Blenheim to Collingwood

CORRIDOR MANAGEMENT PLAN

6 60 62 63

2018-2028

NZ TRANSPORT AGENCY
WAKA KOTAHI

New Zealand Government

Table of contents

Table of figures

Executive summary

Corridor overview

The Blenheim to Collingwood corridor includes SH60 (Richmond to Collingwood); the northern half of SH6 (Blenheim to Nelson); SH62 which provides an alternate route around Blenheim township; and SH63 running through the Wairau Valley and providing access (via the southern section of SH6) to the West Coast and the remainder of the South Island. The corridor stops at Nelson Port and resumes at SH60, south of Richmond. The section of SH6 between Nelson City and Richmond is included in the Nelson to Queenstown corridor. The corridor links the 3 regions of Nelson, Tasman and Marlborough, referred to as Te Tau Ihu (or Top of the South).

The corridor is approximately 356 km long (3.1% of the state highway network). The total value of assets along the corridor is $462M (2.0% of the total national asset value).

In 2016, an earthquake near Kaikoura severed all land transport options along SH1 south between Blenheim and Christchurch. The east-west connectors of this corridor assumed many of the main SH1s functions. The greatest change was SH63, where traffic volumes and traffic mix were well beyond those usually expected (SH63 is a Secondary route, but SH1 is a National Strategic route). SH63 is taking both the regular SH1 traffic and the additional traffic to supplement the loss of rail. Bringing the SH63 up to and maintaining it at a suitable level of service in a timely manner has required a significant investment (time and money). These works will improve both safety and resilience of the (SH63) route for some time to come.

The story of this corridor is one of sun, tourists, primary production, freight and network resilience. Climate is all things to everyone on this corridor. It creates the opportunities for play and productivity with its untouched landscapes and generally favourable year-round temperatures, but also creates challenges with its extremes of terrain, rain, ice and snow.

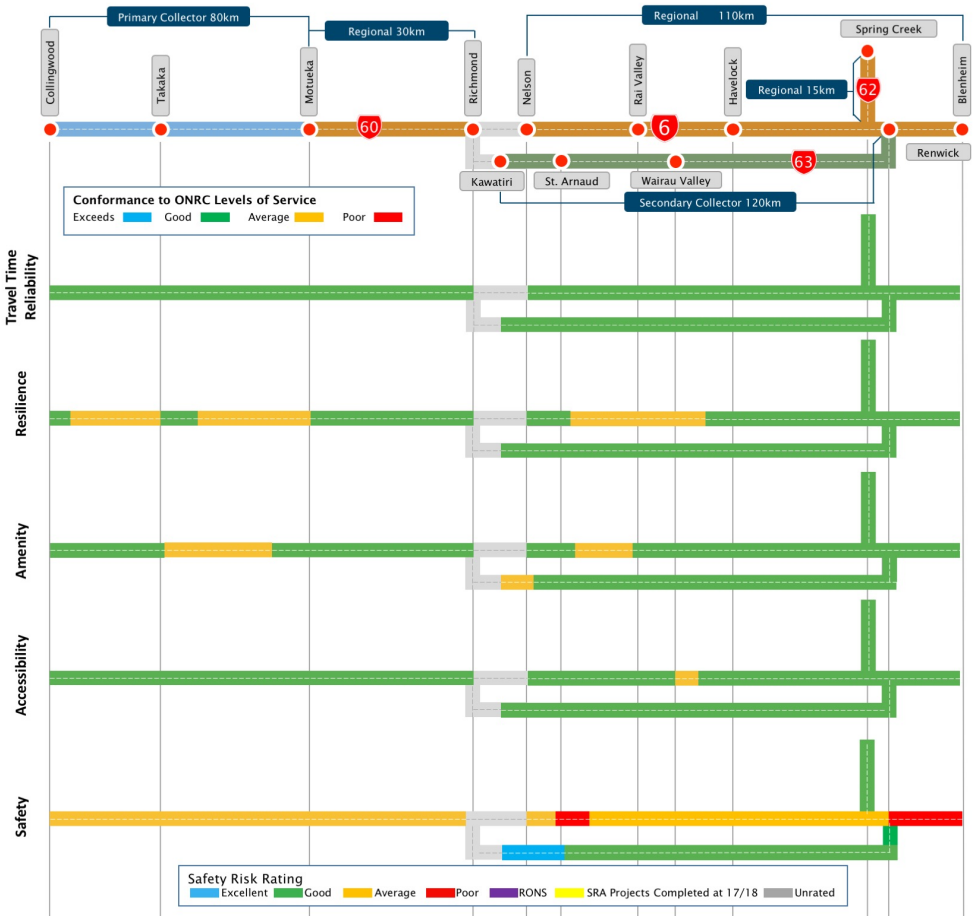
Most transport in this region is by road (90% of freight), supported by two regional airports and seaports, with no accessible rail on the corridor. Three of the highways (SH60, SH63 and the part SH6) include at least one section of difficult mountain pass, with limited passing opportunities, which can constrain all vehicles to the speed of the slowest vehicle. SH6, between Nelson and Blenheim, is the main east-west connector and forms the freight spine of the region.

The corridor traverses and serves national parks and sensitive natural environments. Ecological awareness and considerations have an impact on management of this corridor in terms of amenity, regulatory obligations and maintenance decisions.

The economic activity of this area is inseparably linked to transport. The region has primary production and employment industries that are of increasing materiality to national GDP. Attempts to grow the economy and encourage further business investment require robust and reliable transport (time sensitive fresh produce such as fruits and seafood and schedule sensitive tourists). Initiatives to increase tourism focus on expanding interaction with the natural environment – eco-tourism, a variety of cycling activities and broadening the seasonal distribution of visitors.

Investment implications for the corridor include how the future mix of users impacts the ongoing maintenance, management and improved safety of the corridor.

Figure 1 - Performance of the corridor against ONRC outcomes



Future investment on the corridor will centre on maintaining access and resilience and improving the safety performance of the corridor.

Introduction

Purpose

What is the corridor management plan?

This Corridor Management Plan describes the customer service delivery story for the Blenheim to Collingwood corridor, as measured against the One Road Network Classification performance framework. It is intended to describe the investment story, i.e. why invest in this corridor, in a context everyone can understand whether the activities are delivered through investment in the State Highways maintenance, operations, renewals and improvements programmes.

The corridor management plan considers a combination of:

- The **pressures** on the system that are resulting in increased demand or a reduction in levels of service
- The **current state** of the system and how it is performing
- The **response** the Agency is investing in to deliver the customer levels of service along the corridor.

It is important to note that this is a first-generation Corridor Management Plan, therefore, we expect it to be improved as we learn from this approach. It sets a firm foundation to improve from in the next 2-3 years, utilising a common framework and consistent data sets across the 30 corridors.

Why is it needed?

The corridor plan provides a link between the long-term planning outlook, the 10-year medium term investment programme and the 3-year land transport programmes for the next funding round.

Traditionally, the approach to investing in maintenance and renewals is to consider each asset activity in isolation, i.e. pavement, structures, drainage, and in isolation of capital expenditure. The Corridor Management Plan approach considers all assets within the corridor and takes a holistic view of the customer levels of service they provide throughout the corridor.

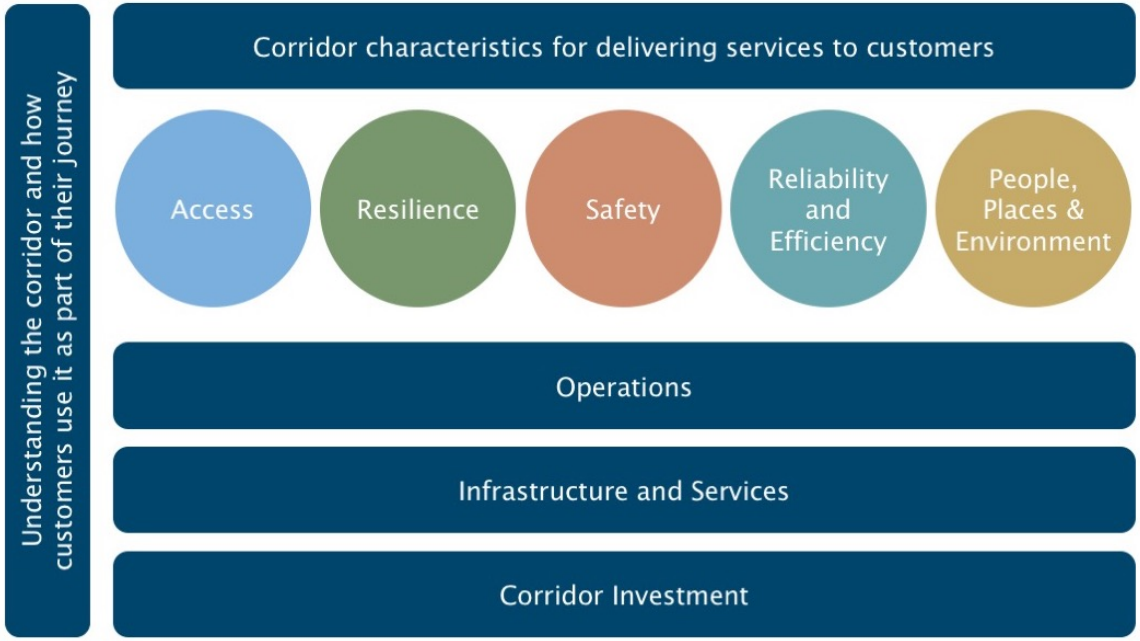
Planning is currently undertaken at the regional level, but typically significant journeys traverse more than one region. By considering the significant customer journeys and destinations, the corridor management plan is a vehicle to engage in regional and inter-regional conversations by focusing on the issues that are important and may extend beyond the state highways network.

How will we use it?

The Corridor Management Plan will provide the customer story and case for investment in maintenance, renewal and improvement on the corridor, based on targeting maintenance to achieve the appropriate customer levels of service within the context of providing value for money. The information presented in the corridor management plan helps to inform the business case for investment in State Highways for the subsequent triennial period.

In conjunction with the long-term view, the corridor management plan will provide for engagement with key stakeholders and partners to shape the future of the corridor. It responds to the needs of the users of the corridor to shape the future service levels.

Figure 2 - Corridor management plan framework



The corridor at a glance

Corridor overview

The Blenheim to Collingwood corridor links the 3 regions of Nelson, Tasman and Marlborough, referred to as Te Tau Ihu (or Top of the South).

The corridor includes SH60 (Richmond to Collingwood); the northern half of SH6 (Blenheim to Nelson); SH62 which provides an alternate route around Blenheim township; and SH63 running through the Wairau Valley and providing access (via the southern section of SH6) to the West Coast and the remainder of the South Island.

The corridor stops at Nelson Port and resumes at SH60, south of Richmond. The section of SH6 between Nelson City and Richmond is included in the Nelson to Queenstown corridor.

Following the Kaikoura earthquake in November 2016, SH63 has become the primary corridor to access the rest of the South Island and will remain so for the short term until the SH1 damage is repaired.

Summer months are busiest on this corridor, with peaks in both tourism and freight.

The regional economy

The 3 regions of Nelson, Tasman and Marlborough have a permanent population of 162,000 residents (3.5% of New Zealand's population), 3% of national employment, and generates 2.9% of New Zealand's Growth Domestic Product (GDP). Forestry, Tourism, horticulture, viticulture, agriculture and aquaculture are major contributors to GDP and local employment.

Four ports (Port Nelson, Nelson Airport, Blenheim Airport & Port Marlborough) support access to the region and to external markets.

The area is experiencing strong economic growth which is reliant on good transport connectivity to get goods to market and tourists to destinations Tourism is on the rise, with a more than 7% increase in guest nights between 2015 and 2016. Mussel exports increased 13% in 2016, and pip-fruit and viticulture are strong on the back of land value pressure in other growing regions. Urban growth in Richmond and Nelson is starting to reflect in higher land value.

Figure 3 – Corridor overview

Understanding our customers

Key customers

The key customers using the corridor are diverse, but use a limited range of transport modes. Different customers have different needs, expectations, and personal circumstances for using the transport system. Therefore, what customers value from the transport network needs to be understood in the context of who they are.

Daily commuter

Daily commuting includes travel to employment and schools. Public transport is available in immediate urban areas of Nelson, Richmond and Blenheim, and school buses service the rural schools. Most commuting travel is by private car.

Cycling is encouraged in Nelson with an increasing presence during commuter periods, on the state highway and at school gates.

Insights into daily commuter users:

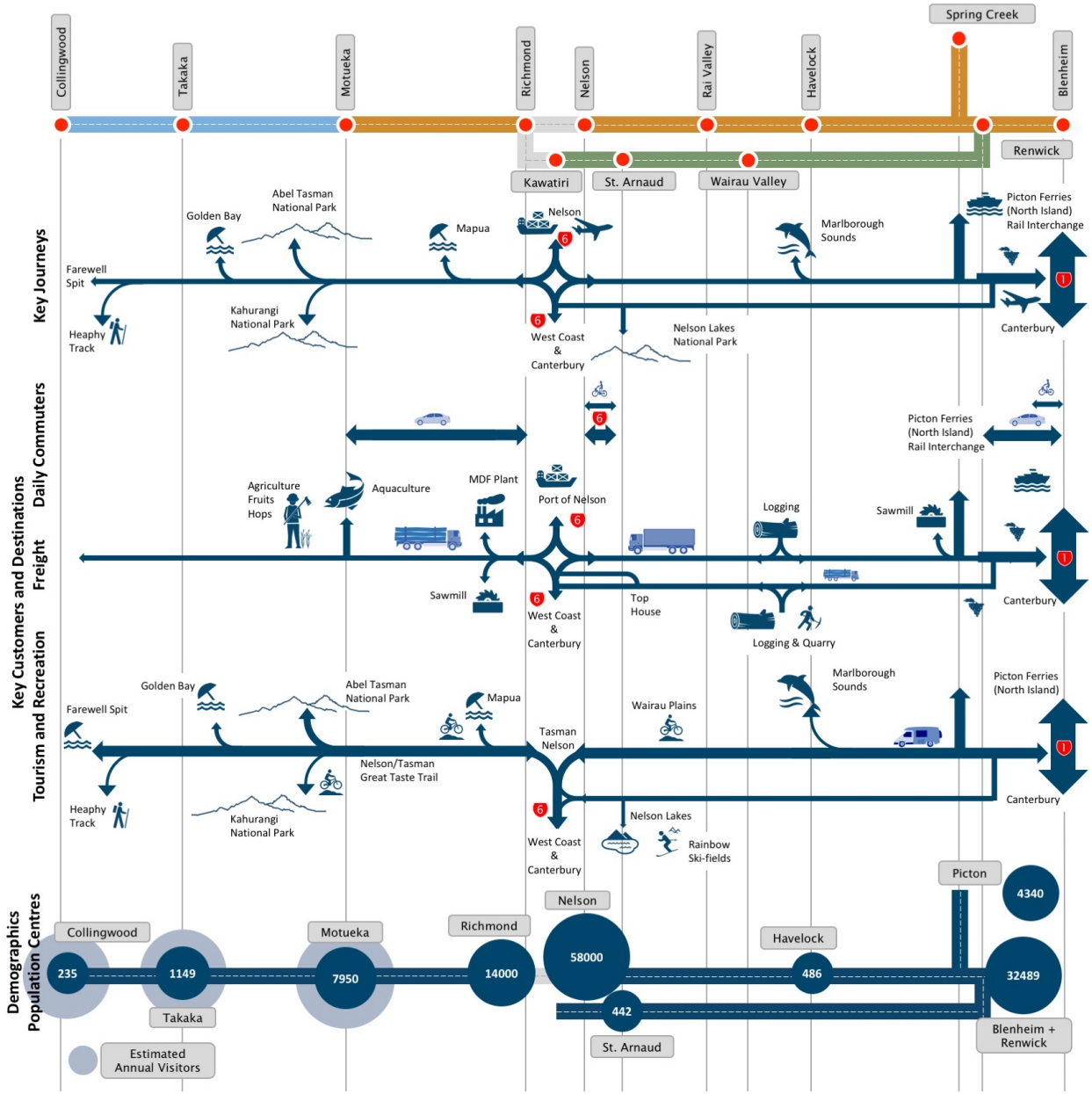
Road use: There are limited alternative transport modes available and there is a heavy reliance on private cars, particularly for rural travel. The few parts of this corridor used by daily commuters include Blenheim/Renwick, Atawhai/Nelson, and Richmond/Motueka.

Road knowledge: Daily commuters are familiar with their route, the variety of other road users present, the seasonal and climatic vulnerabilities of their route, any (minimal) congestion points and the usual travel times.

Pain points: The section from Atawhai to Nelson, around Auckland Point School, and at Haven Road roundabout (Nelson Port end of SH6) are prone to delays. Expansion of the urban fringe in Nelson and Richmond is increasing the number of commuters. Slow vehicles can potentially create pain points at the level of low passing opportunities. (Other issues addressed in the Nelson to Queenstown, CMP.)

Daily commuters expect: Predictable travel times, ready access to the highway and a safe journey.

Figure 4 - Key customers, journeys, and destinations



Tourist and recreational users

Tourism is a major contributor to the regions' economy ($1 billion and 2.2 million guest nights in 2016 being 5.7% of national guest nights). Tourists are coming to the Marlborough Sounds and wineries, the Abel Tasman National Park, the Nelson/Tasman Great Taste Trail, the Heaphy walking trail, and the picturesque beaches.

Tourists are a mix of domestic and international arriving either by plane or by road with much of their local travel done by car or campervan. There is limited organised coach travel. Cycle touring, while still in low numbers, is increasing, providing structured and free-form local day trips that may interact with corridor traffic.

The corridor forms a key tourist route connecting Abel Tasman National Park, the West Coast, Picton and the North Island. Journey time reliability is important with pre-booked activities and ongoing connections to flights and particularly interisland ferries.

Insights into tourist and recreational users are as follows:

Road use: Summer is the peak for tourist numbers on this corridor (domestic and international). During the New Year influx, traffic quadruples, creating pressure on usually adequate amenities. Recreational users vary from touring motorcyclists, to towing vehicles (caravans, trailers). Most tourists are self-drive and in hired cars or camper vans. Along SH6 there is an observable inter-peak "pulse" of vehicles in the early afternoon consistent with Nelson accommodation check out times and Picton ferry scheduling.

Road knowledge: Tourists (domestic and international) can underestimate the driving task and travel time required on this corridor. This can result in risky behaviour trying to regain time or schedules, and avoid late night driving to reach destinations.

Pain points: During normal conditions, the pain point for tourists travelling this corridor is underestimating the required travel time. Summer peak creates safety concerns at some intersections (especially on SH60), minor increase in delays in Motueka and parking issues in Havelock. Traffic can platoon at narrow parts of the corridor such as Takaka Hill, Rai Valley, Golden Bay, and SH6, where overtaking freight or cyclists can be unsafe.

Tourist and recreational users expect: Getting around easily, making connections for ongoing travel, good directional signage about tourism destinations, distances, towns, and other places to stop for refreshments, fuel and toilets breaks when undertaking regional journeys.

Freight operator

SH6, SH62 and SH63 are the core freight routes with product carried in both directions. There are major transportation hubs serving each end of the corridor at Port Nelson and Spring Creek (SH1). Over 90% of freight travels by road and volumes are forecast to increase.

Freight is a mix of both domestic and international export product including high value time critical perishable products (agriculture and aquaculture), regular retail consumables and longer life bulk products such as wine and whole logs.

Since the 2016 Kaikoura earthquake, the regular SH1 National Strategic route freight volume is diverted onto SH63, a longer secondary route of lesser standard with fewer amenities. Drivers are no longer able to complete the equivalent of a SH1 return journey within a shift.

Insights into freight operators are as follows:

Road use: Freight operators programme their routes and resourcing to maximise driving time, but not exceed regulated maximum hours. Excessive delays can seriously impede their operations, limit completion of return journeys, create added fatigue and risk taking. Long-haul journeys are undertaken at night.

Road knowledge: Local drivers are familiar with the corridor's specific weather conditions, such as ice and fog through the valleys and passes. The earthquake response has moved drivers onto the previously little used and narrow SH63, where drivers' specific knowledge is limited, but increasing over time.

Pain points: Time constraints. Roads can be highly variable and unsuited for the size of trucks, with narrow carriageway and tight alignments. One lane bridges (SH63) exacerbate platooning and restrict travel speeds to that of the slowest vehicle. Short lengths of lowered speed limits break the momentum. Inaccessible rest or stopping areas. Lack of pullover areas or inadequate passing opportunities. Insufficient clearance from hazards (drop offs, cyclists or opposing traffic).

Freight operators expect: Infrastructure that supports commercial activity and caters for freight trucks safely; consistent widths and advance visibility; convenient places to stop for rest or to access services; passing or slow vehicle lanes for release of following vehicles; timely and reliable information about road conditions; adequate clearance from other road users; alternatives to travel through residential areas (particularly at night).

How we deliver services along the corridor

Transport partners

The land transport system comprises more than State Highways. To provide customers with a reliable and safe journey usually requires the use of two or more transport infrastructure provider's networks. As such we work with other network providers to provide a one network approach.

Collaboration along the corridor

There is close collaboration between NZTA and the three-other unitary road controlling authorities along this corridor; Marlborough District Council, Tasman District Council and Nelson City Council. Their respective boundaries are shown in Figure 5.

On the east coast, road network management is provided jointly by NZTA and Marlborough District Council as a "one-stop shop" for both state highway and local road services through the Marlborough Roads entity.

In Golden Bay, there is an agreement that the NOC contractor also maintains the local roads.

Kaikoura earthquake

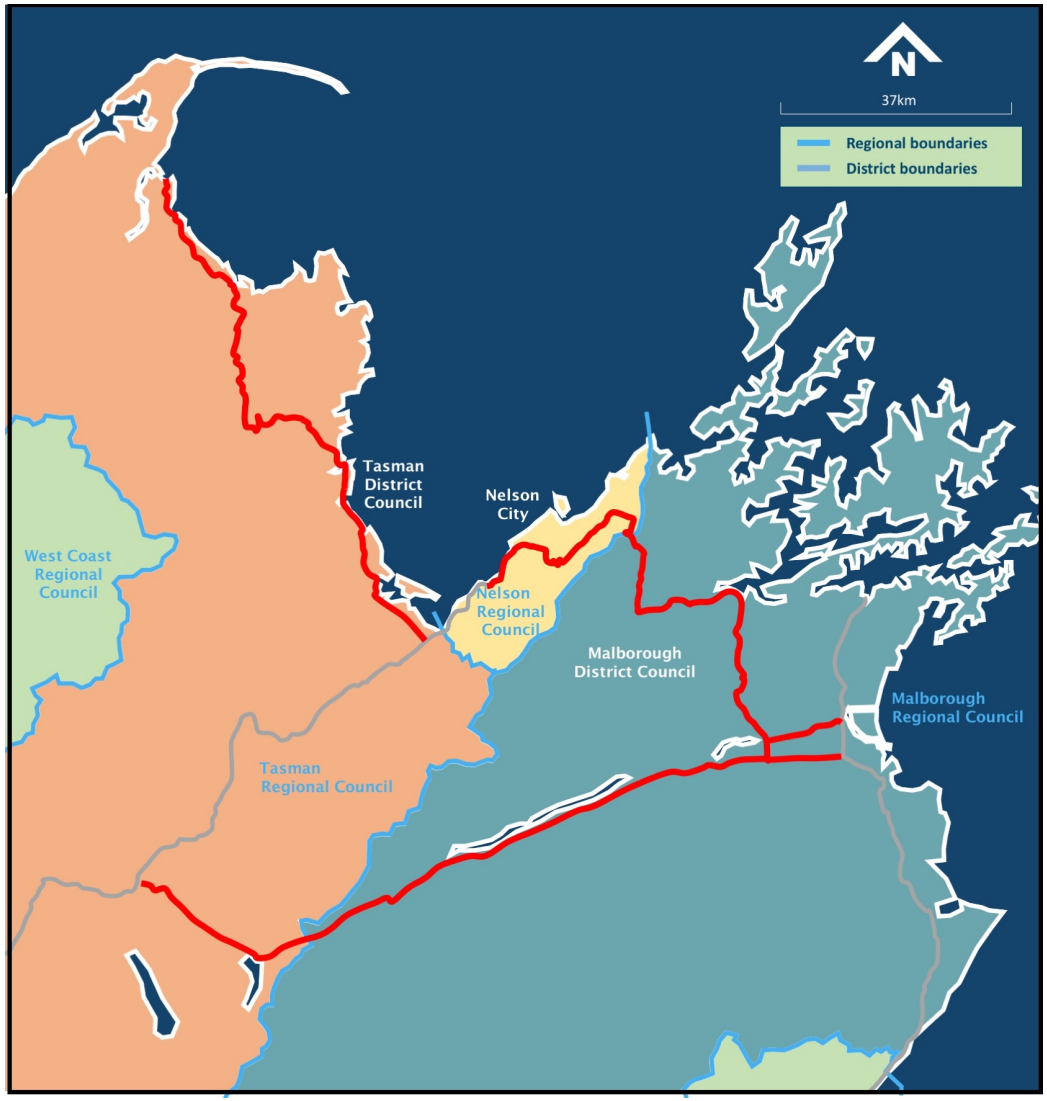
In November 2016 at Kaikoura a 7.8 earthquake caused significant damage to the Marlborough Kaikoura coastal area of the South Island, closing both State Highway 1 (SH1) and the Main North Rail Line between Picton and Christchurch. This has disrupted the lives of those who live along the highway and who rely on the road and rail networks to access their homes, farms and businesses and the movement of goods to market.

The North Canterbury Transport Infrastructure Recovery (NCTIR) has been set-up by the government under the Hurunui/Kaikoura earthquakes Recovery Act 2016 to repair and get the road and rail networks re-opened by the end of 2017. NCTIR is an alliance partnership between the NZ Transport Agency, KiwiRail, Fulton Hogan, Downer, HEB Construction and Higgins.

As at March 2017, State Highway 1 is impassable and remains closed to through-traffic from Picton to Christchurch. The highway has been opened between Picton and Clarence, and from Christchurch to Kaikoura during daylight hours. SH1 remains closed between Clarence and Mangamaunu with the aim of fully opening at the end of 2017.

The work by NCTIR includes repairing and rebuilding the networks to be more resilient and safer, helping keep everyone better connected in the future. NCTIR will also manage the upgrade and interim maintenance of the alternate highway route between Picton and Christchurch, along State Highways 63, 6, 65 and 7 (Lewis Pass), and the Inland Road between Kaikoura and Culverden.

Figure 5 - Map of associated local authorities



Network Outcomes Contracts approach

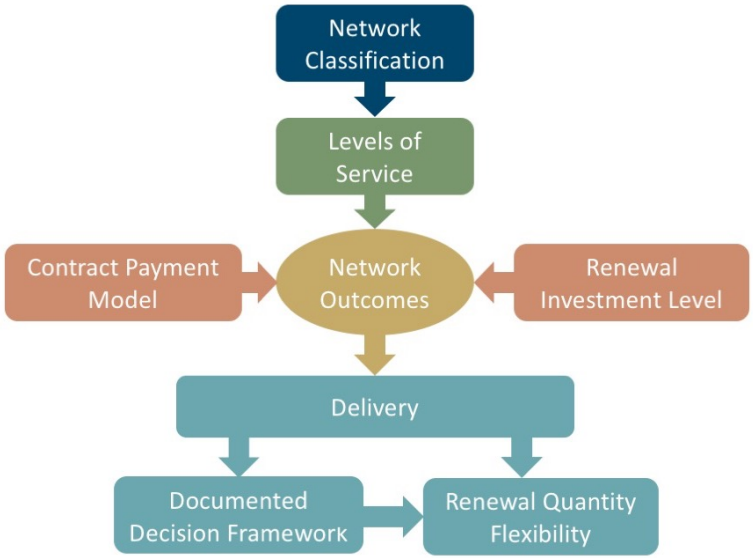
Network Outcome Contracts (NOC) are aimed at improving the effectiveness of service delivery for maintenance and operations of the state highway network. Elements of previous procurement methodologies (PSMC, Hybrid and Traditional models) have been integrated into the NOC contract model which delivers services through a primary supplier incorporating both professional services and physical works for all key maintenance activities.

To support this a central Governance and Management Group represents the interests of the Maintenance and Operations teams in the delivery of the NOCs. This group resolves issues, looks at opportunities for improvement, recommends changes to the national contact documentation, and ensures a consistent application, understanding and implementation of the NOC delivery model.

The core scope of work typically includes, but is not limited to maintenance, operations and renewals. The core scope of work typically **excludes** transport planning, ITS maintenance and management, capital works, emergency works reinstatement, Traffic Operation Centre activities, bridge and other structures management and repairs.

The contract process for the NOC's is shown below:

Figure 6 - NOC contract process



Collaborative delivery of services

The Blenheim to Collingwood corridor crosses over two NOC contract areas with the boundary being the Rai Saddle on SH6 halfway between Rai Valley and Whangamoa. SH62-63 and the first half of SH6 are within the Marlborough NOC area, while the second half of SH6 and SH60 are within the Nelson-Tasman NOC area.

Marlborough Network Outcomes Contract

The Marlborough NOC contract is undertaken by the joint venture between Opus and HEB. The contract commenced on the 1st of July 2013 for a 5-year period.

Nelson Tasman Network Outcomes Contract

The Nelson-Tasman NOC contract is undertaken by Fulton-Hogan contracting Opus as a sub-contractor. It is a 5-year contract that commenced mid 2015.

These contracts are supported by the following specialist contracts:

- **Street light maintenance contract:** The street light maintenance contract covers light maintenance and renewals alongside the state highways. It is undertaken by Marlborough Lines.
- **ITS and traffic signal:** There are no traffic signals on this corridor and ITS is managed under a Wellington/Marlborough/Nelson/Tasman contract managed from Wellington.
- **Traffic monitoring sites:** Undertaken under a national contract.
- **Regional bridge and structures:** Undertaken under a Wellington/Marlborough contract managed by Wellington.

Drivers for change

The Blenheim to Collingwood corridor caters for variable levels and types of customers and this demand is expected to growth into the future. The drivers for change associated with the corridor are briefly described below.

Economic development and growth

This corridor is dominated by a diverse range of primary industries. These businesses continue to grow through greater productivity and greater value products. Reliable access to markets will be an important element of achieving this desired growth and the land transport corridor is a key access point.

Tourism is the top NZ export earner and an important aspect of the economies along this corridor. A safe and acceptable level of access for tourism is a key future consideration for increasing tourist activity in these regions.

Population projections for this corridor were conservative and inconsistent with currently reported growth - people are relocating to the regions at either end of the corridor. Growth of the Nelson/Richmond urban fringes may prompt efficiency improvements, but otherwise anticipated growth should be well within the capacity of the existing corridor.

A disruptive driver for change along this corridor was a 7.8 earthquake that struck Kaikoura in November 2017 and severed access along SH1 (south). The specific influences on the economies of the wider area and their duration, particularly tourism, are as yet unknown. However, the infrastructure investment by Government has been estimated at $2 billion with the aim of having at SH1 available for public use by December 2017. This will have an impact on the local economies of Tasman

Tasman, at the western end of the corridor is a highly productive economic area. The corridor supports primary industries, secondary manufacturing and tourism. It provides the primary access points for the National Parks. These industries have a high dependency upon transport with some products time critical (pip-fruit and seafood).

There are large areas of forestry planting across this region and it will continue to be a significant part of this economy and freight demand. Product is both processed locally and sent direct to export via Port of Nelson and Port Marlborough (Shakespeare Bay, Picton).

Tourism in Tasman currently has a strong seasonality profile, with growth potential identified from spreading the visitation into shoulder seasons. Eco-tourism and adventure tourism are high generators of activity, particularly north of Riwaka in the Golden Bay area of SH60.

Nelson

Nelson is the Major metropolitan centre along this corridor and issues related to the Nelson urban area are addressed in the adjacent SH6 Nelson to Queenstown corridor management plan. Nelson serves as the urban centre and infrastructure hub for the primary production regions of Tasman and Nelson. Infometrics 2016 analysis indicates strong region growth with a GDP increase of 6.7% (greater than the national achieved 4.4%). Agriculture, forestry, seafood, farming and tourism are Nelson Tasman's key economic sectors, followed by engineering, information and communications technology, and avionics.

A strong cycling culture exists in Nelson and has potential as a tourist and eco-culture business opportunity – linking to the New Zealand Cycle Trail, Nga Haerenga and improving community cycling options.

Improved connectivity is identified as a key driver to improving the GDP from tourism - that is both the road and air links. Nelson airport is currently seen as a constraint to tourism growth and redevelopment plans are underway to increase airport capacity and facilities.

Marlborough

Viticulture has become a cornerstone of the local Marlborough economy. It has increased Marlborough's GDP by 28% over the last five years. Vines planting continues to expand across the region contributing to an ongoing freight task, agricultural vehicle activity along the corridor and more business visitors.

Destination Marlborough anticipates tourism in the region increasing by half again by 2025 to $446m per annum. This growth is to come from increased visitor numbers and increased length of stay from building attractive activities leveraged off local businesses such as cycling the vineyards and marine tourism.

Marlborough's extensive coastline provides an ideal climate for aquaculture (currently 60% of national aquaculture) and for marine based tourism. Aquaculture is a growth sector with Marlborough producing from only a small portion of the consented area. The Havelock Marina (accessed via SH6) is a key hub for much of this activity, with product being processed in a range of locations (travelling both directions on SH6).

Understanding customer levels of service on the corridor

Current levels of service performance

The One Network Road Classification (ONRC) is a framework that categorises roads throughout the country depending on what purpose they serve. Importantly it will also help New Zealand to plan, invest in, maintain, and operate the road network in a more strategic, consistent and affordable way throughout the country.

Over time all roads in a category should offer an increasingly consistent and fit for purpose customer level of service (CLoS) for road users. With the knowledge of current CLoS experienced by customers, we can better target investment to meet future intended service levels.

Overall, customers will be provided with the right level of road transport infrastructure where it is needed, determined by a robust, impartial, nationally consistent tool – the ONRC.

Road classification

This corridor has three different classification levels and these are usually consistent with the use of the route:

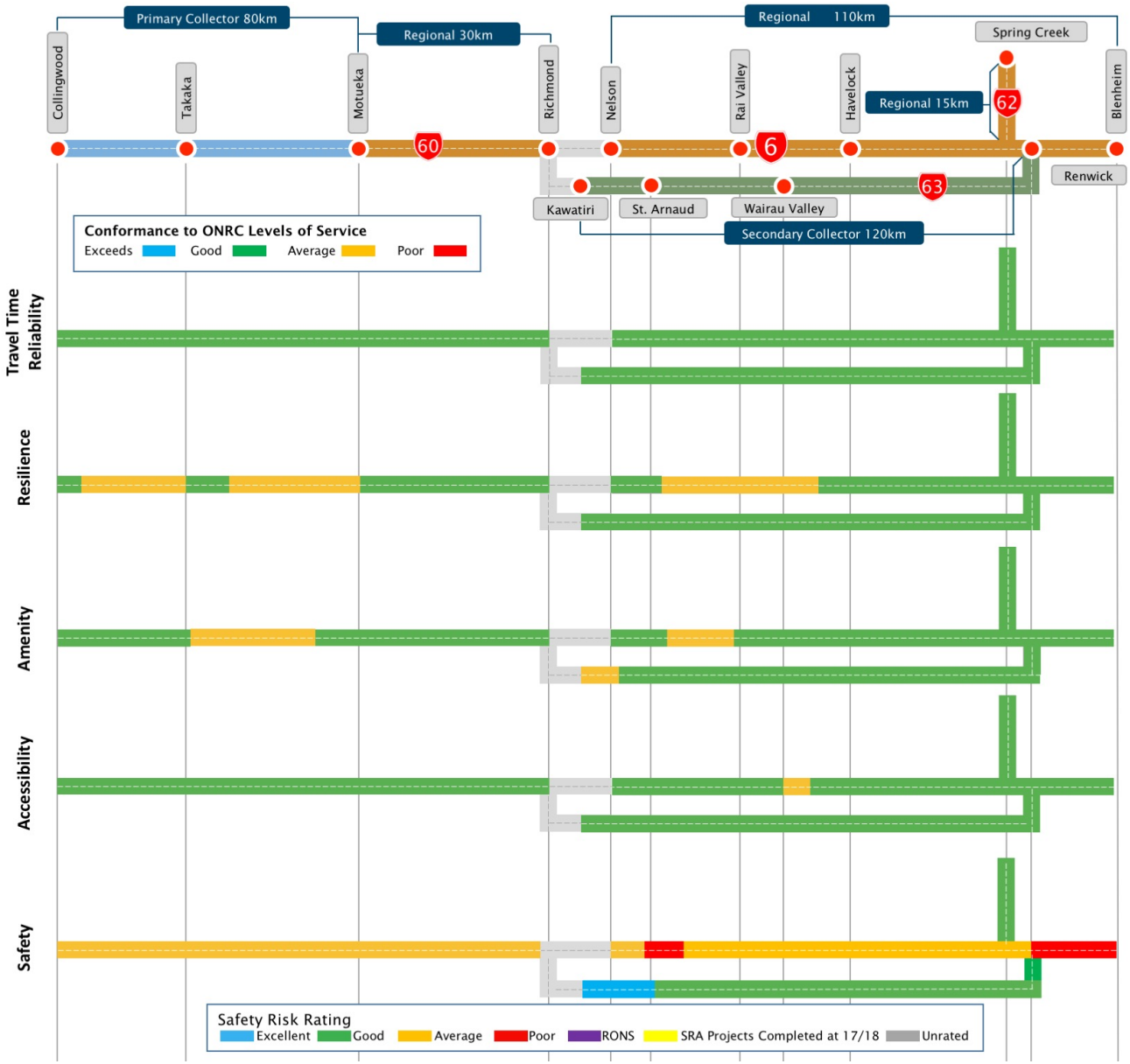
- **Regional** – SH6 from Blenheim to Nelson, SH62 from Springs Creek to Renwick and SH60 from Richmond to Motueka
- **Primary Collector** – SH60 from Motueka to Collingwood
- **Secondary Collector** – SH63 from Renwick to Kawatiri junction (Post Kaikoura earthquake use is at an Arterial level).

Figure 7 shows how the corridor is performing against the ONRC Levels of Service, as they relate to each of the three current classifications.

Levels of service performance has been determined by workshop participants in the development of this corridor plan. It is not based upon consolidated evidence from the ONRC technical measures.

Overleaf provides additional context to explain the current levels of service along the corridor based on the road classification.

Figure 7 - Current ONRC levels of service performance



Summary of current performance

Figure 7 shows how the Blenheim to Collingwood corridor is performing against the ONRC Levels of Service, as they relate to each of the three current classifications.

Levels of service performance has been determined by workshop participants in the development of this corridor plan and is therefore not solely based upon consolidated evidence from the ONRC technical measures.

A simple four-point assessment has been utilised as follows:

Exceeds	The level of service provided by the section of corridor for the activity under consideration exceeds what is required for a highway of that classification
Good	The section of corridor generally meets the LOS requirements for the activity and ONRC
Average	The section of corridor meets some but not all of the LOS requirements for the activity and ONRC classification
Poor	The section of corridor generally fails the LOS requirements for the activity and ONRC classification, or there is a significant gap in the LOS for some aspects of the activity.

Generally, this corridor provides good all-year-round levels of service except for those related to safety, which deteriorates when subject to the intense activity of the summer peak.

Travel time reliability

The corridor is mostly free-flowing and provides reliable travel time, mainly due to the comparatively low traffic volumes. Delays along the corridor are few, and limited to isolated local intersections in Nelson, Blenheim and Renwick.

The lack of passing opportunities in the Rai Saddle can impact travel time, particularly during high tourist peak season. Experienced heavy vehicle drivers try to facilitate passing whenever possible, although limited opportunities are available.

Increased activity around Golden Bay townships during summer months slows travel through these areas, but has a negligible effect on overall travel time. Travel time reliability along this corridor was described as ‘good’ and is appropriate to the ONRC classification.

Post Kaikoura earthquake there are long wait times and delays at road work sites along SH63. Whilst these delays are less than could be expected on a secondary collector such as SH63, they are more than the detoured public would usually expect on a main route.

Resilience

Resilience risks exist in parts of this corridor. Many are readily mitigated through use of parallel routes or via rapid maintenance response. Exceptions include areas of rural remote and hilly terrain. However, levels of delay are generally accepted on the lower classification of these routes.

Resilience has been identified as the lowest priority LoS on this corridor.

Amenity

Driver comfort is low through winding and narrow sections such as the Rai Saddle (SH6) and prior to Kawatiri Junction (SH63). However much of the corridor provides ‘good’ levels of amenity with some stunning views and exposure to untouched natural landscapes. Some businesses and activities on quieter sections of the corridor overflow their sites at busiest times and impact on the adjacent state highway - such as pedestrians and parking at key stopping places (Pelorus bridge, Mussel Inn).

Accessibility

This corridor has low traffic volumes and provides a good level of accessibility.

Safety

Safety is considered the most important Level of Service criteria for this corridor. Levels of service were described as poor through to good, with large parts of the corridor not meeting the target 3 star KiwiRAP rating.

There are isolated land use areas that require improved management such as stock crossings and unsealed private access points along SH6 and SH60.

SH63 is described as ‘good’ based on its pre-earthquake/usual fulltime function. It has a medium-high to high level of personal risk between Kawatiri and the western section of Wairau Valley.

Areas noted as “High” personal risk are located about the alpine environments of Rai Valley, Tophouse and Takaka Hills. These areas are more demanding driving and easily misread by the self-drive tourists. Local knowledge is an advantage for driving in these deceptive tighter road alignments with winter driving conditions that include, ice and snow.

The cumulative safety risks along this corridor are exacerbated by poor and intermittent communication options – both radio and cell phone reception are limited.

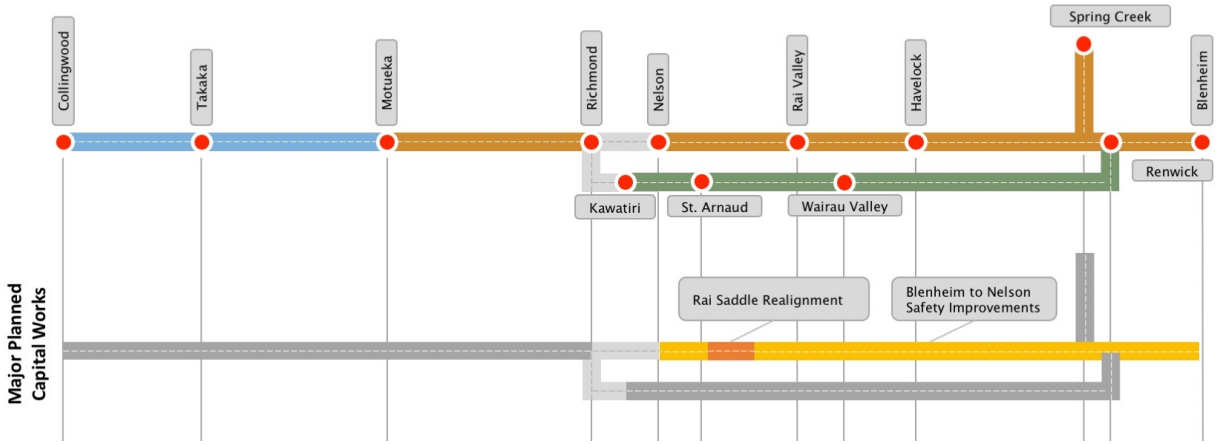
Improving the customer experience

In responding to Customer Levels of Service it is important to acknowledge that significant improvements to the corridor are planned or underway.

- **Rai Saddle realignment** - Over the past years, numerous loss of control crashes, resulting in injuries happened along this winding part of SH6 with inconsistent speed limits. This project will reduce the number of curves or their angle to increase the safe speed allowing a more consistent speed across the entire Rai Saddle.
- **SH6 Blenheim to Nelson Safety Improvements** – SH6 is an important connection between Blenheim and Nelson. This section of highway has seen a large number of crashes and something has to change. Many of these crashes involved loss of control with drivers running off the road and hitting roadside objects such as trees and power poles. There have also been head-on crashes on this highway, and some at intersections. Given the high level of risk and its important role as a regional strategic state highway, we're investigating the best ways to improve safety.

Planned improvements are discussed in greater detail later in this document.

Figure 8 – Significant corridor planned improvements



SH6 Rocks road cycling

Access

Carriageway configuration

Carriageway configuration of two lanes is relatively consistent across the corridor and appropriate to the context of each section. Passing lane opportunities are associated with more difficult terrain (Rai Saddle, Takaka Hill). Through townships, painted flush-medians create a divided carriageway.

Speed limits

The corridor is generally 100km/h, with lower posted speeds through some areas and small townships, as appropriate to those environments.

Pelorus Bridge and Payne's Ford have temporary speed restrictions (50km/h) that apply during December and January. There are school variable speed limits (40km/h) in place in Motueka and Takaka.

Pea Viner Corner - the intersection of Moutere Highway and SH60 is reduced to 80km/h in recognition of the increased activity, reduced safety and overall complexity of the major intersection

Post the Kaikoura earthquake, temporary speed limits were applied in higher risk areas carrying detoured traffic, reduced to 80km/h on SH62 and on SH63. Through the townships of St. Arnaud and Wairau Valley the speed limit was reduced to 70km/h. These temporary speed limits are reviewed three-monthly and will be reviewed with the community beyond the recovery events.

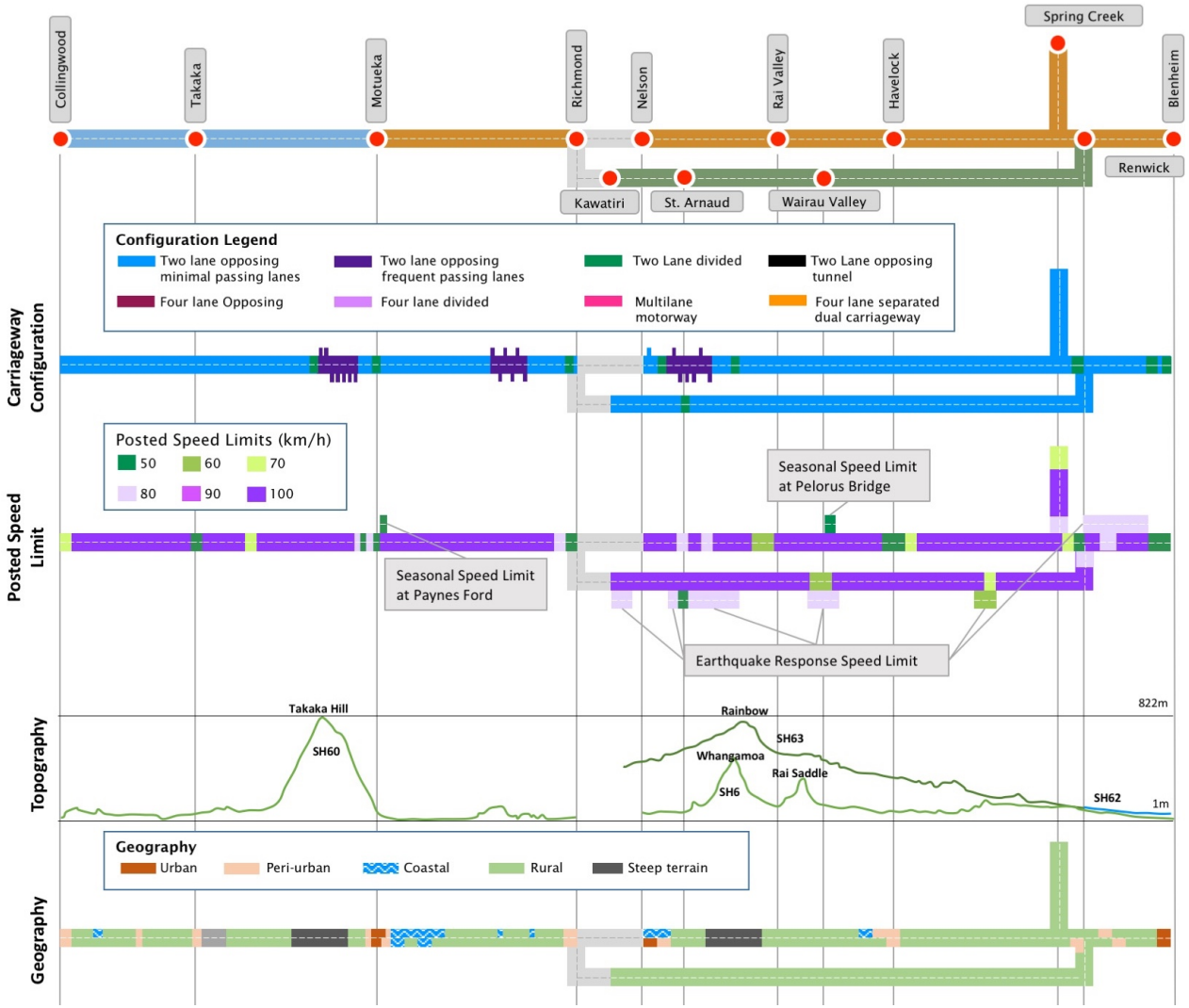
Topography/geography

Three of the highways on this corridor include areas of rural hilly terrain (SH6, SH60 and SH63) with the fourth, SH62, having a relatively straight and flat alignment.

SH6, between Blenheim and Nelson, traverses through open plains to the rural Rai Valley and the Whangamoa Hill, then descends to join and follow the coastline of the Waimea Inlet until Nelson City.

The Takaka Hill range punctuates the relatively flat, open route of SH60. SH63 meanders through remote rural terrain along the Wairau River and through conservation area.

Figure 9 - Corridor characteristics



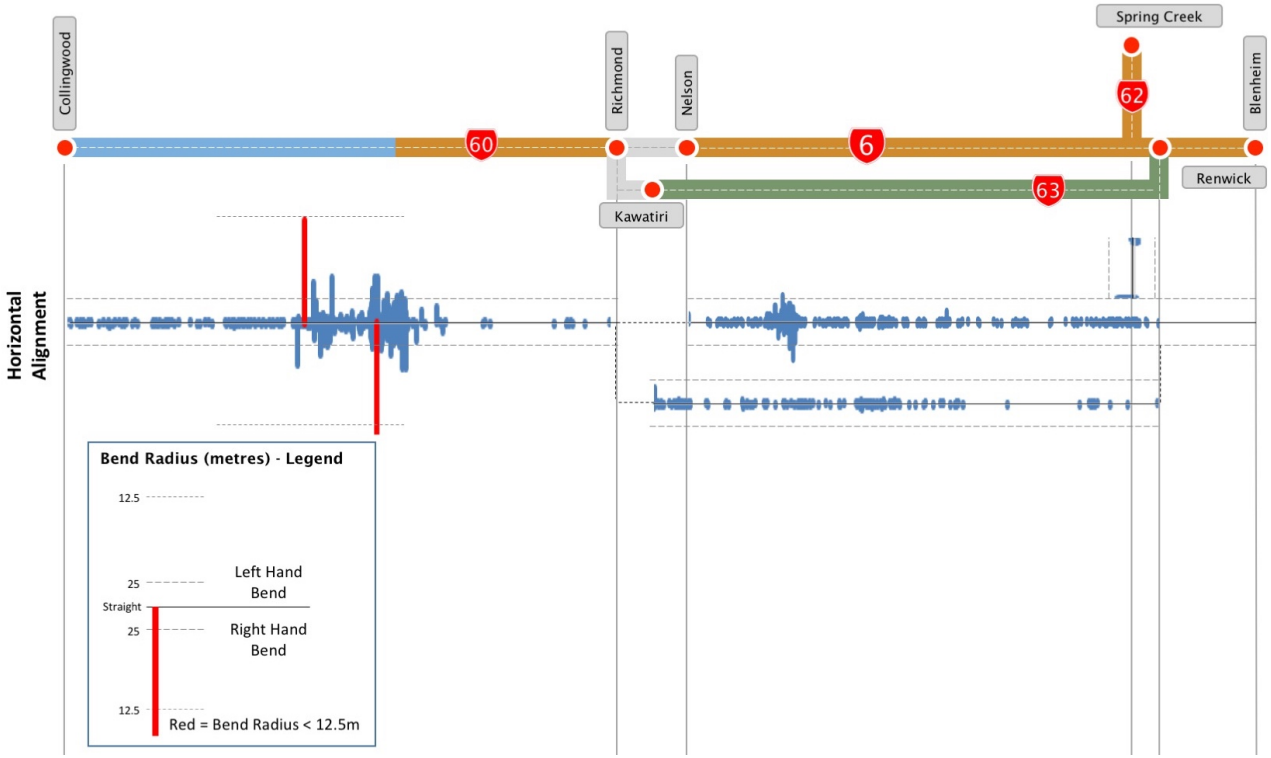
Horizontal alignment

The infographic shows the location and extent of the out of context curves along the corridor. The height of the bar is an indication of the severity of the curve calculated as $\frac{1}{radius^2}$, meaning the taller the bar, the smaller the radius of the curve. Note: Unlike other infographics, the horizontal alignment infographics are drawn in proportion to the length along the corridor. As such they are not shown in context with the intermediate points which have been excluded.

The corridor contains a regular occurrence of larger radius curves, except for the section of SH63 east of Wairau Velley, SH6 between Blenheim and Renwick, and SH62, which are relatively straight. Sharper bends with a radius below 25m occur over the Rae Saddle, and through the Takaka Hills. There are also two severe bends with a radius below 12.5m that occur on SH60 on the Takaka Hill.

SH63 Wairau

Figure 10 - Horizontal alignment



Volumes

Traffic volumes remain low and steady along much of the corridor. There are moderate increases in traffic where there is urban development such as approaching Blenheim, Nelson and Motueka. Heavy vehicle volume is usually concentrated between Motueka and Blenheim (part SH60 through SH6 and to SH62)

Since the Kaikoura earthquake, the use of SH63 has increased from 370 to 1,700 total vehicles daily, including an increase from 40 to 550 heavy vehicles. This change is well beyond that anticipated for this route and traffic volumes are now subject to extra monitoring.

HPMV routes

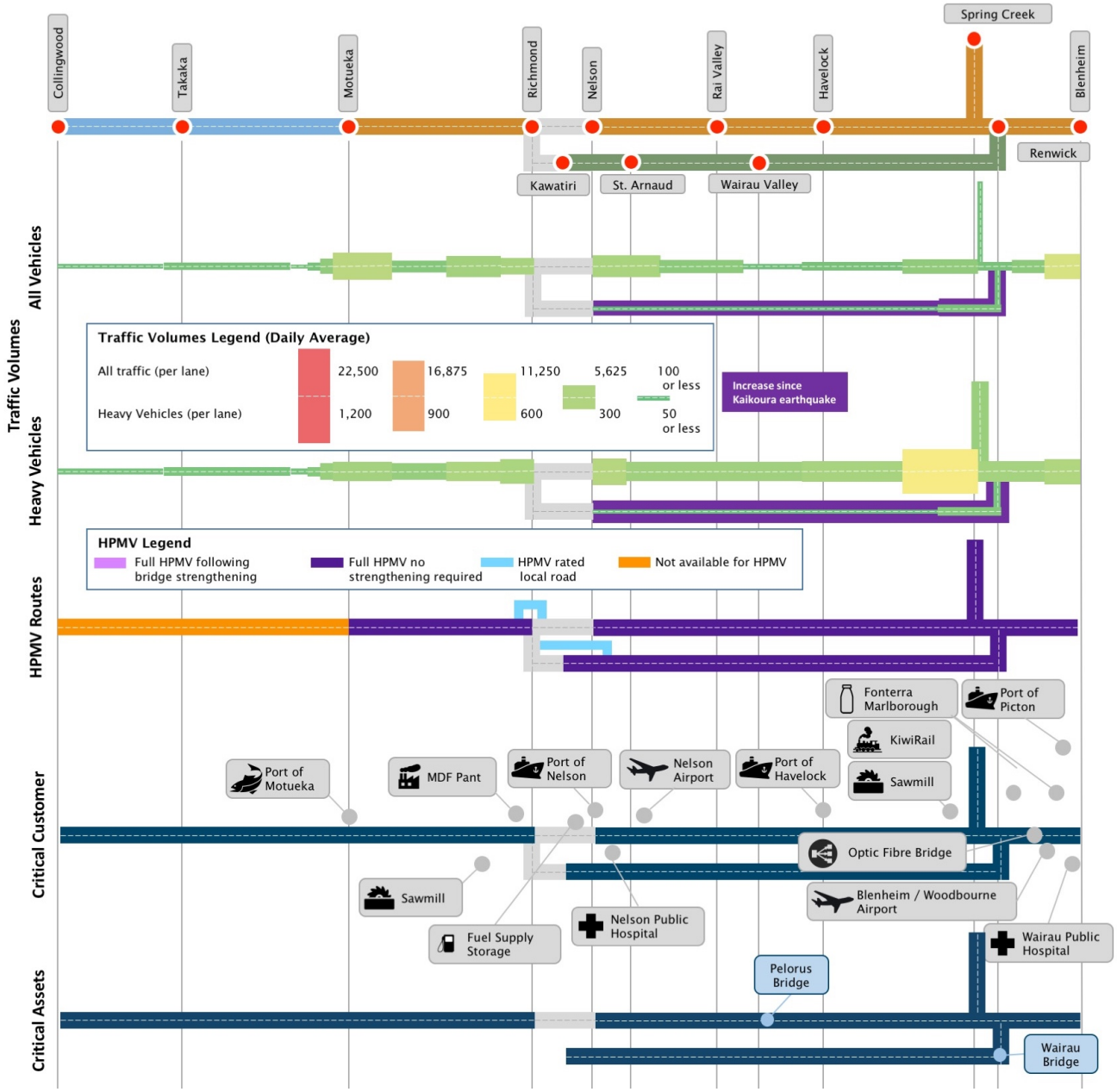
Most of the corridor is suitable for HPMV. The only part where there is no provision for HPMV is in between Motueka and Collingwood on SH60. An HPMV rated local road alternative provides the link between North Richmond and SH60. Tophouse Road (joining both SH63 and SH6) is rated HPMV and heavily used by timber trucks en-route to Nelson.

Critical customers and assets

There are several critical customers adjacent or close to the corridor. They rely on the corridor to be open 24/7 and are vulnerable to having short term interruptions impacting productivity. Examples include timely access to hospitals, health care, and ports. The Kaikoura earthquake highlighted that internet services providers, such as Chorus, with optic fibre cables on Wairau bridge, are also critical customers.

Critical assets along the route require an enhanced maintenance focus to ensure they do not fail or significantly interrupt services along the network. The Motueka bridge provides the only access to the eastern side of SH60. Bridges on SH63 carry critical utilities assets such as optic-fibre network cable providing internet to the rest of the South Island.

Figure 11 - Corridor capacity



Pressure

The pressures on the corridor that are resulting in increased demand or a reduction in levels of service for Access are the following:

- **Access intensification (growth):** Increased subdivision and some rezoning of farmland is reducing highway levels of service faster than anticipated. This additional access creates greater impact on safety and speed as well as maintenance and side road management. Corridor effects of both direct and indirect access are not always adequately considered during the planning process. Examples include Todd Bush Road Nelson where flooding and corridor stormwater capacity was exceeded by addition of development; SH60 to Collingwood where reverse sensitivity issues are occurring and the generally increased demand with the rapid expansion of the urban fringes of Nelson and Richmond.
- **Maintenance activity:** The absence of alternative routes, narrow alignments with frequent slips and the need for a safe working environment for contractors means that in some sections of this corridor, even minor maintenance cannot be performed without some level of disruption to customers. This can result in a much lower level of service and additional platooning effects along the corridor. There is a pressure between balancing access and resilience with reliability and efficiency.
- **Winter accessibility:** A specific maintenance regime has been developed to minimise adverse effects of winter weather events to maintain access (where practical) and manage safety, although overnight closures remain commonplace. Ice (and snow) can be problematic on the hill terrain and where the highway is in continuous winter shade (landform or vegetation). Calcium magnesium acetate (CMA), a relatively benign but costly imported de-icing agent, is applied to known problem areas to reduce the frequency and length of closures (ice and snow). CMA application also requires resource consent and is location specific.
- **Constrained carriageway width:** Many parts of the corridor have narrow lanes and limited shoulder width, particularly through hilly terrain. These narrow widths provide a poor environment for mixed use traffic and are a deterrent to access as well as a safety risk. There is pressure to provide a good level of service and meet expectations of road users – tourists, freight haulers and cyclists etc. Reports of trucks losing wing mirrors along SH63 are an indication of just how narrow.

Future considerations

The future considerations relating to corridor pressures, intervention triggers and appropriate levels of investment related to Access are as follows:

- **Land-use planning**: Growth needs to be managed with consideration of ability of highway to respond. This can be achieved by working with the unitary authorities to ensure that impacts on the corridor are adequately considered during the planning processes.
- **Maintenance strategies:** Consider how to manage and minimise delays from maintenance works, particularly along remote routes. Improved management might include real time notification along and in advance of routes advising of works and likely delays. This could also include working with regulators to develop global consenting for winter maintenance, to simplify compliance, increase flexibility and to enable extended use (duration and location) of CMA when needed. Consider and programme options for minimising shading/icing areas such as tree removal and day-lighting.
- **Management of low volume highways:** Consideration of clear guidance for management and prioritisation of mixed use low volume traffic environments (perhaps ONRC primary and secondary classes). A monitoring programme suited to a mixed use low volume environment, would provide information to fully understand the mix and needs of users present.

SH63 to Rainbow clearing the corridor to maintain access

Resilience

This corridor includes four state highways. SH60 is the only major access to Collingwood. SH6 provides the most direct route between Blenheim and Nelson, SH62 an alternate route north of Blenheim township and SH63 a route between Blenheim and the West Coast. Each provide a long alternative to the other (noting that wide loads are prohibited from Pelorus Bridge on SH6). There are significant parts of the network that have limited viable alternatives.

Vulnerabilities

The corridor is susceptible to flooding for a significant portion of its length, especially on coastal sections and along the Wairau Valley. Rock-fall, ice and fog occur in the Takaka Hill, Rai Saddle and north of Wairau Valley. There is also a high risk of slips between Nelson and Renwick (SH6) and throughout much of Collingwood to Riwaka (SH60).

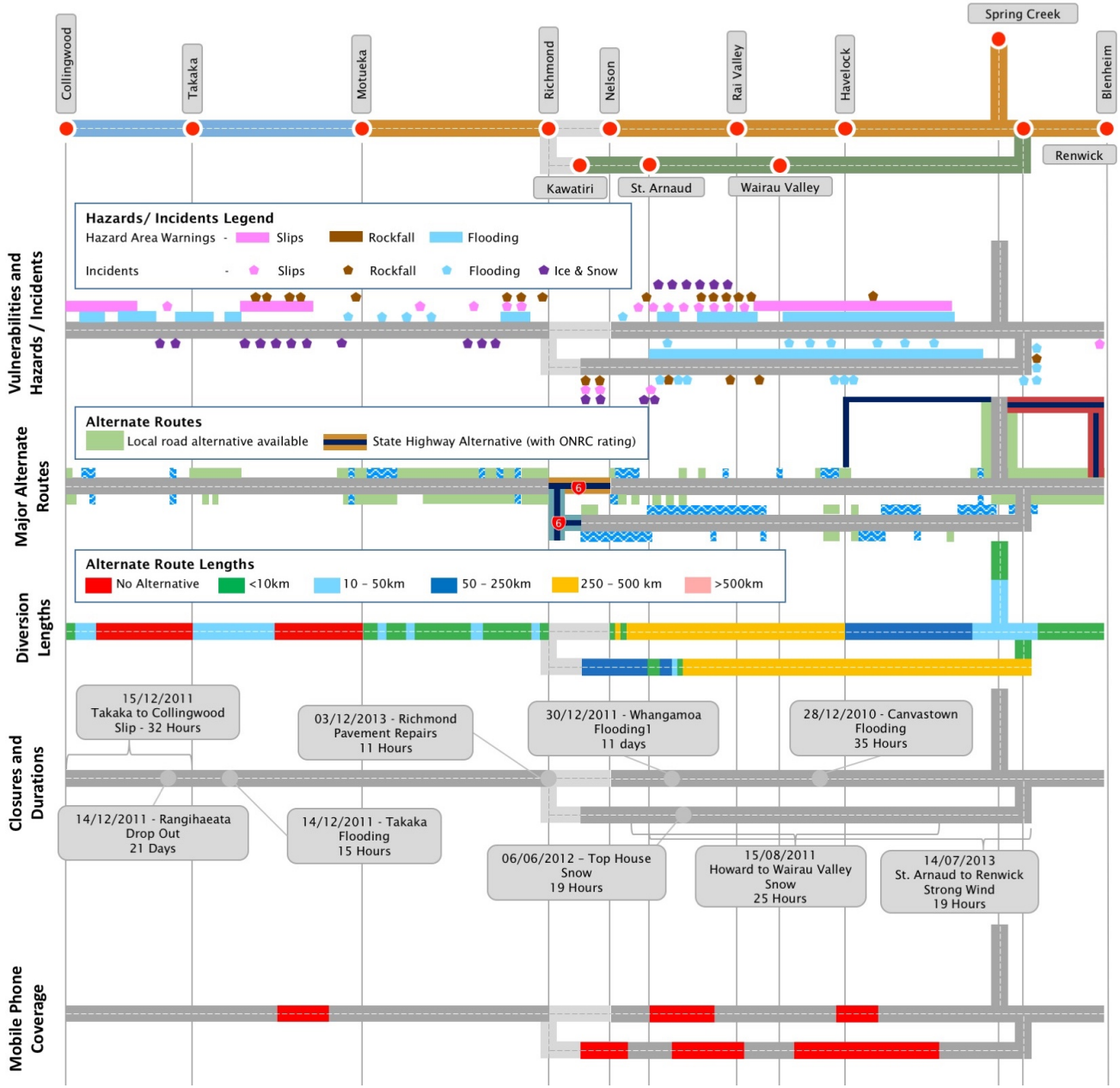
Alternative routes and diversion lengths

As the only two routes to Nelson and the West Coast Region coming from the north, and the only road to the Abel Tasman, the corridor is a crucial link for communities in the event of major closures. Some sections of the corridor, such as the Takaka ranges, the Wairau Valley and Rai Saddle, have no viable alternative routes other than a diversion of more than 250km.

Closures and duration

Over the past 6 years, there were 9 major unplanned road closures. The shortest was an 11-hour closure due to pavement repairs, and the longest was 21 days due to a drop out. Snow and floods are the most recurring type of events related to road closures.

Figure 12 – Resilience



Pressures

The pressures on the corridor that are resulting in increased demand or a reduction in levels of service for Resilience are as follows:

- **Alternative routes:** This corridor functions as an alternative route for the main South Island highway, SH1. During its detour function, there is pressure to compromise many of the levels of service, satisfying neither the regular nor the detoured users. Improvements needed during the detour periods may be inconsistent with the regular corridor operations and budget, particularly where there is a large difference between the usual and detour functions, such as along SH63.
- **Lifeline and critical customers:** Post-earthquake the broadband fibre located in the highway shoulder of SH63 required much higher levels of care and consideration resulting in greater cost and delays in recovery and enablement works.
- **Poor communication:** There are large parts of this corridor that have limited communications – cell phone signal, radio telephone (RT) signal and telephone land lines (undeveloped conservation area). Response to events in parts of the network can be limited by both time to advise and mobilisation (distance and remoteness of some areas). An extended coverage service has now been provided into SH63 as part of earthquake response works, but large coverage gaps remain. Good communication is vital to both corridor resilience and to improved road safety outcomes.
- **Slope stability:** Instability is common along much of this corridor resulting in random slips, rock falls, drop outs and debris. These can often be cleared quickly, but the required response may vary from quick removal to monitor for ongoing activity, installation of debris fencing, or more long-term structural repairs - all with potential for interim disruption to traffic. There is a risk of travellers being isolated by slips.
- **Weather events:** Natural events (particularly flooding) have an influence along much of this corridor, with alternate routes often worse or equally affected. Low lying coastal areas such as along Moutere Bay and Waimea Inlet can be influenced by both rainfall, upstream watersheds and extreme tides. Climatic changes indicate that high intensity rainfall events will become more common and these pressures can be expected to increase both in frequency and effect. Highway flooding from overflowing watercourses currently occurs at Pelorus Bridge (SH6), at many of the small catchments crossing SH63, through much of Golden Bay north of the Takaka Hills, and in areas of land use intensification such as south of Nelson and around Motueka. Localised flooding occurs through low-lying/plains areas and some townships. Flooding causes reduced level of service on the highway and closures.

Future considerations

The future considerations relating to corridor pressures, intervention triggers and appropriate levels of investment related to Resilience are as follows:

- **Alternative routes:** Levels of maintenance and management need to consider the "back-up" function of each route and the likely impact or demand on the corridor sections as well as the different needs and expectations of users. For example, following the Kaikoura earthquake SH6 experienced a tolerable increase, performing within the same ONRC classification range, but SH63 experienced six-fold traffic increase, including a fifteen-fold increase in heavy vehicles. This also means other customers, such as touring cyclists have few safe options.
- **Critical customer framework:** Establish and maintain a criticality framework that clearly identifies lifelines, critical customers, assets and emergency considerations.
- **Improved communications:** The role of improved communication in providing a safe and resilient network needs further consideration and could include working with service providers to improve mobile phone coverage or landline accessibility across the corridor.
- **Slope stability:** Appropriate monitoring to enable and determine how and where to target pro-active management of unstable areas, be that debris fencing or hazardous tree removal programmes or responses to denuding of hillsides from forest harvesting.
- **Rapid response strategy:** Consider where and how to incorporate redundancy or extra resilience into the network such as extra capacity and or amenities to aid rapid maintenance response and remediation. Ensure that heightened maintenance readiness is maintained, particularly in known event areas, such as through the alpine passes and in advance of forecast high risk events.

Reliability and efficiency

Efficiency

Some sections of the corridor perform poorly in terms of highway capacity. The Takaka Hills alternate between low and very high levels of service in terms of efficiency during all three periods of the day, depending on the presence of passing lanes. With fewer passing lanes, the Rai Valley, and St. Arnaud, experience a constant low efficiency. The section from Motueka to the Takaka Hills rates poorly during all three periods of the day. Both Nelson and Renwick experience speed reduction during peak times. The rest of the corridor is generally free-flowing, except for the section of SH60 after Takaka towards Collingwood.

Variability

Austroads variability data are only available for SH6 in between Renwick and Nelson. It shows little variability between Renwick and Havelock and Havelock to Nelson.

Commercial vehicle average speed

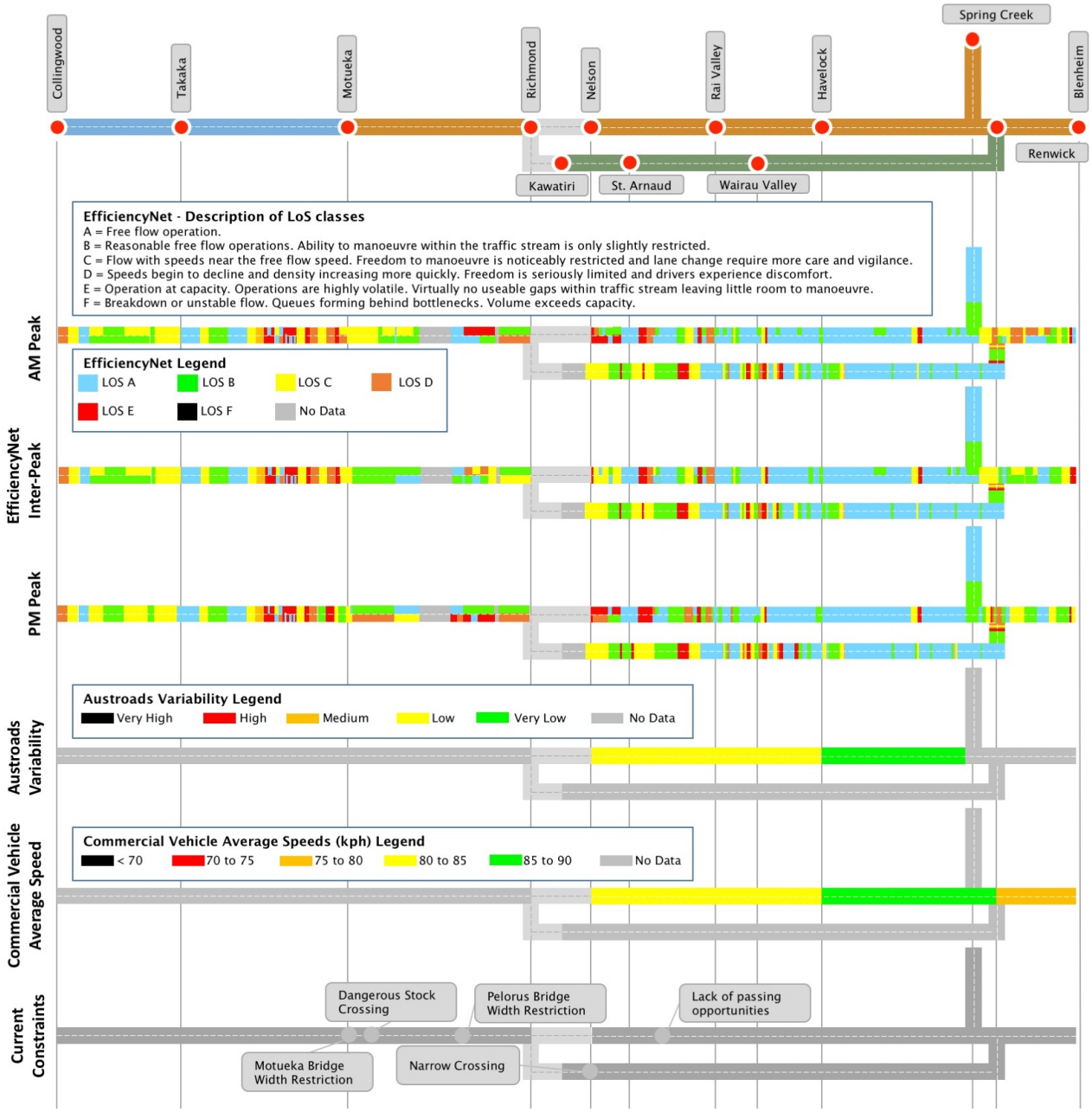
The average speed for commercial vehicles is relatively high for the SH6 section of the corridor. The section Blenheim to Renwick achieves 70 to 75 km/h, indicating higher traffic volume and a need to regularly change speed. There is no data to comment on the rest of the corridor (SH60-62-63).

Current constraints

The current constraints on the network affecting journey reliability and efficiency tend to be due to width restrictions on bridges, queuing and associated platooning at single lane bridges, the narrow carriageway of SH63, stock management on SH6 and extension of the urban fringe.

A lack of passing opportunities is noted as problematic for truck drivers and following vehicles through narrow hilly terrain such as across the Takaka Hills and through the Whangamoas.

Figure 13 - Reliability and efficiency



Pressures

The pressures on the corridor that are resulting in increased demand or a reduction in levels of service for **Reliability and Efficiency** are as following:

- **Adjacent land-use:** The primary and secondary routes can expect more interaction with adjacent land-uses than higher classified routes and a wider mix of customers. This can create pressure on the management of the route when there is conflict between the differing use, needs and expectations. Conflict between the traffic types along the routes (time focussed freight compared to relaxed explorers) and between the traffic and the surrounding environment (land use activity overflowing onto highway or speed reduction for townships).
- **Agricultural/horticultural vehicles:** Agricultural vehicles are wide and travel at slower speeds. It is difficult for following vehicles to gain sufficient clearance to overtake and consequently they cause delays and frustration. Such vehicles can be encountered for relatively short distances on the corridor (SH60, SH62 and SH6 and SH63) both during day and night, particularly in peak harvest seasons From March till Mid-May, around the vineyards harvest peak. Following motorists may take unnecessary risks because they do not know how long travel will be delayed.
- **Topography and geometry:** This challenge's the differing capability of different sized vehicles – e.g., trucks, campervans, caravans, cars and trailer, create delays on steep or tight alignments, whereas light vehicles can more readily accelerate and decelerate for changes of grade and curvature. Each of the highways in this corridor (except SH62) have some degree of narrowed alignment or difficult terrain.
- **Limited passing opportunities:** There are few suitable opportunities to either safely pull over, slow, or over take through much of the corridor, particularly in the tight and narrow hilly terrain such as Takaka Hills and Whangamoas. This means that one slower vehicle can create significant delays and queuing of traffic.
- **Stock crossing:** There are several locations along SH60 prior to Motueka where the stock crossing is becoming a challenge. Located behind a corner, with low visibility on a 100km/h route section, the stock crossing represents safety concerns. Discussion with the local crossing owner are undergoing for a potential underpass upgrade.

Future considerations

The future considerations relating to corridor pressures, intervention triggers and appropriate levels of investment related to **Reliability and Efficiency** are as follows:

- **Landuse planning**: Growth needs to be managed with consideration of ability of highway to respond. This can be achieved by working with the unitary authorities to ensure that impacts on the corridor are adequately considered during the planning processes.
- **Information campaigns:** Identification of regular and seasonal activity and targeted publicity of operating guidelines and action plans could minimise risks and hazards associated with movement of agricultural machinery, e.g. Marlborough currently advertise/educate by way of local newspapers, education, billboards, etc. Targeted messaging could also be developed to inform customers of which routes are more suitable for different vehicles types, and what that means for travel times.
- **Managing vehicle mix:** Consider how to prioritise what types of improvements are suitable where volumes are low and mixed - passing lanes, pull over areas, greater lane definition or separation. Increasing cycling along the corridor will require consideration.
- **Passing opportunities:** Improved passing opportunities will address a key cause of travel time delays through the rural parts of this corridor. Options could include, more or improved passing opportunities or realignment of tortuous/slower less manoeuvrable sections.

Safety

Collective risk

SH6 from Blenheim to Rai Valley and SH63 from Renwick to Kawatiri has a generally low or medium-low collective risk rating.

A medium-high rating is seen on the section between Rai Valley to about halfway between Richmond and Motueka except for the area between Nelson and Richmond which is medium-low.

From Motueka to Collingwood it is generally low risk however the western approach to Motueka is rated high risk. SH62 has a low risk rating in its entirety.

Personal risk

This corridor generally performs well in terms of personal risk. There are several sections of SH1 from Rai Valley to Nelson and Motueka to Takaka which have a high personal risk rating. SH63 between Kawatiri and the western section of Wairau Valley has a medium-high to high personal risk rating.

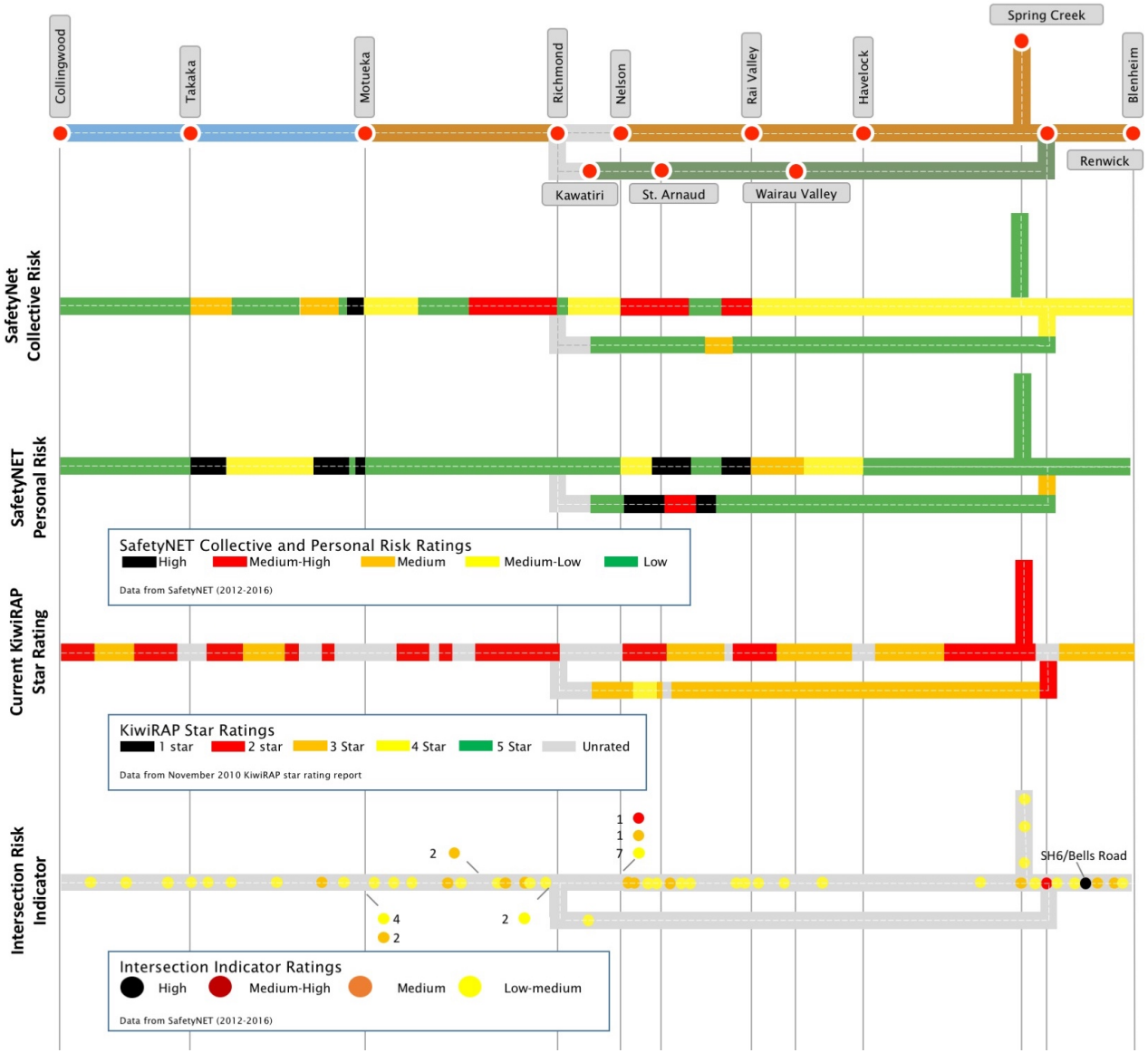
Star rating

SH6 and SH60 has a 2-star rating along most sections of the corridor. There are also multiple sections that are unrated. SH62 is generally 2-star rated and SH63 has a 3-star rating for most sections of the corridor.

Intersection risk Indicators

There is one high risk intersection on the corridor (SH6 and Bells Rd) and two medium-high intersections: one in Renwick and one in Nelson.

Figure 14 – Safety



Pressures

The pressures on the corridor that are resulting in increased demand or a reduction in levels of service for Safety are as follows:

- **Summer peak:** Activity on this corridor balloons during the summer period being most noticeable through the SH60 townships, Havelock, Takaka and Motueka. Along SH60 there are more intersection crashes in summer, kerbside parking is busy and there are increased pedestrians crossing the highway.
- **Unsealed access points and driveways**: Unsealed driveways are a feature of the Golden Bay side of SH60. They have loose material that poses a safety hazard, particularly for motorcycles, and require ongoing maintenance attention.
- **Motorcycles:** Motorcycle involvement in crashes has increased. Such crashes represent a higher risk of death or serious injury and on this route, can be exacerbated by first responder delay because of fewer vehicles and poor communication.
- **Stock crossings:** Stock underpasses along the corridor (SH6) operate well. However, there is limited ability to compel upgrading from an “at-grade” to a stock underpass.
- **Winter extreme conditions:** Winter weather often requires parts of the corridor to be closed, especially in alpine environments. Partial closures allow ongoing access, but require additional care from motorists. Frost, fog and ice that linger reduce the safety margins.
- **Remoteness:** Rapid response to injury or road crashes is a key aspect of minimising severity and ensuring good recovery. Parts of the corridor are remote, have low traffic volumes and limited communication options, meaning that response to crashes can be delayed beyond the ideal “golden hour” for survivability.
- **One-Lane Bridges:** The many one lane bridges along this corridor are generally suitable for the traffic volumes present, but they can present a higher crash risk for tourists or unfamiliar motorists with the potential for priority errors and head-on conflicts as well as rear end crashes.
- **SCRIM:** Local aggregates do not generally provide a reliable level of skid resistance. To achieve and maintain acceptable levels of skid resistance and safety, higher cost treatments must be applied such as transported seed free aggregates, or industrial melter slag.

Future considerations

The future considerations relating to corridor pressures, intervention triggers and appropriate levels of investment related to Safety are as follows:

- **Improved communication:** There are large gaps in reception throughout this corridor which if filled, could improve safety outcomes with quicker response times.
- **Stock crossing strategy**: Work with councils, landowners, and farming organisations (such as Federated Farmers) to assess current at-grade stock crossings along the highway. Prioritise underpasses for those stock crossings that are near bends and other locations that have reduced visibility. Ensure adequate advance warning signage of stock crossings. Gradual reduction in at grade stock crossings will improve safety for customers, particularly motorcyclists having to drive through effluent on the road, but also improve asset condition.
- **Sealing of unsealed accesses:** Working with landowners and councils to seal a nominal length of existing unsealed accesses and unsealed roads will reduce the tracking of loose material onto the corridor, improving safety, particularly for motorcyclists.
- **Information campaigns:** Partner with councils and other organisations to develop and implement road safety information campaigns for peak summer periods to increase awareness of increased activity, particularly in urban areas and at busy intersections.

People, places and environment

Natural environment

Much of the rural highway along the corridor is through and provides access to Department of Conservation (DoC) reserves and conservation areas, including Nelson Lakes National Park, Abel Tasman National Park, Kahurangi National Park, and the surrounding and supporting water courses, coastal, and marine environments.

The corridor has a succession of water catchments and marine environments along SH60 and SH6 and freshwater catchments along SH63.

The natural assets in this region are both of economic and ecological significance.

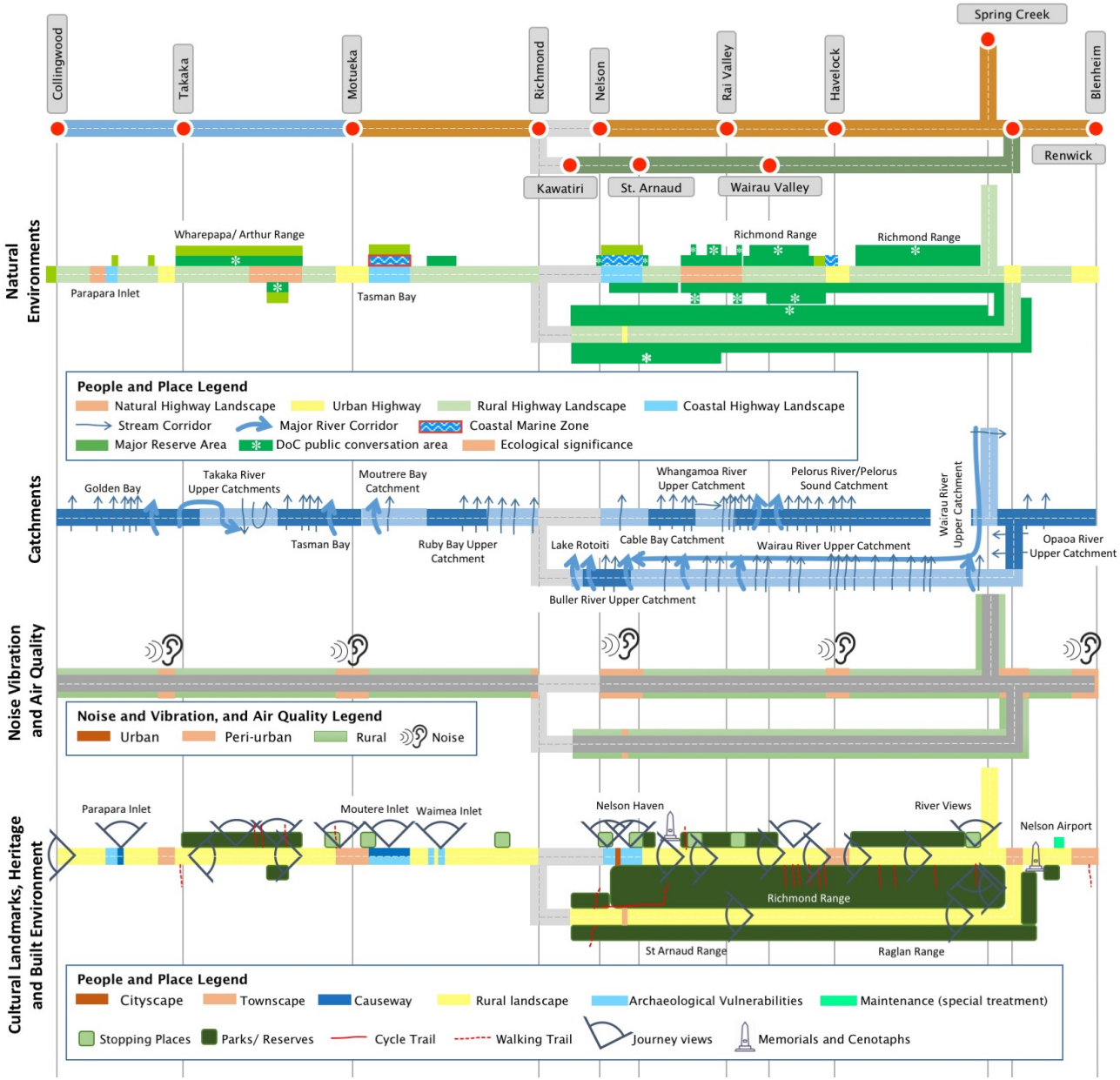
Noise, vibration and air quality

Noise, vibration and air quality are not a concern on this corridor. Noise hotspots occur occasionally - related to heavy vehicles, pavement surfacing, or new housing and have been previously noted in smaller townships, such as Riwaka, Rai Valley and Ruby Bay.

Cultural landmarks, heritage and built environment

This corridor is all about nature and sightseeing and is scattered with cultural and heritage landmarks. DoC has requested these have a higher profile in the visitor experience. Places of large gatherings such as marae and community halls are generally located away from the corridor. There are some schools located directly on the corridor. Informal gathering places along the corridor include swimming holes (Paynes Ford and Pelorus Bridge), entry points for walking and cycling trails, café and roadside attractions, and lookout and stopping places.

Figure 15 – People, places and environment



Pressures

The pressures on the corridor that are resulting in increased demand or a reduction in levels of service for **People, Places and Environment** are as follows:

- **Environmental compliance:** There are compliance requirements and costs to meet regional ecological standards, to attain and retain resource consents, and to meet amended or updated standards. Examples include water quality management through the Coastal Marine Zone (CMZ), pest species management across NZTA owned land, and resource consents for CMA.
- **Stormwater management standards:** There is a demand for higher quality control of stormwater discharge where it is close to waterways or sensitive receiving environments (such as the CMZ). The installation of interceptors meets the requirement in many locations, but they require ongoing maintenance. There are locations on the corridor where there are no options for stormwater disposal (Rai Valley township, low lying), which creates resilience pressure (area floods) and additional cost (in Rai is degrading adjacent pavement).
- **Enhanced ecological outcomes:** There is an increased pressure to retrofit culverts for fish passage in some areas. This creates a pressure on the maintenance programme and there is no explicit responsibility acknowledged nor guide for prioritising installation.
- **Vegetation management:** Vegetation is an increasing cost and includes biosecurity aspects of aggregate carrying gorse or broom seeds. Communities have expectations regarding no spray zones, landscaping and preserving views. As the corridor develops, the area of vegetation to be managed (including landscape areas) is expected to increase and with it, operational costs (e.g. Ruby Bay bypass consent conditions requiring planting). Wilding pines and large trees are an ongoing maintenance item that exacerbate icing or cause closures with fallen limbs or slips and mud.
- **Stock truck effluent stations:** Post the 2016 Kaikoura earthquake, stock trucks no longer have access to the SH1 stock effluent disposal facility. There is no facility along or servicing SH63 (the current detour route). With stock truck capacity to hold effluent being around 400 litres for each unit, spillage onto the corridor is frequent with consequential effects on the surrounding environment in terms of safety, amenity, maintenance and comfort of others.
- **Freight bypasses:** SH63 freight uses a local road south of Renwick to avoid a speed reduced highway section prior to the intersection with SH6 and to access Picton via SH62. This local bypass isn't designed to sustain a heavy volume of freight and increasing heavy traffic on this route is of concern to locals.

Future considerations

The future considerations relating to corridor pressures, intervention triggers and appropriate levels of investment related to **People, Places and Environment** are as follows:

- **Relationships:** Working closely with local decision makers, such as DoC and Tourism Operators to represent the highway, can improve outcomes in relation to growth in tourism and freight, improving road safety, and land management. Working with regulators to explore options for global consenting will provide flexibility in maintenance responses. Consider strengthening monitoring and reporting of compliance needs and results.
- **Stormwater management planning:** A long term resolution of drainage through Rai township would reduce ongoing maintenance 'tidy up' responses after regular flooding events.
- **Vegetation management programme:** A programme of minimisation, removal or revegetation where practical and consideration of how remaining risks can be reduced or managed. Develop and prioritise a hazardous tree register and removal programme.
- **Ecological enhancement strategy:** Developing a clear strategy and clarifying organisational roles in maintaining and improving ecological connectivity, biodiversity of flora and fauna and habitat connectivity, and maintaining safe access to ecologically valued areas will provide greater coordination and enable more effective management of budgets.
- **Stopping place strategy:** Appropriately located stopping points along the corridor incorporating towns and urban areas will ensure visitors are provided with safe places to stop, take photos, and refresh.
- **Stock truck effluent stations:** Assess extent of current and future need for effluent disposal, including consideration of location and destination.

Understanding the infrastructure assets

The following sections contain information about the condition and performance of the state highway assets within the corridor. This information is necessarily complex and therefore challenging to communicate simply. Every effort has been made to explain the base data inputs and what the information is describing in as simple terms as possible, however full comprehension does require some technical knowledge of the terms used.

Corridor asset base

The state highway system is a significant national asset, made up of 11,412km of roads and associated assets. This corridor contributes approximately 356km of road network which reflects 3.1% nationally. The total value of the assets along the corridor is $462M (excluding ITS, and, heritage and green assets).

The corridor assets have been divided into eight groups as shown in Figure 16 which directly support the access, reliability and efficiency, safety, resilience and people, places and environment outcomes on the network.

Asset condition and performance summary

The infographic shows the summary score the entire corridor achieves for each of the eight measures used in this document to assess the condition and performance of the assets. These measures are assessed in more detail along the corridor in the following sections of the document.

Figure 16 – Corridor asset base

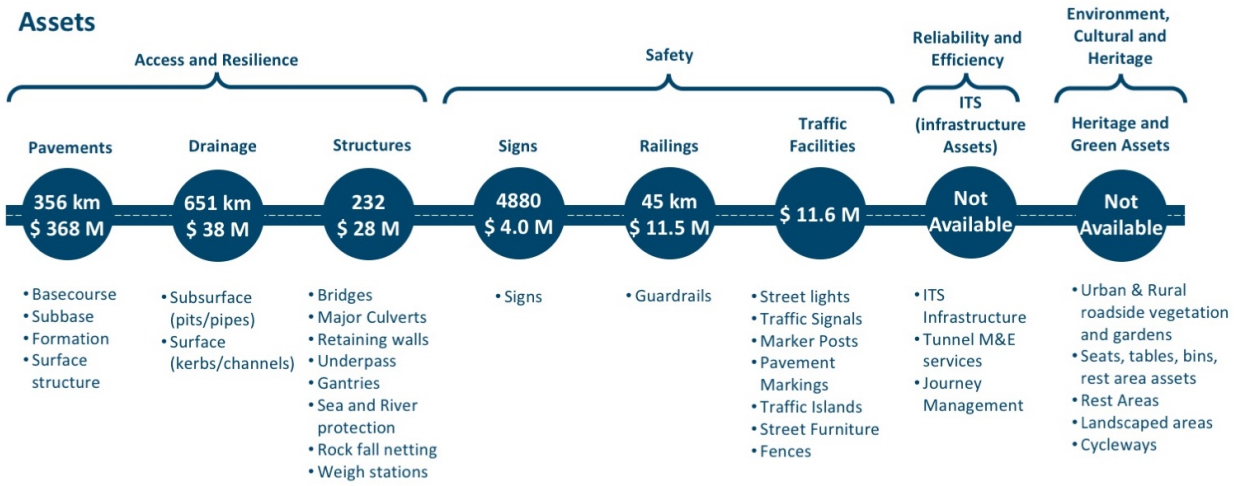


Figure 17 - Asset condition and performance

Asset condition and performance

Surface skid resistance

The infographic shows the proportion of the Route Section, as a percentage, that falls within the two levels of either threshold limit or investigation level. The change in Surface Skid Resistance infographic shows the change in the levels from the 2014 survey to the 2016 survey, as either an improvement or degradation.

The information is derived from inspection data that records a value every 10m in each direction. Each 10m length is rated as to whether it is within one of the bands: below threshold limit; within investigation limits; or above Investigation limits. The proportion is then the number of 10m lengths in that section as a percentage of all 10m lengths in that section.

Much of the corridor has surface skid resistance results between the investigation and threshold levels. There are only limited percentages of surface skid resistance below the threshold level, with the degradation across the three years through SH6, RS99 at Nelson to RS73 before Rai Valley. Improvements in surface skid resistance have been marked along SH60, SH63 and SH6.

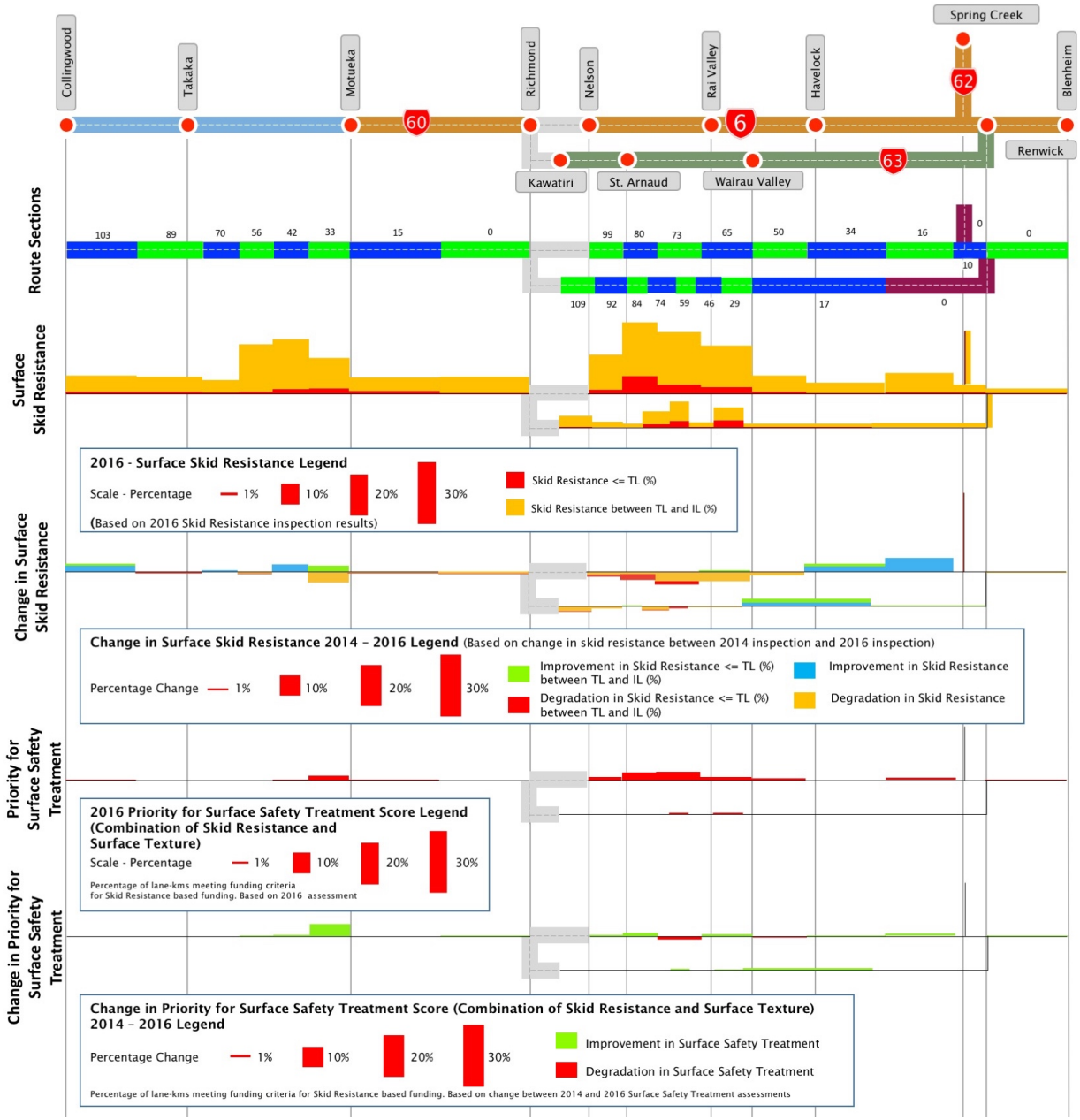
Priority for surface safety treatment

The infographics show the proportion of the Route Section that has a Priority for Surface Safety Treatment (Skid Assessment Length) that would qualify for funding, i.e. a score >140. The second infographic shows the change in these levels from the 2014 survey to the 2016 survey, as either an improvement or degradation.

Taken from inspection data that is normally recorded every 100m in each direction. Each 100m assessment length is rated and if it achieves a score over 140 it qualifies for funding. The proportion is then the length of route section that qualifies for funding as a percentage of the total length of that section.

Only 4.4 (<1%) of the 716 lane km corridor qualifies for surface safety treatment funding. Most of the increase in priority for surface safety treatment across the 3-year period is along SH6, either side of the Rai Valley in RS73 and RS50. Improvements have been achieved across much of SH6 and SH60 near Motueka, RS33 & RS42. The earthquake response will bring a lot of changes on SH63.

Figure 18 – Asset condition



Surface defects

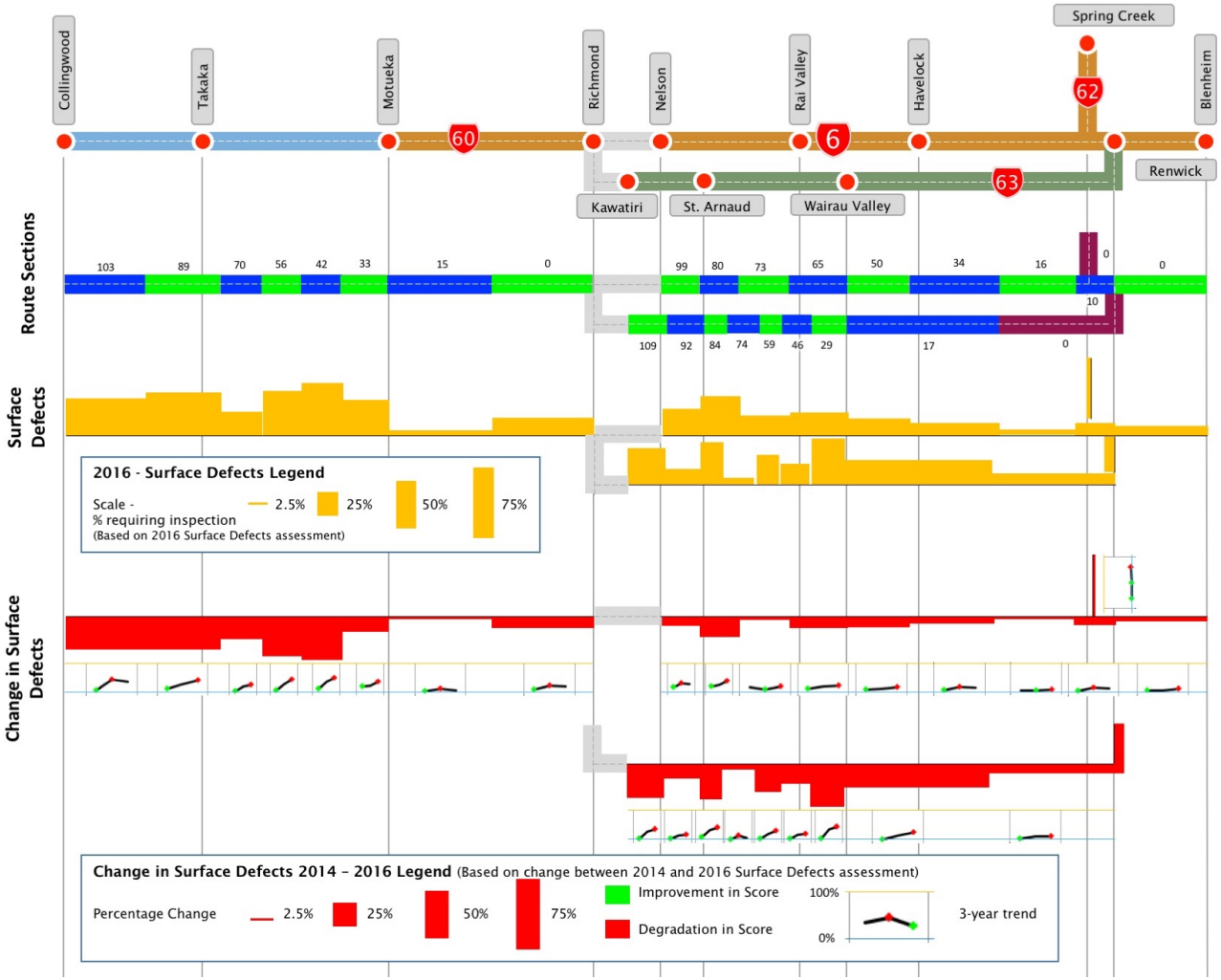
The infographics show the proportion of the Route Section that has a Surface Defects (100m Priority) score that would signal the need for further investigation, i.e. a score >20. The second infographic shows the change in these levels from the 2014 survey to the 2016 survey, as either an improvement or degradation, as well as the three-year trend.

The Surface Defects score is made up of a number of measures which all contribute to the overall score including: roughness, rutting, shoving, flushing, and design life. Any 100m section achieving a score over a total of 20 rates as flagged for inspection. The proportion is then the length of corridor that is flagged for inspection as a percentage of the total length of that section.

Overall, 25.9% of the corridor achieves a score above which inspection is required. Sections with significant lengths of surface requiring inspection include: 63/29 west of Wairau Valley, and sections 60/42/, 60/56, 60/89 and 60/103 between Motueka and Collingwood. These sections also show a significant level of degradation in score over the last three years. Due to the low traffic volume and the low ONRC along RS103&89, there is no high priority investment requirements.

SH6 Rai saddle realignment

Figure 19 – Asset condition 2



Surface age

The infographic shows the weighted average age of road surface, and the proportions of surface age that fall within the three age bands.

The base data is all the seal lengths and their age from RAMM. Then a weighted average is then calculated. Overall, all sections add up to 100%. The proportion is the length of corridor in a particular age band as a percentage of the total length of that section.

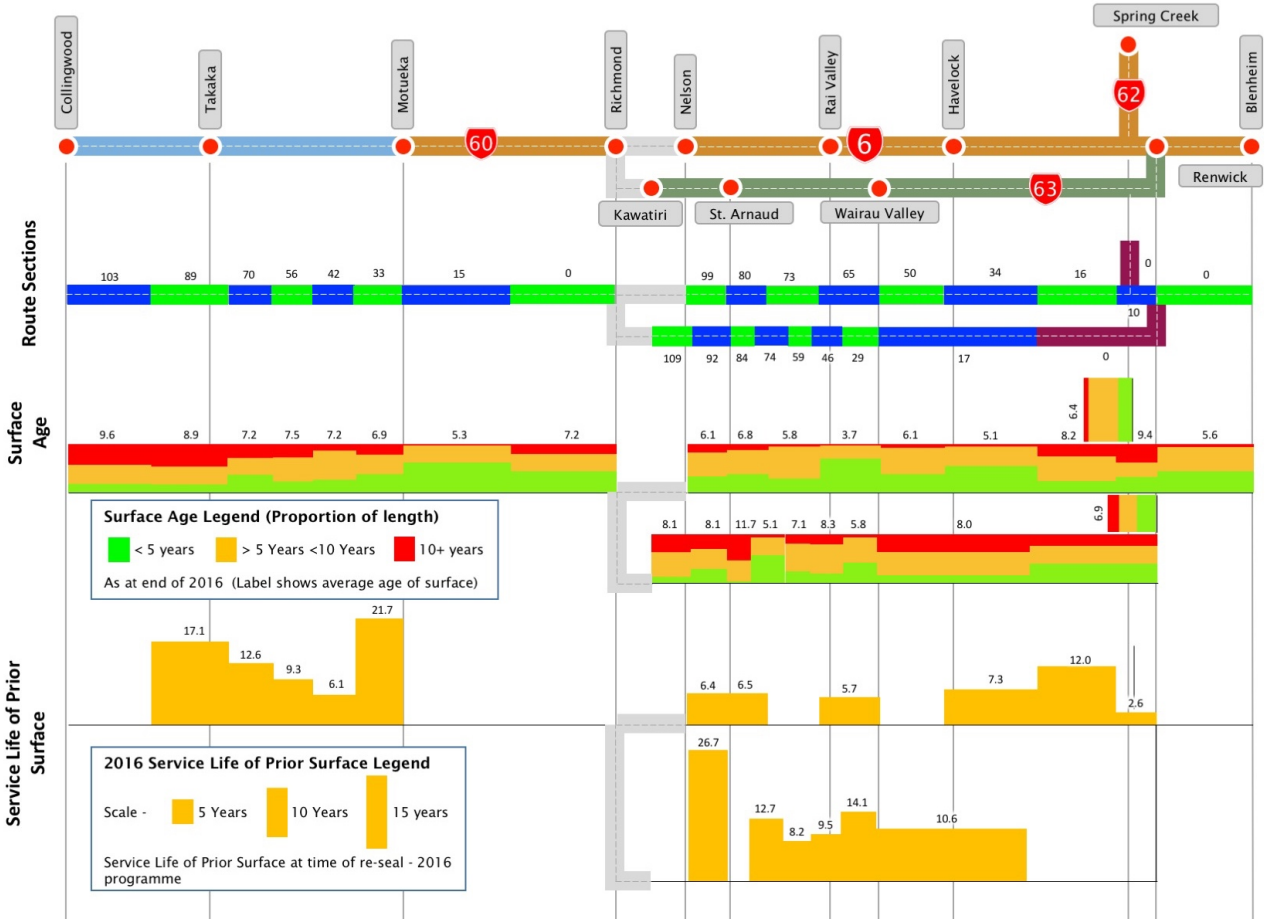
The sections of corridor with the oldest age profile are 6/10 north of Renwick, 63/84 east of St Arnaud, and 60/103 East of Collingwood.

Service life of prior surface

The infographic shows the weighted average age achieved for the sections of road surface that were resurfaced in the last financial year (2015-16). The infographic only shows sections where re-surfacing work was undertaken in the 2015/16 season. The value is derived from the weighted average age of the sections of seal that were overlaid by a new first coat seal. This is a standard ONRC measure.

Overall the re-surfaced sections achieved an average service life of 13.1 years, with sections 63/92 west of St Arnaud, and 60/33 north of Motueka achieving a service life in excess of 20 years.

Figure 20 – Asset condition 3



Resurfacing

The infographics show the proportion of Route Sections planned for resurfacing in the 2016/17 and 2017/18 approved annual plans, confirmed through the RAPT tour, as an indication of the response to the surface condition described previously, and current surface condition.

The major resurfacing works are planned for section 6/73 east of Whangamoa.

Proportion of travel on smooth roads

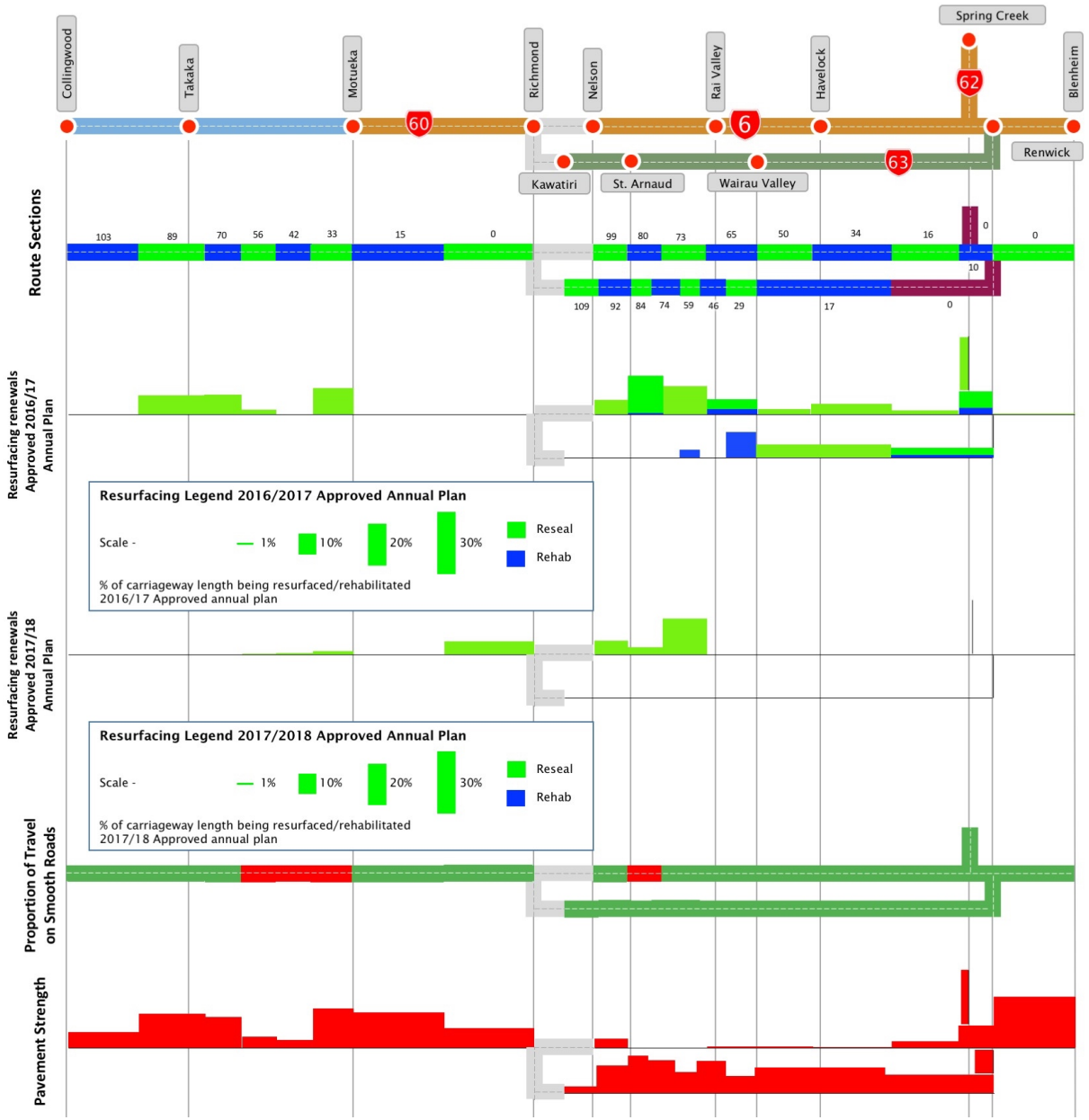
The infographic shows whether the route section passes the ONRC standard for Proportion of Travel on Smooth Roads (Smooth Travel Exposure). 97% is the ONRC target for proportion of travel on smooth roads. The infographic simply shows whether the route section achieves this level or not.

Pavement strength

Recommended deflection constraints for thin asphaltic surfaces is used as a measure of pavement strength. The infographic shows the proportion of the Route Section that fails to achieve the recommended deflection constraint for the classification of road, based on lane-km.

A lot of work (for 2016-17) on SH63 was brought forward by 2 years, triggered by a more rapid deterioration of the pavement caused by the bypass.

Figure 21 – Asset condition 4



Asset condition and performance pressures

The pressures on the corridor that are resulting in increased demand or a reduction in levels of service for **Asset Condition and Performance** are as follows:

- **Low pavement quality:** The large distance from asphalt plants and the scarcity of high quality aggregate quarries on the West coast reduces the options for surface treatment from Havelock and beyond. Poor pavement suffers from moisture with drainage issues and can be a challenge in some towns (Motueka). Low volumes make it harder to justify higher cost treatment.
- **Only bypass route**: SH63 is the only alternative to SH1 for large vehicles in between Picton and Christchurch. There is tremendous pressure to keep it going, since the Kaikoura earthquake, as the flow of heavies has significantly increase (from 50 to 500 a day). Wairau river bridge is a critical asset as if lost, heavies will be blocked.
- **One lane bridges**: While there are a number of old one lane bridges, they are in relatively good condition. Any maintenance work done on these bridges does however require full closure of the road.
- **Mountain ranges resilience issues**: Resilience is an issue on the more remote sections of the corridor, especially the mountain ranges (Whangamoas, Rai Saddle, Takaka Hills). Weather conditions are limiting the sealing season and lose skid resistance creates requirements for special surfaces.
- **Winter maintenance**: There is enormous amount of rehabilitation work to keep operating SH63 through winter as if it was SH1.

Asset condition and performance future considerations

The future considerations relating to corridor pressures, intervention triggers and appropriate levels of investment related to **Asset Condition and Performance** are as follows:

- **One lane bridges**: Re-opening SH1 will drastically reduce the traffic alongside SH63. Temporary one-lane bridge will be kept for at least 5 years allowing NZTA to decide what configuration maintenance is needed for SH63 as a backup for SH1.
- **SH63 resilience improvements**: Geometry, formation and narrowness have been the main issues to keep operating SH63 fully as a bypass for SH1 with the width of the lanes being the biggest risk. The NZ Transport Agency will need to decide the required on SH63 once SH1 will be re-opened.
- **Bridge maintenance**: Increasing the number and frequency of bridge inspection and maintenance.
- **Barrier maintenance**: An increasing number of barrier will require an increased in maintenance.

SH63 narrow work site

Investing in the corridor

The **Customer Levels of Service** shapes our response to our investment in maintenance, renewals and improvements. The NZ Transport Agency must consider the impact we have on our customers, the environment, communities, iwi, and the NZ economy in everything we do.

Decisions must be evidence based, informed and transparent with investment targeted to the right treatment, in the right place, at the right time while considering a range of competing priorities for investment. This requires significant analysis of various alternatives and options and expertise in applying appropriate judgement in collaboration with our service delivery partners.

Right treatment, right place, right time

A range of factors have been considered to determine the best point at which to intervene with maintenance and/or renewal treatments and improvements along the corridor.

Intervention works will be programmed to ensure:

- The right treatment,
- At the right place, and,
- At the right time.

Interventions will:

- Be based on minimising whole of life, whole of system costs and be underpinned by facts derived from enhanced asset information and modelling
- Define the most appropriate approach to asset maintenance, inspection and renewal, supported by reliability, availability, maintainability and safety specifications
- Use a risk-based approach to determine intervention requirements to specified levels of reliability
- Use resilience requirements to a specified range of weather conditions, considering climate change
- Define how sustainable development requirements are to be addressed

Summary investment

The proposed investment in the corridor is as follows:

Table 1- Summary corridor investment ($000)

Outcome	Expenditure Category	2018-2021	2021-2024	2024-2028
Access and Resilience	Maintenance and Operations	$8,341	$8,780	$13,322
	Renewals	$10,506	$11,991	$16,400
	Improvements	$6,300	$50,000	$0
Reliability and Efficiency	Maintenance and Operations	$3,532	$3,792	$5,731
	Renewals	$296	$273	$486
	Improvements	$14,725	$0	$0
Safety	Maintenance and Operations	$8,065	$8,695	$13,256
	Renewals	$1,514	$1,870	$2,823
	Improvements	$55,060	$15,000	$0
People, places and Environment	Maintenance and Operations	$1,801	$1,903	$2,913
	Renewals	$108	$95	$136
	Improvements	$0	$0	$0
	Total	**$110,248**	**$102,398**	**$55,068**

Figure 22 – Corridor investment

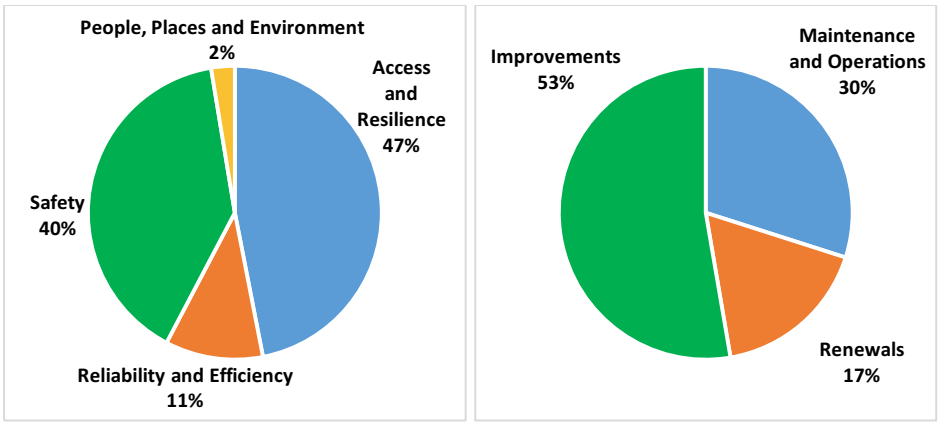


Table 2 - Summary investment by work category ($000)

Outcome	Work Category		2018-2021	2021-2024	2024-2028
Access and Resilience	111	Sealed Pavement Maintenance	$1,777	$1,927	$2,954
	112	Unsealed Roads	$0	$0	$0
	113	Drainage Maintenance	$838	$1,043	$1,670
	114	Structures Maintenance	$1,355	$1,365	$2,050
	121	Environmental Maintenance	$1,874	$1,876	$2,794
	122	Traffic Services Maintenance	$17	$48	$72
	124	Cycle Path Maintenance	$45	$71	$104
	151	Network & Asset Management	$1,954	$1,966	$2,953
	161	Property	$481	$483	$725
	211	Unsealed Road Metalling	$7	$7	$11
	212	Sealed Road Resurfacing (excl. surface skid resistance)	$5,634	$7,129	$9,964
	213	Drainage Renewals	$586	$456	$584
	214	Pavement Rehabilitation	$2,808	$3,002	$3,745
	215	Structures Component Replacements	$1,427	$1,335	$2,005
	222	Traffic Services Renewals	$44	$61	$91
	321 - 341	Improvements	$6,300	$50,000	$0
Reliability and Efficiency	121	Environmental Maintenance	$836	$903	$1,393
	123	Operational Traffic Management	$1,975	$2,158	$3,262
	151	Network & Asset Management	$634	$643	$944
	161	Property	$88	$88	$132
	222	Traffic Services Renewals	$296	$273	$486
	321 - 341	Improvements	$14,725	$0	$0
Safety	111	Sealed Pavement Maintenance	$1,949	$2,059	$3,152
	112	Unsealed Roads	$0	$0	$0
	113	Drainage Maintenance	$241	$361	$595
	114	Structures Maintenance	$358	$390	$586
	121	Environmental Maintenance	$397	$443	$666
	122	Traffic Services Maintenance	$3,255	$3,487	$5,326
	124	Cycle Path Maintenance	$15	$31	$43
	151	Network & Asset Management	$1,644	$1,712	$2,571
	161	Property	$205	$212	$318
	212	Surface Skid Resistance	$1,042	$1,135	$1,705
	214	Pavement Rehabilitation	$15	$31	$46
	215	Structures Component Replacements	$234	$230	$346
	222	Traffic Services Renewals	$223	$474	$726
	321 - 341	Improvements	$55,060	$15,000	$0
People, places and Environment	111	Sealed Pavement Maintenance	$148	$152	$228
	121	Environmental Maintenance	$1,393	$1,490	$2,294
	151	Network & Asset Management	$209	$209	$314
	161	Property	$51	$51	$77
	221	Environmental Renewals	$108	$95	$136
	321 - 341	Improvements	$0	$0	$0
		Total	**$110,248**	**$102,398**	**$55,068**

To be confirmed through the RLTP

Investing in access and resilience

Operations and maintenance

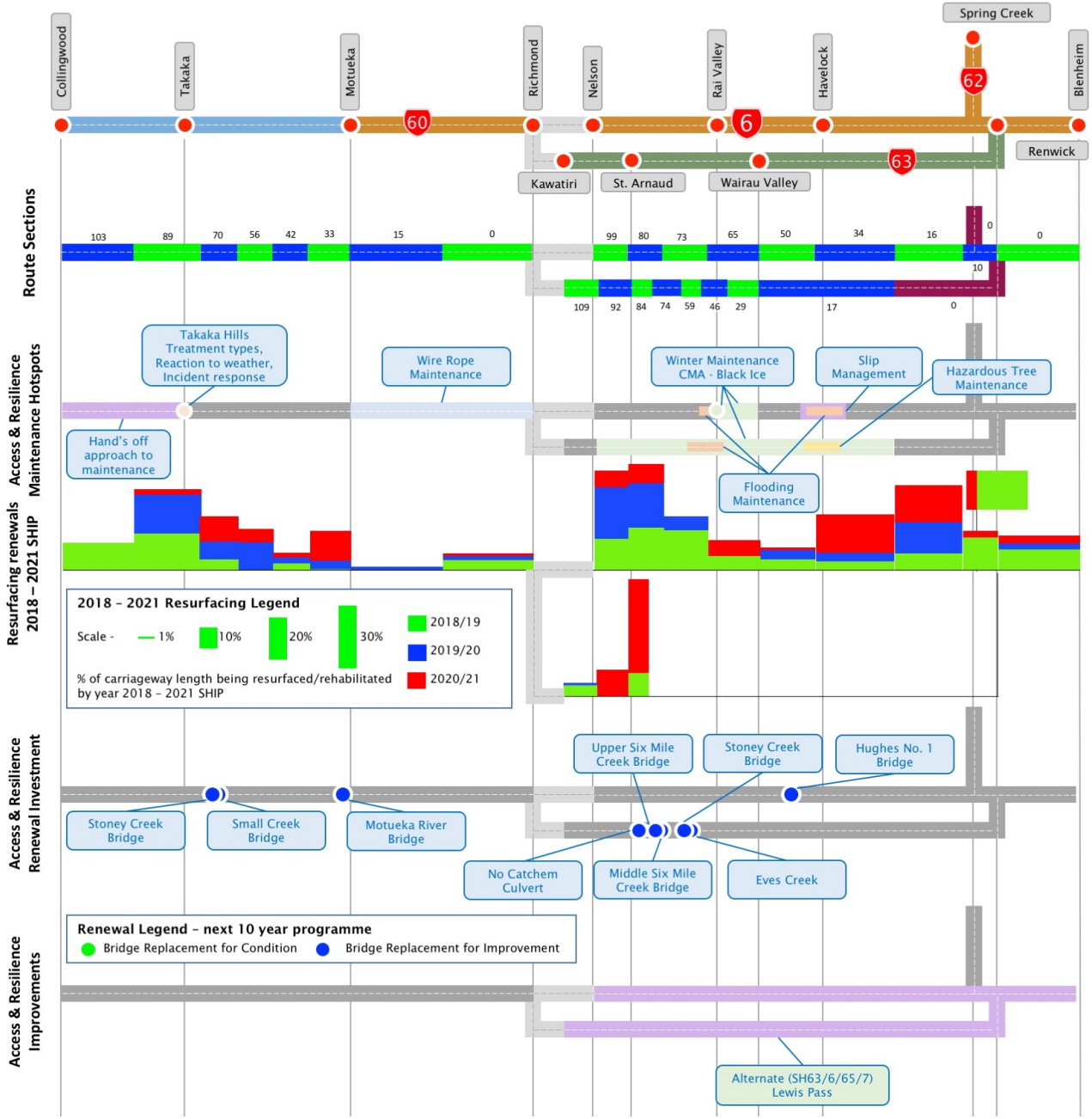
The main areas of investment to provide and preserve access and resilience are drainage maintenance, sealed road surfacing and structural component replacements and vegetation control. A key focus is to realign the base preservation quantities toward increased preventative maintenance and to slow pavement deterioration specially through improved drainage.

Maintenance hot spots

The following maintenance 'hotspots' require additional monitoring or cause an increased maintenance burden along the corridor:

- **Black ice and winter maintenance** is an issue at the Rai Saddle, Takaka Hills and in the Whangamoas requiring a more proactive maintenance approach as well as treatment types with a proactive incident management.
- **Flooding and pavement moisture** are an issue for the Richmond/Motueka Takaka/Collingwood branches of SH60 and alongside the Wairau river on SH63.
- **Hazardous trees** maintenance is required on SH63 on the north end of the Wairau Valley as well as between Havelock and Pelorus bridge.
- **Slips management** is required in the hilly sections of highway around Havelock.
- **Wire Rope / Barrier** maintenance between Richmond and Motueka.

Figure 23 – Access and resilience investment



Renewals

Resurfacing

The infographic shows the proportion of route section by carriageway length planned for resurfacing within the period 2018/19 to 2020/21, the three-year span of the SHIP. This is also broken down in to the individual years to indicate the timing of expenditure over the three-year period.

Significant investment in resurfacing is planned for sections: 6/80 and 6/99 between Whangamoa and Nelson, and 60.89 around Takaka.

Structure Renewal

The renewal investment infographic shows the planned bridge replacements along the corridor. No bridges are planned for replacement due to asset condition. Nine bridges are scheduled to be replaced for improvements reasons, at an estimated cost of $29.4M.

Improvements

Structure Improvements

Nine bridges are scheduled to be replaced for improvements reasons, at an estimated cost of $29.4M.

Planned

There are no currently planned access and resilience related improvements underway on this corridor.

Draft Regional Land Transport Programme considered for the SHIP

The following table shows the list of projects being considered through the Draft Regional Land Transport Programme through the SHIP, and cover the next 10 years.

Table 3- Draft regional programme considered for SHIP

Project	Funding Status	Description
Alternate (SH63/6/65/7) Lewis Pass		Resilience and safety improvements. Including consideration of single lane bridge and improved cell phone coverage for improved event response and recovery.

Investing in reliability and efficiency

Operations and maintenance

The main areas of investment to provide and preserve reliability and efficiency are environmental maintenance through keeping potential obstructions clear of the highway, wayfinding signage, and operational traffic management.

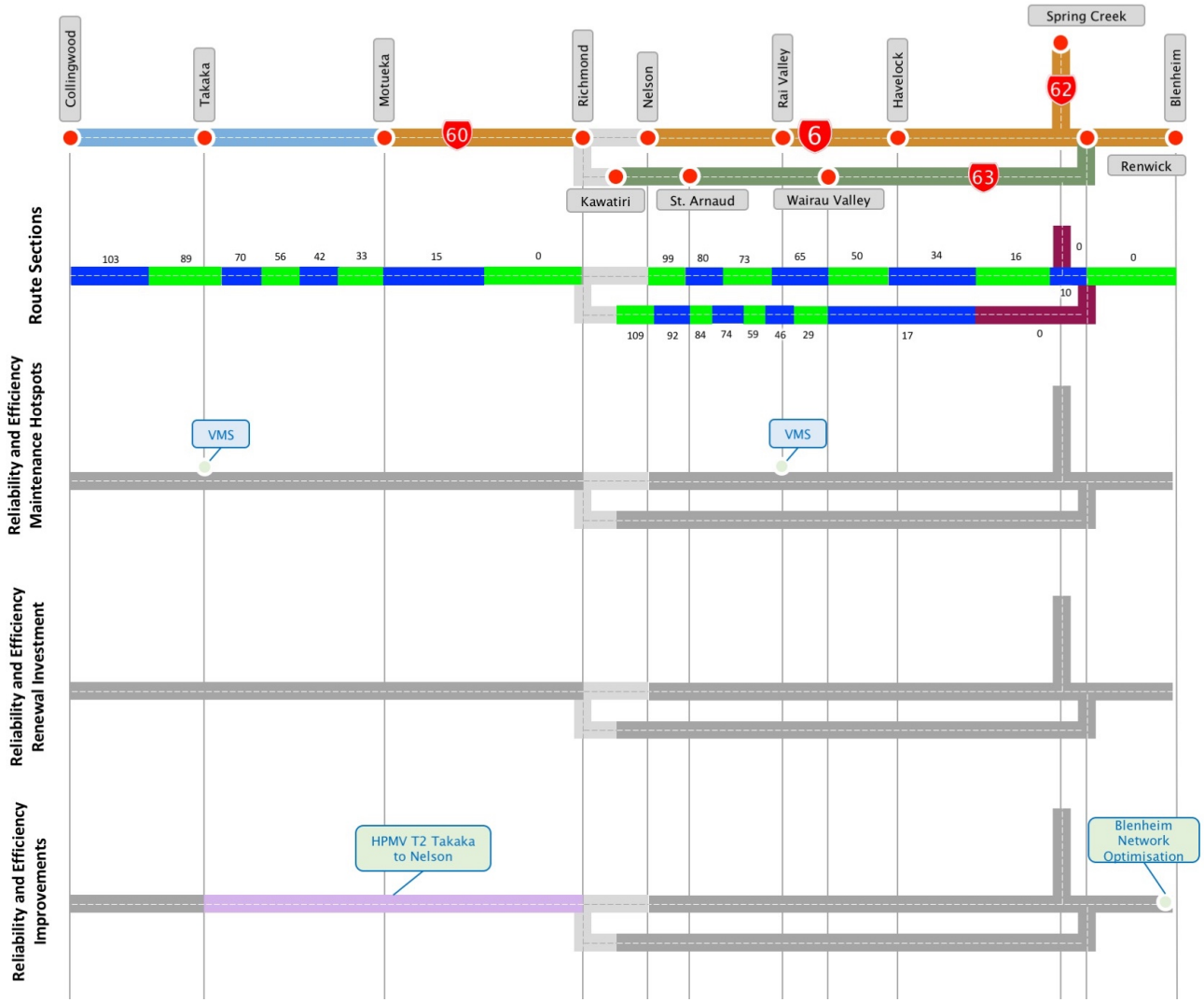
Maintenance Hot spots

The following maintenance 'hotspots' require additional monitoring or cause an increased maintenance burden along the corridor:

- **VMS signs** in the Takaka Hills and in the Ray Saddle.

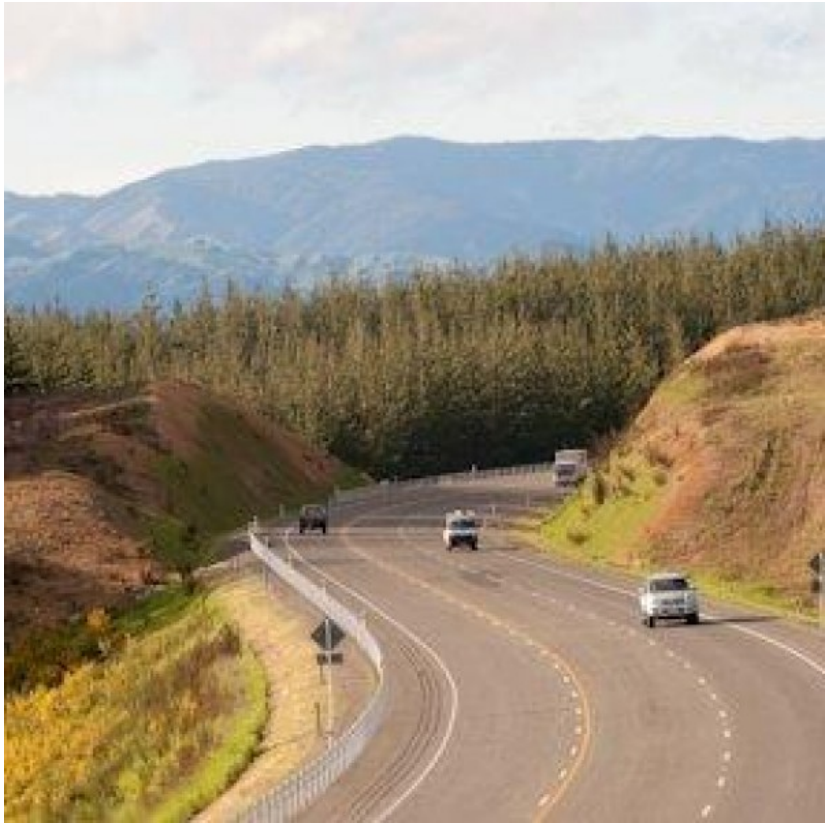
The diversion from SH1 to Christchurch is significant

Figure 24 – Reliability and efficiency investment



Renewals

There are no, reliability and efficiency related renewals planned for the corridor.



Investigations are underway to determine how to make travel in the Tasman region safer, more efficient and more resilient. Strategic cases for three projects: SH6 Richmond Arterial, SH60 Richmond to Collingwood, SH60 Motueka township are underway.

Improvements

Planned

There are no currently planned reliability and efficiency related improvements underway on this corridor.

Draft Regional Programme considered for SHIP

The following table shows the list of projects being considered through the Draft Regional Land Transport Programme though the SHIP, and cover the next 10 years.

Table 4- Draft regional programme considered for SHIP

Project	Funding Status	Description
Blenheim Network Optimisation		Undertake and identify short, medium and long-term improvements to optimise state highway through traffic and local network access in and around Blenheim.
HPMV T2 Takaka to Nelson		Potential HPMV routes are restricted by lack of availability of the corridors due to restrictions, particularly the strength and width of bridge structures. Project is on a major freight route on a Regional Strategic/Connector state highway corridor and providing for HPMV along this route has the potential for a nationally significant contribution to economic growth and productivity.

Investing in safety

Operations and maintenance

Safer Journeys Goal 2016 to 2020 is to reduce the likelihood of crashes occurring and to minimise the consequences. The main areas of investment into ensuring safer journeys include: specialist pavement treatments, road marking including audio-tactile markings (ATP), signage, edge markers, safety barriers, speed limits, roadside vegetation control, and, street lighting.

Maintenance hot spots

There is currently no safety related maintenance 'hotspots' that may require additional monitoring or cause an increased maintenance burden along the corridor.

Gap programme indicator

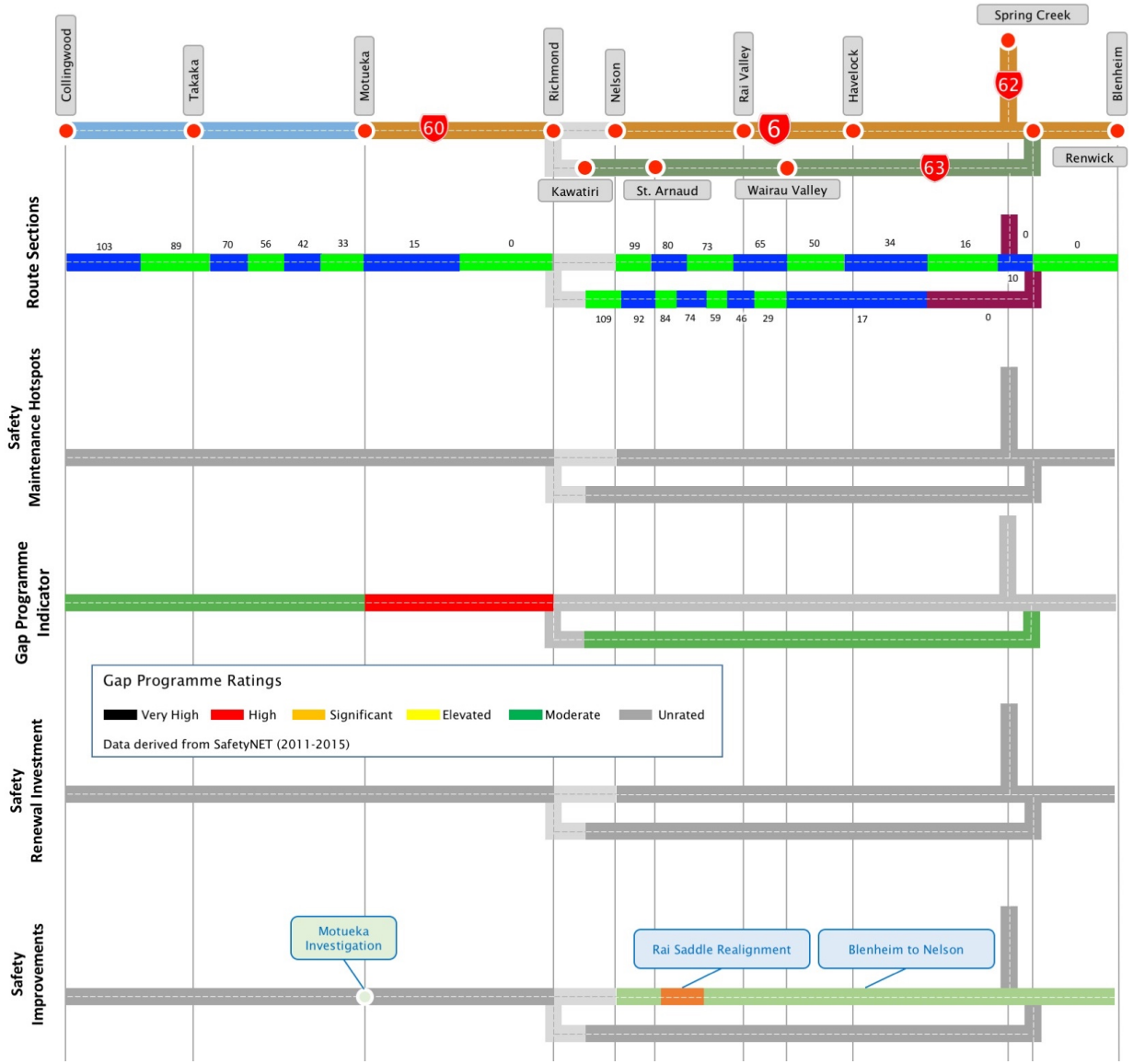
The potential for reducing fatal and serious injuries across the corridor has been assessed under the Gap programme. The Gap programme looks at the collective risk rating, likely level of intervention and the potential reduction in death and serious injury that may be achieved to determine a possible treatment approach. For instance, a road segment rated 'Very High' could potentially achieve a 50-70% reduction in fatal and serious injuries with the application of high cost improvements. Alternatively, if the risk level is "Elevated' a 10-20% reduction may be realised through targeted low cost, high coverage treatment improvements.

There is a high potential for reducing fatal and serious injuries in the section between Motueka and Richmond which would benefit from medium-high cost improvements.

The corridor from Collingwood to Motueka and Kawatiri to Renwick has moderate potential for reducing fatal and serious injury crashes through low cost, high coverage, improvements.

The unrated segments are either areas where potential crash savings are low or are being addressed under other existing programmes.

Figure 25 – Safety investment



Renewals

There are no safety related renewals planned for the corridor.

Improvements

Planned

The following projects are planned and underway. Details of the project progress can be found on the Transport Agency website at: https://www.nzta.govt.nz/projects/

SH6 – Blenheim to Nelson

Description: Part of Safe Road Alliance Programme. Under investigation

SH6 – Rai Saddle

Description: This section of State Highway 6 has seen a number of loss of control crashes over the past few years, with a high proportion of crashes causing injury. The winding nature of the road and the changes in speed limit along this section of SH6 are contributing factors to these crashes. Improving this section of road will make it safer. The purpose of this project is to improve safety by providing a more consistent speed environment. The project will also improve passing opportunities for vehicles travelling towards Blenheim.

SH60 Motueka Investigation

Description: As part of the Tasman Transport Investigations, the NZ Transport Agency is investigating short to medium term improvements to High Street Motueka to improve safety and traffic flows.

Motueka high street

Draft Regional Land Transport Programme considered for the SHIP

The following table shows the list of projects being considered through the Draft Regional Programme for SHIP, and cover the next 10 years.

Table 5- Draft regional programme considered for SHIP

Project	Funding Status	Description
Weigh Right Regional Construction		Improve weigh pits to improve overweight detection and to meet new vehicle and safety standards.
Speed Management Implementation		Transport planning activity to enable development of Regional Speed Management Plan in conjunction with partner Road Controlling Authorities
Minor Improvements 18/21		Activities will be targeted to low cost safety, optimisation and resilience activities which contribute to the Transport Agency's goals of either reduce the level of deaths and serious injuries, improve urban network capacity in our major centres or to reduce the resilience risk on our key routes through preventative maintenance activities.
Accelerated LED Renewals for SH Street Lighting		To replace all street lights with more cost-effective LEDs to save costs on power and maintenance.

Investing in people, places and environment

Operations and maintenance

The main areas of investment into people, places and environment are: pavement rehabilitation to ensure a high proportion of travel on smooth roads, control of litter, provision of rest areas and stopping points, landscaped areas maintenance, and, environmental compliance.

Maintenance Hot spots

The following maintenance 'hotspots' require additional monitoring or cause an increased maintenance burden along the corridor:

- **AC surfacing upgrade** to reduce the noise and vibrations caused by logging trucks on SH6 in Blenheim and SH6 to Renwick.
- **Fire risk monitoring** all along SH63 in combination of total fire ban in summer and fire plans which includes mowing control.

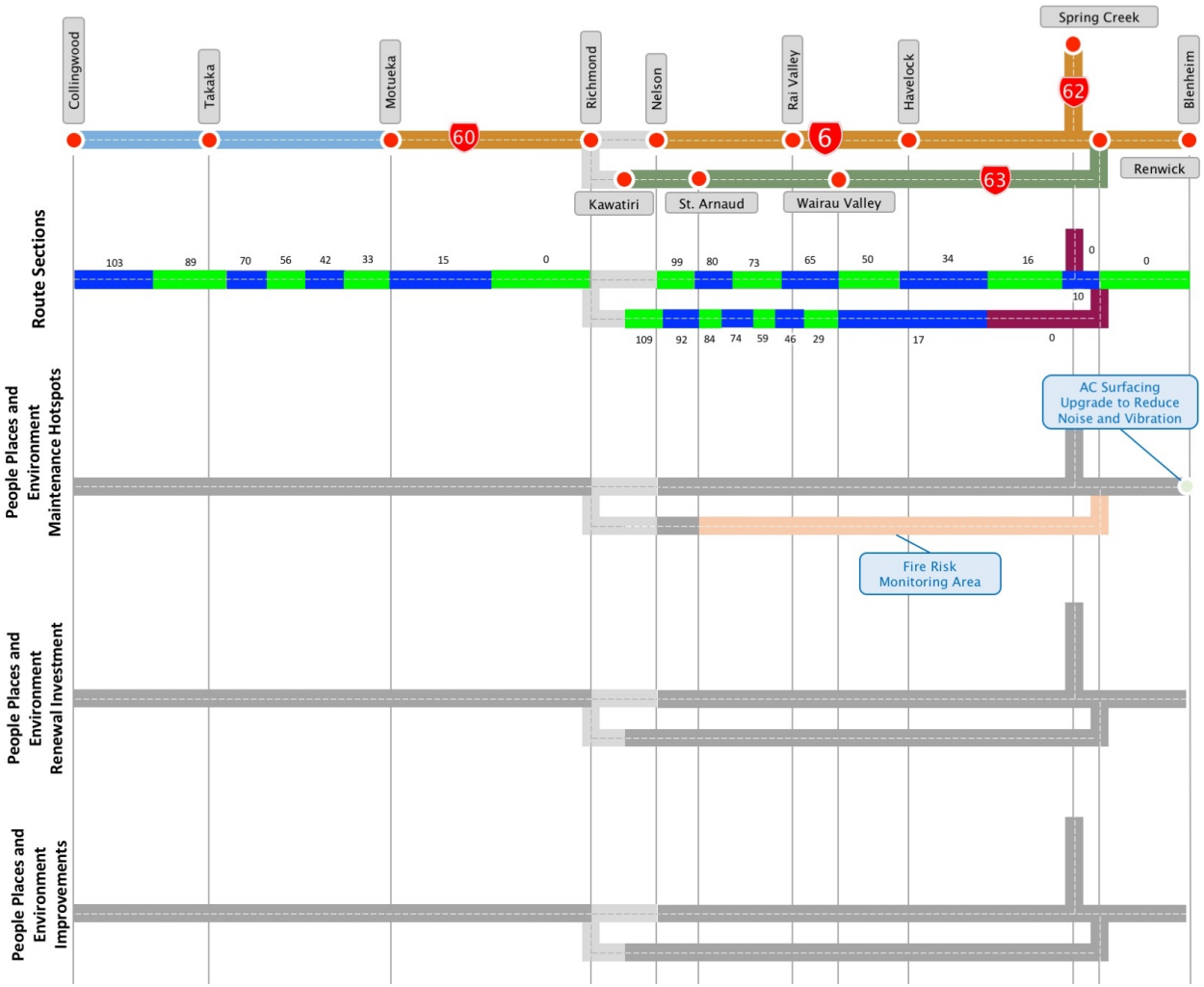
Renewals

There are no planned people, places and environment related renewals planned for the corridor.

Improvements

There are no currently planned safety related improvements underway on this corridor.

Figure 26 – People, places and environment investment



Investment pressures

Access and resilience

The following concerns excerpt pressure on the investment in **Access and resilience** on the corridor:

- **Increasing standards of maintenance treatments:** In response to the change in focus to a more commuter road from Richmond to Takaka Hills on SH60 at Ruby Bay.
- **More intensive drainage maintenance programme:** Identified in the 2017/18 programme and NLTP in order to preserve the aging pavement in the Nelson network.
- **Access intensification:** Increased subdivision and some rezoning of farmland is reducing highway levels of service faster than anticipated. SH60 at Ruby Bay is having a change of focus, to a more commuter road from Richmond to Takaka Hills.
- **Increasing carriageway width:** Many parts of the corridor have narrow lanes and limited shoulder width, particularly through hilly terrain. Increasing these widths will provide a good level of service and meet expectations of road users. Reports of truck losing wing mirrors along SH63 are an indication of just how narrow it is.

Reliability and efficiency

The following concerns excerpt pressure on the investment in **Reliability and efficiency** on the corridor:

- **Cell-phone coverage:** There is a need to develop the cell-phone coverage in the Takaka Hills, the Whangamoas, as well as most of SH63.
- **Commuters and change in land usage:** The combined effect of land use change and commute constraints may require investments to keep the network efficient.
- **Stock crossing:** There are several locations along SH60 prior to Motueka where stock crossing is becoming a challenge and underpass are becoming a requirement.
- **Topography and geometry:** Each of the highways in this corridor have some degree of narrowed alignment or difficult terrain which can create delays on steep or tight alignments.
- **Lack of passing lane:** Due to a lack of passing lanes along the Takaka Hills and Whangamoas, this route is not as efficient as it might be.
- **Rai Saddle:** There are commute constraints in between Blenheim and Nelson, particularly in the Rai Saddle. On most of the Rai Saddle, UTA is a preferred surface over chip seal.

Safety

The following concerns excerpt pressure on the investment in **Safety** on the corridor:

- **Improvement projects:** High potential in reducing fatal and serious injuries along SH60 and in between Renwick and Kawatiri.
- **One-lane bridges:** There are a number of bridges that can present a higher crash risk for tourists or unfamiliar motorists.
- **Surface skid resistance:** Local aggregates do not generally provide a reliable level of skid resistance. To achieve and maintain acceptable levels of skid resistance and safety, higher cost treatments must be applied such as transported seed free aggregates, or industrial melter slag.
- **Increased asset maintenance burden:** A lot of additional wire rope alongside different parts of the corridor will require additional (not yet quantified) maintenance.
- **Some stock crossings** alongside SH6 and SH60 are presenting potential safety risks.

People, places and environment

The following concerns excerpt pressure on the investment in People, places and environment on the corridor:

- **Stormwater management standards:** There is a demand for higher quality control of stormwater discharge where it is close to waterways or sensitive receiving environments.
- **Rest area maintenance:** There is a greater demand for toilet facilities on SH63 during bypass function. Some discussions are happening with local café along the route to upgrade both, the road access and the amenity. Temporary ones were installed by the Council in St Arnaud and SH63. Additional work is carried away to enhance the level of amenities at the Pelorus Bridge due to a significant increase in visitors.
- **Winter / Alpine passes:** Additional winter maintenance is required for tourists around St Arnaud SH63 to keep the road open through winter. During winter, NAAC is used only at the coldest areas, deep south where temperatures don't rise.
- **Trees:** Some trees along the corridor (Pelorus bridge, Whangamoas, Rai Saddle) can present a risk of localised black ice spots in winter by blocking the sun. The maintenance of those trees requires either DOC or private owner's approval.

Investment future considerations

Consideration of investment in the corridor in future should take account of the following:

- **Land-use planning**: Growth needs to be managed with consideration of ability of highway to respond. This can be achieved by working with the unitary authorities to ensure that impacts on the corridor are adequately considered during the planning processes.
- **Maintenance strategies:** Consider how to manage and minimise delays from maintenance works, particularly along remote routes. Improved management might include real time notification along and in advance of routes advising of works and likely delays. This could also include working with regulators to develop global consenting for winter maintenance, to simplify compliance, increase flexibility and to enable extended use (duration and location) of CMA when needed. Consider and programme options for minimising shading/icing areas such as tree removal and day-lighting.
- **Alternative routes:** Levels of maintenance and management need to consider the "back-up" function of each route and the likely impact or demand on the corridor sections as well as the different needs and expectations of users. For example, following the Kaikoura earthquake SH6 experienced a tolerable increase, performing within the same ONRC classification range, but SH63 experienced six-fold traffic increase, including a fifteen-fold increase in heavy vehicles. This also means other customers, such as touring cyclists have few safe options.
- **Timeliness of incident response:** Being able to respond quickly and efficiently to incidents on the network is important to maintaining reliable and efficient journeys for customers, this requires a higher level of response – both in identification and response.
- **Passing opportunities:** Improved passing opportunities will address a key cause of travel time delays through the rural parts of this corridor. Options could include, more or improved passing opportunities or realignment of tortuous/slower less manoeuvrable sections.
- **Improved communication:** There are large gaps in reception throughout this corridor which if filled, could improve safety outcomes with quicker response times.
- **Stock crossing strategy**: Work with councils, landowners, and farming organisations (such as Federated Farmers) to assess current at-grade stock crossings along the highway. Prioritise underpasses for those stock crossings that are near bends and other locations that have reduced visibility. Ensure adequate advance warning signage of stock crossings. Gradual reduction in at grade stock crossings will improve safety for customers, particularly motorcyclists having to drive through effluent on the road, but also improve asset condition.
- **Sealing of unsealed accesses:** Working with landowners and councils to seal a nominal length of existing unsealed accesses and unsealed roads will reduce the tracking of loose material onto the corridor, improving safety, particularly for motorcyclists.
- **Stormwater management planning:** A long term resolution of drainage through Rai township would reduce ongoing maintenance 'tidy up' responses after regular flooding events.
- **Vegetation management programme:** A programme of minimisation, removal or revegetation where practical and consideration of how remaining risks can be reduced or managed. Develop and prioritise a hazardous tree register and removal programme.
- **Ecological enhancement strategy:** Developing a clear strategy and clarifying organisational roles in maintaining and improving ecological connectivity, biodiversity of flora and fauna and habitat connectivity, and maintaining safe access to ecologically valued areas will provide greater coordination and enable more effective management of budgets.
- **Stopping place strategy:** Appropriately located stopping points along the corridor incorporating towns and urban areas will ensure visitors are provided with safe places to stop, take photos, and refresh.
- **Stock truck effluent stations:** Assess extent of current and future need for effluent disposal, including consideration of location and destination.

Appendix A – Information sources

Section	Infographic	Information Source	Date
Introduction	Corridor Overview Map	The Road Efficiency Group https://www.nzta.govt.nz/roads-and-rail/road-efficiency-group/onrc/	2013
Understanding our Customers			
Key Customers	Key journeys	Network Manager and Regional Staff	2016
	Daily commuters	Network Manager and Regional Staff	2016
	Freight	Network Manager and Regional Staff	2016
	Tourism and recreation	Network Manager and Regional Staff	2016
	Demographics and population centres	MBIE Regional Economic Activity Report Web Tool http://www.mbie.govt.nz/info-services/business/business-growth-agenda/regions	2015
Understanding Customer Levels of Service on the Corridor			
Customer Levels of Service	Corridor classifications	The Road Efficiency Group ONRC -right-road-right-value-right-time-combined-poster.pdf https://www.nzta.govt.nz/roads-and-rail/road-efficiency-group/onrc/	2015
Current Levels of Service Performance	Current ONRC Levels of Service Performance	Network Manager and Regional Staff	2016
Improving the Customer Experience	Significant planned improvements	Network Manager and Regional Staff NZTA Projects web page: https://www.nzta.govt.nz/projects/ NZTA Safe Roads web page: https://www.nzta.govt.nz/safety/our-vision-vision-of-a-safe-road-system/safe-roads/ Submitted Regional SHIP programmes	2017

Section	Infographic	Information Source	Date
Access	ONRC classification	The Road Efficiency Group https://www.nzta.govt.nz/roads-and-rail/road-efficiency-group/onrc/	2013
	Carriageway configuration	Network Manager and Regional Staff Corridor drive-over Highway information Sheets	2016
	Posted speed limit	NZTA – MapHub Speed Limits on NZ Road Network	2016
	Topography	Elevations derived from Google Earth™	2016
	Geography	Network Manager and Regional Staff Corridor drive-over	2016
	Traffic volumes – heavy vehicles	RAMM Carriageway Table – December Traffic Estimates	2015
	Traffic volumes – all vehicles	RAMM Carriageway Table – December Traffic Estimates	2015
	HPMV routes	NZTA – MapHub High Productivity Freight Network	2016
	Critical Customers	Network Manager and Regional Staff	2016
	Critical Assets	Network Manager and Regional Staff	2016
Resilience	Vulnerabilities	NZTA – MapHub Hazard Incidents and Area Warnings	2016
	Major Alternate Routes	Network Manager and Regional Staff Desktop analysis Corridor drive-over	2016
	Diversion Lengths	NZTA StateHighways.pptx Diversion Routes	Unknown
	Closures	NZTA 2011-2015_Treis_incidents_by_region.xlsx	2015
Reliability and efficiency	Efficiency	NZTA – MapHub EfficiencyNet	2016

Section	Infographic	Information Source	Date
	Variability	NZTA / Beca Dwg No. GIS-3391515-500-4 Network Performance - Attachments.pdf March 2012 eRUC Commercial Vehicle Data – State Highway Austroads Variability Assessment	2012
	Commercial Vehicle Average Speed	NZTA / Beca Dwg No. GIS-3391515-500-5 Network Performance - Attachments.pdf March 2012 eRUC Commercial Vehicle Data – State Highway Average Speeds	2012
	Current Constraints	Network Manager and Regional Staff Corridor drive-over	2016
Safety	KiwiRAP Collective Risk	https://nzta.abley.com/SafetyNET_2017 SafetyNET	2016
	KiwiRAP Personal Risk	https://nzta.abley.com/SafetyNET_2017/ SafetyNET	2016
	KiwiRAP Star Rating	http://www.kiwirap.org.nz From 2010 KiwiRAP star rating report.	2010
	Intersection Risk Indicator	https://nzta.abley.com/SafetyNET_2017/ SafetyNET	2016
	Gap Programme Rating	https://nzta.abley.com/SafetyNET_2017/ SafetyNET	2015
Environment Culture and Heritage	Natural Environment	NZTA - Environment and Urban Design Team	2016
	People and Place: Journeys	NZTA - Environment and Urban Design Team	2016
	People and Place: Landmarks and Heritage Places	NZTA - Environment and Urban Design Team	2016
	Noise and Vibration	NZTA - Environment and Urban Design Team	2016
	Drainage Catchments	NZTA - Environment and Urban Design Team	2016

Section	Infographic	Information Source	Date
Understanding the Infrastructure Assets			
Overview	Corridor Asset Base	NZTA_ 2017 Values by Corridor.xlsx complied by Opus International Consultants from RAMM and other asset information sources	
	Asset Condition and Performance	Summarised from the data sets described below	
Asset condition and performance	Surface Skid Resistance	SCRIM data derived from RAMM by NZTA Data Quality and Access team	2016
	Surface Safety Treatment	SAL data derived from RAMM by NZTA Data Quality and Access team	2016
	Surface Defects	100m Priority data derived from RAMM by NZTA Data Quality and Access team	2016
	Surface Age	Surface Age data derived from RAMM by NZTA Data Quality and Access team	2016
	Service life of Prior Surface	Surface Age data derived from RAMM by NZTA Data Quality and Access team	2016
	Resurfacing	Resurface data derived from forward works programme	2016
	Proportion of Travel on Smooth Roads	STE data derived from RAMM by NZTA Data Quality and Access team	2016
	Pavement Strength	Deflection data derived from RAMM by NZTA Data Quality and Access team	2016
Investing in the Corridor			
Summary Investment	Summary Corridor Investment	2028-21 SHIP programme funding requests 2017/18 Annual Plans	2017
	Summary investment by work category	2028-21 SHIP programme funding requests 2017/18 Annual Plans	2017
Investing in access and resilience			
Investing in access and resilience	Maintenance Hot Spots	Network Manager and Regional Staff	2017
	Resurfacing 2018 - 2021	Resurface data derived from forward works programme	
	Renewal Investment	National Bridge Replacement Programme National bridge replacement programme 2017 LCMP data.xlsx	

Section	Infographic	Information Source	Date
	Improvements	Network Manager and Regional Staff NZTA Projects web page: https://www.nzta.govt.nz/projects/ Submitted Regional SHIP programmes	
Investing in reliability and efficiency	Maintenance Hot Spots	Network Manager and Regional Staff	2017
	Renewal Investment		
	Improvements	Network Manager and Regional Staff NZTA Projects web page: https://www.nzta.govt.nz/projects/ Submitted Regional SHIP programmes	
Investing in safety	Maintenance Hot Spots	Network Manager and Regional Staff	2017
	Renewal Investment		
	Improvements	Network Manager and Regional Staff NZTA Projects web page: https://www.nzta.govt.nz/projects/ NZTA Safe Roads web page: https://www.nzta.govt.nz/safety/our-vision-vision-of-a-safe-road-system/safe-roads/ Submitted Regional SHIP programmes	
Investing in people places and environment	Maintenance Hot Spots	Network Manager and Regional Staff	2017
	Renewal Investment		
	Improvements	Network Manager and Regional Staff NZTA Projects web page: https://www.nzta.govt.nz/projects/ Submitted Regional SHIP programmes	

If you have any further queries, call our contact centre on 0800 699 000 or write to us:

NZ Transport Agency
Private Bag 6995
Wellington 6141

This publication is also available on NZ Transport Agency's website at www.nzta.govt.nz

NZ TRANSPORT AGENCY
WAKA KOTAHI

New Zealand Government