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AUSTRALIA - NATIONAL REPORT

STRATEGIC DIRECTION SESSION ST2
Roads and Quality of Life

Austroads

Strategic Theme 2: Road Transport, Livability and Sustainable Development

Summary

Road transport, livability and sustainable development are closely linked. Sustainable transport solutions are integral to ongoing economic development in urban and regional areas and quality of life in urban, regional and remote communities. Australia is a unique continent. It is geographically large with a population of just under 20 million people and a large road network length of around 900,000 km. The population settlement patterns which include large urban cities as well as regional and remote communities means that Australia faces many challenges which are similar to those in both developed and developing countries.

This report provides selected examples that highlight Australia's response to the challenges of providing road transport solutions that enhance livability and encourage sustainable development. These challenges include building and maintaining infrastructure to meet the economic and social aspirations of communities; improving the efficiency of strategic freight corridors to meet expected freight growth; improving public health, air quality and road safety; reducing urban congestion and greenhouse gas emissions; reducing environmental impacts to air, water, landscape, biodiversity and ecological resources; reducing amenity impacts such as visual intrusion and traffic noise particularly in urban areas; and contributing to the quality of life, livability and well-being of regional and rural communities.

Within urban and metropolitan areas, a relatively mature road network and key trends such as growth in the freight task, low public transport patronage rates and increasing congestion, mean that an integrated approach to the provision of transport services including the role of land use planning, managing road space and existing road capacity effectively will be important aspects of achieving an improved quality of life and reducing environmental impacts. In regional and remote areas, transport infrastructure is essential for regional economies and meeting the needs of local communities.

The types of responses to these challenges include the National Greenhouse Strategy which acknowledges the importance of reducing transport greenhouse gas emissions through best practice in transport and land use planning. The paper provides examples of sustainable transport solutions for urban and metropolitan areas including a discussion of the benefits of the M5 East Freeway in Sydney and travel behaviour change programs known as TravelSmart and TravelBlending both of which involve voluntary behaviour change.

Further examples illustrate the social, economic and environmental roles of road infrastructure with an emphasis on regional and rural areas. The development of road infrastructure in Boigu Island (which is Australia's northern most territory located at the northern tip of the Yorke peninsular) illustrates how quality of life of local communities is enhanced through transport solutions.

Strategic Theme 2: Road Transport, Livability and Sustainable Development

Introduction

This national report has been prepared as an input to the Strategic Direction Sessions to be held at the XXIInd World Road Congress in Durban in 2003. This national report provides details relating to priorities, challenges and responses relevant to the Strategic Theme 2 (ST2).

ST2 seeks to explore the relationships between road transport, livability and sustainable development. The theme emphasizes that beneficial community outcomes in economic, environmental and social terms, is dependent on the development of road transport polic ies and programmes that take full account of the need for integration with other transport modes.

This national report examines these key issues and the particular challenges they present in the Australian context. The report uses two sets of examples, the first relating to the urban or metropolitan area, and the second to a regional or rural area, to highlight ways in which Australia has responded to the challenges associated with road transport, livability and sustainable development. The examples provided are illustrative only and are not intended to be a comprehensive summary of approaches in each state.

Australian Context

The system of government in Australia includes Commonwealth (or Federal), State and Local levels. Australia is a geographically large continent with many climate zones. For example, the State of Queensland is larger than the whole of Great Britain with a road network of some 174,000 km in length that traverses tropical wet areas in the north, arid areas in the west, as well as sub-tropical and temperate zones. The population settlement patterns are characterised by large urban cities as well as regional and remote communities which are separated by large distances as shown in Figure 1. This means that the challenges which Australia faces, such as meeting the needs of regional economies and remote communities, are similar to those in both developed and developing countries.

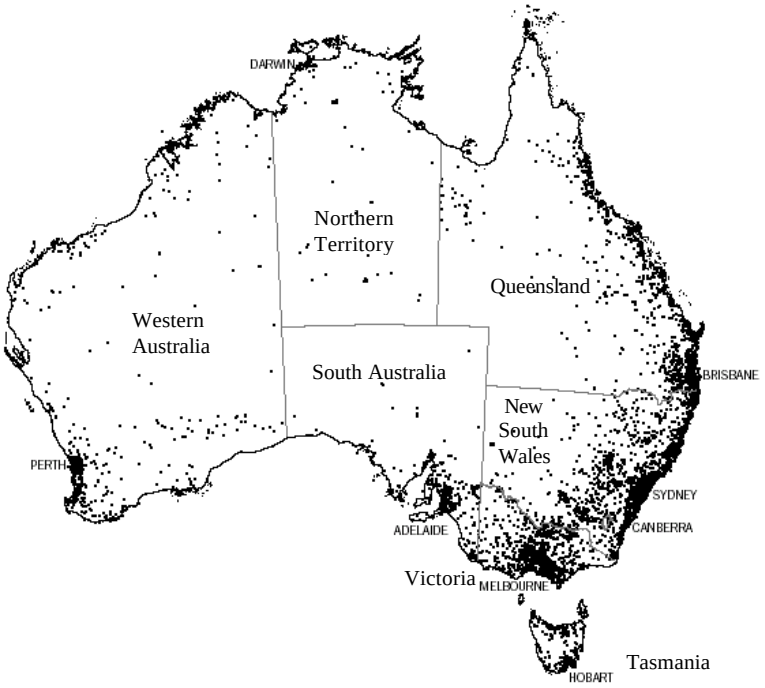

Figure 1. Current population distribution in Australia (source www.abs.gov.au)

The strategic outcomes desired of the Australian transport system include a safe, efficient, reliable and integrated national transport system which supports and enhances national and regional economic development and social and environmental well-being. In the State of Queensland, for example, the key strategic direction for road system management and infrastructure investment is to support triple bottom line (social, economic and environmental) priorities. The *Roads Connecting Queenslanders* strategy[i] has four key outcome areas (safer roads, efficient and effective transport, livable communities and environmental conservation) which will ensure that the road system enhances the social, cultural, environmental and economic well-being of Queensland communities.

Within urban and metropolitan areas, a relatively mature road network and key trends such as growth in the freight task, reduction in public transport patronage and increasing congestion, mean that an integrated approach to the provision of transport services including the role of land use planning, managing road space and existing road capacity effectively will be important aspects of achieving an improved quality of life and reducing environmental impacts. Environmental priorities are also particularly relevant in Australia. For example, because Australia is the driest continent in the world, managing road runoff impacts on water quality and the ecology of adjacent waterways is of paramount importance in our cities. Australia's greenhouse gas emissions in per capita terms are high and the transport sector currently contributes around 17 percent of total emissions. These challenges are being addressed through the National Greenhouse Strategy.[ii]. In regional and rural areas, the key challenges relate to economic viability, access to essential services and quality of life.

The Australian Road System

In 2001 Australia had a population of 19.6 million with a total road network length of around 900,000 km. In 1998, around 40 percent of the total road network was sealed. The road length per 1000 population (46km / 1000 population) is almost twice that of the United States and four times that of Japan. Conversely, the number of people per kilometre of road (22) is significantly lower than other countries such as Canada (33), the United States (42), Japan (110) and the United Kingdom (154). The reason for this is apparent from Figure 1, which shows areas of dense development (along the South and Eastern seaboard) and pockets of development (in other capital city areas such as Adelaide and Perth) with vast, sparsely populated areas between them. The average population density of Australia is 2.5 persons per square kilometre, compared to 3 persons per km^2 for Canada and 29 persons per km^2 for the United States.

The Australian vehicle fleet as at July 1999 consisted of around 9.5 million passenger vehicles representing a car ownership rate of just over one car for every two persons in Australia. This is similar to the vehicle ownership rates in the USA (2.04) and Canada (2.3).

The average distance traveled by each car is around 14,000 kilometres per annum. The road freight intensity (expressed in tonne-km per dollar of Gross National Product) is around 0.35 in Australia compared to 0.2 for USA and 0.15 for Canada.[iii]

Each of the three levels of government plays a role in the management and operation of the Australian road network. The Commonwealth government is responsible for the network of national highways, and in 1997/98, budgeted over AUD$1.6 billion for road related expenditure. Of this, 50 percent was spent on the national highway network, 24 percent on the arterial network (primarily managed by the states and territories) and 23 percent on local roads (managed by local authorities). In addition, the state government and local government roads budget was around AUD$3.4 billion and AUD$2 billion respectively.

Sustainable Development

Within Australia, the National Strategy for Ecologically Sustainable Development (NSESD)[iv] was finalised in 1992 after extensive consultation between government, business, industry and the community. This strategy sets out the framework for cooperative decision-making in government and the promotion of ESD throughout Australia. The goal of the strategy is to encourage development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. Linked to this goal are three core objectives which are to enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations, to

provide for equity within and between generations and to protect biological diversity and maintain essential ecological processes and life-support systems.

Austroads (the peak body representing road and transport agencies in Australia) also developed an ESD Strategy[v] in 1995 that was consistent with the underlying framework of the NSESD. A 1999 review of the Austroads strategy emphasised four sustainability themes that reflected the need for integration and balance between the social, economic and environmental aspirations of the community[vi]. This review also developed a self assessment tool based on a set of questions to describe the extent of progress with respect to the implementation of sustainability principles in the planning, design, construction, operation and maintenance phases of road system management.

There has been a strong response to triple bottom line (social, economic and environmental) priorities in Australia with government, industry and communities strongly supporting these integrated principles. The desired outcomes include an improved quality of life and livability which includes the interplay between aspects such as connectivity between neighborhoods, lifestyle, public health, environment, amenity, cultural heritage and economic and social activity.

Key Challenges

There are a number of key challenges for the road transport system in Australia. These challenges include building and maintaining infrastructure to meet the economic and social aspirations of communities; modal integration; improving the efficiency of strategic freight corridors to meet expected freight growth; improving public health, air quality and road safety; reducing urban congestion and greenhouse gas emissions; reducing environmental impacts to air, water, landscape, biodiversity and ecological resources; reducing amenity impacts such as visual intrusion and traffic noise particularly in urban areas; and contributing to the quality of life, livability and well-being of regional and rural communities.

Regional and Economic Development

The key urban challenges include the need for diversity of transport choice including better public transport and integrated pedestrian and cycleways, improved accessibility for people with disabilities, children and older people with special needs, reduced and reliable travel times, reduced congestion and reduced pollution. Expected freight growth, in particular low volume freight in urban areas, will also be influenced by the emergence of e-commerce opportunities. The key regional issues include the role of roads in regional growth and job creation, tourism opportunities and improved accessibility for remote communities. Most states share common challenges including the state of major road infrastructure, road safety, public health and driver fatigue. Other states have unique challenges. For example, the population growth rate in Queensland is higher than the Australian average and high growth in the south-east and coastal areas of Queensland is expected while the rural and remote areas of the state are likely to experience stable populations. This means that the road system will need to cater for the increasing demand in urban fringe areas as well as maintain basic road services in regional and rural areas. The nature of the transport demand is also influenced by industry dynamics. In Queensland and Western Australia, the rural and remote areas have a high concentration of agricultural and mining activities which have their particular transport requirements.

Infrastructure

The Infrastructure Report Card prepared by the Institution of Engineers Australia, notes a number of significant challenges for road transport infrastructure.[vii] The Report Card rated national road infrastructure as ‘average’ (C rating), state road infrastructure as ‘average to poor’ (C- rating) and local roads as ‘poor’ (D rating) based on criteria including asset condition, availability, reliability management and sustainability.

Safety

In Australia, road safety has improved significantly in the last 30 years with fatalities declining from around 3,800 in 1970 to under 1,800 in 1999. In the period 1970 to the early 1990’s road fatalities declined steeply as a result of a number of factors including police enforcement of seat belt wearing, random breath testing, speed limits, improvements in vehicle design and improved roads. This decline was achieved while, over

the same period, population grew by 50 percent and a 150 percent increase in the number of registered vehicles. Since the early 1990's there has been a leveling-out of this decline which represents a significant current challenge. In response, the Australian Transport Council (comprising Federal, State and Territory Ministers with transport responsibilities) has adopted the National Road Safety Strategy 2001-2010[viii] which complements the strategic road safety plans within each jurisdiction.[ix]. A key initiative has been the introduction of 50 km/h urban speed limit which now applies in practice to the majority of travel on local roads[x]..

Other health issues include driver fatigue and stress particularly due to the long distances and long driving hours. The National Road Transport Commission (NRTC) has recently undertaken a review of heavy vehicle drivers[xi]. Data indicates that fatigue related crashes are more likely to result in a fatality than a serious injury indicating fatigue-related crashes are more severe than other crashes. In Western Australia, around 77 percent of fatal fatigue crashes occurred in the country and 23 percent in the metro area. In WA about one third of drivers in all fatigue crashes were under 25 years old and 95 percent were driving a car. Data also shows that, for all vehicles about 4 in 10 fatal country crashes and close to 1 in 6 metropolitan crashes are attributable to fatigue. For trucks, 1 in 3 fatal country crashes and about 1 in 10 metropolitan crashes are attributable to fatigue[xii].

Environment

The key public health issues include the effects of air pollution on the health and well-being of susceptible members of the community, as well as exposure to traffic noise which results in adverse health impacts such as physiological effects on the cardiovascular system, sleep disturbance and lack of concentration. The Port Phillip Region air emissions inventory undertaken by the Victorian Environment Protection Authority indicates that motor vehicle emissions have dropped since 1990 despite a growth in vehicle use. Recent studies into the health effects of emissions and air pollution include the Melbourne Mortality Study which examined the effects of ambient air pollution on daily mortality in Melbourne[xiii]. Two key initiatives in Australia include new national fuel standards[xiv] under the Fuel Quality Standards Act 2000[xv], and more stringent vehicle emissions standards[xvi] that will bring Australia into line with international best practice for diesel vehicles by 2006. In addition, the Australian Greenhouse Office is undertaking programs focused on alternative fuels that will reduce greenhouse gas emissions and improve urban air quality. These programs include the Compressed Natural Gas (CNG) Infrastructure Program and the Alternative Fuel Conversion Program to promote conversion of heavy vehicles to CNG and Liquefied Natural Gas (LNG).[xvii]

Responses

Policy and Strategy

Example. National Greenhouse Strategy

The National Greenhouse Strategy recognised the importance of transport to the abatement of greenhouse gas emissions, in particular through a measure to develop means of 'promoting best practice in transport and land use planning'. Projects included:

- integrated transport and land use planning guidelines and a directory of current practice;
- performance indicators for transport emissions for urban areas;
- land use and travel characteristics in urban corridors: the relevance of micro-design issues;
- a method to calculate the level of transport-related greenhouse gas (GHG) emissions from any part of a city, suburb or development;
- transit oriented sustainable developments[xviii]
- greenhouse abatement potential of travel behaviour change initiatives; and
- integrated assessment framework for urban transport.

The aim of these was to provide practitioners with tools to support informed decision-making in transport and land use planning. The concept is best summed up in the integrated assessment framework (Figure 2), which stressed the importance of identifying all potential options, adequately accounting for induced demand and effectively integrating all impacts (not just Greenhouse).

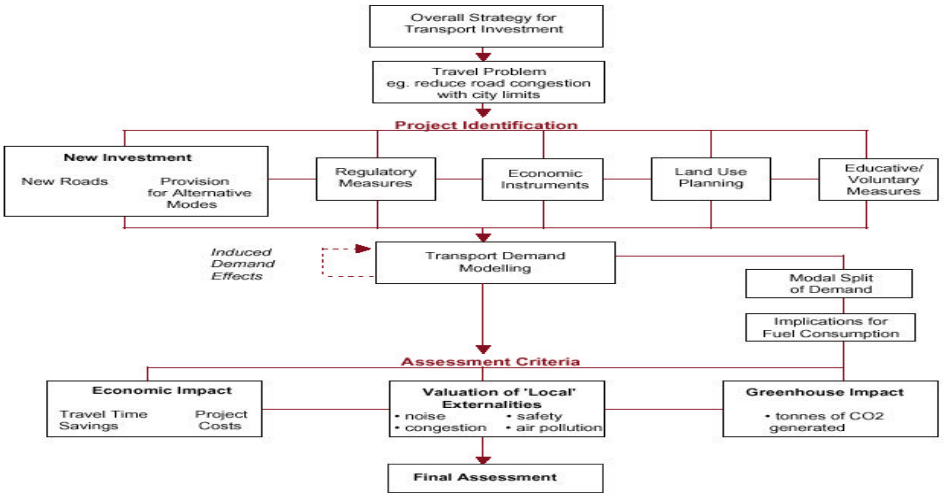

Figure 2. Integrated assessment Framework for Urban Transport

Sustainable Transport Solutions for Urban and Metropolitan Areas

Example: The M5 East Freeway, Sydney, New South Wales

Within metropolitan areas, the role of the road network in improving travel times, reducing travel costs, increasing accessibility to key transport and freight destinations in urban areas and improving community amenity are key drivers of livability and well-being. In Sydney, the construction of the M5 East motorway illustrates a number of significant community benefits that are consistent with sustainable development objectives.

The M5 East freeway is a strategic element of the Sydney road network. At a cost of AUD$794 million, the freeway was opened to traffic in December 2001, six months ahead of schedule. The M5 East is a 13 kilometre route which provides accessibility to key destinations including the CBD, Sydney Airport, the Eastern Distributor and the freight port at Botany. The freeway route includes twin four-kilometre long tunnels which are the longest road tunnels built in Australia.

Since the opening of the freeway traffic volumes have averaged around 77,000 vehicles per day. The freeway has had significant beneficial effects on the surrounding road network. Key surrounding routes have experienced decreases in traffic from around 11 per cent to as high as 51 per cent since the M5 East opened.

A common problem in metropolitan areas that influences the amenity of local communities is the use of local streets to avoid busy arterial roads. This practice, called 'rat running', has been reduced from between 15 percent to just under 40 percent as a result of the opening of the M5 East. Significant community benefits are derived from these changes in traffic patterns.

The 'intrusion' of heavy freight traffic into residential areas has a significant adverse impact on community amenity. Since the opening of the M5 East, there has been significant reductions (for example, between 58 percent and 67 percent) in the number of heavy vehicles on selected routes.

The volume of traffic has indicated that the freeway is meeting a key need of road users and is providing substantial time savings for motorists. Travel time surveys have indicated that significant time savings up to 15 minutes on roads around the M5 East have been achieved. Also, significant reductions in journey times have been achieved during peak AM and PM periods for a wide range of routes surrounding the freeway.

Environmental outcomes are also integral to sustainable development objectives. The region's air quality will be improved by the M5 East as significant numbers of vehicles each day are moved off local streets and stop-start traffic conditions at traffic lights will be eliminated.

An integral part of the freeway design was the development of a sub-regional Air Quality Management Plan for the area around the M5 East. The plan includes a broad range of initiatives including improvements to cycling and pedestrian facilities in the area, with implementation overseen by a community consultation committee. A number of other initiatives are also being implemented. These include smoky vehicle monitoring (using stationary inspectors positioned in each direction of the M5 East and a mobile unit that roves the length of the freeway), a property value guarantee (which applies to home owners living within 400 metres of the M5 East ventilation stack) and an incentive program to assist residents living near the M5 East replace old solid fuel heaters with less polluting new heaters.

Operation of the freeway includes air quality monitoring using purpose-built monitoring stations that record levels of particulate matter, carbon monoxide (CO) and nitrogen dioxide (NO_2). In-tunnel air quality is also monitored automatically to enable the fresh air mix in the tunnel to be controlled.

Example: Travel Behaviour Change

Improving the sustainability of the road transport system involves behaviour changes as well as changes to transport infrastructure. Behavioural changes relating to the choice of transport mode for a given transport need have the potential to provide a range of benefits including reduced energy use and emissions of greenhouse gases, as well as health benefits (where walking or cycling is used in preference to the car).

Two distinct approaches to travel behaviour change have been developed in Australia: TravelSmart Individualised Marketing, in Western Australia [xix], and TravelBlending® in South Australia. [xx] Both initiatives entail *voluntary* behaviour change. Other States are investigating these or similar approaches to travel demand management. The National Transport Secretariat is also undertaking a study of the *Impact of Incentive and Disincentive Programs on Passenger Transport and Efficiency of Vehicle Use*, encompassing taxation and place-based initiatives.

TravelSmart proceeded through a pilot project in South Perth, which produced a 10 percent reduction in car driver trips, which was evaluated and showed benefits exceeding costs by 13:1, through a reduction of 10 percent in car driver trips (14 percent in car-kilometres of travel) and commensurate increases in public transport, walking and cycling. Further implementation on a broad scale has demonstrated even greater car trip reduction and the sustained level of the impact over a period of several years.[xxi] These changes are measured across the whole population of target areas, even though 45 percent do not participate in the program – the changes for participating households would be almost double.

TravelSmart concepts and results have now been incorporated in the strategic transport model for the Perth Metropolitan Region, enhancing the model's ability to realistically assess future transport and land use scenarios.[xxii]

In South Australia, a program branded as TravelBlending® has been used in neighborhoods of Adelaide. This program uses travel diaries to build an understanding of typical travel patterns over time. An initial diary is produced over a 7 day period to enable the identification of travel change opportunities for program participants. This understanding encourages people to reduce their use of the car by thinking about their travel needs in advance and to realize opportunities to chain trips together or to blend their travel. After implementation has begun, a second diary is produced to enable measurement of outcomes achieved.

Benefits derived are dependent on the take-up rates of the target populations. Experience has indicated that up to 15 percent of the population are sufficiently interested to complete the two phases of the travel diary. The reduction in travel achieved by participating households have been around 9 percent to 15 percent reduction in driver trips and a 6 percent to 17 percent reduction in car kilometres. Increases in public transport trips of between 10 percent to 23 percent have also been achieved with a significant increase in the use of buses, and to a lesser extent, walking. The reduction in car trips occurred mostly for short local trips with over 85 percent of the reduction associated with trips of less than 5km in length.

Example: Western Australia – Roads as Economic, Social and Environmental Infrastructure

Transport Infrastructure (TIP) Project

In 1999 the Western Australian Department of Transport established the *Transport Infrastructure (TIP) Project* to develop an integrated state-wide approach to identify infrastructure gaps and opportunities, with the key objectives of reducing transport costs, removing transport barriers to trade growth, extending transport access, improving transport safety and developing an internationally-competitive transport system.

The approach adopted in TIP examined key economic, social and environmental drivers which enabled the identification of strategic investment proposals targeted at key gaps in the State's transport infrastructure. One example of non-traditional project identification and development related to the transport of plantation timber. Significant hardwood timber plantations have been established through the south west of WA which have the potential to reduce the impacts of a phase-out of logging in old-growth forests in the region. Key transport issues include the logistics of harvesting and shipping the timber products, the heavy loads on State and local government roads and heavy vehicle conflict with local and tourist traffic. TIP worked closely with industry, State and local governments to develop a robust basis for road infrastructure development, including industry contribution to a recirculating fund for timely improvement or rehabilitation in return for which industry could gain the cost savings from operating larger vehicles.

The Graham Farmer Freeway

Major roads in cities are often seen to create problems through the social and environmental externalities they create. The development of the Graham Farmer Freeway in Perth, Western Australia, illustrates the role roads can play as social and environmental infrastructure. The need for an inner-city by pass for Perth and river crossing to facilitate urban renewal in East Perth led to the development of a tunnel solution that allowed the urban form (which including heritage buildings) to be retained or reinstated above.

The Graham Farmer Freeway was opened to traffic in 2000. On 26 May 2002, the community celebrated the opening of Plateia Hellas ('Greek Square' – the area was the original settling place for the Greek community in WA) in a peaceful setting above the traffic on the freeway – now part of an extended East Perth redevelopment.

In addition, 10 per cent (roughly $30 million) of the project funding was dedicated to maximising the benefits through enhancing the amenity of the CBD from which traffic had been removed by the by pass. This became known as the Perth Access[xxiii] project and was subsequently enhanced by additional funding from the State Government and the City of Perth. Many of the projects in the Perth Access project, including a bus transfer station and bus lanes on one of the major approaches to the CBD and major changes to traffic and pedestrian facilities to the east of the retail core, have also been implemented.

Example. The Social Value of Roads in Queensland

The State of Queensland has an area of 1.8 million km^2 (which is around 7 times the size of the UK, or 5 times the size of Texas). The length of the road network is around 174,000 km (which includes around 4,200km of national highways, 5,000 km of state strategic main roads, 24,800 km of state regional roads and 140,000 km of local roads). The road network in Queensland is ageing as evidenced by the fact that much of the network was constructed in the 1960s and 70s.

The Queensland population is around 4 million with over 1.4 million residing in the Capital City Brisbane. Rural and remote population densities in Queensland are around 1.7 persons / km^2 in rural areas and 0.1 persons / km^2 in remote areas.

The Queensland Department of Main Roads recognizes the 'social value of the road network'. This has involved a shift away from a primary focus on economic wealth, towards 'triple bottom line' reporting that includes social and environmental outcomes to enhance community well-being.

In Queensland there is a clear community view that roads contribute substantially to social outcomes: roads are an enabling infrastructure that effectively converts 'equity of opportunity' to 'equity of outcome'. As a result, Queensland is enhancing its program evaluation methodologies to include social values. A key principle in this approach is the recognition that desired road system outcomes, which reside with the

community, are discovered through a process of community consultation. As an example, the key community priorities emerging in Queensland include improved safety, economic efficiency, reduced road user costs, reduction of congestion and delays, improved access for freight efficient vehicles and environmental sustainability. Additionally, in rural and remote areas, the importance of access to industry, regional development, access to emergency and essential services are priorities.

In Queensland, a process of developing Integrated Regional Transport Plans (ITRP's) has highlighted a number of key road infrastructure funding issues[xxiv]. For example, the ITRP prepared for South East Queensland in 1997, noted that "to maintain current levels of access and mobility, up to A$31 billion will be needed for (road) system improvements, operating costs and maintenance over the next 25 years, and A$19 billion for capacity enhancement for roads, rail, and other public transport". The Queensland State Infrastructure Plan 2001[xxv] provides a strategic framework including annual implementation plans to ensure that transport infrastructure underpins economic growth, employment creation and livability in the state. The Plan notes the rapid growth in road freight task (increasing by 123 percent of the last decade) and associated issues of road maintenance and funding. In order to maintain the existing network performance to acceptable standards it is estimated that a backlog of $4.8 billion in road rehabilitation and maintenance works exists on state controlled roads.

Different funding mechanisms are emerging as a result of these challenges. As an example, Public Private Partnerships (PPPs) are intended to enable the delivery of transport services to the community through private sector investment in design, construct, operate and maintain projects. In New South Wales and Victoria, major road projects have been delivered through this mechanism. For example, the CityLink project in Melbourne was financed under a Build-Own-Operate-Transfer (BOOT) arrangement as a A$2 billion privately funded fully electronic tollroad.

Example: Nundah Bypass Project, Queensland

Nundah is one of the older suburbs of Brisbane and is located only 8km from the CBD. The Nundah Study area has a population of about 8,000. Lifestyle can be primarily characterised as residential, commercial and retail oriented.

The problems of Nundah

There is a strong sense of community interest and social interactions built around Nundah's unique historical background where a mission for local indigenous people was established in 1837. Thirty five years ago, Nundah was in vibrant active community. This lifestyle deteriorated over time as traffic volumes increased on Sandgate Road which is a major north south arterial road carrying approximately 40,000 vehicles per day. Roadside parking was prohibited in peak periods to allow 2 lane traffic flow in the direction of the peak flow with 1 lane of opposing flow. The major environmental issues in the area related to air and noise pollution, both of which are traffic related.

Sandgate Road effectively spilt the Nundah community either side of this busy arterial. It made access to facilities difficult for the community depending on which side of Sandgate Road these facilities were located or where the community members lived.

Approach to the problem

In response, the Department of Main Roads Queensland (DMR Qld) began planning to examine options for long term solutions to traffic problems in Nundah. A Local Area Consultative Group (LACG) was established to collect views and information from the community. Around sixty prospective solutions were evaluated from which 3 options were thoroughly investigated with an Impact Assessment Study (IAS).

The option selected provided a two way, dual carriageway link to the west of Sandgate Road which was substantially underground – a cut and cover tunnel, as shown in Figure 3. The main objectives were to provide enhanced through traffic movements and to provide an opportunity for the revitalisation of Nundah Village.

Figure 3. Nundah Tunnel

The Nundah project enhanced quality of life through a range of community benefits. These included improved recreational facilities (Nundah Memorial Park, through which the tunnel was excavated, was recontoured to a new design and park facilities upgraded), cultural heritage improvements (upgrading of a major War Memorial and War Trophy in the park), safety enhancements (the road frontage at Nundah State School was reconfigured to improve parking provisions and the local side road access limited to control 'rat running' through residential streets), local environmental improvements (through local drainage systems which improved flood immunity) and other community benefits (including strengthening of the economic viability of local shopping facilities, improvement of physical appearance to provide a stronger identity, improving the connection between the shopping centre and the railway station, and improved pedestrian safety, accessibility and comfort through the centre).

Regional and Remote Areas

Example: Roads as more than a means of transport – Peninsula District of Queensland

As shown in Figure 4, Queensland is a vast state in the north-east of Australia. It is significantly larger than Great Britain. The majority of the population of four million people are located in the narrow strip on the Pacific coast. A dispersed community is spread throughout the remainder of the state.

Two key principles of sustainable development are the intra-generational equity principle and the inter-generational equity principle. These principles guide decision making to ensure equitable outcomes for current communities as well as future generations. The provision of transport services to communities located in sparsely populated areas is a particular challenge in terms of management and funding.

In response to this challenge, the DMR Qld established a Transport Infrastructure Development Scheme (TIDS), which is a means of channeling funding to upgrade road infrastructure in remote communities. The program is in the order of AUD$10 million per annum and is targeted at improving access into and around the communities.

An example of the use of TIDS is seen in the Boigu Island which is Australia's northern most territory located at the northern tip of the Yorke peninsular. The example demonstrates how the provision of road infrastructure can provide significant quality of life benefits for such remote communities. A key thrust of the project was to provide adequate all-weather linkages between the communities and alternative transport modes to ensure year round access to essential services.

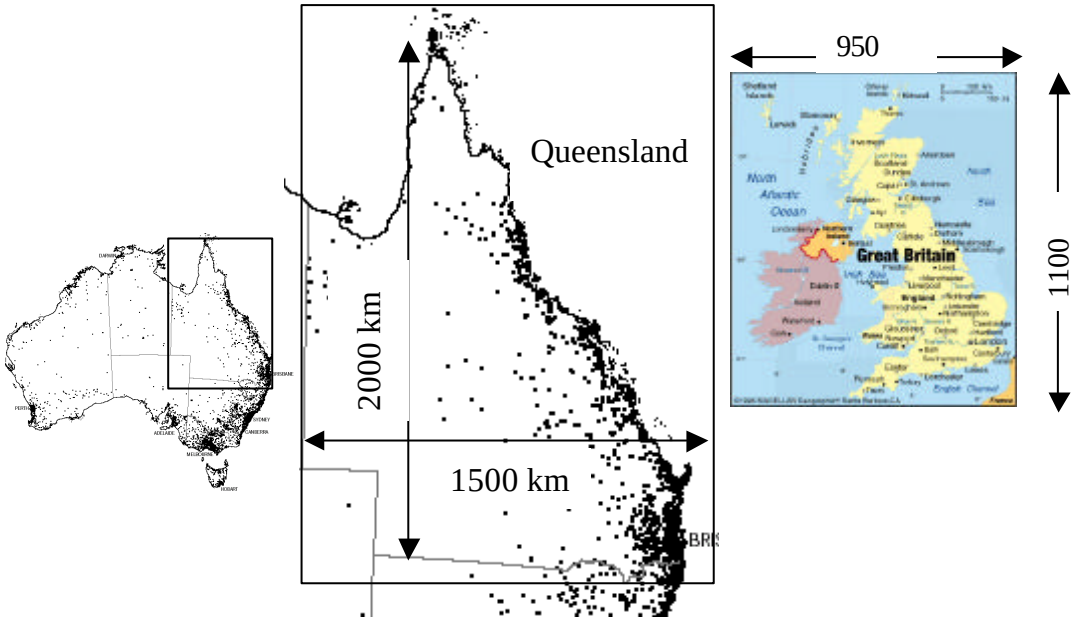

Figure 4. Queensland in context

Boigu Island - Quality of Life

Boigu Island consists of mud and sits not far above sea level. During the wet season the island becomes a quagmire. This is not only a problem from the point of view of access but is also a public health issue due to ponding water. Life threatening diseases such as Japanese Encephilitis can prevail under these conditions.

In the dry season the road becomes dusty and under these conditions respiratory problems prevail. Instead of applying more traditional approaches to the health problem, the wider uses of roads infrastructure were taken into account and the DMR Qld response to this was a $ 1.3 million road project.

The project design was an innovative one that catered for three key issues:

- Lack of traditional road building materials.
- Remoteness of the site.
- Drainage difficulties associated with the flatness of the terrain.

Rather than the traditional crowned road, this road was built as a mirror image with an invert at the centre. Sitting just on natural surface, the road then became the primary drainage system for the island.

It was made of glass fibre reinforced concrete which will be durable under the high water table conditions. This construction was more suited to this remote area where all construction materials have to be barged to the island.

Figure 5 shows the 'before' and 'after' situations.

Figure 5. Environment before and after project

The Boigu Island road has made a significant contribution to enhancing the quality of life for Boigu Island residents. This was obvious at the official opening of the road where the community lined the road with balloons and streamers to welcome the Minister.

One of the consequences that was not contemplated in the design manual was that the road gave the children of the Island their first chance to use rollerblades. Something taken very much for granted in mainstream Australia yet a key performance indicator of this project. This is an important reminder that roads infrastructure not only provides for transport needs but is also an important element of social infrastructure.

Key performance indicators for this project which could be monitored and used to build a knowledge set on identifying and prioritizing and justifying such projects might include Infection rates of "sludge-borne" diseases, Future incidence of respiratory disease and the fitness levels of the youth on the island. It is unlikely that performance measures such as these have ever appeared in a design manual or text on transportation project analysis!

[i] The Roads Connecting Queenslanders strategy is available at the following URL: www.mainroads.qld.gov.au

[ii] See *The National Greenhouse Strategy* (http://www.greenhouse.gov.au/pubs/ngs) and *The Heat Is On: Australia's Greenhouse Future* (http://www.aph.gov.au/senate/committee/ecita_ctte/gobalwarm)

[iii] Austroads (1997). *Roads in the Community*, Sydney

[iv] See http://www.ea.gov.au/esd/

[v] The Austroads ESD Strategy developed in 1995 included four objectives: (i) protection of biodiversity, (ii) improvement of equity within and between generations, (iii) maintenance of ecological processes, and (iv) improvement of individual and community well being and welfare.

[vi] The review of the Austroads ESD Strategy emphasised *social well-being* (aspects of livability, quality of life, equity and human well-being;), e*conomic vitality* (including competitiveness, effectiveness and efficiency), e*nvironmental integrity* (integrity of ecological processes on which life depends, protection of biodiversity and maintenance of environmental amenity) and *integration* (focusing on the balance between social, economic and environmental objectives).

[vii] See http://www.infrastructurereportcard.org.au/

[viii] See the Australian Transport Safety Bureau (ATSB) internet site at www.atsb.gov.au

[ix] See, for example, http://www.vicroads.vic.gov.au/road_safe/index.htm for the Victorian Road Safety Strategy which covers issues such as driver safety, pedestrian, bicycle and pedestrian safety, public transport safety, heavy vehicle safety as well as fatigue, drugs and drink driving.

[x] See the Australian Transport Safety Bureau (ATSB) http://www.atsb.gov.au/road/rpts/eval_speedlimit/review_b.cfm

[xi] See http://www.nrtc.gov.au/publications/content/factsheets/FatigueReviewFactsheet.pdf

[xii] See http://www.mrwa.wa.gov.au/safety/driver_fatigue/fatigue_index.htm

[xiii] The Melbourne Mortality Study is available on the Victorian Environment Protection Authority Internet site at http://www.epa.vic.gov.au/Publications/

[xiv] See http://www.dotrs.gov.au/land/Environment/fuel-issues.htm

[xv] The *Fuel Quality Standards Act 2000* and the *Fuel Quality Standards Regulations 2001* create national standards for fuels and provides a framework for enforcing these standards.

[xvi] This includes the staged introduction of *Euro 2* and *Euro 3* standards for petrol vehicles and *Euro 2*, *Euro 3* and *Euro 4* standards for diesel vehicles. See http://www.dotrs.gov.au/land/Environment/new-adrs.htm Information relating to environmental benefits of new vehicle standards and fuel standards is available from the National Environment Protection Council (NEPC) which was established to set national environmental goals and standards for Australia. See www.nepc.gov.au

[xvii] See http://www.greenhouse.gov.au/transport/alternative_fuel.html

[xviii] Available at http:// www.build.qld.gov.au/research/BrDocs/tosid.pdf

[xix] See http://www.dpi.wa.gov.au/travelsmart/marketing.html

[xx] For a comparative description and analysis see *Review of IndiMark and Travel Blending Applications in Australia, 1997-2000*. National Greenhouse Strategy Measure 5.3 Taskforce, Transport SA: Adelaide, South Australia.

[xxi] See James, B (2002). *Travelsmart – large scale cost-effective mobility management*. Proc Institute of Civil Engineers: Municipal Engineer, March 2002, pp39-48

[xxii] Brog, W, James, B and Lawrence, P (2002). *TravelSmart – Large-Scale Cost Effective Mobility Management Modelled Effects on the Road Network*. Paper for Symposium 'Networks for Mobility', Stuttgart, September 18-20, 2002

[xxiii] *Perth: Access to the City for People*. Transport (now Planning and Infrastructure) WA: Perth, Western Australia

[xxiv] The ITRP's are an element of the Queensland Implementation Plan of the National Greenhouse Strategy. Details are available at the following URL:http://ngs.greenhouse.gov.au/action_plans/module5/measure5.4/qld.html. and http://www.env.qld.gov.au/environment/environment/green/.

[xxv] The State Infrastructure Plan is available on the Department of State Development internet site at www.sd.qld.gov.au by following the investment links.