

3.6.1.4 EB3C – Dulwich Place, Heathridge Place and Tullis Place

- A pedestrian footpath is available on both sides of the road, approximately 1.0 – 1.5m wide and separated from the live lane by a 1.0 – 1.5m grass berm
- There is no footpath for a small section at the southern end of Tullis Place (see **Figure 16**).



Figure 16: EB3C - Dulwich Pl, Heathridge Pl and Tullis Pl existing walking facilities

### 3.6.1.5 EB3C – Burswood Drive west to Burswood Drive east

- A pedestrian footpath is available on both sides of the road, approximately 1.5m wide and separated from the live lane by a 1.0 - 1.5m grass berm
- All intersections are T-junctions. Pedestrian crossing facilities are available at all signalised intersections, however most slip lanes do not have a formal crossing
- No mid-block crossing is available along this section of Tī Rākau Drive. The carriageway is separated by a central median island
- There is no formal pedestrian crossing at the Tī Rākau Drive / Torrens Road priority-controlled intersection.

**Figure 17** shows the existing walking facilities in EB3C on Tī Rākau Drive between Burswood Drive west and east.

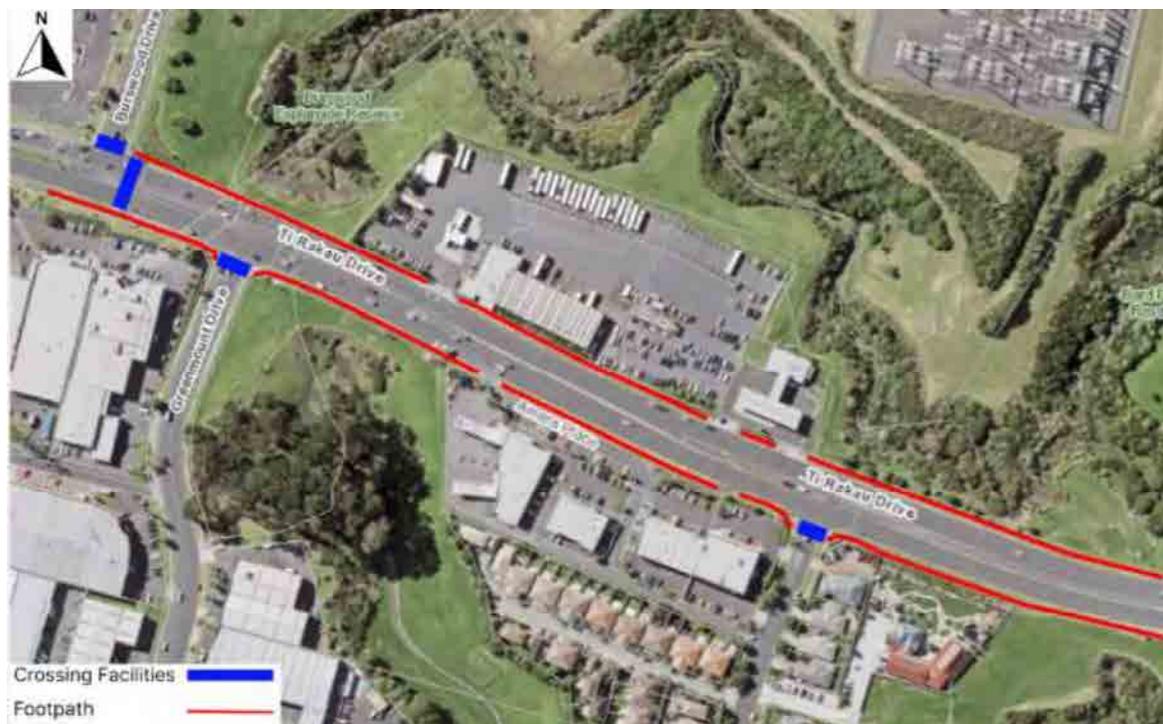


**Figure 17: EB3C - Burswood Dr west to Burswood Dr east existing walking facilities**

### 3.6.1.6 EB3C – Burswood Drive east to Guys Reserve

- A pedestrian footpath is available on both sides of the road, approximately 1.5m wide and separated from the live lane by a 1.0 - 1.5m grass berm
- The only north-south pedestrian crossing facility is provided at the Tī Rākau Drive / Burswood Drive east intersection
- There is no formal pedestrian crossing provided at the Howick & Eastern Bus Depot signalled intersection
- No mid-block crossing is available along this section of Tī Rākau Drive. The carriageway is separated by a central median island
- Intersections are of a similar nature along the route, which consists of a signalled T-junction with a pedestrian crosswalk provided across the side street. There is no facility for pedestrians wanting to cross Tī Rākau Drive between Burswood Drive east and Guys Reserve.

**Figure 18** shows the location of the existing walking facilities in EB3C on Tī Rākau Drive between Burswood Drive east and Guys Reserve.

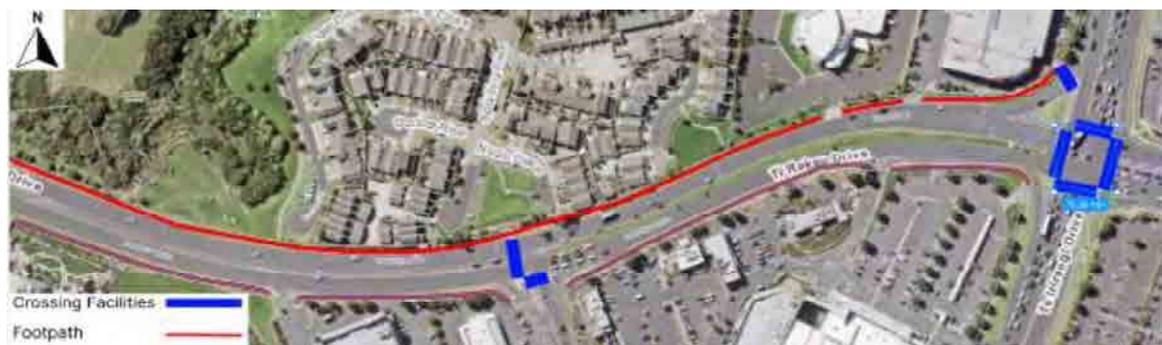


**Figure 18:** EB3C - Burswood Dr east to Guys Reserve existing walking facilities

### 3.6.1.7 EB4i – Guys Reserve to Te Irirangi Drive

- A pedestrian footpath is available on both sides of the road, approximately 1.5m wide and separated from the live lane by a grass berm that is mostly 1.5m but goes up to 3m wide at some locations
- There is no formal pedestrian crossing facility at the priority-controlled western exit of the Huntington Park shops, adjacent to Guys Reserve. There is also no formal crossing available at the priority-controlled Countdown Botany entrance
- The Tī Rākau Drive / Te Koha Road intersection has signalised pedestrian crosswalks across the side road and the western approach, but none across the eastern approach
- The Tī Rākau Drive / Te Irirangi Drive / Botany Road intersection has signalised crosswalks across all approaches, but most slip lanes do not have a formal crossing
- No mid-block crossing is available along this section of Tī Rākau Drive. The carriageway is separated by a central median island. There is no amenity for pedestrians wanting to cross Tī Rākau Drive between Burswood Drive east and the Te Koha Road intersection.

**Figure 19** shows the existing walking facilities in EB4i on Tī Rākau Drive between Guys Reserve and Te Irirangi Drive.



**Figure 19:** EB4i - Guys Reserve to Te Irirangi Dr existing walking facilities

### 3.6.1.8 EB4L – Te Irirangi Drive (Tī Rākau Drive to Te Koha Road)

- A pedestrian footpath is available on both sides of the road, approximately 1.5m wide. The western footpath is separated from the live lane by a grass berm that goes up to 10m wide, the eastern footpath has a 1.8 - 4.5m grass berm
- There are no formal pedestrian crossing facilities at the two priority-controlled entrances to Countdown Botany
- The Te Irirangi Drive / Te Koha Road intersection has signalised crosswalks across all approaches, but most slip lanes do not have a formal crossing
- No mid-block crossing is available along this section of Te Irirangi Drive. The carriageway is separated by a central median island.

Figure 20 shows the existing walking facilities in EB4L on Te Irirangi Drive between Tī Rākau Drive and Te Koha Road.

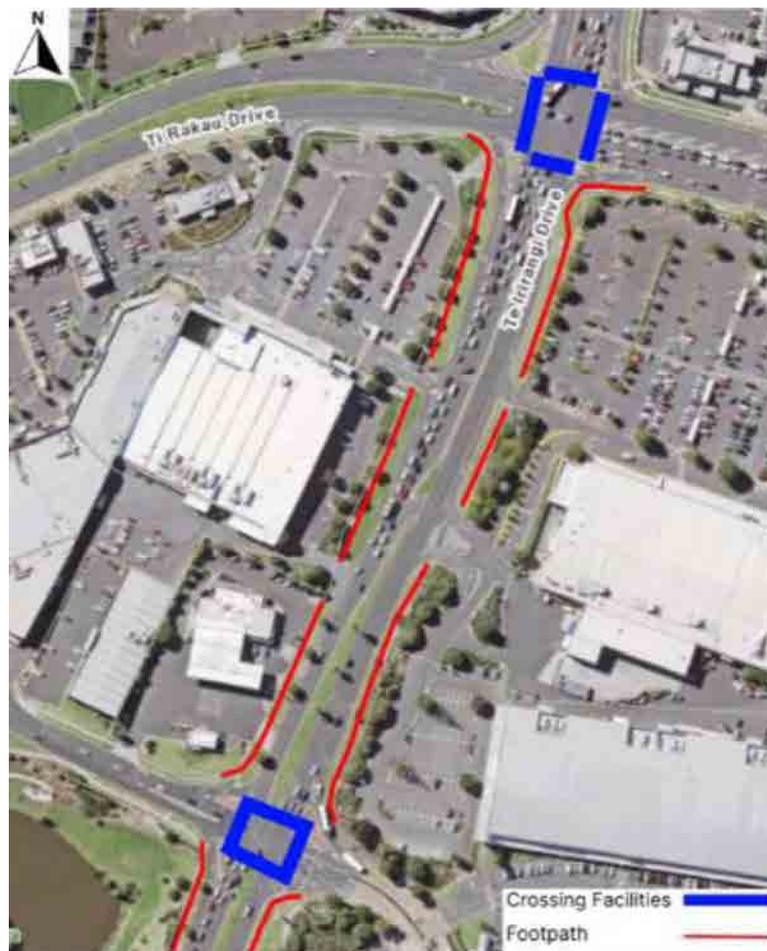


Figure 20: EB4L - Te Irirangi Drive (Tī Rākau Drive to Te Koha Road) existing walking facilities

3.6.1.9 EB4L – Guys Reserve

- A pedestrian footpath is available through the Guys Reserve that connects the residential areas at Cottesmore Place and Guys Road to Te Koha Road and the commercial areas (see **Figure 21**).



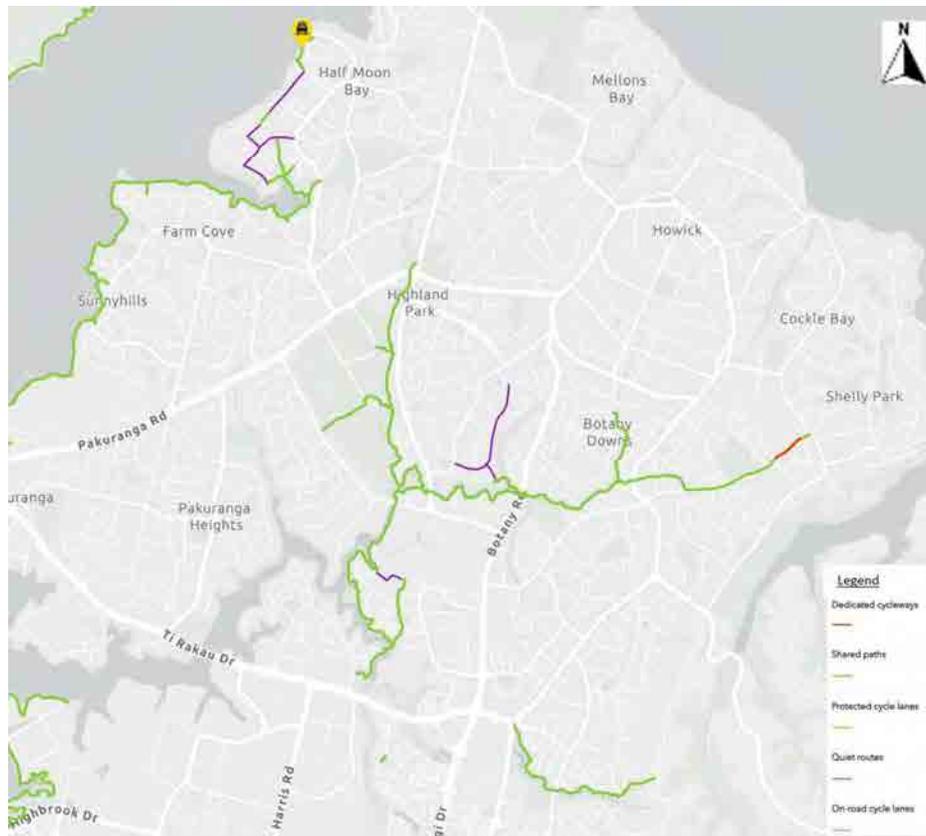
**Figure 21:** EB4L - Guys Reserve existing walking facilities

### 3.6.2 Cycling Facilities

Similar to the EB2 and EB3R project areas<sup>23</sup>, there are no dedicated cycle facilities provided along the section of Tī Rākau Drive between Tī Rākau Bridge and Te Irirangi Road, as well as on Burswood Drive west and east within the EB3C, EB4i and EB4L project areas.

Cyclists travelling along Tī Rākau Drive currently must share an on-road lane with high-volume, high-speed traffic, as well as with heavy vehicles (e.g., buses and articulated trucks). Crossing facilities are limited to those at signalised intersections. More experienced and confident cyclists who mix with general traffic have the choice to cross at intersections from right turning bays but must still cross multiple lanes of traffic to do so. Furthermore, cyclists must navigate numerous large commercial driveways along the corridor.

In the wider Botany area, there are sections of short cycle routes outlined in **Figure 22**. There is an off-road shared path for cyclists and pedestrians that starts on Burswood Drive east in the Burswood Esplanade Reserve. This recreational shared path connects Botany to the suburbs of Golflands, Pakūranga Heights, and Highland Park to the north, as well as the areas of Northpark, Botany Downs, Somerville and Shelly Park to the east. There is a short section of recreational footpath which may also be used by cyclists between Cottessmore Place, Guys Road and Te Koha Road. A recreational shared path starts at Logan Carr Park and passes through the reserves in Botany through to Dannemora.



**Figure 22: Existing cycle routes and facilities in the wider Pakūranga area**

<sup>23</sup> Refer to Appendix A for a description of the existing cycling facilities in the EB2 and EB3R project areas.

## 3.7 Parking

### 3.7.1 Tī Rākau Drive

#### 3.7.1.1 EB3C – Tī Rākau Bridge

On-street parking along the Tī Rākau Bridge is not strictly prohibited by road markings or signage in the existing environment. However, given the nature of Tī Rākau Drive, being a major regional route between Pakūranga in the west and Botany in the east and with high traffic volumes, it is considered very unlikely that motorists would leave vehicles parked along this section of Tī Rākau Drive due to a perceived risk of crashes<sup>24</sup>.

#### 3.7.1.2 EB3C – Tī Rākau Bridge to Harris Road

No on-street parking is currently provided along Tī Rākau Drive between the eastern abutment of the Tī Rākau Bridge and Harris Road. This is enforced by No Stopping at All Times (NSAAT) line markings.

#### 3.7.1.3 EB3C – Harris Road to Guys Reserve

On-street parking between Harris Road and Guys Reserve is not strictly prohibited by road markings or signage in the existing environment. However, given the nature of Tī Rākau Drive, being a major regional road with high traffic volumes, it is very unlikely that motorists would leave vehicles parked along this section of Tī Rākau Drive due to a perceived risk of crashes occurring.

#### 3.7.1.4 EB4i – Guys Reserve to Te Irirangi Drive

On-street parking between Guys Reserve and Te Irirangi Drive is not strictly prohibited by road markings or signage in the existing environment. As above, as Tī Rākau Drive is a major regional road with high traffic volumes, it is very unlikely that motorists would leave vehicles parked along this section of Tī Rākau Drive due to a perceived risk of crashes.

### 3.7.2 EB3C – Residential Area Roads

#### 3.7.2.1 Torrens Road

On-street parking is currently provided along Torrens Road in the existing environment. Torrens Road is a secondary collector road and low-speed environment that serves as the linkage to the surrounding commercial areas, so it is expected that people accessing the Torrens Road restaurants and shops would use the available parking spaces on this road.

#### 3.7.2.2 Dulwich Place and Heathridge Place

On-street parking is currently provided along Dulwich Place and Heathridge Place in the existing environment. Both are access roads and with a low-speed environment that provides access to the Burswood residential areas from the wider road network. Motorists parking on these roads will generally be visitors or residents in the area.

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<sup>24</sup> Refer to Appendix A for a detailed description of the Parking provision and utilisation in the EB2 and EB3R project areas.

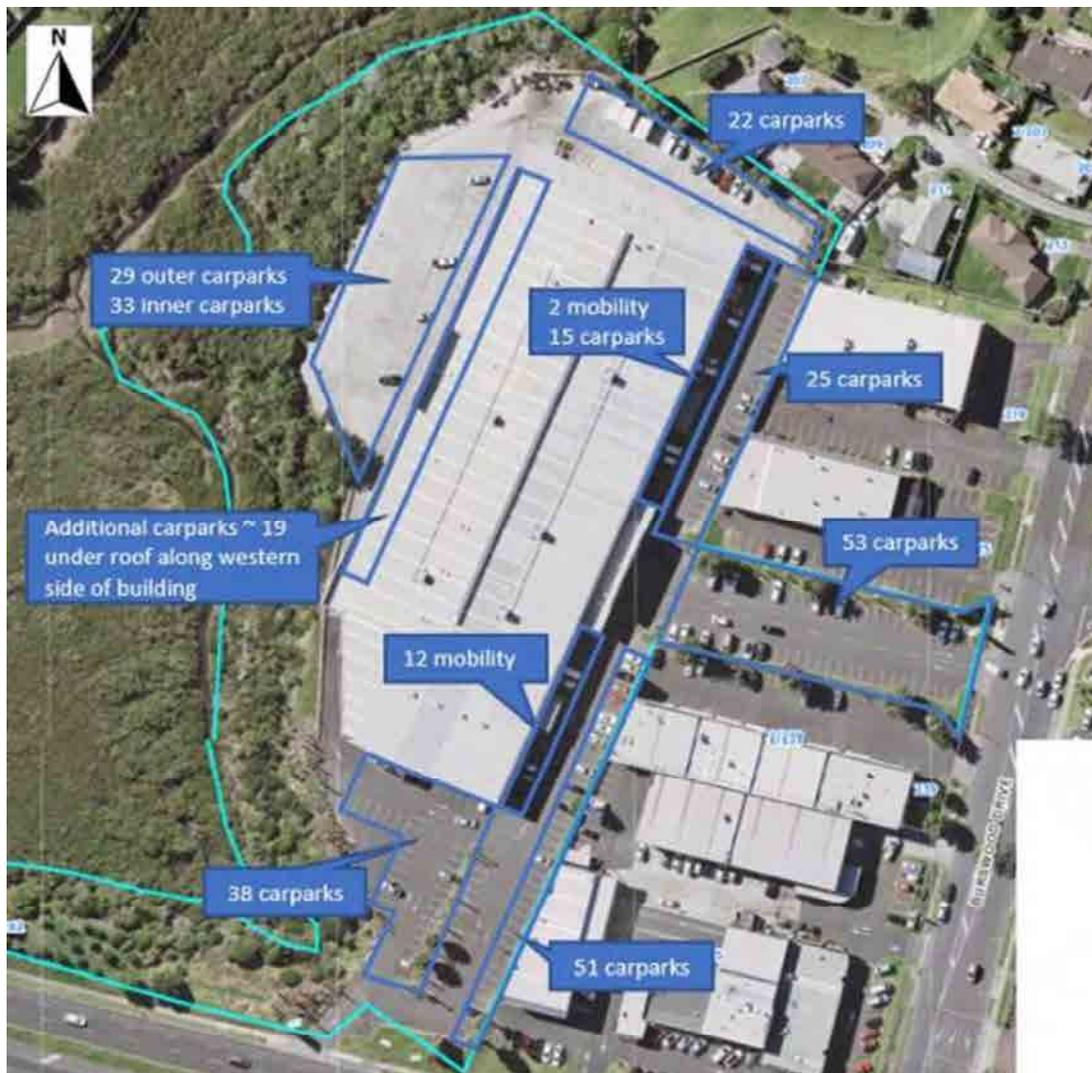
### 3.7.3 EB3C – Burswood Drive

The majority of Burswood Drive west up to the entrance of Burswood Estate is enforced by NSAAT line markings to prohibit on-street parking, with short sections of on-street parking.

On-street parking is currently provided along Burswood Drive east except for short sections of where parking is prohibited either side of the Bunnings Botany entrance, enforced by NSAAT line markings.

### 3.7.4 EB3C – 262 Tī Rākau Drive (Chinatown)

Parking surveys were undertaken between 10:00 and 18:00 on Saturday 10 December 2022 and Wednesday 14 December 2022 to determine the utilisation of the Chinatown parking area. The survey dates were selected to represent typical weekday and weekend operations. There are currently 299 parking spaces on site, 14 of them are mobility parks. The utilisation of these parks was captured for the areas outlined in **Figure 23**.



**Figure 23: Surveyed parking areas of Chinatown**

**Table 5** outlines the findings of the surveys and **Figure 24** below illustrates the daily utilisation profile. The survey showed that the parking was underutilised and did not exceed 69% of available capacity on the typical weekday or weekend. Average utilisation of the carpark was determined to be 51% on the weekend and 43% on the weekday.

**Table 5: Chinatown parking utilisation summary**

Parking Utilisation	Saturday 10 <sup>th</sup> December (10am – 6pm)	Wednesday 14 <sup>th</sup> December (10am – 6pm)
Maximum Parking (Utilisation)	207 (69%)	207 (69%)
Minimum Parking (Utilisation)	90 (30%)	77 (26%)
Average Parking (Utilisation)	151 (51%)	128 (43%)



**Figure 24: Chinatown parking utilisation profile**

### 3.7.5 EB3C – Howick and Eastern Bus Depot

The Howick and Eastern Bus Depot is a privately owned business that is contracted to AT. The Bus Depot currently supports both bus and staff car parking, the parking spaces consists of the following:

- 128 bus parking (including 7 service bays)
- 93 staff carparks (including 11 mobility parks)

Figure 25 shows the parking areas within the Bus Depot.



Figure 25: Parking areas of Howick and Eastern Bus Depot

### 3.7.6 EB4L – 451 Tī Rākau Drive (Huntington Park Retail Area and VTNZ Botany)

The western Huntington Park retail area near the Guys Reserve currently serves many restaurants and commercial shops. There are staff parking and loading areas available behind Stars Seafood restaurant and the adjoining food court, as well as a left turn only exit onto Tī Rākau Drive.

VTNZ Botany is located at the south-west boundary of the Huntington Park Retail Area, and it currently has a total of 17 carpark available for staff and customers. **Figure 26** shows the VTNZ Botany (red outline) at 451 Tī Rākau Drive.



**Figure 26:** VTNZ Botany (red outline) at 451 Tī Rākau Dr

### 3.7.7 EB4L – Te Irirangi Drive / Te Koha Road Intersection

On-street parking at the Te Irirangi Drive north and Te Koha Road approaches are prohibited by road markings within 20 m of the intersection in the existing environment, but not strictly prohibited at the Te Irirangi Drive south and Town Centre Drive approaches. However, given the nature of Te Irirangi Drive, being a regional route between Botany in the north and Manukau City Centre in the south and with high traffic volumes, it is very unlikely that motorists would leave vehicles parked along this section of Tī Rākau Drive due to a perceived risk of crashes.

### 3.8 Crash Environment

#### 3.8.1 Crash Analysis System Data

All reported crashes within the EB3C, EB4i and EB4L project areas<sup>25</sup> were extracted from the Crash Analysis System (CAS) for a seven-year period from 2017 to 2022. For this assessment, the focus of the extracted data was in the areas shown in **Figure 27** and **Figure 28**.



**Figure 27: Extent of extracted CAS data for EB3C project area**



**Figure 28: Extent of extracted CAS data for EB4i and EB4L project areas**

<sup>25</sup> Refer to Appendix A for details on the CAS data collected for the EB2 and EB3R project areas.

In the EB3C project area, there were two fatal crashes and five serious injury crashes in the 2017 – 2022 time period as described and analysed below:

- **Fatal crash 1 (2021/05/04):** A vehicle travelling westbound on Ti Rākau Drive collided with a pedestrian crossing the road to get to a bus stop. The driver tried to swerve to avoid collision, but still collided with the pedestrian with the side of the vehicle, causing the pedestrian to sustain head injuries.
  - No environmental factors were identified other than it being dark at the time of the crash.
  - A pedestrian crossing was available within 150 m of the crash location.
- **Fatal crash 2 (2017/10/25):** A motorcycle was travelling eastbound in a through lane on Ti Rākau Drive. Simultaneously, a bus was turning right from the Bus Depot at 380 Ti Rākau Drive intending to travel west. The motorcycle attempted to stop, but lost control and collided with the bus.
  - The speed limit was 60km/h for vehicles travelling on Ti Rākau Drive. There may also have been visibility issues for buses leaving the Bus Depot. High speed limits along with a lack of sight distance may have contributed to the crash
  - **Figure 2929** shows the intersection layout and control at the time of the crash. The intersection has subsequently been signalised, improving the safety of the intersection.



**Figure 2929: Bus Depot / Ti Rākau Dr intersection, looking eastbound on Ti Rākau Dr (source: Google Street View, Oct 2017)**

- **Figure 30** shows the intersection layout and control after being signalised.



**Figure 30: Bus Depot / Tī Rākau Dr intersection, looking eastbound on Tī Rākau Dr (source: Google Street View, Feb 2023)**

The majority of serious injury crashes in the EB3C project area occurred on Tī Rākau Drive. The data does not suggest commonality between the location and type of crashes. In total, of the five serious injuries, 33% were crossing / turning crashes, 33% were pedestrian crashes, 17% were rear end / obstruction crashes and a further 17% which was due to lost control / head on crashes. The major factors influencing crashes were alcohol consumption and / or poor observation which accounted for 67% and failing to give way and/or pedestrian factors along with poor handling which accounted for 33% of all crashes. Although not conclusive, 33% of crashes occurred during dark times. Weather conditions were not a significant factor as all crashes occurred during dry conditions.

In the EB4i and EB4L project areas, there was one fatal crash and six serious injury crashes in the 2017 – 2022 time period:

- **Fatal crash 1 (2019/01/28):** A vehicle failed to stop and crashed at high speeds into three stationary vehicles on Botany Road at the intersection of Tī Irirangi Drive / Tī Rākau Drive / Botany Road. A number of factors were identified:
  - Driver inattention to the stopped vehicles combined with excessive speeding
  - The diverging of three lanes to four lanes on the Botany Road approach to Te Irirangi Drive

The data indicates that the majority of crashes in the EB4i and EB4L project areas occurred near the Tī Irirangi Drive / Tī Rākau Drive intersection. In total, of the six serious injuries, 57% was a result of rear end / obstruction crashes, and 29% of serious injuries were attributed to pedestrian crashes. A further 14% were attributed to crossing/ turning. The major factors influencing crashes were poor observation (57%), alcohol (29%) and pedestrian factors (29%). A further 14% were due to poor handling, failing to give way or stop, miscellaneous factors and vehicles factors. Time of day and weather conditions although not significant were still notable factors as 29% of crashes occurred when dark and/or wet.

### 3.8.2 Safe System Assessment

A Safe System Assessment (SSA) was undertaken for the entire Project area<sup>26</sup>. The SSA was conducted in accordance with the Auckland Transport Safe System Assessment Guidelines, which are based on the Austroads 2016 Research Report AP-R509-16 - Safe System Assessment Framework. A summary of the SSA is provided below.

The SSA assessed a total of ten crash types as described below:

1. Run-off-road (R-O-R): Involving one or more vehicle(s) losing control on a curve or straight
2. Head-on (H-O): Crashes involving two or more vehicles travelling in opposite directions
3. Intersection (INT): Crashes involving two or more vehicles travelling in adjacent directions
4. Other: Includes manoeuvring, overtaking, parking and miscellaneous crashes
5. Motorcycle (M/C): Any crash type above involving a motorcycle
6. P1: Any crash involving a pedestrian and a vehicle turning at an intersection
7. P2: Any crash involving a pedestrian and vehicle travelling straight (midblock crossing)
8. P3: Any crash involving a pedestrian and vehicle travelling straight through an intersection
9. C1: Any crash involving a cyclist being struck by a vehicle travelling in the same direction
10. C2: Any Crash involving a cyclist being struck by a vehicle at an intersection (turning or straight).

Each crash type is scored based on exposure, likelihood, and severity with a value between 0 and 4. A lower score corresponds with a safer system. A score of 0 for exposure, likelihood or severity means that a particular crash type is not applicable to the location being considered and will result in a product score of 0.

**Table 6** outlines the safe system score of the existing environment in the EB3C project area.

**Table 6: EB3C existing environment safe systems assessment**

SUMMARY											
EXISTING LAYOUT	R-O-R	H-O	INT	OTHER	M/C	P1	P2	P3	C1	C2	TOTAL
A) PAKURANGA CREEK BRIDGE	16	24	0	16	32	0	48	0	36	0	172
B) TĪ RAKAU DR / TRUGOOD DR	24	16	16	16	32	18	0	36	36	18	212
C) BURSWOOD WEST JUNCTION	2	4	0	6	24	0	24	0	18	0	78
D) BURSWOOD STATION	1	2	0	2	6	0	0	0	3	0	14
E) BURSWOOD EAST JUNCTION	2	4	0	6	24	0	24	0	18	0	78
F) H&E BUS DEPOT	16	16	16	16	32	6	48	0	36	9	195
G) TĪ RAKAU DR / HUNTINGTON DR	16	16	16	16	32	12	48	0	36	18	210
H) GUYS RESERVE CROSSING	16	16	0	8	16	0	48	0	36	0	140

The TĪ Rākau Drive / Trugood Drive and TĪ Rākau Drive / Huntington Drive intersections were identified as the highest risk in existing environment across the EB3C project area. Motorcycle, P2 and C1 type crashes were scored relatively high across the majority of locations, with high exposure and likelihood.

<sup>26</sup> Refer to Appendix A for the outcomes of the Safe Systems Assessment of the existing environment in the EB2 and EB3R project areas.

Table 7 outlines the safe system score of the existing environment in the EB4i project area.

**Table 7: EB4i existing environment safe systems assessment**

SUMMARY											
EXISTING LAYOUT	R-O-R	H-O	INT	OTHER	M/C	P1	P2	P3	C1	C2	TOTAL
<a href="#">A) EB3C (midblock to Te Koha Rd)</a>	16	16	8	16	64	12	48	0	36	18	234
<a href="#">B) Ti Rakau Drive/Te Koha Rd</a>	8	8	8	16	64	18	0	36	36	36	230
<a href="#">C) Te Koha Rd to Te Irirangi Rd</a>	16	16	16	16	64	16	64	0	48	24	280
<a href="#">D) Te Rakau Dr/Te Irirangi Dr intersection</a>	24	24	36	24	48	27	0	36	48	48	315
<a href="#">E) Te Irirangi Road to Town Centre Drive</a>	30	10	30	30	64	18	48	0	48	24	302
<a href="#">F) Te Irirangi Road/Town Centre Drive intersection</a>	30	30	30	30	48	18	0	36	48	48	318
<a href="#">G) Botany Station</a>	2	4	4	6	4	12	0	12	18	12	74

The Ti Rākau Drive / Ti Irirangi Drive and Ti Irirangi Drive / Town Centre Drive intersections were identified as the highest risk in existing environment across the EB4i project area. Motorcycle, C1 and C2 type crashes were scored high at the majority of locations with high exposure, likelihood and in some cases high severity. P2 and P3 crashes also scored relatively high at specific locations along the network.

It should be noted that no SSA was undertaken for the EB4L project area in the existing environment as the proposed Link Road does not exist in the existing environment.

### 3.9 Over-Dimension and Over-Weight Routes

Within the EB3C, EB4i and EB4L project areas there are a number of roads that have been defined by Waka Kotahi as strategic Over-Dimension (OD) routes<sup>27</sup>. These support the large commercial and industrial areas in and around Burswood and East Tāmaki which are the key generators of freight and OD loads. The OD routes relevant to the EB3C, EB4i and EB4L project areas<sup>28</sup> are listed below, and are shown in **Figure 31**:

- Tī Rākau Drive – Pakūranga Road to Chapel Road
- Harris Road – Tī Rākau Drive to Boundary Road
- Chapel Road – Whitford Road to Boundary Road.



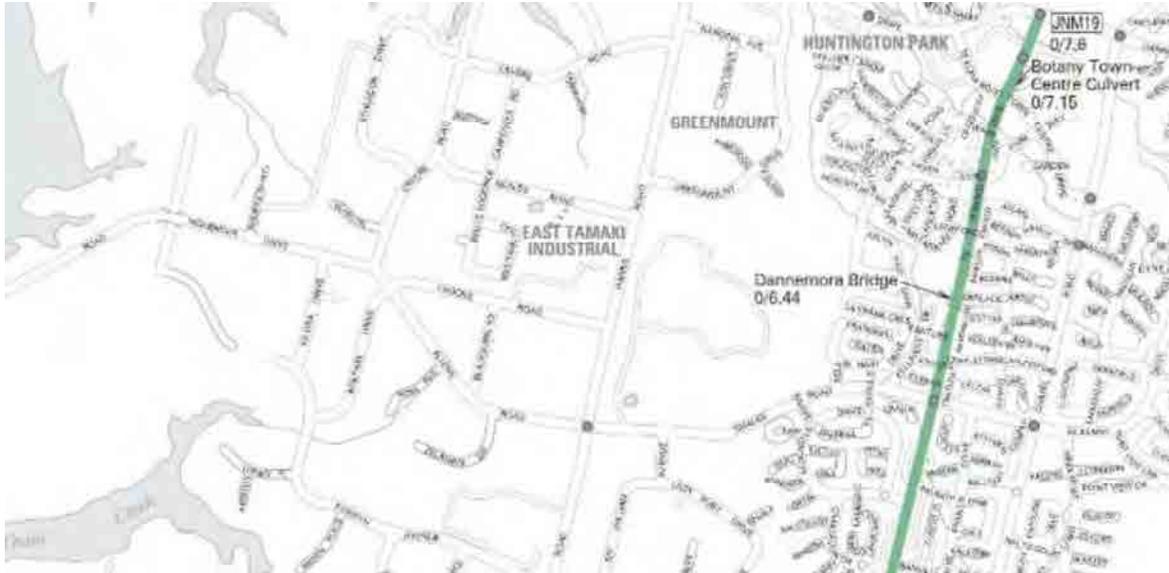
**Figure 31: Over-dimensional vehicle routes**

The Over-Weight (OW) route<sup>29</sup> relevant to the EB3C, EB4i and EB4L project areas includes Te Irirangi Drive between Tī Rākau Drive and Great South Road and is shown in **Figure 32**.

<sup>27</sup> [http://nzta1.cwp.govt.nz/assets/resources/overdimen-veh-route-maps/4-auckland/docs/OD\\_4-35%20Auckland.pdf](http://nzta1.cwp.govt.nz/assets/resources/overdimen-veh-route-maps/4-auckland/docs/OD_4-35%20Auckland.pdf)

<sup>28</sup> Refer to Appendix A for a description of the OD and OW routes in the EB2 and EB3R project areas.

<sup>29</sup> [http://nzta1.cwp.govt.nz/assets/resources/overweight-permit-route-maps/3-auckland/docs/OW\\_3-16%20East%20Tamaki.pdf](http://nzta1.cwp.govt.nz/assets/resources/overweight-permit-route-maps/3-auckland/docs/OW_3-16%20East%20Tamaki.pdf)



**Figure 32: Over-weight vehicle routes**

**Table 8** shows the current Heavy Commercial Vehicle (HCV) percentage of traffic that travels through the EB3C, EB4i and EB4L project areas (both directions). HCV data were sourced through a combination of AT traffic counts and RAMM data.

**Table 8: Existing HCV percentage**

Roads	HCV Percentage
Ti Rākau Dr (Ti Rākau Bridge – Te Irirangi Dr)	7.5%
Gossamer Dr	3%
Trugood Dr	11%
Burswood Dr West	3%
Torrens Rd	4%
Harris Rd	8%
Burswood Dr East	7%
Greenmount Dr	7%
Huntington Dr	1%
Te Koha Rd	3%
Botany Rd	3%
Te Irirangi Dr (Ti Rākau Dr – Te Koha Rd)	9%

## 3.10 Changes to the Baseline Traffic Environment

This section provides a brief overview of changes to the baseline traffic environment that were included in the traffic modelling assessments conducted in this ITA<sup>30</sup>.

### 3.10.1 Eastern Busway 1 (EB1)

EB1 is a key component of the overall Project. It is the segregated busway connection from Panmure train station to Pakūranga Town Centre. EB1 was completed near the end of 2021 and was included in all 'future year' scenarios.

### 3.10.2 WRRE Works

This assessment has considered the effects of the WRRE to be undertaken prior to EB3C, EB4i and EB4L construction. As noted above the WRRE has already been consented and includes the extension of William Roberts Road south to Tī Rākau Drive and the completion of the Cortina Place link between William Roberts Road and Reeves Road. WRRE was included in all future year scenarios.

### 3.10.3 Other EB2 and EB3R Enabling Works

This assessment has also considered the effects of other enabling works to be undertaken during the initial phases of the EB2 and EB3R construction programme, to enable the temporary closure of Reeves Road. The enabling works include geometric and traffic signal timing plan amendments at the Tī Rākau Drive / Reeves Road and Tī Rākau Drive / Gossamer Drive intersections. These enabling works form part of the EB2 and EB3R consent packages<sup>31</sup>.

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<sup>30</sup> Refer to Appendix A for a detailed description of these changes.

<sup>31</sup> See Appendix A.

## 4 EB3C, EB4i and EB4L Design and Construction

The sections below provide details of the proposed design and construction works<sup>32</sup>, split between the EB3C, EB4i and EB4L project areas.

The general extent of the EB3C project area is shown in **Figure 33** (in green), and includes the following roads:

- Tī Rākau Drive from Burswood Drive east to Guys Reserve
- Burswood Drive east
- A small section of Burswood Drive west



**Figure 33: EB3C general extent (green)**

**Figure 34** shows the general extent of the EB4i project area in blue and encompasses Tī Rākau Drive from Guys Reserve to Te Irirangi Drive.

<sup>32</sup> Refer to Appendix A for details on the proposed design and construction of the EB2 and EB3R project areas.



**Figure 34: EB4i general extent (blue)**

**Figure 35** shows the general extent of the EB4L project area (brown) in the Guys Reserve and the Te Irirangi Drive / Te Koha Road / Town Centre Drive intersection.



**Figure 35: EB4L general extent (brown)**

## 4.1 EB3C, EB4i and EB4L Design Overview

As stated in **Section 3.4.1**, without the Project, traffic volumes are predicted to increase on Tī Rākau Drive between Gossamer Drive and Harris Road. Furthermore, with very little growth predicted on Tī Rākau Drive between Harris Road and Te Irirangi Drive, it may indicate that this section of the network is at capacity in the existing environment. Therefore, it is likely that large queues and delays on these sections will act as a bottle neck for the rest of the network<sup>33</sup>.

The Project seeks to reduce congestion and travel times across the transport network, particularly for buses along Tī Rākau Drive. This will be achieved through the construction of dedicated bus lanes, some offline within residential areas and reserves. The dedicated bus lanes will, in future, provide a faster link from Tī Rākau Bridge to Botany, thereby eliminating the need to travel along Tī Rākau Drive inter-mixed with general traffic. The offline bus lane will consist of two lanes, one lane per direction. The Project will also support modal shift towards greater use of public and active transport.

In future, buses will have priority at intersections by way of ‘call-ahead’ features and advance loops to extend the traffic signal green time when a bus is within approach distance of an intersection. The buses will stop at new bus stations with modern facilities. Buses will also be able to move more efficiently, by being able to merge back into dedicated bus lanes instead of general traffic lanes, further improving travel times and general road safety.

The Project will seek to improve the catchment areas of public transport via improved bus stations, as well as improved walking and cycling infrastructure. Improved walkways, shared paths and a cycleway network will provide further improvements to safety and amenity.

Lastly, the Project will seek an all-around improvement in safety to all users through the use of relevant Transport Design Manual (TDM) design standards. Improved pedestrian crossing facilities will be provided to discourage jaywalking and to improve amenity.

### 4.1.1 EB3C – Tī Rākau Bridge to Burswood Drive west

General arrangement plans for EB3C are provided in **Appendix C**. The new offline bus lanes will continue along a new bus and cycleway bridge (Bridge A) from its interface with EB3R, to the north of the existing Tī Rākau Bridge. The bus lanes will follow this alignment up to Trugood Drive where it will curve northward along a new bridge (Bridge B), behind Chinatown and intersect with Burswood Drive west.

In contrast, the bidirectional cycleway will continue along the northern side of Tī Rākau Drive up to the intersection with Burswood Drive west. From here the bidirectional cycleway will be provided on the western side of Burswood Drive up to the intersection with the new busway.

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<sup>33</sup> Further details are provided in the Assessment of Environmental Effects (AEE).

It is intended that the following properties will be acquired by AT to allow for the proposed alignment through this section:

- 242 Tī Rākau Drive (Mobil service station)
- 254 Tī Rākau Drive (PetStop)
- Parcels of 262 Tī Rākau Drive (Chinatown), and
- 207 – 213 Burswood Drive

#### **4.1.2 EB3C – Burswood Drive west to Burswood Drive east and the Burswood Bus Station**

The new busway will remain offline between the two new Burswood Drive west and east intersections as it runs behind the commercial area (see **Appendix C**). The new bidirectional cycleway and a new footpath will be provided on the northern side of the busway along this section through the Burswood residential area. The intermediate bus station in the EB3C project area will be located along this section as well, closer to the residential area instead of along the regional corridor (i.e., Tī Rākau Drive) to improve station accessibility for residents. In future, the bus station will provide seating and sheltered cover. Bicycle and scooter parking will also be established. The two Burswood Drive intersections with the new dedicated bus lanes will be constructed as raised intersections with signalised crossings.

It is intended that the following properties will be acquired by AT to allow for the proposed alignment through this section:

- 200 Burswood Drive
- 16 – 24 Tullis Place
- 23 – 27, 28, 31 – 33 Dulwich Place
- 12 – 36 Heathridge Place
- 26, 30 – 32 Burswood Drive, and
- A parcel (or easement) of 28 Torrens Road

#### **4.1.3 EB3C – Burswood Drive east to Guys Reserve**

The busway and cycleway will enter the Burswood Esplanade Reserve (still offline), running parallel to Burswood Drive east up to the intersection with Tī Rākau Drive. Between the Tī Rākau Drive / Burswood Drive east and the new Guys Reserve intersections the busway will be running online, immediately north of Tī Rākau Drive (see **Appendix C**).

The intersection layouts at Burswood Drive, Greenmount Drive and Huntington Drive will remain largely as per the existing environment. However, Tī Rākau Drive will be reduced from three lanes to two lanes along this section of EB3C.

A new signalised intersection will be provided to the east of the existing access to the Howick and Eastern Bus Depot and will be used by general traffic only. The existing access to the Bus Depot will provide access for buses only to/from the new busway. Therefore, bus and general traffic entering the Bus Depot will be separated. The western and eastern approaches of the new intersection will both consist of three lanes, two full lengths through lanes and one short turning lane into the Bus Depot. The northern approach will consist of a single shared lane. Signalised pedestrian crossings will be provided on the western and northern approaches.

In addition, a new signalised intersection will be provided on Tī Rākau Drive adjacent to the Guys Reserve. This intersection will be at the interface between EB3C, EB4i and EB4L. It will also facilitate the transition of the online running busway in EB3C to the proposed bus lanes on Tī Rākau Drive in EB4i as well as the offline running busway in EB4L.

Along this section of EB3C, the cycleway will be provided adjacent to the new busway except for the section in front of the Bus Depot. Instead, the cycleway will curve northward at the western end of the property and proceed around the back of the Bus Depot. At the eastern end the cycleway will curve back south and run parallel to Tī Rākau Drive up to the new Guys Reserve intersection.

Four new crossing facilities will be provided along this section of Tī Rākau Drive. A single stage pedestrian crossing will be provided on the western arm of the intersection with Greenmount Drive, with an additional crossing east of the intersection across the busway. A three-stage pedestrian crossing will be provided on the western arm at the new Bus Depot access. Lastly, a two-stage shared crossing will be provided on the western arm of the new Guys Reserve intersection.

It is intended that the following properties will be acquired by AT to allow for the proposed alignment through this section:

- 21 and 23 Burswood Drive,
- Parcels of the Burswood Esplanade Reserve
- Parcels of 380 Tī Rākau Drive (Howick and Eastern Bus Depot)
- 386 Tī Rākau Drive (Gull Botany Downs service station), and
- A parcel of 400R Tī Rākau Drive (Bard Place Reserve)

#### 4.1.4 EB4i – Guys Reserve to Te Irirangi Drive

An EB3C/EB4i transition general arrangement plan is provided in **Appendix D**. As stated in **Section 4.1.3**, a new signalised intersection will be provided on Tī Rākau Drive adjacent to Guys Reserve at the interface between EB3C, EB4i and EB4L. Before EB4L is implemented, EB4i will allow for the transition of the online running busway in EB3C to the proposed bus lanes on Tī Rākau Drive between the new Guys Reserve and Te Irirangi Drive intersections. Buses will proceed along Tī Rākau Drive towards the Botany Town Centre bus station via the Tī Rākau Drive / Te Irirangi intersection. Buses will then travel along Te Irirangi Drive as per the existing environment.

Various intersection layouts and bus lane configuration options were modelled in AIMSUN and SIDRA to test the effects on intersection performance and bus travel times. The preferred option (Option E, shown in **Appendix D**) proposes to provide a median-side dedicated bus lane for westbound buses from the eastern arm of the intersection with Te Koha Road up to the new Guys Reserve intersection. A kerbside bus lane for eastbound buses will be provided from the new Guys Reserve intersection up to the intersection with Te Koha Road. A bus queue jump phase will be added to the traffic signal phasing at the Tī Rākau Drive / Te Koha Road intersection. This will assist eastbound buses to weave across to the right turning lanes at the Te Irirangi Drive intersection downstream. As stated above, a signalised shared crossing will be provided on the western arm of the Tī Rākau Drive / Guys Reserve intersection. In the interim, the bidirectional cycleway and footpath will continue along the northern side of Tī Rākau Drive and transition to a shared path between Bard Place Reserve and Te Koha Road. The existing pedestrian crossings at the Tī Rākau Drive / Te Koha Road intersection as well as the footpath on the southern side of Tī Rākau Drive will be maintained.

#### 4.1.5 EB4L – Guys Reserve to Te Irirangi Drive / Town Centre Drive Intersection

General arrangement plans for EB4L are provided in **Appendix E**. The busway will continue along an offline alignment through Guys Reserve and Whaka Maumahara and will for the majority of this section run along a bridge (Bridge C). At its western end it will interface with EB3C and EB4i as discussed above. At its eastern end the busway will join the Te Irirangi Drive / Town Centre Drive intersection.

The western, northern, and southern approaches at the Te Irirangi Drive / Town Centre Drive intersection will remain largely unchanged.

The eastern Town Centre Drive approach will be widened to provide a left-turn slip lane, a short bus lane, a full length shared through and right-turn lane and a full length right-turn lane. The slip lane on the northern approach will be retained. To improve pedestrian safety on these slip lanes, raised platforms will be provided.

The existing pedestrian pathway in the Guys Reserve and Whaka Maumahara will be realigned and will maintain access for residents at Cottessmore Place and Kirikiri Lane. A new dedicated footpath and cycleway will be provided along the western boundary of the Guys Reserve and Whaka Maumahara. At the western end the facilities will connect to the shared crossing at the new Tī Rākau Drive / Guys Reserve intersection as discussed above. At the eastern end the facilities will curve northward along the western side of Te Irirangi Drive and terminate at the Te Irirangi Drive / Town Centre Drive intersection.

It is intended that the following properties will be acquired by AT to allow for the proposed alignment through this section:

- Parcels of 181R Guys Reserve, and
- Parcels of 204R Guys Reserve (Whaka Maumahara)



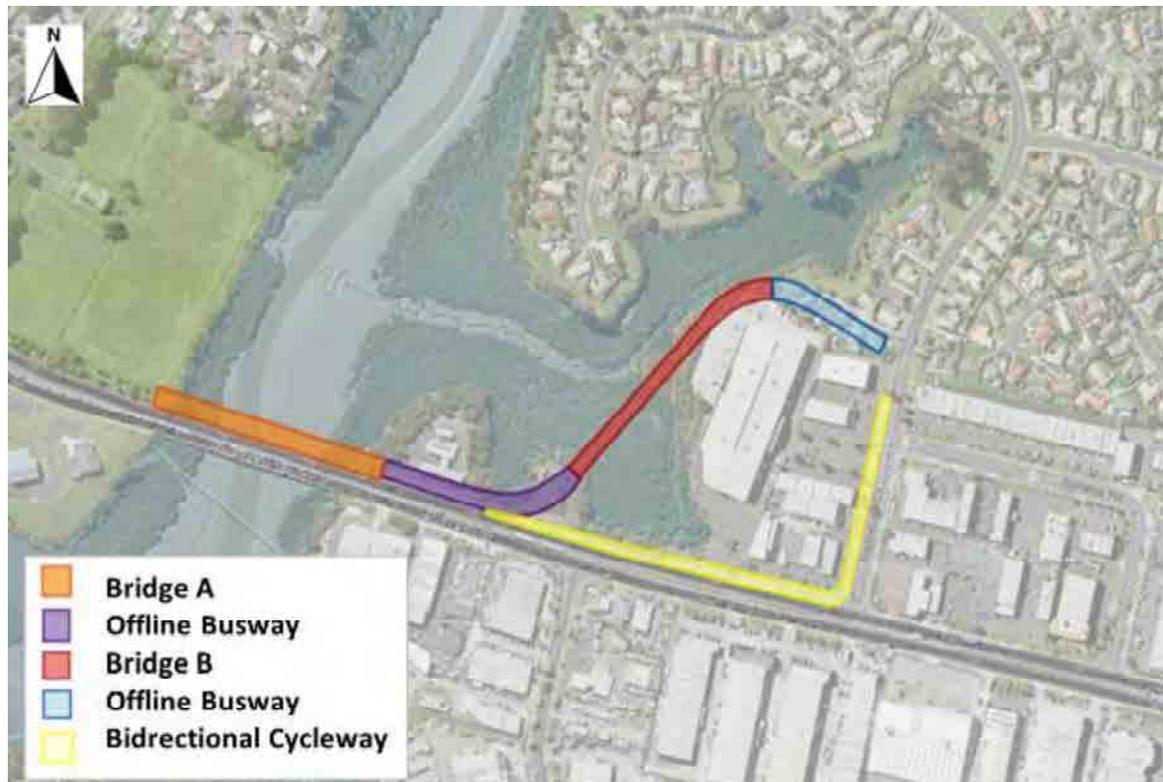
Figure 36: Guys Reserve to Te Irirangi Drive and Town Centre Drive Intersection (EB4L)

## 4.2 EB3C, EB4i and EB4L Construction Overview

The sections below provide details on the proposed construction methodology, split between the EB3C, EB4i and EB4L project areas.

### 4.2.1 EB3C – Tī Rākau Bridge to Burswood Drive west

**Figure 37** shows the indicative work zones in part of EB3C from the Tī Rākau Drive bridge to Burswood Drive west, including Bridge A (orange outline), Bridge B (red outline), offline busway sections (purple and blue outlines) and the bidirectional cycleway (yellow outline).



**Figure 37: Indicative work zones – Tī Rākau Bridge to Burswood Dr west (EB3C)**

The works in this section of EB3C will be offline and is not expected to result in lane reductions on Tī Rākau Drive. The construction of Bridge A and Bridge B is planned to be undertaken from late-2023, with an indicative duration of one and half years.

Following the construction of the bridges it is expected that the offline busway sections will be constructed, starting from late-2024 with an indicative duration of six months. The construction of the bidirectional cycleway can be undertaken at any time and is expected to have a relatively short construction period of approximately six months.

#### 4.2.2 EB3C – Burswood Drive west to Burswood Drive east and the Burswood Bus Station

Figure 38 shows the indicative works zones in part of EB3C between the new Burswood Drive west and east intersections (grey outlines) as well as the offline busway and cycleway (red outline). The intermediate Burswood bus station will also be constructed in this section.



Figure 38: Indicative work zones – Burswood Dr west to east and Burswood bus station (EB3C)

The majority of the works in this section of EB3C will also be offline (e.g., the areas excluding the works related to the new intersections). The construction of the offline busway, cycleway, walkway, and bus station is planned to be undertaken from late-2023, with an indicative duration of one and half years.

The construction methodology of the two new Burswood Drive / Busway signalised intersections is expected to be similar to that of the two Edgewater Drive intersections in EB3R<sup>34</sup>. This will require the closure of Burswood Drive at the proposed intersections, while diverting all residential traffic along Burswood Drive to the other, in an alternating fashion. These works are planned to be undertaken from early-2025, with an indicative duration of three months for each intersection.

<sup>34</sup> See Appendix A.

### 4.2.3 EB3C – Burswood Drive east to Guys Reserve

Figure 39 shows the indicative work zones in part of EB3C from Burswood Drive east to Guys Reserve. This section includes:

- The offline busway (blue outline)
- Burswood Drive to Greenmount Drive intersections (orange outline)
- The offline cycleway (grey outline)
- Tī Rākau Drive eastbound carriageway (yellow outline)
- Tī Rākau Drive centre of carriageway (purple outline)
- Tī Rākau Drive westbound carriageway (red outline), and
- The Guys Reserve intersection (green outline)

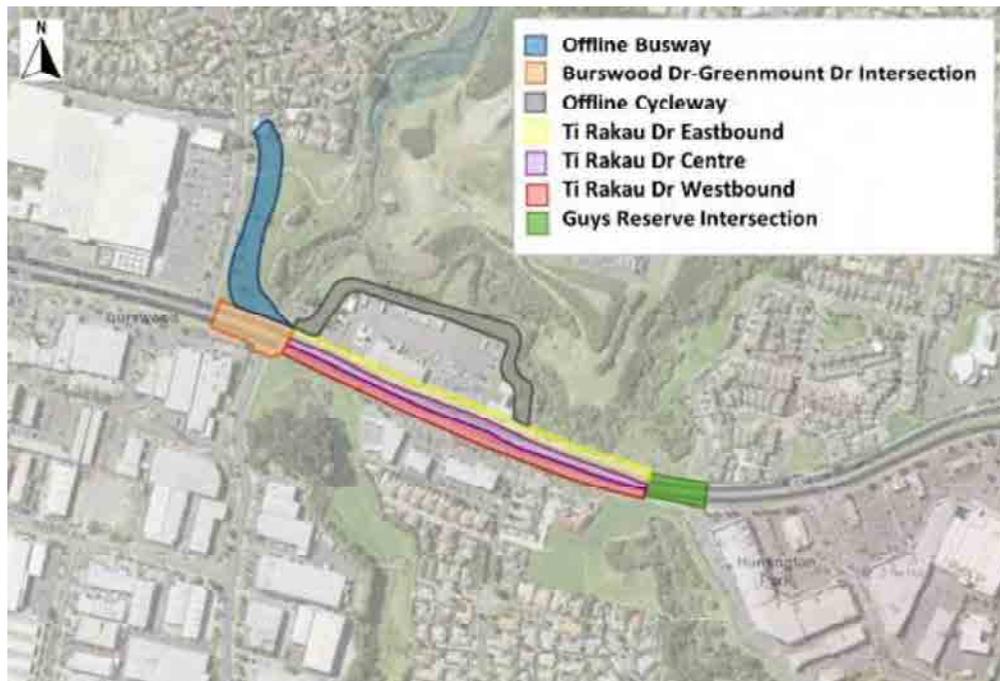


Figure 39: Indicative work zones – Burswood Dr east to Guys Reserve (EB3C)

The construction of the online works within this section of Tī Rākau Drive are planned to be undertaken from mid-ate 2024 with an indicative duration of one and a half years. It is assumed that the works along this section of Tī Rākau Drive will be split into four main phases and that at least two through lanes per direction will be maintained. Phases 1 and 2 are expected to include the construction of the new signalised access at the Howick and Eastern Bus Depot, the busway, and the eastbound carriageway. Phases 3 and 4 are expected to include works in the centre and the westbound carriageway, respectively.

The construction of the offline busway is planned to be undertaken from mid to late-2025, with an indicative duration of six months. The construction of the bidirectional cycleway can be undertaken at any time and is expected to have a relatively short construction period.

#### 4.2.4 EB4i – Guys Reserve to Te Irirangi Drive

Figure 40 shows the indicative work zone in EB4i between the Guys Reserve and Tī Rākau Drive / Te Irirangi Drive intersections (blue outline).



Figure 40: Indicative work zone – Guys Reserve to Te Irirangi Dr (EB4i)

The works in the EB4i project area will involve minor road marking amendments, temporary kerb extensions and traffic signal upgrades. It is assumed that these works will be undertaken late in the construction programme. It should be noted that these planned works will be within the road reserve.

#### 4.2.5 EB4L – Guys Reserve to Te Irirangi Drive / Town Centre Drive Intersection

Figure 41 shows the indicative work zones in EB4L between the Guys Reserve and Te Irirangi Drive / Town Centre Drive intersections. This section includes the offline busway (blue outline), the offline cycleway (orange outline), and the Te Irirangi Drive / Te Koha Road / Town Centre Drive intersection (red outline).



Figure 41: Indicative work zones – Guys Reserve to Te Irirangi Dr / Town Centre Dr intersection (EB4L)

Most works within the EB4L project area will be offline. The construction of the busway and cycleway can be undertaken at any time during the construction programme and is expected to have an indicative duration of two years.

As stated in Section 4.1.5, the southern and western slip lanes will be removed, and raised platforms will be provided on the northern and eastern slip lanes to improve pedestrian safety at the Te Irirangi Drive / Town Centre Drive intersection. The eastern Town Centre Drive approach will be widened to provide a left-turn slip lane, a short bus lane, a full length shared through and right-turn lane and a full length right-turn lane. The construction period of the intersection, estimated at one to two months, is however expected to be significantly shorter than that of the bridge in EB4L.

For the purposes of this transport assessment a conservative assumption was made that EB4L construction would be undertaken concurrently with EB3C. This approach allowed for the assessment of potential cumulative effects on the transport network.

## 5 Assessment of Temporary Effects during Construction

The sections below provide an assessment of the temporary effects during construction of EB3C, EB4i and EB4L including:

- Construction effects
- Road traffic effects
- Effects to pedestrian and cyclist
- Effects to property access and parking
- Effects to safety performance

### 5.1 Construction Effects

#### 5.1.1 Construction Support Areas and Site Access Points

The sections below provide details of notable Construction Support Areas (CSAs) and Site Access Points (SAPs) within the EB3C, EB4i and EB4L project areas as well as an assessment of their temporary effects<sup>35</sup>. The SAPs are anticipated to vary throughout the construction phases, shifting as sections of the roadway are completed.

The CSA locations were chosen after considering their proximity to the planned works, possible access routes, and distance away from residential areas to minimise noise and disruption to residents. Other smaller facilities (for worker welfare) will be set up as works progress along the alignment. Within each compound, designated carparking areas will be set up for construction staff and visitors.

Parking on side streets by construction staff will be discouraged through regular messaging at inductions and toolbox meetings and will be monitored to ensure minimal disruption to the community and users of sports fields, public reserves, and townships on event / opening day(s).

The final location of construction compounds / satellite offices and the activities undertaken within each area will be confirmed in the Construction Environment Management Plan (CEMP). However, the location, size and scale of these compounds may be governed by resource consent and designation conditions.

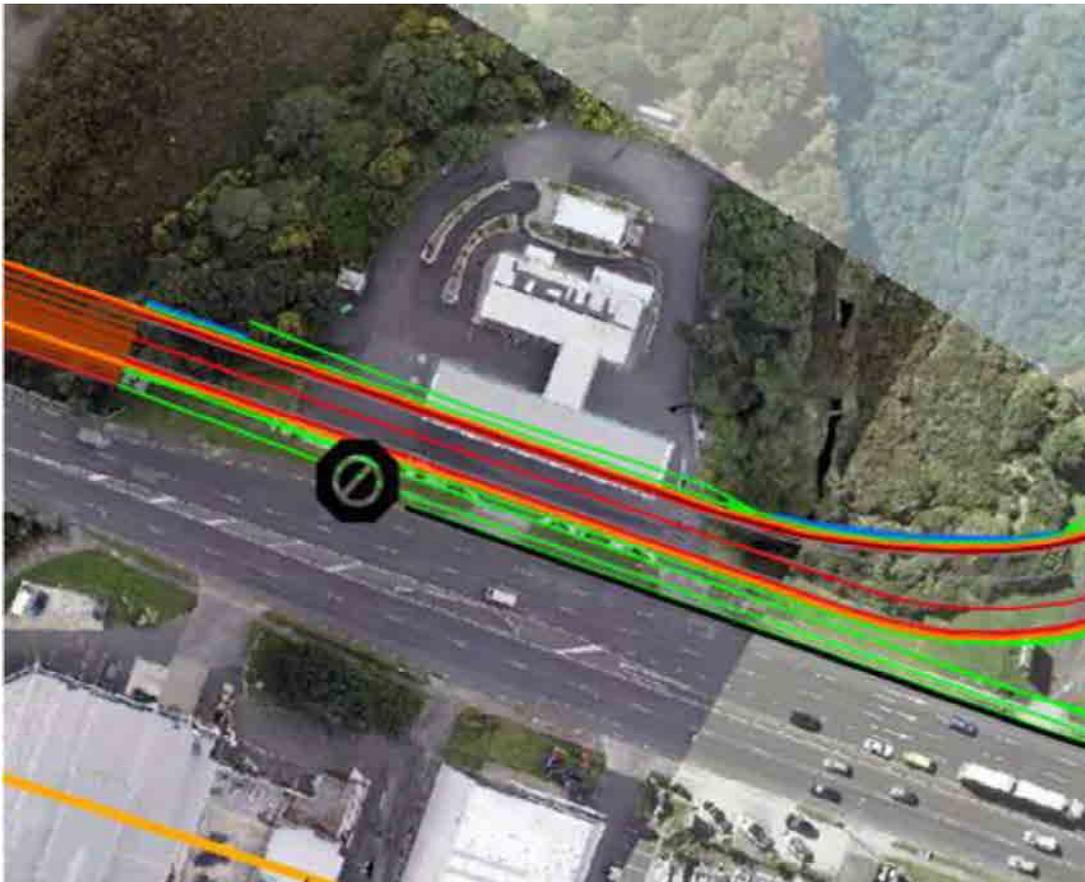
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<sup>35</sup> Refer to Appendix A for details and assessment of the CSAs and SAPs in the EB2 and EB3R project areas.

5.1.1.1 EB3C – 242 Tī Rākau Drive (Mobil service station) CSA and 254 Tī Rākau Drive (PetStop)

It is intended that the property at 242 Tī Rākau Drive (currently a Mobil service station) will be acquired by AT and will serve as a temporary site compound. Therefore, the current use of the Mobil service station will no longer exist in the future. The CSA will be used as a satellite office with some carparking, as well as a staging area for the construction of Bridge A and the western civil works. Access will be off Tī Rākau Drive, utilizing the existing driveway as the entry point. Temporary pavement will be constructed in the existing median on Tī Rākau Drive to provide a temporary right-turn pocket into the property. This CSA is estimated to be occupied from mid-2024 for an indicative duration of 42 months.

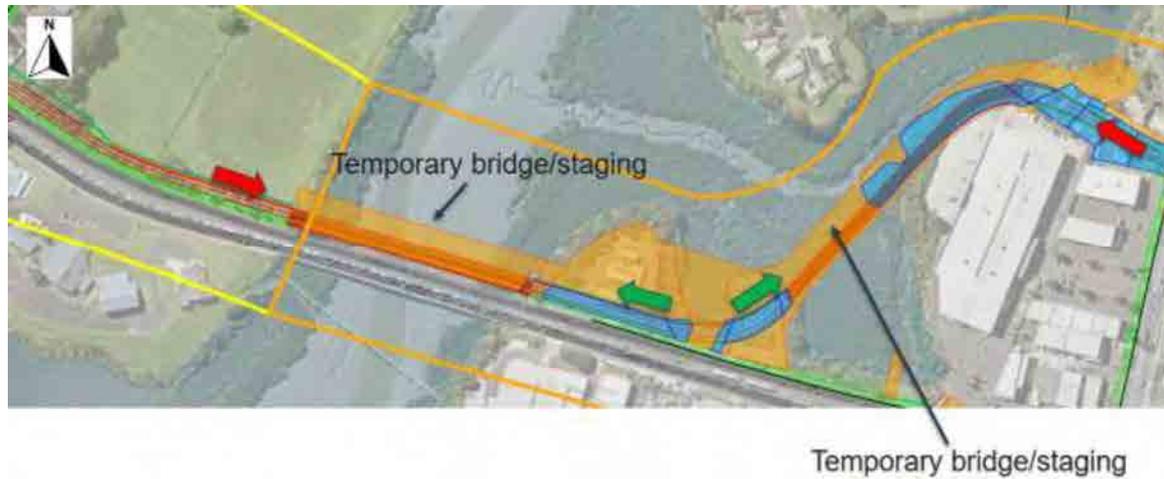
**Figure 42** shows the location of the CSA and SAP at 242 Tī Rākau Drive in EB3C.



**Figure 42: 242 Tī Rākau Drive (Mobil service station) CSA and SAP in EB3C**

The CSA is intended to provide 10 parking spaces for staff and visitors. A conservative assumption was made that all vehicles would arrive/depart the CSA during the AM and PM peak hours, respectively. This would translate to an additional 10 veh/h added to the traffic network during the peak hours. Therefore, the temporary effects of this contained site on the road network are expected to be very low. An assessment of the temporary effects of heavy vehicle construction traffic to/from this CSA is provided in **Section 5.1.2**.

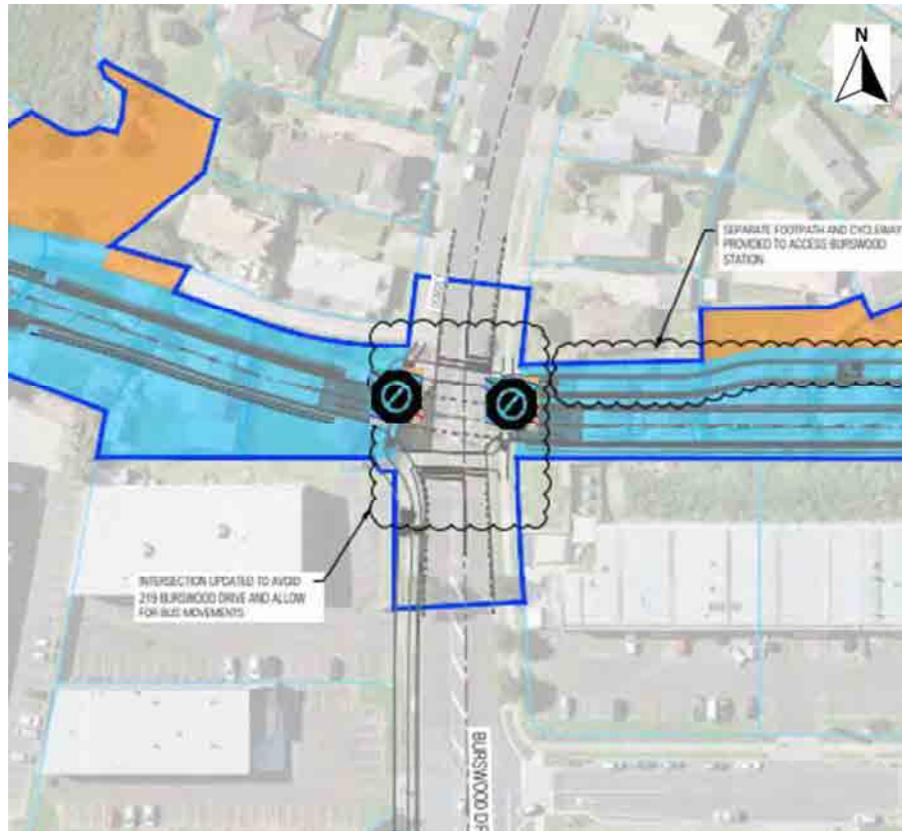
Although not part of the CSA at 242 Tī Rākau Drive, it is intended that the PetStop property at 254 Tī Rākau Drive will also be acquired by AT to serve as a staging area for the construction of Bridge B. It will also form part of the permanent bridge footprint. Therefore, the current use of the property will no longer exist in the future. **Figure 43** shows the 242 and 254 Tī Rākau Drive staging areas.



**Figure 43: 242 and 254 Tī Rākau Dr staging areas in EB3C**

#### 5.1.1.2 EB3C – Burswood Drive SAPs

It is expected that three additional SAPs will be established to assist in the construction of the offline busway behind Chinatown and between Burswood Drive west and east. Two of the SAPs will be located along Burswood Drive west on either side of the proposed Burswood Drive west / Busway intersection, and one SAP at the proposed Burswood Drive east / Busway intersection. **Figure 44** and **Figure 45** show the SAPs along Burswood Drive west and east in EB3C. An assessment of the temporary effects of heavy vehicle construction traffic to/from these SAPs is provided in **Section 5.1.2**.



**Figure 44: Burswood Dr west SAPs in EB3C**

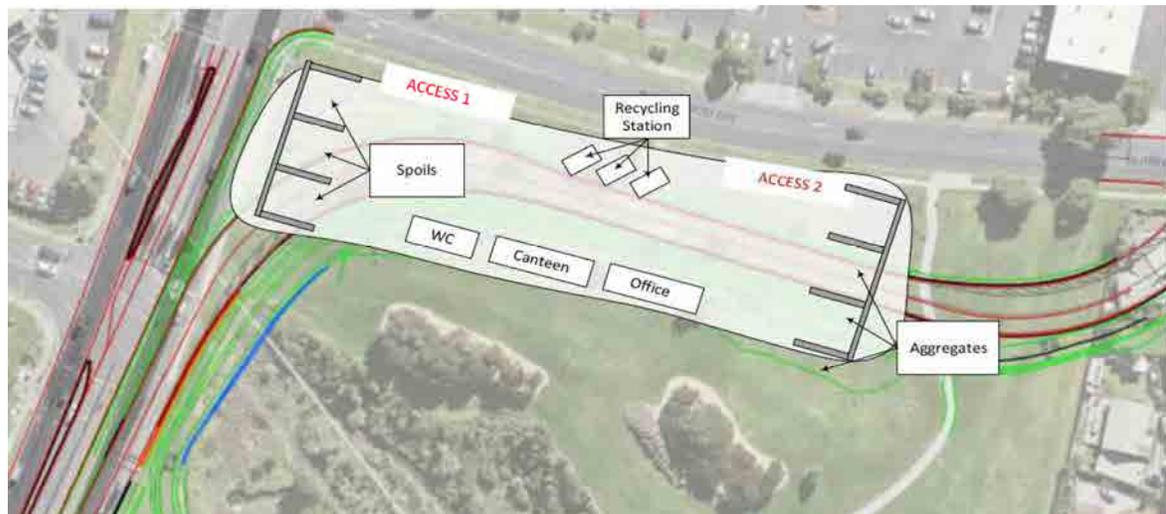


**Figure 45: Burswood Dr east SAP in EB3C**

### 5.1.1.3 EB3C – Burswood Esplanade Reserve CSA

A part of the Burswood Esplanade Reserve is intended to be temporarily occupied to serve as a site compound. The CSA will also be used as a satellite office with some carparking, as well as a transfer station for the construction works in EB3C. Temporary access points will be constructed off Burswood Drive east. This CSA is estimated to be occupied from mid-2024 for an indicative duration of 42 months, upon which it will be removed to make way for a section of the busway.

**Figure 46** shows the location of the CSA and SAPs at the Burswood Esplanade Reserve in EB3C.



**Figure 46:** Indicative layout of the CSA and SAPs at the Burswood Esplanade Reserve in EB3C

This CSA is also intended to provide 10 parking spaces for staff and visitors. A conservative assumption was made that all vehicles would arrive/depart the CSA during the AM and PM peak hours, respectively. This would translate to an additional 10 veh/h added to the traffic network during the peak hours. Therefore, the temporary effects of this contained site on the road network are expected to be very low. An assessment of the temporary effects of heavy vehicle construction traffic to/from this CSA is provided in **Section 5.1.2**.

### 5.1.1.4 EB4L – Guys Reserve CSAs

It is expected that the north-western corner of the Guys Reserve (adjacent to Ti Rakau Drive and 47C Huntington Drive) will be temporarily occupied to serve as a site compound (CSA 1). It is expected that this CSA will be used as a satellite office with some carparking and a staging area for the Guys Reserve bridge construction from the north. Access is expected to be gained from Ti Rākau Drive. This CSA is expected to be occupied for an indicative duration of 24 months. **Figure 47** shows the indicative location of CSA 1 (red outline) and the SAP at the Guys Reserve in EB4L.



**Figure 47: Indicative location of CSA 1 and SAP at the Guys Reserve in EB4L (red outline)**

It is also expected that the eastern frontage of Whaka Maumahara with Te Irirangi Drive will be temporarily occupied to serve as a site compound (CSA 2). Similar to CSA 1, this CSA will be used as a satellite office with some carparking and a staging area for Bridge C construction from the south. Access is expected to be gained from Te Irirangi Drive and will be occupied for an indicative duration of 24 months. **Figure 48** shows the indicative location of CSA 2 (red outline) and the SAP at Whaka Maumahara in EB4L.



**Figure 48: Indicative location of CSA 2 and SAP at Whaka Maumahara in EB4L (red outline)**

Considering the similar size and function of CSA 1 and 2 in EB4L compared to the proposed CSAs in EB3C, it has been assumed that that these CSAs will provide a similar level of carparking (10 parking spaces). Therefore, as above, the temporary effects on the transport network are expected to be very low. An assessment of the temporary effects of heavy vehicle construction traffic to/from these CSAs is provided in **Section 5.1.2**.

As stated in **Section 5.1.1**, parking on side streets by construction staff will be discouraged and monitored to ensure minimum disruption to the community. The final location of construction compounds / satellite offices and the activities undertaken within each area will be confirmed in the CEMP. The location, size and scale of these compounds may be governed by resource consent and designation conditions.

### 5.1.2 Construction Vehicle Effects

The sections below provide details on the construction routes, construction traffic volumes, hours of operation and vehicle types. Thereafter, an assessment of construction vehicle effects is provided, split into sections of the project areas<sup>36</sup>.

#### 5.1.2.1 Construction Routes and Construction Traffic

The construction routes in and around the EB3C, EB4i and EB4L project areas are shown in **Figure 49**. At the time of writing, suppliers of construction materials had not been confirmed. Therefore, the most likely routes for construction vehicle movements to the project areas from plant and material sites not in the immediate vicinity will be the main corridor of Ti Rākau Drive, either through SEART, Harris Road or Te Irirangi Road (main external routes). The figure also shows the Burswood Esplanade Reserve transfer station, as well as the ‘internal material transfer routes’<sup>37</sup> to be used by construction vehicles.



**Figure 49: Construction vehicle routes**

Bulk deliveries of construction materials and the export of waste will predominantly be via the Burswood Esplanade Reserve transfer station. Materials will be transferred between site specific locations and the CSA throughout the Project duration via the three routes. The CTMP will define the site traffic movements to and from the site. Specific deliveries such as retaining wall blocks and bridge beams will be delivered directly to the site location as required. **Table 9** below provides a description of each route as well as the anticipated number of vehicle movements per hour. The number of vehicle movements also include the carting of demolition materials and excess spoil.

<sup>36</sup> Refer to Appendix A for details on construction vehicle effects in the EB2 and EB3R project areas.

<sup>37</sup> Route numbering convention continued from the construction routes in EB2 and EB3R, see Appendix A.

**Table 9: Construction route description and movements**

Route	Construction Activity	Description	Vehicle Movements [veh/h]
Route 7	EB3C Burswood Busway and Bus Station	Egress from the transfer station onto Burswood Dr east northbound, then through the new busway construction area in Burswood residential area westbound, Burswood Dr west southbound, Tī Rākau Dr eastbound, Burswood Dr east northbound, return to transfer station.	2
Route 8	EB3C Bridge A, Bridge B and Western Civil works	Egress from transfer station onto Burswood Dr east southbound, then Tī Rākau Dr westbound, right turn into 242 Tī Rākau Dr, left turn out of 242 Tī Rākau Dr, Tī Rākau Dr eastbound, Burswood Dr east northbound, return to transfer station.	3
Route 9	Shared path, retaining walls and Bridge C	Egress from transfer station onto Burswood Dr east southbound, then Tī Rākau Dr eastbound, turn right into Guys Reserve CSA 1, Tī Rākau Dr westbound, Burswood Dr east northbound, return to transfer station.	2

As stated in **Section 4.2.5**, a conservative assumption was made that EB4L construction would be undertaken concurrently with EB3C to allow for an assessment of cumulative effects. Should this not be the case, for example EB4L is constructed at a later date, materials for Bridge C, retaining walls and other construction works would be carted directly to the proposed CSAs in EB4L. Therefore, construction Route 9 would not be required.

#### 5.1.2.2 Vehicle Types

It is anticipated that a range of vehicle sizes and types will be used for the construction activities within the EB3C, EB4i and EB4L project areas. As stated above, bulk deliveries of construction materials to the transfer station as well as site specific deliveries to other locations will occur during the construction period. It is assumed that 19m truck and trailers will be used for these activities. Materials from the transfer station will be transported to the various work zones via the internal routes with smaller vehicles units such as 6-wheeler trucks.

OD and OW deliveries are also expected; however, these will be infrequent, during low traffic periods such as night deliveries and will travel along appropriate routes such as regional and arterial roads. The Tī Rākau Drive, SEART, Harris Road, and Te Irirangi Drive corridors are well-suited to larger vehicles. Overall, the effects of these types of construction vehicles to the road network are expected to be negligible.

### 5.1.2.3 Hours of Operation

The vast majority of construction activities will be undertaken during ‘typical weekdays’ throughout the construction programme, as well as some weekends. Some construction activities may also be undertaken during lower traffic periods such as April and December holiday periods.

The general hours of operation for the construction activities and the construction routes are envisaged to be from 07:00 to 18:00 on weekdays and 07:00 to 15:00 on Saturdays<sup>38</sup>. As such, construction vehicle movements will be spread throughout the day, avoiding concentrations of construction traffic during the AM and PM peak hours. Therefore, the effects are expected to be very low.

It is anticipated that some night works will be undertaken to minimise the disruption to the public, businesses, and traffic. Night works will be intermittent and will not be continuous in a single location or activity for more than one month. These works will be controlled in part by the Project’s conditions and management plans<sup>39</sup>.

The sections below provide an assessment of construction vehicle effects on specific sections of the road network within the EB3C and EB4L project areas.

### 5.1.2.4 EB3C and EB4L – Tī Rākau Drive

An assessment of construction vehicle effects is provided below for the following sections of Tī Rākau Drive in EB3C (see **Figure 50**):

- Section 1 – Tī Rākau Bridge to Burswood Drive west
- Section 2 – Burswood Drive west to Burswood Drive east, and
- Section 3 – Burswood Drive east to Guys Reserve



**Figure 50: Tī Rākau Drive construction vehicle effects**

<sup>38</sup> It should be noted that staff will begin arriving at site prior to construction start times and leave after construction end times.

<sup>39</sup> These management plans include the Construction Noise and Vibration Management Plan (CNVMP).

Route 8 will be travelling through Section 1 to assist with the construction of Bridge A and B as well as the offline sections of busway. As per **Table 9**, it is expected that this section of Tī Rākau Drive will carry an additional 3 veh/h in both directions.

As stated in **Section 5.1.1.1**, it is intended that the properties at 242 and 254 Tī Rākau Drive will be acquired by AT. Therefore, the current use of these properties will no longer exist in the future. Lastly, the existing pedestrian facilities across Tī Rākau Drive at the Trugood Drive and Burswood Drive west intersections will be maintained during construction.

Routes 7 and 8 will be travelling through Section 2. As per the table above, it is expected that this section of Tī Rākau Drive will carry an additional 5 veh/h eastbound and 3 veh/h westbound. The existing pedestrian facilities across Tī Rākau Drive at the Burswood Drive west, Harris Road and Burswood Drive east intersections will be maintained.

It is assumed that Route 9 will be travelling through Section 3<sup>40</sup>. As such, it is expected that this section of Tī Rākau Drive will carry an additional 2 veh/h in both directions. It should be noted that no pedestrian crossing facilities are currently provided along this section, except at the Burswood Drive east and Te Koha Road intersections. These will be maintained during construction.

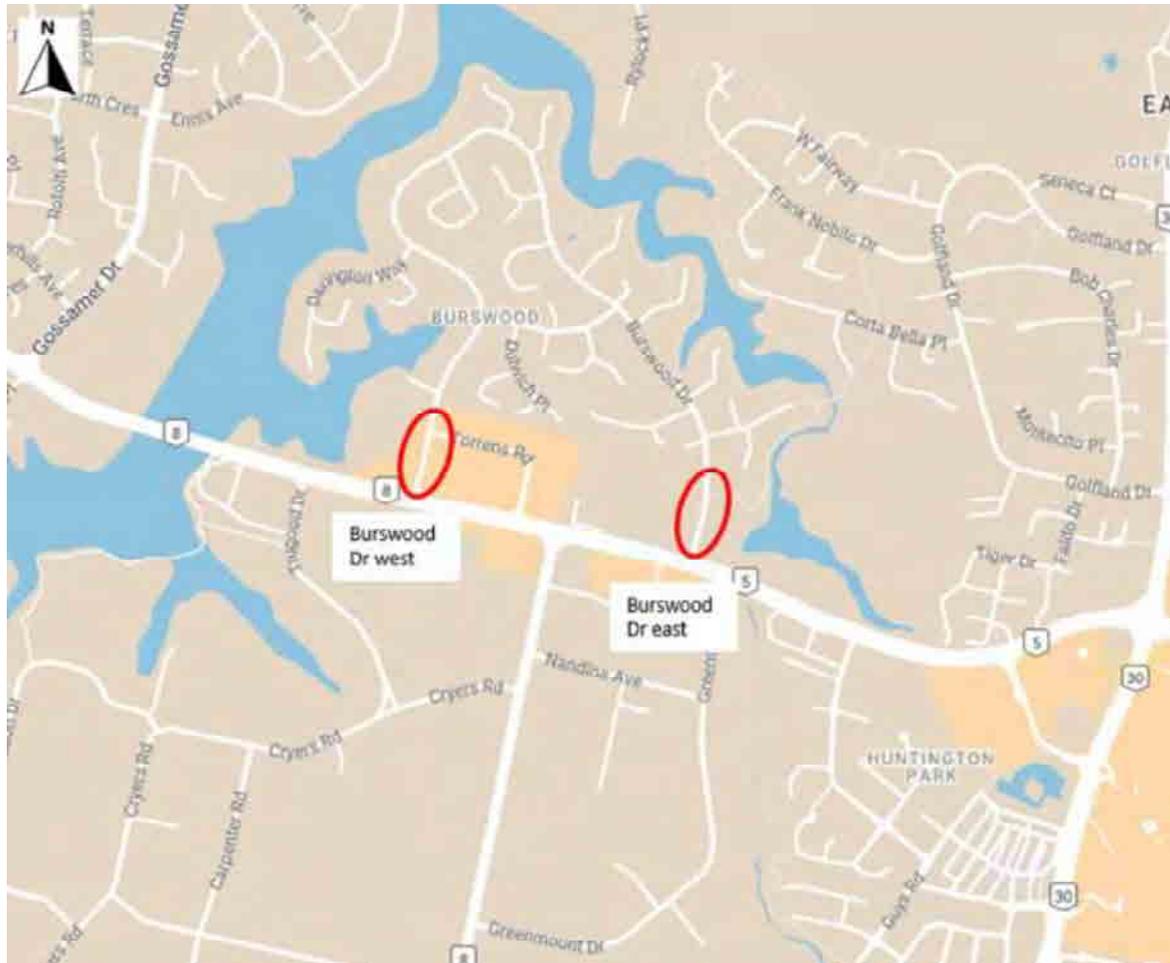
Overall, the addition of construction vehicles to Section 1 of Tī Rākau Drive is expected to be one vehicle every 20 minutes in each direction, one vehicle every 12 minutes in Section 2 and is assumed to be one vehicle every 30 minutes in Section 3. Tī Rākau Drive is also well-suited to larger sized vehicles as a regional route. Furthermore, the current use of some of the properties on the northern side of Tī Rākau Drive will no longer exist and the existing pedestrian crossing points will be maintained. Therefore, based on the above assumptions, the temporary effects are considered to be negligible to very low.

#### *5.1.2.5 EB3C – Burswood Drive west and Burswood Drive east*

This section includes both Burswood Drive west and Burswood Drive east from the new Burswood offline busway in the north to Tī Rākau Drive in the south, see **Figure 51**.

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<sup>40</sup> If construction of EB4L is not undertaken simultaneously with EB3C, all construction materials for EB4L would be transported directly to the EB4L CSAs. As such, no transfer routes would be required as all material carting would be done within the construction work zone.



**Figure 51: Burswood Drive construction vehicle effects**

During the construction of the Burswood offline busway and bus station, construction vehicles are expected to enter Burswood Drive east from the Burswood Esplanade Reserve CSA heading northbound, then into the offline busway and bus station construction area, and into Burswood Drive west southbound. Construction vehicles heading between the transfer station and the CSA at 242 Tī Rākau Drive in EB3C or the CSA at Guys Reserve in EB4L are expected to travel along the southern section of Burswood Drive east.

Burswood Drive west is a secondary collector road and Burswood Drive east is a primary collector road<sup>41</sup>, consisting of one lane in each direction. There are signalised pedestrian crossings provided at the two intersections with Tī Rākau Drive, as well as short strips of solid median islands along Burswood Drive west.

<sup>41</sup> <https://nzta.maps.arcgis.com/apps/webappviewer/index.html?id=95fad5204ad243c39d84c37701f614b0>

Burswood Drive east is expected to carry an additional 7 veh/h northbound and 5 veh/h southbound. Burswood Drive west (southbound) is expected to carry an additional 2 veh/h. The WonderKids Childcare and Preschool at 2 Torrens Road is located close to Burswood Drive west and has some potentially vulnerable users (i.e., children). **Figure 52** shows the location of this education facility (red outline).



**Figure 52: Burswood Dr west education facility (red outline)**

Although the property access is not directly fronting Burswood Drive, appropriate community engagement will be undertaken to raise awareness of the increase in construction vehicles that will pass through this area. Construction vehicle drivers will also be briefed on this property so that additional caution is employed when driving through the area. This will be achieved through the CTMP which will be required by the conditions.

Overall, the addition of construction vehicles to Burswood Drive west (southbound) is expected to be one vehicle every 30 minutes, and one vehicle every eight minutes on Burswood Drive east (northbound). Furthermore, the existing pedestrian crossing facilities will be maintained, and community engagement will be undertaken regarding potentially vulnerable users. Therefore, the temporary effects are considered to be low.

#### 5.1.2.6 *Summary of Temporary Construction Effects*

Overall, the temporary effects of the CSAs and SAPs that will be established as well as the construction traffic in the EB3C, EB4i and EB4L project areas will be mitigated appropriately and are considered to be negligible or very low.

CTMPs will be developed for the Project to avoid, remedy or mitigate the adverse effects of construction on transport, parking and property access so far as is reasonably practicable. The CTMPs will be developed in accordance with the conditions and will include management strategies, controls and reporting protocols to achieve this.

Hours of operation, especially night works, will be controlled in part by the Project's conditions and management plans, including the CNVMP.

## 5.2 Temporary Road Traffic Effects

The sections below provide an assessment of effects to road traffic, including general traffic and buses, during construction. Under this assessment, effects to road traffic refers to the movement of traffic across the road network as a whole. An assessment at a network-wide level provides a better understanding as to the wider traffic effects of the Project and is based on the results from various AIMSUN traffic modelling assessments<sup>42</sup>.

As stated in **Section 2.3**, Auckland's transport networks are constantly changing, undergoing improvements from new initiatives, and being optimised. Furthermore, the global COVID-19 pandemic dramatically affected travel patterns and behaviours, and uncertainty remains as to how these effects would continue into the future. Given these factors, careful consideration was given to determine what formed the "existing environment".

For the purposes of the scenario employed by the traffic modelling and this assessment, the existing environment was based on pre COVID-19 travel behaviours and a number of committed transport projects (including EB1 and WRRE Works) as well as the EB2/EB3R enabling works. Furthermore, a conservative approach was followed, whereby a 2028 future year was used to compare a Do-Minimum (without project) scenario and a EB2/EB3/EB4 (with project) scenario. This approach allowed for the direct comparison between scenarios.

### 5.2.1 Construction Traffic

As stated in **Section 5.2.1**, the effects of the estimated construction traffic volumes are expected to be negligible to low and will be catered for within the existing road network. Therefore, a separate modelling assessment of the 'Do-Minimum' vs 'Do-Minimum + Construction Traffic' scenarios on the entire network was not considered necessary.

### 5.2.2 Modelling Scenario Development

At the time of writing this ITA, the overall construction staging is under development. Therefore, assumptions have been made as to when the EB3C and EB4 works will be scheduled within the construction programme and what other works in the EB2 and EB3R project areas would be occurring at the same time.

As stated in **Section 4.2**, most of the main road works in EB3C and EB4L will be offline, with the exception being the works on Ti Rākau Drive between Burswood Drive east and Guys Reserve. From a traffic modelling perspective, these offline works can be undertaken at any time as these works are not expected to affect the transport network.

Other online road works are planned, as stated in **Section 4.2.4** and **Section 4.2.5**, however these works are expected to be considerably less extensive and shorter in duration. As such, the online works in EB4i and EB4L have not been included in the modelling scenario development.

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<sup>42</sup> These assessments were undertaken in accordance with the methodology set out in **Section 2.4**.

For the purposes of this assessment, a conservative assumption was made that the proposed online works along Tī Rākau Drive in EB3C, between Burswood Drive east and Guys Reserve, would be undertaken simultaneously with the closure of Reeves Road in EB2 and the ongoing construction of the Reeves Road Flyover (RRF), i.e., RRF not constructed yet<sup>43</sup>.

As such, the EB2/EB3/EB4 Construction Scenario model simulates the following changes to the transport network:

- Closure of Reeves Road from Tī Rākau Drive to William Roberts Road in EB2 (**Appendix A**)
- Ongoing construction of the new bus lanes in EB2 on the northern side of Tī Rākau Drive and the completion of the new Tī Rākau Drive / Aylesbury Street / Palm Avenue crossroads intersection. Three lanes in the eastbound carriageway will be maintained (**Appendix A**)
- Completion of the new SEART offramp in EB2, providing two left-turn lanes (one of which will be temporary) and two right-turn lanes (**Appendix A**)
- Ongoing construction of the new SEART onramp in EB2 by shifting traffic over to the existing offramp pavement. These works are not expected to lead to a reduction in general traffic lanes (**Appendix A**)
- Completion of the WRRE (**Appendix A**)
- Temporary signalisation of the Pakūranga Road / William Roberts Road intersection in EB2 (**Appendix A**)
- Ongoing construction of the new westbound lanes in EB3R on the southern side of Tī Rākau Drive as well as the new Tī Rākau Drive / William Roberts Road / Mattson Road intersection. The left-turn onto SEART will be converted back to a slip lane and the westbound carriageway will be reduced to two lanes between Tiraumea Drive and Mattson Road. The pedestrian crossing on the eastern approach of the Tī Rākau Drive / Reeves Road / SEART intersection will be removed temporarily (**Appendix A**)
- Completion of the enabling works at the Tī Rākau Drive / Gossamer Drive intersection in EB3R, including converting the left-turn slip lane on the western and eastern approaches to pass through the intersection (**Appendix A**)
- Ongoing temporary closure of the kerbside left-turn lane at Freemantle Place in EB3R (**Appendix A**)
- Ongoing construction of the new bus lanes in the eastbound Tī Rākau Drive carriageway in EB3C as well as the new Howick and Eastern Bus Depot signalised access (Phase 1, see **Section 4.2.3**). Tī Rākau Drive will be reduced to two lanes in each direction between Burswood Drive east and Te Koha Road.

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<sup>43</sup> Construction Scenario 1.3 in Appendix A was determined to be the most critical modelling scenario for the EB2 and EB3R project areas and so was used in the modelling scenario development in this assessment.

### 5.2.3 Temporary Effects to General Traffic

Route travel times were determined using the AIMSUN model, with a 2028 horizon year. Four routes were selected to compare route travel times between the Do-Minimum and EB2/EB3/EB4 Construction Scenario for general traffic. This is similar to the assessment of travel times in the existing environment (see **Section 3.4.2**) and to maintain consistency across the various assessments already conducted.

These routes are outlined below:

- **Botany to Pakūranga** (Tī Rākau Drive / Chapel Road intersection to Pakūranga Road / Williams Avenue intersection) – both directions
- **Botany to SEART** (Tī Rākau Drive / Te Irirangi Drive intersection to the western abutment on Waipuna Bridge) – both directions
- **Howick to Pakūranga** (Pakūranga Road / Glenmore Road intersection to Pakūranga Road / Williams Avenue intersection) – both directions
- **Howick to SEART** (Pakūranga Road / Glenmore Road intersection to the western abutment on Waipuna Bridge) – both directions

**Table 10** provides a comparison of the route travel times between the Do-Minimum and EB2/EB3/EB4 Construction Scenario, with a 2028 horizon year.

**Table 10: General traffic travel times – Do-Minimum vs EB2/EB3/EB4 Construction Scenario**

AM Peak						
Route	Westbound			Eastbound		
	Do Minimum [min]	EB2/EB3/EB4 Const. Sce. [min]	Difference [min]	Do Minimum [min]	EB2/EB3/EB4 Const. Sce. [min]	Difference [min]
Botany - Pakūranga	24.7	32.3	7.6	13.9	19.7	5.8
Botany - SEART	20.9	28.0	7.1	13.7	12.5	-1.2
Howick - Pakūranga	5.3	4.9	-0.4	4.7	4.6	-0.1
Howick - SEART	11.6	25.0	13.5	8.0	6.9	-1.1
PM Peak						
Route	Westbound			Eastbound		
	Do Minimum [min]	EB2/EB3/EB4 Const. Sce. [min]	Difference [min]	Do Minimum [min]	EB2/EB3/EB4 Const. Sce. [min]	Difference [min]
Botany - Pakūranga	18.4	15.3	-3.1	24.6	25.4	0.8
Botany - SEART	11.6	10.0	-1.6	24.5	30.4	5.9
Howick - Pakūranga	4.7	4.0	0.0	3.4	3.4	-1.6
Howick - SEART	5.0	5.3	0.3	7.5	11.6	4.1

On first inspection, some routes' reduced travel times may seem counter intuitive. However, it should be noted that compared to the Do-Minimum, the EB2/EB3/EB4 Construction Scenario is predicted to

experience less demand on the Tī Rākau Drive corridor in EB3C. Also, the Do-Minimum model includes signal phasing calibrated to obtain travel times similar to surveyed travel times. In contrast, the EB2/EB3/EB4 Construction Scenario model includes optimised phasing arrangements and timings to maximise throughput along Tī Rākau Drive.

Travel times from Botany to Pakūranga (both directions), Botany towards SEART (westbound) as well as from Howick to SEART (westbound) are predicted to experience moderate to relatively large increases during the AM peak, compared to the Do-Minimum. Similar increases are expected for the Botany to SEART (westbound) route in the PM peak. This is not unexpected given the following factors:

- The addition of two new intersections to the network:
  - Tī Rākau Drive / William Roberts Road
  - Tī Rākau Drive / Aylesbury Street / Palm Avenue
- The temporary signalisation of the Pakūranga Road / William Roberts Road intersection
- The closure of Reeves Road, whereby more vehicles are likely to divert to Tī Rākau Drive and Pakūranga Road
- Ongoing construction along Tī Rākau Drive in EB2 (Pakūranga Road to Reeves Road), EB3R (Reeves Road to Gossamer Drive) and EB3C (Burswood Drive east to Guys Reserve)

Tī Rākau Drive is a congested corridor in the existing environment; therefore, it is very likely that redistributing traffic and/or reducing capacity due to road works will lead to increased queues and delays.

It is important to note that the AIMSUN models simulate a worst-case scenario. In addition, the models do not account for various changes in travel behaviour that could reduce the predicted delays. These changes in travel behaviour are also typical for transport construction projects and include:

- The AIMSUN models do not account for peak spreading, i.e., motorists choosing to travel earlier or later on the network for their daily commute. 'As the capacity of the corridors is reached, especially during the peak period, travel behaviour changes. One of these changes may involve travelling to work earlier or later to avoid congestion'<sup>44</sup>. This change in travel behaviour is expected to occur at least to some degree with sufficient community engagement and on-road messaging such as Variable Message Signs (VMS).
- Another change in travel behaviour not included in the modelling assessment is flexible working options, i.e., work from home. During and following the Covid-19 pandemic, many motorists with the option to do so changed their travel patterns in this manner. During construction, it is expected that some motorists may choose not to travel on the network to avoid the temporary disruption.
- Multiple route choices are also an inherent limitation of the AIMSUN model that was assessed. East-west route options within the model are limited to Tī Rākau Drive and Pakūranga Road. **Figure 53** shows the route options for motorists in Howick (red outline) and Botany (blue outline) to/from Panmure and the CBD.

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<sup>44</sup> Research into Traffic Peak Spreading, Transfund New Zealand Research Report No. 241, 2003



**Figure 53: Howick (red outline) and Botany (blue outline) route options**

- Route options for motorists in the Howick area are geographically limited to Pakūranga Road and Tī Rākau Drive. As such, no significant traffic diversion from this area is expected to occur during construction. However, Highbrook Drive, which is not within the extent of the model, may be an alternative route option over Tī Rākau Drive for some motorists in the Botany area for east-west movement to avoid the temporary disruption.
- Mode shift is another travel behaviour change that the AIMSUN model does not take into account. However, realistically it is not expected that a significant mode shift to public transport will occur during construction in the EB2, EB3R and EB3C project areas, given the existing public transport provisions.

Therefore, a combination of the above factors could reduce traffic volumes during construction, leading to more manageable queues and delays overall.