

An Illawarra Macarthur rail link

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Abstract

In 1983, work commenced on a direct rail link between Port Kembla in the Illawarra Region to Maldon near Macarthur. This comprised upgrading the existing 15 km line from Port Kembla to Dombarton (located on the Unanderra Moss Vale line) and a new 35 km link from Dombarton to Maldon. Significant construction work was undertaken during the 1980s on both sections, and studies were undertaken during the 1990s and in 2009 on completing the new link.

The 2009 study followed the release in 2007 of an AusLink Sydney - Wollongong corridor strategy and a House of Representatives Standing Committee report noting capacity constraints on the existing Sydney Wollongong railway. In 2010, the Australian Government commissioned a full feasibility study for the new link. The findings of this study are due in mid 2011.

The paper will outline both the construction undertaken and summarise the findings of the various studies to date. The paper will also note expansion of Port Kembla, increased demand for passenger train services on the existing South Coast railway, and the future option of connecting a Maldon Dombarton link to a proposed 39 km rail deviation from Menangle to Aylmerton on the Main South line.

1. Introduction

The Maldon Dombarton link is some 35 km in length from Maldon (on the Main South line) to Dombarton (located on the Unanderra Moss Vale line within New South Wales). It was started, with enabling legislation, in 1983 by the NSW Government to improve rail access to Port Kembla. During the 1980s, the following work was done (various media reports):

- a. Environmental impact assessment plus design and documentation.
- b. Construction and ballasting of over 25 kilometres of right of way from west portal to the boundary of the water catchment near Wilton.
- c. Construction of approach viaducts in 1984-85 to the Nepean River Rail Bridge.
- d. Installation of plant and site works, environmental control measures, the start of tunnelling at Avon tunnel on east portal and construction of west face of portal. The Avon tunnel contract was cancelled by the Greiner Government in mid 1988 (with \$4.5 million compensation to the contractors and contrary to pre-election promises to complete the line by 1991).

In addition, the 15 km Dombarton-Port Kembla section was upgraded and duplicated, with the erection of masts from Port Kembla to Dombarton for electrification. High voltage electrification for the entire Maldon Port Kembla project was agreed to.

The cost (dollars of the day) for the work done during the 1990s on the Maldon Dombarton section was noted by Freight Rail (Carleton, 1993) as \$42 million, and the work done on upgrading and duplication of the Dombarton Port Kembla section as \$57 million.

It is of note that the Maldon Dombarton link is one of many rail proposals in New South Wales that are yet to proceed. Others include:

- a. Various official Action for Transport (NSW Department of Transport, 1998) proposals for 2010 including a Parramatta Epping rail link, a Sydney North West Rail link, a Sydney Newcastle high speed line, and a Waterfall Thirroul high speed line.
- b. Various proposals for rail deviations on the NSW Main South and North Coast lines, as noted for example, by the Australian Rail Track Corporation (ARTC, 2001, 2008).
- c. Rail reform proposals, as noted in two Long Term Plans (Christie, 2001, 2010) and a Ministerial report on Sustainable Transport (Parry, 2003). The Parry report also notes the important issue of road pricing.

It is also of note that an Epping Chatswood rail link was opened in 2009 and that work has started on a Sydney South West Railway from Glenfield to Leppington.

1.1 The work required to complete the link

Based mainly on a State Rail Authority (1985) brochure, the work remaining to complete the 35 km Maldon Dombarton rail link includes the following:

Avon Tunnel

- Single track 4.2 km tunnel of horse shoe section with 8.0 m nominal diameter at a ruling grade of 1 in 30.
- Note Number 1 portal of the tunnel was built in 1987-88.

Cordeaux River Rail Bridge

- Concrete arch bridge with springing points 132.0 metres apart. The overall length of the bridge is 243.8 metres including approach spans.
- Construction of access roads is completed (1983).

Nepean River Rail Bridge

- Approach viaducts completed in 1985. Prestressed concrete box girderbridge of balanced cantilever construction. The main bridge is 189.6 m long and comprises three spans, the longest being 90.0 m.

Four road Overbridges

- Hume Highway, Picton Road and two local roads.

Earthworks

- Only the section from the Water Board Boundary to Maldon is needed, located about 128km to 133.2km; a little over 5km. Note that the earthworks for Number 2 Portal Avon Tunnel to Cordeaux River and then to the Water Board Boundary (about 103km to 128km) were completed in the mid 1980s. The cost in 1985 was about \$9 million. Earthworks at Maldon for a Triangle/Siding have also been done.

Trackwork

- New single track (with three passing loops at Avon, Cordeaux and Wilton) is needed from Dombarton (98.3km) to Maldon (133.2km), about 35km in all. Note that a major section of track bed in the water catchment is already ballasted.

2. A series of studies: 1992 to 2007

Three studies were undertaken during the 1990s that in part looked at the benefits of completing the Maldon to Dombarton section. The first was a study by the (Federal) Bureau of Transport and Communication Economics (1992). The second was a report for the Research and Development Corporation from the University of Wollongong (Laird and Adorni-Braccesi 1993) that found, inter alia, using projected coal export tonnages and a 7 per cent discount rate a range of positive Net Present Values (NPV) from \$188 to \$358 million for an electrified option costing \$160 million to complete. The third was a detailed study by Kinhill Engineers (1995) for Wollongong City Council that found two negative NPVs (most favourable -\$21 million, least favourable -\$73 million) again with a 7 per cent discount rate and a cost of \$160 million to complete the line, and held that completion of the Maldon Dombarton link was *"not economically feasible and could not be justified on the basis of the coal and freight traffic expected in the foreseeable future."*

The Kinhill Engineers (1995) report advocated protection of both corridors, and *"...establishment of an effective road use charging system whereby road coal freight vehicles pay for the full external costs"* such as pavement damage, congestion, noise and environmental costs.

From 2005 to 2007, there were three further reports that mention the Maldon Dombarton link.

2.1 A NSW Parliamentary report

In granting approval in 2005 for the expansion of Port Kembla to accommodate car carriers, the NSW Government appeared to take the line that the existing road and rail infrastructure would be adequate. This view was questioned by a NSW Parliamentary State Development Committee (2005) examining NSW ports that noted, inter alia, comments for and against completion of the Maldon Port Kembla railway. The NSW Committee made two related recommendations:

Recommendation 12. *That following the anticipated transfer of general cargo stevedoring to Port Kembla in 2006, the NSW Government re-examine the freight task out of Port Kembla to ensure that the anticipated increase in freight traffic is supported by the necessary improvements in road and rail infrastructure.*

Recommendation 13. *That the NSW Government consider the feasibility of expanding rail infrastructure into Port Kembla, including consideration of the Maldon to Dombarton line, in conjunction with the AusLink program.*

These recommendations were noted by the Australian Logistics Council (2006, p40). In addition, the 2005 final report of the State Development Committee in relation to the Inquiry into Port Infrastructure in New South Wales noted, inter alia, the option of tying the Maldon-Port Kembla railway with the "Wentworth" rail deviation from near Menangle to Yanderra.

The report and its recommendations received a formal response from the NSW Government in December 2005. Whilst recommendation 12 was agreed to, recommendation 13 was noted with the comment "that a commercially viable business case has not been established."

2.2 A Federal Parliamentary report

The House of Representatives Standing Committee on Transport and Regional Services (Neville Committee, 2007) in a report *The Great Freight Task: Is Australia's transport*

network up to the challenge? outlined Australia's growing land freight task. In June 2010, a formal government response was made to the report and its 25 recommendations.

The report gives numerous examples of inadequate transport infrastructure, and no fewer than 43 port access issues are identified. These may be found in all States as well as in Darwin. The access issues include channel deepening (particularly Melbourne), rail (including gauge standardization) and road.

The rail issues raised included Maldon Port Kembla in NSW and the Wentworth deviation as one of three NSW Main South rail deviations (with a map on p45 with the proposed Maldon-Dombarton link and the Wentworth deviation). The Committee (2007, p128) expressed the view that "... *the greatest need for Australia is the reconstruction and realignment of the main freight networks.*"

2.3 The Sydney Wollongong Corridor Strategy

The 2006-07 draft Sydney Wollongong Corridor Strategy released by the federal Department of Transport and Regional Services (DOTARS 2007) as part of the former AusLink programme identified many issues relating to present and projected demands in moving people and freight between Sydney and Wollongong.

The strategy notes that the demands on the existing road and rail network will be compounded by the further development of Port Kembla and an expected growth in the number of people commuting between Wollongong and Sydney as well as between Wollongong and Campbelltown/Western Sydney. The projected "*rapid growth in corridor freight*" will also pose additional challenges.

The draft strategy found (DOTARS 2007, p13) that the Mount Ousley Road is already at capacity in the morning peak (AADT 34 500 in 2003 including about 5500 heavy vehicles), there is congestion at times between Heathcote and Jannali, and the rail line through Sydney cannot be used by freight trains for at least seven hours per day.

The draft strategy pays particular attention to various road upgrading options. In regards to rail, it notes (DOTARS 2007, p13) that "*Commuter journeys along the Illawarra rail line are already operating at close to peak capacity. When population growth is taken into account, the Illawarra rail line will reach critical levels before 2016 during the morning peak (between 7.30 am and 9.00 am at Central). More services may need to be provided during the off-peak periods in the longer term as well. This would necessitate either lengthening of existing South Coast trains or the provision of additional services, which will lessen the availability of freight paths in non-peak times.*"

The final strategy (DOTARS 2008, p6) notes that the Illawarra rail line faces an effective restriction on freight train operations during peak periods (600 to 900 and 1500 to 1900hrs) and that "...*it is often difficult to find paths for freight trains as there are only two rail tracks south of Hurstville*" with particular congestion problems between Hurstville and Sutherland. The final strategy notes (DOTARS, 2008, p11), with conditions, that the Maldon -Dombarton line may be able to play a future role and could "*remove bulk freight from the Illawarra rail line and some other parts of the Sydney passenger rail network....*"

3. The 2009 Pre-feasibility study

In 2008, the Port Kembla Port Corporation and the Australian Government commissioned Connell Hatch and SdD (2009) to undertake a pre-feasibility study. The key findings of this pre-feasibility study are, in summary form:

- a) As a project that was stopped mid-construction, it is advanced in many ways, is located immediately adjacent to the third largest city in the state, ... [and] has the potential to become a catalyst for additional trade and commerce in the Illawarra region and the ability to avoid or forestall other transport congestion issues on both road and rail.
- b) Significant site construction, design and detailed research has already been completed and would enable a fast track to completion of the line, with verification of existing designs to ensure that they meet acceptable standards, guidelines, legislation and stakeholder expectations.
- c) With important qualifications, a base cost P50 estimate (50% probability mid-point) for completing the proposed project is \$550 million. [From page 20, the largest two items are the tunnel at \$124.8 million and bridges and crossings \$113.4 million (Cordeaux and Nepean River bridges \$60m); also this estimate is without electrification].
- d) The potential income from current freight markets is unlikely to make the capital funding of the project attractive to a private developer. Whilst the project is attractive from a railway operations perspective, it has a negative return on investment when the capital cost of the rail line is included. ... However, the range of significant indirect and intangible benefits has not been considered in this simple financial assessment. A full economic assessment of the project would be required to accurately identify and quantify the dollar impact of these items.
- e) In all but the most limited and pessimistic scenarios, there appears to be a business case for trade generation from the project. Major beneficiaries include the Port of Port Kembla and existing and proposed coal mines in the Appin-Wilton areas, as well as potential benefits by reducing Sydney road-rail congestion in general and coal and container movements in particular ...
- f) The potential to create jobs in the region is significant. ...
- g) The 35 kilometres rail corridor appears not to have been compromised by any development. Much of the earthworks and completed components of bridge construction remain in place and in serviceable condition.
- h) Further studies are required to assess the project on environmental, social and economic criteria.
- i) New intermodal freight corridors serving south western Sydney industrial areas may be required by 2020 due to road and rail congestion. ...The Maldon-Dombarton Rail Line could become the critical link in a Port Kembla-based container supply chain to handle forecast growth in demand for the Greater Sydney region.
- j) Considering the 2020 scenario, without the Maldon-Dombarton rail line, there will be a significant increase in congestion on the Illawarra South Coast Line to a point where future growth in the region may be limited. This includes possible limits to the planned increase in coal exports via the Port Kembla Coal Terminal from 12 million tonnes per annum to almost 25 million tonnes per annum, as well as limiting the capacity to provide increased rail commuter transport to the greater Sydney area. The effect of the anticipated capacity limitation will occur well before 2020 and will impose limitations on the creation of wealth and employment in the southern regions of NSW...
- l) The line also offers potential haulage savings by requiring lesser locomotive power per tonne of coal and an opportunity to rationalise the maintenance liability of other sections of Illawarra rail links.

Some factors from Chapter four "Technical and Operational Opportunities and Issues" are of note. Significant technological advances in diesel electric locomotives since the 1980s including greater efficiency and "gripping" power and reliability vastly improve their capability of moving freight on the long 1-in-30 grades on the Maldon-Dombarton line. With appropriate

ventilation measures in the four km Avon Tunnel, it is concluded "that there is likely to be little commercial value in providing overhead power..."

It is also noted that the Maldon-Dombarton Rail Project, when started in 1983 and stopped in 1988 (Connell Hatch and SdD, 2009, p23) "...was owned by the State Rail Authority. It is currently owned by the Rail Infrastructure Corporation and is classed as Country Rail Network (CRN) Non Operational. It forms a link to two lines which are part of the ARTC-leased network."

Axle loads of 30 tonnes would be quite possible on the new link, as would the use of diesel passenger rail cars, such as those used for the Moss Vale-Unanderra line.

The report includes detailed Appendices with demand analysis forecasts for the timeframes of 2010, 2020 and 2030. For coal "The current total production of coal in the southern and western coal field is around 24 mtpa, of which 16.5 mtpa is destined for domestic and export operations at Port Kembla." Of this, about 13 mtpa is for export. The report [Appendix B, page 18] notes that by 2013, coal exports could grow rapidly, with optimistic forecasts of 25 mtpa, whilst "An export task exceeding 20 mtpa by that date, however, could be considered reasonable in view of market confidence."

Other freight including grain, other commodities, steel, motor vehicles, containers as well as passenger travel are considered.

On 8 July 2009 the Federal Treasurer at a function in Wollongong with local Federal MPs Ms Sharon Bird and Ms Jennie George released the pre-feasibility study and announced funding of \$3 million to proceed to a full feasibility study. A contract for the full study was awarded in January 2010 to include "detailed planning and engineering work needed to obtain firm costings and determine the viability of this project. " The new study is expected to take around 18 months to complete.

3.1 Some negativity

The pre-feasibility study noted (Connell Hatch and SdD, 2009, Appendix B, p74) some less than positive responses including "investment to address the operating deficiencies of the Illawarra and Moss Vale Unanderra lines was also seen as a potentially lower cost option, which needed to be evaluated against the Maldon – Dombarton option, so that the most economically attractive option to meet the region's needs could be implemented."

A similar view was reportedly held (Illawarra Mercury, May 30 2009) by Pacific National. In addition, the NSW Government has to 2009 taken a less than positive view on the benefits of completing the railway.

4. Existing constraints and benefits of the new line

It is suggested that the following changes in recent years have strengthened the case for completion of the link:

A. Ongoing demand for electric train services from Sydney to Wollongong, with demand for more passenger trains leaving less paths for freight trains on the Illawarra Line. Current NSW Department of Planning (2010a) projections indicate an increase in Wollongong and Shellharbour local government area population from 257,000 in 2006 to 288,000 in 2021. An even stronger population growth is projected for the Outer South Western Sydney statistical subdivision (239,600 to 362,400).

B. Increased rail congestion in Sydney, coupled with the extra costs of raiiling coal via inner Sydney (with increased curfews on coal train movements each working day), and the

steep Como bank needing 4 diesel electric locos for a 45 wagon train. Rail congestion is an ongoing issue in parts of Sydney.

C. The Maldon Dombarton link for some coal traffic would tie in with use of the 32 km ARTC South Sydney Freight Line from Sefton to Macarthur. This line is now due for completion in 2011.

D. Although coal tonnages have not met some earlier projections made up to 1992, and some mines have closed, there is potential for a Maldon Port Kembla railway to carry new freight and passenger traffic. This is opposed to increasing road haulage of coal on public roads.

The City of Wollongong has paid dearly in previous decades for over-reliance on road haulage of coal. The penalties have included not only the reported loss of 27 lives in road crashes involving coal trucks between 1978 and 1985, but stunted growth of Wollongong's CBD to the mid 1980s, and negative impacts on residential amenity and tourism (Laird et al 2001, p41). One estimate of the external cost of road haulage of coal from near Appin due to this writer is about \$1.06 per tonne.

During 2008-09 the Department of Planning processed a Major Projects application by the Port Kembla Coal Terminal (PKCT) to lift a long standing curfew on road deliveries by coal trucks to the PKCT and to lift already high levels of road haulage of coal of some 5.1 million tonne per annum (mtpa) of coal to the PKCT to a maximum of 10 mtpa. The curfew went back to State Environmental Planning Policy 7 (SEPP 7) that was made in 1982 that reflected a 1979 consent of Wollongong City Council but lifted a 1979 consent condition made with the agreement of the NSW Government that imposed a limit of 2 mtpa of road haulage of coal to Port Kembla.

The application resulted in the NSW Department of Planning receiving 122 written objections. To quote from their Director-Generals Report (2009, p12), "The main grounds for objection included:

- noise, road safety and driver behaviour, dust and air pollution, impact on infrastructure and greenhouse gas emissions due to an increase in heavy traffic movements;
- choice of road transport in preference to provision of a rail link, in particular the completion of the Maldon-Dombarton rail line to transport coal more efficiently from the Western Coalfield; ...
- limited community consultation during the environmental assessment process."

E. The Port Kembla Port Corporation is currently seeking approval from the NSW Department of Planning (2010b) for a three stage development of the Outer Harbour of Port Kembla comprising in part:

- 42 hectares of land reclamation and associated dredging;
- shipping berths and freight terminals (container, dry bulk and multi-purpose);
- storage and truck loading facilities; and
- road and rail infrastructure where the Director-Generals requirements include "interaction and integration with existing and planned transport infrastructure (eg Maldon to Dombarton rail link and services)."

In April 2010, an Environmental Assessment was placed on public exhibition by the Department of Planning. This Assessment notes in part (Appendix I, p19.4 of the limitations of rail capacity on the existing main line to Sydney, and suggests rerouting freight trains with new cargo going into and out of Port Kembla via the Moss Vale Unanderra line. However, the Moss Vale Unanderra line has severe speed-weight restrictions.

In June 2010, a Submissions Report was released by the Department of Planning. This included comment by the NSW Roads and Traffic Authority that after consideration of the impact of Stage 1 Port Kemba outer harbour traffic volumes (bulk, general and limited containers) if the predicted rail mode share could not be achieved, there would be likely "... unacceptable impacts to road safety and traffic efficiency as well as environmental issues such as amenity, noise and air quality."

F. Port Botany is the main container port for New South Wales and during 2009-10 saw a total movement of containers amounting to 1.928 million Twenty Foot Equivalent Units (TEUs); also, the present planning consent places a maximum movement of 3.2 million TEUs per annum (Sydney Ports Corporation 2010). At a 6 per cent per annum growth rate, this cap would be reached in 2019. The NSW Government will need to decide whether to lift this cap (which may require extensive investment in expanding the M5 highway) or accommodating this growth at either Newcastle or Port Kembla. Port Kembla's relative proximity to the fast growing Western Sydney region is a point in favour of Stage 2 and 3 development at Port Kembla complemented by the Maldon Dombarton link.

G. The Australian government (2010) has made a commitment to develop a large (220 hectares) Intermodal terminal at Moorebank to handle container traffic from interstate rail freight and Port Botany, and subject to planning approvals, commence staged development in 2013. The new Moorebank Intermodal Freight Terminal will be adjacent to the South Sydney Freight line, the M5 and M7 motorways, with proximity to the industrial centres in Sydney's west and southwest.

Completion of the Maldon Dombarton link would also support the operations of the new terminal at Moorebank.

H. Failure to complete the Maldon Dombarton link will require over time additional capacity and other upgrades on the existing Sydney - Wollongong Railway. These are likely to prove expensive and could include a new Waterfall -Thirroul route with a long tunnel as promised in 1998 by the NSW Government in its Action for Transport 2010 statement. The Waterfall-Thirroul route with a 11 km tunnel was quoted in a consultants report for the NSW Government (Connell Wagner 2003) as costing about \$1.4billion ± 30 per cent. Two partial realignments of this winding track were noted at an indicative cost of \$779 million (best travel time savings) and \$600 million (best value).

The option of triplication (or quadruplication) of the Hurstville Sutherland track may also need to be addressed. This track will see more trains following the introduction of a new timetable later in 2010 following duplication of the Cronulla-Sutherland track and related resignalling works at a cost of \$436 million (NSW Premier, Media Release, re Cronulla Line Duplication, 23 April 2010). The completion of the Maldon Dombarton rail link would be a much less expensive option than significantly improving rail capacity on the existing railway.

I. In February 2010, the NSW Government released a Metropolitan Plan with a commitment to release a Freight Strategy. A further commitment was made to release an Illawarra Transport Strategy by the end of 2010. Both strategies may address some of the above issues.

J. In addition, "oil vulnerability" may need addressing. The Final Report of the Rural and Regional Affairs and Transport Committee Inquiry into Australia's future oil supply and alternative transport fuels that was released in February 2007 (with a response still due in August 2010) included a recommendation (# 7) as follows. *...that corridor strategy planning take into account the goal of reducing oil dependence ... Existing Auslink corridor strategies should be reviewed accordingly.* This Committee also noted (para 8.7) that *"... it may be expected that if there is a long term rise in the price of fuel, this will favour rail because fuel is a greater proportion of costs for road transport. This may suggest a need to increase the pace of catchup investment in rail infrastructure."*

5. The Main South Railway - rail deviations

In the early 1990s, the Hon WC Wentworth suggested (Sydney Morning Herald 26 September 1992) a new railway to follow the route of the present section of the Hume Highway that was opened in 1980 between Campbelltown and Mittagong. It is of note that in about 1977, the former Public Transport Commission had examined a similar route. During the late 1990s, various options were examined for the former Rail Infrastructure Corporation of NSW and outlined in the 2001 ARTC Track Audit (see also Laird 2008).

One proposal for a major 36 km rail deviation between Menangle and Aylmerton is located, for most of its length to the east of the Hume Highway. Starting at 68.0 km from Sydney, the new track would cross the Hume Highway and then follow it to the northern portal of the Aylmerton tunnel at 122.3 km. The net effect would be to replace 54.3 km of track with "steam-age" alignment by 36 km of new track built to modern standards, albeit with a ruling gradient of 1 in 50. The ruling curvature is 1500 m.

This new track could 'tie in' with the existing track at 108.2 km near Yanderra, where heavy south-bound freight trains could be diverted onto the existing track, thus giving a ruling gradient of 1 in 60. The main benefit for completion of 35 km of new track is saving an average of 17 minutes transit time and modest fuel savings for heavy super freighters.

The Wentworth deviation could be built in two sections. The first would be a 25 km Menangle - Yanderra section bypassing 40 km of steam age alignment where trains turn left or right the equivalent of 8.5 circles over 22 km of track with tight radius curves less than 800m. The second section would be about 11 km to replace the southern 14 km section where trains turn 4 circles on 8.4 km of tight radius curves.

5.1 A combined staging option

Pending further analysis of demand and rail operation benefits, one option is to construct the Menangle - Wilton - Yanderra track (25 km) and the Dombarton - Wilton (35 km) sections.

The Menangle - Wilton - Yanderra section could use part of the alignment of the Maldon - Port Kembla railway (east of the road interchange between the Hume Highway and Wilton/Picton road) and would extend from about 9.5 km to 12 km on the new line.

Such work would complement that now due in late 2010 with the Victorian North East Rail Revitalisation project at an initial cost of \$501 million to deliver *"a first-class passenger and rail freight link between Australia's economic hubs, Melbourne and Sydney ..."*

This project is being funded by the Federal Government (\$330m) and the Victorian Government (\$171m) and will be delivered in 2010 by the ARTC. It complements other ARTC projects on the Sydney-Melbourne railway including the South Sydney Freight line.

5.2 Other Main South deviations and rail competitiveness

It is noted that the Wentworth Route is one of three major deviations proposals noted in the 2001 ARTC Track Audit for the Main South line. The other two were between Goulburn and Yass, and between Bowning and near Cootamundra.

These three major rail deviations could be usefully supplemented by two smaller ones (Laird 2007): Werai to Penrose and a bypass of the Bethungra Spiral. The five deviations would require construction of 196 km of new track, and replace about 256 km of 'steam-age' alignment. For an intermodal freight train with two 4000 HP locomotives, the benefits of the

196 km of new track as indicated by SimTrain simulation include a time saving of 105 minutes and a fuel saving of about 1340 litres of diesel per train.

The resulting improvement in rail freight efficiency and competitiveness from construction of a 'fit for purpose' Sydney Melbourne railway combined with better intermodal terminals and the application of 'user pays' and 'polluter pays' road and rail track pricing could well see rail win 50 per cent of Melbourne Sydney rail freight. Toll's Paul Little (2007, p22) commented that rail's share " ... *should really be in excess of 50 per cent.*" A modal share of 50 per cent was adopted as a 2017 goal by the Australasian Railway Association (2007).

Rail's modal share of non-bulk freight on the Melbourne Sydney corridor is about 5 per cent, although this is expected to improve on completion of the current ARTC upgrade.

However, by 2014, with projected intercity freight tonnages, if rail were to achieve a 50 per cent mode share of Melbourne Sydney rail freight, there would be saving of some 77 million litres of diesel each year as well as reductions of greenhouse gas emissions.

It would also reduce transport costs and improve road safety with a reduction in external costs of about \$144 million per year (using estimates indexed to 2014 terms).

The ARTC (2008, p32), noted, inter alia, " *For rail to move to the next step in competitiveness, or even in fact to maintain competitiveness against a constantly improving road network, there is no alternative but to start to consider deviations of the current poorly aligned sections of the network.*"

The ARTC (2008, p32) also notes that " *Deviations offer significant benefits in terms of reduced transit time and reduced distance. As already noted, many capacity projects are required in order to maintain transit times at target levels in an environment of growing volumes. In some cases deviations can offer a lower cost solution to maintaining transit time while offering material costs savings for both above and below rail as a result of shorter route distance and a shorter, better quality track.*"

Four proposed deviations between Sydney and Cootamundra (Breadalbane - Jerrawa, Bowning - Binalong, Cunnighar - Demondrille, and Demondrille - Nubba) with an indicative cost of \$351 million and one between Cootamundra and Melbourne (South Cootamundra - Frampton \$70 million) are noted by the ARTC (2008 p33, Table 7 and a map).

The Queensland MainLine upgrade project has already demonstrated the value of extensive track straightening (some 200 kilometres from the mid 1980s to 2009) and strengthening on its Brisbane - Cairns railway and is a major contributing factor to rail now moving about 30 per cent of freight on this corridor (DOTARS 2006 and Laird 2008).

Other advantages of rail deviations include improved clearances, and improved reliability of train operations. In this regard, the second advantage was noted by Mr Bob Scheuber, CEO of Queensland Rail (2005). To quote re the success of Queensland's Main Line Upgrade (MLU) that included extensive track straightening, it was " *...not only more efficiency of train movements but it dramatically reduced derailments with 100km/h trains with an increase in reliability.*"

Clearly the various Main South rail deviation proposals (along with the Maldon Dombarton link) would need to be subject to the normal cost benefit and triple bottom line assessments expected in decisions to allocate funds (Australian Transport Council, 2006).

6. Conclusions

With the constraints on the existing road and rail networks, the ongoing expansion of Port Kembla, and increased demand for passenger train services on the existing South Coast

railway, the case for completion of the 35 km Maldon - Dombarton link is stronger than it was in 1988 when worked on it was suspended.

Given the positive findings in the pre-feasibility study, either the Federal or the NSW Government should move to acquire the complete corridor (most is already held) and commence additional environmental impact assessment to meet any new requirements introduced since the 1983 EIS was completed. The results of the full feasibility study will be awaited with interest.

The Maldon - Dombarton link could also be tied in with a 36 km Menangle - Aylmerton rail deviation to improve freight and passenger train operations on the NSW Main South railway. Corridor protection for this and other Main South rail deviations could well be expedited.

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References

Australian Government, 2010, Information relating to Moorebank Intermodal Freight Terminal at <http://www.finance.gov.au/property>

Australian Logistics Council 2006, *Infrastructure Action Agenda*

Australasian Railway Association 2007, *ARA Strategic Plan 2008 - 2017* at ara.net.au

Australian Rail Track Corporation (via www.artc.com.au)

2001, *Track Audit*

2008, 2008-2024 *Interstate and Hunter Valley Rail Infrastructure Strategy*

Australian Transport Council (2006) *National Guidelines for Transport System Management In Australia*

Bureau of Transport and Communication Economics 1992, *Relative efficiencies in the transportation of commodities*, AGPS, Canberra.

Carleton, M 1993, *Upgrading of the Port Kembla coal terminal proposed by Port Kembla Coal Terminal Limited*, report to the Hon Robert Webster, Minister for Planning and Minister for Housing, NSW.

Christie, R

2001, *Long-term Strategic Plan for Rail Overview Report*, Office of the Coordinator General of Rail, Haymarket, NSW.

2010, *Independent public inquiry Long-term public transport plan for Sydney, Preliminary Report* (via www.transportpublicinquiry.com.au)

Connell Hatch and SdD 2009, *Maldon-Dombarton Rail Line Pre-Feasibility Study* for Port Kembla Port Corporation (and the Australian Government)

Connell Wagner Pty Ltd 2003, *South Coast corridor-Rail improvement-Thirroul tunnel study*.

Department of Transport and Regional Services (DOTARS) - <http://www.auslink.gov.au/>
2006, Draft Brisbane Cairns corridor strategy
2007, Draft Sydney Wollongong corridor strategy
2008, Sydney Wollongong corridor strategy

House of Representatives Standing Committee on Transport and Regional Services 2007, *The Great Freight Task: Is Australia's transport network up to the challenge?*
<http://www.aph.gov.au/house/committee/trs/networks/report.htm>

Kinhill Engineers 1995, Report re a railway from St Marys to Glenlee to Port Kembla for Wollongong City Council

Laird, P

2007, Melbourne Sydney Brisbane track options for 2014, AusRail, Sydney
2008, Sydney Goulburn rail Railway Digest November issue, p4 and 5
2009, *The Maldon Port Kembla Railway and the Wentworth deviation* AusRail Adelaide

Laird, P G and Adorni-Braccesi, G 1993, *Land Freight Transport Energy Evaluation*, Energy Research and Development Corporation, Canberra.

Laird, P Newman, P Bachelors, M and Kenworthy, J 2001, *Back on Track: Rethinking transport policy in Australia and New Zealand* UNSW Press, Sydney

Little P 2007, Keynote address to 'Transport - the next 50 years conference', Christchurch New Zealand

NSW Department of Planning

2009, Director-Generals Report re Port Kembla Coal Terminal Project via http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=2238
2010a NSW SD SSN Population Projection 2006-2036 kindly advised by Illawarra Regional Information Service
2010b, <http://majorprojects.planning.nsw.gov.au/page/project-sectors/transport->

NSW Department of Transport 1998, Action for Transport 2010: an integrated transport plan for NSW

NSW Legislative Council Standing Committee on State Development 2005, Inquiry into Port Infrastructure in New South Wales Final Report

Parry, T 2003, *A Ministerial Enquiry into sustainable transport in New South Wales*, New South Wales Ministry of Transport.

Scheuber, B 2005, at AusRail Plus 24 November 2005, Sydney

Senate Standing Committee on Rural and Regional Affairs and Transport Committee 2007, report on Inquiry into Australia's future oil supply and alternative transport fuels

State Rail Authority 1985, Maldon Port Kembla Railway brochure

Sydney Ports Corporation 2010, Media release dated 13 August 2010 and consent conditions re expansion from <http://www.sydneyports.com.au>