

Palmerston North to Napier to Gisborne

CORRIDOR MANAGEMENT PLAN



2018-2028



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Executive summary

The Palmerston North to Napier to Gisborne corridor comprises six state highways connecting Palmerston North with Hastings, Napier and Gisborne to the north. It also includes SH38 linking Wairoa to the Te Urewera Rainforest including Lake Waikaremoana, and SH2B which bypasses central Napier across the Ahuriri Estuary. SH50 is an alternative route between just north of Norsewood and Napier.

The corridor is approximately 563 km long (4.9% of the state highway network). The total value of assets along the corridor is \$740M (3.2% of the total national asset value).

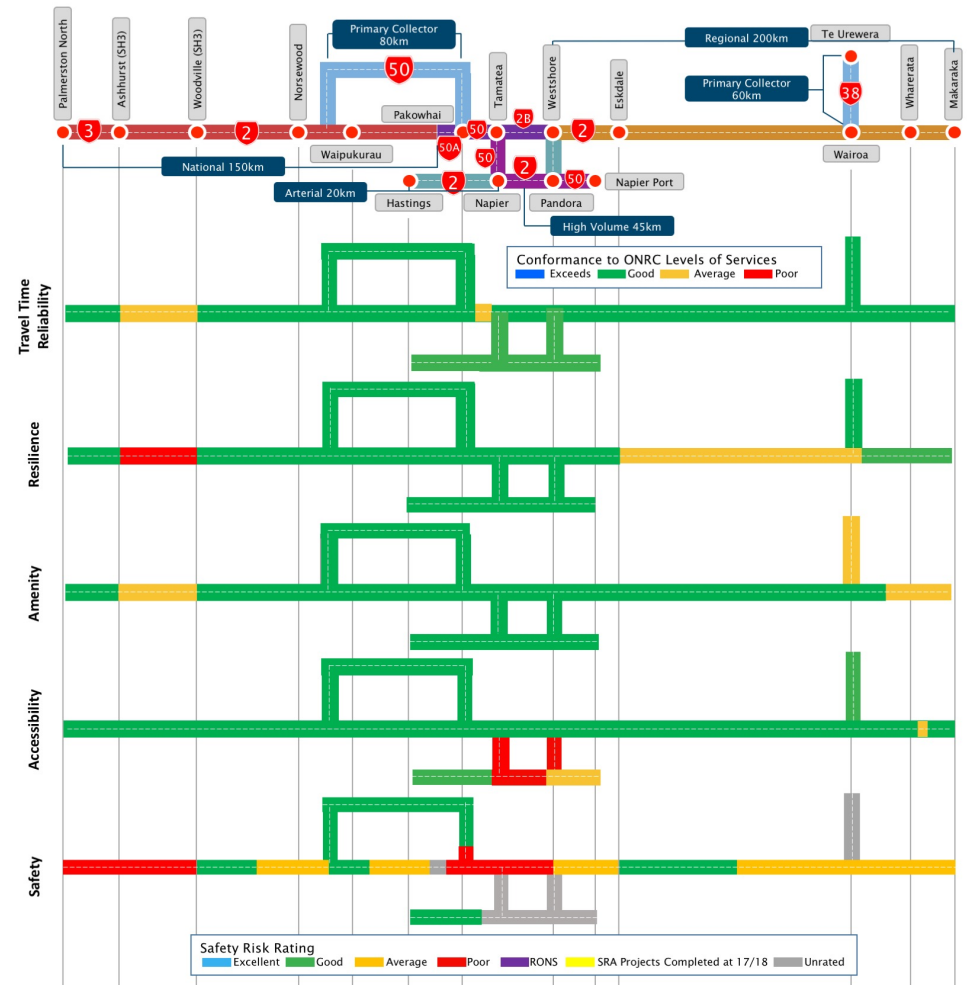
The corridor south of Napier is the main transport route for product from Hawke's Bay and the Gisborne/East Coast to the lower North Island and the South Island. It is a key freight route for export commodities moving between the Wellington, Hawke's Bay and Napier ports and the Palmerston North Freight Hub. This section of the corridor also provides an alternative route if SH5 between Napier and Taupo is closed. North of Napier heavy vehicle traffic reduces, but continues to make up a significant portion of the traffic present. However, SH2 remains the only land transport route available to customers moving between Napier and Gisborne as the railway line has been mothballed. SH2 breaks at Pakipaki (where the road converges with SH50A) and starts again after Hastings where it connects to Napier through a lower speed zone.

Spanning the Manawatu, Hawke's Bay and Poverty Bay regions, the corridor supports strong horticultural, agricultural and forestry industries. With economies built on industry and exports, freight continues to be a transport focus. The corridor south of Napier is the main transport link between the lower North Island and the Hawke's Bay. North of Napier, heavy vehicle traffic reduces significantly. However, SH2 remains the only land transport route available to freight operators between Napier and Gisborne with the railway line no longer in use.

The corridor currently has areas of poor resilience and high vulnerability to service disruption. It is the most interrupted corridor on the highway network and is frequently subject to extensive closures. Parts of the corridor around the Napier and Hastings conurbation are duplicated by local road networks offering viable alternative routes. Other sections have no viable alternatives, meaning a closure would involve a substantial diversion or lengthy disruptions.

There are limited alternative heavy transport routes along this corridor, other than the section around Napier and Hastings, where a number of local roads are available. Resilience of the corridor between Napier and Wairoa is a key consideration as the only viable alternative route is a 500km diversion. Following the Kaikoura earthquake, damage to infrastructure at Wellington's CentrePort resulted in freight being diverted to the Napier Port. As a key contributor to shipping resilience, the road transport system should provide for increased heavy vehicle volumes to correspond to port logistic sensitivities.

Figure 1 - Performance of the corridor against ONRC outcomes



With winding roads, semi-mountainous terrain, long journey times and limited passing opportunities, sections of the corridor can be tiring and frustrating to drive. Identifying and implementing passing opportunities, suitable rest areas and providing timely advice to road users are key future considerations for investment, particularly with logging trucks predicted to increase fourfold over the next 10 years.

Introduction

Purpose

What is the corridor management plan?

This Corridor Management Plan describes the customer service delivery story for the Palmerston North to Napier to Gisborne 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.

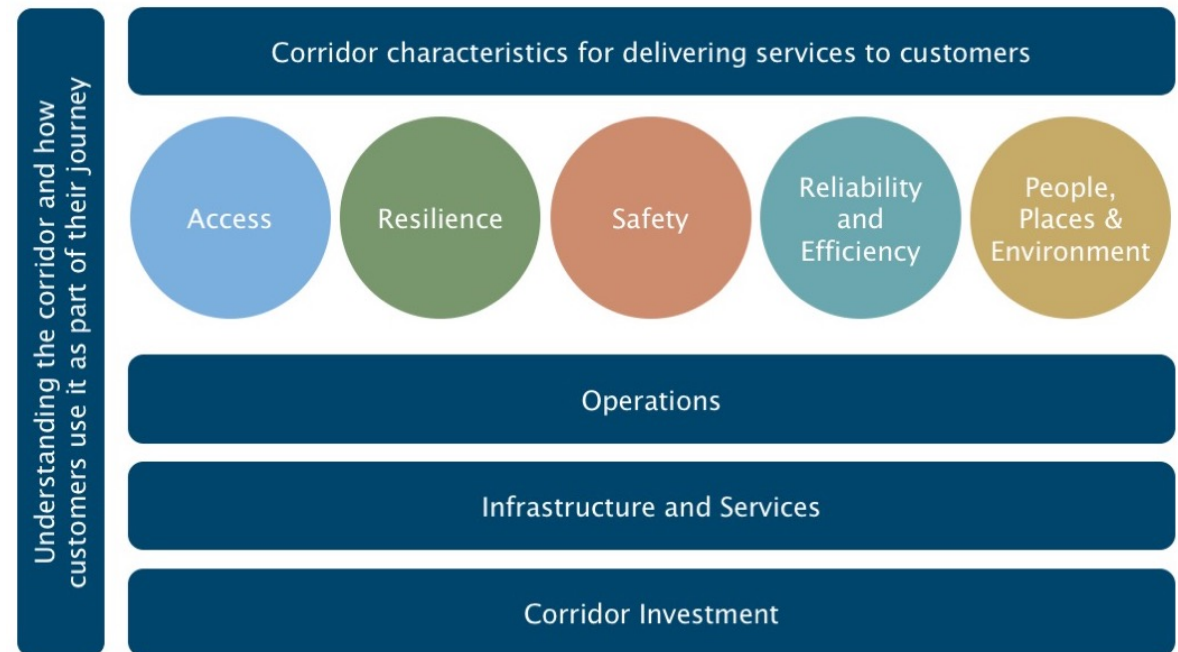
Planning is currently undertaken at the regional level, but typically significant journeys traverse more than one region. By considering the significant customer journeys and destinations, the corridor management plan is a vehicle to engage in regional and inter-regional conversations by focusing on 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

This corridor comprises six state highways connecting Palmerston North with Hastings, Napier and Gisborne to the north. It also includes SH38 linking Wairoa to the Te Urewera Rainforest including Lake Waikaremoana and SH2B which bypasses central Napier across the Ahuriri Estuary. SH50 is an alternative route between just north of Norsewood and Napier.

The corridor south of Napier is the main transport route for product from Hawkes Bay and the Gisborne/East Coast to the lower North Island and the South Island. It is a key freight route for export commodities moving between the Wellington, Hawke’s Bay and Napier ports and the Palmerston North Freight Hub. This section of the corridor also provides an alternative route if SH5 between Napier and Taupo is closed.

North of Napier heavy vehicle traffic reduces, but continues to make up a significant portion of the traffic present. However, SH2 remains the only land transport route available to customers moving between Napier and Gisborne as the railway line was mothballed. SH2 breaks at Pakipaki (where the road converges with SH50A) and starts again after Hastings where it connects to Napier through a lower speed zone.

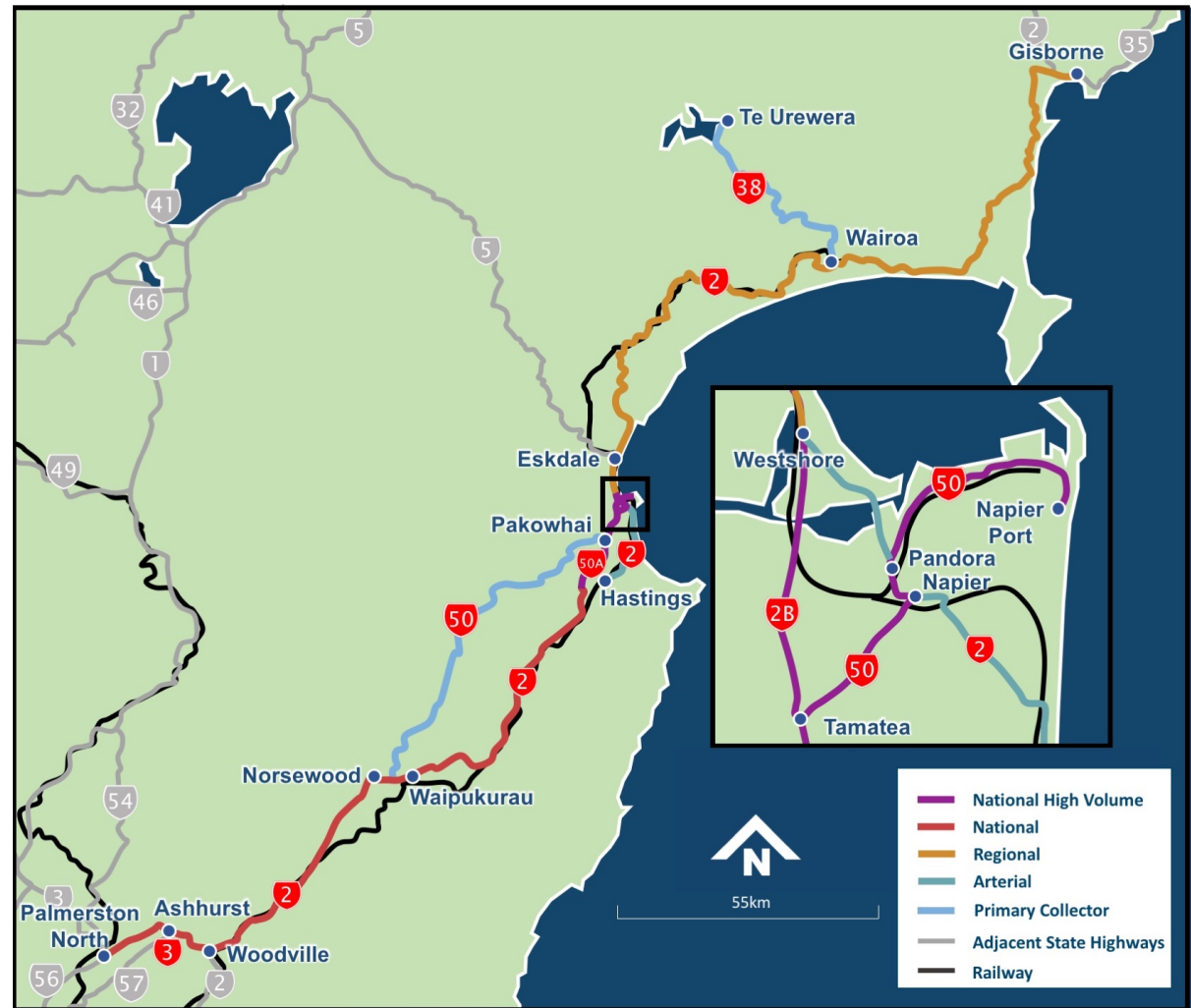
The regional economy

The corridor runs through three regions – Manawatu, Hawke’s Bay and Poverty Bay. Manawatu is a significant horticultural region. Its main centre, Palmerston North, is a major agricultural service centre, including agricultural research and three Fonterra dairy processing plants (Longburn, Pahiatua and Makomako Rd).

In the 2013 Census the Hawke’s Bay region had a total population just over 150,000 (3.6 percent of New Zealand’s population) with a large proportion living in the Napier-Hastings conurbation. The region is renowned for its horticulture and viticulture, with large orchards and vineyards on the plains. Primary industries in the hilly parts are sheep and cattle farming, and forestry. With \$41,323 GPD per capita, the Hawke’s Bay is ranked 12th of 15 regions nationwide.

The Poverty Bay region has a population around 44,000 (1% of New Zealand’s population) with nearly 70% living in Gisborne city. Much the same as the Hawke’s Bay region, Poverty Bay is known for its horticulture, viticulture, farming and forestry. Forestry is regionally important providing much employment and more than 5% of the Gisborne GDP. With \$35,769 GDP per capita, the Poverty Bay is ranked 14th of 15 regions nationwide.

Figure 3 – Corridor overview



Understanding our customers

Key customers

The key customers utilising the corridor are diverse, and utilise a range of transport modes. Different customers have different expectations, needs and personal circumstances for using the transport system.

Daily commuter

The roads connecting rural communities around Gisborne, Napier and Hastings and the sections between Hastings and Napier and Woodville and Palmerston North, provide a daily commuter link during weekday peaks. There are limited public transport options along the corridor, with some cycling and walking activity.

Insights into daily commuter users:

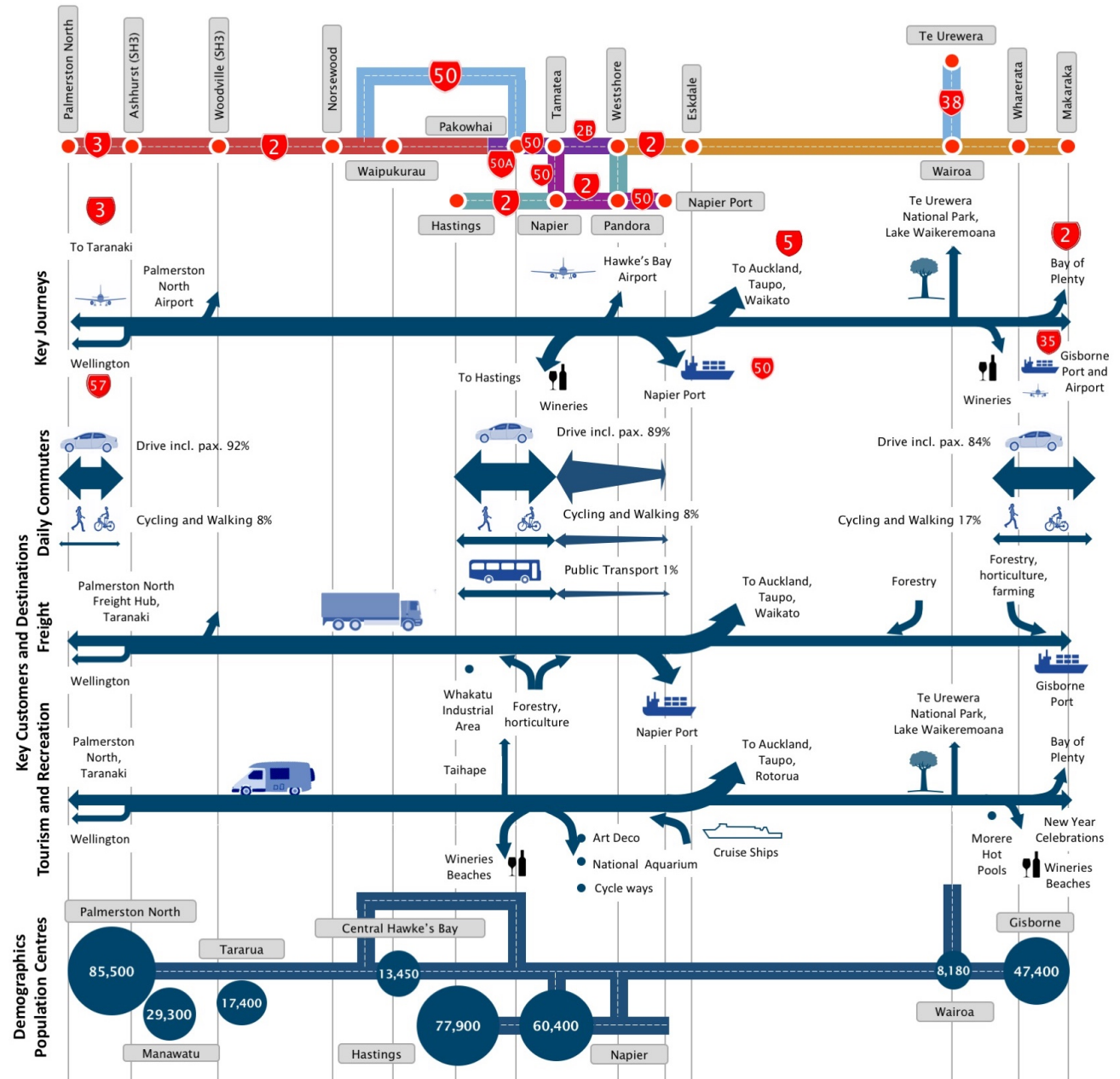
Road use: Use of private vehicles is the principal mode of transport with limited public transport opportunities, particularly for commuters travelling from rural settlements in to the larger urban centres.

Road knowledge: Commuters are familiar with their route and viable local road alternatives to avoid congestion when required. Journey times are relatively predictable considering time of day and day of week with the exception of SH50 between Napier and the Napier Port which has high variability.

Pain points: Major intersections and merging traffic along SH50A and SH50 (Taradale Road) can cause congestion for commuters travelling between Napier and Hastings during peak times. The Manawatu Gorge is a high use daily commuter route between Woodville and Palmerston North. The Gorge is susceptible to slips and rock falls which can impact commuter travel times when the road is reduced to one lane or traffic is redirected via the longer Saddle Road route.

Daily commuters expect: Predictable journeys at peak times; accurate and up to date information about traffic (peak and off peak), weather, road conditions and hazards; a more holistic approach to public transport investment to make it more reliable and accessible, at a reasonable cost; and a focus on city traffic and congestion management on the weekends.

Figure 4 - Key customers, journeys, and destinations



Tourist and recreational users

As a tourist destination, the Manawatu, Hawke's Bay and Poverty Bay regions have a number of attractions including the Te Urewera Rainforest, Lake Waikaremoana Great Walk, Ruahine Forest Park, Cape Kidnappers Gannet Colony and the many wineries and east coast beaches. Much of the tourist or recreational activities generating demand on the corridor are summer based and can result in congestion.

These regions also host several events attracting large crowds of both domestic and international tourists such as the Rhythm and Vines New Year festival in Gisborne, Art Deco weekend in Napier, the Mission Estate Concert in Taradale and Targa Rally in Palmerston North.

Insights into tourist and recreational users are as follows:

Road use: There are tourist and recreational users every weekend in between regions, especially in the summer months, and periodically for long weekends or special events (e.g. New Year celebrations in Gisborne).

While the main centres are serviced by the Palmerston North, Hawke's Bay and Gisborne airports, there is no passenger rail and key tourist destinations require access by road. Hawke's Bay is promoted to motor home drivers as part of the Classic New Zealand Wine Trail.

Road knowledge: There is a high level of road knowledge by local recreational users. Out of town and overseas visitors may not expect some road conditions, such as narrow and partially unsealed roads like those on SH38.

Most journeys are a comfortable length. However, semi-mountainous terrain and windy roads can be tiring for drivers.

Pain points: The corridor north of Napier has sections where slow moving vehicles (e.g. camper vans and towing vehicles) negotiating semi-mountainous terrain can cause a queuing response as there are limited passing opportunities.

Waipawa (just north of Waipukurau) can be a bottle neck in the summer when people are heading for the beaches. The urban areas around Napier and Hastings can also become congested when holiday traffic competes with commuters and freight vehicles.

Tourist and recreational users expect: Ease of getting around; good directional signage to destinations; up-to-date information on road conditions; and places to stop for refreshments and toilet breaks.

Freight operator

This corridor provides key transport access from the East Coast and Hawkes Bay to three NZ major coastal shipping Ports: Wellington, Napier and Gisborne. It is also part of the main freight route to Taranaki and to the Palmerston North inland freight hub.

Some of the corridor freight is transported by rail as far north as Napier, the rail is narrow gauge and single track giving it a fixed capacity. There is no rail service north of Napier as the line was mothballed in 2012. Refined fuel is distributed to Hawke's Bay from the Seaview in Wellington.

At Woodville, Wellington and South Island bound freight have the choice of routes, being SH3 through the Manawatu Gorge, then SH57 and SH1 south, or through the Wairarapa and Rimutaka Hills via SH2. Resilience and downstream performance influence route choice.

Following the Kaikoura earthquake (November 2016), damage to infrastructure at Wellington's CentrePort resulted in freight being diverted to the Napier Port as an alternate to Wellington. These sorts of port logistics influence road transport decisions and route choices.

Insights into freight operators are as follows:

Road use: Drivers accessing ports and important freight links in and via Palmerston North use the corridor, as do drivers freighting goods between towns. This corridor north of Napier is used extensively by logging trucks transporting logs to the Gisborne and Napier Ports and to wood processing facilities at Whirinaki and Gisborne.

Pain points: There are limited alternative heavy transport routes along the corridor, other than the section around Napier and Hastings, where a number of local roads and highways could be used. Resilience of the corridor between Napier and Wairoa is an issue as the only viable alternative route is a 500km diversion. Between Wairoa and Gisborne there is an alternative route via Tiniroto Road. Weather closures, such as ice or snow, are just as likely to affect the alternate routes. The Manawatu Gorge has a local road bypass (Saddle Road) where improvements are currently underway.

The alignment between Napier and Gisborne limits upper travel speeds, but continues to give reliable travel times (particularly Whirinaki to Tutira, Raupunga, Wairoa and Moreere). Travel times between Napier and the Napier Port are highly variable.

Freight operators expect: Infrastructure that supports commercial activity. This includes alternative routes that cater for freight trucks; convenient places to stop with services and facilities for drivers; passing lanes for vehicles that want to overtake slower vehicles; and information about road conditions allowing considered decision-making and confidence to keep their businesses operating efficiently.

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.

We work closely with the Territorial Local Authorities (TLAs) and regional councils along the corridor shown in Figure 5.

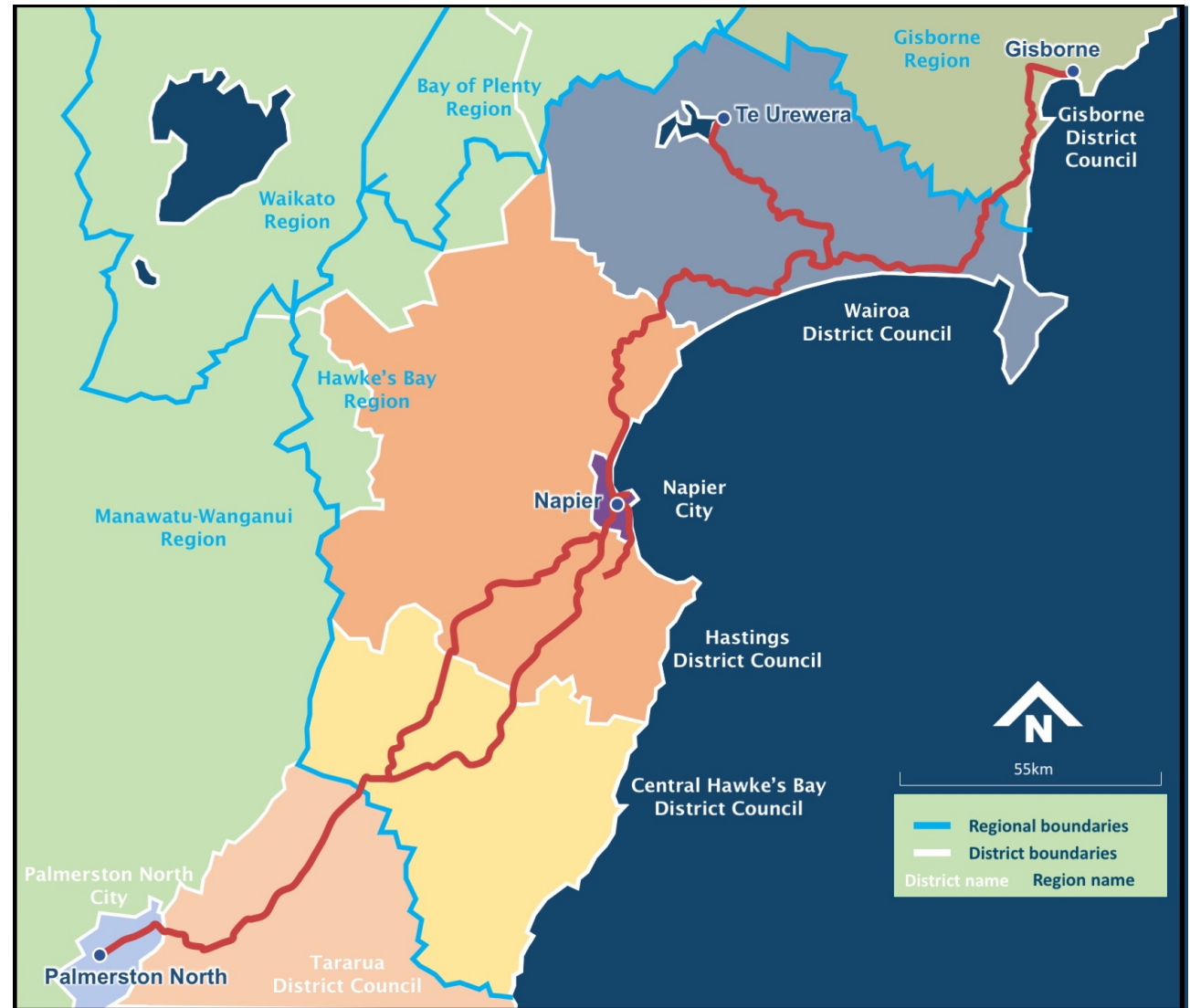
Collaboration along the corridor

Tairawhiti Roads is a joint venture between the NZ Transport Agency and Gisborne District Council that manages both highways and local roads throughout the Gisborne region as a single entity. For this corridor, Tairawhiti Roads covers the northern end of SH2 from the Wairoa/Gisborne boundary.

The NZ Transport Agency co-funded the 'Heretaunga Plains Transportation Study' along with the Napier City Council, Hastings City Council and Hawke's Bay Regional Council. A key aspect of the study was to consider transportation impacts of the 'Heretaunga Plains Urban Development Strategy' developed by the three councils leading to capital improvement projects.

The NZ Transport Agency also works with the Wairoa District Council to maintain the unsealed highway section of SH38.

Figure 5 - Map of associated local authorities



Network Outcomes Contracts approach

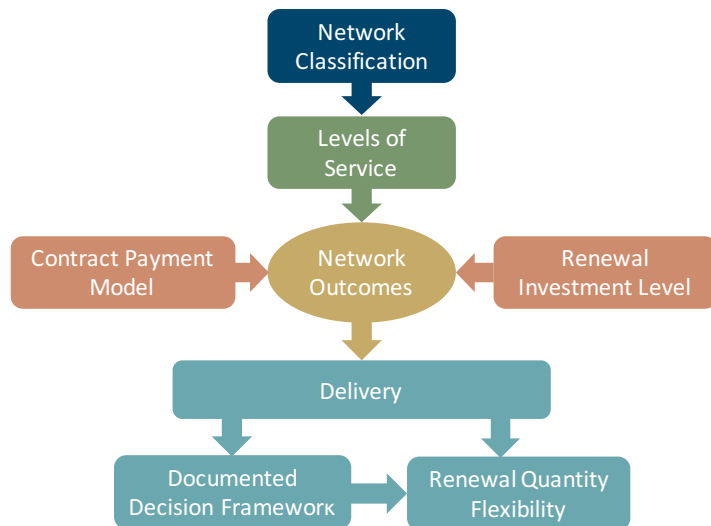
Network Outcome Contracts (NOC) are aimed at improving the effectiveness of service delivery for maintenance and operations of the state highway network. Elements of previous procurement methodologies (PSMC, Hybrid and Traditional models) have been integrated into the NOC contract model that delivers 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 contract 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, and management and repairs of bridges and other structures.

The contract process for the NOC is shown below:

Figure 6 - NOC process



Collaborative delivery of services

The Palmerston North to Gisborne corridor crosses over several NOC areas as outlined below. The Tairāwhiti NOC and the Hawke's Bay NOC divide at the Gisborne and Hawke's Bay council's boundary at the top of the Wharērātas. The division between the Hawke's Bay NOC and the Manawatu-Whanganui NOC is at the Tararua District and Central Hawke's Bay District council's boundary slightly north of Norsewood.

Tairāwhiti Roads Western Network Outcomes Contract

The Tairāwhiti Roads Western NOC (TR 15/02) is delivered by Downer Group. The contract commenced October 2015 for a five-year period with the option to extend for two years, or reduce for three years based on performance.

Hawke's Bay Network Outcomes Contract

The Hawke's Bay NOC (1189/NOC) is delivered by Higgins Contractors (HB) Ltd. The contract was awarded 17 February 2016 for a seven-year period with the option to extend for two years, or reduce for four years based on performance.

Manawatu-Whanganui Network Outcomes Contract

The Manawatu-Whanganui NOC (MWNOC15) is delivered by Higgins in partnership with Beca. The contract commenced July 2015 for a five-year period with the option to extend for two years based on performance.

The NOCs are supported by the following specialist maintenance contracts and supply arrangements:

- **Traffic counting contract** – Currently there are separate traffic monitoring contracts for the Manawatu/Whanganui/Taranaki and Gisborne/Hawke's Bay regions that expire in December 2016. A new contract combining these regions with Wellington will be tendered in 2017 and include traffic counting, installing new count sites, repairs, maintenance and upgrades of assets and carrying out special counts or speed surveys.
- **Gisborne/Hawke's Bay Regional bridge and structures (1202/P6)** – Undertaken by Opus since July 2016, this contract runs for three years with the option to extend for two (3+1+1).
- **Manawatu/Whanganui/Taranaki Regional bridge and structures [PSWT 25]** – Undertaken by Opus since December 2014, this contract runs to June 2017 with the option to extend for two years (3+1+1).
- **ITS and traffic signals** – ITS and traffic signals are managed by staff at the NZTA Wellington Regional Office

Drivers for change

The Palmerston North to Gisborne corridor caters for variable levels and types of customers and this demand is expected to grow into the future. The drivers for change associated with the corridor are briefly described below.

Key journeys

Wellington to Napier to Gisborne

Adjacent corridors provide ongoing connection to the South Island, the Capital City Wellington and international markets via Wellington International Airport and CentrePort shipping (Wellington and Seaview). Limited connectivity between SH1 and SH2 in the Wellington Region affects the efficiency of these inter-regional movements, which makes route choice highly sensitive.

Currently committed capital works projects should eventually favour the flatter graded SH1, but this route is currently constrained by capital works as well as the ongoing closure of the Manawatu Gorge. The SH2 Rimutaka Hill route is less trafficked, but has steep and tortuous alignment where two opposing heavy vehicles are unable to pass either safely or comfortably.

New Plymouth to Palmerston North to Napier

State Highways 3 and 2 carry high volumes of traffic and provide a vital service linking regional and national industry to external markets. It is also a section of the main freight route between Manawatu and Taranaki and Manawatu and Hawke's Bay.

Palmerston North is a key staging point for high value imported and domestic freight. It has good access to the hinterlands that produce New Zealand export commodities, and provides the link for exporting these products through the ports of Napier, New Plymouth, Wellington, Tauranga and Auckland. The Manawatu through flows are the second highest in the country after the Waikato.

Regional growth and development

Hawkes Bay

Hawke's Bay was included in the East Coast Economic Potential Study released in 2014. The study provided an overview of economic development issues and opportunities facing the East Coast study area, which also included Wairoa, Napier and Hastings. The focus was on transport and skills issues for the region. From this, Matariki – Hawke's Bay Regional Economic Development Strategy and Action Plan was subsequently released in July 2016.

Actions within the plan to support economic growth and development include improving access to the Port of Napier and implementation of strategic initiatives within the Regional Land Transport Strategy. It is anticipated pressure will build in Napier and the roads to the

Port (SH50 and SH2) as growing port freight competes with visitor flows from cruise ships, buses and passenger vehicles.

While the projected freight growth is relatively small in relation to the potential current capacity of the main strategic routes, studies have highlighted a need to proactively improve the resilience and safety of SH2 between Gisborne and Napier, especially as a closure of this route would mean a substantial diversion or lengthy disruptions and increased transport costs.

Of note, the study assumes the Napier-Gisborne rail network remained closed. However Kiwi Rail recently announced the reopening of part of the line from Wairoa to Napier for transportation of logs. At this stage, information is not available for what, if any, impact the reopening of rail will have on on-road freight movements with regard to the anticipated growth.

Manawatu-Whanganui

The Manawatu-Whanganui Regional Growth Study was released in July 2015, with the subsequent Manawatu-Whanganui Economic Action Plan launched in August 2016. While this corridor is mostly concentrated in the East Coast region in terms of this growth area, because this corridor covers SH3 from Palmerston North to Woodville aspects of the Manawatu-Whanganui Regional Growth Programme are relevant.

The plan is now being implemented by regional bodies, central government agencies, industry groups, and local businesses and iwi. Within the Horizons Regional the implementation programme is known as Accelerate25. Distribution and transport is one of the four identified enablers within Accelerate 25 aimed at unlocking economic growth and development opportunities.

Accelerated regional roading packages

Historically, accelerated packages funded by the Government have supported significant investment along the corridor including the Matahorea causeway, Napier Expressway Southern Extension and passing opportunities. The Napier Port Access project (including the Pakowhai/SH50 and SH2/Hyderabad Road intersection upgrades) will be funded via the Accelerated Regional Roding Package announced in 2014.

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.

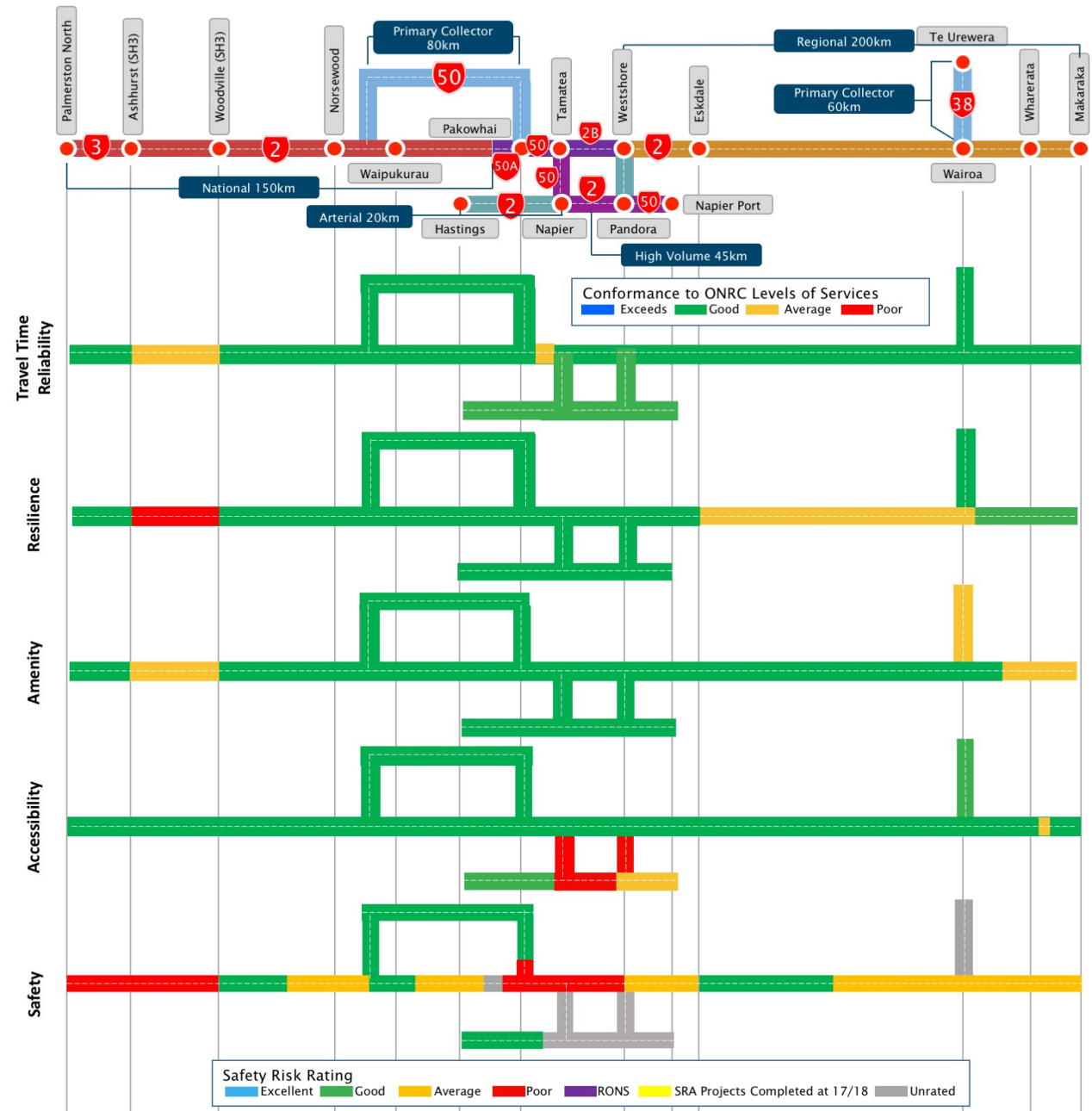
Over time all roads in a particular category should offer an increasingly consistent and fit for purpose customer level of service (CLoS) for road users. With the knowledge of current CLoS experienced by customers, we can better target investment to meet future intended service levels. Overall, customers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

The corridor between Palmerston North and Napier Port is either national or high volume seeking to provide efficient links between freight distribution centres and the Port. SH50 between Takapau and Pakowhai and SH38 are classified Primary Collector linking rural communities to connector routes. SH2 between Hastings and Napier and between Pandora and Westshore are classified Arterial providing access between residential and commercial areas in the Napier/Hasting conurbation. SH2 between Westshore and Gisborne is classified Regional providing the main link between Napier, Wairoa and Gisborne.

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 Palmerston North to Gisborne corridor is performing against the ONRC Levels of Service, as they relate to each of the five 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.

Travel time reliability

Urban areas of the route between Palmerston North and Napier can be subject to short periods of commuter congestion but are otherwise free-flowing. Travel time reliability in the Manawatu Gorge is affected by slow moving vehicles negotiating winding or steep sections with insufficient passing opportunities. The Napier Expressway regularly experiences commuter congestion and is approaching its capacity.

Resilience

The Manawatu Gorge is subject to multiple slips, rock falls and closures. There is a well-defined alternative route (Saddle Road) that adds minimal travel time to the journey. The section between Eskdale and Gisborne has a high resilience risk, due mainly to the significant length of the state highway diversion and availability of suitable local road alternatives. Despite having sections of unsealed road, SH38 performs well against its ONRC rating.

Amenity

The road environment along the majority of this corridor is scenic and comfortable for users. The Manawatu Gorge, and SH38 has a reduced ONRC rating as there are limited amenities and stopping places for drivers. With winding roads, semi-mountainous terrain and long journey times, these sections can be tiring and frustrating to drive.

SH2 between Wairoa and Gisborne has a high level of rutting in comparison to the rest of the journey. Rutting along this section is a result of soil types and poor road aggregates, with cement used to achieve stabilisation. Roughness may also be an issue for users of the unsealed sections of SH38.

Accessibility

The bulk of the corridor is rated as having a good ONRC level of accessibility. There are numerous intersections with many adjoining local roads, along with a high number of direct private accesses along the majority of this corridor.

SH2 and SH50 between Tamatea and the Napier Port is a national high volume highway but, due to its locality within the urban area, has numerous intersections along its entire length. It is rated variously average and poor.

SH2 between Hastings and Napier and between Pandora and Westshore share similar characteristics, but are rated as good. As they have a lower 'arterial' ONRC classification, lower levels of service are acceptable.

Safety

SH2B between Pakowhai and Westshore perform poorly against the expected customer level of service. This section of the corridor is a High Volume National Road, with a target star rating of 4-star, however it is currently rated 3-star.

Multiple safety-related pinch points exist along the entire corridor. Pinch points include but are not limited to busy intersections, unforgiving roadsides, and out-of-context curve alignment. These deficiencies result in an 'average' ONRC rating along most of the corridor. More passing opportunities, particularly in areas with high traffic volumes or on steep sections of the road are required to address potential frustration, and subsequent unsafe passing from motorists following slow moving vehicles.

Between Palmerston North and Ashhurst, there is a high potential for reducing fatal and serious injuries through the implementation of comprehensive, high cost, improvements.

Improving the customer experience

Passing opportunities and road and roadside treatments are seen as critical to improving efficiency, reliability and safety, particularly with a predicted increase of freight movement. Road and roadside treatments and passing opportunities planned for the section between Waipukurau and Gisborne will improve ONRC safety ratings.

The Safe Roads Alliance triggered upgrades on the network from Pakipaki to Waipukurau and from Wairoa to Bayview.

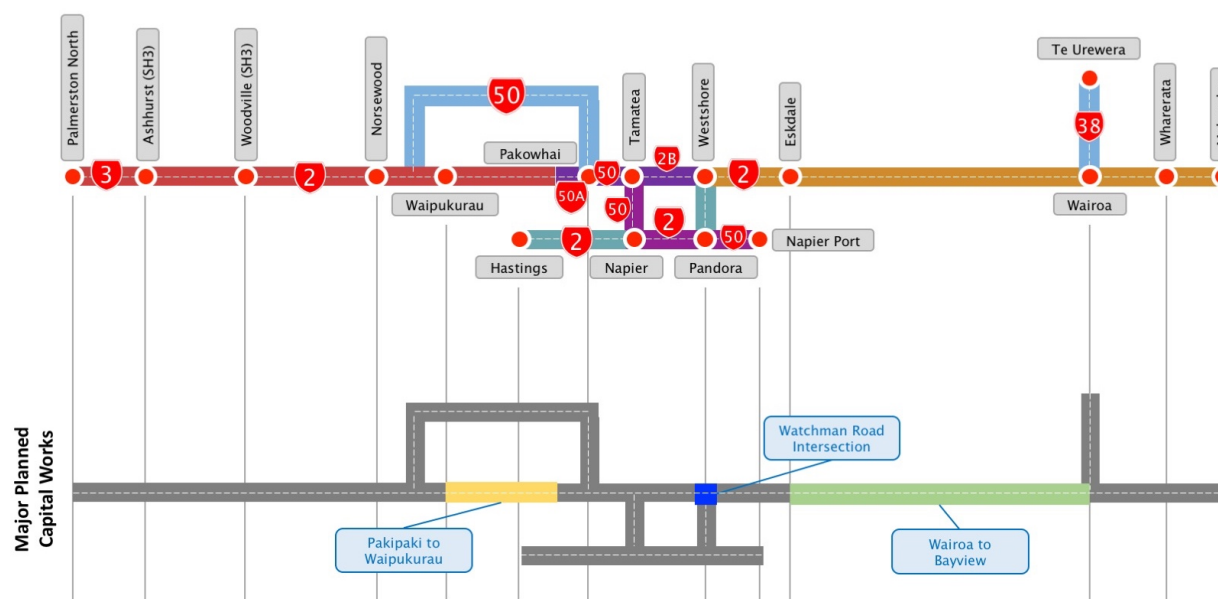
To address significant safety concerns, the intersections of Links Road/Pakowhai Road/SH50/SH50A, Watchman Road/SH2B and the Hawke's Bay Airport/SH2 will be improved in 2017 with the introduction of roundabouts and road upgrades.

A slip lane and other improvements are also planned for the SH50 and Prebensen Drive intersection to address safety concerns and help ease congestion.

HPMV strengthening between Eskdale and Gisborne and to the Tukituki Bridge mean this corridor will be fully HPMV capable with the exception of the Manawatu Gorge.

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

Figure 8 – Significant corridor planned improvements



Access

Carriageway configuration

The corridor is predominantly two way opposing lanes supporting urban commuter, heavy vehicle and tourist traffic.

SH2 and SH50 transition in to four lane roads at highly urbanised areas in Palmerston North and between Tamatea, Napier and Pandora; this configuration supports greater traffic volumes and key journeys made by freight vehicles.

There are limited passing opportunities on large sections of the corridor and a short section of SH38 is unsealed.

Speed limits

The majority of the corridor is 100 km/h except for where reduction in speed limits is required within urban areas or where the road passes through rural settlements.

There is an 80 km/h safer speed zone on SH2 along the Manutuke straights just outside of Gisborne and between Hastings and Clive.

The use of variable speed limits is in place outside some schools.

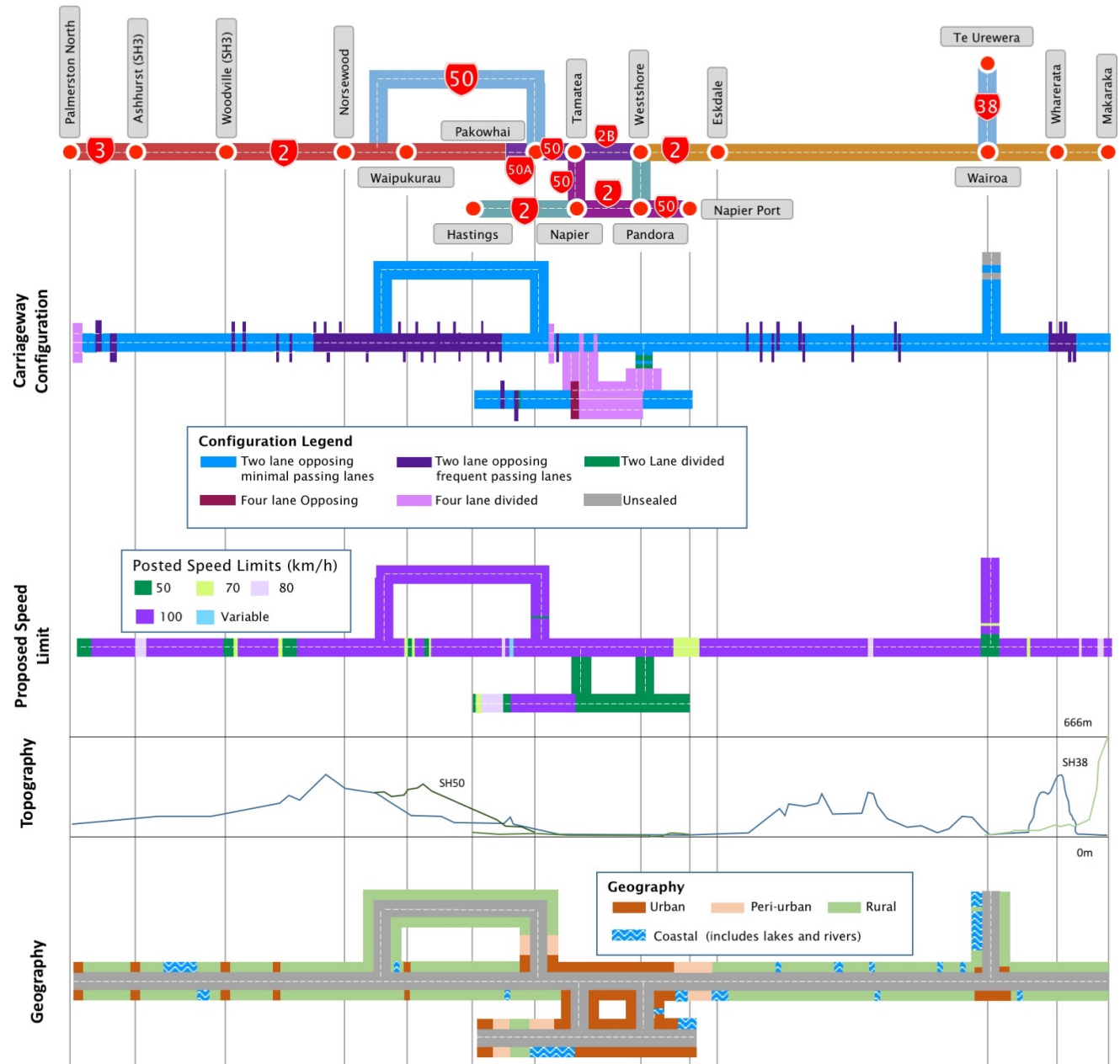
Topography/geography

Much of the corridor is rural with a few urban settlements (the largest being Dannevirke) and a large urban area encompassing Hastings, Napier, Pandora, Tamatea and Westshore.

There are sections of the corridor that are steep or traverse through gorges including Devil's Elbow (SH2), Manawatu Gorge (SH3), Waikere Gorge (SH2), Mohaka Gorge (SH2), Te Urewera (SH38) and Whareratas (SH2).

There are multiple sections of the corridor that run alongside a river or lake and small coastal sections between Napier and Westshore and Eskdale.

Figure 9 - Corridor characteristics



Horizontal alignment

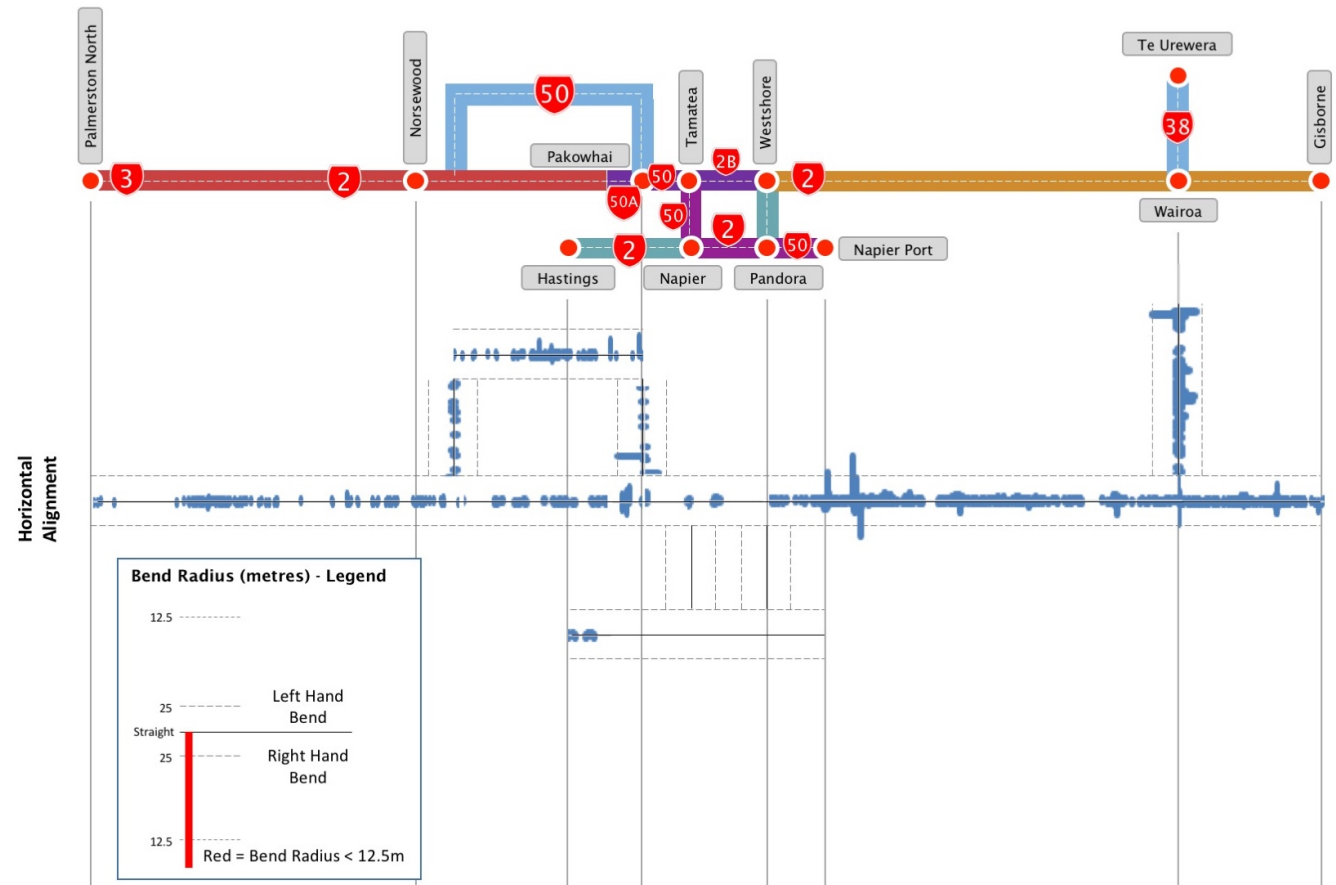
The infographic shows the location and extent of the out of context curves along the corridor. The height of the bar is an indication of the severity of the curve calculated as $\frac{1}{radius^2}$, meaning the taller the bar, the smaller the radius of the curve. Note: Unlike other infographics, the 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 Urban and peri-urban areas of Napier and Hastings. Sharper bends with a radius below 25m occur at Tutira and Lake Waikaremoana. The sharp bend on SH50 at Waiohiki is an intersection.



Bulls township

Figure 10 - Horizontal alignment



Volumes

For the most part volumes of traffic are relatively low with increasing numbers around urban areas which can be expected.

Heavy vehicle volumes are greatest on sections of this corridor accessing the Whakatu Industrial Estate, Napier Port and SH5.

The increase of heavy vehicle traffic at the Gisborne end of the corridor is caused by freight trucks (livestock, agriculture, horticulture, viticulture and logs) merging at the Tiniroto Rd, Wharekopae Rd and SH2 intersection.

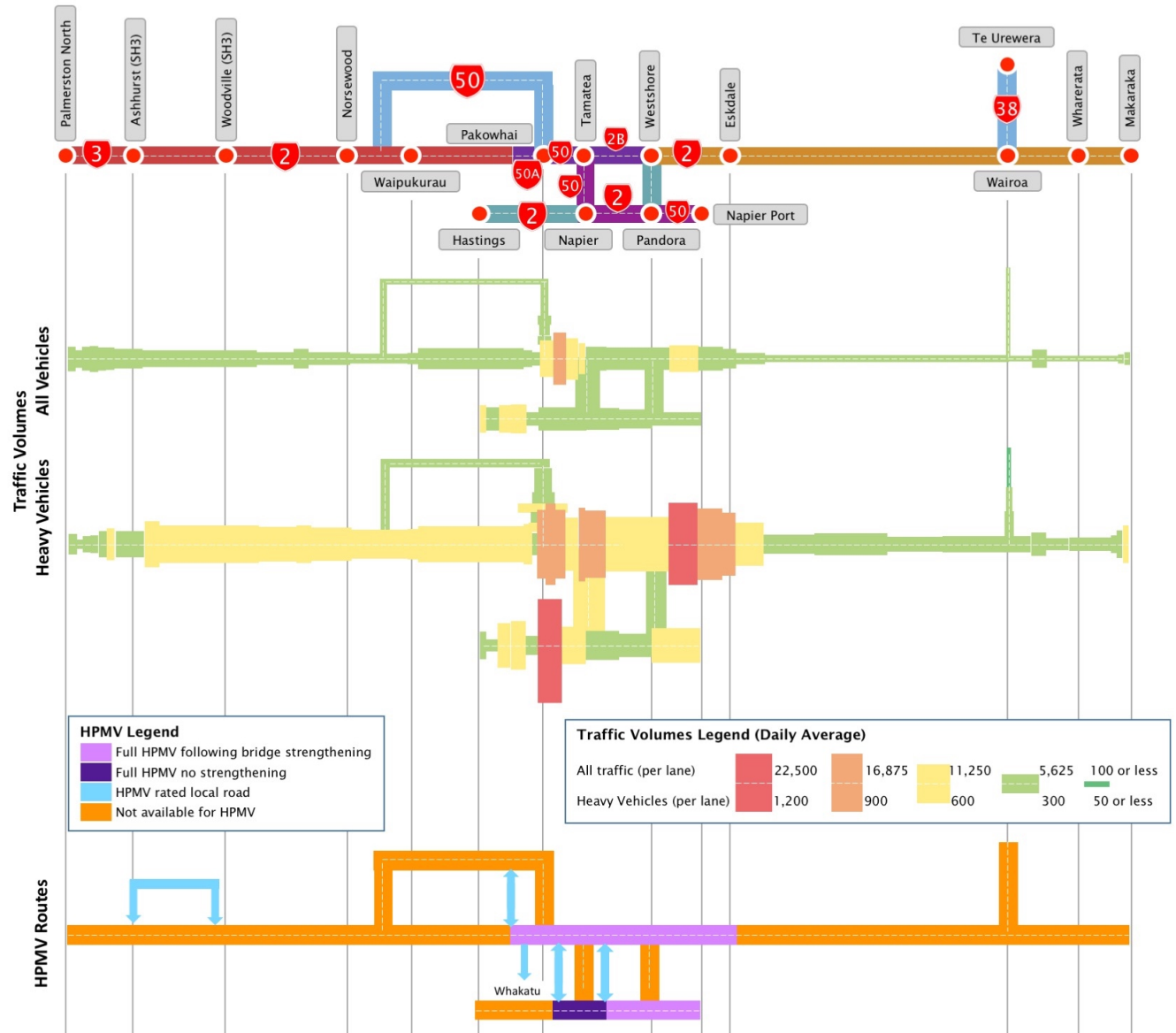
As large forestry blocks reach maturity over the next ten years, logging trucks using this corridor are predicted to increase fourfold. While there are plans to reintroduce rail between Wairoa and Napier), logs will still need to be transported by road to inland ports. There are no alternative transport options from Wairoa to Gisborne as the rail remains closed.

HPMV routes

Once the Tukituki Bridge is strengthened, and Tranche Two of the HPMV project from Wairoa to Gisborne is complete, the corridor will be available to HPMV vehicles with the exception of the Manawatu Gorge.

Saddle Road (which bypasses the Manawatu Gorge) is available as an HPMV alternative route however four different authority permits are required adding considerable expense to freight operators.

Figure 11 - Corridor capacity 1



Critical customers and assets

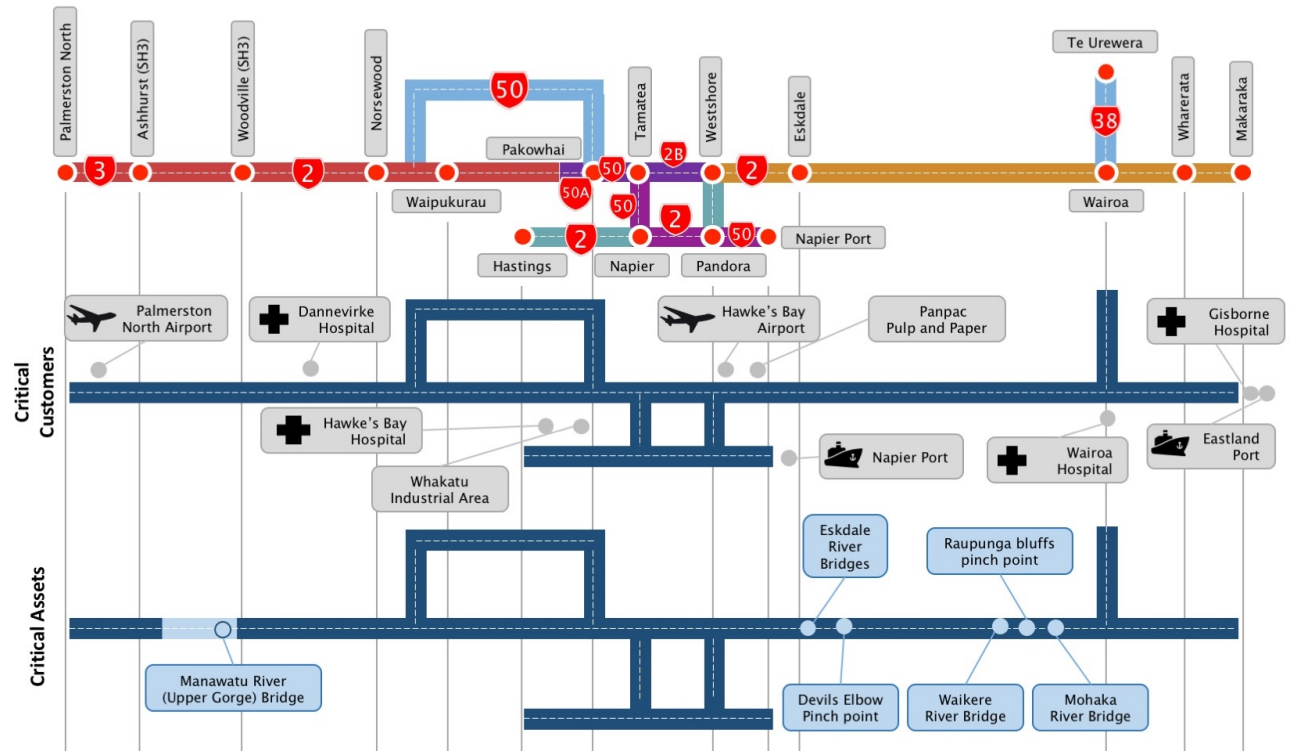
There are a number of customers that rely on the corridor to be open 24/7 and are vulnerable to having short term interruptions. These include hospitals, airports, Napier and Eastland Ports, PanPac and freight operators accessing the Whakatu Industrial Estate.

Critical assets along the network are generally bridges. These are particularly important along SH2 North of Napier (where local roads are unsuitable as alternative routes) and at Eskdale (to maintain access to SH5). These bridges also carry utilities including power, gas, water and telecommunications which the communities along the corridor depend on.



View west along SH2, Woodville township

Figure 12 - Corridor capacity 2



Pressures

The pressures on the corridor resulting in increased demand or a reduction in levels of service for **Access** include:

- **Topography:** Large sections of the corridor have a narrow width and slow alignment, constraining travel speed. There are limited passing opportunities, particularly north of Napier.
- **Urban growth:** Urban growth between Hastings and Napier is expected to continue, and growth along SH3 is projected by the Palmerston North City Council as the city limits expand.
- **Heavy traffic volumes:** Sections of the corridor have heavy traffic volumes which means even minor maintenance (particularly unplanned) cannot be performed without considerable disruption to commuters and freight operators. Added to this is the sensitivity of residents in urban areas to noise and vibration from night works.
- **Maintenance regimes:** Half bridges in the Manawatu Gorge require increasing levels maintenance and have a limited lifespan.
- **Access to Lake Waikaremoana via SH38:** Lake Waikaremoana can be difficult to access especially for vehicles towing caravans or boats. This section of the corridor is partially unsealed and has windy, narrow and steep sections to negotiate.



Debris from slip that occurred in the Manawātū Gorge on 23 July 2017

Future considerations

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

- **Competing users:** Partnering with Palmerston, North City Council to address competing needs of corridor users (i.e. community and freight) and strategically plan for urban growth.
- **Viable alternative routes:** Consultation with local authorities to determine appropriate investment opportunities so viable local road alternative routes are available, particularly between Napier and Wairoa to support an expected increase in logging activity.
- **ONRC Classification:** There are sections of the corridor with National or High Volume road classifications, with high levels of availability and accessibility expected by customers.
- **Whole of life:** Cost effectiveness of bridge maintenance versus replacement in the Manawatu Gorge, (particularly for HPMV strengthening) will be a key consideration for future investment.
- To facilitate growth and economic development within the Wairoa region, especially in tourism, SH38 would require work to ensure safety or road users accessing Lake Waikaremoana and the Te Urewera Rainforest. To protect New Zealand's reputation as a safe tourism destination.
- **Space Port and Tourism:** Unique to this corridor, Rocket Lab will begin launching medium sized rockets from its Space Port at Mahia Peninsula in early 2017. The Ministry of Business, Innovation and Employment and local authorities recently funded a scoping study to research tourism opportunities relating to the site. The study found observing rocket launches is likely to attract some additional tourists. Communication with local authorities (via the inter-agency steering group co-ordinated by the Hawke's Bay Regional Council) to monitor and respond to potential tourism pressures at Mahia Peninsula will be required.
- **Space Port and resilience:** resilience is importance to maintaining the launch programme (i.e. put at risk via say Mohaka Viaduct or other vulnerable or critical assets). The programme aims to reach 50 launches annually and is an international scale business of economic importance to the New Zealand economy.

Resilience

There are parts of this corridor with a poor resilience ratings, particularly the Manawatu Gorge and the section between Eskdale and Wairoa. The alternative routes into the main centres are lengthy and may be subject to adverse weather conditions.

Vulnerabilities

The corridor is susceptible to slips or flooding along its entire length, but especially within the Manawatu Gorge and the section between Napier and Wairoa. Rockfalls also occur, mainly in the Manawatu Gorge, but also in isolated pockets along the corridor.

Alternative routes and diversion lengths

There are many bridges along the corridor that provide the only crossings of deep ravines or major rivers where it would be difficult to bypass or provide alternative means of crossing.

Local roads offer alternative routes for a large proportion of the corridor with the exception of SH38 and SH2 between Napier and Wairoa with the only viable alternative being a 500km diversion.

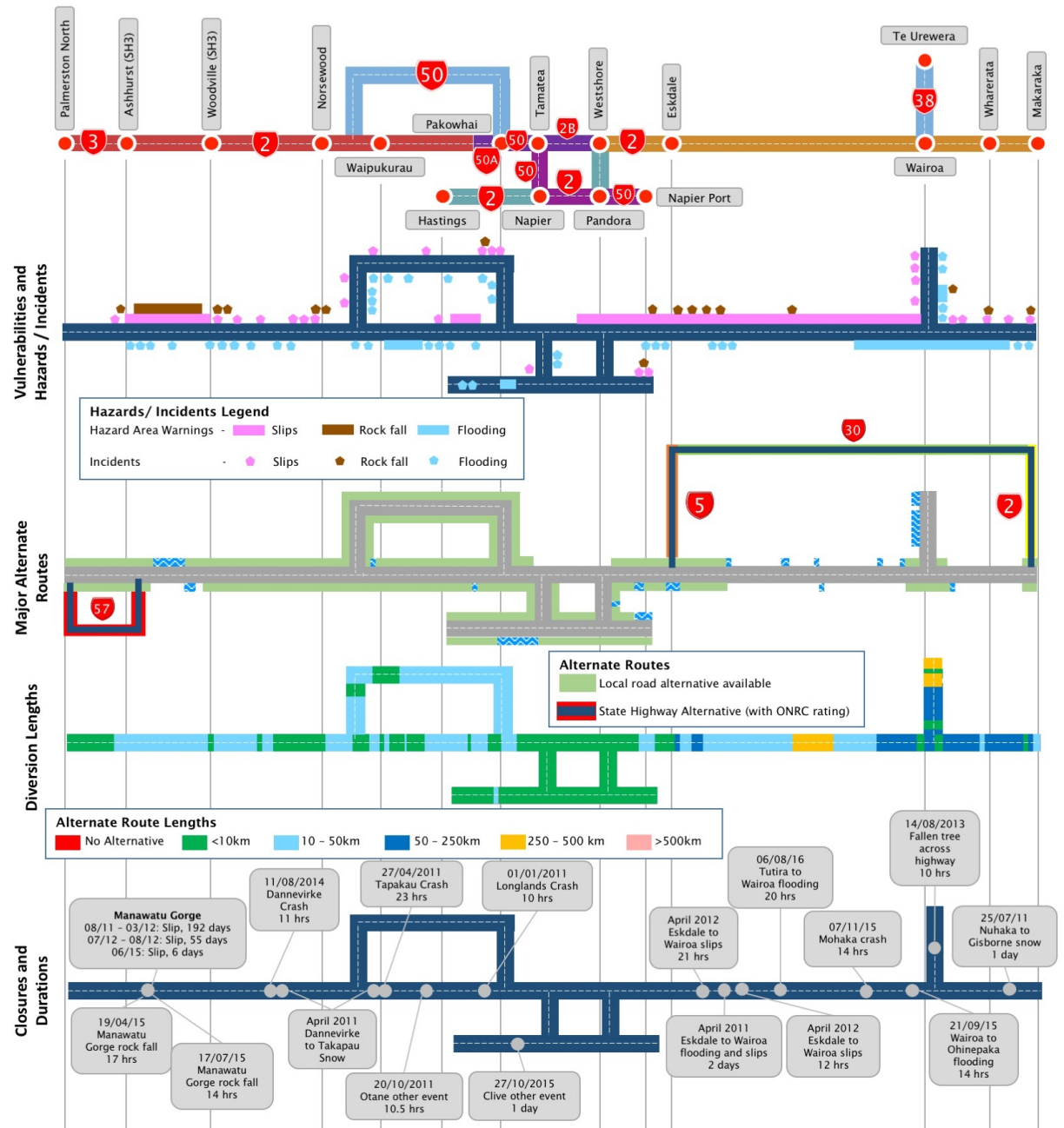
The Manawatu Gorge has a viable local road bypass (Saddle Road) where significant improvements are currently underway.

Between Wairoa and Gisborne there is an alternative route via Tiniroto Road. However, if SH2 is closed because of ice or snow (at the top of the Whareratas) Tiniroto Road is likely to also be affected.

Closures and duration

The major unplanned road closures (greater than 10 hours) and duration of interruption along the corridor in the last 5 years are shown in Figure 13. Closures are mostly related to slips, rock falls and flooding particularly the Manawatu Gorge and section north of Napier. There have also been four crashes with long closure periods due to response distance and difficult access for recovery vehicles.

Figure 13 – Resilience



Pressures

The pressures on the corridor resulting in increased demand or a reduction in levels of service for **Resilience** include:

- **Manawatu Gorge resilience:** The Manawatu Gorge is a critical link for the Hawke's Bay and lower North Island freight link as well as supporting commuter traffic. It is susceptible to road closures from slips, rock falls or traffic accidents due to upper slope stability and a narrow carriageway with limited shoulders or passing areas. Saddle Road (a local road traversing west of the gorge) is currently being upgraded to offer a viable HPMV alternative route in partnership with local authorities. However, four different authority permits are required adding considerable expense to freight operators.
- **Hazards:** Slope instability, flooding and subsidence are common along sections of the corridor resulting in random slips, debris, flooding and drop-outs. These hazards can often be cleared quickly, but the required response may vary from monitoring to more long-term structural repairs and disruption to some or all traffic. The Manawatu Gorge has the largest expanse of rock fall netting in the country with an on-going maintenance burden to maintain functionality.
- **Limitations of communication technology:** Responding to events and providing advice to road users in a timely manner is adversely affected by travel distances and poor mobile phone coverage. Network contractors need to drive significant distances to ascertain road conditions, delaying reports and response times in areas susceptible to hazards. Large portions of the network, particularly north of Tangoio, the Manawatu Gorge, SH38 and SH50, have poor mobile phone coverage limiting road user's ability to report hazards. There is no use of technology to deliver remote data to contractors with the exception of temperature monitoring for snow and ice on the Whararatas.
- **Informed customers:** There is limited use of information technology (point-of-use and social media) for road users. This restricts the ability to inform road users of conditions applicable to the corridor and allow them to make smarter travel choices.
- **Lack of suitable alternative routes:** There are no viable state highway alternatives for a large proportion of the corridor and very limited opportunities for use of local roads North of Napier. The section between Napier and Wairoa is particularly susceptible to disruption from road closures as local roads are not suitable to heavy vehicles and tend to be unsealed, in challenging topography and difficult to follow.
- Vulnerability of the route between Napier and Gisborne could easily be critically severed, particularly where constrained between rail and retreat from the river through the Whararatas.

Future considerations

The future considerations and responses to corridor pressures, intervention triggers and appropriate levels of investment related to **Resilience** are:

- **Targeted preventative works:** Along sections of the corridor with known weaknesses to maintain corridor resilience.
- **VMS:** Installation of variable message boards in strategic positions along the corridor and corridor specific social media accounts will allow road users to make smarter travel choices.
- **Remote "eyes-on" technology:** At key points of the remote parts of the network "eyes-on" technology would aid both the NZ Transport Agency and contractors to monitor road conditions, respond as necessary and inform road users of hazards.
- **Mobile phone coverage:** Consultation with mobile phone network providers to improve mobile phone coverage so road users have the ability to report safety concerns and improve emergency services and maintenance response times, thereby reducing road closure durations.
- **Land owner contact:** Maintaining relationships with Councils to enable efficient access to land owner contact details will become increasingly important as new technology is employed (i.e. drones).



Contractors proactively removing rocks from the upper slopes of the Manawatu Gorge

Reliability and efficiency

Efficiency

Generally, the corridor performs as expected, with reasonable efficiency along the open road sections. Low levels of service are indicative of the geography between Eskdale and Wairoa and the Manawatu Gorge.

During the morning and afternoon commuter peak the sections of road between Ashhurst and Palmerston North and Pakowhai to Napier have low levels of service due to commuter congestion.

Variability

Large portions of the corridor perform well in terms of variability. The exceptions are SH50 between Napier and the Napier Port and sections along SH2 between Eskdale and Wairoa where there is steep terrain and a winding corridor (particularly Whirinaki to Tutira, Raupunga, Wairoa and Morere). It is likely that freight vehicles negotiating Morere Hill account for the high variability in the section north of Wairoa.

Commercial vehicle average speed (overleaf)

The majority of the open road corridor North of Napier performs poorly in terms of commercial vehicle average speed where topography is a factor.

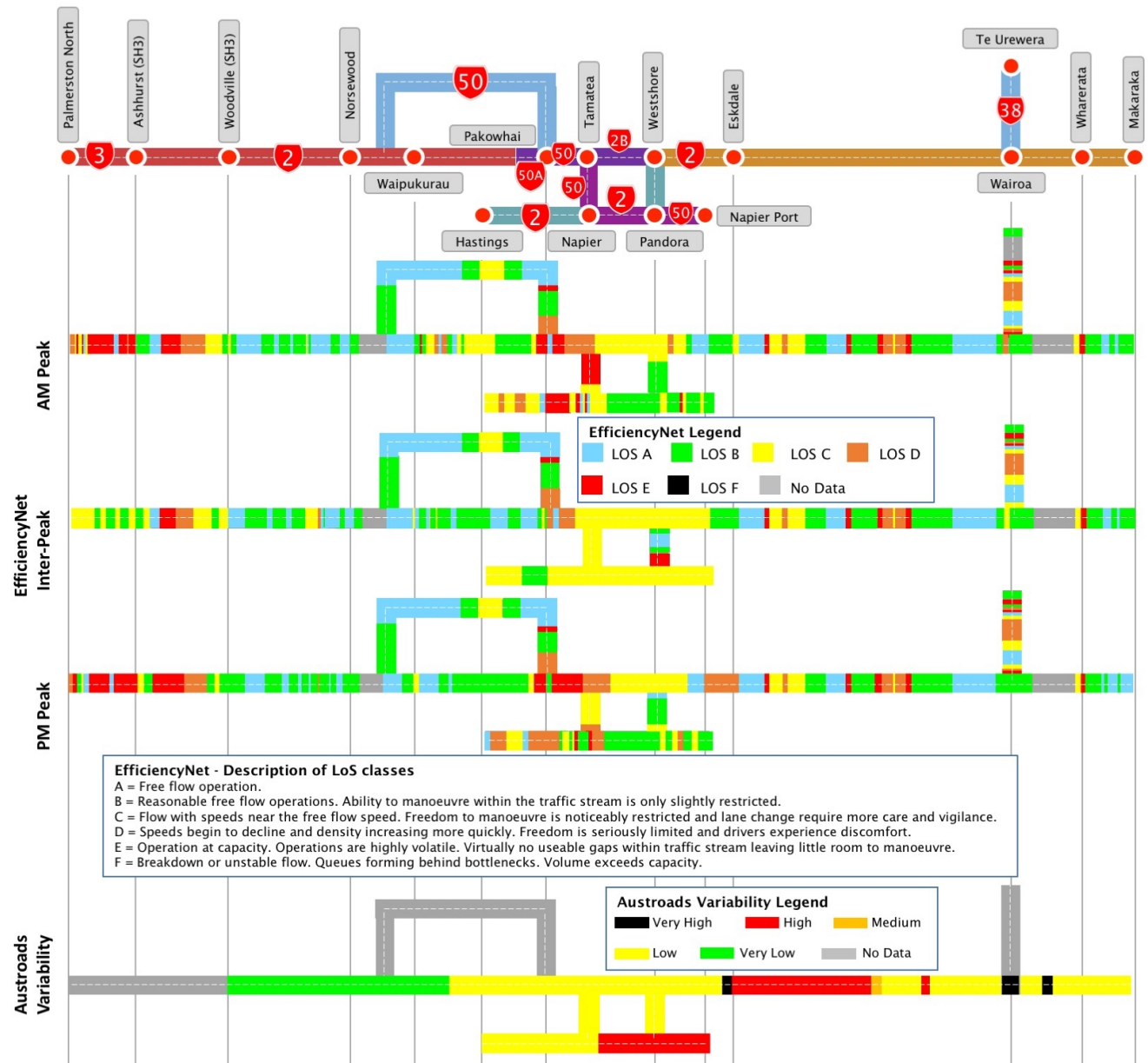
The open road section of SH2, SH50A and SH2B between Waipawa and Westshore also performs poorly. High traffic volumes and limited passing opportunities are likely to be the main contributing factor along this section.

Average speed is reduced between Woodville and Norsewood in part due to a long 50 km/hr zone through Dannevirke with no alternative highway route.

Current constraints (overleaf)

The major current constraints on the network affecting journey reliability and efficiency are shown in Figure 14.

Figure 14 - Reliability and efficiency

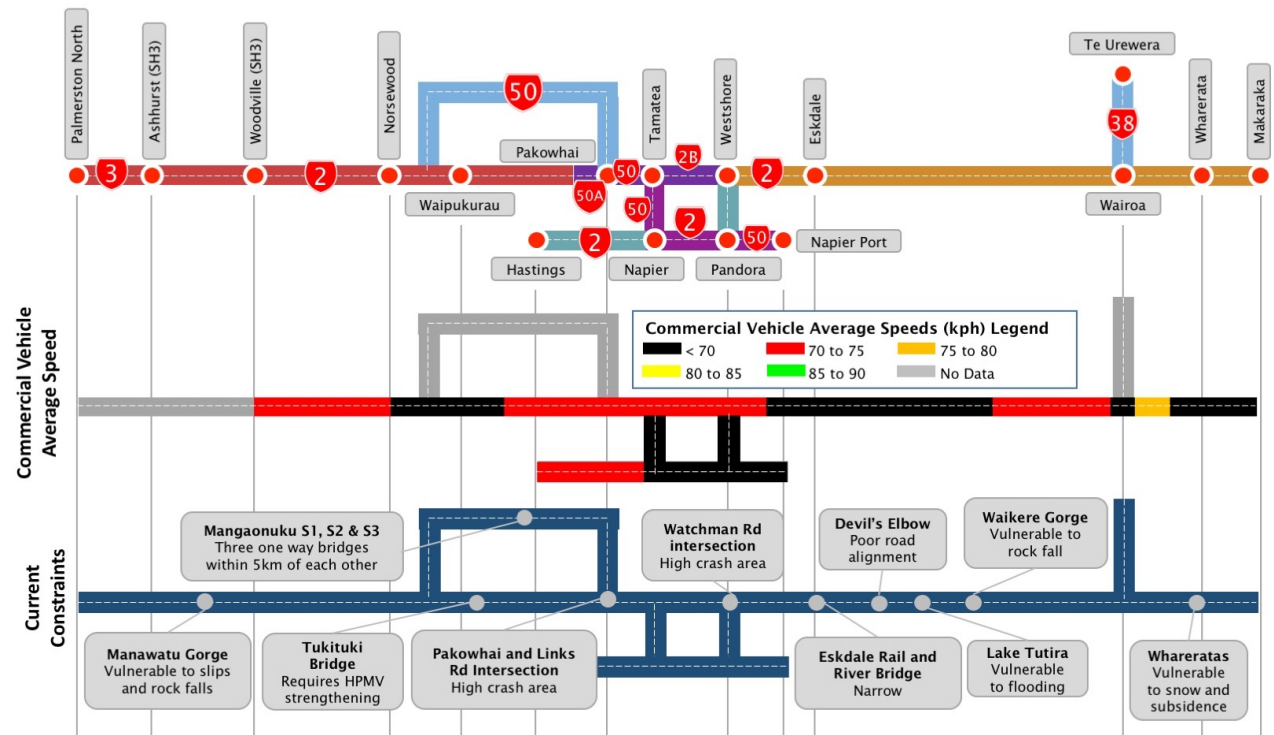


Pressures

The pressures on the corridor resulting in increased demand or a reduction in levels of service for **Reliability and efficiency** include:

- **Lack of passing opportunities:** While passing opportunities do exist along the corridor, in general they are infrequent and insufficient. Slow moving vehicles and hesitant drivers can create delay and driver frustration on the tight terrain, particularly for laden commercial vehicles that are sensitive to time delay.
- **Vehicle conflict:** Commuters competing with heavy vehicles on SH3 between Woodville and Palmerston North and along SH50 in and around Napier cause congestion during morning and evening peak times.
- **Intersection efficiency:** Traffic lights at the SH50/Pakowhai Rd intersection, and merging lanes from Taradale and the Links Rd intersection cause commuter congestion during peak times. Both these intersections are scheduled for major upgrades in the near future.
- **Town centre choke points:** Woodville, Dannevirke, Waipukurau, Waipawa, and Clive are busy towns where through traffic competes with local road users accessing town centre amenities. The town centres tend to be narrow; have pedestrian crossings; and car parks directly accessed from the state highway.
- **Up-to-date information for road users:** Information is not readily available to road users on travel times which would allow them to make journey decisions.
- **Travel time** between Napier and Gisborne is constrained by the challenging alignment – there is a perception of delay by heavy vehicles, but there is no indication that they travel any slower than light vehicles where the terrain allows free flow travel speeds.

Figure 15 - Reliability and efficiency



Future considerations

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

- **Realigning choke points and providing more passing opportunities:** to maintain reliability and efficiency for all users of the network.
- **Heavy vehicle bypass:** Bypass opportunities around towns would increase efficiency for daily commuters and freight operators, particularly where there are long sections of lower speed limits such as Dannevirke.
- **Low maintenance treatments:** (for example, long-life pavements) will reduce interruptions from roadworks and improve reliability and efficiency, particularly in areas with high traffic volumes. Low maintenance treatments will have a higher initial investment than treatments currently used on the corridor.

Safety

Collective risk

Collective risk varies along the corridor. Between Pakowhai and Westshore, the corridor is rated medium-high or high collective risk. This is also observed on SH3 between Palmerston North and Ashhurst, and Hastings and Napier on SH2. SH50 and SH38 are rated either low or medium-low collective risk.

Personal risk

Personal risk rating along the corridor ranges from low to high. From Palmerston North to Tamatea, the corridor is rated either low or medium-low. Between Tamatea and Westshore SH2B is rated high personal risk. There are two significant sections of high personal risk between Eskdale and Gisborne along SH2.

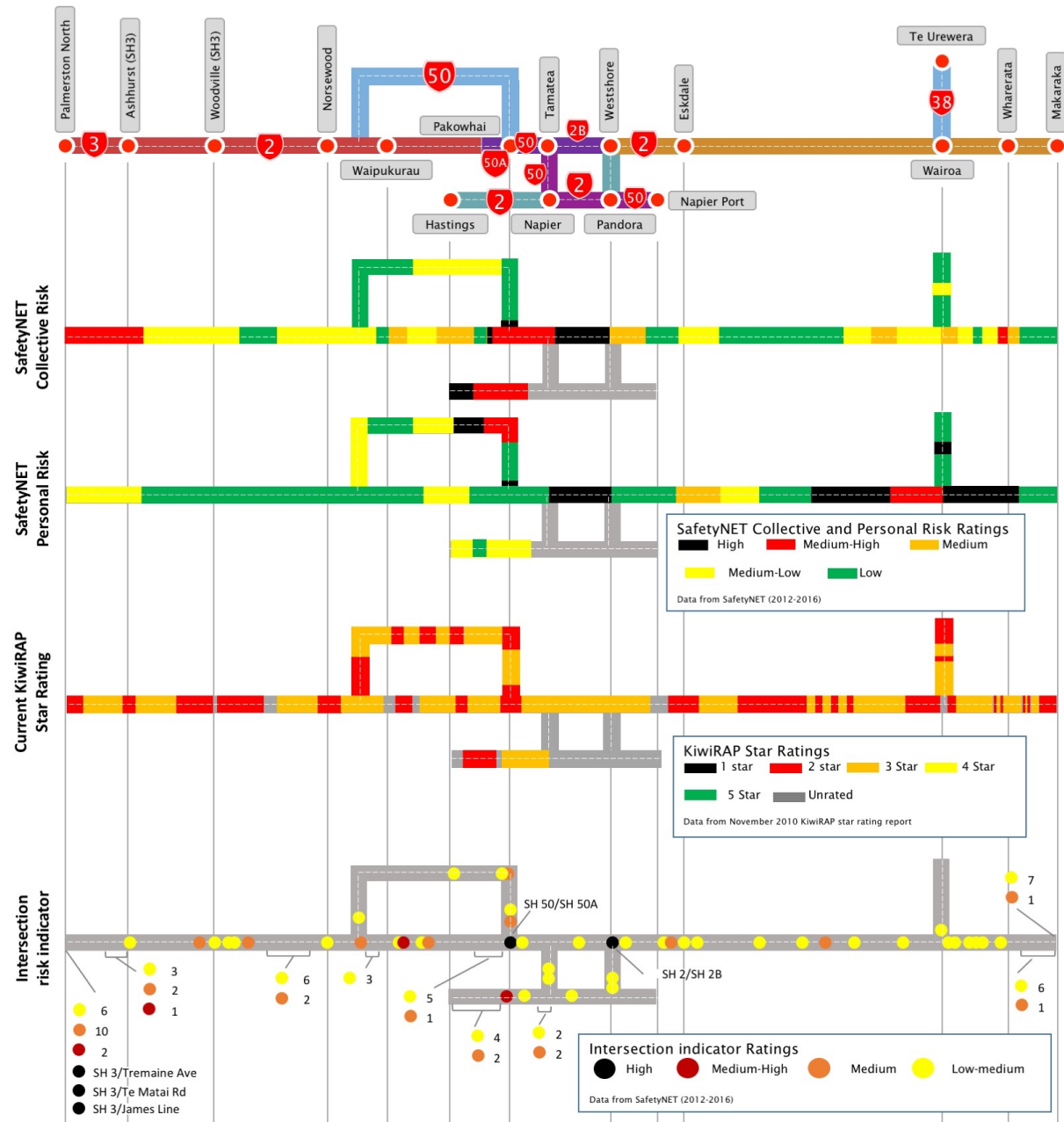
Star rating

The corridor is rated either 2 or 3-star. Areas rated 2-star fall below the target 3-star or equivalent for the National road category. There are sections of the corridor that do not have a current KiwiRAP star rating.

Intersection risk indicators

There are five high risk intersections along the corridor with three in Palmerston North, and one in both Pakowhai and Westshore. There are numerous low-medium and medium risk intersections between Woodville and Norsewood along SH2. There is a high concentration of low-medium and medium risk intersections in Gisborne.

Figure 16 - Safety



Pressures

The pressures on the corridor resulting in increased demand or a reduction in levels of service for **Safety** include the following:

- **Topography:** Sections of this corridor are windy, narrow in profile and in semi-mountainous terrain. Slow moving vehicles cause a queuing response leading to frustration and potential unsafe passing manoeuvres. Straight sections of road are not long enough to allow passing without exceeding the posted speed limit, or traffic volumes prevent it.



SH2 Watchman Rd intersection, with Napier Airport at left in the distance

Future considerations

The future considerations and responses to corridor pressures, intervention triggers and appropriate levels of investment related to **Safety** are:

- **Realignment:** there are several tight horizontal bends where realignment may reduce safety risks in the future.
- **Vehicle activated electronic signage:** Introducing vehicle activated electronic signage may be beneficial in areas where topography constrains opportunities for realignment.



SH2 Watchman Rd intersection aerial view

People, places and environment

Natural environment

Key natural environmental features along the corridor are varied and include the Manawatu Gorge, Pekapeka wetlands, Ahuriri Estuary, Lake Tutira, Te Urewera Rainforest and Whakaki Lagoon.

The corridor is dominated by rural and natural landscapes and provides access to popular Department of Conservation parks including the Ruahine Forest Park, Manawatu Gorge Scenic Reserve, Tangoio Falls, White Pine Bush Scenic Reserve and Te Urewera Rainforest.

The many rivers and streams contribute to flooding along the corridor, particularly along SH2 between Waipukurau and Pakipaki and around Wairoa. The Manawatu Gorge, Devil's Elbow, Waikere Gorge and the Whareratas are susceptible to erosion and slips.

Noise, vibration and air quality

The unsealed sections of SH38 have contributed to air quality complaints by residents due to the generation of dust.

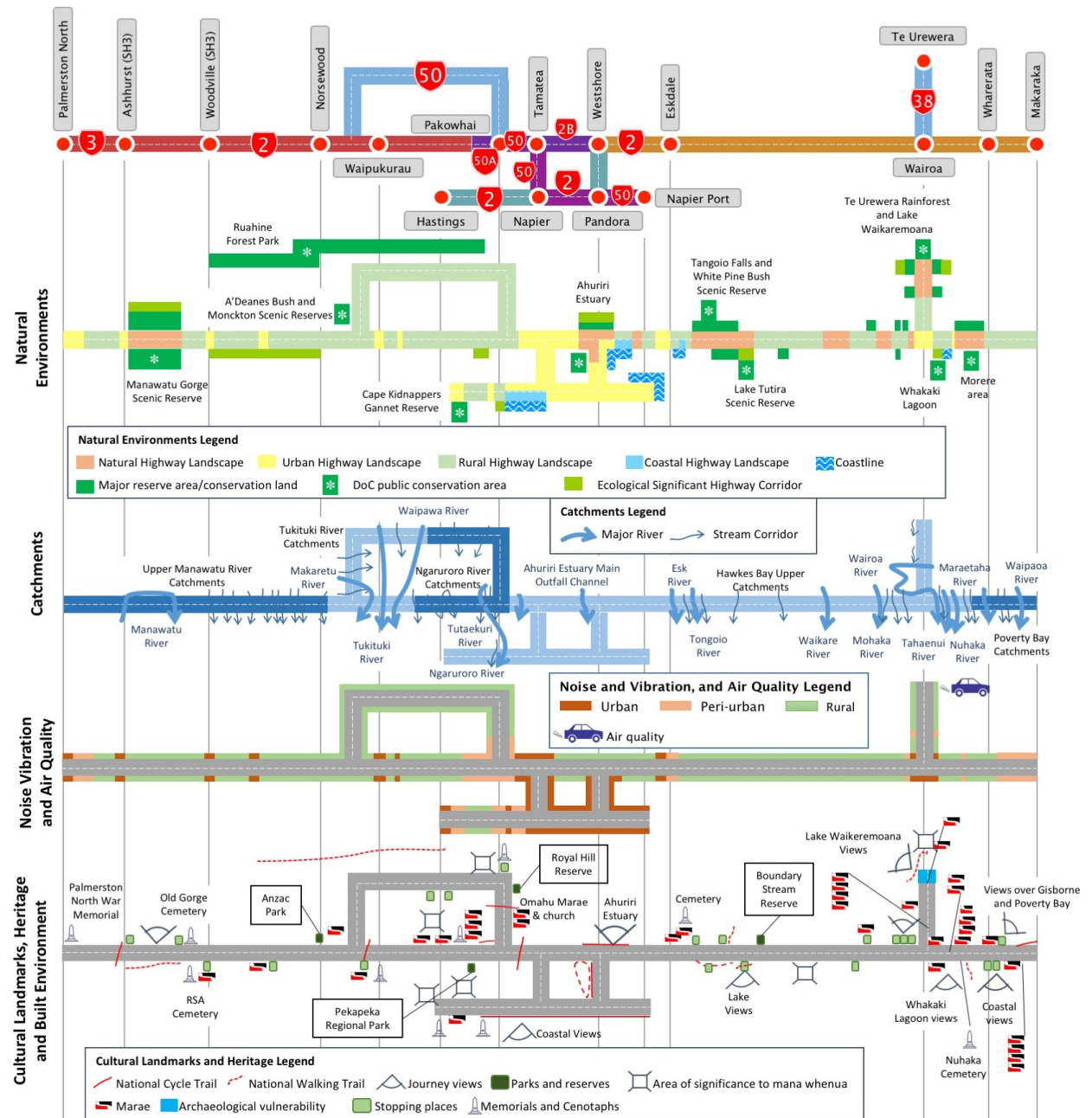
Noise issues on SH2B between Prebensen Drive and Meeanee Road overbridge have been mitigated by application of low noise pavement surface treatments.

Cultural landmarks, heritage and built environment

The corridor traverses a wide variety of scenery from flat pastoral and viticulture land of the Hawke's Bay and Gisborne, forestry, native bush and significant wet lands. The corridor is characterised by urban, peri-urban and rural areas with many small towns between the bigger centres of Palmerston North, Hastings, Napier and Gisborne.

Visible landmarks along the corridor tend to be memorials and Maraes. The Mohaka Viaduct visible from SH2 is registered Category 1 by the New Zealand Historic Places Trust due to its engineering heritage value.

Figure 17 – People, places and environment



Pressures

The pressures on the corridor resulting in increased demand or a reduction in levels of service for **People, places and environment** are:

- **Climate change:** Predicted climate change levels for the Hawke's Bay and Poverty Bay are expected to bring drier conditions to the regions. However, ex-tropical cyclones will likely be stronger and cause more damage as a result of heavy rain and strong winds, putting pressure on areas already susceptible to flooding, slips and rock falls.
- **Dust reduction:** The unsealed sections of SH38 are subject to dust complaints from local residents particularly in the summer months when the roads are dry, and traffic accessing Lake Waikaremoana increases. Options for reducing dust are currently being explored.
- **Rest opportunities:** The difficult topography and long journey times north of Napier can be tiring for drivers. While south of Napier there are, many settlements close together that provide travellers with the opportunity for rest, north of Napier settlements tend to be further apart and facilities may not be open after normal trading hours. A relatively new amenities block and children's play area in Raupunga has significantly improved facilities provided along this section.
- **Walking and cycling:** 50,000 people walk the Manawatu Scenic Reserve walk every year with the start of the track at the western entrance to the Manawatu Gorge. There is currently a cycle track between Palmerston North and Ashhurst, and the local Ashhurst community have advocated for this to connect to the DOC track along the state highway.
- **Agricultural intensification:** Cattle and dairy farms, particularly around the Waipawa/Waipukurau area, have intensified in recent years and this growth is likely to continue especially if a proposed irrigation scheme goes ahead in Southern Hawke's Bay.

Future considerations

The future considerations and responses to corridor pressures, intervention triggers and appropriate levels of investment related to **People, places and environment** are:

- **Environmental management requirements:** Wider erosion and flooding developing with climate change effects. Engineered controls and high standards of environmental management in relation to stormwater, erosion and sediment control particularly in sensitive ecological environments.

- **Town entry treatments:** As with many parts of New Zealand, urban settlements function as part of highway stopping places, with local trade benefits from the connections with highway customers. Increased pressure to support communities with appropriate town entry treatments, streetscape and signage to support local services and facilities will need to be considered along the whole corridor.
- **Noise and vibration impacts:** Increased logging trucks along SH2, particularly through Wairoa, Morere, Raupunga, Tutira and Waipukurau, resulting in a need to manage noise and vibration through these townships.
- **Provision of facilities:** Providing adequate facilities for travellers, particularly between Napier and Gisborne where there are very few towns or settlements.
- **Stock effluent disposal:** With increased livestock movement, the current stock truck effluent disposal facilities at Gisborne and Woodville (and potentially the proposed site in Wairoa) may come under pressure. Collaboration with local authorities on stock effluent disposal facilities may therefore be required.



Damage to bridge that occurred in the Manawātū Gorge on 23 July 2017

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 11,412 km of roads and associated assets. This corridor contributes approximately 563 km of road network which reflects 4.9% nationally. The total value of the assets along the corridor is \$740M.

The corridor assets have been divided into eight groups as shown in Figure 18 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 18 – Corridor asset base

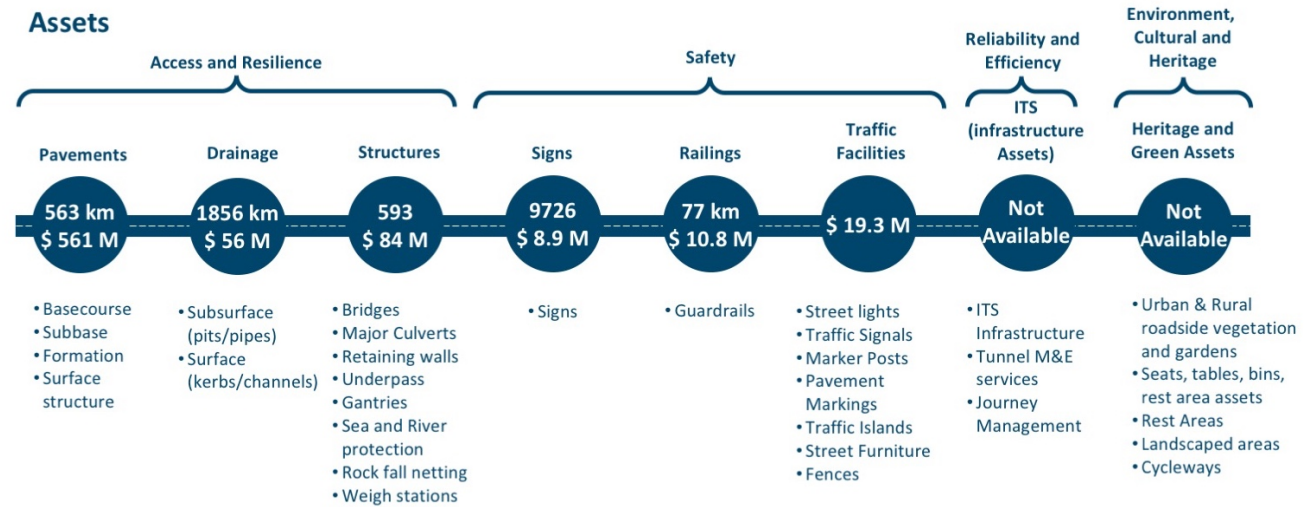


Figure 19 - Asset condition and performance



Figure 20 – Asset condition

Asset condition and performance

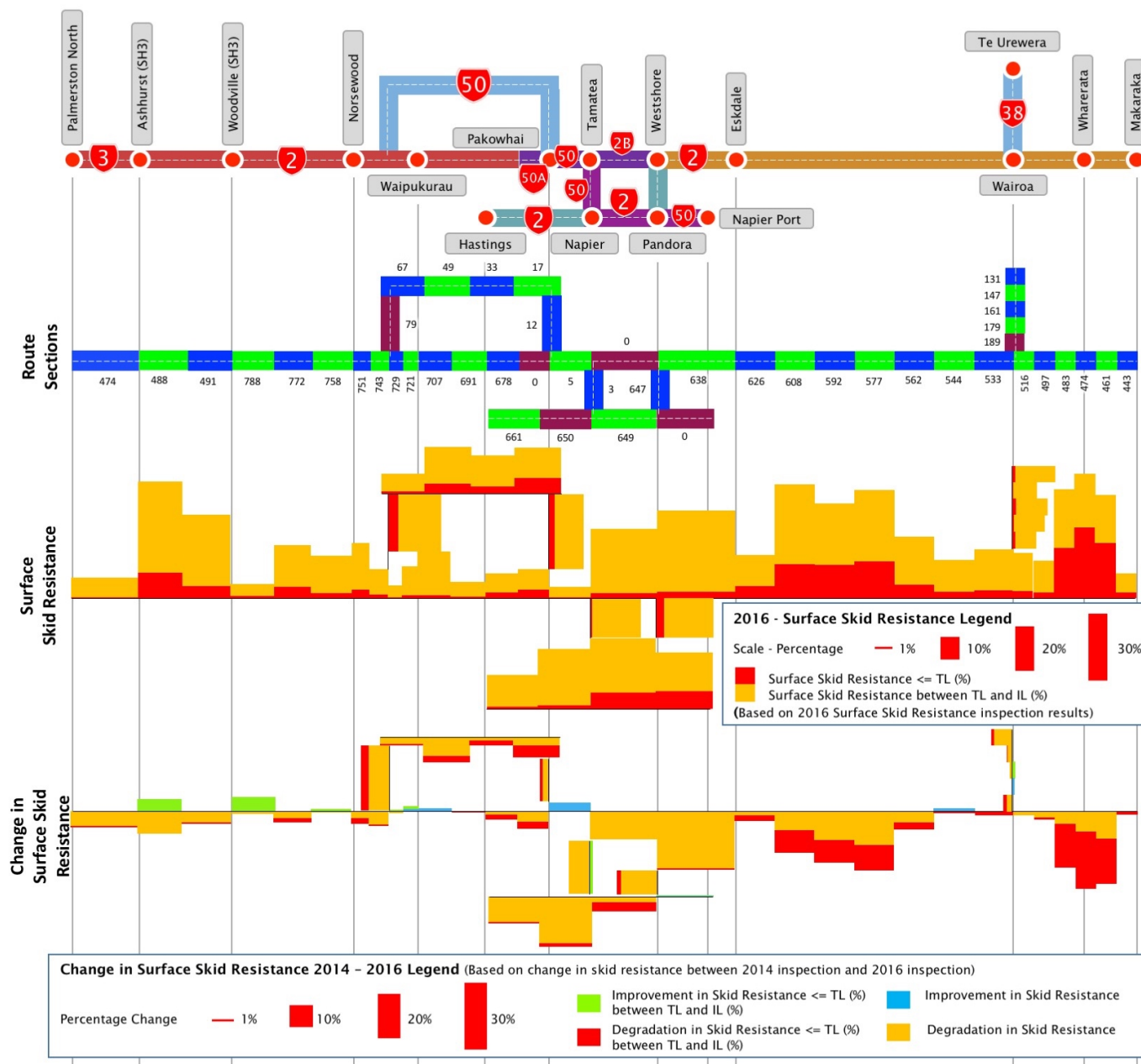
Surface skid resistance

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.

Significant lengths of this corridor fall below the investigation and threshold levels of skid resistance. However, this is likely to be heavily influenced by some historic problem areas through the Whareratas that should now have been addressed and by the currently closed Manawatu Gorge.

Three areas report over half of their lengths either below TL or between TL and IL: SH3 RS488 to RS491 Manawatu Gorge, between Ashhurst and Woodville (with a trend of improvement) and two sections of SH2 where there is ongoing degradation, South of Wairoa, RS608 to RS577 and, south of Gisborne, RS483 to RS461 the Whareratas.



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.

There is a total Skid Assessment Length of 29km, 2.8%, qualifying for funding on this corridor. Qualifying lengths are scattered throughout the corridor. The highest levels of priority for surface safety treatment, both in absolute terms and degradation over time, are located between Wairoa and Gisborne, SH2/483 to SH2/461.

Figure 21 - Asset condition 2

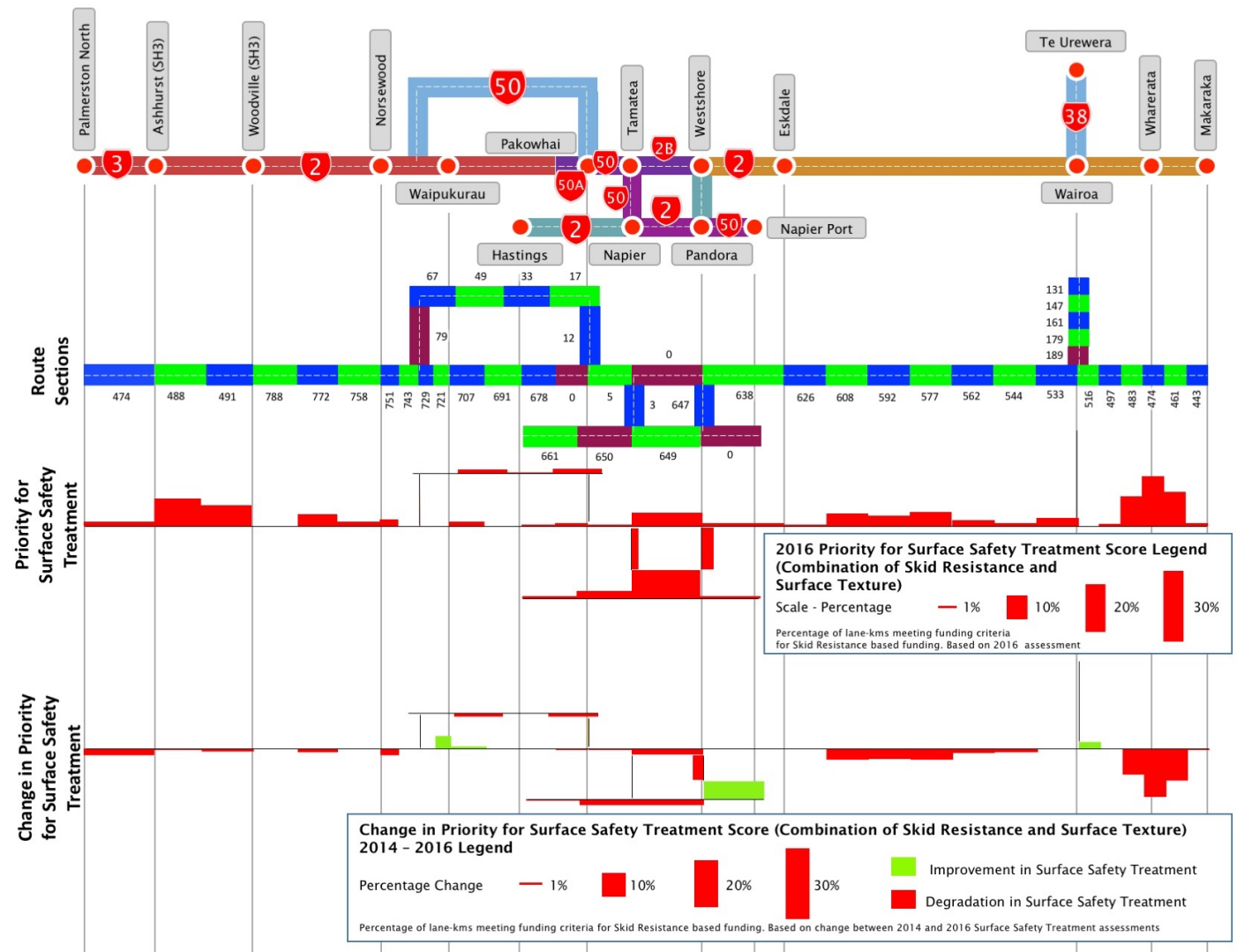


Figure 23 – Asset condition 4

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 3/474 in Palmerston North, 50/3 between Napier and Tamatea, and 38/131 at Te Urewera.

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 7.5 years, with sections 50/5 south of Tamatea, 2/647 at Westshore, and 38/179 achieving service lives in excess of 10 years.

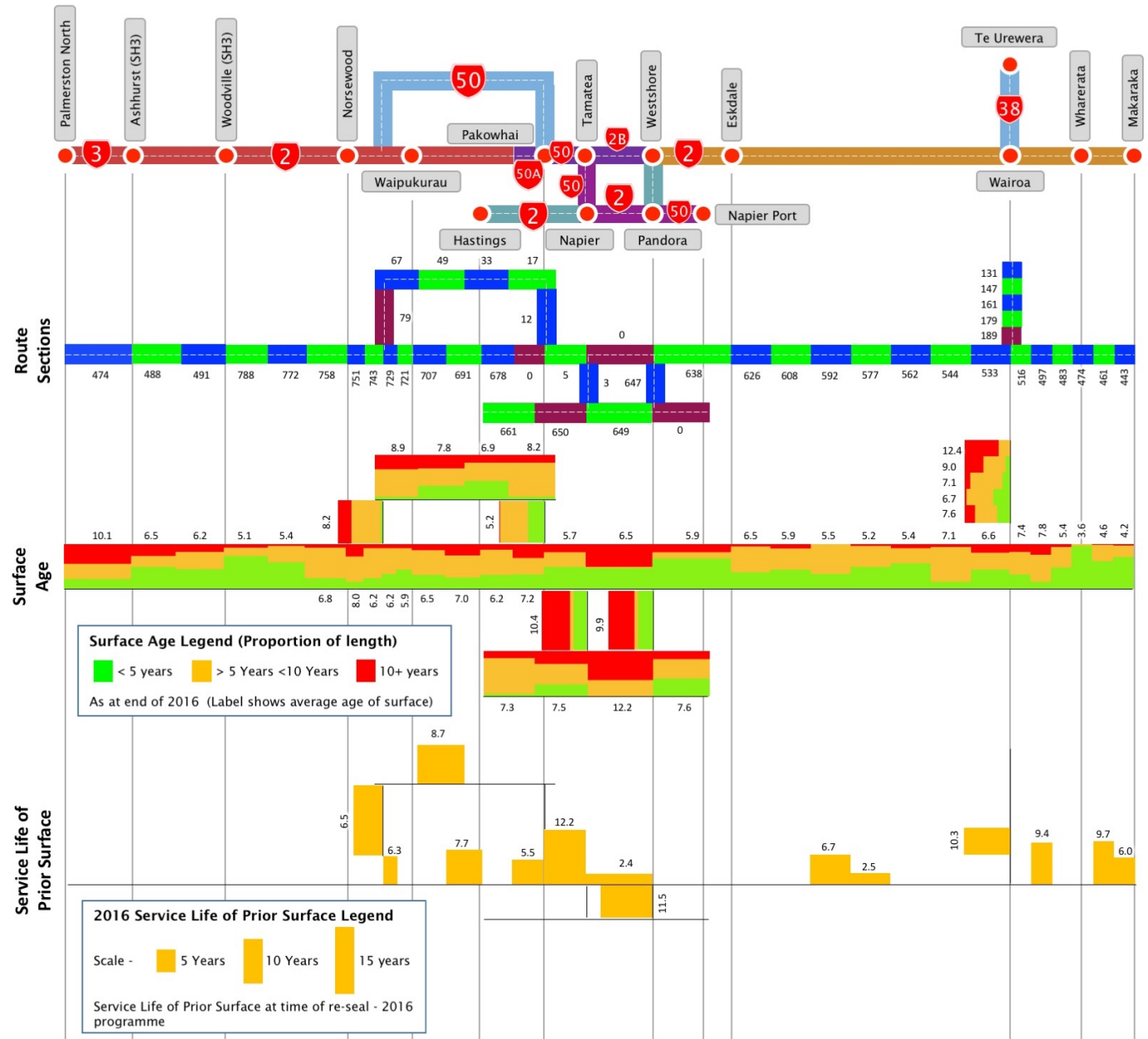
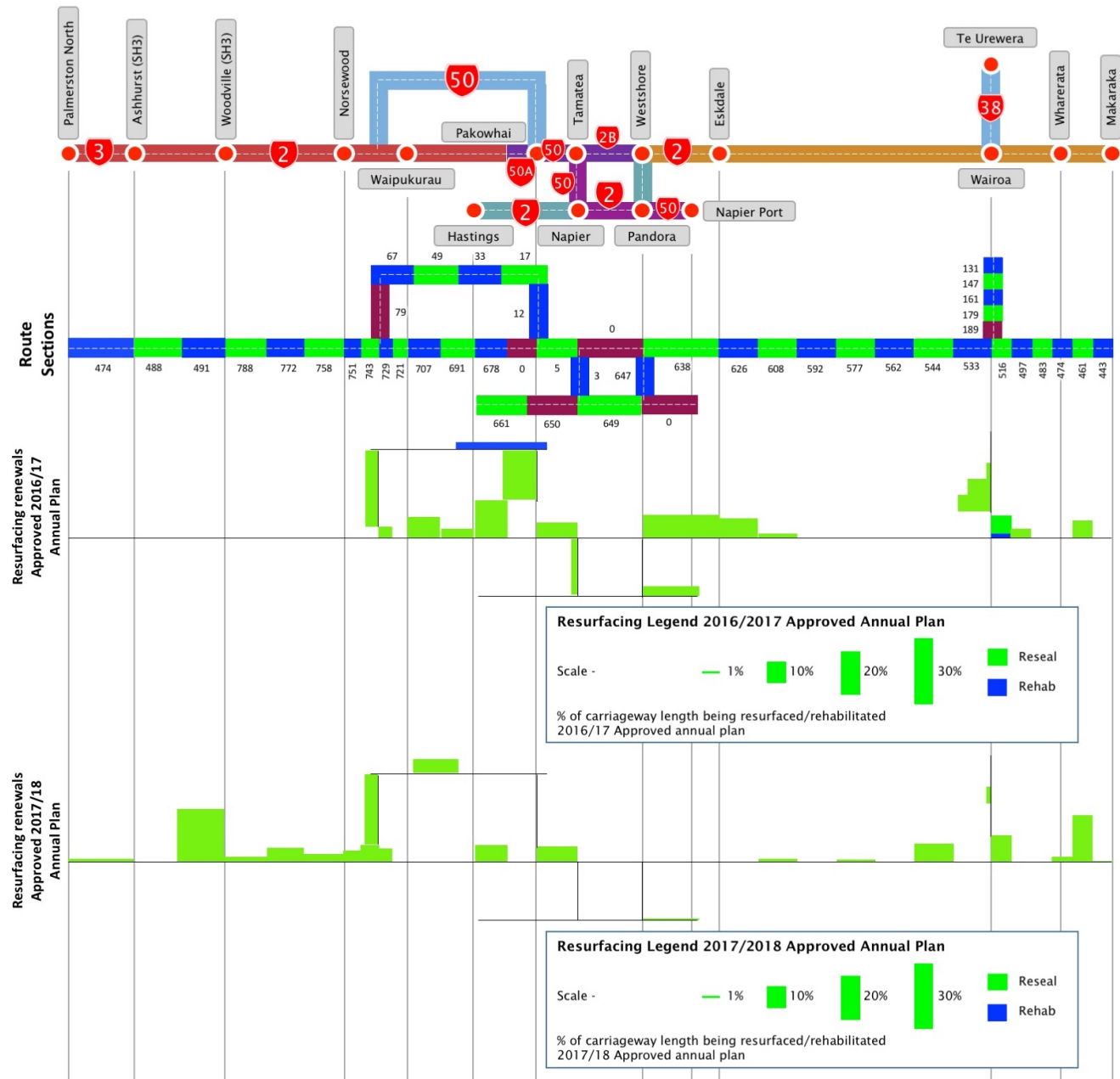


Figure 24 – Asset condition 5

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 sections 3/491 west of Woodville, and 2/461 around Maraetaha.



Proportion of travel on smooth roads

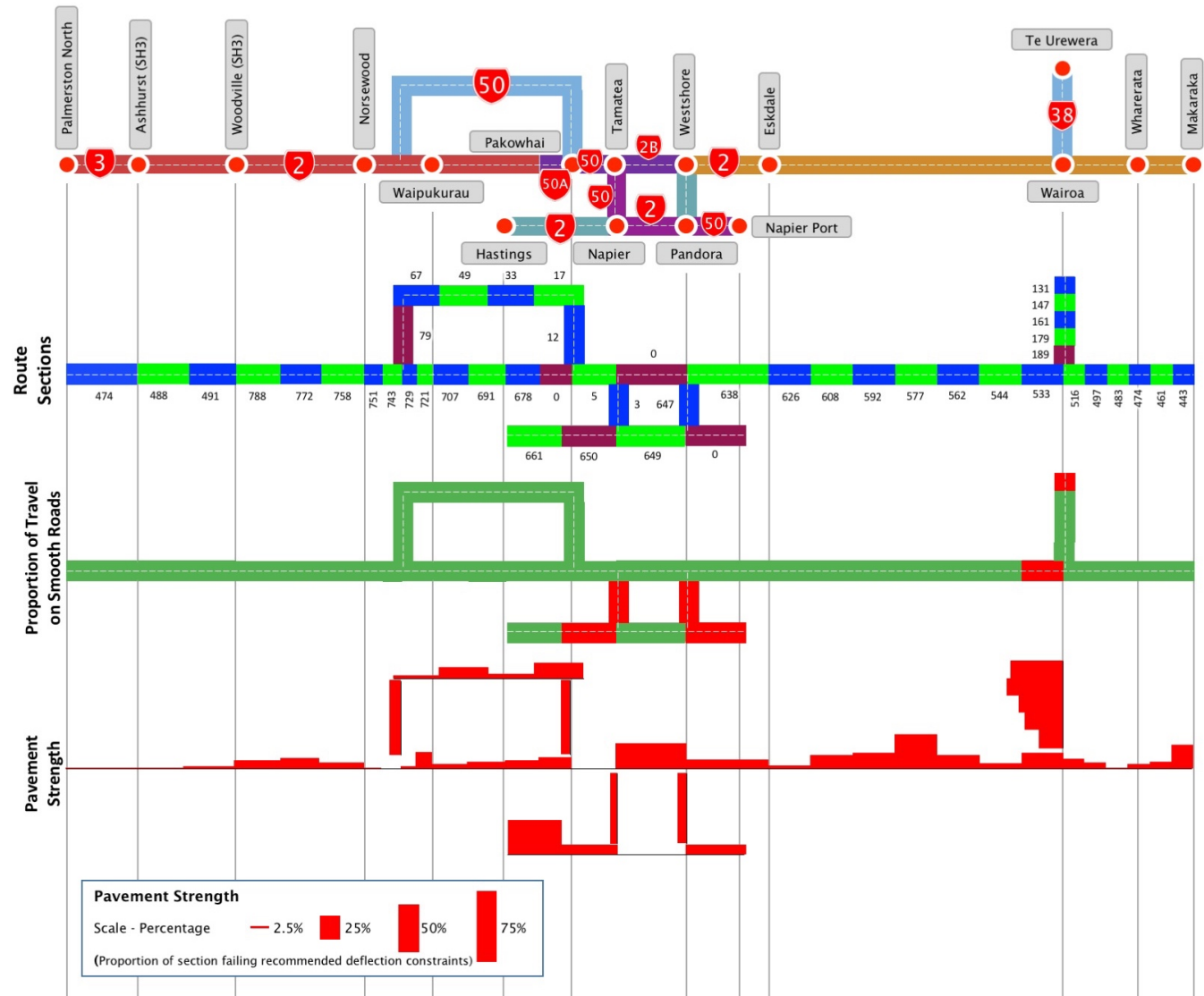
The infographic shows whether the route section passes the ONRC standard for Proportion of Travel on Smooth Roads (Smooth Travel Exposure). 97% is the ONRC target for proportion of travel on smooth roads. The infographic simply shows whether the route section achieves this level or not.

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.

The sections of corridor with the highest proportion of pavement failing to meet the deflection constraints occur along the length of SH38, and SH2/661 between Clive and Hastings.

Figure 25 - Asset condition 6



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:

- **Manawatu gorge:** Pressure is how to maintain an adequate surfacing and performance – it is a demanding environment with heavy loading. There is a tension between skid resistance (safety) and asset life (a surface that adheres). This section of road is subject to multiple and long duration closures - currently closed to public use, more than twelve months, due to large and moving slips. Saddle Road, Manawatu, alignment is used as an alternative to the Manawatu Gorge. However, it offers similar environmental challenges. Do not currently have a good answer for this part of the corridor.
- **Winter maintenance:** Pressure to improve performance of corridor in the winter – there has been a changed approach that may provide the desired improvement and achieve a consistent level of service between Woodville & Waipukurau.
- **Rockfall:** damages pavements and limits the operating environment – Manawatu Gorge and Whareratas. Pressure to maintain guardrails with modern structural capacity and the barrier/retention element to keep vehicles from falling over edge.
- **Surface skid resistance:** the natural/local material performs poorly for skid resistance, particularly on tight curves or where there are multiple demands. A better quality aggregate is required than that currently available. Melter Slag is used sparingly between Napier and Wairoa at only the worst locations. It is expensive to use and there is increasing competition for limited supply. (Supply of Glenbrook Melter Aggregate is increasingly a national safety consideration.)
- **Aggregate supply:** Local basecourse material is moisture sensitive – sourced from watercourses and has high plasticity that requires modification before use on road. It also requires frequent ongoing testing, due to variability, and good quality control in use. The alternative is more costly imported materials.
- **Whareratas:** a difficult to maintain high altitude pass which has winter maintenance, moisture sensitive soils and pavement. Frequently fails, land stability issues, geometrically challenging, are using CMA now. Bitumen flushing has increased and attributed to drainage problems.
- **Adjacent rail corridor:** constrains operations and alignment – rail overbridge creates a height restriction, there is an alignment constraint when road goes over the rail and through the Whareratas (Raupunga Bluffs) where the highway retreats from the river and is constrained by the adjacent rail.
- **Whareratas:** Flushing in this section of highway is driven by inadequate drainage.

- **Land use access:** more intensive use of previously marginal land, such as for forestry, means there is an increasing demand for access points and intersection configurations that could not have been anticipated nor easily accommodated with current layouts. Such as the poor alignment at Maraetaha (RS461/RS474) where there is poor sight visibility with local road and a current intention to harvest logs.
- **Visible pavement distress:** pavement distress is noticeably different between the contract areas. Even to an uninitiated member of the public the differences are noticeable. Issues start at the southern boundary (RS751) – regardless of contractor input there is a distinct change in geology and climate from a dry/brown to a green zone e.g. Dannevirke always green and wet and lush – pavement harder to maintain.

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:

- **Mohaka bridge** is a unique steel design structure approaching end of life and needs consideration about how manage replacement and disruption to the customer. There is a concern about risk and an awareness that high cost and impact if lost, particularly the period between loss and reinstatement of service. Basic supply to the community such as Supermarkets in Napier is easily disrupted – now much more reliant upon service from Auckland, rather than from Palmerston North, due to Manawatu Gorge effects.
- **Pressure to maintain safe and reliable access across the island** – i.e. to and from Napier and Hawkes Bay and the future of the Manawatu Gorge. Topographically and geometrically challenging sections and uncertainty or unreliability about access via Manawatu Gorge requires heightened attention by businesses to transport logistics and limits opportunities for efficiencies/financial impost.
- **Surface skid resistance** – consider extended use of high friction surfacings such as GMA, especially Napier to Wairoa, and Wairoa to Gisborne.
- **How best to retrofit the Manawatu gorge:** There is a similar challenge across the national network, such as Rimutakas and Brynderwyns. Options could include parallels to elevated structures such as through Auckland or Arthur's Pass.
- **Layer instability and flushing** – these areas have had interim treatments and are now approaching end of life and will likely require rehabilitation across the multiple sites. Previous pavement recycling was cost effective and has created a good uniform base in preparation for next layer. There is likely to be an increase in the quantities of rehabilitation due.
- **Successful delivery of forward works programme** and how managed requires consideration because it is large and has not been achieved. The scale of programme will be a challenge to resource and will have implications on route reliability for users.

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 determining 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	\$14,965	\$16,209	\$24,268
	Renewals	\$19,001	\$28,037	\$26,441
	Improvements	\$12,250	\$30,000	\$0
Reliability and Efficiency	Maintenance and Operations	\$5,642	\$6,176	\$9,243
	Renewals	\$441	\$407	\$711
	Improvements	\$49,164	\$19,100	\$58,000
Safety	Maintenance and Operations	\$14,833	\$16,311	\$24,562
	Renewals	\$2,770	\$3,272	\$4,701
	Improvements	\$35,605	\$8,000	\$0
People, places and Environment	Maintenance and Operations	\$3,525	\$3,817	\$5,737
	Renewals	\$99	\$110	\$166
	Improvements	\$0	\$0	\$0
Total		\$158,297	\$131,440	\$153,827

Figure 26 – Corridor investment

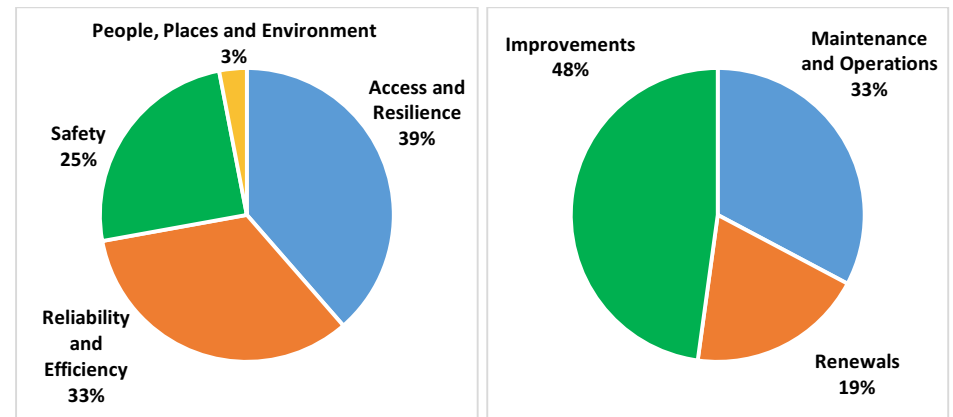


Table 2 - Summary investment by work category (\$000)

Outcome	Work Category	2018-2021	2021-2024	2024-2028
Access and Resilience	111 Sealed Pavement Maintenance	\$3,975	\$4,391	\$6,491
	112 Unsealed Roads	\$331	\$312	\$468
	113 Drainage Maintenance	\$1,474	\$1,375	\$2,081
	114 Structures Maintenance	\$2,411	\$2,570	\$3,874
	121 Environmental Maintenance	\$2,346	\$2,543	\$3,816
	122 Traffic Services Maintenance	\$110	\$167	\$251
	124 Cycle Path Maintenance	\$89	\$97	\$145
	151 Network & Asset Management	\$3,394	\$3,817	\$5,733
	161 Property	\$835	\$938	\$1,408
	211 Unsealed Road Metalling	\$388	\$411	\$618
	212 Sealed Road Resurfacing (excl. surface skid resistance)	\$10,275	\$19,257	\$13,455
	213 Drainage Renewals	\$429	\$484	\$727
	214 Pavement Rehabilitation	\$5,134	\$5,130	\$7,471
	215 Structures Component Replacements	\$2,708	\$2,659	\$4,025
	222 Traffic Services Renewals	\$68	\$96	\$144
321 - 341 Improvements	\$12,250	\$30,000	\$0	
Reliability and Efficiency	121 Environmental Maintenance	\$1,401	\$1,516	\$2,281
	123 Operational Traffic Management	\$3,068	\$3,374	\$5,058
	151 Network & Asset Management	\$1,021	\$1,116	\$1,648
	161 Property	\$153	\$170	\$256
	222 Traffic Services Renewals	\$441	\$407	\$711
	321 - 341 Improvements	\$49,164	\$19,100	\$58,000

Outcome	Work Category	2018-2021	2021-2024	2024-2028
Safety	111 Sealed Pavement Maintenance	\$4,212	\$4,628	\$6,846
	112 Unsealed Roads	\$330	\$311	\$467
	113 Drainage Maintenance	\$342	\$351	\$528
	114 Structures Maintenance	\$765	\$908	\$1,447
	121 Environmental Maintenance	\$227	\$290	\$436
	122 Traffic Services Maintenance	\$5,434	\$5,931	\$8,992
	124 Cycle Path Maintenance	\$10	\$13	\$19
	151 Network & Asset Management	\$3,155	\$3,469	\$5,210
	161 Property	\$358	\$411	\$617
	212 Surface Skid Resistance	\$1,874	\$2,087	\$3,135
	214 Pavement Rehabilitation	\$29	\$206	\$90
	215 Structures Component Replacements	\$340	\$389	\$590
	222 Traffic Services Renewals	\$527	\$590	\$886
	321 - 341 Improvements	\$35,605	\$8,000	\$0
	People, places and Environment	111 Sealed Pavement Maintenance	\$356	\$386
121 Environmental Maintenance		\$2,718	\$2,925	\$4,397
151 Network & Asset Management		\$362	\$406	\$609
161 Property		\$89	\$100	\$150
221 Environmental Renewals		\$99	\$110	\$166
321 - 341 Improvements	\$0	\$0	\$0	
	Total	\$158,297	\$131,440	\$153,827

To be confirmed through the RLTP

Investing in access and resilience

Operations and maintenance

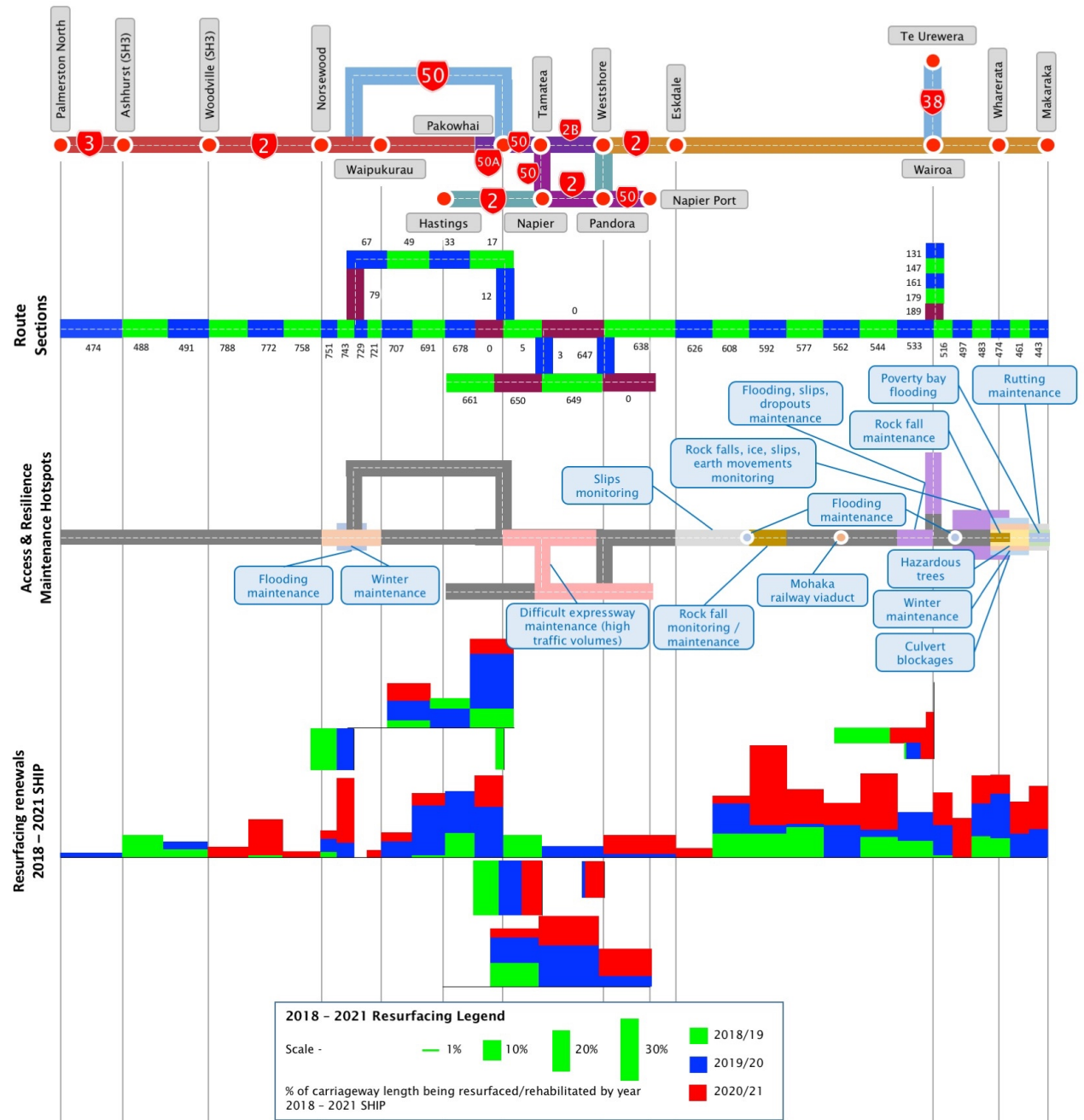
The main areas of investment to provide and preserve access and resilience are drainage maintenance, sealed road surfacing and structural component replacements and vegetation control. A key focus is to realign the base preservation quantities toward increased preventative maintenance and to slow pavement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

Maintenance hot spots

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

- **Manawatu gorge:** when it is open the Manawatu Gorge requires a high level of maintenance and operations to maintain accessibility for public use and for day to day maintenance.
- **Morere Descent SH2/497:** Geotechnically unstable and mobile.
- **Whareratas SH2/474-497:** Ice and winter maintenance, slip chasing and drop outs, particularly the Raupunga Bluffs
- **Flooding at Whakaki SH2/516:** Flooding of and from swamplands at Whakaki through to Nuhaka.
- **SH38:** Flooding along length, slips, drop outs SH38/131-179.
- **Flooding and slips SH2/533** south of Wairoa, SH2/608 north of Tangoio and SH2/638 through Bay View, Napier.
- **Waikere/Putorino Gorge:** Continuous rockfall, SH2/592. The community has called for investigation into a new alternative inland alignment.
- **Flooding at Lake Tutira SH2/592:** The lake has no natural outlet so has flooding issues during extreme rainfall.
- **Flooding SH2:** Southern end of SH50 and SH2/729-743
- **Winter maintenance issues:** Waipukurau and Norsewood through to the SH2 intersection at southern end SH50, SH2/743, also Waikare Gorge and Whareratas.

Figure 27 – 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.

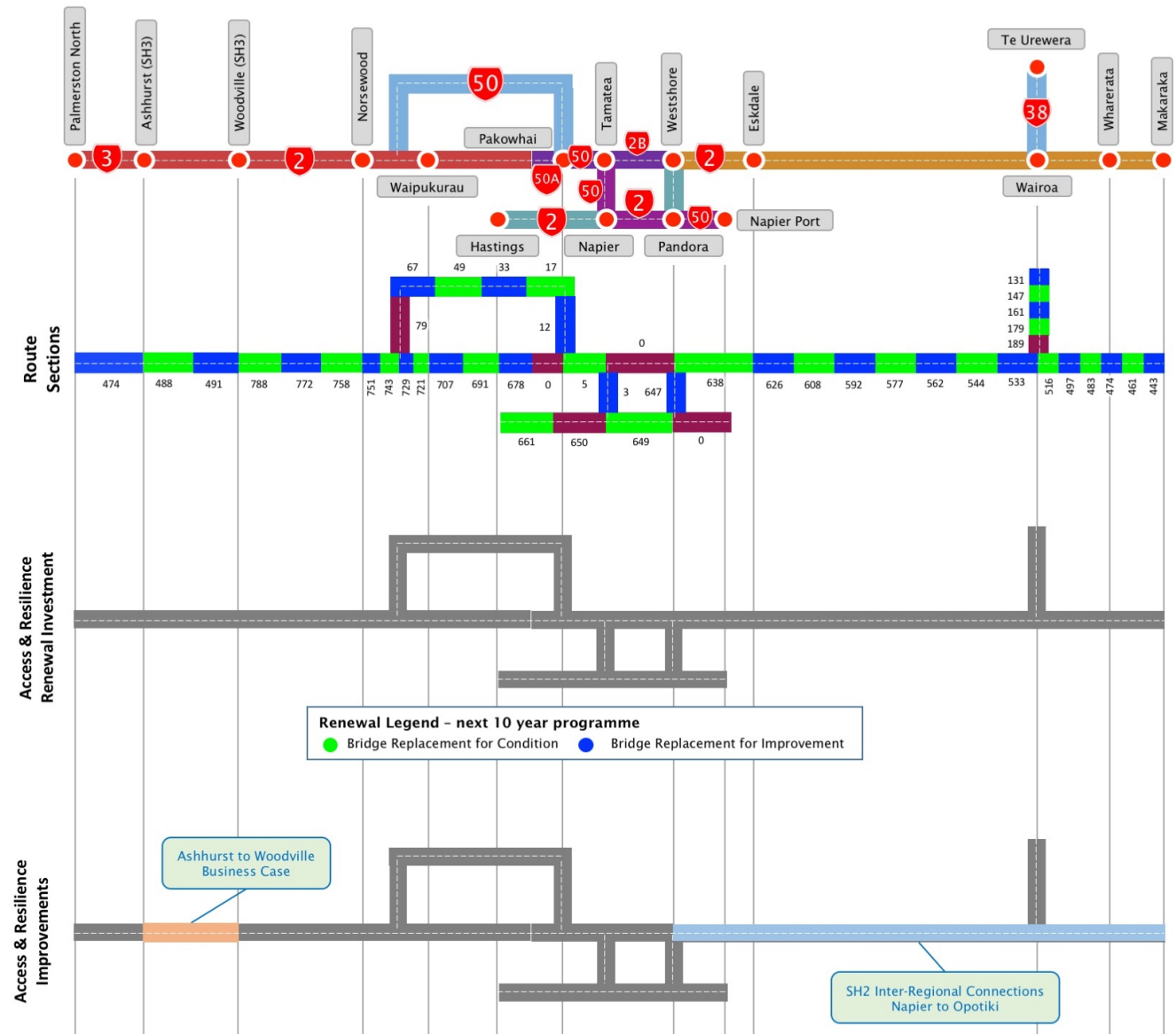
Significant investment in resurfacing is planned for sections: Sh2 between Gisborne and Wairoa, 38/161 around Omahanui, 2/592 north of Lake Tutira, and 50/17 west of Flaxmere.

Rehabilitation/reseal programme built – failed to smooth specimen programme so likely to jump from 17km reseals this year to a scheduled 90km. There is a question whether the contractor can even achieve the pre-seal repairs for a 90km programme let alone achieve programme. There is a risk that could have an impact on public, efficiency and access. The contractor has struggled to deliver the 17km programme for this year let alone the much larger programme due on network over next three years.

Structure renewal

The renewal investment infographic shows the planned bridge replacements along the corridor. No bridges are planned for replacement due to asset condition.

Figure 28 – Access and resilience investment



Renewals

There are no access and resilience related renewals planned for the corridor.



Napier expressway

Improvements

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
REDS: SH2 Inter-Regional Connections Napier to Opotiki		REDS: Identified the need to upgrade SH2 from the Bay of Plenty through Tairāwhiti to Hawkes Bay regions for freight and tourism growth
Ashhurst to Woodville Business Case		This activity will investigate investment in SH3 and alternative routes to the Gorge to maintain efficient and safe travel when the Gorge is closed due to slips, as well as what risk reduction improvements can be undertaken for slips in the gorge.

Investing in reliability and efficiency

Operations and maintenance

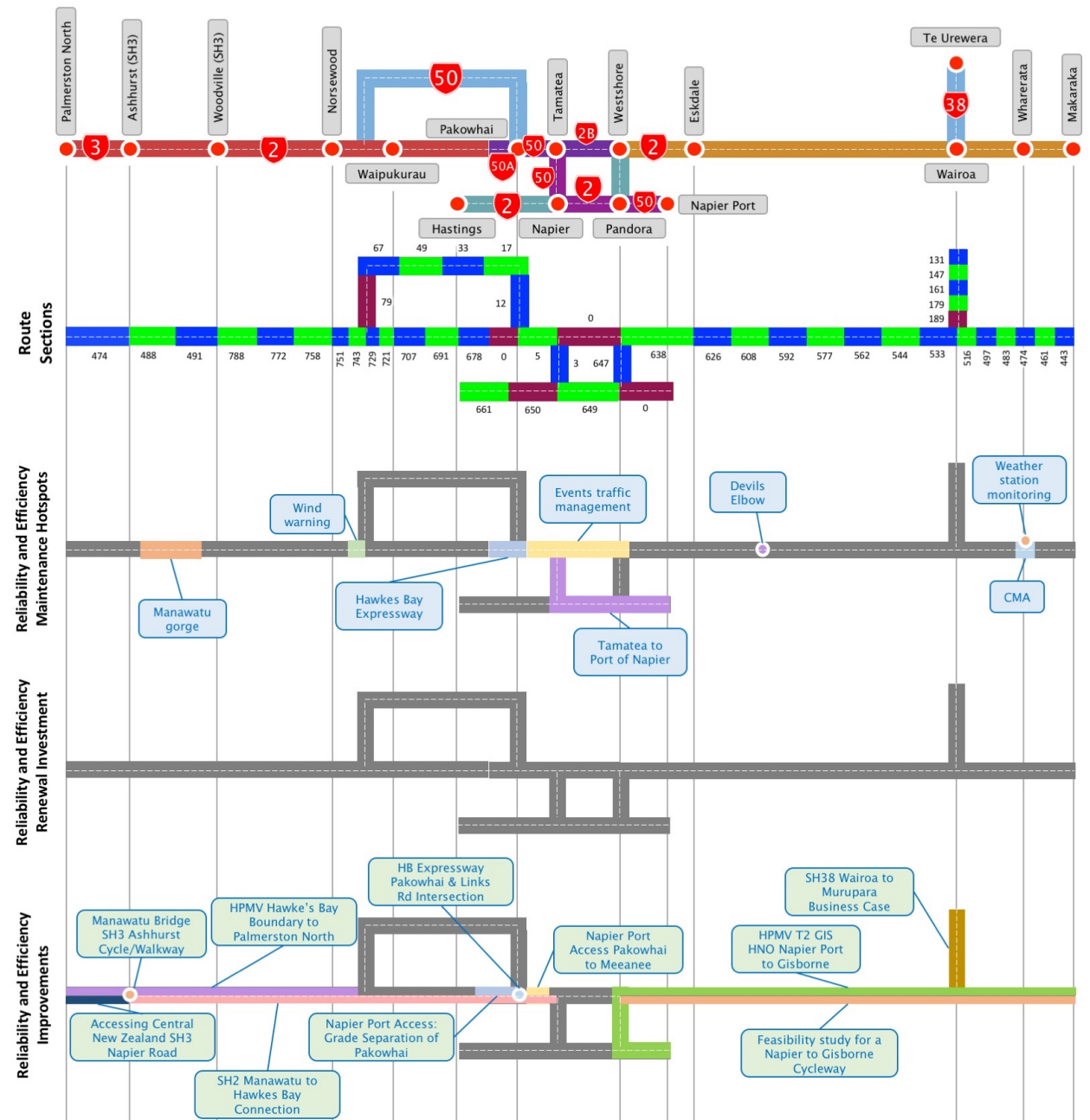
The main areas of investment to provide and preserve reliability and efficiency are environmental maintenance through keeping potential obstructions clear of the highway, wayfinding signage, and operational traffic management.

Maintenance hot spots

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

- **Traffic management for Events** - require additional traffic management on SH network for events that attract out of region traffic such as Iron Maori; Art Deco.
- **Napier/Hawkes Bay Expressway:** the route is at capacity and is sensitive to the incidents and delays and has only limited opportunities for maintenance access.
- **Manawatu Gorge:** outside of the current extended closure, this route can be delayed by maintenance requirements. Currently the alternative Saddle Road route is severely hampered by maintenance demands and the motorists must queue for access to the route.
- **Weather station** - the inability to accurately locate weather stations and still have a signal for reception limits the efficiency of the corridor through the Gorge sections during winter and inclement periods.
- **Tamatea to Port of Napier:** Efficiency issues on that portion mean that the highway and local road are not used as intended, causing inefficiencies.
- **Devil’s Elbow SH2/608** - slips and difficulties maintaining pavement quality and friction, because of the combination of the laden trucks and tight grades and alignment trucks screwing - steep uphill, high maintenance cost.
- **Wind warnings Takapau plains:** VMS boards are used and often require trucks to park up.

Figure 29 - Reliability and efficiency investment



Renewals

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

Improvements

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 4- Draft regional programme considered for SHIP

Project	Funding Status	Description
HB Expressway Pakowhai & Links Rd Intersection		The proposal is to combine the two adjacent intersections (traffic signal and priority controlled) with a single 60 metres diameter at grade roundabout.
SH2 Manawatu to Hawkes Bay Connection		Outlines the future investment for the transport corridor between the Manawatu and Hawkes Bay.
REDS: Feasibility study for a Napier to Gisborne Cycleway		Investigation of corridor improvements that may include: minor safety, minor resilience and sealing improvements.
REDS: SH38 Wairoa to Murupara Business Case		This project is comprised of five components. The road/rail integration component is under development and no information is available. The remaining SH2/2b Watchman Road, Prebensen/Hyderabad, Ahuriri and Expressway components are form the holistic benefit cost appraisal entries. Please note the SH2/2b project is currently being delivered under and independent TIO entry.

Project	Funding Status	Description
Napier Port Access Pakowhai to Meeanee		This project is comprised of five components. The road/rail integration component is under development and no information is available. The remaining SH2/2b Watchman Road, Prebensen/Hyderabad, Ahuriri and Expressway components are form the holistic benefit cost appraisal entries. Please note the SH2/2b project is currently being delivered under and independent TIO entry.
Napier Port Access: Grade Separation of Pakowhai		This project is comprised of five components. The road/rail integration component is under development and no information is available. The remaining SH2/2b Watchman Road, Prebensen/Hyderabad, Ahuriri and Expressway components are form the holistic benefit cost appraisal entries. Please note the SH2/2b project is currently being delivered under and independent TIO entry.
HPMV T2 GIS HNO Napier Port to Gisborne		This activity ensures the Gisborne component of the journey is managed and funded with Gisborne Regional dollars.
Accessing Central New Zealand SH3 Napier Road		This activity delivers on the regional economic development action plan 'Accelerate25' by enabling efficient freight and distribution activities around the wider Manawatu region.
Manawatu Bridge SH3 Ashhurst Cycle/Walkway		Construct of a shared pathway for cyclists and pedestrians on the side of the existing bridge.
HPMV Hawke's Bay Boundary to Palmerston North Connections		Improvements to enable HPMVs to travel into and out of the Manawatu Region, including connections from Napier/Hawke's Bay to the intersection of SH3/SH54 west of Palmerston North.

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

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

- **Manawatu Hill:** This is a safety maintenance site.
- **Guardrails:** A particular challenge for operations and maintenance through this corridor is the ongoing safe operations and maintenance of the corridor through narrower sections, particularly once they have been narrowed further with the installation of roadside barriers and guardrail protection e.g. through the Whareratas guardrail is an ever-expanding asset that requires ongoing repair.

Gap programme indicators

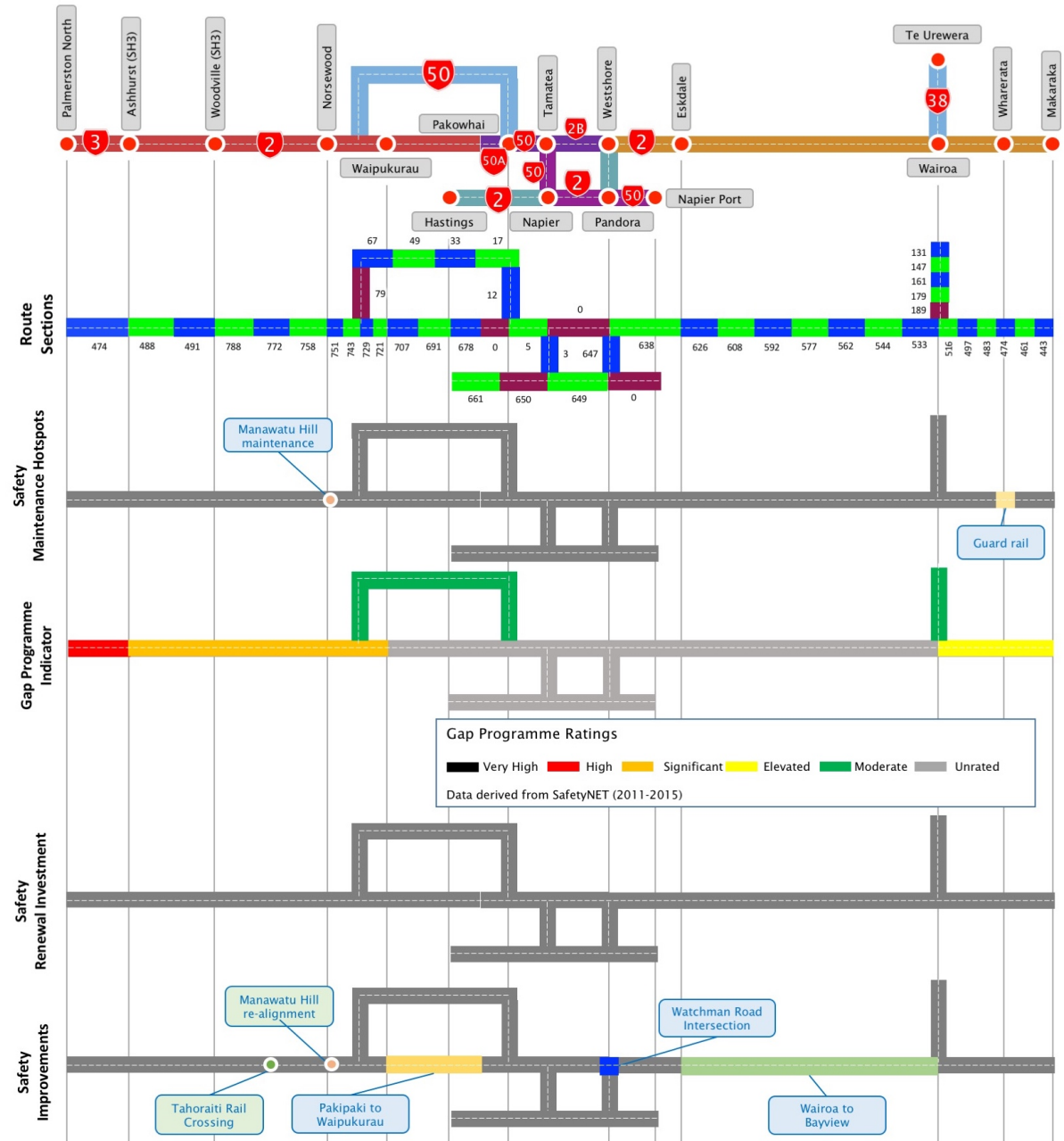
The potential for reducing fatal and serious injuries across the corridor has been assessed under the Gap programme. The Gap programme looks at the collective risk rating, likely level of intervention and the potential reduction in death and serious injury that may be achieved to determine a possible 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.

Between Palmerston North and Ashhurst, there is a high potential for reducing fatal and serious injuries through the implementation of comprehensive, high cost, improvements.

From Ashhurst to Waipukurau, SH38, SH50, and from Wairoa to Gisborne, targeted low cost, high coverage, improvements will be beneficial in reducing fatal and serious injuries.

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

Figure 30 – 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/>

SH2 – Wairoa to Bayview

Description: Treatments will include rumble strips along edge lines, wide centrelines and shoulders, improved signage and side barriers at high risk locations.

SH2 – Watchman Road Intersection

Description: A new roundabout at the intersection of SH2, SH2B and Watchman Road, near Hawkes Bay Airport. As it stands, the current intersection has a poor crash record, makes access to the airport more difficult than it needs to be, and is generally confusing for road users.

SH2 – Pakipaki to Waipukurau

Description: Status Treatments for the corridor will include wider shoulders, median barriers, additional guard rail at high risk locations, realignment and passing improvements.

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.
SH2 Tahoraiti Railway Crossing		Upgrade curves to Austroads standard. The upgrade of the Tahoraiti Rail crossing is to be delivered in co-operation with KiwiRail who also have funding approved for installation of barrier arms across the at grade rail crossing.
SH2 Manawatu Hill Realignment		Improvements to enable HPMVs to travel into and out of the Manawatu Region, including connections from Napier/Hawke's Bay to the intersection of SH3/SH54 west of Palmerston North. The scope includes upgrading the SH56 Longburn Overbridge to carry HPMVs.

Investing in people, places and environment

Operations and maintenance

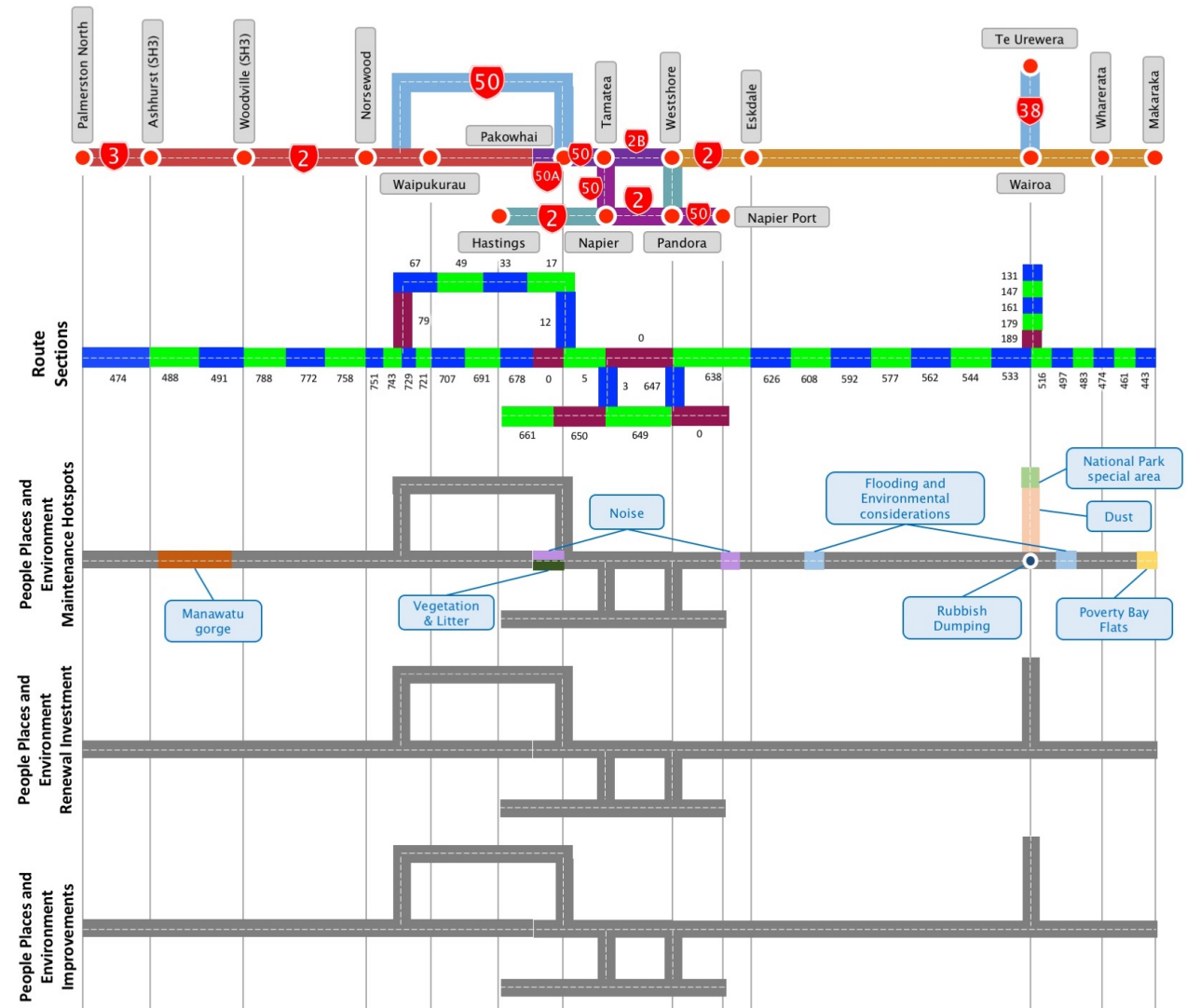
The main areas of investment into people, places and environment are: pavement rehabilitation to ensure a high proportion of travel on smooth roads, control of litter, provision of rest areas and stopping points, landscaped areas maintenance, and, environmental compliance.

Maintenance hot spots

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

- **Manawatu Gorge:** clean-up of slips requires resource consent for disposal of waste material. Currently is stored at a designated cleanfill site, which requires additional equipment and cartage.
- **Noise:** Napier Expressway (SH50A/0), choice of surface treatment and noise consideration, also Bayview SH2/638
- **Flooding and environmental considerations:** Lake Tutira SH2/608 runoff into lake, especially drain clearing; Nuhaka Swamplands, Whakaki SH2/497
- **Flooding at Poverty Bay Flats SH2/443:** Cannot raise level of pavements in the flood plain as it is the natural outlet for the substantial Poverty Bay Flats catchment and raising heights would have an unacceptable impact – it would block/impede the outlet to sea.
- **National park/special areas:** Te Urewera is a special maintenance area, SH38.
- **Dust Concerns:** SH38 is unsealed and there is a strong history of adverse feedback from customers
- **Wairoa** – dumping of rubbish is an increasing cost.
- **Hawkes Bay Expressway** – mowing, litter and vegetation to a higher standard than other rural areas. Landscaping to be maintained.

Figure 31 – People, places and environment investment



Renewals

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

Improvements

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

Investment pressures

Access and resilience

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

- **The distribution of contractor resources** along the corridor is essential to its effective access and resilience, ensuring ongoing maintenance access either side of key corridor hot spots such as Manawatu Gorge, Takapau Plains, Waikare Gorge, and Whararatas.
- **Resilience a priority:** A large amount of operations and maintenance effort on this corridor is focussed on returning the corridor to access following closure, much of which is driven by environmental activity such as rain, flooding, seismicity and extreme weather events prompting landslides, slips and land instability.
- **The Manawatu Gorge** has required significant and ongoing maintenance effort and investment. It is the least resilient of these areas and has been subject to extensive stabilisation work and lengthy closures. The current closure of more than eighteen months has again brought the viability of the route into question and this is being considered separately.
- **Napier Expressway:** is at capacity with 26,000 vehicles daily, which is reflected in increasingly limited and more costly maintenance opportunities and more complicated response to crashes. Capacity improvements are constrained by a bridge and may require a capital project solution.

Reliability and efficiency

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

- **Vehicle operating costs** are anecdotally higher along this corridor, in particular the truck operating costs between Napier and Gisborne are sufficiently high that an economic case has been mounted for the re-opening of the rail link. The ongoing closure of the Manawatu Gorge has produced greater travel time and cost for users that continue to travel the route via the available alternatives.
- **Communication is limited** through parts of the corridor and compromises the ability of travellers and businesses to make timely and accurate travel decisions. Poor cell phone connectivity compromises travellers and even the location of weather stations through the gorges.

Safety

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

- **Surface Friction Treatment:** there are many sites distributed along the corridor that require both temporary and permanent treatment for loss of control from loss of skid resistance, particularly Napier to Wairoa and to Gisborne. Bartletts and RS461 are proposed for treatment.
- **Napier to Wairoa** – has limited roadside protection, many loss of control crashes and a need for high friction surfacing such as CMA, and even interim surface gritting.
- **Pullover zones:** These have been sealed to improve access for trucks to check loads.
- **Manawatu Gorge** –Crashes are lower as been closed for some time. Run off of road crashes dominate. People treat with respect so main stream use slower speeds through here. There is growing concern about presence and safety of pedestrians and cyclists, as the parallel pedestrian walkway is also closed.
- **Dannevirke township:** Side road friction and gap acceptance opportunities lower, especially for side road traffic and pedestrians through CBD. Not currently a satisfactory solution.

People, places and environment

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

- **Bayview:** Environmental pressures on pavements through Bayview township, where short pavement life is due to water damage. Installation of a cycleway constrained drainage (area now floods). Immediate pavement issue could be tied into longer term solutions linked to change of use of the area that was peri-urban, but could now be considered a more urban environment impacting treatment decisions such as surfacing, noise and speed.

Investment future considerations

- **Manawatu Gorge:** Requires clear strategic direction or statement of expectations – currently has implications on the route choice of East Coast/HB vehicles as well as potential compromise to effectiveness of planned capital works, economic transport efficiencies, implications for resilience and treatment choices of parallel routes such as Rimutaka Hill, or investment in rail. Specific route considerations and current proven pressures during route operation include: presence and safety of pedestrians and cyclists; cleanfill and waste disposal options, compliance and consenting; high cost of maintaining pavements damaged by slips and repair; increasing cost of concrete spalling repairs on half bridges, deteriorating old structures; and contingent liability required for maintaining alternative routes.
- **Rail co-ordination and interaction:** A rail corridor parallels much of this corridor – some active rail and some mothballed because of prohibitive repair costs. The role of the integration and co-ordination of road and rail and the complementary opportunities of each needs investment consideration. Specific sites requiring immediate consideration include: the Mohaka Rail Bridge, where alignment constrains the effective operation of the corridor due to the narrowing and the pier with the live carriageway area; Tahoraiti, RS 772, an at grade crossing where crashes are occurring, when other similar crossing points have been grade separated with use of corrugate steel culvert. Other opportunities include co-ordination of structures renewal or repairs, such as the Maraetaha River where parallel bridges cross a common watercourse.
- **Raupunga Bluffs:** A 300-400m section of SH2/461, at the end of the Whararatas, is constrained between the Maraetaha River and the rail corridor. The river has cut away papa rock moving closer to the highway and continuing to wash and undercut the previous highway retreat to the extent that the guardrail clearance has been lost; further retreat is constrained by the close (approx. 20m) proximity of the rail.
- **Napier City:** There is a desire to improve effective operation of the corridor around Napier City and the Port, particularly better alignment of use with route function. Prebensen Drive and Meeanee Quay are not functioning as they should. Resolution of this requires co-operation and agreement between Napier City Council and NZTA about changes in highway designation and ownership of any revoked lengths.
- **Dannevirke township:** Side road friction and gap acceptance opportunities are lower, especially for side road traffic and pedestrians through the CBD.
- **VMS:** Two VMS are planned however there is pressure to have better and more timely advice along the corridor, particularly areas of known disruption. More VMS or improved communication options are needed.
- **Weather station:** Challenge is to locate these so that they can both, provide an accurate picture of conditions, but also actually transmit. In the Gorge areas weather stations would aid decision making about proactive and preventative treatments (CMA or melter aggregate) as well as inform traveller advice (via VMS or other media).
- **Napier to Wairoa:** has a need for more roadside barriers and seal widening, need for melter slag/more enduring surface friction. Many of these safety issues are unable to be justified or implemented in isolation, so there is a need to ensure that are fully considered or included in improvement planning.
- **Stopping places:** Consideration of combining stopping places (including rest areas and look outs) with places of interest, heritage sites, local business areas and main streets, and future electric vehicle charging infrastructure. Incentives such as food and beverage or Wi-Fi connections may assist in increasing use of these areas. Integrating stopping places for all customers that are safe and attractive while having a positive influence on the cost to maintain.
- **Passing Opportunities:** With the forecast increase in logging trucks on the corridor, consider investment in additional passing lanes to allow for efficient journeys.

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

Section	Infographic	Information Source	Date
Reliability and efficiency	Efficiency	NZTA - MapHub EfficiencyNet	2016
	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 compiled 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	



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