

Road transport planning in Australasia – current practice versus best practice

Dimitris Tsolakis, Clifford Naudé and Caroline Evans

ARRB Group, Melbourne



1 Introduction

Transport planning approaches and processes for roads vary widely across jurisdictions within countries as well as between countries and are probably more of an art than a science. This paper reviews current developments, trends and challenges in road transport planning internationally and in Australasia (Australia and New Zealand) and uses this material to compile a set of best practice principles for road transport planning at the road route and link level. The paper then examines current practice in road transport planning in Australasia to determine the extent to which current practice in this area reflects best practice.

The paper raises key policy issues which inform current transport planning thinking at the national and state/territory levels and considers the following areas:

- whether planning processes are consistent with government policy, community and industry expectations
- the interface between planning and operations within road agencies at the national and state/territory levels
- principles for road transport planning adopted for urban and rural areas at the different levels of the network, in particular, road route and link level planning.

The material presented in this paper is based on a study commissioned by Austroads (2008) to develop a *Guide to Road Transport Planning*. This Guide is not intended to be a strict guideline for best practice in road transport planning. Nor is it intended as a 'how to', prescriptive 'recipe book' that is the last word in road transport planning. Rather, it is intended to be a broad frame of reference for practitioners. This work complements the ATC (2006) *National Guidelines for Transport System Management in Australia* by adding a route and link planning dimension to the top-down guidance provided by ATC National Guidelines for land transport planning at the network, corridor and area level.

2 Road transport planning in Australasia

Road transport planning approaches and practices vary across states in Australia, with variations in land-use and transport planning interpretations, nature and extent of stakeholder consultation requirements and supporting legislation. The state of transport planning practice in Australia has recently been canvassed at the national level during development of the ATC (2006) Guidelines. The aim of the Guidelines is to provide 'a consistent framework and processes, methods and tools to assist and guide transport planning and decision-making across Australia'. The focus is on land transport, including road, rail and multi-modal transport. Four levels of planning are identified, namely: network, corridor/area, route and link and an analytical framework is emphasised for top-down planning, consistent with government policy and objectives about land transport networks and corridors.

DOTARS (2006) also undertook a survey of the state of land-use and transport planning practice in Australia, focusing on AusLink urban national corridors across jurisdictions. Key conclusions obtained are as follows:

- Although a level of **convergence exists in the planning processes** applied by states and territories across Australia, variations do occur reflecting local governance and history.
- A high degree of commonality exists in the **strategic directions and actions** applied by states and territories to manage urban corridors.
- A substantial amount of variation exists between jurisdictions in terms of **implementation arrangements** as opposed to policy frameworks.
- **Legal frameworks** vary across jurisdictions.

The New Zealand transport planning process is underpinned by key legislation, namely the *Resource Management Act 1991*, *Local Government Act 2002* and *Land Transport Management Act 2003* (LTNZ, 2007). This legal framework provides for the formulation of Regional Land Transport Strategies by regional councils, involving consultation with Road Controlling Authorities (RCAs) such as Transit NZ and local authorities. The RCAs then formulate road transport plans for their respective networks, e.g. Long Term Council Community Plans or LTCCPs. The need for integrated transport planning in terms of alignment between these documents is explained in detail in the Transit NZ Planning Policy Manual (LTNZ, 2007; Transit NZ, 2007).

3 Elements of transport planning

3.1 A definition of transport planning

The UK Transport Planning Society defines transport planning as follows:

Transport planning is about preparing, assessing and implementing policies, plans and projects. These are designed to improve and manage our transport systems. There is a need for transport planning on a local, regional and national level. It can involve understanding the linkages between transport and the future shape of our towns and cities. It is also about changing people's attitudes towards travel to encouraging use of alternatives to the private car.

(Transport Planning Society, 2006)

This description reflects a shift of transport policy from primarily planning for roads (private car oriented policy) to the need for planning more for other modes such as public transport and non-motorised modes, as well as increased integration with land-use planning.

3.2 Role of transport planning

Transport planning is a critical stage in the assessment of infrastructure proposals. According to Houghton *et al.* (2003), it is necessary in terms of:

- improving accessibility, mobility, transport choice and social equity
- supporting economic and regional development
- ensuring that efficient (and effective) land-use decisions are made
- improving road safety, social and environmental quality and fostering sustainability of infrastructure and the environment
- shaping patterns of development that support communities and neighbourhoods.

Planning decisions made about transport systems do influence wider spheres of community life by facilitating accessibility to, for example, employment and essential services, and mobility by, for example, reducing the cost of doing business or of socially interacting. In addition, many stakeholder groups have a high degree of influence on and interaction in the processes related to planning decision-making (ATC, 2006).

3.3 Strategic planning and policy framework

A strategic planning and policy framework is a prerequisite for sound road transport planning. The Austroads *Principles for Strategic Planning* (Austroads, 1998) contains the following definition of strategic planning:

Strategic planning is a continuous and systematic process where people make decisions about intended future outcomes, how outcomes are to be accomplished, and how success is to be measured and evaluated. (Austroads, 1998)

This strategic planning framework provides a basis for road transport planning in Australasia from network and corridor level through to route and link level.

3.4 Stakeholder consultation

In recent years, greater emphasis has been placed on community and stakeholder consultation within transport decision-making frameworks. This follows recognition that in the past there existed significant gaps in knowledge and information systems concerning community concerns and expectations about the road system (Tsolakis and Thoresen, 1998). Without such processes, transport infrastructure projects may be unable to meet these expectations, and may not adequately serve the transport needs within a region (Xu, 2001). The recent Eddington Transport Study in the UK, a major investigation of the relationship between transport and productivity and economic performance conducted for the UK Department for Transport (DfT, 2006) has emphasised the importance of consultation as early in the process as possible and recommended that the DfT:

Encourage best-practice consultation requiring scheme promoters to consult with the local community and interested parties at an early stage of individual scheme development, so that promoters are adequately prepared for issues likely to arise, and applications can proceed efficiently through the inquiry stages.

(DfT, 2006, p. 352)

Often the extent to which the community and stakeholders are engaged will vary from one case to the next and according to the circumstances, and a range of communication strategies can be adopted (ATC, 2006). Hence, there are varying degrees of community participation within a given process and different levels are appropriate for different situations and interests (Houghton *et al.*, 2004).

The significance of the community/stakeholder consultation process is also emphasised in the Context Sensitive Solutions (CSS) approach (VTPI, 2006). A key principle of CSS is that of 'balanced' decision making, which refers to the need for transport planning to reflect community input and consider the impacts of projects on natural and human environments.

3.5 Importance of good data

The ability to obtain good data is highly relevant for developing and maintaining any transport planning framework; see ATC (2006) for further detail. The Transportation Research Board (TRB, 2006) has identified a number of steps for linking data and transport planning:

- make a case for the benefits of using operational data for planning applications
- develop the relationship between operational and planning staff
- address data issues
- identify a champion in this area within the agency or decision making body.

4 Current trends in road transport planning

Both private and public sectors have steered away from the traditional focus on only financial objectives for the former and emphasis on economic objectives for the latter. Dimensions of social and environmental accountability have been gaining support in reporting project performance. A 'triple bottom line' (TBL) approach (i.e. financial-environmental-social) to decision making has been increasingly promoted (Tsolakis *et al.*, 2003), meaning it has become mandatory (and in many cases legally imperative) to include issues such as environmental pollution impacts in the transport planning process (Goulias, 2003).

4.1 Integrated road transport planning

Integration takes place across disciplines and across levels of government and responsibility and involves horizontal and vertical integration of types and levels of planning, as shown in Figure 1.

This framework recognises sustainability, integration and development of effective partnerships across governments, industry and with stakeholders as foundations of successful integrated transport planning (Queensland Government, 2003).

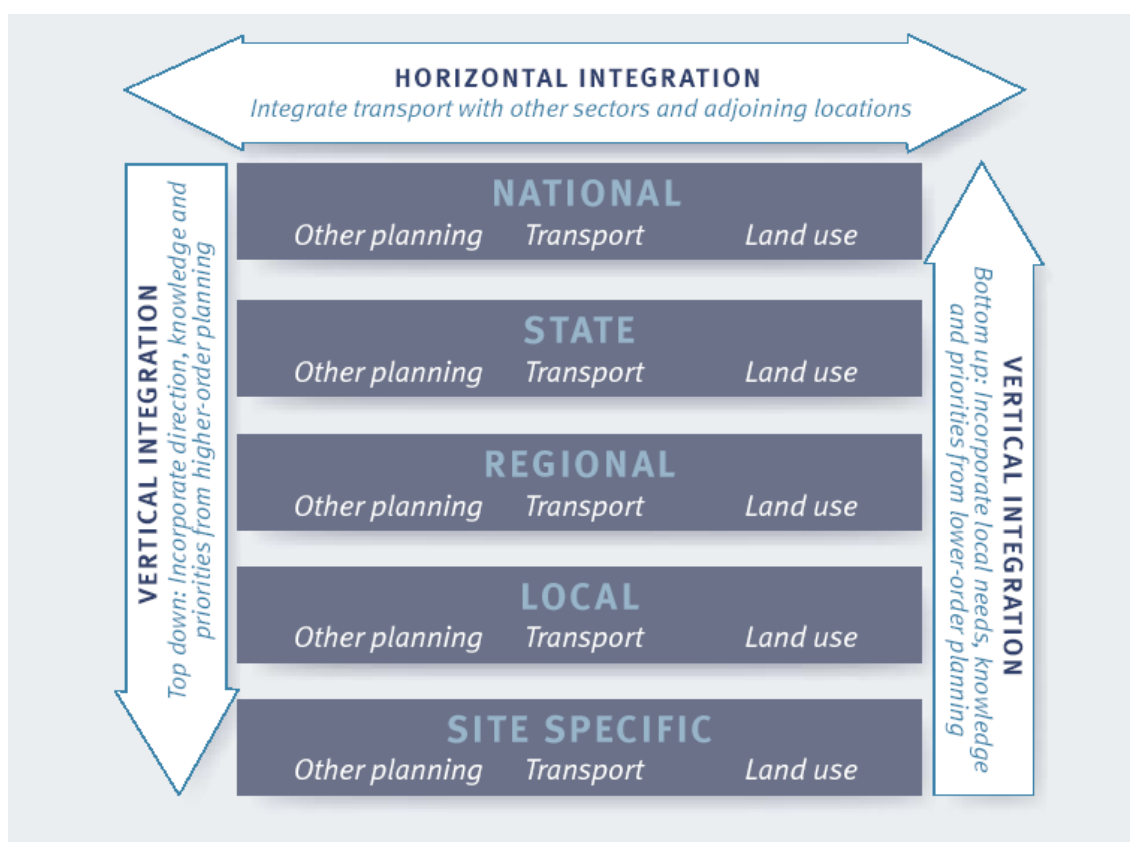


Figure 1 – Integrated planning

Source: Queensland Government (2003).

4.2 Multi-modal planning for roads

ATC (2006) defines multi-modal planning overall as involving network linkages with the full range of transport modes such as road, rail, maritime and air traffic, while also taking into consideration the importance of transport corridors through urban areas, and their related impacts. However, multi-modal planning for roads involves the following modes.

4.2.1 Freight

Given the increasing number of heavy goods vehicles (ABS, 2007) and the increased freight task and traffic volumes forecast in the future, including urban freight traffic (BTRE, 2007; NTC, 2006), planning for freight traffic has become more important in the Australasian context. The importance of trends in global freight issues, freight commodity flows and comprehensive freight databases, as well as the integration of roads with intermodal freight terminals (e.g. ports) for transport planning has been emphasised in ITE (1999) and AASHTO (2003).

4.2.2 Public transport

Planning for public transport has also become more important, given the emphasis on 'sustainability'. In the Victorian Transport Policy Institute (VTPI) *TDM Encyclopedia*, Transit Oriented Development (TOD) (or public transport oriented development) is identified as a key element, together with non-motorised modes in reducing dependency on private car transportation (VTPI, 2006). In terms of Australasian documentation, the Victorian Department of Infrastructure has published *Public Transport Guidelines for Land Use Development* (DoI, 2007) for example, which aim to assist in planning for the public transport requirements of land-use developments and activity centres.

4.2.3 Non-motorised (cycling & walking)

Planning for non-motorised modes implies a significant change to the traditional approach, as ITE (1999) explains:

In many cases, creating a reasonable balance means more than simply installing sidewalks or designated bicycle facilities. For the pedestrian, it means increased attention to factors that have – in the past – been beyond the domain of responsibility for engineers. It means making streetscape improvements – an area in which engineers are not typically trained, but must now become more proficient in with the assistance of planners, landscape architects and urban designers. (ITE 1999, p. 601)

VTPI (2006) contains a significant amount of material on non-motorised planning and outlines the benefits of planning for non-motorised modes, including:

- Mobility – non-motorised modes are more affordable and they provide road users with a level of mobility, especially for short distance trips
- 'TDM' benefits – shifting to non-motorised modes reduces external costs of using private car transport and direct costs to the road user
- Land-use impacts – non-motorised transport supports 'smart growth' development objectives, improving the 'liveability' of urban areas.

In terms of Australasian experience, Austroads has two sets of Guidelines relating specifically to provision of facilities for non-motorised modes, those for pedestrians (Austroads, 1995) and for cycling (Austroads, 1999).

4.3 Sustainable transport planning

In recent decades there has been a significant shift towards embracing a sustainable framework incorporating financial/economic, social and environmental perspectives and priorities. The changing priorities of the community and stakeholders has been a significant driving force in adoption of a triple bottom line approach.

The need to incorporate environmental impacts into transport planning is now a key requirement and current practice (NCHRP, 2005, 2007), while the imperative of climate change is also receiving more attention (TRB, 2008).

4.4 Planning for urban areas

Historically, urban transport planning has been a much more complex and dynamic activity than planning of inter-capital and rural networks, while ever increasing numbers of people continue to migrate to urban centres. Urban planning has come to include economic development planning, community social planning and environmental planning as well as more general land-use planning. Successful urban planning encompasses the understanding of land-use/transport interaction and multi-modal / inter-modal solutions, managing transport demand, making more from the existing infrastructure, utilising non-infrastructure solutions (e.g. use of Intelligent Transport Systems or ITS), access management and making the most of regulation and policy (Litman, 2005).

4.5 Collaborative planning

While interpretation of the term 'collaborative planning'¹ may not be consistent at the national, state/territory and local level, the concept of adopting a thorough consultation process with key stakeholders and the community is increasing in emphasis. For example, the ATC (2006) National Guidelines recognise that stakeholder expectations and values are diverse and include economic progress, environment/sustainability, equity/social cohesion, security and safety.

4.6 Integration of transport and land-use planning

Transport and land-use planning has increasingly been integrated into the planning for urban areas. The integration of the two is regarded as an important means to achieving the objective of sustainable transport systems through a multidisciplinary approach to planning (LTNZ, 2007).

The Transit New Zealand *Planning Policy Manual* explains the two-way relationship between integrated land-use and transport planning as follows:

Transport and land-use are closely related. Land-use activities produce and attract trips and the location and design of different land uses determines the distances people travel and the viability of public transport, cycling and walking facilities. Patterns of development that reduce journey distances tend to provide greater travel choice ... Equally, the availability of transport infrastructure and services can influence land-use. For example, transport infrastructure such as a state highway intersection can stimulate the demand for new development and create growth pressures in areas where urban expansion is not planned for.

(Transit New Zealand, 2007, p. 10).

¹ Planning involving collaboration between various levels of government.

National Co-operative Highway Research Program (NCHRP, 1999, p. 12) argues that *accessibility* is the key to the land-use and transport planning relationship. This relationship can be ...*conceptualised as an interaction of the supply and demand for accessibility*.

In terms of the land-use and transport planning integration, the demand for transport is derived from the urban activity system². However, in turn the transport system itself influences land development and choice of location through the accessibility to land and activities (Miller, 2003).

The role of urban sprawl and its effect on car use is an important component of the land use/urban form-transport planning relationship. In response, the land use concept of 'new urbanism' or 'smart growth' has emerged, including compact residential areas, mixed land uses, improvements in urban design (increased planning for non-motorised modes and public transit) resulting in residential and employment areas that are conducive to these types of activities (Krizek, 2003).

5 Current vs. best practice in road transport planning in Australasia

5.1 Current practice

A survey of road transport planning in Australia and New Zealand was undertaken to determine current practice and compare it to best practice transport planning using the principles identified and presented later in this section. The survey included discussions with practitioners involved in road transport planning at both planning organisations and road authorities in Australasia. A current practice account is developed by synthesising the survey responses from all participating departments/agencies. Surveys were completed and verified by the responders using an iterative survey process that enabled clarifications to be made and a final sign-off step. The responses were analysed and the results were synthesised into consolidated summaries for each jurisdiction. These consolidated summaries were formulated into an account of road transport planning for each question in the survey. Survey responses were supplemented by additional information and a number of case studies obtained via extensive literature reviews³.

A combination of bottom-up and top-down processes become important for road route and link planning. In particular, bottom-up processes can become dominant as mostly local land-use and transport considerations are the focus. Sometimes, these also include 'unplanned projects' of new development opportunities for local areas, real-estate market shifts and land prices, and other political economy developments. All these complex factors tend to increase bottom-up considerations in road route and link planning, and require robust legal, administrative and technical government processes to maintain a strong and more balanced link between top-down and bottom-up considerations of planning.

² The terms land-use, urban activity system and urban form are used interchangeably in Miller (2003).

³ The survey questionnaire was divided into four sections of questions dealing with:

- current practice in road transport planning
- current practice in Guidelines documentation
- degree of development of road route and link planning
- relationships with other departments/agencies and levels of government.

The summary findings for each jurisdiction and the synthesis of responses on a jurisdiction by jurisdiction basis are presented in Austroads (2008).

5.2 Best practice

The material on road transport planning obtained from the review of international and Australasian experience was examined to identify a set of best practice principles for road transport planning. These principles are summarised in Figure 2, and they were then applied to the results of the survey of road transport planning in jurisdictions, so that the state of road transport planning across Australasia could be further clarified. The best practice principles illustrated in Figure 2 range from those linked to 'whole of government objectives and processes' (e.g. strategic planning, legal and institutional arrangements and government processes) to 'key drivers of transport planning' (e.g. role of demand in planning, models/tools and good data and planning for multi-modal road transport).

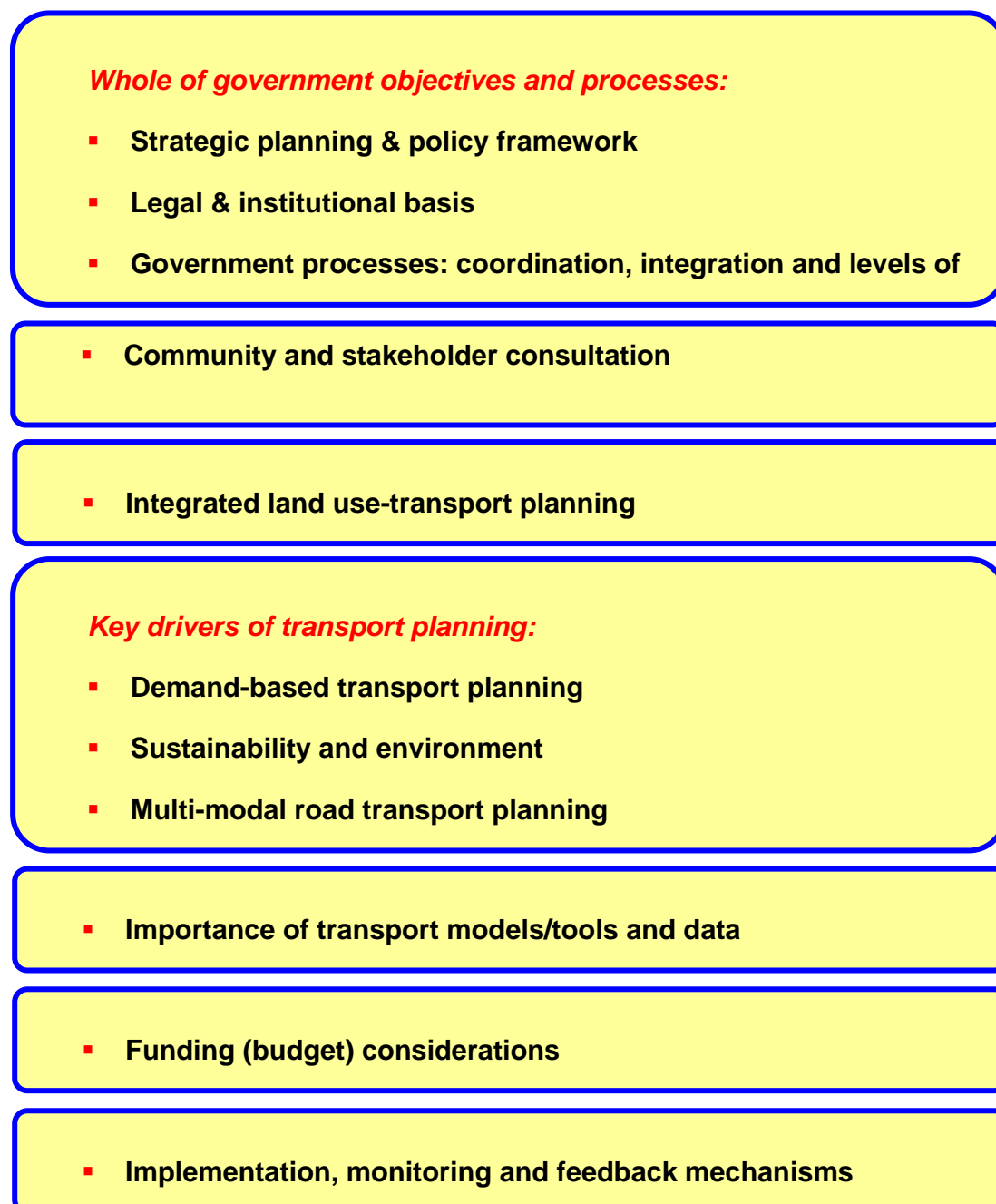


Figure 2 – Identified best practice principles for road transport planning

Source: ARRB Group

5.3 Best practice: is it current practice in Australasia?

A distilled set of the synthesis of responses from all jurisdictions (an account of current practice) were then benchmarked in terms of the framework of best practice principles as illustrated in Figure 2. The results of this benchmarking exercise are set out in Table 1.

Some of the key learnings from the process of comparing the surveyed current practice in Australasia with the identified best practice principles for road transport planning are presented in this section.

Table 1 – Current practice versus best practice in road transport planning in Australasia

<i>Best practice principle</i>	<i>Current practice in Australasia</i>
Strategic planning & policy framework	Provided to varying extents across jurisdictions, but not always referred to at all levels of planning.
Legal and institutional basis	Legislation was identified as necessary to ensure that road transport planning takes place consistently across jurisdictions. Role & importance of legislation currently varies across jurisdictions.
Government processes: coordination, integration and levels of responsibility	Acknowledged need for coordination and integration between departments and levels of government within the same jurisdiction.
Community and stakeholder consultation	Consultation practices vary substantially across jurisdictions. Consultation needs to occur early on in the planning process, must be 'bottom-up' in terms of involving affected road users and must be a legislated requirement.
Integrated land use-transport planning	Most jurisdictions noted the need for integrated land use-transport planning, although practice in this area varies, with little legislation.
Demand-based transport planning	Need for increased emphasis on a demand-based approach to planning as opposed to traditional supply-side approach so that resources are allocated efficiently.
Sustainability and environment	Survey shows that the traditional approach to planning at the route and link level is not conducive to promoting environmentally and socially sustainable transport solutions.
Multi-modal road transport planning	Jurisdictions acknowledge the objective of needing to plan efficiently for all modes, given budget constraints and environmental imperatives.
Importance of transport models/tools and data	Need for a comprehensive and consistent set of data across jurisdictions and departments within the same jurisdiction.
Funding (budget) considerations	Not dealt with as such in the survey, but budget considerations influence the level of planning as well as determine what projects and therefore what planning is required
Implementation, monitoring and feedback mechanisms	Formal mechanisms dealing with these at all levels of government across Australasia are not apparent. Feedback mechanisms are required that enable the road transport planning process to not only be top down, but also bottom up.

Source: ARRB Group

Effective road transport planning processes require adherence to best-practice principles in order to achieve sustainable (economically efficient and socially desirable) transport outcomes. These processes also require robust feedback mechanisms that enable the road transport planning practice to not only be 'top down' (network→corridor→route→link), but also 'bottom up' (feedback so that link planning informs not only route and link but also network and corridor plans and objectives).

Planning at lower (i.e. route and link) levels is a key barometer of how well top-down plans and objectives are identified and developed. It is at the forefront and is seriously influenced by three very important best-practice principles: increasing need for land-use and transport integration, balanced multi-modal development and greater demand-based planning. The survey results acknowledge serious efforts made to recognise the importance of these key principles in planning, but they also make practitioners aware of a number of serious legal and institutional constraints which impede implementation.

The survey results and review of international experience show that the traditional approach to road transport planning especially at these lower (road route and link) levels is not conducive to promoting environmentally and socially sustainable transport solutions. Current planning practice appears to be lenient, mostly not backed by consistent legislation, and influenced by political developments. However, notably New Zealand and a number of Australian jurisdictions have taken serious steps towards developing procedures and guidelines aiming at improving aspects of the current practice. Nevertheless, a lot more is needed in terms of processes and mechanisms that help to pursue common policy objectives, and which support environmentally and socially sustainable transport solutions.

The role and importance of legislation in the road transport planning process was highlighted in the survey of jurisdictions, where it became apparent that it was necessary to ensure that road transport planning takes place to a level of detail and in a form consistent across jurisdictions and specific aspects, e.g. stakeholder and community consultation. Otherwise, road transport planning especially at route and link level is bound to vary across authorities in the same jurisdiction.

Stakeholder and community consultation was also acknowledged to be important, and does occur in some form across all jurisdictions. However, it was not clear to what extent it occurs as part of the route and link level planning process. It was apparent that consultation practices vary substantially across jurisdictions in terms of how and when they occur. There was a feeling that consultation needs to be a legislated requirement to ensure that it takes place and to ensure consistency across jurisdictions and projects. It needs to occur as early in the planning process as possible, and needs to be bottom-up in terms of occurring with road users and the public affected by the route/link road projects. However, there are barriers to effective community consultation which constrain the important role the community can play in land-use and transport planning decisions at the route and link level.

6 Conclusions

This analysis of current practice in road transport planning across jurisdictions in Australasia measured in terms of best practice has shown that planning at these levels should be supported by an effective analytical framework displaying a comprehensive set of analytical features including the following:

- 'Evidence-based' planning - meaning that road transport planning must occur taking into account the 'evidence', 'situation' or needs of road transport on the routes and links comprising the networks and corridors because this will determine what solutions or plans are actually formulated
- To achieve evidence-based planning would require expert use of a robust project evaluation analysis model/tool platform supported by good data, demand estimates and forecasts, and other key parameters informing the space (e.g. social, environmental, political) within which planning takes place.
- Route and link level road transport planning must not only be top-down (network→corridor→route→link) but also bottom-up, occurring at a level of detail that not only enables rigorous analysis for that level of planning; but also feeding back into higher levels of planning, e.g. link→route→corridor→network.
- A supportive national policy framework, such as the ATC (2006) Guidelines, is of great importance in providing guidance to transport planning practitioners. However, it is equally important for this framework to effectively learn from the bottom-up nature of route and link level transport planning.
- Key components of road route and link planning enabling practitioners to formulate route and link plans including stakeholder (government agencies and public) consultation that occurs throughout the planning process starting from the beginning of the process in order for it to be bottom-up planning recognising user needs.
- Continuing to work within the existing legal and institutional planning framework presents major challenges and would require serious strengthening of current *processes and procedures*. However, there are opportunities for making road transport planning more consistent both horizontally (across jurisdictions) and vertically (from national level objectives to local government pressures) by strengthening legislative and institutional *requirements* of planning.
- Benchmarking best-practice principles by regularly reviewing the effectiveness of current processes and procedures, developing innovative public consultation techniques, linking transport funding arrangements with requirements for land-use and transport planning integration, reducing the number of transport departments/agencies/groups within governments and increasing coordination of planning entities, and strengthening feedback mechanisms for monitoring implementation of plans and auditing of project/program performance, are all needed for successful (sustainable) road transport planning.

References

- AASHTO (2003). *Best practices in statewide freight planning*. Report prepared as part of NCHRP Project 08-36, Task 33. American Association of State Highway and Transportation Officials: Washington, DC, USA.
- ABS (2007). *Motor vehicle census*. Cat. No. 9309.0., Australian Bureau of Statistics: Canberra.
- ATC (2006). *National guidelines for transport system management in Australia*. Parts 1 to 5: Australian Transport Council: Canberra, <<http://www.atcouncil.gov.au>>.
- Austrroads (1995). *Guide to traffic engineering practice: Part 13 – Pedestrians*, Austrroads: Sydney.
- Austrroads (1998). *Principles for strategic planning*. Publication AP-55/98. Austrroads: Sydney.
- Austrroads (1999). *Guide to traffic engineering practice: Part 14 – Bicycles*, Austrroads: Sydney.
- Austrroads (2008). *Guide to road transport planning*. (forthcoming), Austrroads: Sydney.
- BTRE (2007). *Estimating urban traffic and congestion cost trends for Australian cities*. Working Paper 71. Bureau of Transport and Regional Economics: Canberra.
- DoI (2007). *Public transport guidelines for land use development*. (Draft). Department of Infrastructure: Melbourne <<http://www.doi.vic.gov.au/doi/Internet/planningprojects.nsf>>.
- DfT. (2006). *The Eddington transport study: Main report: Volume 4*. Department for Transport: London.
- DOTARS (2006). *Integrated transport and land use planning for urban national corridors*. (Draft) Prepared by Geoff Anson Consulting Pty Ltd and InfraPlan (Aust). Department of Transport and Regional Services: Canberra..
- Goulias, K. G. (2003). 'Transportation systems planning'. In Goulias K.G. (ed) *Transportation systems planning: methods and applications*. CRC Press.
- Houghton, N., McRobert, J., Patrick, S., and Tsolakis, D., (2003). *Planning for Freight in Urban Areas*, ARRB Group Ltd. Austrroads Report Project No. RSM.G.N.507.
- Houghton, N., Preski, K. and Tsolakis, D. (2004). *Guide to Project Evaluation Part 6: Distributional (Equity) Impacts*. Austrroads Project No. TP1086.
- ITE (1999). *Transportation planning handbook*. Institute of Transportation Engineers: Washington, DC, United States.
- Krizek, K. J. (2003). 'Planning household travel, and household lifestyles'. In Goulias K.G. (ed) *Transportation systems planning: methods and applications*. CRC Press.
- LTNZ (2007). *Integrating land use and transport planning*, Research Report 333, Land Transport New Zealand: Wellington.

- Litman, T. (2005). 'Access management – coordination between roadway design and land use development to improve transportation'. In *Online TDM Encyclopedia*, Victoria Transport Policy Institute, <<http://www.vtpi.org/tdm/tdm1.htm>>.
- Miller, E.J. (2003). 'Land use: transportation modelling'. In Goulias K.G. (ed) *Transportation systems planning: methods and applications*. CRC Press.
- NCHRP (1999). *Land use impacts of transportation: A guidebook*. Report 423A. National Co-operative Highway Research Program: Washington, DC, USA.
- NCHRP (2005). *Consideration of environmental factors in transportation planning*. Report 541. National Co-operative Highway Research Program: Washington, DC, USA
- NCHRP (2007). *Guidebook for integrating freight into transportation planning and project selection processes*. Report 594. National Co-operative Highway Research Program: Washington, DC, USA.
- NTC (2006). *Twice the task: A review of Australia's freight transport task*. Prepared by Meyrick and Associates and SKM Consulting. National Transport Commission: Melbourne.
- Queensland Government (2003). *Integrated transport planning framework for queensland: A guide for transport planning*. Queensland Government and the Local Government Association of Queensland: Brisbane.
- Transit New Zealand (2007). *Planning policy manual – for integrated planning and development of state highways*. Manual Code SP/M/001. Transit New Zealand: Wellington. <http://www.transit.govt.nz/technical/view_manual>.
- Transport Planning Society (UK) (2006). <<http://www.tps.org.uk/planning.htm>>.
- TRB (2006). *Operations Data for Planning Applications: Identifying Needs, Opportunities, and Best Practices*, Transportation Research Circular E-C095, Transportation Research Board: Washington, DC, USA..
- TRB (2008). *Potential Impacts of Climate Change on U.S. Transportation*. Special Report 290. Transportation Research Board: Washington, DC, USA.
- Tsolakis, D., Rockliffe, N. and Patrick, S. (2003). *Triple bottom line evaluation of transport proposals*. Research Report ARR 359. ARRB Transport Research: Melbourne.
- Tsolakis, D. and Thoresen, T. (1998). 'A framework for demonstrating that road performance meets community expectations', *Road and Transport Research*, 7(3), pp. 79-85.
- Victoria Transport Policy Institute (2006). Comprehensive transport planning. *TDM Encyclopedia*. <<http://www.vtpi.org/tdm/tdm76.htm>>.
- Xu, B (2001). *Integration of community consultation in strategic transport planning*, 24th Australasian Transport Research Forum, 17-20 April: Hobart.