

State Highway 2 Waikare Gorge Realignment Project Transport Impact Assessment

PREPARED FOR WAKA KOTAHI | NZ TRANSPORT AGENCY

12 DECEMBER 2022 | FINAL



Revision schedule

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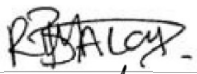
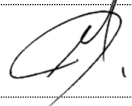
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Quality statement

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Abbreviations

AEE	Assessment of Environment Effects
CAS	Crash Analysis System
CoPTTM	Code of Practice for Temporary Traffic Management
CTMP	Construction Traffic Management Plans
DoC	Department of Conservation
DSI	Death and Serious Injury
HBRC	Hawke's Bay Regional Council
HCV	Heavy Commercial Vehicle
HDC	Hastings District Council
HDP	Hastings District Plan
iRAP	International Road Assessment Programme
MOTSAM	Manual of Traffic Signs and Markings
NOR	Notice of Requirement
NZTA	Waka Kotahi New Zealand Transport Agency
ONRC	One Network Road Classification
PBC	Programme Business Case
PGF	Provincial Growth Fund
PNGL	The Palmerston North–Gisborne Line
RAP	Road Assessment Programme
RTS	Road Traffic Standards
SSBC	Single Stage Business Case
TIA	Traffic Impact Assessment
TREIS	Traffic Road Event Information System
VKT	Vehicle Kilometres Travelled
Waka Kotahi	Waka Kotahi New Zealand Transport Agency
WDC	Wairoa District Council
WDP	Wairoa District Plan



1 Introduction

1.1 Background

The Connecting Tairāwhiti Programme Business Case (PBC), which was developed by Waka Kotahi NZ Transport Agency (Waka Kotahi) in conjunction with key stakeholders in 2018, identified the need for delivering regional transport solutions that connect businesses to markets and improve access to social, tourist and economic opportunities. The SH2 Waikare Gorge Realignment project was identified in the PBC recommended programme of works as part of a wide suite of strategic interventions that could deliver a significant contribution to the programme's outcomes by improving safety and resilience as well as enhancing access to economic and social opportunities within Tairāwhiti and the wider East Coast area.

Further technical investigations and design work have subsequently been undertaken to identify the preferred scope and programme of works for the SH2 Waikare Gorge Realignment project. One such study was the business case titled *State Highway 2: Waikare Gorge Single Stage Business Case* (Waikare SSBC) that was produced by the Stantec, WSP and GHD consortium in 2021. The Waikare SSBC identified and evaluated numerous design alternatives for the section of SH2 passing through Waikare Gorge.

Out of eight new realignment options that were considered (including three identified through historic investigations and five new alignment options identified by the SSBC project team), the "white" realignment option (see Figure 1.1) was recommended as long-term option as it best met the investment objectives and outcomes of the project.

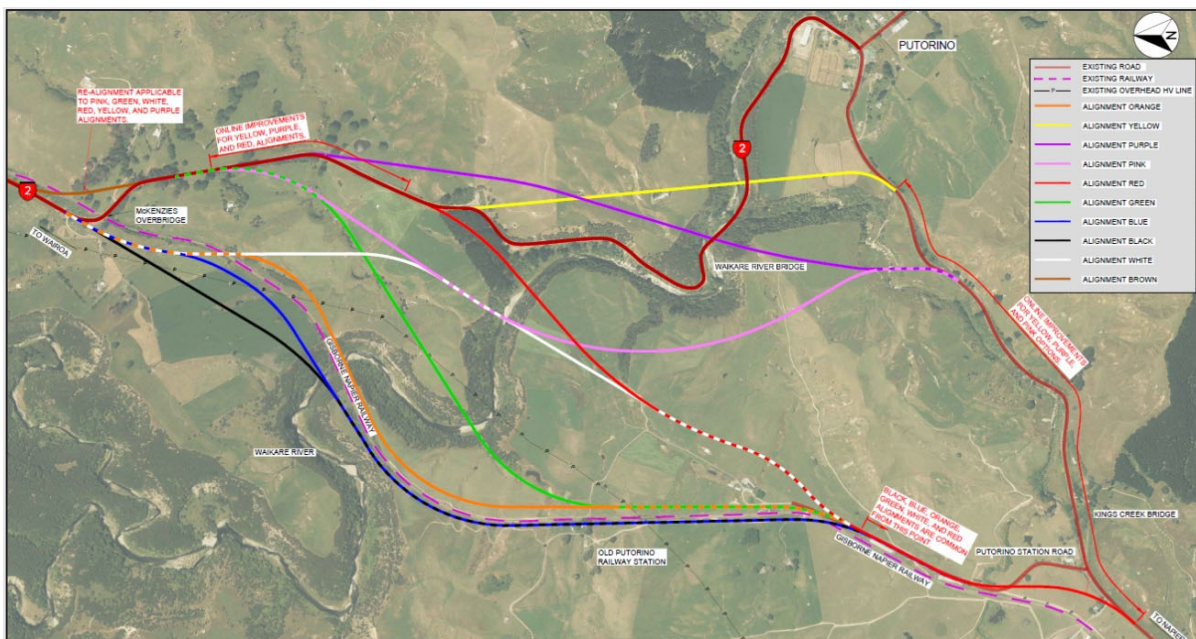


Figure 1.1: Identified alignment options assessed through the Waikare Gorge SSBC

1.2 Project Overview

The preferred option of the SH2 Waikare Gorge Realignment project (the “white” realignment option assessed) comprises a length of approximately 3.9 km (between CH 12300 and CH 16200) and will bypass the existing approximately 6 km section of SH2 going through the Putorino Village.

The new section of highway diverges from the existing SH2 alignment approximately 300 m south of Putorino Station Road and briefly follows the Napier to Gisborne Section of the Palmerston North–Gisborne Line (PNGL) before passing through farmland to cross the gorge and railway line before reconnecting to SH2 immediately north of the existing “McKenzie’s” rail overbridge. The new highway route will comprise of the following elements:

- A two-way, two-lane highway with a central median barrier.
- A slow-moving vehicle bay (northbound) and passing lane (southbound).
- A new 160 m+ bridge crossing the Waikari River, located approximately 800 m upstream of the existing state highway gorge route.
- A rail overpass, stock underpasses and stormwater structures.
- At-grade intersections at the northern and southern ends of the project route to maintain access to local communities.
- Retaining the existing SH2 as a local road to serve local traffic and as a diversion route to the new SH2 when required for maintenance or emergency purposes.

Amendments to the existing SH2 designations are required to accommodate the scope of works for the realignment project. This will involve Waka Kotahi submitting a Notice of Requirement (NOR) for the realigned state highway. In addition to the NOR, regional resource consents will need to be granted where the effects are avoided, remedied or mitigated to allow the proposed works to be undertaken.

While concept design drawings of the recommended alignment were prepared by WSP as part of the Waikare SSBC report, Waka Kotahi has confirmed that the Waikare Gorge project design should be progressed to a Preliminary Design level of detail in order to secure consent approvals for the project.

1.3 Report Purpose

This Traffic Impact Assessment (TIA) report has been prepared in support of:

- A NOR by Waka Kotahi for a new State Highway 2 designation to protect land identified as being required for the construction, operation, and maintenance of the realignment project.
- A resource consent application to the Hawke’s Bay Regional Council (HBRC) to enable the proposed construction works.

The purpose of the TIA is to understand the impacts of the proposed physical works of the project on the adjacent transport network, with consideration to network performance and road safety implications during both the construction stage (i.e., the temporary construction related transport effects) and once operational.

The TIA has been prepared on behalf of Waka Kotahi as a technical input to the overall Assessment of Environmental Effects (AEE) reporting for the NOR and regional resource consent applications. The scope of the TIA included the following:

- A description of the project site and the existing transport environment.
- A high-level appraisal of the traffic and transportation related effects arising from the preferred design for the project. The type of effects include:
 - Impacts on access for properties along the existing SH2 alignment.
 - Impacts on existing public transport operations (including regional bus services and school buses).
 - Impacts on pedestrian and cyclist routes.



- Efficiency and safety of the proposed intersection and access forms.
- Recommended measures as appropriate to avoid, remedy, mitigate or manage potential adverse traffic effects arising from the preferred design for the Project.
- A high-level assessment of the likely construction traffic effects on the transport network, including high-level recommendations associated with temporary traffic management measures.

A site visit was undertaken on Tuesday, 20 September 2022 between 7 am and 9 am (during the typical morning commuter peak period) to observe existing road features including accesses and intersections, network operations and identify any network constraints and/or potential safety issues. Key findings and photographs from the site investigation are provided in **Appendix A**.



2 Existing Transport Environment

2.1 Site Description and Location

The general locality of the SH2 Waikare Gorge Realignment project site is shown in Figure 2.1, while Figure 2.2 illustrates the project extents.

As shown in Figure 2.1, the project site is located in the Hawke’s Bay region, approximately midway between Wairoa and Napier. The project area traverses both the HDC and WDC boundaries, with the Waikari River forming the geographical boundary between the two local councils.

The Palmerston North–Gisborne Line (PNGL) is located to the west of the existing SH2 alignment through most of the study area, except for a small section located near the northern extent of the study where the existing SH2 passes over the railway line. Whilst the alignment of SH2 largely follows the route of the PNGL between Gisborne and Napier, within the study area the state highway diverts away from the more direct route of the railway line and instead meanders through the small rural community of Putorino and the Waikare Gorge.

As illustrated in Figure 2.2, the northern boundary of the project site is located to the north of the existing PNGL overbridge (known as the McKenzie’s overbridge), while the southern boundary is located approximately 300 m south of the intersection of SH2 and Putorino Station Road.

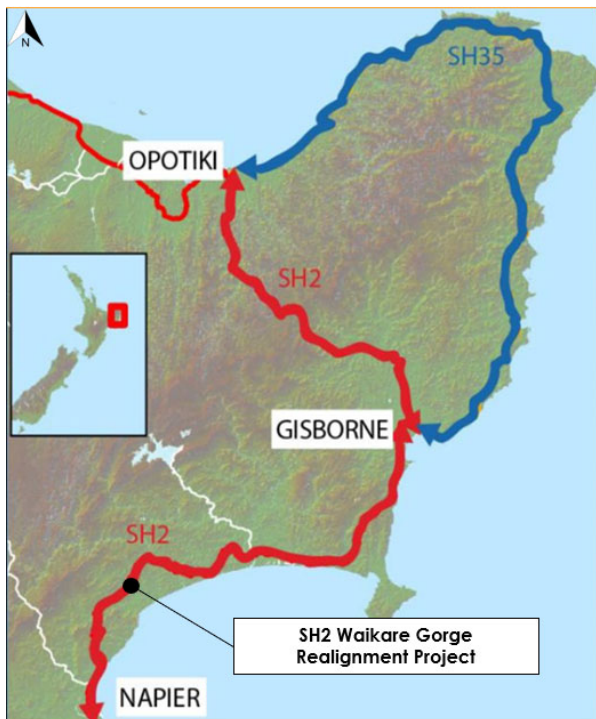


Figure 2.1: Locality Map - SH2 Waikare Gorge Realignment Project

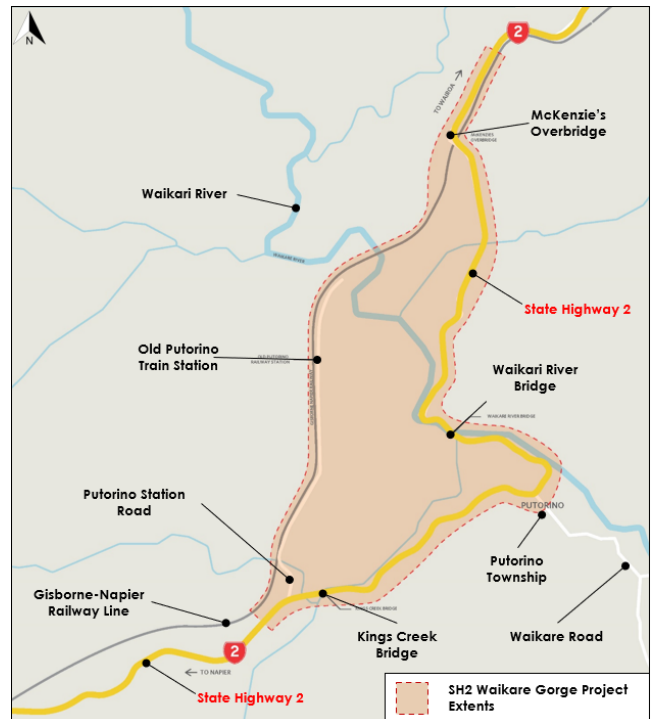


Figure 2.2: Project Extents - SH2 Waikare Gorge Realignment Project

2.2 Existing and Future Land-use

The land surrounding the Project comprises predominantly of rolling rural farmland and dispersed residential dwellings except for the small farming settlement of Putorino. Putorino township currently has a resident population of approximately 180 people¹ and operates as a local service centre for the surrounding rural communities. Key services located within the township include Putorino School, a co-educational state primary school with a roll of 14 students (as of July 2022²), a Fire and Emergency NZ station and the Waikare District Sports Centre.

The proposed realignment (which is described and illustrated in Section 3 of this report) will traverse private property as well as land owned and maintained by the Department of Conservation (DoC).

2.3 Existing State Highway 2 Designations

The existing SH2 designation within the Hastings District Plan (HDP) and Wairoa District Plan (WDP) are summarised in Table 2.1.

Table 2.1: Existing SH2 Designations

Territorial Authority	Designation No.	Legal Description and Location	Designation Purpose
Hastings District Council	D137	SH2, SH5 & SH50	To undertake maintenance, operation and use of, and improvement to the State Highway Network
Wairoa District Council	D44	SH2, Gisborne/Wairoa District Boundary to Wairoa/Hastings District Boundary.	Highway purposes.

The new section of the proposed SH2 realignment will extend beyond the boundary of the existing designations. The new section of road will need to be declared as a State Highway, with the old state highway section revoked to a local public road within each of the respective District Councils.

2.4 Existing Road Network

The existing network of roads within and surrounding the project site are shown in Figure 2.2, and comprise of the existing SH2 corridor, which is administered by Waka Kotahi, and Waikare Road and Putorino Station Road, both of which are local roads managed by HDC.

2.4.1 State Highway 2

SH2 is currently classified as a 'National Route' and 'Regional Arterial' in both the HDP and WDP, with the section between Gisborne and Napier identified within Waka Kotahi's One Network Road Classification (ONRC) framework as a 'Regional Arterial' route. The SH2 corridor is identified as a "key journey" along the east coast of the North Island, forming part of the wider journey that connects Wairoa and Gisborne to the north with Napier to the south.

¹ <https://www.realestateinvestar.co.nz/invest/putorino>, accessed 20 September 2022

² [Putorino - Wikipedia](#), accessed 20 September 2022



The route is also identified as a lifeline connection for communities within the Hastings, Wairoa and Gisborne Districts, providing access to essential supplies and emergency services in the event of natural disasters (such as earthquakes or flooding).

The road is formed of two general traffic lanes providing for travel in both directions. However, the road widens just north of the Waikare Gorge to facilitate both northbound and southbound passing opportunities. The route is a typical rural highway and is generally undulating and windy in parts, passing through several highly constrained sections such as the Devil's Elbow, Mohaka Viaduct and Morere Hill, as well as Putorino/Waikare Gorge. The alignment through the Waikare Gorge provides challenging driving conditions including narrow road widths, winding geometry and steep cliffs/drop offs.

The posted speed limit along the study route section ranges from 100 km/h on rural sections to 70 km/h through Putorino township.

Traffic volumes on SH2 on the journey between Gisborne and Napier range significantly between rural and urban sections. Generally, the corridor carries approximately 2,000 vehicles per day (vpd). Based on the average daily traffic (ADT) data sourced from Waka Kotahi's Traffic Management System (TMS) (site ID 00200606 ³, the section of SH2 through the Waikare Gorge has (pre-COVID-19 conditions) an ADT volume of approximately 1,960 vehicles per day (vpd)⁴. Approximately 20% of the daily traffic volume is classed as heavy commercial vehicles (HCVs).

An analysis of traffic volumes over the previous five-year period pre-2020 (i.e., pre the COVID-19 pandemic indicates that the route has experienced a traffic growth rate of approximately 2.2% per annum.

Seasonal variation data - Increased access demands during the summer period resulting from visitation on SH2 is reflected within the TMS data, where daily traffic volumes are approximately 40% higher in December - January compared with June.

While traffic volumes on SH2 are typically lower than expected for a regional route, its classification reflects the importance of regional connectivity and associated economic and social importance of the route.

2.4.2 Putorino Station Road

Putorino Station Road is classified in the HDP as a 'Low Volume' road. The no-exit road provide access to several rural residential properties as well as the Old Putorino railway station. Based on traffic data sourced from the Mobile Road website, the road carried an ADT of approximately 22 vpd with approximately 10% HCVs (2021 estimate). The road has a 100 km/h posted speed limit.

The first 130 m of the road is a two-way, two-lane road with a sealed carriageway width of approximately 5.3 m, after which the road width reduces to approximately 3.5 m and the surfacing changes to gravel standard.

Putorino Station Road currently intersects SH2 at-grade as a T-intersection with stop-control on Putorino Station Road. The intersection is built to a rural intersection standard with no auxiliary turning lanes. The following photos show the existing configuration of the intersection.

³ Tutira between Sandy Creek Road and Matahaura Road South, 12 km south of Putarino

⁴ Based on data collected between 1 January 2021 and 31 December 2021.





Figure 2.3: SH2 / Putorino Station Road Intersection – approaching from the south on Putorino Station Road



Figure 2.4: SH2 / Putorino Station Road Intersection – looking north towards Putorino Station Road

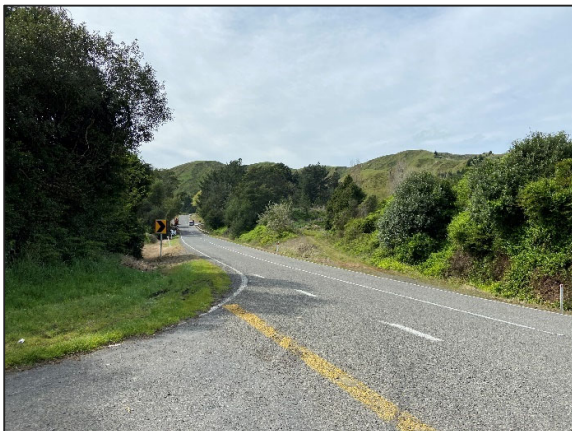


Figure 2.5: Figure 2 4: SH2 / Putorino Station Road Intersection - looking east towards SH2



Figure 2.6: SH2 / Putorino Station Road Intersection - looking west towards SH2

2.4.3 Waikare Road

Waikare Road is classified in the HDP as an ‘Access’ road. Waikare Road passes through Putorino township and provides access to Putorino School and the Waikari River Mouth Campsite, a DoC facility located approximately 13 km south-east of the township.

Based on traffic data sourced from the Mobile Road website, the road carried an ADT of approximately 61 vpd with approximately 10% HCVs (2021 estimate). The section through Putorino township is a two-way, two-lane road with a sealed carriageway width of approximately 6.1 m.

Waikare Road currently intersects SH2 at-grade as a T-intersection with give-way control on Waikare Road. The intersection is built to a rural intersection standard with no auxiliary turning lanes.



2.5 Other Transport Modes or Services

2.5.1 Palmerston North–Gisborne Line (PNGL)

The Palmerston North–Gisborne Line (PNGL) is a secondary main line railway in the North Island of New Zealand. It branches from the North Island Main Trunk at Palmerston North and runs east through the Manawatū Gorge to Woodville, where it meets the Wairarapa Line, and then proceeds to Hastings and Napier in Hawke's Bay before following the coast north to Gisborne (the Gisborne to Napier Section or Line).

In 2012, the line was closed following several large washouts north of Wairoa resulting in significant damage to rail infrastructure. Given the high costs for repairing the line and the rising maintenance costs from aging infrastructure, KiwiRail announced the line would be closed indefinitely.

However, in 2019 the line between Wairoa to Napier was reopened with funding from the Provincial Growth Fund (PGF). The route is intended to cater for the transport of logs from the surrounding forest areas in Wairoa to the Port of Napier. At present, the line is only operational at weekends and most freight in the region is expected to continue being transported on road.

Within the project area, the existing SH2 route crosses the railway line (via an overpass) at only one location (at the McKenzie's overbridge as shown in Figure 2.2 above). The railway line crosses several farm tracks in the area around the existing SH2/ Putorino Station Road intersection at grade.

2.5.2 Existing Public Transport Services

InterCity, which operates bus services nationwide, operates daily services between Gisborne and Napier. The bus service departs from Gisborne at 9:35 am daily, stopping in Putorino on the way to Napier at 11:54 am. The bus departs Napier in the afternoon (at 1:45 pm daily) and stops in Putorino on the way back to Gisborne at 2:39 pm. The bus stops at in front of the Waikare Hotel, near the SH2/Waikare Road intersection.

No other public transport services, including regional and school bus services, currently operate along the existing SH2 corridor.

As shown above, there is limited public transport infrastructure provided within walking distance of the project site. The lack of public transport infrastructure within the project site is indicative of the current rural nature of the area.

2.5.3 Walking and Cycling Infrastructure

There are currently no pedestrian facilities (footpaths or crossings) provided along the section of SH2 that the proposed new highway route bypasses. This is typically due to the current rural road speed environment and a focus on through traffic/ mobility function for the State Highway.

No formal on- or off-road cycling facilities are provided along the existing SH2 corridor. The rolling topography and heavy vehicle volumes, combined with a speed environment of 80-90 km/h, makes for a hostile and unsafe cycling environment that restricts the viability for cycling to only the very experienced and confident rider.

2.6 Crash History

2.6.1 CAS Data

Crash data for the previous full five-year period (January 2017 to December 2021 and including up to September 2022) was sourced from Waka Kotahi's Crash Analysis System (CAS) and analysed to identify any road safety related issues within the vicinity of the project site.

A summary of the crashes recorded within the project area in the previous five years is provided in Table 2.2, while full crash records for the project site are provided in **Appendix B**. The locations of the recorded crashes are illustrated in Figure 2.7 to follow.



Table 2.2: Crash summary for the previous five years (2017 to 2022)

Crash Location	Crash Severity				Total No. of Crashes
	Fatal	Serious	Minor	Non-Injury	
SH2 Corridor (“McKenzie’s” rail overbridge to Putorino Station Rd)	0	1	3	4	8

As shown Table 2.2, a total of eight crashes were recorded along the section of SH2 between the “McKenzie’s” rail overbridge and the Putorino Station Road intersection over the previous five years. Of the observed crashes:

- Only one death and serious injury (DSI) crash was recorded within the project area in the previous five-year period.
- Seven of the eight crashes (including the DSI crash) occurred as a result of a vehicle losing control while navigating a bend.
 - In six of the seven crashes, the single vehicle involved veered off the road and either landed in a ditch/grass berm or colliding with a roadside object.
 - In the remaining crash, the vehicle crossed the centre line and colliding head-on onto a vehicle on the oncoming lane.
 - Four of these crashes resulted in either serious or minor injuries, while the remaining three crashes did not result in any injuries.
 - The crash records indicate the following contributing factors to these crashes: inclement weather conditions (raining and wet conditions), loose material on the road, and an intoxicated driver.
- The remaining crash, a minor injury crash, occurred as a result of an HCV on SH2 overtaking an agricultural vehicle.
- Figure 2.7 shows where the crashes have occurred, with nearly all the crashes located at a horizontal bend. Small clusters are observed at the existing Waikari River bridge and near the horizontal curve at the northern end of the project area (at the “McKenzie’s” rail overbridge).

Based on the recent crash history, SH2 has a ‘Low’ or ‘Low-Medium’ collective and personal risk within the project area. However, as shown above, the crash history does indicate that the current road geometry (winding alignment) and the limited passing opportunities that presently exist as being the main contributors to the risk of crashes.

The SSBC does, however, note that:

” Due to the lack of cell phone reception in the area, there is potentially a higher rate of under-reporting of crashes occurring. Information from a St John Ambulance worker provided evidence of a serious injury crash occurring in the gorge three or four years ago, where a motorcyclist broke their femur and suffered significant internal injuries. The motorcyclist was airlifted to Hastings Hospital. This was not recorded in the CAS database as the police were unable to attend.”

On this basis, there is potentially a higher number of crashes than what is recorded in the CAS database may have occurred along this section of SH2 in the recent five-year period, meaning that the road corridor could have a higher risk rating than currently estimated.



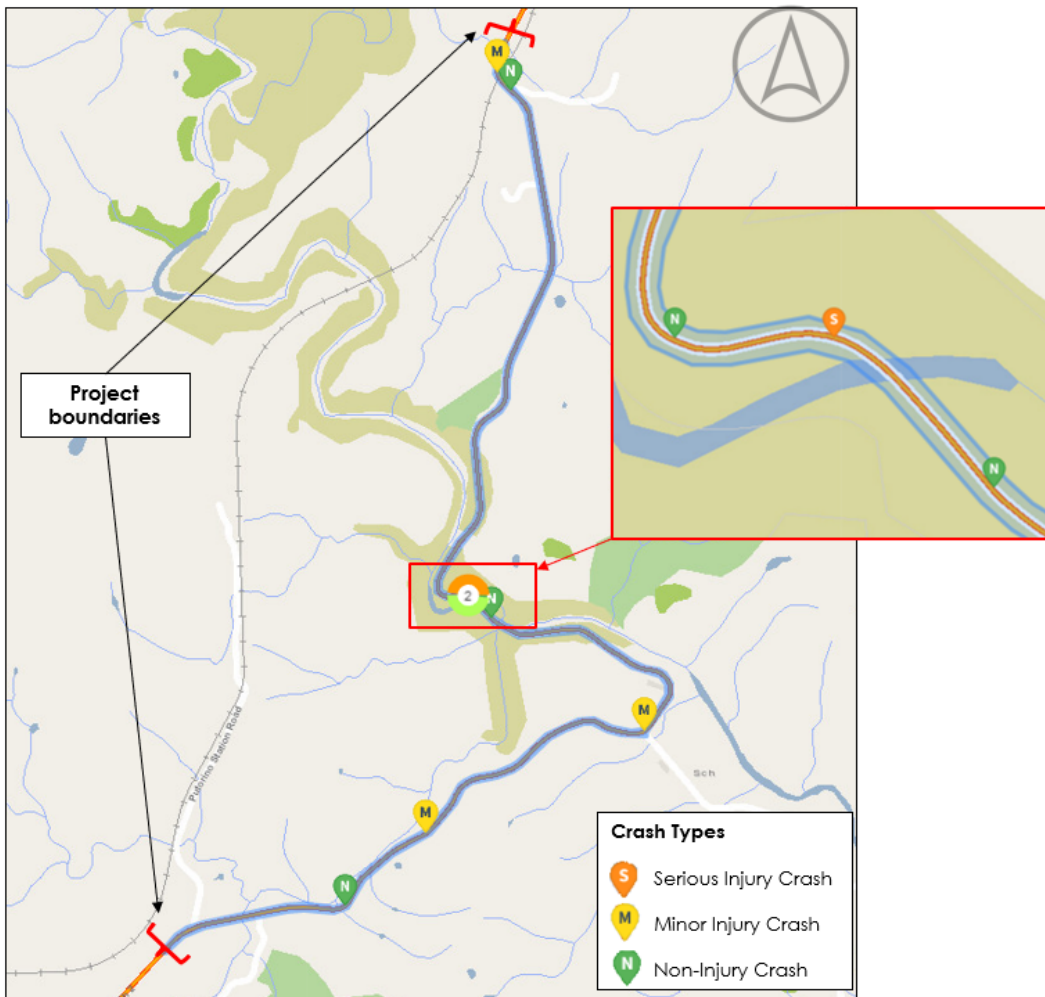


Figure 2.7: Location of Recorded Crashes along the existing SH2 corridor (2017 to 2022)

Source: Waka Kotahi CAS Data

2.6.2 KiwiRAP Rating

In addition to the crash history, the latest available safety rating for roads in the area around the project was sourced from the New Zealand Road Assessment Programme (KiwiRAP) to see how the cross-section, horizontal alignment and roadside hazards contribute to crash risk. Figure 2.8 to follow shows the current KiwiRAP Star Rating of the project area.

As shown in the figure, the rural section of the road (excluding the section outside Putorino township) is predominantly a 2-Star rated road with segments of 3-Star as well. This low standard of road corridor falls below what the ONRC expects of a regional route. The topography within the project area would make it challenging to improve the star rating of the corridor without considerable cost.

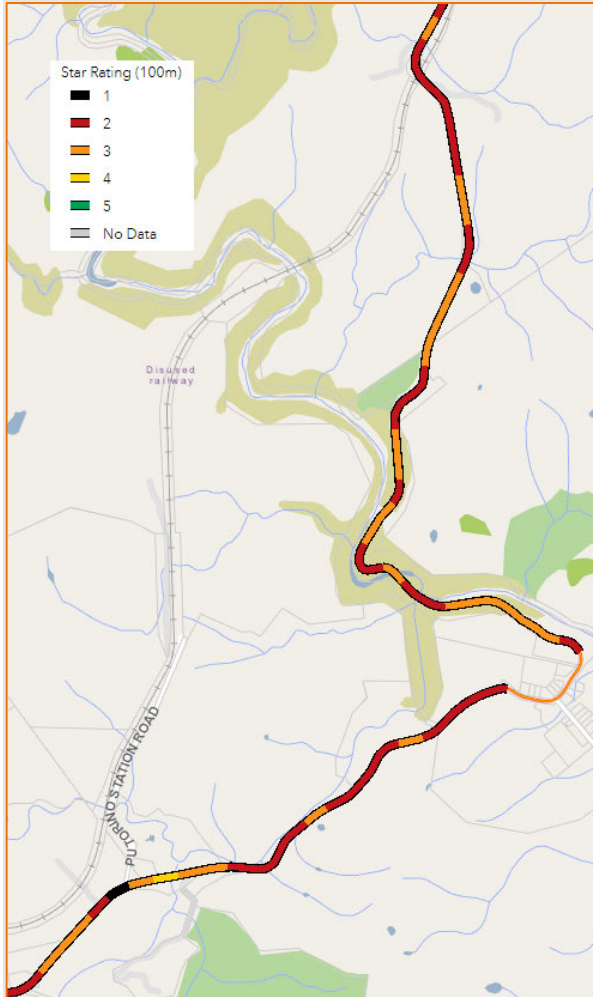


Figure 2.8: Waikare Gorge Project Area KiwiRAP Rating (2017)

Source: www.kiwirap.org.nz

2.6.3 Historic Road Closures

Data from the Traffic Road Event Information System (TREIS) database, which contains information on all road events from planned roadworks, unplanned incidents, and other planned events (such as parades or sports events) that cause delays to road users, was sourced and analysed in the SSBC. TREIS provides an indication of the frequency, cause, location and duration of unplanned closure events.

The analysis undertaken in the SSBC of the TREIS data from the period between 2015 and 2019 is summarised as follows:

- A total of 33 unplanned closure events relating to environmental or traffic incidents have occurred on SH2 within the vicinity of the Waikare Gorge, with an average closure rate of 6.08 events per annum (refer to Table 2.3). Eight of the recorded events (25%) lasted for 8 hours or longer, with three of these lasting longer than 24 hours.
- Environmental factors accounted for 48% of all unplanned closure events and 61% of all recorded closure time, whilst traffic related incidents were responsible for the remaining 52% of closure events and 39% of closure time. Slips were the most common cause of disruptions accounting for 40% of all recorded closure events and most closure duration (52%).



- The data suggests closure events are becoming more frequent at Waikare Gorge. A substantial increase in the frequency of recorded closure events was recorded over the 5-year period, peaking with 15 recorded closures in 2017; however, it is noted the majority of closure duration (57% or 169 hours) occurred in 2016. This was primarily the result of two recorded events that lasted longer than a day;
- Recorded disruption periods indicate most unplanned closures (74%, or 23 events) impacted on traffic flows during the typical working day (8 am – 5 pm), with 32% (10 events) disrupting AM peak hour and 27% (9 events) disrupting PM peak hour traffic flows.
- The most recent closure event occurred on the 20th of January 2020 when a slip blocked the movement of traffic in both directions for several hours, causing disruption for businesses and local communities.

Table 2.3: Summary of Frequency and Duration of Unplanned Closure Events (2015 to 2019)

Incident Group	Type	Total Events	Duration (hours, minutes)		Length of Events	
			Average	Total	>8 hrs	<8 hrs
Environmental	Slips	13	10:23	135:59	3	10
	Rock Falls	3	08:00	24:00	1	2
Traffic Incidents	Crashes	7	10:40	74:40	3	4
	Breakdown / Other	4	01:20	05:20	0	4
	Wandering Stock	4	06:00	24:00	1	3
	Object / obstruction	2	00:07	00:14	0	2
Total		33	06:05	264:13	8	25

As shown above, recent events along the existing SH2 corridor also highlights the potential safety risks present to drivers from large rocks and debris released from the adjacent slopes of the Gorge. The posted speed limit coupled with the challenging rural roadside environment has the potential for severe outcomes to occur either as a result of vehicles colliding with boulders or boulders hitting the car during a rockfall event.

3 Proposed Works

Construction of the proposed SH2 Waikare Gorge Realignment project will include the following works (described from south to north along the route – refer to Figure 3.1):

- Realignment of approximately 5.7 km of the current SH2 to a new greenfield route that runs generally west of the existing SH2. The new SH2 alignment has a length of approximately 3.9 km (measured from the diverge / merge points from the current route) and will hence be 1.9 km shorter.
- Typical road cross sections consisting of a minimum 1.2 -1.5 m sealed shoulders, 3.5 m traffic lanes and provision for a physical median barrier within a minimum 2 - 3 m wide central median.
- Southern tie-in works (the immediate tie-in, encompassing the southernmost curve and the following 500 – 700 m) to provide a more consistent standard between this section and the previously realigned section of highway approximately 4 km to the south⁵.
- Realignment of the existing SH2 corridor from the existing SH2/Putorino Station Road intersection and construction of a new road link connecting the existing SH2 to the new highway.
- Changing the existing SH2 route that the new highway route bypasses to a local road. The future classification of the route will be confirmed with HDC.
- Closure of the existing SH2/Putorino Station Road intersection, and reforming Putorino Station Road to create a private property access.
- Bridge to allow the alignment to cross Kings Creek.
- Stock Underpass structures are proposed along the length of the proposed alignment.
- Construction of a new general access intersection to retain access to the rural residential properties located to the south of the new highway route, near the Old Putorino train station.
- An approximately 550 m long southbound passing lane commencing just after the southern abutment of the proposed Waikari River bridge.
- An approximately 160 m bridge structure spanning the Waikari River.
- An approximately 520 m long northbound uphill slow vehicle bay commencing just after the northern abutment of the proposed Waikari River bridge.
- Earthworks cutting on the northern approach to the Waikare Gorge.
- Culvert construction to allow the alignment to cross existing gully systems / watercourses.
- Construction of a new general access at the location where the new highway route deviates from the existing SH2 alignment to retain property access.
- A rail overbridge crossing the PNGL near the existing rail overbridge at the northern end of the project route.
- Northern tie-in works to create a smooth transition between the existing SH2 corridor and the project works.

⁵ The existing state highway was realigned in 2011 approximately 4 km south of the currently proposed Waikare Gorge realignment tie-in. This existing 4 km stretch of highway only achieves a KiwiRAP rating of 2 and will be out of context compared to the northern and southern approaches following the Waikare Gorge realignment. An investigation of the possible tie-in to the existing SH2 corridor (the immediate tie-in, encompassing the southernmost curve and the following 500-700 m) will be undertaken during the pre-implementation phase based on a Safe Systems design approach.



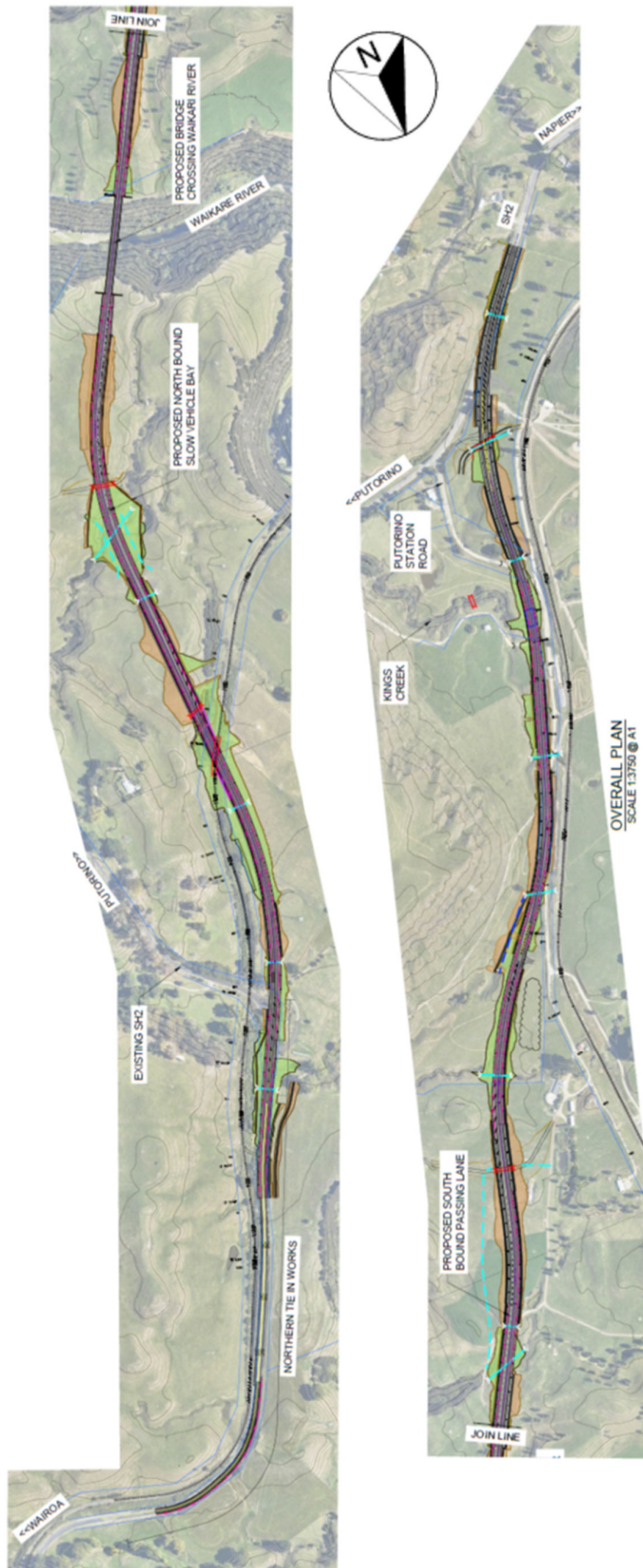


Figure 3.1: General Arrangement – SH2 Waikare Gorge Realignment Project

Source: Plan No. WGR - DES - GEM- 00 - DRG / F

4 Assessment of Transportation Effects

The following sections outline the traffic effects assessment of the recommended design (illustrated in Figure 3.1) that is being advanced by Waka Kotahi. That is, the effects associated with the completed SH2 Waikare Gorge Realignment corridor as well as the temporary construction related transport effects.

4.1 Operational Effects

4.1.1 Local Road Network

As described in Section 2.4.1 of this report, the existing SH2 corridor through the Waikare Gorge currently carries approximately 1,960 vpd with 20% HCVs. Once completed, it is anticipated that all 'regional' traffic (i.e., all traffic, other than local trips) will divert to the new highway route.

The SSBC states⁶ that a traffic model developed as part of the economic analysis estimated that, once the new highway route is completed, some 275 local trips per day (i.e., local trips to/from Putorino township and the surrounding area) would access the new highway route via the realigned Putorino Station Road intersection on completion of the new highway.

Overall, the expected ADT on the new section of highway is likely to remain at the existing levels observed on the existing SH2 alignment (i.e., around 2,225 vpd at opening). Given the rural environment in the area, traffic volumes along the section of SH2 that is bypassed by the new highway and surrounding local road network will remain low (i.e., less than 500 vpd). This is well below the typical capacity of a two-way rural road⁷.

On the basis of the above, no adverse capacity and efficiency effects are anticipated on SH2 and the surrounding road corridors with the implementation of the new highway route. In fact, once completed, the new highway route will result in the following positive effects:

- The new highway route provides additional lane capacity for regional traffic as a result on the improved road alignment (relatively straight alignment compared to the existing winding alignment).
- Reduced journey times for regional/ through traffic travelling through the gorge.
- Reliability (in terms of the number of road closures as a result of traffic incidents, rock falls and slips) compared to the current SH2 route through the gorge.
- Reduction in vehicle operating costs and vehicle kilometres travelled (VKT).

4.1.2 SH2 connection to the new Highway Route

As illustrated in Figure 3.1, the existing Putorino Station Road will be closed, and a new re-aligned road link connecting the existing SH2 to the new highway route near the southern end of the project area constructed. The existing SH2 / Putorino Station Road intersection will be reformed to create an access to the existing property at the north-eastern corner of the existing intersection.

The new SH2 intersection with the new highway route, which will be located at approximately CH 15850 will be designed in accordance with Waka Kotahi's *Manual of Traffic Signs and Markings* (MOTSAM) Part 2: Markings.

⁶ Section 8.1 of the Waikare SSBC report

⁷ According to Table 4.5 of the RTA's Guide to Traffic Generating Developments, the typical capacity of a two-way rural road with a 100 km/h design speed and 5-10% HCV is approximately 900 – 1,000 vehicles during the peak hour.



Intersection Capacity

The future intersection is anticipated to perform satisfactorily from a capacity and efficiency perspective given the:

- Low turning volumes projected at intersection - approximately 245 vpd once construction of the new highway route is completed.
- The area along the existing section of SH2 that the new highway bypass will remain rural, with no developments anticipated in the area in the short, medium or long term (i.e., no significant traffic growth is expected that would require future capacity upgrades at the intersection).

Intersection Safety

While the proposed intersection form is considered appropriate for the following reasons:

- Low crash exposure: the likelihood of intersection related crashes is considered low given the low turning volumes expected at the intersection (245 vpd), especially during the typical commuter peak periods (anticipated to be between 27-30 vph⁸ during the morning and afternoon peak periods) as well as the generally low volume of traffic anticipated on the new highway route.
- Adequate turning facilities: The intersection is designed to the appropriate standard with a dedicated, auxiliary right-turn lane provided.
- Good visibility: the achievable sight lines at the intersection are expected to comply with the minimum sight distance requirements in Table App5B/1⁹ of Appendix 5B of Waka Kotahi 's planning policy manual and the minimum required Safe Intersection Sight Distance (SISD) specified in Table 3.2¹⁰ of the Austroads Guide to Road Design (GRD) Part 4A. It is noted, however, that while the intersection is located on the outside of a horizontal bend (the appropriate location to optimise sight lines), the intersection is also located just before the crest of a vertical curve¹¹.

Notwithstanding the above, the following is recommended to be incorporated into the final intersection design:

- Achievable sight lines to not be obstructed / restricted by the road alignment (vertical and horizontal curves), vegetation or any other roadside structures / furniture.
- The intersection design should accommodate the appropriate design vehicle specified in Waka Kotahi's Road Traffic Guidelines (RTS) 18¹².
- The appropriate advanced warning signs be provided well in advance of the intersection.
- To improve visibility (especially during night-time) and in order to maximise the safety of the intersection, it is recommended that street lighting be incorporated into the intersection design.

⁸ Appendix A.8 in Austroads Guide to Design Part 4 states that where peak hour volumes or peak hour percentages are not available, it can be assumed that the design peak hour volume equals 8% to 10% of the AADT for urban situations and that the design hour volume equals 11% to 16% of AADT for rural situations.

⁹ A minimum sight distance of 282 m is required for a 100 km/h posted speed limit.

¹⁰ A minimum SISD of 285 m is specified for a 110 km/h design speed and two second reaction time.

¹¹ The height difference between the intersection location and the crest / peak of the vertical curve is approximately 2 m. The intersection is located approximately 105 m north of the vertical curve. At this location, the sight lines looking towards the south may be restricted due to the vertical alignment.



4.1.3 Property Access

Property Access

To retain access to existing properties, several new and upgraded vehicle crossings will be provided along the new highway route. These include:

- Reconstruction of the existing vehicle crossing (referred to as 'Access 1' for purposes of this assessment) for the property located at 5500 State Highway 2, Putorino (to be located at approx. CH 12200).
- Construction of a new general access (referred to as 'Access 2'¹³ for purposes of this assessment) at approx. CH 12320 to connect to the existing SH2 alignment. This will involve re-aligning the existing SH2 route and constructing a new road link to the new highway route.
- Closure of a section of Putorino Station Road, and:
 - Construction of a new access (referred to as 'Access 3' for purposes of this assessment) at CH 14905 (approx.) with a new road connection from the new highway route to the farm track / northern end of Putorino Station Road.
 - Reconstruction of the existing SH2 / Putorino Station Road intersection to create an access to the existing property located at the north-eastern corner of the existing intersection.

An assessment of the location and configuration of the proposed accesses against the minimum sight distance and access spacing requirements in Appendix 5B (*Accessway standards and guidelines*) of Waka Kotahi's Planning Policy Manual showed that:

- The achievable sight lines (looking towards the south) at 'Access 1', which are currently obstructed by the horizontal bend to the south of the access, will be significantly improved. The future access is now expected to fully comply with the minimum sight distance requirements
- 'Access 2' does not fully comply with the minimum separation distances. Table App5B/3 specifies a minimum access spacing of 200 m to the nearest intersection and accessway for accesses on a state highway with a posted speed limit of 100 km/h, however 'Access 2' is separated by approximately 120 m to 'Access 1'. The approximately 80 m shortfall is however, considered acceptable in this case for the following reasons:
 - Good visibility on the approaches of both accesses. It is anticipated that the achievable sight lines will exceed the minimum sight distance requirements¹⁴. Drivers approaching the accesses on the new highway route will have sufficient stopping sight distance to safely stop before the access, should there be a vehicle turning in/out of the access.
 - It is anticipated that both accesses will only generate a modest level of traffic during the operating peak periods (e.g., residential dwellings typically generate approximately one vehicle movement during the peak hour; rural residential dwellings will likely generate less than this). This small amount of traffic is unlikely to cause regular conflict at the accesses.
 - The location of Access 2 is constraint by the PNGL, the location of the existing rail underpass and the existing SH2 alignment.
 - A minimum 2 m wide flush median are provided between the two accesses, facilitating right-turning traffic movements from SH2 to these accesses.

¹³ Subject to confirmation from Waka Kotahi, Access 2 is indicatively shown in the concept design drawings as a private access, with the existing SH2 alignment stopped/ severed at this location. If the severed section of SH2 were to remain a public road, the effects of constructing an intersection at this location would need to be assessed.

¹⁴ Appendix 5B specifies a minimum sight distance of 282 m for a 100 km/h posted speed limit, with the Austroads GRD Part 4A specifies a minimum SISD of 285 m for a 110 km/h design speed and two second reaction time.



Similar to the recommendations made in Section 4.1.2 related to the final intersection design, the following is recommended for consideration in the final access designs:

- Achievable sight lines to not be restricted by the road alignment (vertical and horizontal curves), vegetation or any other roadside structures / furniture.
- The access design should accommodate the appropriate design vehicle as specified in RTS18¹⁵.
- The appropriate advanced warning signs be provided well in advance of each access.

Connectivity of surrounding communities

Access to Putorino township and surrounding rural residential dwellings is retained via the existing SH2 route (which is anticipated to be revoked to a local road) that is bypassed by the new highway. However, the new highway route severs the connection between communities living on the eastern and western side of the new highway route (specifically for the area around Putorino Station Road). Connectivity between the two communities is proposed to be retained by the following means:

- The provision of the realigned SH2/ Putorino Road intersection and the new local access connection to the former Putorino Station Road at CH 14905 (i.e., Access 3). The two accesses are located less than 1 km apart.
- Realignment and extension of existing farms tracks are required to connect to the local road network. This will require landowner agreements.

This assessment identified a few gaps related to the provision of adequate access to the properties located along the existing the Putorino Station Road (those on the western side of the new highway route). Access to these properties could be improved by providing a service road / farm track parallel to the new highway route as shown in Figure 4.1. As shown in the figure:

- For Alternative 1: the proposed the service road/ farm track is anticipated to be contained within the geographic extent of the proposed designation.
- For Alternative 2: The service road/ farm track alignment will traverse over two separate properties and will consequently require landowner agreements to be in place.

It is recommended that this be investigated further as part of the detail design stage of the project.

Property Severance

The new highway route is expected to cause some property severance, especially for those properties located near the northern and southern ends of the new highway route. To mitigate this, several stock underpasses have been provided along the new highway route to allow the passage of livestock and agricultural vehicles.

Overview of findings

While the new highway route impacts on local travel, the impact on journey times and property access for local residents living on either side of the new highway will be minimal. The proposed accesses, intersections, and extension of the existing local road connections and farm tracks, pending landowner agreements, will ensure that access is retained for the local communities living on either side of the new highway.

¹⁵ The design vehicle will need to consider the over-dimension vehicles such as 50MAX High Productivity Motor Vehicles (HPMV).



On the basis of the above, no adverse effects on accessibility to/ from the existing properties are anticipated as a result of the changes to private property access. All turning movements are still provided for, either direction off the new highway route, or via new local road/ farm track connections.

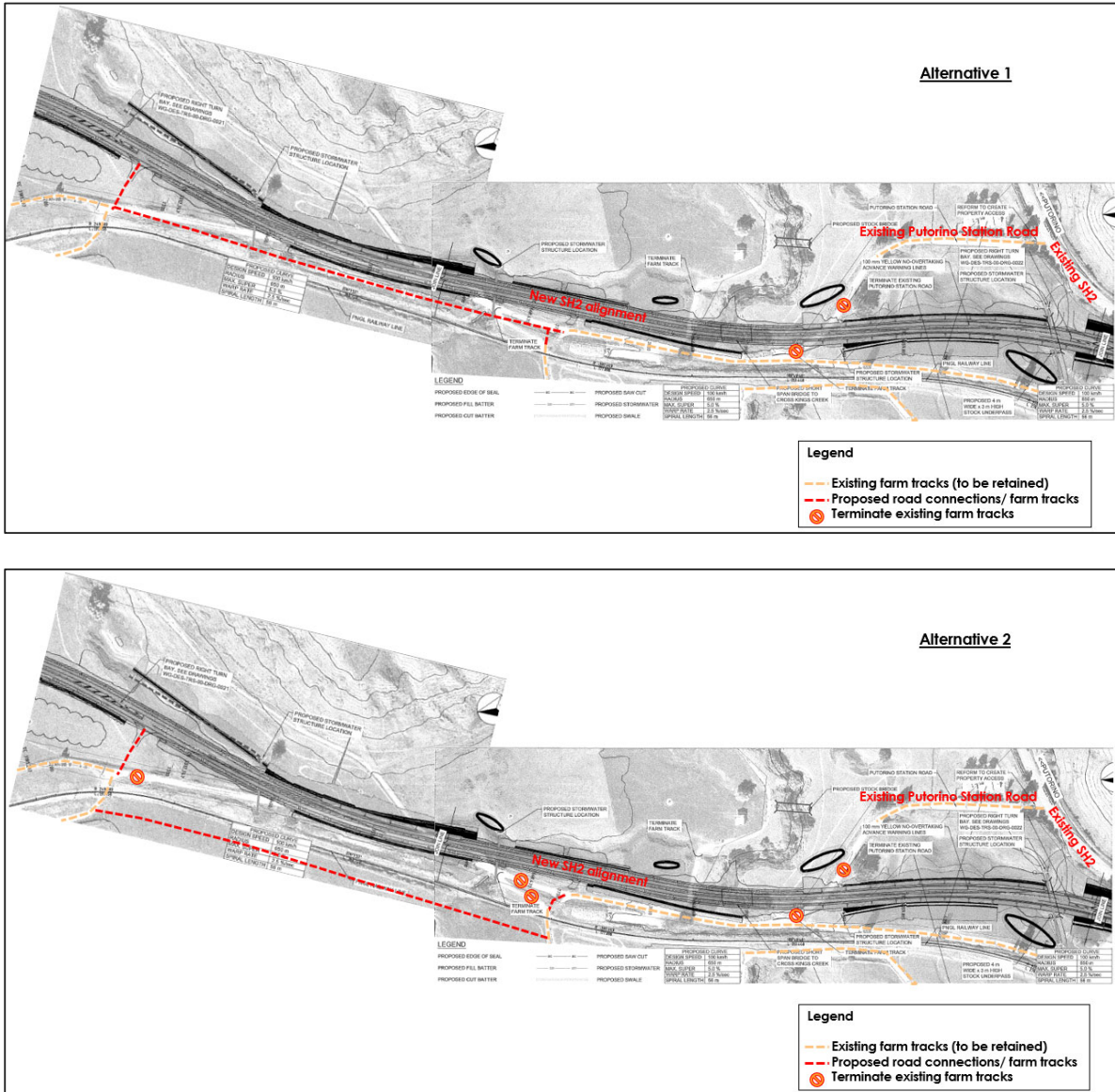


Figure 4.1: Local connections in the vicinity of Putorino Station Road



4.1.4 Level Crossings

As mentioned in Section 2.5.1, the PNGL crosses several farm tracks in the area around the existing SH2 / Putorino Station Road intersection. These are shown in Figure 4.2. Where the PNGL crosses the new highway route, a grade-separated crossing (near the McKenzie's overbridge as shown in Figure 3.1) is included as part of the project's scope of works.

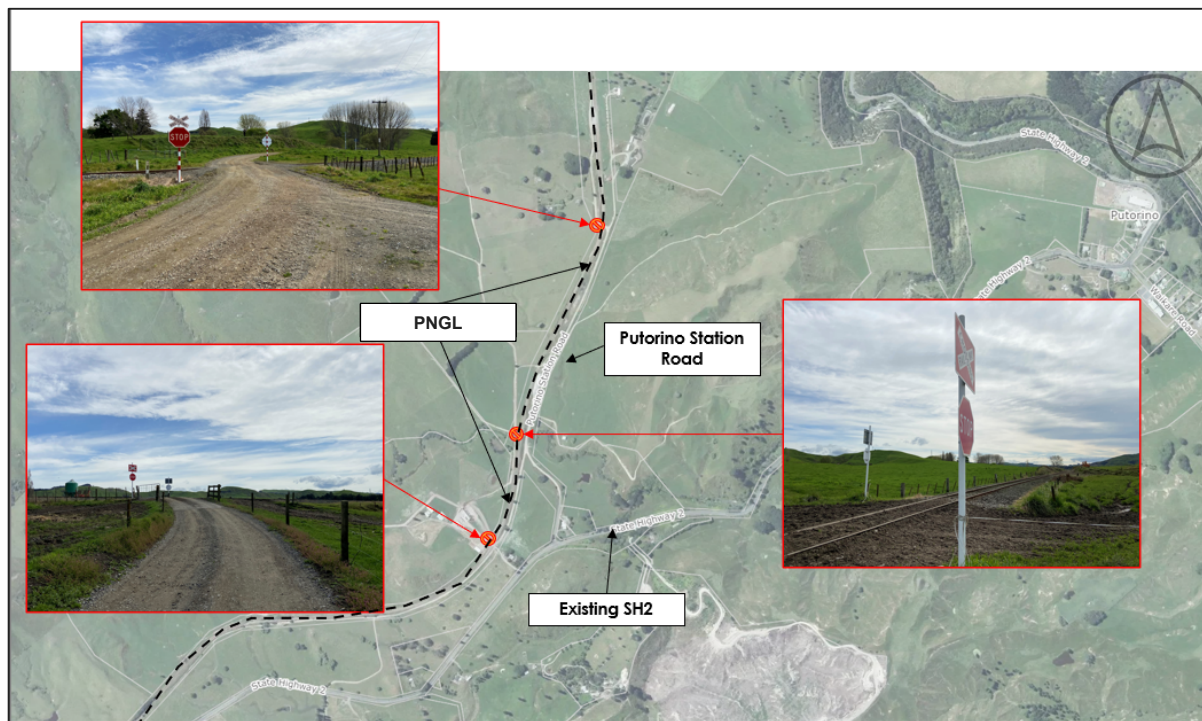


Figure 4.2: Existing level crossings within the project area

KiwiRail have agreed in principle to retaining (and upgrading where required) the existing rail level crossings.

Given the rural nature of the area surrounding the existing level crossings, it is anticipated that the traffic volumes over the rail crossings will not change much compared to existing conditions, unless significant development occurs the land located to the west of the railway line.

On this basis, it is anticipated that the project will not adversely affect the safe operation of the existing PNGL level crossings. It is, however, recommended that a safety review be carried out to see if anything has changed at the time of detailed design that would affect the current assessment that determined that no Level Crossing Safety Impact Assessment (LCSIA) is warranted.

If any land is required to implement any identified safety improvement works, it is anticipated that the required safety improvement works would be included within the footprint of the proposed designation.

4.1.5 Road Safety

Overall, the proposed design of the Project is well aligned with the Road to Zero transport safety objectives adopted by Waka Kotahi and the New Zealand government. It will provide a much safer transport corridor, which will reduce the potential number of DSI crashes annually. The new highway section is expected to result in positive effects on safety for communities that adjoin it when compared to the existing corridor.

These positive effects consist of:

- Significantly reduced likelihood of head-on crashes by providing a flush median along the route, thereby adding separation between the two directions of traffic.
- Significantly reduced number of loss-of-control crashes due to the much-improved road geometry (by removing sub-standard and out-of-context curves).
- Improved number of passing opportunities by providing north- and southbound passing facilities, resulting in a reduction of crashes related to the currently limited passing opportunities (e.g., overtaking at unsafe locations).
- Significantly reduced likelihood and severity of intersection / access crashes by:
 - Limiting the number of accesses to only a few;
 - Providing auxiliary turning facilities (i.e., within the flush median) along SH2 at each access intersection, and
 - Ensuring good visibility (i.e., enhanced SISD) to intersection/ access approaches.
- Reduced risk and likelihood of road closures as a result of the proposed improvements. The increased carriageway width will also allow incidents to be managed more efficiently and may reduce the number of responses requiring full or partial closure.
- Improved transport safety perceptions, especially for communities and settlements whose regular journeys travel via the Waikare Gorge. The new highway section is expected to have a 4-Star KiwiRAP rating with wider sealed shoulders, wide centreline, well designed geometric alignment, and no unprotected roadside hazards.

4.1.6 Other Transport Modes

Public Transport Services

As mentioned in Section 2.5.2, only InterCity currently operates along SH2, with the closest public transport stop to the project located in Putorino, near the SH2/ Waikare Road intersection. Given that the existing SH2 will be retained as a local road, existing public transport services can continue using the route. If no passengers are bound for or departing from Putorino, the bus service can remain on the new highway route, improving passenger journey times. On this basis, minimal disruptions to the existing public transport operations are expected.

Walking and Cycling Infrastructure

Given that the project area comprises of a predominantly rural environment, and that the new highway will be a rural high-speed corridor with a focus on through traffic, walking and cycling facilities have not been incorporated into the design of the projects.

However, the improved road alignment and wide shoulders would enable cyclists to use the new route.

4.2 Construction Effects

The primary construction related effects are summarised as follows:

Truck movements associated with the importation of material (clean-fill and aggregates)

Significant earthworks will be required over the construction period, which will result in an increase in truck movements. These movements will largely occur within the construction zones. It is expected that the pavement construction may require the importation of aggregates. The imported material is expected to be transported to site using up to 50MAX truck-and-trailer units. The routes that will be used by construction vehicles will depend on the locations of quarries and disposal sites which are not yet certain. The exact location and extent of compound sites / lay down areas have not been determined.



The construction traffic movements to accommodate these activities will likely result in a temporary increase in traffic volumes on SH2 and construction routes used during the construction period. Recommended traffic management measures to mitigate any adverse effects that may arise from the increase traffic demand may include (to the required mitigation measures (if any) are to be confirmed prior to construction as part of a Traffic Management Plan):

- Limiting truck-and-trailers to specific routes and/or accesses.
- If required to manage the effects of trucks movements to/ from the site, setting limitations on the daily number of truck movements and/or hours of operation.
- Pre- and post-condition surveys to determine any damage to the existing road pavements as a result of construction activities.

Construction site access(es)

Construction access to the site (i.e., access for HCVs importing material, construction staff and visitors) will likely be via the existing SH2 corridor, via one or more accesses. The site access(es) should be designed and constructed to the appropriated standard, with the access(es) designed to ensure that the access width can accommodate large vehicles.

Tie-ins with the existing SH2

Tie-ins with the existing SH2 corridor must be carefully managed, to ensure safe traffic movement, as will maintaining access during construction.

Construction Traffic Management Plan

A Construction Traffic Management Plan (CTMP) will be required to determine, quantify, and mitigate any transportation related effects of construction traffic. It will be prepared prior to construction in accordance with the proposed designation conditions. Recommended traffic management measures to mitigate any adverse effects that may arise related to the construction site access include (but not limited to):

- Temporary speed reductions at the site access.
- The appropriate traffic control devices and temporary advanced warning signs in accordance with the Code of Practice for Temporary Traffic Management (CoPTTM), supported by safe and appropriate turning facilities in sections under temporary speed limits and traffic management
- Wheel wash or brush facilities provided so trucks do not track dirt onto public roads (where permitted, due to potential entrainment of sediment within water and potential downstream effects).
- The design of the site access should accommodate the tracking curve of the appropriate design vehicle (in this case, truck-and-trailer units).
- Ensuring that the access(es) complies with the minimum sight distance and access separation requirements.

Oversize Vehicles

It is anticipated that there will be several oversize loads associated with the delivery of large heavy items of plant, particularly in relation to the construction of the new bridge over the Waikari River.

Movement of over-dimension and overweight components is facilitated by the Land Transport Rule – Vehicle Dimensions and Mass 2016 (Rule 41001). Under the rule, permits will be required from the Road Controlling Authority for any overweight and over dimension components. These permits are usually applied for at the detailed design stage and require the applicant to demonstrate safe and efficient movement of the vehicles. This separate process can be relied upon to ensure such transport is safe, does not adversely affect other road users, and does not damage roads or bridges. Specific traffic management will be identified as part of the permitting process and, as a minimum, all over-dimension vehicles will require the use of pilot vehicles with an on-road supervisor. The feasibility of routes for over-size vehicles can be confirmed once the loads and transporter truck configurations are determined.



5 Conclusions and Recommendations

5.1 Operational Effects

The following key conclusions are drawn from this TIA report for the SH2 Waikare Gorge Realignment project:

Corridor and Intersection Capacity

- Overall, the expected ADT on the new highway route is likely to remain at the same level observed on the existing SH2 alignment (i.e., around 2,700 vpd). Traffic volumes along the section of SH2 that will be bypassed by the new highway and surrounding local road network will remain well below the typical capacity of a two-way rural road.
- No adverse capacity and efficiency effects are anticipated on SH2 and the surrounding road corridors with the implementation of the new highway route. In fact, once completed, the new highway route will result in the following positive effects:
 - The new highway route provides additional lane capacity for regional traffic as a result on the improved road alignment (relatively straight alignment compared to the existing winding alignment).
 - Reduced journey times for regional through traffic travelling through the gorge.
 - Reliability (in terms of the number of road closures as a result of traffic incidents, rock falls and slips) compared to the current SH2 route through the gorge.
 - Reduction in vehicle operating costs and VKT.

Property Access

- While the new highway route impacts on local travel, the impact on journey times and property access for local residents living on either side of the new highway will be minimal. The proposed accesses, intersections, and extension of the existing local road connections and farm tracks will ensure that access is retained for the local communities living in Putorino township and surrounds.
- On the basis of the above, the effects on property access are considered to be no more than minor.

Road Safety

- Overall, the proposed design of the Project is well aligned with the Road to Zero transport safety objectives adopted by Waka Kotahi and the New Zealand government. It will provide a much safer transport corridor, which will reduce the potential number of DSIs.
- These positive effects consist of:
 - Significantly reduced likelihood of head-on crashes by providing a median divided highway, separating the two directions of traffic.
 - Significantly reduced number of loss-of-control crashes due to the much-improved road geometry (by removing sub-standard and out-of-context curves).
 - Improved number of passing opportunities by providing an approximately 520 m long northbound slow vehicle bay as well as an approximately 550 m southbound passing lane, resulting in a reduction of crashes related to the currently limited passing opportunities (e.g., overtaking at unsafe locations).
 - Significantly reduced likelihood and severity of intersection/ access crashes by:
 - Limiting the number of accesses to only a few, and
 - Providing auxiliary right-turning facilities along SH2 (i.e., within the flush median) at each access and intersection.



- Reduced risk and likelihood of road closures as a result of the proposed improvements. The increased carriageway width will also allow incidents to be managed more efficiently and reduce the number of responses requiring full or partial closure.
- Improved transport safety perceptions, especially for communities and settlements whose regular journeys travel via the Waikare Gorge. The new highway section is expected to have a 4-Star KiwiRAP rating with wider sealed shoulders, wide centreline, well designed geometric alignment, and no unprotected roadside hazards.

Public Transport Operations

- Minimal disruptions to the existing public transport operations are expected. Given that the existing SH2 will be retained as a local road, existing public transport services can continue using the existing route. If no passengers are bound for / departing from Putorino, the bus service can remain travelling on the new highway route, improving passenger journey times.

Walking and Cycling

- Given that the project area comprises of a predominantly rural environment, and that the new highway will be a rural high-speed corridor with a focus on through traffic / mobility, walking and cycling facilities have not been incorporated into the design of the projects.
- However, the improved road alignment and wide shoulders would enable cyclists to use the new route.

On the basis of the above, the traffic and transportation related effects of the SH2 Waikare Gorge Realignment project on the surrounding transport environment are expected to be predominantly positive due to the significantly improved road alignment (relatively straight alignment compared to the existing winding alignment) and the provision of passing opportunities.

No unusual adverse effects (i.e., that require mitigation) on the operation of the transport network, due to the construction of the realignment, has been identified.

5.2 Construction Effects

The proposed activities and constructability are expected to be typical for any road construction project. A Construction Traffic Management Plan will be prepared prior to construction in accordance with the proposed designation conditions. A particular chapter of the CTMP will address the movement of overweight and over-dimension loads or address matters relating to use of any vehicles not registered for road use, if any. If required, specific permits will be required from the relevant authority prior to any transport operation.

The CTMP will, as a minimum, address:

- Construction programme, traffic volumes and routes;
- Specific legislative requirements and consent conditions;
- On-site parking management;
- Driver protocols;
- Over-weight and over-dimension loads and any required permits, which in turn will consider traffic management along the route including bridges, intersection(s), and property accesses;
- Road and access improvements including markings on Spencer Avenue;
- Management of potential effects on adjacent properties;
- Monitoring; and
- Communication arrangements.



Appendices

We design with community in mind



Appendix A Site Investigation Findings



Site #	Site Name	Notes and Comments	Advisory Speed 1	Advisory Speed 2	Guardrails	Signage (north to south)	Signage (south to north)	Markings	Surface Condition
1	Substandard Curve		75		55	55 Advisory sign LHS, 55 Chevron Board LHS, 2 x Chevron Arrows LHS, 6x Chevron Arrows RHS	75 advisory sign LHS, 6 x Chevron Arrows (LHS), Temporary Slippery When Wet LHS, Permanent Slippery When Wet LHS, 55km/h advisory sign LHS, 3 X Chevron Arrows RHS		Average/Good. Some patching both lanes, rutting near edgeline SBD @ 55km/h curve, small patches/breaks, SBD lane, some flushing/wear both lanes
2	Northern tie-in		NII		NII	NII	NII	Centreline - yellow NBD, dashed SBD, edgelines	Fair, some patches, some wear/bleeding
3	Spring Valley Holdings	Gated driveway, sightlines, north 400m, South 150m RT in 120m (south and RT limited by curvature/vegetation)							
4	New "access" connecting to old SH2	Driveway at RS/RP 577/12.42. Sight distance 90m north, 120m south limited by curvature/vegetation. Used for vehicle access (incl trucks) to farm)	55		55	NBD Guardrail is low, approx 500mm above ground, rail in good condition, but paint worn off, some timber posts splitting (see photos), SBD guardrail, newer, steel posts, some posts / bolts damaged, ripples in rail and post damage suggest has been struck, no definitive skid marks though.	55km/h chevron board RHS (curve 1) 55km/h chevron board LHS (curve 2)	Edgelines, dashed white centreline - yellow at start from south	Fair - some bleeding/flushing
5	KiwiRail Pngl Bridge 235 (Tunnel)	Northern portal lined with corrugated iron. N.B. access to southern portal not possible.				See notes above			
6	Proposed NZTA D Type Accessway @ 100 Putorino Station Road	Putorino Road gravel, ends a few metres north at private driveway. No (road) signage. Refer photos.							
7	KiwiRail LX2064, PNGL 240.42km	Single WX11 (stream train) signs on each approach. W46/RP1 ("Railway Crossing" and "Stop") approx 5m back from tracks on each approach, although western W46 missing, eastern W46 small size. Crossing panel mud/gravel.							
8	KiwiRail LX4127, PNGL 239.97km	W46/2 RP1 signs on each approach. Crossing panel mud - wearing away on eastern side exposing sleepers to some damage from heavy vehicle tyres. Sight distance ~440m north, 500m+ south							
9	Paddock access gate	Double gates, mud/gravel. Sight distance to south 110m (alignment/vegetation) to north 85m - tyres est 200m without tyres)							
10	SH2/ Putorino Station Road intersection	Stop controlled intersection, sight distance 455m north, 150m south (curvature). Grades up to south, north - dips down to stream/bridge then rises. Centreline extends 18.3m back from Stop line, no centreline beyond. Putorino Station Road, starts to widen at this point to intersection (from ~6m width). Utilities in berm. Ref photos					Stop sign, road name sign board opposite		Fair/ Good
11	Driveway at RS/RP 592/2.135	Firm gravel. Fontterra signage indicates used for milk tanker access. Sight distance to north 140-150m, to south 450m							
12	KiwiRail LX4126, PNGL 239.43km	Noticeable hump over crossing - potential grounding out issue? - No photos from far side as did not enter private land.						Edgelines, centreline - solid yellow NBD, dashed SBD	Fair
13	Southern tie-in (approx RS/RP 592/2.14	Approx sightlines 150m north, 350m south	NII		NII				
14	Driveway at RS/RP 592/2.326	driveway with cattle grid and gate (chipseal to cattle grid, grassed inside property. Sight distance North 240m South 260m					No signage for Dwy, but permanent slippery when wet opposite		
15	Driveway at RS/RP 592/2.451	Driveway to #5224 Pacific Coast Hwy, Sight distance North 350m, South 150m (curve)					No signage for Dwy, but 65km advisory immediately south		
16	Horizontal Curve at RS/RP 592/2.7 (approx centre)		55km/h		NII	65km/h advisory sign, 65km/h chevron board, 4 x Chevron arrows	55km/h advisory sign, 2 x Chevron arrows	Edgelines, dashed white centreline	Fair

Appendix B Waka Kotahi CAS Data



Untitled query

Saved sites

SH2 Waikari Gorge

Crash year

2017 – 2022

Crash severity

Fatal Crash, Serious Crash, Minor Crash, Non-Injury Crash

Plain English report

10 results from your query.

1-10 of 10

Site Centre: Midpoint	Crash road	Side road	Feature	Distance from side road/feature	Direction	Reference station	Route position	Easting	Northing	Longitude	Latitude	ID	Date	Day of week	Time	Description of events
1944668-5660123	SH 2	PUTORINO STATION ROAD		1004m	W			1945307	5660430	176.994804	-39.136859	2020148070	26/02/2020	Wed	08:30	Truck1 NDB on SH 2 changing lanes to left hit Other2, Other2 hit ditch
1944668-5660123	SH 2		KINGS CK BR	368m	E			1944999	5660152	176.991396	-39.139483	2020145518	06/01/2020	Mon	19:30	Truck1 SDB on SH 2 missed inter: or end of road, Truck1 hit armco (w-section steel)
1945469-5661339	SH 2		WAIKARE RIV BR	145m	N			1945370	5661339	176.995075	-39.128665	2020177353	24/12/2020	Thu	12:33	Car/Wagon1 SDB on SH2 swinging wide hit Car/Wagon2 head on
1945469-5661339	SH 2		WAIKARE RIV BR	50m	N			1945464	5661340	176.996155	-39.128619	2021182894	24/03/2021	Wed	11:55	Motorcycle1 NDB on SH2 lost control turning left; went off road to right, Motorcycle1 hit drainage
1945557-5661251	SH 2		WAIKARE RIV BR	80m	W			1945557	5661253	176.997269	-39.129372	201731576	26/01/2017	Thu	17:35	Car/Wagon1 SDB on SH2 swinging wide hit Van2 head on
1945579-5663333	SH 2		MCKENZIES OBR	1m	N			1945583	5663322	176.996519	-39.110758	2020169041	01/11/2020	Sun	10:42	Ute1 SDB on SH 2 lost control on curve and hit Car/Wagon2 head on, Ute1 hit armco (w-section steel)

Site Centre: Midpoint	Crash road	Side road	Feature	Distance from side road/feature	Direction	Reference station	Route position	Easting	Northing	Longitude	Latitude	ID	Date	Day of week	Time	Description of events
1945630-5663264	SH 2		MCKENZIES OBR	120m	S			1945694	5663192	176.997864	-39.111885	201741313	03/06/2017	Sat	13:28	Car/Wagon1 NDB on SH2, wairoa lost control turning left, Car/Wagon1 hit non specific fence, non specific guard rail, non specific ditch,
1946139-5660821	SH 2	WAIKARE ROAD		30m	N			1946161	5660840	177.004452	-39.132835	2021207089	06/12/2021	Mon	15:10	Car/Wagon1 NDB on SH 2 lost control turning left; went off roac to left, Car/Wagon1 hit power pole
1946751-5664591	SH 2		MCKENZIES OBR	1434m	N			1946437	5664153	177.005958	-39.102952	2022209774	05/01/2022	Wed	18:50	Car/Wagon1 NDB on SH 2 lost control turning right but did not leave the road, Car/Wagon1 hit bank
1946751-5664591	SH 2		MCKENZIES OBR	1353m	N			1946388	5664092	177.005418	-39.103520	2020154589	08/06/2020	Mon	03:00	Car/Wagon1 NDB on SH 2 lost control turning left; went off roac to left

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