

# 2012 -2041 Integrated Transport Programme



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# Glossary

ACC	Accident Compensation Corporation
AIA	Auckland International Airport
AMETI	Auckland-Manukau Eastern Transport Initiative
AT	Auckland Transport
ATMS	Auckland Traffic Management System
CCFAS	City Centre Future Access Study
CRL	City Rail Link
FSI	Fatal and Serious Injury
GPS	Government Policy Statement
HGI	Hauraki Gulf Islands
HPMV	High Productivity Motor Vehicles
ITP	Integrated Transport Programme
KiwiRAP	Auckland Road Assessment Programme
LoS	Levels of Service
MMEWS	Multi-Modal East West Study
NORSGA	Northern Strategic Growth Area
NOX	Nitrogen Oxide
NZTA	New Zealand Transport Agency
PM	Particulate Matter
POAL	Ports of Auckland
PT	Public Transport
QTN	Quality Transit Network
RTN	Rapid Transit Network
RLTP	Regional Land Transport Programme
RUB	Rural Urban Boundary
SMART	South-Western Multi-modal Airport Rapid Transit
TDM	Transport Demand Management
VKT	Vehicle Kilometres Travelled

# Executive Summary

## The Auckland Plan

The Auckland Plan sets out the 30 year spatial framework for the growth and development of Auckland to become the world's most liveable city. The Auckland Plan acknowledges that the transport system is crucial to achieving this vision. The role of the transport system in facilitating liveability, economic growth and productivity is defined in the Auckland Plan by the overarching direction to **Create Better Connections and Accessibility within Auckland, across New Zealand and to the world** and includes four key priorities:

1. Manage Auckland's transport as a single system.
2. Integrate transport planning and investment with land use development.
3. Prioritise and optimise investment across transport modes.
4. Implement new transport funding mechanisms.

Achievement of the outcomes and priorities of the Auckland Plan are linked with meeting key targets for increasing public mode share, reduced greenhouse gas emissions, improved accessibility, lower congestion for public transport and freight, travel time savings and the delivery of transport infrastructure priorities over the next 3 decades estimated at \$60 billion.

## Purpose of the ITP

Auckland's ITP sets out the 30 year investment programme to meet the transport priorities outlined in the Auckland Plan across modes covering the responsibilities of all transport agencies. Developed by Auckland Transport (AT) and the New Zealand Transport Agency (NZTA) in collaboration with Auckland Council, the ITP provides a consolidated transport investment programme across the transport system over the next 30 years. The programme covers state highways and local roads, railways, buses, ferries, footpaths, cycleways, intermodal transport facilities and supporting facilities such as parking and park-and-ride.

In particular, the ITP:

- Guides transport agencies in their detailed planning activities for maintaining, operating, renewing and developing their transport networks.
- Directs transport asset management, corridor and network development, transport service levels and the transport capital portfolio for each of the 10 year periods to 2041.
- Informs the detailed programming of activities in the Regional Land Transport Programme (RLTP).

Figure 1 summarises the role of the ITP within the overall transport planning framework for Auckland.

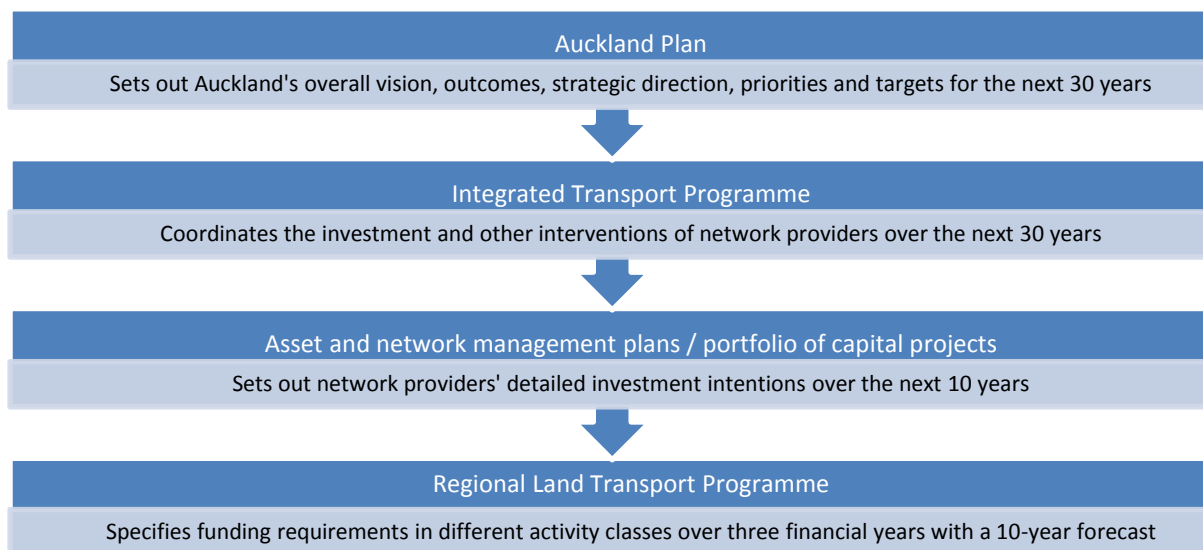


Figure 1: Role of the ITP

## ITP Approach

The ITP identifies the key transport challenges facing Auckland over the next 30 years and proposes two major strategies to meet the priorities in the Auckland Plan. These are the:

- Management of transport as One System and,
- Development of a transport programme to 2041 (using a four staged intervention process).

This is the first publication of the ITP and as such it sets up the approach for future iterations. It describes the One System approach, how it has been adopted and started to be rolled out and introduces the first integrated transport programme for Auckland for the next 30 years which reflects the four staged intervention process.

The evolution of the ITP will reflect the roll out of the One System approach across Auckland over time to ensure that network changes reflect transport user demands and changing circumstances in a coordinated and timely manner.

The ITP programme will be revised and improved to respond to Auckland's changing transport network over time. Review of the ITP will reflect outcomes from the testing of various transport priority packages to ensure that the RLTP is optimised to deliver Auckland Plan transport targets and outcomes.

Auckland Council is leading the assessment of opportunities to meet the funding gap associated with the fully funded programme (see Table 1 below) including alternative funding scenarios and demand management measures to change travel behaviour. The outcomes from these investigations and how these may be implemented will also be addressed in more detail in the next version of the ITP.

## Key Transport Challenges

AT's key challenge is to meet travel demands, Auckland Plan outcomes and targets associated with historical and forecast growth in population, employment, freight across the City and to ensure that transport networks are integrated with planned growth outlined in the Auckland Plan.

Targets and outcomes aim to reduce congestion, improve travel time reliability and frequency, improve safety, reduce greenhouse gas emissions and improve environmental amenity.

## Manage Transport as One System

The One System approach provides for the management and planning of transport networks with land use development as outlined in the Auckland Plan. The One System approach will result in:

- Better use of existing transport networks
- Better alignment of transport provision with changing patterns of land use and demand
- A safer, more resilient national and regional network, where a greater range of resources and options is available to deal with unexpected events or future changes
- Better alignment of effort between network providers and elimination of overlap and duplication

At the strategic level, 10-year Network Plans (strategic and arterial roads, freight, public transport, cycling, and parking) establish the high level priority for transport users for each mode. Levels of service define the desired performance of the network for transport users of the system and the locations served by the network. At all stages in the development of the network plans, transport stakeholders (NZTA, AT, KiwiRail and Auckland Council) are involved in determining network objectives, how priority is assigned and the effects of interventions on the network.

Network Plans also direct the priorities for the development of other tactical and operational transport network activities, including:

- Corridor Management Plans (CMPs) (based on individual arterial roads or groupings of arterials).
- Transport responses to growth in metropolitan centres and other centres.
- Major integrated, multi-modal infrastructure projects (such as City Rail Link (CRL)/Integrated Bus Solutions, the Auckland-Manukau Eastern Transport Initiative (AMETI), Multi Modal East West Study (MMEWS) and the South western Multi modal Airport Rapid Transit (SMART).
- Network operating plans, which translate the strategic direction into the day-to-day operation of the network.

Network Plans are complemented by Network Operating Plans that integrate and optimise transport networks. Network Operating Plans are a new planning and operational tool to link strategic transport objectives with operational interventions.

The performance of the network today as against the desired future network is assessed by the tool. The difference in performance (or operating gap) is addressed by developing

operational interventions, such as “tuning” traffic signal systems, to close the gap. Network operating plans for sub-areas of the Auckland region will be developed in more detail, with the network user’s requirements determining decisions on mode, location and road priorities depending on the time of day. These plans will reflect the strategic intent of the network and provide a graphical representation of the evolution and operation of the transport network. A deficiency analysis comparing the performance of the existing network against the desired future network will enable a clearer understanding of the interventions necessary to meet transport demand.

Transport users will be able to make informed travel decisions based on how they see the network developing and being operated and how transport facilities such as parking areas, interchanges and upgrades will be implemented over time. This information will be made available on the web for public information.

The One System approach will also enable the refinement and optimisation of the ITP to ensure that it achieves the best value for money from previous and new investments especially in relation to the level of service it delivers.

This approach is already being piloted in Takapuna and will be rolled out across other sub-areas in the future.

## **ITP - The Four Staged Intervention**

In order to derive the greatest benefit from transport investment and to meet the transport targets and outcomes for Auckland, a four-stage intervention process has been developed to enable the ITP to prioritise the phasing of Auckland’s 30 year transport programme.

**Appendix 1** outlines the 30 year transport programme for Auckland categorised by four functional areas which make up the intervention:

***Operate, maintain and renew infrastructure optimally:*** Existing assets need to be maintained, repaired and renewed to minimise whole of life costs to avoid increased costs over the longer term and unacceptable risks associated with inadequacy of transport assets and services. Projects in this category relate to the day to day operation of the network and public transport services, renewal of assets to restore levels of service management plans and maintenance activities.

***Make better use of networks:*** Experience with managing the transport system suggests the best returns from investment can often be achieved through optimal management and use of existing assets. Examples of network optimisation activities include: safety schemes; changes to clearways and other parking management measures; “tuning” traffic signalling systems; speed limit reviews and minor upgrades to existing arterial roads and local roads.

***Manage demand efficiently and safely:*** Transport demand management refers to measures which change travel behaviour such as pricing, taxes, use of speed and red light cameras, parking charges, statutory planning controls that are not based on infrastructure solutions but on policies, regulatory levers and incentives.

***Invest in new infrastructure, services and technology:*** Major transport improvements will be crucial to meet increasing demand associated with growth, and to maintain good levels of service for freight and commercial vehicles. The ITP maintains the Auckland Plan’s priorities for major network improvements which are the: completion of the Western Ring Route,

upgrade of public transport infrastructure and introduction of electrified rail services; the CRL, AMETI, MMEWS, and the Additional Waitemata Harbour Crossing.

### Investment Scenarios for ITP

Different scenarios have been tested using a range of assumptions about funding levels, growth and land-use development patterns, as shown in Table 1. The Auckland Plan is based on scenario 1, which assumes high population growth, a moderately compact city and that the transport investment is fully funded. Scenario 2 is a more extensive land use scenario, while scenario 3 is a lower growth, more compact land use scenario.

Land use scenario			Transport investment	
Scenario label	2041 Population	RUB development inside / outside	Fully funded	Committed funding
1	2.4 million	60% / 40%	≈ \$60 billion	≈ \$34 billion
2	2.4 million	75% / 25%	≈ \$60 billion	≈ \$34 billion
3	2.1 million	75% / 25%	≈ \$60 billion	≈ \$34 billion

Table 1: The land use scenarios and investment scenarios used for assessing transport programme performance

The cost of fully funding the transport programme over the 30-year period is estimated at around \$60 billion in 2012 dollars. In addition to initial capital costs, the \$60 billion programme includes the whole-of-life costs, including the running costs of high-maintenance infrastructure such as tunnels. Figure 2 below shows the investment profile for the fully funded programme categorised by the four activity classes.

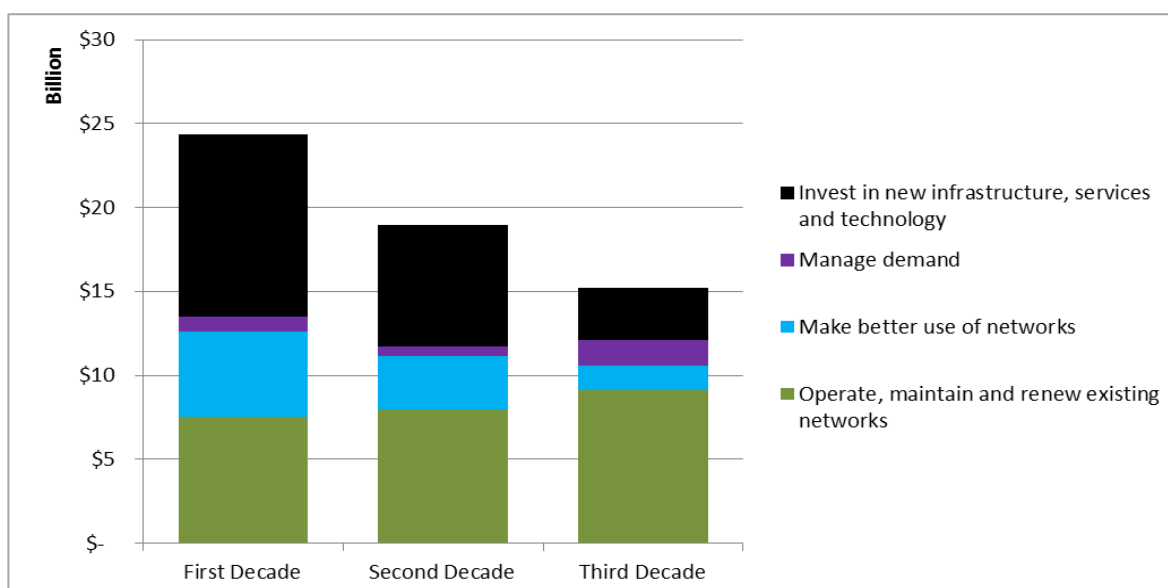


Figure 2: ITP investment profile for fully funded programme



Given current funding sources, there is an estimated funding gap of between \$10b and \$15b to deliver the fully funded programme.

As indicated in the graph, costs peak in the first decade, due to major investments in projects such as the CRL, the Western Ring Route, AMETI and MMEWS. The cost of project packages becomes more challenging to estimate as far out as the third decade so the expenditure forecast for 2032-2041 is likely to be underestimated.

Funding will be a key issue in successfully addressing the challenges of growth in the years ahead. The pressure on already-limited funding is likely to grow as the costs of materials increase and the physical and environmental constraints in expanding network capacity become more difficult (and expensive) to overcome.

Using the four stage intervention process, two investment scenarios have been developed which embrace the whole-of-life costs of operating maintaining, renewing and managing the system, as well as developing it. The two investment scenarios are:

- A fully funded programme, which integrates the transport investments called for in the Auckland Plan into broader activities. This assumes unconstrained funding and therefore 100 per cent of the programme can be funded within the 30-year period (Fully Funded Programme).
- A committed funding programme, which assumes funding would be limited to on-going operation, maintenance, renewal and management of the network together with improvement projects currently under construction or approved for funding. This equates to 57 per cent of the fully funded programme (Committed Funding Programme).

The cost estimates of these scenarios are based on preliminary planning and will be improved over time as more information becomes available.

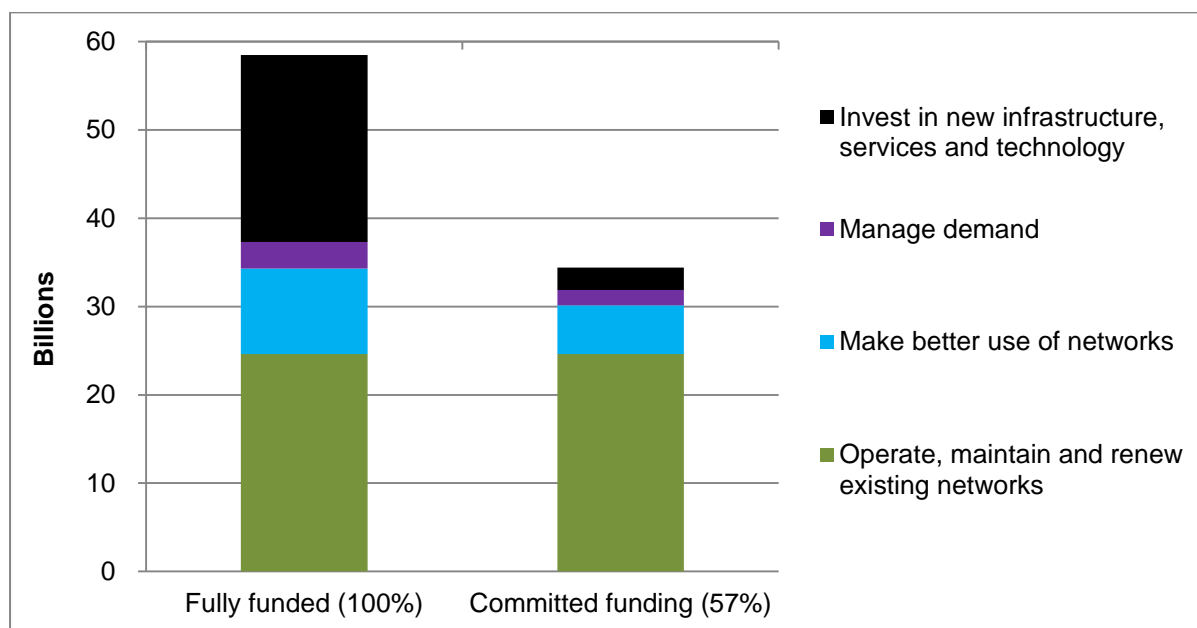


Figure 3: ITP investment scenarios

## Comparison of Impacts

The ITP assesses the performance of the fully funded transport investment programme shown in **Appendix 1** (encompassing all the Auckland Plan projects estimated at \$60 billion) against equivalent performance under an investment programme reflecting only committed funding under the RLTP. Performance is measured against Auckland Plan targets and other outcomes.

The comparison enables an assessment of the relative shortfall between the fully funded programme and committed funding programme in delivering the Auckland Plan vision for transport and shows that implementation of the fully funded programme over the 30-year period provides significant relative transport benefits against nearly all indicators.

Importantly, the assessment also shows that even with the fully funded programme, road congestion levels will deteriorate with volume/capacity ratios exceeding 100 per cent on most of our arterial road network by 2041 and emission levels exceeding current levels. These findings demonstrate the fact that while investment in transport infrastructure is critical, it will need to be complemented with a suite of other measures to achieve congestion relief and reduced greenhouse gas emissions.

## Results from Comparative Assessment

An overview of the main results from the comparative assessment of the fully funded programme against the committed funding programme is outlined below.

### Person Kilometres

Figure 4 shows the steady increase in person kilometres travelled by private vehicle and public transport under the fully funded investment programme. As indicated in the graphs overall accessibility is increased as a result of new transport investment.

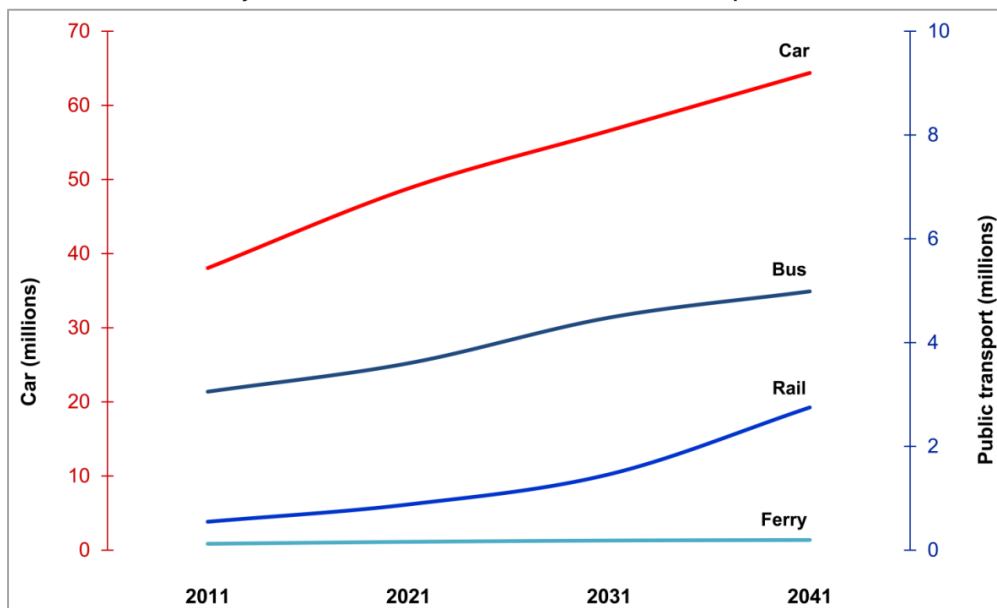


Figure 4: Person km travelled under fully funded transport investment programme

## Freight Congestion

Figure 5 shows the percentage of the strategic freight network subject to excessive congestion for different investment scenarios. Road congestion worsens significantly during the plan period if investment is restricted to only those new infrastructure projects for which funding is already committed. This is particularly marked in the second and third decades. Fully funding the \$60 billion programme significantly moderates the growth in congestion because of the extra capacity added to the system. Without this level of investment, the ability for people and goods to move to, from, within and through Auckland would be constrained as the city's population grows to around two million in 2041.

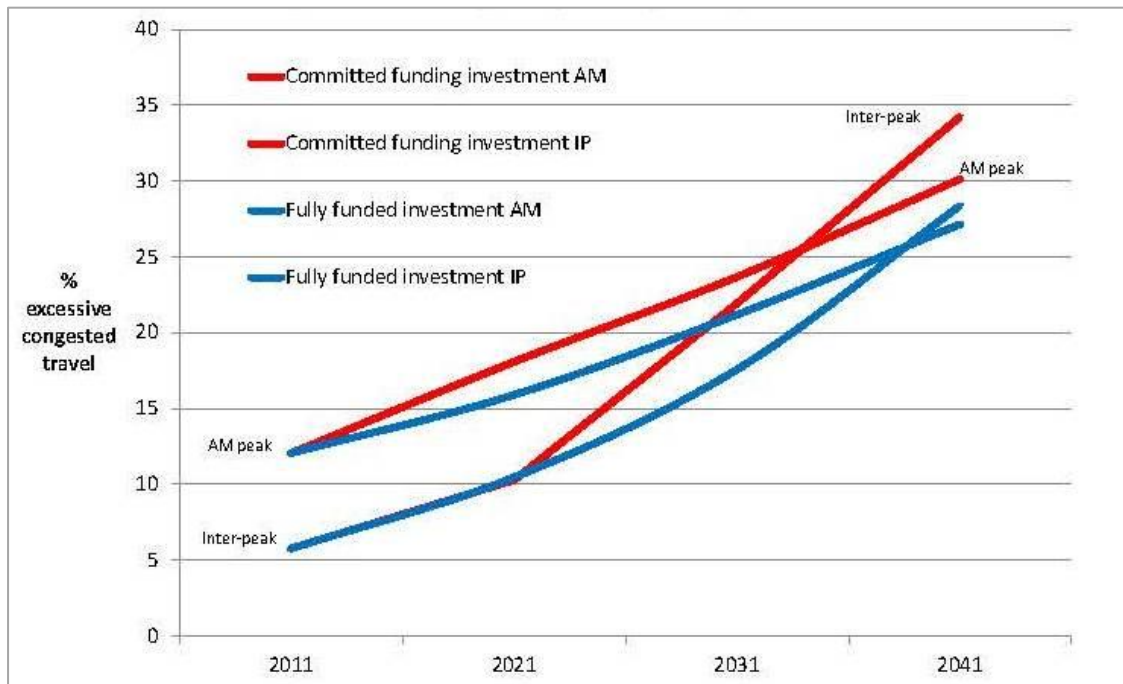


Figure 5: Inter-peak freight congestion

A key driver of the disproportionate growth of congestion during the inter-peak period, as compared to the peak period, is that improved public transport is able to relieve the pressure on the road network for commuting trips during the peak periods, but it is less able to assist for the types of trips occurring between the peaks. This is because currently, there are less services between peaks. It is noted however that the proposed frequent bus service improvements should reduce this impact.

## Public Transport Boardings

As indicated in Figure 6 there is an increase in the range of accessible travel choices under the fully funded programme<sup>1</sup>, with public transport boardings growing strongly throughout the 30-year programme. Figure a.6 shows that under scenario 1 of high population growth, moderately compact land-use development and full funding, the Auckland Plan target of doubling public transport boardings by 2022 is achievable. Under the Committed Funding scenarios growth continues, but at a much slower rate. Greater use of travel demand management measures will only be feasible when more realistic alternatives to private car

<sup>1</sup> The Auckland Plan is based on scenario 1, which assumes high population growth, moderately compact city and that the transport investment is fully funded.

use are enabled by completion of key projects within the fully funded investment programme; and this level of investment also increases public transport network capacity and the transport system's resilience.

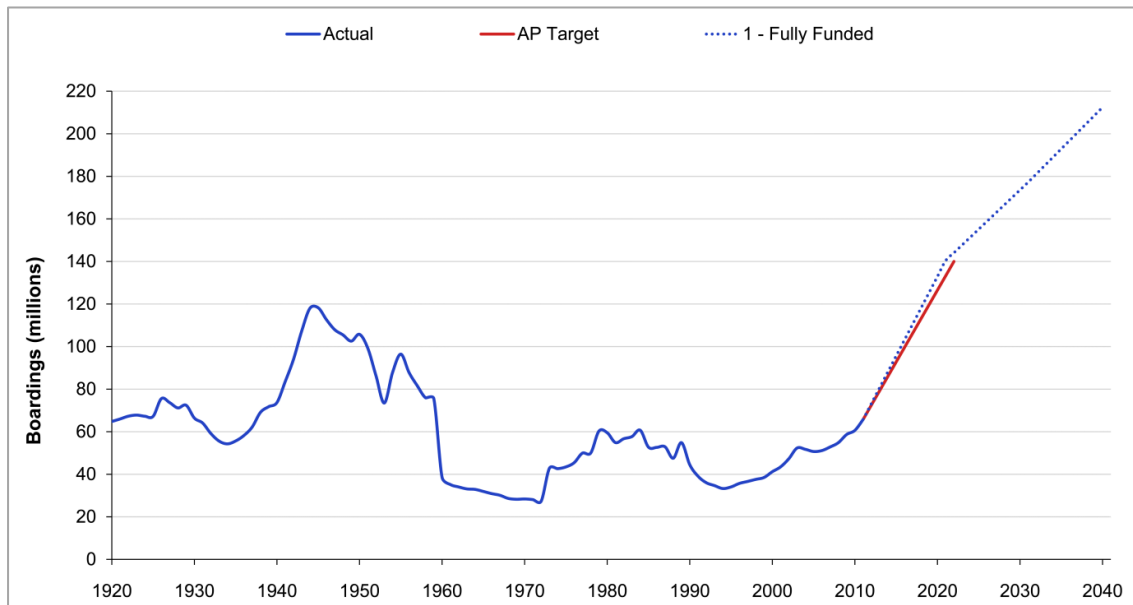


Figure 6: Public transport boardings

### Road Congestion

Excessive congestion on the road network worsens significantly for peak (7-9am) and inter-peak (9am-3pm) periods in the second and third decades, with excessive inter-peak congestion outpacing morning peak congestion levels by 2041 under the Committed Funding scenario. Figure 7 shows that even the fully funded programme is not able to keep ahead of traffic growth after 2021. As noted earlier, the forecast increase in congestion on the strategic freight network is considerably worse by 2041 than for the road network generally. Achieving the target of reducing congestion for vehicles on the strategic freight network by 2021 will therefore require the additional network and demand management interventions discussed earlier, in addition to investment in new capacity.

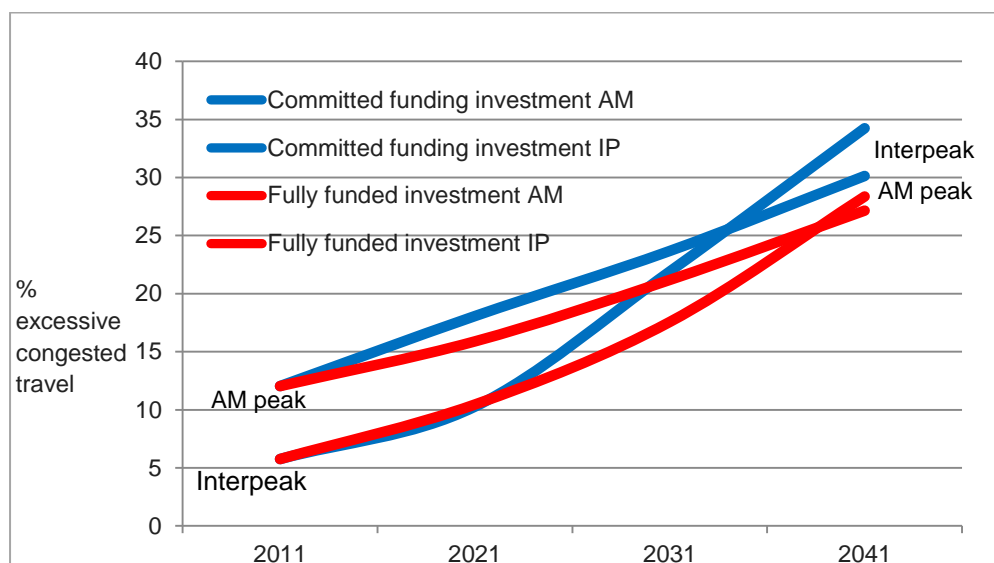


Figure 7: Congestion on the road network

## Safety

The Auckland Plan's road safety target of a 31-34 per cent reduction in fatal and serious injuries over the 30-year period is achievable (as shown in Figure 8) provided the enforcement and other interventions in the Regional Road Safety Plan are fully implemented.

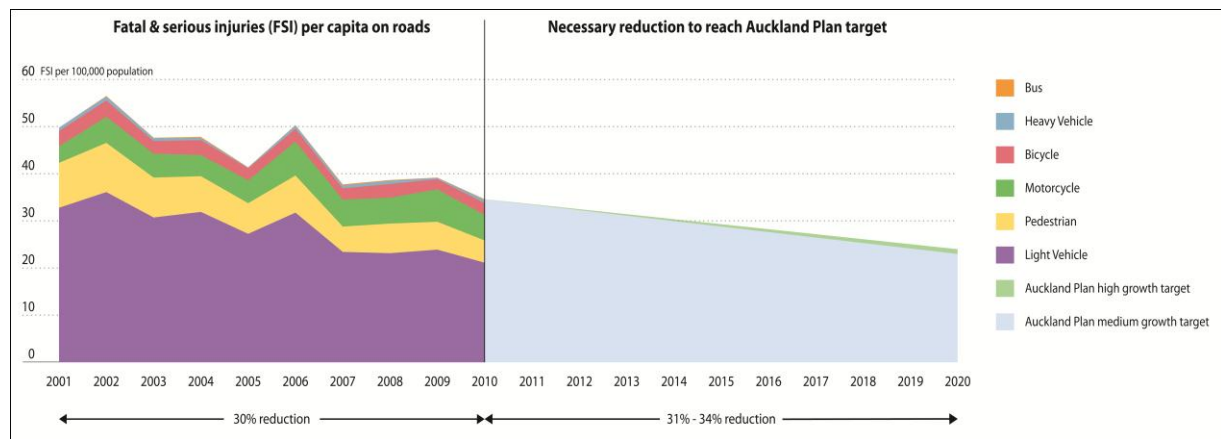


Figure 8: Fatal and serious injuries

## Emissions

Figure 9<sup>2</sup> indicates that CO<sub>2</sub> emissions increase significantly for the fully funded investment scenario on the high growth assumptions of scenarios 1 and 2, and have nil or small percentage increases for the medium population growth assumption, scenario 3. Greenhouse gases emitted by transport in New Zealand are almost exclusively CO<sub>2</sub>. Achieving the Auckland Plan target of a 49% per cent reduction (based on 2009 levels) in greenhouse gas emissions by 2041 will depend on a subsequent review of this programme based on the Energy and Climate Change Mitigation Strategy coordinated by Council which currently relies on a large uptake in electric vehicles, biofuel consumption and road pricing to achieve.

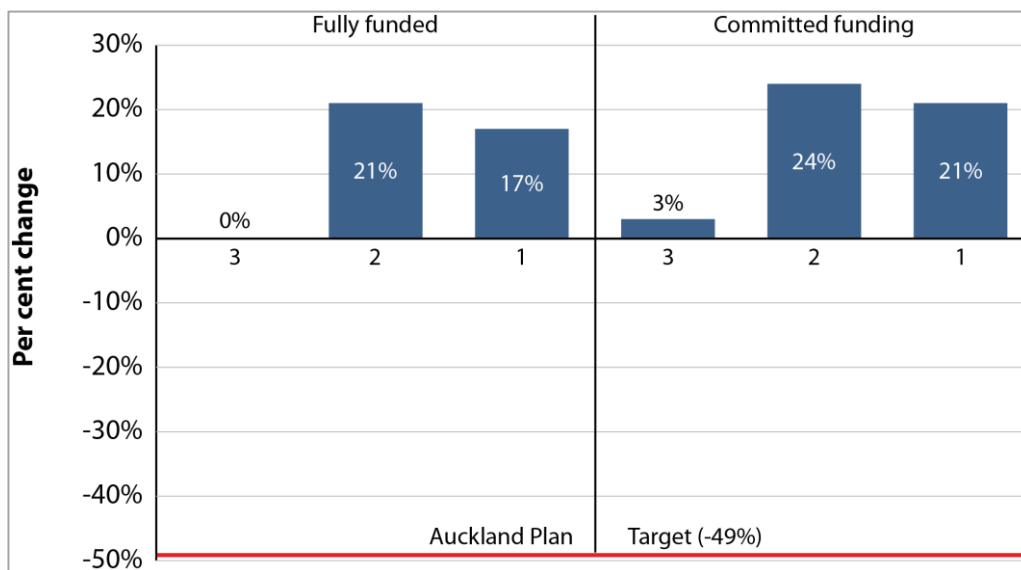


Figure 9: Growth in Co2 emissions: Present to 2040

## Performance Against Key Indicators

Table 2 predicts how the fully funded and committed transport investment scenarios will achieve the Auckland Plan targets and outcomes (such as the target to reach 140 million public transport trips by 2022), compared to current performance. The Fully Funded transport investment performs well for passenger transport and people's access to jobs but congestion and emission levels worsen. The committed funding programme performs less well, on the same indicators.

<sup>2</sup> Equivalent to the Auckland Plan target for CO<sub>2</sub> emission

Indicator	Description	Current	Full funding	Committed funding
Public transport boardings	Number of annual public transport boardings (millions)	70 million	2022: 140.4 million	2022: 103 million
Public transport boardings per capita	Number of annual public transport boardings per capita	44	84	66
Public transport morning peak motorised mode share	Proportion of morning peak motorised trips (PT & Auto) into the CBD by public transport	47%	56.1%	55.5%
Walking, cycling, and public transport morning peak mode share	Proportion of morning peak trips that are made by walking, cycling, or public transport	23%	32.2%	31.0%
Greenhouse gas emissions	Greenhouse gas emissions from ground based transport	2009 base (0%)	17% increase	21% increase
People's access to jobs	Number of jobs (000s) accessible to households within 30 travel time by car	280	450	320
People's access to jobs	Number of jobs (000s) accessible to households within 60 mins travel time by public transport	100	200	170
Roadway congestion on QTN where buses mix in traffic	Per cent of VKT operating at LoS E or F during morning peak where buses mix in traffic on the QTN	17.6%	2041: 8.4%	2041: 10.5%
Strategic freight network congestion	Per cent of VKT that roads on the strategic freight network operate at LoS E or F	12.0% AM	2041: 27.1% AM	2041: 30.1% AM
		5.8% IP	2041: 28.4% IP	2041: 34.2% IP
Transport delay	Annual excess delay (LoS E or worse) per capita	7%	2041: 34.0%	2041: 45.2%

KEY	Improved
	Slight Improvement
	Worse
	Significantly worse

Table 2: Fully Funded and Committed Funding predictions for Auckland Plan Targets

## Need for a wider suite of interventions

In the first decade of the 30-year period, all the scenarios assessed show service performance generally improving, even with Auckland's predicted growth, especially in relation to safety, the number of jobs accessible to households, and access to transport choices. This improving system performance is a result of the significant investment in the first decade of the ITP, building on investments in the previous decade to further develop the strategic road and public transport networks.

In the second and third decades the improvements of the first decade cannot be sustained only through investment in new capacity. This is especially true with regard to increasing congestion during the inter-peak period. While some congestion is to be expected in a thriving, successful city of two million people, the levels of congestion forecast for Auckland by 2041 are well in excess of the current levels experienced in cities such as Sydney and Melbourne, which already have considerably larger populations.

The reason for the forecast increase in Auckland's congestion is that the growth in transport demand outstrips the increase in road capacity, even with the fully funded investment programme. This occurs despite the significant increase in the use of public transport and other ways of travelling, such as walking and cycling.



To sustain the improvements of the first decade through the second and third decades will require much greater emphasis on actively managing the networks to achieve optimal movement of people and goods safely and efficiently. For example:

- Road network use will need to be prioritised to increase the productivity of the network, e.g. by introducing more freight and transit lanes.
- Stronger transport demand management will be needed to reduce congestion on the road network, e.g. by encouraging more use of the improved public transport system and walking and cycling facilities.

A careful balance will need to be struck in optimising the networks to achieve balanced outcomes. This is likely to be particularly challenging during the inter-peak period because of the limited scope to extend clearway restrictions. This ITP sets out a One System approach for achieving an appropriate balance, in which the network providers will work collaboratively with users and communities to manage their networks so they operate seamlessly as a single system.

Obtaining the full benefits of the investment programme will progressively require greater use of network and demand management. These measures can only be successfully introduced when people and businesses have access to realistic transport choices. Such choices depend on delivering integrated infrastructure, and improvements to public transport and rail freight services in the first decade. Given the long lead times involved, planning for this comprehensive suite of interventions needs to start in the first decade alongside completing strategic road, public transport and active mode networks. This is illustrated in Figure 10.

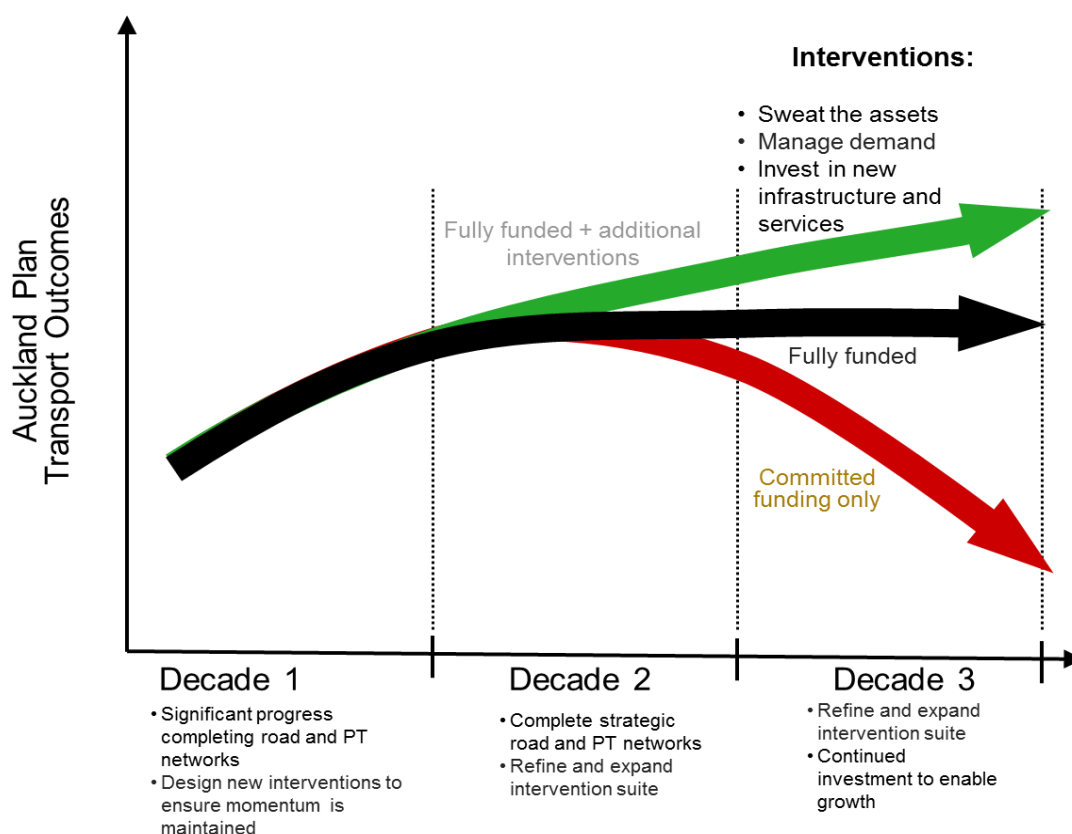


Figure 10: The benefits of additional interventions

A further benefit of progressively optimising the networks and actively managing demand is that the return on investment will increase over the three decades as network productivity rises and unit operating costs fall.

Funding will be a key issue in successfully addressing the challenges of growth in the years ahead. The pressure on already-limited funding is likely to grow as the costs of materials increase and the physical and environmental constraints in expanding network capacity become more difficult (and expensive) to overcome.

## Further development of the ITP

The on-going work on the ITP will reflect a strengthening alignment with the Auckland Plan as it gets implemented and evolves. Priorities for the development of the next ITP include:

**Programme Testing and Prioritisation:** Further work will be undertaken to scenario test project packages against transport outcomes to ensure the maximum benefit is derived from investment.

**Strategic Justification:** The ITP will provide the overarching strategic justification for transport projects by demonstrating how the transport network will be integrated with land use and across modes in a logical and planned manner to respond to growth over time. This will support the economic case for projects going forward.

**Delivery Strategies:** A number of key strategies will be completed which will input into the next ITP. These include the rail development strategy, arterial road strategy, public transport marketing plan, ferry strategy, park and ride and parking strategy.

**One System Roll Out:** The One System Approach is being implemented in Takapuna through the Joint Transport Operations Centre. The success of the approach will be evaluated. A programme for the roll out of the one system approach across the City will follow and will be reflected in the next ITP.

**Additional Funding Initiatives:** Outcomes from Auckland Council's alternative funding review and other investigations from AT including demand management opportunities to meet funding gaps will be incorporated.

### **Interactive and Accessible:**

A summary version of the ITP including network maps, supporting policy direction and programme information will be available on the AT website.

The ITP will inform the development of the LTP/RLTP, Annual Plan, Asset Management Plan and SOI. The timeframe for the delivery of the ITP and other related documents is shown in the table 3 below. The grey shading indicates the quarter when the draft version of the relevant plan is developed, while the dark shading indicates the quarter when the final version is approved. The SOI is developed and approved on an annual basis.

Year	2013				2014				2015			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>ITP</b>												
<b>Fiscal Realities:</b>												
GPS												
LTP/RLTP												
Annual Plan												
<b>Deliverables:</b>												
AMP												
SOI												

Table 3: Timeframe for delivery of the next version of the ITP

# Chapter 1: Defining the challenges facing transport in Auckland

Auckland's transport system has developed from arrival of the tangata whenua and early European settlers to current day. The strengths that have resulted from investments over the past decade and the challenges ahead are outlined below..

## 1.1 Historical context of transport in Auckland

Auckland's first Māori occupants relied on walking and waka to move around. Early European settlers also clustered within walking distance of the Waitemata Harbour. The military, with settlements in Onehunga, Otahuhu and Panmure, built the first major roads north and south, followed by railway lines in the 1870s, tying together a network of villages all the way to Mercer. Ferries connected north shore villages to the growing central city.

Electric tram services ran from downtown Auckland across to Onehunga on the Manukau Harbour from 1902 to 1956, giving Auckland the world's only coast to coast tramway system. Rail continued during that period to be the main bulk freight mover.

Dramatic changes took place after World War II as new technology filtered into everyday life, and private cars and buses began to replace trams and trains. In Auckland, these changes were reflected in the 1950s by a Master Transportation Plan that outlined a new motorway network, now being completed through substantial investments. In 1959, the Harbour Bridge opened up the North Shore to development. Suburban sprawl spread all over Auckland in the post-war period (see Figure 1.1) along with dispersed work places that could only be reached by car.

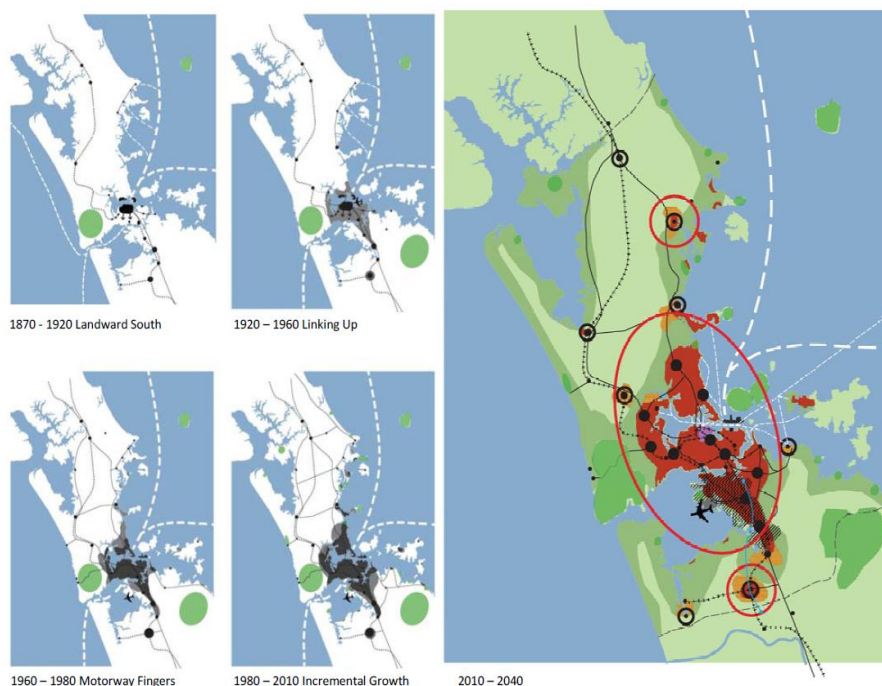


Figure 1.1: Growth of Auckland's transport system from 1870 to 2040

Source: Auckland Plan Figure D.1 Auckland's shape

In the 1960s and 1970s, a number of changes shifted the bulk of freight carriage from rail to roads. These changes included removing the protection for rail freight, the development of improved vehicle technologies and the introduction of just-in-time freight logistics. This led to the growth in light industrial and warehousing development close to Auckland's new motorway network. During the 1980s, the transport system had sufficient capacity to handle the growing traffic volume but road deaths had reached their highest levels, peaking at 216 in 1987 due to relatively low levels of safety intervention and increasing car ownership. By the end of the century, however, road deaths were on a downward trend but traffic congestion and the impacts of vehicles on the environment and human health had begun to emerge as issues. Land use patterns, road freight, car use and investment decisions had meshed to make the region highly dependent on a heavily used road system.

Figure 1.2 shows the complex and shifting interrelationship between public transport patronage and past transport investment decisions, increasing car ownership and use, and macroeconomic factors such as technology changes, oil prices, recessions and the shift to urban living.

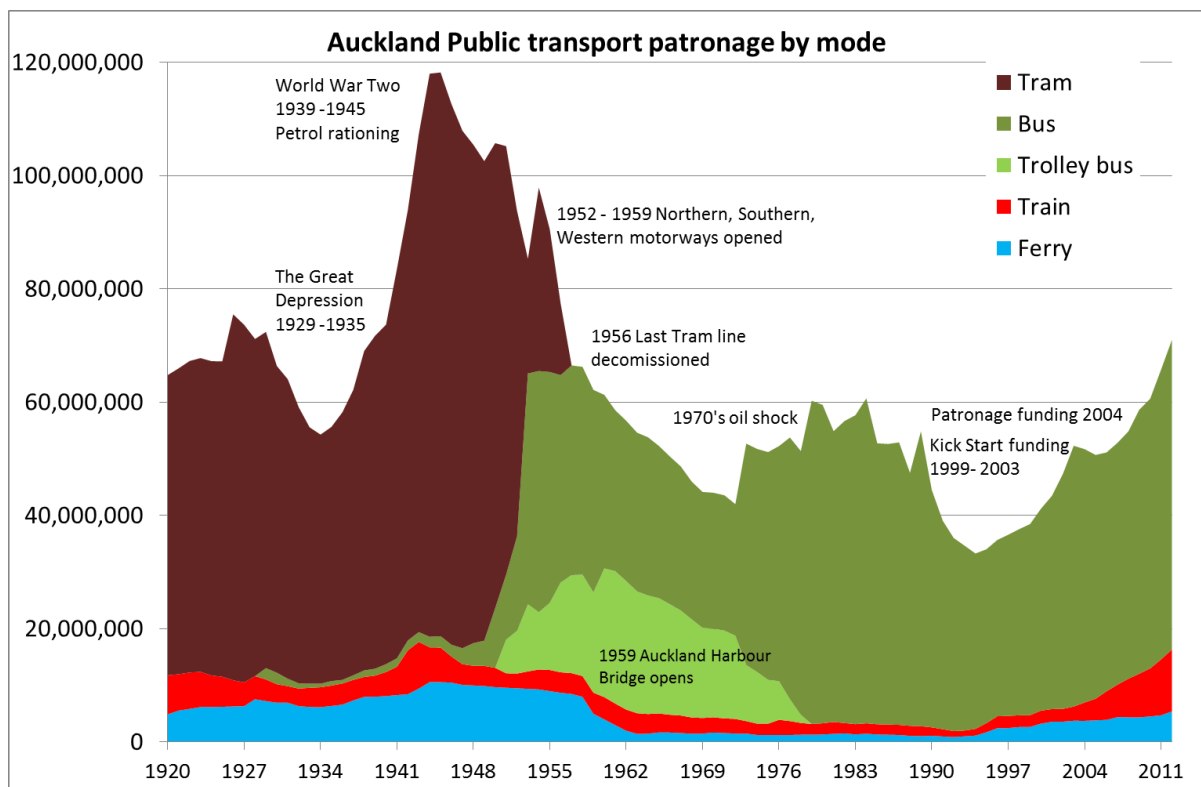


Figure 1.2: Patronage of public transport from 1920-2012

## 1.2 Recent investment in the transport system

There has been substantial investment in the transport system over recent years. This has included: construction of the Northern Busway; double tracking the Western Line; new ferry services from 1991, four new world-class rail stations, beginning with Britomart; new rail links to Manukau and Onehunga; developing the Western Ring Road; the motorway connection through Grafton Gully and the removal of bottlenecks through the Central Motorway Junction. Total spend on transport in Auckland since 2000 has been \$7 billion as summarised in Figure 1.3.

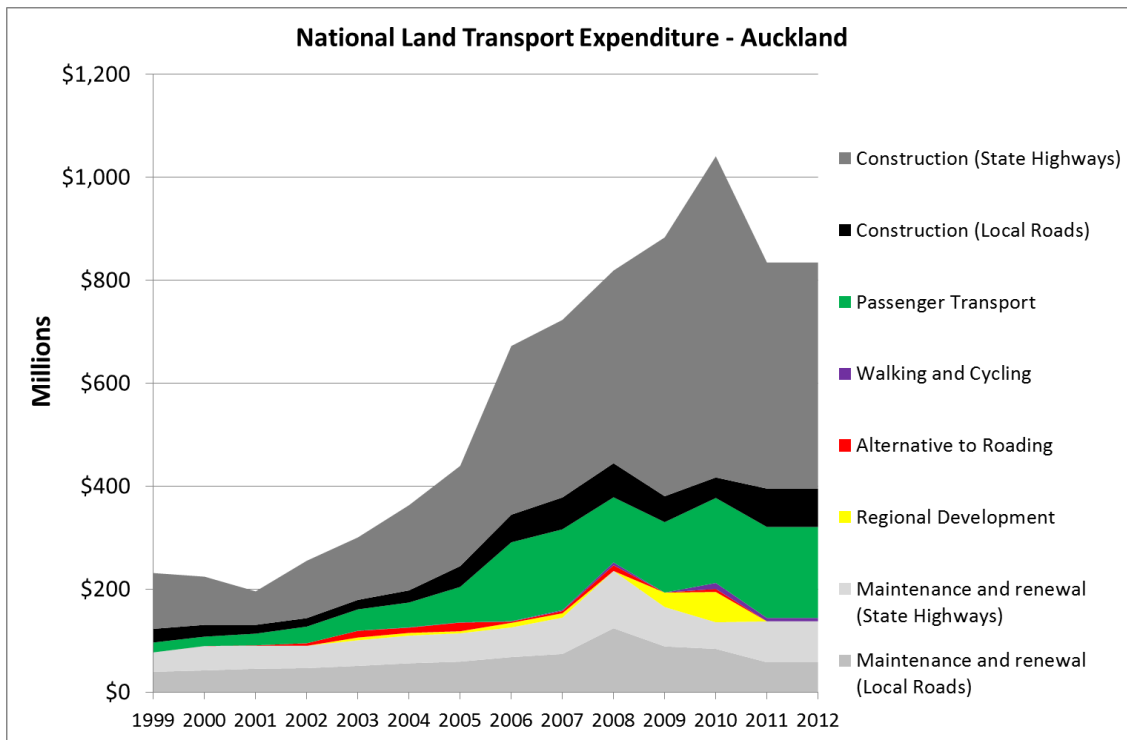


Figure 1.3: National Land Transport Fund expenditure in Auckland

Note that the eight categories in Figure 1.3 (above) are NZTA funding categories, and 'alternative to roading' relates to freight carried by other transport modes such as rail.

Further substantial projects are underway and will be completed over the next few years. These include introducing integrated ticketing and electric trains, and completing the remaining Western Ring Route section of SH20 at Waterview.

Once these planned projects are completed by 2020, the system's strengths will include:

- A motorway network that will provide high-speed, safe road connections for moving people and freight across Auckland
- A safer and more reliable local road network
- Improved network management through the new Joint Traffic Operations Centre, including real-time user information systems
- An electrified passenger rail network with regional connections, including the first new line in 80 years (to Manukau) and world-class stations
- Much improved bus services, which have benefited from the Northern Busway, heavy investment in new bus fleets and a comprehensive restructure of services
- Improved inter-regional connections to Northland and Waikato as a result of the construction of the Northern Toll Road and the development of the Waikato expressway
- A rail freight network that connects Auckland to the North and South as well as providing internal rail freight connections to the Ports of Auckland and the Wiri inland port.

### 1.3 Challenges ahead

Despite the improvements of the last decade, average variability in journey times is still significantly higher than in any of the five big Australian cities<sup>3</sup>. Auckland compares well on inter-peak congestion but peak congestion levels are on par with Sydney and Melbourne whose populations are over four million. Congestion is the necessary price for growth but worsening congestion within the region will inflict significant economic and social costs and further weaken our international competitiveness.

#### Growth in transport demands

Auckland's population is forecast to reach around 2.5 million people by 2041 – about 70 per cent of New Zealand's total population growth over the 30-year period, as shown in Figure 1.4.

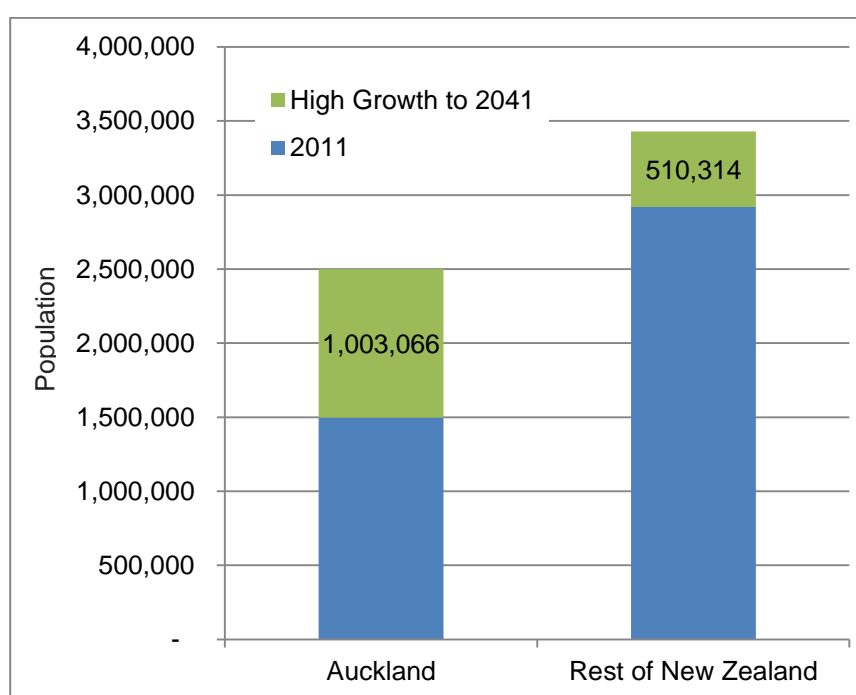


Figure 1.4: Auckland's population growth compared to the rest of New Zealand<sup>4</sup>

To accommodate this growth, the Auckland Plan forecasts that around 5,000 – 6,000 hectares of new undeveloped (Greenfield) land is likely to be needed for residential, business and employment purposes over the next 30 years.

Figures 1.5a and 1.5b show where the Auckland Plan indicates household and employment growth will occur over the three decades of the plan. The targets for household growth are ambitious, with 100,000 new dwellings expected in the first decade, 170,000 in the second decade and 130,000 in the third.

<sup>3</sup> BECA Auckland traffic system performance monitoring report March 2012

<sup>4</sup> Based on a high population growth scenario. Rest of NZ includes Christchurch, Wellington, Waikato, Bay of Plenty and Otago, Statistics NZ, October 2012



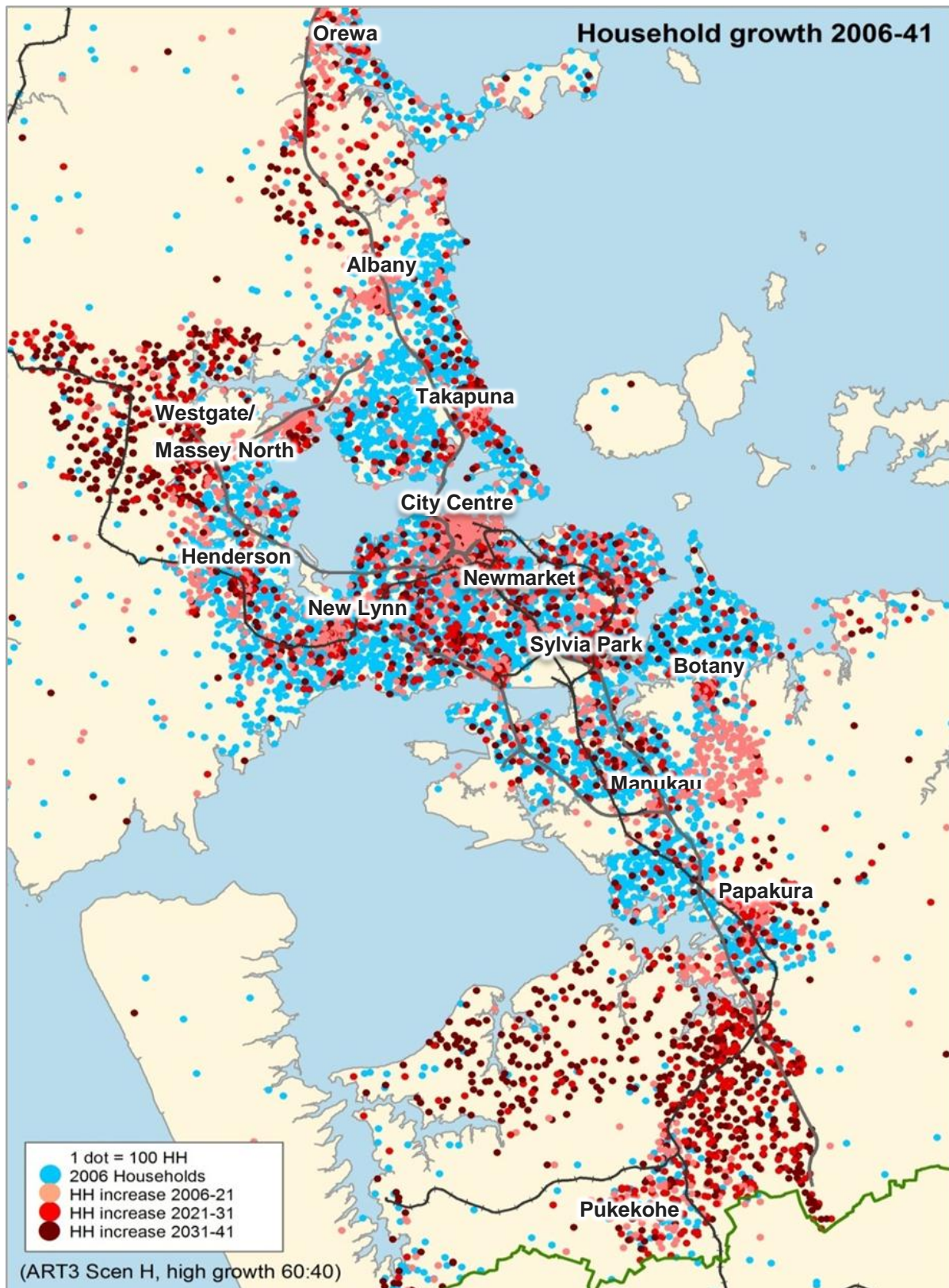


Figure 1.5a: Projected population growth related to transport infrastructure to 2041  
 Source: Auckland Plan high growth scenario 1

In the third decade, household growth is projected outside the existing metropolitan-limits, especially in the Henderson-Massey, Franklin and Hibiscus and Bays areas.

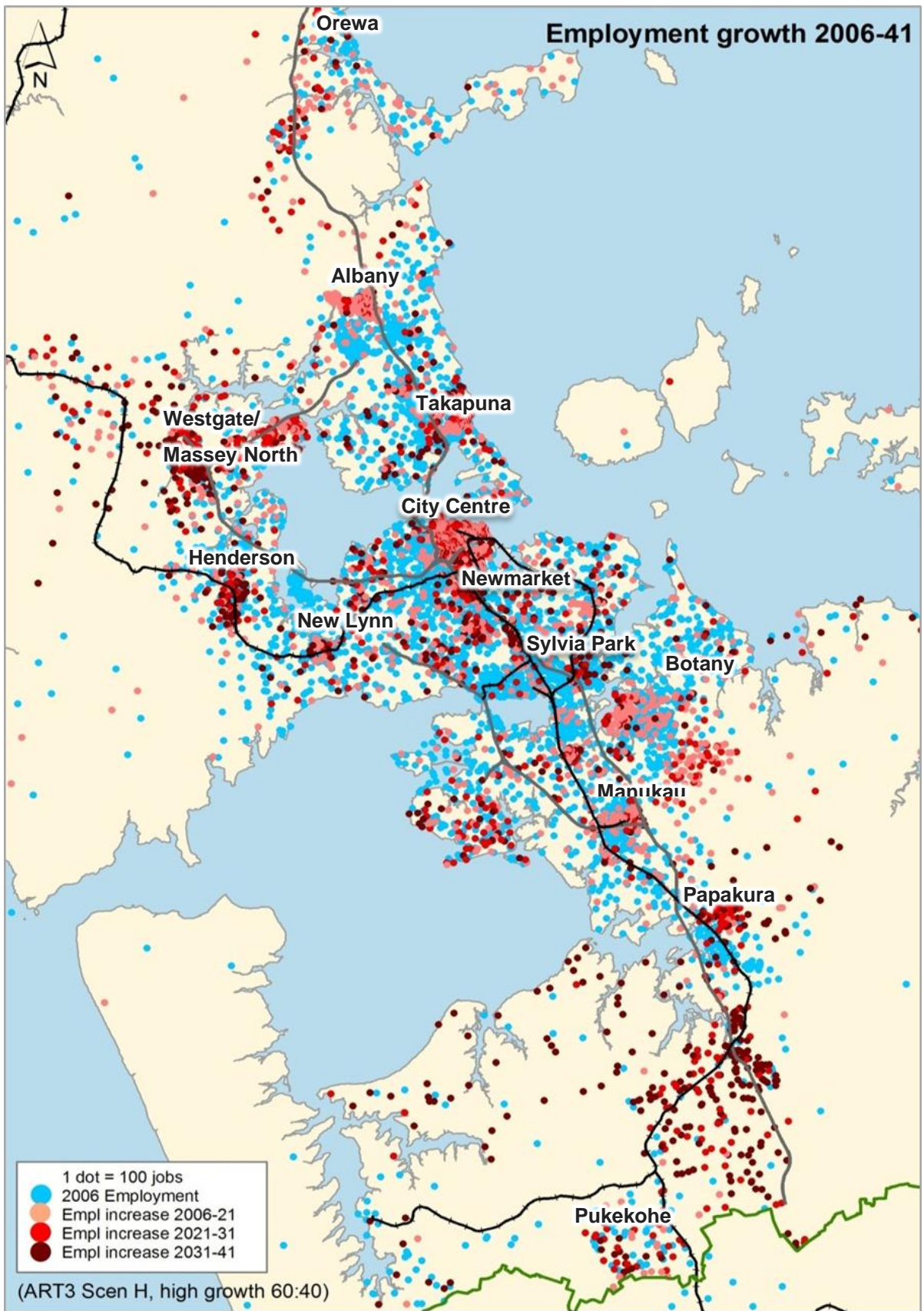


Figure 1.5b: Projected employment growth related to transport infrastructure to 2041  
 Source: Auckland Plan high growth scenario 1



Employment growth is notable in the City Centre and business areas located near Henderson, Westgate and Papakura. Significant employment growth is projected in the third decade for Greenfield areas such as Pukekohe. The key challenge will be aligning and sequencing transport infrastructure to support these growth patterns.

Auckland is a major contributor to New Zealand’s economic development, accounting for 35 per cent of national GDP while 46 per cent of the country’s exports/imports (by value) pass through Auckland Airport and Ports of Auckland. However, Auckland’s economy in turn depends on development in the regions surrounding it – Waikato, Bay of Plenty and Northland.

The Upper North Island Ports consisting of Northport, Ports of Auckland (POA) and Ports of Tauranga (POT) are projected to experience strong growth over the next thirty years due to an expected continuation in growth in primary products and an increase in the number of transhipments (ship to ship movements) and size of ships. This will impact on internal as well as off-port infrastructure requirements.

Access to the city centre, where the Port is located, is constrained by intensive land use (although this density also creates the potential for greater benefits from increased transport investment than would result from a similar investment in other areas of the city). Access to the airport precinct is under pressure from dramatic growth in recent years.

Figure 1.6 identifies the state highway and arterial routes in Auckland likely to experience sharp spikes in heavy commercial vehicle (HCV) use by 2041. Regional arterial roads, particularly SEART and Mt Wellington Highway, carry as much traffic as the Roads of National Significance outside of Auckland. This growth in heavy vehicle traffic adds significant maintenance and renewals costs to roading budgets.

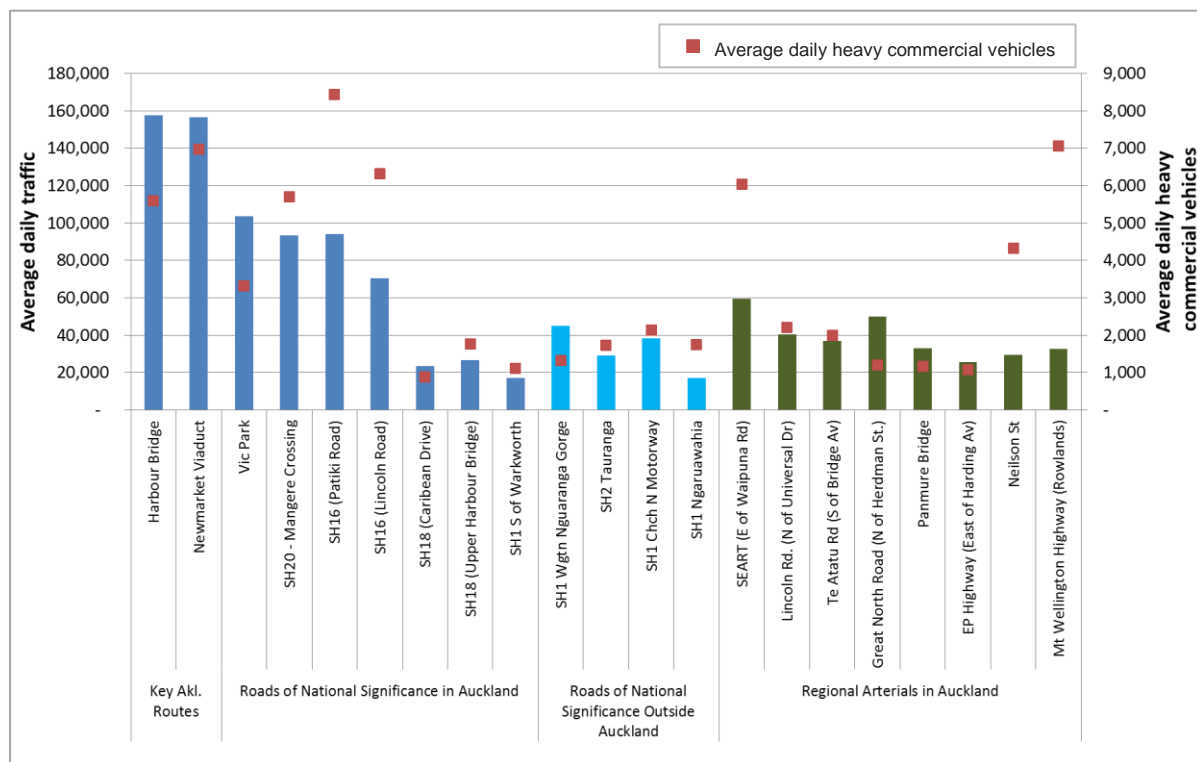


Figure 1.6: Increases in heavy commercial vehicle volumes in Auckland to 2041

Figure 1.7 shows the growth in travel to different destinations within Auckland expected to occur in the morning peak period on medium population growth assumptions to 2041. Of particular note is the increase in people accessing the city centre and its fringes. Much of this growth will need to be accommodated by rail and bus services, walking and cycling.

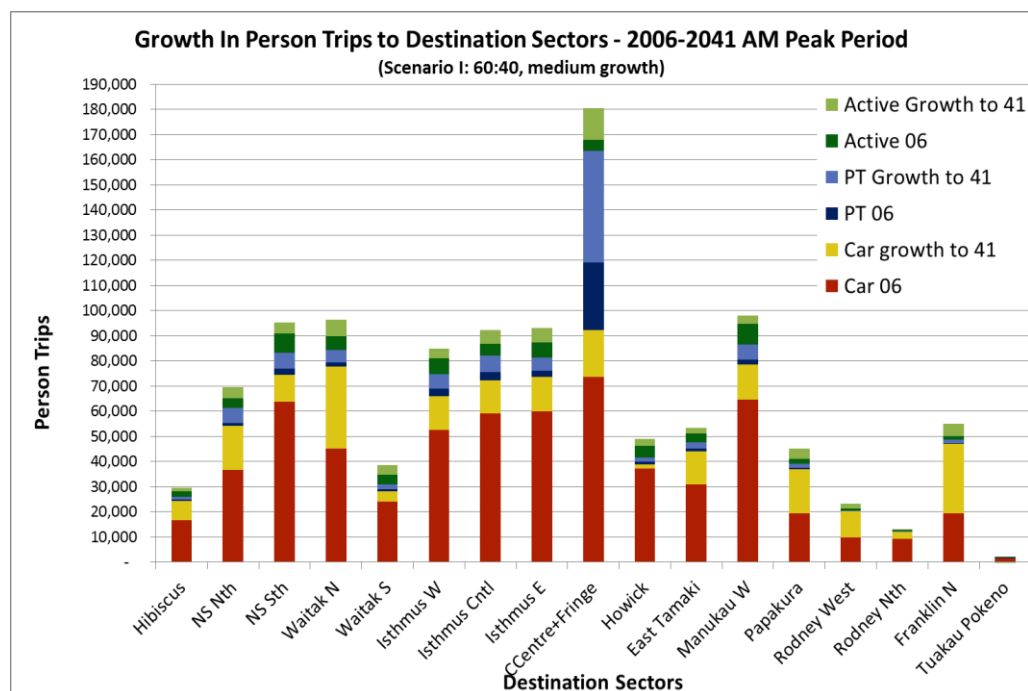


Figure 1.7: Growth in person trips to destination sectors 2006-2041

In response to the forecast high travel demand in the City Centre, AT have undertaken a more detailed study which is described in the text box below:

### City Centre Future Access Study (CCFAS)

By 2041, Auckland will have more than 700,000 new residents and need 400,000 extra houses. City centre and city fringe residents and employee numbers will have doubled and student numbers grown by 30%.

The CCFAS identifies the city centre access issues Auckland will face to meet this growth and looks at options to best address them.

The Study identified and evaluated 46 options and shortlisted three options; CRL, surface bus improvements and an underground bus option.

The surface bus improvements option is made up of double bus lanes on Wellesley and Albert streets and enhanced bus priority on Symonds Street, Great North Road, Great South Road and Eilerslie-Panmure Highway. It would provide only 3-5 years of extra capacity beyond current funded works, would significantly lower private vehicle speeds and would require a lot of residential and commercial property purchase for bus priority measures.

The underground bus option includes a bus tunnel under Wellesley Street, double bus lanes on Wellesley Street and much enhanced bus priority on Symonds Street, Great North Road, Great South Road and Eilerslie-Panmure Highway. It provided marginally more capacity than the surface bus improvements, required less land but was much more expensive than the surface bus option with a similar capital cost to the CRL.

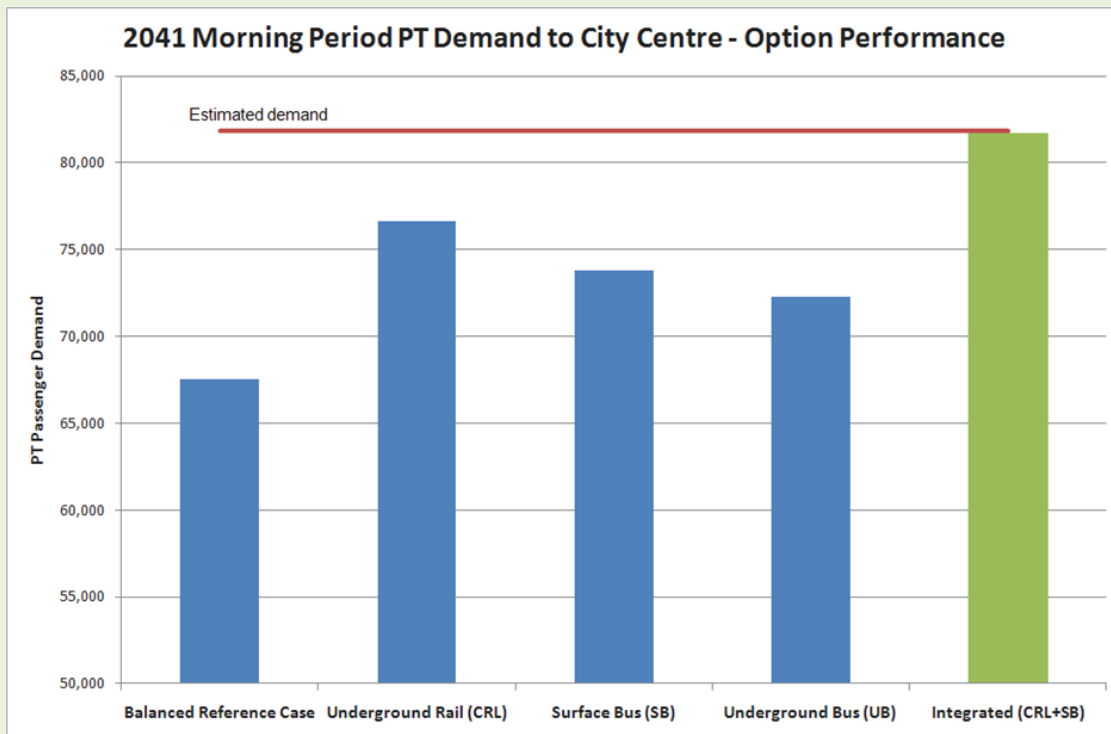


Figure 1.8: Morning Period PT Demand to City Centre – Option Performance

The CRL converts Britomart from a terminating to a through station by connecting it to the western rail line around Mt Eden Station with a 3.5 kilometre rail tunnel under the City Centre. It was the only option to deliver increased capacity beyond 2030, had the greatest multi modal capacity to get people into the city centre and provided the highest speeds for private vehicles within the city centre.

The Study concluded that buses won't be able to meet the demands coming from projected growth and that vehicle speeds in the city centre halve in the morning peak to walking speed. Private trips to the city centre from some areas will take up to twice as long. Trains will be at capacity.

A multi modal solution of the CRL together with integrated surface bus improvements would best meet city centre access demands (refer figure 1.8) with suggested implementation by 2021 as delays beyond this date would limit employment, growth and the ability to capture economic benefits.

The Study will be used as a basis for discussion with central government regarding funding for a multi modal approach to addressing Auckland's transport needs, which needs to include the CRL in order to meet future demand.

Figure 1.9 shows that the growth in demand is not confined to peak periods. While another 450,000 vehicles will be using Auckland’s roads in the morning peak in 2041, the city’s roads will need to provide for an additional 1.35 million trips during the inter-peak business hours.

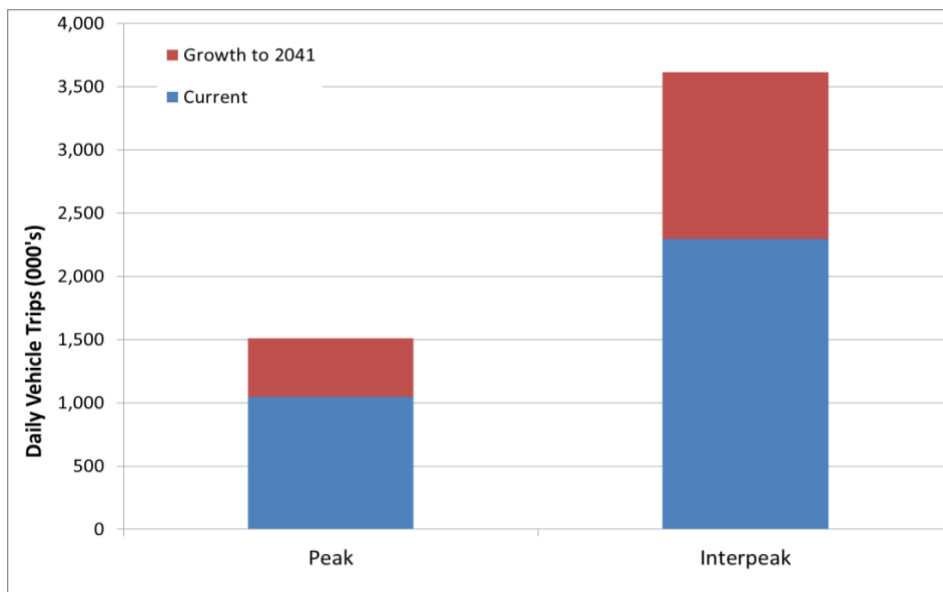


Figure 1.9: Growth in peak and inter-peak demand for vehicle trips

Figure 1.10 shows that the growth in demand is not simply a travel-to-work or education issue. Other types of journeys are growing as strongly and, in some cases, more strongly. This includes leisure (recreation, holidays and events) and business trips (including personal business) which will be occurring throughout the day.

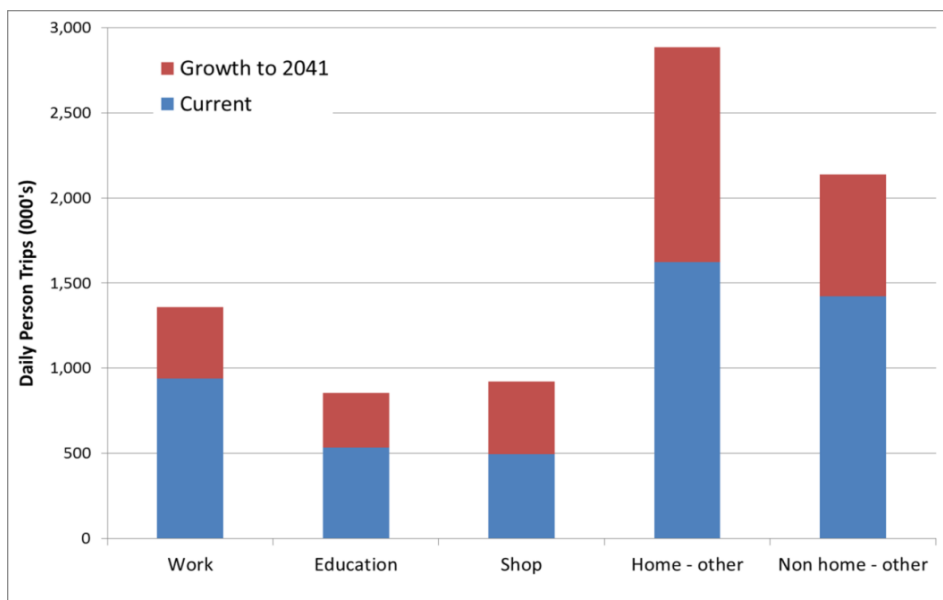


Figure 1.10: Growth in trips by purpose of journey

The rising demand to access increasingly diverse activities and destinations, travelling to, from and within the region throughout the day, means that Auckland will need access to a wider range of transport choices.

The transport system as a whole should be safer, more reliable, better for the environment, and more accessible, which requires substantial improvements to LoS. Customers also want a seamless whole-of-journey approach to LoS, which can only be addressed through coordinated action between network providers. An ageing population will mean more people needing alternatives to the car to meet their transport needs.

There are also external drivers on the transport system. The system is currently heavily reliant on fossil fuel which is a significant cost in the current account deficit and at risk of future fluctuations. Volatile global economic conditions may cause shifts in the NZ economy and potential changes in government transport policy. The need exists to assess the risk and plan ahead for increased frequency and intensity of adverse weather and other consequences of climate change and the impacts on network resilience.

### **Responding to the challenges**

Responding to these changes in transport demand, service expectations and network resilience will require careful choices and trade-offs. Funding will be a key issue. The pressure on already-limited funding is likely to grow as construction costs increase and the physical and environmental constraints to expanding network capacity become more difficult (and expensive) to overcome. Other cities in New Zealand such as Christchurch and Wellington are competing with Auckland for central government funds to renew and improve their transport systems. Auckland will need to make a strong case to retain its existing share of funding; to increase expenditure above this level will almost certainly require new funding mechanisms.

Gaps in the transport system cannot be addressed in isolation. Investing in partial solutions, based on individual projects, is likely to result in those projects not delivering their full potential value. For example, motorways will not flow without attention to complementary arterial road improvements; cycling and walking are unlikely to increase unless it becomes safer and more attractive to do so. All of the above highlights the need for integrated management and planning of the system as a whole, with less emphasis on developing individual transport networks and more in meeting the transport needs of users and the communities through improving system-wide performance.



# Auckland Integrated Transport Programme outcomes framework

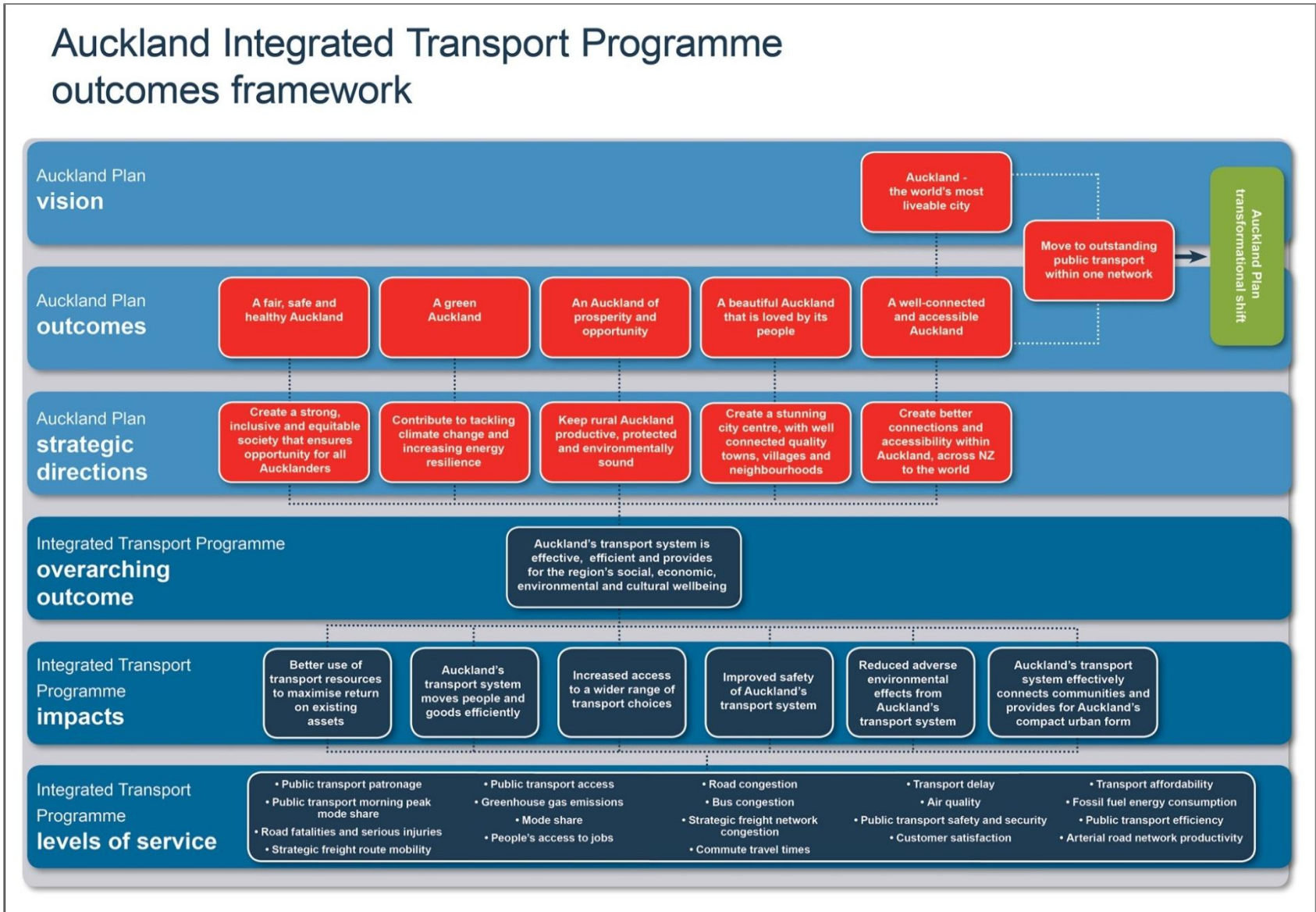


Figure 1.11: The ITP outcomes framework

# Chapter 2: Network Challenges

An overview of the transport networks serving Auckland, the forecast 2040 transport demand flows, and the key challenges that will confront the road, freight, public transport, walking and cycling networks are described below. Transport challenges that relate to the Safer Journeys New Zealand Road Safety Strategy and the reduction of greenhouse gas emissions are also discussed.

Understanding the transport network challenges is a precursor to the development of the One System approach and the ITP for the next 30 years.

## 2.1 Overview of Auckland’s existing networks

Auckland’s transport system is supported by multi-modal networks which enable people and goods to travel by different modes, at different times of the day and to access different activities and places across the Auckland region. These networks supply infrastructure and services to facilitate the travel choices and movements of residents, businesses, visitors and other users to, from and within Auckland. The networks include:

- **Regional roads:**
  - **National and regional state highways** – cars, trucks and commercial vehicles, coach services and cyclists
  - **Arterial and local roads** – cars, trucks and commercial vehicles, and cyclists and pedestrians
- **Strategic freight** – road, rail and sea freight
- **Public transport** – train, bus, taxi and ferry services
- **Parking** – on-street and off-street, park and ride
- **Local active modes** – cycling and walking facilities.

The key functions of these networks are summarised below.

Network	Key functions of the network
<b>National roads</b>	
State highway and motorways (national)	Provides high speed road network for private vehicles and goods and service vehicles to move between centres within the region, and between Auckland and other regions
Rail network (national)	Provides rail freight services to, from, within and through Auckland, connecting Auckland to the port and inland port at Wiri  Provides long distance passenger train services and the potential to provide inter-regional services, for example to Hamilton
<b>Arterial (includes local roads) roads</b>	
Primary and secondary arterials	Provides principal road network for movement of private vehicles and vehicles carrying goods and services within the region and to metro centres
Collector and local roads	Provides road access for people, goods and services to local areas and properties
<b>Strategic Freight</b>	
Road, rail and sea	Provides reliable travel times for heavy freight vehicles by linking major business areas and ports for freight distribution. Provides for

	the general movement of goods and services.
<b>Public transport</b>	
Rapid Network – rail and busways	Provides frequent passenger services on separate right of way, at all times, 7am to 7pm Connects city centre with selected centres via rail lines and busways
Frequent Network – bus and ferry	Provides frequent passenger services across the day and week, 7am to 7pm Connects city centre with metro centres and a range of other centres
Connector Network– bus and ferry	Moderate frequency services connecting to activity centres, town and metro centres. Provides connections to higher frequent services
Local, peak only and targeted – demand driven	Provides frequent passenger services at peak times Connects local areas and centres Includes targeted services, such as school bus services
<b>Cycling and walking</b>	
Cycle highways, connectors and feeders Footpaths, crossings and other pedestrian facilities	Provides for short local and commuter cycling trips on roads or separate right of way, connects to cycleways in parks and reserves Provides access for pedestrians to employment areas, education facilities, local shops, community facilities and open space
<b>Parking</b>	
On-street and off-street parking facilities	Provides for short and long stay visitor, business and workforce parking and loading spaces to support business activity in centres
Park-and-ride	Supports access to the public transport system and helps achieve wider transport objectives (reduced congestion)

Table 2.1 Transport networks and their key functions

Key trip statistics for the regional networks are presented below:

Transport trip statistics	2011	2041	% change
<b>Regional road network</b>			
AM vehicle trips	505,000	740,000	47%
AM average vehicle trip time (mins)	13.4	18	34%
AM average vehicle trip speed (kph)	45.6	34.7	-24%
Road length km (both directions)	5,036	5,206	3%
<b>Regional freight</b>			
AM heavy commercial vehicle trips	26,757	46,980	76%
<b>Regional public transport network</b>			
AM public transport trips	92,000	169,000	84%
AM bus service km	31,000	61,000	97%
AM rail service km	2,100	7,700	267%
AM ferry service km	700	1,500	114%
<b>Regional active transport network</b>			
Daily active (cycle & walking) trips	507,000	1,011,000	99%

Table 2.2 Transport network statistics - 2011 versus 2041

The biggest percentage changes in trip making between 2011 and 2041 are projected for freight, public transport and active transport modes. The changes reflect the historical development of these transport networks and the projected increase resulting from more integrated planning and investment.

## **2.2 Network and demand flows**

The desired 2041 networks for roads, freight, public transport, parking and active modes are illustrated in the maps on the following pages as Figures 2.1a-j. The projected 2041 travel demand flows for each network are indicated in the accompanying demand flow maps. The demand flows are derived from the ART3<sup>5</sup> model.

### **Regional Road network**

Figure 2.1.a illustrates the regional road network planned for 2041. The regional network is comprised of the motorway system, state highways and arterial roads (primary and secondary). The motorway and state highway network has a strong north-south traffic movement, while the arterial road network provides connections from sub-regional areas.

The regional road network is constrained within narrow corridors, surrounded by the Auckland metropolitan area and harbours. Currently, key parts of the network remain uncompleted (including the Waterview section of the Western ring route) or need to be upgraded or built to support increasing travel demand associated with growth, such as the link roads for the AMETI project.

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<sup>5</sup> Based on the ART3 model outputs. ART3 is a travel demand model managed by Auckland Council and is a mathematical representation of how people travel. The model covers the Auckland region and is concerned with broad travel patterns and flows. It has been calibrated on observed data (2006 base year) and used to forecast the responses to the Auckland Plan's land use development strategy and transport changes or interventions.



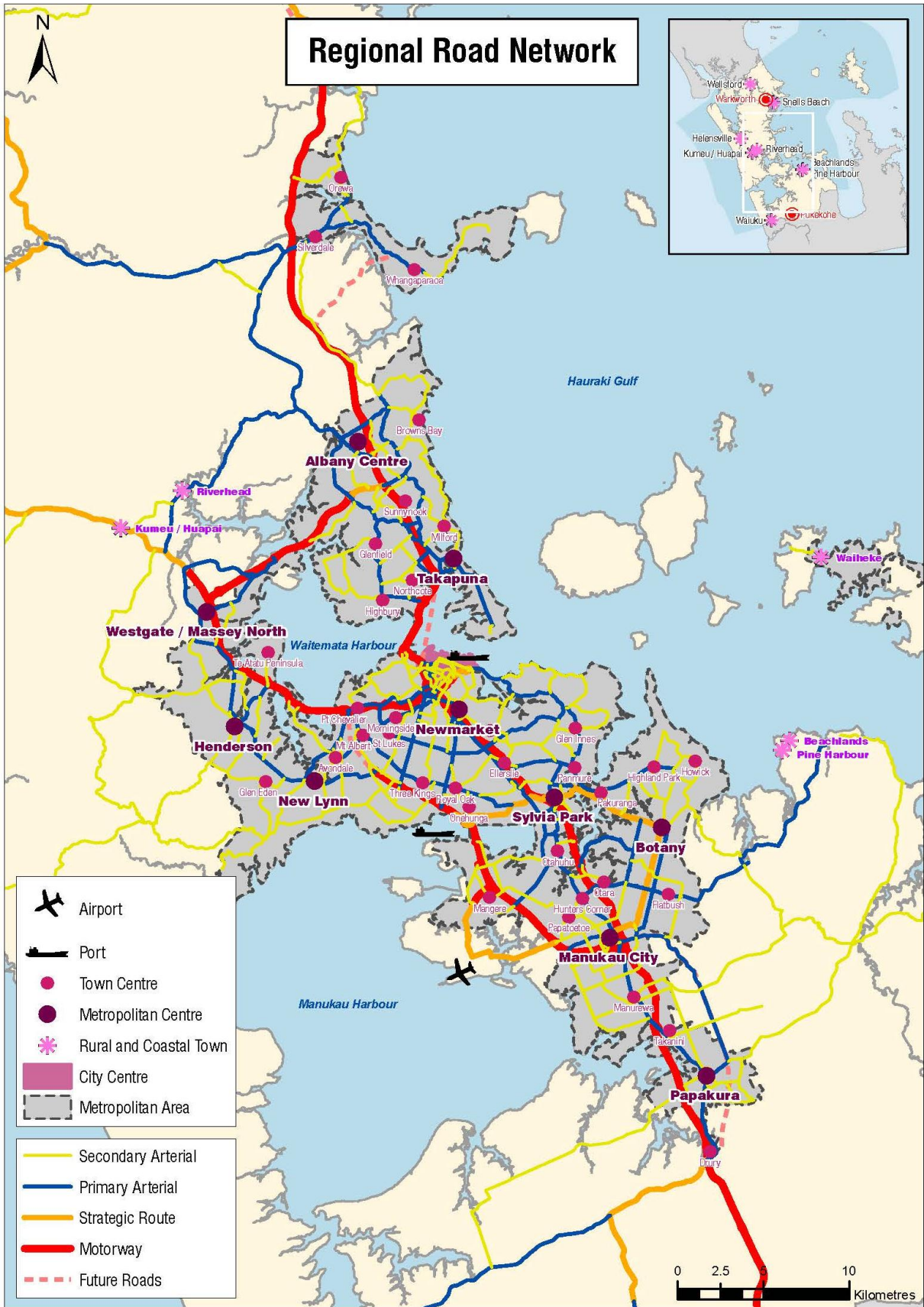


Figure 2.1a Regional road network

Figure 2.1b indicates the level of traffic flow projected during the morning peak (7-9am) in 2041. Greater levels of traffic are indicated by the thickness of the line, as indicated in the key. State Highway 1, the Western ring route (SH20, SH16, SH18) and some key arterials (such as City Centre, Esmond Road, Lincoln Road, Tamaki Drive) are projected to experience high levels of traffic which will increase potential congestion on these parts of the network.

Key challenges for the regional road network are:

- The state highway and arterial network are projected to experience significant increases in traffic growth, particularly people accessing the city centre and its fringes.
- Congestion is projected to worsen significantly in the second and third decade as the road network capacity is reached.
- Expanding the extent of the network will be difficult (and expensive) to overcome.
- Balancing the various competing demands for movement with the liveability needs of the main centres.

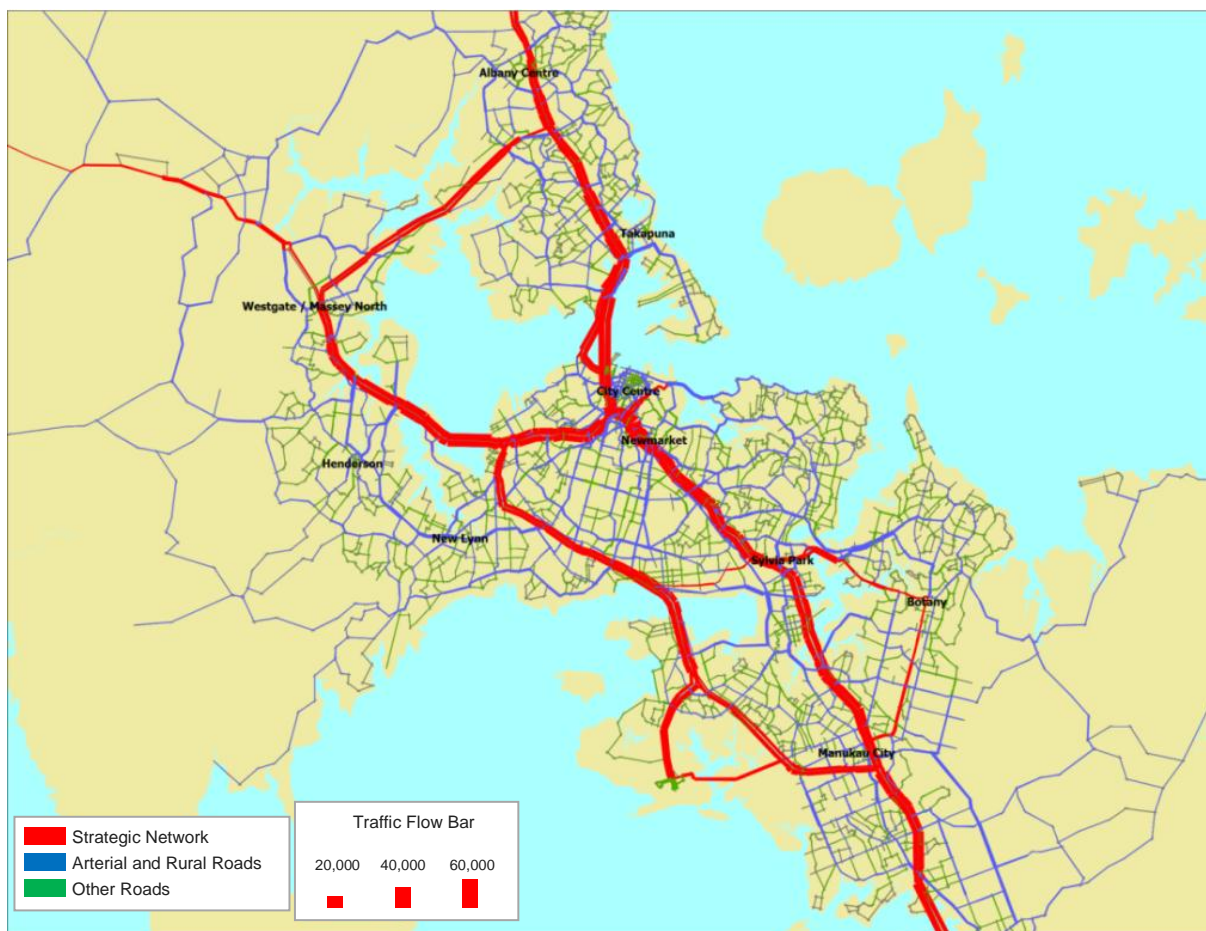


Figure 2.1b Projected demand flows (AM peak) on the road network in 2041

### Strategic Freight Network

Figure 2.1c illustrates the strategic freight network planned for 2041. It is indicated in the map as a black line overlay on the regional road network (comprising the motorway system and key arterial roads) and the regional rail network. It provides for inter-regional freight

movements as well as connections to the key freight generators and attractors such as Auckland Airport, Ports of Auckland, Metroport and business parks.

Productive business parks and industry will continue to require convenient and reliable links to the ports and airport, and the use of large freight vehicles. These must be supported by the road and rail networks, particularly the motorway. Changes to the regional roading networks, such as the completion of the Western ring route or upgrades to arterial roads, will influence the viability of adjacent land-uses by affecting their relative accessibility, amenity and value to different users.



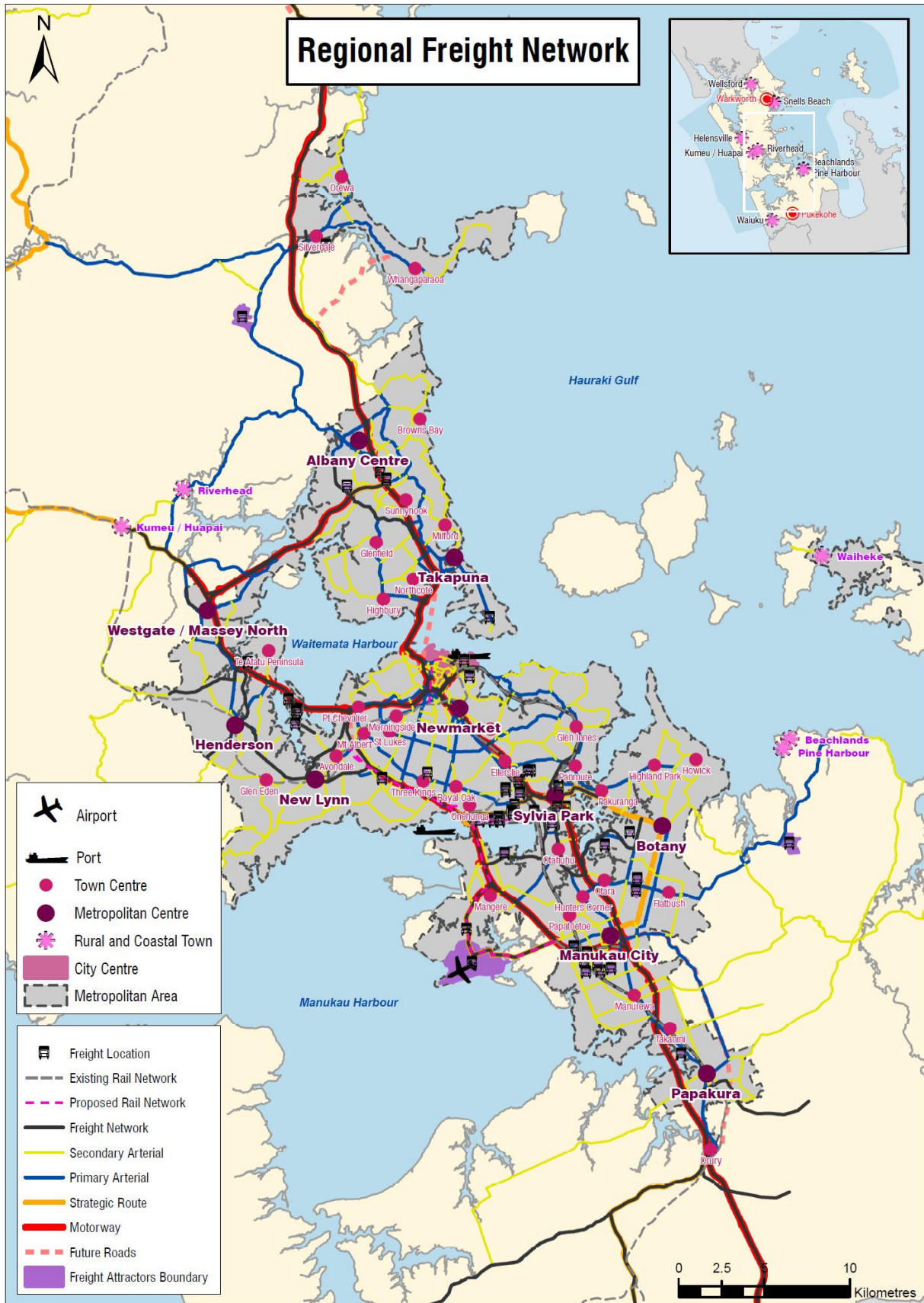


Figure 2.1c: Regional freight network



Figure 2.1d projects the level of freight traffic during the morning peak (7-9am) in 2041. Greater levels of traffic are indicated by the thickness of the line, as shown in the key. SH1, SH16, SH20A and key arterials linking to the ports, airport and main business parks (for example, Southdown) are projected to experience high levels of freight traffic.

Key challenges for the strategic freight network are:

- Balancing the transport needs of the freight industry with that of other road and rail users
- Aligning improvements to the freight network with business developments to maximise productivity gains and access to markets.
- Aligning the demand for land use between freight and other activities: busy, noisy freight routes are not desirable settings for residential intensification as reverse sensitivity issues can result when these activities are in close proximity
- Maintaining the ability of the freight network to offer convenient and reliable connections between business, industrial parks and ports due to growing congestion on the arterial road network



Figure 2.1d: Projected demand flows (AM peak) on the freight network in 2041

## **Regional public transport network**

Figure 2.1e illustrates the proposed public transport network planned for 2041. It is comprised of the Rapid services (rail and busway), Frequent bus and ferry services, and Connector services such as bus feeders.

The Rapid and Frequent bus and ferry service network will deliver at least a 15-minute service operating all day (initially from 7am-7pm), seven days a week. The Rapid and Frequent networks are designed to achieve the transformational shift in public transport as required by the Auckland Plan.

Connector services also operate all-day but at a lesser frequency connecting to more frequent services and increasing coverage. The all-day service network is complemented by more local, peak only and targeted services, such as feeder bus services and school bus services.

In comparison, Auckland's current public transport network has shortcomings. The rapid network is limited by the capacity of Britomart station and the wider rail network and the limited extent of the Northern Busway. The existing network of bus routes is overly complex with a number of routes operating at too low a frequency to be attractive to customers.

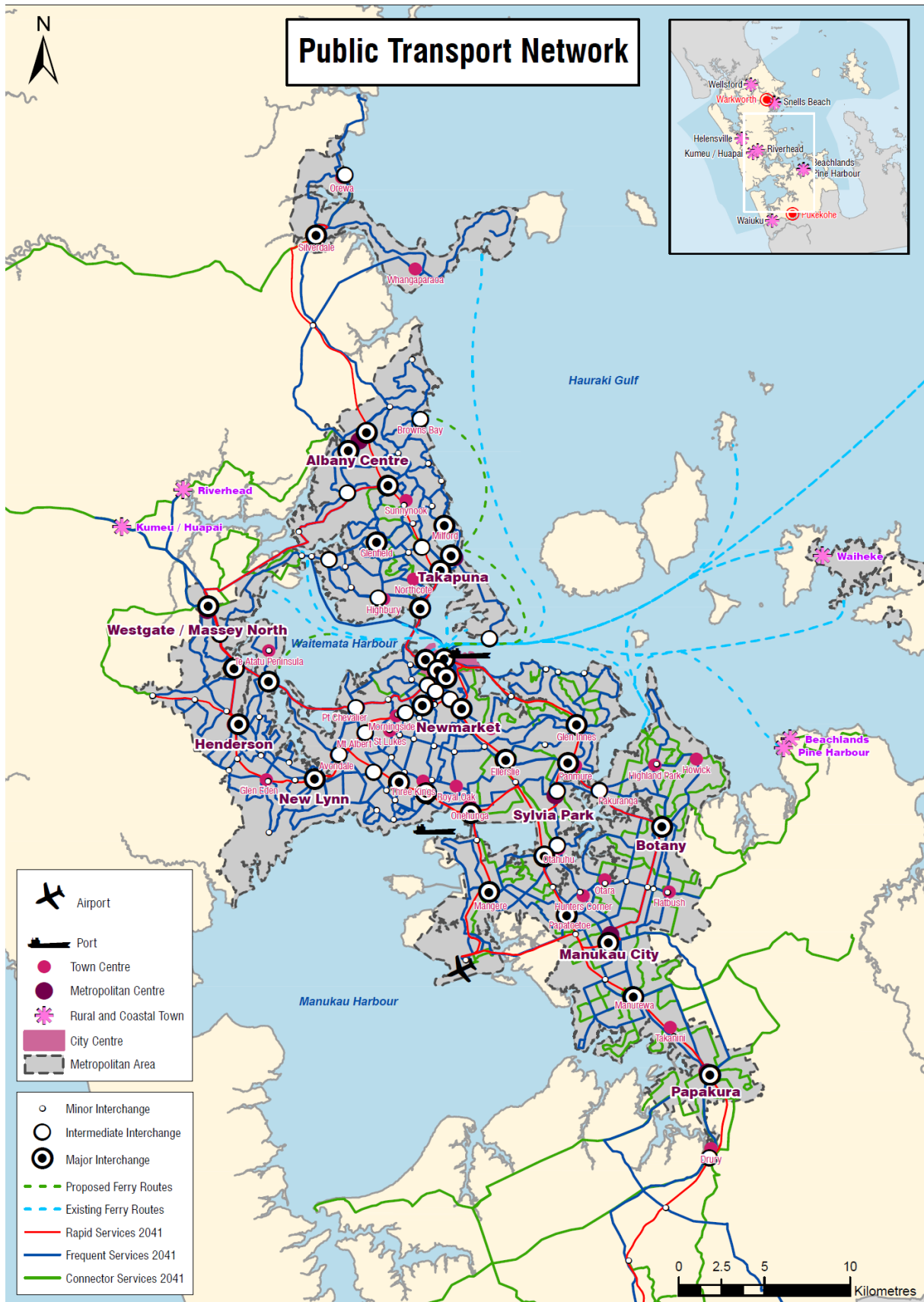


Figure 2.1e: Public transport network

Figure 2.1f shows the projected demand for public transport in 2041 during the morning peak (7-9am). Greater levels of passenger demand are indicated by the increasing thickness of the line, as shown in the key. The map projects a high level of demand on the Rapid and Frequent networks, focussing on the city centre and fringe.

The key challenges for the existing public transport network are:

- The current network needs improvement to achieve the major shift to public transport sought by the Auckland Plan
- Public transport is currently far slower than driving due to a combination of low frequency services, slow-boarding times and stop-start travel on road corridors
- As traffic volumes grow, the ability of the public transport system to offer an attractive alternative to private vehicle travel can be compromised when services are affected by traffic congestion or constrained capacity on the rail network.

Achieving the Auckland Plan targets for public transport requires continued investment in the proposed Rapid and Frequent public transport service networks to support the intensification of centres, corridors and future urban areas. Investment in public transport infrastructure, specifically quality interchanges and bus priority measures, is required to gain the full benefits of the proposed services.



Figure 2.1f: Projected demand flows (AM peak) on the public transport network in 2041

## **Regional park and ride network**

Figure 2.1g illustrates the regional park-and-ride network, comprised of existing or proposed park and ride sites over the next 10 years. The main purpose of the park and ride facilities are to support the use of the public transport network. The key to the map identifies park-and-ride-sites which are existing, proposed for investigation (such as Botany) or for construction (such as Drury). This will be finalised following the adoption of the Regional Public Transport Plan in mid 2013.

High demand for park and rides is projected in areas supporting the busway (such as Albany, Silverdale), the rail network (such as Drury, Westgate, Stoddard Rd) and ferry (such as Birkenhead). The priority for park-and-ride development will be dependent on the timing of major investment in the public transport network.

Compared with other cities, Auckland has a relatively low provision of park-and-ride at present. For example, the Auckland rail system has 2,200 park and ride spaces, compared with 5,200 in Wellington. Most cities in Australia and North America have substantially higher levels of park and ride provision. The key challenges for park-and-ride is to provide significantly more spaces and to locate them at sites which support the growth in public transport use, while discouraging commuters from driving on the congested parts of the road network to access the park-and-ride facilities.



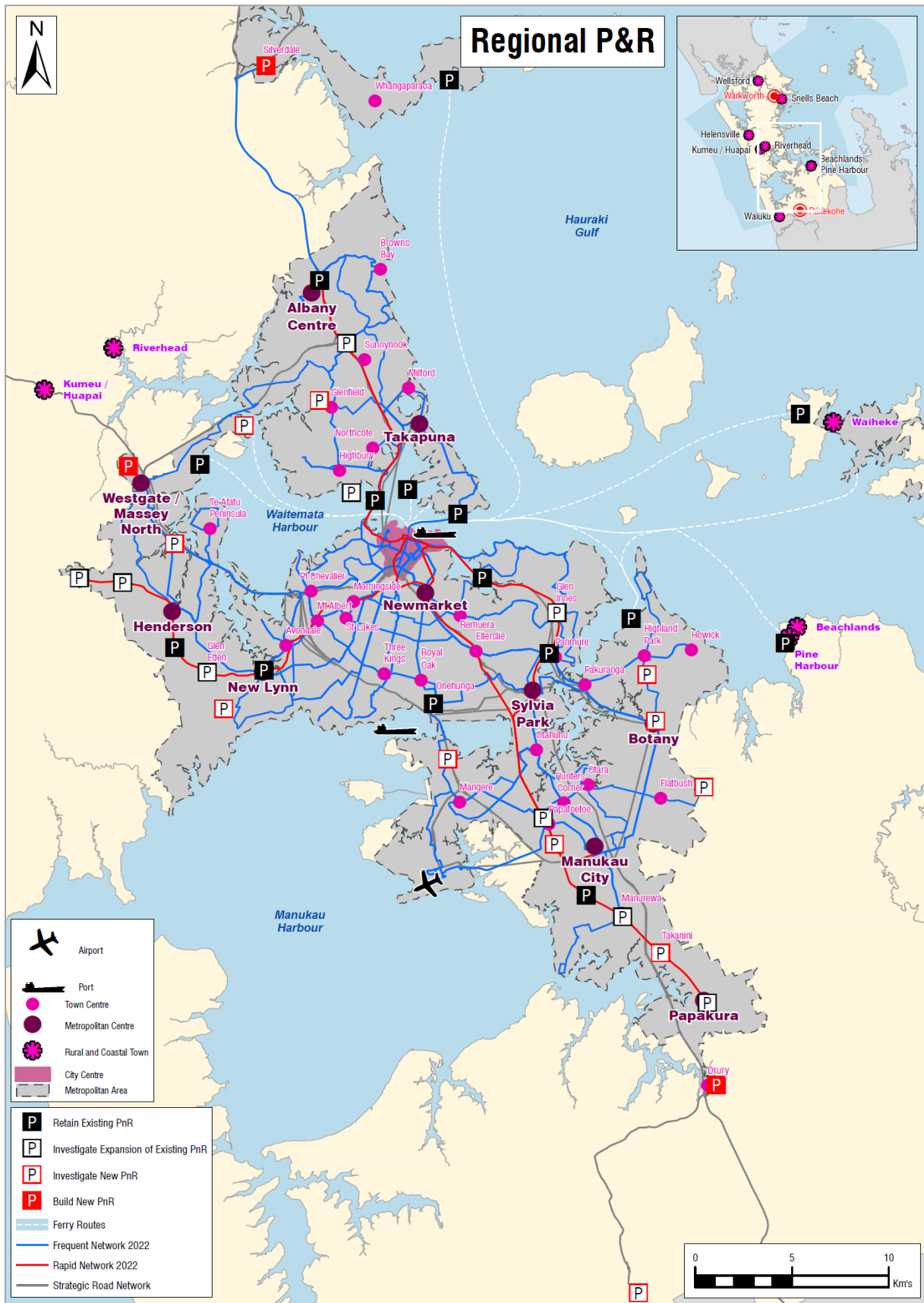


Figure 2.1g: Regional park and ride network

## Parking management

AT is responsible for the supply, management and pricing of on-street parking for the arterial and local road network, and also provides off-street parking in a number of locations, together with private suppliers. The AT off-street parking buildings are outlined below:

<b>City Centre</b>			
Civic, Downtown, Fanshawe St, Karangahape Rd, Victoria Street, Upper Queen street, Garfield Rd			
<b>Metropolitan Centres</b>			
Takapuna	Manukau Central	Henderson	New Lynn
Killarney Street	Ronwood Ave	Henderson Library/Unitec	McCrae Way
	Clonburn Rd		

The focus of parking management for Auckland region is on main centres experiencing high demand, where the parking activities are likely to cause safety, capacity or amenity concerns. Key challenges differ from centre to centre, reflecting changes in the demand and supply of parking:

- The City Centre is projected to have high residential and employment growth, therefore off-street parking will need to be managed to support short-stay parking for businesses and encourage the use of public transport and pedestrian circulation.
- In metropolitan centres, off-street facilities will be maintained or considered in peripheral locations where these do not detract from the centre's growth objectives.

## Regional cycle network

Figure 2.1h illustrates the regional cycle network planned for 2041. The network is comprised of Cycle Highways (off-road and shared path cycle ways) which are the backbone of the network and link metropolitan centres. The Cycle Highways are generally proposed alongside the State Highway or arterial road network, the rail network, along waterfronts and connecting through parks.

Cycle Connectors (on-road cycle lanes and other facilities on arterials and collector roads) provide links to and from the Cycle Highways, and to town centres, public transport interchanges, residential areas and schools. Cycle Feeders (on-road or off-road facilities on slow speed streets) provide local area access and linkages to the cycle network, key community facilities and open spaces.



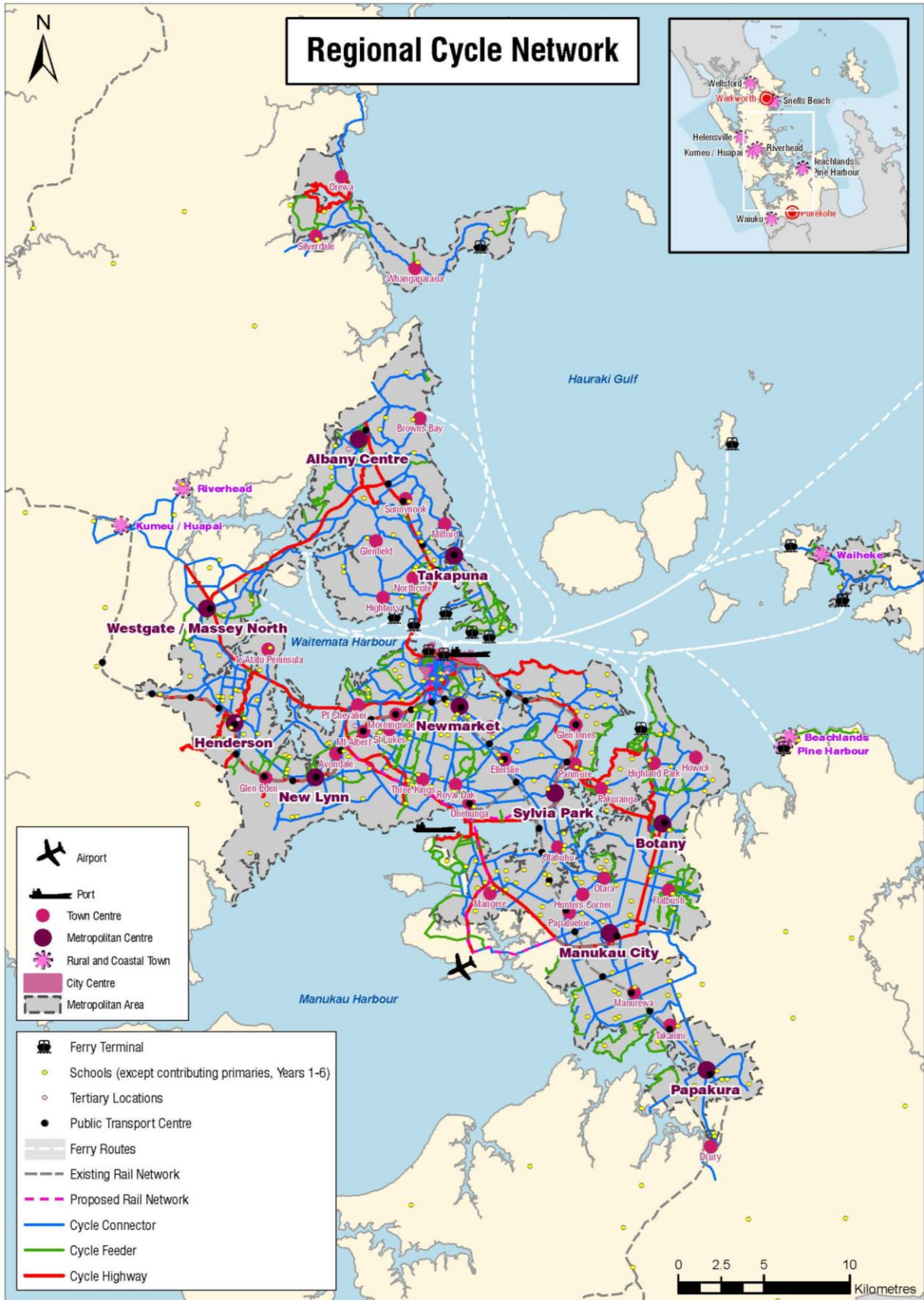


Figure 2.1h: Regional cycle network

Figure 2.1i illustrates the projected demand for active trips based on specific ART3 zones in 2041. High demand (as indicated by the size of the dot) is projected within and surrounding the city centre and metropolitan centres as the main attractors. Walking and cycling is generally undertaken for shorter trips of around 2km to 5km, respectively.

The key challenges for the cycle network are:

- Auckland’s two harbours, many geological features, and existing physical urban form limit the availability of land for developing cycling and walking networks
- The safety perception of walking and cycling is lower than for vehicle travel
- The level of vehicle congestion on roads is a barrier to walking and cycling
- Frequent driveways and side-roads create challenges for implementing separate cycling facilities.

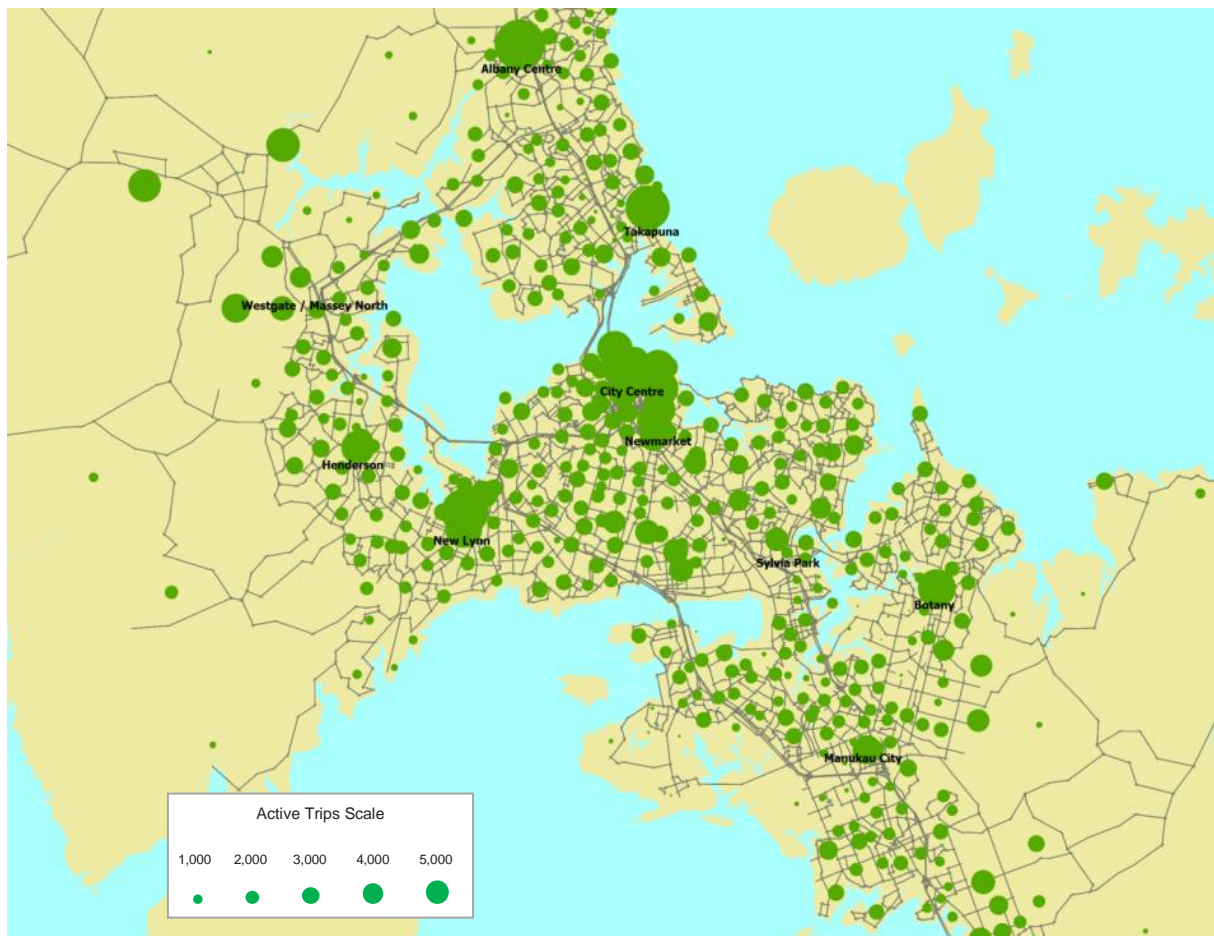


Figure 2.1i: Projected demand for active transport (cycling & walking) in 2041

### 2.3 Safer Journeys: Road Safety Strategy 2010–2020

A key national strategy which will be integrated into the One System approach is the Safer Journeys New Zealand Road Safety Strategy.

The Strategy recognises the interaction between the road user, the road and roadside, speed and the vehicle. All those involved with the design, management and use of the road

system are responsible for understanding this interaction, which means working across all elements of the road system to move towards the following:

The Safer Journeys action plans from 2011 to 2015 set out focus areas for each of the four elements to guide network providers to coordinate action on initiatives that will have the greatest impact as follows:

- Safe roads and road sides
- Safe speeds
- Safe vehicles
- Safe road users

In Auckland, network providers work with the NZ Police, the Accident Compensation Corporation, road user groups, public health groups and communities to provide a coordinated approach for the above initiatives through local road safety action plans.

Figure 2.2 shows the risk rating assigned to Auckland's state highways and local roads, based on the number of fatal and serious injuries that have taken place on them. Routes with both High or Medium High Collective and Personal Risk are generally regarded as needing first priority for improvement, such as parts of SH1 and the City Centre arterials.



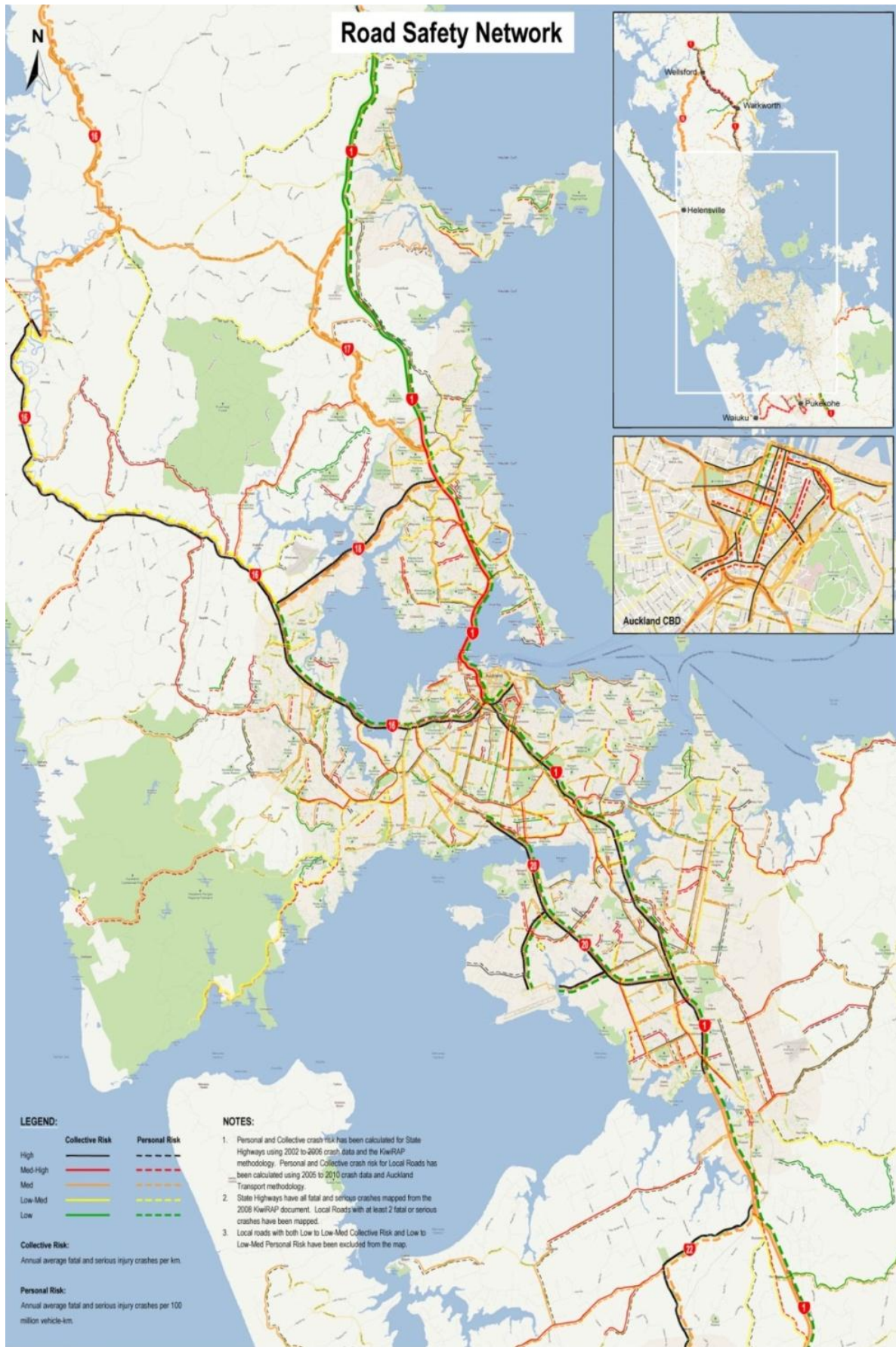


Figure 2.2: Risk rating for regional road safety

## 2.4 Improved Environmental wellbeing

The current operation and functioning of the transport system has diverse impacts ranging from those on public health, storm water, climate change, biodiversity, habitat connectivity, and other impacts from noise, dust, and community severance, to waste production, and non-renewable resource use.

Some of these impacts have already been quantified across the transport system. In the area of air quality, the Health & Air Pollution in New Zealand Study (HAPINZ 2012) estimated that there are \$465M of social costs from transport related air pollution in Auckland alone.

Growing recognition and evolving demand for improvement across a range of outcomes, including the National Environmental Standard for Fresh Water, means a much more coordinated and collaborative approach is needed. The transport sector's contribution to reduce greenhouse gases to 40% below 1990 levels by 2040 (49% reduced from 2009) will be important to meet both Auckland's and central government greenhouse gas targets. The challenge of this target will require further revision of this document on development of the AC-coordinated Energy & Climate Mitigation Strategy.

Improving environmental outcomes will be used as criteria for optimising across the transport networks, for investment itself, as well as assessing impacts from different transport interventions.

Environmental impacts and opportunities will be considered across the range of transport activities including planning, programming, project design, operations, and maintenance. These are discussed in more detail in Chapter 4.

## 2.5 Supporting growth

A key challenge for Auckland's transport networks will be servicing the forecast growth in residential and business activity in new, currently undeveloped areas (Greenfield). Over the next 30 years around 5,000 – 6,000 hectares of Greenfield land is likely to be needed for residential, business and employment purposes. Table 2.3 indicates the amount of projected growth in households and employment in the Greenfield areas identified in the Auckland Plan.

	<b>Existing Dwellings</b>	<b>Dwelling Growth (High 70/40)</b>	<b>Existing Employment</b>	<b>Employment Growth (High)</b>
Southern Greenfield	1010	61038	2401	34844
Northwest Greenfield	231	17902	722	8347
Northern Cluster Greenfield (Warkworth & Silverdale)	590	15396	697	10355

*Table 2.3: Projected growth in households and employment in Greenfield areas*

The Auckland Plan development strategy aims to ensure such lands are released to meet demand, and synchronised with social and physical infrastructure and other services. It

aligns growth and investment in areas of change where the majority of future business, employment and residential growth will occur and shows where it will not occur. This strong tie to the underlying land use means that transport and land use are inextricably bound to each other and require careful planning when sequencing investment. Planning should also be restricted to development that can be serviced and does not threaten the viability of the transport system.

By phasing and sequencing transport investment so that it is well aligned with growth and development, the right conditions will be created to attract quality knowledge workers to the kind of creative and robust economy that underpins any competitive global city. Sequencing also aims to reduce inequalities, by ensuring new developments have adequate connections to meet the transport needs of the people living and working there.

# Chapter 3: One System approach

Prior to the establishment of Auckland Council and the development of the Auckland Plan, numerous government entities developed strategies and programmes to address the transport demands and future growth in Auckland. The formation of Auckland Council in 2010 and development of the Auckland Plan as a strategic development framework for the whole of Auckland has set the overall strategic direction for transport. These changes present the unique opportunity to achieve an integrated approach to transport delivery in Auckland.

The word 'integrated' in the context of transport means three main things:

- Transport networks are planned and implemented in a way that both shapes and serves efficient, sustainable land development within and around the city.
- Travel across the transport networks from point to point should be as seamless as possible, for example in providing good-quality public transport interchanges and safe pedestrian and cyclist crossings points along arterial roads.
- Networks should provide a coherent level of service for people and freight travelling on longer distance journeys to, from and through Auckland from adjacent regions.

The One System approach provides an integrated process that aims to better manage and plan the use of the transport networks with land use development, at all levels of planning as required by the Auckland Plan. The approach involves the key transport stakeholders agreeing a collaborative view of strategic intent for the Auckland region and how this is delivered by transport to address transport challenges and meet Auckland Plan priorities.

The key transport stakeholders responsible for delivering the transport outcomes sought by the Auckland Plan include:

- AT (responsible for all of the Auckland region's transport services (excluding state highways) - from roads and footpaths, to cycling, parking, public transport and road safety).
- NZTA (management of the state highway network, road safety),
- KiwiRail (provides rail freight services and maintains and improves the rail network),
- NZ Police (traffic and commercial vehicle enforcement)

## 3.1 The Auckland Plan's key priorities for transport

To deliver further integration of the networks, the Auckland Plan has drawn on national and international experience of the strategic interventions that make a significant difference. These interventions are identified as four key priorities in the Auckland Plan:

### 1. A single system transport network approach that manages current congestion problems and accommodates future business and population growth to:

- Improve and complete the existing road and rail network
- Encourage a shift toward public transport
- Support environmental and health objectives through walking and cycling.



## **2. Integrate transport planning and investment with land-use investment to:**

- Incorporate the transformational shifts and land-use directives of the Auckland Plan
- Align transport investment and services, especially public transport and regional arterial roads, with future growth and development
- Give particular emphasis to freight movement and other related business travel on international, national and Auckland-wide transport corridors.

## **3. Prioritise and optimise investment across transport modes to:**

- Enable several critical transport projects for Auckland to cope with population growth
- Manage \$25 billion worth of assets in the transport system to get best value from existing investment. This includes maintenance programmes, traffic optimisation and safety programmes
- Manage demand for transport to ease congestion and potentially alleviate the need for expensive additional capacity, through school travel plans, possible time-related pricing mechanisms, smarter parking policies and other initiatives.

## **4. Implement new transport funding mechanisms that:**

- Enable critical infrastructure projects such as the CRL and an additional Waitemata Harbour Crossing
- Consider new funding mechanisms to help finance the approximately \$10 to \$15 billion funding shortfall for transport projects
- Support Auckland Council and central government in jointly considering new funding mechanisms.

### **3.2 Implementation of the One System approach**

The collaborative One System approach improves the integration of network operations and development, and supports the Auckland Plan's four key priorities.

One System also aligns with the Auckland Plan outcomes and provides the best model for integrating transport decisions with land use development and for balancing movement and place. The One System approach will result in:

- Better use of existing networks
- Better alignment with changing patterns of land use and demand
- A safer, more resilient national and regional network, where a greater range of resources and options is available to deal with unexpected events or future changes
- Better alignment of effort between network providers and elimination of overlap and duplication.

This approach will enable the ITP to be refined and optimised so it achieves the best value for money from previous and new investments in terms of the level of service it delivers.

Figure 3.1 below shows a graphic representation of the One System approach. At the network-wide level, individual network plans define the demands, priorities and future development for each mode (strategic and arterial roads, public transport, freight, cycling and walking, parking) over 10 years. The demands and priorities between the different networks and places are integrated and balanced, based on the strategic direction outlined in the ITP and the Auckland Plan.

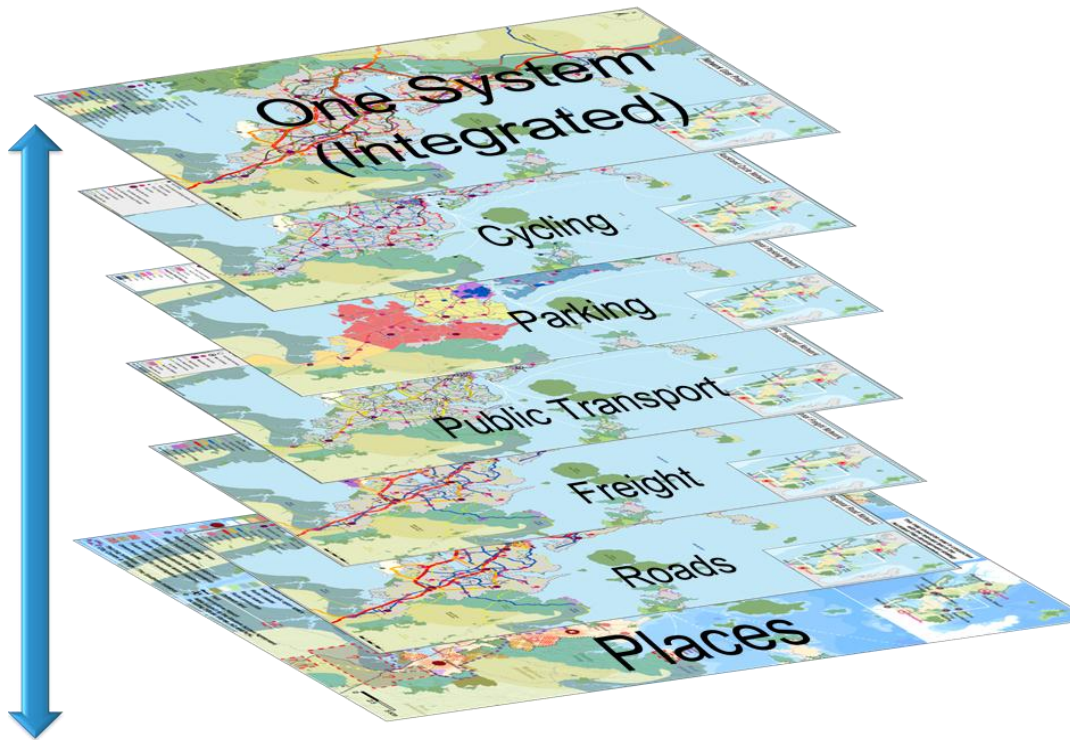


Figure 3.1: Integrated network layers

This guidance directs the priorities for the development of other tactical and operational transport network activities, including:

- CMPs (based on individual arterial roads or groupings of arterials)
- transport response to growth in metropolitan centres and other centres
- major integrated, multi-modal infrastructure projects (such as CCFAS, AMETI and SMART)
- network operating plans, which translate the strategic direction into the day-to-day operation of the network.

At all stages, transport stakeholders agree what is expected of transport, how and to whom priority is assigned and what the effects are of a variety of interventions on the network. Thus the process is also an engagement and agreement framework giving clear, consistent and informed decision making.

The One System approach will be progressively applied to optimise the networks in Auckland. AT is currently working with NZTA and other transport providers to develop detailed network user and place priorities for the One System across the entire network. This will be updated as the One System network optimisation process is completed. Two examples of the One System approach are described below:

## Corridor Management Plans (CMPs)

The CMPs is a multi-disciplinary approach to network and street design taking into account the movement and place functions of roads. This enables guidance on arterial corridors to be developed on a case by case basis. The CMP process is led by AT in collaboration with AC. CMPs are also used to support AT input into AC-led planning initiatives such as master plans, area plans or precinct plans.

The CMP process seeks to balance the demands of people/vehicle movement with place making. Corridor typologies have been developed to provide a range of different street design treatments depending on the influence of movement and place issues along the corridor, which will also vary over the length of the corridor.

The road classification and the road corridor segment typologies are considered side by side so that for each road classification category there is a corresponding range of segment types guiding the design provision for it. This approach ensures that place and movement functions are considered in combination, with their relative importance depending on the classification of the street or corridor in the network. This is illustrated below in Figure 3.2.

To ensure there is a consistent approach to the development of CMPs, AT has developed a CMP Guideline in collaboration with key partners.

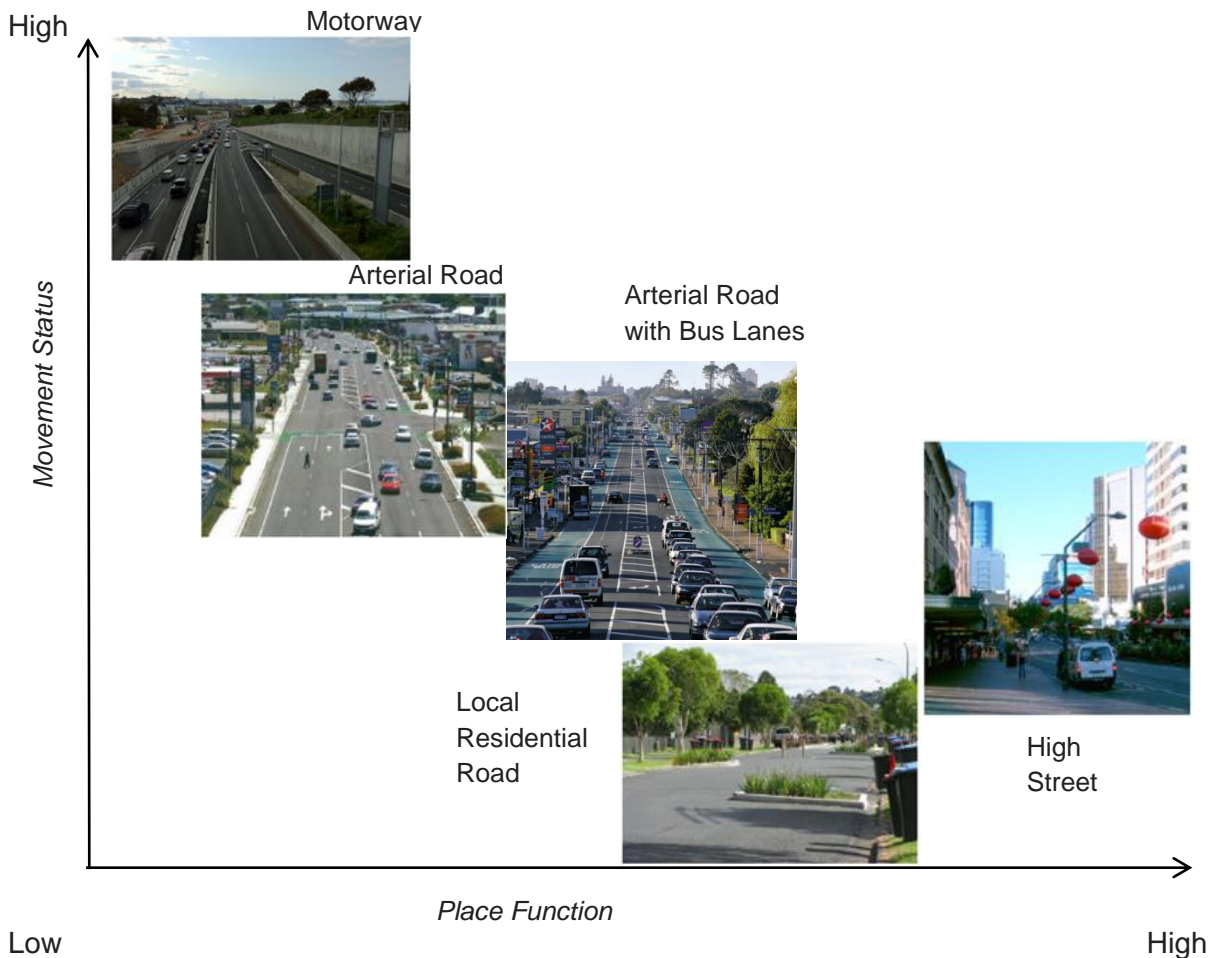


Figure 3.2: Different transport environments

Network Operating Plans provide an example of how the One System approach integrates and optimises transport networks. Network Operating Plans are a new key planning and operational tool to inform decisions and to link those decisions to both strategic objectives and operational interventions. These Plans enable users to make informed travel decisions in relation to how they see the network developing and being operated and involves a 3-step approach described in figure 3.3:

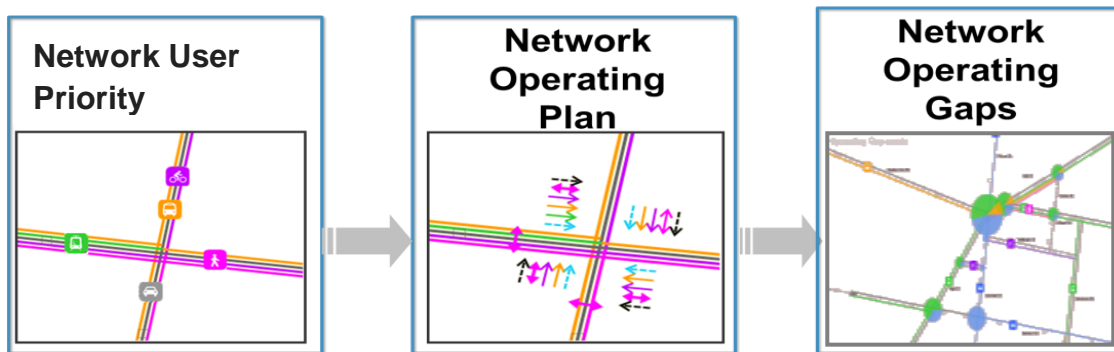


Figure 3.3: Network operating plan process

### Step 1 – Establish network user priority

The 10-year network plans (strategic and arterial roads, freight, public transport, cycling, parking) establish the high level priority for transport users for each of these modes. LoS define the desired performance of the network in relation to the transport users of the system and the places served by the network. Tools such as ‘deficiency analysis’ prioritise the competing user demands between the different modal networks and the liveability needs of places served by the networks. A network user priority map is developed from this process, as illustrated in figure 3.4.

### Step 2 – Develop network operating plans

Network operating plans for sub-areas of the Auckland region are developed in more detail, with the network user’s priorities indicating the mode and place priority along roads. This allows the movement and place-making functions of the network to be balanced and prioritised in finer detail, depending on the time of day, the mode and the location. These plans reflect the strategic intent developed and agreed in step one and are a graphical network representation of the transport network that will deliver the strategies used in step one.

### Step 3 – Identify operating gaps and address them

A workshop-based assessment would be undertaken to compare the performance of the network today versus the future network state that is needed to deliver the strategic intent. The difference, or Operating Gap, is visually displayed by the tool. These operating gaps are the focus of attention in developing interventions to address the performance gaps.

A pilot study of the Network Operating Plan process has been undertaken for the Takapuna area on the North Shore. The study provided an effective forum for capturing knowledge of how the network is intended to operate compared to current performance. The process enables day-to-day operational decisions to be aligned with strategic intentions.



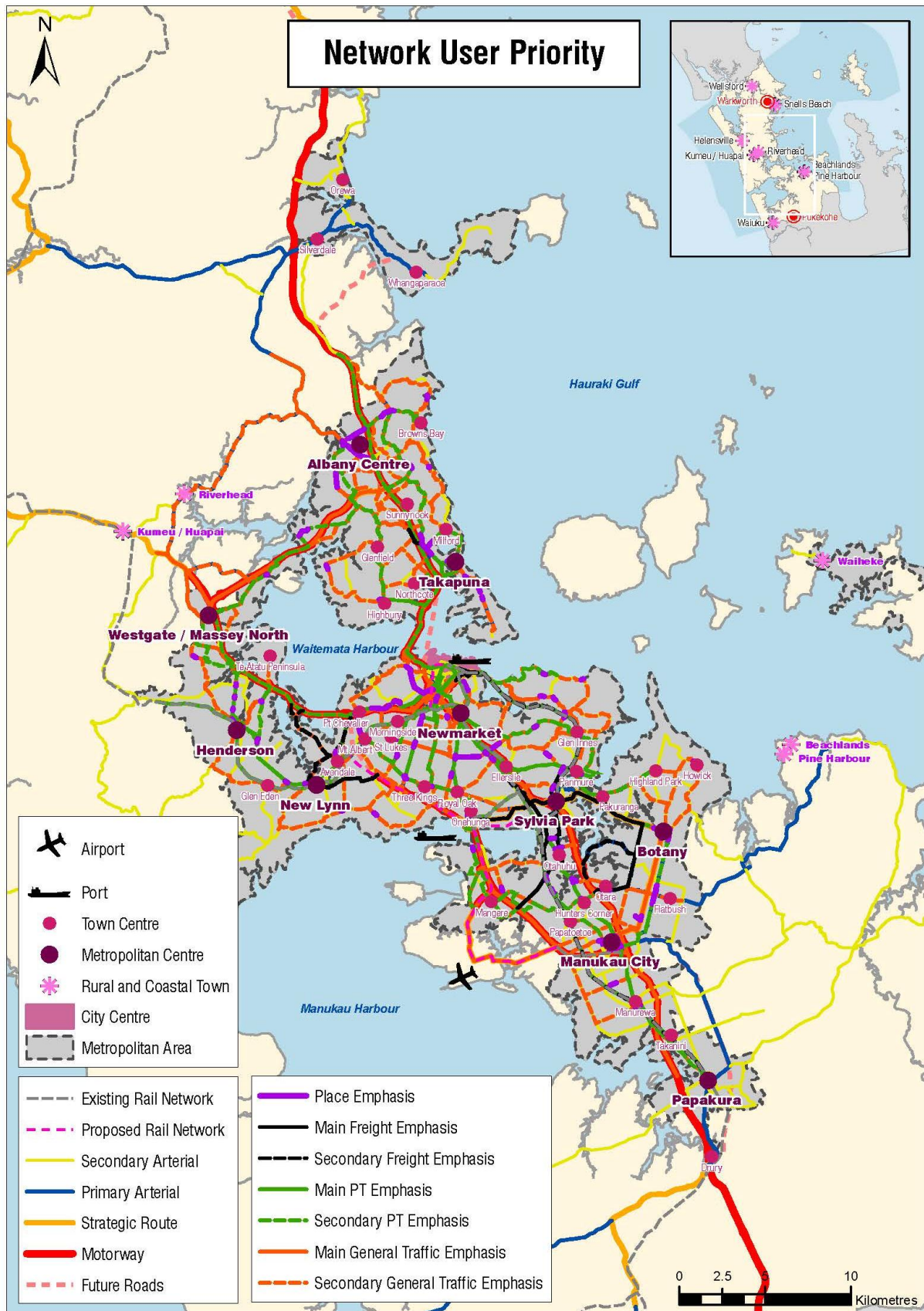


Figure 3.4: Current priorities for use of the road network

### 3.3 Principles for One System approach

The One System approach includes 11 principles from the Auckland Plan that all transport planning and delivery partners are expected to implement when developing policy and priorities for initiatives and investment.

1. Use a single system approach in the planning, design, management and development of our transport system
2. Use travel demand management techniques, such as travel plans for schools and businesses, to manage the growth in demand for private vehicle travel and improve the way existing infrastructure networks operate, before providing additional capacity to the transport system
3. Achieve the appropriate balance between movement and place, considering capacity (incorporating the safe movement of people and goods) and character (recognising the role of road/street in the urban setting and types of buildings/landscape present or planned), acknowledging the role of transport to assist in place-shaping
4. Ensure that long-term land-use and activities drive long-term transport functionality, taking into account the existing and proposed transport network, and that transport investment aligns with growth as envisaged in this Plan
5. Optimise existing and proposed transport investment
6. Establish CMPs that account for 'place shaping'
7. Recognise existing community investment and the need to enable connectivity between and within communities
8. Align community expectations in urban areas with urban LoS, particularly with realistic expectations around levels of congestion
9. Align community expectations in rural areas with rural levels of service, particularly acknowledging limited opportunities for alternatives to motor vehicle travel
10. Ensure that transport is sustainable in the long-term, minimises negative impacts on people's health and the built and natural environment, and reduces our dependence on fossil fuels
11. Improve the capability of the transport system to withstand adverse events.

The Auckland Plan also acknowledges the interdependence between Auckland and the rest of New Zealand. A key theme of the Plan is to recognise that local, regional and national priorities have to be balanced and coordinated for best results. A One System approach must draw on existing national network strategies and plans such the upper North Island freight initiative (refer to the text box below for more information) and the Safer Journeys national road safety strategy.

### **Upper North Island Freight Initiative**

Ten upper North Island organisations have joined forces to deliver freight efficiencies with a goal of helping to boost the economic performance of New Zealand. Delivering freight efficiencies will help reduce the costs of trade, resulting in cheaper goods for New Zealanders and a competitive advantage for New Zealand importers and exporters.

The upper North Island of New Zealand is a critical platform to New Zealand's economic success. More than 55 per cent of New Zealand's freight travels through Northland, Auckland, Waikato and Bay of Plenty regions, and collectively these regions generate over 50 per cent of New Zealand's gross domestic product.

The Upper North Island Strategic Alliance (UNISA) is made up of Northland Regional Council, Whangarei District Council, AC, Waikato Regional Council, Hamilton City Council, Bay of Plenty Regional Council and Tauranga City Council. UNISA is collaborating with AT, KiwiRail and the NZTA to work together on initiatives to reduce the cost of doing business in New Zealand by a strong Upper North Island collaboration.

The organisations involved share the view that to invest smarter and deliver better certainty for industry and investors, they need to understand the bigger Upper North Island picture and work together on the critical priorities that will add the most value. This approach involves discussions with industry, operators and ports, to ensure their views are included, and that their needs can be better understood.



# Chapter 4: Transport programme to deliver the Auckland Plan

The transport investment programme that will be needed to deliver the Auckland Plan and the third key priority in the Auckland Plan – how this programme can be prioritised and optimised across transport modes, is outlined below.

To do this, chapter 4:

- Describes a four-stage intervention process for prioritising the phasing of the programme so that it can be managed within the level of funding made available by central and local government
- Estimates the total operating and capital expenditure associated with this transport programme for three funding scenarios over the 30-year period to 2041. Total expenditure embraces the whole-of-life costs of operating, maintaining, renewing and managing the system, as well as developing it
- Outlines the key directions for each regional network based on the four-stage intervention process. The key direction also identifies the major projects and anticipated phasing over the 30-year period to 2041.

The transport investment programme will be progressively optimised by using the One System approach to integrate the various elements of the programme and thereby ensure the best possible progress is made towards the transport impacts set out in the outcomes framework in chapter 1.

## 4.1 Phasing the transport programme

The pressure on already limited funding is likely to grow as the costs of materials and energy increase and the physical and environmental constraints in expanding network capacity become more difficult and expensive to overcome.

The Auckland Plan includes the following Priority and Directive to specify the phasing or prioritisation of investment:

***Prioritise and optimise investment across transport modes (Priority 3)  
Jointly develop Auckland's transport system, making the best use of existing  
infrastructure and new investments (Directive 13.9)***

The Government Policy Statement on Land Transport Funding (GPS) also recognises the role of phasing, with the following statements:

***Select and fund activities and projects that will make the greatest contribution to  
the government's goals and priorities outlined in this GPS  
Carefully consider the sequencing and phasing of projects***

### Four-stage intervention process

In response, a four-stage intervention process has been developed to enable the ITP to prioritise the phasing of the transport programme. The aim is to progress the implementation of the Auckland Plan programme so it delivers the desired outcomes as quickly as possible

within the funds available. The four stages in the intervention process are described below in priority order. However, in practice, the different stages have to be coordinated and synchronised with each other to produce an optimal investment programme. For example, if travel demand measures (TDM) are to be effective, they will need to be accompanied by changes to the configuration of the network to provide increased capacity for movements by bus, bicycle or on foot. This in turn has implications for the operation of the network, and also for maintenance and renewal activities. The four stages and the feedback loops between the four stages are shown in figure 4.1 below.

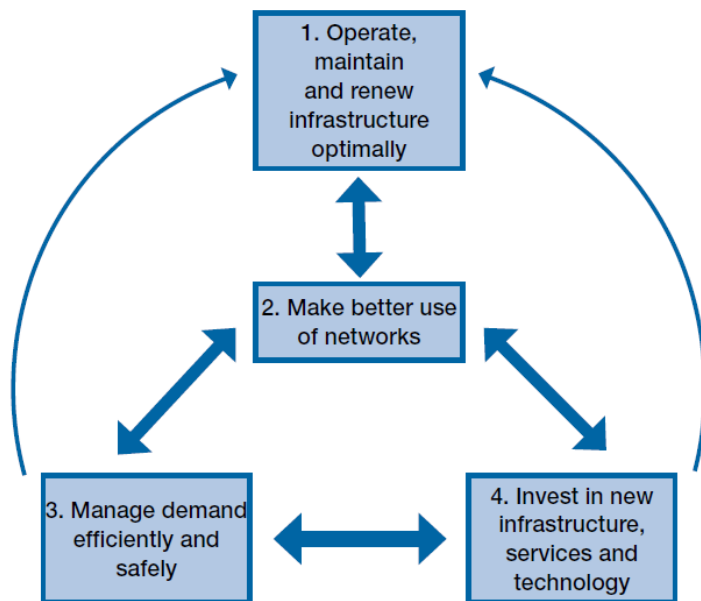


Figure 4.1: Four-stage intervention process

**First stage: Operate, maintain and renew existing infrastructure optimally**

Existing assets need to be maintained, repaired and renewed in a way that minimises whole-of-life costs. This activity has first call on funding because reducing expenditure below the optimal level would lead to increased costs over the long term and therefore ultimately delay the delivery of the transformational projects the Auckland Plan is seeking. It could also lead to unacceptable risks such as the catastrophic failure of a bridge or tunnel.

Currently, AT is working with NZTA and KiwiRail to improve consistency in the way assets are managed in the various elements of the state highway, rail and local transport networks. The aim is to improve value for money through identifying the service levels that will meet stakeholder and customer requirements across the system as a whole, and the optimal works associated with delivering these.

Detailed operational and asset management plans will set out:

- Day to day operation of the network and public transport services to deliver required LoS – for example through the operation of public transport services, network operations through the Joint Traffic Operations Centre, road policing and parking enforcement

- Planned and reactive maintenance activities to minimise long-term costs, taking into account the likelihood and consequences of asset failure – for example inspecting crash barriers and ferry terminal piers
- Renewal of assets to restore LoS when assets become worn or in need of repair, where this is more cost effective than increasing maintenance activities – for example replacement of bridges, and road reseal and rehabilitation works.

### **Second stage: Make better use of networks**

Experience with managing the transport system suggests the best returns from investment can often be achieved through optimal management and use of existing assets. For example, recent network optimisation of traffic signalling on Dominion Road produced benefits that exceeded costs 30 fold. The benefits include CO<sub>2</sub> reductions of 10 per cent and annual time savings of 64,000 hours. Such projects respond to the imperatives in both the Auckland Plan and the GPS to achieve value for money from existing networks.

A further requirement of the Auckland Plan is to achieve an appropriate balance between mobility and place-making, which can also be encouraged by optimising networks. In particular, optimisation addresses the needs of pedestrians and cyclists, for example in making it easier and safer to cross arterial roads. Examples of network optimisation activities include: small safety schemes; changes to clearways and other parking management measures; “tuning” traffic signalling systems; speed limit reviews and minor upgrades to existing arterial roads and local roads.

The Auckland Plan specifically calls for improved street design, improved environmental amenity and an increase in active transport choices. Network optimisation will enable the appropriate balance to be struck through setting objectives that balance the needs of the various network users and the “place-making” needs of the locations they wish to access.

In this context it is important that, when land is purchased to build transport schemes, careful thought is given to how left-over land parcels will be used to improve the local area environment and economy once construction of the transport project is complete.

### **Third stage: Manage demand efficiently and safely**

It is becoming increasingly difficult to solve network problems through new infrastructure investment, due to the high costs of doing so and the associated impacts on the environment and the liveability of the city. In some cases, a more efficient use of resources is to address network pressures through demand management measures instead.

Transport Demand Management (TDM) is already practised to a limited degree through behaviour change activities such as school and workplace travel planning, car-pooling, and road safety education. These are known as “soft” TDM measures. As the transport system faces more pressure in the years ahead, so-called “hard” TDM measures may be justified. Road safety enforcement activities, such as police patrols and use of speed and red light cameras, have demonstrated the importance of hard measures to change behaviour as part of an overall programme to deliver safer journeys. Examples of hard TDM measures that need to be considered for the future include increasing parking charges for commuters and introducing some form of electronic congestion charging.

A key issue in implementing such measures will be to provide transport users with more travel choices whilst ensuring that they are still able to access their workplaces and various other locations. The introduction of TDM measures will need to be carefully phased with the fourth stage (see below) of investing in infrastructure and services so that users have practicable alternatives to travelling by car.

#### **Fourth stage: Invest in new infrastructure, services and technology**

Major route improvements within and through Auckland will be crucial in facilitating land use changes and maintaining good LoS for freight and commercial vehicles. This will be required to support Auckland's growth in the places identified in the Auckland Plan.

In developing the investment programme, the ITP maintains the Auckland Plan's priority order for these major network improvements. The first priority is to complete the Western Ring Route, upgrade public transport infrastructure and introduce electrified rail services. The second priority is to implement infrastructure and service improvements associated with the CRL, the AMETI and the MMEWS, and the additional Waitemata Harbour Crossing. The third priority includes other strategically important road, public transport, rail freight, and walking and cycling improvements.

The ITP assumes that these major projects will be implemented with their associated supporting projects. The AMETI is a good example of an outcome focused multi-modal package of projects that has been developed to address a set of transport issues in a given area, in this case eastern Auckland. The AMETI package is designed to optimise the return from the investment by ensuring balanced outcomes for the different types of transport users, as well as meeting the needs of the local places served by the network.

#### **Auckland-Manukau Eastern Transport Initiative (AMETI)**

A new busway, a new Panmure bridge and a Panmure bus/rail interchange are major projects within AMETI, and their construction is integrated with encouraging active travel modes and town centre revitalisation. For example:

- Cycling and walking improvements feature in most parts of the AMETI project and will be designed to the highest standard. The new Panmure bridge will provide a wide shared-use path for improved pedestrian and cycle connections
- New development around Panmure Station will help encourage new growth and investment in Panmure town centre
- The AMETI Link Road, connecting Mt Wellington Highway with Morrin Road, will allow for Jellicoe Road to become a quieter local street with enhanced pedestrian connections between the Panmure town centre and rail station. The new link road will also allow for improved freight connections
- Opportunities for TDM measures, including improved school and workplace travel plans, are also being investigated to maximise the benefits brought by the AMETI changes.

Similar packages of supporting activities will be needed for the other priority projects in the Auckland Plan. It is important that the whole-of-life costs of these investment packages are assessed, which means the whole-of-life asset management and operational costs as well as the initial capital costs. Sub-regional strategic studies are under way to develop efficient

and effective multi-modal transport packages that respond to the strategic needs of the areas concerned, including the city centre and the airport and south east Auckland areas.

## 4.2 Estimating the costs of the transport programme

The currently available funding for transport in Auckland is estimated to be \$10b to \$15b below the level needed to deliver the full programme envisaged in the Auckland Plan. It is also possible that land development and transport demand patterns may diverge from the central assumptions in the Plan. To deal with these uncertainties, sensitivity testing has been carried out on a number of investment scenarios against a range of growth and land-use development assumptions.

Using the four-stage intervention process described above, two investment scenarios have been developed which embrace the whole-of-life costs of operating maintaining, renewing and managing the system, as well developing it. Within these scenarios, the priority projects identified in the Auckland Plan are integrated with broader packages of supporting projects and activities as explained in section 4.1.

The two investment scenarios are:

- A Fully Funded investment programme. This is 100 per cent of the transport investment described in the Auckland Plan.
- A Committed Funding investment programme. This is a base case against which the benefits of the other options can be assessed. It assumes funding is limited to on-going operation, maintenance, renewal and management of the network together with improvement projects currently under construction or approved for funding. This equates to 57 per cent of the fully funded programme.

Figure 4.2 sets out the estimated costs of the Fully Funded scenario for the three decades to 2041 at around \$60 billion over the 30-year period, a significant increase on the \$7 billion spent since 2000, described in chapter 1. As can be seen, spending levels are considerably higher in the first decade than in the second and third. The peak expenditure in the first decade is due to major investments in projects such as the CRL, the Western Ring Route, AMETI and MMEWS. The estimated whole-of-life cost of project packages becomes more difficult to estimate the further out they are forecast. It is therefore likely that the forecast expenditure in the second and third decades is an underestimate. For example, the costs of likely transport connections to the greenfield investigation areas will be significant. The forecast will increase as more detailed network planning is undertaken in response to emerging land-use and transport demand trends.

The challenging nature of the choices which will have to be made in the event of reduced funding is shown in Figure 4.3, which compares the estimated costs of the Fully Funded and Committed Funding options for the period to 2041. Significant investment in new infrastructure and services would not be undertaken in the committed funding scenario

The first iteration of the transport programme is detailed in Appendix One. The network optimisation process, which is described in Chapter 5, will progressively lead to new projects and other interventions being added to the programme while others will be removed or delayed in the priority order. The ITP will be updated at regular intervals to reflect these changes.



## ITP investment profile for fully funded programme

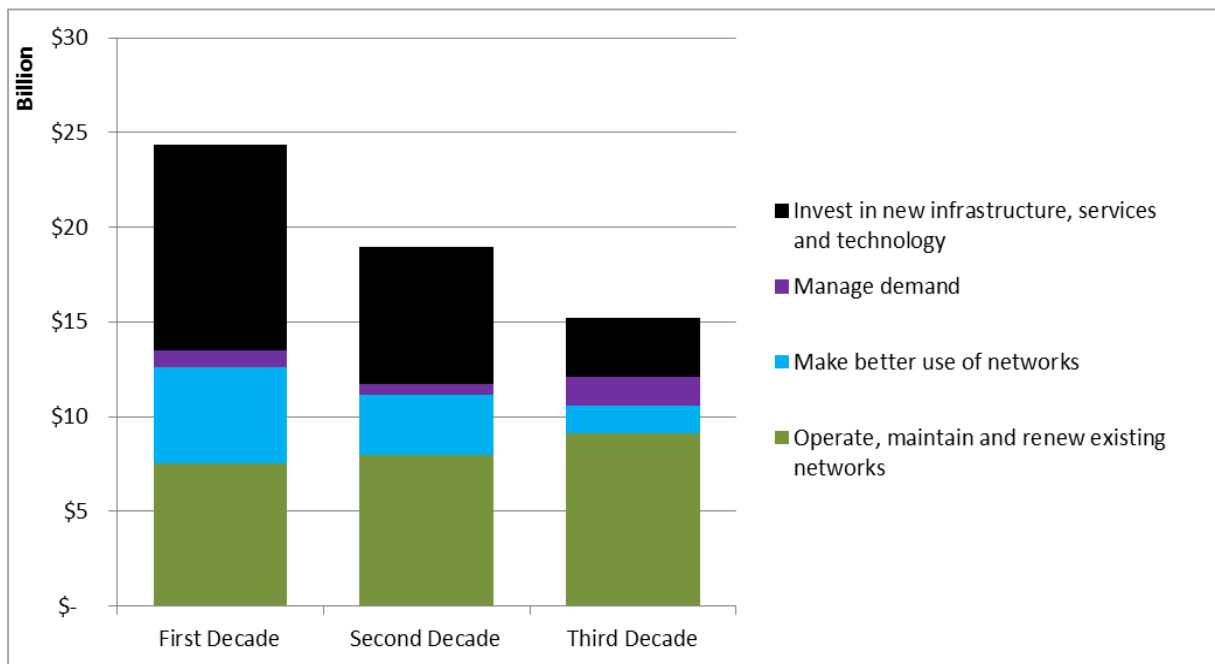


Figure 4.2: Estimated expenditure profile for the Fully Funded scenario for 2012 to 2041

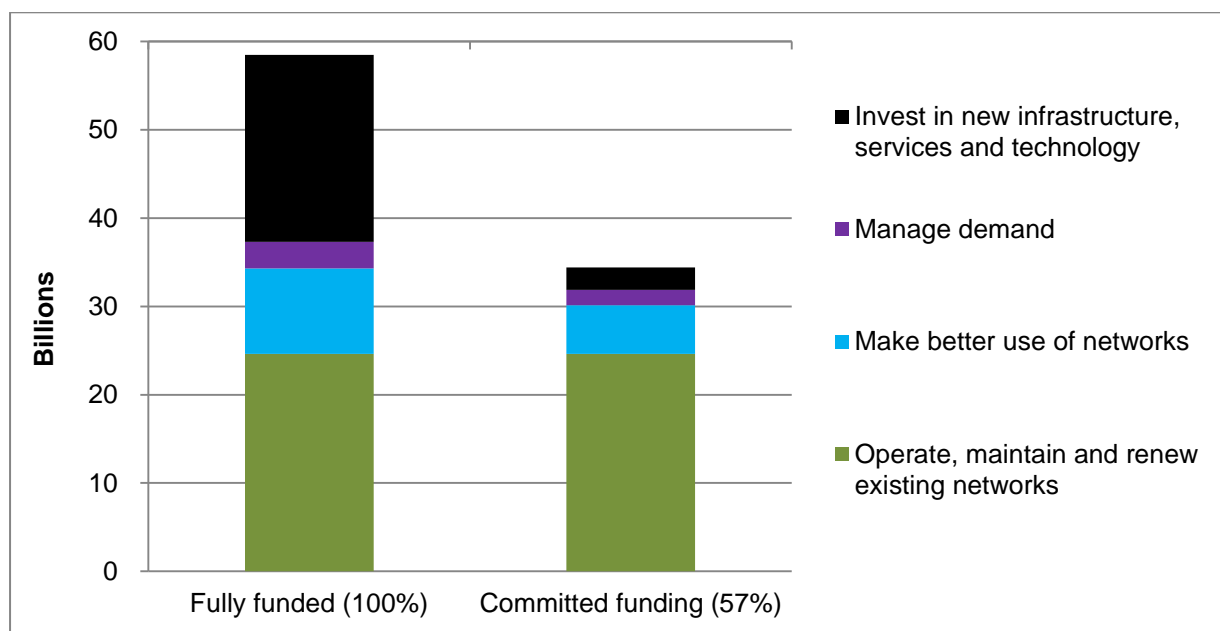


Figure 4.3: Estimated expenditure profile for Fully Funded vs Committed Funding scenario for 2012 to 2041

### 4.3 One System Intervention Framework

The ITP has developed a framework relating the market sectors and networks to be managed by the One System with the four-stage intervention responses described in section 4.1. The One System intervention framework is shown in Table 4.1, indicating where current intervention levels will be maintained or increased in the medium term to make optimal progress within the funds available towards the outcomes and targets in the Auckland Plan.

Market sector and network		Intervention responses			
		Operate, maintain and renew assets	Make better use of networks	Manage demand efficiently and safely	Invest in new infrastructure, services and technology
International	Seaport connections	→	↗	→	↗
	Airport connections	→	↗	→	↗
National	State highways	→	↗	↗	↗
	Rail	↗	→	→	↗
Auckland-wide	General traffic	→	→	↗	↗
	Freight traffic	→	↗	→	↗
	Public transport – trains, buses and ferries	→	↗	→	↗
	Cycling and walking	→	↗	→	↗
	Parking	→	↗	↗	↗
Local access and place-making	City centre and fringe	→	↗	↗	↗
	Metropolitan centres	→	↗	↗	↗
	Town centres	→	↗	→	→
	Rural areas	↗	→	→	→
	Seaports and airports	↗	→	→	↗

Table 4.1: One System intervention framework

**Key:** → Maintain current intervention levels; ↗ increase intervention focus over the next five to 10 years

This high level framework in Table 4.1 is underpinned by directional statements for the regional networks described in chapter 2:

1. Regional road network
2. Regional freight network
3. Regional public transport network
4. Regional cycle and walking network
5. Regional parking
6. Regional road safety
7. Regional environmental outcomes

The directional statements are summarised in the following tables. They reflect the current network plans for each network, which include the Regional Arterial Road Plan, Regional Public Transport Plan, the Regional Road Safety Plan, the State Highway Future Directions and the Asset Management Plans of the network providers. The directional statements will be updated as the network and asset plans are developed and aligned over time.

## 1. Regional road network

1.1 Regional road network – state highways and motorways (national)				
Intervention responses	Key future directions			
Operate, maintain and renew infrastructure optimally	Optimise ‘whole of life cycle’ asset management Continue to work with key stakeholders to co-ordinate transport system safety, development and operations			
Make better use of networks	Improve priority access for freight and public transport where this aids in journey time reliability Target network improvements in areas which will benefit freight and economic productivity Rationalise access to state highways where this provides overall system-wide benefits Monitor traffic across the network to allow for prompt detection and response to incidents			
Manage demand efficiently and safely	Expand the coverage and range of TDM tools used on the state highway network Engage early with developers and Auckland Council to influence land use and infrastructure decisions Investigate opportunities for improving active mode travel across and along the state highway in NZTA projects Expand NZTA’s role in providing informed travel choices to the customer			
Invest in new infrastructure, services and technologies	Complete Roads of National Significance, Target network improvements which benefit freight, public transport, productivity and safety Target network improvements that will enhance road safety and embed the Safe System approach			
	Priority projects by decade:	1	2	3
	Western Ring Route (RoNS), SH1 Puhoi-Warkworth motorway extension, SH20 A widening, SH16 widening Lincoln Rd to Royal Rd/Westgate			
	Additional Waitemata Harbour Crossing – SH1 road (and rail) tunnel, SH1 Warkworth-Wellsford motorway extension			
	SH16 Port access improvements, SH20B widening,			
	SH1 improvements to service Greenfield growth centres			

1.2 Regional road network – primary and secondary arterials				
Intervention responses	Key future directions			
Operate, maintain and renew infrastructure optimally	Optimise ‘whole of life cycle’ asset management			
Make better use of networks	<p>Use a One System approach to:</p> <ul style="list-style-type: none"> <li>• Address gaps in the operating LoS across the transport network by optimising mode productivity through prioritisation</li> <li>• Optimise and integrate infrastructure investment in the regional public transport network</li> </ul> <p>Co-ordinate transport system safety, development and operations with key partners</p> <p>Develop CMPs which take account of the corridor function, primary role in the transport system and the place/context design typology for the street segment concerned. Stage implementation to reflect the intervention framework</p> <p>Improve freight and public transport productivity through improved access</p> <p>Implement the Auckland Transport Code of Practice (ATCOP)</p> <p>The Joint Transport Operations Centre use the One System approach to improve traffic flows across congested sections of the transport network</p>			
Manage demand efficiently and safely	<p>Provide transport users with relevant information to enable them to make smarter transport choices</p> <p>Monitor traffic across the network to enable prompt response to incidents</p> <p>Balance movement and land use demands through corridor management</p> <p>Improve opportunities for cycling and walking in all road projects</p> <p>Rationalise access to State Highways where this provides system-wide benefits</p> <p>Engage early with developers and key stakeholders with regard to infrastructure access, development and land use</p> <p>Expand the range of TDM tools used on the arterial network, taking into account the outcome of the Mayor’s initiative investigating alternative options for funding critical transport projects, which is expected to provide more certainty and direction on TDM tools</p> <p>Manage the transport network to support community events and activities</p>			
Invest in new infrastructure, services and technologies	<p>Complete critical regional infrastructure: AMETI, MMEWS, network-wide corridor improvements</p> <p>Target network improvements based on corridor management priorities in areas which benefit place-making, freight, public transport, productivity and safety</p> <p>Plan for transport infrastructure and services in new greenfield areas to support their development</p>			
	Priority projects by decade:	1	2	3
	AMETI – Package 1 (bridges), Package 2 (Lagoon Drive RTN & arterial link roads), Package 4 (Botany RTN & interchanges), Package 5 & 6 (Mt Wellington/Waipuna/SE Highway upgrades)			
	Multi-modal East/West Project			

	NORSGA projects, SMART detailed design (PT to airport) Corridor improvements: Tiverton to Wolverton upgrade, Te Atatu Rd and Lincoln Rd, Pukekohe – Eastern arterial, East Coast Rd widening, Penlink toll Rd, Mill Rd corridor upgrade, City Centre improvements			
	Corridor/centre improvements: City Centre improvements, Great South Rd - Atkinson to Tamaki Bridge & Ti Irirangi to Redoubt, Grade separations at key intersections with the rail network			
	New arterials to Greenfield areas : Papakura to Pukekohe, Westgate – Riverhead-Kumeu, other Greenfield areas (all dependent on Greenfield plans)			

### 1.3 Regional road network – collector and local roads

Intervention responses	Key future directions			
Operate, maintain and renew infrastructure optimally	Optimise 'whole of life cycle' asset management			
Make better use of networks	Use a One System approach to address gaps in operating LoS by optimising mode productivity through prioritisation such as traffic signal optimisation Improve access to business and properties for people and freight Improve traffic flows at congested local intersections, such as the intersection of Lake Rd and Esmonde Rd Co-ordinate transport system safety, development and operations with key partners Improve opportunities for cycling and walking in road projects (for example, extending Cycle Connectors and Feeders) Provide appropriate level of service across the rural road transport network			
	Priority projects by decade:	<b>1</b>	<b>2</b>	<b>3</b>
	Local road improvements (Auckland-wide) - corridor and intersection improvements, crash reduction, safety around schools, regional safety projects,			

## 2. Regional freight network

### 2.1 Regional freight network – state highway and motorways (national) and rail (national)

Intervention responses	Key future directions			
Make better use of networks	Integrate inter regional freight development and operations with key stakeholders and partners Improve regional understanding of the importance of freight movements through information sharing and regular communication between all stakeholders Improve priority access for freight transport where this aids in journey time reliability Monitor freight traffic flows across the network to allow for informed decision			



	making as well as prompt detection and response to incidents Expand NZTA's role in improving regional understanding of the importance of freight movements through information and communication			
Manage demand efficiently and safely	Encourage freight movement by alternative modes such as rail and coastal shipping where this is economically viable			
Invest in new infrastructure, services and technologies	Complete the Roads of National Significance which are of significance to inter-regional freight movements Target network improvements in areas which will benefit freight and economic productivity			
	Priority projects by decade:	<b>1</b>	<b>2</b>	<b>3</b>
	HPMV – SH1 South Auckland to Tauranga Passing Lane, ATMS Stage IV			
	Third rail line Westfield to Papakura (Westfield to Middlemore, Middlemore to Wiri), Third rail line on eastern line (passing bays)			

## 2.2 Regional freight network – primary and secondary arterials and rail (regional)

Intervention responses	Key future directions
Make better use of networks	<p>Develop and maintain a layered network of freight routes enabling:</p> <ul style="list-style-type: none"> <li>Freight movements on prioritised lanes during specific times of the day across the network</li> <li>Freight movements on dedicated lanes across the network</li> </ul> <p>Use a One System approach to:</p> <ul style="list-style-type: none"> <li>Address gaps in the operating LoS across the transport network by optimising mode productivity through prioritisation</li> <li>Optimise and integrate infrastructure investment in the regional transport network</li> </ul> <p>Real-time travel information for freight along a preferred route or roads</p> <p>Develop freight management guidelines to guide freight movements in local area</p> <p>Develop rail timetables that allow adequate access for freight movements by rail</p> <p>Provide for inputs from all key stakeholders in the freight industry</p>
Manage demand efficiently and safely	<p>Identify appropriate land availability and network connectivity to enable freight development</p> <p>Monitor freight movements on the network to enable an understanding of the impacts of freight movements on the transport system</p> <p>Improve road user perceptions of the importance of freight movements</p> <p>Support TDM measures that provides congestion relief for freight traffic</p> <p>Promote and advocate a supportive regulatory and funding framework for freight across all modes</p>
Invest in new infrastructure and technologies	<p>Develop a road network that supports connectivity of major freight terminals and demand centres</p> <p>Complete critical regional infrastructure</p>

	Priority projects by decade:	1	2	3
	HMPV routes, Multi-modal East West corridor (Neilson Street upgrade)			
	Rail freight third track - Westfield to POAL, SH16 Port Link (includes Grafton Gully), Freight routes – local roads			

<b>2.3 Regional freight network - collector and local roads</b>	
<b>Intervention responses</b>	<b>Key future directions</b>
Make better use of networks	Use a One System approach to address gaps in operating LoS by optimising freight movements through prioritisation at busy intersections and on congested roads  Improve parking and access to business and properties for freight

The location of major road and freight projects proposed for 2012 to 2041 are indicated in the following map.

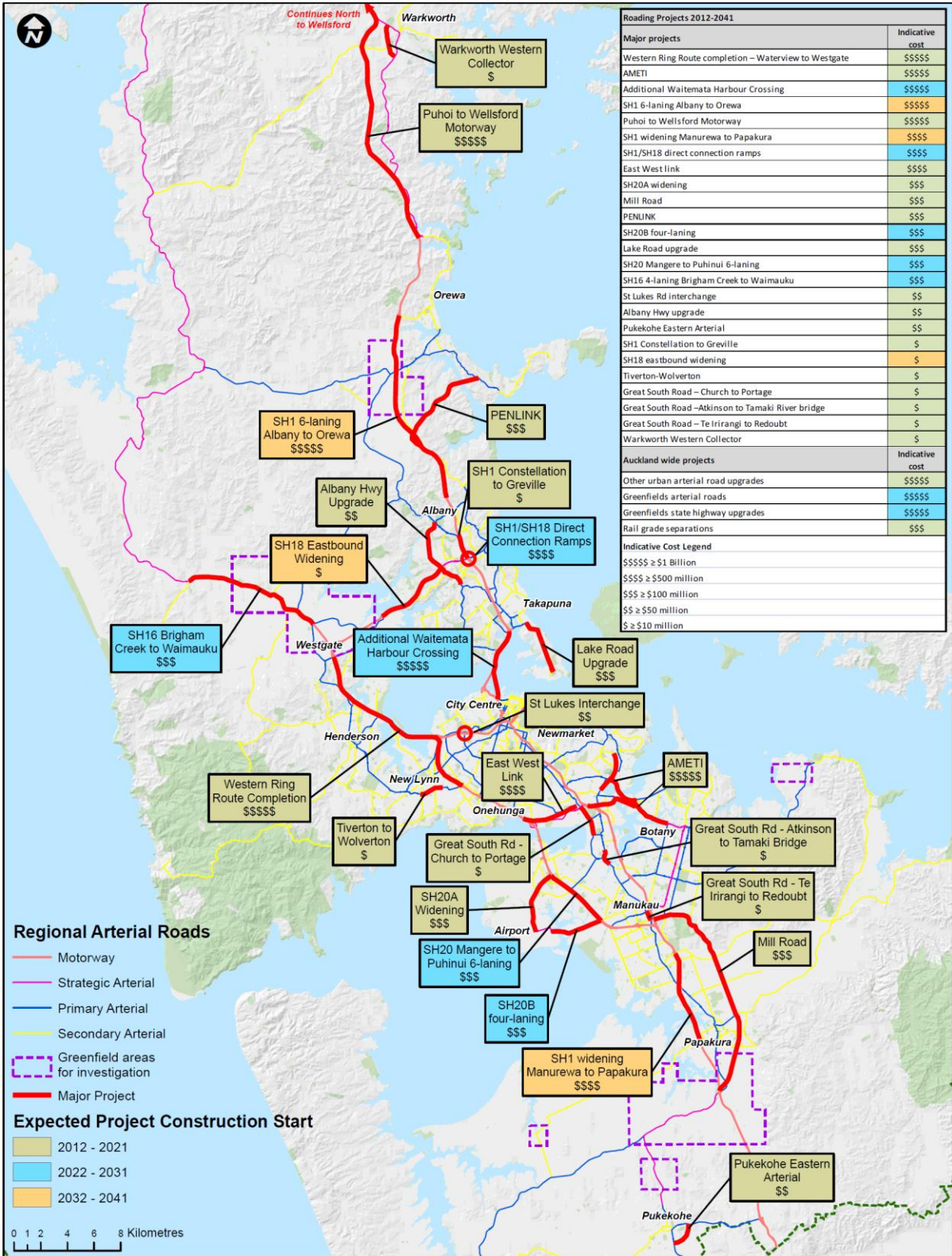


Figure 4.4: Major road and freight projects 2012-2041

### 3. Regional public transport network

3. Regional public transport network	
Intervention responses	Key future directions
Operate, maintain and renew infrastructure optimally	<p>Optimised 'whole of life cycle' public transport asset management</p> <p>Maximise use of current public transport facilities and assets</p>
Make better use of networks	<p>Establish a simpler, better connected network based on a core system of high frequency services, consisting of Rapid and Frequent layers. Maximise the capability of the system through an operational CRL</p> <p>Develop a permanent network of frequent services that provides long-term certainty for investment in future growth areas outlined in the Auckland Plan</p> <p>Maximise mobility opportunities through developing a connective all-day/seven-day network</p> <p>Use a One System approach to:</p> <ul style="list-style-type: none"> <li>• Address gaps in the operating LoS in the public transport network by optimising mode productivity through prioritisation</li> <li>• Optimise and integrate infrastructure investment in the regional transport network</li> </ul> <p>A system of monitoring and review that supports continuous improvement</p> <p>Ensure the effective and efficient allocation of public transport funding</p>
Manage demand efficiently and safely	<p>Provide simple, integrated services that connect people with where they want to go</p> <p>A fares and ticketing system providing an easy transfer between operators and modes without penalty</p> <p>Simple, visible and intuitive customer information and service</p> <p>Modern accessible vehicles that are comfortable and environmentally friendly</p> <p>Improved accessibility for communities and groups whose needs are not met by the regular public transport</p> <p>Balance rail freight and public transport services, prioritising public transport services during peak periods. Capacity enhancements will be sought where there is sustained demand.</p>
Invest in new infrastructure, services and technologies	<p>Route protection of dedicated rail and bus corridors, such as Constellation-Westgate-Henderson Rapid route.</p> <p>Complete critical public transport infrastructure such as Rail Electrification to Pukekohe, the CRL, Northern Busway Extension, AMETI, bus lane priorities and interchanges</p> <p>A high standard of public transport infrastructure that supports service provision and enhances the customer experience, e.g. by providing easy customer connections</p> <p>Develop high-quality streetscapes to support regional interchanges and termini; create enhanced bus stop facilities and amenities including super stops at frequent service connections</p> <p>Increase service frequency on the all-day network as patronage builds and extend public transport services when warranted</p>

	<p>Extend in-corridor public transport priority measures on the Frequent Network in particular, e.g. signal prioritisation, bus lanes</p> <p>A procurement system that supports the efficient delivery of public transport services towards an integrated network</p> <p>A fares and ticketing system that balances user contributions to public funding whilst attracting and retaining customers</p> <p>Develop a consistent and integrated brand across the public transport system</p> <p>Ensure reliable and punctual services through technology - based position tracking systems and robust performance management</p> <p>Real-time based, simple and intuitive passenger service information system</p>																				
	<table border="1"> <thead> <tr> <th data-bbox="400 591 1123 651">Priority projects by decade:</th> <th data-bbox="1123 591 1219 651">1</th> <th data-bbox="1219 591 1315 651">2</th> <th data-bbox="1315 591 1406 651">3</th> </tr> </thead> <tbody> <tr> <td data-bbox="400 651 1123 1032"> <p>Electrification construction, extension of electrification to Pukekohe, Purchase electric trains (and depot), CRL, Rail station improvements, Third rail line Westfield to Papakura (stage 1)</p> <p>Dominion Rd PT corridor upgrade, City centre surface bus improvements, SH20 AIA bus lanes &amp; services along SH20, Manukau bus interchange, Botany to Manukau RTN – bus priority improvement &amp; interchange</p> <p>CRL – new park and ride facilities</p> <p>Real-time PT information improvement, Auckland Integrated ticketing &amp; fares project</p> <p>Ferry terminal upgrades – Bayswater, Half Moon Bay, HGI wharves - Kennedy Point development</p> </td> <td data-bbox="1123 651 1219 1032" style="background-color: #92d050;"></td> <td data-bbox="1219 651 1315 1032"></td> <td data-bbox="1315 651 1406 1032"></td> </tr> <tr> <td data-bbox="400 1032 1123 1155"> <p>New rail stations (Mangere bridge, Mangere town centre, Ascot Park, Airport), AIA rail link (stage 1 – Manukau eastern link &amp; stage 2 Northern Link), additional rolling stock to increase frequencies on main lines and Northern Link, Third rail line on Eastern line</p> </td> <td data-bbox="1123 1032 1219 1155"></td> <td data-bbox="1219 1032 1315 1155" style="background-color: #92d050;"></td> <td data-bbox="1315 1032 1406 1155"></td> </tr> <tr> <td data-bbox="400 1155 1123 1245"> <p>SH1 Northern Busway - Onewa to city centre/Albany to Silverdale</p> <p>Extension of public transport infrastructure to Greenfield growth centres</p> </td> <td data-bbox="1123 1155 1219 1245"></td> <td data-bbox="1219 1155 1315 1245" style="background-color: #92d050;"></td> <td data-bbox="1315 1155 1406 1245" style="background-color: #92d050;"></td> </tr> <tr> <td data-bbox="400 1245 1123 1395"> <p>SH 18 &amp; SH20: Constellation-Westgate-Waterview busway</p> <p>Avondale-Onehunga/Southdown rail extension, EMU – replacement and refurbishment</p> <p>Ferries to Takapuna and Browns Bay</p> </td> <td data-bbox="1123 1245 1219 1395"></td> <td data-bbox="1219 1245 1315 1395"></td> <td data-bbox="1315 1245 1406 1395" style="background-color: #92d050;"></td> </tr> </tbody> </table>	Priority projects by decade:	1	2	3	<p>Electrification construction, extension of electrification to Pukekohe, Purchase electric trains (and depot), CRL, Rail station improvements, Third rail line Westfield to Papakura (stage 1)</p> <p>Dominion Rd PT corridor upgrade, City centre surface bus improvements, SH20 AIA bus lanes &amp; services along SH20, Manukau bus interchange, Botany to Manukau RTN – bus priority improvement &amp; interchange</p> <p>CRL – new park and ride facilities</p> <p>Real-time PT information improvement, Auckland Integrated ticketing &amp; fares project</p> <p>Ferry terminal upgrades – Bayswater, Half Moon Bay, HGI wharves - Kennedy Point development</p>				<p>New rail stations (Mangere bridge, Mangere town centre, Ascot Park, Airport), AIA rail link (stage 1 – Manukau eastern link &amp; stage 2 Northern Link), additional rolling stock to increase frequencies on main lines and Northern Link, Third rail line on Eastern line</p>				<p>SH1 Northern Busway - Onewa to city centre/Albany to Silverdale</p> <p>Extension of public transport infrastructure to Greenfield growth centres</p>				<p>SH 18 &amp; SH20: Constellation-Westgate-Waterview busway</p> <p>Avondale-Onehunga/Southdown rail extension, EMU – replacement and refurbishment</p> <p>Ferries to Takapuna and Browns Bay</p>			
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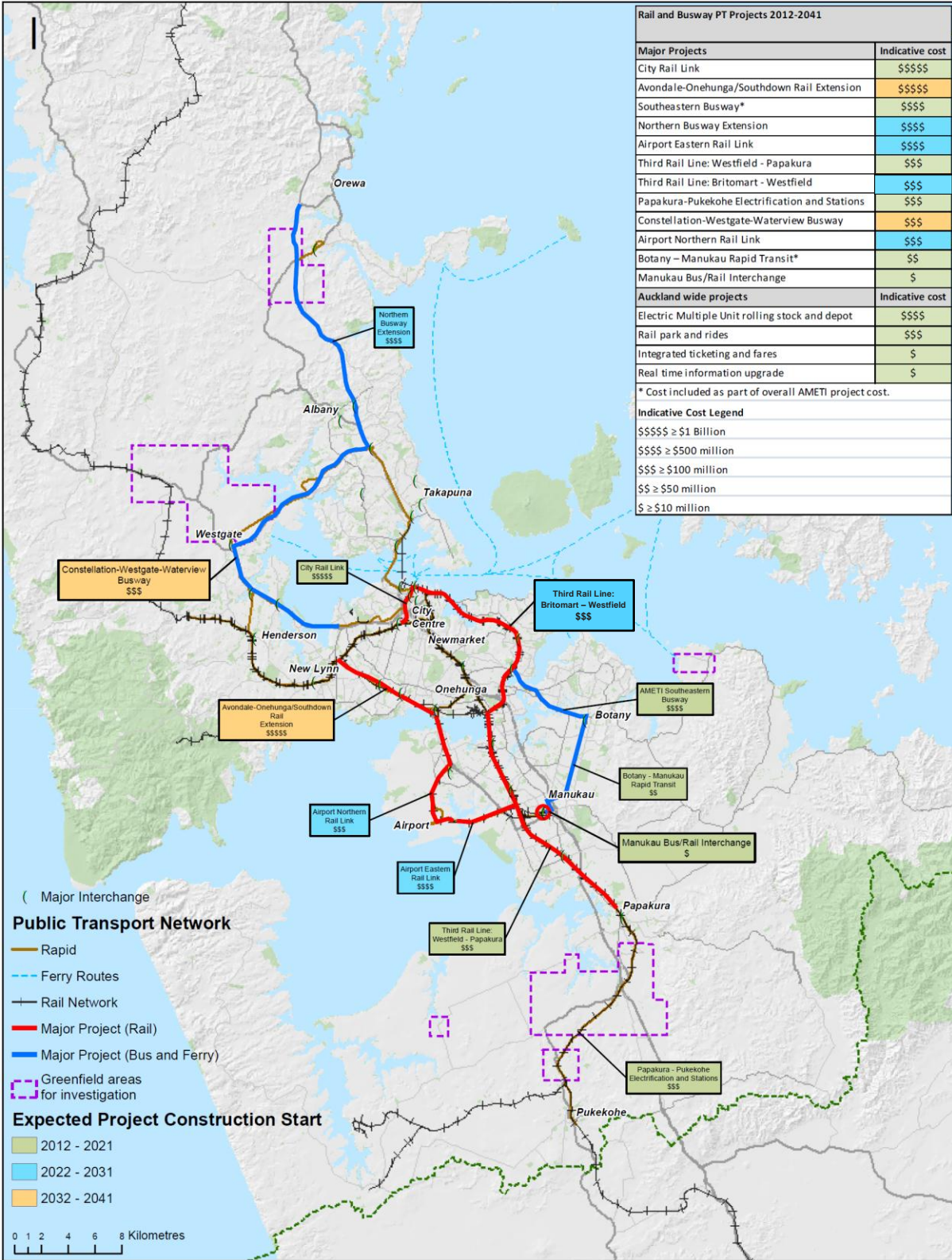


Figure 4.5: Rail and dedicated Busway public transport projects 2012-2041



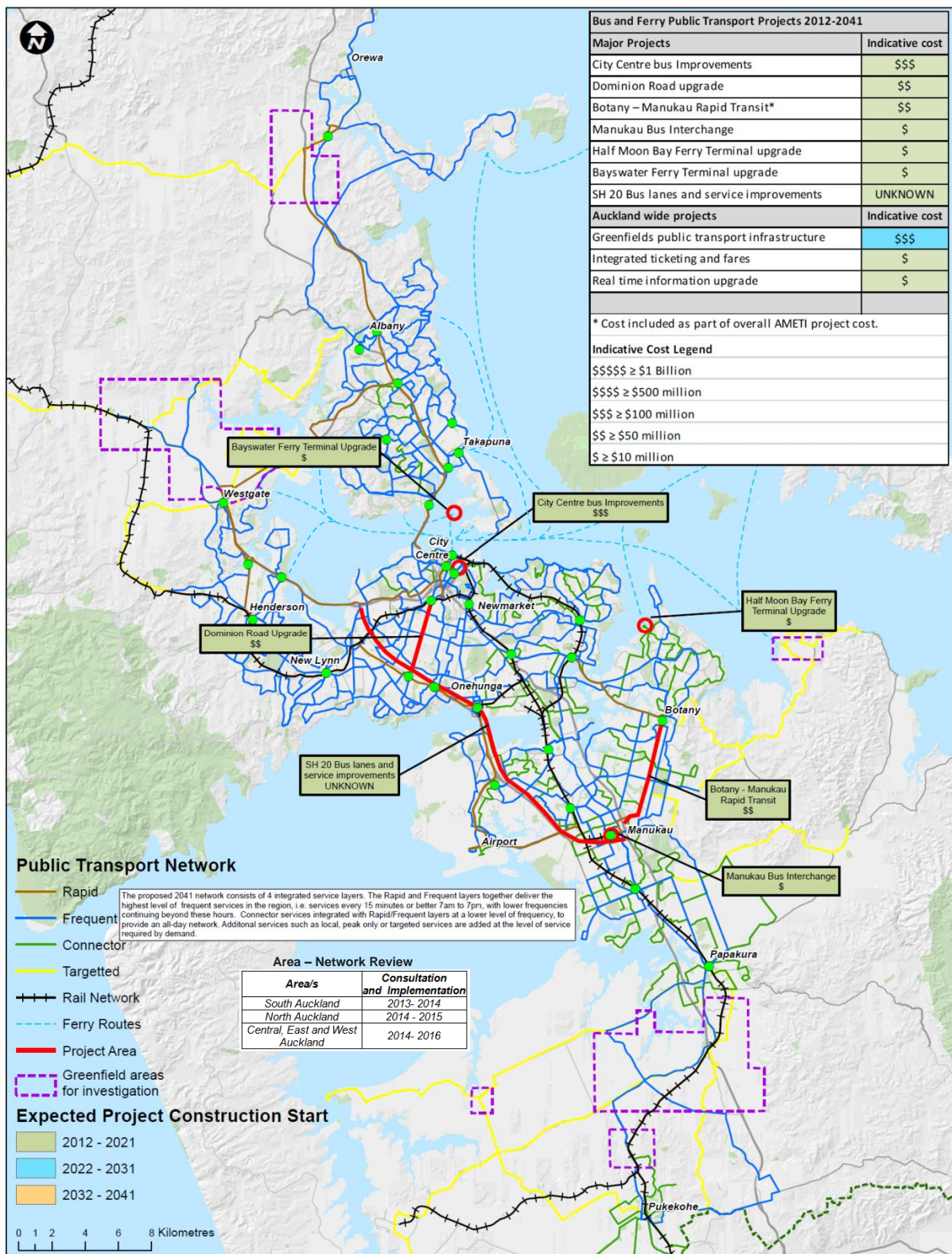


Figure 4.6: Bus and Ferry public transport projects 2012-2041

## 4. Regional cycleway and walking networks

4.1 Regional cycle network				
Intervention responses	Key future directions			
Operate, maintain and renew infrastructure optimally	Optimised 'whole of life cycle' asset management			
Make better use of networks	Develop a cycle network covering three layers: <ul style="list-style-type: none"> <li>• cycle highways,</li> <li>• cycle connectors and</li> <li>• cycle feeders</li> </ul> This three-layered approach will provide a quality, robust and comprehensive network that will make cycling a more attractive and feasible transport option for both commuting and recreation			
Manage demand efficiently and safely	Provide a safe, simple, visible layered network for cyclists (and potential cyclists) to understand LoS Increase accessibility to public transport by active modes Improve cycling routes to schools, tertiary institutions, businesses and key community centres Travel planning and behaviour change programmes to support and promote increased safe cycling Deliver road safety education to reduce injuries and crashes involving cyclists and pedestrians Monitor cycle movements and safety on the network to ensure delivery of infrastructure and education needs			
Invest in new infrastructure and technologies	Prioritise completion of cycle network layers based on strategic need covering demand, safety, congestion, journey ambience and delivery Deliver a prioritised programme of cycle (and shared path) improvements across the region. Including key connections such as the Waterview shared path and Beach Road to Grafton Gully cycleway Develop improved connectivity to centres and communities and linked network Design and implement safe cycle routes for local networks, including connections to open space (Greenways) networks to increase levels of use Develop a high level of integration between public transport and cycling including the provision of bike parking and facilities at interchanges Develop a high standard of end of trip facilities on the network by working with businesses, developers and others Deliver a programme of cycle parking infrastructure to town centres in the region			
	Priority projects by decade:	<b>1</b>	<b>2</b>	<b>3</b>
	Grafton Gully cycle connection, Tamaki Drive Broadwalk, Harbour Bridge shared path, SH1 Northern motorway cycleway, Southern motorway cycleway, Eastern corridor cycleway – Meadowbank to Glen Innes, AMETI walk/cycleway, Waterfront cycleway, North western cycleway, Old Mangere bridge			
	Southwestern cycleway, complete the regional cycle network, regional			

	cycleway development to Greenfield areas			
	School travel plans, Workplace travel plans, Regional cycle parking,			

4.2 Walking – footpaths, walkways and shared paths				
Intervention responses	Key future directions			
Operate, maintain and renew infrastructure optimally	Optimised ‘whole of life cycle’ asset management Incorporate low impact design principles for maintaining and improving pedestrian facilities			
Make better use of networks	Develop the walkability of places and corridors by: <ul style="list-style-type: none"> <li>Improving safety and accessibility to high priority destinations such as public transport stops and town centres</li> <li>Improving safety and pedestrian amenity at intersections</li> <li>Develop an operational model for walkability assessments to ensure safe and easy access for pedestrians in key destinations and linking to public transport</li> </ul>			
Manage demand efficiently and safely	Travel planning and behaviour change programmes to grow safe use of the network Improve walking routes to schools, tertiary institutions, employment areas and town centres, which are supported by travel plans			
Invest in new infrastructure, services and technologies	Improve pedestrian infrastructure between residential areas, public transport interchanges and key employment locations Prepare a prioritisation programme for the construction of new footpaths Develop rural footpaths and recreational trails Design and deliver a programme of infrastructure improvements such as shared paths and new connections			
	Priority projects by decade:	<b>1</b>	<b>2</b>	<b>3</b>
	Walking improvements (Central, West, Southern, Northern), Tamaki Drive broadwalk, AMETI walk/cycleway, Warkworth walking and cycling, Harbour Bridge shared path			
	Region-wide new footpaths			



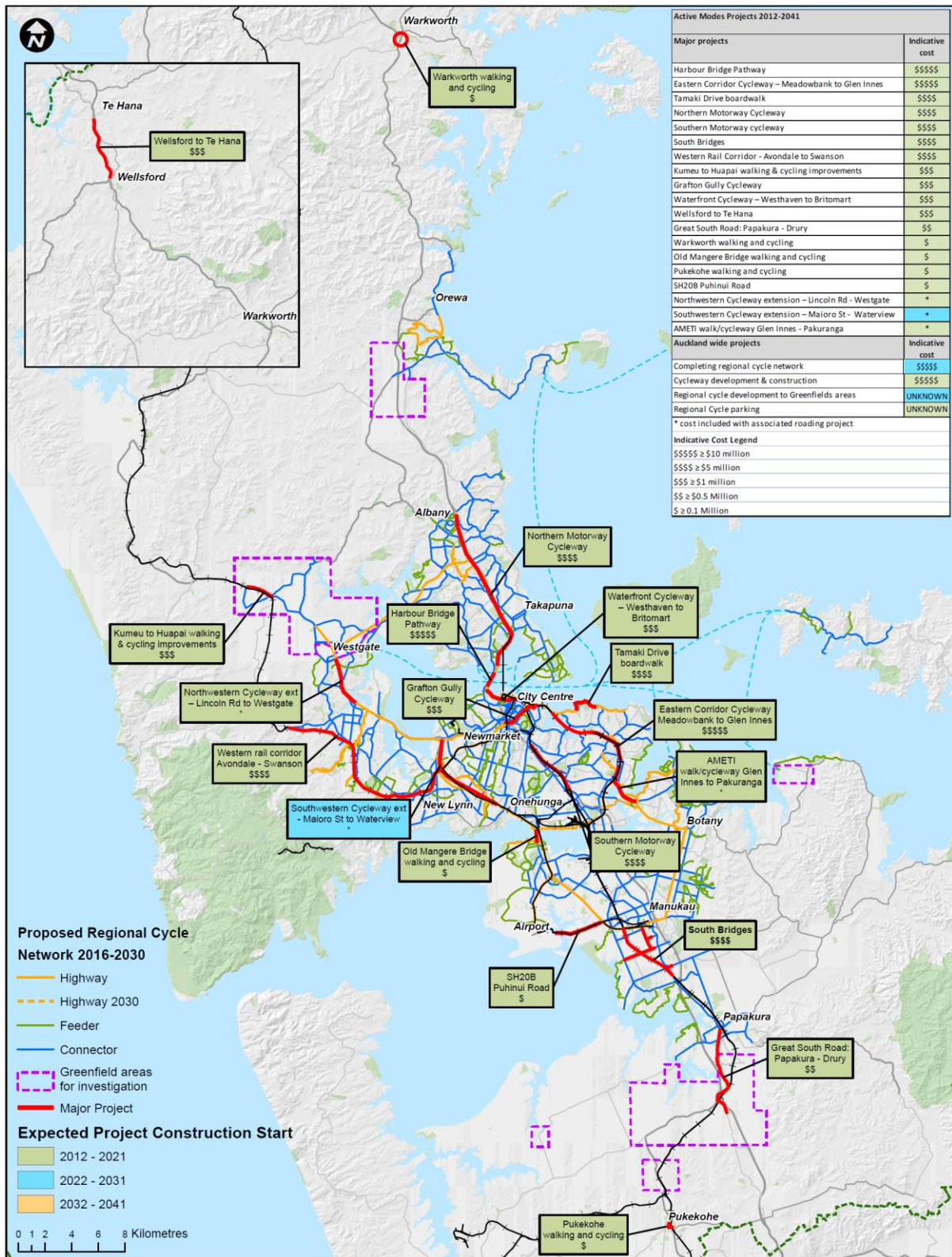


Figure 4.7: Major active modes projects 2012-2041



## 5. Regional parking

5.1 On-street and off-street parking facilities			
Intervention responses	Key future directions		
Operate, maintain and renew infrastructure optimally	Optimised 'whole of life cycle' asset management		
Make better use of networks	<p>Prioritise allocation of on-street kerb-space</p> <p>Manage the parking resource through time restrictions and pricing to achieve an optimum level of availability to support business activity in centres</p> <p>Prepare comprehensive parking plans for the city centre, metropolitan and some town centres</p> <p>Introduce a more consistent approach to parking supply, pricing and management in different parts of Auckland</p> <p>Direct enforcement resources towards increased compliance to ensure fair and equitable access to parking.</p> <p>Enforcement activity will be prioritised in locations where there are safety concerns</p>		
Manage demand efficiently and safely	<p>Charges for on-street parking higher than for off-street parking in high demand centres</p> <p>Adopt a flexible responsive approach to parking supply and pricing within centres</p> <p>Manage spill-over demand in surrounding residential areas by introducing residential permit parking schemes</p>		
	<i>Area</i>	<i>On street</i>	<i>Off street</i>
	City centre	Gradually reduce supply as other demands on kerbside space increase	Continue to provide but shift emphasis to short-stay parking in locations connected to good PT & pedestrian circulation; phase out early bird & leased parking; eventually exit the commuter parking market.
	City fringe	Focus available kerbside space on short stay parking and resident permit parking where appropriate.	Consider the provision of off-street parking including shared parking to meet short-stay demand & avoid adverse effects, especially in heritage areas.
	Metropolitan centres	Gradually reduce kerbside parking as other demands for space increase. Focus on short-stay parking, especially close to core.	Provide off-street facilities where necessary to meet short-stay demand; enable off-street commuter parking in peripheral locations (possibly as a transitional use as centre develops)
	Town centres	Focus available kerbside space on short stay parking and resident parking where appropriate.	Consider the provision of off-street facilities where necessary to meet short-stay demand and/or address amenity or access issues.

	Arterial routes	Remove kerbside parking spaces where necessary to enable safe and efficient operation of the arterial road (including bus or transit lanes)	Consider the provision of off-street facilities where necessary to cater to short-stay demand displaced from kerbside spaces on the arterial, especially in commercial centres.	
Invest in new infrastructure, services and technologies	<p>In some circumstances, AT or Council investment in off-street parking will be considered where it is likely to:</p> <ul style="list-style-type: none"> <li>• fill a gap in demand that is not provided by the private sector</li> <li>• enable the more effective use of the road network by relocating parking activity to off-street locations</li> <li>• free up development sites and act as a catalyst to development by relocating existing parking activity into more appropriate locations</li> <li>• improve safety and amenity outcomes by enabling “shared parking” consolidating ancillary parking activity into a smaller number of well-designed and appropriately located facilities</li> <li>• be necessary to maintain the commercial viability of a centre in the short to medium term</li> <li>• enable AT to maintain sufficient market share to influence the parking market.</li> </ul>			
	Priority projects by decade:	1	2	3
	Complete comprehensive parking plans for the following centres: City centre, Takapuna, Manukau, Ponsonby, Newmarket, Papakura, Devonport, Otahuhu, Silverdale, Albany			
	Develop further parking plans for centres. Parking enforcement equipment & technology projects			

5.2 Park-and-ride facilities	
Intervention responses	Key future directions
Operate, maintain and renew infrastructure optimally	Optimise ‘whole of life cycle’ asset management
Make better use of networks	<p>Ensure that park-and-ride is planned as an integral part of the regional public transport network, extends the customer base and enhances public transport patronage</p> <p>Identify potential catchment areas for park and ride beyond the walk-up catchments of the frequent service network with high potential for park and ride, based on assessed demand</p> <p>Ensure potential sites that are well located to intercept commuter trips in locations where they enable decongestion benefits</p> <p>Avoid park-and-ride in metropolitan and town centres except as part of a staged transition to other land uses</p> <p>Consider requiring a proportion of the parking spaces to be reserved for carpool users</p>
Manage demand efficiently	Where appropriate, introduce charges for park-and-ride facilities to manage demand and ensure that facilities complemented the wider public transport system, and integrate charges with public transport fares, using the <i>HOP card</i> where appropriate

and safely	Take account of fare boundaries in locating and pricing park-and-ride facilities			
Invest in new infrastructure, services and technologies	When determining priorities for investment in park and ride facilities, apply the criteria set out in the Regional Public Transport Plan.			
	Focus new park and ride facilities in outer areas where public transport facilities are limited, or to serve areas that are beyond the walk-up catchment of the frequent service network			
	Future park-and-ride sites will be developed to coincide with new public transport services but also be consistent with the implementation of wider parking policies in the area.			
	Priority projects by decade:	<b>1</b>	<b>2</b>	<b>3</b>
Build new park-and-ride sites: Silverdale Stage 1 & 2, Westgate and Drury (depends on electrification)				
Investigate existing park-and-ride sites for extensions: Papakura, Papatōetoe, Manurewa, Constellation, Glen Innes				
Investigate new park-and-ride sites: Botany Downs /Flatbush area, Glenfield area, Green Bay/Titirangi area, Highland Park area, Pukekohe, Mangere bridge area, Puhinui, Hobsonville, Triangle Road, dependent on adjacent new bus interchange				

## 6. Regional road safety

6. Regional road safety	
<b>Intervention responses</b>	<b>Key future directions</b> High-risk routes, intersections, road users and communities are prioritised for safety engineering, enforcement and education initiatives as part of the annual Road Safety Action Planning process, led by AT, NZ Police, NZTA, ACC and road user groups using a Safe System approach
Operate, maintain and renew infrastructure optimally	Safe System management of infrastructure on roads and roadsides Road safety enforcement, e.g. improved drink/driving enforcement Road and rail safety education programmes, e.g. young drivers Encourage safe transport practices and vehicles, e.g. fleet safety
Make better use of networks	Co-ordinate transport system safety with key partners using the quarterly road safety action planning process Use a Safe System approach to address gaps in the level of safety service across the transport network through the prioritisation of high-risk routes, intersections, road users and communities Minor safety improvements programme Safety around schools, town centres and activity places Safer speed management Crash reduction programme for high-risk routes and intersections Auckland Road Assessment Programme (KiwiRAP) and Road Safety Intelligence Provide advice for legislative safety improvements
Manage demand efficiently and safely	Provide transport users with relevant information to enable them to make safer transport choices Implement safety improvements to enable opportunities for cycling and walking in all road projects

	<p>Priority safety maintenance and improvement response at fatal crash sites</p> <p>Provide safety assessments for land-use planning and developments</p> <p>Ongoing behaviour change programmes: training, education and promotion and enforcement</p>
Invest in new infrastructure and technologies	<p>Safety demonstration programmes</p> <p>Major capital works safety improvements on arterial and local roads, State highway and motorway safety improvements</p> <p>Enforcement technology, e.g. safety and red-light cameras</p>

## 7. Regional environmental outcomes

7. Regional environmental outcomes	
<b>Intervention responses</b>	<p><b>Key future directions</b></p> <p>Measures to ensure the management of environmental impacts associated with the transport system are prioritised and linked to opportunities which achieve benefit and value for money and are integrated with the management and development of the transport system.</p>
Operate, maintain and renew infrastructure optimally	<p>Operate and maintain network assets to effectively contribute to environmental outcomes</p> <p>Ensure all contractors effectively and successfully contribute to positive environmental outcomes through management systems, policies and standards</p> <p>Monitor and manage compliance with consent conditions and other statutory requirements</p> <p>Incorporate appropriate environmental measures when renewing assets according to benefits and costs</p> <p>Enhance the process to close material loops including the incorporation of recycled materials and elimination of wastes</p> <p>Undertake a risk assessment of transport assets for climate change impacts</p>
Make better use of networks	<p>Coordinate a range of programmes of environmental enhancement of transport assets with AC, NZTA and other Network Operators to direct investment to achieve regional best environmental 'value for money' for investment</p> <p>Forward planning such as CMPs are done in collaboration with wider environmental forward planning such as Catchment Management Plans to exchange information and opportunities</p> <p>Develop a street light and energy use upgrade programme</p> <p>Measures to contribute to and influence improved air quality outcomes are undertaken</p> <p>Opportunities for enhancing biodiversity values and ecological function of the transport system are recognised, understood and prioritised.</p>
Manage demand efficiently and safely	<p>Provide transport users with information on the environmental effects of transport choices and utilise network's ability to influence transport users.</p> <p>Provide feedback on environmental impact assessments to improve integration of the transport system with land use development e.g. managing the impacts of transport demands by encouraging and supporting growth around public transport modes and corridors.</p>
Invest in new infrastructure and technologies	<p>New capital works projects are designed for whole of life value and are planned and delivered using organisational sustainable outcomes templates.</p> <p>Ensure code of practice guidelines incorporate appropriate environmental design measures, and that these are reviewed to ensure they are up to date, and best practice.</p>

	<p>Develop a programme for prioritised investment in storm water impact discharge reduction</p> <p>Identify and implement innovative environmental management demonstration projects where and when possible.</p> <p>Develop links with industry on procurement policy to support sustainability outcomes</p>
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Supporting technical information provides details of the intervention framework and the directional statements for the different networks.

#### 4.4 Concluding comments

The key points to emerge from the above prioritised investment programme are:

- Operating, maintaining and renewing assets will have first call on funding because this will minimise whole-of-life costs and, in the long term, accelerate delivery of the rest of the investment programme
- On-going investment in new infrastructure, services and technology will be required to meet the demands imposed by Auckland’s growth. However, the case for fully funding the priority projects in the Auckland Plan will be stronger if it can be demonstrated that the network has been optimised to obtain the best possible return from past and future investments
- Managing demand will reduce the need for new and expensive investment and this option needs to be considered carefully before adding new capacity
- The different elements of the plan (operating, maintaining, renewing, managing, and developing the system) will need to be coordinated with each other to produce an optimal investment profile
- The current view of the 30-year programme indicates a peak level of expenditure in the first decade which is above current levels. This supports the Mayor’s initiative to explore additional funding mechanisms that could be used to fund increased expenditure in addition to existing funding sources.

# Chapter 5: Programme Effectiveness

The effectiveness of the transport programme outlined in chapter 4 in achieving the targets of the Auckland Plan has been assessed. The assessment uses a number of performance measures to compare current network performance with expected network performance in 2041. Sensitivity tests are carried out using two levels of investment and three land use scenarios.

The assessment has not evaluated the effects of demand management strategies (e.g. road pricing, parking management, high-occupancy vehicle lanes) however; the benefits of implementing greater use of network and demand management measures are discussed. The Auckland Plan calls for investigation into demand management techniques and further work in this area is planned following the outcome of the Mayor’s collaborative initiative to explore new funding mechanisms.

## 5.1 Sensitivity testing

Sensitivity testing was undertaken to help identify the possible risks, consequences and different performance levels associated with the Fully Funded and Committed Funding investment scenarios. Results from the Reduced Funding scenario will be integrated into updated versions of the ITP and are expected to fall within the range of the Fully Funded and Committed Funding scenarios. The tests evaluated a range of performance indicators against the two investment scenarios and three land use scenarios, as shown in Table 5.1.

Land use scenario			Transport investment	
Scenario label	2041 Population	RUB development inside / outside	Fully funded	Committed funding
1	2.4 million	60% / 40%	≈ \$60 billion	≈ \$34 billion
2	2.4 million	75% / 25%	≈ \$60 billion	≈ \$34 billion
3	2.1 million	75% / 25%	≈ \$60 billion	≈ \$34 billion

Table 5.1: The land use scenarios and investment scenarios used for assessing transport programme performance to 2041

Note that, although the Auckland Plan’s horizon is to 2040, the projections that underpin the Plan are to 2041 in line with Statistics New Zealand timeframes

The three land use scenarios tested (1, 2, 3) provide differences in population<sup>6</sup> and spatial composition:

<sup>6</sup> Population forecasts taken from the Regional Land Transport Strategy 2010



- Scenario 1 approximates 2.4 million inhabitants in 2041 while development outside the rural urban boundary (RUB) increases to 40 per cent <sup>7</sup>
- Scenario 2 estimates approximately 2.4 million inhabitants in 2041 and the same 25 per cent of land developed outside the RUB
- Scenario 3 uses a medium growth assumption of approximately 2.1 million inhabitants in 2041 and 25 per cent of land developed outside the RUB.

The Fully Funded investment programme allows for expenditure of approximately \$60 billion, regardless of funding constraints. The Committed Funding investment scenario, costing \$34 billion, funds all committed projects to 2020, in addition to all maintenance, renewals and services expected through 2041. This scenario represents the minimum expenditure necessary to keep the current system and committed projects running but does not add any capacity through new capital investment. All scenarios extend out to 2041 to match the Auckland Plan’s 30-year scope.

## 5.2 Increase of transport system’s capacity

A key benefit of increased investment in the multi-modal transport system is that it will greatly improve the capacity and integration of the transport system, helping serve the long-term development growth of Auckland. An increase in capacity, and the associated improvements in levels of service, will provide viable multi-modal choice for more users and produce a more robust and resilient transport network.

Figure 5.1 shows the passenger kilometres of travel achieved across car, rail, ferry and bus modes. Demand for transport is expected to increase across all modes as Auckland grows.

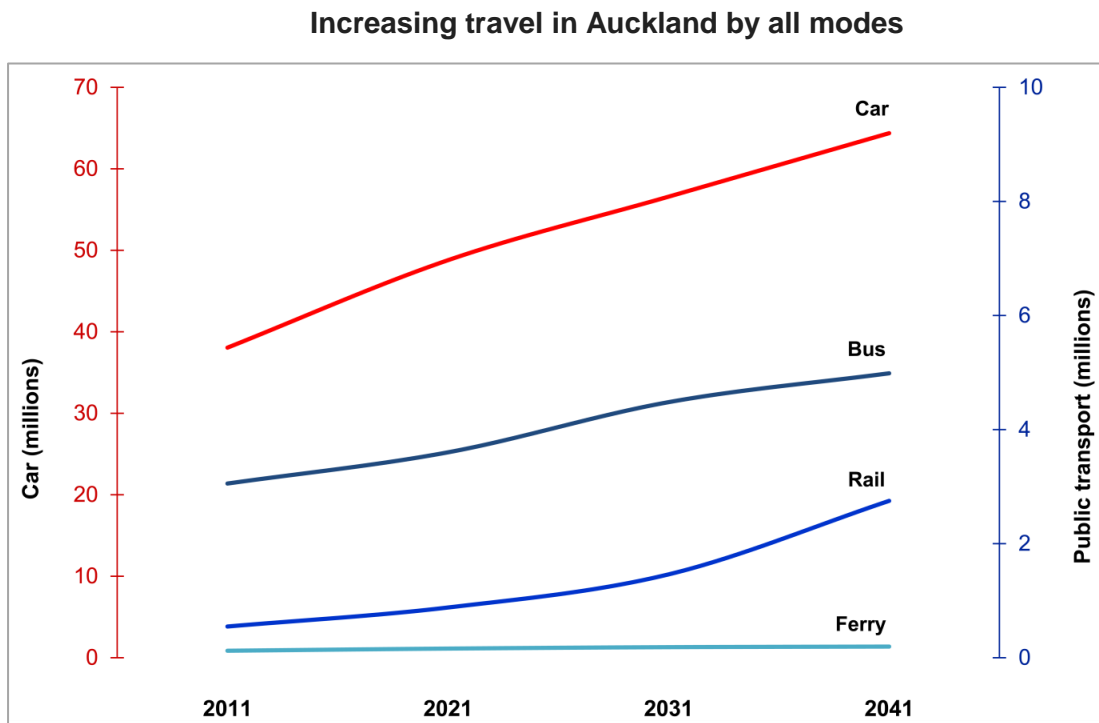


Figure 5.1: Passenger-km travelled via different modes

<sup>7</sup> Scenario 1 represents the Auckland Plan land use (RUB) scenario. Unless otherwise stated, Scenario 1 has been used in all assessments.

Figure 5.2 shows the expected increase in the public transport system’s capacity by seat kilometres serviced under different investment scenarios. It is clear that the increased investment, particularly the CRL, gives public transport the ability to carry far more people. These estimates are modelled and more detailed timetabling and service planning will be carried out closer to the time of implementation to optimise the efficiency and customer effectiveness of services. These operational adjustments could increase or reduce the number of seat kilometres as a result.

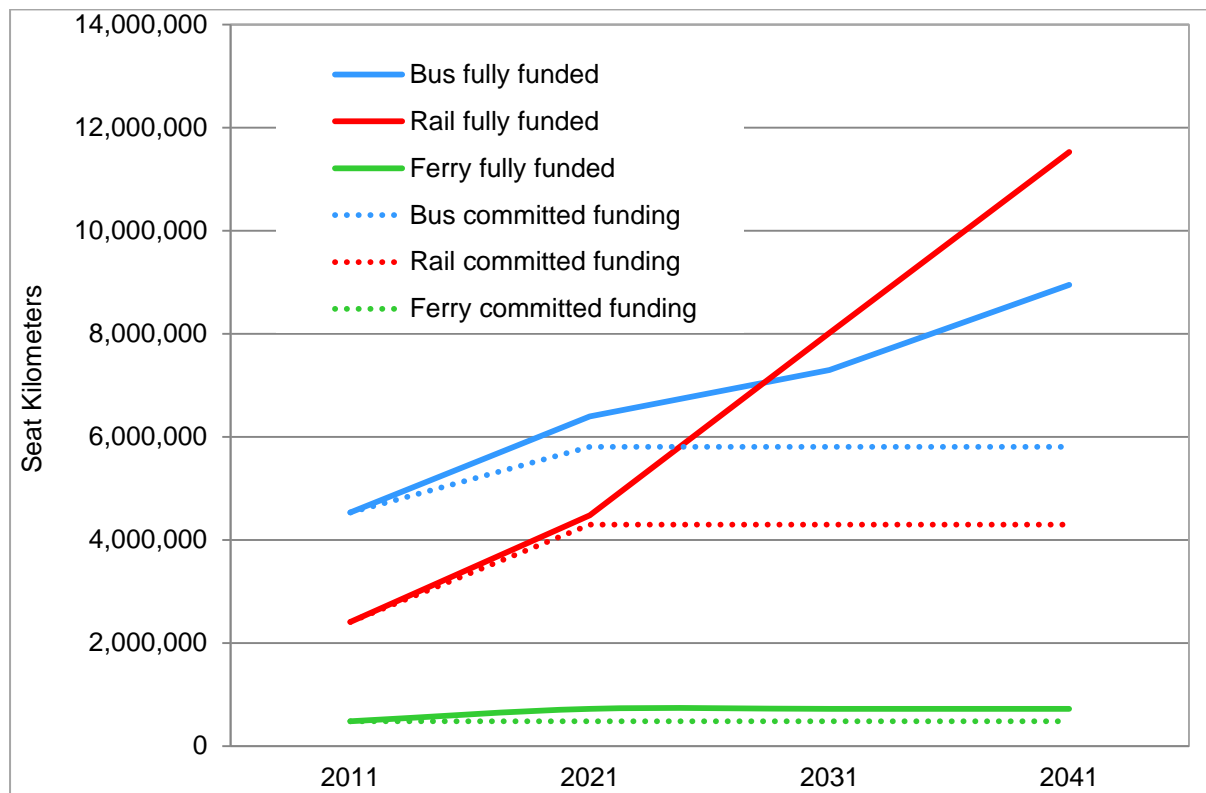


Figure 5.2: Public transport service capacities (seat kilometres) under different investment scenarios

Increasing the transport capacity across all modes ensures for the future:

- Resilience – having a more balanced transport system that can respond nimbly to events such as oil shocks, new transportation technology, or changes in travel patterns
- Adaptability for TDM – viable modal alternatives will be necessary if some users are priced off roads in order to improve road network efficiency. This is especially important for lower income users who are disproportionately affected by such policies
- A healthier city centre and economic anchor that will be necessary to achieve the employment densities required for a globally competitive service-based information economy. This is unlikely to be achieved without high capacity modes being available to access the city centre.

### 5.3 Performance indicators

The performance indicators selected enable the evaluation of the strategic performance of the transport system in a manner that is comprehensive, multi-modal, and as direct as possible.

The Auckland Plan’s transport chapter sets several aspirational targets. These are stretch targets that are expected to be achieved through innovation and developing policies throughout the next thirty years. Of those targets, the ITP forecasts or tracks the indicators shown in Table 5.2 below.

Performance against the public transport access target is not assessed here, but will be monitored and tracked, and reported in future ITPs.

**ITP indicators of Auckland Plan transport targets**

Indicator	Description	Target
Public transport boardings	Number of annual public transport boardings	140 million boardings by 2022
Public transport boardings per capita	Number of annual public transport boardings per capita	100 boardings per capita by 2040
Public transport morning peak motorised mode share	Proportion of morning peak motorised trips (PT & Auto) into the CBD by public transport	70% of all motorised trips by 2040
Walking, cycling, and public transport morning peak mode share	Proportion of morning peak trips that are made by walking, cycling, or public transport	45% by 2040
Road casualties	Number of fatal & serious road crash injuries	Fewer than 410 fatal and serious injuries by 2020
*Strategic freight route mobility	Average daily speed and delay per kilometre on strategic freight network	Ave. daily speed of 45 kph and ave. delay of 32 sec per km by 2021
*Public transport access	Proportion of people living within walking distance of frequent public transport stops	32% by 2040
Greenhouse gas emissions	Greenhouse gas emissions from ground based transport	49% reduction based on 2009 levels by 2040

*Table 5.2: ITP indicators of Auckland Plan transport targets*

In addition to the Auckland Plan’s transport targets, the ITP has developed indicators that relate back to the transport impacts sought in Chapter 1:

1. Better use of transport resources to maximise return on existing assets
2. Auckland’s transport system moves people and goods efficiently
3. Increased access to a wider range of transport choices
4. Improved safety of Auckland’s transport system
5. Reduced adverse environmental effects from Auckland’s transport system
6. Auckland’s transport system effectively connects communities and provides for Auckland’s compact urban form.

The following list links the ITP’s strategic indicators to these six transport impacts<sup>8</sup>. These linkages are still being peer reviewed and are subject to moderation. Some of the indicators are forecast into the future and others are monitored and tracked through time to produce trend evidence. They are discussed in supporting technical information.

Indicator	Description	Impact					
		1	2	3	4	5	6
Mode share	Proportion of trips, trip legs, and kilometres travelled undertaken by car, public transport or active modes in Auckland			•	•	•	
People's access to jobs	Number and per cent of jobs accessible to households within 30 and 60 mins by car and public transport		•	•			•
Roadway congestion on QTN where buses mix in traffic	Per cent of VKT operating at LoS E or F during morning peak where buses mix in traffic on the QTN	•	•			•	
Strategic freight network congestion	Per cent of VKT that roads on the strategic freight network operate at LoS E or F	•	•			•	
Strategic freight node mobility	Average travel times among key freight nodes		•				
Transport delay	Annual excess delay (LoS E or worse) per capita	•	•			•	
Transport casualties	Total fatal & serious road crash injuries per capita		•	•	•		
CO2 emissions	CO2 emissions from road (total & per capita)					•	
Fossil fuel energy consumption	Total & per capita litres of petrol & diesel sold for transport use	•				•	
Air quality	NOX & PM emissions from transport					•	

Table 5.3: Other ITP performance indicators

Additionally, to evaluate the transport system holistically, further indicators have been identified for research. These indicators are listed in supporting technical information and will bring added value and context to the current set, making them more balanced and well-rounded. The majority are not yet sufficiently developed or lack the data collection methods necessary for evaluation. The next steps in developing the ITP will investigate the feasibility of developing these indicators.

#### 5.4 Assessed performance against Auckland Plan indicators

The models used to assess performance in their current form have a tendency to overestimate public transport use when public transport demand exceeds capacity. This is not the case for the Fully Funded scenario but applies in some instances to the Committed Funding scenario. Additional analysis has been undertaken to produce realistic estimates for the public transport boardings target as shown in Figure 5.3 below, but not for the other targets.

<sup>8</sup> The transport impacts are described in Figure 1.11: The ITP outcomes framework

As a result, the analysis below generally underestimates the effectiveness of the Fully Funded scenario compared with the Committed Funding scenario (except for public transport boardings).

Refinement of the models is being undertaken to enable improved assessments to be reported in future ITPs.

### Public transport boardings

*Expected outcome:* The expected numbers of public transport boardings for each land use and investment scenario are shown in Figure 5.3 below. It can be seen that boardings are expected to grow strongly under each scenario until 2021, reflecting the major improvements to public transport which are already committed. As expected, growth is slower with the slower population growth of land use scenario 3. After 2021, strong growth continues under the Fully Funded scenarios (albeit at a slightly slower rate than 2012 – 2021). Under the Committed Funding scenarios growth continues, but at a much slower rate.

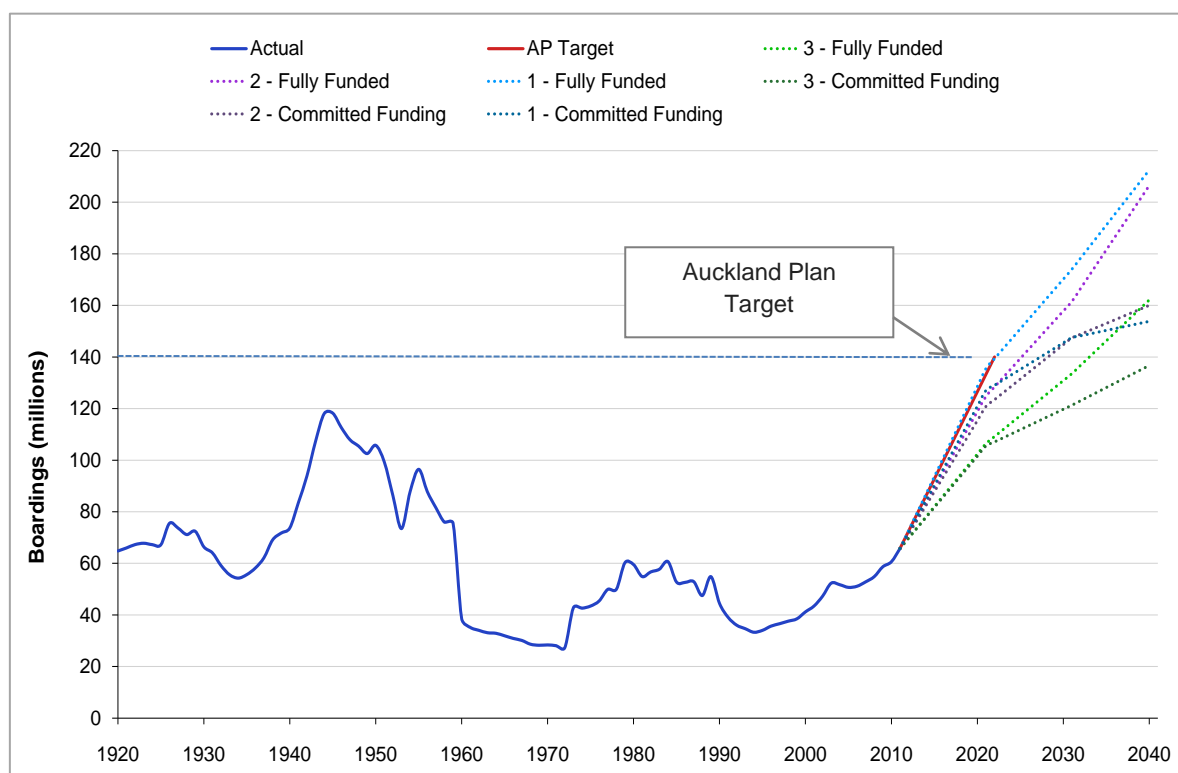


Figure 5.3: Estimated annual public transport boardings to 2040

Note that boardings are estimated from 2010 – 2022 using the Auckland Council Long Term Plan, while estimates from 2022 – 2040 come from the Auckland Regional Transport model.

#### Comparison with Auckland Plan Target:

The target is to double public transport boardings (from 70 million to 140 million) by 2022. Under the Fully Funded investment scenario this target is reached with land use scenario 1. Boardings double by 2025 with land use scenario 2 and by 2033 with land use scenario 3, illustrating the strong relationship between transport and land use.

In all land use scenarios, the Committed Funding scenarios fall well below the Auckland Plan target. The main difference in public transport boarding's between the fully funded and committed funding scenarios is primarily due to the difference in the level of public transport investment. The Fully Funded scenario assumes much higher investment in public transport infrastructure and services than the Committed Funding scenario, including completion of the CRL, rail to the Airport and the Avondale-Southdown line.

### Public transport morning peak City Centre motorised mode share

*Expected outcome:* Conventional modelling using the ART3 model estimates motorised mode splits of around 50% to 56% in 2040 as shown in Figure 5.4 below.

As discussed above, the modelling framework used for this assessment overestimates the use of public transport under the Committed Funding scenario and therefore underestimates the effectiveness of the Fully Funded scenario compared with the Committed Funding scenario.

*Comparison with Auckland Plan target:* The target is to increase public transport's share of motorised trips into the CBD during the morning peak from 47 per cent to 70 per cent by 2040.

Parking supply could account for the lower mode share of public transport into the city centre seen in the results below. There is some difficulty in accounting for parking supply in the city centre under the model used to test this target. In the testing environment, the main constraint to vehicles entering the city centre in the morning peak is the capacity of the roadways rather than the supply of parking. In reality, this is not likely to be the sole constraint as there are limitations to the physical amount of parking available in the city centre as well as the possibility that new parking management policies will be introduced.

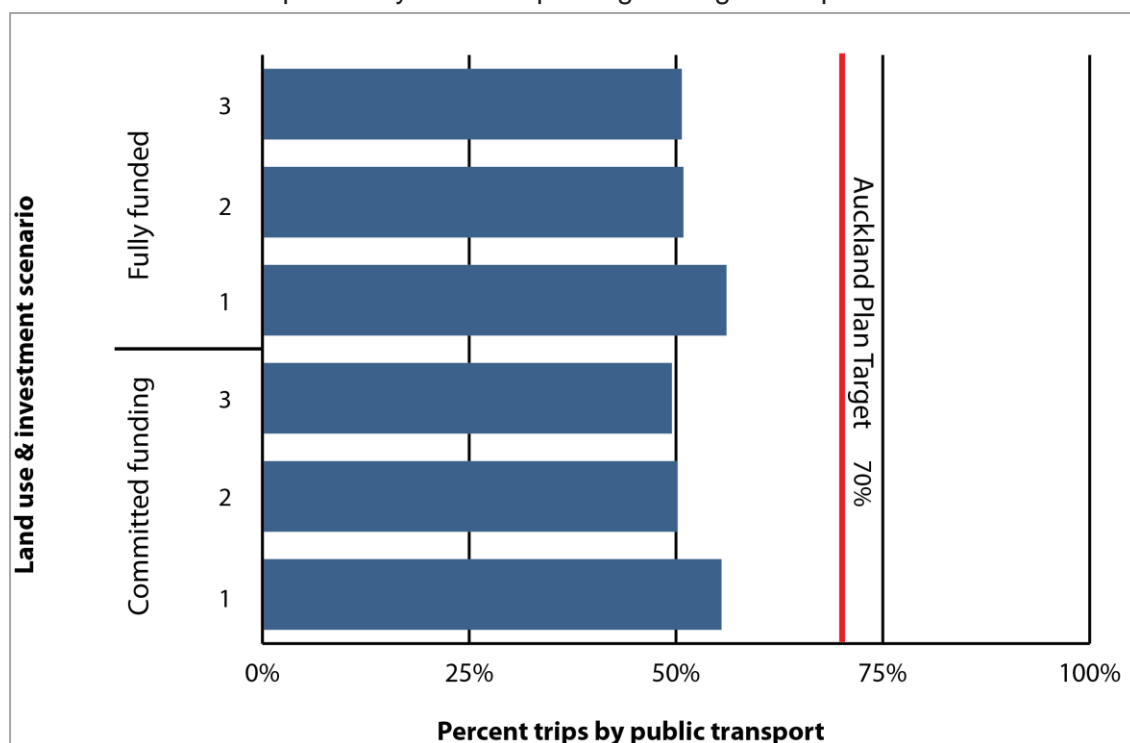


Figure 5.4: 2040 proportion of motorised trips into the city centre (public transport and vehicle) during the morning peak by public transport



The recently completed CCFAS used more sophisticated modelling techniques to estimate future travel patterns to the City Centre, but with a “medium growth” land use scenario. When tested with a transport network including the CRL, the outcome was an estimated mode split for motorised modes of around 58%, still less than the Auckland Plan target.

### **Auckland Plan target: Non car-based mode share**

*Expected outcome:* As shown in Figure 5.5, conventional modelling using the ART3 model mirrors 5.3 in that significant mode shifts to public transport and cycling and walking are seen in the first decade, followed by more moderate growth in the second and third decade. Estimates of morning peak non car based mode share range from 27% to 32%.

As discussed above, the modelling framework used for this assessment overestimates the use of public transport under the Committed Funding scenario and therefore underestimates the effectiveness of the Fully Funded scenario compared with the Committed Funding scenario.

### *Comparison with Auckland Plan target:*

The target is to increase the morning peak non car-based mode share (walking, cycling or public transport) from 23 per cent to 45 per cent by 2040. While more sophisticated modelling is expected to show greater increases in non car mode share, it is likely that they will still fall below target, and that to achieve greater shifts nearer to the Auckland Plan’s aspirational target, new policy levers such as demand management may be necessary.

### Morning peak non car-based mode share (walking, cycling, and public transport)

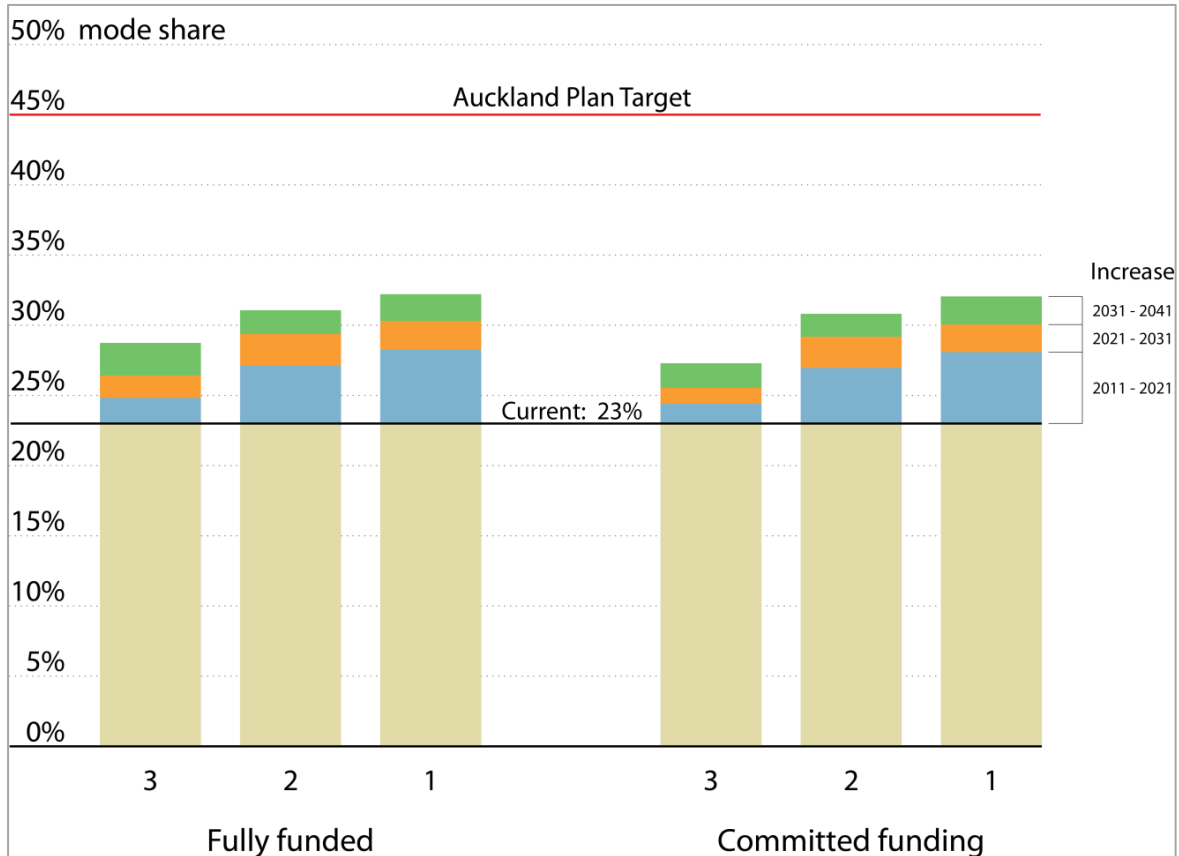


Figure 5.5: Walking, cycling, and public transport morning peak mode share

### Auckland Plan target: Road crash fatalities and serious injuries

*Expected outcome:* Figure 5.6 shows the fatal and serious injury (FSI) figures dating from 2001 to 2010. There has been a 17 per cent reduction in total FSI since 2001 and a 30 per cent reduction per capita.

By far the largest user group involved in FSI crashes is the light vehicle category, at roughly two thirds of all FSIs. The overall reductions in total FSI are mainly accounted for by reductions in light vehicle and pedestrian crashes while the bicycle, heavy vehicle and bus FSI figures have remained mostly constant. Motorcycle FSIs have slightly increased.

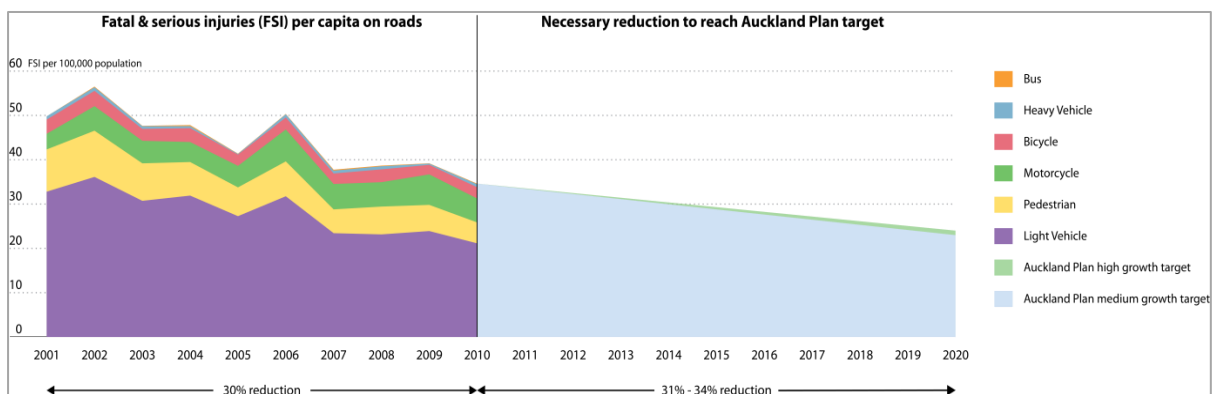


Figure 5.6: Fatal and serious injuries on Auckland's roads

It is expected that a series of on-going initiatives will be implemented ranging across engineering, enforcement and education, and including regulatory changes, and that this will result in a continuation of the trend.

*Comparison with Auckland Plan target:*

The target is to reduce road crash fatal and serious injuries from 506 in 2010 to no more than 410 by 2020.

Improvements to the road network and mode shifts to public transport, walking and cycling will be important, but on their own will be insufficient to achieve the target. New engineering, enforcement and education initiatives will need to be implemented at approximately the same rate as over the last 10 years for the target to be reached. Provisional results for 2011 show that FSIs reduced from 506 in 2010 to 447, which is already ahead of the interim 2015 target of 451.

**Strategic freight network congestion**

*Expected outcome:* Infrastructure improvements will result in increased capacity on the road network but the planned growth in capacity is less than the expected increase in vehicle use due to population and economic growth. This increase in capacity will alleviate the growth in congestion but without other measures congestion would still be expected to increase generally across the network, although there would be some improvement on parts of the network.

The levels of congestion that would be expected to occur if only infrastructure improvements are implemented are shown in Figure 5.7 for the network as a whole and in Figure 5.8 for the regional freight network. While in this situation congestion would be expected to grow, the fully funded scenario shows less congestion than the committed programme. A feature of Figures 5.7 and 5.8 is that interpeak congestion is expected to grow faster than peak congestion, and in 2041 interpeak congestion may exceed peak congestion. As noted earlier, the modelling approach used in this analysis has a tendency to overestimate public transport usage for the Committed Funding scenario, and therefore has a tendency to underestimate the amount of congestion that would occur under Committed Funding.

**Excess road congestion<sup>9</sup>: Current to 2040**

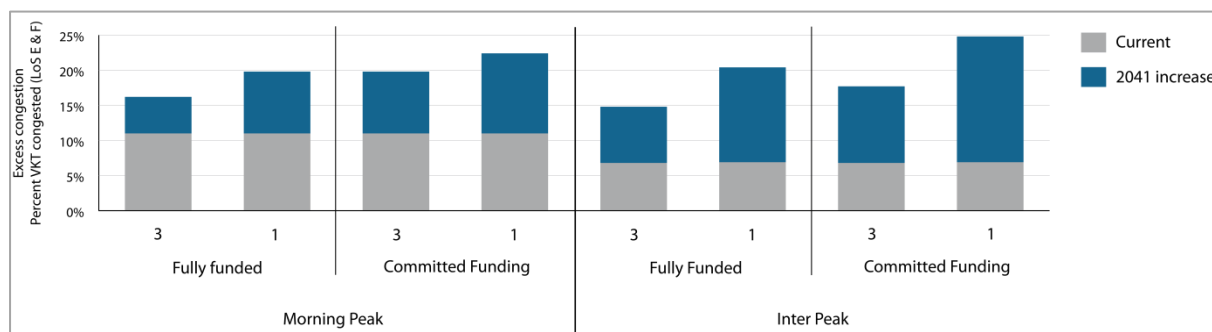


Figure 5.7: Road congestion to 2040

<sup>9</sup> Excess congestion refers to a road performing at levels of service E or F – ie at the following speeds or below:

- 67 kph for motorways, expressways, and rural arterials (outside of towns)
- 25 kph on all other roads.

## Strategic freight network excess congestion: Current to 2040

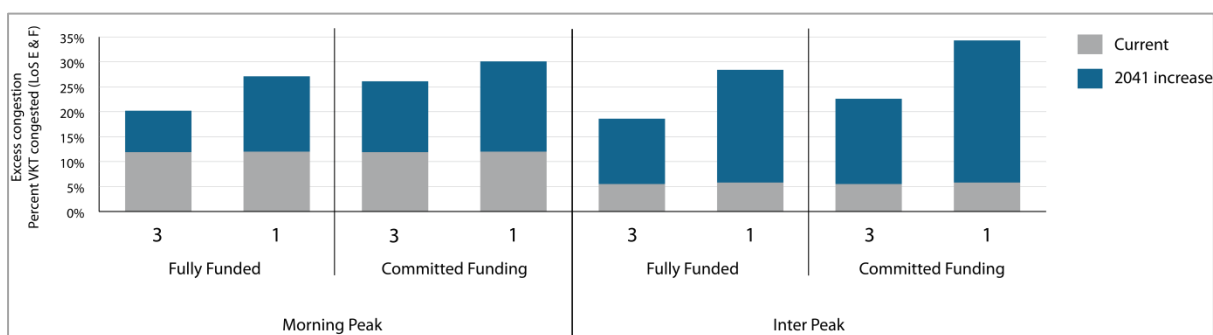


Figure 5.8: Strategic freight network congestion to 2040

In addition to these infrastructure improvements included above, there will be improvements to the operation of the network arising from application of the One System approach. Stages 2 and 3 in particular – “Make better use of networks” and “Manage demand efficiently and safely”, will reduce congestion through operational improvements. The technique of assigning priority to different types of movement and to “place” on different elements of the network will also see congestion reduction targeted at particular parts of the network – such as the regional freight network - while congestion on the network as a whole may increase.

### Comparison with Auckland Plan target:

The target is to reduce congestion levels for vehicles on the strategic freight network to, at or below, the average of 2006-2009 levels by 2021.

Implementing the network improvements in the Fully Funded scenario will assist by removing bottlenecks and providing some additional capacity, but on its own will not keep up with additional demand generated by the expected population growth. Achieving the target will involve using the One System approach to deliver operational improvements that will provide additional congestion relief, with a focus on the strategic freight network.

### Auckland Plan target: Greenhouse gas emissions

*Expected outcome:* Transport’s total contribution to GHG emissions is approximately 40 per cent, while road transport contributes approximately 35 per cent.

As discussed above with regard to road safety and congestion, road network improvements and mode shifts to walking, cycling and public transport will be important, but they will not be sufficient on their own to keep pace with the growth in population. Both investment scenarios (fully funded and committed funding), and all three land use scenarios (1, 2, 3) show the amount of vehicle travel increasing by 2040, with the increase for the Fully Funded scenario being less than for the Committed Funding scenario.

It is expected that Greenhouse gases will reduce by 2041 but as a result of changes in fuel technology and engine efficiency, rather than through reductions in vehicle travel.

### *Comparison with Auckland Plan target.*

The target is to reduce greenhouse gas emissions (GHG) to 49 per cent of their 2009 levels by 2040.<sup>10</sup>

The measures described in the ITP will assist in reducing the growth in Greenhouse gases but reaching the target will require measures outside the scope of this programme, including changes in fuel technology and engine efficiency.

AC is currently developing the Energy and Climate Change Mitigation Strategy, which relies on increases in the use of electric vehicles, biofuel consumption and road pricing to achieve the target. The ITP will be reviewed in response to the Strategy.

## **5.5 Accessibility**

The effect of different levels of investment and land use scenarios can also be shown as changes in accessibility - the ease with which activities, whether economic or social, can be accessed. The following discussion looks at changes in accessibility between households and jobs, but similar analysis could be undertaken into accessibility for other types of trips.

Figure 5.9 shows the total number of jobs accessible to households in Auckland by public transport (PT) and private vehicle/car (PV) within thresholds of 15, 30, 45, and 60 minutes travel time during the morning peak period, for each of the land use and funding scenarios.

For each travel time threshold, for each land use scenario, and for both private vehicles and public transport, the Fully Funded programme provides access to more jobs than are accessible under Committed Funding. For example, for land use scenario 1 the number of jobs accessible by private vehicles within 45 minutes (sometimes regarded as an upper limit of commuting time) is around 25% greater under the Fully Funded scenario than under the Committed Funding scenario. As noted earlier, the modelling framework used to assess the programme tends to underestimate the benefits of the Fully Funded scenario compared with the Committed Funding scenario.

The improvement in accessibility under land use scenario 1 is greater than that for land use scenario 3, suggesting that part of the improvement in accessibility is due to the greater number of jobs and higher density of jobs in 2041 compared with the current situation for each of the scenarios.

Figure 5.9 also shows that more jobs can be accessed by private vehicle than by public transport, and that this difference is more marked for shorter trips (particularly for jobs within 15 minutes travel time) than for longer trips. This is because the walking, loading and unloading components make public transport less competitive for very short trips, and because for many trips around the region private vehicles can take a more direct trip, without the need to stop for additional passengers, than private vehicles. In situations where public transport can avoid congested roads, particularly when serving large job locations such as the City Centre, accessibility by public transport can overcome these disadvantages and public transport accessibility can be greater than private vehicle accessibility.

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<sup>10</sup> This is the equivalent figure, based on 2009 levels, to the Auckland Plan target for a 40% reduction in CO<sub>2</sub> emissions based on 1990 levels by 2040

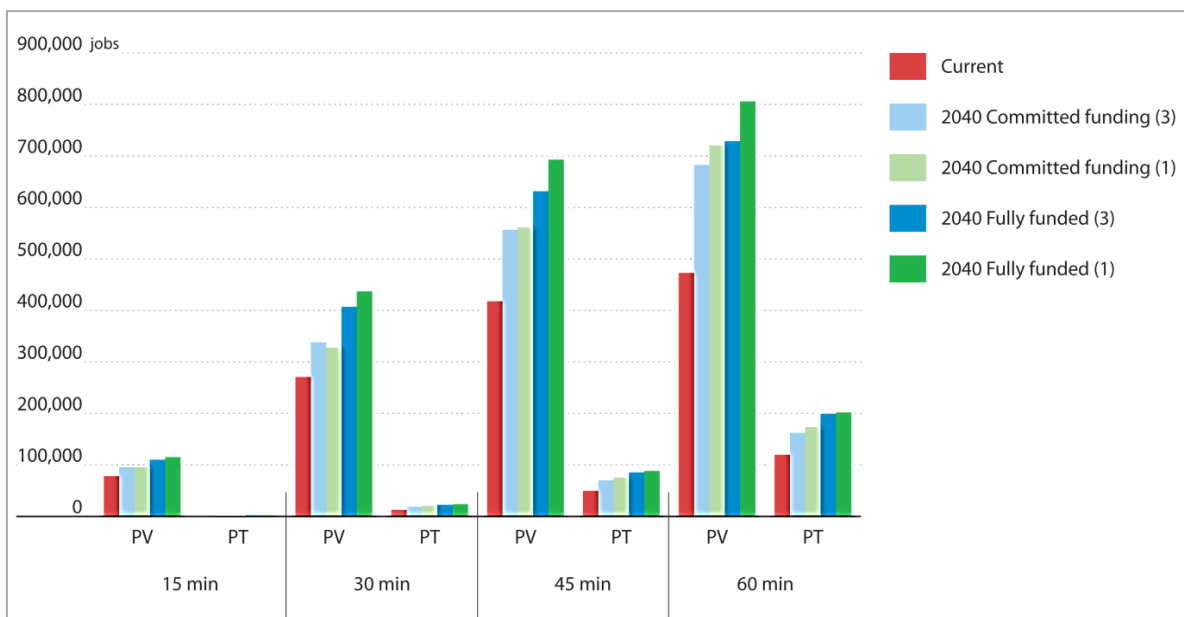


Figure 5.9: Number of jobs accessible to households by private vehicle and public transport

While the accessibility of jobs (and other opportunities) will increase because of the higher density of jobs, accessibility generally around the region will decrease as a result of the expected increase in congestion – the number of jobs within a specified travel time will increase, but the proportion of all jobs in the region within that travel time will decrease. This means that specialised activities (such as the airport or very specialised jobs) which are located at only one place, or a small number of places, will become less accessible. People or businesses which rely on these specialised activities will need to locate closer to maintain accessibility.

Supporting technical information contains a set of 36 maps showing the spatial relationships for accessibility of households to jobs, broken down by census meshblock.

## 5.6 Performance of key indicators

Table 5.3 predicts how the Fully Funded and Committed funding transport investment scenarios will achieve the Auckland Plan targets and outcomes, compared to current performance. The Fully Funded transport investment performs well for passenger transport and people’s access to jobs but congestion and emission levels worsen. The Committed Funding investment performs less well, on the same indicators.



Indicator	Description	Current	Full funding	Committed funding
Public transport boardings	Number of annual public transport boardings (millions)	70 million	2022: 140.4 million	2022: 103 million
Public transport boardings per capita	Number of annual public transport boardings per capita	44	84	66
Public transport morning peak motorised mode share	Proportion of morning peak motorised trips (PT & Auto) into the CBD by public transport	47%	56.1%	55.5%
Walking, cycling, and public transport morning peak mode share	Proportion of morning peak trips that are made by walking, cycling, or public transport	23%	32.2%	31.0%
Greenhouse gas emissions	Greenhouse gas emissions from ground based transport	2009 base (0%)	17% increase	21% increase
People's access to jobs	Number of jobs (000s) accessible to households within 30 travel time by car	280	450	320
People's access to jobs	Number of jobs (000s) accessible to households within 60 mins travel time by public transport	100	200	170
Roadway congestion on QTN where buses mix in traffic	Per cent of VKT operating at LoS E or F during morning peak where buses mix in traffic on the QTN	17.6%	2041: 8.4%	2041: 10.5%
Strategic freight network congestion	Per cent of VKT that roads on the strategic freight network operate at LoS E or F	12.0% AM 5.8% IP	2041: 27.1% AM 2041: 28.4% IP	2041: 30.1% AM 2041: 34.2% IP
Transport delay	Annual excess delay (LoS E or worse) per capita	7%	2041: 34.0%	2041: 45.2%

KEY	Improved
	Slight Improvement
	Worse
	Significantly worse

Table 5.4: Fully Funded and Committed Funding predictions for Auckland Plan Targets

Key performance results include:

- The preferred Fully Funded scenario meets the Auckland Plan target for public transport boardings by 2022, while the Committed Funding version falls well below the target.
- Congestion on the strategic road freight network and for the road network in general, is forecast to worsen significantly for both the Fully Funded and Committed Funding scenarios, especially in the second and third decades. Of particular concern is the growth in congestion for the inter-peak period which will impact on freight.
- Accessibility of households to jobs across the region as a whole improves over the 30-year period. However, increased congestion means the distance household members can travel to work within a given time will on average be less than it is now. (There is no specific Auckland Plan target on accessibility.)
- The modelling suggests CO<sub>2</sub> emissions will increase significantly for the higher growth scenarios and have nil or small percentage increases for the medium growth assumption.

In the first decade of the 30-year period, the Fully Funded investment scenario results in service performance generally improving, even with Auckland's predicted growth. In the

second and third decades, however, the improvements of the first decade are threatened by the growth in road congestion and the unreliability this will bring for people, goods and services using the road network.

## 5.7 Managing demand and optimising the transport networks

Obtaining the full benefits of the investment programme will progressively require greater use of network and demand management. These measures can only be successfully introduced when people and businesses have access to realistic transport choices. Such choices depend on delivering integrated infrastructure, and improvements to public transport and rail freight services in the first decade. Given the long lead times involved, planning for this comprehensive suite of interventions needs to start in the first decade alongside completing strategic road, public transport and active mode networks. This is illustrated in Figure 5.10

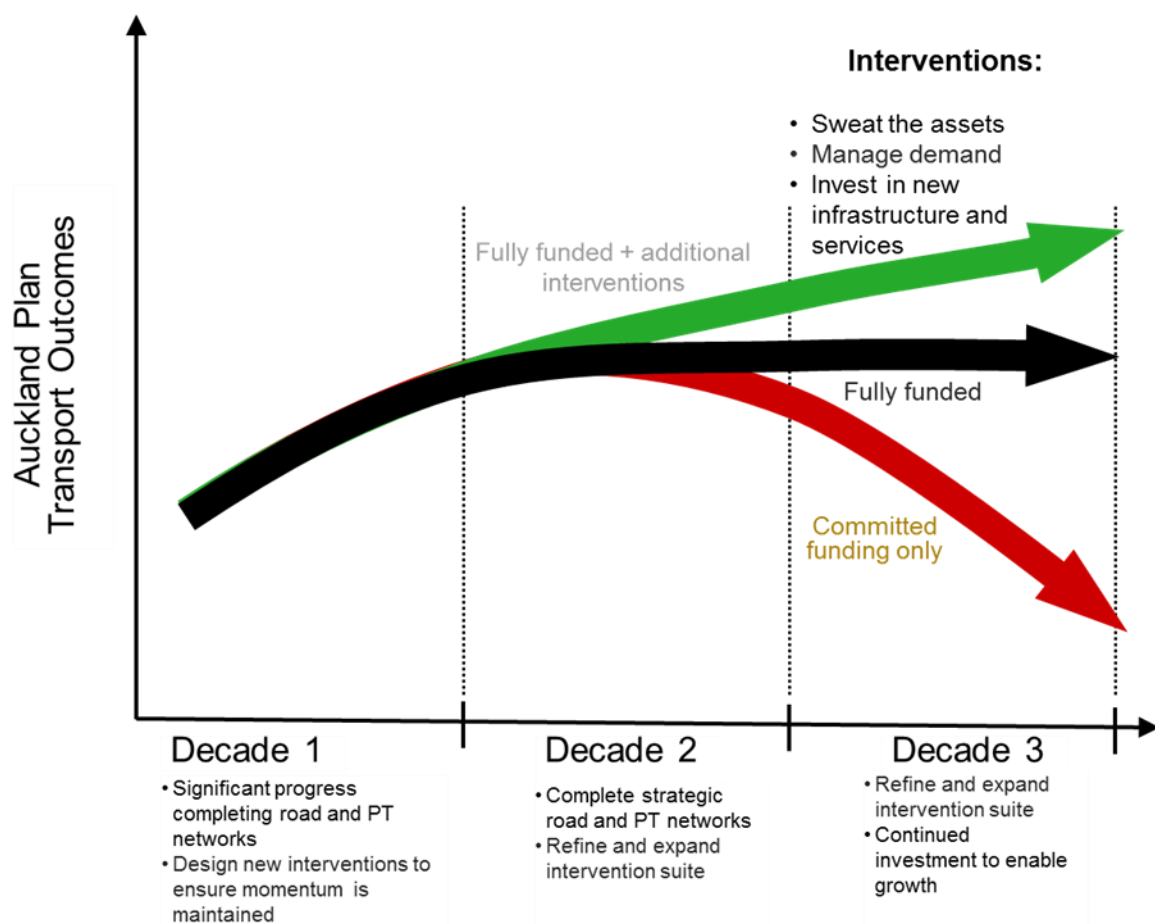


Figure 5.10: The benefits of additional interventions

A further benefit of progressively optimising the networks and actively managing demand is that the return on investment will increase over the three decades as network productivity rises and unit operating costs fall.

## 5.8 Concluding comments

The findings from this chapter clearly demonstrate that increased transport investment plays a significant role in achieving the LoS and transport performance sought in the Auckland Plan. In the face of growing demand over the next 30 years, reduced investment would hamper efforts to keep pace with future growth and lead to potentially higher costs in the future.

Chapter 6 discusses the implications of these results, highlighting the argument for why the Fully Funded programme is necessary but still not sufficient to fully deliver the vision, transport outcomes and targets over the second and third decades of the Auckland Plan. It also highlights the role that demand management measures – as included in the Auckland Plan – may play to close the gap on the transport outcomes and aspirational targets that have been outlined in this chapter. These mechanisms are being investigated with the Mayor’s collaborative initiative to explore new funding mechanisms.

The results are also discussed in relation to how the One System network optimisation process, described in chapter 3, will progressively lead to the system being operated and used in a way that delivers transport impacts consistent with the Auckland Plan outcomes and central government policy.

# Chapter 6: Conclusions and next steps

Conclusions about the investment choices and consequences for implementing the transport programme in response to the Auckland Plan and the government's wider transport policies are outlined below. Further work that will be carried out in updating the ITP in the future is also described.

## 6.1 Investment choices

As explained in Chapter 4, two investment scenarios – Fully Funded (100 per cent) and Committed Funding (57 per cent) – have been developed using the four-stage intervention process:

Stage one: operate, maintain and renew infrastructure optimally

Stage two: make better use of networks

Stage three: manage demand efficiently and safely

Stage four: invest in new infrastructure, services and technology.

Investment in all four intervention stages across all transport modes is needed in order to deliver a system that gives an optimal return on investment and effectively caters for the city's anticipated growth in population to 2041. The four intervention stages interrelate and need to be progressed simultaneously from the first decade of the Auckland Plan.

Investment in the capacity of the road and public transport networks need to be co-ordinated so that increased demand management can be successfully implemented in later years as demand for transport increases. The fully funded One System investment programme is essential but not sufficient to fully deliver the Auckland Plan's vision, transport outcomes and targets without the addition of further demand management measures. Such measures will only be feasible when a wider range of realistic travel choices is enabled by the more integrated system with enhanced capacity that results from the Fully Funded investment programme.

## 6.2 Investment consequences

The consequences of varying levels of investment for a range of growth and land-use development assumptions are discussed below in relation to the six impact statements set out at the end of Chapter 1:

- Improved safety of Auckland's transport system
- Auckland's transport system effectively connects communities and provides for Auckland's compact urban form
- Increased access to a wider range of transport mode choices
- Auckland's road network moves people and goods efficiently
- Reduced adverse environmental effects from Auckland's transport system
- Better use of transport resources to maximise return on existing assets.

## **Improved safety of Auckland's transport system**

Based on historical trends, the Auckland Plan's targeted 31-34 per cent reduction in fatal and serious injuries per capita by 2020 appears to be challenging but achievable, although this has not been specifically modelled in developing the ITP. This conclusion assumes:

- The road safety enforcement and other interventions set out in the Regional Road Safety Plan are fully implemented to manage road safety risks in line with the targeted trend
- Road safety outcomes are fully integrated into the methodology for optimising transport networks under the One System approach described in chapter 3.

To deliver the required improvements in road safety, the transport programme will therefore need to include the road safety interventions in the Regional Road Safety Plan, particularly at stages two and three of the four-stage intervention process.

## **Auckland's transport system effectively connects communities and provides for Auckland's compact urban form**

Accessibility of households to jobs across the region as a whole improves over the 30-year period in terms of the *number* of jobs that households can access within a given time period. This is true for all the investment and growth scenarios assessed, and is due primarily to the growth in employment opportunities for the average household outstripping the increased time it takes to reach the jobs on the congested road network.

However, the size of the geographical area a household can access within a given time will on average be less than it is currently and this means the *proportion* of Auckland's jobs that an individual household can access in a given time period declines. This finding is particularly important for households travelling to places of work or study in the central business district, at the airport and at major hospitals and educational institutions. The reduction in the proportion of accessible jobs is significantly moderated by fully funding the investment programme.

To sustain acceptable levels of accessibility over the 30-year plan period will therefore require substantial investment in all transport modes, particularly at stages two and four of the intervention process.

## **Increased access to a wider range of transport mode choices**

Implementation of the Fully Funded investment scenario increases the range of transport options, by increasing both capacity and use of public transport services as well as improving the safety and convenience of walking and cycling facilities. Under the Fully Funded investment scenario the improvement in transport choices is significantly more than for the Committed Funding scenario.

Increased access to a wider range of transport mode choices is critical to improving the resilience and adaptability of the transport system as transport demand grows and the road network comes under increasing pressure. It is particularly important to facilitating the economic development of the city centre and the airport precinct as capacity of the road network approaches its limit.

To achieve this impact will therefore require the transport programme to include substantial investment at stages two and four of the intervention process, particularly in relation to investments in public transport and active modes.

### **Auckland's road network moves people and goods efficiently**

Congestion on the strategic road freight network and for the road network in general, is forecast to worsen significantly for peak and inter-peak periods especially in the second and third decades. Of particular concern is the growth in congestion for the inter-peak period. While the trend of increasing congestion is moderated significantly by fully funding the investment programme, the Auckland Plan's target of reduced freight congestion in peak periods by 20 per cent by 2041 is not achieved for any of the scenarios assessed.

The reason for the increase in Auckland's congestion is that the growth in transport demand outstrips the increase in road capacity, even with the Fully Funded investment programme. This occurs despite the significant increase in the use of public transport and other ways of travelling, such as walking and cycling.

To tackle this problem will require much greater emphasis on actively managing the networks to achieve optimal movement of people and goods safely and efficiently. For example:

- Road network use will need to be prioritised to increase the productivity of the network, for example by introducing more freight and transit lanes
- Stronger transport demand management will be needed to reduce congestion on the road network, for example by encouraging more use of the improved public transport system and walking and cycling facilities.

Careful trade-offs will be required to optimise the network to achieve balanced outcomes. This is likely to be particularly challenging during the inter-peak period because of the limited scope to extend clearway restrictions when delivery vehicles need access to business premises in the inter-peak period. The One System approach will play a crucial role in achieving an appropriate balance, enabling network providers to work collaboratively with users and affected communities to manage their networks so they meet national, regional and local needs.

To achieve this impact will therefore require the transport programme to include balanced investment at stages two, three and four of the intervention process.

### **Reduced adverse environmental effects from Auckland's transport system**

The modelling suggests CO<sub>2</sub> emissions will rise significantly for the higher growth scenarios and have nil or small percentage increases for the medium growth assumption. The Auckland Plan 2041 target of a 49 per cent reduction in greenhouse gas emissions levels compared to 2009 is not achieved on any of the investment and growth scenarios tested. While greater use of public transport, more walking and cycling and car sharing will assist in achieving the target, against a background of the majority of emissions coming from private vehicles, substantial progress will be reliant on focussed strategy, review of land-use scenarios, changes in vehicle energy efficiency in and above what is already assumed, such as the widespread use of electric vehicles that can be re-charged using electricity generated from renewable energy sources.



To achieve this impact will therefore require the transport programme to include substantial investment at stages two and three of the intervention process, particularly in relation to better management of networks and travel demand (including pricing) to reduce congestion and encourage people to make more sustainable travel choices. Auckland Council is currently developing the Energy and Climate Change Mitigation Strategy, which relies on increases in the use of electric vehicles, biofuel consumption and road pricing to achieve the target. The ITP will be reviewed in response to the Strategy.

### **Better use of transport resources to maximise return on existing assets**

In the first decade of the 30-year period, the fully funded investment scenario results in service performance generally improving, even with Auckland's predicted growth. This is especially so in relation to safety, accessibility of households to jobs and choice of transport mode. The improving system performance is a result of the significant investment in the first decade of the ITP, building on investments in the previous decade to further develop the strategic road and public transport networks.

In the second and third decades, however, the improvements of the first decade are threatened by the growth of road congestion and the unreliability this will bring for people, goods and services using the road network. While existing network assets will be more productive in handling the movement of more people and freight, the LoS in terms of journey time reliability by road will be worse than it is today. Overloading the road network in this way will certainly not maximise the return on existing (or new) investments.

Expanding the capacity of public transport responds to this challenge by encouraging car users to transfer to public transport or walking and cycling, so reducing the pressure on the road network and increasing the flexibility and resilience of the transport system overall. The Northern Busway demonstrates that this can be a cost effective response where public transport offers a competitive journey time. Investing in public transport also benefits people who rely on it either because they do not have access to a car or are deterred from using a car because of increasing energy and other costs. However, as explained above, to realise the full benefits of this approach will require additional interventions to actively manage networks and demand.

To achieve this impact will therefore require the transport programme to include carefully phased investment at stages two, three and four of the intervention process, particularly in relation to completing the road and public transport networks and then managing them effectively and efficiently.

## **6.3 Implications for developing the ITP**

Synchronising transport investment with land development will be crucial in supporting the rapid growth and development of Auckland in the moderately compact form proposed in the Auckland Plan over the next 30 years. Accordingly, the Fully Funded investment programme developed for this ITP includes substantial road *and* public transport investments linked to the anticipated land-use development. To deliver this level of investment will require additional funding over and above the currently projected levels.

Despite this enhanced investment, the net effect of the scenarios tested is that peak and inter-peak road congestion increases substantially in the second and third decades, and

network efficiency declines on current policy settings. The main reason is that, for most journeys, travelling by car remains more attractive than public transport in terms of convenience and the end-to-end journey times, despite the increase in road congestion. These individual transport decisions to travel by car (often as single occupant vehicles) imposes costs on other users, particularly the time penalties and increased operating costs for high-value network users such as freight and other commercial vehicles and buses, as well as environmental costs. When these costs are taken into account, greater use of demand management measures is likely to be economically justified as it will encourage some car users to transfer to public transport who would otherwise not do so, freeing up the road network so it can operate more efficiently and productively, and with greater resilience, and lower environmental impact. This shift will produce benefits for the Auckland and national economies.

However, it will be important to ensure realistic and attractive public transport options are available to accommodate car users who transfer to public transport. Demand management measures can have disproportionate impacts on transport users who do not have access to practicable alternatives to using the car. For example, transport users who are “priced-off” the road network will be worse off as a result unless convenient and affordable public transport services are available to meet their transport needs.

One way to achieve a reasonable balance between overall economic efficiency and disproportionate impacts on different users is to use some of the revenue from the pricing mechanism to fund public transport infrastructure improvements and to support operational subsidies.

#### **6.4 Next steps in developing the ITP**

To achieve the outcomes sought from the transport programme, a careful balance is needed combining the following interventions:

1. Investment in road and rail networks that support land development and network optimisation, where this can be implemented economically and efficiently
2. Investment in enhanced public transport services and better facilities for walking and cycling. This will relieve pressure on the road network; ensure that an alternative choice is available for users; improve accessibility for those who do not have a car or are not able to use one; and improve the overall resilience of the transport system
3. Network demand management measures such as greater use of bus priority lanes (for instance, on motorways) to optimise networks and encourage travel behaviour change
4. Transport demand management measures to further encourage travel behaviour change at times and places where the road network is under pressure.

Elements 1 and 2 above have been factored into this ITP. More emphasis will be given to elements 3 and 4 as the ITP is updated in the future.

The on-going work on the ITP will reflect a strengthening alignment with the Auckland Plan as it gets implemented and evolves. Priorities for the development of the next ITP include:

**Programme Testing and Prioritisation:** Further work will be undertaken to scenario test project packages against transport outcomes to ensure the maximum benefit is derived from investment.

**Strategic Justification:** The ITP will provide the overarching strategic justification for transport projects by demonstrating how the transport network will be integrated with land use and across modes in a logical and planned manner to respond to growth over time. This will support the economic case for projects going forward.

**Delivery Strategies:** A number of key strategies will be completed which will input into the next ITP. These include the rail development strategy, arterial road strategy, public transport marketing plan, ferry strategy, park and ride and parking strategy.

**One System Roll Out:** The One System Approach is being implemented in Takapuna through the Joint Transport Operations Centre. The success of the approach will be evaluated. A programme for the roll out of the one system approach across the City will follow and will be reflected in the next ITP.

**Additional Funding Initiatives:** Outcomes from AC's alternative funding review and other investigations from AT including demand management opportunities to meet funding gaps will be incorporated.

In addition to the above, the ITP will also benefit from the implementation actions summarised in section 6.5 below. This includes the strategic assessment of the major projects such as the CRL and multi-modal links to the growth areas such as the airport precinct, which are key elements of the overall transport programme. This further assessment work will confirm the strategic and indicative economic cases for these major projects (together with their packages of supporting projects) along with more accurate estimates of their costs and timing. The Mayor's initiative of exploring additional funding mechanisms will provide greater certainty about the future direction for the use of pricing and demand management tools.

#### **Interactive and Accessible:**

A summary version of the ITP including network maps, supporting policy direction and programme information will be available on the AT website.

#### **Timeframe for the next ITP:**

The ITP will inform the development of the LTP/RLTP, Annual Plan, Asset Management Plan and SOI. The timeframe for the delivery of the ITP and other related documents is shown in the table 6.1 below. The grey shading indicates the quarter when the draft version of the relevant plan is developed, while the dark shading indicates the quarter when the final version is approved. The SOI is developed and approved on an annual basis. The indicative timeframe for completing the next version of the ITP is the 3<sup>rd</sup> Quarter of 2014.

Year	2013				2014				2015			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>ITP</b>												
<b>Fiscal Realities:</b>												
GPS												
LTP/RLTP												
Annual Plan												
<b>Deliverables:</b>												
AMP												
SOI												

Table 6.1: Timeframe for delivery of the next version of the ITP

## 6.5 Key implementation actions from ITP

Intervention response	Implementation actions by transport agencies
Maintain and renew assets	<ul style="list-style-type: none"> <li>• Align general principles and policies on asset management across delivery agencies</li> <li>• Improve optimised decision making to minimise 'whole of lifecycle' cost of transport asset ownership</li> <li>• Improve knowledge of maintenance and renewal costs associated with planned new infrastructure including tunnels, etc.</li> <li>• Link target LoS improvements to emerging network classification systems</li> <li>• Investigate implications of better place-making/streetscape design for long-term maintenance and renewal costs</li> </ul>
Make better use of networks	<ul style="list-style-type: none"> <li>• Provide transport input into the Unitary Plan process to support the case for moderately compact development</li> <li>• Implement a One System approach to optimise priority between modes and place, and develop a programme to address network operating gaps, including:               <ul style="list-style-type: none"> <li>- Develop a network user priority for the One System across the entire network</li> <li>- Develop an agreed level of service requirement for network modes/places</li> <li>- Develop and commence implementation of area and corridor-specific network operating plans to identify network performance gaps</li> <li>- Progressively implement a prioritised programme of operating network performance improvements</li> </ul> </li> <li>• Develop and implement the simple, layered core public transport network of frequent services to improve priority access for public transport</li> <li>• Complete implementation of the integrated ticketing system and accelerate the next phase to include integrated fares</li> <li>• Implement network management and improvement interventions in the Regional Road Safety Plan</li> <li>• Co-ordinate a range of programmes of environmental enhancement of transport assets with AC, NZTA and other Network Operators to achieve regional best environmental value for money for investment</li> <li>• Develop a core network of freight routes to improve priority access for freight</li> </ul>
Manage demand	<ul style="list-style-type: none"> <li>• Support investigation of options for new funding mechanisms for major transport projects</li> <li>• Explore demand management opportunities and a range of transport demand management tools for managing congestion while improving accessibility</li> <li>• Prepare comprehensive parking plans for the city centre and metropolitan centres to support transport choices and accessibility</li> <li>• Implement behaviour change interventions in the Regional Road Safety Plan</li> </ul>
Invest in infrastructure and services	<ul style="list-style-type: none"> <li>• Support investigation and resolution of options to improve accessibility of the City Centre (including resolving the public transport options)</li> <li>• Support investigation to agree the way forward for an additional Waitemata Harbour Crossing (including resolving tunnel and bridge options)</li> <li>• Progress planning and implementation for AMETI and MMEWS</li> <li>• Complete study on the long term role of port development options and freight provision</li> <li>• Progress route protection of key strategic transport corridors</li> </ul>

Table 6.2: Key implementation actions from ITP

Note: the bullet points reflect the increased intervention focus areas identified in chapter 4 of the ITP

## **ITP - Appendix**

# **Auckland Plan - Transport Programme and Financial Analysis**



The Auckland Plan acknowledges that the vision for Auckland requires substantial public sector investment in transport, and sets out multi-modal investment programme as part of its development strategy for the period to 2041.

The Plan attaches first priority to the key transport initiatives already under way including:

- Completing the state highway network, including the Western Ring Route section at Waterview
- Upgrading public transport infrastructure
- Improving public transport service efficiency through initiatives such as integrated ticketing and electrifying the existing rail network.

The Auckland Plan also identifies three new transport projects which are critical to transforming Auckland into a robust, high-value economy and making the city more attractive to live, work and visit. The three projects in order of priority are:

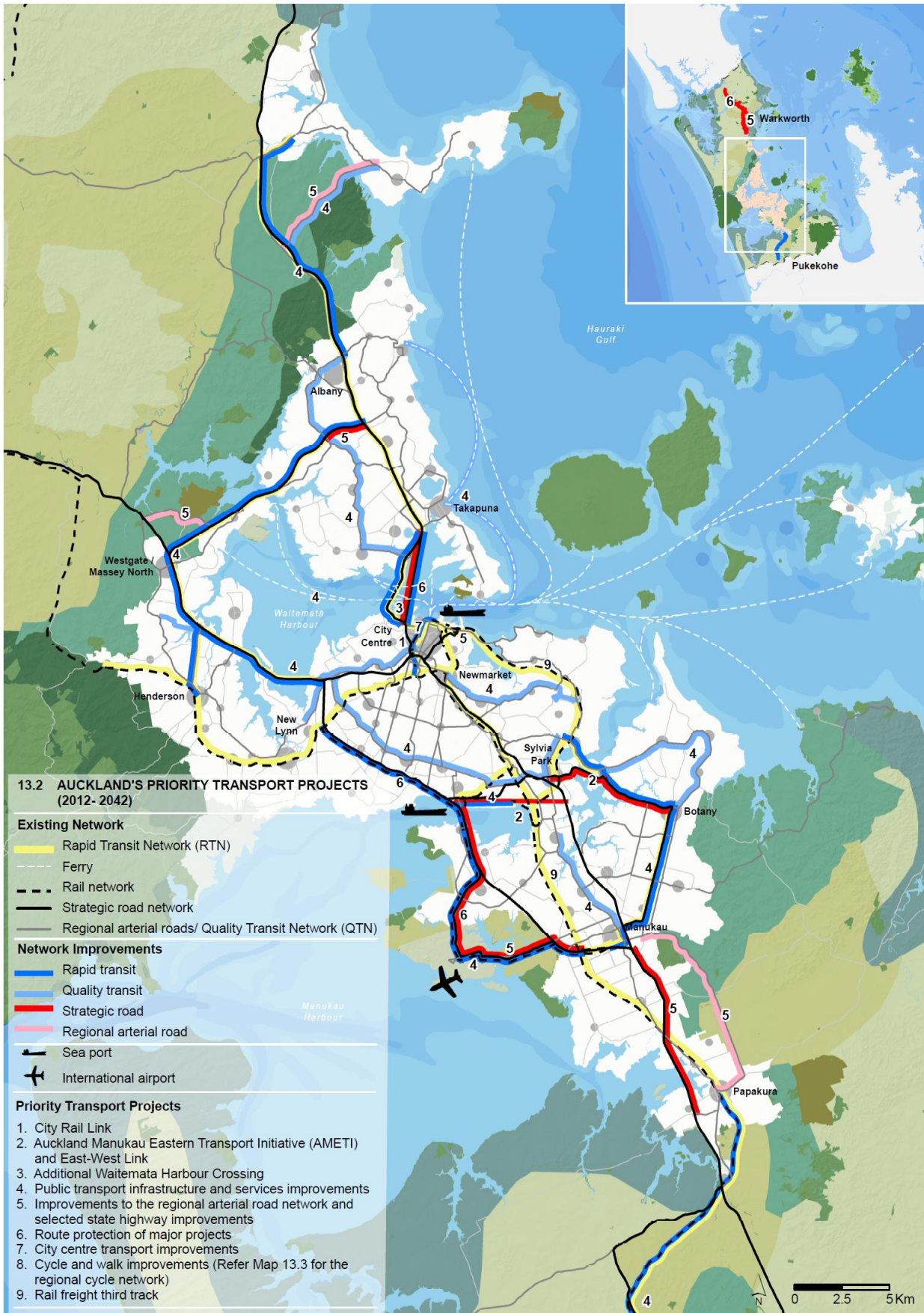
- City Rail Link
- Auckland-Manukau Eastern Transport Initiative and the East-West Link
- Additional Waitemata Harbour Crossing.

Further strategically important transport projects and initiatives required as the next order of priority are:

- Public transport infrastructure and service improvements
- Improvements to the regional arterial road network and selected state highways
- City centre transport improvements
- Route protection of major projects (including the critical three projects above, rail and state highway connections to the airport, rail to the North Shore and Avondale to Southdown rail)
- Cycle and walk improvements
- Rail freight third track.

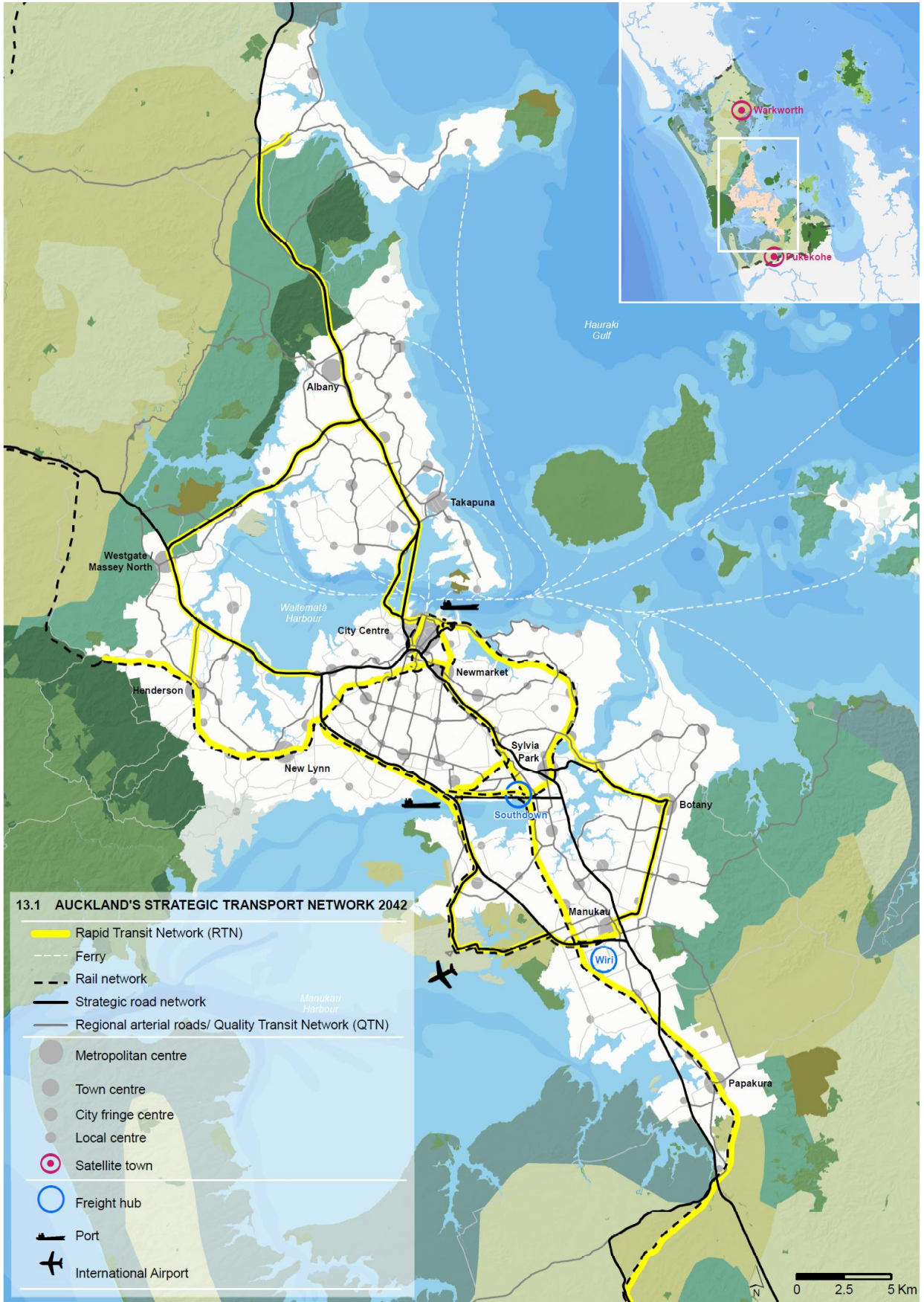
The two Auckland Plan maps on the following pages show, firstly, the priority projects that will be added to the existing transport system and, secondly, what the networks will look like when they have been added.

**Figure 1: Auckland's Priority Transport Projects (2012 – 2042)**





**Figure 2: Auckland's Strategic Transport Network 2042**



## Auckland Plan Transport Programme

Based on the Auckland Plan, the Major Project maps contained in the ITP (chapter 4) indicate the major transport projects proposed over 3 decades for roading and freight, public transport and active modes. These projects overall form a multi-modal programme which supports the planned growth and economic development in Auckland for the period to 2041, as set out in the Auckland Plan's development strategy, as well as the wider transport needs of the upper North Island.

Table1 (below) sorts the transport programme into projects and packages of projects according to:

- The geographic areas<sup>11</sup> (All, Central, North, South, West) in which it occurs.
- The activity class, based on NZTA funding categories
- The priority type (based on one of the four-stage interventions)
- The major transport package it is linked to (if applicable),

The major projects for the Central, North, South and West geographic areas are also indicated in Figures 3 to 6. The maps are illustrative only and do not represent the exact alignment or cost of some projects.

Note that the different projects or packages of projects have to be coordinated and synchronised with each other to produce an optimal investment programme. For example, if travel demand measures (TDM) are to be effective, they will need to be accompanied by changes to the configuration of the network to provide increased capacity for movements by bus, bicycle or on foot. This in turn has implications for operations of the network, and also for maintenance and renewal activities.

## Disclaimer

### 1. Investment priorities

The ITP programme and financial analysis appendix is based on the investment program and time schedule reflected in the Auckland Plan (2012) considered necessary to achieve the strategic transport outcomes for the region over the next three decades.

### 2. Data used

The analysis uses the investment data from the Auckland Plan Funding Gap Assessment (version 7.2) which was generated by the Transport Strategy department of Auckland Council dated 16 March 2012. The data was supplemented with the thirty year investment programs received from the NZTA (HNO section) and from KiwiRail. The consolidated investment program was then circulated to all stakeholders to use as basis for analysis and funding assessments thus ensuring regional consistency in all 30 year funding analyses.

The data for the Auckland Plan Funding Gap Assessment included the ten year transport investment programs from the LTCCPs of all the previous Legacy Councils, planned investment in transport infrastructure that was known beyond the ten year as reflected in other regional and legacy council documents, transport investment proposals from the RLTS and ATP, the

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<sup>11</sup> The regions are based on combinations of the areas of the legacy City and District Councils prior to 2010: North = Rodney district and North Shore City, Central = Auckland City, South = Manukau City, Papakura and Franklin districts, West = Waitakere City, All = Auckland region.

indicative thirty year investment programs of the Highway Network Operations section of NZTA and KiwiRail and the proposed thirty year investment as reflected in the Auckland Plan (2012).

### **3. Accuracy of data**

The accuracy of the data used for analysis purposes should be considered in view of the extent to which it was accurately portrayed in the legacy plans and other regional documents; and the (limited) strategic insight and knowledge of the compilers as to what the future costs of projects may be. The reflected costs were accepted as true and no verification of the accuracy of the costs reflected in legacy documents were done as an independent exercise by AT. Although care was taken to reflect these costs as accurately as possible at the time - for example by using current (2012) costs where available and modelled costs from preferred scenarios - it is possible that the reflected costs will be different from the actual costs as time progress.

In order to overcome this difference, the costs reflected for specific projects in the accompanying tables have been shown as a range of cost and not as a specific cost. Projects have also been bundled into a programme of packages where there was an obvious link between the project and the regional area/outcome they were deemed to fit with. In this way an overall picture of major investments region wide in a programme of packages is provided.


**Table 1: Auckland Plan Transport Programme (Fully Funded) grouped by region, priority type and linked projects**

\$\$\$\$ = >1 billion

\$\$\$ = 100 to 999 million

\$\$ = 10 to 99 million

\$ = less than 10 million

 = indicates projects included in the Committed Funding investment scenario

Project name	Activity class	Priority type	Linked Projects	Region	2012-2021	2022-2031	2032-2041
Transport planning	Transport Planning	Make better use of networks	Business as usual	All	\$\$	\$\$	\$\$
Road Safety promotion	Road Safety	Manage demand efficiently and safely	Business as usual	All	\$\$\$	\$\$\$	\$\$\$
PT services	PT services	Operate maintain and renew infrastructure optimally	Business as usual	All	\$\$\$\$	\$\$\$\$	\$\$\$\$
Roads Maintenance and operations		Operate maintain and renew infrastructure optimally	Business as usual	All	\$\$\$\$	\$\$\$\$	\$\$\$\$
Walking and Cycling	Walking and Cycling	Operate maintain and renew infrastructure optimally	Business as usual	All	\$\$\$	\$\$\$	\$\$\$
Safety around schools	Local Roads	Manage demand efficiently and safely	Safety	All	\$\$	\$\$	\$
Safety and minor improvement	Local Roads	Manage demand efficiently and safely	Safety	All	\$\$	\$\$	\$\$
Strategic Lighting Group	Local Roads	Manage demand efficiently and safely	Street lighting	All	\$\$	\$\$	\$\$
Safety around schools	Local Roads	Manage demand efficiently and safely	Safety	All	\$\$	\$\$	\$\$
Strategic Lighting Group	Local Roads	Manage demand efficiently and safely	Safety	All	\$\$	\$\$	\$\$
Regional safety programme	Local Roads	Manage demand efficiently and safely	Safety	All	\$	\$	\$
Crash reduction implementation	Local Roads	Manage demand efficiently and safely	Safety	All	\$	\$	\$
Safety speed management	Local Roads	Manage demand efficiently and safely	Safety	All	\$	\$	\$
PT Real Time Passenger Information System (RTPIS)	PT Infrastructure	Make better use of networks	Optimisation	All	\$\$	\$\$	\$\$



Project name	Activity class	Priority type	Linked Projects	Region	2012-2021	2022-2031	2032-2041
<b>Network Performance - Route Optimisation</b>	Local Roads	Make better use of networks	Optimisation	All	\$	\$	\$
<b>PT Customer Info - Minor Infrastructure</b>	PT Infrastructure	Make better use of networks	Optimisation	All	\$	\$	\$
<b>Information Technology – Transport miscellaneous</b>	Local Roads	Manage demand efficiently and safely	Optimisation	All	\$\$	\$\$	\$\$
<b>CCTV New</b>	Local Roads	Manage demand efficiently and safely	Optimisation	All	\$\$	\$	\$
<b>Traffic Signals New</b>	Local Roads	Manage demand efficiently and safely	Optimisation	All	\$	\$	\$
<b>More active management of road network</b>	RARP 2	Manage demand efficiently and safely	Optimisation	All	\$	\$	\$
<b>Electronic sign renewals</b>	PT Infrastructure	Operate maintain and renew infrastructure optimally	Optimisation	All	\$	\$	\$
<b>PT Bus Stop Construction and Improvement</b>	PT Infrastructure	Manage demand efficiently and safely	Minor PT	All	\$\$	\$\$	\$\$
<b>Station Amenity Improvements</b>	PT Infrastructure	Manage demand efficiently and safely	Minor PT	All	\$\$	\$\$	\$\$
<b>Region wide RTN and Corridor Land Purchase</b>	PT Infrastructure	Manage demand efficiently and safely	Minor PT	All	\$\$	\$\$	\$\$
<b>EMU's &amp; Depot (Principle repayments)</b>	PT Infrastructure	Make better use of networks	Electrification	All	\$\$\$	\$\$\$	\$\$\$
<b>Electrification of rail network</b>	PT Infrastructure	Make better use of networks	Electrification	All	\$\$\$		
<b>Integrated ticketing and fares</b>	Integrated Ticketing	Make better use of networks	Integrated Ticketing	All	\$\$	\$\$	\$\$
<b>PT Minor Capex</b>	PT Infrastructure	Manage demand efficiently and safely	PT Capex	All	\$	\$	\$
<b>AIFS Capex</b>	PT Infrastructure	Manage demand efficiently and safely	Integrated Ticketing	All	\$		
<b>Land Purchase – Legacy arrangements</b>	Local Roads			All	\$\$	\$\$	
<b>Regional Road Reconstruction</b>	Local Roads	Operate maintain and renew infrastructure optimally	Road reconstruction	All	\$\$\$		
<b>Parking</b>	Local Roads	Manage demand efficiently and safely	Parking	All	\$\$	\$\$	\$\$
<b>City Rail Link</b>	PT Infrastructure	Invest in new infrastructure and services	CRL	All	\$\$\$\$		

Project name	Activity class	Priority type	Linked Projects	Region	2012-2021	2022-2031	2032-2041
<b>Additional rolling stock (to cater for increased service frequencies down to 5 minutes on main lines and additional services for CRL and Airport link north)</b>	PT infrastructure	Make better use of networks	CRL	All		\$\$\$\$	\$\$\$\$
<b>Rail changed to 7.5 minute frequencies rather than 10 (all services)</b>	PT services Rail	Manage demand efficiently and safely	CRL	All		\$	\$
<b>HPMV routes</b>	Local Roads	Make better use of networks	Freight	All	\$		
<b>Completion of 70% of Regional Cycle Network</b>	Walking and Cycling	Manage demand efficiently and safely	Cycling	All	\$		
<b>SH improvements to service greenfield growth centres</b>	State highways	Invest in new infrastructure and services	Greenfield	All			\$\$\$\$
<b>Extension of PT infrastructure to service greenfield growth centres</b>	PT Infrastructure	Manage demand efficiently and safely	Greenfield	All			\$\$\$
<b>Regional Seal Extension Group</b>	Local Roads	Manage demand efficiently and safely	Seal extension	All	\$	\$	\$
<b>Completion of 100% of Regional Cycle Network</b>	Walking and Cycling	Manage demand efficiently and safely	Cycleways	All		\$	

## Central area

Project name	Activity class	Priority type	Linked Projects	Region	2012-2021	2022-2031	2032-2041
Neilson Street: SH20 interchange Onehunga Mall	RARP	Make better use of networks	Neilson St	Central	\$\$		
SH20 to East Tamaki Corridor Stage 1 (Nielsen Street upgrade)	Local Roads	Operate maintain and renew infrastructure optimally	Neilson St	Central	\$\$	\$\$\$\$	
SH20 Waterview section surface and Driven tunnel	State highways	Invest in new infrastructure and services	Western Ring Route	Central	\$\$\$\$		
SH16 St Lukes Interchange (With St Lukes Rd)	State highways	Make better use of networks	Western Ring Route	Central	\$\$		
Great North Road: Blockhouse Bay Road to SH16	RARP	Make better use of networks	Western Ring Route	Central	\$\$		
Tiverton-Wolverton Corridor Upgrade	Local Roads	Make better use of networks	Western Ring Route	Central	\$\$		
SH16 St Lukes Interchange (With St Lukes Rd)	RARP 2	Make better use of networks	Western Ring Route	Central	\$\$		
SH20 Queenstown road Interchange	State highways	Make better use of networks	Western Ring Route	Central			\$\$
Pah Road: Mt Albert Road to SH20 Interchange	RARP	Make better use of networks	Western Ring Route	Central		\$\$	
Mount Albert Road: Dominion Road to Pah Road	RARP 2	Make better use of networks	Western Ring Route	Central		\$\$	
Maioro Street: New Windsor Road to SH20 Interchange	RARP	Make better use of networks	Western Ring Route	Central	\$\$		
Great North Road: Ash Street to Blockhouse Bay Road	RARP 2	Make better use of networks	Western Ring Route	Central		\$	
Great North Road Corridor Improvements	Local Roads	Make better use of networks	Western Ring Route	Central	\$\$	\$\$	
Hillsborough Road stage 1 Reconstruction	Local Roads	Operate maintain and renew infrastructure optimally	Western Ring Route	Central	\$		
Denbigh Road Reconstruction	Local Roads	Operate maintain and renew infrastructure optimally	Western Ring Route	Central	\$		
Parnell Station - Upgrade	PT Infrastructure	Manage demand efficiently and safely	Minor PT	Central	\$		
Westfield Loop Infrastructure Track	PT Infrastructure	Invest in new infrastructure and services	Electrification	Central	\$		

Project name	Activity class	Priority type	Linked Projects	Region	2012-2021	2022-2031	2032-2041
Domain Drive - Parnell	Local Roads	Make better use of networks		Central	\$		
HGI Wharves-Kennedy Point (Waiheke) development	PT Infrastructure	Manage demand efficiently and safely	Waiheke	Central	\$		
3rd Main Westfield to POA	Rail line	Invest in new infrastructure and services	Freight Rail line	Central	\$	\$\$\$	
SH16 Port Link, include Grafton Gully S3	State highways	Make better use of networks	Freight	Central		\$\$\$	
Ellerslie Panmure Highway: Great South Road to Lunn Avenue	RARP	Invest in new infrastructure and services	AMETI 6	Central	\$\$		
Ellerslie/Panmure Highway Upgrade	Local Roads	Make better use of networks	AMETI 6	Central	\$\$		
South Eastern Highway: Carbine Road to Waipuna Road	RARP	Make better use of networks	AMETI 6	Central	\$\$		
AMETI - Sylvia Park Bus Lanes Package 2	PT Infrastructure	Make better use of networks	AMETI 2	Central	\$		
Lunn Ave/Marua Road/Harding – intersection upgrade	Local Roads	Make better use of networks	AMETI 6	Central	\$		
Lunn Avenue/EPH - intersection upgrade	Local Roads	Make better use of networks	AMETI 6	Central	\$		
AMETI - package 6 Mt Wellington area	Local Roads	Manage demand efficiently and safely	AMETI 6	Central	\$		
Dominion Road Corridor Upgrade	PT Infrastructure	Make better use of networks	Dominion Rd	Central	\$\$		
Dominion Road: Balmoral Road to New North Road	RARP 2	Make better use of networks	Dominion Rd	Central	\$\$		
Dominion Road: Mt Albert Road to Balmoral Road	RARP 2	Make better use of networks	Dominion Rd	Central	\$		
Dominion Road: SH20 to Mt Albert Road	RARP	Make better use of networks	Dominion Rd	Central	\$		
Dominion Rd Bus priority improvements	PT Infrastructure	Manage demand efficiently and safely	Dominion Rd	Central	\$\$		
Kohimarama Road: Kepa Road to St Helliers Bay Road	RARP	Make better use of networks	Tamaki/St Johns	Central		\$\$	
St Johns Road: Kohimarama Road to College Road	RARP 2	Make better use of networks	Tamaki/St Johns	Central			\$

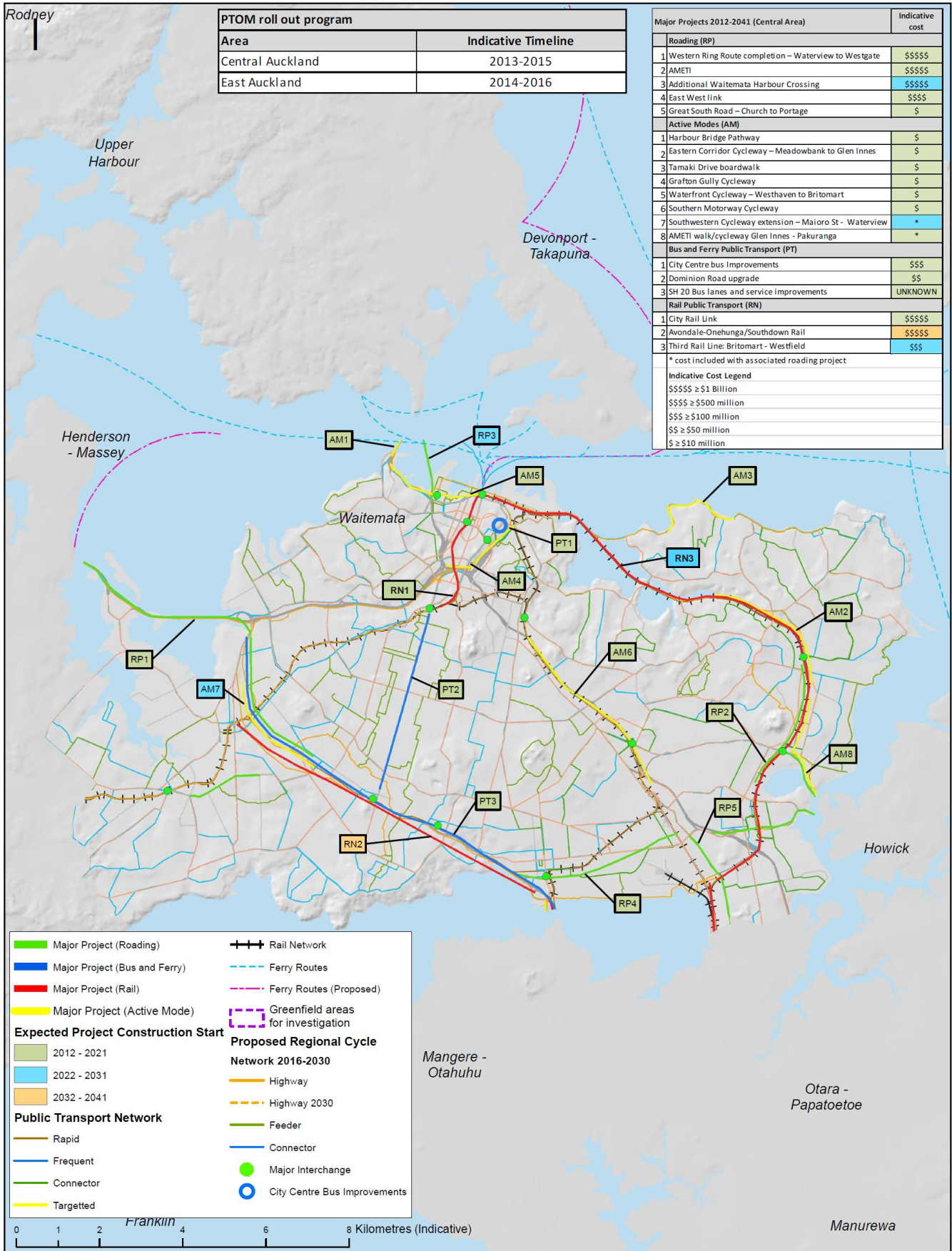
Project name	Activity class	Priority type	Linked Projects	Region	2012-2021	2022-2031	2032-2041
St Johns Road: College Road to Greenlane	RARP	Make better use of networks	Tamaki/St Johns	Central		\$\$	
Tamaki Drive Boardwalk between Kelly Tarltons and Millennium Bridge	Local Roads	Manage demand efficiently and safely	Tamaki/St Johns	Central	\$	\$	
Tamaki Drive/Takaparawha Pt. Safety Imp	Local Roads	Manage demand efficiently and safely	Tamaki/St Johns	Central	\$		
Tamaki Drive and Ngapipi Intersection Safety Imp	Local Roads	Manage demand efficiently and safely	Tamaki/St Johns	Central	\$		
Orakei Road Reconstruction	Local Roads	Operate maintain and renew infrastructure optimally	Tamaki/St Johns	Central	\$	\$	
Kepa Road stage 2 Reconstruction	Local Roads	Operate maintain and renew infrastructure optimally	Tamaki/St Johns	Central	\$		
Khyber Pass Road: Symonds Street to Broadway	RARP	Make better use of networks	Khyber Pass rd	Central		\$\$\$	
Broadway: Khyber Pass Road to Manukau Road	RARP	Make better use of networks	Khyber Pass Rd	Central		\$\$\$	
Gillies Avenue: Khyber Pass Road to Owens Road	RARP	Make better use of networks	Khyber Pass Rd	Central		\$\$	
Khyber Pass Road	Local Roads	Make better use of networks	Khyber Pass Rd	Central	\$\$	\$\$	
Mt Albert Station - Upgrade	PT Infrastructure	Manage demand efficiently and safely	Station upgrades 1	Central	\$		
Newmarket Station	PT Infrastructure	Manage demand efficiently and safely	Station upgrades 1	Central	\$		
Sylvia Park Station Park and Ride	PT Infrastructure	Manage demand efficiently and safely	Station upgrades 1	Central	\$		
Manukau Road: Greenlane to Mt Albert Road	RARP	Make better use of networks	Manukau Rd	Central		\$\$	
Manukau Road: Broadway to Greenlane	RARP	Make better use of networks	Manukau Rd	Central		\$\$	
Downtown Ferry Terminal Pier 2	PT Infrastructure	Make better use of networks	Ferry Terminal Upgrade	Central	\$		
Downtown Ferry Terminal Queens Wharf Extension	PT Infrastructure	Manage demand efficiently and safely	Ferry Terminal Upgrade	Central	\$		
Downtown Ferry Terminal Pier 3 & 4	PT Infrastructure	Manage demand efficiently and safely	Ferry Terminal Upgrade	Central	\$		

Project name	Activity class	Priority type	Linked Projects	Region	2012-2021	2022-2031	2032-2041
East west link (Multimodal East West project) investigation & construction	Local Roads	Invest in new infrastructure and services	East West Connection	Central	\$ \$\$\$		
SH20 to East Tamaki Corridor stage 2 (SH20 - SH1)	State highways	Make better use of networks	East West Connection	Central	\$\$\$		
Princes Street: Atkinson Avenue to SH1 Interchange	RARP	Make better use of networks	East West Connection	Central	\$\$		
East Tamaki Drive: SH1 to Great South Road	RARP 2	Make better use of networks	East West Connection	Central			\$
East Tamaki Drive: Preston Road to SH1	RARP	Make better use of networks	East West Connection	Central		\$\$\$	
Upper Queen Street remove 1 lane over CMJ, Wellington Street 1 lane only	Walking and Cycling	Invest in new infrastructure and services	CBD	Central	\$		
Tetratrap Installation – Central	Local Roads	Invest in new infrastructure and services	CBD	Central	\$	\$	
Karangahape Road: Pitt Street to Great North Road	RARP	Make better use of networks	CBD	Central		\$\$\$	
Customs Street East: Customs Street West to Anzac Avenue	RARP	Make better use of networks	CBD	Central		\$\$	
Customs Street West: Fanshawe Street to Britomart Place	RARP 2	Make better use of networks	CBD	Central	\$\$		
Lower Albert Street/Albert Street: Quay Street to Wellesley Street	RARP	Make better use of networks	CBD	Central	\$\$		
Mayoral Drive: Wellesley Street to Cook Street	RARP	Make better use of networks	CBD	Central	\$		
Federal street shared space between Victoria and Wellesley, speed reduced to 10-20kmh	Walking and Cycling	Make better use of networks	CBD	Central	\$		
Bus tunnels at Cook or Wellesley under Nelson and Hobson (dedicated bus capacity) and Midtown bus terminal/interchange station	RARP 2	Manage demand efficiently and safely	CBD	Central			\$\$\$
Fanshawe street Bus lanes Westbound Albert to Halsey street	PT Infrastructure	Manage demand efficiently and safely	CBD	Central	\$		
40 km/hr speed limit	Local Roads	Manage demand efficiently and safely	CBD	Central	\$		



Project name	Activity class	Priority type	Linked Projects	Region	2012-2021	2022-2031	2032-2041
Nelson St upgrade remove one lane, keep one-way	Local Roads	Manage demand efficiently and safely	CBD	Central	\$		
Balmoral Road: Dominion Road to Manukau Road	RARP	Make better use of networks	Arterial roading upgrade	Central		\$\$	
Mount Smart Road: Royal Oak Roundabout to Mays Road	RARP 2	Make better use of networks	Arterial roading upgrade	Central			\$\$
Greenlane Station Upgrade	PT Infrastructure	Managing demand	Station upgrades 2	Central	\$		
Penrose Station Upgrade	PT Infrastructure	Managing demand	Station upgrades 2	Central	\$		
Onehunga Station Platform extension	PT Infrastructure	Managing demand	Station upgrades 2	Central	\$		
Remuera station Upgrade	PT Infrastructure	Managing demand	Station upgrades 2	Central	\$		
Southdown to Avondale Loop	PT Infrastructure	Invest in new infrastructure and services	Southdown to Avondale Loop	Central		\$	\$\$\$\$
Strand Permanent Station	PT Infrastructure	Manage demand efficiently and safely	New Station	Central	\$		
Westfield Station – Upgrade	PT Infrastructure	Manage demand efficiently and safely	Station upgrades 3	Central	\$		
Tamaki Rail station (re-established as a new high quality station)	PT Infrastructure	Manage demand efficiently and safely	New Station	Central	\$		
Wynyard Quarter - Te Wero Bridge	Local Roads	Make better use	Waterfront Development	Central	\$	\$	
Extend Wynyard Tram to Britomart Via Tepid baths, lower Hobson Quay to Queen st		Managing demand	Waterfront Development	Central	\$\$		

**Figure 3: Central area – Major Projects 2012-2041**



## Northern area

Project name	Activity class	Priority type	Linked Projects	Region	2012-2021	2022-2031	2032-2041
SH1-SH18 Motorway to Motorway ramps	State highways	Invest in new infrastructure and services	Western Ring Route	North		\$\$\$	
SH18 Greenhithe Road to Albany (Additional 3rd lane eastbound)	State highways	Invest in new infrastructure and services	Western Ring Route	North			\$\$
SH18 Buckley Ave to Tauhinu rd (Additional 3rd lane eastbound excluding the bridge)	State highways	Invest in new infrastructure and services	Western Ring Route	North			\$\$
Rodney Taylors Bridge (Coatsville Riverhead Hwy)	Local Roads	Operate maintain and renew infrastructure optimally	Bridge Replacement	North	\$		
Rodney Oldfield Bridge Upgrade	Local Roads	Operate maintain and renew infrastructure optimally	Bridge Replacement	North	\$		
Bayswater Ferry Terminal	PT Infrastructure	Manage demand efficiently and safely	Ferry Terminal Upgrade	North	\$\$		
Shoal Bay Wharf Development (Tryphena) (Great Barrier)	PT Infrastructure	Manage demand efficiently and safely	Ferry Terminal Upgrade	North	\$		
Birkenhead Ferry inner berth	PT Infrastructure	Manage demand efficiently and safely	Ferry Terminal Upgrade	North	\$		
Anzac Street: Fred Thomas Drive to Auburn Street	RARP	Make better use of networks	Anzac Street	North	\$\$		
Anzac Street Westbound bus lane Lake road to Fred Thomas Dr	PT Infrastructure	Make better use of networks	Anzac Street	North	\$		
Takapuna to City Centre bus services 10 min frequency 6am-midnight, 7 days	PT services	Manage demand efficiently and safely	PT Services	North			
Henderson-Westgate-Albany bus (QTN)	RARP 2	Manage demand efficiently and safely	NORSGA	North			\$\$\$
Beachhaven Ferry Terminal	PT Infrastructure	Manage demand efficiently and safely	NORSGA	North	\$		
East Coast Rd Bus Priority	PT Infrastructure	Manage demand efficiently and safely	Northern busway extn	North	\$		
North Area Bus Improvements Programme	PT Infrastructure	Manage demand efficiently and safely	Northern busway extn	North	\$		
SH1 6 laning Constellation Rd to Orewa	State highways	Invest in new infrastructure and services	Northern busway extn	North		\$\$\$\$	

Project name	Activity class	Priority type	Linked Projects	Region	2012-2021	2022-2031	2032-2041
SH1 Constellation to Greville 3 laning northbound	State highways	Invest in new infrastructure and services	Northern busway extn	North	\$\$		
Northern Busway Stage 3 Albany to Silverdale (RTN)	RARP 2	Make better use of networks	Northern busway extn	North		\$\$\$	\$\$\$
SH1 Hibiscus Coast Highway: SH1 Silverdale to Whangaparaoa	RARP	Make better use of networks	Northern busway extn	North	\$\$		
SH17: Oteha Valley Road to SH1 Greville Interchange	RARP	Make better use of networks	Northern busway extn	North		\$\$	
Whangaparaoa Rd Upgrade (Hibiscus Coast to Red Beach)	Local Roads	Make better use of networks	Northern busway extn	North	\$		
SH1 Greville Road Interchange	State highways	Make better use of networks	Northern busway extn	North		\$\$\$	
Northern Busway Stage 2 Constellation to Albany	New Infra SH - PT	Manage demand efficiently and safely	Northern busway extn	North		\$\$\$	
Silverdale park N ride	PT Infrastructure	Manage demand efficiently and safely	Northern busway extn	North	\$		
Busway - Westlake Station Land	PT Infrastructure	Manage demand efficiently and safely	Norther busway extn	North	\$		
Rosedale / Greville Busway Station	PT Infrastructure	Manage demand efficiently and safely	Norther busway extn	North	\$		
Northern Busway Extension - Stations	PT Infrastructure	Manage demand efficiently and safely	Northern busway extn	North	\$		
Hibiscus Coast Busway Station	PT Infrastructure	Manage demand efficiently and safely	Northern busway extn	North	\$		
Services between Albany and Silverdale shifted to Extended northern busway	PT Services	Manage demand efficiently and safely	Northern busway extn	North			
East Coast Road: Constellation Drive to Forrest Hill Road	RARP	Make better use of networks	Northern busway extn	North		\$\$	
Medallion Drive Oteha Valley Rd SAR/detailed design	Local Roads	Make better use of networks	Northern busway extn	North	\$		
Albany capex works Oteha valley Rd/Mc Claymont's Rd	Local Roads	Make better use of networks	Northern busway extn	North	\$		
Oteha Valley Road: SH1 to North Cross intersection	RARP	Make better use of networks	Northern busway extn	North	\$		

Project name	Activity class	Priority type	Linked Projects	Region	2012-2021	2022-2031	2032-2041
Albany Rising Parade Extension	Local Roads	Make better use of networks	Northern busway extn	North	\$	\$	
Northcote Point Ferry Terminal	PT Infrastructure	Make better use of networks	Ferry Terminal Upgrade	North	\$		
Devonport Ferry Terminal	PT Infrastructure	Manage demand efficiently and safely	Ferry Terminal Upgrade	North	\$		
Stanley Bay Ferry Terminal	PT Infrastructure	Manage demand efficiently and safely	Ferry Terminal Upgrade	North	\$		
Lake Road: Esmonde Road to Calliope Road	RARP	Make better use of networks	Lake rd	North		\$	
Takapuna Lake Road Upgrade (Hauraki to Bayswater)	Local Roads	Make better use of networks	Lake rd	North	\$\$	\$\$	
SH1 - Additional WHX (Road tunnel)	State highways	Invest in new infrastructure and services	Harbour Tunnel Road	North	\$	\$\$\$\$	
SH1 - Additional WHX (Rail tunnel)	Rail line	Invest in new infrastructure and services	Harbour Tunnel Rail	North	\$	\$\$\$\$	
Albany Highway: Upper Harbour Highway to Glenfield Road	RARP	Make better use of networks	Albany/Glenfield/Wairau	North		\$\$\$	
Tristram Avenue: Forrest Hill to Wairau Road	RARP 2	Make better use of networks	Albany/Glenfield/Wairau	North			\$\$\$
Glenfield Sunnybrae Road Upgrade (Northcote to Archers)	Local Roads	Make better use of networks	Albany/Glenfield/Wairau	North	\$\$	\$\$	
Albany Highway South Upgrade (Sunset to SH18)	Local Roads	Make better use of networks	Albany/Glenfield/Wairau	North	\$\$	\$	
Glenfield Road corridor (lane widening Bentley ave to Albany Highway)	Local Roads	Make better use of networks	Albany/Glenfield/Wairau	North	\$\$		
Glenfield Rd / Birkenhead Avenue Upgrade (Eskdale to Mokoia)	Local Roads	Make better use of networks	Albany/Glenfield/Wairau	North	\$\$	\$	
Glenfield Rd Upgrade Stage 4 (James to Sunset)	Local Roads	Make better use of networks	Albany/Glenfield/Wairau	North	\$\$		
Glenfield Archers Road Upgrade (Wairau to Coronation)	Local Roads	Make better use of networks	Albany/Glenfield/Wairau	North	\$	\$	
Taharoto Rd / Wairau Rd Upgrade (Shakespeare to Boulevard)	Local Roads	Make better use of networks	Albany/Glenfield/Wairau	North	\$\$		

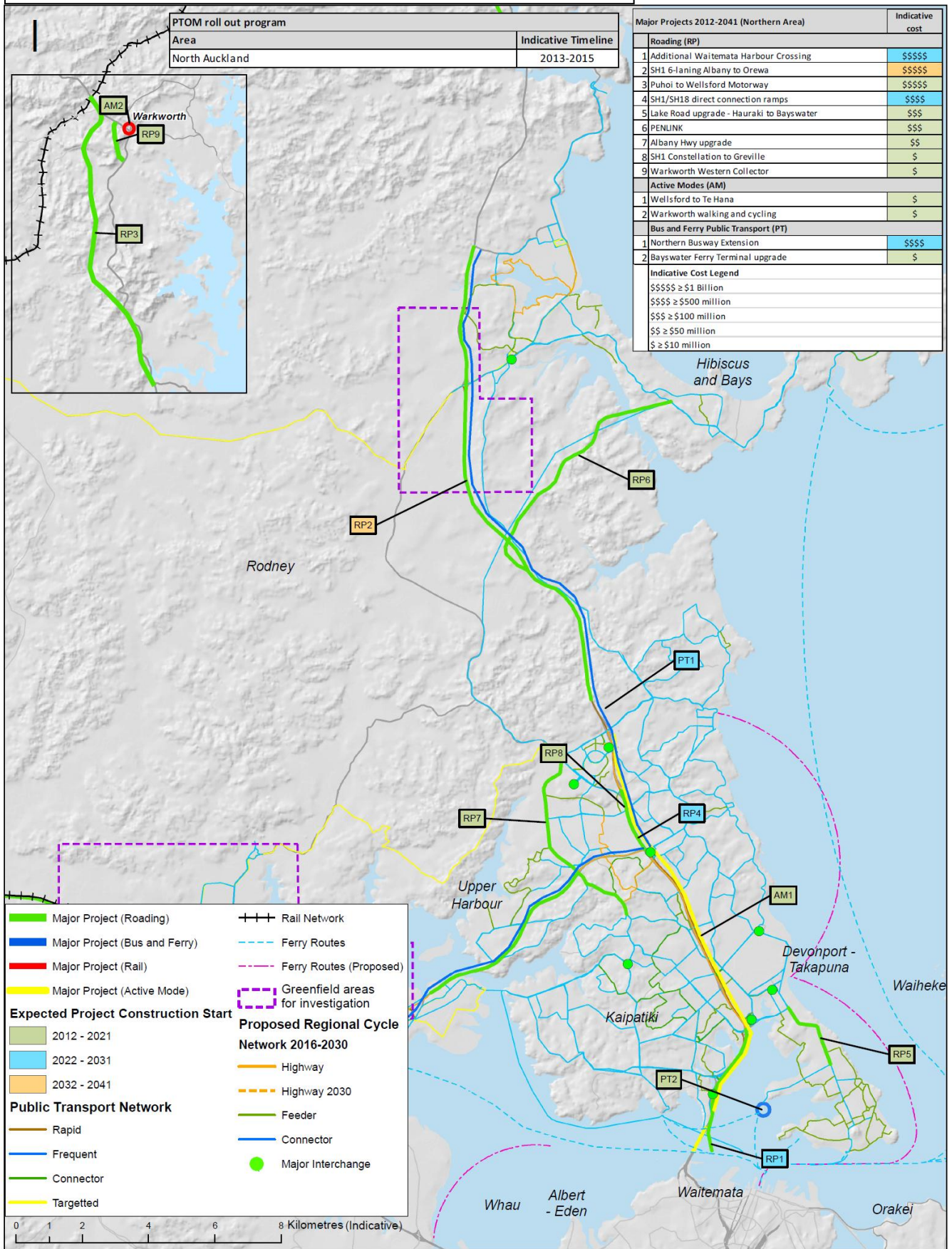


Project name	Activity class	Priority type	Linked Projects	Region	2012-2021	2022-2031	2032-2041
Glenfield Wairau Road Upgrade	Local Roads	Make better use of networks	Albany/Glenfield/Wairau	North	\$	\$	
Glenfield Target Road Upgrade (Wairau to Sunset)	Local Roads	Make better use of networks	Albany/Glenfield/Wairau	North	\$	\$	
Wairau Road: Forest Hill Road to Northcote Road	RARP	Make better use of networks	Albany/Glenfield/Wairau	North		\$	
Glenfield Road: Bentley Avenue to Downing Street	RARP	Make better use of networks	Albany/Glenfield/Wairau	North		\$	
Wairau Road: Target Road to Tristram Avenue	RARP	Make better use of networks	Albany/Glenfield/Wairau	North		\$\$\$	
Albany Highway: Oteha Valley Road to Upper Harbour Highway	RARP	Make better use of networks	Albany/Glenfield/Wairau	North		\$\$\$	
Albany Highway North Upgrade (Schnapper Rock to SH17)	Local Roads	Make better use of networks	Albany/Glenfield/Wairau	North	\$\$	\$\$	
Albany McClymonts Rd Upgrade (Don McKinnon to Medallion)	Local Roads	Manage demand efficiently and safely	Northern busway extn	North	\$\$	\$	
Long Bay East Coast Road Intersection	Local Roads	Make better use of networks	Long Bay	North	\$		
Te Atatu Ferry Terminal	PT Infrastructure	Manage demand efficiently and safely	New Ferry	North	\$		
Browns Bay ferry	PT Infrastructure	Manage demand efficiently and safely	New Ferry	North			\$\$
Takapuna ferry	PT Infrastructure	Manage demand efficiently and safely	New Ferry	North			\$\$
SH1 Warkworth-Wellsford motorway, assume tolled (RON)	State highways	Invest in new infrastructure and services	Puhoi to Wellsford	North		\$\$\$\$	
SH 1 Puhoi-Warkworth motorway extension (RON)	State highways	Invest in new infrastructure and services	Puhoi to Wellsford	North	\$\$\$		
Warkworth Western collector - SH1	Local Roads	Invest in new infrastructure and services	Puhoi to Wellsford	North	\$		
Warkworth Matakana Link (SH1 to Matakana)	Local Roads	Make better use of networks	Puhoi to Wellsford	North	\$	\$	
Warkworth SH1 / McKinney / Hill / Hudson Intersections	Local Roads	Make better use of networks	Puhoi to Wellsford	North	\$	\$	
Penlink - Toll Road, East coast Rd realignment, widening (Arklow to	New Infra Local Rds	Invest in new infrastructure and services	Penlink	North	\$\$	\$\$\$	



<b>Project name</b>	<b>Activity class</b>	<b>Priority type</b>	<b>Linked Projects</b>	<b>Region</b>	<b>2012-2021</b>	<b>2022-2031</b>	<b>2032-2041</b>
Ladies Mile), Redvale Interchange							
<b>Bus service from Whangaparaoa via Penlink to Albany added. 4 services per hour both directions</b>	PT Serv	Make better use of networks	Penlink	North	\$	\$	\$

**Figure 4: Northern area – Major Projects 2012-2041**



## Southern area

Project name	Activity class	Priority type	Linked Projects	Region	2012-2021	2022-2031	2032-2041
Otahuhu Bus Interchange	PT Infrastructure	Manage demand efficiently and safely	Minor PT	South	\$		
Half Moon Bay Ferry Terminal & Vehicular Ferries	PT Infrastructure	Manage demand efficiently and safely	Ferry Terminal Upgrades	South	\$\$		
Papatoetoe TC– St. Geo Kolmar Wallace	Local Roads	Manage demand efficiently and safely	Local roads	South	\$	\$	
Bus service Waiuku to Pukekohe 2 buses per hour both directions.	PT Serv	Manage demand efficiently and safely	PT Services	South	\$	\$	\$
Davies Ave car park building upgrade	PT Infrastructure	Invest in new infrastructure and services	Manukau station	Soth	\$		
Manukau City Rail Link	Rail line	Manage demand efficiently and safely	Manukau station	South	\$		
3rd Main line Wiri to Papakura	Rail line	Invest in new infrastructure and services	Freight Rail line	South	\$\$	\$\$	
3rd Main line Westfield to Wiri	Rail line	Invest in new infrastructure and services	Freight Rail line	South	\$\$		
Inland port connections	Rail line	Make better use of networks	Freight Rail line	South	\$\$		
SH1 widening Hill Road to Hingaia Road (Phase 2)	State highways	Invest in new infrastructure and services	SHI South Widening	South	\$\$\$		
SH1 widening Hill Road to Takanini (Phase 1 to Takanini)	State highways	Invest in new infrastructure and services	SHI South Widening	South	\$\$		
Manuroa/Takanini School Road Intersection Upgrade	Local Roads	Make better use of networks	SHI South Widening	South	\$	\$	
SH1 Takanini Interchange	RARP 2	Make better use of networks	SHI South Widening	South			\$\$
AMETI Land	Local Roads	Invest in new infrastructure and services	AMETI 1	South	\$\$\$		
AMETI Packages 5&6 Reeves Rd Flyover	RARP 2	Invest in new infrastructure and services	AMETI 5	South	\$\$\$		
AMETI - Package 4 Pakuranga Ti Rakau & Reeves Road	Local Roads	Make better use of networks	AMETI 4	South	\$\$\$		

Project name	Activity class	Priority type	Linked Projects	Region	2012-2021	2022-2031	2032-2041
<b>AMETI - Panmure Corridor Package 1</b>	Local Roads	Make better use of networks	AMETI 1	South	\$\$\$		
<b>Ti Rakau Drive: Pakuranga Motorway to Gossamer Drive</b>	RARP	Make better use of networks	AMETI 3	South	\$\$\$		
<b>Ti Rakau Drive: Gossamer Drive to Harris Road</b>	RARP	Make better use of networks	AMETI 3	South	\$\$\$		
<b>Mt Wellington Highway: Waipuna Road to SH1 Interchange</b>	RARP 2	Make better use of networks	AMETI 6	South	\$\$\$		
<b>Mt Wellington Highway: Ellerslie Panmure Highway to Waipuna Road</b>	RARP 2	Make better use of networks	AMETI 6	South	\$\$\$		
<b>Pakuranga Drive : Ti Rakau Drive to Glenmore Road</b>	RARP 2	Make better use of networks	AMETI 4	South	\$\$		
<b>Pakuranga Drive : Tamaki River to Ti Rakau Drive</b>	RARP	Make better use of networks	AMETI 3	South	\$\$		
<b>Ellerslie Panmure Highway: Lunn Avenue to Panmure Roundabout</b>	RARP	Make better use of networks	AMETI 6	South	\$\$		
<b>South Eastern Highway/Pakuranga Motorway: Waipuna Road to Ti Rakau Drive</b>	RARP	Make better use of networks	AMETI 3	South	\$\$		
<b>Ti Rakau Drive: Pakuranga Road to Pakuranga Motorway</b>	RARP	Make better use of networks	AMETI 2	South	\$\$		
<b>Pakuranga Highway QTN</b>	PT Infrastructure	Manage demand efficiently and safely	AMETI 6	South	\$\$		
<b>Lagoon Drive: Panmure Roundabout to Tamaki River</b>	RARP	Manage demand efficiently and safely	AMETI 2	South	\$\$		
<b>Pakuranga Drive : Glenmore Road to Fortunes Road</b>	RARP 2	Make better use of networks	AMETI 7	South	\$		
<b>Pakuranga Drive: Fortunes Road to Buckland's Beach Road</b>	RARP 2	Make better use of networks	AMETI 7	South	\$		
<b>Puhinui Park and Ride</b>	PT Infrastructure	Manage demand efficiently and safely	Station upgrades 1	South	\$		
<b>Pukekohe Station - Upgrade</b>	PT Infrastructure	Manage demand efficiently and safely	Station upgrades 1	South	\$\$		
<b>Papakura Station - Upgrade</b>	PT Infrastructure	Manage demand efficiently and safely	Station upgrades 1	South	\$		

Project name	Activity class	Priority type	Linked Projects	Region	2012-2021	2022-2031	2032-2041
Takanini Park and Ride	PT Infrastructure	Manage demand efficiently and safely	Station upgrades 1	South	\$		
Takanini Station - Upgrade	PT Infrastructure	Manage demand efficiently and safely	Station upgrades 1	South	\$		
Puhinui Station - Upgrade	PT Infrastructure	Manage demand efficiently and safely	Station upgrades 1	South	\$		
Glen Innes Station - Upgrade	PT Infrastructure	Manage demand efficiently and safely	Station upgrades 1	South	\$		
Springs Road/East Tamaki Road: Smales Road to Preston Road	RARP 2	Make better use of networks	East West Connection	South			\$\$
Smales/Allens/Harris/Springs Road widening and intersection Upgrade	Local Roads	Make better use of networks	East West Connection	South	\$\$	\$	
Ormiston/Preston/East Tamaki Road Intersection Upgrade	Local Roads	Make better use of networks	East West Connection	South	\$		
South Western Arterial	Local Roads	Make better use of networks	East West Connection	South	\$	\$	
Hingaia Peninsula Rd Improvement	Local Roads	Invest in new infrastructure and services	Greenfield	South	\$	\$	
Linwood Road Route Improvements (Franklin)	Local Roads	Make better use of networks	Greenfield	South	\$		
Great South Road: Church Street to Portage Road	RARP	Make better use of networks	Great South Rd	South		\$\$\$	
Great South Road: Atkinson Avenue to Tamaki River	RARP	Make better use of networks	Great South Rd	South		\$\$\$	
Great South Road: Te Irirangi Drive to Redoubt Road	RARP	Make better use of networks	Great South Rd	South		\$\$\$	
Great South Road (Manukau Central to Drury)	Local Roads	Make better use of networks	Great South Rd	South	\$\$	\$\$	
Great South Road: Tamaki River to Shirley Road	RARP	Make better use of networks	Great South Rd	South		\$\$	
Great South Road: Browns Road to Alfriston Road	RARP 2	Make better use of networks	Great South Rd	South			\$\$
Great South Road: Ellerslie Panmure Highway to Church Street	RARP 2	Make better use of networks	Great South Rd	South			\$\$



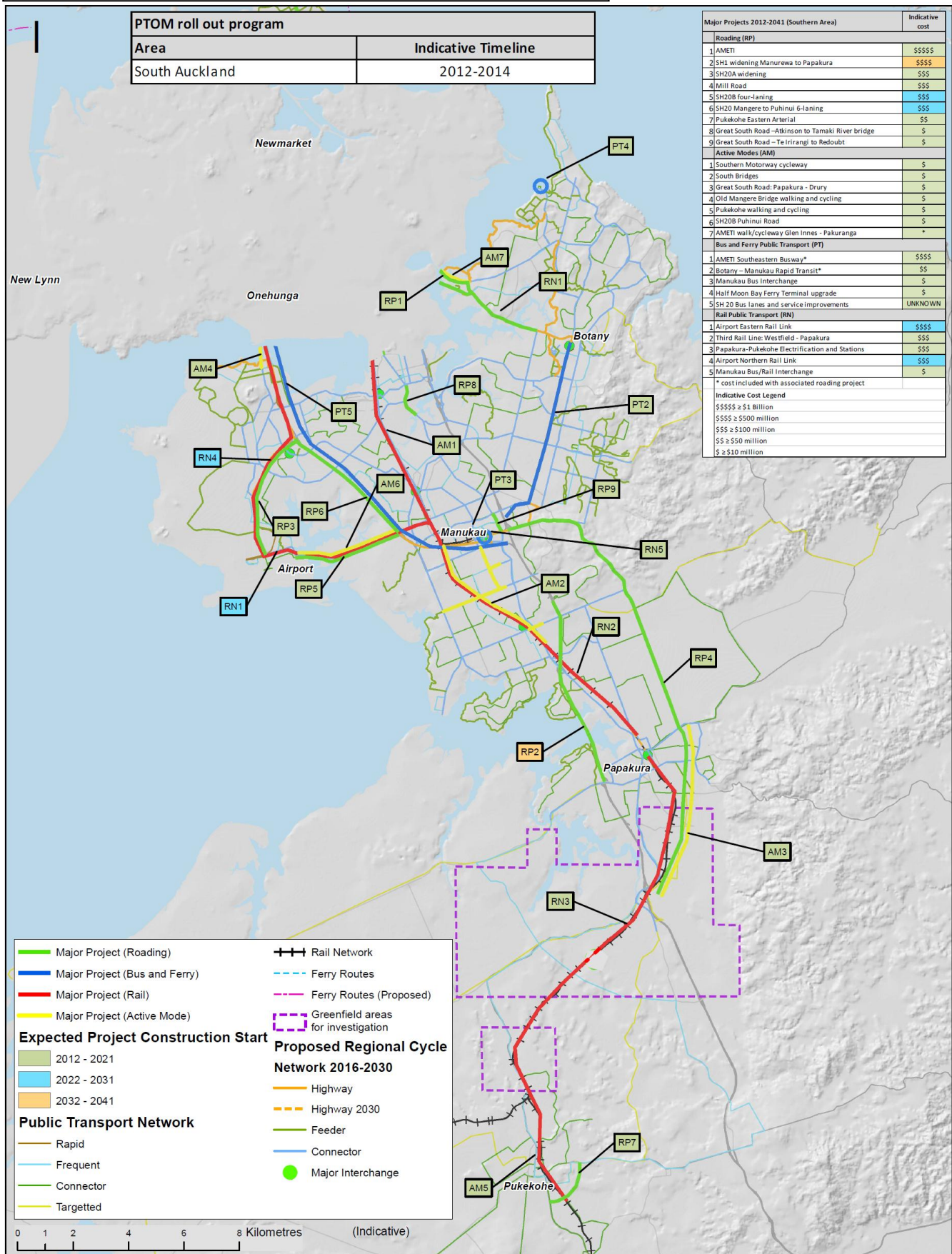
Project name	Activity class	Priority type	Linked Projects	Region	2012-2021	2022-2031	2032-2041
Gt South / Beach Road Intersection Upgrade	Local Roads	Make better use of networks	Great South Rd	South	\$	\$	
Great South Road – Park Estate to Slippery	Local Roads	Make better use of networks	Great South Rd	South	\$	\$	
Great South Road: Tui Road to Te Irirangi Drive	RARP 2	Make better use of networks	Great South Rd	South			\$
GSR/Bell Ave/Mt Richmond Rd intersection improvements	Local Roads	Make better use of networks	Great South Rd	South	\$		
Great South Road / Walters Roundabout Improvement	Local Roads	Make better use of networks	Great South Rd	South	\$		
Great South Road: Shirley Road to Tui Road	RARP 2	Make better use of networks	Great South Rd	South			\$
Botany to Manukau RTN- Botany interchange	PT Infrastructure	Manage demand efficiently and safely	Botany to Manukau RTN	South	\$\$		
Botany to Manukau RTN	PT Infrastructure	Manage demand efficiently and safely	Botany to Manukau RTN	South	\$		
SH20 A widening	State highways	Invest in new infrastructure and services	Airport access	South	\$\$\$		
SH20 B widening	RARP 2	Invest in new infrastructure and services	Airport access	South		\$\$\$	
SH20 Mangere to Puhinui 6 laning	State highways	Invest in new infrastructure and services	Airport access	South			\$\$\$
SMART	Local Roads	Invest in new infrastructure and services	Airport access	South	\$\$	\$\$	
SH20A Kirkbride IC and George bolt memorial drive motorway upgrade	State highways	Make better use of networks	Airport access	South	\$\$		
Cavendish Drive: SH1 Interchange to SH20 Interchange	RARP 2	Make better use of networks	Airport access	South			\$
AIA Bus lanes and bus services along SH20	PT Infrastructure	Manage demand efficiently and safely	Airport access	South	\$\$		
Murphy's Rd Upgrade-(Murphy's Bush Rdbt)	Local Roads	Make better use of networks	Ormiston	South	\$\$	\$\$	
Murphy's Road Bridge Improvements (Manukau)	Local Roads	Make better use of networks	Ormiston	South	\$\$	\$	
Chapel Road Realignment and New Bridge	Local Roads	Make better use of networks	Ormiston	South	\$\$	\$	



Project name	Activity class	Priority type	Linked Projects	Region	2012-2021	2022-2031	2032-2041
Flat Bush School Rd – Stage 4 Murphy’s	Local Roads	Make better use of networks	Ormiston	South	\$		
Ormiston Road Widening (TI Dr-Chapel)	Local Roads	Make better use of networks	Ormiston	South	\$	\$	
Flat bush to Manukau city centre (bus priority improvement)	PT Infrastructure	Manage demand efficiently and safely	Ormiston	South	\$\$		
Flat Bush Main Street Collector Link (Stream to Stancombe Rd)	Local Roads	Manage demand efficiently and safely	Ormiston	South	\$		
Mill Road Corridor Upgrade (Manukau to Papakura)	Local Roads	Invest in new infrastructure and services	Mill Rd	South	\$\$\$	\$\$	
Redoubt Rd 4-laning SH1-Mill Rd	Local Roads	Invest in new infrastructure and services	Mill Rd	South			\$\$
Porchester Road – Manuroa to Stream	Local Roads	Make better use of networks	Mill Rd	South	\$	\$	
Alfriston Stratford Intersection Upgrade	Local Roads	Make better use of networks	Mill Rd	South	\$	\$	
Walters Rd – Porchester to Grove Improvements	Local Roads	Make better use of networks	Mill Rd	South	\$	\$	
Bus service from Papakura to East Tamaki added via Mill road. 2 services per hour both directions	PT Services	Manage demand efficiently and safely	Mill Rd	South	\$		
Karaka Road (SH22): SH1 to Glenbrook	RARP 2	Invest in new infrastructure and services	Arterial roading upgrade	South			\$\$
Pukekohe Eastern Corridor by-pass	Local Roads	Manage demand efficiently and safely	Arterial roading upgrade	South			\$\$
Otahuhu Station upgrade	PT Infrastructure	Managing demand	Station upgrades 2	South	\$		
Pukekohe-Papakura rail shuttle 20min peak, 30min interpeak, 60min late evening 7 days	PT services	Manage demand efficiently and safely	Pukekohe to Papakura rail Improvements	South	\$\$	\$\$	\$\$
Drury Station - New Station	PT Infrastructure	Manage demand efficiently and safely	Pukekohe to Papakura rail Improvements	South	\$		
Paerata Station	PT Infrastructure	Manage demand efficiently and safely	Pukekohe to Papakura rail Improvements	South	\$		
Extension of RTN network (electrification) to Pukekohe and additional rolling stock	Rail line	Make better use of networks	Pukekohe to Papakura rail Improvements	South	\$\$\$		

<b>Project name</b>	<b>Activity class</b>	<b>Priority type</b>	<b>Linked Projects</b>	<b>Region</b>	<b>2012-2021</b>	<b>2022-2031</b>	<b>2032-2041</b>
<b>Te Mahia Station - Upgrade</b>	PT Infrastructure	Manage demand efficiently and safely	Station upgrades 3	South	\$		
<b>Manukau City Centre Car park #2 - Hayman Park</b>	PT Infrastructure	Manage demand efficiently and safely	Manukau station	South	\$\$		
<b>AIA rail link (Stage 2) Northern link (Onehunga, Mangere to airport) 15 minute frequency</b>	Rail line	Invest in new infrastructure and services	Airport rail	South		\$\$\$	
<b>AIA rail link to Manukau (Stage 1) Eastern Link (Puhunui to Airport)</b>	Rail line	Invest in new infrastructure and services	Airport rail	South		\$\$\$	
<b>Onehunga rail duplication &amp; 6 trains per hour. (Included in CRL package)</b>	Rail line	Invest in new infrastructure and services	Airport rail	South			
<b>New Rail Stations - Mangere Bridge, Mangere TC, Ascot Park, Airport (2020-29) (Airport)</b>	PT infrastructure	Manage demand efficiently and safely	Airport rail	South		\$\$	
<b>New Park n Ride facilities in association with opening of CRL.</b>	PT infrastructure	Manage demand efficiently and safely	CRL	South/ West	\$\$\$		

**Figure 5: Southern area – Major Projects 2012-2041**



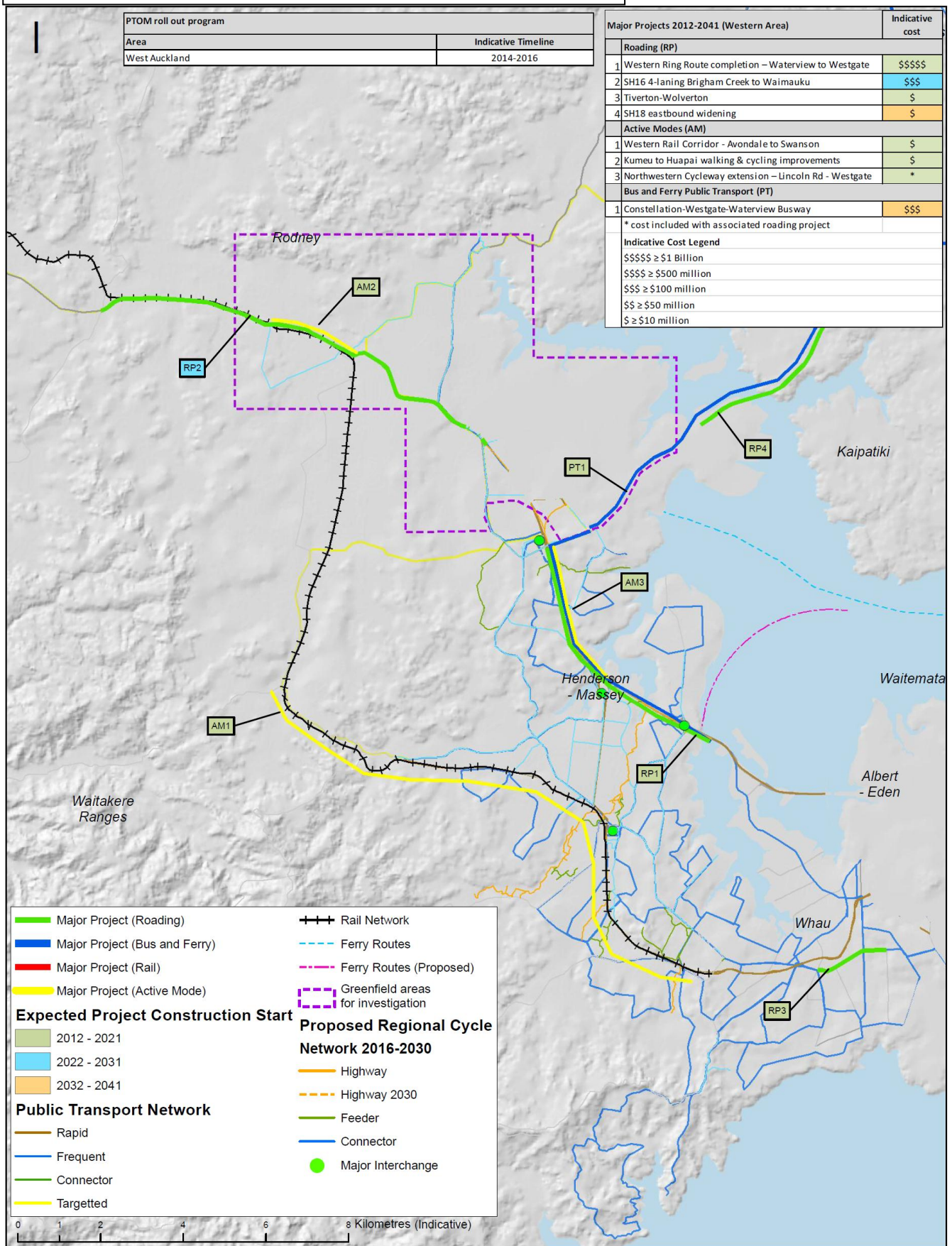
## Western area

Project name	Activity class	Priority type	Linked Projects	Region	2012-2021	2022-2031	2032-2041
SH16 Widening St Lukes - Te Atatu 8 L	State highways	Invest in new infrastructure and services	Western Ring Route	West	\$\$\$		
Lincoln Road: Te Pai Place to SH16	RARP	Invest in new infrastructure and services	Western Ring Route	West	\$\$\$		
SH16 Te Atatu junction improvements and Widening to Lincoln rd	State highways	Invest in new infrastructure and services	Western Ring Route	West	\$\$\$		
SH16 Widening Lincoln to Royal Road 6L	State highways	Invest in new infrastructure and services	Western Ring Route	West	\$\$\$		
Lincoln Road Corridor Improvements	Local Roads	Make better use of networks	Western Ring Route	West	\$\$	\$\$	
SH16 Lincoln rd interchange upgrade	State highways	Make better use of networks	Western Ring Route	West	\$\$		
Te Atatu Road Corridor Improvements	Local Roads	Make better use of networks	Western Ring Route	West	\$\$	\$	
Te Atatu Rd Nth: Gunner Drive - Yeovil Road	Local Roads	Make better use of networks	Western Ring Route	West	\$	\$	
Te Atatu Road: Edmonton Road to SH16	RARP	Make better use of networks	Western Ring Route	West		\$\$	
Construction of busway Constellation-Westgate-Waterview	PT Infrastructure	Manage demand efficiently and safely	Western Ring Route	West			\$\$\$
New Lynn TOD McCrae Way	Local Roads	Make better use of networks	New Lynn	West	\$		
Crown Lynn Regeneration (New Public Roads)	Local Roads	Manage demand efficiently and safely	New Lynn	West	\$\$	\$	
New Lynn TOD Stage 5 Great North Road (Station users 2011 2,703)	PT Infrastructure	Manage demand efficiently and safely	New Lynn	West	\$		
Swanson rail park and ride	PT Infrastructure	Manage demand efficiently and safely	Park and Ride	West	\$		
SH16 Kumeu 4 lane arterial standard Brigham Ck to Waimauku assume speed under 80kph	State highways	Invest in new infrastructure and services	NORSGA	West		\$\$\$	
SH18 upgrade to accommodate NorSGA Stg 2, including capacity upgrade and interchange at Northside Drive (not in NZTA programme)	State highways	Make better use of networks	NORSGA	West			\$\$
Massey Road: Tamaki bridge to SH20 interchange	RARP 2	Make better use of networks	NORSGA	West			\$\$
Brigham Creek Road Corridor Improvements	Local Roads	Make better use of networks	NORSGA	West	\$\$	\$	

Project name	Activity class	Priority type	Linked Projects	Region	2012-2021	2022-2031	2032-2041
<b>Plan Change 14 Area – Hobsonville Town Centre and Industrial Precinct – NORSGA</b>	Local Roads	Make better use of networks	NORSGA	West	\$		
<b>Plan Change 15 Area - Massey North and Westgate – NORSGA</b>	Local Roads	Make better use of networks	NORSGA	West	\$		
<b>Plan Change 13 Area – Hobsonville Airbase - NORSGA</b>	Local Roads	Make better use of networks	NORSGA	West	\$		
<b>Hobsonville Ferry terminal upgrade</b>	PT Infrastructure	Manage demand efficiently and safely	NORSGA	West	\$		
<b>Massey North TC: Bus Interchange</b>	PT Infrastructure	Manage demand efficiently and safely	NORSGA	West	\$		
<b>Glen Eden Park n Ride</b>	PT Infrastructure	Manage demand efficiently and safely	Station upgrades 1	West	\$		
<b>Avondale Station Park and Ride</b>	PT Infrastructure	Manage demand efficiently and safely	Station upgrades 1	West	\$		
<b>Sunnyvale Station - Upgrade</b>	PT Infrastructure	Manage demand efficiently and safely	Station upgrades 1	West	\$		
<b>Central Park Drive / School Road Intersection</b>	Local Roads	Make better use of networks	Henderson	West	\$		
<b>Waitakere Station - Upgrade</b>	PT Infrastructure	Manage demand efficiently and safely	Station upgrades 3	West	\$		
<b>Huapai Station - Upgrade (2009 trial 13 daily users)</b>	PT Infrastructure	Manage demand efficiently and safely	Station upgrades 4	West	\$		
<b>Rail Service extension to Kumeu and Waimauku</b>	PT services	Manage demand efficiently and safely	Extension of rail service	West			



**Figure 6: Western area – Major Projects 2012-2041**



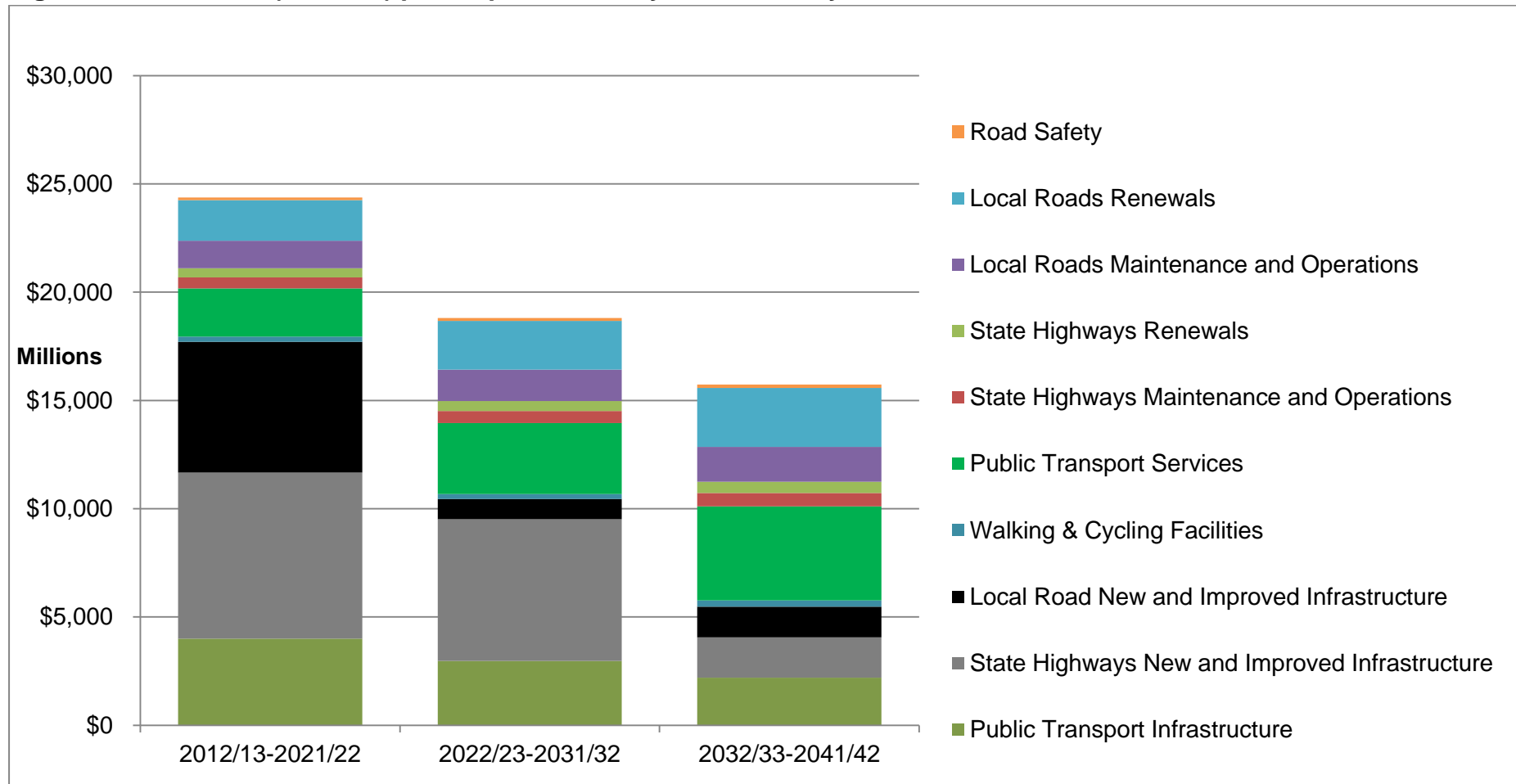


**Table 2: Funding Requirement (2012 \$m) by NZTA Activity Class**

The expenditure is split between opex and capex and is allocated according to activity type or class.

NZTA Activity Class	30yr Total (\$m)	2012/13-2021/22	2022/23-2031/32	2032/33-2041/42
<b>TOTAL CAPEX (\$m)</b>	<b>\$34,390</b>	<b>\$17,950</b>	<b>\$10,680</b>	<b>\$5,760</b>
Public Transport Infrastructure	\$9,170	\$4,000	\$2,970	\$2,200
State Highways New and Improved Infrastructure	\$16,080	\$7,670	\$6,550	\$1,860
Local Road New and Improved Infrastructure	\$8,380	\$6,040	\$930	\$1,410
Walking & Cycling Facilities	\$760	\$240	\$230	\$290
<b>TOTAL OPEX(\$M)</b>	<b>\$24,520</b>	<b>\$6,420</b>	<b>\$8,130</b>	<b>\$9,970</b>
Public Transport Services	\$9,850	\$2,220	\$3,280	\$4,350
State Highways Maintenance and Operations	\$1,680	\$510	\$550	\$620
State Highways Renewals	\$1,400	\$420	\$460	\$520
Local Roads Maintenance and Operations	\$4,340	\$1,280	\$1,450	\$1,610
Local Roads Renewals	\$6,850	\$1,870	\$2,260	\$2,720
Road Safety Promotion (Incl Demand Management & Community Programmes)	\$400	\$120	\$130	\$150
<b>TOTAL EXPENDITURE (\$M)</b>	<b>\$58,910</b>	<b>\$24,370</b>	<b>\$18,810</b>	<b>\$15,730</b>

**Figure 7: Investment (2012 \$m) profile per decade by NZTA Activity Class**



The next thirty years will see a growth in expenditure for PT services in the long term whilst in the short term expenditure on state highways and local roads is higher. Specific projects such as the Western ring route, rail electrification, CRL, and AMETI can cause these fluctuations in activity class allocations. The first ten years have more projects that have undergone investigation so have better costs profiles than those projects that are seen as necessary in the future but are yet to be investigated. The uneven allocation of project cost across the 30 year period will cause cashflow problems and will require some projects to be delayed or other sources of funding to enable completion. Some difficult

choices must be made between projects in the last two decades, some may not be completed and others may be delayed. Constraints include funding, construction resource, and maintaining flow on the network.

**Figure 8: Percentage funding split by NZTA Activity Class**

