

**Ngaaruawaahia, Taupiri,
Hopuhopu, & Horotiu**

Transport Assessment

April 2024

flow

TRANSPORTATION SPECIALISTS



TRANSPORTATION SPECIALISTS

Project: Ngaaruawaahia, Taupiri, Hopuhopu, & Horotiu
Title: Transport Assessment
Document Reference: P:\WADC (Waikato Dist Cncl)\001 Transport Assessment for Ngaruawahia, Hopuhopu and Taupiri\4.0 Reporting\R1D240405 Ngaruawaahia Transport Assessment.docx
Prepared by: Gareth Davies, Sharmin Choudhury
Reviewed by: Michael Jongeneel

Revisions:

Date	Status	Reference	Approved by	Initials
8 November 2023	Draft, Version A	R1A231108	M Jongeneel	MJ
26 January 2024	Final, Version B	R1B240126	M Jongeneel	MJ
22 February 2024	Final, Version C	R1C240222	M Jongeneel	MJ
5 April 2024	Final, Version D	R1D240405	M Jongeneel	MJ

The drawings, information and data recorded in this document (the information) are the property of Flow Transportation Specialists Ltd. This document and the information are solely for the use of the authorised recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that for which it was supplied by Flow Transportation Specialists Ltd. Flow Transportation Specialists Ltd makes no representation, undertakes no duty and accepts no responsibility to any third party who may use or rely upon this document or the information.

EXECUTIVE SUMMARY

Flow has been commissioned by Waikato District Council (WDC) to conduct a transportation study for Ngaaruawaahia, Hopuhopu, Taupiri and Horotiu to understand how future growth until 2050 will affect the existing transport networks in these areas. Our assessment is divided into two parts: Part A (this report) focuses on traffic modelling and road network evaluation, while Part B assesses micromobility/walking/cycling connectivity within and to/from the townships.

Our study has been informed by:

- ◆ Forecast land use change, including population growth, industrial areas, new growth cells, and zoning changes. Notably, the collective population in the 4 townships is expected to double by 2050, with Taupiri in particular expected to see a significant population increase
- ◆ National and regional transport policies and plans. While private car travel is and will continue to remain the primary mode for the foreseeable future, strategic shifts toward more sustainable transport options are increasing at pace
- ◆ Outputs from the Waikato Regional Transport Model (WRTM)
- ◆ Reported crash histories

Our assessment has concluded the following:

- ◆ Although projected land use growth is expected to increase the number of vehicles in the 4 townships, the traffic modelling generally predicts the road network to continue to operate efficiently
- ◆ Key new road connections will be required to enable land use development. We have proposed indicative locations for these new roads in consultation with the WDC stormwater team
- ◆ Safety at rail level crossings will increasingly become a focus for the community. A number of existing level crossings are planned to be closed to traffic in the coming years, and this will place increasing pressure on the available crossings and adjacent intersections. We have identified and assessed the priority intersections to understand the nature and timing of these upgrades
- ◆ Traffic volumes are projected to increase over the coming years, with Great South Road experiencing substantial growth. Left unchecked, this would be inconsistent with desired outcomes for Ngaaruawaahia town centre to be a walkable, cyclable centre. Responding to this, we propose a range of interventions to improve safety and accessibility outcomes within the town centre
- ◆ Waka Kotahi's existing over-dimension route through Ngaaruawaahia is inappropriate, and we recommend that this be updated to use Great South Road. This requires further engagement with Waka Kotahi and the Heavy Haulage Association.
- ◆ We recommend investment in sustainable transport infrastructure, including
 - ◆ Severance by the North Island Main Trunk railway presents a challenge for walking, cycling, and micromobility. Limited cycling facilities exist within the townships, and investing in safe connections can reduce car dependency

- ◆ The current bus network will need to grow in step with the anticipated land use change, in order to meet the future needs of the growing communities. We recommend investment in building better public transport connections
- ◆ The existing rail network passes through Ngaaruawaahia, Hopuhopu and Taupiri but does not currently offer passenger rail services. There may be an opportunity to establish a transport hub in Ngaaruawaahia in the long term.

For the future transport network, we propose a range of projects to improve connections between key areas and improve access to sustainable transportation modes. We have staged the proposed investments across three time periods: short-term, medium-term, and long-term.

- ◆ The short-term plan includes creating a low-speed, accessible and equitable Ngaaruawaahia town centre and addressing safety concerns, while achieving the key move for an east-west walking and cycling route along Jesmond Street.
- ◆ In the medium term, the focus is on improving walking and cycling connectivity and handling increased traffic due to land use development.
- ◆ The long-term vision includes a transport hub in Ngaaruawaahia, which may include a train station, high-frequency bus services, expanded walking and cycling networks, and other transit improvements.

The proposals are presented in the table below:

Table E1: Proposed investments

Short-term (0 – 5 years)	Medium term (5 – 15 years)	Long-term (15+ years)
INTERSECTIONS		
Upgrade the existing Great South Road intersection with Jesmond Street to a roundabout to deliver connection to the town centre.	Upgrade the Jesmond Street/Newcastle Street intersection to manage cyclist and pedestrian safety and reduce speeds as well as deliver connection to the town centre	
Upgrade the Great South Road intersection with Old Taupiri Road (south) to roundabout	Upgrade the Great South Road intersection with River Road to roundabout	
Upgrade Princess Street/GSR intersection	Upgrade the Market Street and Great South Road intersection to reduce speeds through this intersection to help support the low-speed zone south of the intersection	
LEVEL CROSSINGS		
Upgrade the pedestrian level crossing at Jesmond Street during the upgrade of the Jesmond Street intersections.	Upgrade the level crossing at Old Taupiri Road, unless north Ngaaruawaahia Hopuhopu is developed earlier	Upgrade level crossing at Kainui Road, unless the Taupiri development takes place prior. Then upgrade along with Taupiri development.

Table E1: Proposed investments

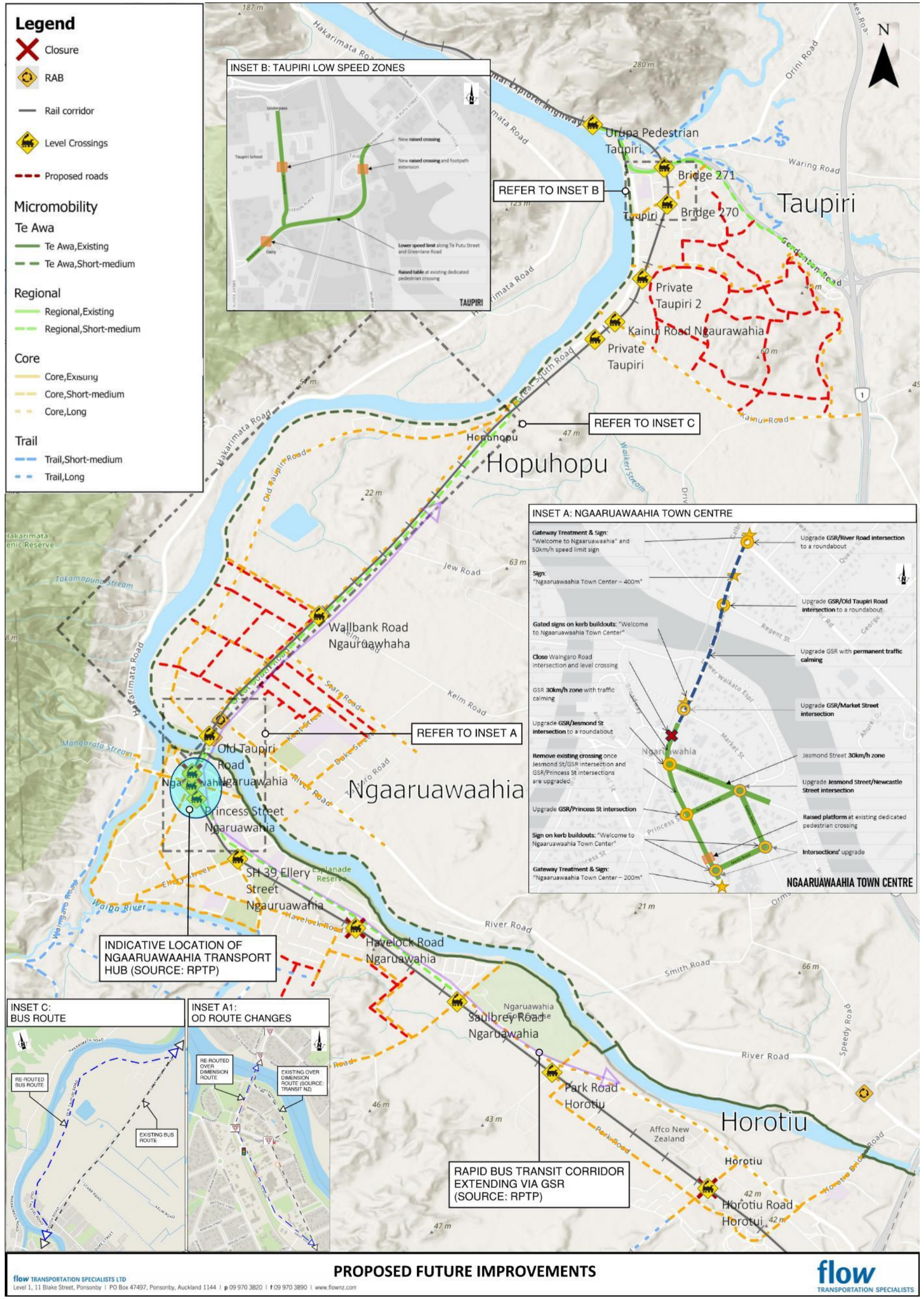
Short-term (0 – 5 years)	Medium term (5 – 15 years)	Long-term (15+ years)
Closure of the Horotiu Road and level rail crossing following the completion of Kohia Drive, encouraging use of the grade separated crossing of the NIMT at Gateway Drive		Close the level crossing at Wallbank Road , once growth cell is developed, providing access to Old Taupiri Road
Closure of the Waingaro Road level rail crossing to formalise the required heavy vehicle movements from the Waingaro Road Quarry and encouraging use of Princess Street (requires Princess Street/GSR intersection upgrade)	Upgrade the Havelock Road level crossing	Monitoring and review safety at the Havelock Road level crossing
Upgrade the level crossing at Princess Street when the level crossing at Waingaro Road, is closed	Upgrade the level crossing at Saulbrey Road	Monitoring and review safety at the Saulbrey Road level crossing
NGAARUAWAAHIA TOWN CENTRE – OTHER IMPROVEMENTS		
Create a defined entryway/town centre gateway at the northern and southern extents with kerb buildouts, raised platforms and visual cues	Provide an improved walking and cycling connection across Great South Road and the NIMT to connect east and west Ngaaruawaahia	
Introduce a speed limit of 30 km/h for key town centre streets supported with engineering features	Provide an improved walking and cycling connection along Great South Road and across the Waikato River	
Provide a low-speed environment (30 km/h) within the town centre, including on sections of Great South Road, Market Street and Martin Street.	Traffic calming measures to be implemented on Herschel Street to discourage rat running via Herschel Street	
Reroute the over-dimension vehicle route along Great South Road		
Undertake safety improvements to existing pedestrian crossing points of Great South Road within the town centre, either signalised crossings or raised zebra crossings.		

Table E1: Proposed investments

Short-term (0 – 5 years)	Medium term (5 – 15 years)	Long-term (15+ years)
Interim traffic calming measures on sections of Great South Road through the town centre, using tactical urbanism to provide affordable yet effective traffic calming measures that support the low-speed limits, the low-speed environment	Provide more permanent traffic calming measures	
TAUPIRI TOWN CENTRE		
Introduce a lower speed limit along Te Putu Street and Greenlane Road		
Introduce some raised platforms to support lower speeds, especially at busier pedestrian crossing locations		
MICROMOBILITY, WALKING AND CYCLING ROUTES – Refer Part B Report		
Regional routes delivered in short to medium term		
Te Awa routes delivered in short to medium term		
Some Core routes		Remainder Core Routes to the full extent shown in the Micromobility Assessment
Some Trail Routes		Remainder Trail Routes to the full extent shown in the Micromobility Assessment
PUBLIC TRANSPORT		
Work with WRC on infrastructure improvements to support bus services along Great South Road.	Work with WRC to deliver Bus Rapid Transit (BRT) to support land use development	Reinstate the train station at Ngaaruawaahia to align with the Hamilton to Auckland (H2A) Corridor Plan.
		Upgrade the existing bus stops and enable the rapid transit route, aligning with the Hamilton Waikato Metropolitan Spatial Plan (HWMSP).

All of the proposals for the study area are presented in the figure on the next page.

Figure ES1: Proposed future improvements



CONTENTS

1	THE PURPOSE OF THIS TRANSPORT ASSESSMENT	1
2	THE STUDY AREA	2
3	THE STRATEGIC DIRECTION	3
	3.1 Outcomes sought	3
	3.2 Strategic context - National strategies and plans	4
	3.3 The strategic direction of Waikato's transport network	4
	3.4 Waikato's climate change response.....	8
4	TRANSPORT MODELLING AND SPATIAL CONTEXT	9
	4.1 Growth cells and modelling assumptions	9
5	REVIEW AND FINDINGS OF THE TRANSPORT ENVIRONMENT	11
	5.1 Surrounding land use and growth cells.....	11
	5.2 Increasing demand for car trips	14
	5.3 Place value considerations	14
	5.4 Population and employment growth	14
	5.5 The effect of traffic growth on the network	15
	5.6 The effect of traffic growth on intersections	16
	5.7 Heavy vehicles – constraints and opportunities	17
	5.8 Buses – constraints and opportunities.....	18
	5.9 Rail – constraints and opportunities	19
	5.10 Micromobility – constraints and opportunities	19
	5.11 Spatial constraints and opportunities	20
	5.12 Speed environment – constraints and opportunities	20
	5.13 Key Links for vehicular movement – constraints and opportunities	21
	5.14 Level Crossings – constraints and opportunities.....	21
	5.15 Safety Review	21
	5.16 Waikato's changing transport focus	22
6	THE FUTURE TRANSPORT NETWORK	23
	6.1 Road classification	23
	6.2 Short term transport changes (0 – 5 years)	28
	6.2.1 Ngaaruawaahia Town Centre.....	28
	6.2.2 Taupiri	30
	6.3 Medium term transport changes (5 – 10 years)	30
	6.4 Long term transport changes (10+ years)	33
	6.5 Summary of proposed transport changes.....	35

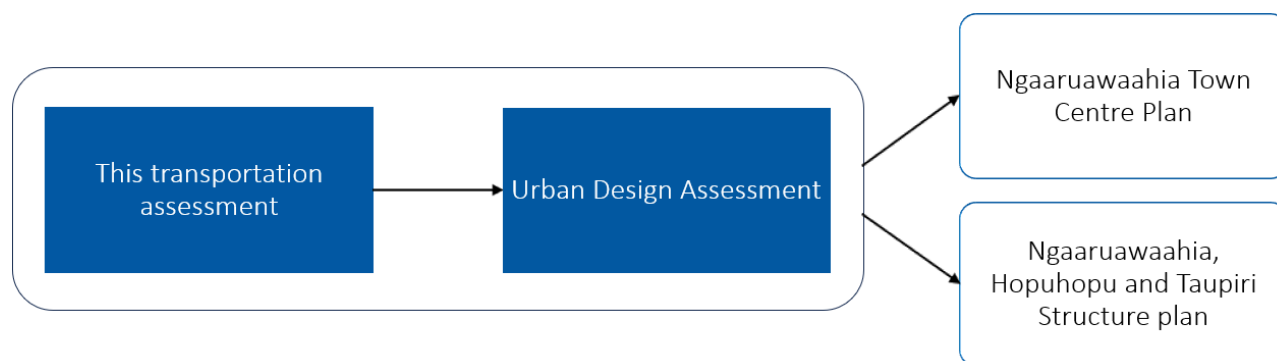
APPENDICES

APPENDIX A	SAFETY ASSESSMENT AND EXISTING NETWORK ENVIRONMENT
APPENDIX B	FUTURE NETWORK ENVIRONMENT
APPENDIX C	INTERSECTION ASSESSMENT
APPENDIX D	NIMT AT GRADE CROSSING REVIEW
APPENDIX E	INTERSECTION UPGRADES
APPENDIX F	EXISTING TRANSPORT MAPS

1 THE PURPOSE OF THIS TRANSPORT ASSESSMENT

Waikato District Council (WDC) has commissioned Flow to undertake a transportation assessment for Ngaaruawaahia, Hopuhopu, and Taupiri to understand how the future growth (projected to 2050) will impact the existing roading and walking/cycling network in these areas. The findings and recommendations of this assessment will guide the Urban Design Assessment for these areas as shown in Figure 1. Both assessments will inform the development of the Ngaaruawaahia Town Centre Plan and the Ngaaruawaahia, Hopuhopu and Taupiri Structure Plan, which WDC is developing in parallel.

Figure 1: Where this reports fits with other strategic documents



This Transportation Assessment has two parts:

- ◆ **Part A** (this report) focuses on the traffic modelling and assessment of the road network projected for 2050 for Ngaaruawaahia, Hopuhopu, Taupiri, and Horotiu.
- ◆ **Part B** provides a high-level assessment of the Micromobility/Walking/Cycling connectivity within and to/from the various townships. This assessment takes into consideration the findings from Part A.

Together, both parts of the assessment provide a suite of transport interventions needed to achieve the structure plan and town centre strategy outcomes.

The transportation assessment takes into account that:

- ◆ the towns of Ngaaruawaahia, Taupiri, and Hopuhopu have experienced significant population growth beyond previous estimates, along with expanded industrial areas, new growth cells, and zoning/density changes.
- ◆ further population growth is beyond what was anticipated when the previous transport assessment was completed for the study area¹, in 2014.
- ◆ the changes in local traffic movements have also been noted since the completion of the Huntly and Hamilton Sections of the Waikato Expressway.

To ensure investment into infrastructure is aligned with and is sufficient to support the anticipated growth, we have considered two time periods being:

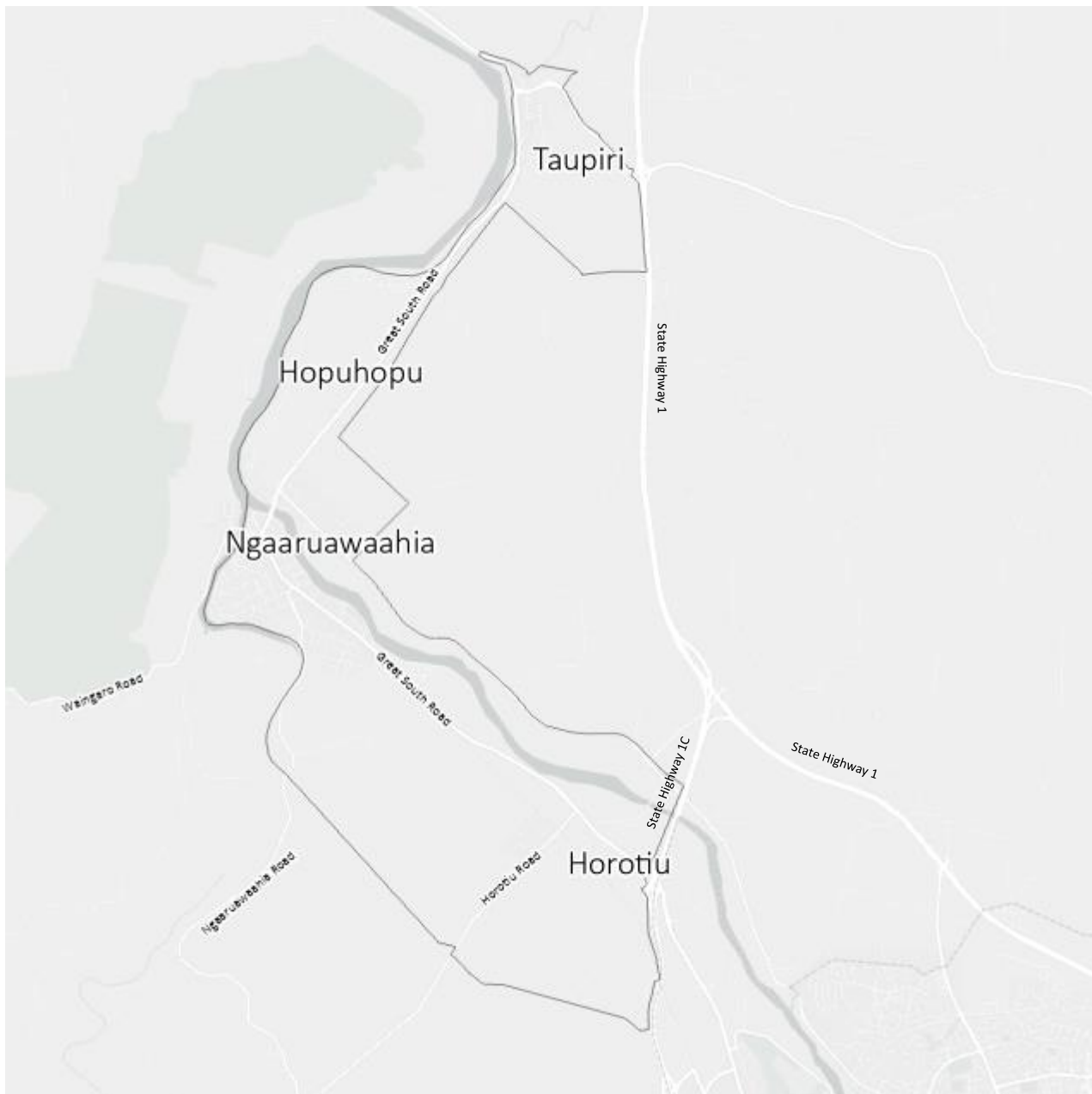
¹ Ngāruawāhia and Surrounds Structure Plan: Integrated Transportation Assessment, AECOM, September 2014

- ◆ Short-term investments are proposed to be delivered in 0-5 years
- ◆ Medium-term investments are proposed to be delivered in 5-15 years.
- ◆ Long-term investments are proposed to be delivered beyond 15 years.

2 THE STUDY AREA

The area considered for this transport assessment is shown in Figure 2. This includes all four communities of Ngaaruawaahia, Taupiri, Hopuhopu and Horotiu, bounded by the surrounding State Highway network to the east and Waikato River and Waipa River to the west.

Figure 2 – Transport assessment study area



3 THE STRATEGIC DIRECTION

To inform the transport assessment of the study area, we have considered a range of National, Regional and Local strategies as summarised in Table 1.

Table 1: National, Regional and Local strategies used to inform this transport assessment

National	Government Policy Statement of land transport 2021-2031
	National Land Transport Plan 2021-2024
	Emissions Reduction Plan 2023
	New Zealand Upgrade Programme – Transport
	Road to Zero
	Keeping Cities Moving: A Plan for Mode Shift
	Arataki Version 2
Regional	Waikato Metro Spatial Plan
	Waikato Regional Land Transport Plan 2021-2051
	Future Proof Sub-regional Growth Strategy
	Hamilton-Waikato Metro Area Mode Shift Plan 2020
	Regional Public Transport Plan 2022-32
Local	Waikato 2070
	Waikato District Blueprints
	Connectivity Strategy 2023

3.1 Outcomes sought

The key takeaway from Waikato’s transport strategies is that the urban areas of Waikato region have begun transitioning away from reliance on private car travel. Increasing investment in public transport, walking, cycling and micromobility unlocks opportunities for communities to get around using these modes.

This transition will not be a fast one, and private car travel is likely to continue to be the primary mode of travel for the next generation. Private car travel will still be necessary to meet the travel needs of these areas, while they are considered urban, they are historically rural communities.

The transport environment will need to support and move in step with this transition and support the development of alternative modes of transport. However, it is essential to recognise that transport by car remains a reality for most residents in the area, and for many of those travelling into Hamilton city and surrounding communities across the wider district.

3.2 Strategic context - National strategies and plans

Waka Kotahi's **Road to Zero**² outlines the Transport Agency's plan for reducing the number of deaths and serious injuries (DSI) on New Zealand's roads to zero. The study area recorded 20 DSI's over the past 5 years, with the past 10 years showing a **downward** trend.

Waka Kotahi's **Keeping Cities Moving**³ outlines the Transport Agency's plan for reducing reliance on private car travel within New Zealand's growing cities. Private car travel currently accounts for 91% of the total distance travelled in main urban centres, and the plan acknowledges that this is unsustainable within constrained urban environments with growing populations. The plan's objective is to **improve wellbeing** in areas like Ngaaruawaahia, Taupiri, Hopuhopu, and Horotiu by growing the opportunity for people to travel by bike, on foot or by public transport.

The **National Policy Statement on Urban Development (NPS-UD)**⁴ has required that policy statements and district plans enable realisation of development capacity for tier 1 urban environments and existing and planned rapid transit stops. Hamilton and the adjacent District Councils, including WDC, are collectively classed by the NPS-UD as a Tier 1 urban environment. Therefore, the study area's town centres are subject to the NPS-UD's rezoning requirements.

The Ministry for the Environment's **Te hau mārohi ki anamata: Aotearoa New Zealand's Emissions Reduction Plan**⁵ sets a target to reduce the total vehicle kilometres travelled (VKT) by light vehicles 20% by 2035. Achieving a VKT reduction against a background of population growth and an increasing demand for travel, will require significant change in how the study area's transport system operates.

3.3 The strategic direction of Waikato's transport network

Ngaaruawaahia, Taupiri, Hopuhopu, and Horotiu's existing transport network has developed around private car travel, and this is reflected in existing travel behaviours. In 2018 travelling to work and school included

- ◆ 85% via car, truck, or van
- ◆ 6% by foot
- ◆ 1% by bike or rail
- ◆ and 7% by bus (of which this is entirely journey to school).

Figure 3 shows the arrival and departure modes of the study area based on Statistics New Zealand 2018 Census Journey to work and education data.

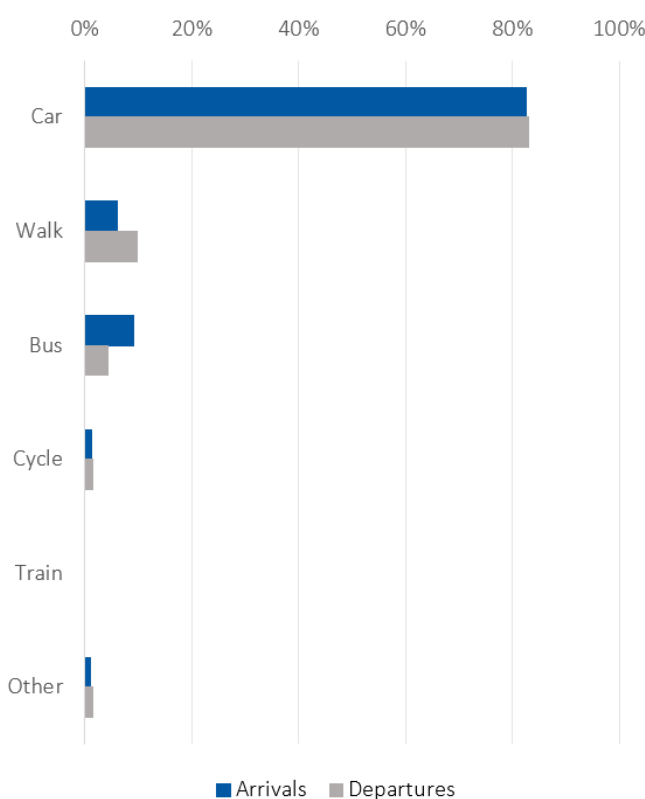
² Waka Kotahi. 2019. Road to Zero – New Zealand's Road Safety Strategy 2020-2030

³ Waka Kotahi. 2019. Keeping cities moving – increasing the wellbeing of New Zealand's cities by growing the share of travel by public transport, walking and cycling

⁴ New Zealand Government. May 2022. National Policy Statement on Urban Development 2020

⁵ New Zealand Government. June 2022. Te hau mārohi ki anamata – Towards a productive, sustainable and inclusive economy. Aotearoa New Zealand's first emissions reduction plan

Figure 3: Arrival and departure mode share



Within the study area:

- ◆ 500 people travel into the area for work or school, 1,850 people live in the area and travel elsewhere for work & school, while a further 1,800 people both live & work/study within the area.
- ◆ people arrive from 26 different areas, the largest external origin being Huntly East (70 people — 3% of arrivals). The most common way to arrive is drive a private car, truck or van (83%).
- ◆ people depart to 27 different areas, the largest external destination being Te Rapa South (354 people — 10% of departures). The most common way to depart is drive a private car, truck or van (83%).

The above mode shares are set to change, with several strategic shifts in transport policy and investment beginning to take effect. The following set out the direction for these shifts:

- ◆ Waikato Regional Land Transport Plan 2021-2051
- ◆ Waikato Regional Public Transport Plan 2022-2032
- ◆ Future Proof Strategy, 2022
- ◆ Hamilton-Waikato Metro Area Mode Shift Plan, 2020
- ◆ Future Proof – Hamilton-Waikato Metro Spatial Plan and Hamilton to Auckland (H2A) Corridor Plan, 2021
- ◆ Future Proof – Hamilton-Waikato Metro Spatial Plan Transport Programme Business Case, 2022
- ◆ Waikato 2070 and Proposed District Plan
- ◆ Town centre urban design workstream currently being undertaken by WDC.

The [Waikato Regional Land Transport Plan 2021-2051⁶](#), sets the strategic vision for the Waikato region’s transport network over the next 30 years. The region’s strategic approach includes guidance on integrating land transport planning and investment in the Waikato region with a focus on

- ◆ Strategic corridors

⁶ Waikato Regional Land Transport Plan (RLTP) 2021-2051

- ◆ Road safety
- ◆ Access and mobility.

The **Future Proof Strategy** is a 30-year growth plan for managing growth and development in the Hamilton, Waipā, Waikato, and Matamata-Piako regions. In 2022, the strategy was updated to include the **Hamilton to Auckland (H2A) Corridor Plan**. One of the H2A Corridor Plan's initiatives is the **Hamilton-Waikato Metropolitan Plan (Metro Spatial Plan)**.

The Hamilton-Waikato Metro Spatial Plan proposes an integrated rapid public transport network for the Hamilton-Waikato metropolitan area (which includes the study area). This network will connect major growth centres and have a comprehensive active mode network to support it. The plan aims to guide future urban growth towards more sustainable, resilient, and affordable settlement patterns in or near public transport centres. These public transport centres are planned to be supported by well-connected arterial roads and active mode networks.

The **Metro Spatial Plan Transport Programme Business Case** proposes long-term plans for rapid transit corridors to promote compact urban form aspirations of the Hamilton-Waikato metropolitan area. It recommends gradual upgrades from bus service provision to bus lanes and bus priority to bus rapid transit outcomes as per demand. RT1, connecting Ngaaruawaahia, Hopuhopu and Horotiu to Rotokauri, Hamilton central, Hamilton airport and Ruakura, is one of the suggested rapid transit corridors.

The strategy highlights the role quality denser housing options will play in providing integrated land use to develop thriving communities.

Supporting Waikato's transition towards sustainable transport options and Keeping Cities Moving, is the **Hamilton-Waikato Metro Area Mode Shift Plan – 2020**⁷. This strategy's goals include

- ◆ shaping urban form
- ◆ making shared and active modes more attractive
- ◆ influencing travel demand and transport choices.

The strategy prioritises investment in a **frequent and fast bus network**, to create a public transport network that is competitive with cars. Supporting this investment will be investment in **active modes**, creating high quality and inclusive infrastructure that is suitable for all ages and abilities.

The implication of the investment in walking and cycling is that over time, Waikato's residents will have increasing opportunities to carry out trips on foot and on bikes. This in turn will reduce reliance on private car travel for some trips.

How the mode shift to public transport will be implemented in practice is presented in the **Waikato Regional Public Transport Plan 2022-2032**⁸ (RPTP). This plan includes a Primary interchange at Ngaaruawaahia and a Key interchange at Horotiu. Potential for **bus rapid transit corridors** extending via

⁷ Hamilton-Waikato Metro Area Mode Shift Plan

⁸ Waikato Regional Public Transport Plan 2022-2032

Great South Road from Te Awa Lakes to Huntly is highlighted, as is passenger rail which would likely integrate with the Primary interchange in Ngaaruawaahia.

One driver of the RPTP is presented in the **Future Proof – Hamilton-Waikato Metropolitan Spatial Plan (HWMSP), Hamilton to Auckland (H2A) Corridor Plan⁹** and **Metro Spatial Plan Transport Programme Business Case**. The H2A Plan suggests Precinct Planning be used to help facilitate transit orientated development.

The recently released **Proposed Waikato District Plan** (Decisions Version) along with **Waikato 2070¹⁰** provides opportunity for:

- ♦ residential expansion of Ngaaruawaahia towards the west and south. Longer term, there are options to expand to the east, as well as the south-west. The town centre can develop medium-density residential with the potential for multiple levels and some intensification.
- ♦ residential expansion of Taupiri towards the south with industrial indicated east.
- ♦ Future urban zoning in Hopuhopu
- ♦ industrial development in Horotiu

The **Ngaaruawaahia, Taupiri and Hopuhopu Town Concept Plan** is being developed and will set out how the streets and public spaces of Ngaaruawaahia, Taupiri and Hopuhopu will change over time to create higher quality urban environments. This will change how residents and visitors get around and experience the town centres. On key streets, this will require a reduction in the space allocated to private cars and parking. The key moves in Ngaaruawaahia relevant to this transport assessment are:

- ♦ **Walking and Cycling:** Key key moves are to provide **north-south and east-west walking and cycling connections** along Great South Road providing a connection across the Waikato River and along Jesmond Street, crossing Great South Road and the North Island Main Trunk rail line at the western end and connecting into the Te Awa River Ride on the eastern end.
- ♦ **Transport Hub:** A longer-term key move is a **transport hub in Ngaaruawaahia**, either with the possibility of a train station or high-frequency bus services, with associated **park-and-ride** facilities. The long-term strategy would also provide more direct connections for buses to and from the transport hub whilst also completing a walking and cycling network to provide alternatives to cars.
- ♦ **Safety at Waingaro Road:** The high heavy vehicle movements via Waingaro Road rail level crossing presents a safety concern and closure of this crossing is anticipated.

The key moves in Taupiri relevant to this transport assessment are:

- ♦ Introduce a lower speed limit along Te Putu Street and Greenlane Road
- ♦ Introduce raised platforms to support lower speeds, especially at busier pedestrian crossing locations.

⁹ Hamilton-Auckland Corridor Plan & Implementation Programme

¹⁰ Waikato 2070 Waikato District Council Growth & Economic Development Strategy

3.4 Waikato's climate change response

WDC has acknowledged urgent need for response to climate change in 2017 and the **WDC Climate Response and Resilience Action Plan Framework¹¹** is council's response to that declaration. The plan focuses on reducing emissions towards a carbon zero 2050. The transport component of the plan includes prioritising funding for public transport, walking, cycling, micromobility and Travel Demand Management programmes.

¹¹ WDC Climate Response and Resilience Action Plan

4 TRANSPORT MODELLING AND SPATIAL CONTEXT

We have used the Waikato Regional Transportation Model (WRTM) to inform this transport assessment. The model has been calibrated and validated to 2018 conditions with forecast models provided for 2031 and 2051 for daily, morning peak, inter peak, and evening peak periods.

Table 2 below provides the WRTM land use assumptions considered for this study compared to Waikato 2070 (W2070) forecasts for 2050. Comparing the base assumptions identifies a minor difference in spatial areas although this may also be attributed to the slight difference in base year.

Table 2: Total population estimated used for this transport assessment

Growth Cells	WRTM 2018	W2070 2020	WRTM 2051	W2070
Ngaaruawaahia	6,700	7,000	10,500	10,500
Hopuhopu	500	Inc in above	Inc in above	Inc in above
Taupiri	400	500	4,000	4,000
Total	7,600	7,500	14,500	14,500

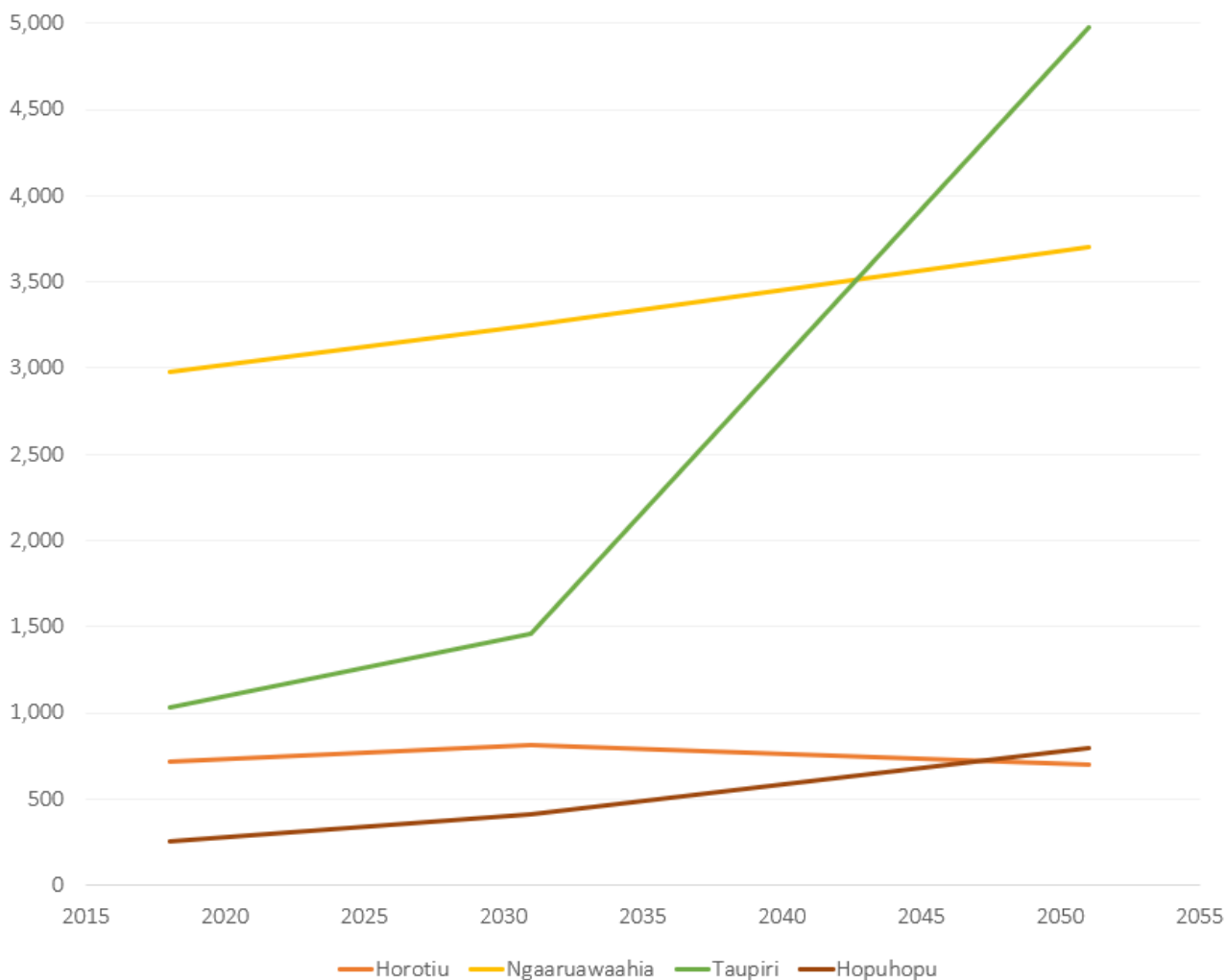
We have provided project specific land use updates to WRTM based on growth cell projections following consultation with WDC. Figure 6 indicates the location of the growth cells within the study area.

4.1 Growth cells and modelling assumptions

Consultation with WDC has highlighted the need for considerations for an updated forecast land use scenario for this study. The updated forecast population growth for the growth cells from 2018 to 2031 and 2051 population are shown in Figure 4.

These projections consider the fully realised development capacity of the growth cells within the study area to 2070 as requested by WDC. We have manually adjusted the identified growth cells in WRTM to align with WDC's aspirations.

Figure 4: Updated population growth projections for this transport assessment



Modest growth is anticipated for Horotiu, Ngaaruawaahia, and Hopuhopu from 2018 to 2051, while forecasts for Taupiri anticipate a significant increase in population over that period. This aligns with subdivision consents lodged for the area.

5 REVIEW AND FINDINGS OF THE TRANSPORT ENVIRONMENT

We outline in the sections below the review and findings of the transport modelling and assessment for these areas.

5.1 Surrounding land use and growth cells

Figure 5 overleaf shows the surrounding land use from the Proposed Waikato District Plan Zoning - Decisions Version.

The Proposed District Plan aligns with the growth cells identified by Waikato 2070 in Ngaaruawaahia and Taupiri being zoned general residential zone (GRZ). Hopuhopu includes a special purpose zone which has been proposed through the PDP from Waikato-Tainui. Similarly, Horotiu is zoned for general industrial (GIZ) due to the expansion of the Ports of Auckland inland port.

Figure 5: Proposed Waikato District Plan Zoning - Decisions Version¹²

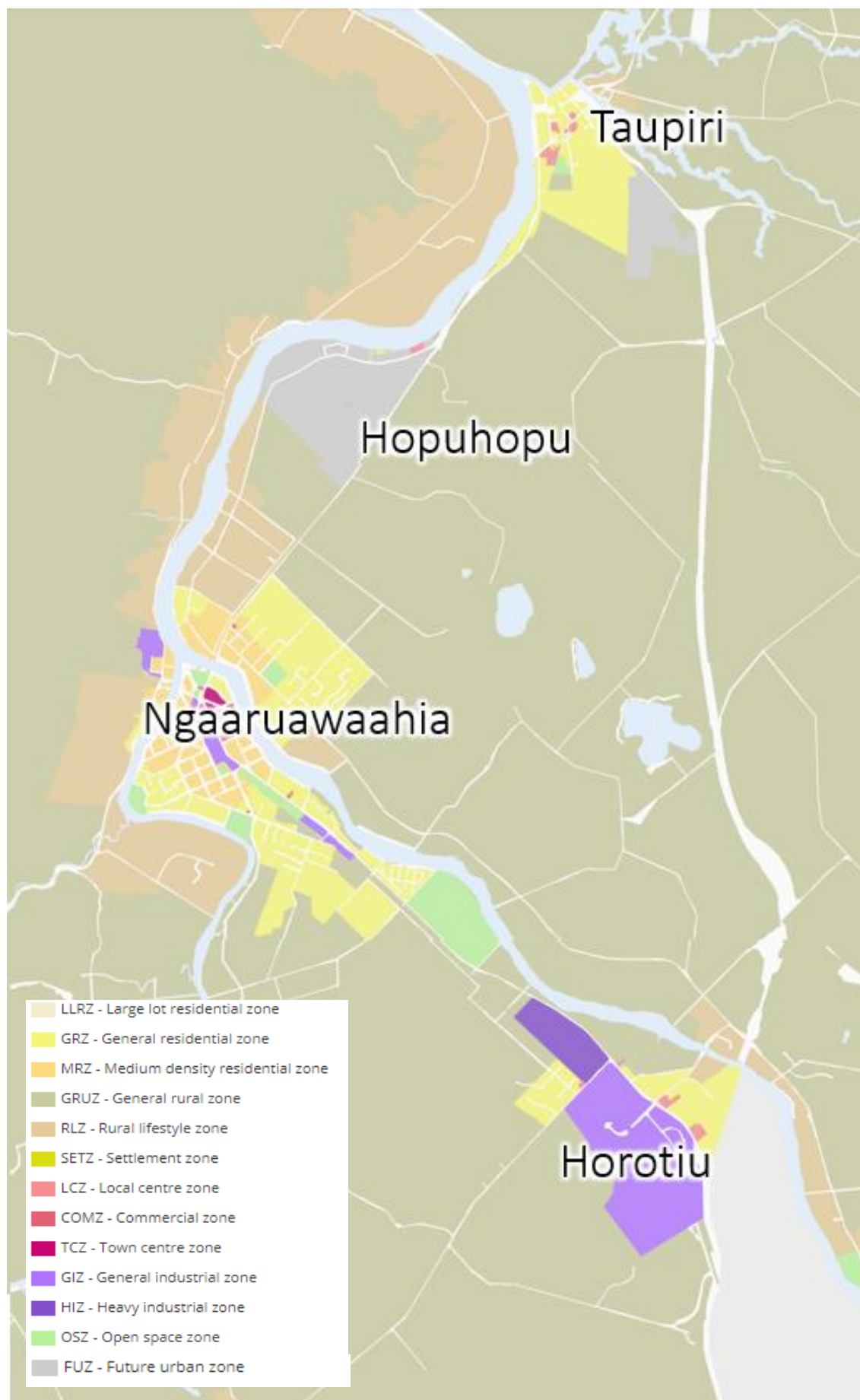
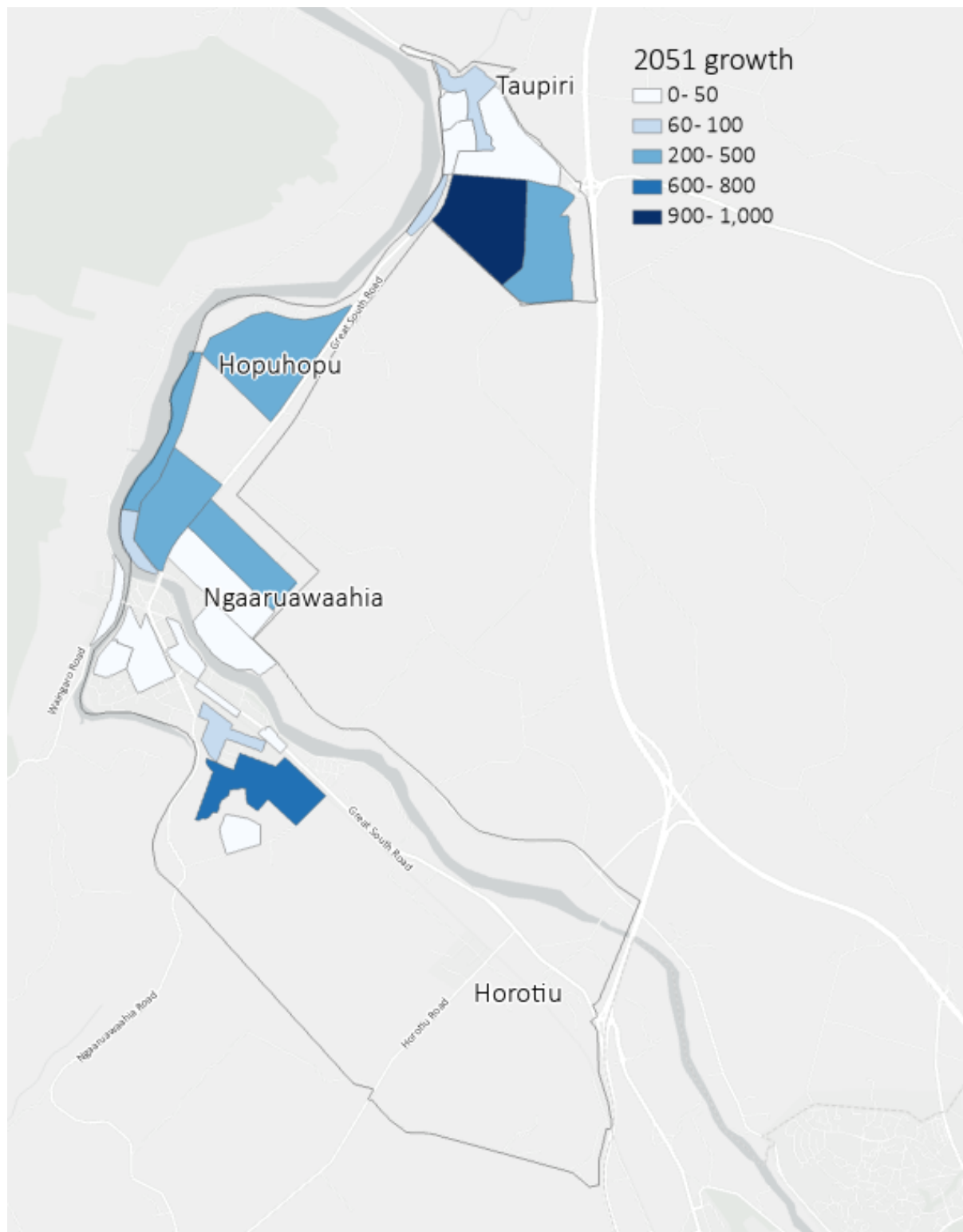


Figure 6 shows the locations and anticipated population of the growth cells for 2051.

Figure 6: Growth cell anticipated population growth to 2051



As mentioned previously, significant growth is expected within Taupiri to 2051. Although the indicative growth cell has excellent access to the State Highway network, it currently lacks appropriate public

¹² Accessed September 2023

transport, walking and cycling infrastructure. This infrastructure is crucial to align with the regional strategies set out in Section 3. There is an opportunity to ensure mode shift targets are achieved by setting a direction to invest in alternative infrastructure, such as building better public transport connections and improving walking and cycling infrastructure, to encourage people to use these modes of transportation instead of relying on private vehicles.

5.2 Increasing demand for car trips

The anticipated changes in land use are predicted to result in an increase in the volume of vehicles within the study area. Appendix B provides the full WRTM outputs, illustrating the growth in vehicle volumes. Although only minor changes to the proposed vehicle network were considered in the WRTM run, the outputs suggest that the network operates efficiently without significant intervention.

5.3 Place value considerations

Great South Road, south of Taupiri, was previously classified as an arterial road in the One Network Road Classification (ONRC). The ONRC has now reclassified Great South Road as a primary collector road. Similarly other roads in and around the Ngaaruawaahia town centre have been classified based on their movement function in the network.

Waka Kotahi's One Network Framework (ONF) classification considers both the movement and place value of a road segment. Within urban areas and particularly through town centre environments, such as Great South Road through Ngaaruawaahia, that place function can be significant. As a result, these roads need to be classified based on their place and movement function in the network. This will ensure that any future upgrades will assist in achieving the desired place value function of the roads.

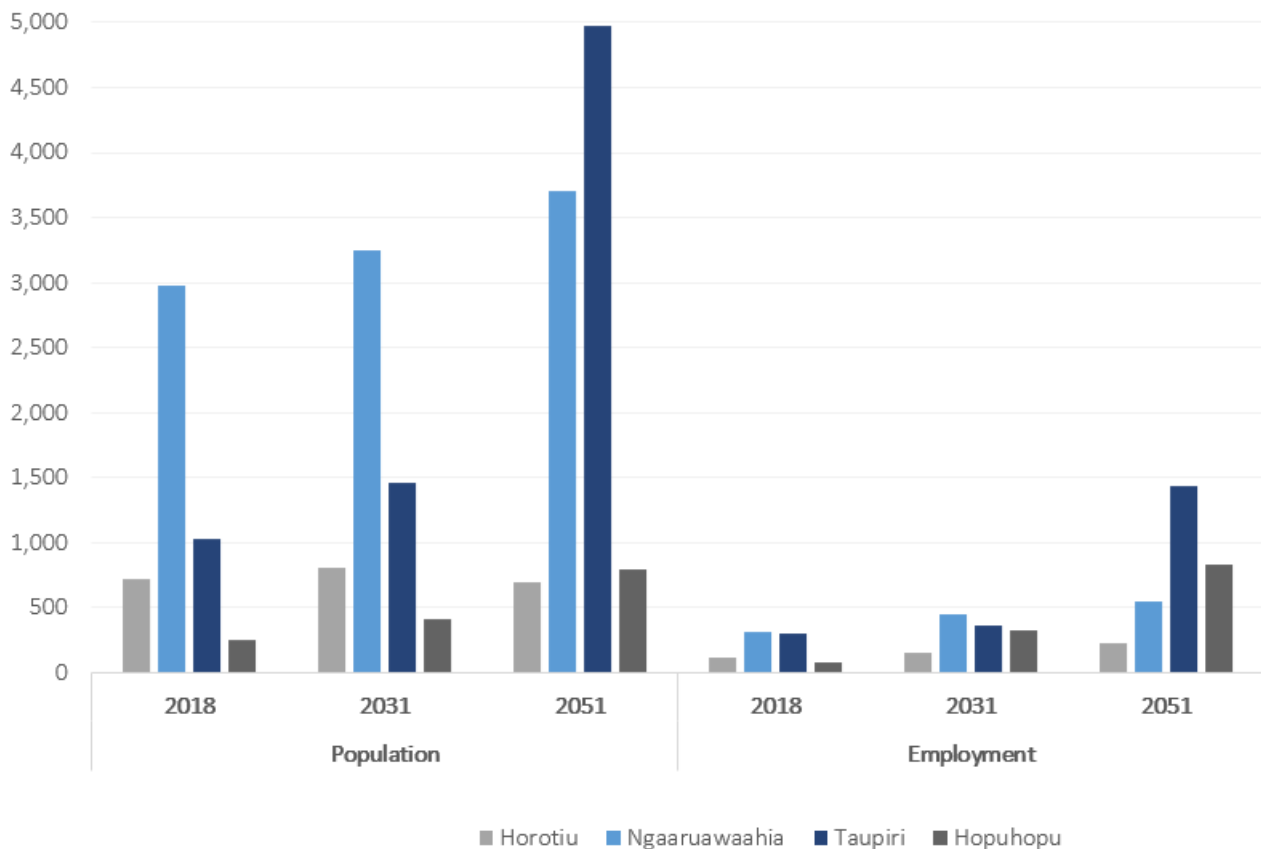
5.4 Population and employment growth

The population of Ngaaruawaahia, Taupiri, Hopuhopu, and Horotiu is currently around 7,500 people¹³, and there has been significant growth over a short period of time with new dwelling building consents increasing year on year.

WDC projections suggest there will be continued rapid growth within growth cells (shown in Figure 6) with the population doubling within these areas from around 5,000 residents to approximately 10,000 residents by 2050. The projected growth in population and employment within the growth cells is summarised in Figure 7.

¹³ Waikato 2070

Figure 7: Population and employment growth cell projections based on the development scenario's WRTM zones



The above indicates that Taupiri is projected to experience significant growth and have a larger population growth compared to the other townships within the study area.

5.5 The effect of traffic growth on the network

We reviewed the WRTM outputs and based on the traffic flows forecast by the model, identified that there will be an increase in volume on most roads due to growth. This notably includes:

- ◆ an increase on Great South Road south of River Road
- ◆ an increase on Herschel Street and Princess Street due to the proposed closure of the Waingaro Road level rail crossing to traffic
- ◆ a notable increase on Great South Road south of Saubrey Road, and similarly a further increase south of Gateway Drive

However, we also noted that the model predicts a demand **reduction** in some areas (relative to the 2018 base model):

- ◆ the opening of the Waikato Expressway was expected to lead to a decrease in traffic north of Taupiri (and indeed, has)
- ◆ the new connection to Saubrey Road will cause a reduction in traffic on Havelock Rd

Following the above, we found that the following are the key issues to consider regarding the general traffic movement in the network:

- ◆ existing daily traffic volumes are relatively low on Great South Road since the opening of the Ngaaruawaahia Section of the Waikato Expressway. However, they are predicted to increase by 20% in the next 5 to 10 years and 50% in the next 10 to 15 years due to the land use changes.
- ◆ without changes to the road network, traffic volumes would still be manageable on Great South Road. However, this would result in a very busy and vehicle dominated road, that may not be consistent with the desired place function within the town centre.

Providing traffic calming for cars and heavy vehicles as well as signalisation of intersections across level rail crossings is advisable both for safety and capacity reasons in the future.

See Appendix B for full WRTM outputs.

5.6 The effect of traffic growth on intersections

We have analysed the outputs from the WRTM, to identify the intersections where the Level of Service (LOS) for general traffic declines in 2031 and 2051, relative to today. Based on the LOS mapping, we found that:

- ◆ LOS for general traffic declines as we approach Hamilton City, which is observed in both morning and evening peak periods
- ◆ predicted LOS are impacted by rail crossing closures resulting in rerouting of trips.

It is worth noting that our assessment only considers vehicles, and that traffic volumes on Great South Road through Ngaaruawaahia and Taupiri have fallen significantly since the Ngaaruawaahia and Huntly sections of the Waikato Expressway were completed. In 2013, daily traffic volumes on Great South Road were in the order of 18,000 vehicles/day¹⁴, and this has fallen to around 9,000 vehicles/day in 2023¹⁵. As a result, these intersections currently operate with surplus capacity and are likely to continue to perform well for general traffic for some time.

We have summarised in Figure 8 the considerations to identify the following intersections for further assessment:

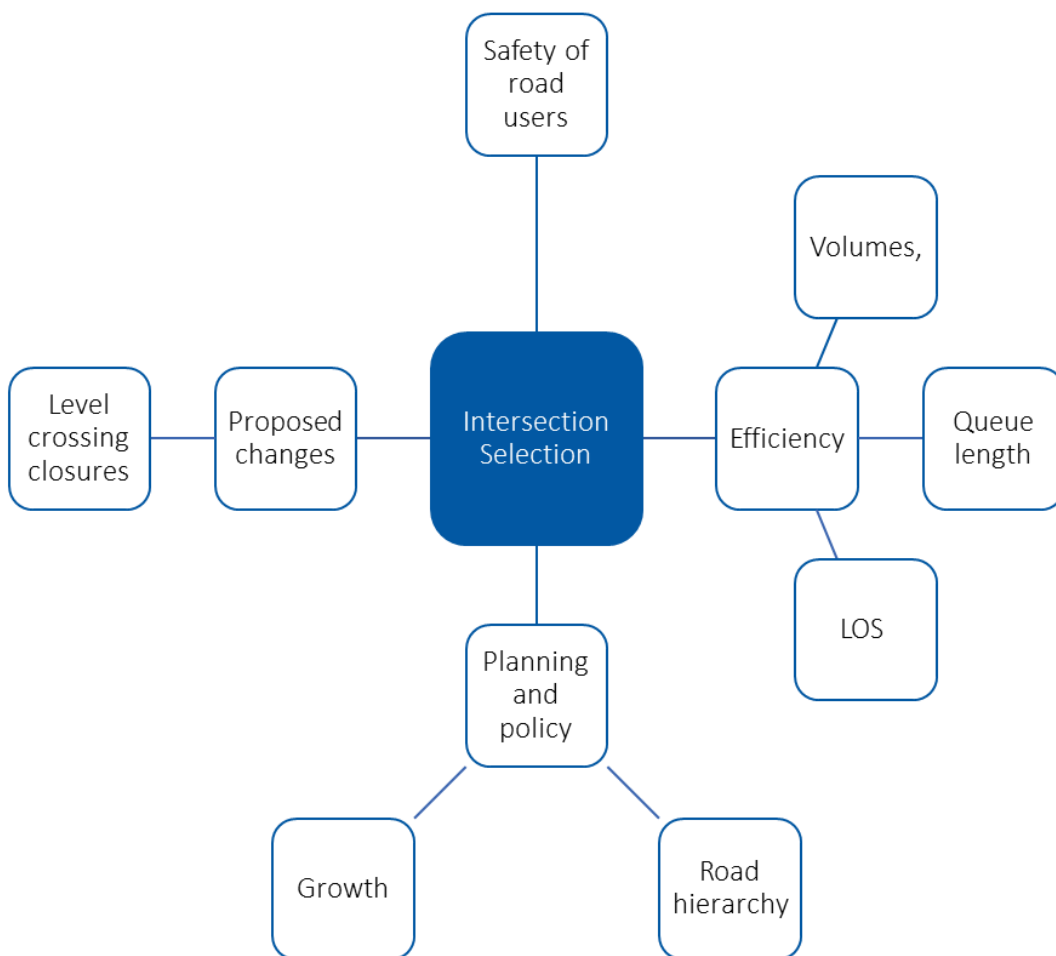
- ◆ Princess St / Great South Road / Newcastle St due to queuing concern (level crossing safety) and traffic reassignment due the proposed closure of the Waingaro Road level crossing
- ◆ Old Taupiri Rd (south) / Great South Road due to queuing concern (level crossing safety) and increasing demand from residential development
- ◆ River Road / Great South Road
- ◆ Saalbrey Rd due to traffic reassignment based increasing demand from residential development and changes at rail level crossings

We presented to WDC the above set of intersections for traffic modelling.

¹⁴ <https://www.nzta.govt.nz/assets/resources/state-highway-traffic-volumes/docs/SHTV-2011-2015.pdf>

¹⁵ https://www.waikatodistrict.govt.nz/docs/default-source/services-and-facilities/roading/traffic-and-loading-_all-roads-nov16.pdf?sfvrsn=a471b6c9_18

Figure 8: Considerations to detailed intersection assessment



As Saalbrey Road is included in Council’s long-term plan this intersection was not included in the intersection assessment. The Great South Road/ Old Taupiri Road (north) intersection was included to confirm if the findings of the Hopuhopu Redevelopment’s ITA regarding the efficiency of this intersection was still valid, using the latest WRTM traffic flows.

Traffic modelling has been carried out in SIDRA to assess the operation and performance of the above intersections, and inform transport improvements to ensure safety and efficiency outcomes are achieved.

Appendix E provides the detailed traffic modelling assessment for these intersections, as well as wider Multi Criteria Analyses (MCAs) of the impacts of each intersection treatment option.

5.7 Heavy vehicles – constraints and opportunities

We have reviewed the existing transport environment for heavy vehicles including Waka Kotahi’s High Productivity Motor Vehicle (HPMV) and over-dimension routes. The following are the key considerations that we have identified regarding the heavy vehicle movement in the network:

- ◆ Great South Road is used by a small proportion of heavy vehicles on a daily basis (around 4%)¹⁶. These heavy vehicles are primarily to/from the industrial area and inland port at Horotiu, Waingaro Road Quarry, and to service local businesses within Ngaaruawaahia.
- ◆ Great South Road currently carries up to 350 heavy vehicles per day through the Ngaaruawaahia town centre
- ◆ The current over dimension route has not been updated since September 2002¹⁷ – well before the completion of the Waikato Expressway.
 - ◆ The main route runs through the town centre via Galileo Street, Market Street, Lower Waikato Esplanade and Great South Road. This route appears to be a mapping error, as there is no connection between Lower Waikato Esplanade and Great South Road. The intended route may have been Market Street, but regardless, the implication is that several intersections along this route need to accommodate the swept path of large vehicles.
 - ◆ If this route is diverted to run via Great South Road, there would be opportunity for tighter intersections especially at the intersection of Newcastle Street and Jesmond Street.
- ◆ An existing consent requirement for the Waingaro Road Quarry requires trucks to access Great South Road via Princess Street, and this is reflected in a second over-dimension route for Ngaaruawaahia via Ellery Street, Herschel Street and Waingaro Road.
- ◆ Currently pre-approved HPMV routes include;
 - ◆ Great South Road from Taupiri to Hopuhopu, plus Gordonton Road
 - ◆ Within Ngaaruawaahia: Great South Road (south of Ellery Street), Ellery Street, Whatawhata Avenue, Ngaruawahia Road, Herschel Street and Waingaro Road.

For an assessment of traffic reassignment due to level rail crossing closures, refer to Appendix D. Existing over-dimension routes are included in Appendix F.

5.8 Buses – constraints and opportunities

We have identified the following key constraints and opportunities to consider for the bus network:

- ◆ Bus stop pairs are located along Great South Road in Ngaaruawaahia, Taupiri, and Horotiu. These bus stop pairs provide access to service route 21 and 44 (ie to Hamilton and Huntly/Pukekohe). The RPTP identifies Great South Road as a future Bus Rapid Transit (BRT) network with a key interchange at Horotiu and primary interchange at Ngaaruawaahia.
- ◆ As a minimum, investment in public transport will need to keep in step with the anticipated population growth. Greater investment will be required if mode shift and emission reduction outcomes are to be reached.

¹⁶ Waka Kotahi's Mobile Road database

¹⁷ Waka Kotahi Over dimension Route 6-2 Ngāruawāhia

- ◆ School buses are generally provided by the Ministry of Education, which encourages a relatively high mode share for journey to school trips. This helps to achieve equitable outcomes for the study area, but predominantly benefits rural residents and students travelling to Ngaaruawaahia High School from Taupiri and Horotiu.
- ◆ WDC has identified a safety issue concerning pedestrians, in particular children, from the Hopuhopu area who cross the railway track and Great South Road near the intersection of Old Taupiri Road (north) to access the bus stop on Great South Road. To address this issue, we recommend that the bus route is rerouted through Old Taupiri Road in the long term once Hopuhopu develops. This would eliminate the need for people to cross Great South Road and provide shorter first leg trips for Hopuhopu residents.

See Appendix A for more details on the existing bus network.

5.9 Rail – constraints and opportunities

The rail network in the study area has some key constraints and opportunities to consider:

- ◆ The North Island Main Trunk (NIMT) follows the Waikato River and hence passes through each community within the study area. As a result, there are level crossings in each community that can pose a safety risk. However, it also provides an opportunity to establish a Transport Hub in Ngaaruawaahia making rail services potentially accessible to people.
- ◆ Currently residents are unable to use existing rail services for travel purposes since passenger rail services are not currently available to these communities.
- ◆ Te Huia currently operates return trips twice daily on weekdays and once on Saturdays with the closest stops being Huntly and Rotokauri. The current journey time between Huntly and Britomart is around 2 hours. In the medium or long term, Te Huia could possibly stop in Ngaaruawaahia, particularly since the historic train station area is available within Kiwi Rail's designation. We recommend a future rail station be located close to Ngaaruawaahia town centre, to maximise the station's accessibility by walking, cycling and micromobility.
- ◆ However, if additional stations are to be established in other communities land acquisition will be required.

5.10 Micromobility – constraints and opportunities

The following are the key constraints and opportunities to consider regarding the walking, cycling and micromobility network:

- ◆ The NIMT represents a major severance for walking, cycling and micromobility trip.
- ◆ There are uncontrolled pedestrian crossings of the NIMT throughout the communities.
- ◆ There are limited cycling facilities in and around the communities, with the Te Awa River Ride between Ngaaruawaahia and Cambridge being the only high-quality, separated cycle route available.

- ◆ The WDC Connectivity Strategy (2023) outlines the existing and proposed cycling and walking trails in the Waikato District. The Strategy classifies these trails according to priority and function within the network.
- ◆ Current WRTM projections indicate that car mode share is anticipated to remain consistent, with traffic volumes increasing in step with increased land use development (in contrast to the National and Local strategies discussed in Section 3). However, providing safe walking and cycling connections within and between the townships will help reduce car dependency. This will lead to less vehicle-dominated urban areas and more people-focused streets.
- ◆ The Te Awa River Ride forms part of Te Araroa – New Zealand’s national walking trail from north to south. It is a significant community asset, and we consider it likely that a proportion of visitors will walk and cycle into the communities, using the Te Awa River Ride.

See Part B for the Micromobility Assessment.

5.11 Spatial constraints and opportunities

Some of the existing urban streets within each township are relatively wide, with for example Great South Road being around 17 m wide through Ngaaruawaahia – an outcome from this road’s former state highway function. Large paved areas of roads have a negative impact on the quality of our public places, and conflict with the outcomes sought by the Town Centre Plan. They result in large quantities of stormwater runoff, increase the temperature of urban areas, and reduce the opportunity for the Place function of streets.

There is an opportunity within each township to reallocate existing road space to better support the Place function, in turn enabling better and healthier use of public space. This approach is consistent with National, Regional and Local strategies aimed at improving the wellbeing of communities. Similarly, repurposing paved area as permeable and planted street area responds to both the Place function, and to our climate response.

5.12 Speed environment – constraints and opportunities

The existing road network encourages speeds that are often inconsistent with the adjacent land use, and are often inconsistent with current best practice. This is evidenced by crash statistics, where loss of control crashes account for over 40% of reported incidents. Many of the roads in the study area do not support higher travel speeds. Road to Zero encourages the reduction of speed limits to align with the existing road design, as well as engineering treatments to better match the road environment to the surrounding land use.

Following consultation with WDC, a particular focus on enabling key moves within Ngaaruawaahia town centre was suggested. We have considered the outcomes and recommendations to facilitate the outcomes sought by the Town Centre Plan in the Short-term transport changes in section 6.2.

Refer to Appendix B for details around how these suggestions were developed.

5.13 Key Links for vehicular movement – constraints and opportunities

The study area has several paper roads. We have proposed new transport connections using some of these paper roads, and amended the locations of some proposed connections based on consultation with the WDC stormwater team. In summary:

- ♦ the short term network includes various links within the Taupiri growth cells, with connections onto Gordonton Road through two roundabouts, and up to four connections onto Kainui Road (depending on the traffic volume generated, this may trigger and upgrade for the Kainui Road level rail crossing).
- ♦ the medium and long term network is likely to require upgrade of the Havelock Road and Saulbrey Road level crossings, particularly with the proposed connection into the southern Ngaaruawaahia growth cell.

Refer to Appendix B for the proposed key links for the study area.

5.14 Level Crossings – constraints and opportunities

We have reviewed the existing safety and operation of the rail level crossings over the 2010 to 2022 period. We note that:

- ♦ most incidents occurred before 2016 (16 of 23 incidents) and were non-fatal with most resulting in no injuries to drivers of vehicles or trains
- ♦ the most recent collisions were on Horotiu Road (2021) and Park Road (2022), with no injuries reported
- ♦ the level crossings at Waingarō Road and Horotiu Road can be closed without significant effects on the transport network, provided that improvements at Saulbrey Road and Princess Street are implemented¹⁸.

See Appendix D for an assessment on traffic reassignment due to level rail crossing closures.

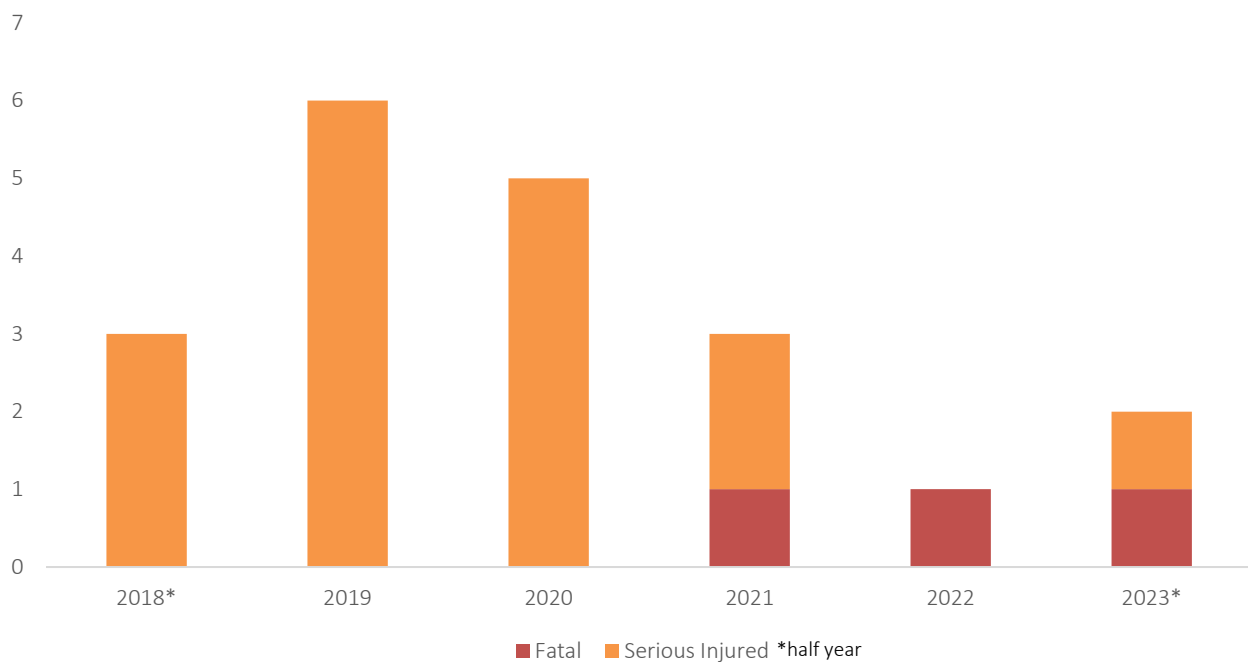
5.15 Safety Review

The safe system approach acknowledges that people make mistakes and are vulnerable in a crash. While mistakes are inevitable, deaths and serious injuries from road crashes are not. Notably, most of the crashes (93%) did not result in serious injuries or deaths. However, Road to Zero expects no deaths or seriously injuries should result from road crashes. The New Zealand target for 2030 is a 40% reduction in DSI translating to less than 2.5 DSI per year for the study area.

We examined the reported crash history between 2018 and 2023 and found that the number of reported injuries have been consistent over the last 5 years. There have been 20 deaths and serious injury (DSI) resulting from 19 incidents reported over the last 5 years, with around 4 reported each year.

¹⁸ A LCSIA is required to determine the interventions needed to ensure the safe operation of the crossings following a traffic demand change using the crossings

Figure 9: Reported DSI over the last 5 years



Appendix A provides the locations and number of the DSI in the period 2018-2023 and a more information related to the safety assessment.

5.16 Waikato’s changing transport focus

The form and function of Waikato’s streets and wider transport system are changing:

- ◆ Waikato is increasingly investing in public transport, walking, cycling and Travel Demand Management, guided by local, regional and national level strategies and plans (see Section 2). Currently the region remains very reliant on private car travel, with cars accounting for 85% of trips to work and education, as of 2018¹⁹
- ◆ Waikato is transitioning from a mainly mono-modal region to a multimodal one, which will take time and require many small incremental steps along the way. There will also be a time lag, with travel behaviour change following behind infrastructure improvements. It takes time for people to change travel habits that have been established over a lifetime
- ◆ It is essential to note that travel by private car will continue to be a necessity for some time. The challenge is to manage cars to support the shift towards public transport, walking and cycling, while recognising the community’s current travel needs.

¹⁹ 2018 census travel to work and education data, for the Ngaaruawaahia Central, Ngaaruawaahia South, Ngaaruawaahia North and Taupiri-Lake Kainui area units

6 THE FUTURE TRANSPORT NETWORK

We recommend the transport network in Ngaaruawaahia, Taupiri, Hopuhopu, and Horotiu is progressively improved over time to support the urban design assessment of the town centre and future development in the area. To support the future transport network, we recommend a suite of proposed transport projects and their prioritisation. The suite of investments interventions is informed by the desire for connections between key origins and destinations, and the proposed modal priority on existing and future streets.

The Ngaaruawaahia, Taupiri and Hopuhopu Town Concept Plan aims to help ensure the communities continue to be a vibrant, people-focused community destination, and the transport assessment supports this plan. The proposed suite of investments is designed to promote alternatives to car use, aligned with local and national policies to reduce the carbon emissions from the transport sector and make active travel a safe and attractive option while improving the existing attractiveness of tourism in the area.

In addition to internal trips within the four communities, the townships currently have a high proportion of residents leaving town for work or education, particularly towards Hamilton. Therefore, a key priority for the future network is providing a reliable, high-frequency public transport service for commuters travelling to employment areas, providing an alternative to private car travel.

We present the proposed suite of transport investments with key movement plans and travel mode hierarchy. It is accompanied by a summary of the key transport considerations.

The following figures are presented:

- ◆ Figures 12 to 16 - Proposed future transport hierarchy
- ◆ Figure 17 - Proposed transport changes – short term (0 – 5 years)
- ◆ Figure 19 - Proposed transport changes – medium term (5 – 15 years)
- ◆ Figure 21 - Proposed transport changes – long term (15+ years)

6.1 Road classification

We propose that the roads, especially in and around the town centre are reclassified using the ONF based on their place and movement function in the network. This will ensure that any future upgrades will recognise that streets have an important place function alongside their traditional movement function.

As an interim step to inform our assessment, we have carried out a high level, approximate ONF classification of the existing road network using data available on Geographic Information Systems (GIS). This helped us identify the indicative future ONF classifications for roads and streets, based on forecast vehicle volumes and typical adjacent land use from the existing District Plan. Refer to figures on following pages for maps of that high level, approximate ONF classification.

The classifications are indicative only, based on data currently available, and should not be considered a final or conclusive ONF classification. The indicative classification for movement function using

volumes is based on the characteristics from Waka Kotahi shown in Figure 10 while place function is based on Figure 11.

Figure 10 – ONF Movement classification characteristics

Considerations to determine Movement Significance		Nature of Movement	Scale of People Movement (all modes)
M1	Major	Mass movement of people and/or goods on roads or streets that are of major importance in urban areas, within and between regions or nationally.	Typically > 20,000 per day
M2	Significant	Movement of people and/or goods on inter-regional routes or primary roads and streets linking main centres or significant destinations and travel hubs within a city/town or region.	10,000 – 25,000 per day
M3	Moderate	Movement of people and/or goods around a city, town or region	3,000 – 12,000 per day
M4	Minor	Local movement by people making short trips or connecting to connector roads	300 – 4,000 per day
M5	Low	Local movement by people going about their daily lives	Typically < 500 per day

Figure 11 - ONF Place classification characteristics

Place function ranking	Level of on-street activity	Typical adjacent land-use
P1	<ul style="list-style-type: none"> Very high on-street activity – very high numbers of pedestrians Very high numbers of people spending time in the location Major movement across the carriageway 	High rise office blocks and apartments, central city shopping and entertainment, major commercial centres, streets with this level of place are most likely to be located within the CBD of major cities
P2	<ul style="list-style-type: none"> High/very high on-street activity – high numbers of pedestrians High numbers of people spending time in the location Significant movement across the carriageway 	Office blocks, low rise apartments, entertainment venues, retail, commercial businesses, community facilities
P3	<ul style="list-style-type: none"> Medium to high on-street activity Some people spending time in the location Some movement across the carriageway 	Office blocks and low-rise apartments, retail, entertainment venues, commercial/trade businesses, community facilities, industrial
P4	<ul style="list-style-type: none"> Low to medium on-street activity related to people going about their lives Limited movement across the carriageway 	Residential, schools, community facilities, low intensity commercial/industrial
P5	<ul style="list-style-type: none"> Little discernible on-street activity 	Mostly rural except for State Highways (motorways/ expressways) in urban areas

The figures overleaf map the high level, approximate ONF classification. Note that these maps have been generated automatically using the available, open-source GIS data. Accordingly, not every public street is represented on this map.

Figure 12: Proposed transport network and indicative road hierarchy (long term) for the study area

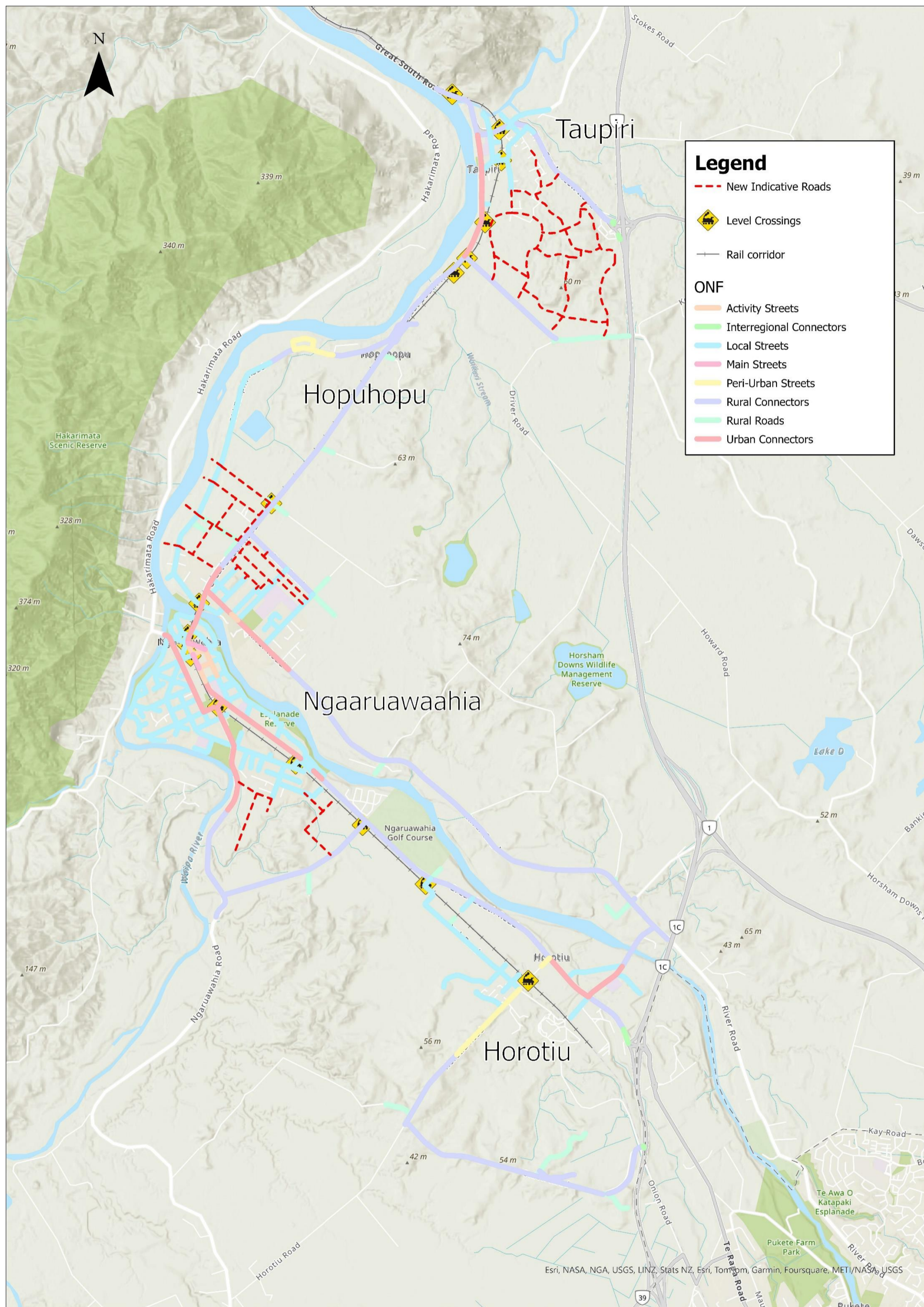


Figure 13: Proposed transport network and indicative road hierarchy (long term) for Taupiri

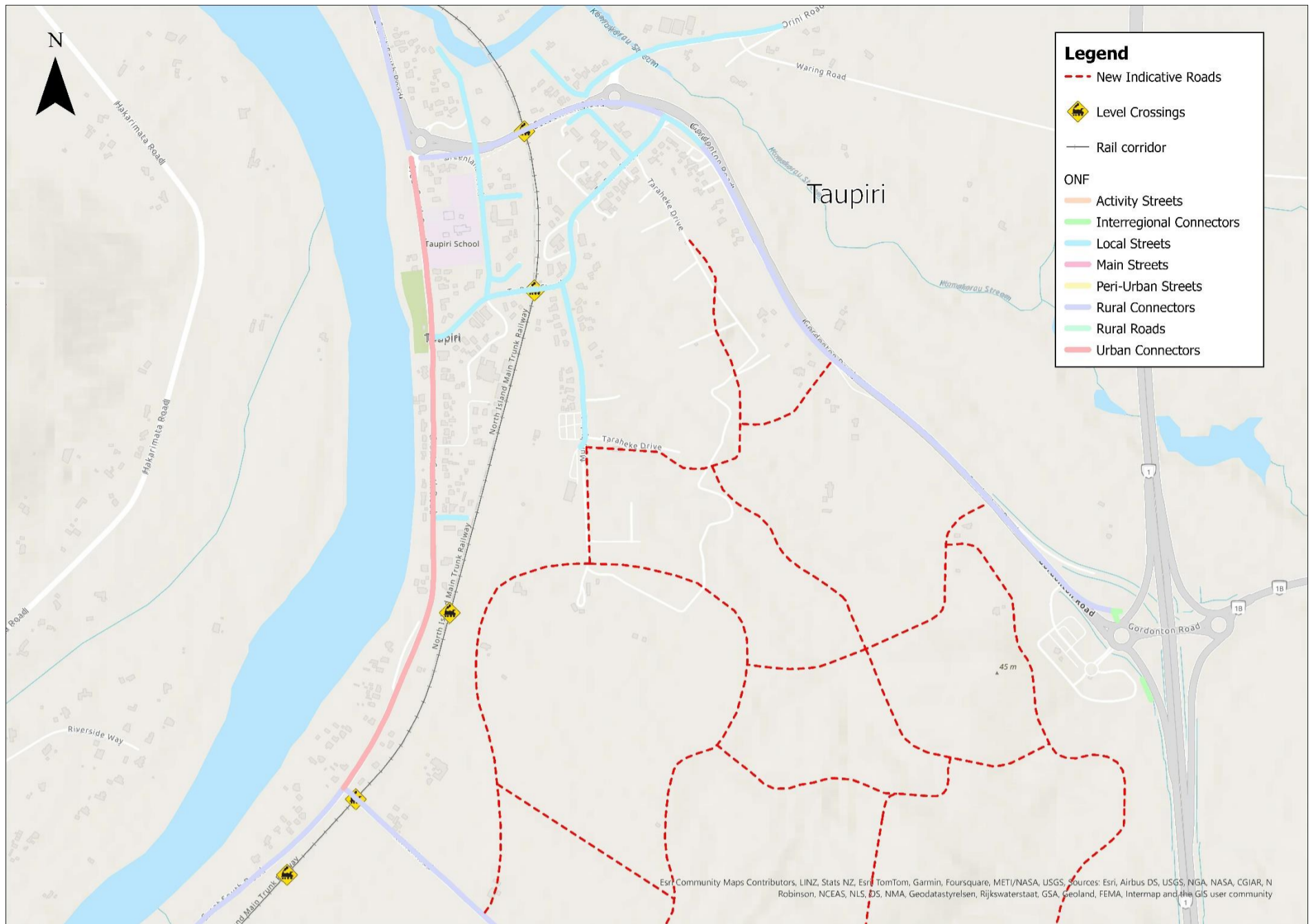


Figure 14: Proposed transport network and indicative road hierarchy (long term) for Ngaaruawaahia

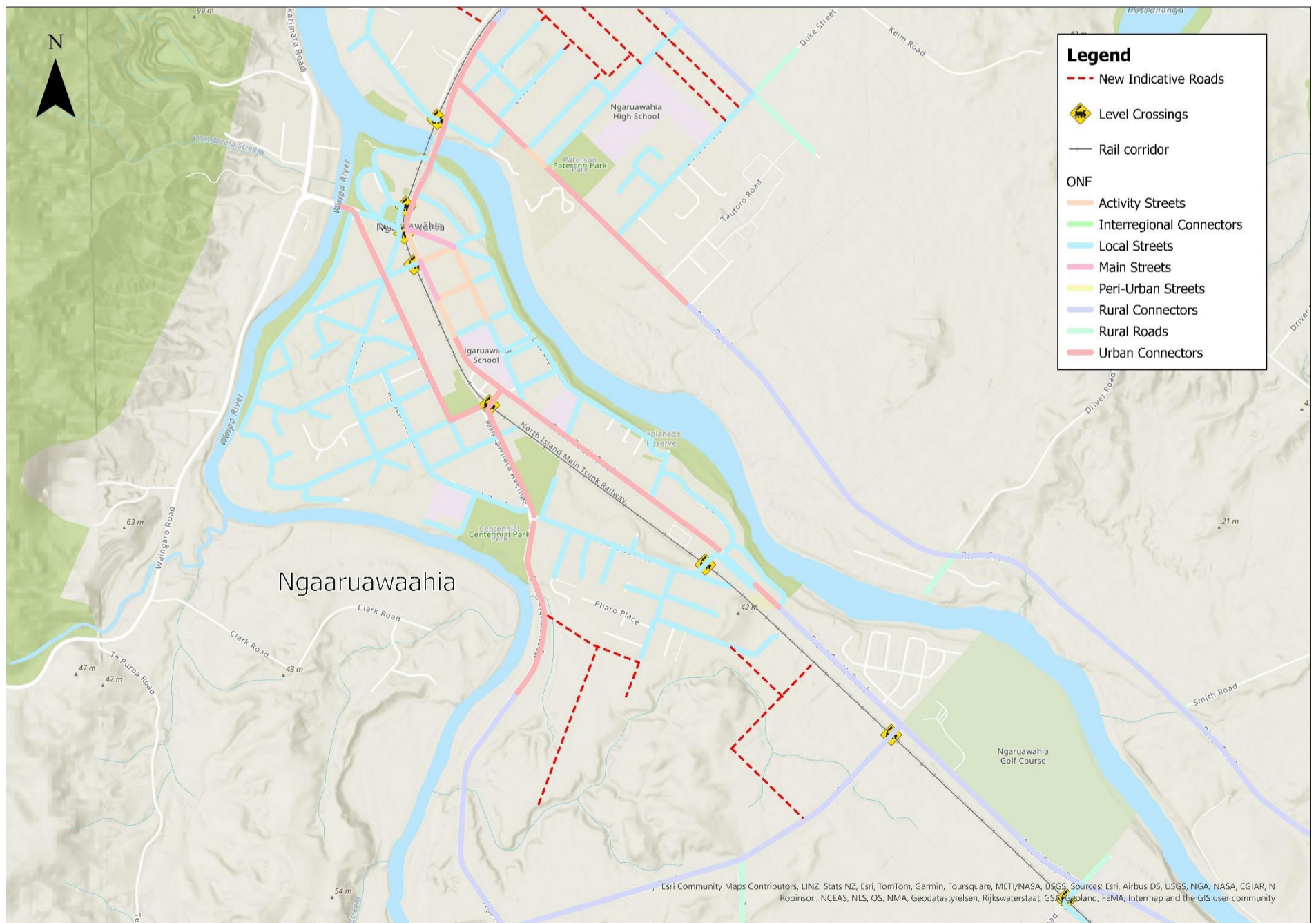


Figure 15: Proposed transport network and indicative road hierarchy (long term) for Hopuhopu

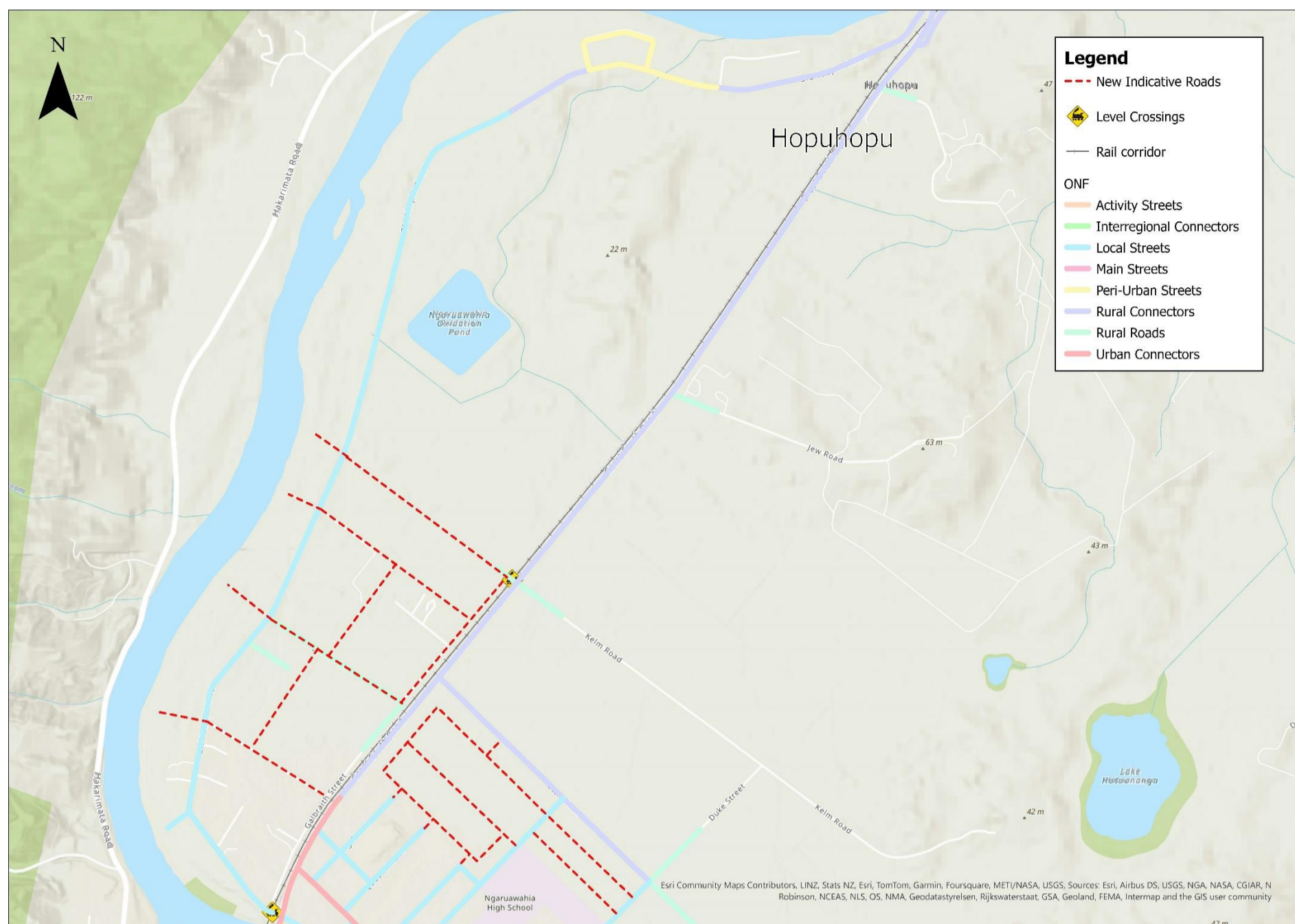
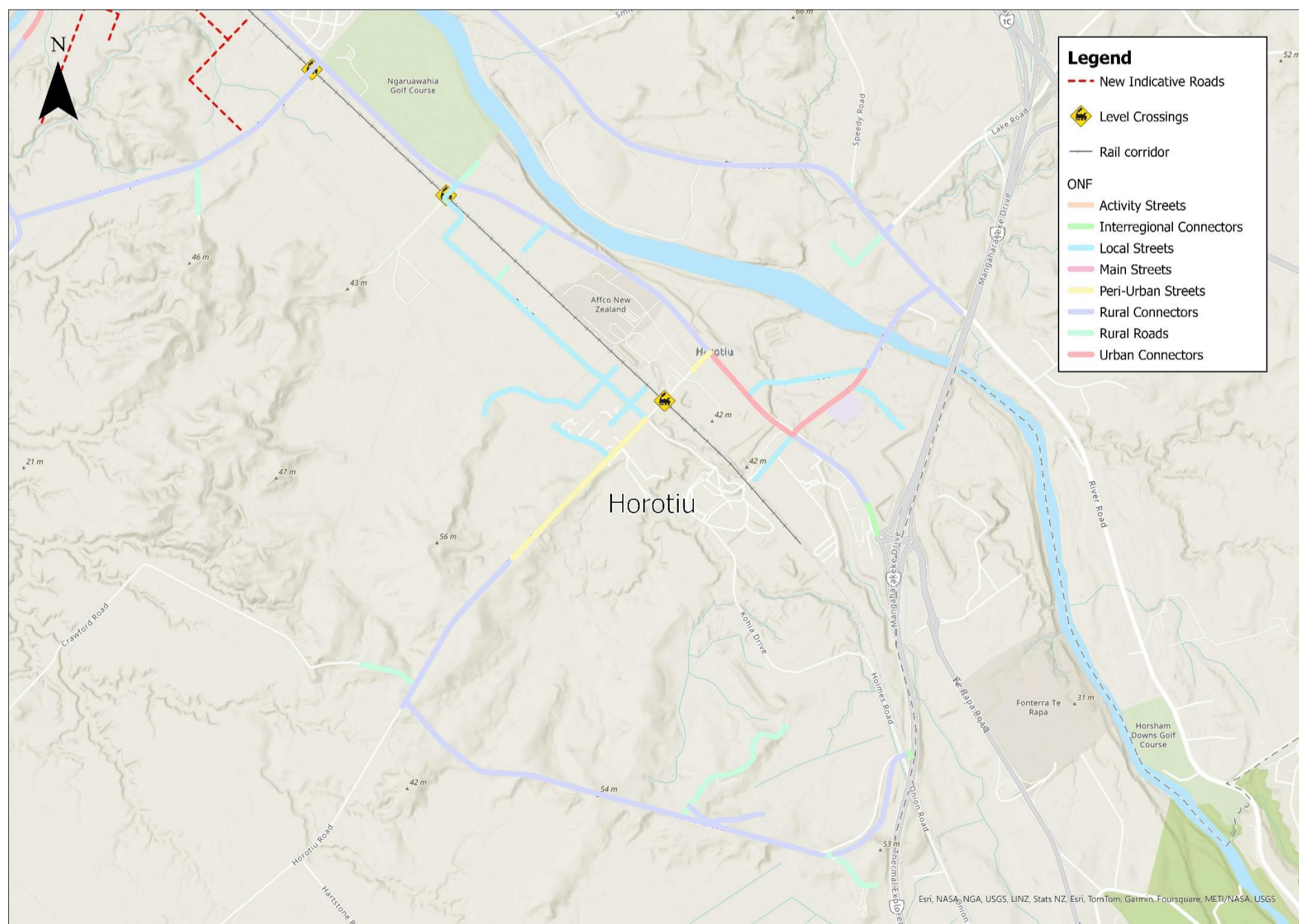


Figure 16: Proposed transport network and indicative road hierarchy (long term) for Horotiu



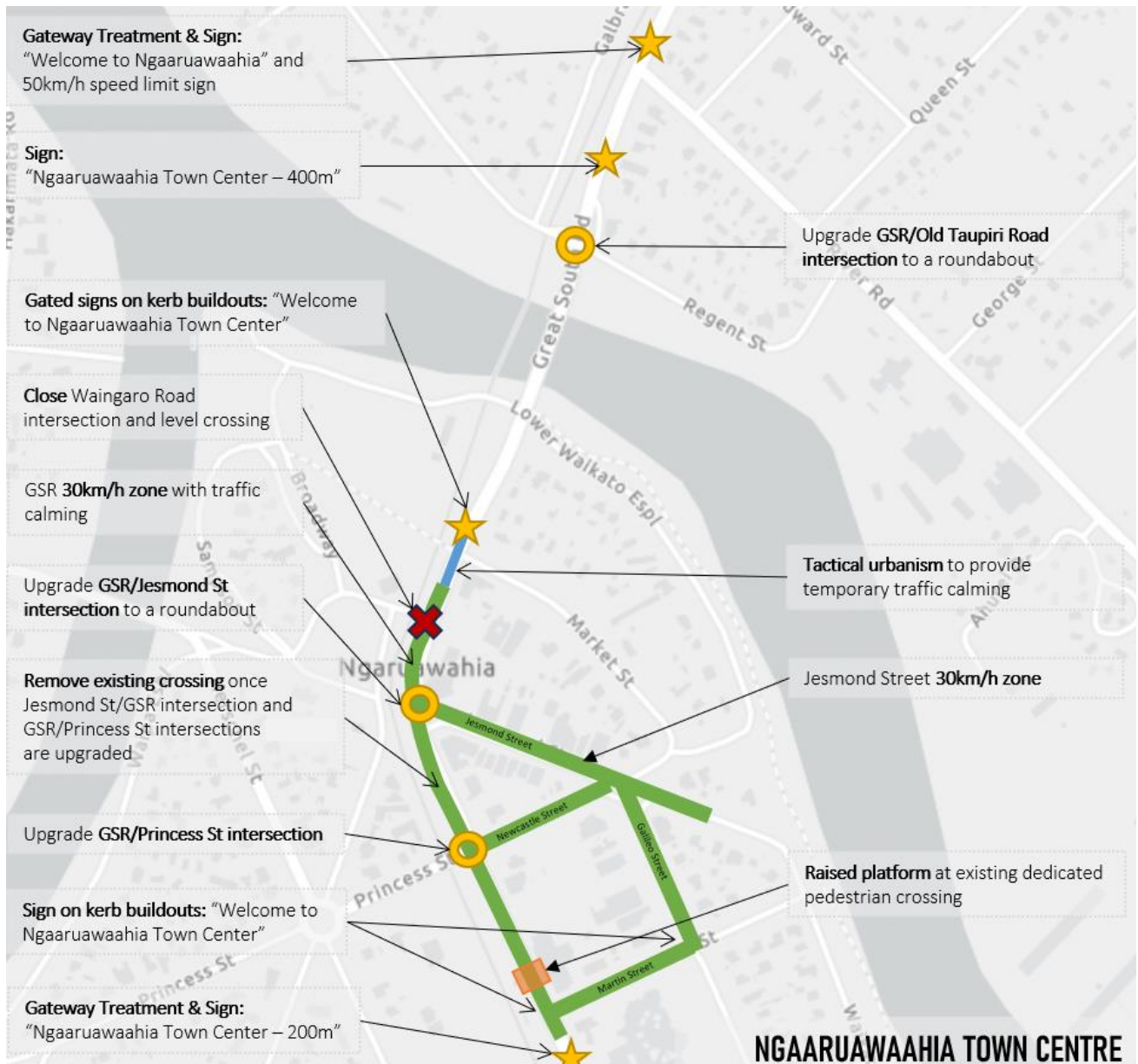
Waka Kotahi’s ONF classification is an ongoing process that Waka Kotahi is still improving and providing more guidance on. Waka Kotahi’s full ONF classification process generally requires extensive stakeholder engagement to confirm the classifications. The indicative ONF classifications shown in the figure above may be used as starting points for these conversations.

6.2 Short term transport changes (0 – 5 years)

6.2.1 Ngaaruawaahia Town Centre

Figure 14 below indicates the proposed transport links in the short term (0 – 5 years) for Ngaaruawaahia. The key changes in the short term are providing a low-speed environment (30 km/h) and closing the unsafe level rail crossing at Waingaro Road.

Figure 17: Transport Strategy - Short term (0 – 5 years) for Ngaaruawaahia



The key transport related changes in the **short term** include:

- ◆ providing a low-speed environment (30 km/h) within the town centre, including on sections of Great South Road, Market Street and Martin Street.
- ◆ the low-speed environment with the town centre should include:
 - a defined entryway/town centre gateway at the northern and southern extents with kerb buildouts, raised platforms and visual cues
 - using tactical urbanism to provide interim traffic calming measures on the approach to the town centre. For the short term, this will support the low speed limits, the low speed environment of the town centre, and upgraded intersection of Jesmond Street and Great South Road, until the traffic calming features are extended and made permanent.
 - a speed limit of 30 km/h (the extent of this may include streets in addition to Great South Road, Market Street, Newcastle Street, Galileo Street, and Martin Street, and would be more effective if supported by physical measures)
 - safety improvements to existing pedestrian crossing points of Great South Road within the town centre, either signalised crossings or raised zebra crossings.
 - upgrade the existing Great South Road intersection with Jesmond Street to a roundabout, including raised pedestrian crossings on all legs to align with urban design key move from the River Ride to The Point. Includes upgrade to pedestrian level crossing. Options assessment and proposed design are in Appendix E
- ◆ upgrading the intersection of Old Taupiri Road (south) and Great South Road to a signalised intersection. The options assessment and proposed design layout is provided in Appendix E.
- ◆ upgrading of the intersection of Great South Road with Princess Street
- ◆ closure of the Waingaro Road level crossing to formalise the required heavy vehicle movements from the Waingaro Road Quarry and improve vehicle safety by encouraging use of Princess Street.
- ◆ closure of the Horotiu Road level crossing following the completion of Kohia Drive, directing traffic to use the grade separated crossing of the NIMT at Gateway Drive
- ◆ reroute the over dimension vehicle route along Great South Road (as opposed to the current route which runs through intersection of Jesmond Street and Newcastle Street in the town centre). This will require engagement with the Heavy Haulage Association and possibly some modifications along Great South Road to provide the required²⁰ heavy vehicle envelope.
- ◆ work with WRC on infrastructure improvements to support bus services along Great South Road.

Other changes to the local transport network are expected to support residential growth and these are generally confirmed at the time of subdivision. For example, review of a subdivision on Galbraith St identified that due to the narrow width of Galbraith St and safety concerns at the Galbraith Street /Old Taupiri Road intersection that the scale of residential development should be limited to prior to construction of Festival Way providing an alternative link to Old Taupiri Road and severing Galbraith Street. These changes would limit the number of vehicle movements at the Galbraith Street /Old Taupiri

²⁰ New Zealand Heavy Haulage Association set out requirements for OD routes

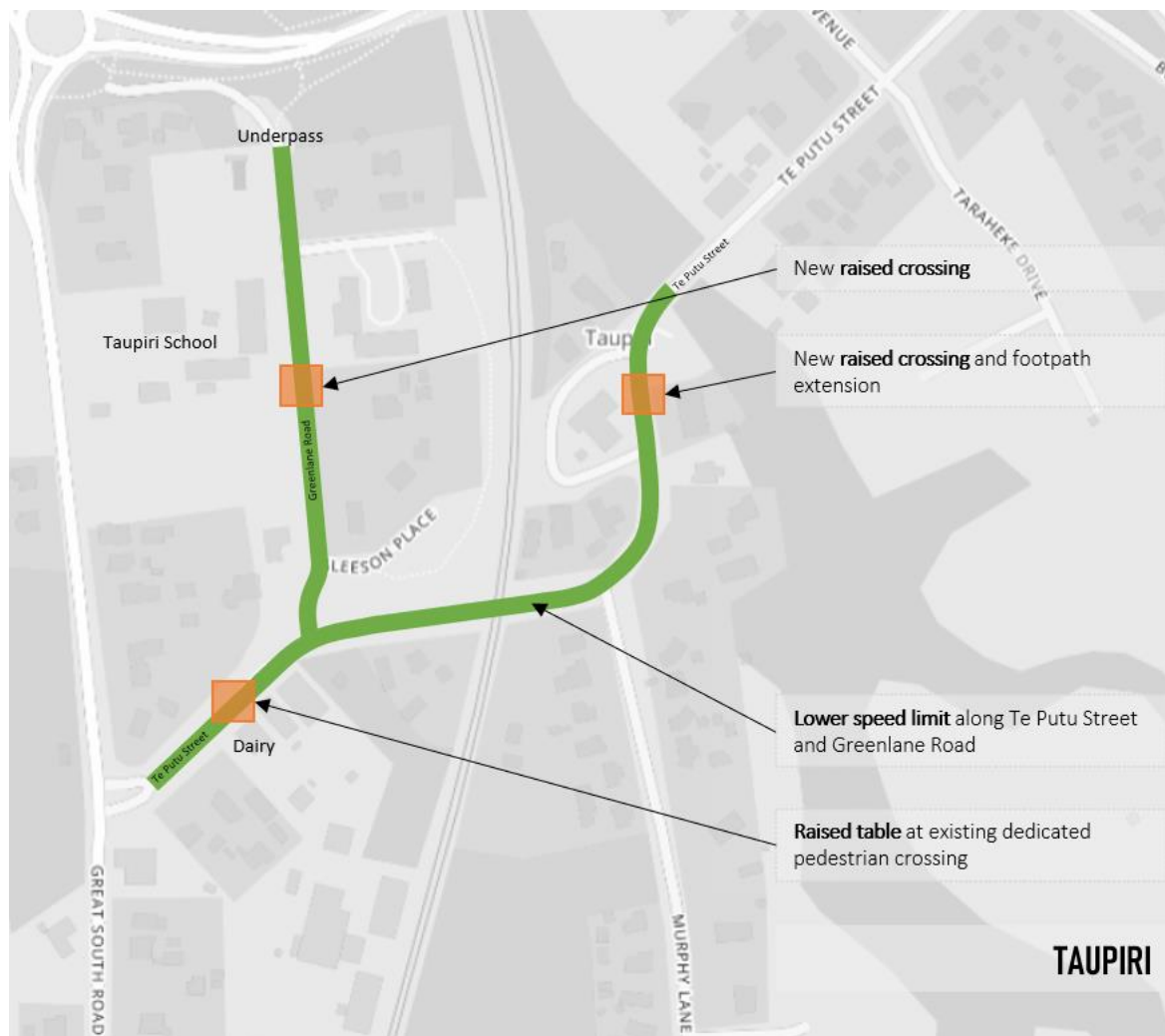
Road intersection which is located adjacent to the rail level crossing. Construction of Festival Way provides a transport connection that supports wider residential development of the area.

6.2.2 Taupiri

Figure 18 below indicates the proposed transport links in the short term (0 – 5 years) for Taupiri. The key changes in the short term are:

- ♦ providing a lower-speed limit along Te Putu Street and Greenlane Road as well as
- ♦ introducing some raised platforms to support lower speeds, especially at busier pedestrian crossing locations.

Figure 18 - Transport Strategy – Short term (0 – 5 years) for Taupiri



6.3 Medium term transport changes (5 – 10 years)

Figure 19 and 20 below indicates the proposed transport links in the medium term (5 – 10 years).

The key move in the medium term is to improve walking and cycling connectivity of the communities. This will help reduce traffic volumes, improve amenity in the town centres and reduce the risk of crashes in the future as both traffic volumes and walking and cycling trips increase. Improving the safety of vehicles using level rail crossings is included in the medium term.

In the medium term, key pedestrian and cycling trails are proposed with links east-west and north-south creating a walking and cycling trail network around the communities.

Figure 19: Transport Strategy - Medium term (5 – 10 years)

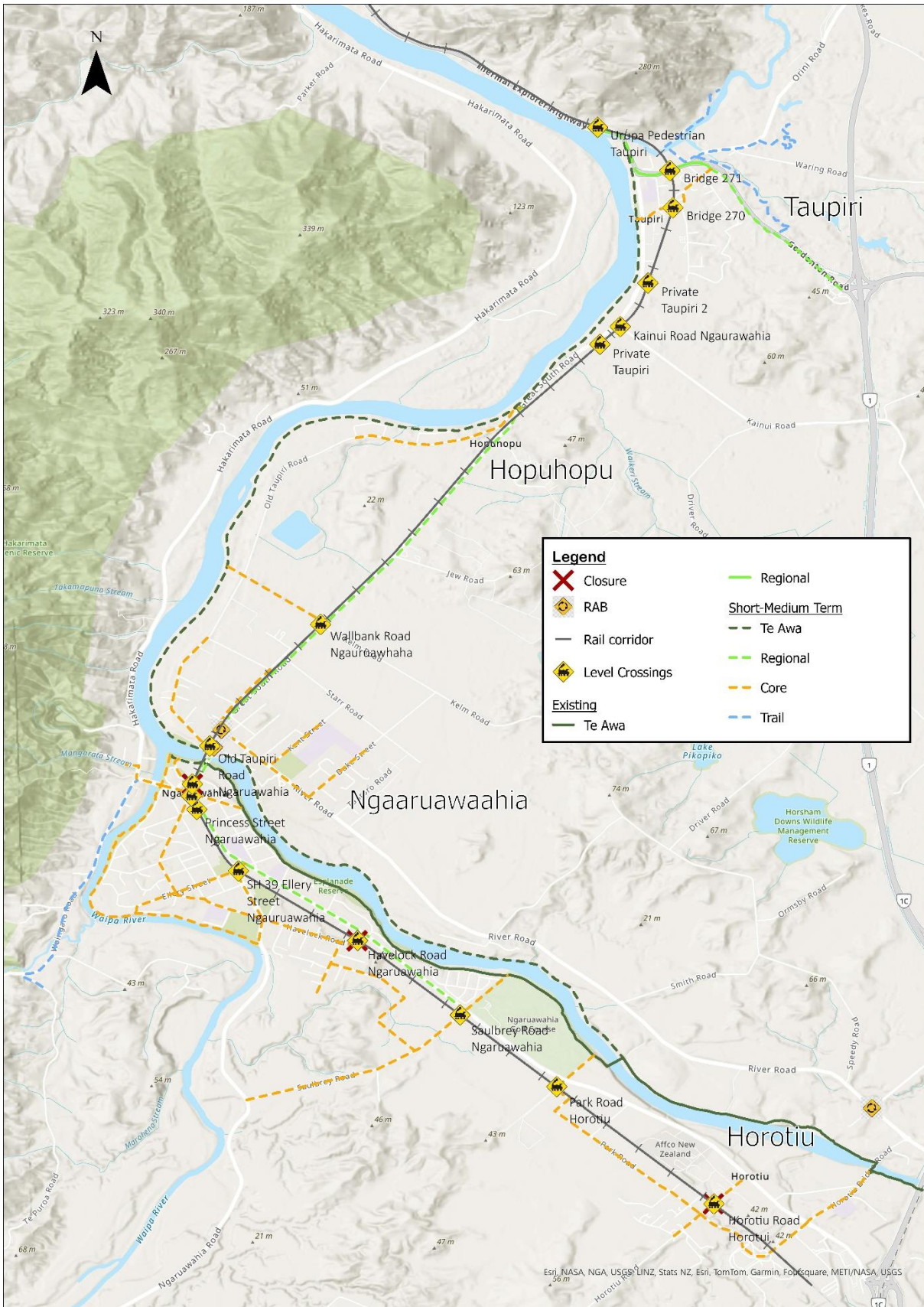
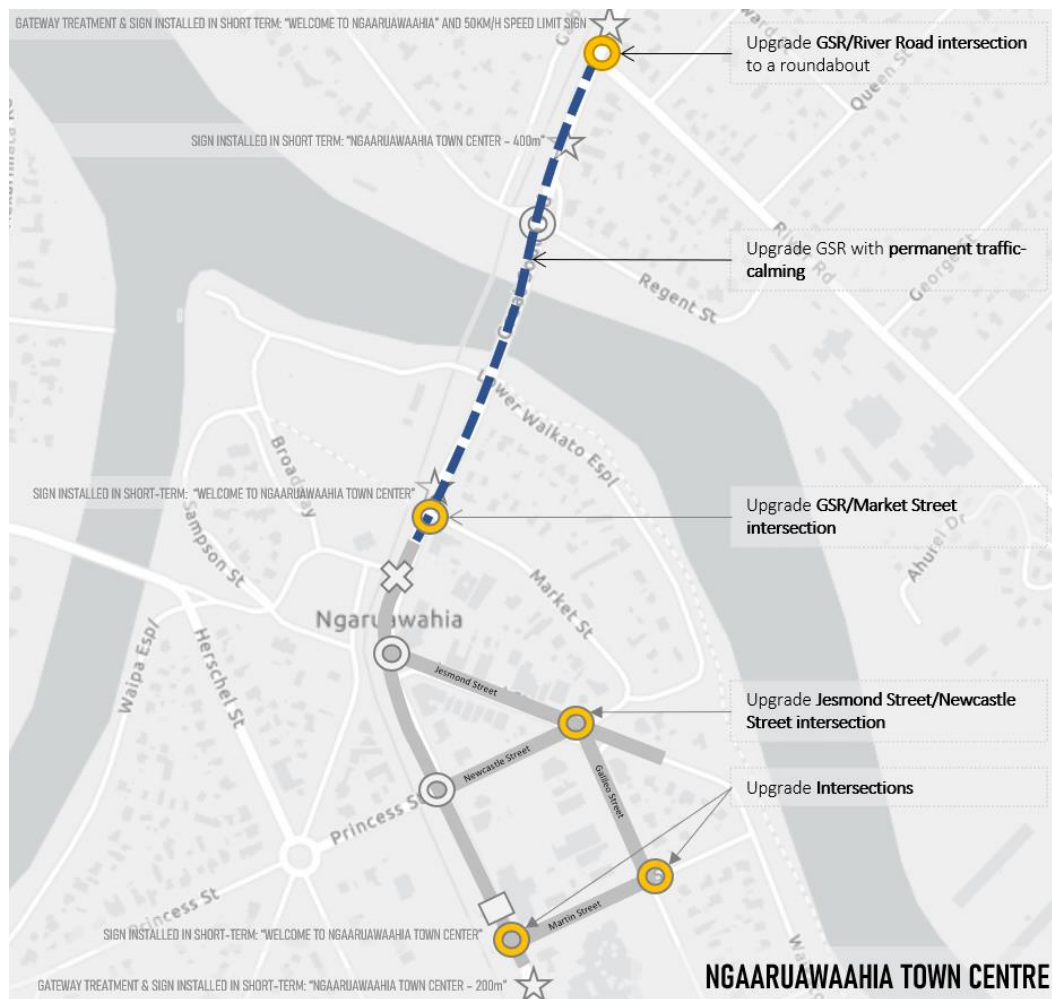


Figure 20 - Ngaaruawaahia Town Centre Transport Strategy - Medium term (5 - 10 years)



The following is a summary of the key transport related changes in the medium term:

- ◆ existing daily traffic volumes on Great South Road are predicted to increase by 50% in the next 10 to 15 years. In response to this, we recommend
 - providing an improved walking and cycling connection across Great South Road and the NIMT to connect east and west Ngaaruawaahia
- ◆ upgrade the **Great South Road/River Road intersection** to a roundabout. This will improve the gateway treatment of Ngaaruawaahia. The proposed design layout is provided in Appendix E.
- ◆ upgrade the roundabout at the **Jesmond Street/Newcastle Street intersection** to manage cyclist and pedestrian safety and reduced speeds as well as deliver on the east-west connection. The options assessment and proposed design layout is provided in Appendix E.
- ◆ upgrade the intersection at **Market Street and Great South Road** to reduce speeds through this intersection to help support the low-speed zone south of the intersection
- ◆ upgrade the **Saulbrey Road** level crossing to align with the planned growth of southwest Ngaaruawaahia.
- ◆ upgrade the **Havelock Road** level crossing

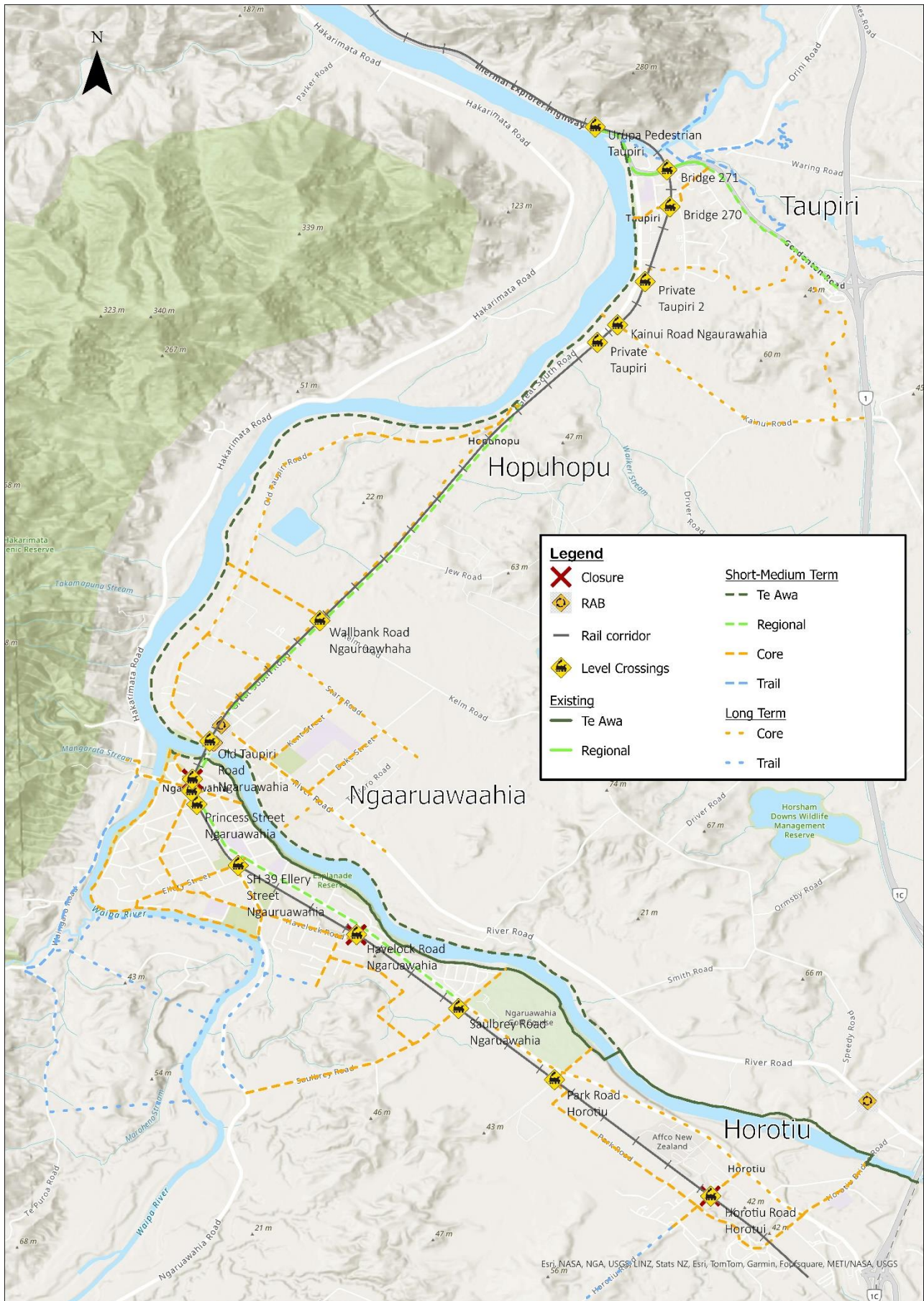
- ◆ upgrade the level crossing at **Old Taupiri Road, unless** north Ngaaruawaahia Hopuhopu is developed earlier
- ◆ provide an **improved walking and cycling connection** along Great South Road and across the Waikato River
- ◆ provide traffic calming measures on **Herschel Street** to discourage rat-running via Herschel Street
- ◆ provide more **permanent traffic calming measures** along Great South Road leading into the Ngaaruawaahia town centre.
- ◆ work with WRC to deliver Bus Rapid Transit (BRT) to support land use development

6.4 Long term transport changes (10+ years)

The key move in the long term is a transport hub in Ngaaruawaahia, providing access to the proposed BRT network. We have considered the appropriateness of a Park and Ride facility, but consider that Ngaaruawaahia would be better suited to a 'town centre' type rapid transit station in the centre of the town, with quality walking and cycling links. Park and ride facilities are more suited to rapid transit stations on the urban fringe, such as at Taupiri interchange. The long term strategy would also provide more direct connections for buses to and from the transport hub while also completing walking and cycling network to provide alternatives to cars.

Figure 21 indicates the proposed transport links in the long term (10+ years).

Figure 21: Transport strategy - Long term (10+ years)



6.5 Summary of proposed transport changes

A summary of the key transport related changes in the long term includes the following:

- ◆ provide an expanded walking and cycling network to the full extent shown in the Micromobility Assessment.
- ◆ monitor and review safety at the Havelock Road level crossing.
- ◆ upgrading the existing bus stops and enable the rapid transit route, aligning with the Hamilton Waikato Metropolitan Spatial Plan (HWMSP).
- ◆ reinstate the train station at Ngaaruawaahia to align with the Hamilton to Auckland (H2A) Corridor Plan.
- ◆ upgrade level crossing at Kainui Road, unless the Taupiri development takes place prior. Then upgrade along with Taupiri development.
- ◆ close the level crossing at Wallbank Road, once the growth cell is developed, providing access to Old Taupiri Road

The proposals per time period are presented in the table below:

Table 3: Proposed investments

Short-term (0 – 5 years)	Medium term (5 – 15 years)	Long-term (15+ years)
INTERSECTIONS		
Upgrade the existing Great South Road intersection with Jesmond Street to a roundabout to deliver connection to the town centre.	Upgrade the Jesmond Street/Newcastle Street intersection to manage cyclist and pedestrian safety and reduce speeds as well as deliver connection to the town centre	
Upgrade the Great South Road intersection with Old Taupiri Road (south) to roundabout	Upgrade the Great South Road intersection with River Road to roundabout	
Upgrade Princess Street/GSR intersection	Upgrade the Market Street and Great South Road intersection to reduce speeds through this intersection to help support the low-speed zone south of the intersection	
LEVEL CROSSINGS		
Upgrade the pedestrian level crossing at Jesmond Street during the upgrade of the Jesmond Street intersections.	Upgrade the level crossing at Old Taupiri Road, unless north Ngaaruawaahia Hopuhopu is developed earlier	Upgrade level crossing at Kainui Road, unless the Taupiri development takes place prior. Then upgrade along with Taupiri development.

Table 3: Proposed investments

Short-term (0 – 5 years)	Medium term (5 – 15 years)	Long-term (15+ years)
Closure of the Horotiu Road and level rail crossing following the completion of Kohia Drive, encouraging use of the grade separated crossing of the NIMT at Gateway Drive		Close the level crossing at Wallbank Road , once growth cell is developed, providing access to Old Taupiri Road
Closure of the Waingaro Road level rail crossing to formalise the required heavy vehicle movements from the Waingaro Road Quarry and encouraging use of Princess Street (requires Princess Street/GSR intersection upgrade)	Upgrade the Havelock Road level crossing	Monitoring and review safety at the Havelock Road level crossing
Upgrade the level crossing at Princess Street when the level crossing at Waingaro Road, is closed	Upgrade the level crossing at Saulbrey Road	Monitoring and review safety at the Saulbrey Road level crossing
NGAARUAWAAHIA TOWN CENTRE – OTHER IMPROVEMENTS		
Create a defined entryway/town centre gateway at the northern and southern extents with kerb buildouts, raised platforms and visual cues	Provide an improved walking and cycling connection across Great South Road and the NIMT to connect east and west Ngaaruawaahia	
Introduce a speed limit of 30 km/h for key town centre streets supported with engineering features	Provide an improved walking and cycling connection along Great South Road and across the Waikato River	
Provide a low-speed environment (30 km/h) within the town centre, including on sections of Great South Road, Market Street and Martin Street.	Traffic calming measures to be implemented on Herschel Street to discourage rat running via Herschel Street	
Reroute the over-dimension vehicle route along Great South Road		
Undertake safety improvements to existing pedestrian crossing points of Great South Road within the town centre, either signalised crossings or raised zebra crossings.		

Table 3: Proposed investments

Short-term (0 – 5 years)	Medium term (5 – 15 years)	Long-term (15+ years)
Interim traffic calming measures on sections of Great South Road through the town centre, using tactical urbanism to provide affordable yet effective traffic calming measures that support the low-speed limits, the low-speed environment	Provide more permanent traffic calming measures	
TAUPIRI TOWN CENTRE		
Introduce a lower speed limit along Te Putu Street and Greenlane Road		
Introduce some raised platforms to support lower speeds, especially at busier pedestrian crossing locations		
MICROMOBILITY, WALKING AND CYCLING ROUTES – Refer Part B Report		
Regional routes delivered in short to medium term		
Te Awa routes delivered in short to medium term		
Some Core routes		Remainder Core Routes to the full extent shown in the Micromobility Assessment
Some Trail Routes		Remainder Trail Routes to the full extent shown in the Micromobility Assessment
PUBLIC TRANSPORT		
Work with WRC on infrastructure improvements to support bus services along Great South Road.	Work with WRC to deliver Bus Rapid Transit (BRT) to support land use development	Reinstate the train station at Ngaaruawaahia to align with the Hamilton to Auckland (H2A) Corridor Plan.
		Upgrade the existing bus stops and enable the rapid transit route, aligning with the Hamilton Waikato Metropolitan Spatial Plan (HWMSP).

APPENDIX A **Safety assessment and existing network environment**

SAFETY REVIEW

We have undertaken a high-level crash assessment for the study area using Waka Kotahi's Crash Analysis System (CAS) for the period between 30 June 2018 and 1 July 2023. Figure A1 shows the CAS search extent and heat map of reported incidents.

Figure A1: CAS search extent

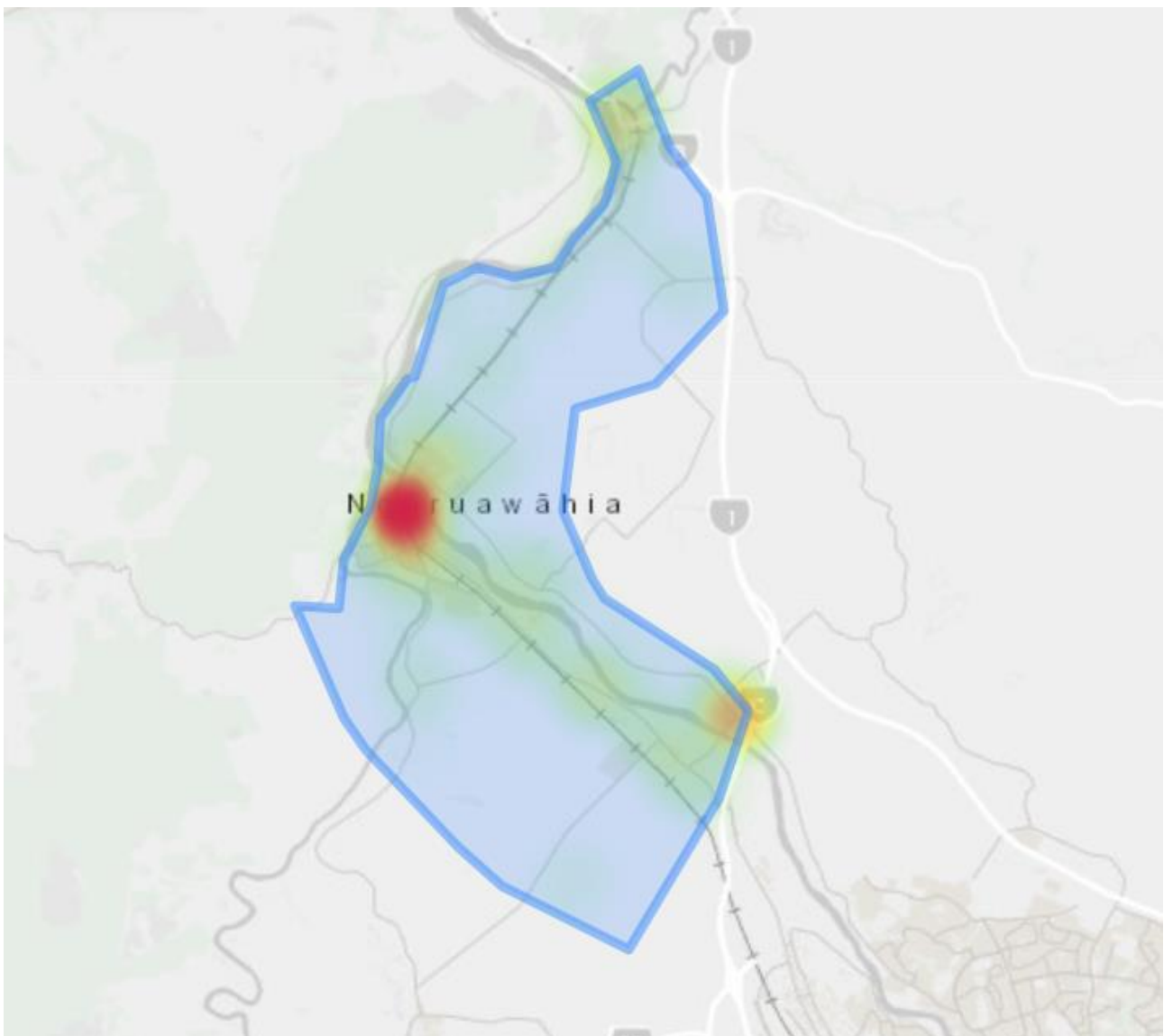


Figure A1 shows most incidents occur in Ngaaruawaahia while a notable amount occurred in Taupiri and north-east of Horotiu.

A total of 258 incidents were reported resulting in 488 injuries and included:

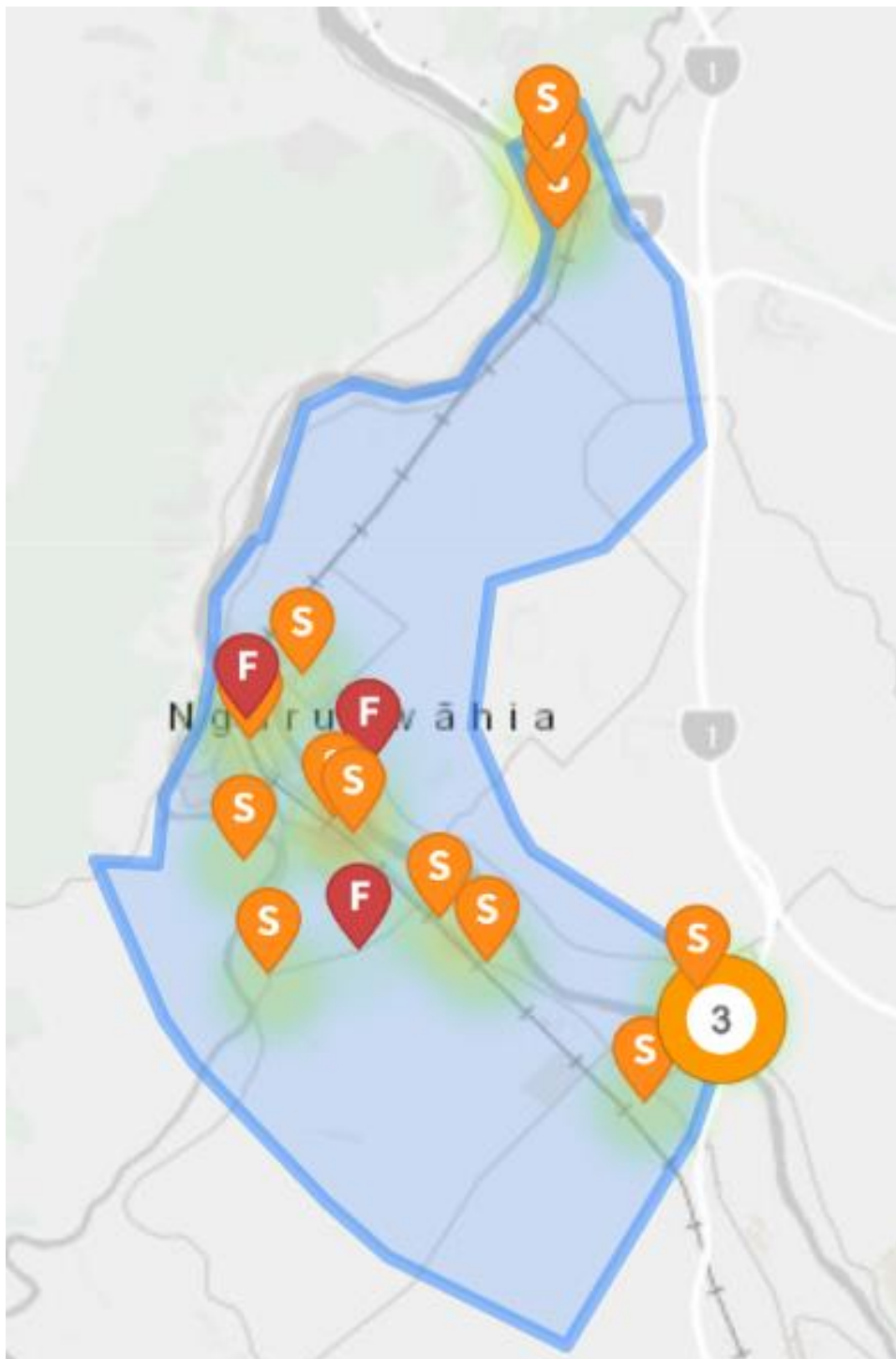
- ◆ 3 (1%) fatal crashes.
- ◆ 16 (6%) serious injury crashes.
- ◆ 84 (33%) minor injury crashes.
- ◆ 155 (60%) non-injury crashes.

Deaths and serious injuries

The safe system approach acknowledges that people make mistakes and are vulnerable in a crash. While mistakes are inevitable, deaths and serious injuries from road crashes are not. Notably, most of the crashes (93%) did not result in serious injuries or deaths.

Figure A2 shows where the 19 Death and Serious Injury (DSI) incidents occurred within the study area resulting in 20 deaths or serious injury.

Figure A2: DSI's within the study area

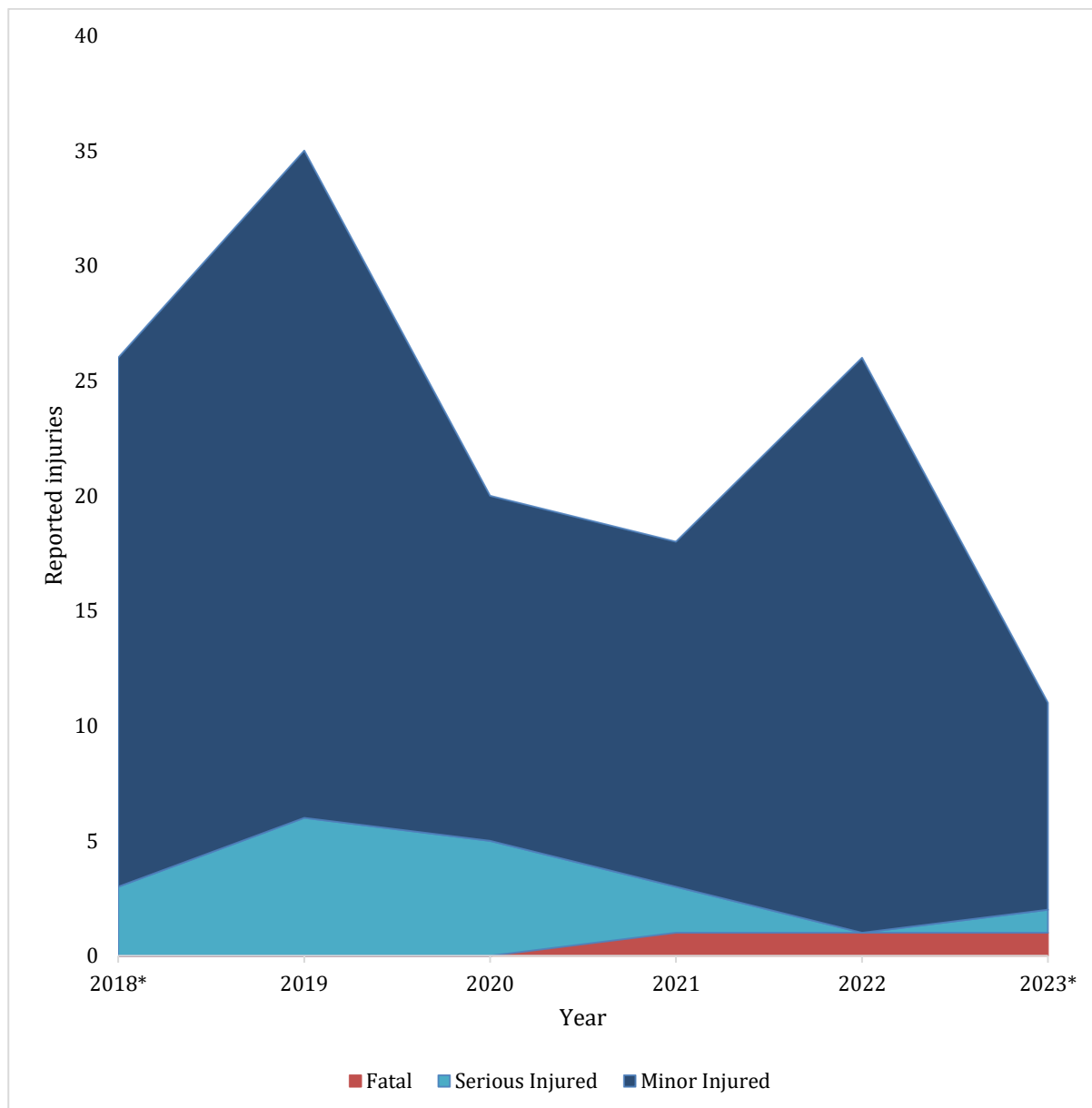


Most incidents are at intersections along Great South Road, particularly at intersections:

- ◆ Newcastle Street / Princess Street / Great South Road
- ◆ River Road / Horotiu Bridge Road (noting this was upgraded to a roundabout in 2021 and not had an incident since)
- ◆ River Road / Sullivan Road

Figure A3 shows the total number of injuries resulting from the crashes per year.

Figure A3: Reported injuries per year



The DSI crash numbers by crash type included:

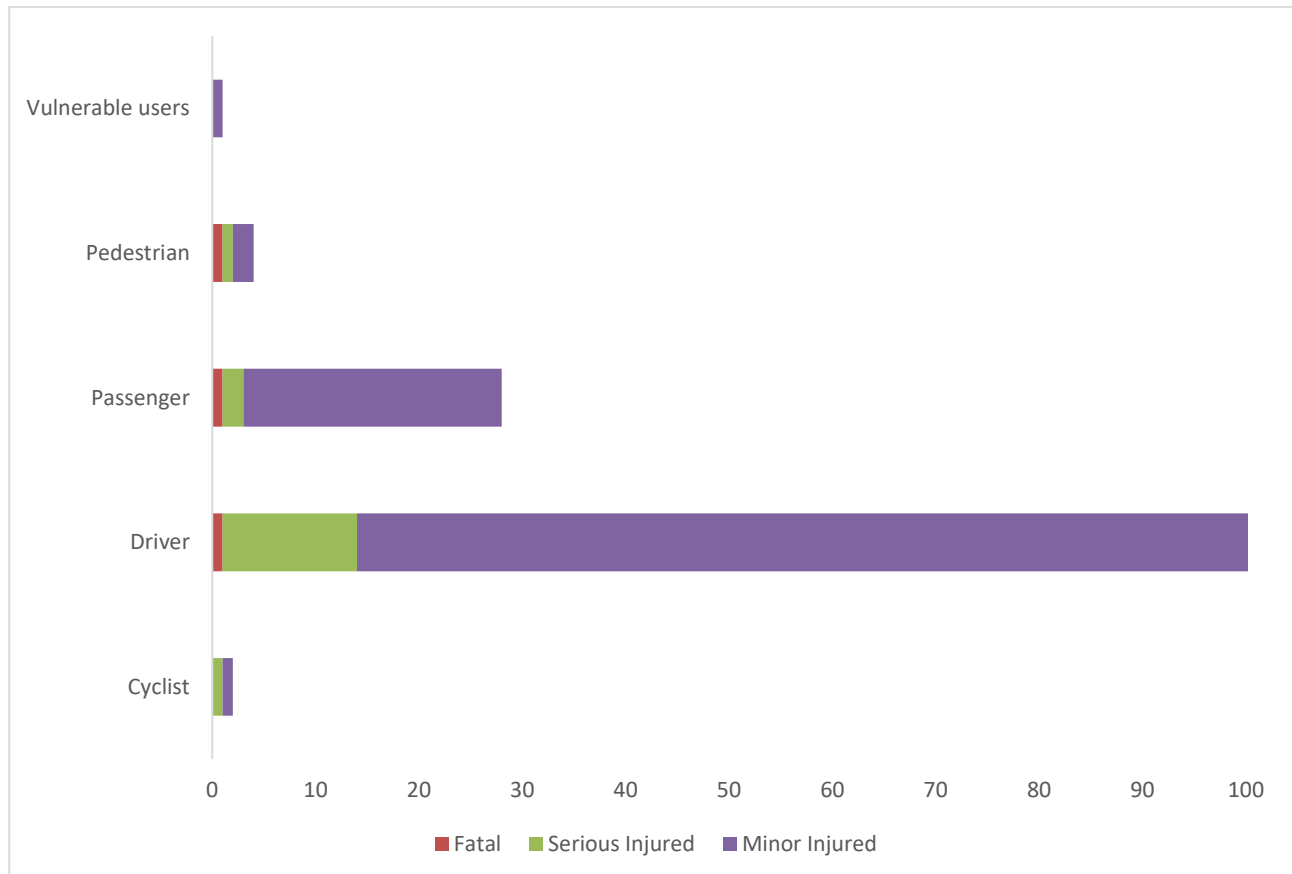
- ◆ 2 (11%) overtaking crashes.
- ◆ 3 (16%) straight road lost control / head on crashes.
- ◆ 4 (21%) bend – lost control / head on crashes.

- ◆ 2 (11%) rear end / obstruction crashes.
- ◆ 6 (32%) crossing / turning crashes.
- ◆ 2 (11%) pedestrian related crashes.

Injuries by mode

We have considered injuries by mode and shown these in Figure A4.

Figure A4: Injuries by mode



EXISTING ENVIRONMENT²¹

Travel patterns

We have considered Statistics New Zealand 2018 Census²² data to determine the existing travel patterns and mode share of the study area.

Figure A5: Departures from the study area

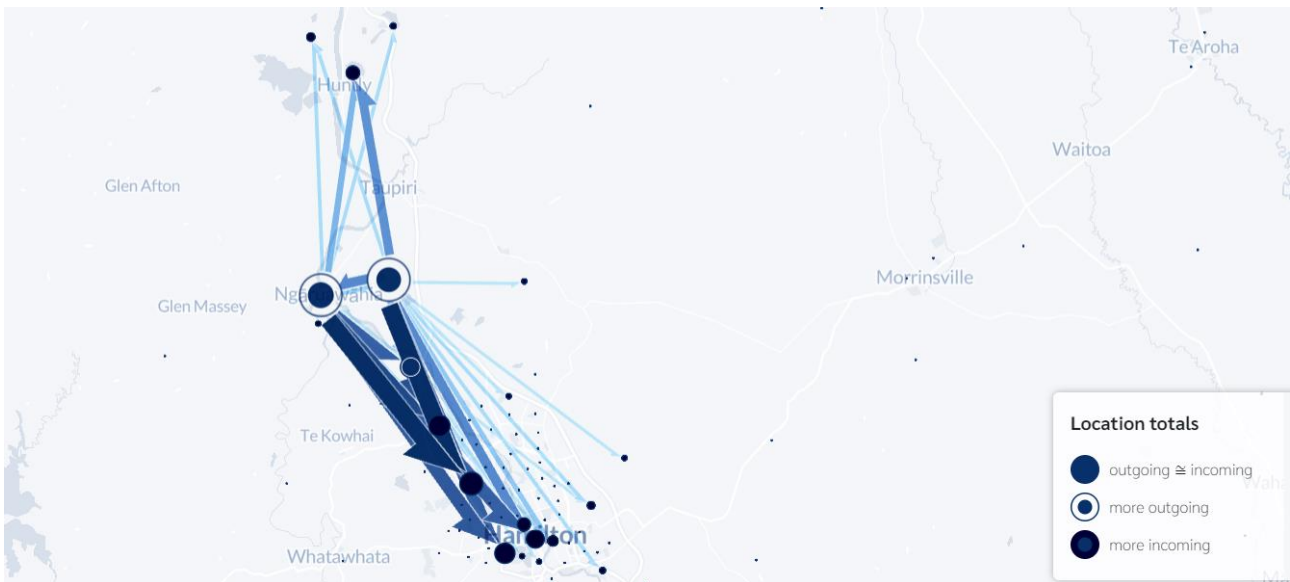
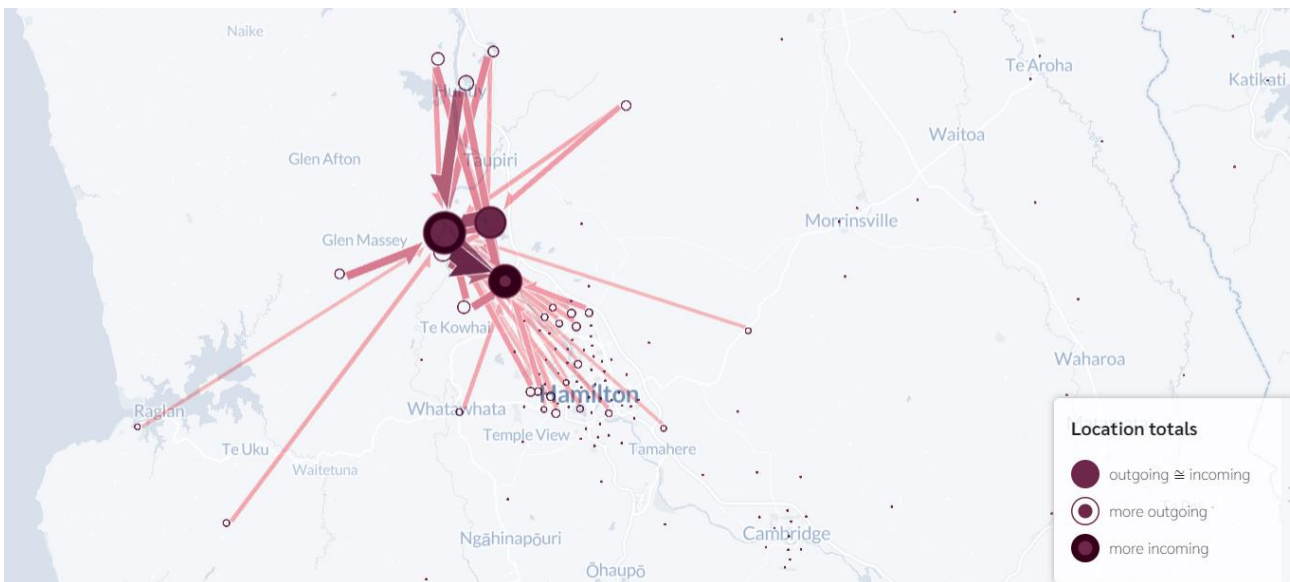


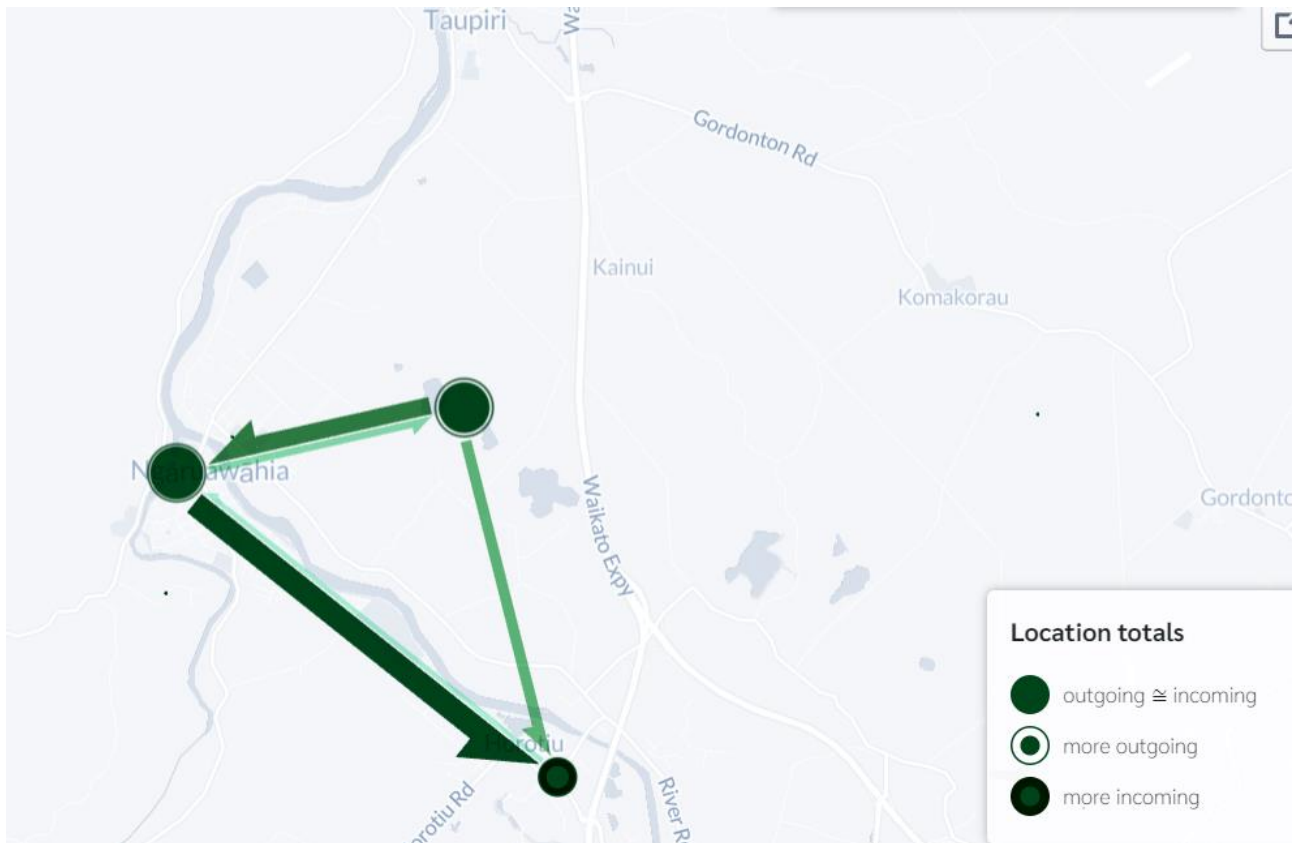
Figure A6: Arrivals to the study area



²¹ Figures for the existing environment have been retrieved from the Waikato RLTP 2021-2051

²² Ngāruawāhia Central, Taupiri-Lake Kainui, Horotiu SA2 via NZ Commuter Flows 2018

Figure A7: Internal trips within the study area



The Census data suggests that

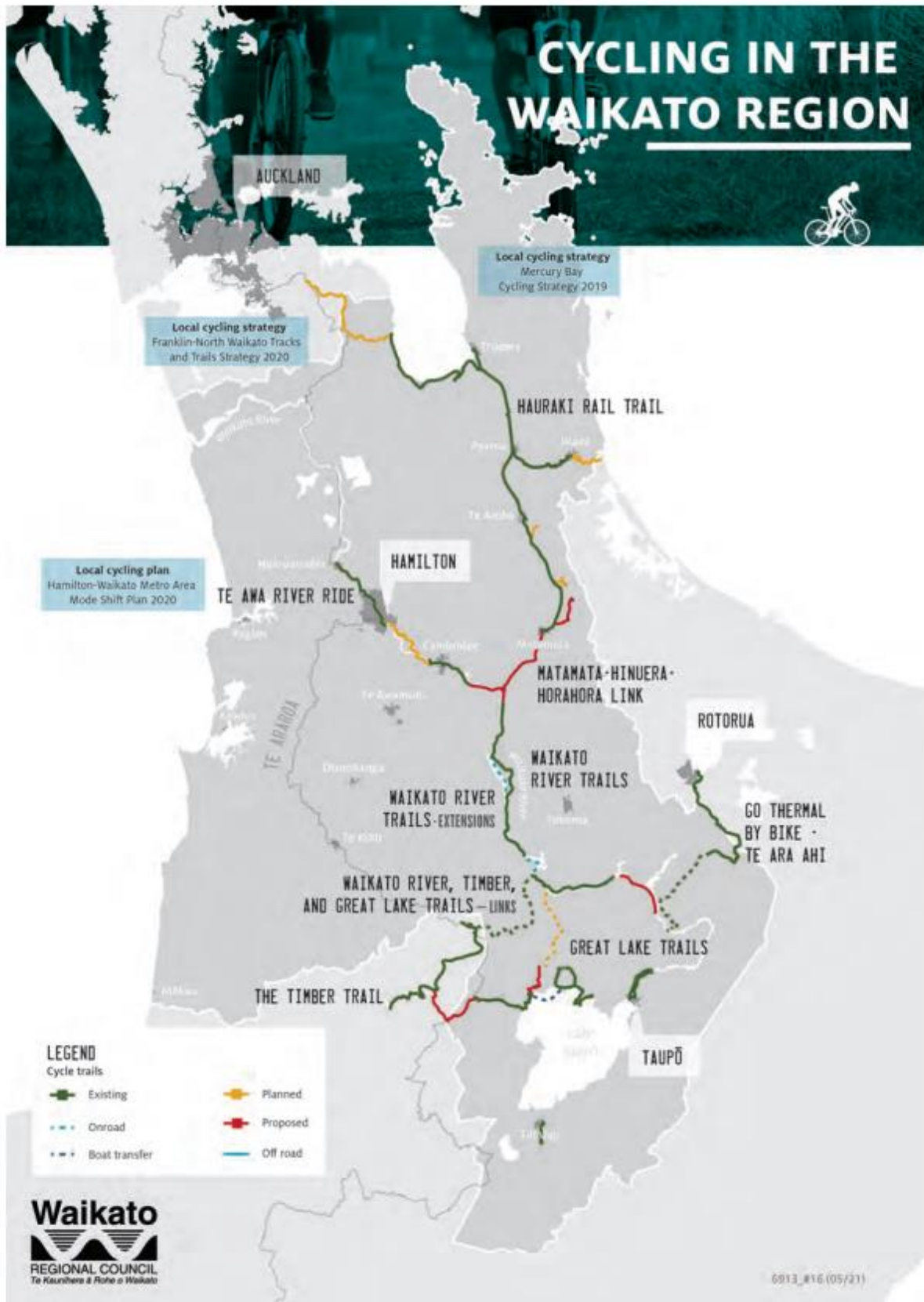
- ◆ a large proportion of trips are internal and likely to be walkable/cyclable.
- ◆ people leaving mostly travel towards Hamilton City.
- ◆ people mostly come to the study area from Huntly.

Walking and cycling

Most public realm infrastructure includes walking paths within urban areas. Connections between the townships are sparse and limited to vehicles while exiting connections are catered towards regional connections.

Figure A8 shows the regional cycling network.

Figure A8: Waikato regional cycling network



Identified in the regional cycling network is the Te Awa River Ride. While its purpose is predominantly for recreation, it provides a high level of service separated cycling route from Ngaaruawaahia to Hamilton. The route is shown in Figure A9.

Figure A9: Te Awa River ride



Public transport

Figure A8 shows the regional public transport network. The network relies on a bus network shown in Figure A11. The Te Huia passenger rail service travels through the study area.

Figure A10: Regional Public Transport network

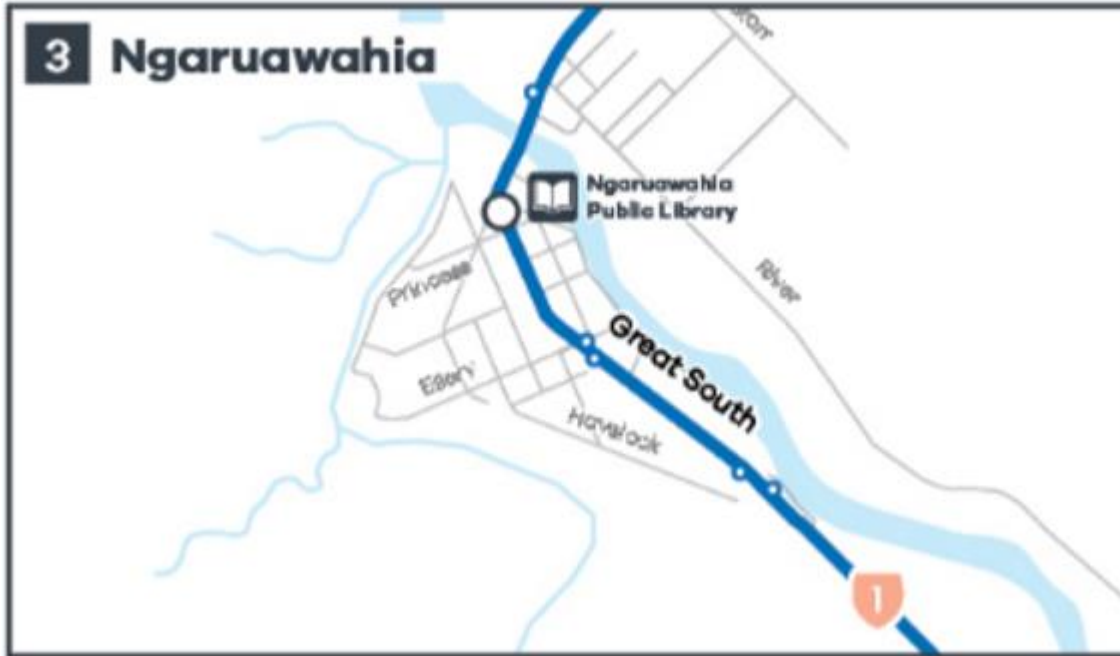


Figure A11: Hamilton City bus network²³



Figure A12 shows the Ngaaruawaahia bus network node.

Figure A12: Hamilton City bus network - Ngaaruawaahia



Vehicles and freight

The study areas roading network is extensive, linking the communities internally but also regionally with excellent access to the State Highway network via interchanges at Taupiri and Horotiu. Figure A13 shows the regional roading network while Figure A14 shows the freight network including annual average daily heavy vehicle counts.

Figure A13: Regional roading network

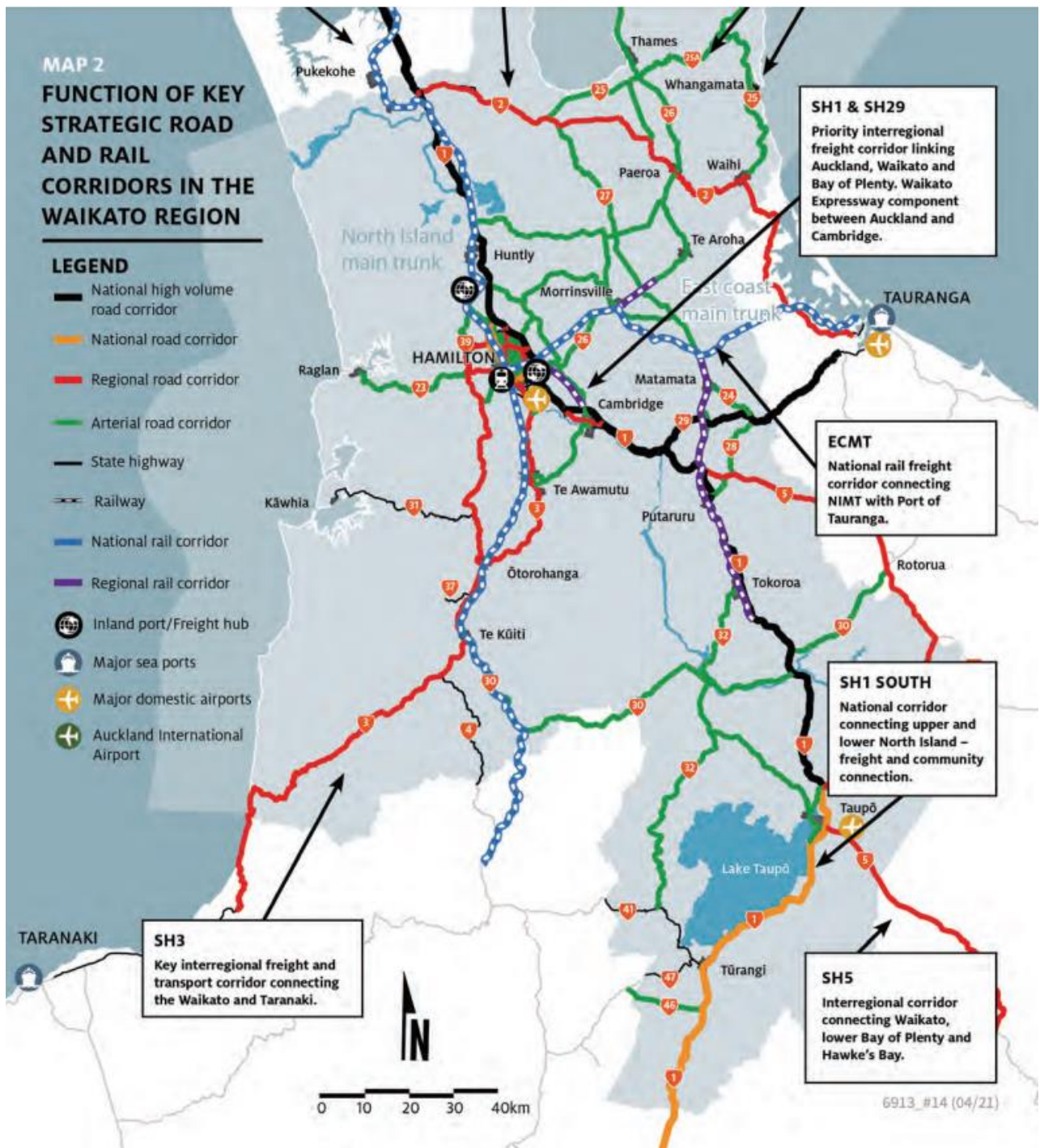


Figure A14: Regional freight network



Road classification

The network within the study area has two classification systems for roading. Waikato District Plan road hierarchy and Waka Kotahi's One Network Framework Classification (ONFC).

6.5.1 Waikato District Plan Classification

The Waikato District Plan roading classification is summarized in Table A1.

Table A1: Waikato District Plan roading classification

Category	Function
National routes	Motorways, Expressways and Principal state highways that: form a strategic network of national importance provide for the collection and distribution of goods significant to the national economy rural roads that typically provide for more than 2,500 vehicle movements per day (vmpd) the through traffic function predominates.
Regional arterial roads: state highways not included in National Routes category roads giving access to important tourist areas or centres of large populations roads linking different transport modes roads providing significant intraurban links.	State Highways and Roads that: form a strategic network of regional importance provide for the collection and distribution of goods significant to the regional economy rural roads that typically provide for more than 2,500 vehicle movements per day (vmpd) include rest areas the through traffic function predominates
Arterial roads: links between residential, commercial, industrial or recreational land use activities provide alternative links between centres of population or are significant for the movement of goods or produce within the district.	Roads that: form a strategic network of district importance provide for the collection and distribution of goods significant to the district's economy. rural roads that typically provide for less than 2,500 vehicle movements per day (vmpd) the through traffic function needs to be balanced against the property access function
Collector roads: provide links between local roads and arterials.	Roads that: provide locally preferred routes between or within areas of population or activities provide alternative routes to arterials are sealed and are of road geometry aligned with operational safety standards required for the traffic volumes on each section the through traffic function needs to be balanced against the property access function.
Local Roads	Roads whose primary function is property access.
Scenic and tourism routes	Roads that are scenic and/or provide preferred connections between tourist locations and: sealed increased traffic services (signage) rest areas.
Culdesac and noexit roads	Roads that do not provide a vehicular thoroughfare between roads, and whose primary function is property access.

6.5.2 ONRC

Waka Kotahi's ONFC is shown in Figure A15.

Figure A15: ONFC



Existing network operation

We have considered the base 2018 WRTM outputs to inform the existing network operation. Figure A16 shows the morning peak period LOS while Figure A17 shows the evening peak period LOS.

Figure A16: WRTM base 2018 morning peak LOS

Figure A17: WRTM base 2018 evening peak LOS

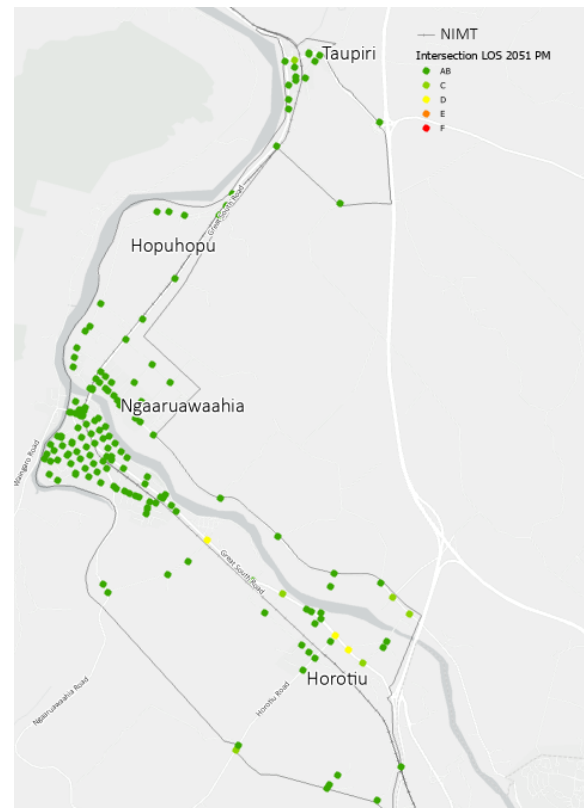
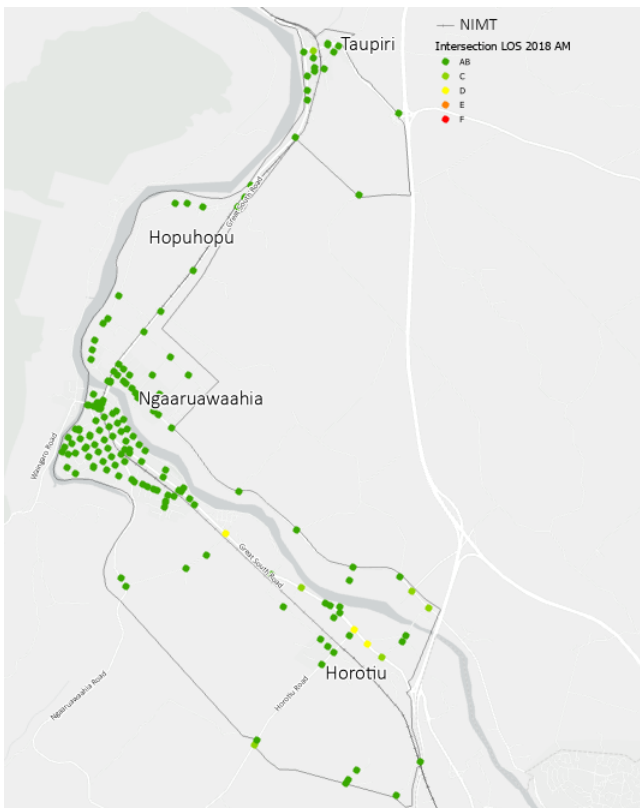
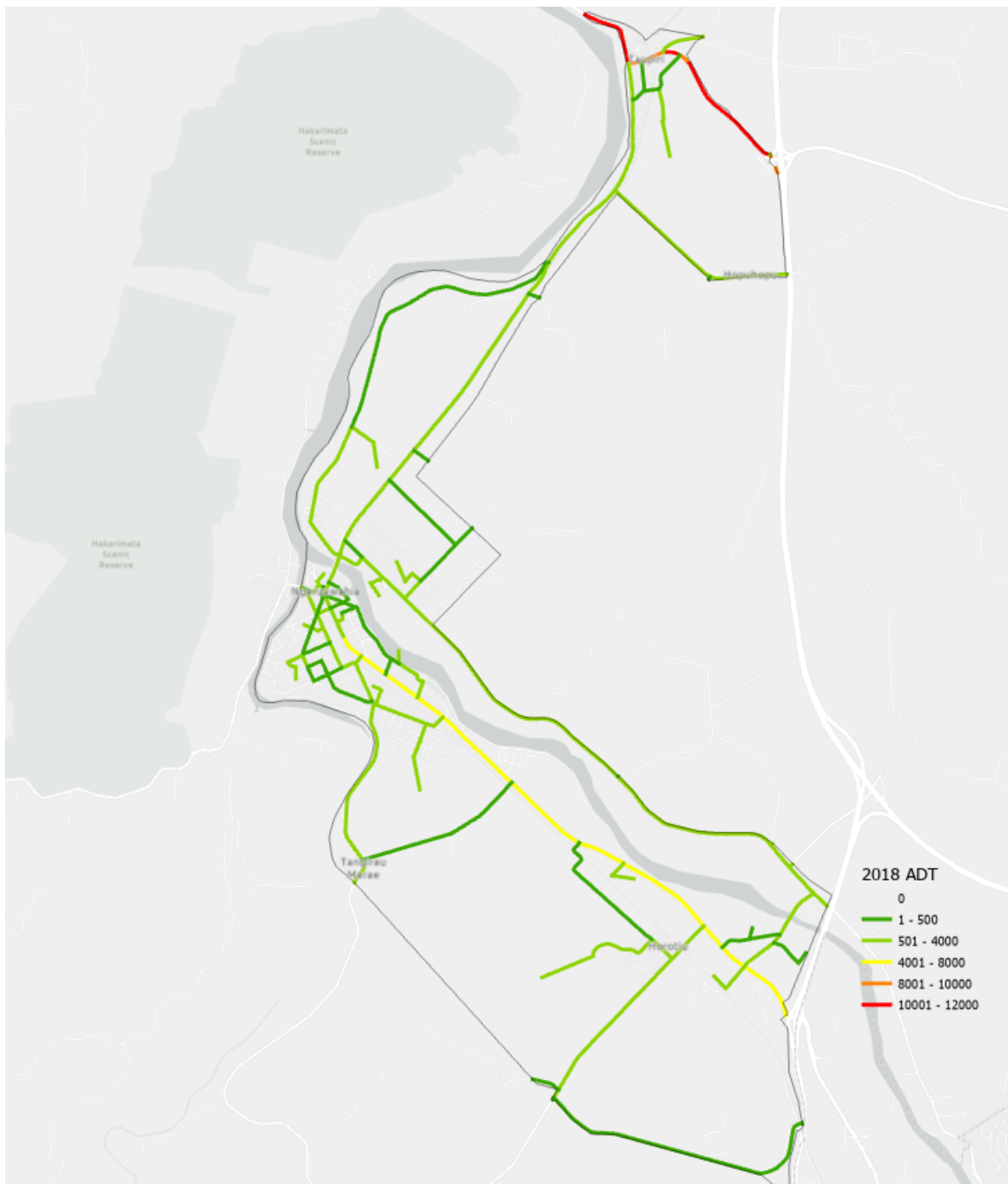


Figure A18 shows the annual daily traffic in 2018 from the WRTM outputs. Future years' modelling outputs are subsequently presented in Appendix B.

Figure A18: WRTM base 2018 daily vehicle volumes



The operation of the existing road network

- ◆ has changed with progressive opening of the Waikato Expressway (Te Rapa 2012, Ngaaruawaahia 2013, Hamilton 2022) and
- ◆ has relatively low volumes since the opening of the Ngaaruawaahia Section providing an opportunity to reutilize the network

-
- ◆ operates at LOS C and above with some exceptions during peak periods.

APPENDIX B

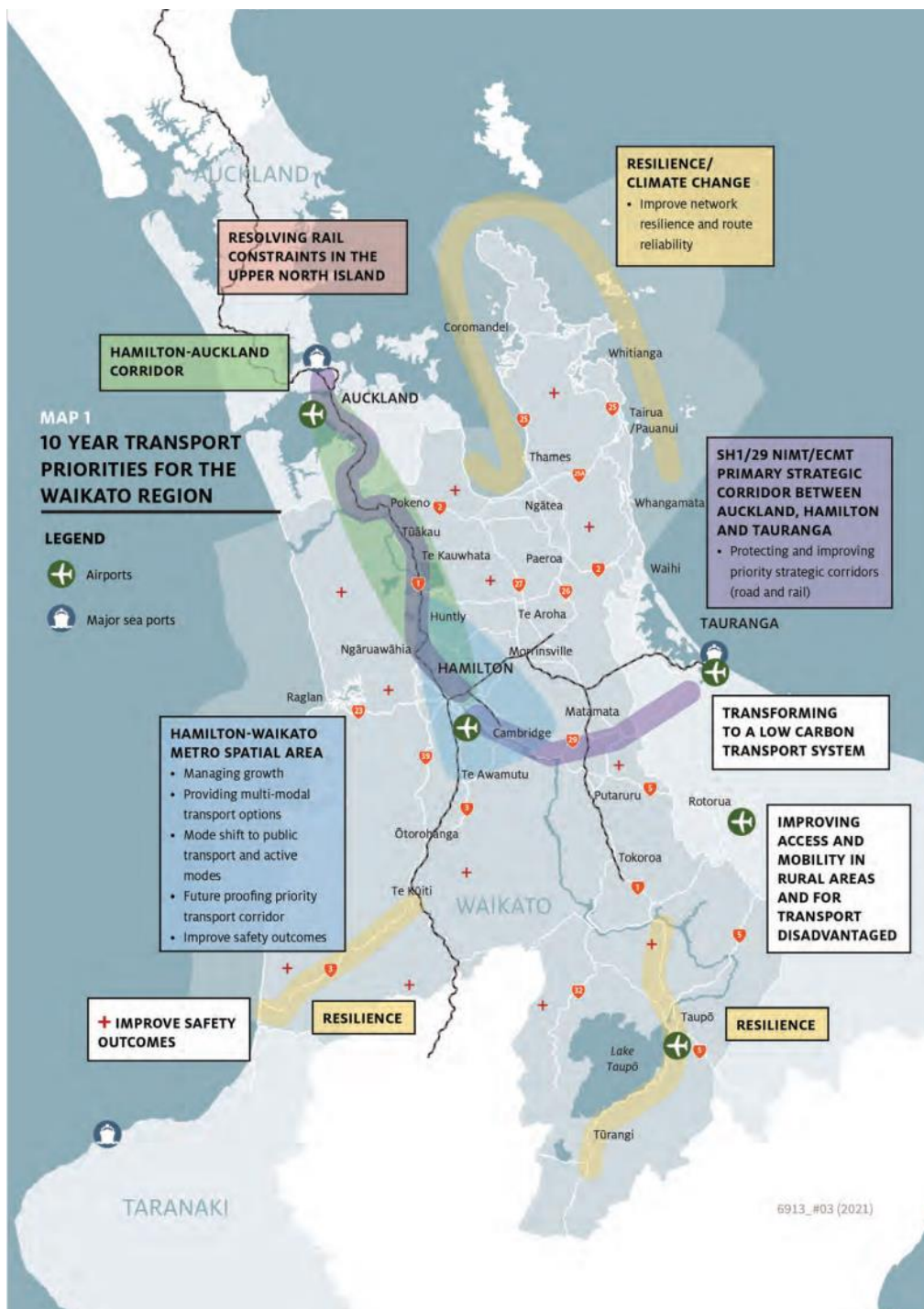
Future network environment

THE CHANGING TRANSPORT NETWORK FOCUS

To inform the transport assessment of the study area, we have considered a range of National, Regional and Local strategies. A summary of these is provided in the main report with figures for each strategy provided in this Appendix.

Waikato Regional Land Transport Plan (RLTP) 2021-2051

Figure B1: Waikato RLTP at a glance



Future Proof – Hamilton Waikato Metro Spatial Plan Transport Programme Business Case 2022

Figure B2: Hamilton Waikato Metro Spatial Plan Transport Programme Business Case at a glance

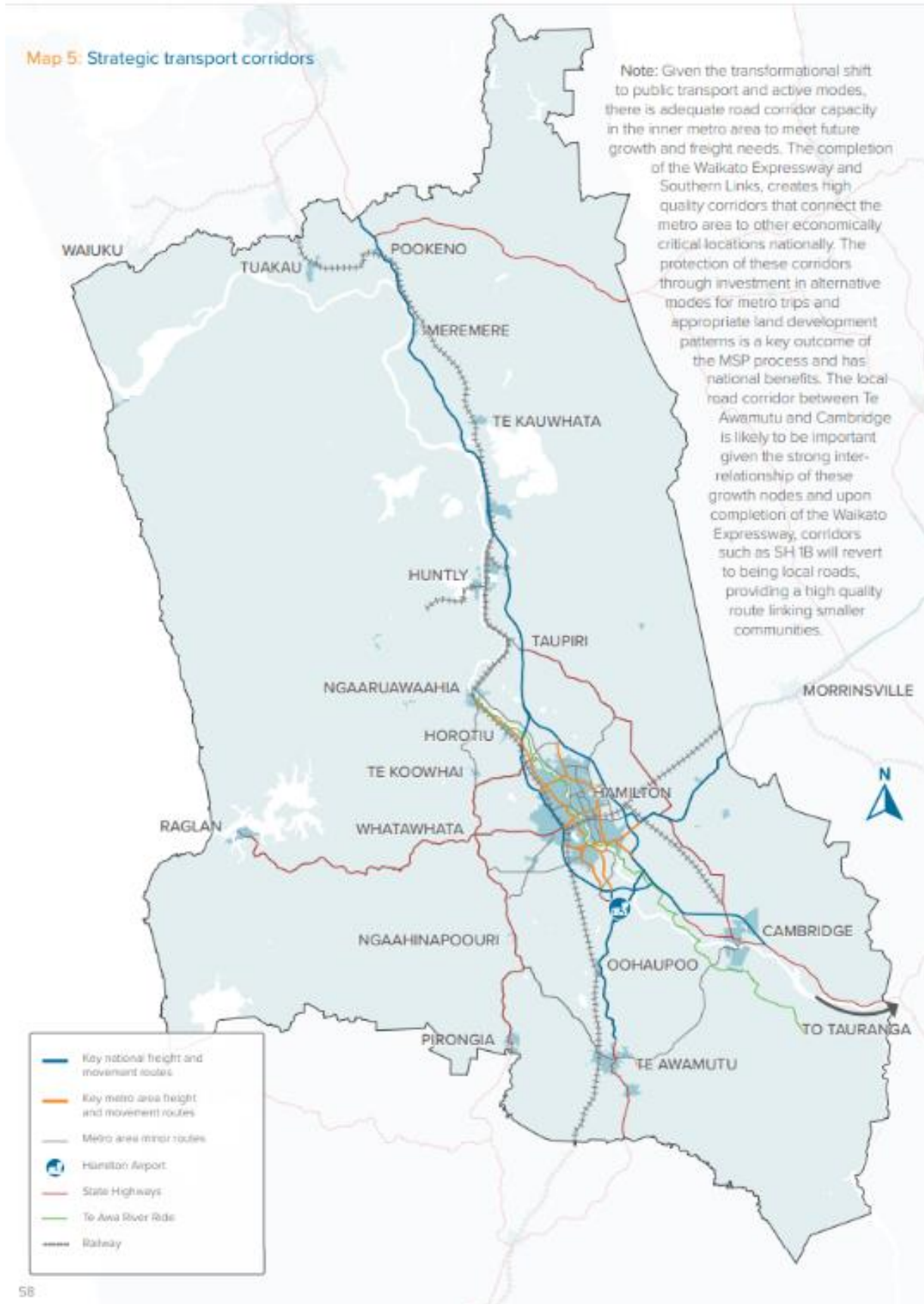


Figure B3: Hamilton Waikato Metro Spatial Plan Transport Programme Business Case public transport network

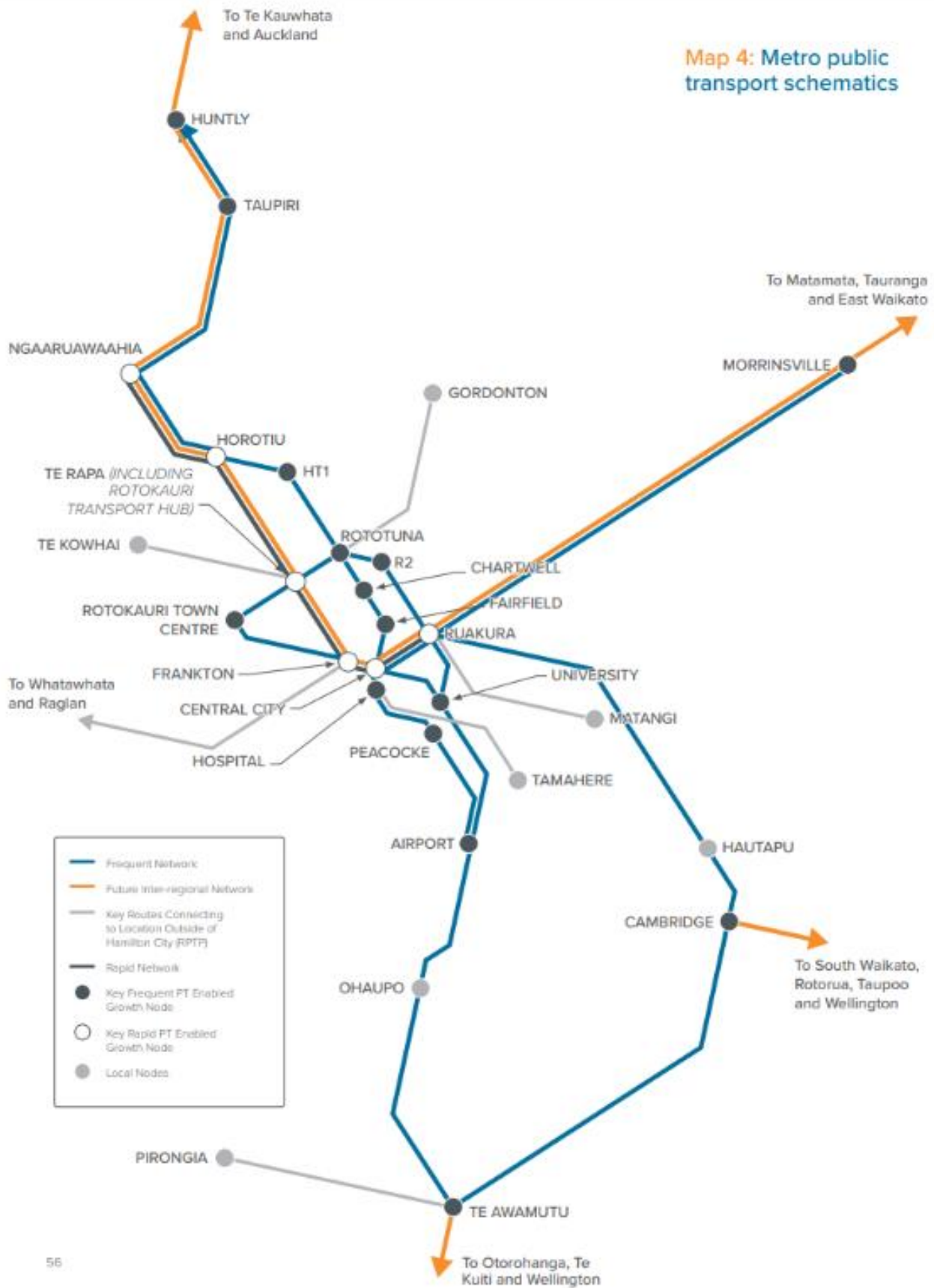
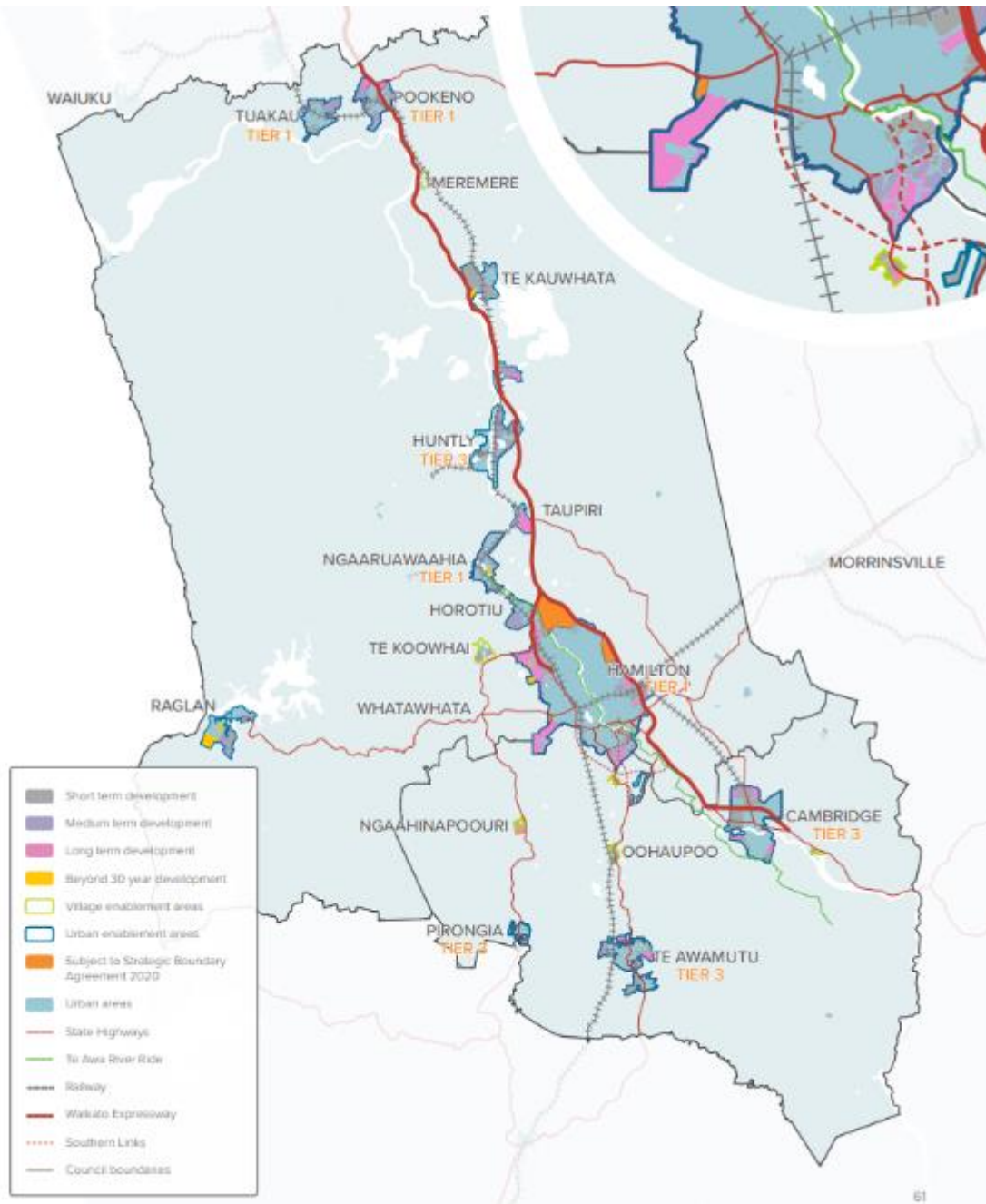
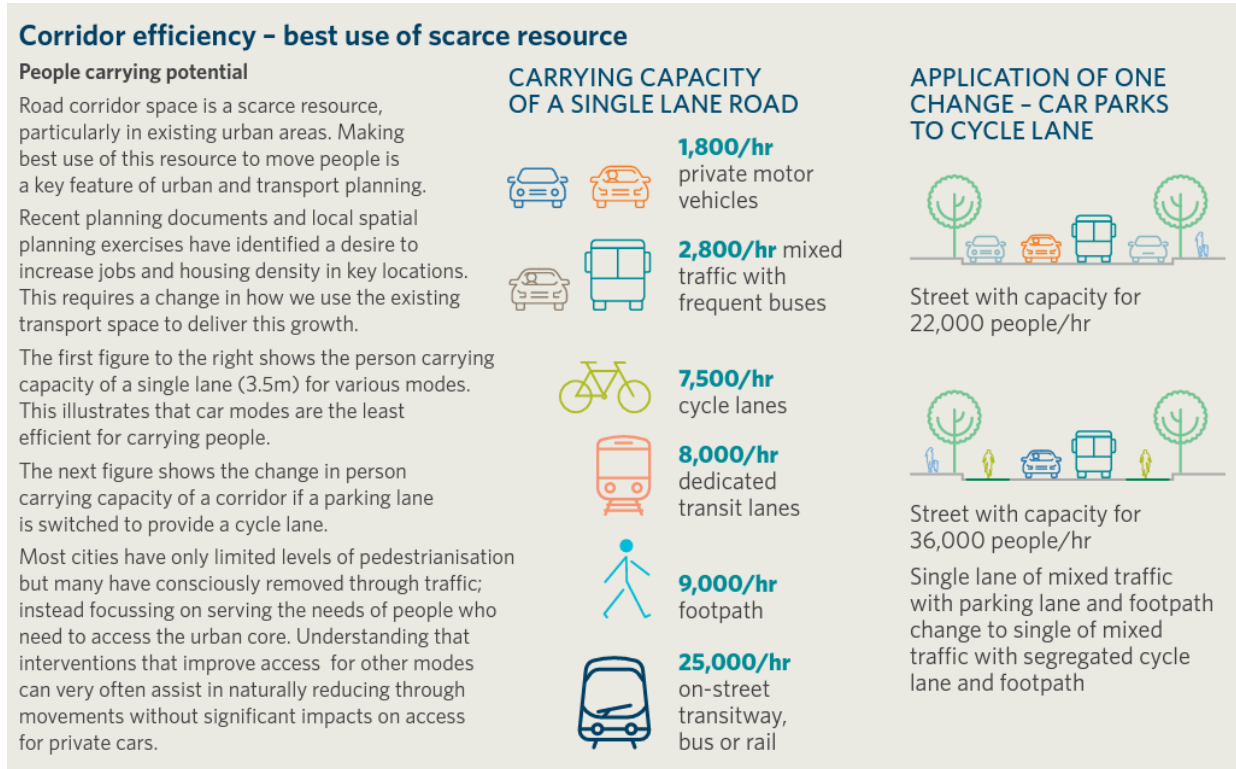


Figure B4: Hamilton Waikato Metro Spatial Plan Transport Programme Business Case future urban zones



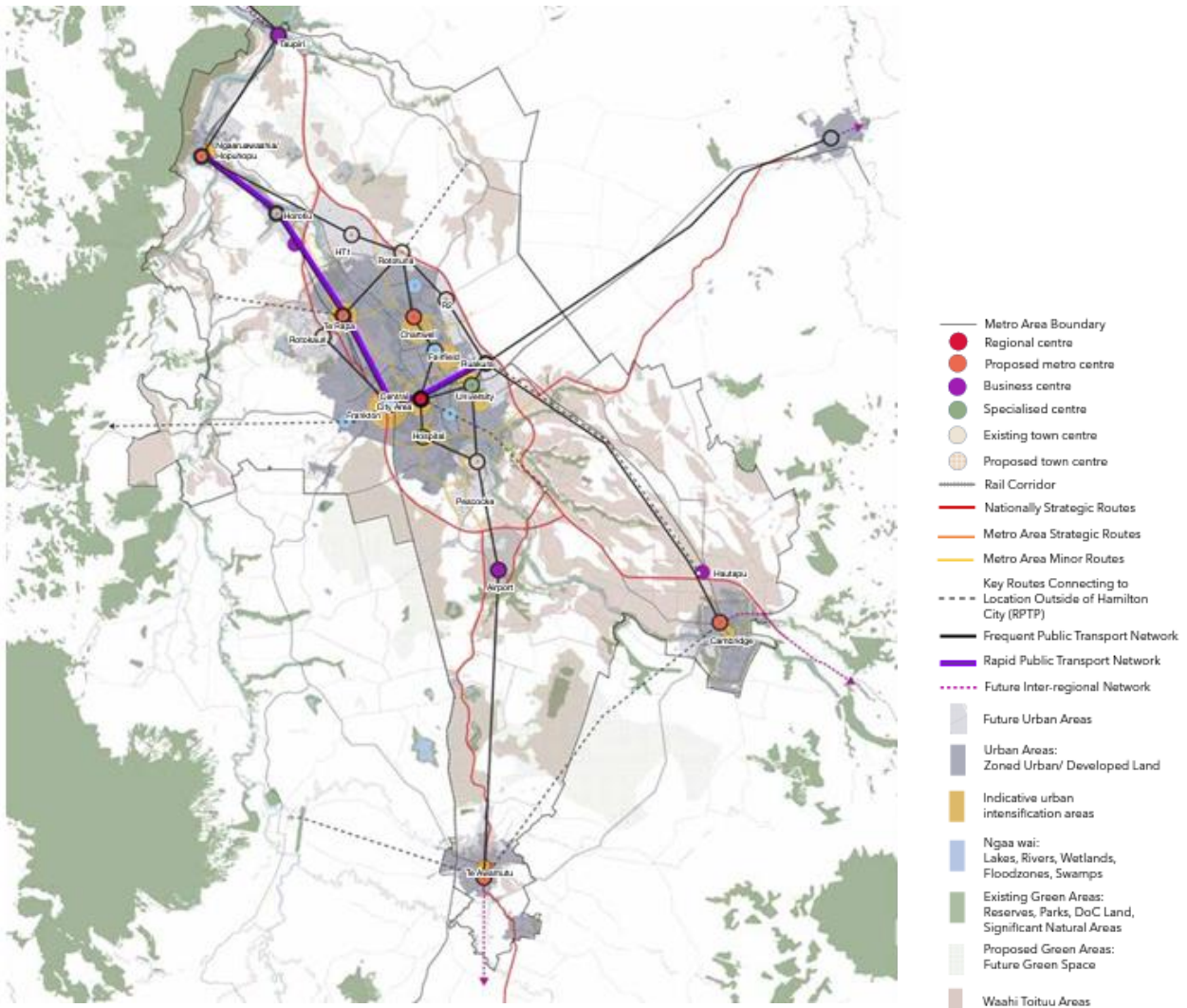
Hamilton-Waikato Metro Area Mode Shift Plan

Figure B5: Hamilton Waikato Metro Spatial Plan Transport Programme Business Case space considerations



Hamilton Waikato Metro Spatial Plan (MSP)

Figure B6: Hamilton Waikato MSP



Waikato Regional Public Transport Plan 2022-2032

Figure B7: Waikato RTPP



Hamilton-Auckland Corridor Plan & Implementation Programme

Figure B8: H2A Corridor Plan



Waikato 2070 Growth & Economic Development Strategy

Figure B9: Waikato 2070 growth and economic development strategy for Ngaaruawaahia, Taupiri and Horotiu



ANTICIPATED POPULATION GROWTH

Figure B10: 2030 population development capacity

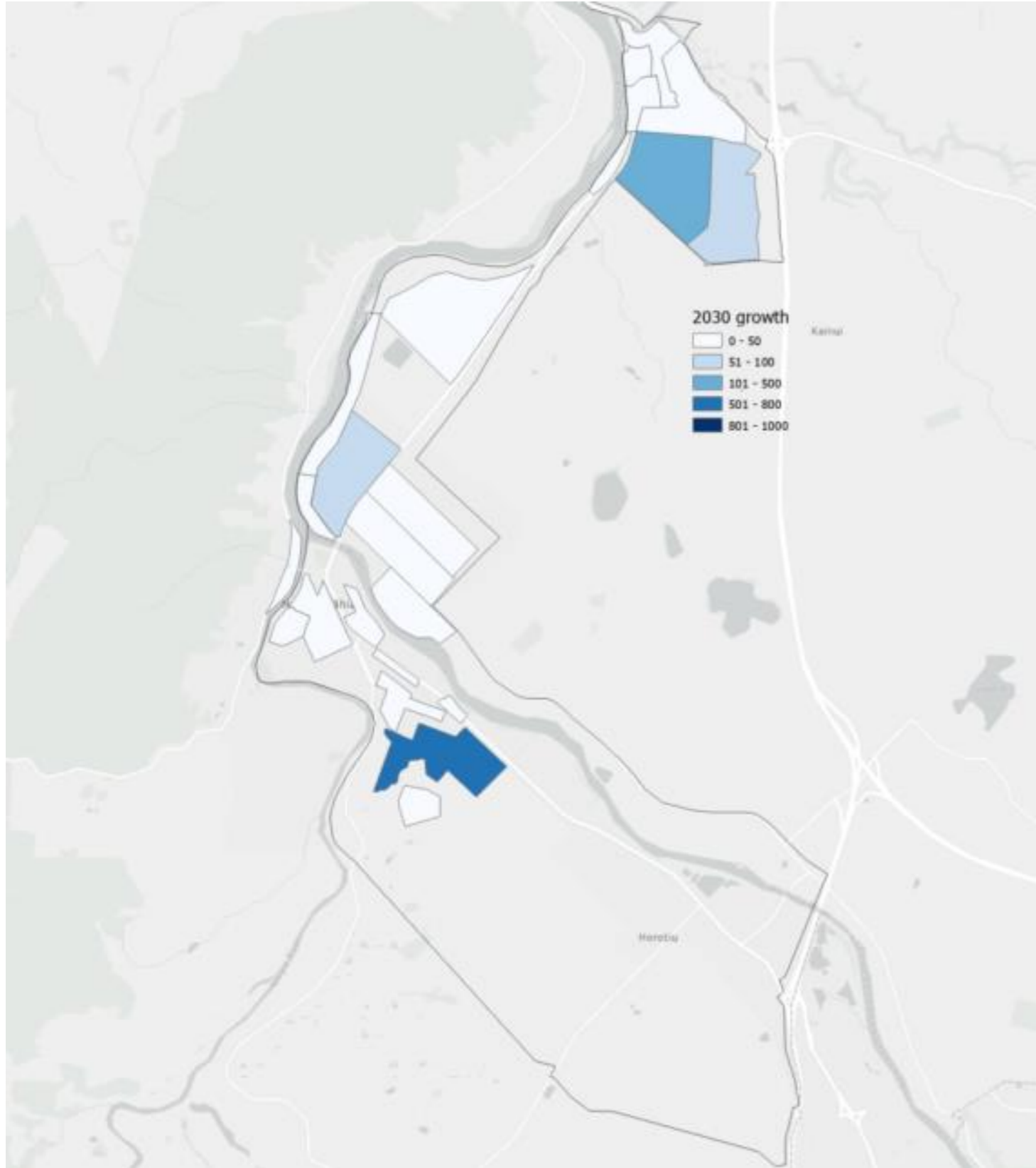
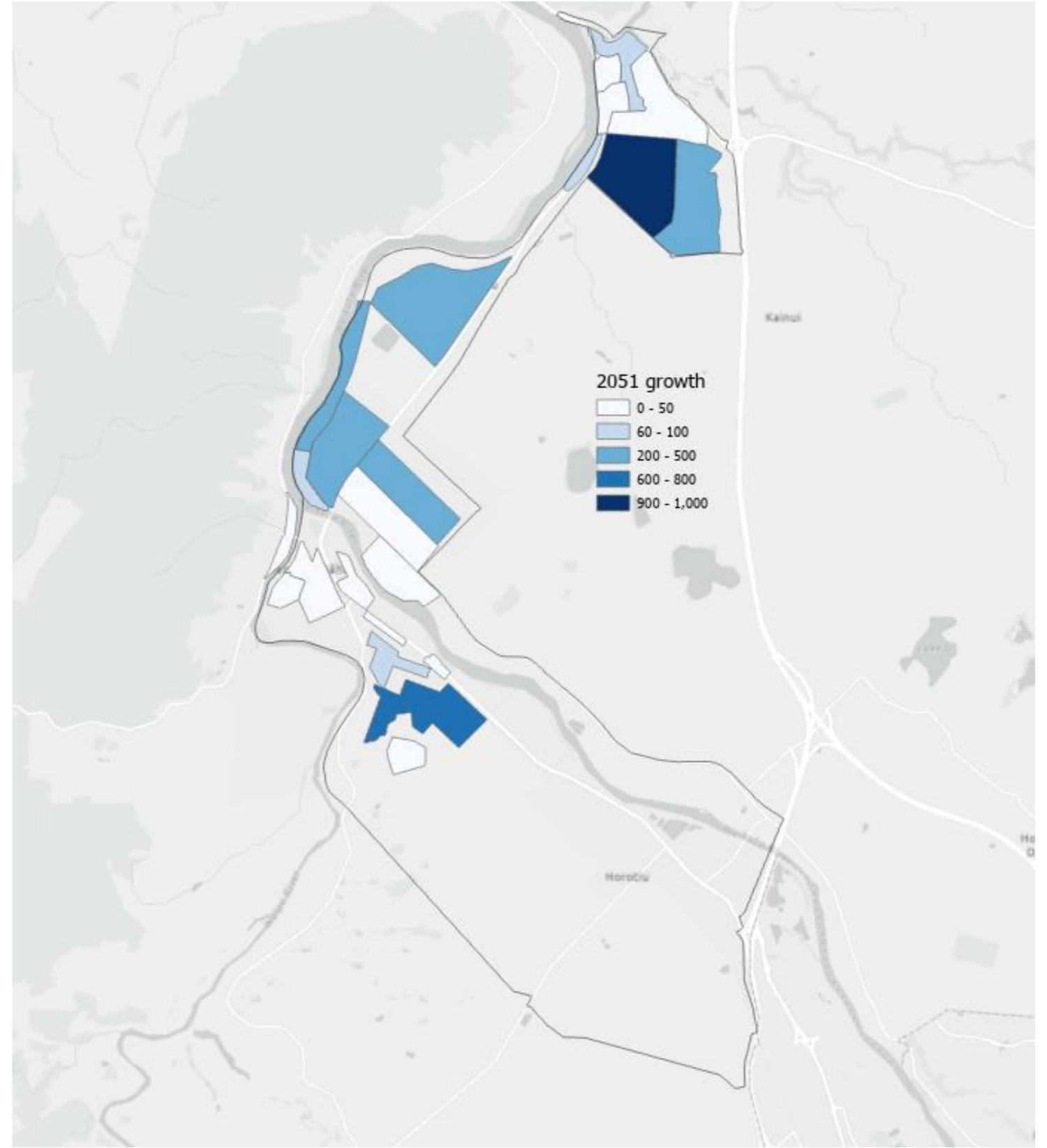


Figure B11: 2050 population development capacity



WRTM FORECAST MODEL OUTPUTS

Daily flows

Figure B12: 2031 daily forecast flows

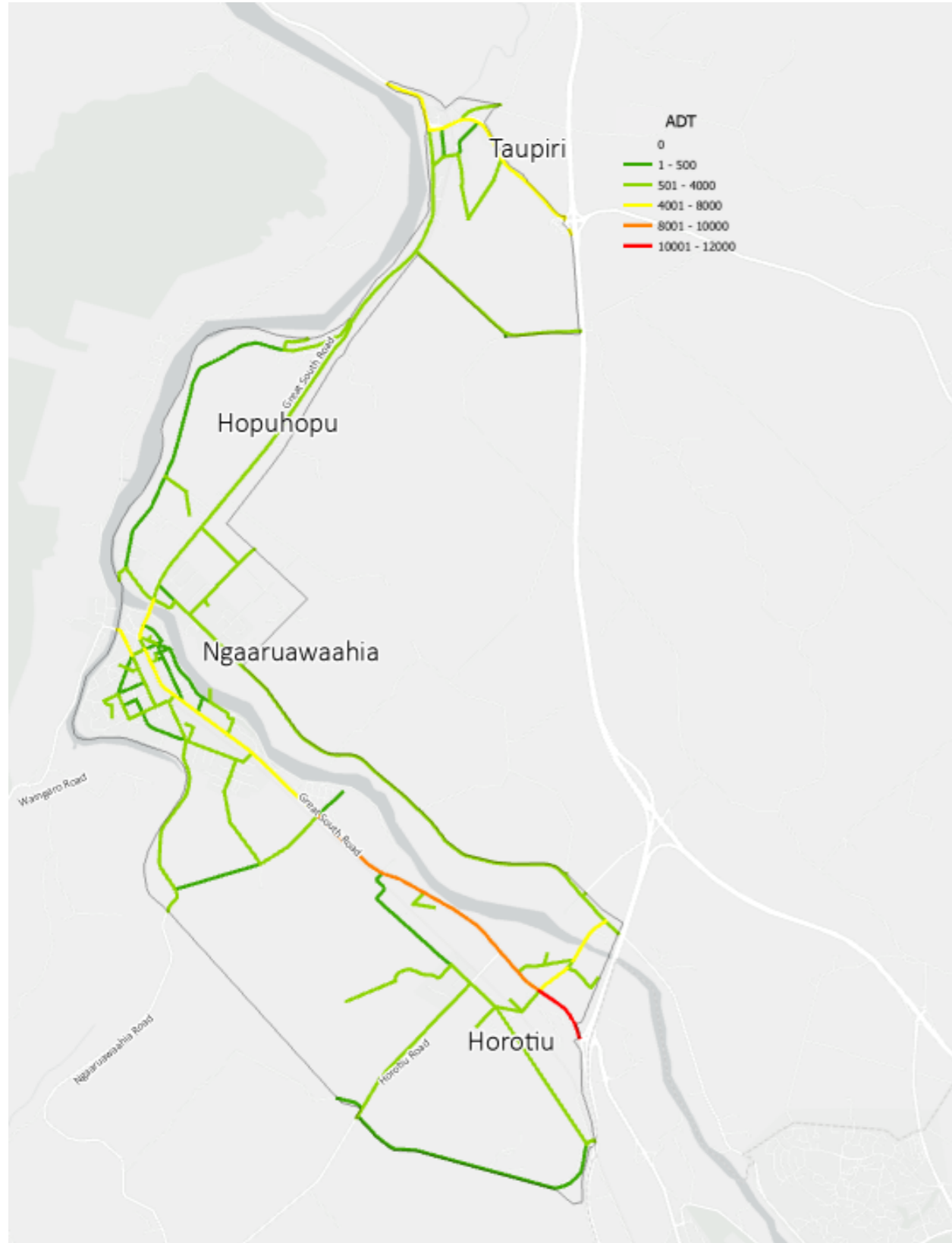
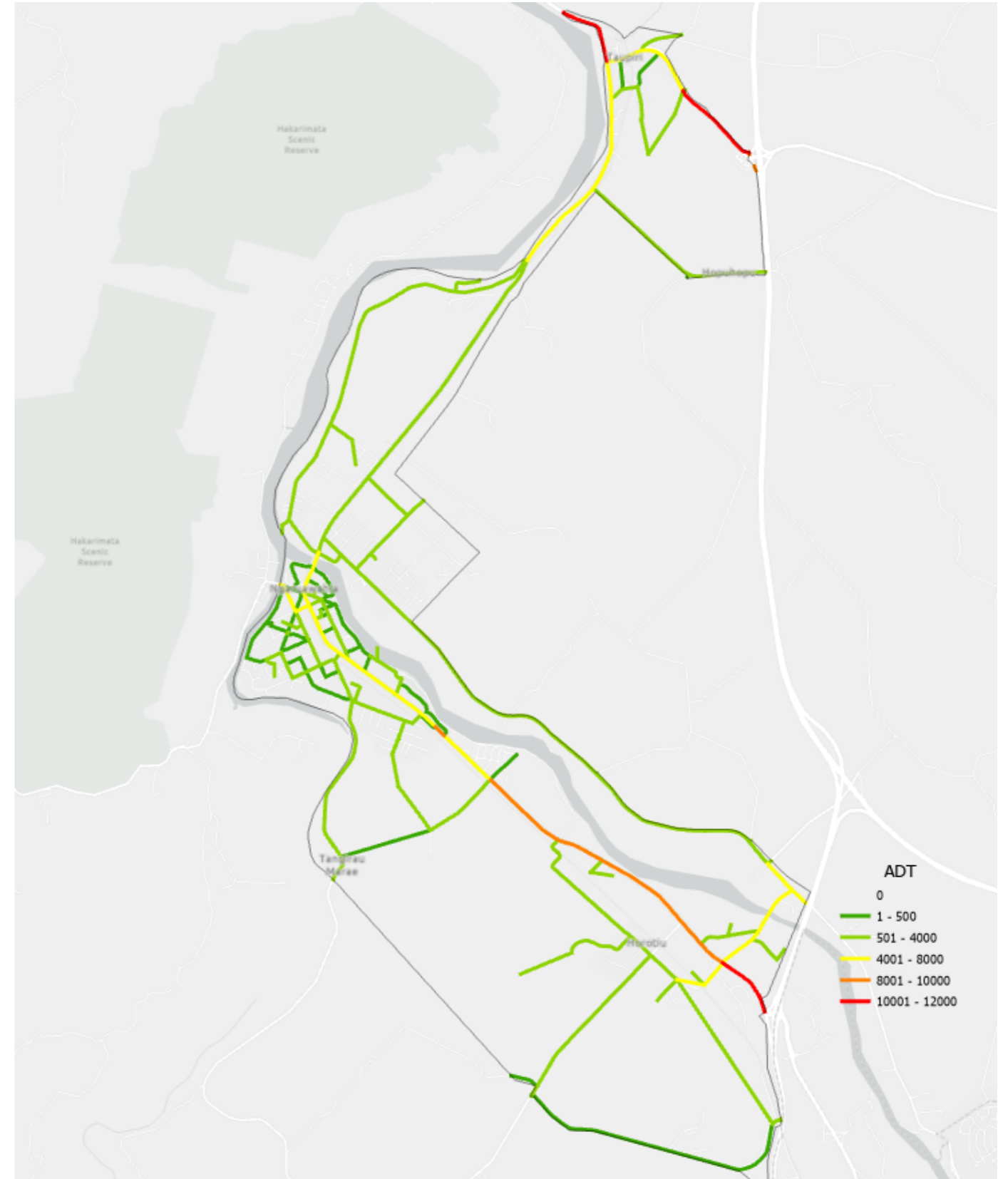


Figure B13: 2051 daily forecast flows



Compared to 2018 we note

- ◆ Increases in volume on most roads due to land use changes, including:
- ◆ Increase on Great South Road south of River Rd
- ◆ Increase on Herschel St/Princess St due to Waingaro Rd closure
- ◆ Large increase on Great South Road south of Saalbrey Rd
- ◆ Large increase south of Gateway Drive
- ◆ Demand reduction north of Taupiri due to Waikato Expressway opening.
- ◆ Demand reduction on Havelock Rd due to new connection to Saalbrey Rd.

Intersection Level of Service

Figure B14: 2031 morning peak period LOS

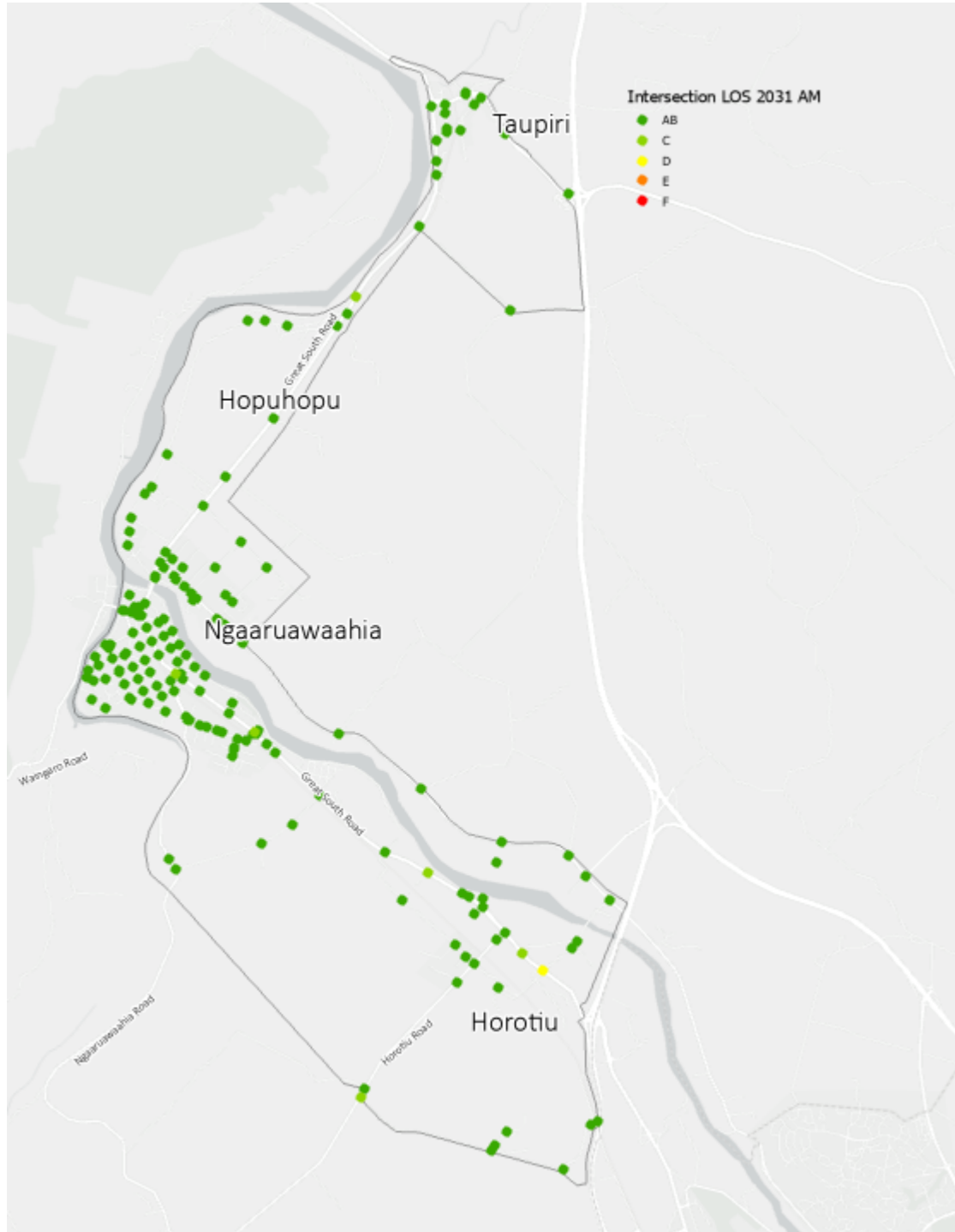


Figure B15: 2051 morning peak period LOS

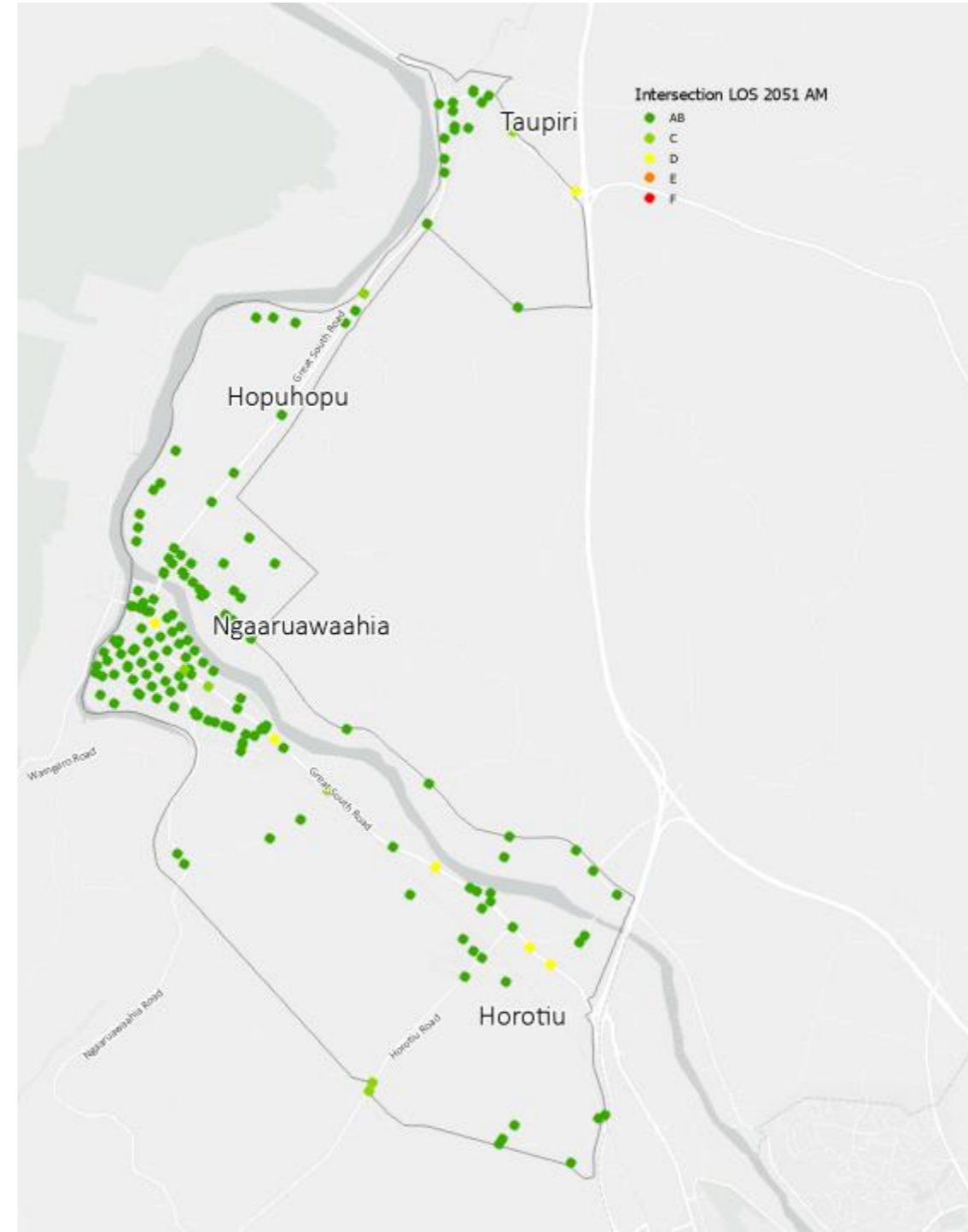


Figure B16: 2031 evening peak period LOS

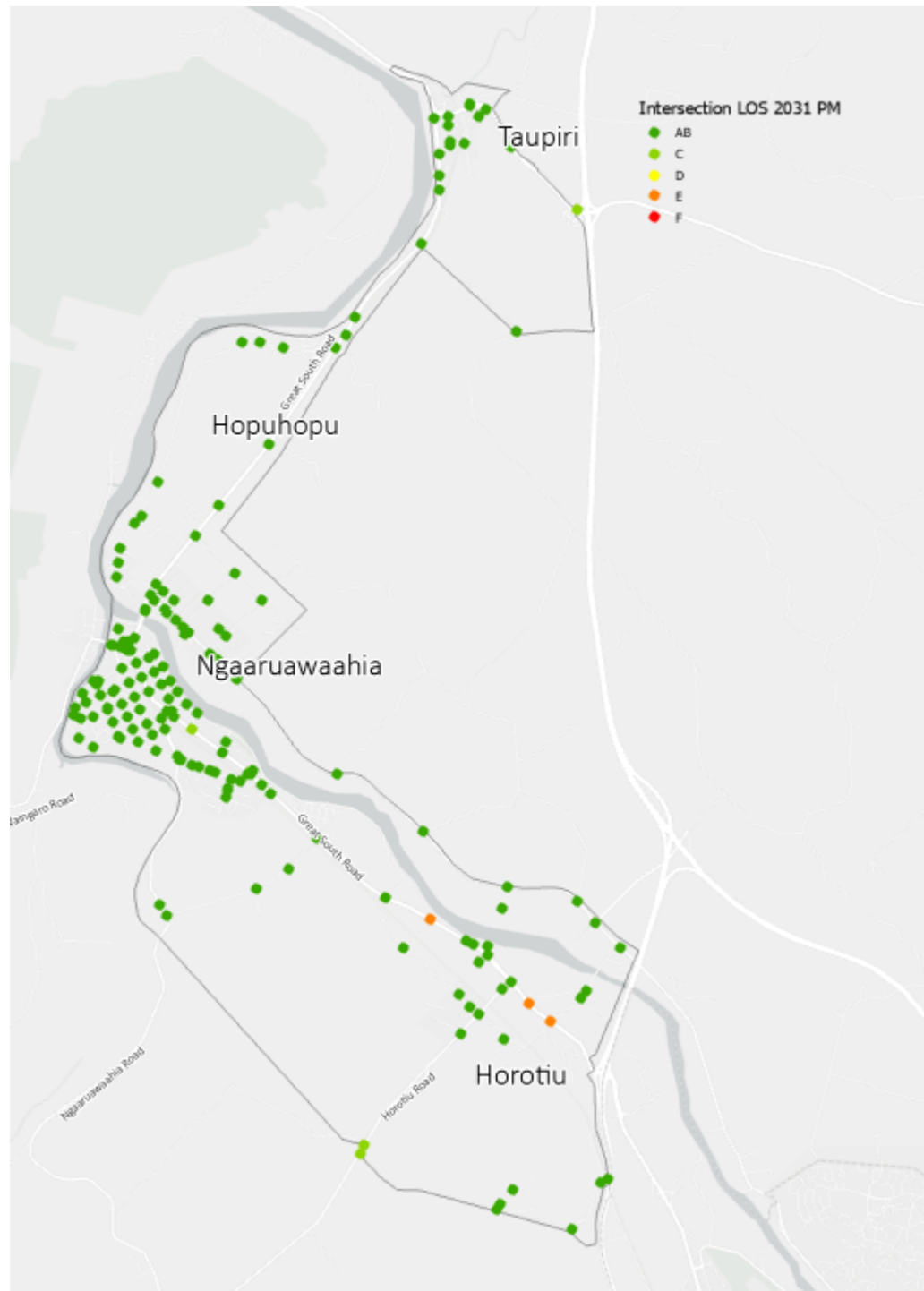
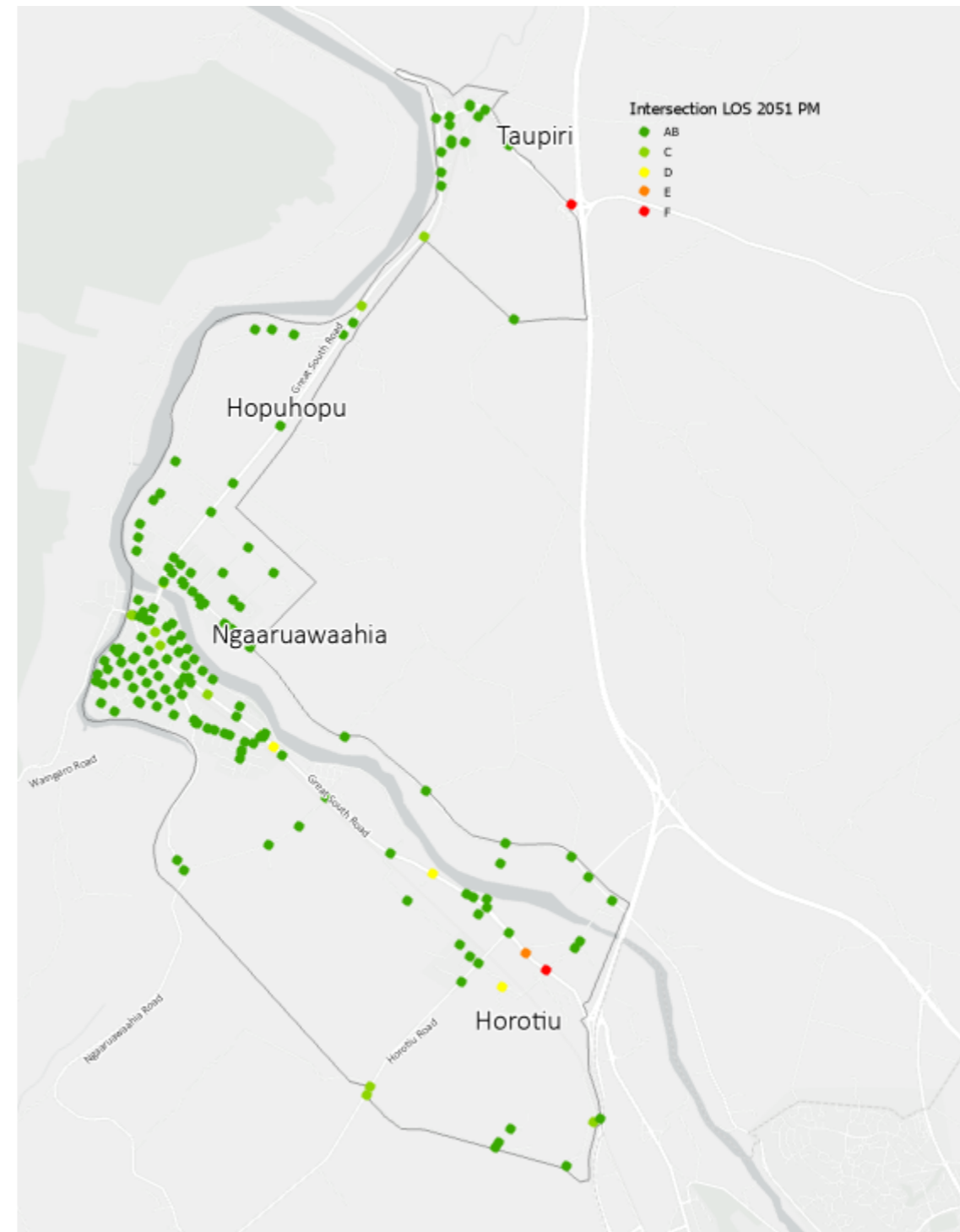


Figure B17: 2051 evening peak period LOS



The 2031 and 2051 LOS outputs from WRTM suggest

- ◆ As we approach Hamilton City, efficiency degrades (observed in both peaks)
- ◆ This is exacerbated with rail crossing closures north
- ◆ That completion of the Waikato Expressway has reduced traffic through Ngaaruwaahia and Taupiri and Great South Road is likely to perform well

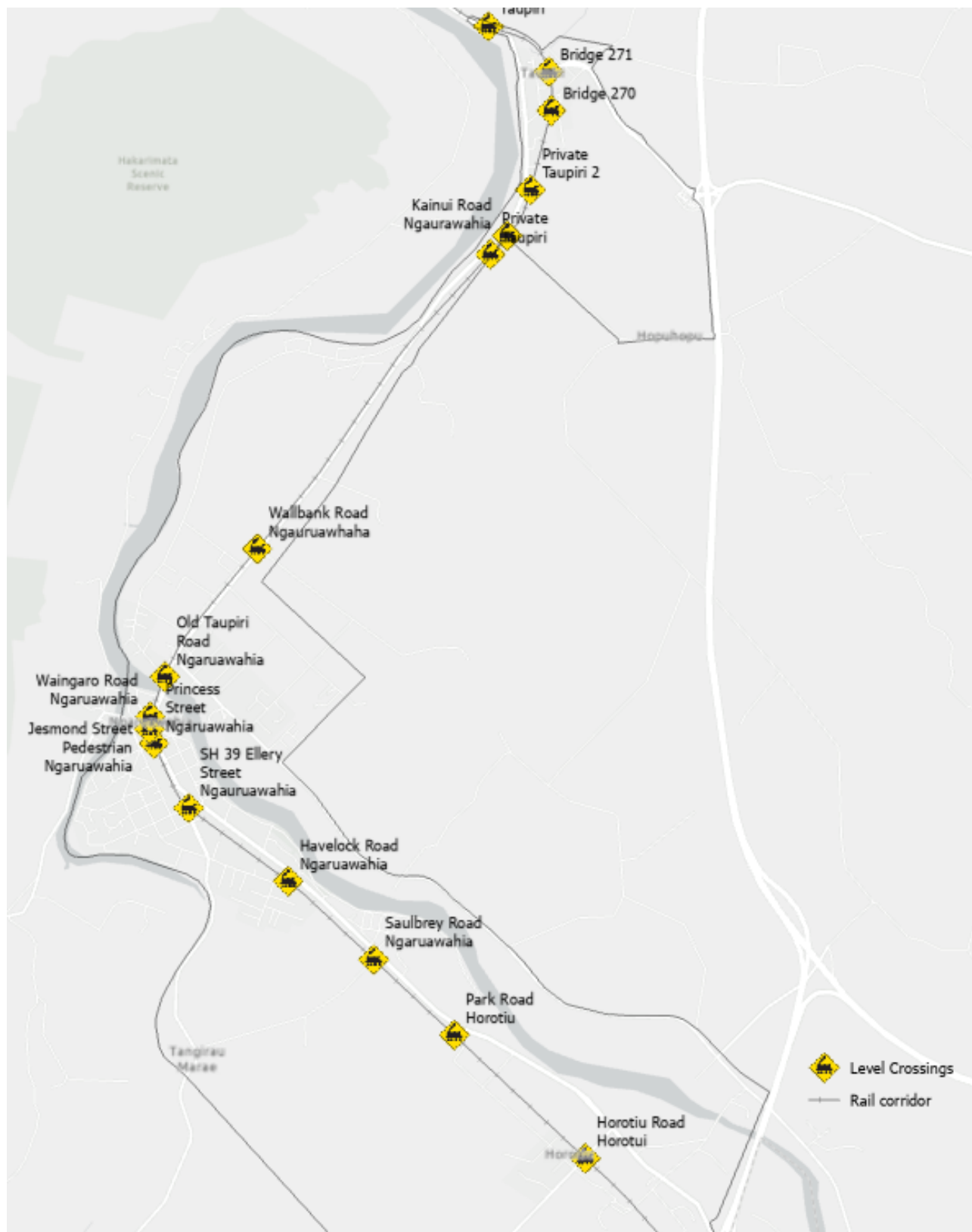
APPENDIX C	intersection assessment

APPENDIX D NIMT at grade crossing review

RAIL LEVEL CROSSING REVIEW

The North Island Main Trunk (NIMT) railway runs through the entire study area. Figure D1 shows the 12 level crossings, including 2 dedicated pedestrian crossings, 8 vehicle and pedestrian crossings, and 2 private crossings. The figure below indicates the level crossings within the study area.

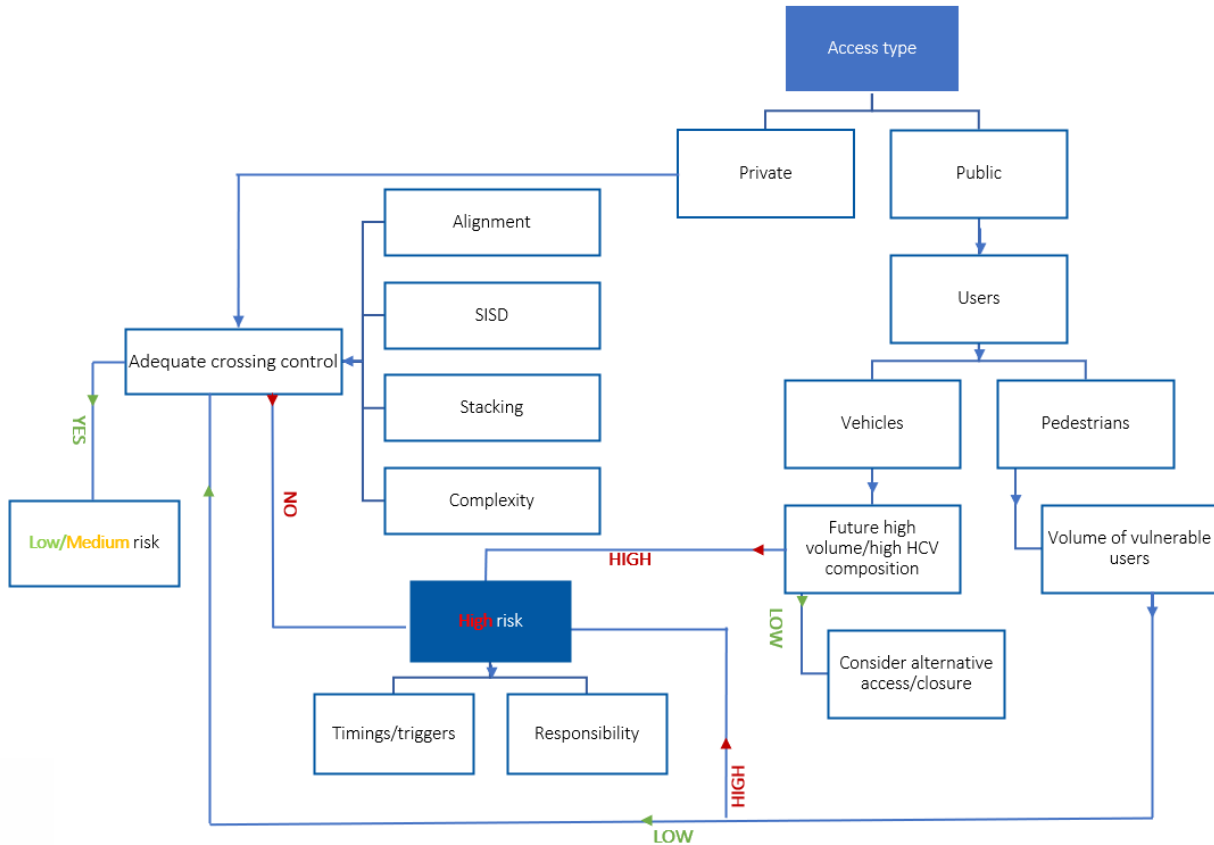
Figure D1: Rail level crossings within the study area



Level crossing assessment criteria

Our assessment has followed an amended simplified Level Crossing Safety Impact Assessment (LCSIA) methodology, including additional considerations for this study as summarised in Figure D2.

Figure D2: Level crossing assessment summary



Our approach broadly considered the following assessment criteria

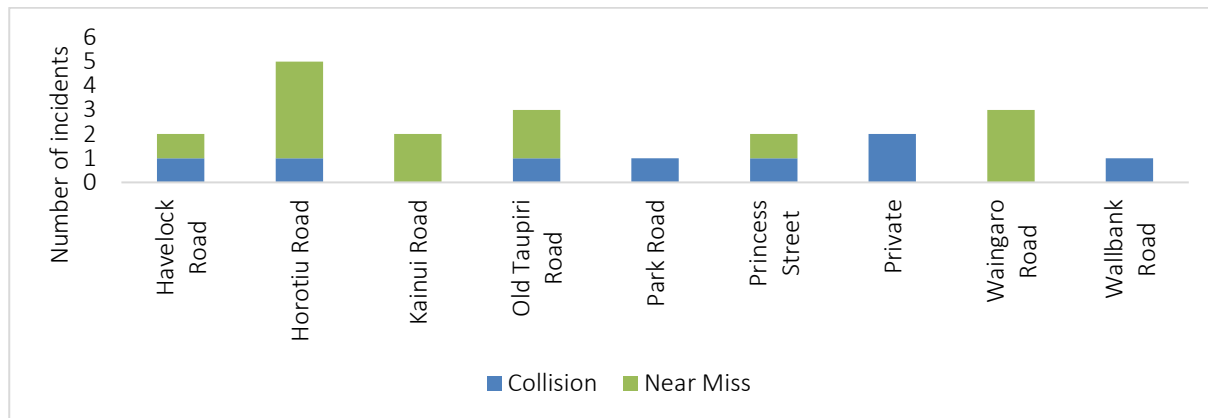
- ◆ Existing incidents and operation
- ◆ Future use and operation

Level crossing safety review

6.5.3 Existing reported incidents

Figure D3 shows the reported incidents for each level crossing between 2010 and 2022.

Figure D3: Reported incidents, 2010-2022



We note

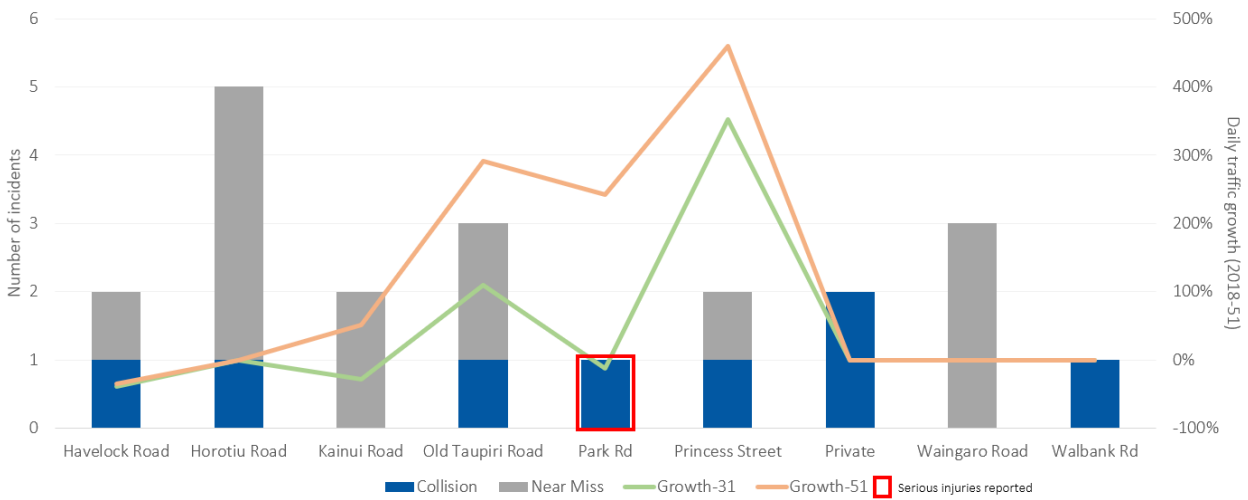
- ◆ Most incidents occurred before 2016 (16 of 23)
- ◆ All collisions have been non-fatal, with most resulting in no injuries to drivers of vehicles or trains
- ◆ A recent (2018) collision on Princess Street resulted in serious injuries
- ◆ In the most recent collisions on Horotiu Road (in 2021) and Park Road (in 2022), no injuries were reported
- ◆ The level crossing on Private access related to the Taupiri Urupa access, where 2 collisions were reported, with no injuries

6.5.4 Future exposure

Future exposure was considered using the future volume outputs from WRTM. The finding is summarised in Figure D4 below. We considered the growth in daily traffic from 2018 to 2031 and 2051. The model suggests that traffic volumes at

- ◆ The Old Taupiri Road level crossing could expect flows to double in 2031, while tripling to 2051
- ◆ The Park Road level crossing would triple by 2051
- ◆ The Princess Street level crossing would quadruple by 2051, based on the assumption that the Waingaro Road level crossing is closed
- ◆ The Havelock Road, Horotiu Road, and Wallbank Road level crossings would be stagnant from 2018.

Figure D4: Future exposure and reported incidents



Comparing the future exposure with the existing reported incidents, Havelock Road, Horotiu Road, Old Taupiri Road, Park Road, and Princess Street are likely to need investment to ensure the safe operation of the crossings continues.

We have summarised our assessment in Table D1 below.

Table D1: Level crossing summary

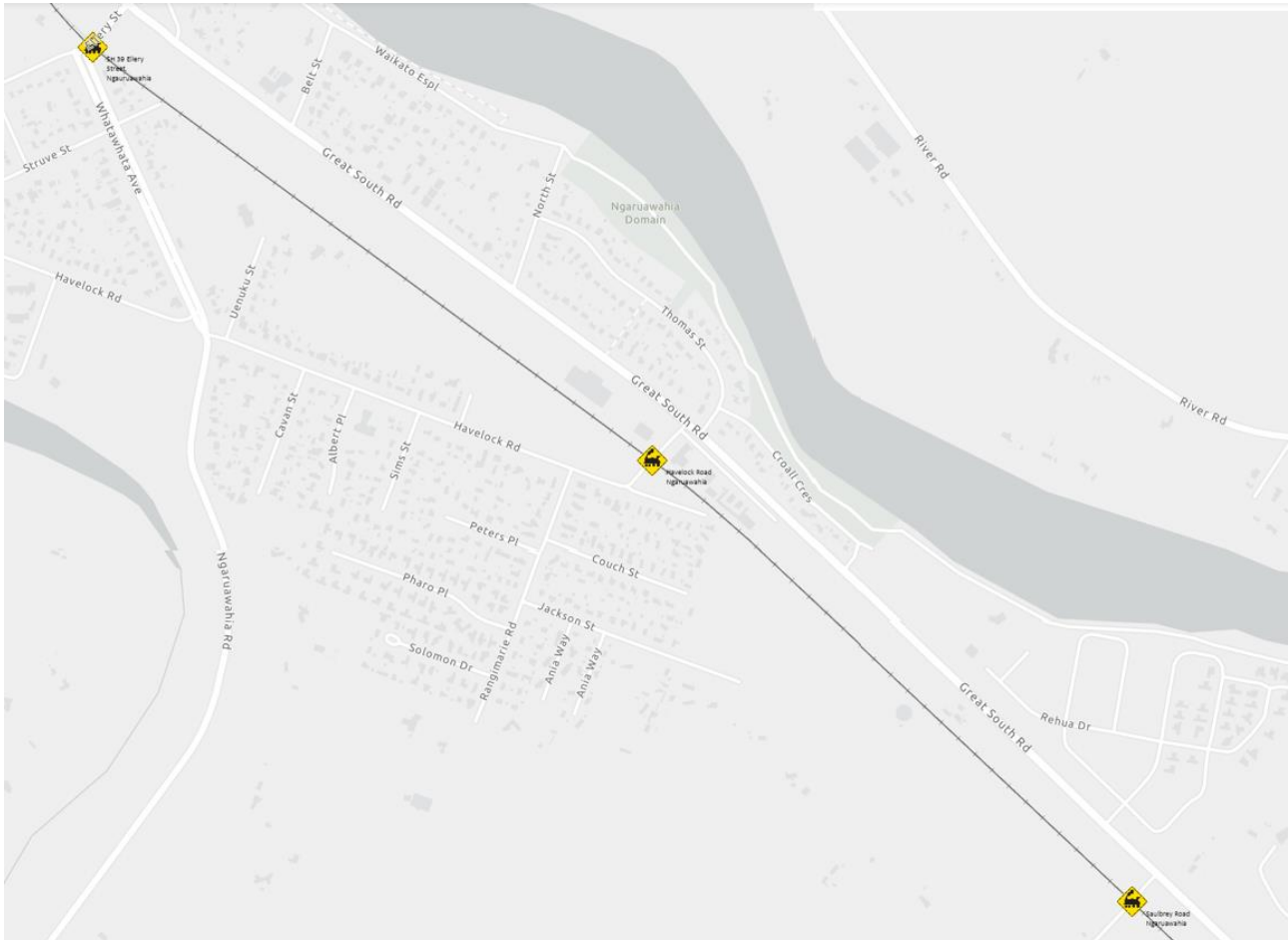
Crossing name	Future Risk	Timing/triggers for treatment	Likely Treatment outcome
Urupa Pedestrian Taupiri	Low	No further upgrade required – access to Urupa now via new Watts Grove bridge	further upgrade required
Kainui Road Taupiri	High	Future growth cell at Taupiri likely around 2050. Consider upgrade to be a condition of consent for the Taupiri development.	Upgrade as exposure increases, particularly if employment growth in Taupiri occurs as anticipated, as that growth cell will have access via Kainui Rd
Wallbank Road Ngaaruawaahia	Medium	New road/growth cell developed, likely around 2050	Closure once the north Ngaaruawaahia Hopuhopu growth cell is developed, access to utilise paper road
Old Taupiri Road Ngaruawahia	High	Concurrent growth, large relative vehicle volume increase, between 2030 and 2050 unless north Ngaaruawaahia Hopuhopu is developed earlier	Roundabout or signalised intersection
Waingaro Road Ngaaruawaahia	None	Within the next 5 years, due to concern of heavy vehicles using this crossing	Closure. Requires improvements at Princess Street level crossing.
Jesmond Street Pedestrian Ngaaruawaahia	High	During the upgrade of Jesmond/GSR	Improved pedestrian crossing
Princess Street Ngaaruawaahia	High	When the crossing at Waingaro Road is closed, a large increase in traffic is observed in WRTM. Timing: when Waingaro Road level crossing is closed.	Improve crossing as the Waingaro Rd closure will affect here, particularly for heavy vehicles from the quarry. Likely signalise Great South Road/ Princess Street/ Newcastle Street intersection.
SH 39 Ellery Street Ngaaruawaahia	Low	None – no reported incidents	Volumes are stable.
Havelock Road Ngaaruawaahia	Low	When Saalbrey Road growth cell develops ie prior to 2030	Monitor. Review need for upgrades or closure in long term as growth occurs.

Crossing name	Future Risk	Timing/triggers for treatment	Likely Treatment outcome
Saulbrey Road Ngaaruawaahia	High	Large relative increase in traffic due to growth, prior to 2030. No reported incidents	Upgrade to be determined in conjunction with improvements at Saulbrey Road/ Great South Road intersection.
Park Road Horotiu	Low	Low growth around this crossing. Prior to 2030, likely for vehicles on Park Road to experience high wait time to turn right due to volume increase on GSR	Monitor. Review need for upgrades or closure in long term as growth occurs.
Horotiu Road Horotiu	Medium	Closure supported by new link to Gateway Drive	Closure planned in short term

Havelock / Great South Road level rail crossing closure

WDC requested Flow investigate the impact of closing Havelock / Great South Road level rail crossing. Figure D5 shows the connection between developments and Great South Road is supported by SH39 Ellery Street and Saubrey Road.

Figure D5: Havelock / Great South Road rail level crossing location



Havelock Road has the following considerations:

- ◆ Current Access: Provides access from Great South Road to residential and industrial area
- ◆ Alternative access: Ellery Street is 1.4 km to the north, while Saubrey Road is 1.3 km to the south
- ◆ Previously reported incidents were both in 2010 (1 near-miss and 1 non-fatal collision)
- ◆ Adjacent horizontal curve on Havelock Road has an advisory speed of 35 kph
- ◆ Street lighting is present
- ◆ There are half arm barriers, but the bells are inactive between 10:30 pm and 7:00 am
- ◆ There is some pedestrian fencing

Figure D6 shows the current street view towards Great South Road.

Figure D6: Havelock Road street view



6.5.5 Review of Traffic Reassignment

The assessment considered the following assumptions based on WRTM outputs:

- ◆ Most people using Havelock Road level crossing are turning right onto GSR or left from GSR
- ◆ Most traffic will use Saalbrey Road level rail crossing if Havelock Road is closed to vehicles. This requires a significant diversion until the adjacent growth cell is developed.
- ◆ WRTM suggests ADT reductions are anticipated from the 2031 forecast

The traffic redistribution methodology considered the following:

- ◆ Existing census and current forecast are used as a base distribution
- ◆ Traffic redistribution was used to determine (for each peak period and ADT)
 - ◆ the percentages inbound and outbound via Ellery Street
 - ◆ the percentages inbound and outbound via Saalbrey Road
- ◆ These percentages are summarised in Table D2 below.

Table D2: 2031 traffic redistribution proportions (from WRTM centroid, links only)

	Southbound		Northbound	
	Outbound	Inbound	Outbound	Inbound
Morning peak	82%	46%	18%	54%
Evening peak	65%	16%	35%	84%
Daily	52%	47%	48%	53%

Traffic redistribution was determined by 2031 ADT changes from

- ◆ 2018 existing
- ◆ 2031 forecast

The 2031 reassignment based on closure is shown in Figure D7 for Saulbrey Road and Figure D8 for Ellery Road.

Figure D7: Traffic reassignment effect on Saulbrey Road based on Havelock Road rail level crossing closure

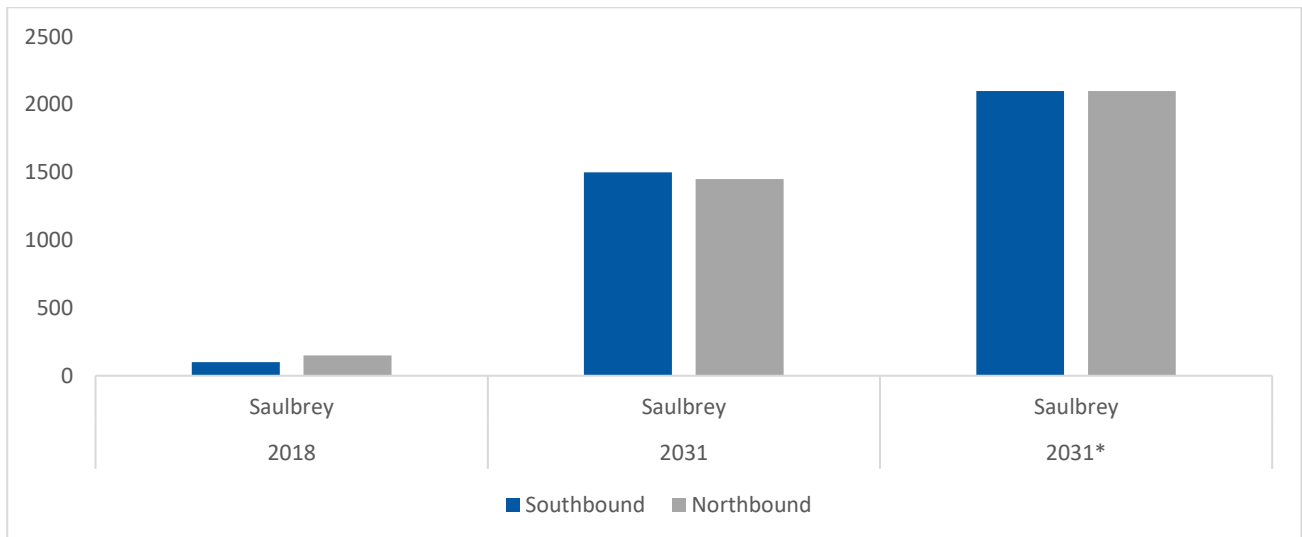
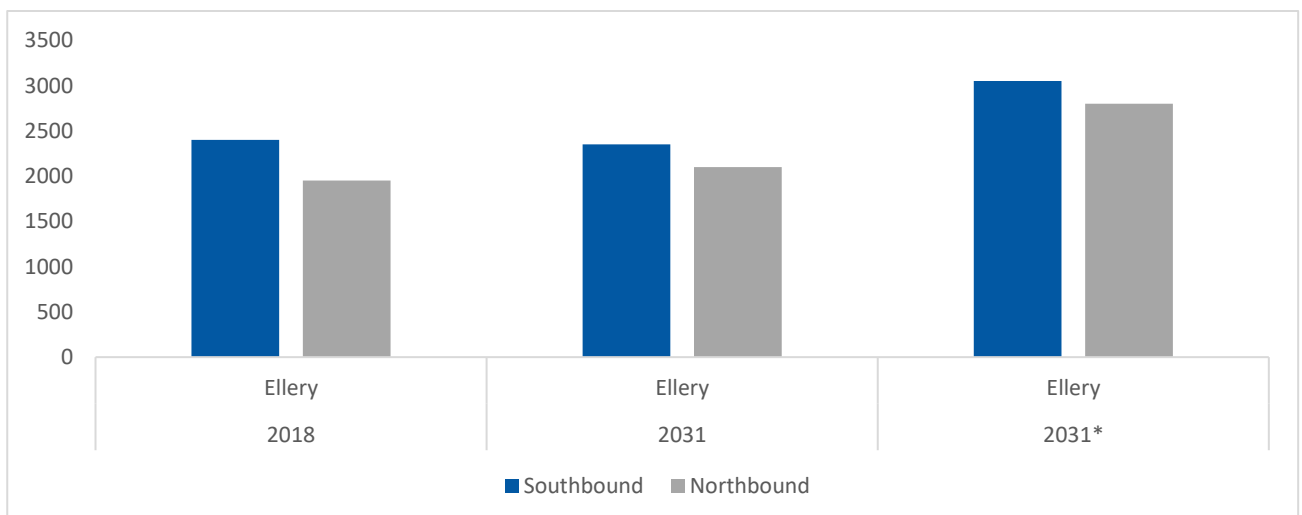
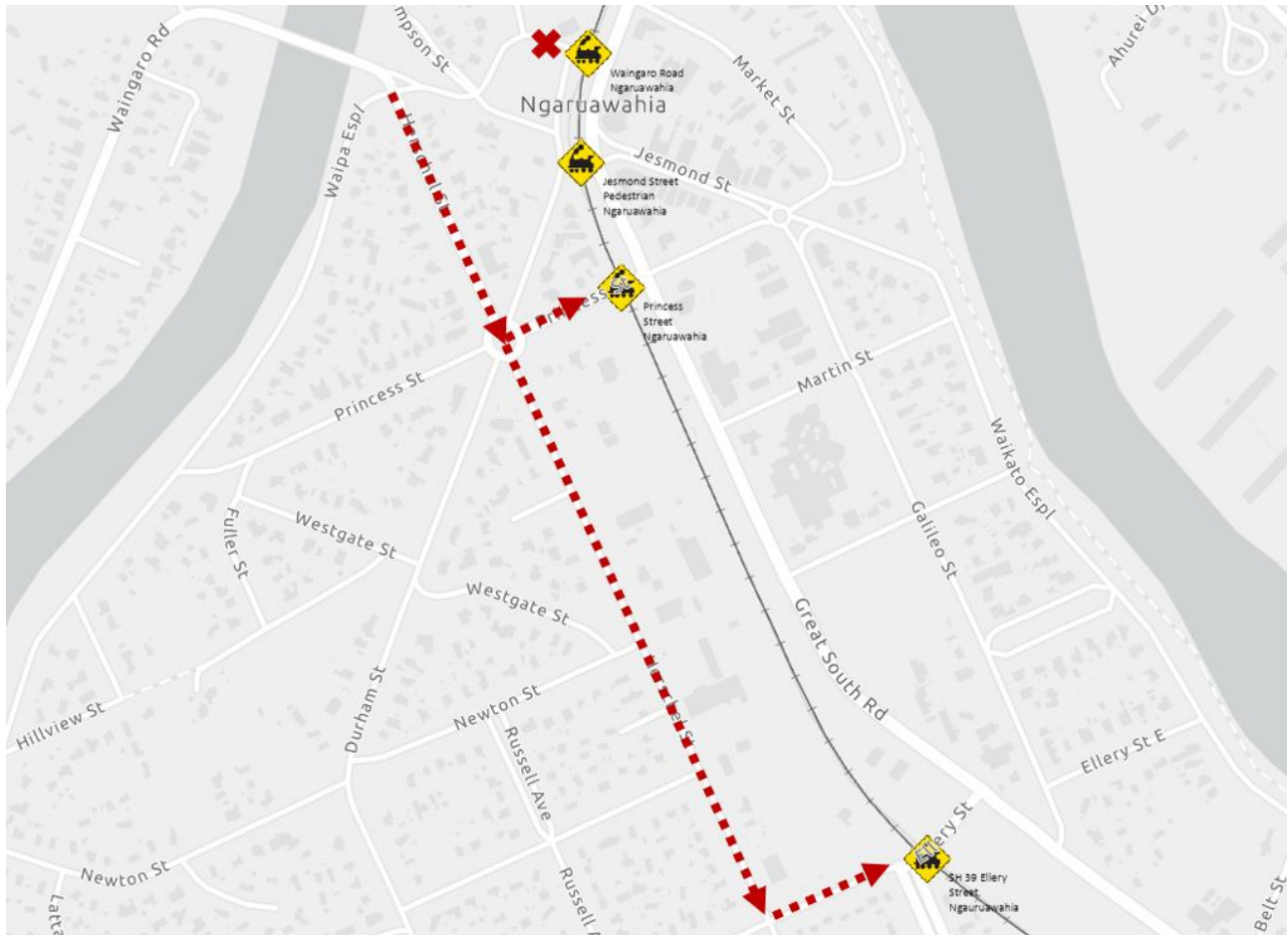


Figure D8: Traffic reassignment effect on Ellery Road based on Havelock Road rail level crossing closure



Wider network implications were considered following closure of the Waingaro Road level crossing in combination with the potential Havelock Road level crossing. Figure D9 shows the reassignment of traffic from Waingaro Road, distributed to Princess Street and Ellery Street.

Figure D9: Traffic reassignment following Waingaro Road level crossing closure



The assessment has taken into consideration the following:

- ◆ The risk of rat running onto Ellery Street level crossing, if signals are provided at the intersection of Great South Road and Princess Street (in conjunction with the closure at Waingaro Rd)
- ◆ The possibility of mitigating the above risk by implementing traffic calming measures on Herschel Street

6.5.6 Review of impact of the closure on active modes

We have also considered the impact of the closure on active modes.

Figure 10 shows the existing and future walking and cycling as depicted in the micromobility study and the current bus stop pair on Great South Road.

Figure 10: Existing and future micromobility network around the Havelock Road level crossing



We find the following are key considerations for its closure and its effect on active modes:

- ◆ The pedestrian crossing provides access across the NIMT for a large walkable catchment
 - ◆ If the crossing is closed, it would significantly increase the walking distance to the nearest level crossing for a number of existing and future households
- ◆ A walking connection is particularly important for future growth cell to access Te Awa River Ride and nearby bus stops.

In summary we recommend:

- ◆ Monitoring safety at the Havelock Road level crossing. If the crossing is closed, the pedestrian access should be retained and upgraded.
- ◆ as part of the upgrade of Princess Street / Great South Road / Newcastle Street intersection, that traffic calming measures are implemented on Herschel Street to discourage rat running via Herschel Street.

APPENDIX E

Intersection Upgrades

APPENDIX F

Existing Transport Maps

Figure 11: Existing over-dimension routes

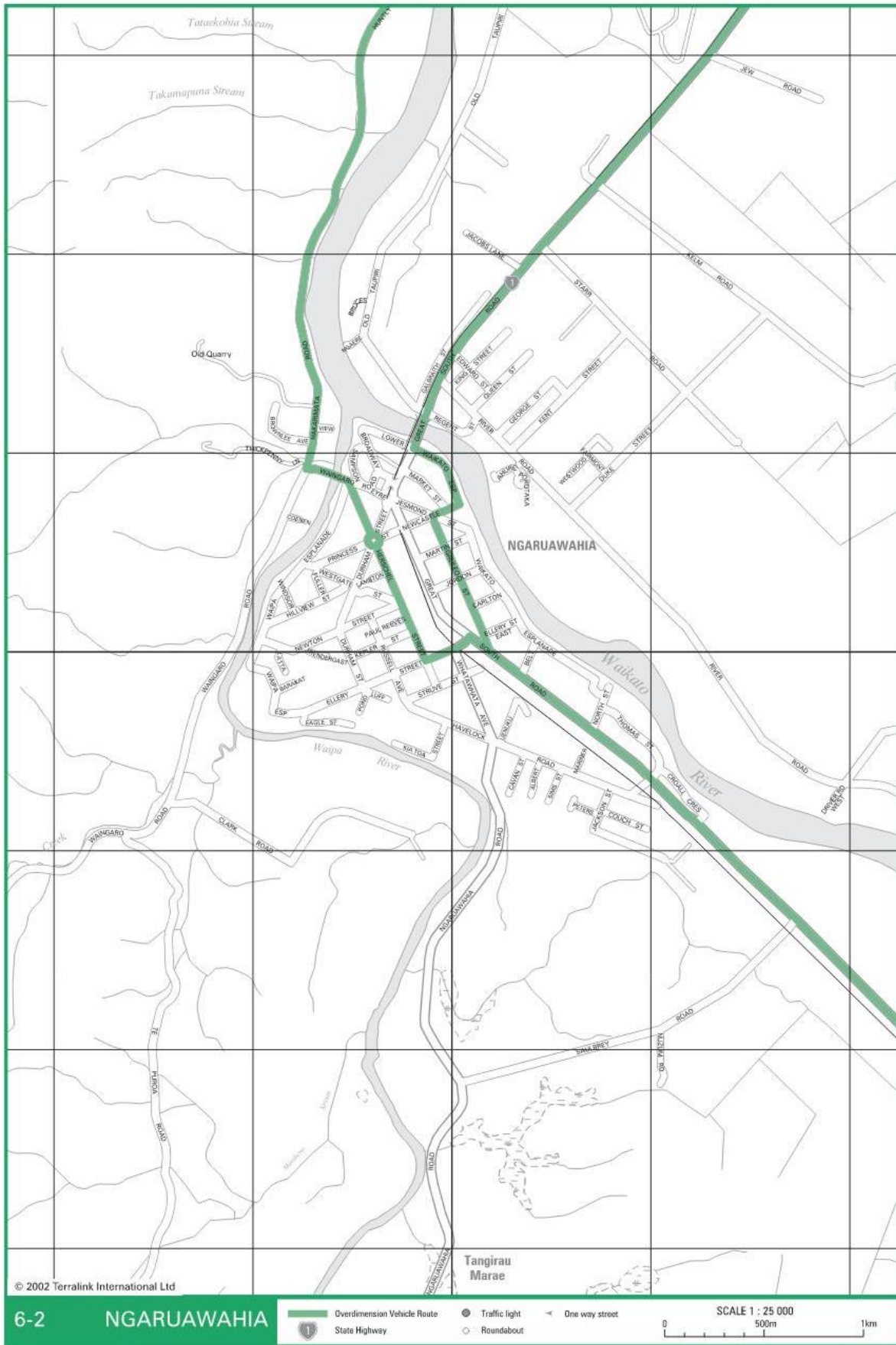


Figure 22 - Existing transport hierarchy and existing rail level crossings

