

Raglan to Hamilton to Coromandel

CORRIDOR MANAGEMENT PLAN

1B 23 25 25A 26 31 39

2018-2028



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Executive summary

The Raglan to Hamilton to Coromandel corridor comprises numerous segments of the secondary state highway network in the Waikato Region. West of Hamilton, the corridor comprises SH23, between Raglan and Frankton, SH31 from Kawhia to Tihiroa and SH39 which travels from Te Rapa through to Otorohanga. To the east of Hamilton, this corridor includes SH1B, linking Taupiri to Hautapu (SH1B is also known as the Gordonton Road and is due to be revoked in 2020); SH26, from Hillcrest to Thames via Morrinsville and Paeroa; and the State Highway network around the Coromandel comprising SH25 from Mangatarata to Waihi via Whitianga, and SH25A between Kopu and Hikuai. The East Coast main trunk rail line operates a freight service between Hamilton and Tauranga, and runs adjacent to SH26 near Morrinsville. A spur rail line links Hamilton to Cambridge. This corridor provides for key journeys to the east and west of Hamilton that link into the primary state highway network (SH1, SH2 and SH3). However, they do not form a strong connection from end to end.

The corridor is approximately 548 km long (4.8% of the state highway network). The total value of assets along the corridor is \$735M (3.2% of the total national asset value).

The state highways along this corridor are either Primary Collector or Arterial routes. As such, investment and maintenance along this corridor will be ‘fit for purpose’ and may not offer the same level of service as higher order roads.

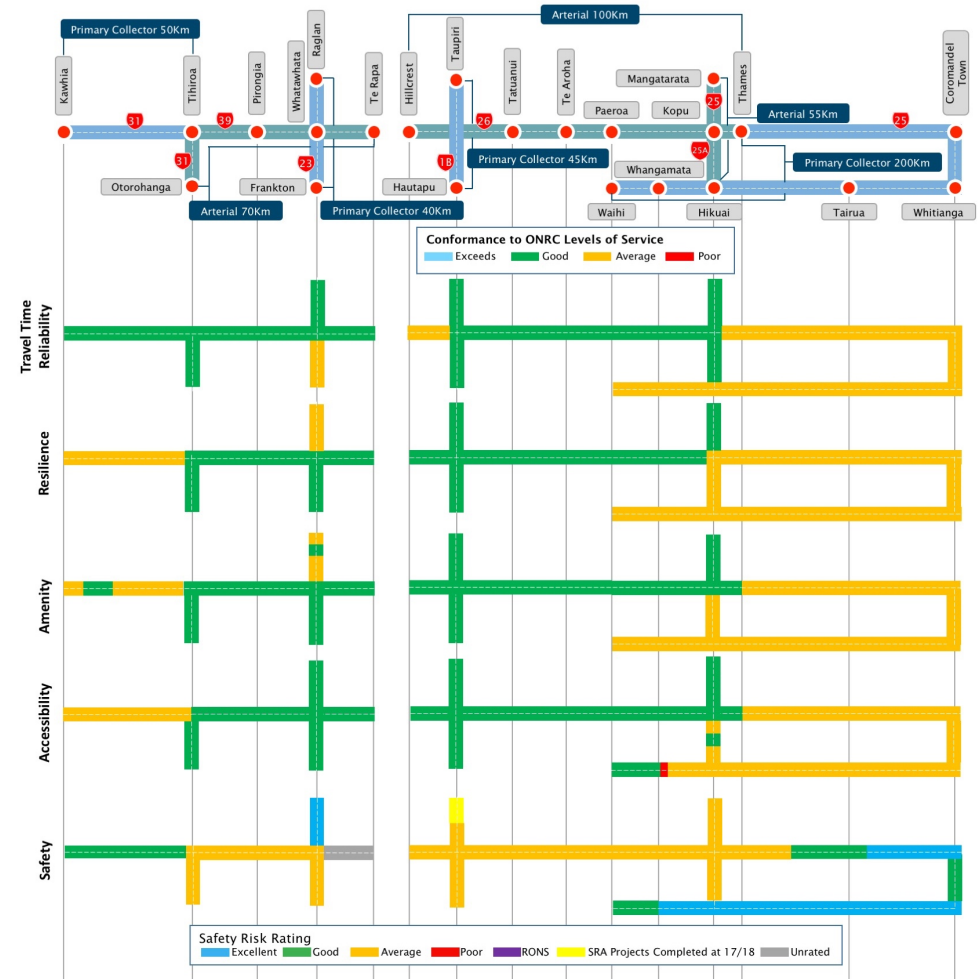
Customers using the corridor include domestic and international tourists accessing east and west coast beaches; freight servicing agriculture and industry; and commuters in the outer suburbs of Hamilton. Tourism and dairy are New Zealand’s highest earning exports, and this corridor provides access for both types of journeys, as well as links to and from the Golden Triangle, the higher classification state highways that link Auckland, Hamilton and Tauranga.

This corridor provides access to high value natural and coastal landscapes, and the beaches of the Coromandel Peninsula and Raglan attract international and local visitors. The Waikato region is one of the most productive agricultural regions in New Zealand. Dairy plays a prominent role, with 25% of New Zealand’s milk supply originating in the region.

The main issues and constraints on this corridor relate to Resilience, Reliability, Safety and Amenity. Some sections of the corridor are lifeline routes, with few alternative options if roads are closed and are regularly closed as a result of erosion, flooding and slips. The east coast of the Coromandel Peninsula has high travel time variability due to the influx of tourists over the Summer period. This results in significant traffic congestion through these townships, and in the vicinity of two single lane bridges during these peak periods. The remoteness of some parts of this corridor can also exacerbate the severity of injuries, given the long emergency response times.

Many sections of the corridor offer access to high value natural and coastal landscapes. However, journeys through the hilly and winding sections of the corridor are uncomfortable in parts, with tight bends, steep drops without barriers and constrained cross sections.

Figure 1 - Performance of the corridor against ONRC outcomes



Future investment on this corridor needs to ensure access and resilience is maintained in support of the many rural communities along the corridor particularly those in the more remote sections. Future investment also needs to support continual improvement in the safety performance of the corridor, including consideration of visiting driver enhancements.

Introduction

Purpose

What is the corridor management plan?

This Corridor Management Plan describes the customer service delivery story for the Raglan to Hamilton to Coromandel 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.

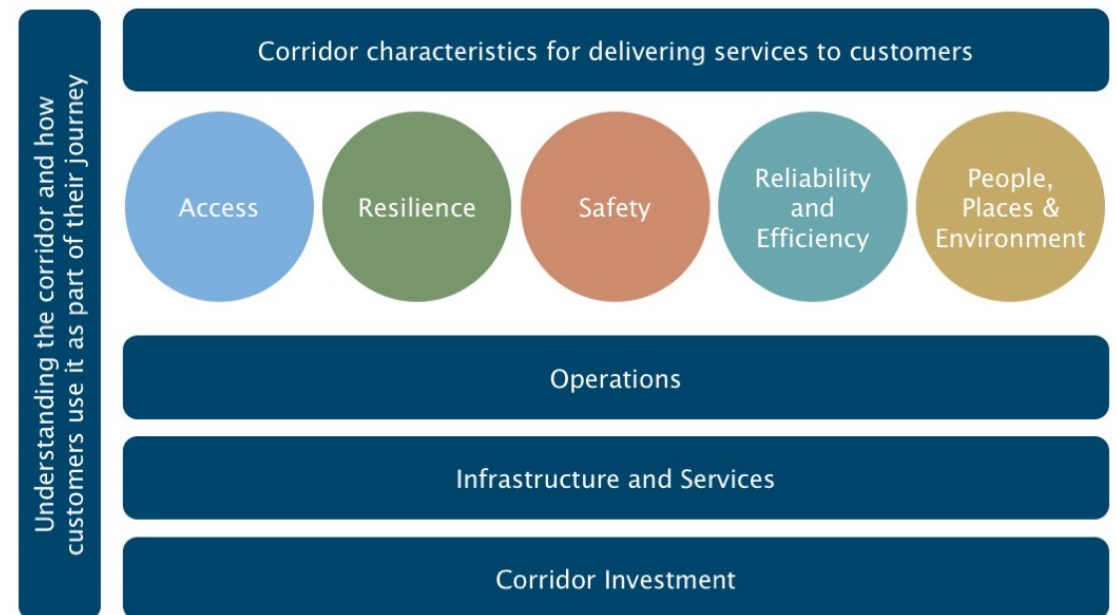
Planning is currently undertaken at the regional level, but typically significant journeys traverse more than one region. By considering the significant customer journeys and destinations, the corridor management plan is a vehicle to engage in regional and inter-regional conversations by focusing on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

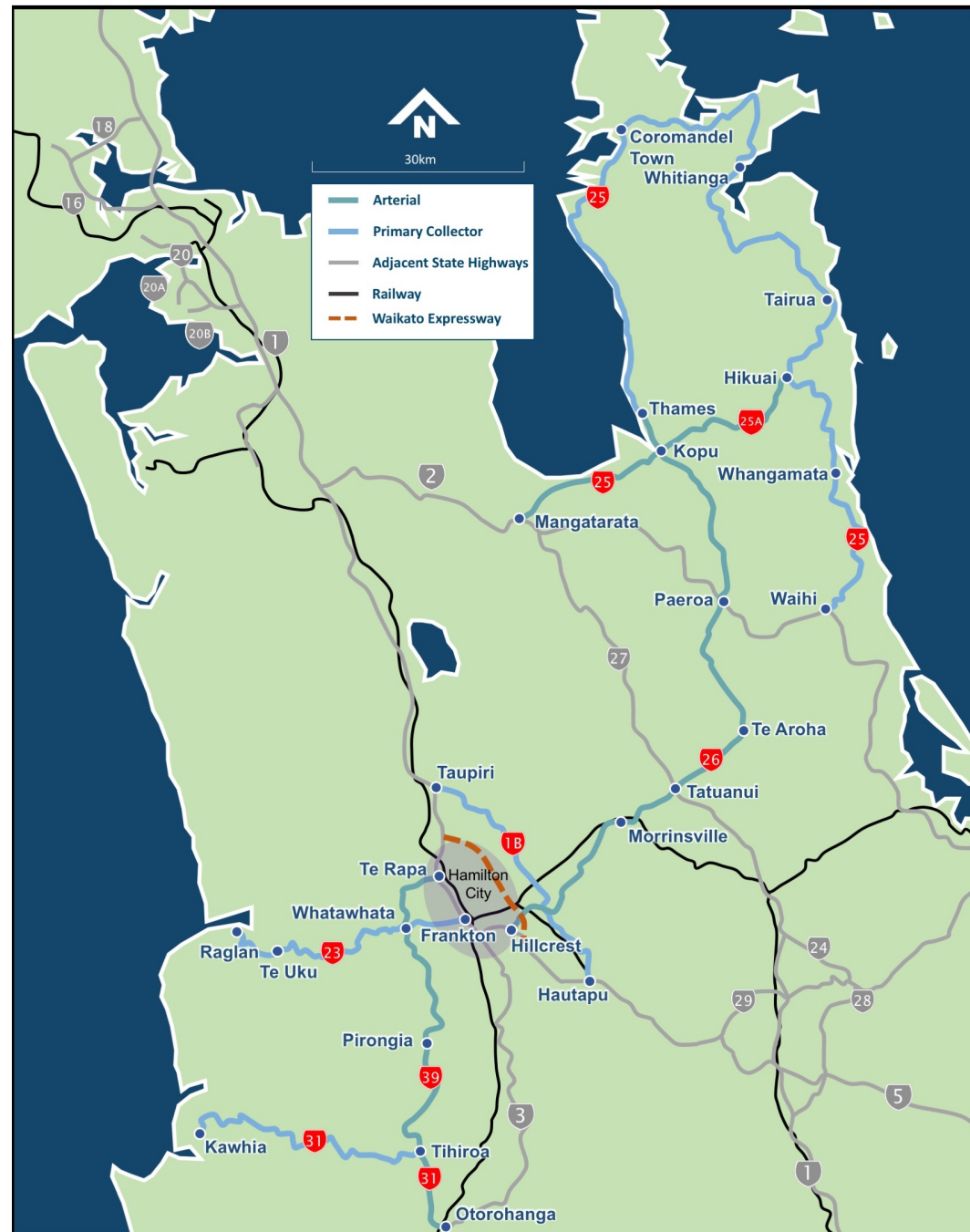
This corridor management plan covers numerous segments of the secondary state highway network in the Waikato Region. This corridor provides for key journeys to the east and west of Hamilton that link into the primary state highway network (SH1, SH2 and SH3). However, they do not form a strong connection from end to end. West of Hamilton, the corridor comprises SH23, between Raglan and Frankton, SH31 from Kawhia to Tihiroa and SH39 which travels between Te Rapa through to Otorohanga. To the east of Hamilton, this corridor includes SH1B, linking Taupiri to Hautapu (SH1B is also known as the Gordonton Road and is due to be revoked in 2020); SH26, from Hillcrest to Thames via Morrinsville and Paeroa; and the State Highway network through the Coromandel comprising SH25 from Mangatarata to Waihi via Whitianga, and SH25A between Kopu and Hikuai. The East Coast main trunk rail line operates a freight service between Hamilton and Tauranga, and runs adjacent to SH26 near Morrinsville. A spur rail line links Hamilton to Cambridge.

The regional economy

The Waikato Region has nearly 450,000 residents (9.6% of New Zealand's population), 9.3% of national employment and generates 9.0% of New Zealand's Gross Domestic Product (GDP). Hamilton City is the hub of the region, and is the fourth largest city in New Zealand, with a population of 156,800. Tourism and dairy are New Zealand's highest earning exports, and this corridor provides access for both types of journeys, as well as links to and from the Golden Triangle.

This corridor provides access to high value natural and coastal landscapes, and the beaches of the Coromandel Peninsula and Raglan attract international and local visitors. The Waikato region is one of the most productive agricultural regions in New Zealand. Dairy plays a prominent role, with 25% of New Zealand's milk supply originating in the region. Dairy contributes 5.1% of Waikato's total employment (compared to the national average of 1.7%), however in some districts the dairy industry provides up to 15% of employment. Forestry, aggregates and minerals play an important role for the regional economy, and 75% of New Zealand's geothermal energy comes from the Waikato region.

Figure 3 – Corridor overview



Understanding our customers

Key customers

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

Daily commuter

Commuters living in the outer suburbs and townships of Hamilton may use parts of this corridor to access key services, employment and education in Hamilton City. Hamilton has a comprehensive bus network, however public transport use for journeys to work is low. Hamilton has the lowest rate of travel by active modes (walking and cycling) compared to the six largest cities in New Zealand.

Whitianga, Morrinsville and Thames function as regional service towns and provide services and facilities to the surrounding rural areas.

Insights into daily commuter users:

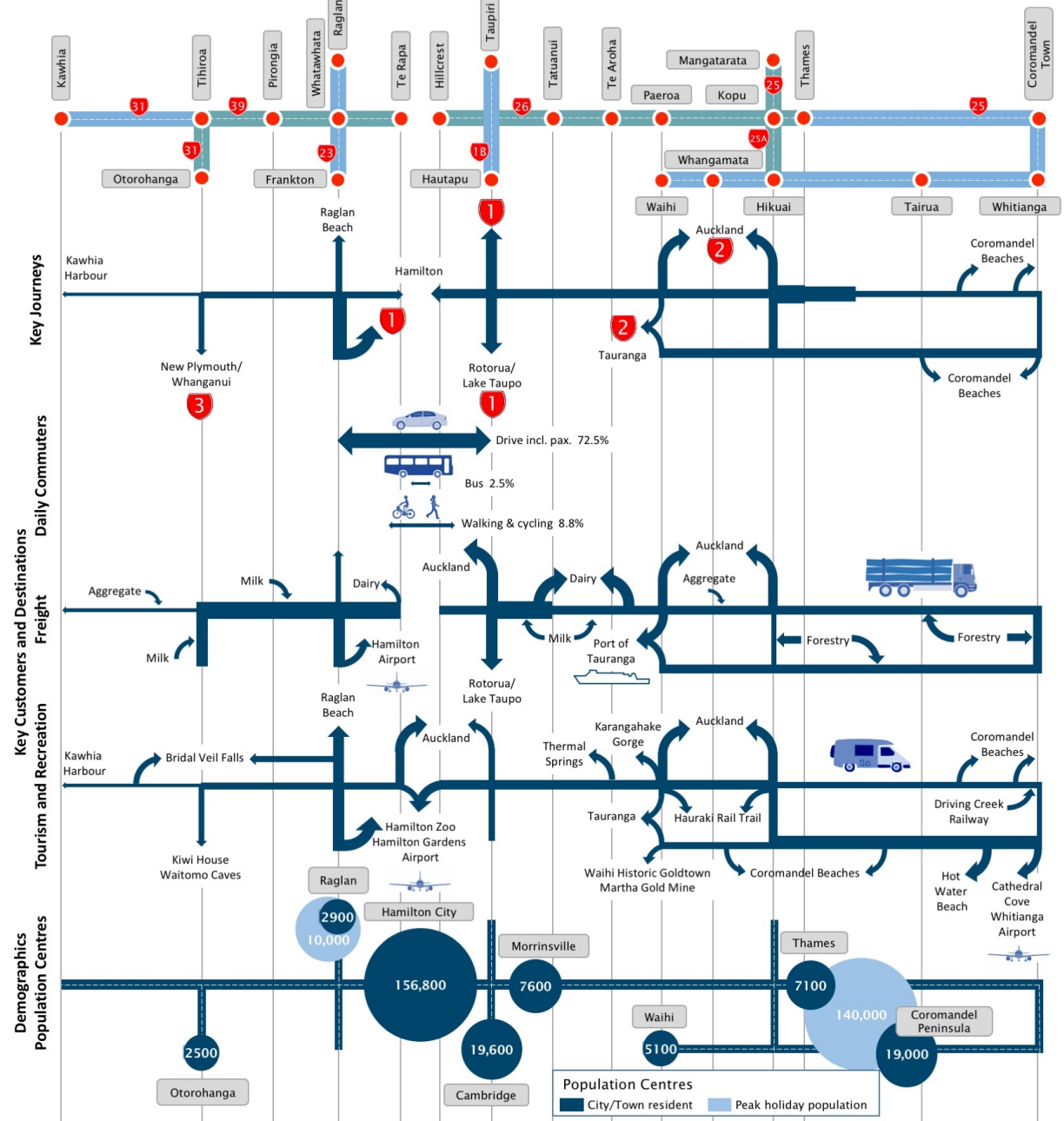
Road use: The suburbs of Hamilton included within this corridor (Frankton, Te Rapa and Hillcrest) are located on the urban fringe. As noted above, public transport use is low and use of private motor vehicles is high.

Road knowledge: Commuters are familiar with their route, and viable alternatives to avoid congestion. Journey times are relatively predictable and consistent.

Pain points: Traffic volumes on the urban section of SH23 at Frankton and through Thames are relatively high. Delays at the Dinsdale roundabout and at the intersection of SH23 and SH1 at Frankton are common during peak times.

Daily commuters expect: Predictable journeys at peak times, accurate and up to date information about traffic (peak and off peak), weather, and road conditions and hazards.

Figure 4 - Key customers, journeys, and destinations



Tourist and recreational users

Tourism contributed \$1.88 billion to the Waikato economy in 2014 which was 8.4% of New Zealand's total tourism spend. Key attractions include the beaches and forests of the Coromandel Peninsula, Raglan Beach, the Hauraki Rail Trail and the historic gold town at Waihi. SH25 and SH39 are used by tourists travelling on promoted routes including the Pacific Coast and Thermal Explorer Highways. Numerous events including Whangamata Beach Hop, Battle of the Streets, and food and heritage festivals attract high numbers of local visitors.

Insights into tourist and recreational users are as follows:

Road use: The population of Coromandel Peninsula townships and Raglan swell over the summer, as well as shoulder periods and weekends. This results in substantial congestion in towns including Tairua, Whitianga and Whangamata, which generally experience few or no delays in off-peak periods. International visitors may have tight holiday schedules and underestimate journey times between key destinations. These factors can increase risk taking and exposure to fatigue. Motorcyclists are drawn to the Coromandel Peninsula and Raglan, as the routes are challenging and offer scenic views and rest stops.

Road knowledge: Many international tourists have not experienced New Zealand roads or conditions. Some tourists are driving unfamiliar vehicles such as campervans and motorhomes, and may be inexperienced driving on the left. Travel times are often underestimated, particularly on the Coromandel where roads are narrow and winding. There are only a handful of passing lanes on the corridor. Lack of safe overtaking opportunities can lead to risk taking. Domestic tourists are generally more familiar with the road environment, however may be impatient or time constrained during peak travel times.

Pain points: High traffic volumes on the Coromandel Peninsula in peak times can add significant delays to journeys. This is exacerbated by two one-lane bridges located on SH25, where traffic management is used on Pepe Bridge and Graham's Bridge at Tairua to manage traffic flows at peak times.

Tourist and recreational users expect: Ease of travelling around the country, straightforward connections between modes, well signposted directions to key attractions and landmarks, easy access to information, and places to stop for breaks and take photos when undertaking regional journeys. Mobile phone reception aids tourists to access information and advise others of delays or changes to their schedule.

"The population of Coromandel townships swells in summer, putting strain on the road network"

Freight operator

The Waikato region is strategically important for freight, with much of the area contained within the Golden Triangle. The region provides key links between Hamilton, Tauranga and Auckland. A total of 25% of New Zealand's land freight movement starts, ends or travels through the Waikato region. The corridor provides key feeder routes for the transportation of key commodities and resources to the primary state highway network (SH1, SH2 and SH3). There is a high concentration of dairy farms and two dairy processing factories on SH26. Established forestry areas are located on the Coromandel Peninsula and around Kawhia resulting in logging trucks on SH25 and SH31 connecting to the Port of Tauranga. Only small sections of the corridor near Hamilton are rated for HPMV vehicles.

"Freight vehicles are required to bypass the town of Whangamata, but the detour route has a low level of service"

Insights into freight operators are as follows:

Road use: Freight journeys generally begin or end on the corridor, providing links between dairy, aggregates and forestry production, and to manufacturing and export destinations. Journeys therefore tend to be shorter on these routes than freight travelling on long haul national routes. SH39 is a liquid petroleum gas (LPG) route that bypasses central Hamilton.

Road knowledge: Knowledge of road conditions is high, verging on technical. Operators have confidence in managing difficult conditions, and may be willing to take calculated risks to meet deadlines.

Pain points: The alignment of SH25, particularly north of Thames is very narrow, reducing to 4.8 metres in some locations. The Criterion Bridge at Paeroa is also narrow and two heavy vehicles are unable to pass on the bridge. Heavy vehicles are required to use the state highway detour at Whangamata, however the bypass deviation offers a lower level of service than the adjacent through corridor. It features tight bends and a single lane timber bridge, and is out of context to other parts of the corridor. Resilience of SH23, SH25, SH25A and SH39 is poor, with few if any viable alternatives in the event of a road closure. Growth of heavy vehicles on SH39 has been substantial and they now comprise 20% of all vehicles on this part of the corridor.

Freight operators expect: Infrastructure that supports commercial activity – alternative routes that reliably and safely cater for heavy vehicles, with consistent width and visibility; convenient places for trucks to stop and drivers to rest; and passing lanes for overtaking. Operators also expect information about road conditions that provides as much planning time as possible, and enables considered decision-making and confidence that the advice is enabling business to operate 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 the Transport Agency work with other network providers to provide a one network approach.

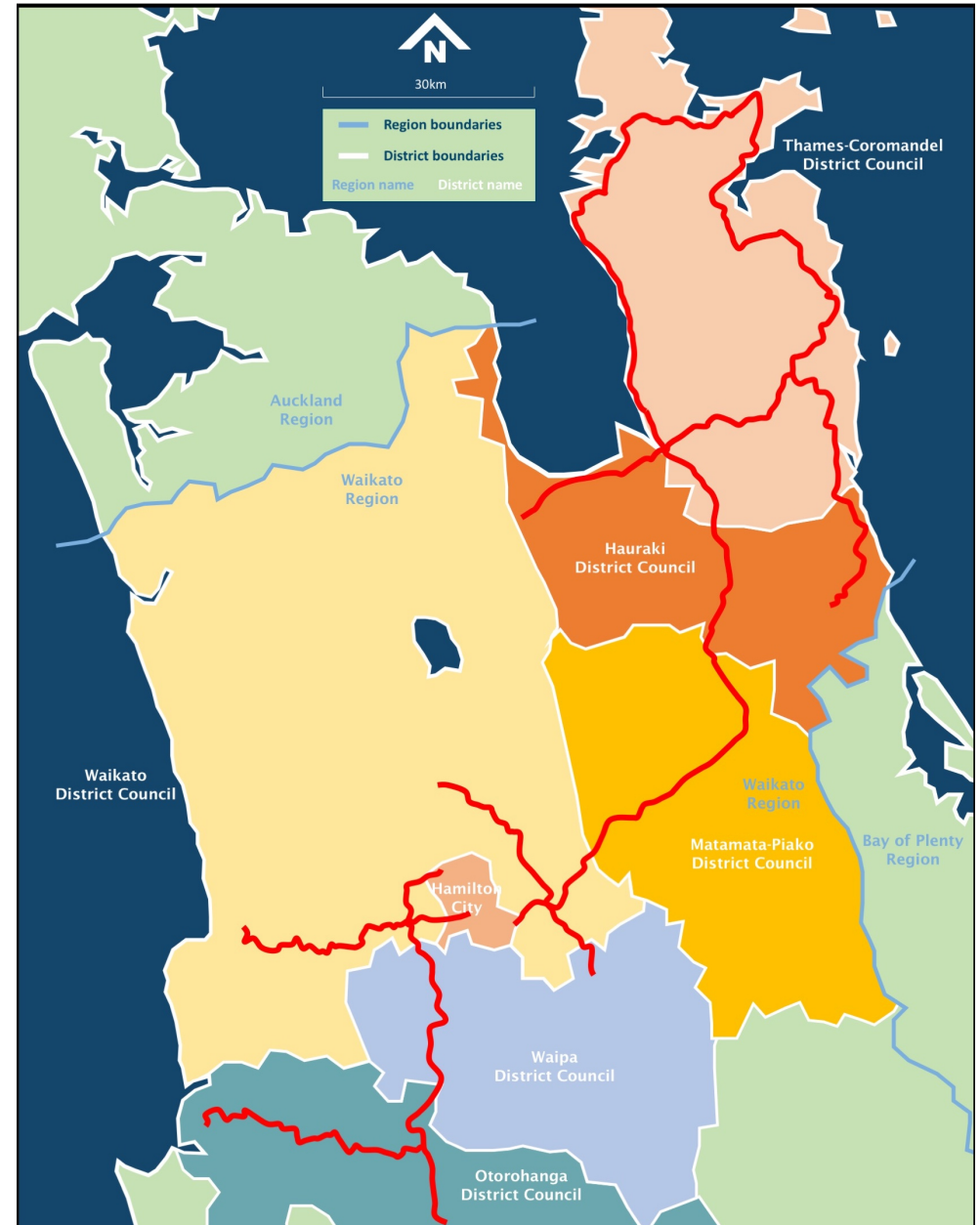
The NZ Transport Agency works closely with the TLAs and regional councils along the corridor shown in Figure 5

Collaboration along the corridor

The NZ Transport Agency are collaborating with the Motorcycle Safety Advisory Council, ACC, Thames-Coromandel and Hauraki district councils, Waikato Regional Council, NZ Police and motorcycling user groups to deliver the Coromandel Motorcycle Demonstration Project.

The Transport Agency has also established a Safe Roads Alliance to deliver road safety improvements on SH1B and SH23. These programmes of work on SH1B and SH23 form part of the government's Safer Roads and Roadsides programme.

Figure 5 - Map of associated local authorities



Network Outcomes Contracts approach

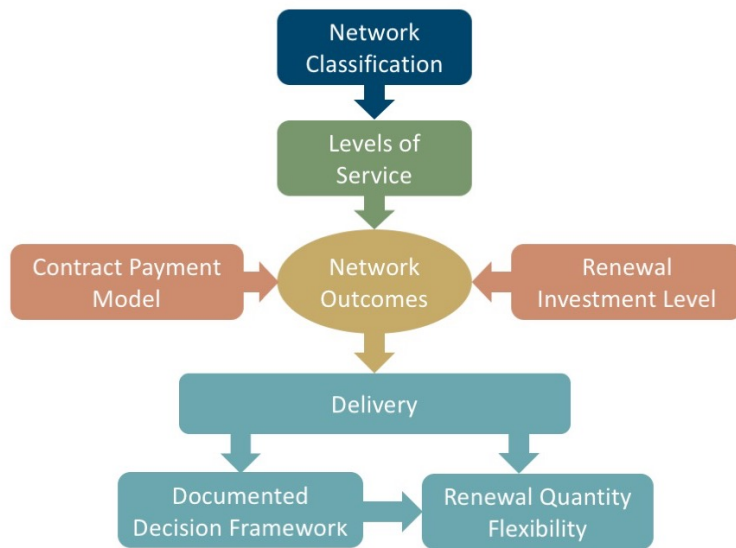
Network Outcome Contracts (NOC) are aimed at improving the effectiveness of service delivery for maintenance and operations of the state highway network. Elements of previous procurement methodologies (PSMC, Hybrid and Traditional models) have been integrated into the NOC contract model which delivers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

To support this a central Governance and Management Group represents the interests of the Maintenance and Operations teams in the delivery of the NOCs. This group resolves issues, looks at opportunities for improvement, recommends changes to the national 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, bridge and other structures management and repairs.

The contract process for the VOC is shown below:

Figure 6 - NOC process



Collaborative delivery of services

The Raglan to Coromandel corridor crosses over three NOC contract areas, as discussed below. The professional services contract for regional bridges and structures across the Waikato and Bay of Plenty regions was awarded to Beca in October 2015 for a three-year period, with the option to extend for a further two years based on performance. Beca also delivers professional services for traffic monitoring across the two regions. This contract was awarded on 1 November 2016, with a contract term of five years (2+1+1+1).

West Waikato North Network Outcomes Contract

The West Waikato North Network Outcomes Contract is delivered by Fulton Hogan. The area (in relation to this corridor) encompasses SH23, SH39 north of Whatawhata, SH1B and SH26 to Motumaoho. The contract commenced 1 July 2015 for a five-year period.

This contract is supported by the following specialist maintenance contracts:

- **Traffic signal maintenance region:** There is one pedestrian operated signal in the West Waikato North NOC that overlaps with this corridor; a pedestrian operated signal at Frankton on SH23. The operation and maintenance of this signal is managed by Hamilton City Council.
- **Regional bridge and structures:** Bridge structures are inspected by Beca every two years. Routine maintenance of bridges, including drain clearing and deck pavement is undertaken as part of the NOC contract.

West Waikato South Network Outcomes Contract

The West Waikato South Network Outcomes Contract is delivered by Broadspectrum. The area (in relation to this corridor) encompasses SH29 south of Whatawhata and SH31. The contract commenced in December 2014 for a six-year term.

This contract is supported by the following specialist maintenance contracts:

- **Traffic signal maintenance region:** There are no traffic signals in this NOC area.
- **Regional bridge and structures:** Bridge structures are inspected by Beca every two years. Routine maintenance of bridges, including drain clearing and deck pavement is undertaken as part of the NOC contract.

East Waikato Network Outcomes Contract

The West Waikato South Network Outcomes Contract is delivered by Broadspectrum. The area (in relation to this corridor) encompasses SH26 east of Motumaoho, SH25 and SH25A. The contract commenced in May 2015 for a term of seven years, with the option to extend for a further two years based on performance.

This contract is supported by the following specialist maintenance contracts:

- **Traffic signal maintenance region:** There are no traffic signals in this NOC area.
- **Regional bridge and structures:** Bridge structures are inspected by Beca every two years. Routine maintenance of bridges, including drain clearing and deck pavement is undertaken as part of the NOC contract.



Drivers for change

The Raglan to Hamilton to Coromandel 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.

Hamilton urban growth and development

Initially an agricultural service centre, Hamilton is now the third fastest growing urban areas in New Zealand. Over the next 30 years, the City's population is projected to grow by almost 40%. As the urban footprint of the City grows, there will be increasing pressure on these secondary state highways near Hamilton to provide for increasing numbers of commuter journeys.

Hamilton is fast becoming a freight hub and inland port destination, given its location between Auckland and Tauranga. The completion of the Waikato Expressway in 2020 will augment Hamilton's role in New Zealand's freight task.

The development of an inland port and logistics centre is proposed for Ruakura, located on the outskirts of Hamilton City. The 365-hectare commercial zone will provide a purpose-built distribution centre that is central to the ports of Auckland and Tauranga. Direct rail and road connections are planned, including a dedicated interchange onto the Waikato Expressway. The inland port is expected to offer cost advantages compared with Auckland and Tauranga, and result in increased economic activity and higher freight movements in and around Hamilton. Increasing freight rail journeys between Hamilton and Tauranga may put pressure on the safety and level of service of the rail level crossing at Morrinsville on SH26.

Development of adjoining corridors

Hamilton forms part of the Golden Triangle, providing strategic links to Auckland and Tauranga. The corridor covered within this Corridor Management Plan interacts with the Auckland to Wellington journey, as described below. The corridor also bisects the Auckland to Tauranga journey at Paeroa. Growth and investment on these state highways will result in changes to the function and/or operation of the state highways that makes up the Raglan to Coromandel corridor.

Auckland to Wellington

SH1 forms the key transport spine on the North Island. It provides the most direct road link between Auckland, New Zealand's largest city, and Wellington, the nation's capital. The highway currently travels through residential and commercial areas within Hamilton City. Once complete, the Waikato Expressway will form part of SH1, and will completely bypass Hamilton City.

Many of the journeys that begin and end on the sections of highway contained within this Corridor Management Plan use SH 1 to access other parts of the network.

Understanding customer levels of service on the corridor

Current levels of service performance

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

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

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

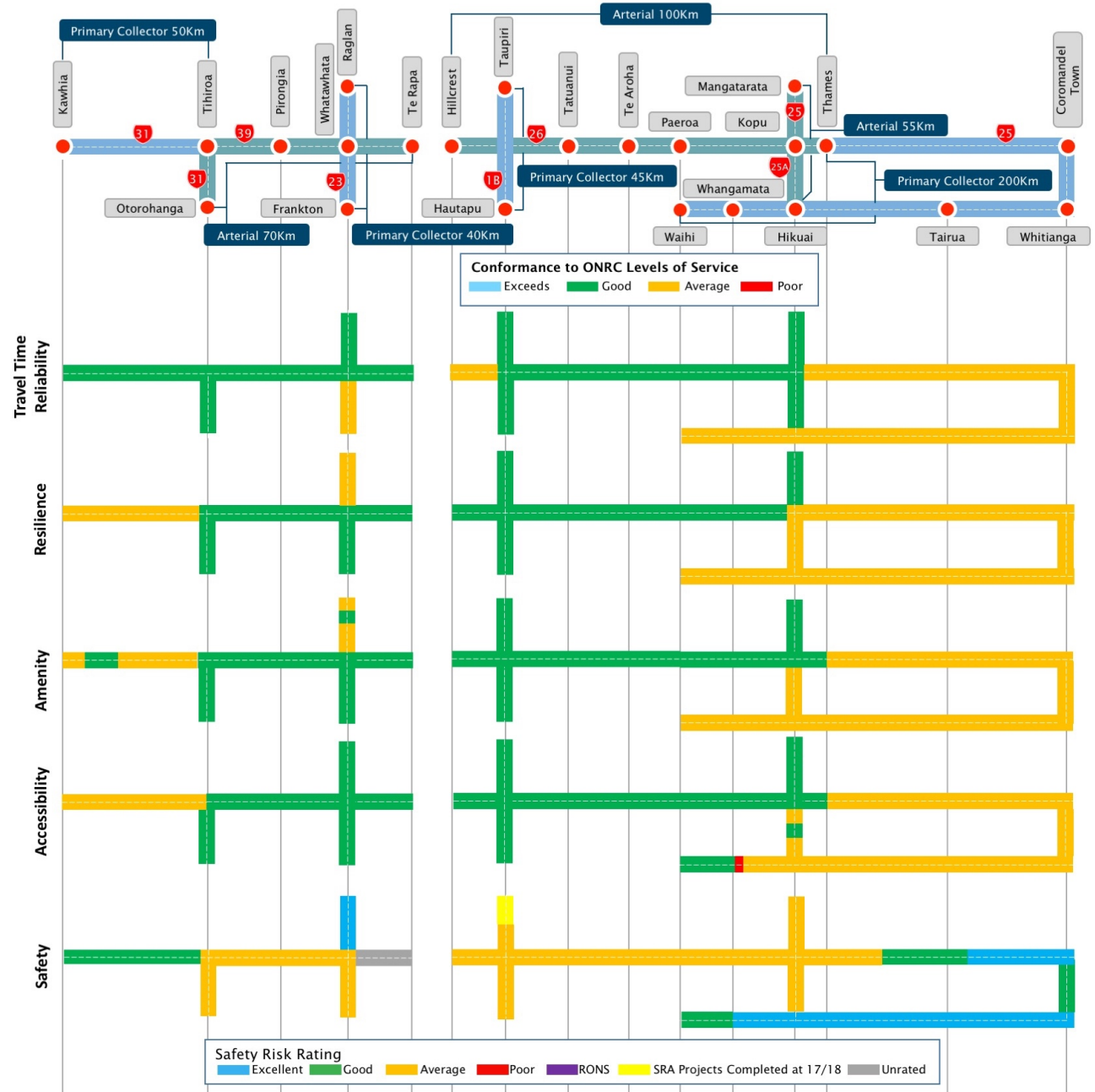
Road classification

SH23 and SH31 are classified as primary collector routes, and function as lifeline corridors to Raglan and Kawhia Harbour respectively. West of Hamilton, SH39 is an arterial highway that links Otorohanga to Te Rapa, providing a parallel route to SH3 and SH1, bypassing Hamilton.

SH1B is a primary collector route that bypasses Hamilton to the east, linking Taupiri and Hautapu. This highway will be revoked following the completion of the Waikato Expressway. From Hamilton, SH26 provides an arterial link to Kopu and serves key industries in central Waikato. From Mangatarata to Thames, SH25 functions as an arterial road. From Thames, SH25 loops around the Coromandel Peninsula through to Waihi, and is classified as a primary collector. It connects local population centres and provides a recreational route for tourists and motorcyclists. Sections of SH25 are performing poorly in terms of safety, amenity and optimal speeds.

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 6 shows how the Raglan to Hamilton to Coromandel corridor is currently performing against the ONRC Levels of Service expected for the relevant classification of each section.

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

Travel time reliability on the corridor is generally good, with little variability in travel times. Journeys in the steep and winding sections on SH31, SH25 and SH25A are slow, but these are consistent, and have negligible effect on travel time variability. Highways in the outer suburbs of Hamilton have average variability, affected by congestion during peak times. Travel times on the east coast of the Coromandel Peninsula have average travel time reliability, primarily influenced by the peak holiday congestion and delays through townships and single lane bridges. However, these delays only occur over a very short period.

Resilience

The coastal segments of the corridor have an average resilience risk. Highways to Raglan, Kawhia and the Coromandel are susceptible to erosion, slips and flooding, and alternative routes are limited should critical assets fail. Some of the primary collector routes are lifeline corridors, however lower levels of resilience are acceptable and some closures are to be expected. Low lying areas along SH39 and SH26 are susceptible to flooding in major weather events. While these highways have viable alternatives, these corridors provide important freight links for agriculture and other industries.

Amenity

While the corridor is classified as either Primary Collector or Arterial, parts of the corridor offer a lower level of service than its ONRC classification. Journeys through the hilly and winding sections of the corridor are uncomfortable and challenging to drive, with tight bends, steep drops without barriers, constrained cross sections and debris from erosion and vegetation often littered on the carriageway. Views along some sections of the Coromandel Peninsula are exceptional, with landscapes of high natural and coastal value. However, there are few stopping areas for photo opportunities and breaks, meaning customers are unable to enjoy the scenic landscapes and views, or may pull over in unsafe locations.

Accessibility

The corridor generally travels through the main street of each town, and features frequent direct access from adjacent properties, with areas of concern those located on tight bends north of Whitianga and on SH31 to Kawhia. Access for other road users is poor, with many towns having insufficient pedestrian crossing facilities. Heavy vehicles can generally navigate the corridor, however the freight bypass at Whangamata is challenging and offers a lower level of service in comparison to the parallel route through the township.

The road environment for cyclists is hazardous, with inconsistent shoulders along much of the corridor, and the high posted speed limit making the corridor threatening for vulnerable road users. Touring cyclists are drawn to the Coromandel Loop and SH23 and the Hauraki Rail Trail, which crosses SH26 in several locations. These users may need to ride on SH26 to access the services and facilities available in adjacent townships.

Safety

Large parts of the corridor fail to meet the target 3-star KiwiRAP rating for Primary Collector and Arterial State Highways. The majority of the corridor is rated 2-star, denoting major deficiencies in some road features. Parts of the corridor have constrained road geometry, inadequate sightlines, and poor provision of facilities for pedestrians and cyclists between urban areas. SH31 has a high personal safety risk, due to low volumes and challenging topography. The remoteness of the highway can also exacerbate the severity of injuries, given the long emergency response times. SH23 has a medium-high collective risk and work is being undertaken through Safe Roads to improve safety on this corridor.

Planned capital works improvements and ongoing maintenance will help address areas of deficiency, however corridor-wide improvements will be required to lift the corridor to a 3-star rating

The high-risk intersections along the corridor are in rural areas. There are small sections along the corridor with high personal and collective risk. Between Hillcrest and Tatuani, there is a high potential to reduce fatal and serious injuries through targeted medium-high cost improvements.

Improving the customer experience

In responding to Customer Levels of Service it is important to acknowledge the significant improvements on, or adjacent to the corridor. The Waikato Expressway project is under construction, and when complete will provide a four-lane highway from the Bombay Hills to south of Cambridge. The project is being delivered as part of the Roads of National Significance (RoNS) Programme and will improve safety and reliability, and reduce travel times and congestion on SH1. While the expressway is not directly located on the corridor, it will result in changes to this corridor, such as the revocation of SH1B.

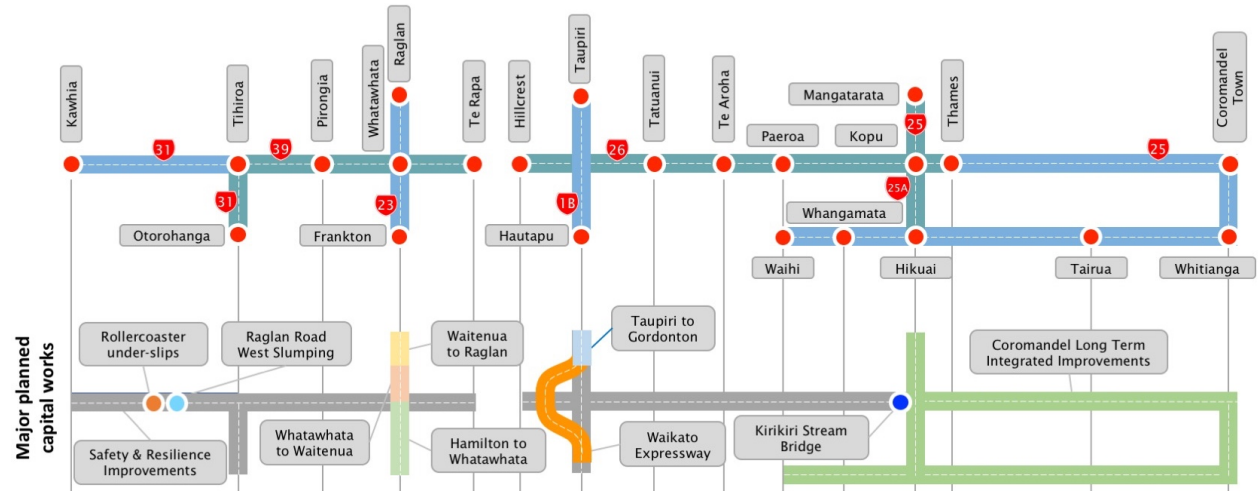
Other significant improvements include the replacement of the Kirikiri Bridge at Kopu with a higher, single span bridge that will help protect the area from severe flooding. When completed, the improvements will provide a bridge that can cater to flows from a 100-year flood. The nearby intersection of SH26 and SH25A will be upgraded at the same time, replacing the existing priority intersection with a roundabout.

The NZ Transport Agency's Safe Roads Alliance is delivering safety improvements on SH23, as the highway is considered a high risk rural road. Works include shoulder widening, side barriers, rumble strips, a wide centreline, minor intersection improvements and motorcycle specific safety interventions.

The Alliance is also undertaking safety improvements on SH1B to address the road's high crash history, and make it 'fit for purpose' prior to its revocation in 2020. Improvements include installation of side barriers, widened centrelines, intersection improvements and improved signage and road markings.

The Coromandel Motorcycle Demonstration Project is a motorcycle safety project delivering initiatives including improved edgeline delineation, trial of new perceptual road markings, improved surfacing, hazard reduction, installation of helicopter landing pads and enhanced mobile phone coverage to improve emergency response times. Work has been completed on the Southern Coromandel Loop, with some initiatives expected to be replicated on the Northern Loop.

Figure 8 - Significant corridor planned improvements



Access

Carriageway configuration

The configuration of the carriageway along the corridor is mostly consistent, comprising two opposing lanes. This is generally appropriate for the role and function of each section of the corridor. However, there are few passing lanes resulting in few safe overtaking opportunities. Near the urban outer suburbs of Hamilton, the carriageway configurations vary and include divided carriageways and four lane sections.

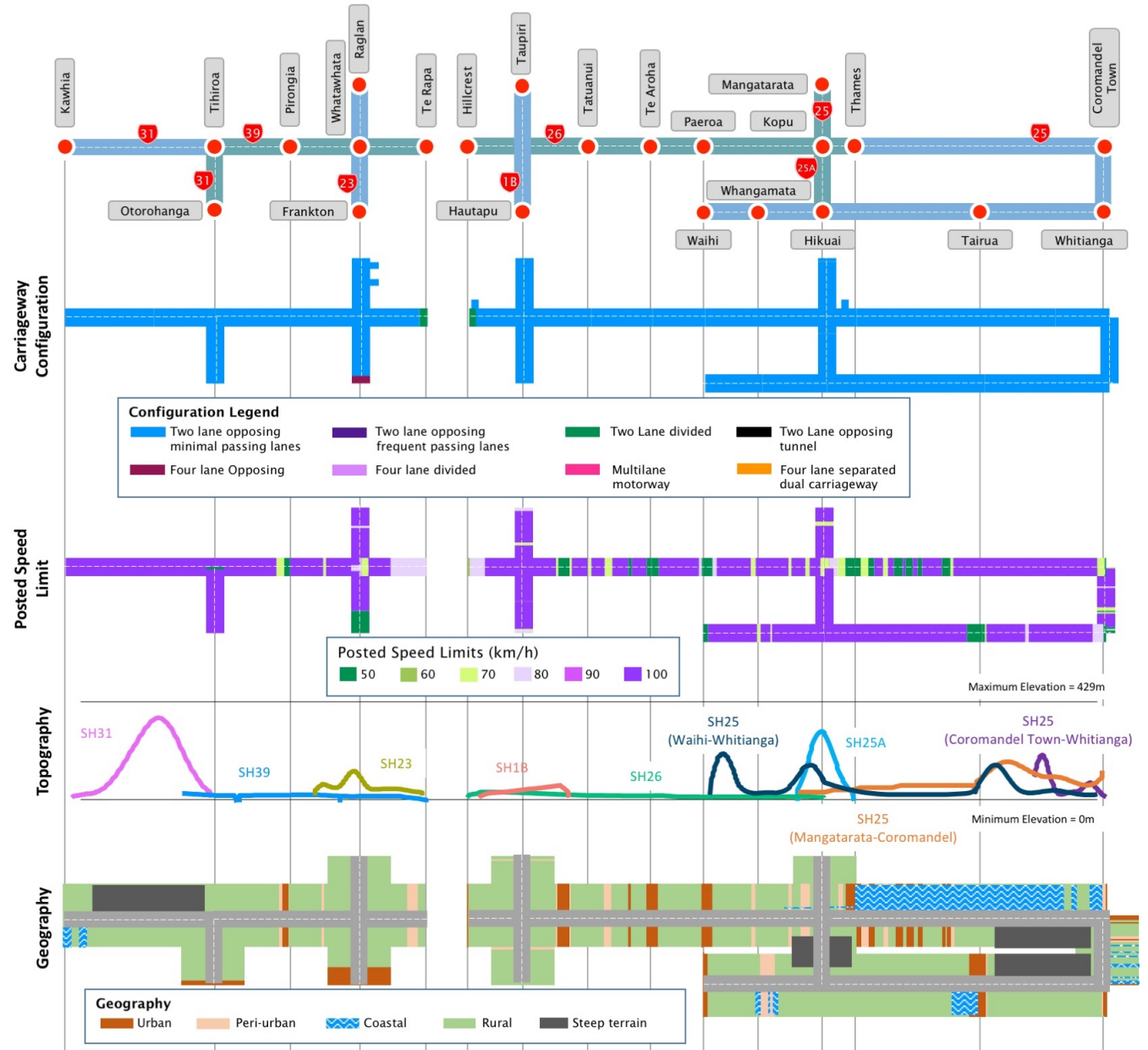
Speed limits

The generally has a 100km/h posted speed limited, except for where reductions in speed limits are required where the highway passes through urban areas and small communities. Assessment under the Speed Management Framework has identified that the 100km/h posted speed limit is not a safe nor appropriate for many sections of the corridor, particularly on lengths of SH23, SH25 and SH25A where the road is predominantly steep and/or winding.

Topography/geography

Both ends of the corridor feature significant hills that are characterised with steep and twisting alignments. Parts of SH25 (particularly between Thames and Coromandel Town) feature sections of curving coastal roads that are often constrained by steep cliffs.

Figure 9 - Corridor characteristics

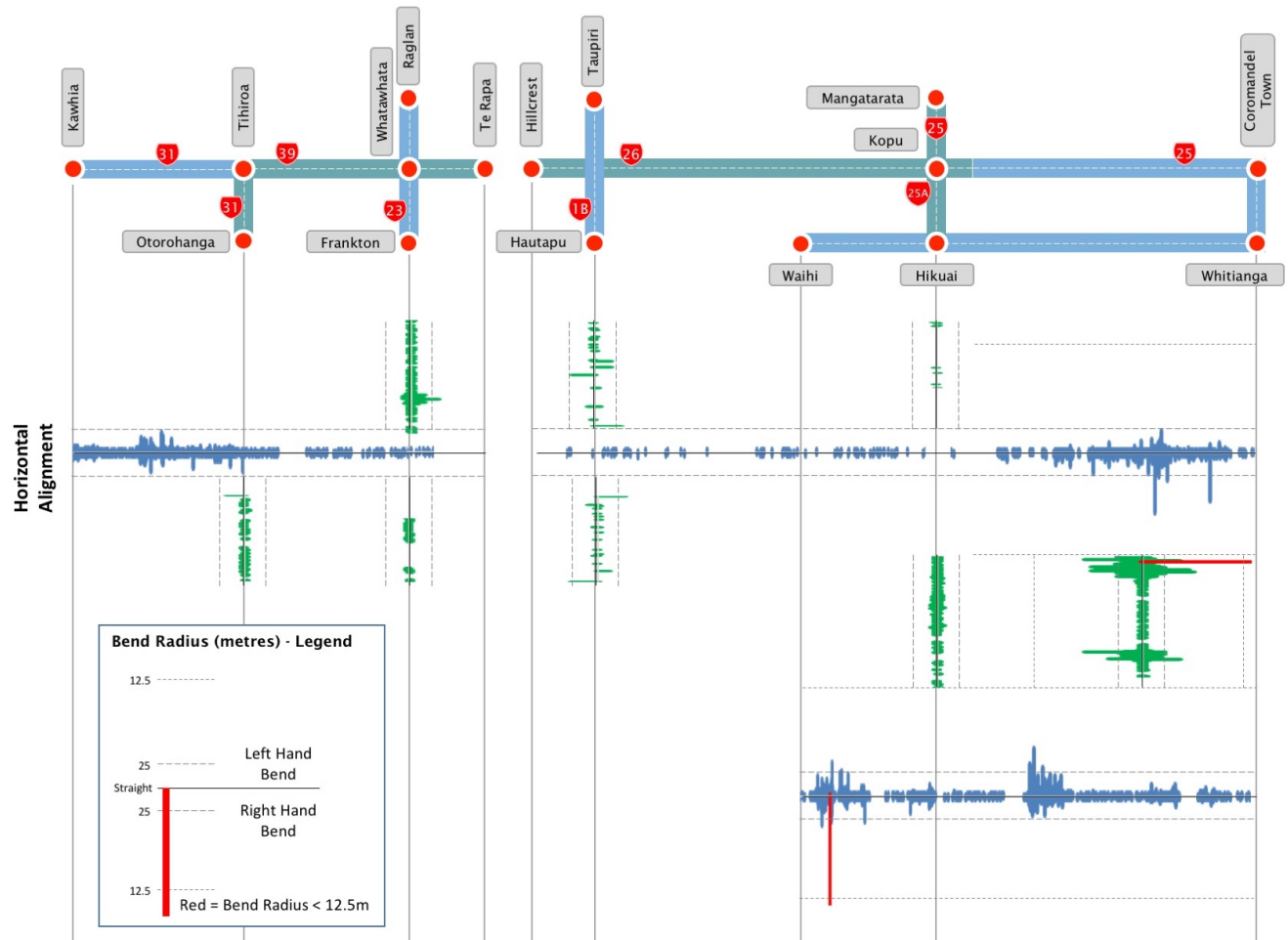


Horizontal alignment

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.

Parts of SH25 around the Coromandel Peninsula contain a number of tight curves with a radius under 25m, including two severe bends with a radius below 12.5m.

Figure 10 - Horizontal alignment



Volumes

Traffic through the outer urban areas of Hamilton and through Thames have the highest traffic volumes on this corridor. However, the data does not reflect the peak traffic volumes at key holiday destinations. Coastal town populations on the Coromandel can increase five-fold, and many experience substantial traffic congestion and delays.

HPMV routes

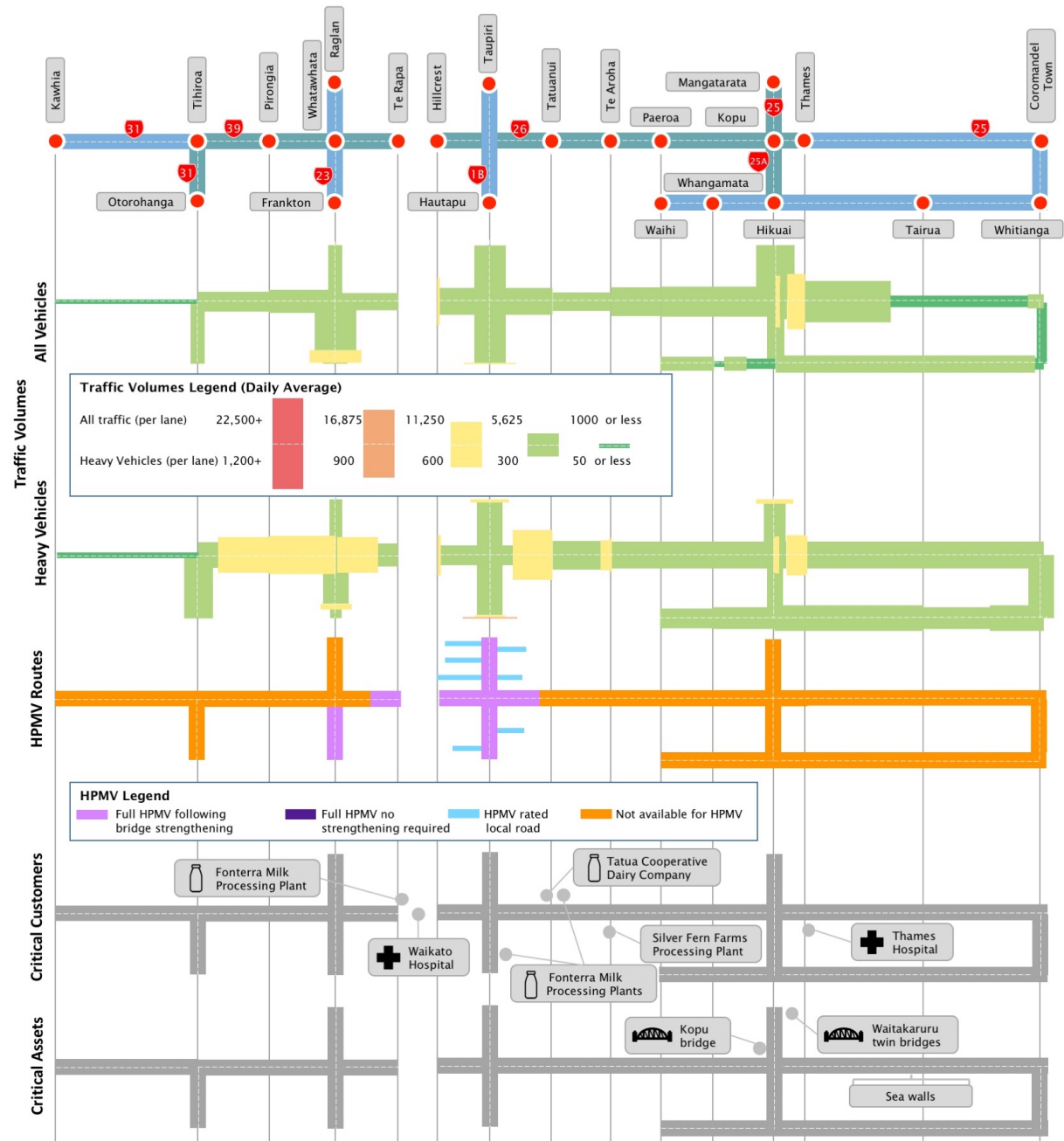
Few sections of the corridor are suitable for HPMV traffic, however it is not intended many sections become HPMV accessible and are therefore considered 'fit for purpose' in this regard. HPMV rated sections of the corridor are SH1B between Taupiri and Hautapu, SH23 between Frankton and Whatawhata, SH39 between Te Rapa and Te Kowhai, and SH26 between Riverlea and Motumaoho. However, all of these sections of the corridor require bridge strengthening to achieve full HPMV rating. Some local roads provide alternative HPMV rated routes.

Critical customers and assets

There are several critical customers adjacent or close to the corridor that rely on the corridor to be open 24/7 and are vulnerable to having short term interruptions that impact productivity. These include milk collections from dairy farms and timely access for patients to get to hospital.

There are also critical assets along the corridor that need an enhanced maintenance focus to ensure they do not fail or significantly interrupt services along the network. Bridges are important assets as they provide network connectivity. They also carry critical utility infrastructure that communities along the corridor depend on. The Kopu Bridge is critical, given the length of detour should it be closed (even though it is a new asset). The Waitakaruru twin bridges near Mangatarata are also critical assets as they feature an out of context alignment, are height constrained and are vulnerable to strikes. Seawalls on SH25 north of Thames are also critical assets with failure of vulnerable sections of this highway requiring long term road closures to reinstate the road.

Figure 11 - Corridor capacity



Pressures

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

- **Topography and landform:** Roads at both ends of this corridor are constrained by the mountainous and coastal landforms, and few alternative routes are available.
- **Few passing opportunities:** The carriageway for this corridor is predominantly two lanes, with only a handful of passing opportunities along the whole length. Some of these passing lanes are too short and customers delayed by slower vehicles may perform risky merges. Passing bays are provided on some of the winding sections of the corridor where they can be accommodated, however these are generally short, making it difficult for slow moving traffic to safely re-enter the traffic stream.
- **Utility access:** High voltage cables are in the road corridor parallel to SH23. Maintaining this section of the road requires enhanced risk and safety precautions. Access may also be required by the utility company, impacting on the function of the road corridor.

Future considerations

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

- **Status of SH39:** SH39 is a temporary state highway functioning as a Hamilton bypass used as a through route for inter-regional traffic between Auckland and Taranaki, and Auckland and National Park. It features a high proportion of heavy vehicles (up to 20%) and serves multiple purposes, however is of rural local road quality. A decision on the status of this road has not been made. Given its temporary status, accesses are managed through district plans, rather than the NZ Transport Agency as it may revert to a local road.
- **Forestry growth:** Plantations on and around SH31 are expected to mature in the next decade, resulting in increasing heavy vehicle traffic, and wear and tear on the road. Ongoing forecasts of growth in forestry on the Coromandel Peninsula have not eventuated.
- **Maintenance disruption:** The absence of alternate routes along portions of the corridor mean that minor maintenance activities (planned and unplanned) cannot be performed without some disruption to the operation of the corridor.
- **ONRC rating for SH25:** SH25 is currently classified as a 'Primary Collector' between Thames and Waihi. An 'Arterial' classification for this highway may be more appropriate for this part of the corridor, given the critical connectivity role it plays for the Coromandel Peninsula. Furthermore, the peak traffic volumes over holiday periods more closely aligns with an arterial function and classification. This corridor has similar features to SH25A, which is classified as 'Arterial'.

Resilience

The corridor provides access to some of New Zealand’s best-known sections of coastline, including Raglan surf breaks and the beaches of the Coromandel Peninsula. However, these roads are particularly vulnerable in significant weather events, and are subject to flooding, slips and rock falls. The highways to Kawhia and Raglan, and the Coromandel Loop (SH25 and SH25A) provide lifeline routes to these areas.

Vulnerabilities

Many low-lying areas are susceptible to flooding, including Whitianga, Tairua, Kawhia, Te Aroha and Whatawhata. Much of the narrow coastal corridor north of Thames is constrained by seawalls and sheer rock faces, and the road is particularly vulnerable to erosion and slips. The Coromandel Peninsula often experiences intense rain events. Sections of SH31 to Kawhia are unstable and subject to erosion and slumping.

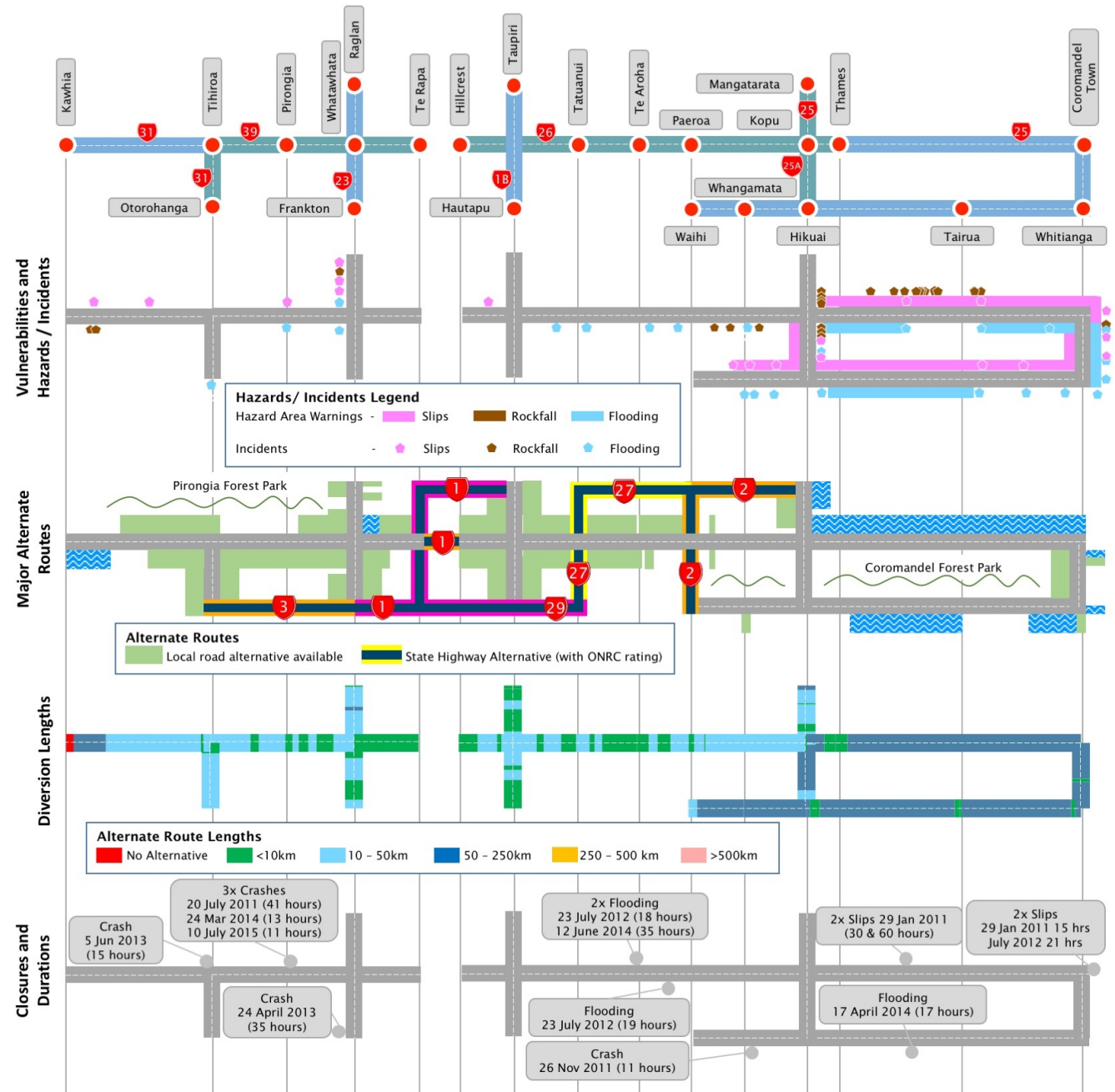
Alternative routes and diversion lengths

The corridors providing links to key recreation attractions including Raglan Beach and the northern tip of the Coromandel Peninsula have few alternative routes available. Where detours are available, these routes are often unsealed, narrow and winding, meaning they are generally unsuitable for heavy vehicles. These alternative routes are unlikely to be accessible if the corridor is closed following a weather event. The last five kilometres of SH31 to Kawhia has no alternative access routes.

Closures and duration

The corridor is subject to both full and partial unplanned closures along its length. Over the last five years there were 14 closures with a duration greater than 10 hours and 44 closures of three to ten hours. The key cause of closures on the western sections of this corridor are predominantly crashes, while widespread flooding and slips are the dominant cause of closures on the eastern highways. Major closures and their duration are shown in Figure 12.

Figure 12 – Resilience



Pressures

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

- **Slope stability:** Slope instability on SH31 and the western side of SH25 is common, with frequent rockfalls, slips and slumping affecting the corridor.
- **Tight terrain and narrow alignments:** SH25 and SH31 travel through mountainous terrain and feature sections with large drops and no shoulder. Between Thames and Coromandel township, many sections of the corridor are constrained by seawalls and steep rock faces, making it impossible to retreat the road. Coastal protection is being undertaken, however the risk of failure will remain.
- **Limited alternative routes to Raglan, Kawhia and the Coromandel Peninsula:** These sections of the corridor are susceptible to disruption following crashes and severe weather events. Communities may become isolated (or must undertake substantial detours) following major slips or flooding.
- **Tsunami risk:** The east coast of the Coromandel Peninsula is recognised as being vulnerable to tsunamis. With limited road access to these communities, evacuation of these townships, and emergency response access will be challenging.
- **Mobile phone reception:** In isolated sections of the corridor mobile phone reception is patchy in parts. It is difficult to communicate timely with road users about network conditions in the event of a disruption. In the event of an incident, response times can be long in remote areas such as SH31 and parts of SH25.
- **Weather events:** The Coromandel Peninsula is subject to intense rainfall, and can be exposed to the tail end of tropical cyclones. Low lying coastal margins, particularly near Whitianga, Tairua and Kawhia can be inundated by rainfall and king tides, blocking road access. Stop banks along parts of the corridor reduce flooding impacts on roads and property, while asphalt bunds divert water discharges from road assets.
- **Bridge washouts and scouring:** Access across bridges are crucial for the lifeline function of many of these highways. Tairua River Bridge on SH25A requires ongoing maintenance due to scouring.
- **Lifeline routes:** Weather events that close the parts of the corridor generally also impact on local road alternatives and detours (e.g. storms on the Coromandel Peninsula or flooding on SH26).

Future considerations

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

- **Response times:** Investment and planning for resilience readiness to improve response times and reduce delays. Preparing and maintaining an inventory of available resources, equipment and materials to fast track post-incident recovery works and reinstate network access (e.g. stockpiled aggregate at key sites on SH25, SH25A and SH31 to restore slips and slumping).
- **Use of technology:** The use of permanent VMS signs at key gateways along the corridor (e.g. SH25A at Kopu, SH25 at Thames, SH23 at Whatawhata and SH31 at Tihiroa) will enable delays and incidents to be communicated quicker allowing customers to make decisions about journeys.



2.5 metres of rain fell on the hills of the Coromandel Peninsula causing slips on SH25

Reliability and efficiency

Efficiency

The corridor performs as expected, with mostly free flowing traffic operations. Lower levels of service are experienced in the AM and PM peaks in the urban areas around Hamilton. Lower levels of service depicted in Figure 11 are reflective of the need to reduce speed while travelling through the challenging mountainous topography of SH23, SH25, SH25A and SH31. They do not indicate congestion and high traffic flows through these areas.

Variability

No variability data is available for the corridor. However, from knowledge of the corridor, there are significant seasonal variations in reliability and efficiency. The populations of towns on the Coromandel Peninsula (and to a lesser extent Raglan) experience five-fold growth in the summer peak, resulting in congestion and substantial travel time variability between peak and off-peak periods.

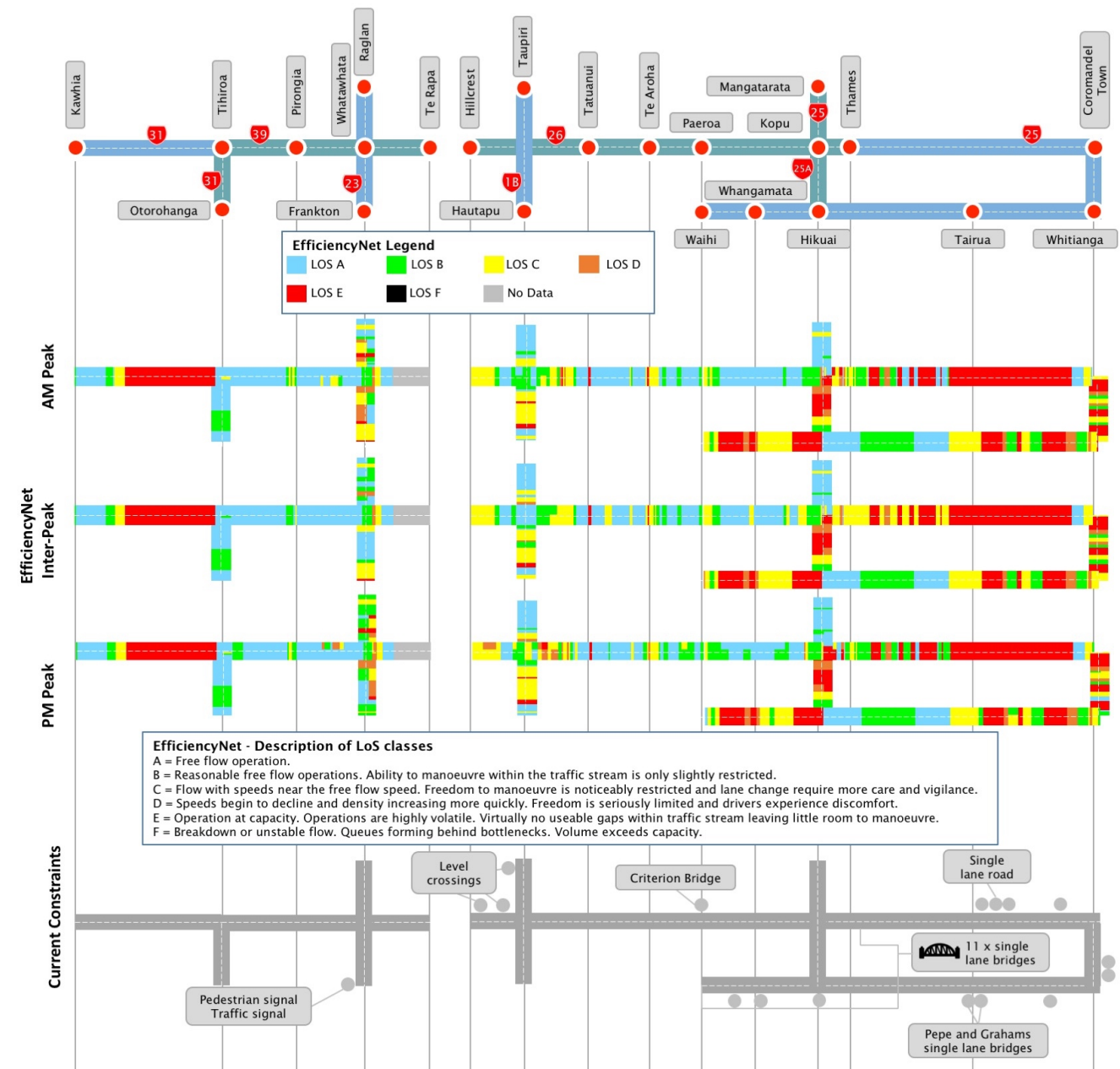
Commercial vehicle average speed

No commercial average speed data is available for this corridor. However commercial speeds are likely to be low at both ends of the corridor, given the topography and geography of the network at these locations.

Current constraints

The key constraints that impact on the reliability and efficiency of the corridor are shown in Figure 11. The constraints include numerous single lane bridges, narrow roads, railway level crossings and a pedestrian operated traffic signal.

Figure 13 - Reliability and efficiency



Pressures

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

- **Lack of data:** No data on variability or commercial speeds is available for this corridor. The sections of corridor with low levels of service reflects the topography and geography of the corridor rather than the flow of traffic. It is therefore difficult to identify where there are genuine areas of network capacity constraints. Similarly, traffic volume data is recorded during the off-peak period and does not reflect the five-fold increase in population and associated traffic in towns on the Coromandel Peninsula over the peak summer period.
- **Seasonal peaks:** Increased summer demands on the Coromandel Peninsula (and SH23 to Raglan to a lesser extent) create congestion through and between towns, particularly on the east coast of the Peninsula. This results in substantial travel time variability between peak and off-peak periods.
- **Single lane bridges:** SH25 features eleven single lane bridges. During the summer peak, two of these bridges result in significant delays. Traffic control is used at Pepe Bridge and Grahams Bridge at Tairua during peak holiday periods to provide opportunities for non-priority traffic flows. However, congestion only occurs for a very small period over the whole year and the problem is not seen as significant enough to warrant investment to date.
- **Width of the Criterion Bridge, Paeroa.** Width constraints on the Criterion Bridge mean it's not possible for two heavy vehicles to pass on the bridge. The proximity of this bridge to the SH2/SH26 intersection mean delays at the bridge can result in short stacking through the intersection. A shared path is provided, but pedestrians and cyclists are required to share a very narrow corridor.
- **Urban growth:** Urban development in the outer suburbs of Hamilton is increasing travel demand on the western end of SH23, increasing travel time delays at peak times.
- **Intersection efficiency:** The intersection of SH23 and SH39 at Whatawhata can be difficult to navigate during the morning peak. The intersection of SH2 and SH26 at Paeroa can also be difficult to navigate at peak times. This can be exacerbated by short stacking issues as heavy vehicles are unable to simultaneously cross the Criterion Bridge, located just west of the SH2/SH26 intersection.
- **Agricultural vehicles using parts of the corridor:** This reduces the level of service for motorists and can lead to drivers taking risks, especially as there are few safe passing opportunities.
- **Pedestrian crossing:** A signalised pedestrian crossing and traffic signals at SH1 and SH23 can impact on the efficiency of SH23 at Frankton.

- **Reduced travel speeds through townships:** Lower speed limits are used through townships to align with the function of the adjacent land use and road users. However, during peak times and holiday periods, parking movements and congestion through these urban areas can result in travel time delays. Ribbon development on SH26 through Morrinsville and a detour of the town centre through an industrial and residential area increases travel times. Residential ribbon development is also a feature of the northern end of Te Aroha where the design speed of the road at Te Aroha doesn't align with the road environment meaning many vehicles travel faster than the posted speed limit.

Future considerations

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

- **Use of technology:** The ability to effectively communicate with road users in real-time following an incident will enable road users to take detours where available, reducing travel time delays (e.g. use of VMS at key gateways).
- **Single lane bridge replacements:** Consideration to develop an investment programme for the single lane bridges may be required as community expectations increase. However, based on age, many of these bridges are due to be replaced in 10 years.
- **Access between Hamilton and the Coromandel Peninsula:** There are several non-state highway alternative routes that provide faster journey times and are widely used by customers. This puts pressure on the local authority to maintain an asset with a dominant through function. In future, the local Council may seek to upgrade the ONRC classification of this highway to reflect the higher volume and through movement function.

Safety

Collective risk

Collective risk along the corridor is varied. There are some sections of high risk along SH26, SH25 and SH1B. From Kawhia to Pirongia and isolated sections between Te Aroha and Waihi there are areas of low risk. Medium risk is particularly seen in the areas between Te Rapa and Pirongia, Kopu to Mangatarata and Tairua to Hikuai.

There are some small sections along the corridor that are unrated for collective risk.

Personal risk

A section of SH31 from Kawhia has high personal risk as does Whangamata to Hikuai on SH25, a small section on SH26 and a few areas north of Thames on SH25 and immediately outside of Coromandel Town. SH39 from Tihiroa to Otorohanga is rated medium-high personal risk along with the segment between Hikuai and Tairua, and the SH25 from Kopu.

Star rating

The corridor is predominately rated as a 2-star road. This rating indicates there are many major deficiencies in some road features along the corridor.

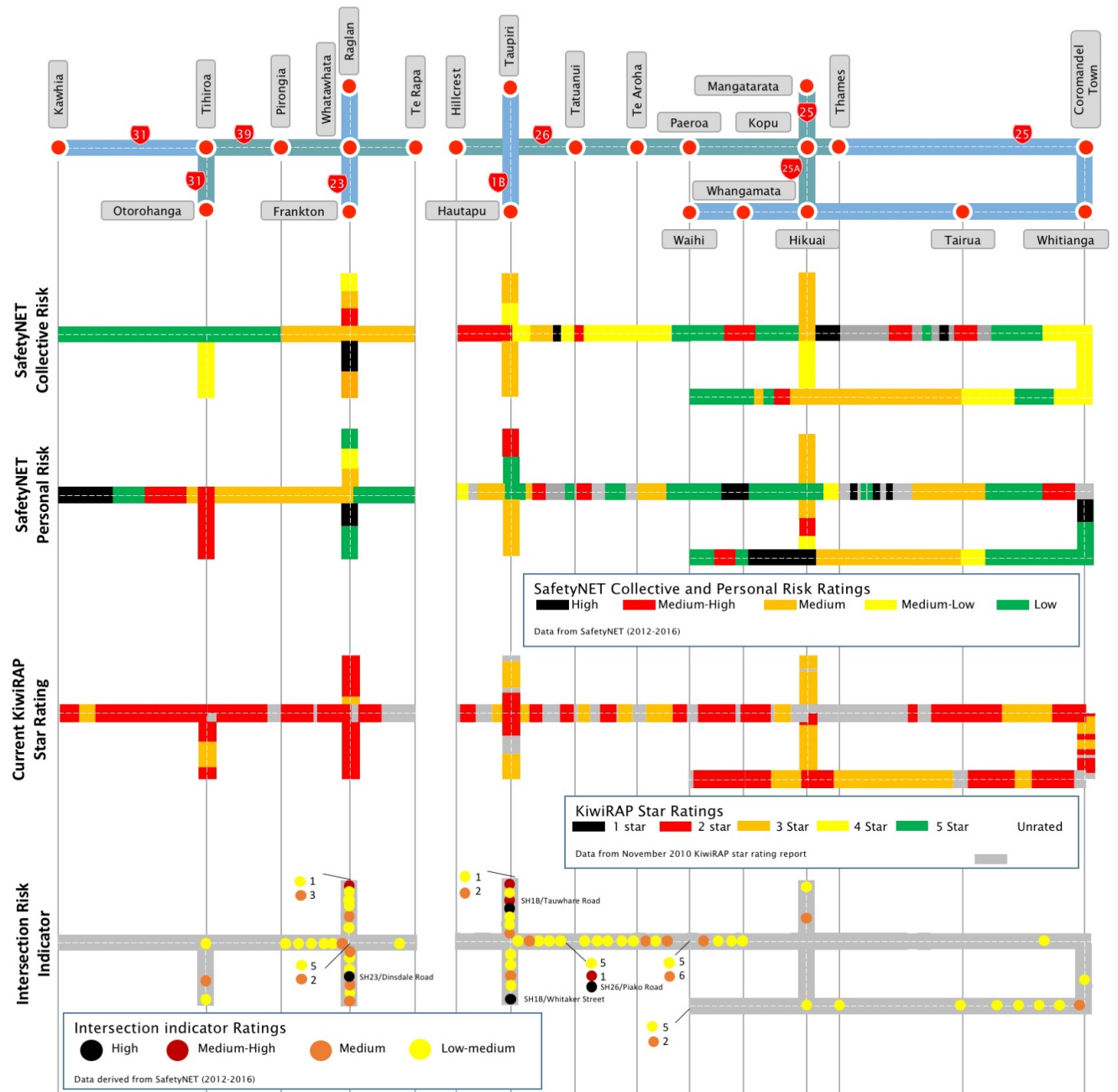
For the most part, the corridor fails to meet the 3-star target for Primary Collector and Arterial state highways.

Intersection risk indicators

There are four high risk intersections along the corridor – on SH23 between Whatawhata and Frankton and 1B between Hautapu and Taupiri and SH26 outside Tatanui.

Three of these high-risk intersections are in rural areas, and one is located in Hautapu on SH1B. Paeroa features six medium risk intersections. There are large sections of the corridor that do not have any high-risk intersections but feature a 2-star KiwiRAP rating.

Figure 14 – Safety



Pressures

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

- **Shoulders:** Some parts of this corridor have inconsistent shoulder widths. In constrained corridors, particularly on the Coromandel Peninsula there are areas with no shoulder provision, adjacent to steep drops and sheer rock faces. Barriers cannot be used in critical sections as there is insufficient space to anchor rails. Single vehicle crashes are common and many are not reported.
- **Deep culverts:** Many of the highways have deep ditches and culverts to enable drainage of the corridor, particularly SH26. Most culverts are protected by barriers; however, some barriers are failing and require maintenance.
- **Location of accesses:** Some accesses on this corridor are poorly located on bends, with inadequate sightlines such as on SH31 near Kawhia, and SH25 north of Whitianga.
- **Driver fatigue:** The Coromandel Loop roads are scenic, recreational routes favoured by motorcyclists. The challenging terrain and length of these highways can strain driver and motorcyclist concentration and result in fatigue related crashes.
- **Intersection risks:** The intersection of SH23 and SH39 at Whatawhata is offset making it difficult for larger vehicles to navigate travelling on SH39. The SH2/SH26 intersection at Paeroa is also offset, and can be challenging for turning vehicles in peak periods with few safe gaps. Both intersections are also challenging environments for pedestrians and cyclists.
- **Manoeuvring issues:** Angle parking is provided on SH25 at the Colenso Café in Tairua and vehicles must reverse onto the highway in a high-speed environment. Similarly, vehicles towing boats and trailers may undertake risky manoeuvring at boat ramps that are accessed from SH25 (e.g. Waikawau) due to congestion in the summer peak.
- **Long response times:** Isolated sections of the corridor mean that response times can be long. In the event of a crash, this can impact on the severity of injuries.
- **Frost and ice:** SH25A is susceptible to frost and ice in winter. CMA is used at times, however it is ad hoc and not well managed.
- **Vulnerable road users:** Poor provision of facilities for pedestrians and cyclists through and between towns increases the safety risk and reduces the attractiveness of these modes on this corridor. In addition, as the Hauraki Rail Trails are expanded and connected, it is anticipated that there will be a growth in cyclists. The trails involve numerous crossings of the corridor, exposing more vulnerable road users to safety risks at these intersections. In addition, cyclists require access to the services and facilities along the corridor, and use to state highways to access key townships.

Future considerations

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

- **Expansion of motorcycle demonstration project:** Initiatives implemented as part of the Southern Coromandel Loop motorcycle demonstration project will be expanded to the Northern Loop. Ongoing evaluation of the effectiveness of these safety initiatives should be undertaken to identify whether they should be replicated in other areas.
- **Improvements to road quality:** Many roads on this corridor are rural local road quality (e.g. SH31 and SH25), and most form part of the state highway network due to their critical connectivity role. However, as traffic volumes on the corridor continue to grow, there will be a greater exposure to safety risks on these secondary highways and a need to consider improvements to the quality.
- **Pedestrian facilities:** As urban areas grow, there will be increased need for pedestrian facilities across and adjacent to the highway. Alternatively, town centre vehicle bypasses could be considered, as has been undertaken in Whangamata and Morrinsville.
- **Tourist safety:** Given the tourist value of many locations along this corridor, interventions to specifically improve visitor driver safety and experience should be considered, including directional arrows, and advance warning of road conditions and delays.
- **Speed management:** Speed environments on SH31 and SH25 and SH25A are not conducive to the posted speed limit of 100km/h. Many bends are posted with curve warning signs, with some as low as 35km/h. A review of speed limits along parts of the corridor, including SH31, SH23, SH25 and SH25A, particularly through towns, should be considered.

People, places and environment

Natural environment

The Coromandel Peninsula is a renowned natural environment, characterised by native forest fragments including threatened Kauri Forests, and scenic coastal views interspersed with Pohutukawa trees. The sections of the corridor to Raglan and Kawhia straddle the Pirongia Forest Park, and are characterised by topography, catchments and scenic harbours. The scenic and tourism value of sections of the corridor are recognised with their inclusion in Tourism NZ's Pacific Coast Highway and Thermal Explorer road trips.

The Waikato, Waipa and Waihou Rivers are significant waterways that interface with the corridor. They are ecologically sensitive environments and those in low lying areas contribute to flooding along the corridor.

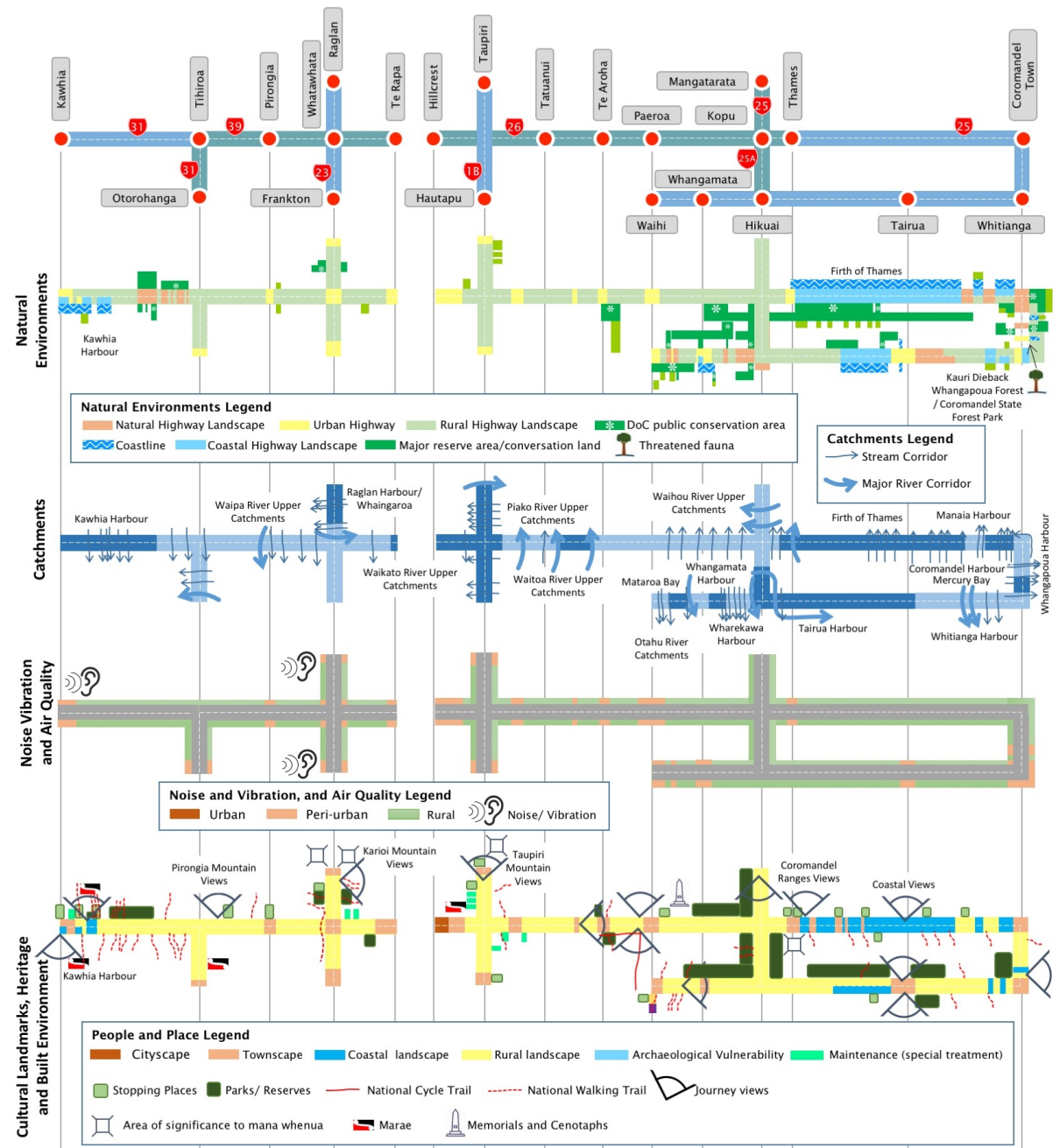
Noise, vibration and air quality

Dense residential development adjoins the corridor in the Hamilton City urban area. As the City expands, more residents will be exposed to noise, vibration and air quality issues. Engine breaking is banned through Raglan, Kawhia and Frankton.

Cultural landmarks, heritage and built environment

Buildings and sites of both Maori and European significance are accessed via the corridor including marae, churches and war memorials. The new Kopu Bridge incorporates images of waka and taniwha, and native landscaping. The old Kopu bridge features a heritage listed single span swing bridge. Long term plans for this bridge are still unclear. Otorohanga has branded itself as the home of Kiwiana, while Paeroa is home to a giant L&P bottle. Waihi and Coromandel township both feature gold mining era buildings, while the operational gold mine at Waihi can be viewed from the town. Commemorative landmarks to Captain Cook are located on the corridor at Kopu, Paeroa and Mercury Bay (Coromandel Peninsula), and a windfarm is visible from Te Uku.

Figure 15 – People, places and environment



Pressures

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

- **Increasing severe weather events:** Impacts from more frequent and intense weather events are expected increase the vulnerability of key parts of the corridor, in particular the west coast of the Coromandel Peninsula and parts of SH31. This will lead to significant impacts, as these sections of corridor have few viable alternatives.
- **Dumped rubbish:** Dumped rubbish is commonly seen along the corridor, and adds to operational maintenance costs. While occurrences on this corridor are no different to other highways, the natural environment along parts of this corridor (such as the Coromandel Peninsula and Raglan) are highly valued, meaning the communities may be more sensitive and reactive to rubbish and litter removal.
- **Viewshaft and vegetation management:** Scenic areas, especially on the Coromandel Peninsula have not been maintained for their view. Many are on private land, or are managed for other values.
- **Stopping Places:** The cultural and scenic amenity of the Coromandel Peninsula is recognised and highly valued. However, there are few stopping places and public amenities available enroute to enhance the journey experience, and provide rest breaks and photo opportunities for customers.

Future considerations

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

- **Integrated land use planning:** With increasing urban development, along and in close proximity to sections of the corridor, the NZ Transport Agency will need to work closely with the relevant local authorities to ensure District Plans consider reverse sensitivity issues and require appropriate management of potential noise and vibration through urban design.
- **Kauri Dieback Management:** The inclusion of managing Kauri Dieback should be considered within NOC contracts to ensure contractors working in affected areas are not spreading the disease.
- **Pest Control Management:** Increased investment to eradicate and manage pest species such as wilding pines, gauze and broom will be required to maintain the natural environments that the area is valued for, particularly along the Coromandel Peninsula.
- **Stopping place strategy:** Appropriately located stopping points along SH25 on the Coromandel Peninsula incorporating educational information (and amenities where appropriate) will ensure visitors are provided with safe places to stop, take photos and learn more about the area.

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 548 km of road network which reflects 4.8% nationally. The total value of the assets along the corridor is \$735M (excluding ITS, and, heritage and green assets).

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

Asset condition and performance summary

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

Figure 16 – Corridor asset base

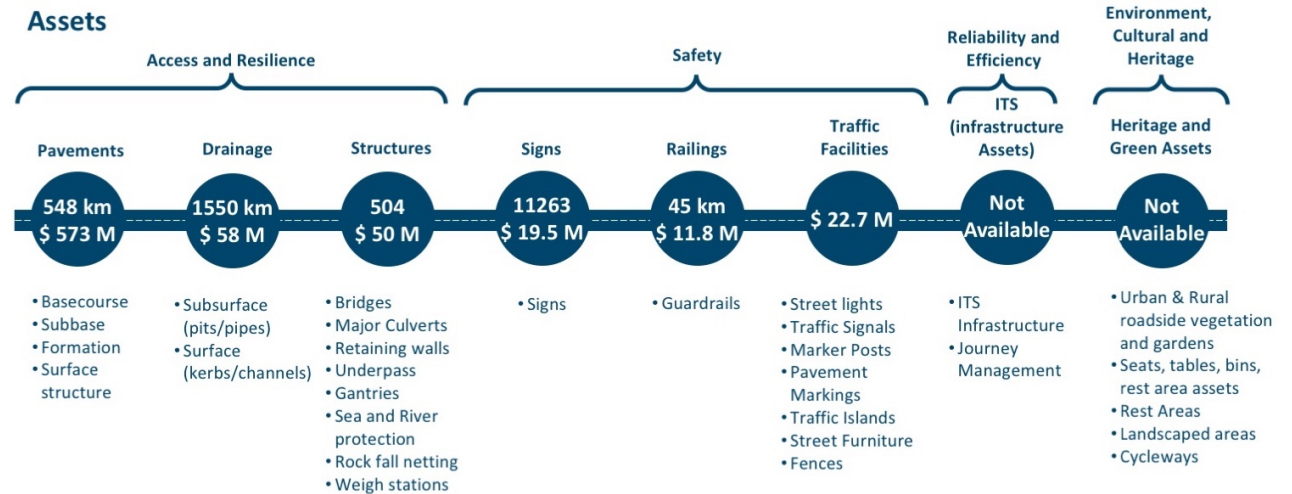


Figure 17 – Summary asset condition and performance



Asset condition and performance

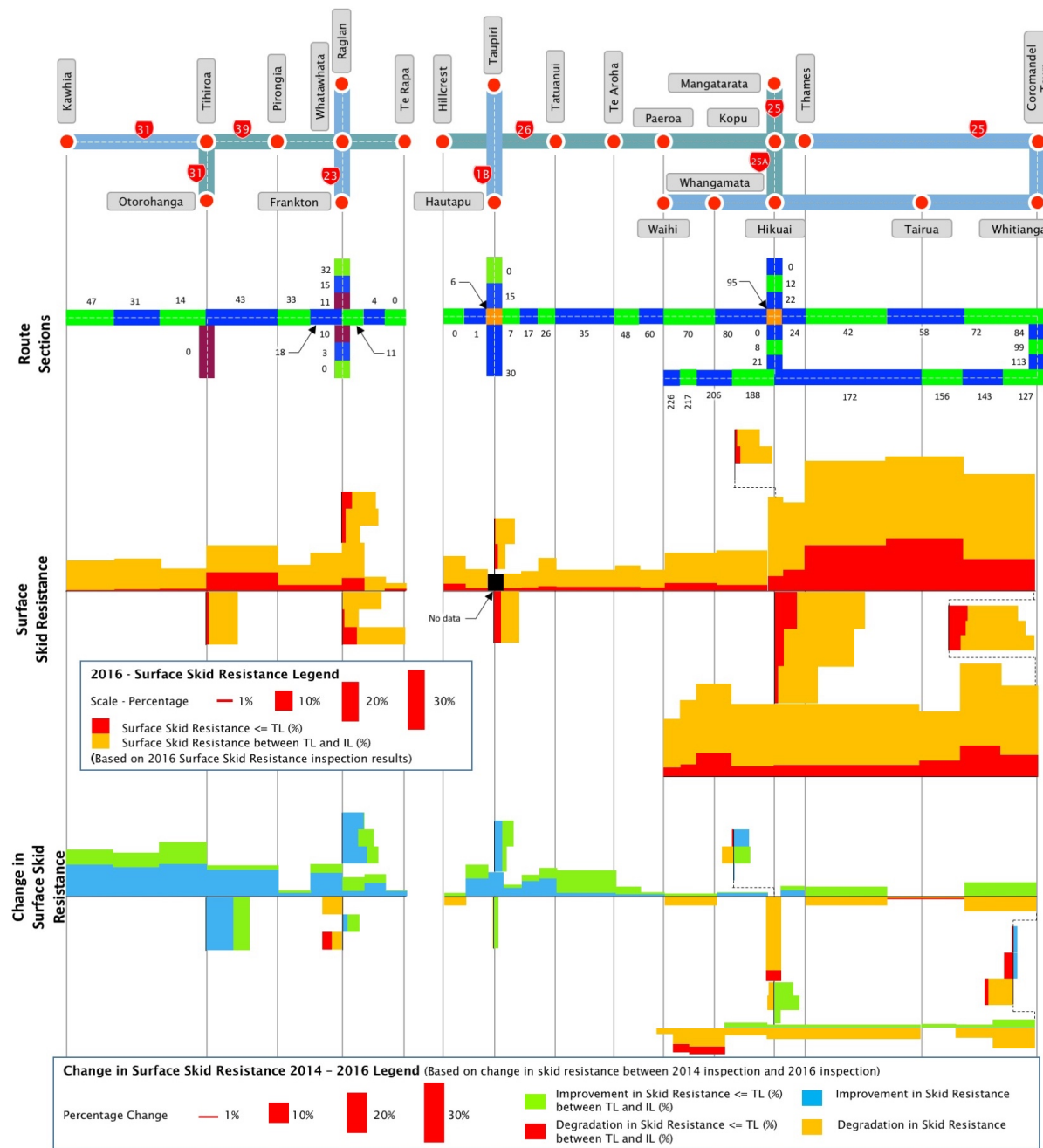
Surface skid resistance

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

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

Sections SH25/42, SH25/58 and SH25/72 between Te Puru and Coromandel Town show high levels of surface skid resistance both below the threshold limit and within the investigation limits. The remainder of SH25 around the Coromandel Peninsula to Waihi, and SH25A between Kopu and Hikuai shows significant levels of surface skid resistance within the Investigation limits. The remainder of the corridor shows moderate levels of surface skid resistance and has demonstrated significant improvement in surface skid resistance levels over the three-year period.

Figure 18 – Asset condition



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.

A relatively high percentage (3.0 %) of the corridor achieved a Priority for Surface Safety Treatment that qualifies for funding. This equates to 32.8 lane-km of the 1089 total lane-km of the corridor. The sections with the highest priority for surface safety treatment are, SH25/42, SH25/58 and SH25/72 between Te Puru and Coromandel Town, SH25/127 south of Whitianga, and SH25/206 around Whangamata. Overall the priority for surface safety treatment scores on the corridor maintained 2014 levels or showed some improvement over the three-year period.

Figure 19 - Asset condition 2

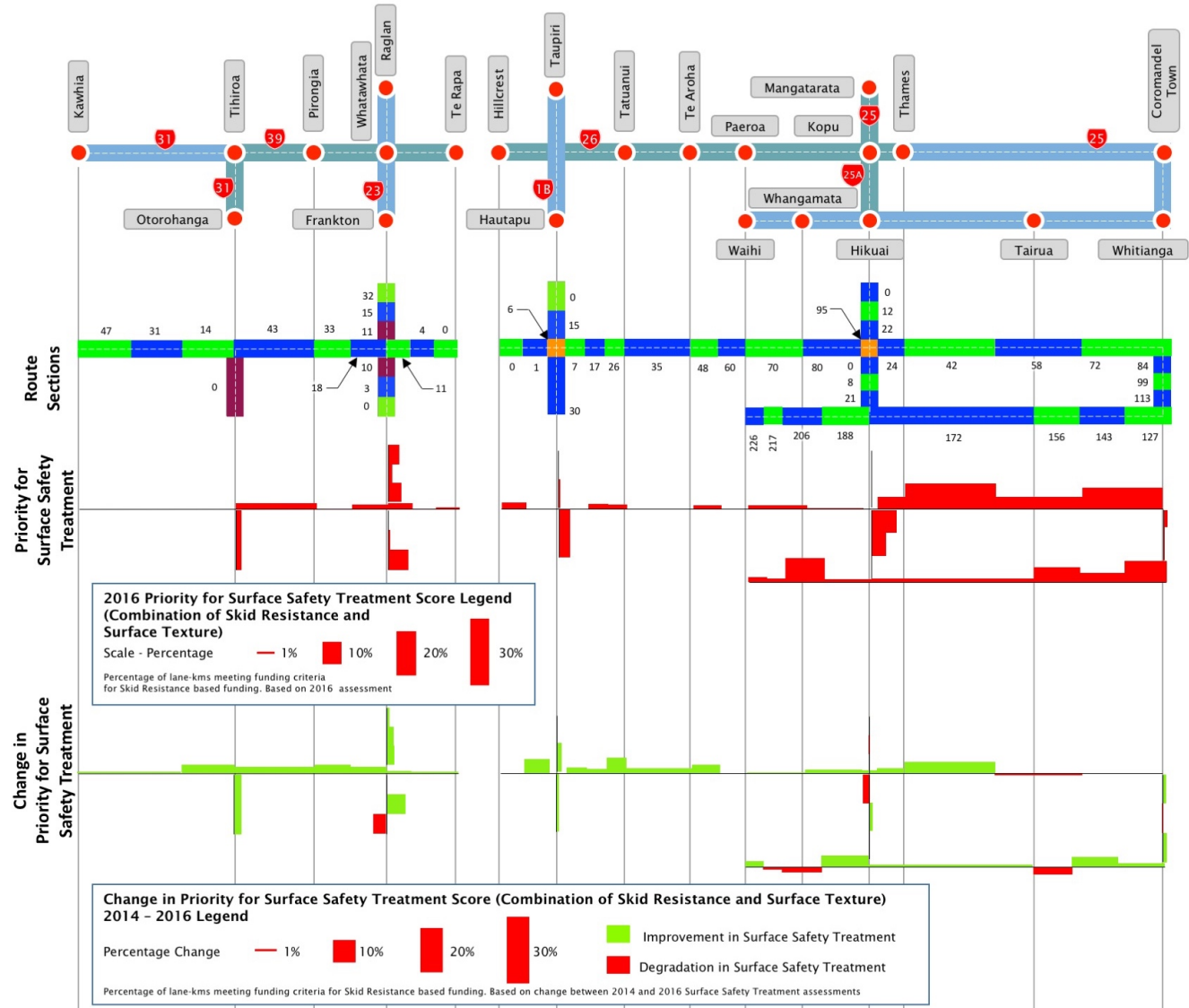


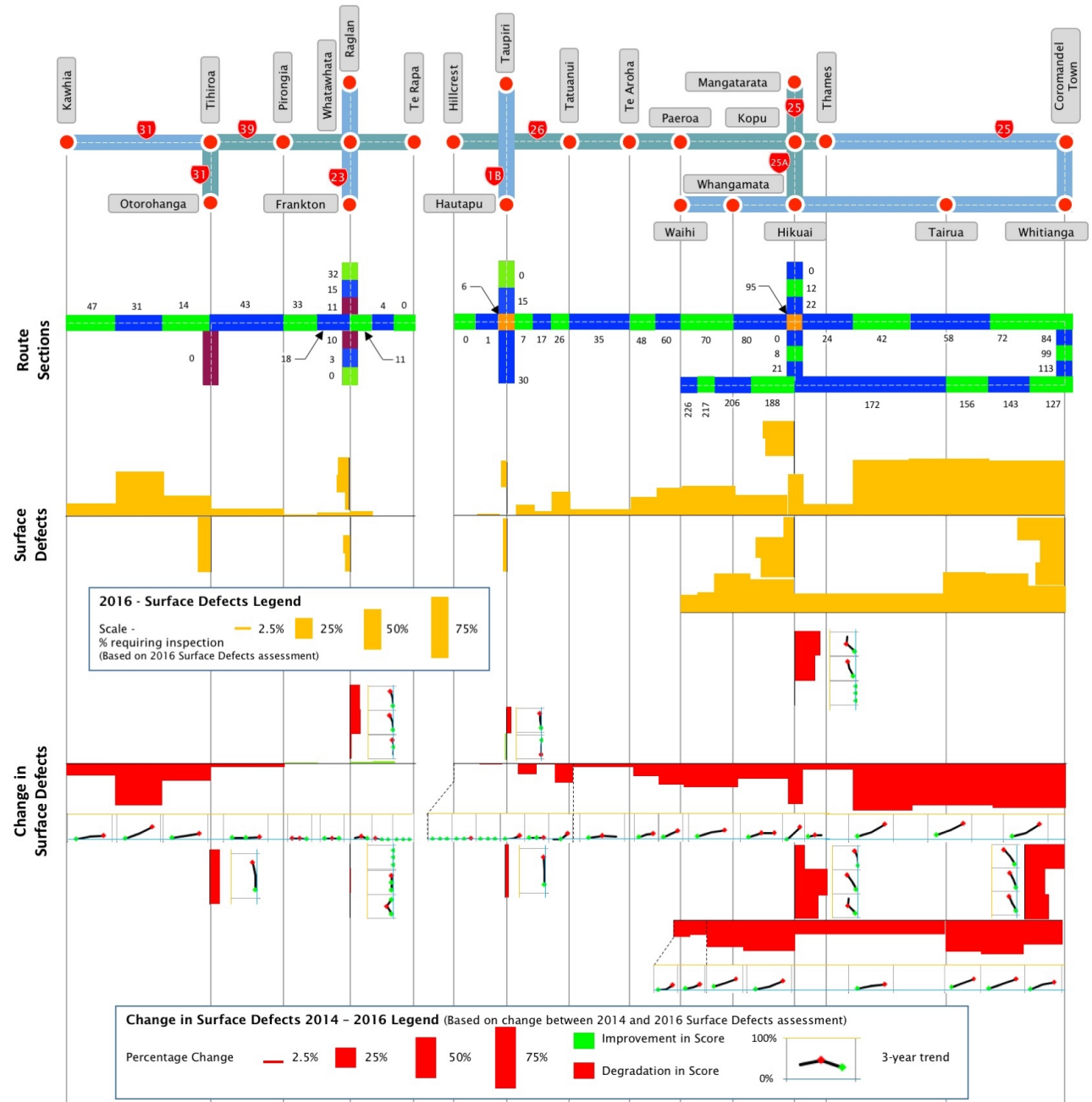
Figure 20 – Asset condition 3

Surface defects

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

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

Overall, 27.1% of the corridor achieved a score above which inspection is required. Sections with significant lengths of surface requiring inspection include: SH25/42, SH25/58 and SH25/72 between Te Puru and Coromandel Town, and to a lesser extent, the remainder of SH25 around the Coromandel Peninsula. These sections also show a significant level of degradation in score over the last three years.



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.

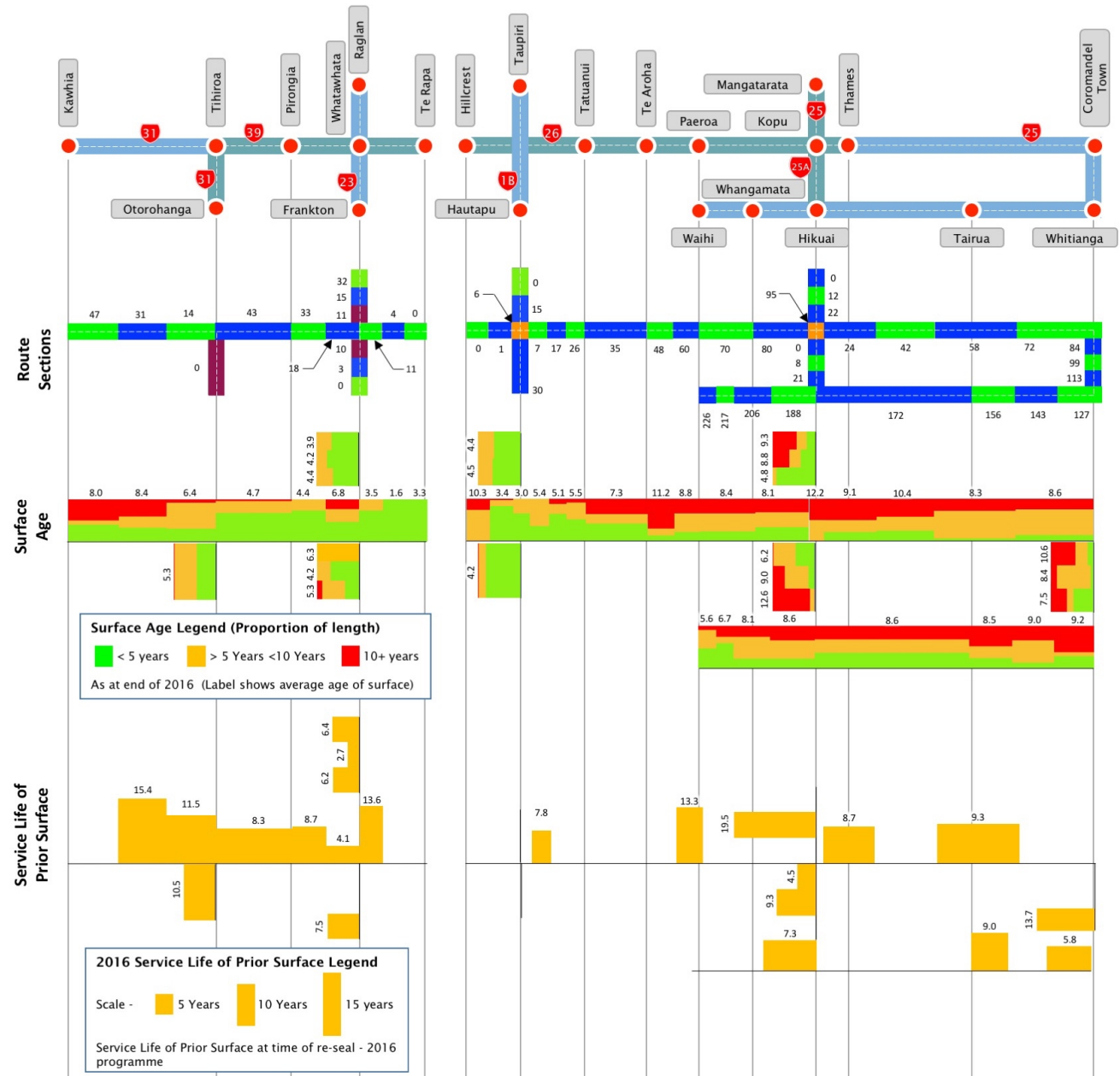
The sections of corridor with the oldest age profile are SH25/42n between Te Puru and Waikawau, SH25/84 East of Coromandel Town, SH25A/21 East of the Tairua River, and, SH26/95 at Kopu.

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 a prior service life of 9.5 years, with sections SH25/12 between Pipiroa and Kopu bridge, SH25/113 between Kuaotunu and Whitianga, SH39/11 between Te Kowhai and Whatawhata, and, SH31/31 between east of Oparau achieving a service life in excess of 12 years.

Figure 21 – Asset condition 4



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.

Based on the Annual Plans WC214 for 2016/17 and 2017/18, the proportion is the length of section planned for re-seal as a percentage of the total length of that section. Only first coat seals are included in the calculation, i.e. second coat seals are excluded.

The major resurfacing works are planned for sections SH25/58. SH25/72 and SH25/84 between Kerata and Te Rerenga, SH25/127 south of Whitianga, and, SH26/35 Tatuani and Te Aroha.

Proportion of travel on smooth roads

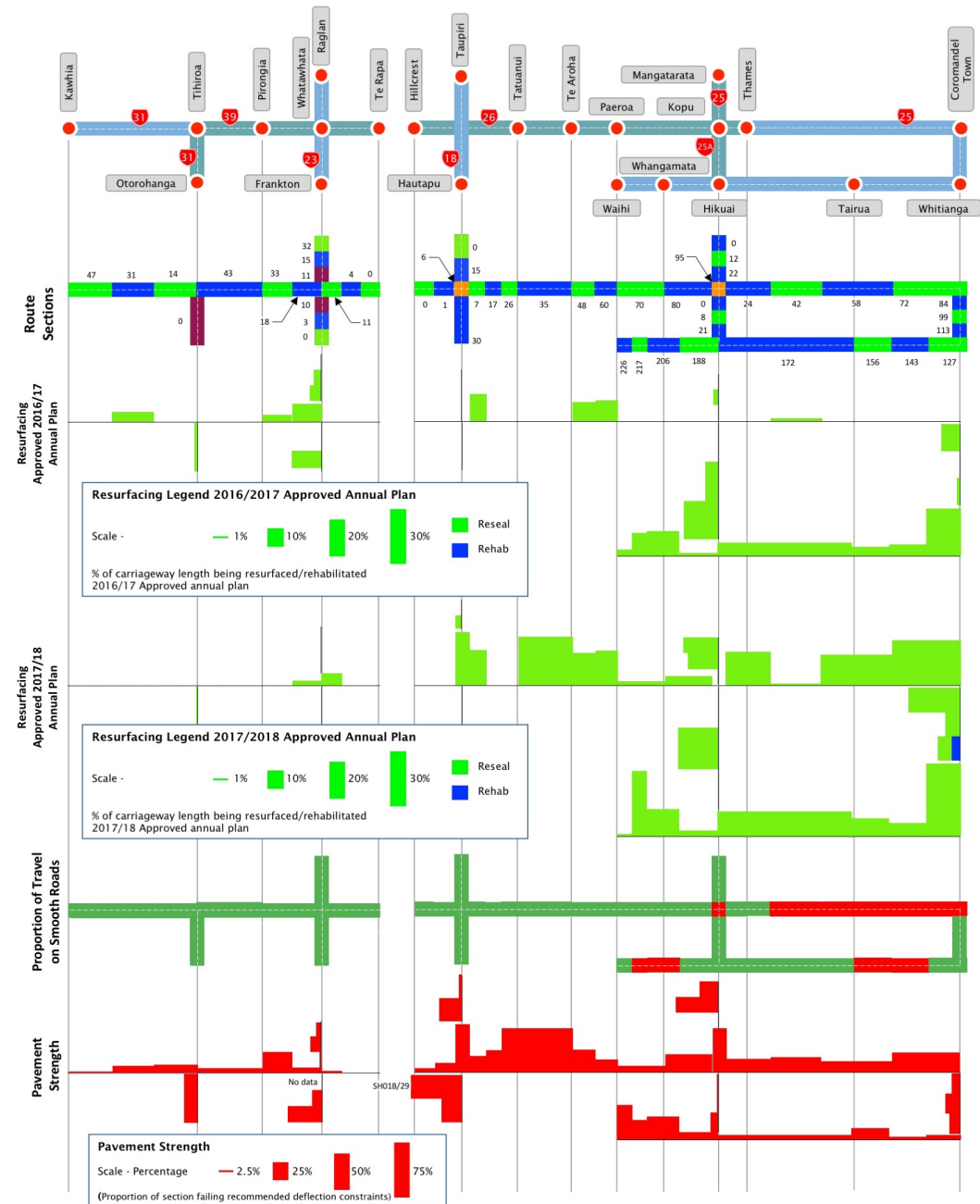
The infographic shows whether the route section passes the ONRC standard for Proportion of Travel on Smooth Roads (Smooth Travel Exposure). 97% is the ONRC target for proportion of travel on smooth roads. The infographic simply shows whether the route section achieves this level or not.

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 SH23/3 between Hamilton and Whatawhata, SH25/12 through Pipiroa, SH25/226 between Waihi and Whiritoa, SH26/26 and SH26/35 between Morrinsville and Te Aroha, and, SH26/95 at Kopu.

Figure 22 – Asset condition 5



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:

- **Substandard Lane Widths:** On coastal parts of SH25 and SH31 lane widths are already substandard, with natural barriers to driving on shoulders (coast on one side and mountain on other) meaning safe working distances are hard to maintain during maintenance works and in some circumstances requiring full closure on routes with little or no alternative route.
- **Large distance from materials:** Options for surface treatments is limited in much of the corridor due to the distance from asphalt plants.
- **Resilience:** Resilience is an issue on the more remote sections of the corridor, especially SH25 around Coromandel Peninsula, and SH31 to Kawhia, with no viable alternative routes. On the Coromandel Peninsula, severe weather events tend to cause widespread issues whereby all alternative routes are affected simultaneously.
- **One Lane Bridges:** While there are a number of old one lane bridges, they are in relatively good condition. Any maintenance work done on these bridges does however require full closure of the road.
- **Stakeholder expectations:** Visitors to the western harbours and Coromandel Peninsula who are familiar with the levels of service on roads in major urban areas have a high level of service expectation above that for which the roads are classified. Local Authorities/Transport partners expectations also exceed the customer level of service for the classification of road.

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:

- **Coastal effects:** A significant storm event or the ongoing coastal effects along the Thames coast SH25/42 to SH25/72 between Thames and Coromandel may eventually cause complete eradication of the pavement, requiring a significant engineering intervention.
- **Safety improvements:** Planned improvements for safety will have a consequential effect on maintenance of SH23 as more barriers are erected. This will eventually make overlay a doubtful option as this would require raising of barrier heights to maintain standard.
- **Change in travel patterns:** Volumes on SH39 have significantly increased, especially heavy vehicles, due to the changes in the Waikato Expressway network. SH39 has become the preferred route for heavy vehicles wanting to avoid the Hamilton Urban area on their journey. This may be further influenced once the Huntly section of the Waikato expressway opens. This increase in heavy vehicles is having a detrimental effect on the pavement, that was not expected.

Investing in the corridor

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

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

Right treatment, right place, right time

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

Intervention works will be programmed to ensure:

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

Interventions will:

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

Summary investment

The proposed investment in the corridor is as follows:

Table 1- Summary corridor investment (\$000)

Outcome	Expenditure Category	2018-2021	2021-2024	2024-2028
Access and Resilience	Maintenance and Operations	\$9,086	\$10,484	\$15,746
	Renewals	\$22,455	\$27,778	\$40,006
	Improvements	\$24,330	\$6,300	\$12,300
Reliability and Efficiency	Maintenance and Operations	\$4,887	\$5,257	\$7,914
	Renewals	\$243	\$351	\$508
	Improvements	\$0	\$0	\$0
Safety	Maintenance and Operations	\$8,824	\$10,065	\$15,154
	Renewals	\$6,264	\$6,770	\$10,226
	Improvements	\$19,187	\$26,530	\$114,500
People, places and Environment	Maintenance and Operations	\$2,580	\$2,848	\$4,278
	Renewals	\$127	\$133	\$203
	Improvements	\$0	\$0	\$0
Total		\$97,983	\$96,516	\$220,835

Figure 23 - Corridor investment

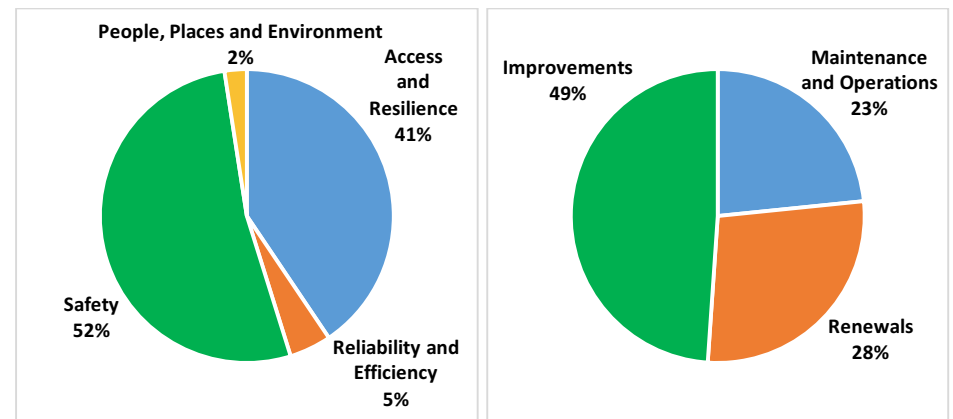


Table 2 - Summary investment by work category (\$000)

Outcome	Work Category	2018-2021	2021-2024	2024-2028
Access and Resilience	111 Sealed Pavement Maintenance	\$1,562	\$2,072	\$3,114
	112 Unsealed Roads	\$0	\$0	\$0
	113 Drainage Maintenance	\$944	\$1,074	\$1,611
	114 Structures Maintenance	\$1,621	\$1,802	\$2,707
	121 Environmental Maintenance	\$1,201	\$1,367	\$2,053
	122 Traffic Services Maintenance	\$19	\$66	\$99
	124 Cycle Path Maintenance	\$10	\$12	\$17
	151 Network & Asset Management	\$2,993	\$3,285	\$4,933
	161 Property	\$736	\$807	\$1,212
	211 Unsealed Road Metalling	\$10	\$12	\$18
	212 Sealed Road Resurfacing (excl. surface skid resistance)	\$13,755	\$14,714	\$23,541
	213 Drainage Renewals	\$656	\$815	\$1,152
	214 Pavement Rehabilitation	\$5,645	\$9,742	\$11,548
	215 Structures Component Replacements	\$2,315	\$2,389	\$3,588
	222 Traffic Services Renewals	\$74	\$106	\$160
321 - 341 Improvements	\$24,330	\$6,300	\$12,300	
Reliability and Efficiency	121 Environmental Maintenance	\$831	\$901	\$1,353
	123 Operational Traffic Management	\$2,651	\$2,904	\$4,382
	151 Network & Asset Management	\$1,270	\$1,306	\$1,959
	161 Property	\$135	\$146	\$220
	222 Traffic Services Renewals	\$243	\$351	\$508
	321 - 341 Improvements	\$0	\$0	\$0

Outcome	Work Category	2018-2021	2021-2024	2024-2028
Safety	111 Sealed Pavement Maintenance	\$1,829	\$2,311	\$3,473
	112 Unsealed Roads	\$0	\$0	\$0
	113 Drainage Maintenance	\$149	\$177	\$273
	114 Structures Maintenance	\$368	\$443	\$697
	121 Environmental Maintenance	\$157	\$210	\$315
	122 Traffic Services Maintenance	\$3,851	\$4,162	\$6,273
	124 Cycle Path Maintenance	\$0	\$0	\$0
	151 Network & Asset Management	\$2,155	\$2,409	\$3,593
	161 Property	\$315	\$353	\$531
	212 Surface Skid Resistance	\$5,031	\$5,405	\$8,118
	214 Pavement Rehabilitation	\$24	\$51	\$77
	215 Structures Component Replacements	\$350	\$403	\$606
	222 Traffic Services Renewals	\$859	\$911	\$1,425
	321 - 341 Improvements	\$19,187	\$26,530	\$114,500
	People, places and Environment	111 Sealed Pavement Maintenance	\$438	\$471
121 Environmental Maintenance		\$1,744	\$1,943	\$2,918
151 Network & Asset Management		\$320	\$349	\$524
161 Property		\$79	\$86	\$129
221 Environmental Renewals		\$127	\$133	\$203
321 - 341 Improvements	\$0	\$0	\$0	
	Total	\$97,983	\$96,516	\$220,835

To be confirmed through the RLTP

Investing in access and resilience

Operations and maintenance

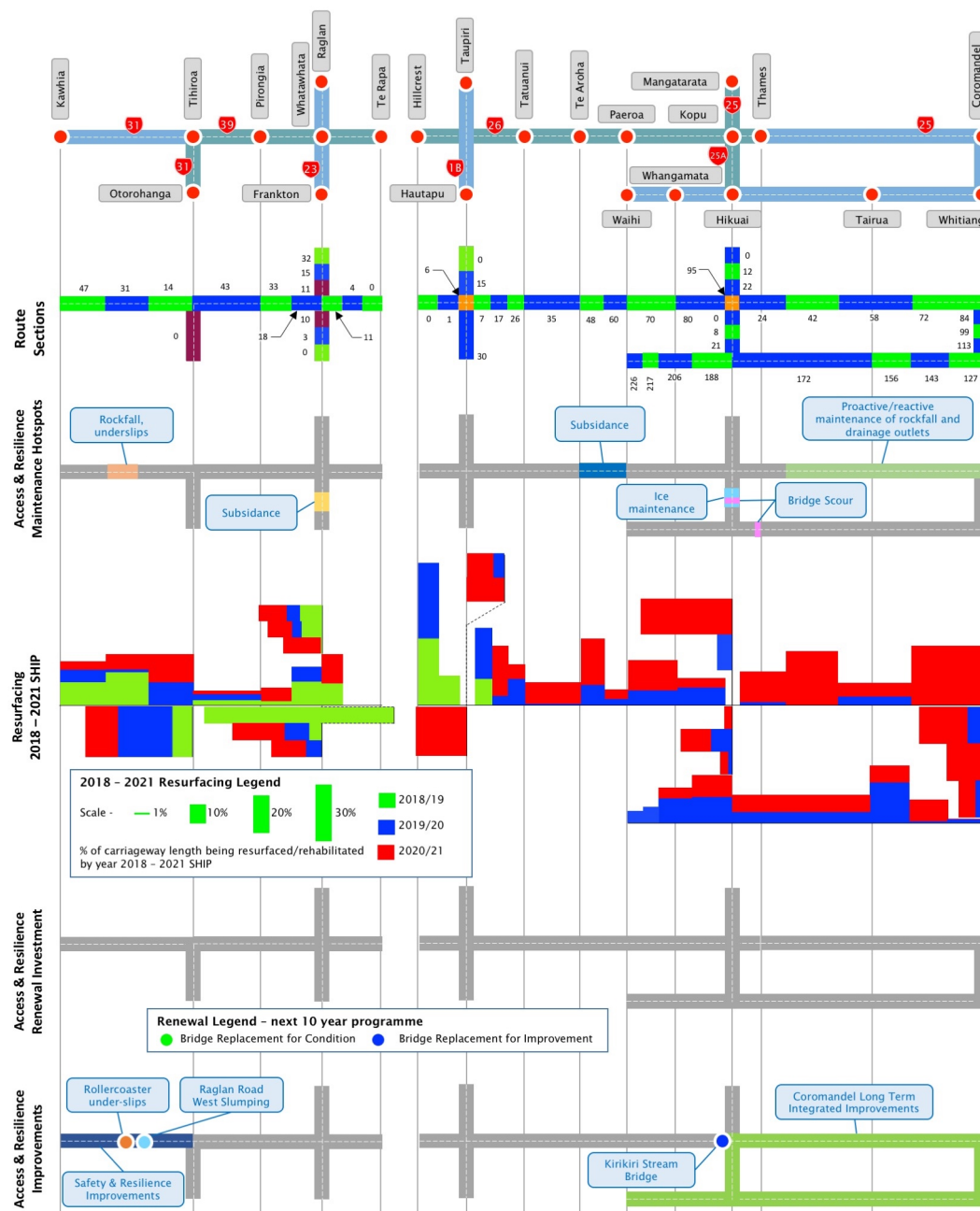
The main areas of investment to provide and preserve access and resilience are drainage maintenance, sealed road surfacing and structural component replacements and vegetation control. A key focus is to realign the base preservation quantities toward increased preventative maintenance and to slow pavement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

Maintenance hot spots

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

- Slips and rockfalls:** During storm events on SH25 sections 42-72 on the coast between Thames and Coromandel work is undertaken in preparing for storms and in the response during and after a storm. Proactive clearing of drainage outfalls occurs along this section to minimise the impact of storm events when they occur.
- Rockfall and under-slips** are an issue on section SH31/31 of the Kawhia Road.
- Subsidence:** A resilience issue on SH23/3 between Hamilton and Whatawhata is subsidence that requires increased monitoring. Subsidence is also an issue on SH26/48 and SH26/60 between Paeroa and Te Aroha to which the response has been levelling
- Winter Maintenance:** Ice is an issue at the summit of SH25A at certain times of year, requiring winter maintenance.
- Bridge Scour:** On SH25A/8 bridge scour occurs that requires increased monitoring.

Figure 24 – 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 into the individual years to indicate the timing of expenditure over the three-year period.

Significant investment in resurfacing is planned for sections: SH25/0 east of Mangatarata, SH25/42 between Te Puru and Waikawau, and, SH31/0 between Tihiroa and Otorohanga

Structure renewal

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



The construction of the new bridge will help protect the area from severe flooding - Kirikiri Stream Bridge in Kopu on State Highway 26.

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/>

SH26 – Kirikiri Bridge Replacement

Description: The construction of the new bridge will help protect the area from severe flooding. The new bridge will be constructed slightly upstream of the existing bridge and will be built to handle the flow of a 100-year flood. An increase in the height of the stopbanks has resulted in the need to build the new bridge higher than the existing bridge. The upgrading of the nearby intersection of SH26 and SH25A will be done at the same time. A roundabout will replace the existing intersection.

Draft regional programme considered for 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 3- Draft regional programme considered for SHIP

Project	Funding Status	Description
SH25 Coromandel Long Term Integrated Improvements - Resilience, Safety & amenity	New	Improvements to SH25 and SH25a to respond to resilience, speeds, safety, amenity and travel time reliability problems
SH31 - SH39 to Kawhia, Safety & Resilience Improvements	New	Safety and resilience improvements on SH31 between Kawhia and SH39
SH31 - Rollercoaster under-slip Resilience	New	Design and construction of tied back retaining wall
SH31 - Raglan Road West Slumping Resilience	New	Further Investigation needed

Investing in reliability and efficiency

Operations and maintenance

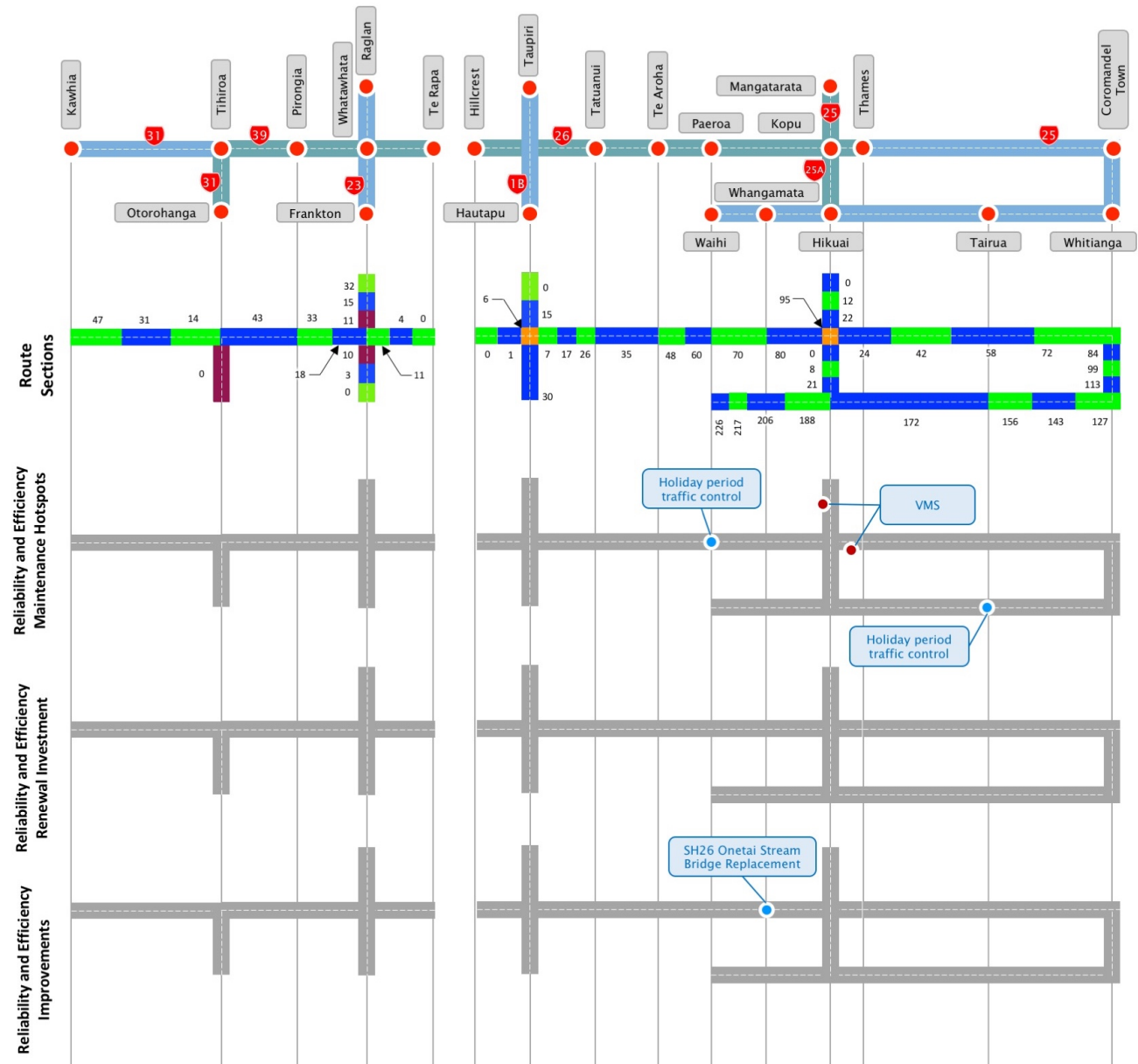
The main areas of investment to provide and preserve reliability and efficiency are environmental maintenance through keeping potential obstructions clear of the highway, wayfinding signage, and operational traffic management.

Maintenance hot spots

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

- **Seasonal increases** in traffic over the summer months impact on the available maintenance window for sections of the corridor that link major urban areas and the coastal communities popular as summer holiday destinations.
- **Holiday period traffic management:** Seasonal increases in traffic during peak holiday season also require an additional response in terms of traffic control including:
 - Criterion Bridge SH26/SH2 junction
 - Tairua Bridge
- **VMS:** Variable message signs are in place at SH25/12 westbound, and, SH25/24:2.8 southbound
- **Night works** are undertaken where the corridor is within the urban area of Hamilton, on SH23 and SH26
- **LED street lighting** upgrades have been approved for the corridor and a priority list will be developed for direct retrofit of LED lanterns.

Figure 25 – Reliability and efficiency investment



Renewals

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



Improvements

Planned

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

Draft Regional Programme considered for 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 4- Draft regional programme considered for SHIP

Project	Funding Status	Description
SH26 Onetai Stream Bridge Replacement		Bridge replacement identified in as priority in the National SH Bridge Programme & Structures Asset Management Plan.

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:

- **Northern Motorcycle loop:** An increase safety based assets due to the Northern Motorcycle loop safety scheme, SH25/42 to the end of SH25/172 at Hikuai that includes wider lines, higher edge marking, helicopter pads, and improved signage, as well as vegetation control will place an increased maintenance burden on this part of the corridor.
- **Crossing stock** leaving effluent on the road surface on sections SH25/113 and SH25/127 requires regular cleaning

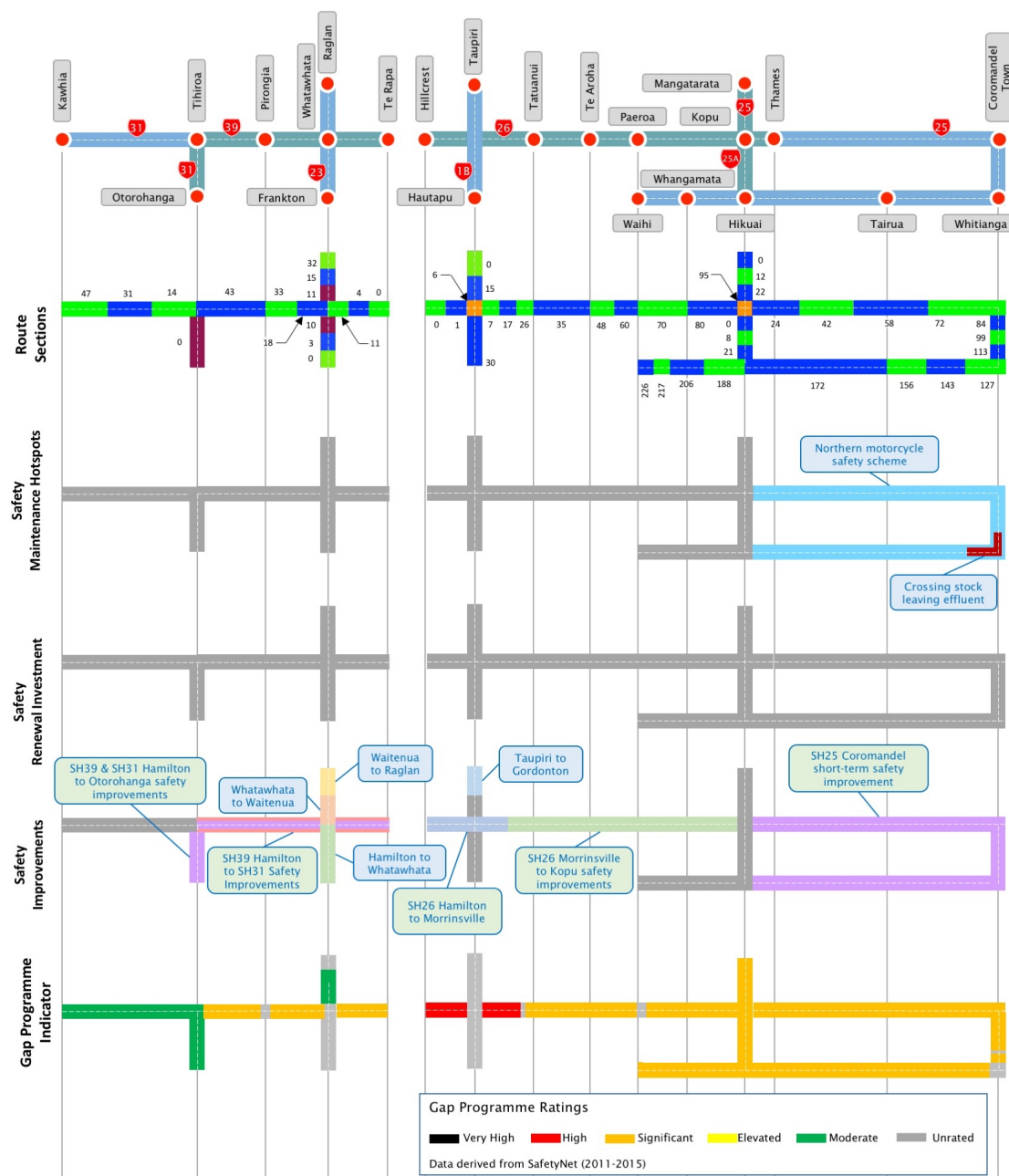
Gap programme indicators

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

There is a high potential for reducing fatal and serious injuries between Hillcrest and Tatuani where comprehensive targeted medium-high cost improvements will be beneficial.

From Tihiroa to Te Rapa and Tatuani to Waihi there is significant potential for reducing fatal and serious injuries through targeted low-medium cost improvements.

Figure 26 – 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/>

SH23 – Hamilton to Raglan

(Hamilton to Whatawhata – Whatawhata to Waitenua – Waitenua to Raglan)

Description: improve the safety features on the road and roadside on SH23 between Hamilton and Raglan. This project includes shoulder widening, side barriers, rumble strips, wide centreline and minor intersection improvements to improve safety.

SH1B – Taupiri to Gordonton

Description: The project will see side barriers installed in locations where there is a high risk of run-off-road crashes, widened centrelines installed to reduce the risk of head-on crashes and signage and road markings improved. The visibility of the roundabout on the northbound exit off the expressway on SH1 between Orini Road, Taupiri and the Gordonton interchange will also be improved.



Taupiri safety improvements

Draft regional programme considered for 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
SH39 Hamilton to SH31 Safety Improvements		Safety improvements on SH39 from Hamilton to SH31 as identified through the NSRRP Review
SH25 Coromandel Motorcycle Demonstration Project - stage 2		Low cost safe system route treatments on SH25/25A Coromandel northern loop, focussed on motor cycle safety.
SH25 Coromandel Short term Safety Improvements		Implementation of revised speed limits with supporting engineering measures on SH25 and surrounding network following Coromandel Integration Improvements
SH26 Hamilton to Morrinsville Safety Improvements		Safety improvements on SH26 from Hamilton through to Morrinsville as identified in the NSRRP Review and the Raglan-Hamilton-Coromandel CMP
SH26 Morrinsville to Kopu Safety Improvements		Safety improvements on SH26 from Morrinsville through to Kopu as identified in the NSRRP Review and the Raglan-Hamilton-Coromandel CMP
SH39 & SH31 Hamilton to Otorohonga Safety Improvements		Safety improvements on SH39 and SH31 from north Hamilton through to Otorohonga to SH39 as identified through the NSRRP Review

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:

- **Falling trees:** including Wilding Pines falling onto road including due to root subsidence along SH25A is an issue.
- **Planting maintenance:** At Kopu on SH25 there is an increased maintenance pressure due to the upkeep of additional plantings around the new Kopu bridge project.

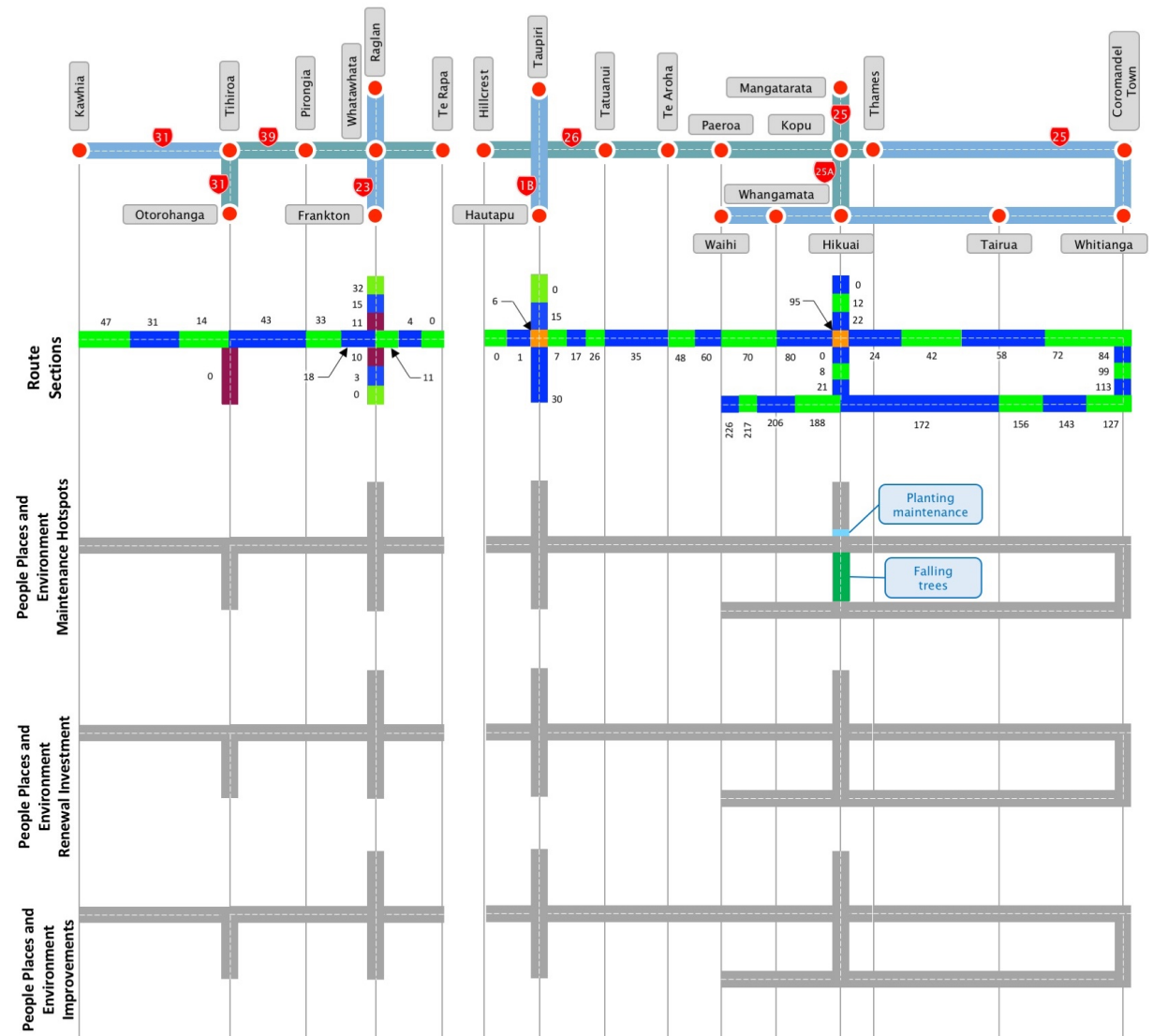
Renewals

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.

Figure 27 – People, places and environment investment



Investment pressures

Access and resilience

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

- **Maintenance timing and access:** Constrained by intense rainfall over winter and spring, and the peak holiday period over high summer, access to the corridor on the Coromandel Peninsula for planned maintenance is confined to a small window in late summer and early autumn. Maintenance access for some other sections of the corridor can also be challenging given the isolation of some areas. Getting resources to these areas puts pressure on contractors to complete work quickly and may require temporary asset maintenance until permanent repairs can be scheduled.
- **Maintenance of SH31:** The highway is the only road to Kawhia and is particularly challenging to maintain due to the underlying geology. The road is subject to frequent erosion and slumping and corrugated sections are common on slopes. Slip seal repairs, retaining wall construction and ongoing maintenance costs are high in relation to its volume and function.
- **Bridge washouts and scouring:** Access across bridges are crucial for the lifeline function of many of these highways. Tairua River Bridge on SH25A requires ongoing maintenance because of scouring.
- **Large distance from materials:** Options for surface treatments is limited in much of the corridor due to the distance from asphalt plants.

Reliability and efficiency

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

- **Seasonal peaks:** Increased summer demands on the Coromandel Peninsula (and SH23 to Raglan to a lesser extent) create congestion through and between towns, particularly on the east coast of the Peninsula. This creates an extraordinary operational burden to implement traffic management during these periods.
- **Urban growth:** Urban development in the outer suburbs of Hamilton is increasing travel demand on the western end of SH23, increasing travel time delays at peak times.
- **One Lane Bridges:** While there are a number of old one lane bridges, they are in relatively good condition. Any maintenance work done on these bridges does however require full closure of the road.

Safety

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

- **Shoulders:** Some parts of this corridor have inconsistent shoulder widths. In constrained corridors, particularly on the Coromandel Peninsula there are areas with no shoulder provision, adjacent to steep drops and sheer rock faces.
- **Deep culverts:** Many of the highways have deep ditches and culverts to enable drainage of the corridor, particularly SH26. Most culverts are protected by barriers; however, some barriers are failing and require maintenance.
- **Road surface:** Bitumen flushing occurs on parts of the corridor and reduces surface skid resistance. This is of particular concern on the Coromandel Peninsula, which is favoured by motorcyclists.
- **Vulnerable road users:** Poor provision of facilities for pedestrians and cyclists through and between towns increases the safety risk and reduces the attractiveness of these modes on this corridor. In addition, as the Hauraki Rail Trails are expanded and connected, it is anticipated that there will be a growth in cyclists.

People, places and environment

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

- **Increasing severe weather events:** Impacts from more frequent and intense weather events are expected increase the vulnerability of key parts of the corridor, in particular the west coast of the Coromandel Peninsula and parts of SH31.
- **Reduced vegetation envelope:** There is a reduced vegetation envelope on SH25/42 and SH25/72 between Thames and Coromandel for to allow for Pohutukawa preservation. Annual inspections are required to agree a trimming programme with the Pohutukawa Preservation Society and Road Transport operators.
- **Vegetation management:** Requirements for biosecurity compliance to minimise the spread of Kauri Dieback disease are likely to increase on the Coromandel Peninsula. Continued urban growth puts pressure on natural environments. Overhanging trees and wilding pines are an ongoing maintenance item. Pohutukawas along the Coromandel coastline are highly valued by local communities; management of these species can be sensitive.

Investment future considerations

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

- **Maintenance management:** Increased investment on preventative maintenance measures to mitigate resilience risks such as enhanced drainage maintenance, construction of retaining walls, and benching or battering rock faces should be programmed for known areas of weakness.
- **Investment in enduring treatments and infrastructure:** For the more isolated and vulnerable sections of the corridor such as SH31 and parts of SH25 and SH25A, investment in quality repairs and renewals should be considered given the fragility and remoteness of parts of this corridor.
- **Cycle facilities:** Initiatives to improve cycle safety at busy crossing points and opportunities to increase shoulder widths on sections of the corridor should be considered, particularly those near the Hauraki Rail Trail.
- **Improvements to road quality:** As traffic volumes on the corridor continue to grow along the corridor, there will be a greater exposure to safety risks that will need to be mitigated on these secondary highways, and the need to consider improvements to the quality of the assets to deliver safety outcomes.
- **Management of at-risk assets:** The constraints and at-risk assets along the corridor are well known. However, given competing demands and priorities, assets such as Coromandel's single lane bridges and constrained road corridor north of Thames are maintained and repaired as required. Preventative works, or replacement of these assets will need to be prioritised before failure of sections of the corridor results in substantial disruptions and inconvenience to communities enroute.
- **Managing customer expectations:** The adoption of the ONRC classification will impact on how roads are being maintained, and the philosophy may not be understood by customers. Higher risks and lower tolerances are generally accepted on lower order roads such as Primary Collectors through the ONRC. However, the effects of less investment and acceptance of a lower level of service may be cumulative and will result in faster deterioration of the road. A change in context between journeys on higher order state highways (e.g. SH1 and SH2), to the more rural state highways that make up this CMP may appear inconsistent to some users. This can increase the risk for drivers who are unfamiliar with network. Conversely, the construction of high quality local roads in new subdivisions (e.g. Whitianga and Pauanui) are raising expectations of the quality and performance of the state highway network.



Ruamahunga slip SH25

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
Major Alternate Routes		Network Manager and Regional Staff Desktop analysis Corridor drive-over	2016
Diversion Lengths		NZTA StateHighways.pptx Diversion Routes	Unknown

Section	Infographic	Information Source	Date
	Closures	NZTA 2011-2015_Treis_incidents_by_region.xlsx	2015
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

Section	Infographic	Information Source	Date
	Noise and Vibration	NZTA - Environment and Urban Design Team	2016
	Drainage Catchments	NZTA - Environment and Urban Design Team	2016
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			
	Maintenance Hot Spots	Network Manager and Regional Staff	2017

Section	Infographic	Information Source	Date
Investing in access and resilience	Resurfacing 2018 - 2021	Resurface data derived from forward works programme	
	Renewal Investment	National Bridge Replacement Programme National bridge replacement programme 2017 LCMP data.xlsx	
	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		

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	



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

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