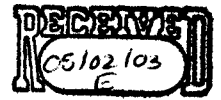


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Att: John Elliott,

The attached document is a detailed response to the green paper on Auslink. It contains answers to most of the questions in the green paper and suggests a specific self-contained project that is suitable for the private sector.

The response refers to two technical papers that are of direct relevance to the above project and I would be pleased to e-mail a copy of the most recent paper if it is of interest.

Regards

**COLIN F G BUTCHER B.Sc, F.I.E. Aust.**

**TOWARDS A NATIONAL**

**LAND TRANSPORT PLAN**

**A RESPONSE TO THE**

**GREEN PAPER**

**ON**

**AUSLINK**

## PREAMBLE

### GENERAL

In general the Department of Transport and Regional Services is to be congratulated for the excellent summary of the status of land transport in Australia. The Auslink green paper presents the projected growth in demand for transport services and should make a major contribution to the debate about investment in land transport infrastructure.

Although the paper suggests a number of initiatives to improve the efficiency of land transport, the general thrust is of some concern. In the view of the author of this response there are several weaknesses in the document and these have been identified in the subsections below. Additional detail is provided in the comments on each chapter and in the responses to the questions that are posed in the paper.

- ◆ Acceptance of current transport technology,
- ◆ Reliance on cost imposts to suppress road transport demand,
- ◆ Integration of rail and road transport in an anti-competitive manner,
- ◆ No indication of how private sector financing is to be attracted to infrastructure projects.

### Transport Technology

The only references to improved technology relate to information technology and the use of the information for management purposes. Whilst this might have some benefits there is no indication of the scale and no recognition that other technological developments might have an even greater impact on land transport in this country. The green paper places a great deal of emphasis on the need for more and better roads coupled with some relatively minor improvements to the existing rail system. It ignores other forms of land transport for freight and passengers and specifically excludes all modes of urban public transport.

Australia must make some critical decisions about the investments that will be required but building more roads and patching up parts of a steam age railway is not an adequate response. Whilst the green paper recognises that incremental change is not an option, there is nothing to suggest that an adequate response will be made to the challenges facing land transport. This is particularly the case where there is any reference to the need for improvements to the rail infrastructure. If rail is to make a significant contribution to the land transport task, the 19<sup>th</sup> century infrastructure must be rebuilt to standards applicable to the 21<sup>st</sup> century. Without this major upgrade to the infrastructure rail cannot take advantage of current railway technology and will not be able to make a substantial

contribution to the land transport task. An out of date rail system will continue to shrink in importance and will become irrelevant.

Apart from the suggestion that rail might be used for some freight flows through urban areas the paper only refers to road for urban and regional transport links. Alternatives such as conveyer belts, bucket conveyers, bus ways, light rail and regional rail links are excluded from Auslink funding. This ignores potential methods of reducing road traffic and avoiding the need to provide funds for the upgrade of local and regional roads.

**The lack of any consideration of alternative methods of land transport for freight and passengers is a serious flaw that should be corrected. Auslink should not exclude any of the existing and potential land transport technologies so that the most economical and acceptable outcome may be obtained.**

### Suppressing Road Transport

The paper refers to various methods of guiding users away from road transport such as a levy or congestion pricing. In theory these extra costs may suppress one mode in favour of another or may even reduce the demand in the same way that high petrol prices have some influence on the use of private cars. There is little to suggest that this distortion of the market is effective in the long term as people grow accustomed to the higher costs and make their choice on the basis of other factors such as performance or comfort. A cost impost to suppress road transport may also be regarded as another form of taxation rather than a valid influence on modal choice.

Where road transport is currently not making an equitable contribution to the cost of the infrastructure that it uses, increased charges are appropriate. The extra cost will be passed on to the end user and this will set a higher benchmark that will reduce pressure on the main competition. The green paper infers the possible introduction of charges that relate to actual vehicle mass and distance travelled but how this will be administered is not defined. Whilst this would be a welcome improvement and would be more equitable than the current arrangement, the possible extra administrative costs to the road transport operators should be recognised. Any such extra costs would reduce transport productivity and from this point of view the proposed changes should be approached with caution.

### Integration of Road and Rail

The green paper suggests only limited investment for rail with some form of integration of road and rail that would not encourage competition. This may ensure that rail will survive for a while but road transport would be married to a rail system that would remain outdated and far from efficient by current world standards. Rail would form a weak link in the transport chain and this would ultimately have a detrimental effect on the Australian economy.

One of the main reasons that road is used for much of the non-bulk freight is significantly better performance that road can offer. Currently the ancient rail alignment is a major impediment to the performance of rail transport and real competition between road and rail is not possible. The proposal to modify some sections of the East Coast rail network will not have a major impact on rail transport performance and road will continue to have the advantage of a more modern infrastructure.

Rail could and should make a much greater contribution to the enormous transport task along the major interstate corridors. A 21<sup>st</sup> century railway would be able to capture a greater share of the non-bulk freight in a competitive environment resulting in benefits to the economy, environment and public safety.

**The proposals in the green paper will only underpin the continued expansion of road's market share with rail unable to make an efficient contribution. The existing rail infrastructure is a valuable asset and should be enhanced so that rail is able to offer real competition to road.**

#### Private Investment

Investment in transport infrastructure has traditionally been in the hands of government but the need for a great deal of new infrastructure makes this impossible. The need for more private investment is noted in the green paper but quite how this is to be achieved is not dealt with in any detail. For the most part there is only a suggestion that governments must seek participation in their projects using toll roads as an example.

The green paper does not make it clear that projects that could be financed solely by the private sector need to be self-contained. Funding of an entirely new urban road or bridge by tolls may be acceptable and a lot of examples of this approach exist within Australia. However, many non-urban roads need to be upgraded on the same alignment leaving users with no option but to pay the toll or find an inconvenient alternative. This is hardly an acceptable environment for the imposition of tolls and would limit the opportunities for private sector financing of major links in the road system.

Rail has the advantage that it is by nature self-contained and the private sector has shown interest in funding major rail projects. An imaginative scheme to completely upgrade the rail line between Melbourne and Brisbane through Sydney is one project that could attract private sector finance. At the local or regional level the rail lines that are no longer in use could be sold to private operators to allow the basic infrastructure to be used for alternative modes of transport. Local bus operators could use the right of way for bus ways or for light rail schemes to avoid adding to the congestion on the roads.

**Whilst there is some reference to specific plans for government investment in the existing rail infrastructure, the green paper fails to indicate any plan to investigate or encourage private sector schemes.**

## **RESPONSES**

The main part of this document is in the form of a review of the chapters in the green paper. Each of the questions has been numbered and is listed under the relevant chapter heading with the page number shown in brackets. In several instances the brief comments on the subject are followed by a final response in bold type. Where the question touches on issues outside the author's experience, a full response is not provided but the question is included for good order.

In addition to the responses to the specific questions in the paper, this document suggests an alternative to the proposed improvements to the rail infrastructure. This alternative would take full advantage of the potential for rail to carry a much larger share of the transport task. The concept would reduce the necessity for massive investment in the road infrastructure and would also help to reduce congestion, pollution and road trauma whilst improving economic development, social cohesion, nation building and accessibility.

As the alternative approach does not fall within the limited format of the green paper, it is dealt with in a separate section. The technical details of the approach are outlined in two papers that were presented at railway conferences held in Sydney in 1994 and in Wollongong in November 2002. Details of these two papers are included in the reference section at the end of this submission.

## **THE AUTHOR**

Whilst the views expressed in this response are those of an individual they are based on over 36 years of experience in the railway rolling stock supply industry. This included responsibility for the design of all types of train from the humble freight wagon to some of the fastest passenger trains. It also included consulting work on various projects such as the original VFT and feasibility studies for proposed coal export lines. Further information is contained in a brief resume in a subsequent section of this document.

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## CHAPTER ONE

***QUESTION 1 (page 23). Do you agree that these are the major transport infrastructure challenges facing governments? What, if any, other challenges should governments consider?***

The list of challenges in the green paper broadly covers the issues that must be faced by government but they are general in nature. Emphasis is given to the basic challenge to provide adequate infrastructure to cope with the future freight and passenger transport requirements. There is much less attention given to the need to ensure that the different modes carry an appropriate share of the load to take full advantage of the merits and benefits of each form of transport.

One of the implications of the continued reliance on roads is the greater input for maintenance and this is only noted in the green paper. Existing roads that are able to take up the additional load will require more frequent resurfacing and may need strengthening and renewal of the basic structure. Funds for the maintenance of these roads must be obtained from the public purse and expenditure must be increased to match the wear and tear of the greater volume of traffic. There is a significant risk that the increase in expenditure on maintenance will exceed the increased revenue available from greater economic activity and these roads will not be maintained in a satisfactory condition. This occurred in the US where continued expansion of the interstate highway system outstripped the funds that were available for maintenance.

The green paper recognises the need for contributions from the private sector but does not suggest an appropriate mechanism or the extent of the required funding. Private funding of roads usually requires tolls to provide all or part of the return on the investment and this has been accepted for a limited number of urban roads. Many priority sections of the interstate road system have already been upgraded without the need for tolls. To impose tolls to upgrade less critical sections that might carry less traffic may not be acceptable.

The green paper suggests that rail is well placed to compete in the long distance non-bulk freight market provided there is an appropriate level of investment in infrastructure. Rail's high market share on the east-west corridor is used to illustrate this point but there is no indication of the scale of the improvements to the infrastructure that would be required to give rail a similar potential share along the more important north-south corridor.

The flow of non-bulk freight between Melbourne, Sydney and Brisbane is much greater than the flow to or from Perth but rail's market share is very low. The green paper suggests that rail could not capture a large portion of the north-south market and states that an increase in rail's share will not reverse the road's dominance for non-bulk freight along this corridor. On this basis the green paper declines to confront the challenge presented by the general community desire to shift non-bulk freight from road to rail and government should not accept this position.



**A substantial transfer of freight from road to rail to reduce the cost of pollution, congestion, road maintenance, road trauma and noise is a major challenge that is not adequately addressed in the green paper.**

## CHAPTER TWO

***QUESTION 2 (page 27). The Government invites your views on how land use planning could be improved? How could planning for transport infrastructure and land use be better integrated?***

There is a definite need for better land use planning in Australia, particularly to allow for the future development of transport corridors. In the larger cities some corridors have been reserved for local purposes but in many cases the provisions have been inadequate or non-existent. Provision for major new links through suburban areas to service regional centres and to allow for new interstate connections appears to be given little if any consideration by state and local governments.

Examples of poor planning for road and rail corridors in and out of city areas are not difficult to find. In the north of Sydney there was no provision for a major road to replace the old Pacific Highway and the F3 freeway had to be built through part of Ku-Ring-Gai National Park. An improved rail line through the same area is under consideration and it too must be to be built through the park or in tunnel.

To the south of Sydney the VFT consortium identified an alignment that allowed the proposed high-speed line to leave the existing rail corridor at Glenfield. During the past decade development of new housing and industrial areas between Campbelltown and Camden has effectively deleted this option from further consideration. For this reason the recent DOTARS study of a high-speed passenger railway between Melbourne and Brisbane made the assumption that the southern access to Sydney would start at Campbelltown. This extended the length of the line that would be constrained by the speed limits applicable to the existing rail infrastructure. On this old alignment it is not feasible to operate high-speed trains at their full potential and this severe restriction is one of the factors that made it impossible to match the proposed performance of the VFT.

In the above cases the responsibility for land use planning rests with the state and local governments. The main focus appears to have been on local issues with little if any consideration of the requirements beyond the greater city area. Even regional transport requirements do not appear to have influenced the decisions made about land use within the suburbs of Sydney.

Ideally transport corridors should be included in the development plans for all urban areas within Australia. This would require a national transport plan that defined the road and rail links that may be required at some time in the future. In addition to the reservation of transport corridors it would be an advantage to nominate areas for industrial development so that freight movement away from these corridors is kept to a practical minimum.

**Improved land use planning should start with a long-term plan for new and improved transport corridors. This should be based on projections similar to those outlined in the green paper but should not prejudice the share between modes. The plan should form a guide for the detail planning at state and local level with a requirement that any development should be compatible with the plan. All levels of government should have input to the planning of the corridors but should then be committed to the final master plan.**

***QUESTION 3 (page 32). What are your views on how an increase in land transport infrastructure spending should be paid for? For example, what would be the advantages and disadvantages of a levy on road users?***

An increase in infrastructure spending is essential to meet the future demand for freight and passenger transport. If this is to come from the public purse there will be pressure for an increase in taxation or some cuts to other programs. The suggestion that road users should pay some form of levy may appear to be attractive for government but it would almost certainly be viewed as another form of taxation. Depending on the form of the levy, the mechanism may require a significant organisation to administer.

As increased taxation or a levy may not be well received by the public, government must seek greater involvement by the private sector. Some important and expensive links such as the Gateway Bridge in Brisbane have been provided by the private sector and the same approach may be used for other similar links. Toll roads through open country might be less acceptable to the public and funding road infrastructure by this method may be limited to relatively short but major developments similar to the Sydney orbital road.

If rail could be improved sufficiently to attract a greater share of the freight and passenger demand, there would be less need for expansion of the road system. It is technically feasible to upgrade the rail infrastructure to create an efficient system that would offer real competition to road. This would shift the load from road to rail and reduce the need for investment in the road infrastructure to cope with the anticipated demand. An outline of the concept is provided in a subsequent section of this report and the technical details are contained in the papers listed in the reference section.

Revitalising the East Coast rail network may be achieved at a lower cost than building a new and separate railway for high-speed passenger trains. The performance improvement for freight trains would be far greater than that envisaged by current proposals to upgrade the existing rail lines and would also suit very fast trains that could match the performance proposed by the VFT consortium more than a decade ago. Where appropriate the rebuilt line would make use of some of the existing alignments and would avoid the need for separate lines for freight and passenger services. The combined income from a very large share of the non-bulk freight market and passenger travel would reduce or eliminate the need for financial support by government. A concession to build own and operate a new railway of the type that is envisaged would be one way to attract private funding of a major new transport asset.

**The imposition of a levy to fund an essential increase in spending on transport infrastructure would be an unwelcome development. For major discrete road projects the funding could come from the private sector but this may only be applicable where tolls are convenient and acceptable. Reconstruction of the intercity rail links by a private organisation to suit high-speed passenger trains and fast freight trains is an attractive alternative that would reduce the need for government investment in road and rail infrastructure.**

***QUESTION 4 (page 32). What are your views on tolls to pay for costly urban roads funded by the private sector?***

As stated above, there appears to be a need for government to seek greater involvement by the private sector. There are quite a few examples of roads and major bridges being built by the private sector and funded in part or in whole by tolls. In most cases the new infrastructure forms a discrete and identifiable link that could not be funded by government within the same time frame. A continuation of this approach may be acceptable where there is a need for similar links that form an entirely new part of the road system.

Large sections of the existing road system have been upgraded to freeway standard but there are many sections that are still in need of major improvement. These are generally in open country and need to be modified rather than replaced by a new road on a completely new alignment. In this case there would be no alternative to the upgraded road and the imposition of tolls to allow the private sector to reconstruct the old road would be very unpopular.

**Tolls to fund the construction of entirely new links should be acceptable but are not appropriate where the existing road is to be upgraded along essentially the same alignment.**

***QUESTION 5 (page 32). What are your views on the option of congestion pricing, ie charging road users more for using roads during peak periods?***

Commuters in private cars use roads during peak periods because they value the benefits of this form of travel and are prepared to accept the inevitable congestion. Mass transit may be cheaper but is less convenient unless the user lives or works close to a station on the line that serves their requirements. Many potential tram and train users regard road as a safer and more convenient form of travel despite the higher actual cost. In some respects the cost of commuting by car is not of critical importance as shown by the lack of response to petrol price increases. Similarly, the tax on car parking spaces in Sydney has not prevented a surge in the use of cars for the work journey.

Extra costs imposed by congestion pricing may have some marginal effect on road usage for a short time but may have little effect in the long term. Any new cost imposed by an arm of government is likely to be seen as another form of tax and an attempt to reduce pressure on the road system to avoid increasing the capacity of the roads that the commuters consider to be necessary. If it is applied solely to distort the competition between modes it may be perceived as an artificial prop for the mass transit system.

The public may accept the introduction of congestion pricing only if it is clearly linked to a defined program to reduce pollution due to road transport. It may also be more acceptable if mass transit systems are improved to provide a viable alternative to the method of transport that most daily commuters currently prefer.

**Congestion pricing may have a marginal effect on the use of cars for the daily commute but is questionable based on the lack of response to other cost increases and the perception that there are no acceptable alternatives.**

***QUESTION 6 (page 37). What are your views about means of achieving more efficient and effective pricing of rail and road transport services?***

Road access charges may not be evenly spread and a system that charges for actual mass and distance usage is implied in the paper. Whilst this would be more equitable than flat fees to recover road infrastructure costs, it might not be easy to administer. One of the advantages would be to increase cost recovery from interstate road trucks that generally operate at high load factors and cover large distances each year. Higher costs for these vehicles may have some negative effect on their market dominance in a sector where rail is able to offer some competition. Reducing the costs for short haul road operations where road is usually the only viable option would not alter the division between road and rail.

Rail access charges currently relate to the actual train consist and operators may adjust the train size to match the demand so that costs are reasonably in line with the actual mass. As an example, the number of cars in the XPT passenger train set has been reduced during periods of low demand. In most cases freight train operators do not pay for access when trains are cancelled and this also helps to relate cost recovery charges to the actual usage.

Rail access charges for non-bulk freight trains may be insufficient to recover actual maintenance costs and to provide for essential track renewal. This was the case in NSW where access charges for bulk freight trains included a "monopoly rent" component that provided funds to maintain the infrastructure on other lines. Reduction of the charges for bulk trains to a more equitable level has created a situation where the total cost recovery is inadequate. Increasing charges for rail access for the non-bulk freight trains would reduce their cost competitiveness on long haul services.

As there would appear to be reasons for increasing infrastructure cost recovery for long distance transport on both road and rail, the competitive position between the two modes may not change significantly. However, there are several implications that should be considered before making any changes to the infrastructure cost recovery methods. As any of these changes to the access charges might have effects that are not in line with long-term aims, the effects should be assessed before the changes are made. If both road and rail charges are changed but the changes are not synchronised, some initial effects may be reversed later. These unwelcome and disruptive consequences should be avoided by making any changes to cost recovery in a planned and coordinated manner.

It should be noted that cost is not necessarily the main factor that has allowed road to become the dominant mode for non-bulk freight. Improving the performance of rail in other areas such as journey time would have a much greater effect on rail's share of the market. This would then allow rail to increase prices to recover infrastructure costs and gain revenue from both volume and price per tonne.

**Cost recovery for road and rail infrastructure requires improvement but this should only be done after assessing the effect on modal shares. Road would appear to present the greater challenge and be more difficult to implement.**

***QUESTION 7 (page 38). What are your views on how the strategic use of technology might be fully integrated into the future transport planning system?***

It is noted that this is the only section of the green paper to mention technology and confines technological change to the management of information. Changes to the road and rail vehicle technology that would have an influence on the infrastructure requirements and the relative competitive position of each mode are almost entirely ignored. The green paper also fails to suggest that some transport requirements may be satisfied by an alternative to both road and rail. This "business as usual" approach is at odds with the general inference that this approach is no longer acceptable.

Reconstructing the rail infrastructure to create a 21<sup>st</sup> century system would have a major impact on rail's performance and would enable rail to compete with road. An outline of a proposal to revitalise rail is provided in a subsequent section and the technical papers listed in the reference section detail the technological basis for the concept. This option uses available technology that could be applied to the land transport task in the immediate future. The resulting jump in rail's market share would reduce the need for investment in roads and would drive down the cost of land transport through real competition. Some of the other benefits would include reduced noise, less pollution and fewer serious road accidents.

***QUESTION 8 (page 39). Do you agree with the proposed possible responses to the challenges in transport infrastructure?***

The proposed possible responses listed in the green paper do not match the scale of the challenges that the paper identifies. The land transport infrastructure is expected to cope with a huge increase in demand but some of the possible responses may be categorised as merely fine-tuning the system. Improved long-term planning and sourcing investment from the private sector, are essential responses to the challenge. Other possible responses, such as new land transport infrastructure pricing mechanisms and increases use of information technology, may produce only marginal improvements.

The identification of a strategic national network and the creation of a fundamentally new framework for land transport infrastructure planning and funding are the most important possible responses to the challenges ahead. However, there needs to be much more attention given to alternatives to the two basic approaches that would increase road capacity and make some small improvements to the existing rail infrastructure. The green paper acknowledges the impediments to real competition between road and rail for the line haul of non-bulk freight. Even on the long interstate links where rail should have an inherent advantage, road has captured most of the market and proposed improvements to rail will not rein in road's dominance.

The green paper places a lot of emphasis on price but rail is unable to compete with road in terms of performance. Increasing the cost of road transport will have little impact on market shares and most freight transport will be more expensive resulting in more cost to industry and the community in general. To obtain real competition between road and rail, the performance of rail must be significantly improved and this requires removal of the current impediments to rail operations. The steam age alignment of the tracks along the East Coast of Australia act as the primary barrier to rail's performance and only a major change to the infrastructure will allow rail to perform to its potential.

It is recognised that reconstruction of the rail alignment cannot be justified solely to cater for the volume of freight that the new line might attract. However, an alignment that would also be suitable for high-speed passenger trains would have far greater potential revenue and given the right approach it would be a viable project that could be funded by the private sector. This is an example of a technically feasible option that would deviate from the "business as usual" approach that appears to form the basis for much of the green paper. An outline of the concept is contained in a subsequent section and technical details are provided in the papers that are listed in the references. This alternative to a business as usual approach is the type of technological solution that should be encouraged by government.

Real competition between road and rail should be a fundamental objective as it has the potential to reduce land transport costs. It would result in a greater share of the non-bulk freight for rail and the number of trucks on the roads would be reduced when compared with a continuation of the present lack of real competition. Rail generally requires less energy input for a given task and a new rail alignment would increase rail's advantage so that pollution would be reduced.

A revitalised rail system that could offer real competition to road would not only be more energy efficient but would have a number of other external advantages. These have been identified in various reports and are acknowledged in the green paper but there is no defined or implied plan to include these in the evaluation of land transport infrastructure proposals. Some reports such as the ARTC Interstate Rail Network Audit have included costs for external factors and these may be used for the evaluation of infrastructure investment options. It is suggested that government should define these costs and require all proposals to include these costs in evaluations where relevant.

**The possible responses to the challenges fall well short of the need for considerable change to the land transport infrastructure. There is no identifiable mechanism to create real competition between modes and no recognition of the potential for change by the application of modern transport technology.**



## **CHAPTER THREE**

This chapter of the green paper is divided into nine sections that match the areas of initiative that form the Auslink plan of action. Some but not all of these sections contain questions and the position of some questions does not encourage comment on all of the contents of the section. To allow for a comprehensive response to this chapter it is reviewed under sub-headings that correspond to the nine points listed on page 44 of the paper.

### **1. Integrating and improving the National Land Transport Network**

Whilst the initial sections of the green paper provide data to demonstrate the need for greater land transport capacity there is no compelling evidence that integration of the rail and road networks should be part of the solution. A fully integrated network implies a complete lack of competition between modes with no mechanism to encourage one or both to improve performance or reduce costs. This would appear to be completely at odds with government efforts to create real competition in other areas of industry.

Integration of road and rail implies that infrastructure investment may target one mode along a corridor at the expense of the other. Picking winners in this way is a matter of great concern as it does not allow for technological developments that could undermine the basis for the selection in the future. Investment in land transport infrastructure should aim to increase competition between modes and in this respect it should target major deficiencies that currently prevent real competition between modes.

Investing in road infrastructure where road currently dominates is anti-competitive unless rail is unable to offer any chance of carrying a reasonable share of the load. Similarly, investment in rail infrastructure where rail has the major share of the market would not be appropriate. Each land transport corridor will require individual attention to allocate investment to match certain criteria such as increased competition, greater capacity, less impact on the environment and gains in other external factors.

At rail terminals where road and rail interact there may be a case for improvements to the infrastructure to increase the efficient transfer of freight between modes. Relocation of rail terminals or improvements to road access may be approached in the same way as the links to ports and airports. As this does not have a direct influence on the choice of mode this form of integration of road and rail may be a valid part of Auslink.

***QUESTION 9 (page 45). What are the elements you would see as comprising such a national network?***

The green paper lists the following four elements that would comprise the national network. It is envisaged that these should form the land transport network that is critical to national and regional economic growth, development and connectivity.

- National and interregional corridors;
- Links from the broader national network to ports, airports, production and distribution centres;
- Connecting inter-modal facilities;
- Local routes of regional significance.

**The second and third elements should be combined so that connections between modes are all treated in the same manner. Connections between road and rail should not be dealt with in the same way as land transport links with sea and air transport. It is envisaged that investment in the land transport infrastructure to improve these links must make provision for greater competition between modes where relevant. It should also allow for other modes of transport that could avoid the need for investment in the existing road and rail infrastructure.**

## **2. Developing a National Land Transport Plan**

In this part of the green paper there is a reference to extensive and early involvement of the private sector in developing the National Land Transport Plan. It is suggested that this should involve integration of privately owned and operated land transport facilities and provide opportunities for private value capture to reduce project dependence on tolls and fares. As an example it is suggested that the private sector may be involved in part of a project such as rail station development and other commercial activities.

The above points are only broad suggestions and do not constitute a plan for the involvement of the private sector. The need to identify suitable self-contained elements of the land transport infrastructure does not appear to be recognised and there is no clear indication as to how the private sector is to be involved.

**An early part of the development of a national land transport plan should identify self-contained elements that might form suitable private sector projects. In some cases these may not appear to be commercially viable without some government input but this should be determined by consultation with the private sector rather than be prejudged.**

## **3. Establishing a national advisory body**

Whilst a national advisory body may be necessary, it must include substantial industry representation if government is to obtain greater private sector involvement in the provision and maintenance of land transport infrastructure.

#### **4. Generating the best ideas**

It is difficult to avoid the impression that the intention here is to develop a national plan that is based on an expansion of the existing infrastructure and to then look for the best ways to carry specific projects to completion. If the plan determines the mode and the specific projects that are to receive investment funds, alternative ways to achieve the same outcome using a different mode or mix of modes will be discouraged.

The best ideas should be sought at the start of the review of future requirements for each corridor or link in the network. New and original concepts should be encouraged and the advantages should be identified to assess the benefits against the general principles that must be applied to all investments in land transport.

**Two ways that the best ideas could be encouraged are as follows;**

- (a) A plan for a particular corridor or link in the network should identify the overall demand and set out the requirements in broad terms that do not impose or imply a specific solution. Additional requirements should include objectives such as lower energy input, greater safety, more services and faster schedules. This may be used as the basis for a call for expressions of interest by industry that would contain indicative plans with broad cost estimates.**
- (b) Alternative solutions should be proposed for industry comment to determine feasibility and viability. This would directly encourage ideas that are not based on conventional wisdom or business as usual. It would provide a basis for further evaluation or rejection of new technologies that might have significant potential benefits.**

#### **5. Funding the best solutions**

***QUESTION 10 (page 53). The Government invites your views on whether an element of Auslink funding should be separately earmarked to foster research and development for future technological solutions. If so, how should private sector contributions be facilitated?***

The green paper appears to refer solely to information technology with little if any recognition of the opportunities presented by developments in transport hardware. If the best ideas are to be encouraged and used to address the need for increased land transport capacity, new technologies must be considered. At present the main response to increased demand for transport services appears to be limited to building more roads and making some relatively minor modifications to the existing railway infrastructure. Some capacity may be gained by fine-tuning the use of equipment to maximise the productivity of the new and old infrastructure but there will be little outward sign of change.

Alternative vehicle and other hardware technologies may have significant advantages but would be discouraged by the continued focus on conventional road and rail transport technologies. To permit full consideration of new technologies, Auslink should foster research to identify potential alternatives to the current methods of land transport used within Australia. It is not suggested here that Auslink would fund development of any solution but Auslink should fund the preliminary review stage and some feasibility studies. This would allow subsequent development of new concepts by industry to take place in a competitive environment

Where any new concept is shown to be technically feasible and has advantages over conventional methods, the commercial viability should be assessed so that the potential for private sector funding may be determined. Given adequate encouragement it is envisaged that some innovations will be proposed by the private sector and will be based on their intellectual property. In these cases the cost of development should be within the bailiwick of the relevant proponent.

***QUESTION 11 (page 53). Transport safety remains a very high priority for the Commonwealth Government. How do you think new technology could be applied to the infrastructure network to enhance land transport safety, including for specific groups, eg children, the ageing, women, pedestrians, cyclists, motorcyclists, public transport users, people with disabilities, motorists and truck drivers?***

A comprehensive response to this question is beyond the scope of these comments on the green paper. However, it is noted that the various groups listed in the question are all placed at some risk by road transport and would be safer if road traffic density was reduced. This would require less traffic on existing roads or an expansion of the road network in excess of the expansion of the quantity of traffic.

Whilst increased traffic may be inevitable and will increase the risk of road trauma, the scale of the increase may be reduced by increased use of other modes of transport. Rail has the potential to carry a far greater share of the non-bulk freight that is currently carried by road. Apart from the interstate traffic this could include some of the long distance freight traffic between regional centres that are located near the railway lines that link the state capital cities.

In addition to fast freight trains a 21<sup>st</sup> century railway would also provide passenger services that would be faster and safer than road transport. It has been shown that a much faster passenger train would attract substantial patronage for travel between regional centres as well as between capitals. The technical papers listed in the reference section of this response describe a system that allows fast freight trains and high-speed passenger trains to operate over the same tracks.

Traffic accident statistics show that heavy vehicles are over represented in serious and fatal accidents. In many cases the cause is driver fatigue due to excessive hours at the wheel and attempts to achieve unrealistic schedules. When a driver suffers a loss of attention or falls asleep the inevitable result is an accident that may involve other vehicles. Safety would be improved if effective limits were placed on driver hours and heavy vehicles were to be fitted with incipient sleep detectors. However, it is not possible to entirely eliminate a loss of control by the drivers of heavy vehicles and it would be impractical to impose the same requirements on all vehicle drivers.

A new operating regime that placed limits on the hours that a driver could be behind the wheel of a heavy vehicle could be introduced in the short term. Other changes to heavy vehicle technology are more likely to be introduced gradually as new vehicles are put on the road. Many older vehicles may be allowed to operate without being upgraded to meet new requirements and the safety of these vehicles would remain unchanged. Increased road traffic tends to increase the risk of accidents and this may not be fully offset by improvements to some sections of the road network and changes to heavy vehicle operations. For these reasons a very large reduction in road trauma does not appear to be possible without a shift of traffic to other modes. Continued reliance on road for a major share of the land transport task will not improve the overall safety of the above groups.

The hours that a train driver may work is easier to control and locomotives are fitted with vigilance systems that continually check that the driver is alert. Even if a train driver were to fall asleep in the cab, the train cannot veer off course and the vigilance system would apply the brakes to bring the train to a stand. Suburban train systems also have controls that ensure that the driver is alert and even the oldest electric railways have signal systems that prevent trains passing signals that are at danger. Safety of the passengers and crew is far superior to that on the roads and is not diminished by increased traffic.

High-speed trains have more sophisticated controls that limit train speed to the level applicable to the relevant section of the line. Signal systems for high-speed trains include cab displays that allow operation to continue in dense fog and more advanced forms of controls that prevent trains from passing adverse signals. These measures have been proven in many years of operation that have verified the greater safety of high-speed trains compared with other forms of land transport.

**Rail travel is safer than travel by road and all of the groups listed in the question would benefit from investment in a modern railway to suit high-speed passenger and fast freight trains.**

## **6. Employing a consistent approach to funding**

Whilst a consistent approach may be a noble aim, it should be noted that road has enjoyed a very long period of massive investment and rail has received very little. In addition to the avenues for road funding listed in this section, there are programs that support local government through at least two other direct paths. Rail has been far less fortunate and is in need of a significant investment to allow it to take up some of the projected increase in demand. For rail to be efficient and truly competitive with road, investment in rail must replace the existing 19<sup>th</sup> century railway with one that is appropriate for the 21<sup>st</sup> century.

## **7. Encouraging reciprocal responsibility**

***QUESTION 12 (page 55). What would be a reasonable minimum threshold value for a project proposal, above which it should be assessed to determine its potential internal rate of return as a private project?***

This is outside the author's field of experience and no comment is made.

## **8. Embedding continuous improvement**

The most successful private companies have embraced the concept of continuous improvement and the same should apply to all forms of land transport. It is difficult to avoid the fact that rail's lack of infrastructure improvement over several decades has been the main factor behind the loss of a major part of its former market. Massive investment in the road infrastructure coupled with larger trucks and efficient management has allowed road to become the dominant mode of land transport.

Investment in some minor improvements to the rail infrastructure will not redress the gross imbalance that has taken place during the past few decades. If land transport is to be improved there is a need to correct the balance as a first step towards greater efficiency through competition. There is also a need to recognise the contribution that could be made by alternative forms of transport that are already in use or are under development in other parts of the world. The efficiency of land transport will not reach its full potential unless the approach used in manufacturing industry is adopted and that requires a much broader canvassing of options.

***QUESTION 13 (page 59). Do you think Auslink should benchmark best practice planning, project development and evaluation and monitoring techniques?***

Yes.

## **9. Negotiating a new inter-governmental agreement**

It is noted that this section contains very broad terms but the only specific reference is to the existing road funding agreement. The 1991 agreement should be replaced to include all forms of land transport and to embrace all of the present avenues of funding. A new agreement on road funding would automatically require the \$870 million in rail infrastructure funding mentioned in the paper to be dealt with separately. This does not appear to be a logical approach for a scheme that envisages the integration of road and rail modes and might be an impediment to the efficient evaluation of alternatives.

## CHAPTER FOUR

***QUESTION 14 (page 64). Do you think the Queensland Local Roads Alliance definition of a local road of regional significance could also be used to define local links of regional significance?***

The definition of local roads of regional significance captures most types of road and only appears to leave out residential streets. If Auslink adopts this definition most roads that link any significant traffic generators would require assessment and might attract some degree of joint funding. This would involve the Federal Government in a major task to evaluate and monitor spending on roads throughout Australia.

One major objection to the approach suggested here is the focus on roads with no attempt to include other forms of transport. In some cases there might be an alternative that could be used to convey freight or passengers between two centres. As this section is mainly concerned with local transport and roads are the only mode that is included in the definition, there would not be any consideration given to these alternatives. Examples that are applicable here are conveyers for freight and fixed guideway systems for both freight and passengers.

Light railways such as the tramways for sugar cane in Queensland may be a more suitable and economical mode for some local freight traffic. Expansion of one of these systems or the construction of a new piece of similar infrastructure might reduce truck movements and free up capacity on local roads. Similarly conveyer belts are used to transport coal in the Hunter Valley and this might be another system that could be applied to a local freight movement. For the local transport of passengers between regional centres, an existing railway alignment might be brought back into service with minimal expenditure on the infrastructure. In parts of Europe this approach has enabled local organisations to reinstate public transport to connect communities without the need to upgrade the roads.

One of the other options that is excluded by the concentration on roads is the introduction of bus ways to cater for flows between significant centres. This could be a dedicated path for the line haul section of the link on a new alignment or using the track bed of a disused rail line. The buses would be able to use town streets at each end to give greater flexibility and convenience than a conventional railway line. This technology is in use in Adelaide and overseas but would not be considered unless the definition of local links of regional significance is revised to avoid the concentration on public roads.

***QUESTION 15 (page 69). Do you have any views on the Commonwealth providing Financial Assistance Grants directly to local government?***

Transport is often an issue at the local level and local government is much closer to the problem than any other level of government. The current assistance programs such as “Roads to Recovery” recognise this fact and funding along similar lines should form an integral part of Auslink.



***QUESTION 16 (page 69). What are your views on earmarking of identified local roads grants for strategic regional priorities?***

The grants for local roads should be based on defined criteria so that funding is equitable and reasonably predictable. The suggestion that some of this should be earmarked for regional roads would create some difficulties where spending on this category may be unusually low. A formula does have some administrative advantages is not appropriate in all circumstances and should be reconsidered.

It should be more acceptable to deal with grants to local government for regional roads separately. Where local roads form part of a strategic regional road, part of the local road funding would be included in the funding for the regional road so that no grant would be decreased. Expenditure on roads within a local government area would be increased where a strategic regional road gained sufficient priority.

***QUESTION 17 (page 69). Interstate and intrastate distributions of identified local roads grants are provided through the Local Government (Financial Assistance) Act 1995. Is it still appropriate to maintain the existing allocation methodologies for roads grants under the Act if we are seeking to move to a more strategic regional approach to infrastructure provision?***

As stated above the allocation of grants to local government should continue but the terms should be revised as part of Auslink. The exact method of funding roads at the local government level may require change and this may alter the origin of the funds but the total expenditure should not be diminished.

***QUESTION 18 (page 70). What are your views on a strategic infrastructure arrangement that supports locally identified priorities and would enable regions to create links between national and regional priorities in order to foster sustainable regional economic and social benefits?***

The paper refers to the "Roads to Recovery" program that has been used to support local government projects. The funding has been used to rebuild roads that were in a poor condition and would otherwise not have been rebuilt within a reasonable time frame. In most cases the relevant roads had no national or regional significance and only local factors influenced the decision to rebuild. The question implies that this source of funds should be used for regional and national links.

At present local government tends to be inward looking and has no real interest in providing funds for national or regional projects. In some cases local councils have quite different interests to their neighbours and actively oppose projects on their borders. For this reason local government should be consulted rather than tasked with developing and managing any part of the national or regional infrastructure. Auslink may need to have local input but in the end it should provide the mechanism for deciding national and regional priorities and allocating the relevant funds.

***QUESTION 19 (page 71). How do you think the Commonwealth Government could work with local governments to achieve a more strategic spend of identified local roads funding?***

See previous response.

***QUESTION 20 (page 72). Do you have any views on what proportion of earmarked regional funding under Auslink should be distributed for local routes of regional significance?***

As stated in response to question 16, the grants for local roads should be based on defined criteria rather than on a formula. There may be some administrative advantages in using a formula but this would not ensure that the funding is equitable and that priorities are correctly apportioned.

***QUESTION 21 (page 73). Do you have any views on the best way to allocate funding for strategic regional transport infrastructure? For example, through general bilateral agreements between the Commonwealth and regional groupings of councils, on a state-by-state basis or according to specific project-based approvals?***

Local councils generally do not have an interest in any form of transport other than roads and groups of councils are unlikely to suggest funding alternatives to roads. For this reason a funding arrangement between a group of councils and the Commonwealth for strategic regional infrastructure should not be considered.

A mechanism currently exists for the funding of major roads on a state by state basis and this should be acceptable for Auslink funding of strategic regional infrastructure. To avoid the need for a new organisation to administer the allocation of funds the funds should not be allocated to individual projects. It is suggested elsewhere that regional and local road projects should be grouped to obtain an adequate total that justifies the deployment of the manpower and machinery that is required. The grouped projects must also be awarded on the basis of competitive tendering to suitable standards for the type of road and traffic volumes.

It is envisaged that any significant improvement to the transport of freight or people would only proceed after evaluation of alternative modes. Continuation of government bodies that exist purely to allocate funds for roads without any upstream assessment of the most appropriate mode should not form part of Auslink.

***QUESTION 22 (page 73). While there needs to be an overall framework for the strategic regional infrastructure element of Auslink's regional approach, there needs to be flexibility to meet different arrangements in each state and territory. Can you suggest a model to accommodate this flexibility?***

This is outside the author's field of experience.

## CHAPTER FIVE

***QUESTION 23 (page 81). The Government invites your suggestions about measures to improve integration of transport infrastructure planning by the different levels of Government.***

In the outline of the first cycle of the infrastructure plan the states and local government are to retain responsibility for the details. It is not clear how regional projects will be administered where these are located within more than one local government area. In some cases these could be quite large projects and it may be more appropriate to include them in the works to be undertaken by the relevant state organisation. In other cases quite large projects might be within one local government area and the size may be more than a small local organisation would normally tackle. To ensure proper engineering and cost control there is a need for a set of project management guidelines for all projects that are funded through Auslink.

The outline of the first cycle of the infrastructure plan is also based on road projects with no indication that other forms of transport will be involved. It might not be appropriate to obtain greater freight or passenger transport capacity by making an improvement to a road, in which case the outline plan does not nominate a suitable administration for the project. Where the best solution might be to restore, improve or modify a rail line, it might be appropriate to provide some funding to a local bus company or railway operator rather than to local or state government organisations. Another case might require a conveyer or a form of transport that does not require improvements to the road or rail infrastructure. These alternatives should be included when formulating the procedure rather than excluding them by basing the arrangements solely on roads.

Although the section on program implementation starting on page 78 contains a reference to “a range of organisations, including....rail track managers, the private sector,” the next two pages concentrate on the relationships between the three levels of government and are solely applicable to road. Finally the above question is limited to these relationships and does not even extend to the private sector. Unless Auslink has adequate links to organisations other than the government bodies that are responsible for roads, it will fail to create the best and most appropriate land transport infrastructure to match the demand.

***QUESTION 24 (page 84). How should the AusLink project evaluation methodology ensure equal treatment of alternative projects and alternative types of projects, eg construction and technological solutions?***

One of the first steps in the evaluation of projects should be a cost-benefit assessment to weed out proposals that have insufficient merit. To obtain consistency and transparency for the process, the green paper suggests that the Commonwealth could develop an appraisal guide. This is an excellent way to remove the uncertainty that discourages some organisations from making valuable proposals.

If the appraisal guide defines the values to be used in the assessment of benefits it would reduce the cost of preparing a submission. Whilst the values placed on saving lives or reducing pollution might be contentious, using the same criteria across many projects would provide a valid ranking.

It is noted that the Australian Transport Council has established an inter-governmental working group to progress an evaluation framework for Auslink. Once again this fails to include the sector that is expected to be an increasing source of funding for land transport infrastructure. Whilst a cost benefit analysis might contain adequate information for the private sector to make a commercial assessment, some representation at this early stage of developing the methodology would to be an essential ingredient for success.

***QUESTION 25 (page 85). The Government seeks your views on how the strategic approach to maintenance funding can be improved?***

This question is outside the author's experience and no response is provided.

***QUESTION 26 (page 88). Please comment on the proposed national principles. Are there other principles that you consider should be included?***

As stated in the comments on chapter 3, the suggested integration of road and rail modes is anti-competitive. Whilst a network focus is a valid principle, the text of item 3 in the list of principles on page 87 concentrates on the elimination of competition between modes and should be revised or deleted.

The text for item 9 in the list of principles refers to innovation in three areas but as stated in response to question 10 the details in the green paper concentrate on information technology. A broader approach is required that would encourage innovative solutions for the physical land transport of passengers and freight.

***QUESTION 27 (page 88). The Government invites your views on whether state and local government responsibilities for arterial and local roads, set out in the 1991 Roads Agreement, need modification. If so, what changes need to be considered? Should the task of reviewing these arrangements and providing advice to ministers be undertaken by the proposed national advisory body?***

This question is outside the author's experience and no response is provided.

***QUESTION 28 (page 92). The proposed network does not, at this stage, identify major national or regional concentrations of inter-modal activity that should be connected to the national network. Your views are invited on what major locations of inter-modal terminal activity should be included under these categories and for what reasons?***

At the start of this section of the green paper on page 88 the responsibility for local and intrastate passenger travel is reviewed. It is stated that this element of the land transport task is outside Auslink's scope and will remain the responsibility of the states and local government. It is not logical to maintain separation of mass transit and local public transport from other forms of land transport.

The growth of private vehicle use has placed a great strain on the urban road system in most cities. The green paper states that this growth has been driven by increases in population, vehicle ownership, increasing incomes and urban decentralisation. It ignores the fact that the rail and tram infrastructure has not expanded to service new areas of housing development. Without expenditure on fixed guideway systems, the urban transport task must be carried by the road system with the inevitable increased pollution and congestion. The Commonwealth should consider the impact of continued reliance on private cars on greenhouse gas emissions.

Freight and passenger flows in and out of the major urban areas must compete for rail access paths with suburban trains. Increased use of the rail system for interstate or regional transport will conflict with the local traffic and additional track capacity might be required. In this case the omission of urban mass transport from Auslink would act as an impediment to adopting the best solution.

In general most inter-modal operations involve either the line haul of freight between major conurbations or the short haul between a port and a distribution centre. In the first case the rail system already has established freight terminals within state capitals and links to these should form an essential part of the inter-modal network. These terminals are currently located in central areas but inner city industry is not as significant as it was when the sites were selected and relocation of freight terminals may be justified. This may also ease the current problems of road access to the terminals and may also reduce the distance between the railhead and the end user.

The second category of inter-modal facilities is in its infancy and some terminals are only in the planning stages. An example is the small terminal on the NSW main south line between Ingleburn and Minto to the SE of Sydney. A second terminal is planned for this area but the roads have not been upgraded to cope with the heavy vehicle traffic that these operations will generate. At present the freight moves in and out of the existing terminal by a narrow urban link road and there is no direct connection to the F5 freeway that is within a couple of kilometres of the terminal.

It should also be noted that the above terminals are alongside a rail line that carries all types of traffic from inter-state freight trains, regional passenger trains and commuter trains. The line capacity has not been upgraded and the rail link to the main container port on Botany Bay uses lines that were not developed for this purpose and trains must take a less than direct route. The short siding capacity at these sites does not allow inter-state freight trains to access the terminal that they pass on their journey between Melbourne and Sydney.

**The green paper recognises that the forecast increase in the passenger task will present a significant challenge within urban areas. It also refers to the effect of congestion on major urban freight routes and the overlap on regional issues. However, it does not take this to the logical conclusion that would require Commonwealth involvement in land use and transport planning in urban as well as non-urban areas.**

***QUESTION 29 (page 92). The Government invites your views on the corridors and links that should be included in the initial draft of the National Land Transport Plan. If you are suggesting other links, please explain how they would support Auslink's national objectives, set out in chapter three? For example, the Government has said the national network will include major Roads of National importance (RONI) routes but apart from the Pacific Highway, these have not been identified in the Green Paper.***

In addition to the roads of national importance, Auslink should include nationally important rail lines. The case study that starts on page 55 of the green paper mentions the rail lines in the Hunter valley. These carry most of the coal that is exported from NSW and are a very important piece of the land transport infrastructure. There are several rail lines in Queensland that carry coal to ports for export and these should also be identified rather than being included in the general category of access corridors to major ports.

Several other rail lines carry large flows of primary produce and minerals to ports for export. These parts of the existing land transport infrastructure are of sufficient national importance to be identified rather than hidden in the general category of access links to ports. It is not suggested that links to these ports would become Commonwealth responsibility but they should be included to draw attention to the existing facilities so that they are not overlooked when other developments are being considered.

It should be noted that the rail line between Sydney and Adelaide via Parkes includes the section between Penrith and Katoomba. It is not clear why the latter receives special mention at the end of the list on page 92 as this section of the line no longer carries much coal traffic and is incorrectly listed as an interstate link. If this part of the line warrants a place in the itemised list, there should not be any question about the inclusion of all the rail links to major ports.

***QUESTION 30 (page 92). The proposed network does not, at this stage, identify specific urban routes. Your views are invited on what specific urban routes, which meet Auslink's national objectives, should be considered for inclusion. These links would need to link the rest of the national network.***

In the Sydney area the extension of the Hume Highway to the airport and on to the container terminal in Botany Bay forms one of the most important urban road links for freight. In parallel the rail line through Campbelltown into the major marshalling yards at Chullora and on to the above container terminal is also an important link.

The proposed ring road linking the M5 with the M4 and the Pacific Highway is a very important link that will provide a through route past Sydney. It will also provide more direct access for interstate freight to reach industrial areas to the west of the Sydney CBD. An upgrade of the rail line to bypass the centre of Sydney is also under consideration but this will not provide a direct link to the industrial areas. The changes to the rail line will merely provide extra tracks to allow freight trains linking Melbourne with Brisbane to avoid conflicts with Sydney suburban trains. This is not in balance with the proposal for the Sydney Orbital road as it does not form a competitive alternative and should be revised to allow long interstate freight trains to access the main west line to reach industrial areas to the west of Sydney.

***QUESTION 31 (page 93). Which are the most important national and regional ports and airports that Auslink should provide access to, in terms of promoting Australia's future economic and social development?***

A complete review of the seaports and airports is outside the scope of this review of the Auslink Green paper. The following comments focus on the principles that should apply to the assessment of the seaports that should be linked to the national land transport network.

The main seaports that should be linked to the Auslink network are those that handle the main flows of primary produce minerals and manufactured goods. In NSW the main ports that are currently relevant are Newcastle, Botany Bay and Port Kembla. In the recent past the list would have included Sydney Harbour but the transfer of coal to Port Kembla and containers to Botany Bay has reduced the importance of Sydney as a seaport.

One of the activities that is still carried on in Sydney is the movement of cars from the port to the main storage and distribution centre in Campbelltown. The port facility is very close to the Harbour Bridge and the cars are transported by road from the centre of the city to the private distribution centres located alongside a main railway line. There might be a case for relocation of the port facility to reduce this traffic and this could be achieved by land use planning tools.

In Queensland the main container seaport is in Brisbane and there are a number of major ports for the export of coal and other minerals. Other states have a similar pattern with the main container port for the import and export of goods in or close to the state capital with major ports for the movement of minerals and produce at other suitable locations. One of the significant examples of the latter is Bunbury in Western Australia.

There are a number of seaports that were built by the private sector for the export of minerals such as iron ore. In some cases the port facilities also cater for other products such as natural gas and solar salt. These privately owned port facilities are part of the transport chain that is an extension of the mining process. However, the infrastructure is a national asset and as such should be regarded as a part of the national land transport system. There may be little if any prospect of Auslink funding for improvements to these ports but they should not be ignored. Future development close to these ports may require connections to other parts of the road and rail system and Auslink involvement in the funding of these links might be justified.

***QUESTION 32 (page 93). The Government invites your views on priority national needs on the corridors and links proposed for the Auslink national network. Please outline reasons why the needs you have identified are national in scope and importance? Priority national needs would need to be consistent with the Auslink national objectives. Please note that national needs include issues such as improving national trade and logistics performance, national and regional connectivity etc. They do not include specific projects, which might respond to those needs.***

Auslink is a response to the need to provide adequate infrastructure to match the projected need for greater land transport capacity. As may be expected the need is greatest along the East Coast of Australia where the majority of people live and where most of the major ports and airports are located. Much of the land transport infrastructure between Melbourne, Sydney and Brisbane is old and does not allow for the fast and efficient movement of freight and passengers. This has a negative impact on all types of industry and a national approach to the need for improvements is urgently required.

One important factor that is not recognised in the green paper is the need to increase competition between modes rather than creating a centrally planned land transport network that would eliminated competition. In most other areas of industry competition has been encouraged and this has produced benefits by way of continuous improvement and innovation by private industry. The green paper ignores this approach and appears to take the view that road and rail infrastructure should be developed as a single entity so that competition between is gradually diminished. This anti-competitive approach is not in synchronism with other aspects of government policy and is not an adequate response to the need for greater land transport efficiency.



The need for greater connectivity is also given some recognition in the green paper but the integration of modes would limit choice. Where roads are selected as the main mode for a specific link the only viable form of public transport would be the bus and a lack of competition would not encourage a high standard and frequency of service. A similar result may be anticipated where rail is the primary mode selected for a given link and here the station locations would be a further impediment to passenger transport.

Transport is a major source of green house gas emissions and continued reliance on current technology will allow these emissions to increase in proportion to the demand for transport. Competition between modes would position the industry to take full advantage of developments in transport technology in one or another mode without delay. The need for more land transport capacity coupled with less green house gas emissions is not compatible with the anti-competitive proposal in the green paper.

A balanced response to the fundamental needs mentioned above would require road and rail to be placed on an even footing. Whilst rail continues to operate along tracks that follow a steam age alignment that has been in place for more than 100 years, competition between modes remains out of reach. To remove the impediment to real competition the rail infrastructure must be replaced with a 21<sup>st</sup> century railway that can carry fast freight and high-speed passenger trains.

The great need for improvements to the land transport infrastructure requires funding that is beyond government resources. This is recognised but the green paper does not suggest a plan to attract private sector investment in infrastructure projects. The past interest in massive projects such as the VFT and similar trains to operate between Sydney and Canberra is ignored. The major disadvantage of these earlier proposals was the focus on passenger transport without considering the opportunity to operate fast freight trains over the same high-speed alignment. These proposals also envisaged the construction of an entirely separate new line leaving freight to compete with road using the existing rail alignment.

The section on revitalising the rail system provides an outline of a concept that would suit both passenger and freight trains. Further information is contained in the technical papers that are listed in the reference section of this response. The cost of the reconstruction would be less than the cost of an entirely new railway similar to that required for the original VFT. As a self-contained transport system with a very broad potential market it should be of interest to the private sector.

Priority should be given to the corridor along the East Coast as it serves the majority of the Australian population. Gains in efficiency here would have the greatest effect on the national economy but on the other hand a poor performance in this corridor would have a negative influence.

To obtain the most from specific projects the investment in the infrastructure should seek to maximise the following objectives.

- ◆ Increase freight and passenger transport capacity
- ◆ Reduce the specific green house gas emissions
- ◆ Increase competition by providing choice between modes
- ◆ Attract private sector funding

It is suggested that all of these objectives would be achieved by reconstructing the existing railway to suit much faster trains. Government should include this type of project in the scope of Auslink and encourage the private sector to make most if not all of the necessary investment. A similar approach should be taken to other self-contained projects that might be suitable for investment by the private sector.

***QUESTION 33 (page 93). The Government is conscious of the inherent differences between the transport networks in individual states and territories and the proposed Auslink network may not incorporate important unique circumstances that have national importance. Input is welcomed in this regard.***

The author does not have sufficient information to offer a response to this question.

***QUESTION 34 (page 95). The Government has not yet resolved the range of issues that could effectively be included in a National Transport Policy. The Government invites your views on what it might usefully encompass.***

A response to this question is made with respect to each of the six areas of interest for a National Transport Policy as listed on page 94 of the green paper.

#### Infrastructure Investment

In the main text of the green paper there are some general comments about value for money but there is little to suggest how this will be achieved. A number of sections address the continued funding of local government for the construction or upgrading of local or regional roads. In the author's experience this is not the best way to obtain value for money and the government should review the method of funding roads that would normally come within the responsibility of local government.

In one instance a local council received funds to repair a short section of an urban road under the *Roads to Recovery* scheme. Several large machines were used to rebuild less than 100m of road and inevitably this was a very inefficient use of these machines. The quality of the work was poor and the repaired section had to receive further attention more than once. The road surface is now stable but it is not as smooth and level as most of the road had been before the repair was started.

As the local council carried out the above task in isolation, productivity was relatively poor. Subsequent problems suggest that the initial works were inadequate and did not conform to appropriate standards. To obtain better value for money Auslink should avoid funding small projects in isolation and should ensure that small tasks are combined into single multi-stage projects under the control of one organisation. There is a need to establish a minimum size or value for local and regional road projects and this should ensure that small projects are combined to reach the minimum contract value. Funding should also require competitive tendering and contracts should be based on suitable standards for the type of work.

At present the Commonwealth does not have a large organisation to administer road works and relies on the state and local governments. A policy that includes a minimum size of contracts with the contracts awarded on the basis of competitive tendering and appropriate engineering standards would reduce the number of contracts that had to be monitored. These measures would be easier to administer and would meet the desire for the investment in the transport infrastructure to be cost effective.

### Safety

It is impossible to eliminate road trauma and even the best roads cannot be made entirely free from accidents. Rail has a vastly superior safety record than road and any comparison will show that the best roads cannot equal the safety record of rail. It is axiomatic that shifting road traffic to rail must have a positive effect on the overall safety of land transport.

Road accident statistics for highways show that heavy vehicles are over represented particularly for fatal accidents. If rail takes a much higher proportion of the non-bulk freight the increase in the number of trucks on the road would be slowed or reversed producing a marked effect on road safety.

The ARTC audit demonstrates the relationship between improved performance and market share. Reductions in transit time for freight trains using the existing railway system would improve competitiveness and there would be some transfer of non-bulk freight from road to rail. The audit was based on various levels of improved performance to determine the cost of the infrastructure changes and the relevant increase in rail's market share of the non-bulk freight. It was not within the terms of reference of the audit to consider the effect of the improvements on the performance of passenger trains and the additional benefits obtained as a result of transfer of passengers from road to rail.

If safe travel is to be given greater emphasis there is a need for more attention to be given to the effect that infrastructure changes have on road trauma. Road improvements may reduce accidents on the relevant section of road but wider and straighter sections often encourage more road use and this increases exposure on connecting roads. Investment in rail infrastructure may be much more effective as it does not induce greater road use and transfers patronage to a safer mode.

As a matter of policy Auslink should include an analysis of the effect of improvements on the overall safety of land transport. Rather than focus on the improved safety of a single section of new or improved road, proponents of changes to the road infrastructure should be required to assess the effect on the overall network including extra traffic on connecting roads. This would identify the real change to the risk of road trauma and would improve the case for investment in rail infrastructure to take trucks off the road or to capture a larger share of the travel market. Local changes to roads to eliminate black spots do not induce extra road traffic and the reduction in accidents at these locations would not have to be balanced against effects elsewhere.

A policy that ensures that changes to the risk of death or injury are identified in the assessment of every project should be a fundamental part of Auslink. It should be noted that high-speed rail has an excellent safety record and in many of the world's leading examples there has not been a single fatal accident involving passengers or members of the crew.

### Environmental Improvement

As stated in the responses to questions 1, 5 and 7, a substantial transfer of freight from road to rail would have environmental benefits due to the reduction in pollution. There would also be some benefits flowing from reduced noise, particularly in urban areas that are close to roads that are used by heavy trucks and large numbers of cars.

It has been noted in the response to question 8 that rail uses less energy for a given transport task. This fundamental advantage over road is not the only reason for stating that rail produces less pollution than road but it is the easiest to quantify. In addition to lower energy input, trains may be powered by electricity obtained from a variety of sources such as wind, solar and hydro. Even when using electricity generated by coal fired power stations, there is ample evidence that there are significant benefits for the environment.

Suburban rail systems in Brisbane, Melbourne, Perth and Sydney are electrically powered and offer an alternative to commuting by road. This is much more acceptable to the environment but the green paper suggests that this significant section of land transport will not be included in Auslink. Congestion pricing may marginally reduce travel by private car but Auslink cannot encourage viable alternatives unless it has the ability to evaluate and invest in the infrastructure for mass transit. The omission of alternative forms of transport that offer benefits to the environment does not appear to be keeping with the Commonwealth's responsibilities and this should be changed.

## Transport Regulation

This topic is largely outside the author's experience but comments made in response to other parts of the green paper may be applicable. It is suggested that road safety would be improved by regulation of the hours that drivers spend behind the wheel of heavy vehicles. There may also be some benefits gained by the introduction of monitoring devices to reduce the incidence of drivers falling asleep at the wheel.

The green paper mentions the need for more data and regulations should be introduced to ensure that all transport service providers are required to report freight and passenger statistics. In line with the general desire to reduce the impact on the environment, data on energy use and emissions should be a fundamental part of the reporting process.

## Infrastructure Pricing

The current method of cost recovery is inadequate and inequitable, as it does not directly relate charges on users to the actual road usage. It has been suggested that road charges for heavy vehicles should be based on the product of the mass and the distance and this has merit. As a first step the distance that trucks travel should be used as the basis for charges for the use of the infrastructure. This could be taken from registration data but would need to be audited to ensure that the data is reliable.

Using the maximum legal mass of the vehicle has the benefit of simplicity but it overcharges a truck that only carries low-density freight or is not fully loaded for much of the distance travelled. To levy charges on the basis of the actual mass and distance the data must include the mass for each trip with the distance for that trip. This may be equitable but is more complex than the present system and it would appear to be difficult to collect accurate and reliable data.

Rail has much less of a problem as the existing access charges are based on the distance travelled and the maximum mass of the vehicles. Some refinement of the rail charges might be appropriate but a review of the level of charges is much more urgent as there is ample evidence to show that revenue is currently insufficient to properly maintain the rail network. Investment in rail infrastructure has not kept pace with investment in roads and there is an urgent need for major improvements. Without a significant increase in market share the access charges could not finance new investment in the infrastructure.

A policy that improves the fairness of the road infrastructure cost recovery should be adopted as part of Auslink. Increased rail access charges would have a negative influence on the amount of freight that travels by this mode but a policy that seeks ways to attract private sector investment to build a viable 21<sup>st</sup> century railway would avoid the need for government funding. Rail pricing would then be placed on a commercial footing with no need for government participation in setting cost recovery targets.

### Technological Innovation

As stated in the preamble, the green paper refers to improved information technology and the use of the information for management purposes but does not make reference to changes to other technological developments that might have an even greater impact on land transport in this country. As a matter of policy, attention should focus on technological solutions that would ensure that the best mode is used for each section of the transport task. Auslink should provide for and encourage the investigation of other forms of transport such as conveyer belts, bucket conveyers, bus ways, light rail and regional rail links. The exclusion of these systems and urban rail from Auslink is a serious flaw that should be corrected.

# REVITALISING RAIL

## HISTORIC BACKGROUND

An article in the July 1966 edition of Railway Transportation advocated the construction of a new and straighter railway line between Sydney and Albury. It proposed this as an extension of the gauge standardisation program that was fully funded by the Commonwealth. The proposed passenger train speed of 160km/hr would allow the journey time between Sydney and Melbourne to be cut in half. Freight trains of the era would also use the line and the cost savings due to increased locomotive and crew productivity would be able to service the estimated debt.

At the time that the above article was published rail still had about 55% of the non-bulk freight market between Sydney and Melbourne. However, non-urban passenger travel by rail had declined sharply during the previous 20 years to only about 15% of the market and was still falling. The primary aim of the proposal may have been to attract passengers back to rail but the faster freight service would have protected rail's share of this sector of the market. The proposal was rather ambitious but nothing was done to improve the steam age infrastructure and the decline in passenger travel continued. Over the next two years a decline in rail's share of the non-bulk freight market became more apparent and the fall rapidly accelerated.

In 1984 the CSIRO put forward their very fast train proposal that would have provided an even shorter journey between Sydney and Melbourne via Canberra. It required a completely new track with very large radius curves to suit the high-speed passenger trains. In the final stages of the VFT feasibility study the consultants investigated the potential market for time sensitive freight. The study recognised the difficulty of operating freight trains on lines designed for the very fast passenger trains and it identified the very high minimum operating speed that would have been necessary.

The VFT was to have been built by private enterprise and initially appeared to have a positive rate of return on the huge capital cost. The special high-speed freight trains could only carry a limited amount of high-value, time sensitive freight and would have been very expensive. Despite the high cost and limited market, the result was a marginal but positive contribution to the VFT revenue. Conventional rail would have continued to carry low value freight on the existing antiquated alignment.

A subsequent proposal envisaged very fast passenger trains operating a service between Sydney and Canberra. Although this was expected to be the first stage of a new railway system for the south east of Australia, it was based on the VFT concept and did not make provision for freight. It was also to be funded by the private sector but the limited scope could not justify the capital cost.

In 2001 the Commonwealth funded the East Coast very high-speed train study to determine the viability of a VFT style passenger service between Melbourne, Canberra, Sydney and Brisbane. The concept also envisaged construction of a new line to suit the passenger trains and did not make any provision for freight. The report on the first stage of the study concluded that the capital cost would be extremely high and could not be justified by the limited revenue.

Most of the above proposals have started out as faster passenger train systems with little if any regard for the needs of the freight sector. The three VFT style concepts would require entirely new tracks that would duplicate rather than replace the lines that are currently used by freight trains. As shown by the original VFT feasibility study, the track standards for these very fast passenger trains would be unsuitable for low speed freight trains.

## **MARKET SHARES**

### Freight

In 2000 the flow of non-bulk freight between Melbourne and Sydney was 9.4 million tonnes and between Sydney and Brisbane it was 6 million tonnes. The direct flow between Melbourne and Brisbane added another 4 million tonnes to bring the total for the North-South links along the East Coast to 19.4 million tonnes. This represents about 72% of the total non-bulk freight that moves between all of the mainland capitals. The efficiency of freight transport along this major corridor has a significant impact on the Australian economy.

At one time rail was the dominant mode for non-bulk freight travelling between mainland capital cities. Rail still has more than two thirds of the market for freight moving to and from Perth and the two largest cities in the East. However, during the two decades between 1964 and 1985 rail lost market share on the three North-South links listed above and road became the dominant mode for interstate non-bulk freight.

On the main interstate links road currently has more than three-quarters of the total market for non-bulk freight. For the largest market between Melbourne and Sydney it has about 89 to 90% and about 80% of the market for non-bulk freight on the links with Brisbane.

### Passengers

The movement of people within the main transport corridors is a little difficult to accurately quantify due to the number of options that are available. Bus and train trip data is available and simple counts provide an indication of the number of cars using a section of road. However, it is important to separate the short car trips from the trips between major centres and this requires comprehensive surveys on several paths.



Each passenger market survey is unique it is not possible to compare the results and predictions from one study with those from another study. The technical papers listed in the reference section provide data from various sources that have been identified and the following data is taken from those papers.

Passenger data obtained for the original VFT consortium identified a total of 31 million trips within the corridor between Melbourne and Sydney. Many of these were only short journeys between intermediate towns and were converted to fractions of the full-length trip to obtain a single value for the complete flow. On this basis the equivalent number of two-way trips between Melbourne and Sydney would be 6.9 million in 2001 and between Sydney and Brisbane would be 4.6 million.

In the late 1970s the National Travel Survey provided data for all modes of non-urban travel and identified the modal shares. At that time the car dominated all long trips but air had a significant share of the interstate journeys. The combined total for car and air was about 94% for all trips in excess of 100km leaving bus and train with only about 3% each. Data for 1994/95 shows a major shift from cars to air for longer journeys with air becoming the dominant mode for travel between Melbourne and Sydney. The data also suggests there had been a small shift away from cars to air and bus for journeys between Sydney and Canberra. Rail remained the least favoured mode with only a very small share of the market on short and long non-urban journeys.

## **POTENTIAL MARKET**

### Freight

Market research for the ARTC has provided an indication of the effect of reduced journey time on the rail share of non-bulk freight. For the most important market between Melbourne and Sydney a time reduction of 30% would more than double the rail share but it is still predicted to be only 25% of the available market. Similar cuts in journey time on the links between Sydney and Brisbane and between Melbourne and Brisbane might increase the rail share to just over 40%. However, planned expenditure nominated in the green paper is well below the level required to allow freight trains to attain these time reduction targets.

Extrapolating the ARTC data suggests that it would require a little more than a 40% reduction in journey time to allow rail to be able to compete for 50% of the market on the two links with Brisbane. On this basis the journey time between Melbourne and Brisbane would fall from 36 to less than 21 hours and between Sydney and Brisbane it would fall from 21 to 12 hours. A similar time saving of 40% on the line between Melbourne and Sydney would require a journey time of a little more than 8 hours but this would only allow rail to compete for about 30% of the non-bulk freight.

The overall result that might be flow from the above times would be an increase in rail's market share from 15% to 40% of the non-bulk freight passing along the major East Coast corridor. In terms of volume the demand would rise to about 7.8 million tonnes or nearly three times the current rail tonnage for the three main north-south links.

### Passengers

Unlike freight the number of passenger trips is not a fixed quantity that is shared between the various modes. The range of available options influences the number of passenger trips and a new form of transport usually induces more people to travel. The results of the market surveys for the original VFT identified a significant increase in total patronage due to the advent of the new service. The proposed minimum transit time of 3 hours for the journey between Melbourne and Sydney produced a predicted increase in demand of 24%.

Based on the VFT data updated to 2001 the market shares and one-way trips on a new high-speed line might be as shown below.

<b>Mode</b> Percent	<b>Car</b> 31.5	<b>Air</b> 13.9	<b>Bus</b> 5.1	<b>Fast Train</b> 49.5	<b>Total</b> <b>100</b>
Melbourne-Sydney	5.42	2.39	0.87	8.52	<b>17.2</b>
Sydney-Brisbane	3.6	1.6	0.59	5.7	<b>11.5</b>

These predictions assume that the existing rail service would cease to operate and the patronage would transfer to the fast trains.

## **TRAIN PERFORMANCE**

### Freight

The audit of the interstate rail network for the ARTC identified costs and benefits for various reductions in transit time. For each case the net present value was calculated to determine the optimum level of investment that would be justified solely by the increased freight traffic. On the line between Melbourne and Sydney the maximum net present value occurred where the cost of the improvements would obtain a reduction of three hours in the transit time. The proposed time of 10½ hours is a significant improvement but this would only increase rail's market share of the non-bulk freight to about 20%. A similar situation applies to the line between Sydney and Brisbane where the proposed time is more than 17 hours and the predicted market share is about 30%.

Much faster transit times are required if rail is to capture a substantial portion of the available freight on these important interstate links. This could be achieved by making far more extensive improvements to the existing lines but this could only be justified by providing a passenger service that would attract substantial patronage. However, it was not within the terms of reference of the audit to assess the benefits that would be obtained by an increase in passenger travel.

Reconstruction of the lines to suit fast passenger trains would provide an alignment that would not restrict the speed of the freight trains. Computer simulations of the performance of fast freight trains have shown that the transit time on a new alignment between Melbourne and Sydney could be just over 6 hours at a maximum speed of 160km/hr. This is a time saving of more than 40% compared with operating the same train on the existing alignment.

To allow for integration of the freight and passenger trains the maximum speed of these freight trains is relatively high but the energy input would be similar to trains operating on the existing alignment at a maximum speed of only 120km/hr. The considerable time saving would provide rail with a major performance advantage over road and a large benefit in terms of crew and locomotive productivity. As the transit times would be less than half the times required on the existing alignment, rail could be expected to capture more than half of the available non-bulk freight.

### Passengers

Market research has shown the need for a major reduction in journey time before rail could be an attractive method of travel. The market research for the original VFT was based on a minimum journey time of 3 hours between Melbourne and Sydney. As a part of the VFT feasibility study a passenger train concept was developed and the performance was compared with that for several existing trains that were in service on high-speed lines in Europe. The optimised train concept was able to meet the journey time target but the other types of train were able to get reasonably close to the target.

To confirm the technical feasibility of the VFT the train performance was simulated using a detailed track profile. This used the existing track alignments through the urban corridors in Melbourne and Sydney and a new profile for the open country section of the line. A detailed horizontal and vertical profile was developed using maps and ground surveys where necessary. This new track profile contained many steep sections to match the natural terrain where possible.

The original VFT consortium identified an alignment between Melbourne and Sydney that would allow passenger trains to meet the target time. Due to urban development the proposed alignment is no longer available but the author has identified an alternative that would permit trains to match the proposed times for the VFT.

### **CONSTRUCTION COST**

The original VFT track profile required extremely large radius curves to suit the type of train that was envisaged. A very large curve radius is difficult to fit within the natural terrain and extensive earthworks increase the cost of construction. The curves must also be banked and this combination of curve radius and banking is not suitable for much slower freight trains.

Very fast passenger trains that have a tilting suspension system require track curves that are significantly smaller than the curves proposed for the original VFT. The technical papers in the reference section show the derivation of the curve radius to suit these passenger trains. The smaller radius curves are easier to fit within the natural terrain and a new line to suit this type of train would be cheaper to construct.

As shown in the reference papers, freight trains that operate at less than half of speed of the passenger trains may use the same tracks as high-speed passenger trains that have tilting suspension systems. This is the key factor that would allow a new line to be used by high-speed passenger and fast freight trains.

Previous proposals to suit high-speed passenger trains have required new lines to separate them from the low speed freight trains. The existing tracks would have to remain in use for the conventional freight trains and the cost of any improvements would remain a matter for government. The cost of changes to the infrastructure could only be justified by the freight traffic that would use the lines and as shown by the ARTC audit the income would be quite modest.

A revitalised railway would suit the fast freight trains that would replace the existing slow freight trains that carry non-bulk freight between Melbourne and Brisbane. In this case it would be feasible to rebuild some parts of the existing alignment to the standards required for the faster trains. Much of the existing non-urban section of the line in Victoria and parts of the line in the south of NSW may be upgraded at far less cost than building a completely new line. Apart from the saving in land cost the rebuilt line would include some other parts of the existing infrastructure and this would also reduce the capital cost.

A rebuilt railway between Melbourne and Brisbane would provide an inter-capital service and would also link many towns along the entire length of the corridor. The recent East Coast very high-speed train study identified a large demand for better connections between regional centres and a revitalised rail system would meet this demand. Much shorter journey times should attract a very large share of the interstate and interregional passenger market and also induce extra demand. The train performance would be competitive with air but would provide a degree of connectivity that air could not match.

## **SUMMARY**

- ◆ It is impossible to match the performance of the competition and capture a significant share of the non-bulk freight and passenger markets by upgrading the existing tracks between Melbourne and Brisbane.
- ◆ Realistically fast freight trains may operate over tracks designed to suit high-speed passenger trains that have tilting suspensions without compromising the performance of either.
- ◆ Rebuilding the tracks to meet the standards required for high-speed passenger and fast freight trains would revitalise rail and provide a broad revenue base.
- ◆ Reconstruction of the existing lines where the alignment is suitably straight, or where it may be straightened at a reasonable cost, would avoid the cost of an entirely new line.
- ◆ The smaller radius curves required for the proposed trains would be a better fit to the natural terrain and would be cheaper to construct than lines built to suit conventional fast passenger trains.

## **RESUME**

Colin Butcher is a mechanical engineer with over 35 years experience in the design of all types of railway rolling stock. He has been responsible for all aspects of rolling stock design including train performance, electrical, mechanical, structural and interior design. His wide experience covers the following vehicle designs:

### **Locomotives**

- 82 and 90 Class for FreightCorp
- C and M Class for Hamersley Iron, BHP Iron Ore and Robe River Iron
- CL and J Class for Australian National
- Q and S Class for WA Government Railways
- 3000 Class for Queensland Rail
- High Speed XPT power cars for SRA of NSW
- Electric locomotives for NSW and Queensland Railways

### **Freight Vehicles**

- Container Wagons
- Cement Wagons
- Milk and Fuel Tankers
- Box Cars
- Bottom & Rotary Dump Coal Wagons

### **Passenger cars**

- Explorer and Endeavour Cars for the SRA and WAGR
- Double Deck Suburban and Inter-Urban EMU's
- XPT High Speed Sitting and Sleeping Cars
- Millennium Train for the SRA of NSW

Colin has held senior engineering management positions, including; Group Engineering Manager for Comeng, Manager Rolling Stock for the consultants to the original VFT and General Manager, Engineering Division for ABB Transportation.

Prior to his retirement from full time work Colin provided engineering management services to Clyde Engineering. He was instrumental in their successful bid for the Millennium trains and for the initial stages of the design of these new trains.

## **REFERENCES**

BUTCHER, C F G (1994) "Mixing High Speed Passenger and Freight Trains - A New Angle", IIR Conf on Railway Engineering and Operations, Sydney.

BUTCHER, C F G (2002) "A Cost Effective High Speed Railway for Australia", Proc. CORE 2002, Railway Technical Society of Australasia.