Wentworth in 1991 to the Industry Commission's rail inquiry (see also Sydney Morning Herald, 26 Sept. 1992). A

recent version was for about 40 km of new track running from near Menangle to north of Mittagong, which could be used by freight trains for most of its length, with heavier south bound freight trains being diverted to the old track near Mittagong. The ARTC Track Audit [MMPL, p64] gave an estimated cost of \$218 million (for single track) reducing route length by 19.6 km, saving an average of 19 minutes. It is difficult to see why single track was even considered and the RTSA requests that any new study obtains a more accurate costing for double track (which we suggest should not exceed \$250 million).

The "Wentworth Route", or a suitable variation, combined with improved rail access between Central and south of Campbelltown (which may require track amplification) would appreciably improve rail travel between the Southern Tablelands of NSW and Sydney. This in turn, would reduce pressure for upgrading the Hume Highway between Sydney and Mittagong from four to six lanes.

13. A third major rail deviation, the **Centennial deviation**, could be constructed between Goulburn and Yass.

The Maunsell McIntyre report [MMPL, p52], notes the cost of the Centennial deviation as \$255 million, with a significant savings of 21 minutes in transit time (as opposed to three minutes from minor track realignment) and on page 65 of this report the length is noted as 88.6 km. However, the amount of new construction involved between Breadalbane and Yass is approximately 68 km. Accordingly, a revised cost estimate is necessary.

14. Other Main South track straightening should include locations near Werai, Exeter and Marulan, and, bypassing the Bethungra Spiral between Cootamundra and Junee. Bypassing the Bethungra Spiral would also give the opportunity to remove two level crossings.

The ARTC Track Audit [MMPL, p65] also notes a "High Speed Alignment Campbelltown to Goulburn" study that includes a number of deviations which permit "*...a considerable time saving to be achieved ...*"

PASSENGER TILT TRAINS

15. It is recognised that aviation and road passenger transport have conveyed most intercity passengers in Australia during the 1990s. However, Queensland Rail has convincingly demonstrated that rail has good potential to regain lost modal share when improved intercity rail services are provided. Rail was the predominant mode of non-urban passenger transport for most of the 20th Century in Australia, and has potential in the 21st Century.

Upgraded passenger rail services can offer many benefits to the travelling public. These benefits include reduced road vehicle use with external benefits such as improved road safety, reduced road congestion plus reduced air pollution and greenhouse gases which arise from rail's superior energy efficiency. For example, based on 1997-98 estimates, non-urban rail had an average energy efficiency of 0.86 passenger km per Megajoule (MJ) as compared with 0.45

passenger km per MJ for non-urban passenger vehicles, 0.34 passenger km per MJ for domestic airlines, and 1.06 passenger km per MJ for non-urban buses (Appelbaum Consulting Group Pty Ltd and Dept of Industry, Science and Resources, 2001). Passenger tilt trains with good load factors would have a higher energy efficiency than buses.

Improved intercity rail services also have the potential to reduce demand for shorter haul air services. As recognised by the Media Release "Sydney's Future Airport Needs" dated 13 December 2000 from the Deputy Prime Minister, the potential of high speed rail is an important factor given the problems with Sydney's Kingsford Smith airport, and the difficulty in securing a site for a major Second Sydney airport.

16. The State of Queensland has operated a very successful high speed tilt train service since 1998.

On 6 November 1998, a new tilt train service between Brisbane and Rockhampton was introduced. This service has proved to be very popular and additional services have been added. As well, the tilt train has provided effective competition to some short haul aviation services. By 19 March 2002, the Queensland tilt train service had carried 1,000,000 passengers. The normal maximum speed of the tilt train on the better quality track away from the Brisbane suburban area is 170 km per hour.

The Queensland tilt train service uses **tilt trains and upgraded track**. The QR **tilt trains** in service since 1998 are two six car electric trains and were constructed by Walkers of Maryborough. Another two diesel powered tilt trains are due to enter revenue service in 2003. The **upgraded track** includes 120 km of rail deviations between Brisbane and Rockhampton built to modern engineering standards with a ruling grade of 1 in 90 and most having a ruling curvature of 2200 metres. The track upgrades were designed for the operation of faster and heavier freight trains.

Most of these deviations were single track constructed under a Mainline Upgrade Program (MLU) in the early 1990s at a cost of about \$1.5 million per kilometre. Queensland Rail has demonstrated that **mainline intercity rail track can be quickly straightened with a good project manager and Government support**.

17. The approach of tilt trains sharing tracks with freight trains is favoured in Canada and the United States in America. This includes Amtrak's 'Mount Baker International' using a Talgo tilt train that commenced services in 1995 between Seattle and Vancouver (British Columbia) with the support of Washington State. As well, a successful new Acela service between Washington DC, New York and Boston was introduced in December 2000. The Acela service was expanded during 2001 to the point that during daylight on weekdays, there is now a New York - Washington train every hour. The faster trains take less than three hours between these two cities.

18. Tilt trains are also used in Europe and Japan, for regions and lines where economics do not permit the construction of dedicated track for Very High Speed Trains. Tilt trains may be either electric using power from overhead catenary, or diesel powered.

It is recognised that it not imperative to use tilt trains to improve intercity passenger services. RTSA notes that a new Prospector train due for delivery in May 2003 for Perth - Kalgoorlie services will be able to reach speeds of 200 km/h, and the Victorian Government has committed funds for new high speed regional rail services in Victoria.

19. An inquiry conducted by the Public Works Committee of the NSW Legislative Assembly during 1998 found a case for mainline track upgrading within NSW prior to the introduction of tilt trains.

Regional NSW and Melbourne - Sydney - Brisbane train passengers deserve better than Xplorers or 20 year old refurbished XPT's running over 'steam age' aligned tracks.

20. Since 1984, Australia has spent many years intensively studying very high speed passenger train options with track dedicated solely for passenger train use for most of the Sydney - Canberra - Melbourne corridors.

In 1997, the Federal Government, with the support of the NSW and ACT Governments, received (in response to six invitations **including four tilt trains**) expressions of interest for a high speed Sydney - Canberra service. Along with Speedrail modelled on the French TGV, and a Maglev proposal, two tilt trains were proposed as follows

- * Capital Rail-ADtranz Swedish X2000 derivative 250 km/h

- * InterCapital Express - Siemens IC-D 200 km/h diesel/electric tilt train

On 8 August 1998 Prime Minister John Howard announced 'SPEEDRAIL' as the successful proponent to build and operate a very high-speed 81 minute train service between Sydney and Canberra. In his speech, he also noted that:

"Our national transport vision is one free of State boundaries and differences where passengers and freight can move at lightning speed in complete safety.

"This nation building project is concrete proof of my Government's determination to harness the latest proven transport technology and Australian ingenuity to deliver ourselves - and our children - a visionary new transport system of which we can all be proud..."

Speedrail submitted a detailed 'proved up' bid in November 1999. On 13 December 2000, the Federal Government announced in effect that the Speedrail Consortium's bid failed to meet a 'no net cost to government' criteria. The bid was quoted at \$4.8 billion, and a contribution of over \$1 billion was understood to be required from government.

21. In place of proceeding with Speedrail, the Federal Government announced that it would fund a major East Coast Very High Speed Train study. The 2001 Federal budget made a \$20

million allocation for this purpose. In 2001, Phase I of the study was completed, and tenders closing 19 December 2001 were invited for two Phase II studies. Tenders were made in good faith by many companies.

However, on 26 March 2002, the Federal Government announced that it would not proceed to Phase II, and was terminating the study. In defence of this position, it was claimed in a media statement that an East Coast VHST could cost as much as \$50 billion.

22. In response, the ACT Legislature considered that the Federal Government had acted prematurely to terminate the East Coast Very High Speed Train study.

In addition, (Mr. M. Deegan, NSW Director-General of Transport, letter 27 November, 2002) commented that *"the NSW Government sees the investigation of a national high speed rail network as an important element in the development of a national transport plan. It is therefore appropriate that the Commonwealth Government lead the process."*

23. The Federal Government released in May 2002 the Phase I report by Arup - TMG. This report had 15 Sections, plus an Executive Summary, which notes that VHST implies train technologies and systems which can operate in the range from 250 km/h to 500 km/h with four options (160/h max, 250km/h, 350km/h and 500km/h).

In place of existing Sydney – Melbourne train services (10hr 30min over 963 km) and Sydney – Brisbane (14hr 16min over 988 km), the report notes that VHST could offer service on each corridor of about 5.5 hours at 250km/h or 3.5 hours at 500km/h.

A limited account of previous Very High Speed Train proposals in Australia and overseas projects are given. However, the report appears to overlook:

- any discussion of the Queensland tilt train,
- the High Speed Boston – New York – Washington Acela service,
- Swiss initiatives for construction and funding of high speed rail,
- the new Koln - Frankfurt high speed line that was opened in August 2002, and,
- development of a National Highway System in Australia with a near absence of tolls and under-recovery of road costs for heavy vehicles.

The restricted attention to passenger trains in a speed range of 250km/h to 500km/h had the effect of excluding any consideration of the Queensland tilt train, or the technology proposed by InterCapital Express with a Siemens IC-D 200 km/h diesel/electric tilt train.

Given that the InterCapital Express proposal was in response to an invitation by Government for expressions of interest for a high speed Sydney Canberra train, **it would have been desirable for the East Coast VHST to have considered an maximum speed range of 200 km/h to 250 km/h.**

24. The Warren Centre at Sydney University in a major Transport Statement "Sustainable Transport in Sustainable Cities" statement (SMH July 4, 2002) argued *"...that the State*

Government should put its weight behind the case for a very high speed train" and that such a train would greatly reduce the need for a second Sydney Airport.

In October 2002, a further call for a VFT was made by the Tourism Task Force. This was endorsed by Victorian Premier Steve Bracks.

25. The Victorian Government has made a major \$550 million commitment to **Regional Fast Rail** to serve four rail corridors to provide faster trains between regional Victoria and Melbourne. This commitment includes new trains and upgraded tracks starting in 2004.

26. The RTSA submits that it is now time for a detailed investigation of the feasibility of the use of fairly fast trains using upgraded existing tracks between Newcastle, Sydney, Canberra and Melbourne.

There is also a need to examine the requirements for additional track capacity within Sydney and near Sydney (on lines leading north and south of Sydney). This may include the construction of freight only lines near and within Sydney.

27. The Sydney - Newcastle railway links the two largest cities of NSW. The current double track railway line has both capacity and speed restraints for freight and passenger trains.

Getting high speed trains between Sydney's Central Station and the Hunter region is a major challenge. Failure to complete a Newcastle High Speed Line for passengers will result in increasing pressures to augment the Sydney - Newcastle freeway from 4 to 6 lanes (and, in another decade, from 6 to 8 lanes).

The RTSA suggests that full Federal funding of the Sydney - Newcastle freeway with the absence of road tolls, and no Federal funding for the Sydney - Newcastle railway, leads to a major distortion in travel choice.

The nature of track upgrading between Hornsby and Hexham will have implications for improving both Sydney-Gosford-Newcastle CityTrain services and high speed intercity rail services. With increasing traffic density, it is desirable to make provision for future separation of freight and passenger trains between Hornsby and Gosford. In this case, on the Cowan bank, it would be possible to construct a passenger line with steeper ruling gradients at much less cost than a passenger line with easier gradients that is likely to require extensive tunnelling.

The construction of a Fassifern – Hexham bypass would also improve future separation of freight and passenger trains near Newcastle.

28. The "Action for Transport 2010" statement released in November 1998 by the NSW Government proposed, inter alia, construction of a new \$791 million high speed rail link between Hornsby and Warnervale by 2007.

The RTSA notes that the rail projects committed in this 1998 NSW will require considerable financial resources. This is confirmed by the reports prepared by Mr Ron Christie for the NSW Government.

Although Dapto-Kiama electrification was completed in 2001, the new Parramatta - Chatswood line has had to be scaled back to Epping - Chatswood with completion delayed to 2008. Preliminary work was underway for Hornsby-Warnervale track upgrading with a NSW budget 2001 allocation of \$1 million for planning followed by \$2 million for further studies announced July 02. Thus, it will be difficult for Hornsby-Warnervale track upgrading to be completed by the initially promised year of 2007.

29. The present line between Canberra and Queanbeyan was completed in 1914, and indeed trains working this section now use the safeworking system installed that year. A connection to Yass was envisaged, and as noted by the Bureau of Transport Economics (1971) in a report 'Economic Evaluation of a Canberra - Yass Rail Link', the Seat of Government Acceptance Act 1909-1938 provides, inter alia, that *"In the event of the Commonwealth constructing a railway within the territory to its northern boundary, the State shall construct a railway from a point near Yass on the Great Southern Railway to join with the said railway ..."*.

The BTE report found with its assumptions that construction of a Canberra-Yass link *"...is not be economically justified at this point of time"*, but notes that an 1969 unpublished report of the Commonwealth Railways found that *"...the operation of a Canberra-Yass link would not in isolation be a commercial proposition. However, [for various reasons]... construction of the Canberra-Yass railway can be justified on economic grounds."*

30. In 1981, the National Committee on Railway Engineering of the Institution of Engineers, Australia (now RTSA) published a "Bicentennial High Speed Rail Proposal" report with a brochure outlining an option of a "T - Line" which includes a new railway from Breadalbane to Yass with a spur to North Canberra. The "T - Line" was proposed after field investigations, with ruling gradients of 1 in 75 and a ruling curvature of 1200 metres to allow for 160 km/hr train operation.

At a then estimated cost of \$127 million, the benefits included faster rail freight services, a potential 3 hour Sydney - Canberra XPT service and a 6.5 hour Melbourne - Canberra XPT service. **It is now worth revisiting the "T - Line" proposal but with the use of tilt trains instead of XPTs.**

The "T - Line" when viewed travelling south west from Goulburn, leaves the existing railway near Breadalbane, and crosses the Cullerin Range at a saddle at an altitude of about 740 metres (which is now used for the new Cullerin Range freeway deviation completed in 1993 and for electrical transmission lines). After crossing this saddle, the line then takes higher ground to pass near Mt Dixon and join the existing railway at the Mundoonen Ranges. A spur line to North Canberra of length about 40 km would start in near Mt Dixon.

31. As the East Coast VHST study is not proceeding, the RTSA now believes that the North Cootamundra - Bowning (Sesquicentennial) line, along with the "Wentworth", the Centennial "T-Line" option and other minor deviations should be closely examined.

The Centennial "T-Line" option would also give a good rail connection to North Canberra - not only from Sydney, but also from Melbourne and southern NSW. It would be ideal for use by modern tilt trains. There is also the option of the private sector building the 40 km spur line to North Canberra and operating tilt trains.

If the "T-Line" was constructed along with the "Wentworth Route" between Menangle and Mittagong, modern tilt trains could traverse Sydney - Canberra in less than 2.5 hours. The T - line would also allow a direct rail service between Canberra and Yass, Cootamundra, Wagga, Albury and Melbourne.

If the "T-Line" was coupled with a direct Yass - Cootamundra route, tilt trains could traverse Canberra - Wagga in less than two hours. Canberra - Albury would easily be possible in less than three hours, and Canberra - Melbourne in about five hours.

Standard gauge tilt train services to Melbourne could require conversion of a Melbourne broad gauge track to standard gauge.

32. It is also desirable that consideration be given to linking the growing Wollongong-Shellharbour-Kiama region to a Sydney-Canberra-Melbourne high speed train link. One option is to complete construction of the Maldon Port Kembla Railway. Completion of this railway could be combined with the Wentworth route and would also give an Illawarra - Macarthur rail link.

CONCLUDING REMARKS

33. The RTSA submits that the ARTC Track Audit optimal package should be regarded as a minimum as it was optimised for freight trains, as opposed to freight and passenger trains. Moreover, consideration should be given to the track straightening options identified in the entire ARTC Track Audit, along with the NSW Government's 1998 "Action for Transport 2010" statement.

In evaluating the suitability of major rail deviations for freight and passenger trains, regard should be given to various passenger transport external costs, along with the freight external costs given by Booz.Allen & Hamilton (BA&H). The RTSA would also recommend revising the greenhouse gas emission costs stated by BA&H, with consideration given to a value of \$40 per tonne of carbon dioxide, as suggested by a submission of the Bus Industry Confederation in 2001 to the Fuel Taxation Inquiry.

34. For the Sydney - Melbourne corridor, the RTSA recommends a close examination of the benefits and costs to freight **AND** tilt train operations of each of the three major rail deviations

(Hoare, Wentworth and Centennial) identified in the full report of the ARTC National Track Audit (Maunsell McIntyre report, page 65).

The three major deviations would extend the optimal \$507 million scope of work recommended by the Track Audit, with the benefits of reducing Sydney - Junee point to point distance by approximately 50 kilometres, and allow for the operation of high speed tilt trains as well as faster and heavier freight trains.

Further details are given in the paper (P Laird, M Michell and G Adorni-Braccesi) Sydney–Canberra–Melbourne High Speed Train Options, Australasian Transport Research Forum, Canberra, Papers, Volume 25 (see <http://www.dotars.gov.au/btre/atrf.htm> etc)

35. It is important that the necessary land corridors for future rail deviations are reserved without further delay. There is also a need when planning rail deviations to ensure that sufficient land is acquired to allow for future additional tracks (as in the case of the Cooroy Bypass which was built with two lanes as part of the Bruce Highway, with land acquired to allow for later widening to four lanes). For example, it may be decided to construct a rail deviation with tracks to serve both freight and tilt trains, but in future years and depending on traffic levels, it may be economically warranted to provide additional tracks to separate the freight and high speed passenger trains.

36. For the operation of tilt trains within NSW, the RTSA suggests that the study examine the costs and benefits of the use of suitable diesel powered sets as well as the use of electric trains using an overhead power supply. The diesel powered sets would be likely to offer cost savings at the expense of longer transit times when compared with electric trains.

If electric power is to be used over long distances, the RTSA recommends the use of 25,000 volts AC, as used in Queensland and WA. Consideration should also be given to the use of dual voltage electric trains as are sometimes used in Europe; in an Eastern Australian setting, this would likely be 1500 volts within Sydney and Melbourne, and otherwise 25,000 volts AC. There is also scope for an "electro-diesel" option where suitably designed locomotives and/or power cars can use either overhead power when under electrified sections of line (thereby reducing urban exhaust emissions), and otherwise diesel.

There are also questions as to the power to weight ratios of tilt trains, and maximum operating speeds that should be addressed. The RTSA urges that consideration be given to the High Speed options of tilt trains operating at a maximum speed of 200 km per hour along with Higher Speed Options such as 240 km per hour.

37. The RTSA has put a detailed case for a new study to build on the extensive work done for the ARTC Track Audit, and the aborted East Coast VHST study. The Society now requests careful consideration of an extensive "passenger and freight train" track upgrade scope of works. This scope of works includes extensive deviations on the Main South line.

This scope of works, which could be called S3 or SP, would cost much more than the \$507 million of optimal track upgrading recommended by the ARTC Track Audit. However, if the full S3 or SP scope of works was completed, it would result in major reductions in rail haul times for intercity rail freight and the opportunity to introduce modern high speed passenger tilt trains.

A similar approach is advocated in a paper 'A cost effective high speed railway for Australia' given by Mr Colin Butcher FIE Aust at the Conference on Railway Engineering at Wollongong in November 2002.

In addition, the full S3 scope of works would cost appreciably less than either a TGV or Maglev system linking Sydney, Canberra and Melbourne, or, the estimated \$4.5 billion invested to date in the Hume, Federal and Barton Highways.

38. As a House of Representatives Committee pointed out in the 1998 report 'Tracking Australia', failure to upgrade "*...substandard national track*" will lead to increasing obsolescence for intercity rail freight in Eastern Australia. However, by taking a decision to substantially upgrade this track, at a relatively modest cost when compared to National Highway System upgrades, significant benefits for rail freight and intercity passengers would be gained.

39. As seen by the Canberra Times Editorial of 6 April 2002 '**Not time for big schemes in transport**' the Federal Government "*...cited a cost of \$50 billion for the high-speed train. For just a few per cent of that, the existing track could be significantly upgraded and the rolling stock improved, perhaps with the addition of tilt trains. This would make the train trip cheaper and faster than the car trip. At present it is cheaper, but not faster. It would be faster and much more comfortable than a bus. It would also take a lot of freight off the roads. This has been the approach in Queensland. Instead of aiming at speeds of up to 300km/h, upgrading the existing track can result in a train doing 160km/h for much of the time.*"

40. To undertake only a minimal upgrade of the existing mainline tracks for freight trains would deny an effective role for both freight trains and intercity passenger rail in New South Wales. The RTSA submits that this option should be rejected by all levels of government, and that consideration should now be given to the track straightening options. The Commonwealth's new AusLink programme provides a possible funding mechanism. However, it is primarily up to the ACT and NSW Government to generate firm proposals.