

Greater Christchurch Public Transport: A Case for Investment

“We have a great opportunity to anticipate growth in Canterbury by shaping future land use and integrating transport options.

Mō tātou, a, mō kā uri a muri ake nei.
For us and for those who follow.”

Steve Lowndes
Chair, Environment Canterbury



Future of Public Transport in Greater Christchurch: A Case for Investment - Summary of Programme Business Case

Introduction

This document provides an updated investment story on the future of public transport in Greater Christchurch. It sets out the case for investment, the key programme elements and their sequencing, the economic case for the programme and next steps.

The PBC was prepared by the Greater Christchurch Public Transport Futures Project Team on behalf of the Greater Christchurch Partnership. The project team followed the NZ Transport Agency business case process; it was workshop led and developed through a collaborative process. Further detail on the process is provided in the full PBC and summarised at Attachment 1.

This PBC has undergone several reviews including:

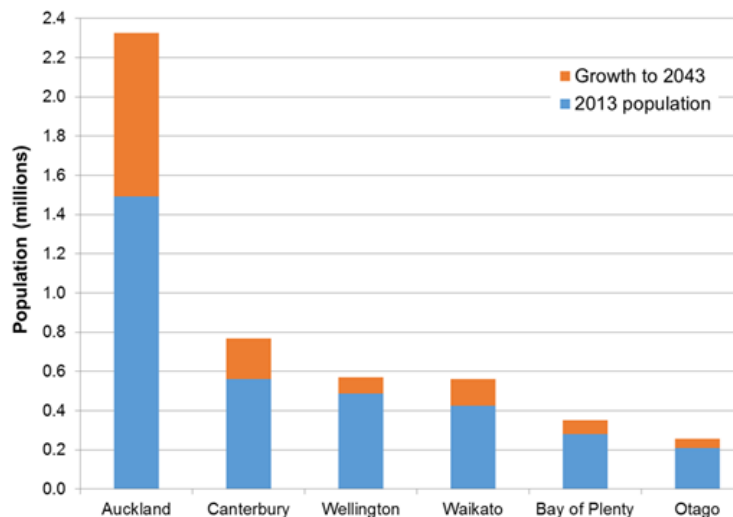
- a) Internal review of the document by Partnership staff
- b) External Peer Review by Aurecon/MR Cagney – including revised investment profile
- c) Investment review by NZTA staff
- d) Review by “Dragon’s Den” Review Panel of officials from NZTA and the Ministry of Transport
- e) Elements of the recommendations from the Business Case were included in the draft Regional Public Transport Plan.

The programme implementation strategy set out in this summary document, will position Greater Christchurch to respond effectively to the changing travel demand caused by growth while remaining sufficiently flexible to incorporating advances in technology and service provision. It is consistent with the spatial planning objectives for Greater Christchurch and will complement the wider investment in the regeneration of Christchurch.

Environment Canterbury, on behalf of the Greater Christchurch Partnership, is seeking the endorsement of partner organisations for the proposed programme outlined in this document, and a commitment to undertake the next stage of business case development. Their endorsement will enable decisions to be made on funding and implementation as part of the next round of long-term plans.

The Vision for Greater Christchurch

Canterbury is the fastest growing region outside Auckland and is projected to experience higher growth than Hamilton, Tauranga, Wellington City and Queenstown combined over the coming decades. The main growth areas are Christchurch City and Waimakariri and Selwyn Districts. The National Policy Statement on Urban Development Capacity (NPS-UDC) identifies Greater Christchurch as a high growth urban area.



Source: Statistics New Zealand, February 2017

Figure 1 Population projections in NZ fastest growing regions (Statistics NZ)

To plan for growth, the vision for Greater Christchurch has been developed via the Greater Christchurch Urban Development Strategy.

The Strategy provides the primary strategic direction for the Greater Christchurch area including: the location of future housing, development of social and retail activity centres, areas for new employment and integration with transport networks.

A strategic pathway has been developed to support the vision and create opportunities for growth through investment in commercial and residential development in key areas. Transport is a key component of its integrated approach to land use development.

Vision for Greater Christchurch - By the year 2041, Greater Christchurch has a vibrant inner city and suburban centres surrounded by thriving rural communities and towns, connected by efficient and sustainable infrastructure. There are a wealth of public spaces ranging from bustling inner city streets to expansive open spaces and parks, which embrace natural systems, landscapes and heritage. Innovative businesses are welcome and can thrive supported by a wide range of attractive facilities and opportunities. Prosperous communities can enjoy a variety of lifestyles in good health and safety, enriched by the diversity of cultures and the beautiful environment of Greater Christchurch.

Greater Christchurch Urban Development Strategy

Vision for Public Transport - Public transport is innovative and successful and sits at the heart of a transport network that supports a thriving, liveable greater Christchurch. The public transport system is accessible and convenient, with high quality, zero emission vehicles and facilities. The system gets people where they want to go – as a result it is well used and valued by the people of greater Christchurch.

Draft Canterbury Regional Public Transport Plan 2018-2028

Investing in the Growing City

Projected Growth

It is anticipated that the population of Greater Christchurch will increase by 158,000 by 2048 taking the sub-region population to 640,000. The projected population of Greater Christchurch up to 2048 is illustrated in Figure 1. The largest concentrations are within 10 km of Christchurch CBD – an important consideration for public transport investment.

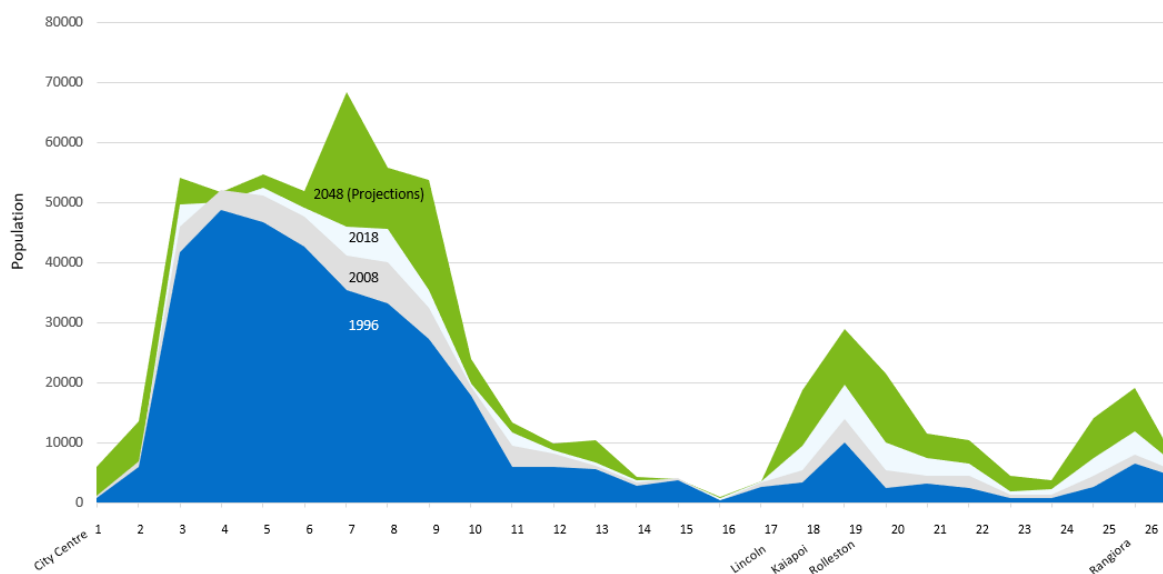


Figure 2 Population and distance from the Christchurch City Centre

The largest concentration of employment will be in Christchurch CBD which will continue to play a critical role in supporting the regional economy and employment opportunities. There will be around 60,000 additional employees working in Christchurch CBD by 2048, with additional, more dispersed growth located around in Key Activity Centres (KACs), particularly along the City-Riccarton-Hornby corridor and Papanui.

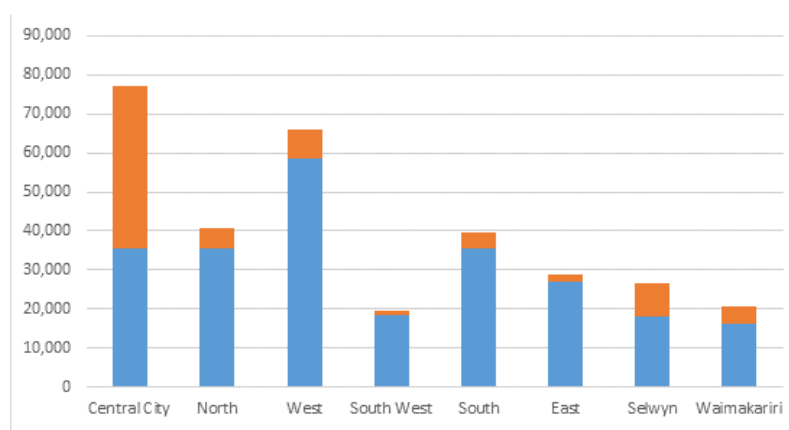


Figure 3 Greater Christchurch Employment Growth 2018 -2048

Implications for Public Transport

The continued growth and regeneration of Christchurch provides an opportunity to ensure that transport infrastructure and land use are closely integrated. The projected level of urban growth will require a successful, evolving public transport system that supports key commercial and residential growth areas. In time, the nature of urban growth will provide the right conditions for the public transport system to grow and succeed further.

Like many cities, private vehicles are the dominant mode of transport in Greater Christchurch with 83% of people driving to work. This level of private vehicle reliance has resulted in increasing impacts on the transport network

including congestion and delays on key corridors. Unless steps are taken to invest in alternative modes and reduce reliance on private vehicles, increased travel demand during the next 10 years and beyond will exacerbate peak time congestion and generate significant impacts on the environment, health, and safety.

Modelling indicates that average speeds at the AM peak period could fall substantially by 2048, especially for trips between Selwyn, Waimakariri and Christchurch. Average travel speeds in the morning peak could reduce by over 6km/h over the next 30 years (from 42km/h in 2013 to 36km/h in 2048)¹.

Public transport investment will be vital to accommodate increasing demands on the transport network. Investing now means proactively ensuring that Christchurch has a well-functioning transport network that can meet future needs and aligns with planned commercial and residential growth areas.

The investment decisions will be critical to shaping the region and providing a foundation that supports population growth. Investment in more sustainable forms of transport is part of that foundation to ensure Greater Christchurch remains a great place to live, visit, work and play.

Environment Canterbury is the lead agency responsible for planning and operating urban public transport services. Christchurch City, Waimakariri and Selwyn District councils to provide public transport infrastructure to support its services. The partnership for urban transport sits within the Greater Christchurch Partnership governance who actively advocate for the urban transport needs at a national level

Christchurch has unique opportunity to plan for public transport system that matches future growth.

Current investment in public transport per person in Christchurch is lower than Auckland and Wellington. Investment in those regions has increased public transport patronage. Investment in Christchurch will provide a similar platform for a future transport network that meets the needs of a growing population and contributes to safer, more sustainable and accessible transport choices.

A Regenerating City

The regeneration of Christchurch CBD is integral to the wider vision for Greater Christchurch providing a vibrant centre that supports regional economic activity and employment. A successful inner city will see significant business and retail activity by day, supported by afterhours activity in the evening and weekends.

A significant amount of rebuilding has occurred since the Canterbury earthquakes and the Greater Christchurch population has exceeded pre-quake levels.

Since the earthquakes, Christchurch's public transport patronage has been impacted by the pace of recovery, city centre employment and public facilities. During the next 3-5 years, this headwind will turn into a tailwind for public transport patronage. Significant developments will come online in Christchurch CBD that will contribute to employment numbers and bring more activity.

Continuing redevelopment of Christchurch CBD is central to the region's recovery and regeneration. Regeneration of the Christchurch CBD is ongoing, and several key projects (Figure 4) are nearing completion. Combined with increased commercial activity, these projects will stimulate activity in the Christchurch CBD and create increased demand for access to the CBD from surrounding suburbs and other districts.

¹ <http://www.greaterchristchurch.com/assets/Documents/greaterchristchurch/Capacity-Assessment-reports/Report-5-Business-Development-Capacity.pdf>
Most of the delays that would reduce these speeds would likely occur within Christchurch City Council boundaries, as a high proportion of Selwyn and Waimakariri residents travel into the City each day for work, education, shopping and recreation.

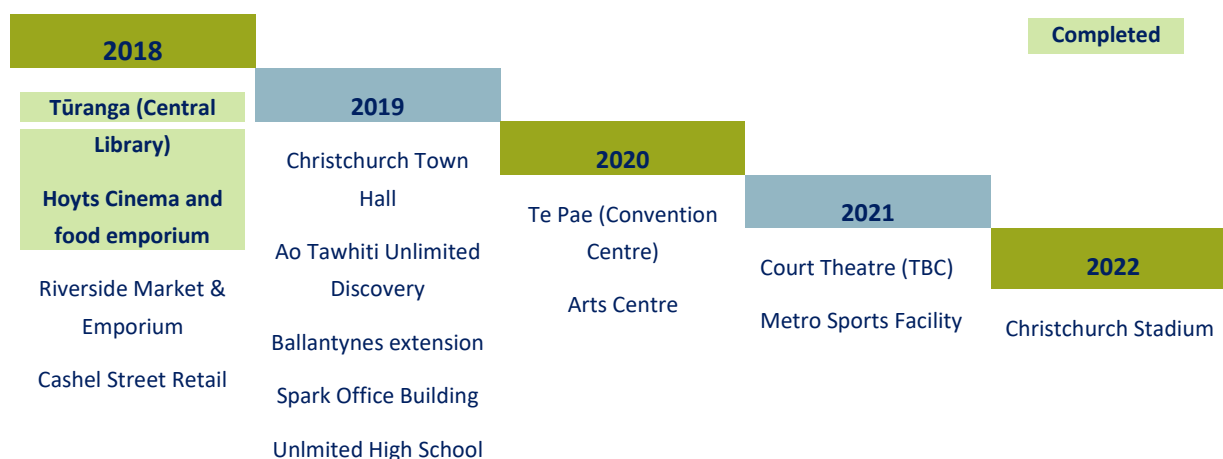


Figure 4 Key Central City Projects Stimulating Activity

Christchurch City Council (CCC) is also working on a Central City Residential Programme which aims to increase the residential population of the Central City from 6,000 in 2018 to 20,000 in 2028.

Public transport, especially rapid transit², has a key role to play in stimulating this regeneration. Greater Christchurch's existing public transport network provides a good foundation for the work set out in the PBC with key public transport corridors aligned with projected growth and access routes.

The Christchurch District Plan, supported by the CCC Long-Term Plan, provides substantial opportunities to redevelop and intensify existing urban areas to meet both housing and business needs. This includes in and around the Christchurch CBD, key activity centres, larger neighbourhood centres and nodes located along core public transport corridors.

Urban expansion in Christchurch is constrained by the Pacific Ocean to the East, the protection of the Outstanding Natural Landscapes of the Port Hills and Bank Peninsula to the South, the Airport and Groundwater Protection Zone to the West, and flood risk and protection of versatile soils to the north. Redeveloping and intensifying existing urban areas in Christchurch City is essential to accommodate the growing needs.

Integrating land use and transport supports an efficient public transport network and is important for rapid transit. Each can have a positive influence on the others by improving the accessibility of an area and supporting growth and housing density around rapid transit corridors and stations. This is essential to maximise the benefits from the large investment required to build and operate rapid transit.

Previous public transport assessments of rapid transit potential in Christchurch focussed on the corridors that generate the highest potential patronage to and from the CBD. This focus is still relevant.

By investing in rapid transit services and encouraging higher density development along high demand corridors, more people will be able to access jobs, services, recreation and education without necessarily having to rely on a private vehicle. Ensuring public transport is increasingly usable for all people has major social, environmental and economic benefits.

² Such as light rail, rapid bus ways or automated trackless trams.

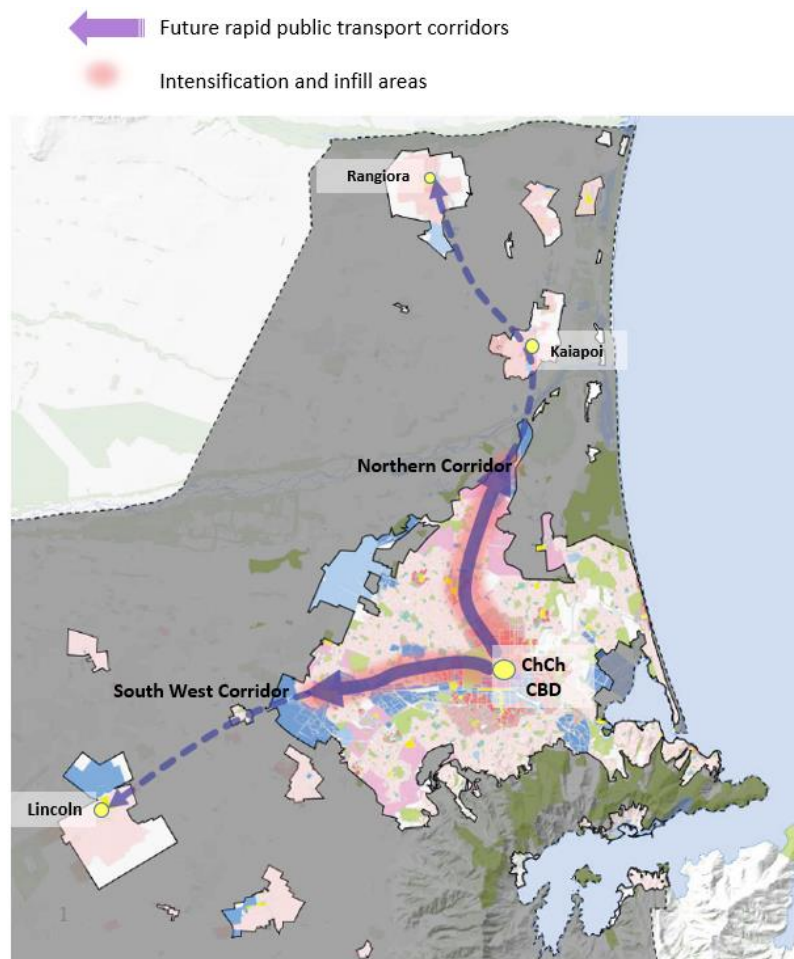


Figure 5 Corridors - Showing Land Use Alignment

It is anticipated that half of all the jobs in Christchurch will continue to be located around the south west corridor between the Central City and Hornby and nearby suburbs, including Sydenham, Addington, Riccarton, Ilam, Sockburn, and Wigram. As Christchurch grows, travel demand along this corridor will continue to intensify. Providing rapid transit along this corridor will provide an attractive alternative to private vehicle travel, make it easier for people to access work, and catalyse housing development.

The Northern Corridor (Christchurch CBD to Belfast via Papanui) is another opportunity where the provision of rapid transit will stimulate redevelopment.

Now is the opportunity for investment in public transport whilst the city is rebuilding, to shape the rebuild and before opportunities to use space for public transport is taken up with other development.

Public Transport and Patronage

Greater Christchurch has a comprehensive network of public transport services, throughout Christchurch City, linking Christchurch with Rolleston, Lincoln, Burnham, Prebbleton, Kaiapoi, Rangiora, Pegasus, Woodend and Waikuku. The Greater Christchurch public transport system includes bus priority measures on some road corridors. The network consists entirely of bus services except for one ferry route connecting Diamond Harbour with Lyttelton.

Prior to the Canterbury Earthquakes public transport patronage in Christchurch was steadily increasing, peaking at just over 17 million per annum. The public transport network was largely radial, based on connecting to the Christchurch CBD. Its evolution was strongly influenced by a previous tram network that operated until the 1950s.

Changes to the Christchurch bus network between 1999 and 2006 saw Christchurch identified as the best and most economical public passenger transport system in Australia and New Zealand.

Following the Canterbury Earthquakes more than 6000 businesses were displaced, and 13,500 residents left Christchurch City. Many relocated to the outer suburbs or to neighbouring districts. This had a significant impact on public transport patronage due to the complexity of providing a transport network that could serve a more dispersed population.

Eight years on, the population of Christchurch has recovered and grown further through high international migration and the regenerating city. The recovery has now reached an inflexion point as the regeneration gathers momentum and businesses return to the CBD.

For the first time since the earthquakes, trip numbers are on the rise. As of June 2018, current patronage is 13.6 million trips each year. This represents a public transport mode share of 2.25%.

Current Travel Choices

A key aim of this programme is to double public transport mode share to around 5% by the late 2020s, with further increases in later years. This can only be realised by providing a public transport system that is convenient and competitive. It is also about providing real choice for people who need to travel within Greater Christchurch.

At February 2017 there were 3,900 businesses employing 35,000 employees in Christchurch CBD. As illustrated in figure 1, many people live within 10km of the city while others travel from further afield or from Waimakariri and Selwyn Districts. Other employment and activity locations are spread across Christchurch commercial and industrial areas.

11,200 workers commute between Selwyn and Christchurch each day. 10,700 workers travel from Waimakariri. Most commuter traffic comprises single occupancy vehicles with an estimated 85% of vehicles crossing the Waimakariri River transporting only one person.

Past growth and changing demographics have contributed to increased vehicle ownership and continued growth in vehicle numbers. The projected level of growth will place additional demand and pressure on transport, mobility and access. Increasing demands are being placed on the transport network to accommodate peak time commuter movements into Christchurch.

Future travel choice will be determined by journey need and how well the land use patterns and form accommodate different transport options invested in during preceding years. Investing in the right infrastructure at the right time, will support growth and avoid the need for retrofitting at greater economic and social cost.

Initial research indicates some shift towards public transport use for younger people with lower rates of licensing and car ownership³. Evolving technology, information provision and changing travel behaviours will also mean current approaches to meeting increasing mobility will change.

The current reliance on private vehicles for travel is simply not sustainable and will result in a failing transport system. For the region to remain productive, traffic volumes cannot grow at the same rate as the population as this will result in more congestion and longer journey times. A shift to alternative modes is essential.

³ <http://www.nzta.govt.nz/assets/resources/research/reports/569/docs/569.pdf>

Land Use and Transport Integration

Integrated land use and transport planning can support opportunities to use viable alternatives to private vehicle use and improve transport choice. Conversely, a lack of integration can reduce transport choice and consequently encourage greater car reliance.

The current spatial planning framework set out in the Canterbury Regional Policy Statement (CRPS), Urban Development Strategy (UDS), district plans and Christchurch public transport planning, is consistent with commercial centres and priority growth areas. The framework and its context within the national planning framework, is shown in Figure 6.

The planning framework developed in response to the earthquakes operates as part of a collaborative planning environment. The UDS, and amendments to the CRPS provided a foundation for more specific statutory planning processes set out in the Waimakariri, Selwyn and Christchurch District Plans. The key objective is to enable and support earthquake recovery and rebuilding through to 2028.

The CRPS sets out the framework for co-ordinated land use and an infrastructure framework for the recovery of Greater Christchurch. It includes existing urban areas and priority areas for development for Greater Christchurch. These areas provide enough land zoned for urban purposes to enable recovery and rebuilding through to 2028.

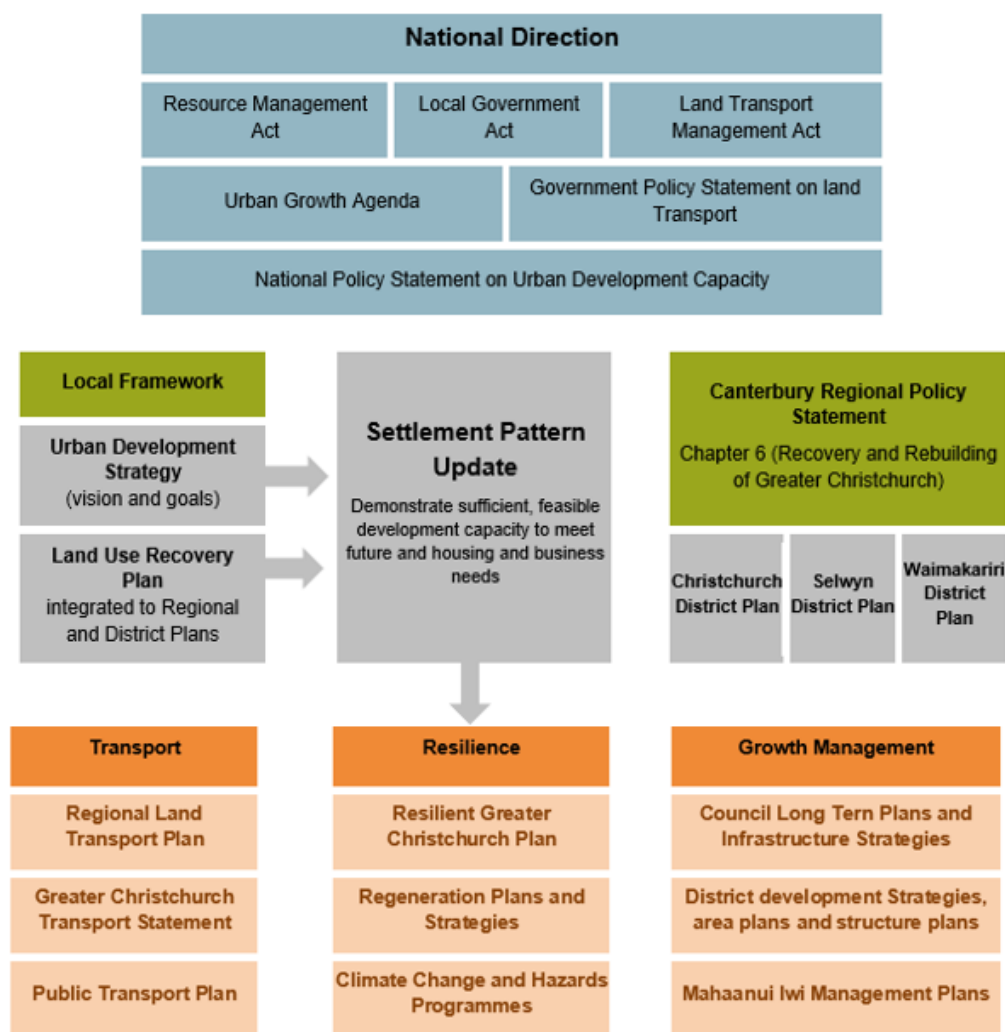


Figure 6 Overview of Strategic Framework

The local framework focuses on:

- Consolidation and intensification of urban areas through higher density living environments in existing areas
- Reinforcing the role of the Christchurch central business district
- Managing growth of towns in Waimakariri and Selwyn, and
- Consolidation of the existing settlement of West Melton.

The settlement pattern is integral to the planning for public transport and integration of transport infrastructure and land use is a key policy.

Key Activity Centres (KACs) provide a focus for commercial activities and residential intensification. Because of their density, mix of activities and location on strategic transport networks, Key Activity Centres support the provision of public transport and intensification of residential activity within surrounding residential areas. KACs also provide for more intensive mixed-use development and provide the focal areas for employment, community activities and the transport network. All are well established and have core or high frequency public transport routes serving them being near the key transport corridors.

The spatial pattern for Greater Christchurch aims for smaller and consolidated urban footprints to encourage the use of less energy, especially those areas where travel patterns can be reduced through optimum relationships between residential, employment, shopping, educational and recreational activities. This will provide better opportunities and choice for people in terms of transport modes. Public transport planning is integral to this objective.

The new locations for intensification are drawn from the strategic direction established through the UDS and implemented through the CRPS. This directs the Councils to focus intensification on activity centres for the purposes of the meeting household demand and supporting centres in the recovery period (until 2028).

The new planning framework encourages higher density living environments, mixed use and a range of housing types in and around the Christchurch CBD, KACs, larger neighbourhood centres, and on brownfield sites. A key objective is to integrate strategic infrastructure and services with land use development. Greenfield development is limited to priority areas to prevent further dispersal.

The planning framework provides for 30 households per hectare in some suburban areas and 50 houses per hectare in the Christchurch CBD. A summary of current activity and density is provided in Table 1. This data demonstrates employment numbers and existing agglomeration around KACs (and therefore key corridors) and the Christchurch CBD; it also demonstrates there is significant opportunity for increased density that is yet to be realised. This provides a robust foundation for investment in a public transport network to support future growth, more intensive residential development and Transit Orientated Developments (TOD) along key corridors.

New areas of medium density should be reasonably accessible to a key or neighbourhood activity centre of a size and diversity that provides a wide range of facilities and services; and in addition, also be accessible to public transport (10-minute walk) and open space.

The public transport network is based on high frequency routes along key corridors. The 2018-28 Draft Regional Public Transport Plan proposes increased frequency on another four routes. Hornby, Riccarton, Papanui, are located on the key corridors. Along with Barrington, Shirley and Linwood, these locations are identified as public transport interchange points where several bus routes converge in a coordinated way to connect services for onward journeys. Consequently, these centres offer a high degree of accessibility to the bus network.

Table 1 Key Centres - Summary of activity and density (2017)

Centre	Employees (2017)	Adjoining Housing Zoning Density*	Households within 400m of centre	Current density (houses/ha)	High Frequency PT connection
Christchurch CBD	35,000	Medium – High	3,000		Y
Papanui	2,801	Low - Medium	1,149	10.0	Y
Shirley (The Palms)	1,224	Low - Medium	813	6.4	Y
Linwood	976	Medium	927	10.0	Y
New Brighton	388	Medium	348	8.4	Y
Belfast / Northwood	648	Low - Medium	639	1.6	Y
Riccarton	4,325	Low - Medium	3,501	14.2	Y
Halswell	314	Low	1,266	9.6	Y
Spreydon (Barrington)	660	Medium	1,140	10.8	N
Hornby	2,211	Low - Medium	678	6.4	Y

*Medium – 30/ha, High – 50/ha

Alignment with Central Government Priorities

The need for investment in public transport is driven by growth and a commitment to achieving a better environmental, social and economic outcome for Greater Christchurch and New Zealand.

Government priorities for the land transport system are set out in the Government Policy Statement 2018 (GPS). The Government's objectives are a land transport system that:

- is safe, free of death and injury
- improves access to economic and social opportunities
- improves resilience, and transport choices
- enables better environmental outcomes
- delivers the best possible value for money.

The GPS identifies an increased focus on urban areas to ensure that transport and land use planning reduces the need to travel by private motor vehicles, by:

- Improving access by reducing the need to travel long distance to access opportunities like employment, education and recreation
- Supporting a mode shift for trips in urban areas from private vehicles to more efficient, low cost modes like walking, cycling and public transport.

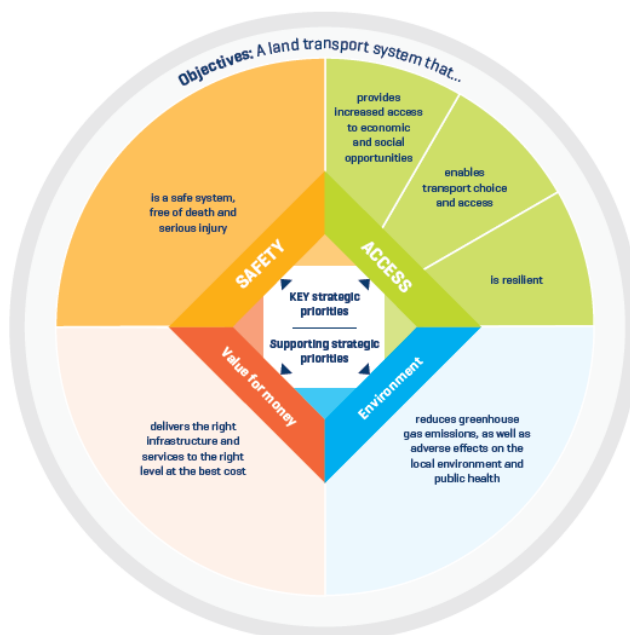


Figure 7 Central Government Land Transport Objectives

The GPS increases Central Government investment in public transport, which is expected to grow public transport patronage by 11 percent over the next three years to 175 million passengers annually.

The investments outlined in this programme are an important step in realising the Government's objectives and reflect the Greater Christchurch Partnership's commitment to moving more people on public transport, curbing the reliance on private vehicle use, responding to the urban growth strategy for Greater Christchurch.

The GPS is also closely aligned with regional transport objectives. A key objective of the in the Regional Land Transport Plan is to improve levels of access in an environmentally sustainable way by increasing the attractiveness of public transport, walking and cycling to achieve is greater use of these modes.

The draft Canterbury Regional Public Transport Plan signals that key changes in the new network centre around increased levels of service on existing core routes, and the addition of new routes to the core network. This provides a critical base line for future development of the public transport network, including investment in rapid transit, to cater for longer term growth.

Greater Christchurch Public Transport Issues

What Needs Addressing?

The most common factors influencing transport choice are cost, comfort and travel time⁴. Similarly, the key areas identified for improvement by this PBC are the public transport system's reliability, connectivity, and attractiveness. The current public transport system in Christchurch is considered unreliable due to lengthy journey times in comparison to private vehicles. It is also regarded as a poorly connected network that does not provide good accessibility to employment, education and services. To address these issues, both the concrete provision of public transport services and the perception of public transport in Christchurch need to change.

These common factors are reflected in the problem statements developed as part of initial work on the programme business case. These problem statements allow the development of an appropriately focused public transport response to the impacts on the transport network that the projected growth will create. These statements allowed a verification process to confirm that all interventions considered in the PBC will contribute to addressing the defined problems and achieving the investment objectives.

Problem Statements	The current public transport system can be unreliable, and many journey times are not competitive with the private car. (50%)	50%
	The current public transport system is not always sufficiently integrated with existing and planned land use in Greater Christchurch. (25%)	25%
	There is poor perception and experience of using public transport in Greater Christchurch. (25%)	25%

Figure 8: PBC Problem Statements

The recommended programme developed through the PBC process aims to improve journey times and service reliability while providing a positive experience by ensuring that interventions are customer focused, flexible and adaptable to change.

Journey Times

Journey times are affected by congestion on roads without bus priority infrastructure, and during peak times the efficiency of bus travel is compromised on some routes. Frequency of stops can also impact on journey time.

Increasing public transport priority and introducing frequent buses during peak times can redress the overall journey time and increase the attractiveness of public transport relative to that of the private vehicle.

Other customer experience issues include limited off-peak service, poor-quality shelters and unreliable timetables. Each of these can be addressed as part of wider network improvements and ongoing investment in public transport.

⁴ Environment Canterbury's *Perceptions of Christchurch Public Transport – Crowd Testing, November 2017*

Reliability

The current reliability of inbound bus services is between 70% - 90%. Reliability increases where buses are given priority over other vehicles using the road. The maximum demands on any corridor occur near Christchurch City area due to greater congestion, lack of priority bus lanes and increasing road users converging during peak demand.

Customers travel needs also influence perceptions of public transport reliability. For example, a person with multiple trips during the day and time constraints is likely to perceive public transport as less reliable, compared with a private car. Conversely, a person travelling directly from home to a place of work may find public transport easy and reliable.

Why is this So Important – the Benefits of Investment

Investment in Greater Christchurch's public transport network has been the subject of extensive discussion and research during the last 20 years. The post-quake environment provided a significant opportunity to confirm the future public transport network, revisit long-term requirements and provide for long-term settlement patterns.

Existing investment in the strategic transport network (Roads of National Significant and Christchurch Northern Corridor) and the completion of current projects will support journey time improvements and reliability in the short term. However, these investments are focused on improving private car journeys. Christchurch Transportation Model (CTM) modelling indicates that the projected population growth will negatively impact the transport network unless investments are made to balance the transport system. Therefore, significant investment is needed in larger scale projects to meet demand for future growth and support a mode share increase for public transport.

Without investment to support changes in travel behaviour and mode choice, the projected growth will place significant pressure on the transport network. The potential effects will be most severe for trips from Selwyn, Waimakariri and western Christchurch into the central city.

Investment Objectives

Investment objectives were developed for the programme through refinement and blending of the problems, benefits and measures.

The investment objectives reflect initial outcomes sought for the Greater Christchurch public transport network.

During engagement with stakeholders, it was agreed that the investment objectives form part of a wider vision for Greater Christchurch and together, land use and transport planning will shape the city.

The key focus is therefore to:

- Support the strategic objectives for Greater Christchurch



- Integrate land use planning with transport facilities and services
- Provide a transport enabler to improve mobility and accessibility
- Enhance real customer choice and experience.

By shaping the pattern of development and influencing the location, scale, density, design, and mix of land uses, planning can help to facilitate an efficient transport and land use system by:

- reducing the need to travel;
- reducing the length of journeys;
- making it safer and easier for people to access services;
- reducing the impact of transport on communities;
- providing a choice of travel modes; and
- ensuring flexibility to meet the demands of a changing economy and market environment.

Broad Benefits

In addition to the direct benefits of increased patronage there are broader, positive outcomes for society, environment and health including:

- Reduced congestion
- Better connection to education, services, employment and recreation activities.
- Environmental and health benefits from reduced emissions (CO₂, particulates) and transport noise;
- Wider economic benefits resulting from the impact of improved accessibility on productivity, labour force participation, and competition⁵.

These benefits are interrelated. For instance, a project that results in larger travel time savings and improvements in the quality of experience will also tend to have larger benefits for productivity and labour force participation, as it will improve access between businesses and employees.

The benefits of public transport are also realised over different timeframes – for example health impacts occur over a person's life time. Reducing stress from commuting on congested roads will have longer term outcomes on an individual's health. By contrast, replacing 30 cars with a single rapid transport option, will have immediate effects on reducing emissions.

Health

Air pollution from all sources in New Zealand is responsible for 1,222 deaths per year; 900 premature deaths are attributed to human sources⁶. Emissions from vehicles cause 256 premature deaths, with annual costs of \$495 million, each year⁷. Public transport has a key role to play in reducing total emissions and effects of car-based commuting. People who live or work in communities with high quality public transport tend to drive less and rely more on alternative modes (walking, cycling and public transport).

The health and wellbeing benefits of active travel modes such as walking, or cycling are well established. There is also growing evidence demonstrating the detrimental impact that commuting by private car can have on our health and wellbeing. This includes impacts on mental wellbeing, physiological measures (such as increased blood pressure), or the time available for activities.

The emissions released by motor vehicles are harmful to the environment and human health, particularly in areas where there are high traffic and congestion rates. Motor vehicles produce a complex mixture of contaminants including particulate matter and nitrogen oxides, both are regularly measured as part of monitoring the New

⁵ <https://www.nzta.govt.nz/assets/resources/economic-evaluation-manual/economic-evaluation-manual/docs/eem-manual-2016.pdf>

⁶ <http://www.hapinz.org.nz/HAPINZ%20Report%20Final%20Clean%20June%202007%20v3.pdf>

⁷ Op. cit.

Zealand airshed. Busy roads are key sources of air pollutants that can affect motorists as well as nearby residents and employees. Motor vehicles contribute 14% of PM10 pollution in Christchurch⁸.

Sustainability

Sustainability benefits are closely aligned to wider health benefits. In addition, by increasing public transport mode share, emission increases may be avoided particularly with the adoption of electric vehicles. As higher rates of public transport patronage are realised, reductions in emissions and fuel consumption will also be achieved. This supports New Zealand's policies on reducing greenhouse emissions.

Safety

Public transport can contribute to safer streets as part of wider land and transport planning approaches. *An Accessible City* is implementing a transport system in the CBD based on a compact, people-friendly core with a key focus on providing for public transport, walking and cycling. These forms of transport are inherently safer than private car which results in fewer crashes. Moving people by bus also improves safety, lowering the overall crash risk per person per kilometre travelled⁹.

Research also indicates that sustainable public transport options have significant safety benefits when introduced as a broader package of road safety policies including street infrastructure and vehicle technology improvements¹⁰.

Economic

Public transport can encourage and enable increased employment in key activity centres and the Christchurch CBD. For Christchurch City, effective transport choices will help to shape the city. For Waimakariri and Selwyn, investment in Public transport will support future growth and enable more direct and timely access to Christchurch CBD.

Public transport infrastructure investment, particularly rapid transit, also influences residential and commercial property values expressed through sales price and rents. Land value uplift¹¹ arises from transport investments which increase the accessibility and attractiveness of a location, which in turn increases the scope for redevelopment and intensification. Land value uplift arises from the knock-on effects of a transit node, such as a concentration of shops at transport hubs.

Over the life of the strategy, reductions in car-based commuters will also free up space that would otherwise be required for car parking.

Economic benefits are discussed in more detail in the Programme Business Case section of this document.

The Recommended Programme

This programme business case identifies what form of public transport network and services will optimally meet the region's regeneration and growth opportunities over the next 30 years, closely linking with land use planning objectives for the sub-region.

The recommended programme provides a composite response drawing together the best performing elements from the shortlist against the investment objectives and implementation criteria. It also considers extensive land use and transport planning investigations that were undertaken to inform the wider vision for Greater Christchurch during the past 20 years.

⁸ <https://www.pce.parliament.nz/media/1256/the-state-of-air-quality-in-new-zealand-web5.pdf>

⁹ https://www.apta.com/resources/reportsandpublications/Documents/how_transit_benefits.pdf

¹⁰ <https://wri.org/sites/default/files/Saving-Lives-with-Sustainable-Transport-EMBARQ.pdf>

¹¹ The process whereby the value flows on the transport network are capitalised into land values)

The programme incorporates an integrated set of interventions ranging from continuous public transport priority lanes and Rapid Transit, to state-of-the-art vehicles, higher frequency and extended operating hours, and improved information provision.

The programme is staged to develop a flexible network that can respond to changes in travel demand through population growth, settlement patterns, and external factors such as emerging technology or pricing.

The programme identifies future corridors however, it does not confirm the mode, exact alignment or precise timing. The programme also focuses on the areas closer to the CBD, the northern corridor and the south west corridors. This ensures alignment with spatial planning objectives, building on existing corridors and addressed problem spots in the network. Those 'problem' spots include congestion points and gaps in bus priority.

This demonstrates good use of the Transport Agency intervention hierarchy to achieve investment value for money.

		High Level Benefits				
		Reduced journey time	Reliability	Sustainability	Better customer experience	Integrated planning
Tools	Marketing				✓	
	User incentives				✓	
	Bus stop improvements				✓	
	ITS operational management	✓			✓	
	Park & Ride	✓		✓	✓	
	Cycle parking & facilities			✓	✓	✓
	Improved connections	✓	✓	✓		✓
	High Frequency routes	✓	✓	✓		✓
	Bus priority lanes	✓	✓	✓		✓
	Intersection priority	✓	✓	✓	✓	✓
	Demand Responsive Services		✓	✓	✓	✓
	State of the art vehicles		✓	✓	✓	
	Mass Rapid Transit	✓	✓	✓	✓	
	Higher density development	✓		✓	✓	✓
	Key Activity Centres	✓		✓	✓	✓
	Mixed Use Development	✓		✓	✓	✓
	District Parking Rules			✓		✓
	Corridor Protection	✓	✓	✓	✓	✓
	Transit Oriented Development	✓		✓	✓	✓
	Traffic Calming			✓	✓	✓
	Travel Demand Management	✓	✓	✓		✓
	Mobility as a Service		✓	✓	✓	✓
	Operation and ongoing optimisation	✓	✓	✓	✓	
	Complementary Measures					
	City Parking Strategy	✓	✓	✓		✓
	Congestion Charging	✓				

Figure 9: Programme Toolkit

The programme elements are listed in Figure 8 below. These elements are complementary and additive. No single measure will succeed in delivering all the benefits, and multiple interventions will often be needed to transform the public transport experience.

- Larger increases in bus frequencies are not a substitute for more public transport priority, as the buses would get caught in traffic and ‘bunch up’ thereby negating some of the benefits of higher frequencies.
- Similarly, park and ride investment without bus priority or rapid transit measures on the congested sections of the network will not attract people out of cars.

Implementation Strategy

The programme implementation strategy positions Greater Christchurch to effectively integrate with land use and the travel demand arising from growth. It also remains sufficiently flexible to incorporate advances in technology and service provision.

To effectively plan the bus priority and complementary interventions, coupled with large scale interventions such as rapid transit, it is suggested that three interrelated packages of work are progressed as business cases.

Three interrelated business cases would develop the programme elements.

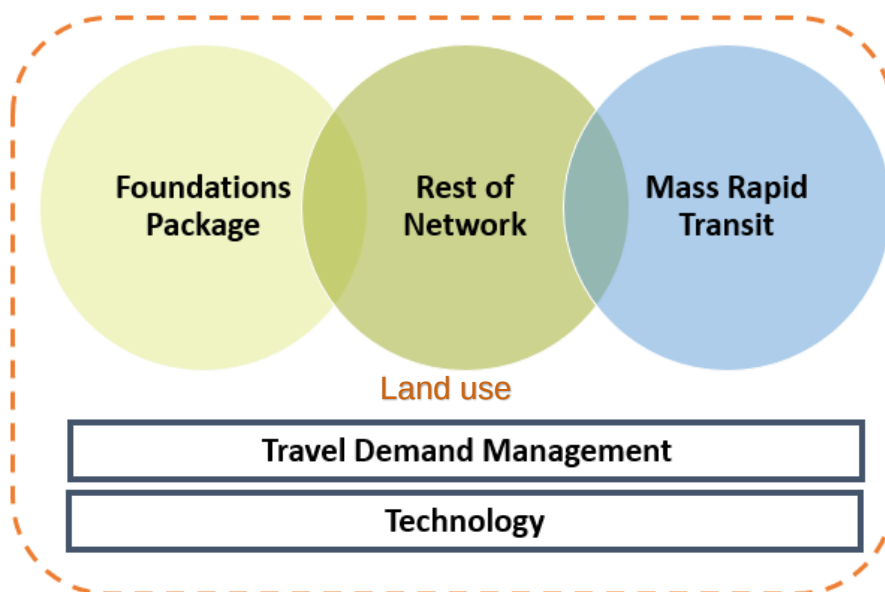
The programme comprises a complementary package of tools that build in the existing initiatives and digital strategies. Land use planning is a key component of the whole programme to ensure Greater Christchurch is prepared to adequately accommodate and respond to future growth.

Implementation is planned but responsive to change. The business cases would progressively develop the programme delivery in a manageable way and allow the identification of short to medium term activities without over-investing in the programme too early.

To ensure effective implementation of the business cases, it is critical to understand the relationship between the interventions and their delivery. In this regard there will be investment trigger points based on the progression of the interventions in each work stream and as population growth reaches critical points. Further investigation is required to determine the specific trigger points; however, these are likely to include population growth, patronage, travel times and settlement patterns. This may also influence the order of the business cases.

A comprehensive monitoring and coordination plan for the overall programme is also recommended to ensure efficient and coordinated investment and implementation. This ensures that there are appropriate monitoring and review points throughout the programme.

Figure 10 Programme Implementation Packages



Package 1 – Foundations

The need for improvements to the Christchurch public transport system to accommodate expected growth is well recognised. The Canterbury Regional Public Transport Plan (CRPT) proposes measures such as increased frequency to improve service.

The Foundations Package seeks to capture these proposals and build on them to achieve low cost, quick win improvements that can reduce journey time, improve public perception and increase patronage. It will build on the current investment being implemented through the Long-Term Plan and reconfirm the year 4-10 investment.

The CRPT introduces a new patronage-based network to the Greater Christchurch area and with that, the need for increased priority measures, frequencies and adoption of technology, moving the fleet toward low emissions. The package will include the necessary elements to support the establishment of a core network of 5 high frequency routes and supporting services.

The key interventions include:

- Increased service frequency
- Hot spot intersection priority
- Bus stop improvements
- ITS operational management of public transport priority
- Technological delivery of personalised public transport information
- Marketing and user incentives
- State of the art vehicles
- Alignment with spatial planning initiative (Accessible City, Central City Regeneration and district planning KAC locations, Suburban Parking Policy)

These interventions are expected to make public transport more reliable, make journey times more competitive with private cars, enhance user perception, and attract patronage. The most immediate opportunity for increased public transport patronage is from residents within 10km of Christchurch CBD, as they generate the most journeys on the transport network. A key focus of this first package is to improve accessibility for this group through frequency improvements. Optimising the current network through frequency and technology interventions will provide immediate cost-effective deliverables and create the foundation for progressive infrastructure, policy and land use enhancements in the medium to long term through the remaining two packages. Fleet procurement to meet the goal of zero emissions by 2030 will begin in this package with new contracts being delivered in 2021. Fleet procurement is also included in both packages 2 and 3 to support service increases.

Package 1 also makes provision for trials of specific elements such as Demand Responsive Transit (DRT). Based on the results, these interventions can then be fully implemented as part of successive packages as appropriate.

This package can be progressed as a Single Stage Business Case to prioritise and provide detailed planning for the interventions.

Package 2 – Rest of Network

Package 2 builds on the established 5 core routes, this package would implement the remaining 4 core routes and support service frequency increases. It builds on the first package to complete the network with new service types such as DRT and other advances in technology to improve the priority, competitiveness and management of the entire core network. The development of this package will enable the adoption of technology advances in all areas of the network from passenger facilities, information, vehicles through to infrastructure and network management. The selected corridors are aligned with the spatial planning framework (higher density development) and existing and future travel demand.

The intention of this package is to focus investment on high demand corridors to provide value for money. The implementation of public transport improvements such as continuous public transport lanes on these corridors

with a longer-term view to the incorporation of MRT (under Package 3) will enable coordinated delivery of service improvements and infrastructure upgrades. This in turn ensures a logical and sequential implementation of programme elements based on future growth. It also allows flexibility in determining the timing and mode of fleet improvements to best complement infrastructure.

The key interventions under Package 2 include:

- Continuous public transport priority lanes on the two key corridors and upgrades to existing facilities and extension to CBD
- Rapid Transit Corridors
- Multimodal interchanges (Park'n'Ride, covered and secure bike parking and bike share)
- State of the art vehicles
- High frequency and extended operating hours
- Demand Responsive Transit.

Fleet procurement is included in packages 1, 2 and 3 to meet the goal of an emission free fleet by 2030 as articulated in the Canterbury Regional Public Transport Plan.

These interventions will build on the hot spot “quick wins” of package 1 to provide a robust public transport system. They will facilitate mode connection, incentivise greater uptake of active modes to complement public transport use, improve “first-mile last-mile” access to attract new users, and improve overall journey time competitiveness with private car journeys.

This package incorporates demand responsive transit (DRT) to replace some low-frequency/low-demand services. While this can provide accessibility where fixed routes are prohibitively expensive, there are some risks associated with the cost of this as a long-term strategy. Frequency and eligibility would need to be carefully managed to ensure that this does not become costlier than providing a fixed route service.

The removal of on-street parking could considerably reduce the amount of land purchase required. Replacement parking facilities would need to be investigated and may offset some of the land cost savings.

It is anticipated that a Single Stage Business Case will be required to confirm the key corridors and interventions.

Package 3 – Mass Rapid Transit

Package 3 is a transformational package that lays the foundation for significant urban development and land use changes and transformation in transport accessibility. Early work will identify and protect the corridors and enable policy changes to support intensification and regeneration in the Christchurch CBD around Key Activity Centres and along the Mass Rapid Transit (MRT) corridors; to signal to developers and investors that there is a commitment for transit-oriented development.

The implementation of MRT is currently mode agnostic and it is anticipated that the MRT business case will determine the timing and methodology for MRT implementation. This will depend on future growth conditions as well as advances in technology and identify whether the strategy is for a demand-based evolution from public transport lanes, or part of a wider strategy to lead development and regeneration.

Interventions include:

- Continuous public transport priority lanes
- Intersection priority
- State of the art vehicles
- Timed transfers on low-frequency routes
- Designations and land acquisition.

It is expected that these large-scale investments will have the biggest impact on reaching the mode share goal of 5% within a 10-year time frame. For example, the implementation of large scale improvements on the Northern

Busway in Auckland resulted in an overall public transport mode share of 12-14% over this corridor, an increase in usage of over 4% between 2006-2013. This corridor also experienced the only drop in private vehicle use over the assessed period with commuting growth dominated by public transport.¹²

North and South West corridors are the 'minimum regrets' options. Public transport priority / rapid transit measures on the inner parts of the corridors (the edge of the Christchurch urbanised area) will have significant benefits regardless of whether the city intensifies more or does more greenfield development.

For example, if city intensification is realised, these corridors will move many people from middle-ring suburbs to key activity centres without adding to (or getting caught in) traffic congestion. Conversely, if more greenfield development occurs, these corridors can efficiently serve travel demands from Rangiora / Kaiapoi and Rolleston via express buses that do not get caught in traffic at the city end.

It is anticipated that an IBC or SSBC will be required due to the network scale of the programme.



Figure 11 30-year Vision for Greater Christchurch public transport (CRPT, 2018)

Complementary Measures

In addition to the investments in public transport, the programme will ensure integration with other strategies relating to land use planning, technology, and parking.

Land Use Planning

The programme is consistent with the existing strategic planning framework for Greater Christchurch of consolidation, intensification and self-sustaining townships. It aligns with Regeneration of the Christchurch CBD as the region's economic hub.

- Enabling neighbourhood design to enable better public transport access and pedestrian accessibility.
- Higher levels of land use density within the walking catchments of bus stops on public transport corridors and KACs

¹² <https://www.transport.govt.nz/assets/Uploads/Research/Documents/Richard-Paling-report-Transport-Patterns-in-the-Auckland-Region.pdf>

- Mixed land use along corridors and within KACs to support multi-trip purposes and to maximise utilisation of public transport services.

Current District Plans for Greater Christchurch include objectives and policies that promote integration of transport and land use, with mixed outcomes. Land use planning is linked to the wider programme regarding the location, access, and integration of the public transport corridor and surrounding land uses. Work on the Waimakariri and Selwyn proposed plans is well advanced.

Over the life of the programmes, the review of the three district plans will occur from 2028. Future work may need to consider the restrictions set out in covenants regarding access design and public transport.

There is a need to manage land-use and transport relationships to achieve a successful city that achieves the vision and desired outcomes for Greater Christchurch.

Land use planning will need to grow in effort and influence over the programmes as it transitions from quick wins and optimisations to the more challenging interventions of land use, public transport priority and pricing policies. This will take time to evolve and approve.

Technology

The transport sector is entering a period of significant change, with new technologies, products and services fundamentally shifting people's expectations and opportunities. Electric vehicle, e-ticketing and connected services using intelligent transport systems will all form part of the evolving programme.

For example, the market for intelligent mobility is rapidly developing in the form of Mobility as a Service (MaaS). The concept of MaaS is to use a single app to access and pay for various transport modes within a city or beyond and will give options to allow a traveller to select the most suitable transport mode. MaaS relies on a digital platform to provide integrated journey planning and ticketing over a range of public and commercial modes including public transport and bike and car share options. If adopted, MaaS has the potential to increase public transport patronage significantly. For instance, following deployment of MaaS in inner Helsinki, Finland, public transport mode shares increased from 48 % to 74% for those customers who subscribed to the service.

A pilot project is underway to investigate how MaaS can be incorporated into the Christchurch transport system and integrated into a longer term national programme. Successful incorporation of MaaS requires significant intra-governmental coordination and coordination with private enterprises in the areas of data sharing, and ticketing. On that basis MaaS will be a focus during packages 1 and 2 as it is developed, matured and normalised. In time, it will have less focus as behaviours and use becomes main stream.

Parking

Parking management is part of the broader approach to achieve an integrated response. Car parking is also one of the most contentious issues arising out of transport improvements. The programme will align with current parking initiatives being developed by territorial authorities.

Car parking requirements for the rest of Greater Christchurch are set out in the current planning framework with a consistent approach to provide minimum numbers based on the type of activity. The CCC District Plan includes parking "reduction factors" based on factors such as proximity to public transport route, walking and cycling facilities. This will become an increasing focus as CCC planning reviews occur during 2025. Waimakariri and Selwyn are currently reviewing their Plans. Minimum parking requirements apply outside Christchurch CBD; within the CBD a maximum parking limit has been set. Selwyn District Council and Waimakariri are considering parking options as part of current District Plan reviews.

Amendment to parking requires further consideration and a fully integrated response. Given the car-centric culture, timing of changes to car parking arrangements is critical. A key focus for the programme will be managing the removal of on-street car parking to accommodate priority lanes in the existing road corridor. The Proposed

Suburban Parking Policy prioritises suburban, kerbside road space; movement for buses takes priority on core bus routes.

Exclusions

Congestion Charging

Congestion pricing was discussed in the PBC produced in June. This has been removed from the revised investment case. Congestion charging in the CBD has the potential to contribute to several of the investment objectives sought by the PBC, including incentivising mode shift and improving the speed and reliability of bus services (by reducing general traffic congestion). However, it also involves the risk of raising the cost of accessing the CBD without delivering travel time savings for drivers who did not shift modes. This may undermine development in the area, negatively impacting the goal of CBD revitalisation and reducing the CBD's ability to provide a critical mass of activity to drive higher public transport use.

Congestion pricing warrants further investigation as a strategy to address the goals of the PBC but it is recommended this **should not be included as an action in the core programme**. It should be progressed as an area for further investigation once the key programme elements such as Bus Priority improvements and Rapid Transit are operational.

As with technological change, it is critical that as service improvements are made, they have enough flexibility to incorporate these pricing elements in the future.

Programme Sequencing

In line with the goals of the Canterbury Regional Public Transport Plan, this programme provides for lower cost short term improvements to grow patronage. These initial quick wins can then be built on to support larger scale elements such as MRT to achieve major gains in mode shift to public transport.

On its journey, Greater Christchurch will face significant technological and societal changes as the way we work, play and communicate, continues to evolve. The spectrum of change leading to 2050 cannot be fully understood, however the decisions made along the way should be future focussed and support the long-term vision for Greater Christchurch providing sufficient flexibility to adapt.

Review and monitoring will be integral to the programme to ensure it is adaptable to meet change and to ensure 'right time for the right response'. Review processes including monitoring to validate progress, inform next steps and refine interventions and investments accordingly. This is also important to ensure effective integration across the land and transport planning spaces.

During the first 10 years, the programme focuses on growing patronage by concentrating investment on more core routes, increasing service frequency and improving customer service. Implementing this represents a significant step towards achieving the investment objectives. Beyond year 10, the recommended programme will progress towards MRT to enable more people to access economic and social opportunities, while providing for long term growth.

The proposed sequencing aims to allow sufficient time for investigation, prioritisation and design activities before specific interventions are implemented, however there are opportunities for the implementation of some of the smaller, or less complex interventions to be pulled forward. These include:

- Demand responsive transport;
- Marketing and personalised journey planning;
- Route protection for public transport priority and MRT interventions.

While the costs associated with the above activities are relatively minor, bringing the implementation timescales forward would impact on the spending profile for the programme.

There is a strong willingness from stakeholders to see a step change in public transport priority, and delivery model and to seize the opportunities and benefits derived from public transport investment. However, some programme interventions may be challenged by some members of the public.

The areas of greatest perceived risk include the reallocation of road space and potential land acquisition for priority infrastructure and removal of parking. These each need to be managed without compromising the vision for Greater Christchurch and broader policies regarding land use and planning integration and sustainability.

Programme Financial Case

The Strategic Summary presents a high-level estimate of whole-of-life costs for the recommended programme. This estimate incorporates several revisions to the original cost estimate outlined in the draft PBC, which are outlined in a supplementary technical note.

Whole-of-life cost estimates, estimated construction cost ranges, and long-term operating and maintenance costs associated with the four components of the programme are summarised in Table 2.

Table 2: High-level cost estimates for Public Transport Futures programme

Package	Indicative whole-of-life cost *	Undiscounted construction cost		Annual operating and maintenance cost (Y30)
		Low	High	
Foundations	\$466m	\$70m	\$130m	\$33m
Rest of Network	\$251m	\$150m	\$250m	\$25m
Rapid Transit to MRT Priority – North and SW Corridors	\$590m	\$500m	\$1,500m	\$40m
Complementary Measures	\$19m	\$12m	\$23m	\$0.5m
Programme Total	\$1,327m	\$732m	\$1,403m	\$98m

** Present value of costs over a 40-year evaluation period, discounted using a 6% discount rate. High construction cost estimates have been used for this cost estimate, except for the Rapid Transit components, where a midpoint construction cost estimate of \$1b has been used.*

The programme has an indicative whole-of-life cost of just over \$1.3 billion. This cost is broken down as follows:

- Around 44% of programme cost is for Rapid Transit improvements on the North and SW Corridors. This reflects costs to develop new corridors, plus an allowance for increased public transport service provision.
- Around 35% of programme cost is associated with package1. While this option involves low capital costs, it includes a large share of added operating costs due to early public transport service improvements.
- Public Transport Priority improvements on the rest of the network account for 19% of programme costs. This mainly reflects costs to develop new priority measures, plus associated service improvements.

The expected cost profile for the recommended programme are summarised in Figure 12.

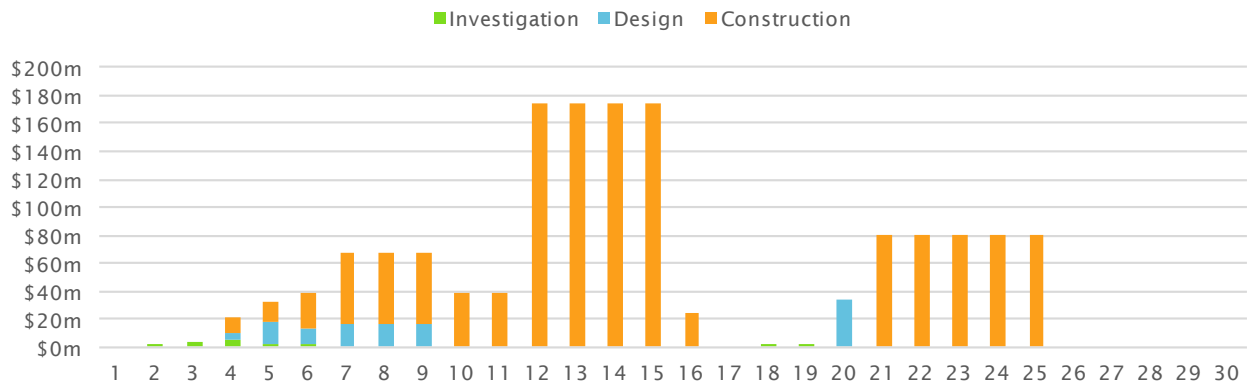


Figure 12 High-level capital cost estimates by programme year

The programme includes capital expenditures to develop new bus priority measures, followed by significant investment in rapid transit corridor development at the start of the second and third decade. Operating costs would ramp up throughout the programme, both to serve demand growth and to complement new infrastructure.

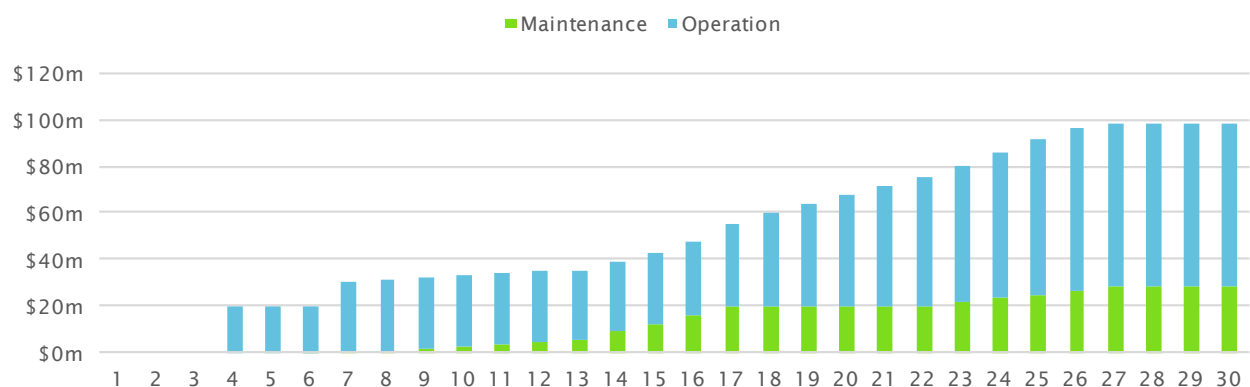


Figure 13: Indicative revised cost profile for programme

Programme Economic Case

An indicative economic evaluation of the programme has been conducted based on Christchurch Transportation Model (CTM) outputs plus supplementary analysis. Due to limitations with the available modelling, this presents a *scenario* for programme benefits, rather than an exact *prediction* of the outcomes that the programme will achieve.

In this context, it will be important for subsequent business cases to undertake more detailed analysis to confirm the value for money delivered by specific programme components.

This analysis was conducted in three stages, which are described in a supplementary technical note (MRC Cagney, 2018) completed to inform this report. First, CTM was used to model outcomes for road congestion and public transport volumes under alternative assumptions about public transport mode share. Second, model outputs were re-analysed to estimate decongestion benefits, emissions reduction benefits, health benefits from increased walking to access public transport stops, and the level of public transport user benefits that would be consistent with a given level of mode shift. An indicative allowance for wider economic benefits (WEBs) from increased accessibility between firms and workers was also incorporated.

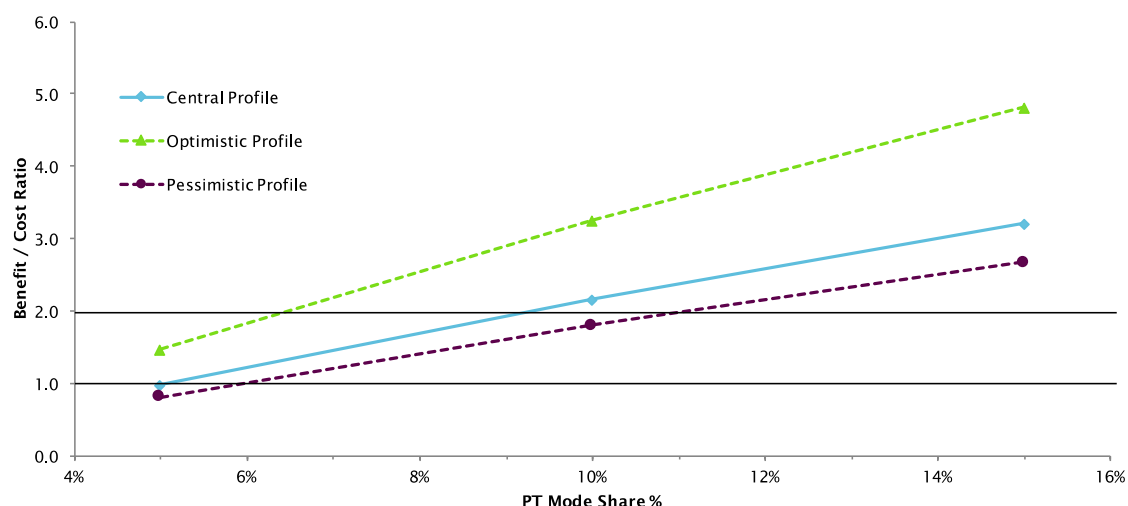
Third, these estimates were combined with indicative programme costs to estimate the level of mode shift to public transport that would be required for the programme to achieve value for money, defined as a benefit-cost ratio (BCR) above one. To understand whether this level of change is likely to be achievable, further analysis was conducted to understand the impact of key programme components on the speed and attractiveness of public transport journeys.

Achieving Value for Money

Revised estimates of the programme BCR under varying levels of mode shift are shown in Figure 14. This suggests that the programme is likely to deliver a BCR above one if it succeeds in lifting public transport mode share to 5.1% or above by the late 2020s.¹³ This represents a doubling of current mode share and is considered achievable. A larger mode shift would result in a correspondingly higher benefit-cost ratio.

In other words, for the programme to deliver value for money, it must increase public transport mode share from the current public transport mode share of 2.25% for all journeys.¹⁴ Given growth projections for Christchurch, it also provides a realistic mode share target in relation to other New Zealand cities with Auckland at 4.5% and Wellington at 5.7%.

Figure 14: Revised high-level estimates of programme BCR under varying levels of mode shift



Composition of Programme Benefits

The following table summarises the expected composition of programme benefits for a scenario that assumes 5% public transport mode share. It estimated that a 5% public transport mode share scenario would generate benefits of around \$1.2 billion, excluding WEBs, or potentially up to \$1.4 billion with an indicative allowance for WEBs.

Analysis of CTM outputs suggests that the programme would benefit public transport users directly, via faster and more comfortable journeys, as well as other road users, via the decongestion benefits from mode shift. In addition, there would be substantial health benefits from added walking to access public transport stops and stations, and emissions reduction benefits.

Indicative estimates of wider economic benefits are set out in **Table 3**, illustrating the impact of improved access between firms and workers on economic productivity. Previous evaluations of major urban transport projects,

¹³ If WEBs were excluded, a 5.8% mode share would be required.

¹⁴ CTM's base case forecast implies that in the absence of interventions PT mode share will fall slightly, to around 1.5%, over the evaluation period.

including major public transport projects in Auckland and Wellington and a variety of projects in Australia and the UK, have found evidence that wider economic benefits may range from 10 to 60% of direct transport user benefits.

Christchurch is also likely to experience wider economic benefits from transport improvements that provide faster and more reliable access to key activity centres. Previous research has shown that the Christchurch city centre enjoys a wage premium over other parts of the city, and that enabling the city centre to regenerate faster would lead to higher productivity by increasing the city's economic 'mass'.¹⁵ This assessment therefore assumes that wider economic benefits may be on the order of 20% of conventional transport user benefits, which is near the lower end of the range observed for previous projects.

Table 3: Composition of whole-of-life benefits from 5% PT mode share scenario

Benefit category	Present value of benefits	Share of benefits
Public transport user benefits	\$392m	28%
Decongestion benefits	\$609m	44%
Health benefits from added walking to access PT	\$162m	12%
Emission reduction benefits	\$12m	1%
Total excluding WEBs	\$1175m	
<i>Wider economic benefits (indicative)</i>	\$200m	15%
Total including indicative WEBs	\$1375m	

How the Programme will Deliver these Benefits

To increase Christchurch's public transport mode share from its current level of 2.25% to the required level of 5.1%, it will be necessary to significantly improve the public transport user experience. This will entail improving 'hard' factors such as public transport speed, reliability, frequency, and local access arrangements, as well as 'soft' factors such as vehicle quality and the quality of public transport stops and interchanges.

The interventions included in the Recommended Programme are expected to deliver comprehensive improvements to public transport journeys. Further analysis was therefore conducted to quantify the potential level of improvement to the public transport journey experience for sample journeys, considering journey time, financial costs, and journey quality and convenience.

This analysis, which is reported in **Table 4**, suggests that improvements to journey time and quality of experience of around 23% to 31% are possible for a typical one-seat journey, improvements of 30% to 37% are possible for a slightly longer two-seat journey, and improvements of 42% to 52% are possible for longer journeys that can employ new access modes, such as park and ride or cycle parking.

These improvements are within the range of journey time / cost improvements that are required to deliver the required increase in public transport mode share.

This analysis shows that multiple interventions are required to deliver a sufficient improvement – there is no one 'silver bullet' that will guarantee mode shift. A few key points are as follows:

- First, frequency improvements are expected to have a significant impact on many journeys, reflecting the fact that waiting times can be a significant component of overall journey times.
- Second, improved vehicle and stop / interchange quality may have a material impact on the perceived quality of experience, although different users may respond differently

¹⁵ Jacobs. 2015. *An Accessible City Program Business Case: Wider Economic Benefits Assessment*.
SGS. 2012. *Urban Economics of Central City Blueprint: Rapid Appraisal Final Report*.

- Third, improved access arrangements via park and ride or multi-modal interchanges may be valuable for some types of journeys, especially on the urban fringe where they can ‘intercept’ journeys at key transfer points. However, they will not necessarily succeed in all locations.
- Fourth, public transport priority measures and rapid transit measures are not necessarily the primary contributor to user benefits. In part, this reflects conservative assumptions about the degree of improvement to in-vehicle travel times, which bus priority measures are estimated to improve from around 25km/hr to 31km/hr. However, these measures are very important for unlocking the benefits of other improvements. For instance, it will only be attractive to use a park and ride facility at the edge of the city if buses provide competitive and reliable travel times from that point onwards.

Table 4: Estimated user experience improvement from interventions

Sample public transport journey	Intervention	Improvement in journey generalised cost *	Potential percentage uplift in patronage **
8km bus journey, no transfers, 20-minute frequency	Improve frequency to 10 minutes	11%	10% to 30%
	Bus lanes and signal priority	7%	10% to 20%
	Improved vehicle quality	6%	10% to 20%
	Bus priority, frequency, and vehicle improvements	23%	30% to 90%
	Rapid transit	17%	20% to 60%
	Rapid transit, frequency, and vehicle improvements	31%	40% to 150%
10km bus journey, 1 transfer, 20-minute frequency	Improve frequency to 10 minutes	15%	20% to 50%
	Improved interchange quality	5%	10% to 10%
	Bus priority, frequency, vehicle, and interchange improvements	30%	40% to 150%
	Rapid transit, frequency, vehicle, and interchange improvements	37%	60% to 220%
15 km bus journey from edge of city, 20-minute frequency, feeder bus access	Rapid transit corridor, improve frequency to 15 minutes, improved vehicle quality, develop park and ride station for access	52%	110% to 530%
10km bus journey, 20-minute frequency, 1km walk to stop	Add cycling access, improve frequency to 10 minutes, bus lanes and signal priority, improved vehicle quality	42%	70% to 290%

* Generalised cost is a standardised measure of the time, financial cost, and perceived comfort of journeys

** Based on a range of elasticities from -1.0 to -2.5

Management Case

Collaborative Approach

The recommended programme has significant potential to meet the investment goals by improving journey time and reliability of public transport services, increasing accessibility, and improving public perception of public transport to increase mode share.

To succeed, a collaborative approach to the pre-implementation and implementation stages of the programme must be taken. As a major funding partner, the NZ Transport Agency has a key responsibility to deliver the recommended programme. Christchurch City Council, Waimakariri District Council and Selwyn District Council are co-investors leading the management of public transport infrastructure, parking assets, planning and policy within their jurisdictions, while Environment Canterbury is the primary investor in public transport operations and administers public transport service improvements.

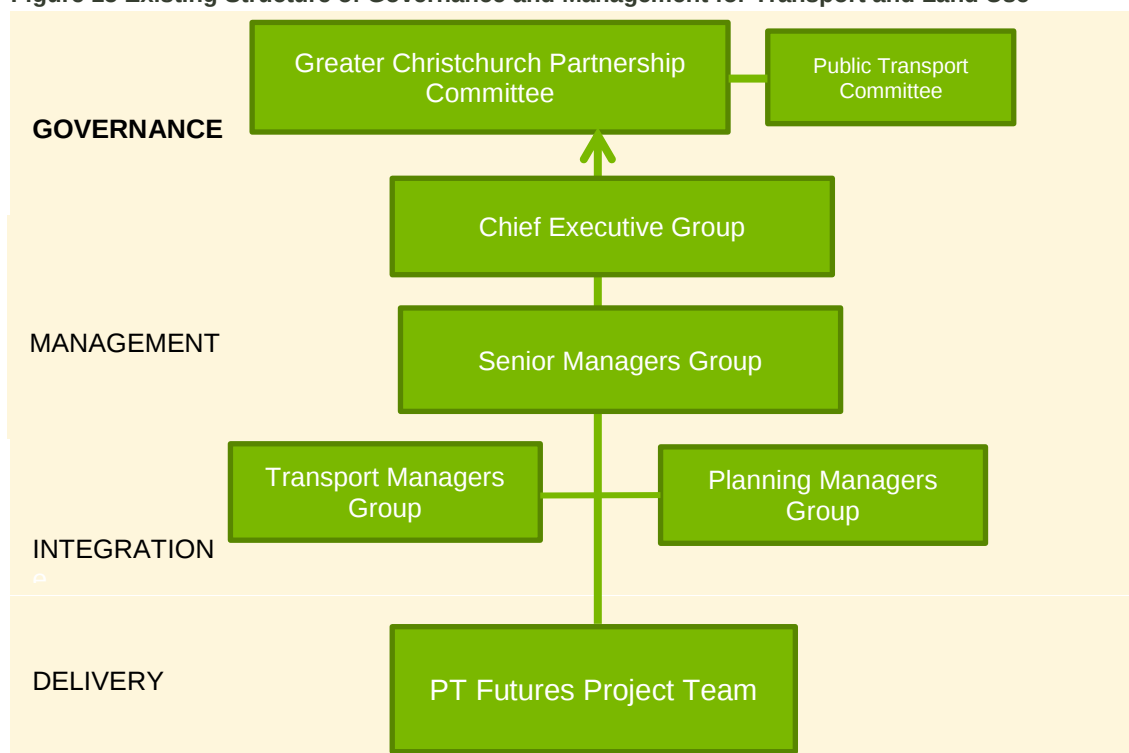
This programme has been developed as an integrated set of interventions that have complementary and cumulative benefits if implemented as a package. It is important to note that there are risks to the expected outcomes if individual elements of the programme are not implemented. The implementation strategy will require alignment of thinking between partner organisations to ensure land use and demand management tools are adequately considered in parallel to the core programme to ensure the maximum benefits of intervention.

Programme Governance

The proposed governance approach builds on the established governance, management and technical structure of the Greater Christchurch Partnership shown in Figure 15 and summarised in Table 5. The current structure provides leadership of Urban Development matters in Greater Christchurch.

The PBC programme would be supported by a dedicated Public Transport Futures project team with core members from CCC, Environment Canterbury, and the Transport Agency. A similar team has been leading the technical aspects of this PBC. While the overall commitment to this project is confirmed, the governance structure may need to be amended to support a project of this scale.

Figure 15 Existing Structure of Governance and Management for Transport and Land Use



This existing project team also reports to the Partnership, through the Transport Managers Group, who oversees projects. Environment Canterbury is the overall agency who owns the process for the business case development on behalf of the partnership.

Table 5 Management Structure and Roles specific to the public transport Futures

Responsibility	Membership		Role in Programme
Governance			
Greater Christchurch Partnership Committee & Public Transport Committee	Environment Canterbury, CCC, Selwyn District Council, Waimakariri District Council, Canterbury District Health Board, NZTA, Ngāi Tahu, Regenerate Christchurch, DPMC. The Public Transport Committee members are generally consistent with the Partnership.	Governed by Terms of Reference	Leadership and enhancement in urban development Govern the Business Case
Chief Executive Group	CEOs of all partners.		Direction for agencies
Senior Managers Group	Responsible for specific workstreams		
Management and Integration			
Transport Managers Group	Portfolio managers from each of the partners org. Report to CEAG. Integrates with the land use planning group	Governed Terms of Reference	Provides strategic oversight of planning
Planning Managers Group	Portfolio managers from each of the partners org. Report to CEAG. Integrates with the transport planning group		
Delivery			
Public Transport Futures Project Team	Technical Staff: CCC, ECAN; under direction of the Management Group. Reporting to CEAG.	Project Plans	Lead development of Business Case (s)

Programme Phasing

To effectively develop the programme delivery, three work streams are proposed to be taken forward to develop the programme elements. This approach builds on the existing activities and enables the enhancement of investment over the medium to long term in a manageable way, while being flexible for any opportunities for advancement of investment.

Years	1 – 3		4- 10		10+	
Foundation	Business Case for Prioritised Programme or Price Level Increase	Design & approvals	2021-2031 LTP: Implementation		Operation & ongoing optimisation	
Rest of Network	Service Review	Business Case	Design & approvals	Implementation		Operation & ongoing optimisation
Mass Transit	Business Case for Mass Transit North to Southwest		Route protection and Designations	Design & approvals	Implementation	Operation & ongoing optimisation

Figure 16 Figure 15 Indicative Programme / Sequencing

Programme Implementation

Package Funding

Environment Canterbury (on behalf of the partners) is submitting this Programme Business Case to NZTA to seek approval from investors to commence the recommended programmes of work. Specifically, the partners are requesting funding to progress work on all three programme areas:

Programme	Business Case	Approximate cost of BC	Time
Foundations	Single Stage Business Case to identify the investment packaged need to implement enhancements identified in the Regional Public Transport Plan	\$300 k Or a Price Level increase on current LTP	2019
Rest of Network	Single stage Business Case to enable technology uptake, completion of supporting network infrastructure and service enhancements.	\$500 K	2020
Mass Rapid Transit	Indicative or Single Stage Business Case to enable the corridors to be defined and protected, and to identify the mode, service configuration and supporting measures for the corridors, including land use policy changes. Further work is anticipated for implementation funding.	\$2m	2019/20

Resourcing

The level of work required to oversee the management of the three planning and investment programmes will require an increase in resource over and above current capacity level of the partner organisations. Although the work to date has been resourced through CCC and Environment Canterbury, this has been alongside the normal roles and responsibilities of the staff involved. Moving forward, more dedicated resources will be required.

With the level of disruption in greater Christchurch over the last 7 years, strategic public transport planning resource has been predominantly focused on short to medium term strategic and operational outcomes to re-baseline the public transport system to respond to progressive land use and population changes. Thus, as indicated above, appropriately skilled additional resource and focus will be required to manage a programme such as this.

The Regional Public Transport Plan and the Future Public Transport Business Case are now signalling the extensive planning and future investment needed to support the growth that has been signalled in the Future Development Strategy for Greater Christchurch. There is a need for a much greater level of resource, including support from NZTA, to provide the strategic, technical and public transport planning resources necessary to progress the work outline in this programme.

Ongoing Stakeholder Engagement Plan

Ongoing partnership and governance engagement will be managed through the existing reporting and communication frameworks that exist for the Greater Christchurch Partnership and the public transport Committee.

Public engagement on the high-level programme was undertaken through the public consultation process surrounding the Regional Public Transport Plan. Ongoing involvement of the public, community boards, central government and relevant stakeholders will form part of the project engagement strategy. Consultation on the development of the next stages will be managed through the management structure. A Communication and Engagement Plan would be developed as part of the work programme through the project team. This will address the specific details for each stakeholder, including key contact person and approach for engagement.

Consultation and engagement will be aligned with statutory processes as part of public consultation strategies associated with the partner's Long-Term Plan processes. The stakeholders have been identified based on the practical and technical details of the range of issues, interactions and alternatives/options that may be considered in subsequent phases of the business case.

Next Steps

The next step is the formal consideration of this Programme Business Case and the funding and resources requests to advance the next phases of the programme. Discussions with NZTA on point of entry will follow. Conversations are underway with the Partnership on the need for funding the local share component of the programmes of work. This will take place over the Annual Planning processes over the upcoming and future financial cycles.

The programme implementation strategy will position Greater Christchurch to respond effectively to the changing travel demand and growth through a 'right infrastructure at the right time' approach. Part of this is ensuring the right governance structure is in place.

Attachment 1: Process

		October 2017	November-December 2017	January 2018	March 2018	May-August 2018	September	September 2018	Oct - Nov
Process		Investment Logic Mapping	Long List Identification	Short List Development	Multi-Criteria Analysis Workshop	Recommended Programme and Review	Revised economic assessment	Dragons Den	<i>Present to CEAG</i>
		Identification of key problems and benefits	Over 100 potential actions were identified	Long list was grouped into seven themes	Short list was assessed to identify optimal programme	Draft programme developed and refined	Revised BCR and align with land use planning	NZTA Assurance Report	<i>Finalise investment story</i>
Engagement		Key stakeholder workshops (CCC, WDC, SDC, ECan, NZTA, CDHB, KiwiRail, Bus & Coach <u>Assoc</u> , advocacy groups)			Greater Chch Partnership – Transport Group			Officials from NZTA and Ministry of Transport	
		Greater Chch Partnership – Elected Members						CEAG	

Attachment 2: Previous Investigations on Public Transport

	SNAPSHOT OF REPORTS	RELEVANT LOCAL POLICY DEVELOPMENTS
1998	Booz Allen & Hamilton: <i>Light Rail for Christchurch: An Overview of Opportunities</i>	
2003		CHRISTCHURCH PUBLIC TRANSPORT STRATEGY
2005	BECA: <i>Christchurch Public Transport Suburban Interchanges Scoping Study</i> GHD: <i>Network Level Investigative Report</i>	CCC CITYWIDE TRANSPORT PRIORITY PLAN
2007	Booz Allen & Hamilton <i>Light Rail for Christchurch (2007 Update)</i>	URBAN DEVELOPMENT STRATEGY
2008	Parsons Brinckerhoff: <i>Christchurch Strategic Transport Study</i> Parsons Brinckerhoff: <i>Christchurch Passenger Transport Future Studies</i> Able: <i>Suburban Interchanges: Preferred Facilities Report</i>	REGIONAL LAND TRANSPORT STRATEGY 2008-18
2009	MWH: <i>Urban Development Strategy Transportation Group North and Southwest Public Transport Corridors Study: Stage One</i>	
2010	MWH: <i>North and Southwest Public Transport Corridors Study: Stage Two</i> MWH: <i>North and Southwest Public Transport Corridors Study: Supplementary Consideration of Using the Existing Rail Network for Passenger Services</i>	GREATER CHRISTCHURCH METRO STRATEGY 2010-2016
POST QUAKE		
2011	CCC: <i>Public Transport Corridor Study</i> Parsons Brinckerhoff: <i>Rapid Transit Economic Benefits – Brief Research Report</i> Aecom: <i>Christchurch Bus Priority Re-evaluation Study</i>	
2012	Aecom: <i>Greater Christchurch Future PT Investigation Outline Study Methodology (draft)</i> Traffic Design Group: <i>Review of Proposed Post-Quake Bus Network</i>	CHRISTCHURCH TRANSPORT STRATEGIC PLAN JUNE 2012-2042 CHRISTCHURCH CENTRAL RECOVERY PLAN GREATER CHRISTCHURCH TRANSPORT STATEMENT REGIONAL PUBLIC TRANSPORT PLAN SUBURBAN MASTER PLANS
2013		AN ACCESSIBLE CITY

	SNAPSHOT OF REPORTS	RELEVANT LOCAL POLICY DEVELOPMENTS
		<i>LAND USE RECOVERY PLAN</i> <i>CANTERBURY REGIONAL POLICY STATEMENT</i> <i>CHRISTCHURCH DISTRICT PLAN REVIEW</i> <i>CANTERBURY REGIONAL PUBLIC TRANSPORT PLAN</i>
2014	Aurecon: Gap Analysis Greater Christchurch Public Transport Review and Gap Analysis Aurecon: Greater Christchurch Northern Rail – Rapid Assessment	
2015		<i>REGIONAL LAND TRANSPORT PLAN</i>
2016	<i>Aurecon: High Level Analysis of Designated Rail Land: Future potential use</i>	PUBLIC TRANSPORT JOINT COMMITTEE WAS ESTABLISHED <i>GREATER CHRISTCHURCH UDS UPDATE</i>
2017	<i>GHD: Future of Public Transport in Christchurch Strategic Case</i>	
2018	<i>Aecom: Future of Public Transport in Greater Christchurch PBC</i>	<i>CANTERBURY REGIONAL PUBLIC TRANSPORT PLAN</i>

