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## ONE TRANSPORTATION PLANET

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**ABSTRACT:** *New Zealand is geographically a rugged country accommodating only 4 million very mobile people. It has many transportation successes to its credit. This dominantly urban nation has one of the highest per capita expenditures on vehicles and travel in the world. Traffic conditions in the three main metropolitan areas of Auckland, Wellington and Christchurch are, as predicted in the 1960s, stumbling into congestion. This paper outlines the activities of New Zealand engineers and planners in developing the country's transport and urban systems. It also discusses some current technical issues in trip generation and establishes that the New Zealand trip generation environment is similar to those being explored in the United Kingdom and Australia. The third section of the paper describes the institutional and policy arrangements being developed for integrated national and regional transportation planning. Our UK and NZ transportation experiences have much in common and demonstrate that we are sharing 'one transportation planet'.*

## PART 1 THE NEW ZEALAND CONTEXT

### 1.1 Introduction

New Zealand's twin islands, with a length of one and a half times the distance between Lands End and John O'Groates, with its rugged mountains and its grand coastlines are occupied by only 4 million people. While this antipodean destination and its spectacular scenery is good for tourism, it can be very difficult for transportation. There is an excellent two lane inter-regional rural and tourist road network and also a central rail link north to south. However in the last 30 years, like the United Kingdom and other urbanising nations, the country's main transport problems have changed with policy focus moving from the rural connection to urban and metropolitan congestion. This applies particularly in the Auckland metropolitan area.

Once, 60 years ago, New Zealand had a majority rural based population. Parallel with the advent of good roads and a good air service the urban share of the population has now reached up to 85%. New Zealand's city dwellers are very mobile in terms of internal migration and heavily reliant on the car for transport. Car ownership is at 620 per 1000 population. In many respects it is a nation on the move. It relies on immigration for growth and enjoys the visits of over two million tourist visitors a year. Nearly all Kiwis share a strong desire for overseas travel for business, recreation and sport. It is becoming more obvious that freedom of movement is now reducing at the centre of New Zealand's largest cities, at the cross roads of its urban motorways and the increasing congestion on its urban arterial streets.

### 1.2 Institutional Arrangements

The Ministry of Transport (MOT), Transit NZ and Land Transport NZ (LTNZ), together with the Police in their traffic enforcement role, are the four major agencies serving government's transport interests. Central Government through Transit NZ takes responsibility for the 11,000 kms of State Highway, using the first half of the government's annual public transport investment for this system. The second half of the public funding is the shared responsibility with the 85 local government Councils, who maintain the other 80,000 kms of local roads. The latter funds largely come from rates and petrol excise tax and a modest level of targeted government grant. Other modes, such as rail and bus, are established as

trading activities but also receive some limited public funding and in urban areas passenger transport subsidies.

Regarding qualified professionals there are some 9000 members of the Institution of Professional Engineers of NZ (IPENZ) and 1000 members of the NZ Planning Institute (NZPI). Of these professionals about half are employed as consultants in the private sector and the rest are divided between central and local government.

The Transportation Group of IPENZ was established in 1972 and now enjoys a membership of over 900 practitioners mainly engineers and with a leavening of town planners, geographers and economists. It is the major professional institution covering the transportation sector. A number of the Group's transportation engineers have come from the UK and also a few from the US and South Africa. These professionals happily adopt their new country and seem to readily adapt their talents to fit and share with Kiwi needs (Ref 10).

### 1.3 A Sketch of NZ Transportation

Over New Zealand's 170 years of European occupation, transport has been a core activity of central government, local government and commercial life. Initially transport was by sea. However land based transport quickly converted bridle trails, to bullock tracks, to coach roads then to motor roads. Transportation also included the creation of a national rail network by 1890. Extensive port improvements occurred in the 1860s and later with the containerisation era of the 1960s. Since the 1950s new airports have been built and their continued extension and development has been necessary to match the spectacular growth in this mode of travel.

The welfare state from the 1930s to the 1980s included, amongst its social goals, the development of a transport system. The resulting improvement in rural and urban accessibility made transport cheaper and more reliable. The most significant transport projects since the 1950s have been made possible through large earthworks and reinforced concrete bridge construction. This construction of new roads and motorways has represented great effort to try and match the demands of a five fold growth in motor vehicle traffic between 1955 and 2005(Ref 6). These transitions are shown in Plates 1 to 3 (Ref 10)

In 1973 it was estimated that 150,000 people or 14% of the New Zealand labour force were, one way or another, employed in transport. Up to 1988 the transport sector was mostly owned and managed by central government, which had operational, planning and subsidy responsibilities. However in the late 1980s the government introduced strong new-right market-led policies resulting in major changes to the sector. This included the sale and transfer of state owned bus, rail, sea, air and other transport assets to private enterprise and State Owned Enterprises (SOE). Following government restructuring in the 1980s the number of people employed in transport was reduced by half to 75,000 people or 4% of the 2005 total labour force. These losses also included a loss of professional engineering design skills. After 150 years the much respected NZ Public Works Department (by then the Ministry of Works and Development) was disestablished in 1987.

From 1982 the de-regulation led to a significant growth in private transport operators and half of the professional engineering design resources transferred from government into private sector consultancies. A down side of that phase of change was a reduced integration in planning for transportation as a whole. I believe this is the same path taken in the UK over the past 50 years. However in New Zealand these changes occurred in a rapid and dramatic way from 1985 to 1995.

With national restructuring in transport largely resolved by 2000 attention turned again to the regions. Auckland is an international city and the power house of New Zealand representing over one third of the economy. It is estimated that by 2021 the population will have grown by a further 0.5 million to about 1.8 million. This dominance of Auckland in the national scene is illustrated in the map of Fig 4.(Ref 18) To accommodate this growth a Regional Growth Strategy (RGS 1999) became a serious central and local government endeavour in an attempt to integrate these demands in an effective regional plan. (Ref 1)

# 1. Landmarks of Land Transportation 1850s To 1950s



1. Otira Gorge Bridle Path after a Flood 1876.  
*Alexander Turnbull Library*



2. Crossing the Bealey River 1860s to 1920s.  
*Canterbury Museum*



3. Tunnel Gang Otira 1923  
Built 1910 to 1923 13.6 kms long.  
*Alexander Turnbull Library*



4. From Coach to Train c.1913  
*Alexander Turnbull Library*



5. Rail Dominance 1890s to 1950s.  
*G.B Churchman*



6. A Ka Steam and Fiat Railcar 1963.  
*J.A.Terry*



7. Diesel Arrived in the 1950s.  
*New Zealand Railways.*

## 2. Landmarks of Land Transportation 1950s to 1990s



1. A Main Trunk Viaduct opened 1987  
*Near Taihape - Mark Cole*



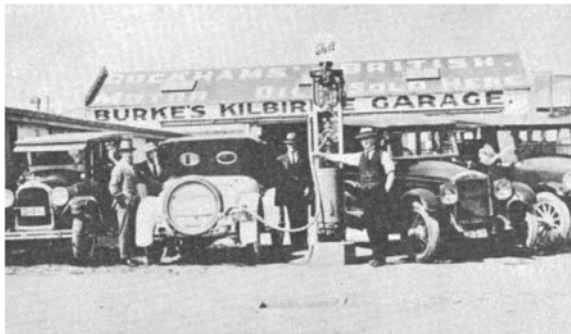
2. Electrification of Main Trunk 1985  
*Near Taihape - Dave Simpson*



3. Inter-island Ferry Arahura - Rail & Roll On Roll Off  
*Picton 1989 - G.B.Churchman*



4. Container Vessel Lyttelton  
*'Encounter Bay' 1969 to 1999 - Transportant.*



5. Wellington's First Service Station 1926.  
*Kilbirnie*



6. Electric Unit at Melling & Western Hutt Motorway  
*1988 G.B.Churchman*



7. Southern Motorway Christchurch  
*Grade Separation Lincoln Rd, opened 1977, M.Douglass*



8. Mangere Airport 1965  
*Whites Aviation.*

### 3. Landmarks and Motorway Developments 1959 to 2000



1. Devonport Car Ferry 1959.  
*New Zealand Herald*



2. Auckland Harbour Bridge 1959  
*Extended to 8 lanes 1969. AHBA Hill-Thomas 1960.*



3. Newmarket Viaduct 1963  
*Auckland motorway - NRB*



4. Auckland Northwestern Motorway  
*Te Atatu 1963 - NRB.*



5. Wellington Waterfront Motorway.  
*Thorndon to Kaiwhara 1969 - Transit 1996*

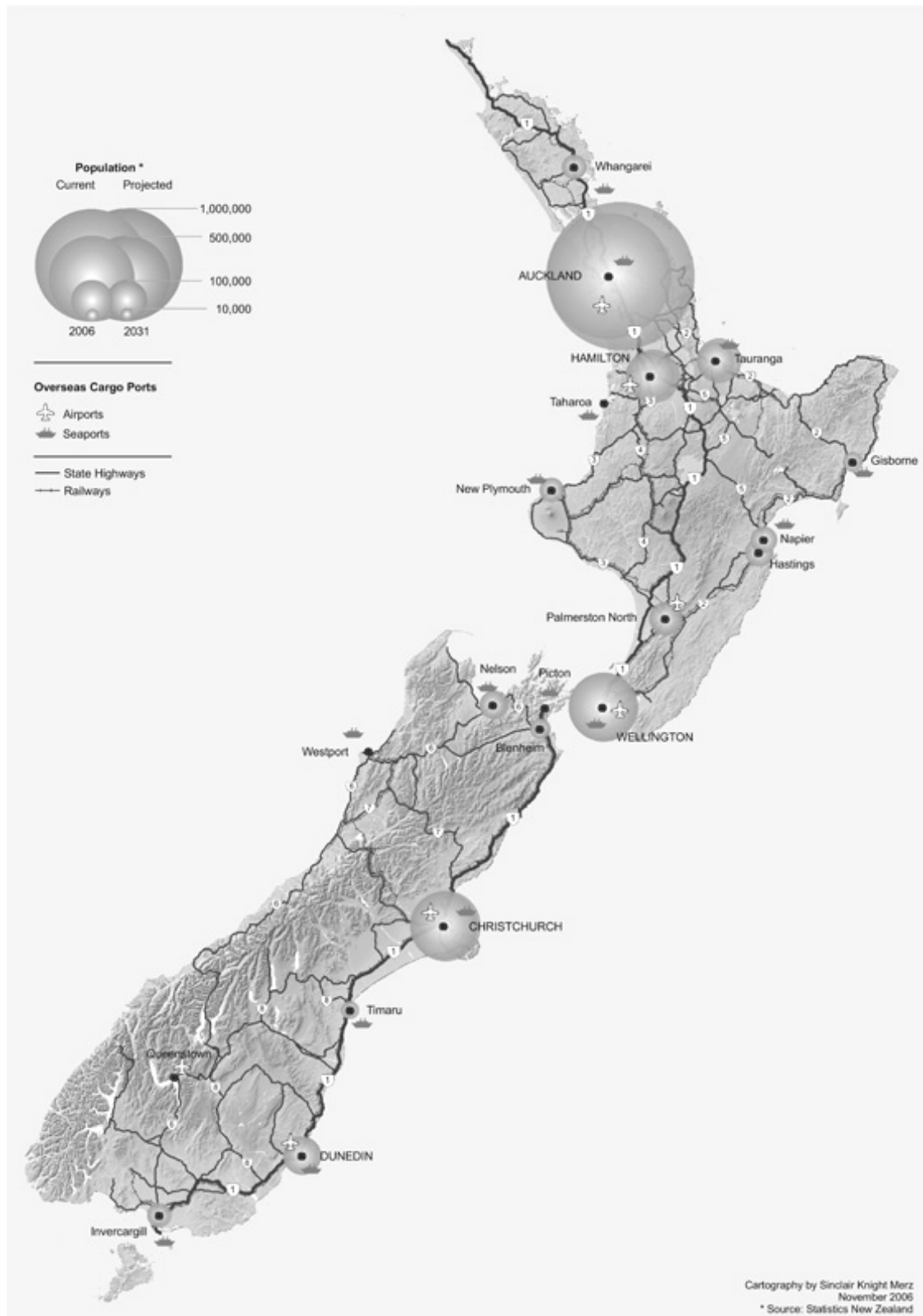


6. Auckland Bus-lanes and Bus-ways



7. Otira Gorge Viaduct  
*Opened 1999 - Transit*

## 4. NZ Cities and State Highways



A special 'Local Government (Auckland) Amendment Act (LGAAA 2004)' was also passed. This included the creation of the Auckland Regional Transport Authority (ARTA) established to plan and manage all land transport in the region covering the four cities and three districts.

## 1.4 Professional Transportation Engineering Training

The need for specific traffic and transportation training of our young engineers became very evident in the late 1950s. The opening of the Traffic School at the University of New South Wales, Sydney, under Professor Ross Blunden in 1958 was a catalyst for training in antipodean Traffic Engineering. By the time Professor Blunden retired in 1981 about 100 New Zealand engineers had attended and qualified from his school. (Ref 10)

In the 1950s and 60s American consultants such as De Leuw Cather, Rankine Hill and Wilbur Smith undertook transportation studies in New Zealand. This introduced the American techniques of that period to transportation practice in NZ. It also opened the door to university courses in the States sometimes sponsored by the International Road Federation (IRF). By 1960 increasing interest had developed for equivalent training in the United Kingdom and this also attracted many kiwis to study at Birmingham, Newcastle and London. Others enjoyed the practice of working for consultancies and government while in the UK and some stayed on to enjoy that experience.

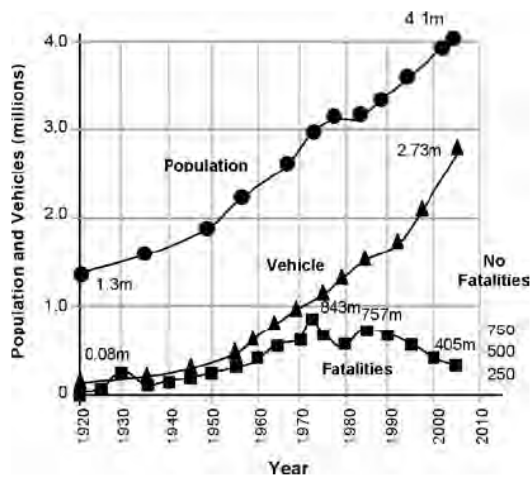
In 1966, as a consequence of increasing public debate about transportation planning and its effects on the urban environment, Professor Colin Buchanan and colleague Geoffrey Crowe visited New Zealand as consultants to Christchurch and Auckland City Councils. They were asked to peer review, in the light of English practice, the emerging metropolitan master transportation plans for these cities. Their reviews were supportive but critical of the need for more harmony between town planning with traffic planning, in particular the absence of the reconciliation of traffic with urban environmental capacity. (Ref 4)

On the practical front, integration of land use and transportation planning has been encouraged by our senior professionals. The principle of integration has been generally accepted as evidenced by the 1966 merging of traffic enforcement and traffic engineering in the MOT. In addition the government is currently merging Transit and LTNZ. Amongst the professionals progress can also be made toward integration leading to improved long term solutions.

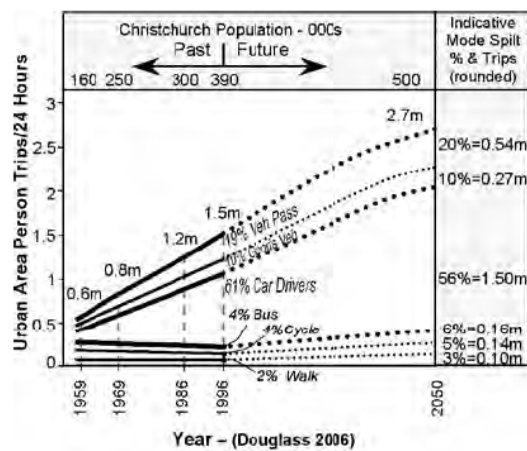
In the new millennium, after a period of 15 years of planning neglect, the framework of a New Zealand Transport Strategy NZTS (2002) and the new Land Transport Management Acts (LTMA 2003 & 2004) have emerged to provide stronger transportation planning and more systematic network planning. This includes the prospect of greater forward planning and also an increased application of new technology (e.g. tolls, travel demand management, electronic aids, alternative energy sources) to manage and propel our vehicle fleets. These directions will increase the demands, skills and training required from leading members of the engineering and planning professions. Our Universities of Auckland and Canterbury and other training institutions are 'racking up a notch' to provide these additional skills. Today the need for sustainable transport planning integrated with strategic urban planning is demanded more explicitly.

The need for training of our engineers and planners on the issues of integrated transportation and urban strategic planning has become a challenge for us all as we plan for the planet's sustainable future.

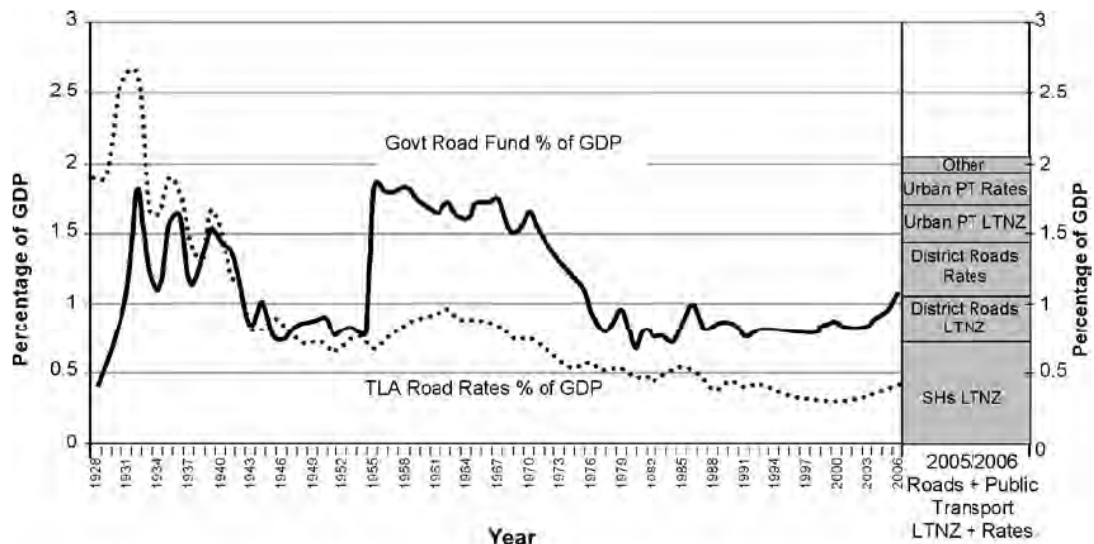
## 5. Graphs of National Growth and Changes in Transport



Graph 1: New Zealand Changing Population, Vehicles and Fatalities



Graph 2: Christchurch Urban Area Past and Projected Future Daily person Trips



Graph 3: Public Spending Percent of GDP



## 1.5 Cost of Travel and Increasing Car Ownership

Plate No 5 includes three graphs reflecting the changing situation of population, vehicle ownership, and transport expenditure in New Zealand. (Ref 10) Graph 1 captures the growth in people and vehicles and, thankfully, the reduction in fatalities after the annual highest peak of 843 in 1973. Graph 2 indicates past and projected future trends in modal split for the Christchurch metropolitan area. Graph 3 indicates the public effort and investment in transport and shows the percentage of the Gross National Domestic Product spent on public investment in land transportation by government and local government since 1928. (Ref 10)

It was in the mid 1920s that the Government began funding a main highway programme in support of local government's road networks. The graph has been prepared on the basis of government tax and local authority rates spending. In addition the total of public spending on all aspects of land transport for 2006/2007 is shown in the pillar diagram at the side. By 2006 the total in all public funding had again crept up to 2% of GDP. Private household expenditure on travel is of course a bigger component and when added to the public expenditure brings GDP total on transport to nearly 10%.

With 620 cars per 1000 population (and total vehicles 730 per 1000) New Zealand is up amongst the world leaders on this index. It ranks with the big four of the United States of America, Italy, Germany and Australia. The New Zealand car population continues to increase. It is of interest that of the cars entering the fleet 67% are second hand overseas imports, mostly from Japan. As with other countries, the average size of car engines keeps creeping up. In New Zealand they have increased from 1.5 litres in 1990 to an average of 3.0 litres in 2005. This also increases fuel use from about 9 litres to 12 litres per 100 km. It seems the Kiwi is as profligate in these matters as the wealthy part of the rest of the world. (Ref 15).

Relative to the increasing household prices and household expenditure, over the past 20 years, new vehicle prices have stayed at a constant level. In 1986 a new Honda Accord was worth about \$ 36000 or 40% of a typical family house price of \$80,000. Today, 20 years later the equivalent car price remains about the same at \$ 36,000. However the house price has escalated to about \$450,000. So the family car is now only 8% of the \$450,000 house value. In the meantime New Zealand households are hungry for their second (and third) car and 18% of the average household expenditure is consumed on transport. Consumer demand for travel and transport seems likely to continue this upward trend!

One excellent change in transport economics has been the steady decline in both international freight and international passenger ticket costs over the years. These are underlined by the reduction in a cost index assumed at 100 in 1940 for overseas freight by sea, air passenger, and telephone calls. This index had reduced to an index of 20 by 1980, and these competitive rates are still declining.

Certainly in cost and economic terms New Zealand sees itself as a part of one transport planet.

## 1.6 Energy and Emissions in Transport

The NZ Ministry for Environment begins its 'Kiwi Cars, Gentle Footprints' paper with '*New Zealand has a love affair with cars, we love all types of cars and we're buying more and more of them*'.(Ref 15) New Zealand's concern for the environment and commitment to international agreements on carbon control and global warming are well known. A more sustainable energy future is already high in policy and political priority. At present with about half of New Zealand's fossil fuels being used on transport this is a major issues for the future. A National Energy Efficiency and Conservation Strategy was launched in 2001 with the intention of improving energy efficiency by 20% by 2012. Greater efficiency is one goal, improved energy sources are another.

Since 1980 lead has been removed from petrol and air pollution in all our cities now has minimal lead content. The government is seeking the same dramatic drop in other pollution from vehicles and compulsory vehicle testing is underway.

The transport sector has a real challenge and the demand for energy by this sector continues to grow 3-4% a year. So there is little real change in energy allocation and no real reduction in transport energy use occurring at present. The impetus toward electric vehicles, hybrid vehicles, greater use of methane and other bio-fuels are all at the forefront of development. While high in government and public interest, industry has not significantly altered its range of energy for vehicles yet. In New Zealand, The transport sector still offers the best opportunity and the most cost-effective method of improved management for reduced fossil fuel use.

One could be optimistic that at this remote corner of the world with our small and relatively homogeneous population, real progress could be made in this public policy area. If not here in New Zealand, then what hope have either the world's major nations or the less wealthy nations of achieving these international goals. It will be a matter of interest to watch how the emerging countries like China (present car ownership only 10 per 1000 population) deal with their issues of urban migration, massive population increases, and overwhelming increases in vehicle transport.

New Zealand is still flexing its muscles in this energy saving area, hopefully with the prospect of significant reductions in fossil fuel use in the future.

## **1.7 The Emergence of our 'Consult-ocracy'**

There has been a dramatic increase in the extent of public consultation in the past 40 years. In New Zealand both planning and local government legislation place great stress on increased and effective participation through consultation. At the national, regional and local levels there has been a prodigious effort in responding to submission and consultation. These submissions by groups and individuals give a lively involvement in public policy development and planning. This era has been dubbed 'consult-ocracy'.

The council hearings and Environment Court system are a growing industry which hugely influences politicians and councillors. It has moved technical discussions into the hands of lawyers and legal processes. Even large organisations such as Transit NZ, who are very determined to improve their environmental performance, find the public consultation process very demanding of resources. In NZ the engineering and planning professions have been patient and generally adapted well to the consultancy processes now required by law and expected by the public. However it also results in more time spent as expert witnesses and less time at the 'drawing board'.

The legal 'requirement' and 'designation' process for acquiring land for public works and roads also involves extensive consultation. These efforts and the way the 'requirement' is managed can lead to delays and a reluctance to make early and adequate property purchases. This process also tends to result in single mode solutions, to the exclusion of multi mode, integrated and joint corridor schemes.

Consultation has become a major part of planning for developments in New Zealand and many other countries.

## 1.8 Politics and Inter-Generation Projects

Since 1996 the New Zealand government has been elected on a mixed member proportional system (MMP). This has resulted in a series of coalition governments. For transportation interests this may initially have slowed some major projects. However overall with MMP there has, I believe, been an increasing convergence of interest from all parties in support of positive transportation policy. This in turn has led to the milestone of a most comprehensive and widely accepted policy statement, namely the New Zealand Transport Strategy (2002).

The integration and sustainability strategies contained in the NZTS have not, however, deterred the anti-motorway lobby, and other environmentally concerned citizens from having their share of marches, protests and opposition. As a result some politicians continue to have a negative attitude toward policies that tackle the larger transport issues. This is at a time when there is an increasing need for longer term regional solutions at a scale suited to solving wider urban transportation problems.

The adoption of a major corridor plan is frequently a 'political riddle'. It is 'dynamite' to the politician and 'mesmerising' to the electorate. As an engineer and a town planner watching the scene over 50 years I am convinced this is an inter-generational management problem. Are we not starting too late, with too little and with inadequate tools of explanation? Projects must be selected much earlier with a focus of 30-50 years necessary for the 'big ones'. For our present generation to secure the property and the space just so the next generation can undertake the network improvements would be a great step forward. Perhaps we have not conveyed the reality that failure to execute a key transportation element in this generation, actually hastens the extent and the rate of environmental decay in the next. We must adopt longer term horizons to achieve an integrated and sustainable transportation future. This requires more political and technical leadership. (Ref 12)

The political riddles of how to gain support for future transportation improvements is an intergeneration issue. An issue which is common to transportation planning all around the planet.

## PART 2 THE TRANSPORTATION DATABASE BUREAU

### 2.1 The Structure of NZTPDB

The NZ Trips and Parking Database Bureau (NZTPDB or TDB for short) was established in 2002 as a focus group of IPENZ and particularly to meet a need for its Transportation Group members. Like TRICS/JMP the Bureau collects transport information, undertakes research and makes the data available to its members. The members are both public authorities and consultant engineers and planners. It is intended to improve 'good practice' in the area and through shared common knowledge, to converge on agreed figures and so reduce needless debate. (Ref 3)

The Bureau has good ties and reciprocal memberships with JMP the consultants responsible for running the TRICS database in the UK, it is seeking to establish closer linkages with Australian colleagues (AITPM and with Canada and the USA).

The Bureau has 50 New Zealand members, including City and District Councils (23), Government agencies (2), and Consultants (26) from throughout the country. The database includes surveys from 550 sites and this information is being steadily extended. The Bureau is of the same general character and purpose as TRICS/JMP. The two databases have much in common and we are looking to greater convergence in the future. (Ref 3, 8 and 19)

I undertook research on trips and parking issues in New Zealand in the 1970s which resulted in a 1973 Road Research Bulletin No 15. In 2000 Douglass Consulting in conjunction with consultants Traffic Design Group using a Transfund NZ research grant reviewed the earlier work. We compared the 1970 and 1990 trip and parking changes and also equivalent UK, Australian and ITE/USA data. In 2001 Transfund published the research as Report No 209, 'Trips and Parking Related to Land Use'. (Ref 8). Since 2002 the Bureau has undertaken research under contracts to LTNZ. Three current projects are outlined below.

### 2.2 Correlation of UK/NZ Trips and Parking Research

This important research project is essential to both the use of information from the UK TRICS database in New Zealand and also the upgrading of the TDB database to be consistent with UK practices. The research project objective is:

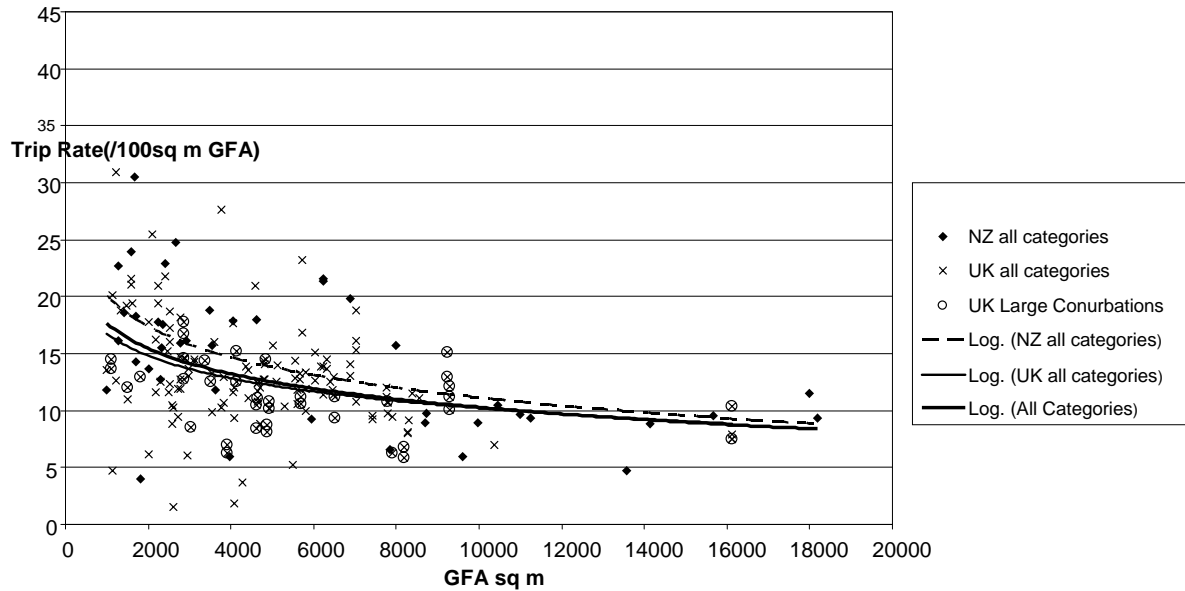
*"To provide New Zealand transport practitioners with better quality and quantity of trip and parking prediction information by making UK data applicable in New Zealand."*

This research has brought UK and NZ data together into comparative tables for equivalent land uses which are defined by similar predictors. A simple system of site lists linked to data for individual sites is being developed in compatible programs by both TRICS and TDB. TRICS has a much larger file of information, about 4000 sites, compared to 600 on the NZ database. In the longer term the two bodies are travelling on parallel paths. TDB intends to finish this research project in March 2008 as it is a prerequisite to the joint TRICS/TDB work and future arrangements.

We have discovered that in both our urban areas we have travel environments which are very similar and looking more coincident over time. Transfund Report 209 established a comparison of trip rates, based on New Zealand, Australia and American trip generation rates in the 1990s. These are briefly summarised here in Appendix 1. These comparisons indicate a convergence and similarity between trip rates in New Zealand, Australia and America and this is currently being tested and confirmed.

## 6. Shopping Centres UK & NZ

**Chart T1: Trip Rate Vs GFA - All shopping centres and Supermarkets including those in large Conurbations**



**Chart P1 : Parking Demand Vs GFA- All Shopping Centres and Supermarkets including those in Large Conurbations**

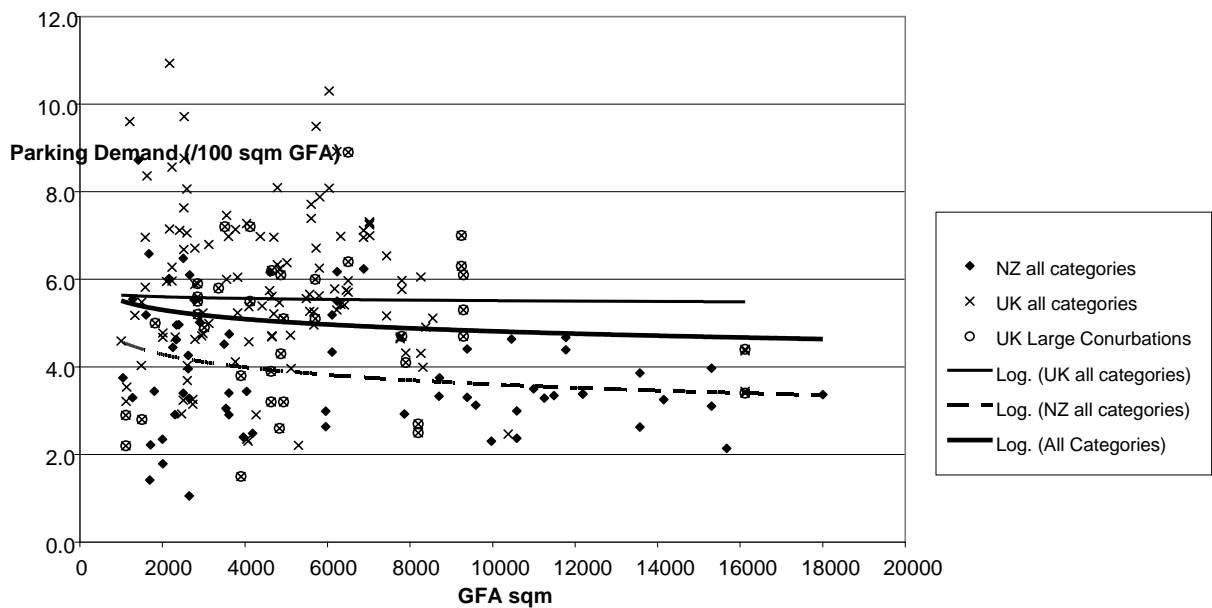


Plate No 6 illustrates the results of our recent analysis for shopping centre sites for a wide range of NZ and UK locations. It can be seen from Plate 6 that we are dealing with a basket of sites which all belong, in a generic sense, to the same travel patterns related to similar sizes of shopping centres. There are, of course, great variations in trip making for the smaller sites. The average results demonstrate the similarity and the 85 percentile results have even greater coincidence between our respective surveyed populations. The research suggests that we can accept the general nature of the similarities and we should now focus on more refined filtering techniques. The differences between premises relate to very specific issues of the descriptions of the activities taking place at the individual site and in both countries the location of the shopping centres relative to population catchments, network accessibility etc. These characteristics can readily be defined in the same manner as already provided for in the TRICS Database, User Practice Guide. (Ref 8 and 19)

## 2.3 Transportation Assessment Framework

This second research project is to establish an agreed national framework as an aid to undertaking Integrated Transportation Assessments suited to the New Zealand administrative, planning and statutory processes. New Zealand does not at present have a comprehensive national guideline for what should or should not be included in transportation assessments and the associated environmental effects. This report seeks to establish suitable thresholds to match the needs of a wide range of situations in all parts of the country.

A recent Integrated Transport Assessment Guideline has been prepared for the Auckland Region by the Auckland Regional Transport Authority (ARTA). These guidelines were developed by reference to current international examples including the Scottish Executive Guidelines of 2006 and current guidelines from Australia. The aim in developing the guidelines is to ensure that assessments address the same questions, and that these are "the right questions" such as

- how does the proposed development fit with regional and local planning objectives;
- how a proposed development will function and its prospective catchment;
- seek that development is located and designed to promote access by a choice of modes;
- identify and mitigate any adverse impacts on the transport system.

For this project TDB is working with Ian Clark of Flow Transportation Specialists and also liaising with ARTA and Austroads who are currently developing their "Guide to Traffic Management Part 12 – Traffic Impacts of Developments", which is due for publication in 2008. (Ref 2)

## 2.4 Research of National Travel Profiles by Home Interview

The third research topic is a detailed analysis of results from national household travel surveys undertaken by the NZ Ministry of Transport (MOT) who made data from surveys over the last five years available for more detailed travel analysis. These annual surveys include trips made by approximately 12,000 people from about 5,000 households from a sample of locations throughout New Zealand. The surveys result in a wealth of daily travel patterns from household surveys including trips by all modes of travel related to different land uses and for varying trip purposes.

The Stage 1 objective of this research is to investigate and determine whether, at the regional level, there are identifiable degrees of variation in New Zealand travel behaviour for the main urban areas and selected rural areas.

## PART 3 NATIONAL STRATEGIES AND INTEGRATION

### 3.1 NZ Transport Strategy 2002

In the past New Zealand has suffered from the absence of a National Transport Strategy and this has been a major handicap for planning at national, regional and district levels. While Transportation Strategies at national, regional and district levels were possible under earlier legislation (e.g. the Town Planning Acts of 1953 and 1977, the RMA1991 and the Land Transport Act 1988) it seems that, for various administrative and political reasons, these statutory provisions were never used.

To resolve this dilemma in December 2002 the Government published the NZ Transport Strategy, (NZTS 2002) as a government policy document and parallel with it also passed the Land Transport Management Act (LTMA 2003 and 2004). These documents now provide a statutory framework for policy setting as a basis for planning and developing the National Land Transport funding programme. This is a comprehensive vision statement of the implications of transport not only in economic, fuel use, energy conservation but also in terms of safety, mobility, public health and environmental planning for our communities. The Land Transport Management Act 2003 (LTMA) gave the NZTS 2002 some statutory force through the role of Land Transport New Zealand (LTNZ) in master minding the annual and ten year National Land Transport Programmes. The process also recognises the parallel role of Regional Land Transport Strategies (RLTS) with their road hierarchies and mode development programmes. (Ref 1 and 9)

The NZTS vision does not make any reference to the spatial, transportation and planning policies to be pursued at a regional level. It deliberately does not consider details such as motorway corridors, environmental capacity or urban development. These practical aspects emerge in the Transit State Highway Strategy (TSHS), the Regional Land Transport Strategy (RLTS) and the District Plan (DP) levels.

Many professional engineers and planners have traditionally been familiar with the issues of an *'integrated, safe, responsive and sustainable transport system'*. However the new statutory requirements lead to a wider acceptance of this broader approach.

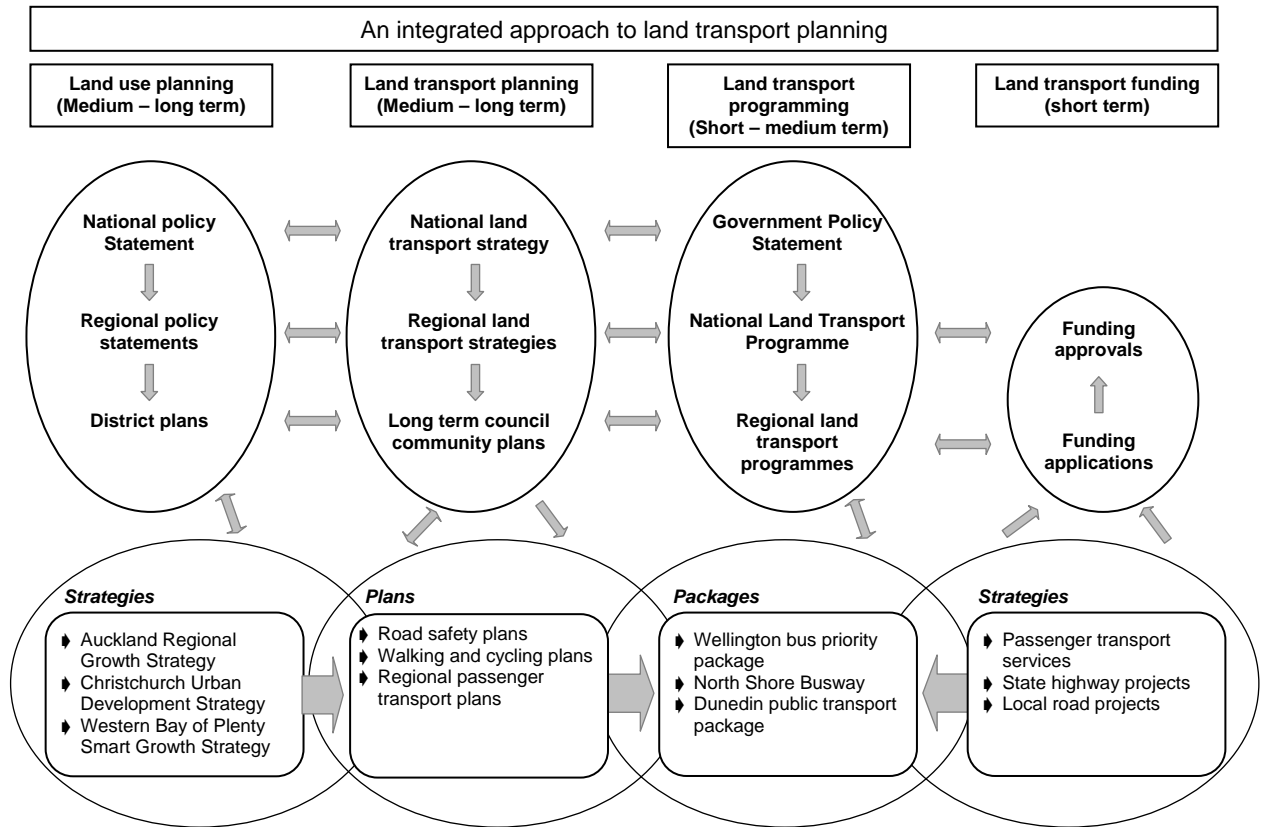
It follows that Regional Land Transport Strategies and the City/District Transport Strategies prepared under the Land Transport Management Act 2003 and the Regional Policy Statements and District Plans prepared under the Resource Management Act 1991, together with the provisions of the Local Government Act 2002, for Long Term Council and Community Plans (LTCCPs) will, in future, all make their contribution to the decisions to be made on transport improvements and network management..

### 3.2 Integration and Sustainability for Transportation Corridors

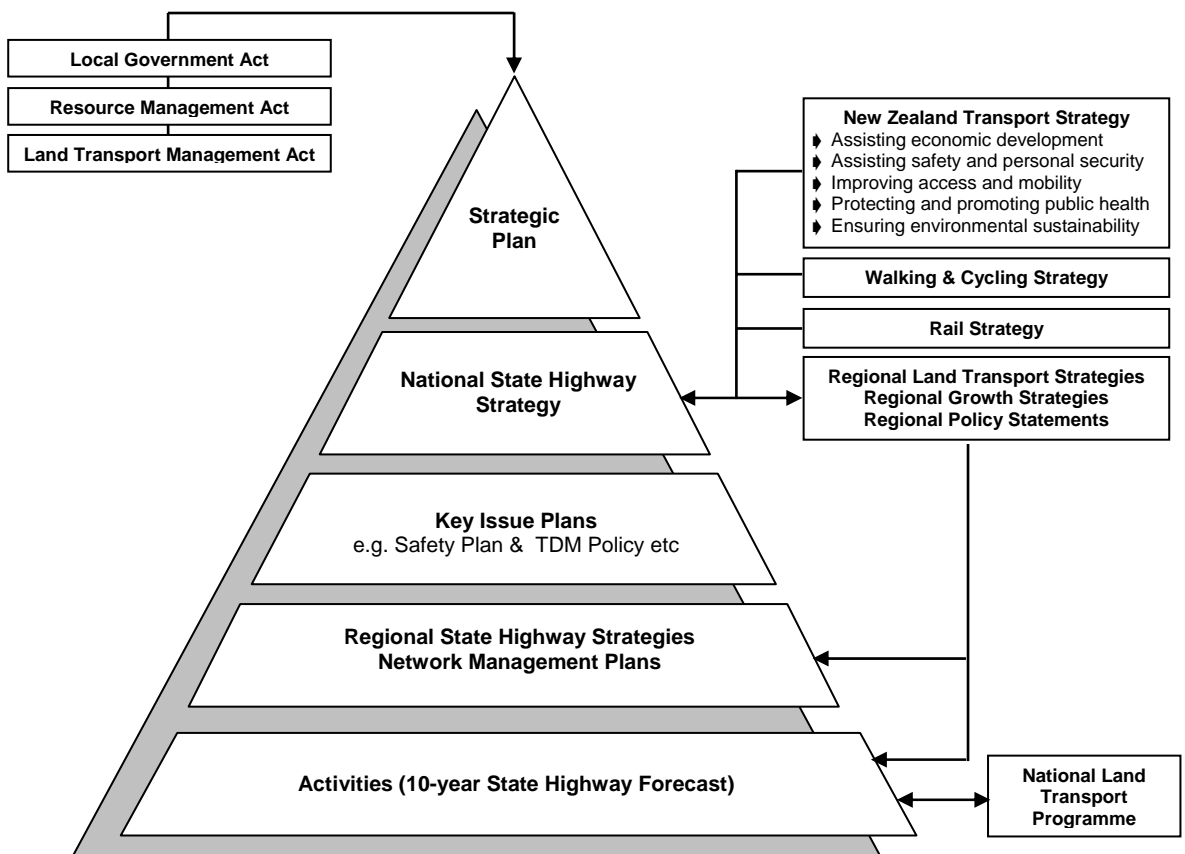
From a professional and technical viewpoint the best way to achieve integrated and sustainable plans is for collegial practitioner agreement that genuine collaboration is a prerequisite to all planning briefs. Integrated transport and land-use planning requires collaboration and trust between all levels of government, national, regional and local. It also requires communication, understanding and trust between the agencies and members of the professions involved. Most importantly the transportation networks and urban strategies must be planned in the long term (30-50 years), medium term (10-30 years) and the short term and be consistently retained and developed. (Ref 16)

A spectacular example of the need for integrated planning surrounds the planning, construction and management of major multi-modal transportation corridors (Ref 9). There is an obvious need, in the main metropolitan centres, for a selected number of higher class corridors to be developed with widened 'footprints' sufficient to provide environmental buffers and anticipate future demands. This should

## 7a. LAND TRANSPORT NEW ZEALAND INTEGRATION



## 7b. TRANSIT NEW ZEALAND INTEGRATION National State Highway Strategy





facilitate future proofing for additional modes of travel in the longer term as well as high standard of landscaping and park ways.

Current practice falls into the short term (10 year) planning horizon and also favours single purpose facilities. While meeting the immediate engineering needs this does not result in planning of sufficient space to provide for future flexibility, expansion, sustainable multi-modal use and reinforcing good strategic urban form. A current research investigation indicates that about half of the existing major corridors have insufficient right of way and lack the ability to use 'buffer land' adjacent to meet any future corridor capacity, e.g. for future bus-ways, HOV lanes, light or heavy rail line, additional trucking lanes, or landscaped cycle and walk ways. This means that still further rights of way or new transportation corridors will have to be carved out in the next generation.

This style of generous corridor planning as part of urban form was relatively well understood in the 1960s but has seldom been seriously pursued (Ref 2, 4, 5 and 13). In New Zealand the lack of funding and institutional turbulence of the 1980s and 1990s resulted in such integrated planning disappearing completely from our radar screen. We are only now again re-discovering comprehensive transportation and land-use corridor planning as part of urban development strategies. With a full generation of professionals having missed the experience of corridor planning there are now very few city regions which have the professional capability to undertake this type of regional planning work. Here is a really big challenge placed on 'our door step' a type of planning which underscores the relevance and importance of the Government's adoption of the New Zealand Land Transport Strategy in 2002.

### 3.3 Institutions and Integration

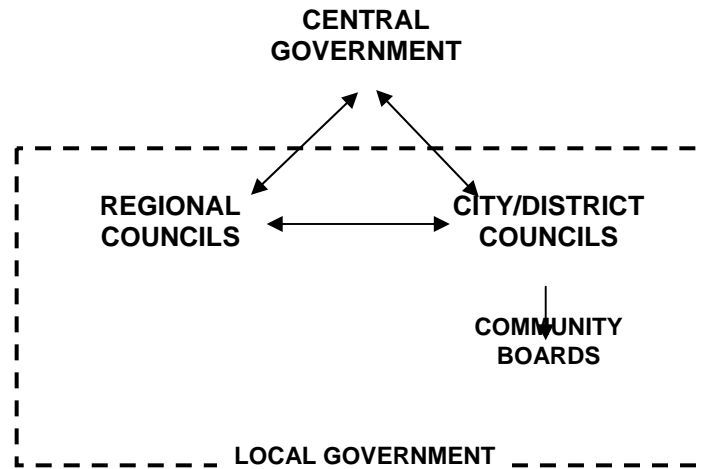
While multiple statutes may appear at first glance a handicap, in reality this need not be the case. The New Zealand statutes are cross linked and the organisations managing them are compelled to adopt a collaborative and integrated approach. The National Land Transport Programmes (NLTP), the National State Highway Strategy (NSHS) and the Regional Land Transport Strategies (RLTS) act as the 'gate keepers' to secure the NZTS purposes. The RLTS is where policy, programmes, spatial planning and design meet. They have the potential to weld national, regional and local levels together and can also ensure that multi-modal transportation planning is integrated with regional land use planning.

Issues for integrated planning are now more complex and subject to much more public consultation and scrutiny than was the case in the past. Three examples (models) of these overlapping and integrating processes for the three major New Zealand transportation organisations are shown on Plates 7 and 8.

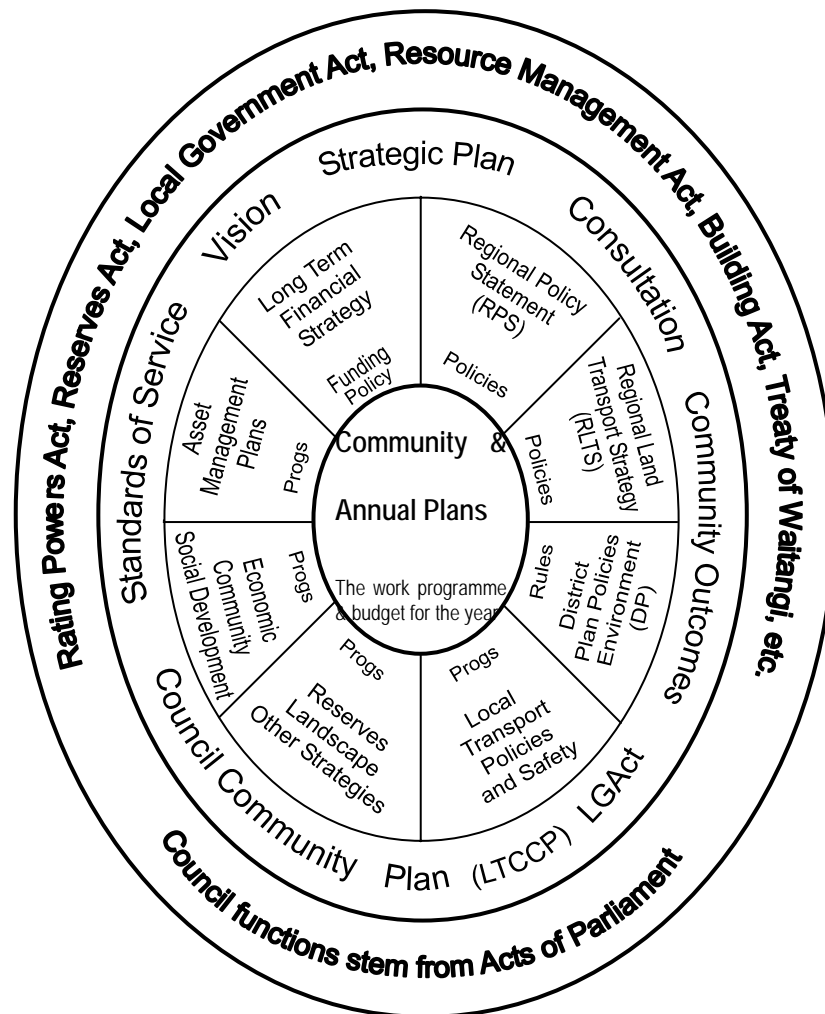
**First: Land Transport New Zealand** in conjunction with the Ministry of Transport is evolving an integrated approach to land transport planning illustrated in Fig 7(a). This is a high level model and links the four time horizons and the three national, regional and local levels together. This recognises the many agencies and their development of strategies, plans, packages and activities. The model provides an effective integration horizontally and vertically through the different agency activities under the oversight of Land Transport New Zealand in the development of Government's National Land Transport Programme. (The Four Egg diagram) (Ref 20)

**Second: Transit New Zealand (NZSHS).** A State Highway Strategy has recently been adopted which also describes how it is to be implemented. This strategy links to Growth Strategies, Regional Policy Statements and Regional Land Transport Strategies and to Transits Planning Policy Manual. Fig 7(b) illustrates these relationships. (The Pyramid diagram) (Ref 14, 17 and 18)

## 8. LOCAL GOVERNMENT INTEGRATION



### a. The Government Triangle



### b. Local Government Planning Processes Integration of Transportation

**Third: Long Term Council Community Plans (LTCCP)** The Regional, District and City Councils are required under the Local Government Act 2002 to develop community outcomes, objectives, policies, asset management plans and annual activity budgets. The purpose is to reconcile expressed community outcomes with the objectives of councils in their planning, for all their activities and infrastructure development. The essence of this last model is the increasing detail and planning needed as each 'skin' of investigation is undertaken, working from the outer legislative framework through the LTCCP process, then into the policy and planning areas so as to achieve the Annual Plan and funding at the core of the LTCCP process. (The Onion diagram) (Ref 9)

These three models show how at national, regional and local levels political leadership and consistency can be achieved while acknowledging the work of all agencies. Land Transport New Zealand, in its responsibilities as part of the preparation of the National Land Transport Programme (NLTP), has to ensure collaborative and integrated planning between all the public agencies involved. These arrangements are new and have only been effective for two years but they do provide a 'top down and a bottom up' framework for integrated transportation policy planning through collaborative administrative arrangements.

## PART 4 CONCLUSION

- How did transport help shape our country?

New Zealand was historically isolated. 170 years ago it relied on sea access and a multitude of harbour and river ports. In the first phase of transport improvements our predecessors developed road and rail networks and overcame the mountainous terrain, crossed rivers, and coastal barriers. To do this the best in transport technology and transportation practice was adapted from English and American experience to shape New Zealand's networks and to link our nation to the rest of the planet.

- How do our communities now shape our transport?

In the second phase of transportation the traditional Kiwi 'developmental' mentality established long paved road links and air routes connecting to the rural towns and rugged regional hinterlands. Now we enter the third more complex transportation phase needed to cope with the urban complexity of our metropolitan communities. Planning as well as engineering skills have now to be gathered together to plan and build the renewal of our established cities in the midst of the existing city populations.

- How do the professions ensure integration?

Integrated transportation planning within cities and between countries involves professionals exchanging 'cutting edge' research and also sharing our 'coal face' experiences. It needs a style of planning clearly recognising the future long, medium and short term frameworks. As in the past this continues to require much ingenuity and also the integration of a wider range of interlocking professions.

As we progress to a global village (by 2030 it is expected 3 out of 5 people in the world will be living in cities and about 500 cities to be over 1 million) the evidence compels recognition that our transport problems are a gathering crisis in the midst of all our metropolitan structures (Ref 11 and 12). There is a growing realisation that *'successful cities must expect to go through successive rebirths over time'*. In this rebirth the arteries for transportation, are the longest lasting element in the city structure, they are the elements that provide the 'framework' for the city form of the future.

In October 2007 the IPENZ Transportation Group published, 'A Wheel on Each Corner,' which records the past 50 years of New Zealand's transportation experience. (Ref 10). The Minister of Transport, Annette King, observed in her foreword *'we need new strategic directions with integrated and innovative solutions and I look forward to the profession's valuable contribution over the next fifty years'*.

Amidst a growing tide of urbanism differences between countries are disappearing and we are increasingly sharing 'one transportation planet'.

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*Malcolm is both a Transportation Engineer and a Town Planner from Christchurch New Zealand. He is a long standing member of both IPENZ and the NZPI. He has held many committee positions in his two chosen professions, including being Vice-President of NZPI and Chairman of the Transportation Group of IPENZ. Following graduation in 1956 with a BE Civil, from the University of Canterbury, Christchurch NZ, he joined the staff of the Wanganui City Council NZ. In 1960-61 he attended Birmingham University with an Aveling Barford scholarship and gained a MSc. in Highway and Traffic Engineering. Later in 1970 he also graduated as a town planner from Auckland University NZ. His career has been divided between city councils, regional councils and consultant practice including a partnership for ten years with Gabites Porter planners, architects and engineers. He received the IPENZ inaugural Rabone Award for his paper 'Traffic Planning and the Functions of a Road Network' in 1967. He also received the NZPI "Distinguished Service Award" in 1991. One of Malcolm's major interests has been to facilitate the integration of transportation planning with regional, community and land use planning. During the 1980s he was chief executive with the Canterbury Regional Council and in the 1990s he was director of planning at Porirua City Council. In 1998 he established his own consultancy, continuing to assist government and local government and undertake research in the field of land use and related travel studies. He is also a part time university lecturer and also an independent planning hearings commissioner. Email douglass.m@clear.net.nz*



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## APPENDIX 1.

**Table 1: Comparison New Zealand, Australian, American Daily Trip Generation Rates in 1990s**

	New Zealand	Australia	America
Dwelling houses	10.4 per dwelling	9.0 per dwelling	9.6 per dwelling
Medium density residential	6.8 per dwelling	4 to 5 per dwelling	5.9 per dwelling
Commercial premises / offices	20 per 100m <sup>2</sup> GFA	10 per 100m <sup>2</sup> GFA	11 per 100m <sup>2</sup> GFA
Supermarkets	130 per 100m <sup>2</sup> GFA	150 per 100m <sup>2</sup> GLFA	177 per 100m <sup>2</sup> GFA
Shopping Centres over 30,000m <sup>2</sup>	47 per 100m <sup>2</sup> GFA	50 per 100m <sup>2</sup> GLFA	43 per 100m <sup>2</sup> GFA

Source: Table 6.1 of Transfund Report 209.

The New Zealand trip rates in Tables 1 and 2 are 85<sup>th</sup> percentiles. Other Australian and American are average.

**Table 2: Comparison New Zealand, Australian, American Peak Hour Trip Rates in 1990s**

	New Zealand	Australia	America
Dwelling houses	1.2 per dwelling	0.85 per dwelling	1.0 per dwelling
Medium density residential	0.8 per dwelling (*)	0.4 to 0.5 per dwelling	0.5 per dwelling
Commercial premises / offices	2 per 100m <sup>2</sup> GFA	2 per 100m <sup>2</sup> GFA	1.5 per 100m <sup>2</sup> GFA
Supermarkets Up to 10,000 m <sup>2</sup>	17.8 per 100m <sup>2</sup> GFA	15.5 per 100m <sup>2</sup> GLFA	12.3 per 100m <sup>2</sup> GFA
Shopping Centres over 30,000m <sup>2</sup>	9 per 100m <sup>2</sup> GFA	7 per 100m <sup>2</sup> GLFA	5 per 100m <sup>2</sup> GFA

Source: Table 6.1 of Transfund Report 209.

Note: details for other land uses were also provided.

**Table 3: Comparison of New Zealand and UK Peak Hour Trip Generation Rates**

	New Zealand	TRICS UK
Residential dwellings	1.2 per dwelling	0.7 per dwelling
Education: preschools	19.0 per 100m <sup>2</sup> GFA	13.8 per 100m <sup>2</sup> GFA
Retail: Bar	9.6 per 100m <sup>2</sup> GFA	14.2 per 100m <sup>2</sup> GFA
Retail: Restaurant	12.6 per 100m <sup>2</sup> GFA	15.2 per 100m <sup>2</sup> GFA
Supermarket	15.2 per 100m <sup>2</sup> GFA	14.4 per 100m <sup>2</sup> GFA

Source: NZTPDB Research Report No 2/2005.

Note: these are average trip rates and minimum (15%) and maximum (85%) and standard deviations are also provided.