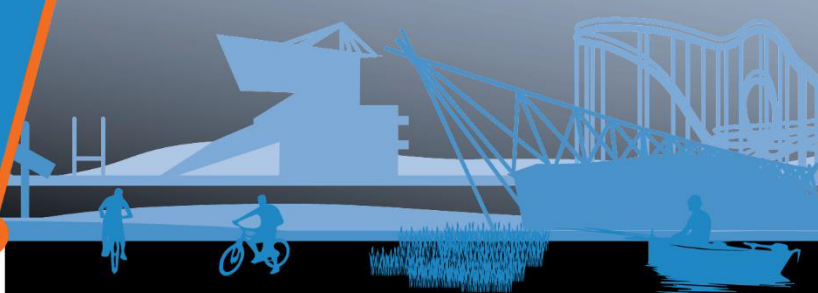


Supporting Growth

South

Indicative Business Case for Route Protection

Version 1.2
11 July 2019



Document Status

Responsibility	Name
Author	[REDACTED]
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Approver	[REDACTED], Transport Planning Discipline Lead

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1.2	11 July 2019	Final

Disclaimer

The option assessment undertaken and the Indicative Strategic Transport Network plans shown were identified through Indicative Business Cases endorsed by the Auckland Transport and NZ Transport Agency boards in early 2019. Proposed corridors shown are yet to be prioritised for funding and delivery over the next 30 years. They will require further technical investigations and engagement to confirm the detail of locations for proposed upgrades or proposed new route alignments, and any associated land requirements. This additional assessment will include development of detailed design and costings to inform further economic analysis for funding purposes. Any land requirement may also require statutory approvals, which would be subject to the processes of the Resource Management Act 1991 and Land Transport Management Act 2003. The Indicative Strategic Transport Network also includes a suite of travel demand management initiatives and supporting public transport services.

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Acronyms

Acronym/Term	Description
AFC	Auckland Forecasting Centre
AMETI	Auckland Manukau Eastern Transport Initiative
Ara Tūhono	SH1 replacement between Pūhoi and Southern Area
AT	Auckland Transport
ATAP	Auckland Transport Alignment Project
AUP: OP	Auckland Unitary Plan: Operative in Part
BCR	Benefit Cost Ratio
Bulk infrastructure	Three waters, community and open space, and transport infrastructure
CAPEX	Capital expenditure
CRL	City Rail Link
DBC	Detailed Business Case
Development ready	Has bulk infrastructure in place
FAR	Funding Assistance Rate
FTN	Frequent Transit Network
FULSS	Future Urban Land Supply Strategy
FUZ	Future Urban Zone
GIS	Geographic Information System
GPS 2018	Government Policy Statement on Land Transport 2018-2021
HCV	Heavy Commercial vehicle
HH	Households
IAF	Investment Assessment Framework
IBC	Indicative Business Case
IBE	Indicative Business Case Estimate
ILM	Investment Logic Map
KPI	Key Performance Indicator
MVA	Manawhenua Values Assessment
LOS	Level of Service
MBIE	Ministry of Business, Innovation and Employment
MCA	Multi Criteria Analysis
MSM	Macro Strategic Model (previously known as the Regional Transport Model)
MUL	Metropolitan Urban Limit

Acronym/Term	Description
MVA	Manawhenua Values Assessment
NIMT	North Island Main Trunk Line
NPS UDC	National Policy Statement on Urban Development Capacity
NPV	Net Present Value
OPEX	Operating Expenditure
PBC	Programme Business Case
PKT	Passenger Kilometres Travelled
PT	Public Transport
RFT	Regional Fuel Tax
RLTP	Regional Land Transport Plan
RMA	Resource Management Act
RTN	Rapid Transit Network
RUB	Rural Urban Boundary
SBC	Southern Business Case
SC	Strategic Case
SGA	Supporting Growth Alliance
SG PBC	Supporting Growth Programme Business Case
SH	State Highway
SSBC	Single Stage Business Case
TFUG	Transport for Future Urban Growth
The Transport Agency	New Zealand Transport Agency
TOD	Transit Oriented Development
V/C	Flow volume to capacity
VCR	Vehicle Capacity Ratio
VOC	Vehicle Operating costs

EXECUTIVE SUMMARY

1. Introduction

1.1. Purpose

The purpose of the Supporting Growth Programme is to identify and protect the preferred transport networks to support Auckland's planned greenfield growth over the next 30 years.

This Indicative Business Case (IBC) identifies key elements of the transport network in the South Auckland growth area. It recognises that the implementation of this network is a key contributor towards improved sustainable urban mobility in Auckland. As such the transport system will need to be appropriately staged to anticipate and support growth, improve accessibility, provide high quality and sustainable mobility which facilitates mode shift – particularly towards greater use of public transport, walking, and cycling.

The IBC:

- confirms the strategic context and policy alignment of the proposed investment
- confirms the case for route protection and the need to invest
- identifies an integrated transport network that enables growth and good urban form in the future urban areas in the south (referred to as the Southern growth area)
- seeks endorsement of the recommended transport network for future route protection to take forward to a Detailed Business Case (DBC).

1.2. Business case history

In 2016, Auckland Transport (AT), the New Zealand Transport Agency (the Transport Agency), and Auckland Council (the Council) worked in partnership to develop a Programme Business Case (PBC). The PBC was a response to the pace, scale, and staging of growth identified in the Auckland Unitary Plan: Operative in Part (AUP: OP) and the Future Urban Land Supply Strategy (FULSS).

The PBC identified a preferred transport network for early route protection in the Southern growth area. The intent of the route protection approach was to save money and minimise social disruption in the long term.

This IBC further tests and develops the recommendations of the PBC to ensure they are robust and identifies the indicative recommended strategic transport network for route protection.

Several strategic documents and policies with a significant bearing on transport planning have been confirmed or updated since the PBC was released. This includes refreshed or new versions of the Government Policy Statement on Land Transport 2018-21 (GPS), the Auckland Plan 2050, the FULSS, and the Auckland Transport Alignment Project (ATAP). The policies in these documents set a direction for increased focus on an equitable, mode-neutral transport system which places weight on public transport, walking and cycling, improving safety and realising environmental, health and growth outcomes.

1.3. Protecting the corridors

The principal task of Te Tupu Ngātahi is to achieve route protection of a preferred network to support Auckland's projected growth over the next three decades. While Notices of Requirement (NoRs) may be the logical choice of route protection mechanism for the majority of the preferred network components, there are a range of other mechanisms available to achieve some degree of route protection that may be valid alternatives to NoRs. In some cases, NoRs may need to be supplemented by the use of other mechanisms including: resource consents (where network components may be scheduled for early construction), plan changes (initiated or submitted on), structure plans and traditional property acquisition. In other cases, where developer plans are well advanced and there is alignment on the preferred network, there may be opportunities to negotiate developer agreements to potentially avoid the need for NoRs (or avoid the need for notification of a NoR). Route protection for some preferred network components will need to be delivered by other partners, including KiwiRail and Auckland Council.

Route protection is important as it provides property owners, businesses and the community with increased certainty on where infrastructure will be in the future, so people can make informed decisions about their land. There are several potential mechanisms for route protection, as discussed in the Route Protection Strategy (Appendix K). The route protection process itself will take place over the next four years. Elements not requiring route protection are also identified in this IBC.

The process of prioritising the route protection of the preferred network will require assessment of a range of factors that can be grouped into the following three categories:

- Strategic importance – which components represent anchor projects that provide early opportunities to deliver on liveability objectives?
- Urgency – which preferred network components need to be advanced as a matter of priority and why?
- Complexity/risk profile – how difficult/straightforward will it be to achieve route protection?

Balanced against the benefits of route protection are the costs. These include increased expenditure on land (in circumstances where early purchase is required) for AT and the Transport Agency and the risk of potential planning 'blight' (adverse social and economic impacts associated with the lack of development on a protected corridor).

1.4. Implementation and staging

The implementation of the transport system to support growth will need to be staged over the next 30 years. The staging responds to the desired FULSS timings for land release, and may also be dependent on the provision of other supporting infrastructure.

Implementation of the recommended network is highly flexible and could be undertaken in different ways to respond to changes such as growth patterns, timing of uptake of developments and complementary urban interventions like network performance improvements ("sweating the assets") or land use zoning refinements.

Given the scale and duration of the growth proposed, the early protection of these critical transport corridors provides the required certainty for AT, the Transport Agency and stakeholders.

1.4.1. Programme Wide Staging

The staging is based on the recommended network, and achieving key drivers such as aligning transport improvements with growth timings and targeting investment that supports early mode shift outcomes. As outlined in this IBC, different affordability scenarios have also been developed to understand the implications of reduced investment. This IBC is part of a wider programme of supporting growth throughout the Auckland region and the affordability challenges and prioritisation of investment are best addressed across the entire programme, with the scenario testing undertaken in this IBC informing that programme wide discussion. This programme wide affordability and prioritisation issue has been considered in a Programme Wide Summary note which sets out the work done in this area and the approach to this critical issue in the next stage of the programme development (DBC).

1.5. The entity carrying out this work

Te Tupu Ngātahi (the Supporting Growth Alliance) is a collaboration between AT and the Transport Agency to carry out the planning phase of the Supporting Growth Programme (formerly known as the Transport for Future Urban Growth Programme, or TFUG).

Te Tupu Ngātahi is undertaking the detailed investigations necessary to recommend a transport network for the Southern growth area as outlined in this IBC. Once confirmed, it will carry out the route protection process, as identified above, to protect the land for these networks over the next four years.

Te Tupu Ngātahi comprises AT and the Transport Agency as the owner participants, consultants AECOM and Beca, and legal providers Bell Gully and Buddle Findlay.

1.6. Partners

AT, the Transport Agency and the Council are investors and partners to the programme. Extensive engagement has been undertaken with them throughout the development of this business case.

Manawhenua are recognised as Treaty Partners by AT and the Transport Agency and as such Te Tupu Ngātahi recognises these responsibilities and commitments in engagement with Manawhenua. AT and the Transport Agency's partnership with Manawhenua provides the project with a framework for working with Māori. Regarding developing the business case, this has meant involving Manawhenua as partners in decision making and considering their views when identifying priorities for investment options.

KiwiRail has the responsibility for owning and operating the rail transport network. KiwiRail operates rail freight services and works with Auckland Transport who is responsible for running the passenger rail and public transport services in the Auckland Region. KiwiRail is currently being funded by both the Crown and the National Land Transport Fund (Transitional Rail activity class).

1.7. Key stakeholders

Engagement has been undertaken with a range of stakeholders, Local Boards, Transpower, significant landholders and developers, the Ministry of Education, and the community, including young

people. Feedback was received in a variety of ways (e.g. via meetings, workshops, hui and feedback forms) and input into the decision making on the recommended network.

2. A story of growth

Auckland is home to approximately 1.65 million people. The Auckland Plan 2050 - Development Strategy signals that Auckland could grow by another 720,000 people to reach 2.4 million over the next 30 years. This will generate demand for 320,000 more homes and require land for 270,000 more jobs. This business case supports the urban vision of the Auckland Plan 2050 to support high population growth through provision of quality urban form, improved access for inclusion and opportunities for improved health and wellbeing.

In July 2017, the FULSS was updated in line with AUP: OP zoning, with 15,000 hectares (ha.) of land allocated for future urbanisation. This gives clarity as to when land identified in the AUP: OP will be 'development ready'. It provides for sequenced and accelerated greenfield growth in ten areas of Auckland, one of which is Warkworth.

2.1. Planning for future urban growth in the Southern growth areas

The Southern growth area is approximately 20 kilometres south of Auckland's central city and is approximately 30 kilometres in length. It makes up the largest proportion of future growth areas in Auckland (45%). The area includes the large future growth areas of Takaanini, Opāheke Drury, Drury West, Pukekohe-Paerata and Clarks Beach. The bulk of the growth is expected to occur in Opāheke-Drury which will grow from a current population of just over 3,300 to a population of around 64,000 by 2046. Pukekohe-Paerata will grow from a current population of around 23,000 to 56,500 by 2046. This is more people than currently live in Nelson, Invercargill, or Napier. On top of this, the North Waikato is anticipated to grow significantly over the same period impacting the Southern growth area as a large portion of the working age population in these communities will travel to the Auckland region to pursue work opportunities.

The urgency for route protection in the Southern growth area is driven by the rate and scale of committed developments, including Special Housing Areas, the rapid release of land planned by Auckland Council (AC) and pressure from developers who are proposing to submit plan changes ahead of AC's structure plan. Failure to protect the network ahead of the development plans risks a combination of prohibitively expensive acquisition costs, a lack of certainty around private development investment, and a loss in ability to influence good urban form.

This IBC reviews and tests the Supporting Growth Programme Business Case (SG PBC) recommended network for the south taking into account changes since its endorsement, and considers its ability to meet the challenges posed by:

- Levels of congestion on existing road and rail capacity constraints restricting access to social, economic and market opportunities locally, regionally and nationally.
- High levels of social deprivation and poor access to employment identified in existing communities compared with the rest of the region.
- A planned population increase of approximately 130,000 households over the next 30 years.
- An estimated 60% increase in economic activity and interregional travel of national significance in "The Golden Triangle" (connecting Northland, Auckland, Hamilton and Tauranga as the economic engine of New Zealand), which interacts with the study area

It is noted that the SG PBC is also known as the TFUG programme.

3. Identifying transport problems

Current travel patterns in the Southern growth area, combined with the planned growth and existing constraints pose a number of future transport challenges including:

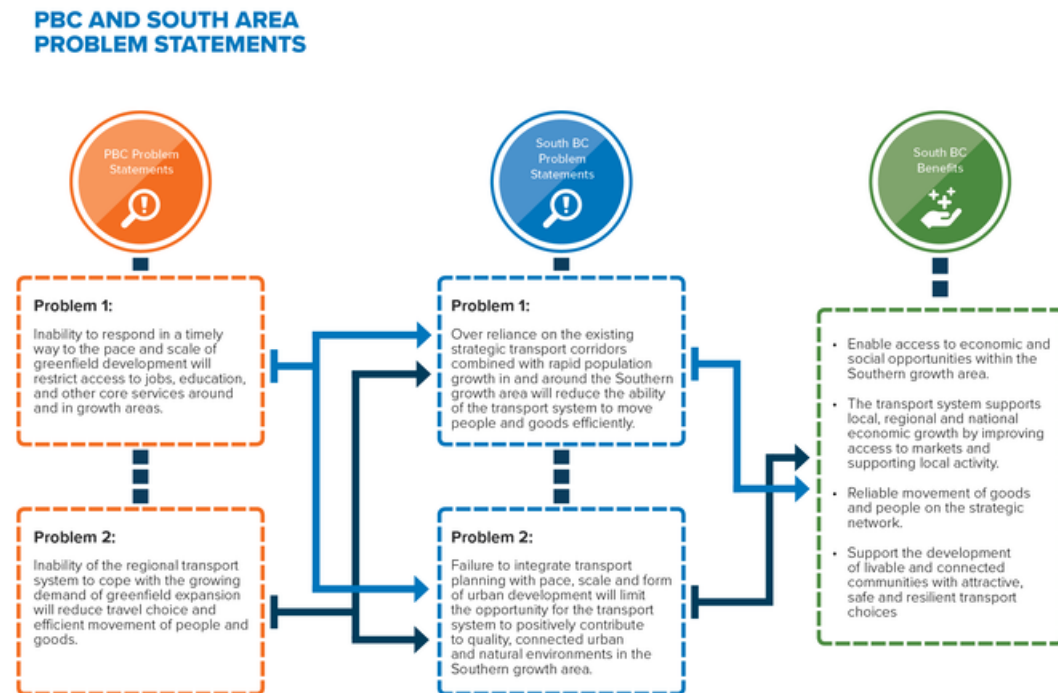
Table A Summary of transport problems

Areas	Challenges
Walking and cycling	No walking and cycling network from Drury and Pukekohe connecting to the Southern Corridor cycleway (currently under construction) to provide mode choice. There is also a lack connected facilities on existing roads throughout the study area.
Public transport	Limited public transport: The existing PT network is not sufficient for planned growth in the South, especially at Drury and Pukekohe. It generally serves the communities within close proximity of the current and future stations, however there is only one bus service for Hingaia Peninsula. The existing lack of suitable roads/infrastructure to operate buses on and the severance created by SH1 limits coverage. AT has indicated plans to expand coverage as the area develops. Rail provides the best opportunity to integrate land use and transport. At present, the rail network is constrained by number of tracks. This limits the capacity of the rail system to enable passenger trains and freight trains to cater for future growth of the proposed magnitude.
Resilience	High resilience risk: High reliance on the Southern motorway, with few alternative routes or a connected network to serve the residential communities to the west of the Southern Corridor. This places high demand pressure on the motorway and SH22 and reduces resilience. Car culture: High private vehicle use (90% car mode share) and reliance places increasing pressure on the strategic transport network and will limit access to social and economic opportunities unless transport choices are improved.
Development ready	Developer pressure: Developers have indicated their intentions to lodge plan changes next year, ahead of the Council structure planning process. Te Tupu Ngātahi is aware of six private plan changes expected early next year (2019). It is therefore important to manage pressure from developers to meet the aspirations for the Southern growth area. Development staging and provision of transport infrastructure and improved public transport to match the pace and the location of development within the southern growth area will be challenging.
Community severance	Severance: The Southern motorway and NIMT Line create severance between communities and create pinch points around Drury, Hingaia and Papakura. Providing transport connectivity to surrounding town centres: Takaanini, Drury and Pukekohe are not geographically connected to the nearest town centres such as Manukau. It is important to provide well-connected transport links to the surrounding town centres or provide enough amenities to enable the growth area to be self-contained to reduce the number of unnecessary trips.

Taking into account the SG PBC problems, the current policy context, locally specific evidence, constraints, and opportunities, the project owners agreed to a set of draft south area-wide problem

statements and investment objectives. These were tested through discussion and development of key themes with key stakeholders and then refined. The links between the PBC problems and the problems for this IBC and the benefits of addressing these can be seen in Figure A.

Figure A Southern Growth area problems and benefits

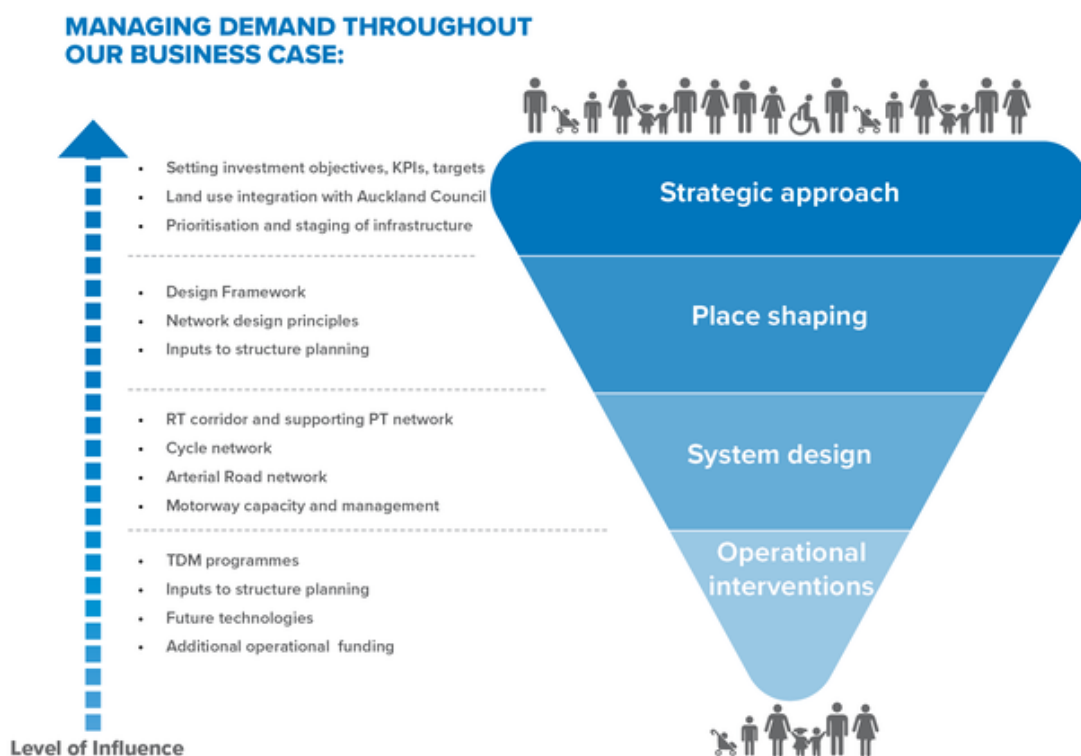


The problems are mutually reinforcing e.g. reduced travel choice contributes to poor access or reliability of the network. Therefore, the transport system response needs to provide a step change to collectively address these problems and achieve the overall target of improved sustainable urban mobility. This investment is likely to provide a balance between improving existing assets, supporting behaviour changes and providing new modes or infrastructure.

4. Influencing travel demand

The guiding principle of this business case is Sustainable Urban Mobility which seeks to develop an urban transport system that fosters a balanced development of all relevant transport modes and encourages a shift to more sustainable modes. Therefore the business case does not provide for unconstrained demand but rather seeks opportunities to influence and reduce demand before infrastructure options are considered. A four-step approach to influencing travel behaviour was therefore developed, as shown in **Figure B** below. This included consideration of an integrated set of policy-base, soft and technical infrastructure measures to achieve the desired goal.

Figure B Demand management influence through the project life cycle



5. Option development and assessment

As part of the long list development 484 options were considered. This involved a range of options across all modes, including strategic and local public transport, walking and cycling, and improved and new roading infrastructure.

All infrastructure options have been assessed at the both the long and short list phases against the Te Tupu Ngātahi multi criteria assessment (MCA) framework. The framework assesses option performance against the investment objectives (see below) and four wellbeing measures: Cultural, Social, Environmental and Economic (see **Figure C**). This process identified potential impacts and opportunities of each option:

The investment objectives are:

- A transport system that provides better access to economic and social opportunities within and outside of the Southern growth area.
- Maintain nationally important freight and servicing connections by providing efficient and resilient strategic connections through Southern growth area.
- Support the communities in the Southern growth area by improving connected, safe and attractive mode choices to key destinations.

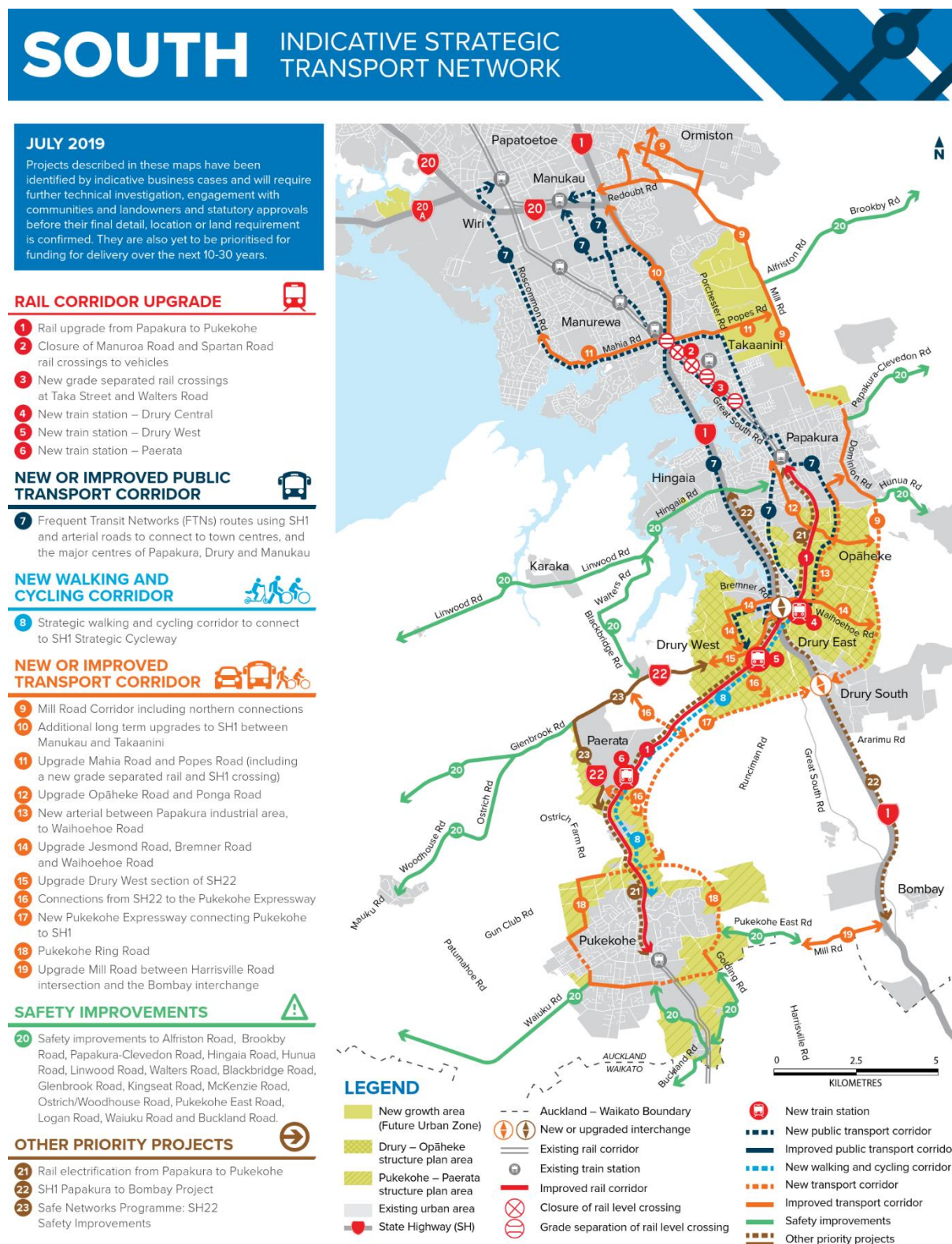
Figure C Multi Criteria Assessment process



6. Recommended network

An analysis of the problem statements, evaluation of options, feedback from workshops and stakeholder/community engagement led to the development of this recommended network. The map shown in **Figure D** has been prepared for communications and engagement purposes. The numbering and naming of options have therefore been simplified from the technical descriptions and option referencing system used in the remainder of this document. For clarity, **Appendix N** sets out these differences.

Figure D Recommended transport network southern growth areas



The recommended network provides a greater range of options for people to travel to their destinations whether the travel is generated from the growth areas or from further afield. The recommended network has the following key highlights:

Rail capacity upgrade (four tracks between Wiri and Pukekohe) and associated stations in Drury and Paerata - provide the opportunity to influence the form and density of land use along the rail corridor and around station locations, and to better use the investment in electrification, leading to an increased public transport mode share and improved accessibility. The rail network is essential for achieving a balanced PT response to the transport network and supports long distance trips to the central city. KiwiRail is the requiring authority for the rail corridor and discussions are progressing on their future plans and recommendations made by Te Tupu Ngātahi.

Frequent Transit Networks on a number of strategic corridors to support local access between centres and to train stations, including State Highway 1, Great South Road, Mahia Road, Roscommon Road, Porchester Road, Popes Road and Rangi Road will provide frequent and efficient bus services between Drury, Takaanini, Papakura, Manukau and Puhinui train stations and provides the majority of additional transport capacity to serve the growth area particularly for the key north-south movements.

A safe and attractive active mode network with strategic cycle connections and facilities on arterial roads will provide high quality, safe and attractive routes along desire lines and linking to key attractions such as centres and public transport stations. A high quality and comprehensive network will enable significant mode shift to active modes, support the urbanisation and the urban form of new greenfield areas.

New strategic arterial corridors to support State Highway 1 including Mill Road and Pukekohe Expressway will provide access to the proposed business (industrial) land, maintain reliability for freight and inter-regional travel on SH1 by providing alternative options for regional trips and allow other corridors to be focussed towards place making and local function. These corridors will need to be staged and managed to ensure this does not undermine mode shift targets.

New arterial networks at Opāheke-Drury and Pukekohe-Paerata will prioritise public transport and active modes enabling transport choice, accessibility and travel behaviour change within existing and new communities.

New arterial network and rail crossing improvements at Takaanini increases safety, east-west movements and connectivity and provides opportunities for routing alternatives in Takaanini. There are also substantial bus network benefits enabling better integration and transfer between local communities and Takaanini train station. Rangi Road grade separation plays a wider strategic function connecting Great South Road and Mill Road providing for regional trips as well as local trips.

Safety improvements on existing roads will focus on safety and support urbanisation of new Greenfield areas. These have been identified through engagement with the public and Local Boards. These improvements will also support resilience and capacity benefits to the network.

This network contains different infrastructure components many of which are part of the same corridor. With the FTN corridor project many of the alignments coincide with new road alignments. It is important to note that the delivery of these public transport corridors is dependent on the construction of the road. The strategic cycle network shares the same level of interdependency and would be put at risk if the rail corridor improvements and SH1 improvements were not to go ahead. This highlights that the risk profile of an individual project must be considered in the aggregate with the whole network rather than individually.

Beyond the interdependency of the individual projects there is a layer of pedestrian and cycling accessibility below the arterial level that needs to be delivered. Whilst not included as discrete projects this active mode layer is required as it underpins access to public transport. Access to or from bus stops and train stations inherently include a degree of walking or cycling to connect from the origin or ultimate destination. There is an assumption that this layer of active mode accessibility will be made available through Urban Design both within the growth areas as well as at the other end of any journey.

6.1. Implementation and staging

The key themes for implementing the recommended network are:

Decade one: Focusing on the need for lead infrastructure to push the desired mode shift targets and support the rapidly developing area by prioritising the rail network (including third main line, stations, grade separation) and supporting bus and road network (including the Southern section of the Mill Road corridor to complete an alternative corridor to the Southern Motorway).

Decade two: Focusing on the needs to support the emerging development areas of Paerata and Pukekohe as well as providing additional public transport services and infrastructure along the existing arterial corridors. Further investigation is required in the DBC to determine whether route protection is required for these corridors, as there is an opportunity to deliver these in Decade one if route protection is not required and respond in an integrated manner to land release.

Decade three: Additional strategic network capacity by completing the Mill Road corridor, implementing the fourth main (subject to Wiri – Westfield fourth main being completed) and upgrading SH1 to provide eight lanes on SH1 between Manukau and Takaanini. The provision of bus shoulder running through this section is included within this project; however, as with the proposals for the arterial corridors, there is an opportunity to further investigate the physical works required to accommodate bus shoulder running on SH1 in the DBC. Bus shoulder running is already allowed for in the SH1: Papakura to Bombay project.

7. What's changed since SG PBC?

The projects that are part of the recommended network in the IBC, that weren't included in SG PBC, are set out in **Table B**.





Table B: Summary of changes since SG PBC




Key area of investment	Project identified in IBC as part of the recommended network	New project compared to SG PBC?
Active Modes	Pukekohe to Drury - walking/cycling connection	✓
Rail	Four rail tracks to Pukekohe (MT9B)	✓
Bus	FTN between Drury and Takaanini, via new arterial between Papakura industrial area, Fitzgerald and Ponga Road (AR10), Porchester Road, Popes Road and Rangī Road to Great South Road (connects to MT3C and MT4L) (MT4I)	✓
Bus	FTN via SH1 on bus shoulders and Orams Road. Drury to Manukau Station Bus stations along SH1, locations to be assessed during DBC stage (MT4L)	✓
Bus	FTN via Mahia Road and Roscommon (MT4K) - upgrade to include Special Vehicle Lanes	✓
Bus	FTN on Porchester Road (MT4I) - upgrade to include Special Vehicle Lanes	✓
Strategic Road	SH1 – Drury South to Bombay (6 laning)	✓
Strategic Road	Providing 8 lanes on SH1 between Manukau and Takaanini interchanges (SR1A).	✓
Local Roads	Upgrading Mill Road/Pukekohe East Road between Harrisville Rd and the Bombay interchange to four lanes	✓
Safety	Improvements on Mill Road/Pukekohe East Road between Harrisville Rd and Bombay interchange – upgrading eastern end of Mill Road.	✓
Safety	Improve Buckland Road - Improve Buckland Road to access Tuakau/Pokeno [4]	✓
Safety	Upgrade Harrisville Road to improve safety [5]	✓
Safety	Upgrade Blackbridge Road from SH22 to Linwood Road and Hingaia Road [2]	✓

8. Outcomes

The table below describes the outcomes achieved by the recommended network in relation to the measurable KPIs and investment objectives. A benefits realisation plan will be developed in the next project phase to measure success against each of these outcomes.

Table C Recommended network outcomes

Areas	Outcomes
 <p>Safe, attractive walking and cycling</p>	<p>The first mile connection is important for the success of public transport. Making the station accessible by active modes helps to further decongest urban centres as well provide healthier options. Additional rail stations adjacent future urban growth areas at Paerata, Drury West and Opāheke Drury is expected to significantly improve walk and cycle access to the RTN network.</p> <p>With the recommended network, over 55% of households in the southern future growth areas are within 3km cycling catchment to RTN network. Furthermore, 18% of households are within 800m walking catchment.</p>
 <p>Frequent, reliable, accessible public transport</p>	<p>The bus and rail work together to provide improved access to social and economic opportunities. The recommended network enables an additional 40,000 jobs within accessible reach by public transport and achieves a significant increase in public transport mode share in the morning peak as shown below.</p> <p>Across the South the average PT mode share for external, peak direction, peak hour trips are 38%. This compares favourably to the 19-25% predicted for the PBC network</p> <p>20% PT mode split from Takaanini 34% PT mode split from Opāheke-Drury 47% PT mode split from Drury West 37% PT mode split from Pukekohe</p> <p>Public transport is also expected to operate more efficiently, with the proportion of travel in buses (kilometres) spent in severe congestion (LoS E and F) reducing from 15% currently to 4% for the southern future urban growth areas.</p>
 <p>Resilient</p>	<p>High quality alternative mode choice provided. Good quality alternative strategic corridor and grid network of arterial corridors to provide choice. This provides flexibility to respond to changes in behaviour, growth, and technology.</p> <p>Public transport improvements on key arterials and SH1 provide an alternative public transport mode to the existing rail alignment. Mill Road also provides additional resilience to the strategic road network.</p>
 <p>Reliable</p>	<p>The recommended network results in a more effective transport system, with reduced travel time per person (for both car and PT trips) than do minimum scenario. The overall travel time reliability is also expected to improve with the preferred network, with reduction of network delays & congestion for both public transport and vehicles.</p> <p>Network improvements result in car travel times reducing by 33% and public transport travel times by 25% to Manukau from the southern future growth areas. This means access to employment, social opportunities, and core services will be more reliable.</p> <p>Substantial growth in the south as well as in North Waikato is expected to result in all day congestion. Upgrades to SH1, Mill Road and public transport network alleviates some of this and reduces the proportion of freight travel spent in severe congestion (from 35% in the Do Minimum Scenario to 15% with the recommended network in the interpeak period)– supporting future communities as well as Auckland's future growth.</p>

Areas	Outcomes
 <p>Safe</p>	<p>Real and perceived safety for pedestrians and cyclists is improved by providing dedicated space for these users, where activation by other modes of transport provides natural surveillance.</p> <p>Safety on rural roads connecting South Auckland communities is enhanced by the recommended network and safety improvements in future growth areas.</p>
 <p>Development ready</p>	<p>The South may be 'development ready' in the FULSS timeframes depending on regional prioritisation of greenfield growth. Based on FULSS 2017, 63% of the land in the Southern growth area is expected to be released for development in the first decade, followed by 28% in second decade and 9% in the third decade.</p> <p>The recommend network therefore:</p> <ul style="list-style-type: none"> • Provides appropriate capacity to meet the demands of growth • Provides flexibility to respond to changes in development timing • Provides opportunities to lead with behaviour-change initiatives.
 <p>Community severance</p>	<p>Existing corridors are enhanced with active mode facilities creating people-oriented streets where more people walk and cycle.</p> <p>Public transport services hub into town centres, helping to support local businesses with high foot traffic. New corridors alleviate potential traffic demand and severance through town centres, Drury and Pukekohe.</p> <p>Pressure on the environment is reduced through lower vehicle emissions.</p> <p>Less physical space is required for car travel and can be re-purposed for people and community places.</p> <p>Consistent look and feel of new and existing corridors creates a cohesive environment.</p>

9. Finance and economics

The capital and operating costs (CAPEX and OPEX, respectively) of options were developed and considered through the option selection process.

For the recommended South network costs are as follows:

Table C Capital costs - recommended network

Estimated costs	\$ Billion
Capital costs (P50)	
Property and land costs	
TOTAL COST	

9.1. Benefit Cost Ratio (BCR)

The BCR was calculated using the Net Present Value (NPV) benefits and costs as outlined in Chapter 10 of the IBC:

Table D Benefit cost ratio - recommended network

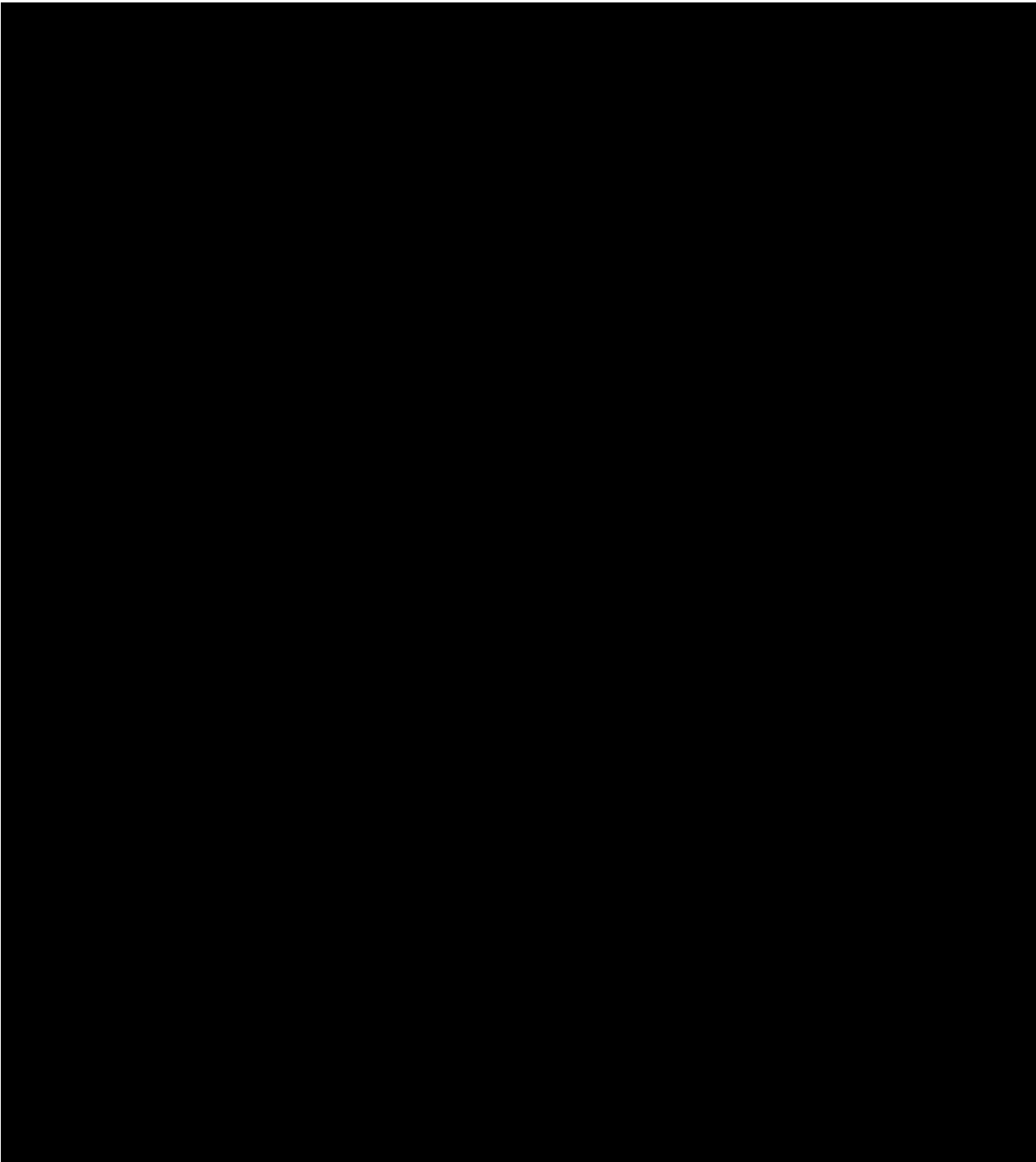
Item	Cost (\$M)
Total NPV benefits	
Total NPV costs	
Benefit Cost Ratio	1.5

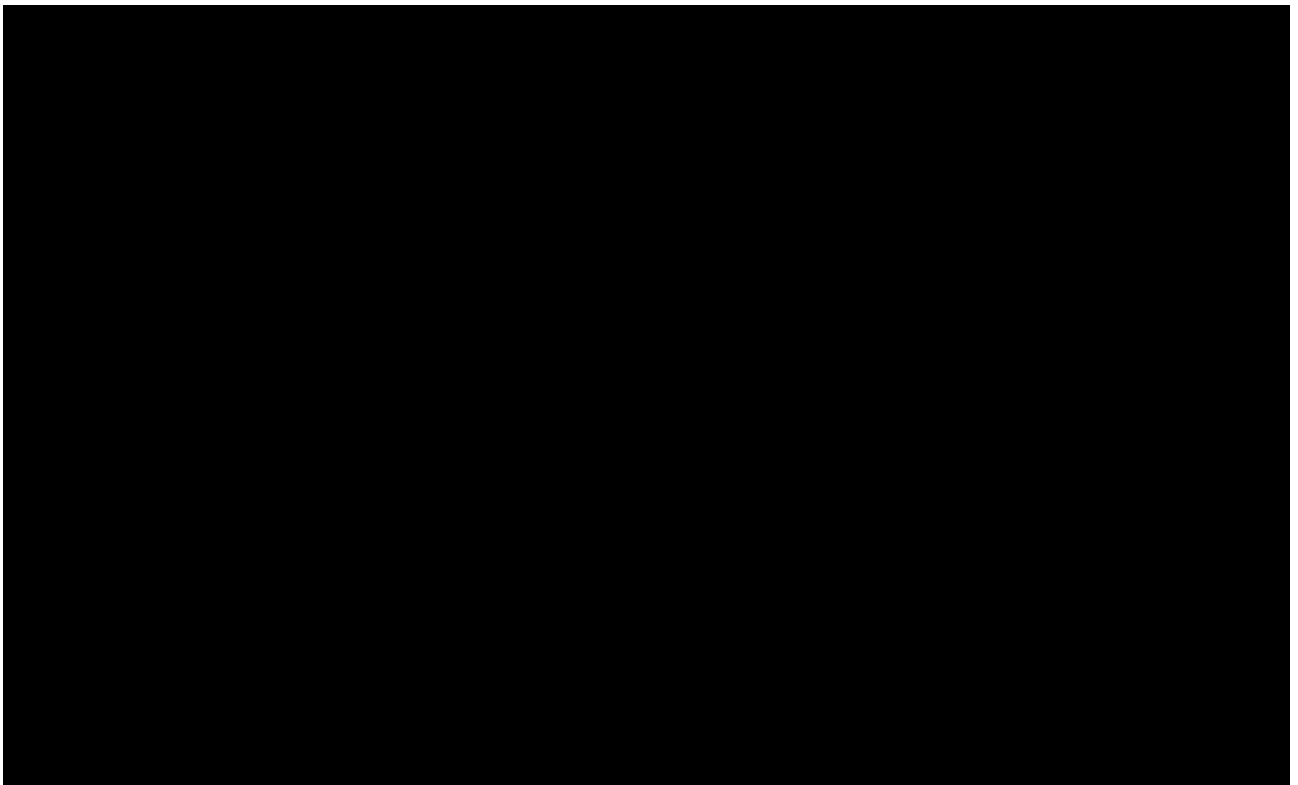
This demonstrates a strong economic case to support the recommended package of improvements in the South.

10. Key risks

The large Supporting Growth Programme comprises of multiple projects, inherent with areas of uncertainty that could transpire into risks and opportunities. A Risk and Opportunity Management Plan has been developed and endorsed by the Te Tupu Ngātahi governance team, to manage those risks and opportunities through the Detailed Base Case and Route Protection phases. The key risks identified as this stage are as follows:

Table E Key risks/opportunities associated with the southern growth area





11. Next steps

There are three key next steps for the progression of each of the elements of the recommended network, being; Detailed Business Case, Pre-Implementation and Implementation.

Each step has very different characteristics and capability needs and are therefore considered separately with regards the procurement strategy.

Detailed Business Case

Te Tupu Ngātahi has been commissioned to complete the Detailed Business Cases (DBC) for the following elements of the IBC programme:

- arterial roads
- strategic State Highway connections
- strategic cycle links
- public transport infrastructure on dedicated corridors or arterial roads (including stations).

It is proposed that one DBC per consenting package is developed, as these packages all contain interdependent projects, therefore simplifying the DBC process.

In the DBC, urban form will further be considered. An integrated transport network that supports and enables growth and good urban form in and around future urban areas is a critical success factor for the SGA programme. The transport network has an important role in supporting and enabling land uses and built form responses, such as Transit Oriented Development (TOD) and higher density housing or town centres closer to public transport nodes. Therefore, recommending transport networks that support and enable good urban form will underpin our DBC process.

During the IBC development, Programme-wide urban design principles were developed and documented in Part A of the Te Tupu Ngātahi Urban Design Framework (refer Appendix G). Urban design criteria were also considered as part of the option development and assessment, and opportunities to apply the urban design principles were identified for each of the recommended networks. During the DBC phase, Part B of the SGA Urban Design Framework will be developed at a Programme-wide level, and applied at a project level in the option development, assessment, design and AEE development. This will include further development and refinement of urban design opportunities and their application at a project and DBC level. As part of this, the Urban Design Framework and DBCs will include more commentary on 'what good urban form is' in the context of these future urban environments, as well as definition of what urban form is enabled by the transport networks (i.e. the 'people-oriented streets' – scale, character and function, and the permeability of the networks that will enable land uses and built form response).

It is expected that the DBC process will include further refinement on issues affecting the success of a sustainable urban mobility system including land use zoning, land use form and opportunities for enhanced land use.

The DBCs will focus on:

- Refinement and confirmation of recommended option alignment, including exact land requirements (if any).

- Identification of urban intervention opportunities e.g. land integration opportunities such as higher densities near transport nodes or the location of the proposed rail stations to better support sustainable urban mobility.
- Further development of project costs based on design refinement.
- Identification of funding mechanisms and cost to different parties for route protection and implementation, including AT, Transport Agency and third parties.
- Confirm route protection mechanism.
- Identify priority order for route protection and implementation.

Pre-implementation

Pre-implementation is the further progression of individual projects from DBC stage through the statutory approvals stage, including design development, the preparation of an Assessment of Environmental Effects to support NoRs and Resource Consent applications, confirmation of property requirements and securing the appropriate statutory approvals to allow the project to be constructed or implemented. The result of pre-implementation will be a network of corridors that are route protected.

The scope of works for Te Tupu Ngātahi is to undertake the works necessary to support and obtain the designations for the recommended network (i.e. route protection). The route protection strategy for each element of the recommended network will define in more detail the approach to this design development and statutory approval process. This route protection is expected to take place over the next four years.

Implementation

Once a project has been through the pre-implementation phase it will be ready for implementation. This will include detailed design, consenting and physical works. The delivery model will need to consider factors, including:

- scale
- complexity
- programme.

A detailed procurement strategy should be developed for each project at an appropriate time in advance and closer to the implementation of each project. Given that this implementation phase is many years away for most Te Tupu Ngātahi projects, and the factors that would influence the method of implementation procurement will almost certainly change over time.

PART A – THE CASE FOR ROUTE PROTECTION

1. Introduction

1.1. Auckland

Auckland is New Zealand's largest city, home to approximately 1.69 million people¹, whose aspirations for a prosperous, healthy and connected future for themselves and their families are at the forefront of our strategic focus on wellbeing for people and the liveability of communities. In 2017, Auckland attracted 36,800 new residents; more than the rest of the country combined. The Auckland Plan Development Strategy (2050) signals that Auckland could grow by another 720,000 people to reach 2.4 million over the next 30 years.

The Auckland Plan anticipates that this growth will generate demand for an additional 313,000 dwellings and require land for approximately 263,000 additional employment opportunities². In response to this demand, the Auckland Unitary Plan (AUP) identified 11,000 hectares (ha) of predominantly rural land for future urbanisation. This land is equivalent to an area 1.5 times the size of urban Hamilton³. In July 2017, the Future Urban Land Supply Strategy (FULSS) was updated in line with the Auckland Unitary Plan: Operative in Part (AUP: OP) zoning, with an increase to 15,000 hectares of land allocated for future urbanisation.

1.2. Purpose of this IBC

This Indicative Business Case (IBC) is for the future urban areas⁴ in the South including Takaanini-Hingaia, Drury, Paerata and Pukekohe as shown in **Figure 1**. The purpose of this document is to develop a recommended transport network (that meet the investment objectives for this region) for Auckland Transport/New Zealand Transport Agency Board approval. Following approval, a Detailed Business Case (DBC) will be prepared.

Planned dwelling growth identified in the FULSS, 2017 has identified an additional 40% of developable land compared with the 2015 version (**Figure 2**) with half of the overall growth in dwellings being outside the MUL being planned for the Southern area.

¹ Statistics New Zealand, June 2018

² Auckland Council (2018) Draft Auckland Plan 2050 Development Strategy <https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-by-laws/our-plans-strategies/auckland-plan/development-strategy/future-auckland/Pages/what-auckland-look-like-future.aspx>

³ New Zealand Transport Agency, AT, Auckland Council (2015) Supporting Growth Strategic Business Case

⁴ The majority of land to be urbanised is zoned as 'future urban' in the AUP but some areas in Hingaia, Drury and Takaanini are live and awaiting urbanisation

Figure 1: Auckland's future urban growth areas

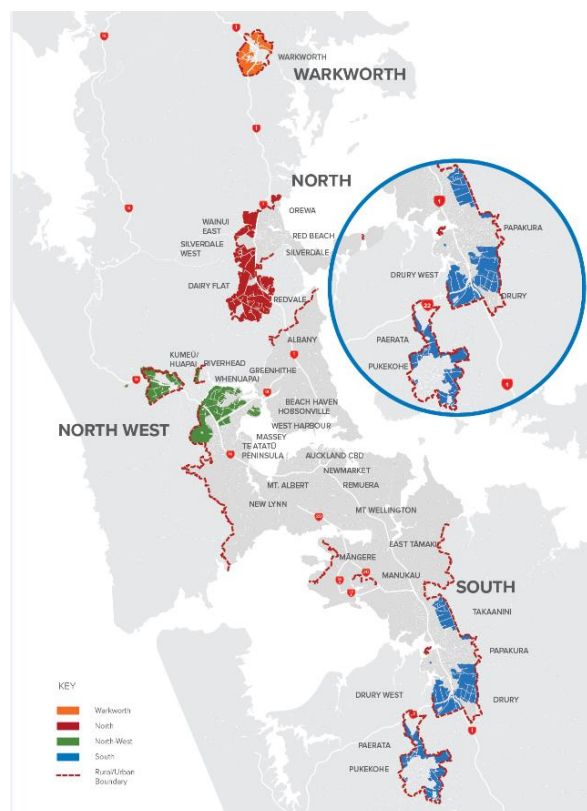
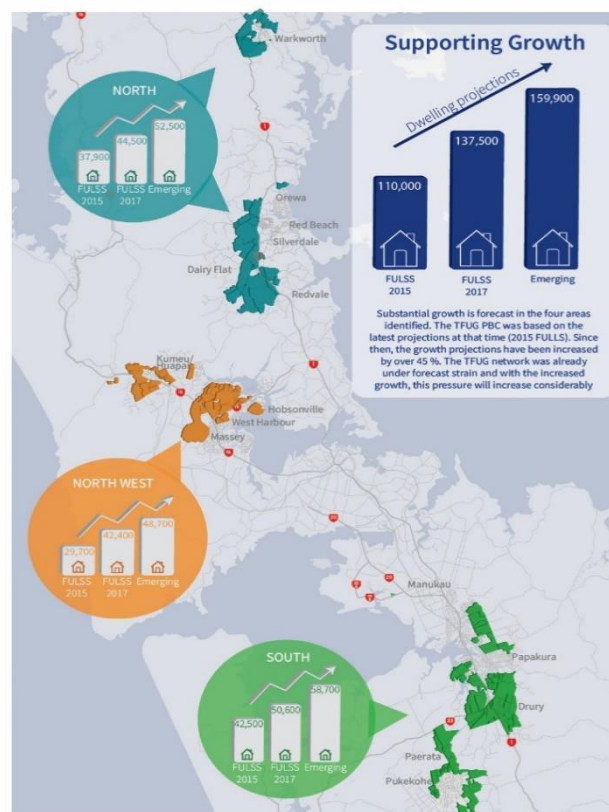


Figure 2: Planned Dwelling Growth (FULSS)



The IBC reviews, tests and develops the recommendations of the SG PBC to ensure they are robust. An optioneering exercise has been undertaken to determine if any additional options are required to accommodate the demand for movement associated with growth.

The IBC will:

- confirm the strategic context and fit of the proposed investment
- confirm the need to invest and the case for change
- re-examine the recommended network identified in the SG PBC and assesses other potential options
- identification of the indicative recommended strategic transport network for route protection that enables growth and good urban form in the future urban areas in the south
- ensure the strategic transport network is right-sized through implementation of travel demand management initiatives which reduce demand for single occupancy vehicle travel and promote walking and cycling as the preferred modes for short distance trips
- explores and identifies the most appropriate form of route protection, considering the implications of the proposed route protection to investors
- outline the affordability and delivery of the recommended network.

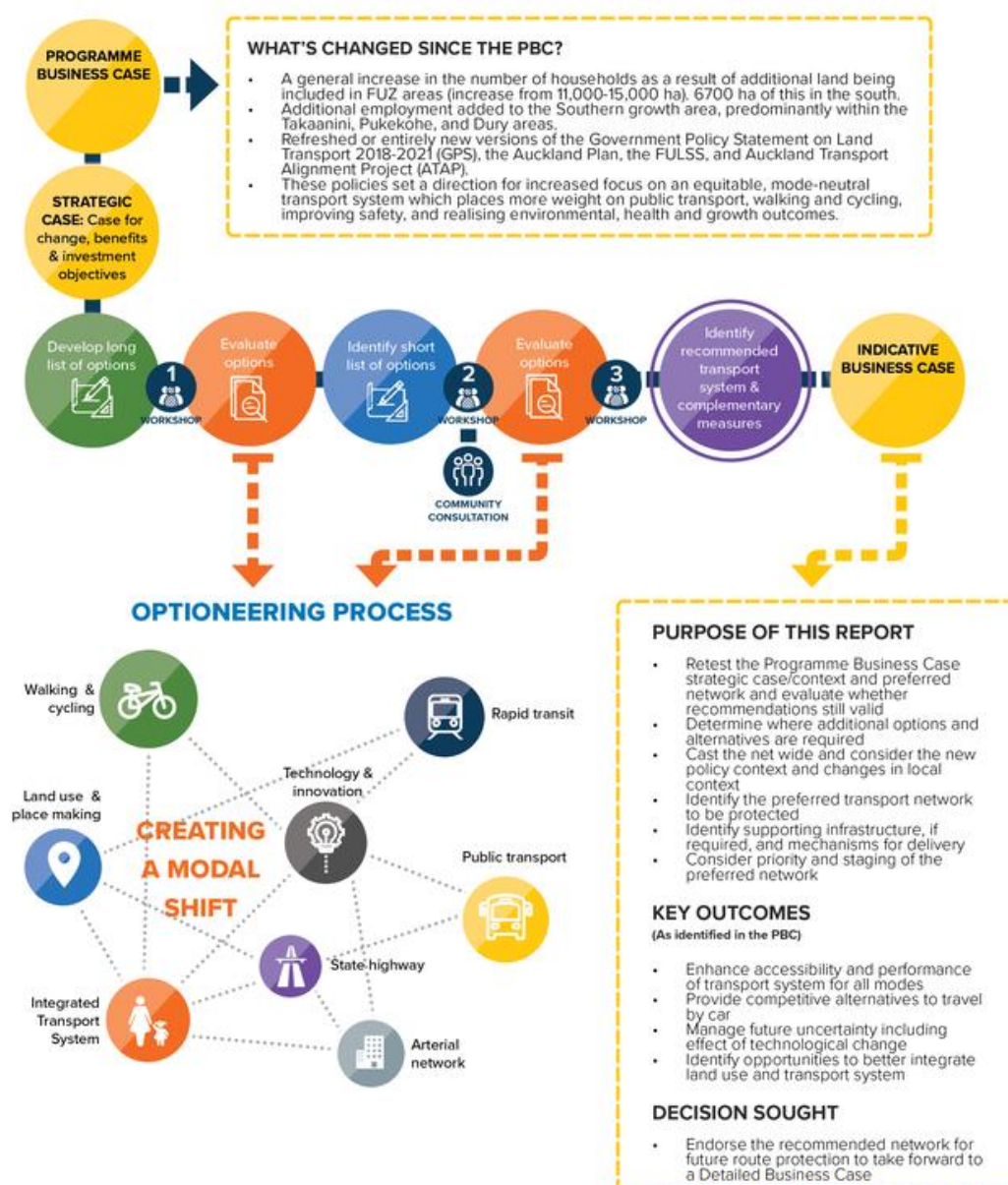
This IBC reviews and tests the SG PBC recommended network for the south taking into account changes since its endorsement, and considers its ability to meet the challenges posed by:

- Levels of congestion on existing road and rail capacity constraints restricting access to social, economic and market opportunities locally, regionally and nationally.

- High levels of social deprivation and poor access to employment identified in existing communities compared with the rest of the region.
- A planned population of approximately 130,000 households over the next 30 years.
- An estimated 60% increase in economic activity and interregional travel of national significance in “The Golden Triangle” (connecting Northland, Auckland, Hamilton and Tauranga as the economic engine of New Zealand).

Figure 3 sets out what has changed since the PBC, the IBC process, the purpose of this report, the process followed, the key outcomes and the decisions sought. The IBC seeks to identify the key transport network elements required to meet the investment objectives for this region.

Figure 3 IBC process and timing



1.3. The urgency of this IBC

The urgency for route protection in the Southern growth area is driven by the rate and scale of committed developments, including Special Housing Areas and the rapid release of land planned by Auckland Council. Approximately 4000 of the total 6,700ha (60% or equivalent to 30,000 households) of land identified in FULSS 2017 is planned for release within the next 10 years with the implementation of the transport system to support the growth staged over the next 30 years. This is significantly accelerated from FULSS 2015 which identified 1200 of the 5300ha (23%) to be released in the first decade. Failure to protect the network ahead of the development plans risks a combination of prohibitively expensive acquisition costs, a lack of certainty around private development investment, and a loss in ability to influence good urban form.

2. Strategic alignment

2.1. Partners and stakeholders

This Indicative Business Case is owned by the NZ Transport Agency and Auckland Transport and has been developed in collaboration with:

- Partners (listed in **Table 1**)
- Key stakeholders through the engagement process; and,
- The public, through a consultation process.

2.1.1. Partners

Further information on roles and responsibilities, as well as a list of the key stakeholders and their level of engagement and involvement throughout this Business Case, can be found in **Appendix A: Strategic Case**.

Table 1: IBC partners

Partners	Responsibilities and involvement
NZ Transport Agency	NZ Transport Agency (the Transport Agency) is a Crown Agency required to give effect to the GPS. The Transport Agency is responsible for planning, delivering, operating and funding state highway transport infrastructure. This includes new investment in rapid transit to deliver a modern, integrated public transport system. The Transport Agency is also a funding partner for non-state highway infrastructure.
Auckland Transport	Auckland Transport is a Council Controlled Organisation of Auckland Council and has responsibility for planning, delivery and operation of non-state highway transport infrastructure. Auckland Transport is also responsible for operating the Auckland region's public transport services.
Auckland Council	Auckland Council is responsible for statutory plan development including land-use planning within the Auckland region to give effect to the Auckland Plan and are key partners in the programme. Auckland Council is also responsible for the development for the storm water and flood management plans as well as regulatory functions under the Resource Management Act (RMA). Auckland Council funds the regional transport system, excluding State Highways, via Auckland Transport.
KiwiRail	KiwiRail has the responsibility for owning and operating the rail transport network. KiwiRail operates rail freight services and works with Auckland Transport who is responsible for running the passenger rail and public transport services in the Auckland Region. KiwiRail is currently being funded by both the Crown and the National Land Transport Fund (Transitional Rail activity class).
Manawhenua	Manawhenua are partners to this investment proposal. The relationship of Manawhenua with their ancestral lands, water, sites, wāhi tapu and other taonga is a matter of national importance and has been recognised and provided for when considering the development of the Southern growth area. Manawhenua have been engaged through the workshop process and a regular forum. The forum enables understanding of key areas of concern, knowledge exchange to inform the IBC, and an ability to seek feedback on the proposed options selection and evaluation. Further detail can be found in Section 8.4 .

2.1.2. Stakeholders

Engagement with stakeholders has been undertaken primarily at a programme wide level, through a series of stakeholder reference group (SRG) presentations and one-on-one meetings. SRGs were established to engage key stakeholders. Four presentations were held in 2018, as summarised in Table 2. The purposes of these were to introduce the Programme, Te Tupu Ngātahi and to discuss options being considered throughout the public engagement process a summary of the stakeholder engagement is provided in Table 3.

Table 2 SRG presentation summary

Date	Stakeholder attendees	Presentation topics
Session 1: 16 August 2018	Auckland Business Forum AA New Zealand Property Council – Auckland Branch	Introduction to: Te Tupu Ngātahi Stakeholders in the room Programme over next 5 years Engagement in North and Warkworth
Session 2: 16 August 2018	Greater Auckland NZ Walking Access Commission	
Session 1: 24 September 2018	Auckland Business Forum Auckland International Airport AA	Report back on Warkworth, North and South public engagement Upcoming North West public engagement
Session 2: 24 September 2018	Campaign for Better Transport Walk Auckland/Living Streets NZ Walking Access Commission	

In the Southern growth area, area-specific engagement has included:

Table 3 Stakeholder engagement summary

Stakeholder	Feedback summary
Franklin Local Boards	<p>Feedback was received from the Franklin Local Board on 12 October 2018, on the transport options proposed by Supporting Growth and the structure plans proposed by Auckland Council via a memo. Franklin Local Board generally supported the transport proposals presented, seeking further work on the following:</p> <ul style="list-style-type: none"> Strategic connections to the western growth settlements in Franklin. Public transport provision to the western growth settlements (including by capitalising on existing infrastructure such as the rail network between Paerata and Mission Bush (Glenbrook Steel Mill) and to the south of Pukekohe, as well as introduction of hybrid electric motor units). Holistic planning for the full impact of housing growth and the supporting growth programme, including the consequential impacts of increased quarry trucks in eastern Franklin. Route protection for key new linkages and ring roads. <p>The Local Board issued a formal resolution (number FR/2018/1 25 September 2018) to:</p> <ul style="list-style-type: none"> request inclusion in the Supporting Growth programme of strategic connections and public transport improvements to serve the growth at Hingaia, Karaka, Kingseat, Clarks Beach and Glenbrook Beach (a minimum of 8,100 homes, as set out in the Future Urban Land Supply Strategy 2017). request an assessment of the cumulative impact of the planned growth at Hingaia, Karaka, Kingseat, Clarks Beach and Glenbrook Beach on Linwood Road and the Hingaia Road

Stakeholder	Feedback summary
	<p>bridge.</p> <p>The Local Board considers there is a need for proper modelling of the cumulative impacts on the local highway network and the SH1 Papakura interchange.</p> <p>Other comments included:</p> <p>Linwood Road and Hingaia Road bridge are overloaded at peak hours and school start/finish times.</p> <p>Consistent underestimating of growth in the past.</p> <p>Previously rejected western strategic connection options should be revisited, such as a western ring road and/or rapid transit network (RTN) from SH20 in the north, through to Tuakau and Pokeno in the south.</p> <p>Request for early prioritisation of route protection for Mill Road, Pukekohe Expressway and the Pukekohe ring road; and</p> <p>Consider cumulative impact of freight movements to service the new employment areas i.e. Drury South.</p> <p>This feedback was considered during the option assessment process.</p>
Papakura Local Board	<p>The Papakura Local Board has expressed concern for the central section of the Mill Road Corridor, in particular the Dominion Road option through Papakura that could have significant impacts on the existing residential community and private property. The Board indicated the uncertainty these options place on existing property owners is unnerving and therefore a decision on the preferred option is requested as soon as possible.</p> <p>Te Tupu Ngātahi engaged with Papakura Local Board and Franklin Local Board in a workshop session to work through the potential implication of the options. Disruption to existing communities and property acquisition impacts are impacts to be considered by Te Tupu Ngātahi in more detail in the next stage, the DBC to come.</p> <p>The Howick Local Board expressed an interest in Mill Road and the timing of its implementation.</p> <p>The Manurewa Local Board expressed an interest in Mill Road and the timing of its implementation.</p>
Ministry of Education	<p>MoE representatives were invited to SRG presentations and were met with individually on 25 September 2018. The purpose of this presentation was to introduce the Programme, the short-listed transport options in the South and understand plans for new/upgraded schools in the South (specifically Drury). MoE is looking at developing a primary school in Drury by 2021. MoE has an ongoing interest in Drury and is a section 274 party (as a person who has an interest in the proceedings that is greater than the interest of the general public) to the appeal proceedings of <i>Elly S-Y Pan v Auckland Council and Karaka and Drury Limited</i> (ENV-2018-AKL-000162) related to private Plan Change 6 (Auranga B1 Drury West).</p>
Developers / Landowners	<p>A number of developers such as Balle-Brothers, Stevenson's Group, Classic Homes, Kiwi Properties, Fulton Hogan and MADE group are actively pursuing developments in the Southern growth areas. A number of meetings were held with landowners in the South. The overall purpose of these meetings was to discuss the short-listed options and hear about landowner/developer plans and potential issues/opportunities with the short-listed options. The information received fed into the option assessment process.</p> <p>Multiple landowners provided written feedback on the transport options in the Southern growth area, particularly in conjunction with the location of structure plan centres. Some of these landowners have signalled a wish to be involved in the process and have had one-on-one meetings with the Te Tupu Ngātahi team and Auckland Council structure planning team to discuss the short list options. These meetings have been information sharing, with landowners presenting their development plans for both short and long-term proposals and discussion of the potential issues/opportunities the short-listed options may present for their development plans.</p>

Stakeholder	Feedback summary
	<p>The feedback from these meetings has fed into the option evaluation process between short-list and the recommended network. Some developers have carried out significant work for their development plans and have signalled plan changes are to be expected within a six-month timeframe. Development plans including residential areas, proposed school locations, commercial and industrial areas have been presented. Te Tupu Ngātahi is conscious the land use and transport network need to be integrated to provide an efficient system on the whole. The issues and opportunities discussed with developers and landowners have informed decision making, particularly where they have differed from initial thinking on the preferred network or provide a significant risk to an aspect of the emerging preferred network. Through these meetings, opportunities have arisen for a particular option to traverse the landowners land or be used for a train station or park and ride facility.</p> <p>Train station locations and the alignment of Mill Road in particular have been raised as key concerns for many landowners where the land adjoins or is near to the rail line or where the alignment of Mill Road can influence land use opportunities. Opportunities have been identified for particular train station locations to be selected to service and support growth in the proposed development areas, along with a required structure plan town centre location. These discussions have identified key servicing opportunities and risks for developments going ahead.</p> <p>The next steps are continued engagement with developers and landholders in partnership with Auckland Council to confirm potential opportunities related to the recommended network.</p>

Further information is contained in **Appendix H: Engagement Feedback Summary**.

2.2. Policy context and regulatory framework

From a policy perspective, the key documents that relate to this investment proposal are:

- Government Policy Statement (GPS) 2018
- The Auckland Plan 2050
- Auckland Transport Alignment Project (ATAP) 2018
- Future Urban Land Supply Strategy (FULSS) 2017 update
- Regional Land Transport Plan (RLTP).

These key documents and their relevance to legislative, regulatory, and policy context for this investment proposal are summarised below and serve to provide the key context for the discussions on problems, benefits and investment objectives which follow.

The relevance of these documents to this IBC is detailed in **Section 3 of Appendix A: Strategic Case** and summarised below in Table 4. The key points are:

- The GPS strategic priority of 'Access' is of particularly high relevance. Increasing access, transport choice and network resilience using a mode neutral approach closely align with the investment objectives of this IBC.
- The GPS supports 'increasing the supply of serviced land for housing development in high growth urban areas, allowing for lead and other investments in transport infrastructure to support this growth'.
- The GPS investment that enables faster rate of housing growth particularly in the urbanisation of new greenfield growth areas
- Significantly reducing the number of deaths and serious injuries that occur on the transport network is a key priority for GPS 2018. In line with the GPS objective 'enabling transport

choice and access', GPS 2018 supports investment in the provision of appropriately designed and maintained infrastructure (e.g. cycleways) and speed management is particularly important to increase access to, and uptake of, active forms of travel.

- The GPS supports transport and land use planning that reduces the need to travel by private vehicle (especially single occupancy), more frequent and highly patronised public transport services, extending greater priority on urban and rural routes for walking, cycling and public transport, and better management of parking.
- The transport challenges identified in ATAP align with the IBC problem statements. Specifically, the issues of poor travel choice beyond private vehicles, especially in lower income areas, enabling and supporting a rapid acceleration in the rate of housing construction and the need to reduce the transport system's environmental impact
- The Auckland Plan 2050 recognises that the Southern growth area includes significant future urban areas due for sequencing according to the FULSS (2017). These areas are a result of changes to zoning in the Unitary Plan which forms the land use tool for FULSS. Structure planning will provide a high-level plan of how the area can be urbanised, mix and location of infrastructure and integration of land use.
- 2017 FULSS indicates a staged release of a large FUZ land area in the south which anticipates a dwelling capacity of 50,600 including rural settlements and an anticipated employment capacity of 30,300 by 2047.

Table 4 Key policies and strategic documents and their relevance to the IBC

Key policy/strategy	Relevance to this IBC
GPS 2018	<p>The GPS outlines the Government's strategy to guide land transport investment over the next 10 years. It sets priorities for a transport system which is: safe, provides access to economic and social opportunities, enables choice, is resilient, reduces the impact on the environment, climate, and public health, and delivers value for money. Safety and access are the key strategic priorities for the Government and reflect the transport system that we are striving for. GPS 2018 is supportive of increasing economic access in high growth areas by encouraging integration between land use and transport planning, and the delivery of transport investments. It also supports new mixed-use housing developments and the implementation of the ATAP.</p> <p>The Southern area transport system will need outcomes that deliver on the GPS priorities.</p>
Auckland Plan 2050	<p>Includes significant future urban areas due for sequencing according to the FULSS (2017). There is a significant area of residential development in the South anticipated to be developed between 2022 and 2047.</p> <p>Will accommodate residential growth and employment (within Pukekohe, Drury and Takaanini).</p> <p>Structure planning will provide a high-level plan of how the areas can be urbanised, taking into account various land use constraints and opportunities. The mix and location of housing, employment, retail, commercial and community facilities, and the layout of infrastructure will be identified.</p> <p>Supports the PBC case for change to identify land use opportunities, particularly around RTNs and stations.</p> <p>The IBC needs to identify opportunities to integrate the strategic transport system effectively with land use.</p>

Key policy/strategy	Relevance to this IBC
ATAP (2018)	<p>Sets out Government and Auckland Council's aligned strategic approach for transport in Auckland.</p> <p>Prioritises public transport, walking and cycling, improving safety, and realising environmental, health and growth outcomes</p> <p>Supports the SG PBC recommended network elements</p> <p>The ATAP 2018 project recommends transport investment priorities, including Pukekohe electrification, third main Westfield-Wiri and further new electric trains, Papakura-Drury motorway widening, Mill Road (first phase) and new infrastructure to enable greenfield growth and improved connections to the Waikato.</p>
FULSS 2017	<p>Identifies the sequencing and timing of future urban land for development over the next 30 years. It will determine the pace and scale of infrastructure investment to support growth in the South, with:</p> <ul style="list-style-type: none"> • 50600 additional dwellings by 2047 • Anticipated employment capacity of 30,300 by 2047 • \$7.4 billion in infrastructure costs <p>Increased density strengthens the SG PBC case for change to respond in a timely way to the pace and scale of greenfield development.</p>
RLTP	<p>The Regional Land Transport Plan (RLTP) is a 10-year investment programme for transport in Auckland, developed by Auckland Transport together with the New Zealand Transport Agency and KiwiRail to respond to growth and challenges facing Auckland over the next decade. The Regional Fuel Tax (RFT) is one of the funding mechanisms that will help pay for transport investment in Auckland.</p>

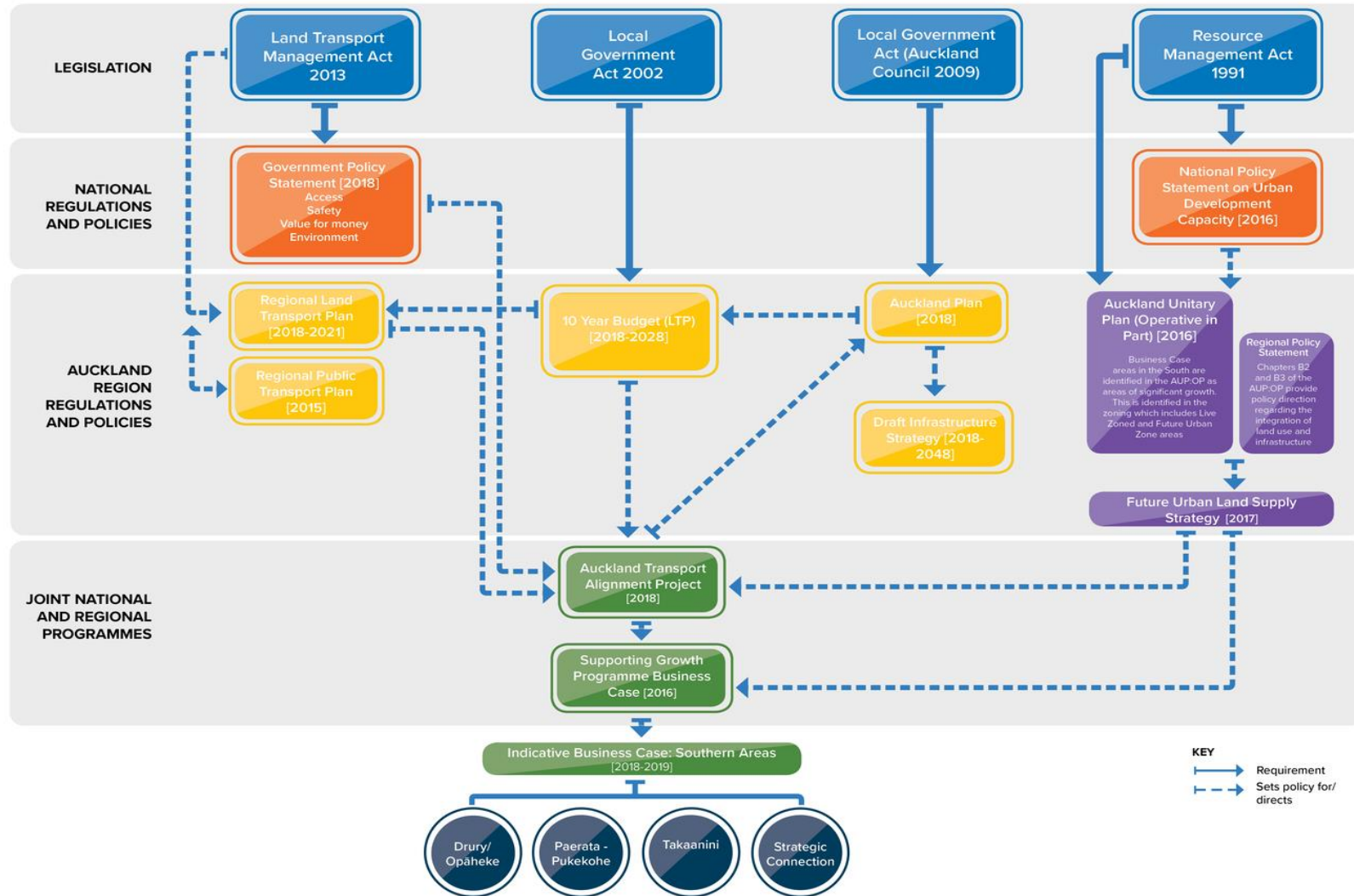
This investment proposal also strongly aligns with the partner organisations' strategic documents and long-term aspirations, as illustrated in Table 5.

Table 5: Organisational alignment

Goal/Theme	GPS	NPS-UDC	Akl Plan	AUP	ATAP	The Transport Agency Sol	AT Sol
Improved Access to Social and Economic Opportunities, by better connecting people, places, goods and services	Y		Y		Y	Y	Y
Improving the customer experience						Y	Y
Improving access to transport choices	Y		Y		Y	Y	Y
Enabling a faster rate of housing growth		Y	Y	Y	Y		
A transport system free of death and serious injury	Y		Y		Y	Y	Y
Supports and shapes Auckland's Growth			Y		Y	Y	Y
Contributes to creating a prosperous, vibrant and inclusive city.			Y		Y		Y
Providing a resilient transport system	Y				Y	Y	Y

Figure 4 outlines the interrelationship of the national and regional policy and regulatory framework.

Figure 4: Policy and regulatory framework



3. Local context

The Southern growth area is approximately 20 kilometres south of Auckland's central city and the area is approximately 30 kilometres in length. The Southern growth area makes up the largest proportion of future urban areas in Auckland (45%). The area includes the large future urban areas of Takaanini, Opāheke Drury, Drury West, Clarks beach and Pukekohe-Paerata. The rural settlements in the south include Oruarangi, Maraetai, Clevedon, Clevedon Waterways, Karaka North, Kingseat, Clarks Beach, Glenbrook Beach and Patumāhoe. Together, they comprise a large land area of approximately 6,706 hectares. The hills of Pukekohe and nearby Bombay Hills form the natural southern limit of the Auckland region. These centres serve the surrounding residential areas and wider rural catchments and are surrounded by horticultural, pastoral and rural lifestyle activities.

This section summarises the social, economic and environmental context for the Southern growth area. It also provides context of the planned growth for South Auckland and North Waikato. Further details are provided in **Appendix A: Strategic Case**.

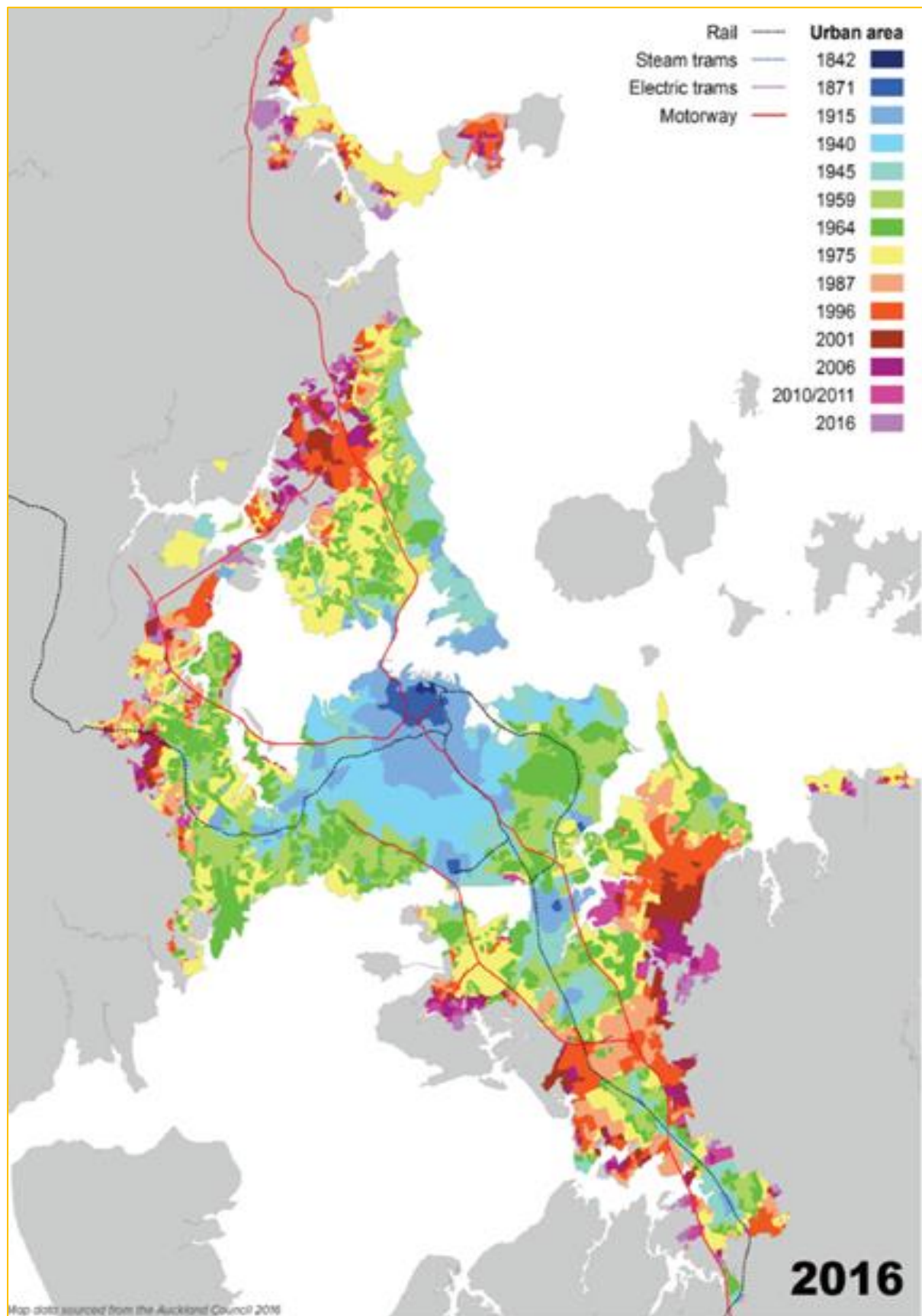
A strong correlation is evident between:

- historic development patterns
- levels of social deprivation
- declining levels of access to employment opportunities.

3.1. Historic development

The development of Auckland over time is shown in **Figure 5**. The oldest parts of South Auckland, such as Takaanini, Pukekohe and Papakura were developed along the key transport corridors railway line. The development of the motorway network in the middle of the 20th century resulted in the rapid sprawl of urban development, which is particularly evident in the South.

Figure 5: Auckland's development pattern and sprawl over time



3.2. The growth challenge

Auckland is growing rapidly; driven by both natural growth, (more births than deaths) and migration from overseas and from other parts of New Zealand. In 2017, Auckland attracted 36,800 new residents; more than the rest of the country combined. More than 1.66 million people live in Auckland already, and The Auckland Plan (2050) signals that over the next 30 years Auckland could grow by another 720,000 people to reach 2.4 million. To meet the challenges associated with population growth in Auckland, the Auckland Plan anticipates that land for an additional 320,000 dwellings and approximately 270,000 additional employment opportunities⁵ will be needed to support this growth.

Forecasting growth quantum is uncertain. The household projections for the FUZ areas in the south as approved by Auckland Council⁶ are shown in Table 6. 2046+ refers to full build out as detailed in Section 3.2.2.

Table 6: Projected household numbers in the FUZ areas (excluding rural settlements)

FUZ regions	2046+ Households
Takaanini FUZ	5,300
Drury FUZ	23,000
Pukekohe FUZ	12,200
Total	40,500⁷

For the purposes of the IBC data projections from the Auckland Forecasting Centre (AFC) have been used. These incorporate the above FUZ projections, but have been expanded to encompass the full Southern growth areas as shown below in Table 7.

Table 7: AFC data summary for wider Southern growth area

Wider region	Households		Population		Employment	
	2016	2046+	2016	2046+	2016	2046+
Takaanini	7,600	14,200	25,000	41,200	6,200	18,900
Drury	1,200	25,400	3,300	64,200	2,000	11,700
Pukekohe	8,100	21,800	22,900	56,500	8,800	17,100
Other	44,400	68,400	142,200	191,100	27,100	41,000
Total South⁸	61,300	129,700	193,400	353,100	44,100	88,700

⁵ The Auckland Plan 2050 <https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/auckland-plan/about-the-auckland-plan/docsprintdocuments/auckland-plan-2050-print-document.pdf>

⁶ Supporting Growth Technical note- Defining the growth issue – programme wide task #22

⁷ This excludes rural settlements and other areas outside the defined Southern growth area

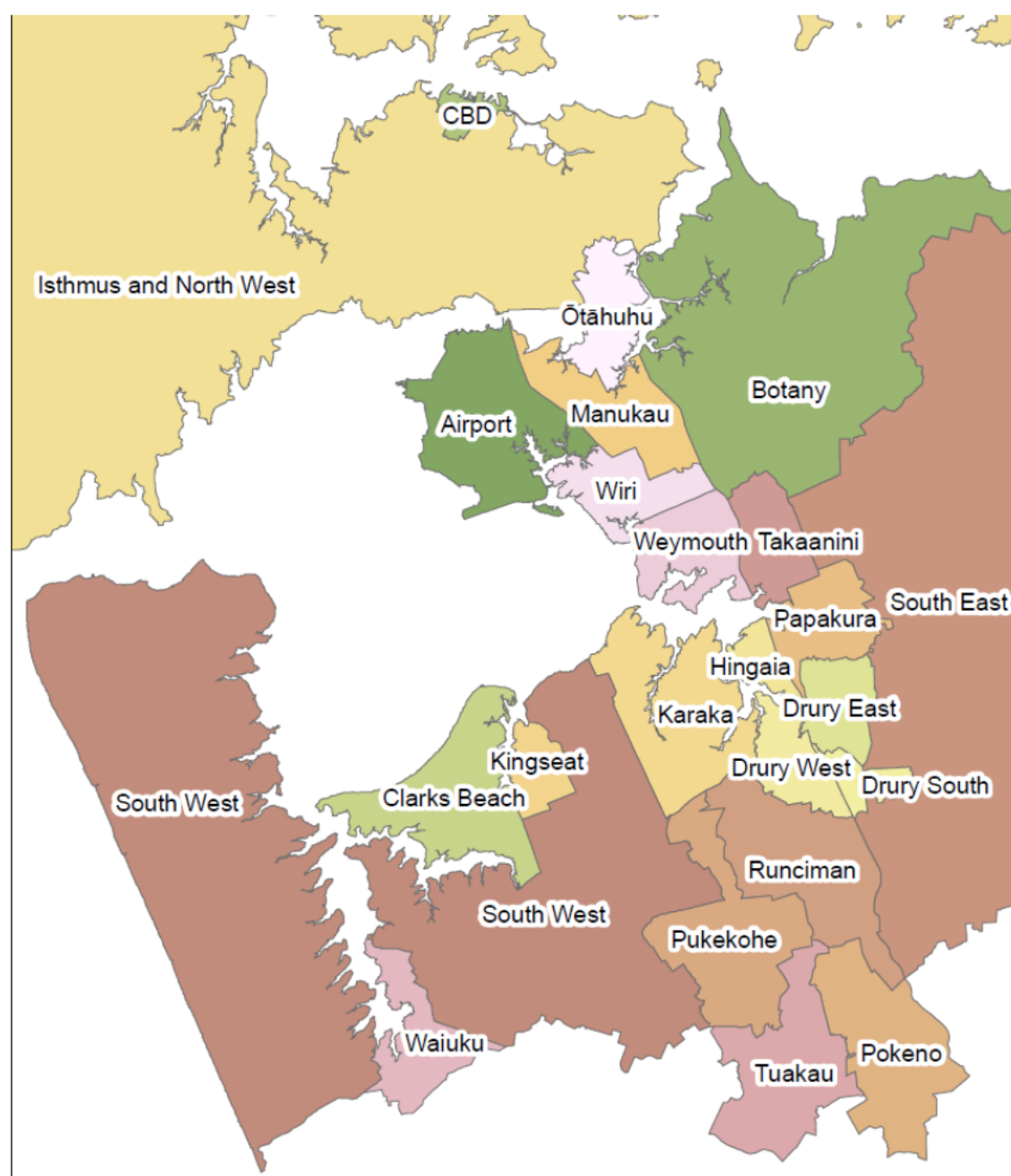
⁸ Further definition of the Southern boundary is contained in Appendix A – Strategic Case

Reference to North Waikato in the IBC refers to the areas of Pokeno and Tuakau. The AFC projections for these areas are as follows in Table 8. Figure 6 shows the location of the regions described in this section.

Table 8: AFC data summary for North Waikato area, November 2018

North Waikato	Households		Population		Employment	
	2016	2046+	2016	2046+	2016	2046+
Pokeno/Tuakau	2,623	7,965	7,670	18,290	1,992	2,743

Figure 6 SBC area and surrounds



3.2.1. Population

Data prepared by the AFC, which includes detailed inputs from the Council's research and evaluation unit (RIMU), indicate dwellings in the Southern growth area will rise from 61,000 in 2016 to 130,000 in 2046. The population is anticipated to grow from 193,000 in 2016 to 353,000 people by 2046. This increase of around 160,000 people is more than the population of Tauranga or Dunedin. It is similar to Hamilton's population of 161,200 people.

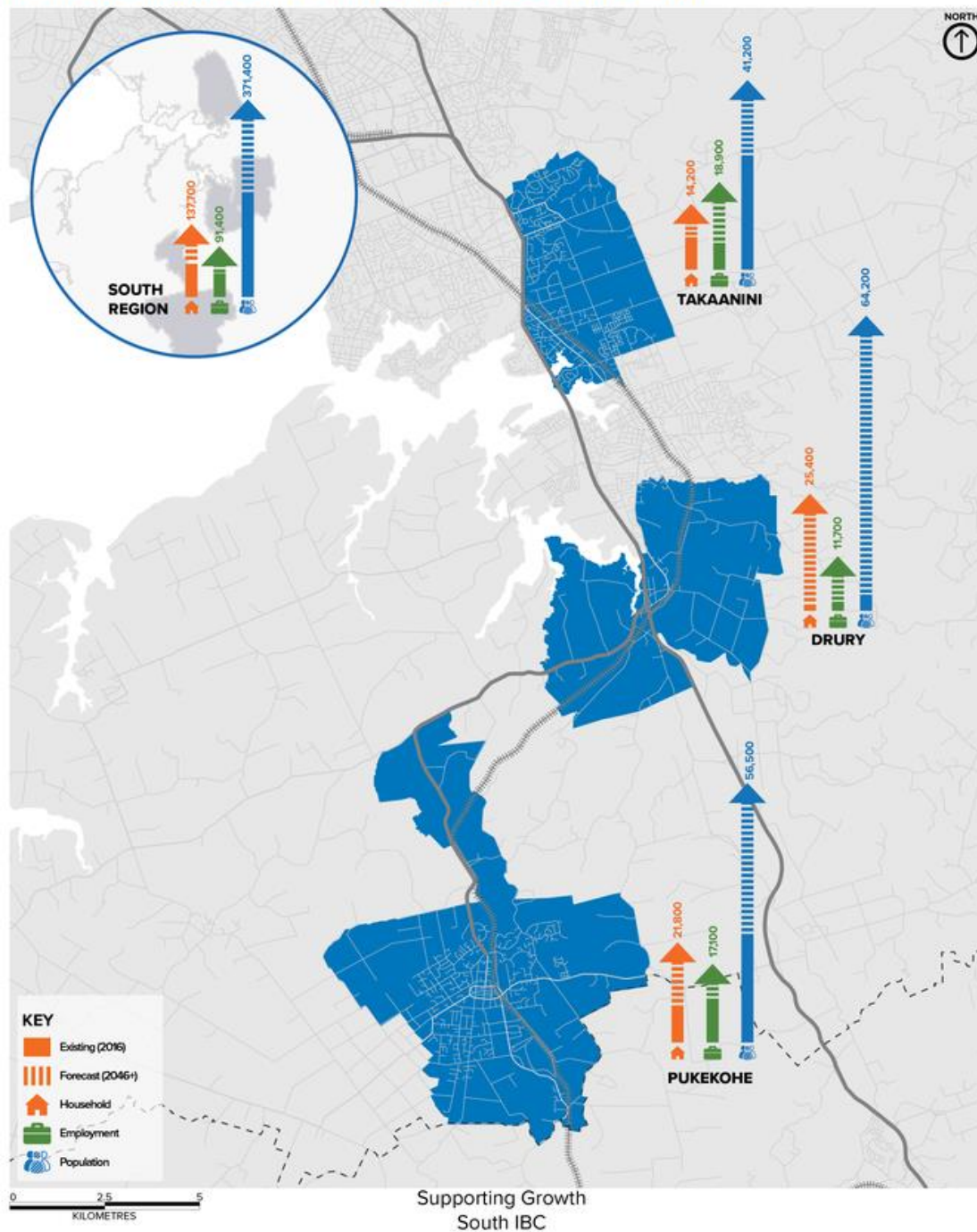
The bulk of the growth is expected to occur in Opāheke-Drury which will grow from a current population of just over 3,300 to a population of around 64,000 by 2046. Pukekohe-Paerata will grow from a current population of around 23,000 to 56,500 by 2046. This is more people than currently live in Nelson, Invercargill, or Napier. The current population of Takaanini is just under 25,000 and is anticipated to grow to approximately 41,000 by 2046.

The North Waikato is also experiencing high population growth. Current growth rates exceed previous predictions due to faster than expected housing demand in Te Kauwhata, Tuakau and Pokeno. Based on the AFC projections current expectation is that North Waikato will grow by over 10,000 people. The growth in this area is significant the Southern growth area as a large portion of the working age population in these communities will travel to the Auckland region to pursue work opportunities. This places further pressure on the transport network.

Figure 7 illustrates the magnitude of population growth in the Southern growth area. The South region in this graph is inclusive of Pokeno and Tuakau in North Waikato.

Figure 7: Existing and future projections for population, households and jobs

**EXISTING VS FUTURE FORECAST
FOR HOUSEHOLDS, JOBS AND POPULATION (2016 AND 2046+)**



3.2.2. Land release

In response to this demand, the Auckland Unitary Plan (AUP) has identified approximately 6,700 hectares of land for future urban development outside the Rural Urban Boundary in the Southern growth area (out of a region-wide total of 15,000 ha). This allows for a total of approximately 50,600 dwellings (and approximately 30,300 jobs) to be developed by 2046.

The business case team has been working closely with Auckland Council to align with Council's current aspirations for the future urban areas. This includes input to the Drury - Opāheke and Pukekohe - Paerata structure planning process to support this area's development as a successful major centre.

Understanding the expected type and quantum of urban development in the Southern growth area is critical to developing the recommended transport network and subsequent implementation strategy. Although estimating the population, rate and ultimate density in greenfield growth areas is inherently uncertain, it was initially assumed the appropriate estimates of the growth would be those reflected in land use Scenario I-11 (consistent with FULSS 2017).

Recent data from actual developments and new future estimates from Auckland Council suggest that the yield assumptions used as the basis for Scenario I-11 could underestimate the ultimate level of residential density. The IBC therefore considers a range of growth scenarios; both lower boundary growth estimates (using FULSS 2017 yields), plus upper boundary estimates (called '2046+' using longer-term/higher yield forecasts) to support the uncertainty of forecasts and allow flexibility to deal with different outcomes. The 2046+ scenario includes full build-out of the future urban growth areas identified, not just the growth assumed by 2046⁹. Agreement was reached with Council that the 2046+ scenario was the most appropriate scenario to inform the optioneering process and network development.

3.3. Demographic context

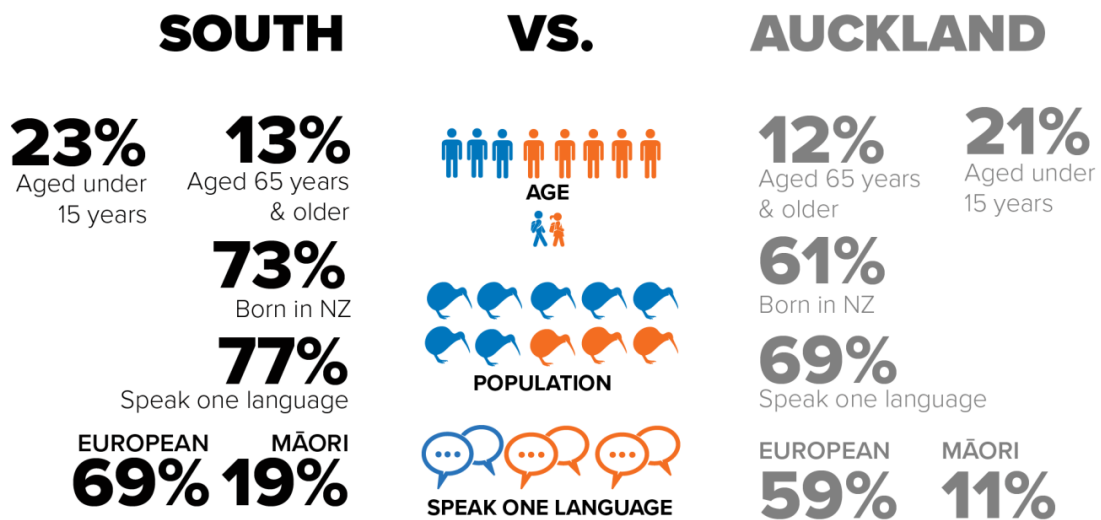
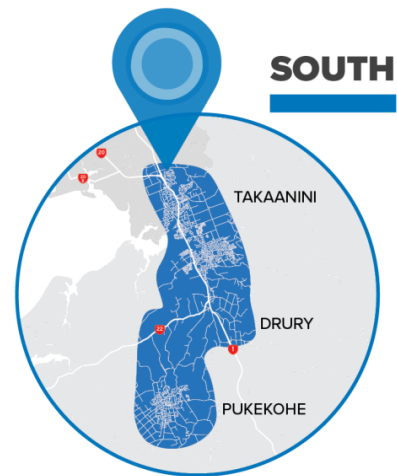
An analysis of Census data from 2006 and 2013 has provided some insight into the socio-economic characteristics of the area. The existing demographic characteristics of the South¹⁰ are summarised below in Figure 8.

⁹ Supporting Growth Technical note – Defining the Growth Issue (Programme wide task #22).

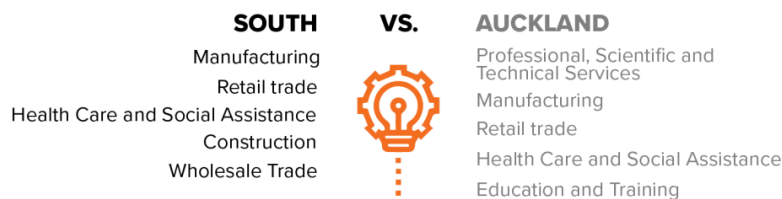
¹⁰ Based on Census Data from Papakura and Franklin Local Board areas

Figure 8 Demographic characteristics of the South

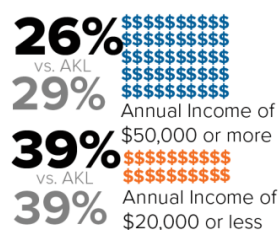
WHO WE ARE & WHAT WE DO?



TOP 5 INDUSTRIES



PERSONAL INCOME (ENTIRE STUDY AREA)



HOUSEHOLD ACCESS TO MOTOR VEHICLE

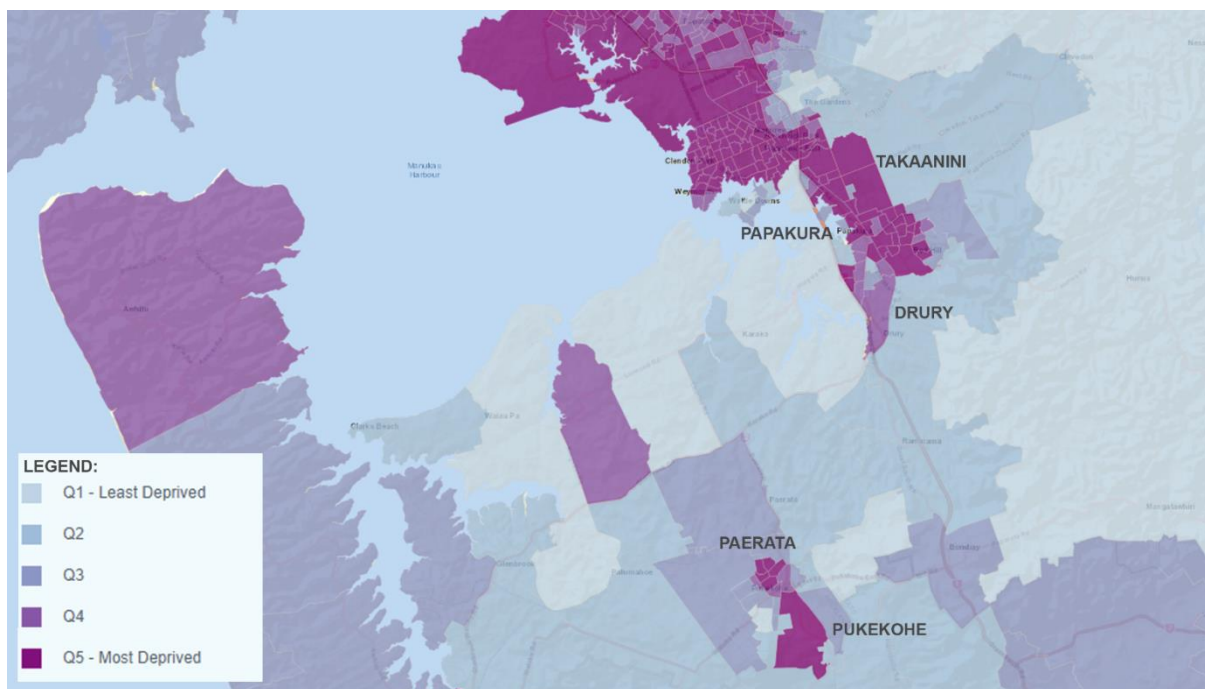


The Southern area contains urbanised communities with high levels of social deprivation, which are characterised by:

- worker participation rates at lower than the regional averages
- lower levels of qualifications for employment
- lower incomes than the regional averages
- lower levels of home ownership than the regional averages
- higher rates of vehicle ownership than the regional averages

As can be seen **Figure 9** in there are communities with the highest levels of deprivation in New Zealand in close proximity to Takaanini, Pukekohe and Paerata. However, in the areas that are currently rural, deprivation levels are low.

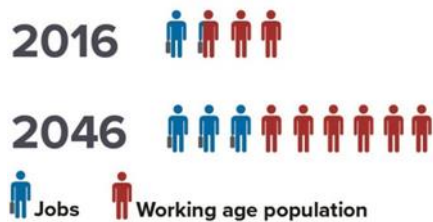
Figure 9 Auckland deprivation map



This aligns highly with the job and wage opportunities in the area. Data for Franklin and Papakura Local Boards shows high income and highly skilled jobs are lower than the national (and presumably regional) averages. The implications of this are that without higher paid, higher skilled employment in the South, high levels of deprivation could perpetuate; or people will travel to higher paid and higher skilled employment opportunities outside the SBC area.

3.3.1. Future demographics

Participation Rate



The future commuting patterns will depend on the characteristics of the workers likely to be resident in the area and the employment opportunities available. The ratio of jobs to working age population (participation rate) is a key determinant of travel demand. A low ratio generates a large travel demand to other areas as residents seek to access jobs elsewhere. In the wider Southern area, the current ratio is around 33% (in the 2016 base year).

The future ratio in 2046+ is expected to fall to 30%. The overall participation rate for New Zealand in 2016 was 70%¹¹. This suggests that there aren't enough jobs in the Southern area being planned to cater for the increase in working-age population likely to be residing in the area.

The other part of this equation is whether the types of jobs available, match the skills of the people who can afford to reside in these areas. KiwiBuild has indicated that an "affordable" home under the KiwiBuild programme will have a market entry price in the order of \$650,000. In order for this to be 'affordable' household income would need to be approximately \$120,000 to \$150,000. Based on this, how many people in the existing area can afford to buy an "affordable" house, and where will they have to travel to access employment that generates these levels of income?

This scenario is becoming apparent in Hingaia, and by way of comparison appears to be a similar demographic to Silverdale (as summarised in **Table 9**). Both Hingaia and Silverdale are emerging residential communities on the fringes of Auckland. In both locations, the growth in residents who are employed in professional services and management have increased at a much faster rate than the regional average. However there are fewer opportunities to be employed in professional services and management in the South, and the average income is lower than the regional average.

¹¹ http://archive.stats.govt.nz/browse_for_stats/snapshots-of-nz/nz-social-indicators/Home/Labour%20market/lab-force-particip.aspx

Table 9: Southern growth area and Silverdale demographics

Location	Income	Education	Employment in Professional Services and Management
Hingaia (emerging community)	Slightly lower than the regional average but higher than other areas in the South	Slightly lower than the regional average for degree qualification	Higher than the regional average
Silverdale (comparator North of Auckland)	Higher than the regional average	Lower than the regional average	Higher than the regional average

The provision of high quality, high-earning jobs would help to reduce the need to commute longer distances to access these, and so would reduce the pressure on the transport system in the area.

In practice however this may be challenging, especially in the light of pressure to increase employment in Auckland's central area in order to gain the benefits from high-density activities and rapid transit systems. This would also represent a reversal of current trends where the numbers of jobs for professionals and managers have been created more slowly in the south than the increase in the resident workforce looking for employment in these job types.

The mismatch between the demographics and the employment both in scale and type continues to be a risk for the investment. Despite the growth in employment there is still expected to be a significant imbalance and skill mismatch between population and jobs. This is likely to lead to increased travel demand to and from the area, and compromise accessibility and liveability aspirations.

3.4. Economic context

3.4.1. National context

Auckland is New Zealand's main gateway for international trade and commerce, including tourism, and is critical to New Zealand's economic welfare. The "Golden Triangle" comprising Auckland, Waikato and the Bay of Plenty is critical to New Zealand's economic success, makes up over 50% of New Zealand's population, and is expected to accommodate over 70% of New Zealand's growth in the future. The "Golden Triangle" connects the two largest seaports in New Zealand (Tauranga and Auckland) and the three largest markets in the North Island¹².

The Southern Motorway and the North Island Main Trunk Line serve as the key strategic transport corridors supporting the movement of interregional freight within the Golden Triangle. Between them, they transport more than 22 million tonnes of inter-regional freight annually. The freight task is expected to increase by 78% in Auckland over the next 25 years, with a 50% increase in inter-

¹² MOT National Freight Demand Study, 2014

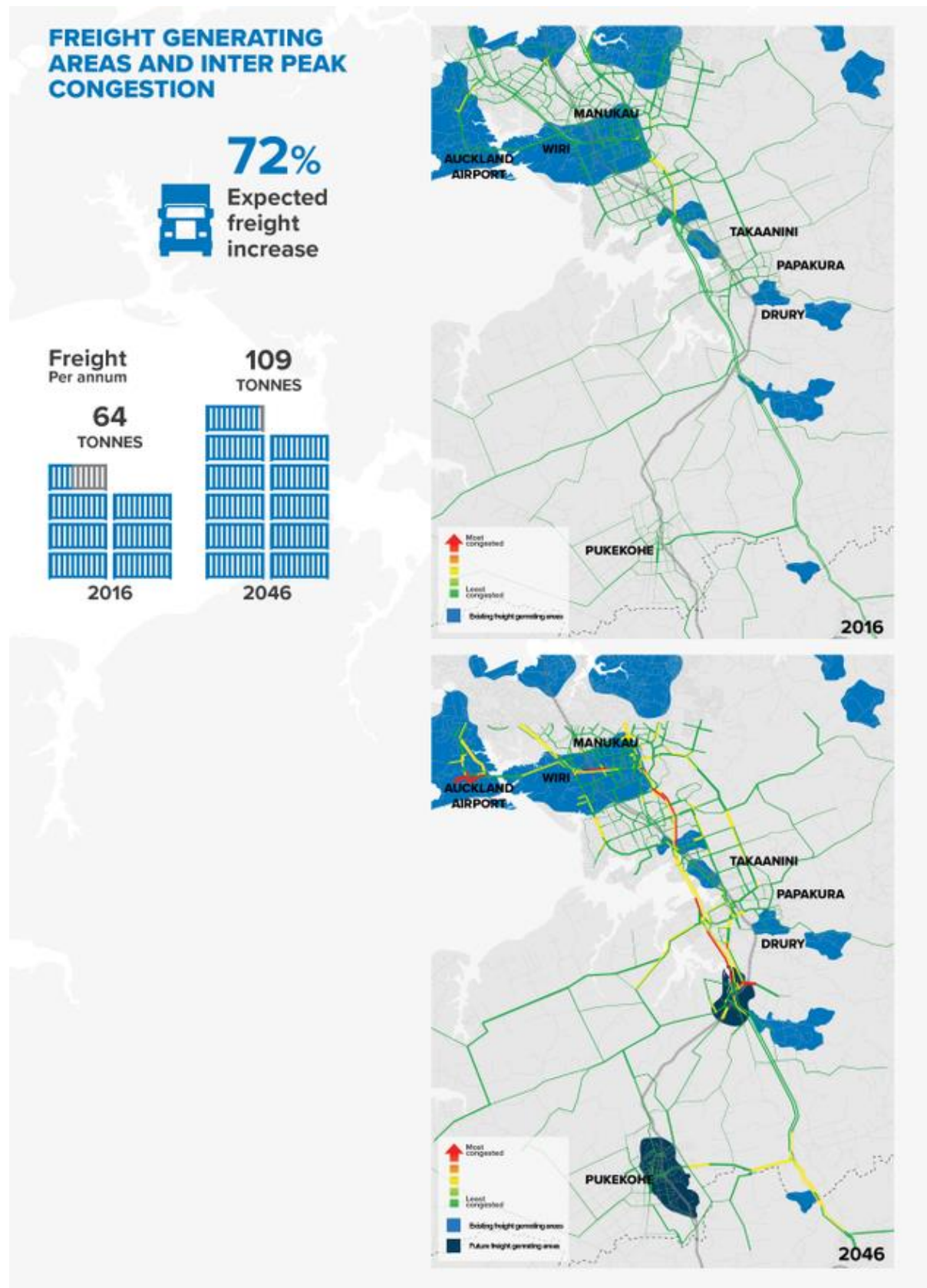
regional freight across the Auckland/Waikato boundary¹³. This represents an increase of inter-regional freight movements to 34 million tonnes annually.

Accommodating this level of freight requires both road and rail in South Auckland to be able to move freight efficiently and reliably in the face of competing demands for access to the transport network driven by the population growth and increased activity in the Southern growth area.

Figure 10 shows the magnitude of the freight task and the impact on the network in the future

¹³ Ministry of Transport future Outlook BAU scenario

Figure 10: Freight generating areas across the Auckland region



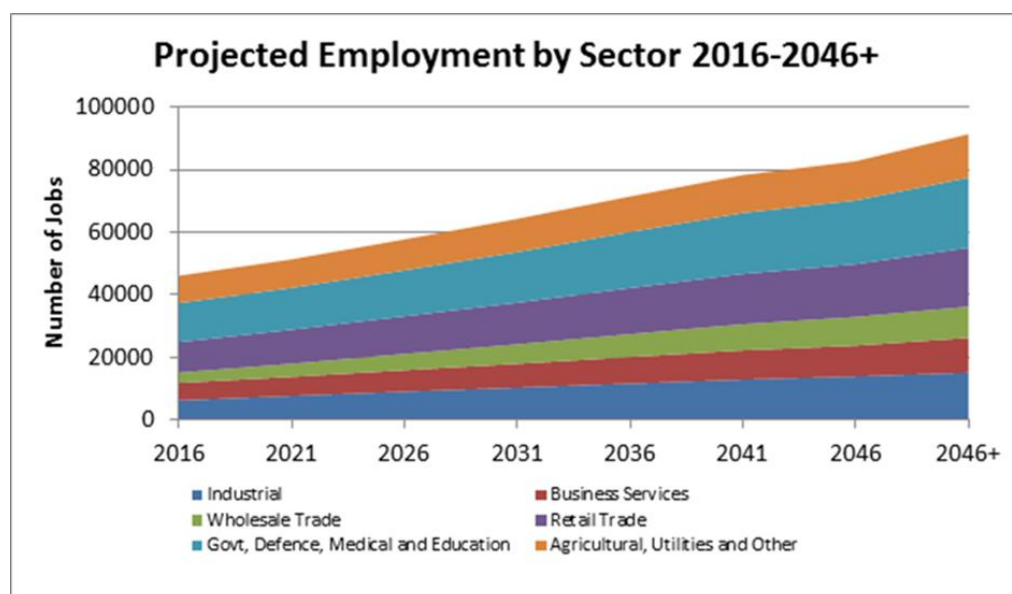
3.4.2. Local context

The Southern growth area is characterised by both primary and secondary industries. The Pukekohe fertile volcanic soil and warm moist climate supports a large horticulture and dairy farming industry. The head office of Fonterra Brands is located in Takaanini, along with international horse breeding facilities throughout the area, including the Karaka Salesyard.

Two large quarries also exist in the study area. Ardmore Airport is located adjacent to the business case area. There are approximately 500 people employed by the various organisations operating out of Ardmore Airport.

The manufacturing industry currently provides the highest level of employment in both the Franklin and Papakura Local Boards. Based on i11 projections however, the growth of this employment sector is very flat, as shown in **Figure 11**.

Figure 11: Projected employment sector growth



Based on data from Infometrics¹⁴ Papakura Local Board's employment is made up of 5.2% professional, scientific and technical employment and 47.4% combined employment for manufacturing, construction and retail trade as shown in Figure 12. This equates to 80% blue collar jobs vs 20% white collar jobs. There is a similar representation in Franklin Local Board are with 5.3% professional, scientific and technical employment compared to 35.7% combined employment in manufacturing, construction and retail trade. This equates to 81% blue collar jobs vs 19% white collar jobs. This can be compared to Auckland region where there are 71.5% blue collar jobs and 28.5% white collar jobs.

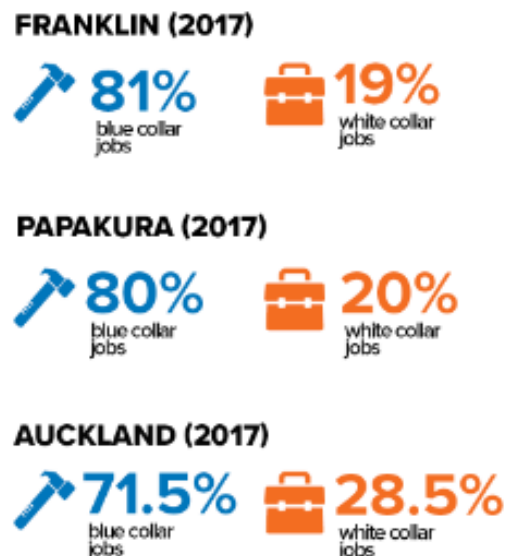
¹⁴ <https://ecoprofile.infometrics.co.nz/Papakura/Employment>
<https://ecoprofile.infometrics.co.nz/Franklin/Employment>

Figure 12 Employment in the Southern growth area



When comparing the blue and white collar proportion with Auckland Region, the data showed that Papakura and Franklin local board has 8.5% and 9.5% less white collar jobs perceptively as shown in Figure 13. This has implications for the growth areas, and the demographics of the new population if local jobs to match their skills are not available. This also reinforces the assumption that there is not enough high paying (white collar) employment to sustain the potential population growth, when considering housing affordability, within the growth areas.

Figure 13 Blue collar vs white collar employment



3.5. Social context

The South has a number of community facilities located in the SBC area including Pukekohe Park Raceway; a motorsports and horse-racing facility and ECOLight Rugby Union stadium. Bruce Pulman Park is a major recreational facility providing sports grounds and indoor gymnastic and sports facilities over 64 hectares of spacious park surroundings. Papakura has notable sports facilities including an indoor-outdoor swimming pool, international athletics track, sports stadium and venues for rugby, netball, cricket, golf, tennis, badminton, and soccer. There are also many parks and reserves throughout the Southern growth area, including local parks, skate parks, scenic reserves and playing fields. There are healthcare facilities at Pukekohe hospital.

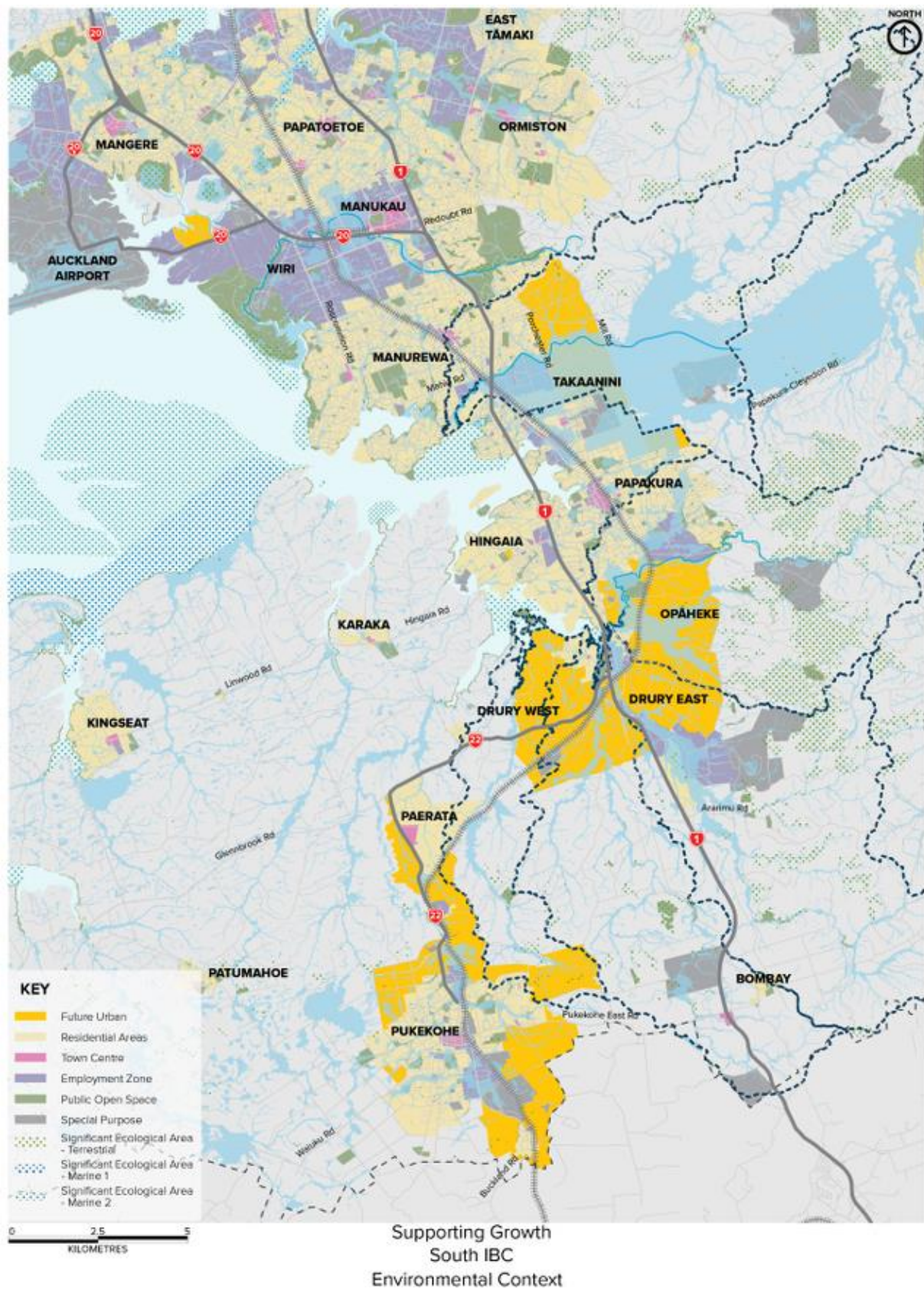
There are many schools in the Pukekohe and Papakura area. Takaanini, Drury and Hingaia also have primary schools and four co-education state schools are planned to be built in Takaanini over the next 15 years.

3.6. Environmental context

The area has a varied geography from harbour foreshore, coastal margins with associated mangroves and salt marshes, to fertile plains to rolling volcanic hills and the foothills of the nearby Hunua Ranges.

Key environmental features /constraints in and around the study area are shown in **Figure 14**. Further details are included in **Appendix A: Strategic Case**.

Figure 14: Environmental context



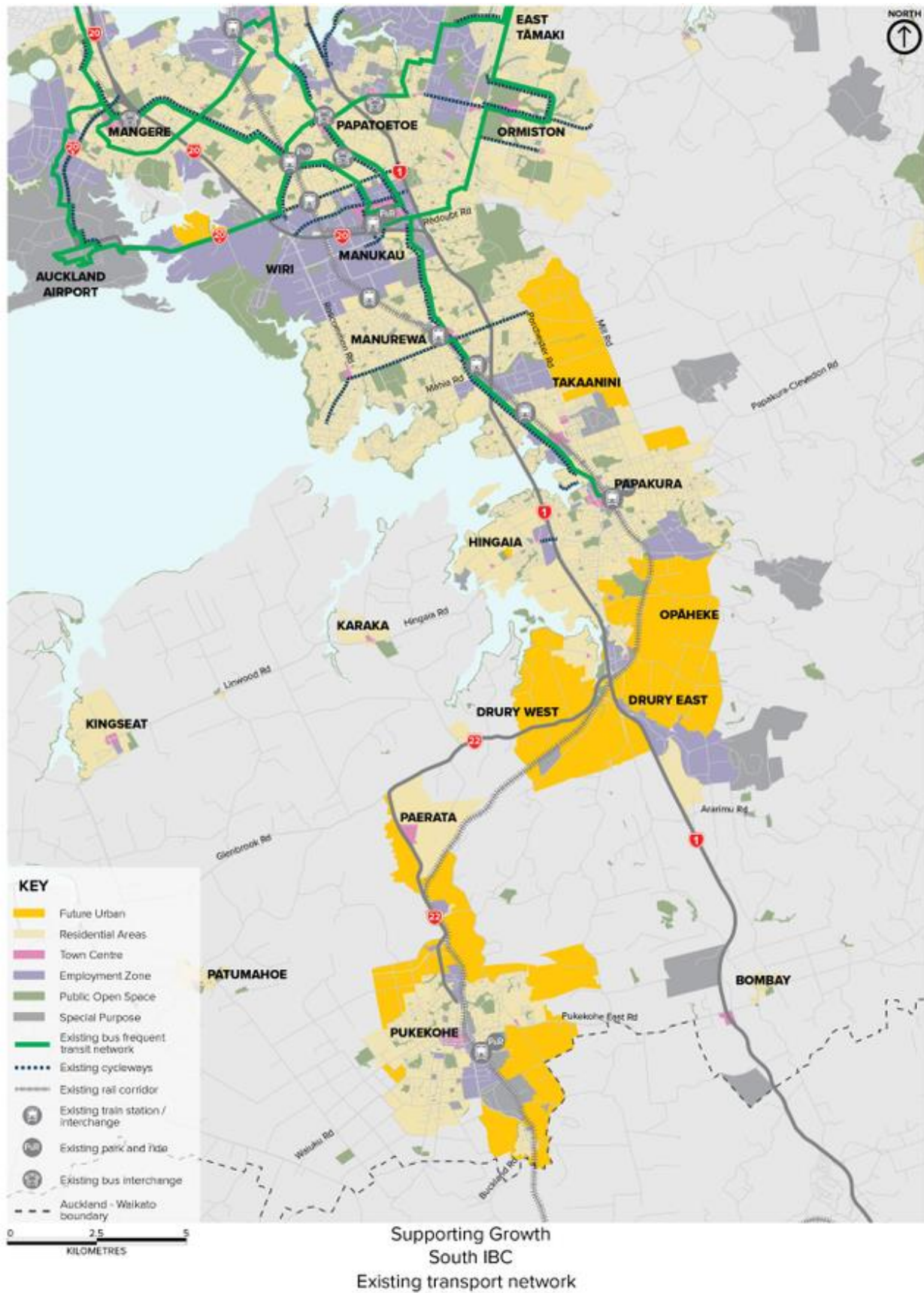
4. Strategic assessment

This section sets out the current transport context, constraints, and opportunities. It describes the 'Do Minimum' scenario, i.e. what happens to the Southern growth area (and the wider study area) if growth happens without corresponding investment in transport infrastructure.

4.1. Transport context, current travel patterns and related transport projects

The existing transport context in the Southern growth area is summarised in **Figure 15**, including committed and funded transport projects that are interrelated with this IBC. The limitations of the existing transport network in the South are clearly evident, especially the lack of public transport and active mode facilities.

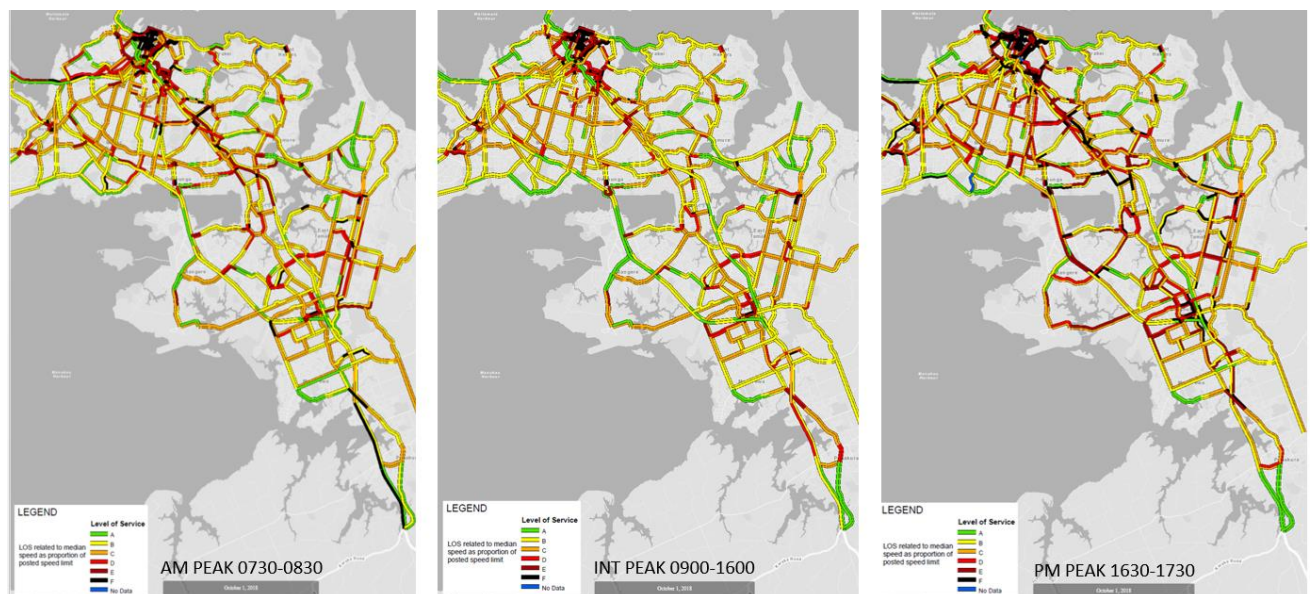
Figure 15: Existing transport network



Given Auckland's dispersed settlement, the state highway network provides critical linkages within the Auckland region and surrounding districts. The existing scale and nature of development in the south are influenced by the corridors of State Highway 1, State Highway 20, State Highway 22 and the NIMT, which serve both people and freight movement functions. Reliance on these corridors for access to employment to the north has generally led to severe congestion on the motorway, increasing travel times during morning and evening peaks. The growing population in the south is also contributing to increasing levels of congestion during the inter-peak on key corridors.

The level of service of the existing network across the day based on median speed relative to posted speed is illustrated below in Figure 16 using October 2018 Snitch GPS data provided by Auckland Transport. These show the significant impediment to north bound flow on the Southern motorway, around interchanges in the morning peak and the overall decline in level of service during the evening peak that is particularly severe in nature around the Takaanini and Wiri interchanges.

Figure 16: LOS related to median speed as a proportion of posted speed limit



4.1.1. Future transport challenges and opportunities

Current travel patterns in the Southern growth area (described in **Section 4.1**), combined with the planned growth and existing constraints identified previously, pose a number of future transport challenges and opportunities. The key challenges and opportunities limiting the ability for people to travel efficiently through the network are listed below with more detailed analysis in the problem evidence in **Section 5**. These have been categorised to highlight whether they are a transport network, land use or developer challenge or opportunity. Landuse and complementary urban interventions will be key opportunities in the DBC to assist the development of an urban form that promotes the principles of a sustainable urban mobility system.

Network

- **SH1 severance:** The Southern Motorway (which is both a barrier and a conduit) constrains the ability for people to move East/West across the corridor. Drury is a key pinch point making it difficult to get from Hingaia area to Papakura town centre and train station. The Southern motorway is a barrier particularly for pedestrians and cyclists.
- **NIMT** is constrained by number of tracks. This limits the capacity of the rail system to enable passenger trains and freight trains to cater for future growth.
- **NIMT** currently does not allow for electrification south of Papakura. This impacts on efficiency as an interchange is required at Papakura.
- **Environmental/geographical constraints:** Environmental features such as the Pāhurehure Inlet and Hunua Ranges constrain the existing network and will challenge the ability of the future network to move people and freight across the day.
- **High resilience risk:** High reliance on the Southern motorway, with few alternative routes to serve the residential communities to the west of the Southern Corridor. This places high demand pressure on the motorway and reduces resilience.
- **Limited public transport:** The existing PT network is inadequate. It generally provides coverage to the communities within close proximity of the current and future stations, however there is only one service for Hingaia Peninsula. The existing lack of suitable roads/infrastructure to operate buses on and the severance created by SH1 limits coverage. AT has indicated they have plans to expand coverage as the area develops.
- **No walking and cycling** network connecting to the Southern Corridor cycleway (currently under construction) to provide mode choice.
- **Car culture:** High private vehicle use and reliance places increasing pressure on the strategic transport network and will limit access to social and economic opportunities unless transport choices are improved.

Land Use

- **Providing transport connectivity to surrounding town centres:** Takaanini, Drury and Pukekohe are not geographically connected to the nearest town centres such as Manukau. It is important to provide well-connected transport links to the surrounding town centres or provide enough amenities to enable the growth area to be self-contained to reduce the number of unnecessary trips.
- **Severance:** Slippery Creek/Ngakorua Stream segregates the Drury West area from the potential Drury Town Centre, and key employment areas north of Drury.
- **NIMT severance:** The North Island Main Trunk Line (which is both a barrier and a conduit) creates severance for communities either side of it, as the ability to cross the railway line is limited by the number of crossings. This will be a particular issue for the emerging Drury development area

Developer

- **Developer pressure:** Developers have indicated their intentions to lodge plan changes next year, ahead of the Council structure planning process. It is therefore important to manage pressure from developers to meet the aspirations for the Southern growth area.
- **Development staging** and provision of transport infrastructure and improved public transport to match the pace and the location of development within the Southern growth area will be challenging.
- Providing high-quality access to Auckland Central city from the Southern growth area can reinforce concentration of jobs in the central city, however there is risk that the growth areas will retain a dormitory status if strong local opportunities are not supported.

4.1.2. Future network and network integration

Significant transport investment has been signalled to support the development of Auckland's growth areas. Several projects which impact the study area are currently under investigation or construction including:

- **Inter-regional rail** – the role of rail in moving interregional freight and passengers is currently being investigated outside of this business case. There is the potential for a new rail corridor between Pokeno and Drury, or to upgrade the existing NIMT to achieve the level of service desired for those inter-regional services. The outcomes from this investigation will need to be incorporated into the DBC.
- **Hamilton to Auckland Spatial Plan** is currently underway and will inform future work in this part of the corridor.
- **Manukau to Papakura motorway** is currently under construction as part of the Southern Corridor Improvements project. This project includes additional lanes in both directions, an upgraded Takaanini Interchange and a 4.5km shared use pedestrian/ cycle path.
- **Murphy's Road** – As part of the Flat Bush Road network upgrade package focusses on Murphy's Road from south of Ormiston Road to the north of Flat Bush School Road to construct a four-lane urban arterial road.
- **Infrastructure works for Drury South (Ararimu)** - Construction of the spine road and ancillary works to unlock the Ararimu Precinct,
- **Hingaia** - Projects supporting the Hingaia SHA, including the Park Estate Rd/SH1 W&C bridge, Hingaia Road four laning, Oakland/Hingaia intersection upgrade and Hingaia Park Estate/Great South Road intersection upgrade.
- Local safety, walking and cycling improvements in the Rosehill area.

The main regional roading, rail and bus network assumed for the Do-Minimum scenario for 2046+ are detailed in Table 10.

Table 10: Projects assumed in the Do Minimum scenario

Project	Project description
SH1 Widening	<ul style="list-style-type: none"> • Southern Corridor and SH1 Papakura to Bombay 6 laning
Mill Road	<ul style="list-style-type: none"> • Northern section – Stage 1
SH22	<ul style="list-style-type: none"> • Safety improvements including alteration of junction form and road widening as per Safe Road Alliance scheme June 2018
SH1 Shoulder Bus Running	<ul style="list-style-type: none"> • Using the facilities proposed as part of the SH1 widening project where express services could run on the shoulder
Revised Bus Service Pattern	<ul style="list-style-type: none"> • Connect to all zones in urban areas, detailed below
New Rail Stations not opened	<ul style="list-style-type: none"> • Paerata, Drury West, Drury Central, Tironui all closed
ATAP 1.1 all-stop Rail Services	<ul style="list-style-type: none"> • No express services to simulate the third rail not being available – effectively 1a and 1b services only, see below

Additional future committed projects in the Southern growth area include:

- Southern corridor improvements – additional motorway lanes, upgraded Takaanini interchange and shared use pedestrian/cycle path along SH1

- SH22 Drury to Paerata Safe system enhancement improvements
- SH1 capacity improvements between Papakura and Bombay
- Pukekohe to Papakura electrification – electrification of the main rail line between Papakura and Pukekohe including traction power supply
- EMU rolling stock - purchase of new EMUs to allow electric rail services to be extended to Pukekohe and to provide additional capacity on the rail network
- Papakura railway station park and ride – new multi-story facility on the site of the existing Papakura park and ride, to increase patronage on the rail network.
- Safer roads

The transport network within the Southern growth area needs to integrate well with the wider regional transport system. Network demand within the area is affected by the surrounding wider network functionality and demand. Of key relevance to this IBC, are three major committed projects north of Manukau:

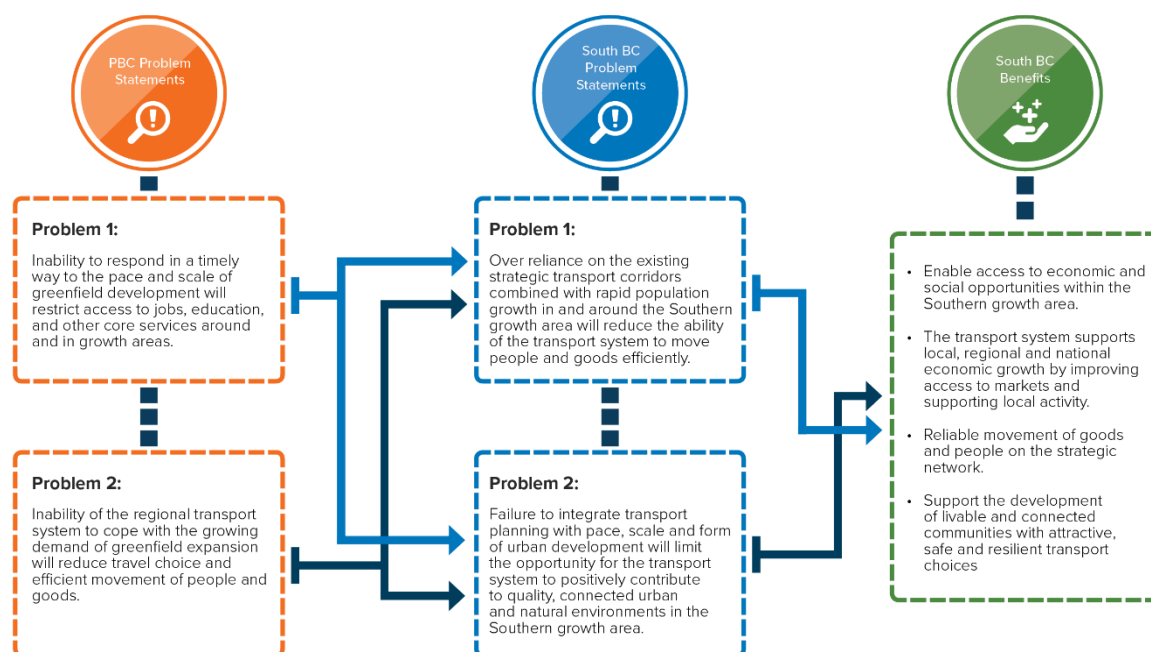
- **20Connect** – 20Connect will identify improvements along State Highway 20, State Highway 20A and State Highway 20B to improve journey reliability and improve short and medium term access to and from Auckland Airport and the surrounding areas. Improvements include upgrades around or alongside the state highways to improve capacity; optimising the existing network and helping people plan their travel options.
- **Airport to Botany** - A single stage business case for mass rapid transit from the Auckland International Airport to Botany Town Centre is currently underway. The purpose of the project is to develop a response to increasing demand from south to east Auckland for the Airport to Botany Access Corridor. A PBC has been approved confirming that there will be a project, but the alignment is yet to be confirmed. Early deliverables are expected by 2020/2021, including a new bus/rail interchange at Puhinui station, additional bus services and walking and cycling connections. This will enable an easier connection to the airport which is an important source of jobs for people living in southern Auckland.
- **City Rail Link (CRL)** - The CRL is a 3.45km twin-tunnel underground rail link up to 42 metres below the city centre transforming the downtown Britomart Transport Centre into a two-way through-station that will better connect the Auckland rail network. Whilst not directly improving rail capacity for the south, the step change in the rail system will improve travel options and times and close a significant gap in customer service. CRL construction is underway and is due for completion in 2024.

Additionally, a third main rail line between Westfield and Wiri and an upgrade of Westfield rail junction has been identified within the Transitional Rail Activity Class, ATAP and the RLTP. This will increase rail capacity and provide better separation of passenger and freight services. There is also funding for the removal of road/rail level crossings to better manage safety risks. At the time of writing, this is not yet formally committed as full funding approval is yet to be obtained.

5. Defining the problem

Taking into account the PBC problem statements, the current policy context, contextual changes discussed above, locally specific evidence, constraints, and opportunities, the project team¹⁵ agreed to a set of draft south area-wide problem statements and investment objectives. These were tested through discussion and development of key themes with key stakeholders and then refined. The links between the PBC problems and the problems for this IBC and the benefits of addressing these can be seen in **Figure 17**.

Figure 17: SG PBC problems IBC South problems and benefits



The PBC problem statements focus on the inability of the transport network to respond in a timely way to growth, cope with growing demands and reduced travel choices. IBC problem statements were therefore developed to explain how each problem or opportunity presents in the Southern growth area in greater detail. The PBC problem statements specifically focused on the growth in terms of pace and scale, and the inability of the regional transport network to cope with this.

The transportation component is developed further in the IBC to detail that there is a lack of transport choice in the southern area which is considered outside of the population growth.

¹⁵ The project team includes representatives from AT, NZTA, transport planning, planning, environmental, engineering, urban design specialists.

5.1. Problem Statement 1: Capacity

Over-reliance on the existing strategic transport corridors combined with rapid population growth in and around the Southern growth area will reduce the ability of the transport system to move people and goods efficiently (60%).

Problem one highlights the lack of capacity on existing strategic corridors. Existing demand causes network constraints during peak periods' indicating that as future rapid growth in population occurs in the South, the network will be unable to sustain an acceptable level of service. If not addressed, the existing transport system will constrain the levels of access for residents in both the existing and future urbanised areas, limit development potential, decrease regional productivity and undermine the quality of life for residents and employees in the area.

5.1.1. Evidence to demonstrate cause

There are four causes that demonstrate the problem of capacity on the southern transport network:

- **Cause 1:** Imbalance between transport demands and network capacity driven by residential growth
- **Cause 2:** Imbalance between households and jobs.
- **Cause 3:** Mismatch of jobs in the area to the skills of the people living in the area.
- **Cause 4:** Limited mode choice

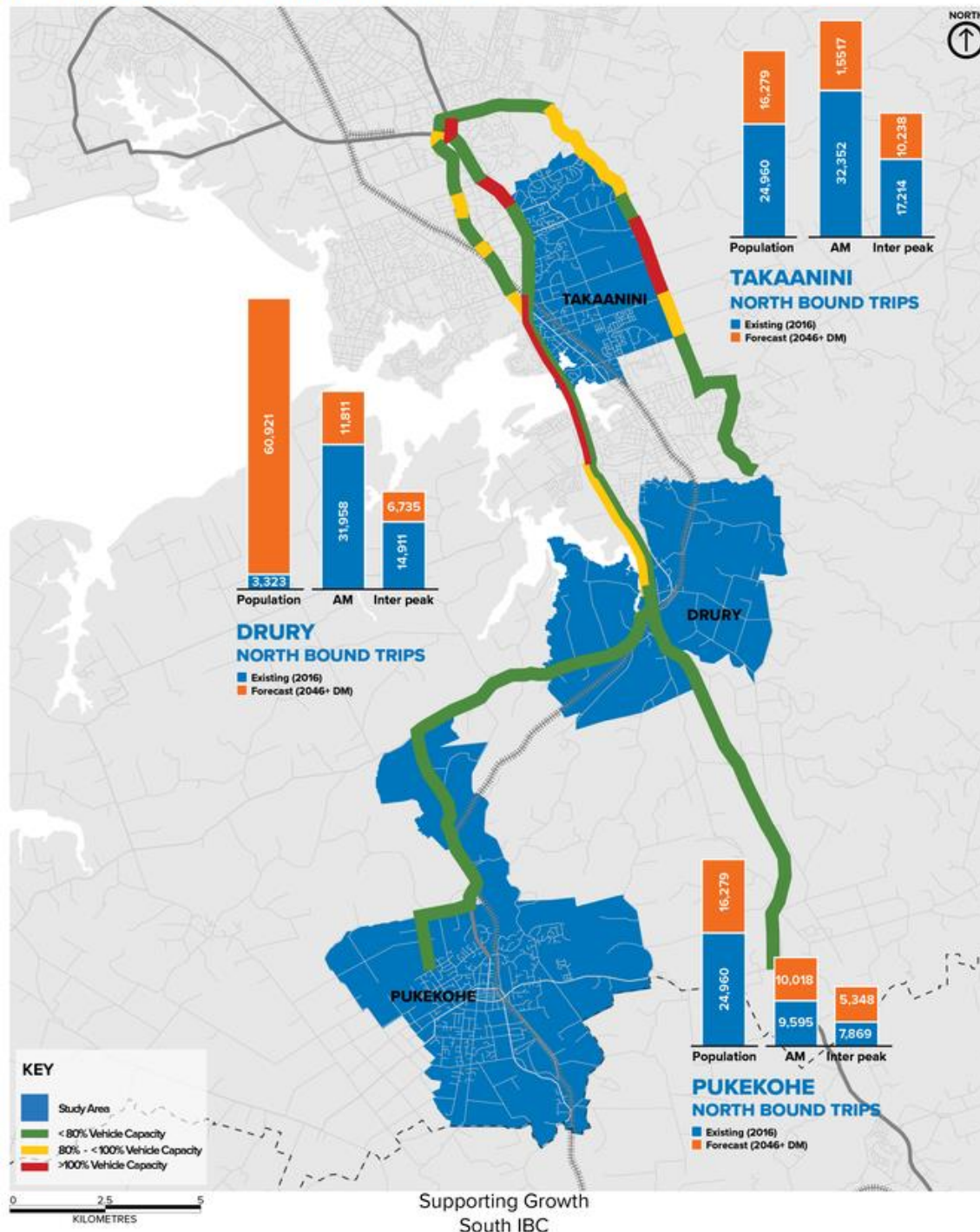
Cause 1: Imbalance between transport demands and network capacity driven by residential growth

As described in the previous sections, significant residential and employment growth is planned for the South. The key areas of population growth are Drury, Drury West, Hingaia, Paerata and Pukekohe, as well as the towns of Pokeno and Tuakau in the North Waikato. This combined with the types of employment opportunities in the South is likely to lead to much greater travel demand on existing strategic corridors.

Lack of connected and supporting routes (road and rail) mean there is a high reliance on SH1 and NIMT. Additionally, physical constraints of only two tracks and limitations to operating effective RTNs and FTNs create capacity constraints. The strategic network is currently operating near capacity and heavy periods of congestion are experienced at interchanges and pinch points throughout the day. With Manukau and Auckland Airport being key employment centres, SH1/SH20 interchange is a bottleneck in the existing network in the evening peak. SH1 north of Drury interchange has heavy congestion throughout the day, as all traffic from Pukekohe, Drury and south of Auckland must go through this point. These are two such areas where the form of the network constrains the ability for travel demand to be met as shown in **Figure 18**. As population and development increases in the South in the future, this capacity issue will be exacerbated.

Figure 18: Network level of service 2016 AM Peak, with existing and forecast population and trip demand

EXISTING VS FORECAST POPULATION AND TRIP DEMAND NETWORK LEVEL OF SERVICE 2016 AM PEAK



At Pukekohe, there are limited opportunities for “through” traffic from surrounding communities to bypass the town centre. An existing inner ring road brings through traffic closer to the town centre than is desirable, compromising access and the quality of the town centre environment.

The Takaanini interchange is over capacity currently limiting access as shown in **Figure 23**. Congestion at the key interchange limits viable options to reach railway stations constraining access to the strategic transport network for longer distance travel.

The strategic corridors have a key role to support the local, regional and national movements of freight. These freight movements significantly impact network demand, and a considerable effect on capacity and network flows. Both SH1 and SH22 are level 1 freight corridors and there are a number of existing and future major and minor freight generating and attracting areas in the study area.¹⁶ In a wider context, Hamilton is also becoming a hub for inland ports that will interact with SH1. These freight movements require sufficient network capacity in order to move their goods effectively and efficiently without impacting on the level of service for other road users.

Cause 2: Imbalance between households and jobs

The future commuting patterns will depend on the characteristics of the workers likely to be resident in the area and the employment opportunities that can be offered.

The growth in employment is disproportionate to the growth in households in the Southern growth area. This essentially means that there aren't enough jobs being planned to cater for the increase in working age population moving to the area.

- In the Southern growth area, there are currently 44,000 jobs and 61,000 households (72%)¹⁷
- With the growth of 69,000 households and 44,600 jobs in the area, by 2046+, there are forecast to be 88,600 jobs and 130,000 households - a drop of 4% in the ratio of jobs to households.
- Additionally, there is a marked drop in the ratio of jobs to households in the North Waikato areas of Pokeno and Tuakau from 76% to 34%.

However, the other part of the equation is the type of jobs that are on offer, and whether they match the skills of the people moving to these areas.

Cause 3: Mismatch of jobs in the area to the skills of the people living in the area

The Southern growth area is isolated from main Auckland employment hubs such as Auckland central city, Auckland Airport and Manukau. The Silverdale area located 30-35kms north of Auckland is similarly isolated from Auckland's major employment locations.

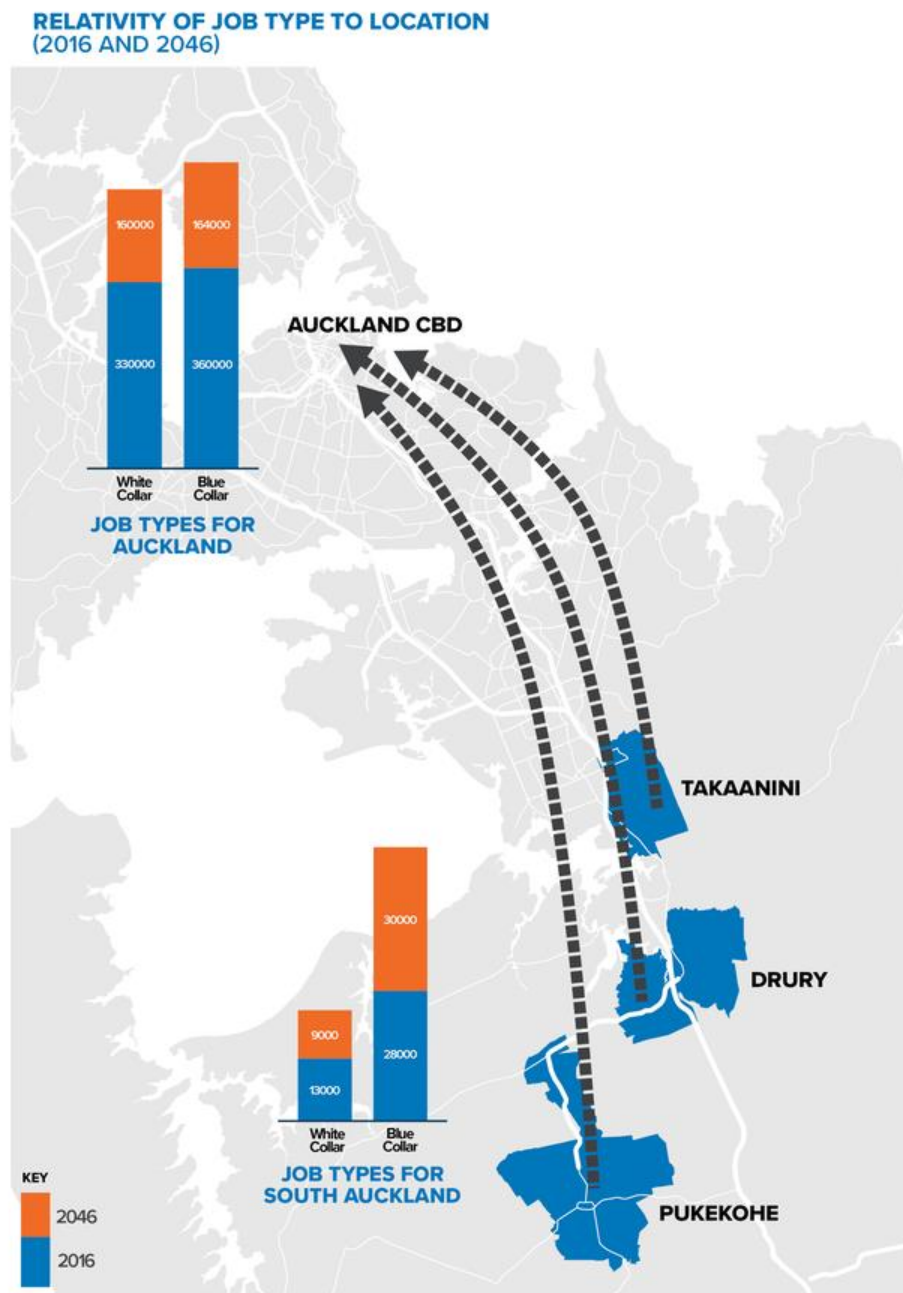
¹⁶ <https://www.transport.govt.nz/assets/Uploads/Land/Documents/ATAP-Freight-Report.pdf>

¹⁷ Base year 2016 and data sourced from AFC.

Like the Southern growth area, Silverdale is also experiencing considerable population growth. Richard Paling Consulting 'Working Paper 6 -Commuting patterns of Silverdale' examines the pattern of Silverdale commuting trips, which may be an indicator of travel patterns expected with the proposed development in the South.

When comparing Silverdale and Hingaia as examples of areas with considerable recent development, Paling concludes that the relative lack of local employment opportunities in Hingaia appears to have resulted in part in higher long-distance commuting to the central city and in part in higher commuting to smaller local employment centres. This may reflect the nature of the employment sought by those moving to the new development areas with a higher emphasis on white collar jobs typically found in the central areas as shown in **Figure 19**.

Figure 19: Relativity of job type to location



Cause 4: Limited mode choice

Based on 2013 census data, 92% of all commuter trips in the South are made by private vehicle (car, truck, van motorcycle, other) with 5% on public transport and 3% active modes.

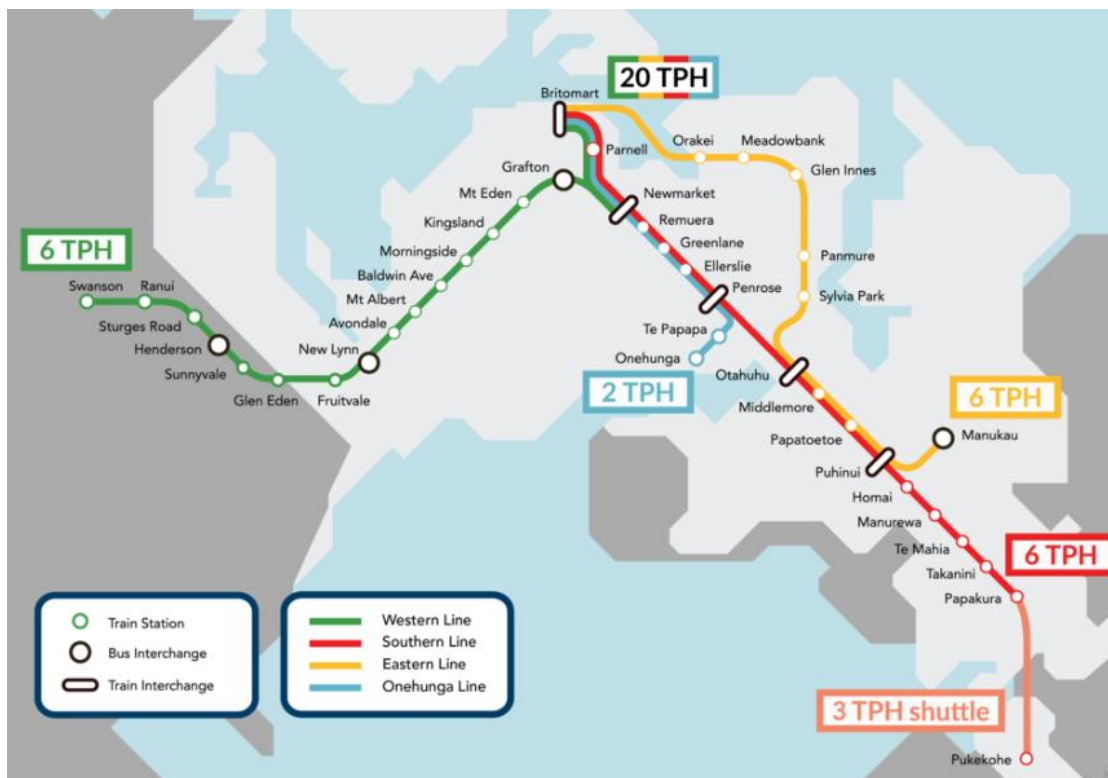
This car dominance is likely to be driven by other mode options not meeting needs as a result of:

- limited strategic walking or cycling corridors currently
- existing walking and cycling network is generally limited to the existing urbanised areas
- limited and unreliable public transport services (bus and rail)

- ingrained car dominated behaviour

In terms of public transport, the NIMT rail line connects Auckland and Wellington and bisects the Southern area between Papakura and Pukekohe. The NIMT is a double track line that is currently non-electrified south of Papakura, with a diesel passenger shuttle service between Pukekohe and Papakura where an interchange is required. With only two tracks, frequency is constrained as shown in **Figure 20**. This limits the capacity of the train system. Historically there were stations located at Opāheke, Drury and Paerata but these have been disestablished and there are currently no intermediate rail stations operational between Papakura and Pukekohe.

Figure 20 Existing Auckland passenger rail services Source: City Rail Link¹⁸



As land is released for development, it is critical that the transport system enables a significantly higher proportion of trips to be made by public transport, walking and cycling.

Increasing public transport service catchment areas is an important part of maximising public transport mode share, particularly for long distance travel from the urban periphery. This effective catchment can be significantly expanded through provision for active mode and micro-mobility modes such (e-bike and e-scooter). These modes extend the distance people are able and willing to travel to reach a public transport node (without using a vehicle) and can replace short to medium private vehicle or taxi trips. The micro-mobility modes have a further advantage of minimising external effects such as steep gradients and personal fitness levels.

¹⁸ <https://www.cityraillink.co.nz/crls-benefits/>

In addition to a transport network that can physically support walking and cycling and micro-mobility modes, suitable support infrastructure will be required at RTN stations and key public transport interchanges such as bicycle or micro mobility parking, electric charging points and lockers.

5.1.2. Customer insights on existing problems

Figure 21 summarises current customer insights on problems within the existing southern transport network and suggestions for the future network, based on feedback received during the public consultation period (plus other survey and data sources, as described in **Appendix H: Engagement Summary Report**). Similarly, **Figure 22** provides insight into customer perspective of the existing issues (real or perceived) in relation to the use of public transport and active transport.

Figure 21: Customer insights – existing road network issues

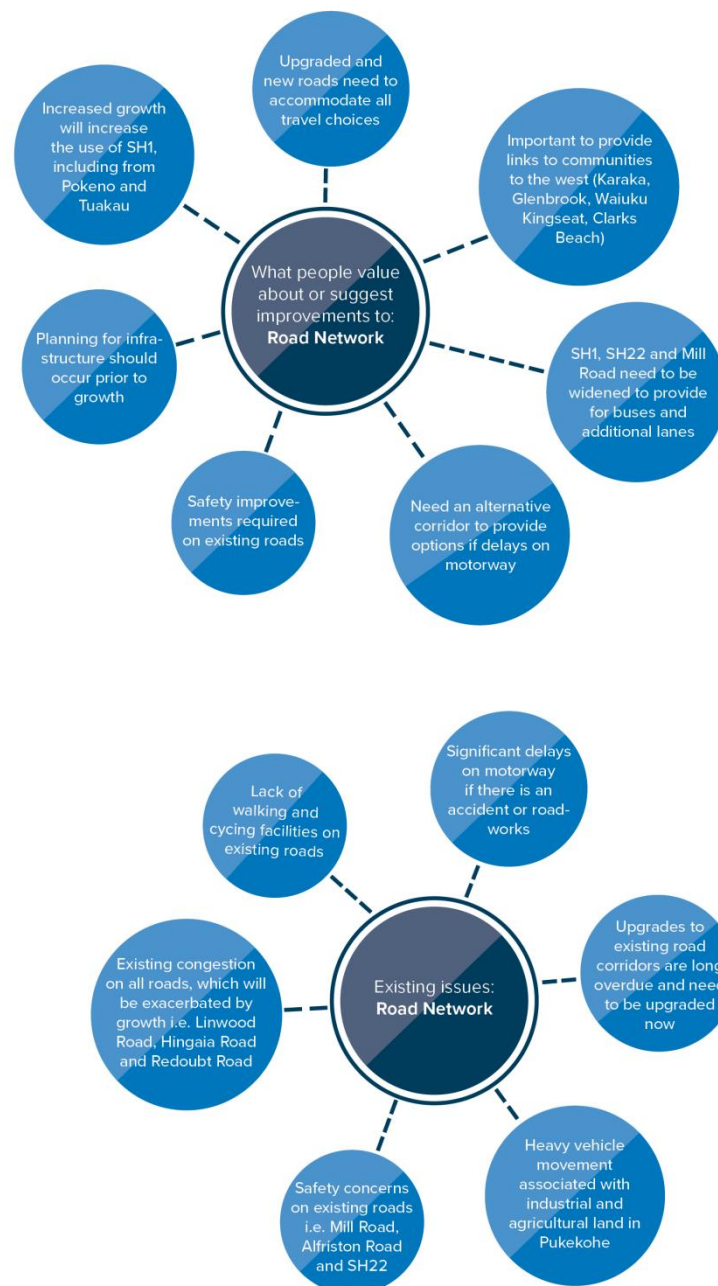
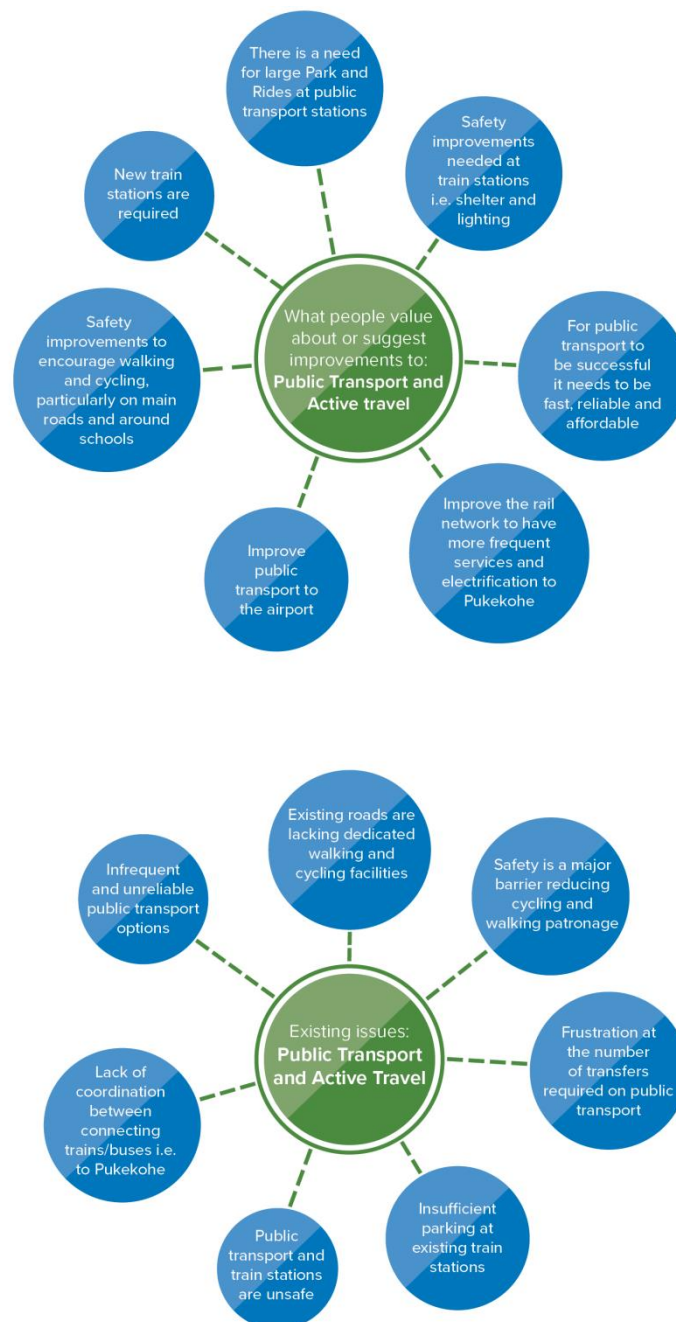


Figure 22: Customer insight – existing public transport and active transport issues



The customers insights reflect the same issues as described above, namely:

- network congestion
- conflicting demands with freight
- lack of walking and cycling facilities
- safety – lack of facilities and poor urban design leading to mode choice barrier
- PT frequency/offering not meeting needs being barrier to mode choice.

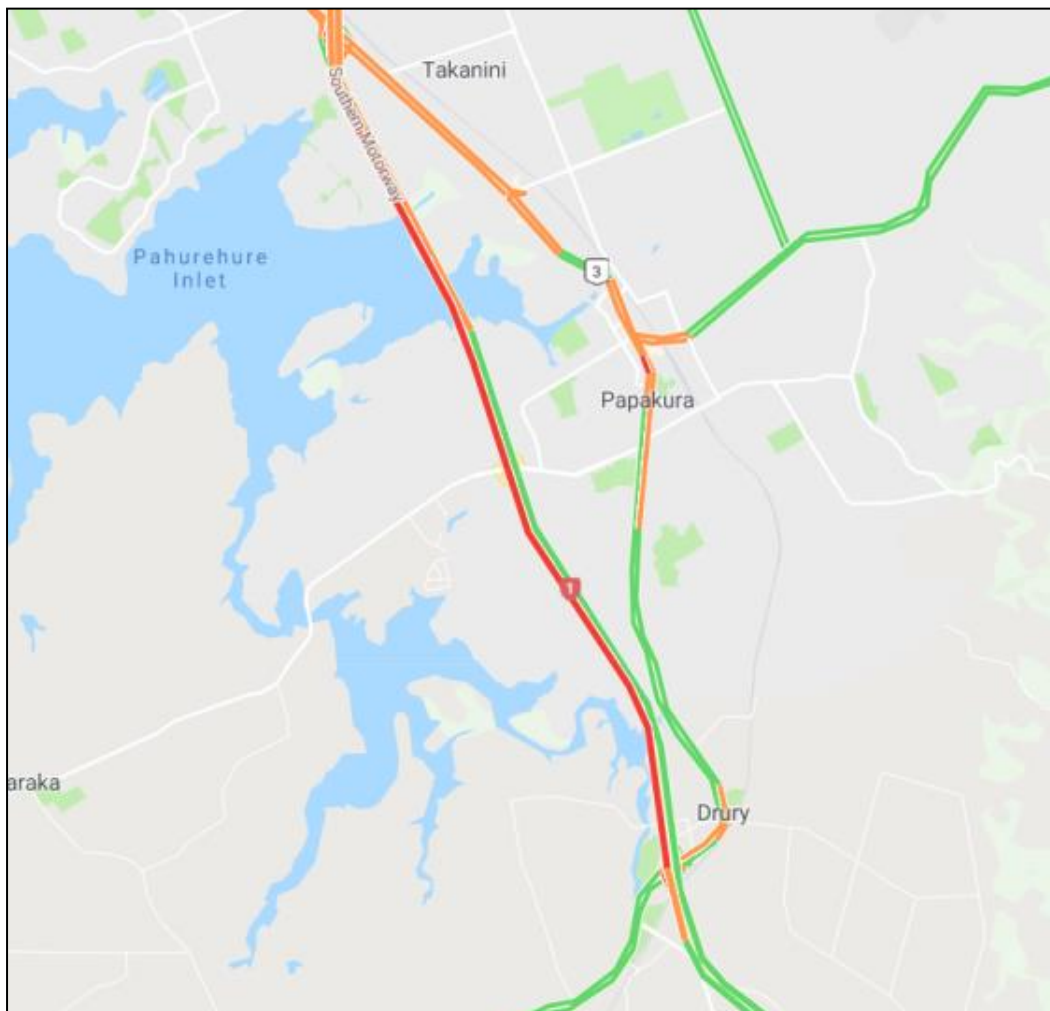
5.1.3. The consequences – What if we do nothing?

If this problem is not addressed, the following consequences can be expected in the Southern growth area.

Consequence 1: Heavy congestion all-day

From a north-south perspective, SH1 is the only strategic road corridor. SH22 is also a key transport corridor for accessing Pukekohe and surrounds. Significant pinch points on these key routes currently exist at Drury, Papakura and Takaanini as shown in **Figure 23** using Google Traffic real-time information mapping. This demonstrates that lack of network capacity for existing travel demand. As population and development increases in the South, this capacity issue and resultant congestion will be exacerbated. Congestion leads to extensive extension of peak periods across much of the day, reducing productivity and resilience.

Figure 23: Existing daytime (weekday) congestion



Modelling indicates that in 2046+ under a Do Minimum transport network, many of the transport network links are under considerable strain. The modelling considers the traffic demand compared to the capacity of the road on which it is travelling to determine a vehicle capacity ratio (VCR).

The analysis indicates that SH1 during the AM, inter-peak and PM peak will experience reduced reliability; this impacts on the resilience of the strategic network. This will impact private vehicle trips as well as freight movements which in turn has a significant economic impact.

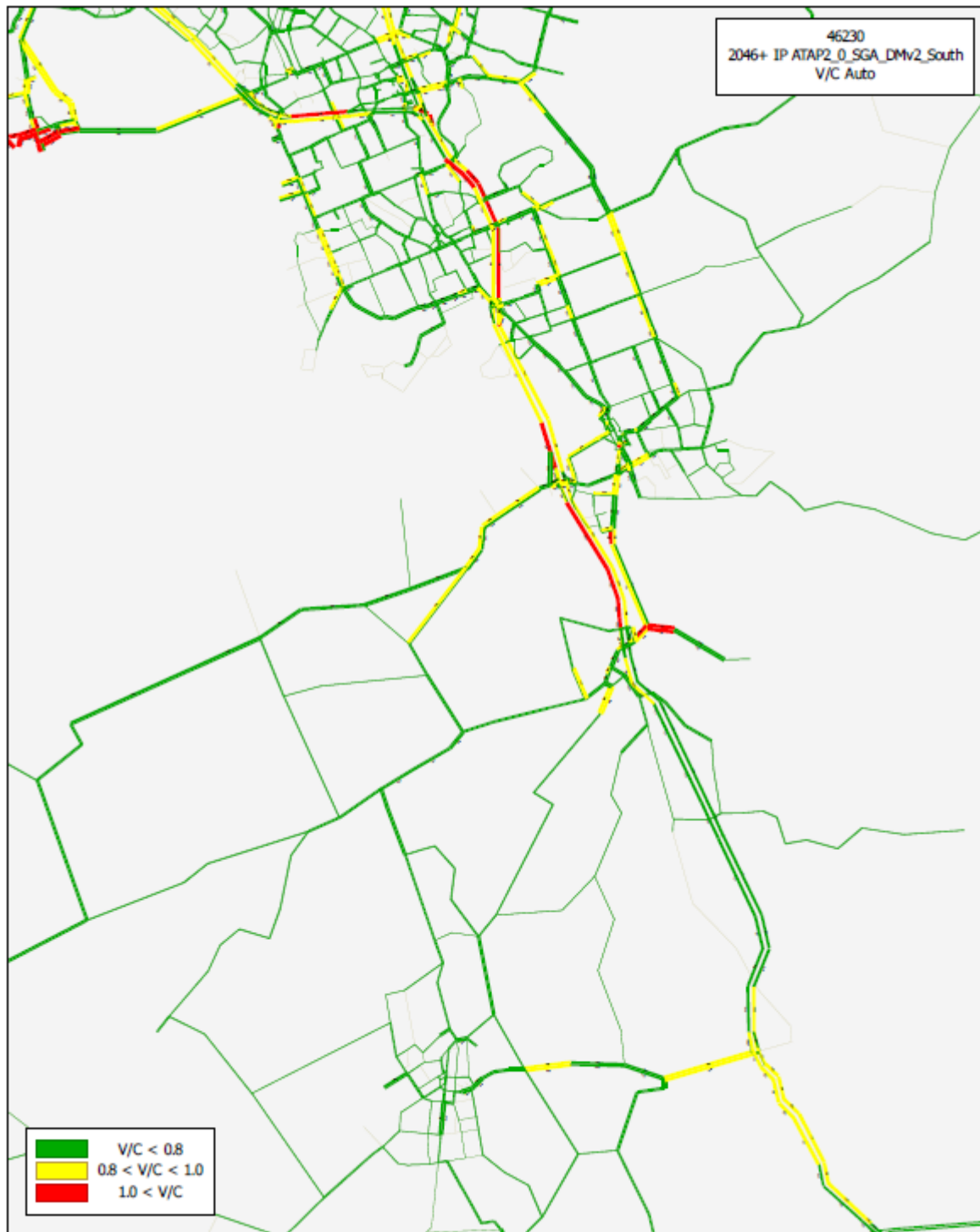
Consequence 2: Constrained network, heavy congestion and reduced economic opportunity

As level 1 freight corridors¹⁹ both SH1 and SH22 are designated strategic corridors of regional and national significance for the movement of freight. The number of existing and future major and minor freight generating and attracting areas in the study area also show economic importance of freight in the Southern growth area. These freight movements require sufficient network capacity in order to move goods effectively and efficiently without impacting on the level of service for other road users. Freight movements have a significant impact on network demand and network flow; particularly in congested network conditions where heavy vehicles take longer to stop and start.

The forecast ratio of flow volume to capacity of the Do Minimum network in 2046+ during the inter peak is shown in **Figure 24**. The level of congestion and network impedance is clearly evident with much of the state highway operating in excess of 80% and 100% V/C.

¹⁹ <https://www.transport.govt.nz/assets/Uploads/Land/Documents/ATAP-Freight-Report.pdf>

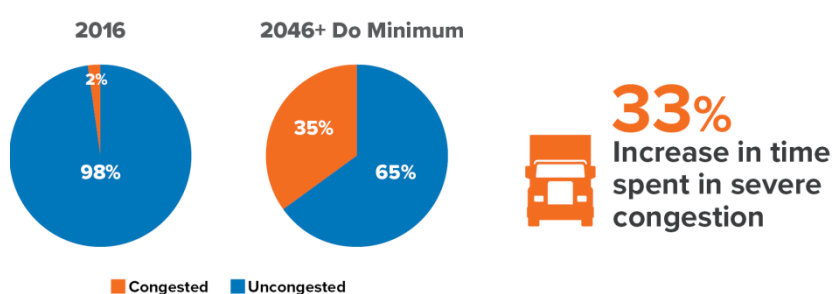
Figure 24: Ratio of flow volume to capacity for 2046+ Inter peak Do Minimum network



Freight logistics planning strongly depends on reliable freight routes. Time spent in congested conditions has significant financial implications for operators. The cost of congestion can be approximately monetised based on a \$90–\$120 per hour standing cost per vehicle. In a very competitive industry, these additional costs cannot be passed on, placing extreme pressure and risk on an important economic sector²⁰.

Under current (2016) conditions HCVs spend 2% of their travel time spent in severe congestion. This is forecast to increase to 35% by 2046 if only do minimum intervention occurs, as shown below in **Figure 25**. This would likely result in substantial disruptions and lost economic opportunity for the freight sector.

Figure 25: Proportion of Heavy Commercial Vehicle travel time spent in severe congestion (LOS EF) during interpeak

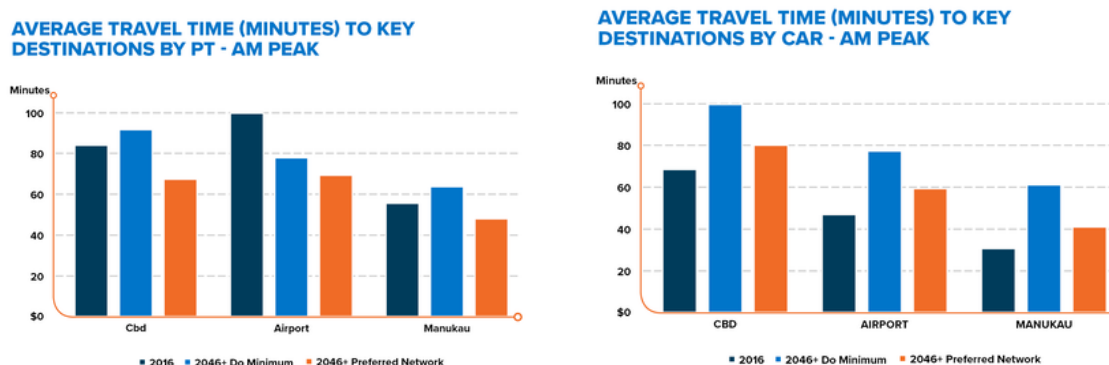


Consequence 3: Unreliable access to and along the strategic transport network

Journey time reliability is a key metric in determining the effectiveness of the transport system in supporting transport demand and access to employment and social opportunities. Travel time reliability is important to customers, as they plan their daily activities and make decisions about how they will travel and where they want to live. A reasonable travel time is assumed to be 30 minutes for private car and 45 minutes by PT.

Average journey times to key destinations by car and public transport are shown below in **Figure 26**. The consequence of insufficient investment over time is clearly seen with travel times increasing by around 30 mins to all destinations, reflecting the increasing levels of congestion across the network during morning peak.

²⁰ <https://www.nzta.govt.nz/assets/resources/research/reports/625/625-use-of-technology-to-measure-and-improve-freight-movements.pdf>

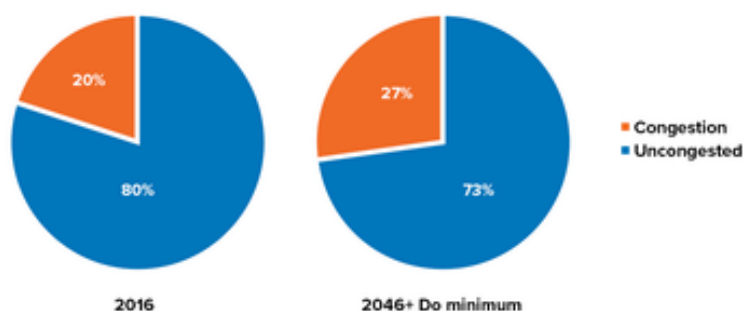
Figure 26: Travel time comparison

Reliability is a key factor for public transport attractiveness and patronage uptake.

Numerous studies consistently show that patronage growth on urban bus services is directly linked to improvements in frequency and reliability. Major bus system improvements in Australia and Europe have shown that the largest increases in patronage are related to increases in service levels, bus rapid transit and bus priority systems targeting improved reliability.

Bus travel time reliability and timetable adherence is compromised when impeded by congestion. This impacts on its attractiveness as a mode, as well as having significant implications for bus operators. The proportion of time buses spend in severe congestion currently is 20% as shown in **Figure 27**. Based on the 2046+ growth scenario, the time buses spend in severe congestion will increase to 27%. This is the result of increased network pressure and lack of priority measures for buses. This decrease in level of service for buses will impede reliability.

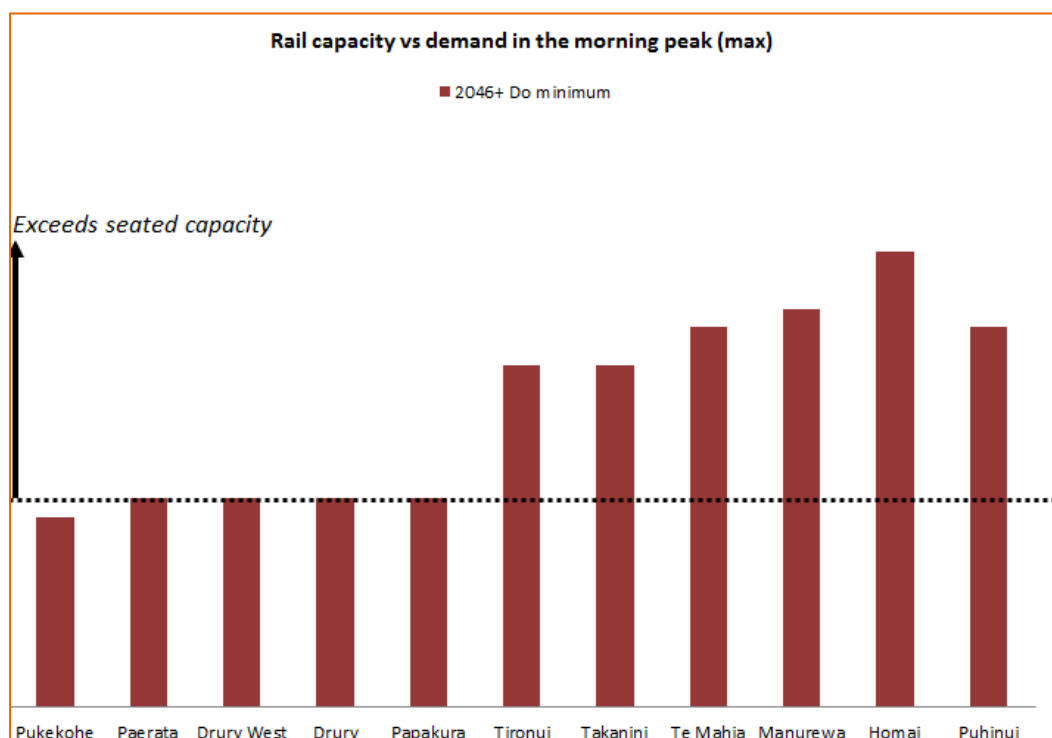
Figure 27 Proportion of time spent in severe congestion (V/C >0.9) by PT (excluding rail) per capita per annum during the AM Peak period.



Public transport is vital to move large numbers of people to key destinations. There are consequences of not providing infrastructure that supports the forecast growth in the Southern area. Based on the existing track and service capacity, by 2046 the rail network is expected to exceed its capacity with there being no seated capacity available past Papakura as shown in **Figure 28** below. This will primarily impact the attractiveness of public transport for people wanting to use the system from the established communities in the South. It is also anticipated that without intervention, the trains will have no standing capacity beyond Puhinui. The impact of this is significant for those living

north of this point who wish to use public transport. The potential knock-on effect is a shift away from public transport back to car adding additional pressure to the road network in the Isthmus.

Figure 28: Rail capacity versus demand

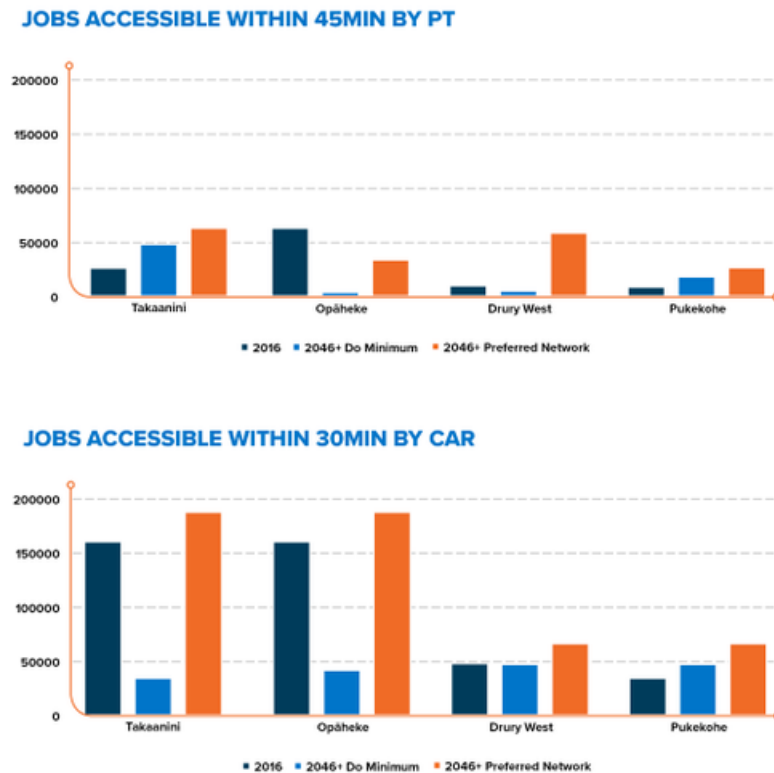


Consequence 4: Poor access to employment, education, community facilities and services

Level of access is dependent on the availability of local jobs and social opportunities/facilities, plus the availability and effectiveness of the transport network to access key employment centres. If this problem is not addressed, predicted population and travel demand growth will exacerbate access problems and transport constraints in the South; constraining access and decreasing liveability.

Future access has been tested by modelling the number of jobs accessible within 45 mins by public transport and 30 mins by car, comparing 2016 (existing) with Future (2046+) based on the Do Minimum scenario as shown in **Figure 29**. Employment centres are also a proxy for access to social opportunities because these are often located in and around employment centres.

Figure 29: Job accessibility



This comparison shows that:

- Between 2016 and 2046+, the number of jobs accessible by car reduces in Takaanini and Opāheke/Drury, suggesting increased network constraints. Whilst in Pukekohe accessibility to jobs by car increases marginally, reflecting increased employment opportunities in this area.
- The jobs accessible by public transport are significantly less compared to car, for both 2016 and 2046+.
- Public transport access to jobs improves in Takaanini and Pukekohe in 2046+ scenario, however remains at very low levels for Opāheke and Drury.

Consequence 5: Poor quality of life for residents and employees in the area

Poor access to where people live, work and play has a direct impact on quality of life (e.g. longer journey times so less time spent with family, impacts on health and wellbeing).

Consequence 6: Over reliance on car travel

Limited mode choice for mobility and access leads to over reliance on car travel to access opportunities.

Over reliance on car travel is undesirable as:

- it will not solve our congestion problem or support growth
- it will lead to poor urban form (car-oriented development)
- it will add more greenhouse gases to the environment (assuming expected domination of petrochemical fuel engines)
- less efficient at moving people than public transport and undermines an effective and attractive PT system
- social isolation and health impacts
- adverse safety outcomes as private vehicles are an inherently dangerous mode of transport
- those without a car cannot get around. This is most likely to affect the already vulnerable segments of the community including youth, the elderly and those with lower incomes.

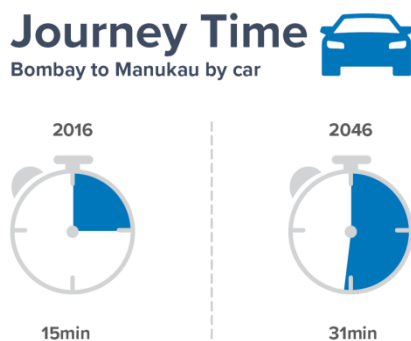
It is undesirable and unaffordable to build a network that can accommodate all trips by private car.

Consequence 7: Compromised network resilience

The existing transport network in the South includes critical North/South transport corridors of regional and national significance with few alternative routes. This means there is a high risk and vulnerability from disruptive events. If access to the transport system is disrupted, the effects will have high social and economic impacts for direct users of the network and those who receive goods and services via the transport system.

The decrease in the resilience of the critical SH1 route is shown in **Figure 30** with travel time doubling from 15 to 31 minutes between 2016 and 2046.

Figure 30: SH1 Bombay to Manukau travel time



Improving network resilience is critical to the Southern growth areas. Proposed network improvements to increase system resilience in the south include:

- additional North-South and East-West links
- Mill Road and Pukekohe Expressway corridor
- upgrades to SH1 including bus improvements along SH1
- improved connections to Manukau and Puhinui Station.

5.2. Problem 2: Integration and route protection

Failure to integrate transport planning with pace, scale and form of urban development will limit the opportunity for the transport system to positively contribute to quality, connected urban and natural environments in the Southern growth area.

Problem two recognises the need for integration of land use planning and transport planning to manage the opportunities from the imminent population growth to shape the transport system in a positive fashion. Failure to do so could have significant detrimental implications on urban form as well as the urban and natural environments. It will also impact on the choices and quality of life for people living in the South study area.

5.2.1. Evidence to demonstrate cause

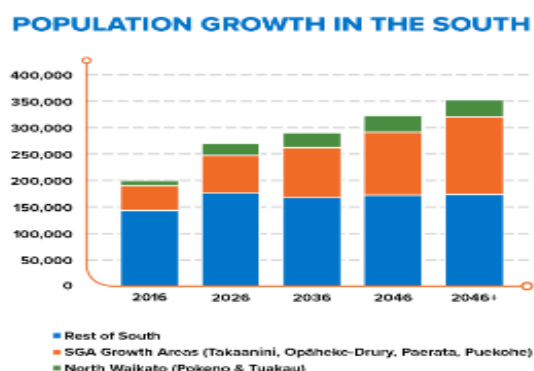
Evidence has been investigated based on the following three causes:

- Cause 1: Pace and scale of urban development
- Cause 2: Form of urban development
- Cause 3: Failure to protect corridors

Cause 1: Pace and scale of urban development

As described in early chapters, and illustrated below in **Figure 31**, the anticipated scale of growth in the Southern growth areas is huge. In addition to the Southern growth urban areas (Takaanini, Drury West, Opāheke Drury, Paerata & Pukekohe), there is also significant growth in existing urban communities in the south and North Waikato, placing increased pressure on the southern transport network. There is also pressure to expand the RUB and the live zoned areas already being developed. Growth of this scale requires a unique planning response.

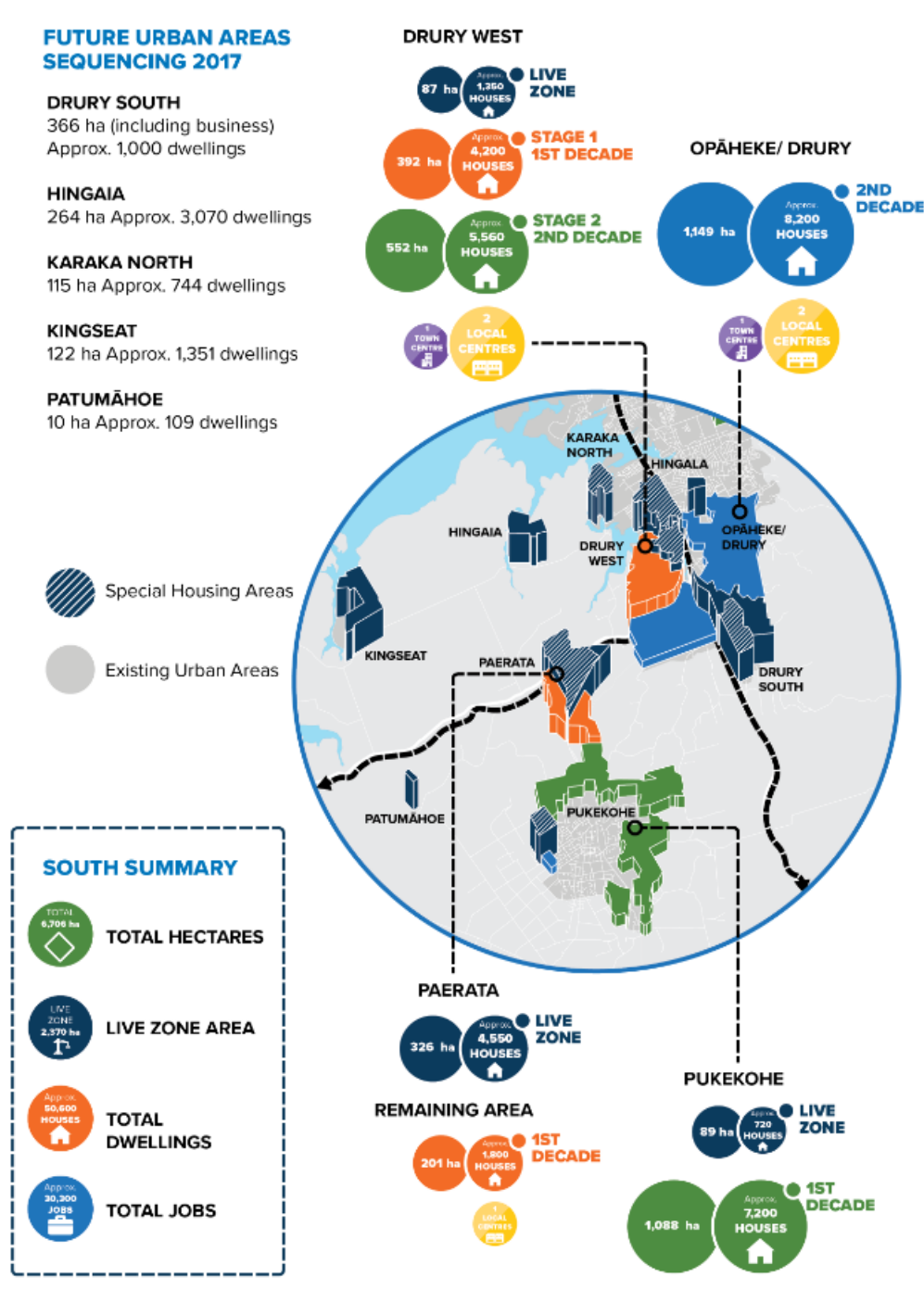
Figure 31: Population growth in the South²¹



²¹ Sourced from AFC projections

The timing of the growth in the Southern growth urban area will influence likely outcomes. A staged release of future urban land is set out in 2017 FULSS and shown below in **Figure 32**.

Figure 32: Proposed staging of development



Developers have the ability to strongly influence the pace and scale of development. There are a number of developers in Drury and early indications is that they intent to lodge private plan changes early next year, ahead of Council structure planning process. If developers are able to proceed, integrated planning outcomes are less likely as developers will be primarily focussed on their own

purposes rather than wider considerations such as the transport network, and the challenges Te Tupu Ngātahi is trying to address.

Cause 2: Form of urban development

The benefits of a fully sustainable urban mobility system include:

- Improved accessibility for all users.
- Balanced system that responds to diverse demands for people, businesses and industry.
- Integration of different transport modes.
- Is sustainable and balances the need for economic viability, social equity, health and environmental quality.
- Optimised efficiency and cost effectiveness.
- Better use of urban space and existing transport infrastructure and services.
- Enhanced attractiveness of the urban environment, quality of life and public health.
- Improved safety and security.
- Reduced air and noise pollution, greenhouse gas emissions and energy consumption.

A transport system dominated by infrastructure for private vehicles will generally promote peripheral low-density urban developments that are reliant on access by private car. Furthermore, incremental upgrades to existing dominant car infrastructure (like in Auckland), reinforces current behaviour.

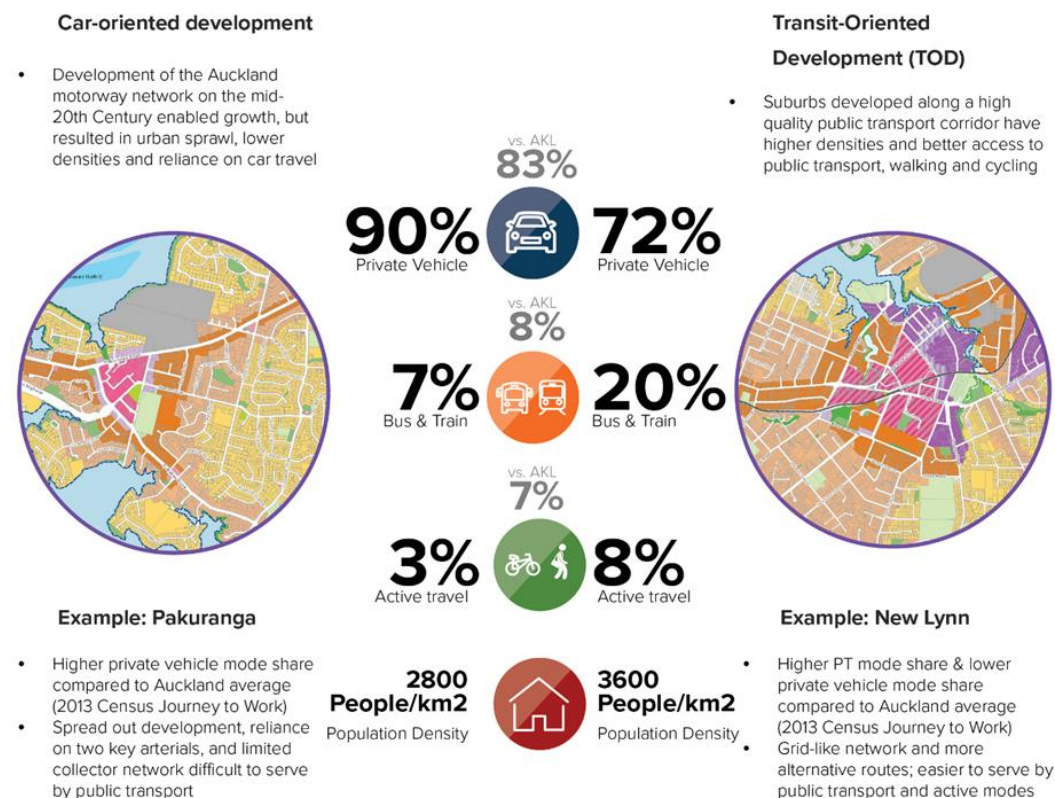
Figure 33 provides examples of transport integration and urban form in different parts of Auckland.

New Lynn shows evidence of a lower private vehicle mode share than elsewhere, despite being retrofitted into an existing car-dominated area. This shows that the opportunity for behaviour change and land use change are greater when TOD is specifically designed for and implemented early.

In comparison, transport systems that include high quality public transport and walking and cycling promote and support development of higher density urban centres and corridors, which in turn attract more development and people. As evidence of this, the Unitary Plan has implemented higher intensity zoning around RTN catchments such as AMETI Stage 2a (Panmure to Pakuranga). Recent analysis of consenting data in Auckland shows that this intensity is being taken up i.e. 40% of dwellings consented in the 2016 defined urban area were in RT catchments, even though the catchments make up only 25% of Auckland's area (Chief Economist Unit, Auckland Council, 2018).

Intense, compact, mixed-use environments at centres and along corridors reduce trip numbers and trip lengths and encourage mode shift away from private vehicle travel.

Figure 33: Urban form examples in Auckland



Cause 3: Failure to protect corridors

Route protection is a mechanism that provides opportunity to secure land requirements now for future transport corridors. This ensures the transport system is able to influence good urban form and encourage sustainable travel behaviours in the future. This is especially important given the scale and pace of the imminent growth in the South.

Route protection options include designation, plan change/zoning, structure planning or precinct plan provisions and landowner agreements. These options recognise that the level of protection appropriate for any option is a balance of the degree of control or restriction on the use of land (prior to infrastructure development) and the potential costs that such protection may impose on both existing landowners and either AT or the Transport Agency.

Within the Southern growth area, the Unitary Plan changed much of the area from a rural land zone to the Future Urban Zone (FUZ). While the FUZ is a transitional zone and cannot be developed before being 'live zoned', the value of the land has increased following the announcement of the FUZ zone. The structure planning process is currently underway for Pukekohe-Paerata and Drury-Opāheke by Auckland Council, as a tool for planning the appropriate zoning for the wider FUZ zoned area. The structure plan will indicate the location of the town centres, commercial and residential zoned land. The structure plan area will then be live zoned through a subsequent plan change process. Land value is likely to increase once the structure planning and live zoning processes are completed as development can then commence. Integration between the land use and transport planning are essential to maximise and support the development potential of the FUZ areas.

Given the scale of opportunity, failure to protect the corridors to deliver a flexible transport system to positively contribute to quality, connected urban and natural environments in the Southern growth area will have significant consequences.

The imminent pressure of build out and lost opportunity is faced across the programme. This pressure was identified by the PBC as being felt most in the Southern areas, with route protection pressure identified from 2019 onwards. The need for route protection is now imminent, and there is a threat to achieving the desired outcomes of the programme if the pace of urbanisation cannot be responded to.

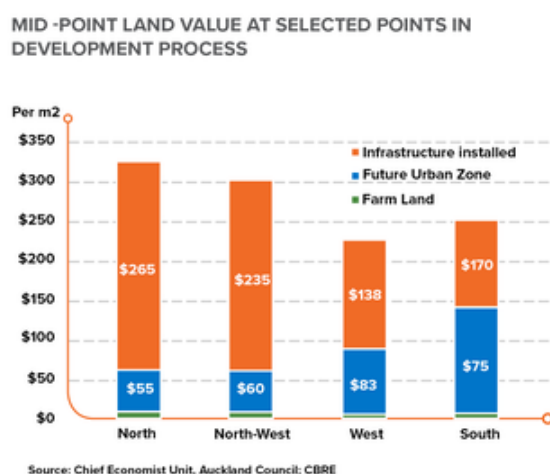
5.2.2. The consequences – What if we do nothing?

Consequence 1: Escalation in cost to deliver required infrastructure

Property prices within the Auckland region are growing at a significant rate. In addition to the general increase in property value for residential areas, changes in land zoning have a significant impact on the value of land (**Figure 34**).

A research paper by MBIE²² reported a threefold change in average value between land just within and just outside the Rural Urban Boundary in the Auckland region.

Figure 34 Mid-point land value at selected points in the development process



Land prices are escalating rapidly. Auckland Council property information²³ shows the magnitude of change in land value between 2014 and 2017. The percentage increase in land values in Drury are shown in **Figure 35** and for Pukekohe in **Figure 36**. As this graphic illustrates, land values across these areas have increased predominately by over 100%, with the value of red areas escalating by greater than 500%.

²² MBIE, 2017 National Policy Statement on Urban Development Capacity Price efficiency indicators technical report: Rural-urban differentials.

²³ <https://geomapspublic.aucklandcouncil.govt.nz/viewer/index.html>

Figure 35: Change in land values Drury

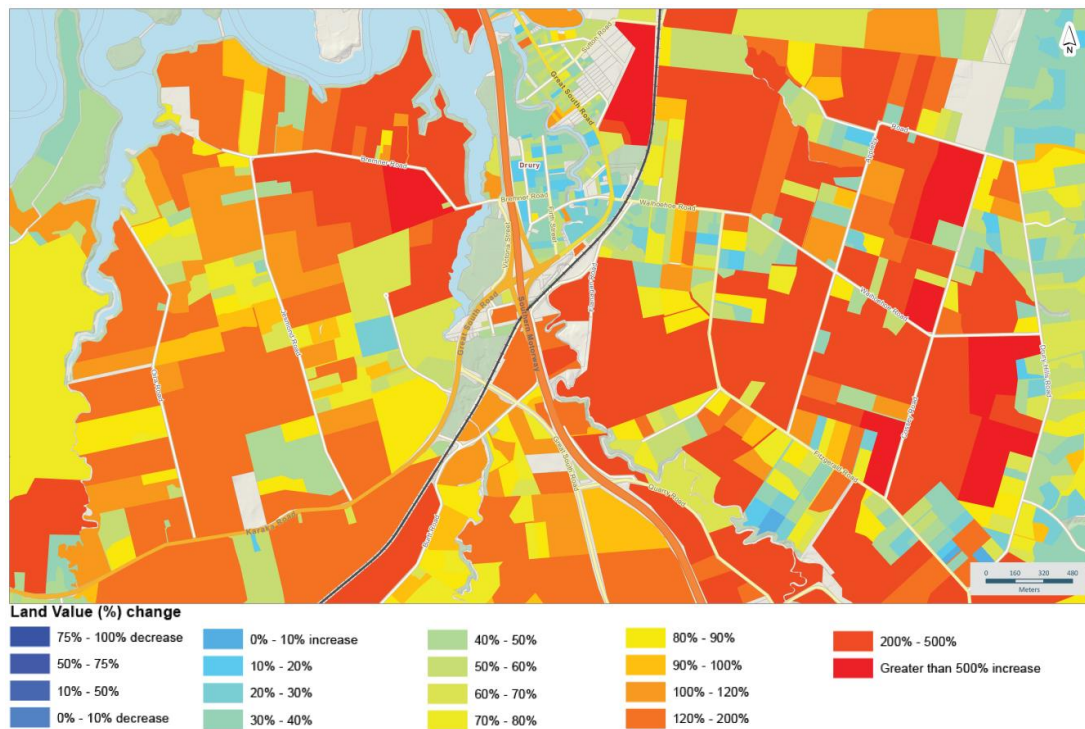
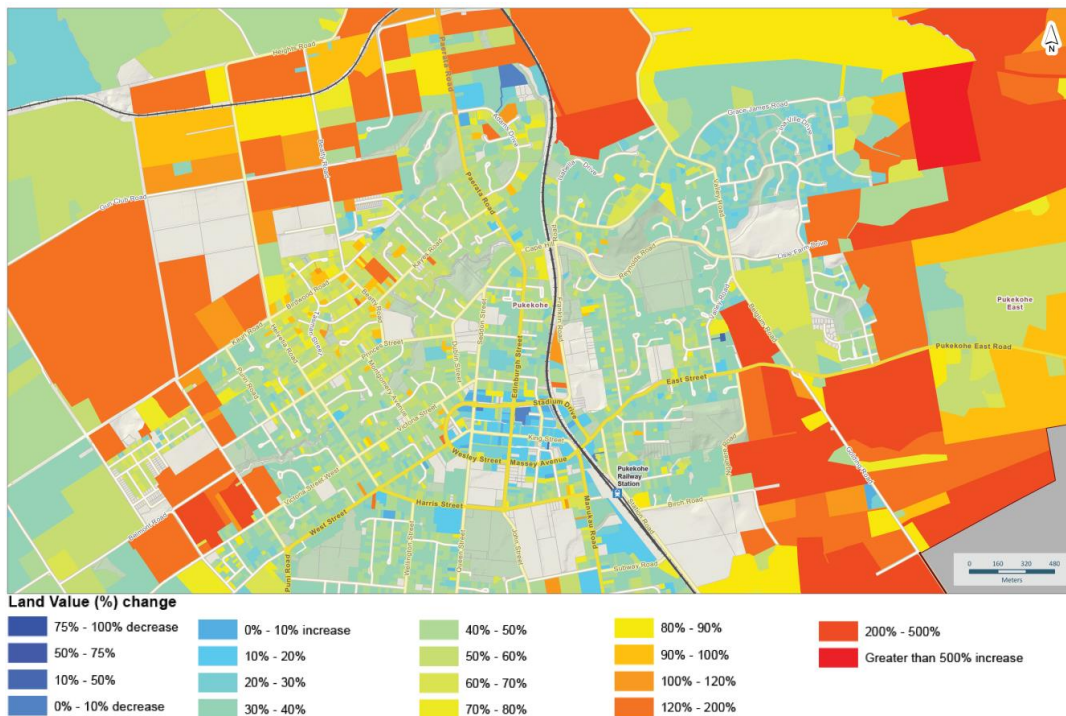


Figure 36: Change in land values Pukekohe



The Southern growth area may face significant build-out pressures and the cost of purchasing land retrospectively once infrastructure has been built is high. This only adds to the impetus that appropriate corridors should be protected before live zoning and development proceeds.

If not protected, land acquisition for future infrastructure projects has the potential to be financially prohibitive. This has significant implications for delivering a future network to support growth in the FUZ areas and supports the case for route protection as an approach to the delivery of the recommended network.

Consequence 2: Poor land use integration and environmental outcomes

A lack of integrated land use and transport planning will limit the ability of the transport system to positively contribute to liveability and a quality, connected urban environment in the growth areas. If transport and land use are not integrated well, the transport system could promote land uses that do not support the land use outcomes sought for Auckland in the Auckland Plan and AUP: OP. It is difficult and expensive to upgrade strategic transport corridors when adjacent land is already urbanised – as this means more disruption, more encroachment on existing development and the natural environment, and more requirement for mitigation of impacts on the existing environment (e.g. for noise, visual, natural environmental impacts).

Without an integrated approach to transport and land use planning such as transit oriented development and mechanisms to drive high occupancy modes, there will be lost opportunities and further car dominance leading to poor environmental outcomes.

Consequence 3: Poor urban form outcomes

The pace and scale of urban development being ineffectively managed could lead to poor urban form and land use integration. There is a particular risk if development is developer led. Developers are going to serve their own purposes, which may lead to poor urban form outcomes. There are a number of challenges for existing and future streets that will need to be addressed to avoid poor urban form outcomes including:

- severance of links between North Island and Auckland
- poor public transport services.
- severance impacts on communities and neighbourhoods (such as highly trafficked roads and streets)
- poor quality public realm
- barriers to residents easily and safely walking to nearby shops or employment opportunities.
- poor levels of air, water and noise pollution around roads/transport corridors.

If managed properly, the transport system can provide strong leverage for promoting land use outcomes and achieving a good quality urban form. Land use planning optimally should include land use design to support the uptake of public transport and active modes. Factors that influence good urban form include:

- rapid public transport networks
- strong pedestrian networks and connections
- safe and dedicated cycle provision
- shared spaces, especially in main streets
- reductions in speed.

In summary, there is compelling evidence for the cause and consequence of these problem statements, confirming the validity of the problem statements. The problems identified above have associated benefits and objectives, which are outlined in the following section.

6. Benefits, investment objectives and key performance indicators

The Southern growth area problem statements, benefits and investment objectives are outlined in **Figure 37**. Addressing the problems will provide a wide range of benefits for the Southern growth area. Based on the PBC objectives, three investment objectives were collaboratively developed for the IBC, and agreed on by the project owners.

The objectives align well with the GPS (2018), which recognises that investment for improved access should be guided by land use and transport planning that reduces the need for single occupant vehicle trips in urban areas; making the best use of the existing network and services; and providing new infrastructure or services where necessary to support planned growth (including housing developments).

This IBC investigation aligns itself with these principles via an established partnership with Auckland Council to ensure effective transport and land use integration. This integration aims to reduce the need to travel by providing access to opportunities but also by making public transport, walking and cycling connections more attractive than car travel where travel takes place. It also adopts the Transport Agency's hierarchy of interventions in developing options, thereby considering options which make the best use of the existing network before new infrastructure is considered. A strong focus is on developing a mode-neutral strategic transport system which enables transport choice for residents and provides access to economic and social opportunities.

Figure 37 IBC benefits, investment objectives and key performance indicators

Investment objective				Benefit	Investment KPI	Measure	Baseline	Target	Measurable in IBC?
A transport system that provides better access to economic and social opportunities within and outside of the Southern growth area	Enable access to economic and social opportunities within the Southern growth area.	Access to employment and key activity centres within a reasonable travel time	Jobs accessible within 30 mins by car.	GIS data mapping or modelling of existing			At least maintain current access levels.		Yes
			Jobs accessible within 45mins by PT	GIS data mapping or modelling of existing			Improve quantum number of jobs accessible through increased access to FTN/RTN, principles or universal design and increase service frequency ²⁴ .		Yes
		Cost of travel	Change in cost of travel (direct cost) as a % of average income.	Indicators for VOC/fares relative to current wage.			Decrease in VOC/fares relative to current wage by 10%		No
		Travel time	Change in % of HBW trips completed within 30 mins by car and 45 mins by	GIS data mapping or modelling of existing			Improve the % of HBW trips able to be completed through increased access to FTN/RTN, principles or universal design and		No

²⁴ Auckland RPTP 2018-2028

Investment objective				Benefit	Investment KPI	Measure	Baseline	Target	Measurable in IBC?
			PT.				increase service frequency ²⁵ .		
		Access to labour within a reasonable catchment.	Number of households accessible from key destinations within 45 mins PT and 30 mins car.	2016 CBD 202,000 PT 168,000 Car Airport , 3000 PT 144,000 Car Manukau 59,000 PT 269,000 Car		Improvement in accessibility proportional to growth in HH and increased uptake in PT.	Yes		
	The transport system supports local, regional and national economic growth by improving access to markets and supporting local activity.	Travel time	Change in average travel time per person	Public Transport Manukau – 55 mins Airport – 100 mins CBD – 85 mins Vehicle Manukau – 30 mins Airport – 45 mins CBD – 70 mins		PT Improve travel time to key destinations Support PT as a mode of choice	Yes		
		Network level of service	Proportion of overall network travel time spent in LOS E or F.	16% 2016		Minimise level of extreme congestion in the network	Yes		
		Strategic network	Average speed	2016 – 15 mins		Minimise impact to	Yes		

²⁵ Auckland RPTP 2018-2028

Indicative Business Case for Route Protection

Investment objective				Benefit	Investment KPI	Measure	Baseline	Target	Measurable in IBC?
		level of service	point to point on SH1				commercial traffic during the working day		
Maintain nationally important freight and servicing connections by providing efficient and resilient strategic connections through Southern growth area	Reliable movement of goods and people on the strategic network.	Travel time	Travel time by car between SH1 Bombay and Manukau during inter peak period.	2016 model = 15mins			At least maintain existing modelled travel times		Yes
		Freight travel time reliability	Proportion of HCV travel spent in congestion (LOS E & F) – inter peak.	2016 model = 2%			Proportion of HCV travel spent in congestion is less than 20%		Yes
		Access to choice/options	Number of strategic corridors through critical screen lines - counting number of routing options North/South	Existing SH1 and rail corridor for N/S			Enable additional alternatives to existing limited strategic network.		Yes
Support the communities in the Southern growth area by improving connected, safe and attractive mode choices to key	Support the development of liveable and connected communities with attractive, safe and	Change in mode share	% of public transport as a proportion of motorised trips	2016 PT trip, external = 6%			29% PT in external trips, peak hour, peak direction from growth area		Yes
		Attractiveness and efficiency of	PKT by bus spent in	2016 modelled = 15%			Reduce to 5% or less		Yes

Indicative Business Case for Route Protection

Investment objective				Benefit	Investment KPI	Measure	Baseline	Target	Measurable in IBC?
destinations.	resilient transport choices	PT network	congestion/ level of service E/F. Rail capacity of demand on route.			2016 modelled = exceeds seated capacity from Tironui	Seated capacity available to Manukau in the AM Peak		
		Access to choice	% HH within 500m walk or 15 min cycle of RTN			GIS data mapping or modelling of existing. RPTP states 50% of Aucklanders currently live within a 15 min bike ride of the RTN network and 40% of Aucklanders live within a 500m walk of the RTN and FTN to support 16% mode share target	Increase the number of people within 500m walk or 15 min cycle to RTN 70% or Aucklanders through improved safety, security, wayfinding, park and ride and convenience of access to RTN.		Yes
		Access to choice	% HH within 5km or 15min drive of Park and Ride			Future measure	Future measure		No

PART B – ECONOMIC CASE

7. Options development and assessment process

7.1. Overview

This IBC further tests and develops the recommendations of the PBC. A wide range of options and alternatives to resolve the problems and meet the investment objectives outlined in **Section 6** have been tested, including those identified in the PBC.

A key part of the option development and assessment process was engaging with partners, stakeholders and the public. Their perspectives and contribution are discussed throughout Part B.

This chapter has been split into two sections.

Section 7.2 sets out the:

- steps involved in the option development and assessment process from the long list to the short list and from the shortlist to the recommended network
- Multi-Criteria Assessment process used to evaluate the effects and opportunities associated with each option
- approach to travel demand management
- assumptions made and refined through the optioneering process

Section 8 provides a summary of why options were discounted and includes feedback and response to consultation and engagement with both the public and Manawhenua.

Further details are provided in **Appendix B: Options Assessment Report**, **Appendix C: Transport Assessment Report** and **Appendix D: Economics Report**.

Figure 38 below details the optioneering process that was undertaken to develop and assess the options.

Figure 38: Optioneering process



7.2. Multi criteria assessment process

All infrastructure options have been assessed at both the long list and short list phases against the Te Tupu Ngātahi Multi Criteria Assessment (MCA) framework. The framework assesses option performance against the investment objectives and four wellbeing's: cultural, social, environmental and economic. Under each wellbeing grouping, a combination of effects and opportunities are considered.

The options were assessed in the context of an environment where FUZ land has been live-zoned and urbanised and other existing zones have developed in a manner anticipated by the AUP: OP. The MCA wellbeing's and criteria are summarised in **Figure 39** and explained in more detail in **Appendix B: Options Assessment Report**. The wellbeing's are groupings of related criteria which operate alongside the investment objectives e.g. the investment objectives also assess social and economic impacts of options.

The purpose of the MCA framework is to identify relevant effects, opportunities and factors for the assessment of the options. The MCA was used to inform the project team's recommendations on which options to discard and which to include in the recommended network.

Figure 39: MCA wellbeing's and criteria



7.2.1. Cultural – Manawhenua

Under the cultural wellbeing grouping several criteria relate to Manawhenua. Manawhenua agreed that they preferred not to score the MCA. Instead a qualitative analysis of the options was provided and general principles which were included in the option analysis. Following a targeted specialist workshop, two wider group workshops, and a follow up hui, Manawhenua representatives have expressed views, provided specialist advice and raised key issues.

7.2.2. Non-scored criteria

In addition to the scored criteria, several non-scored criteria were considered (refer to **Table 11**). These criteria were assessed qualitatively due to their complexity and importance.

Table 11: Non-scored criteria

Criteria	Description
Stakeholder feedback	Stakeholder feedback for each option identifying scale/validity of objections, identified preference/proposed changes to options etc. Feedback provided by other key partners/stakeholders. At longlist stage, stakeholder feedback has been limited primarily to workshop participation and limited additional meetings. At short list it included public consultation feedback.
Policy analysis	Alignment of options with the strategic policy framework including the Unitary Plan, the Auckland Plan, and the RMA Section 6 – Matters of National importance were given particular consideration. The recommended network was also assessed against the directives of the Auckland Plan.
Value for money	An estimate of likely value for money in conjunction with transport outcomes and construction costs. Assessed at the short list.
Resilience	Level of resilience risk posed by adverse geology, steep slopes, seismic impacts, and other resilience risks (low-level infrastructure near coastlines, inundation areas). Assessed at the short list.

For the Southern IBC long list stage, the high-level qualitative assessment focused on the stakeholder feedback and policy analysis alignment. While value for money and resilience criteria were considered at short list assessment.

The full MCA and outcomes of the options assessment and refinement process can be found in **Appendix B: Options Assessment Report**.

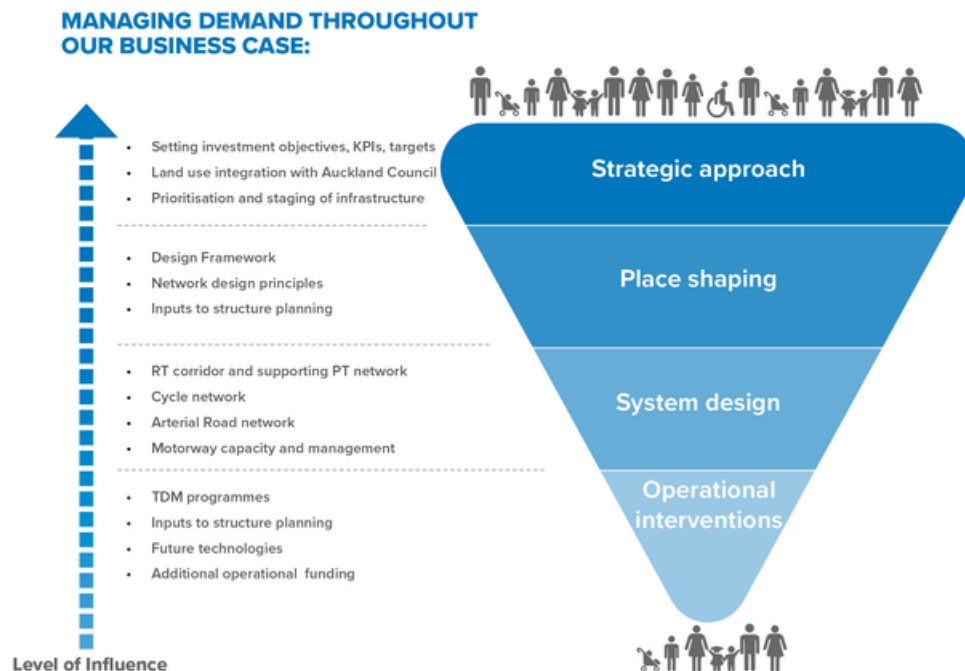
7.3. Influencing demand

Making assumptions about travel behaviour and the ability to influence it is critical at each phase of option development and assessment and is an integral part of urban and transport planning and achieving sustainable urban mobility. Fundamentally, it is not feasible or economic to build infrastructure to accommodate unconstrained transport demand. Central and local governments, with constrained available funding, are required to prioritise infrastructure investment to deliver best value for money, usually through projects that deliver the greatest benefit to the most people.

As projects move through progressively more detailed development phases, the ability to influence travel behaviour reduces, as shown in **Figure 40**.

At a strategic level, decisions have broader effect and have the potential to significantly alter transport demand at a regional level (e.g. alignment of a rapid transit or arterial corridor through urban areas versus around the edge) and therefore the outcomes achieved. Once a project has been designed, opportunities to manage demand are more limited, localised, or add-on/complementary in nature. For example, school travel plans cannot fix poor safety perception caused by a new wide road corridor with no footpaths, they can only enable safer crossing.

Figure 40: Demand management influence through the project lifecycle



This hierarchy of intervention for travel demand has been at the forefront of thinking throughout the SBC. The remaining part of **Section 7.3** below specifically sets out how this hierarchy for influencing demand has been applied throughout the option development and assessment phase.

7.3.1. Step 1 – Strategic approach

At a strategic level, a framework of problems, benefits and investment objectives were developed for the Southern growth area (see **Section 5 and 6**). A set of KPIs and measures were developed to quantify the outcomes associated with each investment objective. These KPIs were used to evaluate options in both a quantitative (where possible) and qualitative manner.

Options were assessed on their ability to address the identified problems and respond to these indicators, which included such things as providing access to key destinations and connecting desire lines. Options that responded best were selected for a recommended package of improvements.

These objectives explicitly guided the option development and assessment towards a reduction in single occupant vehicle travel, which is at the heart of managing demand. The objectives required that ‘reliable access is maintained’ and not that ‘sufficient capacity be provided’ to meet demand. This guided decision-makers towards options that do not over-provide capacity and instead focus on what is required for reliability.

7.3.2. Step 2 – Place shaping/developing good urban form

The importance of place shaping and developing good urban form is paramount to influence travel behaviour. Designing new neighbourhoods with jobs, local centres, schools and parks within walking or cycling distance of houses and connected with good quality, frequent public transport provides attractive travel choices and significantly reduces the need to travel by private vehicle.

Place shaping is integrated into the SBC in several ways to achieve desirable demand management outcomes, as follows:

- Applying transport network and land use integration principles to the design of options to maximise access, e.g. co-locating public transport interchanges with centres and/or intensification.
- Working closely with Auckland Council to articulate the interdependencies between major transport projects and land use to inform future structure planning (i.e. the rail stations and Drury town centres). The Te Tupu Ngātahi team is undertaking an integrated transport assessment to ensure that transport corridors and networks are aligned with land use and maximise access to walking, cycling and public transport.
- Applying urban design framework principles to the development of options e.g. considering the rapid transit corridors' relationships with urban centres.

The transport network and land-use integration principles were developed to define the expectations of key spatial connections. These are informed by the functional needs of the Southern growth area including trip purpose, origins and destinations, and modal integration. The functional needs and associated corridor cross sections (the form) have been uniformly applied across the entire Supporting Growth programme and are discussed further below.

Strategic connections

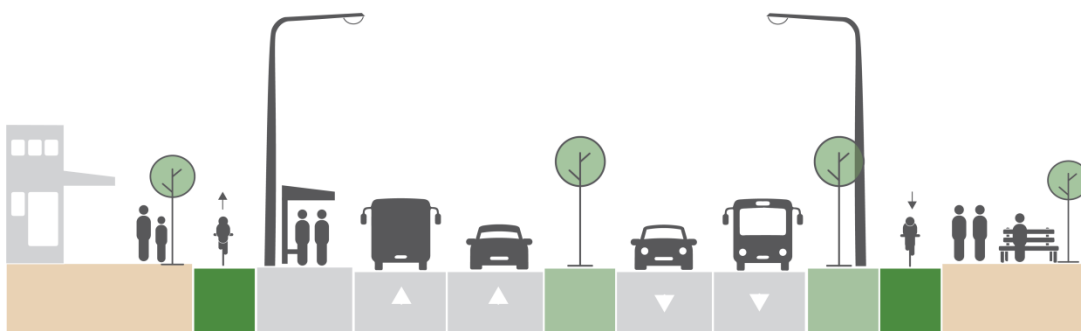
Strategic connections focus on the key desire lines to/from, and through, the study area that support the planned growth in the Southern growth area, whilst providing access to the social and economic opportunities and maintaining reliability for freight and inter-regional travel.

32m urban arterial

Form – 32m carriageway, accommodating separated walking and cycling, and four lanes for public transport, freight and general traffic.

Application – Strategic movement corridors to cater for all modes, including freight.

Figure 41 Example 32m cross section – cross section A

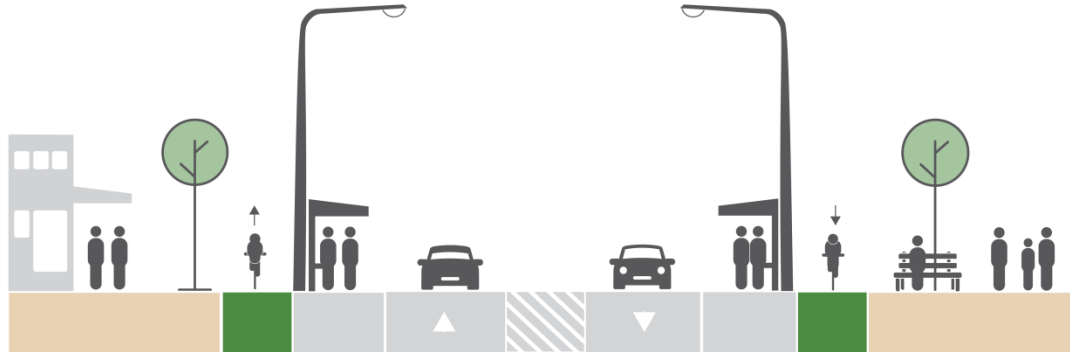


25m urban arterial

Form – 25m carriageway, accommodating separated walking and cycling, public transport facilities, and two lanes for public transport and general traffic.

Application – Strategic movement corridors where the demand can be managed within a two-lane corridor, and therefore a 32m cross section is not required.

Figure 42 Example 25m cross section – cross section B

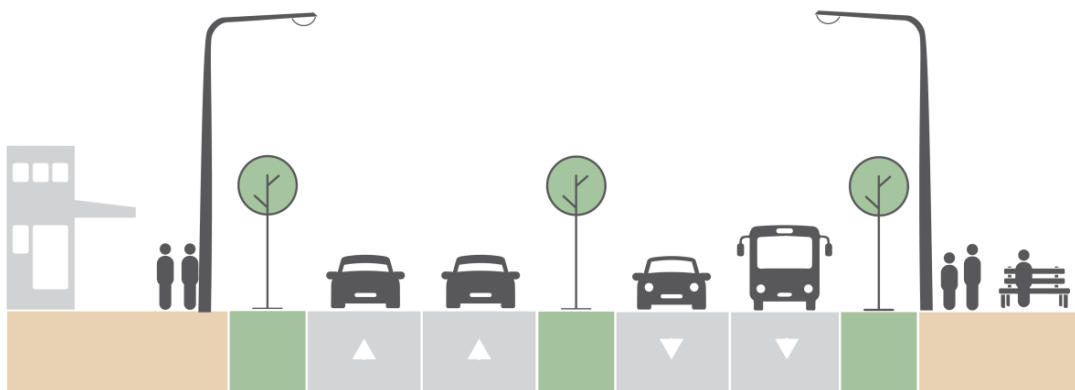


25m rural arterial

Form – 25m carriageway, accommodating walking and cycling, four traffic lanes (with potential for public transport/ managed lanes) and access to the collector network generally limited to roundabouts.

Application – strategic movement corridors with a high-speed environment (80km/hr) with access limited.

Figure 43: Example 25m arterial cross-section – cross section C



Motorway lanes 3/4 lanes plus PT bus shoulder running lane

Form – bus shoulder running in a 3.5m lane adjacent an existing three lane motorway or an additional new 3.5m lane plus bus shoulder running in a 3.5-4.2m shoulder.

Application – strategic movement and FTN corridors such as the existing SH1 after completion of the current Southern Corridor works.

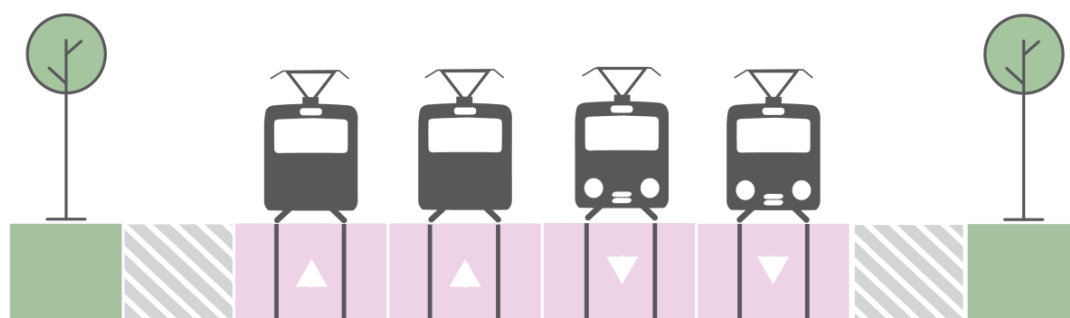


Form – additional three or four tracks plus associated extension of the current or future proposed two-track electrification. A 5.2m standard track separation is provided (4m is the existing separation on the current track) in conjunction with KiwiRail requirements, plus electrification clearance and a 6m buffer overall buffer to achieve a corridor width of 28m.

The station cross section includes 10m wide island platforms and associated access bridge and platform infrastructure (refer to Section 2.1 of **Appendix E: Engineering and Cost**). This results in a corridor allowance for up to 42m based on a four-track option.

Application – the widening of the existing NIMT corridor from Puhinui to Pukekohe to accommodate four rail tracks (currently two tracks). The cross-section incorporates application KiwiRail standard clearances, swales rail formation and cut and fills.

Figure 45: Example four track rail and electrification extension – cross section E



Takaanini, Opāheke-Drury and Pukekohe/Paerata options focus on providing access to/from and within the study areas, and also providing access to the strategic connections to support the planned growth. The aim is to shape travel behaviours by integrating with land use activities and to encourage travel by active modes and public transport to reduce reliance on private vehicle travel.

The active mode network has been considered holistically and developed in conjunction with the strategic and arterial road network. Once the objectives and key spatial connections were identified, the surrounding network and structure plans were reviewed to highlight potential opportunities with developers and AT. Based on design principles and best practice metrics the regional and primary network was developed around the emerging preferred arterial road network to provide safe, efficient, convenient and attractive active mode connections within the south.

Out of scope interventions

Interventions outside of the SBC area were also considered if they significantly contributed to addressing the identified objectives. There is also a need to consider the downstream effects of interventions outside of the study areas. These effects may be identified at a later stage through the assessment of options.

Interventions outside the SBC area which may address the identified objectives or potential downstream effects include the following:

- the Airport to Botany RTN and 20Connect (SH20)
- growth in the North Waikato and other south Auckland areas, including Pokeno, Tuakau, Kingseat and Waiuku.

7.3.3. Step 3 – System design principles

A range of system design principles (highlighted in **Figure 46**) were considered during the option development and evaluation process. These principles provide a framework for classifying the types of interventions considered based on current strategic and guidance documents (e.g. the Government Policy Statement (GPS) 2018, AT's Roads and Streets Framework and the NZ Transport Agency's Urban Design Framework).

The relative effectiveness of different options to manage demand in the Southern growth area specific context was evaluated using the agreed investment objectives and KPIs. Options that performed better against these indicators were selected for the recommended network.

Figure 46: Network design principles

NETWORK DESIGN PRINCIPLES



Transport system

- Recognise the needs of different transport system users
- Apply Safe Systems Approach
- Prioritise reducing the need to travel and optimising existing networks over new infrastructure
- Ensure that 'end to end' journeys are connected. Protect for flexible corridors



Technology and innovation

- Future proof for new and developing technologies
- Consider options for minimising and/or optimising travel through technology and innovation



Walking and cycling

- Provide well-connected and permeable walking and cycling networks
- Provide safe and attractive connections between communities and social and economic opportunities



Mass transit

- Provide mass transit networks to enhance social and economics
- Maximise potential catchment of rail stations and integrate with centres where possible



Public transport

- Optimise public transport systems to maximise demand
- Ensure resilience in operational performance of public transport system



Land use and place-making

- Work with council on structure planning to ensure integrated land use and transport outcomes
- Integrate urban form and transport services to reduce the distance/time needed to access opportunities
- Integrate transport corridors with the natural and built environment



Arterial network

- Align transport movements with the corridor typology (link and place-making function)
- Provide alternative routes to SH1 for local access trips
- Connect centres and other key destinations through key transport corridors



State highway

- Maintain the strategic function of SH1 to provide for inter-regional movements
- Prioritise access to SH1 to align with strategic function
- Minimise the severance effect of SH1
- Maintain the function of the local network

7.3.4. Step 4 – Operational interventions

A range of operational travel demand management options were identified at the long list stage that could be applied in parallel to complement the strategic network infrastructure recommended in the business case.

7.3.5. Influencing demand in South Auckland

The impact of the suite of TDM measures applied across the recommended network has reduced the demand for private vehicles by 10%.

7.3.6. Beyond the scope of IBC considerations

In developing the long list, there were a range of options considered to be beyond the scope of the IBC on the basis they:

- fall outside of the study areas, unless they are able to fundamentally address the identified objectives
- are being addressed by other projects (e.g. upgrade to Puhinui Road, six laning SH1 from Papakura to Bombay)
- are not relevant to the problem we are seeking to solve (e.g. are not related to the identified growth in the SBC area).

8. Options analysis

This section describes the recommended transport network for the Southern growth area which was developed through an option analysis and refinement process from long list to short list to the final compilation of the recommended network.

8.1. Recommended network

The guiding principle of this business case is that unconstrained demand should not be provided for, and opportunities should be sought to influence and reduce demand before infrastructure options are considered. The application of these demand management principles and urban interventions are anticipated to encourage travel by active modes and public transport to reduce reliance on private vehicle travel, reduce pressure on the environment, and to create a cohesive community with a strong character and sense of identity that is not dominated by car travel.

The recommended network provides an enhanced range of travel options whether their travel is generated from the Southern growth area or from further afield. The recommended transport network has been chosen as it best delivers against the investment objectives described in **Section 6**. Highlights of the recommended network include:

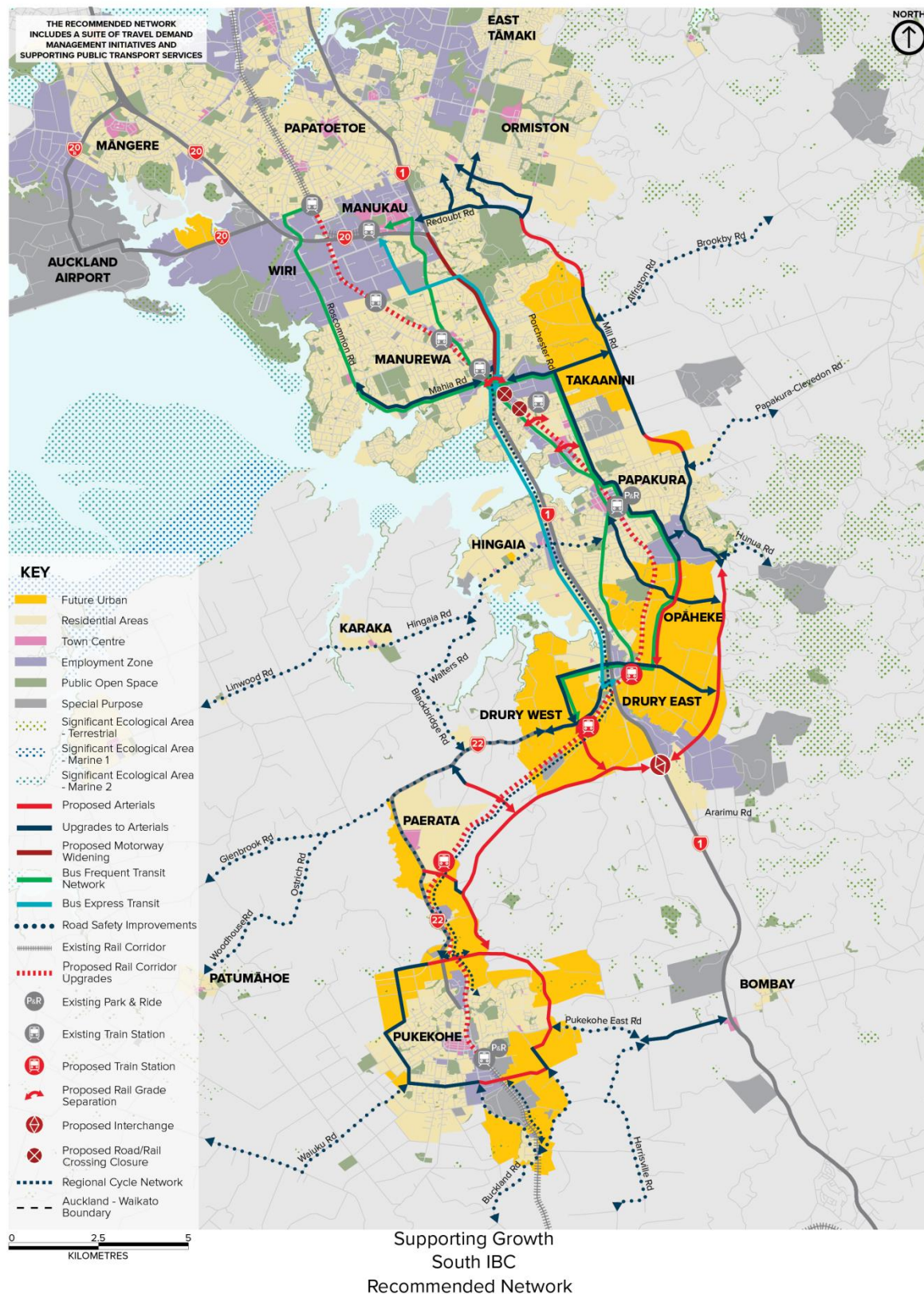
- **Rail capacity upgrade and associated stations** to achieve a high level of integration with existing and future land use. There is opportunity to influence the form and density of land use along the rail corridor and around station locations, leading to an increased uptake in public transport and improved accessibility. The rail network is essential for achieving a balanced PT response and considered to be the heavy lifter for public transport in the south.
- **Frequent Transit Networks on several strategic corridors** including State Highway 1 and Great South Road. FTN will complement and support rail to reduce the need for new arterials to serve the growth area particularly for the key north-south movements through frequent and efficient bus services between Drury, Manukau and Puhinui Station.
- **A safe and attractive active mode network** with strategic connections and facilities on arterial roads will provide high quality, safe and attractive routes along desire lines, linking key activity centres and public transport stations. A high quality and comprehensive network will enable significant mode shift to active modes and an improved urban environment.
- **New strategic arterial corridors to support State Highway 1 including Mill Road and Pukekohe Expressway** will improve reliability for freight and inter-regional travel, provide access to the proposed business (industrial) land, and allow other corridors to be focussed towards place making and local function. These corridors will need to be staged and managed to ensure mode shift targets are not undermined.
- **New arterial networks at Takaanini, Opāheke-Drury and Pukekohe-Paerata** will match the surrounding urbanisation, prioritise public transport and active modes enhancing transport choice, accessibility and travel behaviour change within existing and new communities.
- **Safety improvements on existing roads** will focus on safer outcomes for all users, support resilience and capacity benefits for the network.

The outcome of this integrated approach is a recommended network that enables an additional 40,000 jobs within accessible reach by public transport and provides a quality and connected urban

form with 20% of households within easy walk and over 50% of households within an easy cycle of an RTN.

The recommended network of infrastructure projects is outlined in **Figure 47**.

Figure 47: South IBC recommended network



8.2. Options – long list

The long list process focused on developing breadth and depth of possible interventions, network components and options. The long list of option ideas was generated at workshop one held in May 2018. Attendees of this workshop included representatives from the project team, project partners including AT, the Transport Agency, Manawhenua, KiwiRail and Auckland Council. The project team asked participants to generate ideas for options that would address the functional needs related to the identified problems and benefits sought. In total around 484 long list options were identified across the four SBC sub areas as follows:

SBC sub area	Theme	Number of long list options
Strategic Connections:	Connections that connect the southern area to the wider Auckland Network	242 Options
Opāheke/Drury:	Arterial Network for Drury	88 Options
Pukekohe/Paerata	Arterial Network for Pukekohe	92 Options
Takaanini:	Arterial Network for Pukekohe	62 Options

The initial long list options were then filtered to exclude options that were:

- considered outside the scope of the IBC (e.g. outside of the project area)
- land use options (opportunities were discussed separately with Auckland Council)
- already part of the designated/consented/funded project
- considered business as usual, or would otherwise be implemented (for example use of staging)
- at a level of detail beyond what is being considered appropriate for this stage of the IBC process (e.g. train station locations will be considered in the short list stage)
- considered infeasible due to significant physical constraints – based on a high-level engineering assessment (e.g. “new train line from South to East – Pakuranga”)
- duplication of other options. Some duplicate options were merged to create the final option to be assessed.

Following a filtering exercise 151 options were taken through to the long list MCA process. Workshop two held in July 2018 provided representatives from the project team, key partner and stakeholder organisations an opportunity to review the long list options and emerging short list. The reasons for discarding options and selecting other options for the short list are detailed in **Appendix B: Options Assessment Report**.

8.3. Options – short list

8.3.1. Short list assessment

This section describes the short list and sets out the reasons for selecting the recommended options and the rationale for discarding remaining options. The short list packaged together individual components and assessed competing options (or packages of options) and interdependencies between different options.

The short list assessment summaries below include a summary of feedback from key stakeholders and the public, received during the public consultation period. This feedback does not relate directly to all the option components outlined in this section, as only key decisions were included in the public engagement material. The key decisions people were asked to comment on include:

- **Rail upgrades** - issues and opportunities associated with increasing rail line capacity and rail station locations.
- **RTN/FTN** – a range of RTN and FTN options were included in the shortlist to further investigate potential patronage and destinations.
- **Walking and cycling** – four options for strategic walking and cycling corridors: along SH1, between Pukekohe and Drury, along SH22, and along a new expressway.
- **Strategic connections** – issues and opportunities associated with the widening of SH1, nine options for the northern, central and southern sections of Mill Road, six options for access to Pukekohe.
- **Drury – Opāheke** – issues and opportunities associated with four east-west options, 21 arterial options.
- **Pukekohe** – issues and opportunities associated with three east-west options, four existing arterial upgrades, two western ring route options, eight eastern ring route options and five south ring route options.
- **Takaanini** – issues and opportunities associated with five scenarios for upgrades to level crossings.

Preliminary design was undertaken using Infracore to confirm a potential ‘corridors’ for route protection of each option. For the purposes of the short list assessment, the corridors were assumed as a nominal 100m wide footprint for all options. This was intended to provide a guide as to where the road and rapid transit alignments could be located, with the exact alignment to be determined as part of the DBC.

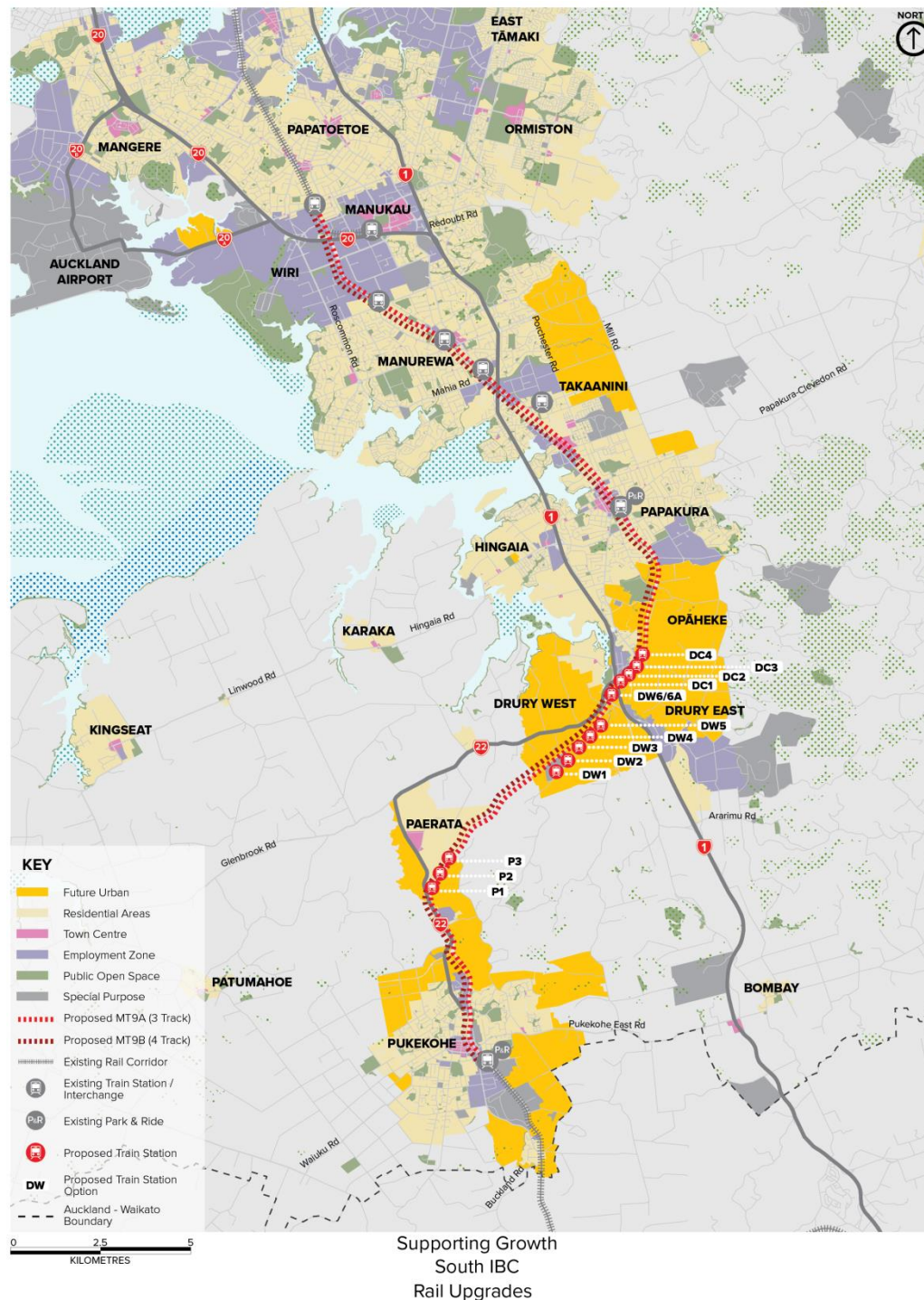
Partner feedback on options was also captured in the IBC workshops and incorporated into the MCA process. This is also summarised in the short list assessments below.

8.3.2. Short list assessment summaries

The short list assessments for each option grouping are discussed below. For the SBC, the most significant option decision related to rail upgrades including both station locations and increasing rail capacity to achieve the desired quantum shift in mode share as well as facilitate growth and efficiency for the movement of freight. Rail upgrade options are illustrated in **Figure 48**.

8.3.3. Rail upgrades

Figure 48 Rail upgrade options



Functional intent: To provide opportunities to maximise potential mode shift to public transport through increased access to rail (through stations), and increased capacity on the rail corridor to cater for future urban growth.

Rail upgrade options investigated at the short list included:

- two options to increase capacity of the rail corridor
- four options for Drury central rail station
- seven options for Drury west rail station
- three options for Paerata rail station

Recommended options:

- four main tracks from Wiri to Pukekohe (MT9B)
- three railway stations - Drury Central 2 – located to the north of the tributary of Hingaia stream and adjacent to Flanagan Road; Drury West 3 or 4 – located adjacent to Jesmond Road; Paerata 2 – located north of Sim Road.

Reasons for selection

Rail Corridor

Committed rail projects through ATAP include investment in a third main rail line between Wiri and Quay Park and extending rail electrification from Papakura to Pukekohe. These projects aim to support growth, improve network efficiency, improve travel times and public transport uptake.

Further upgrades to rail to match travel demand and patterns in Auckland's south have been investigated. These include improved access to the rail network and improved travel times along the southern rail line through the introduction of express services that can overtake trains servicing all stations. Two options to increase rail capacity through upgrading from two tracks to either three or four tracks (from Wiri to Pukekohe) were also assessed at the short list.

KiwiRail is the requiring authority for the rail corridor and discussions are ongoing on their future plans and recommendations made by Te Tupu Ngātahi. KiwiRail has advised that fully supporting express rail services will require a fourth main rail line between Westfield and Wiri, a third or ultimately fourth main line between Wiri and Papakura and third main line between Papakura and Pukekohe.

The Te Tupu Ngātahi assessment against the SBC investment objectives indicated that four tracks scored highest. While both the three track and four track options increase the people moving capacity, and journey time reliability, the impact on improving timeliness and capacity for freight is greater with four tracks. Due to the national significance of freight the fourth line option scores highest against investment objective two as well as objective three.

Preliminary assessment and discussion with KiwiRail indicates that two additional tracks can generally be contained within the existing KiwiRail designation, however there will be some places where this is not possible. Upgrading the rail corridor to four tracks involves significant overbridge changes and potentially extensive property purchase. This is expected to require the widening of 10 existing bridges and 51 culverts along the rail corridor. A number of existing level crossings have been identified for closure and are discussed further in the Takaanini section. All other level crossing closures are assumed to be carried out by others (KiwiRail/AT) as part of safety improvements

programme for rail and collector roads. Stormwater impacts will also need to be assessed further as works will be within overland flow paths and significant flood plain areas.

It is recommended that KiwiRail (with support from Te Tupu Ngātahi) progress route protection for four tracking between Papakura and Pukekohe with the view of implementing three tracks in the short term and four tracks in the medium to long term.

Rail stations

The location of the rail stations is strongly influenced by the proposed land use as this provides for the most opportunity for land use and transport system integration around a key public transport node.

A number of possible rail station locations were identified based on proximity with preferred town centre locations, opportunities to maximise residential density, operational efficiency and previous investigations by AT, AC and developers. The options assessment of rail station locations was originally based on Auckland Council's draft land use which went out public consultation in September and October 2018. The land use was revised in late November 2018 after the consultation period and the rail station options assessment was updated based on this revised land use.

The following factors are highly influential in determining the preferred locations for train stations:

- (a) Maximising rapid transit access for catchments;
- (b) Integrating stations with centres to ensure they service a mix of land uses to maximise both mode shift (for both inbound and outbound trips), and the extent to which overall travel demand can be further reduced through local employment;
- (c) Maximising the amount of developable land around stations to maximise patronage;
- (d) Ensuring centres are both accessible by rail, and visible/accessible from major roads to support their economic viability; and
- (e) Maximising the operational efficiency and attractiveness of the rail services by ensuring fast travel times and aligning with technical rail and engineering specifications

It should be noted that achieving all of the above factors is not always possible and as such, in many cases trade-offs are required.

A summary of options assessment of the train stations is set out in **Table 12** and the current recommendations for the train station locations are below.

Table 12: Summary of option assessment of rail station locations

Station	Assessment summary
Drury Central 1	<p>Has limited access from the west and is furthest away from key local access points including Flanagan Road and Waihoehoe Road.</p> <p>This option also has low total developable area, low residential potential and limited area of walkable catchment.</p> <p>The site is constrained by existing pump station and land owned by Watercare.</p> <p>There is an archaeological site that could be affected and the proposed platform is partly over Hingaia Stream which will require careful stormwater management.</p>
Drury Central 2	<p>Good access and connectivity to proposed town centre and residential areas</p> <p>Close proximity to local access points of Flanagan Road and Waihoehoe road</p>

Station	Assessment summary
Drury Central 3	<p>Good access and connectivity to proposed town centre and residential areas</p> <p>Close proximity to local access points of Flanagan Road and Waihoehoe Road</p> <p>Impacts on Waihoehoe Bridge</p> <p>May affect one archaeological site. One site is also in proximity but is destroyed. Could be some surviving archaeology.</p>
Drury Central 4	<p>Close proximity to local access point Waihoehoe Road</p> <p>Limited direct access to town centre which could impact attractiveness</p> <p>May affect two archaeological sites. One site is also in proximity but is destroyed. Could be some surviving archaeology.</p>
Drury West 1	<p>Potentially high residential catchment however not currently reflected in proposed zoning.</p> <p>Good access to proposed catholic school site.</p> <p>High total developable area. Achieves high separation distance between Paerata and Drury Central train station options. Supports operational efficiency.</p> <p>Low walkable catchment severance from SH22.</p> <p>Not well connected to the proposed bus network.</p> <p>Limited opportunity to attract regional car-based commuter trips</p> <p>Potential for the school to sever the walkable catchment to the south of the site.</p> <p>Not well connected to proposed western centre.</p> <p>Distant from employment areas.</p> <p>Not well connected to proposed future centre.</p>
Drury West 2	<p>Potentially high residential catchment however not currently reflected in proposed zoning.</p> <p>Good access to proposed catholic school site.</p> <p>High total developable area.</p> <p>Achieves high separation distance between Paerata and Drury Central train station options. Supports operational efficiency.</p> <p>Low walkable catchment severance from SH22.</p> <p>Not well connected to the proposed bus network.</p> <p>Limited opportunity to attract regional car-based commuter trips</p> <p>Potential for the school to sever the walkable catchment to the south of the site.</p> <p>Not well connected to proposed western centre.</p> <p>Distant from proposed employment areas.</p>
Drury West 3	<p>Potentially high residential catchment however not currently reflected in proposed zoning.</p> <p>High total developable area.</p> <p>Achieves high separation distance between Paerata and Drury Central train station options. Supports operational efficiency.</p> <p>Well connected to the proposed bus network.</p> <p>Good opportunity to attract regional car-based commuter trips.</p> <p>Limited walkable catchment severance from SH22.</p> <p>Limited connection to proposed western centre.</p>

Station	Assessment summary
	<p>Adequate access to proposed catholic school site.</p> <p>Distant to proposed employment areas.</p>
Drury West 4	<p>Potentially moderate to high residential catchment. Partially reflected in proposed zoning.</p> <p>High total developable area.</p> <p>Achieves high separation distance to Paerata train station options.</p> <p>Achieves moderate separation distance to closest Drury Central train station option.</p> <p>Supports moderate operational efficiency.</p> <p>Well connected to the proposed bus network.</p> <p>Good opportunity to attract regional car-based commuter trips</p> <p>Some walkable catchment severance from SH22.</p> <p>Limited connection to proposed western centre.</p> <p>Limited access to proposed catholic school site.</p> <p>Moderate connection to proposed employment areas.</p>
Drury West 5	<p>Moderate residential catchment. Reflected in proposed zoning.</p> <p>Moderate developable area.</p> <p>Achieves high separation distance to Paerata train station options.</p> <p>Achieves low separation distance to Drury Central train station options.</p> <p>Achieves sub-optimal operational efficiency.</p> <p>Well connected to the proposed bus network.</p> <p>Limited opportunity to attract regional car-based commuter trips</p> <p>Some walkable catchment severance from SH22.</p> <p>Good connection to proposed western centre.</p> <p>Low access to proposed catholic school site.</p> <p>Good access to proposed employment areas.</p>
Drury West 6/6a	<p>Low residential catchment. Reflected in proposed zoning.</p> <p>Low developable area.</p> <p>Achieves high separation distance to Paerata train station options.</p> <p>Achieves low separation distance to Drury Central train station options.</p> <p>Achieves sub-optimal operational efficiency.</p> <p>Well connected to the proposed bus network.</p> <p>Limited opportunity to attract regional car-based commuter trips</p> <p>Some walkable catchment severance from SH22.</p> <p>Good connection to proposed western centre.</p> <p>Low access to proposed catholic school site.</p> <p>Good access to proposed employment areas.</p>
Paerata 1	<p>Good access to residential and proposed school site for PT travel</p> <p>Good opportunity to attract regional car-based commuter trips due to proximity to road network</p> <p>Moderate residential catchment due to proximity to proposed Wesley site. Provides alternative to private car travel with walkable catchment to station</p> <p>May encroach on flood plain located to the south</p>

Station	Assessment summary
Paerata 2	<p>Good access to residential and proposed school site for PT travel</p> <p>Good opportunity to attract regional car-based commuter trips due to proximity to road network</p> <p>Moderate residential catchment due to proximity to proposed Wesley site. Provides alternative to private car travel with walkable catchment to station</p> <p>Some additional earthworks required. However, less than RS P3.</p>
Paerata 3	<p>Limited access to residential and proposed school site for PT travel</p> <p>Limited opportunity to attract regional car-based commuter trips</p> <p>Low residential catchment due to proximity to proposed Wesley site</p> <p>Significant earthworks required</p>

Recommended options

The recommended rail station locations for each of the three location areas (Drury Central, Drury West and Paerata) are as follows:

Drury Central 2 - is preferred due to its proximity to the Auckland Council proposed town centre and new residential communities. DC2 and DC3 score most favourably against the investment objectives as they provide greater access and connectivity to the proposed town centre and residential area due to their close proximity to local access points of Flanagan Road and Waihoehoe Road.

Overall DC2 scores most favourably for the environmental and economic criteria due to its low potential for adverse environmental impacts. The site also provides opportunity for a large park and ride and potential to work with developers to contribute to infrastructure costs.

Drury West 3 and 4 – are preferred as they provide good opportunities for high density residential catchment, are well integrated with the proposed frequent transport network on Jesmond Road and achieve operational efficiency due to distance between the Drury Central recommended option. These options have a high developable area, good walking catchment and integrate reasonably well with the proposed town centre. They score favourably against the investment objectives.

Paerata 2 - is preferred overall. Both P1 and P2 scored more favourably against the investment objectives than the other Paerata options due to their high level of accessibility. This includes their proximity to residential areas, the proposed school site and the road network which provides opportunity to attract regional car-based commuter trips. P2 was ultimately chosen as it aligned with developer proposals and has a low potential for adverse environmental impacts and limited construction impacts. The site also provides opportunity for a large park and ride.

Manawhenua feedback summary:

Manawhenua expressed [REDACTED]
[REDACTED]
[REDACTED].

Stakeholder and partner feedback summary:

There was strong public and partner support for increasing the capacity of the rail network through additional tracks, express services and increased frequency to improve the reliability and level of service of the rail network.

Support was received from the public for inclusion of a rail station in Drury west, and to integrate it with the potential town centre or with the Catholic school zoned site. Feedback received also requested decision making on the location of Drury west train station to be a priority given known development plans/potential in Drury west.

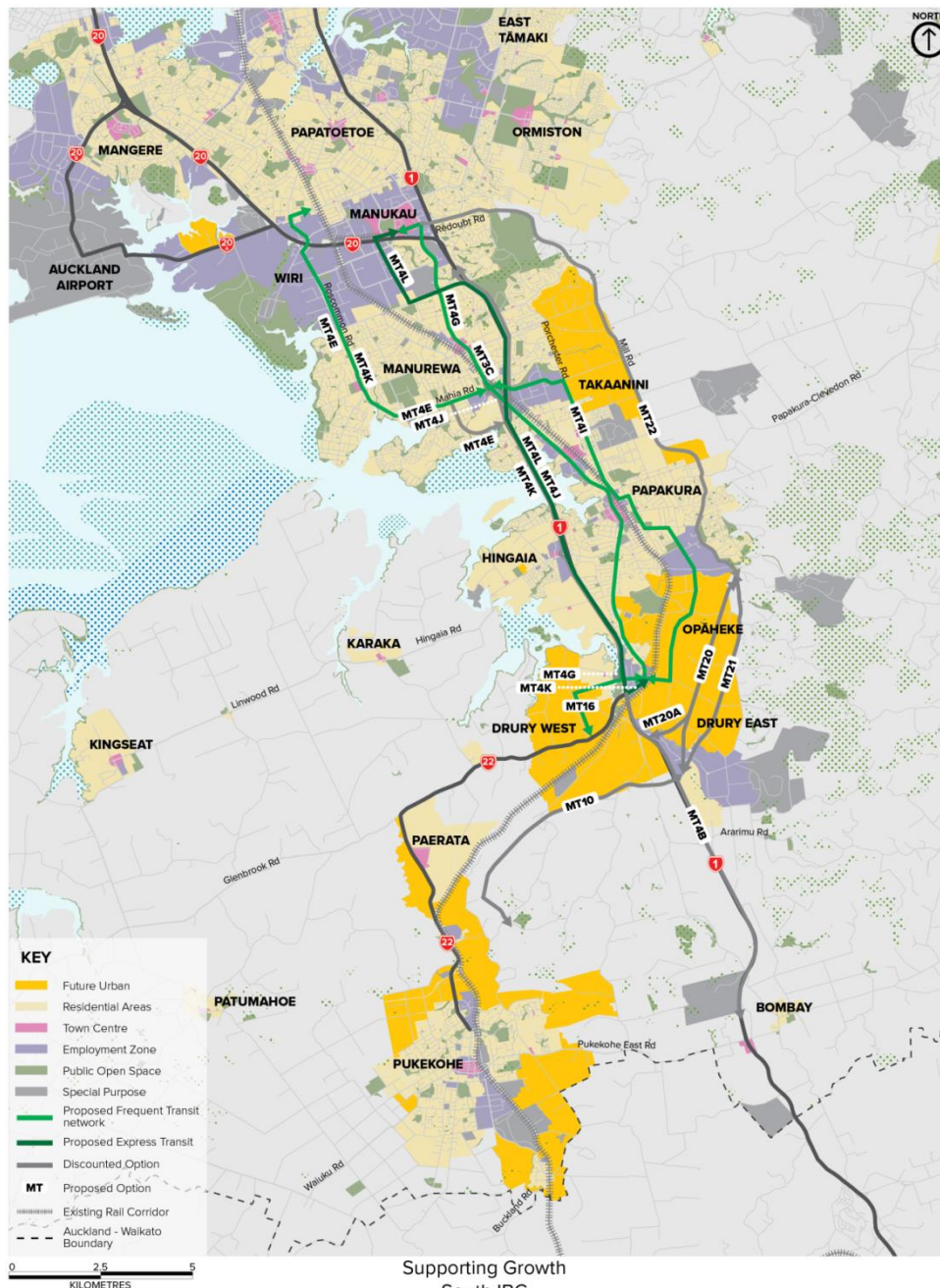
There was public support for a rail station in Paerata, to be accompanied with a large park and ride. There was a request to make an early decision on the Paerata rail station location given other landowner development plans in Paerata.

The project team and workshop three attendees agreed that the Drury rail stations are considered to be priority for decade one staging.

8.3.4. Rapid and frequent transit bus network

Rapid transit provides fast, frequent and high-capacity public transport services, separated from general traffic and therefore not affected by road congestion. It delivers safe and attractive alternatives to private car travel and provides opportunities to develop quality, highly accessible urban places centred around stations. **Figure 49** shows the extent of the proposed network for the South.

Figure 49 Rapid and frequent transit bus network



Functional intent: To augment the capacity of the PT system and provide high quality public transport coverage to existing areas not well serviced by rail. Additionally, provide high quality public transport directly into new urban areas and connecting services to support access to rail.

Fourteen RTN/FTN options were investigated at the short list. These included services:

- from Drury and Pukekohe to Hingaia, Takaanini, Puhinui or Manukau
- on Great South Road
- on SH1
- on Porchester Road
- on Mill Road
- on Pukekohe Expressway.

As part of the option assessment process, AT Metro provided a bus network plan envisaged to support the future growth. Key corridors were tested and modifications made to fit with the MSM road network used in the transport modelling exercise. These modifications are explained in more detail in **Section 4.6 of Appendix C Transport Assessment**.

A number of options did not proceed to short list. The rationale behind their elimination is set out in **Table 13**.

Table 13 Discounted rapid and frequent transit bus options

Bus corridor	Rationale for elimination
MT16	Route for MT16 is duplicated in by MT4I.
MT4J	Corridor MT4J is covered by MT4K and MT4L.
MT4G	This corridor currently attracts relatively low ridership of around 110 passengers per peak hour direction (pphpd) based on modelling.
MT4B	This option had poor ridership due to limited catchment. Other options covering north of Drury replicated the function of this option.
MT21, MT20, MT20a,	Poor demand expected as they are on the fringe of the development Not aligned with AT Metro's bus network plans for 2046+
MT10	Directly competes with rail and does not integrate well with FUZ in terms of its connections (especially the connection at SH1 at Drury south).
MT22	Limited catchment for RTN due to location on the edge of the FUZ. Should not preclude local bus services and bus priority lanes being explored for Mill Road as part of its implementation
MT4E	Poor demand expected as they are on the fringe of the development Not aligned with AT Metro's bus network plans for 2046+

Further analysis was undertaken on the bus priority provision along key corridors. As part of this analysis it was found that the addition of the RTNs significantly improved accessibility for the south, however, it was concluded that the volumes of either buses and/or passenger numbers were not significant enough to justify dedicated bus corridors.

Total average ridership of 1,400 passengers per peak hour per direction and/or 1,800 pphpd at maximum along the SH1 corridor may not justify the provision of a dedicated bus corridor. International benchmarking studies suggests ridership between 3,000 and 45,000 pphpd for busway provision (*Source: ITDP*). As a further comparison, the Northern Busway in Auckland's North Shore has a capacity of 6,000 to 18,000 passengers per peak hour per peak direction (*Source: Wellington Public Transport Spine Study International Review of Public Transport Systems, Base Report*).

Whilst the full implementation of rapid transit may not have been fully justified, the accessibility benefits of enhanced bus services were highlighted. This led to the recommendation of FTN corridors to preserve the accessibility benefits whilst not incurring the higher costs. Further work will be required in the DBC to understand the recommended rapid transit solution (bus shoulder, dedicated busway and managed lanes along SH1).

Table 14 outlines the recommended options and the reason for their selection.

Table 14 Recommended options and their functional intent

Bus corridors	Functional Intent
MT3C Drury to Manukau station via Great South Road	This corridor runs along Great South Road (GSR) from Drury to Manukau. It provides key connections from local centre to local centre and acts as a feeder to the train stations. The existing road is upgraded to provide 14.5km of bus priority (likely of a T2, T3 or peak-hour, peak-directional bus lanes configuration) and generally needs to be above 25m wide to include walking and cycling facilities.
MT4I Drury to Manukau via Porchester Road	This corridor starts and ends in Drury West and Manukau, covering the eastern side of the FUZ (away from SH1 and the rail line). This corridor brings residents to/from the town centres and train stations mainly at the key hubs at Manukau, Papakura and Drury West. Bus priority measures are likely to be T2, T3 or peak-hour, peak-directional bus lanes. Adequate capacity on this corridor can be provided by FTN services. It is noted that Sutton Road could be closed at the level crossing without the need for grade separation.
MT4K Drury to Puhinui Station via Roscommon Road and SH1	This corridor provides critical connection between Roscommon Rd and Puhinui interchange in the north, and Drury West in the south. The bus priority corridor is likely to be T2, T3 or peak-hour, peak-directional bus lanes configuration on the local road network and utilise a mixture of lane treatments on SH1 with stops at the interchanges. The majority of the existing road will need to be widened to a 25m width, with 32m wide upgrade required for a roundabout along the Mill Road corridor which meets the Porchester Road/Popes Road junction.
MT4L Drury to Manukau via SH1	This is a critical corridor providing a fast and largely direct connection between Drury West and Manukau which links onto the Airport and is able to service Hingaia. This corridor will run along shoulder bus lanes on SH1 with stops along on and/or off-ramps. Sections of the FTN are reliant on the Southern Corridor Improvements and SH1 Papakura to Bombay Project. This corridor will include bus shoulder running and indicative bus station locations have been identified and further work is required at the DBC to confirm.

Through the transport analysis it was found that the proposed bus corridors and the potential enhanced bus services that can run on them will complement rail from a wider PT perspective rather than directly compete with it.

The recommended options score most favourably against the investment objectives as they provide fast and frequent public transport between growth areas and employment areas not directly served by rail. The recommended options improve mode choice and accessibility utilising existing infrastructure in a manner that maximises people throughput and connects key origins and destinations. There are also benefits through the separation of strategic and commuter travel and any induced mode shift from private vehicles will improve freight movements through decongestion benefits on strategic links.

Some of the recommended options were originally proposed as separated bus corridors, however following further investigation, it is recommended to generally locate the bus corridors within existing road/SH1 corridors (via shoulders) where possible to reduce environmental and social impacts and

costs. There are also stormwater constraints in Takaanini (relating to all options) that will require careful management.

Manawhenua feedback summary

Manawhenua [REDACTED]
[REDACTED]
[REDACTED]

Public/stakeholder feedback summary

There was strong public support for rapid transit corridors that provide fast, frequent and reliable services, particularly where they connect to Manukau station, the airport and Auckland CBD. Public feedback identified that a rapid transit network would work if it had different destinations to the rail network. There were numerous suggestions to use Great South Road for an RTN or FTN in the south.

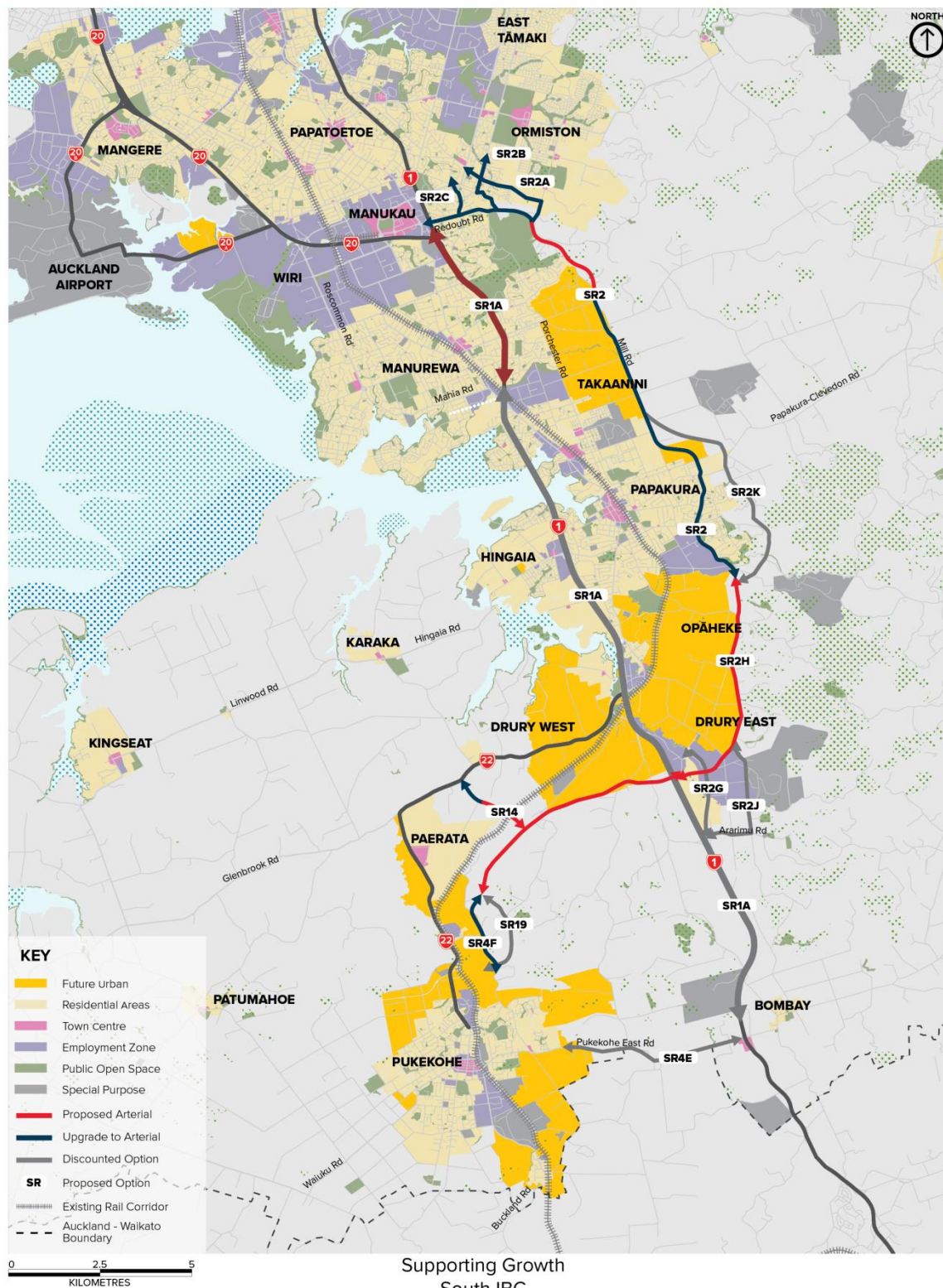
The Franklin Local Board requested consideration of strategic connections and mass transit options to the western growth settlements in Franklin. Mass transit options were investigated at the long list, but eliminated as they largely traversed rural areas so did not have sufficient catchment to support the option. This does not preclude implementing local bus services for these communities (but these are not being explored as part of Te Tupu Ngātahi).

Workshop three participants generally identified rail as the preferred public transport option in the south, with a suggestion to improve the rail network before providing RTN or FTN bus corridors. Some workshop participants suggested that the Great South Road FTN option (MT3C) should be a decade one priority.

8.3.5. Strategic connections

The strategic options investigated at the short list include Mill Road, Pukekohe Expressway, State highway one and a connection between Pukekohe Expressway and SH22 as shown in Figure 50Error! Reference source not found..

Figure 50 Strategic connections



Mill Road

Functional intent: To provide an additional corridor to support improved local access to future urban areas. It allows alternative routing away from the main strategic corridor (SH1) for shorter distance trips. It will improve safety, increase the capacity and the resilience of the network (alternative to SH1), and support future growth.

Recommended options:

- Murphy's Road – Thomas Road/Flat Bush Road to Chapel Road – Te Irirangi Drive. (SR2A North)
- Hilltop Road to Chapel Road/Te Irirangi Drive (SR2B North)
- Hollyford Drive to Te Irirangi Drive (SR2C North)
- Redoubt Road to Hunua Road (SR2 Central)
- New route Mill Road/Cosgrave Road from Dominion Road/Settlement Road junction (Redhills) to Fitzgerald Road – across Hunua Road to Ponga Road (SR2H South)

Reasons for selection:

North

The three Mill Road north options are all recommended. These options extend the existing Mill Road designation to provide connections with Te Irirangi Drive. The Mill Road north options score a low to moderate positive against the investment objectives. These options will increase resilience of the strategic connections for the Southern growth area and will help mitigate SH1 traffic. These options will improve throughput and access to Manukau.

Central

The central alignment through Papakura (SR2) located within the existing Mill Road designation which ends at Popes Road is the recommended option. Despite significant environmental and social effects (partly due to its length) as well as potentially significant property impacts and severance effects (through the existing Papakura community), this option overall scores most favourably against the investment objectives.

The option located around Papakura (SR2K) was eliminated due to significant adverse landscape and visual effects from its location near two outstanding natural features. This option also has substantial impacts on significant ecological areas requiring multiple stream crossings and involves significant construction costs due to bridge construction across valleys and extensive cut and fill.

South

The alignment around the outside of the FUZ connecting with SH1 at Drury south (SR2H) is the recommended option for the Mill Road southern alignment.

The options connecting at Ramarama (SR2G and SR2J) which is not a planned future growth area did not score favourably against the investment objectives as they do not integrate well with FUZ and offer limited benefits.

There have been recent discussions with developers and Auckland Council regarding the opportunities to optimise the southern section of Mill Road (SR2H). The alignment assessed at the short list has been shifted slightly to the west to more align with landowner plans – both in the Drury

south business precinct and the live zoned area to the east of SH1. This new alignment may cause some severance of FUZ in south east Drury. However, conversations are ongoing with Auckland Council on the draft land use in Drury and with developers on the best outcome for land use and transport integration.

Full Option

Transport analysis demonstrates that accessibility is a more important function of Mill Road rather than an alternative route to SH1 - precluding the option needing to be an Expressway – as there is little end to end traffic along the route under normal traffic conditions. It also shows that the onward connections to the north are critical for improving accessibility to Botany. Overall, Mill Road as a four-lane arterial delivers sufficient capacity and improved travel times as well as helping to relieve Great South Road congestion.

Manawhenua feedback summary:

Manawhenua expressed [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Public/stakeholder feedback summary:

Workshop three attendees generally showed strong support for Mill Road alignments (in whole or in part) and for these options to be considered as a decade one priority project.

Key points from stake holder and public consultation:

- General support for Mill Road as an expressway with noted urgency for early prioritisation of route protection for this corridor.
- The most direct route with the fastest travel time was the key customer insight.
- Suggestion that the Mill Road corridor should provide for public transport.
- All three north alignment upgrades were supported.
- SR2C was supported and would best connect to SH1 and SH20.
- Support for Option SR2A as this would avoid unnecessary diversion of traffic through Manukau.
- Support for connections to Chapel Road and Te Irirangi Drive to connect east.
- Ōtara-Papatoetoe Local Board indicated that the northern alignments need prioritising, as there is major traffic from Manukau to Mill Road (and vice versa).
- Mill Road central alignment option through Papakura (SR2) was preferred by the public as opposed to going outside the urban area (SR2K).
- Public support for provision of public transport, walking and cycling facilities on Mill Rd, as well as keeping the speed limit high to enable even flow of traffic.
- Mill Road south alignments were supported by the public as providing an alternative access to Pukekohe and western communities, as well as traffic moving further south on SH1.
- Concerns were raised about impacts on the existing rural communities and Ramarama School (SR2G and SR2J).

- Options through the Drury east FUZ (i.e. SR2 and SR2G) were supported as the most direct, straight and feasible options, providing better access to proposed train station and town centre in Drury.
- Potential opportunities identified through meetings with landowners to work together to deliver a southern alignment that works with their proposed development plans. Particular landowner interest was expressed regarding the connection of the southern alignment to SH1.

Pukekohe Expressway

Functional intent: To support resilient access to Pukekohe and Paerata. Provide alternative route for SH22 to reduce traffic in Drury which will facilitate place making through an improved environment. Providing appropriate road form will increase safety by reducing reliance on minor rural roads.

Recommended option:

Pukekohe Expressway following edge of FUZ (SR4F)

Reasons for selection:

The option following the edge of the Pukekohe FUZ (SR4F) is preferred over the option that is located further east of the Pukekohe FUZ (SR19). Although the options score the same against the investment objectives, the recommended option aligns best with future land use at northeast Pukekohe and provides a more direct route. SR19 has significant adverse landscape and visual effects due to its proximity to Coulthards Scenic Reserve. The recommended option involves several major stream crossings that will likely require bridging.

The Pukekohe Expressway improves separation of strategic and commuter travel by reducing local street rat running and improving the movement of people and goods. The rationale for Pukekohe Expressway is to be able to transfer traffic from SH22, Pukekohe East Road and other local roads such as Burt Road. This will provide safety benefits on local roads, decongestion and greater opportunity for community cohesion in built up urban areas such as Drury West.

There are also network benefits for providing Pukekohe Expressway and Mill Road connecting at Drury South. Having Mill Road connect to Drury South and not having a Pukekohe Expressway results in heavy traffic volumes building along SH1 northbound, with traffic coming from Pukekohe East Road and another pinch point occurring through Drury Central.

In summary, there are benefits to improving accessibility to Pukekohe through upgrades and additions to the network, but there are not major transport benefits to recommend fully implementing Pukekohe Expressway as a full expressway. When assessed against the wider network, the option acts as an important link road from SH22 to the strategic Pukekohe connection which can be fulfilled more appropriately by an arterial. The option improves accessibility to the proposed Mill Road alignment and will support development in Paerata and urban areas east of the rail corridor.

Manawhenua feedback summary:

Manawhenua expressed [REDACTED]
[REDACTED]
[REDACTED]

Public/stakeholder feedback summary:

Public support was received for the Pukekohe Expressway to connect Drury FUZ to Pukekohe and to reduce congestion on SH22 and Pukekohe East Road. Opposition was also received, on the basis that existing SH22 and roads need upgrading in the first instance and agricultural land should be protected.

SH1 upgrade

Functional intent: To increase the capacity of SH1 to support strategic movements as well as freight.

Recommended option:

Additional lanes on SH1 – four lanes each way from Manukau interchange to Takaanini interchange. SR1A was originally investigated as four lanes each way from Manukau to Bombay.

Reasons for selection:

SR1A was scored through the option assessment as an additional lane each way from Manukau to Bombay. It scored a low positive against investment objective one and three, providing an opportunity to improve public transport use of the corridor. Transport analysis indicated that an additional lane would relieve congestion on Great South Road, improve access to jobs within a 45-minute travel time, improve travel time reliability and freight throughput and reduce the likelihood of all-day congestion.

From an environmental perspective SR1A scored poorly as there are existing flooding issues, diversion of overland flow paths on SH1, high adverse effects on ecology due to widening of the corridor across the Pāhurehure Inlet and Drury Creek and effects on a number of significant ecological areas.

Through further investigations this was refined to an additional lane each way from Manukau interchange to Takaanini interchange which avoids these adverse environmental effects. In isolation, this option does not provide for a more resilient network, however if implemented after the other options recommended for the network, it will improve freight and people movement and improve north south connectivity. This option is therefore recommended as a long-term response to full buildout growth in the south.

Manawhenua feedback summary:

Manawhenua [REDACTED]
[REDACTED]
[REDACTED]

Public/stakeholder feedback summary:

There was support for the widening of SH1 from the public as a priority project to provide dedicated lanes for buses, heavy vehicles or T2/T3 and cycling.

Feedback from the public was also received in opposition of widening of SH1 instead preferring prioritisation of investment in public transport, including upgrading of rail.

Connection between SH22 and Pukekohe Expressway (SR14)

Functional intent: This option provides a key strategic link connecting to the strategic corridor (Pukekohe Expressway and SH22). It supports future urban growth areas by adding road capacity in strategic locations.

Reasons for selection:

This option scored low positive against the investment objectives however improves separation of strategic and commuter travel by reducing congestion on local streets. The option is part of building a new road network around Drury to support not only the new development to the west, but also help form the new urban area. The new urban land area for Drury West is distributed across two sides of an existing state highway. It is important to take steps to improve the place making of the new town and so options that help redistribute through traffic away from the town centre should be implemented.

From an environmental perspective the option has low potential for adverse environmental effects.

8.3.6. Active modes

Provision of a network of high-quality walking and cycling facilities is important to improve access via a range of modes.

Functional intent: Provide a high-quality network of strategic walking and cycling connections for key movements through, within and to/from the Southern growth area, connecting existing and new communities.

The regional and primary cycling and walking network has been developed around the arterial road network only and is based on design principles and best practice metrics. The finer detail around collector and local roads will be developed as part of the Integrated Transport Assessment, which is required as part of AC's Structure Planning process.

Recommended options and associated arterial links:

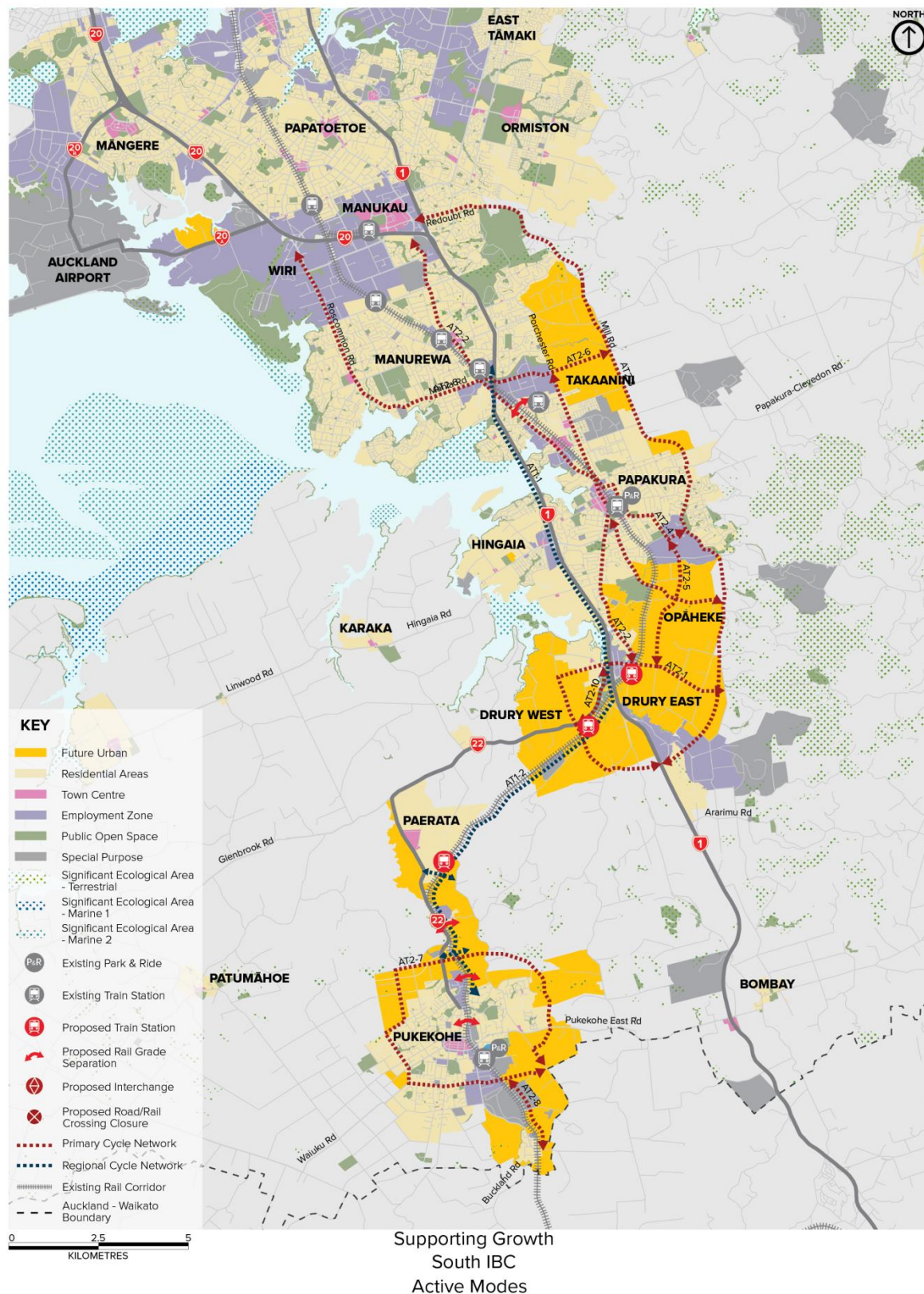
- SH1 NZTA's Southern corridor/Papakura to Bombay improvements (Takaanini to Drury)
- Adjacent to NIMT on the south eastern side (Drury to Pukekohe)
- Jesmond Road/Bremner Road/Waihoehoe Road/Pukekohe Strategic Arterial (Drury) (AR11, AR16a and AR20)

Great South Road (Drury to Manukau) (MT3C)

- Mill Road (Drury to Manukau) (SR2, SR2H)
- Porchester Road/Ingram Street/Marne Road (Drury to Takaanini) (MT4I)
- Proposed arterial (AR10)
- Mahia Road/Roscommon Road/Popes Road to tie into proposed Airport to Botany link (Takaanini to Airport) (EW9)
- Proposed Pukekohe arterial (Pukekohe ring route)
- Station Road (Pukekohe to North Waikato) (AR34)
- SH22 and Victoria Street (Drury)

For new corridors, high quality separated walking and cycling facilities were proposed. The active modes network is shown in Figure 51:

Figure 51 Proposed active modes network



For the retro-fitting of existing corridors, it is expected that a mixture of shared path and separated facilities will be provided. Other proposed arterials will include walking and cycling facilities and will supplement the outlined regional primary network. These will be investigated further at the DBC.

Reasons for selection:

- The regional connections are considered key in achieving a functional network spine which will encourage a significant shift away from reliance on private vehicles, towards active modes and integrated trips. All options will provide highly attractive and safe facilities with physical separation from arterial vehicle traffic and provide significant benefits as they will connect between key spatial connections such as rail stations, employment areas and town centres. Additional primary routes along proposed and upgraded arterials will provide more permeability in the network with additional convenient choices for active mode users.
- The SH1 alignment option utilises the Transport Agency's Southern corridor improvements (under construction) shared path link between Takaanini and Papakura and aligns with the proposed SH1 Papakura to Bombay shared path link. This proposed regional link provides benefits for current and future communities on both sides of the motorway. Due to the location of the proposed link and a larger area of FUZ on the eastern side of the motorway, additional arterial links along Great South Road, Mill Road, Porchester Road and the proposed AR10 arterial are recommended to facilitate and integrate users who cannot conveniently access the SH1 strategic connection.
- The proposed option adjacent to the rail line provides a high quality, direct connection between Drury and Pukekohe. This option has a reduced gradient compared to the Pukekohe Expressway and SH22, as well as increased amenity through travelling away from arterial roads. This link is proposed to be placed south east of the rail corridor. It is proposed to connect directly into the NZTA Papakura to Bombay proposed strategic cycleway to provide a seamless regional route, while the SH22 and Victoria Street route will provide access into Drury Centre and the train station.
- The supplementary arterial link option on Jesmond Road and the proposed Pukekohe ring route benefit users by integrating with the regional connections, the town centres of Pukekohe and Drury, and the surrounding FUZ, providing coherent and accessible links for users.
- The link along Mahia Road/Roscommon Road has been proposed as a primary link on a proposed arterial as it will provide a network benefit through integration with AT's proposed Airport to Botany improvement works.
- The option south of Pukekohe on Station Road and into a separated facility connecting into Logan Road at the existing rail crossing point will deliver longer-term benefits to the network by providing a link to the key destinations in Pukekohe, as well as the rest of the regional network from the south. This link provides an opportunity to connect to North Waikato in the future.
- To ensure that the network is accessible and permeable, it is proposed to provide three new active mode bridges at Hamilton Place, Tuhimata Road and the proposed EW1a arterial link in Pukekohe. These options were identified in the long list phase as improving east west accessibility over the rail line. In addition to this, there will be provision for active modes on several shared crossing points as part of increasing the number of tracks of the NIMT.

There are several opportunities on existing roads which are not part of the recommended arterial road network for the South IBC. These will be investigated further at the DBC.

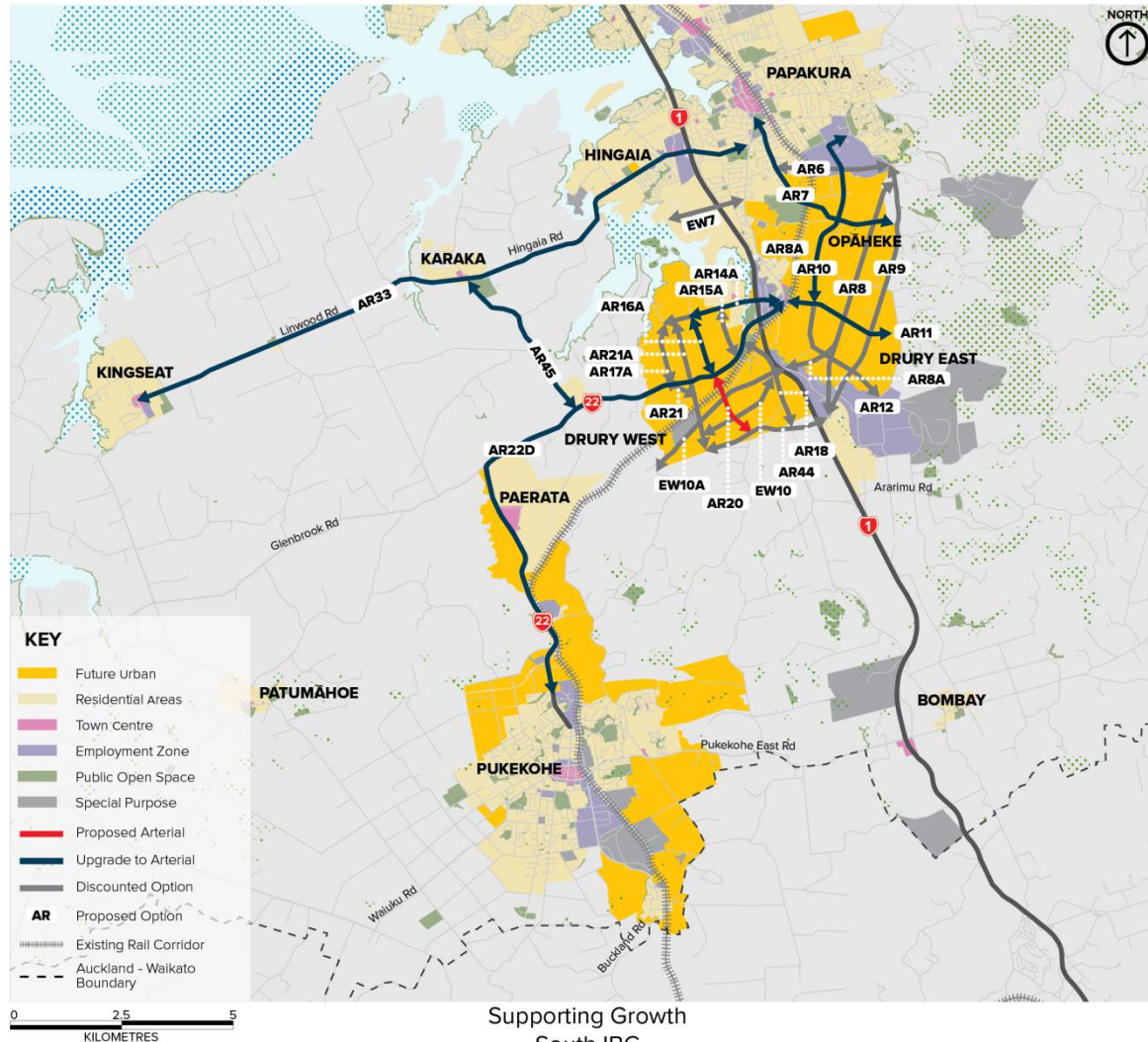
Public/stakeholder feedback summary

- overall strong support for a link adjacent to the rail line
- need to consider the secondary and local network, especially links to greenways and in town centres
- access to local shops and services, along with health, fitness and recreation facilities were highlighted as the major drivers to consider when developing the proposed network
- safety and separation highlighted as important for the walking and cycling network
- concern for potential lack of amenity when facilities are next to arterial roads
- interest in a future inter-regional cycle connection between Pukekohe and Tuakau/Pokeno.

8.3.7. Opāheke-Drury

The Opāheke -Drury options investigated at the short list include a number of arterials and east west connections as shown in Figure 52.

Figure 52 Opāheke-Drury short list options



Supporting Growth
South IBC
Short List Options - Opāheke-Drury

Functional intent: Increase accessibility and people movement within the area to provide connections to employment, industrial areas, residential areas and rail stations, as well as strategic transport connections. To support place making, safety and amenity by creating obvious major corridors for movement function that reduces through movement on local roads.

Recommended options:

- Upgrade Opāheke Road and Ponga Road - Great South Road to Mill Road (AR7)
- New arterial between Papakura industrial area, Waihoehoe Road to Great South Road (AR10)

- Upgrade Waihoehoe Road from Mill Road/Drury Hills Road to Fitzgerald Road (AR11 and AR13 merged to one option as AR11)
- Upgrade and realign Bremner Road from Jesmond Road to Great South Road (AR14a)
- Upgrade Jesmond Road from new connection with Bremner Road to SH22 (AR16a)
- Connection from Jesmond Road to the Pukekohe Expressway (AR20)
- Widening SH22 to four lanes from Drury township to Ira Road and safety improvements on the rest of the corridor to Paerata (AR22d)
- Upgrade Blackbridge Road from SH22 to Linwood Road and Hingaia Road, and across SH1 interchange to Great South Road (now safety improvements) (AR45)
- Upgrading Linwood Road (now safety improvements) (AR33)

Reasons for selection:

The recommended options score particularly well against the investment objectives providing good people and public transport movement, and increased connectivity across the area.

AR7 includes grade separation of the rail line on Opāheke Road, which will make the road operate more efficiently and support public transport, as well as providing access to the proposed Mill Road corridor. This option will also connect FUZ to Papakura and employment areas to the north.

AR11/AR13 together connect into Drury central to provide for a good residential catchment and connection to proposed employment.

The recommended north-south alignment in Drury west is located along the existing Jesmond Road (AR16a). It is centrally located harnessing catchment and aligns with developer proposals. It also connects with the proposed east-west link identified in Auranga Plan Change 6 (identified as AR14a). These two options form the main FTN between the proposed Drury rail station locations.

AR20 provides a connection from Jesmond Road to the Pukekohe Expressway. It increases connectivity to the town centre and strategic corridors. It provides an important crossing point over the rail line improving local connectivity.

AR22d was originally investigated as four laning the SH22 corridor. After further assessment, it is recommended to four lanes from Drury township to Oira Road to increase capacity and support future urban growth. Safety improvements are also recommended on the rest of the corridor to Paerata.

Upgrading Blackbridge Road from SH22 to Linwood Road and Hingaia Road, and across SH1 interchange to Great South Road (AR45) and also upgrading the western part of Linwood Road (AR33) are recommended to improve safety. This option was deemed not to directly support the Supporting Growth programme, but instead it provides an important local connection for communities in Kingseat and Waiuku and was strongly supported by Franklin Local Board. It is anticipated that the improvements would be carried out within the existing road reserve.

Overall, the recommended options provide good people and public transport movement across the area. They are centrally located and generating good catchment to and from proposed employment and residential areas, and they will connect to rail stations providing for active modes and bus priority. These options have low potential for adverse environmental impacts (noting stormwater management will be required) and limited construction impacts.

Manawhenua feedback summary:

Manawhenua [REDACTED]
[REDACTED].

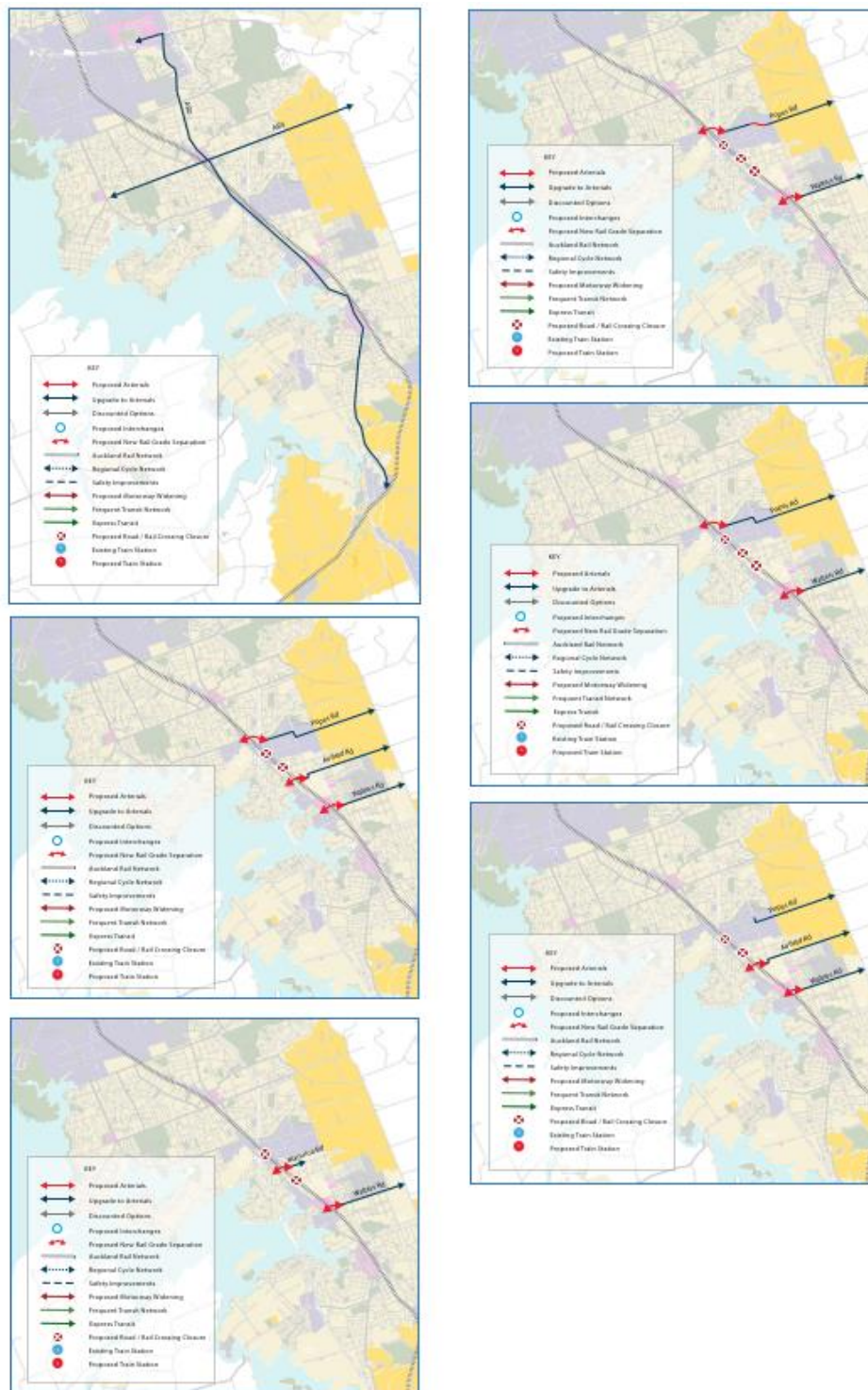
Public/stakeholder feedback summary:

- Strong support for Drury upgrades and new arterials to be prioritised in decade one.
- Flood mitigation and stormwater management were raised as key considerations for all Drury options.
- The north-south connection (AR7) was supported by the public as well as the frequent bus corridor proposed from Drury West.
- Public support for the upgrade of Waihoehoe Road and Fitzgerald Road (AR11/AR13).
- Both support and opposition by the public for the extension of Bremner Road towards the east. This option was supported based on their relation to structure planning of Drury west and the opportunities to connect planned neighbourhoods and ensure connectivity between Drury west and Drury east.
- There was support for AR20 connection, with Jesmond Road being suggested as the key transport spine for Drury West.
- The Franklin Local Board indicated the existing congestion of Linwood Road and Hingaia Road needs addressing, suggesting general support for options AR33 and AR45 that upgrade these roads as part of the network.

8.3.8. Takaanini Short List

The increase in rail frequency will impact on the functionality and safe operation of level grade crossings in Takaanini. To address this and to support the future urban growth in Takaanini, a number of options were investigated at the short list as shown in **Figure 53**. These included different combinations of grade separation or closing level/rail crossings and upgrading adjacent roads.

Figure 53 Takaanini short list options



Takaanini east-west crossings

Functional intent: To reduce the severance from higher frequency trains and improve safety and access of east-west connections over the rail corridor.

Recommended option:

- arterial connection between Roscommon Road at Weymouth Roundabout and Mill Road (via Popes Road, Rangī Road, and Mahia Road), including grade separation of SH1 and NIMT Rail line (EW9B)
- grade separation of Taka Street and Walters Road
- close level crossings at Spartan Road and Manuroa Road

There are 2 lane bridge crossings over Taka Street and Walters Road; and there are 4 lanes to cross via the Rangī Road viaduct.

Reasons for selection:

EW9B was considered to offer the highest quality access of the east west crossing options and scores most favourably against the investment objectives.

EW9B originally included upgrading Walters Road, Airfield Road and Taka Street to arterial standard to Great South Road. Through the transport assessment, the proposed upgrade (and grade separation) between Roscommon Road at Weymouth roundabout and Mill Road (via Popes Road, Rangī Road, crossing SH1 and on to Mahia Road) is well utilised and increases safety, east-west movements and connectivity and provides opportunities for routing alternatives in Takaanini.

The grade separation of Taka Street will also have substantial bus network benefits enabling better integration and transfer between local communities at Takaanini train station.

The grade separation overbridge structures will have some visual effects. Takaanini has significant stormwater issues due to flood plains and stormwater management will need to be carefully managed. There are some additional complexities with construction over NIMT, SH1 and Transpower lines and this will also need to be carefully managed.

Manawhenua feedback summary:

Manawhenua expressed [REDACTED].

Public/stakeholder feedback summary:

Attendees of workshop three supported closing or grade separating level crossings. It was also acknowledged that the viaduct structures, in particular at Rangī Road, would have visual effects.

Closure of Spartan Road and Manuroa Road was strongly supported by the public provided walking and cycling crossing was provided. Through public consultation, the safety of pedestrian and residents was raised. Concern was also raised regarding traffic congestion and significant disruption from road closures and construction.

Takaanini arterial upgrades

Functional intent: Improve capacity for all modes as well as support future urban growth. Arterial improvements offer the opportunity for complete street solutions where all modes of transport can be improved

Recommended options:

AR2 and AR3 are not recommended as part of the network.

Reasons:

Although AR2 (Great South Road upgrade) would provide a strong regional connection, this option focuses on the increased capacity for private vehicles. Frequent bus service on Great South Road has been recommended instead and is discussed separately in this report under Strategic Connections. Widening Great South Road to provide additional lanes for cars would have significant property impacts.

AR2 has some local benefits, however the proposed upgrade (and grade separation) between Roscommon Road at Weymouth roundabout and Mill Road (via Popes Road, Rangi Road, crossing SH1 and on to Mahia Road) together with public transport improvements is sufficient to cater for the growth in Takaanini.

Manawhenua feedback:

Manawhenua expressed [REDACTED].

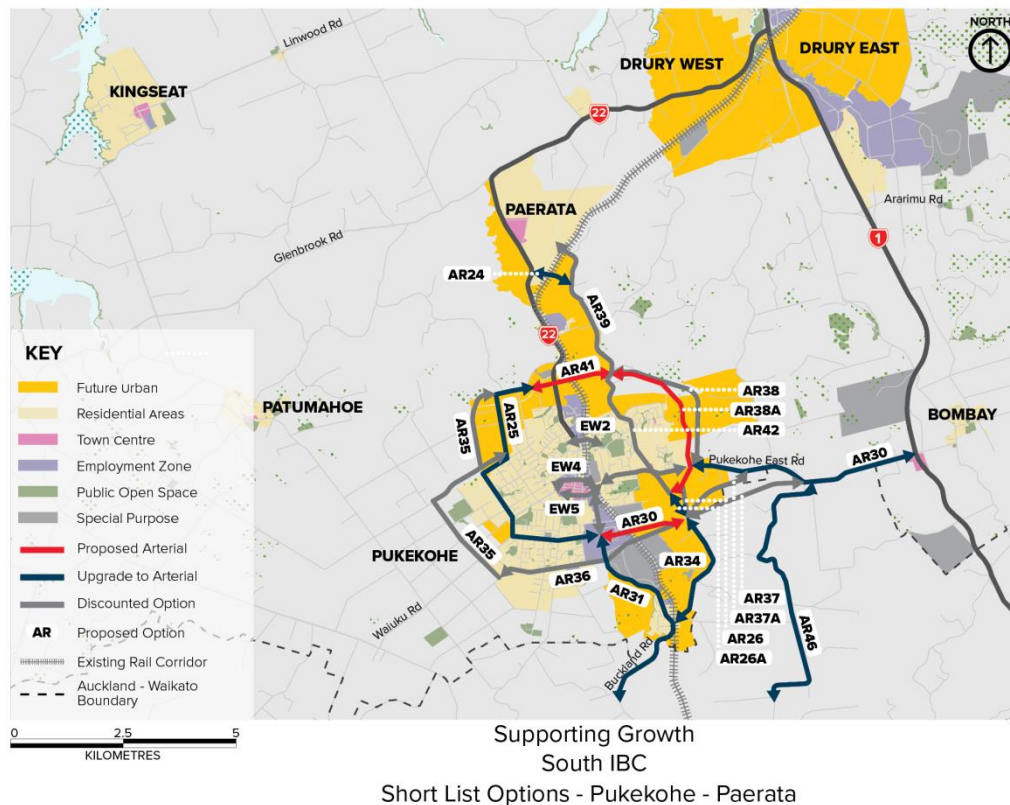
Public/stakeholder feedback summary:

General support was received for decongesting and the provision of public transport on Great South Road.

8.3.9. Pukekohe-Paerata short list

A number of arterial and east west crossings in Pukekohe-Paerata were investigated at the short list as shown in **Figure 54**. These include options for a “ring route”, connections further south from Pukekohe, links to strategic corridors (SH1, SH22 and Pukekohe Expressway), and east west crossings across the rail line.

Figure 54 Pukekohe-Paerata short list options



Functional intent: Increase accessibility between areas east and west of the NIMT to facilitate north-south traffic linking the eastern and western growth areas, providing improved access to SH1 and separating local town centre traffic and through traffic.

Recommended options:

For the ring route:

- inner bypass around west of Pukekohe from Height Road in the north to Manukau Road in the south (AR25)
- inner bypass around south eastern side of Pukekohe from Manukau Road to Pukekohe East Road via Svenden Road and Anselmi Ridge (AR26a)
- north east bypass connecting to AR41, Cape Hill Road and Pukekohe Expressway in the north and Pukekohe East Road in the south (AR38a)
- arterial connecting Heights Road to SR4f, crossing SH22 and NIMT rail line (AR41)

Other connections:

- improvements on Pukekohe East Road/Mill Road, refined to four lanes from SH1 to Harrisville Road and safety improvements on the rest of corridor (AR30)
- connection from SH22 to the Pukekohe Expressway (AR24)

Safety improvements through upgrades on:

- Buckland Road (AR31)
- Logan Road (AR34)
- Harrisville Road (located within Waikato) (AR46)

Reasons for selection:

Ring route

For the ring route, the “inner” bypass options were recommended over the “outer” bypass options.

The ring route is a key component to unlocking the growth around Pukekohe but particularly to the development in the South. Without this alignment traffic from the Southern growth area and North Waikato needs to route through the town centre which is already heavily congested.

The ring route provides two new rail high capacity rail crossings on the urban fringe allowing economic activity to expand in Pukekohe. Without these alignments being protected future commercial economic activity will be difficult.

The ring route fully connects Pukekohe to the Pukekohe expressway. The expressway requires a connection to both the north and south of Pukekohe to be able to exploit the potential of reducing traffic on SH22.

In general, the inner options scored more favourably against the investment objectives as they integrated better with the land use, however significant capacity building on existing roads within the town centre would be required and this does not align with the investment objectives.

The modelling has shown that the ring route supports reduction of congestion in the town centre without requiring car centric widening in the existing commercial town centre. The recommended ring route options reduce the need for through trips to route through the town centre assisting with congestion reduction and the movement of freight and goods by providing a bypass.

Other connections

A connection from SH22 to the Pukekohe Expressway (AR24) is recommended for the network. This option scores moderately well against the investment objectives. It provides an important link for Paerata and other western growth areas (Kingseat, Clarks Beach) to access Pukekohe Expressway. It will also form an important link to the Paerata rail station. It has low potential for adverse environmental and construction impacts.

Safety improvements

Improvements on Pukekohe East Road/Mill Road (AR30) were originally proposed as widening for four lanes however environmental constraints (tuff crater) exist on this corridor. After further assessment it is recommended to increase capacity through widening to four lanes from Harrisville Road to Bombay interchange. Widening is required in this section as additional traffic was identified as coming from north Waikato (utilising Harrisville Road) travelling to SH1. Safety improvements are recommended on the rest of the Pukekohe East Road/Mill Road alignment (to AR38a) as well as Harrisville Road (AR46).

Safety upgrades to Buckland Road is also recommended (as opposed to upgrading to four lanes as originally proposed). Safety upgrades are assessed as sufficient to provide for increased traffic movements from north Waikato.

Upgrading Logan Road (AR34) was not assessed at the short list but was assessed at the long list (as an option for the ring route). However, through the transportation assessment and feedback at workshop three, Logan Road from ring route AR26a to Buckland Road is recommended for safety upgrades to improve conditions for increased traffic volumes.

East-west crossings

None of the east-west crossings are recommended for the network.

None of the above options are recommended to be taken forward to the preferred network. Although scoring moderately well against the investment objectives, these options are more suitable for active modes than upgrading to arterial standard. EW2 is an existing crossing over the rail corridor which will be upgraded as part of the recommended rail corridor widening (MT9B). EW4 and EW5 are existing roads within the town centre. With the implementation of the ring route, upgrading the roads within the town centre is not required.

Manawhenua feedback summary:

Manawhenua [REDACTED].

Public/stakeholder feedback summary:

From public consultation the following key themes were raised:

- general support for ring roads that service the wider Pukekohe area
- safety improvements and upgrades to existing roads were suggested for priority
- strong support was received for upgrading Pukekohe East/Mill Road to be a four-lane expressway, and providing good connections to new developments and residential areas
- support for creation of new corridors to improve congestion
- general support for improving accessibility east-west across the rail corridor, particularly between Pukekohe/Paerata and Drury South.

8.3.10 Safety Improvements

Through further transport assessment²⁶ a number of existing roads serving rural townships in the south were identified for safety improvements. Some of these were originally investigated as arterial upgrades through the options assessment as described in the above sections and are listed again below to have a complete list.

The roads identified for safety improvements are:

Eastern corridors:

- Waiuku Road – Pukekohe to Waiuku
- Alfriston Road/ Brookby Road – northern access to Clevedon from Takaanini
- Hunua Road – connecting Papakura to Hunua

Western corridors

- Waiuku Road – Pukekohe to Waiuku
- Alfriston Road/ Brookby Road – Northern access to Clevedon from Takaanini
- Hunua Road – connecting Papakura to Hunua.
- McKenzie Road – Access to Waiau Pa and Clarkes Beach
- Kingseat Road – Providing southern access to Kingseat from Patumāhoe
- SH22 Karaka Road from Drury to Paerata (already a NZTA project)
- Glenbrook Road, extending west from SH22
- Blackbridge Rd/ Walters Road
- Ostrich Road/Woodhouse Road – Connecting SH 22 to Patumāhoe

Southern corridors

- Pukekohe East Road
- Harrisville Road
- Logan Road
- Buckland Road

²⁶ See Appendix E Design and Cost Report

8.4. Manawhenua feedback

In November 2017, a dedicated forum for Supporting Growth was established with Manawhenua to provide regular updates and input to the SBC.

The key areas of interest within the SBC area for Manawhenua are:

- land – specific concerns about land loss, impacts and loss of natural landscape values
- impacts of development and earthworks on cultural landscape values
- development on floodplains and vegetation clearance
- guardianship over fresh water and recognition of connections with the water
- loss of ground recharge and additional risk of flooding from impervious development
- loss of fish passage and protection of aquatic habitats
- impacts of discharge from sediment and erosion
- dust, emissions and light pollution
- loss of nocturnal flight paths and loss of green space/views and aesthetics
- loss of biodiversity and animal and plant species
- loss of waahi tapu and taonga and access to these places.

Ngāti Tamaoho has recently reached a settlement with the Crown on its Treaty claim, and the Ngāti Tamaoho Claims Settlement Bill has had its second reading before Parliament. The following statutory acknowledge areas are identified within the SBC area:

- Coastal Marine Area (Manukau Harbour and its tributaries)
- Drury Consideration Area and Drury Creek Marginal Strip
- Hingaia Stream and its tributaries
- Oira Stream and its tributaries
- Otūwairoa Stream and its tributaries (includes Waipokapū Stream, Mangapū Stream, and Waihoehoe Stream)
- Ngakoroa Stream and its tributaries
- Waipokapū Stream Conservation Area
- Whangamaire Stream and its tributaries
- Whangapouri Creek and its tributaries

Seven Manawhenua (Ngai Tai ki Tāmaki, Ngāti Maru, Ngāti Tamaoho, Ngāti Te Ata Waiohū, Te Ahiwaru, Ngāti Whanaunga and Te Ākitai Waiohū) have been involved in this IBC. Ngati Te Ata, Ngati Tamaoho, Te Akitui and Ngai Tai ki Tamaki are collaborating on an MVA for the Southern Structure Plan. All seven Manawhenua were invited to participate in the options assessment process.

Manawhenua have attended a site visit, the South IBC workshops and two Cultural Specialists Hui (4th July 2018 and 8th October 2018).

Manawhenua are

[REDACTED]

[REDACTED]

1. [REDACTED]

[REDACTED]

2. [REDACTED]

[REDACTED]

[REDACTED]

8.5. What's changed since SG PBC?

The SG PBC identified a number of projects that will also be required to support the growth in the south. Since the SG PBC was developed, growth projections have changed by over 30%. Predictions now suggest there may be in excess of 50,000 additional households in the Southern growth area over the next 30 years. As a consequence, there are new projects identified as part of this IBC that were not included in the SG PBC.

8.5.1. Complementary projects

These have not been included in the assessment of options as they are already being progressed as parallel projects and are included in the 'Do Minimum' scenario. These projects include the following:

SH1 Papakura to Bombay corridor improvements

The improvements to the SH1 corridor between Papakura and Bombay are part of delivering the Supporting Growth Programme. The preferred option was to widen the motorway corridor to six lanes plus provision for bus shoulder running, delivered in stages to align with the growth in the Southern area. The first two stages upgrade the motorway between Papakura and Drury South, incorporating works to facilitate additional rail tracks at Drury, upgrading the Drury interchange and developing the Drury South interchange. The DBC was approved by the Transport Agency Board, and the Transport Agency is now progressing this project through the pre-implementation stages.

SH22 Safety improvements

The SG PBC identified the need for a safety upgrade of the SH22 corridor from the Drury interchange to Paerata. This section of state highway has demonstrated safety issues, issues relating to travel time at the eastern end (joining SH1) and is subject to increasing growth and urbanisation of surrounding land use in Drury. The interfaces between these drivers for change have been documented in a business case²⁷, which responds to short term pressures and considers longer term opportunities to support the future form of the corridor in the broader context of growth and the transition to an urban arterial road.

The Drury West corridor and surrounding rural area is in transition, with large scale residential development occurring or planned. Auckland Council is in the process of carrying out structure planning in respect of the Drury –Opāheke growth areas, which will confirm the scale and intensity of the residential and business zoned land.

Two lanes are proposed in each direction (four lanes total) with median, side barriers and widened shoulders. This provides for the future reconfiguration of the corridor between Oira Road and Drury interchange to accommodate a future urban environment, consistent with the expected growth and land use changes that will be brought about by the housing development initiatives in the area.

²⁷ " Single Stage Detailed Business Case, State Highway 22: SH1 (Drury Interchange) to Paerata", Safe Roads Alliance, October 2018

8.5.2. Additions to the recommended network since SG PBC?

The projects that are part of the recommended network in the IBC, that weren't included in the SG PBC are set out in Table 15.

Table 15: Summary of changes since SG PBC

Key area of investment	Project identified in IBC as part of the recommended network	New project compared to SG PBC?
Active modes	Pukekohe to Drury - walking/cycling connection	✓
Rail	Four rail tracks to Pukekohe (MT9B)	✓
Bus	FTN between Drury and Takaanini, via new arterial between Papakura industrial area, Fitzgerald and Ponga Road (AR10), Porchester Road, Popes Road and Rangī Road to Great South Road (connects to MT3C and MT4L) (MT4I)	✓
Bus	FTN via SH1 on bus shoulders and Orams Road. Drury to Manukau Station Bus stations along SH1, locations to be assessed during DBC stage (MT4L)	✓
Bus	FTN via Mahia Road and Roscommon (MT4K) - upgrade to include Special Vehicle Lanes	✓
Bus	FTN on Porchester Road (MT4I) - upgrade to include Special Vehicle Lanes	✓
Strategic road	SH1 – Drury South to Bombay (six laning)	✓
Strategic road	Providing eight lanes on SH1 between Manukau and Takaanini interchanges (SR1A).	✓
Local roads	Upgrading Mill Road/Pukekohe East Road between Harrisville Rd and the Bombay interchange to four lanes	✓
Safety Improvements	<ul style="list-style-type: none"> Waiuku Road – Pukekohe to Waiuku Alfriston Road/ Brookby Road – northern access to Clevedon from Takaanini Hunua Road – connecting Papakura to Hunua Waiuku Road – Pukekohe to Waiuku Alfriston Road/ Brookby Road – Northern access to Clevedon from Takaanini Hunua Road – connecting Papakura to Hunua. McKenzie Road – Access to Waiau Pa and Clarkes Beach Kingseat Road – Providing southern access to Kingseat from Patumāhoe SH22 Karaka Road from Drury to Paerata (already a NZTA project) Glenbrook Road, extending west from SH22 Blackbridge Rd/ Walters Road Ostrich Road/Woodhouse Road – Connecting SH 22 to Patumāhoe Mill Road/Pukekohe East Road between Harrisville Rd and Bombay interchange – upgrading eastern end of Mill Road. Buckland Road - Improve Buckland Road to access Tuakau/Pokeno[4] Harrisville Road Blackbridge Road from SH22 to Linwood Road and Hingaia Road via Walters Road 	✓

Assessment of the recommended network

The assessment of the recommended network is presented in the following subsections outlining:

- results alignment (incorporating the outcomes and value-for-money)
- outcomes delivered against the investment objectives
- value for money

8.5.3. Results alignment

The recommended network of improvements has been assessed using the Investment Assessment Framework (IAF). Alignment with the four GPS priorities (safety, access – thriving regions, access – liveable cities, and environment) is evaluated against four categories from low to very high.

Assessment profiles are developed according to activity class groupings. The recommended network of improvements for the Southern growth area is predominantly within the following activity classes:

- promotion of demand management programmes
- walking and cycling improvement activities
- public transport improvement activities
- road improvement activities.

Auckland is identified as a high-growth urban area. The Supporting Growth Programme has been specifically developed to respond to the access requirements of an additional 50,600 new dwellings in the Southern growth area and the significant gap identified between the current transport system and the identified need.

It has been assessed as having **VERY HIGH** results alignment against all four activity classes, as indicated by the elements in **Table 16**. The IAF requires cost benefit appraisal and results alignment evaluationⁱ against the GPS. The cost benefit appraisal has been assessed as **LOW**. The analysis to support this assessment is described in **Appendix D: Economics Assessment**.

Table 16: Results alignment

Activity class	Very High
Walking and cycling improvements	<p>Supports increasing the uptake of localised walking and cycling trips. Strategic active mode corridors provide high quality and safe corridors which will provide access to local town centres, schools and other local facilities.</p> <ul style="list-style-type: none"> • Addresses a critical walking and cycling link between Pukekohe and Drury. Supports agreed integrated land use and multi-modal plans in major metros – with transport interventions that support land use, i.e. public transport interchange next to high density residential and local centre, connected with safe, attractive walking and cycling facilities. • Addresses a significant gap in access to new housing in high growth urban areas – 55% of future Southern growth area residents will be within 3km of the rail corridor using safe, attractive, separated cycle facilities on the arterial network recommended.

Activity class	Very High
Public transport improvements	<ul style="list-style-type: none"> • Enables a substantial increase in access to social and economic opportunities for the significant growth planned in the south along key corridors such as SH1, the North Island Main Trunk line, and arterial roads providing connectivity to local centres • large numbers of people¹ along dedicated key corridors in Auckland, Wellington and Christchurch and enables transit-oriented development • Addresses significant gap in access to new housing in high growth urban areas. Currently there is very limited public transport services provided in the Southern growth area. • Supports agreed integrated land use, multi-modal plans and mode shift in major metros – public transport interchange provided adjacent to centres, high density residential activity and potential new school sites. Strong walk-up catchment. • Improves intermodal connectivity where this enhances the appropriate use of public transport. A walking and cycling network providing quality and attractive connection to stations. Good walk-up catchment to public transport station in proximity to high density residential and centres. • Makes best use of the public transport service operations and connection to other services – public transport service designed to provide connection to the rail corridor as well as providing for local trips. All services connect town centres, enabling good quality connection to other services and maximising walk-up demand and foot traffic to local retail.
Promotion of demand management programmes	<ul style="list-style-type: none"> • Targets opportunity to establish and promote active modes or public transport access to new housing in high growth urban areas. Facilities designed to directly connect schools, rail stations and the centres mean that potential users can be more specifically targeted.
Road improvements	<ul style="list-style-type: none"> • Addresses significant gap in access to new housing in high-growth urban areas – resilient, reliable transport system that connects new housing areas to jobs and social opportunities and includes viable alternatives to private vehicle travel. • Addresses significant gap in the congestion that affects business from efficiently accessing markets for movement of freight and service delivery during business hours

Table 17: Alignment with GPS

GPS 2018: Strategic direction			Supporting Growth – Southern Business Case outcomes								
Strategic Priority	Objective	Result	Significant improvements to the southern rail network	New train stations at Drury and Paerata	FTN on a number of strategic routes,	SH1 upgrade between Takaanini and SH20	New strategic arterial to support State Highway 1 (Mill Road)	New strategic arterial linking Pukekohe and Drury supporting SH22 (Pukekohe Expressway)	New multi modal arterial networks at Takaanini, Opāheke-Drury and Pukekohe-Paerata	Safety improvements on existing roads	Staged delivery and long term route protection
Safety	A land transport system that is a safe system, free of death and serious injury	Significant reductions in deaths and serious injuries									
		<ul style="list-style-type: none"> Renewing our strategic focus State highways and local roads are safer for everyone Cycling and walking is safer Effective enforcement activity to promote safe behaviour by road users Safer road use through appropriate education and promotion activities and regulatory changes 				✓	✓	✓	✓	✓	
Access	A land transport system that provides increased access for economic and social opportunities	Metropolitan and high growth urban areas are better connected and accessible	✓	✓	✓	✓	✓	✓	✓		
		Better access to markets, business areas, and supporting tourism	✓	✓	✓	✓	✓	✓	✓		
		Sustainable economic development of regional New Zealand is supported by safer and better transport connections	✓	✓	✓	✓	✓	✓	✓		
	A land transport system that enables transport choice and access	Increased mode shift from private vehicle trips to walking, cycling and public transport in our towns and cities	✓	✓	✓				✓		
		More transport choice (including for people with less or limited access to transport)	✓	✓	✓				✓		
	A land transport system that is resilient	Improved network resilience for the most critical connections			✓		✓	✓			
Environment	A land transport system that reduces the adverse	Reduce transport's negative effects on the global climate	✓	✓	✓				✓		

GPS 2018: Strategic direction			Supporting Growth – Southern Business Case outcomes								
Strategic Priority	Objective	Result	Significant improvements to the southern rail network	New train stations at Drury and Paerata	FTN on a number of strategic routes,	SH1 upgrade between Takaanini and SH20	New strategic arterial to support State Highway 1 (Mill Road)	New strategic arterial linking Pukekohe and Drury supporting SH22 (Pukekohe Expressway)	New multi modal arterial networks at Takaanini, Opāheke-Drury and Pukekohe-Paerata	Safety improvements on existing roads	Staged delivery and long term route protection
	effects on the climate, local environment and public health	Reduce transport's negative effects on the local environment and public health	✓	✓	✓				✓		
Value for money	A land transport system that delivers the right infrastructure and services to the right level at the best cost	Better informed investment decision-making <ul style="list-style-type: none"> • Delivery of the right infrastructure and services to the right level • Investments are at the best cost 									✓
		Improved returns <ul style="list-style-type: none"> • Improved returns from maintenance • Innovation and technology are used to increase the net benefits from land transport investment and use 									✓

8.5.4. Recommended network alignment

Assessment of the recommended network was undertaken against the investment objectives and is outlined in Figure 55.

Figure 55 Recommended network alignment with investment objectives

Option Group	Brief description of option as recommended	Alignment with Investment Objectives		
		A transport system that provides better access to economic and social opportunities within and outside of the Southern growth area	Maintain nationally important freight and servicing connections by providing efficient and resilient strategic connections through Southern growth area	Support the communities in the Southern growth area by improving connected, safe and attractive mode choices to key destinations.
Strategic Connections				
State Highway 1	Additional Lanes on SH1 -4 lanes each way from Manukau interchange to Takaanini interchange	H	H	L
	Express Transit via SH1 on bus shoulders and Orams Road. Drury to Manukau Station Bus stations along SH1, locations to be assessed during DBC stage	M	L	H
Bus mass transit	FTN on Great South Road from Drury central station to Manukau Bus Station	M	L	H
	FTN between Drury and Takaanini, via new arterial between Papakura industrial area, Fitzgerald and Ponga Road, Porchester Road, Popes Road and Rangi Road to Great South Road	M	L	H
	FTN between Drury and Puhinui, via SH1 bus shoulders, Mahia Road and Roscommon Road includes widening of Mahia Road and reconfiguring Roscommon Road median to accommodate peak direction peak period bus lanes	M	L	H
Mill Road	Mill Rd north alignments - Murphy's road – Thomas Road/Flat bush Rd to Chapel Rd– Te Irirangi Drive	H	M	L
	Mill Rd north alignments - Hilltop Road to Chapel Road /Te Irirangi Drive	H	M	L
	Mill Rd north alignments - Hollyford Drive to Te Irirangi Drive	H	M	L
	Mill Road central alignment - Redoubt Rd to Hunua Road. Combination of 80km/h rural arterial (limited access) and urban arterial	H	H	L
	Mill Road southern alignment - Extension of Mill Road from Hunua Road in the north to the proposed Drury South Interchange. Alignment moved slightly to the west. Alignment to be optimised in discussions with Auckland Council and their revision of draft structure planning in Drury and with developer plans. Includes interchange with SH1.	H	H	L
Pukekohe Expressway	From Drury South Interchange to the end of Cape Hill Road in Paerata includes the interchange with SH1	H	M	L
Rail	Four main trains tracks from Puhinui Station to Pukekohe Station	H	H	H
	Drury central – location to north of tributary of Hingaia Stream	H	L	H
	Drury west - located north east of the catholic school site	H	L	H
	Paerata – Sim Road south	H	L	H
Other connections	Link between SH22 and Pukekohe Expressway	H	M	L

Indicative Business Case for Route Protection

Option Group	Brief description of option as recommended	Alignment with Investment Objectives		
		A transport system that provides better access to economic and social opportunities within and outside of the Southern growth area	Maintain nationally important freight and servicing connections by providing efficient and resilient strategic connections through Southern growth area	Support the communities in the Southern growth area by improving connected, safe and attractive mode choices to key destinations.
Takaanini				
East-west	Arterial connection between Roscommon Road at Weymouth Roundabout and Mill Road (via Popes Road, Rangī Road, and Mahia Road), including grade separation of SH1 and NIMT Rail line.	M	M	H
	Grade separation of Taka Street and Walters Road	M	M	H
	Close level crossings at Spartan Road and Manuroa Road	M	M	H
Opāheke-Drury				
Arterials	Upgrade Opāheke Road and Ponga Road (Great South Road to Mill Road)	M	L	H
	New arterial between Papakura industrial area/ Mill Road, Waihoehoe Road to Great South Road	M	L	H
	Upgrade Waihoehoe Road (from Mill Road/Drury Hills Road to Fitzgerald (junction of the new north south road link to Papakura industrial areas)	M	L	H
	Upgrade and realign Bremner Road from new intersection with Jesmond Road to Great South Road roundabout	M	L	H
	Upgrade Jesmond Road from new connection with Bremner Road to SH22.	M	L	H
	Connection from Jesmond Road to the Pukekohe Expressway	M	L	H
	Upgrade of SH22 – four lanes from Drury township to Oira Road and safety improvements on the rest of SH22	M	L	H
Pukekohe-Paerata				
Arterials – Ring Route	Connection from SH22 to the Pukekohe Expressway – at Paerata (via Sim Road Connection)	M	L	H
	Inner bypass around west of Pukekohe from Height Road in the north to Manukau Road in the south (along Helvetia Rd, Kauri Rd, Jutland Rd, Ward St, and Nelson St)	M	L	H
	Inner bypass around south eastern side of Pukekohe from Manukau Road to Pukekohe East Road via Svenden Road and Anselmi Ridge	M	L	H
	North east bypass connecting to Pukekohe Strategic Arterial at Cape Hill Road in the north and Pukekohe East Road in the South	M	L	H
	Arterial connecting Heights Rd in the west to Pukekohe Strategic Arterial in the east, crossing SH22 and the NIMT rail line	M	L	H
Arterial - other	Improvements on Pukekohe East Road/Mill Road between proposed ring route and Bombay interchange. From AR38a to Harrisville Road this involves safety improvements with no widening. From Harrisville Rd to Bombay interchange widening to four lanes. (previously widening the whole corridor to four lanes)	M	L	H
Urbanisation Safety Response				
Safety upgrade - Drury	Upgrade Blackbridge Road from SH22 to Linwood Road and Hingaia Road, and across SH1 interchange to Great South Road	M	L	H
Safety upgrade – Pukekohe	Improve Buckland Road, extending from Manukau Road ends at AR25 (ring route)	M	L	H
Safety upgrade – Pukekohe	Upgrade Harrisville Road (note this is within Waikato)	M	L	H
Safety upgrade - Pukekohe	Upgrade Logan Road from AR26 to Buckland Road to improve safety. Sub set of existing AR34 option where it follows Logan Road	M	L	H
	(not assessed at the short list, but identified as an important safety upgrade through Workshop 3 and as a result of ring road upgrades)	M	L	H

8.5.5. Outcomes delivered

In order to test the different options being proposed a number of transport modelling scenarios were created. These scenarios were used to assist in the development of the recommended network, and are the source of the data used to highlight the outcomes being delivered. They allow the effectiveness of the overall recommended network to be reported against the investment objectives. The scenarios used in this reporting are briefly described in **Table 18**. Further information concerning the scenarios can be found in the transport assessment report in **Appendix C: Transport Assessment**.

These scenarios are used in the tables and graphics in this section to illustrate the benefits likely to be delivered.

Table 18: South IBC scenario description

Scenario	Description
2016	Base year model, utilises the transport network as per 2016 land use. This represents the current transport situation and is used as a base to measure against.
2046+ Do Minimum	Forecast year model, utilises the transport network as per 2016 and adds in current committed transport projects such as sections of Mill Road. This uses the 2046+ land use scenario for demand. This represents the transport situation if no further new investment was made and is used as a basis to compare the recommended network against.
2046+ Recommended network	Forecast year model that utilises the transport network as per 2016 and adds in current committed transport projects and has the recommended network added in. This uses the 2046+ land use scenario for demand. This represents the transport situation if the additional elements proposed are introduced and demonstrates the benefits delivered.

The recommended network has been assessed in line with the investment objectives and KPI's identified in the strategic case.

This assessment is presented in **Table 19**. The contribution to the GPS objectives is outlined in **Table 17**.

Outcomes delivered by the recommended network are summarised in **Table 19**.

Table 19: Outcomes delivered against key performance indicators

Investment objectives

Outcomes achieved against key performance indicators (KPIs)

Access to employment and key activity centres within a reasonable travel time

1. Jobs accessible within 30 mins by car and 45min by public transport.

With the recommended network, jobs accessible using public transport and car increases across the Southern growth area.

JOBS ACCESSIBLE WITHIN 45MIN BY PT

This bar chart displays the number of jobs accessible within 45 minutes by public transport for four locations: Takaanini, Opāheke, Drury West, and Pukekohe. The Y-axis represents the number of jobs, ranging from 0 to 200,000 in increments of 50,000. The X-axis lists the locations. For each location, three bars are shown: 2016 (dark blue), 2046+ Do Minimum (medium blue), and 2046+ Preferred Network (orange). The data shows a general increase in job accessibility across all locations, with the 2046+ Preferred Network scenario showing the highest values.

Location	2016	2046+ Do Minimum	2046+ Preferred Network
Takaanini	~25,000	~45,000	~60,000
Opāheke	~60,000	~5,000	~30,000
Drury West	~10,000	~5,000	~55,000
Pukekohe	~10,000	~15,000	~25,000

JOBS ACCESSIBLE WITHIN 30MIN BY CAR

This bar chart displays the number of jobs accessible within 30 minutes by car for four locations: Takaanini, Opāheke, Drury West, and Pukekohe. The Y-axis represents the number of jobs, ranging from 0 to 200,000 in increments of 50,000. The X-axis lists the locations. For each location, three bars are shown: 2016 (dark blue), 2046+ Do Minimum (medium blue), and 2046+ Preferred Network (orange). The data shows a general increase in job accessibility across all locations, with the 2046+ Preferred Network scenario showing the highest values.

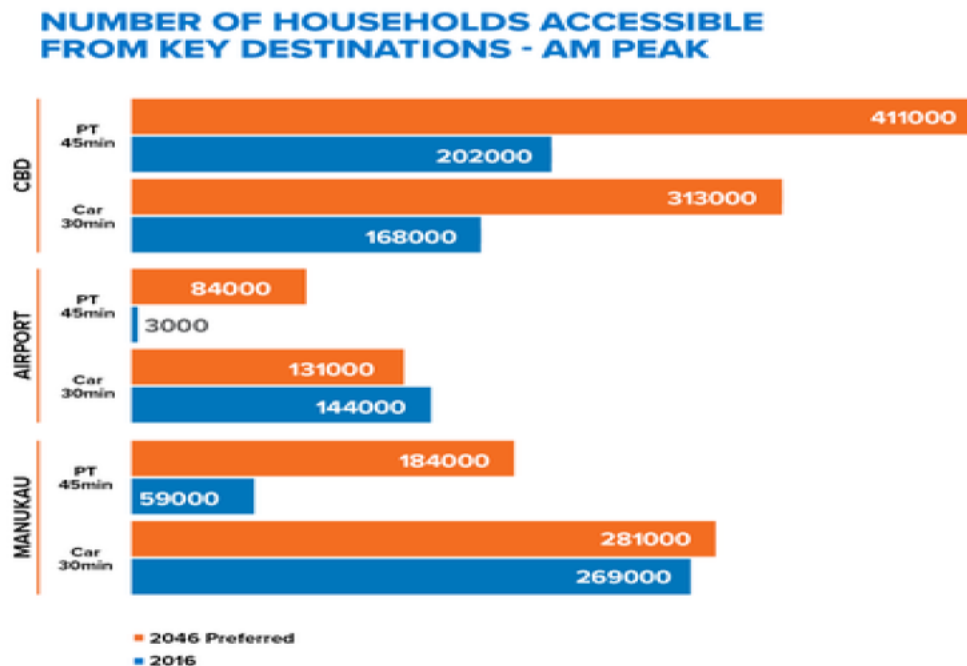
Location	2016	2046+ Do Minimum	2046+ Preferred Network
Takaanini	~160,000	~35,000	~190,000
Opāheke	~160,000	~40,000	~190,000
Drury West	~50,000	~45,000	~65,000
Pukekohe	~35,000	~45,000	~65,000

Investment
objectives

Outcomes achieved against key performance indicators (KPIs)

2. Households accessible within 30 mins by car and 45min by public transport from key destinations.

Access to households from key destinations is also greatly improved from current levels as demonstrated by the chart below – indicating improved access to labour from both public transport and private vehicles. It should be noted the number of households accessible to the airport is lower than CBD due to lower residential population & households around the airport compared to the CBD.



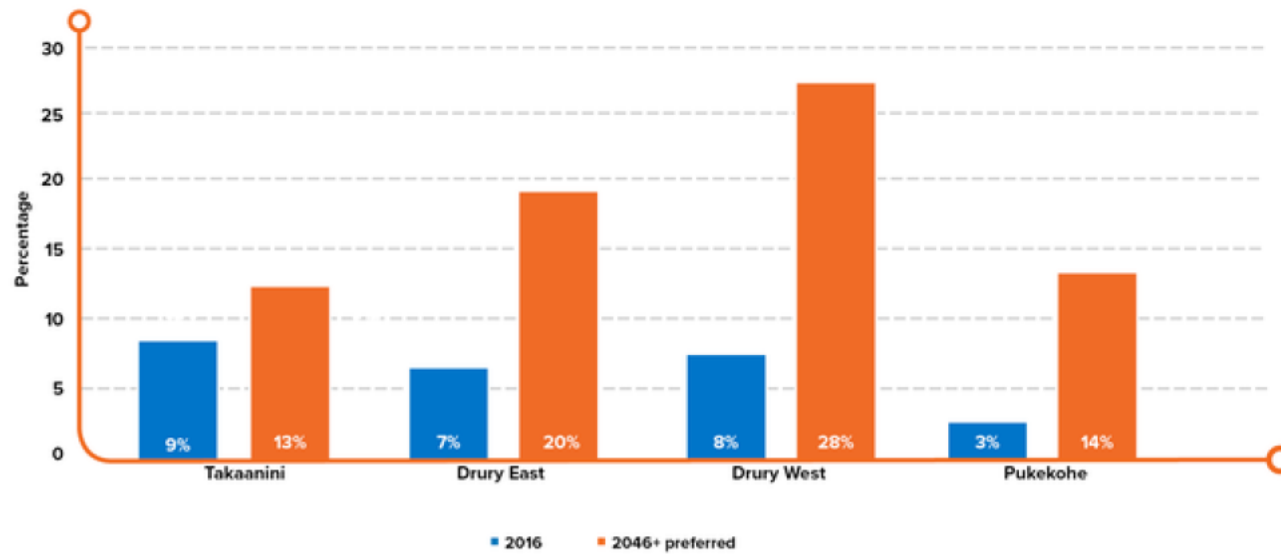
Investment objectives	Outcomes achieved against key performance indicators (KPIs)
	<p>3. Travel time from Southern growth area to key destinations</p> <p>The recommended network results in significant travel time savings from the do-minimum scenario between key destinations and the Southern growth areas. Travel time savings are expected by both public transport and private vehicles, with Drury and Pukekohe growth areas benefiting the most from travel time reductions.</p>
Support the development of liveable and connected communities with	<p>4. Mode share of vehicle and public transport</p> <p>The public transport usage in the south in the base year is comparatively low. The recommended network is enabling mode choice – i.e. opportunity to use public transport from the south. This is demonstrated with the greatly improved mode share split across the Southern growth area.</p>

Investment
objectives

Outcomes achieved against key performance indicators (KPIs)

attractive,
safe and
resilient
transport
choices.

PUBLIC TRANSPORT MODE-SPLIT PREFERRED NETWORK 2046+

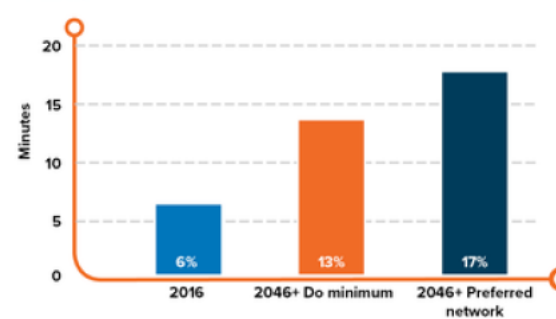


The recommended network also achieves significant increase in public transport mode share in the morning peak as shown by the figure below.

Investment
objectives

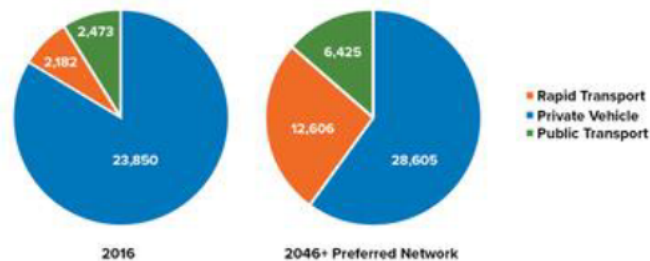
Outcomes achieved against key performance indicators (KPIs)

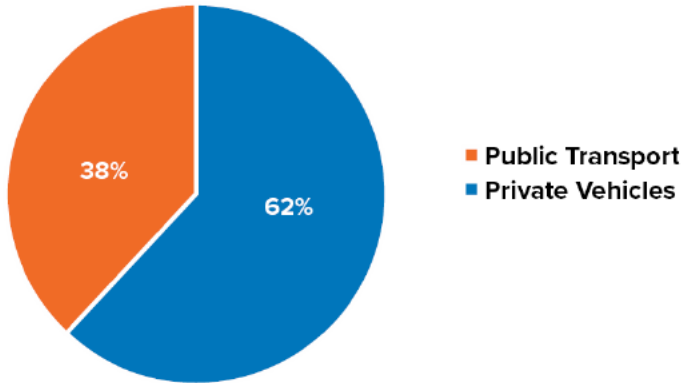
PUBLIC TRANSPORT MODE SPLIT - AM PEAK



The bus and rail work together to provide combined improved PT access to employment centres. This enables flexibility of mode choice –not just for rail but buses as well which contributes to improved public transport accessibility.

NORTHBOUND JOURNEY MODE SHARE AT TAKAANINI SCREENLINE -AM PEAK

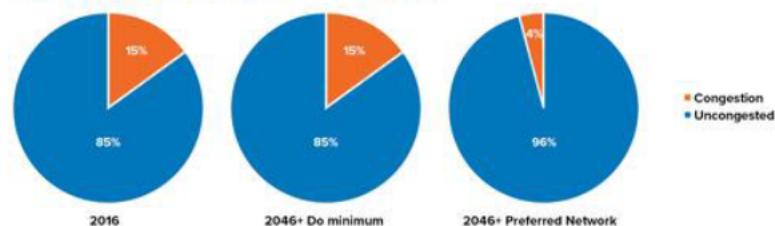


Investment objectives	Outcomes achieved against key performance indicators (KPIs)						
	<p>Using the same metrics as those applied in the PBC to measure the mode share a more direction comparison can be made. This gives an aggregate figure for the whole of the South. This shows a favourable figure for PT mode share in comparison to the PBC which attained 19% - 25%. As shown, the figure exceeds the 29% target, at around 38-40% of all trips by 2046+ being made via Rapid Transport and Private Vehicle. It should be noted that the metrics for this measure have been calculated separately from the others in this section.</p> <p style="text-align: center;">MODE SHARE OF PRIVATE VEHICLES AND PUBLIC TRANSPORT</p>  <table border="1"> <thead> <tr> <th>Mode</th> <th>Share (%)</th> </tr> </thead> <tbody> <tr> <td>Public Transport</td> <td>38%</td> </tr> <tr> <td>Private Vehicles</td> <td>62%</td> </tr> </tbody> </table> <p>5. Proportion of bus network (kilometres) spent in severe congestion (LoS E and F)</p> <p>The recommended bus network is expected to de-congest key bus corridors as highlighted by figures below – which is likely to encourage greater public transport uptake as a result of a more reliable and attractive mode choice.</p>	Mode	Share (%)	Public Transport	38%	Private Vehicles	62%
Mode	Share (%)						
Public Transport	38%						
Private Vehicles	62%						

Investment objectives

Outcomes achieved against key performance indicators (KPIs)

PROPORTION OF PKT BY BUS IN SEVERE CONGESTION (LOS EF) DURING THE MORNING PEAK



6. Patronage and capacity of the rail network

Passenger rail in the Southern growth area is expected to play a key role in enabling future liveable communities. The do-minimum proposal (all stop service starting from Pukekohe and Papakura Stations) results in an overall public transport patronage of 11,300 passengers during the morning peak (two hours). With limited capacity from running only two services, the lack of further improvements may result in severe overcrowding – up to two times the available seated capacity in the northbound direction, morning peak.

The proposed rail network upgrades include an additional express service to the Auckland central city, starting from Pukekohe, as well as increased capacity along all future services (either via nine car trains or increase frequency of services). The express service and additional carrying capacity may result in up to **15,780 passengers during the morning peak – 40% more than the do-minimum scenario**. Whilst there is a significant increase in the people carrying capacity with the recommended rail option, patronage demand from Papakura onwards still exceeds seated capacity by approximately 10% for the express service.

7. Proportion of households in the Southern growth area within reasonable walking and cycling distance from key RTN stations

The first mile connection is important for the success of public transport. Making the station accessible by active modes helps to further decongest urban centres as well provide healthier options. Additional rail stations adjacent future urban growth areas at Paerata, Drury West and Opāheke Drury is expected to significantly improve walk and cycle access to the RTN network.

Investment
objectives

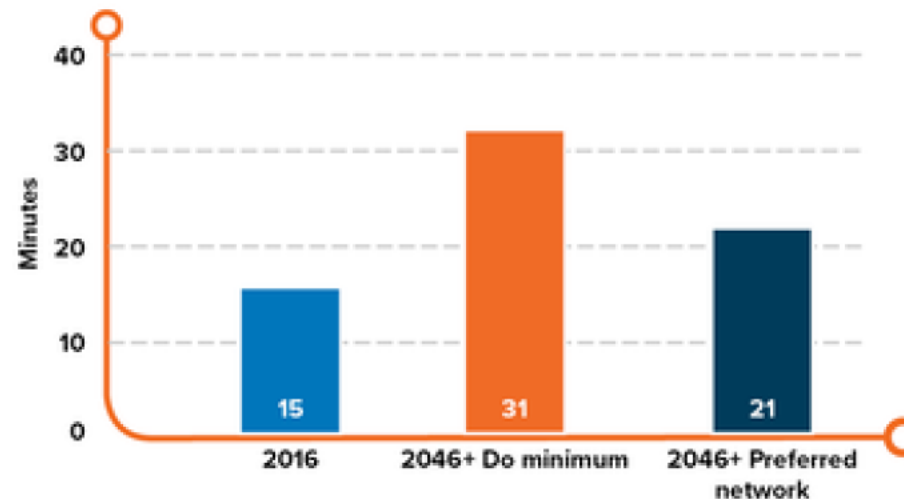
Outcomes achieved against key performance indicators (KPIs)

**Reliable
movement of
goods and
people on
the strategic
network**

8. Travel time by car between SH1 Bombay and Manukau during inter peak period

SH1 remains a critical route for commerce to be able to transport goods and services. During business hours improved travel times will allow business to operate more efficiently. A near 30% improvement in travel time is achieved in the recommended network on SH1. Critically this achieved without resorting to further wide scale widening of SH1 but through the improvement of other parts of the transport network.

**SH1 BOMBAY TO MANUKAU TRAVEL
TIME COMPARISON - INTER PEAK**



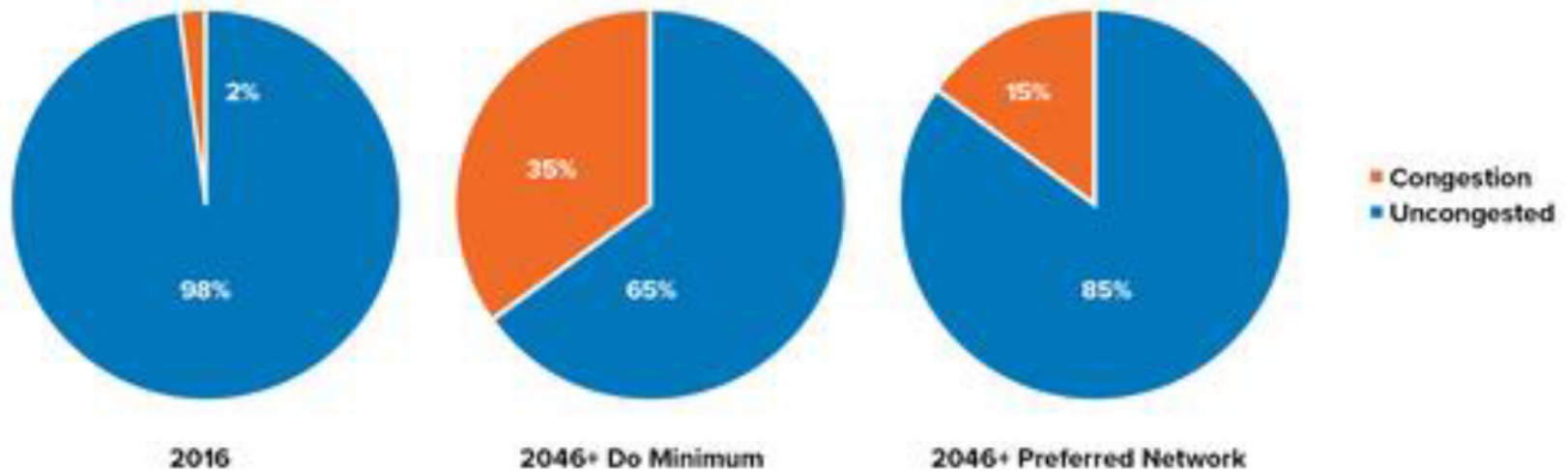
Investment
objectives

Outcomes achieved against key performance indicators (KPIs)

9. Proportion of HCV travel spent in congestion (LOS E & F) – inter peak.

Substantial growth in the south as well as in North Waikato is expected to result in all day congestion. Upgrades to SH1, Mill Road and public transport network alleviates some of this and reduces the proportion of freight travel spent in severe congestion – supporting future communities as well as Auckland's future growth.

PROPORTION OF HCV TRAVEL SPENT IN CONGESTION (LOS E & F) - INTER PEAK



Investment objectives

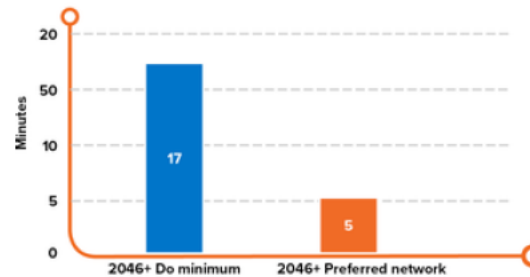
Outcomes achieved against key performance indicators (KPIs)

Effectiveness of transport system

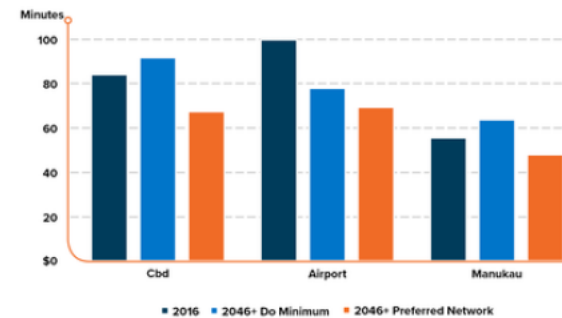
10. Change in average travel time per person – weighted by mode

The preferred network results in a more effective transport system, with reduced travel time per person (for both car and PT trips) than do minimum scenario. The overall travel time reliability is also expected to improve with the preferred network, with reduction of network delays & congestion. Network improvements result in car travel times improving by 33% and public transport travel times by 25% to Manukau.

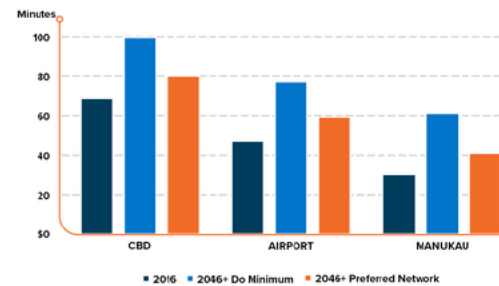
CHANGE IN TRAVEL TIME PER PERSON - RELATIVE TO 2016 AM PEAK AM



AVERAGE TRAVEL TIME (MINUTES) TO KEY DESTINATIONS BY PT - AM PEAK



AVERAGE TRAVEL TIME (MINUTES) TO KEY DESTINATIONS BY CAR - AM PEAK

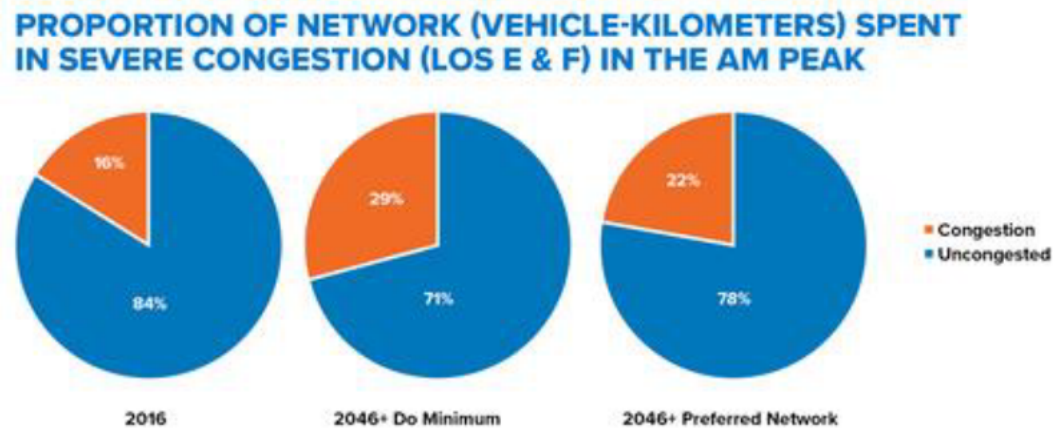


Investment
objectives

Outcomes achieved against key performance indicators (KPIs)

11. Network level of service - Proportion of overall network travel time spent in LOS E or F.

The preferred network improvements are also expected to reduce overall road network congestion as shown by the figure below.



8.5.6. Value for money

This section sets out the costs, benefits, and Benefit Cost Ratio (BCR) for the recommended network. Further detail on the economic analysis undertaken can be found in **Appendix D: Economic Case**. Further detail on the cost estimating approach can be found in **Appendix E: Engineering and Cost**.

Benefits

The economic benefits of the recommended network are summarised in **Table 20**.

Table 20: Economic benefits – recommended network

Item	Benefit (\$M) (NPV)
Travel Time – Car	4,180
Travel Time – PT	1,760
Vehicle Operating Costs – Car	600
Active Modes	370
Safety	380
WEBS	1,460
TOTAL NPV BENEFITS	8,750

Costs

The capital and operating costs of options were developed and considered through the option selection process. Individual project elements comprising the recommended network were priced to an IBE level. **Table 21** summarises the CAPEX costs of the recommended network.

Table 21: CAPEX costs – recommended network

Item	Cost (\$M)
Pre-implementation and design	■
Property	■
CAPEX	■
Base Estimate	■
Expected Estimate Contingency	■
95 th Percentile Estimate Contingency	■
Total Expected Estimate	■
Total 95th Percentile Estimate	■
Expected Estimate (NPV)	■

Operating costs were also calculated as outlined in **Appendix D: Economics**. OPEX costs have been provided in an NPV format as there are varying costs per year due to renewals that make it

difficult to provide a typical yearly figure. All NPV figures have been calculated over a 40-year period. Table 22 summarises the OPEX costs for the recommended package.

Table 22: OPEX costs – recommended network

Item	NPV Costs
Maintenance and Periodic	■
Stations	■
PT Operating Costs	■
TOTAL OPEX (NPV)	■

Benefit Cost Ratio (BCR)

The BCR was calculated using the net present value benefits and costs described above and totals shown in Table 23 below.

Table 23: Benefit cost ratio – recommended network

Item	Cost (\$M)
Total NPV benefits	■
Total NPV costs	■
Benefit Cost Ratio	1.5

This demonstrates a strong economic case to support the recommended network of improvements in the South.

8.5.7. Sensitivity tests

Sensitivity testing was undertaken to understand the impact of different assumptions on the recommended network BCR. The following variables were tested:

- **Discount rate:** A 6% discount rate was assumed for the base case (as per EEM), with 8% discount rate used for the pessimistic case and 4% for the optimistic.
- **Benefits progression:** The benefits from the modelled year (2046) were used and extrapolated for a 40-year evaluation period. The base case assumed 11% of 2046 benefits in 2026 and 82% in 2036, based on the populations' progression and the staging of the proposed projects. The pessimistic scenario assumes no benefits by 2026 and half of the final benefits at 2036. The optimistic scenario uses 30% for 2026 and 90% for 2036.
- **Wider economic benefits:** Base case assumes 20% WEB, with 10% in the pessimistic scenario and 30% for the optimistic.
- **Variance in costs:** Cost estimates have been generated using standardised cost rates. There is therefore an uncertainty about the real capital costs of the elements under evaluation and more detailed costings will need to be obtained for the DBC. Base case assumes P50 estimate and pessimistic case a P95 estimate. Optimistic scenario assumes a 20% reduction from value-engineering opportunities.
- **PT fare revenue:** Consideration of fare revenue is excluded from the base case; however, fare revenue is income for the PT service provider and therefore can be considered as a

reduction in PT operating costs. This is particularly important from the government perspective, when this type of incomes needs to be considered for estimating the government GCR (BCRg). The optimistic scenario considers the offset of fare revenue against PT operating cost.

- **Deferred time zero:** Base case considers 2024 to be time zero. The BCR was tested by postponing the time zero further into the future (2028 and 2034) for optimistic scenarios. There is no pessimistic scenario as an earlier start date is very unlikely.

The impact on the BCR of the sensitivity tests performed is shown in **Table 24**.

Table 24 Sensitivity test results on BCR

Sensitivity	Test 1	Test 2	Test 3
Discount rate	Base Case 6%	Discount Rate 4%	Discount Rate 8%
	1.5	1.2	1.9
Benefits progression	Base Case (2026 @ 11% and 2036 @ 82% of 2046)	Pessimistic (2026 @ 0% and 2036 @ 50% of 2046)	Optimistic (2026 @ 30% and 2036 @ 90% of 2046)
	1.5	1.4	1.7
Wider economic benefits	Base case (20%)	Pessimistic (10%)	Optimistic (30%)
	1.5	1.3	1.6
Cost estimate	P50 cost	P95 cost	20% value engineering
	1.5	1.2	1.8
PT fare revenue	Base case		BCR(g)
	1.5	-	1.5
Time zero	Base case 2024	Time zero 2028	Time zero 2034
	1.5	1.7	1.9

The sensitivity tests show a very stable BCR with only small variances occurring as a result of the change in the assumptions. In all pessimistic cases the BCR remains above 1.2 and in optimistic scenarios it could reach 1.9.

8.5.8. Risk analysis

A risk analysis has been undertaken to assess the BCR range of the recommended network, given that there are a number of assumptions made for both the costs and benefits at this stage. This risk analysis was undertaken based on a high-level risk-based Monte Carlo analysis approach. The Monte Carlo analysis for the cost and benefit risks were undertaken for the following inputs:

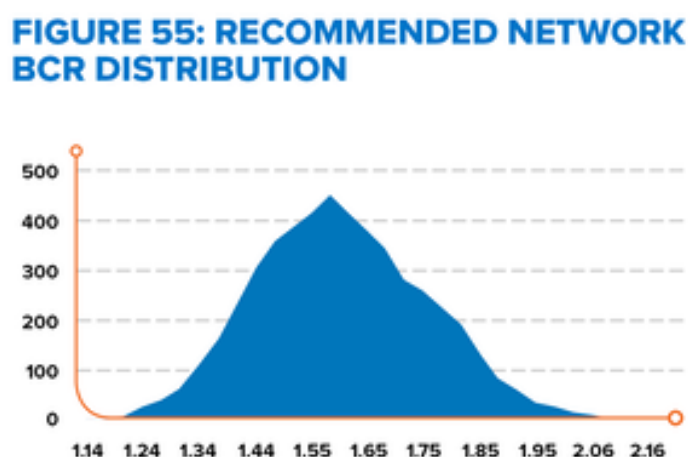
- **Cost risks** - A Base cost estimate (no contingency), P50 (expected estimate) and P95 costs were used as the low, base and high values respectively based on a triangular probability distribution.
- **Benefit progression** over a 40-year period based on outputs of a single modelled year. A major assumption around the benefit progression has been made for the economic analysis. The analysis assumed that the benefits in 2026 and 2036 will be 11% and 82% of the 2046

benefits respectively. A low of 0% (year 2026) and 50% (year 2036), and a high of 30% (year 2026) and 90% (year 2036) have been included in the Monte Carlo analysis based on a triangular probability distribution.

- Wider economic benefits have been assumed to be additional 20% of total benefits at this stage. A low of 10% and high of 30% have been assumed as inputs to the Monte Carlo analysis using a triangular probability distribution.
- Public transport reliability benefits have been assumed to be 30% of the travel time benefits in the interpeak and 50% for the AM and PM peaks. A low of 10% and high of 70% have been assumed as inputs to the Monte Carlo analysis using a triangular probability distribution.

Based on the Monte Carlo analysis with 5,000 iterations, a BCR distribution range was developed, as summarised in **Figure 56**.

Figure 56: Recommended network BCR distribution



Based on this risk analysis, the recommended network has a BCR range between 1.2 and 1.7 (based on 5th and 95th percentile Monte Carlo analysis output distribution profile).

11.1.1. Incremental economic assessment

Incremental benefit cost analysis is often undertaken for mutually exclusive options to identify optimal economic solutions. Mutually exclusive options occur when acceptance of one alternative or option precludes the acceptance of others. For example, when a new road is proposed and there is a choice between two different alignments, and the choice of one alignment precludes the choice of the other, the two options are mutually exclusive.

The options investigated for the Southern growth area are generally individual sections that collectively form a transport network; hence incremental BCR calculations have not been undertaken as these options are not mutually exclusive. There were some short list options with different mutually exclusive alignments; however the differences operationally were too minor to be distinguishable and hence option selection was made based on other considerations, such as construction complexity and extent of land acquisition required.

Scenario testing

The recommended network responds to the investment objectives, current policy context (particularly the GPS), and desired urban form outcomes, in a balanced and appropriate manner. Given the likely timeline for implementing many of the larger projects an early start in the first decade will be essential. Affordability of the package is acknowledged as the main barrier to approval and implementation. To that end, a series of alternative scenarios have been put forward which would require lower levels of investment and reduce the overall network cost. Although pure incremental benefit cost analysis has not been undertaken, economic benefits and costs have been calculated for each scenario and compared with the recommended network.

The expected estimate cost for the Southern growth area recommended network is \$[REDACTED]. The recommended network delivers **HIGH** results alignment and a BCR of **1.5**. Four scenarios have been tested to explore alternative investment scenarios for the Northern growth area which include:

1. **S1 Reduced arterials:** Upgrade existing arterials to urban collector road standard i.e. new arterial roads are downgraded to an urban collector road standard and implemented by developers.
2. **S2 Increased strategic capacity:** Fully segregated RTN is included on SH1 with additional stations and feeder services to maximise catchment.
3. **S3 Reduced walking and cycling provision:** Strategic active mode connections are removed from the recommended programme.
4. **S4 No motorway upgrades:** No additional ramps or motorway widening.

Table 25 summarises the approximate changes in network cost and anticipated effect on the network BCR for each of these alternative investment scenarios.

Table 25: Scenario evaluation summary

Scenario	Change in funding required (M)	Estimated BCR range	Estimated benefit change (PV \$M)	IO1: Access	IO2: Resilience	IO3: Mode Share	GPS: Access	GPS: Safety	GPS: Value for money	GPS: Environment
Recommended network		1.2 - 1.7								
Scenario 1: Reduced arterials		1.4 - 1.7		-	=	-	-	-	=	-
Scenario 2: Increase strategic capacity		1.2 - 1.5		+	+	+	+	=	-	+
Scenario 3: Reduced active		1.2 - 1.6		-	-	-	-	-	=	-
S4: No motorway capacity / access		1.0 - 1.4		-	-	+	-	=	-	=

Scenario 1 reduces provision of arterial roads, leading to a significant reduction in overall cost. Even when this could be seen as advantageous from the affordability perspective, this network has impacts on active modes, public transport and urban form. For the Southern growth region there are a number of arterials that perform a critical strategic function. These contain bridges over rail, watercourses and roads that are unlikely to be funded by developers in the form required to support their strategic nature.

Scenario 2 increases the overall cost of the network but provides additional benefits, mainly against the investment objectives. From a BCR perspective, the additional benefits are outweighed by additional cost leading to a negative economic result when compared with the recommended option.

Scenario 3 seems not convenient from the investment and GPS objectives given that it performs worse than the recommended network in all of them. On the other hand, it represents a decrease in costs from the recommended option, but the benefits lost are higher than the cost savings.

Scenario 4 shows a decrease in costs. These are largely outweighed by decreases to economic benefits and impacts on the investment objectives.

In weighing up all of the scenarios, the recommended network still provides the best balance of economic performance, affordability and delivery against the investment objectives and key outcomes sought for this investment.

While wholesale changes to the arterial road package or active mode network are considered to negatively affect the investment objectives and do not provide strong economic justification, there may be some instances where reduced cross-sections or consolidated corridors (i.e. in the case where an arterial road and strategic cycleway are parallel in close proximity) could have limited effects on the outcomes sought. These opportunities will be explored at a programme and individual project level in more detail during the DBC phase for each project. Further details can be reviewed in **Appendix M: Affordability**.

11.1.2. Programme Wide Affordability

Investment within the currently 10 year period has also been considered across the Programme and this is presented in the Programme Wide Summary note.

By way of a summary this initial analysis indicates that under a funding constrained approach, a number of elements in the recommended network will need to be delayed in their implementation. Under this approach, investment would still be targeted at early growth areas and achieving mode shift and good urban development outcomes, but the reduced investment will likely lead to more of a lag approach to these issues rather than aligned timing or lead approach. This will be addressed at the programme level and may impact on the staging of implementation of the recommended network.

PART C – IMPLEMENTATION

9. Implementation

This section sets out the steps required to implement the recommended network.

9.1. Implementation staging

The proposed implementation and route protection staging has been based on a principles-based approach informed by high level technical analysis. The drivers for the recommended staging are based on three key strategies:

- **Managing transport demand** – Early provision of public transport (including train stations) and walking and cycling infrastructure will enable mode shift of existing customers and encourage sustainable transport behaviours as future communities establish. This has the potential to defer the need for additional road capacity.
- **Flexibility to respond to changes** – A number of projects within the recommended network are highly dependent on land use changes and the timing of growth. The staging strategy is intended to provide flexibility to respond to these changes in an appropriate manner.
- **Shaping the future urban development** – provision of key infrastructure at the right time (such as train stations at Paerata and Drury) will drive development patterns within the FUZ allowing a quality urban form to be achieved.

The key themes for implementing the recommended network are:

- **Decade one:** Focus on the needs required to support the rapidly developing area by prioritising the rail network (including third main, stations, grade separation) and supporting bus and road network (including the Southern section of the Mill Road corridor to complete an alternative corridor to the Southern motorway).
- **Decade two:** Focus on the needs required to support the emerging development areas of Paerata and Pukekohe as well as provide additional public transport services and infrastructure along the existing arterial corridors. Further investigation is required in the DBC to determine whether route protection is required for these corridors, as there is an opportunity to deliver these in decade one if route protection is not required.
- **Decade three:** Additional capacity added to strategic network by completing the Mill Road corridor, implementing the fourth main line (subject to Wiri – Westfield fourth main being completed) and upgrading SH1 to provide eight lanes on SH1 between Manukau and Takaanini. The provision of bus shoulder running through this section is included within this project; however, as with the proposals for the arterial corridors, there is an opportunity to further investigate the physical works required to accommodate bus shoulder running on SH1 in the DBC. Bus shoulder running is already allowed for in the SH1: Papakura to Bombay project.

These themes have informed the route protection implementation strategy outlined in **Section 9.2.3**.

9.2. Route protection implementation

This section sets out the benefits of route protection, and the preliminary route protection and property strategies required to implement the recommended network.

9.2.1. Benefits of route protection

The next stage of implementation for the recommended network depends in part on the nature of the intervention identified and the organisation (be it infrastructure provider, land developer or Council) best placed to deliver it. A large (but not exclusive) element in the next stage of implementation will be to establish 'route protection' for the recommended options, as recommended in the PBC. The intent of route protection is to identify and appropriately protect the land corridor necessary to enable the future construction, operation and maintenance of the recommended network options.

There are a number of potential mechanisms for route protection, which are discussed further in **Appendix K: Route Protection Strategy**. The route protection process itself is proposed to take place over the next four years.

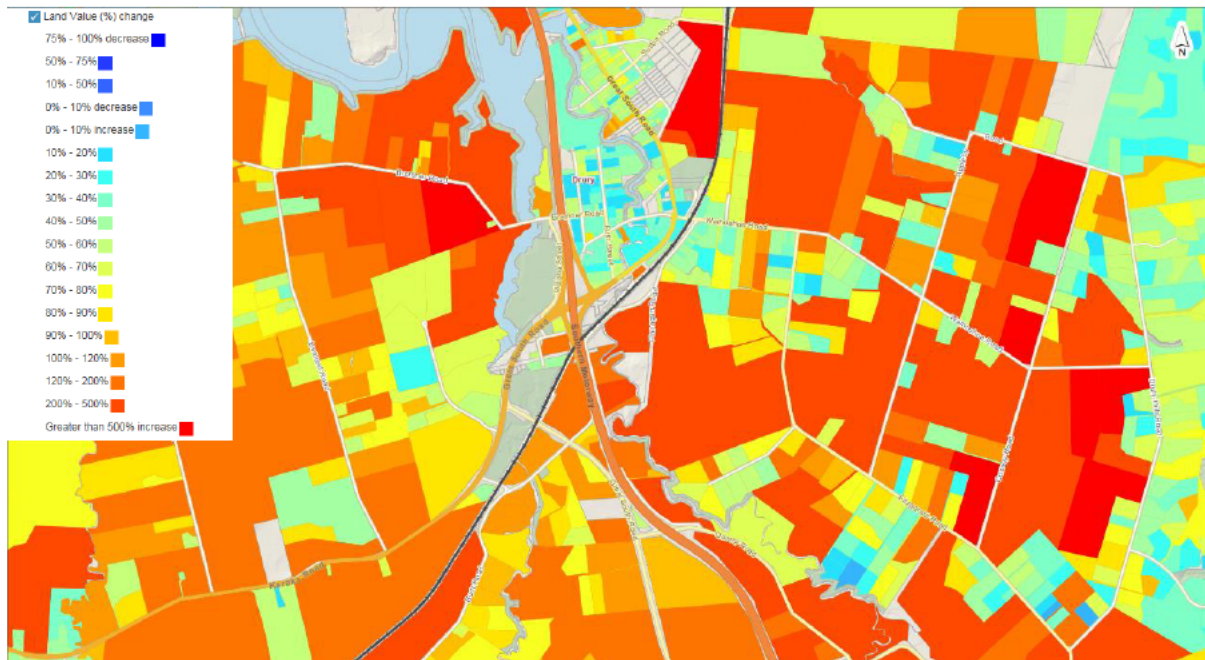
While the IBC has focused on the 'benefits and impacts' of the intervention itself, there are a number of benefits of this initial step of 'route protection'. In summary, the key benefits of route protection are that it:

- **Provides a mechanism for AT and the Transport Agency to plan for future financial investment while retaining flexibility** on the detailed development of the recommended future network, enabling it to respond to the pace, scale, and exact location of future urban growth.
- **Allows for major infrastructure to be implemented at the right time**, integrated with the urban development driving the desired transport and urban outcomes. This means that projects can be delivered to meet project objectives, with the transport network in mind and gives certainty that the transport system can be operated.
- **Reduces future cost risk.** If the corridor is protected by either early acquisition or notices of requirement (NOR), then there is an opportunity to reduce some land costs. This is in part associated with the increasing land values that occur as 'live zones' are implemented, and costs savings associated with the control or management that route protection can place on development on the land. **Figure 57** illustrates that the component costs of land as farm land, FUZ zone, and land once developed. In comparison with the other growth areas in Auckland, the South has the third highest land cost once developed; (but is the largest of the three areas), hence carries a high level of risk. Not only is there a step change in land value as a result of the change in zone, the value of the land on the periphery of the FUZ is also increasing at a significant rate as outlined in **Figure 58**. The designation of land as a FUZ, and the policy settings around allowing faster rates of development on the edges of the urban boundary may be increasing the expectation that the land outside the FUZ could potentially allow for greater levels of development activity, which is likely to lead to an increase in property values.

Figure 57: Mid-point land values in relation to the RUB (Sources: Auckland Council; CBRE)



Figure 58: Land value growth on the edge of the FUZ at Drury (2013 – 2017) (Source: Auckland Council GeoMaps)



- Provides certainty to landowners**, the existing community and future customers. This can minimise the risk of social disruption that can occur when infrastructure is retrospectively delivered within developing and established urban areas. It allows the Transport Agency and AT to release historic designations which are no longer required. It can also enable new and establishing communities to plan with more certainty (e.g. they can move to an area knowing there will be public transport travel options for them in the future).
- Enables developers to commit investment to progress infrastructure**. Where a transport network affects multiple parcels of land, the certainty of route protection enables developers to commit to provision of early 'contributing' infrastructure, with the expectation that subsequent stages of development will complete other elements of the network. For example, protecting an arterial road corridor gives certainty to existing adjacent developers with private plan changes lodged.

- **Supports Council's subsequent stages of land use planning and development and improves the quality of the urban environment** with more certainty, for example enabling Council to identify areas of higher density residential development in areas that will be serviced by rapid transport networks or other higher quality public transport options. For example, location of public transport interchanges adjacent to a proposed local centre and high-density residential activity.

Balanced against the above benefits, there are costs. These include increased expenditure on land (in circumstances where early purchase is required) and the risk of potential planning 'blight' (adverse social and economic impacts associated with the lack of development on a protected corridor).

Further discussion on specific route protection options is provided for below in **Section 9.2.3** and **Appendix K: Route Protection Strategy**. The Route Protection Strategy provides an overview of the overall route protection options (e.g. designation, plan change/zoning, structure planning or precinct plan provisions and landowner agreements). The Financial case (**Section 10**) provides further cost evaluation of the above benefits (and costs).

9.2.2. Priority for route protection

The benefits of route protection of transport corridors are not equal across the range of projects identified in the recommended network. The benefit of route protection for each corridor is dependent on a number of criteria including:

- **Financial benefits obtained from protection** – Route protection has the ability to reduce property and construction costs associated with a project. Benefits achieved are significant if protection is obtained prior to development of the area but erode over time for projects in the longer term.
- **Place shaping** – Certain projects have an increased influence on the surrounding urban environment. Protection of these project corridors is likely to enable land use and shape the urban form within an area.
- **Potential for value capture** – Some projects have significant value capture opportunities which are enabled through corridor protection and increased certainty for land use and development opportunities.

Based on the suite of projects identified within the South recommended network, **Table 26** sets out a high-level assessment on relative route protection priority across the network.

Table 26 Route protection priority

Decade	Project type	Financial saving	Place shaping	Value capture	Overall priority
Short term projects	Rail network improvements – third main line, stations, associated level crossing treatments and train stations	✓✓✓	✓✓✓		High
	Bus network improvements on existing and new arterials and SH1	✓✓✓	✓✓		Medium
	Road network – southern section of Mill Road & support emerging development areas of Drury	✓✓✓	✓✓		High
Medium term projects	Road network – southern section of Mill Road & support emerging development areas of Paerata and Pukekohe	✓✓	✓✓		Medium
Long term projects	Road network – complete Mill Road corridor, further widening on SH1	✓	✓		Medium
	Rail network improvements – fourth main line	✓✓✓	✓✓✓	✓✓✓	High

9.2.3. Preliminary route protection strategy

The key objective of the programme is to establish 'route protection' for the recommended option. Route protection identifies and appropriately protects the land corridors necessary to enable the future construction, operation and maintenance of the recommended network. Route protection is important as it provides property owners, businesses and the community with increased certainty regarding future infrastructure, so they can make informed decisions. The Route Protection Strategy (**Appendix K**) provides more detail in this respect. The route protection process itself will take place over the next four years. Elements not requiring route protection are also identified in this IBC.

The route protection for the recommended network has been prioritised based on:

- Interdependencies with other Auckland Transport, NZ Transport Agency and developer led projects.
- How urgent the project or projects are (i.e. whether they are more desirable in the short term or whether there is live zoned land required, whether there is a risk of build out of subject land or whether there is a high degree of local or central government interest).
- How complex the project or projects might be (i.e. significant potential adverse effects, numerous landowners affected and difficulty of acquiring land, the nature of landholdings, or a sensitive or difficult receiving environment).
- Whether opportunities are enhanced through packaging or strategically timing the route protection (e.g. earlier).

The proposed route protection packages, projects and prioritisation are presented in **Table 27**.

To a significant degree the proposed network is located within the RUB or areas that already have an urban zoning or have a FUZ. With reference to the Property Strategy, this means that the majority of land that will be subject to any NoR protection will be unlikely to generate a high demand for early purchase (i.e. substantially prior to the normal purchase timeframes leading up to project implementation).

The urban sites that might need to be acquired (e.g. grade separation within Takaanini, Mill Road corridor through Papakura and arterial projects in Pukekohe) predominantly have a stable urban zoning. Those sites will either be small residential lots or business zoned land. The former will be relatively affordable housing within the broader Auckland context and therefore likely to be held by the owner, unless the owner's lifestyle changes (for example, job changes, divorce, death etc) demand a sale.

If that occurs, and if the market for the dwelling is impacted by the NoR and the Requiring Authority has to purchase, the costs of that purchase, along with a net margin, can be expected to be met by market rental income, thus making the purchase at least cost neutral. In terms of business land it is expected that the desire of the owner to continue the underlying business activity, and yield profit from that, will mean they will not demand early purchase.

In terms of FUZ land (e.g. Takaanini, Drury East and West) owners have had over five years (the draft AUP was first notified for comment in March 2013) to adjust their expectations of urbanisation in this area. The FUZ zoning has provided a signal to those who hold property for less intense uses or those who prefer a rural amenity that they may wish to sell. In the case of Drury, this has led to substantial consolidation of land-holdings by large scale developers.

To the extent there are smaller property owners who remain, they will be aware of the development potential of their holdings, and likely accept that the highest and best use of the property (its assumed use for valuation purposes) is no longer rural. To this extent, while there may be some demand from landowners to acquire land affected by long-term NoR, these requests are likely to be limited.

Owners of FUZ land affected by NoR's are likely to either have aspirations to hold the land, to reap the benefit of price inflation from the further up-zoning and urbanisation of these areas. Alternatively, if there are some remaining land owners who have to sell as a result of lifestyle changes or do not want to hold land ear-marked for urbanisation and/or subject to an NoR, it is likely that there will be a ready developer market for either their land as a whole (including the relevant NoR).

On this basis, it is not anticipated there will be a high level of demand for early acquisition from the Southern FUZ area. To the extent there is a requirement for early acquisition, it is anticipated there will be a ready market for the Requiring Authorities on-sale of any surplus areas. Further, because significant areas within the Southern Area are owned by large private developers, we anticipate that there will be opportunities to mitigate any exposure to property prices through land owner agreements with experienced developers.

The Southern area contains some links between urban/FUZ zoned land which traverse areas that will remain rural. These include the Pukekohe Expressway and parts of the proposed Mill Road extension. As the Property Strategy identifies, it is likely that these components of the project will lead to a demand for earlier property purchase. This subset will be further limited to those sites which do not have productive rural uses (such as market gardens). It is anticipated those properties will generate less demand for early purchase due to the fact that there is an interim productive use which will produce a commercial return to the landowner up until the project is required. Of the remaining

rural land (generally life style blocks) there might be some demand for early purchase. This is most likely to occur in respect of the Pukekohe Expressway, which traverses the rural zone between the Drury and Pukekohe urban zones. The majority of the proposed Mill Road corridor traverses the RUB and to that extent abuts the urban environment. This means that the Mill Road corridor will also be less likely to bisect and therefore significantly adversely affect rural blocks.

To the extent to which there is a demand for early purchase of rurally zoned land, this zoning will mean that of the land ultimately required to be purchased it will likely have a lower cost per square metre, reflecting its rural zoning. To further control this cost, the SBC Property Strategy also recommends the implementation of a conservative Advanced Acquisition Policy which reflects the timing of the ultimate project works pursuant to the relevant NoRs. A thoughtful approach to early acquisition, reflecting longer project timing, can be coupled with a land-owner consultation process which emphasises situations where a NoR does not denote quick development, which could reduce the number of landowners seeking advance acquisition.

Table 27: Preliminary route protection priorities – recommended network

Package	Components	Mechanism	Requiring Authority	Protect	Recommendation/notes
S1 – Rail Upgrades and associated works	Four rail tracks from Wiri to Pukekohe	NoR (alteration to designation)	KiwiRail	High priority	<ul style="list-style-type: none"> Route protect for four tracks as high priority although it is likely that three tracks will be provided in the short term with four tracks provided in the medium to long term
	Drury Central Train Station	Landowner Agreement, Plan Change and/or NoR	Auckland Transport	High priority	<ul style="list-style-type: none"> Route protect as high priority
	Drury West Train Station	Landowner Agreement, Plan Change and/or NoR	Auckland Transport	High priority	<ul style="list-style-type: none"> Route protect as high priority
	Paerata Train Station	Landowner Agreement, Plan Change and/or NoR	Auckland Transport	High priority	<ul style="list-style-type: none"> Route protect as high priority
	Mahia – Popes – Rangi – new rail and SH1 crossing.	NoR if not within existing corridor	Auckland Transport	High Priority	Route protect as high priority. This component needs to be timed with the 3 rd tracking of the NIMT.
	New rail crossings at Taka Street and Walters Road	NoR if not within existing corridor	Auckland Transport	High Priority	Route protect as high priority. This component needs to be timed with the 3 rd tracking of the NIMT.
	Remove rail crossings at Manuroa Road and Spartan Road	NoR if not within existing corridor	Auckland Transport	High Priority	Route protect as high priority This component needs to be timed with the 3 rd tracking of the NIMT.
	Shared cycle and walking path adjacent to the NIMT	NoR if not within existing corridor	Auckland Transport	High priority	Route protect as high priority. Corridor should be adjacent to NIMT four track corridor.

Package	Components	Mechanism	Requiring Authority	Protect	Recommendation/notes
S2 – Bus Corridors on arterials	Great South Road FTN	NoR if not within existing corridor	Auckland Transport	High Priority	Need to confirm that the extent of works required can be contained within the existing corridor. If the corridor is identified as being insufficient, route protect as high priority.
	Porchester / Mahia / Roscommon FTN	NoR if not within existing corridor	Auckland Transport	High Priority	Need to confirm that the extent of works required can be contained within the existing corridor. If the corridor is identified as being insufficient, route protect as high priority.
S3 – SH1 Upgrades – Stage 1	SH1 Express Transit Network (bus corridors on SH1 shoulders)	NoR (alteration to designation) if not within existing corridor	NZ Transport Agency	High priority	Route protect as high priority. Opportunity to route protect from Drury to Takaanini as a priority with route protection north of Takaanini to be done in conjunction with route protection of eight laning of SH1 (low priority)
S4 - Mill Road	Mill Road Northern Section	NoR if not within existing corridor	Auckland Transport	High Priority	Route protect Mill Road Central and South as high priority.
	Mill Road Central Section	NoR	Auckland Transport	High Priority	For the Mill Road Northern Section, confirm:
	Mill Road Southern Section	Landowner Agreement, Plan Change and/or NoR	Auckland Transport	High Priority	<ul style="list-style-type: none"> Extent of works required in Mill Road Northern Section and conclude whether the existing corridor is sufficient. What is required to achieve substantial progress to giving effect to the existing designation prior to the existing designation lapsing?

Indicative Business Case for Route Protection

Package	Components	Mechanism	Requiring Authority	Protect	Recommendation/notes
S5 – Drury Network	Bremner Road FTN Arterial	Landowner Agreement, Plan Change and/or NoR	Auckland Transport	High Priority	Route protect as high priority
	Jesmond Road to SH22 FTN Arterial	Landowner Agreement, Plan Change and/or NoR	Auckland Transport	High Priority	Route protect as high priority
	Arterial upgrade of Opāheke Road and Ponga Road	Landowner Agreement, Plan Change and/or NoR	Auckland Transport	High Priority	Route protect as high priority
	SH22 upgrade Oira to SH1	Landowner Agreement, Plan Change and/or NoR	NZ Transport Agency	High Priority	Route protect as high priority
	Jesmond Road extension to Pukekohe Expressway	Landowner Agreement, Plan Change and/or NoR	Auckland Transport	High Priority	Route protect as high priority
	Arterial upgrade of Waihoehoe Road (from Mill Road to Fitzgerald)	Landowner Agreement, Plan Change and/or NoR	Auckland Transport	High Priority	Route protect as high priority
S6 – Pukekohe Expressway	The Pukekohe Expressway	NoR	NZ Transport Agency	High Priority	Route protect as high priority.
	Pukekohe Ring Road Stage 1 east – west arterial	Landowner Agreement, Plan Change and/or NoR	Auckland Transport	High Priority	Route protect as high priority.
	SH22 Karaka Road to Pukekohe Expressway	Landowner Agreement, Plan Change and/or NoR	Auckland Transport	High Priority	Route protect as high priority.
	Paerata extension to Pukekohe Expressway	Landowner Agreement, Plan Change and/or NoR	Auckland Transport	High Priority	Route protect as high priority.
S7 – Pukekohe Ring Road Stage 2	South East Section	NoR	Auckland Transport	Medium Priority	Route protect as medium priority. Implementation likely to be medium priority.
	West Section	NoR	Auckland Transport	Medium Priority	Route protect as medium priority.

Indicative Business Case for Route Protection

Package	Components	Mechanism	Requiring Authority	Protect	Recommendation/notes
S8 – Pukekohe East Road	Pukekohe East Arterial	NoR (alteration to designation) if not within existing corridor	Auckland Transport / Waikato District Council	Low priority	Route protect as low priority.
S9 - Takaanini	Popes Road connection to Mill Road	NoR	Auckland Transport	Medium priority	Route protect as medium priority. Alternatively, could form part of the Mill Road package.
	Croskery connection to Mill Road	NoR	Auckland Transport	Medium priority	Route protect as medium priority. Alternatively, could form part of the Mill Road package.
S10 – SH1 Upgrades – Stage 2	Providing 8 lanes on SH1 between Manukau and Takaanini interchanges.	NoR (alteration to designation) if not within existing corridor	NZ Transport Agency	Low Priority	Route protect as low priority.
S11 - Urbanisation safety improvements	Upgrade Buckland Road	TBC	Auckland Transport / Waikato District Council	Low priority	Not part of Supporting Growth programme.
	Upgrade Harrisville Road.	TBC	Auckland Transport / Waikato District Council	Low priority	Not part of Supporting Growth programme
	Upgrade Blackbridge Road from SH22 to Linwood Road and Hingaia Road	TBC	Auckland Transport	Low priority	Not part of Supporting Growth programme
	Upgrade eastern end of Pukekohe East Road	TBC	Auckland Transport / Waikato District Council	Low priority	Not part of Supporting Growth programme
	SH22 Paerata to Oira Road	TBC	NZ Transport Agency	High priority	Not part of Supporting Growth programme

10. Financial case

This section outlines the financial case for both route protection and implementation of the recommended network. The financial case and the cost and property liability aspect (given the route protection focus) is based on several uncertainties as long-term route protection has not previously been widely undertaken.

The types of uncertainty include:

- the level of third party (developer) funding, as this requires negotiation, agreement and must be undertaken on a case by case basis
- change in quantum of property acquisition required
- cost of property is higher or lower than assumed
- growth is quicker or slower than assumed.

This uncertainty should be considered by funders when allocating property funding.

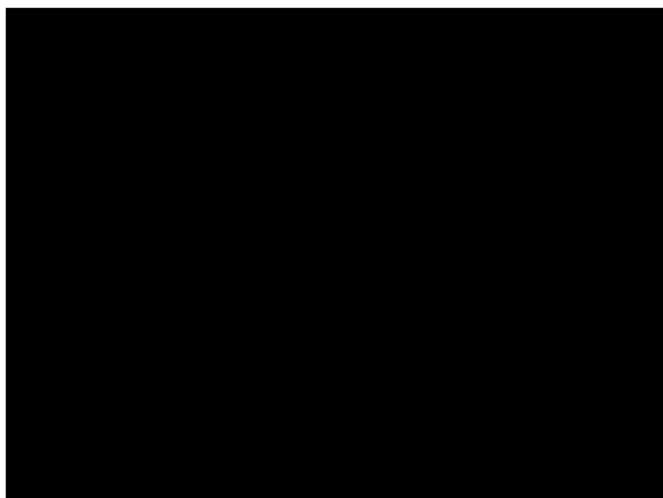
10.1. Route protection

10.1.1. Costs for route protection

The cost and funding required for this next step can be described as follows:

- **DBC and NOR costs** – Route protection using NOR is the recommended mechanism for a number of projects identified in the recommended network. The IBC seeks to progress the recommended network to the next phase including further investigation (DBC) and NOR. For the Southern growth area, the DBC and NOR phase for the recommended network is expected to cost approximately [REDACTED].
- **Expected property costs from NOR** – Once a designation is in place, history suggests a proportion of the total property required will be purchased by the requiring authority (outlined in Appendix J: Property Strategy). Like the capital costs, there is potential for some property cost savings through delivery of projects via developers in the area and this has been taken into account. It is assumed that most property transactions will take place in the three years prior to implementation, with approximately 20% of transactions taking place prior to this period. Based on this timing assumption, the estimated property liability for the recommended network is summarised in **Figure 59**. Given the nature of property prices, there is a high degree of uncertainty as to property cost in the future. As such, property liability has been reported using low (0% escalation) and high (10% per annum) property price escalation. For the Southern growth area, the estimated property liability as a result of NORs is between [REDACTED] distributed over two decades.

Figure 59: Estimated property liability over the next two decades



10.2. Early route protection return on investment

A methodology has been developed to quantify the return on investment associated with early route protection. The approach assumes that there are property and construction cost savings arising from route protection now, rather than in the future, given the long-term nature of some of the interventions in the recommended network.

The following cost savings are expected with early route protection:

- Construction cost savings are expected due to the potential savings associated with lower mitigation requirements (and therefore costs) for projects consented in an undeveloped environment rather than in an existing developed area.
- Property costs are expected to be lower if a designation is in place which will control subsequent land development (e.g. while some land value increases may be experienced, a factor has been applied for the 'avoidance' of development cost risk).

The following assumptions have been made:

- early route protection would be in place by 2020 for projects recommended to be implemented after 2028 (Stages 2 and 3)
- late route protection would be in place by 2027 for projects recommended to be implemented after 2028 (Stages 2 and 3)
- a 10% saving in construction cost
- a 7% saving in property cost through early route protection
- escalation in property price has not yet been accounted for
- escalation in property price has been tested at 0% (low) and 10% (high) per annum
- early route protection requires acquisition of property early (20% within 2020-2028).

This approach to assessing early route protection returns applies to projects recommended for implementation after 2028 (Stages 2 and 3) only – as for Stage 1 projects require route protection immediately for implementation, and are therefore likely to result in limited savings.

Early route protection for medium to long term projects will require between [REDACTED] additional upfront investment when compared to late route protection (with 6% discount rate). This additional upfront investment could however result in future costs savings between [REDACTED] (resulting from reduced property costs, development costs, construction costs, etc). While this assessment will need to be confirmed with specific details and timing, this high-level analysis shows a return of investment of more than two for early route protection of the medium to long term projects.

Financial benefits of route protection have to be considered against other benefits and management issues outlined in Section 9.1.

10.3. Recommended network cashflow

10.3.1. Capital costs for recommended network

A cost estimate for each project element of the recommended network has been developed and is reported in detail in Appendix E: Engineering and Cost Report.

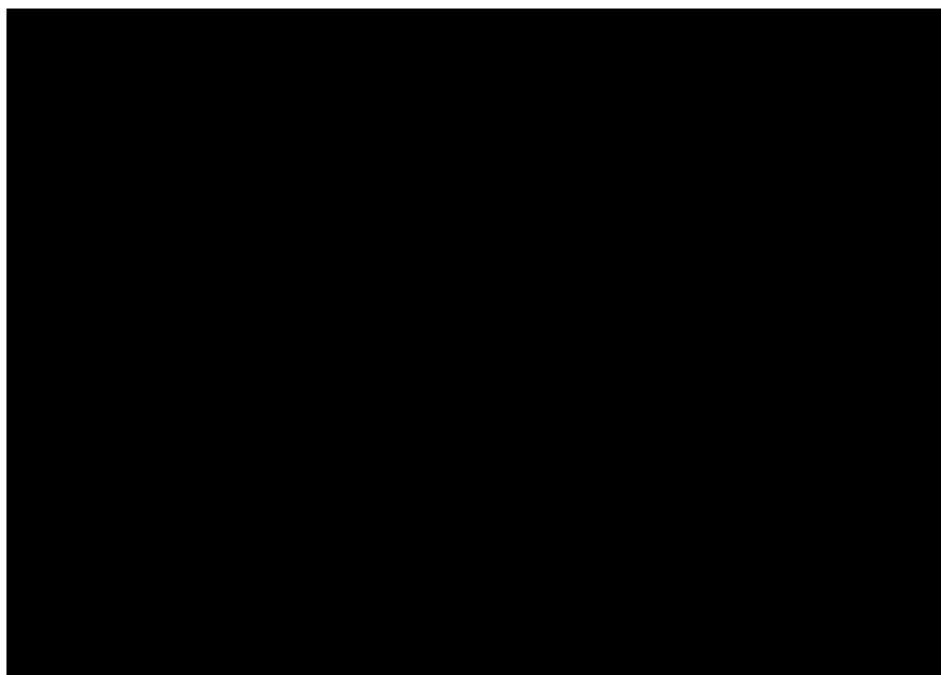
For the recommended South network, total costs are shown in Table 28. This table also includes recognition of possible cost savings through optimisation and developers to reduce the direct costs to project owners. This is discussed further in this chapter.

Table 28 Recommended cost estimation

Estimated costs	\$ Billions
Capital costs (P50)	[REDACTED]
Property and land costs	[REDACTED]
TOTAL COST	[REDACTED]
Less	
Developer delivered	[REDACTED]
Cost optimisation	[REDACTED]
TOTAL estimated AT/Agency cost	[REDACTED]

These costs have been developed at a high level to inform the option assessment process. As each project develops, costs will be developed in more detail and value engineering applied to identify the most cost-effective ways to deliver the identified project outcomes. Costs are still subject to peer review and may change.

Based on current estimates, the anticipated cash flows for the investment proposal over its intended life span are summarised in **Figure 60**. Costs will be spread over multiple decades, based on the staging outlined in **Section 9.1** and will be shared between the Transport Agency, AT and other parties according to the assumptions summarised in **Section 10.4**. Discussions with KiwiRail are ongoing on their future plans and the recommendations made by Te Tupu Ngātahi for the rail corridor. The rail component shown in decade three in **Figure 60** is the fourth track electrification rail upgrade only.

Figure 60 Cashflow for recommended network by decade and project type

10.3.2. Ongoing operations and maintenance costs

Operations and maintenance costs for the recommended network have been identified in **Table 29**:

Table 29 Operation and maintenance costs

Item	Annual costs (\$M)
Bus operating costs	■
Rail operating costs	■
Stations' operation and maintenance costs	■
General infrastructure maintenance (annual) and bridge maintenance (after 10 years)	■
Resurfacing (every 10 years)	■

10.4. Cost by area

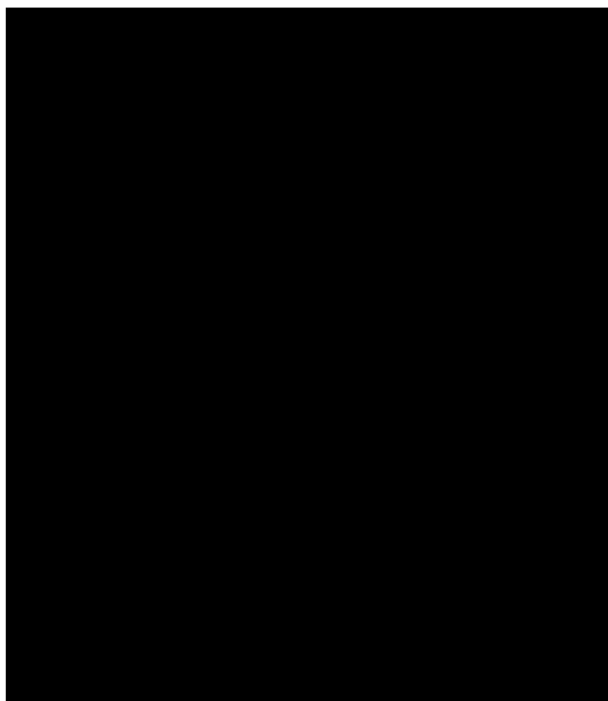
The recommended network includes projects serving existing communities in the SBC area and the future urban area. Cost for the recommended network has been split based on if a project primarily serves the existing area or the FUZ area.

The following assumptions have been made:

- All infrastructure geographically within the growth area has been assigned to the FUZ area.
- All infrastructure geographically within the existing area has been assigned to the existing area.
- A project which responds to an existing problem but is made worse by the growth area has cost split evenly between the existing and FUZ areas.

Distribution of Capex costs (P50) by decade between the existing area and FUZ area are outlined in **Figure 61** below.

Figure 61 CAPEX (P50) split by area



10.4.1. Cost comparison with SG PBC

The emerging recommended network is considerably greater than the cost of the SG PBC recommended network of [REDACTED]. As a result, a comparison of the estimates for each phase has been carried out and is included in the Engineering and Cost Report attached as Appendix E1.

The primary findings of this review were that the two estimates vary significantly due to:

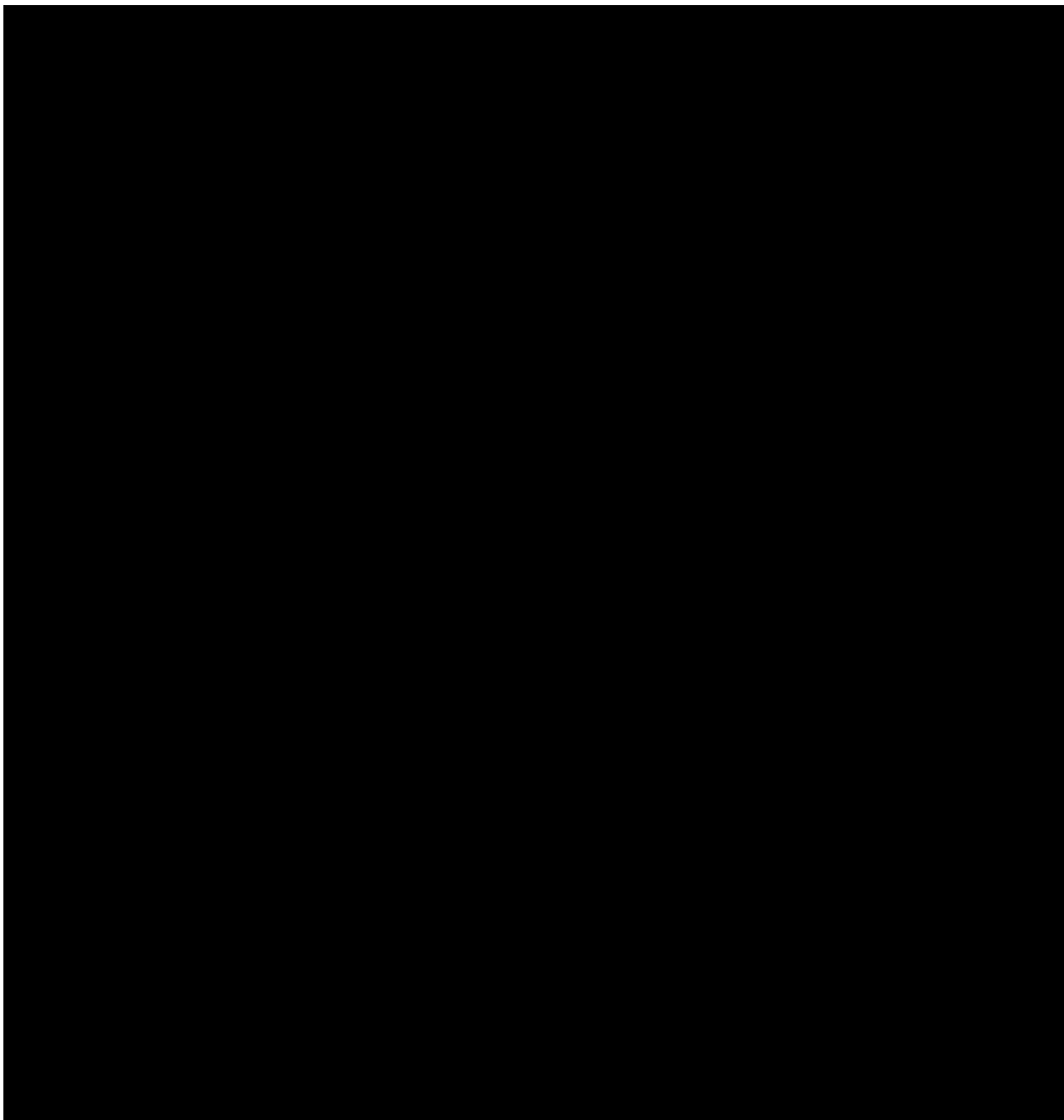
- addition of new projects that weren't identified in the SG PBC
- greater detail and cost provision for specific items within projects identified and retained from the SG PBC
- variation in property rates used in the SG PBC and this IBC

New projects

There are a number of additional projects included in the recommended network as outlined in **Table 30**. One significant project is Mill Road stage one which was not included in the SG PBC programme, and alone represents [REDACTED] of this difference.

Rail provides a key contribution to the outcome, and to respond to the increase in growth since the SG PBC, four tracks will need to be extended further to Pukekohe. This results in increased construction associated with the rail line, but will also require a number of bridge reconstructions and significant land acquisition along the length of the rail corridor.

Table 30: Cost of new projects identified in IBC (IBE level)



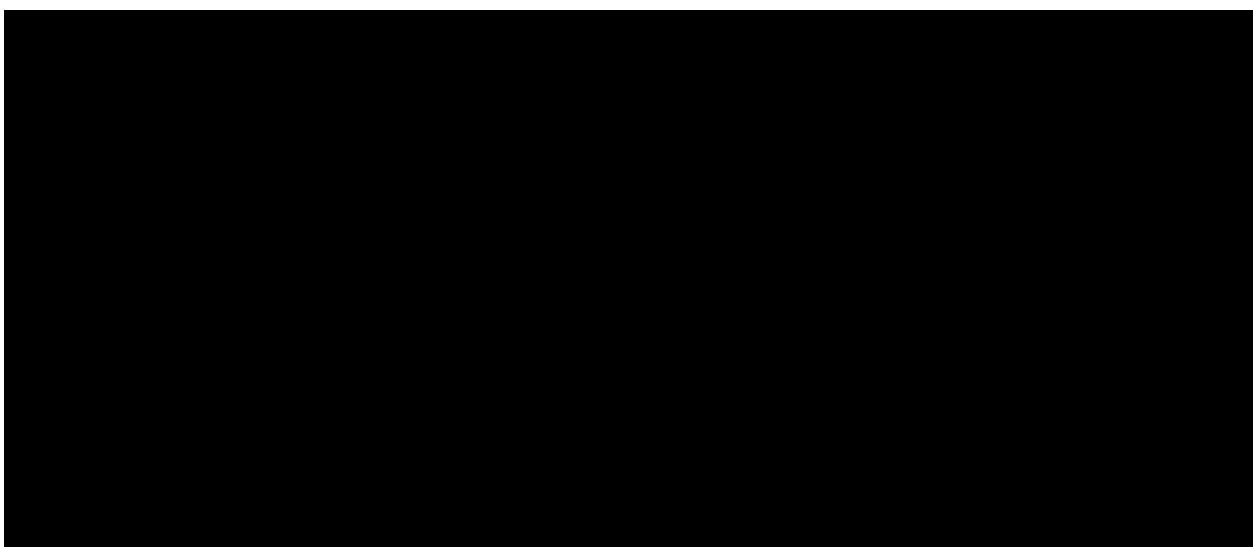
Change in scope and scale of existing projects

The current IBE estimates include more detail and greater cost provision for specific items, particularly for earthworks, structures and traffic management than previously identified. While individual rates vary across these specific items, the review found that broader rates were comparable, with the exception of rates used for property acquisition (outlined below).

The current estimate also includes additional land requirement. This has been identified as a result of developing the cross sections for each corridor, making allowances for stormwater treatment in greenfields sites, as well as the likelihood that full purchase of some properties may be required in urban areas.

There are a number of existing roads that are proposed for upgrading. Generally, these existing roads are 20m in width. To accommodate four lanes (either bus lanes, managed lanes or general traffic lanes), it is assumed that a width of 25m would be required, resulting in the need for additional land acquisition of 5m along the length. As these are in predominantly developed brownfield locations, the cost of this land is significant and reflects an increase in property cost over the SG PBC. The extent of land acquisition will be confirmed during the development of the recommended option, where opportunities to reduce the land requirement can be considered. **Table 31** outlines the projects with significant cost differentials between SG PBC and IBC due to scope.

Table 31: Comparison of SG PBC projects with current cost estimates where there are significant differences (IBE level)



Change in project scope and property rates are the primary drivers of cost differences between SG PBC and IBC. For example since the PBC further assessment of the alignment of Mill Road corridor stage two and three has led to a different and longer alignment being included in the IBC. There is also escalation of cost through higher property costs.

Increases in Drury South interchange costs include bridge structure cost as well as Infracore design and cost development.

Similarly, Pukekohe ring route has a higher cost due to increased scope. The ring route fully connects Pukekohe to the Pukekohe expressway. The expressway requires a connection to both the north and south of Pukekohe to be able to exploit the potential of reducing traffic on SH22. As a result of this [REDACTED] of expenditure on the ring route can be directly attributed to support Pukekohe Expressway. [REDACTED] supports the growth in the south improving connections to strategic road network avoiding further upgrade of Manukau Road [REDACTED] is the western connection supporting further expansion in the west, this will help to mitigate impacts from any further development further West as well as allow the farming business to be supported by appropriate connections to their markets.

Property rates

The significant change in property costs also affects other projects. The SG PBC included [REDACTED] for property acquisition, compared to [REDACTED] in this IBC. Whilst the additional detailing in the design identifies the additional area of land needed to implement the proposed alignments and cross sections, there is a significant difference in the rates applied in the SG PBC to that of this IBC. These

rate differences carry through into the overall increase in property costs. The rates adopted for the IBC are reflective of limited sales data and the Auckland Unitary Plan zoning, and will need further revisions as more information becomes available.

Table 32: Comparison of property rates used

Zone	SG PBC	IBC
Urban	\$129 - \$630	\$725 - \$1,450
Rural	\$34	\$189 - \$754
Industrial	N/A	\$1,160 - \$1,450

10.4.2. Opportunity for cost savings and third-party funding

Two key areas have been identified that could reduce the financial burden on Auckland Transport and the National Land Transport Fund, namely funding from developers, and a reduction in the scope of physical works through value engineering.

There is potential for some new arterial roads to be partially funded by property developers as part of a package of development delivered agreements. AT usually require new developments to construct identified roads to a collector road standard, based on an agreed cross-section, which is then vested in public ownership. In some locations, it may be feasible for AT to require project delivery (including property costs) equivalent to a collector road standard and then be responsible only for the additional cost associated with property and construction of an arterial standard cross section. This assumption has been applied to the arterial roads to support new development areas.

There is also potential to reduce the scope of physical works where projects are upgrading existing corridors. The potential saving is that the majority of the project can be completed within the current corridor widths with only a small amount of localised land acquisition required.

The third opportunity for roads through greenfield areas (such as Pukekohe Expressway) is to adopt a narrower cross section than the proposed 32 metres. This will enable savings in physical works and potential land acquisition. Alternatively, a lag approach could be used where developer's terra form ahead of road deliver. These mechanisms will be explored in greater detail during DBC.

These approaches would greatly reduce implementation costs for AT and the Transport Agency. When determining the opportunity for a reduction in capital cost over the full South recommended network, the following assumptions have been made:

- capital costs of new arterial roads could be reduced through agreements with developers
- existing arterials have limited potential for development contributions and have been excluded
- capital costs for rapid transit could receive developer contributions around stations - this is estimated to account for approx. 1% of cost over the overall cost of the project
- active mode and strategic road corridors are fully paid for by the Transport Agency/AT.


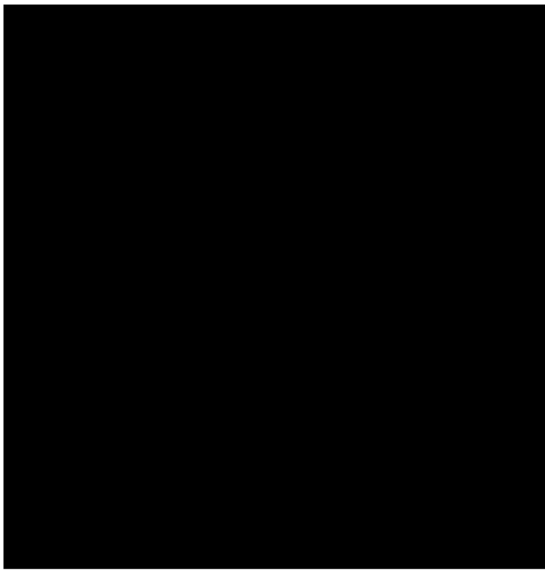
Analysing the recommended network for these opportunities indicates a limited reduction in required funding for each decade. The required funding  outlined in **Figure 62** taking account of proposed implementation timeframes and reductions in cost from developer related savings.

Figure 62 Capital cost by decade with savings



10.5. Funding apportionment

Based on an established Framework Agreement the split of project delivery, operations and maintenance cost responsibilities between investment partners are as follows:

The Transport Agency will be responsible for:

- State Highway improvements including bus priority along SH1
- motorway interchanges and ramps
- strategic cycle facilities.

AT will be responsible for:

- arterial road construction
- improvements to existing arterial roads
- improvements to existing collector roads
- public transport interchanges (park and ride; kiss and ride)
- public transport services.

KiwiRail will be responsible for:

- rail infrastructure excluding stations

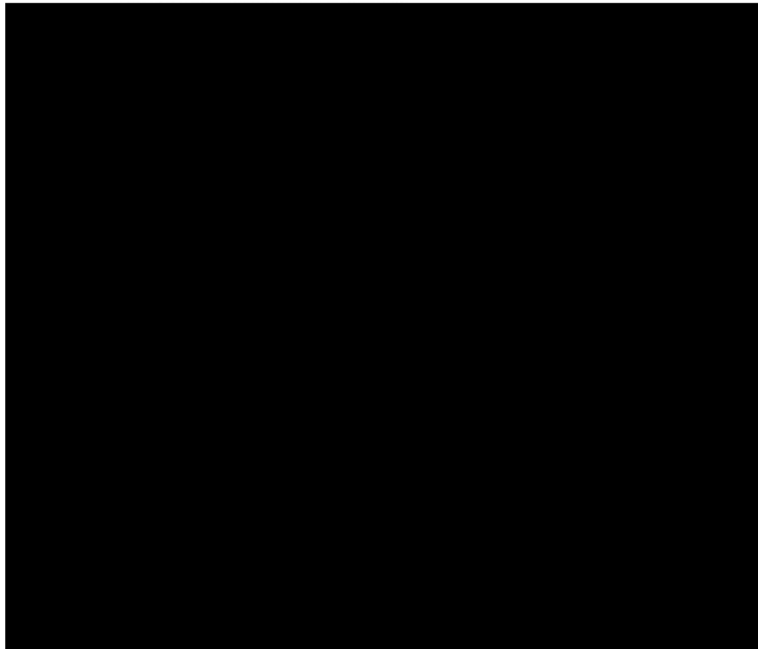
A funding assistance rate (FAR) of 51% has been assumed where Auckland Transport is responsible.

Total funding requirements for the recommended network based on current estimates and the opportunities identified in **Section 10.4.2**, along with the anticipated cost distribution for the investment proposal over its intended life span is summarised in **Figure 63**. Funding requirements are split out for developer contributions, potential for cost optimisation during the DBC phase, projects serving existing areas and remaining funding required from AT or the NLTF.

Given the majority of this funding is required outside the current RLTP period, there is time to further consider the funding requirements and how they could be addressed. The funding requirement for the

Southern growth area is substantial and consideration of alternative funding sources is recommended.

Figure 63 Funding breakdown for the South recommended network



10.6. Funding Shortfall

10.6.1. RLTP allocation for the first decade

ATAP includes the following commentary with respect to the Te Tupu Ngātahi programme of works:

- \$1.3 billion is allocated to greenfield transport infrastructure over the next 10 years. Over this period, around 32,000 new homes housing up to 100,000 people are expected to be built in Auckland's major greenfield growth areas. Significant investment in transport infrastructure will be needed to enable this growth, encourage the use of public transport and active modes, and to provide a reasonable level of service to future residents.
- \$507 million allocated to Mill Road corridor - Delivery of the proposed Mill Road Corridor (phase 1) providing additional strategic North-South corridor for South Auckland, connecting Manukau and Drury to the east of the Southern Motorway.
- \$412 million allocated to SH1 South, Papakura to Bombay - Improvements to SH1 between Papakura and Drury as a first decade priority.
- \$73 million allocated to SH22 Drury to Pukekohe Safe System Enhancement - Improvements along SH22 corridor from the SH1 Drury interchange to the posted speed limit change (to 70km/hr) at Paerata township to reduce the high severity crashes along this corridor.
- \$232 million allocated to Pukekohe to Papakura electrification - Electrification of the main rail line between Papakura and Pukekohe including traction power supply.

This level of funding will not be able to fully support all projects required in major greenfield growth areas. Additional developer funding, an expansion of the Crown Infrastructure Partners programme or the creation of other new funding mechanisms will therefore be required.

The IBC has considered these options at a high level, as potential funding options. As many of these measures require regional alignment and policy but also are very project specific in their application, as outlined in the Programme Wide Management Case, the DBC phase will consider these alternative funding sources in more detail, firstly at the programme wide level and then at the project specific level. This will provide greater clarity on the potential scale and use of alternative funding mechanisms.

For certain projects, such as new arterial roads through FUZ areas, the benefits of investing to enable and support growth are largely enjoyed by landowners in the form of higher value land, as it can be urbanised. Further analysis, on a case-by-case basis, will be required to agree the funding arrangements for these investments between landowners and AT. As the RLTP allocates funding for a 10-year period, costs for the recommended programme within the first decade are shown in **Table 33** with commentary on likely funding sources provided.

Table 33 Funding required in first decade

Project	Funding source	Funding required (P50)	Indicative Transport Agency portion	Indicative AT portion
Project development (DBC and route protection)				
Potential property costs for medium- and longer-term projects				
Mahia/ Roscommon FTN				
Mill Road Corridor				
Safety improvements				
Opāheke Rd				
Takaanini -Croskery Rd Upgrade				
Jesmond/ Bremner/ Waihoehoe				
Drury West Southern Connection				
Popes Rd/ Rangi Viaduct Arterial				
Taka St Grade Sep				
Walters Rd Grade Sep				
Drury Sth Interchange				
Cycling - Active Modes				

Total			
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Part of RLTP for the first decade includes [REDACTED], a funding gap of [REDACTED] (P50) exists within the 10-year period. There is also [REDACTED] currently unfunded in the RLTP specifically for the Southern Growth Area, which leaves an overall unallocated gap of [REDACTED]

It should be noted that there is separate provision for rail infrastructure required to enable regional / express services:

- Third track between Wiri to Papakura, and Papakura to Pukekohe
- Fourth main line between Westfield to Wiri, and Wiri to Papakura

The remaining RLTP elements included in the short-term recommended network (PT improvements, strategic road upgrades, and active mode projects) do not easily support use of Crown infrastructure funding or seed funding arrangements as they are generally serving the existing and live zoned areas within the South – but does play a part in supporting future urban growth.

This expenditure is currently not included in the RLTP or NLTP. Much of this funding shortfall is because the RLTP is focussed on a ten-year horizon, not the 30-year horizon that this business case has considered. There is therefore time to further consider the funding gap and how this could be closed. That said the funding shortfall is substantial and consideration of alternative funding sources is recommended.

10.7. Alternative funding sources

The level of funding currently available through traditional mechanisms is unlikely to be able to fully support the implementation of the recommended network in terms of both the scale and timing. To deliver the recommended network in the timeframes proposed, alternative funding mechanisms may be needed.

Several different investigations are currently underway by Treasury, Ministry of Transport (MoT) and others to consider possible mechanisms for the future funding of infrastructure. These include consideration of:

- value capture
- targeted rates
- road user pricing
- special purpose vehicles through Crown Infrastructure Partners²⁸
- Urban Development Authorities²⁹

²⁸ <https://www.beehive.govt.nz/release/crown-company-invest-600m-housing-infrastructure>

²⁹ <https://www.mbie.govt.nz/info-services/housing-and-property/consultation/urban-development-authorities/b-takeholder-guide-infrastructure-and-utility-providers.pdf>

11. Management case

The management case assesses whether a proposal is deliverable and demonstrates that an appropriate project management regime is in place for the next phases of the project. It tests the project planning, governance structure, risk management, communications and stakeholder management, benefits realisation and assurance. As well as this IBC specific management plan a Programme Wide Management Case has been developed that sets out the management of the programme elements of this programme of works.

11.1. Programme governance

Te Tupu Ngātahi has been formed to deliver route protection for the recommended network in Auckland's greenfield growth areas. AT and the Transport Agency identified that an Alliance model would deliver these outcomes in an agile, efficient manner within a five-year programme.

Governance in the context of Te Tupu Ngātahi is defined as the processes by which the Alliance is directed, controlled and held to account. The Governance Management Plan has been developed and guides the implementation of a shared understanding of why, how and who is responsible for the effective governance of Te Tupu Ngātahi.

The Governance Management Plan describes the key roles and responsibilities of each of these groups.

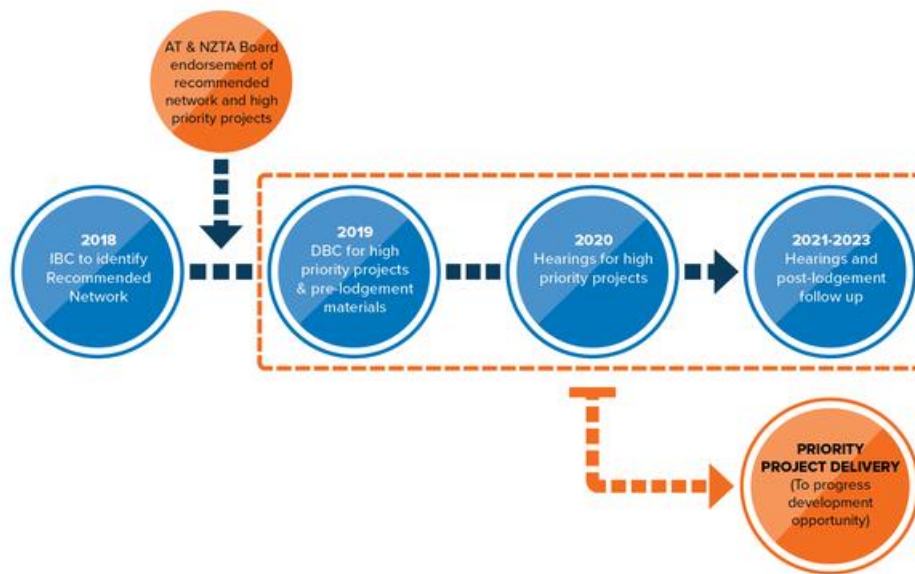


11.2. Programme

The anticipated programme to secure designations for the high priority projects is outlined in **Figure 64**

Figure 64 Programme outline for route protection

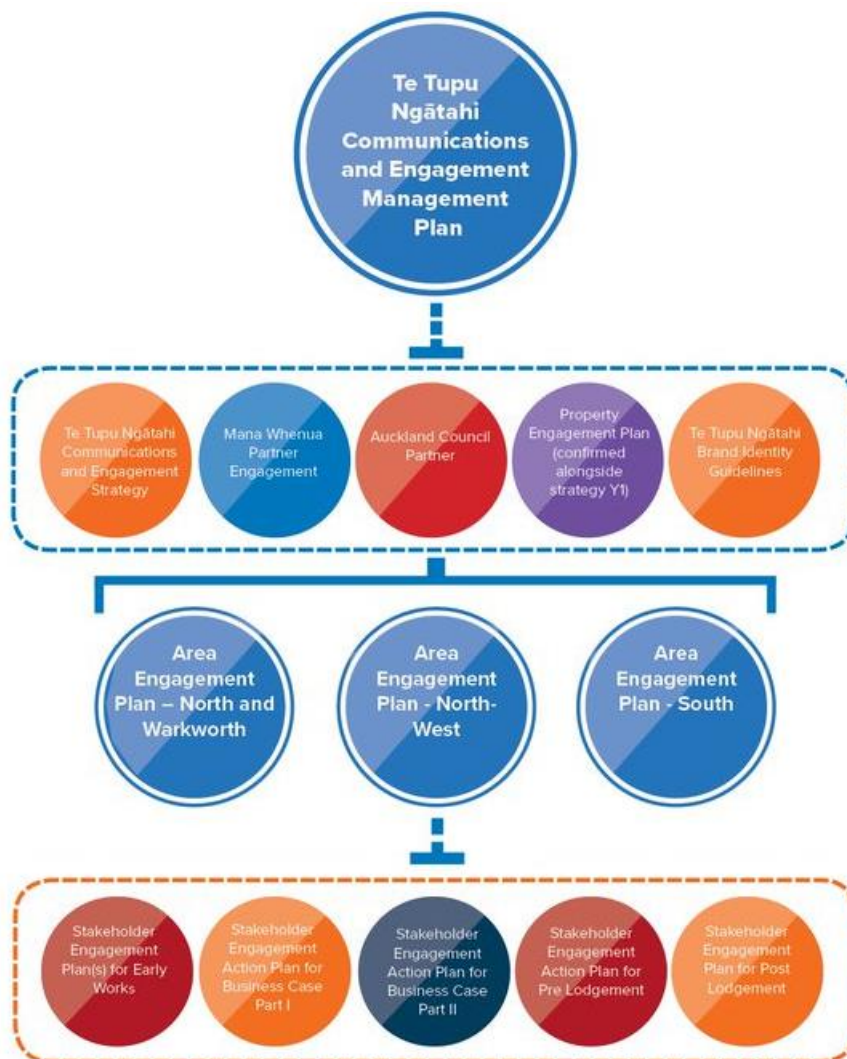
OUTLINE PROGRAM FOR ROUTE PROTECTION



11.3. Communications and Engagement Management Plan

Te Tupu Ngātahi has an extensive and ongoing engagement and consultation programme. A Communications and Engagement Management Plan has been prepared which outlines operational policies and procedures for managing the communication, stakeholder and community engagement work stream within Te Tupu Ngātahi. The Management plan has informed the Communications and Engagement Strategy and a variety of plans to inform engagement with partners, key stakeholders, the community and the public at-large. The relationship of these documents is shown in **Figure 65**.

Figure 65: Communications and engagement framework



Engagement and communication in the DBCs (following AT and the Transport Agency's Board endorsement of the recommended network), will build on engagement undertaken during the IBC phase. The focus of the next stage of engagement is to:

- Provide information on staging and timing for the recommended network, including specific opportunities for sequencing of urban development (e.g. Integration of utilities within the future transport corridor).
- Understand specific issues/ environmental effects and opportunities in the recommended network to identify potential design responses and environmental management/mitigation (for consenting documentation).
- Undertake targeted engagement with landowners/developers regarding potential effects and opportunities for shared alignment in outcomes (e.g. through developer agreements).
- Inform stakeholders about the processes for route protection and provide an opportunity for participation (i.e. submission on the NOR or similar as appropriate).
- Identify opportunities for AT and the Transport Agency property acquisition processes (e.g. willing buyer/willing seller arrangements).

- Inform decision makers on the risks and opportunities of potential route protection mechanisms for the recommended network.

Alongside the community and Local Boards, the key stakeholder groups that will be influential in the design process are presented in Table 34

Table 34 Key stakeholders to be engaged through the programme lifecycle

Development/Freight/Road Users Group	Active Modes/Public Transport Advocacy Group	Environmental/Social Impact Group
<ul style="list-style-type: none"> • Auckland Business Forum • Auckland Chamber of Commerce • Auckland International Airport • Employers and Manufacturers Association • NZ Property Council (Auckland Branch) • Infrastructure NZ • Road Transport Forum • NZ Automobile Association (AA) • Ports of Auckland 	<ul style="list-style-type: none"> • Campaign for Better Transport • Bike Auckland • Walk Auckland/Living Streets • NZ Walking Access Commission • Greater Auckland • CCS Disability Action • Be Accessible • Royal NZ Foundation for the Blind • Matakana Coast Trail Trust • Generation Zero 	<ul style="list-style-type: none"> • Environmental Defence Society • Landcare Research • Forest and Bird • Horticulture NZ • Auckland Regional Public Health Service • Department of Conservation • Heritage NZ Pouhere Taonga • Pukekohe Vegetable Growers Association • Ministry of Education

11.4. Change control

Documented policies and procedures regarding scope change with financial delegations are set out in the Transport Agency's Instruments of Delegation and AT's Delegations Policy and Financial Delegations Limits by Level. These change controls and policies and procedures from Te Tupu Ngātahi around change management and control will be operating throughout the term of the Alliance.

Escalation to the appropriate scope committees, (as detailed in the above mentioned policies), will be undertaken as required to ensure that any initiated scope change is given full value for money consideration, as any significant change in scope post-financial close is likely to have considerable and long-term portfolio implications.

11.5. Assurance and acceptance

As part of standard practice, the Transport Agency and AT have established project assurance and approval processes to support quality investment decision making.

Prior to the completion of the DBC phase, the following assurance procedures will be undertaken:

- independent road safety audit
- safety in design workshop and register maintained
- independent peer review of the economic evaluation
- peer review/parallel capital cost estimate.

11.6. Risk, issues and opportunity management

The large Supporting Growth Programme comprises of multiple projects, inherent with areas of uncertainty that could transpire into risks and opportunities. A Risk and Opportunity Management Plan has been developed and endorsed by the Te Tupu Ngātahi governance team, to manage those risks and opportunities through the DBC and route protection phases. The risk management process is consistent with AS/NZS ISO 31000:2009 as well as risk management processes operating in AT and the Transport Agency.

Risks, issues and opportunities will be managed at three levels:

- organisational business
- programme wide
- project and area-specific

A specific risk assessment has been completed for the Southern area and can be found in **Appendix L: Risk**. The 'Critical' and High' risks are set out in **Table 35**.

A number of issues and opportunities have also been identified to further refine the recommended network in the pre-implementation phase. These were unable to be fully resolved prior to IBC submission. These risks, issues and opportunities, outlined in the tables below, have the potential to better deliver on the transport and environmental outcomes sought, and to reduce the cost risks associated with a project of this scale.

Table 35: Critical and high risks – South

1. **Introduction**

2. **Background**

3. **Methodology**

4. **Results**

5. **Discussion**

6. **Conclusion**

7. **References**

8. **Appendix**

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11.6.1. Funding commitments and obligations

If approval is obtained and the project proceeds to route protection, the project partners have an obligation to secure the funding for the elements of the project for which they are responsible.

Funding will be as agreed by the project partners and includes, but is not limited to:

- further design
- consenting
- potential land acquisition.

Further assessment of the funding implications for AT and the Transport Agency will be undertaken once approval has been received to proceed to a DBC.

11.7. Next steps

Engagement and communication in the next stage (following AT and NZ Transport Agency Board endorsement of the recommended network), will build on engagement undertaken during the IBC phase. The focus of the next stage of engagement in the South is to:

- Continue to build understanding of Te Tupu Ngātahi progress and the process of route protection
- Critical ongoing discussion with Auckland Council around land use and transport integration. This will include a range of interactions from detailed structure plans to wider discussions around achieving sustainable urban mobility in the un-zoned future urban areas. This will take place through specific Auckland Council/SGA forums, workshop environments and individual meetings.

There are three key next steps for the progression of each of the elements of the recommended network, being:

- detailed business case
- pre-implementation
- implementation

Each step has very different characteristics and capability needs and are therefore considered separately with regards the procurement strategy.

11.7.1. Detailed business case

Te Tupu Ngātahi has been commissioned to complete the DBCs for the following elements of the IBC programme:

- arterial roads
- strategic State Highway connections
- strategic cycle links
- public transport infrastructure on dedicated corridors or arterial roads (including stations).

It is proposed that one DBC per consenting package is developed, as these packages all contain interdependent projects, therefore simplifying the DBC process.

All other elements of the IBC recommended package will also require completion of a DBC. Key issues that need to be addressed in the DBCs are outlined in **Table 36**.

Table 36: Issues to be addressed in Detailed Business Cases

Consenting/DBC Package	Component Project	Issue(s) to be addressed in Detailed Business Case
General	Stormwater management	Integrated approach to storm water management <ul style="list-style-type: none"> Working to develop an integrated approach to the catchment management (flooding) and storm water treatment that captures all of the potential developments (transport and land use) that are likely over the next 30 years to reduce the impacts of continued development on the health and sustainability of the waterways and improves the resilience of the transport system.
	Utilities	Integrated approach to provision of utilities <ul style="list-style-type: none"> Integrating the transport response with the needs and opportunities of the utility providers to provide a better whole of system outcome. The key examples are the opportunity for the transmission network identified by Transpower to reduce the complexity and risks associated with their designations.
	Pricing and use of motorway and arterials	Benefit of pricing and road use on the outcomes <ul style="list-style-type: none"> Evaluating the impact and benefit of managed lanes and pricing policy and implementation to achieve the policy objectives and to support the Southern growth area through the use of HOT lanes, distance based pricing or access pricing, in line with "The Congestion Question" (MoT).
	Active modes	Facility type <ul style="list-style-type: none"> For the new corridors where cycling facilities are identified, high quality separated walking and cycling facilities are proposed. For the retro-fitting of existing corridors, it is expected that a mixture of shared path and separated facilities will be provided. Other proposed arterials will include walking and cycling facilities and will supplement the regional primary network. These will be investigated further at the DBC.
	Financial	Financial and management cases <ul style="list-style-type: none"> Further investigations and assessments are required to determine the affordability of the proposals to the requiring authorities and the potential delivery mechanisms including but not limited to: <ul style="list-style-type: none"> identify projects that can be partially or fully developer funded, and include sensitivity tests on the potential funding source value engineering: identify projects that can be delivered within existing corridors and ensure that DBC options explore and assess lower cost interventions to understand the potential to improve the affordability alongside the benefits identify and explore different funding and revenue streams (where possible) to improve affordability of the recommended network include a wider range of cost sensitivities and escalation on the capital and property costs.
S1 – Rail Upgrades and associated works	Four rail tracks from Wiri to Pukekohe	Confirm the extent of alteration to the NIMT designation. <ul style="list-style-type: none"> Confirm the extent to which four tracks can fit within the existing designation. A number of bridges are also required to be replaced due to the widening. KiwiRail are the requiring authority for the rail network. Further clarification is required with KiwiRail on their current programme of works and potential staging.
	Drury Central train station	Land use integration <ul style="list-style-type: none"> Each recommended train station location is located within the FUZ and within areas of high interest to the development community. There continues to be an opportunity to work with the relevant developers to align land use the stations and the surrounding networks through the Structure Plan and Plan Change processes, whilst meeting the operational requirements for the rail network.
	Drury West train station	
	Paerata train station	
	Mahia – Popes – Rangi – new rail and SH1 crossing	Flood plains <ul style="list-style-type: none"> Takaanini has significant flooding issues. Working with Manawhenua and Auckland Council (Healthy Waters) to address stormwater management issues to be further investigated in the DBC.
	New rail crossings at Taka Street and Walters Road	<ul style="list-style-type: none"> Local stakeholders & impacts DBC will need to consider the impacts associated with the loss of east-west connectivity for the local areas around Manuroa Road. Linked with implementation timing of rail grade separation.
	Remove rail crossings at Manuroa Road and Spartan Road	
	Shared cycle and walking path adjacent to the NIMT	Connections <ul style="list-style-type: none"> Where to connect at Drury and Manukau Designation Separate designation required for cycleway adjacent to KiwiRail designation for four tracks.

Consenting/DBC Package	Component Project	Issue(s) to be addressed in Detailed Business Case
S2 – Bus Corridors on arterials	Great South Road FTN	<p>Scope</p> <ul style="list-style-type: none"> The scope of this project is likely to be from Papakura to Drury. North of Papakura has been earmarked for delivery through Auckland Transport's Integrated Corridor Programme <p>Form</p> <ul style="list-style-type: none"> Further investigations into the corridor and intersection form that best meets the objectives, the customer and adjacent property owner's needs, and minimises costs. <p>Land requirements</p> <ul style="list-style-type: none"> The extent to which the frequent bus network can be accommodated within the existing road corridors with a view to reducing the implementation and property acquisition costs.
	Porchester / Mahia / Roscommon FTN	<p>Form</p> <ul style="list-style-type: none"> Further investigations into the corridor and intersection form that best meets the objectives, the customer and adjacent property owner's needs, and minimises costs, particularly through Mahia and Porchester. <p>Land requirements</p> <ul style="list-style-type: none"> The extent to which the frequent bus network can be accommodated within the existing road corridors with a view to reducing the implementation and property acquisition costs.
S3 - Mill Road	Mill Road Northern section	<p>Form and function</p> <ul style="list-style-type: none"> The strategic function of the Mill Road corridor is to provide an alternative corridor to the Southern Motorway whilst providing alternative access into Papakura, Drury and Takaanini from the east. Further work is required in the DBC to determine the intersection form and localised function along the urbanised section regarding access to adjacent properties. <p>Alignment</p> <ul style="list-style-type: none"> Further investigations into opportunities to work with developers in Drury South to optimise the alignment. <p>Flood plains</p> <ul style="list-style-type: none"> Working with Manawhenua, Auckland Council (Healthy Waters) and developer's stormwater management needs to be further investigated. <p>Drury South interchange</p> <ul style="list-style-type: none"> Form of interchange and location to be further detailed in conjunction with NZTA SH1: Papakura to Bombay project.
	Mill Road Central section	
	Mill Road Southern section	
S4 – Drury network	Bremner Road FTN arterial	<p>Land use & transport integration</p> <ul style="list-style-type: none"> Continuing to work with Council and landowners to better integrate transport with future land use development (currently being developed through the Structure Plan and private plan change processes) and provide an alternative for people to switch to public transport mid-trip to avoid congestion further north on the motorway. This includes integrating with the SH22 Safe roads project, electrification and expansion of the NIMT corridor and resolution of over-dimension and heavy vehicle enforcement requirements. <p>Land requirements</p> <ul style="list-style-type: none"> The extent to which the frequent bus network can be accommodated within the existing road corridors with a view to reducing the implementation and property acquisition costs.
	Jesmond Road to SH22 FTN arterial	
	New arterial from Papakura industrial area and Fitzgerald and Ponga Road at Drury East	
	Arterial upgrade of Opāheke Road and Ponga Road	
	SH22 upgrade Oira to SH1	
	Jesmond Road extension to Pukekohe Expressway	
	Arterial upgrade of Waihoehoe Road (from Mill Road to Fitzgerald)	
S5 – Pukekohe Expressway	The Pukekohe Expressway	<p>Form and function</p> <ul style="list-style-type: none"> The strategic function of the Pukekohe Expressway is to connect Pukekohe with the rest of Auckland to enable Drury West and Paerata to grow around the existing SH22 and NIMT. The proposed alignment passes around the FUZ, effectively ring-fencing development. Further work is required in the DBC to determine the intersection form and access controls for the corridor given the current uncertainty as to whether there will be development proposed on the southern side of the corridor.
	Pukekohe Ring Road stage one east – west arterial	<p>Form and access controls</p> <ul style="list-style-type: none"> The strategic function of the Ring Road is to connect Pukekohe (SH22 and Pukekohe East Road) to the Pukekohe Expressway. Further work is required in the DBC to determine the intersection form and access controls for the corridor, and to identify mitigation measures.

Consenting/DBC Package	Component Project	Issue(s) to be addressed in Detailed Business Case
	SH22 Karaka Road to Pukekohe Expressway	Land requirements <ul style="list-style-type: none"> The extent to which the frequent bus network can be accommodated within the existing road corridors with a view to reducing the implementation and property acquisition costs.
	Paerata extension to Pukekohe Expressway	Land requirements <ul style="list-style-type: none"> The extent to which the frequent bus network can be accommodated within the existing road corridors with a view to reducing the implementation and property acquisition costs
S6 – Pukekohe Ring Road Stage two	South East section	Land requirements <ul style="list-style-type: none"> The extent to which the proposed road can be accommodated within the existing motorway designations, including working with NZ Transport Agency teams to design safe and effective on/off ramp treatments and off-line bus station entries and exits.
	West section	
S7 – SH1 upgrades	<ul style="list-style-type: none"> SH1 upgrades and Express Transit Network (bus priority) 	<ul style="list-style-type: none"> Extent of scope SH1 Papakura to Drury project will be progressing through to pre-implementation. Papakura to Manukau requires a DBC. Land requirement The extent to which the frequent bus network can be accommodated within the existing motorway designations, including working with NZ Transport Agency teams to design safe and effective on/off ramp treatments and off-line bus station entries and exits. Approach to designation <ul style="list-style-type: none"> Timing of any alteration to SH1 designation given that the public have been exposed to construction works for a period of time and may respond negatively to further works. Environmental constraints. Further investigations required to mitigate potential effects between Hill Road and Orams Road. Further investigations required for design that will avoid widening of the Pāhurehure Inlet causeway. Confirm bus station locations. Working with Auckland Transport to confirm or modify the notional station locations at Park Estate, Hingaia, and Alfriston.

11.7.2. Pre-implementation

Pre-implementation is the further progression of individual projects from DBC stage through the statutory approvals stage. This includes design development, the preparation of an Assessment of Environmental Effects to support NoRs and resource consent applications, confirmation of property requirements and securing the appropriate statutory approvals to allow the project to be constructed or implemented. The result of pre-implementation will be a network of corridors that are route protected.

The scope of works for Te Tupu Ngātahi is to undertake the works necessary to support and obtain the designations for the recommended network (i.e. route protection). The route protection strategy for each element of the recommended network will define in more detail the approach to this design development and statutory approval process. This route protection is expected to take place over the next four years.

Further discussion on specific route protection options is provided in **Appendix K: Route Protection Strategy**. Appendix K provides an overview of the overall route protection options (e.g. designation, plan change/zoning, structure planning or precinct plan provisions and landowner agreements).

The scope of works for Te Tupu Ngātahi does not currently include obtaining resource consents for individual projects. The timing and delivery model for the remainder of the works needed to support resource consent applications for each individual project therefore should be considered in the pre-implementation phase of work.

11.7.3. Implementation

Once a project has been through the pre-implementation phase it will be ready for implementation. This will include detailed design, consenting and physical works. The delivery model will need to consider factors, including:

- scale
- complexity
- programme.

Given that this implementation phase is many years away for most Te Tupu Ngātahi projects, a detailed procurement strategy should be developed for each project at an appropriate time in advance and closer to the implementation of each project.

11.8. Benefit realisation and management

Benefits management is the identification, analysis, planning, realisation and reporting of benefits. These phases align with the Treasury Investment Lifecycle phases of Thinking, Planning, Doing, Reviewing. Benefits management is vital in ensuring that each element identified in the recommended network achieves what it sets out to do. It involves articulating what benefits are expected from the element, how it will be known that the benefits are achieved, and the assessment of what has eventuated against what was planned.

Detailed benefit management plans will be produced for each of the recommended network elements during the DBC phase. The KPI table (**Section 6**) maps the problem statements, benefits, and investment objectives to a range of KPIs and measures on which projects can be measured.

Benefit realisation is intended to fulfil two key functions:

1. assessment against anticipated benefits of a project which helps validate how well the purpose for investment has been achieved
2. at a programme wide level, providing confirmation of the proposed staging approach.

Given the 20-30 year time period for the implementation of the recommended network, staging of infrastructure is critical to the success of the network in delivering against the investment objectives. Given the suite of first decade projects proposed, measurement and monitoring should be prioritised in areas where change and benefits are expected as a result of these. For the South, this is focused on the communities of Takaanini, Drury and Pukekohe. Tracking of network performance in the following areas should be prioritised and **Table 37** provides an example of what will need to be further developed in the DBC phase:

Table 37: Priority measures for South benefit realisation

Benefit	Relevant KPIs	Measurement Focus	Monitoring Plan Options
Mode shift of the existing areas	<ul style="list-style-type: none"> Change in mode share Access to employment and key activity centres within a reasonable time by car and PT 	<ul style="list-style-type: none"> % change of vehicle driver, vehicle passenger, public transport users & active mode share Jobs accessible within 30min by car and 45min by PT 	<ul style="list-style-type: none"> Monthly and annual public transport patronage trends NZTA TMS database AT traffic counts Census journey to work data
Reliability of public transport services	<ul style="list-style-type: none"> Attractiveness and efficiency of PT network 	<ul style="list-style-type: none"> PKT by bus spent in congestion / level of service E / F 	<ul style="list-style-type: none"> AT HOP/RTI data
Reliability of the strategic road network	<ul style="list-style-type: none"> Freight travel time reliability Strategic network level of service 	<ul style="list-style-type: none"> Proportion of HCV travel time spent in congestion during the inter peak (LoS E & F) Average speed point to point on SH1 	<ul style="list-style-type: none"> Transport Agency TomTom dataset Mobile phone data
Walking and cycling mode share and experience	<ul style="list-style-type: none"> Access to transport choices Change in mode share 	<ul style="list-style-type: none"> Percentage of households within 500m walk or 15min cycle of RTN stations % change of vehicle driver, vehicle passenger, public transport users & active mode share 	<ul style="list-style-type: none"> AT customer insight biannual survey results NZTA CAS database AT cycle count data Monitoring of new facilities

¹ <https://www.nzta.govt.nz/planning-and-investment/planning-and-investment-knowledge-base/2018-21-nltp-investment-assessment-framework-iaf/developing-an-assessment-profile-2018-21/#results-alignment>