A YOUTH PERSPECTIVE ON THE FUTURE OF URBAN TRANSPORT – GENERATION ZERO

Paul Young BSc (Hons), Msc, Dr. Sudhvir Singh MBChB, BMedSci (Hons), Luke Christensen Bsurv [Generation Zero]; Patrick Reynolds BA, Matt Lowrie [TransportBlog].

Lead author and presenter: Paul Young, Solutions Director, Generation Zero.
paul@generationzero.org.nz

ABSTRACT

Driving alone has been the rational transport choice for many people in New Zealand for the last 50 years. However, 2014 is a very different place to 1960, and the ever-increasing economic, social and environmental costs of this type of transport system suggest that it is time to dramatically change our priorities in funding new infrastructure.

This paper presents realistic alternatives to motorway-dominated transport programmes for Auckland and Wellington. Generation Zero has teamed up with independent transport experts and thinkers, looking outward to global trends and the transport systems of world-leading cities, and inward to the climbing demand for greater transport choice as young people move beyond the car.

The proposed Congestion Free Network for Auckland, and Fast Forward Wellington network, emphasise high capacity, frequent, prioritised public transport routes on key corridors and high quality walking and cycling facilities. These are not revolutionary concepts and have been proven to be excellent value and highly utilised when well-implemented in comparable cities overseas and in New Zealand.

The state of transport planning and policy in New Zealand is also discussed, questioning why decision-makers are failing to respond adequately to rising energy prices, the need to decarbonise transport systems, and demographic changes.

CONTENTS

1. INTRODUCTION

As a result of decisions made over preceding decades, New Zealand is today one of the most heavily car-dependent countries in the world. This type of transport system exerts major externalities on society and faces severe challenges to its sustainability for reasons including resource constraints, growing costs of physical inactivity, and the need to reduce and ultimately eliminate carbon pollution to limit human-induced climate change. However, it is often asserted that New Zealand culture, geography and land-use patterns mean that little can be done to reduce automobile dependency – or more colloquially, "Kiwis just love their cars." Assumptions of car preference and a return to steady continued growth in car travel underpin current transport decision-making and economic analysis.

In this paper, we critically examine these claims and assumptions, in light of growing national and international evidence of plateauing traffic growth and a generational shift in travel preferences and behaviour. We go on to propose new transport solutions for New Zealand's largest urban centres that are in line with emerging trends and a healthier and more sustainable long-term direction. We begin with a snapshot of the current transport picture in New Zealand.

2. TRANSPORT IN NEW ZEALAND TODAY

Globally speaking, New Zealand is a heavily car-dependent nation. New Zealand ranks near the top of OECD countries on most measures of car dependence, as shown in Table 1.

METRIC	**NZ VALUE** *(In 2012 unless otherwise stated)*	**INTERNATIONAL COMPARISON**	**SOURCE(S)**
Road VKT per capita	9,026 km	Unclear.[1]	MoT (2013a)
Road VKT per GDP dollar	0.20 km	Highest in OECD.[2]	MoT (2013a), World Bank (2013a), MfE (2009)
Light vehicle ownership per capita	0.68	Fourth highest in OECD in 2010.[3]	MoT (2013b), World Bank (2013b)
Energy consumption per capita for road transport	944 kg oil equivalent (2010)	Fifth highest in OECD.	World Bank (2013b)
Carbon emissions per capita from domestic transport	3.19 tonnes CO_2-equivalent	Fifth highest in OECD.	MoT (2013a), World Energy Council (2013).

Table 1: How New Zealand stacks up on several measures of car dependence.

Around 92% of the vehicle-kilometres travelled (VKT) are done by light vehicles, and passenger transport accounts for approximately 66% of energy consumption and carbon emissions from road transport.[4]

Public and active transport mode shares are generally low in New Zealand compared with most countries besides the US, Australia and Canada. Figure 1 shows the mode share in New Zealand regions. Wellington is notable for its higher pedestrian mode share (25% compared with the national average of 16%) and public transport (PT) mode share (5% compared to the national average of 2.8%). Figure 2 shows national mode share statistics for a selection of OECD countries.

1 Ministry for the Environment (2009) states that New Zealand had the second highest VKT per capita behind the US in 2002, but the value stated (11,200 km) is significantly higher than the estimate by MoT (9,455 km). Based on the MoT estimate New Zealand would have ranked fourth highest in the OECD.

2 "The latest OECD comparison (2002) shows that New Zealand had the highest VKT per unit of GDP in the OECD." Ministry for the Environment (2009).

3 The 2010 World Bank figures place New Zealand fourth highest for both per capita passenger car ownership (0.599 per resident, behind Luxembourg, Iceland and Italy) and per capita motor vehicle ownership (0.712 per resident, behind the US, Iceland and Luxembourg). The Energy in New Zealand 2013 report from MBIE states New Zealand has the second highest private car ownership in the OECD behind the US.

4 Calculated from data in MfE (2012), MBIE (2012) and MoT (2013b).

Notable countries for comparison are Finland and Norway, which are of similar size and average density to New Zealand (MfE, 2009). In both countries, public and active transport constitute a significantly higher percentage of trips than in New Zealand.

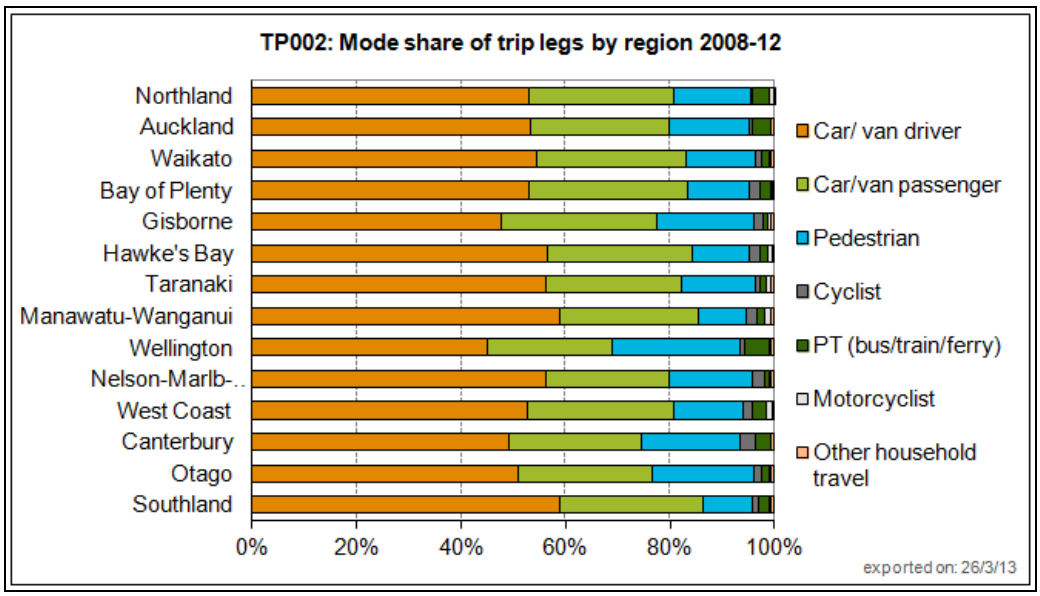


Figure 1: Mode share of trip legs (people aged 5 and over) by region 2008-12 (MoT, 2013a).

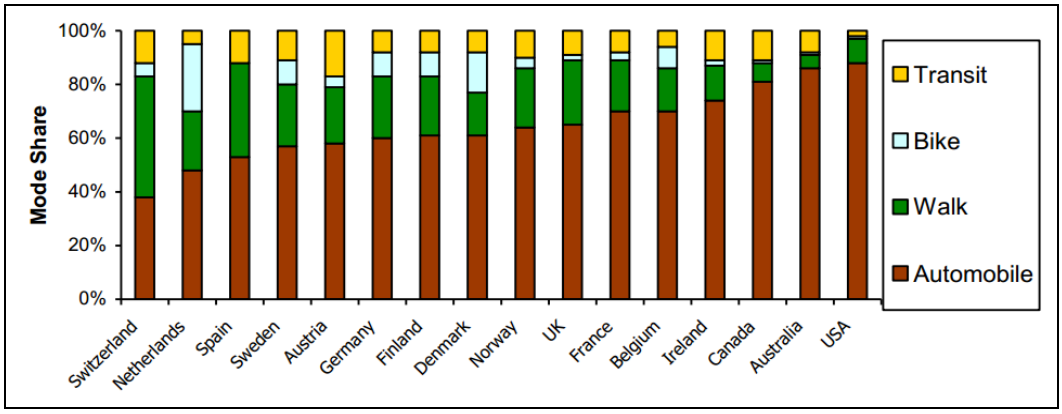


Figure 2: Personal travel mode share in selected countries (Litman, 2013).

3. CHALLENGES TO A CAR-CENTRIC TRANSPORT SYSTEM

The growing prevalence of the car over the last 60 years, catered for by car-centric transport planning and the progressive expansion of road capacity, has undoubtedly delivered major benefits by allowing the population greater mobility and travel speed. However, it is also the cause of significant societal costs, of which the world is becoming increasingly aware as they continue to escalate. Such costs impact on New Zealand's economic, social and environmental well-being. Here we outline three areas of cost that are often neglected or sidelined.

3.1 OIL AND CAR IMPORTS

As a net oil importer and without any domestic vehicle manufacturing industry, dependence on oil and cars impacts negatively on New Zealand's balance of payments. 'Mineral fuels' (oil) is now the largest import category by far, totalling $8.142 billion in 2012 (Treasury, 2013). Based on data from MBIE (2013), oil used for transport in 2012 accounted for approximately $5 billion of the total. 'Vehicles, parts and accessories' was the third largest import category at $4.710 billion. The total amount spent importing oil, vehicles and accessories for transport was therefore close to $10 billion, which is approximately the size of the current account deficit ($9.894 billion), and not far behind the total earned from dairy exports ($11.829 billion).

Oil and car dependence is an ongoing drain on the New Zealand economy and poses risk in the event of oil price spikes, which may be likely in the future as the world appears to have entered an era of highly inelastic oil supply (Murray & King, 2012). It is important to note that New Zealand has so far been shielded from the full extent of the rise in oil price over the last decade by the strong performance of the dollar.

3.2 HEALTH

In the 21st century we are facing a rapid increase in the prevalence of non-communicable diseases, which describes the group of chronic health conditions like diabetes, heart disease, stroke, and some cancers. These diseases are all directly related to inactivity. The car-dependent nature of New Zealand cities contributes to ill-health, and acts as a missed opportunity to offer citizens active transport choices. Several local and international studies have quantified the magnitude of negative impacts resulting from a lack of transport choices:

- The Health and Air Pollution in New Zealand Study (Kuschel et al., 2012) estimated that 256 premature deaths occur each year as a result of motor vehicle emissions - 126 of these in Auckland.

- Lindsay et al. (2011) calculated the effects of shifting 5% of vehicle kilometres of trips less than 7 kilometres in New Zealand to cycling.[5] The authors estimate that the health effects of this would include avoiding approximately 116 deaths annually as a result of increased physical activity, six fewer deaths due to local air pollution from vehicle emissions, and an additional five cyclist fatalities from road crashes. The benefits are not restricted to improved health, but also extend to a range of broader social and economic indicators. In economic terms, the study estimated net economic savings of about $200 million per year from the avoided fatalities alone, without considering the much broader health improvements. The scenario would also save around 22 million litres of fuel and reduce road transport related greenhouse emissions by 0.4%.

- Woodcock et al. (2009) conducted a comparative health risk assessment of different transport modalities in London, concluding that shifting commuters from private motor vehicles to active travel modes would reduce heart disease and stroke by 10–20%, as well as reducing the prevalence cancer (12–13%), dementia (8%), and depression (5%).

3.3 CLIMATE CHANGE

Human release of greenhouse gases is changing the global climate. The Fifth Assessment Report from the Intergovernmental Panel on Climate Change (IPCC, 2013) concluded that “it is extremely likely[6] that human influence has been the dominant cause of the observed warming since the mid-20th century”. New Zealand is part of a global agreement that seeks to avoid dangerous levels of climate change by limiting global temperature rise to less than two degrees Celsius above pre-industrial levels: the Copenhagen Accord.

Because of the long atmospheric lifetime of carbon dioxide, in order to stabilise the climate at less than two degrees of warming, cumulative carbon emissions must be restricted to an overall global “carbon budget”. Based on current scientific evidence, the best estimate of the carbon budget for a “likely” probability (>66%) of meeting the two degree goal is approximately 790 GtC (gigatonnes of carbon[7]) when also considering the effects of other non-CO2 greenhouse gases (IPCC, 2013). Approximately 515 GtC had already been released up to 2011, leaving a remainder of about 275 GtC. If current global emission rates were maintained constant, this carbon budget would be fully

5 This equates to 223 million VKT, approximately 0.55% of the national total. The authors state this would return cycling to the levels seen in this country in the 1980s.
6 “Extremely likely” is defined as a probability of 95% or higher.
7 Note that 1 GtC = 3.67 GtCO2.

drawn in around 35 years.

The carbon maths outlined here leads to the clear conclusion that the appropriate long-term goal in order to protect the two degree threshold is zero net CO2 emissions from fossil fuels, and that urgent action is required. The OECD Secretary-General, Angel Gurría, has recently affirmed this: "[G]overnments need to start taking action now to put us on a pathway to achieve zero net greenhouse emissions globally in the second half of this century," (Gurría, 2013).

This poses an immense challenge for the transport sector. Global CO2 emissions from transport grew by 45% from 1990 to 2007 (ITF, 2010). In New Zealand, the increase in road transport emissions alone was even greater: 69.7% above 1990 levels in 2011 (MfE, 2013). Road transport is the largest contributor to New Zealand's CO2 emissions today at approximately 40%.

Decarbonising the transport sector will require a suite of different solutions, including electrification and biofuels to replace fossil fuels as an energy source. However, the cheapest unit of energy is the one you don't use, and hence decreasing demand for energy through greater use of PT, walking and cycling will generally be the lowest cost and lowest risk option wherever viable. The Global Energy Assessment (2012) demonstrates that strong pursuance of energy efficiency is vital to increase the likelihood of meeting the two degree target and reduce reliance on technologies that may face constraints. Analysis of New Zealand transport systems demonstrates that PT modes are currently around three times more efficient in terms of emissions per passenger-kilometre (see Figure 3).

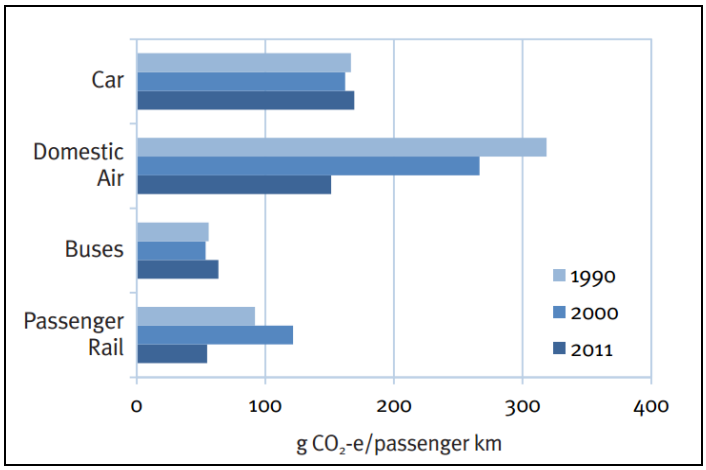


Figure 3: Emissions intensity of passenger transport in New Zealand (MBIE, 2012).

3.4 COMMON SOLUTIONS

The preceding discussion demonstrates that there are common solutions to the energy security, health and climate change problems we are facing that will also deliver economic dividends. A combination of more compact urban design and increasing public and active transport mode share offers win-win opportunities to reduce carbon emissions, improve New Zealanders' health and build a stronger, more resilient economy. These opportunities can be realised through a combination of travel demand measures and enhancing choice with better public and active transport infrastructure and services.

4. THE TIMES THEY ARE A-CHANGIN'

The challenges laid out in the previous section are big, but the good news is that emerging trends indicate things are changing in the right direction. There is evidence of a major shift in travel behaviour and trends over the last decade in New Zealand and elsewhere in the world. All the measures of car dependence shown in Table 1 are declining on a per capita basis.

4.1 NZ TRAVEL TRENDS OVER THE LAST DECADE

After steady growth every decade from the 1950s, vehicle-kilometres travelled have plateaued and are at a similar level today to in 2005 nationally (see Figure 4). Growth in the Auckland region doesn't appear to have stopped but has slowed, while the Wellington region has seen essentially constant VKT since at least 2002. On a per capita basis, VKT is declining in both regions and in New Zealand as a whole following peaks around 2004-06 (see Figure 5).

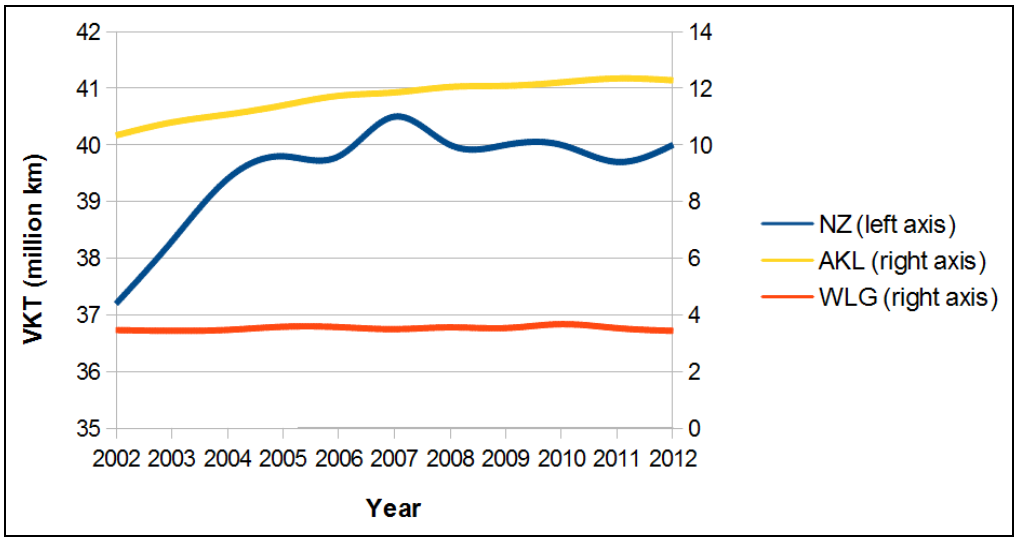


Figure 4: Total vehicle-kilometres travelled in New Zealand and the Auckland and Wellington regions. Note that the regions use the right-hand axis. Source: Ministry of Transport (2013a).

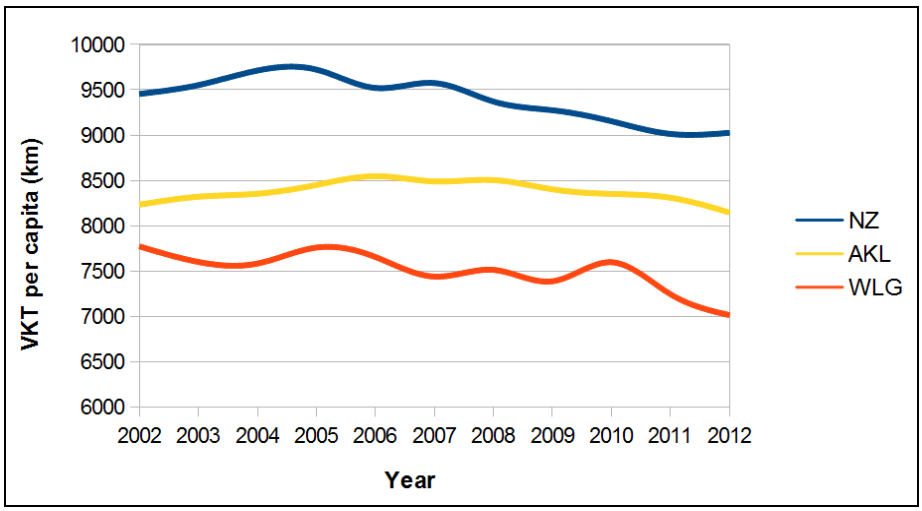


Figure 5: Vehicle-kilometres travelled per capita in New Zealand and the Auckland and Wellington regions. Sources: Ministry of Transport (2013a), Statistics New Zealand (2013).

There has been a corresponding increase in use of other transport modes throughout the country during this period. Ministry of Transport (2013a) data shows a 26% increase in nationwide PT boardings from 2002 to 2012, with most of the growth occurring since 2006. Per capita PT boardings for New Zealand and the Auckland and Wellington regions are presented in Figure 6, showing that large growth has occurred in Auckland while boardings per capita have in fact flat-lined or declined slightly in Wellington since 2005. Table 2 shows that the total number of trips into Auckland's CBD increased 9.5% from 2001 to 2012, but private vehicle trips declined 15.4% while PT trips grew by 55.9%.

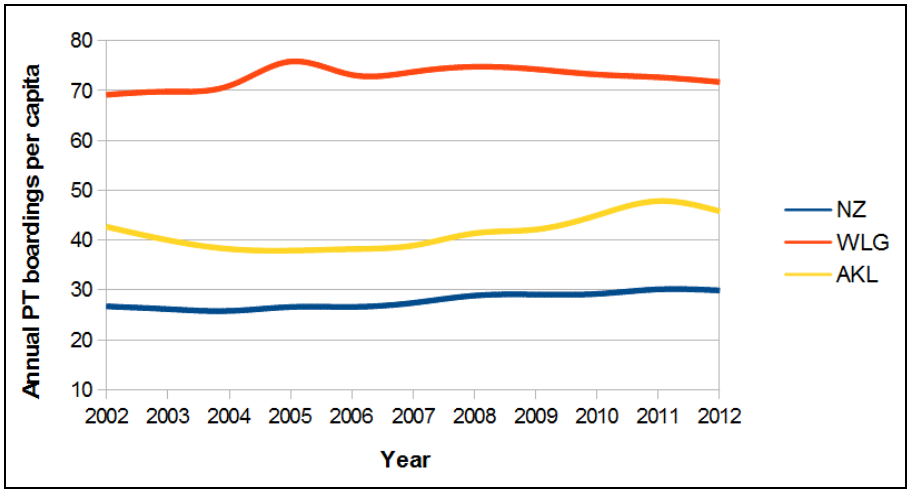


Figure 6: Annual public transport boardings per capita in New Zealand and the Auckland and Wellington regions. Data sources: Ministry of Transport (2013a), Statistics New Zealand (2013).

	PT Trips	PT Modeshare	PV Trips	PV Modeshare	Total Trips
2001	21,483	35.0%	39,897	65.0%	61,380
2012	33,484	49.8%	33,753	50.2%	67,237
Change	12,001		-6,144		5,857
% Change	55.9%		-15.4%		9.5%

Table 2: Number of trips into the Auckland CBD by public transport (PT) and private vehicle (PV), (TransportBlog, 2012).

Information on walking and cycling is scarcer and of poor time resolution[8] and accuracy, making trends hard to distinguish over short time intervals. Available data suggests an overall increasing trend in the annual distance cycled per person since 2005, reversing the large drop of around 50% from 1990 to the early 2000s (MoT 2013a), There is evidence of a strong increase in the number commuting by bicycle in urban centres: the number entering Wellington's CBD has more than doubled from 2006 to 2010 (Capital Times, 2011) and Auckland is also experiencing double digit annual growth in the number of cyclists (TransportBlog, 2013a).

4.2 PEAK CAR?

The changes observed in New Zealand are part of a global phenomenon being referred to as "peak car", which has been acknowledged by expert bodies including the International Transport Forum (2012) and drawn attention from mainstream sources such as *The Economist* (2012). While the Global Financial Crisis has certainly played some role in travel trends over the last few years, changes are evident before the onset of the GFC and there are a range of factors that are likely contributing to reducing demand for automobile travel and increasing demand for alternatives. Suggestions include (Litman, 2013; *The Economist*, 2012):

- Aging populations;
- Higher fuel prices;
- Increasing urbanisation;
- New and improved travel options;
- Increasing health and environmental concerns;
- Changing consumer preferences;
- Internet and mobile technologies;
- Increased use of domestic air travel.

Peak car is a topic of active debate, and it seems transport planning is yet to catch up with all the potential ramifications. As one example, Frith et al. (2012) concluded that traffic projections often

8 Data from the New Zealand Household Travel Survey is presented as four-year rolling averages.

did not appear to take an aging population into account and this could overstate the increase in household travel over a 50-year period by around 40%.

4.3 A GENERATIONAL SHIFT

One key topic that we believe deserves far greater attention is the evident generational shift underway: demand for choice beyond the car is growing particularly amongst young people.

Figure 7 shows the significant fall over the last decade in the percentage of New Zealanders under the age of 35 that are drivers. The trend is asymmetric around the centre of the age distribution (~45), and the decline in younger drivers is almost entirely offset by an increase in the percentage of older people driving. Figure 8 shows a broadly similar picture, but this is a graph of annual kilometres driven per driver. Drivers up to the age of around 40 are bucking a historic trend by driving less than the previous cohort did at the same age.

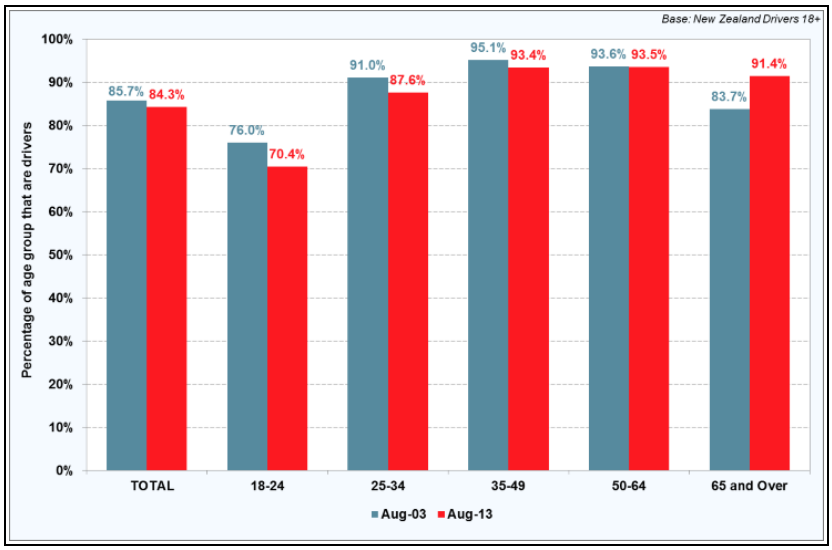


Figure 7: Percentage of New Zealanders who drive, by age (Roy Morgan Research, 2013).

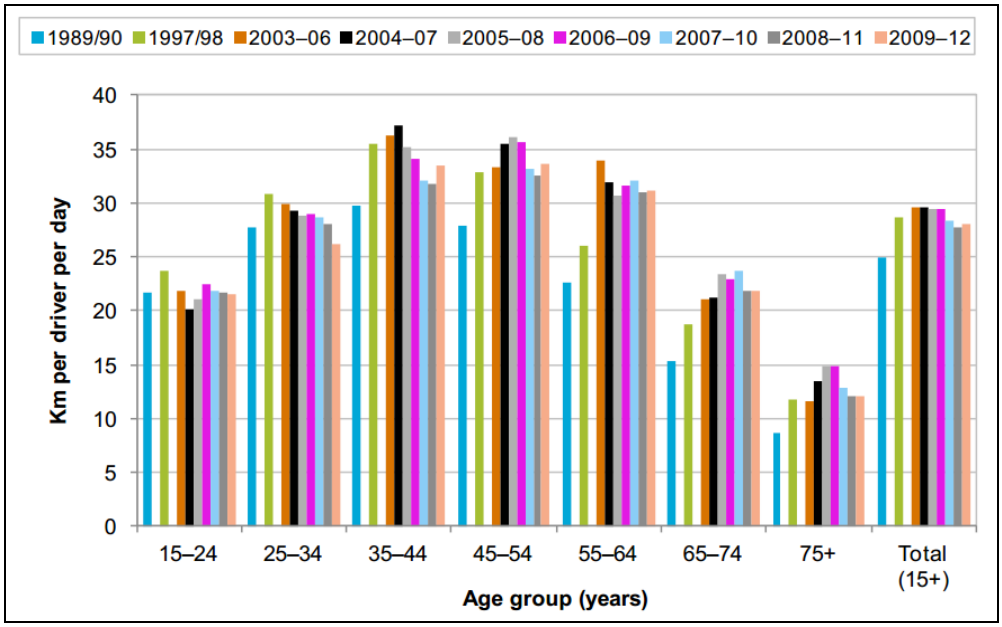


Figure 8: Distance driven per driver in cars, vans, utes and SUVs. A 'driver' is defined as someone who reported driving at least 100 km during the previous year . Note this graph visually compresses the time interval between 1989/90, 1997/98 and 2003-06 (MoT, 2013c).

We emphasise that data in Figure 8 is per *driver*, not per capita, so not only are fewer young people driving, but those who still are are driving less on average than the previous cohort. The fall in VKT per capita is being led by under-40s. This suggests it is quite possible that the observed levelling off of car travel could even turn into a decrease - depending, of course, on population growth and other factors.

Far from being a New Zealand peculiarity, very similar data exists on both driver percentage and kilometres driven for the US (*The Economist*, 2012; International Transport Forum, 2011) and - we would predict - other countries too.

While some trips are being avoided altogether through the use of technology, public transport and cycling seem to be on the rise in recent years, as discussed in Section 4.1. We are not aware of robust data on generational trends in public and active transport use in New Zealand, but reports point to an increase in PT use correlating with the decline in younger people driving (Roy Morgan Research, 2013). More negatively, Ministry of Transport (2013d) data shows a slow but continued decline in the number of school children cycling to school and hours spent walking per person amongst under-25s.

Internationally, Davis & Dutzik (2013) found that from 2001-2009 in the US there was a 23% decline in distance travelled by car amongst the 16-34 age group, but PT use was up 100%, walking up 37% and cycling up 122%. The Sydney Morning Herald recently published data for Sydney which paints a broadly similar picture (Saulwick & Walters, 2013).

4.4 PUBLIC OPINION

Reinforcing the observed changes in travel behaviour, there is evidence of a swing in public opinion to support greater investment in public and active transport facilities. Three examples of this are:

- An opinion poll by UMR Research (2013) asked respondents: "*If you had to choose, should government funds be used to improve motorways and public roads, or should funds be used to improve public transport?*" 48% chose PT compared with 37% who chose motorways and roads (15% chose neither/both/unsure).[9] When the same question was asked in 1992, only 25% chose PT while 43% chose roads and motorways.

- An opinion poll by Colmar Brunton (2011) asked respondents the extent to which they agreed or disagreed that the government should spend a greater percentage on new or improved PT infrastructure in major urban areas or cities in the next decade, after describing the current funding parameters for road infrastructure versus PT infrastructure under the National Land Transport Programme. 72% agreed while only 8% disagreed.[10]

- The New Zealand Automobile Association (2013) conducted an informal survey of its members in 2013 asking: "*If we could improve the safety of cycling on our urban roads, would you give cycling a go?*" 92% of respondents said yes and 8% said no.

4.5 HAVE TRANSPORT MODELS KEPT UP?

As mentioned in Section 4.2, research indicates there are deficiencies in how models used for

9 This poll's margin of error at the 95% confidence level is +/- 3.6%.
10 This poll's margin of at the at the 95% confidence level is +/- 3.1%.

transport projections take account of changes in underlying factors (or fail to). Given that the models generally have a heavy reliance on past trends, we consider it likely they will overestimate car traffic growth and underestimate demand for PT and cycling going forward. Post-implementation reviews conducted by the New Zealand Transport Agency (NZTA) over the last four years show a strong tendency for benefit-cost ratios for road projects to be overestimated, with lower than forecast traffic growth being a commonly cited factor (TransportBlog, 2013b). Meanwhile, two major examples suggest that models used may tend to considerably underestimate the effects of transformational PT projects:

- The 2001 business case for Auckland's Britomart Transport Centre projected daily rail patronage of 18,000 in 2011 and 21,800 in 2021. The actual figure in 2011 was roughly 40% higher at 25,112 (TransportBlog, 2013c).

- The predicted annual passenger volume for Auckland's Northern Busway in 2011/12 was 1,213,266. The actual figure for the Northern Express service alone was nearly double this at 2,311,527 - and this service is estimated to account for less than half of all patronage on the Busway (TransportBlog, 2013d).

Whether recent changes to NZTA's Economic Evaluation Manual will improve the accuracy of projections remains to be seen.

4.6 SUMMARY

In summary: travel trends over recent years in New Zealand and abroad are showing a decline in per capita car travel and an increase in public and active transport; there are several obvious contributing factors and an underlying generational shift where younger people are driving significantly less than the preceding cohort; public opinion has swung firmly behind transport investment being prioritised for public and active transport facilities; and transport models employed in New Zealand seem to be biased towards road projects and inept at predicting the effects of transformational public transport projects.

Discussing the implications of 'peak car', the International Transport Forum (2011) concluded: "'*Peak travel' [...] is a plausible hypothesis but far from a certainty. It seems excessively risky to base projections in rich countries on an assumption of saturation alone.*" While this may be true, we believe it is equally risky to continue to base projections and transport investments on simple assumptions of ongoing increases in road traffic. We are more inclined to the point of view expressed by *The Economist* (2012): "*If policymakers are confident that car use is waning they can focus on improving lives and infrastructure in areas already blighted by traffic rather than catering for future growth. [...] By improving alternatives to driving, city authorities can try to lock in the benefits of declining car use.*"

5. AUCKLAND

5.1 CURRENT SITUATION

As a result of the almost exclusive investment in roading over a 40 year period (Wallace et al., 2011), Auckland is a heavily car-dependent city, with private car mode share rates of 80% (Ministry of Transport, 2013a). As discussed in Section 4.5, recent modest investments in public transport are already paying off: rail patronage has increased by nearly a factor of five since the opening of Britomart, and the Northern Busway has been a big success with 51 per cent of people coming into

city from the North Shore in the morning peak now travelling by bus (TransportBlog, 2013d).

Auckland's current transport spending plan is contained in the Integrated Transport Programme (ITP), the first version of which was released by Auckland Transport in early 2013. Over the 30 year period of the programme it is expected the city will spend approximately $34 billion on new or improved transport infrastructure, of which over $22 billion will be allocated to new roading projects, as detailed in Table 3 below.

Roading Projects 2012-2041	
Major projects	**$m**
Western Ring Route completion - Waterview to Westgate	$1,970
SH1 widening Manurewa to Papakura	$516
SH20A widening	$235
Mill Road	$239
AMETI	$2,600
PENLINK	$203
SH1 Constellation to Greville	$36
SH1/SH18 direct connection ramps	$500
SH20B four-laning	$235
East West Link	$632
Additional Waitamata Harbour Crossing	$4,800
SH18 eastbound widening	$30
St Lukes Rd Interchange	$59
Tiverton-Wolverton	$33
Albany Hwy upgrade	$665
Lake Road upgrade	$120
SH1 6-laning Albany to Orewa	$1,100
SH20 Mangere to Puhinui 6-laning	$180
Great South Road - Church to Portage	$440
Great South Road - Atkinson to Tamaki River Bridge	$240
Great South Road - Te Irirangi to Redoubt	$140
Puhoi to Wellsford Motorway	$1,760
SH16 4-laning Brigham Creek to Waimauku	$150
Pukekohe Eastern Arterial	$50
Warkworth Western Collector	$4
Major projects total ($m)	**$16,937**
Auckland wide projects	**$m**
Other urban arterial upgrades	$2,500
Greenfields arterial roads	$1,200
Greenfields state highway upgrades	$1,800
Rail grade separations	$350
Auckland wide projects total ($m)	**$5,850**
Grand Total ($m)	**$22,787**

Public Transport Projects 2012-2041	
Major projects	**$m**
City Rail Link	$2,617
Northern Busway Extension	$750
Bayswater Ferry Terminal upgrade	$12
Dominion Road upgrade	$82
Half Moon Bay Ferry Terminal upgrade	$12
Southeastern Busway*	$650
Botany - Manukau Rapid Transit	$22
Manukau Bus Interchange	$19
Third Rail Line: Westfield - Papakura	$320
Third Rail Line: Britomart - Westfield	$200
Airport Eastern Rail Link	$602
Airport Northern Rail Link	$491
Avondale-Onehunga/Southdown Rail Extension	$1,000
Papakura-Pukekohe Electrification and stations	$141
Constellation-Westgate-Waterview Busway	$450
City Centre bus Improvements	$250
Major projects total ($m)	**$6,968**
Auckland wide projects	**$m**
Rail park and rides	$100
Electric Multiple Unit rolling stock and depot	$980
Integrated ticketing and fares	$10
Real time information upgrade	$17
Greenfields public transport infrastructure	$400
Auckland wide projects total ($m)	**$1,507**
Grand Total ($m)	**$8,475**
* Cost not included in total as included in overall AMETI project	

First Decade 2012-2021	
Second Decade 2022-2031	
Third Decade 2032-2041	

Table 3: Breakdown of projects contained within Auckland Transport's Integrated Transport Programme, including estimated costs and completion dates (Auckland Transport, 2013).

Auckland Transport's own modelling predicts that the ITP will increase congestion by 20% and increase carbon emissions by 24% (Auckland Transport, 2013). Generation Zero and TransportBlog were concerned at the poor outcomes of this plan despite the very high cost, the heavy orientation towards large roading projects, the lack of integration with the 'Compact City' land use strategy, and the failure to take into account changing trends as seen above. This led us to develop the 'Congestion Free Network' (CFN).

5.2 THE CONGESTION FREE NETWORK

The CFN prioritises the investment in most of the PT projects in the ITP, whilst scaling back many of the roading projects. The CFN isolates the top layer of the PT network and shows how this can be expanded and connected while remaining integrated with the other layers of the PT system - especially the frequent and local bus networks - to form a complete system to compliment the existing and mature road network. Growing this network will give Aucklanders the option to move

across the whole city at speed completely avoiding road traffic. By connecting the existing rail and busway to new high quality bus and rail routes, our current small and disjointed rapid transit network can become a real option for millions of new trips each year. This will have the dual benefit of taking pressure off crowded roads by offering an effective alternative to driving, as well as providing a route that avoids congestion. To qualify for inclusion in the CFN a transit service needs to fulfil three conditions, summarised in Figure 9 below.

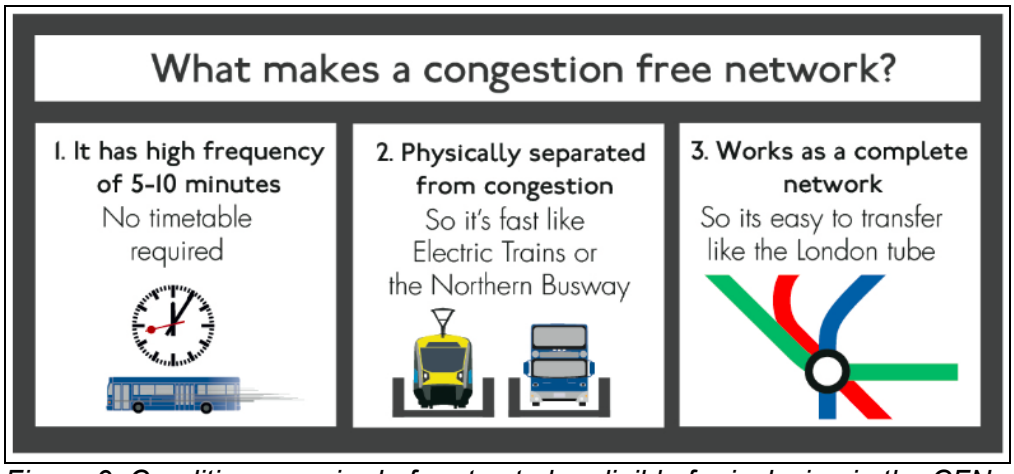


Figure 9: Conditions required of routes to be eligible for inclusion in the CFN.

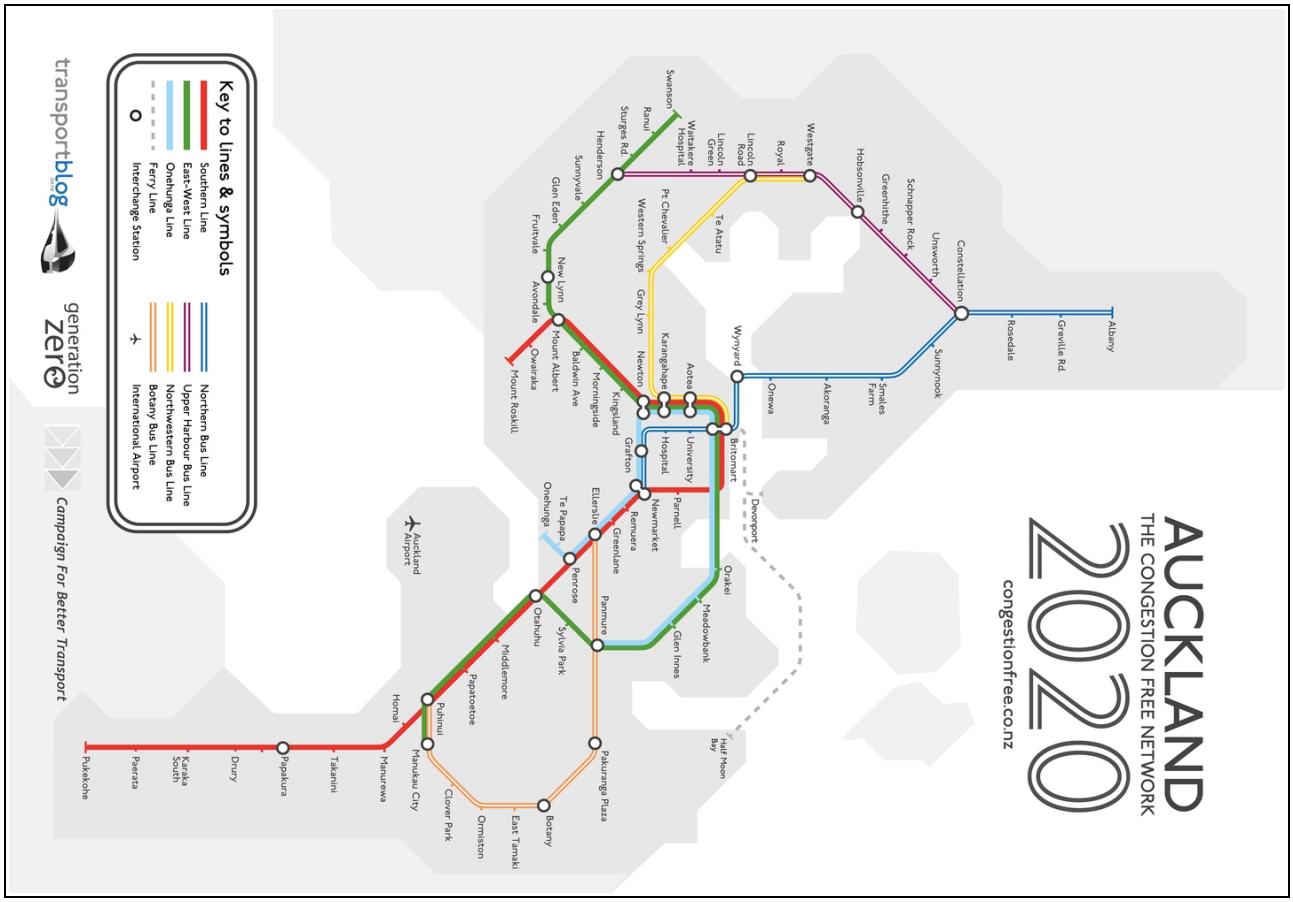
The projects included in the CFN will be developed at five year intervals from 2015-2030. Maps of the network in 2020, when Auckland Council hopes to open the City Rail Link, and at the time of completion in 2030 are displayed below.

In total, we expect that the CFN could be built for less than $10 billion spread over 17 years. This is $24 billion less than the current ITP proposals, as shown in Table 4 below. However the CFN is not just a public transport project; it is about altering the balance of transport investment to reflect changing trends in society. The ITP also proposes spending $21.7 billion on roading projects out to 2030. We have worked through the project list outlined above to suggest what changes could be made to this package of projects to better align with the CFN.

What becomes quite clear from this process is that there are extremely few occasions where we would completely remove a project contained in the ITP. Instead, we have often decreased the amount of money we think should be spent on a particular project – because what has been suggested is 'overkill' for the problems actually faced. Examples of this are the Puhoi-Wellsford upgrade, East-West Link and Airport roading upgrades. Other major projects such as AMETI, SH1 southern motorway upgrades and regional arterial road upgrades are still able to be included unchanged, though some may be delayed. Note too that lower value PT projects such as the eastern section of the Avondale-Southdown route and the eastern rail route to the airport are proposed to be busways instead of rail.

	ITP	CFN	Comparison
Roading	$21,657	$6,970	-$14,687
Public Transport	$8,475	$9,530	$1,055
Total	$30,132	$16,500	-$13,632

Table 4: Comparison of the cost of the Congestion Free Network versus the Integrated Transport Programme. More detailed information is available at http://www.congestionfree.co.nz/.



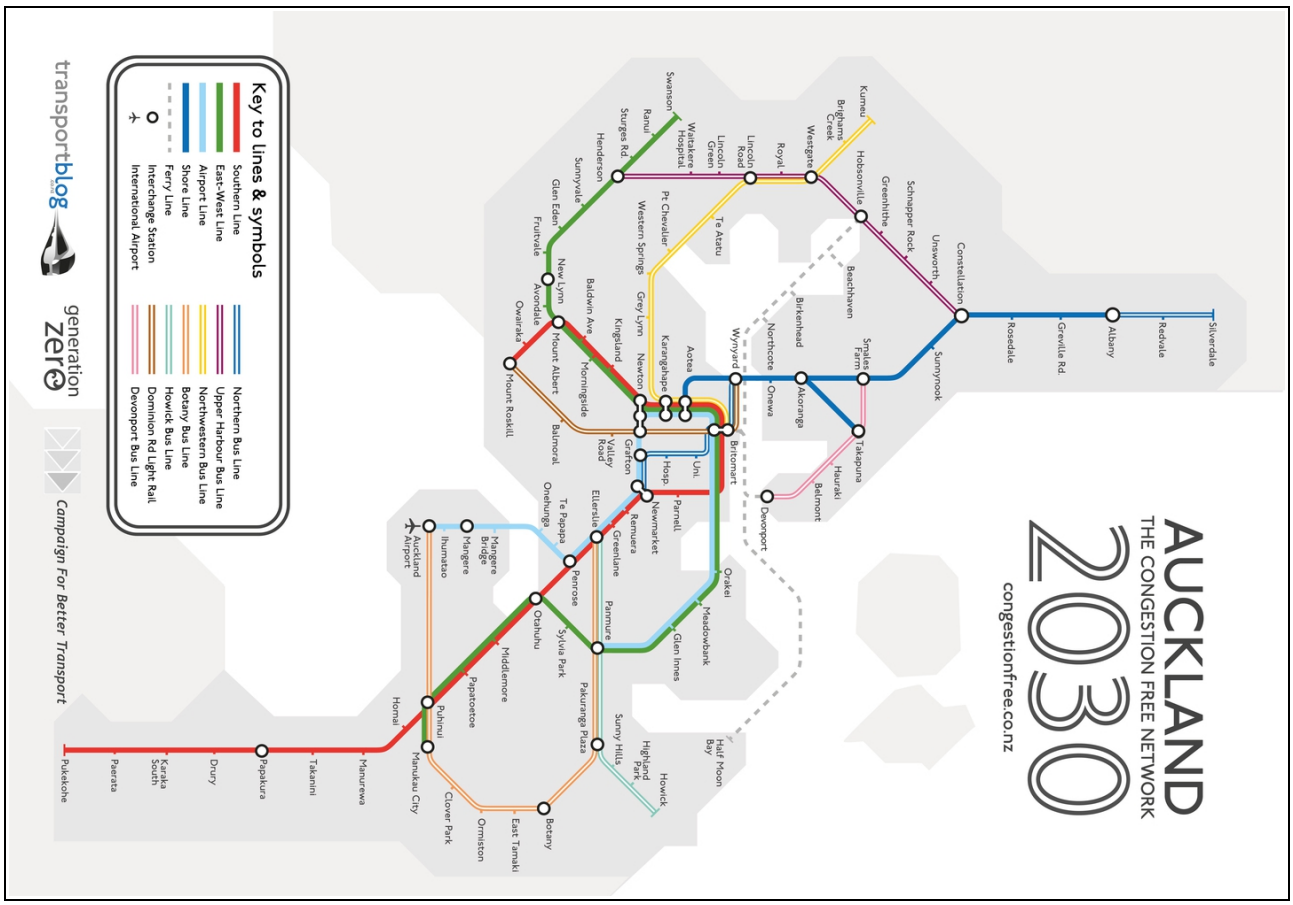


Figure 10: Maps of the Congestion Free Network in 2020 (top) and 2030 (bottom).

The headline figure, summarised in Table 4, is that we are able to reduce expenditure on roading projects from $21.7 billion to just $7 billion. The CFN thus has more of a funding balance with a 42% roads, 58% PT funding split. This compares to the ITP proposing to spend 72% of its capital on roads and only 28% on PT. The key point is that we can actually afford a high quality PT system and it can be done without having to drastically cut road building. Instead the roading programme would focus on smaller network tweaks rather than projects massive in scale.

The networks we are showing are built on what we already have in Auckland and what is proposed in varying scenarios by Auckland Council, Auckland Transport, NZTA, and other professional bodies, and are all predicated on maximising value from existing infrastructure. In other words, these are all possible and realistic projects. They are buildable and fit into efficient operating models as well as being focused on unlocking hidden capacity and other benefits latent in our existing networks. They are in sync with the proposed directions of Auckland's future growth (both up and out) and have been selected with quality of place outcomes in mind as well as likely changes in movement demand. Following completion of the CFN, 40% of the regional population will be within walking distance of a train or bus station (less than 1 kilometre). With the complementary investment in improved cycling amenity, the majority of Auckland's population will be within easy reach of high frequency public transport.

The Congestion Free Network is a multi-modal solution for Auckland that addresses many of the problems with our current transport network. It is also future focussed to ensure that Auckland transport projects take advantage of changing trends in society and the environmental and health issues that we face.

6. WELLINGTON

[TO BE COMPLETED]

7. CONCLUSION

[TO BE COMPLETED]

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