“Twice the Task”
A review of Australia’s freight transport tasks
"Twice the Task"
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1. Executive summary

This project
“Twice the Task” is the National Transport Commission’s first major response to forecasts that Australia’s land freight transport task will double from 2000 – 2020.

The report reviews and comments on these freight growth forecasts, assesses the likely impacts, and identifies and prioritises potential regulatory, operational and other measures to improve environmental, safety, infrastructure and transport cost outcomes.

The project has an underlying assumption that the overall position in 2020 should be no worse than at present, and ideally better.

A longer term planning horizon
Undertaking a strategic planning study for the next fifteen to twenty years is a rare one for most elements of government and industry. The tendency for short term planning to dominate is almost inevitable in fast changing, competitive industries such as land transport and logistics. Shareholders and voters alike look for early returns and tend to discount promised future returns heavily. These circumstances can lead to a view that resources devoted to twenty year horizons are an unnecessary luxury.

However, forward planning is an important role for governments in leading policy development and planning. The community and the significant body of stakeholders consulted during the course of the study expect it, and consistently identified the need for a national entity charged with addressing long term strategic planning for land freight transport in this country, including the regulatory environment.

The Commission has chosen to stimulate longer term planning horizons in order to address its own planning and portfolio requirements. It is worth noting that during the course of the study a minority view was expressed that the brief extended beyond the Commission’s charter, and at the extreme, to the point that the study lacked some legitimacy.

Clearly, the NTC does not have a role in every aspect of long term planning for freight transport. Many of the issues and responses suggested in this work are for others, but the NTC has taken an initiative that aims to place analysis in front of advocacy and an assessed vision in front of an arbitrary viewpoint. This has been welcomed by most with whom consultations were undertaken.

This issue becomes more pressing when it comes to implementation of proposed measures to effect change. Many of those consulted during the study expressed concern stating that many of the “whole of nation” issues are not being dealt with in a comprehensive, consistent fashion.
Many of the issues arising from the study will be handled within existing market structures by the private sector, possibly with some prompting and encouragement by government. Some of the projects are undeniably parts of NTC’s portfolio. Others are ongoing responsibilities of state and commonwealth governments. However there remains a whole raft of measures that fall into a gap: these are either continually pushed to one side (such as a comprehensive review of road infrastructure design standards) or are nibbled away at with varying degrees of success (urban freight rail paths are such an example). There are other measures that require a package of tools to affect delivery and these are identified in this report.

**Findings**

**Freight forecasts**
The report reviews freight task forecasts, and concludes that while there are some alternative opinions to the freight doubling scenario outlined by the Bureau of Transport and Resource Economics and others, they do not justify a departure from the central position that Australia’s freight task will increase significantly in a relatively short time period. Alternative views refer more to timing of the predicted doubling, and differences in effect in various locations (such as urban, regional or specific states).

Forecasts clearly indicate that adverse impacts will be greatest in urban areas, where congestion from cars compounds the impact from freight task growth. The forecasts suggest that most of the growth will be on road, despite some shifts to rail for port shuttles. Annual growth forecasts are highest for Darwin (3.53%), followed by Brisbane (2.98%), Perth (2.93%), Canberra (2.78%), Sydney (2.74%), Melbourne (2.52%), Hobart (2.05%) and Adelaide (2.01%).

It seems probable that the greatest impacts from freight task growth in urban areas will be in, near and between ports, intermodal freight terminals and outer industrial suburbs where the largest warehouses and distribution centres have been established.

There are opportunities for modal shift, particularly on longer corridors, with moves to rail for Melbourne – Brisbane and coastal shipping for eastern states to Perth. However, the forecasts conclude that road will carry the majority of increase on shorter inter- and intra-state corridors.

**Influencing factors**
The key influences on demand are increases in resource demand for minerals and agricultural production, and the substitution and growth of imports as both consumer goods and raw material inputs. The increasing desire to reduce inventory will see growth in air freight and probably a continuing reduction in average delivery size to end destinations.

There are two main measures of freight transport quantity: tonnes or tonne – kilometres moved and that of vehicle kilometres per tonne. It is likely that both of these measures will grow in urban
areas as delivery parcels reduce in size and become more frequent. The trend on intercapital and long distance transport has been for larger payloads (lower vehicle kilometres per tonne) and that is likely to continue to increase on both road and rail as vehicle/train productivity drives regulatory and investment changes in these areas.

The international freight market and the domestic to a lesser extent may see growth in air freight as time sensitive deliveries increase and just in time delivery becomes more intense, although fuel issues will be greater for air freight.

Fuel price increases were a prominent point of discussion during the period of this study, and a review and prognosis was completed as part of the work (Appendix A). This concludes that fuel prices would need to increase at least tenfold to have any real impact on manufacturing and distribution patterns, and that this is unlikely within the period to 2020. However, doubling or quadrupling of fuel prices, in real terms, is quite possible. Reductions in fuel availability and significant price increases in the period 2020 to 2050 are much more likely, depending upon developments of alternative fuels, new discoveries and changes in demand.

**Key issues and views**

The key views expressed were not all intuitive and some of the more important were (in no particular order):

- A doubling of the freight task in two decades is not particularly daunting to industry: “We have managed growth before and we will again…but the urban congestion issues are a worry.”
- In general, urban congestion is caused by cars and imposes on freight vehicles, rather than the reverse, as quite frequently stated.
- Our delivery of nationally consistent regulation is still way short of where it ought to be in rail (rail safety and access provision) and road (national harmonisation of rule making is becoming diluted in the areas of compliance and standards).
- There is a shortage of road transport drivers.
- Urban road and rail infrastructure needs significant attention to planning for future and upgrading of present facilities. This is particularly true of urban distribution and port bound traffics.
- There needs to be better incentives to enhance the utilisation of road and rail infrastructure.
- There is an increasing requirement by the community for more environmentally and socially sustainable transport solutions.
- There is a significant shift in business-to-business solutions in freight transport and these are resulting in and or caused by increased convergence or concentration in logistics provision.
Some of the measures aimed at protecting the community from market power abuses need to be relaxed to allow collaboration discussions to take place in a legal sense. An example of this is the Hunter Valley Coal transport and producers exemptions from some provisions the Trades Practices Act.

The do nothing option
The study concludes that in the light of almost certain significant increases in the land freight transport task, a do nothing option will lead to increased road and rail system congestion, increased costs, and reductions in air quality, society amenity and greater noise.

Thus, the do nothing option fails to meet the underlying assumption that the overall position in 2020 should be no worse than at present, and ideally better.

The strategic measures
The future freight task was viewed as a constrained optimisation, where the objective is to deliver goods as and when they are needed, but subject to identified constraints:

- Maintaining the health and safety of the transport community and participants
- Without consuming avoidable resources
- Without causing avoidable damage to the environment
- With due regard for the amenity and social fabric of the community.

With the assistance of the feedback from the client and two stakeholder workshops, four planks of attack to address this optimisation of future freight tasks were identified:

- Reduce the socio-economic impact of freight transport effort. This includes measures which will reduce resource consumption, noise, emissions, road congestion etc.
- Increase freight transport efficiency. This includes approaches which would reduce the number of trips required for any given task.
- Reduce the average distance each freight tonne is moved.
- Reduce/manage the number of freight tonnes moved in the first place.

This taxonomy was used to categorise the measures that were identified during the course of the study. A total of twelve clusters of measures spawned over seventy individual measures ranging from massive infrastructure programs to health and safety and transport operator training.

These measures were assessed against a set of criteria detailed in the paper and melded into a prioritised set of strategic work groups that were considered the most productive approach to the tasks before the nation. These eight strategic measures related to improving:
- Overall long term national strategic transport planning, including entities, data, formal planning reservations and community awareness campaigns.
- The productivity and utilisation of existing land transport infrastructure.
- To construct improved rail and road infrastructure, particularly in urban areas.
- The long term standards and design capability of our road and rail systems.
- The market and regulatory structures of rail.
- To improve access to quality skilled drivers through licensing, career pathing and occupational health improvements.

This list needs to be read in conjunction with the detail of the report as it is inappropriate to delve into every detail in this summary.

The headline thrusts are to enhance planning in a focussed way, to deliver reduced bureaucratic interfaces, provide incentives for productivity improvements, to recognise urban freight as an important component of an urban road system and to commence reviewing the standards for road and rail for the remainder of the century now.

We have also recognised the very oft repeated plea for a single rail safety regulator. Many decades ago the states ceded power to the commonwealth for aviation safety regulation. It is becoming obvious to most that the time is ripe for a single rail regulator for safety. The industry sees the variety of interfaces as a cot impediment and the truth is that managing the interfaces of responsibility across safety regimes is difficult and can be argued militates against safe outcomes at handover points.

We have consistently butted into the glaring gap of a national research, planning and investment agency. Everyone has recognised the gap but there are many diverse suggestions for alternatives. The previously suggested National Transport Advisory Committee NTAC) has all the hallmarks of fitting the bill in the minds of most with whom we dealt (eg a national entity, devoid of regulatory baggage and independent of any particular government but responsible to all). We note it was approved by ATC but stillborn in the real politik of federalism. It is still a missing link in our view.

Overall, it is concluded that regulatory change will have only a modest impact overall, and that maintaining similar levels of freight task efficiency without decreases in environmental and safety performance will require quite substantial investment in new and upgraded infrastructure. It seems likely that directing this towards alternatives for urban passenger transport to reduce light vehicle traffic (and hence free capacity for freight requirements) may have the greatest overall impact.

This leads onto the all important issues of implementation of these findings.
How are these measures best implemented?

Implementation comprises three phases; a planning phase, a design and a build phase. The suite of measures proposed in this study spans this implementation spectrum and as such serve to form the foundation for one another.

For instance, at one end of the spectrum the measures incorporate watershed type challenges having long lead times but the type that will make a significant difference. A review of the economics of rail and road design standards is an example. The potential gains in safety and productivity from a quantum leap in road and rail standards such as axle loadings or geometric design and signalling operations are enormous. However their implementation is always dogged by the historical reluctance to commence due to the long implementation time-lag in terms of complete delivery across the whole system. The answer appears to be to do the analysis in a comprehensive manner and ask the legitimate question of when and at what rate would it be necessary to reap positive returns. The alternative is to do piece-meal adjustments or worse still to continue to have vehicle and rail operators constrain their vehicle designs to meet standards developed in earlier times.

A corollary to this initiative is to develop pricing and investment strategies that reflect supply and demand impacts far more accurately. Such pricing ought go hand in glove with investment strategies for road and rail. These investment strategies are seen as key measures having priority among those proposed.

In all instances the key to successful implementation is the extent of ownership the solutions enjoy. The report recommends that the NTC seeks Standing Committee On Transport (SCOT) and TACE (committee of Transport Agencies Chief Executives) approval to the report and looks for strong national leadership in delivery. The establishment of a national entity with the ownership, imprimatur and resources to lead national transport planning is still a missing ingredient in the longer term national planning. In the words of one key industry stakeholder:

"We look for leadership from government, and the rest we will do."

This report suggests some of the agenda for the next decade.
2. Introduction

Sinclair Knight Merz, in association with Meyrick and Associates and the University of South Australia, was engaged by the National Transport Commission (NTC) to undertake the investigative research project “Twice the Task”.

Freight forecasts from the Bureau of Transport and Regional Economics (BTRE), generally regarded as Australia’s leading transport research organisation, suggest that the land transport freight task will double within the next 20 years. These conclusions are generally supported by others working in this field and validated in the Department of Transport and Regional Services AusLink White Paper (DoTARS 2004).

The adequacy of transport and port infrastructure to accommodate increasing demands has been a major issue in Australia for several years. Many transport systems, particularly urban road and rail networks, are showing significant congestion, with attendant environmental, social and economic costs.¹

This broad ranging project examined the status of the freight task and recent forecasts. It then identifies the issues and introduces possible measures which could be implemented, supported or encouraged by government to improve the safety, environmental, infrastructure requirement and transport cost outcomes of a doubled land freight task in Australia. Measures include regulatory, infrastructure and other approaches. The study considered actions which government could implement directly, as well as those where government could support or encourage others with direct responsibility to undertake assessment and implementation.

2.1 Context

This project is one of a number of current initiatives aiming to investigate and stimulate the development of Australia’s transport infrastructure and management. These studies include:

- The Australian Government Productivity Commission Review of National Competition Policy reforms (Productivity Commission Inquiry Report 2005), which made some significant recommendations for freight and passenger transport. The Commission’s report called for increased speed in freight transport productivity reform, alignment between modes in terms of

¹ The reader is referred to the 2005 Australian Infrastructure Report Card published by Engineers Australia, (Engineers Australia 2005), which failed to rate Australia’s ports or freight networks greater than a C- in Australia.
pricing, investment and planning, and greater integration of road transport regulatory reform by States and Territories.

- The *Exports and Infrastructure Taskforce Report* (2005), also known as the Fisher Report, which made recommendations to the Prime Minister regarding infrastructure capacity bottlenecks in export related infrastructure.

- The House of Representatives Standing Committee on Transport’s inquiry into regional road and rail networks and connectivity to ports, which by November 2005 had received over 120 submissions.

- The Business Council of Australia’s *Infrastructure Action Plan for Future Prosperity*, (Business Council of Australia 2005), which argued for market, pricing and regulatory reforms championed by the Council of Australian Governments (COAG) with a focus on ‘appropriate’ modal shares as a means to improving the efficiency of transport infrastructure.

COAG has agreed in principle to a number of the Fisher Report recommendations, including:

- Fast tracking land transport infrastructure planning under AusLink
- Incorporating key ports and channels into AusLink and
- Reinvigorating the regulatory reform program of the NTC.

Within this context, the NTC has the opportunity and the challenge to develop a package of reforms that will increase rates of productivity and efficiency improvements. This report addresses methods on priorities, and how they could be addressed.

### 2.2 Project objectives

The objectives of the project are designed to assist the NTC in planning how best to fulfil its role and charter for the benefit of all Australians. Specifically, the project is designed to:

- Assess the likely levels of transport task growth in the medium – longer term
- Identify what parts of the transport system will be under most pressure from freight and other transport growth
- Review initiatives being developed within Australia and overseas to identify a range of approaches that might be adopted to manage an increased freight task

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3 The recommendations are contained in the Communiqué of the COAG Meeting, 3 June 2005, on the COAG website at http://www.coag.gov.au/meetings/030605/#infrastructure
Assess what contribution each of these approaches might make to manage the challenges ahead.

Although the NTC’s charter focuses on regulatory issues, the study also considers a broader canvass covering other measures which may be outside the NTC’s responsibilities. This is particularly so if evidence suggests likely effectiveness, and opportunities appear to exist for such actions.

2.3 Time horizon
The time horizon for this study is defined as 2020. This is the date by which we anticipate the freight task will have increased twofold from the levels at the start of this century. A number of issues are considered in arriving at this definition. Instrumental in starting the present debate, is work that suggests that the land transport task will double within the 20 years between 2000 and 2020. The most recent BTRE studies (BTRE 2005, forthcoming) provide forecasts to 2020. However, we recognise that the increased level of debate in 2004/05 following release of AusLink papers, (Department of Transport and Regional Services 2004), and wide reporting of pinch points in various commodity export chains, resulted in a common reporting that “freight would double by 2020”. This implied a doubling within around 15 years, which was not the position of the original forecasts.

2.4 Passenger issues
This study is primarily concerned with freight. However, passenger issues are considered to the extent that they impact on freight. The principal set of impacts relate to the competition between freight and passenger transport for rail and road infrastructure in urban areas.

2.5 Approach to the Study
The attempts to develop strategies and tools for coping for freight growth in 2020 are difficult. We carried out an intensive round of consultation in order to delve into current industry thinking about the topic. We found this a useful component of a study that consists of seven main steps, which are:

- A review of existing freight task estimates, considering other available relevant information, to produce a spectrum of forecasts for freight task growth for major task groups
- A comprehensive review of the existing studies and relevant research (see the bibliography at Appendix A)
- A review of approaches implemented and under consideration in other countries, which aim to address these issues
- Gaining an understanding of the views and priorities of government transport infrastructure planning authorities throughout Australia
2.6 **Structure of this report**

This report is structured as follows:

- The next section (section 3) presents the reported freight forecasts and an assessment of the anticipated growth in the land freight task in Australia, including an early indication of the parts of the transport system likely to be under greatest pressure coping with the growth.

- Section 4 examines the implications of the forecast growth in demand for land transport, and major background issues which may influence the outworkings of these forecasts in practice.

- Section 5 discusses the range of initiatives which could be considered by the NTC and others in addressing the forecast growth in the land freight transport task, and establishes a broad classification system to align clusters of measures which may address various dimensions of the issue. The sources for this section include international and Australian research, consultation undertaken for the project and opinions raised by industry figures.

- Section 6 undertakes an initial assessment of each measure, and identifies those considered worth more detailed assessment from those with lower perceived effectiveness to achieve desired goals. The technique used in this section relies heavily on desk research and the collective assessment of industry consultations.

- Section 7 presents a summary of a spreadsheet based tool designed to interactively display the sensitivity of assumptions and measures on the relative effectiveness and contribution each initiative could make to better manage the forecast freight task growth. This tool is fully parametric to allow the user full flexibility in applying forecasts and influences.

- Section 8 draws the recommended measures into a focussed plan to address the challenges posed by the forecast growth in freight task. It also addresses implementation responsibility issues, noting that some issues are outside the NTC’s current charter.

- Appendices provide more detail on various aspects relevant to the overall report:
  - Appendix A, contains research examining the potential impact of changes in availability and pricing of liquid fuels on freighting practices in Australia.
  - Appendix B provides a list of the individuals and firms consulted from the areas of industry, government and academia during the course of the study.
  - Appendix C provides more detail on methodology and additional information on forecasts for Australia’s land freight task.
  - Appendix D contains a summary of research undertaken on overseas experiences.
Appendix E contains detailed assessment of the recommended measures, considering:
- The likely impact or effectiveness on various changes sought
- What groups or organisations might be best placed to implement each initiative.
- Appendix F contains the measure impact presentation tool.
- Appendix G contains a glossary of terms.
3. Issues

This section examines the implications of the forecast growth in demand for land transport, and major background issues which may influence the accommodation of these forecasts in practice.

3.1 Growth in demand for transport services

The relentless growth in demand for transport services and supporting infrastructure has been a continuing theme throughout Australia for decades, and the overall conclusions from our examination and assessment of forecasts suggest that this pattern is most likely to continue, albeit at a diminishing rate.

There are many factors supporting this growth in transport, but two of the most important include:

- The scale economies of goods processing, manufacture and transport continue to favour smaller numbers of larger production and processing plants, with distribution from these plants to wider market territories. The result of this concentration of production and wider dispersal of output is more transport. The evidence of concentration of production includes the ever increasing size of “world scale” plants, closure of regional warehouses, and mergers and acquisitions between competitors, seeking benefits from scale economies.

- At the demand/consumption end of the transport chain there is an increasingly diverse and individual nature of demand, where for many markets, there are manufactures and producers willing to subdivide and target increasingly small segments of that market. To achieve economies of manufacturing scale relies on effective transportation to get the finely targeted production to the particular consumers of interest. The increasing diversification of products servicing the same basic market provides evidence for this. Twenty years ago, supermarkets typically contained two or three styles of milk, across two or three pack sizes. Most supermarkets now contain upwards of 40 brand or milk formulation combinations, with pack sizes ranging from 250 ml to 4 litres. This principle applies across the range, with a large supermarket now stocking 50,000 – 60,000 lines, compared to less than a quarter of that number only ten years ago.

The growth drivers are known to include population, gross domestic product levels, increasing trade performance of the World and in particular the growth in affluence of countries within our economic zone.

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4 Readers are referred to Appendix D, which reviews freight transport growth in overseas countries, and the programs and initiatives in place to respond to that growth. Delivering the Goods: 21st Century Challenges to Urban Goods Transport (OECD 2003/5) is relevant to this theme.
3.2 Adverse impacts of transport task growth
A significant and growing proportion of the population, particularly in Western countries, is concerned about adverse impacts on residential amenity, noise, air quality and other dimensions related to quality of life in our large cities. There is evidence that human activities have adversely affected the environment on a worldwide scale. In Australia the evidence we see includes salinity, extinction of native animals, river quality, habitat destruction, and increasing difficulties in controlling weeds, pests and diseases. Evidence of climate change seems stronger, and there is greater support for suggestions that human activities have contributed significantly. While transport safety performance has generally improved over the last few decades (particularly if considered against increased activity levels), traffic related deaths and injuries are still among the top half dozen causes of mortality.

3.3 Transport and economic growth
Improved transport capability and efficiency levels have been both a driver of economic growth, but also a facilitator of that growth. Measures which restrict transport service performance are very likely to restrict economic growth, generally accepted as a fundamental tenet of development and the basis for improvement in living standards. Historically, transport activity has grown faster than overall economic growth, often assessed at about 30% faster.

3.4 Balancing competing priorities
Governments have the unenviable task of attempting to balance these competing needs and requirements, summarised pictorially in Figure 1.

- **Figure 1** Summary of competing demands to be balanced

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<td>While protecting the health and safety of transport system users and others</td>
</tr>
<tr>
<td>To provide access to the goods that people want when they want them</td>
<td></td>
</tr>
<tr>
<td></td>
<td>While preserving residential amenity and respecting other social values</td>
</tr>
<tr>
<td></td>
<td>Without causing avoidable damage to the physical environment</td>
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</table>

Source: Study team
This project has an unstated assumption that actions taken as a result of the work will ensure that the position in 2020 is not worse that the present – the status quo should at least be maintained, and ideally, improvements made.

3.4.1 What if we do nothing?
In the face of almost certain continued growth in demand for transport of goods required, doing nothing will lead to increased congestion, costs, reductions in air quality, amenity and greater noise in urban and regional areas. Potentially adverse effects from past growth have been minimised and ameliorated through measures similar to those which were assessed in this study. Suggestions have been made that the forecast increased freight task will be accompanied by (or even cause) a decrease in efficiency, if major reform aimed at increasing productivity does not occur.

3.4.2 Productivity gains in recent years
Long distance transport – road
If in the future, larger tasks are accommodated more efficiently, the increase in the task is of less concern. The introduction of increased mass limits, longer semi trailers, larger vehicle dimension limits and subsequently the roll out of extensive b-double and road train routes have all provided productivity gain for the road transport industry. The productivity improvements in road freight transport achieved in the shift from semi-trailers to B Doubles was a major contributory factor in coping with freight task increases over the past 20 years. Figure 2 shows the task growth, and proportion carried out in the main classes of road freight vehicles. Figure 3 subdivides articulated trucks into semitrailers (up to six axle) and b-doubles (7 – 9 axles).
In 1966 articulated and rigid vehicles shared what was then effectively the non-urban road freight task. Since then there has been two separate national reviews of road limits in 1975 and 1985, introduction of new national heavy vehicle standards between 1992 and 1995 and progressive...
increases in concessional mass limits and increased relaxation of permits for road trains and b-doubles. Other factors have increased the size of task suitable for larger road vehicles, such as closure of grain branch lines and consolidation of regional distributional centres. All of these factors have increased the task most suitable for larger road vehicles.

However, evidence points to the rate of change plateauing. The recent calls by industry for a new round of productivity reforms may well be explained in part by this plateauing.

**Long distance transport – rail**

The productivity changes in rail in recent times have been similar, with longer trains, higher axle mass limits and increased utilisation of track following major investment and reforms.

- Figure 4 Average train length – ARTC east west corridor

The average train length for high flagfall services (ie the most desired train paths) on ARTC’s east west interstate track is shown in Figure 4. This shows both the increasing actual train lengths, but also the increases in maximum train lengths, stemming mostly from infrastructure investment in longer passing loops and terminal siding track lengths.

Source: ARTC paper at South Australian Infrastructure Summit 2005, 30 Sep 2005
Figure 5 shows changes in aspects of track access charges and revenue yield on all ARTC corridors between 1998/99 and 2003/04. This shows that revenue yield (to ARTC) in real terms has fallen quite significantly, and that average cost of access to rail operators has fallen more. This relates to the two part access charge structure, with a fixed (flagfall) and variable (cents per gross tonne-kilometre) component. As average train weight increases, average cost per gtk falls, as the flagfall component is spread over more gtks in each train.

**The urban freight task**

Similar changes in vehicle type used have also occurred in urban arenas, as shown in Figure 6. More of the urban freight task will be carried by light commercial vehicles, growing from 72% to a forecast 83% of the total urban task by 2020. This reflects the just in time and increase in shelf products that our urban society demands. Vehicle kilometres travelled by articulated trucks in urban areas is forecast to treble, from 0.69 billion vehicle kilometres in 1990 to 2.29 billion vehicle kilometres.

Source: ARTC paper at South Australian Infrastructure Summit 2005, 30 Sep 2005
Scope for efficiency improvements in the urban are limited by existing infrastructure and the saturation of light commercial vehicles.

Both government and industry are seeking similar improvements in productivity and efficiency over the next twenty years as the last twenty. This is the challenge for the National Transport Commission.

3.4.3 Segmentation of freight vehicle fleet

There has been a segmentation in the growth of the road freight transport service provision, sometimes referred to “hollowing out”, with the greatest growth being in the smaller and larger vehicle sizes (1-2 tonne courier vans and small trucks on short haul urban tasks, and B-doubles and larger vehicles where permitted, such as road trains and other innovative multi trailer combinations for longhaul tasks. Correspondingly, there has been a relative decline in the middle range of vehicles, typically larger tray trucks and lighter capacity semi-trailers, as shown in Figure 7.
BTRE forecasting, ABS surveys, industry submissions, global experience and personal consultation all point towards a reshaping of the structure of the truck fleet to carry the transport task. This change can be considered as a ‘hollowing out’ of the truck fleet. As the above diagram indicates, forecasts point towards a significant increase in the use of articulated vehicles at the expense of smaller, rigid vehicles. At the other end of the scale, light commercial vehicles are maintaining their share of an increasing freight task, in effect, increasing the use of LCVs.

3.5 Other relevant background issues and considerations

3.5.1 Liquid fuel availability and pricing

Liquid hydrocarbon fuels power virtually the entire land freight transport task in Australia, with diesel dominating. Transport costs are sensitive to fuel price fluctuations, with surcharges presently almost universal.

Forecasting future oil pricing patterns is difficult, with prices heavily influenced by factors not easily measured or predicted. The major factors influencing longer term pricing trends include the
level of current reserves, new discoveries, cost of extraction and future demand. These issues are discussed in greater detail in Appendix D.

The great uncertainties in oil reserves and future consumption trends make definitive conclusions virtually impossible. The polarisation of views in the oil reserve debate also underlines hazards in predicting when major changes might occur. Making predictions about the implications for Australia’s freight transport task with such uncertain foundations is hazardous, even when the speculative nature of the position is clear. However, the position has been taken that this issue is of such fundamental importance to the project that best estimates, acknowledging the great uncertainties, are required. The conclusions of this study are:

- Major reductions in liquid hydrocarbon fuel availability, and resultant increases in prices are inevitable.

- Reductions in oil derived fuel supply are most likely in the time period 2010 – 2025, meaning that global production peaking is likely within that time range. Some commentators suggest peaking may be later than this date range, but evidence seems to be growing in favour of an earlier point of maximum extraction.

- Implications for oil and fuel pricing are even less certain, but the case for greatly increased prices seems much stronger than that for price falls. Simply, limited supply being chased by likely significantly increasing demand suggests this, given the market place trading environment.

- Historic trends show significant volatility in oil pricing, and it is concluded that this unlikely to change. Specific price changes are likely to be sudden, and over quite short time periods, even if underlying longer term trends are more predictable.

- The greatest rate of price increase is likely to be immediately after peaking, when supply begins to diminish, but demand remains high. This would most likely be in the period 2010 – 2025. However, significant price increases are probable at the point where rates of extraction cease to increase. This could be a few years earlier than the 2010 – 2025 date range.

- Liquefied Natural Gas (LNG) is currently in use in a small number of truck fleets (generally mixed 20% with diesel) and has real potential to supplement oil based fuels. LNG availability and supply / demand balance issues are subject to the same uncertainties as oil. However, the supply position seems somewhat brighter, with likely availability to at least 2050.

- Fuel makes up about 20% of transport costs in Australia considered across all modes. Transport is estimated at around half of supply chain costs (obviously varying greatly depending on the nature of the industry concerned). Supply chain costs are generally
estimated at around 10% of production manufacturing and industrial processing. So in total, fuel for transport is likely to be roughly 1% of total production and supply chain costs, averaging over all industries, from fuel intensive such as mining and aviation, through to IT and services which use very little transport fuel.

- Fuel price changes would need to be measured in orders of magnitude (ie at least ten fold) to stimulate fundamental changes in the way goods are produced, raw materials sourced and finished goods are distributed.

- In the period under consideration, 2005 – 2020, increases of this size are unlikely, although doubling, tripling or quadrupling, in real terms, seem quite possible.

- The success of alternative fuels in powering significant parts of the freight transport task, and reducing demand for hydrocarbon fuels is likely to be a major influencing factor on the size and rapidity of price increases.

- Major changes in goods production and distribution patterns in the next time period (say 2020 – 2050) mostly caused by rapid and dramatic fuel price increases, seem much more likely, unless alternative fuels become successful in providing most of the energy required on a sustainable basis. LNG seems the most promising at this point, based on supply resource estimates, availability and current use in diesel engines.

3.5.2 Security
The increasing focus on transport security in the aftermath of terrorist attacks overseas will impact on the movement of freight by all modes. Further, given attacks on the rail systems of Europe and Asia, security needs to receive serious consideration in design and usage of public transport services, due to the resulting impact on freight transport if roads become more congested with passenger movements in private cars which were previously on public transport services.

Security considerations in freight transport fall under the attack level of “managing the impact of freight transport” and as such do not directly relate to the growth in transport task but rather the result of this task.
4. Measures and initiatives for consideration

4.1 Objective
The challenge in addressing the measures and initiatives to be considered in delivering future freight transport demands is to develop a cogent structure for accommodating the myriad of possible options. The objective of this section is to present, in an organised way, a broad range of initiatives and actions which could be considered to better manage the forecast growth in freight. These measures are then assessed as in section 5 of this report.

4.2 Approaches to reduce the impact of the freight task
The freight transport task consists of the obvious principal movements of the required goods, along with other associated movements, such as packaging, return of empty vehicles and wagons, relocation of empty containers, movements of equipment for maintenance and repair, track repairs as well as movements for recycling and disposal of waste.

We have attempted to identify four generic components of a strategy to reduce the impacts of these future freight demands. We have devised four avenues of attack as the high level strategies from which we derive clusters of more detailed approaches. These in turn lead to specific measures within each cluster. The taxonomy is discussed below and presented schematically at Figure 14.

4.2.1 The four avenues of attack
We have identified four principal avenues by which the adverse impacts of the growing freight transport task may be attacked. These are described below.

1) Reduce the socio-economic impact of freight transport effort. This includes measures which will reduce resource consumption, noise, emissions, road congestion, spillages and accidents.

Rationale: If successful, these measures would reduce the social and environmental impacts of freight transport, or permit an increased freight task without increased impacts.

A key objective of this project is to determine what can be done to minimise adverse impacts, without affecting quality of life economic growth.

2) Increase freight transport efficiency. This includes approaches which would reduce the number of trips required for any given task and reduce non essential freight movements which occur as a result of the required movement. Typical measures could include improving vehicle capacity and productivity, ensuring the most suitable choice of mode is used and reducing empty running.
Rationale: If successful, these measures would reduce the number of transport trips for a given task or permit an increased task to be undertaken by the same number of trips.

Most of the growth of freight task over the past several decades has been accommodated without significant adverse impact through efficiency gain measures – larger trucks, more use of existing infrastructure (eg at night) and construction of higher capacity, faster and safer roads and ports.

Many commentators and industry participants believe that further similar gains are possible.

3) **Reduce the average distance each freight tonne is moved. Measures could address land use planning and spatial efficiency, to reduce the length of freight journeys.**

Rationale: These measures aim to reduce the length of each trip, reduce the number of steps in the supply chain, and/or reduce handling.

Many distribution businesses aim to make their distribution chains as simple as possible – this could make these practices simpler and more effective, but actively seeking to minimise freight transport trip length by better attention to where various facilities are located.

4) **Reduce the number of freight tonnes moved in the first place. Measures could address demand management, possibly in a similar way to measures to improve water conservation.**

Rationale: If successful, these measures would reduce the number, length and impact of trips required to carry out a smaller freight transport task.

The tonnes of freight to be moved are the primary starting point of the whole freight task: in essence the less the number of tonnes means less the task. Concepts to reduce freight tonnes aim at the very heart of society’s focus on economic growth to promote increases in living standards. These measures have understandably met with very limited support from industry. Industry generally see any choking of freight demand as a backward step but there are issues surrounding packaging and collocational choices with in-stream processing that can reduce conventional freight movements. There are recycling practices that increase the task of modern communities. The former practice of removing rubbish from a demolition site and carting it and disposing of it at a tip site has been replaced with sorting and recovery of concrete, bricks and much of the timber at one site and removal of soils to another site, the bricks and recycled concrete products become part of another freight task.
Nevertheless, there may be initiatives which are worthy of consideration under the general heading of decoupling freight and economic growth – that is, measures which do not impede economic growth, but which reduce the attendant freight growth.

There are various measures which could address these “attack points”, and each measure may address one or more attack points, as shown in Figure 8.

Much of the research work undertaken for this project involved desktop study to understand what has been considered and or attempted in other locations, as well as the opinions of a wide range of personnel from all parts of the transport and supply chain industry, road authorities, government infrastructure and planning agencies and others with relevant experience and views.

The next section discusses identified measures, organised into clusters. These clusters translate the four avenues of attack into objective statements. The four avenues of attack map onto one or more clusters and these in turn generate a myriad of detailed measures that serve to assist in achieving one or more of the objectives.
Figure 8  Analysis structure for potential measures

ATTACK POINTS

1. Reduce socio – economic impact of transport
2. Increase efficiency – reduce number of trips
3. Reduce average freight trip length
4. Reduce freight tonnes moved

APPROACH CLUSTERS

1. Improve transport safety
2. Improve Vehicle environmental performance
3. Optimise Use of modes
4. Enhance vehicle capacity and productivity
5. Improve infrastructure use
6. Enhance use of market structures
7. Improve supply chain collaboration
8. Secure skilled labour force
9. Develop selected infrastructure
10. Integrate transport system planning
11. Land use and spatial policy
12. Decouple freight and economic growth

MEASURES

Measure 1
Measure 2
Measure 3
Measure 4
Measure 5
Measure 6
Measure 7
Measure 8
Measure 9
Measure 10
Measure 11
Measure 12
Measure 13
Measure 14
Measure 15
Measure 16
Measure 17
Measure 18
Measure 19
Measure 20
Measure 21
Measure 22
Measure 23
Measure 24
4.3 Clusters of measures

The following measures and their subsequent assessments have been derived from our consultations with industry and Government. That consultation has been developed through face to face interviews, telephone interviews and preliminary result testing at workshops and presentations. A list of those with whom we have consulted is presented at Appendix B.

4.3.1 Improve transport safety (Attack point 1)

Transport safety has been a major focus for governments around the world for at least forty years, particularly for road transport. Significant advances have been achieved, through a combination of road engineering, vehicle design and performance and driver education and training. Involvement of freight vehicles in collisions, injuries and fatalities has fallen faster than the involvement of light vehicles in Australia, considered relative to exposure indicators such as vehicle kilometres travelled. However, increasing activity levels have meant that transport safety remains an issue, particularly for road.

The following measures aim to tackle freight transport safety.

1) Define and assess measures which could improve transport industry occupational health and safety performance for drivers. This includes measures to reduce fatigue and in turn improve driver retention within the industry.

2) Improve road design and management to better suit trucks and road capacity for all vehicles. (This could include approaches such as signal sequencing and speed camera placement).

3) Implement measures to achieve the same safety expectations and performance from road providers and transport operators as occur with rail operators and track providers.

4) Assess return on investment from new infrastructure in terms of safety benefits.

5) Encourage marking hazardous goods routes on road to aid compliance and enforcement.

6) Evaluate and if justified promote annual inspections of all freight vehicles on safety grounds.

5 For instance all road related deaths have decreased by 2% in absolute terms over the past five years and heavy articulated fatal smashes have reduced from 205 in 1990 to 135 in 2004. (Australian Transport Safety Bureau, Road Deaths Australia: 2004 Statistical Summary; Canberra 2004).

6 The costs of road safety trauma in Australia is estimated to be $15 billion per annum (“Road crashes during 1996 cost Australia almost $15 billion, according to a major report on the cost of road crashes released today by the Parliamentary Secretary to the Minister for Transport and Regional Services, Senator Ron Boswell” http://www.ministers.dotars.gov.au/rb/releases/2000/may/b21_2000.htm).
4.3.2 Improve vehicle environmental performance (Attack point 1)

Transport is the major contributor to air pollution in Australian cities and transport is a major source of greenhouse gas emissions. Road traffic\(^7\) is usually cited as one of the greatest detractors from urban amenity and in particular air shed emissions and noise are two of the oft cited culprits.

The following measures aim to improve freight transport performance and impacts in these areas.

**Assess vehicle performance**

7) Develop programs to retire poorer performing older trucks.

8) Undertake research to define and measure exhaust brake noise, to permit legislative definition and enforcement.

9) Evaluate and if justified promote annual inspections of all freight vehicles for environmental performance standards.

10) Evaluate and if beneficial, promote regulations requiring “hush kits” on trucks operating in urban areas at night.

**Infrastructure to improve environmental performance**

11) Define and support traffic management measures to improve traffic flow.

12) Support investment in urban rail infrastructure to increase capacity and improve noise performance.

**Research public attitudes to freight transport and vehicles**

13) Undertake research to determine what aspects of trucks are particularly disliked by the public, and assess how / if mitigation measures could be put in place to affect change in these, without compromising freight task performance efficiency.

4.3.3 Optimise use of transport modes (Attack points 1 and 2)

Giving priority to rail transport as the mode of preference where practicable is found in most national, state and regional transport plans\(^8\). The extension of the use of rail is to consider the use of coastal shipping in circumstances where it can be proven to be cost effective. Our research

\(^7\) BTRE Report No 107 Greenhouse Emissions from Transport; Australian Trends to 2020” Canberra 2002: “the present study estimates direct greenhouse gas emissions from transport in 1998 (the latest year for which detailed modal energy data are available) to be 17% above 1990 base year levels…69.612 million tonnes of carbon dioxide (CO2) equivalent. By 2010 (the middle year of the first ‘budget period’ of the Kyoto greenhouse targets (2008 to 2012), transport sector emissions are projected under ‘base case’, or ‘business-as-usual’ (BAU), assumptions to be close to 47% above the level for 1990 (the Kyoto target base year). By 2020, BAU emissions from Australian transport are projected to be around 6% higher than 1990 levels”.

\(^8\) Examples include policy statements in Western Australia, Victoria, NSW and Tasmania.
indicates that most countries have policies which encourage shifts to rail, and some have specific programs, such as the Trans-Alpine intermodal pricing programs outlined above, some of them supported by financial grants, subsidy programs and tax incentives (eg UK Freight Grants program, Department for Transport 2004).

There is also potential for established technologies to take a bigger role in freight transport, eg airships (Prentice 2005), pipelines (Howgego and Roe 1998) and trams (Rijsenbrij 2004). Fuel cells, hybrids and hydrogen are gradually being applied to propulsion systems, with fuel cells now installed in some switching/shunting diesel locomotives in North America.

**Rail**

14) Align rail regulations across all track jurisdictions and owners, aiming for a single regulator. Standards for communication and signalling may have significant opportunities.

15) Assess benefits from freight only rail infrastructure in urban areas and promote such investment where justified.

16) Evaluate rail for longer journeys for waste to disposal sites.


18) Undertake research to assist state policy planners develop policy which will achieve rail mode share growth.

19) Assess flagfall aspect of rail access charging which makes shorter lightweight trains uneconomic.

**Modal neutrality**

20) Work towards achieving a consistent pricing model across road and rail.

**Coastal shipping**

21) Promote greater use of coastal shipping with permits for foreign flagged ships

**Road rail intermodal**

22) Research circumstances in which intermodal terminals are successful.

23) Define and promote standards for concessional vehicle arrangements for shorthaul road trips to railheads.

**4.3.4 Enhance vehicle capacity and productivity (Attack points 1 and 2)**

Improving the efficiency, capacity and productivity of the existing and planned vehicle fleet has obvious benefits; it allows one to undertake more task with similar or fewer resources. Measures to increase capacity and productivity can consider vehicles, roads and the interaction between the two to achieve the given task requirements.
Performance Based Standards (PBS) aim to give greater flexibility to designers and operators of road vehicles to design vehicles which achieve greater productivity for given tasks, within broad overall requirements determined by safety and infrastructure size and strength limits. PBS will allow for the replacement of a one size fits all rule making process to a framework which encourages operator driven flexibility in vehicle design and operation, while meeting agreed safety and road asset standards. An Interim Regulation Panel has been established to enable the evaluation of industry proposals for PBS vehicles. However, full implementation will require underpinning the regulatory framework and the guidelines for decision making and enforcement to be finalised.

Performance based standards for vehicles
24) Actively progress implementation of enhanced PBS and innovative vehicle design approaches. Aim for a single point for approval, with mutual recognition if necessary. We suggest that to improve accessibility to a PBS scheme there be consideration of a research fund to support such industry development. Such a scheme would need to consider intellectual property issues given the desire for replication and should include both the technical issues relating to assessment of vehicle design, but also the social issues of ensuring broad community support for the initiative.

Regulatory impact statements
25) Promote adequate assessment of productivity implications in regulatory impact statements.

Time and location specific permits with Intelligence Access Project
26) Promote specific permit conditions to improve system capacity and or increase vehicle utilisation, such as specific time of day / day of week and specific routes. The Intelligent Access Project could be a vehicle to monitor operations.

Road – road terminals
27) Evaluate benefits from road to road terminals for transfer of goods from smaller to larger vehicles for the long haul portion of the journey.

Truck mass limits and infrastructure design
28) Work towards consistent higher mass limits for trucks throughout Australia, particularly on interstate highways, major urban freeways and arterials with connections to freight hubs and distribution terminal areas. The provision of improved road capacity and new infrastructure links is one of the consequential costs of such measures.

29) Improve road design and management to better suit trucks and road capacity. This could commence with an NTC/Austroads sponsored seminar on the economics of road design standards. (This could include pavement and bridge strength, signal sequencing and speed camera placement.)
4.3.5 Improve use of existing infrastructure (Attack points 1 and 2)

Improving the efficiency, capacity and productivity of existing infrastructure is immensely attractive to those charged with funding investments in new infrastructure. Governments in Australia are generally unable to fund infrastructure investments from recurrent revenue, and are increasingly reluctant to borrow to do so. A variety of private partnership mechanisms have been used to bridge this gap. However, avoiding the need for new infrastructure entirely, if achievable, presents significant opportunities for governments to use freed up funds in other ways. These measures tackle how existing infrastructure could be used more efficiently.

The most obvious initiative to manage freight transport more efficiently, to influence modal shifts, and to provide a source of finance for infrastructure, is infrastructure access pricing. Although the formulation and implementation of the NRTC/NTC’s charging determinations has been a slow process over the life of the organisation, the gradual imposition of a ‘fair’ pricing regime, reflecting the cost of wear and tear of Australia’s roads and encouraging use of more efficient vehicles, is taking place. Despite this, many opportunities remain untapped in Australia, including charging for externalities, and many overseas countries have achieved much less than Australia to date (Sinclair Knight Merz et al 2004). There is gradual acceptance of the principle that there are more effective mechanisms than blunt fuel and or vehicle taxes, as evidenced by toll roads, bridges and tunnels, and by New Zealand’s RUC system.

The most sophisticated direct charging schemes are those being applied to heavy vehicles in the Alpine countries of Switzerland (ARE 2005) and Austria (Schwarz-Herda 2005), and the nationwide toll for trucks using the Autobahnen of neighbouring Germany. Similar road user charging schemes are being proposed in other countries, such as Sweden and United Kingdom, and an electronic toll system for the Czech Republic is expected to commence in 2007. All countries contributing to the OECD Environmentally Sustainable Transport Policy Instruments Report (OECD 2001) see pricing as a major policy thrust if transport is to make a contribution to a sustainable future.

Infrastructure pricing mechanisms

30) Implement direct user charging by infrastructure provider, including optional charging for higher limits where infrastructure can support. Aim to remove standard mass limits.

31) Determine true costs of road damage from larger / heavier vehicles as a basis for charging operators, and compensating those who bear the costs (particularly local and state governments).

32) Review effects of congestion pricing mechanisms eg London access charge, parking levies etc, to determine likely effectiveness and applicability.

33) Extend heavy vehicle charging approaches to light vehicles, to remove existing difficulties with lightest heavy vehicles.
Utilisation targets and charges
34) Identify specific utilisation targets with penalties for non compliance, at individual operator level, such as two way loading to and from ports.

35) Evaluate and encourage appropriate train strategic operating protocols (eg size, number of destinations etc for port trains.

36) Promote / evaluate infrastructure use charges (eg NSW $100 / TEU for direct stevedore delivery / pickup.

Harmonise concessional vehicle limits
37) Define and promote standards and prices for over general access mass limit operations of heavy vehicles where benefits exceed costs.

Passengers, light vehicles and freight
More than 80% of vehicles on most Australian roads are light vehicles, and are much greater contributors to congestion than heavy freight vehicles. Exclusive truckways have been advocated from time to time. The reason that these facilities for trucks are not as common as busways is partly due to the higher priority being given to passenger transport and the inability of the needs of trucks to be moved up the priority ladder for investment. Truckways were suggested in the South Australian Draft Transport Plan (DTUP 2003), replacing lightly used suburban rail rights-of-way, and were investigated for construction in three major cities and six inter-city routes in Florida (CUTR 2002).

38) Assess the real contribution of freight to congestion with the aim of adopting improved prioritisation for freight and passenger needs. This will assist stimulate awareness about use of road systems by private cars and in assessing the extent of congestion caused by light vehicles. This in turn will address opportunities for improved public transport, car pooling and other car travel minimisation strategies.

39) Assess benefits of freight only routes, truck use of bus lanes and transit and other measures to better manage light vehicles to improve freight capacity.

Better management of road maintenance
40) Review infrastructure design standards to ensure alignment with likely demand within the service life of the asset and to ensure best longer term trade off between construction and maintenance costs. Evaluate benefits from reduced disruption from maintenance activities, through higher initial construction standards.

Technological opportunities
In general, overseas experience suggests technical innovation can improve the performance of freight transport at the margin, but will not in itself offset the adverse effects of increased freight traffic, at least in the short-term future. Some of the possible measures are listed below:
Road
41) Investigate “electronic towbar” technology that enables radio frequency linking of several vehicles from the actions of single driver in lead vehicle, thus reducing headways between vehicles.
42) Use communication technologies to improve vehicle utilisation, reduce empty running and identify optimal routing of vehicles among owner drivers and operators of very small fleets.

Rail
43) Assess and promote more responsive signalling systems to enable shorter headways and better access to train paths.

4.3.6 Enhance the use of market structures (Attack points 1 and 2)
Governments implement a range of control structures to address problems which may arise through various forms of market failure. In Australia, national competition policy, the Trade Practices Act and the ACCC are typical examples of interventions. These interventions can have unintended consequences, and can also cause different market distortions through their presence. The following measures have been proposed by stakeholders in the course of this study to improve freight transport performance and minimise “adverse” impacts.

44) Market control structures to balance greater market power of larger operators who can vertically integrate effectively, and ensure benefits from competitiveness of smaller operators is not lost9.
45) Review the applicability of national competition / ACCC policies to supply chain collaboration processes.
46) Review opportunities from competition, market regulatory or other relevant policies to achieve sustainable, economically efficient rail market structure.
47) Investigate efficient methods to internalise existing external costs.

4.3.7 Improve supply chain collaboration (Attack points 1 and 2)
There has been an increased realisation that optimising one part of a supply chain fails to optimise the supply chain as a whole, and indeed can lead to poorer overall performance. Enhanced collaboration, where various entities along the chain are provided with the incentive and necessary

9 This mechanism has been suggested and rejected on many occasions. The most recent proponent of an operator licensing arrangement was Quinlan Professor Michael Quinlan. Report of Inquiry into Safety in the Long Haul Trucking Industry. (Quinlan 1999)
information to act in a unified way has gained ground both among industry operators, but also government regulators who can testify to the benefits.¹⁰

A collaboration process where all parties with an interest in solving the problems work together in associations that vary from loose committee structures to formal authorities, to improve throughput of the port and its hinterland, to mitigate congestion and to minimise adverse community impacts has gained popularity in North America (US DoT 2003). The best known infrastructure outcome of such collaborations is the Alameda Corridor project, which brought together funding from federal, state and port sources (and which charges user fees) to improve rail access to the ports of Los Angeles and Long Beach. Despite problems which manifested in congestion appearing elsewhere in the rail network, the so called “Gateway” concept is relevant to Australian ports, building on the existing informal and promotional bodies at all major ports.

Much of the credit for innovation in trucking and improved performance is due to the flexibility and innovation of the logistics industry, constantly seeking to optimise logistics through new applications such as back-loading, reverse supply chains, packaging efficiencies, new alliances and third party logistics suppliers (Bologna, Simons & Cooper 1995; David 1995). Together with the continued search for more efficient loading, routing and scheduling (ESRI 2005), such internal innovation will continue to deliver benefits, particularly if left free from regulatory constraints.

48) Examine the costs and benefits from international standardisation for domestic materials handling equipment such as containers, pallets and cartons. If justified, establish programs to encourage or implement the necessary changes.

49) Prepare case studies to better understand supply chain business drivers, based on analysis and evidence rather than anecdote.

50) Encourage the promotion of industry collaboration to reduce bottlenecks eg out of hours warehouse access.

4.3.8 Secure a skilled labour force (Attack points 1, 2 and 3)

51) Encourage the use of existing exemptions for heavy vehicle progressive licensing and minimum age requirements, to reduce licensing difficulties for drivers.

52) Undertake research on driver / operator expectations and the rationales for joining and leaving transport companies.

53) Determine what the role of government should be, if any, in accreditation schemes for drivers and freight operators.

¹⁰ See the experiences of the Victorian government in their promotion of supply chain benchmarking and their supply chain capital program (DIIRD 2005)
4.3.9  Develop selected new infrastructure (Attack points 2 and 3)

Despite the professed inability of governments in Australia to fund infrastructure investments from recurrent revenue and their recent reluctance to borrow to do so, building new infrastructure is still seen as the most effective way to provide greater capacity and reduce problems from congestion, air emissions. Investment in new infrastructure is how the existing system came into being, and further additions and enhancements will continue to be sought to tackle problems. 11.

Maintenance and provision of rail track dominates debates on planning for the generally deregulated freight transport industry around the world. Even where part of the industry is protected in some way, financing, planning and constructing infrastructure is still a major task for the track owners, usually governments.

Among the routine infrastructure improvement tasks specifically to aid freight transport are strengthening of bridges and road pavements, financing inter-modal terminals, rail sidings, grade crossing improvements (urban and rural), truck parking facilities, crawler / climbing lanes on hills, and passing loops on rail lines. There is widespread recognition of the need to eliminate bottlenecks in all modes, and an accent on urban and inter-city links for evaluation as complete transport corridors (OECD 2001). There is also a clear understanding, not always reflected in investment programs, that maintenance of the existing network is at least as important as new, high-profile (and politically attractive) projects.

Where finance for transport infrastructure is lacking, it is important to recognise the economic, social and environmental costs of not keeping infrastructure up to standard – the present state of many of the world’s rail networks, that have been starved of investment funds, is a vivid example of the catch-up funding and work that are required if rail is to play a bigger role in freight transport.

Rail

54) Invest in urban rail infrastructure to improve existing bottlenecks and noise performance, and thus facilitating better utilisation. This should include assessing benefits from freight only infrastructure and under-grounding rail lines.

55) Determine optimal rail design standards to achieve increased productivity, eg increased axle load limits, greater clearance and loading gauges, improved signalling and communication to increase track capacity etc.

11 ARA, The Future for Freight, 2005 page 4 concludes by saying inter alia that: “important gains will come from track investment above that currently planned by the ARTC for investment and maintenance ‘catch up’ ...”
Road
56) Assess the need and source of demand for extended interstate highway duplication.

57) Implement road design standards aimed to minimise the generalised transport cost, not simply to minimise cost of road supply. Consider additional capacity for improved truck size, mass and operational practices, including assessment of specific freight use infrastructure, environmental and safety benefits.

Inter-modal terminals
58) Promote 24 hour operation as a condition for new major inter-modal terminals and set planning bounds to underpin this requirement.

Investment
59) Assess mechanisms to encourage private investment in infrastructure, as governments do not wish to fund required investments from revenue or borrowings.

60) Assess effectiveness of the current road funding model against rail funding model in delivering satisfactory outcomes.

61) Research impact of present Commonwealth – State funding arrangements, presently seen as an obstacle to implementing pricing reforms.

4.3.10 Integrate transport system planning (Attack points 2 and 3)
In Australia, governments have largely withdrawn from directly operating transport services, but retain mixed interests in infrastructure ownership. When combined with the demise of economic regulation, the role of government focuses more on encouraging partnerships to achieve improvements in freight transport. This has been described as creating “an institutional environment that supports the identification and advancement of freight concerns within the transportation development process…” (US DoT 2003).

Nevertheless, there remains a need for overall transport policy coordination, to set agendas and priorities and to review system performance against demand. While the AusLink initiative has set a much more structured process for assessment and management of project investment priorities, a frequent theme throughout consultation in this study was the need for a body to set and manage transport policy at the highest level.

Policy bodies
62) Establish an overall national transport planning body, charged with developing a national transport plan, to be agreed at COAG level considering issues pertaining to federal, state and local government.
Data
63) Establish means and resources to collect essential transport and supply chain data, including time series impact analysis. This would include location and commodity specific information, for basic planning requirements at local and regional level. The current security debate may assist the drive for necessary data collection. There is potential for legislation to require collection, provision and publication of data as per the Inter-State Commission Legislation in the United States.

System wide assessment
64) Promote use of system wide assessments for investment in the freight networks, such as the ARTC 2001 National Audit.

Freight and passenger
Most transport planning, particularly for urban transport, concentrates on people movement, reflecting high levels of personal mobility, and community and political priorities. This has tended to result in systems which are mostly designed and geared for passenger movement and which may not be ideal for freight requirements. In the past three decades or more, strategic planning for transport has recognised the special needs of freight transport, incorporating such features as land use planning for terminals, and recognising special problems such as access to seaports and airports. Nevertheless there is a contention that urban planning is still playing lip service to freight planning.

65) Increase the consideration of freight in transport system planning. For instance, the initial determination of freight routes at the planning stages will lead to more appropriate land use decisions.

4.3.11 Incorporate transport in land use and spatial policy (Attack points 2 and 3)
66) The early identification and preservation of rights of way for transport corridors and terminals, including urban connections and bypasses.
67) Evaluate and promote freight clusters.
68) Identify road and rail transport links to comprise the essential national freight network. Aim for self-driving system, with funding linked to land use and designed to focus priority. The network should include inter capital routes through urban centres to major freight hubs, sources, destinations and regional links.

4.3.12 Decouple freight and economic growth (Attack point 4)
Transport activity has grown faster than overall economic growth. Improved transport capability and efficiency levels have been both a driver of economic growth, but also a facilitator of that growth. Freight forecasts have often adopted forecasts of economic growth as their base as freight growth was said to be “coupled” to economic growth.
In the last decade, the economies of western industrialised countries have become increasingly dominated by service industries. This contrasts with earlier periods where agricultural, and later industrial, manufacturing dominated. Service industries are much less freight intensive than other areas of economic activity, and also generate freight which is less dense.

These changes in economic activity and the resultant changes in the freight task are considered by some commentators to show “de-coupling” of freight growth from economic growth. While the changes in freighting patterns and activities have probably occurred as an unexpected accompaniment to changes in economic growth and structures, suggestions have been advanced that this pattern could be addressed in a more deliberate way to achieve reductions in growth of the freight task.

69) Undertake broad community issue awareness program on balancing development and amenity.
70) Consider how approaches which changed attitudes in domestic water consumption could be applied to the general consumption of goods.
5. **Assessment of initiatives**

A two stage assessment process has been used to define the recommended measures for implementation. The first stage involved ranking each measure on the following attributes:

- Costs of implementation.
- The extent to which there was a perceived role for governments in the measure concerned, and whether or not there was an obvious existing government body which would logically undertake the action or function.
- Impact and effectiveness of the measures was deemed to be the extent to which the measure, if implemented successfully, would achieve the objectives of “Twice the Task” – coping with the forecast doubling of Australia’s land freight transport task.
- Achievability or the ease of implementation and overcoming impediments to make the necessary changes?
- The time it would take to deliver benefits from the measures.

In the absence of a major study budget and data to undertake a quantitative analysis we resorted to using a Delphi approach based on our interviews, workshops, overseas studies, desk research and experience. To assist in that process we opted for a simple three point scale ranking of each measure, as described in Table 1.
Table 1 Initial assessment criteria and scale

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Ranking 1 (low attractiveness)</th>
<th>Ranking 2 (medium attractiveness)</th>
<th>Ranking 3 (high attractiveness)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>Very high (&gt; $10 m)</td>
<td>Moderate ($0.5 - $10 m)</td>
<td>Low (&lt; $0.5)</td>
</tr>
<tr>
<td>Government role</td>
<td>Doubtful whether really a government role – more suited to private sector or market forces; no obvious body with existing charter to tackle or progress</td>
<td>Could be a government role, or possibly partnership; a suitable organisation may exist, but responsibilities would require modification</td>
<td>Clearly a government role; suitable body exists which could tackle</td>
</tr>
<tr>
<td>Impact and effectiveness</td>
<td>Very limited or negligible impact likely</td>
<td>Some impact likely</td>
<td>Likely to be relatively effective</td>
</tr>
<tr>
<td>Achievability</td>
<td>Hard to achieve – very difficult due to likely opposition or structural impediments etc</td>
<td>Probably achievable, but likely some difficulties or opposition</td>
<td>Achievable</td>
</tr>
<tr>
<td>Time</td>
<td>Long lead time to obtain effect – may take 20 years</td>
<td>Moderate lead time – impact within 7 years</td>
<td>Relatively quick impact – within 2 – 3 years</td>
</tr>
</tbody>
</table>

Source: Study team

Table 2 shows the initial assessment and rankings of the 70 measures. Measures in bold and highlighted in yellow are suggested for further assessment and these are discussed further in the next section.
## Table 2: Initial measure assessment

<table>
<thead>
<tr>
<th>Clusters and Measures</th>
<th>Cost</th>
<th>Gov role</th>
<th>Impact</th>
<th>Achievability</th>
<th>Time</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve transport safety (Attack point 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Measure: Define and assess measures which could improve transport industry occupational health and safety performance for drivers.</td>
<td>2</td>
<td>2.5</td>
<td>1</td>
<td>1.5</td>
<td>2</td>
<td>Appears issues not well understood - obvious room for improvement, particularly for fatigue Further assessment</td>
</tr>
<tr>
<td>2. Measure: Improve road design and management to better suit trucks and road capacity. (This could include approaches such as signal sequencing, speed cameras)</td>
<td>1</td>
<td>3</td>
<td>2.5</td>
<td>1.5</td>
<td>1</td>
<td>Incorporated under Measure 96</td>
</tr>
<tr>
<td>3. Measure: Implement measures to achieve the same safety expectations and performance from road providers and transport operators as occur with rail operators and track providers.</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1.5</td>
<td>2</td>
<td>Risk profile issues are different</td>
</tr>
<tr>
<td>4. Measure: Assess return on investment from new infrastructure in terms of safety benefits.</td>
<td>3</td>
<td>2.5</td>
<td>1.5</td>
<td>2</td>
<td>1</td>
<td>Happening now</td>
</tr>
<tr>
<td>5. Measure: Encourage marking hazardous goods routes on road, to aid compliance and enforcement.</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>More urban clutter, many organisations involved</td>
</tr>
<tr>
<td>6. Measure: Evaluate if justified promote annual inspections of all freight vehicles on safety grounds.</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>1.5</td>
<td>3</td>
<td>Been done and generally concluded not cost effective</td>
</tr>
<tr>
<td>Improve vehicle environmental performance (Attack point 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Measure: Develop programs to retire poorer performing older trucks.</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1.5</td>
<td>2</td>
<td>New vehicles do most of the task</td>
</tr>
<tr>
<td>8. Measure: Undertake research to define and measure exhaust brake noise, to permit legislative definition and enforcement.</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>Minor issues in total picture and happening now</td>
</tr>
<tr>
<td>9. Measure: Evaluate and if justified promote annual inspections of all freight vehicles for environmental performance standards.</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>Already examined and generally concluded worthwhile cost effectiveness</td>
</tr>
<tr>
<td>10. Measure: Evaluate and if beneficial, promote regulations requiring &quot;hush kits&quot; on trucks operating in urban areas at night.</td>
<td>2</td>
<td>3</td>
<td>1.5</td>
<td>2</td>
<td>1.5</td>
<td>Increasing concern with urban consolidation, but more local government issue</td>
</tr>
<tr>
<td>Infrastructure to improve environmental performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Measure: Define and support traffic management measures to improve traffic flow.</td>
<td>2</td>
<td>3</td>
<td>1.5</td>
<td>2</td>
<td>1.5</td>
<td>Incorporated under Measure 96</td>
</tr>
<tr>
<td>12. Measure: Support investment in urban rail infrastructure to increase capacity and improve noise performance.</td>
<td>1</td>
<td>2.5</td>
<td>2</td>
<td>1.5</td>
<td>1.5</td>
<td>Urban rail is struggling to cope with freight, but many organisations actively involved Happening already</td>
</tr>
<tr>
<td>Research public attitude triggers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Measure: Undertake research to determine what aspects of trucks are particularly disliked, and assess how/if measures could be put in place to affect change in these, without compromising freight task performance efficiency.</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1.5</td>
<td>2</td>
<td>Austroads has similar project underway Research is easy, but then what?</td>
</tr>
<tr>
<td>Optimize use of transport modes (Attack points 1 and 2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rail encouragement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Measure: Align rail regulations across all track jurisdictions and owners, aiming for a single regulator. Standards for communication and signalling may have significant opportunities.</td>
<td>2</td>
<td>2.5</td>
<td>2.5</td>
<td>2</td>
<td>2.5</td>
<td>Logical extension to NTC responsibility - potentially some impact Further assessment</td>
</tr>
<tr>
<td>15. Measure: Assess benefits from freight only rail infrastructure in urban areas and promote such investment where justified.</td>
<td>3</td>
<td>2.5</td>
<td>2.5</td>
<td>1.5</td>
<td>3</td>
<td>Happening now. Many organisations involved</td>
</tr>
<tr>
<td>16. Measure: Evaluate rail for longer journeys for waste to disposal sites.</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>Already being done - small issue in total picture</td>
</tr>
<tr>
<td>Clusters and Measures</td>
<td>Cost</td>
<td>Govt role</td>
<td>Impact</td>
<td>Achiev- ability</td>
<td>Time</td>
<td>Recommendation</td>
</tr>
<tr>
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</tr>
<tr>
<td>Measure: Assess whether we want a robust rail system. If so, review rail track conditions nationwide, in light of clearly stated concerns about major deterioration in WA, SA, Vic and NSW interstate networks. Assess need and justification for government investment in track.</td>
<td>2</td>
<td>2.5</td>
<td>2.5</td>
<td>2</td>
<td>2</td>
<td>ARRC evidence from interstate track audit impressive</td>
</tr>
<tr>
<td>Measure: Improve information on freight flows and modal decision making to assist state policy makers develop policy which will achieve rail mode share growth.</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1.5</td>
<td>2.5</td>
<td>Already being examined, but tough question.</td>
</tr>
<tr>
<td>Measure: Assess flagfall aspect of rail access charging which makes smaller lightweight trains uneconomic.</td>
<td>3</td>
<td>1</td>
<td>1.5</td>
<td>2</td>
<td></td>
<td>Consider lower priority</td>
</tr>
<tr>
<td>Measure: Work towards achieving a consistent pricing model across road and rail.</td>
<td>2</td>
<td>2.5</td>
<td>1.5</td>
<td>1.5</td>
<td>2</td>
<td>Consistent views that road model works better. AusRAIL aims to standardise assessment processes. Impact may be limited.</td>
</tr>
<tr>
<td>Measure: Establish circumstances in which intermodal terminals are successful.</td>
<td>3</td>
<td>2</td>
<td>1.5</td>
<td>2.5</td>
<td>2.5</td>
<td>Regional terminals have had mixed fortunes; some feasibility assessments have failed to meet hurdle requirements.</td>
</tr>
<tr>
<td>Measure: Define and promote more productive vehicle access arrangements for shorthaul road trips to railheads.</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>Incorporate under Measure 30</td>
</tr>
<tr>
<td>Enhance vehicle capacity and productivity (Attach points 1 and 2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance based Standards for vehicles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Actively progress implementation of enhanced Performance Based Standards and innovative vehicle design approaches. Aim for a single point for approval, with mutal recognition if necessary. Consider research fund to support development. Needs to consider intellectual property issues - rapidity of replication. Include both the technical issues relating to assessment of vehicle design, but also the social issues of ensuring broad community support for the initiative.</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td></td>
<td>Significant potential. Aim for standardisation and consistency</td>
</tr>
<tr>
<td>Regulatory impact statements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Promote adequate assessment of productivity implications in regulatory impact statements.</td>
<td>2.5</td>
<td>2.5</td>
<td>1</td>
<td>1.5</td>
<td>2</td>
<td>Already under consideration. Part of PBS type assessment. Total impact likely small.</td>
</tr>
<tr>
<td>Measure: Promote specific permit conditions to improve system capacity and or increase vehicle utilisation, such as specific time of day/ day of week and specific routes. Use Intelligent Access Programs to monitor operations.</td>
<td>2</td>
<td>2.5</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>Logical tool for mass distance charging. PBS criteria may be relevant.</td>
</tr>
<tr>
<td>Road - road terminals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Evaluate benefits from road - road terminals for transfer of goods from smaller to larger vehicles for part journey.</td>
<td>3</td>
<td>2</td>
<td>1.5</td>
<td>2</td>
<td>1.5</td>
<td>Incorporate under Measure 22</td>
</tr>
<tr>
<td>Clusters and Measures</td>
<td>Cost</td>
<td>Gev</td>
<td>Impact</td>
<td>Achievability</td>
<td>Time</td>
<td>Recommendation</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------------</td>
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<td>----------------------------------------</td>
</tr>
<tr>
<td><strong>Truck mass limits and Infrastructure design</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28 Measure: Work towards consistent higher mass limits for trucks throughout Australia, particularly on interstate highways, major urban freeways and arterials with connections to freight hubs and distribution terminal areas.</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>Likely significant productivity impact. Maintain longstanding trends. Further assessment</td>
</tr>
<tr>
<td>29 Improve road design and management to better suit trucks and road capacity. (This could include pavement and bridge strength, signal sequencing and speed camera placement).</td>
<td>1</td>
<td>2.5</td>
<td>2</td>
<td>1.5</td>
<td>1</td>
<td>Long term change. Many organisations involved. Very high cost implementation, but fundamental to support larger more productive vehicles. Further assessment</td>
</tr>
<tr>
<td><strong>Improve use of existing infrastructure (Attacks points 1 and 2)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infrastructure pricing mechanisms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 Measure: Implement direct user charging by infrastructure provider, including optional charging for higher limits where infrastructure can support. Aim to remove standard mass limits.</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2.5</td>
<td>2</td>
<td>Key measure worldwide. Further assessment</td>
</tr>
<tr>
<td>31 Measure: Determine true costs of road damage from larger/heavier vehicles as a basis for charging operators, and compensating those who bear the costs (particularly local and state governments).</td>
<td>2</td>
<td>3</td>
<td>1.5</td>
<td>2</td>
<td>1.5</td>
<td>Incorporate into Measure 30 above. Research findings will emerge anyway. Could become part of national transport planning body (see Measure 61) work program.</td>
</tr>
<tr>
<td>32 Measure: Review effects of congestion pricing mechanisms eg London access charge, parking levies etc., to determine likely effectiveness and applicability.</td>
<td>2</td>
<td>2</td>
<td>1.5</td>
<td>1.5</td>
<td>2</td>
<td>Research findings will emerge anyway. Could become part of national transport planning body (see Measure 61) work program. Coordination is daunting.</td>
</tr>
<tr>
<td>33 Measure: Extend heavy vehicle charging approaches to light vehicles, to remove existing difficulties with highest heavy vehicles.</td>
<td>3</td>
<td>3</td>
<td>1.5</td>
<td>1</td>
<td>1.5</td>
<td>Could become part of national transport planning body (see Measure 61) work program. Coordination is daunting.</td>
</tr>
<tr>
<td><strong>Operational targets and charges</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34 Measure: Identify specific utilisation targets with penalties for non compliance, at individual operator level, such as two-way loading to/from ports.</td>
<td>2</td>
<td>2</td>
<td>1.5</td>
<td>2</td>
<td>2</td>
<td>Mostly private sector operational issue</td>
</tr>
<tr>
<td>35 Measure: Evaluate and encourage appropriate train strategic operating protocols (eg size, number of destinations etc for ports trains).</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1.5</td>
<td>2</td>
<td>Mostly private sector operational issue</td>
</tr>
<tr>
<td>36 Measure: Promote/evaluate infrastructure use charges for terminal/port access pricing (eg NSW $100/TEU for direct stevedore delivery/pickup)</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1.5</td>
<td>0</td>
<td>Mostly private sector operational issue</td>
</tr>
<tr>
<td>Harmonised concessional vehicle limits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37 Measure: Define and promote standards for over standard limit operations of heavy vehicles where benefits exceed costs.</td>
<td>0</td>
<td>2.5</td>
<td>1.5</td>
<td>2</td>
<td>2</td>
<td>Consider under PBS and IAP programs. Many organisations involved, and many regional issues. May have limited impact.</td>
</tr>
<tr>
<td><strong>Passenger, light vehicles and freight</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38 Measure: Assess real contribution of freight to congestion. Aim for optimal prioritisation of freight and passenger needs. This will assist stimulate awareness about use of road systems by private cars and assessing the extent of congestion caused by light vehicles, and opportunities from public transport, car pooling etc.</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>Implementation of effective approaches challenging, but potentially very important. Further assessment</td>
</tr>
<tr>
<td>39 Measure: Assess benefits of freight only routes, truck use of bus lanes etc against measure to better manage light vehicles to leverage freight capacity.</td>
<td>2.5</td>
<td>3</td>
<td>2</td>
<td>1.5</td>
<td>2.5</td>
<td>Mostly regional jurisdiction for implementation</td>
</tr>
<tr>
<td>Clusters and Measures</td>
<td>Cost</td>
<td>Gvt</td>
<td>Role</td>
<td>Impact</td>
<td>Achievability</td>
<td>Time</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------</td>
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<td>------</td>
</tr>
<tr>
<td>Better management of road maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40 Measure: Review design standards for road, rail and possibly other infrastructure to ensure alignment with likely demand within service life and to ensure best longer term trade-off between construction and maintenance. Evaluate benefits from reduced disruption from maintenance activities, through higher initial construction standards.</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1.5</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Technology opportunities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41 Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41 Measure: Investigate &quot;electronic towbar&quot; enabling radio linking of several vehicles from actions of single driver in lead vehicle, to reduce headway.</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>42 Measure: Use communication technologies to improve vehicle utilisation, reduce empty running etc among owner drivers and operators of very small fleets.</td>
<td>2</td>
<td>1.5</td>
<td>2</td>
<td>2</td>
<td></td>
<td>2.5</td>
</tr>
<tr>
<td>Rail</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43 Measure: Assess/promote more responsive signalling systems to enable shorter headways and better driver communication. Link with GPS for exact train location.</td>
<td>1.5</td>
<td>2</td>
<td>2.5</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>44 Measure: Market control structures to balance greater market power of larger operators who can vertically integrate effectively, and ensure benefits from competitiveness of smaller operators is not lost.</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td></td>
<td>2.5</td>
</tr>
<tr>
<td>45 Measure: Review applicability of national competition/ACCC policies to supply chain collaboration processes.</td>
<td>3</td>
<td>3</td>
<td>2.5</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>46 Measure: Review opportunities from competition, market regulatory or other relevant policies to achieve sustainable, economically efficient rail market structure.</td>
<td>3</td>
<td>3</td>
<td>2.5</td>
<td>1.5</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>47 Measure: Investigate efficient methods to internalise existing external costs.</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1.5</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td>Improve supply chain collaboration (Attack points 1 and 3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48 Measure: Examine costs and benefits from international standardisation for domestic materials handling equipment such as containers, pallets and carts etc. If justified, establish programs to encourage or require change.</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1.5</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>49 Measure: Pressure case studies to better understand supply chain business drivers, based on analysis and evidence rather than anecdote.</td>
<td>2</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td></td>
<td>2.5</td>
</tr>
<tr>
<td>50 Measure: Promotion of industry collaboration to reduce bottlenecks eg out of hours warehouse access.</td>
<td>3</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Secure a skilled labour force (Attack points 1, 2 and 3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51 Measure: Encourage use of existing exemptions for heavy vehicle progressive licensing and minimum age requirements, to reduce licensing difficulties for drivers.</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>52 Measure: Undertake research on driver/operator expectations and rationale for joining and leaving transport companies.</td>
<td>3</td>
<td>2</td>
<td>1.5</td>
<td>1.5</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>53 Measure: Determine what role of government should be in accreditation schemes for drivers and freight operators.</td>
<td>3</td>
<td>3</td>
<td>0.5</td>
<td>1.5</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Clusters and Measures</td>
<td>Cost</td>
<td>Govt role</td>
<td>Impact</td>
<td>Achievability</td>
<td>Time</td>
<td>Recommendation</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------</td>
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<td>---------------</td>
<td>------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>Develop selected new infrastructure (Attack points 2 and 3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Invest in urban rail infrastructure to improve existing bottlenecks and noise performance, facilitating better utilisation. This should include assessing benefits from freight only infrastructure undergrounding rail lines.</td>
<td>1</td>
<td>2</td>
<td>2.5</td>
<td>1.5</td>
<td>1</td>
<td>Evidence of market failure. Rail will not achieve the gains desired without better infrastructure. Further assessment.</td>
</tr>
<tr>
<td>Measure: Determine optimal rail design standards to achieve increased productivity, e.g. increased axle load limits, greater clearance and loading gauges, improved signalling and communication to increase track capacity etc.</td>
<td>3</td>
<td>3</td>
<td>1.5</td>
<td>2</td>
<td>0</td>
<td>Design standards may be limited productivity improvements. Further assessment.</td>
</tr>
<tr>
<td>Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Assess true need and source of demand for interstate highway duplication (cars at peak holiday periods)</td>
<td>3</td>
<td>3</td>
<td>0.5</td>
<td>1.5</td>
<td>3</td>
<td>Already been done</td>
</tr>
<tr>
<td>Measure: Implement road design standards aimed to minimise transport cost, not necessarily minimise cost of road supply. Consider additional capacity for improved truck size, mass and operational practices, including assessment of specific freight use infrastructure, environmental and safety benefits.</td>
<td>2</td>
<td>3</td>
<td>1.5</td>
<td>2</td>
<td>2</td>
<td>Vehicle sizes have been increasing consistently for many years. Further assessment.</td>
</tr>
<tr>
<td>Intermodal terminals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Promote 24 hour operation as a condition for new intermodal terminals</td>
<td>5</td>
<td>1.5</td>
<td>1.5</td>
<td>2</td>
<td>2</td>
<td>Mostly market drivers issue - would do if sufficient demand.</td>
</tr>
<tr>
<td>Investment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Assess mechanisms to encourage private investment in infrastructure, as governments cannot fund required investments from revenue, and are reluctant to borrow.</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1.5</td>
<td>2.5</td>
<td>Concerns about many existing arrangements.</td>
</tr>
<tr>
<td>Measure: Assess effectiveness of road funding model against rail funding model in delivering generally satisfactory outcomes.</td>
<td>3</td>
<td>3</td>
<td>1.5</td>
<td>2</td>
<td>2</td>
<td>Could become part of national transport planning body (see Measure 61) work program.</td>
</tr>
<tr>
<td>Measure: Research impact of present Commonwealth – state funding arrangements, presently seen as an obstacle to implementing pricing reforms.</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>Could become part of national transport planning body (see Measure 61) work program.</td>
</tr>
<tr>
<td>Integrate transport system planning (Attack points 2 and 3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy bodies</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Establish an overall national transport planning body, charged with developing a national transport plan, to be agreed at COAG level considering issues pertaining to federal, state and local government.</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>Consensus that there is a policy vacuum. Further assessment.</td>
</tr>
<tr>
<td>Data</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure 63: Collect essential transport and supply chain data, including time series impact analysis. This would include location and commodity specific information, for basic planning requirements at local and regional level. Security debate may assist drive necessary data collection, for assessing and optimising infrastructure. There is a potential need for legislation to require collection, provision and publication.</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>Lack of basic data consistently raised. Further assessment.</td>
</tr>
<tr>
<td>System wide assessment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Promote use of system wide assessments for investment, such as ARTC 2001 National Audit</td>
<td>3</td>
<td>3</td>
<td>1.5</td>
<td>1.5</td>
<td>2</td>
<td>Useful feedback over such breadth and complexity network; AustLink is tackling.</td>
</tr>
<tr>
<td>Clusters and Measures</td>
<td>Cost</td>
<td>Govt role</td>
<td>Impact</td>
<td>Achievability</td>
<td>Time</td>
<td>Recommendation</td>
</tr>
<tr>
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<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>65 Measure: Increase consideration of freight in transport system planning, which is</td>
<td>3</td>
<td>3</td>
<td>1.5</td>
<td>1.5</td>
<td>3</td>
<td>Freight will not be accommodated better unless needs are planned for, but</td>
</tr>
<tr>
<td>largely passenger dominated. Initial determination of freight routes will lead to</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>implementation challenging</td>
</tr>
<tr>
<td>more appropriate land use decisions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>66 Measure: Actively incorporate transport in land use and spatial policies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>67 Measure: Preservation of right of way for transport corridors and terminals,</td>
<td>2</td>
<td>3</td>
<td>2.5</td>
<td>2.5</td>
<td>2</td>
<td>Key future planning and assessment tool</td>
</tr>
<tr>
<td>including urban connections and bypasses.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>68 Measure: Introduce freight clusters.</td>
<td>3</td>
<td>2</td>
<td>1.5</td>
<td>2</td>
<td>3</td>
<td>Some developing, more potential, but more private sector</td>
</tr>
<tr>
<td>68 Measure 68: Identify road and rail transport links to comprise the essential</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1.5</td>
<td>2</td>
<td>National Highways and AusLink have commenced, but more opportunities,</td>
</tr>
<tr>
<td>national freight network. Aim for self driving system, with funding linked to land</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>particularly in urban areas</td>
</tr>
<tr>
<td>use and design to focus priority. Network should include inter capital, as well as</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>routes through urban centres to major freight hubs, sources, destinations and regional</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>links.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>69 Measure: Decouple freight and economic growth (Attack point 4)</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1.5</td>
<td>1</td>
<td>Very long term goal</td>
</tr>
<tr>
<td>69 Measure: Undertake broad community issue awareness program on balancing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>development and amenity.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70 Measure: Consider how approaches which charged attitudes to water consumption</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1.6</td>
<td>1</td>
<td>Very long term goal - incorporate into Measure 69</td>
</tr>
<tr>
<td>could be applied to general consumption of goods.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Study team
6. **Assessment of preferred measures**

This section presents an assessment of each of the initiatives identified in the previous section according to likely impact or effectiveness in better managing freight growth in various locations and under various circumstances. The details of processes are provided at Appendix E.

The assessment for each measure encompasses consideration of the following points:

- Objective and rationale – why would the measure improve freight transport and in what manner?
- How would the measure be implemented? What actions and agreements would be required, and by whom?
- What is the potential effectiveness of the measure?
- Are there downsides or other potential consequences of its implementation/adoption?
- What risks can be foreseen, and are there ways to minimise these?
- The effectiveness rating of the introduction of the measure which is defined as the estimated percentage change in the following criteria if the measure achieved full (100%) implementation. The criteria included
  - Productivity of freight transport in the urban area
  - Productivity of freight transport in the rural area
  - Environmental outcomes
  - Safety outcomes

The tool is necessarily imprecise and the technique is based on limited inputs. Accordingly we have provided a fully parametric spreadsheet model where the client may chose to alter any of the parameter values we have chosen to recalibrate the priorities. This is described in the following section and Appendix F.

The results of these assessments are shown at Table 3.

6.1 **Summary: Assessment of recommended measures**

Table 3 shows a summary of the rankings and an overall priority ranking for each of the 20 measures assessed in more detail.
Table 3  Assessment and priorities for recommended measures

<table>
<thead>
<tr>
<th>Clusters and Measures</th>
<th>Effectiveness</th>
<th>Overall priority ranking (H M L)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Productivity</td>
<td>Environment</td>
</tr>
<tr>
<td></td>
<td>Urban</td>
<td>Rural</td>
</tr>
<tr>
<td>Improve transport safety (Attack point 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Define and assess measures which could improve transport industry occupational health and safety performance for drivers.</td>
<td>0.5%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Optimise use of transport modes (Attack points 1 and 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rail encouragement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Align rail regulations across all track jurisdictions and owners, aiming for a single regulator. Standards for communication and signalling may have significant opportunities.</td>
<td>1.0%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Measure: Assess whether we want a robust rail system. If so, review rail track conditions nationwide. In light of clearly stated concerns about major deterioration in WA, SA, Vic and NSW intrastate networks. Assess need and justification for government investment in track.</td>
<td>2.0%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Road rail intermodal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Establish circumstances in which intermodal terminals are successful.</td>
<td>1.0%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Enhance vehicle capacity and productivity (Attack points 1 and 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance Based Standards for vehicles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Actively progress implementation of enhanced Performance Based Standards and innovative vehicle design approaches. Aim for a single point for approval, with mutual recognition if necessary. Consider research fund to support development. Needs to consider intellectual property issues - rapidity of replication. Include both the technical issues relating to assessment of vehicle design, but also the social issues of ensuring broad community support for the initiative.</td>
<td>2.5%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Measure: Promote specific permit conditions to improve system capacity and or increase vehicle utilisation, such as specific time of day / day of week and specific routes. Use Intelligent Access Programs to monitor operations.</td>
<td>1.0%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Truck mass limits and infrastructure design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Work towards consistent higher mass limits for trucks throughout Australia, particularly on interstate highways, major urban freeways and arterials with connections to freight hubs and distribution terminal areas.</td>
<td>1.5%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Measure: Improve road design and management to better suit trucks and road capacity. (This could include pavement and bridge strength, signal sequencing and speed camera placement).</td>
<td>2.0%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Clusters and Measures</td>
<td>Effectiveness</td>
<td>Overall priority ranking (H M L)</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------</td>
<td>---------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td><strong>Clusters and Measures</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve use of existing infrastructure (Attack points 1 and 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infrastructure pricing mechanisms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Implement direct user charging by infrastructure provider, including optional charging for higher limits where infrastructure can support. Aim to remove standard mass limits.</td>
<td>2.0% 2.0% 2.0% 0.5%</td>
<td>H</td>
</tr>
<tr>
<td>Passengers, light vehicles and freight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Assess real contribution of freight to congestion. Aim for optimal prioritisation of freight and passenger needs. This will assist stimulate awareness about use of road systems by private cars and assessing the extent of congestion caused by light vehicles, and opportunities from public transport, car pooling etc.</td>
<td>3.0% negligible 2.0% 1.0%</td>
<td>H</td>
</tr>
<tr>
<td>Enhance use of market structures (Attack points 1 and 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Review applicability of national competition / ACCC policies to supply chain collaboration processes.</td>
<td>1.5% 1.5% 1.0% negligible</td>
<td>M</td>
</tr>
<tr>
<td>Measure: Review opportunities from competition, market regulatory or other relevant policies to achieve sustainable, economically efficient rail market structure.</td>
<td>0.5% 2.0% 0.5% negligible</td>
<td>M</td>
</tr>
<tr>
<td>Secure a skilled labour force (Attack points 1, 2 and 3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Encourage use of existing exemptions for heavy vehicle progressive licensing and minimum age requirements, to reduce licensing difficulties for drivers.</td>
<td>0.5% 1.0% negligible likely negative</td>
<td>M</td>
</tr>
<tr>
<td>Develop selected new infrastructure (Attack points 2 and 3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rail</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Invest in urban rail infrastructure to improve existing bottlenecks and noise performance, facilitating better utilisation. This should include assessing benefits from freight only infrastructure undergrounging rail lines.</td>
<td>1.0% 0.0% 1.0% 1.0%</td>
<td>M</td>
</tr>
<tr>
<td>Measure: Determine optimal rail design standards to achieve increased productivity, eg increased axle load limits, greater clearance and loading gauges, improved signalling and communication to increase track capacity etc.</td>
<td>0.5% 2.0% 1.0% 0.5%</td>
<td>M</td>
</tr>
<tr>
<td>Road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Implement road design standards aimed to minimise transport cost, not necessarily minimise cost of road supply. Consider additional capacity for improved truck size, mass and operational practices, including assessment of specific freight use infrastructure, environmental and safety benefits.</td>
<td>2.0% 2.0% 2.0% negligible</td>
<td>M</td>
</tr>
<tr>
<td>Clusters and Measures</td>
<td>Effectiveness</td>
<td>Overall priority ranking (HML)</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------------</td>
<td>------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Integrate transport system planning (Attack points 2 and 3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy bodies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Establish an overall national transport planning body, charged with developing a national transport plan, to be agreed at COAG level considering issues pertaining to federal, state and local government.</td>
<td>2.0% 1.0% 2.0% 2.0%</td>
<td>H</td>
</tr>
<tr>
<td>Data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure 83: Collect essential transport and supply chain data, including time series impact analysis. This would include location and commodity specific information, for basic planning requirements at local and regional level. Security debate may assist drive necessary data collection, for assessing and optimising infrastructure. There is a potential need for legislation to require collection, provision and publication.</td>
<td>negligible negligible negligible negligible</td>
<td>H</td>
</tr>
<tr>
<td>Freight and passenger</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Increase consideration of freight in transport system planning, which is largely passenger dominated. Initial determination of freight routes will lead to more appropriate land use decisions.</td>
<td>2.0% 0.5% 0.5% negligible</td>
<td>M</td>
</tr>
<tr>
<td>Actively incorporate transport in land use and spatial policies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Preservation of rights of way for transport corridors and terminals, including urban connections and bypasses.</td>
<td>1.0% 1.0% 1.0% 1.0%</td>
<td>H</td>
</tr>
<tr>
<td>Measure 84: Identify road and rail transport links to comprise the essential national freight network. Aim for self driving system, with funding linked to land use and design to focus priority. Network should include inter capital, as well as routes through urban centres to major freight hubs, sources, destinations and regional links.</td>
<td>1.0% 1.0% 1.0% 0.5%</td>
<td>M</td>
</tr>
<tr>
<td>Decouple freight and economic growth (Attack point 4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure: Undertake broad community issue awareness program on balancing development and amenity.</td>
<td>2.0% negligible likely negative negligible</td>
<td>L</td>
</tr>
</tbody>
</table>

Source: Study team
7. Impact and effectiveness of initiatives

This section provides a summary and examples of outputs from an interactive Excel based tool designed to demonstrate the potential effectiveness of various initiatives under consideration, considering the four effectiveness dimensions used above.

7.1 Approach
This tool takes the effectiveness ratings for each assessed measure, considering productivity impact in urban and rural area, and amenity impact, and applies these ratings according to the percentage implemented estimate selected by the user. The data input screens are shown at Appendix G.

The tool enables manipulation of:

- The Percentage Implemented score (0% - 100%) for each measure
- Effectiveness if the measure is fully implemented (100%), on four dimensions:
  - Productivity (Urban)
  - Productivity (Rural)
  - Environment
  - Safety
- This is applied to create a calculated impact score (in percentage terms) for 2020 for the four dimensions.
- It also has an overlap factor, which enables downwards adjustment of impact, if it is considered that multiple measures implemented simultaneously would have less total impact due to overlap or tackling the same issue.
- This is then compared with the position now, which has been set at 100 for each measure, and the anticipated “do nothing” outcome.

The interactive version of the tool enables users to manipulate implementation percentages and overlap factor, and if authorised, effectiveness assessments on the four dimensions.

7.2 Sample outputs
Sample outputs for full (100%) implementation of three sets of recommended measures are shown in Figure 9 – Figure 12.
Figure 9  Safety Performance

![Safety Performance Chart]

- 2005: 100%
- Do Nothing 2020: 75%
- Take Action 2020: 85%

Total Non-bulk freight by mode (Billion Tonne Kilometres)
Figure 10 Productivity Rural
Figure 11 Productivity Urban
Figure 12 Environment

![Graph showing Total Non-bulk freight by mode (Billion Tonne Kilometres) from 2005 to 2020 with options to Do Nothing or Take Action in 2020.]
8. Implementation

For ease of implementation planning, the twenty one recommended measures have been categorised according to the following topic groupings:

- **Strategic planning:**
  - Measure 22 – Determine circumstances for intermodal terminal business success
  - Measure 62 – Establish overall national transport planning body
  - Measure 63 – Facilitate collection of essential transport data
  - Measure 65 – Freight considerations in land use planning
  - Measure 66 – Ensure necessary land reserved for transport corridors
  - Measure 68 – Review freight transport network
  - Measure 69 – Raise community awareness on balancing development and amenity

- **Harnessing market structures to aid competition and productivity**
  - Measure 45 – Seek improvements to national competition policy to better support supply chain collaboration
  - Measure 46 – Review market structures to achieve sustainable, competitive rail services

- **Infrastructure design and management**
  - Measure 29 – Road design standards
  - Measure 55 – Rail design standards
  - Measure 57 – Construct roads to standards which support greater productivity

- **Enhancing road vehicle productivity**
  - Measure 24 – Implement enhanced Performance Based Standards for innovative vehicles
  - Measure 28 – Achieve higher mass limits for road vehicles
  - Measure 26 – Implement Intelligent Access Program for monitoring vehicle use
  - Measure 30 – Implement direct user charging for road use

- **Enhancing rail productivity**
  - Measure 14 – Align rail regulations across track owners and operators
  - Measure 17 – Assess need for rail investment to achieve robustness
  - Measure 54 – Invest in urban rail infrastructure

- **Enhancing driver resources**
  - Measure 1 – Improve driver OH & S
  - Measure 51 – Encourage use of progressive heavy vehicle licensing exemptions
Consideration of these work streams immediately reveals that some areas are further advanced along the typical continuum of:

- Research and plan
- Design and or regulate
- Build.

The questions posed for the consultants in this brief incorporate a strong emphasis on pragmatic and innovative approaches to how the freight task might be handled in the years to come. As should be clear from the approach and activities documented in this report, many rich and some parlous veins of ideas have been considered during the course of the study. The taxonomy of four attack planks seems to have remained valid throughout and the clusters of recommended programs of initiatives have been described and found to be largely intact at the end of the process. Many of the actions or measures contribute to more than one attack point, and assessment and consolidation of measures is discussed at some length. This section now tackles developing a pragmatic means for their implementation.

We have tackled this in two ways.

- **The first** identifies that in any program there is a set of necessary and sufficient preconditions required for its successful implementation. Any one of these preconditions alone will not produce a physical outcome but all are essential for the delivery of practical outcomes, as shown in Figure 13.

  The measures identified fit into one or more of the three stages of implementation. The implementation cannot be achieved by completing only stage one or stage two but requires all three to be completed. This schematic helps to illustrate that investment in data and research is as instrumental as spending on design or building. We need to do all things to achieve effective outcomes.
The Three Stages of Implementation

**STAGE ONE**
Research, data assembly and strategic planning

**STAGE TWO**
Design, regulation, investment and education

**STAGE THREE**
Construction, enforcement, purchase and behaviour change

---

### Research / Plan

1. OHS
51. HV Licensing
22. Intermodal
38. Freight / Passenger
45. Supply Chain
69. Community
62. National Planning
14. Rail Regulation
63. Transport Data
65. Freight in planning
66. Planning

### Design / Regulate

24. PBS
26. IAP
24. Mass Limits
17. Robust rail system
54. Urban rail
55. Rail Design
29. Road Design/Management

### Build

30. Direct user Charging
57. Road design

---

Figure 13  Implementation process
The second way to address the implementation question is to consider the delivery channels and who might be the key players in the delivery. This issue of ownership of the implementation has been an ongoing question during the course of this review. The fact that the NTC sponsored this study meant, in the view of some people, that the issues to be discussed needed to be contained to the NTC’s formal charter. For others, the questions set were necessarily beyond such a constraint, and required a broader canvass to grapple with the full dimensions of the task. We have deliberately kept the focus as wide as possible.

The issues extend beyond the NTC’s responsibilities, beyond those of state and commonwealth governments: it rests with all of these, all industry participants and the wider community. In this section, we attempt to identify the likely firms and organisations who could take responsibility for implementing the priority actions. This is not meant to be a categorical view but more an indication that there exists a broad spectrum of entities and interests that need to be involved in implementation. Indeed, the consultation with the broader transport community that has been a key hallmark of our brief must continue if the program is to move to endorsement and implementation.

The sensible approach to developing a programmatic design for the delivery of these actions is to seek endorsement from industry and governments. The latter process is more easily identifiable; although the tools need to be carefully considered. The consideration of the implementation proposal by the states and commonwealth governments is best handled in the SCOT/ATC forum. It may be a prudent precursor to provide one on one briefings with each jurisdiction and agency to enable feedback and enhance support from constituents. Some adjustments and additions to recommended initiatives may well flow from this process. The key purpose of this process is to improve the set of initiatives as well as seeking to foster ownership of the program for championing to ATC. Local government should be a key constituent in these discussions.

The formative players in industry and the community are varied. They should include strong emphasis on the urban sector as that is where most of the initiatives fall; representatives from suppliers of building materials, retail distribution, extractive industries and fuel distributors on the freight side are important. The inclusion of motoring organisations, public transport and environmental agencies would also provide useful feedback and serve to broaden the canvas and ownership within the community.

The formation of these focus groups could well be a role for individual jurisdictions although some national consistency in their dealings suggests that there is a role for SCOT to coordinate much of the feedback.

Nevertheless the NTC has a definite mandate to effect regulatory improvements that will improve the efficiency and effectiveness of freight transport. The delivery mechanisms and tools are vast and in Figure 14 below we attempt to identify which of these fall within the current portfolio.
responsibility of the NTC. In doing so it must be emphasised the Commission is itself the creature of state and commonwealth governments and the two are necessarily interwoven. However, the schematic below shows the palette available to address most of the implementation issues and those belonging to the NTC are shown in aqua blue, those inaccessible to the NTC as grey, with the balance being those instruments that the NTC might be able to influence.

- Figure 14 Implementation instruments and policy areas

**Instruments for implementing strategies**

With these in mind it is fruitful to examine how these key strategies meld with the current NTC programme. The tableau in Figure 15 presents a matrix of key strategies against:

- The current NTC programs and sub programs of safety environment, efficiency and compliance
- Other known programs and agency responsibilities
- Program gaps or vacuums.
Figure 15  Policy areas, responsibilities and current activities

### NTC Current Activities and the Key Strategies

<table>
<thead>
<tr>
<th>Policy Area</th>
<th>Responsibility/Initiatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decouple freight &amp; economic growth</td>
<td>AusLINK, State initiatives</td>
</tr>
<tr>
<td>Integrate transport system planning</td>
<td>State Planning</td>
</tr>
<tr>
<td>Land use and spatial policy</td>
<td>State initiatives</td>
</tr>
<tr>
<td>Improve infrastructure use</td>
<td>Road Agencies, ATRC, PPPs., Rail Co’s</td>
</tr>
<tr>
<td>Develop selected infrastructure</td>
<td>Customer choices, State policies</td>
</tr>
<tr>
<td>Optimise use of modes</td>
<td>SFCs, HVCC</td>
</tr>
<tr>
<td>Improve supply chain collaboration</td>
<td>State &amp; Fed Env. regulators</td>
</tr>
<tr>
<td>Improve vehicle environmental performance</td>
<td>Road &amp; Rail Co’s, States</td>
</tr>
<tr>
<td>Enhance vehicle capacity &amp; productivity</td>
<td>State initiatives</td>
</tr>
<tr>
<td>Improve transport safety</td>
<td>ALC, CILTA, TAFEs</td>
</tr>
<tr>
<td>Secure skilled labour force</td>
<td>ACCC, ESC, QCA, ERA</td>
</tr>
</tbody>
</table>

**NTC Programs:**

- Safety
- Environment
- Compliance

*Other programs*  

*Potential Policy Gap*
The glaring gap in policy relates to the decoupling of freight and economic development. The ability to grow our economy without concomitant freight growth is challenging. The measures identified would require central planning and or community behaviour shifts well beyond general experience to date. Indeed when the concept of reducing the task was discussed in interviews and at the workshops in the course of this study, there were very few who considered the objective as a pragmatic one. Many simply could not understand how it could even be considered.

There was an observation that freight needs to grow if economic and environmental standards are to increase. Matters such as increases in the quantum of reverse logistics, recycling and smaller scale retail centres serving denser central communities suggest that the impetus for implementing freight reduction programs will have competing socio economic pressures.

The breadth of the agenda presented in these findings requires a coordinated focus and leadership by governments. The ATC has been presented with proposals for the development of a national entity to address many of the broader national transport issues (NTAC). In the absence of such a body, the responsibility falls to either committee structures of ATC – that have been of limited influence and temporal stability over the years – or to an expanded charter of the NTC.
Appendix A  Liquid fuel availability and pricing

A.1 Transport dependency on oil
Liquid hydrocarbon fuels power virtually the entire land freight transport task in Australia, with diesel dominating. Fuel accounts for typically 20 – 30% of the total costs of road freight, around 7 – 10% for rail and less for sea.

Fuel surcharges applied to road freight rates (and to a lesser extent, rail rates) demonstrates their sensitivity to changes in fuel costs. Fuel surcharges in July 2005 were typically an additional 10% to road base rates, and 5% for rail (SKM, 2005).

A.2 Oil
A.2.1 Price trends
Figure 16 shows historic fuel price trends, showing that prices have been highly volatile over time. All the significant increases in fuel prices have resulted primarily from war or political activities. The 1973, 1979 and 1990 oil peaks resulted from conflict in the Middle East, and the fluctuations of the 1980s are generally attributed to attempts to stabilise prices by OPEC. While OPEC’s attempts to stabilise prices did assist to reduce the per barrel cost of fuel, certain members chose to manipulate or ignore their prescribed quotas and subsequently caused fuel shortages and gluts. The price reduction in this period was also assisted by reduced demand in the United States. This resulted from more efficient energy consumption in both homes and vehicles.

Figure 16 Historic fuel prices

- Iranian revolution/Iran Iraq war
- Iraq invades Kuwait
- Yom Kippur War
- OPEC lowers production quotas to stabilise pricing, US become more efficient energy users

Source: Illinois Oil & Gas Association, 14 June 2005
Forecasting future oil pricing patterns is difficult, with prices heavily influenced by factors not easily measured or predicted. The major factors influencing longer term pricing trends include the level of current reserves, new discoveries, cost of extraction and future demand. There are other factors which influence pricing in the shorter term, such as supply difficulties, conflicts affecting production rates, agreements among oil exporting countries and influences from commodity trading activities. These types of factors are even harder to predict.

A.2.2 Oil reserves

There is no commonly accepted view of the level of oil reserves. This stems from poor data accuracy, availability and trust, lack of standard reporting protocols, as well as strategic withholding and distortion of information for a variety of commercial and political reasons. Further, there is no independent body able to regulate the accuracy of information or with the authority to request full disclosure of information.

Views on oil reserves have become polarised into “depletionists” who hold a pessimistic view on the level of oil reserves, and the amount of oil as yet undiscovered; and “anti-depletionists” who hold much more optimistic views. Depletionists tend to be conservationists and environmental groups, which generally hold that global oil production will peak by 2010. Peaking refers to the point when more than half of the available oil supplies have been extracted. Further extraction then becomes increasingly expensive and slow. Depletionists’ views have been treated with some scepticism, as earlier dire predictions have not eventuated, although in recent times their views have received more mainstream acceptance. This polarisation of views has been well explained recently (BTRE, 2005).

Anti-depletionists tend to be government bodies and companies with interests in oil which contend that there is significantly more oil available and that supplies will not peak until some time between 2020 and 2030. Anti-depletionists may have vested interests in maintaining the status quo, as well as influencing beneficial economic conditions.

Figure 17 compares typical conservative depletionist views on remaining reserves with those of the United States Geological Survey (USGS), a prominent anti-depletionist group. The USGS hold that around one quarter of the world’s oil supplies has been consumed. They also believe that advancements in technology and economic theory suggest that price for all commodities (including oil) will decrease over time in real terms. Figure 17 also shows typical depletionist and anti-depletionist views on remaining undiscovered oil reserves. The accuracy of such estimates is extremely difficult to assess.
The peaking of an oil field can be accurately identified only after it has occurred. Table 4 lists those countries whose oil producing capacity is known to have peaked prior to 2000. This leaves Iraq, Saudi Arabia, United Arab Emirates and Kuwait as the major oil producers which have not yet peaked. All of these countries are members of OPEC and situated in a politically unstable region. These factors have heightened concerns about the scarcity of oil supplies and price fluctuations.

**Table 4 Nations with oil reserves which have peaked pre-2000**

<table>
<thead>
<tr>
<th>Oil Producing Nation</th>
<th>Year of Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>1970</td>
</tr>
<tr>
<td>Libya</td>
<td>1970</td>
</tr>
<tr>
<td>Iran</td>
<td>1974</td>
</tr>
<tr>
<td>Romania</td>
<td>1976</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1977</td>
</tr>
<tr>
<td>Trinidad</td>
<td>1977</td>
</tr>
<tr>
<td>Brunei</td>
<td>1979</td>
</tr>
<tr>
<td>Peru</td>
<td>1982</td>
</tr>
<tr>
<td>Cameroon</td>
<td>1985</td>
</tr>
<tr>
<td>FSU</td>
<td>1987</td>
</tr>
<tr>
<td>PNG</td>
<td>1993</td>
</tr>
<tr>
<td>Egypt</td>
<td>1993</td>
</tr>
<tr>
<td>Syria</td>
<td>1995</td>
</tr>
<tr>
<td>UK</td>
<td>1995</td>
</tr>
</tbody>
</table>

Source: (Hanson 14 June 2005)
The peaking effect is shown in Figure 18, which illustrates historic and forecast US production trends. While reasonably high production levels were maintained during the US peak, production rates have now diminished consistently. (This comes from Udall & Andrews 1999, accepted as a depletionist view. The original labels from the chart underline the emotional interpretation included in the views presented).

- **Figure 18  U.S. Oil Production 1900 to 2050**

Source: Udall & Andrews 1999

It is widely accepted that oil occurs rarely in nature and when it does develop it is often in concentrated areas. Figure 19 presents a history of giant oil clusters discovered since 1870. It can be seen that despite the recent advancements in geological exploration technology, the number of major finds continue to diminish. Many geologists suggest that the likelihood of further major oil cluster discoveries is extremely remote (Udall & Andrew 1999). It could be concluded that few significant finds remain.
Figure 19 Discovery of major oil fields from 1870 to 1995

Source: Udall & Andrews 1999 (No X scale provided, but each bar appears to represent 5 years)

Figure 20 shows an interpretation of net differences between oil discoveries and demand (Hirsch, Bezdek & Wendling, 2005) with the conclusion being that oil depletion is inevitable in the absence of significant new finds.

Figure 20 Increasing oil demand relative to additions in oil reserves

Source: Hirsch, Bezdek & Wendling, 2005
A.2.3 Demand for oil
The United States Energy Information Administration (EIA) group is the US government’s official energy statistics organisation. The EIA estimates that total oil demand has grown by around eight percent from 2002 to 2005. This demand is predicted to continue to grow strongly into the future, driven predominately by developing countries, where demand is expected to grow by 71% over the next twenty years, driving global demand up by 43%, as shown in Figure 21.

- Figure 21 Oil Demand Outlook 2002-2025

Forecast World Demand
(Million barrels per day)

Source: Study team, based on data sourced from EIA, 14 June 2005

A.2.4 Supply vs demand
Based on estimations of global supply and demand, sourced from USGS and EIA respectively, projections can be made estimating when oil reserves will become insufficient to meet demand. Obviously such projections are reliant on the accuracy of the underlying estimates for supply and demand, which both have considerable uncertainty. As shown in Figure 22 the anti-depletionists estimation of reserves (represented by USGS) suggest that supplies are likely to be exhausted by 2055. If the depletionists Udall & Andrews are correct in their 1999 publication “When will the joy ride end? A petroleum primer” then supplies will not sufficient to sustain demand beyond 2037.
Figure 22  Supply versus demand projections

- Does not make an allowance for the amount of fuel consumed between 1999 (date of fuel estimation) and January 2002 (commencement of demand estimate) so this estimation is optimistic.
- Assumes that future extraction and refinery rates will be able to match demand.
- Demand forecast extended past 2025 using a linear demand growth trend line.

Source: Study team

A.2.5 Oil pricing

Oil price is determined on a market basis, and typical prevailing prices occur where sellers’ price demands meet buyers’ preparedness to pay. However, it must be said that many other factors can influence global oil prices, including artificial trading positions established by major operators in the market, as well as politically motivated actions influencing supply and preparedness to either pay or accept a given pricing level.

A variety of publications including “Oil in troubled waters” featured in the Economist, 28 April 2005, contend that oil price escalation in 2004-05 had been caused by short term supply issues, the position of the investor market, and political/civil unrest. It was felt that these factors would not persist in the long run and that prices would decline, with prices as low as $35USD per barrel by the end of 2005 being suggested. Such a reduction now seems unlikely given persistent supply issues, political instabilities and the rapid growth in demand.
There are two main views about longer term pricing, which stem from the differing views of depletionists and anti-depletionists on reserves and future discoveries. Depletionists contend that the current price escalation will continue, but at a reduced rate. They believe that price escalation will slow until a point where half of the world’s oil has been extracted, after which prices will rise dramatically. Once half the oil has been extracted an oil fields is said to “stall”, meaning that the rate at which oil can be removed becomes slower and more costly.

The major points of contention between depletionists and anti-depletionists in terms of future oil pricing are when the peak will occur, and how prices will react to them. Depletionists believe that oil production peaking on a global basis will occur suddenly and with little warning, causing fuel prices to increase rapidly. Anti-depletionists suggest that production peaking will have a gradual impact on fuel prices, after a period of steady decline as supply and political stability returns. Figure 23 shows an interpretation of this.

- **Figure 23 Future Annual Average Oil Prices**

Sources: Historic fuel pricing sourced from Illinois Oil & Gas Association, 14 Jun 2005. Present dollars calculated by SKM, and forecasted calculated by SKM based on interpretation of Anti-Depletionists, and Depletionist research)  http://www.ioga.com/Special/crudeoil_hist.htm
A.3  Liquid Natural Gas

A.3.1 Historical supply and demand for LNG

Historically the production levels of Liquid Natural Gas (LNG) have grown to meet demand increases. The trend, as depicted in Figure 24, shows a clear increase in both supply and demand with several periods of stagnated growth. These slower periods appear to be in line with the declining production levels from certain geographical groups. The minor discrepancies in supply and demand suggest that production levels are dictated by anticipated demand. This is a result of the large capital cost involved in establishing extraction and refinery infrastructure.

- Figure 24 Historic global production and consumption levels

![Production Vs Consumption](source)

Source: Study team, drawing from data sourced from EIA, 22 August 2005

A.3.2 Longevity of estimated current reserves

The different reporting agencies have varying views on the actual levels of reserves current available. This is clearly shown in Figure 25. The reason for this discrepancy is that the definition of “proven reserves” is such that only those reserves which can be economically extracted are included. Given that future demand will undoubtedly increase, and the cost of extraction will diminish the level of reserves would grow without any additional discoveries being made. The different reporting groups each have made a judgement as to what they feel to be economically viable reserves, and thus it is difficult to accurately quantify. For the purposes of this investigation the average of all estimations will be used to gauge current supplies. A linear graph has been used...
to project future demand growths, which is based on historic data recorded since 1980. This projection is shown in Figure 26. Under this worst case estimation of how long current reserves will last, there should be sufficient quantities available until 2050, as illustrated in Figure 27.

- **Figure 25 Alternative Views of Current LPG Reserves**

![Bar Chart: Average Remaining Reserves](chart.png)

Source: Study team, drawing on data sourced from EIA, 22 August 2005
**Figure 26** Demand forecast

![Linear Demand Forecast](image1)

Source: Study team

**Figure 27** Longevity of Current Reserves

![Linear Demand Forecast](image2)

Source: Study team
A.3.3 Forecast LPG future supply and demand.
Based on the research undertaken by Laherrere of ASPO Berlin in 2004 the future growth in LNG reserves will outweigh the expected linear increase in demand. This forecast predicts that the former communist Russia and other Eastern European countries would become the world leading supplier of LNG, overtaking northern America. Laherrere also predicts that Africa and Latin America will greatly increase their contribution to world LNG production and become the second and third largest producers respectively. This projection would suggest that LNG supplies should sufficient well into the distant future.

**Figure 28** Anticipated Fuel Production Vs Linear Demand

![Chart showing anticipated fuel consumption](chart)

Source: Study team
A.4 Implications of liquid fuel availability and pricing on predicted doubling of Australia’s freight transport task

The great uncertainties in oil reserves and future consumption trends make definitive conclusions virtually impossible. The polarisation of views in the oil reserve debate also underlines hazards in predicting when major changes might occur. Making predictions about the implications for Australia’s freight transport task with such uncertain foundations is hazardous, even when the speculative nature of the position is clear. However, the position has been taken that this issue is of such fundamental importance to the project that best estimates, acknowledging the great uncertainties, are required. The conclusions of this study are:

- First, the study concludes that major reductions in liquid hydrocarbon fuel availability, and resultant increases in prices are inevitable.

- Reductions in oil derived fuel supply availability are most likely in the time period 2010 – 2025, meaning that global production peaking is likely within that time range. Some commentators suggest peaking may be later than this date range, but evidence seems to be growing in favour of an earlier point of maximum extraction.

- Implications for oil and fuel pricing are even less certain, but the case for greatly increased prices seems much stronger than that for price falls. Simply, limited supply being chased by likely significantly increasing demand suggests this, given the market place trading environment.

- Historic trends show significant volatility in oil pricing, and it is concluded that this unlikely to change. Specific price changes are likely to be sudden, and over quite short time periods, even if underlying longer term trends are more predictable.

- The greatest rate of price increase in likely to be immediately after peaking, when supply begins to diminish, but demand remains high. This would most likely be in the period 2010 – 2025.

- However, significant price increases are probable at the point where rates of extraction cease to increase. This could be a few years earlier than the 2010 – 2025 date range.

- Liquefied Natural Gas (LNG) is currently in use in a small number of truck fleets (generally mixed 20% with diesel) and has real potential to supplement oil based fuels. LNG availability and supply / demand balance issues are subject to the same uncertainties as oil. However, the supply position seems somewhat brighter, with likely availability to at least 2050.

- Fuel makes up about 20% of transport costs in Australia considered across all modes. Transport is estimated at around half of supply chain costs (obviously varying greatly
depending on the nature of the industry concerned). Supply chain costs are generally estimated at around 10% of production manufacturing and industrial processing. So in total, fuel for transport is likely to be roughly 1% of total production and supply chain costs, averaging over all industries, from fuel intensive such as mining and aviation, through to IT and services which use very little transport fuel.

- This study concludes that fuel price changes would need to be measured in orders of magnitude (ie at least 10 fold) to stimulate fundamental changes in the way goods are produced, raw materials sourced and finished goods are distributed.

- In the period under consideration, 2005 – 2020, increases of this size are unlikely, although doubling, tripling or quadrupling, in real terms, seem quite possible.

- The success of alternative fuels in powering significant parts of the freight transport task, and reducing demand for hydrocarbon fuels is likely to be a major influencing factor on the size and rapidity of price increases.

- However, major changes in goods production and distribution patterns in the following time period (say 2020 – 2050), mostly caused by rapid and dramatic fuel price increases, seem much more likely, unless alternative fuels become successful in providing most of the energy required on a sustainable basis. LNG seems the most promising at this point, based on supply resource estimates, availability and current use in diesel engines.
# Appendix B  Stakeholder Consultation List

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organisation</strong></td>
<td><strong>Name</strong></td>
</tr>
<tr>
<td>National Transport Commission</td>
<td></td>
</tr>
<tr>
<td><strong>Executive</strong></td>
<td></td>
</tr>
<tr>
<td>Des Powell, Commissioner</td>
<td></td>
</tr>
<tr>
<td>Erik Finger, Commissioner</td>
<td></td>
</tr>
<tr>
<td>Virginia Hickey, Commissioner</td>
<td></td>
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<tr>
<td>Michael Deegan, Commissioner</td>
<td></td>
</tr>
<tr>
<td>Tony Wilson, CEO</td>
<td></td>
</tr>
<tr>
<td><strong>Staff</strong></td>
<td></td>
</tr>
<tr>
<td>Barry Moore</td>
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<td>Phil Giltinan</td>
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<td>Tim Eaton</td>
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<td>Paul Salter</td>
<td></td>
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<td>Paul Sullivan</td>
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<td><strong>Australian government planning agencies</strong></td>
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<td>John Dudgeon</td>
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<tr>
<td>Bureau of Transport and Regional Economics</td>
<td>Dr Phil Potterton</td>
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<td></td>
<td>David Mitchell</td>
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<td></td>
<td>William Lu</td>
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<td></td>
<td>David Gargett</td>
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<tr>
<td>Department of Transport and Regional Services</td>
<td>Dr Anthony Ockwell</td>
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<td></td>
<td>Peter van Rens</td>
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<td></td>
<td>Michael Mrdak</td>
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<td>Robert Hogan</td>
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<td></td>
<td>Diane Stewart</td>
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<td></td>
<td>Caroline Evans</td>
</tr>
<tr>
<td><strong>State government planning agencies</strong></td>
<td></td>
</tr>
<tr>
<td>NSW Department for Infrastructure Planning and Natural Resources</td>
<td>Liesbert Spanjaard</td>
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<td>Victoria Department of Innovation, Industry &amp; Regional Development</td>
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**SINCLAIR KNIGHT MERZ**
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<td>Queensland University of Technology</td>
<td>Prof Luis Ferreira</td>
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<td>Curtin University</td>
<td>Prof Fred Affleck</td>
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<tr>
<td>University of Melbourne</td>
<td>Dr Russell Thompson</td>
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Appendix C  Forecasts of Australia’s land transport task

This appendix presents the reported research and conclusions on the anticipated growth in the land freight task in Australia and includes an assessment of the areas likely to experience the greatest pressure from the growth. A number of the forecasts available were analysed to assist in determining the structure and geographical implications of an increasing freight task in Australia. The reasonableness of the forecasts in terms of the identified drivers of growth was analysed. In conjunction with research for this study, these key forecasts formed the underlying basis for the report’s discussion of the ramifications for dealing with the freight task over the next two decades.

C.1  Background
At the outset it should be said that the forecasting of freight flows is fraught. Primarily this is because in Australia, data sets are sparse and measurement is difficult because many transport flows occurs on along long ‘thin’ routes, posing measurement problems that are compounded when data are aggregated. Collection of data is neither routine nor at the required level of frequency or detail. Furthermore, an increasing proportion of useful data is held by private interests and is protected under commercial in confidence demands\(^{12}\). The available data sets on freight movements have typically been designed to assist with mode specific planning issues, as follows.

Road agencies have sought to measure and predict the size and distribution of pavement loadings on the network. This in turn allows engineering decisions on pavements and bridge design strengths and the capacity needs of networks. Historically, road authorities have had little interest in the commodities being moved or the detailed origins and destinations of commodity movements. Therefore, the data assembled covers about weights, loads and pavement measures, but not about the products that are moved to, from and through regions.

Rail operators on the other hand have a need to understand commodity flows and locations in order to optimise their services to clients or potential clients. The track owner, similar to the road operator, has network and design motives for data on traffic flows, by tonnes and axle loadings.

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\(^{12}\) The consultants are indebted to the frank discussions they had with industry and this comment is in no way meant to adversely reflect on our consultations for this study. The facts are that, unlike in the USA, privately owned enterprises in this country are not required to disclose trade data and a diminishing number are doing so voluntarily. The consequence is that data that was hitherto published in rail company annual reports or port and airport statistics is no longer available to researchers. This is something we address more formally in the body of this report.
Track owners offering assets on an access basis to others collect train weight and movement data for billing purposes.

Ports also need to know trade flows to meet infrastructure capacity demands of their clients, the stevedores and shipping lines. Commodity data is also essential, both in demarcation of the types of facilities and the potential for growth. With the change in ownership from government monopoly to the commercial private sector, many of data collections are no longer publicly available. Investment decisions are in the domain of private owners and the extent of governments’ legitimate needs to be able to plan are deprecated in the sale to commercially sensitive owners.

The forecasts identified in this study include those prepared by the Bureau of Transport and Regional Economics which is historically recognised as the leading transportation forecasters in Australia. Studies by Apelbaum Consulting Group; Australian Bureau of Agricultural and Resource Economics; the Australian Bureau of Statistics; and Austroads forecasts and forecast methodologies, add to the bank of publicly available data and forecasts some of which have been reviewed in this section. A full listing of the reported research that was accessed is contained in the bibliography at Appendix A.

C.2 Analysis and review of forecasts

In assessing the relative value of each of the data sets and forecasts, original research was used as an industry yard stick. The majority of the players in the industry thought that the strong growth predictions inherent in previous BTRE and DoTARS publications was about right and this was supported by simple hind casting. In this appendix the reported estimates are reviewed, with an analysis of the data, noting the requirement to put some ‘bounding’ on the estimates. While some sensitivity assessments were undertaken on forecasts internally using different assumptions about parameter shifts, a comprehensive formulation of ranges of forecasts was seen as less critical.

During the course of the study two parallel themes developed:

- There was a shift from assuming some cynicism in predictions of the freight task doubling to a realisation that the prediction was about right.
- While simple aggregation within corridor estimates were interesting, detailed bottom up forecasts are essential to justify any high cost investments.

13 The consultants are indebted to the Bureau and staff for the professional and courteous assistance provided during the course of this study. We have wherever possible attempted to properly cite the BTRE’s contributions and of course those from other sources. Any interpretation or errors are ours however.
The presentation of forecasts involves trade-offs between the practical usefulness that disaggregated statistics provide, and the reliability and precision of the statistics themselves. The standard deviations of the estimates quickly swamp the averages and become meaningless. On the other hand, to report forecasts in highly aggregated form is misleading and in the context of designing infrastructure and regulatory responses to the predicted future needs can lead to expensive mistakes. The strong conclusions that have been almost universally reinforced in the field research are those relating to the very strong growth in urban freight and its compounding problem of increasing in the midst of increasing car travel.

Similar growth rates in freight traffic are forecast for the intercapital and long distance routes. However, stakeholders contacted considered the long distance issues as far more tractable than the intra urban tasks. This underpins the importance of a stratification of forecasts between urban shorthaul and long distance traffic. The taxonomy used comprises:

- Intercapital movements:
  - Short haul (eg Adelaide – Melbourne, Sydney – Brisbane)
  - Long haul (eg Eastern states to Perth, Melbourne – Brisbane)
- Regional and intrastate movements
- Metropolitan

### C.3 Best estimates of freight growth forecasts

As noted previously, in this section each of the forecast reports were reviewed and analysed using common techniques. A compilation of the “best” set of forecasts, shown in Table 5 is presented first, derived from BTRE sources. This set encompasses the range of forecasts reviewed in this study. Elements in this table are examined further in this section.

#### Table 5 Estimates of the growth in freight by principal routes and segments

<table>
<thead>
<tr>
<th>Segment</th>
<th>Road</th>
<th>Rail</th>
<th>Sea</th>
<th>Air</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>Total tonne tkms (2000-2020)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.01%</td>
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<tr>
<td>Billion tonne km change 2000-2020</td>
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<td>2.84%</td>
<td>1.91%</td>
<td>2.50%</td>
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</table>

<table>
<thead>
<tr>
<th>Intercapital Movements (short-haul) 2000-2020</th>
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<tbody>
<tr>
<td>Melbourne-Sydney</td>
</tr>
<tr>
<td>% change per annum</td>
</tr>
<tr>
<td>Billion tonne km change 2000-2020</td>
</tr>
<tr>
<td>Sydney-Canberra</td>
</tr>
<tr>
<td>% change per annum</td>
</tr>
<tr>
<td>Billion tonne km change 2000-2020</td>
</tr>
<tr>
<td>Sydney-Brisbane</td>
</tr>
<tr>
<td>% change per annum</td>
</tr>
<tr>
<td>---------------------------------</td>
</tr>
<tr>
<td>Melbourne-Adelaide</td>
</tr>
<tr>
<td>% change per annum</td>
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<tr>
<td>Billion tonne km change</td>
</tr>
<tr>
<td>Sydney-Adelaide</td>
</tr>
<tr>
<td>Billion tonne km change</td>
</tr>
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</table>

| Intercapital Movements (long-haul) 2000-2020 |
|---------------------------------------------|----------------|----------------|---------------|---------------|-----------------|
| Eastern States to Perth                    | 3.04%          | 3.65%          | 5.46%         | n.a           | 3.82%           |
| % change per annum                         | 3.70%          | 4.10%          | -10.87%       | n.a           | 3.76%           |
| Billion tonne km change                   | 2.72           | 7.47           | 3.54          | n.a           | 13.73           |
| Melbourne-Brisbane                        | 3.63           | 2.28           | -0.09         | n.a           | 5.83            |

<p>| Metro short haul (capital cities) 2003-2020 |
|---------------------------------------------|----------------|----------------|---------------|---------------|-----------------|
| Sydney                                      | 2.74%          | -              | -             | -             | 2.74%           |
| % change per annum                         | 2.01%          | -              | -             | -             | 2.01%           |
| Million tonne km change                    | 7.46           | -              | -             | -             | 7.46            |
| Melbourne                                  | 2.52%          | -              | -             | -             | 2.52%           |
| % change per annum                         | 2.98%          | -              | -             | -             | 2.98%           |
| Million tonne km change                    | 6.64           | -              | -             | -             | 6.64            |
| Brisbane                                   | 2.93%          | -              | -             | -             | 2.93%           |
| % change per annum                         | 2.62%          | -              | -             | -             | 2.62%           |
| Million tonne km change                    | 4.56           | -              | -             | -             | 4.56            |
| Adelaide                                    | 2.01%          | -              | -             | -             | 2.01%           |
| % change per annum                         | 2.93%          | -              | -             | -             | 2.93%           |
| Million tonne km change                    | 1.10           | -              | -             | -             | 1.10            |
| Perth                                      | 2.05%          | -              | -             | -             | 2.05%           |
| % change per annum                         | 2.05%          | -              | -             | -             | 2.05%           |
| Million tonne km change                    | 0.16           | -              | -             | -             | 0.16            |
| Hobart                                     | 3.53%          | -              | -             | -             | 3.53%           |
| % change per annum                         | 0.19           | -              | -             | -             | 0.19            |
| Million tonne km change                    | 0.19           | -              | -             | -             | 0.19            |
| Darwin                                     | 2.78%          | -              | -             | -             | 2.78%           |
| % change per annum                         | 2.78%          | -              | -             | -             | 2.78%           |
| Million tonne km change                    | 0.19           | -              | -             | -             | 0.19            |
| Canberra                                   | 3.53%          | -              | -             | -             | 3.53%           |
| % change per annum                         | 0.19           | -              | -             | -             | 0.19            |</p>
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<tr>
<th>Segment</th>
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<th>Rail</th>
<th>Sea</th>
<th>Air</th>
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<td>n.a</td>
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**International**

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**Pipeline**

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<tr>
<td></td>
<td>Million tonne km increase 2000/01 to 2020/21</td>
<td>11.25</td>
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1. Unless otherwise stated all estimates and implied % change per annum are derived from BTRE (forthcoming) Freight Measurement and Modeling: Road Rail Air and Sea
2. BTRE has noted that projections for the individual modes are based on past trends. Particularly in the case of rail, the projections do not take account of potential increase in rail traffic in the future, in response to significant new investment and other planned improvements.
3. These figures represent simple percentage growth figures
5. Meyrick and Associates projections of average growth rates of a number of bulk commodities including grain, coal and iron ore.
Discussions with local, state and federal government agencies reinforced the use of Bureau of Transport and Regional Economics freight forecasts as an indicator of the aggregate level of growth in the freight transport task across Australia. Although there were some concerns regarding the methodology utilised by the BTRE in determining more disaggregated statistics such as urban growth and the contribution in the growth in the freight task by each of the modes or states and territories, the BTRE aggregate figures are utilised in a number of government planning and evaluation processes. This may be due, in some respects, to the fact that there is a dearth of comparative data available and the cost of undertaking data collection studies at a sub-national level is prohibitive. However, all those interviewed were reasonably comfortable regarding the indications of the size of the growth in freight task over the next twenty years.

C.3.1 The total freight task

Figure 29 presents a total snapshot of actual (1960 to date) and predicted (to 2020) total freight movements by mode derived from the BTRE forecasts. In their most recent publication the BTRE has reviewed these forecasts and the following features are important to note.

14 The BTRE provided us with a draft version of their forthcoming publication Freight Measurement and Modelling: Road Rail Air and Sea for this study. Where the discussion below includes BTRE forecasts the figures cited are from this forthcoming publication.
The domestic freight task in 2000 totalled 377.58 billion tonne-kilometres and comprised the following modal shares:

- Road 36%
- Rail (combined private and public rail movements) 35%
- Sea 29%

It is forecast that by 2020, the total domestic freight task will have increased by over 80% (not the doubling often mentioned) to 682.63 billion tonne kilometres. This is an increase of almost 350 billion tonne kilometres of freight task. Road, rail and sea traffics all are forecast to grow in terms of volume of tonne kilometres carried but their shares are predicted to change. The modal shares in 2020 are forecast to be:

- Road 42% (up 6% from 36%)
- Rail 35% (no change in share)
- Sea 23% (down by 6% from 29%)

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15 BTRE (Forthcoming), *Freight Measurement And Modelling: Road Rail Air And Sea*
C.3.2 Other forecasts of total freight task

Another source of forecasts that is held in high regard by the private and public sectors is the Apelbaum and Associates work published annually in the compendium *Australian Transport Facts*. As Figure 30 indicates, the Apelbaum work estimates a higher level of total road tonne kilometres currently being experienced across the Australian domestic land transport network. However, their forecast transport task growth mirrors that forecast by the BTRE.

- **Figure 30 Aggregate Road Freight Task Billion tonne km 2001-2013.**

The general agreement regarding the growth in the aggregate freight task is further highlighted by comparing the BTRE and Apelbaum figures for the aggregate rail and sea freight (see Figure 31 and Figure 32 respectively).
Figure 31 Aggregate rail freight task billion tonne km 2001-2013

Figure 32 Aggregate sea freight task billion tonne km 2001-2013
ABARE forecasts of commodity production

The growth in the freight task estimated by BTRE and other commentators is also supported by secondary sources such as major commodity production forecasts. ABARE’s commodity outlook (see Figure 33) predicts a 3.44% per annum rise in the volume of mine production and a 3.38% per annum increase in farm production between 2002-03 and 2009-10. Other forecasts such as grain tonnages replicate these long-term growth projections. While relating production forecasts to transport movement and logistics arrangement is an inexact science, it is likely that such growth in production will lead to at least a parallel increase in the freight transport required to move product from production point to final consumption destination, be it domestic or overseas.

C.3.3 Interstate freight

It is the interstate task where the opportunities for modal shift from road to rail and or coastal shipping are the most relevant – particularly in the longer haul corridors of Perth-Adelaide and Brisbane-Melbourne where rail already has a significant modal share. The commodities moved along these interstate corridors are varied. However, most is value added product for export, or interstate domestic and industry construction, rather than raw ingredients.

While the demand on the interstate corridors is growing it is really at the hub points where increased freight will be seen as an issue.
A further element of the growing freight task is the movement between capital cities. By analysing this growth we can see not only the pressure put on the total domestic transport system but also which modes are likely to carry a greater or lesser extent of the freight task.

The section below analyses a selection of major interstate freight transport routes to garner the extent and type of growth in the freight task.

**Melbourne – Sydney**
Figure 34 indicates that volumes on the Melbourne Sydney corridor are expected to more than double between 2000-2020, moving from approximately 7.8 to 16.3 billion tonne kilometres (btk) by 2020. Based on past trends, road is predicted to increase its modal share from 85% of the total task to 94%. In the absence of change, the freight task carried by rail is forecast to fall by 100 million tkm over the period. These modal projections do not take account of potential increase in rail traffic in the future, in response to significant new investment and other planned improvements.

16 BTRE (Forthcoming), *Freight Measurement and Modelling: Road Rail Air and Sea*
Sydney – Brisbane

Similarly to the Melbourne-Sydney corridor, the Sydney to Brisbane intercapital corridor (Figure 35) will see strong freight task growth, doubling from almost 5.6 btk to over 12 btk between 2000 and 2020. Again, the road freight task is increasing its modal share over rail on this corridor. The rail freight task is forecast to fall from over 1 billion tonne kilometres to 890 million tonne kilometres in the twenty years forecast. As with Melbourne-Sydney, these modal projections do not take account of potential increase in rail traffic in the future, in response to significant new investment and other planned improvements.

- Figure 35 Sydney to Brisbane Corridor Projections 2000-2020

17 BTRE (Forthcoming), *Freight Measurement and Modelling: Road Rail Air and Sea*
Melbourne – Brisbane

The tonne kilometres moved on the Melbourne-Brisbane corridor is also expected to more than double over the twenty years studied (Figure 36). However, while the shorter corridors discussed above have forecast decreases in rail share, this longer corridor sees rail taking an increased freight task, doubling from a low of 1.85 btk to 4.13 btk in 2020. Coastal shipping, which at the commencement of the study period carried 1 million tonne kilometres of the task, is forecast to lose freight to the other modes and fall to only 100,000 tonne kilometres.

- Figure 36 Melbourne to Brisbane Corridor Projections 2000-2020

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18 BTRE (Forthcoming), *Freight Measurement and Modelling: Road Rail Air and Sea*
Eastern States – Perth
Similarly to the longer east coast route, the north-south corridor between the eastern states and Perth sees modes other than road growing significantly by 2020, as shown in Figure 37. Both sea and rail modes on this corridor are forecast to more than double their freight task, moving from 7.1 to 14.6 btk in the case of rail and 1.87 to 5.41 btk in the case of sea freight. The modal share carried by sea will increase by 6% over the period to 21%, taking 2% from rail and 4% from road.

- Figure 37 Eastern states to Perth corridor projections 2000-2020

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19 BTRE (Forthcoming), *Freight Measurement and Modelling: Road Rail Air and Sea*
C.3.4 Urban freight

The growth of the urban freight task in all capital cities of Australia is strong over the forecast period, as shown in Figure 38. Urban freight growth is related to the economic growth of GSP/GDP, population and prices of freight. Historically the growth of the urban freight task has outstripped GDP and there is estimated to be an income elasticity of 1.24.

**Figure 38 Capital City Road Freight Projections**

The forecasts assume the task is carried entirely by road and while some shifts to rail shuttles in the next two decades are likely, the volumes are likely to be proportionately small. This does not imply that the efforts to streamline and encourage rail to port and other intermodal terminals (IMTs) are futile. On the contrary, the value and nature of port based traffics and the projected growths in international trades impose real challenges for a road based system alone. It is likely that governments and their constituents will put increasing pressure upon shippers to move more of the freight task to rail to increase its share of this task.

Urban freight requires massive movements between thousands of nodes and in all manner of forms. The building and construction industry constitute a large portion of these tasks and small regular deliveries of all inputs, intermediate goods, final consumption goods, and waste are the hallmark of

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20 BTRE (Forthcoming), *Freight Measurement and Modelling: Road Rail Air and Sea*
urban freight requires massive movements between thousands of nodes and in all manner of forms. The building and construction industry constitute a large portion of these tasks and small regular deliveries of all inputs, intermediate goods, final consumption goods, and waste are the hallmark of the urban goods movements that are growing at around 2 – 3.5% per annum.

Darwin is forecast to see the strongest freight growth at almost 3.5% per annum. Sydney, Brisbane, Perth and Canberra are all forecast to experience freight growths of over 2.7% per annum between 2003 and 2020. Melbourne is forecast to grow at 2.5% per annum and Adelaide and Hobart will rise at just over 2% over the forecast period. Growth rate projections tend to disguise the actual physical task. For instance, Sydney and Melbourne already manage a very significant freight task of over 10 million tonne kilometres per annum. Brisbane is growing rapidly from the 2003 base of 5.71 million tonne kilometres. The other capital cities are rising strongly from smaller road freight task bases of 4 million tonne kilometres or less.

Other evidence of the increasing urban freight task can be sourced from the records of the major toll roads in Australia’s capital cities. These records have the advantage of accurate measurement (from direct toll transactions) but the disadvantage that tollway use may not change at the same rate as usage of other roads. Both CityLink in Melbourne and Hills Motorway in Sydney report transactions (toll registrations) rather than vehicle numbers, as these more directly relate to revenue changes, and reflect changes in journey lengths. The traffic increase reported by Melbourne's CityLink for 2004-05 was 4.3%, compared with 4.6% in 2003-04. Hills Motorway in Sydney reported a 3.5% increase in 2004-05, down from 3.8% the previous year.

C.3.5 Other modes

Shipping
The forecasts for coastal shipping along the major routes are outlined in Appendix C.3. However the growth in international freight will also have a significant impact on the growth of the domestic freight task, particularly in urban areas.

Forecasts for the rate of growth in international shipping to and from Australia are dependant on a number of factors including the type of commodity being shipped, international and domestic economic growth and the competitiveness of our major export competitors.

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Containerised freight is currently growing at 5.7%. The Australian task is approximately 4.2 million TEU (M TEU) and is forecast to increase to 11M TEU by 2020\textsuperscript{22}. This represents a strong growth rate of over 6.5% per annum.

Crude oil, as an example of bulk liquid shipping movements, is determined by energy demand and the use of alternative energy sources. Energy demand is growing at 2.3% per annum to 2020 and growth in imports is expected to increase at 1-2%, as higher prices lead to a shift to alternative fuel sources.

Dry bulk products include grain, coal and iron ore. Grain exports are set to grow at 2.4% to 2020 from a 2005 base of 25M tonnes (Mt) to an expected 37 Mt at 2020\textsuperscript{23}. Coal exports are growing strongly from 233 Mt in 2005 to 411 Mt at 2020\textsuperscript{24}. In 2005 the export of iron ore is estimated at 294 Mt. Taking into account known and expected mine and development plans, the volume of exported iron is predicted to grow 10% to 375 Mt. Even at half the predicted rate of increase, the expected level of iron ore exports at 2020 will be 476 Mt.

Airfreight
As Appendix C.3 indicates, the domestic airfreight task is relatively small, with only 0.25 btk of freight carried in the 150 billion total task. This task is expected to increase by 2020 to 0.41 btk. However, this contribution is still less than 1% of the total forecast freight task.

International air freight, however, is expected to see significant growth in the forecast period. International forecasts are strong, with Boeing forecasting at least 6.3% per annum growth for world air freight\textsuperscript{25}.

Pipelines
It is difficult to forecast the use of pipelines to move freight, either as liquid bulk or slurry, across Australia. Data is sparse and current volumes may be swamped by investments in new pipeline systems. Apelbaum Consulting provides the most detailed estimate of current usage of pipeline for movement of liquid and natural gas. The forecasts that appear in Table 5 are derived from this work by maintaining the current growth rate for the forecast period.

\textsuperscript{22} MA projections of AUS container trade overlaid onto 2004 base data
\textsuperscript{23} Grains Research and Development Corporation
\textsuperscript{24} ABARE and Meyrick and Associates research for coal industry
\textsuperscript{25} 2003-2023 World Air Cargo Forecast (base case) from The Boeing Company (2004), The Boeing World Cargo Forecast 2004-05
Appendix D  International experience

D.1 Objective

The objective of this chapter is to review international practices in managing and responding to increased freight tasks, identifying approaches, measures and solutions that may be applicable to Australia. The focus is on initiatives relating to planning, operations, pricing, regulation, infrastructure and technology of freight transport (including transport of services) and the inter-relationships with passenger transport and the broader economic, social, institutional and environmental frameworks within which freight transport has to operate. An assessment is made of the relevance and applicability of these practices, proposals and initiatives to Australia, as well as the potential benefits and likelihood of implementation in Australia.

D.2 Demand

In considering the development and growth of freight transport internationally, it is important to maintain perspective about the significance of freight in the total transport task. As policies and programs are being implemented or proposed in countries and regions of the developed world to try to reduce (or slow down the growth of) freight movements, in the developing world the accent is on growth. More than 22 million multi-purpose CRVs in China will be replaced by similar vehicles or more conventional, perhaps larger, trucks in the next decade (Sperling, Lin & Hamilton 2005), an enormous number compared to around half a million trucks in Australia. On a metropolitan scale, Australian governments espouse the wish to limit the adverse effects of trucks in urban areas, but continue to compete for and invest in activities that will increase the number of truck movements, through, for example, enhancing port infrastructure and facilities and/or competing for major shipbuilding contracts.

Similarly, although many countries advocate policies to shift more freight from road to other modes, greater use of rail is likely to have minimal impact on the total amount of road freight, and in some cases could have a perverse effect of increasing the number of urban truck movements at one end or both ends of an inter-city trip. On the other hand, as for-hire trucking only accounts for about 20% of all urban freight movements (most freight is in service vehicles, garbage trucks, private cars, etc.), the overall impact of increases in commercial freight growth is relatively minor.

While freight volumes are increasing, in Australia and many overseas countries, the increased volume may not result in increased numbers of trucks. Aside from the potential to move some of the increase by other modes of transport (rail, air, pipeline, inland waterway or coastal shipping), changes in logistical practices and truck technology can contribute to limiting increases in the truck fleet, either in absolute numbers or relative to increases in passenger vehicles. In Canada, the
proportion of trucks to cars decreased slightly in 2004 from the proportions the previous year: there are 47 cars in Canada for each small truck (up to 4.5t) and 62 cars for every large truck (Baldwin 2005). Even at major Canada/US border crossings there is an average of 4.5 cars per truck crossing, though at crossings in the industrial corridor, such as Port Huron/Sarnia, there is a truck for every two cars.

The demand for freight transport in other countries is expected to increase faster than general traffic. In Ohio, for example, vehicle million tonnes (VMT) by freight trucks are forecast to increase by 2.3% pa (compared to 2.04% for other traffic), resulting in a 58% increase over 20 years (compared to 48% for general traffic) from 18 million to 30 million VMT per day (Cambridge Systematics 2002). Growth statistics for Minnesota are similar, and it is interesting to note both these states make extensive use of rail and inland waterway transport, including the Great Lakes (Minnesota Department of Transportation 2005).

Against this background, the following are some of the strategies that are being pursued overseas to cope with freight traffic growth and, if possible, manage the demand in such a way that resources are used more efficiently. Is it possible to find research or practice aimed at reducing consumption, regionalising markets, and/or simplifying logistics and reducing the number of movements required to generate, add value to, or deliver a product?

D.3 Pricing

The most obvious initiative to manage freight transport more efficiently, to influence modal shifts, and to provide a source of finance for infrastructure, is pricing. Although the formulation and implementation of the NRTC/NTC’s charging determinations has been a slow process over the life of the organisation, the gradual imposition of a ‘fair’ pricing regime, reflecting the cost of wear and tear of Australia’s roads and encouraging use of more efficient vehicles, is taking place. That much remains to be done in Australia, including charging for externalities, is reflected in many overseas countries (Sinclair Knight Merz et al 2004). Authorities everywhere must be encouraged by the gradual acceptance of the principle that there are more effective mechanisms than blunt fuel and/or vehicle taxes, as evidenced by toll roads, bridges and tunnels, and by New Zealand’s RUC system.

Similar road user charging schemes are being proposed in other countries, such as Sweden and United Kingdom. An electronic toll system for the Czech Republic is expected to commence in 2007; tenders are being received and evaluated during 2005, with a franchise awarded by the end of the year (CTK News 2005).

The most dramatic direct charging schemes are those being applied to heavy vehicles in the Alpine countries of Switzerland (ARE 2005) and Austria (Schwarz-Herda 2005), and the nationwide toll for trucks using the Autobahnen of neighbouring Germany. The charging systems are slightly different, reflecting national priorities and objectives, but are essentially aimed at implementing more effective direct pricing techniques and encouraging traffic to use rail transport where
possible. The German and Austrian schemes could be applied to trucks using the National Highway System in Australia. Although all three systems have been implemented successfully (at reasonable capital and operating costs), a full assessment of their benefits will need to be made in the longer term. For example, some Alpine rail tunnels are still being altered to increase the loading gauge to enable bigger trucks and/or higher trailers to be carried (Modalohr, in Today’s Railways 2005).

All countries contributing to the OECD Environmentally Sustainable Transport Policy Instruments Report (OECD 2001) see pricing as a major policy thrust if transport is to make a contribution to a sustainable future. However, countries differ in the mechanisms they see as acceptable and capable of introduction. Whereas European countries in general see the gradual introduction of direct charges as possible, Canada prefers the traditional fuel pricing and taxation model, noting that several US states have repealed weight-distance taxes in favour of higher registration fees. A differential toll (by time-of-day - $US6 per truck/bus axle in peak hours, $US5 off-peak) instituted in 2001 by the Port Authority of New York & New Jersey (PANYNJ) on all its bridges and tunnels (affecting 125 million vehicle movements per annum), resulted in only 14% of carriers changing their behaviour. Yet this PANYNJ pricing initiative has been described as ‘the largest application of road pricing in the United States’ (Holguin-Veras et al 2005).

D.4 Planning and Operations
Most transport planning, particularly for urban transport, concentrates on people movement, reflecting high levels of personal mobility, and community and political priorities. Whatever the motivation, any improvements to the performance of the transport sector should have overall benefits for freight transport (though there are exceptions, such as limitations on truck use in favour of passenger vehicles). In the past thirty years or so, most strategic planning for transport has recognised the special needs of freight transport, incorporating such features as land use planning for terminals, and recognising special problems such as access to seaports and airports.

The issue of port congestion and its effect on a region’s economy, is one confronted by most countries, eg in January 2005 there were 110 freight trains queued waiting to enter ports on the Russian Pacific coast, 34 of them outside Vladivostok (Bent 2005). This congestion was caused by improvements to the Siberian main rail lines (but not to the sidings in the port complexes), by outdated cargo handling techniques at the Russian ports, and by renewed use of the Trans-Siberian freight routes. The North American Pacific ports experience similar land-side congestion (particularly of rail), their ability to deal with the problem being reflected in the fluctuations in the competitive positions of the major ports of British Columbia, Washington, Oregon and California.

The ‘Gateway’ concept has gained ground in North America, whereby all parties with an interest in solving the problems work together in associations that vary from loose committee structures to formal authorities, to improve throughput of the port and its hinterland, to mitigate congestion and to minimise adverse community impacts (US DoT 2003). The best known infrastructure outcome
of such collaborations is the Alameda Corridor project, which brought together funding from federal, state and port sources (and which charges user fees) to improve rail access to the ports of Los Angeles and Long Beach. However, as is commonly found in similar major road projects, one effect has been to shift the rail congestion from southern metropolitan Los Angeles to the Union Pacific and BNSF rail lines linking the Alameda Corridor with the rail lines to the east. (Unfortunately, completion of the Alameda Corridor freight route coincided with the development of the Metrolink suburban rail service network.) Whatever the problems, the Gateway concept is relevant to Australian ports, building on the informal and promotional bodies that exist in all the State capital cities. The concept has already been adopted by some UK and European local and port authorities (see, for example, Hampshire County Council 2001). The performance of similar partnerships to alleviate airport access problems and tackle metropolitan freight issues more generally can be seen in the Freight Quality Partnership program in the United Kingdom (Slinn 2005).

Giving priority to other modes of transport is found in most national, state or regional transport plans. This has obvious relevance in Australia, with potential for greater use of coastal shipping (including removal of the remaining cabotage limitations) and of rail transport. Most countries have policies which encourage shifts to rail, and some have specific programs, such as the Trans-Alpine intermodal pricing programs outlined above, some of them supported by financial grants, subsidy programs and tax incentives (see, for example, the UK Freight Grants program, in Department for Transport 2004). While these programs may be highlighted by their promoting governments, in practice many of them are relatively minor in the total freight transport picture – funding a new warehouse or rail siding etc. And very often their potential is limited by capacity problems on the rail network itself, with investment required to provide the necessary paths for any new freight trains. Indeed, giving greater priority to freight trains in general might be a more effective way of inducing modal change – priority for passenger trains creates problems for freight moving by rail through some Australian and overseas metropolitan rail networks.

Much of the credit for innovation in trucking and improved performance is due to the logistics industry’s own dynamism and flexibility, constantly seeking to optimise logistics through new applications such as backloading, reverse supply chains, packaging efficiencies, new alliances, third party logistics suppliers, etc. (Bologna, Simons & Cooper 1995; David 1995). Together with the continued search for more efficient loading, routing and scheduling (ESRI 2005), such internal innovation will deliver more benefits than government plans, especially if the latter impose offsetting regulatory constraints.

D.5 Regulation
The big productivity gains made following deregulation of transport around the world are in the past and no longer apply. The regulation that remains responds mainly to technical, safety and
environmental issues, and tends to restrict the potential of the transport industry, though the wider community effects are usually beneficial, eg

- Product regulation - temperature of meat, poultry, fish etc
- Proof of sanitation of equipment – road and rail tankers etc
- Environmental standards – emissions, noise etc
- Safety standards – OH&S, working hours etc
- Route limitations on particular vehicles – B-double routes etc
- Strict controls on speed
- Traffic calming and environmental zones in cities
- Night bans on noisy vehicles
- Other time delivery restrictions (Browne et al 2005)
- Technical standards – size and weight limitations
- Zoning limitations affecting terminal locations

Such regulations are applied universally, varying only in their intensity or extent of application. Some positives have been found, such as the eco-point system for trucks in Austria and Italy, with more fuel-efficient trucks paying lower registration fees (OECD 2001). Regulations that protect sites for terminals (and control adjacent uses to avoid future conflict) and protect transport corridors also have long-term benefits for freight transport.

With the demise of economic regulation, the institutional role is more one of encouraging partnerships to achieve improvements in freight transport – what has been described as creating “an institutional environment that supports the identification and advancement of freight concerns within the transportation development process…” (US DoT 2003). However, to demonstrate more than goodwill, it is helpful if the public sector partner/s can bring sustainable funding programs to the partnership, particularly if pricing reform is also on the agenda. Raising the political profile for freight transport is another useful role for public agencies, through education and public information programs geared to achieving acceptance of the need for, and role of, freight transport in the national economy (UK Freight Logistics Research Program, in Department for Transport 2004).

D.6 Technology and Infrastructure
Some technological innovation is geared to getting better performance from the existing freight transport system or to getting the same performance at lower cost, eg more fuel-efficient trucks, lighter trailers (Roadlite 2003) and application of ITS to the freight transport industry (Moving the Economy 2004; US DoT 1997). One idea that has been advocated from time to time is that of exclusive truckways. The fact that such facilities for trucks are not as common as busways is partly
due to the higher priority being given to passenger transport and the inability of the needs of trucks to be moved up the priority ladder for investment. Truckways were suggested in the South Australian Draft Transport Plan (*DTUP 2003*), replacing lightly used suburban rail rights-of-way, and were investigated for construction in three major cities and six inter-city routes in Florida (*CUTR 2002*). The Florida research notes that prohibiting trucks from some lanes on highways effectively creates a truck lane.

There is also potential for established technologies to take a bigger role in freight transport, eg airships (Prentice 2005), pipelines (Howgego and Roe 1998) and trams (Rijssenbrij 2004). Fuel cells, hybrids and hydrogen are gradually being applied to propulsion systems, with fuel cells now installed in some switching/shunting diesel locomotives in North America.

In general, overseas experience suggests technical innovation can improve the performance of freight transport at the margin, but will not be enough to offset the adverse effects of increased freight traffic, at least in the short-term future.

Maintenance and provision of track dominates debates on planning for the generally deregulated freight transport industry around the world. Even where part of the industry is protected in some way, financing, planning and constructing infrastructure is still a major task for the track owners, usually governments.

Among the routine infrastructure improvement tasks specifically to aid freight transport are strengthening of bridges and road pavements, financing intermodal terminals, rail sidings etc, grade crossing improvements (urban and rural), truck parking facilities, crawler/climbing lanes on hills, and passing loops on rail lines. There is widespread recognition of the need to eliminate bottlenecks in all modes, and an accent on urban and inter-city links for evaluation as complete transport corridors (*OECD 2001*). There is also a clear understanding, not always reflected in investment programs, that maintenance of the existing network is at least as important as new, high-profile (and politically attractive) projects.

Where finance for transport infrastructure is lacking, it is important to recognise the economic, social and environmental costs of not keeping infrastructure up to standard – the present state of many of the world’s rail networks, that have been starved of investment funds, is a vivid example of the catch-up funding and work that are required if rail is to play a bigger role in freight transport.

Before summarising the current position, the OECD’s 2003 report *Delivering the Goods: 21st Century Challenges to Urban Goods Transport* provides some observations relevant to Australia:

- There are often competing priorities in the planning and policy of freight transport. In particular, the competing priority of maintaining and improving the sustainability of cities
“whilst ensuring a goods transport system that sufficiently serves their needs” is a constant struggle.

- Information and data to inform policy and planning is sparse as is lack of awareness and knowledge by the general public of urban goods transport. The consequence of this has been a focus on passenger transport perspectives.
- A lack of integration of supply-chain perspectives which encompass wider geographical considerations than just the urban areas where the facilities are required.
- A growing recognition that collaborative public-private initiatives and broader consultation on freight issues increasing the long-term sustainability of the system
- Facilities that are publicly owned or managed often do not receive the private sector support expected by government.
- Consolidation of deliveries appears to be a growing trend within industry and can provide planners and policy developer with solutions to freight related problems.
- Innovation in freight policy development is a growing trend, particularly in the areas of pricing, timesharing and multiple use of infrastructure

The paper recommends a number of policy platforms as a result of the above which are also relevant to the work of this study. These recommendations include:

- A policy / planning framework set at a national or state level in which lower tiers of government can tailor make local measures.
- The main national objective is defined as “sustainable urban goods transport”

When implementing measures to deal with the new challenges that urban freight transport presents the paper recommends:

- Actively increasing awareness of the importance of urban goods transport.
- A focus on evaluation and data to inform policy development.
- Consolidation of goods delivery to improve the sustainability of the urban transport system as it generates economies of scale and this reduces vehicle trips and reduces the financial and external costs of transport.
- Innovation and technology by encouraged in both the public and private sector.

**D.7 Conclusions**

Reviewing freight transport growth in overseas countries, and the programs and initiatives in place to respond to that growth, confirms that Australia has little to learn: the main drivers are the same,
as are the issues and their possible solutions. Macro-economic factors will dominate the nature and pace of change, such as:

- The shift from manufacturing to services
- Deregulation and greater private sector involvement
- Pull logistics (US DoT 2003)
- Globalisation (and national competitiveness)
- Environmental regulation

The main issues to be confronted are those of congestion and capacity, and the lead in responding to these issues has to come from the freight industry and its users, supported by governments, through:

- Adding new capacity
- Preserving existing facilities and infrastructure (Hensher and Brewer 2001)
- Improving operations (ECMT 2003)

The ‘shopping list’ of options to improve freight transport, particularly in urban areas, is universal, but very general: intermodal and supply chain efficiencies; technology; land use and traffic planning; financial and economic; partnerships; etc. (Moving the Economy 2004).

Overseas efforts to improve the performance of freight transport in general, and road freight in particular are impressive, but the motivation for the new thrusts is partly a reflection of the fact the image and perceptions of road freight are largely negative: the adverse community and environmental impacts are obvious but the benefits are not. Whereas for private cars, the mobility benefits are obvious, but the deleterious effects of continued increases in car ownership and use are long-term and will be left for future generations to resolve, while current policies towards the car are driven more by local and national economic priorities – building, advertising and selling cars being considered to be more important than coping with the problems they create. Similarly while programs to shift freight to rail may have some potential, they are largely a response to the idea that ‘rail is good, trucks are bad’; the benefits of any mode shifts will be marginal, except in particular local situations.

A major role for governments and their agencies is therefore to take a national perspective, and set a clear implementation strategy to manage difficult political and social change (May 2005), such as the Swedish model of ‘acceptance, adjustment, implementation’. There are lots of elements in the freight business that will change at varying speeds and at different times – the role for a national planning body is to ensure clear understanding and to provide oversight, direction and support.
D.8 Urban Freight Transport: Checklist of Tools, Measures & Policy Options

1) Infrastructure modification
   - Bays for delivery – service vehicles
   - Delivery yards for off-street service
   - Improved loading zone placement – delimitation and control
   - Non-vehicular transport of goods and waste
   - Reserved lanes for heavy vehicles
   - Underground delivery facilities

2) Management
   - Centralised delivery schemes
   - Municipal delivery services
   - Package delivery services
   - Private multi-firm delivery services
   - Shop-to-home delivery services
   - Teleshopping

3) Regulatory changes
   - Encourage late night delivery
   - Hours of service modification
   - Loading requirements
   - Off-hour access to pedestrian zones
   - Peripheral break-bulk and transfer stations
   - Policies toward stopped delivery vehicles
   - Secure containers for off-hours delivery
   - Size limits on vehicles in certain areas
   - Special truck routes
   - Specific hours access to bus lanes
   - Truck bans

4) Measures involving taxes or charges
   - Area licences
   - Area mileage charges
5) Vehicle/design changes

- Delivery in small electric flatbeds
- Secure containers for out of hours collection/delivery
- Swap-body systems

Ref: EcoPlan International 1991, Access Project WP2, Paris
Appendix E  Detailed assessment of recommended measures

8.1  Improve transport safety (Attack point 1)

Measure 1: Define and assess measures which could improve transport industry occupational health and safety performance for drivers

Objective and rationale – why would it improve what?

Transport drivers are well recognised as working in less safe environments than most workers, and occupational health and safety industry performance is poorer than for many other industries, reflected in workers’ compensation insurance premiums. Further, opportunities to improve driver health have been the subject of investigation, particularly concerning poor diet, lack of exercise, high smoking rates and back injuries.

There is generally a high turnover and poor industry perception of transport driving as a desirable career, making recruiting and retaining good people difficult.

Improving the OH&S performance of the transport industry could contribute to attracting larger fields of better calibre candidates, and greater retention rates. The high likelihood of employees leaving has been cited as a reason for reluctance to invest in personnel training. Thus, improving OH&S performance could assist in providing the industry with a more experienced and better trained workforce.

How implemented?

Initially, research among drivers and transport business managers and owners could identify key opportunity areas, and potentially both mechanisms and impediments to their application. A research partnership involving industry associations as well as businesses and their employees is suggested.

NTC could engage with transport associations and potentially academic institutions involved with psychology or occupational health to undertake this research. Implementation of the programs recommended to tackle the issues would probably be largely an industry responsibility, with potential for encouragement or requirement through workplace regulation or insurance requirement.

Potential effectiveness?
Programs which aim to change human behaviour, particularly towards ‘safe’ or ‘desirable’ actions are notoriously difficult to implement with demonstrated effectiveness, unless there are enforcement or engineering solutions accompanying them. Such programs also usually take quite a long time for evidence of change. Nevertheless, the obvious need and potential for improvement may make this appealing as a joint government – industry initiative.

**Downsides and other consequences?**

There are no obvious downsides or risks perceived. The transport industry has tight margins, and is likely to resist any actions which reduce employee productive time or cost money.

This measure could be perceived as well outside the NTC’s existing charter, and possibly more properly the realm of industrial regulation or private sector decision making. Further, as the NTC’s traditional activities have been much more focussed on technical and economic analysis, attention to such a ‘human factors’ area could cause comment.

**Conclusion: Effectiveness**

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**Recommendation:** Lower priority, in view of likely negligible impact

**8.2 Improve vehicle environmental performance (Attack point 1)**

No measures suggested for further assessment.

**8.3 Optimise use of transport modes (Attack points 1 and 2)**

**Rail encouragement**

Measure 14: Align rail regulations across all track jurisdictions and owners, aiming for a single regulator. Standards for communication and signalling may have significant opportunities.

**Objective and rationale – why would it improve what?**

The multiplicity of rail regulators and differences between regulations in various states cause unnecessary uncertainty, cost and waste to rail operators and their customers. Similarly, the separate and differing requirements of different track owners and differences between their access regimes also causes unnecessary cost to rail operators and freighters. Different rail organisations
have established different technical standards for basic operational parameters such as axle load limits, communication systems and wagon loading gauge profiles.

Establishment of a single rail regulator would assist in aligning regulations and technical standards, and reduce the number or organisations whose requirements rail operators must meet. Establishing common standards for rail access, communication, loading limits and similar operational factors has significant potential to reduce compliance, access and operational costs and restrictions.

**How implemented?**

NTC has responsibility for rail safety regulation, and extension of this to cover broader technical and operational arrangements would be a logical step. There are several track access models in operation in Australia, but the Australian Rail Track Corporation’s approach and outcomes seems to meet with consistently positive assessment from most in the industry.

NTC could undertake a work program to develop a model set of safety, technical and operational regulations for rail, and champion its adoption by all rail owners and operators, using similar approaches which have largely achieved uniform road regulations around Australia.

Achieving a single access regime for all Australian track will be a difficult task, but recent developments such as ARTC taking over arrangements in NSW show that movement towards uniformity are happening. Links to funding for infrastructure upgrades and new construction is likely to be important in achieving this goal, and NTC could advocate for this approach both on its own behalf and through a national transport planning and policy body.

**Potential effectiveness?**

The multiplicity of regulators, regulations and regimes controlling rail is so commonly raised as an issue that streamlining must have significant potential to improve rail’s contribution, both in rural and urban areas.

**Downsides and other consequences?**

There will be many vested interests which may benefit from aspects of existing arrangements, and achieving change may be difficult. However, rail’s inability to contribute to the transport task to the extent many believe it ought to be able to underlines the real need for improvement.

**Conclusion: Effectiveness**

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<td>1.5%</td>
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<td>Environment:</td>
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SINCLAIR KNIGHT MERZ
Safety: 1%

Recommendation: Very high priority for further attention.

Measure 17: Assess whether we want a robust rail system. If so, review rail track conditions nationwide, in light of clearly stated concerns about major deterioration in WA, SA, Vic and NSW intrastate networks. Assess need and justification for government investment in track.

Objective and rationale – why would it improve what?

Great concern has been expressed throughout consultation undertaken for this project about deteriorating rail track and infrastructure condition in virtually all Australian rail systems, with the only consistent exceptions being ARTC interstate track and much track in Queensland. The poor condition of state rail infrastructure limits rail’s capacity to contribute to carrying the existing freight task, and provides an inadequate foundation for mode share growth.

The ARTC undertook a major network wide condition assessment in 2001 – 02 which has effectively set the agenda for track upgrade and rehabilitation priorities. A similar approach may prove effective for other rail infrastructure.

How implemented?

The NTC does not have a mandate to undertake such a project, as the rail assets concerned are owned and managed by a number of organisations. This includes access arrangements. However, extension of the NTC’s rail safety regulatory charter could include overall planning and investment priority determination. Alternatively, such responsibilities could become part of an overall national strategic planning body for transport, further discussed in Measure 62.

Initial action would need to be directed to agreeing responsibility, as this does not clearly lie with any single organisation at present.

Potential effectiveness?

It appears there is great potential for improvement in rail’s contribution to meeting Australia’s freight transport task, particularly for intrastate short – medium haul trips and rail interfaces in urban areas.

Downsides and other consequences?

It is likely that this will reveal a significant deficit in track and infrastructure condition, and potential exists for ambit claims from various track owners, operators and lessees. Nevertheless, obtaining a clear strategic position of the present infrastructure position and demand for these
resources will provide a firm base for determining priorities. Much of the information required is likely to exist, albeit at varying levels of detail and currency.

**Conclusion: Effectiveness**

Productivity: Urban: 2%
Productivity: Rural: 2%
Environment: 2%
Safety: 1.5%

**Recommendation:** Very high priority for further attention

**Modal neutrality**

No measures are suggested for further assessment.

**Coastal shipping**

No measures are suggested for further assessment.

**Road rail intermodal**

**Measure 22: Research circumstances in which intermodal terminals are successful**

**Objective and rationale – why would it improve what?**

Road rail intermodal terminals have shown varying degrees of financial viability, with some operations failing and investment plans for others failing to achieve required hurdle rates. There is a general feeling that there is a lack of connection between financial viability and desired broader economic outcomes.

**How implemented?**

DoTARS is the most likely organisation to undertake the transport research and investment guidance tasks required. DoTARS is currently managing a project which should provide a better baseline understanding of current intermodal terminals and tasks handled. Research to draw conclusions on general intermodal terminal business viability patterns could follow.

NTC could encourage DoTARS or other organisations to undertake this task, or could do so itself.
Potential effectiveness?

Understanding when rail intermodal terminals are likely to succeed could improve investment decision making and reduce resources devoted on failed projects. It could also assist in identifying possible types or locations for successful terminals which might otherwise be overlooked, increasing rail’s modal share, with attendant environmental, amenity and safety benefits.

Downsides and other consequences?

This work could be viewed as a private investment issue, and not one where governments have a strong mandate for action.

Conclusion: Effectiveness

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<tr>
<td>Safety</td>
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Recommendation: Medium priority, in view of relatively low potential effectiveness and private sector decision making arena

8.4 Enhance vehicle capacity and productivity (Attack points 1 and 2)

Performance Based Standards for vehicles

Measure 24: Actively progress implementation of enhanced Performance Based Standards and innovative vehicle design approaches. This needs to include both the technical issues relating to assessment of vehicle design, but also the social issues of ensuring broad community support for the initiative.

Objective and rationale – why would it improve what?

There is significant evidence that Australia’s history at accommodating past increases in freight task has been facilitated by increases in vehicle capacity. Performance Based Standards (PBS) provides an opportunity to provide increased vehicle capacity without as great an increase in vehicle mass, dimensions, traffic and road impacts as might otherwise be the case. There is also evidence that little vehicle productivity increase is likely without further measures to encourage and support potentially beneficial projects.

Figure 39 shows a diagrammatic representation of the current levels of implementation of innovative vehicle design which PBS could encourage.
There remain some impediments on incentive to innovate, including:

- The highly competitive road transport industry where gains are passed through to shippers
- The likelihood of innovative designs and concepts rapidly being copied by competitors
- Lack of mutual recognition of PBS between jurisdictions, requiring multiple approaches in various jurisdictions
- The high capital costs of research and development.

**How implemented?**

NTC clearly has the necessary regulatory authority and influence to implement this measure, although in the case of vehicle standards, this is tempered through state implementation. NTC needs to progress a situation to achieve a single point to gain approval for vehicle designs, and mutual recognition across all road jurisdictions in Australia.

There is also some evidence that transport companies are reluctant to invest in achieving new innovative PBS vehicle approvals when competitors can match the design concepts quickly and generally at much lower cost. Some form of federally funded research foundation to support development may have great impact in increasing the take-up of new vehicle designs.
A useful and justifiable role for the NTC and governments could be to encourage operators to undertake productivity based research. This encouragement could, in our view, be a legitimate item of contributory funding by government not unlike research grants, export incentive grants and similar high yield research funding. To assume that the industry is able to work at the cutting edge of vehicle research without assistance may be correct, but assistance would accelerate the introduction of improvements and the concomitant benefits to the system as a whole.

There remains some conjecture regarding the level of government who should be responsible for decision making and approval of performance based vehicle standards. Mutual recognition of PBS would be the ideal scenario and lead to a greater uptake of PBS, as outlined in Figure 40. If this is unachievable then the NTC could provide a broker role to industry and between governments to boost recognition across borders.

**Figure 40 Ideal PBS uptake scenario**

Potential effectiveness?

PBS has great potential to increase vehicle capacity and efficiency, reducing the number of vehicle movements for any given task.

**Downsides and other consequences?**

There are no apparent downsides to this measure.

**Conclusion: Effectiveness**

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**Recommendation: Very high priority**
Time and location specific permits with Intelligent Access Programs (IAP)

Measure 26: Promote specific permit conditions to improve system capacity and or increase vehicle utilisation, such as specific time of day / day of week and specific routes. Use Intelligent Access Programs to monitor operations.

Objective and rationale – why would it improve what?

There is ample evidence that significant spare capacity exists on many parts of the road network at night or other times, when permitting larger vehicles to operate would have minimal adverse consequences. However, these same vehicles would pose unacceptable impacts during peak times. Similarly, permits for operation of heavier or larger vehicles in specific locations may be acceptable, but not elsewhere, due to infrastructure strength, congestion or similar reasons.

Intelligent Access Programs enables the tracking of vehicles by location (down to virtually the lane on a road used) and time, providing the tools to ensure operation remains within defined limits.

How implemented?

NTC clearly has the necessary regulatory authority and influence to implement the measure, although in the case of vehicle standards, this is tempered through state implementation. NTC needs to progress a situation to achieve a single point to gain approval for vehicle designs, and commonly accepted standards defining the types of locations, times and circumstances in which higher limits may be allowed, monitored by IAP.

Potential effectiveness?

The circumstances in which IAP monitored permission might be granted are relatively few in the total picture, being limited to larger urban roads at night and certain rural routes which heavier mass limits are beneficial overall (eg a short haul to railhead).

Downsides and other consequences?

There will be a need for a certain degree of monitoring to ensure compliance, and an enforcement framework will need to be established. There is some potential for deliberate or accidental breaches, which could have significant consequences if a very heavy vehicle strays onto infrastructure incapable of bearing the applied load.

Conclusion: Effectiveness

Productivity: Urban: 1%
Productivity: Rural: 0.5%
Recommendation: Medium – high priority, in view of foundation tool for implementing other approaches to increase productivity

**Truck mass limits and infrastructure design**

**Measure 28:** Work towards consistent higher mass limits for trucks throughout Australia, particularly on interstate highways, major urban freeways and arterials with connections to freight hubs and distribution terminal areas.

**Objective and rationale – why would it improve what?**

There is significant evidence that Australia’s history at accommodating past increases in the freight task has been facilitated by increases in vehicle capacity. Performance Based Standards provides an opportunity to increase vehicle capacity without as great an increase in vehicle mass, dimensions, traffic and road impacts as might otherwise be the case. Trucks and trains have benefited from regulatory and technological improvements to allow greater productivity in freight transport. At the same time infrastructure investment has delivered capacity expansion of rail and road on a number of routes.

These two approaches are now showing diminishing returns. The gains in moving the mass limits of a six axle semi trailer by 5 tonnes from 38 tonne to 42.5 tonne will not be able to be repeated at the similar costs as in the 1990s, because the marginal damage to pavements and bridges will be significantly higher if mass limits approached 48 tonnes. There are several approaches which can be considered for this issue:

- Increase the mass limits, but use technology such as air suspensions to minimise the impact on the infrastructure. This is in fact a performance based standard and effectively internalises some of the costs of a productivity gain to the truck owner. This is already largely in place.

- Increase the mass limits (either generally or for those prepared to pay) and charge the user the direct marginal costs of the additional pavement wear. This again effectively internalises the costs of achieving productivity improvements to the user.

- Increase the construction standard of the road system so that additional mass can be accommodated without additional maintenance costs or vehicle mitigation measures. The costs of these increased standards could be recovered through pricing and again the costs are internalised.
The first two approaches assume the quality of supply is fixed and requires the user to develop innovative approaches to minimise damage, and then charge for any damage unable to be avoided. The third approach increases the quality of supply and may reduce the effort required from the user. It is uncommon in a competitive market to find a supplier maintaining design standards over decades yet in many respects that is what is happening with the road supply industry.

When airports are faced with the next generation super airbus or Boeing 800 passenger aircraft, airports are redesigned to cater for the improved productivity aircraft. When ports are faced with deeper and wider ships channels are dredged and larger higher span cranes substituted. Infrastructure operators try to avoid asking operators to find means of adjusting vehicle or ship designs to accommodate infrastructure designed decades earlier.

It is simply difficult to support the retention of static road supply standards in the face of serious growth in road transport. The introduction of new standards takes significant time for rollout and this, combined with “weakest link” arguments about inability to capture gains are usually the basis of arguments for never starting. When we look out twenty years and beyond the concept seems less daunting.

The economics of new and higher road design standards were last established in the 1970s with the National Highway standards and in some marginal improvements in bridge design standards. An independent review of the economics of improving road design standards in the context of 20 year planning horizons would produce very interesting outcomes. The economic comparison of improving road design standards and the long term pursuit of diminishing returns from increased vehicle standards for a nation reliant on trading high density products over long distances would be a worthwhile exercise in our view.

**How implemented?**

NTC clearly has regulatory authority and influence, although in the case of vehicle standards, this is tempered through state implementation. The NTC needs to progress a situation to achieve a single point to gain approval for vehicle designs, and commonly accepted standards defining the types of locations and circumstances in which higher limits may be allowed. IAP provides an ideal monitoring and enforcement tool.

**Potential effectiveness?**

The potential for significant increases in vehicle mass limits are not as great as in the past, as the exponential mass limit – road damage relationship means that further increases have greater road damage consequences. Nevertheless, there remains potential for further gains, which has potential to reduce the number of vehicles required to perform any given task, including urban areas.
Downsides and other consequences?

Larger vehicles are likely to have negative public perception, and will cause greater road damage which must be designed or allowed for in maintenance budgets.

Conclusion: Effectiveness

| Productivity: Urban: | 1.5% |
| Productivity: Rural: | 2% |
| Environment: | 0.5% |
| Safety: | negligible |

Recommendation: High priority, although long lead time for widespread impact

Measure 29: Improve road design and management to better suit trucks and road capacity. (This could include pavement and bridge strength, signal sequencing and speed camera placement).

Objective and rationale – why would it improve what?

Many limits on freight vehicle operation are imposed by infrastructure design standards and by road management priorities set mostly to the needs of light vehicles.

How implemented?

These measures are mostly the responsibility of road owners, although the NTC has vehicle regulatory authority. Nevertheless, achieving greater productivity levels will come from the interaction of road and vehicle standards. NTC could promote greater consistency of standards around Australia, and work towards road authority goals being defined more as minimising the cost of transport, rather than minimising the cost of road provision.

There is also ample evidence that most road management priorities are set to meet light vehicle needs more than the differing requirements of freight vehicles, particularly in terms of traffic signal sequencing.

Potential effectiveness?

These measures could have quite worthwhile impacts, as many aspects of road design and management are set around very different needs of light vehicles.
Downsides and other consequences?

Careful assessment of impacts needs to be done, because if such measures are effective they are likely to reduce road system performance for light vehicles, the largest traffic component. This could have adverse public reaction, but more importantly could reduce total network capacity also.

Conclusion: Effectiveness

Productivity: Urban: 2%
Productivity: Rural: 2%
Environment: 2%
Safety: 0.5%

Recommendation: High priority, in view of likely effectiveness

8.5 Improve use of existing infrastructure (Attack points 1 and 2)

Infrastructure pricing mechanisms

Measure 30: Implement direct user charging by infrastructure provider, including optional charging for higher limits where infrastructure can support. Aim to remove standard mass limits.

Objective and rationale – why would it improve what?

Existing arrangements provide many situations where various types of road user activities are cross subsidised by others, including by location, type of vehicle or nature of operation. In general, they also result in road authorities opposing higher limits, as there is no direct way to compensate them for the greater damage and hence costs they bear.

How implemented?

Increasing standard mass limits is one initial approach. However, replacement of standard limits with graduated charging scales according to damage caused (up to a maximum determined by infrastructure strength) provides a more flexible approach, enabling users to determine the best alternative for their specific operational needs.

What action, by whom?

The concept of mass distance charging has been generally accepted for implementation in the fourth road pricing determination, likely around 2008, and can be accommodated within the existing NTC charter. However, this measure when fully implemented requires a direct payment
from user to infrastructure owner / maintainer, which is quite different from current payment and funding models.

Implementation of this change would occur at a political level, and effective explanation of the benefits, costs, winners and losers would most likely be necessary to carry the day.

**Potential effectiveness?**

There is little doubt that this is potentially one of the most effective approaches that could be made, as it directly enables users to feel the impact of their decision making, and hence should ensure more rational outcomes. Similarly, road providers would be encouraged to establish pricing structures which support enhanced use of infrastructure consistent with payment for damage caused.

**Downsides and other consequences?**

As with all major structural change, there will be winners and losers, and the losers are likely to be more vocal in their expression. This represents major change, and will not be achieved easily.

**Conclusion: Effectiveness**

- Productivity: Urban: 2%
- Productivity: Rural: 2%
- Environment: 2%
- Safety: 0.5%

**Recommendation: Very high priority.**

**Passengers, light vehicles and freight**

Measures 38: Assess real contribution of freight to congestion. Aim for optimal prioritisation of freight and passenger needs. This will assist stimulate awareness about use of road systems by private cars and assessing the extent of congestion caused by light vehicles, and opportunities from public transport, car pooling etc.

**Objective and rationale – why would it improve what?**

Most vehicles on the road are motor cars, and increases in capacity generally stimulate increased car travel. There is also ample evidence that most road management priorities are set to meet light vehicle needs more than the differing requirements of freight vehicles, particularly in terms of traffic signal sequencing.
Reducing car traffic would increase available capacity for freight vehicles.

**How implemented?**

Achieving change in this will require long term attention and quite fundamental changes in the land use and transport infrastructure investment priorities of most state and regional governments. The NTC could attempt to stimulate the debate by demonstrating the contribution of light vehicles to urban congestion, and the relative benefit cost ratios of various methods to provide additional freight vehicle capacity.

**Potential effectiveness?**

These measures could have significant impacts, as most road congestion is caused by light vehicles, on corridors where there are few or no viable travel alternatives.

**Downsides and other consequences?**

Careful assessment of impacts needs to be done, as if effective such measures are likely to reduce road system performance for light vehicles, the greatest traffic component. This could have adverse public reaction, but more importantly could reduce total network capacity also.

**Conclusion: Effectiveness**

Productivity: Urban: 3%
Productivity: Rural: negligible
Environment: 2%
Safety: 1%

**Recommendation: High priority, in view of potential in urban areas.**

### 8.6 Enhance use of market structures (Attack points 1 and 2)

**Measure 45: Review applicability of national competition / ACCC policies to supply chain collaboration processes.**

**Objective and rationale – why would it improve what?**

Many opportunities for efficiency gain in freight arrangements are at the boundaries between modes and where one company hands responsibility over to the next in the supply chain. These are being explored and various approaches to collaboration established. However, many of these are in contravention of Australia’s national competition and or ACCC policies and regulations. While
provisions exist for exemptions in the public interest, these require time and effort to establish and maintain, as they are usually provided for specific terms rather than on an ongoing basis.

It is likely that these legal issues may deter some parties from exploring or implementing arrangements which would improve productivity.

How implemented?

Changes in this area would be a federal government decision, probably agreed at cabinet or political party level. The NTC could stimulate this debate by assembling and publicising evidence demonstrating the outcomes from current arrangements and potential to achieve improvement from change.

Potential effectiveness?

This measure could have significant impact in various local circumstances, with smaller flow on effects generally, and in the total picture.

Downsides and other consequences?

There could be public concern expressed about impact on competition. Impact on competition could be real, and have adverse consequences for both service users and competitors in the market place.

Conclusion: Effectiveness

Productivity: Urban: 1.5%
Productivity: Rural: 1.5%
Environment: 1%
Safety: negligible

Recommendation: Medium priority

Measure 46: Review opportunities from competition, market regulatory or other relevant policies to achieve sustainable, economically efficient rail market structure.

Objective and rationale – why would it improve what?

There is a general consensus among larger rail users that there is little competition in most rail markets, with a dominant player and few alternatives with any real capacity or capability. The dominant players in various locations differ, but three companies dominate most of Australia.
Australia’s national competition policy is generally credited with improving Australia’s domestic and international competitive position.

There is little reason to suggest that a more competitive rail industry would not improve matters.

Changes in this area would be a federal government decision, probably agreed at cabinet or political party level. The NTC could stimulate this debate by assembling and publicising evidence demonstrating the outcomes from current arrangements and potential to achieve improvement from change.

Potential effectiveness?

This measure could have worthwhile impact, particularly in rural areas.

Downsides and other consequences?

There could be public concern expressed about favouritism of certain smaller players in various markets, particularly by the dominant player.

Conclusion: Effectiveness

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Recommendation: Medium priority

8.7 Improve supply chain collaboration (Attack points 1 and 2)

No measures recommended for further investigation.

8.8 Secure a skilled labour force (Attack points 1, 2 and 3)

Measure 51: Encourage use of existing exemptions for heavy vehicle progressive licensing and minimum age requirements, to reduce licensing difficulties for drivers.

Objective and rationale – why would it improve what?

Lack of a suitably skilled and experienced workforce for the road and rail transport industries is of increasing concern to many companies. There have been suggestions that progressive or graduated driver licensing regulations discourages potential drivers from joining or remaining in the industry.

Although there are exemption provisions, they are rarely used.
How implemented?

It is believed that lack of awareness of the provisions and their applicability is the main issue, so a publicity campaign to raise awareness of how the regulations can be applied may be all that is required.

Potential effectiveness?

In certain local circumstances, this could be quite effective, but in larger markets is unlikely to have much effect.

Downsides and other consequences?

Enabling younger drivers behind the wheel of larger vehicles is likely to have safety disadvantages.

Conclusion: Effectiveness

Productivity: Urban: 0.5%
Productivity: Rural: 1%
Environment: negligible
Safety: likely negative

Recommendation: Medium priority. Quick and cheap measure, although of limited impact.

8.9 Develop selected new infrastructure (Attack points 2 and 3)

Rail

Measure 54: Invest in urban rail infrastructure to improve existing bottlenecks and noise performance, facilitating better utilisation. This should include assessing benefits from freight only infrastructure undergrounding rail lines.

This study has clearly identified that the greatest problems from the likely increased freight task will be in urban areas. Urban rail systems are struggling to cope with the demands of increased urban passenger services, and desired paths are generally unavailable for more urban or passenger services around peak hours. Nearly all urban rail systems have curfews or no available paths for freight trains for much of the day, typically 0600 – 1000 and 1500 – 1900.

Rail cannot carry more freight in urban areas without investment in capacity.

Proposals for additional rail services have raised concerns about local amenity impacts, particularly noise.
How implemented?

Rail investment is generally the responsibility of the track owner or leaseholder, which then seek to recover costs incurred by charging access (usage) fees. Governments have supported private leaseholders with rail investments where justified on social, political or other grounds.

The NTC could aim to influence the investment decisions of track owners and leaseholders, and governments, to increase the rail system’s capacity and improve its environmental performance.

What action, by whom?

The NTC would need to demonstrate the benefit cost outcomes of selected investments, with fully monetised externalities wherever possible. Case studies, extrapolated to broader regions, may provide examples more readily grasped by non-technical audiences.

An awareness raising approach would probably be required, possibly through seminars, conference presentations etc, to broadcast the message to relevant audiences.

Research may be required to assess the relative effectiveness of various types of noise attenuation treatments. Rail noise has significant differences to road noise, particularly its greater height above ground level of noise emission and its frequency spectrum.

Potential effectiveness?

Rail has some real opportunities to assist in the urban freight task, particularly for port related freight. Many of the difficulties for longer distance interstate rail freight are in intermediate cities (eg in Sydney on the Melbourne – Brisbane corridor).

Urban opposition to expansion of night rail freight services on the basis of noise is quite likely.

These measures have some real potential to improve rail capacity, reducing growth in road freight in urban areas, and reducing amenity opposition to rail.

Downsides and other consequences?

Rail investment is very expensive, and could reduce funds available for other, more beneficial projects. Some projects could require additional land, which would increase disruption during construction. If noise treatments prove effective, there could be widespread calls for implementation throughout the rail network, which would prove expensive and could also divert funds from other more beneficial projects. Government investment in privately leased rail facilities is already proving difficult to manage on a cost and benefit accounting basis, and this project could exacerbate this.
Conclusion: Effectiveness

Productivity: Urban: 2%
Productivity: Rural: negligible
Environment: 1%
Safety: 2%

Recommendation: High priority, in view of potential benefits to urban productivity, environmental and safety performance

Measure 55: Determine optimal rail design standards to achieve increased productivity, eg increased axle load limits, greater clearance and loading gauges, improved signalling and communication to increase track capacity etc.

This study has clearly identified that the greatest problems from the likely increased freight task will be on road. Opportunities for other modes to carry a greater share have real potential to deliver improvement.

Rail cannot carry more freight in urban areas without investment in capacity, and capacity limitations in rural areas reduce efficiency.

How implemented?

Rail design standards are mostly the responsibility of track owners and leaseholders, moderated by industry groups such as the Australian Rail Association and international practice. NTC could stimulate this debate through these organisations, and through government which in many locations is making more direct rail investments even when track is leased, due to overall community benefit, and avoidance of road damage.

NTC could aim to influence the investment decisions of track owners and leaseholders, and of governments to increase rail system capacity and improve environmental performance.

NTC would need to demonstrate the benefit cost outcomes of higher design standards, with fully monetised externalities wherever possible. Case studies, extrapolated to broader regions may provide examples more readily grasped by non technical audiences.

An awareness raising approach would probably be required, possibly through seminars, conference presentations etc, to broadcast the message to relevant audiences.
Potential effectiveness?

Rail has some real opportunities to assist in the urban freight task, particularly for port related freight. Many of the difficulties for longer distance interstate rail freight are in intermediate cities (eg in Sydney on the Melbourne – Brisbane corridor.

These measures have some real potential to improve rail capacity, reducing growth in road freight in urban areas, and reducing amenity opposition to rail.

Downsides and other consequences?

Rail investment is very expensive, and could reduce funds available for other, more beneficial projects. Some projects could require additional land, which would increase disruption during construction.

Government investment in privately leased rail facilities is already proving difficult to manage on a cost and benefit accounting basis, and this project could exacerbate this.

Conclusion: Effectiveness

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Recommendation: Medium priority, in view of limited potential benefits to urban productivity, environmental and safety performance, and very high costs

Road

Measure 57: Implement road design standards which provide additional capacity for improved truck size, mass and operational practices. Include environmental and safety benefits assessment.

Objective and rationale – why would it improve what?

It is generally acknowledged that road design and traffic management is primarily set up to meet the requirements of the light vehicles that comprise most of the traffic stream. In so doing, the differing needs of trucks and heavy vehicles are less well met. These can have adverse safety, environmental and productivity impacts.
How implemented?

Control of the on road systems is vested with state and territory road authorities who make management decisions to best balance competing demands according to influences and pressures applied at the time. Affecting the settings and balances among competing priorities would require changing these road authorities’ judgements on balance and priorities. Most such authorities are engineering dominated, but are sensitive to political pressure as publicly funded organisations.

To be effective, the NTC would need to provide both scientifically justified cases to satisfy engineering assessment, and also socio-politically reasoned explanations of the sources of benefit, and management strategies for any groups who may be adversely affected by resultant changes.

The NTC could compile evidence to convince road designers and managers to change standards and priorities to improve heavy vehicle productivity, safety and environmental impact. This could draw on case studies to provide real world examples of the benefits from changes in road performance. These benefits should then be extrapolated to whole of region, state or country level using economic principles to monetise costs and benefits.

Potential effectiveness?

Implementation of measures to change road management setting to improve productivity, environmental performance and safety will be difficult, and would need to be done individually on a case by case basis for identified road sections. In many cases, measures to improve say productivity may have adverse impacts on safety and or environment. Improvements may be small, implementation costs considerable, and timeframes lengthy before substantial sections of the road network could be treated or modified. Further, determining the actual causes of changes in road safety is notoriously difficult when so many actions and campaigns often run concurrently.

Downsides and other consequences?

The needs of trucks and heavy freight vehicles are different to those of car. Modifying settings to better suit trucks is likely to reduce performance for cars. Given that cars make up the vast majority of the traffic stream, reducing performance for cars could negate the benefits sought for heavy vehicles. It could well be unpopular, and generate political interest and pressure.

Conclusion: Effectiveness

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Recommendation: Medium priority, in view of very long leadtimes for achieving change
8.10 Integrate transport system planning (Attack points 2 and 3)

Policy bodies

Measure 62: Establish an overall national transport planning body, charged with developing a national transport plan, to be agreed at ATC / Cabinet level considering issues pertaining to federal, state and local government.

Objective and rationale – why would it improve what?

Suggestions that governments should more actively lead the planning and strategic policy settings for national freight transport infrastructure were frequently made during consultation undertaken for this project. The impression is that the research and analysis needed to assist decision making in the public and private sectors are not being provided in any coordinated manner. There has been support for the work the BTRE is publishing but it is not sufficiently targeted to answer the ‘what, where and when?’ questions that face industry and departments alike. The Commonwealth’s initiatives on AusLink are evolving and are centred on projects within corridors, rather than adopting business cases bound by network considerations across broader parts of Australia.

Gaps identified in this area include:

- Multiple and uncoordinated funding of national rail and highway projects.
- No coordinated investment strategy for intermodal facilities.
- Two distinct pricing models for road and rail with responsibilities handled by different portfolio ministers in most of the nine government jurisdictions.
- Data gaps in both the breadth and depth of freight tasks, and concerns that these were becoming more difficult to obtain given the private ownership of roads, rail and ports.

In many ways isolation of planning from regulation by governments serves to impose inefficiencies on the transport systems that have been identified by others. For instance the Fisher Report states:

“Governments should consider whether the multiplicity of regulators and the fragmentation of the regulatory system is in Australia’s interest. More specifically, governments should examine the scope for establishing a single regulator...”. Fisher Report Australia’s export infrastructure May 2005

How implemented?

The need for an independent national body to deliver national transport policy analysis and research has been identified in earlier studies and separately endorsed by ATC. The National Transport Advisory Committee (NTAC) was raised as the missing link in the course of several interviews and both workshops. There was also a strong view that without Commonwealth
government support, the NTAC would not commence. This impasse still exists and an alternative is to ask the NTC to take on the role. This would mean that the regulator would also be asked to make judgements on infrastructure investments.

The alternatives of ALC and the AusLink programs are not national bodies and as such become constrained by other responsibilities and powers.

There is still in our view a distinct gap in the delivery of national research and planning for freight transport in this country. The Australian Constitution envisaged that there would be an Inter-State Commission to handle matters such as this. The short flirtation of the Commonwealth Parliament with this matter ended nearly twenty years ago and there seems to be little enthusiasm to resurrect the organisation in any form.

Changes in this area would be a Federal Government decision, probably agreed at cabinet or political party level. The NTC could stimulate this debate by assembling and publicising evidence demonstrating the outcomes from current arrangements and potential to achieve improvement from change.

**Potential effectiveness?**

The lack of such a policy with broad national policy and planning responsibilities for an inherently networked function such as transport is in some ways surprising. The potential benefits from better coordination across and between jurisdictions are compelling.

**Downsides and other consequences?**

There is some potential for reactions of “not another transport planning body”. However, it seems likely that the current surplus of bodies dabbling around the edge of this area results from none having the necessary charter or responsibility to do the job properly.

**Conclusion: Effectiveness**

Productivity: Urban: 2%
Productivity: Rural: 1%
Environment: 2%
Safety: 2%

**Recommendation: Very high: probably the highest single priority recommended by this work**
Data

Measure 63: Collect essential transport and supply chain data, including time series impact analysis. This would include location and commodity specific information, for basic planning requirements at local and regional level. The security debate may assist drive necessary data collection for assessing and optimising infrastructure. There is a potential need for legislation to require collection, provision and publication.

Objective and rationale – why would it improve what?

Good information on what is currently going on is essential at sufficiently fine grain to enable useful analysis of transport needs at local, regional and longer corridor levels.

There is ample evidence that available data is declining in accessibility, detail and frequency of collection. Data which is available is much better for main inter-capital corridors than urban networks.

This study has highlighted the greater levels of adverse impacts likely in the urban areas of Australia, where data is more limited. Further, data is generally collected based on traditional mass and distance information, which although suitable for long-distance measurement is less suited to the urban environment. This approach is increasingly unlikely to reveal the full picture of urban freight issues, as urban economies move towards a more service orientated base, with a bulkier, more time critical freight task. A move to measurement based on cubic (m³) or vehicle floor space (m²) basis is likely to provide additional useful information. Moving to a more space based measure will have the added advantage of better understanding the composition of congestion in the urban area. It is therefore recommended that analysis is undertaken on how best to begin a time series volumetric measurement of freight in urban areas.

How implemented?

The responsibility to require provision, collection, analysis and publication of relevant data is probably a federal government responsibility, possibly through the Australian Bureau of Statistics or BTRE.

Potential effectiveness?

In itself, this measure will make little if any impact. However, as a fundamental ingredient to better analysis and hence decision making, there is probably no measure more important to the long term health of Australia’s transport systems.
Downsides and other consequences?

There will be many reasons advanced why such data cannot or should not be collected and made available – security, commercial, cost and lack of immediate payback will be cited. Nevertheless, it is recommended very highly for pursuit by this study.

Conclusion: Effectiveness

Productivity: Urban: negligible
Productivity: Rural: negligible
Environment: negligible
Safety: negligible

Recommendation: Very high priority, as fundamental ingredient to future decision making

Freight and passenger

Measure 65: Increase consideration of freight in transport system planning, which is largely passenger dominated. Initial determination of freight routes will lead to more appropriate land use decisions.

Objective and rationale – why would it improve what?

Many limits on freight vehicle operation are imposed by transport system planning priorities that are set mostly to accommodate the needs of passengers and light vehicles.

How implemented?

Transport system planning is mostly handled at a state and local government level, although the NTC has vehicle regulatory authority. Nevertheless, achieving greater consistency of outcomes and probably increased productivity will come from better integration of freight needs into transport system planning. The NTC could promote greater consistency of standards around Australia, and work towards planning goals being defined more as enhancing all aspects of amenity rather than mostly focussing on passenger transport.

There is also ample evidence that most road management priorities are set to meet light vehicle needs more than the differing requirements of freight vehicles, particularly in terms of traffic signal sequencing.
Potential effectiveness?

These measures could have some useful impact in urban areas, but will be long term goals, and alignment between the large numbers of local bodies potentially involved will be difficult.

Downsides and other consequences?

There are no obvious disadvantages of these measures other than low chances of great success.

Conclusion: Effectiveness

Productivity: Urban: 2%
Productivity: Rural: 0.5%
Environment: 0.5%
Safety: negligible

Recommendation: Medium priority

Actively incorporate transport in land use and spatial policies

Measure 66: Preservation of rights of way for transport corridors and terminals, including urban connections and bypasses

Objective and rationale – why would it improve what?

Lack of critical land for transport corridors and links prevents many otherwise good transport plans proceeding. Later resumption of privately owned and developed land is expensive, unpopular and divisive.

How implemented?

This is largely the immediate province of local government administering planning schemes, but is influenced by state and Federal government policies and planning. The NTC’s actions are probably best directed towards raising the profile of national and state transport planning, through championing a national transport policy and planning body.

Potential effectiveness?

Such measures have a very high potential return in the longer term.
Downsides and other consequences?

There are no obvious downsides, except for the possibility of opposition from local interest groups, some of whom may have vested interests.

Conclusion: Effectiveness

Productivity: Urban: 1%
Productivity: Rural: 1%
Environment: 1%
Safety: 1%

Recommendation: High, in view of cost and impact of failing to reserve required land

Measure 68: Review road and rail transport links comprising the essential national freight network. Opportunities may include routes through urban centres to major freight hubs, sources and destinations as well as regional links to export ports.

Objective and rationale – why would it improve what?

Transport has a network structure in urban areas and more of a link structure in less densely populated areas. Performance is frequently determined by weak points in a network, and weak links. Lack of targeted investment in the most important areas and projects to comprise these networks and links can have major impact.

How implemented?

This initiative is also probably best tackled by the national transport policy and planning body, at a Federal Government level, with as close cooperation with the states and territories as possible.

The NTC’s actions are probably best directed towards raising the profile of national and state transport planning, through championing a national transport policy and planning body.

Potential effectiveness?

This measure has a very high potential, although in the longer term.

Downsides and other consequences?

There are no obvious downsides save the possibility that local interest groups may have vested interests that will result in their opposition to the measure.
Conclusion: Effectiveness

Productivity: Urban: 1%
Productivity: Rural: 1%
Environment: 1%
Safety: 0.5%

Recommendation: Medium priority

8.11 Decouple freight and economic growth (Attack point 4)
No measures are recommended for further assessment.

Measure 69: Undertake broad community issue awareness program on balancing development and amenity

Objective and rationale – why would it improve what?
This concept is based on a better understanding of conflicting priorities of development and amenity (particularly at a local level) leading to more informed debate, and less kneejerk reactions against most or all development projects of various types or in a certain area.

How implemented?
The implementation of this measure would require some form of broad community information or communication program. It might fit at Federal, state or local level, but is likely to have more impact the more local is the targeting.

Potential effectiveness?
Many such communication campaigns have limited effectiveness, and this could be difficult to deliver effectively.

Downsides and other consequences?
There would be a potential diversion of resources and attention from potentially more effective opportunities, should this measure be implemented.

Conclusion: Effectiveness

Productivity: Urban: 2%
Productivity: Rural: negligible%
Environment: possibly negative
Safety: negligible

Recommendation: Lower priority
## Appendix F  Measure impact presentation tool

### F.1  Data input screen 1 – Level of implementation

<table>
<thead>
<tr>
<th>Measure</th>
<th>Level of Implementation</th>
<th>Measure</th>
<th>Level of Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Determine measures which could improve transport industry CHSS for drivers</td>
<td>0%</td>
<td>46) Review opportunities from competition, market regulation or other relevant policies to enhance rail competition</td>
<td>0%</td>
</tr>
<tr>
<td>14) Act on regulations across all transport jurisdictions and owners.</td>
<td>100%</td>
<td>51) Encourage use of heavy vehicle progressive licensing and min age requirements, to reduce licensing difficulties for drivers</td>
<td>0%</td>
</tr>
<tr>
<td>17) Measure: Assess whether we want a robust rail system. If so, review railroad conditions nationwide, in light of already stated concerns about major deterioration in WA, SA, Vic and NSW/Intestate networks. Assess need and justification for government investment in track.</td>
<td>100%</td>
<td>54) Invest in urban rail infrastructure to improve existing bottlenecks</td>
<td>0%</td>
</tr>
<tr>
<td>22) Establish circumstances in which intermodal terminals are successful</td>
<td>0%</td>
<td>55) Determine optimal rail design standards enabling increased productivity</td>
<td>0%</td>
</tr>
<tr>
<td>24) Actively progress the implementation of enhanced Performance Based Standards and innovative vehicle design approaches</td>
<td>100%</td>
<td>57) Implement road design standards which provide additional capacity for increased truck size, mass and operational practices.</td>
<td>0%</td>
</tr>
<tr>
<td>26) Promote specific permit conditions to improve system capacity and/or increase vehicle utilization.</td>
<td>0%</td>
<td>62) Establish an overall national transport planning body</td>
<td>100%</td>
</tr>
<tr>
<td>29) Work towards consistent higher mass limits for trucks throughout Australia</td>
<td>100%</td>
<td>63) Collect essential transport and supply chain data, including time series impact analysis</td>
<td>0%</td>
</tr>
<tr>
<td>29) Improve road design and management to better suit truck and road capacity</td>
<td>100%</td>
<td>65) Increase consideration of freight in transport system planning, which is largely passenger dominated</td>
<td>0%</td>
</tr>
<tr>
<td>30) Implement direct user charging by infrastructure providers. Aim to remove standard mass limits.</td>
<td>0%</td>
<td>66) Preservation of rights of way for transport corridors and terminals, including urban connections and bypasses</td>
<td>0%</td>
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<tr>
<td>38) Assess real contribution of freight to congestion and impact of congestion on freight</td>
<td>0%</td>
<td>68) Identify road and rail transport links to comprise 21st Century Freight Network, and ensure priority funding, administered by a single regulator</td>
<td>100%</td>
</tr>
<tr>
<td>42) Review applicability of ACCC policy requirements on supply chain collaboration processes</td>
<td>0%</td>
<td>89) Unilateral broad community issue awareness program on balancing development and amenity</td>
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</tr>
</tbody>
</table>
### F.2 Effectiveness input screens

<table>
<thead>
<tr>
<th>Measure</th>
<th>Productivity - Urban</th>
<th>Productivity - Rural</th>
<th>Environment</th>
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<tbody>
<tr>
<td>1) Determine measures which could improve transport industry OH&amp;S for drivers</td>
<td>0.5%</td>
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<tr>
<td>Safety</td>
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<tr>
<td>14) Align rail regulations across all track jurisdictions and owners</td>
<td>1.00%</td>
<td>1.50%</td>
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<tr>
<td>Safety</td>
<td>2.00%</td>
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<tr>
<td>17) Review rail track conditions nationwide. Assess need and justification of government investment</td>
<td>2.00%</td>
<td>2.00%</td>
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</tr>
<tr>
<td>Safety</td>
<td>1.50%</td>
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<tr>
<td>22) Establish circumstances in which intermodal terminals are successful</td>
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<td>Safety</td>
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<tr>
<td>24) Actively progress the implementation of enhanced Performance Based Standards and innovative vehicle design approaches</td>
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<td>Safety</td>
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<tr>
<td>25) Promote specific permit conditions to improve system capacity and or increase vehicle utilisation</td>
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<td>Safety</td>
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<tr>
<td>28) Work towards consistent higher mass limits for trucks throughout Australia</td>
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<tr>
<td>29) Improve road design and management to better suit trucks and road capacity</td>
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<tr>
<td>30) Implement direct user charging by infrastructure providers. Aim to remove standard mass limits</td>
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<td>Safety</td>
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<tr>
<td>32) Assess real contribution of freight to congestion and impact of congestion on freight</td>
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<tr>
<td>Safety</td>
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<tr>
<td>45) Review applicability of ACCC policy requirements on supply chain collaboration processes</td>
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<td>45</td>
<td>Review opportunities from competition, market regulatory or other relevant policies to enhance rail competition</td>
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<tr>
<td>51</td>
<td>Encourage use of heavy vehicle progressive licensing and min age requirements, to reduce licensing difficulties for</td>
<td><strong>Productivity - Urban</strong></td>
<td><strong>Productivity - Rural</strong></td>
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<tr>
<td>54</td>
<td>Invest in urban rail infrastructure to improve existing bottlenecks.</td>
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<tr>
<td>55</td>
<td>Determine optimal rail design standards seeking increased productivity</td>
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<td>57</td>
<td>Implement rail design standards which provide additional capacity for increased truck size, mass and operational practices</td>
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<tr>
<td>62</td>
<td>Establish an overall national transport planning body.</td>
<td><strong>Productivity - Urban</strong></td>
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<td>Safety</td>
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<tr>
<td>63</td>
<td>Collect essential transport and supply chain data, including time zones impact analysis</td>
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<td>Increase consideration of freight in transport system planning, which is largely passenger dominated</td>
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<td>Safety</td>
<td>0.00%</td>
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<tr>
<td>66</td>
<td>Preservation of rights of way for transport corridors and terminals, including urban connections and by-passes</td>
<td><strong>Productivity - Urban</strong></td>
<td><strong>Productivity - Rural</strong></td>
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<tr>
<td>68</td>
<td>Identify road and rail transport links to comprise 21st Century Freight Network, and ensure priority funding, administered by a single regulator</td>
<td><strong>Productivity - Urban</strong></td>
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<td>Safety</td>
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<tr>
<td>69</td>
<td>Undertake broad community issue awareness program on balancing development and amenity</td>
<td><strong>Productivity - Urban</strong></td>
<td><strong>Productivity - Rural</strong></td>
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<td>Safety</td>
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</table>
Appendix G  Glossary of terms

ALC    Australian Logistics Council
ARTC   Australian Rail Track Corporation
ATC    Australian Transport Council
AusLink AusLink is the Australian Government's policy for improved planning and accelerated development of Australia's land transport infrastructure.
B-double Double articulated combination vehicle
BTRE   Bureau of Transport and Regional Economics (operating within the Australian Department of Transport and Regional Services)
GTK    Gross tonne-kilometres – total train weight x kilometres travelled. Used to calculate access charges to track owner
HV     Heavy Vehicle
IAP    Intelligent Access Project
LCVs   Light Commercial Vehicles
NTAC   A mooted National Transport Advisory Committee
NTK    Net tonne-kilometres – weight of freight carried on a train x distance travelled
OHS    Occupational Health and Safety
PBS    Performance Based Standards
SCOT   Standing Committee on Transport - comprises commonwealth, state, territory and New Zealand ministers responsible for transport, roads and marine and ports issues
TACE   Committee of Transport Agencies Chief Executives
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