Appendix 14

Integrated Transport Assessment

Eastern Busway

EB3 Commercial, EB4 Interim, and EB4 Link Road

Integrated Transport Assessment

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Eastern Busway

Quality Information

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Terms and Definitions

Table 1: Terms and definitions

Abbreviation and Definitions	Description
AADT	Average Annual Daily Traffic
ATOC	Auckland Transport Operations Centre
AEE	Assessment of Effects on the Environment
AFC	Auckland Forecasting Centre
AMETI	Auckland-Manukau Eastern Transport Initiative
AC	Auckland Council
AT	Auckland Transport
A2B	Airport to Botany
AUP(OP)	Auckland Unitary Plan (Operative in Part) (Updated 20 July 2023)
BPO	Best Practicable Option
CAR	Corridor Access Request
CAS	Crash Analysis System
CEMP	Construction Environmental Management Plan
CMA	Coastal Marine Area
CoPTTM	Code of Practice for Temporary Traffic Management
CTMP	Construction Traffic Management Plan
DOS	Degree of Saturation
EB1	Eastern Busway 1 (Panmure to Pakūranga)
EB2	Eastern Busway 2 (Pakūranga Town Centre)
EB3C	Eastern Busway 3 Commercial (Pakūranga Creek to Botany)
EB3R	Eastern Busway 3 Residential (SEART to Pakūranga Creek)
EB4i	Eastern Busway 4 interim (a proposed interim solution along part of Tī Rākau Drive to provide buses with the ability to access the new busway along the EB3C section of the Project before the proposed EB4L section is implemented)
EB4L	Eastern Busway 4 Link Road (link between Tī Rākau Drive and Te Irirangi Drive, Botany Town Centre)
EBA	Eastern Busway Alliance
HNZPT	Heritage New Zealand Pouhere Taonga
HNZPTA	Heritage New Zealand Pouhere Taonga Act 2014
ITA	Integrated Transport Assessment
km	Kilometre(s)
km/h	Kilometres per hour
KPI	Key Performance Indicator
LOS	Level of Service

m	Metre(s)
m^2	Square Metre(s)
m^3	Cubic Metre(s)
MCA	Multi Criteria Analysis
MSM	Macro Strategic Model
NES - CS	Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011
NES - FW	Resource Management (National Environmental Standards for Freshwater) Regulations 2020
NPS - FM	National Policy Statement for Freshwater Management 2020
NPS - UD	National Policy Statement for Urban Development 2020
NoR	Notice of Requirement
NSAAT	No Stopping at All Time
NZCPS	New Zealand Coastal Policy Statement 2010
NZGTTM	New Zealand Guide to Temporary Traffic Management
OD and OW	Over-Dimension and Over-Weight
PWA	Public Works Act 1981
RAMM	Road Assessment and Maintenance Management
RASF	Roads and Street Framework
RTN	Rapid Transit Network
RRF	Reeves Road Flyover
RMA	Resource Management Act 1991
SSA	Safe System Assessment
SSTMP	Site Specific Traffic Management Plan
STMS	Site Traffic Management Supervisors
TCQSM	Transit Capacity and Quality Service Manual
tcu	Through car equivalent units or passenger car units
TDM	Transport Design Manual
VMS	Variable Message Sign
TTM	Temporary Traffic Management
v/c	Volume over capacity ratio
WBS	Work Breakdown Structure
WRRE	William Roberts Road Extension
WTMP	Workforce Travel Management Plan

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Purpose

The purpose of this Integrated Transport Assessment (ITA) is to evaluate the permanent and temporary transport effects of the EB3 Commercial (EB3C), EB4 interim (EB4i) and EB4 Link Road (EB4L) components of the overall Eastern Busway Project (the Project) and to recommend appropriate mitigation measures. This report will form part of the Assessment of Environmental Effects (AEE) supporting the Notices of Requirement (NoRs) and resource consent applications for EB3C and EB4L. The EB4i section of the project involves permitted works (for example lane markings) within the existing road reserve and no resource consents are required for the works associated with EB4i.

Note: The ITA for the EB2 and EB3R project areas[1] provides supporting information for this ITA and can be found in **Appendix A** of this report. Localised transportation effects due to the proposed EB2 and EB3R design, such as parking effects at specific properties for example, are detailed in **Appendix A**.

This ITA will not only assess the local traffic and transportation effects of the proposed EB3C, EB4i and EB4L design, but will also assess the cumulative effects on the transport network (i.e., by traffic modelling) due to the proposed EB2, EB3R, EB3C, EB4i and EB4L design and construction as a whole.

The Need for the Project

Auckland's eastern suburbs have one of the highest levels of journey to work trips by car and lowest use of public transport in Auckland[2]. This is due to a combination of lower density land uses and relatively unattractive bus services, lack of cycle facilities and low urban amenity on main roads.

With regard to transport issues in EB3C, EB4i and EB4L, it has been identified that the area experiences heavy congestion. Recent population growth and a heavy dependence on private vehicles has put significant strain on the existing road network. Furthermore, projected population growth from both established and new suburbs is expected to exacerbate this issue.

Lastly, congestion due to the growth in commercial activity is also anticipated. Tī Rākau Drive and SEART are important for the efficient movement of freight and goods vehicles, connecting the commercial areas of East Tāmaki, Highbrook, Botany, Pakūranga and Highland Park to the wider Auckland region.

Without intervention, demand for public transport, walking and cycling will remain low, the heavy reliance on car travel will continue and the road network will experience significantly increased congestion. This will further impede the efficient movement of people and goods within the area, lead to detrimental environmental outcomes and exacerbate the area's limited access to opportunities compared to the rest of the region both in terms of the quality of life for residents and the economic wellbeing of businesses. It will also limit the area's potential to sustainably accommodate further residential and employment growth.

[1] EB234-1-PL-RP-Z2-000032-A5.
[2] SNZ Census 2018

Benefits of the Project

The Eastern Busway programme presents an opportunity to address these problems by extending the existing rapid transit, high frequency busway between Panmure and Pakūranga, through to Botany Town Centre. The Project will include new walking and cycling connections, placemaking, urban renewal initiatives and improvements for general traffic. The result will see customers being able to travel between Botany and Britomart by bus and train in less than 40 minutes, which is 20 minutes quicker than the current journey times.

The Project will provide increased transport choices for residents and visitors. The dedicated bus lanes and new station will improve the public transport experience for passengers and make it more attractive relative to private vehicle use. Increased uptake of public transport will ease congestion and reduce greenhouse gas emissions. Similarly, the Project's walking and cycling investments make those transport modes safer and more attractive to users. EB3C, EB4i and EB4L, in combination with EB2 and EB3R, will help alleviate congestion for road traffic.

Lastly, an additional positive effect associated with EB3C, EB4i, EB4L, and the wider Project, is improved accessibility. Better public transport, safer walking and new cycling infrastructure will improve the ability for both residents and visitors to access jobs, education, recreation, housing, and healthcare.

Given the above, EB3C, EB4i and EB4L will have significant positive effects for Auckland.

Assessment of Effects

Overall, through AIMSUN and SIDRA modelling assessments, EB3C, EB4i and EB4L are expected to lead to acceptable intersection operations across the network. Importantly, bus movements are predicted to operate at LOS C (or better) overall and with spare capacity. Significant improvements in general traffic and bus travel times are expected overall, especially from Botany towards Pakūranga and SEART.

EB3C, EB4i and EB4L are predicted to significantly increase public transport patronage in the future. As such, bus station platforms and loading areas have been designed to provide appropriate levels of service and capacity to support increased uptake. Furthermore, bus service headways will be improved, and travel times are predicted to decrease overall, leading to faster and more reliable public transport trips. The combination of these public transport upgrades and improvements is expected to significantly increase public transport mode share, which in turn will reduce congestion and greenhouse gas emissions.

Dedicated footpaths and cycleways will improve pedestrian and cyclist amenity and safety which will provide users with a more attractive mode of travel and supports the uptake of cycling. Furthermore, the cycleways will improve accessibility to the bus stations, resulting in increased catchment and mode shift to public transport.

Lastly, through a Safe System Assessment (SSA), EB3C, EB4i and EB4L are expected to provide an overall safer transport system for all modes of transport through the project areas with the aim to reduce fatal and serious injury crashes.

Mitigation

The conditions will require preparation of Construction Traffic Management Plans (CTMPs) which will be developed to avoid, remedy, mitigate the adverse effects of construction on transport, parking and property access so far as is reasonably practicable, along with measures to manage travel demand through the provisions of the Site-Specific Traffic Management Plans (SSTMPs). The CTMPs will include management strategies, controls and reporting protocols to achieve this. Hours of construction operation will be controlled in part by the Project's conditions and management plans, including the Construction Noise and Vibration Management Plan (CNVMP).

Temporary effects during construction relating to Construction Support Areas (CSAs) and Site Access Points (SAPs), construction vehicles, pedestrians and cyclists, property access and parking, and safety performance are considered to range from negligible to low. Temporary effects to road traffic travel times are considered to range from low, and in a few cases from moderate to relatively large. It should be noted that these predicted increases in travel times are temporary. Furthermore, these levels of delay are predicted to occur during the peak hours. Outside of these periods and for most of the day the network will experience lower levels of delay. Also, the predicted increases in travel times are for the routes across the modelled network. Depending on their origins and destinations (e.g., travelling only within the commercial areas in EB3C), many motorists will only be travelling on sections of the routes and may not experience the full effect of the predicted travel times.

Various mitigation options were tested, ranging from traffic signal phasing amendments to delaying specific pieces of the proposed works, in an attempt to improve travel times. One option that was examined was the addition of more lanes. This was not considered practicable as it would be expected to have significant implications on construction cost and result in a longer construction programme.

Therefore, as part of the conditions to mitigate the predicted effects to travel times, it is recommended that strategic public communication be undertaken. The purpose will be to inform the travelling public of the planned works to enable the public to plan their trips accordingly. It is recommended that appropriate public engagement be undertaken before and during construction. This in turn could lead to more manageable queues, reduced delays, and improved travel times on the network. This will be managed through the CTMP.

Conclusions

With the proposed mitigation measures in place, the overall potential adverse effects during construction and upon completion of EB3C, EB4i and EB4L are considered to be mitigated as far as is reasonably practicable. Furthermore, the proposed design is predicted to result in significant improvements to the existing transport environment and provide a wide range of benefits overall.

1 Introduction

1.1 Project Background

The Auckland Manukau Eastern Transport Initiative (AMETI) programme was initiated in 2006 and has become the responsibility of Auckland Transport (AT) following the amalgamation of Auckland's previous local authorities in October 2010. The Eastern Busway Project (the Project)[3] is a flagship project for Auckland and will form a key part of the region's Rapid Transport Network (RTN). It will create dedicated bus lanes to connect people from Botany, Pakūranga, and the surrounding suburbs, to the rail network in Panmure and the wider Auckland Region. The Project includes cycling and walking paths, roading improvements, safety improvements and a new Reeves Road Flyover (RRF) to ensure better journey reliability for all modes.

The Panmure to Pakūranga section of the busway (EB1) opened in late 2021. The Eastern Busway Alliance (EBA) has been formed to design and consent the Pakūranga to Botany sections of the Project (EB2,3,4), progressing towards construction, which commenced in late 2022. The Project will provide a busway from Pakūranga Town Centre in the west to Botany Town Centre in the east. The busway will be approximately 5km long and will run at grade primarily along Tī Rākau Drive. A median busway (Online Busway) is proposed along Tī Rākau Drive from Pakūranga Road to Gossamer Drive, while a separated busway (Offline Busway) is proposed between Gossamer Drive and Botany Town Centre.

There will be one major interchange station at Pakūranga Town Centre, one major interchange station at Botany Town Centre, and three intermediate stations along the remainder of the route. A new cycleway and upgraded footpath are also proposed along the length of the Project. The proposed busway will serve the major employment areas of East Tāmaki, Botany and Panmure, as well as Botany and Pakūranga Town Centres. The proposed busway will also connect with major interchanges at Botany, including local bus services and Airport to Botany (A2B) RTN services, and at Panmure for suburban rail services.

1.1.1 Strategic Context

Auckland's eastern suburbs have one of the highest levels of journey to work trips by car and lowest use of public transport in Auckland[4]. This is due to a combination of lower density land uses and relatively low use of bus services, lack of cycle facilities and low urban amenity on main roads.

Without direct intervention, demand for public transport, walking and cycling will remain low and the heavy reliance on car travel will continue. This will impede the efficient movement of people and goods within the area, lead to detrimental environmental outcomes and exacerbate the area's limited access to opportunities compared to the rest of the region. It will also limit the area's potential to sustainably accommodate further residential and employment growth as planned by the Auckland Unitary Plan (Operative in Part) (AUP(OP)).

[3] Formally known as AMETI.

[4] SNZ Census 2018.

The Eastern Busway presents an opportunity to address these problems by extending the rapid transit, high frequency busway between Panmure and Pakūranga, through to Botany Town Centre. The Project will include new walking and cycling connections, placemaking, and improvements for general traffic. The end result will see customers being able to travel between Botany and Britomart by bus and train in less than 40 minutes, which is 20 minutes quicker than the current journey times.

1.1.2 Project Objectives

The Project has a set of clear objectives as outlined below:

1. Provide a multimodal transport corridor that connects Pakuranga and Botany to the wider network and increases choice of transport options.
2. Provide transport infrastructure that integrates with existing land use and supports a quality, compact urban form.
3. Contribute to accessibility and place shaping by providing better transport connections between, within, and to the town centres.
4. Provide transport infrastructure that improves linkages, journey time and reliability of the public transport network.
5. Provide transport infrastructure that is safe for everyone.
6. "Provide or Safeguard future" transport infrastructure at (or in the vicinity of) Botany Town Centre to support the development of strategic public transport connection to Auckland Airport.

1.1.3 Benefits of the Project as a Whole

With the Panmure to Pakūranga (EB1) section of the Project completed, once delivered the next stage between Pakūranga and Botany (EB2, 3 and 4) will provide:

- Better connections and sustainable travel options for pedestrians, cyclists, motorists, bus and train customers
- A reliable 40-minute bus and train trip between Botany Town Centre and Britomart (saving 20-minutes)
- Increase in public transport trips from 3,700 to 18,000 per day by 2028
- Increase in public transport mode share from 7% to 25% by 2028
- Reduce carbon emissions by 9,292 kg per day by 2028
- 24,000 more people with access to a rapid transit bus station within 1 km from home
- 5 km of busway between Pakūranga and Botany fully separated from other traffic
- 5 new bus stations with quality facilities
- 12 km of safe and separated walking and cycling infrastructure
- Reeves Road flyover to reduce vehicle congestion around Pakūranga Town Centre
- Encourage and support development of a more sustainable urban form and improve urban amenity
- Accommodate electric buses, a key part of AT's low-emission vehicle fleet by 2040.

1.1.4 EB3C, EB4i and EB4L Project Benefits in the Strategic Planning Context

The Project, including EB3C, EB4i and EB4L, will deliver significant benefits to the communities of southeast Tāmaki/Auckland and the wider region. The Project has been developed in response to transport issues within southeast Tāmaki Makaurau/Auckland, to meet projected

population growth, reduce regional greenhouse gas emissions and to achieve modal shift goals.

Numerous studies have identified that the Howick Local Board area experiences heavy congestion, with 90,000 vehicles per day (vpd) using the Panmure and Waipuna Bridges. Recent rapid population growth and a heavy dependence on private motor vehicles has put significant strain on the existing road network. EB3C, EB4i and EB4L, as part of the Project, will help alleviate some of this congestion. This will principally be by providing improved access to, as well as the performance of, public transport services. When combined with the new cycling and walking infrastructure, the Project supports modal shift from private motor vehicle to other transport modes. This in turn assists in managing both current and projected future congestion within the wider area's road network. As such, EB3C, EB4i and EB4L's contribution to congestion management will improve travel times, supporting the movement of freight and people.

In addition, the development of the Project will support urban intensification in a way that achieves a well-functioning urban environment within southeast Tāmaki Makaurau/Auckland. Pakūranga, Botany and the adjoining suburbs have been identified as being important areas for urban intensification, through both infill housing and whole-site redevelopments. The EB3C, EB4i and EB4L project areas sit between these residential growth areas. They also run through East Tāmaki, a regionally significant employment area. As such, the transport improvements undertaken for EB3C, EB4i and EB4L supports the connectivity of the employment and residential hubs in southeast Tāmaki Makaurau/Auckland.

Traffic flows from the isthmus are also expected to increase given population growth from brownfield developments like the Tāmaki regeneration programme and the movement of these residents to recreation, education, and employment opportunities within southeast Tāmaki Makaurau/Auckland [5]. Botany Town Centre is also expected to grow significantly through greater residential intensification and redevelopment, with these residents and businesses reliant on Tī Rākau Drive as a transport connection to the wider region. Growth is also being generated by greenfield developments like Flat Bush, where 1700 ha of land is being urbanised for a population of approximately 40,000 people. Lastly, congestion due to the growth in commercial activity is also anticipated, noting the role that Tī Rākau Drive has in connecting the commercial areas of East Tāmaki and Highbrook to the wider region.

[5] Tāmaki regeneration programme will deliver 10,500 new homes over the next 20 years.

Without the construction of the Project (including EB3C, EB4i and EB4L) and the provision of improved transport choices (i.e., public and active transport modes), southeast Tāmaki Makaurau/Auckland's road network would experience significantly increased congestion. This congestion would in-turn impact both the quality of life for residents and the economic wellbeing of Tāmaki Makaurau/Auckland's businesses. The Project will alleviate, in part, projected increases in road congestion.

As mentioned above, the Project also provides increased transport choices for residents and visitors. The dedicated bus lanes and stations will improve the public transport experience for passengers, through reliable travel times and high quality/frequent services and make it more attractive to current private vehicle users. Increased uptake of public transport will also ease congestion and reduce regional greenhouse gas emissions. Similarly, the Project's walking and cycling investments make those transport modes safer and more attractive to users. This will also assist in reducing congestion and greenhouse emissions. This is a significant benefit, given the number of schools, childcare centres, and similar land uses present within the Project area.

Lastly, the overall positive effects associated with EB3C, EB4i and EB4L, and the wider Project is improved accessibility. Reduced congestion, better public transport, safer walking, and new cycling infrastructure will improve the ability for both local residents and visitors to access jobs, education, recreation, housing and healthcare.

Given the above, EB3C, EB4i and EB4L will have significant positive effects for Tāmaki Makaurau/Auckland.

1.2 Scope and Purpose of Report

The assessment and consenting phases of the proposed alignment of the Project has been divided into various 'packages'. The rationale is to aid in obtaining relevant Resource Management Act 1991 (RMA) approvals for sections of the Project without potential undue delay to the Project as a whole.

This ITA assesses the traffic and transportation effects during construction and upon completion of the EB3C, EB4i and EB4L sections of the Project. The EB4i section of the project are permitted works within the existing road reserve and no resource consents are required for the works associated with EB4i.

Note: The ITA for the EB2 and EB3R project areas[6] provides supporting information for this ITA and can be found in **Appendix A** of this report. Localised transportation effects due to the proposed EB2 and EB3R design, such as parking effects at specific properties for example, are captured in **Appendix A**.

This ITA will not only assess the local traffic and transportation effects of the proposed EB3C, EB4i and EB4L design, but will also assess the cumulative effects on the transport network (i.e., by traffic modelling) due to the proposed EB2, EB3R, EB3C, EB4i and EB4L design and construction as a whole. Therefore, this ITA will make several references to **Appendix A** to avoid unnecessary repetition and manage the size of this document.

Assessment of the proposed Botany Town Centre major interchange bus station will be provided in a separate report and is not part of this ITA.

It should be noted that the William Roberts Road Extension (WRRE) has already been subject to an earlier resource consent process, with approval granted by Auckland Council in late 2022[7]. As such, that work package has been considered as part of the "existing environment" for the purposes of this ITA.

[6] EB234-1-PL-RP-Z2-000032-A5.
[7] LUC60401706 and DIS60404194.

The full extent and location of the Project are shown in **Figure 1**.

Figure 1: Full project extent and location[8]

The main elements of EB3C include the construction of a secondary Tī Rākau bridge (Bridge A) to the north of the existing bridge along Tī Rākau Drive to support the busway and a bidirectional cycleway, an additional bridge behind the Chinatown retail centre (Bridge B), and the busway behind the commercial area and through the Burswood Esplanade Reserve. A new Burswood Bus Station will also be constructed, which will have pedestrian connections to Torrens Road, Dulwich Place and Heathridge Place.

EB4i is a proposed interim solution along Tī Rākau Drive to provide buses with the ability to access the new busway in EB3C to/from the Botany Town Centre bus station, before the proposed EB4L section is implemented. The main elements of EB4i include a continuation of the eastbound bus lane along Tī Rākau Drive up to the intersection with Te Koha Road, and an additional median-side bus lane along Tī Rākau Drive for westbound bus traffic from Te Irirangi Drive. The proposed design layout and associated works footprint of EB4i is within the existing Tī Rākau Drive road reserve.

[8] https://at.govt.nz/projects-roadworks/eastern-busway/

The main elements of EB4L include the construction of a new segregated two-way busway in Guys Reserve and Whaka Maumahara, continuing from the new EB3C busway. New walking and cycling facilities will be constructed in Guys Reserve to provide access from Tī Rākau Drive to Te Irirangi Drive. The existing pedestrian pathway in Guys Reserve will be realigned to avoid the piers of the EB4L bridge and to maintain access for residents at Cottesmore Place and Kirikiri Lane to the Huntington Park retail area. The Te Irirangi Drive / Town Centre Drive intersection will also be improved (widened) to provide a dedicated bus lane on the eastern arm of the intersection and raised platforms will be added.

The general extent and location of EB3C, EB4i and EB4L[9] are shown in **Figure 2**.

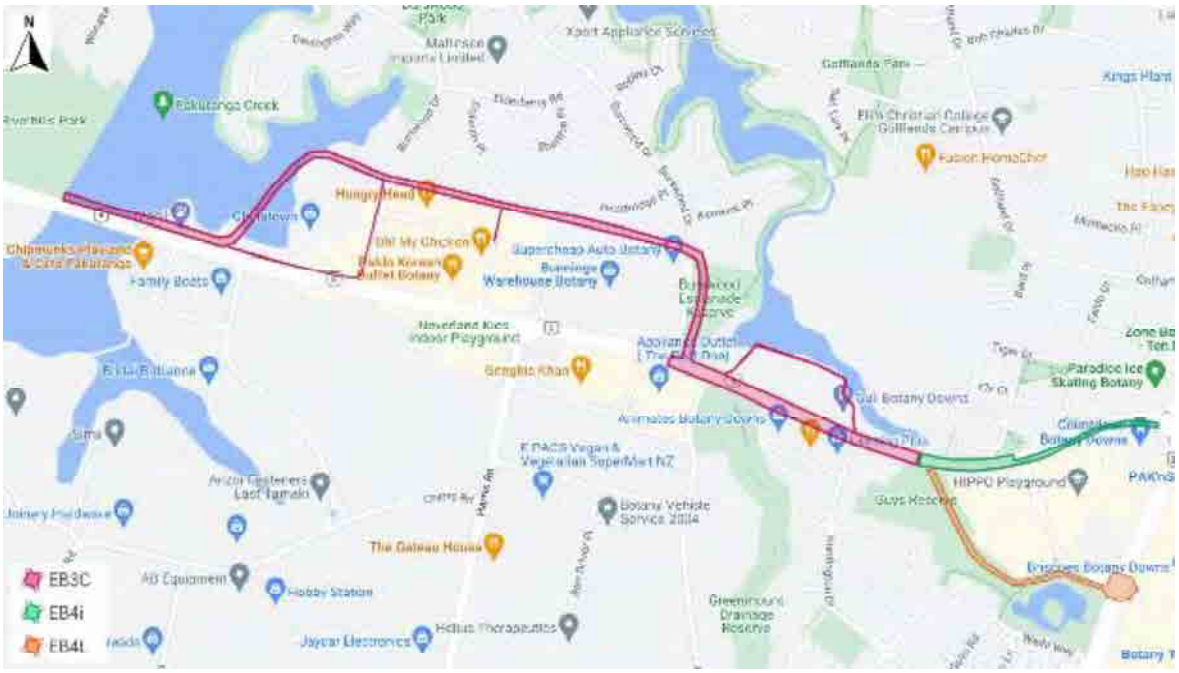

Figure 2: EB3C, EB4i and EB4L general extent and location

The purpose of this report is to:

1. Identify and describe the existing traffic and transport environment, including the key issues that the environment faces
2. Describe the potential positive and adverse traffic and transport effects of the EB3C, EB4i, EB4L sections and the Project as a whole during its construction and upon completion, in order to highlight the benefits of the Project and to develop mitigation measures as needed
3. Recommend measures (including any conditions / management plans required); as appropriate to avoid, remedy or mitigate potential adverse traffic and transportation effects during construction and upon completion of the Project
4. Present an overall conclusion of the level of potential traffic and transport effects of the Project after the recommended measures are implemented.

[9] Refer to Appendix A for a description of the general extent and location of the EB2 and EB3R project areas.

1.3 Report Structure

This ITA has been structured as follows:

Section 2 describes the methodology used to assess the effects of EB3C, EB4i and EB4L on the transport environment. This includes EB1, WRRE and other EB2 and EB3R enabling works that will form part of the baseline traffic environment, traffic modelling methodology, public transport, walking and cycling, property access and parking, safety performance and freight traffic.

Section 3 provides a description of the existing transport environment including land use zoning, the transport network, traffic volumes, travel times, road characteristics, bus services and facilities, walking and cycling facilities, parking, crash environment, over-dimension and over-weight (OD and OW) routes, and changes to the baseline traffic environment for modelling.

Section 4 provides an overview of the proposed design and construction of EB3C, EB4i and EB4L.

Section 5 provides an assessment of the temporary effects of EB3C, EB4i and EB4L during construction, including construction effects, general traffic, bus services and facilities, pedestrians and cyclists, property access and parking, and safety performance.

Section 6 provides an assessment of the permanent effects of EB3C, EB4i and EB4L upon completion, including a description of the future transport network, general traffic, bus services and facilities, pedestrians and cyclists, property access and parking, and safety performance.

Section 7 provides a summary of the mitigation measures proposed in this ITA.

Section 8 provides the conclusions from this ITA.

2 Assessment Methodology

2.1 Introduction

This section describes the methodology used to assess the effects of EB3C, EB4i and EB4L on the transport environment including:

- A description of the transport environment for assessment
- Traffic modelling methodology
- Public transport
- Walking and cycling
- Property access and parking
- Safety performance
- Freight traffic

2.2 Guidance and Scope

The preparation of this ITA has considered the guidance set out in the Auckland Transport (AT) document "*Integrated Transport Assessment Guidelines*" (January 2015) and the Waka Kotahi NZ Transport Agency (Waka Kotahi) document "*Integrated Transport Assessment Guidelines*" (November 2010). This assessment has considered the operational effects of the following areas in the system:

- Road network – general traffic flows and travel time
- Public transport network
- Walking and cycling network
- Property access
- Parking
- Safety performance
- Heavy vehicle routes

2.3 Transport Network for Traffic Modelling Assessment

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 the effects would continue into the future. Therefore, assessment of the Project against the current period transport environment would not allow an adequate understanding of project impacts.

Instead, a more conservative approach was followed whereby a future year scenario was used to compare a 'without Project' and a 'with Project' scenario. Throughout this assessment, the 'without Project' scenario is also referred to as the 'Do-Minimum' scenario, whilst the 'with Project' scenario is also referred to as the 'EB2/EB3/EB4' scenario. The transport models used to simulate the effects of the future year scenarios are listed below:

- Do-Minimum – 2028
- EB2/EB3/EB4 – 2028

Notable major changes to the existing transport network, that were included in the modelling assessments include (see **Section 3.10** for further details):

- EB1
- WRRE
- Other EB2 and EB3R enabling works[10]

2.4 Traffic Modelling Methodology

Traffic modelling undertaken of the proposed design of the Project used data cascaded from a number of higher-order, more strategic models provided by the Auckland Forecasting Centre (AFC).

Macro Strategic Model (MSM) Auckland Regional Transport Models (EMME) – These models forecast demands based on Auckland Council's Scenario I Modified Version 11.5 demographic and land use data. The outputs of these models include general traffic demand and public transport demand.

AMETI Regional Traffic Models (EMME) – The outputs of the MSM models were used as inputs into the Regional Traffic Models to generate traffic demands across the region. The outputs of the regional models were then fed into project specific Operational Microsimulation Models (AIMSUN) models to allow for a more detailed assessment of traffic effects.

AIMSUN – These models provide information regarding travel times along different routes within the project area as well as turn movements and traffic demand along roads within the project area. The turning movement outputs from these models were used as inputs into the Intersection Models (SIDRA models).

SIDRA models were used to determine the performance of intersections using traffic movement data from the AIMSUN models. The key outputs include Degree of Saturation (DOS or v/c ratio), delay in seconds, Level of Service (LOS) and queue lengths in metres.

2.4.1 Supplied Models

The AIMSUN 2018 Base Model was subjected to various calibration and validation checks to assess the accuracy and suitability of the model. These checks were undertaken with reference to criteria for Category C: Urban Area NZTA Model Development Guidelines (Criteria) on individual link flows, turn flows and travel time for each hour between 07:00 – 09:00 and 16:00-18:00 and is considered acceptably calibrated and validated for the purposes of Eastern Busway design work[11] (see **Appendix B**).

2.4.2 Model Outputs

Traffic flow outputs (in vehicles per hour) from the AIMSUN models were used as inputs in the SIDRA models to assess intersection performance. AIMSUN models simulate several hours of the network operation during the AM and PM peak periods. However, in order to account for residual demand and queues within the network and to maintain consistency across the various model runs, the AM peak hour was between 08:00 – 09:00 while the PM peak hour was between 17:00 – 18:00. Traffic flows from these peak hours, produced by AIMSUN, were used to assess intersection performance in SIDRA.

[10] Refer to Appendix A for a detailed description of these works.
[11] Eastern Busway – Base 2018 Model Update Report, BECA, February 2019.

Another key AIMSUN model output considered during this ITA was travel time. Route travel times were determined along various routes through the Project areas for the Do-Minimum and EB2/EB3/EB4 scenarios. The effects of the proposed design were determined by comparing these scenarios in each direction, for the AM and PM peak periods.

Key SIDRA outputs considered during this ITA included Level of Service (LOS), Degree of Saturation (DOS) or v/c ratio, and delay in seconds.

2.4.3 Traffic Demand

The traffic demand data, cascaded down from the various models as detailed above and used in the SIDRA models, represent an average weekday's traffic demand in the AM and PM peak hours. Interpeak periods and weekends were determined to generally have lower traffic activity and congestion compared to weekdays, so explicitly modelling these periods was not considered necessary to understand the effects and outcomes of the Project.

2.4.4 Assumptions

Below are the key assumptions used in the modelled transport environments.

2.4.4.1 MSM Assumptions

- Auckland Council's Scenario I Modified Version 11.5
- All relevant projects that have been identified in the ATAP plan delivery 2021 – 2031 were included in the MSM version 11.5. Notable projects that may influence the demand of the movement of people around the Project include:
    - Airport to Botany interim bus improvements
    - Sylvia Park bus improvements
    - Connected Communities (Pakūranga Road)
    - City Rail Link
- Eastern Busway 1 Panmure to Pakūranga was included in the future Do-Minimum and Project scenarios.

2.4.4.2 AIMSUN Assumptions

- By consequence, the above-mentioned projects are included in the AIMSUN models.

2.4.4.3 SIDRA Assumptions

- Where turning movement volumes were <10 veh/h, a minimum of 10 veh/h was adopted
- Rather than being random, bus arrivals at intersections were set to Arrival Type 6 on all busway lanes. This means a high percentage of arrivals occur during the green phases, which was used to simulate Traffic Signal Priority for buses
- Free flow speeds along Tī Rākau Drive were assumed from the free-flow speeds provided by the MSM modelling. The following speeds were assumed for the various other streets:
    - Side streets – 50 km/h
    - William Roberts Road - 30km/h

  - Entrances (i.e., to the mall) – 20 km/h
  - Along busways – 50 km/h
- Saturation flow rate was left at the SIDRA default Basic Saturation Flow of 1950 tcu/h per lane
- Where the approach/ intersection was modified, lanes widths for general vehicle lanes and bus lanes were taken as 3.2 m and 3.5 m, respectively
- The following model adjustments were added to simulate the effects of a raised table or raised intersection:
  - Saturation flow rate of 1860 tcu/h per lane, calculated from a jam spacing assumption of 6.5m which is between 6 m (standard queue space value) and 7 m (default SIDRA light vehicle jam spacing value)
  - Saturation speed of 25 km/h (MOTSAM guidelines for raised tables/humps)
  - Negotiation speed of 25 km/h
- In/out movements from the Howick and Eastern Bus Depot accesses assumed to be 10 veh/h during the peak hours as the majority of demand to/from this site is expected to fall outside these peak periods.

2.5 Public Transport, Walking and Cycling

2.5.1 Public Transport

The effects on the public transport network focused on the following aspects:

- Direct effects on bus routes and bus stops
- Effects on travel times of buses through the Project area

2.5.2 Walking and Cycling

The assessment considered the potential effects of EB3C, EB4i and EB4L on pedestrians and cyclists. This was primarily via a qualitative assessment of changes in the type and quality of connections and facilities provided.

2.6 Property Access and Parking

2.6.1 Property Access

The assessment considered the potential effects of changes in property access. Local access effects were assessed in terms of extra travel time and distance as well as safety.

2.6.2 Parking

This included assessment of the potential physical effect of reducing properties' on-site parking spaces, as well as any on-street parking that may be affected by the proposed design.

2.7 Safety Performance

A Safe System Assessment (SSA) was undertaken for the Project, which provides a comprehensive assessment of the existing crash environment and the potential future environment.

The safety performance assessment considered the effects of the proposed design on existing roads, new roads and vulnerable users.

2.8 Freight Traffic

It is recognised that cars and trucks generally have the same travel times in congested urban networks and therefore the same methodology described in **Section 2.4.2** was used to assess the effect of the Project on freight traffic and direct effects to heavy vehicle routes.

3 Existing Transport Environment

This section provides a description of the existing transport environment, including the following:

- A description of the existing problems and challenges
- Land use zoning
- Existing transport network
- Traffic volumes
- Travel times
- Road characteristics
- Bus services and facilities
- Walking and cycling facilities
- Parking
- Crash environment
- Over-dimension and over-weight (OD and OW) routes
- Changes to the baseline traffic environment

3.1 Description of the Existing Problems and Challenges

In 2016, AT, Waka Kotahi and Auckland Council agreed the following key problems in the AMETI Project area for the AMETI programme, including the Eastern Busway, to address:

- **Problem 1** – Lack of connections in the transport network creates congestion and unreliable travel times for people accessing employment and other destinations

- **Problem 2** – Lack of travel choices and reliance on private cars is resulting in congestion, lack of access to opportunities and poor environmental outcomes

- **Problem 3** – Provision of transport capacity and options has not kept pace with land use development resulting in congestion and inefficient use of transport corridors

- **Problem 4** – Poorly integrated land use and transport design is limiting accessibility, creating poor places and discouraging economic development

- **Problem 5** – Development and operation of the road network has prioritised the efficient movement of vehicles ahead of safety resulting in too many people dying or being seriously injured, especially vulnerable users.

The Project will seek to address these problems through a range of improvements to existing infrastructure as well as new infrastructure.

3.2 Land Use Zoning

The Project area[12] is located in East Auckland and bordered by Pakūranga Town Centre in the northwest and Botany Town Centre in the southeast. Major industrial and commercial areas in East Tāmaki are situated to the west and south, which play an important role in providing employment opportunities to the residents in the vicinity of the Project. These employment zones include Panmure, Mt Wellington, Penrose/ Onehunga and Highbrook/ East Tāmaki.

The local land uses comprise of medium density / single dwelling residential lots with retail-based town centres, local shops, commercial activities and industrial blocks. These areas are currently connected to the Project area by either direct property access or near-direct access via side roads. The Project will also have a through-function and will serve movements between and beyond the fringes of the project area, including links to Panmure, Mt Wellington, Flat Bush, and Manukau. Notable features of the existing land use and environment in EB3C, EB4i and EB4L include:

Business Land Uses of Interest:

- 242 and 254 Tī Rākau Drive Mobil service station Tī Rākau Drive and PetStop
- 262 Tī Rākau Drive Chinatown
- 22 and 28 Torrens Road commercial and mixed-use properties
- 316 Tī Rākau Drive medical services
- 320 Tī Rākau Drive Bunnings Warehouse Botany, Supercheap Auto Botany, and Target Furniture
- 380 and 386 Tī Rākau Drive Howick and Eastern Bus Depot and Gull service station Botany Downs
- Tī Rākau Drive / Torrens Road shops and restaurants
- Tī Rākau Drive motor service and dealerships
- 90 Greenmount Drive Warehouse Stationery East Tāmaki
- New Eat Asian food court
- Huntington Park retail area
- 451 Tī Rākau Drive The Hub and VTNZ Botany
- Botany Town Centre

Residential and Community Land Uses of Interest:

- Burswood residential area
- 219 Burswood Drive East City Wesleyan Church
- Burswood Esplanade Reserve
- Bard Place Reserve
- Guys Reserve
- Whaka Maumahara

Schools and Education Land Uses of Interest:

- 8 Torrens Road WonderKids Childcare and Preschool
- 415 Tī Rākau Drive Piccolo Park Botany
- 10 Torrens Road Fulton Swim School

[12] Refer to Appendix A for a description of the existing Land Use Zoning in EB2 and EB3R.

Figure 3 shows the surrounding area zoning of EB3C, EB4i and EB4L in the AUP(OP), in the existing environment.

Figure 3: Existing EB3C, EB4i and EB4L zoning (source: Auckland Council GIS)

3.3 Existing Transport Network

In order to align with AT's and Auckland Council's desire to consistently identify the different functions of roads and streets in Auckland, the EBA has adopted the Roads and Streets Framework (RASF) by using concepts of 'Place' and 'Movement' to reflect the strategic role of streets.

The RASF provides a systematic and consistent methodology for identifying the 'Place' and 'Movement' functions of roads and streets. In doing this, it reflects the needs and catchment of the adjoining land use as well as the movement of people, goods, and services. A full RASF assessment was completed for the Project[13] and the section below summarises the key aspects of the existing transport network and modal priority in the EB3C and EB4 project areas[14].

Figure 4 shows the RASF typology matrix as a function of 'Movement' and 'Place' significance.

Figure 4: RASF typology matrix

[13] EB234-1-TE-RP-Z0-0001-A3-Roads and Street Framework.

[14] Refer to Appendix A for a description of the Existing Transport Environment in the EB2 and EB3R project areas.

Figure 5 outlines the current typology of the EB3C project area, and **Figure 6** outlines the current typology of the EB4 project area.

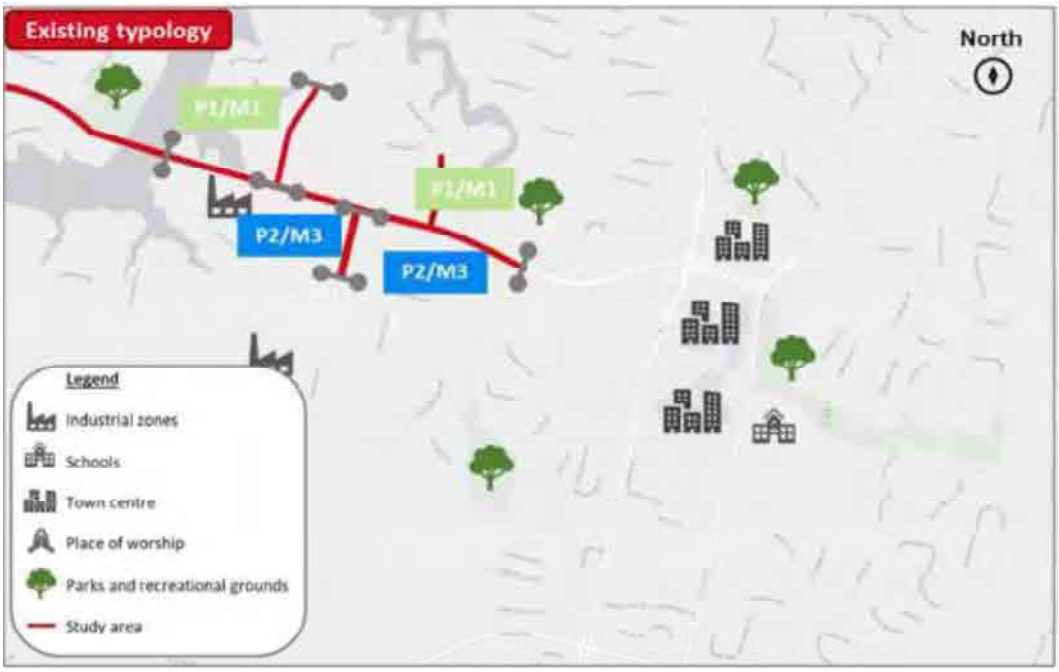

Figure 5: Existing EB3C typology

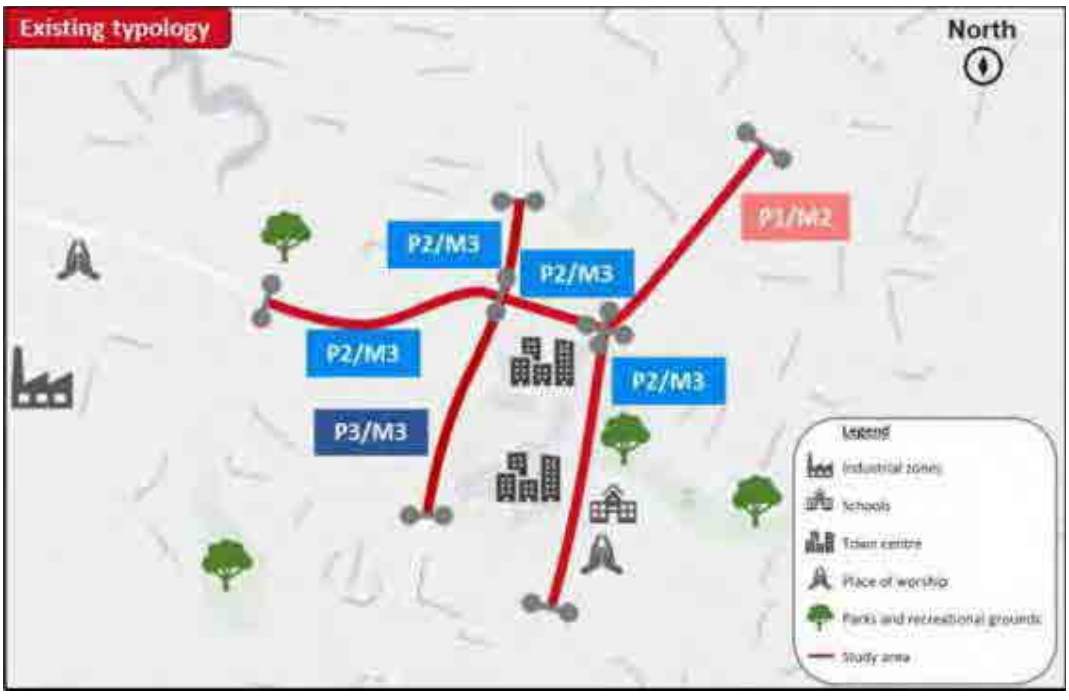

Figure 6: Existing EB4 typology

The EB3C project area comprises parts of Tī Rākau Drive and includes a section through the Burswood Residential area. Tī Rākau Drive is an east-west strategic route that is classified as a regional road[15] that connects Botany with Panmure via Pakūranga.

It runs through the northern part of the East Tāmaki industrial zone. This part of the industrial zone includes light industrial land use such as office space, wholesale retail premises, and food and drink shops. These premises typically have a car park in front with large setback space between the footpath and building frontage. Therefore, the primary function of this corridor is 'Movement' and has a typology of 'M3' classification.

Currently, Tī Rākau Drive is also a level 1B freight route and frequent bus services also operate along this route.

The EB4 project area comprises the eastern end of Tī Rākau Drive and the Te Irirangi Drive/Town Centre Drive intersection.

There are retail premises around Botany Town Centre along Tī Rākau Drive between Botany Road and Chapel Road. However, these premises have large setbacks with carparks in front, so that the prime function of this corridor remains as 'Movement' (M3 classification).

Te Irirangi Drive and Chapel Road are north-south corridors running in parallel. Te Irirangi Drive is a level 1B freight route, whereas Chapel Road is a frequent transit network (FTN) route connecting Botany with Manukau. The focus point for both corridors is Botany Town Centre, given its role as a commercial hub and Metropolitan centre for south-east Auckland. However, the town centre is self-contained and surrounded by car parking spaces. Consequently, both Te Irirangi Drive and Chapel Road do not have any active frontages. The primary function of these corridors is 'Movement' (M3 classification).

A trend is observed whereby 'Movement' is largely prioritised over 'Place', which is particularly noticeable along Tī Rākau Drive. The Project seeks to improve this, particularly at the proposed locations of the new bus stations.

[15] https://nzta.maps.arcgis.com/apps/webappviewer/index.html?id=95fad5204ad243c39d84c37701f614b0

3.4 Traffic Volumes, Travel Time, and Road Characteristics

3.4.1 Traffic Volumes

Traffic volumes in the existing environment[16] were determined predominantly using traffic data from 2017. In 2020/2021, COVID-19 dramatically affected the way people travelled and so these years would not accurately reflect the volumes of traffic expected on the road network. It was anticipated that data from 2019 would be the most accurate, however, it was determined that this data set was incomplete and would likely produce inaccurate results.

Data from 2017 was the most complete data set available from the previous life cycle of the AMETI EB2 and 3 specimen design. Although traffic volumes are expected to have grown marginally between 2017 and 2019, it is not expected that this growth would be significant, and the 2017 data is still considered relevant.

Table 2 shows the Average Annual Daily Traffic (AADT) volumes in the existing environment in the EB3C project area as well as the anticipated daily volumes for the 2028 and 2048 future years, without the Project. A conservative approach was followed to produce the 2028 and 2048 future year AADTs, by not factoring for the effects of COVID-19. The purpose of this table is to provide context for a more detailed comparison of the future years.

Table 2: Existing[17] and future[18] AADT (without project)

Road Section	Direction	Existing AADT (2017)	2028 without project	2048 without project
Tī Rākau Drive				
Gossamer Dr – Trugood Dr	Westbound	24,750	26,800	29,400
	Eastbound	23,100	24,700	26,800
Trugood Dr – Burswood Dr west	Westbound	20,200	20,200	21,100
	Eastbound	21,700	21,100	24,000
Burswood Dr West – Harris Rd	Westbound	20,200	19,400	20,300
	Eastbound	21,800	20,900	23,800
Harris Rd – Burswood Dr east	Westbound	20,600	20,700	21,400
	Eastbound	19,400	19,100	20,100
Burswood Dr east – Huntington Dr	Westbound	18,700	18,200	18,800
	Eastbound	22,700	21,900	23,300
Huntington Dr – Te Koha Rd	Westbound	18,800	18,500	19,300
	Eastbound	22,000	21,200	22,600
Te Koha Rd – Te Irirangi Dr	Westbound	19,950	19,900	20,200
	Eastbound	17,350	16,600	17,600
Te Irirangi Drive				

[16] Refer to Appendix A for details on the existing Traffic Volumes in the EB2 and EB3R project areas.
[17] The majority of the existing volumes were sourced from 2017 SCATS data, however where this data was not available a mixture of RAMM, ONRC, and the most recent AT traffic counts have been reported.
[18] 2028 and 2048 future year demand was determined from the EMME models.

Road Section	Direction	Existing AADT (2017)	2028 without project	2048 without project
Tī Rākau Dr – Te Koha Rd	Northbound	14,100	20,600	21,600
	Southbound	15,600	24,600	25,900
Side Roads				
Trugood Dr	Exit	5,900	5,100	6,300
	Enter	3,300	6,300	6,000
Burswood Dr west	Exit	3,900	3,200	3,200
	Enter	1,330	3,000	2,900
Harris Rd	Exit	11,500	14,100	15,600
	Enter	12,300	14,200	17,300
Burswood Dr east	Exit	3,100	2,200	2,100
	Enter	2,400	2,200	2,200
Greenmount Dr	Exit	2,900	3,800	4,500
	Enter	1,300	3,000	3,300
Huntington Dr	Exit	730	2,200	2,100
	Enter	1,440	2,200	2,200
Te Koha Rd	Exit	3,700	2,000	2,100
	Enter	3,500	4,400	4,500

This table provides useful context, however a more detailed comparison of future years 'without and with the Project' is discussed in **Section 5** and **Section 6** of this report.

Increases in traffic volumes are predicted on Tī Rākau Drive for both westbound and eastbound traffic movements between Gossamer Drive and Trugood Drive in 2028, with a further increase by 2048. Increases in traffic demand are also predicted for eastbound movement between Trugood Drive and Harris Road in 2048.

A trend is observed where westbound and eastbound traffic demands on Tī Rākau Drive between Harris Road and Te Irirangi Drive are expected to decrease or remain roughly unchanged in 2028, before a slight increase by 2048. A similar trend is observed for westbound traffic movements between Trugood Drive and Harris Road. This predicted trend indicates that these sections of the network may currently be operating at full capacity, causing large increases in queues and delays. This may cause it to act as a bottleneck for the rest of the corridor, forcing vehicles to reroute to less congested links.

The largest predicted increase in traffic demand is observed at Harris Road. Harris Road is a main connector to State Highway 1 (SH1) through both the Highbrook Drive on-ramp and the Pakūranga Highway on-ramp. The increase in traffic demand could be attributed to vehicles rerouting onto Harris Road to access the motorway using the Highbrook Drive on ramp when Tī Rākau Drive is at capacity. A similar trend is observed on Trugood Drive, Greenmount Drive and Huntington Drive, with large increases in traffic demand predicted to occur by 2028 and 2048.

However, from 2018 to 2028, traffic demand is expected to reduce for vehicles accessing Trugood Drive, Burswood Drive west and east, and Te Koha Road. A slight reduction is expected for vehicles exiting Burswood Drive west and east, and Te Koha Road in 2048. These slight reductions in traffic demands

may be attributed to fluctuations in the road network as Tī Rākau Drive may already be operating at full capacity.

Figure 7 shows the existing environment AADT (2017) volumes in the EB3C, EB4i and EB4L project areas, in a network context.

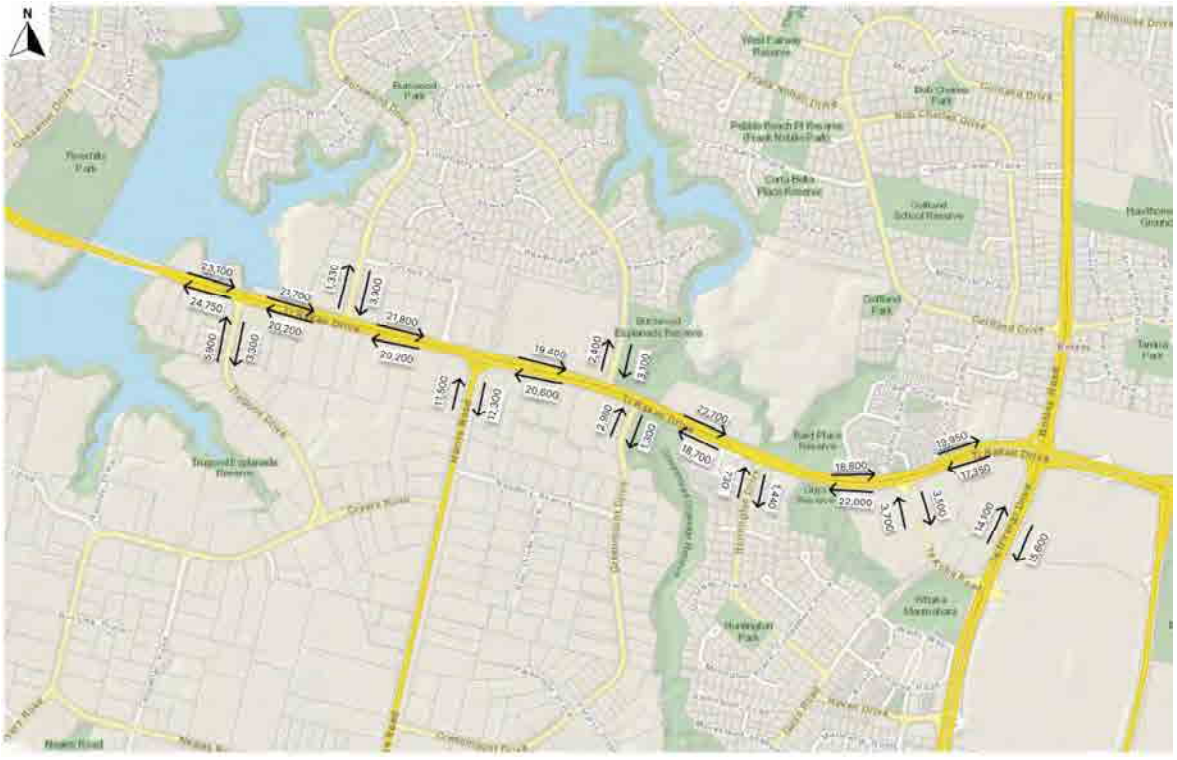

Figure 7: Existing environment AADT

3.4.2 Travel Time and Variability

Route travel times and variability in the existing transport network were determined from the AIMSUN 2018 Base Model. The AM peak hour was recorded between 07:30-08:30 and the PM peak hour between 16:30-17:30. To maintain consistency across the different assessments already conducted, four routes were selected to determine the travel time of general traffic in the existing environment. These routes are outlined below, and the results are shown in **Table 3**:

- **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 3: Base model (2018) general traffic travel times

AM Peak						
Route	Westbound			Eastbound		
	Base Model 2018 [min]	Variability + [min]	Variability – [min]	Base Model 2018 [min]	Variability + [min]	Variability – [min]
Botany - Pakūranga	12.1	1.1	-1.2	14.4	8.4	-4.3
Botany - SEART	10.4	1.9	-2.1	9.5	1.9	-1.2
Howick - Pakūranga	3.1	0.1	-0.2	3.3	0.4	-0.4
Howick - SEART	12.2	0.7	-0.9	6.3	0.7	-1.2
PM Peak						
Route	Westbound			Eastbound		
	Base Model 2018 [min]	Variability + [min]	Variability – [min]	Base Model 2018 [min]	Variability + [min]	Variability – [min]
Botany - Pakūranga	16.5	3.9	-2.8	23.3	5.3	-5.2
Botany - SEART	9.6	2.4	-1.2	16.6	3.6	-3.3
Howick - Pakūranga	2.9	0.3	-0.3	4.7	0.9	-1.0
Howick - SEART	4.6	0.4	-0.3	8.5	0.9	-1.7

In the AIMSUN model, the routes from Botany to Pakūranga and Botany to SEART travel along the same section of Tī Rākau Drive up to the Tī Rākau Drive / Reeves Road / SEART intersection, and hence have the same travel time along this section of the corridor.

The Botany to Pakūranga route extends further north on Tī Rākau Drive and then turns left on Pakūranga Road up to the Williams Avenue intersection, a distance of roughly 780m. Meanwhile, the Botany to SEART route extends up to the western abutment of Waipuna Bridge, a distance of roughly 1.4 km.

The Botany to Pakūranga route is shorter in distance but includes more signalised intersections when compared with the Botany to SEART route, and the travel time is significantly longer. The longer travel time is likely due to congestion on Tī Rākau Drive between Pakūranga Road and Reeves Road at the two signalised intersections, leading to large queues and delays. This is particularly evident in the PM peak.

A similar trend is found for the travel routes from Howick, where the travel time from Howick to Pakūranga is significantly shorter than the route from Howick to SEART during the AM peak, and the travel time in the opposite direction takes longer in the PM peak.

3.4.3 Road Characteristics

Figure 8 (left) shows the existing directional signage[19] for eastbound traffic on Tī Rākau Drive near the Tī Rākau Drive / Harris Road intersection and **Figure 8** (right) shows the directional signage near the Tī Rākau Drive / Te Irirangi Drive intersection.

Figure 8: Existing directional signage on Tī Rākau Dr eastbound at Harris Rd (left) and Te Irirangi Dr (right)

[19] Refer to Appendix A for a description of the Road Characteristics in the EB2 and EB3R project areas.

Figure 9 (left) shows the existing directional signage for westbound traffic on Tī Rākau Drive near Harris Road and **Figure 9** (right) shows the directional signage near Gossamer Drive.

Figure 9: Existing directional signage on Tī Rākau Dr westbound at Harris Rd (left) and Gossamer Dr (right)

Tī Rākau Bridge has two lanes in each direction. Tī Rākau Drive between Tī Rākau Bridge and Te Irirangi Drive varies between two to three lanes in each direction, and additional short lanes at intersections. All intersections on Tī Rākau Drive between the Tī Rākau Bridge and Te Irirangi Drive are signalised, except for Torrens Road.

From west to east, a raised median on Tī Rākau Drive between the eastern abutment of the Tī Rākau Bridge and Harris Road prevents right-turn movements, except at intersections with side roads. There are some gaps in the raised median that provide access to light industrial centres, food and drink shops and wholesale retail centres. All intersections are signalised with full turning movements provided, except Torrens Road, where the raised median prevents right-turn movements. This section of the Tī Rākau Drive carriageway consists of two westbound lanes and three eastbound lanes.

Burswood Drive has two access points into Tī Rākau Drive, at Burswood Drive west and Burswood Drive east. Between Burswood Drive west and the entrance to the Burswood residential area, there is a total of 10 vehicle accesses to the surrounding retail area.

A raised median continues from Harris Road to Burswood Drive east, with gaps to allow for access into the retail centres on both sides of the road. There are three lanes in each direction in this section of Tī Rākau Drive.

A similar raised median restriction exists between Greenmount Drive and Te Irirangi Drive, however full turning movements are provided at all intersections. The vehicle access into the Howick and Eastern Bus Depot is signalised with full turning movements allowed. There is a traffic island dividing the Tī Rākau Drive traffic that enters and exits the Huntington Drive signalised intersection.

Figure 10 shows the existing directional signage on Te Irirangi Drive northbound near the intersection with Tī Rākau Drive.

Figure 10: Existing directional signage on Te Irirangi Dr close to the Tī Rākau Dr intersection

Te Irirangi Drive has two lanes in each direction separated by a raised median, as well as additional short lanes for turning movements at intersections.

Between the Te Irirangi Drive/Tī Rākau Drive and the Te Irirangi Drive/Te Koha Road intersections, there are several access points to access the commercial areas of Botany Town Centre and "The Hub"[20].

[20] The Hub is a multi-unit large format retail development at the corner of Tī Rākau and Te Irirangi Drives.

3.5 Bus Services and Facilities

AT launched a new bus network for East Auckland in December 2017. This included a new bus network, bus routes, route numbers, timetables and buses. The new East Auckland Bus Network philosophy was improved integration with other public transport networks for Auckland, such as buses connecting with trains at the Panmure and Otahuhu interchanges, as well as at the Middlemore, Papatoetoe and Manukau train stations. **Figure 11** outlines the existing bus routes and services operating on the transport network through the EB2, EB3R, EB3C, EB4i and EB4L project areas.

Figure 11: Existing bus network through EB2, EB3R, EB3C, EB4i and EB4L project areas[21]

There are a number of bus services within the EB3C and EB4 project areas that currently operate on the proposed Eastern Busway corridor, including:

- **70** – Botany to City
- **351** – Botany to Ōtāhuhu Station
- **352** – Panmure to Manukau
- **353** – Manukau to Botany Town Centre

[21] https://at.govt.nz/media/1974487/east-new-network-get-ready-poster-aug17-v30.pdf

Details of these services are outlined in **Table 4**.

Table 4: Existing bus services through EB3C, EB4i and EB4L project areas

Route Type	Route No	Frequency	Route Description
Frequent Services	70	At least every 15 minutes. 7am - 7pm, 7 days a week. Lower frequencies early morning and evenings.	Botany, Pakūranga, Panmure, Ellerslie, Newmarket, Britomart
Connector Services	353	At least every 30 minutes. 7am - 7pm, 7 days a week. Lower frequencies early morning and evenings.	Manukau, Preston Rd, Springs Rd, Harris Rd, Botany Town Centre
Local Services	351	Frequencies and hours of operation vary (Monday to Friday only).	Botany, Highbrook, Ōtāhuhu Town Centre, Ōtāhuhu Station
Peak Services	352	Services operate weekdays only, during morning and afternoon peaks.	Panmure, Highbrook, East Tāmaki, Manukau

In the existing environment, the 70, 351, 352 and 353 services travel along Tī Rākau Drive in the kerbside lanes with general traffic. As such, buses have roughly the same travel times as general vehicles along these sections (excluding dwelling time at bus stops) and experience the same delays at intersections. Furthermore, without the Project, buses are expected to experience the same increases in delays in the future as a result of congestion and queueing on Tī Rākau Drive.

School bus services operating through the EB3C and EB4 project areas include:

- **S013** – Otara to Edgewater College
- **S416** – Botany Downs to Sacred Heart College
- **S421** – Burswood to Farm Cove Intermediate, St Marks School and Wakaaranga School
- **S440** – Bucklands Beach to Sancta Maria College

In the EB3C, EB4i and EB4L project areas there are 15 bus stops, seven of which are on Tī Rākau Drive. The majority of the bus stops are mainly for public bus services, while some are stops for school services. **Figure 12** shows the existing bus stop locations in the Project areas.

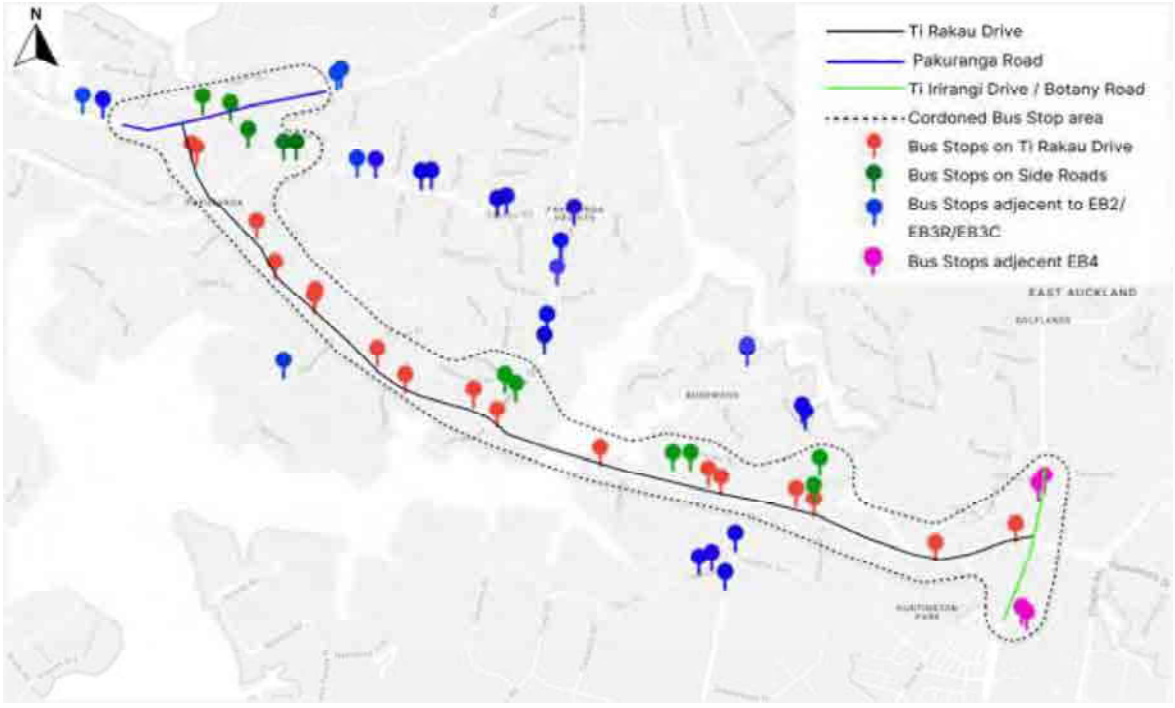

Figure 12: Bus stops within EB2, EB3R, EB3C, EB4i and EB4L project areas

The spacing between the existing bus stops on a corridor varies considerably, with the average distance between stops being 500m. The walking catchments for these bus stops show that there are some significant gaps in the walking network over large areas, particularly along Tī Rākau Drive. All existing bus stops are on-street and the majority of bus stops do not provide seating or sheltered cover. No bicycle parking is provided in the existing environment.

3.6 Walking and Cycling Facilities

3.6.1 Walking Facilities

Overall, the majority of roads within the EB3C project area have existing pedestrian footpaths[22] provided along both sides of the corridor. A footpath is absent for a small section at the southern end of Tullis Place, while the majority of the slip lanes do not have pedestrian crossings. There are no dedicated pedestrian crossing facilities on Burswood Drive west or Burswood Drive east, except at the intersections with Tī Rākau Drive.

3.6.1.1 EB3C – Tī Rākau Bridge

- A 1.7m wide pedestrian footpath is available on both sides of the bridge with no separation from the live lane (see **Figure 13**).

Figure 13: EB3C - Tī Rākau Bridge existing walking facilities

[22] Refer to Appendix A for a description of the existing Walking Facilities in the EB2 and EB3R project areas.

3.6.1.2 EB3C – Tī Rākau Bridge to Burswood Drive west

- 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
- Pedestrian crossing facilities are available at all signalised intersections, however, there are no signalised pedestrian crosswalks at the Tī Rākau Drive / Trugood Drive east arm, and at the Tī Rākau Drive / Burswood Drive west arm
- There are no formal crossing facilities at the slip lanes
- 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, consisting of a signalised T-junction with a left-turn slip lane for vehicle efficiency and crossing facilities provided across the side street and one leg of the corridor. Pedestrians must cross the slip lane, unprotected, to the refuge island before arriving at the push button to cross the road. Additionally, the intersections only have one pedestrian crosswalk in the north-south direction across Tī Rākau Drive, instead of crosswalks across both sides of the intersection, reducing pedestrian amenity and efficiency.

Figure 14 shows the location of the existing walking facilities in EB3C between Tī Rākau Bridge and Burswood Drive west.

Figure 14: EB3C - Tī Rākau Bridge to Burswood Dr west existing walking facilities

3.6.1.3 EB3C – Burswood Drive

- 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
- Formal crossing facilities are only provided at the two Tī Rākau Drive / Burswood Drive signalised intersections
- At the Torrens Road / Burswood Drive intersection, there is a raised table with tactile pavers, and there are pram ramps at the north and south arms

Figure 15 shows the existing walking facilities in EB3C on Burswood Drive.

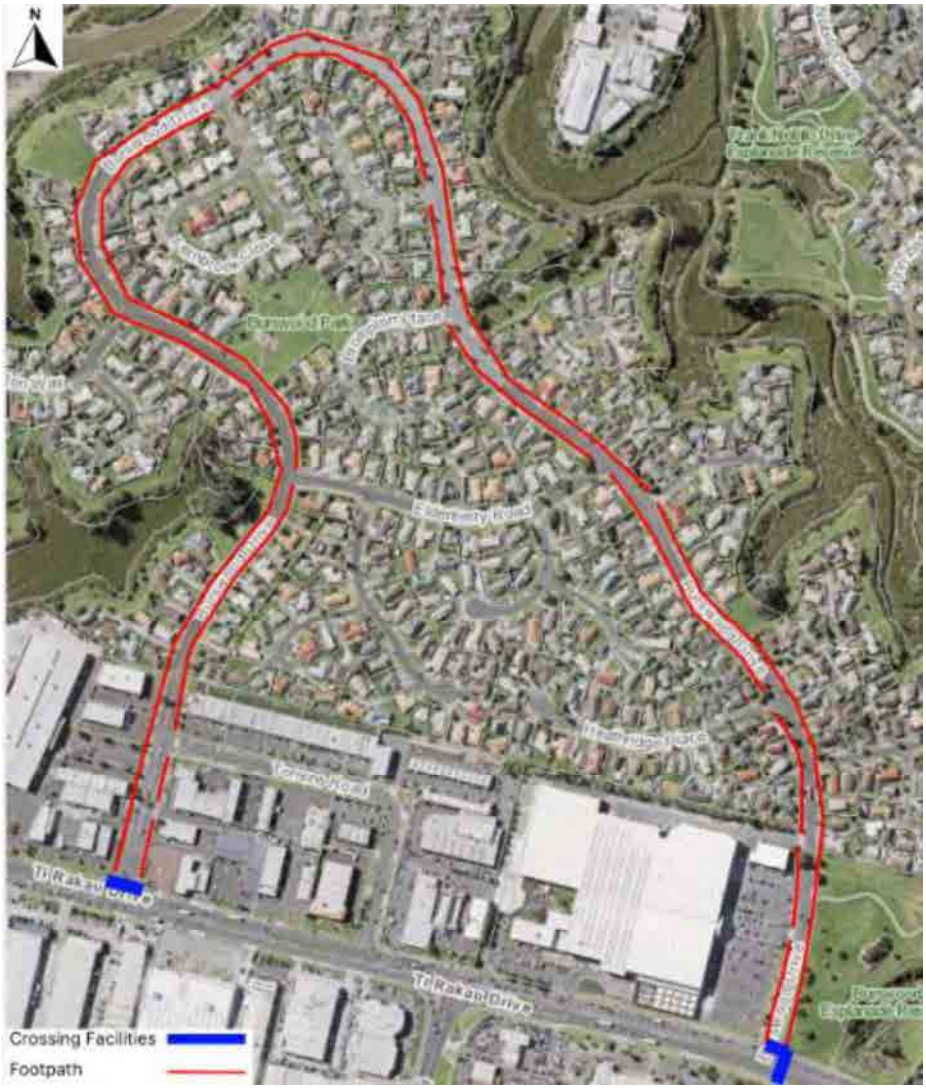

Figure 15: EB3C - Burswood Dr existing walking facilities