

Pokeno to Tauranga

CORRIDOR MANAGEMENT PLAN

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2018-2028

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Executive summary

The Pokeno to Tauranga corridor comprises two of the three routes connecting Auckland, Hamilton and Tauranga (the Golden Triangle). The first is the SH2 route from the SH1/SH2 interchange at the southern base of the Bombay Hills, through to the intersection of SH2/SH29 in Tauranga. The second is the SH27/24 route which runs from the SH1/SH2 interchange to Mangatarata, then down SH27 through to Matamata; and SH24 from Matamata through to its intersection with SH29 at the western base of the Kaimai Ranges. Refer to Figure 2.

The corridor is approximately 244 km long (2.1% of the state highway network). The total value of assets along the corridor is \$467M (2.0% of the total national asset value).

Part of the golden triangle, the SH2 route is a key journey connecting Auckland to Tauranga and provides access to the Coromandel Peninsula. Both the SH2 route and the SH27/24 route are two of the three routes connecting Auckland with Tauranga and beyond, catering for the movement of people and freight to international ports in Auckland and Tauranga, important tourist locations across the regions (e.g. The Coromandel Peninsula) and significant areas of economic activity. SH27 functions primarily as a long-haul freight and tourism north-south alternative to SH1 in addition to providing an alternative route to Tauranga. SH24 performs an inter-regional role connecting SH27 to SH29, carrying a high proportion of heavy vehicles to and from the Port of Tauranga.

Customer along this corridor are a combination of daily commuters, local traffic, tourists, inter regional traffic and freight. Customers along this corridor tend to be well-informed, have an expectation of continuous service, but accept that the quality of service may vary according to overall demand. The SH2 route is marketed as the Pacific Coast Highway, attracting visitors to tourist attractions and activities across the two regions and providing linkages to key tourist destinations such as the Coromandel Peninsula, Karangahake Gorge, Waihi Beach and Tauranga/Mount Maunganui

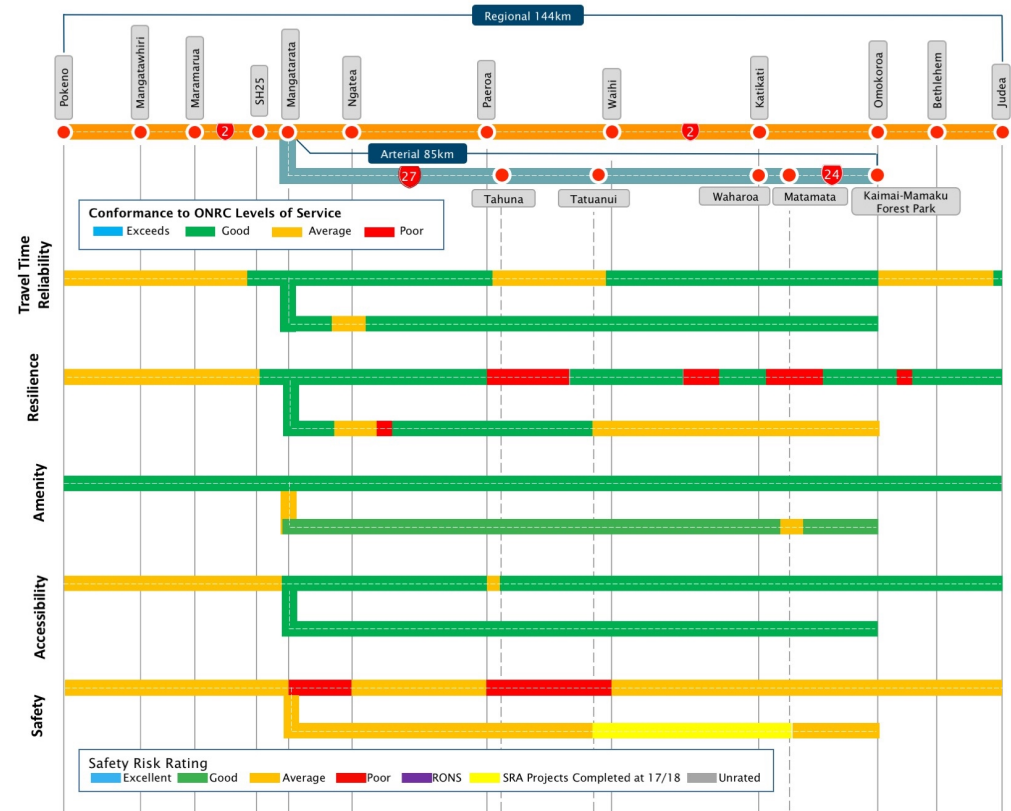
Population growth, weekend holiday traffic, increased freight and tourist demand will continue creating additional demand on the corridor especially between Katikati and Tauranga on the SH2 route.

Safety has been the primary concern along the corridor. Holiday peaks resulting in long queues and delays has also been a focus of investment in recent years resulting in a number of planned improvements that will be completed over the next 10 years.

As activity increases on the corridor, customer safety and travel reliability will continue to become more important. Travel time reliability is already a concern at the northern end of the corridor with AM/PM peak traffic affecting levels of service towards Tauranga. The challenging terrain of the Karangahake Gorge, Kaihere Hill and the tight bends along the

corridor make an unforgiving road environment where fatal and serious injuries are high and continue to be a concern.

Figure 1 - Performance of the corridor against ONRC outcomes



A number of improvements including the Tauranga Northern Link (TNL), the Waikato Expressway and safety improvements are already underway to relieve some of the pressure on the corridor. The expectation is for some traffic to shift to the Waikato Expressway (SH1/29 route) once completed. Despite the shift, the SH2 will continue to be a key connection and the SH27/24 will continue to service intra-regional freight and offer an alternative route between Auckland and Tauranga (and beyond).

Introduction

Purpose

What is the corridor management plan?

This Corridor Management Plan describes the customer service delivery story for the Pokeno to Tauranga 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 30-year, long term planning outlook, the 10-year medium term investment programme and the 3-year land transport programmes for the next funding round.

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

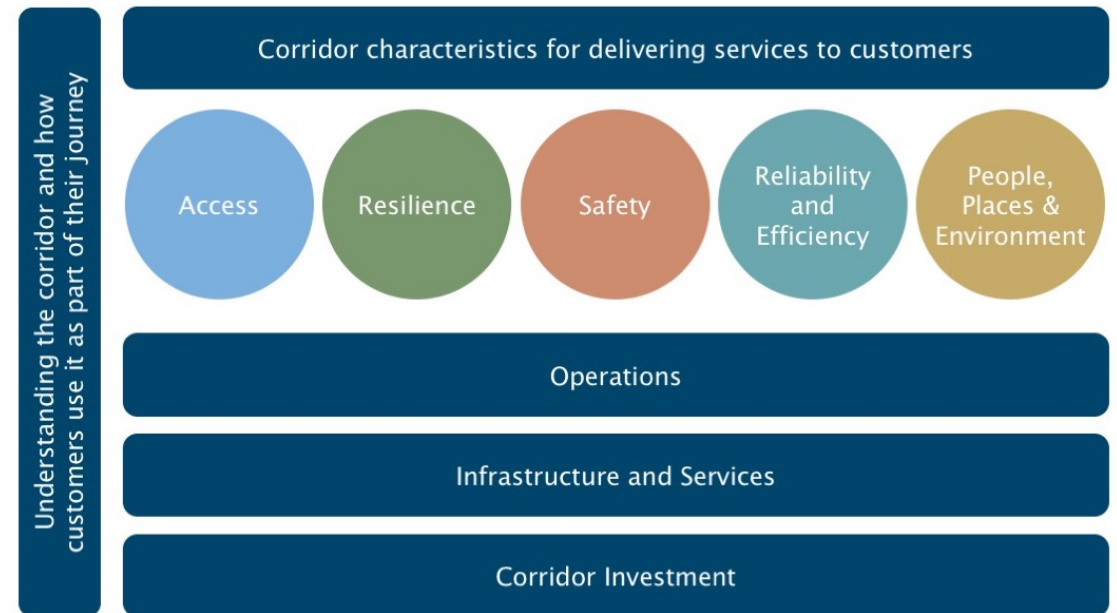
Planning is currently undertaken at the regional level, but typically significant journeys traverse more than one region. By considering the significant customer journeys and destinations, the corridor management plan is a vehicle to engage in regional and inter-regional conversations by focusing on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

How will we use it?

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

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

Figure 2 - Corridor management plan framework



The corridor at a glance

Corridor overview

The Pokeno to Tauranga corridor comprises two of the three routes connecting Auckland, Hamilton and Tauranga (the Golden Triangle). The first is the SH2 route from the SH1/SH2 interchange at the southern base of the Bombay Hills, through to the intersection of SH2/SH29 in Tauranga. The second is the SH27/24 route which runs from the SH1/SH2 interchange to Mangatarata, then down SH27 through to Matamata; and SH24 from Matamata through to its intersection with SH29 at the western base of the Kaimai Ranges. Refer to Figure 2.

As a main transport route between Auckland, Waikato and Bay of Plenty (BoP), SH2 caters for the movement of people and freight to international ports in Auckland and Tauranga, important tourist locations across the regions (e.g. The Coromandel Peninsula) and significant areas of economic activity. SH27 functions primarily as a long-haul freight and tourism north-south alternative to SH1 in addition to providing an alternative route to Tauranga. SH24 performs an inter-regional role connecting SH27 to SH29, carrying a high proportion of heavy vehicles to and from the Port of Tauranga.

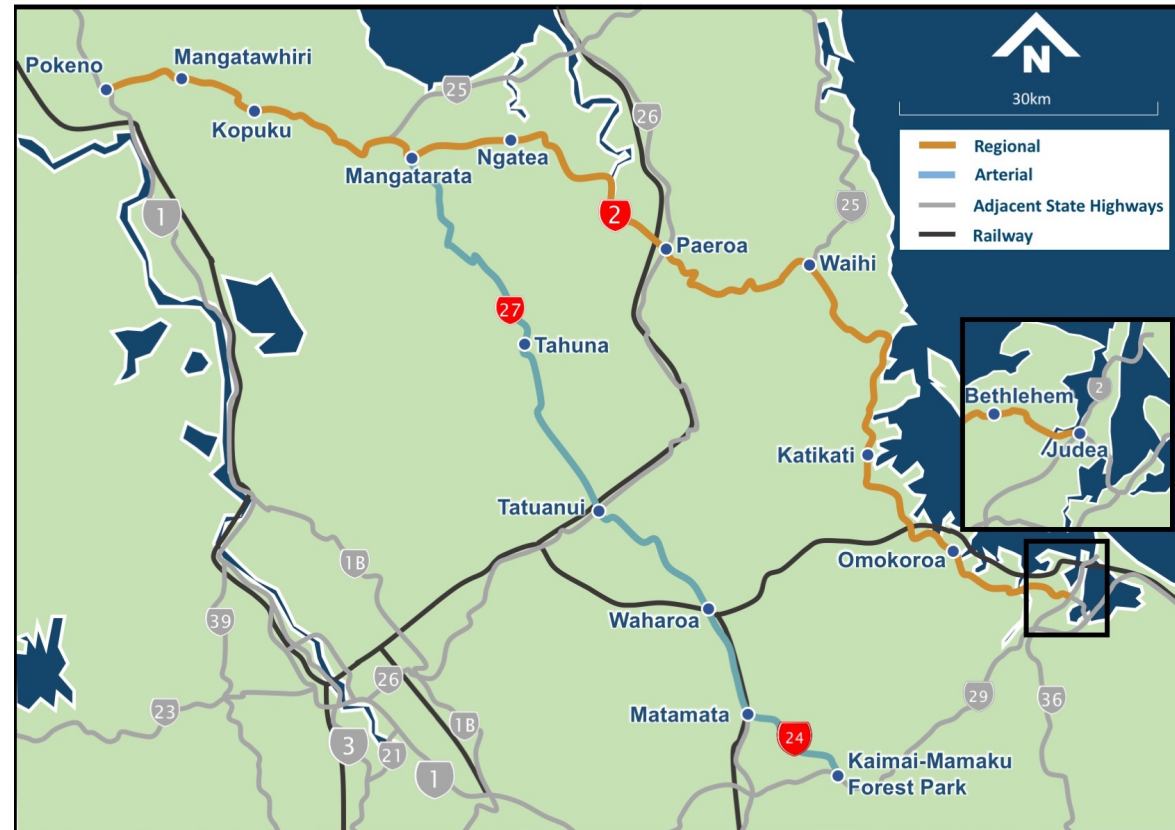
SH2 between Pokeno and Mangatarata is close to capacity for a regional route, with 15,500 vehicles using the corridor daily. Traffic returning to Auckland after public holidays and weekends creates congestion and delays, with weekend travel days experiencing the highest flows, often reaching 25,000 vpd. Fuelled by residential and commercial growth in the Western Bay of Plenty, the route between Katikati and Tauranga exceeded capacity in 2016 at Te Puna with daily volumes in excess of 20,000vpd. Issues such as unpredictable journey times, congestion, safety and difficulties accessing the highway by the local communities and residents are common concerns.

The regional economy

The BoP has approximately 320,000 residents (7% of New Zealand’s population), making it the fifth most populated region in New Zealand, and contributes just over 5% to New Zealand’s GDP. The regions’ economy is expected to increase by 50% over the next 20 years, driven by a well-diversified range of export-focused industries, including forestry and wood processing, dairy farming and horticulture. The BoP produces more than 80% of NZs highest value horticultural export – kiwifruit, and almost 75% of the national avocado crop. The Waikato region is home to almost 10% of New Zealand’s population and is projected to reach 470,000 by 2031. The region has considerable economic diversity providing 9% of New Zealand’s GDP with a strong economic focus on dairy, sheep and beef farming, forestry, horticulture, mining and mineral assets (coal and iron sand).

With projected growth in population across the regions and in Katikati and Omokoroa, combined with growth in economic activity, the demands for personal, tourist and freight use is expected to increase along the corridor. Improving capacity, travel time reliability and safety will be key drivers.

Figure 3 - Corridor overview



Understanding our customers

Key customers

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

Daily commuter

The section of SH2 from Omokoroa to Tauranga provides a daily commuter route. With increasing urban growth in areas such as Katikati and Omokoroa, commuter use will continue to increase pushing this route to capacity at peak times. With limited public transport options elsewhere, use of personal vehicles is the predominant mode of commuter transport. Increasing urban growth in settlements towards Tauranga will likely result in an increase in the use of this corridor as a commuter route.

Insights into daily commuter users:

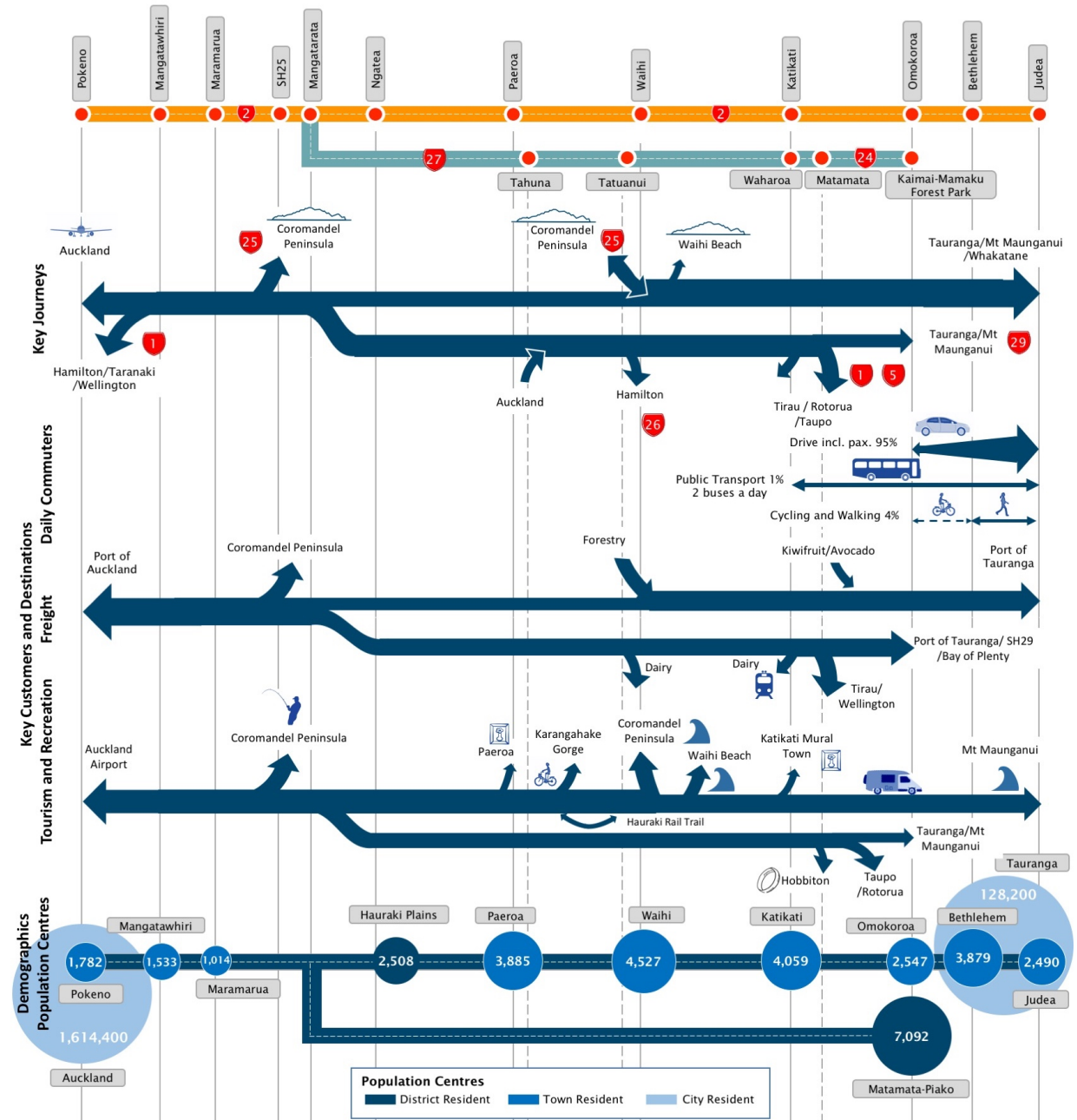
Road use: As Pokeno, Katikati and Omokoroa are all characteristic of smaller settlements outside of the main centres like Auckland Hamilton and Tauranga, commuters have limited alternative transport modes. The use of personal vehicles therefore is the predominant mode for daily commuters.

Road knowledge: Commuters are familiar with their route and viable alternatives to avoid congestion when required. Journey times are relatively predictable outside of peak times.

Pain points: The Omokoroa to Tauranga section regularly nears capacity at peak times, affected by the choke points at Te Puna and Wairoa River Bridge and the high frequency of accessways.

Daily commuters expect: Predictable journeys at peak times, accurate and up to date information about traffic (peak and off peak), weather, road conditions and hazards, safe access onto the corridor, safe crossings and turning along the corridor and a holistic approach to transport with investment in public transport to make it more reliable and accessible.

Figure 4 – Key customers, journeys, and destinations



Tourist and recreational users

The SH2 route is marketed as the Pacific Coast Highway, attracting visitors to tourist attractions and activities across the two regions and providing linkages to key tourist destinations such as the Coromandel Peninsula, Karangahake Gorge, Waihi Beach and Tauranga/Mount Maunganui.

BoP beaches are a key attraction, particularly in the summer months, with the Mt Maunganui Main Beach having been ranked the best beach in NZ by Trip Advisor in 2015. The SH27 route provides access to Hobbiton in Matamata and an alternative route for travel to Rotorua.

Insights into tourist and recreational users are as follows:

Road use: High numbers of tourist and recreational users travel the SH2 route between the Auckland, Waikato, Coromandel Peninsula and BoP regions. The Hauraki Rail Trail, Karangahake Gorge and BoP beaches attract tourists and recreational users further along SH2, with many stopping in Paeroa and Katikati townships. The Coromandel Peninsula is a popular destination for international and domestic visitors with increasing holiday home ownership resulting in increased weekend travel from and to Auckland. The SH27/24 route is the preferred route for coach tours from Auckland to Rotorua/Taupo (via Matamata), and also used by recreational travellers as an alternative to SH1 for north-south journeys.

Road knowledge: Many independent travellers are unfamiliar with their route, with limited knowledge of places on the journey where the road narrows or becomes winding. Tour buses and domestic recreational users are more aware of the route, its challenges and anticipated travel times.

Pain points: Between Pokeno and Mangatarata variable speed limits and high northbound flows after public holidays and during summer weekends result in congestion. Poor geometry and numerous stopping places within the Karangahake Gorge can cause conflict between tourists unfamiliar with the route, exacerbating safety and reliability issues. Between Waihi and Tauranga, Katikati township creates unreliable travel times during summer peak periods.

Tourist and recreational users expect: Reliability of routes and predictable destination arrival. Scenic routes with good signage. Smooth road surface and plenty of places to pull over safely for refreshments and toilet breaks.

“I want to reach my destination in the time I expect”

Freight operators

Both major ports, Auckland and Tauranga, are located at the ends of the corridor. The Port of Tauranga is the largest port by volume. It is the second largest container port and the largest export port in New Zealand, and a major contributor to the BoP economy, contributing almost 10% to New Zealand’s GDP.

Intra-regional freight such as horticulture (mainly kiwifruit and avocado) contributes to traffic surrounding Katikati and relies on SH2 to transport produce to the Port of Tauranga. Logging is regularly transported from the Coromandel Peninsula to the Port of Tauranga via SH25 (Waihi) and SH2.

Freight movements along SH27 are predominantly made up of long haul freight, dairy and general goods servicing the local communities. Milk is transported on trucks to processing plants surrounding Tatuani and Waharoa, before being transported by rail to Hamilton for packaging and loading into containers.

Insights into freight operators are as follows:

Road use: According to the NZ Transport Agency’s 2015 traffic report, between Auckland and Tauranga, 36% of the freight travels to Tauranga via the SH2 route. 13% divert towards the Coromandel Peninsula at SH25 and 51% travel the SH27 route for journeys to Tauranga and beyond.

Road knowledge: Freight operators’ knowledge of the road conditions is high with the confidence of managing difficult conditions.

Pain points: Kaihere Hill along SH27 and the SH2 route through the Karangahake gorge exhibits poor geometry and alignment. This combined with a lack of passing opportunities, tight bends, and gradients affect truck speeds through these sections of the corridor.

Freight operators expect: The ability to safely undertake the freight journey from Auckland to Tauranga with convenient places to stop and travel time reliability. Good quality, straight and flat roads. Information about road conditions.

“Being up to date with real time delays and road conditions helps me plan my journey”

How we deliver services along the corridor

Transport partners

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

The NZ Transport Agency works closely with the Territorial Local Authorities (TLA's), regional councils, KiwiRail and police along the corridor as shown in Figure 5.

Collaboration along the corridor

The NZ Transport Agency is a partner in the SmartGrowth Strategy (2013), along with the Bay of Plenty Regional Council, Western Bay of Plenty District Council, Tauranga City Council, and tangata whenua. SmartGrowth provides a direction for growth, infrastructure planning and development. Current investigations such as the Tauranga City PBC (2016), Waihi to Tauranga PBC (2015) and the Tauriko Network PBC (2016) are assisting to develop the future form and function of the transport network within the Western Bay of Plenty area.

Upper North Island Strategic Alliance

The Upper North Island Strategic Alliance (UNISA) collaborates with the NZ Transport Agency, KiwiRail, Auckland Transport, industry groups, ports and freight operators to identify critical issues to help move freight more efficiently through the region, creating a shared evidence base to enable better future decision-making between the UNISA and strategic partners.

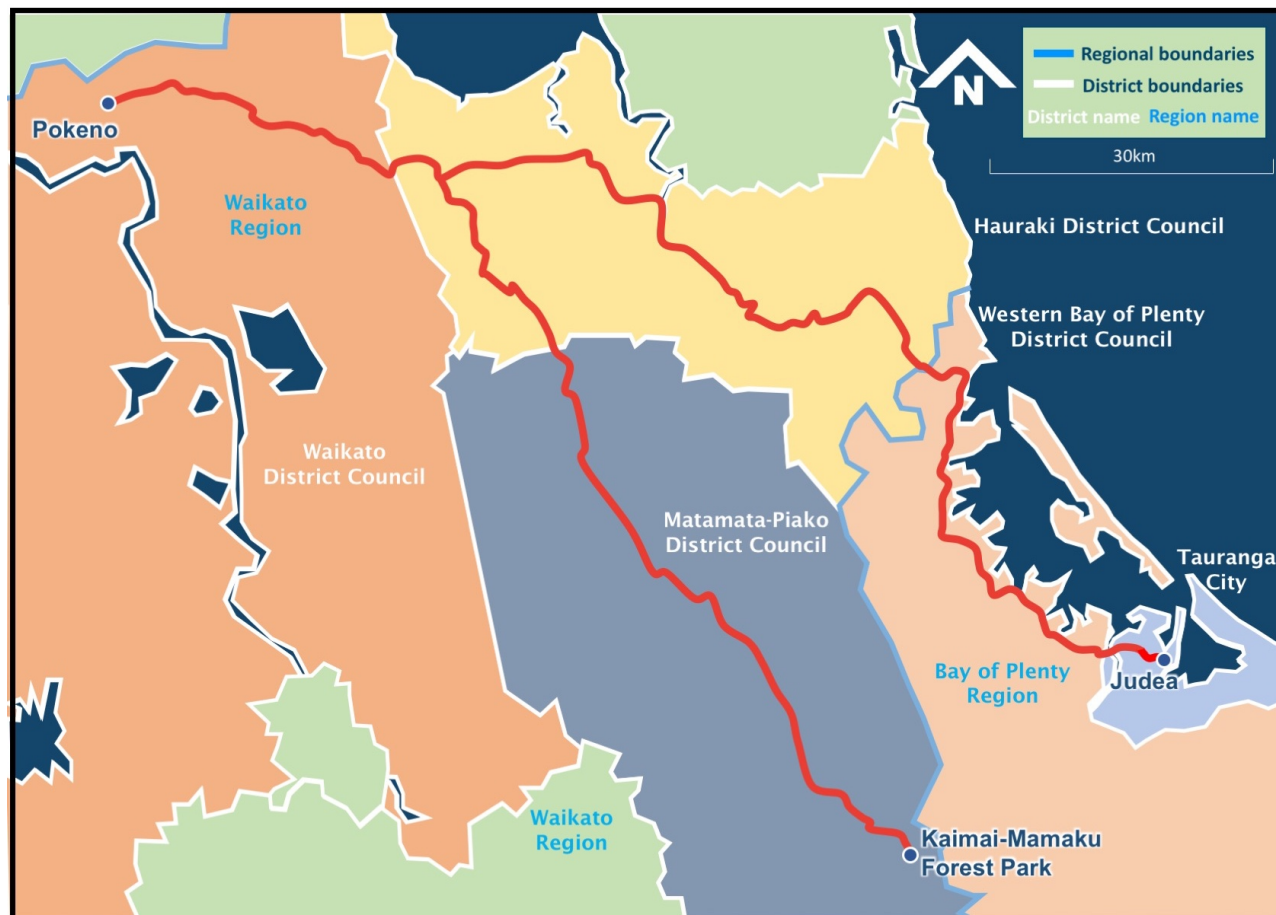
Safe Roads Alliance

The Safe Roads Alliance commenced in July 2015 to deliver a program of road and roadside safety improvements to the State Highway Network over a six-year term. A programme alliance of Beca, BBO and Northern Civil partnered with the NZ Transport Agency, currently covers approximately 55 projects nationally, 4 of which are located on this corridor.

Traffic Operation Centres (TOC)

Traffic Operation Centres are the 'conduit' services in place nationwide to communicate activities/event on the transport network to the users of the SH network and wider stakeholders (e.g. emergency services and NOC suppliers providing emergency response), and monitor and report SH incident response in the online TREIS system. ATOC (Auckland) covers the entire corridor.

Figure 5 - Map of associated local authorities



Network Outcomes Contracts approach

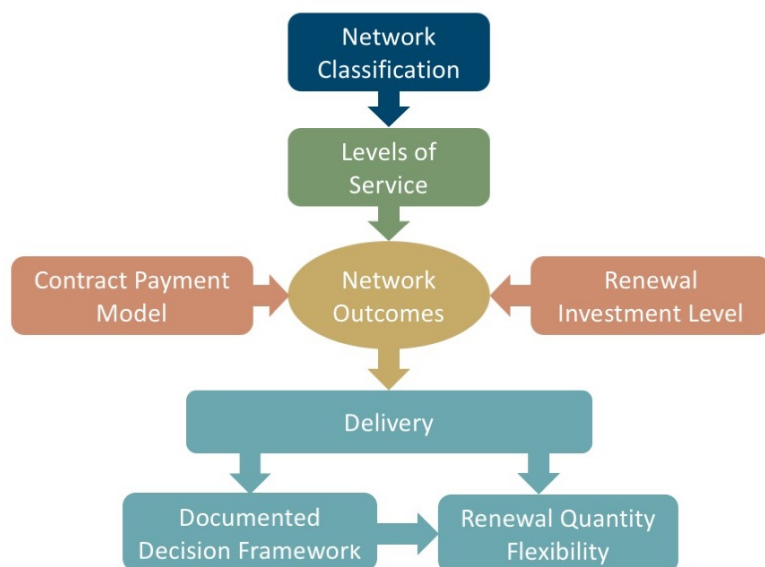
Network Outcome Contracts (NOC) are aimed at improving the effectiveness of service delivery for maintenance and operations of the state highway network. Elements of previous procurement methodologies (PSMC, Hybrid and Traditional models) have been integrated into the NOC contract model which delivers 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 NOCs is shown below:

Figure 6 – NOC process



Collaborative delivery of services

The Pokeno to Tauranga corridor crosses over two NOC contract areas as discussed below. The boundary of the two contract areas occurs on SH2 at the Bay of Plenty (BoP) District and Waikato District boundary lines, approximately 7km south of Waihi. Therefore, SH2 from Pokeno to just south of Waihi and all of SH27 and SH24 are within the East Waikato NOC, with remainder of SH2 in the BoP West NOC.

BoP West Network Outcomes contract

The BoP West One Network Maintenance contract is undertaken by WestLink, an Opus led contract supported by Downer. The contract commenced on the 1st of November 2014 for a 7-year period with the option based on performance for a further 2 years. It covers all Western Bay of Plenty local roads (over 1000km) and all state highways (257km) within the Western Bay of Plenty and Tauranga City, with the state highway component being operated under the NOC format. This corridor incorporates 74km of state highways within this NOC area.

This contract is supported by the following specialist maintenance contracts:

- **Regional bridge and structures:** Professional Services contract covering the wider Waikato and BoP regions, awarded to Beca in September 2015 with a contract term from 1 November 2015 to 31 October 2018.
- **Traffic monitoring sites:** Professional Services contract covering the wider Waikato and BoP regions, awarded to Beca in October 2016 with a contract term of two years with the option based on performance for a further three years.

East Waikato Network Outcomes contract

The East Waikato NOC contract is undertaken by Broad-spectrum (formerly Transfield Services). The contract commenced on the 1st of July 2015 for a 5-year period with the option based on performance for a further 2 years. The contract covers 565km of which 188km are within this corridor.

This contract is supported by the following specialist maintenance contracts:

- **Regional bridge and structures** – Professional Services contract covering the wider Waikato and BoP regions, awarded to Beca in September 2015 with a contract term from 1 November 2015 to 31 October 2018.
- **Traffic monitoring sites** – Professional Services contract covering the wider Waikato and BoP regions, awarded to Beca in October 2016 with a contract term of two years with the option based on performance for a further three years.

Drivers for change

The Pokeno to Tauranga 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.

Population growth

Over the coming years, the population along the corridor is expected to continue its upward trend as Auckland continues to expand and more people move into the regional centres such as Hamilton and Tauranga, and smaller settlements like Pokeno, Katikati and Omokoroa.

SH2 from Waihi to Tauranga is defined as a preferred area for population and economic development in the SmartGrowth Strategy (2013). The population along this section of the route is expected to increase from 21,000 in 2016 to 35,000 people by 2040 with growth expected in Katikati, Omokoroa, Minden and Te Puna on the approach to Tauranga. Tauranga too is forecast to grow by 80,000 people over the next 30 years, a 70% increase from 2013, requiring approximately 45,000 new homes.

Growth in demand for travel to the Coromandel Peninsula by weekend holiday makers and access to holiday homes will continue to add to the traffic volumes, in turn adding to the pressure of providing safe and efficient travel routes.

Freight demand

Along with population and tourism growth, freight movement along the corridor is also expected to increase by 50% to 65% between 2006 and 2040 in response to freight movements into, from, and within the Bay of Plenty region related to growth in horticulture (avocados and kiwifruit), logs, timber products and aggregate. Freight traffic from the Bay of Plenty region alone is expected to grow by around 60% over next 20 years, equating to between 500 and 1000 additional trucks per day along the different segments of SH2. The Port of Tauranga is expected to increase its capacity to continue to grow freight volumes for the foreseeable future and relieve constraints emerging elsewhere in New Zealand's port infrastructure.

Levels of service

In light of the growth rates based on the Waikato Regional Transport Model, by 2040, and without any significant intervention, levels of service on SH2 between Pokeno and Mangatarata and Katikati to Tauranga could lower to levels of service E/F. A key focus therefore moving forward is to ensure that the state highway network meets the aspired levels of service for the corridor.

Future focus

Influencing travel demand: The SH2 route at either end is subject to reliability issues especially during peak times due to a mix of development, tourist traffic, freight as well as daily commuters. This may require land use decisions to support an efficient transport network and further investment in public transport to facilitate daily commuter journeys. Maximising opportunities from existing and new technologies (e.g. intelligent transport systems to provide real-time information) to increase vehicle occupancy and throughput, and encourage more efficient travel should also be key in managing travel demand moving forward.

Making better use of existing infrastructure: Ensuring best returns on infrastructure investment means better prioritisation of existing networks to get the most out of the existing infrastructure and continue to improve efficiencies in maintaining, operating and renewing infrastructure.

New infrastructure and services: Committed infrastructure including the Tauranga Northern Link (TNL) and Waikato Expressway (SH1/29) seek to alleviate capacity pressure faced by the network.

The SH1/29 route will be prioritised for future investment serving national traffic (e.g., Auckland - Tauranga). The SH2 route will be expected to operate at a lower level of service appropriate for a Regional Strategic route however, as SH2 offers the shortest route option between Auckland and Tauranga, it will continue to be attractive for many journeys.

SH27/24 route will also continue to provide an alternative route for inter-regional freight and continue as a key connection for intra-regional freight.

Going forward, the focus for transport is to aid development growth, tourism, and freight demand in Waikato and the Bay of Plenty through the provision of new infrastructure and services where justified.

Vulnerability to natural events: Impacts of climate change, the risk of flooding and tsunami risk on SH2 makes it vulnerable to natural events especially given the importance of the route connecting the golden triangle. The need to manage this vulnerability is likely to heighten as the population along the corridor and the intensity of weather events increases.

Understanding customer levels of service on the corridor

Current levels of service performance

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

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

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

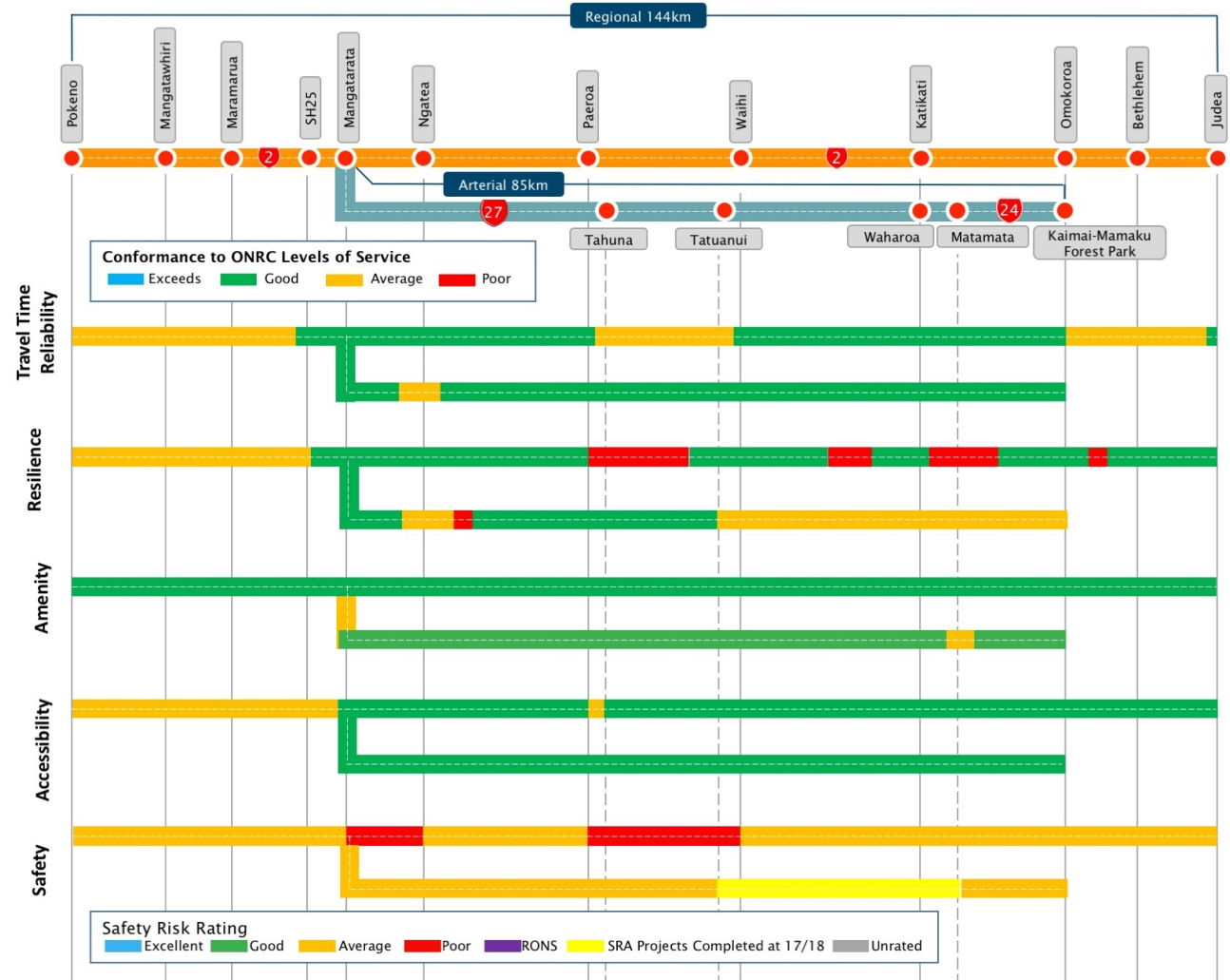
Road classification

The 144km corridor comprising SH2 between Pokeno and Tauranga is classified as a Regional route. SH27 and SH24 from Mangatarata to Kaimai-Mamaku Forest is a length of 85km, and is classified as an Arterial route.

The expected decrease in use of SH27/24 resulting from the completion of Waikato Expressway may prompt a revision in classification.

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

Figure 7 - Current ONRC levels of service performance







Summary of current performance

Figure 7 shows how the Pokeno to Tauranga corridor is currently performing against the ONRC Levels of Service as they relate to each of the two current classifications.

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

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

The SH2 route from Pokeno to south of Maramarua faces heavy traffic volumes with Travel time reliability significantly affected during summer weekends and holiday travel. Between Omokoroa and Bethlehem lower levels of service during AM/PM peak are attributed to local commuting to and from Tauranga. Sections passing through the Karangahake Gorge on SH2 and Kaihere Hill on SH27 are also subject to lower levels of service reflective of the geography and poor geometric alignments. A lack of passing opportunities and the terrain with horizontal curves and vertical gradients affect truck speeds along the length of the corridor.

As a key investment driver on routes within the corridor, improving travel time reliability is a focus of all planned improvement packages.

Resilience

This corridor includes two of the three routes connecting Auckland with Tauranga. Sections on the SH2 route, and SH27/24 route to a lesser extent are subject to natural vulnerabilities (flooding, slips and rockfall), road closures due to crashes and long diversions in case of an event. The impact is exacerbated by high traffic volumes and narrow alignments (lack of shoulder width and increasing construction of side railings), limiting both the ability for emergency services to access the site and the ability to clear and re-open the route efficiently.

Areas of concern include the Karangahake Gorge, parts of SH2 from Athenree Gorge through to Omokoroa and Kaihere Hill (SH27) which have sections where diversion lengths exceed 50km. On the southern end of SH2 Athenree Rd to Tuapiro Rd, Kauri Pt to Katikati, Rea Rd to Wainui Sth Rd, Barret Rd to Snodgrass Rd, and, Te Puna Bridge have no viable alternate routes.

Resilience has not been a key investment driver on this corridor, but rather a convenient secondary benefit from safety and reliability improvements due to availability of alternative routes between Auckland and Tauranga.

Amenity

Generally, the ride quality meets expectations and the standard of amenity of the corridor is depicted of its ONRC rating of SH2 as a Regional and SH27/24 as an Arterial.

Accessibility

Generally, the corridor provides appropriate levels of accessibility in relation to its ONRC rating, except during peak holiday periods - especially at either ends of SH2. From Pokeno to Mangatarata, the route performance is comparatively lower as it caters for high levels of heavy vehicle traffic at peak times. Accessibility through this section is also impacted by the frequent intersections and accessways.

Towards Tauranga, the SH2 route passes through a number of built up areas like Paeroa and Waihi with high levels of traffic including HCVs presenting potential issues relating to severance and local accessibility.

With predicted growth in traffic volumes on the corridor, accessibility will continue to be an issue and require better management.

Safety

The SH2 corridor is performing below its 3-star safety target and has medium-high and high collective risk over notably large sections along its length. The high traffic volumes, unforgiving roadside environment result in loss of control, run off road and head on crashes, as well as rear end queue and right turn against crashes.

The SH27/24 route also falls short of the 3-star target along most of its length. This is particularly due to the high frequency of roadside hazards, especially unprotected deep side drains and power poles.

Safety is the highest investment priority on this corridor, with Pokeno to Mangatarata Corridor Improvement Project in the pre-implementation phase and improvements from Waihi to Omokoroa, and south of Tatuani on SH27 expected over the next 3 to 5 years.

Improving the customer experience

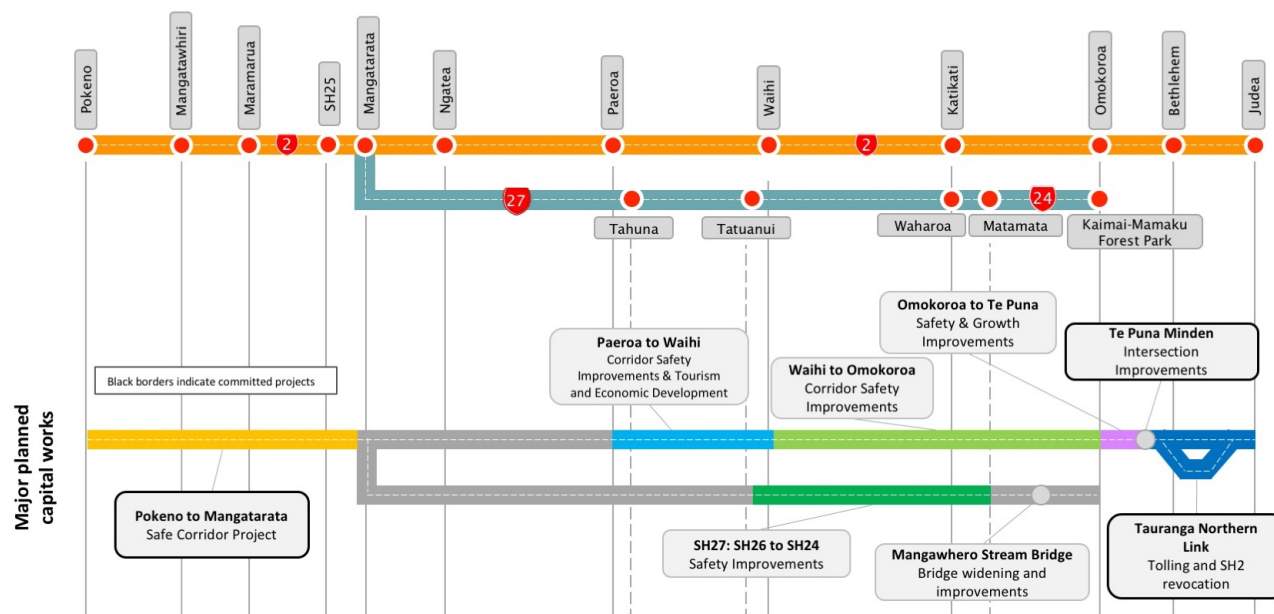
The programme of improvements planned or underway, displayed in Figure 8, have been identified through the Safer Roads and Roadside Programme (2015), Pokeno to Mangatarata Corridor Improvement Project (2015) and the Waihi to Tauranga Programme Business Case (2015). The Omokoroa to Te Puna Single Stage Business Case (SSBC) (2016/2017) is investigating options to improve capacity, safety and reliability to ease the growing congestion between Omokoroa and Tauranga. Katikati Urban IBC (2016/2017) is investigating options to improve town centre amenity and trip reliability to improve tourism in the BoP.

The following Improvements are expected to reduce deaths and serious injuries, improve the KiwiRAP star road rating, relieve capacity issues, and improve travel time reliability along the corridor:

- Safety improvements, are planned between Waihi and Omokoroa and south of Tatanui on SH27 to improve KiwiRAP ratings and facilitate a more consistent road environment, reducing deaths and serious injuries.
- Corridor improvements from Pokeno to Mangatarata and Omokoroa to Tauranga will address safety concerns, improve reliability and increase roadway capacity.
- The Waikato Expressway is expected to create a safe, efficient and reliable alternative route from Auckland to Tirau and between Auckland and Tauranga. Traffic modelling has suggested that up to 2,300 vehicles per day may transfer from SH2/27 to the Waikato Expressway following completion in 2020 relieving.
- TNL has proceeded to pre-implementation with expected construction of the new strategic link into Tauranga completed by 2022. The opening of this Link (TNL) will primarily address capacity issues positively affecting travel time reliability, particularly between Te Puna and Bethlehem.
- The Omokoroa to Tauranga cycle trail will be complete by mid-2018, seeking to encourage more walking and cycling as an alternative mode of transport.

Construction along SH2 is currently staged over a period of 10 years. When completed, the planned improvements on the corridor should result in significant improvements to corridor performance against the ONRC outcomes. Planned improvements are discussed in greater detail later in this document in Improvement Investments (pg. 31-32). They will also result in an increased portfolio of assets which have implications in terms of maintenance and associated costs.

Figure 8 – Significant corridor planned improvements



The following sections consider the current state, pressures and future considerations for Access, Resilience, Reliability and efficiency, safety and people, places and environment.

Access

Carriageway configuration

The carriageway configuration is made up primarily of two lanes with minimal passing lanes, multiple connections to a network of local roads, and direct access to adjoining properties. At either end of SH2 corridor, passing lanes become more frequent.

Between Waihi and Bethlehem, on average, there is an intersection every kilometre and a private access way every 250m, causing frequent conflicts between road users

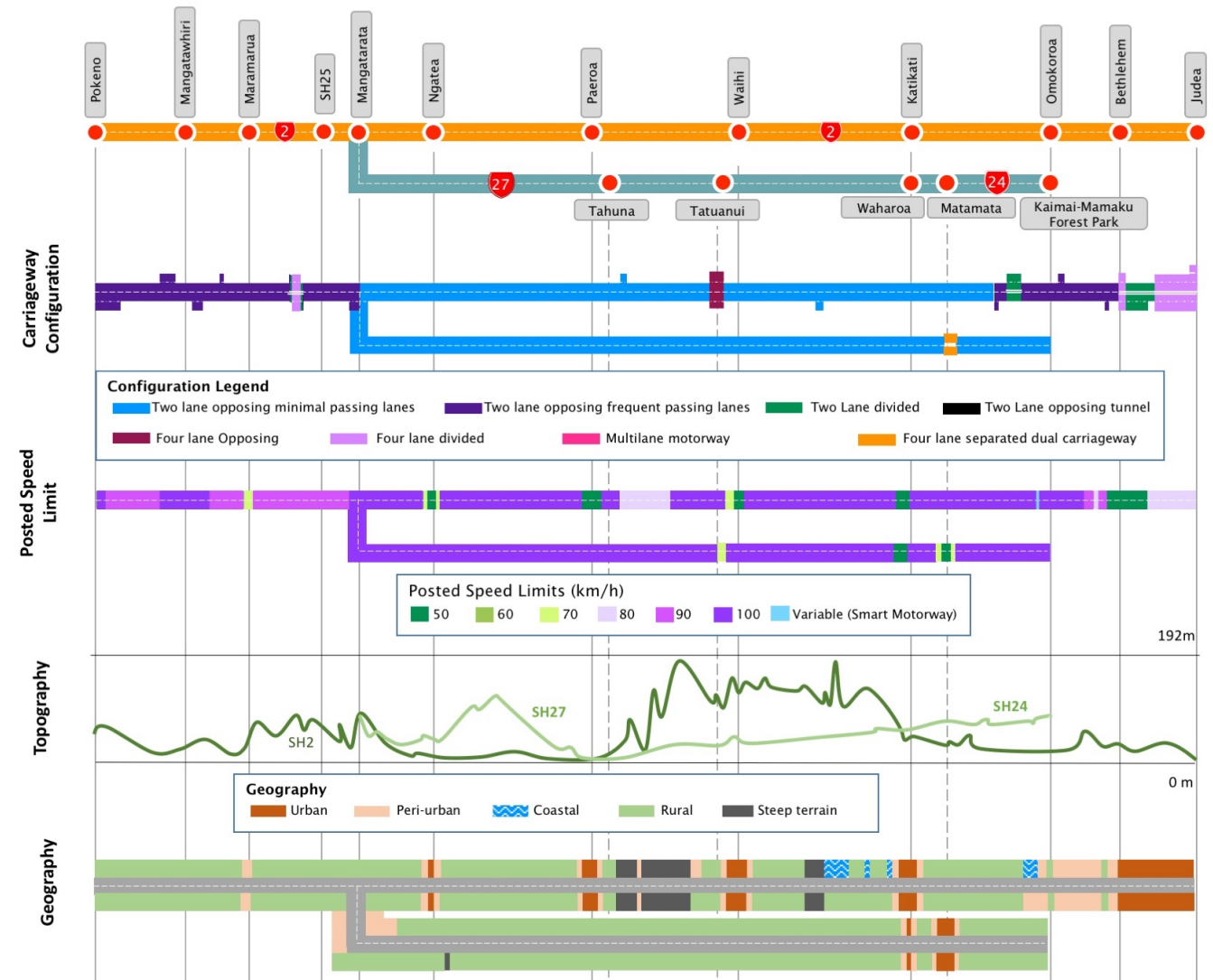
Speed limits

In 2011, a 90km/hr safety trial was established along the majority of the Pokeno to Mangatarata section to address safety concerns. A short 90km/hr section is in place around Te Puna on the approach to Bethlehem. Although in a rural area, the Karangahake Gorge with challenging alignment has a posted speed limit of 80km/hr. The corridor has 6 urban centres (50km/hr), 3 peri-urban areas (70km/hr), and variable speed management signs at Pahoia School.

Topography/geography

The top third and lower third of the SH2 route has rolling, tight geometry separated by the low-lying Hauraki Plains and steep terrain surrounding the Karangahake Gorge. The SH27 route is dominated by tight corners and geometry along the first quarter, followed by long straights through low-lying flat agricultural lands to the SH24 intersection with SH29. The route transitions from high density urban environment in the south to open rural landscapes over the majority of length with minor urban settlements scattered throughout.

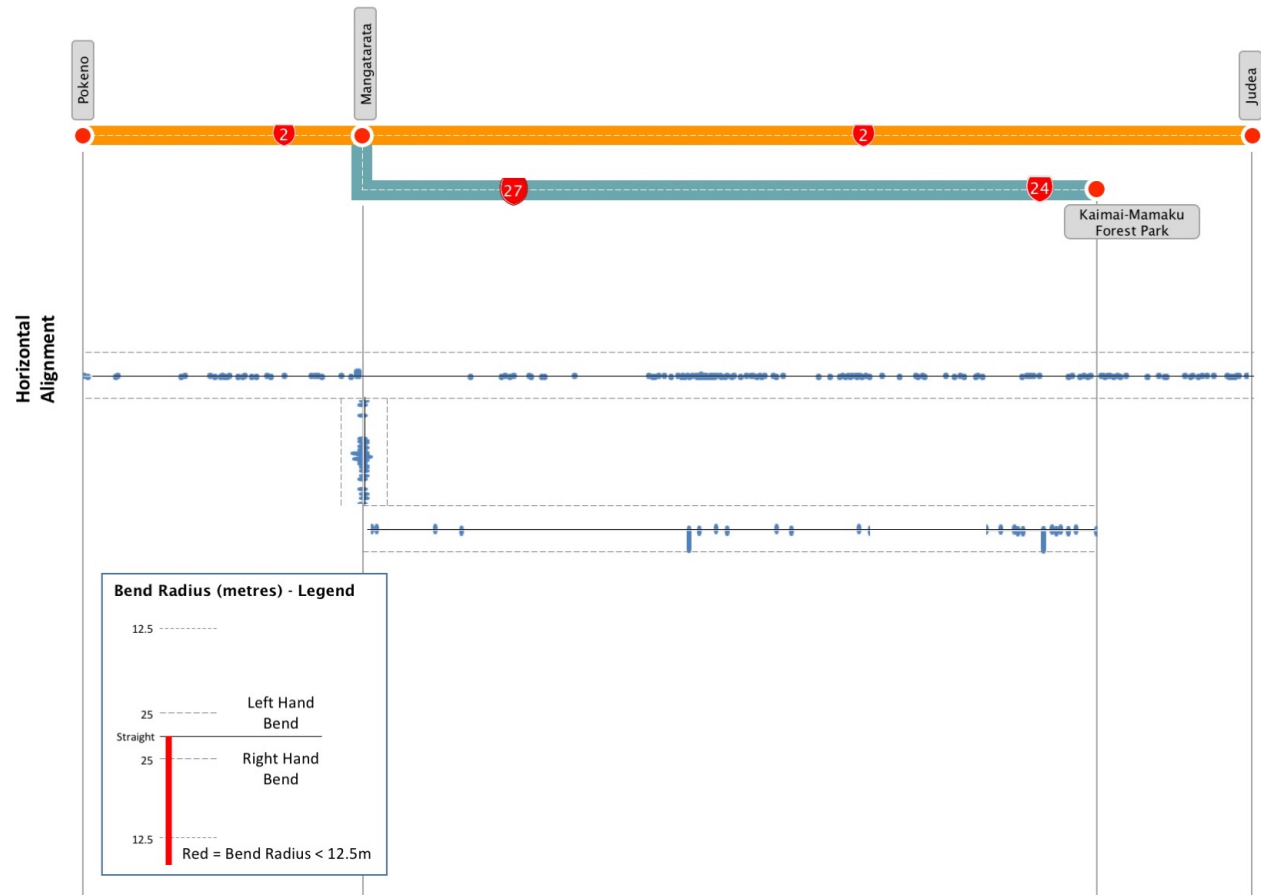
Figure 9 - Corridor characteristics



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.

Figure 10 - Horizontal alignment



Volumes

Seasonal flow variations of between 30% to 40% are experienced, particularly on the SH2 route, peaking in summer (variation not captured in Figure 9).

Heavy vehicle traffic volumes on SH2 between Pokeno and Mangatarata, then split at Mangatarata towards the SH27/24 route or beyond to SH1 and SH25 towards the Coromandel Peninsula. Freight volumes increase past Waihi on the SH2 route, explained by logging from the Coromandel Peninsula and horticulture south of Waihi, both being transported to the Port of Tauranga. High heavy vehicle volumes around Waharoa and Matamata on the SH27/24 route are a result of milk transportation and increasing horticulture industry in the area.

HPMV routes

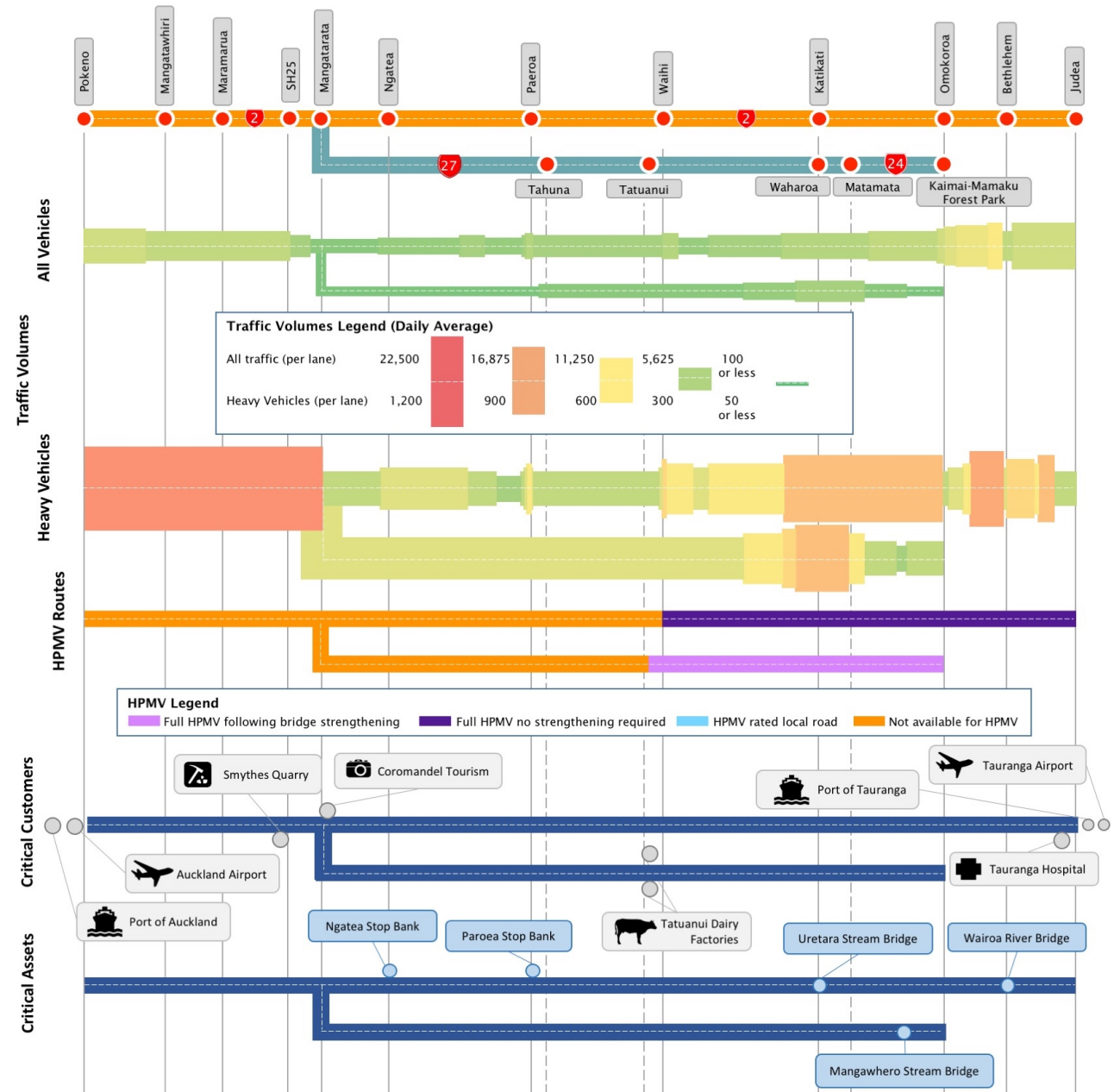
HPMV routes between Waihi and Tauranga, and Tatuani and Kaimai-Mamaku Forest Park are used for regional and local HPMV freight including dairy, logging and horticulture.

Critical customers and assets

There are a number of critical customers identified in Figure 11 adjacent or close to the corridor which rely on the corridor to be open 24/7 and are vulnerable to interruptions which impact productivity e.g. the Port of Tauranga, and the Tatuani Dairy factory.

There are also critical assets along the route which need an enhanced maintenance focus to ensure they do not fail or significantly interrupt services along the network, e.g. Wairoa River Bridge.

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:

- **Increased demand for access to the corridor:** Continued growth in tourist, recreational, freight traffic and urban population increase in particular at Katikati, Omokoroa and Tauranga combined with the growth of holiday makers/holiday homes in the Coromandel Peninsula are resulting in a heightened demand on the corridor and putting pressure on the existing access points.
- **Traffic growth limiting ability to deliver maintenance:** Between Katikati and Tauranga, maintenance work is carried out off-peak and at night where possible to minimise disruption to customers, however renewal works such as road resurfacing are not always practical at night due to lower temperatures and worker health and safety concerns. Lack of shoulder width, and where widening has occurred - construction of side barriers, limits the ability to operate two-way traffic flow during planned and unplanned closures.
- **Choke points:** The single lane SH2 off-ramp from SH1 is seeing long queues especially during holiday peak periods putting pressure on the entry point to the corridor at Pokeno. This choke point however, relieves downstream pressure on the corridor by slowing eastbound traffic entering SH2.
- **Increased demand for parking at popular sites:** Karangahake Gorge is facing an increased demand from tourists and recreational users leading to an increase in the demand for off-road parking.

Future considerations

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

- **Corridor access:** Improvements including intersection upgrades and rationalising access will improve safety along the corridor, however the construction of side barriers also limits accessibility and has a risk of creating community severance. The accessibility needs of utilities, industry, communities and private residents along the corridor should be considered in the design of improvements.
- **Waikato Expressway benefits realisation:** Considerations should be made for the expected impact of costs to maintain the corridor if Waikato Expressway does not remove the expected heavy vehicles off the SH27/24 route. Additional measures may need to be considered to encourage vehicles over to Waikato Expressway which could include differential road user charges.
- **Whole of life capital investment:** The design and construction quality of new assets on the corridor will impact on type, frequency and cost of future maintenance. Planned improvements on the corridor will result in growth of assets on the corridor. Provision for adequate maintenance and renewal investment should be considered as these projects are committed.
- **Provision of parking at key tourist destinations:** As the popularity of the Karangahake Gorge and the Hauraki Rail Trail grows, parking demand especially at peak times may need better management, rationalisation and further provision of parking may need to be considered.

Resilience

SH2 and SH27/24 make up two of three routes connecting Auckland and Tauranga, with resilience displayed in Figure 10.

Vulnerabilities

The Karangahake Gorge and SH2 between Waihi and Katikati are susceptible to flooding, and unplanned incidents along the length of the corridor affect the resilience and availability. Gabion baskets have been constructed along the banks of the Ohinemuri River to reduce the risk of slips or rock falls.

Alternative routes and diversion lengths

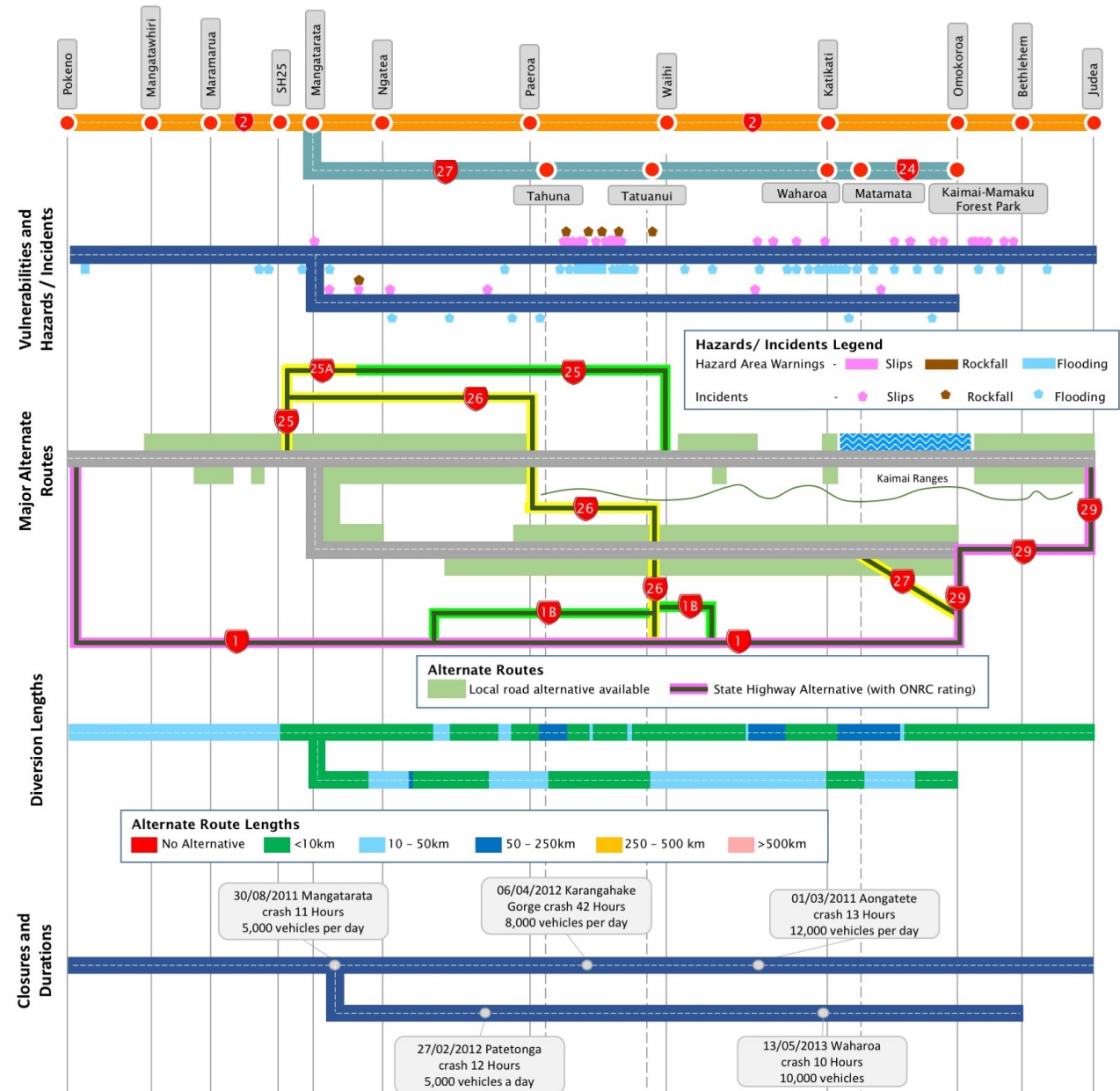
Where there are alternative routes, generally the length of diversion routes is less than 10km, although not all diversions are HPMV compatible.

The route passing through challenging terrain of the Kaihere Hill, Karangahake Gorge, and through the Athenree Gorge between Waihi and Katikati exhibit diversion lengths of more than 50km.

Closures and duration

Over the past five years, there have been five major unplanned road closures due to crashes, with a duration of 10 hours or longer, with the longest closure being 42 hours as a result of a crash in the Karangahake Gorge.

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:

- **Timely access for emergency services:** Ability for emergency services to access the site, clear and re-open the routes efficiently is impacted by high traffic volumes and narrow carriageway alignments (lack of shoulder width and increasing construction of side railings). Well prepared and tested response plans are in place, although there are some locations with no practical alternative route especially between Waihi and Katikati.
- **Increased risk of flooding:** Increasing flood events on sections of the corridor will increase route susceptibility to closures, travel disruption and damage to highway assets due to flooding, slips and rockfall, especially between Paeroa and Waihi along the Karangahake Gorge and the low-lying coastal area around Katikati (e.g. Uretara Stream Bridge).
- **Limited river crossings over the Wairoa River:** The only northern crossing over the Wairoa River providing access to Tauranga from the north is at the Wairoa River Bridge on SH2. A southern crossing is available at the Ruahihi Bridge on SH29. An unplanned incident will divert vehicles down Wairoa Road and Poripori Road, accessing Tauranga via SH29, creating delays particularly for freight using SH2 to access the Port of Tauranga and creating maintenance pressure on the local road network.
- **Lack of suitable alternative routes:** Significant diversion lengths of more than 50km on SH2 through Karangahake Gorge, Athenree Gorge to Omokoroa and Kaihere Hill on SH27, result in unexpected delays in the event of unplanned incidents. Where alternate local routes exist, few are HPMV capable, placing further pressure to re-open the route to minimise adverse economic impact.
- **Vulnerability to natural disasters:** Low lying coastal sections with erodible soils, high frequency of steep cuts, and deep fills between Waihi and Tauranga are particularly vulnerable to land movement and tsunamis in the event of an earthquake. Entire communities such as Omokoroa are dependent upon SH2 for evacuation, both access to the route and reliance of the route to be operational in the event of emergency are key investment considerations.

Future considerations

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

- **Shoulder widening:** Widening of the shoulders on the corridor to minimise the impact that planned and unplanned events have on traffic flow. Consideration should also be given during the design of safety improvements to provide sufficient width for two-way flow during partial closures and clearing of debris.
- **Preventive maintenance:** Continued investment in monitoring and preventive maintenance to mitigate resilience risk on sections of the corridor where there are poor viable alternatives. This may include provisions to:
 - Increase drainage to mitigate effects of flooding and extending the life of pavements, management of existing stop banks and investigation into future stop banks around Katikati
 - Stabilise erodible and high-risk cuts, embankments and fills to mitigate effect of slips and rock falls.
- **Upgrading of key alternative routes:** Local roads are regularly used to divert state highway traffic during planned and unplanned events. Typically under width, with poor alignment and wayfinding, upgrades of key routes (e.g. Poripori Road linking SH2 to SH29 as an alternate access to Tauranga) could be considered to handle the high traffic volumes and traffic mix.
- **Technology solutions:** Future investment into existing technologies should be considered to create improved and innovative early warning systems in the event of unplanned closures, including catastrophic natural disasters and crashes.

Reliability and efficiency

Efficiency

Efficiency between Omokoroa and Tauranga is low due to increasing commuter demands in the AM and PM peaks. Low levels of service on SH2 between Paeroa and Waihi are indicative of the nature of the geography through the Karangahake Gorge. Kaihere Hill exhibits low levels of service due to poor geometric alignment. Seasonal fluctuations experienced along the entire corridor (and not captured in Figure 13), are high, particularly over weekends, long weekends and holiday periods where travel time reliability can be poor.

Variability

Overall the corridor performs well in terms of variability. High levels of variability between Bethlehem and Judea are indicative of the competing traffic priorities near Tauranga.

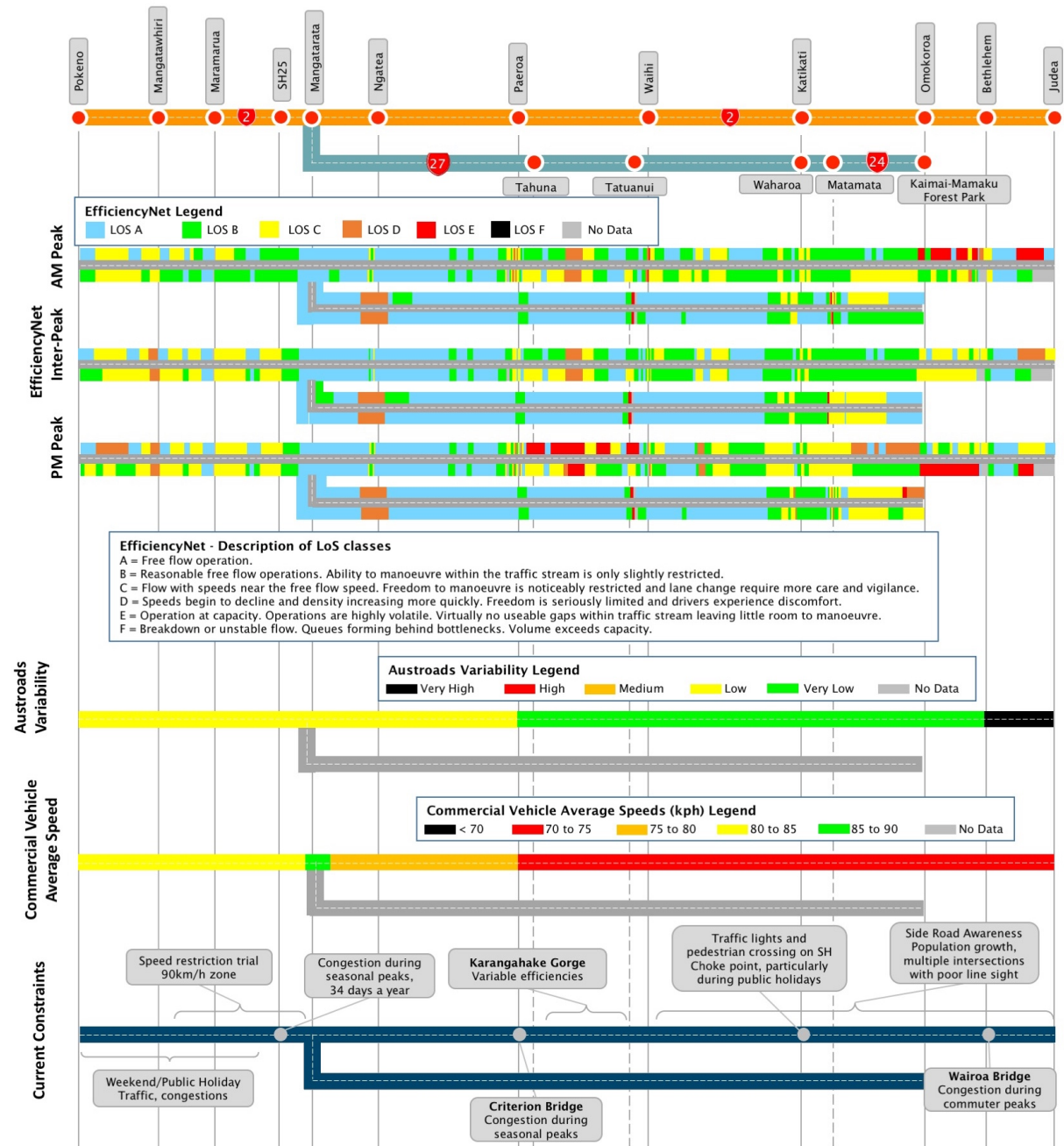
Commercial vehicle average speed

Average speeds for commercial vehicles performs poorly along the southern half of the SH2 route, between Paeroa and Tauranga. This is an indication of the limited passing opportunities, the terrain with horizontal curves and vertical gradients that affect truck speeds and high volumes of recreational and local traffic.

Current constraints

Current constraints on the network affecting journey reliability and efficiency tend to be due to a lack of passing opportunities for much of the corridor, particularly between Pokeno-Mangatarata, Karangahake Gorge and Waihi to Katikati. Multiple side road accesses and community activity, particularly between Waihi and Tauranga also contribute to the reduced efficiencies. Limitations of the Karangahake Gorge and of the carriageway alignments tend to constrain the section between Paeroa and Waihi, as shown in Figure 13.

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:

- **Seasonal peaks and long weekend travel leading to travel time delays:** During peak holiday times, particularly westbound back to Auckland is subject to travel time delays. Weekend travellers from Auckland to the Coromandel Peninsula regularly push the northern section of SH2 to capacity (especially between Pokeno and Mangatarata), resulting in long weekend travel time delays of increasing duration and frequency. This is further exacerbated by the seasonal increase in horticultural traffic resulting in a greater mix of vehicles (tractors, heavy vehicles) using the road.
- **Increasing travel demand on SH2 is resulting in reduced efficiency:** Flows on SH2 vary, but on sections approaching SH1 at Pokeno in the north and Tauranga City to the south, daily traffic volumes (people and freight) are high, impacting critical journey time efficiency and reliability. Population and economic growth between Waihi and Tauranga is also expected to increase travel demand and reduce the ability of the route to facilitate efficient, reliable and safe journeys. Although the TNL will provide new strategic road connections to the centre of Tauranga, the existing route of SH2 is expected to remain heavily trafficked for local access to Bethlehem.
- **Conflict between State Highway traffic and local community resulting in reduced route efficiency:** A high frequency of intersections and access ways on SH2 between Pokeno and Mangatarata, and Waihi and Bethlehem combined with heavy traffic volumes is making it difficult for traffic accessing the State Highway from the local network resulting in reduced route efficiency.
- **Roadside uses impacting traffic efficiency:** Road parking and signalised pedestrian crossing in Katikati and roadside activities through Maramarua and Matamata slow the traffic and result in localised delays with flow on effects on the corridor.
- **Low public transport usage:** Daily commuter traffic on the network at either ends of the SH2 route is resulting in lower levels of service during AM/PM peak especially between Omokoroa and Tauranga.

Future considerations

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

- **Customer journey experience:** Better management of the journey experience through speed management, enforcement and driver information. Continued use of ITS assets and advanced warning signs along the corridor to improve the information available for visitors and road users including the use of real time information to convey messages to drivers about expected travel times, incidents, delays and weather events.
- **Journey time reliability:** Consider the development of measures to improve journey time reliability for example, investigation into the provision of safe passing opportunities along the corridor for example between Pokeno and Mangatarata and four laning between Omokoroa and Te Puna to address reliability and efficiency concerns at either end of SH2.
- **Demand:** As demand grows on the corridor (specifically on the SH2 route) bypasses and expressway design is likely to be desirable, allowing for accessibility from the existing road to meet current and future growth needs. Suitable heavy vehicle bypass options for Maramarua, Katikati and Matamata could be considered as the towns expand, traffic volumes grow and conflicts worsen. Land for a potential Matamata bypass is owned by Matamata-Piako District Council and will be sold in 2020 unless a purpose and willingness to retain and future proof becomes clear.
- **Better planning, communication and assignment of maintenance responsibilities:** Between parties working on the road improvements should be exercised in order to ensure disruption to customers is minimised
- **Expand and connect alternative mode initiatives:** Including public transport, walking and cycling to manage both commuter and tourist demand, as the urban population grows and development expands especially at built up areas closer to Tauranga i.e. Katikati, Omokoroa.

Safety

Collective risk

Collective risk is medium-high or high between Pokeno and Maramarua, SH25 to Mangatarata, Paeroa to Waihi and Katikati to Bethlehem. Much of SH27 is rated low to medium, except for the section between Waharoa and Matamata which has a medium high rating. The level of collective risk across the entire length of SH24 is medium high.

Personal risk

The level of personal risk across SH2 is predominantly low to medium, except between the intersection of SH2/SH25 and Mangatarata which is rated as high. SH24 along its entire length from Matamata to Kaimai-Mamaku Forest Park is rated medium high for collective risk.

Star rating

Between Pokeno and Paeroa, SH2 is rated as 3-star with only small pockets of 2 star, whereas the predominant rating for the rest of SH2 is 2-star. A small section of SH2 between Bethlehem and Judea is rated 4-star.

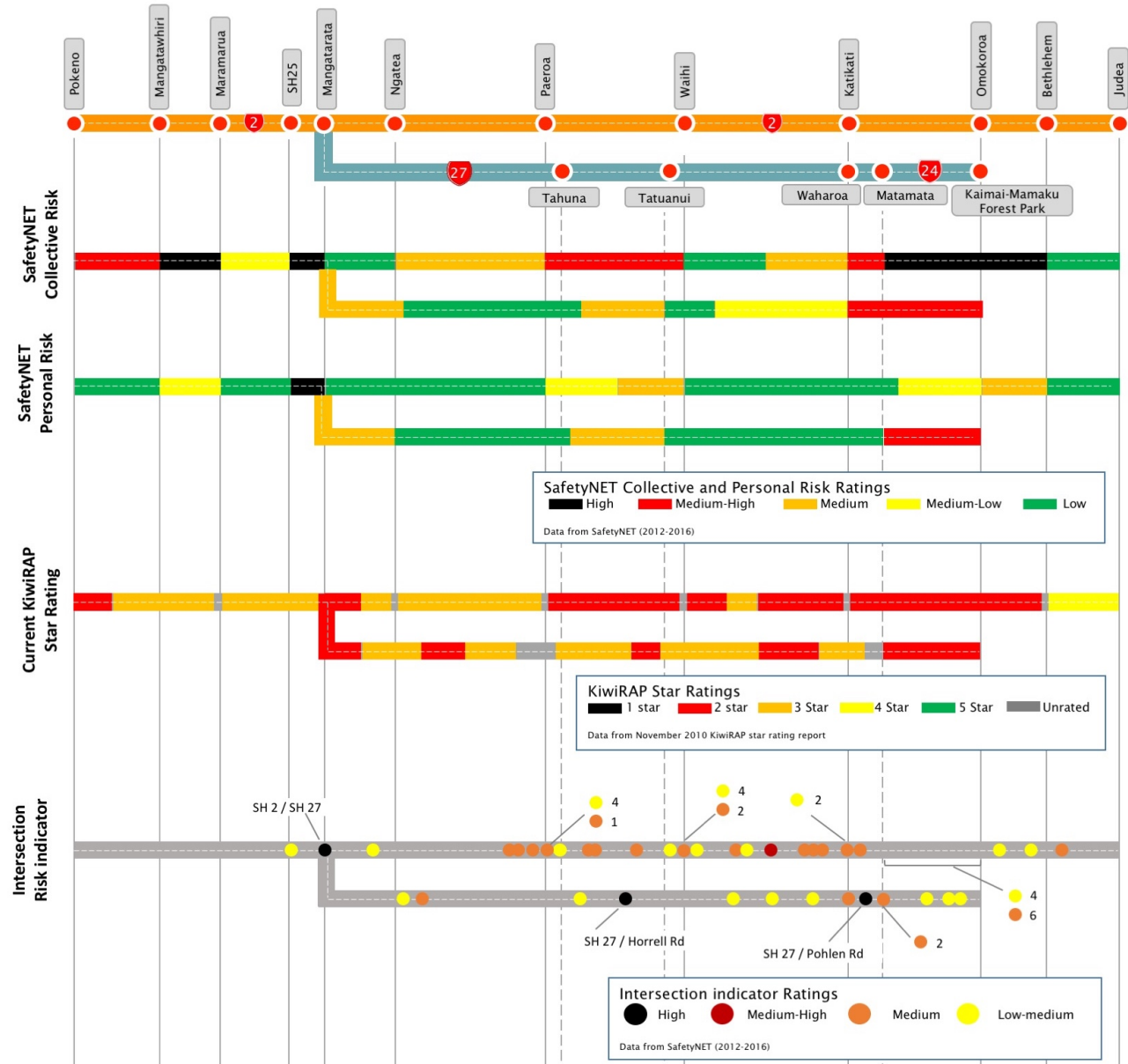
The star rating for most of SH27 varies between 2 and 3-star, whereas the full length of SH24 is rated as 2-star.

SH2 is classified as Regional, whereas both SH27 and SH24 are classified as Arterial. The desired customer level of service for Regional and Arterial roads are a star rating of 3, which is not met along several sections of the corridor, particularly along SH2 between Paeroa and Bethlehem.

Intersection risk indicators

Intersections within the corridor predominantly have a low to medium risk rating. There are only three high risk intersections across the entire corridor, two are located along SH27 and the other is the intersection of SH2/SH27. There is also one medium high risk intersection on SH 2 between Waihi and Katikati.

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:

- **Challenging topography raising safety concerns:** An unforgiving roadside environment together with the alignment, limited width, and lack of shoulder correlate with the location of loss of control, run off road and head on crashes, as well as rear end queue and crossing turning crashes. Access through the Kaihere hills on the SH27/24 route and the Athenree and Karangahake Gorges on the SH2 route is challenging. The Karangahake Gorge has a high frequency of tight bends and limited passing opportunities resulting in safety and route security concerns. Unprotected drains and power poles along SH27 and SH24 are also a notable safety concern.
- **Out of context and narrow bridges:** Widening improvements on SH2 (excluding bridges) result in bridges becoming increasingly out of context and difficult to navigate, particularly by heavy vehicles. The width of the Criterion Bridge in Paeroa limits 2-way truck passage, resulting in queues on SH2 during seasonal peaks.
- **Safety at worksites:** As traffic volumes increase and AM/PM peaks extend in duration, it becomes increasingly difficult to safely deliver maintenance and renewal on this corridor. This pressure extends to both road worker and road users, with an impact on future investment as night work and use of high-value, rapid construction maintenance methods increase.
- **Heavy traffic volumes:** High traffic volumes on the SH2 route pass through several built-up areas resulting in community severance issues at Katikati, Bethlehem and Te Puna.

Future considerations

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

- **Safe system approach:** Continued implementation of the Safe System approach including speed management, following successful reduction of death and serious injury from the speed trial between Mangatawhiri and SH25, measures to address issues caused by deficient shoulder widths, wide centrelines and flush medians where road widths permit, maintenance of delineation to high standards (markings, edge marker post, raised pavement markers, chevrons, etc.) to help drivers better judge the alignment of the road and mitigate risk of run-off-road crashes.
- **Safety in Design (SiD):** This should be an important consideration in the planning, investigation and design of capital improvements. For a more detailed discussion, refer to Investment Improvements.
- **Improvement to bridges:** Prioritised widening of narrow and unsafe bridges could be considered, especially given the predicted increase in traffic volumes on the SH2 route.
- **Improve safety at worksites:** Increased levels of Temporary Traffic Management (TTM) to protect safety of both road workers and road users during maintenance and construction are based on traffic volumes. Parts of the corridor including Katikati to Tauranga and sections between Pokeno and Mangatarata are currently operating with higher cost Level 2 TTM. An increase in operational investment may need to be considered if traffic volumes increase and remaining sections of SH2 transition to higher levels of TTM.
- **Improve safety for vulnerable road users:** Design of improvements should be considered to improve the access and safety of vulnerable users to tourist destinations along the corridor. In particular, where side barriers have been constructed, ensure at least 1m width from edge line and sections of corridor with inadequate shoulder widths or sight line deficiencies should be analysed.
- **Invest in treatment strategies:** Consider investigation of treatments to best manage conflicting traffic movements and address community severance issues e.g. in Katikati, Matamata and Maramarua

People, places and environment

Natural environment

The corridor transitions from rolling agricultural landscapes, fringed by the Hunua Ranges in the north, through the flat Hauraki Plains and Waihou Valley. SH2 cuts through the base of the Coromandel Ranges at the Karangahake Gorge before opening up to coastal exposure along the Western Bay of Plenty to the south. These coastal sections are lined with horticulture and fringed by the Kaimai Ranges.

Streams and rivers flowing from the Coromandel Peninsula and Kaimai Ranges contribute to flooding along the corridor, particularly along the Ohinemuri River as it narrows through the Karangahake Gorge. The sensitive areas within this gorge are managed by the Department of Conservation (DOC), providing access to remains from the mining and railway era.

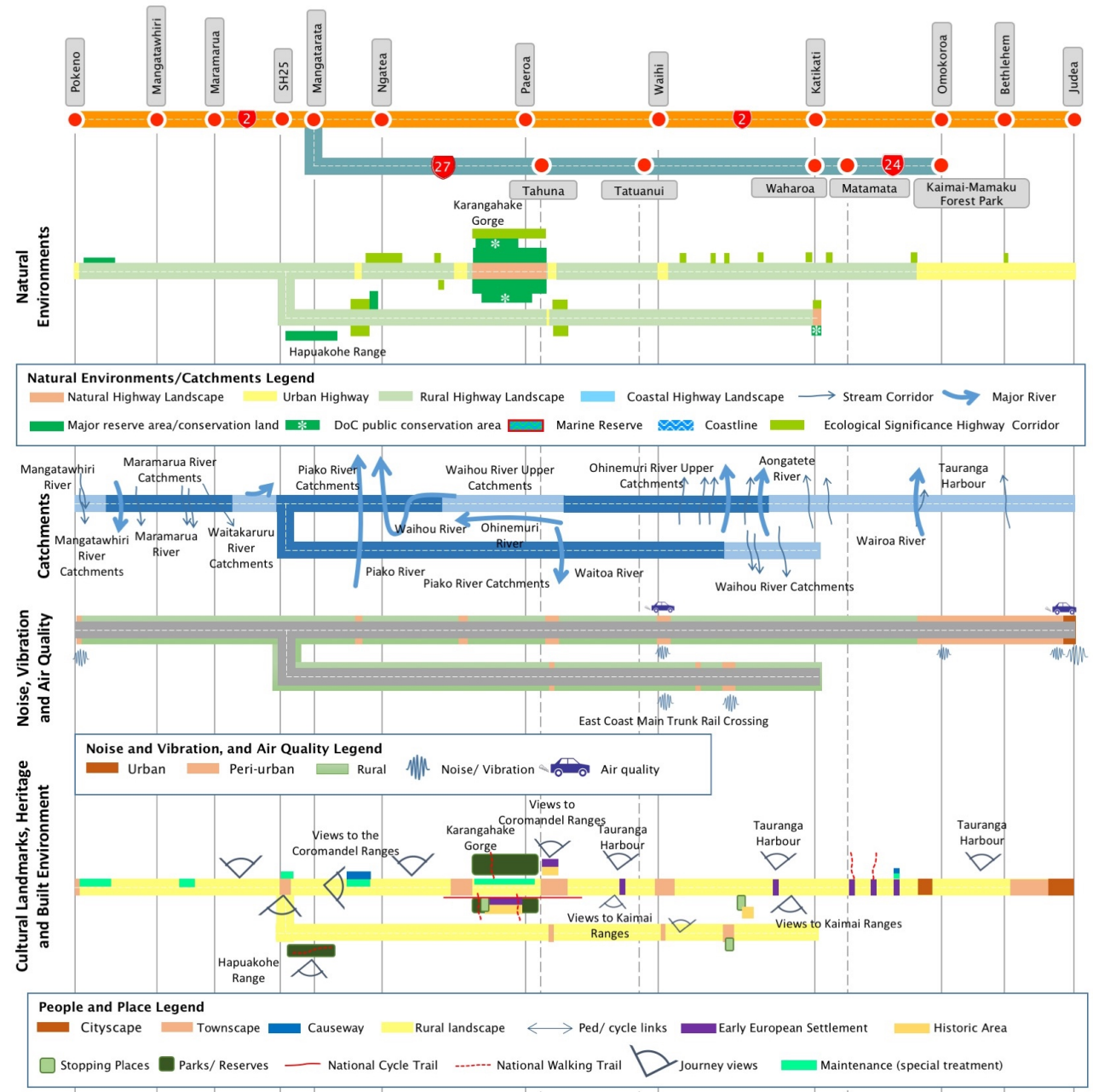
Noise, vibration and air quality

Consistent heavy traffic volumes on the SH2 route create noise and vibration issues for adjacent residential development in Bethlehem. SH2 has priority through Katikati, affecting the amenity of the town centre, creating severance and exposing residents to potential noise, vibration and air pollution.

Cultural landmarks, heritage and built environment

The visual character of the corridor provides vibrancy and attractiveness to the journey, with a wide range of natural and rural landscapes and seascapes interspersed with small towns. Lookouts and views capture the Coromandel Ranges (SH2), the Kaimai Ranges (SH2/27/24) and the Tauranga Harbour (SH2). There are a number of early European settlements on SH2 with significant cultural landmarks and heritage buildings concentrated within the Karangahake Gorge. The Karangahake Gorge and Waikino have a rich history of gold exploration, mining and rail, which have been preserved and forms part of the Karangahake Gorge Historic Walkway and Hauraki Rail Trail. There is one marae and two pa sites facing onto the corridor.

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:

Natural environment

- **Climate change:** Changes in the weather patterns resulting in high temperatures and more intensive rainfall patterns will have an influence along vulnerable sections of this corridor (discussed in the resilience section on pg. 16/17). Climate change analysis indicates these areas will increasingly encounter high intensity rainfall events creating pressure on the management of the highway as it is expected that more effort will be required in the future to protect the corridor functionality from inundation.
- **Vegetation management requirements and biosecurity compliance:** Along the entire corridor are likely to increase as urban growth expands resulting in operational cost implications.

Noise, vibration and air quality

- Noise and vibration will exacerbate as urban development continues in the south (Judea, Omokoroa, Katikati), in Pokeno and in Matamata, as such, the need to manage impacts will increase.
- **Increased congestion:** Congestion in Katikati and Judea closer to Tauranga is creating air pollution with more vehicles moving slower and burning fuel less efficiently. This is likely to increase until such time as proposed new infrastructure is built, however increases in demand will lead to higher traffic demand and worsening conditions

Cultural landmarks, heritage and built environment

- **View shaft and associated vegetation management;** Maintaining view shafts along with provision of adequate amenity facilities at stopping places (including rest areas) along the corridor are becoming an increasingly important part of the journey experience and development of the corridor.
- **Service towns function:** As part of the highway and provide rest areas, with local trade benefiting from the connection with highway customers. Increasing corridor demand will increase pressure on these communities in their ability to continue as a functional part of the customer journey without impacting local liveability.
- **Jaywalking:** In Waharoa, tourist buses stopping creates a jaywalking issue, as the café and toilets are on opposite sides of road.
- **Pedestrians:** In Matamata, pedestrians standing in middle of road to take photos of the Hobbit house inspired information centre creates a safety issue. There are usually lots of people wandering about within the carriageway.

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:

- **Noise and vibration:** As townships continue to develop and vehicle numbers increase, more people will be exposed to noise and vibration. Avoiding reverse sensitivity issues early, through land use planning and urban form conversations and refined maintenance technology such as improving seal joints may decrease the level of vibration and noise complaints.
- **Relationships:** Effective relationships between iwi and associated councils to work together and maximise access to cultural and heritage places (built forms, monuments, marae and pa site) to support economic and social growth.
- **Consolidate/rationalise resource consents:** Consider opportunities to consolidate/rationalise resource consents, particularly for regular maintenance activities.
- **Town entries:** Appropriate town entry treatments, streetscape and signage to support local services and facilities should be considered particularly where new sections of the highway bypass existing settlements and connections are redeveloped (Maramarua, Bethlehem).
- **Mapping of sensitive ecological areas:** Managing biosecurity and biodiversity issues along the corridor through smart technologies and monitoring.
- **Archaeological sites:** Updating the GIS based record of the multiple archaeological sites adjacent to the highways would enable maintenance and capital works to avoid significant sites and improve planning, design and investment.
- **Streamlining environmental assessment work:** Increasingly, higher standards of environmental assessment and management may be sought. Opportunities for Archaeological assessments across the corridor, and guidance from Tangata Whenua would assist in work on cultural and heritage places, and what should be budgeted.
- **Combining stopping places:** (including rest areas and look outs) with places of interest, heritage sites, local business areas and main streets, and future electric vehicle charging infrastructure. Utilising these places to tell local stories and enhance the attractiveness and amenity of journeys.

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 244 km of road network which reflects 2.1% nationally. The total value of the assets along the corridor is \$467M (excluding ITS, and, heritage and green assets).

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

Asset condition and performance summary

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

Figure 16 - Corridor asset base



Figure 17 - Asset condition and performance summary



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 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 SH2/72, SH2/73, and SH2/93 between Paeroa and Athenree, and SH27/0 south of Mangatarata show significant levels of both surface skid resistance below the threshold limit and within the investigation limits. Section SH24/0 also shows a high level of surface skid resistance within the investigation limits. Overall, the corridor has shown significant improvement in the levels of surface skid resistance over the three years.

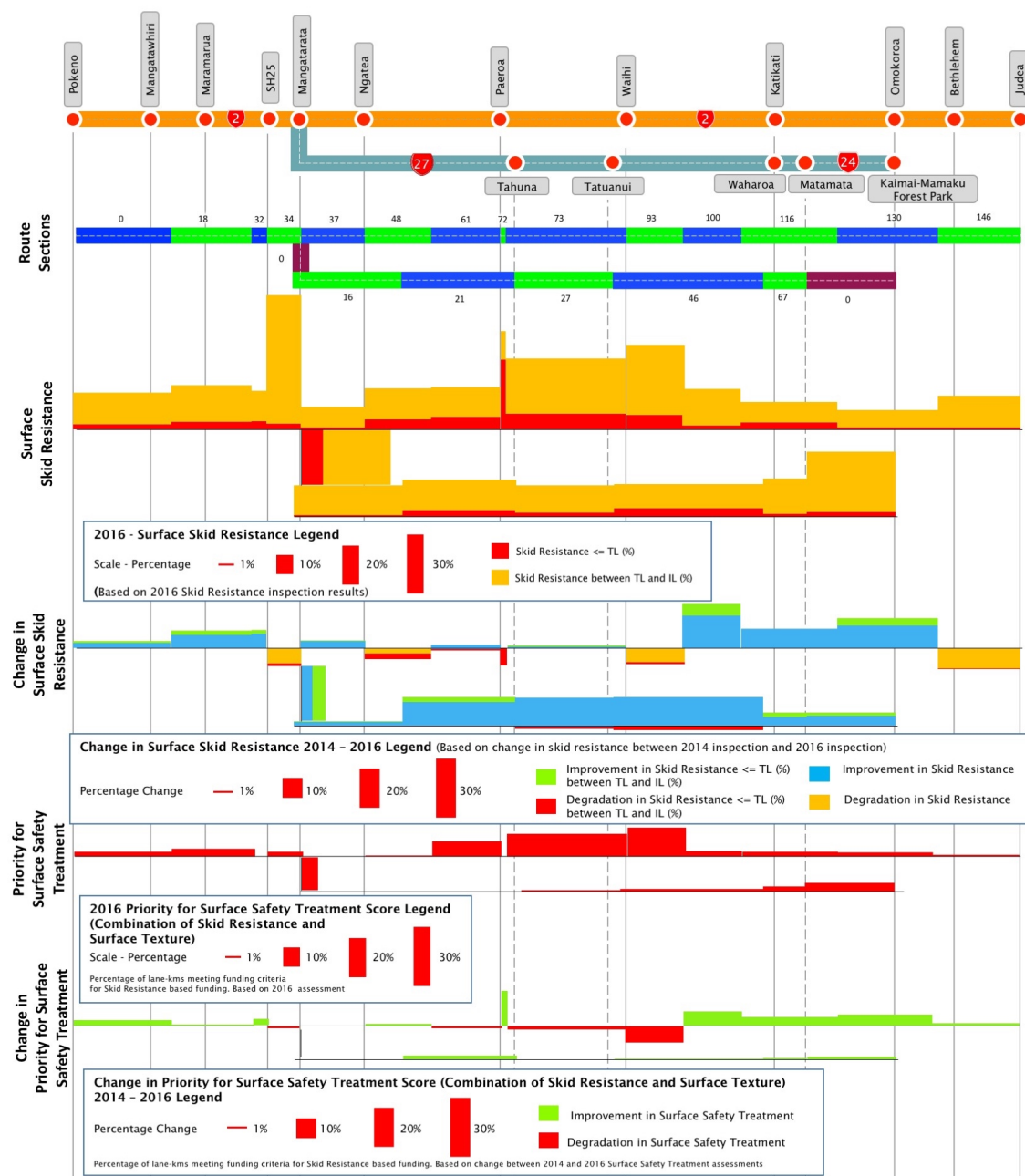
Priority for surface safety treatment

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 (3.62 %) of the corridor achieved Skid Assessment Length that qualifies for funding. This equates to only 16.9 lane-km of the 467 total lane-km of the corridor, making this one of the worst performing corridors on the State Highway network. Sections with the highest priority for surface safety treatment qualifying for funding are SH2/61, SH2/73 and SH2/93 between Kerepehi and Athenree. These three sections also show the largest increase in priority for surface safety treatment over the last 3 years.

Figure 18 - Asset condition



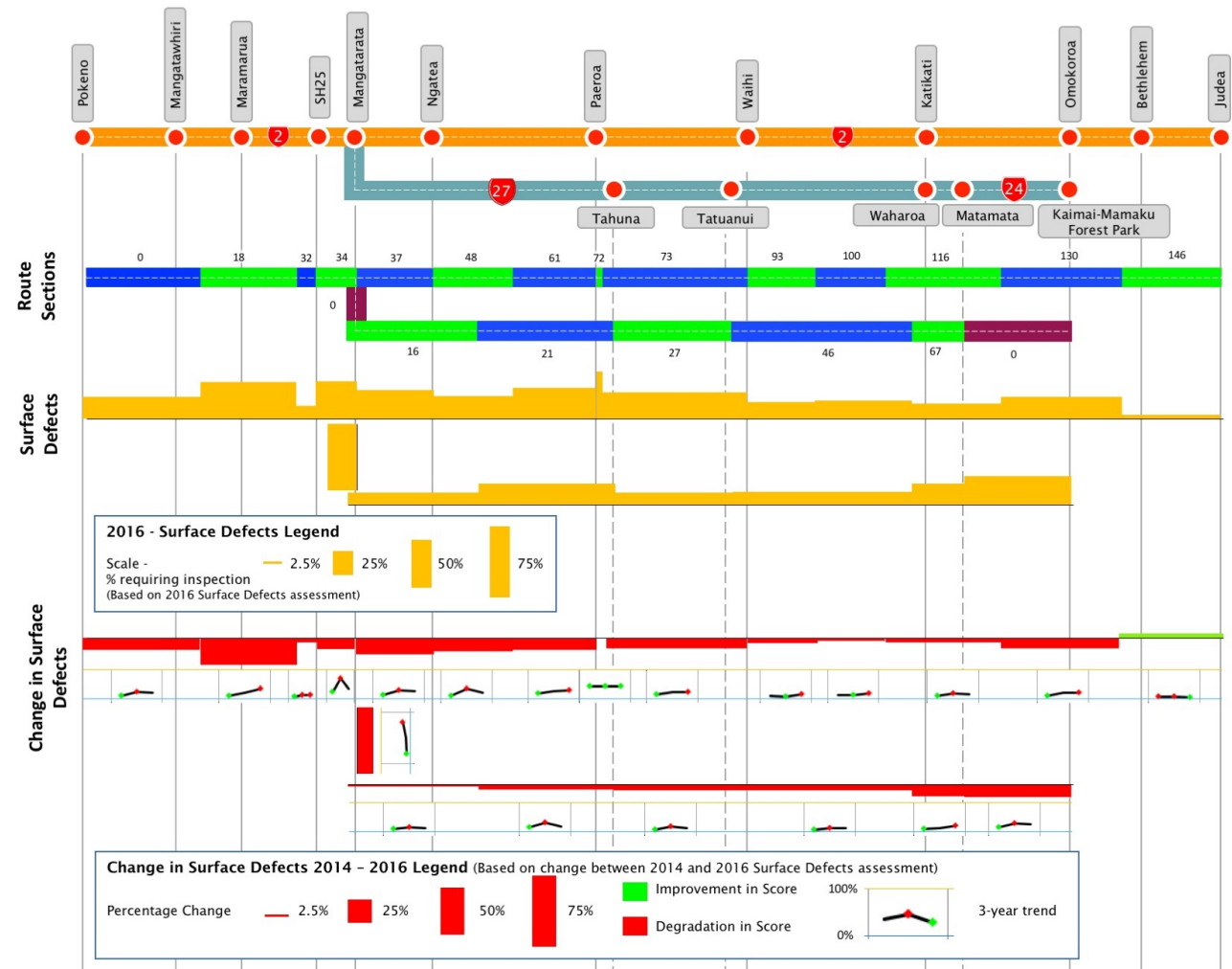
Surface defects

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

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

Overall, 22.6% of the corridor achieves a score above which inspection is required. Sections with significant lengths of surface requiring inspection include: SH2/18 through Maramarua, SH2/34 north of Mangatarata, and, SH27/0 south of Mangatarata. These sections also show a significant level of degradation in score over the last three years.

Figure 19 – Asset condition 2



Surface age

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

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

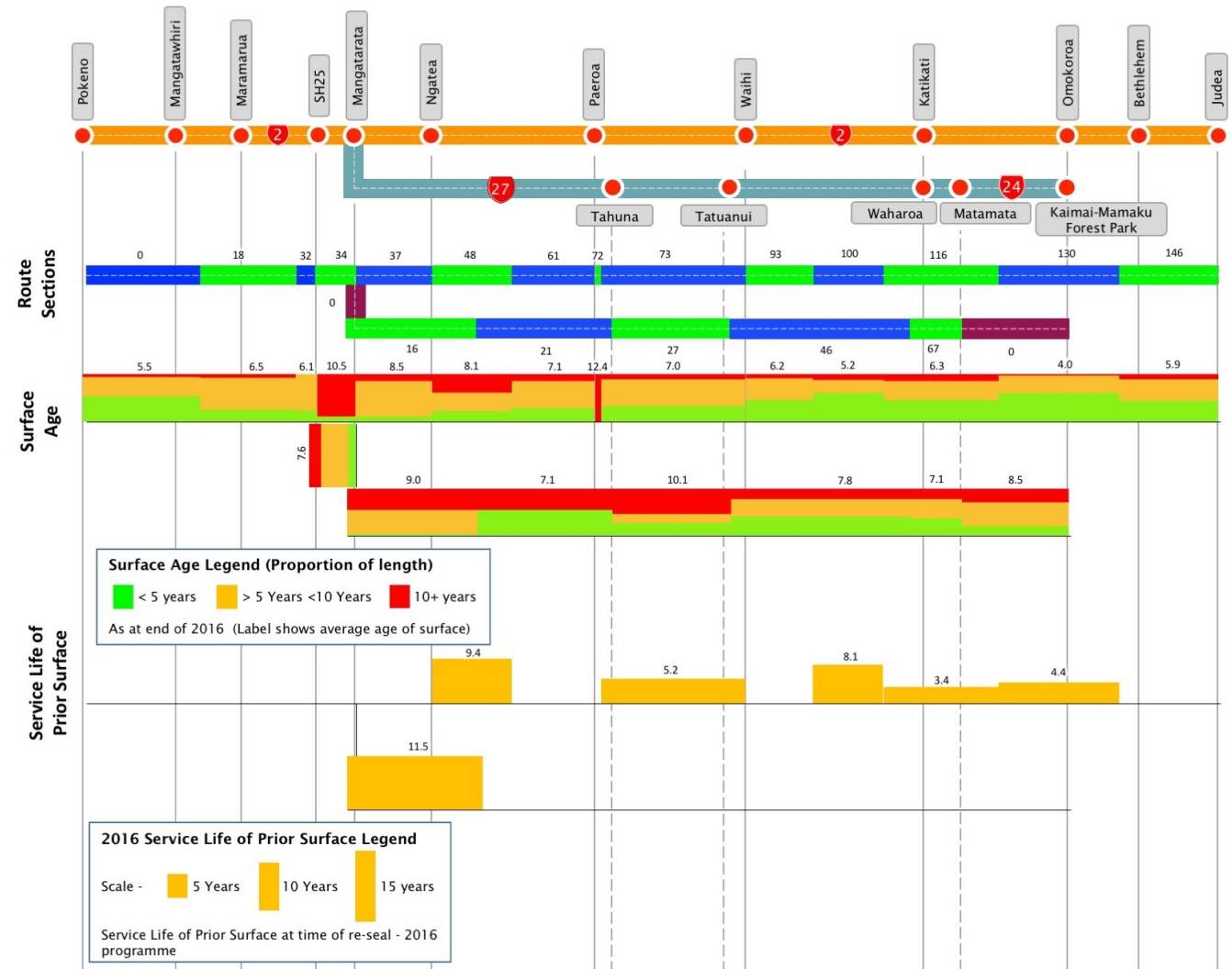
The sections of corridor with the oldest age profile are SH2/34 between SH25 and Mangatarata, SH2/72 in Paeroa business area, and SH27/27 between Tahuna and Tatuani.

Service life of prior surface

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

Overall the re-surfaced sections achieved an average service life of 6.5 years, with section SH27/16 south of Patetonga achieving a service life in excess of 10 years. A problem with the quality of the aggregate used meant that the section through Katikati SH2/116 had to be resealed much earlier than would normally be the case.

Figure 20 – Asset condition 3



Resurfacing

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

The major resurfacing works are planned for sections SH2/0 between Pokeno and Mangatawhiri, SH2/34 between SH25 and Mangatarata, SH2/72 in Paeroa business area, and, SH27/21 north of Tahuna.

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.

Sections failing to meet the target include SH2/34 around Mangatarata, SH27/67 north of Matamata, and SH24/0 east of Matamata.

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 at SH2/37 between the SH25 junction and Mangatarata, SH2/93 between Waihi and Athenree, SH24/0 east of Matamata, and, SH27/27 and SH27/46 between Tahuna and Waharoa.

Figure 21 – Asset condition 4



Asset condition and performance pressures

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

- **Aggregate quality:** The availability of quality aggregate which is mostly associated with surface skid resistance failure.
- **Early pavement failure:** Early pavement failure at the end of Maramarua deviation through to SH25 has been observed. This could be due to poor drainage. Failure occurs quickly once deterioration has started. This requires a quick response due to the number of heavy vehicles using this corridor.
- **Pavement Moisture:** Removing moisture from pavements is difficult due to poor drainage in many areas, especially through the Hauraki Plains. While deep drains exist along much of SH27, these are used more as drainage of adjacent land, meaning a high water-table causes saturated soil. Narrow shoulders and steep sided drains also contribute to this issue.
- **Old Bridges:** There is an evolving maintenance situation evidenced by urgent repair works needed on 80-year-old bridges, which were not constructed to today's standards and HPMV traffic loading is producing structural problems from these defects not previously experienced. One such example exists on SH24.
- **Narrow Bridges:** There are nine narrow bridges along SH2 between Waihi and Tauranga with an overall width of 7.5m or less, the worst of which is Te Mania bridge with a width of only 6.9m.

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:

- **Shift of pressure (pinch) points:** As journey patterns change due to external influences such as growth north of Tauranga, and the completion of the Waikato Expressway, stress will come onto different sections of pavement. Pavement specifications may have to be increased to meet this change in demand.
- **Urban environs:** Paeroa and Waihi urban areas will continue to present issues with increased traffic, noise, and effect on the safety of pedestrians.
- **Side barriers:** As more side barriers are installed there will be an increased impact of these assets on the ability to easily undertake pavement and surface maintenance, where barriers may need to be removed and replaced if undertaking overlay treatments. On the section of corridor north of Matamata through to Tātuanui, this will also cause an issue where shoulder widths are narrow beside steep banked drains.
- **Growth:** Growth north and east of Tauranga will continue to apply pressure to the existing network. A planned new expressway standard road between Omokoroa and Tauranga, and Takitimu Link North will address these growth-related issues, and result in an increased maintenance requirement. The on-streaming of these new sections of corridor will need to be coordinated with the maintenance needs of the existing sections that will ultimately be revoked.
- **Old Bridges:** Need to consider if a more proactive bridge maintenance regime needs to be put in place.

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	\$9,055	\$10,942	\$16,719
	Renewals	\$23,809	\$32,942	\$39,346
	Improvements	\$0	\$0	\$0
Reliability and Efficiency	Maintenance and Operations	\$4,808	\$5,282	\$7,957
	Renewals	\$389	\$485	\$2,636
	Improvements	\$143,843	\$181,113	\$40,620
Safety	Maintenance and Operations	\$8,554	\$10,893	\$17,076
	Renewals	\$4,105	\$4,313	\$6,462
	Improvements	\$114,541	\$83,589	\$42,029
People, places and Environment	Maintenance and Operations	\$3,634	\$4,026	\$6,047
	Renewals	\$137	\$147	\$224
	Improvements	\$0	\$0	\$0
Total		\$312,875	\$333,733	\$179,116

Figure 22 - Corridor investment

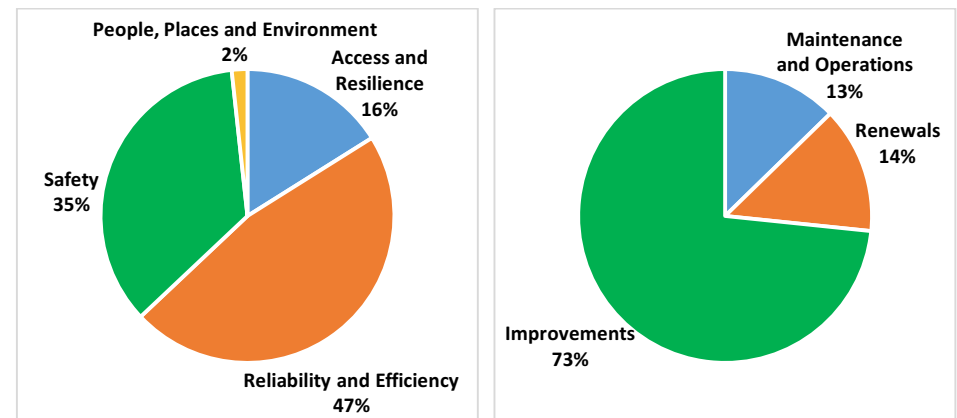


Table 2 - Summary investment by work category (\$000)

Outcome	Work Category	2018-2021	2021-2024	2024-2028
Access and Resilience	111 Sealed Pavement Maintenance	\$1,462	\$2,375	\$3,844
	112 Unsealed Roads	\$0	\$0	\$0
	113 Drainage Maintenance	\$731	\$875	\$1,315
	114 Structures Maintenance	\$1,914	\$1,986	\$2,991
	121 Environmental Maintenance	\$1,212	\$1,350	\$2,026
	122 Traffic Services Maintenance	\$33	\$82	\$122
	124 Cycle Path Maintenance	\$35	\$39	\$59
	151 Network & Asset Management	\$2,943	\$3,401	\$5,108
	161 Property	\$724	\$835	\$1,255
	211 Unsealed Road Metalling	\$10	\$12	\$18
	212 Sealed Road Resurfacing (excl. surface skid resistance)	\$14,864	\$15,724	\$18,139
	213 Drainage Renewals	\$665	\$833	\$1,196
	214 Pavement Rehabilitation	\$6,344	\$14,065	\$16,505
	215 Structures Component Replacements	\$1,865	\$2,216	\$3,348
Reliability and Efficiency	222 Traffic Services Renewals	\$60	\$93	\$140
	321 - 341 Improvements	\$0	\$0	\$0
	121 Environmental Maintenance	\$597	\$666	\$1,001
	123 Operational Traffic Management	\$2,938	\$3,238	\$4,886
	151 Network & Asset Management	\$1,141	\$1,225	\$1,842
	161 Property	\$132	\$152	\$228
	222 Traffic Services Renewals	\$389	\$485	\$2,636
Safety	111 Sealed Pavement Maintenance	\$1,740	\$2,646	\$4,251

Outcome	Work Category	2018-2021	2021-2024	2024-2028	
	112 Unsealed Roads	\$0	\$0	\$0	
	113 Drainage Maintenance	\$150	\$190	\$286	
	114 Structures Maintenance	\$496	\$1,078	\$2,106	
	121 Environmental Maintenance	\$90	\$142	\$214	
	122 Traffic Services Maintenance	\$3,551	\$3,890	\$5,844	
	124 Cycle Path Maintenance	\$0	\$0	\$0	
	151 Network & Asset Management	\$2,218	\$2,581	\$3,827	
	161 Property	\$310	\$366	\$550	
	212 Surface Skid Resistance	\$2,374	\$2,616	\$3,929	
	214 Pavement Rehabilitation	\$24	\$53	\$80	
	215 Structures Component Replacements	\$344	\$389	\$579	
	222 Traffic Services Renewals	\$1,363	\$1,255	\$1,874	
	321 - 341 Improvements	\$114,541	\$83,589	\$42,029	
	People, places and Environment	111 Sealed Pavement Maintenance	\$512	\$552	\$829
		121 Environmental Maintenance	\$2,730	\$3,023	\$4,541
151 Network & Asset Management		\$314	\$362	\$543	
161 Property		\$77	\$89	\$134	
221 Environmental Renewals		\$137	\$147	\$224	
	321 - 341 Improvements	\$0	\$0	\$0	
	Total	\$312,875	\$333,733	\$179,116	

To be confirmed through the RLTP

Investing in access and resilience

Operations and maintenance

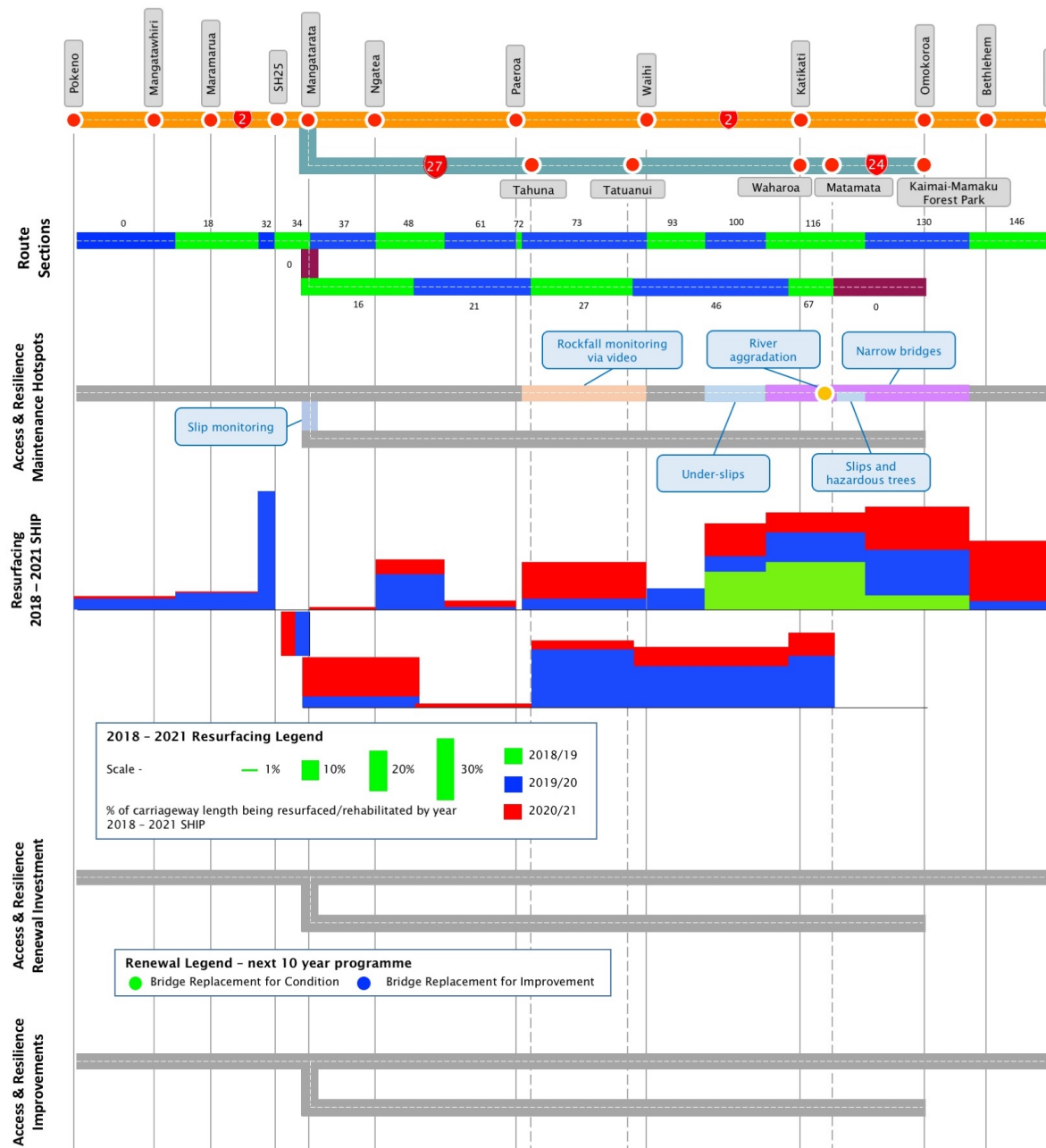
The main areas of investment to provide and preserve access and resilience are drainage maintenance, sealed road surfacing and structural component replacements and vegetation control. A key focus is to realign the base preservation quantities toward increased preventative maintenance and to slow pavement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

Maintenance hot spots

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

- **Karangahake gorge:** Rock fall occurs throughout the Karangahake gorge. Increased monitoring via video is included in the new NOC contract for the region
- **Slip monitoring:** Is undertaken on SH27/0 south of Mangatarata
- **Under-slips:** Occur on SH2/100 north of Katikati. This problem is exacerbated by inappropriately located utilities
- **Slips and hazardous trees:** Are an issue on SH2/116 – at the southern end south of Katikati
- **Narrow Bridges:** On SH2 between Waihi and Tauranga there are a number of narrow bridges which cause issues when heavy vehicles meet at the bridge
- **River channel aggregation:** from storm debris occurs at the Waitekohe river bridge.

Figure 23 – Access and resilience investment



Renewals

Resurfacing

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

Significant investment in resurfacing is planned for sections: SH2/32 west of the SH25 junction, SH2/100, SH2/116 and SH2/130 between Athenree and Bethlehem, and, SH27/27, SH27/46 and SH27/67 between Tahuna and Matamata.

Improvements

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



Works are planned to boost safety and capacity on SH2 from Pokeno to the SH2/SH25 roundabout

Investing in reliability and efficiency

Operations and maintenance

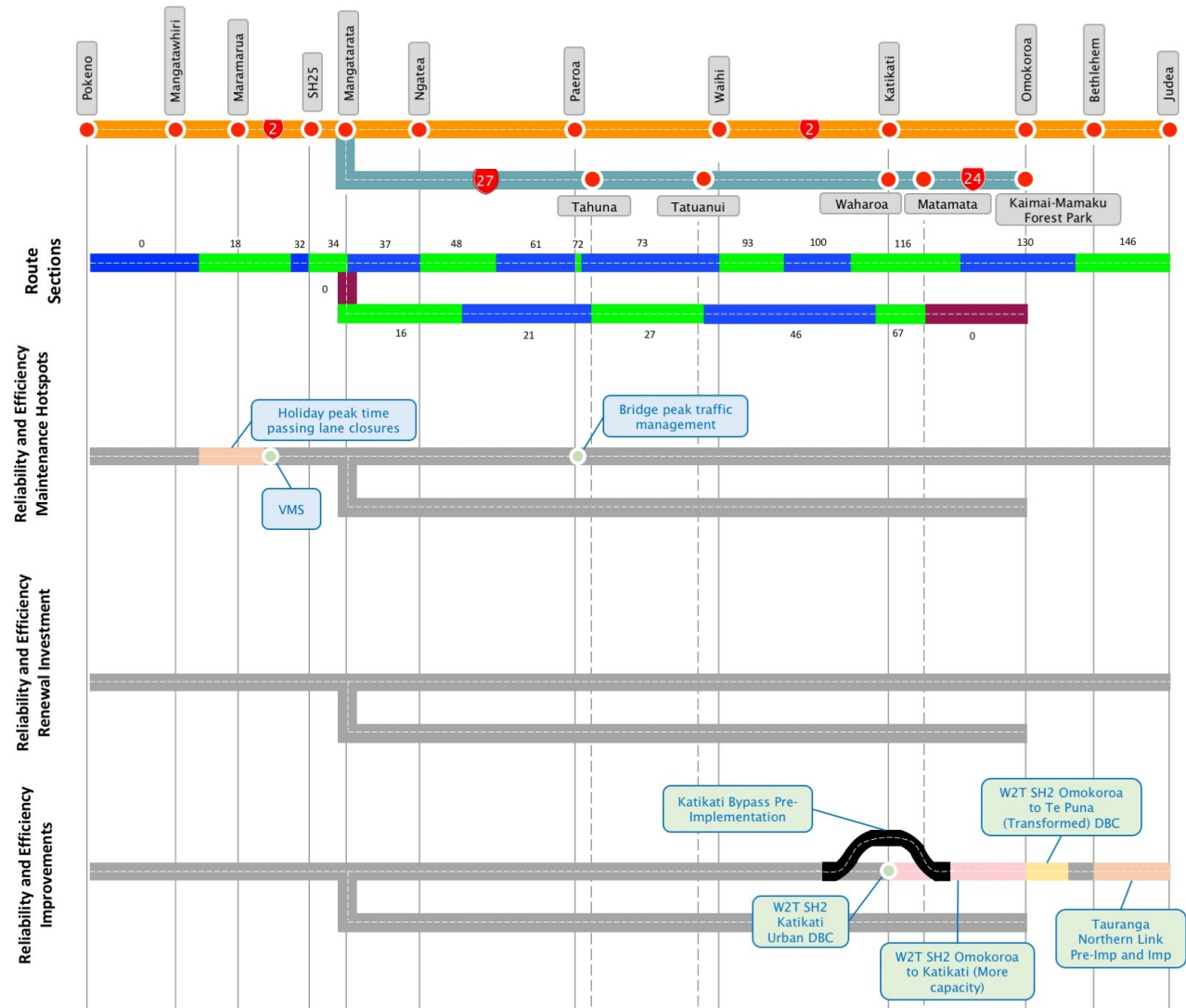
The main areas of investment to provide and preserve reliability and efficiency are environmental maintenance through keeping potential obstructions clear of the highway, wayfinding signage, and operational traffic management.

Maintenance hot spots

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

- **Additional traffic management:** is put in place at SH2/18 with passing lane closure during peak holiday traffic, and also SH2/72 in Paeroa for Criterion Bridge at the SH2/SH26 junction.
- **VMS:** There is VMS at SH2/32 northbound and just north of Bethlehem in each direction. Mobile VMS is also used during peak holiday periods for early warning of issues.
- **Maintenance during kiwifruit season:** Significant maintenance is avoided during Kiwifruit picking season. Night works are undertaken where possible. Efforts are also made to maintain contraflow where possible.

Figure 24 – Reliability and efficiency investment



Renewals

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

Improvements

Planned

There are no planned reliability and efficiency related improvements 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 3- Draft regional programme considered for SHIP

Project	Funding Status	Description
Katikati Bypass Pre-Implementation		2 lane State Highway bypass to the west of Katikati between Busby Road and Wharawhara Road.
Tauranga Northern Link Pre-imp and Imp		4 lane State Highway link between Te Puna and Tauranga CBD, bypassing Bethlehem.
W2T SH2 Katikati Urban DBC		Define form and function of State Highway bypass to the west of Katikati.
W2T SH2 Omokoroa to Te Puna (Transformed) DBC		Median & side barrier treatments. Link and intersection capacity upgrades.
W2T SH2 Omokoroa to Katikati (More Capacity)		More online road capacity to enable forecast throughput growth.



Over the next 10+ years, four key packages of work will focus on improving road safety, providing more reliable journey times and supporting growth along one of New Zealand's highest risk and fastest growing travel routes.

Investing in safety

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.

Operations and maintenance

Maintenance hot spots

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

- **Reduced speed zones:** There are reduced speed zones between Pokeno and SH25 junction
- **Category 2 sites:** There is a high level of category 2 sites traversed by heavy vehicles that include out of context curves. This is contributing to surface skid resistance pressure.

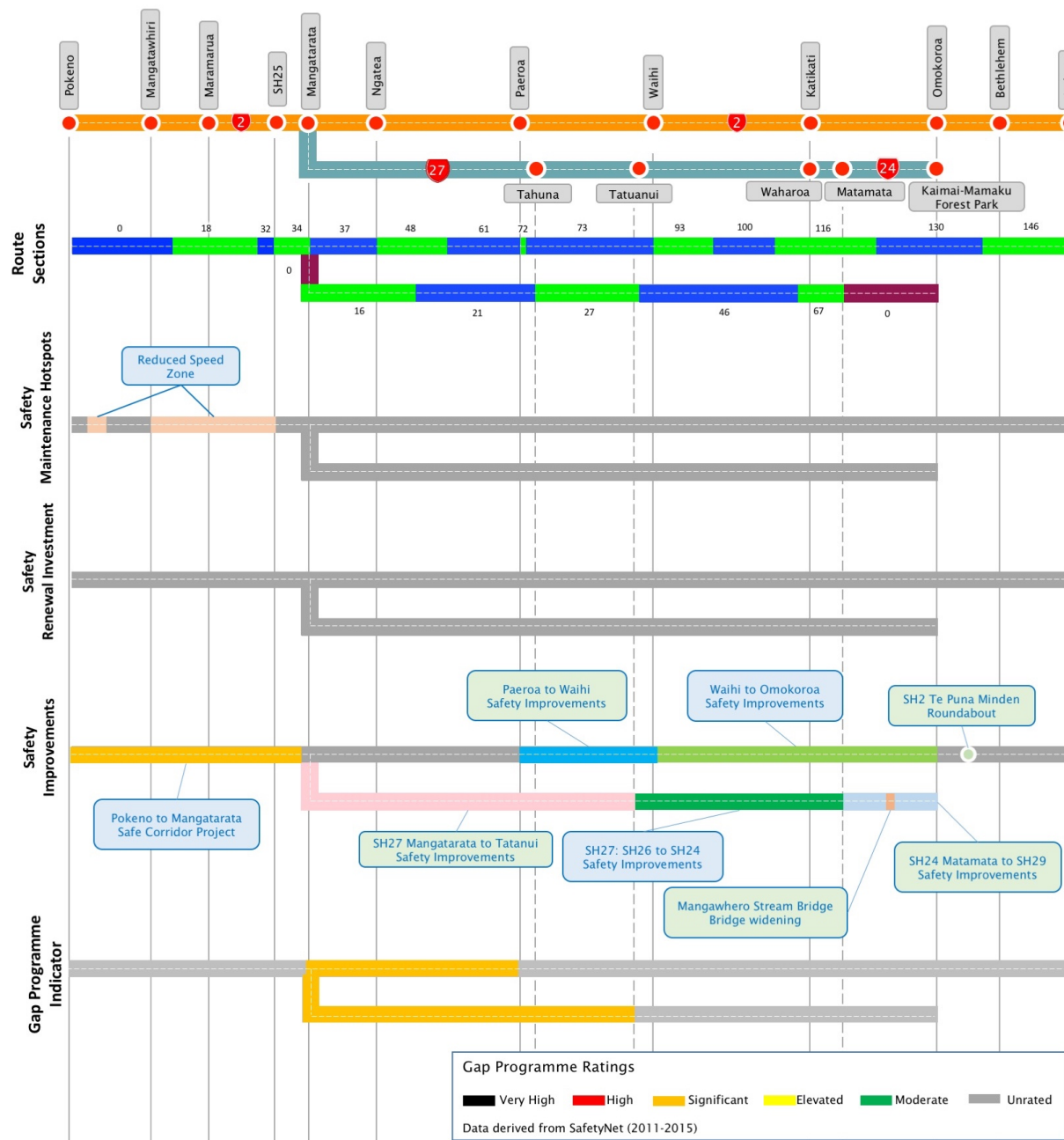
Gap programme indicators

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

There is significant potential to reduce fatal and serious injuries on SH2 between Mangatarata and Paeroa, and SH27 between Mangatarata and Tatanui with the application of targeted low-medium cost improvements.

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

Figure 25 – Safety investment



Renewals

There are no safety related renewals planned for the corridor.

Improvements

Planned

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

SH2 – Pokeno to Mangatarata Improvements Programme (Section A to E)

Description: The improvements will reduce head-on, loss of control and rear end crashes along the corridor and improve community connectivity. It will also improve journey time predictability for customers who currently experience excessive delays at peak (weekends and public holidays). There will be additional VMS and ITS installed on this section of corridor.

SH27 – SH26 to SH24 Safety Improvements

Description: This project is part of the Government’s Safe Roads and Roadsides programme and aims to improve the safety of the SH27 by installing safety barriers on the side of the road at high-risk locations to prevent vehicles running off the road, and add rumble strips to parts of the road and improve some property entrances.

SH2 – Waihi to Omokoroa Corridor Safety Improvements

Description: This project will improve road and roadside safety on State Highway 2, between Waihi and Omokoroa. Improved safety features may include roadside and median barriers, rumble strips, improved signage, intersection upgrades and speed management.

SH2 Te Puna Minden Roundabout

Description: The intersection will be replaced with a two-lane roundabout allowing safe access to the state highway from the local roads and businesses.

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
SH2 Mangatarata to Paeroa safety improvements		Safety improvements to SH2 between Mangatarata to Paeroa to reduce deaths and serious injuries as per the NSRRP review
SH2 Paeroa to Waihi improvements		Placeholder activity subject to PBC - Development and implementation of SH improvements as part of the preferred programme for SH2 Paeroa to Waihi.
SH27 Mangatarata to Tatuani Safety improvements		Safety improvements on northern section of SH27 from Mangatarata to Tatuani as identified in the NSRRP Review and Pokeno to Tauranga CMP.
SH27 Mangawhero bridge DBC		Safety improvements on SH24 between Matamata and intersection with SH29.
SH24 Matamata to SH29 safety improvements		Safety improvements on SH24 between Matamata and intersection with SH29.

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:

- **Parking in Karangahake gorge:** Parking is an issue in Karangahake gorge for the walking trail, that is being looked at in a Programme Business Case
- **Grass cutting** at Maramarua has been increased in response to the fire risk of dry grass during drier months
- **SH27 Lookout:** The carpark/lookout on SH27/0:9.5 has issues with litter. There is also a safety and access issue due to the entrance being on a 35km/h bend with limited sight lines.
- **Noise complaints:** Monitoring of noise complaints and responding accordingly is an issue in Katikati. The Transport Agency also receive a number of vibration complaints from this area.
- **Noise reduction:** AC is used in Matamata and Paeroa to reduce noise in urban areas, so a higher cost treatment than what would normally be necessary.

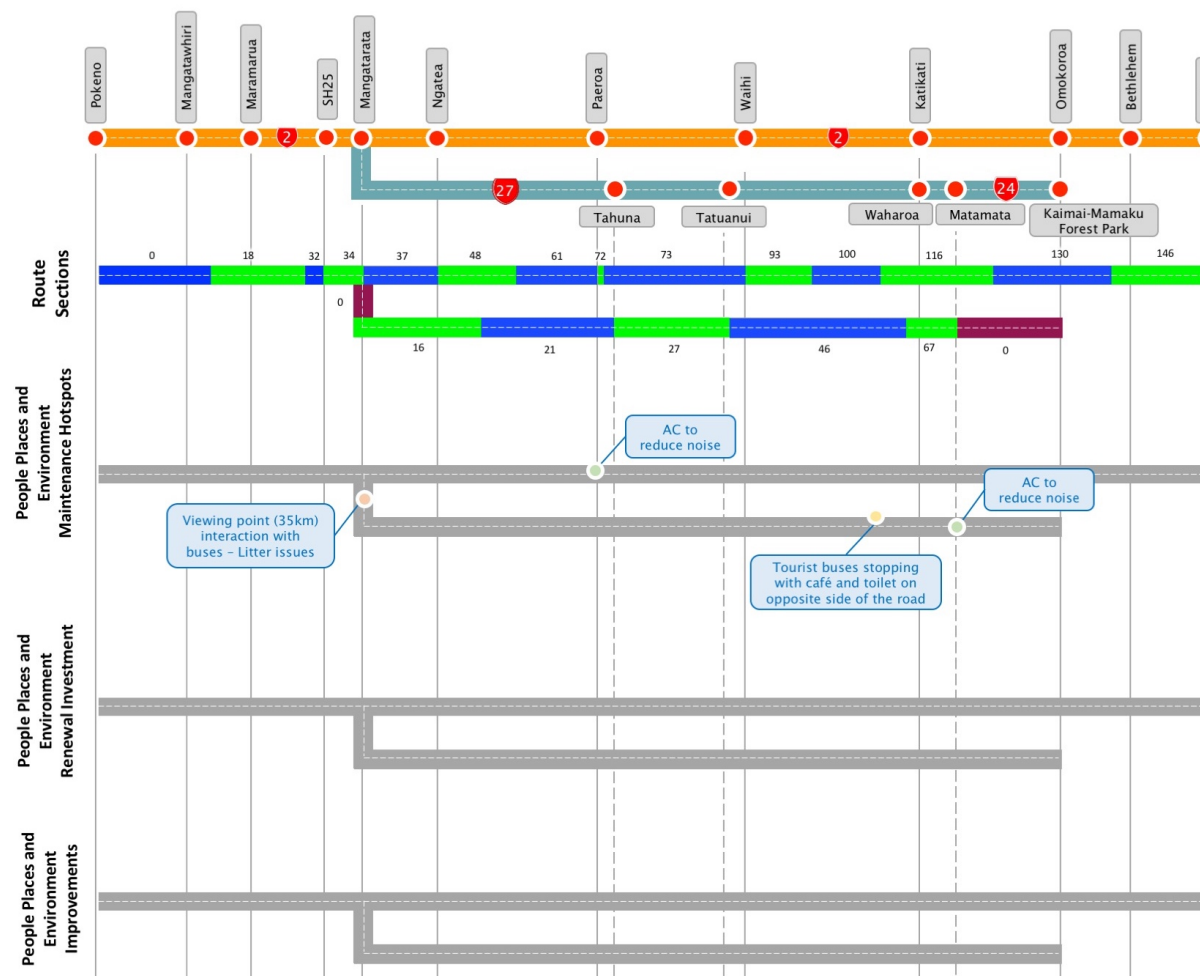
Renewals

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 26 – People, places and environment investment



Investment pressures

Access and resilience

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

- **Traffic growth limiting ability to deliver maintenance:** Between Katikati and Tauranga, maintenance work is carried out off-peak and at night where possible to minimise disruption to customers, however renewal works such as road resurfacing are not always practical at night due to lower temperatures and worker health and safety concerns. Lack of shoulder width, and where widening has occurred - construction of side barriers, limits the ability to operate two-way traffic flow during planned and unplanned closures.
- **Increasing maintenance burden:** Significant improvement projects under construction and staged over the next 10 years will place pressure on the existing infrastructure, customer journey, and result in the growth of assets on the corridor (e.g. new road alignments, safety barriers, signs, markings, planting etc.) with both maintenance and cost implications.
- **Increased demand for parking at popular sites:** Karangahake Gorge is facing an increased demand from tourists and recreational users leading to an increase in the demand for off-road parking.
- **Waikato Expressway benefits realisation:** Quantify the expected impact of costs to maintain the corridor if Waikato Expressway does not remove the expected heavy vehicles off the SH27/24 route.

Reliability and efficiency

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

- **Increasing maintenance burden:** Significant improvement projects under construction and staged over the next 10 years will place pressure on the existing infrastructure, customer journey, and result in the growth of assets on the corridor (e.g. new road alignments, safety barriers, signs, markings, planting etc.) with both maintenance and cost implications.
- **Night works** are currently required in Matamata, Paeroa, Waihi and Bethlehem/Omokoroa due to traffic volumes. Weekend work on SH2 is possible as the level of heavy vehicles drops. Some night works are also undertaken as it is sometimes too hot during the day.

Safety

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

- **Additional safety assets:** Investment will increase in Rumble Strips (ATP) investment and also into additional barriers, this will increase the maintenance burden.
- **Out of context and narrow bridges:** Widening improvements on SH2 (excluding bridges) result in bridges becoming increasingly out of context and difficult to navigate, particularly by heavy vehicles. The width of the Criterion Bridge in Paeroa limits 2-way truck passage, resulting in queues on SH2 during seasonal peaks.
- **Safety at worksites:** As traffic volumes increase and AM/PM peaks extend in duration, it becomes increasingly difficult to safely deliver maintenance and renewal on this corridor.

People, places and environment

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

- **Vegetation management requirements and biosecurity compliance:** Along the entire corridor are likely to increase as urban growth expands resulting in operational cost implications.

Investment future considerations

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

- **SH2 Maintenance investment:** Identifying the right level of maintenance as a result of reduction in traffic volumes on the corridor routes once TNL and the Waikato Expressway is complete. Continued investment and maintenance of the future revoked SH2 between Te Puna and Tauranga will be required so the route continues to deliver the required level of service through to handover.
- **Night maintenance:** Consideration should be given to the potential cost and quality impact of only being able to perform maintenance at night, as growth in traffic volumes are expected to limit and possibly eliminate the use of day time stop and go operations, currently employed during planned daytime activities (e.g. road resurfacing). Future methods for delivering this maintenance should be considered to improve vehicle access during maintenance works. In the case of road resurfacing, higher quality pavements could also be considered to reduce future maintenance
- **Better planning, communication and assignment of maintenance responsibilities,** between parties working on the road improvements should be exercised in order to ensure disruption to customers is minimised
- **Shoulder widening:** Widening of the shoulders on the corridor to minimise the impact that planned and unplanned events have on traffic flow. Consideration should also be given during the design of safety improvements to provide sufficient width for two-way flow during partial closures and clearing of debris.
- **Demand:** As demand grows on the corridor (specifically on the SH2 route) bypasses and expressway design is likely to be desirable, allowing for accessibility from the existing road to meet current and future growth needs. Suitable heavy vehicle bypass options for Maramarua, Katikati and Matamata could be considered as the towns expand, traffic volumes grow and conflicts worsen. Consider investigation of treatments to best manage conflicting traffic movements and address community severance issues e.g. in Katikati, Matamata and Maramarua
- **Improve safety for vulnerable road users:** Design of improvements should be considered to improve the access and safety of vulnerable users to tourist destinations along the corridor. In particular, where side barriers have been constructed, ensure at least 1m width from edge line and sections of corridor with inadequate shoulder widths or sight line deficiencies should be analysed.
- **Environmental standards:** Tighter environmental standards for stormwater, erosion and sediment control may be required for maintenance and upgrades in the vicinity of coastal areas and waterways (e.g. Ohinemuri River, Wairoa River, and Tauranga Harbour). Activities in these areas may be restricted to certain times of the year impacting maintenance programmes.
- **Consolidate/rationalise resource consents:** Consider opportunities to consolidate/rationalise resource consents, particularly for regular maintenance activities.
- **Expand and connect alternative mode initiatives:** Including public transport, walking and cycling to manage both commuter and tourist demand, as the urban population grows and development expands especially at built up areas closer to Tauranga i.e. Katikati, Omokoroa.
- **Provision of parking at key tourist destinations:** As the popularity of the Karangahake Gorge and the Hauraki Rail Trail grows, parking demand especially at peak times may need better management, rationalisation and further provision of parking may need to be considered. Consider combining stopping places with places of interest, heritage sites, local business areas and main streets, and future electric vehicle charging infrastructure.
- **Side barriers:** As more side barriers are installed there will be an increased impact of these assets on the ability to easily undertake pavement and surface maintenance, where barriers may need to be removed and replaced if undertaking overlay treatments.
- **Old Bridges:** Need to consider if a more proactive bridge maintenance regime needs to be put in place.
- **Non-asset solutions:** TNL tolling could be sensitivity tested to inform the effects of tolling on travel demand, travel time reliability and public transport usage along the corridor.

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	



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