
North Shore Rapid Transit Network Strategic Case

Auckland Transport - Strategy Division

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VERSION DRAFT 2.0

Strategic Assessment of the need for an improved North Shore Rapid Transit Network



Approvals

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	22 nd August 2016	Updated to include ATAP references, Project Plan (Part B), Appendix 1&2 updated with ILM/Benefits maps
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PREFACE

In early 2016, Auckland Transport commissioned the North Shore Rapid Transit Network (RTN) study.

This work was initially designed to be a “pre-scoping” study, to inform Auckland Transport’s involvement in the NZ Transport Agency’s Additional Waitematā Harbour Crossing route protection planning, regarding future public transport/RTN requirements.

The study was based around understanding the scale of the public transport (PT) problem (a strategic assessment of cross-harbour PT demand), timing for any interventions, mode and alignment options and how the RTN might integrate with other projects.

The outcomes of the North Shore RTN Study inform this Strategic Case, as well as contributing to a Programme Business Case to investigate future improvement to the North Shore RTN.

EXECUTIVE SUMMARY

This document outlines the strategic case for investigating improvements to the North Shore Rapid Transit Network (RTN). The Northern Busway is the core of the current North Shore RTN¹.

Existing access for both buses and general traffic between the city centre and the North Shore is via State Highway 1, on the Auckland Harbour Bridge (AHB). Growth in travel demand is expected to put pressure on the AHB infrastructure as well as on city centre transport infrastructure.

Auckland Transport (AT) is planning a range of transport improvements to the city centre network. However, it is anticipated that improvements to the public transport network will have limitations in respect to bus capacity and characteristics and do not provide a long-term RTN solution.

Separately, the NZ Transport Agency (NZTA) is planning for an Additional Waitemātā Harbour Crossing (AWHC) to relieve some pressure on the AHB and to provide better state highway network resilience.

The need to plan for future investment in improvement to the North Shore RTN is pressing. Imminent land use growth (both on the North Shore² and regionally) means that AT needs to investigate future improvements to the North Shore RTN now, to understand how these fit with planning for an AWHC and the overall transport network.

As this strategic case outlines, there are several reasons for the immediate need to plan for improvements to the existing North Shore RTN. For simplicity, this need is explained as two-fold:

(1) Anticipated development on the North Shore over the next 30 years and beyond is expected to see significant increases in population and employment³. During the same time, employment in the city centre is expected to increase by 60 per cent, of which the North Shore represents nearly a quarter of the total public transport demand into the city centre during the morning peak period.

As growth occurs, land demand and values will increase. Development pressures will make land within range of the state highway and public transport networks more sought-after, compounding the need to plan and protect land needed for future improvements to the North Shore RTN.

Maintaining effective RTN access to the city centre and other employment/education centres along this key corridor and within the North Shore is crucial to maintain and enhance Auckland's economy and enable further economic and urban growth.

(2) The NZ Transport Agency is currently planning for route protection for an AWHC, which offers an opportunity to enable North Shore RTN. Conversely an inappropriately scoped AWHC could inhibit the ability to deliver necessary improvements to the North Shore RTN. AT needs to therefore continue to work with the NZ Transport Agency to define the future transport network requirements and to protect for future improvements to North Shore RTN as part of an integrated approach to an AWHC.

Integrated planning for the North Shore RTN and an AWHC is crucial to achieving cost-effective regional road and public transport outcomes.

¹ See Figure 1.

² See Section 7.3, Figure 9.

³ See Appendix 4.

This strategic case and subsequent business case work will follow the guidance of the Auckland Transport Alignment Project (ATAP) process, which is a joint project including Auckland Transport, Auckland Council, the NZ Transport Agency, Ministry of Transport, the Treasury and the State Services Commission. ATAP highlighted that the AHB has limits on its ability to cater for heavy traffic growth, but that the very high opportunity costs of a new harbour crossing require significant consideration before investment. ATAP also recommended that route protection for a new crossing needs to progress in a way that integrates further roading and public transport requirements⁴.

⁴ ATAP references are included in Appendix 5.

THE STRATEGIC CASE

1. INTRODUCTION

1.1 Purpose

This strategic case outlines the case for continuing to investigate future improvements to the North Shore Rapid Transit Network (RTN). It seeks confirmation of funding for co-investment in a Programme Business Case to develop a preferred programme for further investigation.

Auckland's North Shore is currently home to around 23 per cent of the region's population⁵, with a corresponding 23 per cent of the region's morning peak period trips into the city centre by public transport⁶. The existing North Shore RTN, the Northern Busway, is shown in Figure 1.

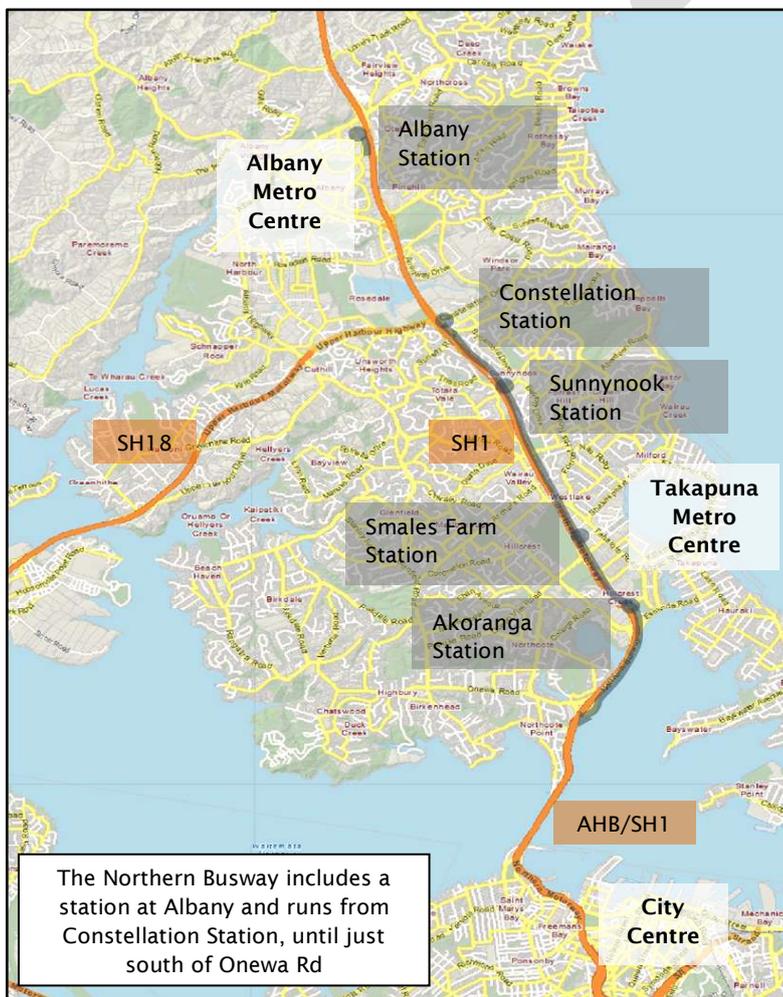


Figure 1: North Shore RTN infrastructure 2016

⁵ Including Rodney and Hibiscus Coast, Statistics NZ, Census 2013

⁶ 2013 ART3 run using 2013 Census land use data

During the morning peak period, the Auckland Harbour Bridge carries around 10,000 people; this is comparable to Auckland rail access to the city centre, or morning peak period alightings at Britomart⁷. The North Shore RTN is clearly a critical component of Auckland's transport network.

Auckland is growing at an unprecedented rate. Growth in the Auckland over the next 30 years is expected to be more than the total population of the Canterbury region⁸. Anticipated development on the North Shore over the next 30 years is expected to see a 30 per cent increase in population (approximately 100,000 additional people) and a 16 per cent increase in employment (approximately 40,000 more jobs)⁹. During the same time, employment in the city centre is expected to increase by 60 per cent¹⁰. While a substantial portion of future travel demands are expected to be within the North Shore, nearly a quarter of regional public transport demand into the city centre during the morning peak period is expected (southbound) across the Waitematā Harbour¹¹. There is a strong link between transport access and land use development. This can be seen clearly in Auckland's urban development. Appendix 3 provides a summary of land use development on the North Shore, Figure 3.1 shows temporal land development patterns.

As growth occurs, land demand and values will increase, as has been shown in the Auckland housing market in recent years. Development pressures will make land within range of the state highway and RT networks more sought-after, expensive and intensely developed, compounding the need to plan and protect land for improvements to the future North Shore RTN.

Recent decisions on the Auckland Unitary Plan have set out a clearer basis of land use expectations and Auckland Transport will need to continue to work with Auckland Council to determine the best transport network to support the newly confirmed land use zonings, as well understanding the way land use development and staging can support the transport network.

An initial analysis of the ongoing performance of the Northern Busway into the future shows that at some point in the foreseeable future (potentially during the mid 2030's depending on growth projections), peak demand is expected to overtake the practical capacity of the busway, even taking into account planned improvements. Some form of higher-capacity solution is therefore likely to be required for future North Shore RTN.

Maintaining effective RTN access to the city centre and other employment/education centres along this key corridor and within the North Shore is crucial to maintain Auckland's economy and enabling further economic and urban growth.

The NZ Transport Agency is currently planning for route protection (designation) of an Additional Waitematā Harbour Crossing (AWHC). The Notice of Requirement is expected to be notified in 2017.

In parallel, planning, design and procurement for the AWHC as a physical project (as opposed to the route protection exercise) will continue. Given the overlapping corridors and potential interaction between travel demand drivers, an AWHC offers the opportunity to enable future improvements to North Shore RTN, or conversely an inappropriately scoped AWHC could inhibit the ability to deliver necessary improvements to the North Shore RTN. AT needs to therefore continue to work with NZTA to define the future transport network requirements and to protect for future improvements to North Shore RTN as part of an integrated approach to an AWHC.

⁷ Northern Busway southbound AM peak patronage = 6,569, other southbound North Shore buses = 3,234, mid-March 2016 vs Britomart AM peak alightings = 9,162, average March 2016.

⁸ See Appendix 4, Figure 4.1.

⁹ See Appendix 4, Figure 4.2.

¹⁰ See Appendix 4, Figure 4.3.

¹¹ See Appendix 4, Figure 4.4 and Section 3.4.1, Figures 3, 4 & 5.

Integrated planning for the North Shore RTN and an AWHC is crucial to achieving cost-effective regional road and public transport outcomes.

1.2 Decision sought

This Strategic Case establishes the need for investigation and planning for future improvements to the North Shore RTN, in conjunction with planning and design for the surrounding transport network. It seeks confirmation of funding for co-investment in a Programme Business Case to develop a preferred programme for further investigation.

DRAFT

2. PARTNERS AND KEY STAKEHOLDERS

From a governance point of view, the key project partners outlined below will provide guidance and make decisions around the direction of the project. From a key stakeholder point of view, departments within these organisations will provide technical advice and direction.

2.1 Project partners

The NZ Transport Agency is the Crown Entity responsible for fulfilling the expectations of government as expressed in the Government Policy Statement on Transport (GPS). It allocates the National Land Transport Fund to activities which give effect to the GPS. The 2015-2018 GPS sets out an overall strategic direction and direction for the National Land Transport Fund (NLTF), which is to drive improved performance from the land transport system by focusing on economic growth and productivity, road safety and value for money. Relevant objectives from the GPS are:

- *“A land transport system that addresses current and future demand for access to economic and social opportunities”*
- *“A land transport system that provides appropriate transport choices.”*

NZTA Highways and Network Operations (HNO) manage the state highway network and motorway corridors. NZTA Planning & Investment (P&I) provide funding to co-invest in transport projects and programmes undertaken by Auckland Transport, Auckland Council and HNO.

The NZ Transport Agency’s role is as custodian of the existing AHB and planning route protection for an AWHC, which could enable future access for the North Shore RTN. The NZ Transport Agency is a requiring authority for state highways and cycle ways, it does not have requiring authority status or financial responsibility for rail and therefore cannot designate for rail.

Auckland Transport is the strategic transport planning authority for Auckland and has responsibility for all non-state highway transport infrastructure. AT is responsible for giving effect to the Auckland Plan. Planning and providing for public transport is a core responsibility. In respect of the North Shore RTN, this includes the Northern Busway, any potential rail services and facilities and includes arterial and local roads, other bus services and facilities, as well as walking and cycling. Departments within AT will provide specific advice/feedback on the RTN development.

The Auckland Transport Alignment Project (ATAP) is a joint project including Auckland Transport, Auckland Council, the NZ Transport Agency, Ministry of Transport, the Treasury and the State Services Commission. ATAP recognises that Auckland has transport funding shortfalls and investigates delivery mechanisms. Upcoming business case analysis of the current and future improvements to North Shore RTN will follow the guidance of the ATAP process, which highlighted that the AHB has limits on its ability to cater for heavy traffic growth, but that the very high opportunity costs of a new harbour crossing require significant consideration before investment.

ATAP also recommended that route protection for a new crossing needs to progress in a way that integrates further roading and public transport requirements. Figure 2 shows the process and expected programme for AWHC and North Shore RTN planning. Note that in light of ATAP work which suggests that an AWHC is not required as soon as the project had proposed; a hold has been put on the planned Programme Review and Financial Review. The NOR will go ahead as planned but further business case work related to the AWHC will not.

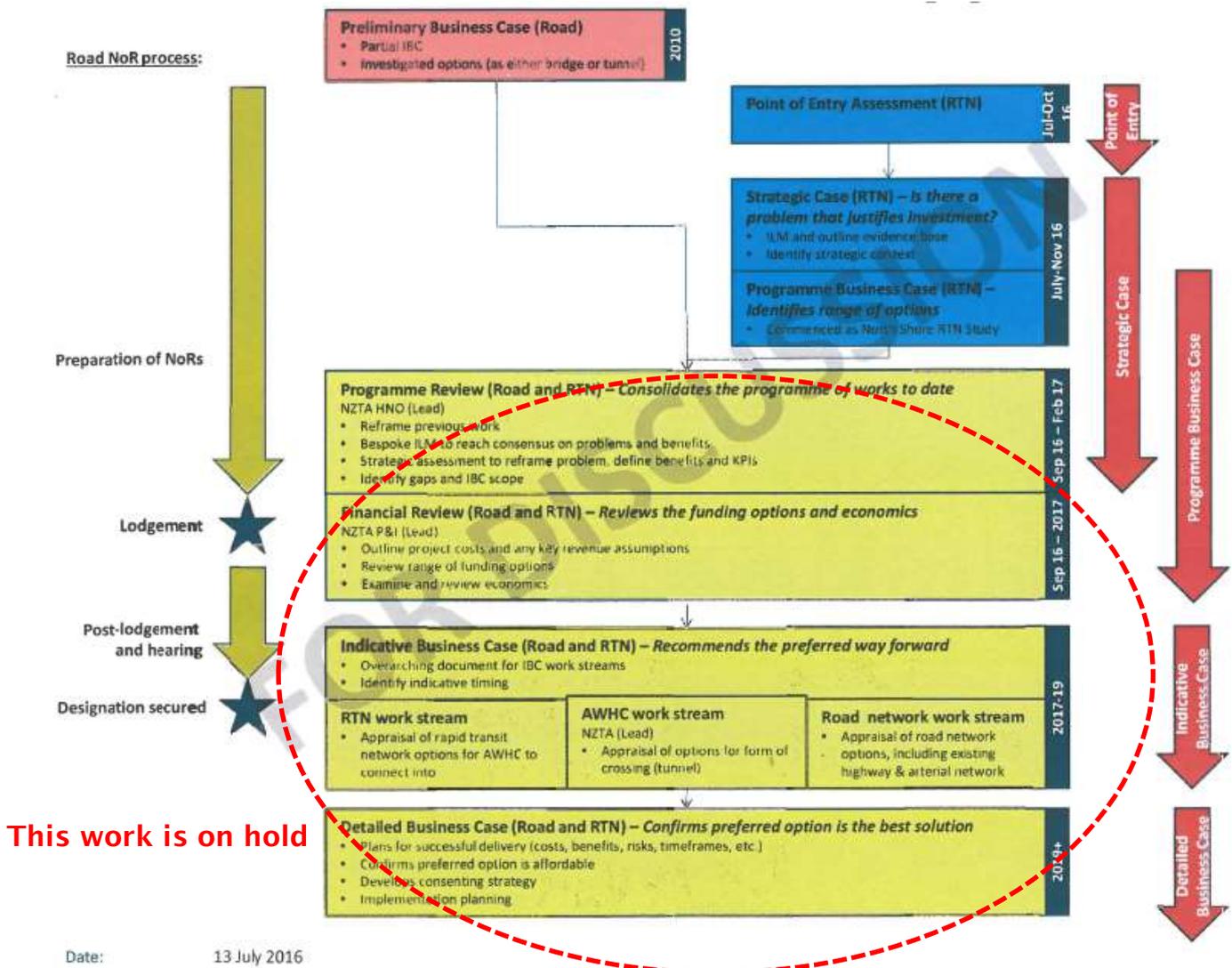


Figure 2: Anticipated AWHC and NSRTN planning programme

2.2 Key stakeholders

The area of influence for the North Shore RTN strategic case is large and is highly connected to a wide range of parallel or related workstreams. RTN investment can also be strategically influential in city-shaping. These factors generate a wide range of stakeholders that may have an interest in or may be able to inform and shape the project outcomes.

Auckland Council is the most significant of the key stakeholders, and provides direction for integration between land use and transport development and investment. It is the statutory planning authority for the Auckland region.

The Council is responsible for the Auckland Plan which provides strategic direction for developing and managing the Auckland Region. The Auckland Plan outlines overall objectives and funds to which Auckland Transport is to give effect. Council is also responsible for preparing the Unitary Plan, which is a key mechanism for delivering the Auckland Plan.

Auckland Council has interests in both the significance of this project, in terms of the strategic and regional role of an AWHC and the North Shore RTN, and from a statutory and consenting point of view.

Table 1 below includes identified stakeholders. Note that stakeholder involvement is also contingent on the level of detailed feedback sought. For instance, Local Boards would be interested in the whole of life of the project, whereas individuals may be interested in more immediate land impacts.

Table 1: Project Stakeholders

Stakeholders	Knowledge Areas
Auckland Council	Regional strategies, land use, unitary planning
Local Boards	Local issues, strategies and community aspirations and views. Likely to be most relevant to immediately adjacent Local Boards, with other Local Boards interested in respect of regional benefits.
KiwiRail	Rail network planning. Any integration with freight
Iwi	Cultural issues and aspirations of Tangata Whenua
Members of Parliament	Community and political views and risks
Councillors	Community and political views and risks
Resident groups	Local issues and community aspirations
Business groups	Requirements, dynamics and risks to business
Transport interest groups	Needs and aspirations of users of all transport modes
Environmental groups	Risks and issues associated with specific environmental issues and wider sustainability
Specific businesses and residents close to option routes	Issues, risks and needs of specific areas

3. STRATEGIC ASSESSMENT - OUTLINING THE NEED FOR INVESTMENT

3.1 Defining the Problem/Opportunity

An investment logic map (see Appendix 1) identified the following key problems, to which the investment proposal seeks to respond:

- **Problem 1:** Inability to effectively meet projected public transport demand to, from and within the North Shore will constrain Auckland's economic performance and inhibit urban growth.
- **Problem 2:** Unresolved public transport integration with the Additional Waitematā Harbour Crossing (AWHC) will increase cost and risk of achieving regional road and public transport outcomes.

3.1.1 Description of Problem 1

Problem 1: Inability to effectively meet projected public transport demand to, from and within the North Shore will constrain Auckland's economic performance and inhibit urban growth.

Currently committed PT infrastructure and services to, from, and within the North Shore will be unable to provide sufficient capacity and service quality to support planned residential and employment growth. If left unaddressed, a lack of adequate PT capacity connecting planned North Shore growth areas with key employment centres and with the regional public transport network will inhibit planned urban growth. It will also negatively impact on economic performance by constraining regional labour market accessibility.

Presently, during the morning peak period, the North Shore RTN (on the AHB) carries around 10,000 people, comparable to Britomart train alightings during the same morning peak period. The AHB is the only viable cross-harbour road connection and a critical link for journeys to/from the City Centre and the North Shore. Planning for the North Shore RTN will consider the benefits of improving PT network resilience with and without an additional harbour crossing.

Forecast growth in population and employment on the North Shore (and Auckland more generally) will drive future transport demands, including demand for PT. The Auckland Plan land use forecasts developed in 2011/2012, and subsequently used as a basis for transport planning, recognise the high expected level of growth. However, since then, three policy changes have affected expectations for future PT demand growth and the distribution of demands within the network:

- The Auckland Unitary Plan will enable greater levels of urban intensification and greenfield growth on the North Shore than previous district and regional plans. This will contribute to accommodating expected population and employment growth, but it may also change the spatial distribution of that growth.
- Auckland Transport is currently implementing the New Network, which is intended to deliver greater region-wide PT accessibility by enabling transfers between frequent PT services and better integration of the bus network and existing rapid transit network. In effect, while services may still travel to the city centre, enabling connections allows passengers to access a wider range of destinations by public transport.
- Since its development in 2008, demand on the Northern Busway has grown more rapidly than forecast, in the context of overall growth in demand on the PT network. The Northern Busway's success in attracting patronage means that the expected date that it reaches

capacity is sooner than expected in the 2008 study of future PT requirements on the North Shore underpinning the Indicative Business Case for the AWHC (Parsons Brinkerhoff, 2008).

As a consequence of these policy developments, the forecast scale of PT demand on the Northern Busway, the North Shore's PT trunk route, is expected to exceed the capacity of currently planned infrastructure and service by the mid-2030s at latest. There is already evidence of service quality and capacity problems on portions of the Busway, particularly when it reaches the City Centre. Attempting to meet future demand growth within the constraints of the existing infrastructure will result in inefficient and costly public transport operations and poor customer experience, including extended and unreliable travel times. Furthermore, capacity constraints and poor service quality on North Shore PT will reduce the attractiveness of PT relative to private vehicle modes, increasing private vehicle demand on congested corridors such as the Harbour Bridge and reducing the efficiency of the region's road network.

Unaddressed transport problems also create risks that economic and urban growth will be constrained, or pushed to less optimal locations (e.g. other parts of the North Shore, other parts of the Auckland region or beyond the region) that are less productive or less attractive for households and businesses. Limited capacity or long/unreliable travel times on PT services to, from, and within the North Shore will, over time, reduce households' accessibility to the City Centre and Metropolitan centres, which are expected to accommodate significant employment growth for office-based and retail activities.¹²

Reduced PT accessibility will have negative impacts on the region's economic performance, as it will reduce the potential for agglomeration economies arising from labour market pooling (i.e. businesses being able to access a large pool of workers, including workers with specialised skills), supply-chain efficiencies (i.e. better accessibility between businesses and their customers), and knowledge spillovers (i.e. exchange of information between firms and workers). Given the scale of Auckland's economy, these negative economic impacts are of national significance.

3.1.2 Description of Problem 2

Problem 2: Unresolved public transport integration with the Additional Waitematā Harbour Crossing (AWHC) will increase cost and risk of achieving regional road and public transport outcomes.

The Northern Busway runs in parallel to the Northern Motorway before crossing the AHB (in mixed traffic) and entering the City Centre on Fanshawe St (on-street bus lanes). As a result, the design of the AWHC will have significant implications for the operation of the Busway and future options to invest in upgrading PT capacity on this corridor. If planning for PT and road infrastructure solutions for AWHC is not coordinated, it is likely to introduce a number of risks, including significant risks for the level of public spending required to deliver infrastructure for both modes.

The AWHC project is on an accelerated programme for route protection. Investigations of the road component of the AWHC are ahead of investigations into public transport requirements. There is a risk that independent analyses of road and PT requirements will not deliver an integrated, best-value outcome.

While existing PT arrangements on the North Shore are not expected to reach capacity until the mid-2030s (although this timing needs to be investigated further), current planning on the AWHC offers

¹² Office-based and retail activities are expected to account for a large share of Auckland's future employment growth. These activities primarily, although not exclusively, locate in centres, in contrast with industrial and warehousing activities which are typically more dispersed.

an opportunity to develop a project where planning, construction and ongoing operation of road and public transport elements are well-integrated.

In the absence of integration, there is a significant risk of negative outcomes around the cost and deliverability of the future transport infrastructure, including:

- Increased capital costs arising from independently planned and delivered road and PT infrastructure projects, e.g. due to higher costs to ‘retrofit’ a PT solution in the same corridor after first constructing new road tunnels;
- Increased planning, consenting and design costs if infrastructure projects are pursued independently;
- Inability to deliver the optimal PT solution due to difficulties securing a corridor or station locations after road infrastructure is developed;
- Risk of over-building road or PT capacity if modes are planned for independently;
- Loss of opportunity to consider the potential for construction efficiencies (e.g. avoiding “construction fatigue”, the opportunity for using a single tunnel for both road and public transport);
- Poorer ongoing transport outcomes if options are pursued independently and result in a less optimal multi-modal solution;
- Loss of future options for long-term improvements to Auckland’s public transport and road network, e.g. by failing to future proof for a regional rapid transit network.¹³

Coordinated and integrated planning of both long-term PT and road requirements for the Harbour Crossing presents significant opportunities for both cost savings and improved transport outcomes. Given the expected cost of the AWHC, any savings could be of a scale that is nationally significant. There are likely to be synergies in providing road and public transport capacity upgrades simultaneously, with high-quality public transport provision likely to moderate passenger demand on the road crossing, reducing risks of poor regional-scale road transport outcomes (e.g. congestion and unreliable travel times).

The ATAP work notes that “Projected growth in public transport demand appears likely to trigger the need for a new crossing within the next 30 years... Because any new crossing will be tunnelled, there is a significant opportunity cost arising from this investment. Fully understanding key drivers, alternatives, cost and benefits will be crucial before any investment decisions are made... It makes sense to protect the route for a new harbour crossing in a way that integrates potential future roading and public transport requirements.”

In summary, the ATAP recommendation in respect of the AWHC is to “protect route for a new crossing, but further analysis of drivers and timing, and better integration with public transport options is needed before investment decisions are made.”

3.2 The Benefits of Investment

The potential benefits of successfully addressing these problems through appropriate investment were identified as follows, through an ILM process (see Benefits Map in Appendix 2):

Benefit 1: Planned residential and employment growth in Auckland is enabled.

¹³ For an overview of the importance of preserving future investment options in transport networks, see Grimes, A. 2011. *Building Bridges: Treating a New Transport Link as a Real Option. Motu Working Paper 11-12* and Ministry of Transport. 2016. *Adaptive Investment Management: Using a real options approach in transport planning*. Wellington: Ministry of Transport.

Benefit 2: Auckland's economic performance is improved by increasing labour market accessibility.

Benefit 3: A high-quality PT service benefits users and increases PT mode-share, improving the efficiency of Auckland's wider multi-modal transport network.

Benefit 4: North Shore PT services operate efficiently and cost-effectively.

Benefit 5: Public spend is minimised.

Benefit 6: PT and road investment outcomes are optimised.

The reasons for identifying these potential benefits from successful investment to address the problems include:

3.2.1 Benefit 1: Planned residential and employment growth in Auckland is enabled

Providing sufficient passenger-carrying capacity on the North Shore's public transport network, including the North Shore RTN, will enable planned growth to occur, including employment growth in North Shore's Metropolitan Centres and the City Centre and residential growth in existing North Shore urbanised areas, as well as regional access to greenfield development sites.

Without adequate public transport provision (including connector and feeder networks), the planned level and location of growth is unlikely to be achievable. In particular, peak-period access between the North Shore and the City Centre is likely to be constrained, limiting employment growth in the City Centre and labour market accessibility for North Shore residents. Reduced labour market accessibility is likely to make residential development on the North Shore less attractive.

Without sufficient capacity and quality on the North Shore PT system, the planned scale and spatial distribution of residential and employment growth is unlikely to occur, and growth will instead be pushed elsewhere in the region, elsewhere in the country or even overseas. This may include pushing growth to locations that are less productive or less attractive to households and firms, e.g. due to lower levels of accessibility to employment, other firms or amenities.

Planning for the North Shore RTN will consider the benefits of improving PT network resilience with and without an additional harbour crossing.

3.2.2 Benefit 2: Auckland's economic performance is improved by increasing labour market accessibility

An efficient and high-quality PT system for the North Shore can increase regional labour market accessibility which can in turn benefit regional economic performance. By providing sufficient passenger-moving capacity and fast and reliable peak-period travel, the PT system can increase the potential job pool available to workers within a reasonable commute time, or, conversely, the labour pool available to firms.

Improved inter-regional labour market accessibility can support agglomeration mechanisms associated with increased labour market scale. These agglomeration economies include productivity benefits from better matching of skills between workers and jobs, and increased potential for labour market specialisation.¹⁴

Improved accessibility to dense employment hubs, including the Auckland City Centre, can also have productivity-enhancing agglomeration benefits. Improved transport accessibility can enable the

¹⁴ Labour market pooling is one of several mechanisms through which agglomeration economies arise. The others include better supply-chain linkages and knowledge spillovers.

growth of employment clusters like the City Centre and North Shore Metropolitan Centres (Albany and Takapuna) and create productivity benefits associated with knowledge spillovers between workers and firms operating in close proximity, especially in specialised service sectors. A lack of PT accessibility and capacity is likely to constrain the growth of these centres both directly (by limiting the number of people who can travel to work in them) and indirectly (by increasing the space and cost required to provide for private vehicle access and parking).

Upgrades to North Shore RTN capacity and quality will enable continued growth of the Auckland City Centre as New Zealand's most significant high-value employment hub and a key destination for commuters from the North Shore. It will also support increased density and scale of employment in North Shore Metropolitan Centres.

3.2.3 Benefit 3: A high-quality PT service benefits users and increases PT mode-share, improving the efficiency of Auckland's wider multi-modal transport network

Providing sufficient PT capacity and a high quality of service on the North Shore will benefit existing and new PT users through travel time savings, reliability improvements and other service quality improvements. A high-quality service will also encourage increased PT mode share, reducing private vehicle demands on congested corridors such as the Auckland Harbour Bridge and generating regional-scale benefits for road network efficiency.

A low-quality PT service is unlikely to encourage high levels of use, with users choosing private transport modes with accompanying impacts on road congestion and potentially higher financial costs for users. An over-loaded PT system (e.g. bus service levels operating beyond the busway's functional capacity) will lead to delayed and unreliable journeys.

3.2.4 Benefit 4: North Shore PT services operate efficiently and cost-effectively

Providing PT capacity that matches demand will increase the operating efficiency of the PT network by ensuring that over-capacity operations are avoided (and their accompanying costs of congested operations including travel time delays, unreliability, crowding and poor customer experience).

There may be opportunities for RTN upgrades to reduce the average operating costs of public transport provision through utilisation of modern vehicles and technologies.

3.2.5 Benefit 5: Public spend is minimised

Providing a long-term rapid transit solution for the North Shore at the same time as the planned AWHC allows for cost efficiencies in combining infrastructure for both road and PT modes. Cost efficiencies are possible at the planning, consenting, designing and construction stages of the projects. Conversely, failing to pursue an integrated solution at the planning and design stage will increase the cost and risk of successfully delivering on road and PT transport outcomes, e.g. by increasing the cost to 'retrofit' a PT corridor across the harbour after a road corridor is developed, or by constraining options for corridor alignment and station location.

Benefit 6: PT and road investment outcomes are optimised

An integrated road and PT crossing will result in better transport outcomes for the regional network. For example, simultaneous provision of improved PT alongside an AWHC for road transport may assist in managing road transport demand and reducing road congestion. An integrated solution is more likely to reduce risks of closing out alignment options for either road or PT that could result in sub-optimal solutions being constructed (e.g. PT infrastructure where station location is compromised or incapable of efficiently serving key origins or destinations).

3.3 The Key Performance Attributes and Measures

The performance attributes and measures for assessing the success of the proposed investment in addressing identified problems are summarised in Appendix 2. Performance measures are organised according to the six benefits identified. Between one and three measures are identified for assessing performance against each benefit. Measures have been selected that allow for quantitative verification and ongoing testing of the performance of the investment. These are outlined in Table 2.

The investment is primarily targeted at improving ‘network performance and capability’ and ‘cost’ outcomes (from the five outcome classes identified by NZ Transport Agency planning and investment guidance). Safety, environment and health outcomes may be co-benefits of successful investment, but are not the primary focus.

Table 2: Summary of performance measures

Benefits	Performance measures
<p>Benefit 1: The planned scale and location of residential and employment growth in Auckland is enabled.</p>	<ul style="list-style-type: none"> • Functional public transport capacity is sufficient to meet peak-period public transport demand to and from the North Shore (i.e. demand across the Auckland Harbour Bridge, Upper Harbour Bridge, and Additional Waitematā Harbour Crossing). • Rapid and frequent transit networks are accessible to North Shore residents and employees. • Rapid and frequent PT is provided to support and enable growth in greenfield areas and metropolitan centres
<p>Benefit 2: Auckland’s economic performance is improved by increased labour market accessibility.</p>	<ul style="list-style-type: none"> • North Shore residents’ accessibility to employment (including but not limited to city centre, metropolitan centres) increases faster than overall employment growth
<p>Benefit 3: A high quality public transport service benefits users and increases public transport mode share, improving the efficiency of Auckland’s multimodal transport network.</p>	<ul style="list-style-type: none"> • Public transport travel times to key destinations improve • Public transport travel time variability reduces • PT is an attractive option that can capture higher mode share on key corridors
<p>Benefit 4: North Shore public transport services operate efficiently and cost-effectively.</p>	<ul style="list-style-type: none"> • Public transport operating costs per passenger/km reduce over time due to a combination of increased demand and more efficient operation of vehicles.
<p>Benefit 5: Public spend is minimised.</p>	<ul style="list-style-type: none"> • Total cost of providing an integrated road and public transport solution reduces total costs relative to planning, designing, building and operating road and public transport infrastructure independently.

Benefit 6: Public transport and road investment outcomes are optimised.

- Provision of public transport solutions reduce congestion on key road corridors, e.g. the harbour crossing and on approaches to the city centre.

3.4 Status of the Existing Evidence Base

Table 3 summarises the existing evidence available that supports the defined problems. It also notes the status of the current evidence, including noting gaps in the current evidence base. Evidence for Problem 1 draws on the findings of the recently completed study; *North Shore RTN: Transport and land use deficiency and opportunity analysis* (Aurecon and MRCagney for Auckland Transport, 2016).

Table 3: Summary of evidence available for problems and status of evidence

Problem	Current evidence available	Status of evidence
<p>Problem 1: Inability to effectively meet projected public transport demand to, from and within the North Shore will constrain Auckland’s economic performance and inhibit urban growth.</p>	<p>ATAP notes the following relevant points: “...The assumed pattern of employment growth (which has been peer-reviewed) includes a very strong focus of growth in the Central Area and a limited number of other major centres.</p> <p>Projected growth in public transport demand appears likely to trigger the need for a new crossing within the next 30 years. There is potential for a shared road/PT crossing but the costs and benefits of different options require further analysis.</p> <p>An early investment focus on route protection and land acquisition is required to ensure investment is able to proceed when required and in a cost-effective way. Route protection helps avoid incompatible development and reduces the cost of land purchase for key projects.”</p> <p>Analysis included in the recent study: <i>North Shore RTN: Transport and land use deficiency and opportunity analysis</i> (Aurecon and MRCagney for Auckland Transport, 2016) provides evidence that passenger transport demand accompanying planned growth in the North Shore and City Centre is likely to exceed the functional capacity of the Northern Busway by the mid-2030s.</p> <p>This study also provides evidence that public transport demands exceeding capacity are likely to result in poor transport outcomes for both passengers and operators, including travel time delay and unreliability.</p> <p>Evidence that poor passenger transport outcomes for the links between the City Centre and Metropolitan Centres will result in negative economic impacts includes research on wider</p>	<p>ATAP includes good strategic evidence for land use and transport relationships, likely growth patterns and transport demand. This is reflected in the ART modelling, the context of which is explained in Section 3.4.1 below. An updated land use scenario will also be required to better-understand the likely impacts of the growth enabled by the Unitary Plan. However, this will not be available until after the PBC stage.</p> <p>Good evidence that the functional capacity of the existing Northern Busway will be insufficient to cater to forecast PT demands.</p> <p>Reasonably good evidence supporting PT demand forecasts. However, the demand forecasts use various assumptions about land use forecasts and travel behaviour for which there are inherent uncertainties.</p> <p>Good evidence establishing the functional passenger-carrying capacity of the North Shore Busway across its length and for evaluation years of 2016, 2026, 2036 and 2046.</p> <p>Indicative evidence on the</p>

	<p>economic impacts, (e.g. agglomeration economies arising from increased labour market accessibility and increased accessibility between firms).</p>	<p>wider economic impacts of not providing sufficient RTN capacity to enable future employment growth in centres and ensure good transport accessibility between firms and workers.</p>
<p>Problem 2: Unresolved public transport integration with the AWHC will increase the cost and risk of achieving regional road and public transport outcomes.</p>	<p>ATAP notes the following: “The strategic road, public transport and rail networks carry a significant proportion of the daily transport task in Auckland. As Auckland grows, demand pressures on (these) strategic routes will increase. Maintaining strong and resilient strategic networks that can cope with (these) increased demands is essential.</p> <p>Because any new crossing will be tunnelled, there is a significant opportunity cost arising from this investment. Fully understanding key drivers, alternatives, cost and benefits will be crucial before any investment decisions are made.</p> <p>It makes sense to protect the route for a new harbour crossing in a way that integrates potential future roading and public transport requirements.”</p> <p>Analysis in this Strategic Case identifies some specific ways in which this problem may lead to costs and risks for achieving regional transport outcomes. This includes:</p> <ul style="list-style-type: none"> • Increased costs to ‘retrofit’ PT solutions around previously developed road infrastructure; • Increased costs in planning, design, and consenting; • Physical constraints on delivering optimal PT corridors and stations; • Risk of ‘over-building’ road or PT infrastructure due to a lack of coordination when investing; • Worse overall transport outcomes due to a lack of complementarity between road and PT solutions; • Loss of future options for investing in long-term transport networks to enable urban and economic growth. 	<p>Good evidence of there being a problem but not quantified.</p> <p>Evidence for this problem is generally more limited than for Problem 1, reflecting the fact that a certain level of detailed design work and scheme investigation is required to identify how alternative staging and design may affect project costs and deliverability.</p> <p>Some of this evidence is likely to be available from engineering feasibility and costing studies. For instance, costings for combined road and PT tunnels versus separate tunnels, or costings for different tunnel alignments and portals could be used to provide evidence for the cost savings associated with a combined solution.</p> <p>This is acknowledged as an area in which further evidence is needed. It is recommended that further analysis is undertaken to identify the specific constraints, costs, and risks that may arise in each area.</p>

3.4.1 Status of evidence for Problem 1

The status of evidence for problem 1 is organised by the following sub-sections:

- Evidence on transport demand and land use change forecasts.
- Evidence on PT demand in relation to functional capacity of the Northern Busway and harbour crossing.
- Evidence on transport performance impacts (service quality and operational performance) from demand exceeding functional capacity and from inadequacies in Northern Busway infrastructure.
- Evidence on wider economic impacts of poor transport performance on the North Shore RTN.

Evidence on transport demand and land use change forecasts

The recent study, *North Shore RTN: Transport and land use deficiency and opportunity analysis* (Aurecon and MRCagney for Auckland Transport, 2016) provides forecasts of passenger transport demand accompanying planned growth on the North Shore and in the City Centre.

The demand forecasts are from the Auckland Regional Transport (ART) Model and are based on the following key inputs:

- A fixed land use scenario (I9 scenario based on the Auckland Plan 'medium growth' projections) consisting of forecasts for future levels and location of employment and population.
- A scenario for future transport infrastructure and services, including pricing. The transport investment scenario used was the Auckland Transport Alignment Project (ATAP) 'Common Elements' scenario.

Based on these inputs, the ART model simulates transport demands between model zones, assigns these demands to routes and modes, and simulates travel times and costs. Key outputs from the central ART demand forecasts developed for the *North Shore RTN* study are summarised in the following paragraphs.

Error! Reference source not found.³ compares AM peak travel demands from the North Shore study area to the City Centre + Fringe + Newmarket and from the Study area to the two North Shore metropolitan centres, Albany and Takapuna. Total passenger demand to the three centres increases by approximately 50 per cent between 2013 and 2046. Demand for travel from the North Shore to Takapuna is similar to that for the North Shore to City Centre + Fringe + Newmarket zone, while demand to Albany is about two-thirds of demand to each of the other centres.

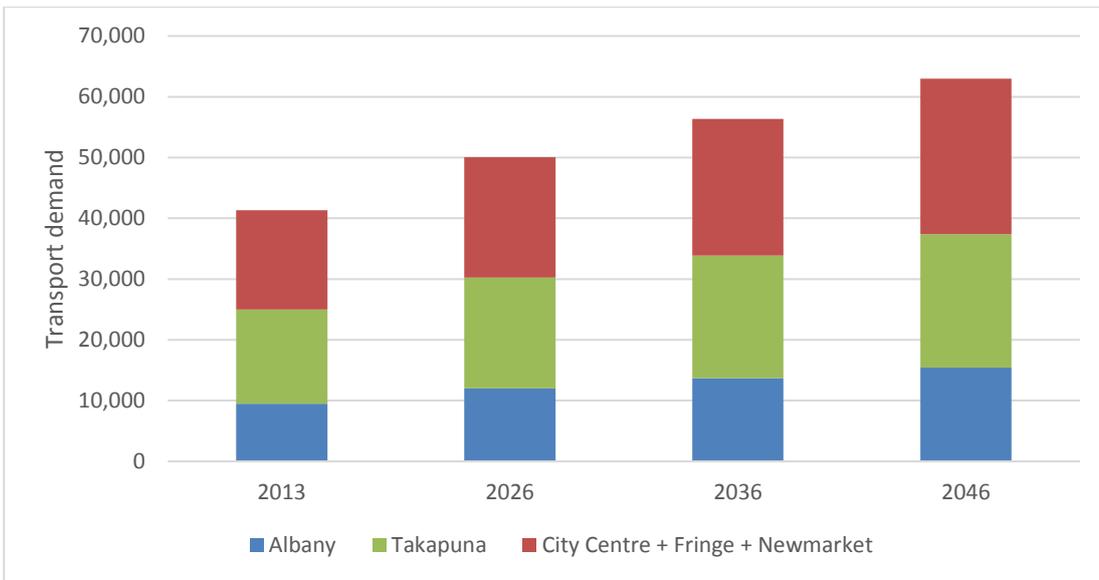


Figure 3: Forecast AM peak (7am-9am) travel demand from the North Shore to selected Metropolitan Centres (ART model ATAP base case).

Figure 4 below provides mode share forecasts for peak-period North Shore trips across the Waitematā Harbour. This provides an indication of the scale of the public transport task across the Harbour which increases to around 20,000 passenger trips during the peak 2 hours by 2046. At present, around one third of all trips on the Waitematā Harbour crossing are public transport trips. By the mid-2030s public transport demand exceeds general traffic and by the mid-2040s public transport is forecast to be the dominant mode on the Waitematā Harbour crossing.

The ATAP work also observes this travel demand noting that projected growth in public transport demand appears likely to trigger the need for a new crossing within the next 30 years.

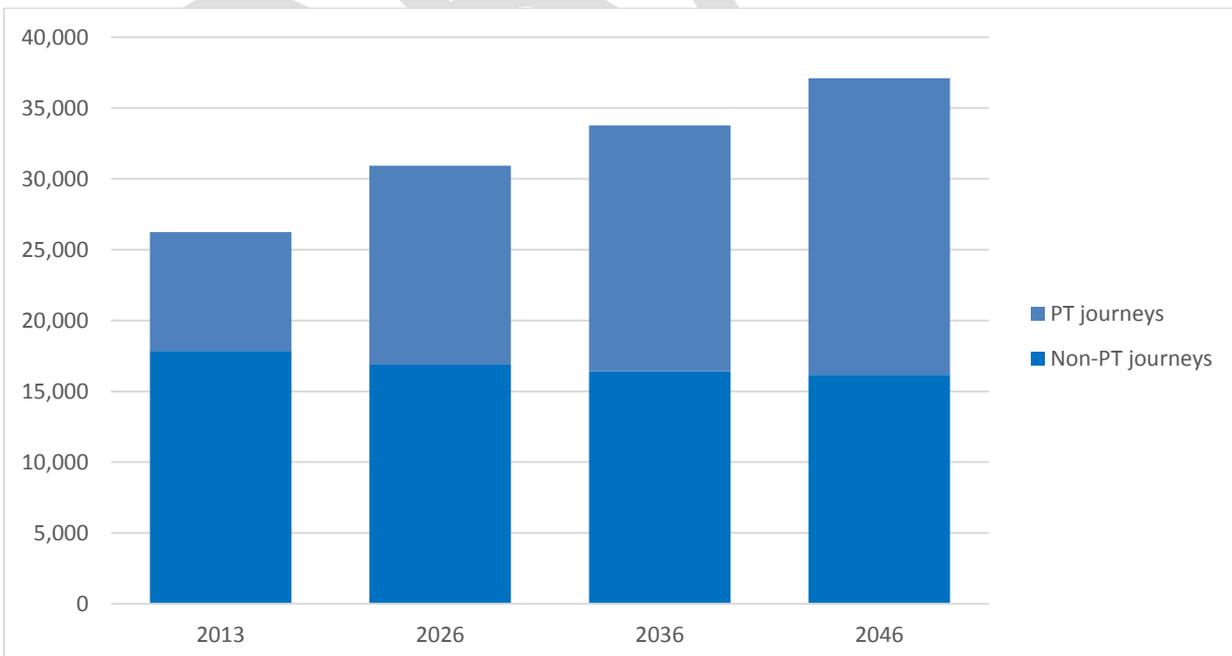


Figure 4: Forecast AM peak PT and private vehicle travel demand across the Auckland Harbour Bridge.

Error! Reference source not found.5 maps the spatial distribution of change in public transport demand (left hand map) and change in private vehicle passenger transport demand (right hand map) for AM peak-period trips from the North Shore to zones outside the study area during the period 2013 - 2046. It illustrates that growth in intra-regional public transport demand on the North Shore is focused on three corridors:

- The North-South spine (State Highway 1)
- The Onewa Road – City Centre corridor (serving Birkenhead and Glenfield)
- The Takapuna-City Centre corridor

The maps illustrate that the major destination for intra-regional PT demand growth from the North Shore is to the City Centre zone, and PT demands to other parts of the region are limited. The two maps also highlight that the bulk of growth in intra-regional passenger transport demand is likely to use PT rather than private vehicles. This is due in part to road capacity constraints on the Harbour Bridge, but it is also be affected by factors such as increased reliability of PT travel times at peak times due to the Northern Busway and increases in the price to park in the city centre.¹⁵ On the basis of the information available, the ART forecasts are considered accurate and relevant for defining the strategic ‘task’ for public transport.

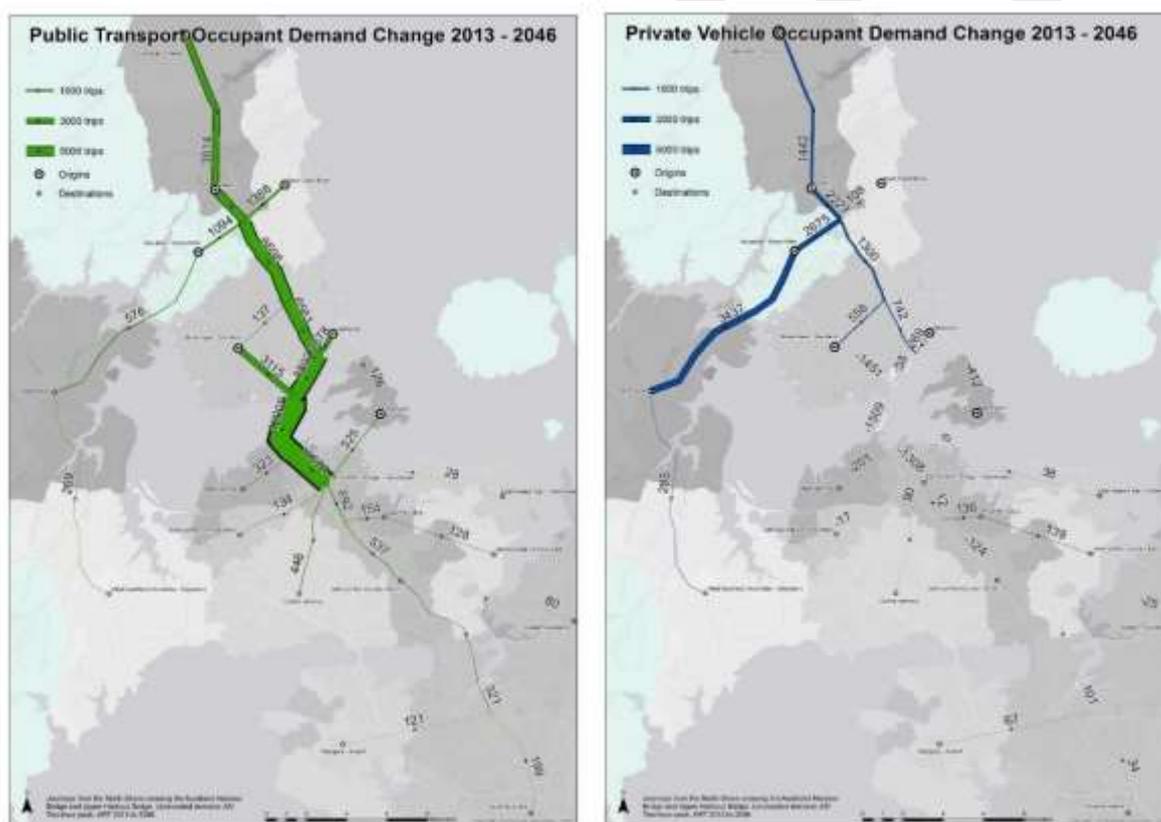


Figure 5: Forecast change in AM peak PT and private vehicle travel demand for trips from the North Shore to zones outside the North Shore.

¹⁵ Parking prices can have a strong impact on mode share, as they make up a large share of the overall cost of travel for city centre-bound private vehicle trips. For instance, the daily rate to park at AT’s Downtown Carpark is currently \$24, which is equivalent to over an hour of travel time based on NZTA’s EEM parameter for average value of travel time on urban arterial roads during the AM peak (\$21.79/hour in 2015 NZD; calculated from Tables A4.3 and A12.2).

The North Shore RTN Study also considered alternative scenarios for growth in PT demand from the North Shore across the Waitematā Harbour. Figure 6 below compares the modelled travel demands with historical patronage data for am peak travel on this corridor. The average annual increase in patronage in the last three years was significantly higher than the average annual public transport demand increase forecast from 2013 to 2026. The chart shows linear extrapolation of actual patronage using the average growth rate from the last three years (2013–2015) and from the past ten years (2006–2015), both of which are higher than the model forecasts.

While the three-year extrapolation is considered too short to inform a view on a 30 year forecast and is shown for context, the ten-year extrapolation is a more valid picture of underlying trends. By 2046, the ten-year linear extrapolation is 13 per cent higher than the ART model outputs, which equates to bringing forward growth or the timing of a required change by about 5 years. Thus, while it is not expected that travel demands will grow linearly for the next three decades and may be influenced by a range of factors, the ART model forecast appears to fall at the lower end of likely demand growth rates.

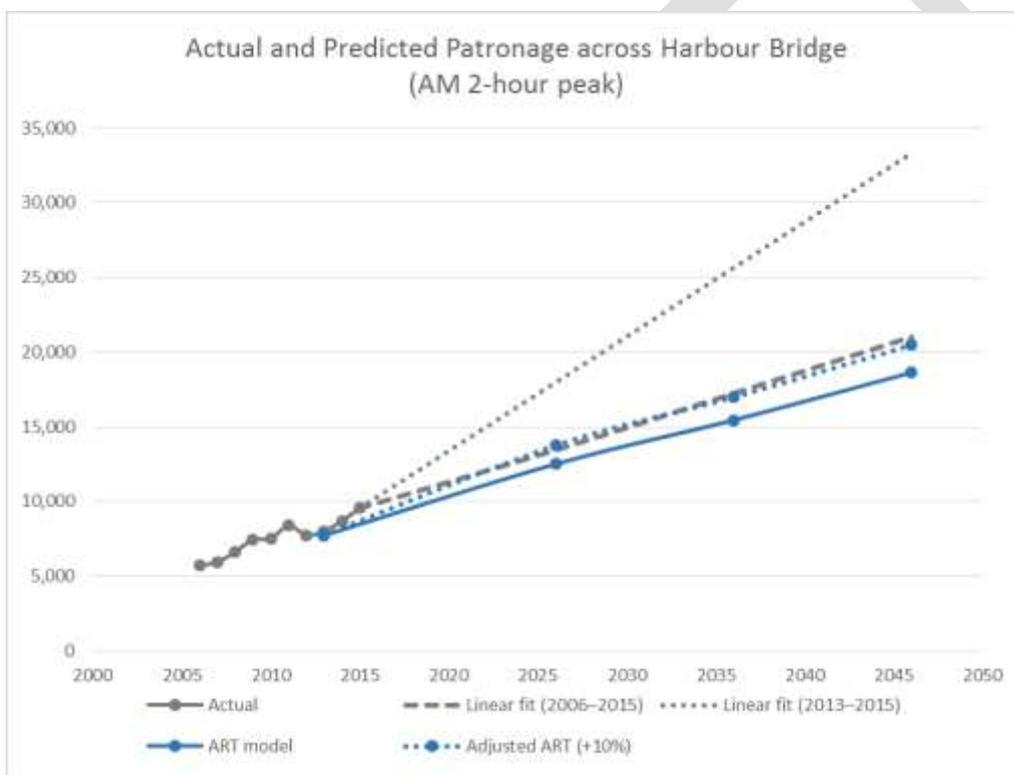


Figure 6: Comparison of public transport patronage across the Auckland Harbour Bridge from ART model outputs (I9 scenario), APT model outputs (CRL scenario), and actual screenline counts.

Conversely, there is a possibility that ART forecasts may overestimate future PT mode share. The ART model ATAP Common Elements scenario used for future growth and demand analysis does not include the AWHC, and additional capacity for private vehicle travel across the harbour may reduce future PT mode share relative to the ART model forecasts.

On balance however, historical patronage growth trends suggest there is a greater risk that ART forecasts underestimate rather than overestimate future public transport demands. The upside risk

associated with demand estimates is more strongly supported by the fact that observed outcomes have consistently exceeded forecast demands. Unless demand falls to get back in line with ART forecasts, it will accelerate the date at which public transport capacity upgrades are required. Furthermore, if the more rapid growth observed over the past three years is sustained over a reasonable time horizon, it may affect the optimal capacity solution.

Lastly, we note that land use forecasts underpin transport demand forecasts. **Error! Reference source not found.**7 below illustrates ART model inputs for projected changes in population and employment density on the North Shore. Residential development and accompanying population growth is forecast to be concentrated in the Metropolitan Centres, Albany and Takapuna, in Birkenhead and Long Bay within the currently urbanised area and at Silverdale in greenfield development areas. Employment growth is forecast to be concentrated in the City Centre (contributing to cross-harbour transport demands), Takapuna, Wairau Valley, Westgate and Orewa.

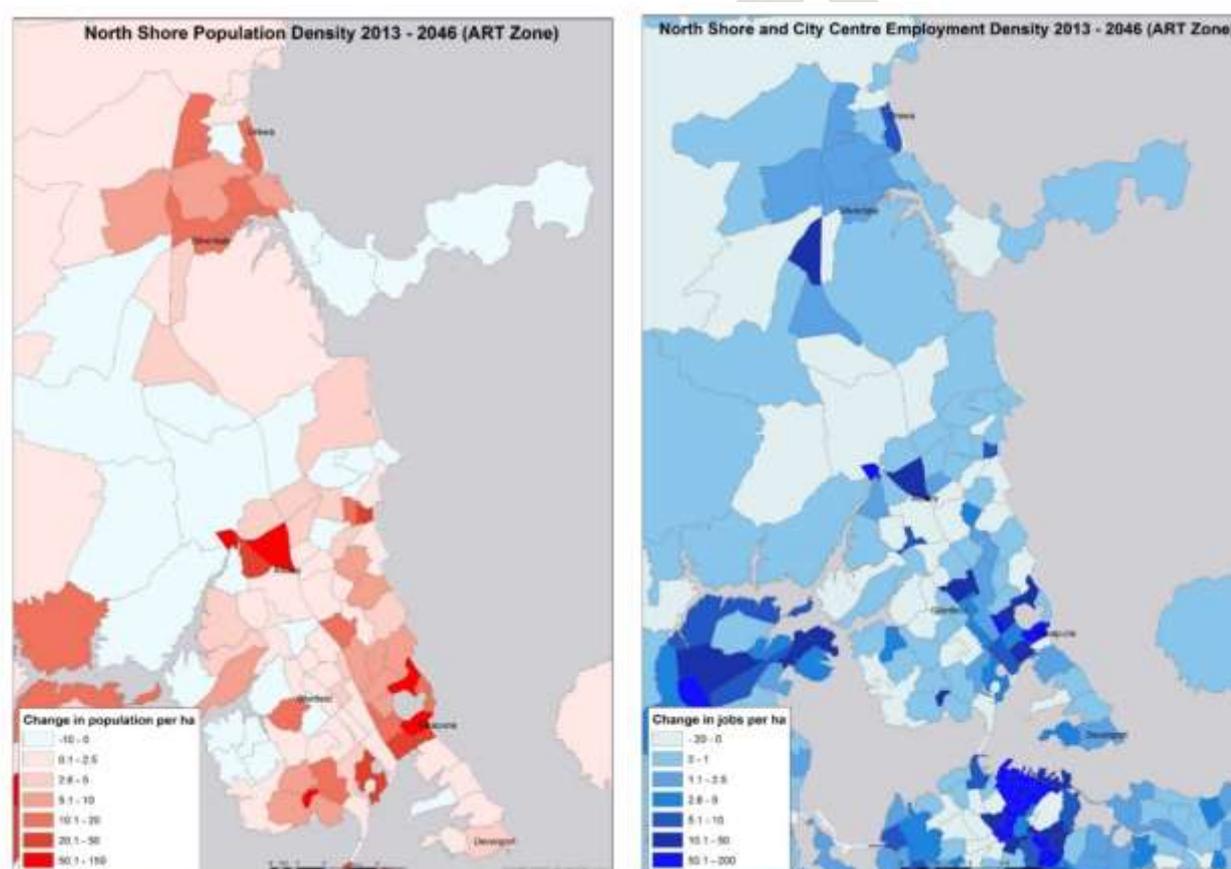


Figure 7: Forecast change in population and employment density 2013 - 2046 (ART model inputs)

Caveats to modelling

As with any demand forecasts, there are uncertainties about the modelling inputs and changes to these inputs may significantly change the demand forecast. For example, key uncertainties include:

- **The land use forecast.** Recent increases in plan-enabled development capacity introduced with the latest changes to the Auckland Unitary Plan may mean the land use forecast is under-predicting the scale and/or location of land use change and consequently the level of PT

demand.¹⁶ Conversely, the land use forecast may be predicting more change than is likely given inherent uncertainties in translating information about plan-enabled development capacity to precise forecasts for the scale, location and timing of development uptake and accompanying population and employment growth.

- **Use of a fixed land use forecast.** A core assumption underpinning the demand forecast is that land use is 'fixed', or held constant regardless of which transport investments are made. This assumption is not necessarily realistic, as there is a two-way interaction between transport infrastructure investment and land use change. For example, North Shore RTN investment may increase the relative accessibility of North Shore locations and hence its attractiveness, accelerating land use change and development. Future stages of the business case process will need to consider how North Shore RTN can shape and enable land use and development, rather than simply responding to a fixed land use forecasts and associated level of demand.
- **Attractiveness of PT modes relative to other modes.** There are uncertainties about ART modelling processes and the modelled attractiveness of PT relative to other modes. For example, recent PT patronage growth rates exceed modelled growth rates. This may mean that ART modelling is under-estimating future PT demand growth.
- **Impact of the AWHC road crossing on PT demand.** The future transport infrastructure scenario used for modelling demand excludes the Additional Waitemata Harbour Crossing (AWHC) and as a result the PT demands produced by the ART model may be influenced by the constraints on the road network.

Evidence on PT demand in relation to functional capacity of the North Shore Busway

The recent study, *North Shore RTN: Transport and land use deficiency and opportunity analysis* (Aurecon and MRCagney for Auckland Transport, 2016) provides evidence that forecast passenger transport demand is likely to exceed the functional capacity of the Northern Busway by the 2030s.

This is a problem of regional and national significance due to the importance of the North Shore RTN in providing passenger transport connections between a major urban residential area (the North Shore) and New Zealand's most significant employment hub (the City Centre, currently the location of over 150,000 jobs, or 23 per cent of Auckland's total jobs).

Key evidence for PT demand exceeding the functional capacity of the existing Northern Busway is provided by the *North Shore RTN* study that compares infrastructure capacity with forecast bus volumes required to meet modelled growth in PT demand in four evaluation years: 2016, 2026, 2036 and 2046. It finds that:

- Current peak-period bus volumes exceed functional capacity already in 2016 at the City Centre end of the busway and at Constellation Station.
- Capacity problems are somewhat reduced by 2026 due to implementation of bus infrastructure improvements in the City Centre. However, Albany Station experiences capacity problems.
- By 2036 operating bus volumes that are sufficient to cater to forecast demand mean significant over-capacity operations in the City Centre and at Albany, Constellation and Akoranga Stations.
- By 2046 capacity problems exist at all major North Shore Stations and in the City Centre.

¹⁶ The Independent Hearings Panel's recently-released report on the Auckland Unitary Plan recommended zoning provisions that enable greater residential development throughout the existing urban areas on the North Shore, but particularly around Takapuna and Albany centres. This is likely to support achieving the ART population projections. The Panel also recommended zoning a significant amount of greenfield land for future growth in the Silverdale area.

The analysis also assesses the performance of the Northern Busway against a broader range of criteria beyond capacity, including: alignment with land use, operational performance, urban amenity, quality, service frequency and span and cost-effectiveness. In addition to the capacity problems summarised above, the assessment also predicts poor performance with regard to integration with land use, operational performance by 2036.

Evidence on transport performance impacts from demand exceeding functional capacity and from inadequacies in Northern Busway infrastructure

The recent study, *North Shore RTN: Transport and land use deficiency and opportunity analysis* (Aurecon and MRCagney for Auckland Transport, 2016) provides an assessment of the forecast performance of the existing Northern Busway in relation to transport indicators including travel speed and reliability for the four evaluation years: 2016, 2026, 2036 and 2046.

The status of the evidence is somewhat limited, and forecast impacts are confined to qualitative assessment based on comparisons of PT demand with the functional capacity of the busway stops and corridors. Later stages of the business case will need to further investigate and quantify travel time and travel time variability performance under a 'base case' Northern RTN infrastructure scenario. The findings from the *North Shore RTN* (2016) assessment are organised by the following main components of the existing North Shore RTN:

- Busway
- Harbour Crossing
- City Centre

Busway: In 2016 performance issues identified include:

- limited capacity, slow travel speeds and variable travel times for the missing segment of busway between Constellation and Albany.
- inadequate size and capacity of Constellation Station to accommodate a large volume of bus services and passenger demand.

However, by 2026, the joint AT/ NZTA Northern Corridor Improvements (NCI) project is anticipated to have completed the missing section of the busway, constructed a new Rosedale Busway station and provided an additional platform to Constellation Station, therefore improving these deficiencies.

Nevertheless, by 2026, increased patronage on the busway and busway stations is likely to manifest in over capacity conditions and poor operational performance at Albany Station due to large volumes of commencing services in the AM peak which use up a lot of station capacity. Sunnynook Station which has the shortest platforms of all the busway stations will also be experiencing over capacity conditions affecting dwell times. Akoranga Station is also starting to experience congestion by this time.

By 2036, performance has degraded further at the above stations, whilst Constellation and Smales Farm are now also expected to experience over capacity conditions affecting operational performance (i.e. dwell times).

By 2046 all of the busway stations are expected to be at or near capacity suffering from increased dwell times and greater dwell time variability affecting operational performance.

Harbour Crossing: The assessment of 2016 conditions finds quality, capacity and performance issues associated with the northbound link from Victoria Park (Fanshawe Street) to Akoranga Station via SH1 Northern Motorway including the Auckland Harbour Bridge. This is due to a range of factors including limited bus priority on the motorway itself or on the Esmonde Road off ramp. In the

southbound direction significantly greater bus priority is already in place with a one-way busway from Akoranga Station for over 2km (to south of Onewa Road on ramp) and another bus lane on the City side of the AHB approaching Fanshawe Street. These bus lanes along with the fact that there is more upstream capacity south of the bridge than provided on its approaches from the north means that inbound traffic over the bridge itself (where there is no bus priority) is relatively free flow with minimal bus journey time variability experienced here.

The Additional Waitematā Harbour Crossing (AWHC) project is currently undergoing further design development ahead of route protection and as such the proposed level of bus priority as part of this project is not yet know. However, the previous plans (2010) proposed dedicated bus lanes on the AHB itself as well as a bus only bridge linking the northbound 'kerbside' bus lane to the two-way busway on the eastern side of the motorway south of Esmonde Road. These are expected to improve travel time and reliability performance on this section of the North Shore RTN from 2026.

City Centre: The city centre extension of the busway from Victoria Park to Britomart and Learning Quarter has been shown to be the weakest link in the North Shore RTN for every assessment period.

In the 2016 assessment year, significant issues are evident with the operational performance of all City Centre sections of this RTN extension. However, by 2026, a significant improvement in city centre bus infrastructure has been assumed. These interventions, while still conceptual in nature and subject to funding commitments, could improve operational performance. However, these upgraded bus priority corridors and new termini are still constrained by signals at intersections. As such even in 2026, soon after implementation the city centre infrastructure is likely to only just provide sufficient capacity to meet demands.

By 2036, all City Centre corridors and termini are likely to be under sustained pressure in peak times at between 102-108 per cent of capacity. This is likely to lead to degraded performance, with dwell times becoming more variable, increased bunching of buses and accumulation of passengers at stops congesting footways. It is in by this time period that the performance of the busway is likely to no longer be to an acceptable RTN standard.

By 2046, virtually all parts of the City Centre used by buses would be operating at over 110 per cent of theoretical capacity, and with highly degraded and unacceptable levels of performance (slow and highly variable travel times).

Evidence on wider economic impacts of poor transport performance on the North Shore RTN

There is some evidence that future poor passenger transport outcomes on the North Shore RTN will have negative economic impacts. Evidence for the 'wider economic benefits' of improved North Shore RTN will need to developed further as part of later stages of the business case process, potentially including some degree of quantification in the Economic Case.

Economic theory and evidence suggests that improved transport accessibility, including PT accessibility, can lead to economic benefits over and above the benefits to transport users. This includes higher economic productivity as a result of increased agglomeration economies. This suggests that North Shore RTN investment that can overcome accessibility or transport capacity constraints to the Auckland City Centre may have regionally and nationally significant benefits for economic growth and productivity.

Kernohan and Rognlien (2011) review several ways in which transport improvements can lead to wider economic benefits.¹⁷ They find evidence for four key mechanisms through which wider economic impacts may arise, including:

- Agglomeration economies, i.e. the economic benefits associated with increased scale and density of economic activity;
- Imperfect competition benefits, i.e. the additional savings from reductions in the cost of business travel in imperfectly competitive markets;
- Labour supply benefits, i.e. the impact of reduced commuting costs on labour market participation and hence income tax collections; and
- Job relocation impacts, i.e. the wage and productivity increases arising when major transport improvements allow people to move to higher-productivity locations.

Kernohan and Rognlien's findings were subsequently incorporated into recent updates to the NZTA's Economic Evaluation Manual, and their proposed methodologies for quantifying these benefits have been applied in a number of projects.

Agglomeration economies tend to account for the majority of wider economic impacts of major transport projects. These arise from fixed costs in production or increasing returns to scale at the firm level (Fujita, Krugman and Venables, 2001) or knowledge spillovers or improved potential for specialisation between firms and workers (Glaeser, 2008). This enables businesses located in larger or denser areas to be more productive. Following Alfred Marshall, there are three main "micro-foundations" for agglomeration:

- Geographically concentrated industries can support a wider and more specialised range of local providers of inputs and better supply-chain linkages
- Increased accessibility between firms and workers can support labour market pooling, which increases productivity by better matching workers to jobs and enabling firms to better adjust their labour input in response to demand shocks
- Geographic proximity facilitates knowledge spill-overs between firms and between workers.

A number of empirical studies have confirmed a relationship between locations' 'effective density', or their accessibility to a larger number of other firms or workers, and higher productivity levels. There is evidence of bidirectional causality at work – i.e. higher density/accessibility leads to higher productivity, and vice versa (Graham et al, 2010). In New Zealand, Maré and Graham (2009) have studied agglomeration economies in different industries, finding a positive (causal) relationship between the effective density of employment and productivity. This relationship tends to be strongest in service sectors that tend to locate in major centres, including financial services, professional services, and retail trade.

Maré (2008) provides further evidence on the "Auckland productivity premium". As shown in Table 4, the Auckland urban area is 29 per cent more productive than the rest of New Zealand even after adjusting for industry composition. He finds an even higher productivity premium of 72 per cent in the Auckland City Centre, which is the city's most accessible and dense employment centre. The North Shore as a whole also enjoys a productivity premium relative to the rest of the country, albeit not as large a premium.

¹⁷ Kernohan, D. and Rognlien, L. 2011. Wider economic impacts of transport investments in New Zealand. *NZTA Research Report 448*.

Table 4: Auckland's productivity premium, 2006 (Source: Maré, 2008)

Area	Value added per worker (VAPW)	Industry-adjusted VAPW	Productivity premium (industry-adjusted)
New Zealand	\$52,037	-	-
New Zealand excluding Auckland	\$45,440	\$48,126	-
Auckland Urban Area	\$68,435	\$61,943	+29%
Former Auckland City Council area	\$76,930	\$66,836	+39%
Auckland city centre	\$106,873	\$81,638	+72%

If observed relationships between transport accessibility, effective density, and productivity continue to hold true, then it is reasonable to expect reductions in the performance of North Shore PT will reduce agglomeration economies in Auckland. Longer or less reliable commuting for some North Shore residents and constraints to peak-period capacity of the overall passenger transport system (both road and public transport) will constrain the growth of employment and limit labour market pooling.

However, further analysis, potentially including modelling of the agglomeration benefits of alternative transport and land use arrangements using procedures set out in the NZTA's Economic Evaluation Manual, is likely to be useful in establishing the degree to which constraints on PT capacity and reliability will affect economic outcomes. This is likely to be a focus for economic cases, particularly at the Indicative Business Case level.

3.4.2 Status of Problem 2

Further work is needed to provide specific quantitative evidence around problem 2. This should include, but is not necessarily limited to:

- A review of the available engineering feasibility and costing studies to identify costs for different project components or alternative designs, and identify cases where non-integrated designs may physically constrain options for corridor or station development;
- A review of costs associated with planning, investigation, and consenting, e.g. to obtain multiple Notices of Requirement for separate projects on the same corridor;
- A review of the link between road and PT outcomes, particularly focused on the relationship between provision of PT services or rapid transit corridors and road congestion;¹⁸ and
- A more in-depth discussion of the value of preserving future investment opportunities, e.g. to enable the longer-term development of the city's rapid transit and road networks to enable economic and urban growth.

¹⁸ There are a number of empirical studies of the impact of disruptions to PT networks on road congestion. These generally find that unmet public transport demand worsens congestion. See e.g. Ministry of Transport (2014), *The transport impacts of the 20 June 2013 storm in Wellington*; Adler and van Ommeren (2015), *Does Public Transport Reduce Car Travel Externalities?*

4. STRATEGIC CONTEXT

Government provides direction by way of a Government Policy Statement (GPS) on Transport to the NZ Transport Agency, Auckland Council and AT. The 2015-2018 GPS sets out an overall strategic direction and direction for the National Land Transport Fund, which is to drive improved performance from the land transport system by focusing on economic growth and productivity, road safety and value for money. Relevant objectives from the GPS are:

- *A land transport system that addresses current and future demand for access to economic and social opportunities*
- *A land transport system that provides appropriate transport choices*
- *A land transport system that is resilient*
- *A land transport system that delivers the right infrastructure and services to the right level at the best cost*

Given the uncertainties associated with timeframes in staging and delivering future improvements to RTN and the likelihood of North Shore RTN requiring very significant investment, the Government is likely to be involved in future stages.

The Auckland Council, through the Auckland Plan, has a vision to “make Auckland the world’s most liveable city”. Further explanation of the Plan’s view to achieving this through delivering transport outcomes are included below in section 4.1.

The Auckland Plan also refers to planning for an Additional Waitematā Harbour Crossing, see Appendix 6. Of note are the recognition of long-term urban density possibilities, references to further studies (which are yet to be done) and the recognition that any North Shore RTN rail solution will require significant investment beyond that which can be delivered by traditional funding methods, requiring new revenue tools.

Auckland Transport delivers on the Council’s transport outcomes via its Statement of Intent (SOI). Further explanation of the 2015-2018 SOI is included in section 4.1 below.

The Auckland Transport Alignment Project (ATAP) is a joint project including Auckland Transport, Auckland Council, the NZ Transport Agency, Ministry of Transport, the Treasury and the State Services Commission. ATAP is underway to identify and agree on Auckland’s strategic transport requirements. It acknowledges the significant travel demand pressures that Auckland faces. ATAP recognises that route protection for a new Waitematā Harbour crossing needs to progress, as well as integrating public transport and road and investigation into costs and benefits. Further to the ATAP recommendations noted in section 3.4.2:

The existing Auckland Harbour Bridge has limits on its ability to cater for heavy traffic growth, and increased private vehicle and public transport demand. A new crossing has very high opportunity costs meaning it is very important to understand key drivers, alternatives, costs and benefits before any investment decisions are made. Route protection for a new crossing needs to progress in a way that integrates further roading and public transport requirements.

The NZ Transport Agency notes that *Connecting New Zealand* and the *National Infrastructure Plan* give policy direction to the GPS around improving transport network efficiency improving the use of existing networks, and appropriately allocating new investment. These are fundamental to the NZ Transport Agency’s investment principles, in particular the investment hierarchy and basis of the NZTA Business Case Approach.

4.1 Organisational Overview

Auckland Council, Auckland Transport (AT) and the NZ Transport Agency are mandated by the Land Transport Management Act with its purpose “to contribute to an effective, efficient, and safe land transport system in the public interest.”

Auckland Council - Auckland Council is responsible for the Auckland Plan 2012, which guides Auckland’s future over the next 30 years and is intended to tackle Auckland’s challenges, including reducing transport and housing shortages. It outlines overall transport objectives, for Auckland Transport to give effect to it.

Auckland Transport - Auckland Transport is a Council Controlled Organisation with the responsibility to deliver on transport in relation to the Auckland Plan.

NZ Transport Agency - The NZ Transport Agency is the Crown entity with responsibilities to invest in land transport activities, manage the state highway network and provide access to and regulation for land transport. The NZ Transport Agency’s primary function is to promote an affordable, integrated, safe, responsive and sustainable land transport system.

4.2 Organisational Outcomes, Impacts and Objectives

The North Shore RTN Study was required to provide background and input to the AWHC requirements for RTN. The timeframe and programme for the North Shore RTN study is being driven by the AWHC study and accelerated programme to secure a NOR for the AWHC.

Auckland Council

Auckland Council is responsible for the Auckland Plan 2012. The Auckland Plan’s strategic direction for transport (Strategic Direction 13 – Auckland’s Transport) is:

“Auckland expects significant improvements in its transport system so that it works well for business, residents and visitors and supports Auckland’s development and contributes to the health and safety of its people and the character of its places.”

The Auckland Plan states that the vision of becoming the world’s most liveable city will not be achieved by incremental change. It submits that transformational change is required and puts forward six “Transformational Shifts”. Of particular relevance to the rapid transit network are:

- ***Move to outstanding public transport with one system*** - *The congestion on Auckland’s transport network will increase as the population grows. Unchecked, this will have a negative impact on our economic performance and our quality of life. Addressing this congestion requires a transformational shift towards far greater use of public transport and a stronger focus on planning, developing, and operating the entire transport network as an integrated system.*
- ***Radically improve the quality of urban living***

Specific targets of relevance to ensuring effective RTN include:

- *“Double public transport from 70 million trips in 2012 to 140 million trips by 2022”*
- *“Increase the proportion of trips made by public transport into the city centre during the morning peak, from 47% of all vehicular trips in 2011 to 70% by 2040.”*
- *“Increase the proportion of people living within walking distance of frequent public transport from 14% (2011) to 32% by 2040.”*

Auckland Transport

AT's responsibility in relation to rapid transit planning and implementation is explained in two key statutory documents:

- 1) Regional Land Transport Plan (RLTP) - this identifies AT's approach to investment and lists all future transport investments in the Auckland region over a ten year period, including local roads, public transport services and infrastructure, maintenance and renewals, walking and cycling and investment management activities as well as (NZTA) state highway activities.
- 2) Regional Passenger Transport Plan (RPTP) - which outlines AT's approach to public transport over a three year period. This includes policies that relate to fare box recovery and concessions

The Auckland Transport Board has adopted the following set of strategic themes in it's 2015-2018 Statement of Intent which relate to the Auckland Plan directions:

- Prioritise rapid, high frequency public transport
- Transform and elevate customer focus and experience
- Build network optimisation and resilience
- Ensure a sustainable funding model
- Implement accelerated, adaptive, innovative solutions

Though these are more easily applied to an operational situation than planning for a RTN, these strategic themes are directly related to the transport benefits that a RTN delivers.

NZ Transport Agency

The NZ Transport Agency states its mandate on delivering on the National Land Transport Fund by way of a 2015 Statement of Performance Expectations. The 2015 Statement of Performance Expectations for the Transport Agency gives its overall function as *Planning and Investing in the Land Transport Network*. Its Services and Investment are defined as:

- Investment management
- Public transport
- Road safety promotion
- Local road improvements
- Walking and cycling

The Transport Agency has the Goal:

- Integrate one effective and resilient network for customers

It has two objectives that are particularly relevant to the North Shore RTN:

- Integrate land uses and transport networks to shape demand at national, regional and local levels
- Integrate national and local transport networks to support strategic connections and travel choice

This includes for following expected results:

- Predictable journeys for urban customers

4.3 Alignment to Existing Strategies/Organisational Goals

Planning for a regional RTN, of which the North Shore RTN would form part, is in line with national and regional strategies.

The NZ Transport Agency’s planning programme for an AWHC is accelerated and ahead of Auckland Transport’s RTN investigation planning. There is some risk that planning for an AWHC may be established, ahead of determining the optimal outcome for integrated RTN and an AWHC.

Given the uncertainties associated with timeframes in staging and delivering future improvements to RTN and the likelihood of North Shore RTN requiring very significant investment, funding for delivery is not included in any strategic plan. As noted above, the Auckland Transport Alignment Project recognises these transport funding shortfalls and is investigating delivery mechanisms.

Table 5: Organisational Strategies

Organisation	Organisational Strategies
NZ Transport Agency	National Land Transport Programme, Government Policy Statement, Statement of Performance Expectations, Freight Plans, National Infrastructure Plan National Business Cases,
Auckland Council	Auckland Plan, Auckland Unitary Plan, Local Board Plans, Long-term Plan, Auckland’s Economic Development Strategy, City Centre Masterplan, Sea Change- Hauraki Gulf Marine Spatial Plan, Centre Plans (including Silverdale, Milford, Takapuna), other Council strategies that may be relevant - Arts and culture, Asset management plans, Community and social development, Housing, Infrastructure planning, Parks, sport and outdoors, Waste, Youth
Auckland Transport	Auckland Plan, Statement of Intent, National Land Transport Programme Regional Land Transport Plan, Regional Public Transport Plan, Integrated Transport Plan, current planning for regional state highways, roads, RTN and FTN.

5. ANTICIPATED STRATEGIC FIT & EFFECTIVENESS

The overall strategic fit for investing in planning for North Shore RTN is assessed as being High. Appendix 7 provides an explanation of this assessment, within the NZTA Investment Assessment Framework. A rating of H/M/_ has been assessed. At this stage, there is not enough information to properly assess the effectiveness or a benefit cost appraisal. Further information on economics will be available during the Financial Review and will be assessed during future stages of the business case. Notably, the AWHC investigation has an investment profile of H/H/0.5.

The North Shore RTN provides around 23 per cent of the regional morning peak period PT trips into the city centre. Aside from ferry, it provides the only viable PT access to the city centre. The North Shore RTN is a core component of the regional rapid transit network and it is strategically important to ensure RTN provision into the future.

Section 4 explains the context of the AWHC in terms of the Auckland Plan. Other considerations include the fact that the North Shore RTN has potential to include access to the metropolitan centres of Albany and Takapuna, the fact that it links people to the city centre and onwards across the region.

The relevant expected long term results from the GPS objectives are:

- Support economic growth and productivity through the provision of better access to markets, employment and business areas
- Support economic growth of regional New Zealand through provision of better access to markets
- Provide appropriate travel choices, particularly for people with limited access to a private vehicle
- Improved network resilience at the most critical points
- Delivery of the right infrastructure and services to the right level
- Improved returns from road maintenance
- Improved returns from public transport

Relevant investment performance measures for investigation into future improvements to North Shore RTN are included in Section 3.3, Table 2.

6. KEY FINDINGS/CONCLUSIONS AND NEXT STEPS

The need to plan for an improved RTN is pressing. Imminent land use growth means that Auckland Transport needs to investigate future improvements for the North Shore RTN now, to understand how these fit with planning for an AWHC and the overall transport network.

The NZ Transport Agency is currently planning for route protection for an AWHC. An AWHC could enable future improvements to North Shore RTN. Integrated planning for the North Shore RTN and an AWHC is crucial to achieving cost-effective regional road and public transport outcomes.

Auckland Transport needs to continue to work with the NZ Transport Agency to understand future transport network requirements and to protect for future improvements to North Shore RTN as part of an integrated approach to an AWHC.

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PROJECT PLAN FOR THE NEXT PHASE

7. SCOPE

7.1 Purpose

The purpose of the Programme Business Case (PBC) for planning for future improvements to the North Shore Rapid Transit Network is to investigate and develop a preferred programme of activities for integration with the AWHC project, for further investigation as part of an Indicative Business Case, which will best achieve the benefits and outcomes defined in this strategic case.

A Programme Business Case for future improvements to the North Shore RTN is currently being scoped, using the existing evidence base, outlined in Section 3. The PBC is scheduled to be complete by October/November 2016. This will then be considered along with future AWHC business case processes to develop programmes to take forward for assessment.

Along with Figure 2 (which contains more detail), the diagram in Figure 8 explains how AT and the NZ Transport Agency are working together through the Business Case Approach. It is anticipated that once the North Shore RTN Programme Business Case is complete, that this work, along with the NZTA AWHC preliminary business case, be subject to a Programme Review and a Financial Review¹⁹. These will help to identify any gaps and to scope a joined-up approach to an Indicative Business Case, which still enables AT and the NZ Transport Agency to carry out work within their statutory scope.

¹⁹ Note that in light of ATAP work which suggests that an AWHC is not required as soon as the project had proposed, a hold has been put on the planned Programme Review and Financial Review. The NOR will go ahead as planned but further business case work related to the AWHC is on hold.

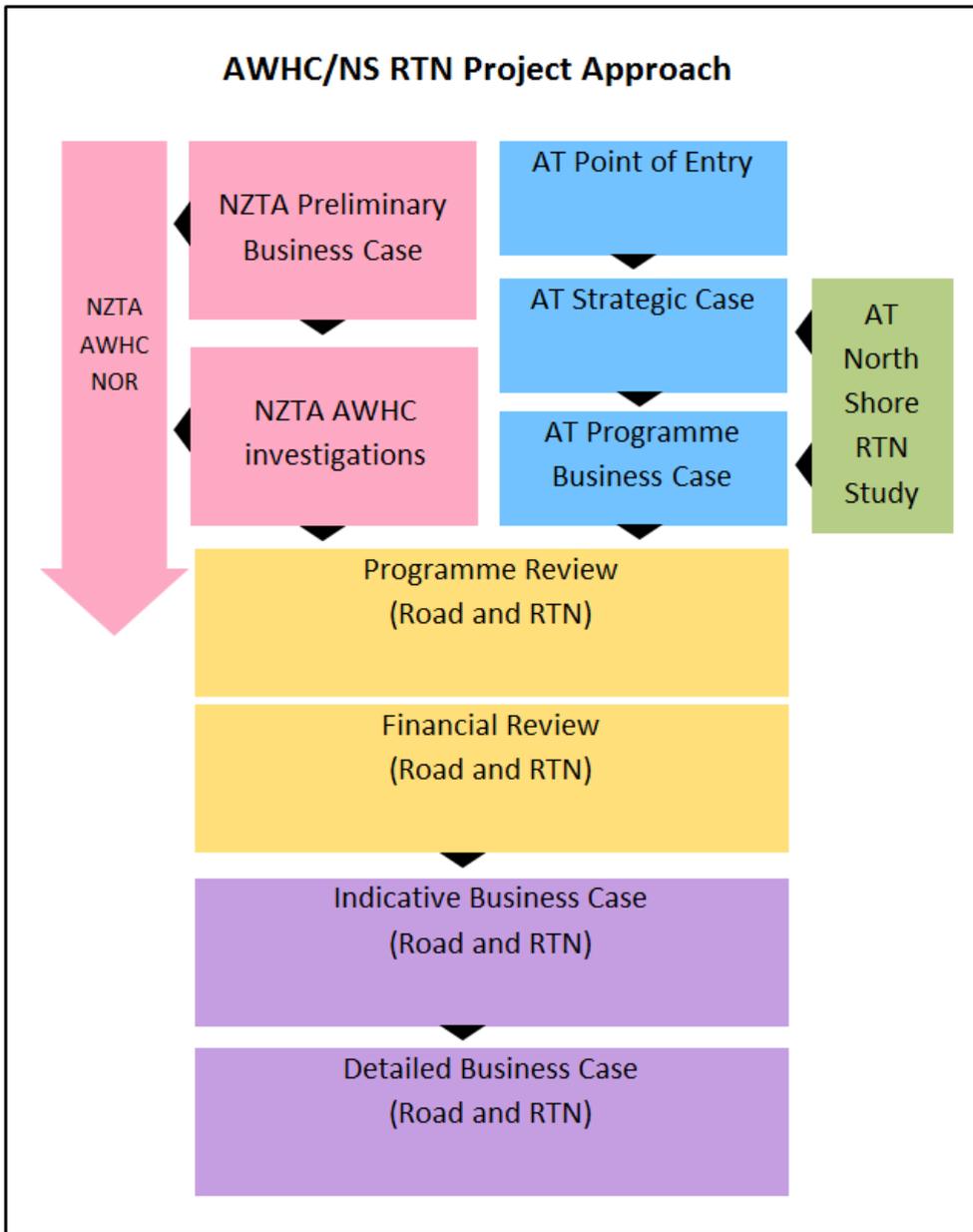


Figure 8: Anticipated AWHC and NSRTN planning programme

7.2 Key benefits

Benefit 1: Planned residential and employment growth in Auckland is enabled.

Benefit 2: Auckland's economic performance is improved by increasing labour market accessibility.

Benefit 3: A high-quality PT service benefits users and increases PT mode-share, improving the efficiency of Auckland's wider multi-modal transport network.

Benefit 4: North Shore PT services operate efficiently and cost-effectively.

Benefit 5: Public spend is minimised.

Benefit 6: PT and road investment outcomes are optimised.

7.3 Geographic boundary

The area of influence for the North Shore RTN is large and is highly connected to the surrounding transport systems (bus networks, rail network, state highway and road networks) as well as land uses (in particular expected growth) and natural/geological features such as the Waitematā Harbour. The regional Rapid Transit Network, of which North Shore RTN is part, can also be far-reaching and strategically influential in city-shaping.

The northern boundary for the project includes consideration of the northern reaches of the Auckland region, focussing on the need to service areas of population growth, notably Warkworth, Wainui and Dairy Flat. Further intensification is expected within the urban limits too. The southern reaches of the project are connections into and integration with RTN in the city centre. State Highway 1 is a key consideration as it is also the route of the current North Shore RTN. Other considerations include access from the west via SH18 and any future SH18 RTN alignment. The maps below show the geographic extent with Figure 9 showing the Unitary Plan map²⁰ of zoning with areas of future growth highlighted in yellow. Figure 10 shows the state highways and existing North Shore RTN.

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²⁰ Recommendations zoning maps, <http://www.aucklandcouncil.govt.nz/EN/planspoliciesprojects/plansstrategies/unitaryplan/Documents/ihprecommendations/upzoningmaplegendmap.pdf>, accessed 17/08/16.

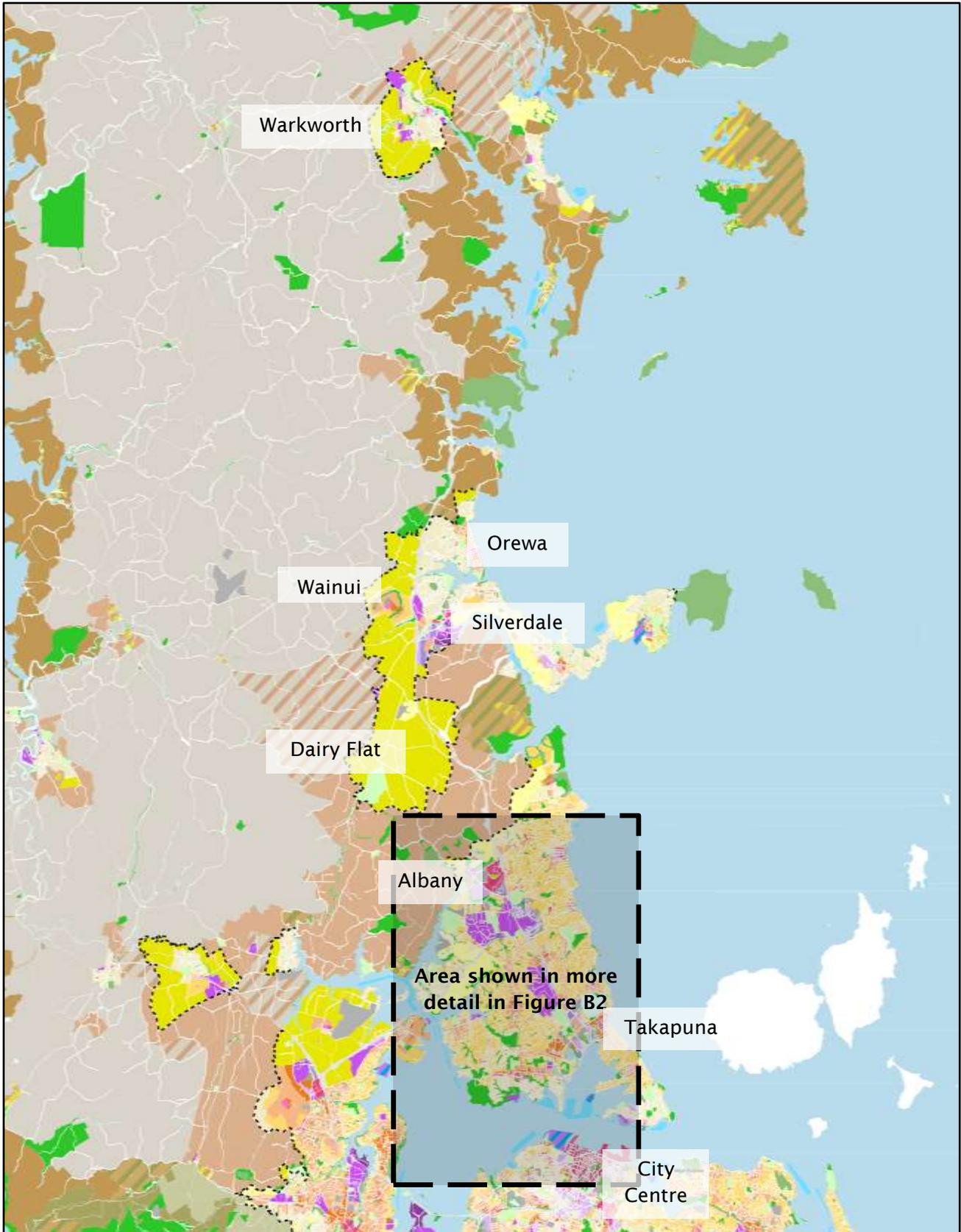


Figure 9: Unitary Plan map, areas of future growth shown in yellow



Figure 10: State highways and North Shore RTN 2016

Scope

The work already undertaken to develop the North Shore RTN Study will be used as the basis of the North Shore RTN PBC.

Gaps in the evidence base for the North Shore RTN strategic case will either be filled or highlighted for further work. In particular, problem 2 relates to the potential efficiencies in AT and the NZ Transport Agency working together. This may still be hard to quantify at the PBC stage, and will be addresses through NZTA's Financial Review of both the AWHC and the North Shore RTN planning.

During the North Shore RTN PBC, further work will be undertaken to define the investment objectives, refine the key performance indicators and determine baselines and targets.

Further transport modelling will be required, including modelling the packages/programmes put forward as part of the PBC. An updated land use scenario will also be required to better-understand the likely impacts of the growth enabled by the Unitary Plan. However, this will not be available until after the PBC stage (this is a challenge currently facing all transport projects, given the recent Unitary Plan decisions, and the approach will be to continue with existing modelling until such time as newer material is available).

Further work is required to understand potential for staging and (if required) integrating/introducing any future "step-change" in mode.

Further developments and directions from ATAP will also clearly need to be taken into consideration in the planning and programming of any future investment.

The NZ Transport Agency had planned a parallel exercise in undertaking a Programme Review and a Financial Review of both the AWHC and the NS RTN planning, expected to run from September 2016 through to 2017 (outlined in Figure 2). The Programme Review proposes a bespoke ILM process to consolidate the problems and benefits relating to the Waitematā Harbour Crossing. The Programme Review will involve a strategic assessment to reframe the problem, refine the benefits and KPIs and identify gaps in the IBC scope. In light of ATAP work which suggests that an AWHC is not required as soon as the project had proposed, a hold has been put on the planned Programme Review and Financial Review. The AWHC NOR will go ahead as planned (lodgement planned for April 2017) but further business case work related to the AWHC is on hold.

The programme business case will be completed within the existing North Shore RTN Study contract (via variation). Section 10 explains project financial management.

7.4 Constraints and assumptions

An underlying assumption in understanding the problems associated with providing for North Shore RTN is expected land use and subsequent travel demand. These will be aligned with what is enabled by the Unitary Plan. There is already a strong direction on this from most recent land use/travel demand modelling scenario (I9, ATAP Common Elements). This scenario will be used until an agreed and updated scenario is available.

Work already undertaken suggests that the current Northern Busway alignment provides the most likely alignment for future improvements to RTN. The Northern Busway runs directly alongside State Highway 1, together these crucial spines of infrastructure both access and sever the surrounding areas. The PBC will consider and test other alignment options.

A key project constraint is the fact that there is only one (viable) crossing of the Waitematā Harbour. Notably, this is an issue from the point of view of RTN resilience; it is also a constraint in terms of options for constructability.

A key assumption is the form and alignment of the AWHC. The Notice of Requirement for the AWHC is anticipated to be notified in April 2017. While the designation sought is compatible with rail options, at the NOR stage, it will not obligate Auckland Transport to provide for rail.

7.5 Interfaces

There are two projects that are likely to be of the most consequence to planning for future improvements to North Shore RTN. These are the Additional Waitematā Crossing and decisions made on rapid transit networks in the city centre, namely the Central Access Programme (City to Airport Mass Rapid Transit).

Existing access between the city centre and the North Shore is via State Highway 1, on the Auckland Harbour Bridge (AHB). The Northern Busway is the core of the current North Shore RTN. In assessing the need for an improved North Shore RTN, options including but not restricted to the AHB and AWHC will need to be considered.

Key to understanding how the North Shore RTN will fit with the wider regional network will be opportunities and limitations to integrating in the city centre. This will involve consideration of the findings to date of the Central Access Programme.

Other projects which interface with the North Shore RTN include:

- Northern Corridor Improvements
- Transport For Urban Growth work
- Wynyard/Fanshawe Corridor improvements
- East-West Midtown PT Corridor Improvements

8. ANTICIPATED STRATEGIC FIT AND EFFECTIVENESS

An assessment of the anticipated strategic fit and effectiveness has been undertaken in accordance with the Transport Agency Investment Assessment Framework. The assessment gives an anticipated profile of H/M/-. Notably, the NLTP includes the AWHC project with an assessment profile of H/H/0.5.

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9. TIMEFRAMES

Given the body of work already existing, the PBC is expected to be complete by October/November 2016. The figure below provides an overview of the North Shore RTN and AWHC programme.

NS RTN & AWHC Programme											
	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17
RTN POE											
RTN SC			AT Board								
RTN PBC			AT Board								
AWHC NOR									NOR lodgement		
NS RTN IBC (TBC)											
AWHC & RTN Programme Review (TBC)											Programme TBC in 2017
AWHC & RTN Financial Review (TBC)											Programme TBC in 2017

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10. FINANCIAL

Financial management estimated cost and financial plan

Auckland Transport has undertaken North Shore RTN Study at a cost of \$350,000. Further work to collate the PBC will cost \$60,000. At a funding/co-investment rate of 51 per cent, it is expected that the NZTA reimbursement for the PBC work will be in the order of \$209,100.

The AT WBS for the 2015/16 financial year was E.700604.07.01.01.

AT has budgeted \$350,000 for the Indicative Business Case work in the 2016/17 year, WBS E.700701.02.02.

Internal resourcing requires the equivalent of one FTE.

Funding conditions

This strategic case is to confirm the NZ Transport Agency's agreement to part-fund or co-invest in the North Shore RTN Programme Business Case. It is understood that this would be by way of a CSA (or other) to The NZ Transport Agency's HNO AWHC work, at a rate of 51 per cent.

11. QUALITY MANAGEMENT

Document management

All key electronic documents will be stored within Auckland Transport's SharePoint system under Key Strategic Initiatives/Rapid Transit Network/North Shore RTN.

Quality assurance

The programme business case phase will be delivered in accordance with NZTA's business case approach and signed-off through Auckland Transport's delegation requirements.

Risk/Issues and opportunities

Top project risks relate to not finding the best outcome to address the problem statements identified in the NS RTN ILM (and for providing an AWHC). As the project(s) progress, key issues such as RTN function, form, network integration, feasibility, constructability, affordability, staging and political support will need to be addressed. In terms of project approach, the business case approach inherently seeks to reduce project risk as the project progresses through stages.

Having two organisations (AT and NZTA) involved in the project, with differing statutory obligations and guiding policies introduces risk. A "One Network Approach" and reframing during the Programme Review stage will help to mitigate this risk.

North Shore RTN management and organisational risks are included in a North Shore RTN Risk Register (SharePoint/KSI/RTN/SNRTN/Project_Risk_Register_NS RTN).

Change control

Any changes to the approach outlined in Figure 8 will be consulted on and agreed as appropriate.

12. ORGANISATION AND GOVERNANCE

Programme organisation

Resourcing and governance structure (internal/external)

Completion of the PBC will be undertaken by AT Strategy Division with the assistance from specialist consultants. Development of the PBC will be in consultation with the NZ Transport Agency and AT internal stakeholders and will be reported through AT management and the AT Board.

Governance and organisational charts

Figure 11 explains Auckland Transport reporting lines for this project.

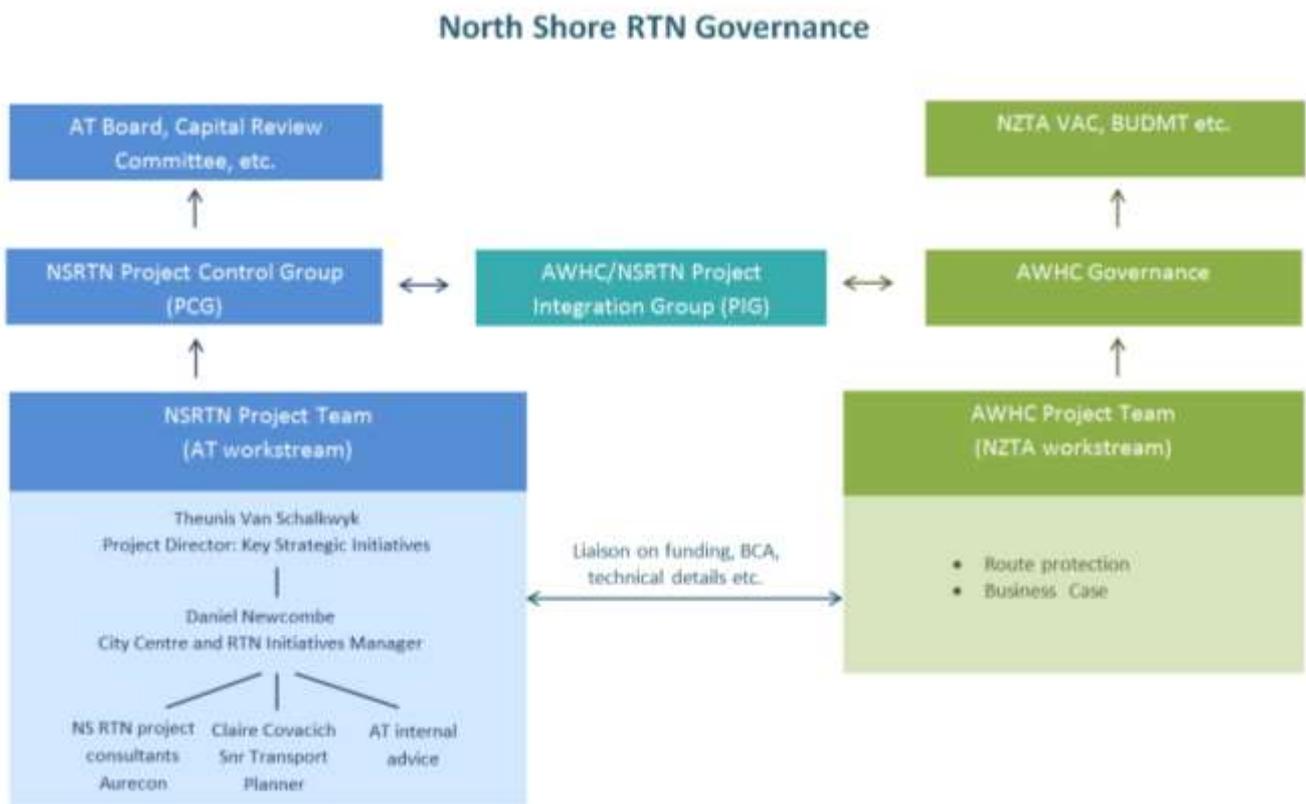


Figure 11: North Shore RTN governance structure

13. COMMUNICATIONS

From a governance point of view, the key project partners, the NZ Transport Agency and Auckland Transport, will provide guidance and make decisions around the direction of the project. From a key stakeholder point of view, departments within these organisations will provide technical advice and direction. Part A, Section 2 provides more information on the project partners and key stakeholders.

Key stakeholders

The area of influence for the North Shore RTN strategic case is large and is highly connected to a wide range of parallel or related workstreams. RTN investment can also be strategically influential in city-shaping. These factors generate a wide range of stakeholders that may have an interest in or may be able to inform and shape the project outcomes.

Table 6 below includes identified stakeholders. Note that stakeholder involvement is also contingent on the level of detailed feedback sought. For instance, Local Boards would be interested in the whole of life of the project, whereas individuals may be interested in more immediate land impacts.

Table 6: Project Stakeholders

Stakeholders	Knowledge Areas
Auckland Council	Regional strategies, land use, unitary planning
Local Boards	Local issues, strategies and community aspirations and views. Likely to be most relevant to immediately adjacent Local Boards, with other Local Boards interested in respect of regional benefits.
KiwiRail	Rail network planning. Any integration with freight
Iwi	Cultural issues and aspirations of Tangata Whenua
Members of Parliament	Community and political views and risks
Councillors	Community and political views and risks
Resident groups	Local issues and community aspirations
Business groups	Requirements, dynamics and risks to business
Transport interest groups	Needs and aspirations of users of all transport modes
Environmental groups	Risks and issues associated with specific environmental issues and wider sustainability
Specific businesses and residents close to option routes	Issues, risks and needs of specific areas

Stakeholder engagement strategy

The project partners will continue to work together to understand the interactions between land use, public transport and road components of the studies.

Along with the project partners, Auckland Council and internal stakeholders will be invited to attend a workshop on option development and assessment. The majority of these stakeholders were involved during development of the North Shore RTN study so have existing knowledge of the project.

External stakeholders will be informed of Auckland Transport's position on the project, as the AT Board are briefed and agree to information becoming publically available

Procurement strategy

The North Shore RTN Study was procured via an open tender, using a Purchaser Nominated Price procedure, in line with Auckland Transport's Procurement Policy and Procurement Strategy. The value of the contract was \$350,000. Aurecon were awarded the contract (#342-16-261-PS). The North Shore RTN Study will form the basis of the PBC. However, as outlined in the scope, further work is required to refine and articulate the PBC. This is being managed as a variation to the Aurecon contract, to the order of \$60,000.

Health and safety management

Auckland Transport is committed to providing a healthy and safe working environment for all those involved with its activities including employees, contractors, volunteers and all other persons working in or visiting our workplaces.

We will achieve this through an effective partnership between management, our employees, and all those working for us that will promote a culture of zero harm and by taking all reasonably practicable steps to ensure the health and safety of all people associated with our operations.

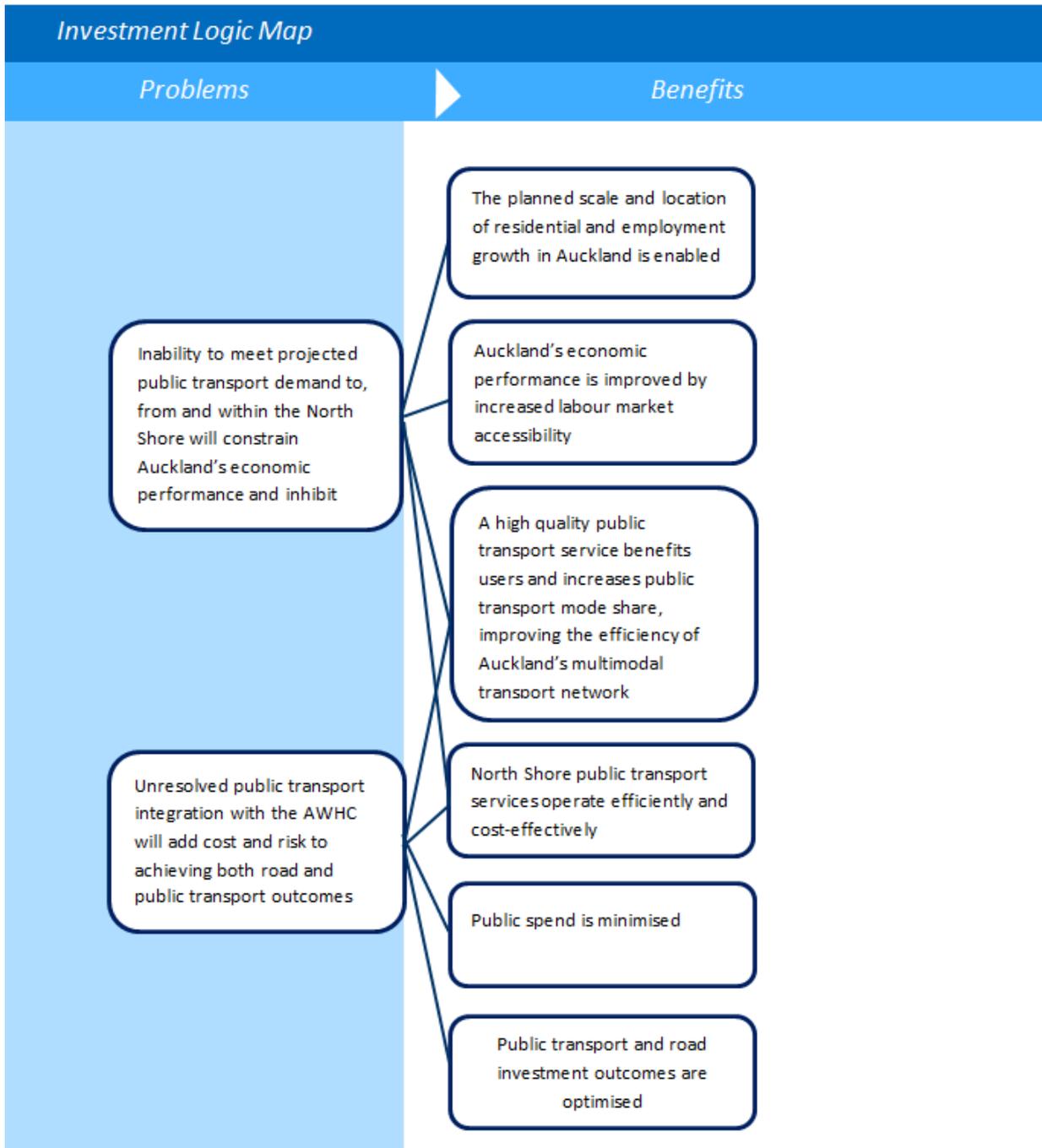
APPENDIX 1 - INVESTMENT LOGIC MAP



An Auckland Council Organisation

North Shore Rapid Transit Network

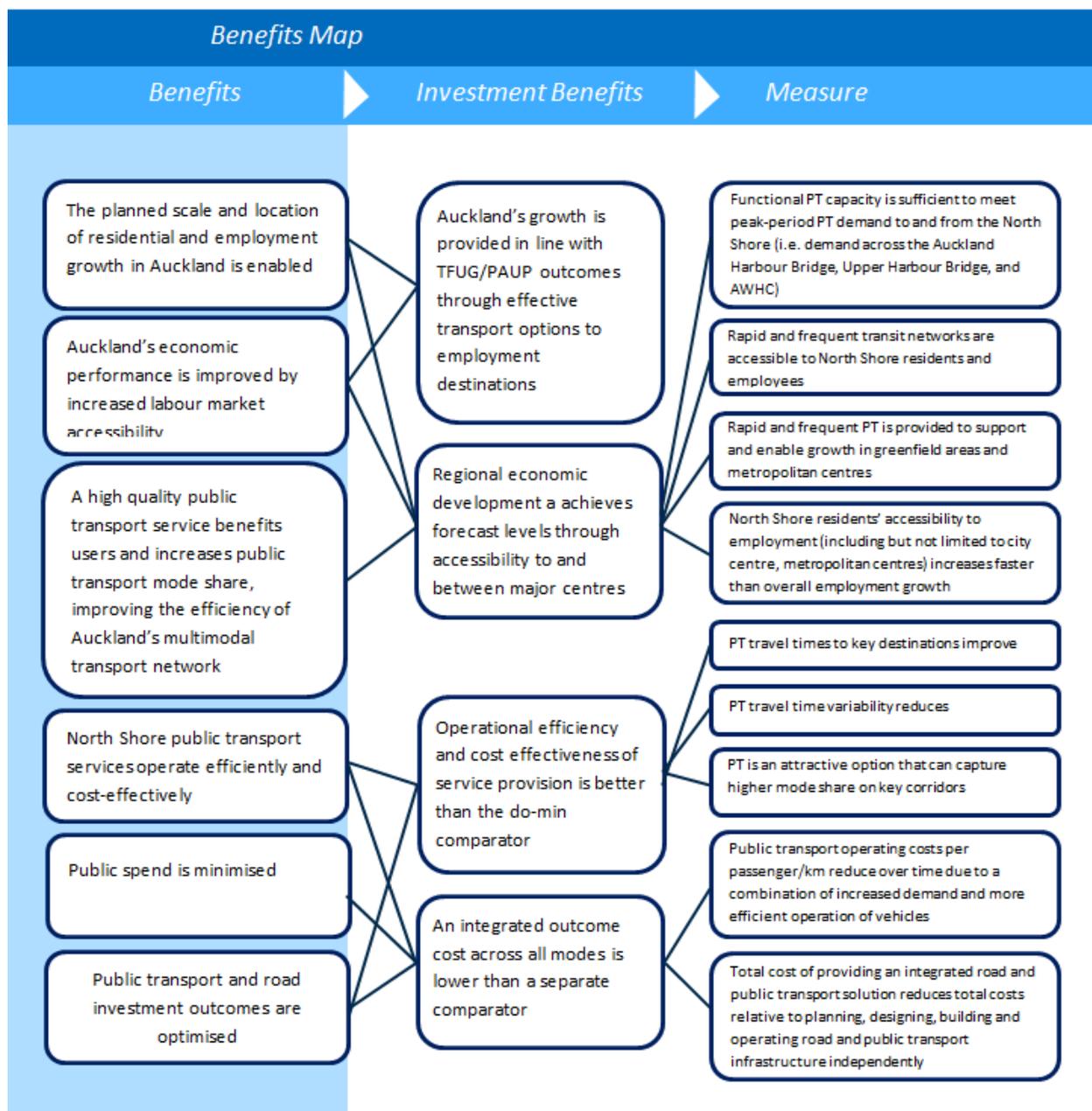
Strategic Case



APPENDIX 2 – BENEFITS MAP

North Shore Rapid Transit Network

Strategic Case



APPENDIX 3 – AUCKLAND’S NORTH SHORE DEVELOPMENT

From Auckland city centre’s early development in the mid-1800s, access across the Waitematā Harbour from the North Shore centred on ferries. Suburbs such as Northcote Point, Bayswater, Devonport and Takapuna prospered. With the advent of vehicle travel, these suburbs expanded and car ferry services increased the range of travel.

In 1959, the Auckland Harbour Bridge opened. While originally tolled, it improved access and spurred development in the North Shore suburbs of Northcote, Wairau Valley, Glenfield, Sunnynook and Forrest Hill. Extensions of State Highway 1 led to a proliferation of inland growth with expansion of suburbs such as Northcote, Glenfield, Wairau Valley, Forrest Hill and further north around the East Coast Bays.

Further development of the SH1 during the 1990s stimulated development around Albany, supported around a decade later by improved access from SH18 from the west. By the mid-2000s, bus mode share was just over a third of morning peak demand into the city centre, with ferries playing a more minor support role. The Northern Busway became fully operational in 2008, providing more reliable public transport access to/from the city centre and establishing a strong growth pattern towards the urban limits. By 2016, the Northern Busway is well-established as the basis of the North Shore Rapid Transit Network (RTN).

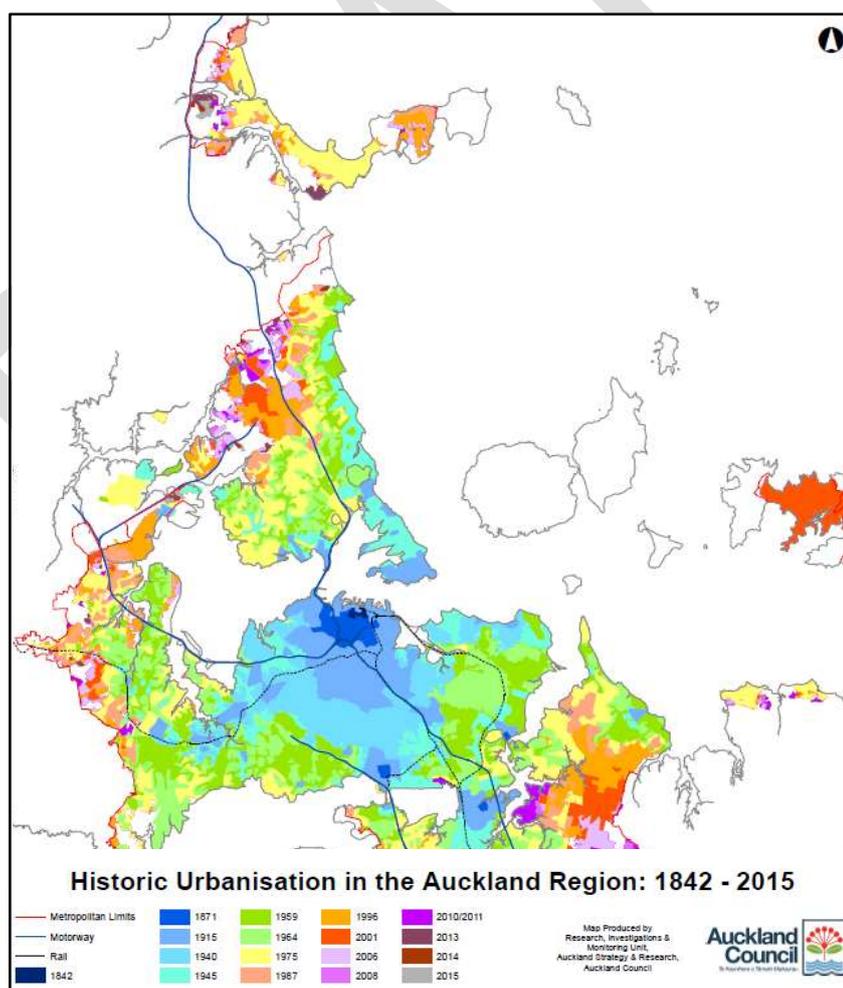


Figure 3.1: Historic Urbanisation in the Auckland Region

APPENDIX 4 – AUCKLAND’S RAPID GROWTH

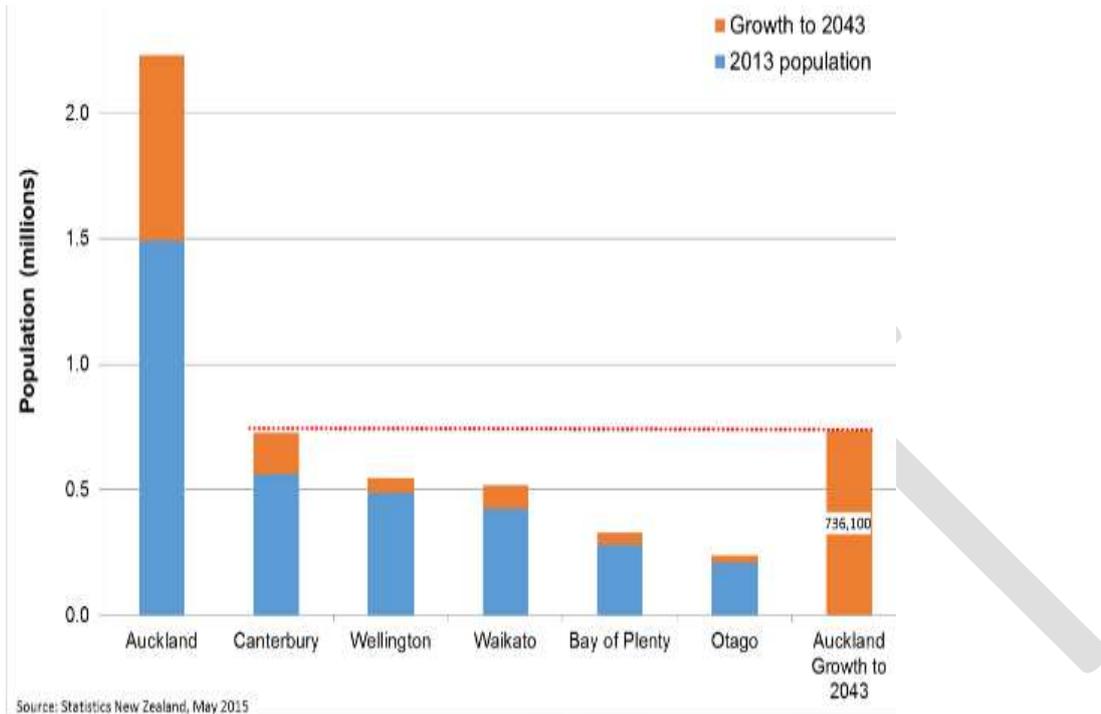


Figure 4.1: Regional Growth by NZ sector

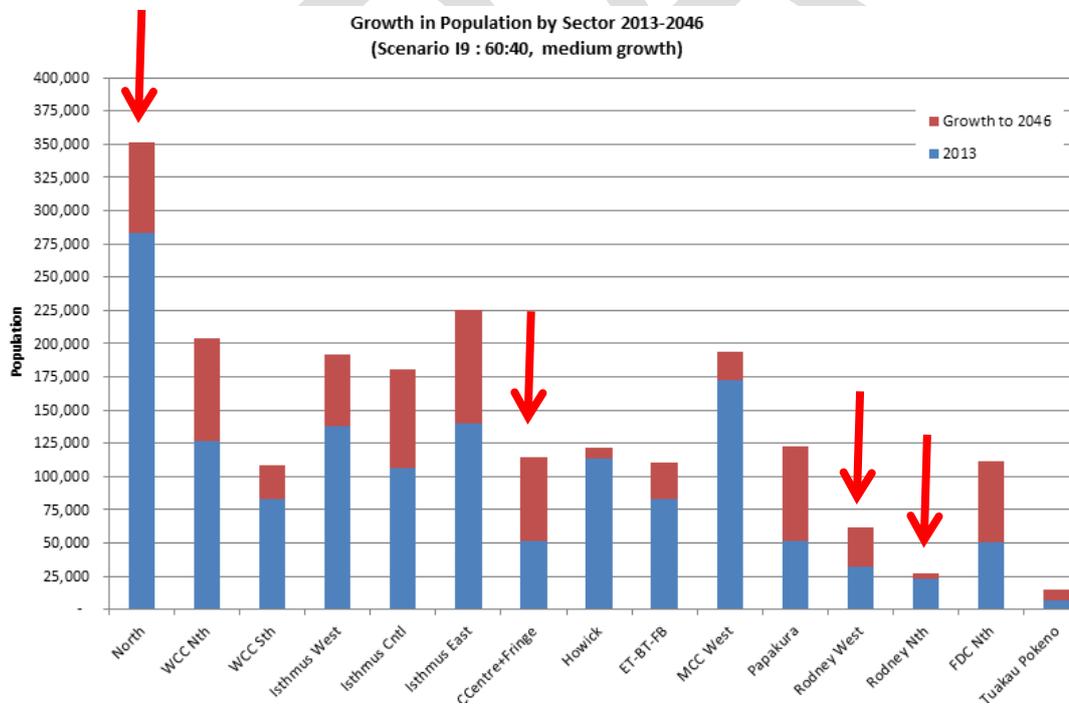


Figure 4.2: Auckland’s population growth by area

Growth in Employment and Education Roll by Sector 2013-2046

(Scenario I9: 60:40, medium growth)

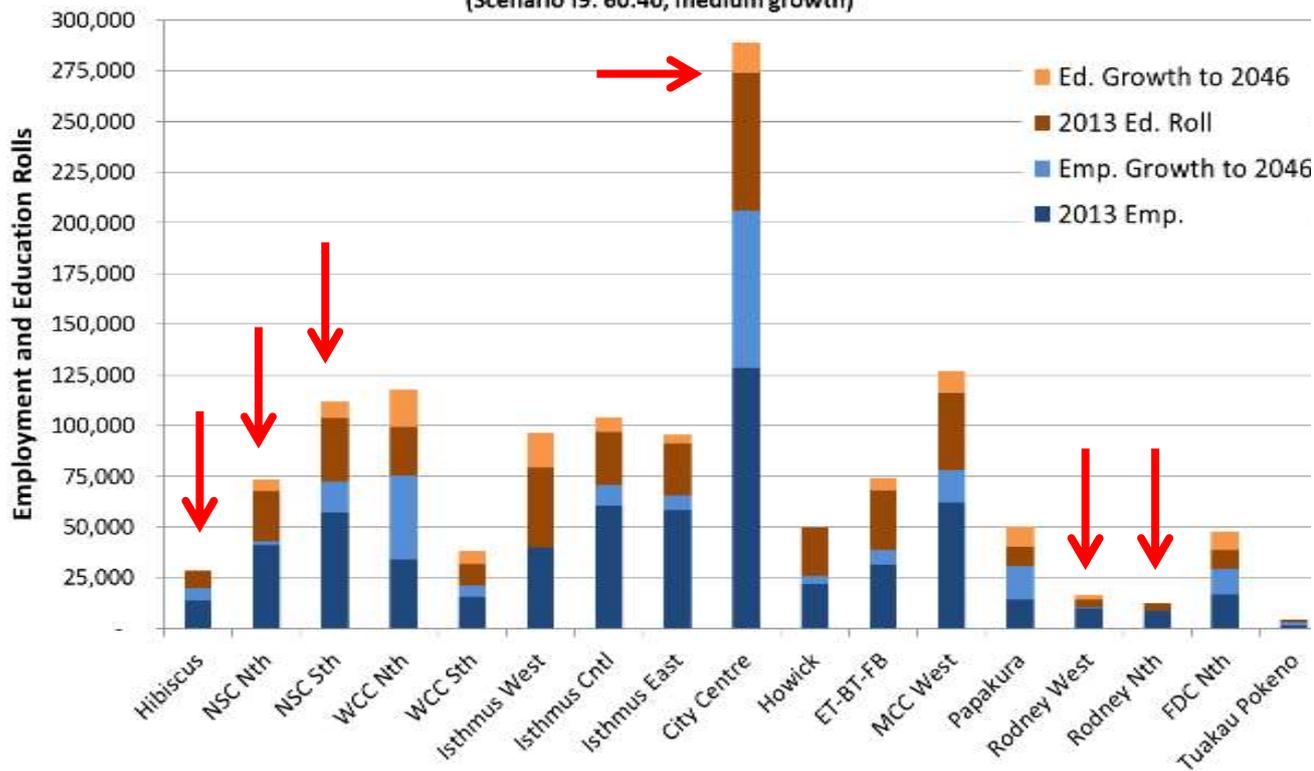


Figure 4.3: Employment and Education Growth

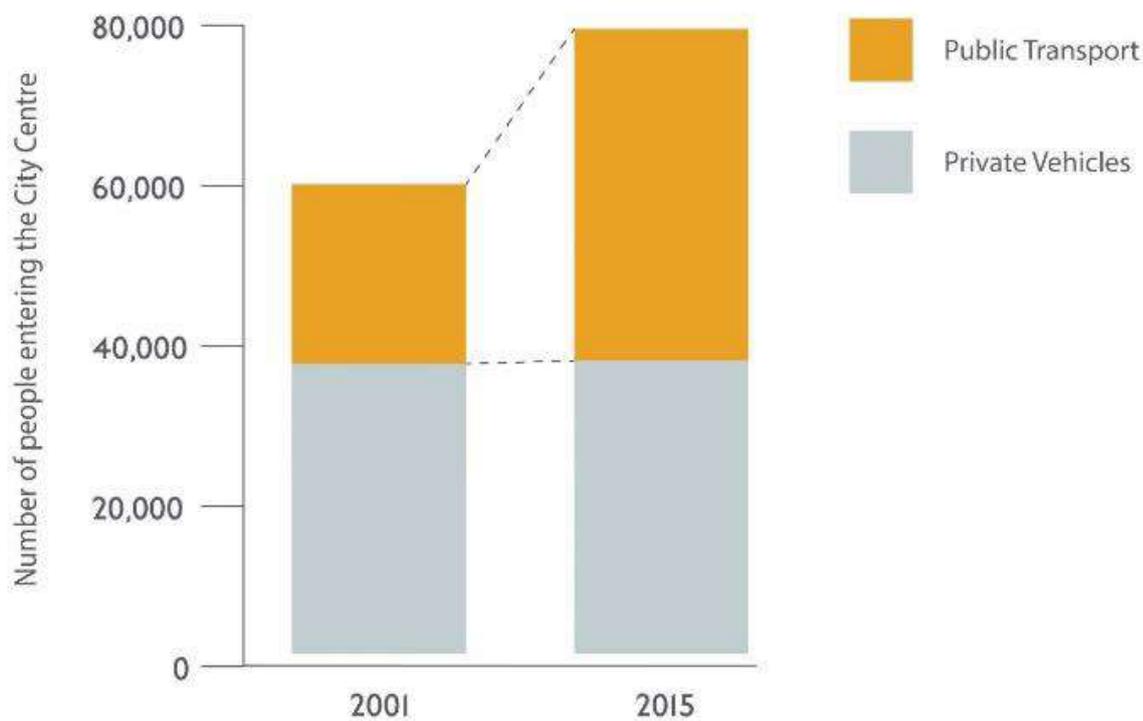


Figure 4.4: Changing access to the city centre

APPENDIX 5 – AUCKLAND TRANSPORT STRATEGIC ALIGNMENT PROJECT REFERENCES TO AWHC/NORTH SHORE RTN

Following are excerpts from the ATAP interim report (21 June 2016) and project update:

- Continued growth in public transport ridership will put pressure on key bus corridors into the central area. Efficiency improvements to the bus network (completing currently planned bus infrastructure improvements, rerouting services and fully utilising benefits of the City Rail Link project) will help to address these challenges. However, substantial further capacity increases will be required to avoid severe overcrowding in the future.
- The existing Auckland Harbour Bridge has limits on its ability to cater for heavy traffic growth, and increased private vehicle and public transport demand. A new crossing has very high opportunity costs meaning it is very important to understand key drivers, alternatives, costs and benefits before any investment decisions are made. Route protection for a new crossing needs to progress in a way that integrates further roading and public transport requirements.
- Enabling growth in newly developing areas requires early investment in route protection and land acquisition, and an early start is needed on key connections in the north-west and south, including investment to support Special Housing Area development.
- Northern Motorway: future enhancements will be strongly tied to timing of Additional Waitemata Harbour Crossing (AWHC) and greenfield growth in the longer term, leading to demand growth north of Albany.
- AWHC: protect route for a new crossing, but further analysis of drivers and timing, and better integration with public transport options is needed before investment decisions are made.

Provide new infrastructure and services: Ensure that transport enables and supports growth:

- New urban growth areas in the north, north-west and south will need investment in transport infrastructure before significant growth can occur.
- Without investment, a lack of transport infrastructure will constrain development in these areas. Early growth areas in the north-west and south require new internal and external connections within the next decade to enable their development.
- An early investment focus on route protection and land acquisition is required to ensure investment is able to proceed when required and in a cost-effective way. Route protection helps avoid incompatible development and reduces the cost of land purchase for key projects.
- Early investment will also be needed to support Special Housing Areas, address current deficiencies and enable a faster rate of development, particularly in the north-west and parts of the south.
- Transport investment within the existing urban area can also unlock growth by providing improved accessibility and making redevelopment more market attractive. Projects like AMET1, which improves access and connections in east Auckland, are important catalysts for growth, especially in the town centres they serve. Similarly, ensuring that planning documents enable growth in areas with good accessibility and spare capacity is an important way to minimise future investment requirements.
- The extent to which a transport investment enables growth should be an important consideration in its prioritisation for funding.
- Further work required for final report: understand which potential investments enable the greatest level of growth, particularly in the next decade.

Addressing Public Transport Capacity Constraints

Continued growth in public transport ridership will put pressure on key bus corridors into the central area

Strong Projected Public Transport Growth

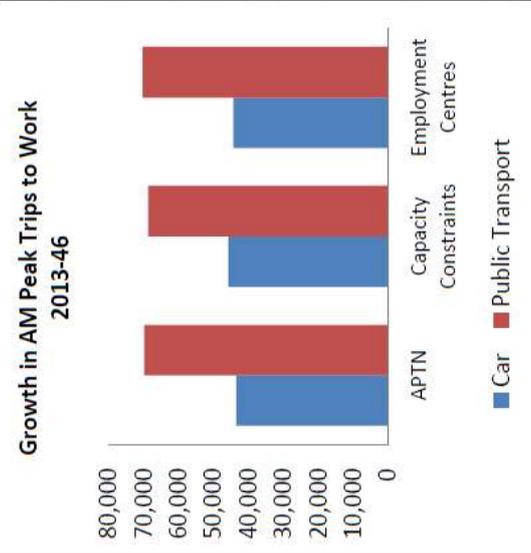
- Public transport ridership is expected to triple by 2046.
- Public transport expected to carry the majority of growth in AM peak trips to work over the next 30 years.

Concentration of Trips in Central Area

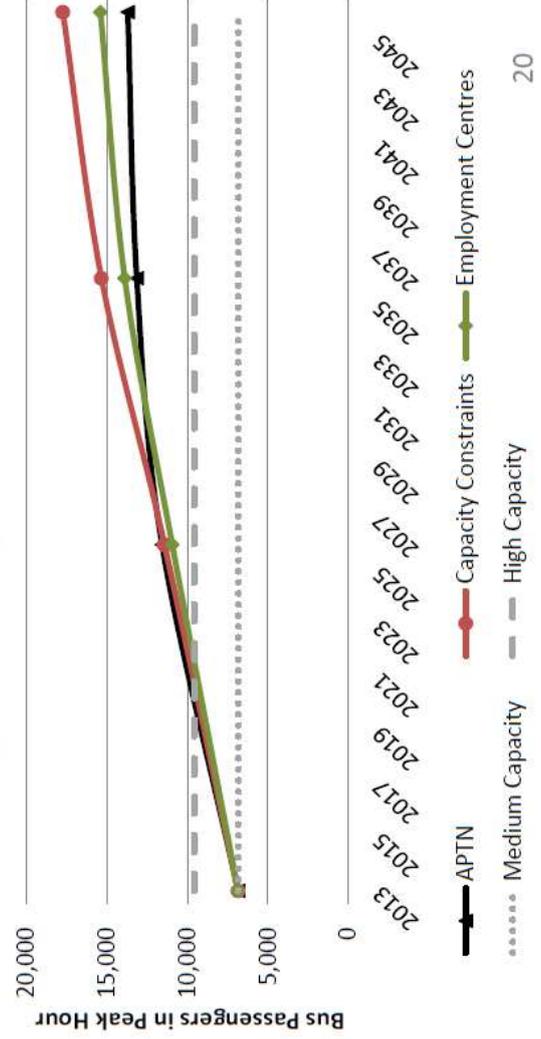
- The greatest concentration of PT trips is related to accessing Auckland's largest and fastest growing employment centre, the central area (city centre & fringe, Newmarket)
- Rail network serves the west, south and eastern parts of Auckland. However, access to central area from much of the isthmus, the North Shore and the northwest currently relies upon buses.

Bus Capacity Constraints

- There is substantial projected growth in bus passenger numbers accessing the central area from the isthmus, North Shore and the northwest.
- The number of buses required to meet this demand is channelled into a few key corridors and is reliant upon limited space within the city centre for passengers to board and alight.
- These constraints will have a widespread impact on the effectiveness of the bus system to meet demand, with widespread overcrowding projected on a variety of routes serving the isthmus, North Shore and the northwest. This will increase delays and decrease reliability.
- In the short term, efficiency improvements to the bus network (completing currently planned bus infrastructure improvements, rerouting services and fully utilising benefits of the City Rail Link project) will help to address these challenges.
- Beyond this, however, it appears that substantial further capacity increases are required to avoid severe overcrowding.



Bus Demand – Symonds Street (Isthmus Access Corridor)



Addressing Auckland Harbour Bridge Constraints

2. Key Learnings

The existing bridge has limits on its ability to cater for growth in heavy vehicles, but any new crossing will require very substantial investment

Preserving the Auckland Harbour Bridge's Lifespan

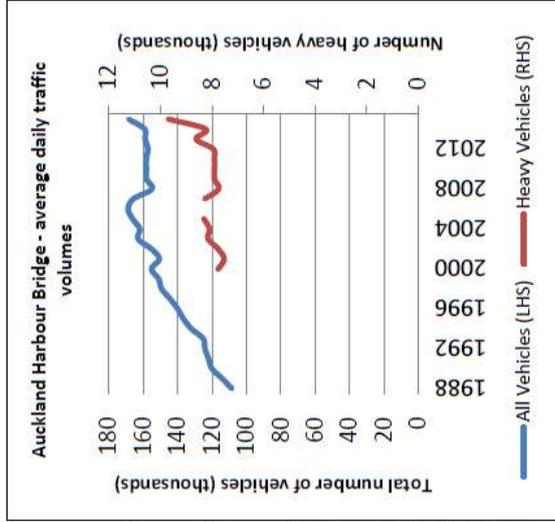
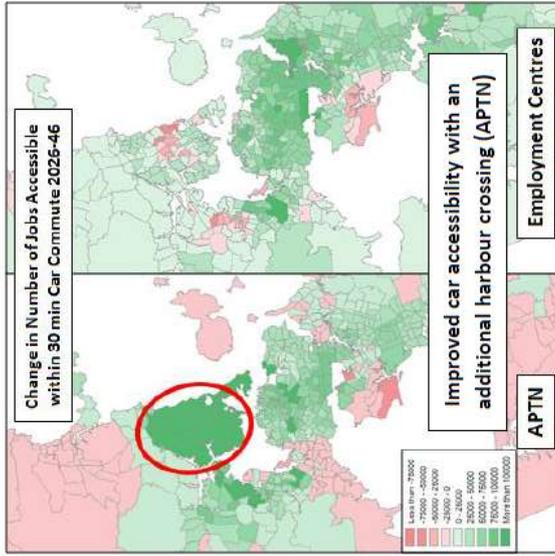
- The Auckland Harbour Bridge is one of the most important pieces of transport infrastructure in New Zealand, being both State Highway 1 and the main connection between the North Shore and the rest of Auckland. Preserving the bridge's lifespan is critical.
- Although strengthened in the past decade, the bridge has limitations in its ability to cater for growth in heavy vehicle traffic. Some level of heavy vehicle management will be necessary in the future to preserve its lifespan.
- Depending on the timing and nature of any restrictions on heavy vehicle traffic, there could be substantial economic costs for Auckland and New Zealand.

Improving access to and from the North Shore

- The bridge and its approaches are a pinch-point on the transport network, particularly during the evening peak in both directions.
- An additional crossing significantly improves accessibility to/from the North Shore but does not appear to substantially improve congestion results.
- Projected growth in public transport demand appears likely to trigger the need for a new crossing within the next 30 years. There is potential for a shared road/PT crossing but the costs and benefits of different options require further analysis.

High cost of potential solutions

- Because any new crossing will be tunnelled, there is a significant opportunity cost arising from this investment. Fully understanding key drivers, alternatives, cost and benefits will be crucial before any investment decisions are made.
- It makes sense to protect the route for a new harbour crossing in a way that integrates potential future roading and public transport requirements.



APPENDIX 6 - AUCKLAND PLAN REFERENCE TO ADDITIONAL WAITEMATĀ HARBOUR CROSSING

BOX 13.4 ADDITIONAL WAITEMATĀ HARBOUR CROSSING

Auckland is likely to need an additional harbour crossing by approximately 2030 to move increasing volumes of freight and a growing population. The capacity of the transport network will need to increase, to respond to the pressure on the state highway network and remove constraints on economic growth. While this Plan foresees significant business and employment growth in the north, large numbers of future employees will still travel from the North Shore around the Auckland isthmus and further south. The additional crossing must make provision for road and public transport (rail), and will require significant investment beyond that which can be delivered by traditional funding methods, requiring new revenue tools.

An additional harbour crossing would improve the resilience of Auckland's transport infrastructure and provide new and better connectivity into and through the central city. Several feasibility study reports on the next crossing have been completed, including a 2010 study comparing a bridge with a tunnel, without recommending either option. Submissions to the Auckland Unleashed discussion document show that Aucklanders prefer a tunnel to a bridge.

The tunnel option aligns the west of the city centre from Esmonde/Onewa Roads to the Wynyard Quarter, emerging around Wellington Street. It has provision for rail, and is estimated to cost \$5.8 billion. This alignment would future-proof suburban rail for a Gaunt Street station and involve the removal of the Victoria Park viaduct completely when the additional crossing opens. With the western alignment, there will be complementary improvements for rail and road access to the port undertaken in the second decade (see [Figure 13.2](#)). Auckland Council acknowledges that there are different views on the alignment of the new crossing, particularly around a possible eastern alignment.

The additional Waitemata Harbour Crossing will make provision for rail, because of the anticipated population and business growth north of the bridge. It will also form a key component of the single system approach to Auckland's transport. Rail to the North Shore will impact on future growth opportunities in northern Auckland, and initial rail route options are being investigated. Long-term urban density possibilities, and the demand for travel by rapid transit, will be taken into account when considering these route options. Further detailed studies will look at the economic, social and environmental benefits and costs associated with the various options. Regardless of the option decided on in the future, rail to the north will be a substantial investment. It is unlikely that any physical work on rail north of the crossing will commence within the period of this Plan.



Figure 6.1 Additional Waitematā – Harbour Crossing

APPENDIX 7 – INVESTMENT ASSESSMENT PROFILE

STRATEGIC FIT (High)

This problem / opportunity identified in the Strategic Case involves journeys for employment, access to economic opportunities and freight, where strategic travel demand modelling shows that there will be a shortfall in PT supply/capacity in future years. This will impact on levels of service for journey time reliability, resilience and mismatched capacity and demand that results in severe congestion.

The North Shore rapid transit network would connect residents living in the North to employment opportunities in the City Centre. It would also improve access to employment opportunities in the metropolitan centres at Takapuna and Albany and tertiary education centres in Albany.

Significant brownfield and greenfield growth is anticipated in the North Shore over the next three decades. Access to and from development is an important factor to its uptake and viability. Investment in North Shore RTN will support public transport mode share, providing faster, more reliable journey times for public transport passengers and road users (including freight).

The North Shore rapid transit network would also increase resilience of the transport network by improving connectivity and providing an alternative mode of travel that is separated from congestion in general traffic lanes, particularly over the Auckland Harbour Bridge (AHB) which is currently the critical link for journeys to/from the City Centre and the North Shore.

EFFECTIVENESS (Medium)

Outcomes Focussed (H) – This activity provides a tangible change relative to the strategic fit outcomes identified in a number of strategic documents including the Auckland Plan and the Regional Public Transport Plan. Investment in the North Shore RTN is expected to alleviate the problems arising from the anticipated brownfield and greenfield growth by providing regional access to employment and education, provide resilience on a critical connection from the City Centre to the North Shore and links with the proposed changes to the AHB.

Integrated (H) - The activity is well-aligned with current network and future transport plans (both regional and national) and land use. It takes into account the continued development of the North as well as growth as a result of intensification. It will also consider the linkages with other activities also in progress within the North growth areas and the Additional Waitematā Harbour Crossing project being developed by NZTA HNO. The project is supported by the two project partners (the NZ Transport Agency and Auckland Transport). The activity will support the wider state highway network and will improve connectivity with public transport services on ancillary corridors.

Correctly Scoped (M) - The planning phase of this activity has been identified in the RLTP and a strategic case is being finalised. For the purpose of developing a PBC, this activity is correctly scoped and is of an appropriate scale in relation to the issue. Work to date shows that at some point during the 2030s, peak travel demand is expected to overtake the practical capacity of the busway, even taking into account planned improvements. Some form of higher-capacity solution is therefore likely to be required for future improvements to North Shore RTN.

Affordable (M) - The development of the PBC is affordable and is considered to be value for money, however no funding has been identified for North Shore RTN within the Long Term Plan or the RLTP.

A funding plan is yet to be fully developed for the overall project, including any cost share agreement with key partners. However Auckland Transport is current working with the NZ Transport Agency on interdependencies between this activity and the AWHC programme being developed. Carrying out robust strategic assessment at the PBC stage of the alternatives and options will enable affordable options to be identified.

Timely (M) - The development of the PBC is timely. Growth in the North is occurring faster than previously anticipated and there is an opportunity to align the delivery of planning outcomes in conjunction with other key activities being undertaken (e.g. AWHC, SH1 Northern Corridor Improvements and TFUG). While the capital funding has not been identified, the planning of major projects is required in advance to ensure that opportunities can be identified for land acquisition early and undertake notice of requirement / route protection. Ongoing benefits are expected to arise from increased rapid transit capacity along the corridor, similar to those observed with the existing Northern Busway.

Confidence (H) - Risks have been identified and are acknowledged. These will be considered further during the development of the PBC, particularly around interdependencies with other activities within the North Shore. The AWHC/NS RTN Programme Review and Financial Review will further consider these interdependencies as well as possible cost impacts.

DRAFT