Part A – The Case for Investment

1. INTRODUCTION

1.1. Purpose

This SSBC presents the case for investment in an integrated, legible, attractive and safe walking and cycling network across the Wakatipu Basin to support communities and the local economy and encourage use of active modes as an alternative to private vehicle trips. It has been prepared by Beca Limited (Beca) on behalf of Way to Go (W2G), addressing national, regional and district policies promoting an effective and efficient active transport network which will allow local residents and visitors to choose cycling and walking for getting to work, school, university, shops and recreation.

The proposed WATN will build on the existing limited network of recreational trails. The network will provide increased connectivity and level of service through targeted enhancements and investment in the creation of new trails to address local demand. The WATN seeks to maximise accessibility between residential and commercial/employment centres within the Wakatipu Basin by connecting communities through a network of safe, integrated and consistent walking and cycling trails. Given increasing urban and population growth in the coming years and a continued reliance on private vehicles as a primary mode of transport in the absence of alternatives, an active travel network presents an opportunity to support regional growth, integrate future changes to land use with the transport system, and support improved health benefits for the local community and visitors.

1.2. Scope

The scope of the SSBC is to develop an investment proposal which provides the broad foundation for investment in an active travel network within the Wakatipu Basin. The SSBC is required to outline the opportunity to provide new or improved links to key destinations and integrate with other modes to facilitate a step-change in walking and cycling trips between home, employment, business, services and other destinations. The network improvements developed will result in positive economic, health, and social benefits for residents and visitors to the region.

This SSBC is an activity that was identified for further investigation through the NZTA endorsed Queenstown Integrated Transport Programme Business Case (QITPBC). This SSBC:

- Confirms the strategic context for investment in the WATN
- Confirms, through analysis of evidence, the problems and benefits of investment in the active travel network
- Defines the investment objectives
- Explores responses to the identified problem and benefit statements
- Tests response options against the investment objectives and MCA criteria
- Identifies a recommended option
- Presents the economic, financial, commercial and management cases for the funding, procurement and delivery of the recommended option to proceed to pre-implementation and ultimately implementation.

The scope of the SSBC is to develop a network that is focussed on providing connectivity to the two main populous urban centres of Queenstown and Frankton, with the smaller destinations of:

- Fernhill;
- Jacks Point;
- Kelvin Heights;
- Arthurs Point;

- Lake Hayes Estate; and
- Arrowtown.

The primary and secondary connections between these destinations are to be identified in the SSBC, including detailed connections within the Frankton Area. The Queenstown Town Centre internal routes have already been identified under the Queenstown Town Centre Masterplan (QTCMP) PBC and are to be included for assessment.

The SSBC is primarily focussed on active travel users and encouraging an increased mode share amongst this group, while also considering the access to the existing regional and national recreational focussed trails.

1.3. Development of Single Stage Business Case

The WATN SSBC is the product of an iterative business case process and represents a comprehensive investment proposal generated with key partners and stakeholders. The development of this SSBC is represented in Figure 5 and has adopted the following process:

- **Project initiation:** Stakeholders were engaged to confirm the methodology and identify key risks and opportunities through development of the SSBC.
- **ILM Workshops:** associated with investment in an active travel network within the Wakatipu Basin.
- **Strategic case development:** ILM workshops were used to identify and define key problems, benefits, and objectives. The strategic context and strategic assessment for an integrated active travel network were also defined as well as the problems, benefits and key performance indicators. Available evidence was considered to inform the next stage of assessing options.
- **Long-list to short-list analysis:** Outlined the ILM process and the methodology from moving from a long-list to short-list of options. It provided the opportunity to omit certain routes based on feedback generated through stakeholder workshops.
- **Options Assessment report**: Determined the proposed Multi Criteria Assessment (MCA) and provided the broader rationale for how it was used on the shortlisted options to define an emerging preferred network. The outcome of this report was identification of preferred options for each route.
- **Single Stage Business Case report:** The SSBC provides a broader platform for investment by merging option identification and detailed analysis into one business case phase. It builds on the previous long-list to short-list and options assessment by:
    - reviewing and confirming the strategic context identified previously;
    - evaluating a range of route options in order to identify a preferred network with additional stakeholder feedback and following more recent workshops;
    - providing an economic evaluation of the preferred network to determine whether it is the best way to respond to identified problems and represents value for money;
    - identifying the costs, risks and benefits of the preferred network.
    - Confirming delivery staging for constructing the preferred network as well as the proposed funding split amongst project partners.

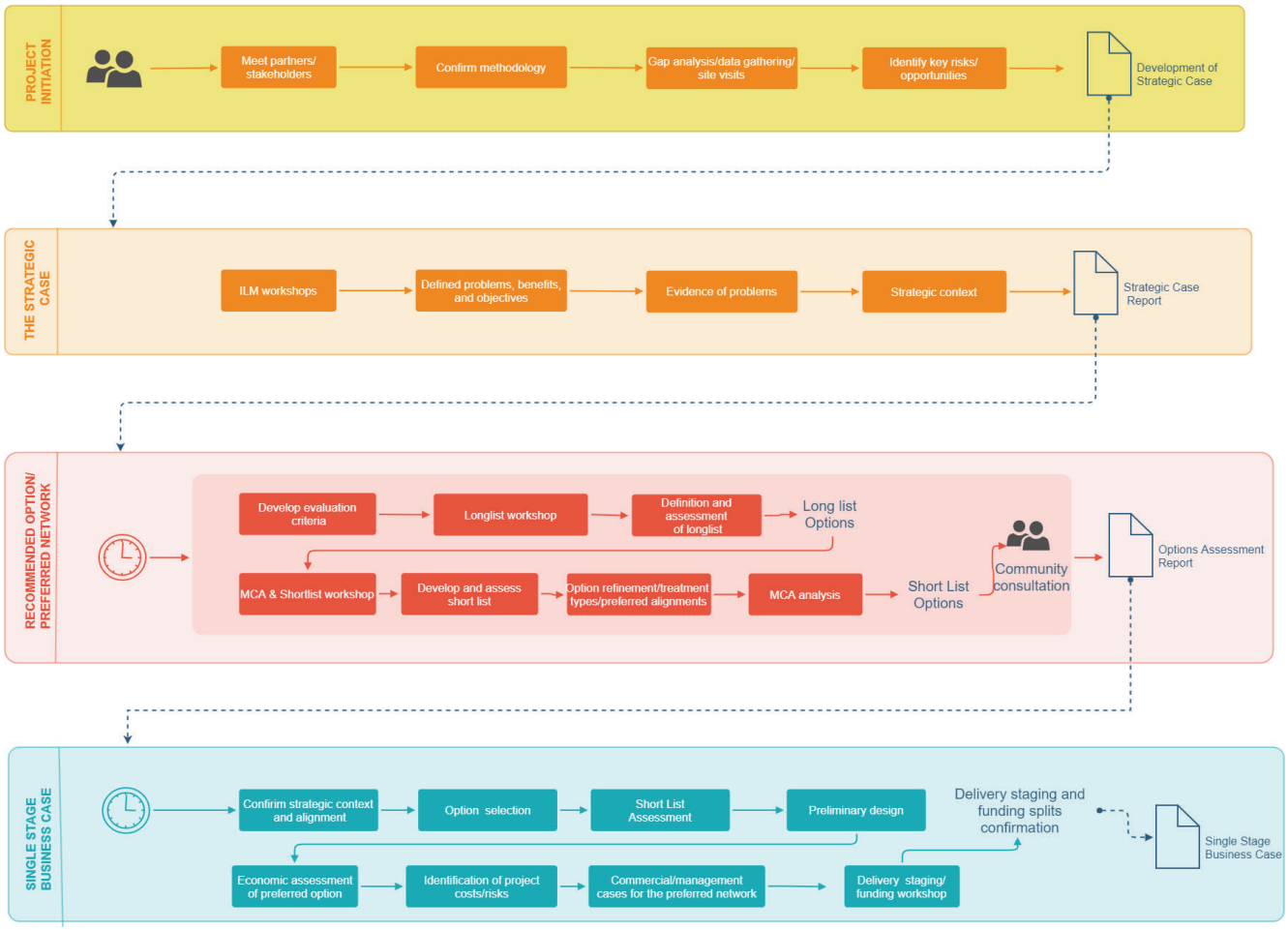


Figure 5: Process for Developing SSBC

1.4. Report Structure

The SSBC is structured around the following:

- **Background (Section 2)** - Provides context of the project area in its existing state with reference to work completed to date;
- **Partners and Key Stakeholder/ Organisational Overview (Section 3 & 4)** – Highlights the partners and key stakeholders and outlines the organisational structure used in this project;
- **Problems, Opportunities and Constraints (Section 5)** – Explores the strategic context to define the problems and opportunities, benefits and summary of problem statements;
- **Project Outcomes (Section 6)** - Defines the project outcomes, benefits, Key Performance Indicators (KPIs) and associated measures;
- **Options Selection/ Assessment of Shortlist (Sections 7, 8 & 9)** - Identifies and reviews options to determine a preferred network of routes;
- **Preferred Network (Section 10)** – Presents the preferred network based on the assessment process;
- **Economic Case (Section 11)** – Provides an economic assessment of the preferred network to determine Benefit Cost Ratios (BCRs);
- **Financial Case (Section 12)** - Provides information surrounding delivery and maintenance costs, and funding options with associated risks;
- **Commercial Case (Section 13)** - Provides evidence of the commercial viability of the proposal and the consenting and procurement strategy that will be used to engage the market; and
- **Management Case (Section 14)** - Provides information surrounding the viability of delivering the proposal including project planning, governance structure, risk management, communications, stakeholder management, benefits realisation and assurance.

1.5. Parallel Projects

A number of parallel business cases currently under development in the Wakatipu Basin have been considered through the development of this SSBC. The key partners for WATN are working collaboratively to improve transport through a programme of inter-related masterplans and business cases. In December 2018, a Memorandum of Understanding was signed between QLDC, NZTA and ORC to work together to provide integrated forward-thinking solutions to create a safe and well-connected transport network for the Wakatipu Basin. The 'Way to Go' (W2G) partnership recognises that all three partners have an important role to play in driving and delivering change through collectively leading strategic transport planning and delivery, including integration of transport with land use and business cases. Specifically, these are detailed in Table 1 below.

Table 1: Overview of Parallel Projects

Business Case	Specific Details
Queenstown Town Centre Detailed Business Case (In Progress)	This business case is focussed on the Queenstown Town Centre. This will build upon the interventions identified in the Queenstown Town Centre Programme Business Case (PBC) and Indicative Business Case (IBC). The options being developed and evaluated include: • Optimisation of the existing transport network, including the role of technology and supporting network management infrastructure; • Testing of the QLDC parking strategy and the level of parking infrastructure (spaces and management) required to deliver the wider transport system outcomes sought (including • supporting ITS etc); • Network operation items including ITS and other management interventions; • Required public transport services and interchange infrastructure for bus and ferry • services; and, • Development of the arterials.
Frankton to Queenstown Single Stage Business Case (In Progress)	This business case is focussed on SH6A from SH6 through to Ballarat Street. This will build upon the interventions identified in the Queenstown Integrated Transport PBC, which are being developed and evaluated further to define a preferred option, including: • Increased capacity of SH6A (4 or 3 lanes); • Localised widening; • Bus priority and supporting measures (e.g. signal prioritisation); and • Intersection improvements. The Active Travel SSBC has considered the most appropriate route for active travel between Frankton and Queenstown and will also need to consider the linkages from the Frankton Track (as the emerging preferred option) to SH6 and the residential areas on Queenstown Hill. Without appropriate connections, there could be a reduced uptake of the proposed facilities.
Frankton Masterplan & Integrated Programme Business Case (In Progress)	A transport Master plan is being prepared for Frankton, being a major centre in the Wakatipu Basin that is attracting a growing number of residents and visitors for services, amenities and employment. The Master plan process will result in a preferred programme of transport improvements to ensure good access both to, within and through Frankton.

	Frankton is a key destination on the trails network with a number of routes considered as part of the WATN SSBC providing access to Frankton. Consideration is also to be given to how these routes will connect within the Frankton area.
Grant Road to Kawarau Falls Bridge Detailed Business Case (In Progress)	This DBC is focussed on improving traffic flows on SH6 between Grant Road and the Kawarau Falls Bridge and developing a preferred option for achieving better connectivity, whilst improving the network for public transport, walking and cycling. The connectivity across the river and connections between the main active travel routes within Frankton is an important consideration as part of the WATN SSBC.
Lake Wakatipu Public Water Ferry Service Detailed Business Case (In Progress)	This business case is focussed on the Lake Wakatipu public water ferry service and will determine the viability of a ferry service to attract commercial operators and a potentially subsidised service. The water ferry is among several options being considered to provide improved travel choices for users, and form part of the wider programme that looks to reduce reliance on private vehicles. This project will also consider the potential connections.
Parking Detailed Business Case (In Progress)	A DBC is currently being prepared for Queenstown and Frankton town centres outlining a recommended programme of interventions to address parking-related issues and contribute to a more balanced transport system. The management of parking within these centres has important implications for development and investment in the WATN by providing additional deterrents for single occupant vehicle trips and in effect providing incentives for active travel users.

2. BACKGROUND

This section provides background context and sets the strategic case for the SSBC.

2.1. Context

2.1.1. Geographic Context

The study area for the WATN SSBC covers the Wakatipu Basin, an area within the Queenstown Lakes District, home to the main urban areas in the region of Queenstown and Frankton, expanding as far as Fernhill, Jacks Point and Arrowtown. The active travel network in 2015 contained 190km of trails for walking, hiking and biking, including 120km of the Queenstown Trail, supporting walking and cycling in the Wakatipu area. The area is shown in Figure 6.

The Wakatipu Basin is characterised by spectacular scenery coupled with its variable four-season weather. These characteristics, which make it a tourist magnet throughout the year also provide a challenging environment to develop appropriate solutions for active travel. It is also situated in a location which connects to the wider national New Zealand Cycle Trail Network, including some of New Zealand's great rides such as the Queenstown Trail, and the Otago Rail Trail slightly further afield.

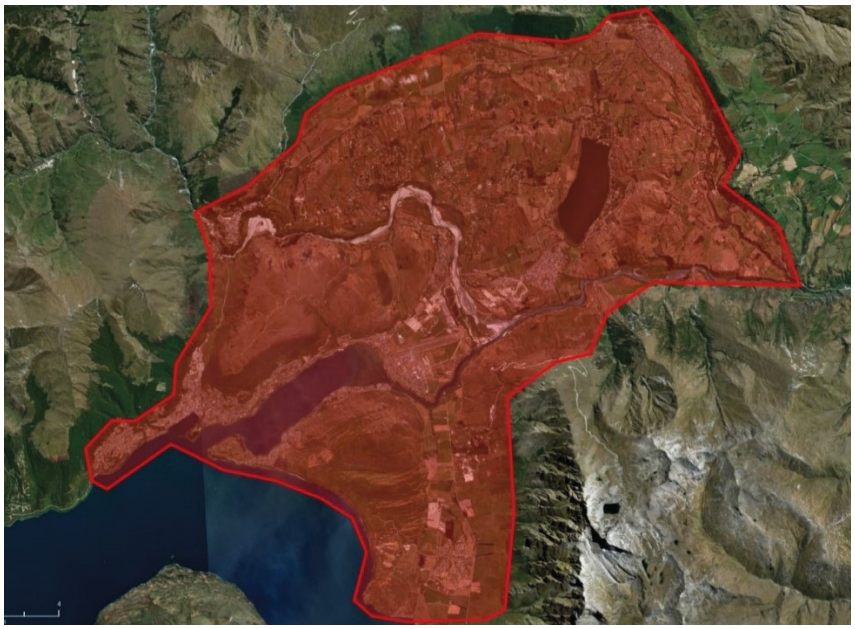


Figure 6: The Wakatipu Basin

2.1.2. Growth

The Queenstown Lakes District is experiencing significant growth, with residential population projected to nearly double between 2018 and 2048, increasing from an average day-time population of over 64,000 (comprising residents and visitors) to approximately 113,000[2]. The highest rate of residential growth is projected over the next 10 to 15 years with growth in international visitors

[2] *Queenstown Lakes District Population Projections (December 2018), https://www.qldc.govt.nz/assets/Uploads/Our-Community/Population-Projections/QLDC-Growth-Projections-2018-to-2048-summary-table.pdf*

expected to continue from its already high levels of up to 34 visitors for each resident (Figure 7). In the wider context of the District, population growth is expected to be the greatest in the residential areas of Jack's Point, Kelvin Heights, Frankton East, which are expected to grow by 17.1%, 4.9%, and 7.9% in residents respectively by 2028. Within the Wakatipu Basin itself, there is expected to be a 5.6% growth in residents by 2028 as well as 3.7% growth in average visitors. The unprecedented growth in residents outside of Queenstown town centre and Frankton, as well as visitors to the region, will continue to place sustained pressure on existing infrastructure, including the transport network, in the absence of alternatives.

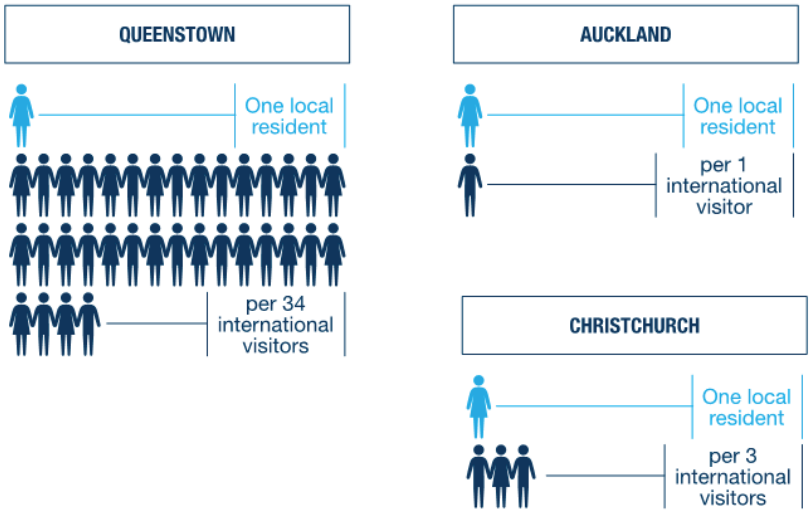


Figure 7: Number of international visitors per resident

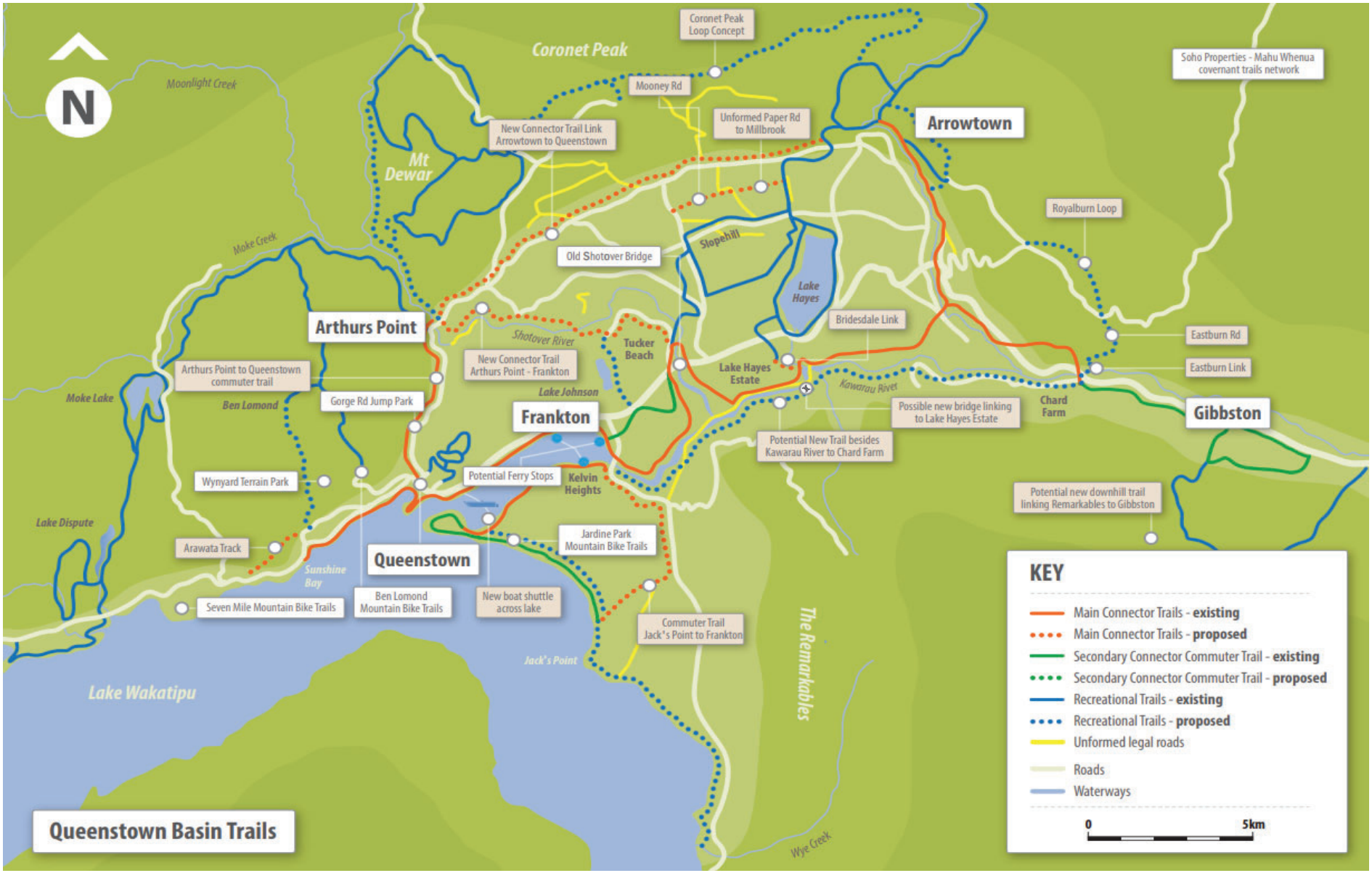
Urban growth in the Wakatipu Basin has and will continue to generate demand for an integrated network of commuter and recreation trails. Whilst growth is occurring in the Frankton Flats area between Queenstown Airport, Remarkables Park and Lake Hayes, there is considerable growth in subdivisions in more recent areas such as Jack's Point, Fernhill, and Kelvin Heights that will enable a greater demand for travel to employment and commercial areas in Queenstown and Frankton. As residential and commercial subdivision continues to expand, there will be an associated need for effective and efficient linkages between communities, shops, schools, places of work, leisure facilities and the great outdoors.

2.1.3. Existing and Planned Future Active Travel Network

The existing and proposed trail network for the area taken from *Queenstown Trails for the future 2015-2025* is shown in Figure 8 and highlights the existing and proposed QTT connections for the area. Since the release of this document by QTT, the following trails have been implemented or are in the process of being implemented:

- Recreational track between Arthurs Point and Arrowtown; and
- Arthurs Point and Tucker Beach.
- $26 Million New Zealand Cycle Trails (NZCT) project to link up Alexandra, Cromwell, Wanaka and Queenstown.

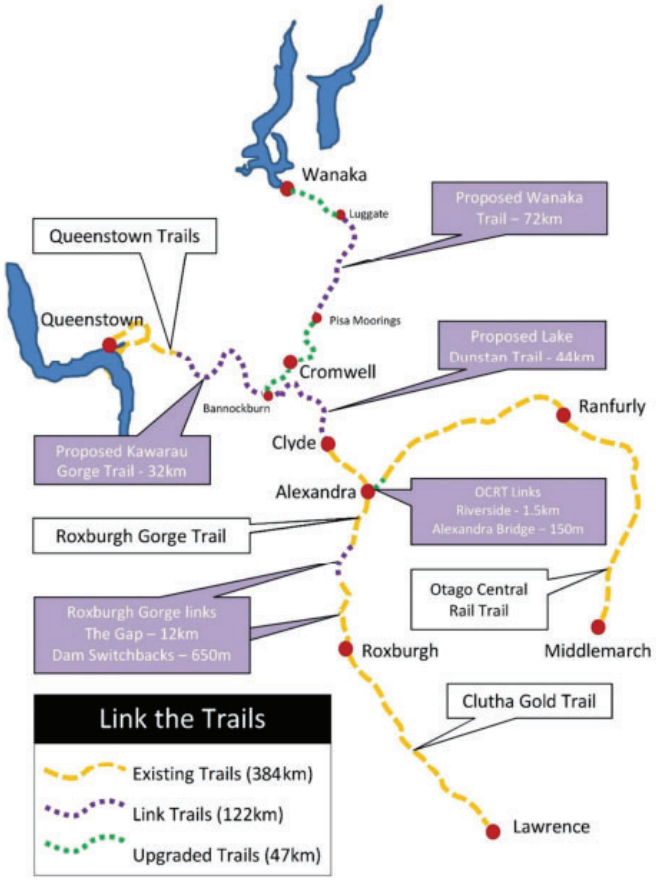
Figure 8: Existing and proposed trails network by QT



The active travel network in 2015 contained 190km of trails for walking and biking, including 120km of the Queenstown Trail[3], supporting walking and cycling in the Wakatipu area. The most popular trails in relation to journeys completed are the Millennium and Frankton tracks, which represent between 15%-20% of trail traffic as highlighted in Table 2.

There is also continued investment and focus on creating a network of walking and cycling trails within the Otago region. The Central Otago Queenstown Trails Network aims to extend the four Great Rides in the Queenstown-Lakes and Central Otago districts so that they connect to each other providing a seamless network of over 500 kilometres of Grade 1 and 2 trails that will disperse, attract, and extend the stay of cycle visitors to the region. Figure 9 below outlines the regional trail network, highlighting the proposed Dunstan, Gorge, and Wanaka trails.

Figure 9: Central Otago Queenstown Trail Network



Development of the regional network is expected to increase visitors both nationally and internationally to the region and will likely leverage the existing trails and Queenstown as a visitor destination to increase the benefits associated with cycle trails. In particular, the network will increase the ability of trails to leverage Queenstown as a gateway to the region, attracting and dispersing visitors more widely across the region.

[3] *Queenstown Trails for the future 2015-2025, A strategic plan for the Queenstown Trails Trust, https://www.qldc.govt.nz/assets/Uploads/Leisure-and-Culture/Walkways/QTT/Queenstown-Trails-for-the-future-2015-2025-171115.pdf*

2.1.4. Existing Usage

The existing network supports over 330,000 one-way movements over an average 12-month period on the trails[4]. This equates to a total of 1,294,144 trail journeys between 2012 and 2017, with a 5% year on year increase from this date[5]. The overall increase is within the QTT Strategic Plan targets (2015-2025) of a 5-8% annual increase by the local population but falls short of the targeted 6-10% annual increase in use of trails by visitors. From the usage data summarised in Table 2, it can be seen that the Millennium Track, and Frankton Track are currently the most popular trails. The distribution of 2017 trail use across the QTT network is shown in Figure 10. A summary of the count data can be found in Appendix A.

Table 2: Most popular trails and their usage (2017)

Trail Counter / Section	2017 Trail Journeys	% of Total Trail Traffic
Millennium Track	22,465	19.5%
Frankton Track	15,571	16%
Lake Hayes Circuit	12,475	11%
Gibbston River Trail	12,344	11%
Kawarau Falls Bridge	9,443	8%

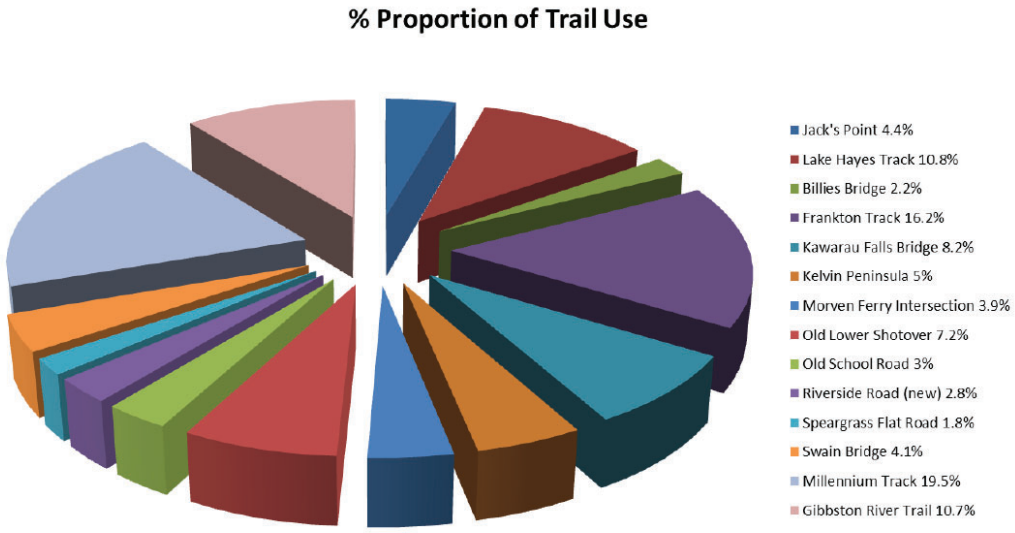


Figure 10: Proportion of trail use (2017)

[4] *Queenstown Trails Trust- Trail Count Report, April 3 2017 as referenced in the Review of Queenstown Trails, Economic Impacts and user satisfaction, Final Report 26 July 2017*
[5] *Queenstown Trails Trust - Trail Count Report, April 3 2017* as referenced in the *Review of Queenstown Trails, Economic Impacts and user satisfaction, Final Report 26 July 2017*

Figure 11, Figure 12 and Figure 13 show the types of bikes used on the existing trails, the age of the users, and the regularity of use[6]. The data shows existing incomplete active travel network serves a wide range of individual needs from school aged children to the elderly, for walking, cycling (include e-bikes and other forms of e-mobility). Even though the data set is relatively small compared to population numbers, it can be assumed that around 5-10% of those surveyed use the trail daily throughout the working week. In addition, given the rise and popularity of e-bikes for domestic and international visitors in the region, it can be expected that the proportion of e-bike users has increased since 2017 when the data was collected. The dispersed nature and types of visitor accommodation and destinations around the Wakatipu Basin mean that a key assumption (based on available evidence) is that all routes are likely to have some degree of non-local usage. This is reflected in Figure 14 which shows splits between domestic and international trail visitors. In 2017, roughly 15% of trail users were international.

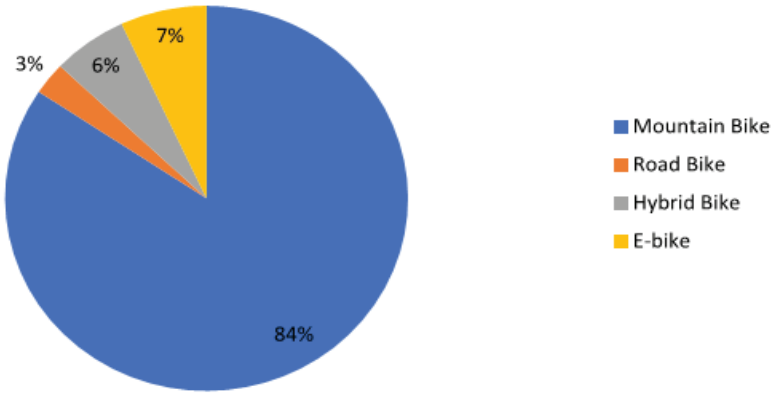


Figure 11: Type of bike used (n300)

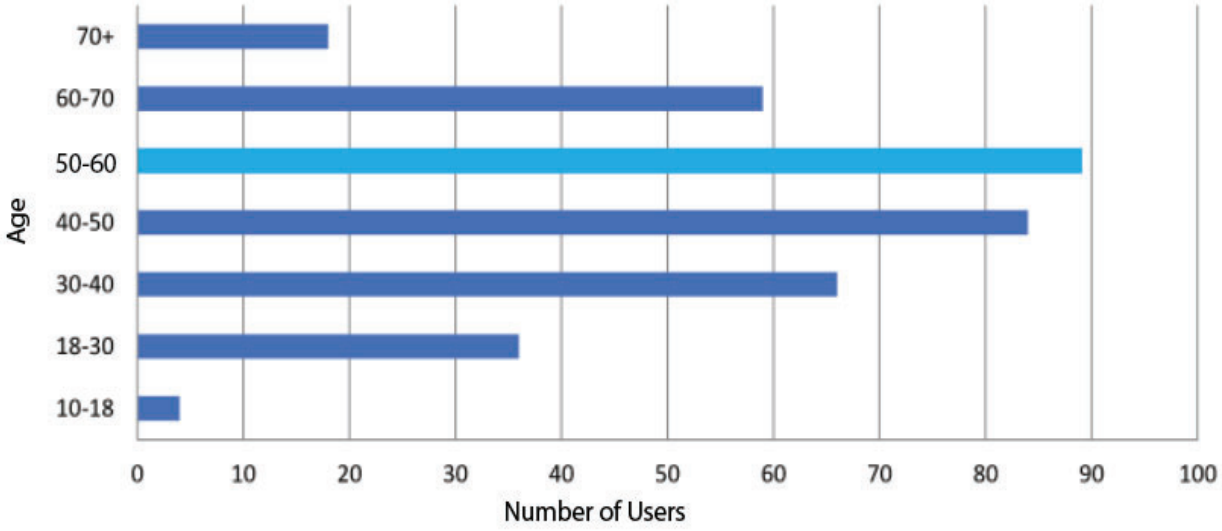


Figure 12: Age of users (n356)

6 Tourism Recreation Conservation (2017). REVIEW OF THE QUEENSTOWN TRAIL | Economic Impacts and Trail User Satisfaction. Queens Town Trails Trust.

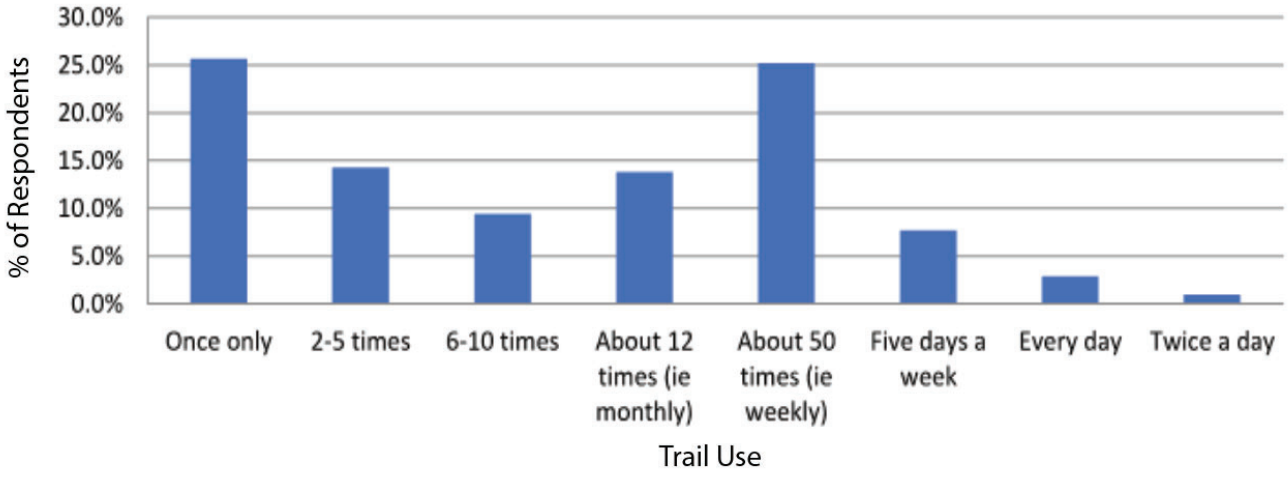


Figure 13: Regularity of trail use (n413)

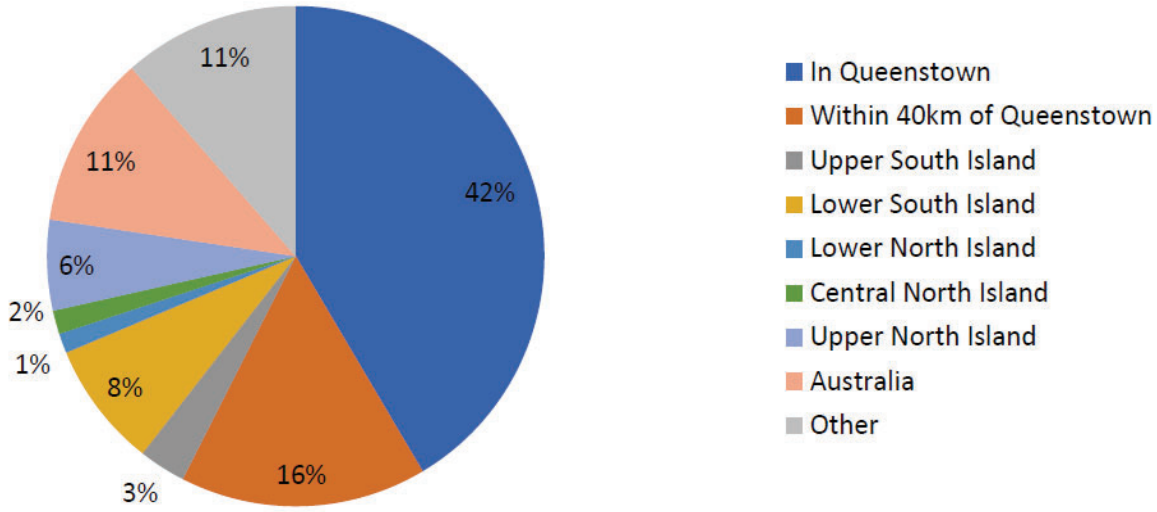


Figure 14: Origin of Queenstown Trails Users

2.2. Existing Strategies

A number of existing strategies relevant to this WATN SSBC are summarised in this chapter. Additional related document summaries can be found in Appendix B.

2.2.1. Queenstown Integrated Transport PBC and Queenstown Town Centre Masterplan PBC

The Queenstown Integrated Transport (QIT) PBC and Queenstown Town Centre Masterplan (QTCMP) PBC prepared for QLDC in 2017 identified a number of interventions specifically related to active travel, as follows:

- A significant investment in active travel which will improve service levels and amenity for pedestrians and cyclists through the sealing and lighting of tracks as well as the extension of the active travel network including an additional crossing of the Shotover River;
- Frankton Track improvements - Upgrade Frankton track including sealing and lighting existing path;
- Pedestrianisation of Queenstown town centre, including the relocation of on-street parking to increase the attractiveness and amenity of the area, and to discourage private vehicle usage; and
- Improved walking and cycling routes and facilities in the town centre, supporting the uptake of active transport and integrating with wider networks.

The QIT PBC seeks to address the transport problems through a mix of infrastructural, public transport and behaviour change measures.

The recommended programme is shown in Figure 15.

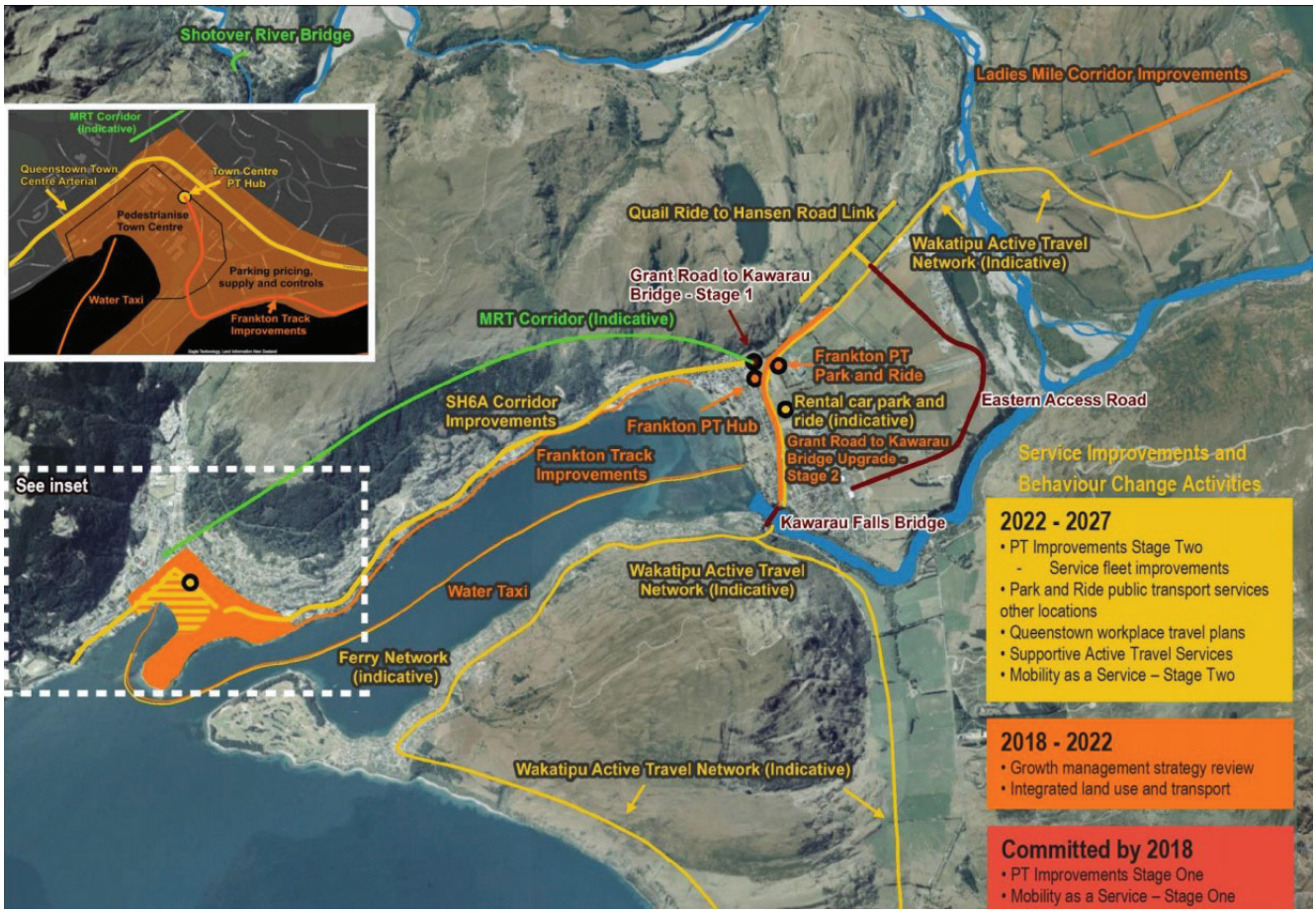


Figure 15: Recommended Programme

The programme includes a "Wakatipu Active Travel Network", which this SSBC is investigating and identifying a preferred option for.

The recommended programme is expected to improve the transport system through improved transport choice and level of service for all modes. Key outcomes by 2045 include:

- 30% alternative mode share (up from 15%);
- 329 public transport passengers per hour (Frankton to Queenstown);
- 223 fewer vehicles (7%) per hour (Frankton to Queenstown);
- A 16-minute reduction in average/peak vehicle travel time (Frankton to Queenstown); and
- A three-minute travel time variability during the morning peak hour at the same location.

The QIT PBC provides the case for transport investment in active travel improvements as this aligns with the outcomes of alternative mode share and fewer vehicles per hour from Frankton to Queenstown.

The recommended programme from the QTCMP PBC includes a strong mix of interventions that have been developed to an Indicative Business Case (IBC) level in many instances through detailed project analysis and programme evaluation. The following options are relevant to this SSBC:

- Improved walking and cycling routes and facilities in the town centre, supporting the uptake of active transport and integrating with wider networks; and
- Marketing communication campaigns to better educate people on transport options.

This recommended programme is focussed on best achieving the following outcomes:

- People enjoy spending time in the town centre;
- Improved access to the town centre for locals and visitors;
- A liveable, thriving town where visitors and locals mix freely; and
- Increased commercial activity.

The focus on improved walking and cycling routes and facilities in the town centre for visitors and locals aligns with the outcomes sought from this SSBC. The links within Queenstown Town Centre have been identified as part of the QTCMP works are shown in Figure 16. This earlier work and considerations are to provide input into the SSBC.

The preferred programme of public realm improvements aims to enhance the visitor and local experience in the town centre through enhancing streets and lanes, improving connections between attractions and celebrating Queenstown's unique heritage and culture. With regards to its relationship with the WATN, there are proposed improvements set to occur in Park Street, Brecon Street and Rees Street (Gardens to Gondola Route), and Beach Street (Upper and Lower Beach Street public transport connection), which will form part of the WATN.

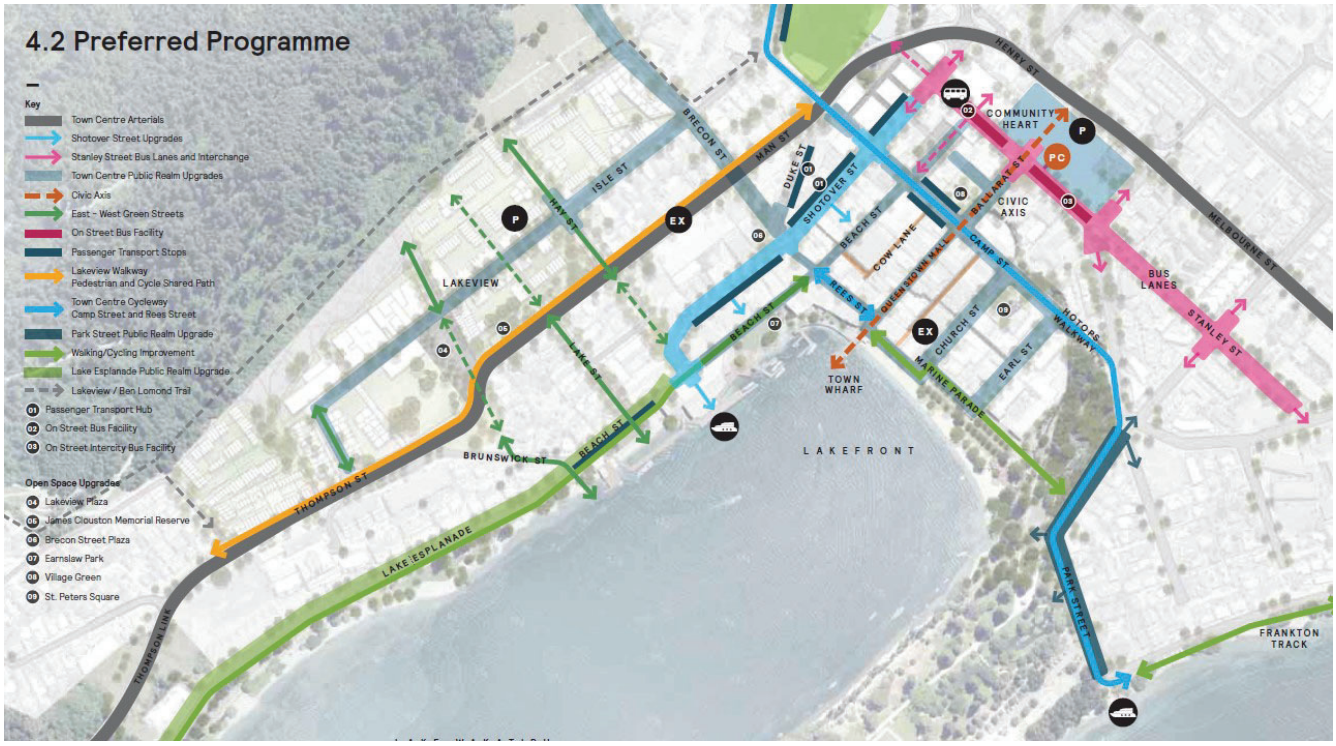


Figure 16: Queenstown Town Centre proposed Links

From the QTCMP works, an implementation plan was proposed for all the improvements, with the routes relevant to the WATN envisaged to be delivered in a staged approach. This is more fully detailed in section 10.4 – Implementation Approach. It should be noted that there may be some differences in the implementation plan for the WATN once the prioritisation of all routes is finalised.

3. PARTNERS AND KEY STAKEHOLDERS

QLDC, the NZ Transport Agency and ORC are working collaboratively as part of 'Way to Go'. There is a Memorandum of Understanding (MoU) between all three parties to commit to working together to provide forward-thinking solutions to provide a safe and well-connected transport network. This will ensure an integrated approach to addressing the transport challenges facing Queenstown, including this WATN SSBC. This one system approach contract (and others in the area) are being delivered through this collaborative working arrangement.

Figure 17: Integrated Client Team

In addition, QTT are also a key stakeholder on this project given their role in developing and managing walking and cycling trails in the Wakatipu Basin. Way to Go and QTT are represented by the key personnel detailed in Table 3 in the preparation of this SSBC.

Table 3: Key representatives of W2G and QTT

INDIVIDUAL	AGENCY	KNOWLEDGE/INVOLVEMENT
Gabrielle Tabron	QLDC	Senior Project Manager, Property and Infrastructure
Tony Pickard	QLDC	Transport Strategy Manager, Property & Infrastructure
Peter Hansby	QLDC	General Manager, Property and Infrastructure
Matthew Roberts	QLDC	Senior Transport Engineer, Property and Infrastructure
Tony Sizemore	NZ Transport Agency	Transport Planning Manager
Chad Barker	NZ Transport Agency	Principal Investment Advisor, Partnership Investments
Erik Teekman	NZ Transport Agency	Principal Walking and Cycling Advisor, System Design and Delivery
Stephen Patience	ORC	Senior Public Transport Officer
Mark Williams	QTT	Chief Executive Officer

3.1. Engagement and Communication Approach

Ongoing engagement has been undertaken over the development of the SSBC as part of the wider Way to Go project. Feedback from the community, users of the trail, and relevant stakeholders has been critical in understanding why people choose to travel around the project area, what can be done to increase active travel modes, and how development of a WATN might facilitate this.

The broader approach to engagement and communication is outlined in Appendix C.

3.2. Iwi Engagement

The impacts of this business case have been determined to involve decisions in relation to ancestral land or a body of water or other elements of intrinsic value to Iwi. Ngā Rūnaka have been engaged in the SSBC process to assist in determining the significance, if any, of impacts on Iwi that result from implementation of the WATN. It should be noted that engagement occurred following the shortlist assessment process and therefore specific risk and impact concerns relating to each route have been identified post-route identification. The associated impact or risk with each route and their affect on Iwi have been highlighted within the Section 8.4 – Options Overview with proposed mitigatory measures suggested.

Engagement has highlighted a number of the preferred routes pass through both Statutory Acknowledgement areas and wāhi tupuna. Lake Wakatipu, including the Frankton arm, is recognised as a statutory acknowledgment area under the Ngāi Tahu Claims Settlement Act 1998. Therefore, Kāi Tahu interests do not just reflect intrinsic interests but are also subject to statutory processes. In addition, it has been highlighted that a number of the routes are located within other wāhi tūpuna which are currently being mapped within the proposed district plan review.

Ngā Rūnaka have expressed clarification relating to how the WATN will affect Kāi Tahu sites of significance including, but not limited to:

- Wāhi Tūpuna;
- Wāhi Tapu;
- Mahika Kai;
- Ara Tawhito;
- Nohoaka; and
- Statutory Acknowledgment Areas.

These have been detailed further in section 9.1.1.

4. ORGANISATIONAL OVERVIEW

This section outlines the key projects partners and stakeholders of the Wakatipu Active Travel Network.

4.1. Way to Go (W2G)

4.1.1. NZ Transport Agency

The NZ Transport Agency is responsible for giving effect to the current (2018) Government Policy Statement on Land Transport (GPS), which sets out the Government's strategic direction for investment in the land transport network. This role extends from planning and funding activities, supporting public transport, building the networks that connect communities, to ensuring the people and vehicles that use the system are safe to do so.

The NZ Transport Agency assesses all potential projects against the GPS which has priorities of Safety, Access, Environment and Value for Money. The priorities for GPS 18 are further outlined in Appendix B.

4.1.2. Queenstown Lakes District Council

The QLDC formulates the strategic direction for the District including transport planning, land development and managing the effects of land use in the District. The Council is responsible for managing the local transport network that along with the state highway, forms the land transport network serving the Wakatipu Basin.

QLDC recognises the importance of providing good quality facilities to support active modes of transport in travel to work, education and recreation.

4.1.3. Otago Regional Council

ORC are responsible for the operation of public transport services in the region which will have influence on the WATN with regards to providing choice and convenience for the customer. This close linkage means public transport improvement initiatives and the WATN must align and complement each other.

4.2. Queenstown Trails Trust

Queenstown Trails Trust (QTT) are an independent charity advocating and facilitating the creation of a network of recreational trails within the Wakatipu Basin. The trust plays a major role in trail advocacy through engagement with various levels of government and the NZ Transport Agency to seek funding for trail related initiatives. They provide varying levels of data information relating to existing usage and future demand of trails.

5. PROBLEMS, OPPORTUNITIES AND CONSTRAINTS

This section considers the case for investment in the Wakatipu Active Travel Network. It considers the nature of the problem and opportunities provided by investment, the benefits of investing in the WATN, and the merits of investing now.

The underlying problem currently is that there are cumulative real and perceived safety issues for active travel users with the current network of trails and the use of arterial and urban roads for active travel in the Wakatipu Basin. Cyclists are disproportionately more unsafe when compared to public transport and vehicle users on the road network. Perception and increased relative risk mean that Wakatipu residents do not view cycling as a viable travel choice for work or recreation. When combined with a trail network with missing links and poor levels of service for pedestrians and cyclists, this deters active travel users and reinforces a transport system dominated by private vehicle trips.

5.1. Defining the Problems and Opportunities

A facilitated workshop using the Investment Logic Mapping (ILM) process was held on 10th October 2018 with key stakeholders including W2G and QTT, to gain a better understanding of current problems. The stakeholders identified and agreed the following key problems and problem weightings:

- Problem one: Lack of appropriate and safe infrastructure creates actual and perceived safety and security risks which are barriers to cycling and walking (40%);
- Problem two: Informal and incomplete cycle and walking trails leads to low usage and will not help achieve a sustainable transport system (40%); and
- Problem three: Current preferences of mode due to limited alternative options reinforce unwelcome congestion, health and other effects (20%).

5.2. Benefits of Investment

The potential benefits of successfully investing to address the problems above were identified as part of the same workshop held on 10th October 2018. The ILM generated at the workshop is attached in Appendix D. The stakeholders identified and agreed the following potential benefits (and benefit weightings):

- Benefit one: Better safety and security (40%);
- Benefit two: An integrated active travel network (35%); and
- Benefit three: Positive community and environmental effects (25%).

All three benefits are linked to increasing pedestrian and cyclist use and overall achieving greater active travel mode share, particularly for commuting.

5.3. Understanding and Analysing the Problem

The problem statements identified and defined above have been investigated and analysed based upon the existing available evidence base. All evidence is presented in the context of the problem ***cause*** and ***effect***.

5.3.1. Problem Statement 1

Lack of appropriate infrastructure creates actual and perceived safety and security risks which are barriers to cycling and walking.

A lack of appropriate infrastructure for cyclists and pedestrians creates both actual and perceived safety and security risks. This has led to people choosing not to cycle or walk.

The Problem Statement can be broken down into the following cause and effect:

Cause: Lack of appropriate infrastructure

Effect: Actual and perceived safety and security risks

This section demonstrates that:

- Current routes are not popular for commuters, school children, the elderly and others (based on Census Data and QTT usage)
- There are serious safety and security risks based on customer insight data from community consultation
- There are a range of crashes across the network caused by lack of appropriate infrastructure and other factors.

Cause – Lack of appropriate infrastructure:

The cause of the safety and security risks along the corridor can be broken down into both perceived and actual safety and security. The evidence utilised to assess this is as follows:

- Review of surveys and stakeholder consultation
- Review of current pedestrian network and level of appropriate infrastructure
- Review of current cycling network and level of appropriate infrastructure
- Review of e-mobility and impacts
- Contributing factors

Perceived safety and security

Perceived safety and security data has been obtained via community engagement which has been undertaken throughout the project. Relevant information is provided in Table 4 below.

Table 4: Safety Concerns Highlighted Through Community Engagement

AREA	DETAILS
Motatapu Finish Line	• Barriers preventing people from cycling include: ○ Poor lighting ○ Safety concerns ○ Difficulty wayfinding ○ Track surfacing
Survey	• Safety suggestions: ○ Sealed and separated from pedestrians (although note that sealed tracks are a contentious issue ○ Mirrors on blind corners ○ Protected cycling lanes ○ Seal and light the Frankton track

Other safety concerns	• Dangerous to walk on the road • Conflict between high speed cyclists and pedestrians (walkers) • Crossing of busy roads needs improvement • Sealed tracks can become a “race track” • Potentially have an on road cycle track for commuters from Frankton to Queenstown and retain the lake side track for recreational cyclists
Other infrastructure concerns	• No infrastructure facilities in the form of showers • When wet and muddy many people choose not to cycle

The insights from community engagement plus expert assessment of routes demonstrate that there are a range of infrastructure deficiencies along the paths and that poor lighting, safety concerns, surfaces and also lack of appropriate wayfinding are issues. In addition to issues on the actual paths, lack of facilities for commuters (such as showers at the airport for employees) also limits ridership.

Cycling network

The existing trails in the Wakatipu Basin are well used for recreational purposes. MBIE data indicates that more people visited the Queenstown Trails in 2016 than any other Great Ride in NZ[7]. However, due to constraints/ short-comings such as topography, surfacing, width, isolation, reduced visibility, barriers, and exposure to weather conditions, these routes are not popular for commuters, school children, the elderly and others due to the actual and perceived safety and security risks. Figure 18, Figure 19 and Figure 20 show examples of situations where there is a reduced standard of infrastructure that may impact on safety and security.

[7] NZ Cycle Trail Evaluation Report 2016

Figure 18: Steep gradients and loose surfacing between Frankton and the Shotover River

Figure 19: Narrow paths on approach to Lake Hayes Estate

Figure 20: Isolated route with no lighting through Kawarau Falls Scenic Reserve

Contributing Factors

In addition to the above, there are a range of contributing factors that impact on the ability and willingness for cyclists and pedestrians to take up active modes. Table 5 provides further details.

Table 5: Problem Statement 1 Cause - Contributing Factors

Factor	Details
Topography	The steep gradient of some sections can contribute to safety issues for cyclists. This may include the risk of conflict between users travelling downhill at speed and those walking/ riding uphill on the trail. Topography is covered in the Safety and Mobility categories of the Austroads Level of Service (LoS) assessment tool, which is presented under Problem Statement 2.
Surfacing/ width:	Substandard widths provide an uncomfortable environment for all users, particularly where there is interaction between different modes.

	Surfacing on primary routes with high expected usage also presents a challenge in providing accessibility and connectivity for all users (i.e. wheel chairs, mobility scooters). Surfacing/ width is covered in the Mobility and Amenity categories of the Austroads LoS assessment tool, which is presented under Problem Statement 2.
Isolation/ reduced visibility barriers:	Isolated areas with limited visibility contributes to an unattractive environment where perceived safety becomes an issue for less confident users. For example, vegetation may impede visibility. Isolation/ visibility is covered in the Amenity and Safety categories of the Austroads LoS assessment tool, which is presented under Problem Statement 2.
Exposure to weather conditions:	The climate for the area is temperate but shows strong temperature variations between summer and winter (Figure 21). The area experiences relatively high rainfall compared to the rest of NZ with an average rainfall of 900mm a year[8]. Rainfall (ice and snow) on loose surfaces could cause real and perceived safety issues for users if not dealt with appropriately. These risks are increased due to the mountainous topography increasing shading and the potential for ice/frost. Exposure to weather conditions is covered in the Amenity and Safety categories of the Austroads LoS assessment tool, which is presented under Problem Statement 2.
Access/ intersections:	There are numerous intersections in the network which provide access for users and interact with other mode types (vehicles, public transport). Additionally, the access roads and property accessways connecting with the existing network are formed to variable standards (e.g. gradient) and interact with roads with varying road classification, leading to potentially unattractive or unsafe routes to and from the network. In addition, gaps within the network may force users onto roads and verges as part of their trips. Access/ intersections is covered in the Safety, Access and Information categories of the Austroads LoS assessment tool, which is presented under Problem Statement 2.
Wayfinding:	On parts of the network, there is a lack of legibility, which may make it less attractive to both commuter and non-commuter users. This may result in users being unsure of the way they need to go to their destination or not having confidence that they are going in the direction they intend to. Wayfinding is covered in the Information category of the Austroads LoS assessment tool, which is presented under Problem Statement 2.
Weather	The climate for the area is temperate but shows strong temperature variations between summer and winter (Figure 21). The area experiences relatively high rainfall compared to the rest of NZ with an average rainfall of 900mm a year[9]. Rainfall (ice and snow) on loose surfaces could cause real and perceived safety issues for users if not dealt with appropriately because of the increased likelihood of slippage. These risks are increased due to the mountainous topography increasing shading and the potential for ice/frost. Exposure to weather conditions is covered in the Amenity and Safety categories of the Austroads LoS assessment tool, which is presented under Problem Statement 2.

[8] *About.metservice.com. (2019). Climate Summary » About MetService. [online] Available at: https://about.metservice.com/our-company/learning-centre/climate-summary/ [Accessed 26 May 2019].*
[9] *About.metservice.com. (2019). Climate Summary » About MetService. [online] Available at: https://about.metservice.com/our-company/learning-centre/climate-summary/ [Accessed 26 May 2019].*

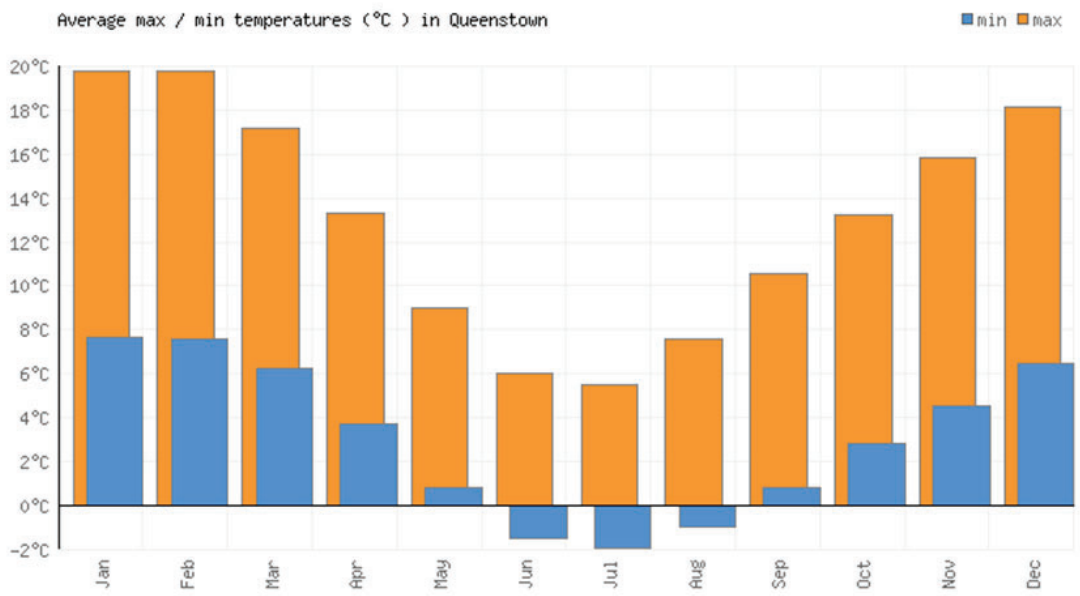


Figure 21: Average minimum and maximum temperatures in Queenstown throughout the year

Effect/Consequence – Actual and perceived safety and security risks:

Crash data

A review of the NZ Transport Agency's Crash Analysis System (CAS) data was undertaken to understand the number and severity of crashes in the Queenstown Town Centre and wider District in the ten-year period between 2008-2017. This is shown in Figure 22, with the extents of Queenstown Town Centre in Figure 23. A large proportion of recorded crashes are represented along existing road corridors that are either in part of fully shared with active modes, illustrating the current vulnerabilities and safety risks to trail users.

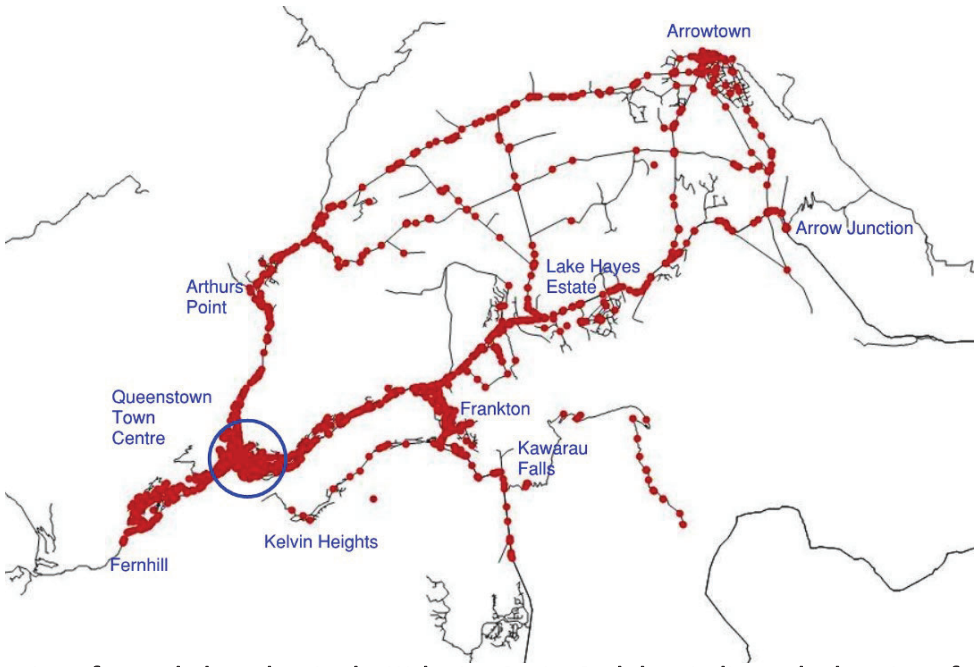


Figure 22: Location of recorded crashes in the Wakatipu Basin. Red dots indicate the location of crashes, which indicates a concentration in and around Queenstown Town Centre (circled).

Figure 23: Extents of Queenstown Town Centre

It is important to note that this data represents the reported and recorded crashes on the road network between the designated dates only. The NZ Transport Agency have completed a study to predict accident rates for cyclists and pedestrians due to under-reporting of such incidents[10]. This includes data from the CAS system, Accident Compensation Corporation (ACC) and St John database archives. Regarding unreported crashes, the study states that at least half of the cycle accidents occur off-road, and approximately 37% of on-road or footpath accidents involving a pedestrian do not involve a motor vehicle. The study concluded that after a comparison of the three datasets, there is an indication that the reporting rate of pedestrian and cyclist accidents in the CAS database is low.

Having regard to the potential under-reporting of crashes involving active modes, Table 6 shows the number of pedestrian and cycle crashes, and the proportion relative to total crashes recorded on the road network in the period from 2008-2017. In the Queenstown Town Centre area, 7.9% of crashes recorded involved a pedestrian or a cyclist, compared with 5.6% for the Wakatipu Basin. A probable contributing factor is the higher density of pedestrian and cycle activity within the town centre area.

Table 6: Number of pedestrian and cycle crashes as a proportion to total crashes for the period from 2008-2017

AREA	CYCLE CRASHES	PEDESTRIAN CRASHES	TOTAL PEDESTRIAN AND CYCLE CRASHES	TOTAL CRASHES	PROPORTION
QUEENSTOWN TOWN CENTRE	19	42	61	770	7.9%
WAKATIPU BASIN	44	63	107	1913	5.6%

Table 7 shows the number of fatal and serious injuries involving pedestrians and cyclists in the recorded period. There were two fatal injuries, which involved pedestrians and that took place on Fernhill Road and Arthurs Point Road. Both incidents were during the evening hours when it was dark, suggesting visibility could have been a contributing factor. In addition, the incident on Arthurs Point Road was a result of the pedestrian walking on the road. It is not known but the quality of the existing facilities may be a factor that resulted in the pedestrian walking on the road. There were no recorded fatal injuries involving cyclists within the dataset. However, the majority of cycle-related crashes resulted in some form of injury.

[10] *Predicting Accident Rates for Cyclist and Pedestrian*, Land Transport New Zealand Research Report 289 (2006). *https://www.nzta.govt.nz/assets/resources/research/reports/289/docs/289-Predicting-accident-rates-for-cyclists-and-pedestrians.pdf*

With regards to serious injuries in the area, the most common cause of incidents was due to failure to give way, failure to notice and crossing roads, which tend to be issues that can be addressed through implementation of appropriately designed infrastructure.

Table 7: Number of pedestrian and cycle fatal and serious injuries (FSIs) from 2008-2017

AREA	FATAL	SERIOUS	MINOR	NON-INJURY	FSI (FATAL AND SERIOUS INJURIES)
QUEENSTOWN TOWN CENTRE	0	13	35	14	**13**
WAKATIPU BASIN (INCLUDING QUEENSTOWN)	2	25	57	26	**27**

The proportion of total crashes that resulted in serious or minor injuries for pedestrians and cyclists was 77% and 79% for Wakatipu Basin and Queenstown Town Centre respectively. Table 8 outlines the social cost of FSI's in the Wakatipu Basin. The proportion of social costs relating to pedestrian and cyclist FSI crashes totalled around $30m between 2008 and 2017[11].

Table 8: Social Cost of Pedestrian and Cyclist Crashes (2008-2017)

CRASH TYPE	COST
Fatal	$8.68m
Serious	$17.5m
Minor	$2.3m
Total:	**$28.48m**

Regionally, the proportion of pedestrian and cyclist FSIs within the Wakatipu Basin are statistically significant. Whilst crashes involving cyclists and pedestrians are major issues in urban areas of Otago such as Dunedin (due to a variety of factors including population size and active travel mode share), the Wakatipu Basin is the second-highest District for recorded FSIs amongst pedestrians and cyclists between 2008-2017. Figure 24 below, based on CAS data, shows the proportion of FSIs by Otago district showing the severity injury split by fatality, serious injury, and minor injury. It shows that the Queenstown Lakes District counts for a proportionally higher number of serious injuries relative to total crashes compared to other districts. A comparison with similar urban areas within NZ also provides assessment of FSI severity nationally. Recorded FSIs in Queenstown Lakes District has been compared with NZTA Peer Group D urban areas (defined as principal towns with a population of 20,000-75,000 and/or rural crashes greater than 55 percent) to provide such an assessment. Figure 25 compares the proportion of FSIs across Peer Group D Districts between 2008-2017. Queenstown Lakes District shows a relatively high proportion of FSIs when compared to urban areas and towns of a similar size and risk profile.

[11] Based on average social cost per fatality of $4,369,700, social cost is estimated at $458,400 per serious injury and $24,700 per minor injury (Social Cost of Road Crashes and Injuries 2018).

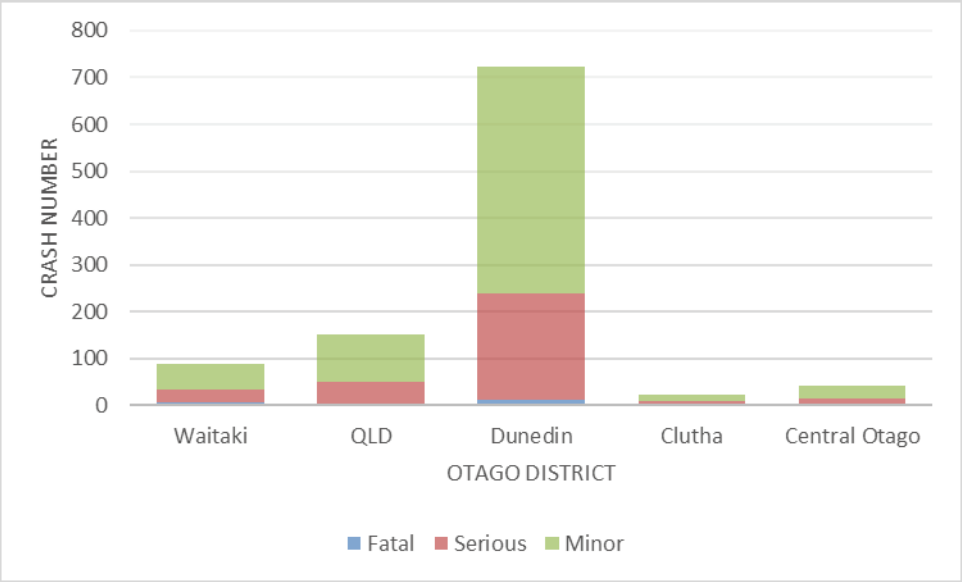


Figure 24: Comparison of FSIs in Otago by District

	Ashburton	Manawatu	Marlborough	Masterton	QLD	Selwyn	Southland	Tasman	Taupo	Thames-Coromandel	Waimak	Waipa	Western Bay of Plenty	Whakatane
Minor	48	50	145	104	101	43	23	109	91	46	62	97	55	62
Serious	11	15	26	16	48	12	12	21	35	29	26	40	32	31
Fatal	4	7	5	1	3	6	1	6	8	1	5	3	9	2

Figure 25: Comparison of FSIs across Peer Group D Districts

Causation factors were also reviewed from the dataset and are shown in Table 9. Most of the crashes involving pedestrians and cyclists were due to driver only factors (driver error), with the main reasons being poor road positioning, failing to give way and failing to notice. The review of the fatal and serious injuries (FSIs) summarised in Table 7, and of the causation factors (Table 9), suggests that there is an increased likelihood of injury when vehicles interact with pedestrians and cyclists. This is likely due to the absence of appropriate protection and facilities in a potentially high speed and/or busy environment which requires interaction between mode types.

Table 9: Breakdown of Causation Factors for Pedestrian and Cycle Incidents

CAUSATION	CYCLE CRASHES	PEDESTRIAN CRASHES
All road user factors	8	13
Driver only factors	63	60
Pedestrian factors	0	34
Vehicle factors	2	2
Road factors	5	5
Environmental factors	0	7
No identifiable factors	4	4

In a national context, the percentage of cyclist-vehicle collisions suggests cyclists are not at fault in 70% of crashes between 2012-2016 (Figure 26). For the same period (2012-2016), this value was 75% within the Wakatipu Basin (n=75). Pedestrian behaviour was also the contributing factor of a high proportion of crashes, around half of those where drivers were at fault. Reasons included pedestrians making misjudgements and failure to notice vehicles.

In the context of high-speed environments such as those experienced on Malaghans Road for example, Ministry of Transport (MoT) national statistics show that 35% of cyclist deaths occur on the open road, due to the higher impact speeds. The absence of any deaths involving cyclists in the Wakatipu Basin over the period analysed may be attributed to the low levels of usage. As shown in Figure 26, the majority of incidents involving cyclists and vehicles (70%) are not due to the fault of cyclists.

Pedestrians are also at a higher risk of serious injury in these environments, and therefore require enhancements to improve safety.

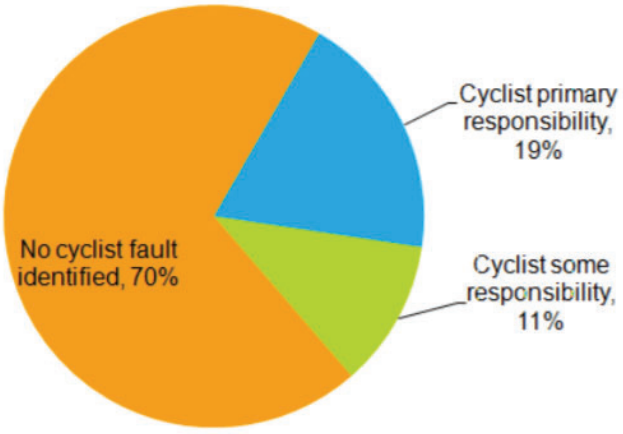


Figure 26: Percentage of cyclist-vehicle collisions (nationally) by fault (2012-2016)

The Queenstown Trail Trust User Satisfaction Survey completed[12] (2017) included 14 comments on safety issues regarding the trail network. Several respondents raised concerns surrounding pedestrian and cyclist interaction, including congestion on the trail in the Hilton area, and desirability from respondents of separating pedestrians and cyclists on sections of the trail that are busy. The need for regular vegetation trimming and maintenance to improve sight lines was also mentioned. As part of the engagement process, non-users were asked what barriers they face with regard to using the WATN.

[12] *Economic Impacts and Trail User Satisfaction,* Queenstown Trails Trust (2017). *https://queenstowntrail.co.nz/assets/AGM-2017/Queenstown-Trail-Economic-Impact-and-User-Satisfaction-Final-Report-260717.pdf*

Crime Prevention through Environmental Design (CPTED) is a design philosophy to promote safer neighbourhoods. Based on the application of these guidelines, there are potential issues for active travel users on the trail network due in part to a lack of passive surveillance (i.e. roads and built up areas) and appropriate lighting. These pathways are likely to be used during daylight hours only. Efforts are required to mitigate CPTED concerns through enhanced technology to provide lighting to key pathways, as well as locating pathways close to development or roads.

Problem Statement Summary

In summary the evidence shows that:

- There is a perceived safety and security risk for existing and potential users to the active travel network.
- There are a range of infrastructure deficiencies when compared to other cycling and pedestrian infrastructure around New Zealand.
- There is a higher rate of accidents than other parts of New Zealand based on CAS data.

5.3.2. Problem Statement 2

Informal and incomplete cycle and walking trails lead to low usage and will not help achieve a sustainable transport system.

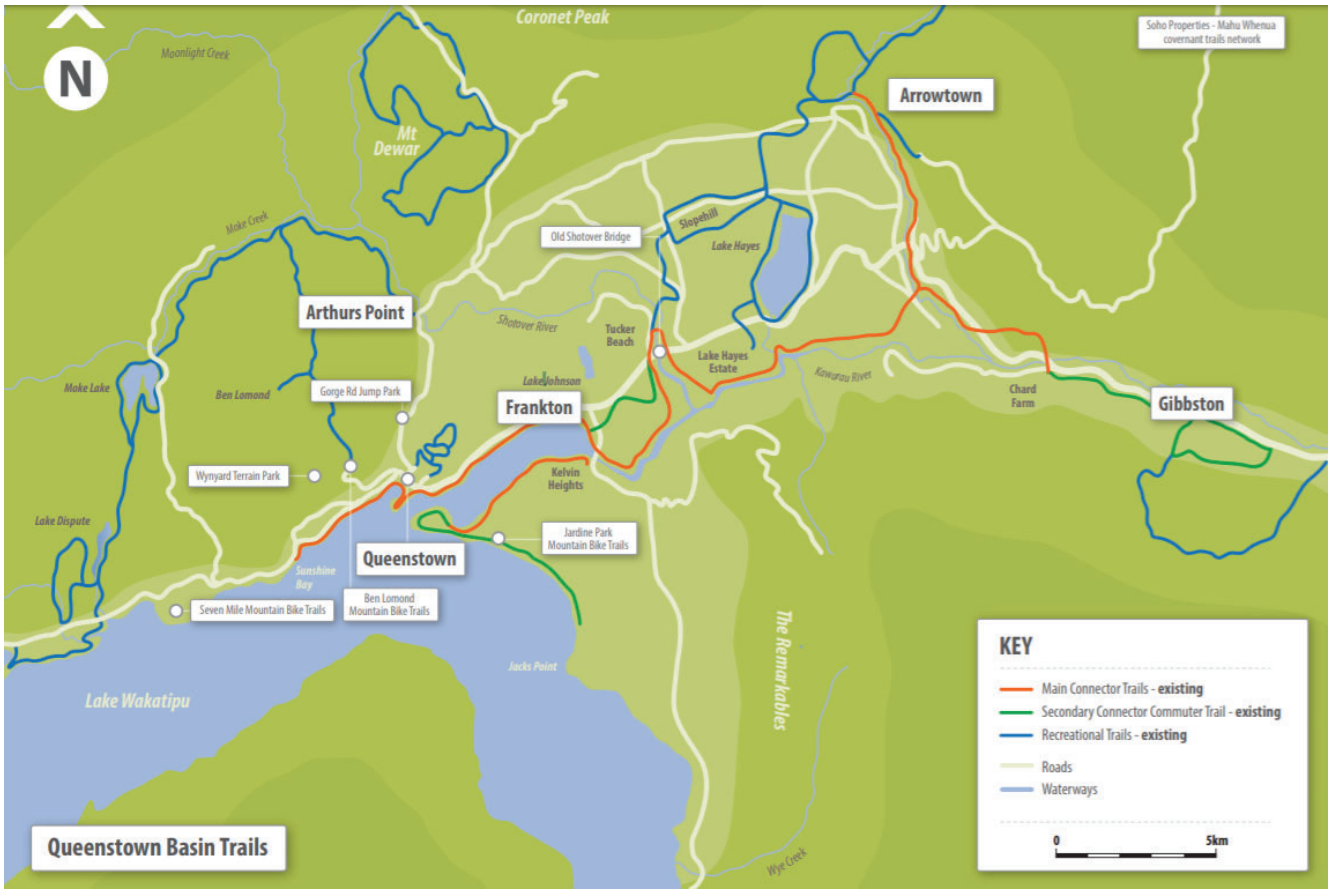
Cause: Informal and incomplete cycling network and walking trails

Effect: Low usage which increases use of unsustainable modes

Cause – Informal and incomplete cycle and walking trails:

The existing trail network extent within the Wakatipu Basin provides a limited number of connector routes between residential and employment/business areas principally between Lake Hayes, Frankton, and Queenstown Town Centre. The connector routes that do exist have varying levels of service in relation to directness, comfort, and safety. The extent of the existing trail network is illustrated in Figure 27 below.

Figure 27: Wakatipu Basin Existing Trail Network



The existing trail network has sections that are informal and incomplete and thus provides a low LoS, which discourages travel by active modes in favour of the private vehicle and promotes an unsustainable transport system. This compromises the potential integration with key destinations and public transport hubs.

The LoS of the existing routes (off-road ad on-road facilities) defined by QLDC have been reviewed for both pedestrians and cyclists and is shown in Figure 28 and Figure 29. This was completed using Austroads Level of Service Metrics (for Network Operations Planning) (2015), which provided a framework for both assessing the pedestrian and cyclist LoS.

The Austroads LoS framework is recommended by NZ Transport Agency as the default for network operating frameworks for New Zealand localities. The framework uses an A to F scale but is rated subjectively according to set criteria which allows for a simpler assessment process versus other methods.

The Austroads LoS framework is a qualitative assessment which provides LoS rating for walking and cycling modes individually so that shortcomings between modes can be more easily understood.

Appendix E includes notes on each of the routes against the key drivers and bespoke associated factors for each mode, highlighting the issues that limit the overall LoS.

Figure 28: LoS assessment of existing routes (Pedestrian)

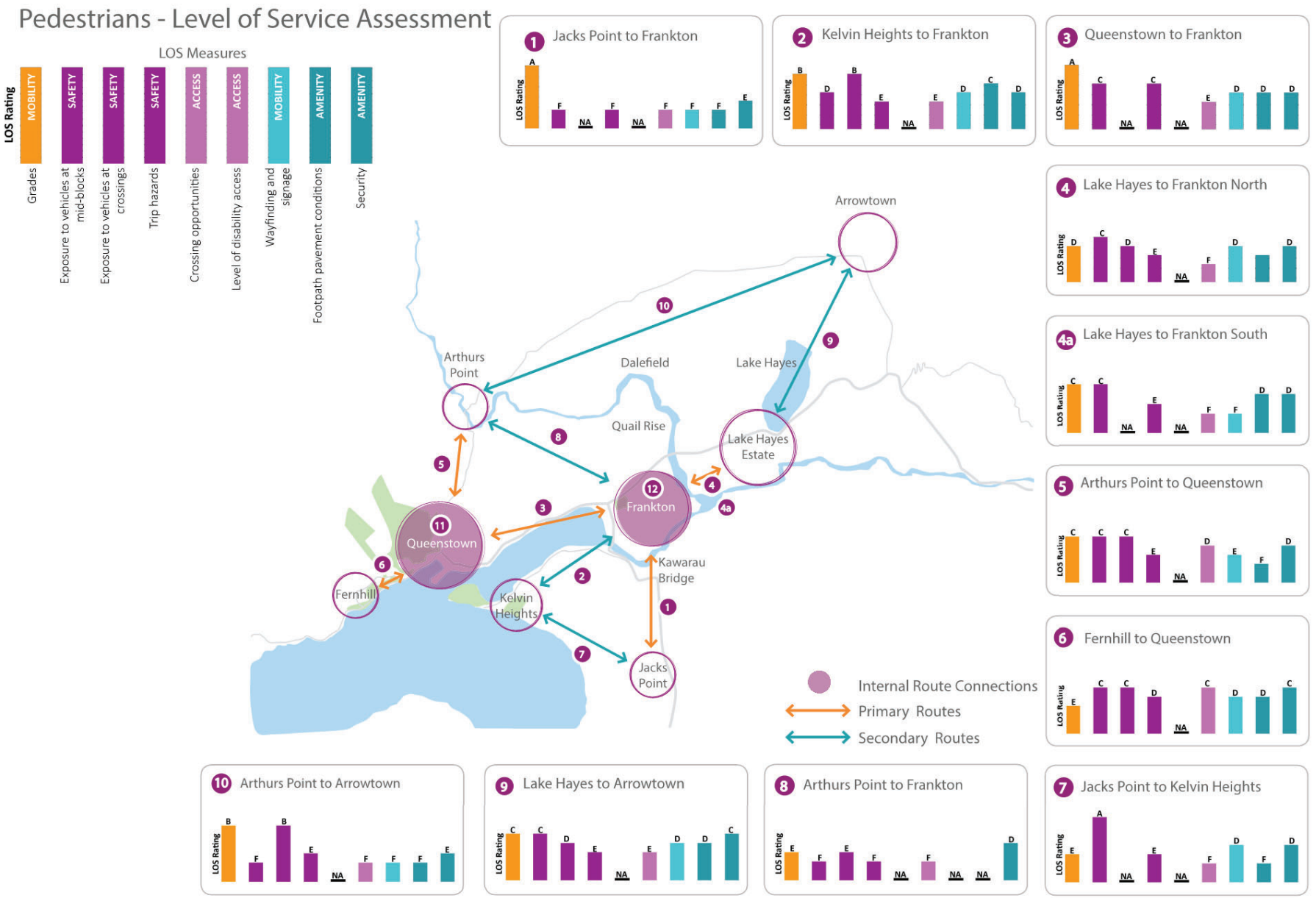
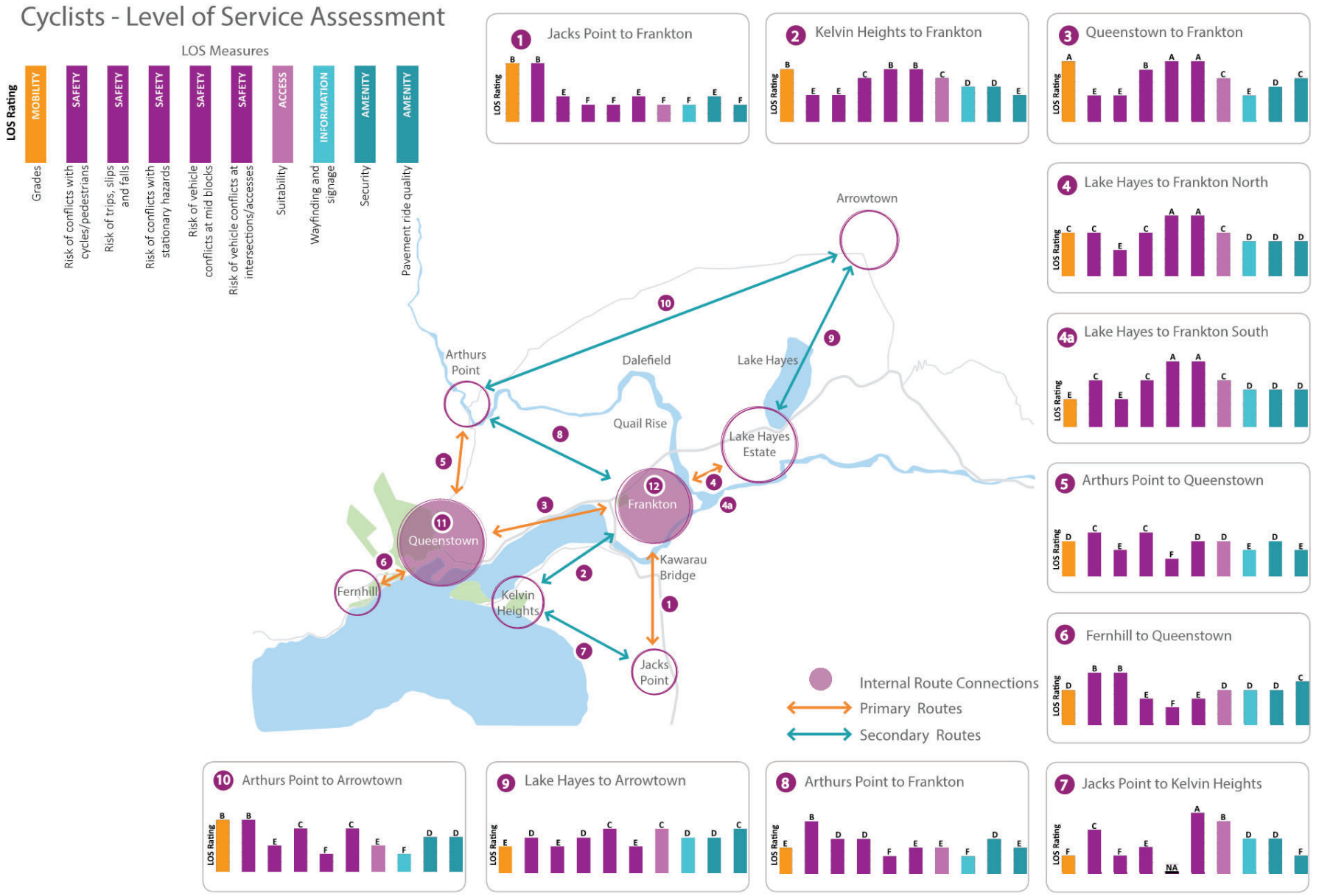


Figure 29: LoS assessment of existing routes (Cyclists)



Even with the existing network facilities, there are still a number of incomplete or informal connections between key destinations within the area. Table 10 summarises the identified network gaps and missing links following review of the proposed routes by Way to Go. Integration with the public transport network is further discussed in Problem Statement 3.

Table 10: Network Gaps and Missing Links of the Existing Network

#	Route	Network Gaps and Missing Links
1	Jacks Point to Frankton	There is an existing gap in the network with no walking and cycling facilities between Jacks Point and Frankton. It would serve an area of population growth with new housing developments at Jacks Point, Hanley's Farm and a proposed Special Housing Area at Coneburn. Also, with the development of industrial zoned land at Coneburn and the establishment of a retail centre at Jacks Point, there will be employment and business growth that generates demand.
2	Kelvin Heights to Frankton	It has been identified that there are minimal access points to the existing trail from Peninsula Road, with a substandard connection to the Kawarau Bridge There are also sections of the existing track that are narrow and provide a sub-optimal LoS.
3	Frankton to Queenstown	There are existing safety concerns through the area adjoining the marina. At present, a large number of vehicles and trailers of different sizes, associated with the boat ramp and roadway, presents a risk to active modes. There are also minimal access opportunities between the existing track and SH6a.
4	Lake Hayes Estate to Frankton	There is an existing gap in the network between Lake Hayes Estate and south Frankton with the absence of a direct, safe active travel route between the two areas. The presence of various schools within Frankton increased the demand for travel for schoolchildren and parents from the residential areas within Lake Hayes Estate. Having regard to the existing and anticipated growth in Frankton, there is a need for improved accessibility to the area, particularly from a significant catchment to the west of the Shotover River.
5	Arthurs Point to Queenstown	The existing connection is substandard, with anticipated residential development for Arthurs Point in the future.
6	Fernhill to Queenstown	LoS issues regarding the volume of vehicle traffic on the existing road, coupled with the challenging gradient.
7	Jacks Point to Kelvin Heights	Challenging grades throughout the route, along with narrow sections around blind corners.
8	Arthurs Point to Frankton	Discontinuous existing connection with uneven surface and varying widths more typical of a recreational hiking/walking trail.
9	Arrowtown to Lake Hayes Estate	No existing path on Arrowtown-Lake Hayes Rd which has a high traffic volumes and 100kph speeds. Lake Hayes circuit currently has LoS issues for a successful mixed walking and cycling corridor.
10	Arrowtown to Arthurs Point	Until the QTT trail is constructed, there is no appropriate facilities for active travel users. Once the QTT trail is complete, it will not provide a direct link
11	Queenstown Town Centre*	Narrow widths and inconsistent pathway treatments between the gardens to gondola. Very high pedestrian volumes throughout town centre with priority given to vehicles at many crossing points.
12	Frankton Connections.	There is a critical gap through Frankton as there is a need to connect the five proposed routes into Frankton (Route 1, 2, 3, 4 and 8). Without these links, it will be difficult for users to navigate through the centre.
*Streetscape improvements proposed in the QTCMP PBC are to be funded as part of these works.		

Figure 30 shows an example of an informal section of the current trail from Queenstown to Frankton adjacent to the Frankton Marina. The image shows it is not separated in an area that is busy with

private vehicles, delivery vehicles and boats being manoeuvred without clear delineation of where to walk/ ride.

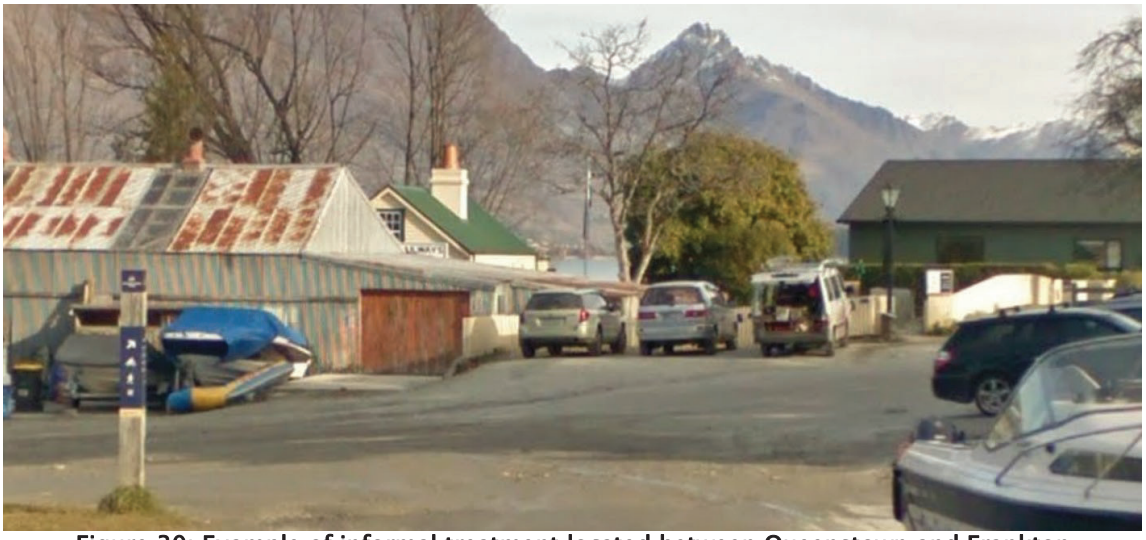


Figure 30: Example of informal treatment located between Queenstown and Frankton

Figure 31 shows an informal section of the existing network from Queenstown to South Frankton along the Shotover Delta. Like Figure 30, it is not separated, with the area providing access to a local quarry. Even though this is a low volume road, the required access by heavy vehicles to the existing quarry may cause discomfort and safety concerns to users on the trail in this location.

Figure 31: Existing Queenstown to South Frankton Trail along Shotover Delta

Poor quality connections between routes was also highlighted as a barrier to users. The example shown in Figure 32 is a narrow and uncomfortable connection between the Kelvin Heights Track and the Old Kawarau Falls Bridge into Frankton. The grades on this section make it uncomfortable for walkers and extremely challenging for people on bikes, having regard to its steepness and the tight bends. Inappropriate and informal connections between existing and proposed routes will not be attractive to users and may discourage use of the network.

Figure 32: Incomplete connector between Kelvin Heights and the SH6 Bridge

Outside the Queenstown and Frankton area, the routes are more informal and incomplete, making trips in the wider areas less desirable. Evidence of informal usage can be seen in Figure 33, which is located on Speargrass Flat Road and shows signs of usage on the grass verge to access the path.

Figure 33: Signs of usage on grass verge adjacent to Speargrass Flat Road

Effect/Consequence – Low usage and an unsustainable transport system:

The significant levels of population growth will lead to increased demand for residential and commercial land, land use change and increased volumes of traffic, placing the transport system under even more pressure. On top of this, Queenstown attracts more than two million visitors per year, with visitor numbers exceeding the usually resident population by as many as 34 to one[13].

Traditionally, the visitor derived travel volumes have been quite seasonal with the highest demand being experienced in the winter and summer months, coinciding with the ski season and summer holiday period. The overall growth in visitor numbers, and the shift into the previously lower demand shoulder periods, is increasing the pressure across the network all year round. Notwithstanding this, the usage of the trail network is still very much seasonal as seen in the QTT trail usage data represented in Figure 34. This may reflect the low attractiveness of walking and cycling in winter months.

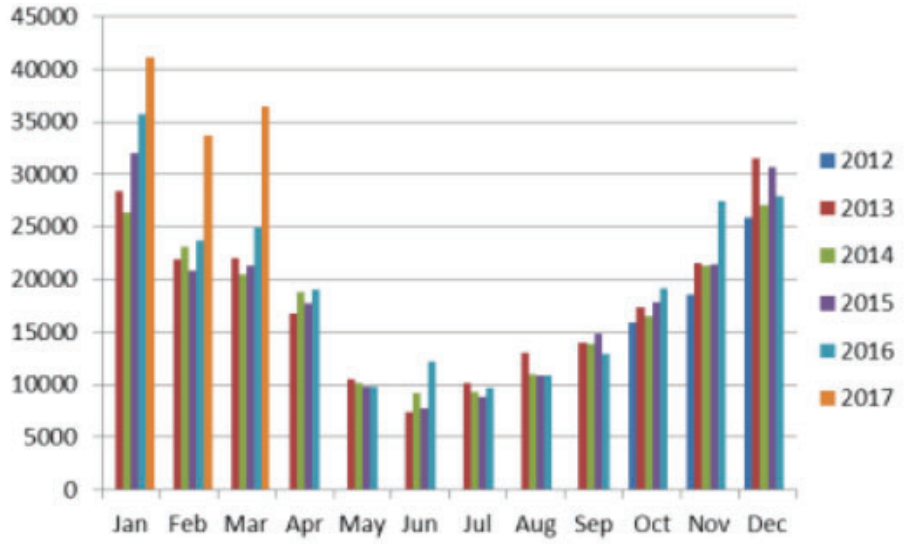


Figure 34: QTT total counts per month on the Queenstown trail network from 2012-2017.

The growth of Frankton Flats as an employment hub and the development of residential areas such as Lake Hayes Estate, Jack's Point, Hanley's Farm, Shotover Country and new Special Housing Areas is leading to an overall increase in movements across the wider area and associated congestion on the network due to its limited capacity.

Low Usage (as described in the Problem Statement)

Since opening in 2012, the trail network has seen a large uptake, showing yearly improvements (excluding 2014) as the network develops further (Table 11). With an overall year on year growth of 5%, the data shows that it is attracting new users. However, this value is on the lower end of the QTT Strategic Plan targets (2015-2025) of 5-8% for local populations and 6-10% for visitors. This, along with the highlighted gaps in the network, indicate that investment has the capability to unlock the full potential of the network.

[13] QLDC *Ten-year plan 2018-2028 He Mahere Kahurutaka*

Table 11: QTT yearly trail use data

YEAR	% INCREASE
2013	18%
2014	-3%
2015	3.2%
2016	11%
2017	5%

Unsustainable Transport System

The following is evidence of an unsustainable transport system at present, with a heavy reliance on private vehicle (refer to an overview of mode share below) and variability in travel times on key routes.

The 2013 census provides an indication of mode share for commuters travelling to Queenstown Town Centre, which is presented in Figure 35. It should be noted that 2018 census data has been collected but has yet to be released at the time of writing this SSBC.

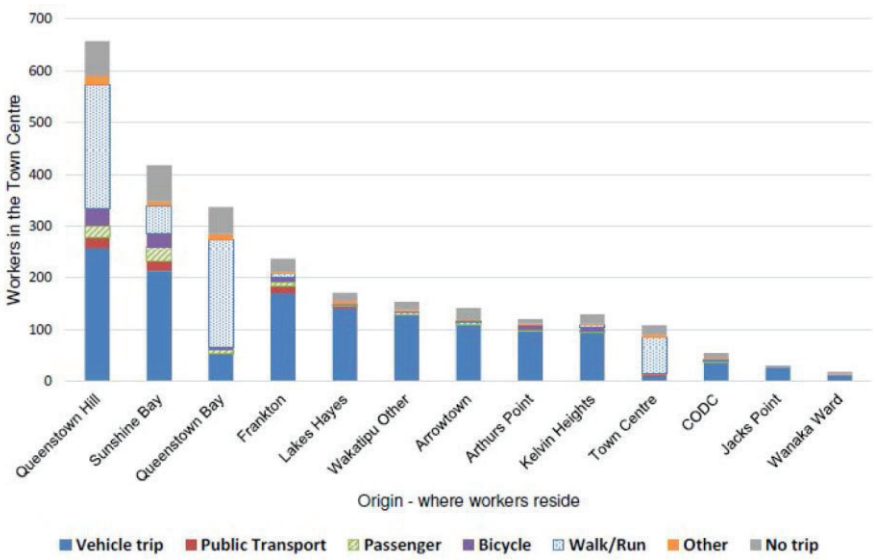


Figure 35: Overview of the mode share split for travel to work in Queenstown Town Centre from different origins (Census 2013)

The mode split as recorded in the 2013 census is acknowledged as being out of date, due to a number of factors, including more frequent public transport (Orbus) services. As new data becomes available, this will be updated in the Business Case.

Key observations that can still be derived from the census data include:

- Walking trips are relatively high for the three centrally located Area Units of Queenstown Hill, Sunshine Bay and Queenstown Bay;
- Cycling and public transport modes are sparsely represented with most trips from Queenstown Hill, Sunshine Bay and Frankton. It is noted that the Census 2013 precedes the changes to Orbus and more frequent services;
- Vehicle driver trips are the most prevalent mode especially from areas further away from Queenstown Town Centre; and,

- Vehicle occupancy rates for commuter trips are generally low.

The pressure on the network is reflected in review of TomTom GPS data from 2018, which is presented in Table 12 and Table 13. The data illustrates the travel time variance along key sections of the network (as defined in Figure 36) during the AM peak period (0700-0900hrs), evening (PM) peak period (1600-1800hrs), inter-peak period (1000-1400hr) and Free Flow traffic (0000-0400hrs) on a typical weekday throughout a three month period. Due to variation in climate, data for both the summer and winter months were assessed separately.

Figure 36: Extents of travel time analysis areas

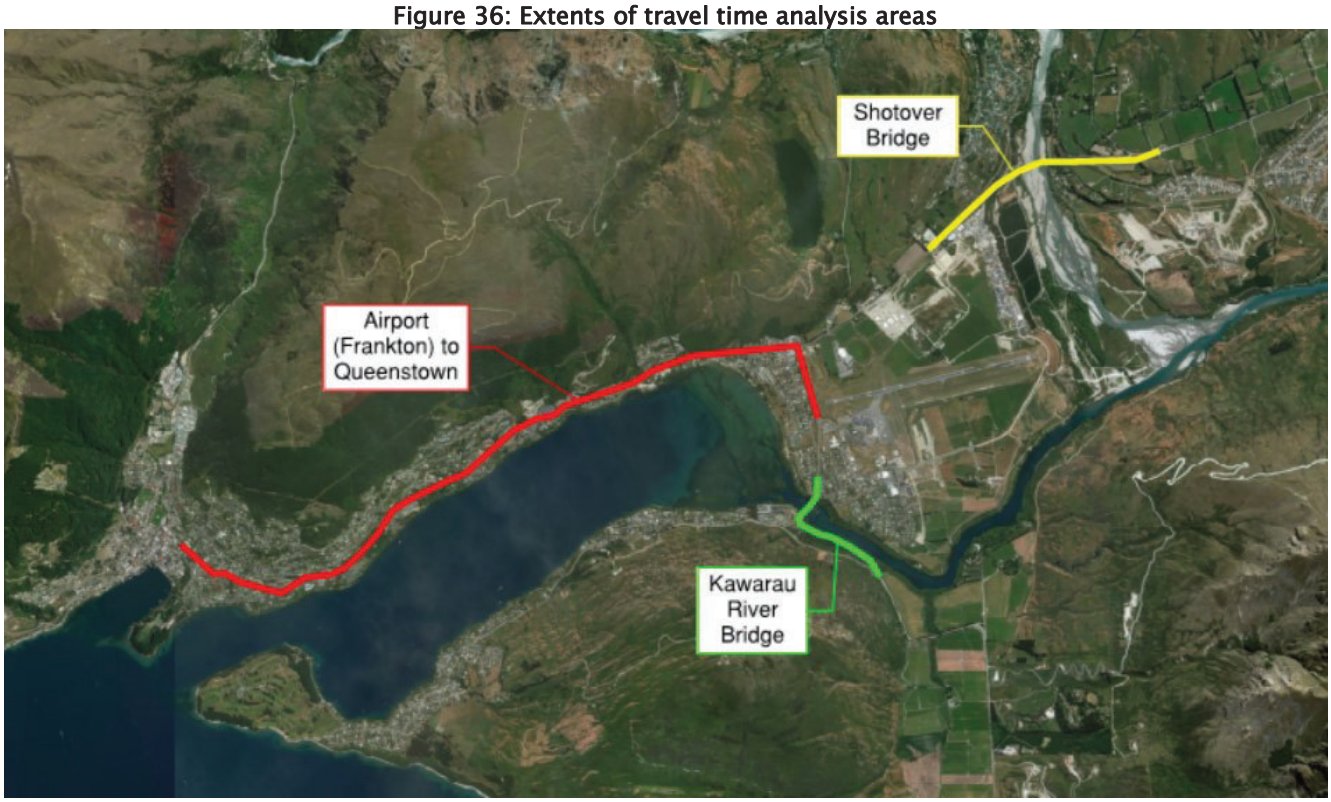


Table 12: Vehicle travel times for key routes in winter

	Lower Shotover Bridge Eastbound Mins:Seconds		Airport (Frankton) to Queenstown Eastbound Mins:Seconds		Kawarau River Bridge Northbound Mins:Seconds	
Percentile Speeds	10%ile	90%ile	10%ile	90%ile	10%ile	90%ile
AM Peak	1:58	2:45	7:30	13:36	1:41	2:46
PM Peak	2:04	3:40	7:34	15:11	1:45	3:06
Inter Peak	1:58	2:40	7:20	12:04	1:44	2:51
Free Flow*	1:45	2:34	6:37	10:48	1:25	2:29
	Lower Shotover Bridge Westbound Mins:Seconds		Airport (Frankton) to Queenstown Westbound Mins:Seconds		Kawarau River Bridge Southbound Mins:Seconds	
Percentile Speeds	10%ile	90%ile	10%ile	90%ile	10%ile	90%ile
AM Peak	2:09	4:54	7:24	14:55	1:36	2:31
PM Peak	1:59	2:54	8:03	29:29	1:33	2:28
Inter Peak	1:57	2:46	7:22	15:17	1:36	2:36
Free Flow*	1:44	2:38	5:19	10:59	1:19	2:03

**Free Flow travel times taken between 12am – 4am in the defined season*

Table 13: Vehicle travel times for key routes in summer

	Lower Shotover Bridge Eastbound Mins:Seconds		Airport (Frankton) to Queenstown Eastbound Mins:Seconds		Kawarau River Bridge Northbound Mins:Seconds	
Percentile Speeds	10%ile	90%ile	10%ile	90%ile	10%ile	90%ile
AM Peak	1:58	2:52	7:19	11:53	2:08	7:50
PM Peak	2:03	3:28	7:33	14:56	2:14	10:48
Inter Peak	2:01	2:51	7:34	13:49	2:16	8:53
Free Flow*	1:51	2:45	6:52	11:34	1:48	3:40
	Lower Shotover Bridge Westbound Mins:Seconds		Airport (Frankton) to Queenstown Westbound Mins:Seconds		Kawarau River Bridge Southbound Mins:Seconds	
Percentile Speeds	10%ile	90%ile	10%ile	90%ile	10%ile	90%ile
AM Peak	2:01	3:30	7:16	14:14	1:54	5:38
PM Peak	2:00	2:54	8:06	26:39	1:50	6:50
Inter Peak	2:00	3:02	7:46	22:17	1:54	5:31
Free Flow*	1:50	2:54	6:45	13:25	1:36	3:17

The Airport to Queenstown link that is most affected proportionally by travel time delays, particularly westbound route into the town centre during the PM peak. There is an additional 3-18 minutes delay when compared to the free flow value. This unreliability and lack of resilience is due to the key connection between the two most populous areas in the Wakatipu Basin running at or close to capacity, which could cause potential further network effects on both private car and public transport users.

On the Lower Shotover bridge, there is tidal variance in travel times, with westbound traffic being affected in the AM peak (into Queenstown) and vice versa. As Frankton develops further and there are more trips for residential and commercial purposes, the variance in travel time will have to be managed effectively, with efforts made to shift existing travel behaviours.

For both the Lower Shotover Bridge and the Airport to Queenstown Route, the overall variance in travel time is similar for both peak periods, with some additional delays in winter. This is likely to be due to road conditions and mode choice due to weather (e.g. snow and ice), as well as the addition of winter tourists.

For the Kawarau River Bridge, there was a much larger variance in the summer months as it coincided with the construction of the new bridge structure. From review of travel times in the winter months, there is a small amount of variance due to the recent improvements, even with the popularity of the Remarkables Park ski field. However, as Kelvin Heights, Jack's Point, Hanley's Farm and the wider area develop in the future, there will need to make provision for more mode choices across the Kawarau River and into Frankton. There are currently no priority measures for public transport, meaning the high variances in vehicle travel times will also affect the attractiveness and convenience of using buses.

There is a risk that demand on the transport network will compromise the function of the urban area and values identified by the community and visitors. For example, additional traffic congestion giving rise to adverse effects on the environment such as reduced amenity. Growth in Queenstown and the wider area is significant with effects on the environment, community and economy. The transport network is under sustained pressure with reliance on private vehicles and associated traffic congestion. These issues can be overcome by:

- Providing convenient routes for pedestrians, cyclists and other active mode users within urban areas;
- Offering access by walking, cycling and/ or public transport, including appropriate and safe infrastructure and a complete network (currently being investigated by the Frankton to Queenstown SSBC and QTCMP PBC);
- Providing integrated travel options that provide enhanced opportunities for access between where people live, work and visit; and
- Providing an increased LoS.

5.3.3. Problem Statement 3

Limited alternative options and current modal preferences are leading to congestion, poor health and other effects.

Cause: Limited Alternative travel Choices

Effect: Congestion and poor health

This evidence reviewed as part of this assessment includes:

- New Zealand Census Data – Commuting data
- School travel and commuting patterns
- Mode Share Data
- Extent of bus network

Cause – Limited Alternative Travel Choices:

Census Data

According to 2013 Statistics New Zealand Census Data (Table 9), the Queenstown Basin is still car dependant, with many residents using private vehicles. The data shows:

- For commuters, the use of private cars, buses, trucks and vans rose from approximately 5,500 commuters per day in 2001 to nearly 10,000 commuters per day in 2013;
- The use of bikes rose from 230 daily commuters in 2001 to 520 daily commuters in 2013; and
- Walking / jogging to work was the mode of choice for 1,200 daily commuters in 2001 rising to 1,800 in 2013.

Table 14 summarises the split between modes for all trips into the Queenstown town centre between 7am and 11am on a typical weekday. The data is collected on the three arterials leading to the town centre, namely Frankton Road, Gorge Road and Lake Esplanade.

Table 14: Mode Share for travel to town centre during the period 7am – 11am

Mode	Gorge Road	Lake Esplanade	Frankton Road	All Travel
Car Occupants	88%	67%	82%	77%
Public Transport (including coaches)	9%	15%	13%	13%
Pedestrians	2%	17%	3%	9%
Cyclists	1%	1%	1%	1%

The results demonstrate that the car is the dominant mode. Walking and cycling are not well represented, which may be influenced by the issues with the existing infrastructure identified earlier. In this regard, non-users of the network may perceive that it is not providing a choice that enables journeys to be made for work, recreation and other purposes. It should be noted that public transport does have a reasonable mode share and walking and cycling trips may have been completed to access these services. However, there is limited existing capacity on public transport for bicycle storage, making it an unattractive option due to the uncertainty of available space.

School Travel

With 2,000 primary aged and 3,100 secondary aged students within the Wakatipu Basin, school related trips are a significant component of morning peak and afternoon travel demand. Approximately 60% of school travel is completed by car with the remainder undertaken by active modes and public transport. There is considerable potential to integrate school trips with existing active travel infrastructure and the opportunities of investment in an active travel network mean that there is potential to increased active travel mode share amongst school pupils. Figure 37 illustrates the locations of schools and early child centres in the Wakatipu Basin. With a majority of trips being located in Queenstown and Frankton town centres, connections to these centres with outlying residential areas will be particularly important to realise mode share targets. With the relocation of Wakatipu High School from Queenstown to Remarkables Park in 2018, a change in travel patterns between Queenstown and Frankton is possible and there is a degree of uncertainty regarding whether this will have a significant impact on commuter peaks.

Figure 37: Locations of Schools and Early Child Centres

Public Transport Network

There have been recent improvements to the existing bus network through the implementation of the Orbus network in 2017 shown in Figure 39. Patronage data from 18/19 indicates that such improvements have been popular with residents and visitors, with a 64% (n=1,467,778) increase in patronage numbers from 17/18 (prior to the Orbus network being introduced). Patronage appears to be consistent through most of the year as indicated in Figure XXX, with slight increases over the summer months presumably as a result of a growth in visitors over this period. The highest patronage and revenue routes are Fernhill – Remarkables Park and Lake Hayes Estate – Jack's Point, which show roughly a 200% increase in passengers and revenue in 18/19 over Arthurs Point – Arrowtown and Kelvin Heights - Frankton Flats routes[14].

[14] Sourced from https://www.orc.govt.nz/media/7088/appendix-2-queenstown-buses.pdf

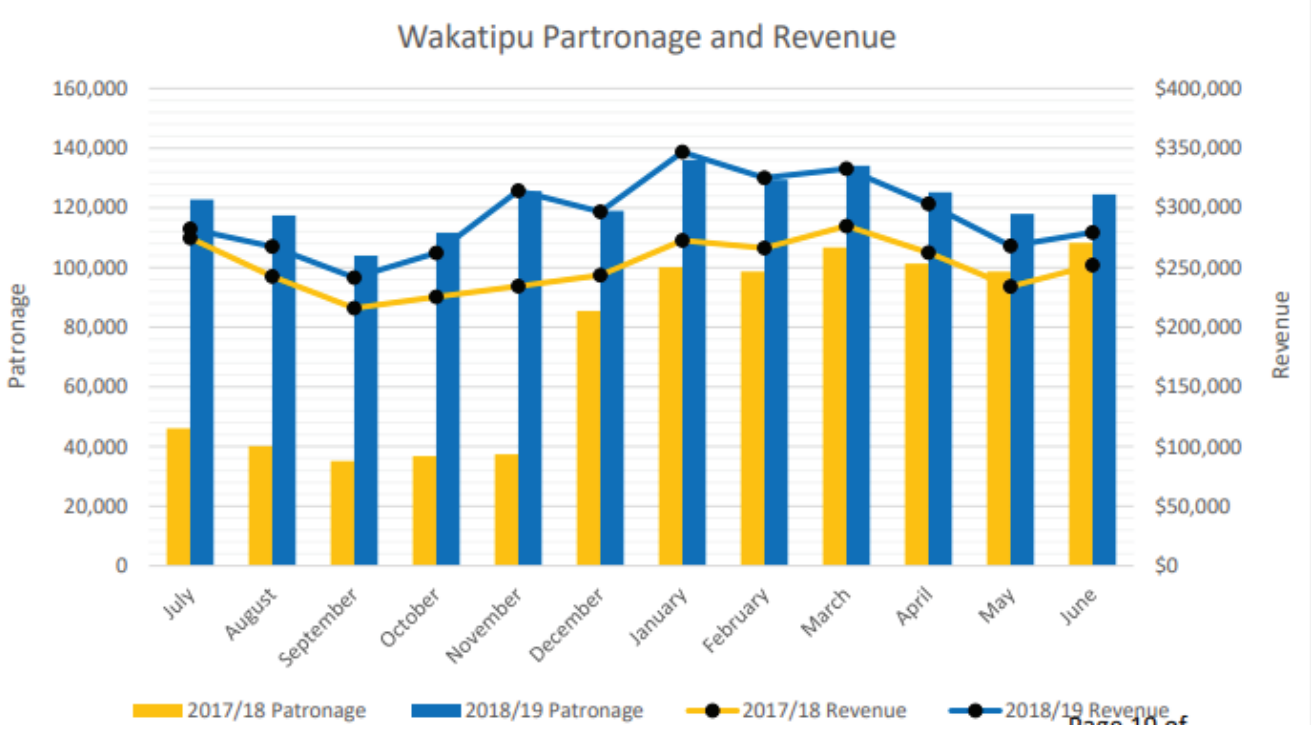


Figure 38: Wakatipu Bus Patronage and Revenue (18/19)

There is also a ferry service which links Queenstown Bay to Frankton, connecting the Queenstown Golf Course, Bayview, The Rees and the Marina. There is some level of connectivity between buses and ferry services, but it is limited to areas on the northern and southern banks of the Frankton Arm, with wharfs at Kelvin Heights, Kawarau Falls and along the Frankton Track connecting to Queenstown town centre, as shown in Figure 40. It should be noted that there is a separate ongoing Detailed Business Case (DBC) regarding proposed improvements to ferry services that will explore additional wharfs and ferry services and the potential for further transport integration.

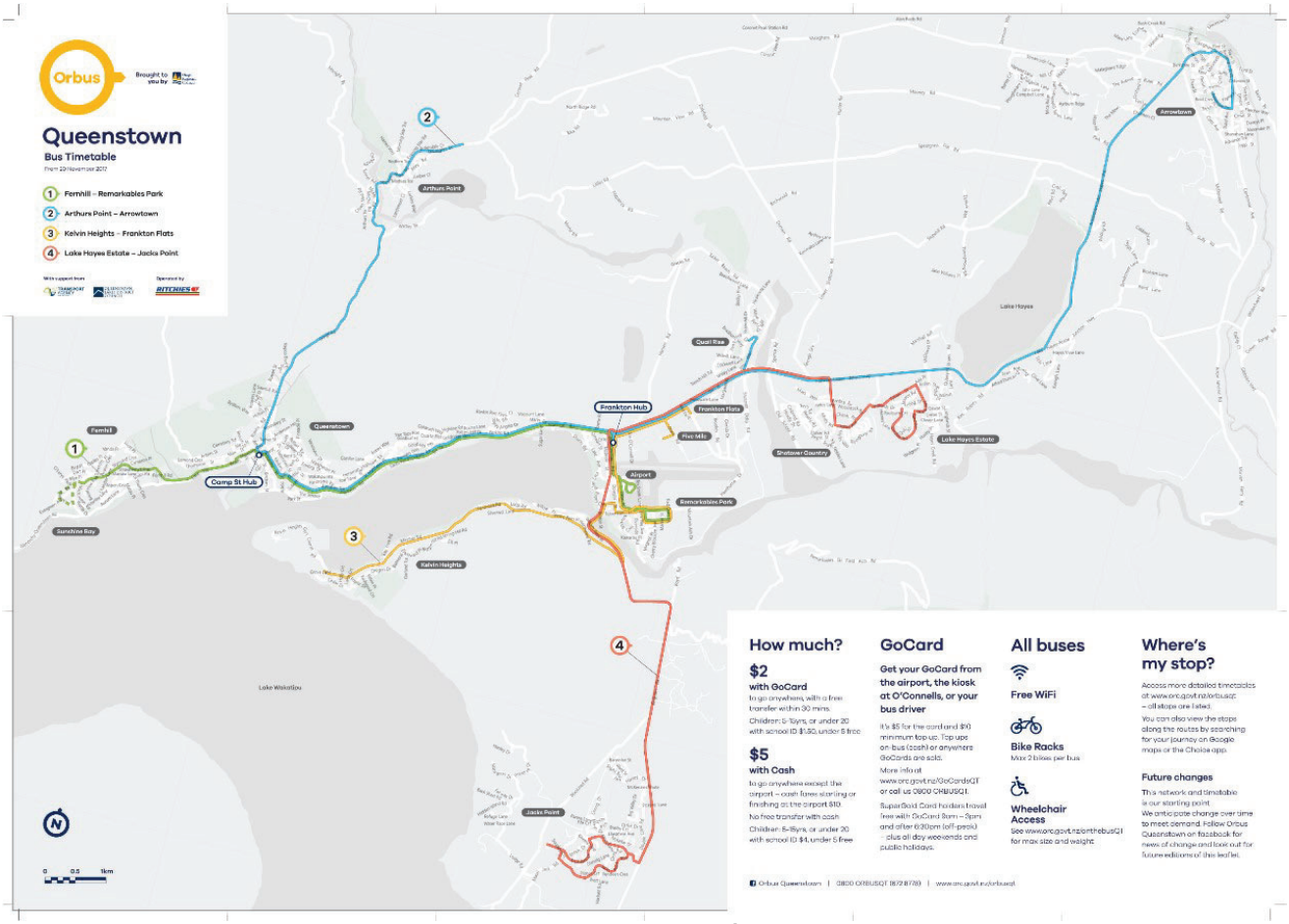


Figure 39: Orbus bus network for Queenstown

Figure 40: Integration Between Bus and Ferry Services

While the bus network at present serves a number of areas, the existing routes do not provide convenient links between Arthurs Point and Arrowtown, Arrowtown and Lake Hayes Estate/Shotover Country, and Arthurs Point and Frankton. This lack of network permeability, coupled with a low density of development, challenging terrain in some areas and convenience of travel by private vehicle encourages the use of private vehicles for certain trips. An improved active travel network will provide more choice and convenience for users, be it for part of a multi-modal trip or a full journey.

Notwithstanding the above, there has been recent success with the roll out of the Orbus bus system in 2017. The improved fare structure of up to $2 (NZD) for any trip, coupled with increases in the CBD parking fees has resulted in 85,000 trips in the first full month (December 2017) of service compared to 41,000 in the same period in December 2016. Route 1 (Fernhill to Remarkables Park) has a frequency of 15 minutes during peaks times, with Route 2 (Arthurs Point to Arrowtown) and 4 (Lake Hayes Estate to Frankton Flats) every 30 minutes and Route 3 (Kelvin Heights to Frankton Flats) every 60 minutes. The limited frequency of services at peak times on certain routes, and the access and integration with the wider network may not attract users to utilise these services, which shows the importance of providing convenient and reliable choices. This issue is compounded due to the lack of bus priority measures, resulting in bus services being delayed by congestion and making the service less desirable. In addition, there are limited direct choices, contributing to a less reliable service and lack of facilities at bus stops to keep customers informed.

Effect/Consequence – Congestion and Poor Health:

Refer to Problem Statement 2 for information regarding unsustainable travel patterns and mode share, congestion, and the variability of travel times on the road network for both private vehicles and public transport.

Evidence, which links higher private vehicle use and associated levels of physical activity to a number of health and environmental effects, has been used to determine the impact of existing mode share on public health. Current levels of physical activity are low with only 50% of the adult population reported to be physically active in them most recent NZ Health Survey, and only 44.5% of school children use active transport to get to and from school. Regionally, a higher proportion of residents in Otago are physically active when compared to the national average, with 75% of adults taking part in sport and recreation in any given week[15].

With regards to health, New Zealanders who walk or cycle to their main activity each day have a 76% higher chance of achieving the Ministry of Health physical activity guidelines than those who drive cars. Currently, in a national context less than half of the population meet the Ministry of Health physical activity guidelines of 2.5 hours of moderate or 1.25 hours of vigorous physical activity per week, with 1 in 6 people completing less than 30 minutes physical activity each week in total[16]. The benefits of active commuting are:

- Reduction in weight[17];
- Reduction in risk of diabetes[18];
- Reduction in work sickness absence[19];
- Reduction in risk of cardiovascular disease and all-cause mortality[20]; and

[15] Sourced from: https://sportnz.org.nz/assets/Uploads/attachments/managing-sport/research/Sport-and-Active/2013-14-Regional-Profile-Otago-FINAL.pdf

16 Shaw C, Keall M, Hayley Guiney. What modes of transport are associated with higher levels of physical activity? Cross-sectional study of New Zealand adults. Journal of Transport & Health 2017; 7B: 125-133.

17 Martin A, Panter J, Suhrcke M, Ogilvie D. Impact of changes in mode of travel to work on changes in body mass index: evidence from the British Household Panel Survey. J Epidemiol Community Health 2015; 69(8): 753-61.

18 Rasmussen MG, Grøntved A, Blond K, et al. Associations between Recreational and Commuter Cycling, Changes in Cycling, and Type 2 Diabetes Risk: A Cohort Study of Danish Men and Women. PLoS Med 2016; 13(7): e1002076.

19 Mytton OT, Panter J, Ogilvie D. Longitudinal associations of active commuting with wellbeing and sickness absence. Prev Med 2016; 84: 19-26.

20 Celis-Morales CA, Lyall DM, Welsh P, et al. Association between active commuting and incident cardiovascular disease, cancer, and mortality: prospective cohort study. BMJ 2017; 357.

- Improvement to Mental Health.[21]

With regards to air quality in the region, Environmental Health Indicators New Zealand (EHINZ) completed a study and estimated that in New Zealand, there have been 256 premature deaths since 2006, with a further 91 respiratory hospital admissions and 51 cardiac hospital admissions associated with poor air quality. The social cost of air pollution is quoted at $4 billion NZD a year, or approximately $1,000 NZD per person, with motor vehicles contributing to 22% of that total[22].

21 Oja, P & Titze, Sylvia & Bauman, Adrian & De Geus, Bas & Krenn, Patricia & Reger-Nash, Bill & Kohlberger, T. (2011). Health benefits of cycling: A systematic review. Scandinavian journal of medicine & science in sports. 21. 496-509. 10.1111/j.1600-0838.2011.01299.x.

22 Kuschel G, Metcalfe J, Wilton E, Guria J, Hales S, Rolfe K, et al. 2012. Updated Health and Air Pollution in New Zealand Study. Volume 1: Summary report. *Prepared by Emission Impossible and others for Health Research Council of New Zealand, Ministry of Transport, Ministry for the Environment, and NZ Transport Agency. Available online*

5.4. Summary of the Problem Statements

The review of the evidence for each of the problem statements can be summarised as follows:

- Lack of appropriate infrastructure outlined in Problem Statement One causes perceived and actual safety issues on the proposed routes. Physical barriers can also discourage the use of active modes, on the basis that it is unattractive for less confident riders;
- The informal and incomplete parts of the network deters the use of active modes, as it does not provide a convenient choice for users. This, with the increase of trips due to population growth within the region will result in an unsustainable transport network unless a shift in modal preference is achieved; and
- The recent improvements to Orbus bus services, which includes pricing, route and frequency changes, has shown that providing an affordable and convenient alternative to private vehicles will result in an increased use in said mode. Modal preferences can be altered towards active modes by providing high quality infrastructure for people to use as part of, or all of a journey. This could result in a greater uptake of walking and cycling, reduction in congestion, and an increase in physical activity, leading to environmental and health benefits for the region.

From review of the evidence, the following gaps have been identified that could contribute to the story:

- Greater understanding of perceived barriers to cycling, preference of treatments (i.e. surfacing) and desired outcomes;
- Data on use of the existing network including by user type (i.e. commuting for school and work, recreational or tourist travel);
- 2018 census data; and
- Crash/ safety data on the off-road network, and further data relating to incidents that do not involve a motor vehicle.

The SSBC confirms the outcomes of the Strategic Case by highlighting the significance and severity of these problems.

6. OUTCOMES

6.1. Project Outcomes

The desired outcomes of the WATN are to support and increase the continuing growth in the region by facilitating a step-change in commuter travel behaviour through greater uptake in active travel modes and a reduction of single occupant vehicle trips. Significant investment is required in developing an active travel network that is designed to attract those who perceive the current network as insufficient. These constraints include the existing network not being complete, and of varying quality. A collaborative approach between the W2G partners needs to be taken with the active travel network design to ensure all trip types are catered for, as well as their integration with other modes.

This SSBC follows the preparation of the QIT PBC, with the outcome identifying a recommended network option with associated economic, financial, commercial and management cases for the funding, procurement and delivery of the recommended option to proceed to pre-implementation and implementation.

6.2. Investment Objectives

The problem-benefit statements, along with the strategic context and desired project outcomes have been used to develop Investment Objectives, which are as follows:

- To provide a sustainable, integrated transport system by 2029 that results in an enhanced user experience and increased use of active modes;
- To support safe and secure journeys for walking and cycling by 2029; and
- To facilitate positive community and economic outcomes associated with improvements to the active travel network by 2029.

Measurement of achievement of the investment objectives is through tracking of the key performance indicators described in the next section. The suggested timeframes will be influenced by a number of factors and will need to take account of design, approvals and construction realities, plus funding availability. In addition, because of the proposed staged delivery of the network (described later in Section 10.4 – Implementation Approach), timeframes will have to be revised at later stages to reflect the implementation of the active travel network.

6.3. Benefits, KPIs and Measures

For the purpose of measuring the success of investment options, KPIs have been identified by key project partners as summarised in Table 15. For the purposes of collating contemporary and up-to-date information, it has been agreed by project partners that the collection of baseline information will occur during Pre-implementation and post-construction phases for the following measurements:

- Pedestrian and cyclist counts on primary routes (it is envisaged that counters will be implemented as soon as route construction is completed);
- User satisfaction and perception survey of the preferred network.

The three key benefits identified represent strong alignment to wider strategic objectives outlined in the Government Policy Statement on Land Transport 2018 (GPS) principally through investment in an active travel network that reduces deaths and serious injuries for existing and new users, facilitation

of increased access to social and economic opportunities between key residential and employment areas, and through positive health and environmental benefits. Additionally, they represent strong alignment with QLDC's ambitions to increase active travel mode share and reduce the proportion of trips being taken by single occupant vehicles.

Table 15: Key Performance Indicators

BENEFIT	KPI	MEASURE	DESCRIPTION	BASELINE	TARGET
Better safety and security	Perception survey	Survey responses referencing safety/security issues on the WATN	Responses to separate surveys on safety/ security issues for both residents and visitors.	14 (QTT User Satisfaction Survey 2017)	Reduction of users referencing insufficient safety/security issues on the WATN in 2029 by 75% from baseline (2017). Reduction of 11 from baseline (2017).
	Perception survey	User experience and satisfaction of the WATN	Satisfaction of trail facilities and infrastructure regarded as 'excellent'	59% of users rated overall satisfaction as 'excellent' (QTT User Satisfaction Survey 2017)	80% of respondents rate overall satisfaction as excellent in 2029 for WATN facilities and infrastructure. Increase of 21% from baseline (2017).
An integrated active travel network	Active mode usage	Daily average cyclists using WATN primary routes	Recorded counts of cyclists on the WATN.	• **Route 1 Jack's Point to Frankton –** collected during pre-implementation • **Route 3 Frankton to Queenstown –** 278 (winter) • **Route 4N Lake Hayes Estate to Frankton North –** 132 (winter) • **Route 4S Lake Hayes Estate to Frankton South -** collected during pre-implementation • **Route 5 Arthurs Point to Queenstown –** collected during pre-implementation • **Route 6 Fernhill to Queenstown -** collected during pre-implementation	Increase daily average cyclist flows on WATN primary routes by 50%[23] in 2029 from baseline.
	Active mode usage	Daily average pedestrians using WATN primary routes	Recorded counts of pedestrians on the WATN.	• **Route 1 Jack's Point to Frankton –** collected during pre-implementation • **Route 3 Frankton to Queenstown –** 362 (winter) • **Route 4N Lake Hayes Estate to Frankton North –** 187 (winter) • **Route 4S Lake Hayes Estate to Frankton South -** collected during pre-implementation • **Route 5 Arthurs Point to Queenstown –** collected during pre-implementation • **Route 6 Fernhill to Queenstown -** collected during pre-implementation	Increase daily average pedestrian flows on WATN primary routes by 30% in 2029 from baseline (2020).
Positive community and environmental effects	Quality and accessibility of facilities and infrastructure	Level of Service (LoS) rating for WATN primary and secondary routes.	An assessment of route suitability for pedestrians and cyclists across a range of criteria	Defined in Appendix E	Remove all poor and critical Austroads LoS ratings (D-F) across WATN primary and secondary routes by 2029.

[23] Based on doubling the existing 5% annual growth between 2012-2017.