

Draft Report

# Lake Road Improvements - Indicative Business Case

Prepared for Auckland Transport

Prepared by Beca Ltd (Beca)

6 June 2017

DRAFT

## Revision History

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1.0	Joe Phillips	Draft for Public Consultation	6 June 2017

## Document Acceptance

Action	Name	Signed	Date
Prepared by	<b>Joseph Phillips</b>		6 June 2017
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on behalf of	Beca Ltd		

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## Executive Summary

This Indicative Business Case (IBC) is to improve accessibility along the Lake Road corridor with elements of improvements on Esmonde Road and Bayswater Avenue, and improve the offering for alternative modes in Devonport peninsula, including Takapuna Centre. The corridor encompasses the whole extent of Lake Road between Anzac Street (Takapuna Centre) and Albert Road (Devonport), including Esmonde Road between Lake Road and State Highway 1 (SH1).

The basis for this IBC is the Strategic Case Assessment undertaken in 2016, which draws on the information from the Lake Road Corridor Management Plan (Lake Road CMP) and the Takapuna Centre-Based Transport Study (Takapuna CBTS), both completed for Auckland Transport in 2014, plus other existing information. The purpose of this IBC is to:

- Confirm the problems and the need to address them
- Develop options that address the identified problems and deliver the benefits as well as assess the performance of the options against the Investment Objectives
- Recommend a preferred option package for further development in a Detailed Business Case (DBC).

The project has reached a stage where public feedback and engagement is necessary to continue the evaluation and recommendation of a preferred option to be considered in the next phase, the DBC.

### The Case for Change

Following the earlier studies, an initial strategic case prepared by Auckland Transport identified investment in transport improvements on the Lake Road corridor as one of the highest priorities to be progressed to an IBC, based on the Transport Agency's Investment Assessment Framework. The context is one of ongoing growth in population, jobs and urban intensification affecting the study area. Clear evidence exists of congestion on the corridor, and this is forecast to worsen.

The 2016 Strategic Assessment undertaken for this IBC, identified that the data and information generated through the Lake Road CMP and Takapuna CBTS supported the strategic case for investment to address currently identified problems. It outlined that appropriate investment in public transport, walking and cycling and car sharing will make these modes more attractive alternatives to single occupied cars. Thus, it identified that the investment will deliver increased throughput of people along the corridor, lower journey times for multiple occupancy vehicles and reduced travel time variability.

The identified problems, benefits and Investment Objectives for the investment in the corridor are summarised in **Table 1**.

Table 1: Summary of Problems, Benefits and Investment Objectives

Problems	Benefits	Investment Objectives
Unreliable, Unattractive and Ineffective Alternatives Modes	Transport Infrastructure will Support Current Demand and Future Growth	<b>Investment Objective 1</b> Improve transport infrastructure to support current demand and future growth by reducing overall people travel time on the corridor
Existing Corridor Layout and Lack of Alternatives	Improved Attractiveness and Effectiveness of Alternative Modes	<b>Investment Objective 2</b> Improve the effectiveness of high occupancy modes of transport and healthier transport modes by increasing the number of people throughput
Existing Road Layout and High Vehicle Movements	Improved Community Satisfaction with Transport Infrastructure	<b>Investment Objective 3</b> Improve the attractiveness of high occupancy and healthier transport modes by increasing mode share for these modes

Problems	Benefits	Investment Objectives
	Improved Economic Outcomes for Takapuna and the Devonport peninsula	<b>Investment Objective 4</b> Improve community satisfaction with transport infrastructure

The main problems were identified through an Investment Logic Map (ILM) approach in workshops with the key stakeholders. Unpredictable and high levels of congestion are the most significant issues affecting Lake Road, not only during weekday peak periods, but also on weekends, particularly between Hauraki Corner and Esmonde Road. During the weekday morning peak period, congestion associated with queuing along Esmonde Road accessing the Northern Motorway (SH1) contributes to the high and highly variable travel times for residents leaving the peninsula. All road trips have to use the same road corridor and there is little or no incentive to use other transport modes (i.e. walking and cycling, as well as high occupancy vehicles including buses), plus a lack of alternative route choice for road users forcing them to use Lake Road. Evidence also indicated that around half of the road users are making short distance trips (such as to local schools and employment).

The potential benefits of addressing these problems were identified with the key stakeholders through the workshops and a Benefits Map was developed linking the problems to the resulting benefits of investment in those problems. To support and measure progress towards the identified benefits, a number of key performance indicators (KPIs) were developed relating to each of the above benefits, which were encapsulated in the Investment Objectives for the project. The Investment Objectives and associated KPIs formed part of the evaluation framework used to short-list the investment options.

## Option Development and Assessment

The IBC option development process was based around an understanding of the problems, benefits and outcomes identified through the ILM approach. The option assessment followed a two-stage process, evaluating a long list and then a short list of option packages. Options were assessed by the project team and key stakeholders using Evaluation and Assessment Criteria developed with particular consideration of the Investment Objectives and KPIs.

A wide range of potential interventions were identified and collated from previous technical investigations to form a long list of potential interventions for the Lake Road and Esmonde Road corridors. The long list spanned supply, demand and optimisation options. These included providing light rail and rapid transit on the corridor, as well as options and alternatives to provide improved facilities for pedestrians, cyclists, buses and high occupancy vehicles. Access restrictions and other demand side responses were also considered, together with the reallocation of road space to achieve better people throughput.

A number of the potential interventions identified were small-scale improvements (many of which were identified through the Lake Road CMP and Takapuna CBTS), which could form part of any investment activity. Others were larger scale projects that are being progressed separately by Auckland Transport and its partner agencies (the NZ Transport Agency and Auckland Council), including the proposed Additional Waitemata Harbour Crossing, the Devonport-Takapuna 'Greenways' project and the SeaPath Cycleway.

In addition to these projects, other parallel and complementary activities / projects were identified as being progressed by Auckland Transport, including the planned 'New Network' bus services improvements, ferry service and infrastructure improvements, school and workplace travel plans, as well as new technologies to make better use of existing infrastructure and services (real time information, rideshare apps, journey planners etc.).

The base case consists of these existing and proposed projects that would potentially affect the operational management of Lake Road and Esmonde Road as well as complementing any intervention for the corridor. The base case therefore allows the activity evaluation process to be focussed on the improvement activities that differentiate the investment options in the Devonport peninsula and Takapuna area.

In order to understand the potential for the short list option packages to achieve the IOs, KPIs, Evaluation Criteria and the ILM Benefits, as well as consider the associated risks and dependencies, further conceptual design of the short list option packages was progressed. This considered both some of the key matters raised by stakeholders and also technical matters identified by the project team during the development of the conceptual options.

The long list assessment concluded that the five option packages for Lake Road shown in the **Table 1** had the potential to deliver on the Investment Objectives. The approximate cost and anticipated range of economic benefit to cost ratios (BCR) for the short list option packages determined through the short list assessment is also summarised in **Table 2**.

Table 2: Short List Option Packages - Cost and Anticipated BCR Range

Option	Overview	Rough Order Cost (\$m)	Indicative BCR Range
Package A	Base Case incorporating minor efficiency improvements (kerb lines unchanged)	11.4 (Low Cost)	1.7 to 2.6
Package B	Emphasis on improvements to on-road cycle facilities, with limited improvements to transit lane provision (some alterations to kerb lines, within the existing road reserve)	32.9 (Medium Cost)	0.8 to 1.3
Package C	Emphasis on the provision of continuous transit lanes in both directions where practical, with some reduction in the quality of service of existing cycle facilities (some alterations to kerb lines, within the existing road reserve)	28.3 (Medium Cost)	1.3 to 2.0
Package D	Emphasis on the provision of transit lanes where most needed, with improvement in the quality of service of cycle facilities (some alterations to kerb lines, within the existing road reserve)	29.7 (Medium Cost)	1.1 to 1.6
Package E	Provision of continuous transit lanes in both directions and improved on-road cycle facilities (some acquisition of land, and potentially properties, required outside the existing road reserve)	75.4 (High Cost)	0.6 to 0.9

Typical cross-sections and feasibility plans were developed for each of the options on Lake Road and Bayswater Avenue, whilst draft concept plans for the provision of a westbound transit lane on Esmonde Road (prepared by other consultants) were provided by AT. Summary indicative plans for each option package are shown in **Figure 1**.

All options include repurposing the existing westbound bus lane on Esmonde Road (between Lake Road and State Highway 1 (SH1)) to form a lane for high occupancy vehicles, including on the SH1 southbound on ramp from Esmonde Road. All options also include improved cycle facilities on Esmonde Road (between Hauraki Corner and Takapuna Centre) and Bayswater Avenue.

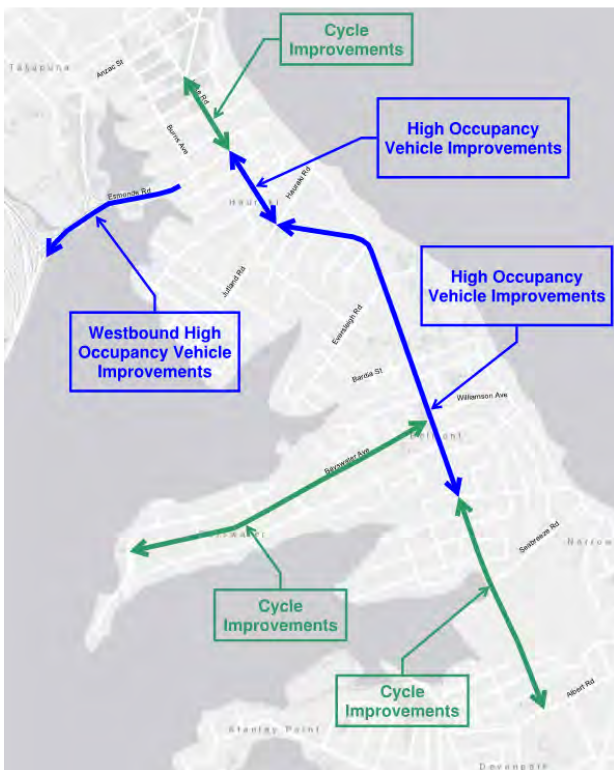
Figure 1: Short List Option Packages – Indicative Summary Plans



Option Package A



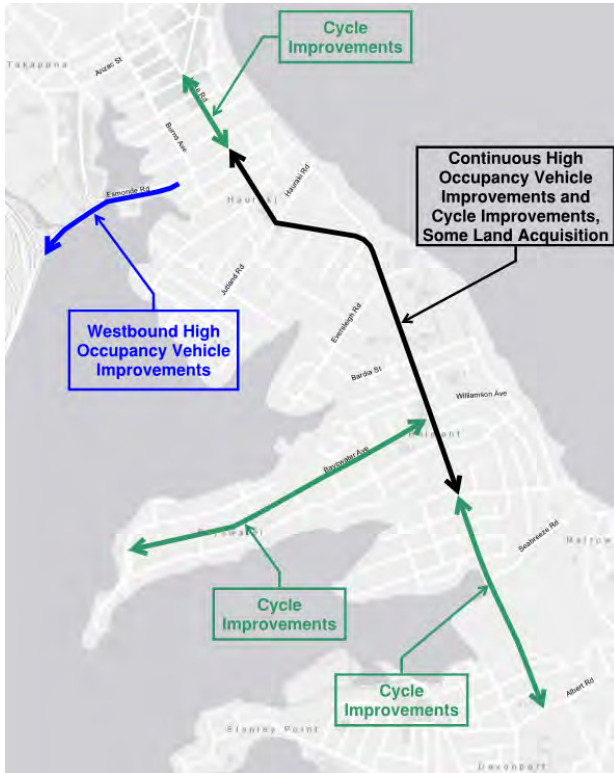
Option Package B



Option Package C



Option Package D



Option Package E

The overall short list option packages evaluation summary against the Investment Objectives, including the summarised benefits, dis-benefits and risks is provided in **Table 3**.

### Recommended Option Package

The project has now reached a stage, where public feedback and engagement is necessary to continue the evaluation and recommendation of a preferred option to be considered in the next phase, the DBC.

On the basis the project progresses to a DBC, the assessment has identified that further investigation of the following matters (relating to the cost, risks and technical delivery) is required through that stage to confirm the preferred option package is optimally scoped:

- **Lake Road Land Acquisition** – The extent and strategy of any land acquisition during construction and permanently to achieve the outcomes sought through the preferred option package
- **Topographical Survey** – Initially focussing on parts of the corridor where there are particular constraints in terms of delivering the preferred option package
- **Effects on Overhead Power Lines and Other Services/Utilities** – Establish where potential undergrounding of power lines is necessary along the corridor, as well as understand impacts other services / utilities on the corridor
- **Lake Road Intersection Treatments** – The extent of transit lane and cycle provision at intersections, which will be informed by detailed intersection modelling of the signalised intersections along the corridor
- **Removal of On-street Parking** – The extent to which this is required, including undertaking parking surveys and liaising with key stakeholders
- **Provision of Transit Lane on Esmonde Road** – Confirm the benefits of this element of the project to high occupancy car users will not be outweighed by dis-benefits to other road users, including investigation of the operational and safety effects
- Initial concepts to be discussed with mana whenua to provide a better understanding of any potential cultural effects associated with the proposed works
- **Other Investigations** – The following other preliminary investigations are likely to be required: Preliminary social and community impact assessment
  - Preliminary arboricultural report
  - Stormwater assessment to determine stormwater treatment and management
  - Preliminary archaeological/heritage assessment
  - Urban and landscape assessment of the preferred option
  - Indicative Erosion and Sediment Control Plan in relation to the potential works at Esmonde Road SH1 southbound on-ramp
  - Constructability review to determine a typical construction methodology.

Table 3: Options Evaluation Summary

Short List Option Packages		A	B	C	D	E
		Base Case	Cycle Emphasis	Transit Emphasis	Transit / Cycle Mix	Transit and Cycle
Investment Objectives	IO1	+1	+1	+3	+2	+3
	IO2	+1	+1	+2	+1	+3
	IO3	+1	+1	0	+2	+3
	IO4	0	0	+1	+1	+2
<b>Investment Objectives Sub-total</b>		<b>+3</b>	<b>+3</b>	<b>+6</b>	<b>+6</b>	<b>+11</b>
Multi-criteria Assessment (MCA)	Economy	+1	+1	+2	+2	+3
	Integration	0	+1	+1	+1	+3
	Social	0	-1	-1	-1	-1
	Natural and Built Heritage Environment	0	-1	-1	-1	-3
	Human Health	0	-1	-1	-1	-2
	Cultural	0	-1	-1	-1	-2
	Property	0	-1	-1	-1	-3
<b>Multi-criteria Assessment Sub-total</b>		<b>+1</b>	<b>-3</b>	<b>-2</b>	<b>-2</b>	<b>-5</b>
<b>Total (Investment Objectives + MCA)</b>		<b>+4</b>	<b>0</b>	<b>+4</b>	<b>+4</b>	<b>+6</b>
<b>Relative Performance Against KPIs</b>		<b>Low</b>	<b>Low</b>	<b>High</b>	<b>Medium</b>	<b>High</b>
Risks to Implementation	Technical	+3	+2	+1	-1	-1
	Consentability	-1	0	0	-2	-2
	Operational/ maintenance	-1	-1	-2	-2	-1
	Safety and design	+1	-2	-1	-1	-1
	Stakeholder / Public	TO BE COMPLETED AFTER PUBLIC CONSULTATION				
<b>Key Benefits Summary</b>		Consenting Implementation	Consenting Low/Med KPI Performance	High performance against KPIs Consenting	Medium performance against KPIs Consenting	High performance against KPIs
<b>Key Dis-benefits Summary</b>		Existing problems not addressed Low performance against KPIs Esmonde Rd Effects	Existing problems not well addressed Esmonde Rd Effects	Adverse impacts on cycle facilities Esmonde Rd Effects	Existing problems only partly addressed Esmonde Rd Effects	Outside road reserve Complex consenting/ designation Esmonde Rd Effects
<b>Key Risks / Dependencies Summary</b>		Esmonde Rd Effects	Consenting risks Implementation risks Esmonde Rd Effects	Implementation risks Esmonde Rd Effects	Implementation risks Esmonde Rd Effects	Land acquisition risks Consenting risks Implementation risks Esmonde Rd Effects



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# 1 Introduction

## 1.1 Overview

This Indicative Business Case (IBC) has been prepared by Beca Limited (Beca) for Auckland Transport (AT) to develop the case for a proposed investment in transport improvements to the Lake Road corridor, between the Devonport peninsula and Takapuna Centre, and its access to the strategic transport network via Esmonde Road. Investment is required to address current problems and allow for future anticipated growth.

Lake Road is the primary and only arterial connection between the Devonport peninsula and Takapuna, as well as the wider Auckland region via Esmonde Road and State Highway 1 (SH1), as shown in **Figure 1-1**. The IBC encompasses the whole extent of Lake Road between Anzac Street (Takapuna Centre) and Albert Road (Devonport), which includes the key local centres of Hauraki and Belmont, as well as Esmonde Road.



Figure 1-1: Lake Road Corridor Improvements Indicative Business Case Study Corridor

The Auckland Plan recognises that transport investment is vital to achieving the overarching goal for Auckland to be the “*world’s most liveable city*”. The Devonport peninsula and Takapuna Centre (a Metropolitan Centre) will play a major role in delivering the aspirations of the Auckland Plan, as they present opportunities for developing attractive, vibrant and well connected communities.

The basis for this IBC is the Strategic Case Assessment undertaken in 2016. This IBC also draws on the information from the Lake Road Corridor Management Plan (Lake Road CMP), which covered the section of Lake Road between Esmonde Road and Albert Road and the Takapuna Centre-Based Transport Study (Takapuna CBTS), both completed for AT in 2014, plus other existing information. These studies did not follow the business case process, but the principles and requirements of the Strategic and Programme Business Cases are well documented in these studies.

A projects prioritisation exercise was undertaken by AT assessing all recommendations put forward from CMPs developed between 2012 and 2014. The result of this process was considered by AT as the Programme Business Case (PBC) for the Strategic Case. This IBC further investigates the recommendations from these previous studies relating to Lake Road by developing an IBC to support investment for the corridor.

As the IBC progressed, a decision was made by AT’s Project Control Group (PCG) to include additional priority for high occupancy vehicles on Esmonde Road in the scope of the IBC. The preliminary investigation was completed more recently in December 2016, the results of which have been incorporated in this IBC.

## 1.2 Approach Taken for this Indicative Business Case

The NZ Transport Agency’s (Transport Agency) business case approach is used by AT. It typically involves the following key steps, each step building on the previous stage:

- Strategic Case – sets the strategic context of the project, presents the investment logic mapping (ILM) exercise and describes the significance of the problems and outcomes
- PBC – confirms the Strategic Case and identifies alternative options (or a preferred programme of options), at a high level to address the identified problems
- IBC – reconfirms the Strategic Case and PBC, further develops alternative options and recommends a preferred option or short list of options.
- Detailed Business Case (DBC) – confirms an activity from the programme of activities, confirms the overall assessment profile and includes detailed reporting of the economic, financial and commercial assessments of the activity
- Pre-Implementation and Implementation – covering preliminary/detailed design and construction.

## 1.3 Purpose of this Indicative Business Case

The purpose of this IBC is to:

- Confirm the problems and the need to address them
- Develop options that address the identified problems and deliver the benefits and assess the performance of the options against the Investment Objectives (IO)
- Recommend a preferred option package for further development in a DBC.

## 1.4 Report Structure

This IBC report is structured in three parts:

- Part A – The Case for Change
- Part B – Management Case
- Part C – Funding Requirements for the Next Phase.

The Case for Change (Part A) includes a summary of the Strategic Case for intervention (**Section 2**), the problem definition and evidence base (**Section 3**), the potential benefits of investing (**Section 4**), the development of investment options (**Section 5**) and the economic, commercial and financial case discussion (**Section 6**).

The Management Case (Part B) (**Section 7**) addresses the achievability of the preferred option(s) and planning arrangements required to ensure successful delivery and to manage project risks. It contains the project management strategy and framework, the governance and reporting, risk management and stakeholder engagement and communications.

The approach that needs to be taken for development of a DBC and associated work for the preferred option(s) is contained in Part C (**Section 8**). It covers the estimated investment required (**Section 12**) and a discussion of the next steps.

## Part A – The Case for Change

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## 2 Background and Strategic Case

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### 2.1 Background

#### 2.1.1 Current Transport Network and Demand

Lake Road is a north-south route located in Auckland's North Shore (see **Figure 1-1**). It extends from Anzac Street in Takapuna (northern end) to Albert Road in Devonport (southern end) with a total length of 5.1 kilometres. Lake Road provides a critical transport link between the Devonport peninsula and the Takapuna Centre. Esmonde Road provides a critical link between Lake Road and State Highway 1 (SH1). The geographical features surrounding the corridor means that the activity development has considered the whole of the peninsula area of Devonport and Takapuna Centre.

The Devonport section of Lake Road (Esmonde Road - Albert Road) is classified as a primary arterial route. The northern section (north of Bayswater Avenue) carries approximately 32,000 vehicles per day (vpd), while the southern section (south of Bayswater Avenue) carries 15,000-20,000 vpd. The Takapuna section (Anzac Street - Esmonde Road) is a collector route, carrying between 8,000-15,000 vpd. 2015 traffic counts show that there is very little difference in demand between the Monday-Friday and the Monday-Sunday Average Daily Traffic (ADT), indicating that traffic flows on weekends are as busy as weekdays.

Esmonde Road is a regional arterial route and carries approximately 38,000 vpd. Recent (2015) traffic counts show that traffic flows on weekends are nearly as busy as weekdays.

Lake Road's cross section varies from one lane in each direction between Anzac Street and Esmonde Road, two lanes in each direction between Esmonde Road and Hauraki Road and one lane in each direction from Hauraki Road to Albert Road. There are turning bays at most intersections and a central flush median is provided along most of the corridor except along the Takapuna Centre, Hauraki Corner, Belmont local centre and near the Albert Road roundabout. The on-street Takapuna Bus Interchange is located at the northern end between Huron Street and Anzac Street. The rest of the Takapuna section has parallel on-street parking lanes that are clearway lanes during peak periods.

Much of the road network on the Devonport peninsula has been laid out in a grid pattern with Lake Road acting as the spine. Only five intersections along the corridor are signalised while both ends (at Anzac Street and Albert Road) are controlled by roundabouts. The remaining intersections are priority controlled with priority given to Lake Road traffic.

Esmonde Road's cross section varies from two lane in each direction at its eastern end (Lake Road) to four lanes in each direction at its western end (SH1). There are turning bays at intersections and a central raised median is provided along most of the corridor. A bus lane runs westbound along the southern side of Esmonde Road from just west of Bracken Avenue to the SH1 Interchange, where there is a dedicated on ramp for buses to the Northern Busway.

The indicative current provision of transport facilities along Lake Road and Esmonde Road (excluding intersection turning lanes) is illustrated on **Figure 2-1** below.





Figure 2-1: Indicative Current Transport Provision

### 2.1.2 Modes of Travel Used for Journeys to Work

Census Journey to Work (2013) data indicates that approximately 49% of journeys in the Devonport /Takapuna area are by private vehicle. Trips made by active modes (i.e. walking and cycling) are notably higher than the regional average (3% cycled and 7% walked/jogged) particularly in Takapuna Central with 11% who walked/jogged. Active modes are very plausible modes of travel for those who live and work in the area.

Bus travel (5%) is comparable to the regional average and bus travel to Takapuna is higher than average at 11%. The Census did not include ferry as a travel mode; hence a considerable proportion of those who used 'other' modes (12% in Devonport) are presumed to include travel by ferry. Approximately 25% of employed residents work in Auckland City Centre.

Information from the Devonport Peninsula Travel Survey,<sup>1</sup> highlighted that during the weekday morning (AM) (6.30-9.30am) and evening (PM) (2.30-6.30pm) peak periods, over 80% and around 75% of surveyed vehicles respectively were single occupancy. There is little difference between occupancy with respect to direction of travel. An average of 1.24 passengers per vehicle was observed, which is typical within Auckland.

Approximately half of the vehicles on Lake Road (south of Esmonde Road) heading north return during the same survey period. 82% of trips heading north on Lake Road (south of Esmonde Road) during the AM period potentially started their trips in the suburbs at the southern end of the peninsula closer to Devonport, i.e. Narrow Neck, Stanley Bay and Mt Victoria. Over 50% of trips are made for work purposes.

AT surveys of Esmonde Road in 2011 have indicated that around 85% of the vehicles along the corridor are single occupancy cars during the weekday AM peak period. This equates to about a 58% single occupancy car mode share in terms of person trips in this period.

TravelWise data from 2014 indicates high percentages of students walk (34%) and cycle (13%) to school. Belmont Intermediate is known to have the highest proportion of students cycling to school (29%) in Auckland (and New Zealand). Mainly older students (secondary and intermediate levels) travel by bus (23% of Takapuna Grammar students) while higher proportions of primary students are dropped off to school by car (40%).

25% of Takapuna Primary School students walk to school (25%) and 3% take the bus (3%), which is comparable to the peninsula average. Sixty four per cent of students are dropped off by car. The mode of transport used to access all schools is shown in **Figure 2-2** below.

### 2.1.3 Trip Destinations

Of the 26,000 people who live within the Devonport and Takapuna Central areas units, approximately 6,200 people work in Devonport and 7,600 work in Takapuna Central according to the 2013 Census. The Census indicates that approximately 40% of residents within the Devonport-Takapuna Local Board work within the same Local Board area, which is a higher than usual proportion. Information from the Devonport Peninsula Travel Survey highlighted that:

- 50% of vehicles on Lake Road (south of Esmonde Road) heading north return during the same period
- 82% of trips heading north on Lake Road (south of Esmonde Road) during the AM peak period potentially started their trips in the suburbs at the southern end of the peninsula closer to Devonport, i.e. Narrow Neck, Stanley Bay and Mt Victoria.

The Devonport Peninsula Travel Survey also reviewed the origin and destination of trips on the peninsula on weekdays and weekends, as shown in **Figure 2-3** and **Figure 2-4** below. The surveyed number of origin and destination movements are shown on the figures and discussed below.

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<sup>1</sup> Devonport Peninsula Travel Survey (Opus International Consultants Ltd, August 2015)

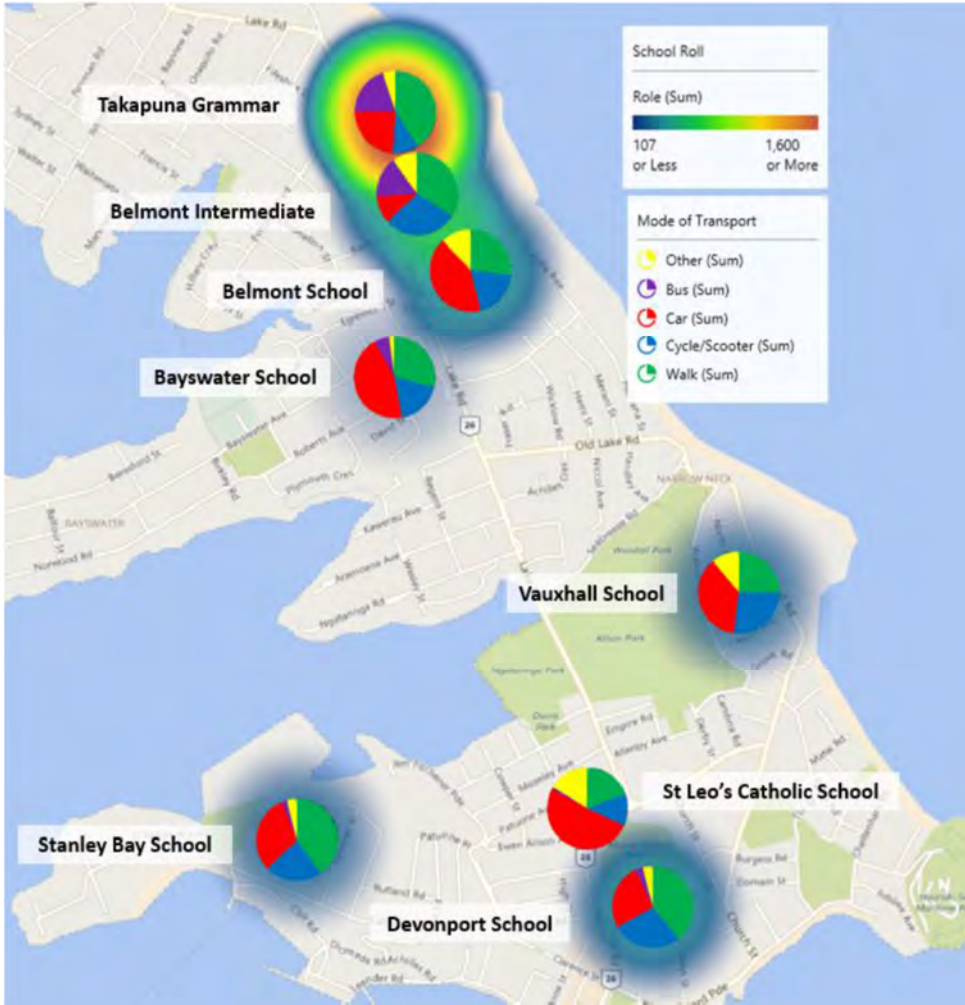


Figure 2-2 Travel Mode Share for Peninsula Schools

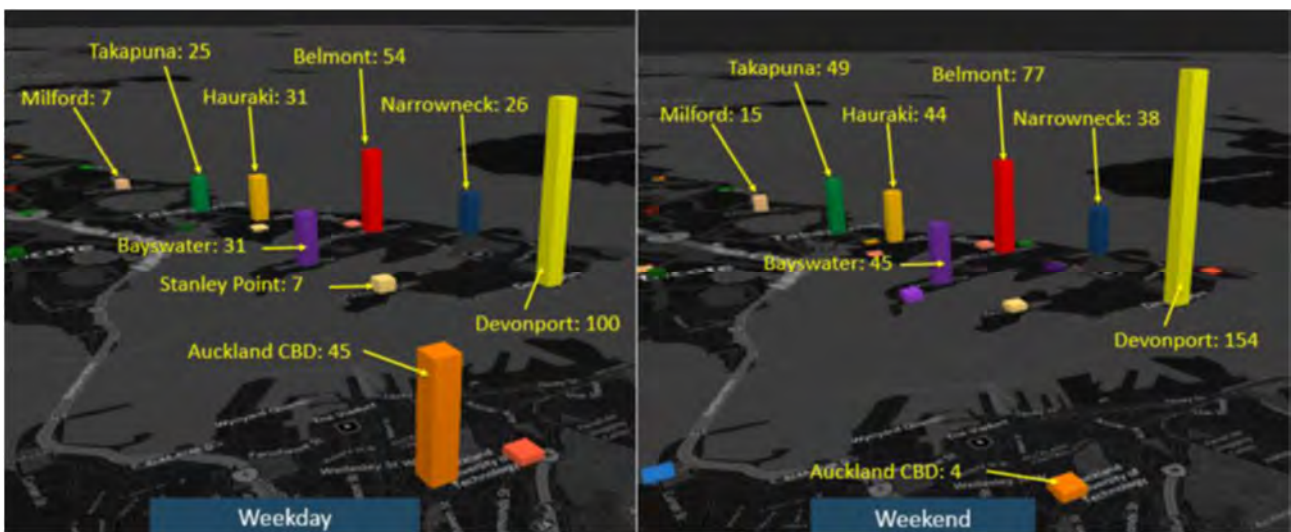


Figure 2-3: Travel Survey Trip Origins

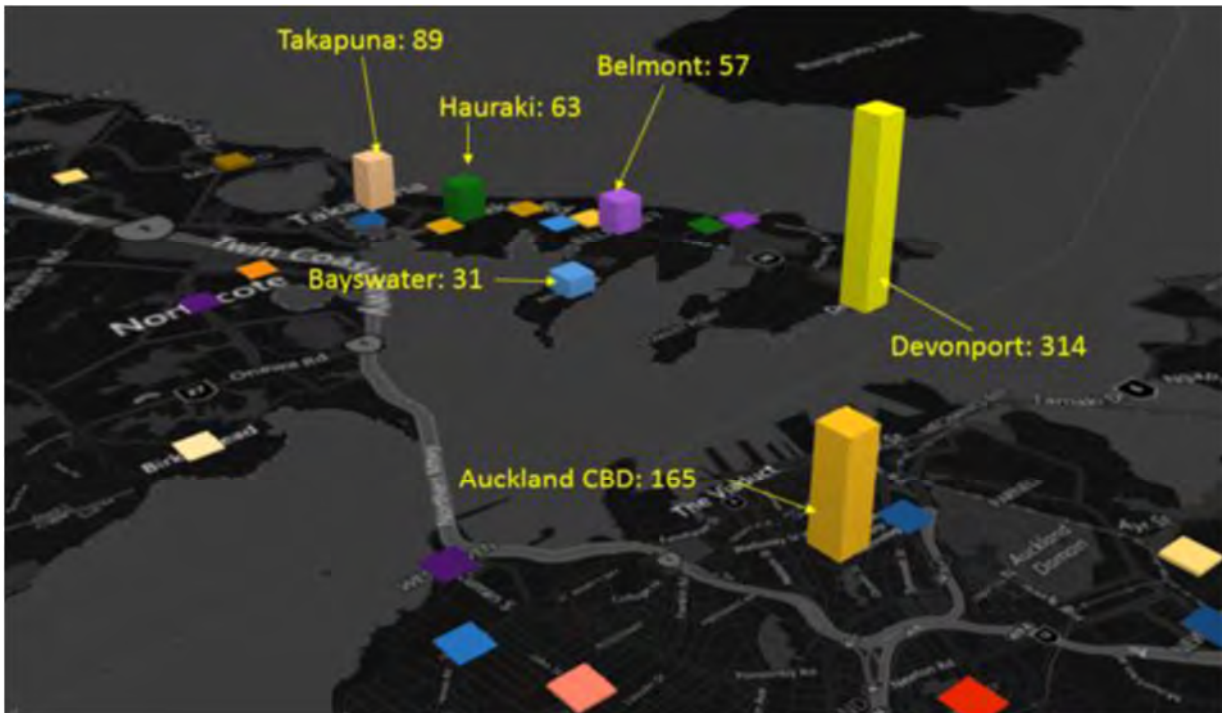


Figure 2-4: Travel Survey Trip Destinations

The key findings from the origin / destination survey shown on **Figure 2-3** and **Figure 2-4** being:

- **Trip Origins**
  - Trips originated mainly from within the Devonport peninsula and Auckland CBD
  - The highest number of trips (100) on weekdays originated from Devonport – 29%
  - The number of trips originating from within the peninsula on a weekday is similar to that during the weekend. Notably different is the number of trips originating from Auckland CBD, being more during the week (45) than in the weekend (4)
- **Trip Destinations**
  - The highest number of trips (314) were destined for Devonport zone – 37%
  - Combined proportion of trips headed for destinations on the peninsula (including Devonport, Bayswater, Belmont and Hauraki) or in Takapuna – At least 65%
  - The second highest individual destination zone (165) was the Auckland CBD – 19%
  - The weekend/weekday split of trip destinations within the peninsula is largely similar:
    - The number of trips to Auckland CBD being significantly more during the week than in the weekend
    - Twice as many trips are made to Devonport in the weekend than on weekdays.

#### 2.1.4 Current and Future Land Use

The existing land use adjacent to Lake Road is predominantly suburban-type residential except at the Takapuna Centre, which predominantly comprises retail/commercial and some residential activity. Local centres, schools and open spaces are also located along the corridor. A number of popular local beaches are located along the Takapuna and Devonport coasts. The peninsula features a number of volcanic cones and is home to the NZ Navy Base. Open spaces are popular for organised sporting activities and other recreational events.

There are eight schools in the peninsula, with a total roll exceeding 4,000 in 2014. Most of these schools are located near or along the Lake Road corridor, generating significant travel demands. Takapuna Primary School in Takapuna Central has a roll of 320 (in 2014).

### 2.1.5 Projected Growth

The Auckland Plan has identified Takapuna as a Metropolitan Centre, Hauraki Corner and Belmont as local centres (both along Lake Road) and Devonport centre as City Fringe. The Auckland Unitary Plan (Operative in Part) (AUP(OP)) includes zoning changes that provide for further development opportunities in most parts of Devonport peninsula along the Lake Road corridor. Significant up-zoning and development potential is proposed in Takapuna Centre (see **Figure 2-6** below).

Capacity for growth analysis arising from the AUP process was undertaken by Auckland Council's Research and Evaluation Unit in February 2015 for the Council's North West Planning Unit indicated the total capacity for additional development on the Devonport peninsula through redevelopment, including redevelopment of amalgamated sub-precincts as single sites was in the order of 3,200. This is roughly a 37% increase in the number of existing dwellings (approximately 8,900). The majority of this growth is additional dwellings using redevelopment (approximately 2,500 dwellings).

The 2014 Auckland Housing Accord aims to accelerate the delivery of new housing across Auckland. Through the accord, Special Housing Areas (SHAs) are identified for fast-tracked development.

One SHA has been approved in the Devonport peninsula area, including one on Hilary Crescent, which is also one of six sub-precincts (A-F) in the Devonport Peninsula Precinct defined in the Auckland Unitary Plan (Decision Version). This and the five other large development sites are all part of commercial settlement of Ngati Whatua o Orekeo Treaty claims. The precinct enables more intensive housing development with greater building heights than the rest of the peninsula. There is a strong likelihood that the remaining five sub-precincts will also proceed in the short to medium term. **Figure 2-5** below shows the Hilary Crescent site, together with the Ryman Healthcare Retirement Village at the Wakakura site in Ngataranga Bay (sub-precinct F), that has been recently consented, but is subject to appeal, and the location and approximate scale of other approved SHA developments in Takapuna.

The SHAs in the Devonport peninsula area are likely to intensify commuter demand within this area, which will contribute to the problem of limited accessibility and transport choice undermining liveability and economic prosperity for the area. Because of this, the SHAs and the Devonport Peninsula Precinct sub-precincts are likely to increase the potential benefits achievable through investment by supporting population growth in the area. The overall extent of the future growth that can be enabled by the AUP (OP) is shown in **Figure 2-6** below. Noting that the comprehensive development of the Peninsula Precincts may enable more intensive development than shown by the underlying zoning of the Auckland Unitary Plan.

The growth enabled by the Unitary Plan (Decision Version) and the current development of the SHAs and other residential development, potentially at a faster rate in nearer term, will put additional pressure on the existing corridor, which has a lack of alternatives. Whilst some transport infrastructure upgrade would be funded directly, based on the effects of those developments, a comprehensive corridor approach to delivering short and longer term corridor solutions is important to a holistic corridor strategy.



Figure 2-5 Special Housing Areas and Other Current Residential Development

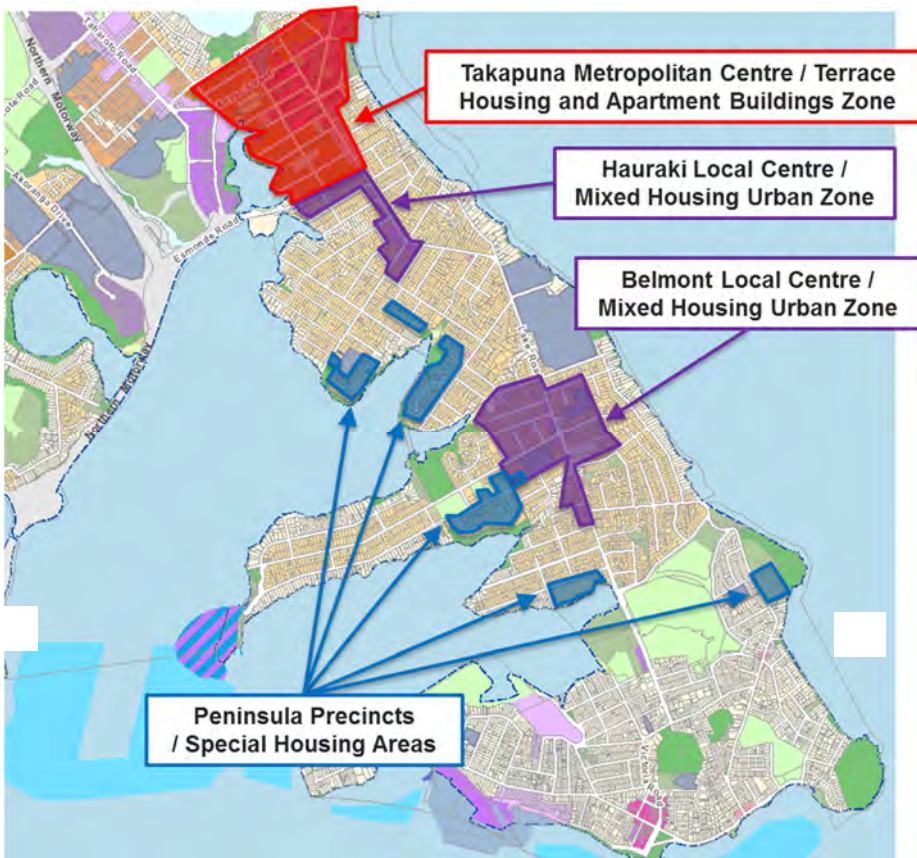


Figure 2-6 Auckland Unitary Plan (Decision Version) – Planned Growth Summary

## 2.2 Strategic Alignment

The following strategic documents support the need to improve the efficiency and resilience of the transport connections to and from the Devonport peninsula to move people and goods more effectively. They also highlight the importance of improving the level of accessibility and transport choice in the Devonport peninsula area.

This IBC aims to address the strategic priorities in the documents and develop a coordinated view for transport provisions. This will ensure that investment in the outcomes of the IBC will reflect the compelling needs identified within the project partner's organisational goals and outcomes.

### 2.2.1 Auckland Plan

The Auckland Plan is the roadmap to deliver on Auckland's vision to be the world's most liveable city. It is a 30-year plan that is underpinned by a set of outcomes and transformational shifts to achieve this vision which help ensure we focus on the right things.

The Auckland Plan sets strategic direction and transformational shifts to achieve actions, targets and outcomes that are required to achieve the vision to be the world's most liveable city. AT plays a critical part in delivering on these actions and outcomes. In particular, AT actions that contribute to the transformational shifts are outlined in **Table 2-1**.

Table 2-1: AT Actions Contributing to the Auckland Plan Transformational Shifts

Auckland Plan	Degree of contribution	How AT contributes
Children and young people	Secondary	<ul style="list-style-type: none"> <li>■ Public transport services including school transport and fares concessions</li> <li>■ School travel planning and road safety initiatives</li> </ul>
Environmental action and green growth	Secondary	<ul style="list-style-type: none"> <li>■ Contributing to the reduction of greenhouse gas emissions by:               <ul style="list-style-type: none"> <li>– Providing effective and efficient transport alternatives to private vehicle use, such as public transport, cycleway and walkway;</li> <li>– Introducing electric trains</li> </ul> </li> </ul>
Outstanding public transport	Primary	<ul style="list-style-type: none"> <li>■ Providing reliable, efficient and safe rail, bus and ferry services, thereby increasing public transport patronage</li> </ul>
Quality urban living	Primary	<ul style="list-style-type: none"> <li>■ Contributing to a quality built environment through enhanced accessibility and well-planned and vibrant town centres that are walkable and have streetscapes that reflect local identity;</li> <li>■ Providing an effective, efficient and safe transport system that supports growth, including geographic spatial priorities and SHAs</li> </ul>

Auckland Plan	Degree of contribution	How AT contributes
Raised living standards	Secondary	<ul style="list-style-type: none"> <li>■ Providing effective and efficient transport choices enabling Aucklanders to easily access economic, social and cultural opportunities</li> </ul>
Māori social and economic wellbeing	Secondary	<ul style="list-style-type: none"> <li>■ Improving accessibility for Māori to economic, social and cultural opportunities through public transport network improvements and transport infrastructure projects</li> <li>■ Ensuring effective engagement with mana whenua on transport projects</li> <li>■ Acknowledging Māori values in stormwater management</li> <li>■ Providing infrastructure support and technical advice on marae development and papakainga housing</li> </ul>

The Auckland Plan identifies four strategic priorities for transport; managing Auckland's transport system as a single system, integrating transport planning and investment with land use development, prioritising and optimising investment across transport modes, and implementing new transport funding mechanisms.

The Auckland Plan Development Strategy identifies the expected level of growth across Auckland over the next 30 years. A focus of the strategy is to achieve a compact city by focusing growth in existing urban areas. Creating a high-quality, liveable, compact city will see parts of Devonport-Takapuna change over time with more business and homes, offering a wider range of local employment and housing choices. The Auckland Plan estimates about 13,000 new households and 15,000 new jobs by 2042. Most of the future residential and employment growth will be concentrated in and around town centres, including the Takapuna Metropolitan Centre.

### 2.2.2 Devonport Takapuna Area Plan

The 2014 Devonport Takapuna Local Area Plan outlines how the Local Board envisages the Devonport Takapuna area to change over the next 30 years. It sets out the key moves, desired outcomes and supporting actions to assist in achieving firstly the vision for Auckland as set out in the Auckland Plan and also the vision of the Devonport-Takapuna Local Board in its local board plan – to create the world's most liveable city at the local level.

Outcome six of the area plan seeks to achieve and integrated and efficient transport network in Devonport-Takapuna, with an emphasis on frequent and reliable public transport. A key action in delivering this outcome over the next five years and beyond is to implement key projects identified in the Lake Road Corridor Management Plan, including and upgrade of Lake Road between Hauraki Corner and Belmont with an emphasis on public transport improvements and increasing people-moving capacity



### 2.2.3 Local Area Plans

The 2014 Devonport-Takapuna Local Area Plan advocates a greenways network as a 'Key Initiative' under the outcome 'Easy safe and reliable journeys that reduce congestion'. This includes a proposed walking/cycling connection from the Devonport Ferry Terminal to Esmonde Road in Takapuna (see **Figure 2-7**), which can be developed in stages and includes a connection to the Auckland Harbour Bridge at Esmonde Road. This route and others, both west and east of Lake Road are currently being investigated by the Local Board in partnership with AT, developing the routes indicated in the Devonport-Takapuna Greenways document (June 2015).



Figure 2-7 Greenway for the Devonport to Takapuna

The Plan notes that *“our most vexing road is Lake Road, parts of which are often close to gridlock”*. The Plan also notes that the network plan is aspirational and that further investigation is required for each individual project, as the route may be influenced/modified by topography, vegetation, land ownership, timing of renewals funding, etc.

## 2.2.4 AT Statement of Intent

AT develop a three-year Statement of Intent (SOI) each year. The Board's strategic themes form the foundation of the SOI, and the three-year work plan and performance measures are centred on the themes.

The strategic direction outlined in the AT SOI is based on four primary sources:

- AT's legislative purpose
- The vision, outcomes, strategic directions and priorities set out in the Auckland Plan
- The Mayor's Letter of Expectation
- The AT Board's analysis of transport priorities.

## 2.2.5 Transport Agency Statement of Intent

The Transport Agency is responsible for giving effect to the Government Policy Statement (GPS) 2015, which sets out the Government's strategic direction for investment in the land transport network. The GPS 2015 outlines the three strategic priorities for investment in NZ's land transport system:

- Economic growth and productivity
- Road safety
- Value for money.

The Transport Agency's strategy and goals that underlie its planning and investment strategic directions are set out in its current Statement of Intent (2015-19) shown in **Figure 2-8**.



Figure 2-8 Transport Agency Strategic Framework

### 2.2.6 Auckland Integrated Transport Programme

Auckland's Integrated Transport Programme (ITP) sets out the 30 year investment programme to meet the transport priorities outlined in the Auckland Plan across modes, covering the responsibilities of all transport agencies. The ITP was developed by AT and the Transport Agency in collaboration with Council. The programme encompasses state highways and local roads, railways, buses, ferries, footpaths, cycleways, intermodal transport facilities and supporting facilities such as park-and-ride.

The ITP promotes the 'one system' approach to better manage, plan and integrate the use of the transport networks with land use development at all levels of planning, as required by the Auckland Plan. The approach requires the key stakeholders to agree on a collaborative view of strategic intent for the Auckland region and how this is delivered by transport.

The One System approach provides a compelling case to result in:

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

This IBC seeks to develop activities that better align with forecast changes in land use and to provide a more resilient transport network.

The four staged intervention process that has been developed in the ITP to enable the prioritisation of Auckland's 30 year transport programme is as follows:

- Operate, maintain and renew infrastructure optimally
- Make better use of networks
- Manage demand efficiently and safely
- Invest in new infrastructure, services and technology.

This IBC has been developed to align with stage 4 of this intervention process which addresses the importance of upgrading public transport infrastructure.

### 2.2.7 Regional Land Transport Plan

The Regional Land Transport Plan (RLTP) describes how transport providers intend to respond to growth and other challenges facing Auckland over the next ten years. It is updated every three years and includes a ten year prioritised delivery programme of transport services and activities for Auckland. The RLTP represents the combined transport programmes of the Transport Agency, AT and KiwiRail.

The RLTP has developed several strategic themes which are intended to shape the delivery of the transport components of the Auckland Plan. These themes include the following:

- Prioritise rapid, high frequency public transport
- Transform and elevate customer focus and experience
- Build network optimisation and resilience
- Ensure a sustainable funding model
- Develop creative, adaptive, innovative implementation.

### 2.2.8 Auckland Regional Public Transport Plan

The Auckland Regional Public Transport Plan (RPTP) sets out the proposed public transport services for the Auckland region over the next ten years as a range of service layers: rapid, frequent, connector, peak-only, local and targeted services.

The current regional bus network is considered to be complex, with over 400 different route variations, many of which are infrequent, long and indirect. In order to achieve the transformational shift in public transport required by the Auckland Plan, the RPTP therefore proposes a new frequent transport network (referred to as the 'New Network'), that provides a simpler, more connected network made up of approximately 130 routes.

The New Network involves an 'all day' frequent service network consisting of rapid, frequent and connector services supported by local and peak only and targeted services. In comparison to the existing direct service network, the proposed network will provide fewer routes at higher frequency with high quality interchange facilities to provide efficient public transport services.

Within the study area, the RPTP proposes alterations to the existing network to focus movements on a smaller number of bus corridors. The ability to consider physical changes consistent with the proposed network through the IBC process will better enable these objectives within the study area.

Consultation on the proposed New Network for the North Shore was undertaken by AT in 2015 and changes made to the proposals in response to the feedback received. The plans include a new bus route (N30) which will travel between Devonport Ferry and Akoranga Bus Interchange via Takapuna Centre. This will travel along Lake Road from Old Lake Road through to Takapuna. The proposed New Network routes are shown in **Figure 2-10** and are anticipated to be implemented in mid-2018.



Figure 2-9 Current and Proposed Public Transport Network

### 2.2.9 Auckland Transport Alignment Project

The Auckland Transport Alignment Project (ATAP) is a joint project involving Council, Ministry of Transport, AT, Transport Agency, Treasury and State Services Commission. The project identified a preferred approach for developing Auckland's transport system over the next 30 years. It provides a common understanding of how and where Auckland is likely to grow, what the transport priorities are and when they need to be addressed. ATAP recommends a greater focus on getting more throughput on the existing network, because this is where most growth in travel demand will happen.

## 2.2.10 Alignment to Existing Strategies/ Organisational Goals

**Table 2-2** provides a summary of the organisation strategies that this IBC aligns with.

Table 2-2: Organisational Strategies and Alignment to Investment Goals

Organisation	Organisational Strategies/Plans	Alignment to Goals
Transport Agency	GPS on Land Transport 2014/15–2024/25	<p>National land transport objectives:</p> <ul style="list-style-type: none"> <li>■ Economic growth and productivity <ul style="list-style-type: none"> <li>– A land transport system that addresses current and future demand for access to economic and social opportunities</li> <li>– A land transport system that provides appropriate transport choices</li> <li>– A land transport system that is reliable and resilient</li> </ul> </li> <li>■ Road safety <ul style="list-style-type: none"> <li>– A land transport system that is a safe system, increasingly free of death and serious injury</li> <li>– A land transport system that mitigates the effects of land transport on the environment</li> </ul> </li> <li>■ Value for money <ul style="list-style-type: none"> <li>– A land transport system that delivers the right infrastructure and services to the right level at the best cost.</li> </ul> </li> </ul>
	Statement of Intent 2015-19	<ul style="list-style-type: none"> <li>■ Integrate one effective and resilient network for customers</li> <li>■ Shape smart, efficient, safe and responsible transport choices</li> <li>■ Deliver efficient, safe and responsible highway solutions for customers</li> <li>■ Maximise effective, efficient and strategic returns for NZ.</li> </ul>
Auckland Council	Auckland Plan	<p>Transport priorities:</p> <ul style="list-style-type: none"> <li>■ Manage Auckland's transport system as a single system</li> <li>■ Integrate transport planning and investment with land use development</li> <li>■ Prioritise and optimise investment across transport modes</li> <li>■ Implement new transport funding mechanisms.</li> </ul> <p>Takapuna is identified in the Plan as a Metropolitan Centre. The Plan envisions good transport access and service by high-frequency public transportation. Metropolitan Centres are considered a major hub at sub-regional scale with high trip generation and destination functions.</p>

Organisation	Organisational Strategies/Plans	Alignment to Goals
		Devonport is identified as a City Fringe Centre. Its transport functions are to support the City Centre (Auckland) with medium trip generation (mainly as origin), and has the provision for high frequency public transport.
	Auckland Unitary Plan (AUP) – Decision Version	<p>The physical growth envisaged in the Auckland Plan is governed by the AUP. Growth in the Devonport peninsula is seen through AUP zoning that supports Takapuna growing as a Metropolitan Centre and Hauraki and Belmont as local centres as well as encourages further infill and redevelopment.</p> <p>Devonport is also identified as City Fringe. The Decision Version of the AUP identifies the Devonport Peninsula Precinct, which includes six sub-precincts that are large sites in single ownership, with the potential to deliver more intensive, comprehensive and coordinated development in these areas.</p> <p>Given the geographical context of the area, any growth within the peninsula, particularly in the northern part, would directly affect the operation of Lake Road.</p>
	Spatial Priority Areas and Special Housing Areas	<p>Greater Takapuna is identified as an SPA. A number of SHAs are also identified within the study area including:</p> <ul style="list-style-type: none"> <li>■ Takapuna Strategic SHA</li> <li>■ Hillary Block SHA in Belmont, which is one of the six sub-precincts of the Peninsula Precinct in the AUP.</li> </ul>
	Long Term Plan 2015-2025	The Plan identifies a number of priority growth areas, of which Takapuna is one. The Council's focus for the priority areas is to ensure that certainty is provided over major public investment and planning initiatives.
	Devonport-Takapuna Area Plan 2014	The Plan outlines the need for an integrated and efficient network in Devonport-Takapuna, with an emphasis on frequent and reliable public transport, which supports existing needs and provides for future growth and development. The Local Board supports and recommends improving the Rapid Transit Network (RTN) accessibility into the area, particularly between the Auckland City Centre and Takapuna.
AT	Statement of Intent 2016/17-2018/19	<p>The SOI identifies delivering on the following key strategic themes:</p> <ul style="list-style-type: none"> <li>■ Prioritise rapid, high frequency public transport</li> <li>■ Transform and elevate customer experience</li> <li>■ Build network optimisation and resilience</li> <li>■ Ensure a sustainable funding model</li> </ul>

Organisation	Organisational Strategies/Plans	Alignment to Goals
		<ul style="list-style-type: none"> <li>■ Develop creative, adaptive, innovative implementation.</li> </ul>
	Integrated Transport Programme 2012-2041 (ITP)	<p>The ITP aligns with the GPS and is developed jointly with the Council and the Transport Agency. It sets out a 'One System' approach for managing networks, so they operate seamlessly as a single system.</p> <p>This IBC will consider the four-stage intervention process which enables the ITP to prioritise the phasing of the 30-year programme for transport:</p> <ul style="list-style-type: none"> <li>■ Operate, maintain and renew infrastructure optimally</li> <li>■ Make better use of networks</li> <li>■ Manage demand efficiently and safely</li> <li>■ Invest in new infrastructure, services and technology.</li> </ul>
	Regional Public Transport Plan 2015 (RPTP)	<p>The RPTP introduces a new model for the provision of public transport within the Auckland region (the New Network). The main change from the current network pattern will be the much stronger focus on integration between services (i.e. bus, train, ferry) to improve network efficiency and effectiveness. This requires an equally strong focus on the ongoing significant investment in public transport infrastructure, high frequency services and a simple integrated fare system. The staged implementation plan of the new network structure has been updated with the North Auckland network to be implemented in late 2017.</p>
	Auckland Transport Alignment Project (ATAP)	<p>ATAP notes the importance to <i>"continue the work currently underway to protect the route for a new (Additional Waitemata Harbour) harbour crossing in a way that integrates potential future road and public transport requirements"</i>.</p>
	Lake Road CMP	<p>Identified a preferred package of interventions along the corridor between Albert Road and Esmonde Road that informed the previous Strategic Case.</p>

## 2.3 Stakeholder Engagement

The IBC has been developed through engagement with key stakeholders from AT, Council and Transport Agency involving meetings and interactive workshops. The key stakeholders involved in the workshops are listed in **Appendix A**. Key stakeholders involved in the Lake Road CMP and Takapuna CBTS have provided input, where practical.

Stakeholder engagement assisted in defining the project problems and objectives; developing the evaluation framework; and developing and evaluating options.

The workshops held were as follows:

- Workshop 1: Stakeholder alignment (30 August 2016)
- Workshop 2: Problem definition (8 September 2016)
- Workshop 3: Benefits definition (19 September 2016)
- Workshop 4: Long list options / evaluation criteria (5 October 2016)
- Workshop 5: Short list / development of preferred option(s) (20 December 2016).

Engagement captured stakeholder's key concerns and successful outcome aspirations for the project. These concerns were incorporated into option development and evaluation.

An external stakeholder group have also provide input into the IBC via AT. These groups are:

- Bayswater Community Committee
- Belmont Business Group
- Belmont Hauraki Community Association
- Bike Devonport (and Bike Auckland)
- Devonport Business Association/Business Improvement District
- Devonport Peninsula Trust.

Public stakeholder engagement is being undertaken on the draft IBC and feedback will inform the evaluation and recommendation of a preferred option.



## 3 Problems Definition and Evidence Base

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### 3.1 Overview

A significant amount of analysis has been undertaken in regard to the problems surrounding access on the Devonport peninsula however, some of this analysis predates the implementation of Transport Agency's business case approach. There is significant evidence and a clear need for investment documented in these earlier studies.

The previous Strategic Case identified the following problems (and the weighting to be given to them) through an investment logic mapping (ILM) workshop held on 13 November 2014:

- **Problem 1:** Limited physical space along the northern section of the corridor and substantial number of turning movements which generate high volumes of traffic at numerous times across the day including weekends (35%)
- **Problem 2:** Lack of viable alternative routes, particularly along the northern section of the corridor, limits the potential to adequately accommodate all modes (20%)
- **Problem 3:** Lack of reliable alternative modes to private vehicles along the corridor resulting in a high dependency on cars (35%)
- **Problem 4:** Lack of priority for alternative modes particularly around the Takapuna Centre attracting high volumes of vehicle traffic causing delays for all road users (10%).

Data and information generated through the Lake Road CMP and Takapuna CBTS supported the problem identification analysis and the setting up of the key performance indicators. However, the Strategic Case noted that additional evidence relating to the travel time variability by mode and growth projections/trends should be collected during the IBC phase.

The key problems to be addressed by the investment were reviewed with the key stakeholders at a Problem Definition workshop on 8 September 2016 to gain a better understanding of current and anticipated problems and issues. The workshop was facilitated using the Investment Logic Mapping technique, and the outcome of the workshop was an Investment Logic Map (ILM). The Problem Trajectory technique was followed, to reconfirm and explore the problems articulated in the Strategic Case.

The stakeholders identified the following three key problems:

- **Problem 1:** Unreliable, unattractive and ineffective alternatives modes are contributing to high and increasing congestion levels (50%)
- **Problem 2:** Existing corridor layout and lack of alternatives are unable to adequately accommodate all modes (30%)
- **Problem 3:** Existing road layout and high vehicle movements are causing high, variable and increasing congestion levels (20%).

The agreed problem statement, which were briefly reviewed and confirmed at the benefits definition workshop held on 19 September 2016, is shown on the Investment Logic Map (ILM) in **Appendix B**.

The key evidence or rationale for investing is also identified in **Appendix B** in relation to each of the agreed problems. The evidence base has been largely drawn from the information gathered for the Strategic Case and supplemented with updated information where relevant and available. Additional information relating to travel time variability by mode and growth projections/trends was added to the evidence base to inform this IBC.

### 3.2 Problem Definition Summary

In relation to the problem statements for this IBC, the following summary of evidence has been identified:

#### **Problem 1: Unreliable, unattractive and ineffective alternative modes are contributing to high and increasing congestion levels (50%)**

- There is a lack of continuous cycle facilities along the Lake Road corridor and existing cycle facilities are not separated from general traffic
- Buses have no dedicated facilities along Lake Road and therefore experience similarly high and highly variable travel times to general traffic. This occurs for a more extended PM peak period due to the schools on or close to the Lake Road corridor and also on weekends, particularly southbound
- Ferries are expensive relative to buses, often not frequent as bus services and there are poor bus and active mode connections to the existing ferry terminals. The regional transport models show that increasing ferry frequency and accessibility to ferry terminal facilities can lead to increased public transport patronage
- Travel survey for the Devonport peninsula shows that:
  - Other than trips staying within the peninsula, the CBD is an important destination for trips, but public transport is not well used
  - Walk, cycle and public transport modes are not considered to be convenient and travel times are too long
  - 82% of northbound general traffic on Lake Road (south of Esmonde Road) in AM peak are from origins at southern end of peninsula.
- Takapuna has planned growth, as a Metropolitan Centre, which will increase travel demand on Lake Road between peninsula and Takapuna
- The regional transport model does not include any population or employment growth on Devonport peninsula over next 10-30 years. However, there is now potential for residential growth of more than 30% enabled by Unitary Plan zoning, which is already being realised through the SHA at Hillary Crescent and will be realised in the development of a further five sub-precincts of the Devonport Peninsula Precinct.

#### **Problem 2: Existing corridor layout and lack of alternative routes are unable to adequately accommodate all modes (30%)**

- There is a single arterial corridor for entering and exiting the Devonport Peninsula, as parallel collector and local road corridors are not suitable to accommodate increased traffic demands
- Lake Road corridor is physically constrained at present in several sections by adjacent land use and topography. The corridor does not provide for competing general traffic, bus and cycle modes all using the same corridor between the Eversleigh Road and Hauraki Corner intersections, as well as between the Esmonde Road and The Strand intersections
- Alternative routes, particularly for cyclists, are long and circuitous
- Transport access for the future Takapuna Metropolitan Centre has limited route options, plus there is a lack of a clear traffic route through Takapuna
- There will be increasing demand to travel along the Lake Road corridor with the planned growth in Takapuna and the growth enabled on the Devonport peninsula by the Unitary Plan, as identified in Problem 1.

**Problem 3: Existing road layout and high vehicle movements are causing high, variable and increasing congestion levels (20%)**

- There are high and highly variable travel times northbound along the Lake Road corridor in the AM peak period, particularly between the Eversleigh and Hauraki Corner intersections, as well as southbound along the corridor in the PM peak period between the Esmonde and Hauraki Corner intersections
- Weekend travel times are similarly high and highly variable to those in the weekday peak periods and affect similar volumes of peak period traffic along the corridor, particularly southbound and northbound between Hauraki Corner and Bayswater
- There are high and highly variable travel times on Esmonde Road between Lake Road and SH1, primarily westbound and in the AM peak period, that further contributes to the poor journey experience for people exiting the Devonport peninsula
- There will be increasing demand to travel along Lake Road with the planned growth in Takapuna and the growth enabled on the Devonport peninsula by the Unitary Plan, as identified in Problem 1.

## 4 Potential Benefits of Investing

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The potential benefits of successfully investing to address the key problems on Lake Road were identified as part of a second facilitated ILM workshop held on 4 November 2016 for the Strategic Case, as follows:

- **Benefit 1:** Greater/Better use of current network (70%)
- **Benefit 2:** More travel choice (30%).

The benefits have been refined since the Strategic Case was prepared at the benefits definition workshop held on 19 September 2016. The benefit workshops was also facilitated using the Investment Logic Mapping technique, and the outcome of the workshop was an ILM contained in **Appendix C**. The main benefits of successfully responding to the problem or opportunity identified at the workshop were:

- **Benefit 1:** Transport infrastructure will support current demand and future growth (50%)
- **Benefit 2:** Improved attractiveness and effectiveness of alternative modes (20%)
- **Benefit 3:** Improved community satisfaction with transport infrastructure (20%)
- **Benefit 4:** Improved economic outcomes for Takapuna and the Peninsula (10%).

Further discussion of the importance and potential benefits of addressing the problems is contained in **Appendix C**.

The remainder of this section discusses the revised KPIs and associated IOs which have been used to assess the options and to assess the future performance of the investment.

### 4.1 How the Potential Benefits of Investing Can be Measured

To support and measure progress towards the identified benefits, a number of key performance indicators (KPIs) were developed that can both evaluate the potential outcomes associated with shortlisted options, as well as measure the performance of the preferred investment option over time. From the key KPIs, identified as the most important by the key stakeholders, associated IOs (IOs) were developed, which are used as part of the evaluation of the long list and shortlisted activities.

#### 4.1.1 Key Performance Indicators

To support and measure progress towards the identified benefits, the ILM facilitator worked with the project team and key stakeholders during and following the second facilitated workshop held on 4 November 2016 to identify the KPIs for each benefit. These build on the KPIs developed for the Strategic Case. The project team has refined the KPIs as options have been identified and evaluated, but the essence of the KPIs developed with the key stakeholders at the ILM workshops has been maintained.

The KPIs developed are summarised in **Table 4-1** below and shown on the Benefits Map included in **Appendix C**. These KPIs are expected to further evolve as the project progresses in a DBC, as the ability for AT to measure and assess the performance against these KPIs is further understood and refined.

Table 4-1: Summary of Key Performance Indicators and Measures

Benefits	Key Performance Indicators (KPI)	Indicative Measures
Transport infrastructure will support current demand and future growth (50%)	KPI 1 – Overall people travel time (25%)	Average travel time for people in vehicles travelling along Lake Road (between Albert Road and Esmonde Road) in weekday peak periods
		Average travel time for people in vehicles travelling along Esmonde Road (from Lake Road to SH1) in weekday AM peak period
	KPI 2 – Number of people throughout (25%)	Total number of people travelling by car, bus and bicycle along Lake Road (between Albert Road and Esmonde Road) in weekday peak periods
		Total number of people travelling by car, bus and bicycle along Esmonde Road (from Lake Road to SH1) in weekday AM peak period
Benefit 2: Improved attractiveness and effectiveness of alternative modes (20%)	KPI 1 – Mode share for alternative modes (20%)	Mode share for alternative modes across the Devonport peninsula (including Takapuna), based on Census Journey to Work
Benefit 3: Improved community satisfaction with transport infrastructure (20%)	KPI 1 – Community satisfaction ratings (20%)	Community satisfaction surveyed by AT through Annual Road User Satisfaction Surveys
Benefit 4: Improved economic outcomes for Takapuna and the Devonport peninsula (10%)	KPI 1 – Employment in Takapuna (20%)	Number of jobs in Takapuna as identified in Census (or other Council surveys)

The baselines for the identified measures (in **Table 4-1**) are outlined in **Table 4-2** together with the potential target outcomes, which the investment is seeking to achieve. These measures are a mixture of both quantitative and qualitative measures, such as the Community Satisfaction Rating KPI, which whilst a quantitative measure is based on surveying qualitative public perceptions of their experience.

It will be necessary to further refine the measurement of some of the KPIs in a DBC, as further information is provided to facilitate a more quantitative or qualitative assessment of those measures, which may include assessing more accurately journey times for the different modes. The identified baseline and ‘target’ measures are based around the evidence base, where available at this time.

Table 4-2: Summary of Benefits Map

Key Performance Indicators (KPI)	Indicative Measures	Baseline	Indicative Target
KPI 1 – Overall people travel time (25%)	Annual average travel time for people in vehicles travelling along Lake Road and Esmonde Road (between Albert Road and SH1) in the weekday AM peak hour	2015-2016 Commercial GPS Data - 20 to 22 minutes	15 to 17 minutes
	Annual average travel time for people in multi-occupant vehicles travelling along Lake Road and Esmonde Road (between Albert Rd and SH1) in the weekday AM peak hour	2015-2016 Commercial GPS Data - 20 to 22 minutes	10 to 12 minutes
KPI 2 – Number of people throughout (25%)	Total number of people travelling by car, bus and bicycle in both directions along Lake Road in the weekday peak periods	2016 AT Counts and Devonport Peninsula Travel Survey 2015 -	13,100 to 14,500 people

Key Performance Indicators (KPI)	Indicative Measures	Baseline	Indicative Target
		12,100 to 12,300 people	
	Total number of people travelling by car and bus along Esmonde Road in the weekday AM peak period	2016 AT Counts and AT Occupancy Survey 2011 - 3,200 people	3,500 to 3,700 people
KPI 1 – Mode share for alternative modes (20%)	Mode share for alternative modes across the Devonport peninsula (including Takapuna)	2013 Census Journey to Work (Devonport peninsula and Takapuna) - 33 to 35%	44 to 46%
KPI 1 – Community satisfaction ratings (20%)	Overall community satisfaction for Lake Road	AT Annual Road User Satisfaction Surveys 2015-16 - 47%	Increasing customer satisfaction trend
	Overall community satisfaction for Esmonde Road	AT Annual Road User Satisfaction Surveys 2015-16 - 58%	Increasing customer satisfaction trend
KPI 1 – Employment in Takapuna (10%)	Number of jobs in Takapuna as identified in Census (or other Council surveys)	To be confirmed at DBC	Increasing trend

The Community Satisfaction Ratings and Employment in Takapuna KPIs are primarily outcomes of achieving the benefits and a result of meeting the other KPIs, but provide a more customer focussed outcome of achieving the benefits of the investment. As such, as those KPIs also represent only 30% of the overall investment benefits, those KPIs were not used in assessing the long list and shortlisted options.

## 4.2 Investment Objectives

The following IOs were developed to assess the options and to assess the future performance of the investment following the second facilitated workshop held on 4 November 2016. They were developed through liaison between the facilitator and the key stakeholders:

- **Investment Objective 1** – Improve transport infrastructure to support current demand and future growth by reducing the overall people travel time on the corridor
- **Investment Objective 2** – Improve the effectiveness of high occupancy modes of transport and healthier transport modes by increasing the number of people throughput
- **Investment Objective 3** – Improve the attractiveness of high occupancy and healthier transport modes by increasing mode share for these modes
- **Investment Objective 4** – Improve community satisfaction with transport infrastructure.

These IOs focus on the key benefits of the potential investment in Lake Road and Esmonde Road. The statements provide the qualitative IO statements that are key part of the evaluation of both the long list and shortlist activities by the project team and the key stakeholders.

The quantitative IO statements below develop these into a measurable objective, informed by the KPIs for achieving the measurable outcomes of the investment at a DBC and will be refined further at that stage:

- **Investment Objective 1** – Improve transport infrastructure to support current demand and future growth by reducing overall people travel time along:
  - Lake Road and Esmonde Road between Albert Road and SH1 for customers in all vehicles in the weekday AM peak hour from 20-22 minutes to 15-17 minutes
  - Lake Road and Esmonde Road between Albert Road and SH1 for all multi-occupant vehicle customers in the weekday morning peak hour from 20-22 minutes to 10-12 minutes
- **Investment Objective 2** – Improve the effectiveness of high occupancy modes of transport and healthier transport modes by increasing the number of people throughput on:
  - Lake Road in both directions (south of Esmonde Road) by car, bus and bicycle in the weekday peak period from 12,100 to 12,300 people to 13,100 to 14,500 people
  - Westbound on Esmonde Road (West of Lake Road) by car, bus and bicycle in the weekday morning peak period from 3,200 people to 3,500-3,700 people
- **Investment Objective 3** – Improve the attractiveness of high occupancy and healthier transport modes by increasing the Census Journey to Work mode share for alternative modes on the Devonport peninsula (including Takapuna) from 33-35% to 44-46%
- **Investment Objective 4** – Improve community satisfaction with transport infrastructure for:
  - Lake Road by achieving an ongoing trend of improved customer satisfaction through implementation of the investment over time from the current 47%
  - Esmonde Road by achieving an ongoing trend of improved customer satisfaction through implementation of the investment over time from the current 58%.

Like the KPIs, the IOs will be developed and timescales identified in a DBC, as further information is provided to facilitate a more quantitative or qualitative assessment of those measures, particularly to assess more accurately journey times for the different modes.

## 5 Activity Development

This section describes the process followed, and the range of activities developed and assessed, to identify the investment activity or option package(s) that will best achieve the IOs. The activity development process was based around addressing the identified problems, realising the investment benefits and therefore primarily focussed on the ability of an activity/option to achieve the IOs developed through the ILM approach. The activity (or option) development and assessment was a two-stage process, evaluating a long list and then a short list of options. The options developed were assessed by the project team and key stakeholders using an increasing refined evaluation approach from the long list to the short list.

At the long list stage, the evaluation of the options focussed on the IOs and was supplemented by project team and key stakeholder identification of key risks/opportunities, as well as any potential dis-benefits and dependencies for activities. The further appraisal was important in identifying any potential 'red flags' for activities that would not be apparent through the evaluation against the IOs. The appraisal of key risk/opportunities was based on relevant multi-criteria assessment and implementability matters identified in the Transport Agency's IBC Options Summary Table template.

At the short list stage, evaluation of the activities was again focussed on the IOs, but was able to be supplemented by consideration of the performance of options against the KPIs, as the further refinement of the short list options allowed these outcomes to be better defined. Similarly, with the further definition of the options at the short list stage, more specific evaluation and appraisal of options against the relevant multi-criteria and implementability matters in the Transport Agency's IBC Options Summary Table template was also able to be undertaken.

### 5.1 Definition of Base Case

The definition of the base case is discussed further in **Appendix E** and summarised in **Table 5-1**.

Table 5-1: Summary of Base Case

Projects Identified in Previous Studies	Other AT Projects and Programmes	Larger Scale Projects
<p>Improvements at the Lake Road/Albert Road and Lake Road/Anzac Street roundabouts by replacing with signalised intersections that can better provide for safe and efficient pedestrian and cycle movement</p> <p>Upgrade / additional / relocation pedestrian crossings (safety improvements), refer Figure 1, <b>Appendix E</b></p> <p>Removal of indented bus stop north of Hauraki Shops</p> <p>Rationalisation of bus stop locations to reduce the close spacing between stops, as proposed following consultation on the New Network</p> <p>Removal of free left turn slip lanes from Bayswater Avenue (east) to Lake Road south at the Lake Road/Bayswater Avenue intersection and from Lake Road in Hauraki Road</p>	<p>The owners of the Harbourside Church (located on the south side of Esmonde Road) are proposing to utilise part of their existing car park as a paid Park and Ride facility. This is currently being provided on a trial basis with AT support</p> <p>Improvements to bus services (routes and service frequencies) proposed to be introduced by AT as part of the New Northern Public Transport Network</p> <p>Improvements to ferry service frequencies between Auckland and Devonport/Bayswater to meet future demand increases</p> <p>Measures to deter 'rat running' traffic, notably on Harley Road and Napier Road through to Eldon Street</p> <p>The planned upgrade of the Lake Road/Eversleigh/St Leonard Road intersection to have traffic signal control (which will be implemented in</p>	<p>The Devonport-Takapuna 'Greenways' project (see <b>Figure 2-7</b>)</p> <p>SeaPath Cycleway (a cycle route connecting Esmonde Road/Takapuna to the proposed cycle route across the Auckland Harbour Bride ('Skypath') that is currently being investigated by the Transport Agency – refer Figure 1, <b>Appendix E</b>)</p> <p>Completion of an Additional Waitemata Harbour Crossing (AWHC), as per ATAP – refer Figure 1, <b>Appendix E</b>.</p>



Projects Identified in Previous Studies	Other AT Projects and Programmes	Larger Scale Projects
<p>Improve layout at the Lake Road/Winscombe Street/Bardia Street signalised intersection by considering measures such as removing right turn lanes for northbound and southbound vehicles on Lake Road</p> <p>Optimisation of operation of existing signal controlled intersections.</p>	<p>association with SHA developments with the Peninsula Precincts on the western side of the peninsula)</p> <p>The planned upgrades to the Lake Road/Strand/Hurstmere Road signalised intersection in Takapuna to improve pedestrian crossing facilities and rationalise vehicle movements</p> <p>School/work place travel planning initiatives at all Primary, Intermediate and High Schools on Devonport peninsula and at all major employers in the Takapuna and Devonport peninsula area (notably at the Devonport Navy Base) Development of real-time multi-modal traveller information.</p>	

## 5.2 Development of Long List of Alternative Activities

A wide range of alternative activities or options were identified which could potentially achieve the identified IOs and optimise value for money (economic case). The options were identified from a review of previous technical investigations, including the Lake Road CBP and Takapuna CBTS, and through discussions with key stakeholders at a long list options /assessment criteria workshop (Workshop 4). The development of the long list for both Lake Road and Esmonde Road are discussed further in **Appendix E**. To meet the IOs, most long list options are a combination of optimisation and supply responses.

In terms of the long list, the matter of demand management (pricing models, network access limitations etc.) was considered to be a region-wide decision and therefore excluded from the scope, albeit the long list options were assessed as not precluding any future implementation of demand management responses. The consideration of optimisation is inherent in the long list options in that allocation of corridor space is generally towards higher 'people movement' modes including PT, whilst allocation of road space to cyclists is linked to regional (and national) policies. Most of the long list are 'new supply / capacity' enhancement options, which are driven by growth pressures and existing servicing gaps.

At this stage of the IBC process, the options were identified at a high level. Details such as the extent of bus or transit lanes, the precise width of traffic lanes and the type of cycle facility to be provided (other than whether they would be separated or unseparated), were not determined. This approach was consistent with the high level evaluation framework (primarily based on a quantitative evaluation against the IOs that was used at this stage).

## 5.3 Assessment of Long List Options

### 5.3.1 Assessment Process

A draft long list evaluation framework was developed using the IOs and inputs from the Transport Agency's Options Summary Table template, as described previously. This also considered a cost range, as well as the potential dis-benefits and dependencies of the option, particularly where this may identify a 'red flag' for an option.

The draft evaluation framework was issued to stakeholders in advance on the long list workshop for comment on the framework, as well as the do-minimum/base case and other long list options identified. Feedback from stakeholders was incorporated into the framework used during the workshop, as was further refinement of the framework during workshop in terms of developing the completed framework and evaluation.

The long list options were initially assessed using a three point scale against the IOs, as follows, based on the informed opinion of the key stakeholders who are either specialists or have key information regarding the study area and also supplemented by the evidence base:

- Green – Significantly contributes
- Amber – Contributes / Neutral / Detracts
- Red – Significantly detracts / Potential 'red flag'.

As identified above, for each of the long list options, key risks / opportunities were identified and captured in the Risks / Opportunities section of the evaluation framework. These key risks, together with any potential dis-benefits and dependencies, were carried forward to inform the short list assessment. The risks were categorised on a similar basis to the IOs:

- Green – Significant positive opportunity
- Amber – Positive opportunity / Neutral / Adverse risk
- Red – Significant adverse risk / 'Red flag'.

### 5.3.2 Assessment Summary

The completed Evaluation Framework for the long list is included in **Appendix F** and summarised in **Table 5-2**. The evaluation was completed following the long list workshop and was circulated for key stakeholder feedback, which was then incorporated in the final evaluation.

The options carried forward to the shortlist are highlighted 'green' in **Table 5-2**, with the other options not progressed highlighted 'red'. The key reasons for progressing and rejecting the options are summarised. The table also expands on the details of the options that have been progressed to the short list. The 'Base Case' option (highlighted in orange) is carried forward to the shortlist evaluation to provide a basis for assessing the other short list options, consistent with the Transport Agency's guidelines for an IBC.

Table 5-2: Summary of Long List Option Assessment

Option	Benefits	Disadvantages <sup>1</sup>	Comment
<b>Option 1 - Base Case</b>	Relatively straightforward consenting, excluding 'major projects', which are not part of this project scope	Highly unlikely to address IOs	Would not be progressed, given poor performance against IO, but carried forward as 'baseline' for shortlist evaluation
<b>Lake Road Options</b>			
<b>Option 2 - Dynamic Lane and Separated Cycle Lane</b>	Improvements for cyclists and cycle mode share, improved cycle user group satisfaction	Current traffic demands not tidal, so does not support two-way demands. Does not provide sufficiently for IO around travel time and multi-occupant vehicle travel modes	Not progressed, due lack of tidal demand and support for multi-occupant vehicles

Option	Benefits	Disadvantages <sup>1</sup>	Comment
<b>Option 3 - Four-laning for General Traffic</b>	Primarily supports improved single occupancy vehicle travel	Does not provide sufficient benefits multi-occupant vehicle users. Potential adverse effects for cycle users requiring alternative cycle corridor	Not progressed, as does not address IO relating to throughput and potential adverse impacts on cycle mode share
<b>Option 4 - Four-laning for Bus Lanes</b>	Supports improved bus travel times and partial throughput improvement in relation to IO	Does not provide sufficient benefits multi-occupant vehicle users. Potential adverse effects for cycle users requiring alternative cycle corridor. Potential poor customer satisfaction with corridor allocation to buses only	Not progressed, as does not address IO, particularly relating to throughput, and potential adverse impacts on cycle mode share
<b>Option 5 - Unseparated Cycle Lanes</b>	Only marginal improvement in cycle mode share, relatively straightforward consenting	Does not address IO relating to throughput and travel time and likely adverse customer feedback	Not progressed, as highly unlikely to address key IO for throughput and travel time
<b>Option 6 - Separated Cycle Lanes</b>	Will provide facility for wider range of cycle users improving mode share, relatively straightforward consenting. Does not impact on other modes, where there is current good vehicle travel times / throughput	Adverse impacts on vehicle users, where there is current poor travel times and throughput	Progressed to short list, as part of corridor package, where can be implemented without adverse impact on IO for throughput and travel time
<b>Option 7 - Transit Vehicle Lanes</b>	Likely to provide significant benefits to multi-occupant vehicle users and further encourage these modes, where necessary on corridor. Strongly supporting IO for throughput and travel time improvements, as well as mode share	Potential adverse effects for cycle users requiring alternative cycle corridor	Progressed to short list, as part of corridor package, where can be implemented without adverse impact on cycle users and subject to assessment of alternative cycle corridor
<b>Option 8 - Four Laning for Transit/Bus Lanes with Separated Cycle Lanes</b>	Likely to provide significant benefits for all transport modes. Strongly supporting all IO	Requirement for land acquisition and consenting risks, plus likely to have adverse community feedback	Progressed to short list, as part of corridor package, given strong support for all IO
<b>Option 9 - New Road Corridor – Western Side of Peninsula</b>	Provides additional throughput for single occupancy vehicle travel and can contribute to improved travel times	Not focussed on multi-occupant vehicle travel. High level of risk relating to cost, land acquisition (away from existing corridor) and consenting, including new structures in Coastal Marine Area (CMA). Highly likely to result in adverse community feedback	Not progressed, as benefits likely to be outweighed by lack of sufficient population growth to support cost of investment and other land acquisition and consenting risks.
<b>Option 10 - New Ferry Service from Takapuna</b>	Will provide support to population growth in Takapuna	Not supported in adopted Ferry Development Plan (Nov 2015). Community concerns arising from capital and operational	Not progressed, as cost outweighs potential benefits

Option	Benefits	Disadvantages <sup>1</sup>	Comment
		costs for new ferry service and consenting risks	
<b>Option 11 - Improve Access to Bayswater Ferry Terminal</b>	Will provide benefits to all users accessing the ferry terminal, supporting mode share IO and likely to gain support from community	Potential impacts on car parking with introduction of improvements to cycle facilities	Progressed to shortlist, given support for improvement in mode share and likely community support
<b>Option 12 - Grade Separated Intersections on Lake Road</b>	Supports throughput and travel time IO, but not focussed on multi-occupant vehicle travel	Potential adverse impacts on pedestrians and cyclists and significant adverse feedback from community with new grade separated structures and associated consenting (designation) risks with land acquisition. Alternative cycle route may be required	Not progressed, as significant costs, consenting risks and adverse community feedback unlikely to outweigh potential benefits
<b>Option 13 - Roundabouts replace Signalised intersections on Lake Road</b>	Supports throughput and travel time IO, but not focussed on multi-occupant vehicle travel	Potential adverse impacts on pedestrians and cyclists and significant adverse feedback from community with new structure and associated consenting (designation) risks with land acquisition.	Not progressed, as costs, consenting risks and adverse community feedback unlikely to outweigh potential benefit
<b>Option 14 - At-Grade Mass Rapid Transit between Devonport and Takapuna</b>	Supports throughput and travel time IO, particularly for multi-occupant vehicle travel and can improve mode share	Potential adverse effects for cycle users requiring alternative cycle corridor. Future growth not likely to support this level of investment	Not progressed, as future growth not likely to support investment require and likely adverse impact on cycle users. Could be future evolution of Option 7, if growth is greater than currently anticipated
<b>Option 15 - Grade Separated Mass Rapid Transit between Devonport and Takapuna</b>	Supports throughput and travel time IO, particularly for multi-occupant vehicle travel and can improve mode share	Potential adverse impacts on pedestrians and cyclists and significant adverse feedback from community with new grade separated structures and associated consenting (designation) risks with land acquisition. Alternative cycle route may be required	Not progressed, as significant costs, consenting risks and adverse community feedback unlikely to outweigh potential benefits
<b>Option 16 - Takapuna Centre Access Improvements</b>	Likely to only provide marginal benefits to improved throughput and travel time on Bracken and improved pedestrian environment in Takapuna	Shared space on Lake Rd (Anzac to Strand) likely to have adverse impacts on throughput and travel times	Not progressed, as potential adverse vehicle impacts and reliance on single corridor around Takapuna outweigh benefits
<b>Option 17 - Alternative Cycle Route</b>	Potential to provide for greater range of cycle users and improve mode share / throughput support these IO and is pre-requisite for earlier short list options	May not to be as direct and convenient as existing corridor, reducing cycle user quality of service, and may require land acquisition	Progressed to short list to support other short list options, but requires further investigation

Option	Benefits	Disadvantages <sup>1</sup>	Comment
<b>Esmonde Road Options</b>			
<b>Option 1 - Existing Westbound Traffic/Bus Lane converted to Transit Lane</b>	Likely to provide support to improved throughput and travel time IO for multi-occupant vehicles	Utilising existing general traffic lane for multi-occupant vehicles only likely to result in significant dis-benefits to single occupancy vehicle users	Not progressed, as overall throughput and travel time dis-benefits outweigh multi-occupant vehicle benefits
<b>Option 2 - Westbound General Traffic Lane Converted to Traffic Lane</b>	Likely to provide support to improved throughput and travel time IO for multi-occupant vehicles	Removal of general traffic lane likely to result in significant dis-benefits to single occupancy vehicle users	Not progressed, as overall throughput and travel time dis-benefits outweigh multi-occupant vehicle benefits
<b>Option 3 - Westbound Transit Lane Added with Ramp Meters Relocated</b>	Likely to provide very strong support for improved travel time and throughput for many users	Potential dis-benefits to single occupancy vehicles and physical works require further investigation	Progressed to short list as provides very strong support to throughput and travel time IO, subject to further investigation
<b>Option 4 - Existing Eastbound Lane converted to Transit Lane</b>	Will provide some improved travel time for multi-occupant vehicles, increasing throughput	Existing travel times not particularly poor. Removal of general traffic lane likely to result in significant dis-benefits to single occupancy vehicle users	Not progressed, as overall throughput and travel time dis-benefits outweigh multi-occupant vehicle benefits, given current travel times are not poor
<b>Option 5 - New Eastbound Transit Lane Added</b>	Will provide some improved travel time for multi-occupant vehicles, increasing throughput, without adverse impact on other vehicle users	Existing travel times not particularly poor. Cost and risk with designation, for additional lane and work in CMA, plus adverse community feedback	Not progressed, as cost and risks outweigh potential benefits, given current travel times are not poor

<sup>1</sup> Disadvantages – includes Risks and Dis-benefits

### 5.3.3 Short Listed Options for Lake Road

The options progressed to short list were based around the following Key Themes:

- The need to maximise people throughput by the use of transit lanes and (in the longer term, as justified by greater than currently anticipated growth, bus lanes and a-grade MRT)
- Improving the existing cycle facilities on Lake Road, which could potentially be achieved by adopting an alternative route on the peninsula
- No deterioration in pedestrians facilities along and across the corridor
- Reducing traffic volumes on Lake Road through Takapuna Centre
- Improved cycle and/or bus access to Bayswater Ferry Terminal.

On the basis of the Key Themes and the Evaluation Framework, the following options for the Lake Road corridor were progressed to the short list for further evaluation:

- **Option 6** – Separated Cycle Lanes within the Existing Corridor
- **Option 7** – Transit Lanes within the Existing Corridor
- **Option 8** – Four Laning for Transit/Bus Lanes with Separated Cycle Lanes
- **Option 11** – Improved access to Bayswater Ferry Terminal through bus and/or cycle improvements.

Feedback from the long list assessment workshop was that stakeholders were generally supportive of the assessment findings. Other feedback from stakeholders to be considered in the development and evaluation of the shortlist option packages:

- The need for transit lanes along the full length of corridor
- Further definition of the extent to which options may require land acquisition
- The relative impact on mode share of allocating corridor space for either cycling or transit lanes
- Further consideration of whether cycle facilities should be uni- or bi-directional (including the possible use of Copenhagen facilities).

In relation to Option 6, it was noted that further consideration needed to be given to whether this option incorporates one-way facilities on both sides of the road or a bi-directional cycle facility on one side of the road only on different sections of the Lake Road corridor. This option was progressed to the short-list on the basis that the extent of such facilities would be limited to locations on the corridor, where implementing cycle lanes did not adversely impact on overall vehicle travel times and people throughout.

In relation to Option 7, it was concluded that this option should be developed to enable the transit lanes to be converted to bus lanes or MRT in the future should future circumstances make this viable. This option may result in an alternative cycle route being required, if there is insufficient space in the road reserve. As such, it was also agreed that further investigation should be made into Option 17 (Alternative Cycle Route), as this may be a pre-requisite to Option 7.

In addition, it was noted that consideration needs to give to whether a transit lane in one direction only (i.e. northbound) could be provided in some sections of the corridor, perhaps with a separated bi-directional cycle facility in the southbound direction.

It was noted that the geographic extent of each of the options needs to be considered in the short list. For example, different shortlist options, such as the provision of an alternative walking and cycle route north of Hauraki Corner or extending four-laning of Lake Road from Hauraki Corner to Belmont, may be more applicable than an alternative walking and cycling route or four-laning along other parts or the full lengths of the corridor, i.e. options may not be needed or may not be practical.

### 5.3.4 Short Listed Options for Esmonde Road

Only one option for Esmonde Road was short-listed (Option 3). Options 1 and 2 were not short-listed because they are likely to result in significant adverse impacts on other vehicles, which could outweigh the benefits of providing a transit lane. Options 4 and 5 were not progressed, as travel times in the eastbound direction are not sufficiently poor or highly variable to justify either the potential significant adverse impacts on single occupancy vehicles (Option 4) or land acquisition / consenting risks (Option 5).

## 5.4 Development of Economic Case

### 5.4.1 Overview

Prior to determining the short list options taken forward to be presented at the preferred option/s workshop, an iterative development of the short list packages was undertaken. The overall process for moving from the short list identified through the long list workshop toward the identification of the preferred option/s (as a package), is summarised in **Figure 5-1**.

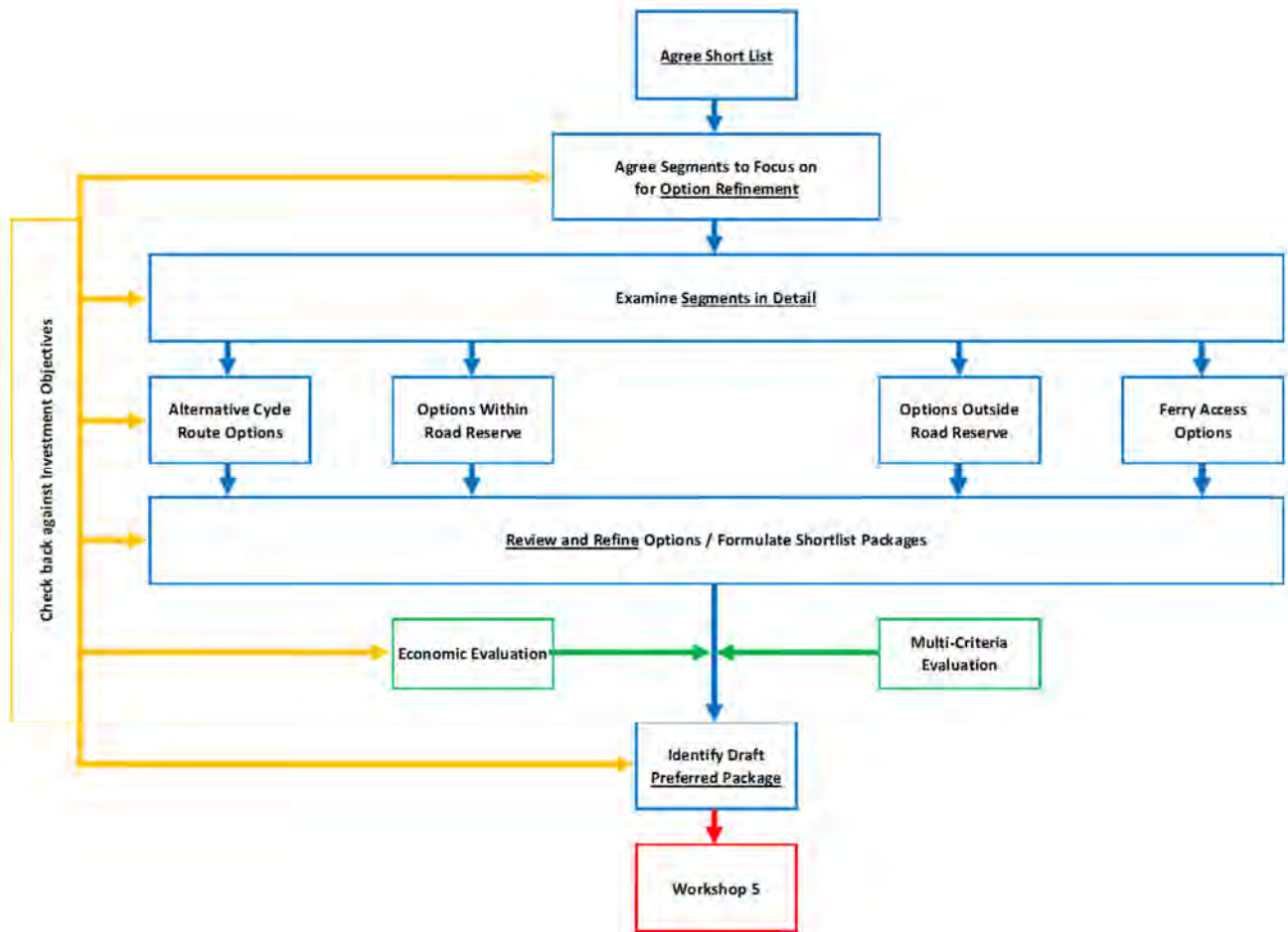


Figure 5-1: Short List Options Assessment Process

During the development and evaluation phase, there has been an ongoing iterative review of the shortlist packages with the AT project team and selected stakeholders, in particular with regard to:

- Alignment with the defined IOs
- Options being progressed for different route segments, where they are clearly needed and are practical
- Continuity of options along the Lake Road corridor
- Resource Management Act (RMA) considerations
- Economic analysis, which is addressed in **Section 6**.

Consideration was also given to proposals contained in other studies, such as AT's Bayswater Avenue Detailed case study<sup>2</sup> and the Greenways projects being developed by Council in partnership with AT.

The main focus of the short list option development was on determining the optimum cross-section at pinch points on each segment of the route in relation to each option, which is discussed in **Appendix G**, supported by **Appendices H and I**.

<sup>2</sup> Bayswater Avenue Detailed Case Study, Auckland Transport, June 2016

### 5.4.2 Confirmation of the Short List Option Packages

Based on the shortlist option refinement described above, packages of short list options have been developed to be evaluated. The shortlist option packages are summarised in **Table 5-3**.

The shortlist comprises the following option packages:

- Lake Road Option Packages
  - Option Package A – Base Case
  - Option Package B – Lake Road CMP / Takapuna CBTS (within existing road reserve)
  - Option Package C – Transit Emphasis (within existing road reserve)
  - Option Package D – Transit / Cycle Mix (within existing road reserve)
  - Option Package E – Transit and Cycle Combined (acquiring land outside the existing road reserve, where required)
- Bayswater Avenue Option Package
  - Access to Bayswater Ferry Terminal – Cycle Access Improvements
- Esmonde Road Option Package
  - New Transit Lane to Southbound On Ramp (i.e. re-purposing existing Esmonde Road bus lane).

Table 5-3 Summary of Shortlist Option Packages

Option Package	Description / Assumptions
<b>Lake Road Option Packages</b>	
<b>Option Package A – Base Case</b>	Refer to <b>Appendix E</b>
<b>Option Package B – Cycle Emphasis</b>	<ul style="list-style-type: none"> <li>■ Separated cycle facilities between The Strand and Albert Road</li> <li>■ Transit Lanes between Esmonde Road and Hauraki Corner and Removal of hatched median</li> <li>■ Kerb realignment on one or both sides of the road between Hauraki Corner and Seabreeze Road</li> <li>■ Removal of on-street parking: The Strand to Esmonde Road / Around Bayswater Avenue / Around Old Lake Road / Seabreeze Road to Ariho Terrace.</li> </ul>
<b>Option Package C – Transit Emphasis</b>	<ul style="list-style-type: none"> <li>■ Separated cycle facilities between The Strand and Esmonde Road and between Old Lake Road and Albert Road</li> <li>■ Wide Transit Lanes (Shared with Cyclists) in both directions between Esmonde Road and Hauraki Corner</li> <li>■ Alternative Cycle Route to Lake Road required between Hauraki Corner and Old Lake Road</li> <li>■ Transit Lanes in both directions between Hauraki Corner and Old Lake Road</li> <li>■ No Hatched Median between Hauraki Corner and Old Lake Road</li> <li>■ Kerb Realignment (on one side of the road only) between Hauraki Corner and Seabreeze Road</li> <li>■ Removal of on-street parking: The Strand to Esmonde Road / Around Bayswater Avenue / Around Old Lake Road / Seabreeze Road to Ariho Terrace.</li> </ul>



Option Package	Description / Assumptions
<b>Option Package D –</b> Transit / Cycle Mix	<ul style="list-style-type: none"> <li>■ Separated cycle facilities between The Strand and Hauraki Corner and between Seabreeze Road and Albert Road</li> <li>■ Copenhagen Cycle Lanes between Hauraki Corner and Seabreeze Road</li> <li>■ Transit Lanes – Direction-specific (i.e. on one side only) between Esmonde Road and Old Lake Road</li> <li>■ No hatched median between Esmonde Road and Old Lake Road</li> <li>■ Kerb realignment (on one side of the road only) between Hauraki Corner and Seabreeze Road</li> <li>■ Removal of on-street parking: The Strand to Esmonde Road / Around Bayswater Avenue / Around Old Lake Road.</li> </ul>
<b>Option Package E –</b> Transit and Cycle Lane Improvements	<ul style="list-style-type: none"> <li>■ Separated cycle facilities between The Strand and Albert Road</li> <li>■ Transit Lanes in both directions between Esmonde Road and Old Lake Road</li> <li>■ No Hatched Median between Hauraki Corner and Old Lake Road</li> <li>■ Kerb realignment on both sides of the road between Esmonde Road and Seabreeze Road</li> <li>■ Mid-block property acquisition on one or both sides of the road between Esmonde Road and Seabreeze Road</li> <li>■ Removal of on-street parking: The Strand to Esmonde Road / Around Bayswater Avenue / Around Old Lake Road.</li> </ul>
<b>Esmonde Road Option Packages</b>	
<b>New Transit Lane to Southbound On Ramp</b>	<ul style="list-style-type: none"> <li>■ New single lane bridge over the Northern Busway to accommodate a separate on-ramp transit lane at the on-ramp</li> <li>■ Road widening and new guardrail on the eastern side of the on-ramp to accommodate a new transit lane between the existing ramp metered signals and the Esmonde Road Northern Busway on-ramp</li> <li>■ Relocation of the ramp metering signals approximately 80 metres upstream of existing location</li> <li>■ Free flow transit lane at the ramp meters</li> <li>■ Re-purposing of the Esmonde Road bus lane to a transit lane at the transit lane at the approach to the on-ramp.</li> </ul>

Option Package	Description / Assumptions
<b>Bayswater Avenue Option Package</b>	
<b>Access to Bayswater Ferry Terminal – Cycle Access Improvements</b>	<ul style="list-style-type: none"> <li>■ Moana Avenue to 179 Bayswater Avenue – <ul style="list-style-type: none"> <li>- Westbound shared path</li> <li>- Eastbound on-road cycle lane</li> <li>- Remove on street parking – North side only</li> </ul> </li> <li>■ 179 Bayswater Avenue to 111 Bayswater Avenue – <ul style="list-style-type: none"> <li>- On-road cycle lanes – Both sides</li> <li>- Remove on-street parking – One side only</li> </ul> </li> <li>■ 111 Bayswater Avenue to Beresford Street – <ul style="list-style-type: none"> <li>- On-road cycle lanes – Both sides</li> <li>- Remove on-street parking – One side only</li> </ul> </li> </ul>

Concept cross sections for the Lake Road and Bayswater Avenue packages are included in **Appendix J** with further discussion provided in the short list package descriptions (**Appendix L**). In all cases, the existing footpath provision, predominantly along both sides of Lake Road and Bayswater Avenue is retained with all option packages. Any widening or kerb extensions within options are yet to be fully determined, particularly whether one side of the road or both sides would be feasible.

The cross sections are based on looking north along Lake Road or east along Bayswater Avenue. The solid blue lines indicate existing kerbline locations, whilst solid red lines indicate the existing road reserve boundary. Where either the kerbline or road reserve boundary changes with an option, these are shown as dashed lines.

Supplementing these indicative cross sections are indicative transport provision plans for each of the Lake Road option packages, as well as the Bayswater Avenue and Esmonde Road option packages. These are shown in the further short list package descriptions below.

In addition to the cross sections and indicative transport provision plans, feasibility plans for the Lake Road and Bayswater Avenue options were prepared to further understand the ability to accommodate the options within the corridor and other implications, such as the need to realign kerbs or relocate services/utilities along the corridor. These were necessary to gain a wider understanding of the options, rather than simply using the cross sections, which were at identified 'pinch points' in each segment.

The feasibility plans for the drawings for the Lake Road and Bayswater Avenue options are contained in **Appendix K**. In relation to the Esmonde Road option package, draft concept drawings were provided by AT based on previous high level work undertaken other consultants, are also included in **Appendix D**.

### 5.4.3 Description of Short List Option Packages

A description of the short list option packages is provided in **Appendix L**.

## 5.5 Short List Options Assessment

### 5.5.1 Assessment Process

The evaluation framework for the shortlist option packages is based on the following:

- The four IOs, which have been developed through the earlier ILM workshop and further feedback following the long list options workshop (Workshop 4)
- A multi-criteria assessment (MCA) based on criteria in the Transport Agency's guidance for assessment of options during the IBC phase.
- An assessment of the KPIs relating to the option packages, specifically a quantitative evaluation against the travel time, throughput and mode share KPIs, as well as a qualitative assessment of the potential to achieve the customer satisfaction and people employed in Takapuna KPIs.

The evaluation framework was based on the IOs and the above mixture of qualitative and quantitative measures for each option. The aim was to incorporate as many quantitative measures as possible in order to strengthen the evidence base for the assessment of the options. With the further definition of the option packages at this stage, more specific evaluation and appraisal of options against the relevant multi-criteria assessment and implementability matters in the Transport Agency's IBC Options Summary Table template was also able to be undertaken.

The criteria included as part of the evaluation framework were reviewed with stakeholder during the short list workshop (Workshop 5) and it was confirmed that they were consistent with the IOs and would enable a robust evaluation of the identified short list option packages.

The IOs, as well as multi-criteria assessment and implementability matters were 'scored' on the following seven point scale:

- **+3** – Fully contributes or enhances in relation to the Investment Objective or criteria evaluated
- **+2** – Significantly contributes or enhances
- **+1** – Partial contribution or enhancement
- **0** – Neutral or negligible contribution or enhancement
- **-1** – Partially detracts or adverse effects
- **-2** – Largely detracts or more than minor effects
- **-3** – Significantly detracts or adverse effects.

This more disaggregated scoring system was used for the short list options in order to try and provide greater differentiation between the options. It was not considered necessary to have any weighting for the IOs, the multi-criteria assessment and implementability matters, as it was considered that the range of objectives/criteria/matters provided allowed a balanced outcome. Scores were totalled separately for each of these three means of evaluating the short list option packages. As with the long list options the key benefits, dis-benefits and risks/dependencies of each option package were also captured in the evaluation framework.

Each of the option packages was evaluated against a 'Do Nothing' scenario. Noting that the activities that form the Lake Road Base Case option (Option A) are considered to be part of all other Lake Road option packages, as it is considered that in any event these activities would occur (or at least do not differentiate the options), as discussed previously in **Section 5.1**.

### 5.5.2 Evaluation Summary

The completed option short list option package evaluation is contained in **Appendix M** and summarised in **Table 5-4**, with the key to the evaluation ratings in **Table 5-5**. This shows that the alternatives and option assessment process was comprehensive and evaluated, as far as possible, the costs, time frames, risks and dis-benefits for each of the activity options considered. This will also be informed by the outcomes of the public consultation on the IBC.

Table 5-4: Summary of Option Package Evaluation – All Options

Lake Road Short List Options – Evaluation Summary		Lake Road - Option A	Lake Road - Option B	Lake Road - Option C	Lake Road - Option D	Lake Road - Option E	Access along Esmonde Road	Access to Bayswater Ferry
		Base Case	Cycle Emphasis	Transit Emphasis	Transit/ Cycle Mix	Transit and Cycle Combined	Westbound Transit Lane	Cycle Access Improvements
Investment Objectives	Improve transport infrastructure to support current demand and meet future growth by reducing the overall people travel time on the corridor	-1	-1	+3	+1	+3	+3	+1
	Improve the effectiveness of high occupancy modes of transport and healthier transport modes by increasing the number of people throughput	-1	-1	+2	+1	+3	+3	+1
	Improve the attractiveness of high occupancy and healthier transport modes by increasing mode share for these modes	+1	1+	-1	+2	+3	+2	+1
	Improve community satisfaction with transport infrastructure	-1	-1	0	+1	+2	+2	+1
<b>Investment Objectives Sub-total</b>		<b>-2</b>	<b>-2</b>	<b>+4</b>	<b>+5</b>	<b>+11</b>	<b>+10</b>	<b>+4</b>
Multi-criteria Assessment	Economy	0	0	+1	+1	+3	+2	0
	Integration	0	+1	+1	+1	+3	+1	+2
	Social	0	-1	-1	-1	-2	+1	+1
	Natural and Built Heritage Environment	0	-1	-1	-1	-3	-2	-1
	Human Health	0	-1	-1	-1	-2	-1	0
	Cultural	0	-1	-1	-1	-2	-1	0
	Property	0	-1	-1	-1	-3	-2	0
<b>Multi-criteria Assessment Sub-total</b>		<b>0</b>	<b>-4</b>	<b>-3</b>	<b>-3</b>	<b>-6</b>	<b>-2</b>	<b>+2</b>
<b>Total (Investment Objectives + Multi-criteria Assessment)</b>		<b>-2</b>	<b>-6</b>	<b>+1</b>	<b>+2</b>	<b>+5</b>	<b>+8</b>	<b>+6</b>
<b>Relative Performance Against KPIs</b>		<b>Very Low</b>	<b>Low</b>	<b>High</b>	<b>Medium</b>	<b>High</b>	<b>Medium</b>	<b>Low</b>
Risks to Implementation	Technical	+3	+2	+1	-1	-1	0	+3
	Consentability	+3	+2	+2	0	-2	-2	0
	Operational/ maintenance	0	-1	-2	-2	-1	-2	+1
	Safety and design	+2	-2	-1	-1	0	-2	+1
	Stakeholder / Public	TO BE COMPLETED AFTER PUBLIC CONSULTATION						
<b>Key Benefits Summary</b>		Minor localised improvements for pedestrians and at intersections. Relatively straightforward to consent and implement	Supports increased cycle mode share. Relatively straightforward to consent, noting Risks. Within road reserve.	Supports improved throughput and travel time, enabling mode shift. High performance against KPIs. Relatively straightforward to consent, noting Risks. Within road reserve.	Partly supports improved throughput and travel time, enabling mode shift. Supports increased cycle mode share. Medium performance against KPIs. Relatively straightforward to consent, noting Risks. Within road reserve.	Supports improved throughput and travel time, enabling mode shift. Supports increased cycle mode share. High performance against KPIs	Supports improved throughput and travel time, enabling mode shift. Medium performance against KPIs	Supports increased cycle mode share. Relatively straightforward to consent, noting Risks. Within road reserve.

<b>Key Dis-benefits Summary</b>	Existing Lake Rd problems not addressed and likely to be exacerbated by growth. Poor performance against KPIs and will not meet stakeholder expectations	Existing Lake Rd problems not addressed and likely to be exacerbated by growth. Low performance against KPIs and unlikely to meet stakeholder expectations	Adverse impact on quality of service for cyclists along Lake Rd, associated stakeholder concerns. Removal of hatched median	Existing Lake Rd problems only partly addressed and likely to be exacerbated by growth. Unlikely to meet stakeholder expectations	Outside road reserve. Potentially complex consenting/designation, given need for land acquisition. Stakeholder objections to land acquisition.	Potentially work outside road reserve in the CMA to enable delivery without adverse operational and safety outcomes	Low performance against KPIs
<b>Key Risks / Dependencies Summary</b>	Funding commitment to 'Parallel' works required	Underground power lines / Impact on notable trees / Loss of parking	Underground power lines / Impact on notable trees / Loss of parking	Underground power lines / Impact on notable trees / Loss of parking	Land acquisition / Underground power lines / Stormwater treatment / Impact on notable trees, Heritage places, possible contaminated land	Potential land acquisition / Work in CMA / Stormwater treatment. Operational outcomes at ramp signals requires further investigation	Loss of parking

Table 5-5: Key for Evaluation Ratings

	<b>+3</b>	<b>+2</b>	<b>+1</b>	<b>0</b>	<b>-1</b>	<b>-2</b>	<b>-3</b>
<b>Investment Objectives</b>	Significantly Contributes or Enhances	Highly Contributes or Enhances	Partially Contributes or Enhances	Neutral / Negligible Impacts	Partially Detracts or Adverse	Highly Detracts or Adverse	Significantly Detracts or Adverse
<b>Multi-criteria Assessment</b>							
<b>Risks to Implementation</b>	Low Risk						High Risk

A further summary of the evaluation ratings of the overall option packages against the KPIs, both quantitatively and qualitatively and using the ratings (Table 5-5) provided above, is shown in Table 5-6. This has informed the evaluation of the 'Relative Performance Against KPIs' for each of the option packages as summarised in Table 5-4. The further detailed analysis of the performance of the option packages against the KPIs, as relevant to each option, is provided in Appendix N. As quantitative evaluation of the Community Satisfaction and Employment in Takapuna KPIs has not been undertaken for the IBC, these two KPIs have been evaluated on the basis of the equivalent Community Satisfaction Investment Objective and the Economy MCA score respectively, as a proxy for the potential outcomes.

Table 5-6: Summary of KPI Evaluation for Overall Option Packages

Overall IBC Package	Measure / Rating	Reduce overall people travel time (All Vehicles) (m:ss)	Reduce overall people travel time (HOVs Only) (m:ss)	Increase number of people throughout (Lake Road)	Increase number of people throughout (Esmonde Road)	Increase mode share for alternative modes	Improve community satisfaction ratings	Increase employment in Takapuna
Option Package A	Qualitative Measure	-1:13 to -2:22	-3:57 to -8:03	0	+300 to +500	+3 to +7%	n/a	n/a
	<b>Evaluation Rating</b>	<b>+1</b>	<b>+1</b>	<b>+1</b>	<b>+1</b>	<b>+1</b>	<b>0</b>	<b>+1</b>
Option Package B	Qualitative Measure	-1:13 to -2:22	-3:57 to -8:03	0 to +100	+300 to +500	+3 to +7%	n/a	n/a
	<b>Evaluation Rating</b>	<b>+1</b>	<b>+1</b>	<b>+1</b>	<b>+1</b>	<b>+1</b>	<b>0</b>	<b>+1</b>
Option Package C	Qualitative Measure	-2:36 to -4:37	-7:35 to -11:41	+1,000 to +2,100	+300 to +500	+8 to +12%	n/a	n/a
	<b>Evaluation Rating</b>	<b>+3</b>	<b>+2</b>	<b>+2</b>	<b>+2</b>	<b>+2</b>	<b>+1</b>	<b>+2</b>
Option Package D	Qualitative Measure	-1:54 to -3:29	-5:46 to -9:52	+500 to +1,100	+300 to +500	+6 to +10%	n/a	n/a
	<b>Evaluation Rating</b>	<b>+2</b>	<b>+1</b>	<b>+1</b>	<b>+1</b>	<b>+1</b>	<b>+1</b>	<b>+2</b>
Option Package E	Qualitative Measure	-2:36 to -4:37	-7:35 to -11:41	+1,000 to +2,100	+300 to +500	+9 to +13%	n/a	n/a
	<b>Evaluation Rating</b>	<b>+3</b>	<b>+3</b>	<b>+3</b>	<b>+3</b>	<b>+2</b>	<b>+2</b>	<b>+3</b>

Table 5-7: Summary of Option Package Evaluation – Project Packages

Lake Road Short List Option Packages – Evaluation Summary		Option Package A	Option Package B	Option Package C	Option Package D	Option Package E
		Base Case	Cycle Emphasis	Transit Emphasis	Transit/ Cycle Mix	Transit and Cycle Combined
Investment Objectives	Improve transport infrastructure to support current demand and meet future growth by reducing the overall people travel time on the corridor	+1	+1	+3	+2	+3
	Improve the effectiveness of high occupancy modes of transport and healthier transport modes by increasing the number of people throughput	+1	+1	+2	+1	+3
	Improve the attractiveness of high occupancy and healthier transport modes by increasing mode share for these modes	+1	+1	0	+2	+3
	Improve community satisfaction with transport infrastructure	0	0	+1	+1	+2
<b>Investment Objectives Sub-total</b>		<b>+3</b>	<b>+3</b>	<b>+6</b>	<b>+6</b>	<b>+11</b>
Multi-criteria Assessment	Economy	+1	+1	+2	+2	+3
	Integration	0	+1	+1	+1	+3
	Social	0	-1	-1	-1	-1
	Natural and Built Heritage Environment	0	-1	-1	-1	-3
	Human Health	0	-1	-1	-1	-2
	Cultural	0	-1	-1	-1	-2
	Property	0	-1	-1	-1	-3
<b>Multi-criteria Assessment Sub-total</b>		<b>+1</b>	<b>-3</b>	<b>-2</b>	<b>-2</b>	<b>-5</b>
<b>Total (Investment Objectives + Multi-criteria Assessment)</b>		<b>+4</b>	<b>0</b>	<b>+4</b>	<b>+4</b>	<b>+6</b>
<b>Relative Performance Against KPIs</b>		<b>Low</b>	<b>Low</b>	<b>High</b>	<b>Medium</b>	<b>High</b>
Risks to Implementation	Technical	+3	+2	+1	-1	-1
	Consentability	-1	0	0	-2	-2
	Operational/ maintenance	-1	-1	-2	-2	-1
	Safety and design	+1	-2	-1	-1	-1
	Stakeholder / Public	TO BE COMPLETED AFTER PUBLIC CONSULTATION				
<b>Key Benefits Summary</b>		Consenting Implementation	Relatively straightforward to consent Low/Med KPI Performance	High performance against KPIs. Relatively straightforward to consent	Medium performance against KPIs Relatively straightforward to consent	High performance against KPIs
<b>Key Dis-benefits Summary</b>		Existing problems not addressed Low performance against KPIs Esmonde Rd Effects	Existing problems not well addressed Esmonde Rd Effects	Adverse impacts on cycle facilities Esmonde Rd Effects	Existing problems only partly addressed Esmonde Rd Effects	Outside road reserve Complex consenting/designation Esmonde Rd Effects
<b>Key Risks / Dependencies Summary</b>		Esmonde Rd Effects	Consenting risks Implementation risks Esmonde Rd Effects	Implementation risks Esmonde Rd Effects	Implementation risks Esmonde Rd Effects	Land acquisition risks Consenting risks Implementation risks Esmonde Rd Effects

### 5.5.3 Environmental and Social Responsibility Screen

Initial Environmental and Social Responsibility Screen (refer to **Appendix O**) assessments have been undertaken for all the shortlist options including the Lake Road, Esmonde Road and Bayswater Avenue components.

The initial screening has identified a number of notable and generally protected trees along road corridor, which may be affected by the works (particularly along Lake Road), as well as a number of heritage sites (both built heritage and cultural heritage). To detail the scale of the potential social and environmental effects and to identify actions to avoid or opportunities to mitigate specific effects, preliminary technical assessments and/or baseline monitoring may be required for the Project during the DBC.

An initial assessment of requirements is outlined below:

- A preliminary social and community impact assessment is required to understand potential effects on those directly affected by the project (given the land acquisition required) and wider the local community. This includes construction effects (e.g. construction disruption, temporary access effects) and long term effects associated with land acquisition bringing the road corridor closer to residential properties (e.g. changes to amenity, views, and permanent changes to access to properties). This would enable a better understanding of effects to determine appropriate mitigation, such as looking for opportunities to minimise the number properties affected or extent of land acquisition, or to mitigate potential effects through urban design (e.g. providing alternative and better access)
- A preliminary arboricultural report is recommended to assess the potential effects on the trees along the corridor as a result of the works. Some of the trees are “notable” (including a number on Lake Road) and others “generally protected”. All of the trees provide strong amenity values to the local community. The assessment is required in order to identify the extent of effects and potential mitigation options. Given the significance of the trees, further engagement with the Council Arborist at the DBC stage is recommended to obtain initial feedback. The arborist should have experience in assessing protected trees and heritage matters, to address the matter below
- Depending on the extent the DBC requires works in the vicinity of heritage sites, a preliminary archaeological/heritage assessment is recommended. This will provide an understanding of what (if any) heritage sites may be affected, how this could be mitigated or what opportunities there are to avoid these sites
- A stormwater assessment is required to determine stormwater treatment and management given the increased road corridor, and additional impervious surface. Consideration will need to be given to how this could be integrated into the overall design, where stormwater will be discharged and how it will be treated
- It is recommended that the initial concepts be discussed with mana whenua to provide a better understanding of any potential cultural effects associated with the proposed works
- An urban and landscape assessment is recommended to determine how it will be integrated into the existing environment, measures to mitigate landscape/amenity effects and what opportunities there are to enhance the amenity of the area
- Given the location of the Esmonde Road section adjacent the Coastal Marine Area (CMA), it is recommended that an indicative Erosion and Sediment Control Plan be developed to understand how the road can be constructed to minimise discharges to the CMA
- It is recommended that the constructability be established to determine a typical construction methodology, which would be used to assess potential construction effects.

## 5.5.4 Further Investigation Matters

In addition to the matters discussed in **Section 5.5.3**, a number of other further matters will need investigation in a DBC. Further matters may emerge from stakeholder consultation.

### 5.5.4.1 Land Acquisition

The DBC will need to further identify the land acquisition requirements along the Lake Road corridor, so these can be better understood both from a physical works and risk perspective, in terms the stakeholder and consenting risks. It will then be necessary to obtain the services of a Property Specialist.

That stage will include further development of the design, including considering the nature and form of the transit lane and cycle facilities along the Lake Road corridor, as well as factors such as the power lines, intersection treatments and car parking, as discussed below. This will be based on a preliminary topographical survey of the corridor to better understand the physical constraints and trade-offs.

### 5.5.4.2 Topographical Survey

To inform the further design, a preliminary topographical survey is recommended to be undertaken to inform the DBC. This should initially focus on parts of the corridor, where there are particular constraints.

Ultimately, a detailed topographical survey will be necessary for later design and implementation stages.

### 5.5.4.3 Impacts on Power Lines / Utilities

The design of some options assumes that the existing power lines on the eastern side of Lake Road (from Hauraki Corner to Old Lake Road) would need to be relocated (probably underground). A similar undergrounding solution was progressed during the recent widening of Lake Road between Esmonde Road and Hauraki Corner.

In addition to the power lines, further investigation will also need to be progressed in relation to other services / utilities that would be affected. There are currently two 300mm diameter water mains running most of the length of the corridor, one under the centre of the road and another under the western kerb/footpath.

As the design development occurs at the DBC, further consideration will be given to the impacts on the power lines and watermains, as well as other services/utilities, and the potential solutions. It is noted that the undergrounding of power lines will have amenity outcome benefits and has the potential to make the network more resilient to unplanned events, i.e. severe weather events or a vehicle striking a power line pole.

It is therefore recommended that the DBC include liaison with Auckland Council and the utility providers in relation to these matters, as the design is developed.

### 5.5.4.4 Consideration of Intersection Treatments

Intersection improvements were not considered during this phase, as they were not expected to differentiate the short list options brought forward and the option evaluation. Major improvements to cycle facilities at most of the intersections are not anticipated to be possible without land acquisition and any transit lane options do not need to be delivered right to the intersection, as the benefits can be realised by simply bypassing any congestion on the approach and allowing buses to pass through on the next green phase.

The DBC would be informed by detailed intersection modelling of the current and potential future signalised intersections along the corridor, based on the predicted future corridor demands and design development.



#### 5.5.4.5 Consideration of Removal of Car Parking

There are several locations where existing on-street car parking would need to be removed have been identified on Lake Road and Bayswater Avenue. This includes:

- Parking on both sides of Lake Road from The Strand to Esmonde Road
- Short section of parking on the eastern side of Lake Road just south of Takapuna Grammar School
- Short section of parking on the western side of Lake Road between Bardia Street and Bayswater Avenue
- Short section of parking on the western side of Lake Road opposite Old Lake Road
- Potentially parking on the western side of Lake Road between Seabreeze Road and Ariho Terrace.

During the DBC, as the design is developed, the need for removal of on-street car parking and the potential effects associated with its removal will be investigated. Where car parking is identified to be removed, this will include undertaking parking surveys at those locations and on the adjacent streets to understand the current utilisation of the parking and the ability for current demand to be accommodated on adjacent streets. In particular, consideration will need to consider potential impacts around Belmont centre, where this could affect the functioning of the centre and broader centre-related planning and design matters should be considered. The investigations are also likely to include consultation with key stakeholders, such as local business and property owners, as well as local business associations.

#### 5.5.4.6 Esmonde Road On Ramp

There are still several matters that will require further investigation during the DBC to confirm the potential benefits, physical works and consenting requirements. This will include the following matters, which will be investigated in close liaison with the Transport Agency:

- Undertake traffic capacity analysis/modelling to understand:
  - the impacts of no ramp signal on the new transit lane ramp on the mainline traffic
  - the impact of a ramp signal on the new transit lane in terms of the timing of the existing ramp signals
  - the associated impacts of the ramp signal timings in terms of queuing in these lanes back onto Esmonde Road, impacting westbound through traffic and bus services accessing the Northern Busway on ramp at Esmonde Road
- Review the geometric design of the on ramp in relation to providing satisfactory merge lengths for both the existing ramp signals and the new transit lane ramp signal, as well as sufficient forward visibility of the ramp signals. Should this require further land to the east of the existing on ramp, this may require further investigation relating to the existing embankment and slope stability with the widening of the ramp and potentially require realignment of the existing bus on ramp requiring land acquisition and works in the CMA. The further investigation of the geometric design and safety matters will confirm the extent of further investigation required in this regard.
- Undertake geotechnical investigations to understand the ground conditions in the proposed location of the new bridge over the Northern Busway to confirm ground conditions and therefore provide more refinement in relation to the design and cost of this structure
- Undertake further investigation in relation to understanding any services / utilities that may be impacted by the proposed transit lane design and associated structures.

## 6 Economic, Commercial and Financial Case

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### 6.1 Indicative Economic Case

#### 6.1.1 Indicative Cost Estimates

Indicative cost estimates have been prepared for the short list option packages. The estimates for the Lake Road and Bayswater Avenue options have been prepared by Beca and are included in **Appendix Q**. The high level estimates for the Esmonde Road option were prepared for AT by other consultants, as part of its investigations and that is included in **Appendix D**.

The rough order costs are only determined to a preliminary planning order of accuracy for purposes of option comparison. The estimates for Lake Road and Bayswater Avenue based on the typical cross sections developed for each section of the corridor and the initial appraisal of upgrades associated with the projects on the Lake Road corridor that form part of the Base Case, i.e. new pedestrian crossings, intersection signalisation etc.

This is considered to be appropriate for the purpose of this IBC, and is largely due to the lack of detailed survey and development of the option design at this stage of the IBC process. Sufficient design development has been undertaken to understand the potential need for kerb realignment (on one or both sides), relocation of power lines and potential land acquisition associated with the short list options, based on the application of the cross sections, as shown on the feasibility plans.

#### 6.1.2 Economic Benefit Categories

The categories of economic benefits considered are as follows:

- Crash benefits for cyclists and pedestrians
- Benefits arising from the provision of improved walking and cycling infrastructure
- Vehicle operating cost (VOC) savings for buses and private vehicles using transit lanes
- Travel time savings for buses and private vehicles using transit lanes.

The economic case for the five short-listed options has been established.

#### 6.1.3 Evaluation Framework

The economic evaluation has been undertaken in accordance with the Transport Agency's Economic Evaluation Manual (EEM), as per updates issued by the NZ Transport Agency to January 2016. The evaluation of vehicle operating cost savings and travel time savings has been calculated using the full procedures. The evaluation of crash benefits for cyclist and pedestrians and benefits arising from the provision of improved walking and cycling infrastructure has been calculated using Simplified Procedure 11 (SP-11). With the project in the IBC stage, the use of SP-11 for some elements is deemed appropriate for the reporting of the economic benefits and return on the options assessed.

#### 6.1.4 Economic Analysis of Options

Based on the economic analysis carried out, the indicative economic analysis results for all the options are summarised in **Table 6-1**, whilst the detailed technical note and analysis spreadsheets are provided in **Appendix P**. It should be noted that the evaluation results are indicative, given that the option packages are not scoped in detail, and modelling of their impacts has not been undertaken at this stage. They therefore provide an indicative range of potential economic outcomes.

Table 6-1 Indicative Economic Analysis Results

Item	Option Package A	Option Package B	Option Package C	Option Package D	Option Package E
Pedestrian safety benefits	0.3	0.3	0.3	0.3	0.3
Cycle safety benefits	0.2	0.6	-0.2	0.6	0.6
Cycle facility benefits	1.0	9.5	-0.9	4.2	9.5
Private vehicle travel time & VOC savings	20.5	20.5	36.2	27.1	36.2
Bus travel time & VOC savings	n/a	n/a	6.8	3.4	6.8
<b>Total Benefits (NPV)</b>	<b>22.0</b>	<b>31.0</b>	<b>42.2</b>	<b>35.6</b>	<b>53.4</b>
<b>Total Costs (NPV)</b>	<b>10.8</b>	<b>31.0</b>	<b>26.7</b>	<b>28.0</b>	<b>71.1</b>
<b>BCR</b>	<b>2.0</b>	<b>1.0</b>	<b>1.6</b>	<b>1.3</b>	<b>0.8</b>
<b>First Year Rate of return (FYRR)</b>	<b>11.2%</b>	<b>5.6%</b>	<b>9.1%</b>	<b>7.3%</b>	<b>4.3%</b>

The indicative results suggest that Option Package A has the highest benefit to cost ratio (BCR) and is the economically preferred option. With a BCR of around 2.0, Option Package A has a **Low** economic efficiency rating under the NLTP 2015/18. Option Packages B, C and D also have a **Low** economic efficiency, with a BCR of 1.0, 1.6 and 1.3 respectively. Although, indicatively, Option E as scoped shows a BCR of less than 1.0, it may be possible to optimise this option to achieve a BCR above 1.0, as discussed in the discussion of sensitivity testing below.

### 6.1.5 Sensitivity Testing and Incremental Analysis

The economic evaluation sensitivity testing results are included in **Table 6-2**.

Table 6-2: Indicative Economic Evaluation - Sensitivity Testing Results

Variable	Option Package A	Option Package B	Option Package C	Option Package D	Option Package E
Capital cost (+/- 20%)	1.7-2.6	0.8-1.3	1.3-2.0	1.1-1.6	0.6-0.9
Cycle demand on Lake Road (+/- 50%)	n/a	0.8-1.1	1.6-1.7	1.2-1.5	0.7-0.8
Private vehicle travel time saving on Lake Road (+/- 20%)	n/a	n/a	1.2-1.9	1.0-1.6	0.6-0.9
Bus travel time saving on Lake Road (+/- 20%)	n/a	n/a	1.4-1.7	1.1-1.4	0.7-0.8
Bus demand on Lake Road (+/- 20%)	n/a	n/a	1.5-1.6	1.3	0.7-0.8
Cycle demand on Bayswater Avenue (+/- 50%)	2.0-2.1	1.0	1.6	1.3	0.7-0.8
Private vehicle travel time saving on Esmonde Road (+/- 20%)	1.7-2.0	0.9-1.0	1.4-1.6	1.1-1.3	0.7-0.8

The sensitivity testing suggests that there is a strong likelihood that Option Packages A to D would retain the **Low** economic efficiency rating under the sensitivity testing scenarios considered, and that Option Package E could achieve a **Low** economic efficiency rating should there be greater benefits or reduced costs compared with the base case economic analysis.

Incremental analysis has also been undertaken for the options, from lowest cost option (Option A) to the highest cost option (Option Package E). The incremental analysis results are summarised in **Table 6-3**. This shows that Option Package C is the economically preferred option based on the incremental assessment.

Table 6-3: Incremental Analysis of Indicative Economic Evaluation Results

Base Option Package	Next Higher Cost Option Package	Incremental Benefits (\$)	Incremental Costs (\$)	Incremental BCR	Preferred Option Package (Target BCR of 1.0)
A	C	20.2	15.9	1.3	C
C	D	-6.6	1.3	-5.0	C
C	B	-11.2	4.3	-2.6	C
C	E	11.3	44.4	0.3	C

### 6.1.6 Economics Summary

The indicative cost estimates and anticipated range of BCRs for the five short list option packages is summarised in **Table 6-4**.

Table 6-4: Summary of Indicative Cost Estimates and Economic Evaluation Results

Option Package	Rough Order Cost (\$m)	Benefit to Cost Ratio (lower estimate)	Benefit to Cost Ratio (upper estimate)
<b>A (Low Cost)</b>	11.4	1.7	2.6
<b>B (Medium Cost)</b>	32.9	0.8	1.3
<b>C (Medium Cost)</b>	28.3	1.3	2.0
<b>D (Medium Cost)</b>	29.7	1.10	1.6
<b>E (High Cost)</b>	75.4	0.6	0.9

## 6.2 Initial Commercial Case

This section, as well as **Sections 6.3 to 6.5** will be further developed following the identification of the preferred option, which is still to be informed by the public consultation.

### 6.2.1 Procurement Strategy

The likely procurement strategy for a DBC is likely to be for AT to put out a request for tender. The Professional Services would probably be procured through an open tender process.

There are likely to be in the order of 4-8 large engineering consultants based in New Zealand who would have the capability to deliver a DBC for a project like this.

The engineering consultants would typically be engaged under AT's standard Conditions of Contract for Consultancy Services. These have been prepared by AT in association with industry representatives and endorsed for use by AT by The Association of Consulting Engineers New Zealand Inc. (ACENZ).

A subsequent DBC will have a more detailed assessment of procurement options, and a preferred one will be confirmed. The assessment of procurement options would need to focus on a number of key factors, particularly:

- Cost competitiveness, and the ability of the different models to ensure strong market tension
- The ability of the procurement model to meet construction deadlines
- The effectiveness of the procurement model at transferring risk from the project sponsors over its design, construction and building life, enabling greater certainty of costs
- The ability of the model to accommodate unexpected changes to scope or original specification during procurement and construction due to potential changes in the Auckland transport network over the analysis period (e.g. uncertainty around the timing of completion of the AWHC project)
- The procurement model's ability to deliver innovation in asset design, construction and management, achieving lower whole-of-life project costs
- Opportunities for commercial development.

### 6.2.2 Consenting Strategy

The following preliminary technical assessments and/or baseline monitoring is recommended during the DBC to further refine the consenting risks and strategy:

- A preliminary social and community impact assessment is required to understand potential construction and operational effects on those directly affected by the project and wider the local community
- A preliminary arboricultural report to assess the potential effects on the trees along the corridor and potential mitigation options
- A preliminary archaeological/heritage assessment to understand what (if any) heritage sites may be affected
- An urban and landscape assessment recommended to determine how it will be integrated into the existing environment, measures to mitigate landscape/amenity effects and opportunities for enhancement
- Given the location of the Esmonde Road section adjacent the CMA, it is recommended that further investigation of the potential impacts on the CMA be investigated.

It is also recommended that the initial concepts be discussed with mana whenua to provide a better understanding of any potential cultural effects associated with the proposed works.

### 6.2.3 Potential Property Strategy / Land Acquisition

The services of a Property Specialist may be necessary during the DBC, depending on the selected option package, in order to further develop the strategy for property acquisition and consider the potential pathways and restrictions associated with these processes. The advice of the Property Specialist would be sought early in the DBC in order that this could inform development of the design process. This would enable the relative benefits, dis-benefits and costs associated with the design development

## 6.2.4 Joint Working

The following opportunities exist for joint working with a number of agencies to obtain value for money in the development of the preferred option(s):

- Working with utility companies to underground power lines and consider the relocation of other services/utilities in association with any necessary or imminent upgrades along Lake Road (e.g. the relocation of the water mains along the western side)
- Working with Council to deliver streetscape improvements in Takapuna Centre and around the Bayswater/Belmont and Hauraki local centres in parallel with the delivery of the option
- Working with Council (including Panuku Development Auckland) to develop a coordinated strategy for on-street and off-street car parking within Takapuna Centre and around the Bayswater/Belmont and Hauraki local centres
- Working with the Local Board to develop a coordinated and coherent network of pedestrian and cycle (recreational and commuter) routes along Lake Road, as well as on parallel and connecting corridors, for the current and future residents of the Devonport peninsula, including Takapuna centre
- Working Takapuna Grammar School and the Local Board to identify opportunities to provide public access through the school grounds (for pedestrians and cyclists), as well as to understand the ability to align school access off Lake Road with potential corridor upgrades (i.e. realigning vehicle access to tie-in with the potential signalisation upgrade to the Eversleigh Road intersection)
- Working with private land developers to integrate potential upgrades required in association with future land development with the future upgrades to the Lake Road and Bayswater Avenue corridors
- Working with the Transport Agency to deliver improvements to Lake Road and Esmonde Road, which exploit potential synergies with planned future improvements on SH1 and do not preclude potential future works in and around SH1.

## 6.3 Indicative Financial Case

The indicative financial case covers the financial viability of the project, possible funding sources and the process the project must follow in order to gain funding. For the IBC stage, the financial case simply provides assurance that the activity (option package) is affordable.

This section outlines the financial considerations for the project and outlines possible funding sources and commercial opportunities pertaining to the option package recommended to be taken forward to a DBC. More detailed analysis of the financial case, including ultimate affordability for the project's stakeholders will take place at a DBC.

### 6.3.1 Impact on Financial Statements

Rough order cost estimates are summarised in **Table 6-5** (at 2016 prices) and more detail is provided in **Appendix Q**. These estimates are based on high level concepts only and on the current level of understanding of the project risks. The high level estimates for the Esmonde Road transit lane package are based on those provided by other consultants for AT included in **Appendix D**. The following assumptions were made in determining the rough order cost estimates:

- Allowance for service / utility relocation (as identified on Council's Geospatial mapping), where necessary
- Allowance for relocation / undergrounding of power lines, where necessary
- Environmental Compliance – 2%
- Traffic Management – 20%
- Allowance for Investigation & Reporting – 3%
- Allowance for Design & Project Documentation – 6%
- Allowance for MSQA, Client Managed Costs and Consent Monitoring Fees – 8%
- Contingency – 30%

- Allowance for land and property acquisition, assuming:
  - Option design across a property boundary, but does not touch the building on that property, then rough order estimate on a square metre rate
  - Option design across a property boundary and potentially impacts on the building on that property, then rough order estimate assumes purchase of whole property
- Hydro excavation excluded
- Escalation from Q4 2016 is excluded
- GST is excluded.

Table 6-5: Rough Order Cost Estimates

Option Package	Lake Road Package	Bayswater Avenue Package	Esmonde Road Package	Total Capital Cost
Option A	\$2.3m	\$1.1m	\$8.0m	\$11.4m
Option B	\$23.8m	\$1.1m	\$8.0m	\$32.9m
Option C	\$19.2m	\$1.1m	\$8.0m	\$28.3m
Option D	\$20.6m	\$1.1m	\$8.0m	\$29.7m
Option E	\$66.3m	\$1.1m	\$8.0m	\$75.4m

While the capital cost estimates are adequate for providing guidance on the relative cost of the options for the purpose of this IBC, they will need to be updated in detail for a DBC. The estimates are currently being peer reviewed and a parallel estimate is also being undertaken.

The capital expenditure will increase with inflation over time. Inflation has not been included but would need to be taken into account when using these values for budgeting purposes.

There is inherent uncertainty over the potential capital costs for investments like this. Business cases often express the capital expenditure values as a probability range. This is not undertaken in this IBC.

### 6.3.2 Funding Plan

A combination of central and local government may be available to deliver and sustain the option package recommended to be progressed to a DBC. Central government funding may be sought subject to negotiation between AT and the Transport Agency. These arrangements will be assessed further during a DBC.

Assuming the current funding arrangements are retained, the project will be jointly funded by AT and the Transport Agency.

The Lake Road IBC is not currently included in the NLTP 2015-18. The NLTP sets out the items to be funded by the Transport Agency via the NLTF for a three-year period, based on the programmes and activities submitted through RLTPs. This is set every three years, but can be varied during that period.

The DBC phase will provide further certainty about the total cost of the project. To ensure enough local share is available for its implementation, AT will need to factor the results of the IBC and future DBC into their annual and long term planning processes.

A funding plan has not yet been developed for future phases of this activity. AT and the Transport Agency will need to work together closely over the development of future phases for this activity. A funding plan will be developed for a DBC.

## 6.4 Assessment Profile

### 6.4.1 Overview

The project was assessed using both the Transport Agency's Investment Appraisal Framework (IAF) for strategic fit and effectiveness, together with the economic efficiency rating. An **assessment profile of HML** has been determined for the Project using the Agency's funding allocation process as discussed further below.

### 6.4.2 Strategic Fit

Lake Road is classified as a Regional Strategic arterial in the ONRC system and is the sole north-south connection between Devonport (a City Fringe Centre) and Takapuna (a Metropolitan Centre). It is the only land-based means of access to employment opportunities at Takapuna and beyond (including Auckland CBD) for Devonport peninsula residents.

Lake Road serves as a multi-modal corridor however restricted carriageway width south of Hauraki Corner means buses compete for road space with general traffic and are caught in the same congestion particularly in the peak periods. This, together with congestion on Esmonde Road, has made public transport unattractive and led to a high proportion of single occupancy car journeys.

The work carried out by in this IBC has confirmed the existence of peak period week day congestion and significant weekend congestion which results in unreliable journey times for both public transport (buses) and general traffic. Infill development allowed under new zoning in the Auckland Unitary Plan creates the potential for residential growth on the Devonport peninsula of more than 30 percent which will exacerbate existing congestion and reliability issues.

A high rating for Strategic Fit is warranted as the evidence base confirms that the issues along Lake Road involve journeys for employment and access to economic opportunities; and that there is a significant gap in customer levels of service for journey time reliability and mismatched capacity and demand that results in severe congestion.

Based on the above, the project achieves a **High (H) strategic fit** rating.

### 6.4.3 Effectiveness

Overall, the option packages are considered to have a **Medium (M) effectiveness rating**.

### 6.4.4 Economic Efficiency

The indicative economic assessment of the project indicates the options do not perform strongly from an economic perspective, but there is the potential for wider intangible benefits. As such, it is considered likely the Project will achieve a **Low (L) economic efficiency rating**, based on the indicative range of BCR for the preferred options.

It is noted that the efficiency rating in the Strategic Case was Medium (M), but at that stage of the business case process an economic analysis had not been undertaken.



## 6.5 Stakeholder Engagement

Public feedback and engagement will be included in this section, once it has been completed, and will inform the evaluation and recommendation of a preferred option.

## 6.6 Peer Review

An independent peer review of the IBC will be undertaken for AT to ensure that the Project has been developed in accordance with recommended practice and to ensure the economic analysis has been carried out correctly. The peer review findings will be incorporated following the public consultation and appended to the IBC (**Appendix S**), while the key findings and the matters to be resolved as well as the resulting changes to the IBC following the peer review will be discussed in this section.

## Part B Management Case

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## 7 Management Case

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Work to develop this IBC has involved a co-ordinated approach within AT across all levels of project development and decision-making. This section outlines how the AT project team will manage the relevant activities and inputs to deliver the DBC.

### 7.1 Project Management Strategy and Framework

#### 7.1.1 History of the Project to Date

A Strategic Case Assessment was undertaken by AT in 2016. That Strategic Case drew on the information from the Lake Road CMP and the Takapuna CBTS (both completed for AT in 2014), plus other existing information. These studies did not follow the business case process, but the principles and requirements of the Strategic and Programme Business Cases are well documented in these studies.

A projects prioritisation exercise was undertaken by AT assessing all recommendations put forward from CMPs developed between 2012 and 2014. The result of this process was considered by AT as the PBC for the Strategic Case.

The Lake Road Improvements IBC has been commissioned by AT in order to develop the case for a proposed investment in transport improvements to the Lake Road corridor, between the Devonport peninsula and Takapuna Centre. Investment was considered to be required to address current problems and allow for future anticipated growth.

The IBC has investigated the recommendations put forward from previous studies including other interventions suggested by stakeholders (and the community) to support funding investment for the improvement of Lake Road and Esmonde Road. During the IBC, the scope of the project was expanded by the PCG to include improvements to transport infrastructure on Esmonde Road.

The analysis at the IBC stage will be used to make a considered decision about whether to progress to developing a DBC for a smaller set of possible options following public consultation on the IBC.

#### 7.1.2 Detailed Business Case Approach

The Transport Agency's business case approval process requires a DBC to be undertaken, after this IBC, before any funding can be approved for construction. The DBC will follow a series of steps. **Table 7-1** below shows two key inputs into a DBC and what subsequent steps the stage will cover after that.

Key items that will need to be completed in a DBC phase include:

- Preliminary design and optimisation
- Detailed transport modelling, and identification of wider effects
- Fully quantifying all the costs and benefits
- Detailed development of the financial requirements, the funding, procurement and management plans, and the consenting and property strategies.

The DBC phase will be complete once public consultation feedback has been collated, reviewed and incorporated, and final approvals obtained.

Table 7-1: Potential Stages for a DBC

Stages						
Scoping and Procurement	Preliminary Design for infrastructure elements including network effects modelling	Develop DBC	Decision	Public Consultation	Make changes and update DBC	End of Stage

### 7.1.3 Project Milestones and Deliverables

The following key deliverables will be produced in a DBC phase:

- Detailed scoping
- A preliminary design, informed by topographical survey and services/utilities information, as well as geotechnical investigations
- Detailed network effects traffic and intersection modelling to support option selection
- Detailed impacts identified and assessed including any land requirements confirmed
- Detailed impacts on parking, pedestrians and road safety
- Continuous stakeholder engagement and communications
- Formal public consultation
- DBC to be updated after formal public consultation
- Approvals
- Consenting strategy confirmed, delivery strategy, next steps
- Construction sequencing within wider transports activities.

It is estimated that a DBC phase could take up to approximately 12-15 months, and the cost could be in the order of \$1-2m, depending on funding availability and the preferred investment level.

### 7.1.4 Benefits Realisation

As indicated in Part A (Section 5) of the IBC, the benefits have been refined since the Strategic Case was prepared at the benefits definition workshop held on 19 September 2016. The main benefits of successfully responding to the problem or opportunity identified at the workshop were as follows:

- Supporting current demand and future growth
- Improved attractiveness and effectiveness of high occupancy and healthier
- Improved community satisfaction with transport infrastructure
- Improved economic outcomes for Takapuna and the peninsula.

The outcomes of the project will be measured to evaluate the success of the project throughout its use, i.e. over the long term life of the project. The KPIs will be:

- Overall people travel time
- People throughout
- Mode share for high occupancy and healthier
- Community satisfaction ratings
- Employment in Takapuna.

Measures / targets for each of these KPIs were defined in **Section 4**.

AT will be responsible for the measurement of project benefits against target outcomes. Specific, measurable KPIs will be finalised during a DBC phase.

## 7.2 Governance and Reporting

### 7.2.1 Governance Structure

The delivery method for the project which emerges from the DBC has not been finalised, and this will guide the ultimate project delivery governance structure and supporting processes. These processes will include directions relating to project controls and will clarify responsibilities for decision making, strategic direction setting and reporting.

It is likely however that the DBC is likely to be prepared by an external consultant who will be managed by an AT project manager. The AT project manager will report to the Project Sponsor/Programme Manager who supports an internal steering group.

The project will affect a range of 'Council family' initiatives and projects as well as public interest. As such, reference or stakeholder groups will be established to assist in the completion of a DBC. These are likely to be internal reference/stakeholder group comprising representatives from various AT and Council teams. This group will also include representative from the Transport Agency.

It is envisaged that a PCG will be established during a DBC stage, continuing through to the completion of the construction and commencement of operations. The PCG should include representatives from key stakeholders in the development and implementation phases of the project and should meet regularly to discuss issues pertaining to the project. All key decisions should be made collaboratively and clearly documented, taking adequate account of integration requirements across multiple organisations.

The proposed governance for a DBC phase could be a continuation of the existing arrangement between AT and its providers, to further develop a DBC towards delivery and to ensure that the key objectives of the project can be delivered upon.

### 7.2.2 Project Meetings and Reporting

To ensure clear, accountable project execution, control mechanisms may include a direct reporting line from the DBC Team Leader to the PCG and regular interface meetings between key AT staff, external advisors and the Team Leader.

In addition to internal project reporting requirements, external reporting requirements should include:

- AT Board
- Council
- Transport Agency
- Other key stakeholders being reported to on progress.

Such operational governance considerations should include:

- Who regulates the operations?
- Who measures operational performance?
- Who conducts key reporting to Government?
- Is there a subsidy required to operate? If yes, how is this structured and managed?
- Who ensures the condition of the asset is satisfactory at the end of the contract?

## 7.3 Risk Management

Given the complexity of the project and its surrounding environment, effective and timely risk management is a critical component in ensuring the project remains on track. At this stage of the project, a risk register has been prepared and is included in **Appendix R**. The risk register identifies the key opportunities and risks identified by the Project team throughout the course of the IBC. In addition to identifying the opportunities/risks, the register identifies the risk owners, the current exposure for the opportunity / risk, the treatment strategy, and the resulting residual (or target) exposure and risk score. These actions are planned to be progressed through to the completion of a DBC.

The top three ranked risks and opportunities to be taken forward to a DBC stage are summarised in **Table 7-2**. The risks could lead to an option package not being fully delivered. However, in our view the risks should be able to be adequately managed or mitigated through careful scoping, tight contract documentation and appropriate and proactive management effort.

Table 7-2: Summary of the Top Three Risks and Top Three Opportunities

Rating	Risk/Opportunity Description	Risk Owner Organisation	Treatment
1	The Transport Agency does not agree with the preferred option	AT	Follow NZTA guidelines as closely as possible and work closely with the Transport Agency to confirm the case for investment
2	The cost of delivering the project is greater than anticipated	AT	Undertake careful scoping of the design in a DBC phase
3	Delivery of the preferred option is jeopardised by consenting risks	AT	Further investigation in a DBC phase
1	Deliver transport outcomes that support Takapuna becoming a Metropolitan Centre and support growth on the Devonport Peninsula	AT	Continue to engage with Panuku Development Auckland and include relevant stakeholders in the workshop process
2	The Transport Agency will provide co-investment for the project	AT	Follow NZTA guidelines as closely as possible and work closely with the Transport Agency to confirm the case for investment
3	Gain full support from stakeholders for the project	AT	Continue to actively engage with stakeholders, especially during public consultation

Risk identification and management frameworks will be developed and confirmed by AT during the DBC, as well as by the designer and contractor. These are 'live' risk registers and should be continually reviewed and updated regularly throughout the delivery of the project. If the project is funded, it is suggested that a specialist risk consultant be engaged to prepare and maintain a comprehensive risk management strategy.

## 7.4 Stakeholder Engagement and Communications

### 7.4.1 Stakeholders

The key partners to the preferred option package(s) are AT, Council and Transport Agency. Their responsibilities are outlined below:

- **Auckland Transport** is primary partner leading the development of the business case. The CCO has responsibility for planning, delivery and operation of transport infrastructure on Auckland's roads (except state highways) and is primary lead in the development of Auckland's ITP and the RLTP.
- **Auckland Council** is responsible for leading the overall planning for Auckland. Council is responsible for the preparation of the Auckland Plan, AUP (OP), Devonport-Takapuna Area Plan and planning for the Greater Takapuna Spatial Priority Area. It is also responsible for the approval of SHAs and the development of the Greenways projects. Council develops the LTP which sets the investment to achieve the Auckland Plan vision. Panuku Development Auckland, one of the CCO's, is responsible for the redevelopment initiatives in the Takapuna metropolitan centre.
- **Transport Agency** is responsible for the planning and operational management of the State Highway network, their interchanges and facilities for public transport, cyclists and pedestrians within the state highway corridor. In this case, the relevant network is the Northern Motorway (State Highway 1) and its interchange at Esmonde Road. The Transport Agency's Board is responsible for allocating funds from the National Land Transport Fund to land transport activities, including local roads, state highways and public transport. The Transport Agency is also a partner in the development of the ITP and the RLTP.

A number of teams/units within AT, Council and Transport Agency have been identified as key stakeholders in the development of the business case. These teams (or their original team at the time) have previously been involved as technical stakeholders who provided input into the Lake Road CMP and/or Takapuna CBTS.

### 7.4.2 Stakeholder Engagement and Communications Plan

The area of influence for the recommended project is large and connected to a wide range of parallel or related workstreams. 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. Stakeholder involvement is 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.

A detailed stakeholder engagement and communication plan will need to be developed for the DBC. This plan will address future engagement, along with designated roles and responsibilities to implement this engagement. It will recommend possible frameworks and methodologies for communication with each key stakeholder groups, appreciating the complexities associated with both internal and external relationships. It will be regularly updated to reflect changes as the project progresses.

It is acknowledged that there are significant risks around stakeholder engagement and that this needs to be managed in a structured and transparent manner, in order that stakeholders feel involved and issues and interests can be identified and managed early. The stakeholder plan will identify these risks as well as potential mitigation measures. These risks will also be included in the DBC project risk register, with an owner and mitigation plan assigned to each. Stakeholder feedback will be used to inform ultimate project design and the evaluation of options.

A number of recent major transport infrastructure projects delivered in Western Australia developed a highly successful process to involve community, business and Government stakeholders in the project development and decision making process. A Community Working Group (CWG) was established early in the project and was involved in all major aspects of options development and refinement. This provided stakeholders with the opportunity to be directly involved in the project and resulted in a high level of awareness and 'buy-in', and a very low level of resistance to the preferred project solution. This was seen as a highly effective risk mitigation tool, which added very little cost to the project development process while removing significant risk and potential cost impacts later in the project delivery phase. By running one integrated process, overall planning time was reduced.

The process was also seen as enhancing Government's reputation, due to the value that stakeholders placed on being involved in genuine and open consultation, rather than, as is often the case, merely being informed of key decisions and outcomes after the fact.

Consideration should be given to adopting a similar process for progressing the preferred option package(s), in order to deliver the following potential benefits:

- Improved AT reputation as an open and engaged body
- Reduction in negative stakeholder impacts in relation to the preferred solution
- Potential to save time and cost through early and ongoing consultation and negotiation of issues
- Better understanding of stakeholder interest in incorporation of opportunities to support their objectives
- Improved ultimate solution through real engagement with all key stakeholder groups
- Prove the value of the concept for use on future infrastructure programs.



## Part C - Funding Requirements for the Next Phase

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## 8 Funding Requirements and Next Steps

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### 8.1 Investment Required

The IBC has developed a robust short list and proceeded to allow identification of a recommended option, following the completion of public consultation phase, which will consider varying investment levels. The process undertaken has mitigated the risks associated with narrowing the list of options too early in the assessment process and potentially rejecting an option that might have proved to be favourable if further analysis had been carried out.

### 8.2 Next Steps

There are a number of projects in the Devonport peninsula and Takapuna area that the recommended option package(s) for Lake Road needs to coordinate and integrate with. The preferred option package(s) could be delivered as a single project or in multiple stages, the latter assisting with the staged funding of the project, if necessary.

It could also be combined with the delivery of other projects in the area, including potentially combining the consenting processes. There are a number of potential benefits from both staging the implementation and combining it with other projects. This should also consider the initial feedback from the liaison with the Council Projects Design Review Panel (CPDRP), particularly the general principles suggested by the CPDRP and summarised in **Appendix T**.

There are a number of risks which could lead to investment in improvements to the Lake Road corridor not being fully delivered. However, these should be able to be adequately managed in order that they can be understood and timely interventions made.

There is nothing in this management case which suggests that the next stage of more detailed assessment should not be undertaken. As indicated above, funding availability may lead to a phased implementation.

The next step in the assessment process is the DBC. Key items not undertaken at the IBC stage include: preliminary design and optimisation of options; detailed transport modelling of all options; fully quantifying all the costs and benefits for all options (including peer review); and detailed development of the financial requirements, and the funding, procurement and management plans. These will all be part of the DBC.