REPORT

Tonkin+Taylor

Healthy Waters - Te Ararata Flood Resilience Works - Walmsley Road Bridge Replacement

Integrated Transport Assessment (ITA)

Prepared for
Auckland Council Healthy Waters
Prepared by
Tonkin & Taylor Ltd
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1 Introduction and project overview

1.1 Introduction

Tonkin & Taylor Ltd (T+T) has been engaged by Auckland Council's Healthy Waters department to undertake an Integrated Transport Assessment (ITA) related to the proposed Te Ararata Walmsley Road bridge replacement Project (the Project). The Project is flood resilience works, with this assessment prepared to support a resource consent application under the Severe Weather Emergency Recovery (Auckland Flood Resilience Works) Order 2024.

This report assesses the construction transport effects of the Project based on an indicative construction methodology and concept design developed to support the resource consent application. This ITA report has been prepared in accordance with the Te Ararata Stage 2 Design agreement dated 17 June 2024 and Variation Order dated 30 July 2024.

A reasonable worst case and effects envelope has been assumed within this assessment to account for potential changes to activities and programme. Minor changes to the final methodology and detailed design are unlikely to change the overall envelope of effects as presented in this report.

1.2 Project background

The January 2023 floods, followed closely by Cyclone Gabrielle, marked a period of unprecedented weather challenges for Auckland. The floods, and the subsequent cyclone caused significant infrastructural damage, with an estimated 8,000 homes destroyed or damaged and thousands of residents' lives affected. The events underscored the city's vulnerability to extreme weather, prompting Auckland Council to endorse the "Making Space for Water Programme" developed by Healthy Waters. This initiative aims to mitigate flood risks through a series of blue-green networks, addressing critical flood-prone areas with sustainable stormwater solutions.

As part of the overall Programme, Healthy Waters identified a combination of interventions within the Te Ararata catchment (overall referred to as the Te Ararata Project) to collectively address the flood resilience issues further outlined in the Assessment of Effects on the Environment (AEE).

1.3 Project Overview

The first package of works within the overall Te Ararata Project is for the Walmsley Road bridge replacement works (i.e. the Project) and is the subject of this assessment. The Project seeks to achieve greater flow capacity and reduce blockage risk beneath Walsmley Road and within Te Ararata Creek.

A detailed description of the proposed work and indicative methodology is provided in the AEE prepared for the application. The Project is located within the existing Walmsley Road bridge, Te Ararata Creek, Black Bridge Reserve and Walmsley Road Reserve ashown inFigure 1.2 below.

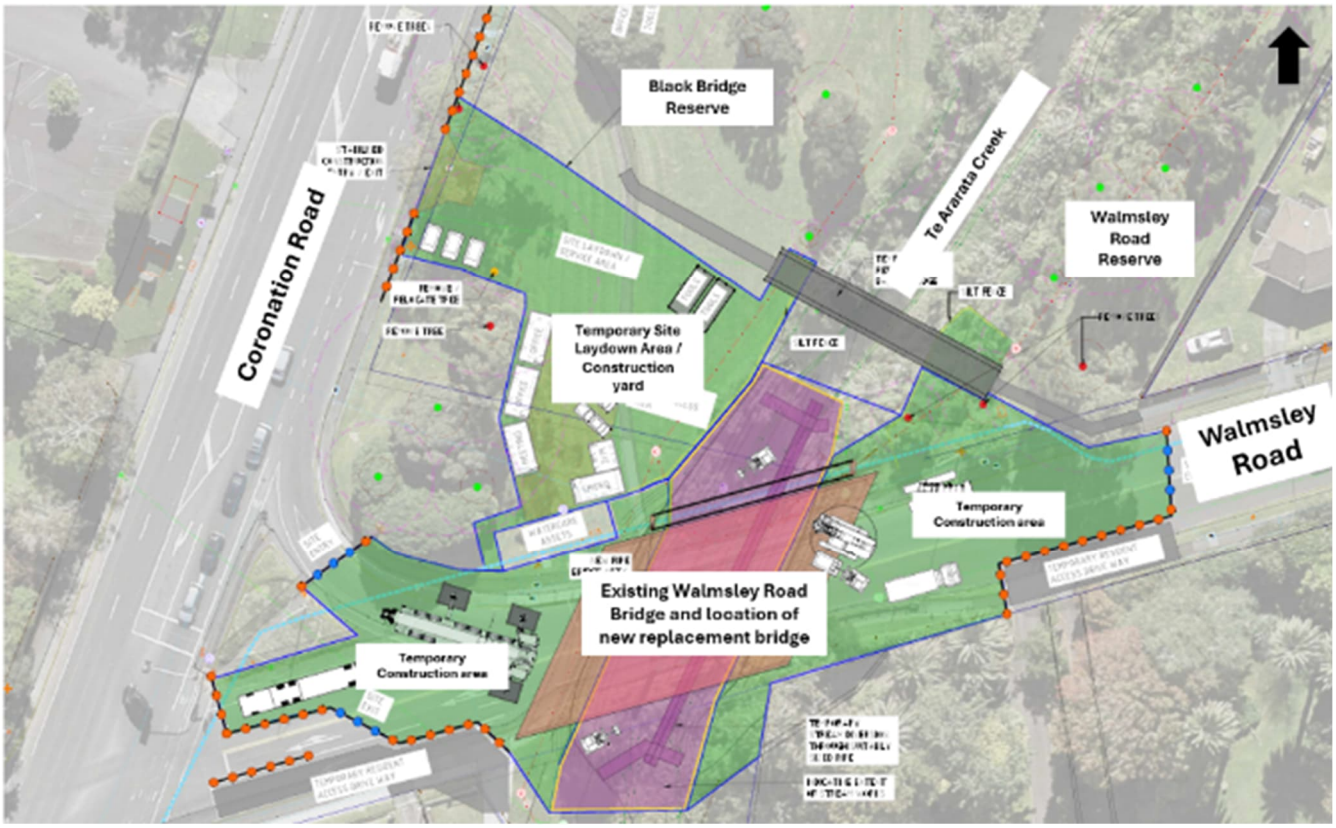

Figure 1.1: Proposed site layout

Overall construction of the Project is anticipated to take approximately 10 – 12 months, with closure of the existing Walmsley Road bridge required for approximately 7 months during this period (and resultant diversion of traffic).

In summary, the Project includes the following key elements:

- Demolition and removal of the existing Walsmley Road twin culvert.
- Construction of a new replacement Walmsley Road bridge over Te Ararata Creek.
- Works to tie in the new replacement bridge with the existing road network.
- Recontouring of the stream banks under the bridge to achieve a wider stream channel.
- Relocation of the existing Watercare watermain pipe bridge foundations to achieve a wider clearance beneath the structure.
- Existing service relocation and/or realignment.
- Vegetation clearance, including within riparian margins and the removal of trees.
- Earthworks associated with temporary and permanent works, including within the riparian margins.
- Other temporary works and activities to facilitate the construction of the permanent Project including:
    - The formation and operation of laydown areas and a site compound predominantly within Black Bridge Reserve.
    - Works within and around the Te Ararata Creek including temporary stream diversion.
    - Temporary traffic management measures including a temporary bailey bridge to facilitate pedestrian and active mode diversions between Coronation Road and Walmsley Road. Vehicular traffic will be diverted to the wider existing road network.

Black Bridge Reserve will be used as the main construction compound and laydown area. Working hours are anticipated to be 7 am to 7 pm on weekdays and 8:30 am to 7 pm on Saturday with no works planned on Sundays and Public Holidays. Some night works may be required (for pavement

tie-ins, road markings and bridge beam deliveries) and some early morning work required for concrete pours.
Some flexibility in construction methodology is sought given the constrained implementation timeframes and to accommodate outcomes from ongoing engagement with Auckland Transport (AT) and New Zealand Transport Agency Waka Kotahi (NZTA), which is currently being undertaken in parallel with the consenting process.
Final temporary traffic management (TTM) measures will be confirmed by the contractor closer to the time of construction and in accordance with the Construction Environmental Management Plan (CEMP) condition requirements of the Order in Council (OiC).

1.4 Purpose of Integrated Transport Assessment

The purpose of this ITA is to assess the potential traffic and transport impacts of constructing the proposed works. The ITA also identifies traffic management measures that a contractor could use to minimise potential effects of construction on traffic movements and neighbouring properties. Any further traffic management and mitigation measures identified following AT and other stakeholder consultation is to be considered and undertaken by the Project contractor.
The ITA has been informed by several meetings with Auckland Council, AT SMEs (Subject Matter Experts) and also with NZTA/ASM (Auckland System Management) team. Appendix A lists the Council and AT staff consulted during the preparation of this ITA.

1.5 Background and experience to date

Healthy Waters has extensive experience in successfully delivering water improvement projects throughout Auckland, which they can bring to this Project. As such, the activities and effects of construction are well understood and the Project team's experience has demonstrated that the effects associated with the proposed construction works, including traffic effects, can be successfully managed by resource consent conditions and the suite of management plans approved by Council for construction sites. However, it is also acknowledged that every new construction site needs to be assessed for its individual characteristics and its potential for effects on the surrounding transport network.
This ITA supports the resource consent application for the Project and is based on an indicative construction methodology (included in the AEE) and provides details on the duration and types and numbers of vehicles for the construction activities as provided by the contractor. A detailed construction programme and methodology will be finalised prior to the commencement of construction activities. It is anticipated this will be prepared by the Contractor and incorporated into the Project's Construction Environmental Management Plan (CEMP). This ITA has been prepared on a conservative basis, using worst case traffic scenarios, such that any effects arising from the construction (once methodology is confirmed) will be within the envelope of effects assessed.
This ITA is heavily informed by practical on-the-ground experience, including directly comparable experience in relation to the type of works and location of works (in proximity to houses, schools, businesses and reserves). However, while this ITA has been informed by this experience to date, careful consideration has been given to the particular characteristics of the area. The previous experience is helpful insofar as it provides a solid 'real-world' basis for understanding the nature of activities at Walmsley Road, the actual and potential traffic effects of those activities and how the effects are best managed and mitigated to cause the least disruption to surrounding properties and road users and to minimise environmental effects, but ultimately it is the particular receiving environment and characteristics of the surrounding transport network that are paramount and which are the focus of this ITA.

1.6 Cumulative assessment

AT has confirmed that there are no planned works in the area adjacent to the Project Site or on any of the proposed diversion routes at the same time as the proposed construction work. As such a cumulative assessment of effects is not required.

1.7 ITA and the traffic management approach

This ITA forms part of a comprehensive suite of technical reports to support the resource consent application and to inform the Assessment of Effects on the Environment (AEE) report. The ITA assesses the impact of construction traffic on the surrounding transport network and identifies key issues to be addressed within conditions and the Contractor's final Construction Traffic Management Plan (CTMP). Site Specific Traffic Management Plans (SSTMP's) with detailed Traffic Management Plan Drawings will also need to be provided to Auckland Transport (AT) (and, where appropriate, NZTA) prior to construction.

Figure 1.2 below shows the relationship between the sequence of documents relating to traffic management activities post approval of the ITA. It is important to note that the CTMP does not enable physical works to take place on the road corridor but rather sets the philosophy as to how traffic is managed for this Project. SSTMP's and Corridor Access Requests (CAR) approved by AT and NZTA enable physical works to take place within the road corridor. These will be developed in accordance with the philosophy documented in the CTMP. A Draft CTMP has been prepared in support of the resource consent application.

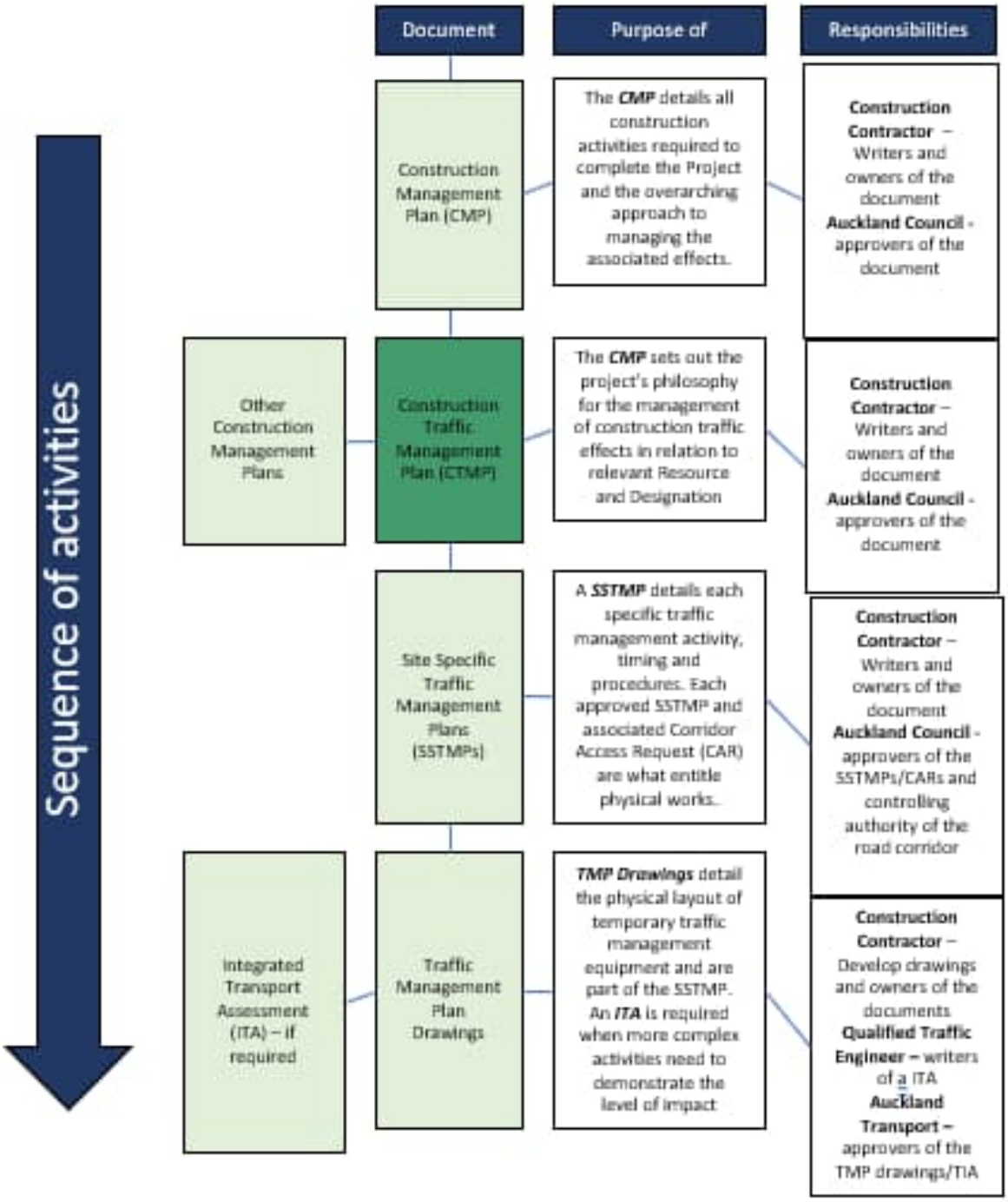

Figure 1.2: Sequence of activities for traffic management related documents following approval of the ITA.

1.8 Consultation and Engagement

As detailed in the AEE, extensive Project consultation and engagement has been carried out since July 2024 to inform the Project and the outputs have also been used to inform the ITA and the Draft CTMP. In summary, consultation and engagement so far has involved:

- Iwi including: Ngāi Tai ki Tāmaki, Ngāti Maru,Ngāti Tamaoho, Ngāti Tamaterā, Ngāti Te Ata, Ngāti Whanaunga, Ngāti Whātua Ōrākei, Te Ahiwaru – Waiohua, Te Ākitai o Waiohua, Te Kawerau ā Maki and Waikato – Tainui.

- Māngere-Ōtāhuhu Local Board.
- Community Work Group including Mangere Town Centre, I am Mangere, Neighbourhood support, Affirming works, Mangere East Family Services, 257 Times, Te Ararata Stream, Te Ahi Taiao and Mangere Library.
- Various schools including Mountain View School, Favona School, Waatea School, Koru School, Sir Keith Park School, Mangere College, One School Global Auckland Campus, Auckland Seventh Day Adventist (ASDA) High School and Te Kura Kaupapa Māori O Mangere.
- Adjacent residential properties.
- Collaboration with Kāinga Ora, Māngere-Ōtāhuhu Local Board and I Am Māngere to host several community meetings to inform and support the community.
- Setting up of a Te Ararata project webpage, community meeting in August 2024 and FAQ flyer distributed September 2024.
- Stakeholder Working Group comprising the main utility and infrastructure providers impacted by the project being Watercare, Auckland Transport, Kainga Ora and Auckland Council representatives.

2 Site Location

Walmsley Road is located within Māngere/Favona, a mix of a residential and business zone suburb in south Auckland. The location of the Project area is shown below in Figure 2.1.

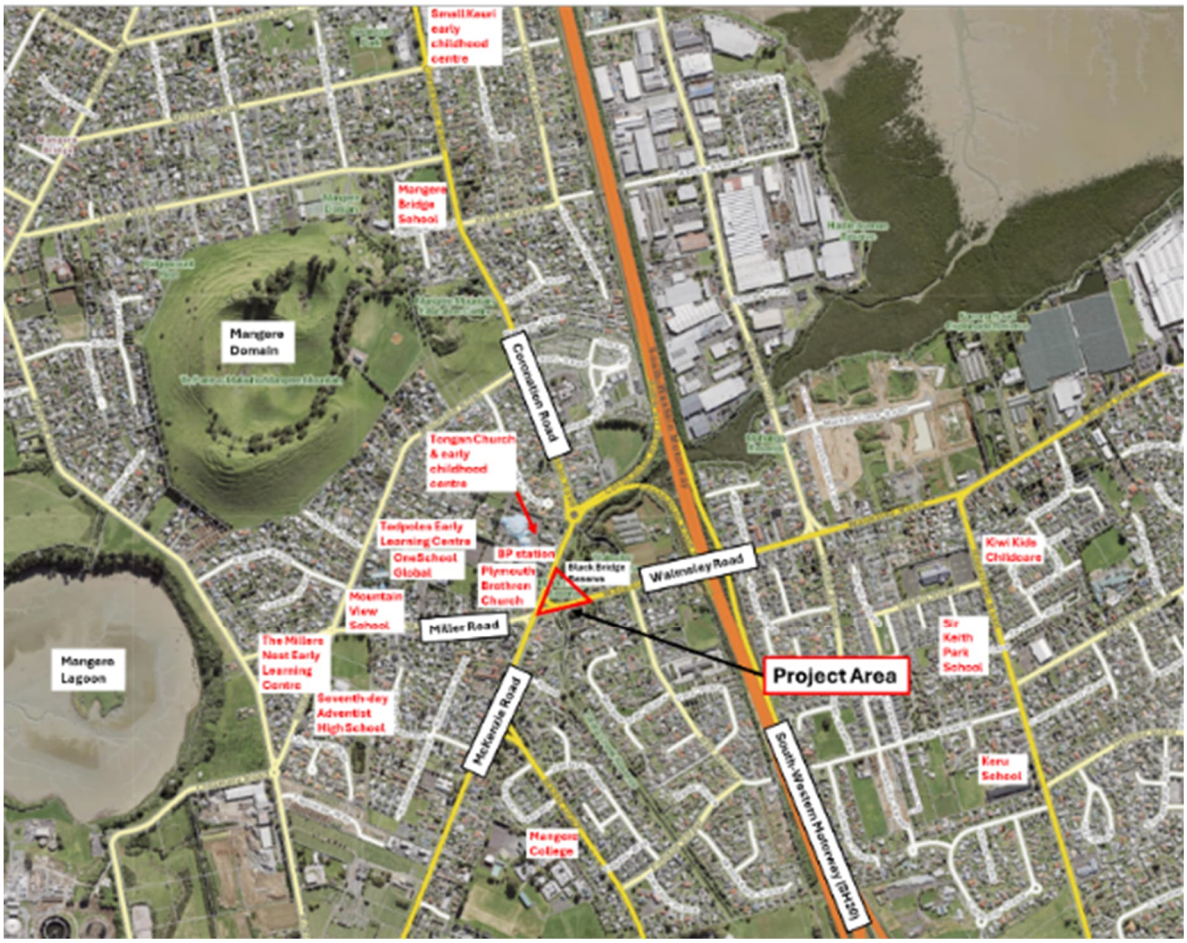

Figure 2.1: Project Location [1].

The Project site is adjacent to the Walmsley Road/Coronation Road/Miller Road/McKenzie Road intersection and the Black Bridge Reserve. The site is within the road reserve, water and Open Space (Informal Recreation and Conservation) zones under the Auckland Unitary Operative Plan (Operative in Part) (AUP OP, 2024). Zoning in the immediate vicinity of the Project comprises of residential, open space, special purpose (school) and business zones, as shown in Figure 2.2 below.

[1] Aerial image from Auckland Council GeoMaps, Accessed July 2024. Retrieved from Auckland Council GeoMaps

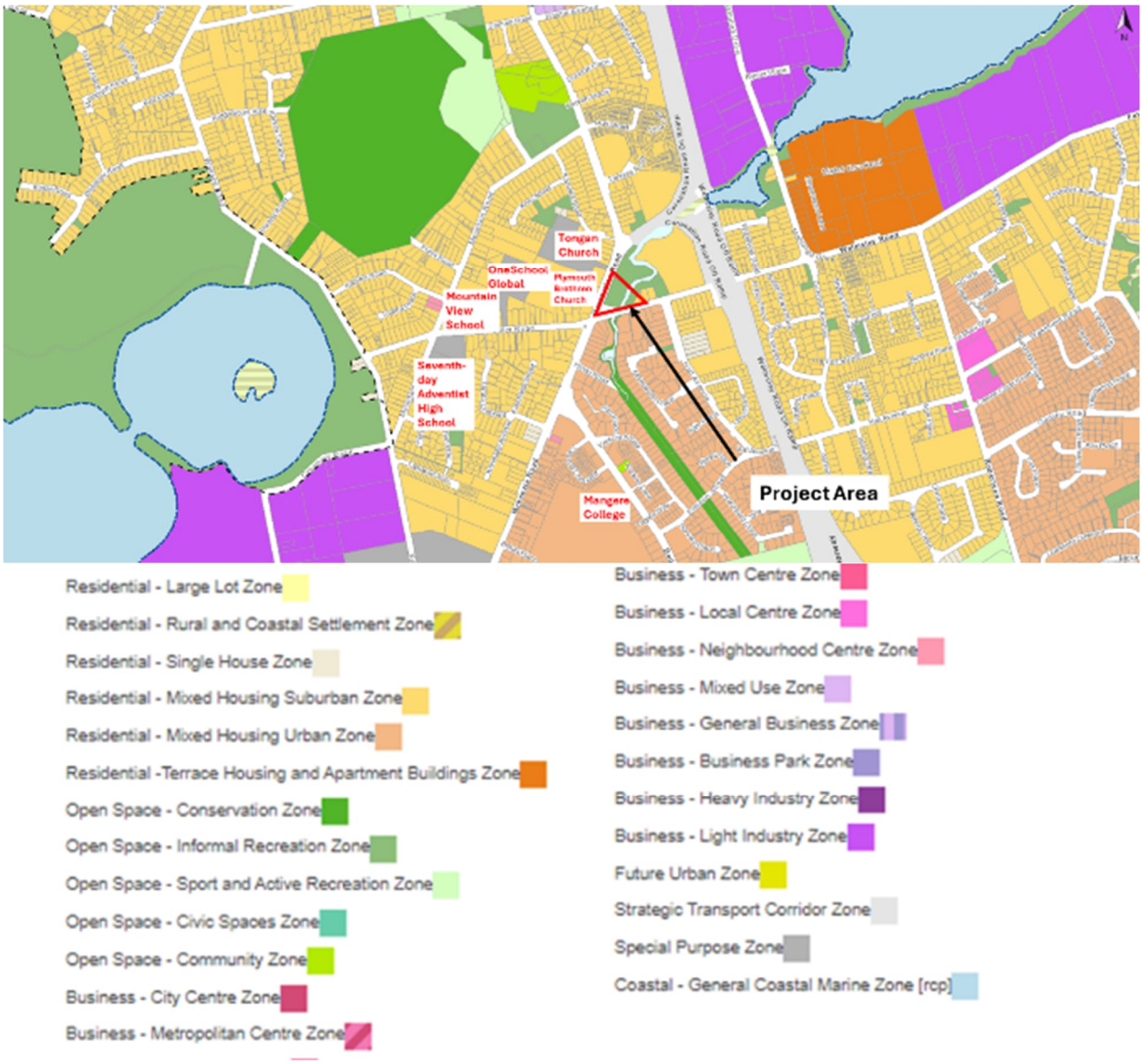

Figure 2.2: Zoning of surrounding areas to Project location[2].

Several schools are located in the neighbourhood (including OneSchool Global, Mountain View School, Māngere College and Auckland Seventh-day Adventist High School) as well as two churches one of which operates as an Early Childhood Education (ECE).

[2] Image from Auckland Unitary Plan, Accessed July 2024. Retrieved from Auckland Council GeoMaps

3 Existing Transport Network

3.1 Introduction

The following sections provide a description of the transport network, firstly adjacent to the Project site and then for the proposed diversion routes with the proposed temporary closure of Walmsley Road.

3.2 Existing transport network adjacent to Project Site

3.2.1 Description of road network

Table 3.1 below provides a brief description of the layout for each road adjacent to the Project site:

Table 3.1: Existing road network

Road name	Posted Speed (km/h)	Mean Operating Speed (km/h)	Road description	Auckland Council GeoMaps Road Classification
Walmsley Road/Coronation Road/Miller Road/McKenzie Road intersection				
Coronation Road	60	38	• Several accesses on west side including Plymouth Brethren church gated access, BP petrol station, Tongan ECE and residential properties. • Two northbound lanes which merge to one lane at the BP egress. • One lane southbound which widens to two lanes (left turn and ahead) at the BP access. • On road unbuffered cycle lane southbound commences at the BP egress and continues as an unbuffered centre lane cycle lane in between the left and ahead traffic lanes. • On road unbuffered cycle lane northbound which ends by BP egress and merges onto a shared path. • Sealed width varies from 12.5 to 19 m. • 1.6 m wide footpath on both sides, grass berms on sections of the west side. • No Stopping At All Times (NSAAT's) on entire length. • On AT High Productivity Motor Vehicle (HPMV) detour route (i.e. for when there are Motorway closures).	Primary Arterial
Walmsley Road and bridge	50	45	• One lane for traffic in both directions. • 12.0 m wide sealed width (circa 9 - 10 m on bridge). • 1.5 m wide footpath on both sides, grass berms on both sides (circa 1.2 m on bridge). • Footpath through Black Bridge Reserve joins the north side footpath.	Primary Arterial

Road name	Posted Speed (km/h)	Mean Operating Speed (km/h)	Road description	Auckland Council GeoMaps Road Classification
			• Mixture of unrestricted on-road parking and NSAAT's east of intersection. • Residential accesses on both sides. • On AT Over Dimension Route. • On AT HPMV detour route. • Bus stops circa 130 m and 24 0m west of intersection. • Cyclist are signed to '*use pedestrian signals*' noting that no specific cycle provision is made at the pedestrian signals.	
Miller Road	50	39	• One lane for traffic in both directions. • 10.5 m wide carriageway. • 1.5 m wide footpath on both sides, grass berms on both sides. • Unrestricted on street parking circa 50 m west of intersection on both sides of road. • Various residential accesses and Plymouth Brethren church access • Bus stops circa 30 m and 130 m west of intersection. • Signs indicate that *Heavy goods service vehicles prohibited unless loading or unloading*.	Collector
McKenzie Road	50	41	• Two lanes northbound and one lane southbound. • On road unbuffered cycle lane northbound and southbound. • 1.5 m wide footpath with grass berms on the eastern and western side. • NSAAT's on both sides of road. • On AT Over Dimension Route. • On AT HPMV detour route. • Bus stops circa 60 m and 110 m south of intersection.	Primary Arterial
Coronation Road/SH20 on and off ramp intersection				
Coronation Road (North)	60	47	• One lane northbound and one lane southbound. • Bus stops circa 150 m north of intersection. • 1.5 m wide footpath on both sides. • Unrestricted on street parking circa 70 m and 100 m north of the intersection on both sides of the road. • Various residential accesses. • 11.0 m wide sealed width.	Primary Arterial
SH20 off ramp	100	52	• On AT HPMV detour route. • One way traffic flow. • No pedestrians or cyclists allowed.	Primary Arterial

Road name	Posted Speed (km/h)	Mean Operating Speed (km/h)	Road description	Auckland Council GeoMaps Road Classification
SH20 on ramp	60	59	• On AT HPMV detour route. • One lane widening out to one T2 Transit and Truck Lane and two traffic lanes. • One way traffic flow. • No pedestrians or cyclists allowed.	Primary Arterial

Speed information was obtained from NZTA's MegaMaps[3] and road dimensions were estimated using Auckland Council's GeoMaps.
Figure 3.1 below shows the layout of the Walmsley Road/ Coronation Road/Miller Road/McKenzie Road intersection.

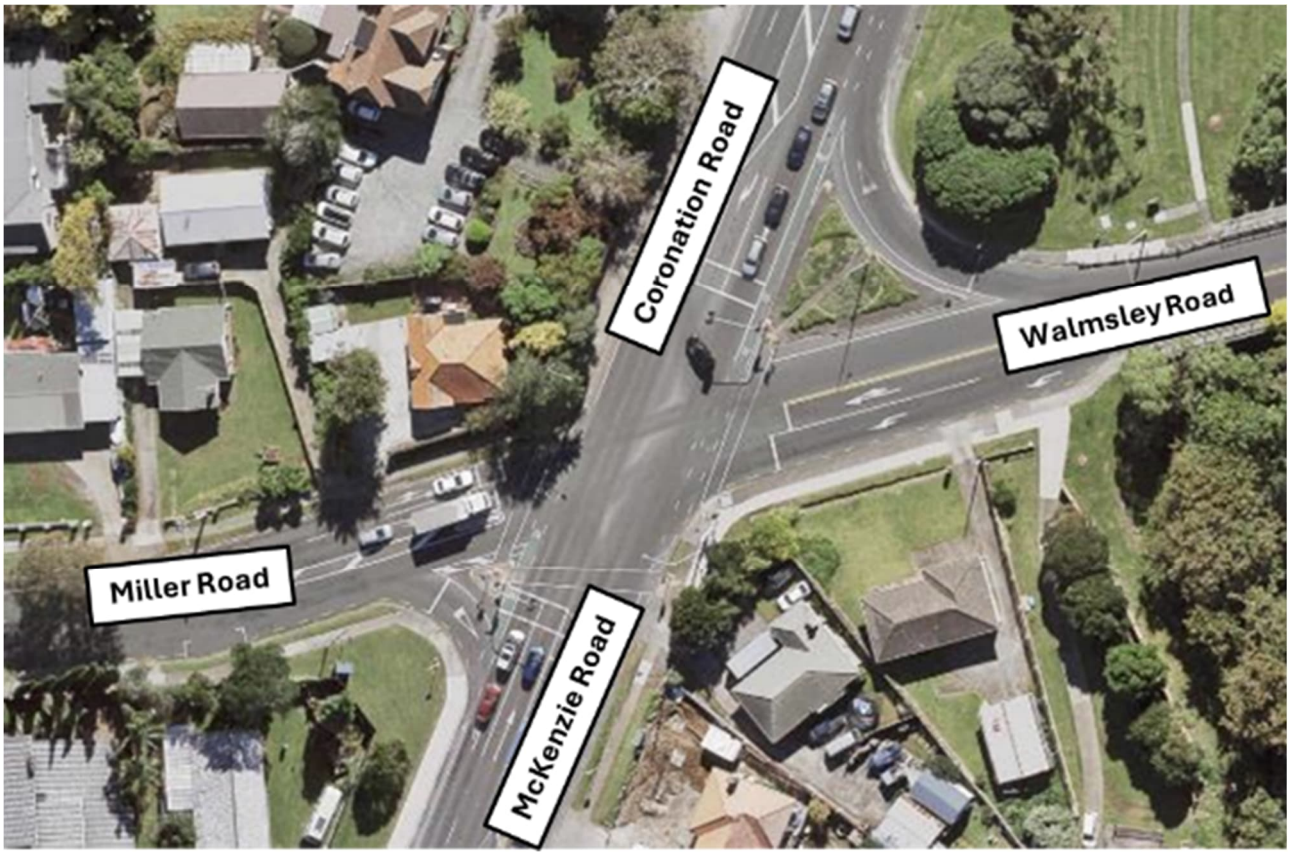

Figure 3.1: Walmsley Road/Coronation Road/Miller Road/McKenzie Road intersection (source Auckland Council GIS)

Based on information supplied by AT on 6 November 2024, it is understood that Walmsley Road is on a Road 2 Criticality Lifeline route[4].
Figure 3.2 below shows the layout of the Coronation Road/SH20 on and off ramps intersection.

[3] Data accessed July 2024, Retrieved from ArcGIS Web Application (nzta.govt.nz)
[4] lifelines-transport_central.pdf

Figure 3.2: Coronation Road/SH20 on and off ramps intersection (source Auckland Council GIS)

3.2.2 Existing traffic and pedestrian/cycle flows

Table 3.2 below summarises existing traffic flows on the roads adjacent to the Project site.

Table 3.2: Existing traffic flows

Road name	Average Daily Traffic (ADT) veh/day (heavy vehicle %)	AM peak period veh/hour (heavy vehicle %)	PM peak period veh/hour (heavy vehicle %)	Average peak flow % of ADT
Walmsley Road/Coronation Road/Miller Road/McKenzie Road intersection				
Coronation Road	16,021 (9%)	1,413 (11%)	1,545 (8%)	9%
Walmsley Road	17,525 (8%)	1,437 (11%)	1,486 (11%)	8%
Miller Road	4,364 (8%)	634 (4%)	580 (5%)	14%
McKenzie Road	17,809 (16%)	1,322 (10%)	1,345 (10%)	8%
Coronation Road/SH20 on and off ramp intersection				
Coronation Road (North)	10,288 (7%)	852 (2%)	1307 (3%)	10%
SH20 off ramp (one-way traffic)	4,401 (8%)	299 (13%)	85 (10%)	4%
SH20 on ramp (one-way traffic)	7,099 (3%)	636 (12%)	953 (3%)	11%
Coronation Road (South)	16,021 (9%)	773 (7%)	1,284 (3%)	6%

Average Daily Traffic (ADT) traffic volumes were obtained from MobileRoad[5] and the AM and PM peak period flows have been taken from 12 hour classified traffic counts (data attached in Appendix B) carried out on 30 July 2024 at:

- Coronation Road/Miller Road/McKenzie Road/Walmsley Road intersection.
- Coronation Road/SH20 on and off ramp intersection roundabout.

As shown in Figure 3.3, based on these surveys, the AM peak hour was observed to be between 08:00 – 09:00 (orange highlight) and the PM peak hour was observed between 15:00 – 16:00 (orange highlight). The earlier than usual PM peak hour probably reflects the large number of education facilities in close proximity of the site as shown in Figure 2.1 above.

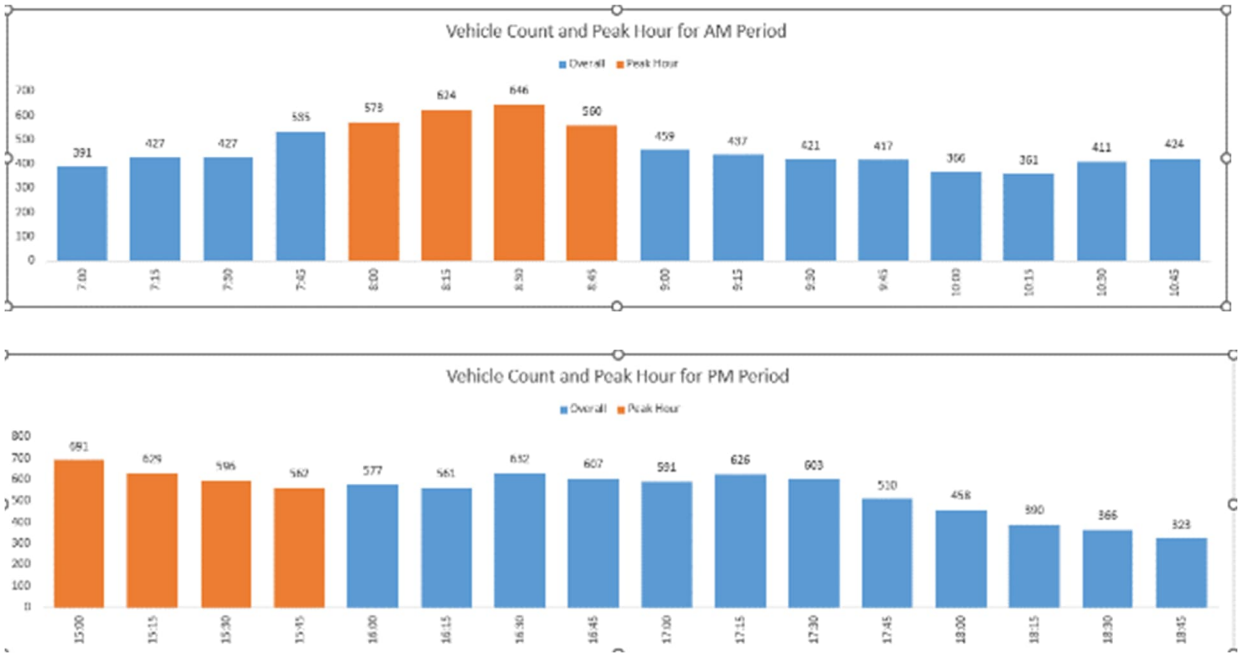

Figure 3.3: Coronation Road/Miller Road/McKenzie Road/Walmsley Road intersection AM and PM peak hours

Figure 3.4 below, summarises the counted peak period turning flows (total vehicles).

[5] Data access July 2024, and retrieved from Mobile Road

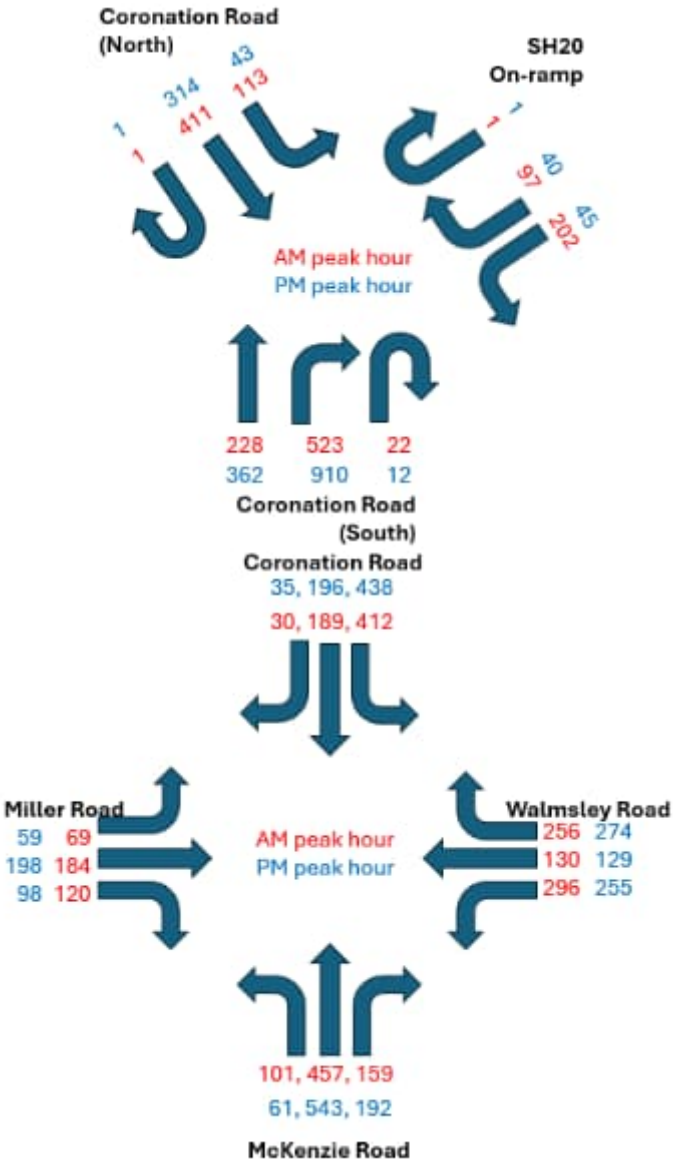

Figure 3.4: Existing Peak Hour turning counts at Coronation Road/Miller Road/McKenzie Road/Walmsley Road and Coronation Road and SH20 on/off ramp intersections

Despite being signed as "*Heavy goods service vehicles prohibited unless loading or unloading*" circa 14 trucks were observed using Miller Road in the peak periods. Given the predominantly residential nature of Miller Road, these truck movements are unlikely to be loading/unloading and hence it is considered that these signs are not currently being adhered to by truck drivers.

Comparison of ADT and peak period flows indicates that the average peak period flow equates to approximately 10% of the ADT flow.

3.2.3 Pedestrians and Cyclists

The number of cyclists using the Coronation Road/Walmsley Road intersection were observed to be very low with 3 cyclists counted north to south in the AM peak and 1 cyclist counted south to north in the PM peak.

The number of pedestrians crossing at the intersection was observed to be low with 8 pedestrians observed to be crossing in the AM peak and 16 in the PM peak, with the majority crossing McKenzie Road.

3.2.4 Existing traffic conditions

Google maps was used as a guide to typical traffic speeds and hence to indicate any congestion adjacent to the Project for the weekday AM and PM peaks (based on a review carried out on weekdays during w/c 2 September 2024). Extracts are shown below in Figure 3.5 (AM peak 08:00 - 09:00), Figure 3.6 (PM peak 15:00 – 16:00) and Figure 3.7 (for the 17:00 – 18:00 period).

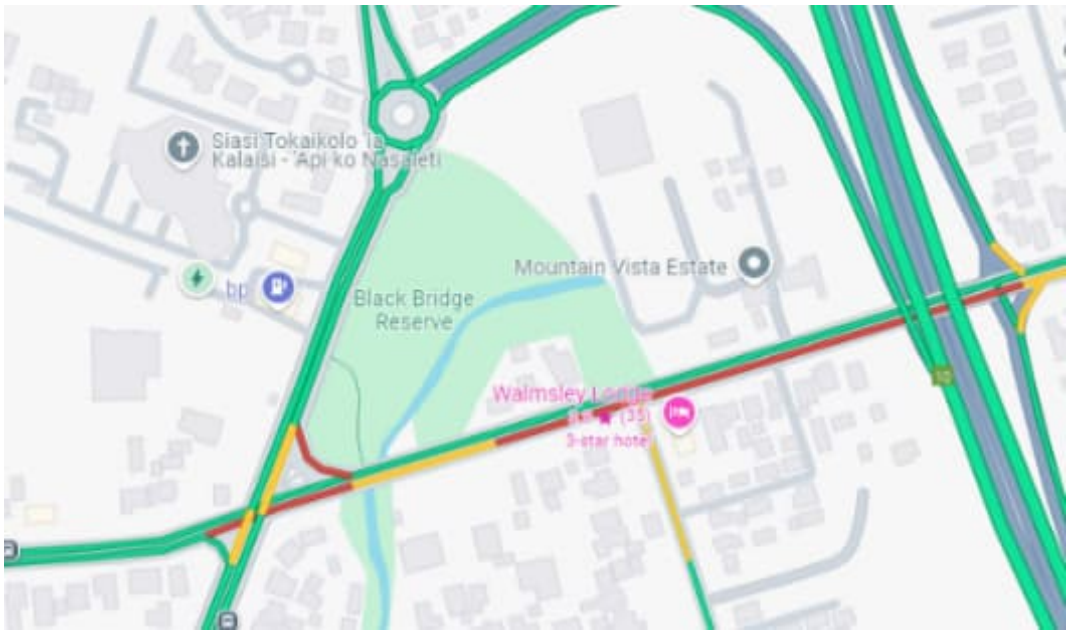

Figure 3.5: Typical congestion during AM peak period (08:00 – 09:00)

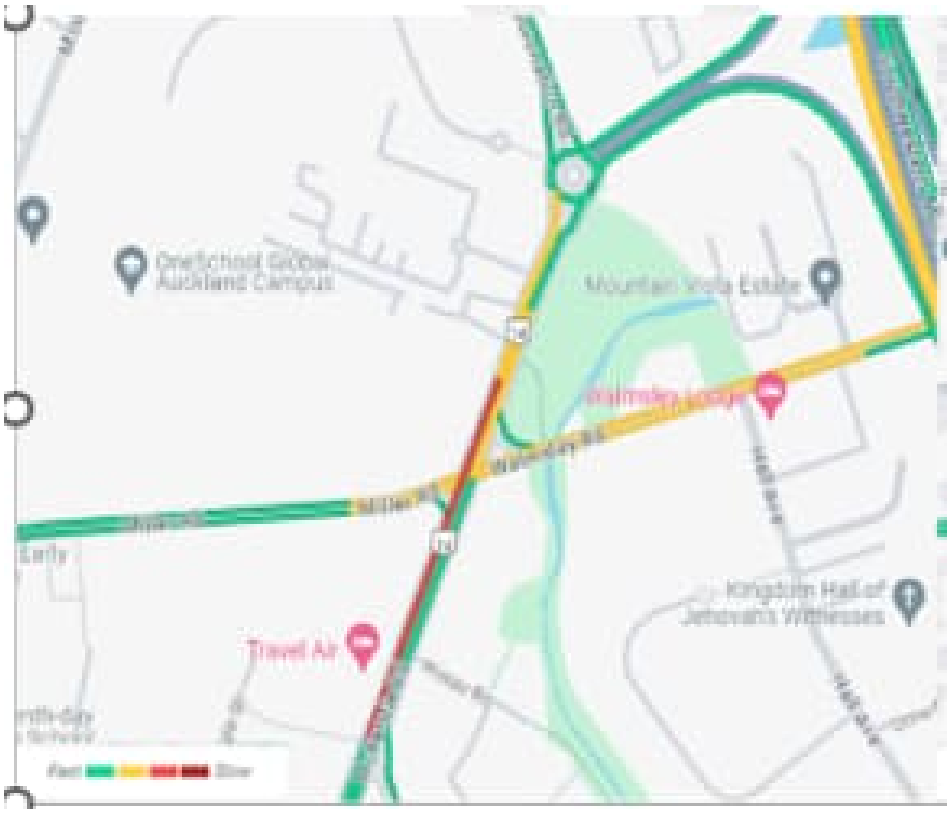

Figure 3.6: Typical congestion during PM peak period (15:00 -16:00)

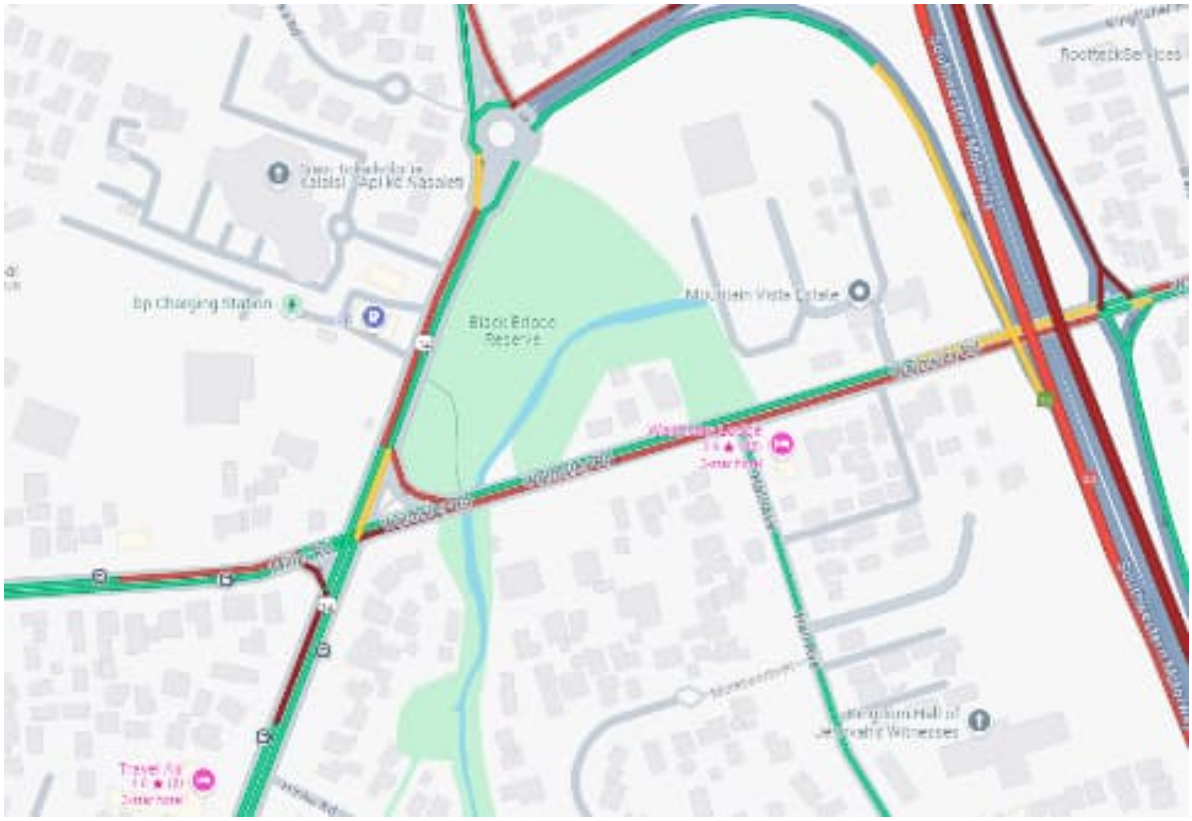

Figure 3.7: Typical congestion during 17:00 - 18:00 period

The peaks in these figures were selected as examples of the busiest/worst-case congestion, with slow (shown as red) traffic speeds assumed to be due to congestion. Figure 3.5, Figure 3.6 and Figure 3.7 above indicate for the McKenzie Road /Miller Road /Coronation Road /Walmsley Road intersection:

- AM peak- congestion on the Walmsley Road approach extending back to the SH20 on/off ramp intersection.
- PM Peak (15:00 – 16:00) - slow moving traffic on the Walmsley Road, Miller Road and Coronation Road approaches, congestion on McKenzie Road back to Bader Drive.
- 17:00 – 18:00 period - congestion on Walmsley Road back to the SH20 overbridge, blocking back from SH20 on ramp to the Walmsley Road/McKenzie/Miller Road intersection and a small amount of congestion on McKenzie Road and Miller Road.

Figure 3.5, Figure 3.6 and Figure 3.7 above indicate for the Coronation Road/SH20 on and off ramps intersection:

- AM peak - no queues.
- PM peak - slow moving traffic on the Coronation Road south approach.
- 17:00 – 18:00 period - blocking back from the SH20 on ramp traffic signals onto Coronation Road south.

AM and PM peak period site observations carried out on 6 September and 29 October 2024, confirm the findings above from google maps, with the exception that additional congestion was observed in the AM peak for the right turn from McKenzie Road to Walmsley Road which formed a queue back to Bader Drive at the end of the green phase, and the queue on Walmsley Road typically extended as far back as Hall Avenue. PM peak site observations indicate that the queue on Walmsley Road is

more of a slow moving queue and that the queues on Coronation Road towards SH20 on ramps are relatively small.

3.2.5 Sidra modelling

SIDRA Intersection v9 (SIDRA) was used to assess the capacity of the McKenzie Road /Miller Road /Coronation Road /Walmsley Road and the Coronation Road/SH20 on and off ramps intersections for the AM peak (08:00 – 09:00) and PM peak (15:00 – 16:00) periods. The Sidra outputs are attached in Appendix C and a summary of the results is presented in Table 3.3 and Table 3.4 below.

Table 3.3: Existing intersection movement summary McKenzie Road /Miller Road /Coronation Road /Walmsley Road intersection

Road		Existing AM peak hour			Existing PM peak hour		
		Average delay (seconds)	95% queue length (m)	Level of service (LOS)	Average delay (seconds)	95% queue length (m)	Level of service (LOS)
McKenzie Road (South)	Left	6.8	5.5	A	6.4	3	A
	Straight	96.8	123.2	F	110.2	150.8	F
	Right	158.7	95.4	F	175.5	118.4	F
Walmsley Road (East)	Left	26.6	59.5	C	26.6	50.7	C
	Straight	120.8	193.1	F	162.3	222.4	F
	Right	125.4	193.1	F	166.9	222.4	F
Coronation Road (North)	Left	15.7	55.2	B	17.9	68.5	B
	Straight	58	53.2	E	56.5	55.9	E
	Right	64.6	8.6	E	60.6	9.1	E
Miller Road (West)	Left	137.6	119.2	F	169	139.3	F
	Straight	132.9	119.2	F	164.3	139.3	F
	Right	66.3	35.5	E	66.6	29.6	E

Table 3.4: Existing movement summary Coronation Road/SH20 on and off ramps intersection

Road		Existing AM peak hour			Existing PM peak hour		
		Average delay (seconds)	95% queue length (m)	Level of service (LOS)	Average delay (seconds)	95% queue length (m)	Level of service (LOS)
Coronation Road (South)	Left	4	12.9	A	3.8	34.6	A
	Right	8.5	12.9	A	8.3	34.6	A
	U-turn	12	12.9	B	11.6	34.6	B
SH20 On-ramp	Left	9.5	6.2	A	8.6	1.4	A
	Right	14.6	6.2	B	13.7	1.4	B
	U-turn	17.3	6.2	B	16.4	1.4	B
Coronation Road (North)	Left	8.6	16.2	A	15.1	16.8	B
	Right	12.7	16.2	B	18.4	16.8	B
	U-turn	16	16.2	B	21.7	16.8	C

3.2.5.1 McKenzie Road /Miller Road /Coronation Road /Walmsley Road intersection

Overall, in the AM peak, Sidra indicates that the intersection operates with a LoS E with queue lengths back to Hinau Road on McKenzie Road, back to Hall Avenue on Walmsley Road, short queues on Miller Road and negligible queues on Coronation Road. This calibrates well against the google maps and on-site observations of queue lengths.
In the PM peak, Sidra indicates that the intersection operates with a LoS F with longer queues than in the AM peak. Queue lengths back to Bader Drive on McKenzie Road, back to Hall Avenue on Walmsley Road, short queues on Miller Road and negligible queues on Coronation Road. This calibrates well against the google maps and on-site observations of queue lengths.

3.2.5.2 Coronation Road/SH20 on and off ramps intersection

Overall, in the AM peak Sidra indicates that the intersection operates with a LoS A with minimal queueing. This calibrates well against the google maps and on-site observations of queue lengths.
In the PM peak Sidra indicates that the intersection operates with a LoS A with minimal queueing. This calibrates well against the PM peak site observations.

3.2.6 Public transport

There are four bus services that pass through the McKenzie Road /Miller Road /Coronation Road /Walmsley Road intersection namely, Routes 36, 38, 309 and 309X (which takes the same route as 309 at this location), as shown in Figure 3.8 below.

Figure 3.8: AT bus route 36, 38 and 309 (and 309X)

Routes 309 and 309X serve bus stops on Walmsley Road and Miller Road, four buses go through the intersection in the AM peak period and five in the PM peak period. Route 36 serves bus stops on McKenzie Road and Miller Road. Route 38 travels down both Coronation Road and McKenzie Road but only has bus stops on McKenzie Road. These routes all have bus stops within 200 m of the Project area. Eight buses go through the Walmsley Road/Coronation Road/Miller Road/McKenzie Road intersection during the AM and PM peak periods for both the 36 and 38 bus routes. Discussions with AT Metro have indicated that in October 2025 the 309X is to be withdrawn and there will be a new 311 service from Western Māngere Bridge to Otahuhu Station. The exact routing of the 311 service has not been finalised, but AT Metro have confirmed this new service would not be affected by the Walmsley Road closure.

3.2.7 School buses

AT GIS data (School Bus Route | Auckland Transport Open GIS Data (arcgis.com) indicates that there are the following AT contracted school bus routes on Walmsley Road:

- S084 - St Joseph's School (Onehunga) to Māngere Town Centre which travels ahead from Walmsley Road to Miller Road.
- S062 - Favona to Onehunga Schools Via Māngere Bridge which travels ahead from Walmsley Road to Miller Road.
- S061 - Royal Oak Intermediate to Māngere Town Centre which turns left from Coronation Road to Walmsley Road and then turns onto Hall Avenue.
- S061 - Māngere Town Centre to Onehunga Schools which travels from Hall Avenue, then ahead from Walmsley Road to Miller Road.
- S061 - Onehunga High to Māngere Town Centre which travels from Miller Road then ahead to Walmsley Road and then to Hall Avenue.
- S058 - Favona to Onehunga Schools which turns right to Coronation Road from Walmsley Road.
- S002 - Onehunga High to Favona which travels from Miller Road then ahead to Walmsley Road.
- S001 - Royal Oak Intermediate to Favona from Miller Road then ahead to Walmsley Road.
- S001 - Onehunga High to Māngere East from Walmsley Road and left turn to McKenzie Road.

An extract of the AT contracted school bus routes is shown in Figure 3.9 below.

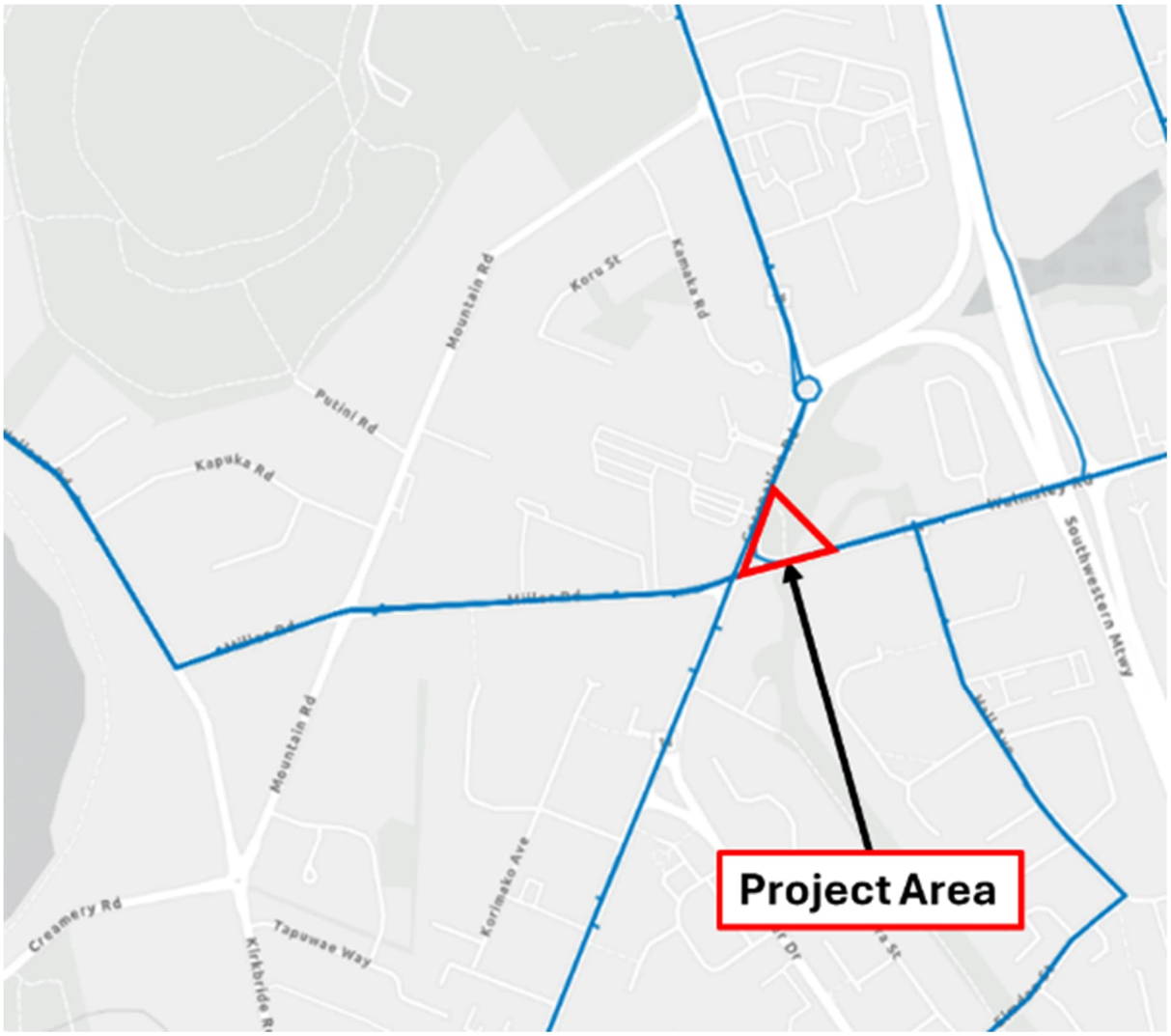

Figure 3.9: Walmsley Road AT contracted school bus routes

There are currently three school bus stops on Hall Avenue and two on Elmdon Street.
A review of the Ministry of Education School Bus information (School bus route maps (arcgis.com) indicates that there are no MoE contracted school bus services on Walmsley Road as shown in Figure 3.10 below.

Figure 3.10: MoE contracted school bus routes (highlighted in brown)

3.2.8 Road safety

An assessment of the road safety record of the surrounding road network has been undertaken using the NZTA Crash Analysis System (CAS). Crash history was assessed for the period from 2019 – 2024 (inclusive) on Walmsley Road and the adjacent Coronation Road/McKenzie Road/Miller Road intersection (noting some of the 2024 data may be incomplete due to a delay between crashes and upload of their data). The reported crash history for the road network near the site is shown below in Figure 3.11.

Figure 3.11: Crash study area

From this search, a total of 31 crashes were recorded. A summary of the crash severities and factors can be found in Table 3.5 and Table 3.6 below and the collision diagram can be found in Appendix D.

Table 3.5: Crash summary

Year	Serious	Minor	Non-injury	Total
2019	0	2	3	5
2020	0	1	9	10
2021	0	1	5	6
2022	0	0	6	6
2023	0	1	2	3
2024	1	0	0	1
Total	1	5	25	31

Table 3.6: Crash factor summary

Crash Type	Crash Numbers
Overtaking crashes	3
Straight road lost control/head on	5
Bend – lost control/Head on	3
Rear end/obstruction	10
Crossing/turning	10
TOTAL	31

None of the crashes within this study period involved cyclists or pedestrians and there was only one serious crash and no fatal crashes. The serious crash occurred when the driver, heading southbound on McKenzie Road, fell asleep and then crashed into a tree. Rear end/obstruction and crossing/ turning were the most common crash factor for the crashes that occurred in the study area, accounting for two thirds of the recorded 31 crashes. 12 of these 31 crashes occurred at, or in the immediate vicinity of, the Coronation Road /Walmsley Road/Miller Road /McKenzie Road intersection. None of these 12 crashes involved pedestrians or cyclists, nor were any of them serious crashes. Five of these crashes involved vehicles entering/exiting Walmsley Road. Overall, it is considered that there is no common crash type across these five crashes on Walmsley Road at the Coronation Road/Walmsley Road/McKenzie Road/Miller Road intersection.
There is a small number of five crashes at the Walmsley Road/Hall Avenue intersection. With one crash being a minor severity and the other four being non-injury crashes. Four of the five crashes were crossing/turning crash types.
Seven crashes were also recorded along Coronation Road near the entrance/exit to the Coronation Road BP station (see zoomed in view of crashes study area below in Figure 3.12).

Figure 3.12: Crashes occurring near the Coronation Road BP station during the study period

Overall, the number of crashes, as well as the severity of the crashes, is considered to be low and it is considered that there is no inherent safety issues present in the vicinity of the Coronation Road/ Walmsley Road/Miller Road/McKenzie Road intersection.

3.2.9 Future Improvements

AT has confirmed that there are no planned works adjacent to the Project site or on the proposed signed diversion routes during the anticipated construction period.

Although funding is not yet confirmed, AT has proposed works adjacent to the Project site as part of the Māngere West Cycling Improvements Project, which is anticipated to be implemented post construction of the replacement Walmsley Road bridge. The design of the replacement Walmsley Road bridge has considered these future plans and will not preclude integration with the future works. The Māngere West Cycling Improvements are shown in Figure 3.13 below (from Māngere West Cycling Improvements | Have your say | Auckland Transport (at.govt.nz).

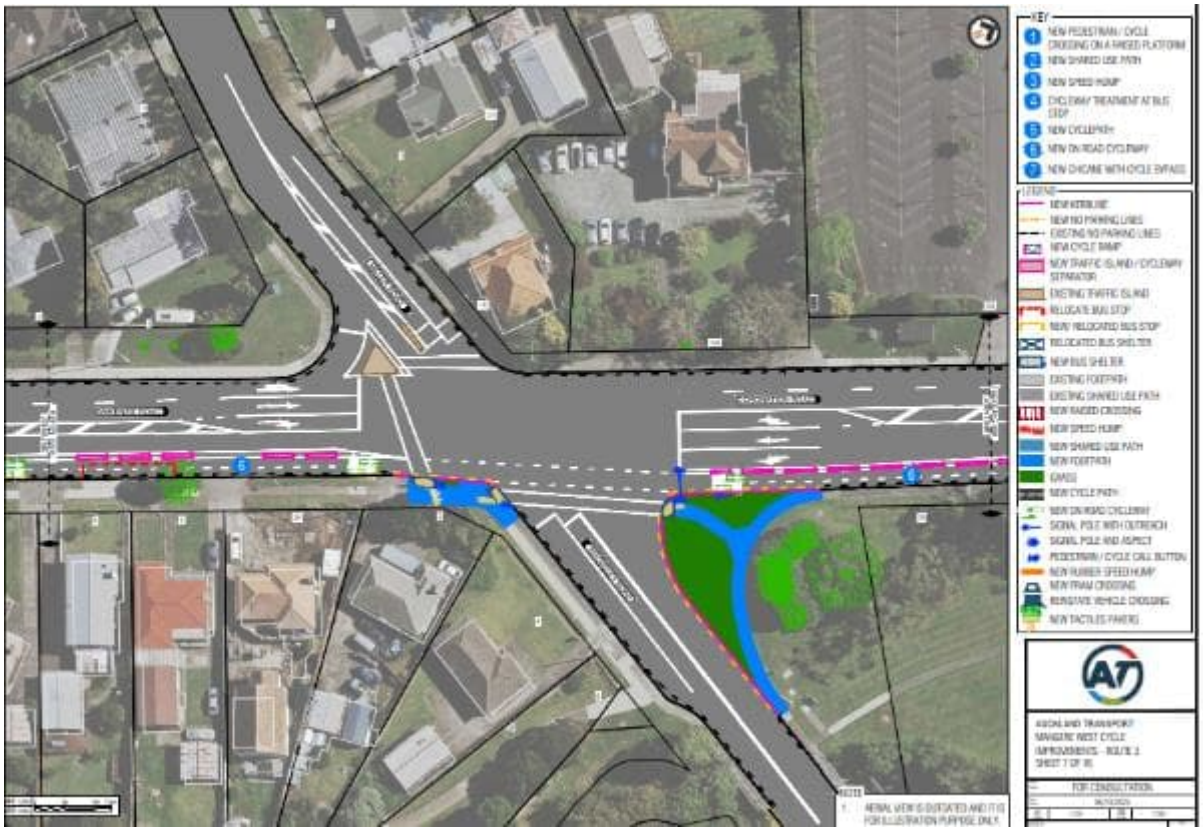

Figure 3.13: Proposed Māngere West cycling improvements

3.3 Existing transport network on proposed signed diversion routes

3.3.1 Summary of proposed signed diversion routes

In an email dated 25 September 2024, AT confirmed that Coronation Road through Māngere Bridge Centre should not be a signed diversion route since it is "*not an arterial and the town centre is not an ideal place to divert traffic through".* It should be noted that Māngere Bridge Centre is not a town centre with the AUP OP zoning the centre as a Business - Local Centre area between Rimu Road to the north and Miro Road to the south. At a meeting with AT and Auckland Council on 10 October 2024, AT confirmed that Church Road and Wallace Road are also not suitable as a signed diversion route. At meetings on 1, 10 and 11 October 2024, AT and Auckland Council indicated an in principle agreement to the use of Hall Avenue and Elmdon Street as a signed diversion route for light vehicles (subject to identification of temporary improvements). However, AT and Auckland Council did not consider this route to be an acceptable route for trucks since it was considered that this could impact on the existing pavement structure which may not have been designed for large numbers of trucks.

Taking the above into account the following signed diversion routes are proposed, as shown in Figure 3.14 below noting:

- Red = All vehicle diversion Walmsley Road to SH20 northbound on ramp and to/from Māngere Bridge Centre.
- Yellow = Light vehicle diversion SH20 northbound off ramp to Walmsley Road.
- Blue = Heavy vehicle diversion SH20 northbound off ramp to Walmsley Road.
- Green = Light vehicle two way diversion Walmsley Road to/from Miller Road and McKenzie Road.
- Orange = Heavy vehicle two way diversion Walmsley Road to/from McKenzie Road and Miller Road.

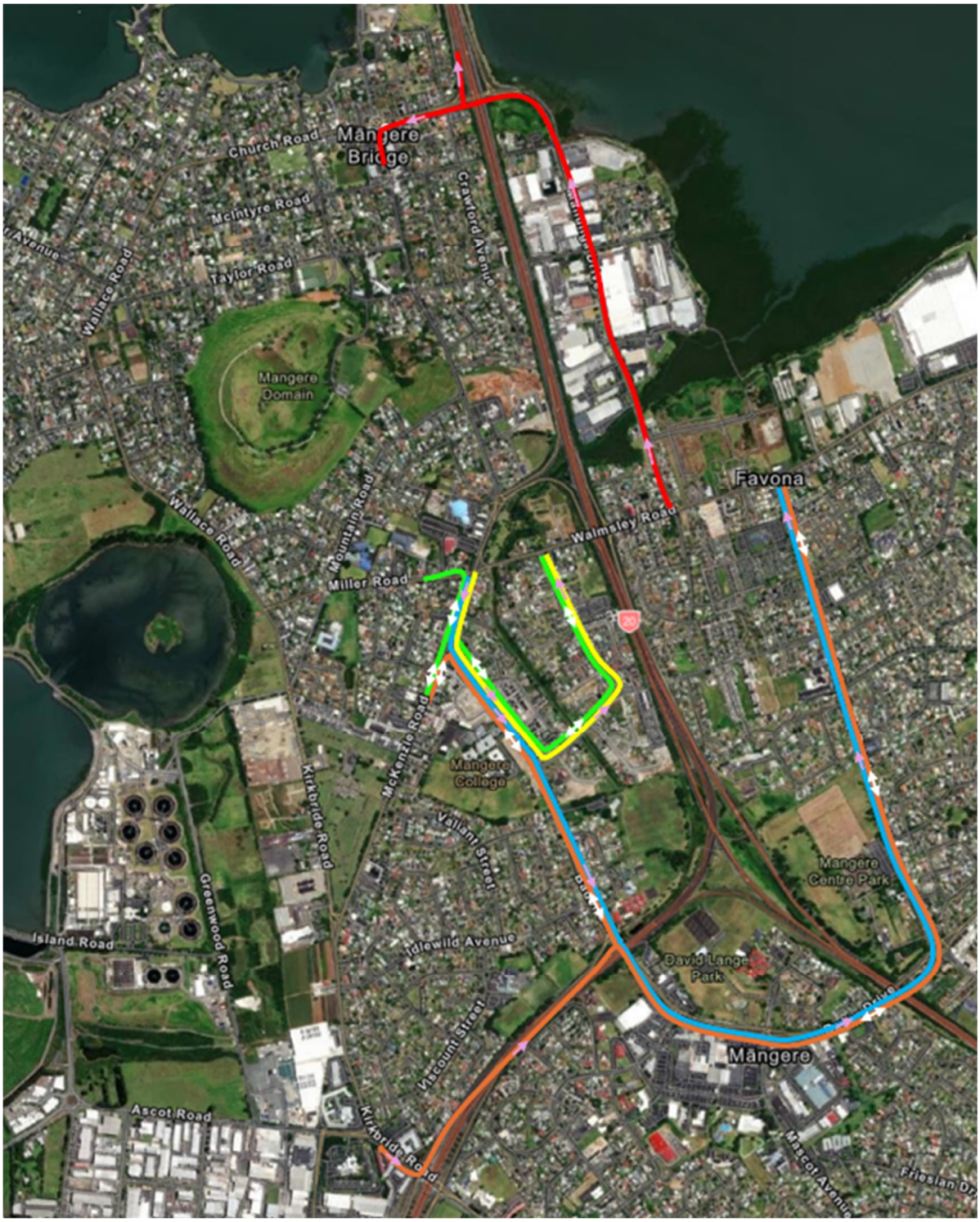

Figure 3.14: Proposed diversion routes

Comments received from AT on 31 October 2024, indicated that "*they suspect that a high proportion of the HV traffic travelling eastbound on Walmsley Road will be travelling to the industrial area south of Ascot Ave. It might be best to divert this traffic via the Walmsley Rd / SH20 southbound on-ramp, then via SH20, then via SH20A, exiting at the Kirkbride Rd interchange, rather than the orange route shown".* This route was originally considered, but was rejected as a signed diversion route since this would involve a significantly longer detour route (circa 7 km compared to 4.5 km via the proposed orange signed route). However, if requested, this route could be included as part of the proposed Draft CTMP monitoring (see section 6 below).

3.3.2 Walmsley Road to SH20 northbound on ramp and to/from Māngere Bridge Centre

The detour route highlighted in red on Figure 3.14 re-routes all traffic to the SH20 northbound on ramp and Māngere Bridge Centre via Mahunga Drive to the Rimu Road/SH20 northbound on ramp and the Rimu Road/Coronation Road intersection for access to/from Māngere Bridge Centre. This is the existing right turn traffic from Walmsley Road to Coronation Road. Traffic turning left from Coronation Road to Walmsley Road which has originated from Coronation Road north of the SH20 intersection will be rerouted from where it joins at Rimu Road and redirected via Rimu Road and Mahunga Drive as shown in red on Figure 3.14. As such, this will not represent an increase in traffic on Coronation Road since this existing traffic is already using Coronation Road and is merely re-routed back to Rimu Road and Mahunga Drive.

3.3.2.1 SH20 off ramp at Coronation Road to Walmsley Road

Traffic turning left from Coronation Road to Walmsley Road which has originated from the SH20 off ramp will be re-routed via McKenzie Road/Bader Drive/Elmdon Street/Hall Avenue for Light vehicles[6] (shown in yellow on Figure 3.14) and via McKenzie Road/Bader Drive/Robertson Road for heavy vehicles (shown in blue on Figure 3.14).

3.3.2.2 Walmsley Road to/from Miller Road and McKenzie Road

Light vehicles will be routed via McKenzie Road, Bader Drive, Elmdon Street and Hall Avenue (i.e. the existing light vehicle two way ahead movements between Walmsley Road and Miller Road and the existing light vehicle right turn from McKenzie Road to Walmsley Road and left turn Walmsley Road to McKenzie Road). The detour route is highlighted in green on Figure 3.14.

Existing heavy vehicle right turn from McKenzie Road to Walmsley Road, left turn Walmsley Road to McKenzie Road and (although not signed as permitted to use Miller Road), heavy vehicles between Miller Road and Walmsley Road will be rerouted via Robertson Road, Bader Drive and McKenzie Road. Also, should any of these heavy vehicle movements originate from the Ascot Road area these will be re-routed via Kirkbride Road, SH20A, Bader Drive and Robertson Road. The detour route is highlighted in orange on Figure 3.14.

[6] Defined by MoT and NZTA as vehicles with a maximum weight of less than 3.5 tonnes and include passenger and commercial vehicles such as cars, vans, utes, SUVs and 4WDs (Buying a light vehicle | Ministry of Transport) and Light rigid vehicles | NZ Transport Agency Waka Kotahi (nzta.govt.nz))

3.3.3 Existing traffic conditions

3.3.3.1 Background

Existing traffic conditions on the proposed signed diversion routes are discussed below. The traffic volumes were obtained from MobileRoad[7], and AT GIS[8] and speed information was obtained from NZTA's MegaMaps[9]. It should be noted that for the peak period flows, this publicly available data did not have information for both peak periods and neither was the data available by direction.

3.3.3.2 Turning counts

During initial discussions with AT and Auckland Council, a request was made for modelling of key intersections on the proposed signed diversion routes to assess the impact of the diverted traffic. Discussions with the Auckland Forecasting Centre (AFC) indicated that there is not an existing transport model available to do this modelling. Therefore, AT/Council indicated that the modelling would need to be carried out using Sidra and existing turning traffic count data. Discussions with AT indicated that on the proposed signed diversion routes, turning count data at the intersections was not available. A method to estimate turning proportions based on Tom Tom sample data was suggested by AT to apply to available existing peak period link counts.
It should be noted that there are a number of issues with this approach including:

- This is based on only a sample of turning movements and hence may not be reliable.
- Link peak period counts are not always available for the AM and PM peak periods.
- Link data on AT GIS is two way flows – AT s confirmed they can provide the directional flow data in CSV format.
- Where peak period data is available it will be for different years, different months and different days of the week and hence may not be reliable or compatible.
- Long timescales for AT to process the Tom Tom data and therefore it was agreed with AT that the Tom Tom data would be provided for the key intersections only

Despite these concerns, Tom Tom turning % splits of traffic for the AM (08::00) and PM (17:00 - 18:00) peak periods was requested from AT at the following intersections for a typical weekday, for an agreed (with AT) time period of March 2024:

- Walmsley Road/Hall Ave.
- Bader Drive/Elmdon Street.
- Bader Drive/McKenzie Road.
- Walmsley Road/Mahunga Drive/Dornell Avenue.
- Rimu Road/SH20 off ramp
- Rimu Road/SH20 on ramp.

Where available, directional link flow data (in CSV format) for the AM (08:00 – 09:00) and PM (17:00 -18:00) peak periods at each of the above intersections was also requested.

The data was received on 24 October 2024 and was provided based on a signed AT/T+T Information Sharing Agreement. As such, none of the information supplied by AT is reproduced in this ITA and the data has been used solely for the purposes of the Sidra modelling. A summary of the Sidra modelling is presented in section 6.

[7] Data access July 2024, and retrieved from Mobile Road
[8] Data accessed August 2024, and retrieved from Average Daily Traffic Counts (arcgis.com)
[9] Data accessed July 2024, Retrieved from ArcGIS Web Application (nzta.govt.nz)

In addition to the Tom Tom and directional link count information, SCAT (Sydney Coordinated Adaptive Traffic System) hourly detector counts, hourly phase and cycle times for a weekday in March 2024 for the following traffic signal intersections was also requested from AT to supplement the estimated turning flows:

- Walmsley Road/Mahunga Drive.
- Walmsley Road/Robertson Road.
- Rimu Road/SH20 off ramp.

It is noted that:

- This data is only available at traffic signal intersections.
- AT indicates that the counts "*are not 100% correct compared to manual counts and from past experience there are variations of between + or - 5% to 10%".*
- Where there are shared lanes it is not possible to get turning movements.
- Free flow left turn lanes are not counted.
- AT indicated a number of concerns with the data.

The SCATS data was used to review and update the estimated turning flows from the Tom Tom data used in the Sidra modelling as presented in Section 6.

3.3.3.3 Proposed signed diversion route via Mahunga Drive and Rimu Road

Table 3.7 below provides a brief description of the layout for each road on this diversion route (note mean operating speeds obtained from NZTA's MegaMaps[10]).

[10] Data accessed July 2024, Retrieved from ArcGIS Web Application (nzta.govt.nz)

Table 3.7: Existing transport conditions

Road	Auckland Unitary Plan Road Classification	Key road features
Mahunga Drive	Collector	• Speed Limit = 50 Km/h. • Mean operating speed = 48 to 52 km/h. • Footpath on both sides of the road. • Signalised intersections at Walmsley Road and SH20 off ramp. • Bus stops but currently no scheduled bus services. • School bus route (routes 1, 2 and 62). • Mixture of residential and commercial land uses. • On AT HPMV detour route.
Rimu Road	Collector	• Speed Limit = 50 Km/h. • Mean operating speed = 27 to 38 km/h. • Footpath on both sides of the road, reducing to one on southern side across the motorway overbridge. • Signalised intersection with SH20 off ramp, priority give way at SH20 on ramp and roundabout and raised zebra crossings at Coronation Road. • Traffic calming along road, including pedestrian refuges and kerb buildouts. • Bus stops and bus route 309 and 309X. • Several school buses (routes 2, 3, 5, 58, 59, 61, 62, 84). • Predominantly residential. • T2 lane eastbound approach to SH20 on ramp.
SH20 on ramp	Collector	• Speed Limit = 100 Km/h. • Mean operating speed = 52 km/h. • T2 lane. • Bus route 309 and 309X. • School bus route (routes 58, 59, 61, 62, 84). • On AT HPMV detour route.
SH20 off ramp	Collector	• Speed Limit = 50 Km/h. • Bus route 309 and 309X. • Several school buses (routes 1, 2, 3, 5, 61, 84). • On AT HPMV detour route.

Existing traffic count data is summarised in Figure 3.8 below.

Table 3.8: Existing traffic flows

Location	Average Daily Traffic two way veh/day (Heavy Vehicle %)	Peak flow (two way veh/hour) and peak period (hour starting)
Mahunga Drive	15,445 (7%) to 19,096 (8%)	1,578 (1630) to 1,935 (0745)
Rimu Road	12,696 (6%) to 15,332 (6%)	1,414 (1645)
SH20 on ramp	12,170 (4.9%)	Data not available Estimated using 10% of ADT = 1217
SH20 off ramp	11,544 (4.7%)	Data not available Estimated using 10% of ADT = 1,154

Google maps was used as a guide to typical traffic speeds and congestion on the diversion routes for the weekday AM and PM peaks (based on a review carried out on weekdays during w/c 2 September 2024). Extracts are shown in Figure 3.15 (08:00-09:00) and Figure 3.16 (17:00-18:00) below.

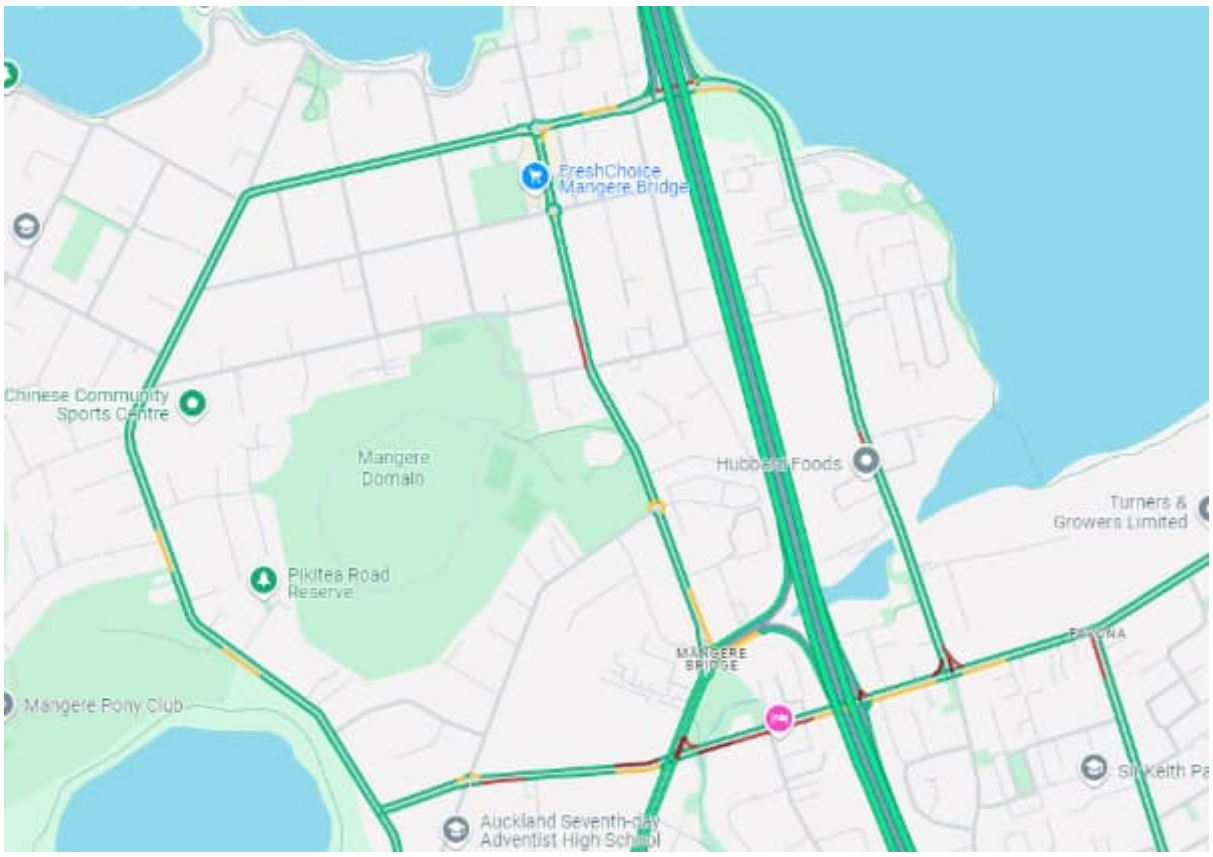

Figure 3.15: Typical congestion during 08:00-09:00 period

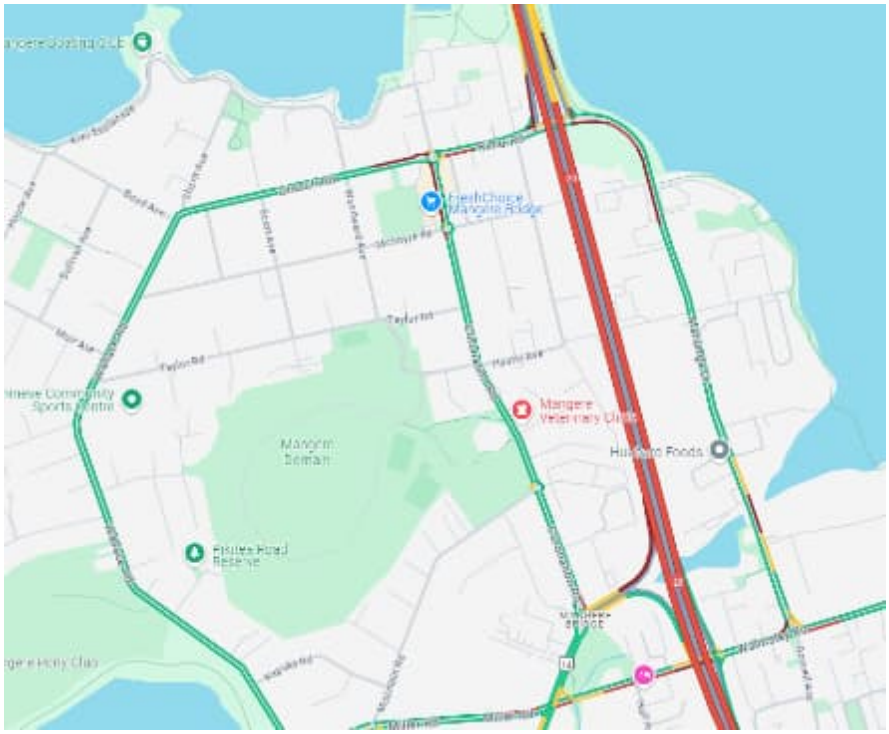

Figure 3.16: Typical congestion during 17:00-18:00 period

The peaks in these figures were selected as examples of the busiest/worst-case congestion, with slow (shown as red) traffic speeds assumed to be due to congestion.
Figure 3.15 and Figure 3.16 indicate:

- AM peak - largely uncongested. This was confirmed by the site observations.
- PM Peak - Rimu Road/SH20 on ramp congestion extending approximately 500 m back on Mahunga Road. Small amount of congestion at the Mahunga Road/Walmsley Road and the Rimu Road/Coronation Road intersections.

These findings are confirmed by the PM peak site observations where queueing on the SH20 northbound mainline was observed from 16:30 through to 18:00. This did cause slow moving queues on the Rimu Road SH20 on slip that resulted in queues back to Mahunga Road to Miro Road for a 15 to 20 minute period and then after this queues were small. Queues on the SH20 Rimu Road off ramp were observed to be small (circa 10 to 15 vehicles). Longer queues were observed on the Walmsley Road approaches to Mahunga Drive, with slow moving queues typically extending east to Robertson Road and east to SH20. SH20 southbound mainline queuing was not observed to be as extensive as that indicated by google maps.

3.3.3.4 Proposed signed diversion route via Bader Drive, Elmdon Street and Hall Avenue

Table 3.9 below provides a brief description of the layout for each road on this diversion route.

Table 3.9: Existing transport conditions

Road	Auckland Unitary Plan Road Classification	Key road features
Bader Drive (north of Elmdon Street)	Arterial	• Speed Limit = 50 Km/h. • Mean operating speed = 46 km/h. • Footpath on both sides of the road. • Traffic calming along road, including raised zebra crossing and kerb buildouts. • Bus stops and bus route N10 and 38. • Predominantly residential area and Māngere College.
Elmdon Street/ Hall Avenue	Collector	• Speed Limit = 50 Km/h. • Mean operating speed = 32-39 km/h. • Footpaths on both sides of the road and Hall Avenue at the bend connects to a pedestrian bridge over SH20. • Give way intersection with Bader Drive and Walmsley Road. • Bend at Hall Avenue/Elmdon Street. • School bus route 61. • Predominantly residential area. • On street parking.

Existing traffic count data is summarised in Table 3.10 below.

Table 3.10: Existing traffic flows

Location	Average Daily Traffic two way veh/day (Heavy Vehicle %)	Peak flow (two way veh/hour) and peak period hour starting
Bader Drive (north of Elmdon Street)	8,086 (6%) to 8,189 (7%)	979 (08:15)
Elmdon Street/Hall Avenue	4,152 (5%) to 5,980 (2%)	442 (15:00)

Google maps was used as a guide to typical traffic speeds and congestion on the diversion routes for the weekday AM and PM peaks. Extracts are shown in Figure 3.17 (08:00 – 09:00) and Figure 3.18 (17:00 – 18:00) below (based on a review carried out on weekdays during w/c 2 September 2024).

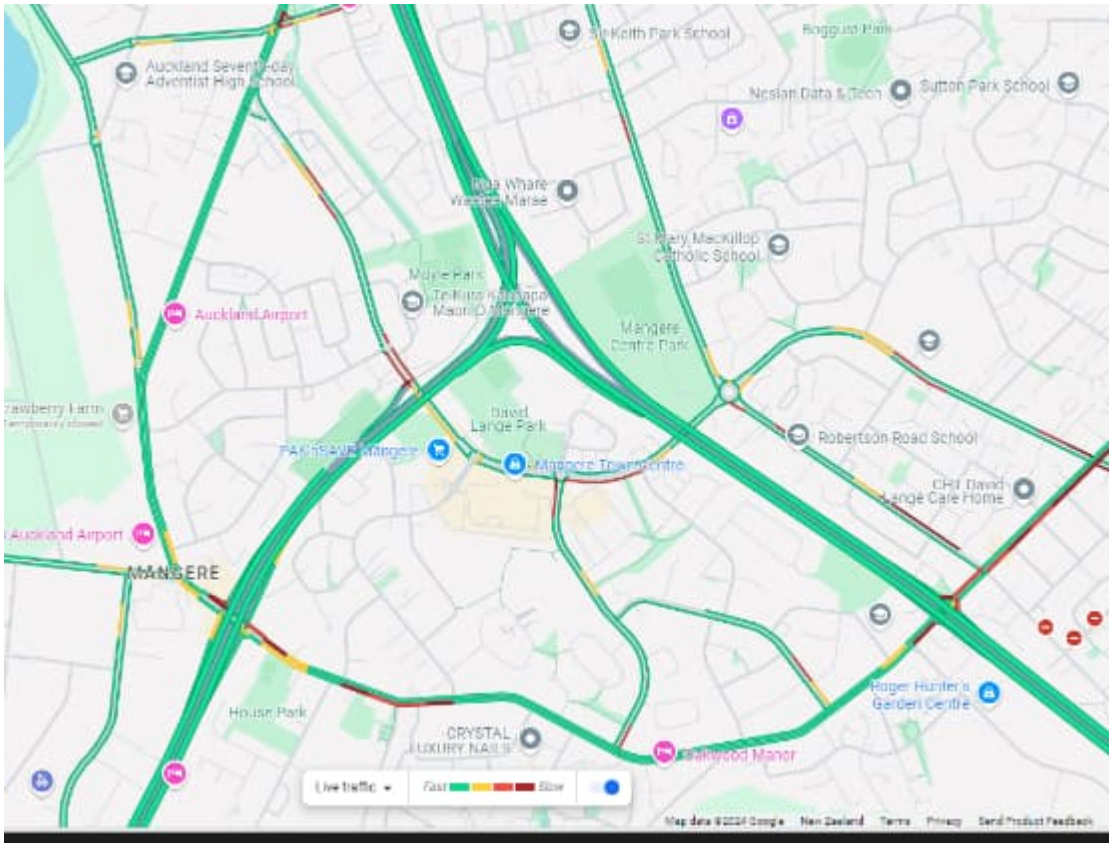

Figure 3.17: Typical congestion during 08:00-09:00 period

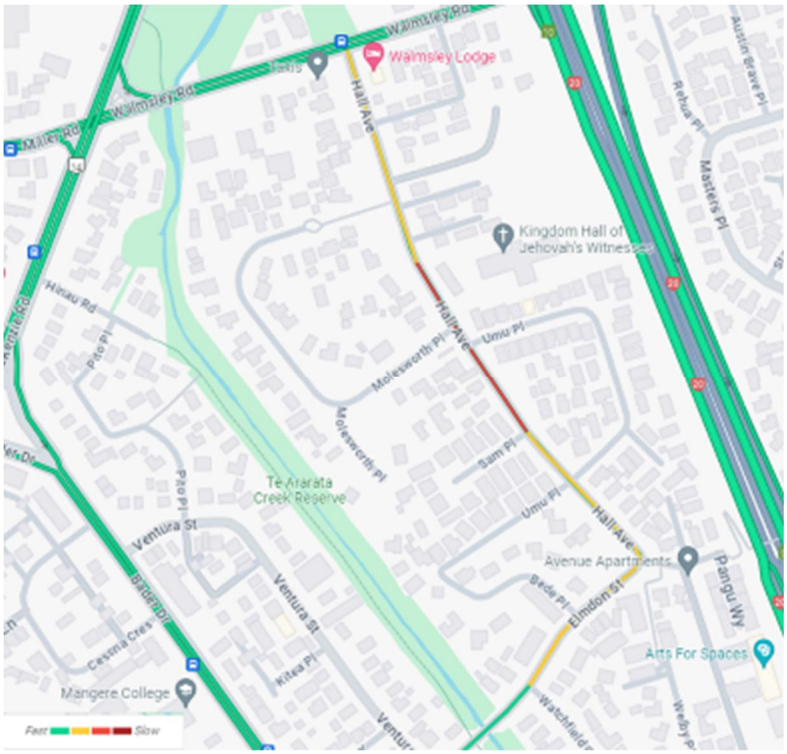

Figure 3.18: Above two images, typical congestion during 17:00-18:00 period

The peaks in these figures were selected as examples of the busiest/worst-case congestion, with slow (shown as red) traffic speeds assumed to be due to congestion.
Figure 3.17 and Figure 3.18 indicate for the Bader Drive, Elmdon Street and Hall Avenue diversion route:

- AM peak – largely uncongested, with a small amount of congestion at the Bader Drive/ Elmdon Street intersection.
- PM Peak (17:00 – 18:00) - Some congestion on Bader Drive at the McKenzie Road intersection extending approximately 150 m back to Ventura Street. Slow moving traffic on Hall Avenue and Elmdon Street. PM peak site observations indicated that queues on Bader Drive were relatively shorter in length and delays were observed to be minimal. Hall Avenue/Elmdon Street were observed to be free flowing, with vehicles slowing down to pass parked vehicles at the bend.

Community consultations carried out by Healthy Waters have indicated that there are currently some issues for traffic in the peak periods turning out of Elmdon Street onto Bader Drive. This was not observed during the peak period site visits.

3.3.3.5 Proposed signed diversion route Bader Drive/Robertson Road, Kirkbride Road/SH20A northbound/Bader Drive and SH20 southbound/SH20A/Kirkbride Road

Table 3.11 below provides a brief description of the layout for each road on this diversion route.

Table 3.11: Existing transport conditions

Road	Auckland Unitary Plan Road Classification	Key road features
Bader Drive (south of Elmdon Street)	Arterial	• Speed Limit = 50 Km/h. • Mean operating speed = 32 to 47 km/h. • Footpath on both sides of the road. • Signalised intersection with SH20A off ramp, two zebra crossings, four roundabouts, two midblock signalised pedestrian crossing • Traffic calming along road, including raised zebra crossings. • Roundabout intersection with Idlewild Avenue, Orly Ave Mascot Ave and Robertson Road. Traffic signal intersection with SH20A off ramp. • Eastbound cycle lanes between SH20A off ramp and Robertson Road. • Westbound cycle lane between Mascot Ave and SH20A off ramp. • East bound bus lane between Ashgrove Road and Mascot Ave. • Bus stops and bus routes 31, 32, 36, 38, 309, 309X, 313, 324, 325, 326 and N10. • School bus route (routes 1, 12, 61, 84). • Mixture of residential, schools, reserves and Māngere Town Centre land uses.
Robertson Road	Arterial	• Speed Limit = 50 Km/h. • Mean operating speed = 40-46 km/h. • Footpaths on both sides of the road. • Bi-directional cycle way for 600 m from Bader Drive to 70 Robertson Road. • Traffic calming along road, including raised zebra crossings, speed cushions and pedestrian build outs. • Traffic signal-controlled pedestrian crossing at Koru school. • Traffic signal intersection with Walmsley Road. • Bus stops and bus routes 309, 309X and 324. • School bus route (routes 1, 12, 41, 84). • Mixture of residential, schools and reserves.
Kirkbride Road	Arterial	• Speed Limit = 50 Km/h. • Mean operating speed = 38 km/h. • Footpath on both sides of the road. • Signalised intersections with SH20A on ramp and Ascot Road. • Eastbound and westbound cycle lanes either side of SH20A. • On AT Over Dimension route. • School bus route (routes 1, 59). • Bus stops and bus route 38.

Road	Auckland Unitary Plan Road Classification	Key road features
		• Commercial land uses. • On HPMV route.
SH20A northbound on ramp at Kirkbride Rd	Arterial	• Speed Limit = 100 Km/h. • Mean operating speed = 58 km/h. • Truck Lane. • Adjacent off road cycle way and footpath.
SH20A off ramp at Bader Drive	Arterial	• Speed Limit = 50 Km/h. • Mean operating speed = 42 km/h. • Shared path on one side. • Signalised intersection with Bader Drive.

Existing traffic count data is summarised in Table 3.12 below.

Table 3.12: Existing traffic flows

Location	Average Daily Traffic two way veh/day (Heavy Vehicle %)	Peak flow (two way veh/hour) and peak period (hour starting)
Bader Drive (south of Elmdon Street)	11,587 (4%) - 14,737 (3%) north of SH20A 24,479 (5%) to 26,986 (4%) west of SH20	1,234 (0815) to 1,522 (16:15) 2.331 (1445) to 2,393 (16:00)
Robertson Road	11,538 (4%) to 18,095 (4%)	1,167 (1645) to 1,768 (16:45)
Kirkbride Road	20,808 (15%)	1,935 (08:00)
SH20A northbound on ramp at Kirkbride Road	5,508 (10.1%)	Not available Estimated using 10% of ADT = 551
SH20A off ramp at Bader Drive	3,182 (4.9%)	Not available Estimated using 10% of ADT = 318

Google maps was used as a guide to typical traffic speeds and congestion on the diversion routes for the weekday AM and PM peaks (based on a review carried out on weekdays during w/c 2 September 2024). Extracts are shown in Figure 3.19 (08:00 – 09:00) and Figure 3.20 (17:00 – 18:00) below.

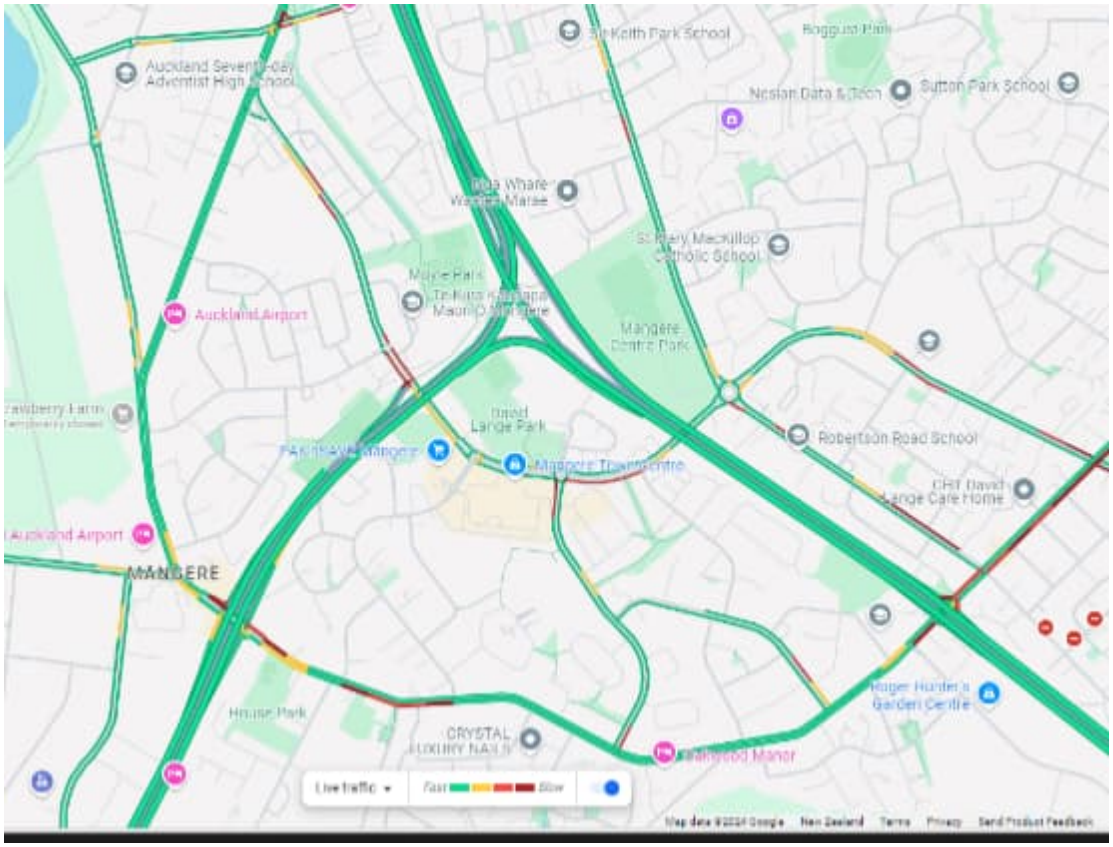

Figure 3.19: Typical congestion during 08:00-09:00 period

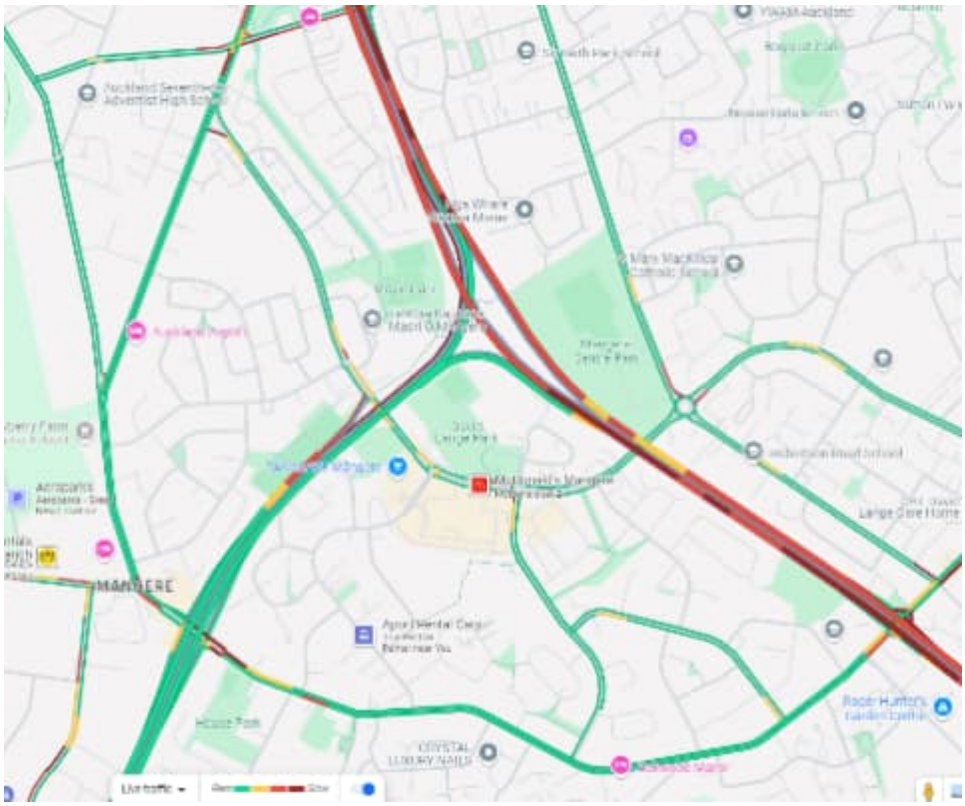

Figure 3.20: Typical congestion during 17:00-18:00 period

The peaks in these figures were selected as examples of the busiest/worst-case congestion, with slow (shown as red) traffic speeds assumed to be due to congestion.

Figure 3.19 and Figure 3.20 above indicate for the Bader Drive, Robertson Road diversion route:

- AM peak – small amount of congestion on Bader Drive between its intersection with Idlewild Avenue and SH20A off ramp, at the Bader Drive/Mascot Ave intersection and at the Kirkbride/SH20A intersection.
- PM Peak (17:00 – 18:00) - small amount of congestion on the Bader Drive /SH20A off ramp, the Kirkbride Road/Ascot Road intersection and the Robertson Road/Bader Drive intersection.

3.3.4 Proposed signed diversion routes crash record

An assessment of the road safety record of the proposed diversion routes has been undertaken using the NZTA Crash Analysis System (CAS). Crash history was assessed for the period from 2019 – 2024 (inclusive) on the route of the Project (noting some of the 2024 data may be incomplete due to a delay between crashes and upload of their data). The reported crash history for the road network on the diversion routes is shown below in Figure 3.21 and the collision diagrams can be found in Appendix D.

Figure 3.21: Diversion Route Crash study area

From this search, a total of 320 crashes were recorded, with 25 serious crashes and one fatal crash. A summary of the crash severities and factors can be found in Table 3.13 and Table 3.14 below:

Table 3.13: Crash summary

Year	Fatal	Serious	Minor	Non-injury	Total
2019	0	4	11	49	64
2020	0	6	12	45	63
2021	1	3	8	41	53
2022	0	2	13	42	57
2023	0	2	17	42	61
2024	0	2	9	11	22
Total	1	19	70	230	320

Table 3.14: Crash factor summary

Crash Type	Crash Numbers
Bend – lost control/Head on	42
Crossing/turning	86
Miscellaneous	2
Overtaking crashes	32
Pedestrian vs vehicle	8
Rear end/obstruction	100
Straight road lost control/head on	50
TOTAL	320

Along the detour routes 17 crashes involved either pedestrians or cyclists, 5 of which were serious crashes and 8 being minor crashes. Being such a large crash study area there are a large number of reported crashes and there are the following four locations where there is a high number of crashes: Rimu Road near the Rimu Road on/off ramps, 49 crashes occurred in the area including two serious and the one fatal crash. The fatal crash was classified as 'miscellaneous' with the incident involving a passenger who left the vehicle while it was still moving and no other vehicles were involved in the crash. No pedestrians were involved in any of the crashes, but two crashes involved a cyclist with one being a serious crash. 41 of the crashes involved one of the three following movement factors: bend (lost control/head on collision east of the SH20 off ramp), crossing/ turning or rear end/obstruction collision including where eastbound vehicles on Rimu Road not giving way to right turning traffic turning into the Rimu Road on ramp. Figure 3.22 below indicates the unusual layout at the Rimu Road/SH20 on ramp intersection where Rimu Road ahead traffic has to give way to traffic turning right to SH20. Ordinarily it is considered that this type of intersection would be traffic signal controlled or the right turn to SH20 on ramp having to give way, as is the case for similar intersections across the State Highway network in Auckland.

Figure 3.22 Rimu Road/SH20 on ramp existing layout

- Walmsley Road / Mahunga Drive intersection, 28 crashes. No serious or fatal crashes occurred during the study period. Two minor crashes involved a pedestrian. Crossing/turning and rear end/obstruction were the movement factors involved in 21 of the 28 crashes. AT implemented an improvement scheme during this crash analysis period which is understood to have been implemented early 2022. Since 2022, the number of crashes has reduced at this intersection with 1 crash being recorded in 2022 and 3 in 2023, compared to the situation before this improvement of 6 in 2019, 9 in 2020 and 8 in 2021.
- Walmsley Road / Favona Road / Robertson Road intersection, 22 crashes. No serious crashes and none of the crashes involved pedestrians or cyclists. Two-thirds of the crashes involved overtaking and rear end/obstruction movement factors.
- Bader Drive / Robertson Road / Buckland Road intersection, 21 crashes. No serious or fatal crashes occurred. Two crashes involved a cyclist (one minor and one non-injury). Two-thirds of the crashes involved rear end/obstruction and bend loss of control/head on.

Discussions with the AT Road Safety team on 11 October 2024 confirmed that there are no proposed road safety improvement works at the above locations.
Collective and Personal risk ratings (from NZTA mega maps) have been reviewed on the roads (combined link and intersections) adjacent to the Project and on the proposed signed diversion routes. The results are summarised in Table 3.15 below.

Table 3.15: Personal and Collective Risk

Road	Section	Personal Risk	Collective Risk
Mahunga Drive	Walmsley Rd to Market Cove Rd	Low Medium	Low Medium
	Market Cove Rd to Rimu Rd	Low Medium	Medium
Rimu Road	Mahunga Dr to SH20 on ramp	Low	Low
	SH20 on ramp to Church Rd	Medium	Medium
SH20 on ramp Rimu Rd (north of the Rimu Road intersection)		Medium High	Medium
Coronation Road SH20 off ramp		Low	Low

Road	Section	Personal Risk	Collective Risk
Coronation Road	SH20 Off ramp to Walmsley Rd	Low Medium	Low Medium
Miller Road		Low	Low
McKenzie Road	Walmsley Rd to Bader Dr	Low	Low
	Betula Pl to Bader Dr	Medium High	Medium
	Left turn slip to Bader Drive	Low	Low
Bader Drive	Westbound approach to McKenzie Road	Medium	Medium
	Median island to Ventura St	Low	Low
	Ventura St to Tagata Way	Low Medium	Low Medium
	Tagata Way to Comet Cres	Medium	Medium
	Comet Cres to Idlewild Ave	Low	Low
	Idlewild Ave to fire station	Medium High	Medium High
	Fire station to Orly Ave	Low	Low
	Eastbound Orly Ave to Mascot Ave	Low Medium	Medium
	Eastbound Mascot Ave to Ashgrove Rd	Low medium	Low Medium
	Westbound Ashgrove Rd to Mascot Ave	Low	Low
	Westbound Mascot Ave to Orly Ave	Low	Low
	Ashgrove Rd to Rye Ct	Medium	Medium High
	Rye Ct to Robertson Rd	Low	Low
Robertson Road	Bader Dr to Hall Ave	Medium	Medium
	Hall Ave to Wakefield Rd	Medium	Low Medium
	Wakefield Rd to Tilberg St	Low	Low
	Tilberg St to Walmsley Rd	Medium	Low Medium
Elmdon Street		Low	Low
Hall Ave		Medium	Low Medium
Kirkbride Road (Ascot Rd toSH20A on ramp		Medium	Medium
SH20A onramp at Kirkbride Road		Medium	Low Medium
SH20A offramp at Bader Drive		Low	Low

Collective Risk (crash density) is a measure of the total number of fatal and serious injury crashes per kilometre over a section of road and highlights which road links have a high number of fatal and serious crashes on them. Personal Risk takes into account the traffic volumes on each section of road and shows the likelihood of a driver or rider, on average, being involved in a fatal or serious road crash on a particular stretch of road.

AT have commented that the MegaMaps data is based on the Serious and Fatal crash record for the period 2017 - 21, which includes the COVID years. A review of the crash data in Table 3.13 indicates a larger number of fatal and serious crashes per annum in the period 2019-2021 (which is within the Mega Maps personal and collective risk assessment time period) than in the period 2022-2023, and this is also the case with the total number of crashes. As such, the MegaMaps personal and collective risk assessment is considered to be a worst case assessment.

In interpreting the NZTA calculated collective and personal risk ratings, roads with an existing high overall safety risk have been assumed to be those with a high or medium high collective risk and those with a high personal risk. Based on this, for the roads adjacent to the Project and on the proposed signed diversion routes, the following road sections have been identified with an existing high overall safety risk:

- SH20 on ramp Rimu Road (north of the Rimu Road intersection).
- McKenzie Road - Betula Place to Bader Drive.
- Bader Drive - Idlewild Avenue to fire station.
- Bader Drive - Ashgrove Road to Rye Court.

4 Construction Methodology and Construction traffic volumes

4.1 Introduction

An indicative construction methodology is provided in the AEE and an overview is provided in section 1 above.

4.2 Description

The proposed construction site layout is shown in Figure 4.1 below.

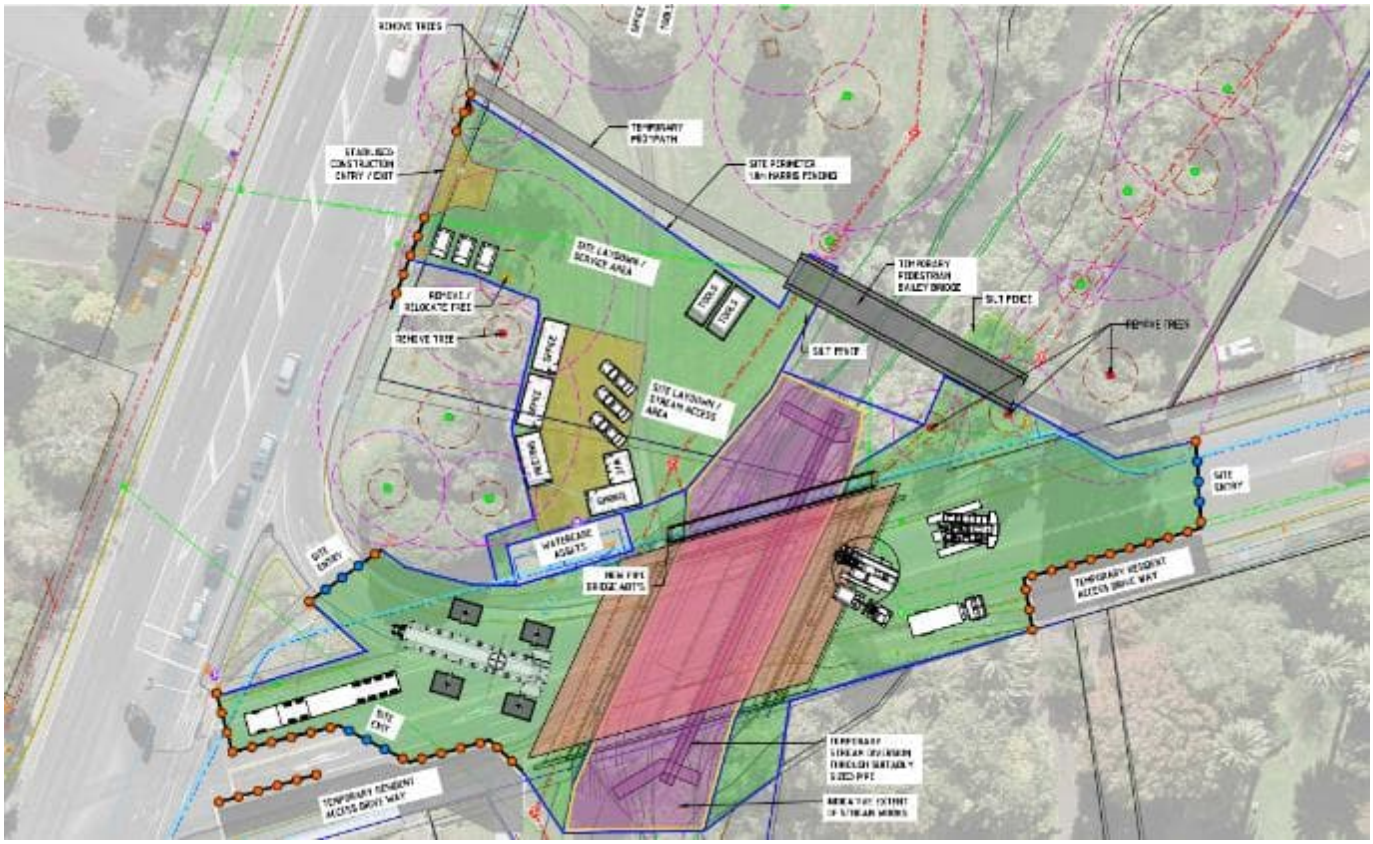

Figure 4.1 Construction site layout (from Drawing No. TACR-HEB-01-00-DR-Z002 Rev D4)

The works involve the temporary full road closure of Walmsley Road bridge. Temporary traffic diversion will occur using the surrounding existing road network (proposed signed diversion routes shown in Figure 3.14 above). A temporary bailey bridge for active modes only will be established to the north of the existing Walmsley Road bridge, within Black Bridge Reserve. The width of the bailey bridge is anticipated to be 2.5 m to 3 m. The temporary pedestrian route between Coronation Road and Walmsley Road will be lit.

This option anticipates staged-construction work and is likely to occur over a period of approximately 10 to 12 months, of which approximately 7 months will be the duration of the Walmsley Road closure (and resultant diversion of traffic), and 3 to 5 months will be pre and post closure works (for example to establish and disestablish the site and undertake offline finishing work).

The proposal provides for:
Pedestrians

- Bailey bridge provides pedestrian connection between Walmsley Road east of the bridge, Black Bridge reserve and the existing footpath on Coronation Road.

Cyclists

- Cycle lanes retained on Coronation Road and McKenzie Road.
- Cyclists using Walmsley Road can wheel their cycles on the bailey bridge.

Existing McKenzie Road/Miller Road/Coronation Road intersection

- Traffic signal phasing and timings to be updated and optimised with the Walmsley Road closure.
- Right turn lane McKenzie Road to Walmsley Road temporarily closed.
- Coronation Road left turn lane to be closed (except for construction traffic.
- Miller Road lane configuration unchanged except ahead lane markings to be temporarily removed.

#2 and 4 Walmsley Road residents access and egress

- Residents access via left turn only from Coronation Road at the Coronation Road/Miller Road/McKenzie Road intersection into a temporary resident access driveway. This is a separate access to the construction traffic access.
- Residents egress via left turn (on give way) to McKenzie Road from the temporary resident access driveway. This is in a separate egress lane to the construction traffic egress.
- The proposed site layouts allow for temporary driveway access for residents cars, emergency, delivery and refuse collection vehicles.

#10 and 12 Walmsley Road residents access and egress

- Access and egress via temporary resident access driveway to Walmsley Road.

Construction traffic access

- Construction site west of Walmsley Road bridge - from Coronation Road access via existing left turn lane from Coronation Road to Walmsley Road. Egress to Coronation Road via left turn (on give way) to McKenzie Road in a separate egress lane to the residents egress.
- Construction site east of Walmsley Road bridge - via Walmsley Road.
- Site laydown, service area and stream access area – from the temporary construction site access on Coronation Road which will be a left in/left out only.

Construction worker and visitor parking

- Three car park spaces for construction workers and visitors is provided within the compound. The remainder of construction workers will be able to safely park on street on Walmsley Road (between the site and Mill Road) given that all through traffic is removed with the Walmsley Road closure.

Coronation Road **Construction Access** compliance with AUP and Austroads standards

Although Auckland Unitary Plan – operative in Part (AUP) Rule E27 is not directly applicable to construction activities, the Project complies with the following E27 rules of:

- E27.6.1 Trip Generation - E27.6.1 (1) (b), where trips generated from the Project are below the 100 vehicles/hour threshold (see Table 4.2 below).

- E27.6.2 Number of parking and loading spaces - Table E27.6.2.3 (T36), noting no maximum parking rates apply.
- E27.6.3 Design of parking and loading spaces, the Project complies with:
  - E27.6.3.1 and E27.6.3.2 – parking and loading space dimensions will comply with these requirements.
  - E27.6.3.3 - access and manoeuvring complies with NZTA tracking curves.
  - E27.6.3.4 – vehicles do not need to reverse into or from the site.
  - E27.6.3.6 – gradients of parking spaces will not exceed 5% and manoeuvring areas will not exceed 12.5%.
- E27.6.4 Access, the construction phase access for the Project complies with:
  - E27.6.4.1 (3) (a)- Site accesses are located more than 10 m from an intersection and hence no Vehicle Access Restriction applies (noting that since this is a temporary construction access the vehicle access restriction being on an Arterial is considered not to apply).
  - Table E27.6.4.2.1 (T146) and Table E27.6.4.3.2 – vehicle crossing width and number of vehicle crossings complied with.
  - Table E27.6.4.3.2 (T158) maximum gradient of 12.5% will be complied with.

Sightline requirements - with the removal of two trees to the east of the site access and with a 5 m setback from the proposed construction site access, there is an available sight distance from the access to the Coronation Road/SH20 on and off ramps roundabout to the north (approximately 155 m). To the south the available sight distance is beyond the Coronation Road/McKenzie Road/Miller Road intersection to a distance of circa 300 m. For a 60 km speed environment the Austroads Safe Intersection Sight Distance (SISD) is 123 m. The available sight distance to the north and south of the construction site access exceeds this requirement.

4.3 Overweight and Over Dimension Vehicles

Overweight and Over Dimension permits will be required for the transporters for the crane and plant at the start and end of the project. These deliveries are effectively one-offs that will happen in the early hours of the morning or later in the evening and pilot vehicles usually stop traffic as needed to get trucks into the site. Agreement on routes taken by these transporters will be agreed with AT at the permitting stage.

4.4 Construction traffic volumes and distribution

4.4.1 Overview

The Project transport movements will be associated with activities including delivery of plant and construction materials, staff access, site establishment, piling, removal of material, temporary bailey bridge and permanent bridge construction, concrete pours, demobilisation and site remediation. Light vehicle movements for construction, management and supervision staff, to and from site, are likely to be tidal due to staff arrivals at the start of the shift (i.e. from 06:30 for a 07:00 start) and departures at the end of the shift (i.e. after 19:00).

4.5 Construction vehicle trip generation

Table 4.1 outlines the expected construction traffic associated with different aspects of construction.

Table 4.1: Indicative construction traffic

Stage of Construction	Type of vehicles	Approximate vehicles per day
Site Establishment and Temporary Bridge Construction	Construction vehicles	10 – 20 vehicles
	Labour and Staff Vehicles	5 – 10 vehicles
Road Closure • Permanent Bridge Substructure Construction • Permanent Bridge Superstructure Construction	Construction vehicles	20 – 30 vehicles
	Labour and Staff Vehicles	10 – 15 vehicles
Road open, Site disestablishment	Construction vehicles	10 – 20 vehicles
	Labour and Staff Vehicles	5 – 10 vehicles

Included in Table 4.1 above are deliveries for the Project which are anticipated to be from the Auckland urban region. Some plant deliveries (approximately 20 deliveries) will be from Tauranga. The estimated average number of deliveries per day are as follows:

- Site Establishment and Temporary Bridge Construction = 5 – 10 deliveries per day.
- Road Closure = 10 – 20 deliveries per day.

The size and types of trucks anticipated include the following:

- Plant and equipment - combination of transporters and flat deck trucks. The crane car body and 50 t drill rig will be delivered using a low-loader transporter with dolly arrangement.
- Aggregate deliveries - will be predominately truck and trailer or 6-wheeler.
- Culvert demolition - 6 wheelers, artic trucks with large bins or truck and trailers.
- Bridge beam deliveries - a truck and jinker.
- Superstructure material deliveries - a combination of flat deck Hiab and non-Hiab trucks.
- Transport of the 120 -180 t crane - typically involves 8 -12 truckloads depending on the amount of boom.
- Transport of the 50t drill rig - typically involves 2 truckloads (one for the car body and the other for the Kelly bar).
- Transport of the 200 - 250 t mobile crane - typically involves 2 - 5 truckloads depending on the amount of counterweight being carried.
- Transport of the 100 – 150 t mobile crane - typically involves 2 - 3 truckloads depending on the amount of counterweight being carried.

Based on Table 4.1, Table 4.2 below summarises the anticipated daily maximum two way construction traffic movements from east and west of Walmsley Road Bridge.

Table 4.2: Anticipated daily maximum two-way construction traffic movements

Location	Site Establishment and Temporary Bridge Construction	Road Closure	Road open, Site disestablishment
West of Walmsley Road bridge (Coronation Road/McKenzie Road)	60 (40 Trucks, 20 Light vehs)	45 (30 trucks, 15 Light vehs)	60 (40 Trucks, 20 Light vehs)
East of Walmsley Road bridge	0	45 (30 trucks, 15 Light vehs)	
Total	60 (40 Trucks, 20 Light vehs)	90 (60 trucks, 30 Light vehs)	60 (40 trucks, 20 Light vehs)
Programme length (months)	3	6	3

It has been assumed that the construction traffic is split 50/50 Coronation Road/Walmsley Road. On Coronation Road it is also further assumed that construction traffic will be split 50/50 to/from Coronation Road and McKenzie Road.

Construction worker activity vehicle movements will predominantly be outside of AM and PM peak periods since they will arrive from 06:30 and depart after 19:00 (i.e., before the AM and after the PM peak periods). All other vehicle trips are expected to be dispersed throughout the construction weekday working period of 07:00 – 19:00.

5 Assessment Of Temporary Transport Effects – additional construction traffic

5.1 Traffic impact of temporary additional construction vehicle movements (usual construction hours)

As detailed in Table 4.2 above it is anticipated there will be up to 60 construction movements (40 trucks and 20 light vehicles) per day on Coronation Road and up to 45 construction movements (30 trucks and 15 light vehicles) per day on Walmsley Road. Over an 11 hour construction working day this represents up to 6 vehicle movements per hour or 1 vehicle movement approximately every 10 minutes on Coronation Road and up to 4 vehicle movements per hour or 1 vehicle movement approximately every 15 minutes on Walmsley Road.

Compared to the daily and peak hour flows given in Table 3.2, construction traffic will temporarily increase traffic volumes on Coronation Road/McKenzie Road by only 0.4% for both daily and peak hour flows. This increase in vehicles is well within the range of typical day to day fluctuations in traffic flow of 5% to 10% that regularly occur on the road network. These roads are arterial and already performing a movement function. The negligible increase in traffic movements therefore should not result in a noticeable increase in congestion or unreasonable delays or worsening of road safety for road users on Coronation Road or McKenzie Road.

As detailed in Section 9 below, the CTMP will contain measures including that the Site Traffic Management Supervisor will safely manage the movement of construction traffic to and from the road network to ensure the safety of all road users is maintained and that the construction vehicles can safely negotiate access and egress to avoid any additional queueing on the adjacent road network in the peak periods on Coronation Road, McKenzie Road and Walmsley Road.

5.2 Traffic impact of temporary additional construction vehicles (outside of usual construction hours)

As detailed in Section 1.3, there may be occasions where it is necessary to undertake construction activities outside of usual construction hours. Given these activities will take place at off peak times on the surrounding road network (when there is no congestion), then it is considered that the traffic impact of these activities is negligible.

5.3 Road safety impact of temporary additional construction vehicles

It is considered that the low number of temporary additional trips generated by the construction traffic for the Project will have a negligible impact on the safety of the adjacent road network which, as detailed in Section 3.2.8 above it is considered that there are no inherent safety issues present in the vicinity of the Coronation Road/Walmsley Road/Miller Road/McKenzie Road intersection.

5.4 Impact on road pavement condition

Construction truck movements are anticipated to access the site from either Coronation Road, McKenzie Road or Walmsley Road and, as demonstrated above, this is considered to be a negligible temporary increase in traffic. As such, it is considered that there will be a negligible impact on the pavement condition of these roads especially given they are arterial roads carrying high traffic volumes which also currently consist of up to 16% heavy vehicles.

Although this is considered to be a negligible impact on the road pavement condition, it is proposed that the CTMP includes measures to carry out a Pavement Condition Assessment (PCA). The PCA will be carried out by a Suitably Qualified Experienced Practitioner (SQEP) in Transport Engineering. The PCA will provide an assessment of the road surface condition, prior to and post construction on:

- Coronation Road (between Miller Road/McKenzie Road intersection and the Coronation Road/SH20 on and off ramp intersection).

- McKenzie Road (between Kirkbride Road and Miller Road).
- Walmsley Road (between the site and Walmsley Road/SH20 on and off ramp intersection).

This will allow for an evaluation of any changes to the condition of the road pavement.
A pre-construction PCA will be carried out by a visual inspection of the road surface and the findings will be presented in a Pre-construction PCA report which will identify any pre-existing road surface condition issues. Upon completion of the construction works, a post construction PCA will be carried out by a visual inspection of the road surface. A comparison of the road surface conditions pre-and post-construction will be carried out and reported in a post construction PCA report. This will also identify any remedial works and a timescale for implementation that are directly attributable to the construction traffic (as opposed to general wear and tear). In order to determine what is directly attributable to the construction traffic will require pre and post construction classified tube traffic counts on the sections of these roads and a comparison with records from the contractor of the daily number of trucks accessing the Project. This then allows calculation of the proportion of the Project construction trucks compared to existing total and heavy vehicle traffic flows and hence the contribution to any required remedial measures.

5.5 Summary of additional construction traffic effects

Based on the assessments carried out in section 5.1 to 5.3 above, the additional construction traffic is considered to have a negligible impact on the surrounding road network.

6 Assessment Of Temporary Transport Effects

6.1 Introduction

The following sections provide detail on the assessment of the temporary transport related effects and has been carried out separately for Walmsley Road and for each of the proposed signed diversion routes.

For Walmsley Road the assessment incudes:

- Effects on adjacent properties.
- Effects on pedestrians and cyclists.
- Effects on buses and school buses.
- Effects on on-street parking.
- Effects on OD/HPMV detour routes.
- Effects on emergency services vehicles.
- Effects on traffic capacity

For the temporary diversion routes, the assessment incudes:

- Diversion traffic flow increases and effects on existing congestion.
- Diversion traffic flow increases and effects on road safety.
- Effects on adjacent properties.
- Effects on pedestrians and cyclists.
- Effects on buses and school buses.
- Effects on on-street parking.
- Effects on OD/HPMV detour routes.
- Effects on Pavement Condition.

6.2 Walmsley Road

6.2.1 Walmsley Road resident access

6.2.1.1 #2 and #4 Walmsley Road.

Assessment

As detailed in section 4.2 above, access to these two properties will be provided as a left turn in from Coronation Road (which will be separate to the left turn in access for construction vehicles). Access from Miller Road or McKenzie Road will require residents to u turn at the Coronation Road/SH20 on and off ramps roundabout intersection which would involve a detour of approximately 500 m which, at an average speed of 30 km/h, is anticipated to add 1 minute to the residents' journey time. Access from Walmsley Road east would involve a detour of approximately 2 km via Hall Avenue, Elmdon Street, Bader Drive, McKenzie Road and the u turn at the Coronation Road/SH20 on and off ramps roundabout intersection. At an average speed of 30 km/h, this is anticipated to add 4 minutes to the residents' journey time.

Egress from these two properties would only be possible as a left turn onto McKenzie Road (which will be separate to the left turn egress for construction vehicles). Egress north to Coronation Road or SH20 north on ramp would be via McKenzie Road, Bader Drive, Elmdon Street and Hall Avenue (and then onto Walmsley Road and Mahunga Drive) involving a detour of approximately 1.5 km. At an average speed of 30 km/h, this is anticipated to add 3 minutes to the residents' journey time. Egress to Miller Road would be via McKenzie Road/Wallace Road involving a detour of approximately 2.3

km. At an average speed of 30 km/h, this is anticipated to add 4.5 minutes to the residents' journey time.
For journeys during the peak periods, it can be expected that these additional journey times are likely to be longer.
Service and deliveries access and egress for these properties (eg FENZ, NZ Police and St Johns, refuse collection, delivery vans) will also use the residents temporary access and egress.
Overall, for a temporary period, residents of #2 and #4 Walmsley Road would incur additional journey times of up to 4.5 minutes (and likely longer in the peak periods and with the increase in traffic on the diversion routes). Overall, this is considered to be a temporary adverse impact for the **residents of these two properties**.

Mitigation
Given the restrictions for access to #2 and #4 Walmsley, it is recommended that the CTMP includes the following measures:

- Continuous communications with residents will be essential to rapidly address any traffic issues should they arise.
- Where required, design and provide temporary accessways and vehicle crossings to residential properties to ensure residents have 24 hour access to their homes.
- Clear signing of the diversion routes.
- FENZ, NZ Police and St Johns, as well as Council refuse collection will be informed of changes to access to #2 and #4 Walmsley Road.

However, the mitigation is not expected to reduce the effects assessment of a temporary adverse **impact for the residents of these two properties.**

6.2.1.2 Walmsley Road residents east of bridge.

Assessment
During the construction works, temporary access to #10 and #12 will be provided via a temporary driveway using the existing footpath.
For all residents east of the bridge, access to/from McKenzie Road, Miller Road and Coronation Road would be via McKenzie Road, Bader Drive, Elmdon Street and Hall Avenue involving a detour of approximately 1.5 km and adding 3 minutes to the residents' journey time.
For journeys during the peak periods it can be expected that these additional journey times are likely to be longer and also this journey time will also likely be longer taking into account that existing Walmsley Road traffic will also be diverted onto this route.
Overall, for a temporary period, residents on Walmsley Road east of the bridge would incur additional journey times of at least 3 minutes (and most likely longer taking into account the additional Walmsley Road traffic which will be using this route and also taking into account likely longer journey times in the peak periods).
Service and deliveries access and egress for these properties (eg FENZ, NZ Police and St Johns, refuse collection, delivery vans) will only be available from Walmsley Road east of the bridge.
Overall, this is considered to be a temporary adverse impact for the Walmsley Road residents east of the bridge.

Mitigation
Given the restrictions for access to Walmsley Road residents east of the bridge, it is recommended that the CTMP includes the following measures:

- Continuous communications with residents will be essential to rapidly address any traffic issues should they arise.

- Where required, design and provide temporary accessways and vehicle crossings to residential properties to ensure residents have 24 hour access to their homes.
- Clear signing of the diversion routes.
- FENZ, NZ Police and St Johns, as well as Council refuse collection will be informed of changes to access to residential properties east of Walmsley Road.

However, the mitigation is not expected to reduce the effects assessment of a temporary adverse impact for the resident access east of the Walmsley Road bridge.

6.2.2 Effects on pedestrians

Assessment

Pedestrian access to Black Bridge Reserve will remain (albeit except within the construction site area). As detailed in Section 3.2.3 above, the number of pedestrians adjacent to the Project is very low. The temporary bailey bridge will provide a continuous footpath and therefore, other than a small detour of an additional 70 m to the controlled crossing facilities at the McKenzie Road/ Coronation Road /Miller Road intersection, it is considered that this will have a negligible impact on pedestrians.

Mitigation

It is recommended that the CTMP includes provision of TTM direction signing on Walmsley Road either side of the construction works for pedestrians and cyclists to the bailey bridge.

Where construction traffic needs to enter the site and needs to cross a footpath, the CTMP will include measures to ensure the safety of pedestrians including warning signs, provision of traffic marshals at the site entrances and construction driver education programmes implemented, particularly in relation to access and egress of sites adjacent to footpaths.

6.2.3 Effects on cyclists

The cycle lanes on Coronation Road will be retained on Coronation Road and cyclists can wheel their cycle on the bailey bridge with a small detour of an additional 70 m to the McKenzie Road/Miller Road/Coronation Road intersection. As detailed in Section 3.2.3 above, the number of cyclists adjacent to the Project is very low. Overall, it is considered that there will be a negligible impact on cyclists.

6.2.4 Effects on existing bus services 309 and 309X

Assessment

Discussions have been held with AT Metro and it is agreed that suitable diversion routes for these bus services are available. Discussions are ongoing with AT Metro to confirm the final details of the temporary diversion routes (and any associated temporary terminus and layover facilities including any need for temporary Traffic Resolutions) for the 309 and 309x (noting the 309X service ceases in October 2025).

The diversion routes are likely to result in additional journey times for buses and given that some of these routes will also be used as diversion routes for Walmsley Road traffic, then bus journey times and reliability could be adversely affected.

At this stage it can be expected that the diversion will increase bus journey times, and it is considered that this will result in a temporary significant adverse impact.

This would also mean that the existing three pairs of bus stops on Walmsley Road would be temporarily closed, with passengers likely having to use the bus stops on Favona Road east of Robertson Road or on Miller Road. This could increase the walk distance for existing users of the Walmsley Road bus stops by up to 600 m (up to 8 minutes). This is considered to be a temporary adverse impact.

Mitigation

Given the potential impact on bus routes 309 and 309X it is recommended that the CTMP includes the following measures:

- Identify the final diversion routes and associated temporary infrastructure (and any supporting Traffic Resolutions), communications (including multilingual posters and social media to advise of route changes) and any other mechanisms to help maintain bus service reliability (such as supporting financial contributions towards additional operational costs (including extra kilometres, driver's hours and potentially extra bus(es).
- Coordinate timing of the Walmsley Road closure and reopening with AT Metro timing of notification of the 309 and 309X bus schedule changes.
- Fortnightly meetings with AT Metro prior to and during the Walmsley Road closure to coordinate changes of the bus services.
- Communications with residents and other users of the temporarily closed 3 pairs of bus stops (on Walmsley Road east of the bridge, Hall Avenue and Dornall Avenue) to inform them of the bus stop closures and available alternative bus stops.
- Direction signing at each of the three pairs of bus stops on Walmsley Road to the nearest alternative bus stop.

Mitigation involving financial support is expected to reduce the effects assessment of a temporary significant adverse impact to a temporary adverse impact, since this financial support and working closely with AT and the bus operators should assist in maintaining bus service reliability.

6.2.5 Effects on school buses routed on Walmsley Road

Assessment

Discussions have been held with AT Metro and it is agreed that suitable diversion routes for the six existing AT contracted school bus routes using Walmsley Road are available. Discussions are ongoing with AT to confirm the final details of the temporary diversion routes for these school bus services, the timing when these changes are made (for example it may be better to make these changes at the start of a school term rather than at a time later on in the term), any associated temporary infrastructure, communications and financial support for any increase in operational costs.

The diversion routes are likely to result in additional journey times for buses and given that some of these routes will also be used as diversion routes for Walmsley Road traffic, then school bus journey times and reliability could be adversely affected.

At this stage it can be expected that the diversion will increase school bus journey times, and it is considered that this will result in a temporary significant adverse impact.

Mitigation

Given the potential impact on school bus routes and any pick/drop offs on Walmsley Road between Coronation Road and Hall Avenue it is recommended that the CTMP includes the following measures:

- For school buses contracted by AT, identify the final diversion routes, associated temporary infrastructure (and any supporting Traffic Resolutions), communications to schools and

parents/guardians of the children (to advise for example route changes and any pick up and drop off changes) to advise of route changes, any other mechanisms to help maintain school bus service reliability (such as supporting financial contributions towards additional operational costs and the exact timing of implementation of the changes.

- Coordinate timing of the Walmsley Road closure and re-opening with school term time start and end dates and subsequent AT Metro timing of notification of the school bus schedule changes.
- Fortnightly meetings with AT Metro prior to and during the Walmsley Road closure to coordinate changes of the school bus services.
- For school buses not contracted by AT (eg existing MoE contracted buses operating on Bader Drive on the detour route and any private school buses), consultations will be carried out with the schools and wider project communications to make the schools aware of the road closure.

Mitigation involving financial support is expected to reduce the effects assessment of a temporary significant adverse impact to a temporary adverse impact, since this financial support and working closely with AT and the school bus operators should assist in maintaining school bus service reliability.

6.2.6 Effects on on-street parking

The majority of Walmsley Road (apart from a 30m section) where the closure will take place currently has No Stopping At All Times (NSAAT's) in place. It is considered that there will be a negligible impact on on-street parking.

6.2.7 Effects on Over Dimension (OD) / High Productivity Motor Vehicle (HPMV) detour routes

6.2.7.1 Assessment

As detailed in Table 3.1 above, Walmsley Road is on the AT OD and HPMV detour routes. Following discussions with the AT OD team on 12 September 2024, AT confirmed that alternative suitable OD and HPMV routes are available, and that AT would need to be informed of the closure details and AT would then carry out necessary business consultations to inform them of the alternative routes. Overall, this is considered to be a negligible impact.

6.2.7.2 Mitigation

It is recommended that the CTMP includes the following measure:

- Liaise with AT OD team with details of start and end of the road closure, so that AT can carry out necessary business consultations and communications.

6.2.8 Effects on Emergency Services

Assessment

The Walmsley Road temporary closure could impact on FENZ, NZ Police and St Johns services where Walmsley Road is used to attend emergencies. The nearest fire station is south on Bader Drive (south of the SH20A intersection), the nearest ambulance station is further south at Kirkbride Road and Middlemore Hospital is further east off Masey Road. Therefore, although not directly on the route to/from these bases, the temporary increased traffic on the diversion routes, along with the closure of Walmsley Road could increase journey times for the emergency services and could delay the response time for emergency services. At this stage it is considered that this will result in a temporary adverse impact.

Mitigation

It is recommended that the CTMP includes the following measure:

- Liaison with FENZ, NZ Police and St Johns with details of the start and end of the road closure, so that the emergency services are informed of diversionary routes.
- Work with AT to identify suitable measures required with temporary closure of the Walmsley Road Lifeline route.

However, the mitigation is not expected to reduce the effects assessment of a temporary adverse impact.

6.2.9 Effects on traffic capacity

The Sidra assessments reported in Section 3 above have been repeated with the temporary closure of Walmsley Road predicted flows indicated in Sections 6.3 to 6.6 below, and are summarised in Table 6.1 and Table 6.2 for the Miller Road/McKenzie Road/Coronation Road and the Coronation Road/SH20 on and off ramps intersections respectively.

Table 6.1: Miller Road/McKenzie Road/Coronation Road intersection movement summary

		McKenzie Road		Coronation Road		Miller Road	
		Left	Straight	Straight	Right	Left	Right
AM	Delay	5.8	20.8	7.7	22.6	10.4	29.4
	Queue	3.9	33.7	17.8	2.5	3.3	34.3
	LOS	A	C	A	C	B	C
PM	Delay	5.5	18.9	8.2	28.5	12.3	25.5
	Queue	3.1	42.8	14	3.8	3.6	32.7
	LOS	A	B	A	C	B	C

Table 6.2: Coronation Road/SH20 on and off ramps intersection movement summary

		Coronation Road (South)			SH20 ramps			Coronation Road (North)		
		Left	Right	U turn	Left	Right	U turn	Left	Right	U turn
AM	Delay	3.9	8.4	11.8	7.8	13.4	16.2	5.2	9.4	12.7
	Queue	6.3	6.3	6.3	3.8	3.8	3.8	4.2	4.2	4.2
	LOS	A	A	B	A	B	B	A	A	B
PM	Delay	3.7	8.3	11.6	8.4	13.9	16.8	8.6	12.8	16.1
	Queue	20.6	20.6	20.6	1.3	1.3	1.3	9.8	9.8	9.8
	LOS	A	A	B	A	B	B	A	B	B

Note:

- Delay = Average delay (seconds).
- Queue = 95% queue length (m).
- LOS = Level of service.

The results indicate that, with the Walmsley Road closure, both intersections will work well within capacity with minimal queues and delays.

Overall, this is considered to be a negligible impact.

Mitigation

- Work with ATOC to review and optimise traffic signal timings at the Miller Road/McKenzie Road/Coronation Road traffic signal intersection.

Summary of transport effects on Walmsley Road

Based on the assessments carried out in sections 6.2.1 to 6.2.9 above, the proposal is considered to have a:

- Temporary significant adverse impact on buses and school buses. Mitigation is expected to reduce the effects assessment to a temporary adverse impact.
- Temporary adverse impact on #2 and #4 Walmsley Road residents. Mitigation is not expected to reduce the traffic effects assessment.
- Temporary adverse impact for access for Walmsley Road residents east of the bridge and for emergency vehicle access.
- Negligible impact on traffic capacity, pedestrians, cyclists, on street parking and OD and HPMV detour routes.

6.3 Walmsley Road to/from Miller Road and McKenzie Road diversion traffic flows

6.3.1 Estimated diversion flow heavy vehicles

Appendix B indicates the following heavy vehicle flows between Walmsley Road and McKenzie Road, which would be diverted onto the route highlighted in orange on Figure 3.14.

- Robertson Road, Bader Drive two way increase = AM peak 82 and PM peak 73.

Appendix B indicates the following heavy vehicle flows between Walmsley Road and Miller Road, which would be diverted onto the route, also highlighted in orange on Figure 3.14.

- SH20A northbound (Kirkbride Road to Bader Drive) and SH20 southbound (between Walmsley Road and SH20A Kirkbride Road) two way increase = AM peak 8 and PM peak 10.

6.3.2 Estimated diversion flow light vehicles

Appendix B indicates the following light vehicle flows between Walmsley Road and McKenzie Road and Miller Road which would be diverted onto the route highlighted in green on Figure 3.14.

- Bader Drive (north of Elmdon Street), Elmdon Street, Hall Avenue two way increase = AM peak 672 and PM peak 680.

6.4 SH20 off ramp at Coronation Road to Walmsley Road diversion traffic flows

6.4.1 Estimated diversion flow heavy vehicles

Using the count data in Appendix B it is estimated that 32% of the traffic turning left from Coronation Road to Walmsley Road has come from the SH20A off ramp in the AM peak and 12% in the PM peak. This would be diverted onto the route highlighted in blue on Figure 3.14.

- Robertson Road, Bader Drive two way increase = AM peak 12 and PM peak 1.

6.4.2 Estimated diversion flow light vehicles

Using the count data in Appendix B it is estimated that 32% of the traffic turning left from Coronation Road to Walmsley Road has come from the SH20A off ramp in the AM peak and 12% in the PM peak. This would be diverted onto the route highlighted in yellow on Figure 3.14.

- Bader Drive, Elmdon Street, Hall two way increase = AM peak 120 and PM peak 21.

6.5 Walmsley Road to SH20 northbound on ramp and to/from Māngere Bridge Centre

6.5.1 Estimated diversion flow

Appendix B indicates the following vehicle flows turning right between Walmsley Road and Coronation Road, which would be diverted onto the route highlighted in red on Figure 3.14.

- Mahunga Drive/Rimu Road one way increase = AM peak 256 and PM peak 274.

Using the count data in Appendix B it is estimated that 68% of the traffic turning left from Coronation Road to Walmsley Road has come from the Coronation Road/ Māngere Bridge Centre area in the AM peak and 88% in the PM peak. This would be diverted onto the route highlighted in red on Figure 3.14.

- Mahunga Drive/Rimu Road one way increase = AM peak 280 and PM peak 159.

6.6 Impact of diversion flows

6.6.1 Total diversion flows

Based on the diversion flows indicated in sections 6.3 to 6.5, Table 6.3 below summarises the temporary peak period increase in traffic compared to existing flows.

Table 6.3: Traffic flows along diversion routes

Location	Existing peak flow (veh/hr)	Temporary diversion peak flow (veh/hr)	% increase with temporary diverted traffic
Bader Drive (south of Elmdon Street)	1,234 (0815) to 1,522 (1615)	102 (AM), 87 (PM)	8% (AM) 6% (PM)
Robertson Road	1,768 (1645)	102 (AM), 87 (PM)	5% (PM)
Mahunga Drive	1,935 (AM), 1,578 (PM)	536 (AM), 681 (PM)	28% (AM) 43% (PM)
Rimu Road	1,414 (PM)	536 (AM), 688 (PM))	49% (PM)
SH20A on ramp at Kirkbride SH20A off ramp at Bader Drive	318 to 551	8 (AM), 10 (PM)	2% to3%
Bader Drive (north of Elmdon Street)	979 (AM),	894 (AM), 793 (PM)	91% (AM)
Elmdon Street and Hall Avenue	442 (PM)	792(AM), 706 (PM)	160% (PM)

6.6.2 Bader Drive (south of Elmdon Street), Robertson Road, SH20A on ramp at Kirkbride Road and SH20A off ramp Bader Drive

6.6.2.1 Assessment

On Bader Drive (south of Elmdon Street), Robertson Road, SH20A on ramp at Kirkbride Road and SH20A off ramp at Bader Drive, the temporary increase in traffic on these routes is considered to be very low and well within the range of typical day to day fluctuations in traffic flow of 5% to 10% that regularly occur on the road network. These roads are already performing a movement function. The negligible increase in traffic movements therefore should not result in a noticeable increase in congestion or unreasonable delays for road users on Bader Drive (south of Elmdon Street), Robertson Road, SH20A on ramp at Kirkbride Road, SH20A off ramp Bader Drive.

In terms of road safety, AT have queried "*that there are a lot of pedestrian generators on both Bader Dr and Robertson Rd* and *that a crash involving a heavy vehicle would likely result in injury".* Based on the crash data reported in section 3.3.4 above, in the period 2019 - 2024 on the Bader Drive and Robertson Road route (from Mckenzie Road to Walmsley Road) there have been no crashes which have involved both a truck and a pedestrian. There currently isn't a crash issue between trucks and pedestrians on these two Arterial Roads and it is considered that this situation would not change with the marginal increase in traffic flows on these routes.
Therefore, the low temporary increase in traffic is not considered to have a significant impact on the safety risk in terms of increased exposure and likelihood on these routes and it should be noted that it is considered that this would be offset by the significant temporary reduction in road safety risk on Walmsley Road (and the roads currently used by drivers to access Walmsley Road) with the road closure in place.
There is not expected to be any impacts on pedestrians, cyclists, bus and school buses and it is not expected to have any impact on access to properties.

As such the impact of the diverted traffic is considered to be negligible.

6.6.2.2 Mitigation

It is recommended that the CTMP includes the following measures:

- Clear signing of the diversion routes including use of VMS signs where appropriate.
- Work with ATOC to optimise existing traffic signal timings with the changes in traffic flows on Bader Drive and Robertson Road.

6.6.3 Mahunga Drive and Rimu Road

6.6.3.1 Pre Mitigation Assessment

Traffic capacity
Overall, the temporary increase in traffic on these routes is considered to be large. Although the diverted movement via Mahunga Drive/Rimu Road to SH20 northbound on ramp and Māngere Bridge Centre is unlikely to involve any additional journey distance, it can be expected with the increased amount of diverted traffic using this route that journey times are likely to increase, in particular in the peak periods for existing and diverted traffic using Mahunga Drive and Rimu Road. Mahunga Drive and Rimu Road are classified as Collectors and therefore are intended to perform a movement function for through traffic. During the AM peak there is currently limited congestion on these routes but in the PM peak the temporary increase in traffic could increase the existing levels of congestion experienced on these roads. This could also impact on existing bus and school bus journey times and reliability on Rimu Road.
Discussions are ongoing with the Auckland System Management Team in terms of any potential impacts on capacity of the surrounding State Highway network and in particular to ensure queue lengths on the SH20 off ramp at Rimu Road do not block back to the mainline SH20 with the Walmsley Road closure

Sidra modelling
Background
SIDRA Intersection v9 (SIDRA) was used to assess the capacity of the Walmsley Road/Mahunga Drive and the Rimu Road/SH20 on and off ramps intersections for the AM peak (08:00 – 09:00) and PM peak (17:00-18:00) periods. The assessments have been carried out for the following scenarios:

a) Existing intersection layout and estimated existing traffic flows.
b) As scenario a) with the Walmsley Road closure diversion flows.

c) Subject to the findings from scenario b), with temporary mitigation measures.

Walmsley Road/Mahunga Drive
A summary of the results is presented in Table 6.4 and Table 6.5 below for the Walmsley Road/Mahunga Drive for the AM and PM peaks respectively.

Table 6.4: AM Peak intersection movement summary

Scenario		Dornell Road			Walmsley Road (East)			Mahunga Drive			Walmsley Rd (West)		
		Left	Straight	Right	Left	Straight	Right	Left	Straight	Right	Left	Straight	Right
Scenario a) Existing	Delay	78.7	76.7	78.9	130.2	125.5	32.1	40.1	56.8	58.4	5.6	38.9	69.4
	Queue	105.5	105.5	105.5	816.2	816.2	5.6	197.1	45.4	45.4	3.5	102.9	20.7
	LOS	E	E	E	F	F	C	D	E	E	A	D	E
Scenario b) Closure	Delay	78.7	76.7	78.9	23.9	19.2	37.6	485.9	56.8	58.4	8.5	34.4	69.2
	Queue	105.5	105.5	105.5	206.4	206.4	92.6	1402.5	45.4	45.4	7.2	37	20.7
	LOS	E	E	E	C	B	C	F	E	E	A	C	F

Table 6.5: PM Peak intersection movement summary

Scenario		Dornell Road			Walmsley Road (East)			Mahunga Drive			Walmsley Road (West)		
		Left	Straight	Right	Left	Straight	Right	Left	Straight	Right	Left	Straight	Right
Scenario a) Existing	Delay	54	52	54.2	170.7	166	36	74.8	56.7	58.3	5.3	61.1	457.2
	Queue	40.1	40.1	40.1	910.2	910.2	19	337.7	39.1	39.1	1.2	202.3	134.6
	LOS	D	D	D	F	F	D	E	E	E	A	E	F
Scenario b) Closure	Delay	54	52	54.2	27.3	22.7	42.7	74.8	56.7	58.3	8.4	36.9	257
	Queue	40.1	40.1	40.1	207.3	207.3	126.7	337.7	39.1	39.1	3.2	60.6	91
	LOS	D	D	D	C	C	D	E	E	E	A	D	F

Note:

- Delay = Average delay (seconds)
- Queue = 95% queue length (m)
- LOS = Level of service

The Sidra model is based on the SCATS signal data provided by ATOC and indicates in both peak periods that there are existing peak period capacity issues with LOS greater than D experienced on all approaches. For the AM peak this doesn't match site observations and in the PM peak, other than for both of the Walmsley Road approaches, this doesn't match site observations. This could reflect the use of the SCATS data rather than allowing Sidra to optimise the timings.

Comparing the results of scenario b (with the Walmsley Road closure) with scenario a (existing) in Table 6.1 and Table 6.2 above, indicates that on the whole the capacity of the intersection is largely unchanged in both peak periods. It is noted that there is an improvement in the AM peak on

Walmsley Road (east) but an increase in queues and delays on Mahunga Drive. This could be a reflection of the use of the existing SCATS traffic signal data to allow a relative comparison between the two scenarios. With the proposed mitigation of optimisation of traffic signal timings, then it is considered any additional queues and delays arising from the closure of Walmsley Road could be minimised.

Rimu Road/SH20 on and off ramps

A summary of the results is presented in Table 6.6 and Table 6.7 below for the Rimu Road/SH20 on and off ramps intersections for the AM and PM peaks respectively:

Table 6.6: AM Peak intersection movement summary

Scenario		Rimu Rd/SH20 on ramp				Rimu Rd/Mahunga Dr/SH20 off ramp			
		Rimu Rd (east)		Rimu Rd (west)		Mahunga	SH20 off ramp		Rimu Rd
		Straight	Right	Left	Straight	Straight	Left	Right	Straight
Scenario A Existing	Delay	3.2	4.9	4.5	1637	11.3	12.7	23.3	341.5
	Queue	0	0	0	868.8	54.4	19	10.1	70
	LOS	A	A	A	F	B	B	C	F
Scenario B Closure	Delay	3.2	4.9	4.5	1764.3	8.4	19.6	25.8	12.5
	Queue	0	0	0	1246.9	53.5	27.4	9.8	24.8
	LOS	A	A	A	F	A	B	C	B
Scenario C Closure + TTM	Delay	0.4	631.8	4.5	644.1	11.2	51.7	74.9	10.3
	Queue	16.8	70	0	1132.8	647	101.9	145.9	70
	LOS	A	F	A	F	B	D	E	A

Table 6.7: PM Peak intersection movement summary

Scenario		Rimu Rd/SH20 on ramp				Rimu Rd/Mahunga Dr/SH20 off ramp			
		Rimu Rd (east)		Rimu Rd (west)		Mahunga	SH20 off ramp		Rimu Rd
		Straight	Right	Left	Straight	Straight	Left	Right	Straight
Scenario a Existing	Delay	3.2	4.9	4.5	721	14.8	11.6	25.5	1882.1
	Queue	0	0	0	564	47.2	34.4	6.3	70
	LOS	A	A	A	F	B	B	C	F
Scenario b Closure	Delay	3.2	4.9	4.5	1247.4	6.2	25.5	25	19.4
	Queue	0	0	0	1178	30.8	58.5	4.5	46.4
	LOS	A	A	A	F	A	C	C	B
Scenario c Closure + TTM	Delay	0.2	439.7	4.5	468.2	5.4	58.5	77	31.8
	Queue	4.5	70	0	822	446.2	188.4	67	70
	LOS	A	F	A	F	A	E	E	C

Note:

- Delay = Average delay (seconds).
- Queue = 95% queue length (m).
- LOS = Level of service.

The Sidra model is for both intersections as a linked network model and for the off ramp is based on the SCATS signal data provided by ATOC. The Sidra results indicate the following:

- AM peak - minimal queues on all approaches, which matches site observations except on Rimu Road west ahead approach at the SH20 on ramp where a long queue is predicted but was not observed. The model is therefore assumed to be a worst case scenario.
- PM peak - minimal queues on all approaches except on Rimu Road west ahead at the SH20 on ramp where a long queue is predicted. This partly reflects observed PM peak conditions where queues on the on ramp are predicted to be circa 34m or approximately 6 vehicle lengths (where queues of 10 to 15 vehicles were observed). It should be noted that this queue length is well within the circa 330 m off ramp length before it meets the SH20 mainline and hence queueing does not currently block back to the SH20 main line. The Sidra model though is considered to under predict queue lengths on Mahunga Drive and the right turn into the on ramp at the peak of the PM peak period. It is considered that this is essentially due to the model not including SH20 mainline PM peak queues and blocking back/slow moving queue (for a 15 to 20 minute period) on the on ramp.

Comparing the results of scenario b (with the Walmsley Road closure) with scenario a (existing) in Table 6.6 and Table 6.7 above, indicates that, on the whole, the capacity of the intersection is largely unchanged in both peak periods. The queue length in the PM peak on the SH20 off ramp is predicted to increase from 34 m to 59 m and this is well within the length of the off ramp before it meets the SH20 mainline. The model though does predict an increase in both peak periods on the Rimu Road west ahead queue length.

Road Safety

As detailed in Section 3.3.4 above, the SH20 on ramp (not the intersection) is a location with a high collective accident risk rating and its intersection with Rimu Road is a location with a large number of crashes. The remainder of this diversion route does not have an existing high overall safety risk.

In terms of road safety, AT have queried "*High Operating speed at 48-52 km/h and an increase of 28%/43% traffic would increase the risk along this route. There are church and Marae on Mahunga Dr that need to be managed".* Based on the crash data reported in section 3.3.4 above, in the period 2019-2024 on Mahunga Drive there have been no crashes at either the Church or Marae access. In theory, the temporary increase in traffic could have a significant impact on the safety risk in terms of increased exposure and likelihood on these routes. However, it is considered this could be offset by the significant temporary reduction in road safety risk on Walmsley Road (and the roads currently used by drivers to access Walmsley Road) with the road closure in place.

As noted in Section 3 above, discussions with the AT Road Safety team on 11 October 2024 indicated that there are no planned AT safety improvement works on any of the proposed signed diversion routes.

Overall pre-**mitigation assessment summary**

Overall, the increase in traffic on these two roads is considered to be a temporary signi**fi**cant adverse impact.

6.6.3.2 Mitigation

Given the large temporary increase in traffic on Mahunga Drive and Rimu Road, it is recommended that the CTMP includes the following measures.

- Introduce TTM traffic calming measures (eg warning signs) on Rimu Road and Mahunga Drive to advise drivers to reduce vehicle speeds.
- Given the existing crashes that currently occur on the bend at Mahunga Drive/Rimu Road east of the SH20 off ramp intersection, introduce TTM safe hit poles on the centre line to increase

conspicuity of the bend. A suggested layout is shown in Appendix E TTM drawing No T2024/038/002.

- Given the crashes that currently occur at the Rimu Road/SH20 on ramp intersection, introduce TTM traffic signal control. A suggested layout is shown in Appendix E TTM drawing No T2024/038/002.
- Work with ATOC and ASM to review and optimise traffic signal timings at the the Rimu Road/ SH20 on and off ramp traffic signal intersection (including the TTM signal proposal) including monitoring of queues on the SH20 off ramp.
- Work with ATOC to review and optimise traffic signal timings at the Walmsley Road/Mahunga Drive and Rimu Road traffic signal intersection.
- Work with ATOC to optimise existing traffic signal timings at the Rimu Road/SH20 off ramp and Mahunga Road/Walmsley Road/Donnell Road Intersections with the changes in traffic flows.
- Clear signing of the diversion routes including use of VMS signs where appropriate.

Based on discussions with AT, the proposed safe hit poles and temporary traffic signal control measures will be approved via Traffic Resolutions.

Mitigation Assessment

Safety

Based on the NZTA high risk intersections Guide [11] the proposed provision of temporary traffic signals at this existing unusual intersection arrangement with an existing large number of crashes involving vehicles not giving way on Rimu Road, could reduce the number of crashes by up to 30%. Furthermore, the NZTA Crash Compendium[12] indicates that median treatments on urban mid blocks can result in a crash reduction factor of 15% to 45% and hence the proposed temporary safe hits could reduce the existing high number of cross over crashes on the bend south east of the SH20 off ramp intersection.

It is therefore considered that the provision of the temporary traffic signals and the safe hit sticks could address existing crash problems at these locations and therefore could offset the increased exposure and likelihood crash risk on these routes with the additional diversion traffic. As indicated above, it is also considered that any increased exposure and likelihood could be offset by the significant temporary reduction in road safety risk on Walmsley Road (and the roads currently used by drivers to access Walmsley Road) with the road closure in place. As such the road safety mitigation proposed is expected to reduce the effects assessment of a temporary significant adverse impact to a temporary adverse impact.

Capacity assessment

For the proposed TTM signalisation of the Rimu Road/SH20 on ramp, comparing the results of scenario c (with the Walmsley Road closure and the TTM proposed signalisation) with scenario a (existing) in Table 6.6 and Table 6.7 above, indicates the following in both of the peak periods:

- An increase in queue length on the Rimu Road east right turn to the SH20 on ramp of up to 70m which would be within the right turn lane storage length of 80m.
- A redution in the queue length on the Rimu Road west ahead at the SH20 on ramp.
- An increase in queue length on the SH20 off ramp of up to to 188m (which is within the off ramp length of 330m and thefore will not block back to the SH20 mainline).
- An increase in queue length on the Mahunga Drive approach of up to 647m.

[11] https://www.nzta.govt.nz/assets/resources/high-risk-intersections-guide/docs/high-risk-intersections-guide.pdf

[12] Crash estimation compendium: New Zealand crash risk factors guidelines, second edition – July 2024

It is noted that the Sidra modelling is based on SCAT existing signal timings and hence signal optimisation is anticpated to improve the capacity results. Notwithstanding this, when compared to the capacity assessment without the TTM proposal (scenario b), Sidra predicts that the TTM proposal does not work as efficiently. However, the safety benefits of the TTM proposal are considered to outweigh any potential capacity disbenefits with this proposal and, as such, the TTM traffic signal proposal is recommended for implementation.

Overall Assessment

Given the large increase in traffic flows, congestion and resultant travel times the effects assessment is expected to remain as a temporary significant adverse impact.

However, it should be noted that:

- This is a temporary impact only.
- The calculated diverted traffic flow is a maximum, worst case traffic flow since it has been assumed that all of the surveyed existing traffic will use the diversion route. In reality, depending on the end destination and trip purpose, drivers may re-route to a wider alternative route choice.

6.6.4 Bader Drive (north of Elmdon Street), Elmdon Street and Hall Avenue

6.6.4.1 Pre mitigation Assessment

Traffic Capacity

Overall, the temporary increase in traffic on these routes is considered to be very large. The diversion would involve a detour of up to approximately 1.5 km. At an average speed of 30 km/h this is anticipated to add 3 minutes to the vehicle journey time. It can be expected though with the increased amount of diverted traffic using this route, that journey times are likely to increase, in particular in the peak periods, for existing and diverted traffic using Bader Drive (north of Elmdon Street), Elmdon Street and Hall Avenue.

In terms of this increase in traffic it is noted:

- Bader Drive (north of Elmdon Street) is classified as an Arterial and therefore performs a movement function for through traffic. There is congestion in the AM peak at the Elmdon Street intersection and in the PM peak at the McKenzie Road intersection. The level of temporary increase in traffic could increase this congestion and could impact on residents access to adjacent residential properties as well as access to Māngere College. This could also impact on existing bus and school bus journey times and reliability. The temporary diverted traffic will also increase traffic flows passing Māngere College and hence traffic could increase where there is high pedestrian activity and the need to safely accommodate pedestrians and vehicles adjacent to the school.
- Elmdon Street and Hall Avenue are classified as Collectors and therefore are intended to perform a movement function for through traffic. During the AM peak there is currently a small amount of congestion at the Bader Drive intersection and slow moving traffic in the PM peak. Existing on street parking (for example around the bend at Hall Avenue/Elmdon Street) could be a contributory factor to the slow movement of traffic in the peak period. The temporary increase in traffic could increase the existing levels of congestion experienced on these roads and could impact on residents access to adjacent properties. This could also impact on existing school bus journey times and reliability.

Sidra modelling

Background

SIDRA Intersection v9 (SIDRA) was used to assess the capacity of the Walmsley Road/Hall Avenue, the Elmdon Street/Bader Drive and the Bader Drive/McKenzie Road intersections for the AM peak (08:00 - 09:00) and PM peak (17:00 - 18:00) periods. The assessments have been carried out for the following scenarios:

a) Existing intersection layout and estimated existing traffic flows
b) As scenario a) with the Walmsley Road closure diversion flows.
c) Subject to the findings from scenario b), with temporary mitigation measures.

Hall Avenue/Walmsley Road

A summary of the results is presented in Table 6.8 and Table 6.9 below for the Walmsley Road/Hall Avenue intersection for the AM and PM peaks respectively:

Table 6.8: AM Peak intersection movement summary

Scenario		Hall Ave		Walmsley Road East		Walmsley Road West	
		Left	Right	Left	Straight	Straight	Right
Scenario a) Existing	Delay	19.5	36	4.7	0.1	0.3	10.8
	Queue	29.8	29.8	0	0	3.1	3.1
	LOS	C	E	A	A	A	A
Scenario b) Closure	Delay	N/A	4.6	4.6	N/A	N/A	N/A
	Queue	N/A	0	0	N/A	N/A	N/A
	LOS	N/A	A	A	N/A	N/A	N/A

Table 6.9: PM Peak intersection movement summary

		Hall Ave		Walmsley Road East		Walmsley Road West	
		Left	Right	Left	Straight	Straight	Right
Scenario a) Existing	Delay	15	31.1	4.6	0	0.2	9
	Queue	25.9	25.9	0	0	2.9	2.9
	LOS	C	D	A	A	A	A
Scenario b) Closure	Delay	N/A	4.6	4.6	N/A	N/A	N/A
	Queue	N/A	0	0	N/A	N/A	N/A
	LOS	N/A	A	A	N/A	N/A	N/A

Note:

- Delay = Average delay (seconds)
- Queue = 95% queue length (m)
- LOS = Level of service

The Sidra results for the existing situation (scenario a) indicate small queues and delays in both peaks which reflects on site observations. Comparing the results of scenario b (with the Walmsley Road closure) with scenario a (existing) indicates no capacity issues with the closure of Walmsley Road.

Elmdon Street/Bader Drive

A summary of the results is presented in Table 6.10 and Table 6.11 below for the Elmdon Street/Bader Drive intersection for the AM and PM peaks respectively:

Table 6.10: AM Peak intersection movement summary

Scenario		Bader Drive (South)		Elmdon Street		Bader Drive (North)	
		Straight	Right	Left	Right	Left	Straight
Scenario a) Existing	Delay	3.6	7.3	6.1	12.9	4.7	0.1
	Queue	0	2	7.5	7.5	0	0
	LOS	A	A	A	B	A	A
Scenario b) Closure	Delay	3.6	27.3.	1470.4	1479.8	4.8	0.2
	Queue	0	8.1	2451	2451	0	0
	LOS	A	D	F	F	A	A
Scenario c Closure + RAB	Delay	16.4	18.9	12.4	13.9	5.6	4.7
	Queue	100.2	100.2	59.2	59.2	58	58
	LOS	B	B	B	B	A	A
Scenario c Closure + signals	Delay	18.6	78.7	55.8	55.7	39.4	34.8
	Queue	170.3	31.3	283	283	367.1	367.1
	LOS	B	E	E	E	D	C

Table 6.11: PM Peak intersection movement summary

Scenario		Bader Drive (South)		Elmdon Street		Bader Drive (North)	
		Straight	Right	Left	Right	Left	Straight
Scenario a) Existing	Delay	3.6	7.9	6.4	12.5	4.7	0.1
	Queue	0	4.5	7	7	0	0
	LOS	A	A	A	B	A	A
Scenario b) Closure	Delay	7.4	32.9	987.9	998.2	4.8	0.2
	Queue	45.3	18.1	1838.7	1838.7	0	0
	LOS	A	D	F	F	A	A
Scenario c) Closure + RAB	Delay	12.4	14.8	13.7	15.3	6.4	5.5
	Queue	80	80	63.5	63.5	65.5	65.5
	LOS	B	B	B	B	A	A
Scenario c) Closure + signals	Delay	14.7	72.9	60.1	60.1	44.8	40.2
	Queue	125.7	58.3	269.8	269.8	374.6	374.6
	LOS	B	E	E	E	D	D

Note:

- Delay = Average delay (seconds)
- Queue = 95% queue length (m)
- LOS = Level of service

The Sidra results for the existing situation (scenario a) indicate limited queues and delays in both peaks which reflects on site observations. Comparing the results of scenario b (with the Walmsley

Road closure) with scenario a (existing) indicates that significant queues will form on Elmdon Street without any mitigation.

Bader Drive/McKenzie Road

A summary of the results is presented in Table 6.12 and Table 6.13 below for the McKenzie Road/Bader Drive intersection for the AM and PM peaks respectively:

Table 6.12: AM Peak intersection movement summary

Scenario		McKenzie Road (South)		Bader Drive		McKenzie Road (North)	
		Straight	Right	Left	Right	Left	Straight
Scenario a) Existing	Delay	3.7	9.1	6.2	14.6	4.7	0
	Queue	0	0.8	1.1	19.5	4.7	0
	LOS	A	A	A	B	A	A
Scenario b) Closure	Delay	3.7	10.1	5	10.5	5.7	0
	Queue	0	10.1	8.2	24.1	18.2	0
	LOS	A	B	A	B	A	A

Table 6.13: PM Peak intersection movement summary

Scenario		McKenzie Road (South)		Bader Drive		McKenzie Road (North)	
		Straight	Right	Left	Right	Left	Straight
Scenario a) Existing	Delay	3.7	8.1	5.9	11.6	4.7	0
	Queue	0	0.6	0.6	13.6	5.2	0
	LOS	A	A	A	B	A	A
Scenario b) Closure	Delay	3.7	9.4	4.9	8.1	5.8	0
	Queue	0	11.4	6.3	17	14.6	0
	LOS	A	A	A	A	A	A

Note:

- Delay = Average delay (seconds)
- Queue = 95% queue length (m)
- LOS = Level of service

The Sidra results for the existing situation (scenario a) indicate limited queues and delays in both peaks which reflects on site observations. Comparing the results of scenario b (with the Walmsley Road closure) with scenario a (existing) indicates that queues and delays will not significantly increase.

Road Safety

This diversion route does not have an existing high overall safety risk. In theory, the temporary increase in traffic could have a significant impact on the safety risk in terms of increased exposure and likelihood on these routes. However, it is considered this could be offset by the significant temporary reduction in road safety risk on Walmsley Road (and the roads currently used by drivers to access Walmsley Road) with the road closure in place.

Overall pre-**mitigation assessment summary**
Overall, the increase in traffic on Bader Drive (north of Elmdon Street), Elmdon Street and Hall Avenue is considered to be a temporary signi**fi**cant adverse impact.

6.6.4.2 Mitigation

Given the very large temporary increase in traffic on Bader Drive (north of Elmdon Street), Elmdon Street and Hall Avenue, it is recommended that a CTMP includes the following measures:

- Working with AT introduce temporary 30 km/h speed limit on Bader Drive (north of Elmdon Street), Elmdon Street and Hall Avenue to reduce vehicle speeds and hence injury severity in the event of an accident. Note the temporary speed limit would be introduced in accordance with Section 7 of the Land Transport Rule: Setting of Speed Limits 2024. Signs would be placed approximately every 200 m.
- Introduce TTM traffic calming measures in the form of bolt down rubber speed cushions (in accordance with ATCOP Drawing No. TC006) on Bader Drive, Elmdon Street and Hall Avenue to reduce vehicle speeds, especially on the approaches to and adjacent to Māngere College as indicated in Appendix E TTM drawing No T2024/038/001. The cushions would be located at approximately 60m intervals taking into account locations of side roads, car park accesses, bus stops, intersections and the Bader Drive raised zebra crossing. PW39 signs would be provided on the approach to each cushion. Daily checks will be carried out to ensure the speed cushions have not been dislodged and remedial action taken if they have.
- Introduction of TTM measures to change the priorities of the Walmsley Road/Hall Avenue intersection with Walmsley Road west (residents access) being changed to give way with supporting No Stopping At All Times (NSAAT) parking restrictions on Hall Avenue. A suggested layout is shown in Appendix E TTM drawing No T2024/038/006.
- Introduction of TTM improvements at the Bader Drive/Elmdon Street priority intersection with Option 1 traffic signals (a suggested layout is shown in Appendix E TTM drawing No T2024/038/003) or Option 2 temporary bolt down roundabout (a suggested layout is shown in Appendix E TTM drawing No T2024/038/004). With Option 2 daily checks would be carried out to ensure the roundabout has not been dislodged and remedial action taken if it has.
- Introduction of TTM No Stopping At All Times (NSATT's) on the Elmdon Street/ Hall Avenue bend and its approaches to improve forward visibility for approaching vehicles and to reduce any scope for delays. A suggested layout is shown in Appendix E TTM drawing No T2024/038/005.
- Clear signing of the diversion routes in particular in respect of routes for light vehicles and heavy vehicles through use of VMS signs.

Based on discussions with AT, the proposed temporary traffic calming, change of priorities, parking controls and intersection control measures will be approved via Traffic Resolutions.

Mitigation assessment
Road Safety
There is substantial NZ and international research that demonstrates that reduced speed limits reduce the number of injury crashes and, in particular, fatal and serious injury crashes. For example, AT Research [13] indicates that "*where safe and appropriate speed limits have been implemented injuries and deaths have reduced. Data from the first phase of speed limit changes in June 2020, showed a 30 percent reduction in deaths and a 21 percent reduction in serious injuries".*

[13] https://at.govt.nz/projects-initiatives/region-wide-auckland-projects-and-initiatives/vision-zero-for-the-greater-good/safe-speeds-programme/safe-speeds-the-reasons#:~:text=The%20evidence%20is%20clear%2C%20safe,percent%20reduction%20in%20serious%20injuries.

The NZTA Crash Compendium[14] also indicates that traffic calming can result in a 20% crash reduction and parking restrictions can also result in a 20% crash reduction.
Therefore, it is considered that the provision of these TTM measures will reduce the likelihood of additional crashes with the additional diverted traffic and reduce the overall severity of crashes.
It is therefore considered that the provision of a temporary 30 km/h speed limit, traffic calming and parking restrictions could offset the increased exposure and likelihood crash risk on these routes with the additional diversion traffic. As indicated above it is also considered that any increased exposure and likelihood could be offset by the significant temporary reduction in road safety risk on Walmsley Road (and the roads currently used by drivers to access Walmsley Road) with the road closure in place. As such the road safety mitigation proposed is expected to reduce the effects assessment of a temporary significant adverse impact to a temporary adverse impact.

Sidra Capacity Assessments

Elmdon Street/Bader Drive

For the proposed Option 1 TTM signalisation of the Elmdon Street/Bader Drive intersection comparing the results of scenario c (closure + signals) with scenario a (existing) in Table 6.10 and Table 6.11 above, indicates that in both of the peak periods queues and delays will be longer with this option compared to the existing situation. However, when compared to without TTM mitigation (scenario b), queues and delays on Elmdon Street are significantly reduced.
For the proposed Option 2 TTM roundabout at the Elmdon Street/Bader Drive intersection, comparing the results of scenario c (closure + RAB) with scenario a (existing) in Table 6.12 and Table 6.13 above, indicates that in both of the peak periods queues and delays will be longer with this option compared to the existing situation. However, when compared to without TTM mitigation (scenario b), queues and delays on Elmdon Street are significantly reduced. The roundabout though will perform with a LoS of B which is considered an acceptable level of capacity performance. Furthermore, when compared to the TTM traffic signals option, the roundabout perfoms with significantly lower queues and delays.
Therefore, the TTM roundabout proposal is recommended for implementation, although the traffic signals remains an option to consider.

Overall Assessment

Although the above mitigation is expected to reduce the safety risk of additional traffic on these routes, given the large increase in traffic flows, congestion and resultant travel times and possible impact on access to adjacent residences and Māngere College, the effects assessment is expected to remain as a temporary significant adverse impact.
However, it should be noted that:

- This is a temporary impact only.
- The calculated diverted traffic flow is a maximum, worst case traffic flow since it has been assumed that all of the surveyed existing traffic will use the diversion route. In reality, depending on the end destination and trip purpose, drivers may reroute to a wider alternative route choice.

[14] Crash estimation compendium: New Zealand crash risk factors guidelines, second edition – July 2024

6.7 Monitoring

A number of monitoring actions will be undertaken within the CTMP including fortnightly reporting (to be carried out by a Suitably Qualified Experienced Practitioner (SQEP) in Transport Engineering) including:

- Directional classified tube traffic counters will be installed both before the Walmsley Road closure and during the 7 month closure period at the locations shown in Figure 6.1. In addition to these being located on the proposed signed diversion routes, additional locations have been included as identified in discussions with AT. Based on these traffic counters, reporting to AT will be undertaken comparing the results from the traffic counters with both the ITA predicted peak period flow changes and with the pre closure traffic flows. Depending on the findings from this review, in consultation with AT, additional TTM mitigation measures will be identified and agreed with AT to address any issues arising.
- On Hall Avenue and Elmdon Street, changes in heavy vehicle flows will be monitored. Should heavy vehicle flows be significantly higher than pre closure, then periodic site surveys will be carried out to identify the heavy vehicle operators on this route and additional TTM mitigation measures will be identified and agreed with AT to address any issues arising. These measures could include a review and improvement to VMS displays and /or undertaking targeted communications with specific heavy vehicle operators observed using this route.
- Review of the CAS database will be undertaken on the signed diversion routes. Should this highlight any significant safety issues associated with increased traffic flows from the Walmsley Road closure, then additional TTM mitigation measures will be identified and agreed with AT.
- With AT and ASM, use ATOC supplied data to monitor queues on the SH20 off ramp at Rimu Road. Where required, work with ATOC and ASM to optimise traffic signal timings at the Rimu Road/ SH20 on and off ramp traffic signal intersections (including the TTM traffic signal proposal).
- Available AT Metro data on bus journey times and reliability for the re-routed 309 and 309X bus services will be reviewed. Depending on the findings from this review, in consultation with AT, additional TTM mitigation measures will be identified and agreed with AT to address any issues arising.
- Available AT Metro data on school bus journey times and reliability for the six re-routed school bus services will be reviewed. Depending on the findings from this review, in consultation with AT, additional TTM mitigation measures will be identified and agreed with AT to address any issues arising.
- Available AT Metro data on bus and school bus journey times and reliability on the signed diversion routes will be reviewed. Depending on the findings from this review, in consultation with AT, additional TTM mitigation measures will be identified and agreed with AT to address any issues arising.

In addition, as part of wider monthly community engagement reporting, the Project Engagement Lead (PEL) will ensure ongoing communications with residents, schools, churches and businesses is undertaken to rapidly address any traffic issues should they arise. Additional TTM mitigation measures arising from these consultations will be identified and agreed with AT.

Figure 6.1: Proposed location of temporary traffic counters denoted by black triangle

6.8 Impact on road pavement condition on proposed signed diversion routes

At this stage it is not possible to assess where there will be any impact from increased traffic on the pavement condition of roads on the signed diversion routes.

It is proposed that the CTMP includes measures to carry out a Pavement Condition Assessment (PCA) on the diversion routes. The PCA will be carried out by a Suitably Qualified Experienced Practitioner (SQEP) in Transport Engineering. The PCA will provide an assessment of the road surface condition of the signed diversion routes prior to and post construction. This will allow for an evaluation of any changes to the condition of the road pavements.

The signed diversion roads to be surveyed are:

- Bader Drive between McKenzie Road and Robertson Road.
- Robertson Road between Bader Drive and Walmsley Road.
- Hall Avene and Elmdon Street between Walmsley Road and Bader Drive.
- Mahunga Drive and Rimu Road between Walmsley Road and Coronation Road.

A pre-construction PCA will be carried out by a visual inspection of the road surface and the findings will be presented in a pre-construction PCA report which will identify any pre-existing road surface condition issues. Upon completion of the construction works, a post construction PCA will be carried out by a visual inspection of the road surface. A comparison of the road surface conditions pre-and post-construction will be carried out and reported in a post construction PCA report. This will also identify any repair works and a timescale for implementation that are considered to be directly attributable to the diverted traffic (as opposed to general wear and tear).

6.9 Summary of transport effects

Based on the assessments carried out above, the Project is considered to have a:

- Temporary significant adverse impact on the proposed signed diversion route using Mahunga Drive and Rimu Road. Mitigation is not expected to reduce the traffic effects assessment but can help to address increased safety risks. It should be noted that this is a temporary impact only and the calculated diverted traffic flow is a maximum, worst case traffic flow since it has been assumed that all of the surveyed existing traffic will use the diversion route. In reality, depending on the end destination and trip purpose, drivers may reroute to a wider alternative route choice.
- Temporary significant adverse impact on the proposed signed diversion route using Bader Drive (north of Elmdon Street), Elmdon Street and Hall Avenue. Mitigation is not expected to reduce the traffic effects assessment but can help to address increased safety risks. It should be noted that this is a temporary impact only and the calculated diverted traffic flow is a maximum, worst case traffic flow since it has been assumed that all of the existing surveyed traffic will use the diversion route. In reality, depending on the end destination and trip purpose, drivers may reroute to a wider alternative route choice.
- Temporary significant adverse impact on buses and school buses on Walmsley Road. Mitigation is expected to reduce the effects assessment to a temporary adverse impact.
- Temporary adverse impact on #2 and #4 Walmsley Road residents. Mitigation is not expected to reduce the traffic effects assessment.
- Temporary adverse impact for access for Walmsley Road residents east of the bridge and for emergency vehicle access. Mitigation is not expected to reduce the traffic effects assessment.
- Negligible impact on traffic capacity, pedestrians, cyclists, on street parking and OD and HPMV detour routes on Walmsley Road.
- Negligible impact on the proposed signed diversion route using Bader Drive (south of Elmdon Street), Robertson Road, SH20A on ramp at Kirkbride Road and SH20A off ramp Bader Drive.

7 Proposed Walmsley Road Bridge Upgrade - Assessment of Effects

7.1 Proposal

The proposed cross section of the replacement bridge is shown in Figure 23 of the Construction Methodology included in the AEE and is shown in Figure 7.1 below.

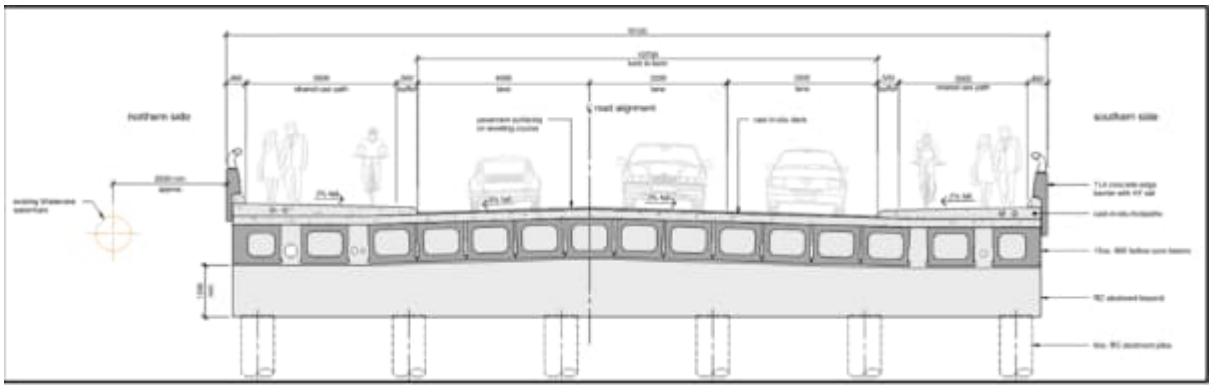

Figure 7.1: Typical cross section of the new bridge showing piles, abutment caps, beams, deck pour, footpath pour, concrete barriers and road surfacing.

The replacement bridge provides:

- 0.46 m concrete edge barrier on both sides.
- 3.5 m shared footpath on north side.
- 3.0 m shared footpath on south side.
- 0.5 m buffer on both sides
- One 4 m wide traffic lane eastbound.
- Two traffic lanes westbound (3.2 m and 3.5 m).

The works will be designed and installed in accordance with Auckland Transport and NZTA Bridge Manual requirements.

7.2 Assessment

Active Modes

Compared to the existing Walmsley Road bridge this is a substantial improvement for active modes with much wider path widths for pedestrians and also introduces a new cycle facility on Walmsley Road. This will also be compatible with the proposed AT Māngere West Cycling Improvements as shown in Figure 3.13 above.

Bus and general traffic

Compared to the existing Walmsley Road bridge this is a substantial improvement for bus and general traffic with two westbound lanes which will improve the capacity of Walmsley Road and improve the operation of the existing Walmsley Road/Coronation Road/McKenzie Road /Miller Road intersection.

Overall assessment

Overall, the upgraded Walmsley Road bridge is considered to have a **significant positive impact**.

8 Conclusions

Based on the assessments detailed in sections 6 and 7 above, the Project is considered to have a:

- Temporary significant adverse impact on the proposed signed diversion route using Mahunga Drive and Rimu Road. Mitigation is not expected to reduce the traffic effects assessment but can help to address increased safety risks. It should be noted that this is a temporary impact only and the calculated diverted traffic flow is a maximum, worst case traffic flow since it has been assumed that all of the surveyed existing traffic will use the diversion route. In reality, depending on the end destination and trip purpose, drivers may reroute to a wider alternative route choice.
- Temporary significant adverse impact on the proposed signed diversion route using Bader Drive (north of Elmdon Street), Elmdon Street and Hall Avenue. Mitigation is not expected to reduce the traffic effects assessment but can help to address increased safety risks. It should be noted that this is a temporary impact only and the calculated diverted traffic flow is a maximum, worst case traffic flow since it has been assumed that all of the existing surveyed traffic will use the diversion route. In reality, depending on the end destination and trip purpose, drivers may reroute to a wider alternative route choice.
- Temporary significant adverse impact on buses and school buses on Walmsley Road and mitigation is expected to reduce the effects assessment to a temporary adverse impact.
- Temporary adverse impact on #2 and #4 Walmsley Road residents. Mitigation is not expected to reduce the traffic effects assessment.
- Temporary adverse impact for access for Walmsley Road residents east of the bridge and for emergency vehicle access. Mitigation is not expected to reduce the traffic effects assessment.
- Negligible impact on traffic capacity, pedestrians, cyclists, on street parking and OD and HPMV detour routes on Walmsley Road.
- Negligible impact on the proposed signed diversion route using Bader Drive (south of Elmdon Street), Robertson Road, SH20A on ramp at Kirkbride Road and SH20A off ramp Bader Drive.

Post Construction, the upgraded Walmsley Road bridge is considered to have a **significant positive** impact.

Overall, it is considered that some potential significant adverse effects are identified but some of these can be managed and mitigated either by standard approval processes/ practices or proposed conditions to be acceptable over the approximately 7 month Walmsley Road closure period. A number of mitigation measures to address safety, bus routing and traffic capacity effects have been identified to include within the CTMP and are summarised in Section 9.

9 Recommendations - Construction Traffic Management Plan (CTMP)

9.1 Background and objectives

It is recommended that a condition is imposed on any resource consent for a CTMP to be submitted for certification prior to any works commencing. The objectives of the CTMP are to:

a Ensure construction traffic movements on the transport network are appropriately managed.

b Provide for the safety of everyone at all times.

c Minimise disruption and maintain pedestrian and vehicle access to/from surrounding residential properties.

d Minimise disruption from construction traffic on the travelling public and road users along the identified sections of the construction routes.

e Seek to avoid full road closures and minimise any partial or managed closures.

f Manage integration with other construction projects and Auckland Transport projects.

A draft CTMP will be submitted with the Resource Consent submission.

9.2 CTMP measures

Specific issues that the CTMP will need to address includes:

9.2.1 Construction traffic routing

Access to the site will be from:

- Left in from Coronation Road and left out to McKenzie Road.
- Walmsley Road east of the bridge.
- Construction accesses will be designed in accordance with relevant AT design standards (including sight lines, accessway widths and gradients).

9.2.2 Construction site operation

- A 1.8 m high security fence will be erected around the perimeter of the site to delineate the construction area to prevent public access.
- TTM and clear warning signs of the construction site access and egress.
- Appropriate wheel wash facilities to be set up at the exit points.
- Site Traffic Management Supervisor will safely manage the movements of construction traffic to and from the road network to ensure the safety of all road users is maintained and that construction vehicles can negotiate access and egress to avoid any additional queueing on in the peak periods on Coronation Road and Walmsley Road.
- Site Traffic Management Supervisor will co-ordinate (for example via radio control) trucks accessing the site to ensure that construction vehicles arriving and departing the site can do safely.
- The CTMP will implement a construction driver education programme given the close proximity to residential properties and pedestrians.
- Movements of specialised machinery or large components (e.g., cranes) will not occur on a day to day basis. Separate to the Resource Consent application, bespoke SSTMPs and CARs will be developed once exact details of the machinery and vehicles required is known, as they have successfully been carried out for other Healthy Water projects. Agreement with Auckland Transport will be required and over-dimension rules and associated permitting processes will need to be complied with.
- Contractor to provide appropriate staff and visitor parking within the site.

9.2.3 Walmsley Road residents access

- Ongoing communications with residents will be essential to rapidly address any traffic issues should they arise.
- Where required, design and provide temporary accessways and vehicle crossings to residential properties to ensure residents have 24 hour access to their homes.
- Clear signing of the diversion routes.
- FENZ, NZ Police and St Johns, as well as Council refuse collection will be informed of changes to access to Walmsley Road properties.

9.2.4 Communications

- Communication campaigns should be undertaken in relation to traffic management activities throughout construction activities (including letter drops to affected residents/schools/churches/businesses, flier drops, project signage, web based resources, etc).
- Appropriate temporary traffic management measures should be incorporated by AT to advise other road users of the construction traffic.
- Liaison with FENZ, NZ Police and St Johns with details of the start and end of the road closure, so that the emergency services are informed of diversionary routes.

9.2.5 Existing McKenzie Road/Miller Road/Coronation Road intersection

- Work with ATOC to review and optimise traffic signal timings at the Miller Road/McKenzie Road/Coronation Road traffic signal intersection.
- Right turn lane McKenzie Road to Walmsley Road temporarily closed.
- Coronation Road left turn lane to be closed (except for construction traffic.
- Miller Road lane configuration unchanged except ahead lane markings to be temporarily removed.
- Work with AT to identify suitable measures required with temporary closure of the Walmsley Road Lifeline route.

9.2.6 Walmsley Road pedestrians and cyclists

- TTM direction signing on Walmsley Road either side of the construction works for pedestrians and cyclists to the Bailey Bridge.
- Where construction traffic needs to enter the site and needs to cross a footpath, the CTMP will include measures to ensure the safety of pedestrians including warning signs, provision of traffic marshals at the site entrances and construction driver education programmes implemented, particularly in relation to access and egress of sites adjacent to footpaths.

9.2.7 Walmsley Road bus services

- Identify the final diversion routes and associated temporary infrastructure (and any supporting Traffic Resolutions), communications (including multilingual posters and social media to advise of route changes) and any other mechanisms to help maintain bus service reliability (such as supporting financial contributions towards additional operational costs (including extra kilometres, driver's hours and potentially extra bus(es)).
- Coordinate timing of the Walmsley Road closure and reopening with AT Metro timing of notification of the 309 and 309X bus schedule changes.

- Fortnightly meetings with AT Metro prior to and during the Walmsley Road closure to coordinate changes of the bus services.
- Communications with residents and other users of the temporarily closed 3 pairs of bus stops (on Walmsley Road east of the bridge, Hall Avenue and Dornall Avenue) to inform them of the bus stop closures and available alternative bus stops.
- Direction signing at each of the three pairs of bus stops on Walmsley Road to the nearest alternative bus stop.

9.2.8 Walmsley Road school buses

- For school buses contracted by AT, identify the final diversion routes, associated temporary infrastructure (and any supporting Traffic Resolutions), communications to schools and parents/guardians of the children (to advise for example route changes and any pick up and drop off changes) to advise of route changes, any other mechanisms to help maintain school bus service reliability (such as supporting financial contributions towards additional operational costs and the exact timing of implementation of the changes.
- Coordinate timing of the Walmsley Road closure and re-opening with school term time start and end dates and subsequent AT Metro timing of notification of the school bus schedule changes.
- Fortnightly meetings with AT Metro prior to and during the Walmsley Road closure to coordinate changes of the school bus services.
- For school buses not contracted by AT (eg existing MoE contracted buses operating on Bader Drive on the detour route and any private school buses), consultations will be carried out with the schools and wider project communications to make the schools aware of the road closure.

9.2.9 AT OD route

- Liaise with AT OD team with details of start and end of the road closure so that AT can carry out necessary business consultations and communications.

9.2.10 Common on all diversion routes

9.2.11 Specific measures for Bader Drive (south of Elmdon Street) and Robertson Road

- Clear signing of the diversion routes including use of VMS signs where appropriate.
- Work with ATOC to optimise existing traffic signal timings with the changes in traffic flows on Bader Drive and Robertson Road.

9.2.12 Specific measures for Mahunga Drive and Rimu Road

- Introduce TTM traffic calming measures (eg warning signs)) on Rimu Road and Mahunga Drive to advise drivers to reduce vehicle speeds.
- Given the existing crashes that currently occur on the bend at Mahunga Drive/Rimu Road east of the SH20 off ramp intersection, introduce TTM safe hit poles on the centre line to increase conspicuity of the bend. A suggested layout is shown in Appendix E TTM drawing No T2024/038/002.
- Given the crashes that currently occur at the Rimu Road/SH20 on ramp intersection, introduce TTM traffic signal control. A suggested layout is shown in Appendix E TTM drawing No T2024/038/002.

- Work with ATOC and ASM to review and optimise traffic signal timings at the the Rimu Road/ SH20 on and off ramp traffic signal intersection (including the TTM signal proposal) including monitoring of queues on the SH20 off ramp.
- Work with ATOC to review and optimise traffic signal timings at the Walmsley Road/Mahunga Drive and Rimu Road traffic signal intersection.
- Work with ATOC to optimise existing traffic signal timings at the Rimu Road/SH20 off ramp and Mahunga Road/Walmsley Road/Donnell Road Intersections with the changes in traffic flows.
- Clear signing of the diversion routes including use of VMS signs where appropriate.

9.2.13 Specific measures for Bader Drive (north of Elmdon Street) Elmdon Street and Hall Avenue

- Working with AT introduce temporary 30 km/h speed limit on Bader Drive (north of Elmdon Street), Elmdon Street and Hall Avenue to reduce vehicle speeds and hence injury severity in the event of an accident. Note the temporary speed limit would be introduced in accordance with Section 7 of the Land Transport Rule: Setting of Speed Limits 2024. Signs would be placed approximately very 200 m.
- Introduce TTM traffic calming measures in the form of bolt down rubber speed cushions (in accordance with ATCOP Drawing No. TC006) on Bader Drive, Elmdon Street and Hall Avenue to reduce vehicle speeds, especially on the approaches to and adjacent to Māngere College as indicated in Appendix E TTM drawing No T2024/038/001. The cushions would be located at approximately 60 m intervals taking into account locations of side roads, car park accesses, bus stops, intersections and the Bader Drive raised zebra crossing. PW39 signs would be provided on the approach to each cushion. Daily checks will be carried out to ensure the speed cushions have not been dislodged and remedial action taken if they have.
- Introduction of TTM measures to change the priorities of the Walmsley Road/Hall Avenue intersection with Walmsley Road west (residents access) being changed to give way with supporting No Stopping At All Times (NSAAT) parking restrictions on Hall Avenue. A suggested layout is shown in Appendix E TTM drawing No T2024/038/006.
- Introduction of TTM improvements at the Bader Drive/Elmdon Street priority intersection with Option 1 traffic signals (a suggested layout is shown in Appendix E TTM drawing No T2024/038/003) or Option 2 temporary bolt down roundabout (a suggested layout is shown in Appendix E TTM drawing No T2024/038/004). With Option 2 daily checks would be carried out to ensure the roundabout has not been dislodged and remedial action taken if it has.
- Introduction of TTM No Stopping At All Times (NSATT's) on the Elmdon Street/ Hall Avenue bend and its approaches to improve forward visibility for approaching vehicles and to reduce any scope for delays. A suggested layout is shown in Appendix E TTM drawing No T2024/038/005.
- Clear signing of the diversion routes in particular in respect of routes for light vehicles and heavy vehicles through use of VMS signs.

9.2.14 Monitoring

A number of monitoring actions will be undertaken within the CTMP including fortnightly reporting (to be carried out by a Suitably Qualified Experienced Practitioner (SQEP) in Transport Engineering) including:

- Directional classified tube traffic counters will be installed both before the Walmsley Road closure and during the 7 month closure period at the locations shown in Figure 9.1. In addition to these being located on the proposed signed diversion routes, additional locations

have been included as identified in discussions with AT. Based on these traffic counters, reporting to AT will be undertaken comparing the results from the traffic counters with both the ITA predicted peak period flow changes and with the pre closure traffic flows. Depending on the findings from this review, in consultation with AT, additional TTM mitigation measures will be identified and agreed with AT to address any issues arising.

- On Hall Avenue and Elmdon Street, changes in heavy vehicle flows will be monitored. Should heavy vehicle flows be significantly higher than pre closure, then periodic site surveys will be carried out to identify the heavy vehicle operators on this route and additional TTM mitigation measures will be identified and agreed with AT to address any issues arising. These measures could include a review and improvement to VMS displays and /or undertaking targeted communications with specific heavy vehicle operators observed using this route.
- Review of the CAS database will be undertaken on the signed diversion routes. Should this highlight any significant safety issues associated with increased traffic flows from the Walmsley Road closure, then additional TTM mitigation measures will be identified and agreed with AT.
- With AT and ASM, use ATOC supplied data to monitor queues on the SH20 off ramp at Rimu Road. Where required, work with ATOC and ASM to optimise traffic signal timings at the Rimu Road/ SH20 on and off ramp traffic signal intersections (including the TTM traffic signal proposal).
- Available AT Metro data on bus journey times and reliability for the re-routed 309 and 309X bus services will be reviewed. Depending on the findings from this review, in consultation with AT, additional TTM mitigation measures will be identified and agreed with AT to address any issues arising.
- Available AT Metro data on school bus journey times and reliability for the six re-routed school bus services will be reviewed. Depending on the findings from this review, in consultation with AT, additional TTM mitigation measures will be identified and agreed with AT to address any issues arising.
- Available AT Metro data on bus and school bus journey times and reliability on the signed diversion routes will be reviewed. Depending on the findings from this review, in consultation with AT, additional TTM mitigation measures will be identified and agreed with AT to address any issues arising.

In addition as part of wider monthly community engagement reporting, the Project Engagement Lead (PEL) will ensure ongoing communications with residents, schools, churches and businesses is undertaken to rapidly address any traffic issues should they arise. Additional TTM mitigation measures arising from these consultations will be identified and agreed with AT.

9.2.15 Pavement Condition Assessment (PCA)

Construction truck movements Coronation Road, McKenzie Road and Walmsley Road

Construction truck movements are anticipated to access the site from either Coronation Road, McKenzie Road or Walmsley Road and, as demonstrated above, this is considered to be a negligible temporary increase in traffic. As such, it is considered that there will be a negligible impact on the pavement condition of these roads especially given they are arterial roads carrying high traffic volumes which also currently consist of up to 16% heavy vehicles.

Although this is considered to be a negligible impact on the road pavement condition, it is proposed that the CTMP includes measures to carry out a Pavement Condition Assessment (PCA). The PCA will be carried out by a Suitably Qualified Experienced Practitioner (SQEP) in Transport Engineering. The PCA will provide an assessment of the road surface condition, prior to and post construction on:

- Coronation Road (between Miller Road/McKenzie Road intersection and the Coronation Road/SH20 on and off ramp intersection).

- McKenzie Road (between Kirkbride Road and Miller Road).
- Walmsley Road (between the site and Walmsley Road/SH20 on and off ramp intersection).

This will allow for an evaluation of any changes to the condition of the road pavement.
A pre-construction PCA will be carried out by a visual inspection of the road surface and the findings will be presented in a Pre-construction PCA report which will identify any pre-existing road surface condition issues. Upon completion of the construction works, a post construction PCA will be carried out by a visual inspection of the road surface. A comparison of the road surface conditions pre-and post-construction will be carried out and reported in a post construction PCA report. This will also identify any remedial works and a timescale for implementation that are directly attributable to the construction traffic (as opposed to general wear and tear). In order to determine what is directly attributable to the construction traffic will require pre and post construction classified tube traffic counts on the sections of these roads and a comparison with records from the contractor of the daily number of trucks accessing the Project. This then allows calculation of the proportion of the Project construction trucks compared to existing total and heavy vehicle traffic flows and hence the contribution to any required remedial measures.

Diversion Routes

At this stage it is not possible to assess where there will be any impact from increased traffic on the pavement condition of roads on the signed diversion routes.
It is proposed that the CTMP includes measures to carry out a Pavement Condition Assessment (PCA) on the diversion routes. The PCA will be carried out by a Suitably Qualified Experienced Practitioner (SQEP) in Transport Engineering. The PCA will provide an assessment of the road surface condition of the signed diversion routes prior to and post construction. This will allow for an evaluation of any changes to the condition of the road pavements.
The signed diversion roads to be surveyed are:

- Bader Drive between McKenzie Road and Robertson Road.
- Robertson Road between Bader Drive and Walmsley Road.
- Hall Avene and Elmdon Street between Walmsley Road and Bader Drive.
- Mahunga Drive and Rimu Road between Walmsley Road and Coronation Road.

A pre-construction PCA will be carried out by a visual inspection of the road surface and the findings will be presented in a pre-construction PCA report which will identify any pre-existing road surface condition issues. Upon completion of the construction works, a post construction PCA will be carried out by a visual inspection of the road surface. A comparison of the road surface conditions pre-and post-construction will be carried out and reported in a post construction PCA report. This will also identify any repair works and a timescale for implementation that are considered to be directly attributable to the diverted traffic (as opposed to general wear and tear).

10 Applicability

This report has been prepared for the exclusive use of our client Healthy Waters, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.
We understand and agree that our client will submit this report as part of an application for resource consent and that Auckland Council will use this report for the purpose of assessing that application

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:

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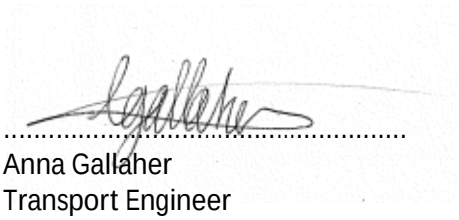
Colin Shields
Senior Principal Transport Engineer



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Authorised for Tonkin & Taylor Ltd by:

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Chris Bauld
Project Director

COSH
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Appendix A AT and Auckland Council consultees

During the preparation of this ITA consultations have been undertaken with Michael Kwok at Auckland Council and various AT SME's including:

Hedre Dednam (Development Planning)
Matt Ford (Development Planning)
Paul Schischki (PTM consultants)
Greig McDonnell (AFC)
Andrew Mein (AFC)
Patrick Chan (Road safety)
Clay Allen (ASM)
Steve Wrenn (PT)
Warren Nagel (PT)
Isha Sibal (Works Coordinator)
Laurence Jones (CAR)
Priya Augustine (ATOC)
Fransiska Amos (Traffic Engineering)
Mohammed Alsakini (Design Review)
Kyle Ho (ATOC)
Deepan Kumar (OD)
Nitin Mukkoth Valappil (Data Acquisition)
Veraina Tanielu (Data)
Sajjad Hassanpour (Data)
Terry Sugrue (Traffic Resolutions)
Liam Amundsen(Traffic Resolutions)

Appendix B Traffic Count Data

	AM				AM Total	PM				PM Total	IP				IP Total
	Cars	Trucks	Buses	Cyclists		Cars	Trucks	Buses	Cyclists		Cars	Trucks	Buses	Cyclists	
Coronation Road (North)	**512**	**7**	**4**	**2**	**525**	**346**	**6**	**4**	**2**	**358**	**339**	**11**	**4**	**0**	**354**
Left into Mangere Bridge On Ramp	110	3	0	0	113	43	0	0	0	43	51	3	0	0	54
Thru to Coronation Road (South)	401	4	4	2	411	302	6	4	2	314	287	8	4	0	299
U-turn	1	0	0	0	1	1	0	0	0	1	1	0	0	0	1
Mangere Bridge Off Ramp (East)	**261**	**38**	**0**	**0**	**299**	**77**	**9**	**0**	**0**	**86**	**309**	**49**	**0**	**0**	**358**
U-turn	0	0	0	0	0	1	0	0	0	1	2	0	0	0	2
Left into Coronation Road (South)	168	34	0	0	202	37	8	0	0	45	170	45	0	0	215
Right into Coronation Road (North)	93	4	0	0	97	39	1	0	0	40	137	4	0	0	141
Coronation Road (South)	**720**	**48**	**5**	**0**	**773**	**1241**	**36**	**6**	**1**	**1284**	**630**	**39**	**11**	**1**	**681**
U-turn	19	3	0	0	22	12	0	0	0	12	28	6	1	0	35
Thru to Coronation Road (North)	217	7	4	0	228	351	6	4	1	362	231	7	4	1	243
Right into Mangere Bridge On Ramp (East	484	38	1	0	523	878	30	2	0	910	371	26	6	0	403
Grand Total	**1493**	**93**	**9**	**2**	**1597**	**1664**	**51**	**10**	**3**	**1728**	**1278**	**99**	**15**	**1**	**1393**

	AM				AM Total	PM				PM Total	IP				IP Total
	Cars	Trucks	Buses	Cyclists		Cars	Trucks	Buses	Cyclists		Cars	Trucks	Buses	Cyclists	
Coronation Road (North)	**582**	**42**	**4**	**3**	**631**	**598**	**61**	**10**	**0**	**669**	**499**	**57**	**5**	**0**	**561**
Left into Walmsley Road (East)	375	37	0	0	412	378	55	5	0	438	303	52	1	0	356
Thru to McKenzie Road (South)	179	3	4	3	189	185	6	5	0	196	181	3	4	0	188
Right into Miller Road (West)	28	2	0	0	30	35	0	0	0	35	15	2	0	0	17
Walmsley Road (East)	**607**	**69**	**6**	**0**	**682**	**604**	**48**	**6**	**0**	**658**	**474**	**58**	**4**	**0**	**536**
Left into McKenzie Road (South)	251	44	1	0	296	215	37	3	0	255	163	37	1	0	201
Thru to Miller Road (West)	119	6	5	0	130	124	2	3	0	129	98	6	2	0	106
Right into Coronation Road (North	237	19	0	0	256	265	9	0	0	274	213	15	1	0	229
McKenzie Road (South)	**641**	**67**	**9**	**0**	**717**	**717**	**67**	**11**	**1**	**796**	**614**	**45**	**16**	**2**	**677**
Left into Miller Road (West)	97	1	3	0	101	57	0	4	0	61	67	1	4	0	72
Thru to Coronation Road (North)	423	28	6	0	457	504	31	7	1	543	413	16	10	2	441
Right into Walmsley Road (East)	121	38	0	0	159	156	36	0	0	192	134	28	2	0	164
Miller Road (West)	**362**	**6**	**5**	**0**	**373**	**333**	**11**	**11**	**0**	**355**	**166**	**12**	**5**	**0**	**183**
Left into Coronation Road (North)	66	3	0	0	69	57	2	0	0	59	32	5	0	0	37
Thru to Walmsley Road (East)	181	2	1	0	184	185	8	5	0	198	94	5	1	0	100
Right into McKenzie Road (South)	115	1	4	0	120	91	1	6	0	98	40	2	4	0	46
Grand Total	**2192**	**184**	**24**	**3**	**2403**	**2252**	**187**	**38**	**1**	**2478**	**1753**	**172**	**30**	**2**	**1957**

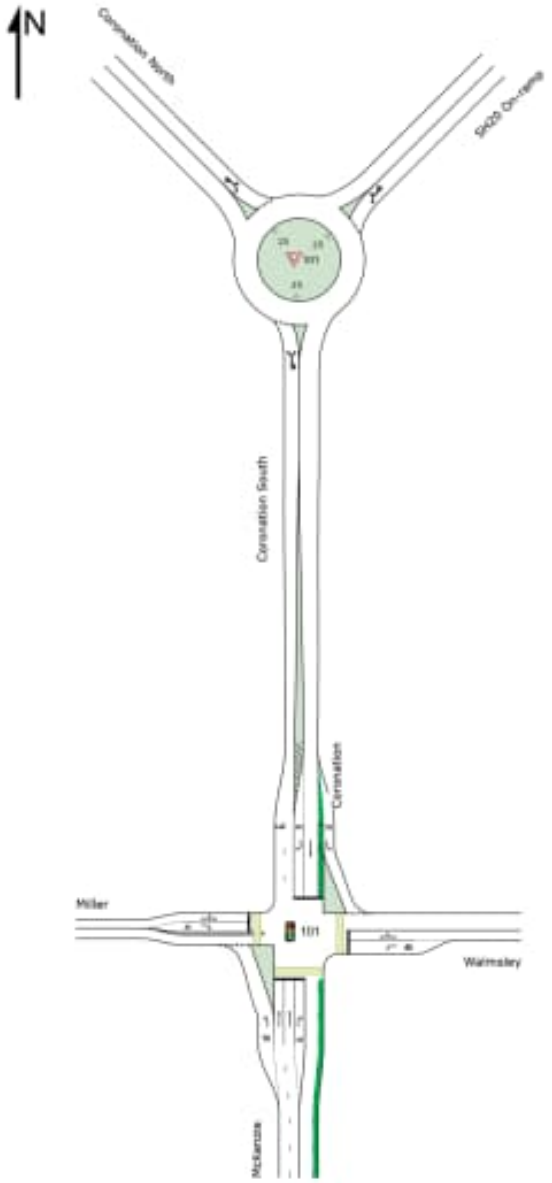
Appendix C Sidra - Existing situation

NETWORK LAYOUT

Network: N101 [Existing AM (Network Folder: Concept Staggered-T_Inc SH20 RAB)]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
101	NA	Existing XRd AM
101	NA	Existing RAB AM

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Sensitivity: General

MOVEMENT SUMMARY

Site: 101 [Existing XRd AM (Site Folder: Existing Layout)]

Network: N101 [Existing AM (Network Folder: Concept Staggered-T_Inc SH20 RAB)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: McKenzie														
1	L2	101	4.0	101	4.0	0.072	6.8	LOS A	0.8	5.5	0.23	0.57	0.23	44.7
2	T1	457	7.4	457	7.4	* 1.009	96.8	LOS F	16.5	123.2	0.98	1.11	1.38	9.0
3	R2	159	23.9	159	23.9	* 1.052	158.7	LOS F	11.3	95.4	1.00	1.24	1.88	12.5
Approach		717	10.6	717	10.6	1.052	97.8	LOS F	16.5	123.2	0.88	1.06	1.33	12.7
East: Walmsley														
4	L2	296	15.2	296	15.2	0.500	26.6	LOS C	7.5	59.5	0.62	0.73	0.62	33.2
5	T1	130	8.5	130	8.5	* 1.011	120.8	LOS F	25.9	193.1	1.00	1.22	1.58	17.9
6	R2	256	7.4	256	7.4	1.011	125.4	LOS F	25.9	193.1	1.00	1.22	1.58	10.9
Approach		682	11.0	682	11.0	1.011	81.7	LOS F	25.9	193.1	0.83	1.01	1.16	18.9
North: Coronation														
7	L2	412	9.0	412	9.0	0.363	15.7	LOS B	7.3	55.2	0.49	0.71	0.49	40.2
8	T1	189	3.7	189	3.7	0.516	58.0	LOS E	7.4	53.2	0.93	0.78	0.93	20.5
9	R2	30	6.7	30	6.7	0.111	64.6	LOS E	1.2	8.6	0.90	0.72	0.90	22.8
Approach		631	7.3	631	7.3	0.516	30.7	LOS C	7.4	55.2	0.64	0.73	0.64	31.7
West: Miller														
10	L2	69	4.3	69	4.3	1.028	137.6	LOS F	16.7	119.2	1.00	1.33	1.69	10.5
11	T1	184	1.6	184	1.6	* 1.028	132.9	LOS F	16.7	119.2	1.00	1.33	1.69	16.9
12	R2	120	4.2	120	4.2	0.418	66.3	LOS E	4.9	35.5	0.95	0.79	0.95	22.9
Approach		373	2.9	373	2.9	1.028	112.3	LOS F	16.7	119.2	0.98	1.15	1.45	17.1
All Vehicles		2403	8.7	2403	8.7	1.052	77.9	LOS E	25.9	193.1	0.82	0.97	1.12	18.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: McKenzie											
P1	Full	5	69.1	LOS F	0.0	0.0	0.96	0.96	236.0	216.9	0.92
East: Walmsley											
P2	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	234.0	214.3	0.92
West: Miller											
P4	Full	4	69.1	LOS F	0.0	0.0	0.96	0.96	232.0	211.7	0.91
All Pedestrians		10	69.1	LOS F	0.0	0.0	0.96	0.96	234.2	214.6	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Existing RAB AM (Site Folder: Existing Layout)]

Network: N101 [Existing AM (Network Folder: Concept Staggered-T_Inc SH20 RAB)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Coronation South														
1a	L1	228	4.8	226	4.8	0.542	4.0	LOS A	1.7	12.9	0.27	0.56	0.27	55.5
3a	R1	523	7.5	518	7.5	0.542	8.5	LOS A	1.7	12.9	0.27	0.56	0.27	51.6
3u	U	22	13.6	22	13.6	0.542	12.0	LOS B	1.7	12.9	0.27	0.56	0.27	41.0
Approach		773	6.9	766 N1	6.9	0.542	7.3	LOS A	1.7	12.9	0.27	0.56	0.27	53.2
NorthEast: SH20 On-ramp														
24a	L1	202	16.8	202	16.8	0.300	9.5	LOS A	0.8	6.2	0.64	0.74	0.64	60.9
26	R2	97	4.1	97	4.1	0.300	14.6	LOS B	0.8	6.2	0.64	0.74	0.64	61.0
26u	U	1	0.0	1	0.0	0.300	17.3	LOS B	0.8	6.2	0.64	0.74	0.64	63.5
Approach		300	12.7	300	12.7	0.300	11.2	LOS B	0.8	6.2	0.64	0.74	0.64	61.0
NorthWest: Coronation North														
27	L2	113	2.7	113	2.7	0.504	8.6	LOS A	2.3	16.2	0.87	0.71	0.87	53.6
29a	R1	411	1.9	411	1.9	0.504	12.7	LOS B	2.3	16.2	0.87	0.71	0.87	51.8
29u	U	1	0.0	1	0.0	0.504	16.0	LOS B	2.3	16.2	0.87	0.71	0.87	56.5
Approach		525	2.1	525	2.1	0.504	11.9	LOS B	2.3	16.2	0.87	0.71	0.87	52.3
All Vehicles		1598	6.4	1591 N1	6.4	0.542	9.5	LOS A	2.3	16.2	0.54	0.64	0.54	53.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Existing XRd PM (Site Folder: Existing Layout)]

Network: N101 [Existing PM (Network Folder: Concept Staggered-T_Inc SH20 RAB)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: McKenzie														
1	L2	61	6.6	61	6.6	0.043	6.4	LOS A	0.4	3.0	0.20	0.55	0.20	45.0
2	T1	543	7.0	543	7.0	*1.059	110.2	LOS F	20.3	150.8	0.99	1.19	1.46	8.0
3	R2	192	18.8	192	18.8	*1.078	175.5	LOS F	14.6	118.4	1.00	1.28	1.94	11.6
Approach		796	9.8	796	9.8	1.078	118.0	LOS F	20.3	150.8	0.93	1.16	1.48	10.5
East: Walmsley														
4	L2	255	15.7	255	15.7	0.410	26.6	LOS C	6.4	50.7	0.61	0.73	0.61	33.2
5	T1	129	3.9	129	3.9	*1.076	162.3	LOS F	30.9	222.4	1.00	1.36	1.81	14.5
6	R2	274	3.3	274	3.3	1.076	166.9	LOS F	30.9	222.4	1.00	1.36	1.81	8.5
Approach		658	8.2	658	8.2	1.076	111.7	LOS F	30.9	222.4	0.85	1.12	1.35	15.0
North: Coronation														
7	L2	438	13.7	438	13.7	0.415	17.9	LOS B	8.8	68.5	0.54	0.73	0.54	38.9
8	T1	196	5.6	196	5.6	0.517	56.5	LOS E	7.6	55.9	0.92	0.78	0.92	20.8
9	R2	35	0.0	35	0.0	0.106	60.6	LOS E	1.3	9.1	0.87	0.73	0.87	23.6
Approach		669	10.6	669	10.6	0.517	31.5	LOS C	8.8	68.5	0.67	0.74	0.67	31.4
West: Miller														
10	L2	59	3.4	59	3.4	1.077	169.0	LOS F	18.9	139.3	1.00	1.46	1.87	8.8
11	T1	198	6.6	198	6.6	*1.077	164.3	LOS F	18.9	139.3	1.00	1.46	1.87	14.5
12	R2	98	7.1	98	7.1	0.364	66.6	LOS E	4.0	29.6	0.94	0.78	0.94	22.8
Approach		355	6.2	355	6.2	1.077	138.1	LOS F	18.9	139.3	0.98	1.27	1.61	14.9
All Vehicles		2478	9.1	2478	9.1	1.078	95.8	LOS F	30.9	222.4	0.85	1.05	1.24	15.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: McKenzie											
P1	Full	5	69.1	LOS F	0.0	0.0	0.96	0.96	236.0	216.9	0.92
East: Walmsley											
P2	Full	1	69.1	LOS F	0.0	0.0	0.96	0.96	234.0	214.3	0.92
West: Miller											
P4	Full	4	69.1	LOS F	0.0	0.0	0.96	0.96	232.0	211.7	0.91
All Pedestrians		10	69.1	LOS F	0.0	0.0	0.96	0.96	234.2	214.6	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Existing RAB PM (Site Folder: Existing Layout)]

Network: N101 [Existing PM (Network Folder: Concept Staggered-T_Inc SH20 RAB)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Coronation South														
1a	L1	362	2.8	351	2.7	0.774	3.8	LOS A	4.8	34.6	0.29	0.52	0.29	55.5
3a	R1	910	3.5	882	3.5	0.774	8.3	LOS A	4.8	34.6	0.29	0.52	0.29	51.7
3u	U	12	0.0	12	0.0	0.774	11.6	LOS B	4.8	34.6	0.29	0.52	0.29	40.8
Approach		1284	3.3	1245 N1	3.2	0.774	7.1	LOS A	4.8	34.6	0.29	0.52	0.29	53.2
NorthEast: SH20 On-ramp														
24a	L1	45	17.8	45	17.8	0.078	8.6	LOS A	0.2	1.4	0.49	0.66	0.49	61.1
26	R2	40	2.5	40	2.5	0.078	13.7	LOS B	0.2	1.4	0.49	0.66	0.49	61.1
26u	U	1	0.0	1	0.0	0.078	16.4	LOS B	0.2	1.4	0.49	0.66	0.49	63.6
Approach		86	10.5	86	10.5	0.078	11.1	LOS B	0.2	1.4	0.49	0.66	0.49	61.1
NorthWest: Coronation North														
27	L2	43	23.3	43	23.3	0.468	15.1	LOS B	2.4	16.8	1.00	0.77	1.00	50.7
29a	R1	314	0.0	314	0.0	0.468	18.4	LOS B	2.4	16.8	1.00	0.77	1.00	48.3
29u	U	1	0.0	1	0.0	0.468	21.7	LOS C	2.4	16.8	1.00	0.77	1.00	54.4
Approach		358	2.8	358	2.8	0.468	18.0	LOS B	2.4	16.8	1.00	0.77	1.00	48.7
All Vehicles		1728	3.5	1689 N1	3.6	0.774	9.6	LOS A	4.8	34.6	0.45	0.58	0.45	52.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

NETWORK SIGNAL PHASE TIMINGS

Network: N101 [Existing AM (Network Folder: Concept Staggered-T_Inc SH20 RAB)]

New Network
Network Category: (None)

Offset Definition: Green Start

Displayed Phase Times for Sites/CCGs

Site: 101 [Existing XRd AM (Site Folder: Existing Layout)]

Phase Timing Summaries for Sites/CCGs

Site: 101 [Existing XRd AM (Site Folder: Existing Layout)]

Phase Sequence: Leading Right Turn

Reference Phase: B

Phase	A	B	C	D
Phase Change Time (sec)	121	0	36	66
Green Time (sec)	23	30	24	49
Phase Time (sec)	29	36	30	55
Phase Split	19%	24%	20%	37%

NETWORK SIGNAL PHASE TIMINGS

Network: N101 [Existing PM (Network Folder: Concept Staggered-T_Inc SH20 RAB)]

New Network
Network Category: (None)

Offset Definition: Green Start

Displayed Phase Times for Sites/CCGs

Site: 101 [Existing XRd PM (Site Folder: Existing Layout)]

Phase Timing Summaries for Sites/CCGs

Site: 101 [Existing XRd PM (Site Folder: Existing Layout)]

Phase Sequence: Leading Right Turn

Reference Phase: B

Phase	A	B	C	D
Phase Change Time (sec)	117	0	38	67
Green Time (sec)	27	32	23	44
Phase Time (sec)	33	38	29	50
Phase Split	22%	25%	19%	33%

PHASING SUMMARY

Site: 101 [Existing XRd PM (Site Folder: Existing Layout)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

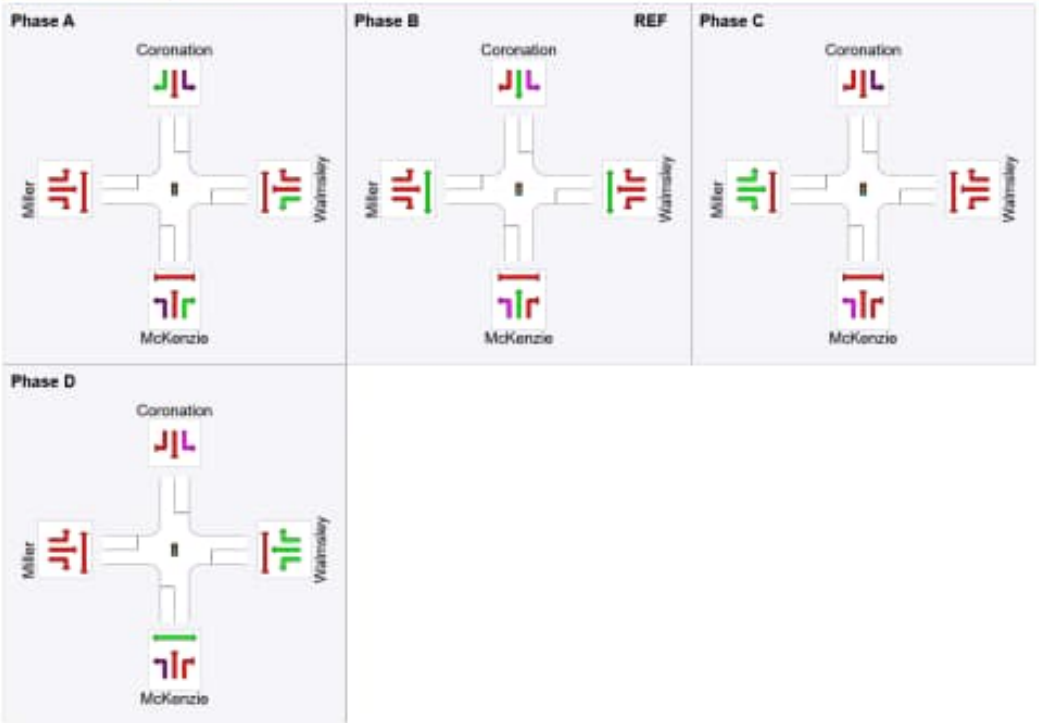
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase B
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	117	0	38	67
Green Time (sec)	27	32	23	44
Phase Time (sec)	33	38	29	50
Phase Split	22%	25%	19%	33%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

PHASING SUMMARY

Site: 101 [Existing XRd AM (Site Folder: Existing Layout)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

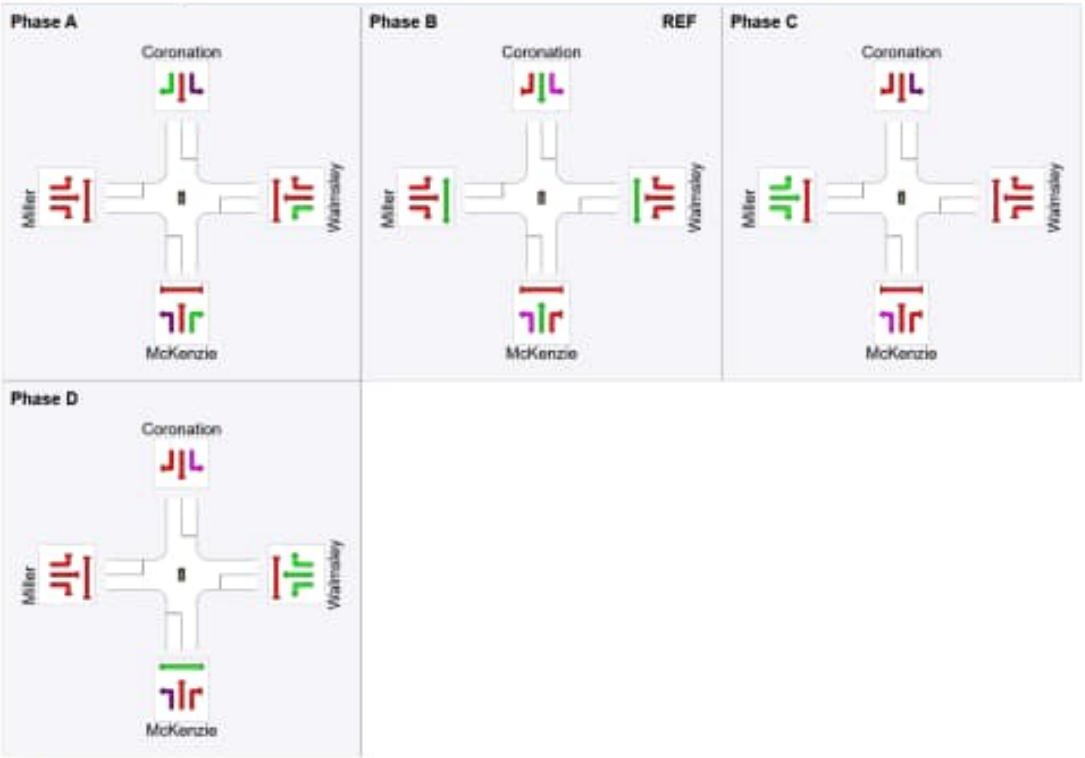
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase B
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary

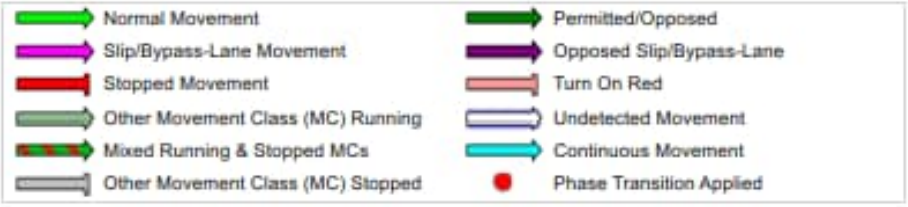
Phase	A	B	C	D
Phase Change Time (sec)	121	0	36	66
Green Time (sec)	23	30	24	49
Phase Time (sec)	29	36	30	55
Phase Split	19%	24%	20%	37%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



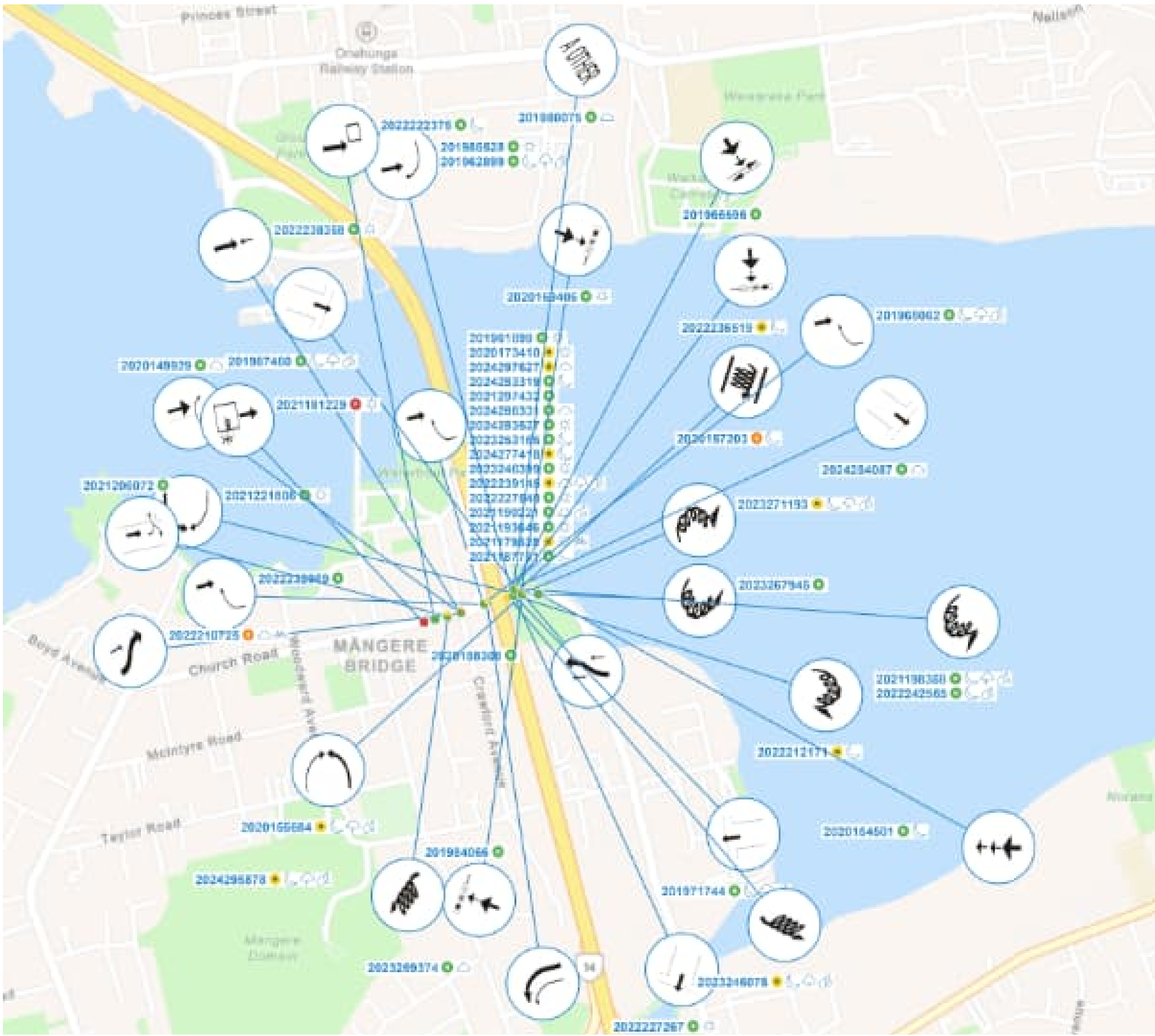
REF: Reference Phase
VAR: Variable Phase



Appendix D Collision Diagrams

Existing Crash Study Area Collison Diagram

Rimu Rd/SH20 Intersection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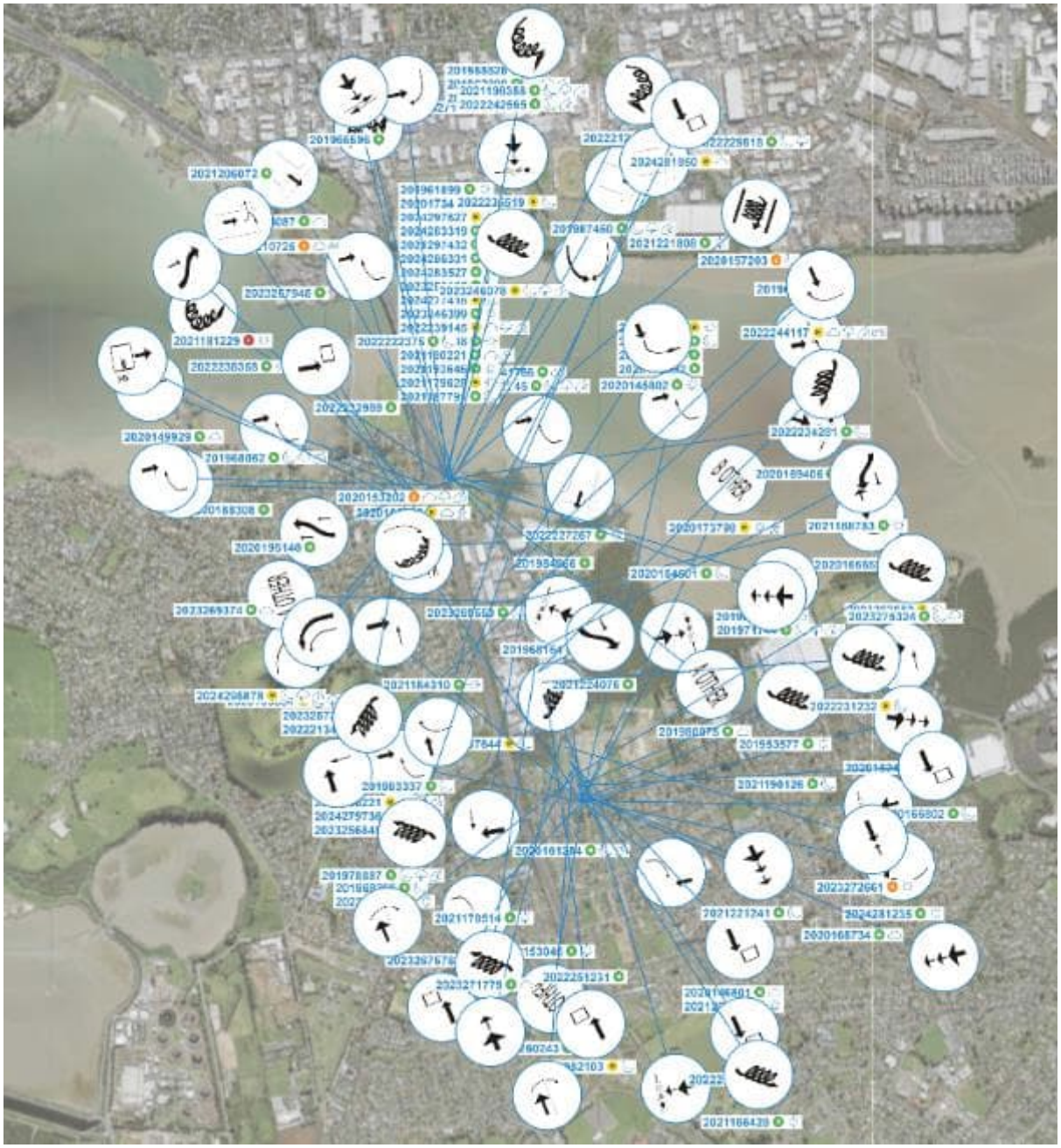
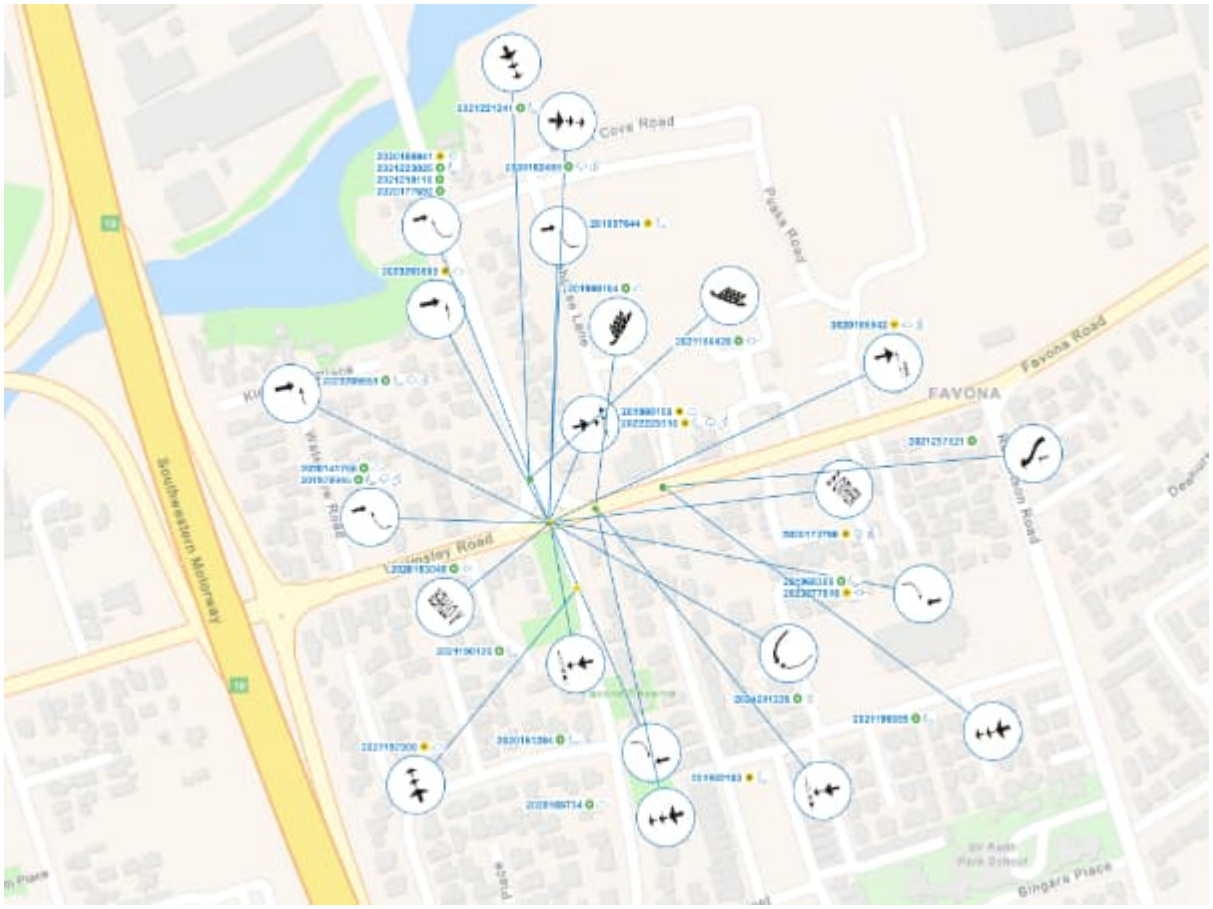
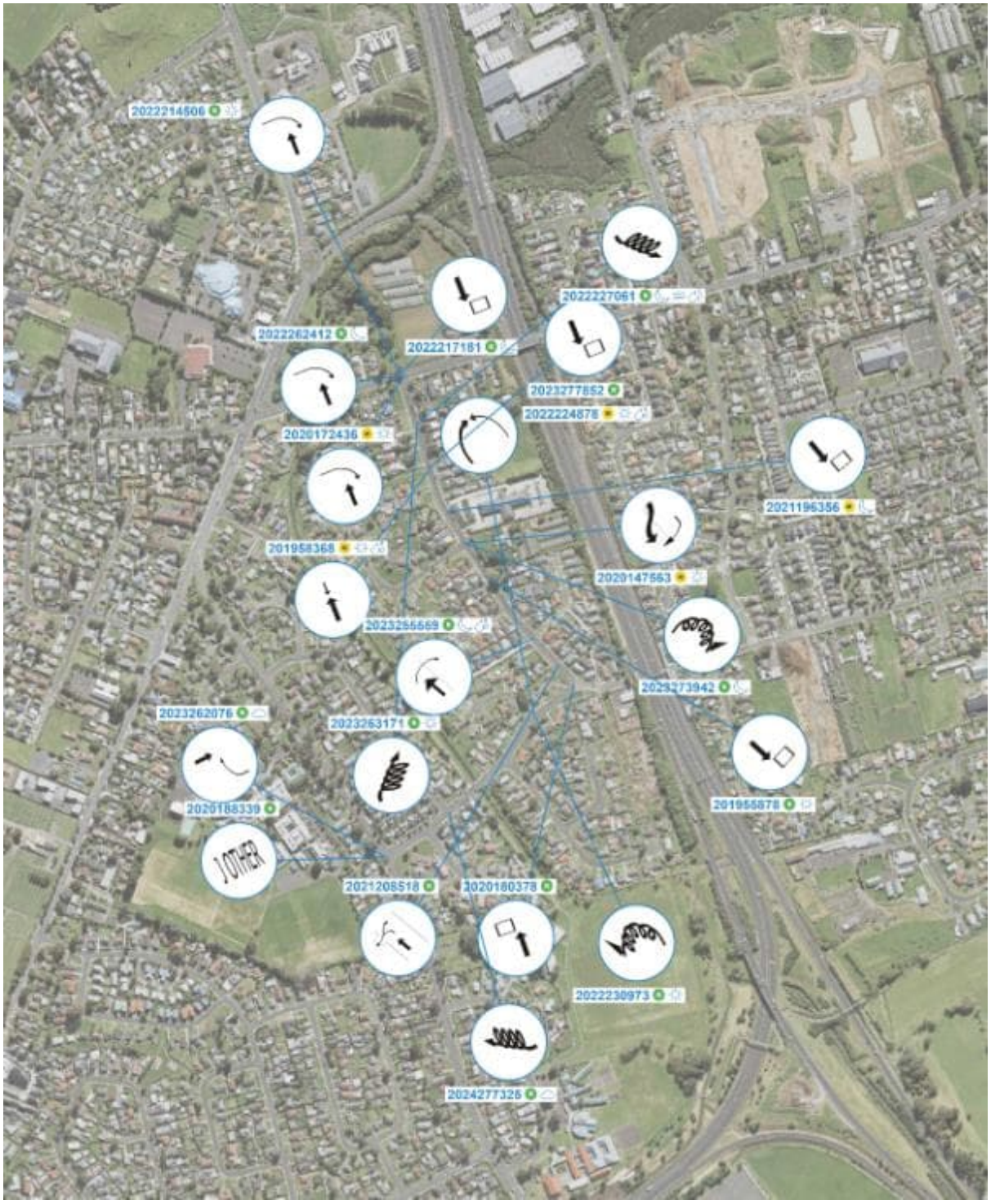
Onehunga Railway Station
MĀNGERE BRIDGE
Church Road
Mcintyre Road
Taylor Road
Boyd Avenue
Crawford Avenue

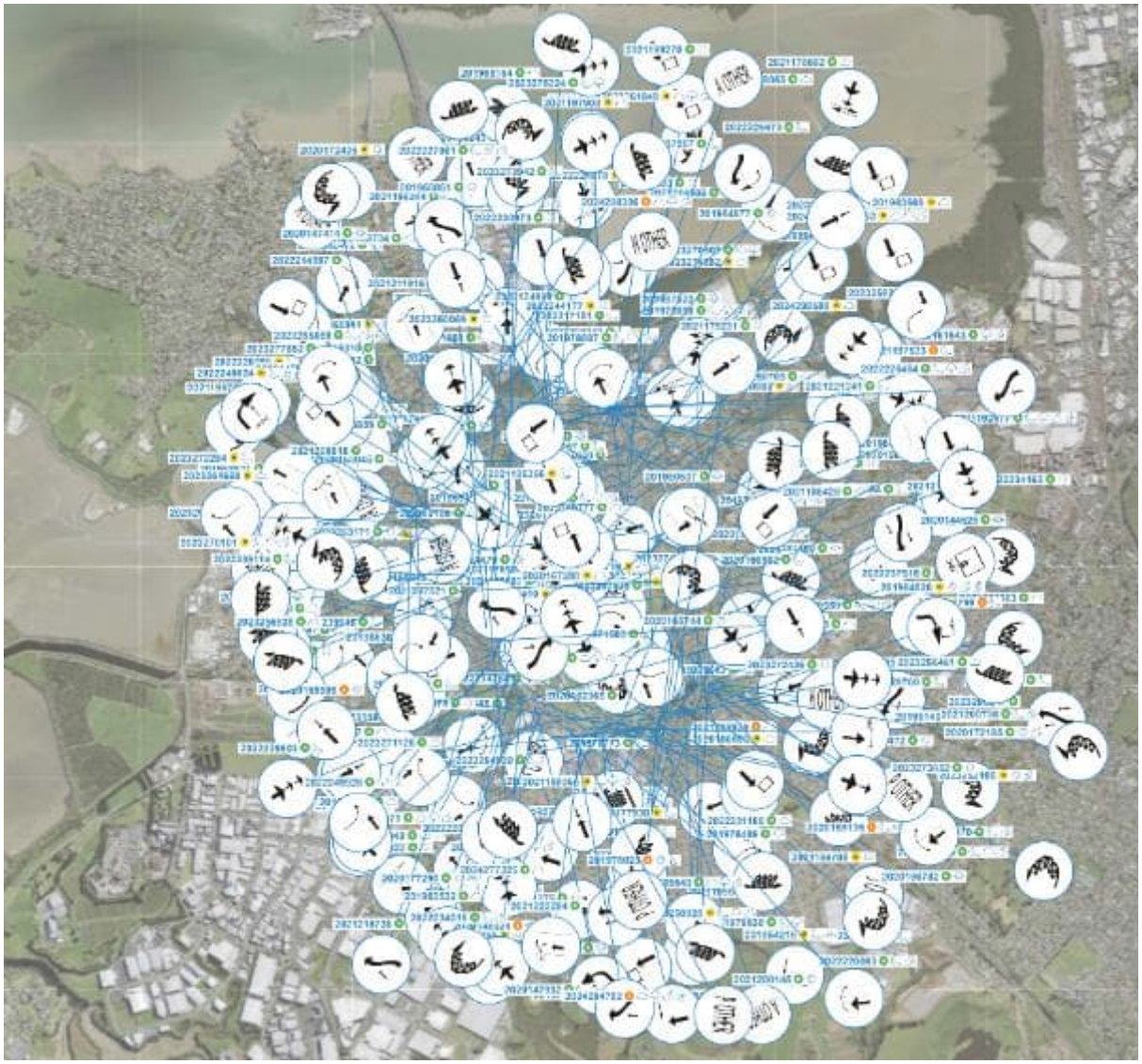


Walmsley Road/Mahunga Drive


Cove Road
Favona Road
FAVONA
Southwestern Motorway
Elmdon St/Hall Ave



Bader, Hall, Elmdon, Robertson, Mahunga/Walmsley intersection



Kirkbride Rd/SH20A on ramp, Bader Drive SH20A o**ff** ramp

NZ TRANSPORT AGENCY
WAKA KOTAHI

VEHICLE MOVEMENT CODING SHEET

For use with crash data from CAS (Version 2.8 May 2010)

	TYPE	A	B	C	D	E	F	G	O
A	OVERTAKING AND LANE CHANGE	PULLING OUT OR CHANGING LANE TO RIGHT	HEAD ON	CUTTING IN OR CHANGING LANE TO LEFT	LOST CONTROL (OVERTAKING VEHICLE)	SIDE ROAD	LOST CONTROL (OVERTAKEN VEHICLE)	WEAVING IN HEAVY TRAFFIC	OTHER
B	HEAD ON	ON STRAIGHT	CUTTING CORNER	SWINGING WIDE	* BOTH OR UNKNOWN	LOST CONTROL ON STRAIGHT	* LOST CONTROL ON CURVE		OTHER
C	LOST CONTROL OR OFF ROAD (STRAIGHT ROADS)	OUT OF CONTROL ON ROADWAY	OFF ROADWAY TO LEFT	OFF ROADWAY TO RIGHT					OTHER
D	CORNERING	LOST CONTROL TURNING RIGHT	LOST CONTROL TURNING LEFT	MISSED INTERSECTION OR END OF ROAD					OTHER
E	COLLISION WITH OBSTRUCTION	PARKED VEHICLE	CRASH OR BROKEN DOWN	NON VEHICULAR OBSTRUCTIONS (INCLUDING ANIMALS)	WORKMANS VEHICLE	OPENING DOOR			OTHER
F	REAR END	SLOWER VEHICLE	CROSS TRAFFIC	PEDESTRIAN	QUEUE	SIGNALS	OTHER		OTHER
G	TURNING VERSUS SAME DIRECTION	REAR OF LEFT TURNING VEHICLE	LEFT TURN SIDE SIDE SWIPE	STOPPED OR TURNING FROM LEFT SIDE	NEAR CENTRE LINE	OVERTAKING VEHICLE	* TWO TURNING		OTHER
H	CROSSING (NO TURNS)	RIGHT ANGLE (70° TO 110°)							OTHER
J	CROSSING (VEHICLE TURNING)	RIGHT TURN RIGHT SIDE	OPPOSING RIGHT TURNS	TWO TURNING					OTHER
K	MERGING	LEFT TURN IN	RIGHT TURN IN	TWO TURNING					OTHER
L	RIGHT TURN AGAINST	STOPPED WAITING TO TURN	MAKING TURN						OTHER
M	MANOEUVRING	PARKING OR LEAVING	"U" TURN	"U" TURN	DRIVEWAY MANOEUVRE	ENTERING OR LEAVING FROM OPPOSITE SIDE	ENTERING OR LEAVING FROM SAME SIDE	REVERSING ALONG ROAD	OTHER
N	PEDESTRIANS CROSSING ROAD	LEFT SIDE	RIGHT SIDE	LEFT TURN LEFT SIDE	RIGHT TURN RIGHT SIDE	LEFT TURN RIGHT SIDE	RIGHT TURN LEFT SIDE	MANOEUVRING VEHICLE	OTHER
P	PEDESTRIANS OTHER	WALKING WITH TRAFFIC	WALKING FACING TRAFFIC	WALKING ON FOOTPATH	CHILD PLAYING (INCLUDING TRICYCLE)	ATTENDING TO VEHICLE	ENTERING OR LEAVING VEHICLE		OTHER
Q	MISCELLANEOUS	FELL WHILE BOARDING OR ALIGHTING	FELL FROM MOVING VEHICLE	TRAIN	PARKED VEHICLE RAN AWAY	EQUESTRIAN	FELL INSIDE VEHICLE	TRAILER OR LOAD	OTHER

* = Movement applies for left and right hand bends, curves or turns

New Zealand Government

NZTA Collision coding sheet

Appendix E TTM Plans

Date Plotted: 06 November 2024 11:35 am

File Location: ----

NORTH

TEMPORARY TRAFFIC SIGNAL FOR RIGHT TURN ONTO SH20

TEMPORARY SAFE-HIT IN CENTRELINE

NO EXIT (CUL-DE-SAC) AND CHANGE GIVE WAY PRIORITY FROM HALL AVE TO WALMSLEY RD AND PROVIDE NSATT'S

NSATT'S AT THE CORNER OF ELMDON ST

MAGENTA LINE INDICATES LOCATION FOR PROVISION OF TEMPORARY 30 KPH SPEED LIMIT (WITH 200m SIGNS SPACING), TEMPORARY SPEED CUSHIONS IN ACCORDACE WITH ATCOP DRAWING TC006 (LOCATED AT APPROXIMATELY 60m INTERVALS) AND ASSOCIATED PW39 SIGNS ON BADER DRIVE, ELMDONST AND HALL AVE

FOR TENDER
NOT FOR CONSTRUCTION

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RCA / Client / Contractor / Contract: Te Kaunihera o Tāmaki Makaurau Auckland Council	Author / Originator: HEB construction, Spiller VINES	Project / Contract: TE ARARATA CULVERT REPLACEMENT PROJECT	Designed: A Sukasem, Nov 2024
		Layout Title: OVERVIEW OF TEMPORARY TRAFFIC MANAGEMENT (TTM)	Layout Parts: 1 of 1
			Drawn: Nov 2024
			Checked: V Waru, Nov 2024
			Scale: NTS A3
			Drawing No. T2024 / 038 / 001

Revision No. 0

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Author / Originator:

HEB construction

Project / Contract: TE ARARATA CULVERT REPLACEMENT PROJECT

Layout Title: MAHUNGA DR/ RIMU RD AND SH20

Layout Parts: 1 of 1

Designed	A Sukasem	Nov 2024
Drawn		Nov 2024
Checked	V Waru	Nov 2024

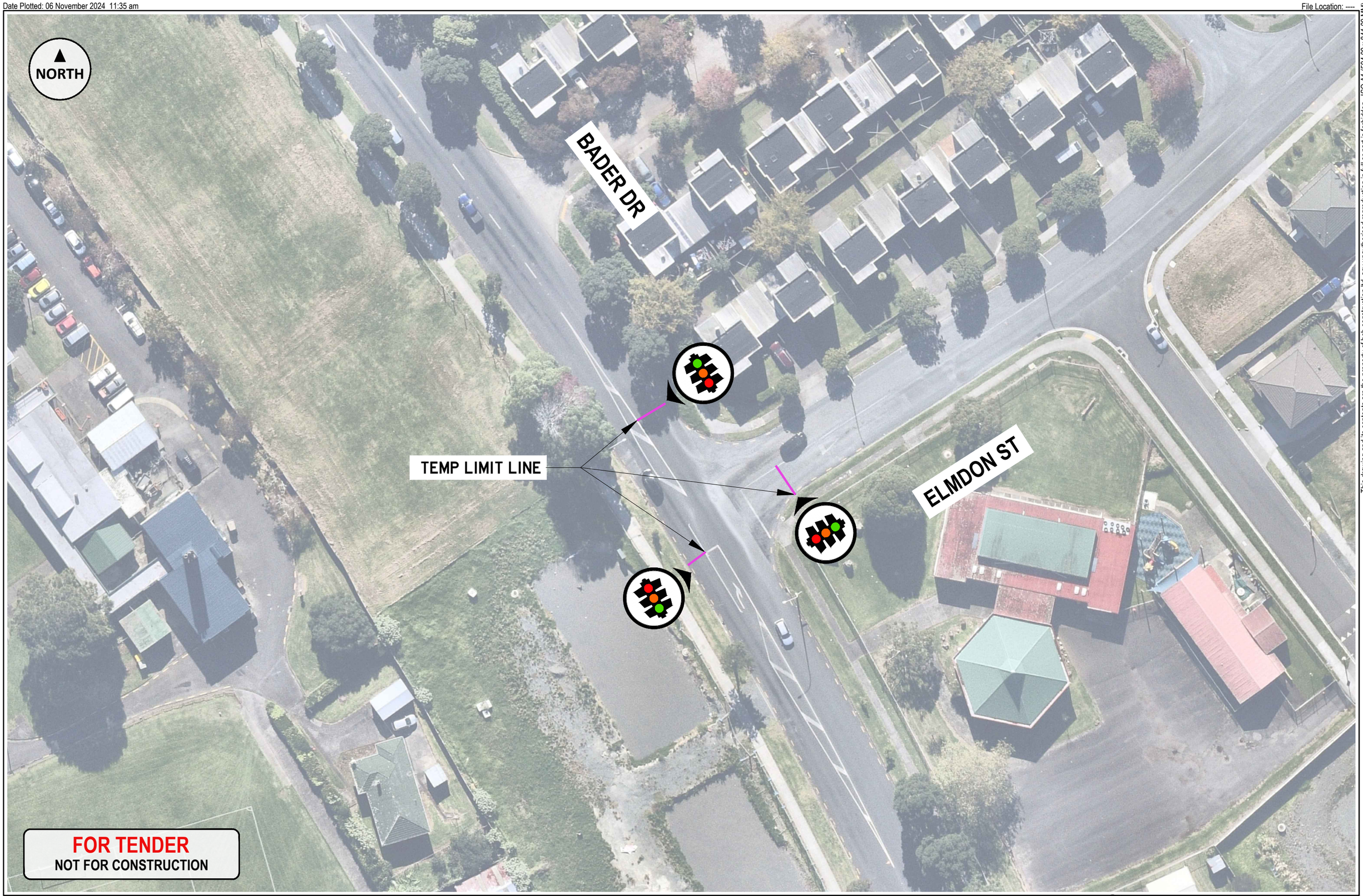
Scale: NTS A3

Drawing No. T2024 / 038 / 002

Revision No. 0

Date Plotted: 06 November 2024 11:35 am

File Location: ----



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RCA / Client / Contractor / Contract:

Te Kaunihera o Tāmaki Makaurau Auckland Council

Author / Originator:

HEB construction

Project / Contract: TE ARARATA CULVERT REPLACEMENT PROJECT

Layout Title: BADER DR/ ELMDON ST INTERSECTION - 3-WAYS SIGNALS OPTION 1

Layout Parts: 1 of 1

Designed	A Sukasem	Nov 2024
Drawn		Nov 2024
Checked	V Waru	Nov 2024

Scale: NTS A3

Drawing No. T2024 / 038 / 003

Revision No. 0

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Project / Contract: TE ARARATA CULVERT REPLACEMENT PROJECT

Layout Title: BADER DR/ ELMDON ST INTERSECTION - ROUNDABOUT OPTION 2

Layout Parts: 1 of 1

Designed	A Sukasem	Nov 2024
Drawn		Nov 2024
Checked	V Waru	Nov 2024

Scale: NTS A3

Drawing No. T2024 / 038 / 004

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Author / Originator:

HEB construction

Project / Contract: TE ARARATA CULVERT REPLACEMENT PROJECT

Layout Title: HALL AVE/ ELMDON ST - NSATT'S

Layout Parts: 1 of 1

Designed	A Sukasem	Nov 2024
Drawn		Nov 2024
Checked	V Waru	Nov 2024

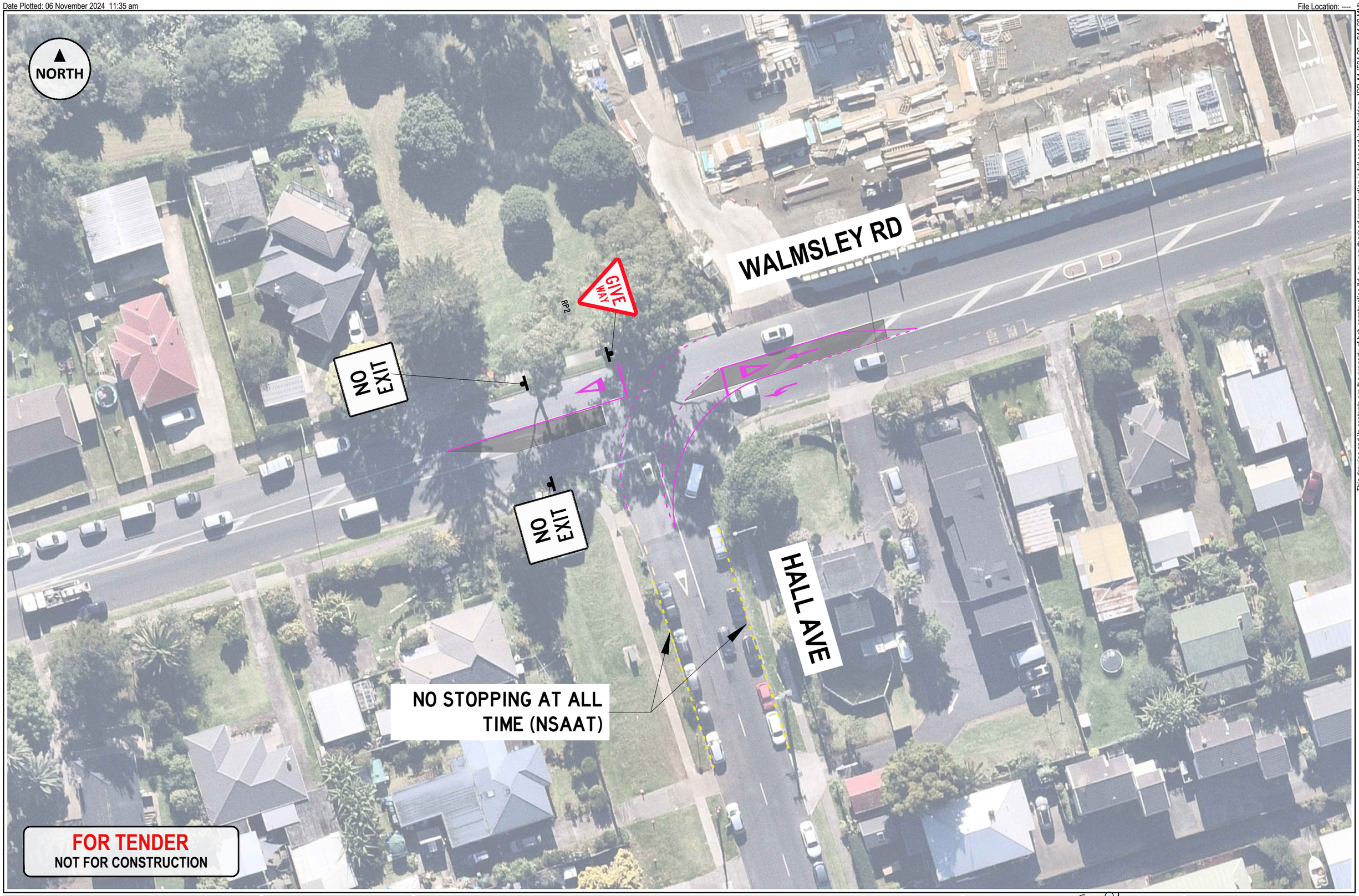
Scale: NTS A3

Drawing No. T2024 / 038 / 005

Revision No. 0

Date Plotted: 06 November 2024 11:35 am

File Location: ----



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RCA / Client / Contractor / Contract:

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Author / Originator:

HEB construction

Project / Contract: TE ARARATA CULVERT REPLACEMENT PROJECT

Layout Title: HALL AVE/ WALMSLEY RD SECTION

Layout Parts: 1 of 1

Designed	A Sukasem		Nov 2024
Drawn			Nov 2024
Checked	V Waru		Nov 2024

Scale: NTS A3

Drawing No. T2024 / 038 / 006

Revision No. 0

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