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Strategic Transport Planning in New Zealand's Two Major Urban Areas Auckland and Wellington

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Abstract

Auckland and Wellington Regional Councils have recently developed transport strategies for their city regions This is a requirement of New Zealand law. This strategy is required to identify the future transport needs of the region, identify the most desirable means of responding to those needs and identify the appropriate role for each transport mode The strategy guides infrastructure investment for the next 5 years The two regions are very different. Auckland is an urban area of approximately 1 1 million people whose population is widely dispersed It does not have a dominant employment centre but has a number of important regional centres distributed around the area Its transportation system is car dominated and experiences significant congestion even outside the peak periods Wellington by contrast is a smaller region with approximately 420,000 people It has a strong compact CBD which is the region's dominant employment centre Its transportation system is constrained by its hilly topography which makes new construction expensive Wellington has a linear road network, unlike Auckland's,, which experiences some congestion at peak times but there is an effective passenger transport system serving radial movements to the CBD Strategy development has encompassed setting up multimodal strategic transportation models and, for Auckland, a land use/transport interaction model for strategy testing and using a workshop structure to discuss, debate and develop the strategic options, with the aim of establishing an appropriate balance between road and public transport infrastructure, transport management and pricing - road user charging was specifically investigated In both cities, some controversial plans which had to be addressed by this process The Steering Groups comprised officers and politicians drawn from national, regional and local authorities, whose policies on these issues were not always compatible The recommended transport strategies for the two cities were markedly different. This paper discusses the development of a Regional Land Transport Strategy for the respective urban areas. It discusses the issues in common and contrasts the differences The proposed strategies for the two regions are compared

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Introduction

This paper outlines the processes recently used in developing integrated transport strategies for two of New Zealand's major urban areas - Auckland and Wellington - and describes the resulting strategies.

Transport strategies for Oceanic cities which are technically well-founded and influential are rare. In New Zealand, there is a move to change this situation and our purpose in this paper is to illustrate a successful process of strategy development and, by contrasting its results in two rather different contexts, provide some information on its potential value.

The paper starts with some background to transport planning in New Zealand and to the cities themselves, then discusses the process of strategy development applied in Auckland and Wellington, and its findings. Finally we offer some overall conclusions on the value of the process and its outcomes.

The regional land transport strategy

In New Zealand the Land Transport Act[1] sets out a hierarchical planning process involving, among other matters, a National Land Transport Strategy, Regional Land Transport Strategies[2] and individual transport infrastructure projects. It is required that transport infrastructure projects must be 'not inconsistent with' the Regional Land Transport Strategy, and this in turn is required to be 'not inconsistent with' the National Land Transport Strategy. In practice, only recently has a national transport strategy been issued in draft form, and regional transport strategies have commonly been so vague as to exert little constraint on transport scheme promoters. There is nothing unusual about this position, but both Auckland and Wellington Regional Councils and the transport funding agency Transfund New Zealand wished to see the regional transport strategies much strengthened in the current round of updates.

Thus the Regional Land Transport Strategy is intended to establish the framework for the development of the region's transport system. The legislation requires it to:

(a) identify the future land transport needs of the regions;
(b) identify the most desirable means of responding to such needs in a safe and cost effective manner, having regard to the effect the transport system is likely to have on the environment;
(c) identify an appropriate role for each land transport mode in the region ... including freight traffic, public passenger transport, cycling and pedestrian traffic;
(d) state the best means of achieving the objectives referred to in paragraphs (b) and (c)"

[1] The term 'land transport' is used to refer to public and private transport modes in New Zealand and includes ferries.
[2] Covering city regions, such as Auckland and Wellington, and rural regions.

Because the process described herein is strategic rather than detailed and because there exist detailed procedures for evaluating individual transport infrastructure projects in New Zealand, the transport strategy is generally expressed in terms of the corridor in which a transport improvement is envisaged and the general nature or capacity of the improvements. It is intended that the subsequent detailed studies would identify the optimal infrastructure project.

The city regions

Auckland

The Auckland region is situated towards the northern end of New Zealand's North Island. The region's population was 1.1 million in 1996 with 881,000 of these located in the urban part of the region; 29% of New Zealand's population now resides in the Auckland region. Over the previous 5 years, Auckland's population growth was 17%, such that Auckland absorbed over half of New Zealand's growth in this period. Substantial further growth is anticipated, projections of Auckland's population in 2021 ranging from 1.4 to 1.6 million, corresponding to growth of between 27% and 45% over 1996.

Employment in the Auckland region was 440,000[3] in 1996, of which only 11% was located in the CBD (down from 13% in 1991 and 15% in 1986). Main employment sectors in 1996 were Trade/Hospitality (26%), Manufacturing (21%), Community Services (21%) and Business Services (16%). The Auckland region is home to 38% of New Zealand's business enterprises. 75% of New Zealand's imports and 42% of export by value come through Auckland's ports and airports.

Auckland has developed around two harbours, the Waitemata and the Manukau, which together with their estuaries define a central isthmus containing the CBD and port (Figure 1). The central isthmus is the historic core of the region and still contains 34% of the region's urban population and 53% of its urban jobs. Development of the region over time has resulted in 29% of the population now living to the south of the central isthmus, 20% to the north and 16% to the west; population densities are relatively low.

Travel between the central isthmus and the north, west and south is constrained by the harbours, particularly in the case of the northern sector which is joined to the main urban area by a single 8 lane bridge, the Auckland Harbour Bridge. Rail corridors exist from the CBD to the west and to the south but the rail lines terminate 1 km from the centre of the CBD in an unprepossessing 'central' station, and this has limited their attractiveness to passengers (rail accounts for an insignificant proportion of travel in the region, most public transport journeys being by bus). A six lane motorway traverses the region from north to south, touching the edge of the CBD, and another six lane

[3] Full time equivalent

motorway connects the CBD and the North-South motorway with the west. Transport studies in the 1960's established a series of road corridors which allowed the construction of the motorway and major arterial system, but there is now only very limited ability to construct more road capacity in these corridors, particularly through the central isthmus

The Northern, Southern and North Western motorways not only form the major connections between the geographical sectors, but also form the main road connections to the CBD. The central parts of the motorway system have been at capacity for some years with extensive delays in the morning and evening peaks, and are now also approaching capacity in the interpeak.

It follows that the main issues for the Auckland regional transport strategy related to urban form, the role of passenger transport, north-south accessibility and the harbour crossing, and road pricing.

Urban form

The Auckland region has been going through a period of rapid growth and it has become apparent that the expected future growth cannot be accommodated within the planned urban area at current development densities. Nor can the expected growth be accommodated without considerable infrastructure investment - the capacity of water supply and sewage treatment plants for example need to be significantly increased, as does the transport system. There is strong community feeling that the spread of urban development into the rural areas, particularly the environmentally sensitive coastal areas to the north and east, and the bush clad ranges to the west, must be halted, or at least slowed dramatically. Car ownership is very high (1.55 cars/household in 1996) and reliance on the car is seen as a prime driver of sprawl (the average length of the journey to work increased by 40% between 1986 and 1996). High quality passenger transport systems, particularly rail, are seen as a catalyst to more intense, mixed use development that would enable much of the expected growth to be absorbed into the existing urban area, while also reducing the need for car use.

The local authorities of the region have joined together to address these issues and have prepared a Growth Strategy for the region, with a theme of increased development around selected nodes and corridors, particularly around the rail lines. The Growth Strategy is currently progressing through a public consultation phase.

Role of passenger transport

Closely allied with concerns over urban form are concerns that over reliance on cars is a leading cause of congestion. Journey to work mode share across the region for car use has grown from 63% in 1986 to 70% in 1996, with passenger transport mode share dropping from 12% to 6% in the same period. Rail mode share is now 1%. There is a strongly held view in the community that if passenger transport is improved, its mode

share will increase and congestion will be relieved. Central to this issue is a long standing proposal to extend passenger rail to the heart of the CBD and significantly upgrade rail stations, services and rolling stock (possibly to LRT). The rail company however is now privately owned and is primarily a freight business. It is proving difficult to reach a satisfactory commercial arrangement with the rail company for upgrading passenger services.

North-South accessibility

The main north-south transport corridor comprises the Northern and Southern Motorways which converge on a single crossing of the Waitemata Harbour - the Auckland Harbour Bridge. This was constructed as a four lane facility in 1959 and extended to 8 lanes in 1969. It has been operating in excess of capacity in the morning peak hour for more than ten years. The road approaches to the Bridge, particularly on the southern side, are also at capacity with no likely prospects of significant improvement through a heavily urbanised area and involving a number of major engineering structures. This heavily congested central spine to the road system affects the motorway feeders so that cross-town as well as north-south traffic is caught in the congestion. Providing more road capacity is not simply a matter of finding a new location for a bridge or tunnel across the Waitemata Harbour, but of developing a new north-south route from a point north of the harbour to a point about 11 km south of the harbour. There are no obviously buildable routes, with the candidates all being either very environmentally damaging, very disruptive to local communities, very expensive, or all three.

Road pricing

Numerous international studies, as well as studies of the Auckland transport system, have shown that congestion pricing has the potential to be a very powerful demand management and funding tool. The New Zealand Government has been working towards restructuring the road sector in a way which would enable road pricing to be introduced as a practicable option in future. Public understanding and acceptance of road pricing however is very low and there are numerous practical and political challenges to be overcome before it can be a major contributor to improved transport.

Wellington

The Wellington region is situated at the southern end of New Zealand's North Island. Its 1996 population was 414,000 with most (373,000) located in the urban part of the region. The dominant population centre is Wellington city, the nation's capital which has a population of 158,000. Population growth over the previous 5 years was small (0.7% per annum), while projections show steady, low growth in the region up to the year 2001 of 0.9% per annum, and modest growth thereafter. The limited growth is however expected to be focused in the Wellington City to Kapiti Coast corridor (Figure 2).

The urban part of the region provides employment for 168,000[4]. The dominant employment centre is Wellington city which employs 102,000 (full time equivalents) of which 68,900 are located in the central business district - this is more than 40% of the regional total, the central city focus contrasting strongly with the very much more dispersed employment patterns in Auckland. The regional economy is dominated by the service sector, accounting for 80% of output, much of which is located in the Wellington central business district

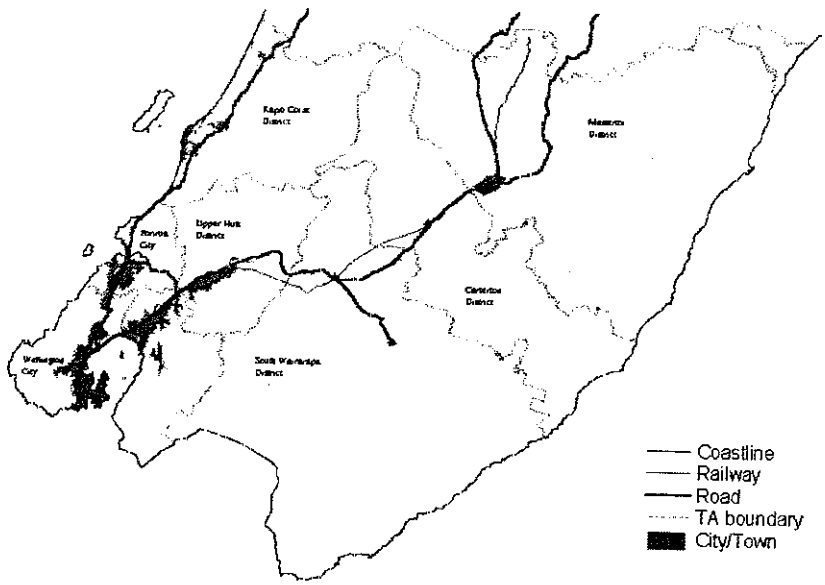

Figure 2 Major transport routes of the Wellington region

Two primary transport corridors provide access to Wellington City, its central business district, regional airport and port. Both the northern and northeastern corridor (Figure 2) provide highway and rail access. The difficult topography of the region creates barriers that constrain the locations and capacities of major transport corridors and limits the ability to expand highway capacity. At peak times, there are numerous bottlenecks in each corridor.

According to the 1996 Census Journey to Work, almost 30% of commuters used public transport to access employment in the CBD, whereas for commuting to the central areas of outlying suburbs the public transport share was less than 10%.

In Wellington the following issues for the transport strategy have been identified through analysis and stakeholder consultation.

[4] Full time equivalent.

Funding

Funding is constrained. Based on historic expenditure, it is estimated that $900 million will be available over 20 years to fund capital projects and public transport subsidies. Yet, there is a list of over $2.0 billion worth of capital projects and public transport subsidies average $27 million per annum.

Economic activity and accessibility

There is great concern about the region's future economic prospects and the role of transportation in assisting those prospects by providing a competitive advantage. Particular issues include forestry access, access by freight vehicles to the Port of Wellington, the airport and other regional destinations and access to the major employment centres.

Road construction and traffic capacity

The region's difficult topography and generally poor geotechnical conditions makes major road construction difficult and expensive. The existing state highway corridors are generally constrained and expansion will have severe impacts on the surrounding environment.

The Wellington CBD has a limited capacity to provide further car parking. Recent land developments have reduced parking spaces, a trend which is expected to continue.

Demand for travel

There is a growing demand for travel in the Wellington-Kapiti corridor but, otherwise, such traffic growth as there is tends to be confined to off-peak times. The major road corridors leading into the Wellington CBD experience significant congestion at peak times and there is evidence that peak periods are lengthening. However, these corridors generally have good public passenger transport alternatives whose peak period patronage is growing rapidly.

Environmental and traffic impacts

There is a high level of awareness about the environmental impacts of transport systems. Lobby groups are actively seeking to minimise the emission of greenhouse gases. Recent air quality monitoring has confirmed that in specific locations CO emissions are exceeding or close to international health standards. This is regarded as a site specific issue.

Local communities have voiced strong objections to further road improvements in some parts of the region.

Land use

It is desired that land use planning to be integrated with transport planning to, in the long term, enhance the efficiency of the strategic transport system.

Safety

There is a general desire to see the improvement of the transport system in safety terms.

The transport strategy development process

The process used to develop the transport strategy was the same in both cities. It had three main features:

- establishing the outcomes that are sought for the urban area - typically these are defined in an overall vision for the area, which is translated into a set of high level goals and these are in turn specified using a set of more detailed objectives;
- establishing technical procedures for evaluating alternative strategies against the desired outcomes, involving the development of a transport model and the design of strategy performance indicators;
- a workshop-based process for analysing and designing the strategies,

and each of these is described below.

Vision, Goals and Objectives

The overall vision and goals for each city were set by officers and politicians in Auckland and Wellington:

Auckland

Vision: a safe, efficient and environmentally sustainable transport system for the Auckland Region which meets the community's accessibility needs at reasonable cost.

Goals: covering land use, accessibility, efficiency, the environment and safety.

Wellington

Vision: a sustainable land transport system that meets the needs of the Regional Community.

Goals: covering accessibility, safety, economic efficiency, affordability and sustainability.

Unsurprisingly, given the need for consistency with national policy and strategy, the vision and goals are similar. The objectives specify each goal in more detail. For example, Auckland's accessibility objectives relate to each mode of transport individually; Wellington's economic efficiency objectives cover costs, benefits, prices, and synergies between modes of transport and land use.

Supplementing the objectives, specific strategic transport issues were identified. A list of all known strategic transport (and related) problems was prepared, together with the potential solutions. Generally, these had been the subject of previous studies, and the most important have been mentioned earlier in the paper.

Technical procedures

An appraisal approach is needed which can evaluate alternative strategies against the defined objectives. Where the objectives are quantifiable, it is likely that a transport model will be the appropriate source of information. The major concern is that the transport model should be suitable for the purpose of strategy development, and this essentially implies that it should be able to address all significant outcomes of the alternative strategies. In this respect, the most demanding elements are the public transport and pricing components of strategies.

In Auckland and Wellington, the transportation models used were conventional strategic four stage aggregate models. They contained trip generation, distribution, mode split and assignment with broadly 100 zones covering each city region. The models were able to model peak and interpeak periods separately and encompassed car driver and passenger, public transport and slow modes. Following formal reviews of their fitness for the purpose, various improvements were made to the established models including the incorporation of a car trip retiming module for road pricing investigations

Because standard transport model output is inconvenient for strategic analysis, sets of performance indicators were developed which could be output by the models and which, so far as possible, measured the outcomes pertaining to each objective. Some examples are given in Figure 3.

Not all objectives are readily quantified and the appraisal approach allowed for qualitative judgement in respect of some objectives. For example, environmental effects such as noise, visual intrusion and severance were difficult to quantify at a strategic level

The effects of the strategies were evaluated for a future scenario some 20 years ahead against a Do Minimum context which included committed transport infrastructure and other projects or policies which were expected to be common to all strategies. Analysis of this Do Minimum forecast was also useful in the identification of future problems and issues.

Figure 3 Examples of performance indicators

Objectives	Indicators
Environment	Fuel consumption Emissions by type and location Transport land take Length of new road
Accessibility - by car - by public transport - to key industrial areas/generators	Average car journey speeds by location; relief of key congestion/choke points; reductions in delays; road network plans showing road link volume:capacity ratios Public transport network kms and vehicle kms Journey times to ports, airports etc.
Efficiency	Full financial and economic appraisal
Safety	Annual number of accidents
General Statistics	Number of trips by mode; mode shares Screenline road traffic and public transport flows Average vehicle speed, trip length Total vehicle kms Total vehicle journey time

Notes: Locations would be classified by a transport zone aggregation to well-chosen sectors, and information presented in sector-to-sector matrix form where appropriate.

Percentage changes from the do minimum or from the current year are usually also helpful.

The strategy development process

The sequence of activities for developing the strategies in both Auckland and Wellington is illustrated in Figure 4. It comprises a sequence of three workshop-based cycles. In each cycle, the transportation model is used to forecast the impacts of a pre-defined set of strategies. It was found that some associated optimisation studies on specific features of the strategies (for example, the optimum scale of project in a particular corridor, or the best combination of projects along a corridor) were required.

Because of the complexity of strategies which combine a variety of public transport and road schemes with, perhaps, traffic management and demand management/pricing measures, we followed the now customary approach of commencing with simple, single dimension strategies - a road strategy, a public transport strategy, a pricing strategy and a traffic management strategy (sometimes termed "cartoon" strategies). These initial strategies were formed from all the known transport projects and policies established through previous studies.

Figure 4 The strategy development process

Establish the Do Minimum Scenario

1st Cycle

Define a first set of alternative strategies (eg "cartoons")
Run model to forecast their impacts; produce performance indicators
Associated optimisation studies

Workshop I:
Analyse performance of strategies and results of associated studies
Design next round of strategies

Run model to estimate impacts of the revised strategies; produce performance indicators
Associated optimisation studies

Repeat Workshop/Model Run Cycle until preferred strategy is identified

Prepare draft Regional Land Transport Strategy
Public Consultation

At a workshop of typically six people, the forecasts were analysed in depth to establish a clear understanding of the performance of the alternative strategies and their individual components. This sought to identify for an individual strategy: how far it achieves the objectives; the issues which it solves and those left unresolved; the effective, ineffective or unacceptable elements of its performance; the additional projects which might be added and whether projects taken from other strategies might complement or enhance the strategy and address some of its weaknesses. Figure 5 illustrates how, at the end of a workshop, the consensus view of the overall performance of each alternative strategy was usually characterised against the major goals (using a 5 point scale). On the basis of the analysis, a revised set of strategies which were expected to more closely meet the objectives was designed in the workshop.

Figure 5 Overall strategy assessment against objectives

Goals/Objectives	Strategy A	Strategy B	Strategy C	Strategy D
Environment	++	-	--	+
Accessibility				
road	0	+	++	0
public transport	++	0	-	+
Efficiency	0	++	--	0
Safety	0	0	-	0
Financial	+	+	-	+

Note : Strategies are rated on a 5 point scale: (very good) ++, +, 0, -, -- (very poor).

During these in-depth studies, the known list of planned projects was invariably found to be insufficient to secure the balanced strategy sought within the workshops, and further studies were commissioned into new project concepts to establish broad feasibility, costs etc.

The workshops did not include representatives of all the main stakeholding organisations and therefore wider consultation on the conclusions of each workshop followed very shortly afterwards. In consequence, some adjustment to the design of the strategies was usually required. Such consultation not only ensured that wider views influenced the process but also helped in the development of a stakeholder consensus as to the most appropriate direction for the strategy to take.

Key findings

Auckland

As a result of the analysis of a wide range of strategic combinations of transport improvements, some important conclusions concerning the likely outcomes of each of the possible dimensions of the strategy were reached:

- road investment would be able to keep accessibility at reasonable levels throughout the region, but only if a new north-south corridor was assumed; as noted earlier, that is a very difficult and controversial proposition, but without a new north-south corridor accessibility declined in the central isthmus;

- passenger transport strategies generally resulted in low levels of accessibility, due to the relatively low density and dispersed land use pattern of Auckland, although passenger transport in exclusive rights of way in congested areas did make a worthwhile contribution in those locations;

- on the environmental indicators the road strategies did not give markedly worse consequences than more public transport orientated strategies because the emissions impacts of the higher vehicle km of travel were broadly offset by the less congested conditions;

- congestion pricing had marked effects in reducing both congestion and vehicle travel (and the corresponding environmental effects) but, by itself, would imply prices which would almost certainly be unacceptably high.

The preferred strategy can generally be described as new roads linking the outer sectors of the region and serving the Port, with major passenger transport investments on the three main corridors serving the CBD (Figure 6). These passenger transport investments would comprise a busway (buses operating on an exclusive right of way) on the northern corridor and major upgrading of the western and southern rail corridors,

together with their extension to the CBD. A large number of bus priority schemes are also proposed, again mainly on the radial routes serving the CBD. The rail investments in particular are seen as catalysts for the development of higher density mixed use nodes around key rail stations.

As well as these infrastructure investments, the strategy includes a range of traffic demand management measures, including the promotion of teleworking, support for walking, cycling and car pooling, and the development of a regional car parking strategy. Traffic management improvements are also proposed, including the introduction of advanced incident detection and management systems together with motorist information systems, initially on the central motorways.

Relative to 1991, the strategy would reduce the expected decline in road speeds by 2021 from 14% without the strategy to 6%. The public transport share of travel to the CBD would increase from 16% to 21%.
The passenger transport improvements, together with limited road improvements to the existing Harbour Bridge corridor, will bring modest improvements to north-south accessibility but are unlikely to resolve the issue in the long term. The preferred strategy presents a number of alternatives for new north-south routes as a matter for public debate, but acknowledges that because of their environmental and community impacts and their costs, they may not ultimately be able to be built. These options have generated lively and heated public debate. The matter is not yet resolved, and may not be for some time.

The preferred strategy points to the major role that road pricing could play in improving transport but acknowledges the practical, political and legal difficulties in implementing road pricing. Further work is proposed on road pricing options designed to develop an implementable scheme, with a view to introducing road pricing in the short to medium term. The preferred strategy is not reliant however on road pricing and is still an appropriate strategy if road pricing does not eventuate.

The costs of implementing the preferred strategy are estimated to be $250 million per year road investment for the first five years, reducing to $150 million per year thereafter, plus $75 million per year on passenger transport. The level of road investment is comparable with that of current investment, although that is considerably higher than historic investment levels. The level of investment in passenger transport is considerably higher than either current or historic levels.

There has been disappointment from some sectors of the Auckland community at the treatment of passenger transport in the preferred strategy. There is a feeling that passenger transport should be developed as "a genuine alternative to car use" and that the strategy does not go far enough in delivering this, particularly with respect to developing cross-town passenger transport services. Part of this response has been because the document is written at a regional strategic level and many of the policies

relating to passenger transport are therefore written in a generalised way. It has been hard for some members of the public to see in the strategy the improvements to passenger transport they are looking for. To address this perception, additional work has now been done on more detailed projects and policies, and particularly on setting aggressive passenger transport mode share goals on key screenlines. This work will be published as a companion document to the strategy, and the key projects and policies incorporated in the final version of the strategy.

The modelling was undertaken with a 2021 land use scenario based on the Growth Strategy referred to earlier. It assumed a degree of development intensification including nodal intensification around selected rail stations. The degree of intensification which is considered realistic in the time frame is not dramatic however. As a sensitivity test, the preferred transport package was tested against a "trend based" land use, and produced similar performance indicators to the main land use scenario. The inference drawn from this was that the modelled time period was too short to allow regionally significant changes in the land use pattern to develop. We are aware of similar conclusions being drawn for Bristol (UK) and Melbourne.

Wellington

Some of the general findings of the analysis were as follows:

- the analysis of the Wellington network showed that performance against the objectives was not greatly enhanced over the do minimum scenario with modest road and passenger transport improvements; a high level of performance against objectives would require a more radical approach;

- road construction was found to be useful in solving specific bottlenecks, but there was a widespread tendency for bottlenecks to move elsewhere as a result of the additional traffic attracted to the corridor (usually as a result of rail users transferring to car, and having a serious impact on rail patronage); a network-wide approach to road-building would also be too expensive; consequently, a programme of heavy road investment was rejected;

- public transport investment was not found to be an effective tool for removing specific road bottlenecks, but it did generate useful time savings to road users through the accumulation of small reductions in congestion along the corridor;

- a regime of modest road pricing was judged to be promising as a means of increasing the efficiency of operation of the road network and of eliminating outstanding bottlenecks.

In designing the preferred strategy, one of the key issues was the need to find a balanced set of road and public transport projects which improved accessibility and resolved the main transport issues without simply transferring road congestion from one place to another or significantly undermining rail patronage.

Two alternatives for the preferred strategy for the Wellington Region were identified. The first was a modest, balanced mix of road and passenger transport improvements (Figure 7). This strategy has a satisfactory performance in terms of the objectives of accessibility and economic development safety and sustainability but is not an exciting prospect. It performs well against the objectives of affordability and economic efficiency and would attract funding support from the Government The capital cost is $160 million over 20 years.

The second alternative is to add to the modest strategy above the more ambitious (and expensive) mix of road and passenger transport projects as shown in Figure 8. This strategy is still in balance. This strategy has a far more attractive performance against the strategy's objectives, particularly accessibility and economic development, but does not perform well against the affordability and economic efficiency objectives. This strategy has a capital cost of $640 million over 20 years.

The inclusion of road pricing at a level required to fund the more expensive infrastructure items in the enhanced strategy would potentially address the affordability and economic efficiency issues. The level of road pricing required would also not be prohibitive. For example, a peak period cordon toll of $1.00 around central Wellington or a petrol tax of $0.20 a litre would be sufficient to fund the enhanced strategy. Such a proposal is likely to provide overall accessibility benefits that more than compensate for the additional user costs but, as with most such schemes, many toll-payers would be incur disbenefits.

The light rail schemes require further analysis. This strategy analysis has illustrated that a significant investment in passenger transport in the particular corridors identified is worth considering. The most effective use of that investment may not be light rail transit but some other technology.

The strategy development process considered the role of travel demand management of which road pricing is a subset. There was an investigation into measures such as parking management, land use planning and other measures. However, because of the legislative environment that exists within New Zealand it was concluded that such measures could only have a secondary role and are included in the preferred strategy. Road pricing was found to be a far more direct and effective means of implementing travel demand management.

Other measures such as I.T.S. systems, passenger transport priority measures and real time information systems were found to have a useful but secondary role. These measures are included in the preferred strategy in an appropriate way.

Preliminary stakeholder and commuter feedback on these proposals has been very supportive. There has also been strong support for the enhanced strategy and for the use of road pricing to fund the more expensive infrastructure items.

Conclusions

The process of transport strategy development described in this paper has been successful in enabling the identification of preferred strategies for each city which have met the requirements of major stakeholders. In both cases, the process has worked effectively and efficiently. That for Auckland has been the subject of public consultation, with the result that some amendments will be made. At the time of writing, the draft Wellington strategy is in the public consultation phase.

The development of the transport strategies has enabled differing measures such as road investment, passenger transport enhancement, traffic management and road pricing to be integrated in response to the identified broad range of issues. This process has also explicitly allowed for the interdependency of projects in different parts of the network and the interaction between road and passenger transport investment. Induced traffic issues have been addressed.

It cannot be argued that either of these strategies could have been drafted without the aforementioned analysis. In neither case was the particular balance of the strategy apparent at the outset and in both cases, new projects were identified as being needed in the course of the strategy development process.

Neither can it be argued that the same strategic solution is appropriate to every city. While clearly there are many common components to a transport strategy, the balance and level of investment in the preferred strategies for these two cities are markedly different which, we would argue, reflects the differences in the context (ie population, geographic structure, economic activity, transport networks and travel patterns).

Having thus argued that the process has achieved a great deal, we must acknowledge that it remains for the future to demonstrate whether these strategies will turn out to be as influential as the Land Transport Act and regional stakeholders intend.