TUUMATA PLAN CHANGE, RUAKURA, HAMILTON

Integrated Transport Assessment

Issue 5, December 2022

Prepared for:
Tainui Group Holdings

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E	Issue 5	MA/AW	15/12/2022	MA	15/12/2022

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Executive Summary

The Tuumata Plan Change proposes to create a new structure plan area known as the Ruakura-Tuumata Structure Plan, within the existing Ruakura Structure Plan area.

The Plan Change seeks to change the zoning from Industrial Park to a new residential neighbourhood providing for approximately 1,269 residential households and a Neighbourhood Centre of approximately 6,000m^2 gross floor area (GFA). Provision has also been made for inclusion of a primary school, should the Ministry of Education seek to designate one in future.

A multi-modal transport network has been designed to prioritise safe and accessible walking, cycling and micro-mobility routes, and access for public transport services. The proposed transport network appropriately integrates with the surrounding arterial network, by providing a limited number of access points for vehicles. Transport corridors have been designed to provide appropriate capacity for these intersections, and their function is protected through supporting vehicle access restrictions.

Transport modelling confirms that the existing and planned future transport networks will have adequate capacity to accommodate the expected land uses in the Plan Change area.

Overall, the Plan Change aligns well with national, regional and local strategic transport planning and land use frameworks. It has been developed in consultation with key stakeholders and Agencies including HCC and WRC and seeks to respond to and support the strategic directions of these organisations.

The transportation infrastructure needed to support full development of the Plan Change is shown on **Figure 1.1** below and can be summarised as:

- The Eastern Transport Corridor (ETC), from Ruakura Road to join the existing formation to the north of the Fifth Avenue Extension;
- The Fifth Avenue Extension, from Wairere Drive to the ETC;
- A signalised intersection where the Plan Change collector road meets the Fifth Avenue Extension; and
- Either a signalised intersection or a roundabout where the Plan Change collector road meets the ETC.

A staging rule is required to reflect that up to 430 dwellings can be accommodated on the existing network, ahead of the ETC. Development of more than 430 dwelling equivalents, including any development in the Neighbourhood Centre area, will require the Fifth Avenue Extension to extend east and link with the ETC, and the Eastern Transport Corridor (ETC) to be adequately committed and certain.

The analysis in the WRTM shows that at 2041 (at least) both the Fifth Avenue Extension and the ETC will function acceptably with one lane in each direction, for general traffic.

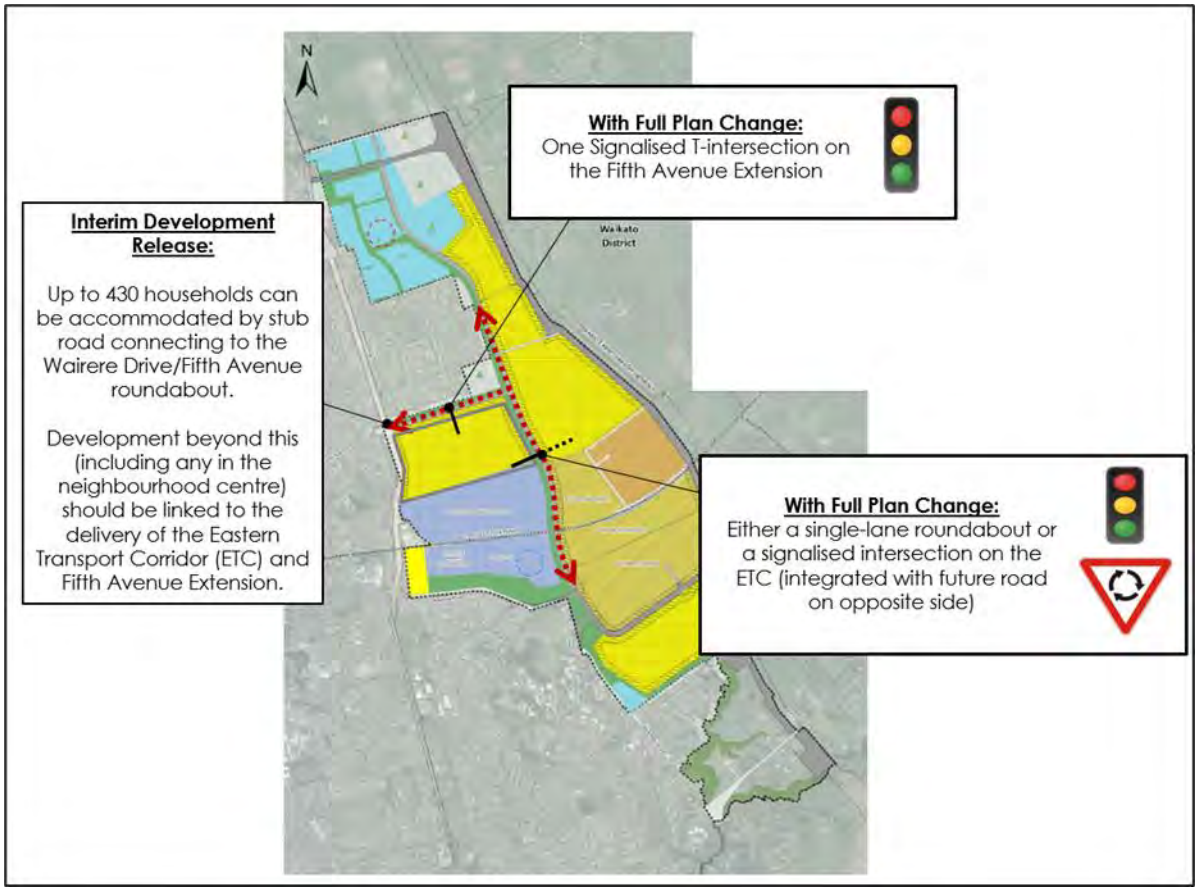


Figure 1.1: Plan Change Transport Infrastructure Summary Findings

Acronyms / Abbreviations

ADT	Average Daily Traffic
CAS	Crash Analysis System
ECMTR	East Coast Main Trunk Railway
ETC	Eastern Transport Corridor
GFA	Gross Floor Area
HCC	Hamilton City Council
ITA	Integrated Transportation Assessment
km/h	Kilometres per hour
LOS	Level of Service
MoE	Ministry of Education
NPSUD	National Policy Statement on Urban Development
ODP	Operative District Plan
SUP	Shared user path
SH	State Highway
vpd	vehicles per day
vph	vehicles per hour
WEX	Waikato Expressway
WRTM	Waikato Regional Traffic Model

1 Introduction

Stantec has been asked by Tainui Group Holdings (TGH) to examine and describe the traffic and transportation effects of the proposed Tuumata Plan Change, comprising the Tuumata Residential Zone and Tuumata Neighbourhood Centre.

The Plan Change proposes to create a new structure plan area known as the Ruakura-Tuumata Structure Plan, within the existing Ruakura Structure Plan area. The Plan Change seeks to change the zoning from Industrial Park to a new neighbourhood providing for approximately 1,269 residential households and a Neighbourhood Centre of approximately 6,000m^2 gross floor area (GFA).

This Integrated Transportation Assessment (ITA) assesses and describes the:

- Current transportation environment;
- Road safety environment;
- Planned future transport environment;
- Plan Change Proposal;
- Strategic Framework;
- Trip Generation;
- Plan Change Effects; and
- Recommended the transport infrastructure approach to be adopted in the Plan Change.

This ITA refers to, and should be read in conjunction with, the Traffic Modelling Report ('the Modelling Report') that has also been prepared by Stantec to accompany the Plan Change Application. This is included as a separate report to be read in conjunction with this assessment.

The Modelling Report describes assessments undertaken in the Waikato Regional Transportation Model (WRTM), as well as supplementary SIDRA Intersection tests.

By way of an overall summary, it is concluded the Plan Change can be supported, with inclusion of the transport infrastructure together with the transport objectives, policy and rule framework proposed.

2 Existing Transport Environment

2.1 Plan Change Location

The Tuumata Plan Change area has a gross area of approximately 68 hectares (ha). It sits on the eastern side of Wairere Drive, to the north of the AgResearch campus and the south of the established residential area of Fairview Downs. The location of the subject land is shown below as Figure 2.1.

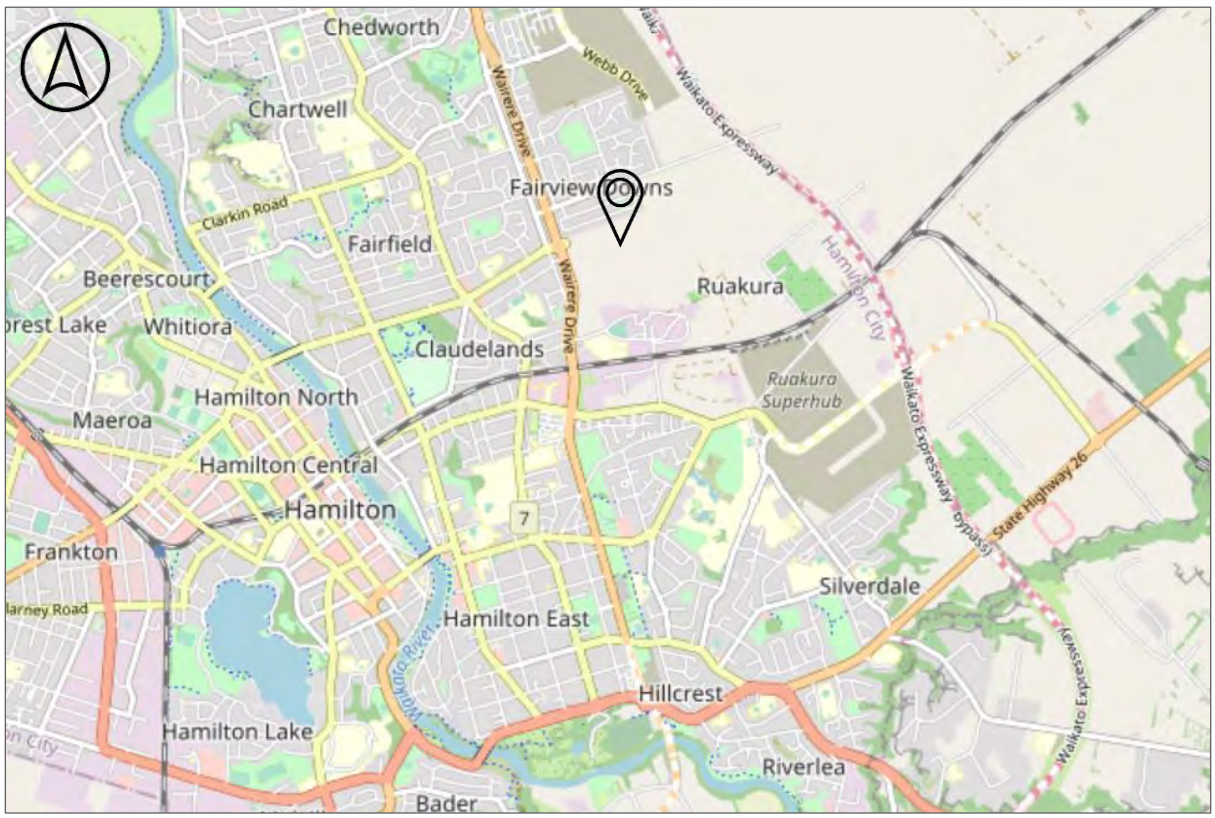


Figure 2.1: Locality Plan

Source: Openstreetmap, 2022

The Plan Change area is part of the Ruakura Structure Plan area, as set out in the Hamilton City Council (HCC) Operative District Plan (ODP). As shown on Figure 2.2, the Plan Change area carries 'Industrial Park' zoning within the Structure Plan. In terms of transport network connectivity, the land is bounded by Wairere Drive to the west, the future Fifth Avenue Extension to the north and the future Eastern Transport Corridor (ETC) to the east.

The AgResearch campus sits to the immediate south and is not part of the Plan Change proposal.

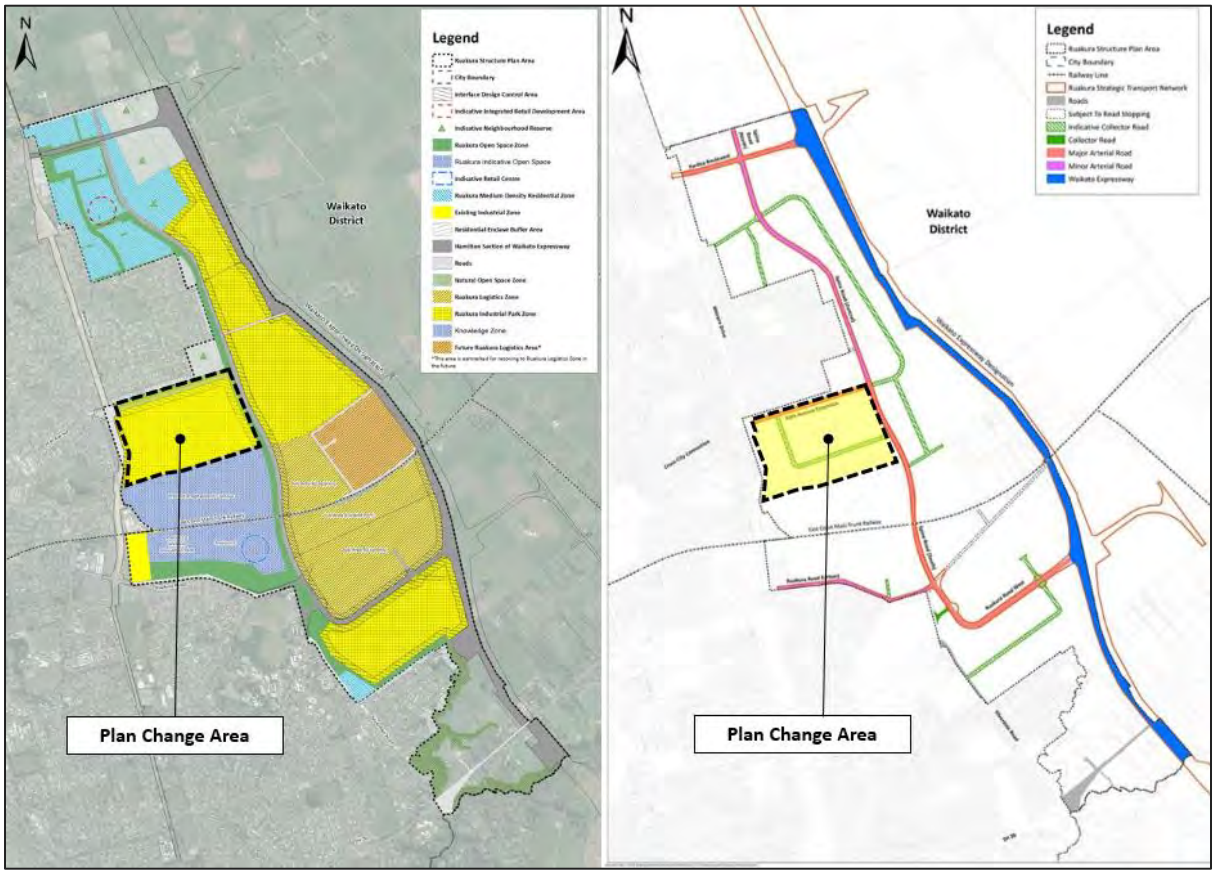


Figure 2.2: Structure Plan Context

Source: HCC ODP Figure 2-14 and 2-15A

These and other maps from the Ruakura Structure Plan are included at a larger scale in Appendix A.

2.2 Transport Corridor Hierarchy

The location of the Plan Change area relative to the HCC ODP transport corridor hierarchy is shown below as Figure 2.3.

Figure 2.3: Transport Corridor Hierarchy

Source: HCC ODP

Figure 2.3 shows that the Plan Change area is bounded by major arterial corridors (one existing, two planned) on three sides. Wairere Drive, to the west, is part of the HCC major arterial ring road, providing strategic transport access around the city.

The Fifth Avenue Extension will extend the existing cross-city arterial route, formed by Boundary Road and Fifth Avenue, from the city to the planned future Eastern Transport Corridor (ETC).

The ETC runs north-south through the Ruakura Structure Plan area, connecting the Waikato Expressway (WEX) interchanges at Realigned Ruakura Road in the south with Greenhill Road in the north. The ETC is classified as a major arterial route as far as the Fifth Avenue Extension. This reflects the role it plays in connecting industrial areas around Ruakura Road to the Wairere Drive/Fifth Avenue roundabout, which provides connectivity around and across the city. To the north, the ETC changes to a minor arterial classification, reflecting the slightly reduced but still important through movement function it serves in this part of the structure Plan area. Longer term the ETC is expected to extend further north to service future residential growth areas north of Greenhill Road.

2.3 Local Road Environment

The existing land use and transport environment in and around the Plan Change area is shown below at wide scale (Figure 2.4) and a local scale (Figure 2.5).

Figure 2.4: Existing Land Use and Transport Environment (Wide View)

Source: HCC GIS Maps (Aerials Flown January 2021), annotations added

The wider view on Figure 2.4 shows the Hamilton Section of the WEX under construction to the east of the Plan Change area. At the time of writing this report, the WEX has been made operational together with Realigned Ruakura Road. It provides a strategic transport connection around the eastern fringe of Hamilton and provides a four-lane highway between the Bombay Hills and Cambridge. Interchanges are provided at five locations, including Realigned Ruakura Road and Greenhill Road.

The East Coast Main Trunk Railway (ECMT) can also be seen running approximately 500m to the south of the Plan Change area. ECMT passes under both Wairere Drive and the WEX.

Wairere Drive is formed with two traffic lanes in each direction separated by a solid central median. Short auxiliary turning lanes are also provided at some intersections. This part of Wairere Drive provides no direct property access and has a limited number of side road intersections. The posted speed limit is 80km/h.

Fifth Avenue provides one traffic lane in each direction and operates under a 50km/h posted speed. Property access and side road intersections along Fifth Avenue are generally unrestricted, except for some movements at the intersection with Tramway Road, which can be seen to the west of Wairere Drive on Figure 2.5.

Figure 2.5: Existing Land Use and Transport Environment (Local View)

Source: HCC GIS Maps (Aerials Flown January 2021), annotations added

Wairere Drive and Fifth Avenue meet at a dual-lane roundabout. This roundabout has an internal diameter of approximately 40m. As can be seen on Figure 2.5, the eastern leg of this roundabout is formed as a stub road and is currently used only for occasional access to the farming activities on the land. The roundabout has a grade-separated pedestrian and cycle path which is described further in Section 2.5.

The next intersection to the north is the Wairere Drive/Powells Road traffic signals. This intersection is approximately 250m from the roundabout. Powells Road and the Carrs Road interchange further north provide access to Fairview Downs.

The next intersection to the south is the Wairere Drive/Bisley Road traffic signals. This intersection is located approximately 700m from the roundabout. Bisley Road provides access to the AgResearch campus and other activities on Bisley Road including a church and industrial activity. No right turn has been established at this time into Bisley Road from the south.

2.4 Public Transport Servicing

As the Plan Change area and two of its planned frontage roads are currently undeveloped, there is limited public transport coverage in the immediate vicinity as things currently exist.

The 11 (Fairfield) route operates along Tramway Road (approximately 700m from the site). The 14 (Claudelands) route runs along Fifth Avenue, Wairere Drive and Powells Road (approximately 250m from the site). These services connect the eastern suburbs with the Hamilton central business district (CBD) and Chartwell commercial area. They operate on weekday frequencies of 30-60 minutes.

2.5 Walking and Cycling

2.5.1 Catchments

Walking catchments for 5-minute intervals up to 20 minutes are shown below as Figure 2.6. It is noted that this assessment includes only the existing walking network. Because the Plan Change area and two of its planned frontage roads are currently undeveloped, there is no direct connectivity available south or east. The analysis adopts an assumed walking speed of 5 km/h.

Figure 2.6: Existing Walking Isochrone map (5-min intervals, up to 20-min)

Source: Stantec, 2022

Figure 2.6 shows that a range of local shops, services and community infrastructure is available within the 20-minute catchment. This includes schools, parks and playgrounds and shopping areas of various scales.

Cycling catchments for 5-minute intervals up to 20 minutes are shown below as Figure 2.7. Again, it is noted that this assessment includes only the existing cycling network, which limits the catchment areas to the south and east. The analysis adopts an assumed cycling speed of 20 km/h.

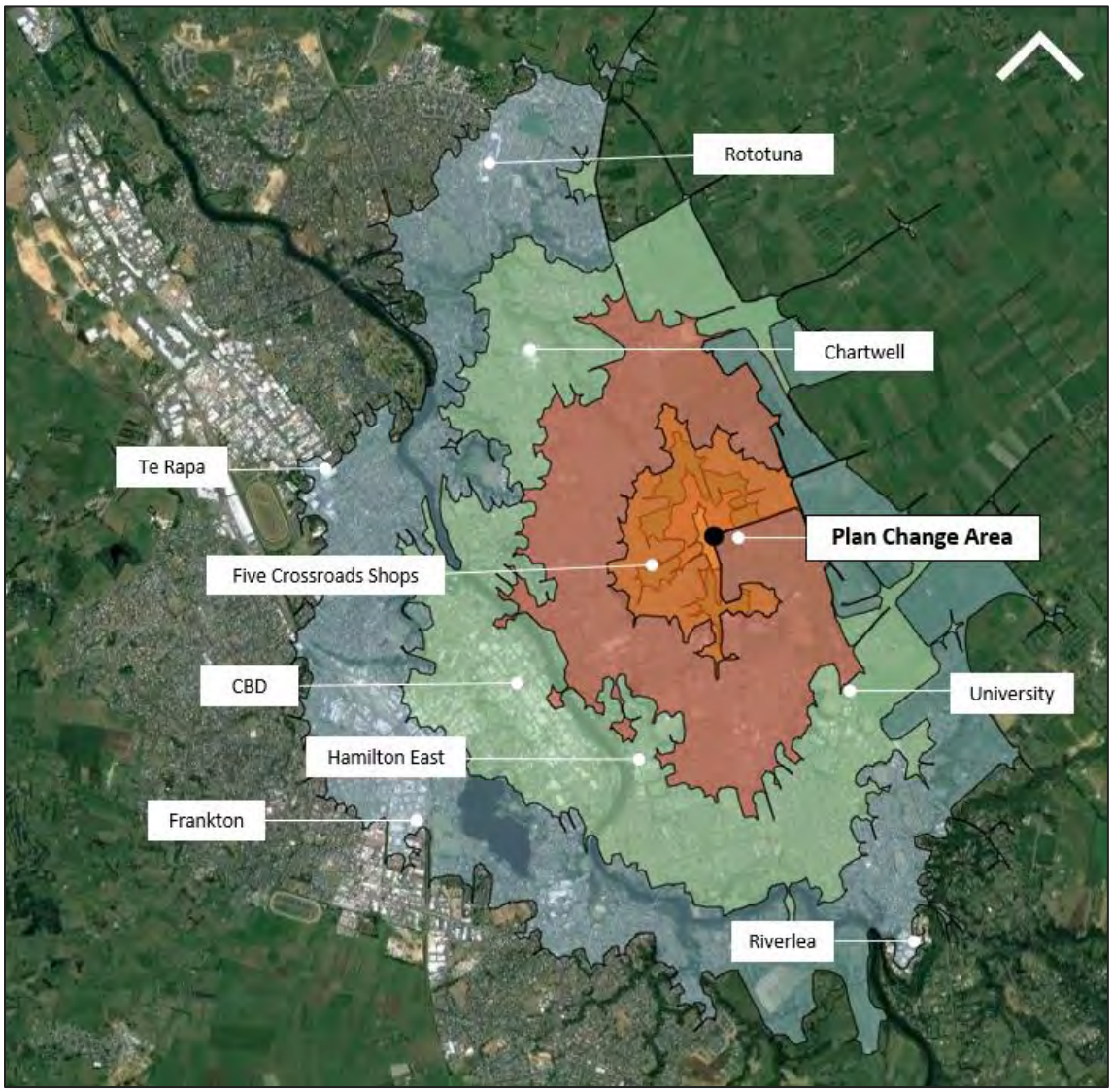


Figure 2.7: Existing Cycling Isochrone map (5-min intervals, up to 20-min)

Source: Stantec, 2022

Figure 2.7 shows that the 20-minute cycling catchment covers a significant proportion of the Hamilton urban area. The CBD, Hamilton East commercial area, Chartwell commercial area and the University of Waikato are all within the 15-minute catchment. The 20-minute catchment extends to Riverlea in the south, Frankton in the west and Rototuna in the north. This gives future residents of the Plan Change area potential cycling access to wide range of employment, retail, recreation, education and commercial opportunities.

2.5.2 Walking & Cycling Infrastructure

The Hamilton City bike network in the vicinity of the Plan Change area is shown indicatively below as Figure 2.8.

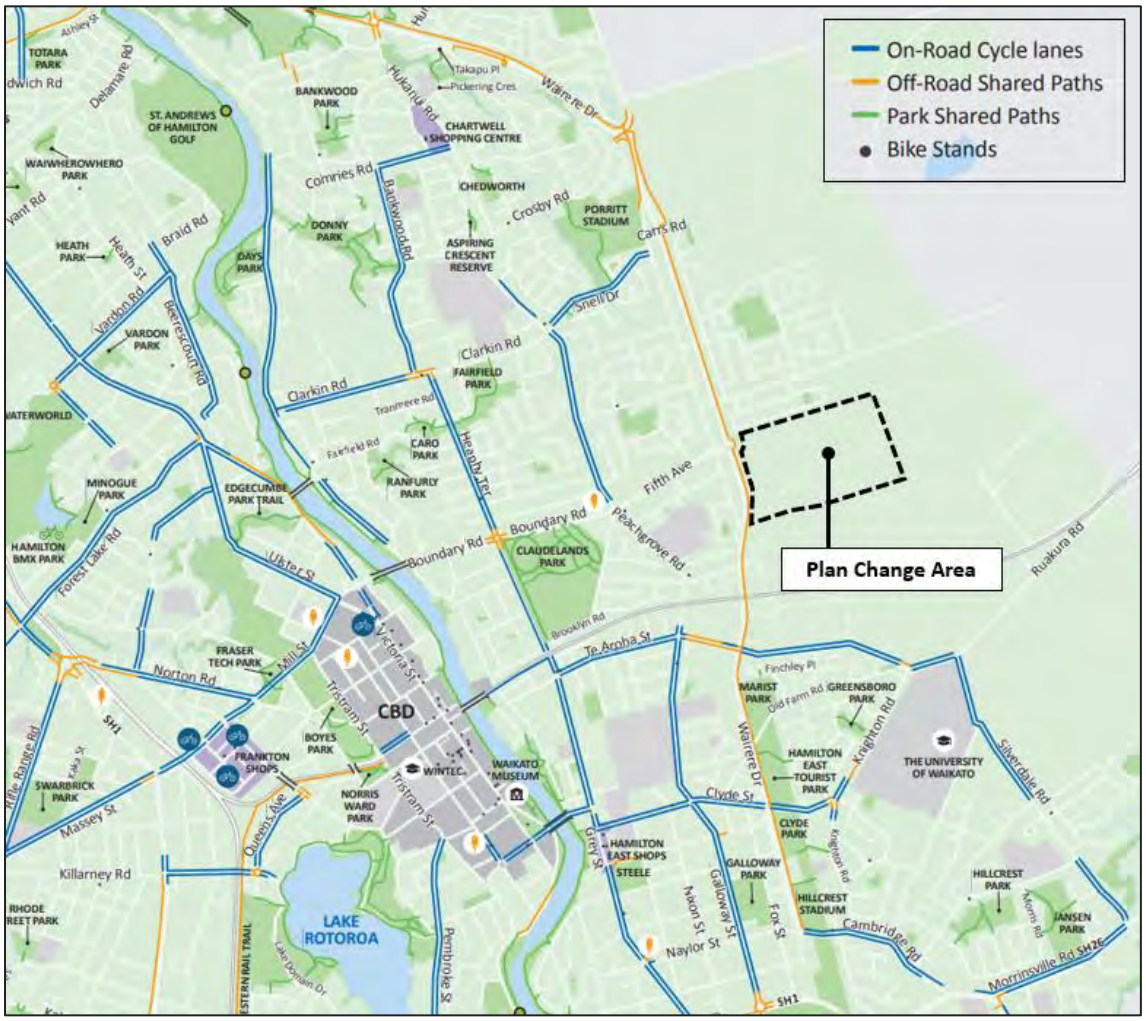


Figure 2.8: Bike Hamilton Map

Source: HCC, September 2018

The Wairere Drive off road shared path runs along the western boundary of the Plan Change area. This path and its various connecting paths can also be seen on Figure 2.5 (earlier). It provides a route around the city, connecting to Rototuna and Te Rapa in the north and the Western Rail Trail in the western part of the city.

Various on-road cycle lanes are also provided including along Ruakura Road, east to the University and west to the CBD along Te Aroha Street.

Locally, roads that surround the Plan Change (other than Wairere Drive) have footpaths on both sides. Grade-separated crossings for pedestrians and cyclists are provided in the form of:

- An underpass under Wairere Drive, south of the Wairere Drive/Fifth Avenue roundabout;
- An underpass under Wairere Drive, north of Alderson Road (which is approximately 700m north of Fifth Avenue); and
- An underpass under Wairere Drive, south of Bisley Road.

At-grade pedestrian/cycle crossing facilities are also provided at the Wairere/Drive Powells Road traffic signals. There is also an at-grade crossing on the eastern leg of the Wairere Drive/Fifth Avenue roundabout however as noted in Section 2.3 above, this leg is formed as a stub and carries a negligible volume of vehicular traffic.

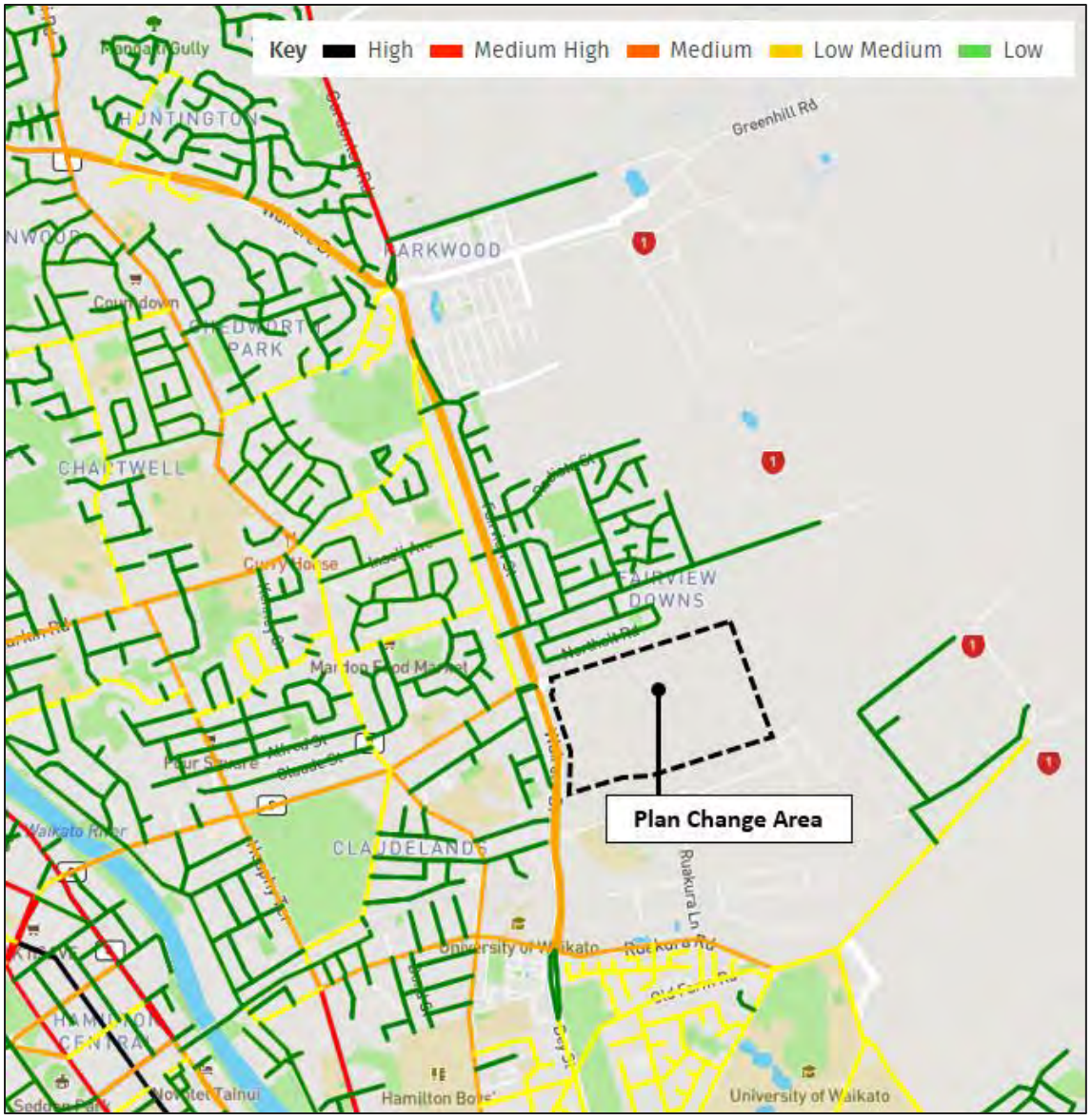
3 Road Safety

3.1 KiwiRAP

Figure 3.1 and Figure 3.2 below present KiwiRAP collective risk and personal risk ratings for roads in the area around the Plan Change. KiwiRAP is part of an international family of Road Assessment Programmes (RAPs) under the umbrella of the International Road Assessment Programme (iRAP).

Collective risk[1] is a measure of the total number of fatal and serious injury crashes per kilometre over a section of road. Collective Risk can also be described as the crash density.

Personal risk is a measure of the risk to each individual using the section of road being assessed. Assessments of personal risk take into account the traffic volumes on each section of road.



[1] Risk definitions come from KiwiRAP Highway Safety Ratings 2012 – 2016, Published 2018

Figure 3.1: Collective Risk Ratings Map

Source: www.roadsafetyrisk.co.nz

Figure 3.2: Personal Risk Ratings Map

Source: www.roadsafetyrisk.co.nz

The Figures show that Wairere Drive has a medium collective risk rating and a medium-high personal risk rating, in part reflecting the higher (80km/h) speed environment on Wairere Drive. Fifth Avenue and Ruakura Road both have medium ratings for collective and personal risk.

3.2 Local Road Safety Records

The Waka Kotahi Crash Analysis System (CAS) was used to review the current safety performance of the area. The study area included:

- Wairere Drive, for a length of 1km north and south of the Fifth Avenue roundabout, including the intersections of:
    - Wairere Drive/Powells Road;
    - Wairere Drive/Fifth Avenue; and
    - Wairere Drive/Bisley Road.
- Fifth Avenue, from Wairere Drive to east of the Five Cross Roads roundabout, including its intersections with:
    - Tramway Road;
    - Spenser Street; and
    - John Street.

The search covered the full five-year period 2017 to 2021 inclusive, as well as any available data from 2022. Figure 3.3 shows the study area and the locations of reported crashes. Full CAS outputs are also included as Appendix B. The Figure shows a distribution of crashes on the approach and departure areas, predominantly north and west of the intersection as well as around the circulating area of the roundabout.

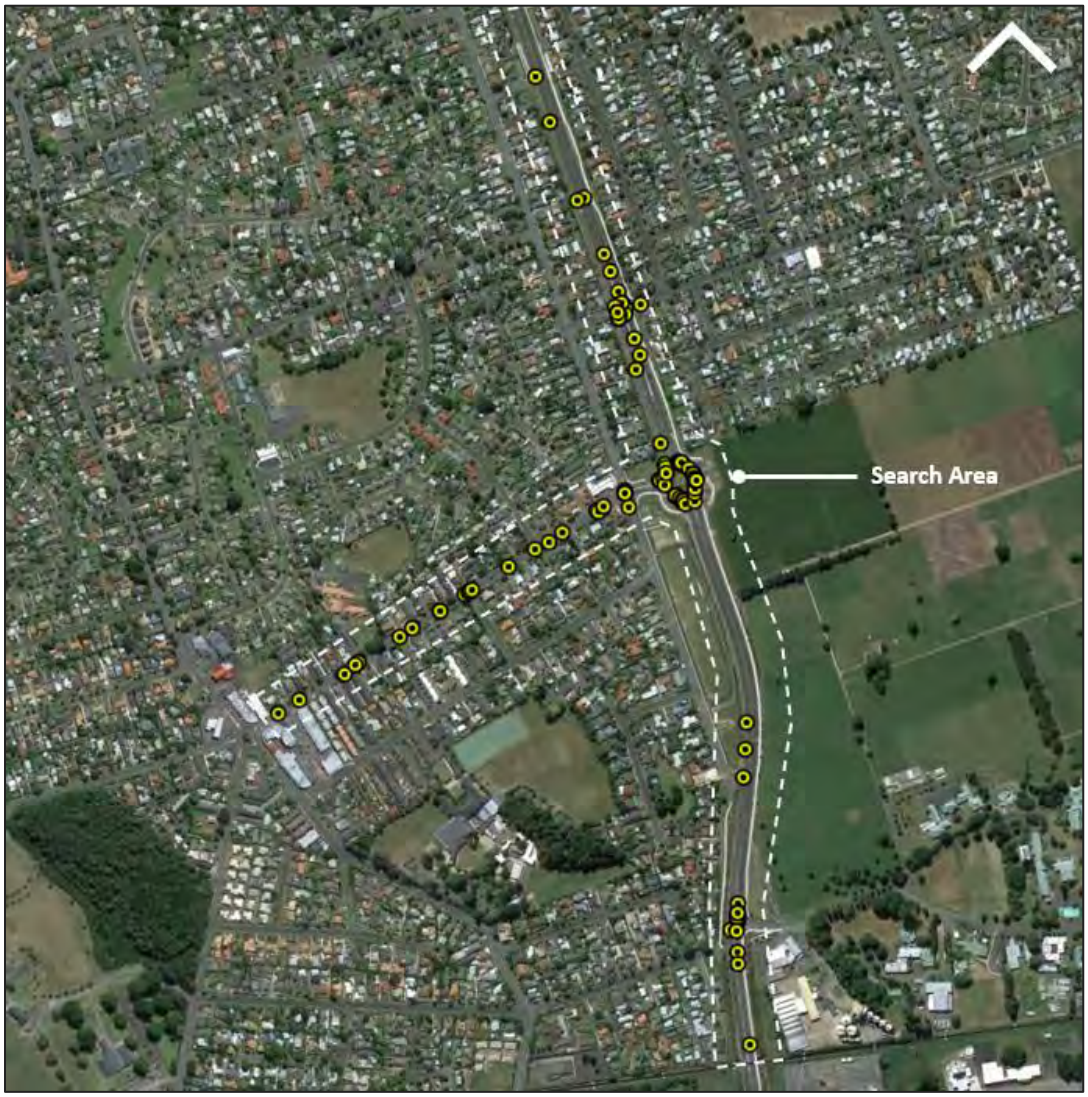


Figure 3.3: CAS Search Area and Reported Crash Locations

Table 1 summarises reported crashes by severity and location. For the three major intersections on Wairere Drive, the Table also presents the observed and expected average annual injury crash rate. The expected values are derived from the Waka Kotahi general crash prediction models in the Crash Estimation Compendium. They are used here to give a general indication of how each intersection is performing relative to a typical intersection with the same form and traffic loading.

Table 1: Crash Summary

Road Section or Intersection	Crash Severity				Total Injury Crashes/Year	
	Fatal	Serious	Minor	Non-Injury	Actual	Expected
Fifth Avenue (Wairere Drive to East of Five Cross Roads)	0	2	5	18	-	-
Wairere Drive Midblocks (1km north and south of Fifth Avenue)	0	1	2	13	-	-
Wairere Drive/Fifth Avenue Roundabout	0	0	2	30	0.4	0.27-0.49[2]
Wairere Drive/Bisley Road Traffic Signals	0	0	3	6	0.6	0.93
Wairere Drive/Powells Road Traffic Signals	0	1	4	12	1.0	0.82
Wairere Drive/Tramway Road (South) Left Turn Slip	0	0	0	1	-	-

The Table illustrates that the Wairere Drive/Fifth Avenue roundabout is operating within the range expected, with a relatively low occurrence of injury crashes compared to non-injury. The Wairere Drive/Powells Road intersection is operating with a higher-than-expected crash rate whilst the Wairere Drive/Bisley Road intersection has a slightly lower rate than expected.

Of the circa 100 crashes that are presented in Table 1, three involved vulnerable road users (pedestrians, wheeled pedestrians, cyclists, or scooter/skate riders). Two of these occurred on Wairere Drive and the crash reports noted no contributing factors on the part of the drivers. The third involved a scooter user being hit by a car trying to cross Fifth Avenue.

Approximately two thirds of all the crashes occurred in adverse weather (including rain, mist and fog). Six of the one hundred reported crashes noted a road factor as contributing to the crash. Where these were listed in the crash report they included:

- Parked vehicles on Fifth Avenue restricting sight distance at the John Street intersection;
- Loss of traction at the Wairere Drive/Fifth Avenue roundabout (southbound) in wet conditions (3);
- ‘Aquaplanning’ at the Wairere Drive/Fifth Avenue roundabout (northbound); and
- Planting in Wairere Drive median obscuring visibility of a pedestrian emerging from the other carriageway (this is one of the two pedestrian crashes mentioned above).

Overall, this crash history reflects a busy urban environment and one relatively high-speed corridor (Wairere Drive), compared to the more urbanised surrounding aeras.

The nature of the crashes on Wairere Drive and at the Wairere Drive/Fifth Avenue roundabout point to road surface and vegetation factors which can be addressed as part of routine maintenance activities.

[2] Range represents the =>80km’h rural roundabout model and the 50km/h-70km/h urban roundabout model, both of which are potentially relevant.

4 Planned Future Transport Network

4.1 Road Infrastructure Projects

The following transport infrastructure projects are planned (and in some cases completed or nearing completion) in the area surrounding the site.

Waikato Expressway (WEX) Hamilton Section

As described earlier in Section 2.3, the Hamilton Section of the WEX is operational having recently been opened (August 2022). The broader WEX project delivers a strategic transport corridor for the Waikato region, connecting Auckland to the Waikato and Bay of Plenty regions and provides strategic connectivity with the Ruakura Industrial Superhub and the Inland Port, a key road/rail point of integration.

Section 5.1 of the Modelling Report details the effects that the opening of the Hamilton Section of the WEX is expected to have on traffic volumes around the Plan Change area. The WEX has been included in the 'existing' network scenarios because it is expected to be in place ahead of any activity in the Plan Change area.

HCC Ring Road Development

HCC is currently extending Wairere Drive (the Hamilton Ring Road) south to Cobham Drive and across the Waikato River into Peacocke. This will complete the final section of the Ring Road route around the city. The project also includes shared walking and cycling paths.

The Wairere Drive elements of the project are expected to be complete in 2022. The new Waikato River bridge is expected to be complete by late 2023.

Ruakura Road Urban Upgrade

HCC is currently/has recently completed upgrading Ruakura Road between Wairere Drive and Silverdale Road, where existing Ruakura Road will meet Realigned Ruakura Road. The upgrade includes new and upgraded signalised intersections, additional traffic lanes in some locations and new walking and cycling paths and crossings. Some of this work delivers parts of the transport infrastructure planned as part of the Ruakura Structure Plan area.

Eastern Transport Corridor

The Eastern Transport Corridor (ETC), formerly known as the Spine Road, runs through the Ruakura Structure Plan area from Pardoa Boulevard in the north to Realigned Ruakura Road in the south.

The northern section (Pardoa Boulevard to Webb Drive) has been constructed as part of development in Greenhill Park. At the southern end, Realigned Ruakura Road (from the Ruakura WEX interchange to the Ruakura Road/Silverdale Road intersection) has been constructed as part of the Ruakura Road Urbanisation project and development of the inland port.

The middle section is a significant piece of infrastructure, requiring a new grade-separated crossing of the ECMTR. The HCC LTP includes $84M in funding for Ruakura transport upgrades and development over the period 2022/23 to 2030/31.

4.2 Public Transport

The Waikato Regional Council (WRC) released its draft 2022-2032 Regional Public Transport Plan (RPTP) for consultation in July 2022.

In Hamilton, the ‘Hamilton Ridership Network Plan’ element of the RPTP targets the interdependent outcomes of better frequency, better ridership, easier transfers and reduced waiting times. Higher urban density and compact urban form are recognised as both contributing to, and being enabled by, frequent public transport.

The proposed ‘Future Frequent Network’ to be implemented over the period 2022 to 2032 is shown below.

Figure 4.1: Future Frequent Public Transport Network (Draft RPTP, Network Diagram 1)

The Plan Change area (named “Tramway” on this diagram) is well integrated with this planned network. Tramway is a key interchange with three frequent bus lines. There is also a primary interchange nearby at Ruakura.

The planned evolution of this network over the period 2022-2052 is shown as Figure 4.2. It retains the same core structure but strengthens the two central networks with bus rapid transit (BRT) services.

Figure 4.2: Future Frequent Public Transport Network + Rapid Lines (Draft RPTP, Network Diagram 2)

4.3 Walking and Cycling Networks

Eastern Pathways / Te Ara o te Rawhiti Project

HCC is delivering a range of active model transport project under the umbrella of the Eastern Pathways / Te Ara o te Rawhiti Project.

A key component of this is the School Link project, which is intended to provide a safer environment along the Hukanui Road & Peachgrove Road corridors for walking and cycling (as well as scooters, skateboards and other non-motorised and micro-mobility modes) It also aims to improve the priority of public transport to/from the educational facilities in the eastern suburbs of Hamilton.

A map of the project and its intended staging is shown on Figure 4.3 below.

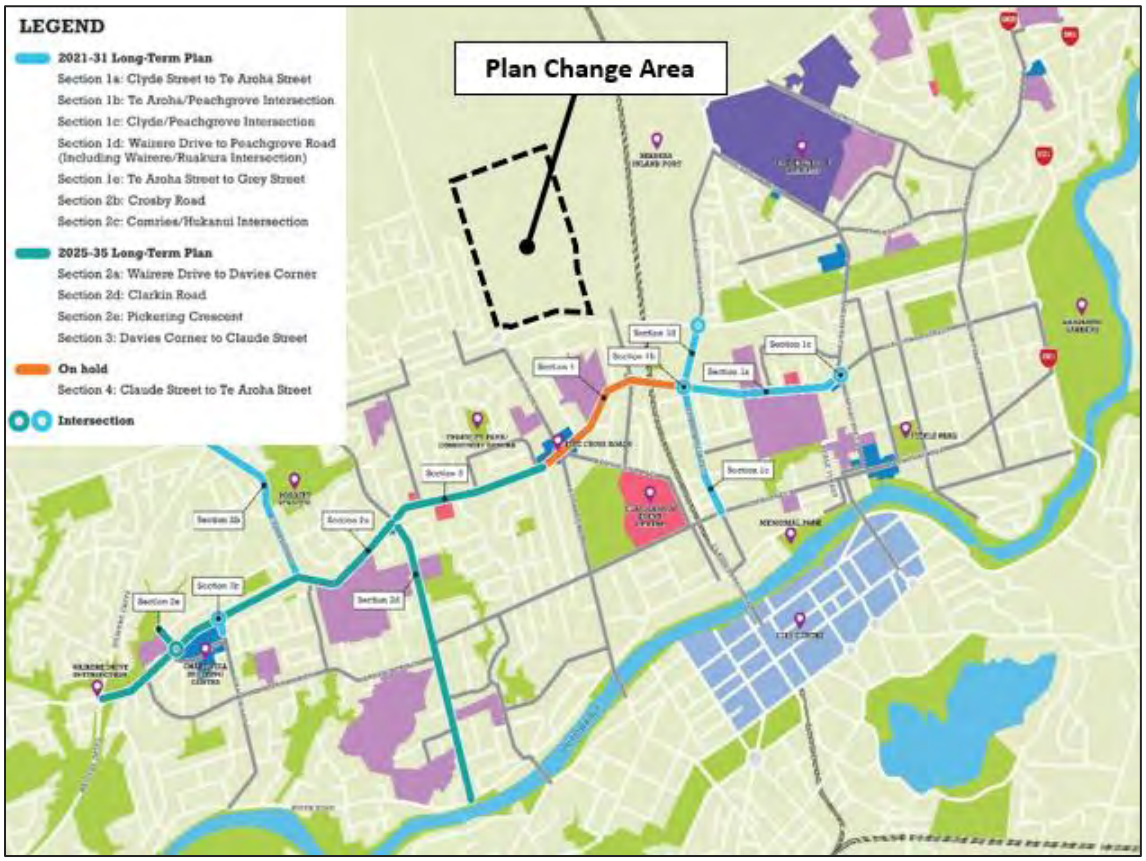


Figure 4.3: School Link Project Staging

Source: HCC, 2022

In late 2021, the School Link Project was approved by Waka Kotahi NZ Transport Agency for pre-implementation funding of $2.8 million, which will fund the design of the project in stages. The full budget required to deliver School Link is $28 million. This funding forms part of the 2021-24 National Land Transport Programme (NLTP) announced in September 2021, under which Waka Kotahi guaranteed funding of $163.5 million for transport projects in Hamilton. Under the NLTP, Waka Kotahi co-invests 51% of the cost of approved projects with Council funding the remaining 49%.

4.4 Micro-Mobility

HCC's biking and micro-mobility programme is at a relatively early stage. One of its aims is to prepare a city-plan to encourage biking and micro-mobility (which includes use of electric and non-electric devices such as bikes, scooters, and skateboards).

The draft Biking and Micro-Mobility Programme Single Stage Business Case (HCC, April 2021) includes the strategic network plan shown as Figure 4.4 below.

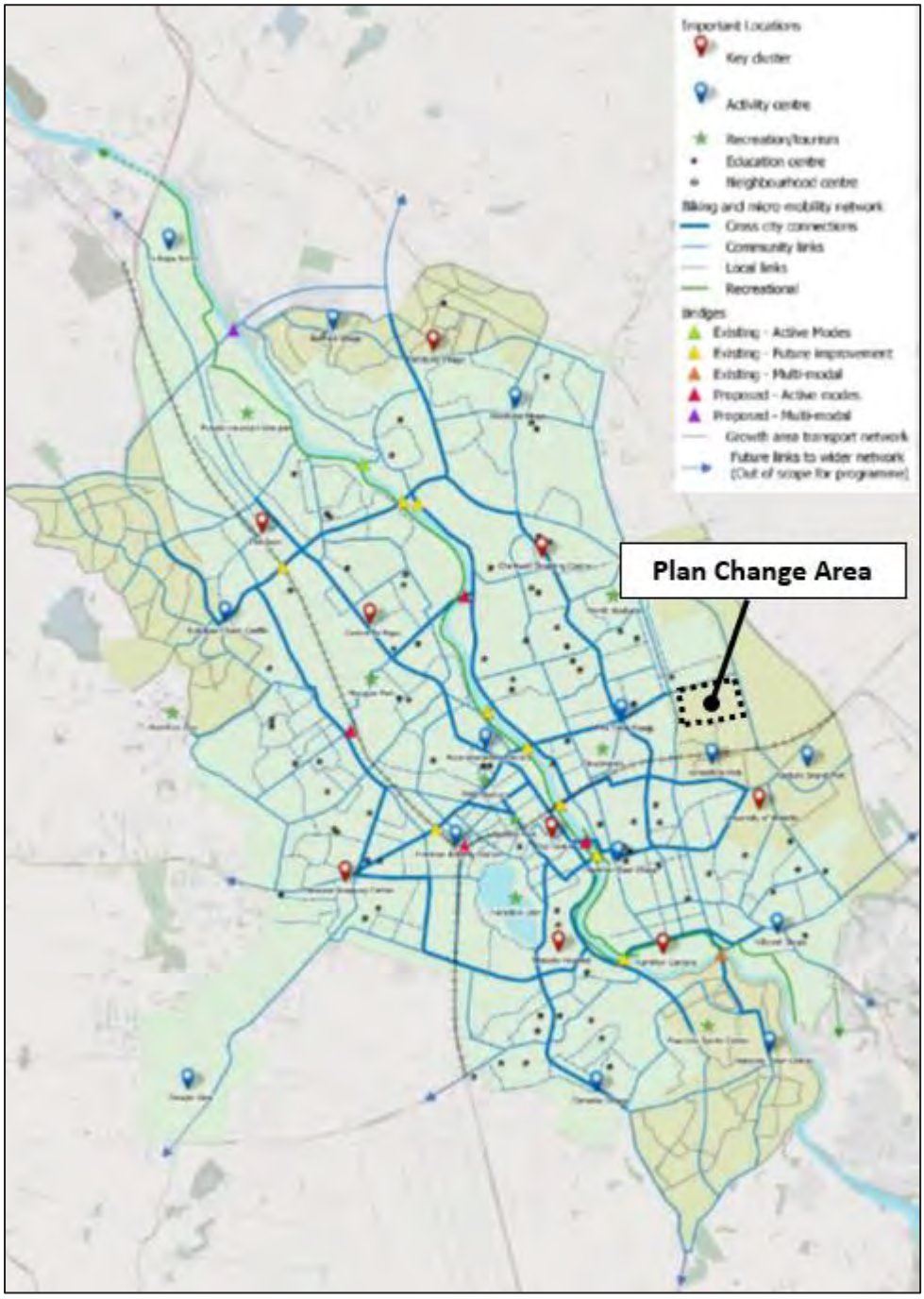


Figure 4.4: Proposed Biking and Micro-mobility Strategic Network Plan

Source: HCC, 2021

In the vicinity of the Plan Change area, Five Cross Roads, the University and Innovation Park are recognised as key activity centres. Ruakura Road and the area around the University are included in Decade 1. Five Cross Roads and the area around the Plan Change are included in the second decade.

4.5 Speed Management

The HCC Speed Management Plan is an implementation plan for achieving safer speeds in Hamilton. It sets out the what, who, where and how of work to be done, and indicates funding to implement the work. Speeds are managed through a combination of road design, risk-targeted enforcement, and education on safe behaviour, all reinforced by appropriate speed limits. It supports the Road to Zero outcomes for the City and as directed by Government.

The Plan describes a range of "Principles" including targeted 30km/h speed outcomes for schools and high pedestrian/cycle areas and 40km/h speed outcomes for the local road environment. The endorsed Speed Management Plan (July 2022) for the city is shown on the following Figure:

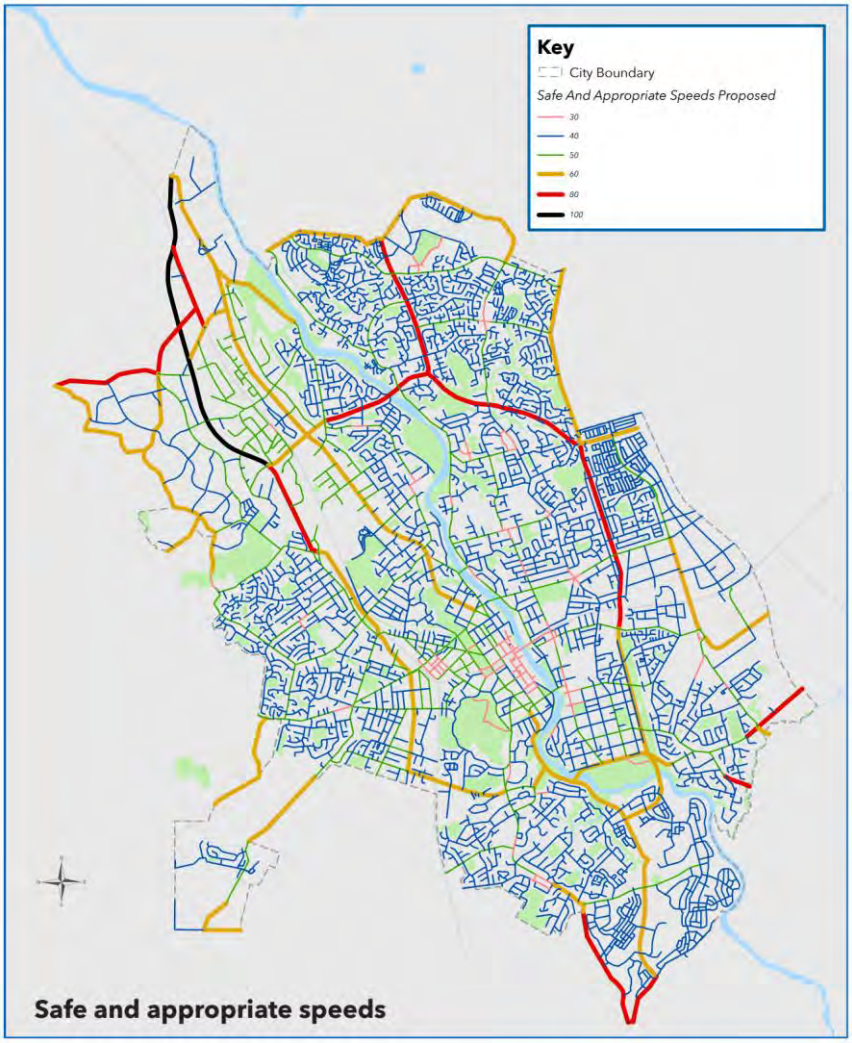


Figure 4.5: Speed Management Plan

Source: HCC, 2022

The map shows the following speed zoning objectives:

- Fifth Ave extension: 50km/h;
- ETC adjacent to the site: 60km/h
- Internal roads within the site: 40km/h;
- The school location within the site: this is currently a land use option not foreclosed and therefore planning for the school frontage speed environment will need to be undertaken in conjunction with planning for the activity.

The programme for speed management works anticipates the subject greenfield site will develop in a way that is aligned with the Plan, when development occurs.

5 Plan Change Proposal

5.1 Land Use

The Tuumata Plan Change includes three land use types, the Tuumata Residential Zone, the Tuumata Neighbourhood Centre (NC) (Business 6 Zone), and Ruakura Open Space Zone. The proposed Structure Plan is shown as Figure 5.1 below. This and other Structure Plan drawings are also included at a large scale in Appendix C.

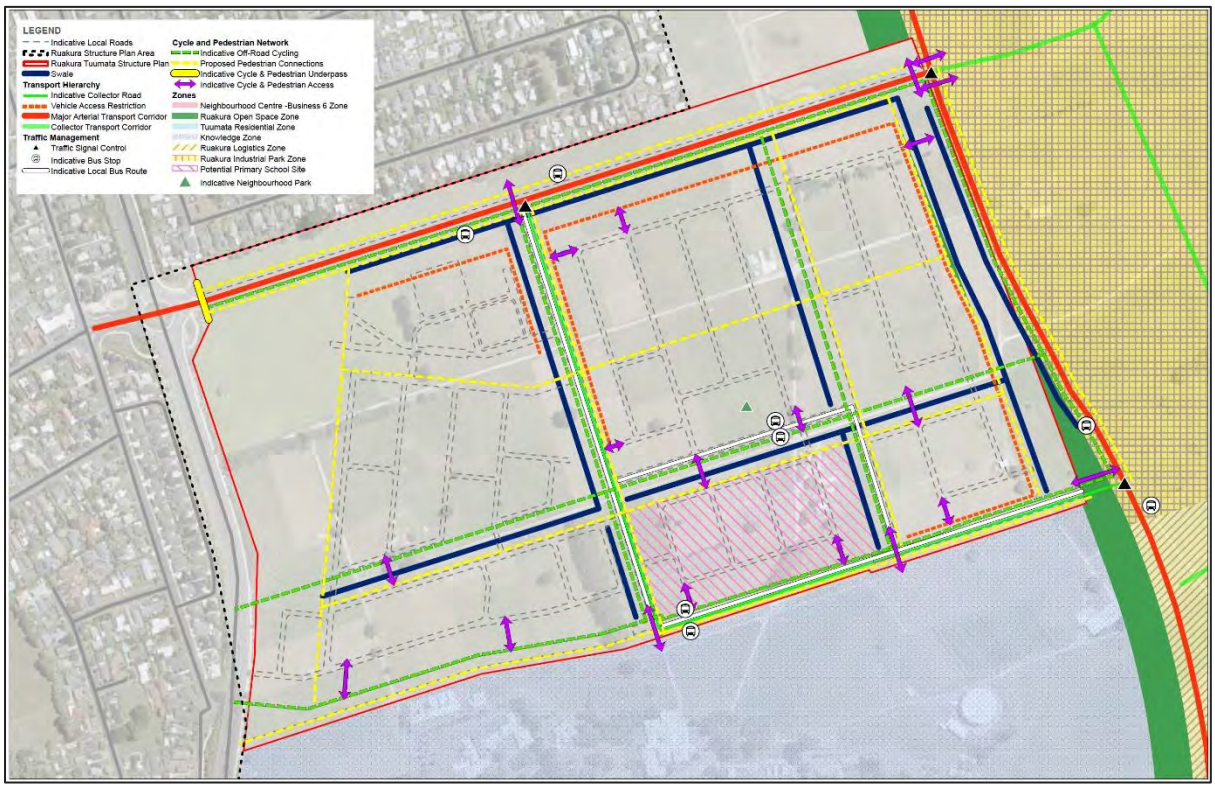


Figure 5.1: Ruakura Tuumata Structure Plan

Source: Boffa Miskell

The Plan Change area is expected to yield approximately 1,269 dwellings (including 100 apartments in the NC) and approximately 6,000m^2 gross floor area (GFA) of NC. For the purposes of the analysis that follows, the HCC ODP definition[3] of GFA has been adopted.

[3] **Gross Floor Area (GFA):** Means the sum of the gross floor area of all floors of all buildings on a site measured from the exterior faces of the exterior walls or from the centrelines of walls separating two buildings. Gross floor area shall include elevator shafts, stairwells and lobbies at each floor and mezzanine floors and balconies, and exclude any provided car-parking, loading and servicing areas and access thereto and building service rooms containing equipment such as lift machinery, tanks, air conditioning and heating plants.

TGH has also been in discussions with the Ministry of Education (MoE) regarding the opportunity to designate a primary school in the southern part of the Plan Change area. Although the planning for this is at an early stage and a formal designation process would need to be undertaken, the planning of the road network and land use pattern has ensured a school could be appropriately accessed if needed, including by school buses. The land use therefore is intended to not preclude a school establishing where that is to be progressed by others.

5.2 Transport Hierarchy

5.2.1 HCC Transport Hierarchy

The Plan Change adopts the existing transport hierarchy of the Ruakura Structure Plan, with a change to the indicative collector road network. The proposed transport hierarchy is shown below as Figure 5.2. Full scale drawings are also included as Appendix C.

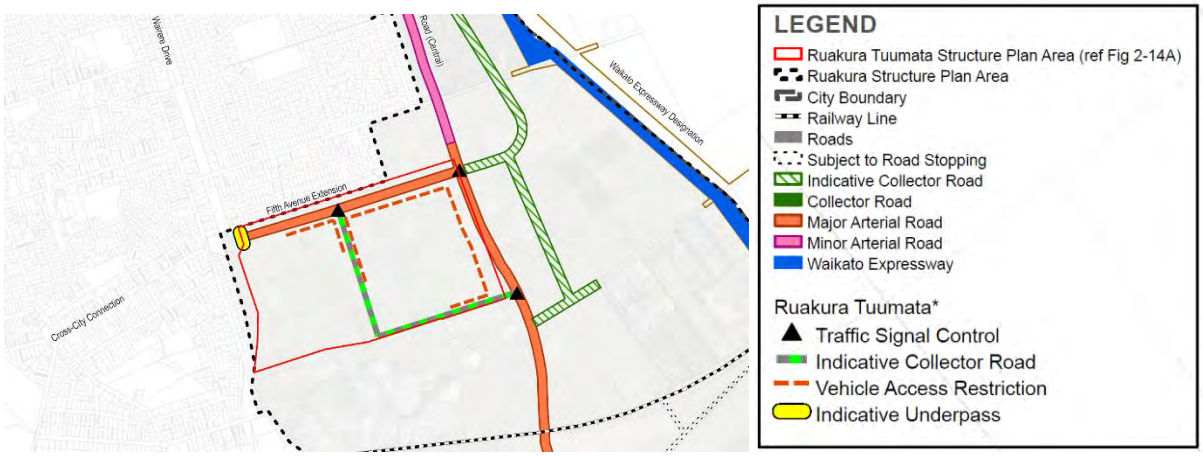


Figure 5.2: Plan Change Transport Hierarchy

Source: Boffa Miskell

The Fifth Avenue Extension and ETC (from just north of the Fifth Avenue Extension) form the major arterial road network in this area. As the ETC moves north it takes on minor arterial status.

Two collector road corridors are proposed to serve the Plan Change area, one connecting to the Fifth Avenue Extension and one connecting to the ETC. These corridors are intended to be only partially constructed in the initial stages, to avoid creation of a continuous route that could be used as an alternative through route, rather than staying on the ETC and Fifth Avenue Extension. Movement between them will be enabled for active modes and potentially public transport vehicles only. All other roads within the Plan Change area would be local roads.

The collector road that runs approximately north-south is intended to provide for a future extension of the collector road network into the neighbouring land to the south. The future development intent for this land (the AgResearch area) is not known and is beyond the scope of the current Plan Change.

Provision of a collector road to the southern boundary of the Plan change protects options for this area, which will need to go through its own planning process in future.

Figure 5.2 also shows vehicle access restrictions along parts of the Fifth Avenue Extension, the ETC frontages, and the internal collector roads. The basis for these is discussed in Section 5.3.

5.2.2 Internal Transport Hierarchy

Internally, the Plan Change features a network of collector roads and local roads. Within these general categories, specific cross-sections have been developed to respond to features such as intersections, adjacent land uses and the multi-modal network. This results in two types of collector road and a range of local road typologies.

The intended, and at this time indicative only, internal hierarchy is shown below as Figure 5.3, with a larger scale version also included in Appendix C.

Figure 5.3: Internal Transport Hierarchy

Source: Boffa Miskell

Cross-sections are included in Appendix E for the following road types:

- Collector road (A);
- Collector road (Intersection) (A2);
- Local road (7m) (B);

- Local road with shared path (B2);
- Local road adjacent to Neighbourhood Centre (B3);
- Local road with shared path and bidirectional cycle lane (B4);
- Local road with bidirectional cycle lane (B5);
- Local street (5.7m) (C);
- Local road (5.7m) with shared path (C2);
- Local road (5.7m) and separated cycle way (C3); and
- Local road (5.7m) adjacent to park (C4).

These cross-sections were developed through a multi-disciplinary process considering integrated stormwater management, intended urban design outcomes, as well as the transportation outcomes of a providing appropriate capacity and space for each mode, creating a self-explaining low-speed environment, and minimising conflict between modes.

5.3 Access Management

Vehicle access restrictions are proposed on:

- Fifth Avenue Extension, from approximately halfway between Wairere Drive and the new collector road to the ETC;
- The ETC, from the Fifth Avenue Extension to the collector road;
- Part of the east and west sides of the north-south collector road; and
- Part of the northern side of the east-west collector road on the approach to the ETC.

These vehicle access restrictions are shown on Figure 5.4 below.

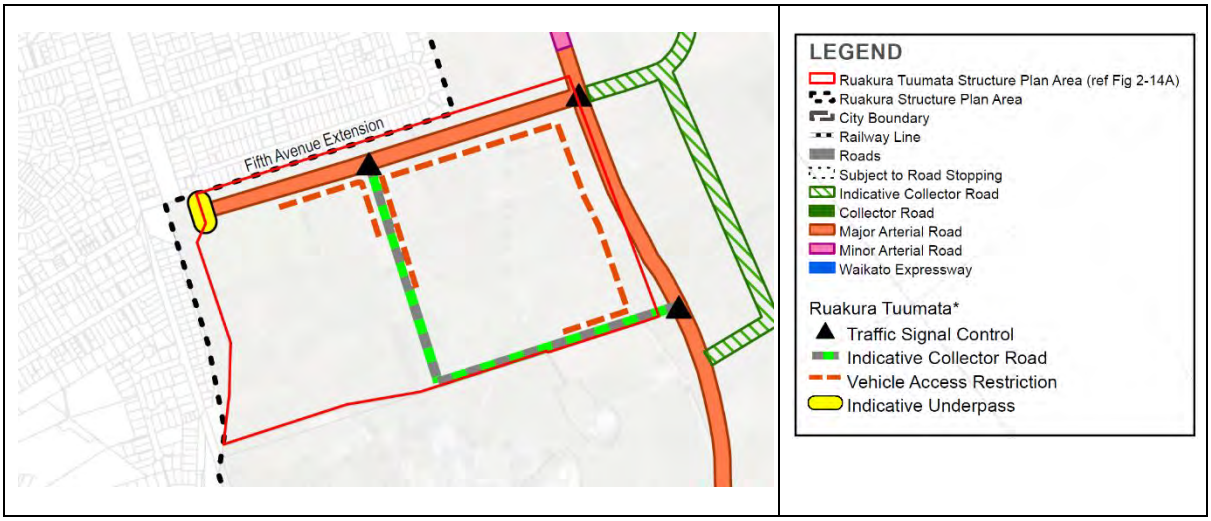


Figure 5.4: Access Restrictions

Source: Boffa Miskell

The purpose of these restrictions is to respond to and protect the major arterial road functions of the frontage roads, and potential conflict with the walking and cycling paths that run along them. Managing the number of intersections and driveways along these routes reduces side friction and the number of potential conflict points. For the walking and cycling paths it also reduces the potential for conflict and creates longer sections of uninterrupted paths, which improves travel time for cyclists in particular. Pedestrian, cycle and micro-mobility movement across these vehicle restriction areas is intended to be unencumbered.

The internal restrictions on the collector roads are designed to keep access points out of areas that are needed (or may be needed in future) for approaches to the intersections on each frontage road.

5.4 Multi-modal Accessibility

5.4.1 Walking and Cycling

The multimodal transport network in the Plan Change builds on and refines the existing Ruakura Structure Plan pedestrian and cycle network. The proposed Plan Change network is shown below as Figure 5.5. It is also shown at a large scale, and over a wider area, in Appendix C.

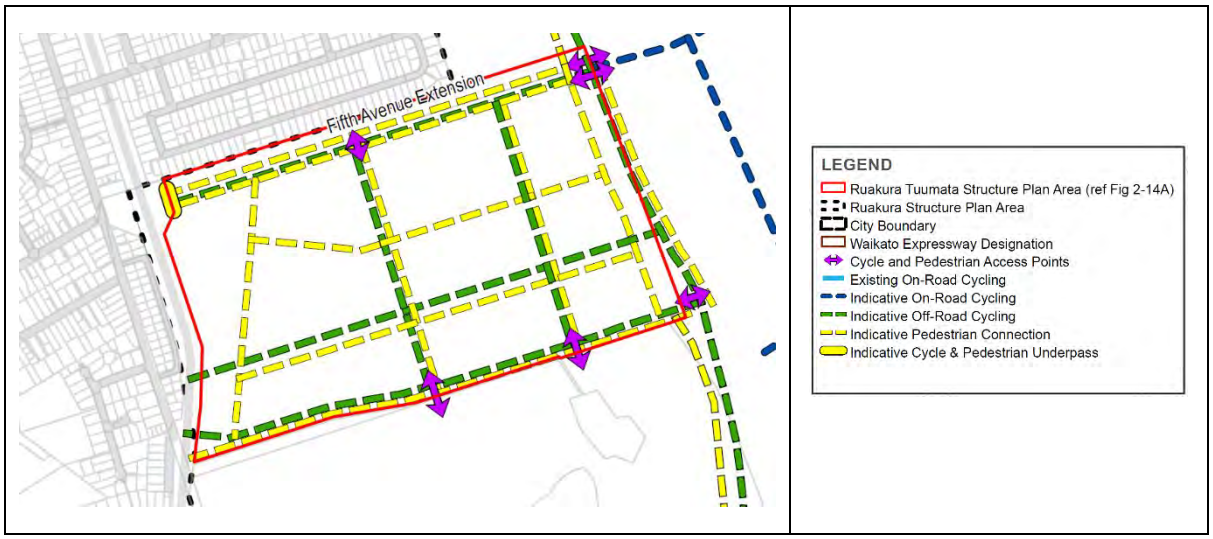


Figure 5.5: Plan Change Walking & Cycling Network

Source: Boffa Miskell

The network has been designed to offer a high degree of permeability for walking and cycling, to support direct travel routes and to minimise travel time via these modes. Integration with surrounding facilities including the Wairere Drive shared path and underpasses is also provided along all frontages.

5.4.2 Public Transport

Public transport routes have been identified within the Plan Change area and along the networks that surround it. These have been developed in consultation with both Hamilton City Council and Waikato Regional Council (WRC).

Primary public transit routes are shown on the WRC Draft Regional Public Transport Plan (RPTP) as being maintained on the Fifth Ave extension and along the proposed ETC, both with frontages to the site. The longer term objective is for these to be enhanced to perform as frequent[4] service routes which link with the BRT networks at the University of Waikato, along Ruakura Road and Peachgrove Road to the west.

Within the site, provision has been made for public transit servicing on the secondary, collector road network. This includes provision for school bus access to the school site should that be established.

The structure plan is therefore well located in terms of access to planned frequent bus networks and is also designed to include internal servicing where that is to be progressed. Bus network servicing is to be established by others and subject to other considerations. In the early stages, the site is accessible to and able to make effective utilisation of the on-demand public transport system. It is expected that as numbers and density of development within the site increases this will be able to be supported with increasingly frequent public transport services.

5.5 Speed Management

The structure plan has been developed to ensure the proposed local and adjoining arterial road network will be formed to align with Council's Speed Management Plan (SMP). A range of indicative street cross sections have been prepared to indicate the potential speed management outcomes within the structure plan area for the local and collector streets. The arterial road network will be determined in consultation with Council at the time it is to be designed and formed.

Within the local and collector road network areas, forms of positive traffic management will be required to manage speeds to achieve the SMP targeted outcomes. Within the structure plan there is the opportunity to plan and locate these to prioritise safe pedestrian and cycle movement through the site, delivering a neighbourhood capable of supporting higher alternative transport mode use and fewer local motorised vehicle trip outcomes.

[4] It should be noted that a 'frequent service' is distinct from a 'rapid transit service' which is defined in the NPSUD 2020 (Updated May 2022) as "…any existing or planned frequent, quick, reliable and high-capacity public transport service that operates on a permanent route (road or rail) that is largely separated from other traffic."

6 Strategic Framework

This section provides an overview of relevant strategies and policies as well as a summary as to how the proposed Tuumata Plan Change supports each policy and responds to it. A full assessment of the strategic transport context with respect to an integrated approach to land use and transport planning is summarised in Appendix D. The strategies and plans reviewed are:

- Draft Hamilton Urban Growth Strategy – October 2022;
- HCC Proposed Plan Change 12;
- Government Policy Statement on Land Transport - 2021-2031;
- National Policy Statement on Urban Development 2020;
- Government Emissions Reduction Plan;
- Road to Zero - 2020-2030;
- Future-Proof 2021:
- Waka Kotahi Investment Proposal - 2021-2031;
- Waka Kotahi Keeping Cities Moving - Published 2019;
- Waikato Regional Land Transport Plan - 2021-2051;
- Waikato Regional Public Transport Plan (Draft) – 2022-2032;
- Hamilton-Waikato Metro Spatial Plan – Published 2020;
- Access Hamilton – Published 2010; and

HCC has other strategies and plans in place for speed management, walking and cycling, and recently completed a Biking and Micro-mobility Programme Business Case. These have been had regard for in developing the proposed structure plan.

By way of a broad summary, the strategic context documents indicate the following directions:

- Targeted outcomes for transport safety, both in terms of reduced frequency of crashes and for reduced personal injury (severity) in the event of a crash. The Government Policy Statement (2021) signals a purposeful shift toward planning for a transport network free of death or serious injury;
- Increased utilisation of public transport, walking cycling and modes alternate to the private motor vehicle;
- Enhanced freight connectivity and movement, delivering economic efficiency, in part delivered through the other outcomes but also through strategic interventions;
- Improved community and urban environment outcomes;
- Integrated land use and transport environments that provide choice and reduce the demand for private motor vehicle travel;
- Enhanced environmental outcomes, principally through reduced transport emissions, including through the introduction of electric vehicles and increased utilisation of transport modes alternate to the private motor vehicle; and

- Increased land use densification around rapid transit corridors.

These fundamental principles can be seen to cascade through policy direction from Government, to regional and into the local strategy development, including planned implementation programmes. The assessment in Appendix D describes how these strategic directions have influenced design of the transport system for the Tuumata Plan Change.

Overall, the Tuumata Plan Change aligns well with national, regional and local strategic transport planning and land use frameworks. It has been developed in consultation with key stakeholders and Agencies including HCC and WRC and seeks to respond to and support the strategic directions of these organisations.

The policy framework proposed as part of the Plan Change provides support for a high level of integration between land use and transport and promotes both density and the prioritisation of specific transport modes in the appropriate setting.

7 Trip Generation

Trip generation rates were developed in consultation with HCC and with reference to the RMS Guide to Traffic Generating Developments (New South Wales) and associated studies[5], the New Zealand guidance document RR453 (Trips and Parking Related to Land Use), as well as the existing characteristics of the WRTM in comparable land use zones.

The adopted rates are:

- 0.53 vehicles per hour (vph)/residential unit during the AM and PM peaks;
- 7.76 vph/100m^2 GFA of the neighbourhood centre during the AM peak; and
- 10.41 vph/100m^2 GFA of the neighbourhood centre during the PM peak.

Further analysis of trip generation rates relative to those that are established for other areas in the WRTM model is presented in Section 2.3 of the Modelling Report.

The expected trip generation of the Plan Change area is summarised in Table 2. The table shows one-hour and two-hour volumes, since the WRTM represents two-hour peak periods. The expected generation of the interim stage of development is also shown.

Table 2: Plan Change Trip Generation

Land Use	AM Peak		PM Peak	
	One Hour	Two Hour	One Hour	Two Hour
Full Development				
Neighbourhood Centre	466	815	625	1,093
Residential	673	1,177	673	1,177
TOTAL	1,138	1,992	1,297	2,270
Interim Stage (Pre-ETC)				
Residential	228	399	228	399

[5] Trip Generation Surveys Small Suburban Shopping Centres Analysis Report, Bitzios Consulting for Roads and Maritime Services NSW (November 2018)

8 Plan Change Transport Effects

8.1 Intersection Type Selection

The Plan Change has two intersections that connect it to the wider arterial transport network, one on the Fifth Avenue Extension and one on the ETC. The form of control for these intersections was assessed and evaluated considering a wide range of factors.

HCC's approach in other Structure Plan areas, and the approach generally adopted by Waka Kotahi in project evaluation, identifies the following factors to be considered in intersection design, in descending order of importance:

- Achieving Vision Zero safety objectives;
- Encouraging active modes;
- Public transport prioritisation; and
- Car efficiency.

It is also relevant to note that HCC has advised that it intends to provide a signalised intersection where the ETC meets the Fifth Avenue Extension. Other major intersections along the ETC are formed or intended to be formed as a mixture of signals and roundabouts.

This approach to intersection design generates a hierarchy of potential intersection treatments to be considered. Grade separation is the highest form of treatment, on the basis that it eliminates conflicts and the potential for harm. The full list of intersection forms is:

- Grade separation of all movements;
- Roundabouts with grade separation for active mode;
- Signalised intersections with grade separation for active modes. Vehicle speeds to be managed through use of raised platforms on the approaches, or tables across the whole intersection;
- Signalised intersections with signalised crossings for active modes. Vehicle speeds to be managed through use of raised platforms on the approaches, or tables across the whole intersection;
- Roundabouts with "build-outs" (or similar) provided for active mode crossings being made at-grade;
- Signalised intersections with signalised crossings for active modes. No physical control of vehicle speeds; and
- Priority controlled (Give Way) intersections.

Specific design features such as the number, allocation and length of lanes is also considered but at an operational level, once the philosophical approach to the form of control is identified.

Taking into consideration these matters, an evaluative framework has been prepared to provide some guidance and comparative assessment of the options, as set out in Table 3 below. The various forms of control have been scored in the context of the proposed Plan Change intersections.

Table 3: Intersection Form of Control Evaluation

Evaluation Criteria	FORM OF INTERSECTION CONTROL						
	Grade separation	**Roundabout with grade separation for active modes**	**Signals with grade separation for active modes**	**Signals with signalised crossings for active modes, with speed management**	**Roundabout with "build-outs"**	**Signals with signalised crossings for active modes, no speed management**	**Priority control**
Investment Objectives							
Safety – Contribution to Vision Zero	3	2	2	1	-1	-2	-3
Encouraging Active Modes	-3	3	3	1	0	-1	-2
Public Transport Prioritisation	3	1	1	1	1	1	-1
Access / Efficiency	0	3	3	3	3	3	-2
Investment Objectives Sub-Total	3	9	9	6	3	1	-8
Critical Success Factors							
Technical Difficulty (how achievable)	-3	-1	-1	1	1	2	2
Potential Affordability	-3	-1	-1	1	1	1	3
Enabling Development	-3	3	3	2	2	2	-1
Environmental Context	-3	2	2	2	2	2	2
Critical Success Factor Total	-12	3	3	6	6	7	6
Opportunities and Impacts							
Environmental Effects / Constraints	-3	-1	-1	0	0	0	0
Social and Cultural Impacts	-2	1	1	1	1	0	0
Impacts to Jobs, Recreation etc.	0	1	1	0	0	0	0
Climate Change Adaption	-2	2	2	1	1	-1	-1
Maintenance	-2	-1	-1	0	0	0	0
Opportunities and Impacts Sub-Total	-9	2	2	2	2	-1	-1
Overall Total	**-18**	**14**	**14**	**14**	**11**	**7**	**-3**
Ranking	7	1	1	1	4	5	6

This analysis shows that the joint top-ranking options are assessed to be roundabouts or signals with grade-separated pedestrian crossings, or a signalised intersection with speed management and at-grade crossing facilities.

On the Fifth Avenue Extension, a signalised intersection (with speed management and at-grade crossings) is assessed as the preferred option from these three options because it:

- Satisfactorily achieves the necessary safety in performance outcomes;
- Provides a management mechanism (through signalisation) for the control and prioritisation of movement modes and primary traffic movement flows, including coordination of movements with the Fifth Avenue/ETC intersection;
- Enables the intersection to be managed in terms of how it interacts with Wairere Drive;
- Integrates well in terms of accessibility with the neighbourhood centre;
- Provides for the potential to integrate bus priority outcomes and integrated stop locations that align well with the commercial centre
- Is able to be established to achieve necessary vehicle efficiency outcomes; and
- Is an affordable solution.

On the ETC either a signalised intersection or a roundabout treatment remain feasible options. It is understood that a separate business case process is being progressed by HCC to determine the form of intersections along the ETC and the outcome of that process is expected to determine the eventual design solution at this location. The structure plan has been arranged to enable it to accommodate either option or a hybrid outcome as an when that is determined. Planning for the design solution at this location should ideally have regard for the long-term future development potential of adjacent land to the south of the subject site. The structure plan arrangement achieves this and the same will need to be ensured through Council's business case process.

8.2 Modelling Results

The Modelling Report separately prepared to assess the wider traffic effects of the Plan Change concluded that:

- The Plan Change area is expected to generate approximately 1.138 vehicle movements per hour (vph) during the morning peak hour and 1,297 vph during the evening peak hour.
- Analysis using models for the years 2018 and 2031 shows that an initial release of 430 households can be accommodated by the network, ahead of delivery of the Eastern Transport Corridor (ETC).
- The critical corridor that would support this stage of development is Wairere Drive, which is expected to see a reduction in traffic volume following the opening of the WEX.
- The peak period volume through the Wairere Drive/Fifth Avenue roundabout is expected to reduce by 25-35%.
- The initial development release is expected to generate some 230 vph, which represents a change of between 7% and 9% in peak hour volume at the roundabout. The model indicates that the roundabout can accommodate this change and maintain an acceptable level of service.
- The Wairere Drive/Powells Road intersection to the north of this roundabout operates with a poor level of service irrespective of the Plan Change, and the Plan Change adds a negligible volume of traffic to it.
- Reliance on this intersection will reduce when Powells Road is eventually connected east, to the ETC. In the interim, there are options (explained in Section **Error! Reference source not found.** of this report) to improve the function of this intersection by removing some lower volume movements.
- When fully developed, the Plan Change area is expected to increase link volumes on the existing arterial network by between 5% and 22%. All roads continue to operate with daily volumes that are within their practical carrying capacities.
- At 2041 the city network has various areas that are expected to operate at LOS F. This includes the northern section of Wairere Drive, Resolution Drive, River Road, Hukanui Road. Cambridge Road and Cobham Drive, and parts of the cross-city connector and Ruakura Road.
- The Plan Change does not make link performance around the study area materially worse.
- Travel times with and without the Plan Change were assessed for two routes, one along Wairere Drive from Pardoa Boulevard to Cobham Drive and the other along the cross-city connector from the ETC to the Boundary Road Bridge.
- The travel time comparisons show that the Plan Change is expected to increase journey times on these routes by up to 13% (up to one minute). This corresponds to a reduction in average speed of up to 3.5km/h.
- Analysis of intersection volumes shows that the Plan Change causes nine intersections in the AM peak and seven intersections in the PM peak to see volume increases of 5% or more.
- These intersections all operate at LOS D or better and therefore no changes are required to the network beyond the Plan Change area's immediate access points.
- The Plan Change area is proposed to have two access points, one on the Fifth Avenue Extension and one on the ETC.
- The Fifth Avenue Extension intersection can operate appropriately as a signalised intersection with either a two-lane or four-lane configuration of through lanes along the Fifth Avenue Extension.

- If a school is to be designated in the Plan Change area in future, initial analysis (assuming a primary school with 800 students) indicates that the intersection can accommodate increases in demand, with some potential changes to storage lane lengths. Specifically, the right turn approaching the Plan Change area on the Fifth Avenue Extension would need to be around 20m longer.
- The ETC intersection can operate acceptably as either a single-lane roundabout or a signalised intersection. Either treatment can accommodate the increases associated with a future school.

The full modelling report is set out in a separate report and should be read in conjunction with this assessment.

8.3 Plan Change Infrastructure Needs

8.3.1 Transport Corridors and Intersections

The transportation infrastructure needed to support full development of the Plan Change can be summarised as:

- The Eastern Transport Corridor, from Ruakura Road to join the existing formation to the north of the Fifth Avenue Extension.
- The Fifth Avenue Extension, from Wairere Drive to the ETC.
- A signalised intersection where the Plan Change collector road meets the Fifth Avenue Extension; and
- Either a signalised intersection or a roundabout where the Plan Change collector road meets the ETC.

The analysis in the WRTM shows that at 2041 (at least) both the Fifth Avenue Extension and the ETC will function acceptably with one lane in each direction, for general traffic.

8.3.2 Alternative Mode Provision

The structure plan figures indicate clearly the extent to which alternate transport modes are planned to be established. These are described both in plan form as well as on the cross-section figures. These have been planned to integrate with the wider established multi-modal transport network and include strategic crossing places. This infrastructure is to be established in conjunction with incremental development of the structure plan areas.

8.3.3 Staging

Modelling indicates that some residential development is able to be accommodated prior to the delivery of the ETC. The network can accommodate up to 430 households, accessed via a connection to the eastern leg of the Wairere Drive/Fifth Avenue roundabout.

Any development in the Neighbourhood Centre, and residential development beyond 430 household equivalents has been assessed as necessitating Fifth Avenue to be extended east to the ETC and the ETC to be delivered or committed with sufficient certainty.

9 Conclusions and Recommendations

The proposed Plan Change enables development of approximately 1,269 dwellings and approximately 6,000m^2 gross floor area (GFA) of Neighbourhood Centre. Provision has also been made for inclusion of a primary school, should the Ministry of Education seek to designate one in future.

A multi-modal transport network has been designed to prioritise safe and accessible walking, cycling and micro-mobility routes, and access for public transport services. The proposed transport network appropriately integrates with the surrounding arterial network, by providing a limited number of access points for vehicles. Transport corridors have been designed to provide appropriate capacity for these intersections, and their function is protected through supporting vehicle access restrictions.

A comprehensive set of transport corridor cross-sections are included in the Plan Change to guide delivery of the intended form and functional outcomes. These cross-sections together with the overall system network have been developed to integrate with both the stormwater and open space networks.

Transport modelling has enabled assessment of and confirms that the existing and planned future transport networks will have adequate capacity to accommodate the expected land uses in the Plan Change area. A staging rule is required to reflect that up to 430 dwellings can be accommodated on the existing network, ahead of the ETC. Development of more than 430 dwelling equivalents, including any development in the Neighbourhood Centre area, will require the Fifth Avenue Extension to extend east and link with the ETC, and the Eastern Transport Corridor (ETC) to be adequately committed and certain.

Overall, the Plan Change aligns well with national, regional and local strategic transport planning and land use frameworks. It has been developed in consultation with key stakeholders and Agencies including HCC and WRC and seeks to respond to and support the strategic directions of these organisations.

In relation to residential areas these frameworks generally seek to reduce reliance on private car travel, support the safety and accessibility of alternative modes, and create land use environments that promote choice and enable needs to be met locally.

The policy framework proposed as part of the Plan Change provides support for a high level of integration between land use and transport and promotes both density and the prioritisation of specific transport modes in the appropriate setting.

The existing transport provisions of the HCC District Plan support this strategic transport framework. The Tuumata Plan Change goes further, with supporting detail including a comprehensive on and off-road walking, cycling and micro-mobility network, and transport corridor cross-sections that provide appropriate guidance (on the relevant streets) for separation of active modes along transport corridors and through intersections.

Overall, it is concluded the transport elements of the Plan Change and the supporting policy context enable an appropriate transport network to be established.

Appendix A Ruakura Structure Plan Maps

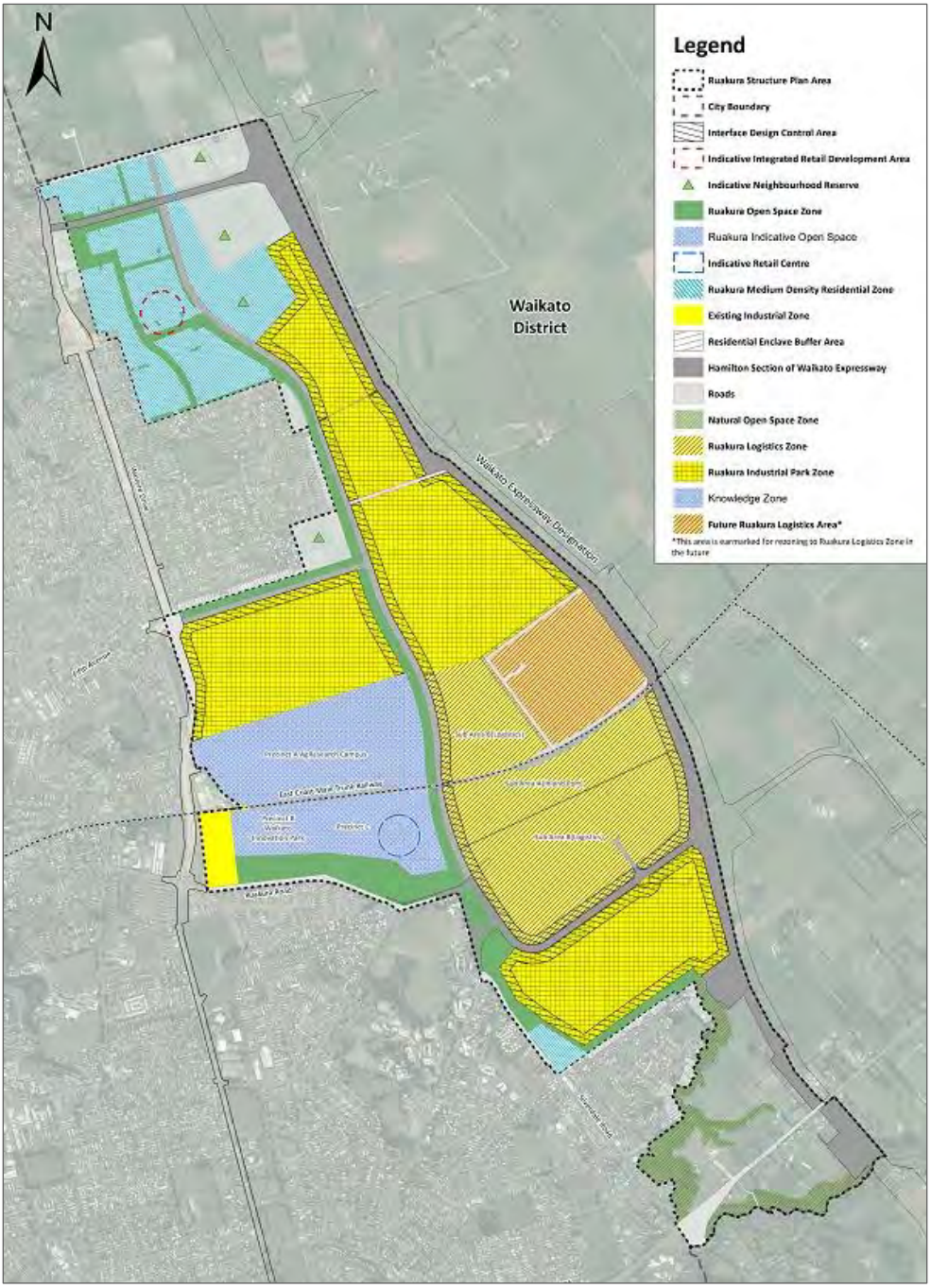


Figure 9.1: Ruakura Structure Plan – Land-use

Source: HCC, 2022

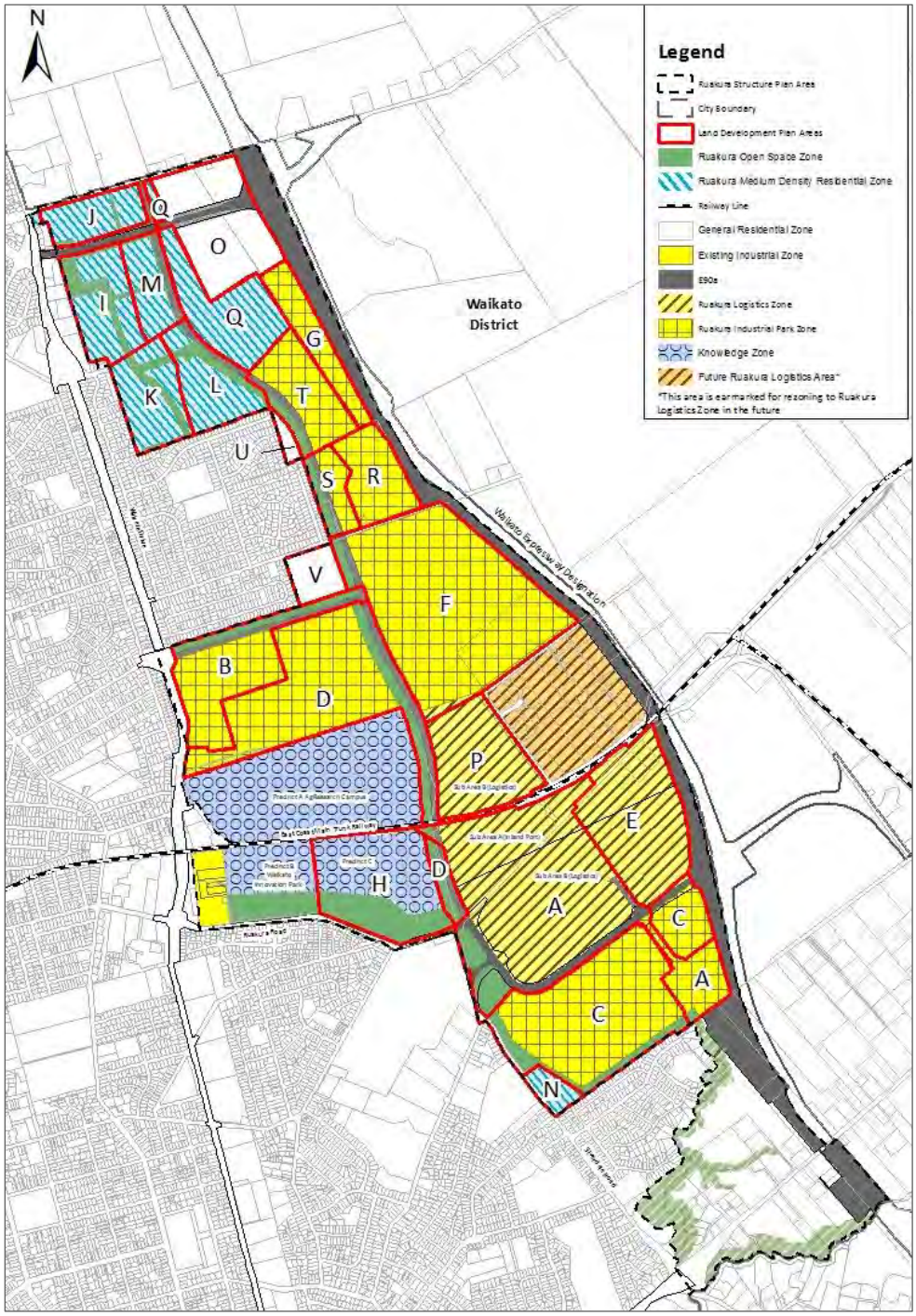


Figure 9.2: Ruakura Land Development Plan Areas

Source: HCC, 2022

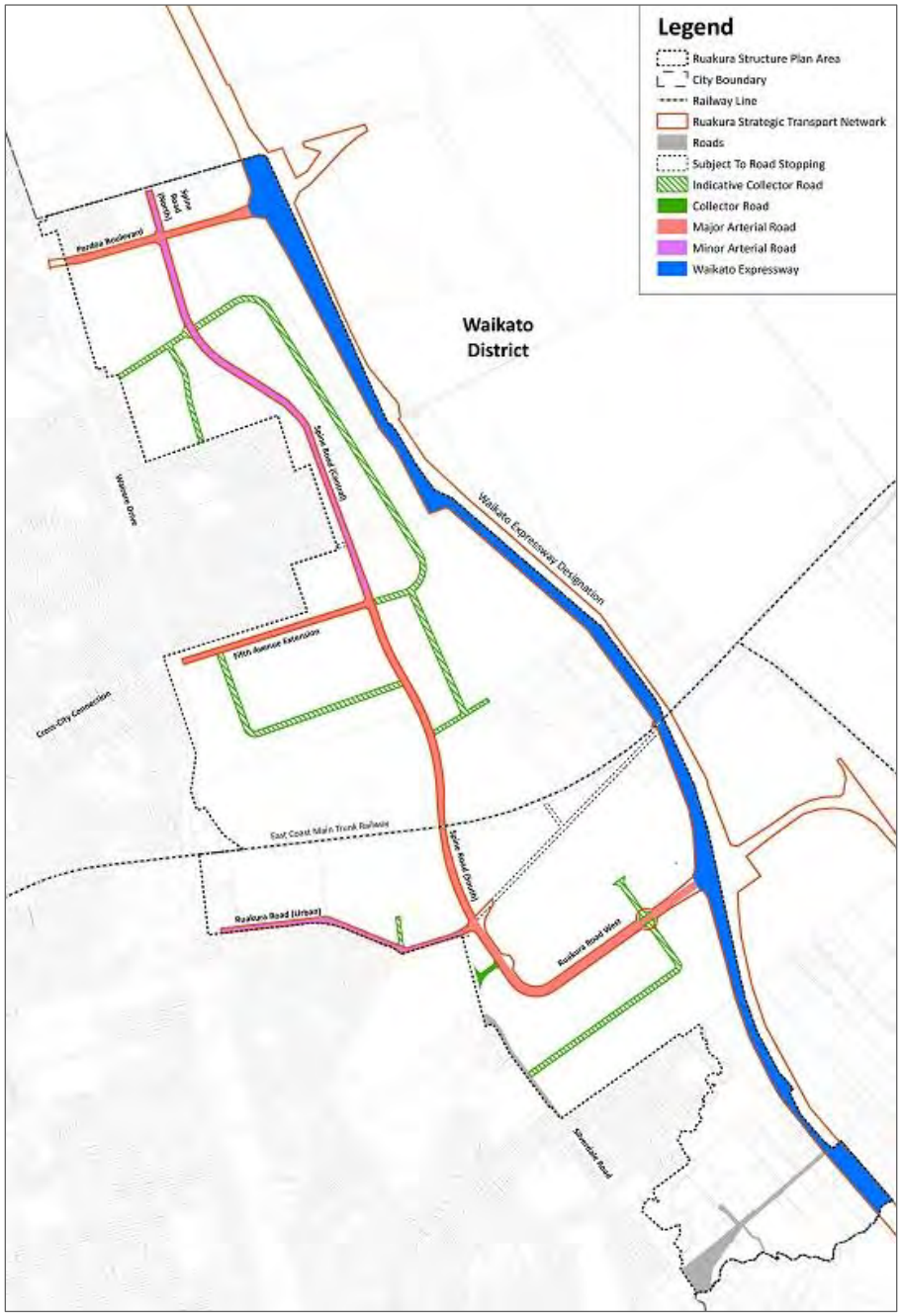


Figure 9.3: Ruakura Strategic Infrastructure - Transport

Source: HCC, 2022

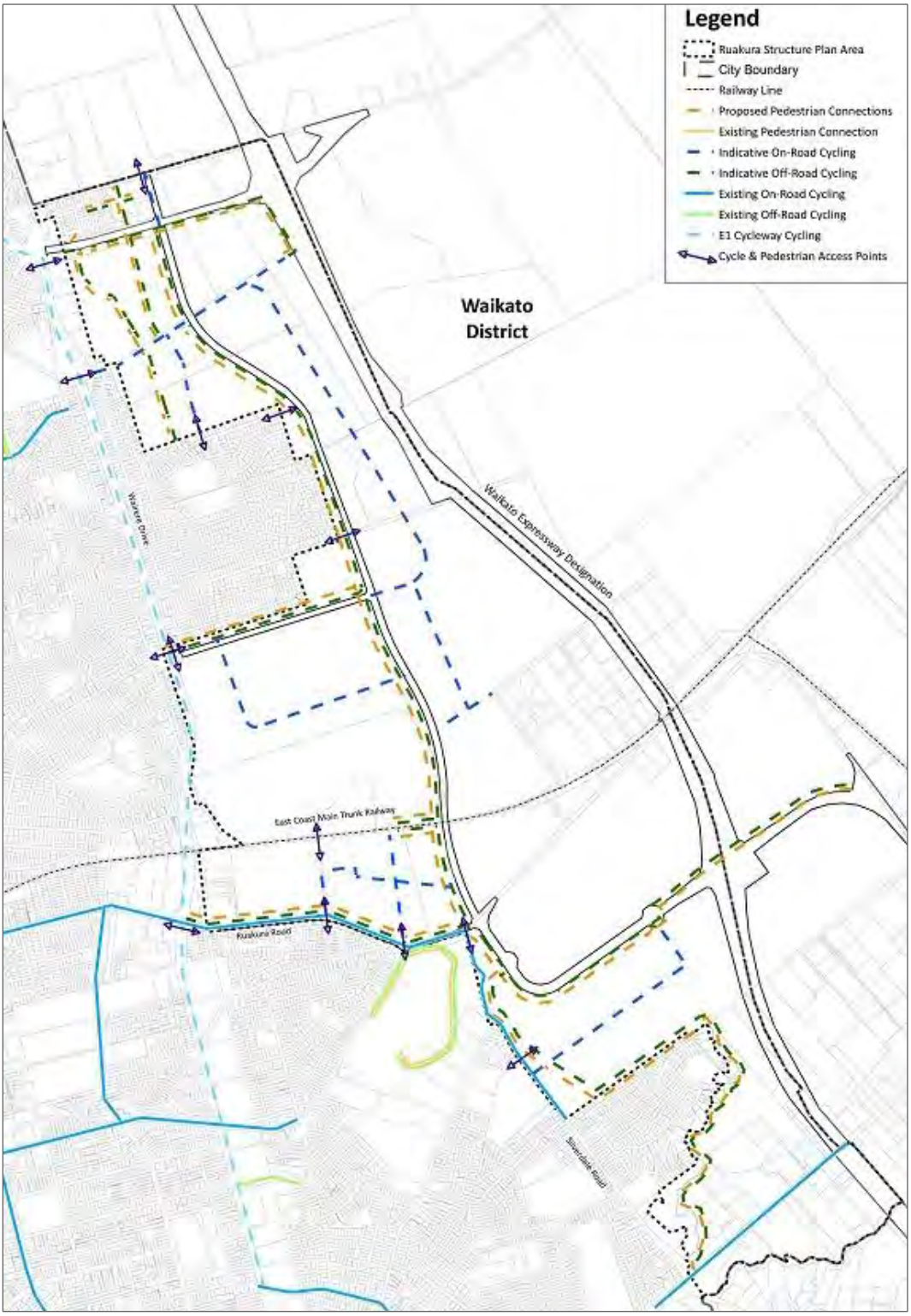


Figure 9.4: Ruakura Cyclist & Pedestrian Network Plan

Source: HCC, 2022

Appendix B CAS Outputs

Fifth Avenue (Wairere Drive to Five Cross Roads)

CODED CRASH ID	Crash road	Distance	Direction	Side road	Easting	Northing	Longitude	Latitude	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor	Social Cost $(m)
1202164	FIFTH AVENUE	55	E	PEACHGROVE ROAD	1802055	5816968	175.29415	-37.772307	201967183	5/12/2019	Sun	18:30	Car/Wagon1 EDB on FIFTH AVENUE overtaking Ute2	CAR/WAGON1, too far left	Wet	Dark	Light rain	Nil (Default)	Nil	0	0	0	0.03
1139439	FIFTH AVENUE	100	E	PEACHGROVE ROAD	1802091	5816991	175.294556	-37.772102	201753336	10/24/2017	Tue	8:20	Truck1 WDB on FIFTH AVENUE changing lanes/overtaking to right hit Car/Wagon2	TRUCK1, incorrect merging/diverging manoeuvre	Null	Bright sun	Null	Nil (Default)	Unknown	0	0	0	0.03
1272292	FIFTH AVENUE	190	N	PEACHGROVE ROAD	1802169	5817032	175.29543	-37.77171	2020198129	12/20/2020	Sun	9:35	Car/Wagon1 NDB on FIFTH AVENUE lost control; went off road to right, Car/Wagon1 hit parked (unattended) vehicle	CAR/WAGON1, swerved to avoid vehicle, too far right	Null	Unknown	Null	Nil (Default)	Nil	0	0	0	0.03
1140639	FIFTH AVENUE	220	E	PEACHGROVE ROAD	1802194	5817052	175.2957	-37.77153	201754549	11/11/2017	Sat	14:00	Car/Wagon1 EDB on FIFTH AVENUE hit Car/Wagon2 manoeuvring, Car/Wagon1 hit non specific parked	CAR/WAGON1, did not check/notice another party behind	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0	0.03
1186541	FIFTH AVENUE	210	E	PEACHGROVE ROAD	1802188	5817047	175.295639	-37.771568	201956229	5/11/2019	Sat	16:48	Motorcycle1 EDB on FIFTH AVENUE, ENDERLEY, HAMILTON hit SUV2 parking/unparking	MOTORCYCLE1, alcohol test below limit SUV2, intentional collision	Dry	Twilight	Fine	Nil (Default)	Unknown	0	0	1	0.1
1224736	FIFTH AVENUE	55	W	JOHN STREET	1802333	5817135	175.297266	-37.770749	201986099	11/24/2019	Sun	15:51	Car/Wagon1 EDB on FIFTH AVENUE lost control; went off road to left, Car/Wagon1 hit parked (unattended) vehicle	CAR/WAGON1, other lost control	Dry	Bright sun	Fine	Nil (Default)	Nil	0	0	0	0.03
1114984	FIFTH AVENUE	140	W	JOHN ST	1802264	5817093	175.296494	-37.771145	201719560	11/22/2017	Wed	18:15	Car/Wagon1 WDB on Fifth Avenue hit Wheeled pedestrian (wheelchairs, mobility scooters, etc) 2 (Age 7) crossing road from right side	WHEELED PEDESTRIAN (WHEELCHAIRS, MOBILITY SCOOTERS2, other pedestrian crossing road	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	1	0	0.63
1289703	FIFTH AVENUE	107	S	JOHN STREET	1802286	5817107	175.296733	-37.771012	2021193108	6/24/2021	Thu	11:42	Car/Wagon1 WDB on FIFTH AVENUE hit Car/Wagon2 headon on straight		Dry	Bright sun	Fine	Nil (Default)	Nil	0	0	0	0.03
1196420	FIFTH AVENUE	55	W	JOHN STREET	1802334	5817134	175.297272	-37.770752	201961515	3/12/2019	Tue	10:00	Car/Wagon1 WDB on FIFTH AVENUE hit Car/Wagon2 parking/unparking, Car/Wagon1 hit fence, concrete	CAR/WAGON2, alcohol test above limit or test refused, did not check/notice another party behind CAR/WAGON1, alcohol test below limit	Dry	Bright sun	Fine	Nil (Default)	Nil	0	0	0	0.03
1302363	FIFTH AVENUE		I	JOHN STREET	1802376	5817161	175.297746	-37.770501	2022219006	4/8/2022	Fri	19:50	Car/Wagon1 EDB on FIFTH AVENUE changing lanes/overtaking to right hit Car/Wagon2		Dry	Dark	Fine	T Junction	Give way	0	0	1	0.1
1267601	FIFTH AVENUE		I	JOHN STREET	1802389	5817169	175.297883	-37.770431	2021194407	6/27/2021	Sun	15:30	Car/Wagon1 WDB on FIFTH AVENUE hit Car/Wagon2 turning right onto AXROAD from the left	CAR/WAGON2, did not check/notice another party from other dirn, failed to give way at priority traffic control, ENV: visibility limited by parked vehicle	Wet	Overcast	Light rain	T Junction	Give way	0	0	1	0.1
1135027	FIFTH AVENUE		I	JOHN ST	1802384	5817165	175.297821	-37.77047	201748851	9/7/2017	Thu	3:08	Car/Wagon1 WDB on Fifth Avenue, Hamilton lost control; went off road to right, Car/Wagon1 hit non specific parked	CAR/WAGON1, other fatigue	Wet	Dark	Light rain	T Junction	Give way	0	0	0	0.03
1272321	FIFTH AVENUE		I	JOHN STREET	1802386	5817167	175.297851	-37.770448	2021177131	1/27/2021	Wed	7:06	Car/Wagon1 NDB on FIFTH AVENUE hit turning SUV2	SUV2, alcohol test below limit, did not check/notice another party from other dirn, failed to give way entering roadway from driveway CAR/WAGON1, alcohol test below limit	Dry	Overcast	Fine	Driveway	Nil	0	0	0	0.03
1262123	FIFTH AVENUE	51	E	SPENSER ROAD	1802544	5817261	175.299617	-37.769563	2020170272	11/2/2020	Mon	20:55	Car/Wagon1 EDB on FIFTH AVENUE hit parked veh, Car/Wagon1 hit parked (unattended) vehicle, Car/Wagon2 hit parked (unattended) vehicle	CAR/WAGON1, alcohol suspected, intentional collision, interferred with driver	Dry	Dark	Fine	Nil (Default)	Nil	0	0	0	0.03
1238902	FIFTH AVENUE	23	N	SPENSER ROAD	1802521	5817245	175.29936	-37.76971	2020158677	7/18/2020	Sat	19:20	Car/Wagon1 NDB on FIFTH AVENUE hit rear of Car/Wagon2 NDB on FIFTH AVENUE turning right from centre line , Car/Wagon2 hit tree	CAR/WAGON1, alcohol test above limit or test refused, too far right CAR/WAGON2, alcohol test below limit	Dry	Dark	Fine	Driveway	Nil	0	0	1	0.1
1201049	FIFTH AVENUE	55	W	SPENSER ROAD	1802451	5817206	175.298584	-37.770081	201966073	5/1/2019	Wed	8:40	Car/Wagon1 EDB on Fifth avenue hit rear end of Bus2 stop/slow for queue	BUS2, alcohol test below limit CAR/WAGON1, alcohol test below limit, attn diverted by console inbuilt features radio/ac, failed to notice car slowing, stopping/stationary	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0	0.03
1211721	FIFTH AVENUE		I	SPENSER ROAD	1802497	5817234	175.299093	-37.769816	201976466	8/2/2019	Fri	8:25	Car/Wagon1 EDB on FIFTH AVENUE hit turning Car/Wagon2	CAR/WAGON2, failed to give way at priority traffic control	Wet	Overcast	Light rain	T Junction	Give way	0	0	0	0.03
1160513	FIFTH AVENUE		I	TRAMWAY ROAD	1802651	5817325	175.300812	-37.76897	201834762	2/28/2018	Wed	17:25	Car/Wagon1 EDB on Fifth avenue hit Car/Wagon2 crossing at right angle from right	CAR/WAGON2, failed to give way at priority traffic control	Dry	Overcast	Fine	Crossroads	Give way	0	0	0	0.03
1278222	TRAMWAY ROAD		I	FIFTH AVENUE	1802650	5817329	175.300806	-37.768929	2021183131	3/28/2021	Sun	0:10	Car/Wagon1 SDB on TRAMWAY ROAD missed intersection or end of road, Car/Wagon1 hit traffic island	CAR/WAGON1, alcohol suspected, emotionally upset/road rage, speed approaching a traffic control	Dry	Dark	Fine	T Junction	Give way	0	0	0	0.03
1174828	TRAMWAY ROAD		I	FIFTH AVENUE	1802651	5817325	175.300812	-37.76897	201849138	9/30/2018	Sun	20:09	Car/Wagon1 NDB on TRAMWAY ROAD, ENDERLEY, HAMILTON missed intersection or end of road	CAR/WAGON1, alcohol suspected, emotionally upset/road rage, other inattentive CAR/WAGON2, alcohol test below limit	Dry	Twilight	Fine	T Junction	Give way	0	0	0	0.03
1123902	TRAMWAY ROAD		I	FIFTH AVENUE	1802651	5817325	175.300812	-37.76897	201737550	4/22/2017	Sat	10:00	Van1 SDB on TRAMWAY ROAD hit rear end of Car/Wagon2 stop/slow for cross traffic	VAN1, following too closely	Dry	Bright sun	Fine	Crossroads	Give way	0	0	0	0.03
1125025	FIFTH AVENUE		I	TRAMWAY ROAD	1802651	5817325	175.300812	-37.76897	201738679	5/7/2017	Sun	4:01	Car/Wagon1 EDB on Fifth Avenue lost control; went off road to left, Car/Wagon1 hit non specific traffic island	CAR/WAGON1, evading enforcement, new driver/under instruction	Dry	Dark	Fine	Crossroads	Give way	0	0	0	0.03
1254043	FIFTH AVENUE	55	W	TRAMWAY ROAD	1802602	5817297	175.30027	-37.769229	2021180123	2/21/2021	Sun	19:56	Car/Wagon1 WDB on FIFTH AVENUE hit Motorcycle2 U-turning from opposite direction of travel	MOTORCYCLE2, speed on straight CAR/WAGON1, alcohol test below limit, misjudged another vehicle	Dry	Twilight	Fine	Nil (Default)	Nil	0	1	0	0.63
1213304	FIFTH AVENUE	60	W	TRAMWAY ROAD	1802605	5817294	175.300308	-37.769249	201977946	8/15/2019	Thu	16:50	SUV1 WDB on FIFTH AVENUE, ENDERLEY, HAMILTON hit rear of Truck2 WDB on FIFTH AVENUE, ENDERLEY, HAMILTON turning right from left side	TRUCK2, alcohol test above limit or test refused, did not check/notice another party behind SUV1, alcohol test above limit or test refused	Dry	Overcast	Fine	Driveway	Nil	0	0	0	0.03
1260744	FIFTH AVENUE	42	W	TRAMWAY ROAD	1802614	5817303	175.300405	-37.769169	2021188411	5/20/2021	Thu	8:00	Motorcycle1 EDB on FIFTH AVENUE hit Car/Wagon2 merging from the left	MOTORCYCLE1, alcohol test below limit, motor vehicle in cycle lane CAR/WAGON2, alcohol test above limit or test refused, did not check/notice another party from other dirn	Dry	Overcast	Fine	Driveway	Nil	0	0	1	0.1

Wairere Drive Midblocks

CODED CRASH ID	Crash road	Distance	Direction	Side road	Easting	Northing	Longitude	Latitude	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor	Social Cost $(m)
1177667	WAIRERE DRIVE	20	W	POWELLS ROAD	1802517	5818027	175.299103	-37.762669	201950238	2/28/2019	Thu	20:50	Car/Wagon1 NDB on Wairere drive hit Pedestrian2 (Age 21) crossing road from left side	CAR/WAGON1, alcohol test below limit, PEDESTRIAN2, other pedestrian crossing road, ENV: visibility limited by hedge or fence	Dry	Dark	Fine	Nil (Default)	Unknown	0	1	0	0.67
1140795	WAIRERE DRIVE	25	N	TRAMWAY ROAD ONRAMP	1802843	5816890	175.303116	-37.772842	201754708	10/22/2017	Sun	16:30	Car/Wagon1 NDB on WAIRERE DRIVE hit rear end of SUV2 stop/slow for queue	CAR/WAGON1, attention diverted by cell phone	Dry	Bright sun	Fine	Multileg	Unknown	0	0	0	0.04

1190481	WAIRERE DRIVE	29	N	POWELLS ROAD	1802648	5817663	175.300688	-37.765922	2018100112	11/23/2018	Fri	21:00	Car/Wagon1 SDB on WAIRERE DRIVE hit rear end of Ute2 stop/slow for queue	CAR/WAGON1, alcohol test below limit, failed to notice car slowing, stopping/stationary UTE2, alcohol test below limit	Dry	Dark	Fine	Nil (Default)	Nil	0	0	0	0.04
1267482	WAIRERE DRIVE	35	N	BISLEY ROAD	1802824	5816631	175.302977	-37.775179	2020173354	12/17/2020	Thu	15:35	SUV1 SDB on WAIRERE DRIVE hit rear end of Truck2 stop/slow for queue	SUV1, alcohol test below limit, failed to notice car slowing, stopping/stationary TRUCK2, alcohol test below limit	Dry	Bright sun	Fine	Nil (Default)	Nil	0	0	0	0.04
1170788	WAIRERE DRIVE	50	S	POWELLS ROAD	1802673	5817584	175.300995	-37.766632	201845089	7/26/2018	Thu	18:38	Car/Wagon1 SDB on WAIRERE DRIVE, FAIRVIEW DOWNS, HAMILTON changing lanes/overtaking to right hit Car/Wagon2	CAR/WAGON2, alcohol test below limit CAR/WAGON1, following too closely	Dry	Twilight	Fine	Nil (Default)	Unknown	0	0	0	0.04
1135261	WAIRERE DRIVE	50	N	FIFTH AVENUE	1802714	5817407	175.301498	-37.768215	201749089	8/27/2017	Sun	16:30	Car/Wagon1 NDB on WAIRERE DRIVE changing lanes/overtaking to right hit Car/Wagon2	CAR/WAGON1, emotionally upset/road rage, intentional collision	Dry	Overcast	Fine	Nil (Default)	Unknown	0	0	0	0.04
1228992	WAIRERE DRIVE	64	S	BISLEY ROAD	1802822	5816529	175.302977	-37.776093	2020143464	1/19/2020	Sun	0:41	Car/Wagon1 SDB on WAIRERE DRIVE lost control turning left; went off road to left, Car/Wagon1 hit guard rail, kerb	CAR/WAGON1, evading enforcement, speed entering corner/curve, too far left	Dry	Dark	Fine	Nil (Default)	Nil	0	0	0	0.04
1159469	WAIRERE DRIVE	70	N	POWELLS ROAD	1802636	5817698	175.300537	-37.765614	201833709	3/6/2018	Tue	9:24	Car/Wagon1 SDB on Wairere drive hit rear end of Car/Wagon2 stop/slow for obstruction	CAR/WAGON2, alcohol test below limit CAR/WAGON1, alcohol test below limit, attention diverted by cell phone	Dry	Overcast	Fine	Nil (Default)	Unknown	0	0	0	0.04
1244178	WAIRERE DRIVE	71	N	TRAMWAY ROAD	1802846	5816935	175.303141	-37.772436	2020164889	9/22/2020	Tue	12:37	Car/Wagon1 NDB on WAIRERE DRIVE, RUAKURA, HAMILTON lost control turning left; went off road to left, Car/Wagon1 hit substantial vegetation (causing vehicle damage or stopping the vehicle), kerb	CAR/WAGON1, alcohol test below limit, other fatigue, too far left CAR/WAGON2, alcohol test below limit	Dry	Overcast	Fine	Nil (Default)	Nil	0	0	1	0.11
1120223	WAIRERE DRIVE	80	S	POWELLS ROAD	1802682	5817556	175.301102	-37.76688	201733836	3/3/2017	Fri	8:48	Car/Wagon1 SDB on Wairere dr hit rear end of Car/Wagon2 stop/slow for queue	CAR/WAGON1, misjudged another vehicle, other inexperience	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0	0.04
1138651	WAIRERE DRIVE	100	N	POWELLS ROAD	1802626	5817727	175.300415	-37.765354	201752536	10/17/2017	Tue	7:15	Car/Wagon1 SDB on WAIRERE DRIVE changing lanes/overtaking to right hit SUV2	CAR/WAGON1, cut in after overtaking	Dry	Overcast	Fine	Nil (Default)	Unknown	0	0	0	0.04
1193995	WAIRERE DRIVE	100	S	POWELLS ROAD	1802674	5817531	175.301025	-37.767101	201959165	2/16/2019	Sat	21:12	Car/Wagon1 NDB on WAIRERE DRIVE hit rear end of Ute2 stop/slow for queue	CAR/WAGON1, alcohol test below limit, attention diverted by food, cigarettes, beverages, failed to notice car slowing, stopping/stationary UTE2, alcohol test below limit	Dry	Dark	Fine	Nil (Default)	Nil	0	0	0	0.04
1284402	WAIRERE DRIVE	197	N	POWELLS ROAD	1802583	5817818	175.299903	-37.764542	2021189581	5/21/2021	Fri	20:00	Car/Wagon1 NDB on WAIRERE DRIVE overtaking Car/Wagon2	CAR/WAGON2, alcohol test below limit CAR/WAGON1, alcohol test below limit, too far right	Dry	Dark	Fine	Nil (Default)	Nil	0	0	0	0.04
1225365	WAIRERE DRIVE	199	S	BISLEY ROAD	1802839	5816393	175.303207	-37.777313	201986626	12/3/2019	Tue	21:45	Car/Wagon1 SDB on WAIRERE DRIVE lost control while overtaking, Car/Wagon1 hit armco (w-section steel), Car/Wagon2 hit armco (w-section steel)	CAR/WAGON2, alcohol test below limit, speed on straight CAR/WAGON1, alcohol test below limit, new driver/under instruction, other lost control, speed on straight	Dry	Dark	Fine	Nil (Default)	Nil	0	0	0	0.04
1105757	WAIRERE DRIVE	200	N	POWELLS ROAD	1802595	5817822	175.300034	-37.764503	201710207	1/10/2017	Tue	17:10	Car/Wagon1 SDB on Wairere Drive hit Pedestrian2 (Age 21) crossing road from right side	CAR/WAGON1, suddenly turned, PEDESTRIAN2, mental illness (depression, psychosis), pedestrian running across, heedless of traffic	Dry	Overcast	Fine	Nil (Default)	Unknown	0	0	1	0.11
1133614	WAIRERE DRIVE	340	N	POWELLS ROAD	1802540	5817951	175.299377	-37.763355	201747418	8/18/2017	Fri	17:30	Car/Wagon1 NDB on Wairere Drive weaving in heavy traffic hit SUV2, Car/Wagon1 hit non specific traffic island, SUV2 hit non specific traffic island	CAR/WAGON1, failed to signal in time, following too closely, weaving or cut in on multi-lane roads	Dry	Twilight	Fine	Nil (Default)	Unknown	0	0	0	0.04

Wairere Drive/Fifth Avenue Roundabout

CODED CRASH ID	Crash road	Distance	Direction	Side road	Easting	Northing	Longitude	Latitude	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor	Social Cost $(m)
1155957	WAIRERE DRIVE	15	N	FIFTH AVENUE	1802720	5817372	175.301575	-37.768532	201830121	1/1/2018	Mon	19:15	Car/Wagon1 NDB on WAIRERE DRIVE hit rear end of Car/Wagon2 stop/slow for queue	CAR/WAGON1, other lost control	Wet	Twilight	Light rain	Roundabout	Give way	0	0	0	0.04
1176525	WAIRERE DRIVE	15	S	FIFTH AVENUE	1802748	5817308	175.30191	-37.7691	201850841	10/25/2018	Thu	19:59	Car/Wagon1 NDB on Wairere dr overtaking Car/Wagon2	CAR/WAGON2, alcohol test below limit CAR/WAGON1, alcohol test below limit, swerved to avoid vehicle, too far left	Dry	Twilight	Fine	Roundabout	Give way	0	0	0	0.04
1139714	WAIRERE DRIVE		I	FIFTH AVENUE	1802721	5817357	175.301605	-37.768665	201753614	10/29/2017	Sun	0:35	Car/Wagon1 NDB on Wairere Drive hit obstruction, Car/Wagon1 hit non specific street furniture, non specific landslip	CAR/WAGON1, driver over-reacted, lost control - road conditions, ENV: road obstructed by flood waters/large puddles/ford	Wet	Twilight	Light rain	Roundabout	Give way	0	0	0	0.04
1294555	WAIRERE DRIVE		I	FIFTH AVENUE	1802721	5817365	175.301596	-37.768585	2021197830	8/6/2021	Fri	15:00	Car/Wagon1 NDB on WAIRERE DRIVE hit rear end of Car/Wagon2 stop/slow for queue		Wet	Overcast	Light rain	Roundabout	Give way	0	0	0	0.04
1156163	FIFTH AVENUE		I	WAIRERE DRIVE	1802718	5817348	175.301559	-37.768745	201830327	1/2/2018	Tue	19:44	Car/Wagon1 SDB on Wairere drive lost control turning right, Car/Wagon1 hit non specific guard rail	CAR/WAGON1, lost control when turning, mental illness (depression, psychosis)	Wet	Overcast	Light rain	Roundabout	Give way	0	0	0	0.04
1283415	FIFTH AVENUE		I	WAIRERE DRIVE	1802709	5817345	175.301468	-37.76877	2021205321	3/22/2021	Mon	16:00	Truck1 EDB on FIFTH AVENUE hit rear end of Van2 stop/slow for cross traffic	TRUCK1, following too closely	Null	Unknown	Null	Roundabout	Give way	0	0	0	0.03
1165007	WAIRERE DRIVE		I	FIFTH AVENUE	1802737	5817319	175.301788	-37.769005	201839276	5/3/2018	Thu	7:45	Car/Wagon1 NDB on WAIRERE DRIVE hit rear end of Car/Wagon2 stop/slow for cross traffic	CAR/WAGON1, failed to notice car slowing, stopping/stationary, following too closely	Dry	Bright sun	Fine	Roundabout	Give way	0	0	0	0.04
1123222	WAIRERE DRIVE		I	FIFTH AVENUE	1802737	5817319	175.301788	-37.769005	201736864	2/16/2017	Thu	17:00	SUV1 NDB on WAIRERE DRIVE hit rear end of Car/Wagon2 stop/slow for cross traffic	SUV1, failed to notice car slowing, stopping/stationary	Wet	Overcast	Heavy rain	Roundabout	Give way	0	0	0	0.04
1155958	WAIRERE DRIVE		I	FIFTH AVENUE	1802737	5817319	175.301788	-37.769005	201830122	1/1/2018	Mon	16:30	Car/Wagon1 NDB on WAIRERE DRIVE hit rear end of Car/Wagon2 stop/slow for cross traffic	CAR/WAGON1, following too closely	Wet	Overcast	Light rain	Roundabout	Give way	0	0	0	0.04
1302732	WAIRERE DRIVE		I	FIFTH AVENUE	1802743	5817314	175.301862	-37.769043	2021206407	11/30/2021	Tue	7:32	Car/Wagon2 turning right hit by oncoming Car/Wagon1 NDB on WAIRERE DRIVE		Wet	Overcast	Light rain	Roundabout	Give way	0	0	0	0.04
1296398	WAIRERE DRIVE		I	FIFTH AVENUE	1802750	5817309	175.301941	-37.769088	2021200164	9/5/2021	Sun	23:01	Car/Wagon1 NDB on WAIRERE DRIVE missed intersection or end of road, Car/Wagon1 hit roadwork barrier, traffic island		Dry	Dark	Fine	Roundabout	Give way	0	0	0	0.04
1256054	WAIRERE DRIVE		I	FIFTH AVENUE	1802752	5817304	175.301968	-37.769134	2021183045	3/30/2021	Tue	21:42	Car/Wagon1 NDB on Wairere Drive lost control turning left; went off road to right, Car/Wagon1 hit traffic island, traffic sign/signal poles, bollards	CAR/WAGON1, alcohol test above limit or test refused, speed approaching a traffic control, swung wide on bend	Wet	Dark	Mist or Fog	Roundabout	Give way	0	0	1	0.11
1310292	WAIRERE DRIVE		I	FIFTH AVENUE	1802749	5817311	175.301929	-37.769067	2021225755	11/6/2021	Sat	14:35	Left scene1 NDB on WAIRERE DRIVE hit rear end of Car/Wagon2 stop/slow for cross traffic		Dry	Bright sun	Fine	Roundabout	Give way	0	0	0	0.03
1277208	WAIRERE DRIVE		I	FIFTH AVENUE	1802742	5817375	175.301834	-37.768494	2021182232	3/20/2021	Sat	20:56	Car/Wagon1 SDB on WAIRERE DRIVE hit rear end of Car/Wagon2 stop/slow for cross traffic	CAR/WAGON1, alcohol test below limit, other inattentive CAR/WAGON2, alcohol test below limit, suddenly braked	Dry	Dark	Fine	Roundabout	Give way	0	0	0	0.04
1285083	WAIRERE DRIVE		I	FIFTH AVENUE	1802759	5817363	175.302038	-37.7686	2021188973	5/26/2021	Wed	1:00	Car/Wagon1 SDB on WAIRERE DRIVE lost control turning right; went off road to left, Car/Wagon1 hit armco (w-section steel)	CAR/WAGON1, alcohol test below limit, new driver/under instruction, too far left	Dry	Dark	Fine	Roundabout	Give way	0	0	0	0.04
1119607	WAIRERE DRIVE		I	FIFTH AVENUE	1802748	5817374	175.301895	-37.768505	201733219	2/26/2017	Sun	20:00	SUV1 SDB on WAIRERE DRIVE hit rear end of Car/Wagon2 stop/slow for cross traffic	SUV1, failed to notice car slowing, stopping/stationary, following too closely	Dry	Twilight	Fine	Roundabout	Give way	0	0	0	0.04

1283813	WAIRERE DRIVE		I	FIFTH AVENUE	1802745	5817372	175.301869	-37.768522	2021188296	5/18/2021	Tue	15:03	SUV1 SDB on WAIRERE DRIVE hit rear end of Car/Wagon2 stop/slow for cross traffic	CAR/WAGON2, alcohol test below limit SUV1, alcohol test below limit, following too closely	Dry	Overcast	Light rain	Roundabout	Give way	0	0	0	0.04
1135352	WAIRERE DRIVE		I	FIFTH AVENUE	1802748	5817374	175.301895	-37.768505	201749180	8/23/2017	Wed	5:25	Car/Wagon1 SDB on Waiwere Drv hit rear end of SUV2 stop/slow for cross traffic	CAR/WAGON1, following too closely	Dry	Dark	Fine	Roundabout	Give way	0	0	0	0.04
1201577	WAIRERE DRIVE		I	FIFTH AVENUE	1802742	5817374	175.301841	-37.7685	2018101710	7/30/2018	Mon	6:45	Car/Wagon1 DIRN on WAIRERE DRIVE hit rear end of Car/Wagon2 stop/slow for cross traffic	CAR/WAGON1, other inattentive	Wet	Overcast	Heavy rain	Roundabout	Give way	0	0	0	0.04
1136462	WAIRERE DRIVE		I	FIFTH AVENUE	1802768	5817354	175.302124	-37.768681	201750300	9/26/2017	Tue	14:00	Car/Wagon1 SDB on Wairere drive lost control; went off road to left, Car/Wagon1 hit non specific guard rail	CAR/WAGON1, new driver/under instruction, other lost control, ENV: slippery road due to rain	Wet	Overcast	Light rain	Roundabout	Give way	0	0	0	0.04
1223913	WAIRERE DRIVE		I	FIFTH AVENUE	1802769	5817347	175.302149	-37.76874	201985584	11/18/2019	Mon	13:30	Car/Wagon1 SDB on WAIRERE DRIVE lost control turning left; went off road to left, Car/Wagon1 hit armco (w-section steel)	CAR/WAGON1, alcohol test below limit, lost control when turning, speed entering corner/curve	Wet	Overcast	Light rain	Roundabout	Give way	0	0	0	0.04
1174539	WAIRERE DRIVE		I	FIFTH AVENUE	1802768	5817354	175.302124	-37.768681	201848849	9/24/2018	Mon	19:18	Car/Wagon1 SDB on Wairere Drive lost control turning right, Car/Wagon1 hit non specific guard rail	CAR/WAGON1, alcohol test below limit, lost control - road conditions, ENV: slippery road due to rain	Wet	Dark	Light rain	Roundabout	Give way	0	0	0	0.04
1117484	WAIRERE DRIVE		I	FIFTH AVENUE	1802768	5817354	175.302124	-37.768681	201731083	1/19/2017	Thu	13:01	Car/Wagon1 EDB on Fifth avenue and wairere lost control turning right, Car/Wagon1 hit non specific guard rail	CAR/WAGON1, lost control when turning, new driver/under instruction, speed entering corner/curve	Wet	Overcast	Light rain	Roundabout	Give way	0	0	0	0.04
1158919	WAIRERE DRIVE		I	FIFTH AVENUE	1802768	5817354	175.302124	-37.768681	201833157	2/14/2018	Wed	13:15	Van1 SDB on WAIRERE DRIVE lost control turning right, Van1 hit non specific fence	VAN1, lost control - road conditions	Wet	Overcast	Heavy rain	Roundabout	Give way	0	0	0	0.04
1278764	WAIRERE DRIVE		I	FIFTH AVENUE	1802768	5817325	175.302146	-37.768937	2021183256	4/1/2021	Thu	2:58	Car/Wagon1 SDB on Wairere drive lost control turning right; went off road to left, Car/Wagon1 hit guard rail, raised median	CAR/WAGON1, new driver/under instruction, too far left, ENV: fog or mist	Wet	Dark	Mist or Fog	Roundabout	Give way	0	0	0	0.04
1226881	WAIRERE DRIVE		I	FIFTH AVENUE	1802772	5817343	175.302185	-37.768775	201987838	12/18/2019	Wed	9:21	Car/Wagon1 SDB on WAIRERE DRIVE lost control turning left; went off road to left, Car/Wagon1 hit fence	CAR/WAGON1, alcohol test below limit, lost control when turning, speed entering corner/curve	Wet	Overcast	Light rain	Roundabout	Give way	0	0	0	0.04
1187805	WAIRERE DRIVE		I	FIFTH AVENUE	1802769	5817343	175.30215	-37.768775	201898185	9/7/2018	Fri	1:50	Car/Wagon1 SDB on WAIRERE DRIVE lost control turning right; went off road to left, Car/Wagon1 hit new jersey barrier, light pole	CAR/WAGON1, alcohol test below limit, lost control when turning, speed entering corner/curve	Dry	Dark	Fine	Roundabout	Give way	0	0	0	0.04
1251518	WAIRERE DRIVE		I	FIFTH AVENUE	1802769	5817344	175.302155	-37.768762	2020162118	8/21/2020	Fri	22:47	Car/Wagon1 SDB on WAIRERE DRIVE lost control turning right; went off road to left, Car/Wagon1 hit armco (w-section steel)	CAR/WAGON1, alcohol test above limit or test refused, lost control when turning	Wet	Dark	Fine	Roundabout	Give way	0	0	0	0.04
1313731	WAIRERE DRIVE		I	FIFTH AVENUE	1802768	5817308	175.302151	-37.769091	2022213137	2/11/2022	Fri	13:43	Car/Wagon1 SDB on WAIRERE DRIVE lost control turning right; went off road to left, Car/Wagon1 hit armco (w-section steel)		Wet	Overcast	Light rain	Roundabout	Give way	0	0	0	0.04
1300006	WAIRERE DRIVE		I	FIFTH AVENUE	1802768	5817322	175.302149	-37.768968	2021204073	10/30/2021	Sat	22:00	Car/Wagon1 SDB on WAIRERE DRIVE lost control turning right; went off road to left, Car/Wagon1 hit wire rope barrier		Wet	Dark	Light rain	Roundabout	Give way	0	0	0	0.04
1219075	WAIRERE DRIVE		I	FIFTH AVENUE	1802769	5817329	175.302154	-37.768899	201982104	12/17/2019	Tue	19:45	Car/Wagon1 SDB on WAIRERE DRIVE lost control turning right; went off road to left, Car/Wagon1 hit concrete	CAR/WAGON1, alcohol test below limit, lost control when turning, new driver/under instruction	Wet	Overcast	Light rain	Roundabout	Give way	0	0	1	0.11
1313663	FIFTH AVENUE		I	WAIRERE DRIVE	1802711	5817344	175.301489	-37.768779	2021227972	12/17/2021	Fri	13:25	Car/Wagon1 EDB on FIFTH AVENUE weaving in heavy traffic hit Car/Wagon2		Dry	Overcast	Fine	Roundabout	Give way	0	0	0	

Wairere Drive/Bisley Road Signals

CODED CRASH ID	Crash road	Distance	Direction	Side road	Easting	Northing	Longitude	Latitude	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor	Social Cost $(m)
1230436	WAIRERE DRIVE		I	BISLEY ROAD	1802823	5816615	175.30297	-37.775323	2020146252	2/11/2020	Tue	17:41	Car/Wagon1 SDB on WAIRERE DRIVE hit rear end of Car/Wagon2 stop/slow for obstruction	CAR/WAGON2, alcohol test below limit, suddenly braked CAR/WAGON1, alcohol test below limit, attention diverted by other traffic	Dry	Bright sun	Fine	T Junction	Traffic Signals	0	0	0	0.04
1206685	WAIRERE DRIVE		I	BISLEY ROAD	1802824	5816616	175.302974	-37.775313	201971551	6/21/2019	Fri	19:08	Car/Wagon1 SDB on WAIRERE DRIVE hit rear end of Car/Wagon2 stop/slow for signals	CAR/WAGON2, alcohol suspected CAR/WAGON1, failed to notice car slowing, stopping/stationary	Dry	Dark	Fine	T Junction	Traffic Signals	0	0	0	0.04
1309123	WAIRERE DRIVE		I	BISLEY ROAD	1802822	5816608	175.30296	-37.775384	2022210363	1/12/2022	Wed	18:20	Car/Wagon1 SDB on WAIRERE DRIVE hit rear end of Car/Wagon2 stop/slow for signals		Dry	Bright sun	Fine	T Junction	Traffic Signals	0	0	0	0.04
1290210	WAIRERE DRIVE		I	BISLEY ROAD	1802824	5816605	175.302977	-37.775409	2021193114	6/27/2021	Sun	8:15	Car/Wagon1 SDB on WAIRERE DRIVE lost control turning left; went off road to right, Car/Wagon1 hit traffic signal		Wet	Overcast	Light rain	T Junction	Traffic Signals	0	0	0	0.04
1172794	WAIRERE DRIVE		I	BISLEY ROAD	1802821	5816585	175.302948	-37.775597	201847100	8/20/2018	Mon	17:25	Car/Wagon1 SDB on Wairere Drive hit rear end of Car/Wagon2 stop/slow for signals	CAR/WAGON1, alcohol test below limit, defective vision, failed to notice car slowing, stopping/stationary, misjudged intentions of another party, new driver/under instruction, speed approaching a traffic control	Wet	Dark	Light rain	T Junction	Traffic Signals	0	0	0	0.04
1274383	WAIRERE DRIVE		I	BISLEY ROAD	1802824	5816602	175.30298	-37.77544	2021180486	2/18/2021	Thu	12:00	Car/Wagon1 SDB on WAIRERE DRIVE hit rear end of Car/Wagon2 stop/slow for signals	CAR/WAGON1, alcohol test below limit, following too closely CAR/WAGON2, alcohol test below limit	Dry	Bright sun	Fine	T Junction	Traffic Signals	0	0	1	0.11
1265283	WAIRERE DRIVE		I	BISLEY ROAD	1802823	5816604	175.302971	-37.775422	2021192579	6/23/2021	Wed	13:12	Car/Wagon1 SDB on WAIRERE DRIVE hit rear end of Car/Wagon2 stop/slow for signals	CAR/WAGON2, alcohol test below limit CAR/WAGON1, alcohol test below limit, did not stop, impaired ability due to old age	Dry	Bright sun	Fine	T Junction	Traffic Signals	0	0	1	0.11
1178490	WAIRERE DRIVE		I	BISLEY ROAD	1802811	5816587	175.302841	-37.775577	201950650	1/31/2019	Thu	14:24	Truck1 NDB on WAIRERE DRIVE hit rear end of Car/Wagon2 stop/slow for signals	TRUCK1, alcohol test below limit, following too closely CAR/WAGON2, alcohol test below limit	Dry	Bright sun	Fine	T Junction	Traffic Signals	0	0	1	0.11
1241651	WAIRERE DRIVE	43	S	BISLEY ROAD	1802821	5816549	175.302968	-37.775914	2020158730	7/2/2020	Thu	8:55	Car/Wagon1 NDB on WAIRERE DRIVE hit rear end of Car/Wagon2 stopped/moving slowly	CAR/WAGON1, alcohol test above limit or test refused, following too closely, speed on straight CAR/WAGON2, alcohol test below limit	Dry	Bright sun	Fine	T Junction	Traffic Signals	0	0	0	0.04

Wairere Drive/Powells Road Signals

CODED CRASH ID	Crash road	Distance	Direction	Side road	Easting	Northing	Longitude	Latitude	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor	Social Cost $(m)
1238340	WAIRERE DRIVE		I	POWELLS ROAD	1802653	5817644	175.30075	-37.766093	201978729	8/19/2019	Mon	15:45	Truck1 SDB on WAIRERE DRIVE, FAIRVIEW DOWNS, HAMILTON hit rear end of Car/Wagon2 stop/slow for signals	CAR/WAGON2, alcohol test below limit TRUCK1, alcohol test below limit, following too closely	Wet	Overcast	Light rain	Crossroads	Traffic Signals	0	0	0	0.04
1203276	POWELLS ROAD		I	WAIRERE DRIVE	1802660	5817635	175.300827	-37.766174	201968236	5/21/2019	Tue	8:06	Van1 WDB on POWELLS ROAD overtaking Car/Wagon2	VAN1, alcohol test below limit, incorrect merging/diverging manoeuvre	Dry	Overcast	Fine	Crossroads	Traffic Signals	0	0	0	0.03
1220297	WAIRERE DRIVE		I	POWELLS ROAD	1802653	5817643	175.300751	-37.766102	2020146004	1/26/2020	Sun	4:08	Car/Wagon1 SDB on Wairere Drive hit Car/Wagon2 crossing at right angle from right	CAR/WAGON2, alcohol test above limit or test refused, did not stop at steady red light CAR/WAGON1, alcohol test above limit or test refused	Dry	Dark	Fine	Crossroads	Traffic Signals	0	0	1	0.11
1253943	WAIRERE DRIVE		I	POWELLS ROAD	1802658	5817625	175.300817	-37.766264	2020163927	9/5/2020	Sat	5:17	Car/Wagon1 SDB on WAIRERE DRIVE hit VEHB manoeuvring	CAR/WAGON1, alcohol test above limit or test refused, other postion on road	Dry	Dark	Fine	Crossroads	Traffic Signals	0	0	0	0.04

1261273	WAIRERE DRIVE		I	POWELLS ROAD	1802658	5817628	175.300818	-37.766234	2020168328	10/28/2020	Wed	18:55	Car/Wagon1 NDB on WAIRERE DRIVE lost control; went off road to right, Car/Wagon1 hit traffic sign	CAR/WAGON1, alcohol suspected, drugs suspected, medical illness (not sudden), too far right	Dry	Overcast	Fine	Crossroads	Traffic Signals	0	0	0	0.04
1129933	WAIRERE DRIVE		I	POWELLS ROAD	1802658	5817632	175.300812	-37.766201	201743674	5/31/2017	Wed	7:15	Car/Wagon1 SDB on WAIRERE DRIVE hit rear end of SUV2 stop/slow for signals	CAR/WAGON1, failed to notice car slowing, stopping/stationary, following too closely	Wet	Bright sun	Fine	Crossroads	Traffic Signals	0	0	0	0.03
1151746	POWELLS ROAD		I	WAIRERE DRIVE	1802658	5817632	175.300812	-37.766201	201817106	8/22/2018	Wed	20:15	Van2 turning right hit by oncoming Car/Wagon1 SDB on WAIRERE DRIVE, FAIRVIEW DOWNS, HAMILTON	CAR/WAGON1, alcohol test below limit, did not stop VAN2, alcohol test below limit, did not stop, failed to give way turning to non-turning traffic	Wet	Dark	Light rain	Crossroads	Traffic Signals	0	0	1	0.11
1233805	WAIRERE DRIVE		I	POWELLS ROAD	1802652	5817646	175.300734	-37.766076	2020149258	3/24/2020	Tue	11:40	Van1 SDB on WAIRERE DRIVE, FAIRVIEW DOWNS, HAMILTON hit Car/Wagon2 crossing at right angle from right , Car/Wagon2 hit parked (unattended) vehicle	VAN1, alcohol test below limit, did not stop at steady red light, failed to notice control	Dry	Bright sun	Fine	Multileg	Traffic Signals	0	0	0	0.04
1208098	WAIRERE DRIVE		I	POWELLS ROAD	1802647	5817619	175.300695	-37.76632	201972906	7/2/2019	Tue	10:40	Car/Wagon1 NDB on WAIRERE DRIVE hit Car/Wagon2 crossing at right angle from right	CAR/WAGON2, did not stop at steady red light	Dry	Overcast	Fine	Crossroads	Traffic Signals	0	0	0	0.04
1307455	WAIRERE DRIVE		I	POWELLS ROAD	1802648	5817617	175.300702	-37.766335	2021222901	9/1/2021	Wed	15:55	Car/Wagon1 NDB on WAIRERE DRIVE hit rear end of Car/Wagon2 stop/slow for signals		Dry	Bright sun	Fine	Crossroads	Traffic Signals	0	0	0	0.04
1138526	WAIRERE DRIVE		I	POWELLS ROAD	1802646	5817628	175.300674	-37.766239	201752409	10/19/2017	Thu	9:00	SUV2 turning right hit by oncoming Van1 NDB on Wairere drive	SUV2, failed to notice control	Dry	Bright sun	Fine	Crossroads	Traffic Signals	0	0	0	0.04
1106408	POWELLS ROAD		I	WAIRERE DRIVE W	1802646	5817628	175.300674	-37.766239	201710861	1/21/2017	Sat	3:24	Car/Wagon1 NDB on Wairere Drive hit Car/Wagon2 crossing at right angle from right	CAR/WAGON2, did not stop at steady red light, evading enforcement, speed approaching a traffic control	Dry	Dark	Fine	Crossroads	Traffic Signals	0	1	0	0.63
1265285	WAIRERE DRIVE		I	POWELLS ROAD	1802646	5817621	175.300682	-37.766299	2021192582	6/24/2021	Thu	15:55	Car/Wagon1 NDB on WAIRERE DRIVE hit rear end of Car/Wagon2 stop/slow for signals	CAR/WAGON1, following too closely	Dry	Bright sun	Fine	Crossroads	Traffic Signals	0	0	1	0.11
1165014	WAIRERE DRIVE		I	POWELLS ROAD	1802646	5817628	175.300674	-37.766239	201839283	4/20/2018	Fri	10:16	Truck1 NDB on WAIRERE DRIVE hit rear end of Car/Wagon2 stop/slow for signals	TRUCK1, following too closely, misjudged intentions of another party	Dry	Bright sun	Fine	Crossroads	Traffic Signals	0	0	0	0.03
1138550	WAIRERE DRIVE		I	POWELLS ROAD	1802646	5817628	175.300674	-37.766239	201752433	9/18/2017	Mon	12:30	Van1 NDB on Wairere Drive hit rear end of Car/Wagon2 stop/slow for signals	VAN1, following too closely	Wet	Overcast	Light rain	Crossroads	Traffic Signals	0	0	0	0.04
1185039	WAIRERE DRIVE		I	POWELLS ROAD	1802642	5817637	175.300624	-37.766152	201955052	1/28/2019	Mon	19:00	Car/Wagon1 SDB on WAIRERE DRIVE lost control turning right; went off road to left, Car/Wagon1 hit traffic sign/signal poles, bollards	CAR/WAGON1, alcohol test above limit or test refused	Dry	Twilight	Fine	Crossroads	Traffic Signals	0	0	0	0.04
1148211	POWELLS ROAD	30	E	WAIRERE DRIVE	1802686	5817641	175.301117	-37.766113	201813551	3/12/2018	Mon	15:05	Car/Wagon1 WDB on POWELLS ROAD hit rear end of Car/Wagon2 stop/slow for queue	CAR/WAGON1, failed to notice car slowing, stopping/stationary	Null	Overcast	Null	Nil (Default)	Unknown	0	0	1	0.1

Wairere Drive/Tramway Road

CODED CRASH ID	Crash road	Distance	Direction	Side road	Easting	Northing	Longitude	Latitude	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor	Social Cost $(m)
1295683	WAIRERE DRIVE		I	TRAMWAY ROAD	1802839	5816843	175.303081	-37.773267	2021198430	8/17/2021	Tue	13:36	Car/Wagon1 NDB on WAIRERE DRIVE lost control; went off road to left, Car/Wagon1 hit traffic sign		Wet	Overcast	Light rain	T Junction	Give way	0	0	0	0.04

Appendix C Structure Plan Drawings

Figure 2-14: Ruakura Tuumata Structure Plan - Land Use

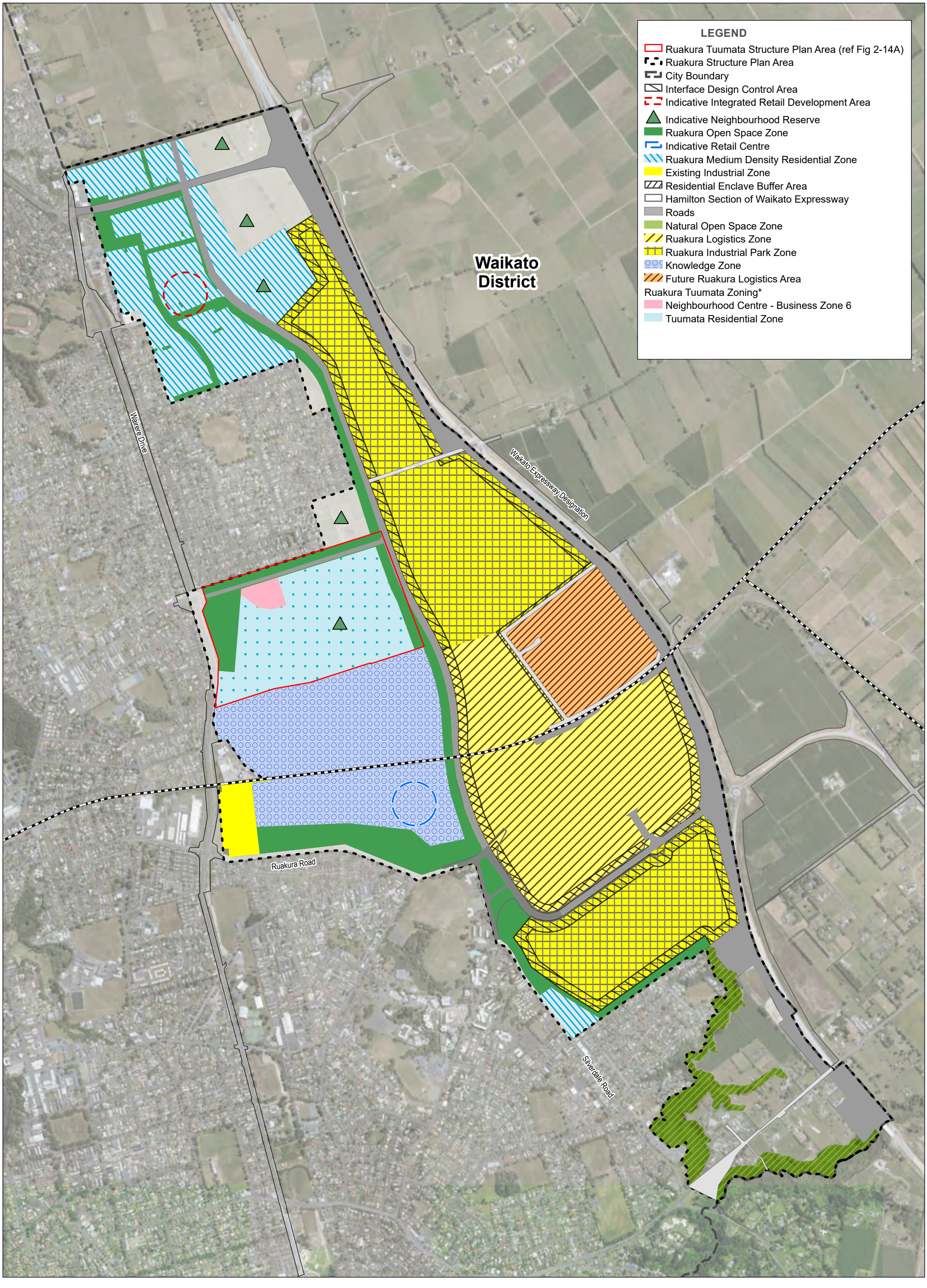


Figure 2-14A: Ruakura Tuumata Structure Plan

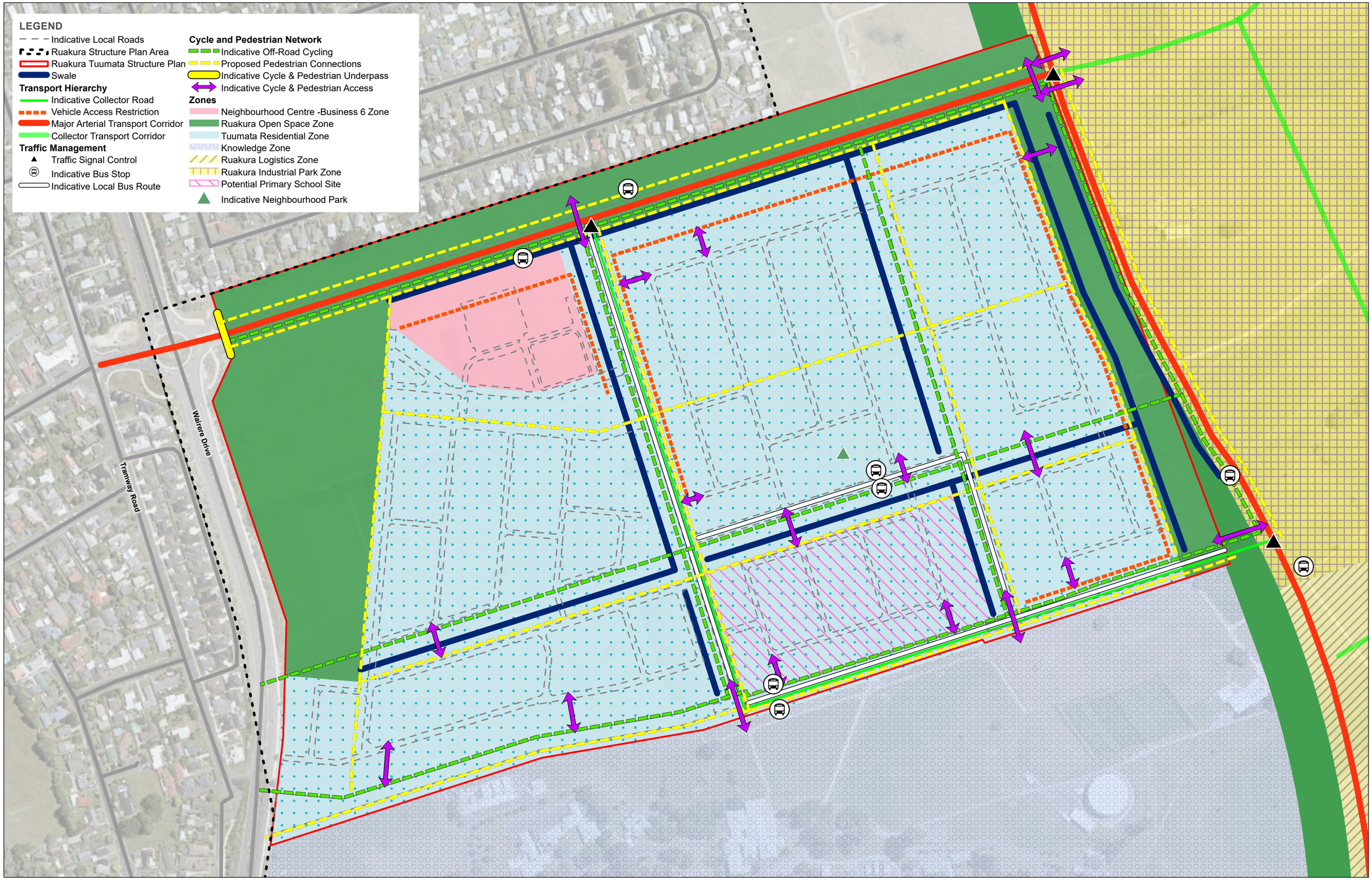


Figure 2-15A: Ruakura Tuumata Structure Plan - Transport

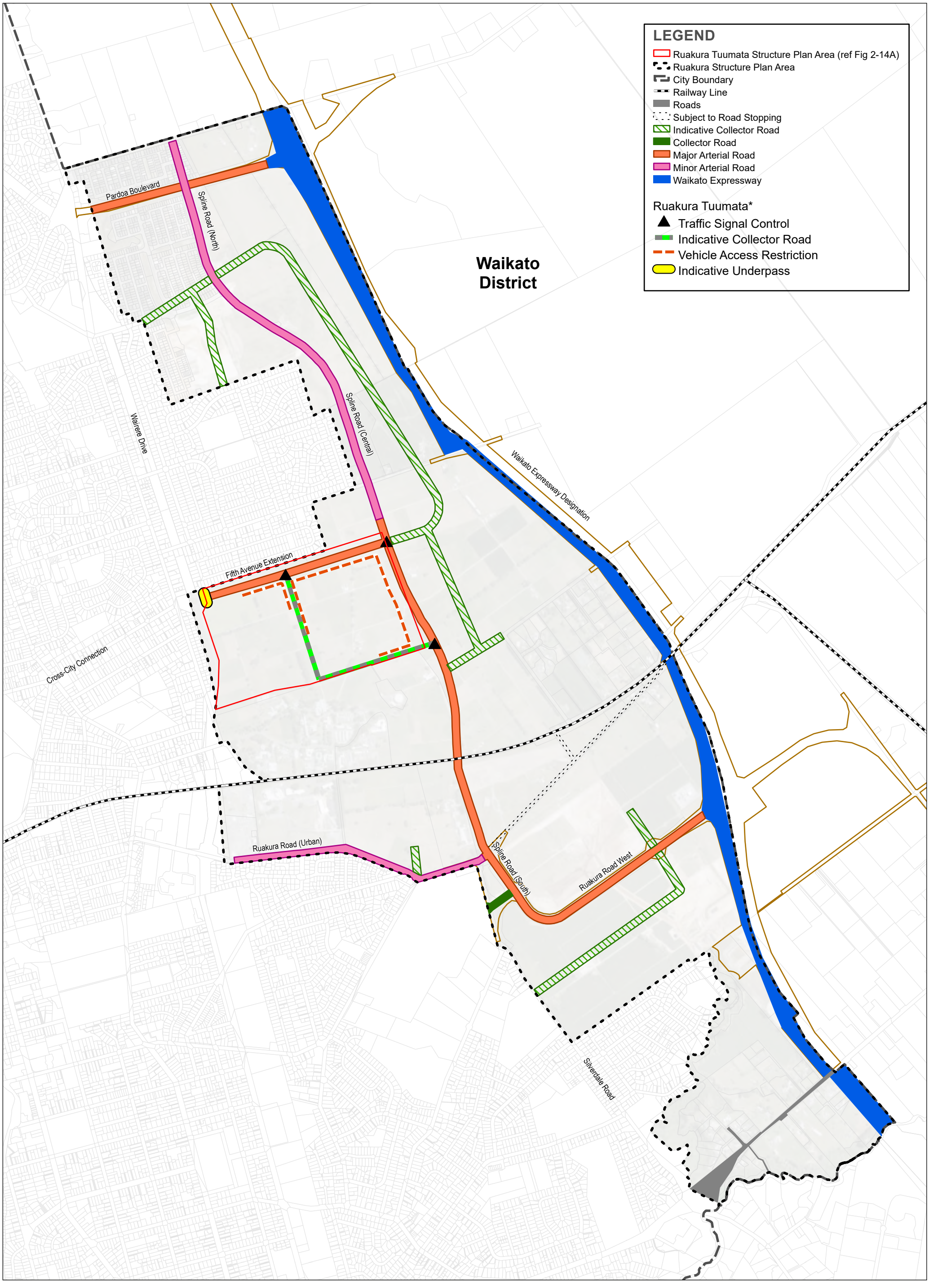


Figure 2-16: Ruakura Tuumata Structure Plan - Land Development Plan Area

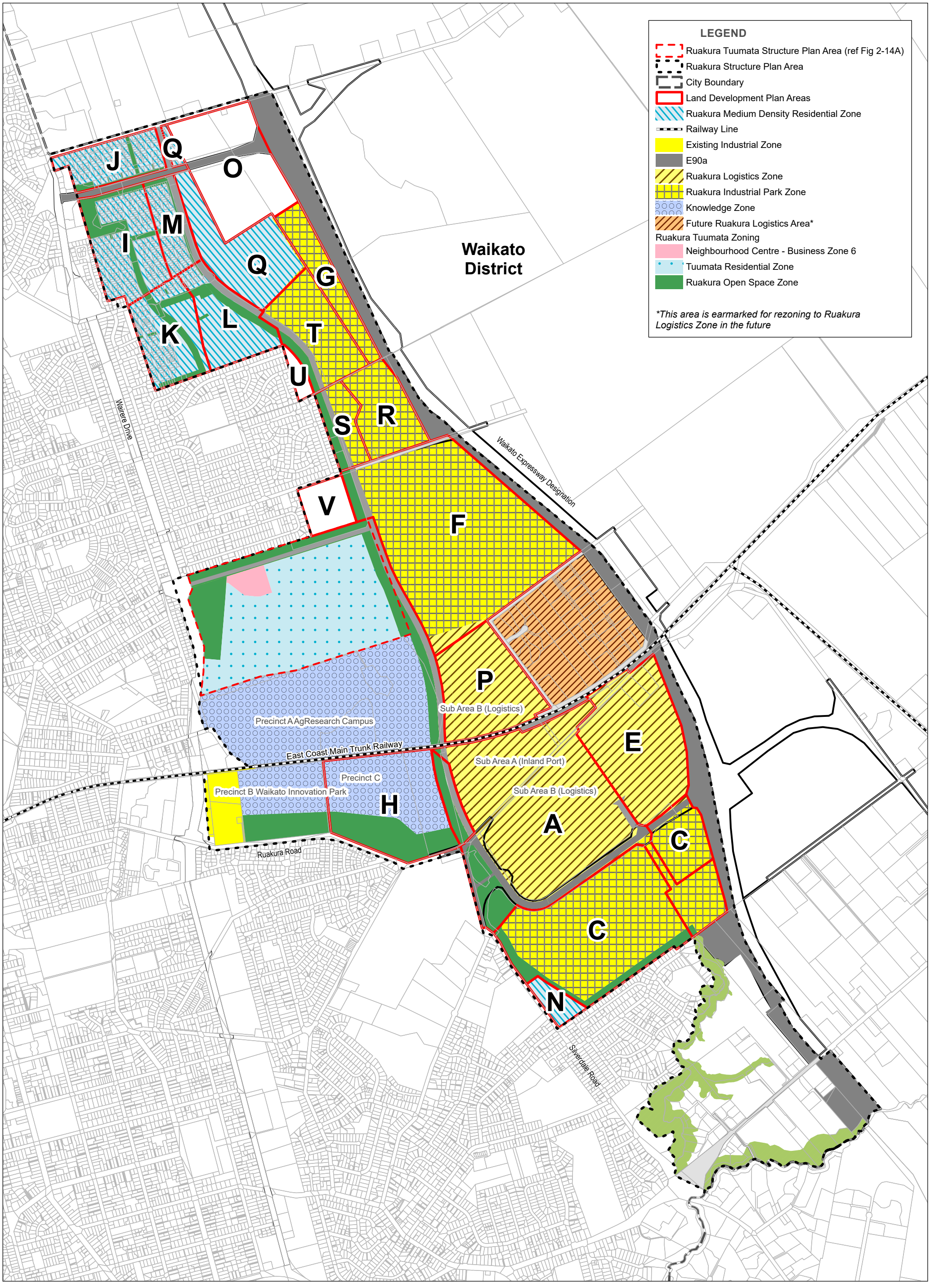
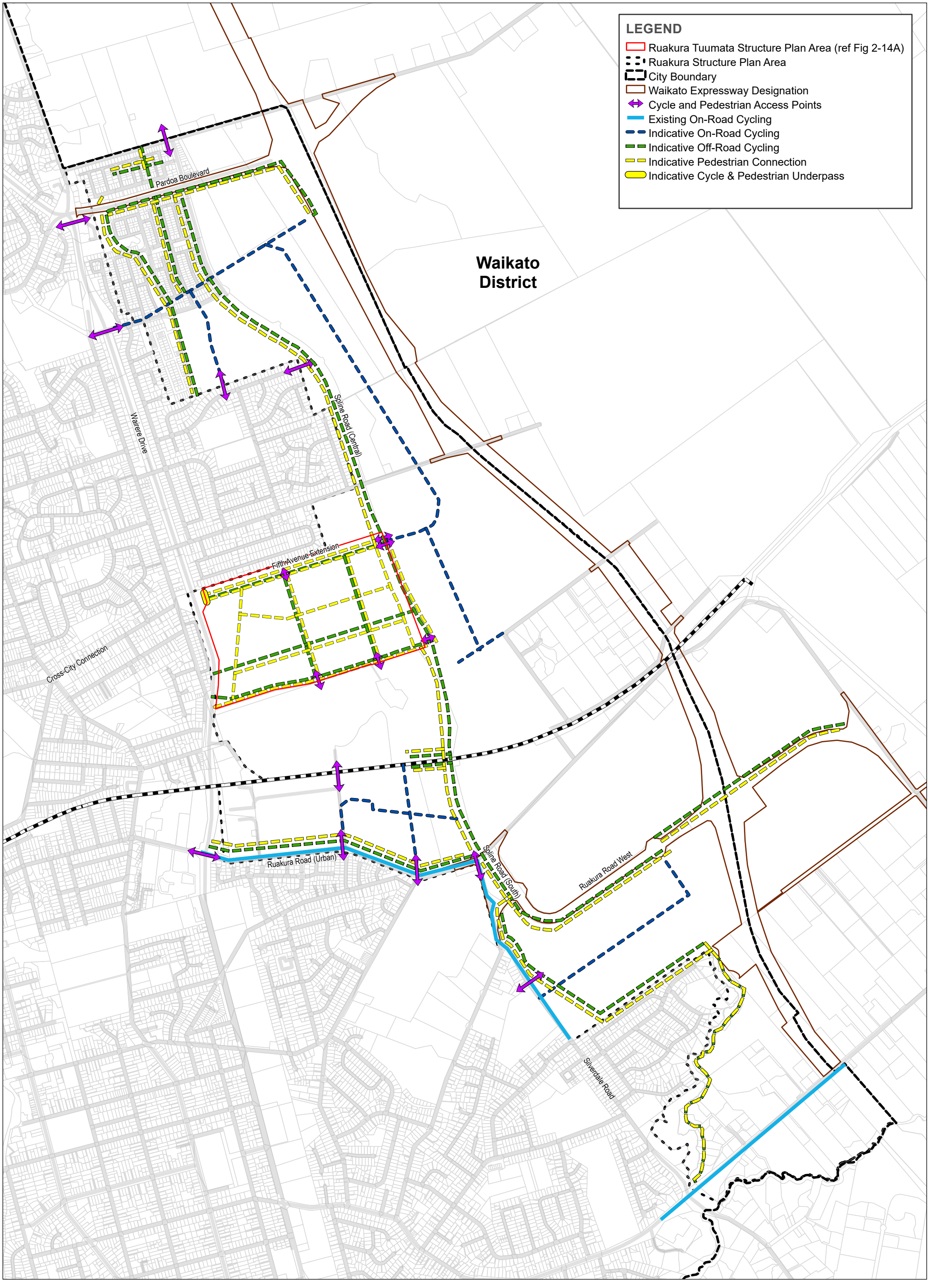


Figure 2-18: Ruakura Tuumata Structure Plan - Cycle and Pedestrian Network



Appendix D Strategic Policy Analysis

D.1 Draft Hamilton Urban Growth Strategy (HUGS) – October 2022

The Hamilton Urban Growth Strategy (HUGS) articulates a vision that "Hamilton Kirikiriroa is the best place to live and work with connected, vibrant and prosperous communities." It has three target outcomes, to:

- Grow up and out from the central city;
- Grow along transport corridors; and
- Support the development of quality greenfield neighbourhoods.

'Improved travel choices' is one of the strategy's five key considerations. The stated aspiration is to be "…a 20-minute city, allowing people to meet most of their daily needs by walking from their home, in pleasant surroundings, and with safe, easy, access to other parts of the city by biking, using micro-mobility or public transport." Specifically, this means:

- Targeting growth in areas where more of people's daily needs can be met;
- Ensuring new communities deliver 20-minute city principles from establishment;
- People have genuine options so they can choose to travel by modes other than car such as on bike, by bus or by using micro-mobility devices.

Of specific relevance to the Tuumata Plan Change, the HUGS identifies the following focus areas:

- Enable and encourage intensification and mixed-use development at key transport interchanges;
- Require greenfield developments to integrate with the rapid transport network;
- Increased diversity of housing typologies and local needs; and
- Higher density neighbourhoods that are supported by genuine public transport options that are reliance, efficient and high quality.

Ruakura, Peacocke, Rotokauri and Rototuna are recognised as existing greenfield development areas. Partnerships between Hamilton City Council and other organisations will deliver more than 50,000 homes in these areas, as well as employment opportunities.

D.2 HCC Proposed Plan Change 12 (PC12)

PC12 is HCC's proposed response to directives from Central Government (the NPSUD and the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021) to change the way New Zealand's larger cities grow.

At the time of writing this report the public consultation period had concluded and hearings were planned for early 2023.

In relation to transport, PC12 proposes a wide range of changes to objectives, policies and rules that generally seek to:

- Give greater recognition to climate change in the design and assessment of developments;
- Give more priority to travel modes other than private cars including walking, cycling, micro-mobility and public transport, in the appropriate settings;
- Introduce more specific requirements around the supply and design of space and infrastructure for walking, cycling, electric vehicles, and micro-mobility devices; and
- Change the design standards for new roads to accommodate landscaping, stormwater devices, separated cycle lanes, public transport and parking spaces.

The proposed Tuumata Plan Change refers to the city-wide transport and parking provisions of the District Plan and does not propose any changes to these. Changes that evolve and take effect through the PC12 process will therefore apply in Tuumata.

The Ruakura-Tuumata Structure Plan transport network and indicative cross-sections have been developed to reflect the intent of PC12 including prioritisation of alternative modes of transport, protection of arterial transport corridors and an integrated land use form that seeks to manage travel demand and encourage trips by walking, cycling and public transport.

D.3 Government Policy Statement on Land Transport 2021/22 – 2030/31

The Government Policy Statement (GPS) on Land Transport 2021/22 to 2030/31 sets out how money will be invested to achieve the Government's transport outcomes and priorities. The outcomes framework seeks to deliver a transport system that improves wellbeing and liveability, by targeting five areas:

- Inclusive access;
- Healthy and safe people;
- Economic prosperity;
- Environmental sustainability; and
- Resilience and security

The four strategic priorities that are to contribute to this are:

- Safety – developing a system where no-one is killed or seriously injured.
- Better travel options – providing people with better transport options to access social and economic opportunities.
- Climate change – developing a low carbon transport system that supports emissions reductions, while improving safety and inclusive access.
- Improving freight connections – improving freight connections for economic development.

Table 4 presents a summary of how the Plan Change supports each GPS outcome.

Table 4: GPS Alignment

GPS Outcome	How the Plan Change Supports
Inclusive Access	A land use pattern and transport network that supports a range of transport modes and prioritises the safety and efficiency of walking, cycling and other active modes.
Healthy and safe people	Providing safe transport infrastructure that supports active travel modes and social inclusion.
Economic prosperity	A multi-modal transport network and access management approach that integrates with surrounding networks and supports the intended function of those roads in the city transport hierarchy.
Environmental sustainability	A land use pattern that provides the opportunity to minimise travel. A transport network that supports and prioritises active modes and public transport.
Resilience and security	A transport network with multiple connections for all modes of transport.

D.4 National Policy Statement on Urban Development (NPS-UD) 2020

The National Policy Statement on Urban Development (NPS-UD) sets out the objectives and policies for planning for well-functioning urban environments under the Resource Management Act 1991. Hamilton City Council is identified as a tier 1 local authority under the NPS-UD, this requires the City to implement the relevant objectives and policies of the NPS-UD.

The NPS-UD clarifies the link between urban environments and people's wellbeing. It outlines important and nationally consistent factors that contribute to good urban outcomes. It aims to help decision-makers prioritise improving urban development outcomes over retaining the status quo. Development will need to recognise and have regard for the shift in outcomes the changed definition seeks. These apply differently to Tier 1 and Tier 2 & 3 urban environments.

The intensification policies within the NPS-UD are intended to ensure council plans provide for greater numbers of people, homes, jobs, and activities to be accommodated in areas with high levels of accessibility to jobs, amenities and services – for development both in existing urban environments and greenfield areas. There is an emphasis around public transport hubs, corridors and in centres that provide good access to jobs, services, and facilities – locations where the benefits of greater levels of urban development can best be realised.

The provisions seek greater density around public transport corridors and in centres, building heights of at least 6 storeys within walkable catchments of planned or existing rapid transit stops as outlined in Policy 3. This policy is applicable to the Tuumata proposal in that the Waikato Regional Public Transport Plan proposes high-frequency services (as distinct from rapid transit services) on both the Eastern Transport Corridor and Fifth Avenue extension, which each form a boundary with the structure plan area.

The NPS-UD also directed tier 1, 2 and 3 territorial authorities to remove minimum parking requirements (other than for accessible car parks) from their District Plans by February 2022. This has been completed by Hamilton City Council.

D.5 Government Emissions Reduction Plan

Transport is one sector of the overall emissions reduction plan published in May 2022. The long term vision for transport is stated as:

"*By 2035, Aotearoa New Zealand will have significantly reduced transport-related carbon emissions and have a more accessible and equitable transport system that supports wellbeing."*

Key actions in the Plan and how they relate to the plan change proposal are summarised as follows:

- Reduce reliance on cars and support people to walk, cycle and use public transport, achieved through:
    - Being located adjacent to planned high frequency public transport routes on Fifth Ave and the ETC;
    - Establishing the neighbourhood in a way that is highly conducive to walking, cycling and micro-mobility modes, avoiding short trip making by private motor vehicle;
    - Integrating safer streets outcomes to support alternative travel mode selection; and
    - The inclusion of Neighbourhood Centre, with a supermarket, to enable daily needs of residents to be met locally.
- Rapidly adopt low-emissions vehicles, achieved by enabling the structure plan area in a way that supports adoption of low-emissions vehicles, recharging facilities, ride share facilities and access to an efficient low-emissions public transport service;

While the primary targets are planned to be met through Government's four transport targets focussed on changes to the vehicle fleet, freight transport and fuel emissions reductions, the plan change will contribute through achieving better travel options through its urban form.

D.6 Road to Zero

The Road to Zero strategy for 2020-2030 is the Government's ten-year plan to support the GPS outcome seeking healthy and safe people. Its vision is 'a New Zealand where no one is killed or seriously injured in road crashes' and it has five focus areas:

- Infrastructure improvements and speed management;
- Vehicle safety;
- Work-related road safety;
- Road user choices; and
- System management.

HCC has adopted a Vision Zero target and is aiming to *"… design and deliver infrastructure that recognises humans are fallible and that when we make a mistake, we should not pay for it with our life*."[6]

[6] https://www.hamilton.govt.nz/our-services/transport/accesshamilton/Pages/default.aspx

The Plan Change transport reflects Vision Zero principles of designing streets that seek to protect vulnerable road users and promote a low speed, healthy urban environment. This achieved by measures including:

- Managing access to higher volume, higher speed arterial roads that are intended to provide for through traffic movement and the movement of freight;
- Providing separated walking and cycling networks;
- Limiting the extent of long, straight and continuous vehicle routes that promote higher speeds;
- Designing narrow carriageways with side friction in the form of parking and berm treatments; and
- Using horizonal deflection in road design and also vertical deflection in the intended treatment of intersections (raised crossings and raised table intersections).

D.7 Future Proof Strategy 2022

The Future Proof strategy is described as:

The Future Proof Strategy is a 30 year growth management and implementation plan specific to the Hamilton, Waipā and Waikato sub-region within the context of the broader Hamilton-Auckland Corridor and Hamilton-Waikato Metropolitan areas, which include important adjacent areas such as Pukekohe, Drury and Morrinsville. The strategy provides a framework to manage growth in a collaborative way for the benefit of the Future Proof sub-region both from a community and a physical perspective.

Figure 7 – Summary of H2A key initiatives describes Focus Area 5: Hamilton-Waikato Metro Area including the initiative: *Priority development area: central corridor - Frankton, Hamilton City Centre, Hospital, University and Ruakura.*

The Transport outcomes are linked with Ruakura as follows:

The vision is that at the heart of the future public transport network will be a rapid transit spine linking the major employment and residential hubs of Horotiu, Rotokauri/Te Rapa, Frankton, the central Hamilton city area and Ruakura with fast and frequent services throughout the day.

In terms of the City's town centre planning, Future Proof identifies:

In the future growth areas of Ruakura, Rotokauri, Rototuna and Peacocke, and envisioned future growth areas of HT1 and R2 (both to the northeast of the current city boundary), town centres will be planned in order to service the everyday needs of the growing neighbourhoods. Town centres will function as the local hubs within the developing communities. Smaller neighbourhood centres will be easily accessible for day-to-day needs. Town centres and local shops will connect through to metro and regional centres for centralised services not provided locally.

Residential intensification targets are identified for Ruakura[7] as targeting 35 to 55 dwellings per ha and the area being serviced by a "Rapid" future public transport service.

Within the Transport Initiatives (page 105) a programme business case is intended to consider:

- *supporting and enabling rail and road infrastructure in key growth areas, including Ruakura, Peacocke, Cambridge West- Hautapu, airport, Rotokauri, Te Rapa, Horotiu and Ngaaruawaahia.*

On these bases it is evident there is a purposeful focus on progressing development within the wider Ruakura economic area including zoning for residential intensification. It's also evident the Ruakura area (including the Tuumata area) is contemplated being supported with a rapid transport service facility.

D.8 Waka Kotahi Investment Proposal (2021-31)

The Waka Kotahi Investment Proposal (WKIP) sets out the activities that will receive funding in the National Land Transport Programme (NLTP). These activities aim to give effect to the GPS. The WKIP identifies four strategic activities:

- Safety:
- Better travel options;
- Improved freight connections;
- Climate change

Projects around the Plan Change area that are included in the WKIP programme include:

- Completion of the various sections of the WEX;
- Completion of the Hamilton Ring Road (Wairere Drive to Cobham Drive);

Table 5: WKIP Alignment presents a summary of how the Plan Change can support and align with each of Waka Kotahi's strategic activities.

[7] Future Proof Strategy 2022, Table 6, page 95

Table 5: WKIP Alignment

WKIP Strategic Activities	How the Plan Change Supports
Safety	A transport network that is planned to consider all modes of transport and designed to support use of that network by the intended modes. Road and intersection designs that support low speed operation.
Better travel options	Providing safe transport infrastructure that supports active travel modes and social inclusion. A land use pattern and density that supports and prioritises active modes and public transport.
Improved freight connections	Access controls on arterial road frontages. Arterial intersections that provide appropriate safety, connectivity and capacity.
Climate change	A land use pattern that provides the opportunity to minimise travel. A transport network that supports and prioritises active modes and public transport.

D.9 Waka Kotahi Keeping Cities Moving

Keeping Cities Moving is Waka Kotahi's plan to partner with other organisations to reduce New Zealand's reliance on private car travel. Its vision is to increase the wellbeing of New Zealand's cities by growing the share of travel by public transport, walking and cycling. The plan seeks to influence mode shift in three main ways:

- Shaping urban form;
- Making share and active modes more attractive; and
- Influencing travel demand and transport choices.

The Plan Change supports this strategy in ways including:

- Prioritising walking, cycling and other active modes on the internal network;
- Providing walking and cycling paths that are as direct and uninterrupted as practical;
- Adopting a land use form that provides residential density and an integrated mixed use area with zoning to enable a range of local commercial activities and services; and
- Proving a transport network that integrates with planned future public transport investment and network form.

D.10 Waikato Regional Land Transport Plan (RLTP) 2021-2051

The RLTP sets the strategic direction for land transport in the Waikato Region including its policy framework and transport programme. The RLTP includes three strategic objectives and two underpinning objectives:

Strategic objectives:

- Strategic corridors and economic development – an efficient and resilient land transport system that advances regional economic wellbeing and supports liveable urban areas now, and in the future
- Road safety – no-one is killed or seriously injured on our regional transport system
- Access and mobility – our land transport system provides an inclusive range of integrated and safe travel choices for people to meet their various needs.

Underpinning objectives:

- Climate change and environmental sustainability – ensuring that transport plays its role in delivering an energy efficient, resilient, and low carbon sustainable future
- Integrated land use and transport planning – ensuring that collaborative spatial-based approaches to decision-making continue to drive the best outcomes for our communities.

Table 6: RLTP Alignment

RLTP Objectives	How the Plan Change Supports
Strategic corridors and economic development – an efficient and resilient land transport system that advances regional economic wellbeing and supports liveable urban areas now, and in the future	The Plan Change appropriately responds to its arterial network frontages with access controls and intersections.
Road safety – no-one is killed or seriously injured on our regional transport system	The internal Plan Change network is designed to prioritise active modes and manage vehicle speeds.
Access and mobility – our land transport system provides an inclusive range of integrated and safe travel choices for people to meet their various needs.	The internal Plan Change network is designed to prioritise active modes and support public transport frequency with density and walkable neighbourhoods.
Climate change and environmental sustainability – ensuring that transport plays its role in delivering an energy efficient, resilient, and low carbon sustainable future	The Plan Change land use pattern incorporates residential density, mixed use and a walking, cycling and public transport focussed transport network.
Integrated land use and transport planning – ensuring that collaborative spatial-based approaches to decision-making continue to drive the best outcomes for our communities	The Plan Change has been designed to integrate with existing transport networks and future plans such as the RPTP.

The Regional programme of transport activities identifies a range of strategic regional responses. These include amongst them:

- A business case for the Ruakura Eastern Transport Corridor (ETC) in 2021/22.
- Pre-implementation activities for the Ruakura ETC in 2021/22 and 2022/23, with implementation to follow from 2023/34 to 2026/27.
- Cross-city collector designation (Ulster to Wairere) (unfunded).
- Implementation of the Ruakura Road Urban Upgrade in 2021/22 and 2022/23.
- Intersection improvements at Boundary Road/Heaphy Terrace (business case, pre-implementation and implementation by 2024/25.
- Eastern pathways School link, implementation by 2024/25

D.11 Waikato Regional Public Transport Plan (RPTP) 2022-2032

The Waikato Regional Council (WRC) released its draft 2022-2032 Regional Public Transport Plan (RPTP) for consultation in July 2022. It sets seven objectives:

- Objective 1: Deliver public transport services in a way that results in negative carbon emissions from 2027 onwards.
- Objective 2: Deliver an integrated network of public transport services that enhances accessibility and wellbeing.
- Objective 3: Provide a fares and ticketing system that is simple, affordable and attracts and retains customers.
- Objective 4: Provide high quality and intuitive public information.'
- Objective 5: Provide the infrastructure necessary for accessible, effective and efficient public transport services.
- Objective 6: Provide public transport services that are affordable for passengers and funders.
- Objective 7: Develop and maintain partnerships that obtain best value for money in the delivery of transport solutions.

The proposed 'Future Frequent Network' to be implemented over the period 2022 to 2032 was shown earlier as Figure 4.1 and Figure 4.2.

D.12 Hamilton-Waikato Metropolitan Spatial Plan

The Hamilton-Waikato Metropolitan Spatial Plan (MSP) is a vision an framework prepared by the Future Proof partners (HCC, Waipa District Council, Waikato District Council, Waikato Regional Council, and Waikato Tainui). It identifies six 'transformational moves' which are:

- Waikato River - celebrating the Waikato River as the defining ecological feature connecting the metro area to the heart of a blue-green network supporting environmental and recreational use and creating a sense of place.
- A radical transport shift - a multi-modal transport network, connecting the metro area and facilitating a radical shift to using public transport through the establishment of a rapid and frequent public transport network shaped around where and how our communities will grow.
- A vibrant metro core and lively metropolitan centres - growing Hamilton central city as our civic, administrative, cultural and commercial metro core, alongside lively metropolitan centres, well connected by public transport and safe walking and cycling networks, where people can afford to live, work and play.
- A strong and productive economic corridor - establishing an economic corridor that links the highly productive employment areas between Ruakura, Hamilton central city and north to Horotiu and Ngaaruawaahia.

- Iwi aspirations - enhancing the environmental health and wellbeing of the Waikato River in accordance with Te Ture Whaimana o Te Awa o Waikato – Vision and Strategy for the Waikato River, while supporting iwi in embracing social and economic opportunities within the metro area with a specific emphasis on Hopuhopu and Ruakura.
- Thriving communities and neighbourhoods - enabling quality denser housing options that allow our natural and built environments to coexist in harmony increasing housing affordability and housing choice to meet the needs of growing and changing communities

The MSP also contains transport directives which are:

- Optimise the use of existing transport infrastructure, by aligning land use and development.
- Plan and protect efficient freight network operations and inter-regional corridors.
- Connect transport and resident hubs, linking major growth centres by public transport and active modes.
- Plan and design neighbourhoods to make public transport use, walking and cycling easy and attractive.

The proposed Plan Change is supportive of these directions because it:

- Creates residential density in an area that is between an established urban area and a growth area;
- Responds appropriately to its arterial road frontages and does not compromise their intended function;
- Creates walking and cycling connections between new and existing residential areas and employment areas in the Ruakura Structure Plan;
- Integrates with planned future public transport investment and networks;
- Has an internal transport network that is designed to prioritise active modes and walkability to local employment and social opportunities.

D.13 Access Hamilton

Access Hamilton is Hamilton's overarching transport strategy that targets four outcome areas:

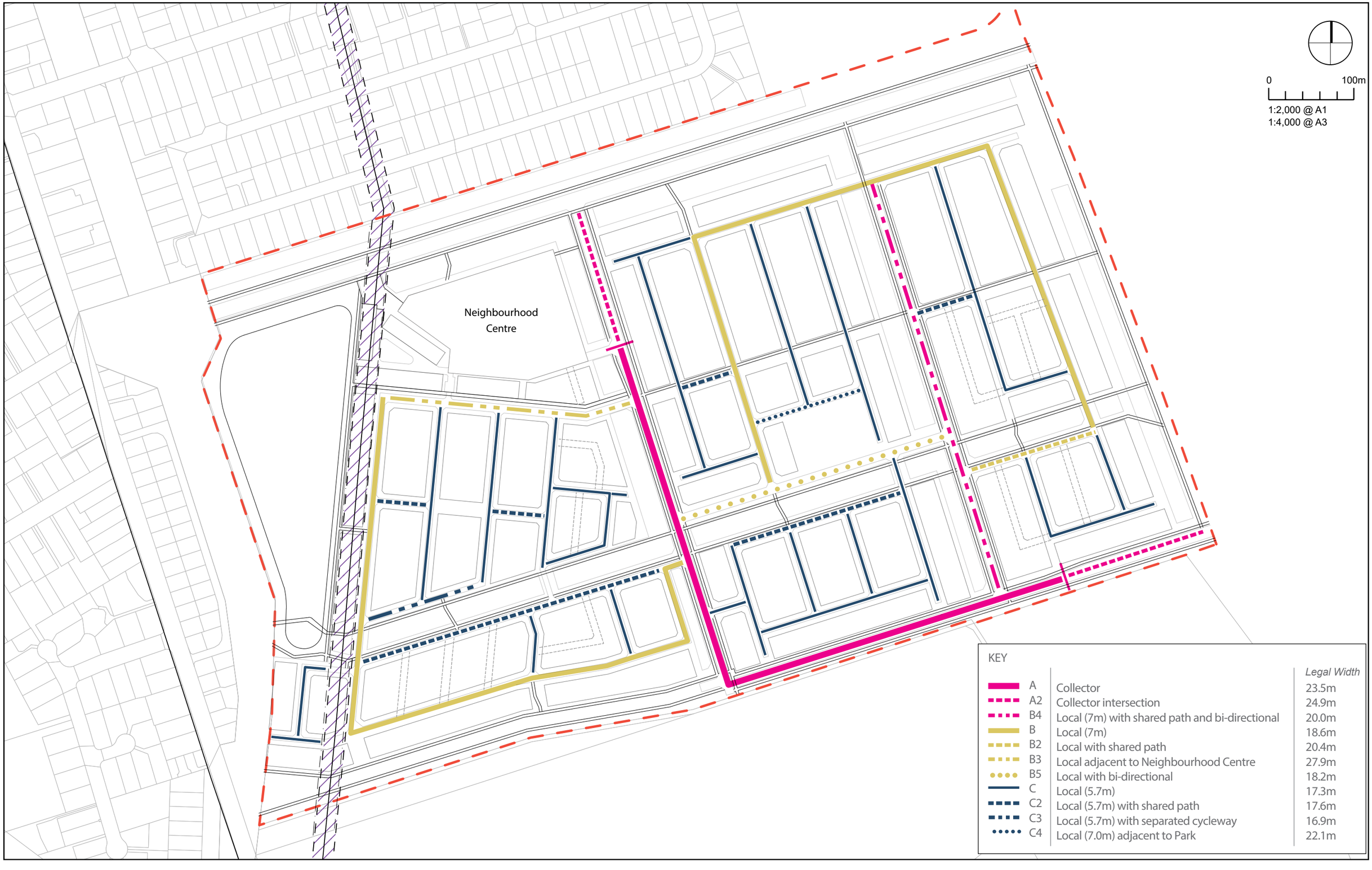
- Safe – everyone experiences a safe and enjoyable journey;
- Smart – our transport network is adaptable and resilient to change.
- Choice – everyone has travel options for moving around the city.
- Growth – we are forward thinking with our city planning and crate attractive neighbourhoods which keep our city moving.

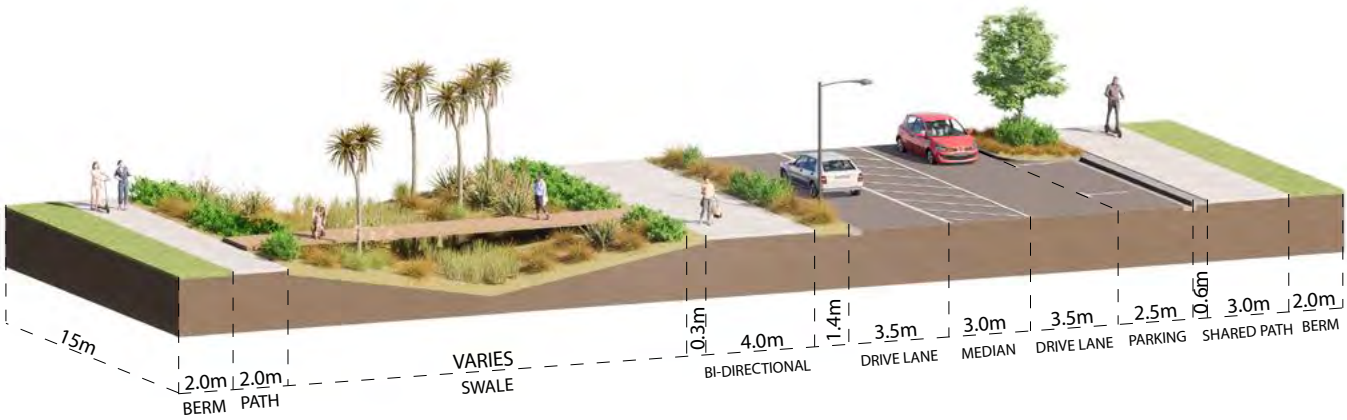
Access Hamilton guides investment in transport activities across a range of transport modes, with a current focus on supporting greater uptake of public transport and mode shift to walking and cycling.

The Plan Change is supportive of these outcomes through its location relative to major centres of employment and education facilities, its multimodal transport network and its proposed urban form.

Appendix E Road Cross Sections

Figure 2-14B Ruakura Tuumata Structure Plan: Transport Corridor Cross Sections





A - COLLECTOR ROAD - 23.5M

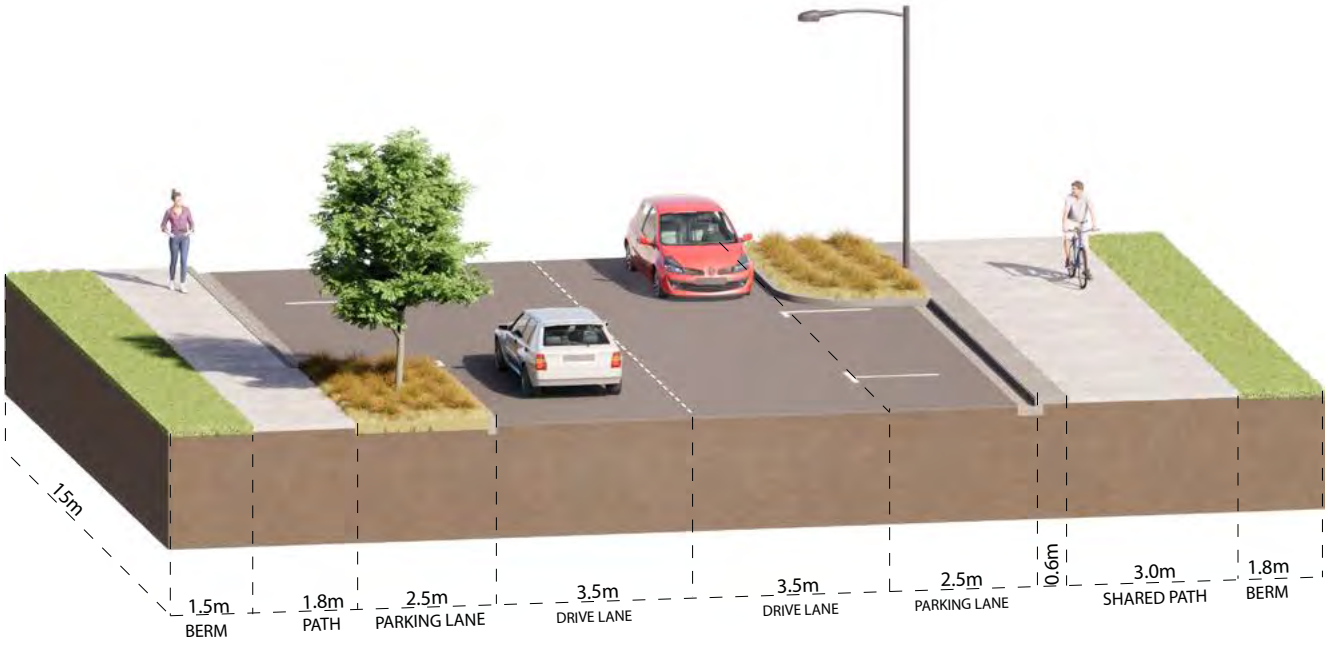
Internal dimensions indicative only and subject to detailed design

A2 - COLLECTOR ROAD WITH INTERSECTION - 24.9M

Internal dimensions indicative only and subject to detailed design

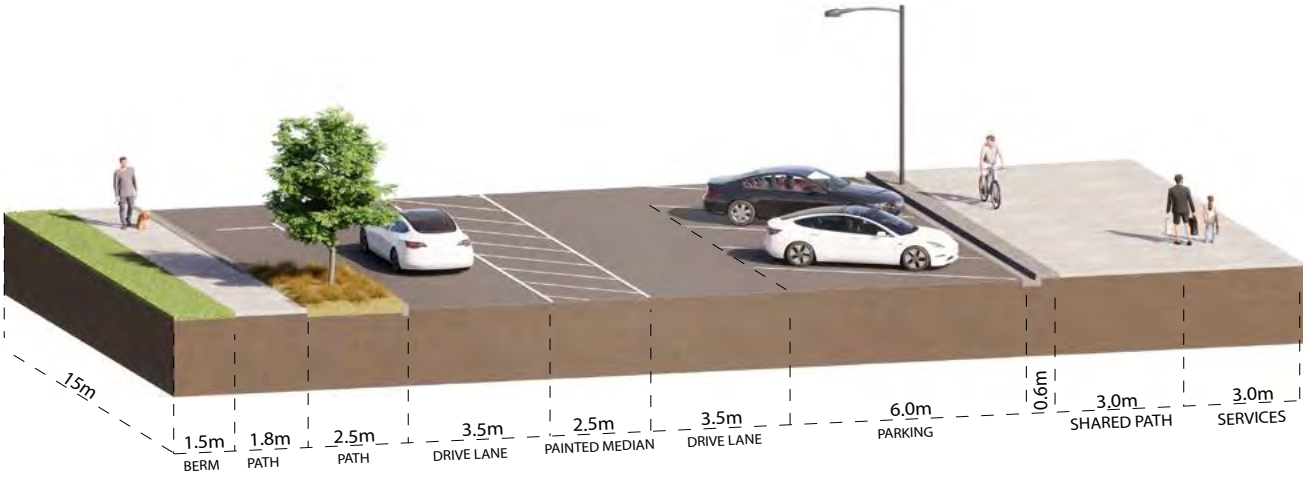
B - LOCAL ROAD - 18.6M

Internal dimensions indicative only and subject to detailed design



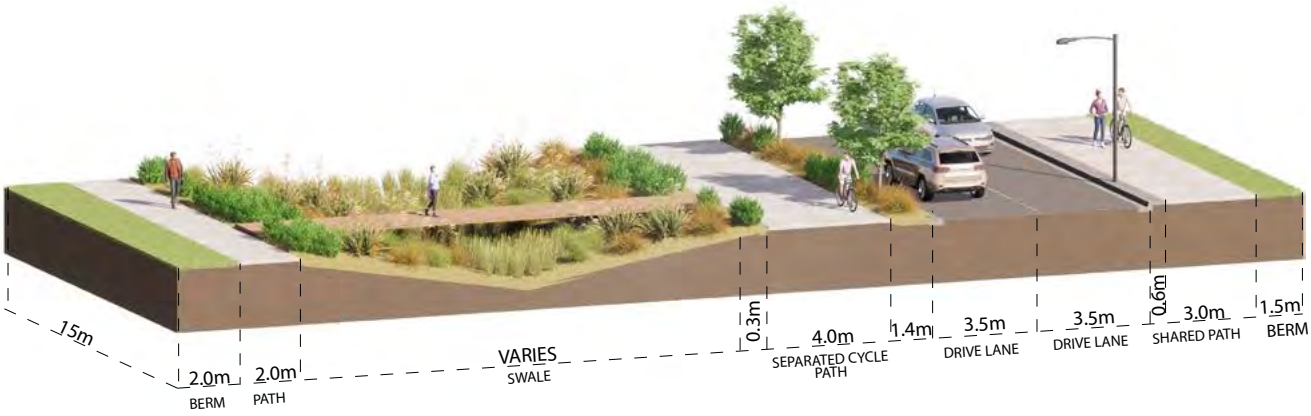
B2 - LOCAL ROAD WITH SHARED PATH - 20.4M

Internal dimensions indicative only and subject to detailed design



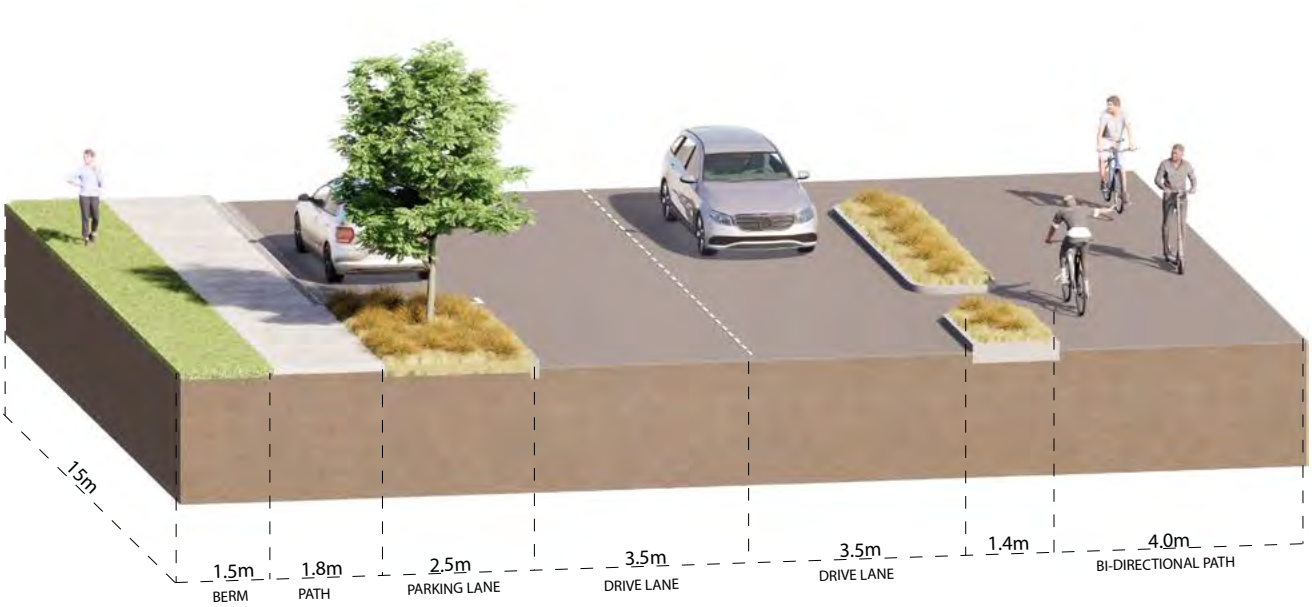
B3 - LOCAL ROAD ADJACENT TO URBAN CENTRE - 27.9M

Internal dimensions indicative only and subject to detailed design



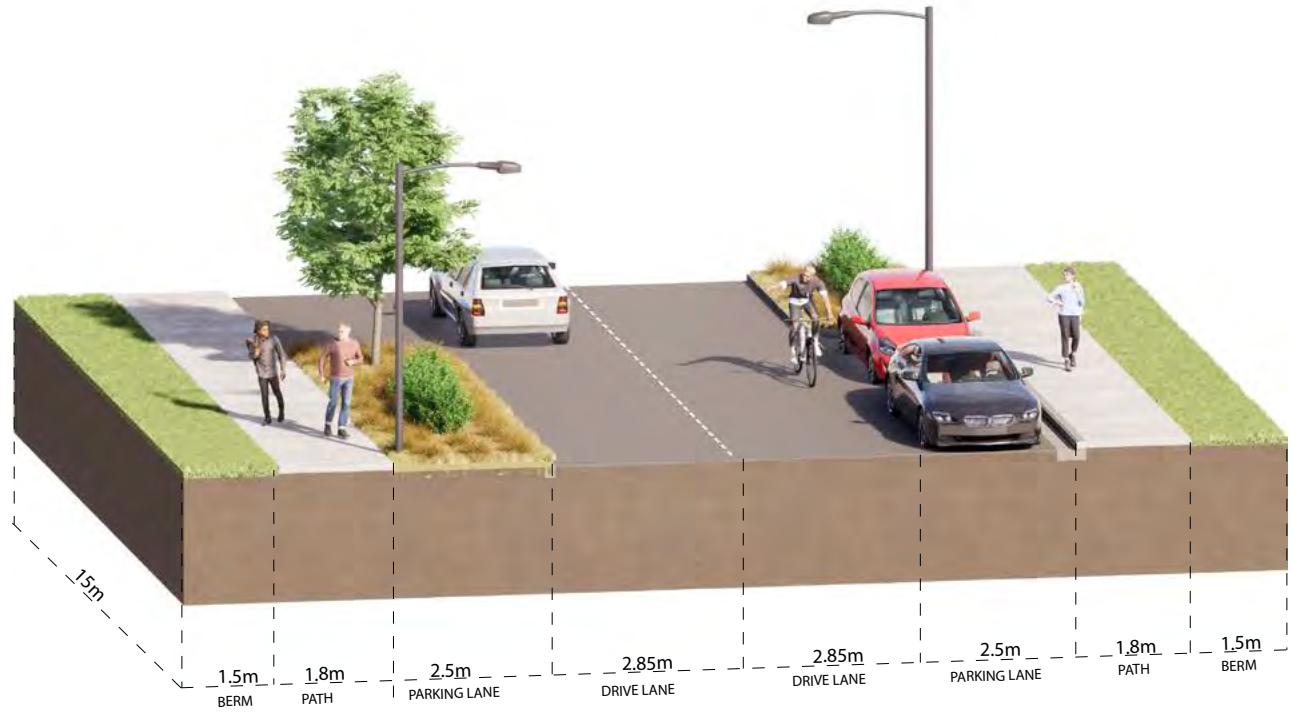
B4 - LOCAL ROAD WITH SHARED PATH AND BIDIRECTIONAL CYCLE PATH - 17.5M

Internal dimensions indicative only and subject to detailed design



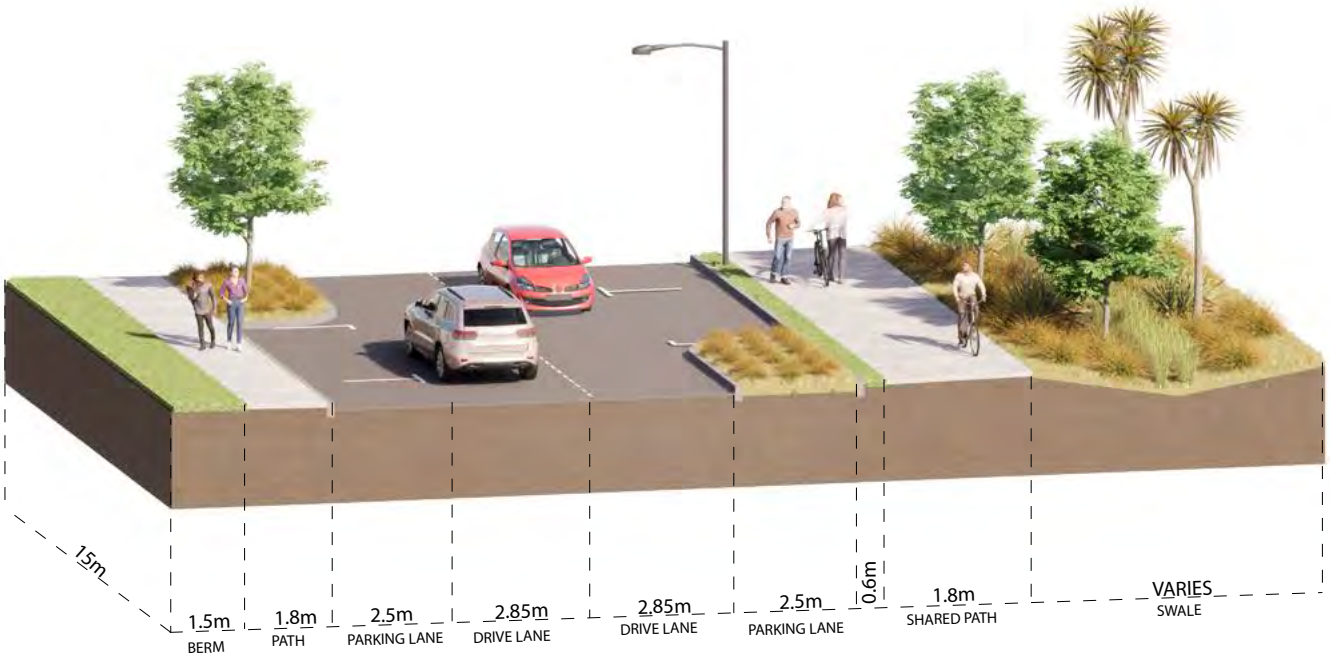
B5 - LOCAL ROAD WITH BIDIRECTIONAL CYCLE PATH - 18.2M

Internal dimensions indicative only and subject to detailed design



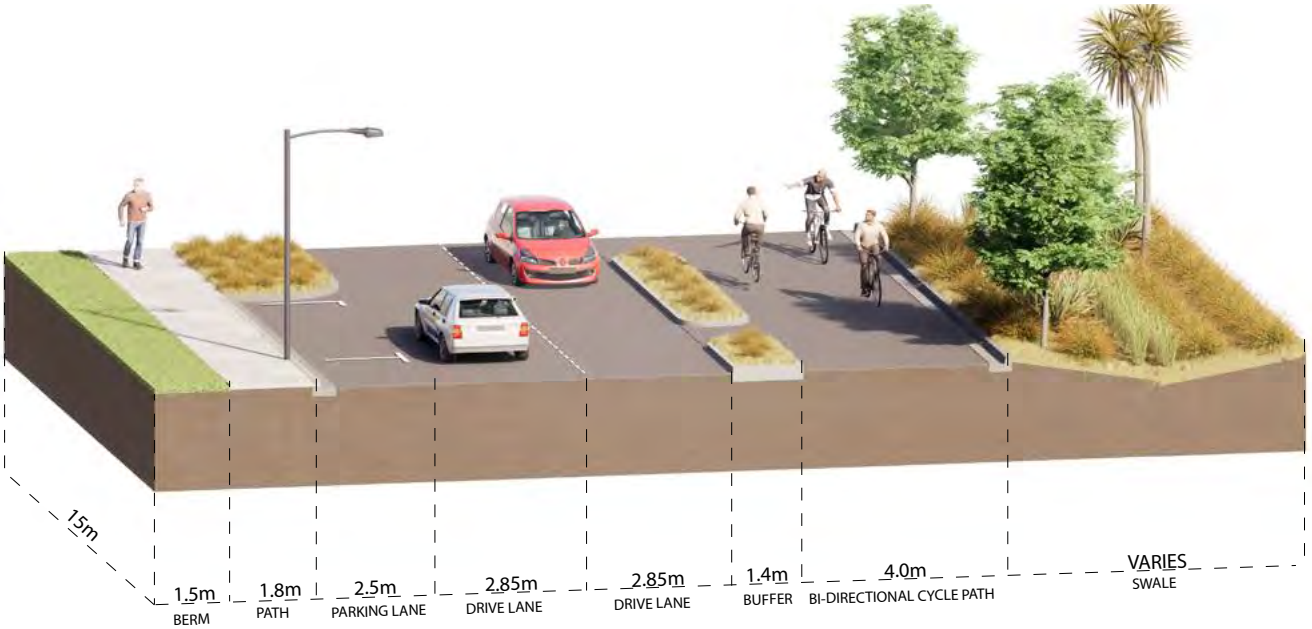
C - LOCAL ROAD AND NEIGHBOURHOOD STREET - 17.3M

Internal dimensions indicative only and subject to detailed design



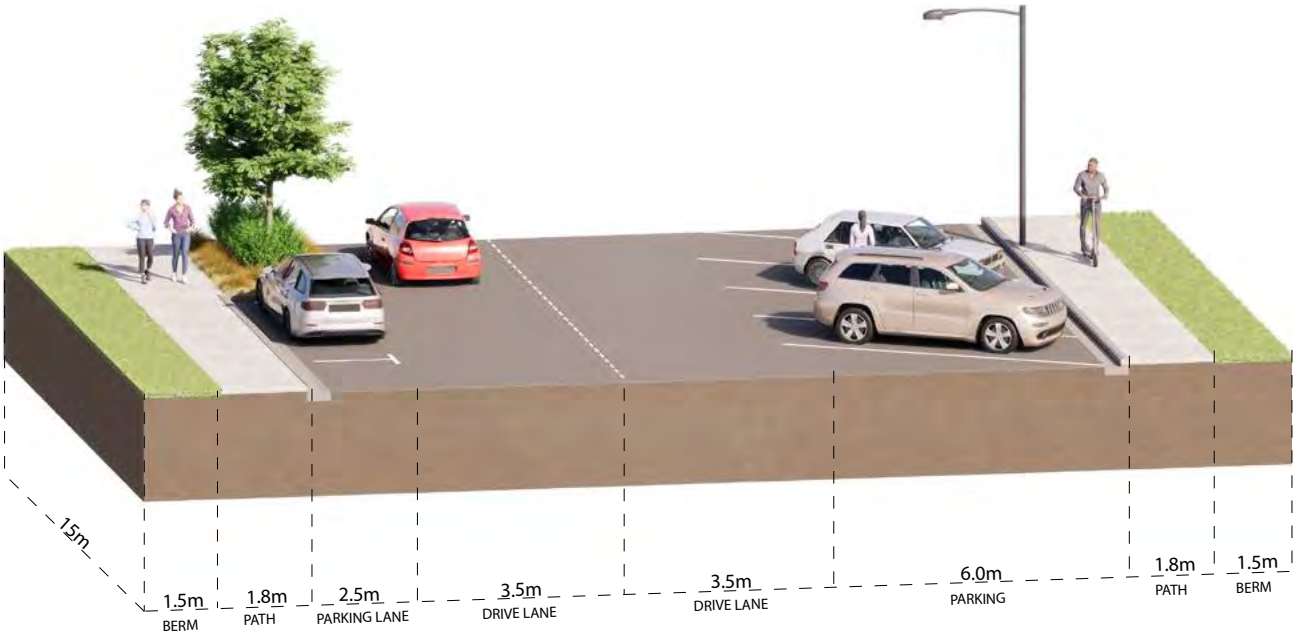
C2 - LOCAL ROAD WITH SHARED PATH - 17.6M

Internal dimensions indicative only and subject to detailed design



C3 - LOCAL ROAD WITH SEPARATED CYCLEWAY - 16.9M

Internal dimensions indicative only and subject to detailed design



C4 - LOCAL ROAD ADJACENT TO PARK - 22.1M

Internal dimensions indicative only and subject to detailed design