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Auckland Network Optimisation Programme Business Case

For decision:

For noting:

Ngā tūhonga / Recommendations

That the Auckland Transport Board (board):

- a) approve the scaled-up preferred Network Optimisation Programme Business Case subject to prioritisation within the next Regional Land Transport Plan (RLTP) refresh and funding, noting an estimated increased investment to \$221 - \$268 million (Auckland Transport share) from the current \$180 million allocated in the RLTP
- b) approve a request for additional funding of up to \$88 million through the next RLTP process, subject to the completion of a Single Stage Business Case (SSBC), which will be brought back to the board in 2021 for approval
- c) approve the commencement of a joint SSBC with the NZ Transport Agency to develop an agreed detailed optimisation programme

Te whakarāpopototanga matua / Executive summary

1. The Government Position Statement on Land Transport (“GPS”), the Auckland Plan, the RLTP and the Auckland Transport Alignment Project (ATAP) recognise “Making better use of existing networks” (optimisation) is critical in meeting the transport needs of a fast-growing city.
2. The NZ Transport Agency (NZTA) and Auckland Transport (AT) have jointly documented a Programme Business Case (PBC) to scale up Network Optimisation, with indicative investment profiles of \$330 and \$400 million. AT local roading investment is approximately two-thirds excluding NZTA financial assistance (\$221 - \$268 million).
3. Currently, congestion continues to impact Auckland’s social, economic and environmental wellbeing. The optimisation programme is one of AT’s tangible multi-modal programmes delivering on environmental sustainability and levels of service improvements through the reduction of vehicle emissions and facilitating all transport modes.
4. The PBC focusses on improving people and goods movement to deliver improved network productivity, agility and reliability.
5. To develop the recommended programme, a range of ten scenarios were created in collaboration with key stakeholders and assessed against multi criteria and strategic alignment interventions and included a ‘do minimum’ option.

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6. The preferred programme is the “Focus on Travel Choice” programme. This programme was found to best align with the key strategic transport outcomes provided for by the legislated planning framework and ATAP.
7. The joint PBC was approved by the NZTA Board on 24 February 2020.

Ngā tuhinga ō mua / Previous deliberations

8.

Date	Report Title	Key Outcomes
September 2019	Road Network Optimisation Update	The paper explained the current optimisation model and programme and identified the next step as seeking endorsement of the joint Transport Agency and AT PBC.

Te horopaki me te tīaroaro rautaki / Context and strategic alignment

9. This programme is strongly aligned with the Auckland Plan 2050 focus to “better connect people, places, goods and services” and “increase genuine travel choices for a healthy, vibrant and equitable Auckland and the GPS objectives for safety, access, environment and value for money.
10. ATAP recognises “Making better use of existing networks” (Optimisation) is critical in meeting the transport needs of a fast-growing city and is one of the three key components of the ATAP strategic approach. ATAP identified a \$700 million optimisation and technology programme as being a critical contributor towards making better use of the existing transport system.
11. The RLTP acknowledges the importance of a more extensive network optimisation programme as important for Auckland in addition to the ATAP package. Local Boards also specifically supported network optimisation in their feedback on the RLTP.

Ngā matapakinga me ngā tātaritanga / Discussion and analysis

12. The road network optimisation model uses three main levers to manage congestion in the short and medium term - network management, capacity creation and behaviour change.

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13. It is increasingly important to take all possible steps to optimise existing networks through relatively small-scale quick-win initiatives that can be implemented quickly to meet customer needs and have a high return on investment to counter increased congestion, an example being the Whangaparaoa Dynamic Lane (Attachment 3 - Project Benefits Fact Sheet).
14. The PBC identified the following three problems in Auckland to be addressed through the delivery of the programme:
 - Productivity – The increasing number of pain points on the network is reducing transport productivity (people, goods and services).
 - Agility – Conflicting prioritisation of customers' needs reduces our ability to deliver optimisation projects in an agile and efficient way
 - Insufficient management of the growing number of planned and unplanned events is reducing the reliability of customer journeys.
15. The PBC identifies the following four investment objectives:
 - Improve throughput on key networks during commuter peaks and improve freight throughput during weekday interpeak periods on the strategic freight network.
 - Improve safety and accessibility of walking and cycling in locations with high "place" function and near public transport interchanges.
 - Streamline performance measures, more agility to accelerate delivery of optimisation improvements to customers.
 - Improve customer journey time reliability for people, goods and services by maintaining reliability for general traffic during peak periods, maintaining reliability for freight during interpeak periods, improving bus travel times on key bus routes, and improve response times for network disruptions.
16. To develop the recommended programme, a range of ten scenarios were created in collaboration with key stakeholders. These scenarios aligned with possible strategic interventions and included a 'do minimum' option.
17. A diverse range of investment scenarios were tested. These included a range of investment scales, different mixes of interventions from improved day-to-day operations to small physical changes, a suite of programmes that balanced investment between modes and programmes that skewed investment to specific modes and outcomes. These scenarios were then estimated in cost, and shortlisted using a multi-criteria assessment, which assessed each scenario against its ability to deliver on strategic outcomes, investment objectives and return on investment.
18. The recommended programme was a "Focus on Travel Choice" programme. Investment is directed to provide more travel choices and change travel behaviour to higher occupancy modes, while maintaining levels of service for freight and general traffic.
19. The Transport Agency's internal investment quality assurance review was highly complementary of the quality of PBC including the evidence provided, strategic alignment, issues, benefits, optioneering process and forward plan.

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Ngā ritenga-ā-pūtea me ngā rauemi / Financial and resource impacts

20. The PBC identifies indicative investment of between \$330 to \$400 million in Optimisation. AT and the NZTA estimate that approximately two-thirds of the investment will be for Local Roads with AT's share, before applying Financial Assistance Rates, will be in the range of \$221 to 268 million.
21. Currently there is \$180 million allocated over 10 years in the current RLTP for Optimisation projects. Therefore, the preferred programme in this PBC will look to call on additional funding of up to \$88 million in the next RLTP, which will be subject to the RLTP prioritisation and approval process.
22. The NZTA and AT have agreed to jointly fund, resource and deliver a SSBC to identify and investigate the Optimisation projects for the first three years of the NLTP. The estimated costs for developing the SSBC is \$2.1 million. AT's share of this cost is \$1 million, which has been provisioned over two years in the 2019/2020 and draft 2020/2021 budgets. Financial assistance for AT's share of this cost has also been approved by the Transport Agency Board at its meeting of 24 February 2020.
23. Currently the Optimisation programme is funded in part by the Regional Fuel Tax.

Ngā whaiwhakaaro ō te taiao me te panonitanga o te āhuarangi / Environment and climate change considerations

24. The Optimisation programme supports The Mayor's Letter of Expectation on Climate Change by reducing vehicle emissions and encouraging mode shift to public transport and active modes.
25. One of the key benefits of Optimisation is vehicle emission savings.

Ngā reo o mana whenua me ngā hapori katoa / Voice of mana whenua, customer and community

26. The PBC identified the benefits to stakeholders and customers by running a series of workshops and included internal customer experience staff from the agencies.
27. The single stage business case will engage with mana whenua and obtain feedback from stakeholders and customers based on the detailed programme proposed.

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Ngā tūraru matua / Key risks and mitigations

28.

Key risk	Mitigation
Optimisation initiatives are small scale but can be complex to deliver. Reallocation of existing road space (including parking) or intersection priority can generate public backlash	Ensure a well-defined programme of work with strong stakeholder and community engagement and communications management at a programme and project level

Ngā whaiwhakaaro haumarū me ngā whaiwhakaaro hauora / Health, safety and wellbeing considerations

29. The SSBC will deliver on the National Road to Zero and Vision Zero for Tamaki Makaurau Transport safety strategies.

30. "Safe Mobility" will underpin the development of improved mobility across the network when developing the detailed programme of works in the SSBC

Ā muri ake nei / Next steps

31. Complete a joint SSBC with the NZTA to identify in detail the first one to three years of projects and initiatives.

32. The single stage business case will be presented to the Board in early 2021 for approval.

Ngā whakapiringa / Attachments

Attachment number	Description
1	Auckland Network Optimisation Programme Business Case (excluding Appendices)
2	Investment Quality Assurance Report by Transport Agency (Internal document)
3	Whangaparaoa Dynamic Lane Project Benefits Fact Sheet

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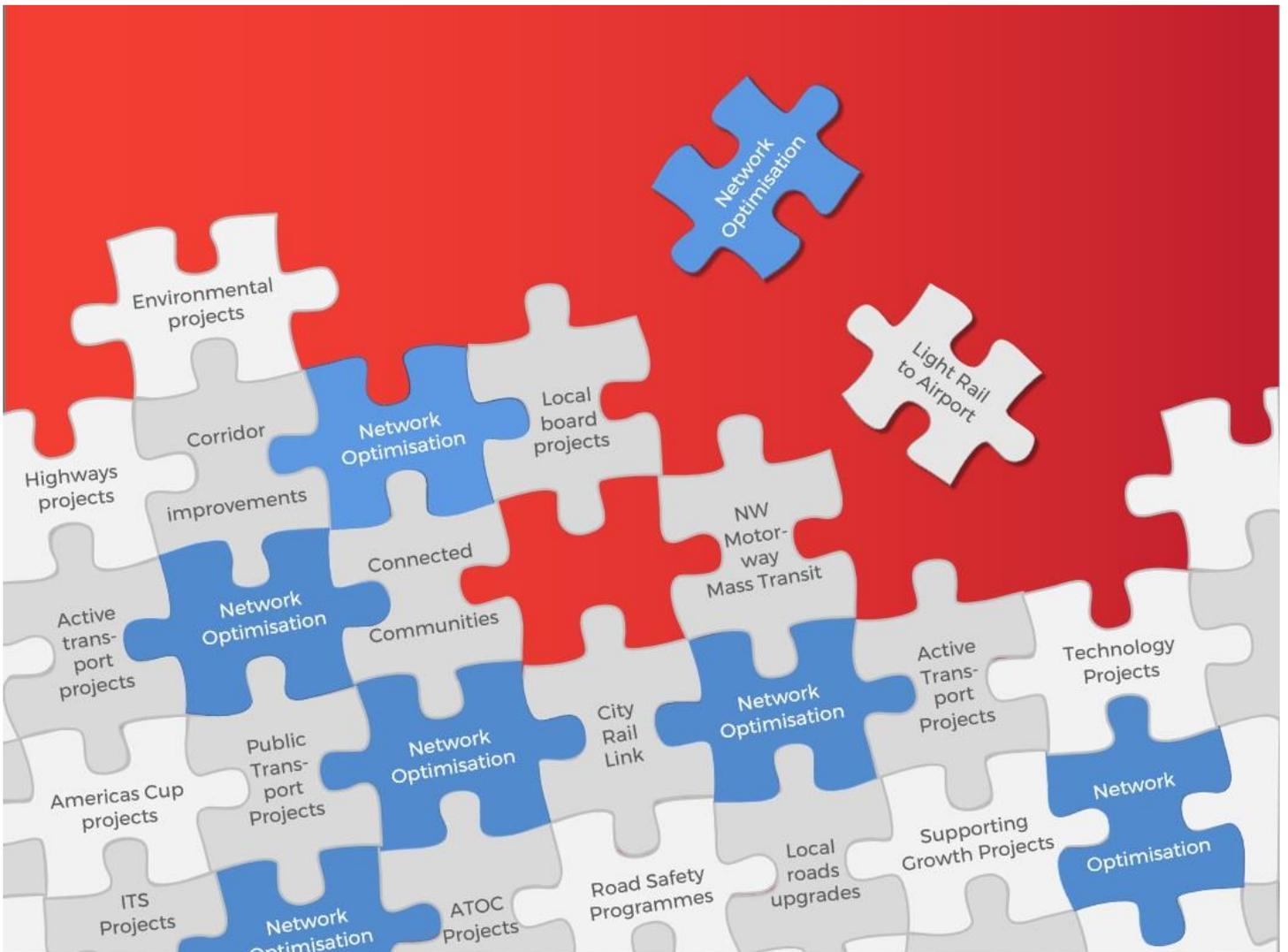
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Auckland Network Optimisation

Programme Business Case



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Executive Summary

Auckland is growing fast. Its population of 1.6 million is expected to increase by another million people over the next 30 years which means an extra 263,000 jobs will be required. This will increase travel demand and congestion on an already struggling transport system.

Larger transformational projects are expected through the Auckland Transport Alignment Project (ATAP) to help accommodate growth, but these will take decades to plan, fund and deliver. In the meantime, congestion and excess car dependency will continue to impact Auckland's social, economic and environmental wellbeing.

The majority of Auckland's transport infrastructure already exists. The large programme of capital projects planned will only add marginal capacity to the network. Planning for and accommodating growth is therefore going to require a greater focus on making better use of the network and maximising opportunities to influence travel demand. Inadequate emphasis and investment have been made in this space. This report presents the case for optimising the Auckland network and how Auckland Transport (AT) and the New Zealand Transport Agency (the Transport Agency) can best go about it.

Road Network Optimisation is a relatively inexpensive, quick and effective way to mitigate the effects of congestion and low levels of service. It is a series of multi-modal low-cost interventions that maximises use of the existing network through small physical interventions, active network management, behaviour change and technology to create extra road capacity. It is the 'one percenters' of small but effective interventions that collectively accrue big network benefits.

This Optimisation Programme will enable smarter travel choice now, encouraging the right mode on the right route at the right time. It's about moving more people (and goods) in fewer vehicles. It will improve safety, resilience, productivity and the environment. It's about supporting growth and enhancing liveable communities. It's about getting more out of what we already have.

Optimisation is strongly aligned with the strategic direction for land transport. Improving travel choice to move more people in fewer vehicle is essential in achieving the Government Policy Statement (GPS) objectives for safety, access, value for money and the environment. In doing so it aligns with Auckland transports future connect strategy and the road and streets framework and the Transport Agency's *Arataki* 10-year master plan and *Keeping cities moving* mode shift action plan, which all seek to deliver on the GPS objectives. (Delivery of this Programme Business Case (PBC) is one of the key actions of the mode shift action plan).

Similarly, the Auckland Plan intends to "*better connect people, places, goods and services*" and "*increase genuine travel choices for a healthy, vibrant and equitable Auckland*". Network optimisation is also identified in the Auckland Transport Alignment Project (ATAP) 2018 update (Network optimisation and technology programme), which is supported at Cabinet level. The Auckland Transport (AT) Asset Management Plan also includes specific reference to a Strategic Case for Network Optimisation (Section 13).

The programme focuses on three key issues:

Productivity - Since the 1950's the car has dominated the urban landscape, squeezing the space available for other modes. The way people travel is changing, and the transport network must now cater to a growing demand from a range of users or modes (cars, buses, trucks, walking and cycling). This is creating a complex, challenging environment as these modes compete for limited road space. The current expectations of meeting the needs of all modes, using the same road space, at the same time, is challenging. The result is a low level of service for many customers, a reduced ability to move people and goods effectively and processes that often still prioritise unsustainable car movements

over other modes (which invariably add more cars into the system). Without a clear network view, it is hard to build the right infrastructure and support the needs of different users.

Agility – Poor direction and capability gaps on how to prioritise competing demands are resulting in an inefficient use of the network. Our ability to respond quickly to a dynamic network is hindered by our knowledge of network performance. AT and the Transport Agency need to improve responsiveness to change. They need a process which allows continuous and adaptable optimisation activities to take place. They need to be able to take a more holistic approach to the network rather than pick off problems one by one as this can often just push problems elsewhere meaning that they will remain reactive rather than become proactive in their response.

Reliability – Whilst travel demand is increasing and causing a drop in reliability, the frequency and duration of events that can impact on network availability and performance resulting in road closures, lane outages and detours are also on the rise. These include public events (e.g. marathons, festivals, marches) and road works or unplanned sudden outages due to crashes and severe weather impacts such as flooding. These events effectively reduce the useable capacity in the existing transport system.

Network monitoring is an essential tool and the use of traffic cameras for incident management on the motorways and in the Central Business District (CBD) have been incredibly effective. Outside of these areas however AT and the Transport Agency have very little visibility of how the network is performing in real-time and this limits their ability to manage traffic effectively, which results in increasingly unreliable journeys.

AT and the Transport Agency already know they can do more to operate and manage the networks, and the teams are doing the best they can with the tools and resources they have, but this is currently insufficient to manage and operate an environment as complex as Auckland.

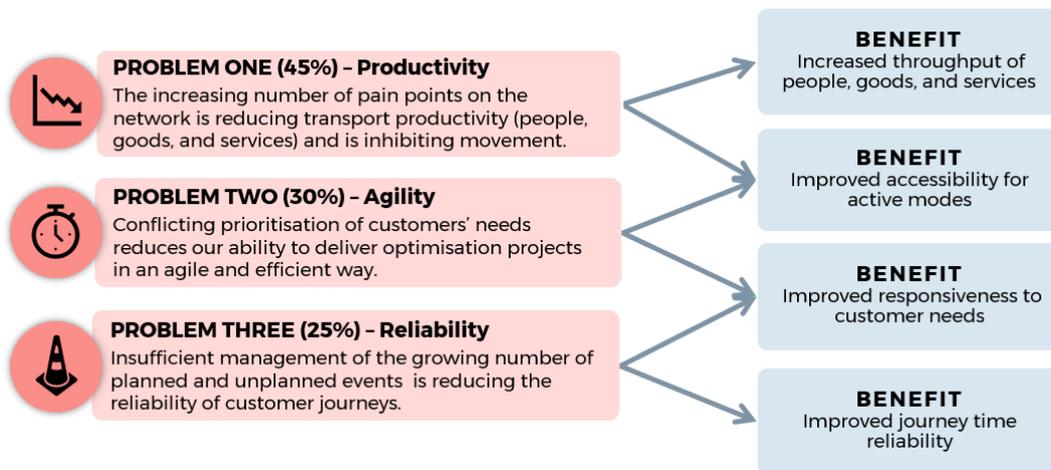


Figure 1-1 Problem statements and anticipated areas of benefit Problem statements and anticipated areas of benefit.

These problem-benefit statements were developed, along with potential key performance indicators, into the following draft investment objectives:

- Improve throughput on key networks to 25,000 person/hour/lane or more during commuter peaks and improve freight throughput during weekday interpeak periods on the strategic freight network
- Improve accessibility of walking and cycling in locations with high 'place' function and near public transport interchanges measured through reduced crossing delay, improved perceptions of safety, and improved Crime Prevention Through Environmental Design (CPTED) rating.
- Streamline performance measures, planning and delivery approaches to accelerate delivery of optimisation improvements to customers and maximise value for money measured through reducing average project delivery time from three years to two years and improved network performance measurements.

- Improve customer journey time reliability for people, goods and services by maintaining reliability for general traffic during peak periods, maintaining reliability for freight during interpeak periods, improving bus travel times and Level of Service (LOS) on key bus routes, and reduce responses and clearance times for network disruptions.

This programme intends to embed best practice optimisation within transport planning such that it becomes business as usual and that making the most of the existing network is the first option that is considered, in line with the NZ Transport Agency (NZTA) intervention hierarchy.

Our Response – An optimisation programme focused on travel choice

As described the transport system is dynamic, and the needs of users are changing and evolving. AT and the Transport Agency need to ensure they are responsive to these changes. To make real progress it's not just about doing more of the same. There is a finite level of money to invest in Auckland's transport system, which means there is a much greater need for lower cost and higher value solutions that address the cause and consequence of increased travel demand.

AT and the Transport Agency have a network that can be better optimised, but very little emphasis and proportionally small investment and resourcing has been devoted to making better use of it. This approach allows them to better understand their network and ramps up the scale and pace of optimisation projects in Auckland to meet increasing demands on the network, while meeting the priorities in ATAP (supported by the GPS 2018). This will also allow them to review the time lines required for capital investments.

Recommended Programme

The recommended Focus on Travel Choice programme would create a better travel experience for many Aucklanders by reducing congestion, enhancing travel choices and improving service levels. At the same time, it would maintain speed and reliability for freight customers. This programme would achieve this through a mode shift from single occupancy vehicle use to active mode and high occupancy travel. It proposes the biggest mode shift of all programmes assessed, and as such offers the strongest support for outcomes sought through the GPS and Auckland Plan, such as improved environmental sustainability and health outcomes.



Single occupancy travel is not an optimal use of the limited road space AT and the Transport Agency have, so they need to work on supporting more effective ways of moving people and goods, within existing constraints, where feasible. This means changing the way they use road space to meet the needs of customers.

The Focus on Travel Choice programme proposes the biggest mode shift of all programmes assessed, maximises people and goods movement efficiencies and improves active mode experience at locations with a high place function, and as such offers the strongest support.

By prioritising people rather than vehicles AT and the Transport Agency can optimise the capacity of the existing network. This will target higher level of service improvements for walking, cycling and high occupancy vehicles such as buses and car-share first, especially for peak time (commuter) travel, while retaining a focus on Freight customers, especially in the inter-peak. The benefits of this programme however also extend to all, including those that are less able to mode shift away from car dependency as moving more people in fewer vehicles will help to manage congestion and improve travel time reliability.

By focusing on moving more people in fewer vehicles the programme also has potential for high non-monetary related benefits and opportunities that extend across the public realm including:

- Safety and health: Improving the LoS for vulnerable road users will reduce the risk of death and serious injury whilst increased exercise levels from walking and cycling will benefit public health.
- Environmental: Reduced emissions and road and car park surface run-off pollution.
- Liveability: Improved journey experiences across modes, improved connectivity and reduced community severance.
- Demand management through improved accessibility to PT interchanges, improved bus service reliability which grows patronage and fare revenue to further improve bus service quality, service frequency and coverage.
- Economic: Improved productivity and reduced business costs due to improved travel time reliability and less individual 'dead time' stuck in traffic, increased retail spend as more people walk and dwell as opposed to drive past shops and reduced parking and road space demand can free up land for more productive use. Optimisation also demonstrates value for money as the life of existing infrastructure is prolonged, more people in fewer vehicles can reduce maintenance costs and larger scale transformation projects may not be needed until much later (if at all).

Specific outcomes for each mode customer are summarised below:



Figure 1-2 Specific outcomes of the recommended Focus on Travel Choice Programme for each modal customer.

The advantages of road network optimisation over other initiatives to tackle the problems identified on the Auckland network includes its capability to:

- Be truly responsive to changing needs and demands in the short term (0-3 years)
- Operationalise the strategic direction from the Future Connect programme, Arataki and Keeping cities moving (the mode shift action plan) across the entire Auckland road network and all modes
- Fill the gaps where customers' needs are not being met by other programmes.
- Defer investment for larger scale infrastructure and support its construction and implementation
- Implement a network view, which differs to transformational projects which are focused on a specific area or corridor.
- Prioritise the same space for different purposes at different times i.e. prioritise pedestrian movement in peak within town centres and prioritise freight movements inter peak.

AT and the Transport Agency have clear evidence of the benefits of individual optimisation projects, they are looking to increase the scale and pace of optimisation projects in Auckland to meet increasing demands on the network and to meet the priorities in the Auckland Transport Alignment Project (supported by the GPS 2018).

The optimisation programme will be broken up into sub-programmes, which focus on the different strategic responses defined in the PBC:

Network Operating Planning and performance reporting

Refreshing the joint Auckland Network Operating Plan (ANOP) is an important first step to unlocking the true potential of the existing transport network. The ANOP is an agreed plan and process that enables partners to optimise the network through agreeing priorities by mode, time of day and levels of service. ANOP was first developed in Auckland in 2014 but is now in need of a refresh to reflect changes as well as the revised strategic direction of the GPS.

The ANOP allows us to make more informed decisions about a number of aspects of the network including:

- allocating public transport priority
- allocating road space to competing transport modes, depending on the time of day.
- improving traffic flow at highly congested intersections
- controlling access to and from the arterial network
- planning for growth areas
- planning for the development of activity areas.
- reduce travel demand
- more efficient and sustainable travel
- better information, and management of existing infrastructure
- managing the trade-offs between modes
- understand function of new infrastructure to support economic growth

An updated and agreed network operating plan with supporting tools, will ensure AT and the Transport Agency are able to confirm the best suite of interventions under an optimisation programme. By embedding operational planning through the refreshed network operating plan, they will understand the current gaps in network performance (for different modes at different times of the day). This will allow them to monitor and report on agreed multi-modal network performance measures to inform decision making, and agreed responses to issues on the network, through either optimisation sub-programmes or through network improvement projects. This will include monitoring the benefits of optimisation activities.

A more robust Network Operating Plan (NOP) and tools will emerge from this which will be used to identify a suite of small, quick to implement pain point fixes for delivery every 3 years. A continuous programme will be established to respond to changes in the network from thereon.

Active operations management, including routine signal optimisation

The broad nature of day to day management and operational activities encompass a wide variety of activities. Examples of typical operations activities include:

- Active monitoring, for example operators monitoring and managing the city centre.
- ITS optimisation activities (e.g. SCATS signal optimisation, ramp signalling system operation)
- incident management
- Planned event co-ordination to mitigate the impacts
- ITS network operation and management systems (e.g. speed management, automated safe systems)
- providing travellers with better information (e.g. website mapping, travel time information, network status information and updates).

By extending operational activities AT and the Transport Agency can operate and manage more of the key strategic networks in 'real time;' to align with the strategic direction through the network operating plan.

Physical "pain point" fixes for people movement, active modes, freight routes and general capacity

Examples include the repurposing of existing road space to create increased people and good movement capacity, resulting in increased productivity of the network, bus priority measures, better freight practices and enhancements to our road network to support walking and cycling, resulting in increased people throughout, journey reliability and mode shift

Innovation, trials and demonstrators

The programme will support the implementation of proactive trials and testing of ideas and ITS to support all aspects of optimisation.

Complementary Behaviour change/ Travel demand management

Whilst deliberate network management and capacity create in themselves influence behaviour change, specific behaviour change intervention plays a role in further increasing productivity of the network. Travel demand management and other techniques to change attitudes and behaviour all form part of the toolkit for optimising our road network.

So, what's next?

This PBC shows that optimisation is clearly aligned with strategic goals for Auckland. We therefore recommend a Single Stage Business Case is undertaken to develop and agree a detailed programme for implementation in the next NLTP, including as a first step, an updated Auckland Network Operating Framework and Network Fit Assessment tool in order to develop the Network Operating Plan.

We are requesting:

- Immediate funding approval for \$2 094 533 to complete a SSBC for Auckland Network Optimisation. This will include:
 - A refreshed Auckland Network Operating Plan and the development of an upgrade tool as necessary to produce a optimisation programme.
 - The development of a suite of standard interventions for optimisation, similar to the toolkit developed for the Safe Network Programme with approval pathways to fast track activity.
- In principal funding of an additional \$330-400 million for investment in optimisation activities over ten years, with a focus on travel choice (this is in addition to existing OPEX). The indicative split for investment would be 1/3rd highway investment and 2/3rds local roading investment.

We understand that funding is constrained across all activity classes, but to provide short term solutions (0-3 years) to Auckland road network customers AT and the Transport Agency need to prioritise further investment in optimisation activities, which make better use of their existing key transport networks. We are therefore asking for funding to be reprioritised and for funding to be released for the SSBC to prioritise optimisation activities. This will also enable the realisation of the value for money proposition that optimisation brings. The SSBC will also necessarily include the development of a continuous funding mechanism, which will allow us to implement a dynamic programme which can respond to the changing needs of our customers from hereon, i.e. ensure that optimisation can become embedded as a core first step principle.

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Document History and Status

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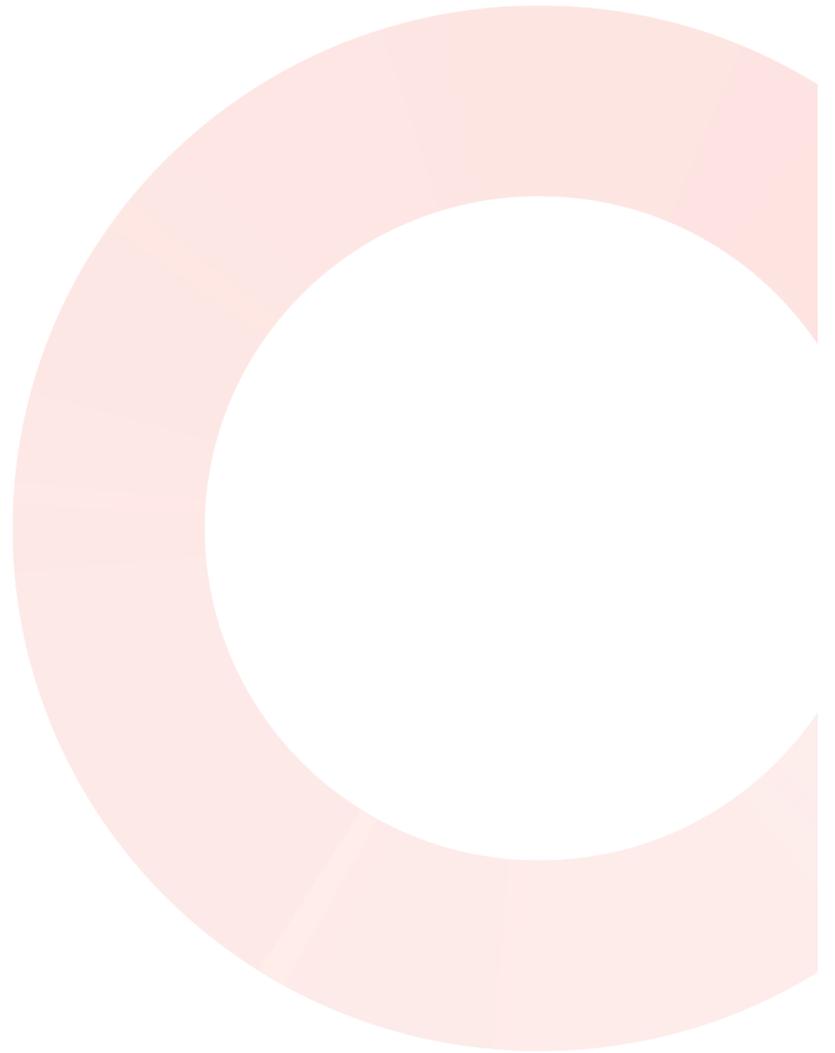
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Issue 3	Draft issued to Project Sponsors for review
Issue 4	Draft (excluding Part C) issued to Project Sponsors
Issue 5	Final submission with Part C

Glossary

Term	Definition
ANOF	Auckland Network Operating Framework
ANOP	Auckland Network Operating Plan
AM Peak	The weekday morning commuter peak, generally from 7am to 9am
AT	Auckland Transport
ATAP	Auckland Transport Alignment Projects
ATOC	Auckland Traffic Operations Centre
BCR	Benefit cost ratio
CAPEX	Capital Expenditure
Catchment within walking distance	The reasonable walking distance catchment around a destination/location, e.g. bus stop.
CBD	Central Business District
ConOps	Concept of Operations – Plan for how a certain section/area of the network should be operated
CPTED	Crime Prevention through Environmental Design
Dynamic lanes	Lanes that change priority throughout the day through use of ITS and LED lighting systems rather than traditional painted lane marking and fixed signs.
Do Min	Do minimum – the current road network optimisation work undertaken by AT, the Transport Agency, and ATOC.
GPS	Government Policy Statement 2018
HOV	High occupancy vehicle (e.g. bus, car with more than one occupant)
Interpeak	The period after the weekday morning peak and before the weekday afternoon peak, generally 9am to 4pm.
ITS	Intelligent Transport System
Key networks	Key networks are those networks that are identified in the Regional Land Transport Plan (RLTP) as: <ul style="list-style-type: none"> • Key road network: Motorways and arterials on 'Figure 15 Auckland arterial road network', • Key freight network: Freight routes on Figure 16 Auckland regional freight network, • Key public transport network: Rapid or frequent services routes on Figure 19 Public transport new network • Key Place function areas: Town centres or metropolitan centres on Figure 26 Major centres (high place value) and major roads, • Key cycle network: Metros or connectors on the Figure 27 Auckland cycle network
KPIs	Key Performance Indicators.
LOS	Level of Service
MCA	Multi-Criteria Assessment
Micro-mobility	Small/light vehicles such as electric scooters and e-bikes
NLTP	National Land Transport Programme
NOF	Network Operating Framework (see also ANOF)

Term	Definition
NOP	Network Operating Plan (see also ANOP)
NZTA	The New Zealand Transport Agency
The Transport Agency	The New Zealand Transport Agency
OPEX	Operational expenditure
Pain points	Like pinch points, areas where customer level of service drops below the desired standard. (e.g. areas of poor safety, congestion, queueing, long delays)
Place function	An areas purpose as a destination, to provide space for community and social interaction, a space to linger
PM Peak	The weekday afternoon commuter peak, generally from 4pm to 6pm (but can be longer in congested areas of the network)
Reliability	The predictability of a journey or variability. Measured as standard deviation of travel time or difference between 85 th percentile and median travel times
RLTP	Auckland Regional Land Transport Plan
Strategic networks	See “key networks”
TDM	Traffic demand management
TIMs	Traffic Incident Management
VURT	Valuing the Urban Realm Toolkit
we	The term ‘we’ generally refers to the road network optimisation project team, either those who have or will deliver the optimisation programme.

Part A – Strategic Case



1 Introduction

1.1 Scope of this report

There is a strong drive for investment in road network optimisation at a national, regional and local level. Significantly, the Auckland Transport Alignment Project (ATAP) has identified \$700 million for network optimisation and technologies to improve the performance of Auckland’s transport system. This programme aims to support and strengthen the effort made so far to “keep Auckland moving” through making better use of existing road network to enhance its productivity. Ultimately, optimisation will maintain or improve mobility during the construction of city-shaping but disruptive larger scale transport infrastructure projects.

This business case sets out the reasons for substantially increasing investment in optimising Auckland’s road network and provides a basis for investment decisions over the next 10 years. It demonstrates a real commitment to optimising the use of the existing network and a sea change in the way AT and the Transport Agency go about planning for and accommodating growth by thinking about moving people and goods rather than just vehicles.

1.2 What is road network optimisation?

‘The road network’ refers to all public roads or adjacent or connecting footpaths, cycle paths or shared paths. Its users include people walking, cycling or using emerging ‘micro-mobility’ devices such as e-scooters. It also includes public transport passengers, people travelling together in cars or on their own as well as vans and trucks carrying freight. Virtually everybody that lives, work or is visiting Auckland will be users of the road network as they go about their lives, traveling to and from work, home, school and college, for business and pleasure or as receivers of goods and services that are transported on it.

‘Optimisation’ refers to the process of improving the value of an asset without necessarily increasing the size of that asset (in this case the road network). For example, this may be done by reallocating road space or changing the way the road operates to work more efficiently within the existing road reserve, typically by not increasing the size (carriageway width or length) of the road network. Optimisation also factors in the intended use of the road, by considering both the movement and place functions.

Road network optimisation must consider the needs of the customer, and in doing so consider the efficiency (safety and customer experience) of moving people, goods and services.

The intervention hierarchy for national land transport projects (Figure 1-1) prioritises network optimisation before new infrastructure as a response to network problems, because it makes “best use of the existing network”.

Optimisation supports ‘demand management’ through encouraging ‘the right traffic (or mode) on the right route at the right time. This programme business case does not consider road pricing or investment in underlying transport technology platforms.

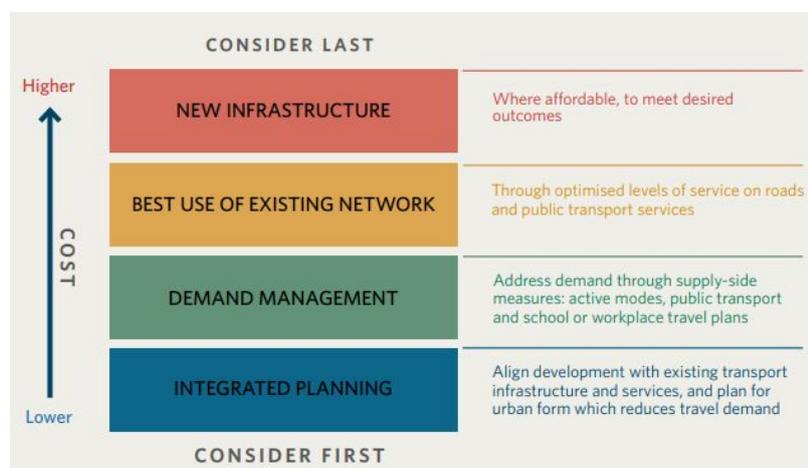


Figure 1-1 Intervention Hierarchy (source: NZTA Business Case Approach guidance)

The end goal of network optimisation also supports integrated planning and vice versa. Developing urban form such as higher density and mixed-use land patterns enables people to live nearer to where they work, study and play or to

local shops and services. This in turn can encourage a greater take up of walking, cycling or public transport trips as distances are shorter and greater catchments make improved bus services (increased frequency and route coverage) more viable.

2 Context

2.1 Auckland is growing

Auckland’s population of nearly 1.6 million is predicted to grow by another million in the next 30 years.

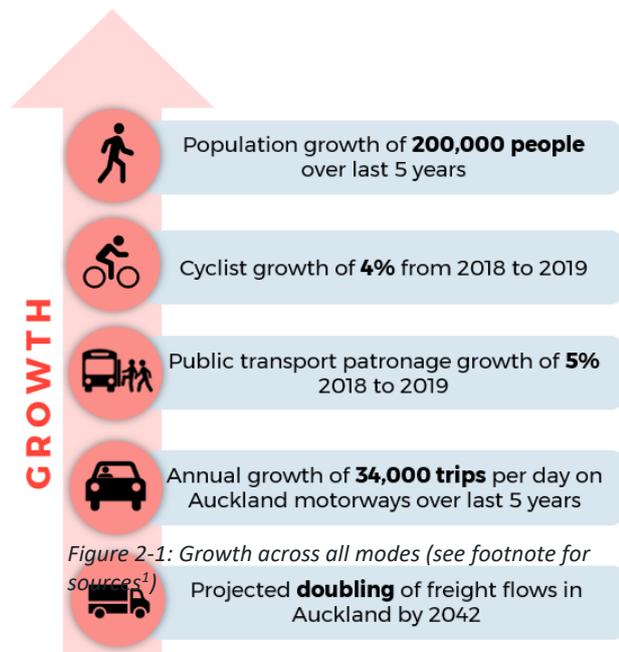
Approximately 50,000 people are living in the central isthmus where there were 5,000 people in 2006, and yet despite this intensification, the city is also expanding outwards, resulting in:

- More people, goods, and services using the Auckland road network (see Figure 2-1)
- Changing travel patterns, across modes and geographically as Auckland grows upward and outward
- More planned and unplanned events (e.g. road construction and crashes), which reduce capacity on the network and journey predictability (Figure 2-2)

Increasing demands and varying travel patterns from changing land use will require ongoing and effective network optimisation to ensure customers journeys are not adversely affected.

There has been a clear upward trend towards planned and unplanned events, as discussed further in Section 4.2.3. The frequency and impacts of planned and unplanned events (e.g. construction and crashes) are likely to increase as the network becomes more congested. This is demonstrated in the following figure which shows the expected construction impact of major projects including the Eastern Busway, light rail and the East-West link on road capacity through to 2028.

For example, according the RLTP and ATAP, there will be significant constructions occurring on the network such as the Eastern Busway (and extensions), mass rapid transit and various other public transport investment. These will put pressure on an already under-performing road network across Auckland, and congestion will likely get worse before it improves, as demonstrated by Figure 2-2.



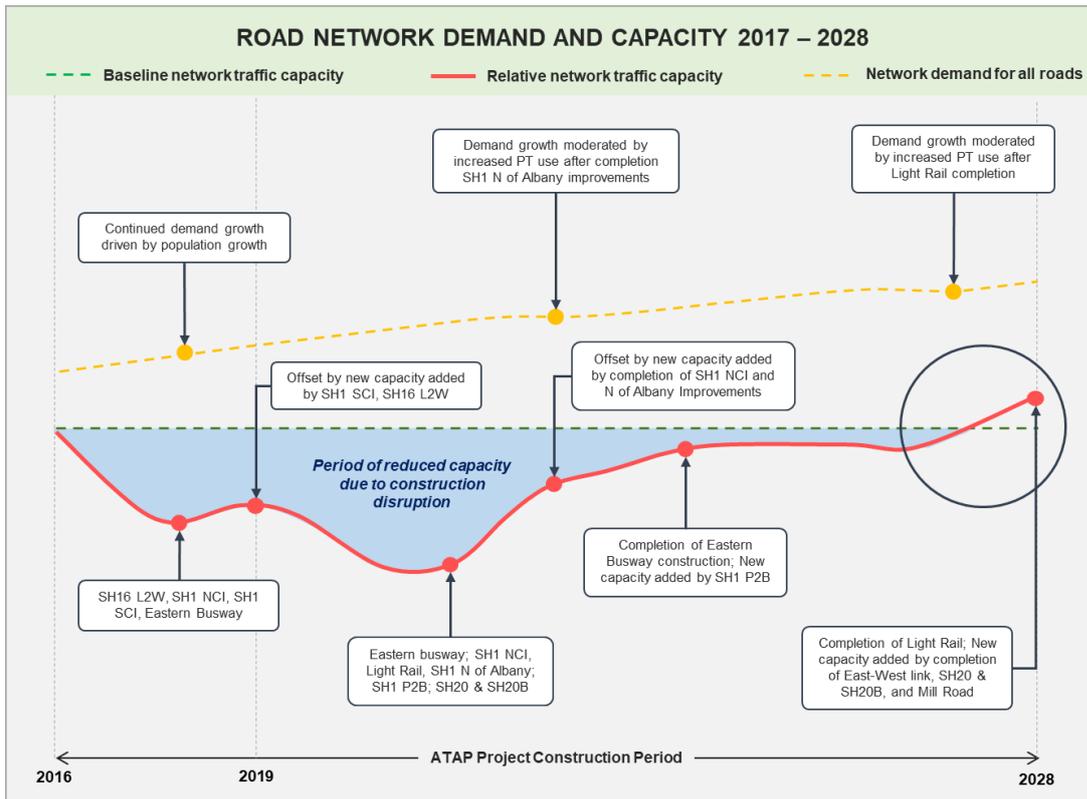


Figure 2-2 Future network efficiency

There is a requirement within the scope of each construction project to mitigate the impacts of construction on the road network; however, the scope is often not broad enough to fully consider mode shift, to appreciate the combined effects of multiple construction projects occurring on the network simultaneously, or to fully eliminate construction effects (i.e. there are still residual effects on the network to consider). Optimisation is therefore essential to address these capacity gaps and wider network effects.

2.2 Customers need improvements now

Customers are experiencing poor journeys on all modes, and this is getting worse. They need improvements now. Optimisation is nimble enough to deliver improvements while more transformational projects are progressed.

The frustrations of congestion, whilst often more loudly heard from car drivers impact across all users (or modes) on the network as well as anyone else receiving transported goods or services. Customers are increasingly using alternative modes including walking, cycling, emerging forms of micro-mobility such as e-scooters and public transport (buses, trains and ferries) to get about as the city gets busier and more people move into the CBD. Auckland is still, however a highly car-dependent city and this reliance on the car, particularly for peak time (commuter) travel is increasing the extent and frequency of congestion across the network. This in turn:

- Impacts on safety. More vehicles on the road increases conflict potential, particularly for people walking and cycling. This makes these active modes less attractive which in turn increases car dependency and thus congestion.
- Impacts on bus travel times and reliability, reducing the viability of public transport to optimise the people moving capacity of the network, thereby maintaining dependency on cars and thus congestion.
- Impacts on the environment, health and wellbeing: Increased air pollution and climate change impacts from emissions, waterway pollution from road and car park surface run-off, traffic noise impacts on communities and lost exercise benefits of not walking or cycling instead.

- Impacts on community access and severance. It's harder to get across or onto busy roads and wide expanses of road space, particularly multi-lane wide arterials can disrupt connectivity and social cohesion.
- Impacts on freight efficiency and labour productivity due to dead time spent in traffic which in turn can increase costs and reduce economic productivity; and
- takes up land (for roads and car parking) which could otherwise be used for more productive purposes including residential, commercial and recreational activity. More road space in cities invariably leads to urban sprawl rather than higher intensity land use which is more conducive to encouraging active mode travel (shorter walking and cycling trips) and therefore leads to an increased reliance on the car to get about and increased congestion, pollution, safety risk etc.

Appendix C6 of this report provides further specific customer feedback and survey data. It indicates that a lack of overall satisfaction amongst all users is overwhelmingly driven by poor traffic flows. Whether they are walking, cycling, catching a bus, driving a truck or travelling by car, people have stories to tell about poor travel experiences across Auckland that are invariably linked to growing levels of congestion.

Clearly there is public demand to improve on these travel experiences and in doing so the safety and reliability of travel across modes. That said, building new road capacity (either additional traffic lanes or new roads) is not only typically a lengthy and costly process but inevitably does little to alleviate congestion in the long run. Instead, new road space can often end up having the opposite effect of inducing more traffic onto the network. AT and the Transport Agency recognise this and are placing greater emphasis on the diverse needs of Auckland road network customers and particularly the importance of optimising the network capacity through encouraging a greater take up of more sustainable modes for day to day travel including walking, cycling and higher occupancy car and public transport.

3 Strategic Alignment

There is a strong drive for significant investment in road network optimisation at a national, regional and local level.

3.1 National alignment

3.1.1 *The Government Policy Statement for Land Transport 2018/19 – 2027/28*

The strategic direction set by the Government for land transport investment has a focus on improving safety and access whilst ensuring value for money and reducing the adverse effects on the environment, including climate change and public health.

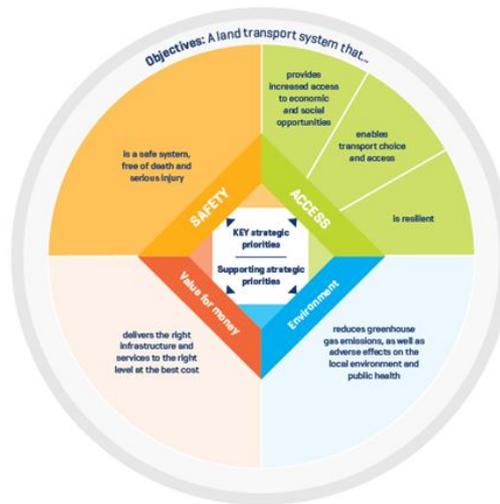


Figure 3-1 Government policy statement for land transport - Strategic Direction.

Optimising the existing transport network is at the core of all these objectives. Particularly, its key focus of reducing single occupant car dependency, especially for peak time (commuter) travel will:

- Improve safety: Moving more people in fewer vehicles will reduce conflict potential, particularly for vulnerable road users walking or cycling.
- Improve access: Moving more people in fewer vehicles will improve productivity (economic and social opportunities) through reducing congestion effects, enabling transport choice and access for all and improving resilience (people are less reliant on one mode or route).
- Value for money: Moving more people in fewer vehicles and through walking and cycling will get more out of the existing transport network, extend asset life and delay or avoid the need for more costly larger scale new infrastructure. Optimising the network now will also embed smarter travel behaviour that will get even more out of new build projects when they are completed.
- Environment: Moving more people in fewer vehicles and increasing the active mode share will help reduce environmental impacts (reduced emissions) and help improve public health (exercise benefits from walking and cycling).

3.1.2 Arataki – Our Plan for the Land Transport System (10-year Master Plan)

Arataki will describe how the Transport Agency will contribute to the government's long-term outcomes and short-term priorities for land transport, through system-level and place-based investment programmes over the next 10 years. Arataki will help the Transport Agency identify the areas where a shift is needed in the land transport system to address the issues that are not being resolved through current initiatives. These shifts respond to the external drivers on the system and reflect the government's long-term objectives and short-term priorities. The five key strategic shifts are:

- 1 Transform urban mobility: Shift from a reliance on private vehicles to more sustainable transport solutions for the movement of people and freight.
- 2 Tackle climate change: Support the transition to a low emissions economy and enhance communities' long-term resilience to the impacts of climate change.
- 3 Significantly reduce harms: Transition to a land transport system that reduces deaths and serious injuries and improves public health.
- 4 Improve urban form: Optimise transport's role to improve connections between people, product and places.

- 5 Support regional development: Optimise transport's role in enabling regional communities to thrive socially and economically.

Optimising the network will be a key component in achieving these shifts, particularly with its focus on enabling transport choice to reduce car dependency.

3.1.3 Keeping Cities Moving

Keeping Cities Moving is the Transport Agency's plan to improve travel choice and reduce car dependency. The Plan outlines how the Transport Agency, in partnership with others, will help address the causes of car dependency and in doing so contribute to the GPS objectives by increasing the wellbeing of New Zealand's cities by growing the share of travel by public transport, walking and cycling.

Keeping Cities Moving includes an action plan of 34 interventions that will focus on leveraging mode-shift through:

- Spatial and place-based planning
- Policy and regulatory interventions
- Network design, management and optimisation
- Investment in infrastructure, platforms and services
- Economic tools; and
- Education, engagement and awareness interventions

3.2 Regional and local government alignment

The Auckland Plan strategic directions include to *"better connect people, places, goods and services"* and *"increase genuine travel choices for a healthy, vibrant and equitable Auckland"*. Road network optimisation can reallocate road space to better balance the needs of customers from all modes, enabling better transport choice and system resilience. Furthermore, by focusing on customers not cars, place as well as movement, and enabling access to the whole system (not just roads) network optimisation can:

- Enable Auckland to become a more liveable city; and
- Provide better value (for money) both for the existing network and by supporting larger projects.

3.3 Auckland Transport Alignment Project (ATAP)

ATAP is a programme of work and a transport strategy that was developed to document the longer-term transport plans for Auckland. It has identified \$0.7 billion for network optimisation and technology.

ATAP identifies that network optimisation is an urgent priority and that: *"There is potential for substantial gains to be achieved through increased investment in network optimisation and it is recommended a much greater focus on these projects be considered"*.

It identifies that network optimisation can include *"traffic light optimisation, dynamic lanes – as recently implemented on Whangaparāoa Road – freight lanes and other priority measures, intersection improvements such as roundabout metering, and improvements to support bus priority or higher vehicle occupancy, such as T2 and T3 lanes"*.

This business case establishes a plan for some of the \$0.7 billion identified for optimisation and technology in ATAP.

3.4 Regional Land Transport Plan (RLTP)

The RLTP provides a summary of the currently committed and discretionary projects to be delivered by AT and THE TRANSPORT AGENCY including a *"Network Optimisation Programme providing a package of targeted small-to-medium scale infrastructure projects to optimise routes through synchronisation of traffic signals, optimising road layout, dynamic traffic lanes and managing traffic restrictions."* Submissions made during consultation on the RLTP indicate a high level of public support for this programme.

By examining current network performance against the RLTP and ATAP, it is apparent that:

- There are gaps on the network that are not covered by other committed works, programmes or business cases but that still cause poor customer experience now and will in the future.
- There is also a gap in timing between today's issues and when implementation of some business cases will occur.
- In some cases, other business cases or programmes are trying to address significant issues, while ignoring smaller issues.

Road network optimisation presents a unique opportunity to unify the range of delivery programmes and tackle issues not addressed by these programmes.

3.5 Road Authority Direction – AT and the Transport Agency

Both AT and the Transport Agency share a strategic focus on people, improving access and better connecting the whole transport system; specifically:

- The Auckland Transport Statement of Intent (SOI) identifies key priorities for AT to follow including, *“Deliver a safe, efficient and effective transport network”* and *“Focus on the customer”*. Optimisation is identified as a key component that will deliver *“improvements to the wider transport system including public transport, freight and parking, building on the work already underway on the Auckland road network and traffic management system.”*
- As defined in its Statement of Intent, the Transport Agency seeks to create *“one connected system”* with a *“people centric approach”*, and *“partnerships for prosperity”* to unlock social and economic opportunities, which is reflected in its positional statements of *“inclusive access”* and *“liveable communities”*.

3.6 Future Connect

- Future Connect will be the blueprint for Auckland's future integrated transport system.
- Auckland Transport will develop the future transport network and proposals to guide subsequent strategies and plans, including Regional Land Transport Plan (RLTP) prioritisation.

3.7 Roads and Streets Framework

- The Roads and Streets Framework is a planning tool to help guide business case development and design. It is an application of strategy and takes a holistic view of the roles of roads and streets alongside land use.
- With the Roads and Streets Framework, AT and the Transport Agency can better plan and design our roads and streets to meet the needs of all people who use them and better fit the places they serve.
- The output provides a cohesive strategic view for a road/street and mandate for new projects to inform design with guidance that is both strategically sound and locally relevant.

This business case for Auckland network optimisation is well aligned with the intents of both road controlling authorities.

4 The Need for Investment

4.1 Problems

The stakeholder group, with AT and the Transport Agency, worked together to identify specific problems to be solved by any proposed new programme, the intended outcomes (benefits) of solving these problems, and the overall objectives of the project.

A set of three problem statements was developed based on the combined knowledge of the network from the stakeholder group, including analysis of data as evidence gathered by stakeholders, during a series of workshops conducted during early stages of the business case.

Related evidence of these problems is already shown broadly in Section 2. Further evidence of these problems is provided in Section 4.2.



PROBLEM ONE (45%) - Productivity

The increasing number of pain points^{1,2} on the network is reducing transport productivity (people, goods, and services)³ and is inhibiting movement.



PROBLEM TWO (30%) - Agility

Conflicting prioritisation of customers' needs reduces our ability to deliver optimisation projects in an agile and efficient way.



PROBLEM THREE (25%) - Reliability⁵

Insufficient management of the growing number of planned and unplanned events⁴ is reducing the reliability of customer journeys.

¹ Pain points are defined as areas that are deficient for their intended use i.e. poor capacity, accessibility, efficiency etc.

² Pain points apply to PT, Freight, Pedestrians, Cyclists (and similar modes), general traffic. Ferry and train journeys are not included.

³ Productivity is defined by the value of the road for both its place and movement functions; it is people or goods throughput over time.

⁴ Events are incidents and works that result in temporary reduction of the performance of the road e.g. reduced capacity from roadwork or a crash.

⁵ Reliability is the variation in travel time (standard deviation of travel time). It is a measure of how predictable a customer's journey time will be.

4.2 Evidence

Further to the context and evidence outlined in Section 2 of this business case, the problems and related evidence are summarised below.

4.2.1 Evidence of Problem One



PROBLEM ONE (45%) - Productivity

The increasing number of pain points on the network is reducing transport productivity (people, goods, and services) and is inhibiting movement.

Problem one refers to pain points, such as speed restrictions during road works, causing a reduction in the number and volume of people, goods, and services that can be transported on the road network. The consequence of the problem is:

- Journey time delays across all modes i.e. customers taking longer to get to school, appointments, and jobs etc.
- Reduction in productivity of freight and services (e.g. tradespeople) as they spend longer time on the road
- Poor accessibility for active modes, e.g. difficulty crossing the road in town centres

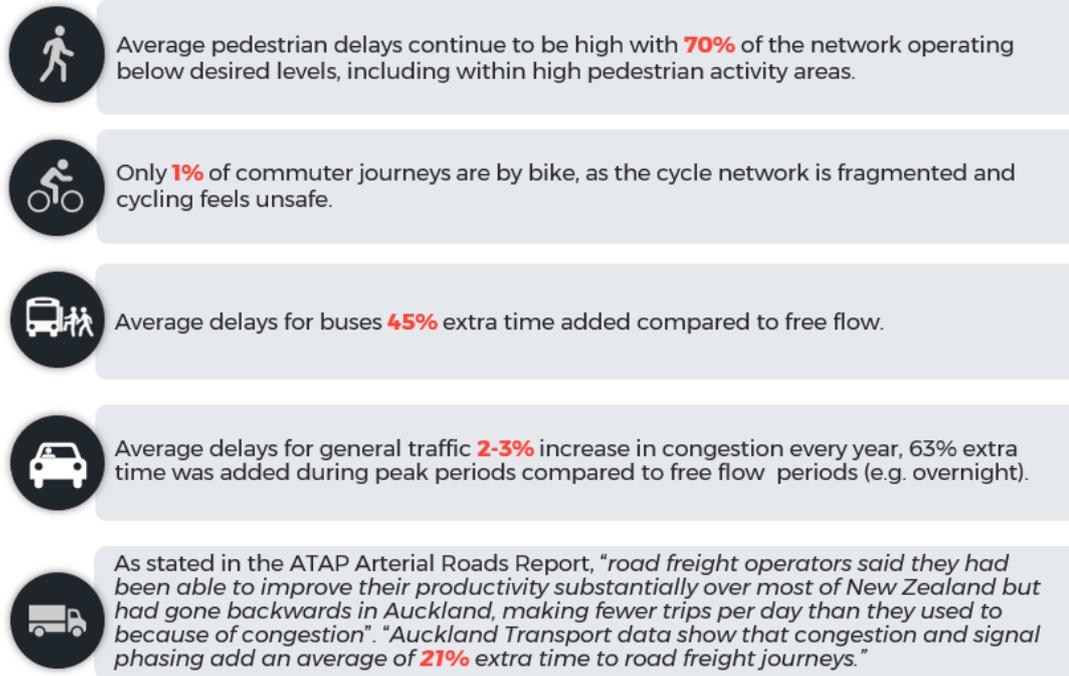


Figure 4-1 Productivity effects across road transport modes

The cause of Problem One (i.e. the increasing number of pain points) is driven by:

- Forecast construction taking place within the road network, which will reduce capacity over the next 10 years (Figure 2-2) and
- Increasing demands (Figure 2-1) from the significant population growth, which is resulting in an increasing volume of cars and buses on the road network and people using active transport. This in effect increases the amount of conflicts or pain-points between the specific modal networks.
- The increasing conflict between strategic modal networks from the shift away from a vehicle-centric approach to a customer-centric approach and from the growth in public transport and active mode share (see Section 2)

The effect of the problem (i.e. reducing productivity) is seen in:

- The downward trend of speeds on the motorway network, which are not being offset by improvements from major projects such as the Victoria Park Tunnel and Waterview Connection (see Figure 4-2).
- Trends in network performance, which show current levels of service are less than desired by AT across most modes (Figure 4-1).
- Austroads Congestion and Reliability Review (ACRR), which states that "Auckland has significantly higher levels of congestion than its international and local comparators".
- Customer surveys, which show a common complaint that customer journeys are "longer and more unpredictable". This issue makes trip planning much more difficult and even deters people from undertaking their journeys and taking on work opportunities (see Appendix C6).

Network level analysis of performance enables a high-level understanding of the problems and constraints whilst a more detailed picture of location-specific pain points is currently compiled into a programme of work separately by the Transport Agency and AT (detail of these pain points is summarised in the network performance score cards in Appendix C3). A more aligned and prioritised programme of work is expected to occur in the next stages of the project.

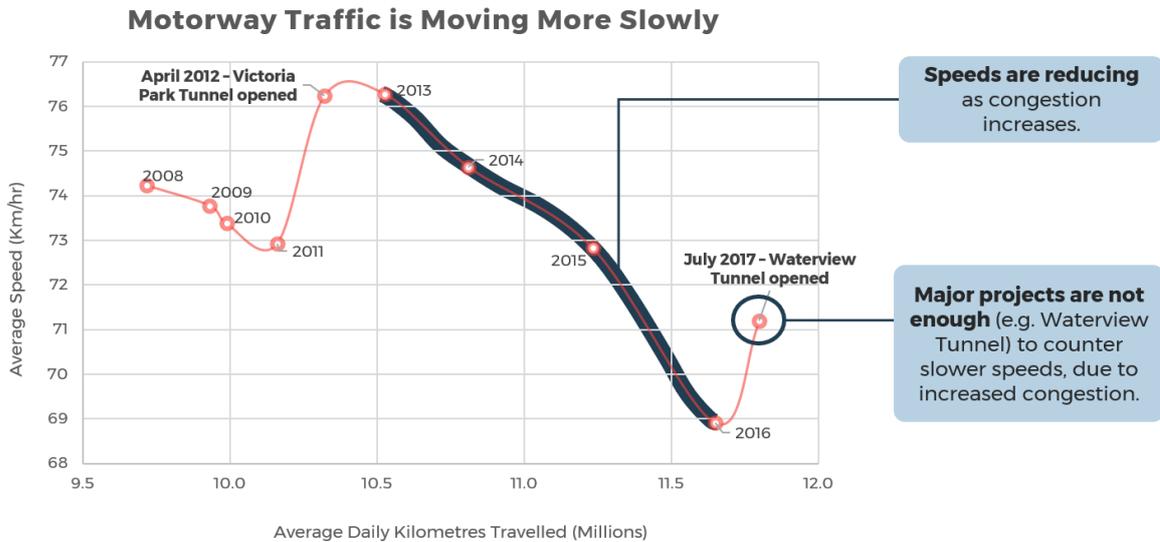


Figure 4-2 Network Efficiency on Auckland Motorway Network

Note: This graph shows congestion affecting vehicle travel on the motorway network, the majority of which is currently by private vehicle. This congestion affects buses using the motorway, which then results in longer overall bus journey times and increasing unreliability of services.

The link between Problem One and road network optimisation can be seen in the following examples:

- Average delay for pedestrians at Victoria Street intersection with Queen Street in Auckland reduces from 27 seconds to 20 seconds with signal optimisation equating to \$12million of benefits over a 40-year analysis.¹
- A traffic management system providing traffic and guidance information to roadside VMS displays and a mobile application in Szczecin (Poland) allowed freight vehicles to be directed to less congested routes. There was a 36% improvement in the freight vehicle flow² (Malecki et al 2014).

Appendix C provides further evidence of the link between Problem One and optimisation.

4.2.2 Evidence of Problem Two



PROBLEM TWO (30%) - Agility

Conflicting prioritisation of customers' needs reduces our ability to deliver optimisation projects in an agile and efficient way.

Problem Two refers to the difficulty in allocating already-limited road space to facilitate all modes and customer needs. The struggle to find consensus on what customers want can often be time-consuming and hinder efforts to tackle congestion issues. The consequences of this problem are:

¹ Source MR Cagney, 2017, <http://knowledgeauckland.org.nz/assets/publications/Measuring-pedestrian-delay-Auckland-MRCagney-2017.pdf>

² Source: NZTA, Research report 625 -Use of technology to measure and improve freight movements, <https://www.nzta.govt.nz/assets/resources/research/reports/625/625-use-of-technology-to-measure-and-improve-freight-movements.pdf>

- Lack of progress in delivering solutions, e.g. average delays for pedestrians within town centres is approximately 40s per person during inter-peak periods, which is considered undesirable by AT and the Transport Agency.
- Unhappy customers and negative reputational outcomes for AT and the Transport Agency, e.g. recent projects have stalled because residents disagreed with proposed solutions, which did not fully consider conflicting modal priorities.
- Less value for money as more time is spent coming to a consensus.

The cause of the problem (i.e. conflicting prioritisation of customer needs) can be seen in:

- Competition for road space and strategic modal networks that overlap (Figure 4-3).
- Changing customer needs, which require a network response (see section 2.2)
- A lack of appropriate measurements for customer level of service because of the historic vehicle-centric approach to data capture. For example, pedestrian Level of Service is currently measured by delays crossing the road, but from customer surveys we know that Level of Service for pedestrians also depends on perceived safety and accessibility (see Section 2).
- The lack of a coordinated approach to optimisation across AT, the Transport Agency, and ATOC, e.g. the NOP is not widely known within the organisations or used often enough

The effect of the problem (i.e. our reduced ability to deliver road network optimisation in an agile and efficient way) is seen in:

- Auckland Transport road network optimisation team project delivery times, which are typically 2-3 years for projects that could be delivered within 1-2 years if conflicts could be resolved sooner. For example, it takes 2-3 years to respond to some problems on the network because projects need to be undertaken within full business case procedures. In contrast, the recent Safe Networks National Programme identified an over-arching and continuous programme of work, like a framework, to guide investment in road safety.

The various strategic modal networks often intersect or share a road corridor, resulting in confusing or often conflicting modal priorities. For example, in Takapuna town centre (Figure 4-3) the intersection of Anzac Street and Lake Road is on the strategic cycle network and bus network, and is also a critical route for walking and general traffic (cars).

Without a transparent decision-making process, it is difficult for programme delivery teams to ensure that the appropriate modal and place priorities are established during solution development. In addition, the current limited understanding and application of network operational planning results in unclear communication of level of service expectations, with operational teams struggling to translate the available plans into actionable day-to-day operations.

In some instances, de-conflicting some transport networks that conflict in a revised Integrated Transport Plan, and therefore NOP, will facilitate clearer modal priorities and improve decision-making.



Figure 4-3 Takapuna town centre NOP strategic networks

In Auckland, it is common for the arterial network to conflict with place and modal priorities. This occurs in town centre locations where customers have conflicting needs, which also sometimes conflict with a need for liveable and healthy places. These issues create confusion within dense populaces such as town centres, e.g. Takapuna town centre has several busy intersections with high demand from each mode. In these locations, vehicle through traffic can create a barrier to active travel trips (and vice versa). Both issues reduce accessibility in an area where business and services depend on first and last leg journeys.

Average delays for pedestrians within town centres is approximately 40s per person during inter-peak periods, which is considered undesirable in this context, and adequate provision of facilities is typically lacking, resulting in poor customer experience. A lack of clear Level of Service priorities can make a public place unattractive, ill-purposed and unsafe for people walking and cycling. In addition, appropriate improvements are difficult to implement due to competing stakeholder views.

Overall satisfaction of travelling on Auckland's road network is low, particularly for drivers with only 35 per cent satisfied with their experience (see Section 2.2).

Customer insight surveys reveal that potential users of public transport have the most negative impressions of the Auckland network, ranging between 60 and 80 per cent depending on the type of user. Network reputation measures show that few users (35 per cent) believe that Auckland has transport choices that "allow me to get where I want, when I want". This has remained consistent over the last 18 months.

Some of the biggest issues identified regarding the public transport network included lack of customer focus, and public transport which does not suit the needs of Aucklanders. Personal safety is one of the specific concerns, which appears to be of worst concern on trains and when walking to/from stops and stations (refer to Figure 4-4).

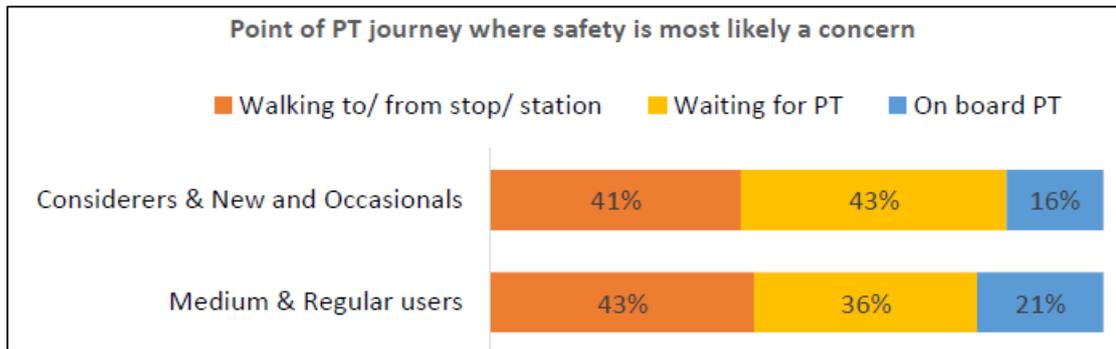


Figure 4-4 AT Market Perceptions Survey (2018) – Safety concerns during PT journeys

Based on the analysis of the strategic networks and customer insights, the current lack of prioritisation and optimisation methods are not resulting in the desired outcomes. Customers generally still find that using modes other than private vehicles is difficult and does not meet their needs. This appears to be due to a lack of understanding of customer needs and a complex combination of user priorities requiring prioritisation.

The link between Problem Two and road network optimisation can be seen in the example of the Whangaparaoa Dynamic Lane trial, which was much cheaper and easier to implement than its road space widening alternatives.

Appendix C provides further evidence of the link between Problem Two and optimisation.

4.2.3 Evidence of Problem Three



PROBLEM THREE (25%) – Reliability

Insufficient management of the growing number of planned and unplanned events is reducing the reliability of customer journeys.

Problem Three refers to the disruptions caused by planned events (concerts, construction) and unplanned events (accidents, breakdowns) being inadequately managed (e.g. by providing customers with travel information for detours or clearing the incident quickly). The inadequate management of these events causes customers to experience poor reliability or predictability of their journeys. The consequences of this problem are:

- Customers arriving late for appointments, school, and jobs: increasing overall stress during daily journeys and reducing liveability
- Customers needing to allow more time for their journeys to account for unpredictability on the network, which takes valuable time away from their responsibilities and leisure time
- Customers experiencing higher travel costs, leading to more people choosing to move out of Auckland to other locations with lower living costs
- Poorer air quality as vehicles idle for longer with increasing congestion

The first part of the cause of the problem (i.e. the growing number of events) can be seen in:

- The clear upward trend in the number of logged incidents, with a 9 per cent increase from 2016 to 2017 and a 2 per cent increase in the year to date³.

³ ATOC keeps an active register of incident records in their database, sourced from their ILS and Riskshield. ATOC changed their reporting system in 2018, meaning a trend cannot be calculated across that period.

- Corridor access requests have increased as represented in Figure 4-5 below, which is primarily attributed to the construction boom from Auckland’s rapid growth.

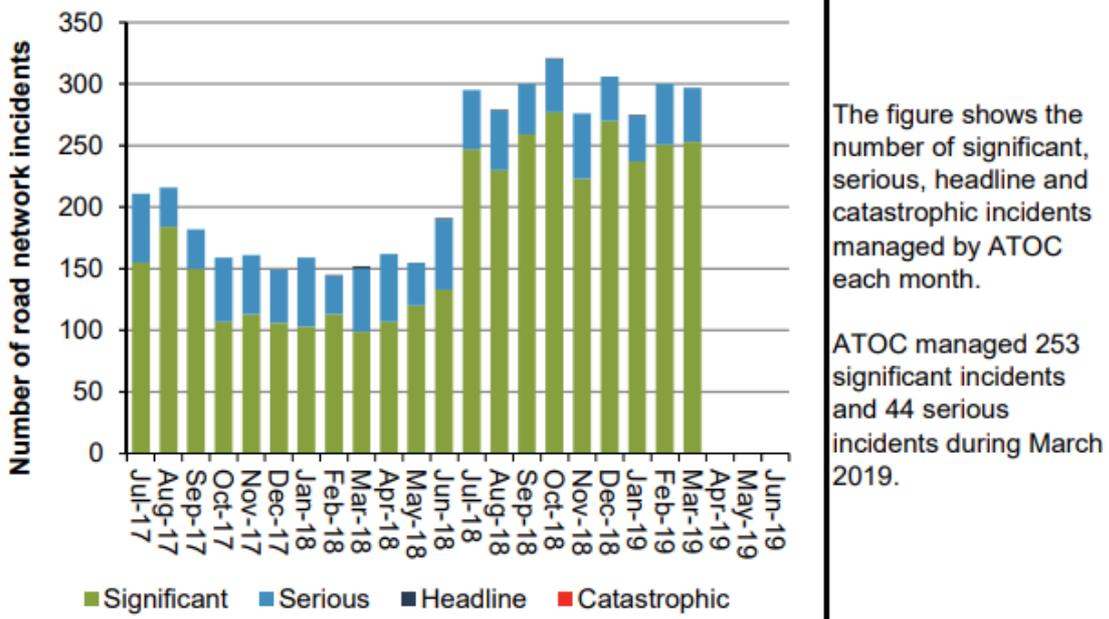


Figure 4-5 ATOC Managed Incidents¹³

The second part of the cause, insufficient management of those events, is clear when considering:

- ATOC only have camera coverage of parts of the motorway network and significant metropolitan centres, most arterials have little to no camera coverage – meaning it takes longer for ATOC to become aware of an incident and respond to it
- ATOC relies on Traffic Incident Management (TIM) units from the Auckland System Management (ASM) contract (formally the Auckland Motorway Alliance), which has a focus on the motorway network (i.e. there are no TIMs for the arterial network).
- ATOC has limited capacity to inform customers to seek alternative routes or modes of travel during an incident. There are some VMS displays on parts of the motorway network but little elsewhere.

The effect of Problem Three (i.e. poor reliability) can be seen in customer feedback and reliability studies.

In the Auckland Transport Business survey, 61 per cent of businesses agreed that congestion is a significant issue affecting business and three quarters of businesses agreed that transport challenges affect staff wellbeing.

In the 2019 Transport Agency study *Auckland Travel Demand Management*, respondents report that journey times are longer and more unpredictable: “It’s hard to plan, and stressful trying to get to work, childcare, education, client meetings on time”. Longer journeys (20 - 40 km) are particularly affected by small disruptions which can then cause extensive delays.

As stated in Section 2.1 and evidenced in Figure 4-5, crash rates and corridor access requests have been increasing year-on-year, with the number of incidences occurring each month approximately doubling in the last year.

The Austroads Congestion and Reliability Review (ACRR)⁴ states that 9 per cent of Auckland congestion⁵ is due to identified non-recurrent causes, primarily traffic incidents (see Figure 4-8) and that: "Auckland has low reliability, and road users need to budget 45 per cent additional travel time in order to arrive on time nine times out of 10 in the afternoon, a likely consequence of the geographical impediments and land use". (Figure 4-6)

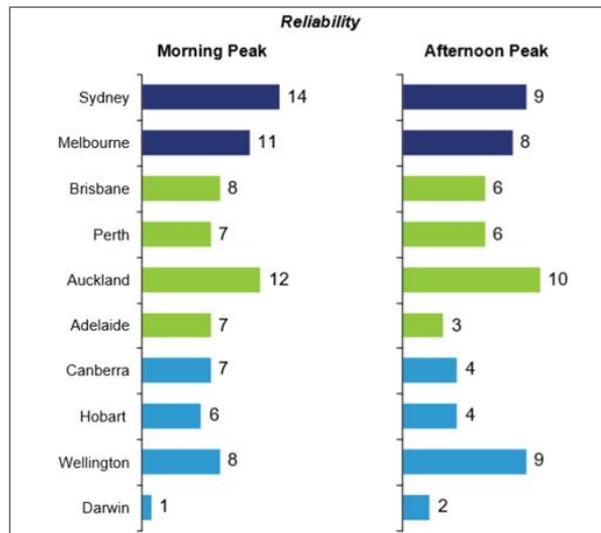


Figure 4-6 Reliability measures (Source: Austroads congestion and reliability review)

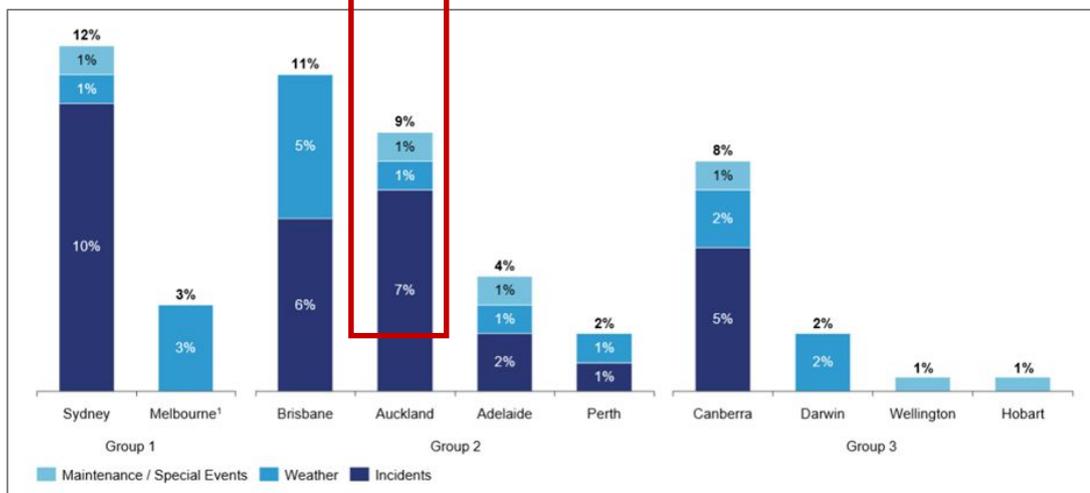


Figure 4-8 Non-recurrent causes of urban congestion (Source: Austroads congestion and reliability review)

Problems with reliability on Auckland's road network are evidenced by a comparison of travel times from Albany to the CBD at various times during the day, see Figure 4-9. The reliability of public transport travel times is much better than general traffic due to bus priority measures, which is one reason for high uptake of public transport use on the northern busway⁶. Travel times for general traffic travelling southbound varies by 30 minutes between interpeak and morning peak periods (i.e. from 17 minutes to 47 minutes), meaning drivers must allow an extra 170 per cent travel time to their journey to arrive on time.

⁴ Austroads, 2016, Congestion and Reliability Review: Summary, AP-R533-16

⁵ Road congestion based on Google data

⁶ Public transport use is 24% in north Auckland, but higher still for those who use the northern busway at 39%.



Figure 4-9 Median travel times by mode between Albany and the CBD (source: AT, March 2019)

The link between Problem Three and road network optimisation can be seen in the following examples:

- As stated in the NZ Transport Agency Research report “Overseas sources indicate that the early detection and management of incidents can reduce the duration of an incident by 40% to 60%” and “Various ITS applications, such as traffic signal pre-emption, vehicle location and dispatch systems or pre-trip information can improve the bus trip time reliability. There is a range of values quoted in the literature, from a 5% reliability improvement due to pre-trip information to up to 60% improvement due to traffic signal pre-emption.”⁷
- Bus lanes often provide more reliable journeys than general purpose lanes. For example, the northern busway is more reliable than motorway lanes (Figure 4-9). By optimising the network and supporting customers to make the change from single occupancy vehicles to buses customers will experience more reliable journeys.

Appendix C provides further evidence of the link between problem three and optimisation.

4.3 Benefits and KPIs

The potential benefits, or outcomes, of investing in these problems and opportunities were identified as part of a range of facilitated workshops held between November 2018 and March 2019.

Project stakeholders all agreed that a potential new optimisation programme could significantly enhance the experience for customers, if working in a complementary way to other programmes and through unlocking additional capacity for people movement in the network. Aucklanders could be enabled to choose from a range of reliable travel options, despite several years of expected construction on the network, and increasing demands. To achieve this, the optimisation teams from AT and the Transport Agency would need to be more in-tune with customer needs on a regular basis and be more agile in the planning and delivery of optimisation improvements.

Stakeholders and sponsors identified and agreed the following benefits for a potential new programme:

Benefit 1: Increased throughput of people, goods and services (50%)

Benefit Statement 1 reflects the ambitions of the GPS and ATAP on enhancing the network’s ability to move people well and improve access. As stated in ATAP: “...make better use of existing infrastructure and encouraging a modal shift to public transport, walking and cycling...”.

Benefit 2: Improved accessibility for active modes (20%)

Active modes provide a critical part of transport journeys, particularly for first and last trip legs, where safety,

⁷ Source: NZTA, 2016, Research report 584 Considering a cost benefit analysis framework for intelligent transport systems <https://www.nzta.govt.nz/assets/resources/research/reports/584/584-considering-a-cost-benefit-analysis-framework.pdf>

inclusive design and crime prevention are as important as adequate capacity. This benefit statement directly aligns with over-arching policy for improving access and safety. It will likely result in positive mode shift as well.

Benefit 3: Improved responsiveness to customer needs. (10%)

Overall, this benefit statement is considered the lowest weighted, however represents a critical function of both AT and the Transport Agency, and plays a significant role in responding to GPS priorities, such as “enables transport choice and access”. This benefit places customer needs at the centre of network management. Customer-centricity is also emphasized in policies of both AT and the Transport Agency, as described in Section 3.4. Improvements related to benefits 1, 2 and 4 interventions will also improve the customer experience.

Benefit 4: Improved journey time reliability (20%)

Journey time reliability underpins customer transport choice and experience. High-level government policy is not explicit about this factor, however the range of investment in transport throughout Auckland aims to improve reliability through enhanced capacity and choice. Road network optimisation should also contribute to reliability through active management. Auckland road network customers have reported⁸ that journey times are longer and more unpredictable.

The Investment Logic Map, which maps the relationship between the problems and benefits is attached as Appendix D.

Investment objectives and a range of potential key performance indicators (KPIs) were developed by stakeholders and agreed by project sponsors. These KPIs provide a measurable basis for monitoring how well a potential new programme achieves the above benefits over time. The table below summarises the investment objectives and examples of possible key performance indicators (KPIs).

Table 4-1 Investment Objectives and KPIs

Investment Objective	Baseline	Example KPIs
Improve throughput (people, goods and services) on key networks⁹	21,000 (TBC ¹⁰) on arterials 105,000 (TBC) on motorways	Average Network Lane Productivity of 25,000 persons/hour/lane or more during commuter peak hours
	TBC – project level	Increased throughput of freight during weekday interpeak on freight network
Improve accessibility of walking and cycling in locations with high ‘place’¹¹ function and near public transport interchanges.	Average crossing delay is 40s in town centres during interpeak period	Reduced crossing delay in areas with high ‘place’ function
	TBC – project level	Improved perceptions of safety
	TBC – project level	Improved CPTED rating
	TBC – project level	Improved Pedestrian Environment Review System (PERS) rating
Streamline performance measures, planning and delivery approaches to accelerate delivery of optimisation improvements to	Currently 3 years	Reduction of time from problem identification to implementation to no more than 2 years
	Do not capture enough information for active modes	Improved network performance measurement

⁸ In a 2019 study of Aucklanders’ travel choices, Auckland Travel Demand Management, Transport Agency

⁹ For description of key networks see glossary

¹⁰ TBC: To be confirmed in the next phase of the programme. Part of the Recommended Programme is to develop better KPI measuring and reporting (Benefits statement 3)

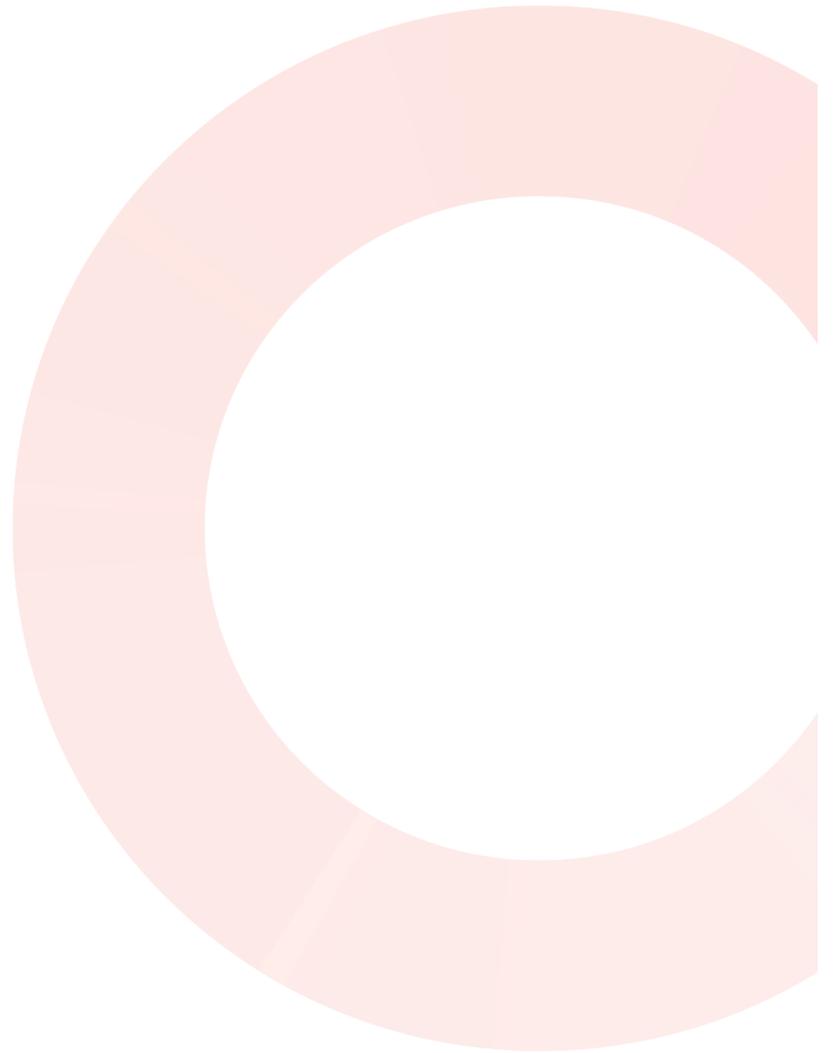
¹¹ For description of high place function see glossary

Investment Objective	Baseline	Example KPIs
customer and maximise value for money.		
Improve customer journey time reliability for people, goods and services.	TBC	Maintain reliability for general traffic during peak periods
	TBC	Maintain reliability for freight journeys during interpeak
	TBC	Improve bus travel times / Bus LOS on key routes
	TBC	Reduce response and clearance time for network disruptions

These KPIs only measure some outcomes and will need to be reviewed when new and improved methods for capturing customer experience are developed. The recommendation for a new road network optimisation programme for Auckland includes improved measurement of KPIs to capture what matters to customers – benefit statement 3.

KPIs for road network optimisation should include both network level results as well as project level results. Network lane productivity can be captured at network level but many of the active mode measures, such as CPTED rating, can only be measured at site specific locations. There will likely be a need to capture data to identify project sites for interventions and then more detailed site-specific data to capture the benefits of the interventions, which at network level will be difficult to capture and attribute directly to network optimisation.

Part B – Developing the Programme



5 Developing the Programme

The process of developing a recommended programme differed from most traditional transportation business cases in that:

- AT, the Transport Agency and ATOC already undertake road network optimisation - just at a small scale and somewhat siloed
- Road network optimisation involves use of many interventions, which could be considered alternatives and options. For example, some interventions will result in demand management, others will result in supply improvements through unlocking bottlenecks.

This process involved, in the early stages, identifying everything that road network optimisation could include. This is because an effective programme needs to draw on a variety of interventions to maximise the network.

Appendix E discusses the alternatives assessment. Appendix B discusses the programme development in more detail.

6 Do Minimum scenario

The Do Minimum scenario is the current optimisation work undertaken by AT, the Transport Agency, and ATOC, who typically operate separate optimisation programmes with limited joint projects.

The current optimisation budget is split between operations and capital works, with almost half of the \$33 million current spend on network optimisation undertaken by ATOC as part of active operational management of motorways and some key road networks, e.g. the CBD. Approximately \$12 million is spent by Auckland Transport with funding from various sources, including the Low Cost Low Risk (Minor Improvements) programme. Transport Agency optimisation projects are primarily Low Cost Low Risk projects and inputs to ATOC operations.

Table 6-1 Do Minimum (Current) scenario summary

Organisation	Current (Do Minimum) Work Undertaken
Auckland Transport	<p>Joint static Auckland Network Operating plan (NOP) developed by AT for operational activities was endorsed in 2016. NOP updates completed by exception and utilised across organisations, limited use at the Transport Agency and ATOC.</p> <p>A transit project every 2 years. Typically, bus shoulder running and on-ramp transit lanes and/or bus and transit lanes on some arterial corridors.</p> <p>Four minor intersection improvements every year (focussed on walking and cycling), one major project every 3 years.</p> <p>Five to six freight projects investigated every year with one delivered per year.</p> <p>Four general traffic projects each year, one large project e.g. dynamic lane or similar large project every few years.</p> <p>Complimentary TDM - Two campaigns per year for optimisation purposes.</p>
NZ Transport Agency	<p>Primarily Low Cost Low Risk projects e.g. general widening and shoulder work. Some individual trial projects / interventions implemented for example, bus shoulder running, ramp signal review, dynamic lanes.</p>
Auckland Traffic Operations Centre	<p>Active monitoring occurs where technology permits. Limited visibility on arterials, limited ability to influence real time public transport services. Special events (e.g. concerts and sporting events) are planned to a high standard, but the management and mitigation of other planned events is disjointed. High level of incident management (including verification, response and recovery) on motorways and key transport facilities but low level on arterials and for PT services. Limited real time information is available to customers.</p>

Organisation	Current (Do Minimum) Work Undertaken
	Routine Signal optimisation - Arterials and Metropolitan Centres reviewed once every 2 years, City centre annually, remainder every 3 years.
Combined / All	Limited network monitoring and measurement – particularly limited for active modes, which are primarily captured by limited cycle counts, AT customer satisfaction surveys, and signal crossing delays.
Approximate current annual spend \$33m¹²	
Approximate 10-year forecast \$330m	

It is important to consider that Auckland road network customers will experience increasing levels of congestion over the next 10 years, due to problems described in Part A (Section 2.1).

Current levels of investment in road network optimisation under the Do Minimum scenario will not be sufficient to mitigate increasing congestion and the knock-on negative effects on road network customers.

7 Programme Development Approach

7.1 Summary of Approach

The project team, with input from stakeholders, worked together through a process of workshops, meetings and interviews to develop a recommended programme. Stakeholders were actively involved in the initial ideas generation, the development of a typical programme structure (strategic responses and building blocks), programme alternatives and assessment, at each step of the process.

¹² Various funding sources. Includes CAPEX and some OPEX (e.g. for signal optimisation and pain point fix investigations), as well as ATOC operational costs. The values do not include other general operational aspects e.g. installation of new cameras is included but maintenance of existing cameras is not. Technology and systems (whether new or upgraded) are not specified.

This process flow diagram summarises the journey undertaken by participants:

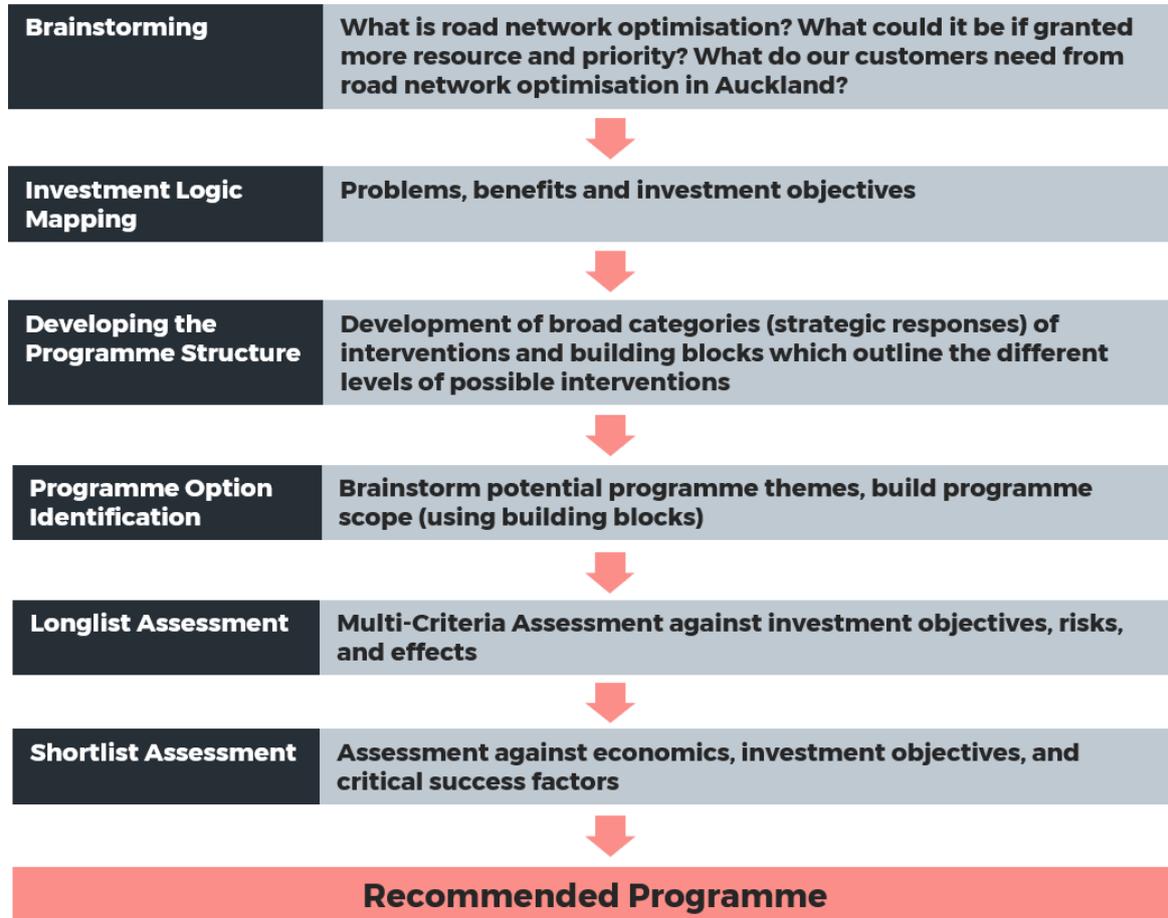


Figure 7-1 Process flow diagram

See Appendix B Programme Development for full details of the process.

7.2 Guiding Principles

The following principles of road network optimisation were agreed by participants in order to guide decision-making:

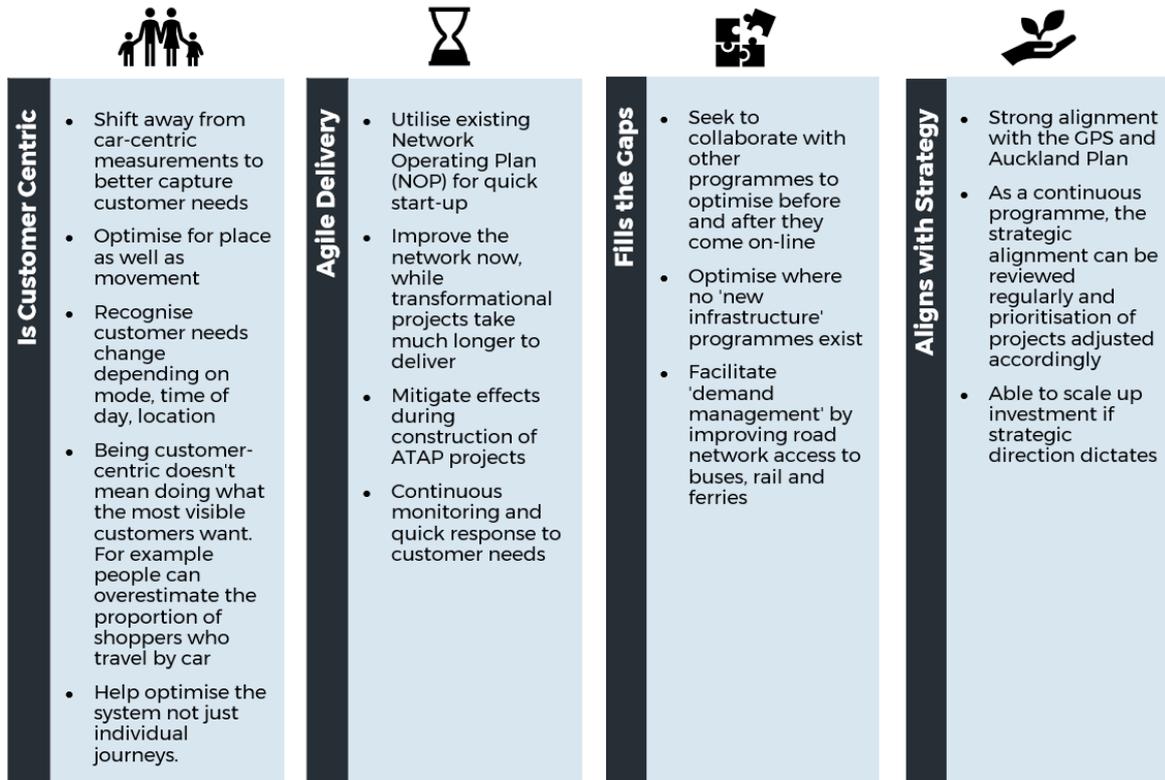


Figure 7-2: Guiding principles of road network optimisation

8 Longlist Development

During ideas workshops, participants developed a list of potential interventions to address the problems identified in Part A. These interventions covered the current scope of road network optimisation as well as what could be considered going forward (see Appendix B2).

The project team together with key stakeholders decided that any road network optimisation programme would likely require a variety of interventions to optimise the network, including consideration of interventions that would normally be considered alternatives (e.g. improving access to rail stations to reduce demand for the road network).



8.1 Strategic responses and building blocks

These ideas/interventions were grouped into **strategic responses** (a type of intervention, such as signal optimisation, or TDM) to:

- Improve the approach to funding (i.e. some strategic responses will have different funding mechanisms to others)
- Improve approach to delivery (i.e. enable delivery by different organisations, for example enhanced operations could be delivery by ATOC)
- Improve assessment (e.g. the economic assessment for each strategic responses could vary)

To assist AT and the Transport Agency with appraising costs and programme outcomes, the project team developed a set of **building blocks**

demonstrating varying levels of intervention, i.e. from low investment to very high level of investment (see Appendix B3).

Strategic responses and building blocks were built up by:

- Looking at the types of interventions that are currently implemented as optimisation projects in Auckland within the current budgets, and
- Asking how optimisation could be further expanded based on international best practice and local demonstrator projects (see Appendix C for examples).

8.2 Themes

Various **themes** (focus areas, e.g. operations focus or modal focus) were developed with stakeholders, including whether there should be a mode focus, an operational or physical improvement focus, or a balanced approach to road network optimisation in Auckland.

It was agreed that there could not be a geographical focus to network optimisation because the locations in need of optimisation can shift depending on changing land use, growth, construction activities and effects of other programmes so there is a need for the optimisation programme to be agile and involve continuous/periodic monitoring and prioritisation.

8.3 Longlist

By applying building blocks to each strategic response under each theme, a cost for each longlist programme could be developed and the scope of each programme understood.

Programme costs were developed via two approaches, top-down and bottom-up:

- The top-down approach examined the current levels of funding and total programme cost and considered the potential ways this funding could be scaled upwards to deal with the problems raised by the Strategic Case.
- The bottom-up approach examined the costs of each of the building blocks (Appendix B3, shown as low costs), based on current infrastructure cost rates and current funding for each strategic intervention (shown in the Do Minimum, Section 6). The bottom-up approach yielded a range of annual programme costs which were factored up for a total programme cost.

To ensure scope and cost estimates were realistic and feasible, the bottom-up costs were compared with the top-down review and verified with key stakeholders.

Programmes were allocated cost ranges, where the upper range included an estimate of contingency for the cost of the programmes.

The longlist of programmes is summarised in Table 8-1 and described further in Appendix B5. The indicative costs provided are in addition to the current costs (as outlined in Section 6). Further information about how programme costs were estimated is shown in Appendix G.

Table 8-1 Longlist of Programme Options

Programme		Purpose	Funding Split	Indicative 10-year Cost
Balanced Approach	Balanced Approach (Low) 	All three balanced approach programmes test if the current balanced approach to optimisation is right. They also test what level of further investment is required, e.g. Is a slight increase of investment sufficient or is step change required?	Balanced approach to all strategic responses.	\$150m- \$180m
			Most like Do Minimum but with slightly higher spend across all strategic responses to slightly increase benefits of current programme	
	Balanced Approach (Med) 		Evenly spread medium spend across all strategic responses.	\$300m- \$330m
			Like do min but with moderately higher spend across all strategic responses to more significantly increase benefits	
Balanced Approach (High) 	Evenly spread high spend across all strategic responses	\$460m- \$550m		
Future Focused Balanced Approach 	Test if a focus on prioritising digital and technology solutions would produce best outcomes	Similar to 'Balanced Approach Medium' but with more spend on technology, innovations and trials rather than infrastructure intervention	\$390m- \$450m	
Network Management Focus	Operational Improvements Only 	Test if outcomes can be achieved solely through operational enhancements	No additional spend on physical interventions - pain point fixes. High spend on operational, innovation, and complementary behaviour change	\$230m- \$280m
	Low Physical Intervention, High Operations Focus 	Test if outcomes are best achieved through operational enhancements while only undertaking high priority physical works	Similar to operational improvements only but with low additional spend on pain-point fixes	\$300m- \$390m
	Higher physical intervention, low operation focus 	Test if it is more important to undertake physical improvements than operational	High spending on physical interventions – pain point fixes, low spend on operational	\$350m- \$400m
Mode	Focus on Travel Choice 	Test if a programme that enables mode shift, by promoting alternative modes to private vehicles,	High spending on operations, active modes and public transport, low spending on general traffic and freight	\$330m- \$400m

Programme		Purpose	Funding Split	Indicative 10-year Cost
		would achieve the best outcomes		
Medium, exclude active modes		Test if focussing only on motor vehicles would achieve the best outcomes	Evenly spread medium-high investment across all strategic responses except no additional investment into active mode pain point fixes, only low investment in people movement pain points, and low investment in complementary behaviour change	\$250m-\$280m
Focus on vehicle travel		Test if focussing on general traffic throughput would achieve best outcomes	High operations and capacity pain-point fixes additional spend, low or no additional spend on all other strategic responses	\$290m-\$320m
Focus on Freight		Test if focusing on improving freight throughput would achieve best outcomes	High additional spend on operations and freight, low or no additional spend on all other strategic responses	\$200m-\$270m
Aspirational		Test outcomes of full commitment across all strategic responses for maximum benefits.	Gold standard for all strategic responses	\$700m-\$1BN

9 Longlist Assessment

9.1 Evaluation Criteria

This section outlines the multi-criteria assessment (MCA) undertaken to narrow down the longlist of programmes to a shortlist.

The following criteria were used within the MCA with a weighting of 50 per cent investment objectives, 25 per cent risks and 25 per cent effects as the baseline assessment:

Table 9-1 Multi Criteria Assessment - Criteria and Weighting

Criteria	Weight	
Investment Objectives	IO1 – Improve throughput (people, goods, and services) on key networks	12.5%
	IO2 – Improve accessibility of walking and cycling in locations with high ‘place’ function and near public transport interchanges	12.5%
	IO3 – Streamline planning and delivery approaches to accelerate delivery of optimisation improvements	12.5%
	IO4 – Improve customer journey time reliability for people, goods, and services.	12.5%
Risks	Affordability (includes consideration of value for money)	12.5%
	Deliverability / Feasibility	12.5%
Effects	Safety	8.3%
	Access	8.3%
	Environment	8.3%

The programmes that typically scored higher in the MCA (Table 9-2) were those that included higher levels of optimisation for active modes. This is because they achieved higher scores against Investment objective 2 “*Improve accessibility of walking and cycling in locations with high ‘place’ function and near public transport interchanges*” and higher scores against ‘safety’ and ‘access’ because they were more likely to unlock transport choice and improve safety of vulnerable road users.

Table 9-2 Multi Criteria Assessment Results and shortlisting process

Programme		MCA Score	MCA Ranking
Travel Choice		0.77	1
Balanced Approach (Medium)		0.72	2
Balanced Approach (High)		0.72	2
Aspirational		0.63	4

Programme		MCA Score	MCA Ranking
Future Focussed Balanced Approach		0.48	5
Low physical intervention, high operations		0.40	6
Medium Balanced, exclude active modes		0.40	6
Balanced Approach (Low)		0.32	8
Operational only		0.32	9
Higher physical intervention, low operations		0.25	10
Focus on Vehicle travel		0.25	10
Freight focussed		0.20	12

9.2 Sensitivity testing

Sensitivity testing is the final validation of the MCA results, achieved by changing the weightings of different criteria and observing any shifts that significantly affect results. This proves outcomes are not skewed by particular criteria.

Sensitivity testing of the MCA scores found the top three ranked programmes ('Balanced Approach Medium', 'Balanced Approach High, and 'Focus on Travel Choice') were not sensitive to changes in the MCA weightings (see Table 9-1 for base weightings). The following weightings were tested:

- Sensitivity 1: 50% Investment objective, 30% risk, 20% effects (risks preference over effects)
- Sensitivity 2: 60% investment objectives, 20% risks, 20% effects (high objectives weighting)
- Sensitivity 3: 40% Investment objectives, 40% risks, 20% effects (high risk weighting)
- Sensitivity 4: 50% Investment objective, 20% risks, 30% effects (effects preference over risks)

10 Shortlist

Based on the MCA, and understanding a number of key risks and effects, four programmes were shortlisted:

Table 10-1 Shortlisted programmes overview

Program			Reason for inclusion
Balanced Approach (Medium)		\$300m - \$330m	These were shortlisted as the three highest ranked programmes in the MCA. Both Balanced Approach programmes (Medium and High) were shortlisted, despite being similar, to test the scalability of optimisation and determine which had the best value for money.
Balanced Approach (High)		\$460m - \$550m	
Focus on Travel Choice		\$330m - \$400m	Focus on Travel Choice strongly aligns with the government objective of switching road users from private vehicles to more sustainable options. This is reflected by Focus on Travel Choice ranking the highest in the MCA.
Low physical intervention, high operations		\$300m - \$390m	This was included as it was both affordable (low risk) and provided a point of difference from the other shortlisted programmes; specifically, it enables a better understanding of how the operational side of optimisation (rather than physical interventions) performs economically.

The **Aspirational Programme**, though ranked 4th in the MCA, was not shortlisted because it was considered unaffordable, potentially difficult to implement due to its scale, and any programme could potentially be scaled up to aspirational at a later date if required.

10.1 Shortlist Evaluation

10.1.1 Summary

The four shortlisted programmes were evaluated for:

- **Value for money** (benefit-cost ratios BCR)
- **Non-monetised benefits**
- **Multi-criteria assessment** (MCA score from the longlist assessment)
- **Critical success factors** (by scoring them against the GPS and Auckland Plan).

Table 10-2 Shortlist Evaluation Results

Evaluation Criteria		Balanced Approach (Medium) 	Balanced Approach (High) 	Focus on Travel Choice 	Low Physical, high operations focus 
Value for money (BCR)		Medium (3-5)	Medium (3-5)	Medium (3-5)	Low (1-3)
Non-monetised benefits		Medium	High	High	Low
MCA score		0.72	0.72	0.77	0.4
Critical success factors	Alignment with GPS	Medium	Medium-High	High	Low
	Alignment with Auckland Plan	Medium	Medium-High	High	Low
Overall ranking		3rd	2nd	1st	4th

As summarised in Table 10-2 the 'Focus on Travel Choice' programme ranked the highest because through mode shift it offers:

10.1.2 Value for Money

Focus on Travel Choice has the highest value for money with a medium BCR of 4.3. The Balanced Approach programmes also score well with medium BCRs.

The value for money assessment of each of the shortlisted programmes was completed using procedures in the NZTA Economic Evaluation Manual (EEM)¹³. An aggregate network level economic assessment was undertaken with sufficient detail to assess the viability and ranking of the programmes¹⁴.

The benefits quantified in this analysis are those recommended by the EEM, and are further explained in Appendix G. The benefits have been based on people kilometres travelled for all modes (single occupancy vehicles, high occupancy vehicles, public transport, freight, walking and cycling). In summary, the quantified benefits are:

- Travel time benefits (all modes)
- Vehicle operating costs and benefits
- Emission (CO₂) benefits
- Health benefits (from increased Walking and Cycling)
- Reliability benefits

Various additional benefits were considered but not quantified (see section 10.1.3) because of the levels of uncertainty involved or because they are not easily monetised.

All assumptions of the do minimum and future scenarios can also be found in Appendix G.

¹³ EEM amendment 2, effective 1 July 2018

¹⁴ It is acknowledged that there is some uncertainty around the specific impact of the programmes because of the uncertainty at programme level (e.g. locations of interventions are not known), which would need to be addressed at project level

The results of the economic appraisal, including the benefit-cost ratio (BCR) of the shortlisted programmes is summarised in Table 10-3 below and further detailed in Appendix G¹⁵.

Table 10-3 Economic Results (all benefits and costs are in net present value)

	Balanced approach medium	Balanced approach high	Focus on Travel Choice	Low physical, high operations
Total Benefits	\$1,056m	\$1,450m	\$1,204m	\$745m
Total Costs	\$255m	\$394m	\$282m	\$260m
BCR	Medium (4.1)	Medium (3.7)	Medium (4.3)	Low (2.9)
Ranking	2nd	3rd	1st	4th

The Value for money (economic) analysis found:

- All shortlisted programmes are economically viable (i.e. all score above 1.0)
- There is very little difference between the scores for the top three ranked programmes, which all have 'Medium' level BCRs
- The Focus on Travel Choice programme and Balanced Approach High programme are likely to have the highest non-monetised benefits because of their levels of investment in active modes.

10.1.3 Non-monetised benefits

It is expected that Focus on Travel Choice would have significantly higher non-monetised benefits than the Do Minimum scenario, and somewhat higher benefits than other programmes, as it allows for more investment in active modes around areas of high place function. There may be similar benefits in the Balanced Approach High programme.

Non-monetised benefits have not been included in the economics because of levels of uncertainty or because they are not easily monetised. These non-monetised benefits have significant potential. For example, the Value of Urban Realm (VURT) methodology developed for Transport for London has shown there are significant economic benefits associated with increased foot traffic in town centres. These business benefits have the potential to exceed the standard transport benefits calculated using the EEM.

Some non-monetised benefits could be monetised with further investigation, as shown in Table 13-5.

Table 10-4 Non-monetised benefits that are expected from road network optimisation but have not been included in the analysis.

Non-monetised benefits	Potential to monetise / quantify
Business benefits (retail sales growth)	These can be quantified using the VURT method developed for Transport for London but has been excluded from this analysis because of the level of uncertainty. These benefits could be significant and for some optimisation projects they may even outweigh the standard transport benefits calculated from the EEM.
Safety benefits	These can be quantified using the EEM but have been excluded at this stage because they cannot be easily quantified at network level. They should be included at project level where site specific details will enable the safety benefits to be quantified. It is

¹⁵ Appendix G includes information about the methodology used for the economic assessment and how programme cost estimates were built up.

	expected that active mode optimisation investments will result in safety benefits for vulnerable road users.
Liveability benefits	These are not easily quantified except indirectly and partially through calculation of travel time and reliability benefits. Optimisation will result in more travel choice across modes, resilience improvements (e.g. from better incident response), and travel time reduction resulting in more places accessible (within commutable distances) for customers.
Amenity benefits.	Active mode improvements particularly in areas of high place function is expected to positively affect amenity and therefore how customers feel when using the road network. These can be quantified using the VURT method developed for Transport for London.
Crime prevention (CPTED)	Active mode improvements are expected to improve both the road safety but also perceived safety and crime prevention through environmental design for example by installing a safe crossing facility of the road where the alternative is to walk a longer distance along a poorly lit area of the road network. These can be quantified using the VURT method developed for Transport for London.
Demand management	Road network optimisation is expected to improve accessibility to rail interchanges and therefore reduce demand for the road network. For example, by improving crossing facilities near rail interchanges and thereby increase the catchment within walking distance of the interchange resulting in uptake of rail use and reduced use of the road network. This can be evaluated using EEM guidelines.
Cost savings	Road network optimisation can defer the need to undertake other programmes (e.g. by reducing congestion such that a transformational project can be delayed).
Other customer experience benefits	There are benefits within the EEM, such as driver frustration, that have not been evaluated at this stage because they would form a small component of the benefits. Including these smaller benefits should be considered at project level. Similarly, there are also benefits that can be evaluated using the NZ Treasury CBAX tool that have not been included because they are indirect benefits and difficult to quantify at this stage.

10.1.4 MCA score

The MCA score was taken directly from the longlist assessment, without further refinement.

Focus on Travel Choice has the highest MCA score from the longlist assessment, as shown in Section 0.

10.1.5 Critical Success Factors

Shortlisted programmes were evaluated against outcomes sought in the GPS and Auckland Plan because it was recognised by the project team and key stakeholders that road network optimisation would be an important contributor towards the GPS and Auckland Plan outcomes.

Focus Travel Choice has the highest alignment with outcomes sought in the GPS and Auckland Plan, primarily by enabling mode shift away from single occupancy vehicles.

Table 10-5 Critical success factor evaluation

	Government Policy Statement 2018	Auckland Plan 2050
Travel Choice	Contributes positively to: <ul style="list-style-type: none"> • 'Access' outcomes through: <ul style="list-style-type: none"> ○ transport choice, with improved choice across modes, ○ resilience with better response to incidents, and 	Contributes positively to: <ul style="list-style-type: none"> • Transport and Access' outcomes primarily through providing transport choice and improved connectivity, but also by providing some safety and environmental outcomes.

	Government Policy Statement 2018	Auckland Plan 2050
	<ul style="list-style-type: none"> ○ connectivity with reducing travel times between people and places • ‘Environmental’ outcomes (i.e. reduced emissions) through mode shift to active modes, and • ‘Safety’ outcomes by investing more in vulnerable road users (active modes). <p>Rated High positive contribution</p>	<ul style="list-style-type: none"> • ‘Homes and Places’ outcomes by improving accessibility in areas of high ‘place’ function and • ‘Belonging and Participation’ outcomes through improved health by increasing active mode share <p>Rated High positive contribution</p>
Balanced Approach High	<p>Balanced approach high contributes positively toward the GPS outcomes, however due to its high investment in general traffic it is unlikely to result in the mode shift to the same degree as the Focus on Travel Choice programme.</p> <p>Rated Medium-High positive contribution</p>	<p>Contributes positively toward the Auckland Plan outcomes; however, will not enjoy as much success for the ‘Belonging and Participation’ outcome as the Focus on Travel Choice programme because of its high investment in general traffic, which is unlikely to result in the mode shift to active modes and therefore health outcomes. For a similar reason, it is unlikely to have as positive environmental outcomes.</p> <p>Rated Medium-High positive contribution</p>
Balanced approach Medium	<p>Similar to Balanced approach high but with lower investment and therefore lower contribution to GPS outcomes</p> <p>Rated Medium positive contribution</p>	<p>Similar to Balanced approach high but with lower investment and therefore lower contribution to Auckland Plan outcomes</p> <p>Rated Medium positive contribution</p>
Low physical high operations focus	<p>Due to the high focus on operations and limited changes to the physical environment, it is unlikely to significant change travel patterns and will therefore not contribute as significantly to GPS outcomes as the other programmes</p> <p>Rated Low positive contribution</p>	<p>Limited capacity to reach the desired outcomes for the placing making and health plans. Some of ‘Transport and Access’ outcomes can be achieved.</p> <p>Rated Low positive contribution</p>

11 Recommended programme

The recommended **Focus on Travel Choice** programme would create a better travel experience for many Aucklanders by reducing congestion, enhancing travel choices and improving service levels. At the same time, it would maintain speed and reliability for freight customers. This programme would achieve this through a mode shift from single occupancy vehicle use to active mode and high occupancy travel. It proposes the biggest mode shift of all programmes assessed, and as such offers the strongest support for outcomes sought through the GPS and Auckland Plan, such as improved environmental sustainability and health outcomes.



11.1 Benefits

The key differentiator of the recommended Focus on Travel Choice programme is a significant mode shift to active mode and high occupancy travel. This aims to provide more travel choice for the large number of Aucklanders who rely on transport for commuting or regular errands. It also improves the levels of service for customers who rely on use of their vehicles for business, through improving reliability on the modal networks and, in the longer term, reducing congestion associated with excessive reliance on single occupancy vehicle travel for general commuting.

As shown in Section 13, Focus on Travel Choice is a clear winner: it offers the highest value for money, expected non-monetised benefits, the highest MCA score, and the highest alignment with government transport strategies.

Specific benefits of Focus on Travel Choice aligning with investment objectives include:

Increased throughput of people, goods, and services, for example by reducing single occupancy vehicle use through:

- a reduction of single occupancy vehicles by 3 per cent and consequent uptake of higher occupancy modes and active travel where optimisation occurs
- an average speed increase across all modes of 0.4 per cent.

Improved accessibility for active modes through:

- reduced delays equating to faster average travel times - estimated average 4 per cent improvement of average travel speed where optimisation occurs
- reduced distances to travel through provision of more direct, safer crossings.

Improved responsiveness to customer needs through:

- a continuous programme shortening delivery time from 2-3 years to 1-2 years for more significant interventions
- improved KPI measurements and reporting ensuring measures that matter to customers are delivered on.

Improved customer journey time reliability for people, goods, and services through:

- \$500,000 reliability benefit from:
 - improved response times to incidences through better visibility of the network and response vehicles (TIMs), and
 - more travel choice, which is reflected in 3 per cent reduction of single occupancy vehicles where optimisation occurs.

Focus on Travel Choice has the potential to truly respond to customer needs. This would involve actively monitoring changing customer needs and levels of service across the whole road network, and all modes, enabling quick delivery of improvements as well as response to incidences.

Specific outcomes for each modal customer are summarised in Figure 11-1.

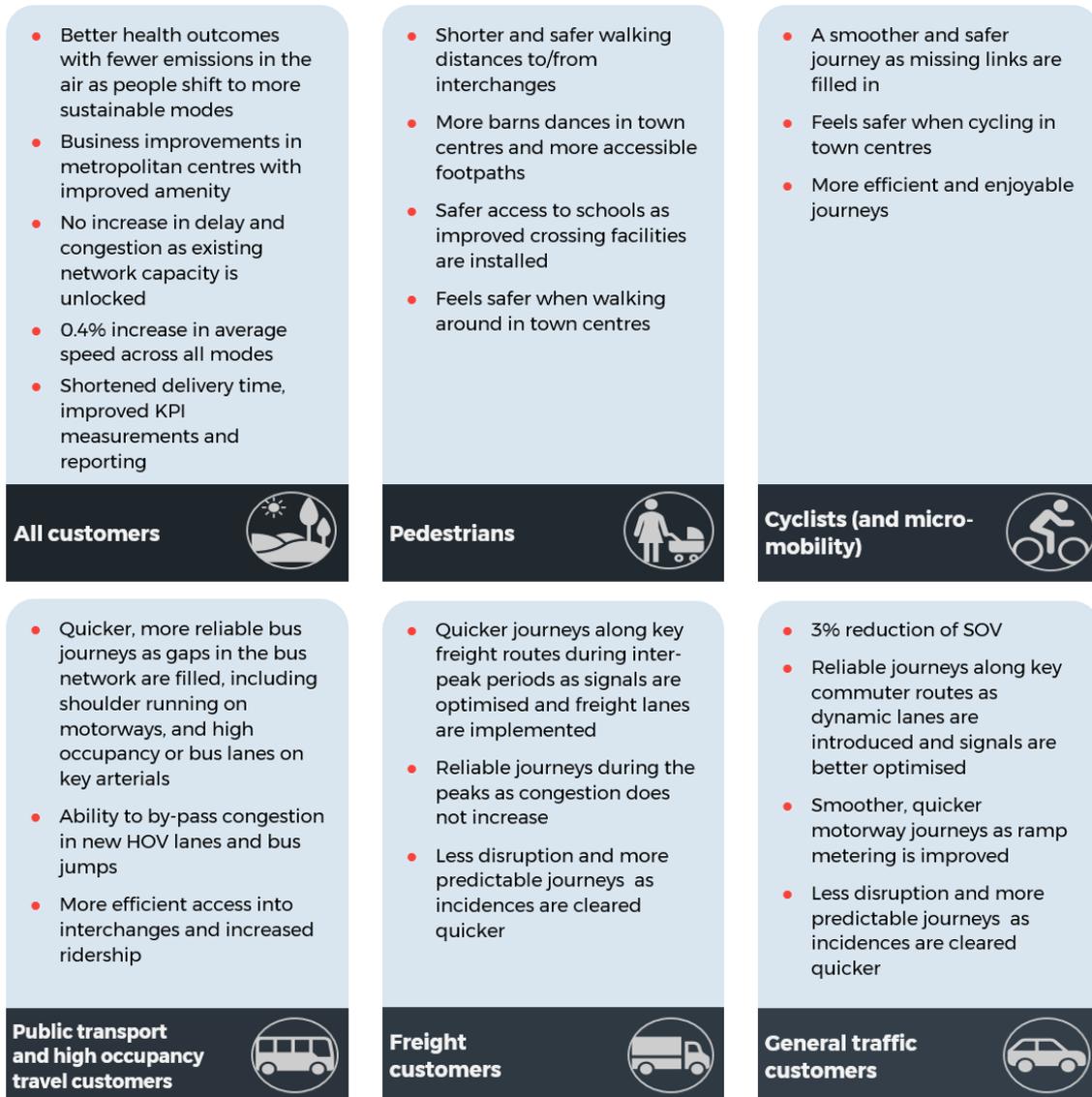


Figure 11-1: Specific outcomes of the recommended Focus on Travel Choice Programme for each modal customer.

11.2 Scope

This section provides guidance for how road network optimisation funding for the Focus on Travel Choice programme could be invested. The specific interventions and geographic locations of investment will need to be determined through identification and prioritisation activities as part of 'network reporting and operation planning' strategic response (see Table 11-1.). The application of the programme is planned in more detail in Part C: Management Case.

The recommended programme increases investment in optimisation improvements for all modes compared with current levels including for general traffic and freight, but most significantly for active modes and high occupancy vehicles, as shown in Figure 11-2 and detailed in Table 11-1.

Figure 11-2: Programme 9: Focus on Travel Choice summary

PROGRAMME 9: Focus on Travel Choice

Investment directed to provide more travel choices and change travel behaviour to higher occupancy modes, while maintaining levels of service for freight and general traffic



Assessment - Does the programme achieve investment objectives? (Yes/Partial/No)

YES	YES	YES	PARTIAL
IO 1: Throughput	IO 2: Active modes	IO 3: Delivery & Value	IO 4: Travel Reliability

Additional Investment

\$330M-
\$400M

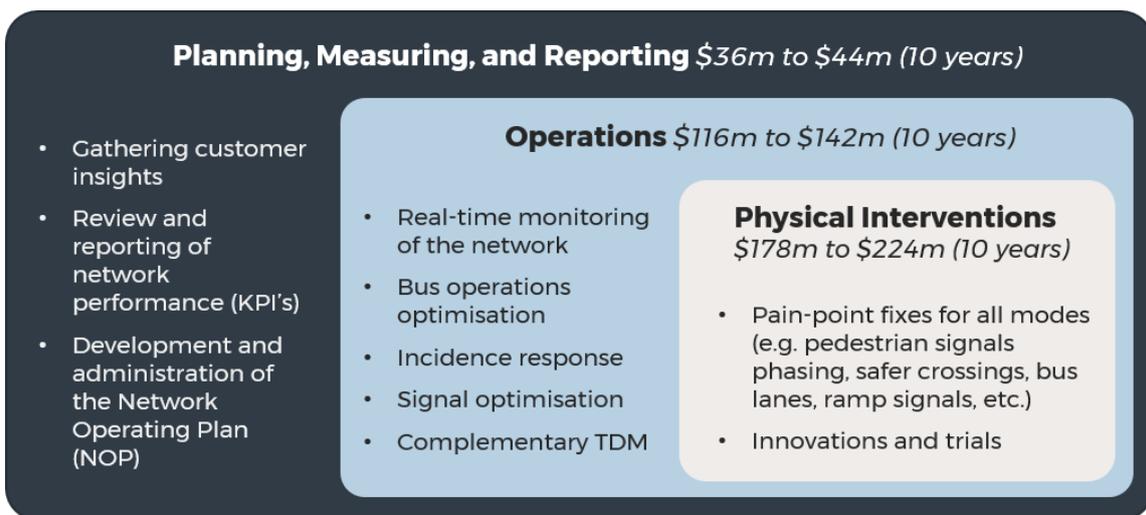
Summary Themes of Programme

- Network Operating Plan refreshed and improved, with real-time reporting, streamlined delivery methods.
- Feedback from customers regularly incorporated
- Some increase in capacity to monitor and manage key networks, with increased incident response capacity
- Improvements in LOS at top pain-points for higher occupancy/active modes across the city.
- Step change increase in people moving capacity across all corridors.
- Improved management of freight network, maintained good LOS
- Some additional general traffic pain point improvement, but congestion eased by mode shift

Table 11-1 Recommended Programme Scope

Strategic Response	Detail	Cost	Relative to Existing
Network reporting and operation planning	High intervention level. Real time performance reporting with automated data collection, analysis and reporting system. Joint governance and maintenance of ANOP. ANOP embedded in operational decision making. Joint Low Cost Low Risk Optimisation programme based on NOP. ConOps for entire strategic network.	\$36M - \$44M	
Active Operations Management of Network	Medium intervention level. Further addition of key network coverage and management capability (detection and VMS). Real-time monitoring tool for key networks (motorways, arterials). Improved joint activity planning. Additional incident response staff and equipment, Mandatory traveller information for new projects.	\$56M - \$68M	
Routine Signal Optimisation	High intervention level. Arterials and Metropolitan Centres reviewed annually, City centre annually. Targeted reviews based on real time network performance. Rolling programme targeting worst performers. Continuous ramp signal optimisation programme. All traffic signals reviewed annually	\$30M - \$37M	
High occupancy pain point fixes	High intervention level. People moving enhancements on all commuter routes (where missing) and on motorways. For example, bus lanes, transit (high occupancy) lanes, signal priority for buses,	\$58M - \$71M	

Strategic Response	Detail	Cost	Relative to Existing
Active modes pain point fixes	High intervention level. Delivery of currently identified low-cost/low-risk opportunities, for active modes at intersections. Signal changes and minor safety improvements, around centres and schools. Enable more connectivity and convenience along key cycle routes.	\$57M - \$69M	
Freight route pain point fixes	Low intervention level. Address the worst problem areas on the freight network, with additional 50% investment. It is expected that improved operations and signal optimisation will also benefit freight drivers.	\$24M - \$29M	
Capacity pain point fixes	Low intervention level. Address a few of the worst general traffic problem areas through lane treatments and signals, e.g. Dynamic lanes. 50% additional investment.	\$24M - \$29M	
Innovations, trials & demonstrations	Low intervention level. Create optimisation trials methodology and joint programme. Including ITS technology. Investment based on approx. 5% of CAPEX spend.	\$15M - \$18M	
Complementary Behaviour change	High intervention level. A TDM programme dedicated to supporting mode shift on major people moving routes and around PT hubs.	\$30M - \$37M	
Total 10-year Cost		\$330M to \$400M	



Further details about the recommended programme, and all other programmes, are included in Appendix B5.

11.3 Investment Assessment

11.3.1 Value for Money

The economic assessment¹⁶ has established that the Recommended Programme will provide value for money for the investor because the cost to implement the programme is significantly less than the benefits Auckland road network customers will realise through travel time reductions, vehicle operating cost savings, health benefits, and reduction in CO₂ emissions.

The BCR for the recommended Focus on Travel Choice programme is Medium.

Furthermore, the programme has potential for significant non-monetised benefits and potential to save costs elsewhere by deferring the need to undertake other programmes (e.g. by reducing congestion such that a transformational project can be delayed).

The summary of indicative costs and benefits (the Net Present Value) of the programme are presented in Table 11-2.

Table 11-2 Recommended Programme Economic Summary

BCR	4.3 (Medium)
Total Benefits	\$1,204m (net present value)
Total Costs	\$282m (net present value) ¹⁷

As discussed in Section 10.1.3 of this report, there are non-monetised benefits that have not been included. It is expected that the Recommended Programme, *Focus on Travel Choice*, would have:

- Business benefits (retail sales growth) by improving accessibility and reducing walking delays in areas of high place function, thereby increasing foot-traffic. For some optimisation projects, business benefits will be significantly greater than the traditional EEM benefits¹⁸.
- Safety benefits. It is expected that active mode optimisation investments will result in safety benefits for vulnerable road users.
- Liveability benefits. Optimisation will result in more travel choice across modes, resilience improvements, and travel time reduction resulting in more places accessible for customers.
- Amenity benefits. Active mode improvements particularly in areas of high place function is expected to positively affect how customers feel when using the network.
- Crime prevention (CPTED). Active mode improvements are expected to improve crime prevention for example by installing a safe crossing facility of the road where the alternative is to walk a longer distance along a poorly lit area of the road network.
- Demand management. Road network optimisation is expected to improve accessibility to rail interchanges and therefore reduce demand for the road network.
- Cost savings. By deferring the need to undertake other programmes.
- Other customer experience benefits (e.g. reduced driver frustration).

The economic viability of the recommended programme was tested through sensitivity tests. The sensitivity tests determined that the recommended programme has a robust BCR with all but one of the sensitivity tests sitting within the medium BCR range of 3.0 to 5.0. The summary is shown in Table 14-3 below.

¹⁶ The economics analysis of the Recommended programme is consistent with the information presented in Section 10.1.2

¹⁷ The economic cost is a net present value and therefore is less than the cost quoted in other parts of the business case (e.g. Table 11-1).

¹⁸ As calculated in accordance with the VURT methodology developed for Transport for London

Table 11-3 Sensitivity of Recommended Programme Economics

Sensitivity Test	Lower Limit	Upper Limit
Discount Factor (4%/8%)	4.1	4.4
Benefits (+/-20%)	3.4	5.1
Costs (+/-20%)	3.6	5.3
Base vehicle speeds (+/-5km/hr)	3.0	6.1
Demands (+/- 20%)	2.6	6.8
Analysis period 15 years	-	6.2

Furthermore, the shortlist economic assessment (Section 10.1.2) showed the road network optimisation programme could be scalable as both the Balanced Approach High and Balanced Approach Medium had Medium level BCRs despite the cost difference. It is likely that *Focus on Travel Choice* would be similarly scalable.

11.3.2 Predicted results alignment

The results alignment is an assessment of investment proposals against the outcomes sought from the GPS. The outcomes of the Recommended Programme are primarily:

- **Access:** through transport choice (improved choice across modes), resilience (e.g. better response to incidences), and connectivity (reducing travel times between people and places)
- **Value for money:** Optimisation will reduce or delay the need to implement new infrastructure. It also has a medium BCR but potential for significant non-monetised benefits (see Section 11.3)

Safety and environment will also be positively affected by investing in improvements for vulnerable road users and reducing emissions.

The Results Alignment for the recommended Focus on Travel Choice programme is estimated to be High, as it addresses a significant gap in Auckland's accessibility through providing better mode choice, easing congestion and improving journey reliability, and improves access to social and economic opportunity.

This programme generally sits within several activity categories including:

- Low cost low risk and
- Investment management – transport planning

As stated in the NZ Transport Agency's planning and investment knowledge base "*The generic rating for results alignment for low cost, low risk programmes is High.*"

Specific to the Investment management activity class, Auckland road network optimisation has a high results alignment because it "*considers approaches to addressing a significant actual or predicted gap in access to economic and social opportunities in major metros and makes improvements to multi-modal whole-of-network, long-term local, regional and national planning.*"

11.3.3 Assessment profile

According to the NZ Transport Agency's Investment Assessment Framework (IAF) for the 2018-2021 NLTF programme¹⁹ the investment assessment considers two factors:

- Results alignment (Section 11.3.2)
- Cost Benefit Appraisal (Section 11.3.1)

¹⁹ <https://www.nzta.govt.nz/assets/planning-and-investment/nltp/IAF-for-GPS-2018.pdf>

The two assessment factors are brought together to form an assessment profile that determines the proposal's priority within the National Land Transport Fund (NLTF) assessed by the Transport Agency.

This programme generally sits within several activity categories and seeks to plan land transport investment over a wide area. As such, it is more likely to fit into the "Investment Management" category which only requires a results alignment assessment. The activities within this programme would have to go through a process of prioritisation and funding approval, requiring a BCR at an activity-level (i.e. projects).

The programme is assessed as having a medium economic efficiency, based on an expected BCR of 4.3 within a range of 3 to 5.

Substantial additional benefits (e.g. safety and amenity) and potentially dis-benefits (e.g. parking loss) are expected to arise from this programme as discussed in Section 10.1.3 which have not been included within the reported BCR.

In summary, the programme provides a **High Results alignment** with **Medium BCR** which equates to a **Priority order of 4**.

11.4 Risks and opportunities of the Recommended Programme

11.4.1 Implementation Process

The expected risks associated with delivering the programme are summarised in Table 11-4. These risks will need to be addressed through the Management Case (Part C) and next phases.

Table 11-4 Risks and opportunities associated with implementing programme outcome

Risk Description	Rating	Risk Mitigation
Funding availability	Risk - High	Continued engagement with investment planning teams. Consideration of splitting programme to progress quick wins
Working with groups like Panuku – conflicting interests	Risk - Low	Consider consultation
Interface with other business cases: <ul style="list-style-type: none"> Duplicating work Conflicting priorities 	Risk - Moderate	Have considered in the broad consideration with this programme. Continue to consult.
Technological advances <ul style="list-style-type: none"> New data analytics or network management software New data collection hardware ITS 	Opportunity and Risk	Monitor and research
Opportunity to integrate with and support other delivery programmes with constrained funding	Opportunity - High	Continued consultation with wider organisation
Learnings from Safer Networks Programme delivery models improves BC delivery efficiency	Opportunity - High	Continue to consult with Safer Networks team
Development of a streamlined approach and 'standard interventions' for Auckland could be used as a test case and rolled out to other cities within New Zealand.	Opportunity - High	Set up Auckland business case with aim of rolling out to other cities.

11.4.2 Achieving Intended Outcomes

The expected risks associated with achieving the intended programme outcomes are summarised in Table 11-5. These will need to be addressed through a strong monitoring and evaluation strategy and regular review of the programme.

Table 11-5 Risks associated with achieving programme outcome

Risk Description	Rating	Risk Mitigation
Programme may or may not be able to completely achieve objectives due to: <ul style="list-style-type: none"> • Population growth • Timings of other infrastructure delivery • Lack of integration across organizations • Unclear prioritisation, geographically • General delivery constraints 	Risk - high	To be investigated in next phase. Programme to be agile to respond to changing factors. Imperative to provide an actual programme of work through analysis in the NOP (next phase).
Specific investment by mode inadequate to maintain network availability (e.g. freight)	Risk - Low	To be dealt with in the next phase – all modes receive increased investment
Technological advances: Automated vehicles	Opportunity and Risk - Low	Monitor and research
Changing political priority	Risk - high	Programme is continuous and requires annual review. There are tools, systems and process within the programme that can be updated with any changes in priorities

12 Programme Development Summary

The recommended programme, Focus on Travel Choice, was developed with key stakeholders through a robust assessment process including MCA, economics, and assessment against the Auckland Plan and GPS outcomes.

The recommended programme should be implemented utilising the guiding principles of road network optimisation that have surfaced during development of the recommended programme, as summarised in *Figure 7-2* [Guiding principles of road network optimisation]²⁰.

Part C, which follows, describes how the recommended programme will be managed, funded, and delivered.

²⁰ These principles build on those identified at the start of programme development

Part C Delivering and Monitoring the Programme

13 Management case

The Auckland Network Optimisation Programme Business Case looks to ensure we are making better use of Auckland's existing transport network and maximising opportunities to influence travel demand (GPS 66). Evidence suggest that we can expect delays and the unreliability of journey times to increase, as demand increases, and capacity is reduced due to large scale construction projects. AT and the Transport Agency have a network that can be better optimised, but only in the last few years has emphasis been placed and investment allocated in making better use of the existing network and balancing the modal priorities. The recommended approach increases the scale and pace of optimisation projects in Auckland, to meet increasing demands on the network and to meet the priorities in the Auckland Transport Alignment Project (outlined in the GPS 2018).

Larger transformational projects are expected through the Auckland Transport Alignment Project (ATAP) to help accommodate growth, but these will take decades to plan, fund and deliver. In the meantime, congestion and excess car dependency will continue to impact on Auckland's social, economic and environmental wellbeing. Auckland road network customers are not happy to wait years for change. Optimising for improved people and goods movement ensures we make the best use of the limited space we have in the short term. This means challenging the way we have historically thought about and used the available road space.

To do this we need to take a whole of network approach with agreed priorities by mode, time and place in order to enable people to make smarter travel choice and a systematic 'one network' approach. As such, Auckland Network Optimisation remains a joint programme between Auckland Transport (AT) and Waka Kotahi NZ Transport Agency (NZTA). AT and the Transport Agency need to be responsive to change, and agile in how they work. We need to increase the level of investment and remove barriers to create an environment (including tools, processes and systems), to support NZTA and AT to deliver this change for our customers.

As optimisation is clearly aligned with the strategic goals for Auckland, the PBC determined it is appropriate to continue to the next business case phase. The PBC was not an exercise to develop the solution, as this work will be undertaken in the next phase guided by the successful optimisation model already applied in Auckland Transport.

This management case outlines the next steps for Auckland network optimisation to further develop a continuous agile funding model, with a joint 'one network approach' for supporting systems, processes and tools for optimisation initiatives in Auckland.

To further develop and understand the programme we are requesting immediate funding approval for **\$2 094 533** to complete a SSBC for Auckland Network Optimisation, to understand and define the specific programme for optimisation investment over the next ten years.

As per the findings of the PBC, at the end of SSBC we will have: -

- A revised and updated one network Auckland Network Operating Plan (Volume 1*) that will be developed and endorsed by AT, NZTA, ATOC and ASM. This will give us an agreed position in terms of mode priorities depending on the time of day and location (or network function) from which we can then identify level of service gaps, test interventions and then develop the most appropriate response or optimisation programme. This document will include: -
 - Maps of strategic networks (these will be updated to reflect changes from the agreed strategic documents)
 - LOS descriptors and LOS measures
 - Clearly documented principals which outline how AT and the Transport Agency make trade off decisions when modes are in conflict, based on movement and place, and time of day.
 - A documented process of how to use and apply the ANOP
 - Clearly defined terminology for the framework and plan
 - A shared viewer where AT and the Transport Agency can all view the strategic networks geospatially.
- An agreed Auckland Network Operating Plan (Volume 2) which would move us from a static system, available to Auckland transport, to a one network online tool, which is regularly updated. In the initial phase this tool would: -
 - Incorporate learnings from the process and viewers currently utilised by Auckland Transport.

- Incorporate existing data sets into one place
- Confirm LOS gaps across the network by mode, by comparing current performance against targeted LOS e.g. using the LOS measures and LOS agreed in Volume 1
- Identify highest priority problems.
- Allow us to test a suite of interventions and the impacts on the network in order to generate a proposed programme of optimisation projects (using a similar approach to megamaps for safety).
- Replace the current manual process used in Auckland Transport, increasing the efficiency and robustness of this process and reducing the administrative burden on staff, given them increased time to focus on developing and implementing more of the optimisation programme.

The optimisation programme will be reviewed on an annual basis and will include a suite of 'toolkit' optimisation interventions that can be adapted as necessary to reflect network changes.

The optimisation programme will be supported by:

- An approval pathway to fast track activity.
- The development of a continuous funding mechanism, which allows us to implement a dynamic programme which can respond to the changing needs of our customers and priorities in the short term (0-3 years)
- An agreed funding and delivery model
- Publicly available information and guides that explains the need to optimise and encourages people to make smarter travel choices by mode, time and route through informing them of the benefits of the interventions in the programme. This will essentially form a user guide to the network and will include a publicly available view of the strategic networks.

Volume 1 is the most enduring part of the optimisation planning process and would be refreshed in line with bigger network changes, i.e. a change in the strategic networks, a national review of the LOS, and in line with changes resulting from the One Network framework review.

Longer term we are requesting in principal funding of an additional \$330-400 million for investment in optimisation activities over ten years, with a focus on travel choice (this is in addition to existing OPEX). The indicative split for investment would be 1/3rd highway investment and 2/3rds local roading investment. This split will be confirmed as part of the SSBC.

14 Auckland Network Optimisation Programme- SSBC

The Auckland Network Optimisation PBC gathered new evidence and data to increase our understanding of the problems in Auckland and its context. It identified a recommended optimisation programme focused on travel choice as the best way to address the stated problems, at a conceptual level. The next step is to develop and agree a detailed programme for implementation in the 2021-24NLTP. The development of a detailed optimisation programme is dependent on an updated Auckland Network Operating Plan (Volume 1) and an updated Auckland Network Operating Plan (Part B) by migrating the current static part B into a newly developed tool that will allow us to automatically measure gaps in network performance and test interventions, in order to develop the optimisation programme for delivery.

We recommend the continued development of the business case approach through a Single Stage Business Case. The figure below outlines the scope of the SSBC. The investment will utilise an updated Auckland Network Operating Plan (Volume 1 and 2), to identify network issues, prioritise programmes and test the effectiveness of responses and includes the development of a quicker approval processes for standard interventions, to expedite delivery. It will also look to ensure AT and the Transport Agency have a continuous programme for investment, which can keep pace with changes on the network.

14.1 Key milestones & timeline

Below is a high-level delivery plan, including approximate timings for the milestone delivery (Figure 16.1). This timeline aims to ensure that we can secure funding for implementation of the Auckland Network Optimisation programme in the next NLTP period (2021-2024). Further work will be undertaken to ensure alignment with the new NLTP and RLTP processes.

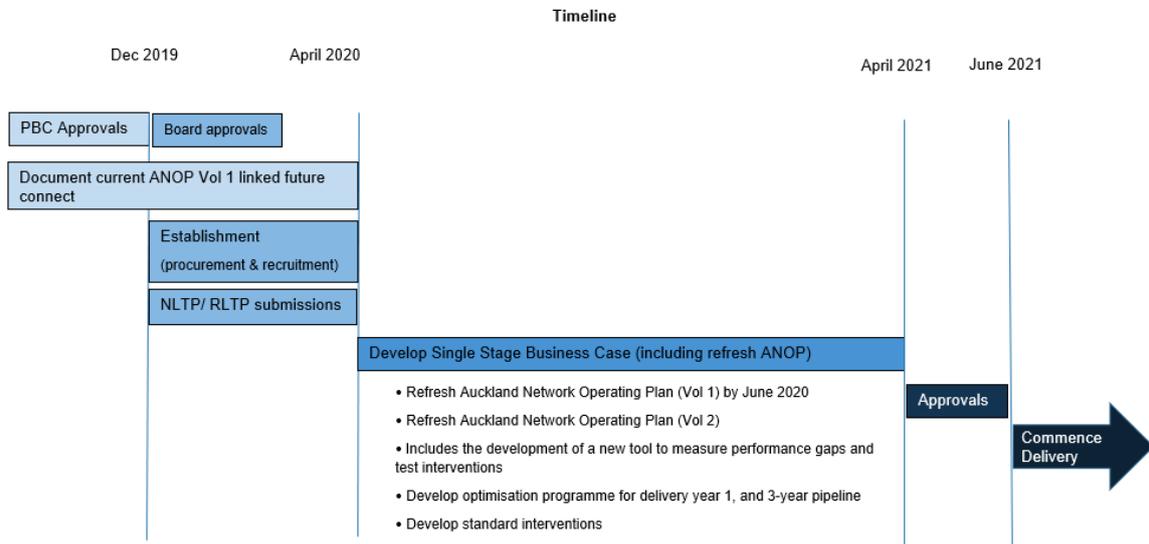


Figure 14-1- High Level Delivery Roadmap

14.2 Programme governance and reporting

The main investment partners are the Waka Kotahi NZ Transport Agency and Auckland Transport. Below is an overview of the recommended joint governance structure. Roles and responsibilities will be confirmed as part of the SSBC project plan.

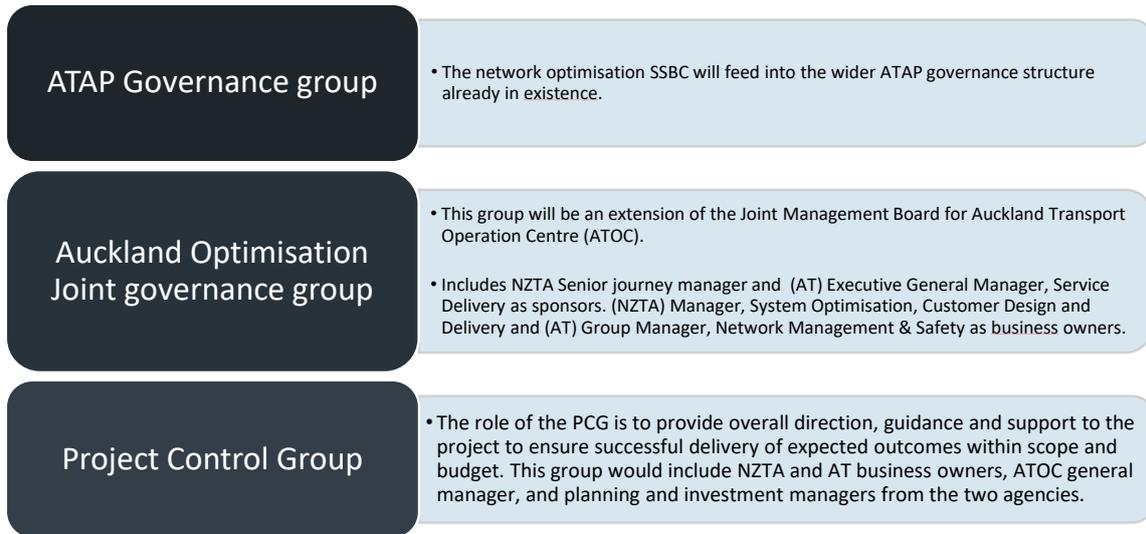


Figure 14-2 Programme Governance and Reporting

14.3 Delivery plan

A core AT/ NZTA team will work alongside the successful consultant team to deliver the SSBC. An indicative project structure is set out below, this will be refined with partners as the RFP is developed and resource availability becomes clearer.

14.3.1 Indicative Project Team Structure

The indicative project team structure utilises the learnings from this PBC. The team developing this SSBC will be made up of 3 dedicated FTEs from AT and NZTA and ATOC, who will be committed to this business case for three days a week for 6 months. The intention is to co-locate this team to facilitate discussions better collaboration and expedite progress. To ensure this core team can focus on delivering this SSBC, the costs for backfilling these FTE has been factored into the SSBC funding request. The leads will be supported by SME's from the optimisation teams and this will be incorporated into their existing work plans.

A dedicated external programme manager will be assigned who has extensive knowledge of the business case process and the associated systems and processes and who has the experience and political savvy to lead a complex project across NZTA and AT. This role will be supported by a dedicated stakeholder and communications advisor will also form part of the team. This person will focus on key internal and external communication, ensuring this project is visible and is working to support other key pieces of work.

A dedicated investment advisor and quality assessor from both organisations will work closely with the team throughout the process to ensure all requirements of the business case process are met. Ideally, we would like to retain existing resources assigned to the PBC, but this is subject to approval. This core team will be supported by a wider SME group from a range of disciplines, which will again be determined as part of the SSBC scoping exercise and development of the project plan.

The exact delivery model will be confirmed as part of the SSBC scoping exercise and development of the project plan.

The professional service team will be expected to develop the SSBC and the corresponding components. The development of the online tool may be sub-contracted, dependant on the skills and capability within the professional services team. The joint 'one network' Auckland network operating plan (Volume 1 and 2) will form the basis of the SSBC write up.

The scoping and procurement phase will be undertaken between Jan- April 2020 using existing resources.

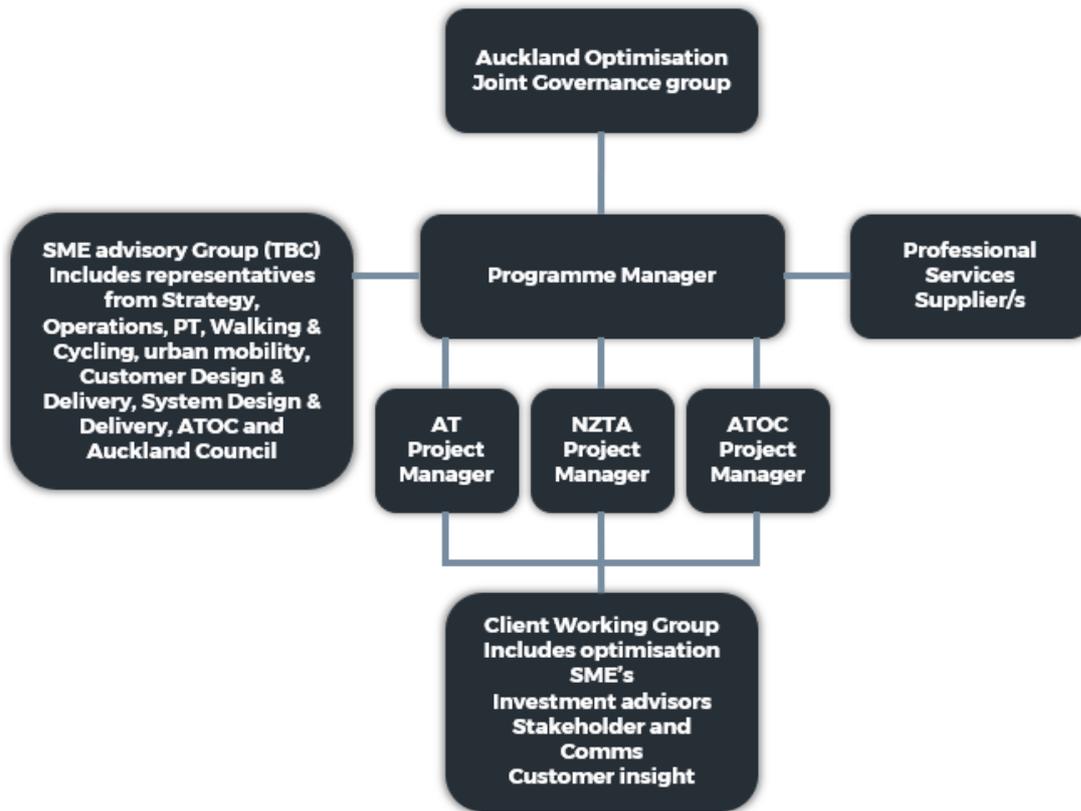


Figure 14-3 Indicative Project Team Structure

14.3.2 Key Skills

14.3.2.1 Key skills required of the consultancy team include:

- Project lead – liaises with the Clients' Project Managers, manages the consultant's resources and key milestones. Identifies key risks and works with the Clients' Project Managers to manage and mitigate these risks as appropriate. Works closely with the Clients' Project Managers and business case specialist.
- Business Case specialist – understands the requirements of the business case and how to apply the principles in a manner that delivers a fit for purpose business case. Works with the clients to develop the early investment narrative which is constantly reconfirmed and adjusted throughout the development of the business case. Works closely with the project lead, business case author, and client's team.
- Business case author – an experienced business case author who has prepared business cases and can adapt business case frameworks to develop a compelling and cogent investment narrative, and a fit for purpose business case. Works closely with the business case specialist, and client's team to develop the business case.
- Transport planner – an experienced transport planner who is able to work with multiple strands of Council, AT and the NZ Transport Agency to make sense of the various strategies and policies to guide agreement on priorities and optimal programmes.
- Optimisation specialist(s) – experts in optimisation and transport systems (across all modes including public transport, walking and cycling) that can work with the wider project team and stakeholders, to explore and consider a wide range of options, and put together optimisation programmes that can be assessed. Able to provide technical input to the development of interventions. Is open minded to different solutions/ interventions.
- Road safety- expertise in road safety and vision zero.

- IT/ software development- to develop the network operating planning tool- The tool is critical for measuring gaps in performance and testing interventions. Expertise or previous experience with the Smartroads tool would be beneficial to ensure this tool is fit for purpose and scoped appropriately.
- Graphics/information designer – an experienced designer who can take options and programme concepts and develop a visual representation that is easily understood.
- Economist/ Cost estimator – Provide appropriately robust cost estimates for programme activities and economic analysis.

14.3.2.2 Key skills required of the client's team:

- Project Managers– works closely with the consultancy team to lead and develop a fit for purpose business case. Able to be adaptive, understand team dynamics, and empower a joint team to deliver timely quality. Understands the business case approach and the principles. Responsible for the administrative elements of the project including programme/budget monitoring and reporting.
- Strategy specialists – experts in the relevant organisations strategies who can guide the SSBC development to ensure that it is aligned to strategic priorities.
- Optimisation specialists – experts in optimisation and transport systems that can work with the wider project team, stakeholders, to explore and consider a wide range of options, and put together optimisation programmes that can be assessed. Able to provide technical input to the development of interventions. Is open minded to different solutions/ interventions.

14.3.2.3 Key skills required of the project team (in-house or out)

- Programme manager/ Director – able to reduce and remove road blocks within AT and NZTA to allow the project team to focus on delivering a fit for purpose business case. Specialist skills in managing several related projects is required. This person will ensure the programme goals are met and are supported by project- level activity and will provide a decision- making capability that is not achievable through the individual project managers.
- Customer/UX specialist – an expert in analysing and understanding customers and strategies to influence change.
- Communications and Engagement specialist – an expert in engaging and communicating with stakeholder and customers. Prepares the necessary stakeholder and communications plans as well as the necessary collateral required.
- Urban design/place specialist - many of corridors will transverse main streets, town centres, mixed use areas, schools, employment areas, etc within Auckland's urban areas. The inter-disciplinary approach will be critical to achieving better integrated and holistic outcomes.
- Network Operating Planning experts – Whilst there is a network operating plan it will need to be challenged and tested to more clearly demonstrate the modal priorities by which to guide optimisation activities.
- Network operating planning tool- The tool is critical for measuring gaps in performance and testing interventions. Expertise or previous experience with the Smartroads tool is essential to ensure this tool is fit for purpose and scoped appropriately.
- Business technology
- Programme management

14.4 Stakeholder engagement and communications plan

Following the recruitment of the stakeholder and communications resource we will develop a full stakeholder and communications plan as part of the SSBC, this will include key parties such as key internal teams working on ATAP projects, ATAP governance, and a wider external communication plan.

14.5 Funding

To further develop the Auckland network optimisation programme, we are requesting immediate approval for \$2 million from the 18-21 NLTP, to deliver the SSBC which includes refreshing the ANOP (volume 1 and 2). See below for a breakdown of activities.

It is recommended that:

That the Senior Manager, OPPP Transport Services endorses:

Recommending that the NZA transport Agency Board resolves to;

- **Endorse** the Auckland Network Optimisation PBC.
 - **Approve** funding to funding to NZ Transport Agency and Auckland Transport to undertake a SSBC for Auckland Network Optimisation with total shared project costs of \$2,094,533 from the NLTP including: -
 - \$1 042 288 from the state highways improvement activity class (includes a 2.6% admin fee \$25, 883 and 2.1% on-charged salaries \$20, 906 and \$995,500 for delivery of the SSBC);
 - \$1 052 244 from the local road improvement activity class with a FAR rate of 51% (\$536,644 NLTF) (includes a 5.7% admin fee of \$56 744 and \$995,500 for delivery of the SSBC).
- 6 The wider benefits to NZTA which justify this expenditure includes: -
- The ANOP tool developed under the Auckland SSBC, will be a scalable for use as a national tool, for use with all Network Operating Plans nationally providing value for money and aligning with the GPS. Auckland will be the first region to implement the use of the tool through the SSBC.
 - The development of standard interventions and fast-tracked approval pathways will also be applied nationally.
 - The process developed as part of the SSBC to develop the optimisation programme through the ANOP (Volume 1 and 2), will be subsequently applied at a national level, so the work undertaken as part of the Auckland SSBC will have wider application.

Recommendations AT

7 That the EGM Service Delivery:

- Endorse the next phase funding request and recommend that the Chief Executive approve funding for Auckland Network Optimisation Single Stage Business case with total shared project costs of **\$2 094 533** from NLTP, \$1 052 244 million funded by AT from local road improvement activity class with a FAR rate of 51% (\$536 644 NLTF)) (includes a 5.7% admin fee of \$56 744 and \$995,500 for delivery of the SSBC).

That the AT and NZTA boards:

- 8 Endorse in principal funding for an additional \$330-400 million for investment in optimisation activities over ten years, with a focus on travel choice. This investment would be split across the following activity classes
- SH improvement
 - local road improvement
 - SH maintenance
 - Local road maintenance.

This is in addition to existing budgets, i.e. (Low Cost/Low Risk) LCLR programmes, ATOC management existing ASM optimisation budgets.

We understand that funding is constrained across all activity classes, but to provide short term solutions (0-3 years) to our customers we need to prioritise further investment in optimisation activities, which will ensure we are maximising our existing key transport networks. We are therefore asking for funding to be reprioritised (from the 2018-21 NLTP) and for funding to be released for the SSBC to prioritise optimisation activities. Please refer to Table 16-1 for the indicative cost breakdown for the SSBC.



Table 14-1 SSBC Indicative Cost Breakdown

Item	Description	Base Estimate	Contingency
1 SSBC- Professional services fees includes ANOP Volume 1 and 2			
1.1	SSBC development and write-up included: <ul style="list-style-type: none"> ○ Contract Management ○ Strategic assessment and context reviewed and confirmed ○ the development of standard interventions, ○ development of a continuous funding mechanism ○ an agreed delivery model for implementation ○ funding model. ○ Agreed optimisation programme including investigation and concept review using ANOP Vol 1 and 2. ○ Detail analysis of the costs, risks and benefits of the preferred option, includes economic review ○ Stakeholder management (provisional). 	\$420,000	
1.2	Refresh Auckland Network Operating Plan (Volume 1) includes <ul style="list-style-type: none"> ○ LOS descriptors and LOS measures ○ Documented principals ○ A documented process of how to use and apply the ANOP ○ Clearly defined terminology for the framework and plan ○ Endorsement through AT, NZTA, ATOC and ASM. ○ Development of a public viewable map of the strategic routes and high level ANOP process 	\$200,000	
1.3	Auckland Network Operating Plan (Volume 2) including online tool includes <ul style="list-style-type: none"> ○ Incorporate existing data sets into one place ○ Measures and LOS agreed in Volume 1 ○ A shared viewer where AT and the Transport Agency can all view the strategic networks geospatially. ○ Confirmation of the LOS gaps across the network by mode ○ Identify highest priority problems. ○ Testing a suite of interventions to generate a proposed programme of optimisation projects (similar to kiwirap and megamaps for safety). 	\$600,000	
Base Consultancy Fee		\$1,220,000	
2 Client Managed Costs			
2.1	NZTA project manager- FTE backfill- 60%-time allocation for 6 months	\$100,000	
2.2	AT project manager- FTE backfill-60%-time allocation for 6 months	\$100,000	
2.3	ATOC project manager- FTE backfill-40%-time allocation for 6 months	\$60,000	
2.4	Programme Management – 50% time for 12 months	\$200,000	
2.5	Stakeholder and communications resource	\$80,000	
2.6	Client/SME working group travel and admin costs	\$50,000	
Expected Estimate (Client Managed Costs)		\$590,000	
	Contingency (@10%)		\$181,000
	NZTA admin fee 2.6%	\$25 883	
	NZTA On salaries on-charged 2.1%	\$20 906	

	AT admin fee 5.7%	\$56 744	
Total SSBC Development Phase Estimate		\$2 094 533	

Note: (1) These estimates are exclusive of GST.

14.6 Procurement

Scoping and tendering will be undertaken by the core internal team.

The procurement of the consultants will follow standard processes of either AT or NZTA. To be confirmed following confirmation of the funding breakdown.

Procurement of ANOP Vol 2 online tool will be done in consultant with the AT and NZTA technology teams.

14.7 Risk Management

On commencement of the Single stage business case a full risk assessment will be completed. The risk register will be updated and reviewed monthly (the ultimate responsibility sitting with the programme manager) and will be tabled at the quarterly meetings for oversight.

The table below outlines the key risks for the SSBC as identified presently with proposed mitigation. High level risks include: -

Table 14-2 Key Risks and Proposed Mitigations

Risk	Proposed Mitigation
Key staff within the joint project team don't work collaboratively to deliver on shared "one network" customer outcomes.	Careful selection of project members from AT & NZTA Clear roles and responsibilities External Programme Management
Lack of alignment between organisations around the scope, resourcing, funding and findings	Integrated project governance put in place and agreed project plan
All funding activity classes are constraint so the SSBC may struggle to secure funding	Cost sharing agreeing to be established between NZTA and AT to split funding requirements. Benefits of the optimisation programme made clear to investors.
Work on the Auckland blue print (roads and streets framework and Future Connect) and how they work with the ANOP takes longer than expected and delays the refresh of ANOP and the related SSBC milestones.	Team to work closely with AT's strategic team leading the blueprint work to ensure alignment.
There is a risk that the professional services will be hard to secure due to the complex needs of the SSBC.	The core team will ensure the SSBC is well scoped and requirements are clear, to remove ambiguity around expectations. Sub-contracting will be encouraged if existing capability in one area is limited.
There is a risk that we fail to apply the key lessons from the PBC development.	A lesson's learnt review will be conducted prior to scoping the SSBC. Findings from this review will be incorporated into the project plan for the SSBC.
Optimisation is still not well understood and there are many misconceptions around what an optimisation programme will deliver.	Development and delivery of a communication strategy to broaden thinking about what "Optimisation is", the benefits it can deliver and work that is already underway, will form part of the communications and stakeholder plan.
Uncertainty of delivery timeframes for other ATAP programme means it is hard for us to commit to a concrete programme.	Work with ATAP governance and key programme managers will ensure timeframes are aligned. Moving towards a continuous funding stream will mean AT and the Transport Agency will have more agility in their response to changes.
There is a risk to delivery of the programme if the development of the ANOP Vol 2 tool takes longer than scheduled.	RFP scoping will clearly outline requirements, and clear project management will signal any issues early, so clear decision making is possible.

<p>There is a risk that the agreed modal priority and LOS between and within organisations takes longer than expected.</p>	<p>We will involve a wide range of stakeholders early to get buy in and build on existing agreements such as agreed LOS and strategic networks. Ensuring we keep going back to strategic intent. We will work closely with strategic teams on future connect, Arakaki and escalate conflicts at a strategic level to strategic team to resolve. Strong focus on partnering.</p>
<p>The views of the customer are not captured in the PBC</p>	<p>The team will include expertise in customer behaviour and experiences. New LOS will be developed to reflect customer requirements.</p>

14.8 Benefit realisation

Further work is needed to confirm the benefits described in the PBC and how we would measure success. This work will be undertaken as part of the SSBC and will tie in with national reviews looking into national performance metrics and the work examining pedestrian and cycling LOS, amongst other reviews.

14.9 Outstanding gaps

As part of the PBC we recognise there are gaps, which are outlined below. The SSBC will focus its effort on understanding and closing these gaps. The refreshed ANOP will capitalise on the existing work undertaken by Auckland Transport and further develop this for the whole of the Auckland Transport network, this will allow us to confidently target investment.

14.9.1 Joint ‘one network’ Auckland Network Operating Plan (ANOP) Volume 1

The foundation to the SSBC will be a refresh of the existing Auckland Network Operating Plan (ANOP) utilising the work already being undertaken by Auckland Transport. As outlined in part b, the ANOP will provide a jointly owned and agreed one network view across modes for Auckland. It assesses the operating gaps for each mode and time period, by comparing the existing levels of service against desired target levels of service, derived from the agreed strategic direction and mode hierarchy priority. The ANOP enables better visibility of the conflicts between modes and the principals established allow agreed trade-offs between the different modal levels of service. By agreeing the different priorities of modes depending on the time of day, NZTA and AT can balance the competing demands for limited road space.

The refresh ANOP utilises an existing holistic vision of transport that focuses on:

- moving people and goods, not just vehicles, and seeing this by time of day
- seeing transport as supporting broader community goals
- balancing the competing demands for limited road space
- thinking ‘network’ rather than sites or routes.

The Auckland Network Operating Framework (ANOP) volume 1 was jointly developed by AT and NZTA in 2014. This framework is routinely applied to route optimisation projects within AT and has been used to help inform some larger scale projects such as the East - West Connection. Resourcing limitations reduced the ability of the team to fully document and embed the ANOP, and to work with project managers across both NZTA and Auckland Transport to ensure it was applied more consistently to projects and operations.

The existing ANOP is not widely understood within either AT or NZTA. It is used in an ad-hoc basis, rather than consistently applied across the whole network, although principles thereof are applied throughout both AT and NZTA. Limited resource and insufficient communications regarding the benefits of optimisation activities at a network level, have often resulted in opposition to individual projects, especially where removal of parking has been proposed, making project implementation slow and complex.

The existing ANOP tool also lacks data and measures for active modes, which is a critical focus area.

There is therefore a need to refresh this framework and to document the current LOS and principals applied in order to improve its use and application. This will need to be developed and endorsed by all key partners. Refreshing the ANOP also presents a further opportunity to increase the coordinated approach to optimisation across AT, NZTA, ATOC and ASM. Updating the ANOP offers extensive benefits at a network level. By refreshing the ANOP, it will inform the direction and help provide greater investment assurance around the ongoing optimisation programme over the next ten years.

The ANOP allows us to make more informed decisions about a number of aspects of the network including:

- allocating and supporting public transport priority
- improving provision for active modes
- allocating road space to competing transport modes, depending on the time of day.
- improving traffic flow at highly congested intersections
- controlling access to and from the arterial network
- planning for growth areas
- planning for the development of activity areas.
- reduce travel demand
- more efficient and sustainable travel
- better information, and management of existing infrastructure
- managing the trade-offs between modes
- understand function of new infrastructure to support economic growth

The ANOP volume 1 will help practitioners manage the network temporally and make project decisions that align with the agreed objectives.

In order to develop the optimisation programme, we need to update the ANOP volume 2 and evolve it from a static view to a living representation of network gaps across all modes. This requires the development of a tool that allows performance deficiencies to be identified and interventions tested and compared (covered under ANOP Volume 2) and a process around how to undertake network planning.

14.9.2 Joint 'one network' Auckland Network operating Plan (ANOP) Volume 2

Auckland Transport currently use a system to view the strategic networks and have a process to measure the gaps in network performance. This is currently not readily accessible by NZTA. Volume 2 of the ANOP would move us from a static system, available only to Auckland transport, to a one network online tool, which is regularly updated. The tool would enable us to identify the operating gaps (deficiencies). This Operating Gap indicates how well we are doing against the plan (strategic intent).

AT currently use a tool named 'SmartRoads', to test specific interventions when necessary. This tool was originally developed by VicRoads (Australia) to assist in the application of network operation planning, the tool:

- provided an interactive planning environment to visualise road use priorities, operation gaps and impacts of treatments
- facilitated the consistent application of network operation planning including specific specifications and standards
- assessed road network operations improvement opportunities for general traffic, buses, freight vehicles and active transport

Austrroads took on a custodian role for the 'SmartRoads' software, as the tool evolved into an Australasian tool. However, SmartRoads is now outdated and Victoria State specific. SmartRoads remains useful for small area analysis, which it was originally designed to do, but as network operating planning has evolved and more strategic/network-wide applications have become important, the tool is no longer fit for purpose. This tool is difficult to use, and it is time consuming and labour intensive. Due to these shortcomings and user feedback which has been well documented, SmartRoads is no longer supported by Austrroads, so this is no longer a tool we can effectively use going forward.

A new simplified tool ANOP volume 2 tool will bring together these two legacy tools and will aid the consistent application of ANOP network wide and would streamline the application of the ANOP resulting in reduced resource cost, benefits to road users, and better investments returns for both AT and NZTA.

The tool would provide a visual of the gaps in LOS and would allow us to test interventions. This would be done utilising the Network fit assessment process similar to that applied in SmartRoads and used by Auckland Transport to determine if a proposed intervention will close the operating gap and meet the strategic intent. The assessment process is used to determine the degree of 'fit' of a proposal and its impact on the wider network. The assessment is also a collaborative process and provides decision-makers with information to better understand the trade-offs between transport modes within a wider network context.

All these processes are a "trial and error" cyclic process, which should feedback either to the Auckland Network Operating Plan or to strategy setting if necessary. This whole process is a transparent and collaborative process, which provides all stakeholders and partners a clear understanding of the consequences and impacts of decisions in network operation. This process would be documented as part of ANOP Volume 1.

The main benefit of this process lies in the improved engagement and understanding between engineers, planners and stakeholders, right from setting strategy through to understanding the impacts of individual projects. The process also provides significant value when assessing options for projects where there is no clear 'best option'. The Network Fit Assessment tool can succinctly show whether the impacts on each mode is positive or negative, and it can show this location by location, or across a wider network area. The process also helps to ensure that projects and operations focus on the movement of people and goods rather than just vehicles, thus helping to maximise the efficient use of the transport system.

The output of the ANOP using Volume 1 and 2 is the optimisation programme which will make better use of the existing network working to "close the gaps" in Auckland's network performance, towards the strategic objectives, by agreeing how competing priorities are to be managed. This programme would in effect form the agreed one network optimisation programme for the next NLTP/ RLTP. We would then need to agree how often the ANOP volume 2 is refreshed to ensure we can respond to changes in a dynamic network.

The ANOP would be jointly developed by the different road controlling authorities (NZ Transport Agency, Auckland Transport, Auckland Airport), in conjunction with key partners such as ATOC, ASM and Auckland Council

14.9.3 Terminology

The current network operating process implemented by the optimisation team within Auckland Transport uses different terminology to the process defined in Austroads and currently being adopted across New Zealand. The New Zealand Transport agency is working to embed the Austroads process nationally through the one network framework. At a high level the principals used by Auckland Transport and those used wider within NZTA, remain largely the same.

Further work is needed to resolve and agreed terminology to ensure a shared understanding is established and documented as part of the refreshed ANOP Volume 1.

14.9.4 Performance metrics and benefit realisation

Further work is needed to clarify the investment objectives and KPIs we should be using, based on the movement of people and good rather than vehicles. It is recognised that the setting of service level targets is more of 'an art than science' and further work is needed to understand the service level targets that reflect the priorities of the users. It is also key that this work links in with national initiatives in this space.

Work is ongoing at a national level to look into cycling and pedestrian LoS and metrics to assess TDM programmes. Work is also underway within the Road Efficiency Group One Network Framework initiative to develop LoS descriptors and measures for all modes. AT and NZTA are involved in both these initiatives and this SSBC will need to tie in with the work looking at performance metrics at a national level.

14.9.5 Data gaps

Data gaps are detrimental to the delivery of any optimisation programme, outside the use of private vehicles, particularly spatially based information. A key data gap is the lack of pedestrian and cycling information, or suitable techniques for estimating these at a network level and the integration of public transport information. The absence of data for active road users is often seen as a barrier to justifying optimisation improvement projects for these users.

For pedestrian activity, we will explore the opportunity to link into the pedestrian analytics project jointly delivered by AT and Auckland Council and further technology.

14.9.6 Standard interventions

Information and guidance on optimisation is limited, and there is currently no 'tool kit' of standard interventions that have been tested and agreed. Further work is needed to investigate the opportunity for pre-approved standard optimisation interventions, using a similar process to that developed by the safe network programme. This would include work looking into the development of: -

14.9.6.1 Standard optimisation interventions toolkit

This Standard Optimisation Interventions Toolkit would provide guidance for road practitioners of all types and levels of professional experience. The toolkit would not provide design guidance or specifications; rather it would assist project managers in demonstrating value for money, to support investment decisions on projects or activities that meet required criteria at a programme level. The Toolkit would be a 'living' document; and would be maintained and updated regularly, so that new standard interventions could be captured and disseminated to practitioners. The Toolkit would provide photographic examples of individual approved standard interventions and for most treatments, technical references would be provided, some with links to internet sites containing the documents.

The standard optimisation interventions that would be included within the toolkit are proven optimisation measures that deliver beneficial outcomes by optimising the use of the existing road network; it is not intended to be used for new road corridors or transformation projects.

This work would need to tie into the standard interventions work for urban areas under the safe networks programme and the innovating street for people workstream.

14.9.7 Continuous funding and links with AMPs and CMPs

It is unclear how optimisation should be funded going forward and how we can ensure the programme is agile enough to respond to a dynamic network. The SSBC would need to define how a continuous optimisation programme would work in with the Activity Management Plans²¹.

14.9.8 Alignment with other ATAP projects and wider reviews.

Work is needed to further understand how the optimisation programme can support other key projects under ATAP, such as the business cases for connected communities, supporting urban growth and rail, and wider initiatives such as TDM and mode shift activities. There is also an opportunity for optimisation initiatives to further support larger infrastructure projects, either allowing us to re-time these transformational projects, or to support implementation through the construction phase or once these projects go live. This will involve a higher degree of collaborative working to understand the wider programme of work in Auckland and how optimisation can fit in and support this.

²¹ Auckland CMP, can be found here, <https://www.nzta.govt.nz/assets/Highways-Information-Portal/Processes/Corridor-management/Corridor-management-plans/CMP-documents/04-CMP-Urban-Auckland-Final-Jan-2018.pdf>

Further work is needed to ensure alignment with key partners including Auckland council to look for ways that optimisation can support their vision for Auckland²².

Following the completion of the PBC several key initiatives are now in progress. Other key pieces of work to be considered as part of the work on the SSBD include: -

- **Future connect-** Auckland Transport project which looks at a long-term strategic plan for the network, with an initial focus on RLTP 2021-2031, and thereafter extending out to 2040/50. It takes ATAP as our shared/agreed approach and looks at opportunities where we can refine) and add further detail needed for AT to make trade-offs. This will be a living document, which will be easily updated as it is GIS based.
- **Arataki-** Outlines NZTAs 10-year plan for land transport system including modal change. It has called out five step changes needed to the land transport system to achieve government objective and translates strategy to place. This plan will shape the TAIP and how we inform investment locally and regionally. Optimisation is one of the key levers included to instigate change.
- **Transport Agency Investment Proposal (TAIP).** Development of the next TAIP is well underway. The TAIP is emphasising making better use of existing networks, HOV and active modes, so further work is needed to understand how we support this and how optimisation programmes are reflected in the TAIP.
- **Data release-** NZTA is working with MOT to source data and define better metrics for the transport system. This information be used to define where problem areas exist. This project will help support our performance metrics and LOS.
- **ONRC-** The current road classification framework is under review as the One Network framework. This framework aims to provide a consistent travel experience along elements of the transport system with similar characteristics. Provide a structure service level and performance framework so transport investment decisions consider all modes equally. Provide a clear line of sight between transport interventions and the customer service levels and community outcomes.
- **Investment Decision-Making Framework (IDMF)** is used to decide how to prioritise and fund proposals for transport changes. The framework is currently being reviewed to make sure it's in line with the Government's broader policies across social, economic and environmental outcomes. The review also aims to ensure the framework is easy to use and understand while supporting the delivery of a better transport system. The focus will be removed from capital investment and this will now be seen as a last resource, once all options have been considered, including optimisation. Tools will be developed to support this framework.
- **Supporting Urban growth-** This will align the long-term strategic planning for the Auckland Network with supporting short term optimisation initiatives.
- **ATOC amalgamation-** Auckland Transport and the NZ Transport Agency's joint priorities are to enable customers to make informed choices about the way they travel and to optimise the Auckland region and upper North Island's transport network across all modes. The purpose of this project is to enable those outcomes through amalgamating the two current Auckland Transport Operation Centres (ATOCs) (ATOC Smales and ATOC Central) into a single, multi-modal ATOC. ATOC amalgamation will deliver a more customer-centric and fully integrated (multi modal) transport operational service. The project is being delivered jointly by AT and the NZ Transport Agency. The ATOC amalgamation will deliver clear benefits for customers. Of primary importance is the positive impact on the customer journey and customer experience across all modes, including all public transport modes and freight movement. Speed and effectiveness of network optimisation and responsiveness to incidents will be improved, and this will impact all our customers, including those using public transport modes and moving freight.
- **Auckland Integrated Transport Plan .pdf²³**

²² <https://ourauckland.aucklandcouncil.govt.nz/articles/news/2018/11/council-green-lights-bold-new-city-centre-plans/>

²³ <https://infohub.nzta.govt.nz/otcs/cs.dll/link/36506158>



Appendix A

Programme Development Process

Appendix A - Stakeholders

Appendix B

Programme Development

Appendix B - Overview of Programme Development

Appendix C

Evidence

Appendix C - Evidence

Appendix D

ILM

Appendix D - ILM

Appendix E

Assessment of Alternatives

Appendix E - Assessment of Alternatives

Assessment of Alternatives memo

.

Appendix F

Multi-Criteria Analysis

Appendix F - Multi-Criteria Analysis

MCA memo and full results

.

Appendix G

Economics

Appendix G - Economics

Economic evaluation memo and full results

Attachment 2

INVESTMENT QUALITY ASSURANCE (IQA)

Recommendation and summary	DP&S / PI / I&F to complete	
<p>Business case assessment summary <i>DP&S / PI</i></p>	<p>Overall this is a very worthwhile piece of work and evidences why it should be taken forward to further investigation and implementation well. It has come from the ATAP work programme and aligns with strategies and larger programmes strongly. It gives a robust view of the network, the issues and benefits and the optioneering process. The forward plan is robust and gives a good indication of coming phases and work. It is my recommendation to move this forward.</p> <p>While longer term projects are expected to improve the network, this project looks at how to make the best of it in the meantime, to lift customer levels of service and get good value for money. "This programme intends to embed best practice optimisation within transport planning such that it becomes business as usual and that making the most of the existing network is the first option that is considered, in line with the NZ Transport Agency (NZTA) intervention hierarchy."</p> <p>There is a good use of glossary, definitions, images, graphs, maps and examples to help every reader of this business case understand the investment story. The appendix is robust and covers a good level of detail to support the information given within the business case document.</p> <p>The problems are presented thoroughly with well-reasoned cause and effect, a strong evidence base for each and benefits which explain the possible outcomes of addressing these problems well. Investment objectives are sound and presented to a fit for purpose level of detail for this phase in the business case.</p> <p>The optioneering process is robust, well thought out and presented. It has a logical and easy to follow flow from long list to short list and recommended option and explains each of the components, assessments and options thoroughly so it is easy to understand the trade offs and choices.</p> <p>The back end of the business case is fit for purpose at PBC phase, and the management case is excellent going into a much greater level of detail than we may be used to seeing. It gives confidence of this work moving to the next phase and indicates expectations of implementation also.</p> <p>Well done to the project team, this has come through as a strong representation of a good business case.</p>	
Assessed by	Monica Petriko	Date 6/11/2019
<p>Investment assurance assessment summary <i>I&F if relevant</i></p>	<p>The Auckland Transport Alignment Project (ATAP) has identified \$700 million for network optimisation and technologies to improve the performance of Auckland's transport system. This PBC establishes a plan for some of this \$700 million. The expected cost of the preferred programme in \$330 – 400 million over ten years. Funding is sought for \$2 million to develop the SSBC, which will be included for implementation in the next NLTP. The funding sought will also enable a refresh and further development of the Auckland Network Operating Plan (NOP). The updated NOP is important as it will enable the identification of future optimisation interventions.</p> <p>Programme development processes appears robust. Substantial effort went into developing and testing the problem statements, with problems, benefits and</p>	

Attachment 2

	<p>investment outcomes being approved by stakeholders and sponsors. The case is made for a programme to address the significant actual and predicted gaps in Auckland resulting from the implementation of long-term infrastructure projects.</p> <p>A range of lower and higher cost programmes were considered. MCA and sensitivity testing were used to establish that the preferred programme (Focus on Travel Choice) performed best.</p> <p>This business case provides a sufficient level of analysis and evidence for a PBC. The expected BCR of the preferred option is 4.3, with a range of 2.8 – 6.8. The proposed programme performed well under sensitivity testing. The economics methodology has been previously reviewed by NZTA and deemed satisfactory. Further consideration of non-monetised benefits (particularly safety) will be needed at the SSBC stage.</p> <p>This version of the PBC has selected the incorrect activity class (investment management) against which to assess the programme against. The programme has a high results alignment when assessed under the correct activity class (local road and state highway improvements) as it:</p> <ul style="list-style-type: none"> • Supports high priority elements in agreed integrated land use and multi-modal plans (ATAP); • Makes best use of key corridors that prioritise multi-modal use and freight; and • Provides significant operational efficiencies to reduce the costs of meeting appropriate levels of service without impacting benefits adversely. <p>The PBC signals an awareness that all funding activity classes are constrained, but no lower cost options for the SSBC development are presented as a mitigation.</p> <p>Due to extenuating circumstances, DPS and IA agreed to waive external peer review requirements. However, DPS and IA have undertaken an extensive internal peer review of this PBC, to ensure a sufficient level of oversight was provided at this stage. External peer review will be undertaken at the next phase of the SSBC and parallel cost estimates.</p>		
Assessed by	Phillip Hall	Date	12/11/2019
Recommendation commentary	<p>Note that external peer review of SSBC and parallel cost estimates will be undertaken as a BAU requirement in the next phase, as set out in PIKB: https://nzta.govt.nz/planning-and-investment/planning-and-investment-knowledge-base/2018-21-nltp-investment-assessment-framework-iaf/requirements-for-improvement-activities-packages-and-programmes/</p> <p style="color: #808000;"><i>Other factors, readiness, acceptance on certain conditions, good enough, etc.</i></p>		
Proposed Recommendation	Recommend with conditions		
Proposed conditions (if applicable)	<p>We recommend that the Senior Manager OPPP includes the following conditions.</p> <p>As a condition precedent...Endorse the business case from available (SH) activity class with funding confirmation from Treasury and Cashflow regarding the Local Road activity class as noted at end of this IQA</p> <p>As a condition subsequent...</p>		
Delegated decision maker	<p>(Vanessa Browne) Senior Manager; Operational Policy, Planning & Performance Explain if escalated (Howard Cattermole) General Manager; Investment & Finance</p>		

Attachment 2

	NZ Transport Agency Board
Reason for recommendation	The majority of Auckland’s transport infrastructure already exists. The large programme of capital projects planned will only add marginal capacity to the network. Planning for and accommodating growth is therefore going to require a greater focus on making better use of the network and maximising opportunities to influence travel demand. Inadequate emphasis and investment have been made in this space. This report presents the case for optimising the Auckland network and how Auckland Transport and the NZ Transport Agency can best go about it.
IAF Profile	H/M (BCR 4.3), priority order 4.
Readiness / urgency factors to consider	<p>“We are requesting:</p> <ul style="list-style-type: none"> • Immediate funding approval for just under \$2 million to complete a SSBC for Auckland Network Optimisation. This will include: <ul style="list-style-type: none"> • A refreshed Auckland Network Operating Plan and the development of an upgrade tool as necessary to produce a optimisation programme. • The development of a suite of standard interventions for optimisation, similar to the toolkit developed for the Safe Network Programme with approval pathways to fast track activity. • In principal funding of an additional \$330-400 million for investment in optimisation activities over ten years, with a focus on travel choice (this is in addition to existing OPEX). The indicative split for investment would be 1/3rd highway investment and 2/3rds local roading investment. <p>We understand that funding is constrained across all activity classes, but to provide short term solutions (0-3 years) to Auckland road network customers AT and the Transport Agency need to prioritise further investment in optimisation activities, which make better use of their existing key transport networks. We are therefore asking for funding to be reprioritised and for funding to be released for the SSBC to prioritise optimisation activities. This will also enable the realisation of the value for money proposition that optimisation brings. The SSBC will also necessarily include the development of a continuous funding mechanism, which will allow us to implement a dynamic programme which can respond to the changing needs of our customers from hereon, i.e. ensure that optimisation can become embedded as a core first step principle.”</p>

Business case quality assessment questions		DP&S / PI to complete
Problem/opportunity statements		
Is it clear what the problem is that needs addressing (both cause and effect)?	<p>The problems are clear, sound, well considered and the cause and effect are explained well. They consider the whole network from different perspectives and users very well.</p> <p>Problem one: Productivity – The increasing number of pain points^{1,2} on the network is reducing transport productivity (people, goods and services)³ and is inhibiting movement. (45%)</p> <p>Problem two: Agility – Conflicting prioritisation of customers’ needs reduces our ability to deliver optimisation projects in an agile and efficient way. (30%)</p> <p>Problem three: Reliability⁵ – Insufficient management of the growing number of planned and unplanned events⁴ is reducing the reliability of customer journeys. (25%)</p> <p>¹ Pain points are defined as areas that are deficient for their intended use i.e. poor capacity, accessibility, efficiency etc. ² Pain points apply to PT, Freight, Pedestrians, Cyclists (and similar modes), general traffic. Ferry and train journeys are not included. ³ Productivity is defined by the value of the road for both its place and movement functions; it is people or goods throughput over time.</p>	

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	<p>⁴ Events are incidents and works that result in temporary reduction of the performance of the road e.g. reduced capacity from roadwork or a crash. ⁵ Reliability is the variation in travel time (standard deviation of travel time). It is a measure of how predictable a customer's journey time will be.</p>
<p>Is there evidence to confirm the cause and effect of the problem?</p>	<p>The evidence and explanation is provided throughout the document. It thoroughly covers off different perspectives including growth, network use, customers across transport modes including active modes, public transport, general traffic and freight. The appendix includes detailed information while the document summarises issues well. The evidence explains the cause and effect of each of the problems strongly.</p>
<p>Does the problem need to be addressed at this time?</p>	<p>This work is aligned with many different strategies at region and national level. The premise of this project is to fix issues short term in a much faster and more value for money way than simply bringing big construction projects forward. This work is the interim solution to keep the network moving as best it can in the short term until those large complex projects are completed in the longer term. If it is approved to go ahead, it makes sense to ensure as little delay as possible so it is making the best of the short term for customers in this way.</p>
<p>Is the problem specific to this investment (or should a broader perspective be taken)?</p>	<p>The problems themselves are much larger than this investment. However, the short term optimisation solution, until larger long term investment is made, is fairly specific to this investment.</p>
<p>Benefits</p>	
<p>Have the benefits that will result from fixing the problem been adequately defined?</p>	<p>The benefits from addressing the problems have been well defined.</p> <p>Benefit 1: Increased throughput of people, goods and services (50%) Benefit Statement 1 reflects the ambitions of the GPS and ATAP on enhancing the network's ability to move people well and improve access. As stated in ATAP: "...make better use of existing infrastructure and encouraging a modal shift to public transport, walking and cycling...".</p> <p>Benefit 2: Improved accessibility for active modes (20%) Active modes provide a critical part of transport journeys, particularly for first and last trip legs, where safety, inclusive design and crime prevention are as important as adequate capacity. This benefit statement directly aligns with over-arching policy for improving access and safety. It will likely result in positive mode shift as well.</p> <p>Benefit 3: Improved responsiveness to customer needs. (10%) Overall, this benefit statement is considered the lowest weighted, however represents a critical function of both AT and the Transport Agency, and plays a significant role in responding to GPS priorities, such as "enables transport choice and access". This benefit places customer needs at the centre of network management. Customer-centricity is also emphasized in policies of both AT and the Transport Agency. Improvements related to benefits 1, 2 and 4 interventions will also improve the customer experience.</p> <p>Benefit 4: Improved journey time reliability (20%) Journey time reliability underpins customer transport choice and experience. High-level government policy is not explicit about this factor, however the range of investment in transport throughout Auckland aims to improve reliability through enhanced capacity and choice. Road network optimisation should also contribute to reliability through active management. Auckland road network customers have reported that journey times are longer and more unpredictable.</p>

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<p>Will the measures specified provide reasonable evidence that the benefits have been delivered?</p>	<p>Investment objectives and a range of potential KPIs were developed by stakeholders and agreed by project sponsors. These KPIs will provide a measurable basis for monitoring how well a potential new programme achieves the above benefits over time.</p> <p>The baseline and indicative KPIs are sound, fit for purpose and this is expected to be finalised to greater detail in coming phases of the business case.</p> <p>Investment objective 1: Improve throughput (people, goods and services) on key networks Investment objective 2: Improve accessibility of walking and cycling in locations with high 'place' function and near public transport interchanges Investment objective 3: Streamline performance measures, planning and delivery approaches to accelerate delivery of optimisation improvements to customer and maximise value for money Investment objective 4: Improve customer journey time reliability for people, goods and services</p>
<p>Are the measures both attributable and quantifiable to this investment?</p>	<p>The measures provided will be attributable and quantifiable to this investment however, a wider scope would be taken for some (eg improve throughput would have many different causes). This was considered deeply through the business case process to ensure KPIs were attributable. The baseline data and specific measures will be finalised in coming phase/s to show what aspect of this particular investment will be measured against these. This is fit for purpose at PBC phase.</p>
<p>Are the benefits of high value to the NZ Transport Agency (furthering its objectives)?</p>	<p>Yes the benefits are of high value to the Agency, as well as to Auckland at a council and regional level, and customers of varying types through the city. As shown in the strategic context section below, this works aligns to a lot of varied expectations and strategies very strongly.</p>
<p>Alternatives and options considered (strategic response level)</p>	
<p>Have a sufficient range of strategic alternatives and options been explored (demand, productivity and supply)?</p>	<p>The explanation of the strategic response 'process' in this business case is sound, thorough and in my opinion has been done and portrayed very well. It gives a good overview of what is already happening in the network, what has been taken into consideration, and what would therefore be in scope for this optioneering. It explains the consideration of demand, productivity and supply. This is fit for purpose for this business case. The flow from long to short list and recommended programme is logical, easy to follow in the business case with the use of a summary, images etc.</p> <p>The do-minimum explanation clearly shows that the status quo is not enough as the problems identified in this business case abound and customer levels of service are lacking.</p> <p>Guiding principles were first agreed in the optioneering followed with strategic responses, building blocks (components) and these were grouped to themes. This thinking was then made into a long list of programmes. The long list was filled out with top down and bottom up detail. The long list considered a great, fit for purpose range of programmes to be able to assess, trade off and come to an appropriate short list to find the best solution. The short list took forward three high ranking programmes and one for comparison which were assessed with a higher level of detail using value for money, non-monetised benefits, MCA, and critical success factors around the GPS and Auckland Plan.</p>
<p>Is it clear what alternatives and options are proposed and the rationale for their selection?</p>	<p>The programme options are portrayed very well to a good level of detail. It gives the reader a strong idea of what each programme consists of and takes us through the rationale for selection well. This level of detail, and the use of images in the optioneering, makes it easier for the reader to both follow the process and understand the trade offs and why the recommended programme is being taken forward.</p>

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	<p>The assessment process and criteria are outlined and explained well in the document.</p> <p>“The recommended Focus on Travel Choice programme proposes the biggest mode shift of all programmes assessed, maximises people and goods movement efficiencies and improves active mode experience at locations with a high place function.”</p>
<p>Are the proposed programmes the most effective response to the problem (comprehensive and balanced)?</p>	<p>The proposed programme is shown to be very effective with the trade offs and reasoning for this choice shown to a good degree of detail.</p> <p>The recommended option is detailed at PBC level very well. It shows why it’s the recommended option, what the expected benefits will be, how it will positively affect each of the customer groups, and the overall network advantages of optimisation. This also goes into a great ‘back end’ of the business case outlining expectations of what will come in the next phase and implementation in an easy to follow way and to a good level of detail.</p>
<p>Are the proposed programmes <i>feasible</i>?</p>	<p>Yes the proposed programme is shown to be feasible as it goes into a robust explanation of the programme, and a good level of detail through the optioneering process and the further information on the recommended programme in the back end of the business case indicating next steps and expectations.</p>

General assessment		DP&S / PI to complete
Robustness of management case	<p>Overall this management case is excellent, especially considering this is still in the PBC phase. It is much stronger and more detailed than many others we may be used to seeing. The management case is robust covering to a very good level the expectations for the next phase of work as well as touching on expectations at implementation.</p> <p>This management case outlines the next steps for Auckland network optimisation to further develop a continuous agile funding model, with a joint ‘one network approach’ for supporting systems, processes and tools for optimisation initiatives in Auckland. The recommendations include an updated and agreed network operating plan and related tools, trials and innovation, behaviour change, travel demand management.</p> <p>It is listed to a good level of detail what investigation will be undertaken in the next phase of business case. It covers review plans, timing and longer term expectations and outcomes through implementation.</p> <p>Key milestones and timing, governance and reporting, an indicative project team structure including key skill requirements of the team, stakeholder engagement, funding, an indicative cost breakdown of the SSBC, and some level of detail for implementation as well including indicative procurement, risk management, benefit realisation, and outstanding gaps to be investigated further. Work is expected to be undertaken to investigate standard intervention possibilities in optimisation.</p>	
Strategic context and programme linkages	<p>The strategic context is outlined very well in the business case. It notes the how and why of alignment to the various strategic directions robustly rather than just listing documents as is sometimes seen.</p> <p>“Optimisation is strongly aligned with the strategic direction for land transport. Improving travel choice to move more people in fewer vehicle is essential in achieving the Government Policy Statement (GPS) objectives for safety, access, value for money and the environment. In doing so it aligns with Auckland Transport’s Future Connect Strategy and the road and streets framework and the Transport Agency’s Arataki 10-year master plan and Keeping cities moving mode shift action plan, which all seek to deliver on the GPS objectives. (Delivery of this PBC is one of the key actions of the mode shift action plan).</p>	

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	<p>Similarly, the Auckland Plan intends to “better connect people, places, goods and services” and “increase genuine travel choices for a healthy, vibrant and equitable Auckland”. Network optimisation is also identified in the Auckland Transport Alignment Project (ATAP) 2018 update (Network optimisation and technology programme), which is supported at Cabinet level. The Auckland Transport (AT) Asset Management Plan also includes specific reference to a Strategic Case for Network Optimisation (Section 13).”</p>
<p>Results alignment</p>	<p>Indicative results alignment in the business case is shown to be high with a good explanation behind this. It focuses on access and value for money with additional benefits and also has positive impact on safety and environment. I agree with this assessment as 'high'.</p> <p>“The Results Alignment for the recommended Focus on Travel Choice programme is estimated to be High, as it addresses a significant gap in Auckland’s accessibility through providing better mode choice, easing congestion and improving journey reliability, and improves access to social and economic opportunity.”</p> <p><u>Investment Assurance comment:</u> The incorrect activity class (investment management) was selected in the PBC. The programme has a high results alignment when assessed under the correct activity class (local road and state highway improvements).</p>
<p>Cost benefit appraisal</p>	<p>Medium BCR – 4.3 for the recommended ‘Focus on travel choice’ programme.</p> <p>Costs, benefits, non-monetised benefits, etc have all been undertaken and portrayed in the document to a robust level of detail, and is sound.</p> <p><u>Investment Assurance comment: BCR range of 2.8 – 6.8 (mid-point 4.3)</u> Benefit calculations, cost inputs and assumptions are provided to a sufficient level of detail in the economics report. Sensitivity testing was undertaken using a number of scenarios (including reduced benefits, increased costs and reduced demand). The expected BCR range of 2.8 – 6.8 results in a medium cost-benefit appraisal rating on average for the recommended programme. Note that safety benefits were counted as a non-monetised benefit and excluded from the BCR.</p>
<p>Economics robustness</p>	<p>Sensitivity testing at short list was undertaken and is shown to be sound. Incremental analysis was used in the optioneering. Investment Assurance team has undertaken a review of the economics. Overall, this shows a robust level of detail for the recommended programme.</p> <p><u>Investment Assurance comment:</u> The economic evaluation methodology has been peer reviewed by NZTA (Ben Smith, Investment Assurance) and was deemed satisfactory. There has not been an external peer review, however extensive internal peer review has been undertaken. External peer review should be undertaken on future phases.</p> <p>Incremental Analysis was undertaken, in accordance with the EEM. A with a target incremental BCR set of 3.0, with travel choice achieving an incremental BCR of 5.5 over balanced medium; balanced high achieved an incremental BCR of 2.2. against travel choice. Sensitivity testing undertaken as per the previous section, including variations in benefits, costs, base speeds and demand. Travel choice was most sensitive to demand changes (+/- 20%), with the BCR ranging from 2.6 to 6.8.</p>

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<p>Risks and significance</p>	<p>A robust risk register and mitigations are included. It accounts for a strong range of risks from the business case side through the project implementation.</p> <p>The highlighted risks in my opinion are around investor engagement and resourcing at this early stage. If Auckland Transport don't continue with this work, the Agency is not in a position to implement on their behalf.</p> <p>The opportunity with this particular business case is to take the work and findings, lessons learnt etc and build a framework of optimisation interventions that can be easily implemented nationwide.</p>
<p>Form, function and standards</p>	<p>ONRC has been considered as appropriate for various thinking in the optioneering. Whole of life implications have been considered to an appropriate level of detail for this phase of business case.</p> <p>Peer review has been undertaken internally to all organisations for the economics and the business case and finalised.</p> <p>Customer levels of service have been taken into consideration throughout and this business case has a strong customer focus in the investment story and the data / evidence / options etc.</p>
<p>Investment</p>	<p>The activity is eligible to be funded from 324 road improvements work category and SH improvements activity class (not local road improvements as below).</p> <p>Funding availability has been confirmed by Martin Shearman by email to Monica 8/11/19 as follows:</p> <p>I can confirm funding within the State Highway Improvement activity class. But CANNOT confirm funding within Local Road Improvements because it is not prioritised!</p>

Investment and Finance questions	I&F to complete (if relevant)
<p>Affordability</p>	<p>The Auckland Transport Alignment Project (ATAP) has identified \$700 million for network optimisation and technologies to improve the performance of Auckland's transport system. This PBC establishes a plan for some of the \$700 million identified. The expected cost of the preferred programme is estimated at \$330-\$400M over 10 years. The SSBC will develop a programme for implementation in the next NLTP.</p> <p>This PBC is requesting \$2M of funding to deliver the SSBC and a refresh of the Auckland Network Operating Plan (volumes 1 and 2).</p>
<p>Robustness of the financial case</p>	<p>The financial case is sufficiently robust for a PBC. More work should be undertaken at the SSBC stage to quantify non-monetised benefits, in particular those relating to safety.</p> <p>Section 14 outlines a high-level delivery plan and a comprehensive breakdown of the \$2 million cost for the SSBC. The PBC notes a risk that professional services may be hard to secure due to the complex needs of the SSBC, which may raise some uncertainty as to the true cost of the SSBC stage. The PBC signals an awareness that all funding activity classes are constrained, but no lower cost options for the SSBC development are presented as a mitigation. For example, could some of this work be undertaken in-house by AT or NZTA?</p> <p><u>Project team comment:</u> One of the key lessons learnt from the PBC was that using existing staff is not feasible for a business case of this scale. Resources working in optimisation and operations are not trained in the business case process, making it difficult for them to lead a business case approach, and it's a steep learning curve. This is made more difficult by the difficult and complex environment of the current business case approach, which is under review to try and simplify and streamline the approach.</p>

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	<p>Staff were put under incredible pressure to deliver this PBC, as this had to fit into existing workloads. Existing operational and optimisation teams are incredible small (with small budgets) and have a high workload, the delivery of the SSBC using in-house resourcing is not feasible. There would be an expectation that existing staff provide technical and subject matter expertise, and this will be reflected in the functional workplans for the next two years for these teams.</p> <p>The costs of the SSBC is reflective of the ongoing benefits this approach will provide. The SSBC will provide an updated Auckland Network Operating plan and a tool to measure gaps in network performance and to test interventions, which will be used nationally. This along side the standard interventions that will be developed as part of the SSBC, and the continuous funding model, will all drive long term change within the two agencies.</p> <p>The legacy of the SSBC will be that we have enduring continuous optimisation programmes which are evidence based and that we have process, systems and tools which ensure we are agile in our response to changes in the transport system. This will change how we focus, plan and deliver investment in the Auckland Transport system in the long term. In turn this model will be applied nationally so the benefits are far reaching.</p>
<p>Procurement approach</p>	<p>Procurement will be primarily for personnel to undertake the SSBC. The scoping and procurement phase for the SSBC will be undertaken between Jan – April 2020 using existing resources. The PBC notes that “procurement of the consultants will follow standard processes of either AT or NZTA.”</p>

Whangaparaoa Benefits Fact Sheet



- PM travel time savings:
1½ to 4½ minutes travel savings per vehicle
- 98 hours saved per day during the PM peak period
- Significantly improved travel time reliability
- 200 more vehicles

Whangaparaoa Dynamic Lanes implemented with 83,500 hours travel time savings, 845 tons CO2 emission reductions and 267,200 litres fuel savings per year.