# Sunfield Masterplanned Community Fast-Track

## Integrated Transportation Assessment Report

10 February 2025

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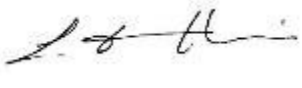
| | |  |  |

# TABLE OF CONTENTS

# 1 EXECUTIVE SUMMARY

Winton Land Limited is proposing to develop a masterplanned community known as 'Sunfield Masterplanned Community'. Sunfield is designed to be a 15-minute sustainable neighbourhood to provide residents access to most, if not all, resident needs within a short walk or bike ride from their home, including schooling, employment, medical services, restaurants and bars, recreational spaces, retail, and food supplies. Sunfield is designed on eight core principles, with the most fundamental principle being to enable 'Car-less Living'.

Critical to achieving a 'car-less' community are:

- Significant limitations in the number of cars on the site (generally 10% of a more standard development).
- Provision of a frequent public transport system linking both internally within the site and the wider network (including town centres and major train stations).
- Encouraging active transport modes through reduction in car ownership.

It is anticipated that any future development, would provide the transport network upgrades described in this assessment including:

- Provision (including funding) of a public transport network with a fleet of vehicles that operate continuously within the site and linking to Papakura and Takanini Train Stations / Town Centres;
- Local intersection upgrades (roundabouts and signalised intersections);
- Provision of upgraded cycle lanes linking the site to Papakura Rail Station and Town Centre and Takanini Rail Station and Town Centre by way of cycling / pedestrian facilities.

It is recognised that this development is essentially a first for New Zealand. As a result, it is considered that carefully monitoring of initial stages of the development is needed to ensure the measures proposed have the desired result of significantly reducing private car travel (both internal and externally).

# 2 INTRODUCTION

Commute Transportation Consultants (Commute) has been engaged by Winton to prepare an Integrated Transportation Assessment for the proposed development of a master planned community which borders Papakura and Takanini in South Auckland (known as “Sunfield”).

The site is zoned Future Urban Zone and Mixed Rural Zone under the Auckland Unitary Plan – Operative in Part (Unitary Plan) and has an approximate area of 244.5 hectares.

As detailed within the Context and Executive Summary, a key design principle of Sunfield is to create a masterplanned community that enables ‘car-less living, which significantly reduces the reliance on private cars within the development.

Vehicle access to the site to / from the wider roading network is proposed to be via Mill Road (at the Mill Road / Walters Road intersection), Old Wairoa Road (at the Old Wairoa Road / Okawa Avenue intersection), Hamlin Road (east), Airfield Road (north), and Cosgrave Road (west). Each of the accesses will connect to the internal road network. As part of the proposal Hamlin Road (western end) will be re-aligned within the Sunfield site to directly connect to Walters Road.

Key transportation considerations of Sunfield are:

- The accessibility of the site to various modes of transport; and
- The ability of the surrounding road network to safely and efficiently accommodate traffic generated by potential development.

These and other transportation issues will be addressed in this report.

# 3 CONTEXT

The following section provides context of the proposal as provided by Winton.

*"Winton and the design team were presented with an opportunity to explore a new approach to development that moves away from a reliance on private motor vehicles toward a future-thinking people centric collection of liveable neighbourhoods. This approach has unlocked a number of doors that will lead to healthier and more sustainable outcomes for now and the future. Meeting the needs of our communities requires that the Sunfield concept masterplan considers all aspects of life and integrates housing, employment opportunities, amenity and open space as we look to our neighbourhoods to become more self-sufficient and provide for higher standards of living in compact ways.*

*The 15-minute sustainable neighbourhood is designed to provide residents access to most, if not all, resident needs within a short walk or bike ride from their home, including schooling, employment, medical services, restaurants and bars, recreational spaces, retail, and food supplies. The 15-minute sustainable neighbourhood concept serves as an organising principle for urban development and urban life. It makes life more liveable for residents so they can live and work locally, increasing their quality of life with better air quality, safer neighbourhoods that are quieter, more diverse, inclusive, economically vibrant and not reliant on cars.*

*Considering transport and buildings together through the process has been integral to the design of the Sunfield concept masterplan. By focusing on people not cars, Sunfield enables car-less living by innovatively designing the concept masterplan to remove the challenges usually incurred in leading a car-less lifestyle while improving resident quality of life. Using ground-breaking technology for transport, residents will be able to jump on the Sunfield autonomous electric bus that continuously runs to link with the train station, the central Sunfield Village, small neighbourhood hubs, and stop anywhere in between, along with dedicated bus and bike lanes, wider footpaths and shared vehicles for those times when car use is unavoidable.*

***Sunfield is designed on eight core principles, with the most fundamental principle being to enable 'Car-less Living'**.*

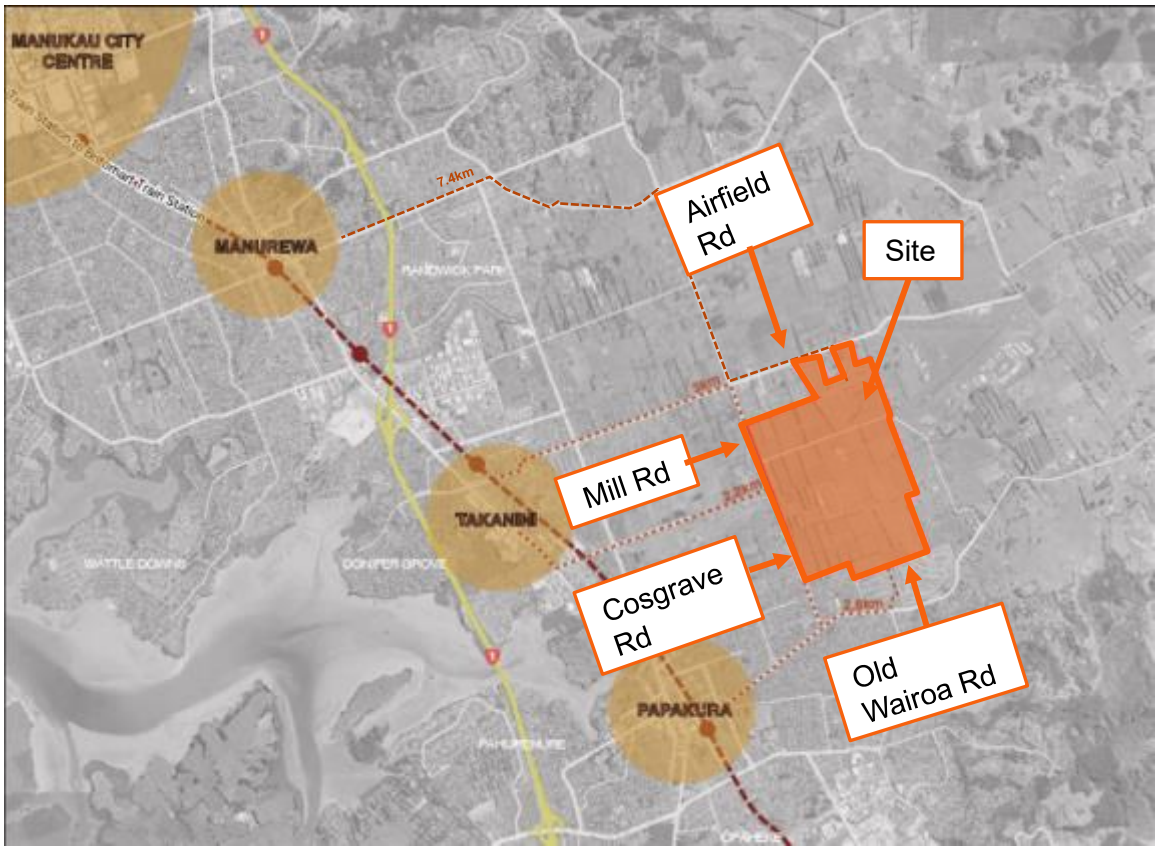
*'Car-less Living' is the ability to live without a private motor vehicle. Households living without their own car is both a realistic and achievable possibility if the right ingredients are provided. Sunfield's ambition is to provide a significant step change in people's perceptions and behaviours. The benefits of car-less living are many, and a reduction in internal combustion engine vehicles will be a significant component in achieving New Zealand's goal of carbon neutrality by 2050. Aside from the obvious environmental benefits and the reduction of pressure on Auckland's already overloaded roading network, removing cars from the equation unlocks many positive social benefits through the creation of safe and walkable neighbourhoods. Enabling car-less living requires embedding the requirements for daily life within close proximity to minimise the need for longer distance travel, and where travel is required by providing viable, efficient, and affordable alternatives that are preferable to owning and running a private motor vehicle"*

# 4 EXISTING ENVIRONMENT

## 4.1 SITE LOCATION

Figure 4-1 shows the location of the site in relation to the surrounding environment. The site has frontages to the existing Mill Road, Cosgrave Road, Airfield Road, and Old Wairoa Road.

**Figure 4-1: Site Location**




The site is located on the fringe of the South Auckland suburbs of Papakura and Takanini, with residential dwellings to the west and south, and the surrounding area to the north, east, and south being primarily rural in nature. It is also noted that the Ardmore Airport is located to the east.

The site is proposed to have a total of seven connections to the local road network, via the following links:

- Mill Road (at the Mill Road / Walters Road intersection);
- Old Wairoa Road (at the Old Wairoa Road / Pakaraka Drive intersection);
- Hamlin Road (east) to Ardmore airport, via two new roads from within Sunfield to Airfield Road;
- Two connections to Cosgrave Road from within Sunfield; and
- Two connections to Airfield Road also from within Sunfield.

As previously noted, the western end of Hamlin Road will be re-aligned within the Sunfield site to directly connect to Walters Road.

Cosgrave Road, Mill Road, and Airfield Road are all classified as 'Arterial Roads' in the Unitary Plan, and therefore subject to vehicle access restrictions. Old Wairoa Road and Hamlin Road are not classified as 'Arterial Roads' and therefore direct access off this corridor is permitted under the Unitary Plan.

Figure 4-2 shows a recent aerial photograph of the site and surrounding environment.

**Figure 4-2: Aerial Photograph of the Site and Surrounding Environment**


## 4.2 EXISTING ROAD ENVIRONMENT

### 4.2.1 COSGRAVE ROAD

As detailed previously, Cosgrave Road is classified as an 'Arterial Road' in the Unitary Plan. It connects to Clevedon Road in the south, and transitions to Mill Road in the north, north of the Hamlin Road intersection.

In vicinity of the site, Cosgrave Road has an approximate carriageway width of 9m, accommodating one traffic lane in each direction and a central median. The western side of the road has been upgraded to include a footpath, berms, kerb, and channel, while the eastern side of the corridor has a narrow gravel shoulder.

Cosgrave Road has a posted speed limit of 60km/h adjacent to the site. Photograph 4-1 shows Cosgrave Road fronting the site.

**Photograph 4-1: Cosgrave Road Layout**

### 4.2.2 OLD WAIROA ROAD

As detailed previously, Old Wairoa Road is not classified as an 'Arterial Road' in the Unitary Plan. It connects to Porchester Road in the west and transitions to Twin Park Rise in the east. There is a paper road included on the Council maps which suggests that Old Wairoa Road may be extended to the east to connect with Papakura-Clevedon Road in the future.

Old Wairoa Road has an approximate carriageway width of 9m, accommodating one lane of traffic in each direction. The southern side of the road has been upgraded to include a footpath, berms, kerb, and channel, while the northern side of the corridor has a berm with a kerb and channel.

Old Wairoa Road has a posted speed limit of 50km/h adjacent to the site. Photograph 4-2 shows Old Wairoa Road fronting the site.

**Photograph 4-2: Old Wairoa Road Layout**

### 4.2.3 AIRFIELD ROAD

As detailed previously, Airfield Road is classified as an 'Arterial Road' in the Unitary Plan. It connects to Takanini School Road in the west and connects to Mullins Road in the east.

Airfield Road has an approximate carriageway width of 11m, accommodating one lane of traffic in each direction. Both sides of the carriageway have a narrow gravel shoulder.

Airfield Road has a posted speed limit of 80km/h adjacent to the site. Photograph 4-3 shows Airfield Road fronting the site.

**Photograph 4-3: Airfield Road Layout**

### 4.2.4 HAMLIN ROAD

As detailed previously, Hamlin Road is not classified as an 'Arterial Road' in the Unitary Plan. It connects to Cosgrave Road in the west and connects to Papakura-Clevedon Road in the east.

Hamlin Road has an approximate carriageway width of 6m, accommodating one lane of traffic in each direction. Both sides of the carriageway have a narrow gravel shoulder.

Hamlin Road has a posted speed limit of 60km/h adjacent to the site. Photograph 4-4 shows Hamlin Road fronting the site.

**Photograph 4-4: Hamlin Road Layout**

### 4.2.5 MILL ROAD

As detailed previously, Mill Road is classified as an 'Arterial Road' in the Unitary Plan. It connects to Redoubt Road in the north and transitions to Cosgrave Road in the south, south of the Hamlin Road intersection.

In the vicinity of the site, Mill Road has an approximate carriageway width of 9m, accommodating one traffic lane in each direction and a central median. The western side of the road has been upgraded to include a footpath, berms, kerb, and channel, while the eastern side of the corridor has a narrow gravel shoulder.

Mill Road has a posted speed limit of 60km/h adjacent to the site. Photograph 4-5 shows Mill Road fronting the site.

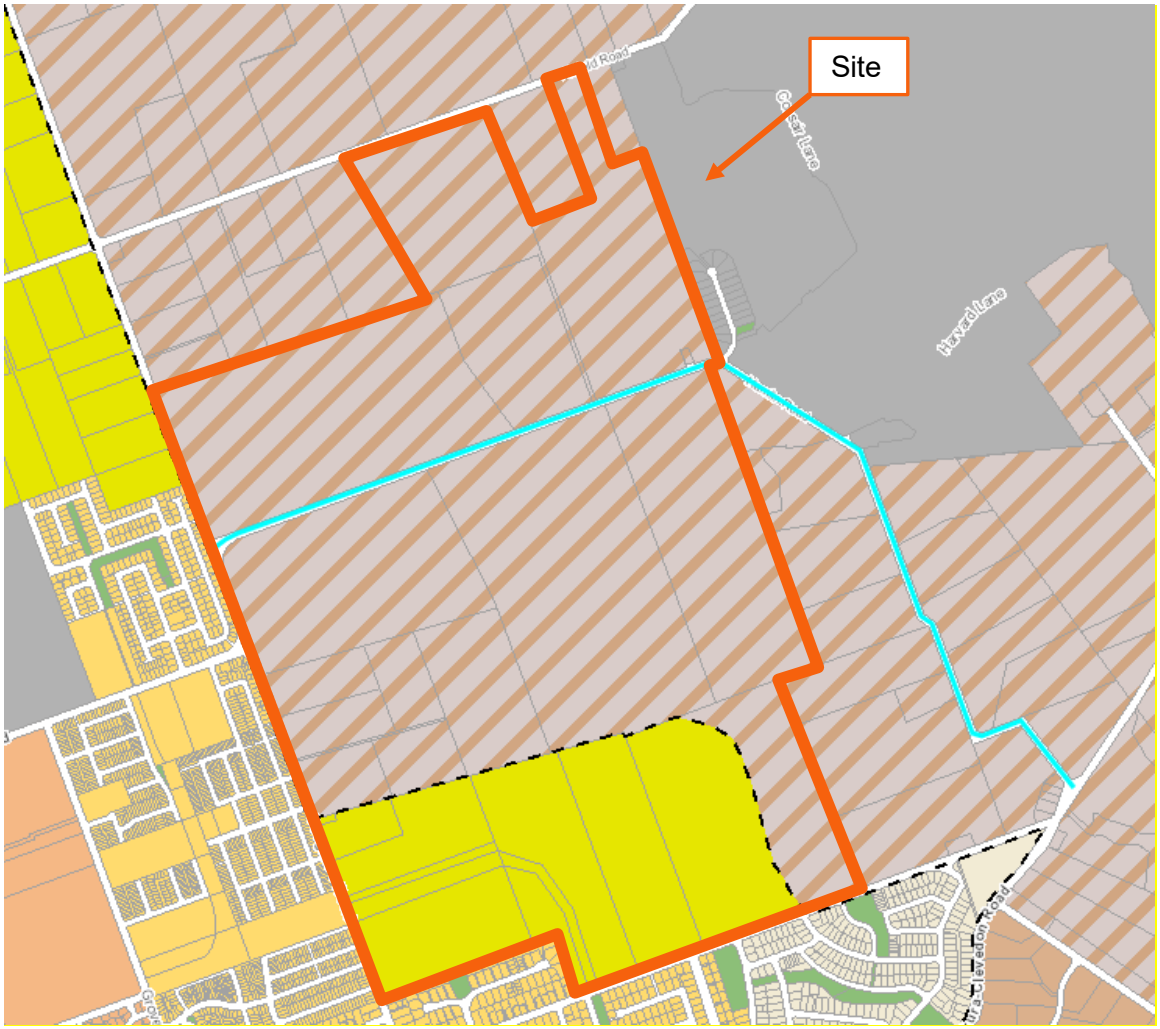
**Photograph 4-5: Mill Road Layout**

## 4.3 UNITARY PLAN ZONING

The existing Unitary Plan Zoning for the site is shown in Figure 4-2. The yellow zoning represents 'Future Urban Zone', while the brown striped zoning represents 'Mixed Rural Zone'.

There is estimated to be approximately 56.5 hectares of 'Future Urban Zone' and 188 hectares of 'Mixed Rural Zone' within the subject site.

**Figure 4-2: Unitary Plan Zoning**




## 4.4 CURRENT TRAFFIC VOLUMES

Traffic surveys were undertaken at 8 nearby intersections. The following 7 intersections were surveyed on Tuesday 4 April 2023 between 7:00-9:00 AM and 3:00-6:00 PM:

- Cosgrave Road / Walters Road;
- Cosgrave Road / Old Wairoa Road;
- Cosgrave Road / Clevedon Road;
- Pakaraka Drive / Old Wairoa Road;
- Okawa Avenue / Old Wairoa Road;
- Pakaraka Drive / Papakura-Clevedon Road; and
- Okawa Avenue / Clevedon Road / Dominion Road / Papakura-Clevedon Road.

The following intersection was surveyed on Wednesday 6 July 2022 between 7:00-10:00 AM, 11:00 AM – 2:00 PM, and 3:00-7:00 PM:

- Airfield Road / Mill Road.

It was considered that the morning peak hour for all intersections was 7:15-8:15AM and the afternoon peak hour was considered to be 3:45-4:45PM.

Figures 4-3 and 4-4 below shows the turning movement counts for the morning and afternoon peak hours respectively.

**Figure 4-3: Existing AM Traffic Volumes at Surveyed Intersections**

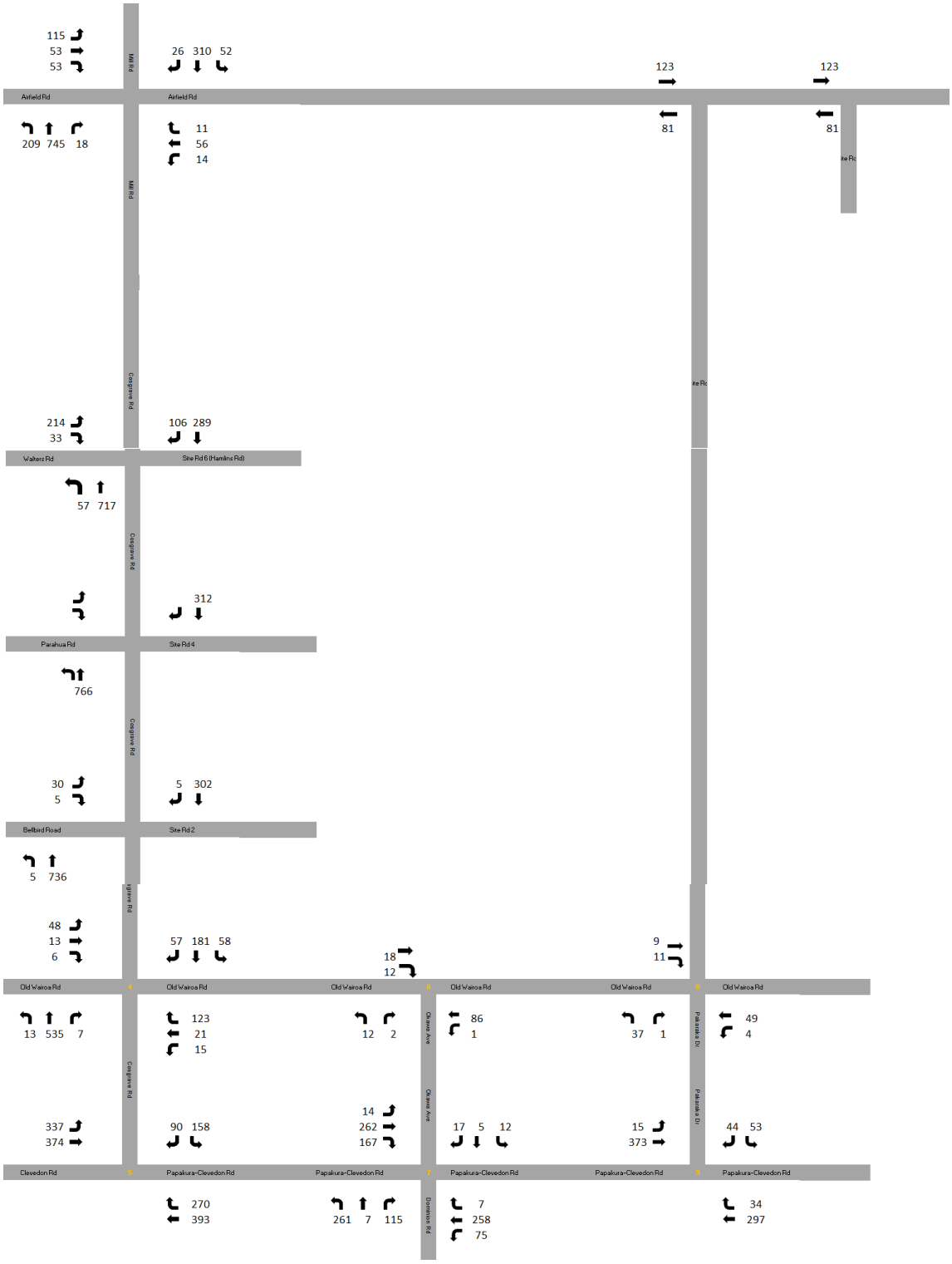
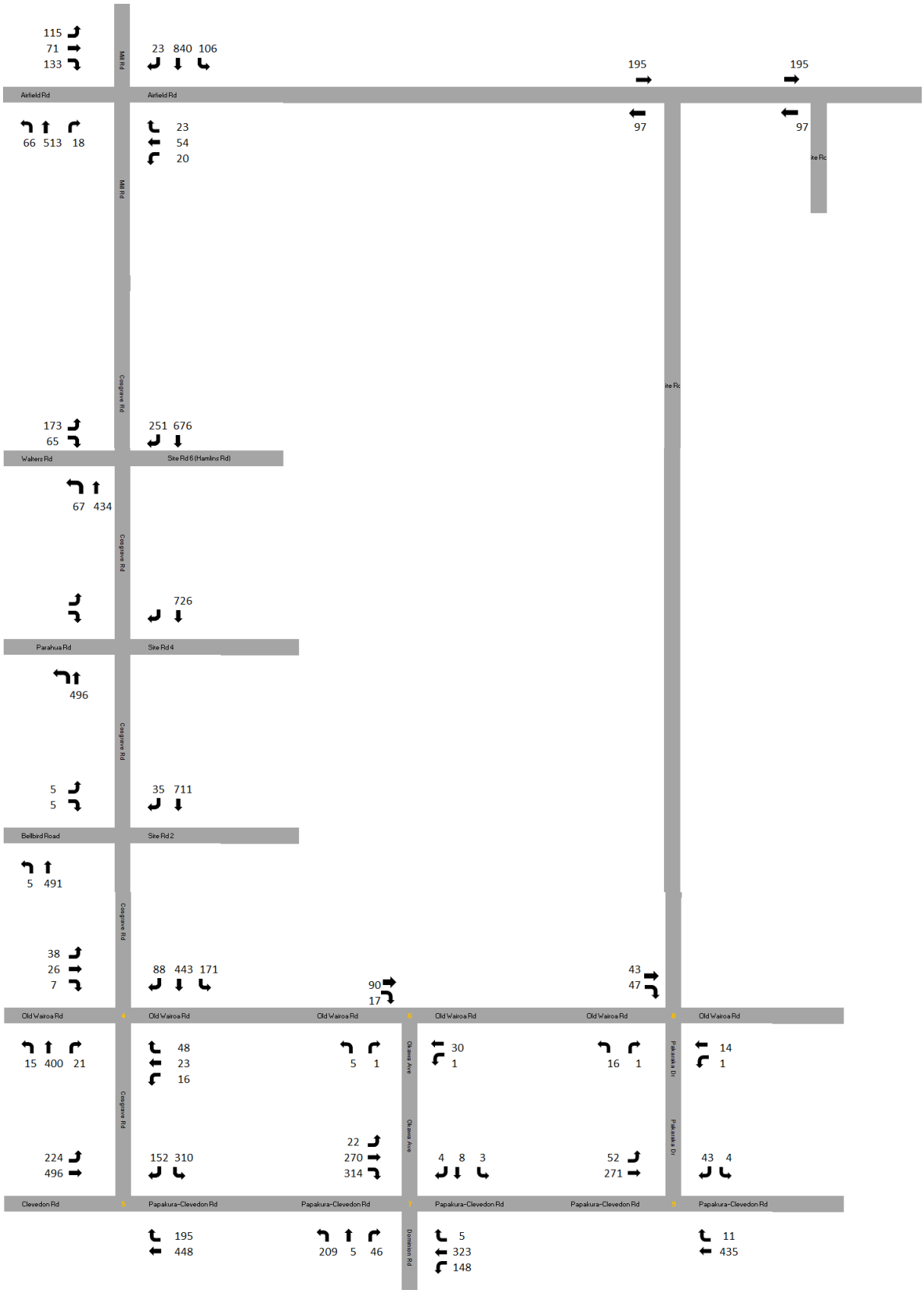


**Figure 4-4: Existing PM Traffic Volumes at Surveyed Intersections**



## 4.5 ACCESSIBILITY

### 4.5.1 WALKING AND CYCLING

Table 4-1 summarises the nearby attractions within walking and cycling distance of the site.

**Table 4-1: Nearby Attractions (Measured from Nearest Point on the Site as per Figure 4-1)**

| Nearby Attractions | Distance | Walk Time | Cycle Time |
|---|---|---|---|
| Kauri Flats School | ~ 0.2 km | ~ 5 mins | <5 mins |
| Bruce Pullman Park | ~ 1 km | ~15 mins | 5-10 mins |
| Takanini Town Centre & Train Station | ~ 2 - 3 km | ~ 30 - 40 mins | 5-15 mins |
| Papakura Metropolitan Centre & Train Station | ~ 3 km | ~ 40 mins | 10-15 mins |

The site is located on the fringe of residential suburbs and rural land and therefore there are currently limited existing attractions within walking distance. There are a number of attractions within cycling distance of the site including education, employment, retail, and recreational.

Where the land to the west and south of the site has been developed with residential subdivisions there are footpaths, however many of the roads in close proximity to the site do not have a kerb, channel or footpath. Similarly, there are no dedicated cycling facilities near the site.

### 4.5.2 PUBLIC TRANSPORT

The current bus routes nearest to the site travel along Cosgrave Road and Clevedon Road, and provide the following services:

- Bus Route 372, a connector service[1] between Papakura Station, Willis Rd, Sheehan Ave, Dominion Rd, Clevedon Rd, Papakura Station. (Papakura Shops To Keri Hill Loop);
- Bus Route 365, a connector service[2] between Botany, Kilkenny Dr, Middlefield Dr, Mission Heights, Ormiston, Manukau; and
- Bus Route RBS/33, a frequent service[3] between Papakura, Great South Rd, Manurewa, Manukau, Ōtāhuhu town centre, Ōtāhuhu Station.

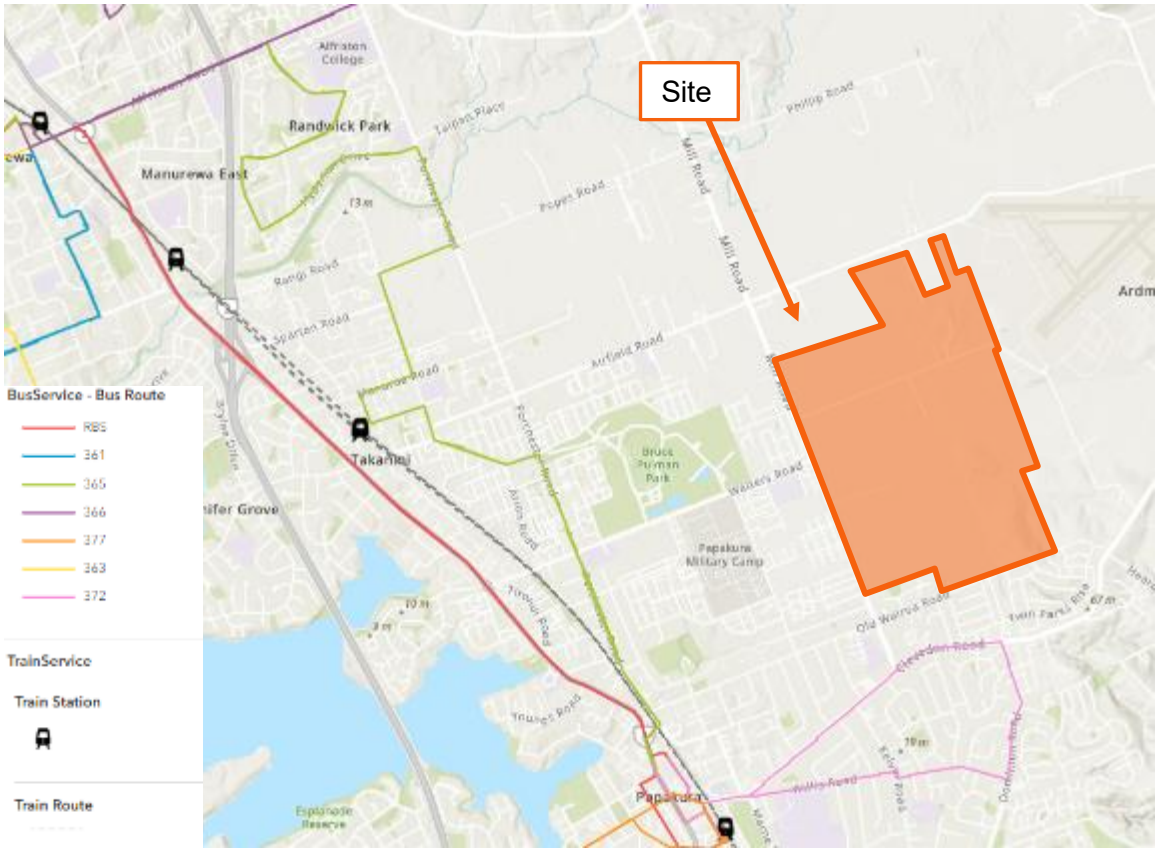
[1] At least every 30 minutes, 7am – 7pm, 7 days a week. Frequencies may be lower early mornings and evenings.

[2] At least every 30 minutes, 7am – 7pm, 7 days a week. Frequencies may be lower early mornings and evenings.

[3] At least every 15 minutes, 7am – 7pm, 7 days a week. Frequencies may be lower early mornings and evenings.

Figure 4-5 shows the public transport services in the local area[4].

**Figure 4-5: Public Transport Routes**




It is also noted that Papakura and Takanini Train Stations are located approximately 3.1-4.0 km from the site. Both of these train stations are located on the southern line, which connects Pukekohe in the south to Britomart (being the Auckland CBD) in the north. Southern line train services operate with a 10-minute frequency in both directions from 7am to 7pm, and 20-minutes frequencies in the early mornings and evenings.

### 4.5.3 PRIVATE VEHICLES

The development site is reasonably well located with regards to road connectivity to the wider Auckland Region. The development site has frontage to a number of Arterial Roads and as such, the development site has direct access to the Arterial Road network which in turn connects to the State Highway network.

The closest highway is SH1, with the Takanini interchange located approximately 6km north of the site and the Beach Road / Papakura interchange approximately 5km south of the development site. SH1 provides the primary connection through Auckland, orientated in a north-south direction through the city.

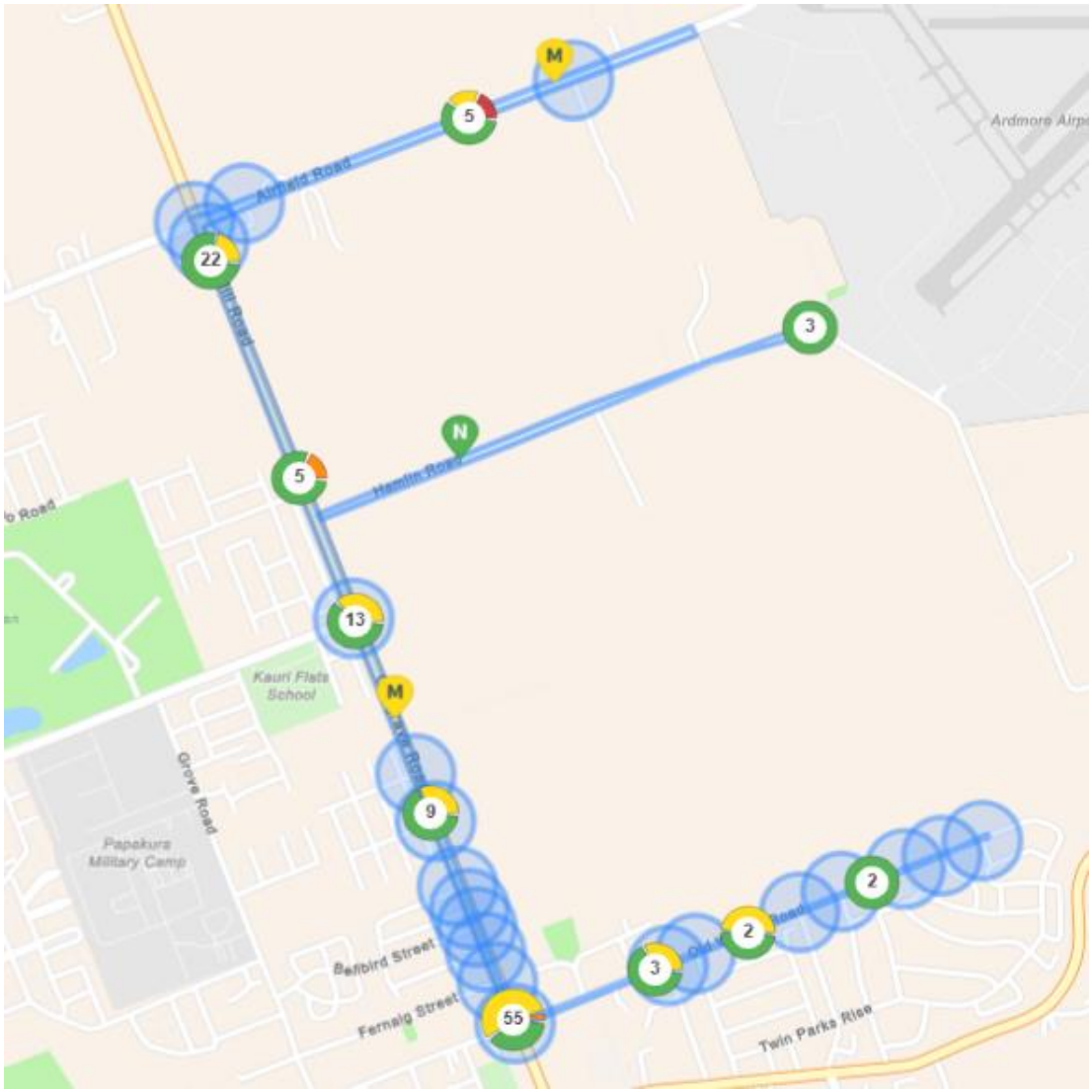
[4] AT Open GIS Data December 2023.

## 4.6 ROAD SAFETY ASSESSMENT

An assessment of the surrounding area's safety record has been carried out using Waka Kotahi's CAS database for crashes occurring within the designated study area between 2019 and 2023, as well as any crashes entered in the database for 2024. The study area comprises the roads where links to the road network for the site are proposed (Mill Road, Airfield Road, Old Wairoa Road, Cosgrave Road, and Hamlin Road), and includes a 100m radius searches at the each of the neighbouring intersections.

A total of 124 crashes were recorded over the period within the search criteria as shown below in Figure 4-6. The green represents non-injury crashes, the light orange represents minor injury crashes, the dark orange represents serious crashes, and the red represents a facility. Table 4-2 summarises the reported crashes based on location and severity

**Figure 4-6: Crash Location and Severity Map**




The majority of the crashes occurred at the Cosgrave Road / Old Wairoa Road intersection (41%), plus a portion at other intersections (40%), leaving only 24 crashes (19%) occurring at midblocks.

Table 4-2 summaries the reported crashes based on location and severity.

**Table 4-2: Historic Crash Summary**

| Severity | No. of Crashes | Crash Details |
|---|---|---|
| Within 100m Radius of the Cosgrave Road / Old Wairoa Road Intersection | | |
| Serious | 2 | • 1 driver failed to give way to another vehicle leaving driveway.<br>• 1 driver speeding and attempted to overtake another vehicle. |
| Minor | 30 | • 24 drivers failed to give way / stop at stop (alcohol suspected for 4 of them).<br>• 2 crashes occurred between a vehicle and cyclist.<br>• 1 driver collided with a power pole.<br>• 1 driver fell asleep while driving.<br>• 1 rear-end crash.<br>• 1 crash occurred due to a vehicle oversteering while turning at the intersection. |
| Non-Injury | 19 | • 19 drivers failed to give way / stop at stop. |
| Within 100m Radius of the Other Intersections | | |
| Minor | 16 | • 1 driver crashed into a parked car.<br>• 5 loss of control crashes<br>• 2 rear-end crashes.<br>• 1 vehicle collided with a pedestrian.<br>• 6 vehicles failed to give way.<br>• 1 driver collided with a guard rail (speeding was suspected). |
| Non-Injury | 33 | • 4 drivers crashed into a parked car.<br>• 13 loss of control crashes (alcohol was suspected for 4 of them and lack of sleep was suspected for 5 of them).<br>• 2 drivers crashed into power pole.<br>• 5 rear-end crashes.<br>• 1 crash involved a driver beings spiked by police after attempting to escape.<br>• 1 crash involved oversteering at the Mill Road / Walters Road intersection.<br>• 5 vehicles failed to give way.<br>• 1 vehicle was towing a swimming pool (4.6m) which got caught in powerlines above.<br>• 1 vehicle collided with a cow off the roadway, |
| Midblocks | | |
| Fatal | 1 | • 1 loss of control while overtaking. |
| Serious | 1 | • 1 driver collided head-on with oncoming vehicle (alcohol suspected) |
| Minor | 4 | • 1 rear-end crash (foggy and dark).<br>• 3 loss of control crashes (speeding was suspected for 1 of them). |

| Severity | No. of Crashes | Crash Details |
|---|---|---|
| Non-Injury | 18 | • 7 loss of control crashes (alcohol and speeding suspected for 2 of them).<br>• 1 driver crashed into power pole due to lack of sleep.<br>• 5 drivers collided head-on with oncoming vehicle (alcohol suspected for one of them).<br>• 3 drivers crashed into a parked car.<br>• 1 rear-end crash.<br>• 1 driver lost control (alcohol and lack of sleep suspected). |

## 4.7 LEVEL CROSSINGS IN TAKANINI

A Detailed Business Case for the Takanini level crossings (DBC) was completed in late 2022. The DBC seeks to close / remove five existing level crossings in Takanini, namely:

- **Walters Road** – Closing the railway level-crossing on Walters Road and replacing it with a fully separated crossing over the railway (a bridge) for people walking, cycling and driving.
- **Taka Street** – Closing the railway level crossing on Taka Street and replacing it with a fully separated crossing over the railway (a bridge) for people walking, cycling and driving. This will see Takanini Road turned into a cul-de-sac.
- **Manuroa Road** – Complete closure of the railway level crossing on Manuroa Road and replacing it with a new walking and cycling bridge.
- **Manuia Road** – A brand-new railway crossing on Manuia Road. It would be a fully separated crossing (a bridge) for people walking, cycling and driving.
- **Spartan Road** – Complete closure of the railway level crossing on Spartan Road and replacing it with a new walking and cycling bridge.

These changes are shown in Figure 4-7 below.

**Figure 4-7: Proposed Level Crossing Changes**


It is considered that, with the site being south of Walters Road and the two southern crossings being maintained and enhanced (i.e. grade separated crossing), the accessibility of the development site will be enhanced by this proposed project, without being reliant upon it.

# 5 PROPOSED DEVELOPMENT

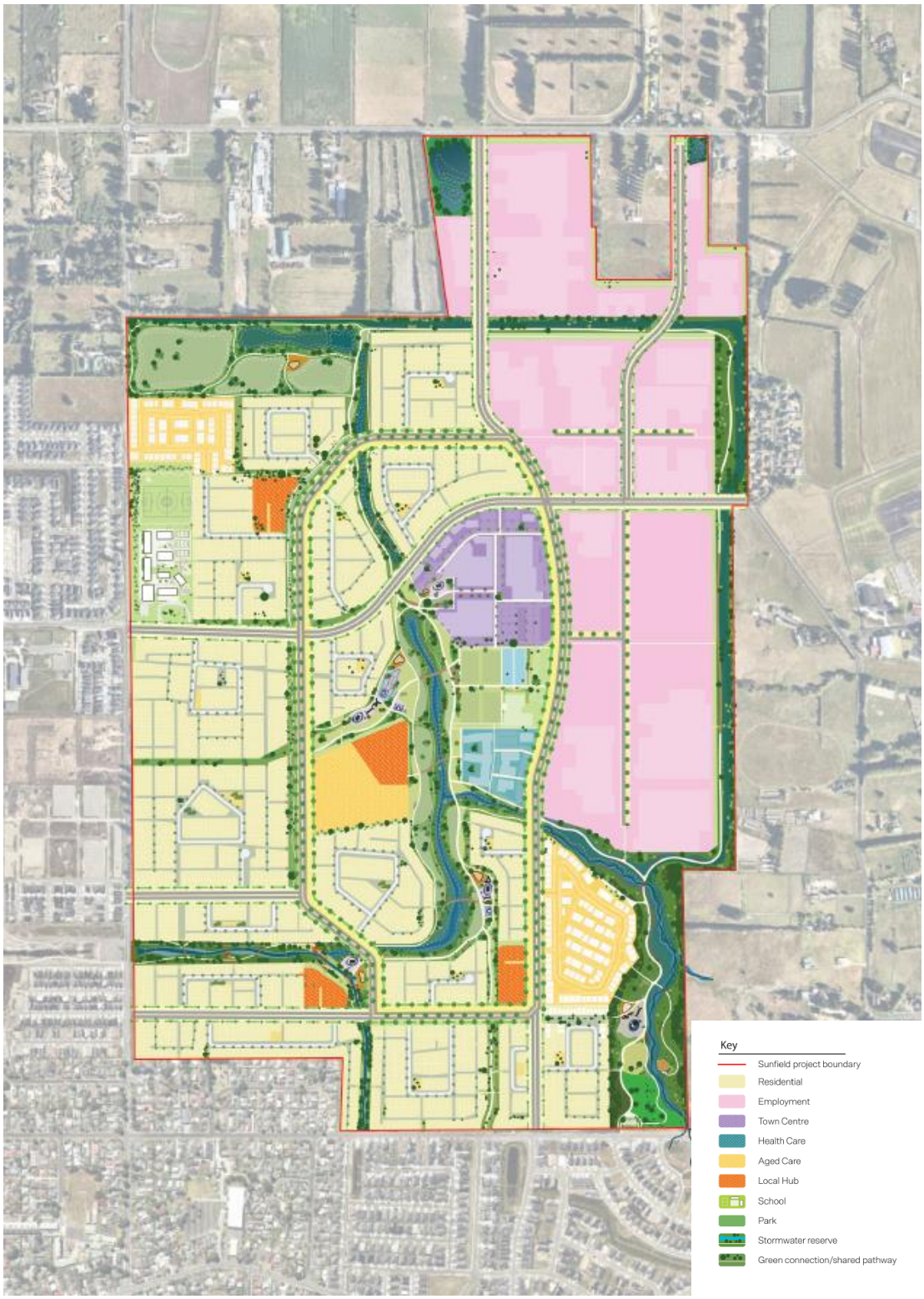
## 5.1 GENERAL

Wintonis proposing to develop a masterplanned community known as ‘Sunfield Masterplanned Community’. Sunfield is designed to be a 15-minute sustainable neighbourhood to provide residents access to most, if not all, resident needs within a short walk or bike ride from their home, including schooling, employment, medical

services, restaurants and bars, recreational spaces, retail, and food supplies. Sunfield is designed on eight core principles, with the most fundamental principle being to enable 'Car-less Living'.

Figure 5-1 below shows the proposed development, where the cream colour shows the residential areas, pink shows employment, orange shows neighbourhood local centres, green shows parks, yellow shows the school space, and lilac shows the town centre.

**Figure 5-1: Proposed Development**



Upon its completion, Sunfield will provide for:

- A community designed to enable “car-less” living.
- 4,000 homes, consisting of 3,400 individual homes and 3 retirement villages of approximately 600 independent living units and care beds.
- 400,000 sqm of employment, healthcare and education buildings.
- A 7.6-hectare town centre.
- A school.
- A further 4 retail hubs located throughout the community.
- Permanent jobs for over 11,000 people.
- 27.7 hectares of open spaces, green links, recreation parks and reserves and ecological offsets.
- An extensive restoration and native planting of the core stream and wetland network.
- The establishment of the Sunfield renewable solar energy network for the community.
- The ‘Sunbus’ electric shuttle fleet.

As detailed within the Context and Executive Summary, a key design principle of Sunfield is to create a masterplanned community that enables “car-less living, which significantly reduces the reliance on private cars within the development. This is to be achieved by way of a number of measures including:

- Only 1 in every 10 dwellings will have on-lot car parks;
- Visitor parking will be provided at the same 1 in every 10 dwelling ratio;
- The provision of car share spaces at Sunfield at a ratio of 1 in every 11.5 dwellings;
- Provision of the ‘Sunbus’ electric bus fleet that operate continuously. These vehicles will travel around internally as well as linking the site to Takanini rail station and town centre and Papakura station and town centre.
- Provision of schools, town centre, local centres and employment zone to encourage residents to live, shop, play and work in the Sunfield area;
- Provision of an upgraded cycle / pedestrian network both internally and linking to the Papakura and Takanini town centres

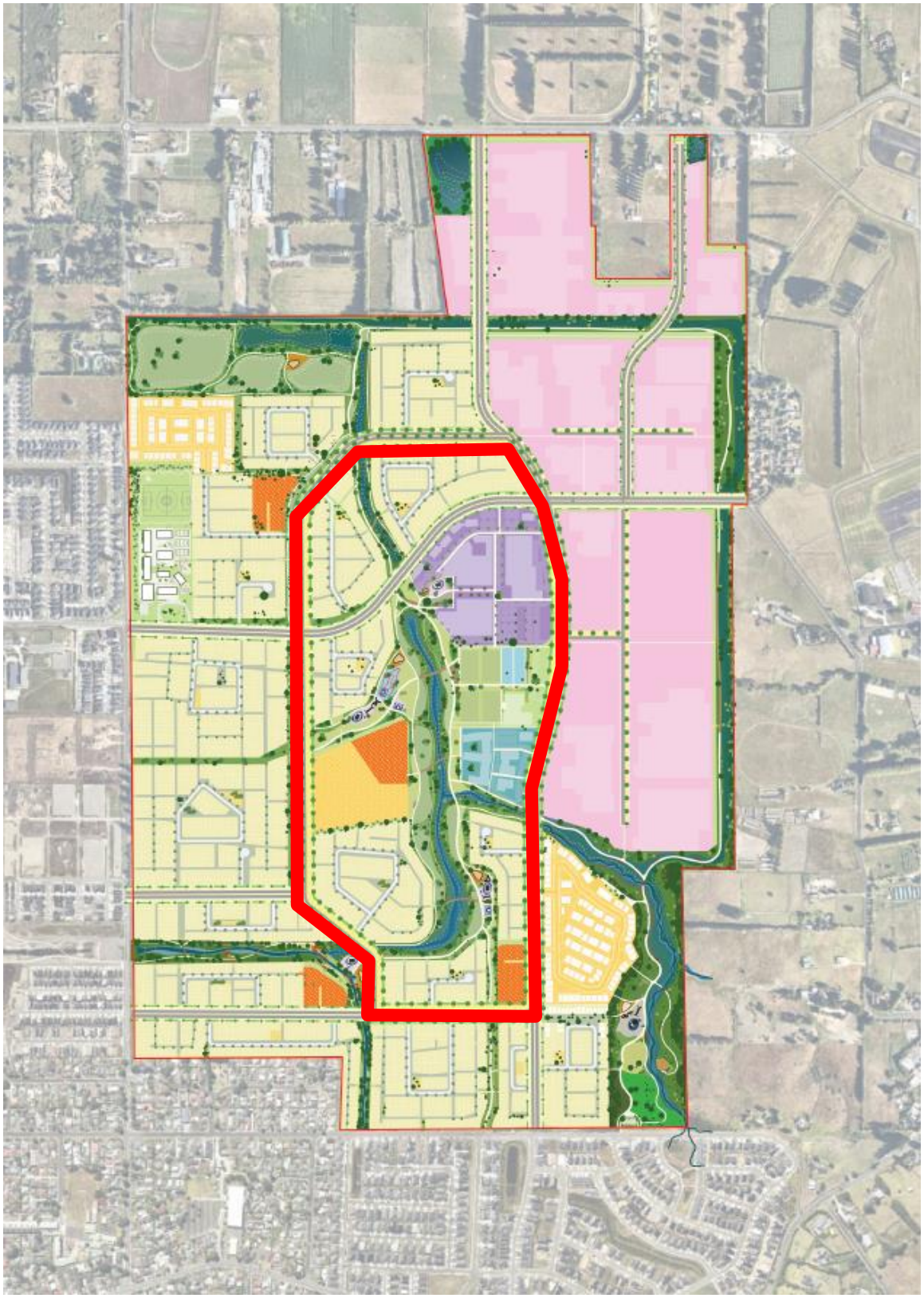
These concepts are discussed further in the following sections.

## 5.2 INTERNAL ROAD LAYOUT

### 5.2.1 SUNFIELD LOOP

A loop road is proposed to be the primary road within the development area as shown below in Figure 5-2.

**Figure 5-2: Indicative Loop Road Layout**

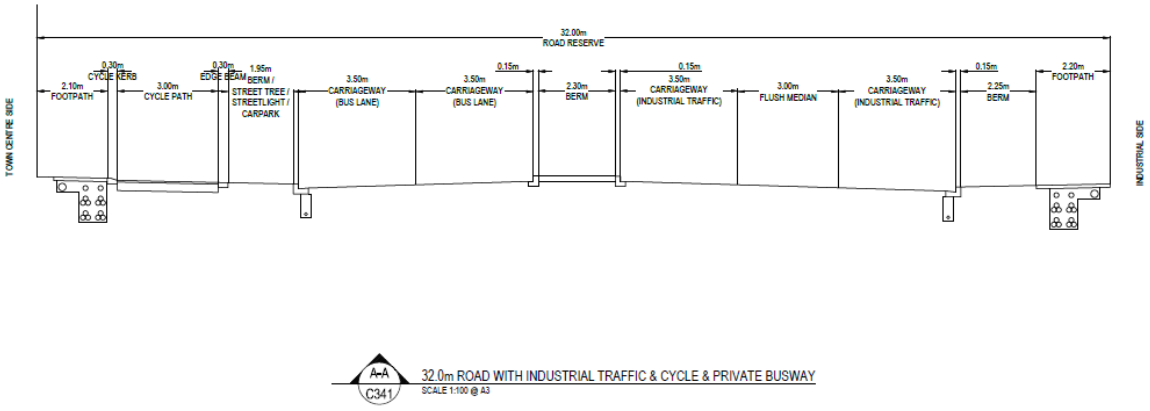


The Sunfield Loop is a 32m wide transport corridor conceived as a distinctive internal feature that prioritises active and shared transport modes to provide easy access throughout the site and enable the concept of 15-minute walkable neighbourhoods.

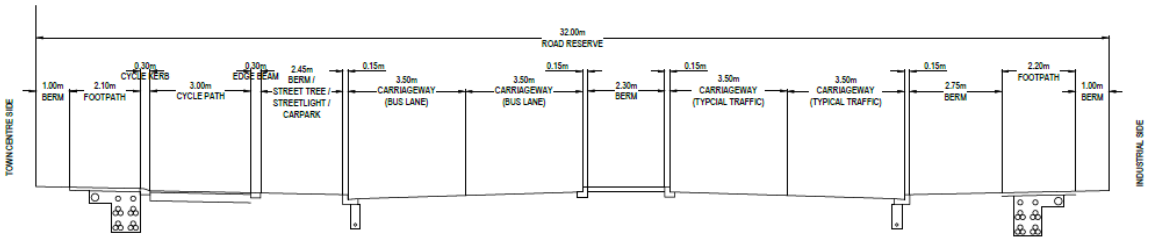
Community transport (bus or vehicle service) operates on its own dedicated and separated corridor with stops at local hubs and 400m intervals.

Figure 5-3 below shows the indicative cross section of the loop road.

**Figure 5-3: Indicative Loop Road Cross Section**




A-A C341 32.0m ROAD WITH INDUSTRIAL TRAFFIC & CYCLE & PRIVATE BUSWAY
SCALE 1:100 @ A3




A1-A1 C341 32.0m ROAD WITH TYPICAL TRAFFIC & CYCLE & PRIVATE BUSWAY
SCALE 1:100 @ A3

DRAFT FOR REVIEW

Generous separated and dedicated cycle lanes and footpath allow for active modes as priority. A separated two-way bus vehicle facility is provided. Private vehicle access is restricted to the separate two-way corridor to avoid conflict and minimise crossing points. The loop is the primary movement corridor through the site.

### 5.2.2 LINKS TO WIDER NETWORK

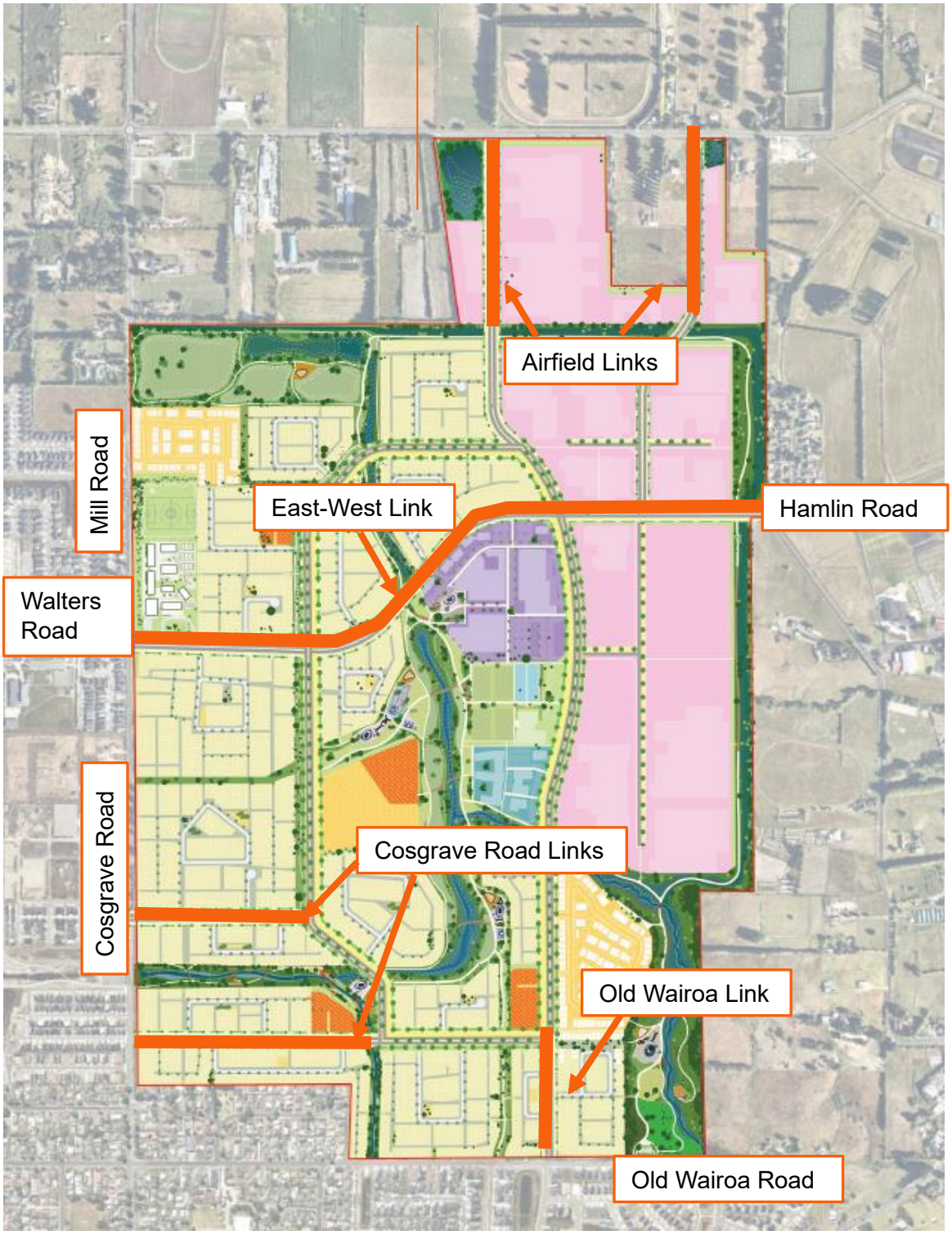
Seven links to the wider roading network are provided including:

1. Realigned Hamlin Road: An east-west road is proposed to bisect the development area with a connection to Walters Road/Cosgrave Road in the west and Hamlin Road in the east.
2. Cosgrave Road Link: Three separate east-west Cosgrave Road Links that connect up to the Sunfield road loop.
3. Old Wairoa Road link: A north-south connection is also proposed to connect to the loop road at the southern end of the site, with a connection to Pakaraka Drive/ Old Wairoa Road in the south.

4. Airfield Road: Two new east-west roads proposed from the employment land across a parcel of land owned by Sunfield Developments Limited with two connections to Airfield Road.

These are shown below in Figure 5-4.

**Figure 5-4: Internal-External Links**



### 5.2.3 INTERNAL ACCESS ROADS

Additional access roads are proposed within the development area including 16m wide local roads, 20m collector roads, and 20m, 25m, and 30m primary roads. These are further discussed in Section 9 of this report.

## 5.3 VEHICLE PARKING

The proposal includes residential vehicle parking at a maximum rate of 1 per 10 dwellings (i.e. 10% of dwellings have a parking space).

In typical residential developments in Auckland, most / all dwellings provide one parking space under the Unitary Plan (dependent on future zoning and size of dwellings), and therefore this is 10% of parking typically provided. It is noted that the National Policy Statement on Urban Development (NPS-UD) required Auckland Council to remove car parking minimums from the Auckland Unitary Plan. The removal of minimums occurred on 11 February 2022.

Residents and visitors parking will be provided within the neighbourhood centres. It is understood that the neighbourhood centres will be generally 700m or less from any point within the site and therefore at most approximately a 10–15-minute walk.

# 6 PLANNING POLICY

## 6.1 GENERAL

This section provides a review of the development site in relation to established policy and plans. The review focuses on the transportation components of the following documents:

- Auckland Plan 2050;
- Auckland's Climate Plan;
- Auckland Regional Land Transport Plan;
- Auckland Transport Alignment Project 2021-2031;
- Auckland Regional Public Transport Plan 2018-2028;
- Unitary Plan;
- Auckland Design Manual 2014;
- Auckland Transport Design Manual; and
- FDS.

## 6.2 AUCKLAND PLAN 2050

The Auckland Plan 2050 sets the direction for how Auckland will grow and develop over the next 30 years. It responds to the key challenges Auckland faces today – high population growth, sharing prosperity among all Aucklanders, and reducing environmental damage. The key transport related outcome is detailed below:

*"Aucklanders will be able to get where they want to go more easily, safely and sustainably".*

The Auckland Plan 2050 details seven focus areas in order to achieve this outcome:

- Make better use of existing transport networks;
- Target new transport investment to the most significant challenges;

- Maximise the benefits from transport technology;
- Make walking, cycling and public transport preferred choices for many more Aucklanders;
- Better integrate land-use and transport;
- Move to a safe transport network, free from death and serious injury; and
- Develop a sustainable and resilient transport system.

It is considered that the development of the site aligns well with the Auckland Plan 2050, as it will provide additional housing in close proximity to the Papakura Town Centre and the Rail Network which will assist with making the best use of existing corridors and infrastructure.

The development of the site will also result in upgrades to existing corridors which will improve safety and provide alternative modes of travel for residents and visitors.

## 6.3 AUCKLAND CLIMATE PLAN

Published in December 2020, the Auckland Climate Plan outlines the City's strategic plans and goals to work towards a region that is resilient and well connected to the environment. One of the primary targets of the plan is to halve the region's emissions by 2030 and to achieve net zero emissions by 2050.

The plan highlights that transportation is the single biggest contributor to emissions in Auckland, accounting for nearly 44% of all emissions in the region. To reduce transportation related emissions, the plan outlines the following targets:

- Reduce private vehicle kilometres by 12% through avoided motorised travel such as remote working;
- Increase in public transport usage from 7.8% in 2020 to 24.5% in 2030, and 35% in 2050;
- Increase in cycling as a mode of travel from 0.9% in 2020 to 7% in 2030, and 9% in 2050;
- Increase in walking as a mode of travel from 4.1% in 2020 to 6% in 2030.

The development of the site will provide housing within walking and cycling distance of the Papakura Town Centre and Rail Network. Furthermore, the development site has access to an existing feeder bus service, with there being the opportunity for Auckland Transport to enhance this connectivity by rerouting this service through the development site as development is undertaken. As such, the development is considered to be aligned with Auckland's Climate Plan as it provides resilient land use where residents have travel choice options available.

## 6.4 AUCKLAND REGIONAL LAND TRANSPORT PLAN 2021 – 2031

The Auckland Regional Land Transport Plan (RLTP) forms part of the National Land Transport Programme and represents the combined intentions of Waka Kotahi (formerly the NZ Transport Agency), Auckland Transport (AT), and KiwiRail to respond to growth and other challenges facing Auckland in the next 10 years.

The general Alfriston / Takanini area is currently more rural in nature, located approximately 30km south of the Auckland City Centre, and as such many of the projects identified in the RLTP are located closer to the City Centre. Notwithstanding

this, the Mill Road safety improvements are included in this plan which will directly benefit the development site given this corridor is located just to the north of the site.

The proposed development of the site is considered to be compatible with the surrounding transport environment and offers alternative travel modes to private vehicle, with the options of public transport, walking, and cycling between the site and key local attractions.

## 6.5 AUCKLAND TRANSPORT ALIGNMENT PROJECT 2021 – 2031

On 12 March 2021 the Minister of Transport released the Auckland Transport Alignment Project 2021-2031 (ATAP) programme which will invest approximately $31.4 billion into critical transport infrastructure and services throughout Auckland. The ATAP is focused on encouraging the shift from private cars to public transport, walking and cycling and addressing Auckland's longer-term challenges of climate change and housing development.

The development of the site will help address Auckland's housing challenges by providing additional housing supply. Furthermore, the site is located within walking distance of two schools (Kauri Flats and Cosgrave Primary), a handful of Early Childhood Education centres, and is proposed to include a new commercial centre and a new school to serve the site. As such, the development allows for additional residential development within walking distance of community amenities, and therefore provides the opportunity for walking and cycling to be used as a mode of transport.

## 6.6 AUCKLAND REGIONAL PUBLIC TRANSPORT PLAN 2018 - 2028

The Auckland Regional Public Transport Plan 2018 – 2028 (RPTP) seeks to deliver an improved public transport network in Auckland by increasing public transport frequency along key transport corridors.

The vision of the RPTP is to "*provide Auckland with seamless end-to-end customer journeys that are safe, accessible and reliable*". To achieve this vision, the RPTP features four focus areas:

1. Expanding and enhancing rapid and frequent networks;
2. Improving customer access to public transport;
3. Improving Māori responsiveness; and
4. Harnessing emerging technologies.

The development of the site will increase the number of residents that are located near the Papakura and Takanini Town Centres and rail stations, which improves the patronage and viability of both the existing and potential future public transport services (being the number of services and their frequencies).

## 6.7 AUCKLAND UNITARY PLAN

The Unitary Plan has the following objectives with regard to the region's transport infrastructure under Chapter E27 (Transport):

- *Land use and all modes of transport are integrated in a manner that enables:*
    - *a. the benefits of an integrated transport network to be realised; and*
    - *b. the adverse effects of traffic generation on the transport network to be managed.*

- An integrated public transport network, including public transport, walking, cycling, private vehicles and freight, is provided for.
- Parking and loading support urban growth and the quality compact urban form.
- The provision of safe and efficient parking, loading and access is commensurate with the character, scale and intensity of the zone.
- Pedestrian safety and amenity along public footpaths are prioritised.
- Road/rail crossings operate safely with neighbouring land use and development.

The zoning of the site aligns well with the transport objectives of the Unitary Plan.

## 6.8 AUCKLAND DESIGN MANUAL

The Auckland Design Manual 2014 sits alongside the Unitary Plan and provides practical advice, best practice processes and detailed design guidance to enable informed choices, to help build houses and develop streets and neighbourhoods that not only look good but are built to last, are sustainable and give the best return on investment. Section '3. Movement networks', a subsection of the 'Subdivision and Neighbourhood Design' chapter, specifically seeks the following transport-based design outcomes:

- ***Connections and connectivity*** *- Subdivisions that provide movement choice and connectivity, while balancing costs, safety, and privacy;*
- ***Walkable neighbourhoods*** *- Prioritisation of pedestrian convenience and access to destinations in the design of subdivisions;*
- ***Legible hierarchies*** *- A clear and consistent road hierarchy to create accessible, legible and safe subdivisions and help people understand how to get to, and when they are on, main routes;*
- ***Managing speed and modes*** *- Subdivision design ensures the safety of pedestrians and cyclists by managing vehicle travel speed, and provides equally for the four major modes (walking, cycling, passenger transport, vehicles) in a way that will appeal to the users of each;*
- ***Vehicle emissions and road layout*** *- Movement networks are designed to minimise the costs and environmental impacts of unnecessary travel;*

The development of the site will follow these design guidelines, and will promote connectivity with the existing residential, employment, retail and recreational activities in the local and wider community.

Traffic calming can be provided within the site to promote pedestrian movement and slow traffic within the site.

## 6.9 AUCKLAND TRANSPORT DESIGN MANUAL

Any road improvements undertaken as part of the development will follow approved standards namely the Auckland Transport Design Manual (TDM), Austroads and NZS4404. These documents supersede Auckland Transport's Code of Practice (ATCoP) and provides the current best practice design requirements for road, intersection, and access designs.

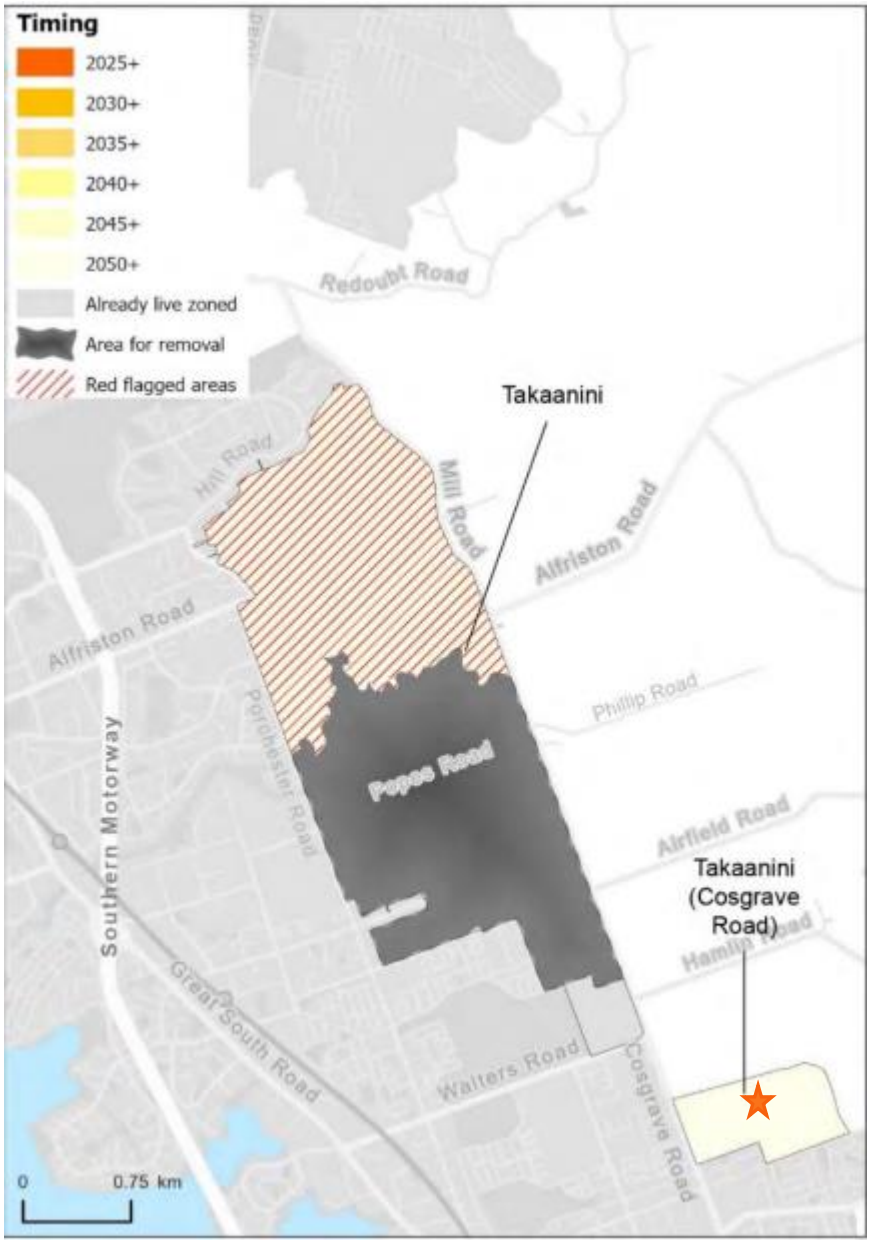
## 6.10 FUTURE DEVELOPMENT STRATEGY (FDS)

The Future Development Strategy (FDS) identifies a programme to sequence the use of FUZ land for urbanisation over the next 30 years relative to bulk infrastructure development.

Auckland Council adopted the FDS in November 2023 which is intended to supersede the Future Urban Land Supply Strategy (FULSS).

The FDS identifies the development site to be development ready in 2050+ as shown below in Figure 6-1.

**Figure 6-1: FDS**




This strategy includes prerequisite infrastructure and specifies the following traffic requirements for Takanini and Cosgrave Road:

- Mill Road; and

- Takanini FTN Upgrade.

# 7 TRANSPORT EMISSIONS REDUCTION PLAN

The Transport Emissions Reduction Plan (TERP) is Auckland Council's and Auckland Transport's pathway to reducing Auckland's emissions. The document sets Auckland's target of emissions, with the goal of halving Tāmaki Makaurau's emissions by 2030 and net zero emissions by 2050.

Four broad objectives are identified in the TERP, each with a subset of objectives as summarised below in Table 7-1.

**Table 7-1: TERP Objectives**

| Broad Objectives | Sub-Objectives |
|---|---|
| Reduce reliance on cars and support people to walk, cycle, and use public transport. | 1. Supercharge walking and cycling |
| | 2. Massively increase public transport patronage |
| | 3. Prioritise and resource sustainable transport |
| | 4. Reduce travel where possible and appropriate |
| | 5. Safe low-traffic neighborhoods for people |
| | 6. Build up not out |
| Rapidly adopt low-emissions vehicles | 7. Electrify private vehicles |
| | 8. Enable new transport devices |
| Begin work now to decarbonise heavy transport and freight | 9. Low-emissions public transport |
| | 10. Efficient freight and services |
| Empower Aucklanders to make sustainable transport choices | 11. Empower Aucklanders to make sustainable transport choices |

Achieving these objectives will be the responsibility of central government, local government, developers, and the general public.

Some of the above objectives are difficult to have an effect on at a developer level, and for this reason the analysis reviews infrastructure and facilities per mode of travel.

The underlying direction and goals are the same, with the same modal splits that were used to generate the objectives used to identify what is proposed and can be considered to improve sustainable travel.

The following sections summarise the proposed and possible transport infrastructure within the proposed development that will assist in achieving the TERP goals.

## 7.1 MODAL ASSESSMENT

A modal assessment has been undertaken by comparing the target mode splits of the TERP against the 2018 census data, to understand if the targets are currently achieved in any suburbs within Auckland. Figure 7-1 below summarises the TERP mode split targets.

**Figure 7-1: TERP Mode Split Targets**

| | Trip share | | Mode share by distance | |
|---|---|---|---|---|
| **Mode** (rounded) | **2019** | **2030** | **2019** | **2030** |
| **Walking** | 11% | 22% | 1% | 3% |
| **Cycling** | 1% | 8% | <1% | 5% |
| **Micromobility** | <1% | 9% | <1% | 8% |
| **E-motos, e-mopeds** | <1% | 4% | <1% | 4% |
| **Microcar** | <1% | 3% | <1% | 4% |
| **Train** | 1% | 9% | 1% | 15% |
| **Bus** | 3% | 13% | 3% | 12% |
| **Ferry** | <1% | 1% | <1% | 2% |
| **Light Vehicle** | 83% | 32% | 94% | 47% |

The census data is specific to journey to work information, however as a starting point it is recognised that commuter trips are a good starting point for change given:

- The trips are regular and therefore habits can be formed,
- The trips are routine, with many jobs having constant start and end times, and
- The trips are typically of notable distance (compared to retail and entertainment trips where the closest attraction can be utilised).

It is also noted that the 2018 census data included different mode categories with the inclusion of a passenger however the exclusion of micromobility, e-motos/e-mopeds, microcar. For the purpose of this assessment, passenger trips have been classified as bus trips as it is seen to be a form of shared transport.

### 7.1.1 WALKING

The suburbs that currently achieve 22% of commuter trips via walking are either located in the City Centre or on the fringe of the City Centre. It is thought that the decision-making process behind these trips is likely to be a combination of convenience, cost of parking, and access to a vehicle.

These areas are not comparable to the development site, with the City Centre being the primary employment area of Auckland. Recognising that the development is for a predominantly residential area the following infrastructure requirements are recommended to be incorporated:

- New footpaths will be provided on all public roads within the development site. These will connect the development site internally, as well as externally to existing nearby attractions such as the local schools and Papakura Town Centre;

- Traffic calming will be used to encourage safer speeds, including the use of roundabouts and signals; and
- As is shown on the Sunfield Concept Masterplan, provision of retail and recreational facilities within walking distances of majority of residents within the development site.

### 7.1.2 CYCLING

Currently there is not one suburb in Auckland that achieves 8% of commuter trips travelling via cycling. This suggests that there is a notable barrier to discouraging people from choosing this mode of travel which could be infrastructure, education, access to equipment, or other.

The suburbs with the greatest percentages of commuter cyclists were generally located next to separated cycle facilities and located in Central Auckland. In particular, suburbs located along the north-western cycleway from Point Chevalier to the city were recognised.

While the development site is not located within Central Auckland there is an opportunity to provide cycle connectivity to key employment, retail, and recreation destinations[5] such as:

- Bruce Pullman Park ~ 5 minutes cycle;
- Papakura Town Centre (including train station) ~ 10 minutes cycle;
- Papakura High School and Intermediate ~ 10 minutes cycle; and
- Takanini Town Centre (including train station) ~ 10 minutes cycle.

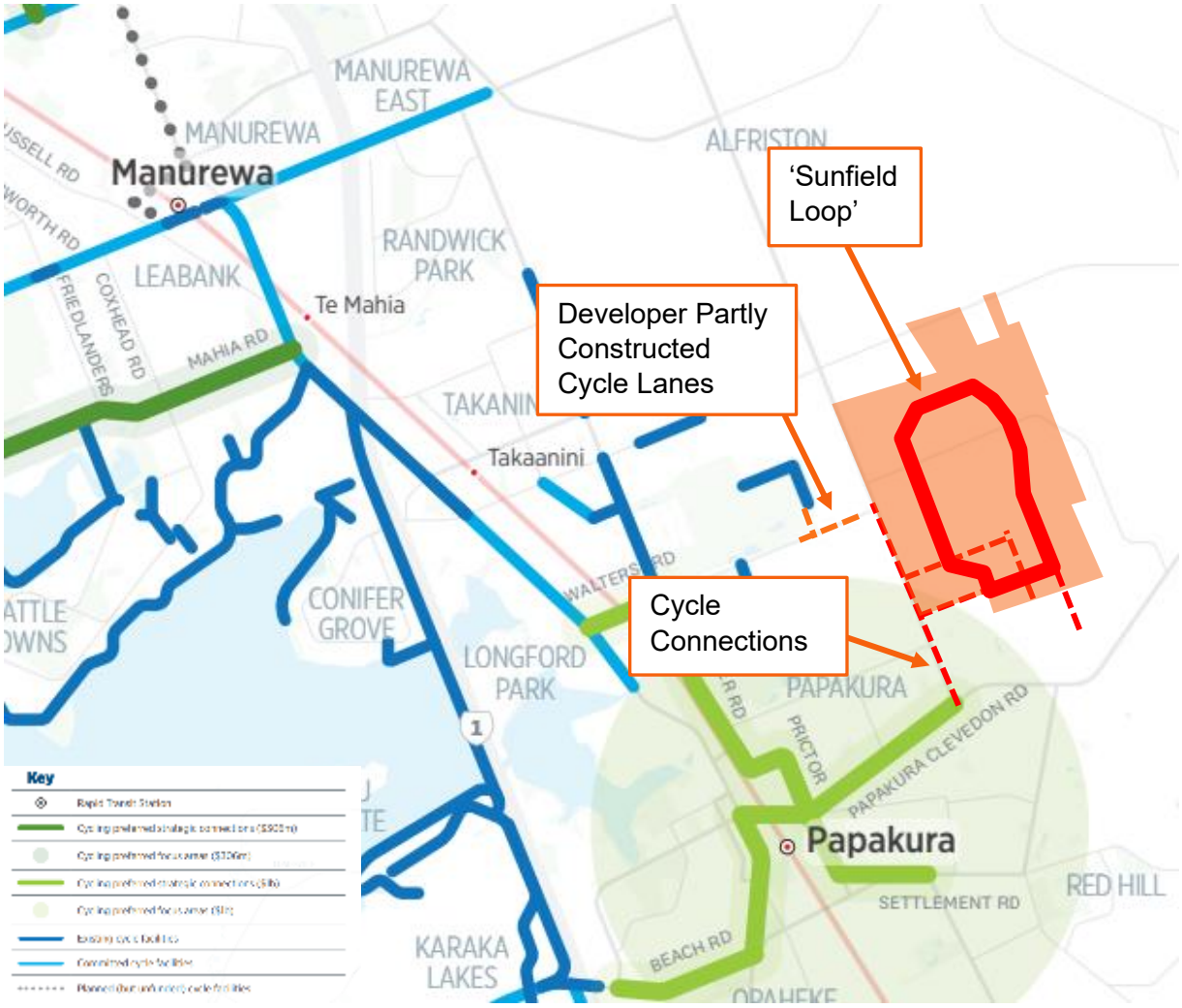
To help improve cycling numbers the following infrastructure requirements are recommended to be considered:

- New shared paths will be provided on Cosgrave Road (between Walters Road and Clevedon Road);
- Consideration should be given to providing infrastructure that ensures public and private bicycle parking is accessible, sheltered from the weather, and can be secured by more than a bicycle chain lock;
- Consideration to providing a bicycle training park within the development's parks for children in the area to learn the road rules and encourage a behavioural shift in the younger generation;
- New Travel Plans for the schools are recommended as the area develops, the infrastructure improves, and new travel modes become more attractive; and
- Consideration given to providing traffic calming on Old Wairoa Road to lower speeds and thus improve cyclist safety

It is noted that the development site will connect to the cycling network with the upgrades proposed. Figure 7-2 below shows the intended upgrades proposed by the development on Auckland Transport's Cycling and Micromobility Programme Business Case (CAM-PBC) map in the wider Takanini area.

[5] Assessed from the intersection of Mill Road/Alfriston Road

**Figure 7-2: Cycling Network**




The 'Sunfield Loop' is proposed to contain a cycle network which will have connections to the external network as shown above in Figure 7-2.

### 7.1.3 MICROMOBILITY

Micromobility as a specified mode of transport is a relatively new concept, however the human-powered forms of micromobility transport have been around for a long time. It refers to small, lightweight wheeled vehicles and includes the likes of scooters and skateboards both electric and kick powered.

To encourage the option of micromobility travel within the development site the following considerations are recommended:

- Stairs in public places should be avoided to improve accessibility via micromobility transport;
- These vehicles should be given access to the cycle infrastructure, with these corridors typically having smooth continuous surface and therefore safer for micromobility modes; and
- A shared e-scooter fleet could be provided, however the feasibility and terms of this would need to be further assessed.

### 7.1.4 E-MOTOS/E-MOPEDS AND MICROCAR

These modes of travel are only starting to increase in popularity in New Zealand, with a very small ownership rate. It is anticipated that, through designing to current standards, the roading and infrastructure will accommodate the needs of these vehicles.

### 7.1.5 TRAIN

The target modal split for train travel is 9% which is currently only achieved for commuter travel in suburbs that are located on the train line. Travel via train is likely to be most attractive during commuter periods, with the mode split likely to drop outside of these times.

The development site is located approximately 2.5 km from the Papakura Train Station and is sufficiently close that some train trips are expected. To encourage residents of the community to consider travelling via train, the following infrastructure requirements are recommended to be considered:

- Review the existing Papakura Train Station feeder bus through the area to see if it is feasible to route it through the development site. Connectivity to the train station is a key barrier to train travel and therefore a feeder bus would open up using the train as a travel option; and
- Additional bicycle amenities at the train station, particularly secure bicycle parking, would also help with the connectivity constraint.

### 7.1.6 BUS

The commuter data shows that 39% of suburbs achieve the bus target currently. As mentioned above, the census data is swayed through counting passengers as a shared/bus trip, however the discrepancy is still large whether the passengers are included or excluded.

The majority of suburbs that achieve the 13% mode split target are located in the City Centre, North Shore, or Central Auckland suburbs. It is thought that high uptake in these suburbs is likely to represent a strong correlation between residence and employment in the City Centre or along the Northern Busway. It is also noted that there are also a large number of services connecting these suburbs, with many of these being frequent services.

To encourage residents of the community to consider travelling via bus the following infrastructure and policies are recommended to be considered:

- A frequent bus service through the development site that serves the local employment zones and train stations; and
- During the early stages of the development when a bus is not feasible, it is recommended that a shuttle service is considered to local attractions such as Papakura Town Centre, and local schools.

Further details on the future bus provisions are provided in Section 11.2 of this report.

### 7.1.7 FERRY

Ferry transport is considered low priority for the development given the area is not located near the coast. As such, no incentives are proposed to encourage this mode of travel for the development.

### 7.1.8 LIGHT VEHICLE

The only suburbs that currently achieve the light vehicle target (less than 32% travel via private vehicle) are in the City Centre. As per the walking mode split in this area, it is thought that the decision-making process behind these trips is likely to be a combination of convenience, cost of parking, and access to a vehicle.

There are two ways to reduce light vehicle trips, being to:

1. Incentivise non-light vehicle trips by making alternate modes more attractive and accessible, and
2. Disincentivise light vehicle trips through making these trips challenging by the addition of parking restrictions.

The above sections have detailed the incentives that are recommended to be undertaken in and around the development site to encourage travel via modes other than light vehicle. Some additional considerations to disincentivise light vehicle travel include:

- The restriction of parking provisions to encourage lower commuter vehicle usage as has been adopted in the Sunfield masterplan. Careful consideration is required should this be pursued, to avoid illegal parking in the berms or even on the roads; and
- Parking and housing could be decoupled such that those who do not need a parking space do not find themselves paying for an unused parking space as has been adopted within the Sunfield masterplan. Again, this can lead to operational challenges with people parking illegally which would then require enforcement.

# 8 TRAFFIC GENERATION

## 8.1 PREVIOUS PLANS & REPORTS

A framework plan for the Future Urban Zone (FUZ) part of Sunfield has previously been developed by Auckland Council. This showed approximately 1,200 dwellings however this is not across the entire FUZ zone but rather only 75% of the part of the site that is zoned FUZ. Using all land in the FUZ zone this translates to approximately 1,600 dwellings.

Council's 'Future Development Strategy' (FDS) dated July 2018 identified the FUZ land in the 2023 – 2028 "development ready" time period. The FDS was updated in November 2023, with the current FDS identifying the FUZ land to be development ready in 2050+.

A "standard" subdivision of 1,600 dwellings in this environment would typically generate 0.5-0.65 traffic movement per dwelling in the peak hour. This would assume some improvement in public transport / walking / cycling as would be considered typical of a residential development in FUZ land. This totals some **800-1,040** movements in the peak hour (a movement being either "to" or "from" the site).

# 9 PROPOSAL

## 9.1 TRIP RATES

### 9.1.1 RESIDENTIAL

Sunfield proposes around 4,000 dwellings (residential and retirement) highlighted by the following:

- Parking is only provided in the order of 10% (excluding visitors) of a more typical development;
- 'Sunbus' electric bus fleet providing continuous and reliable connection to the Papakura and Takanini Train Stations;
- The ability for residents of Sunfield to 'Live Local' and 'Work Local';
- The ability to walk and / or cycle to the Papakura and Takanini Train Stations; and
- 600 of the dwellings will be retirement units.

While only 10% of dwellings own a car, it is considered that the car traffic generation rate is not going to reduce completely to 10% of typical due to:

- It being more likely that the cars provided will be more utilised than a typical subdivision (i.e. you will only have one if you really need it); and
- Uber, etc. will also be used by residents thereby creating traffic in the peak periods (and these create two trips of one entering and one exiting).

It is considered a more reasonable assumption is the traffic generation will be 20-25% of typical so 0.10-0.16 trips per dwelling. This is **400-640** movements in the peak hour.

### 9.1.2 EMPLOYMENT

The site also has 53.9 hectares of employment which will also generate traffic outside the site (the town centre and hubs should not typically generate external traffic as they will serve Sunfield with any visitor traffic already accounted for in section 8.2.1.1 above).

The following has been assumed in this assessment, based on the proposed masterplan for the warehouse distribution and office facilities which has been developed for the property:

- Site coverage of 60% (being 326,610 sqm in total)
- 45,725 sqm of office (being 14%), and
- 280,885 sqm of warehouse distribution (being 86%).

A standard employment peak hour trip rate would be 2 trips / 100 sqm for office and 0.75 trips per 100 sqm for the manufacturing. If this were a standard site it would therefore generate in the order of 915 trips for the office and 2,107 trips for the warehouse distribution (3,022 total).

As mentioned previously, the parking provided for the employment zone is also proposed to be carefully managed to limit private vehicle usage. This will encourage workers to live in the area and promote public transport / active modes.

Again, the parking rates have been assumed to be approximately 10% of typical. As per residential, with parking constraint to 10%, it is considered that the car traffic generation rate is not going to reduce completely to 10% of typical due to;

- It being more likely that the cars provided will be more utilised than a typical subdivision;
- Uber, etc. will also be used by employees thereby creating traffic in the peak periods (and these create two trips of one entering and one exiting); and
- Freight will still need to occur via truck / road.

The site is however located so that the residents of Sunfield are more likely to work in Sunfield. As such external traffic (i.e. that outside Sunfield) will also significantly reduce. It is therefore considered that a more reasonable assumption is that the office peak hour traffic generation will be 20-25% of a typical development.

Further as is detailed later in this assessment, it is envisaged that a Traffic Plan be created for the employment zone. A key part of this Traffic Plan would be the requirement for 75% of the movements relating to the warehouse distribution operation to be confined to off-peak only (being the hours outside of Monday to Friday 7-9am and 4-6pm).

It is therefore considered that a more reasonable assumption is that the warehouse distribution peak hour traffic generation will be 10-15% of a typical development.

The total for the employment precinct is therefore **394-545** movements in the peak hour.

### 9.1.3 MEDICAL CENTRE

The site also has 2.37 hectares for a proposed a medical centre of up to 7,610 sqm. The following has been assumed:

A medical peak hour trip rate would be 8.8 trips / 100 sqm. If this were a standard site it would therefore generate in the order of 670 trips per hour.

As mentioned previously, the parking provided for the medical centre is also proposed to be carefully managed to limit private vehicle usage.

Again, the parking rates have been assumed to be approximately 10% of typical. As per residential, with parking constraint to 10%, it is considered that the car traffic generation rate is not going to reduce completely to 10% of typical due to:

- Uber, etc. will also be used by patients outside the Sunfield area thereby creating traffic in the peak periods (and these create two trips of one entering and one exiting); and
- Often patients are dropped-off / picked-up at medical centres.

The site is however located so that the residents of Sunfield are more likely to use the medical centre. As such external traffic (ie that outside Sunfield) will also significantly reduce. It is therefore considered that a more reasonable assumption is that the traffic generation will be 15-20% of a typical development. This is **100-134** movements in the peak hour.

### 9.1.4 LOCAL / TOWN CENTRE / SHOPPING

The uses in the local and town centre are intended to serve the Sunfield area and not those outside. They will also have very limited parking provision and as such external traffic generation to these areas is expected to be minimal.

### 9.1.5 TOTAL

Based on the above, the total external traffic generation is expected to be **894-1,329** movements in the peak hour (two-way). This is higher than the original FUZ land proposal by between 12% and 28%. However, consideration needs to be given to the facts that:

- Sunfield will be developed over an extended period of time in the range of 10 to 15 years;
- Sunfield is being developed over an area of 244.5 hectares rather than the 56.5 hectare of development on the FUZ land;
- The Sunfield proposal provides an additional 2,400 homes when compared to the development of the FUZ land; and
- The Sunfield proposal delivers 76.5 hectares of employment, healthcare and education zoned land which is not considered in the development of the FUZ land and will provide permanent employment for in excess of 11,000 people.

For the purposes of modelling the effects on the surrounding road network from the development, the average of the above range of 894-1,329 movements have been assumed for the peak hour which translates to **1,112** movements per hour..

### 9.1.6 MODE SHARE

A mode share analysis has also been undertaken separately to confirm the external traffic generation of the residential / employment zones. This is detailed in **Appendix A**

and results in a total of **1,271** external movements in the peak hour entering / leaving the Sunfield site. This analysis is based on a number of assumptions including:

- 50% of all employees in Sunfield live in Sunfield (regardless of mode);
- 60% of people use public transport;
- Shopping / retail / local centre in Sunfield attracts no external traffic in the peak commuter hours (i.e. they only attract Sunfield residents);
- Limited / no customer deliveries in peak hours for the commercial/industrial uses (essentially given Auckland's limited spare capacity in commuter peaks);
- 50% of all staff / patients of the medical centre is from Sunfield residents;
- 15% walk;
- 5% cycle;
- 20% use private car (either on their own or share with other);
- 25% of people travel in the peak commuter hour (by some mode); and
- Average occupancy of private car is 1.2 people per car.

### 9.1.7 SENSITIVITY

As noted above, the mode split and trip generation are based on an assumption that 50% of all employees in Sunfield live in Sunfield (regardless of mode) and that 60% of people use public transport with only 20% using private vehicles for all trips. It is recognised that this type of mode split is very different to that currently seen across New Zealand.

Sensitivity tests on the mode share targets have therefore been considered, with the transport response of each scenario being considered.

While there may be a concerted effort to reduce car dependency by the developer in creating the community envisaged, should homeowners find alternative means to park a car nearby the number of vehicles generated and therefore effects may be increased.

A more conservative / typical set of assumptions have been also reviewed as follows:

- 50% of all employees in Sunfield live in Sunfield (regardless of mode);
- 15% of people use public transport;
- Shopping / retail / local centre in Sunfield do attract external traffic in the peak commuter house in a more typical trip rate;
- More standard customer deliveries in peak hours for the commercial/industrial uses;
- 50% of all staff / patients of the medical centre are from Sunfield residents;
- 15% walk;
- 5% cycle; and
- 65% use private car (either on their own or share with other).

With these assumptions it is recognised that traffic generation could be as high as 6,000 vehicles per peak hour. This demonstrates the importance of the planning provisions delivering the mode share.

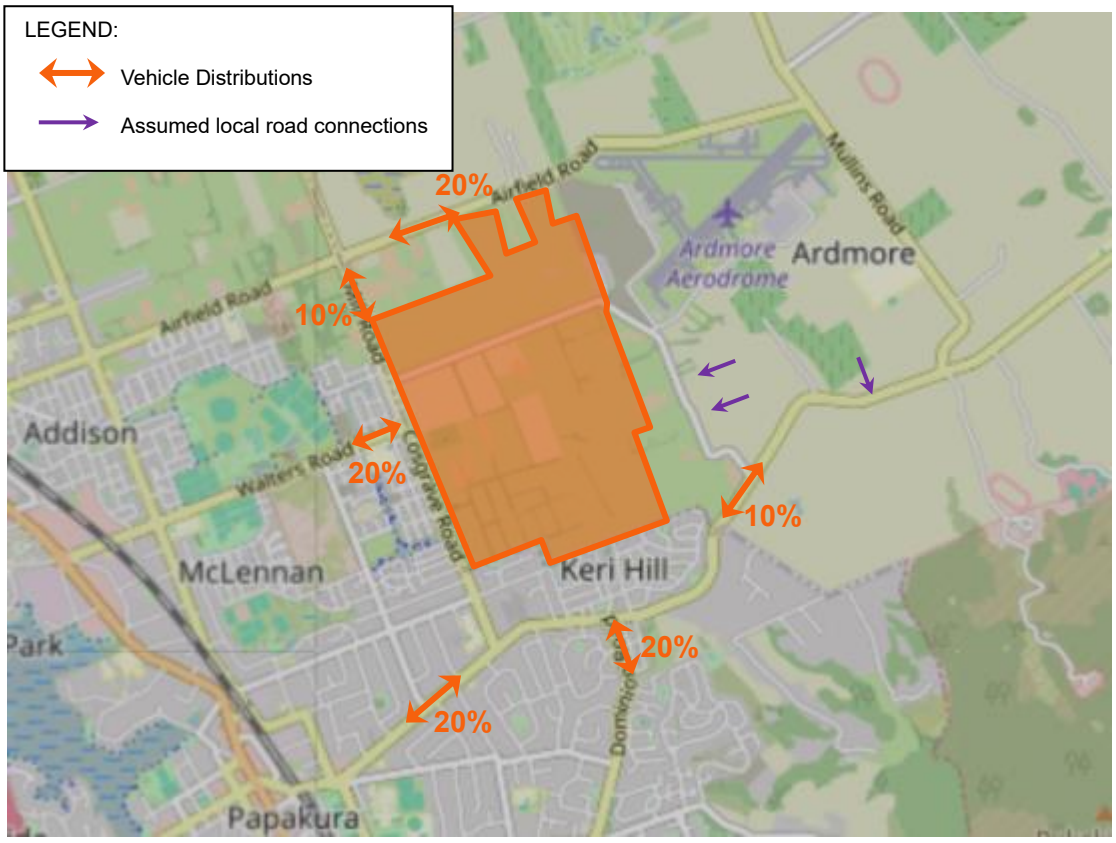
As noted previously, for the purposes of modelling the effects on the surrounding road network from the development, the average of the realistic "car-less" parking constrained scenario has been assumed which translates to 1,112 movements per hour.

## 9.2 VEHICLE TRIP DISTRIBUTION

The industry standard is for 70% of trips to depart in the morning peak hour, and 30% of trips to arrive during this period. This directional split has been adopted for this assessment, with the opposite flows assumed in the afternoon peak hour.

High level directional distribution patterns for the development site have been assessed using the 2018 Census travel data and engineering judgement and is summarised in Figure 9-1 below.

**Figure 9-1: Trip Distributions**




It should be noted that the volumes provided in the figures below are worst-case-scenario volumes – obtained by utilising the upper end of trip rates when calculating the number of trips.

Figure and 9-3 below show detailed distributions for the site traffic. It should be noted that the volumes provided in the figures below are worst-case-scenario volumes – obtained by utilising the upper end of trip rates when calculating the number of trips.

**Figure 9-2: Site Vehicle Trips Distribution in the AM Peak Hour**

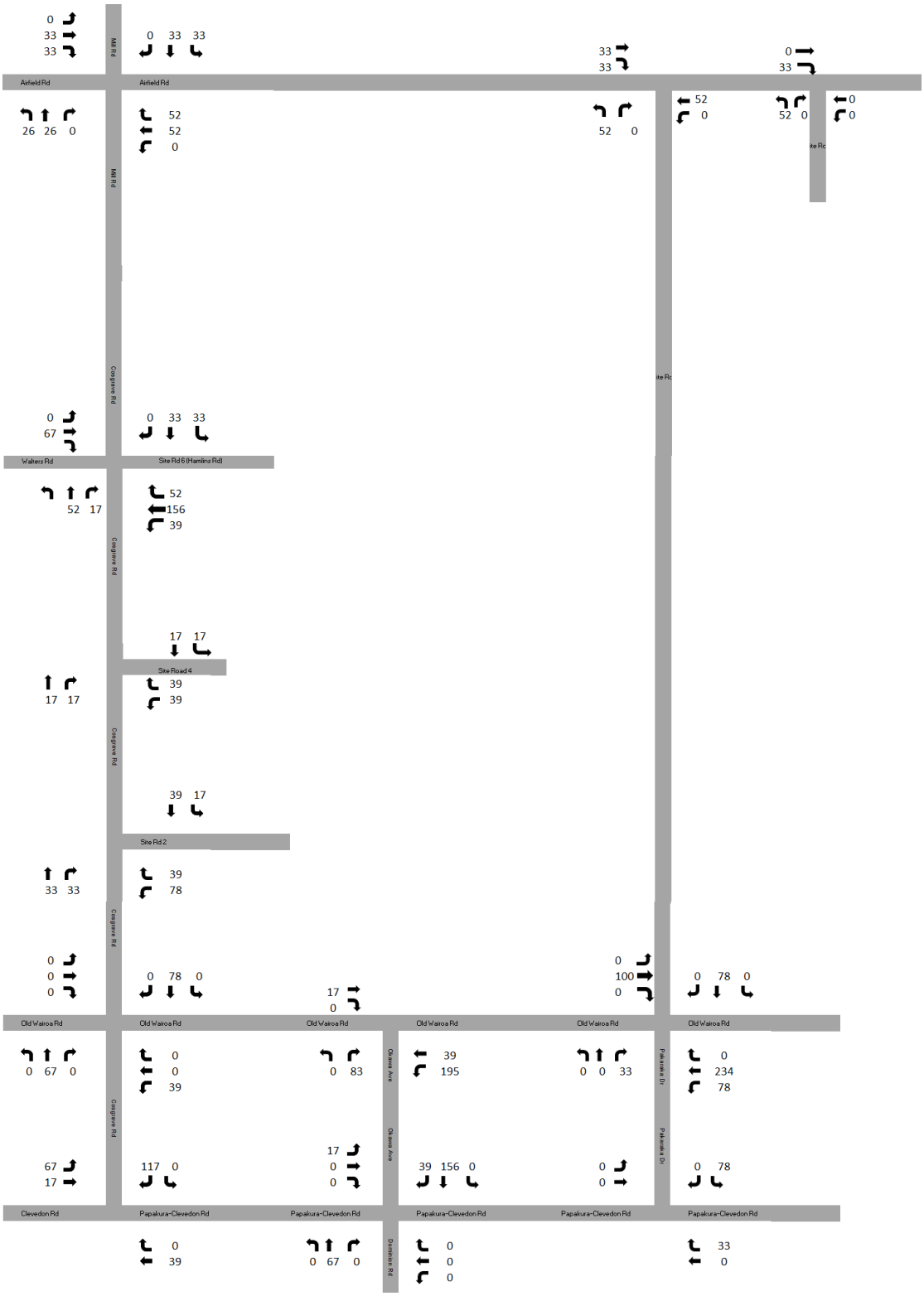
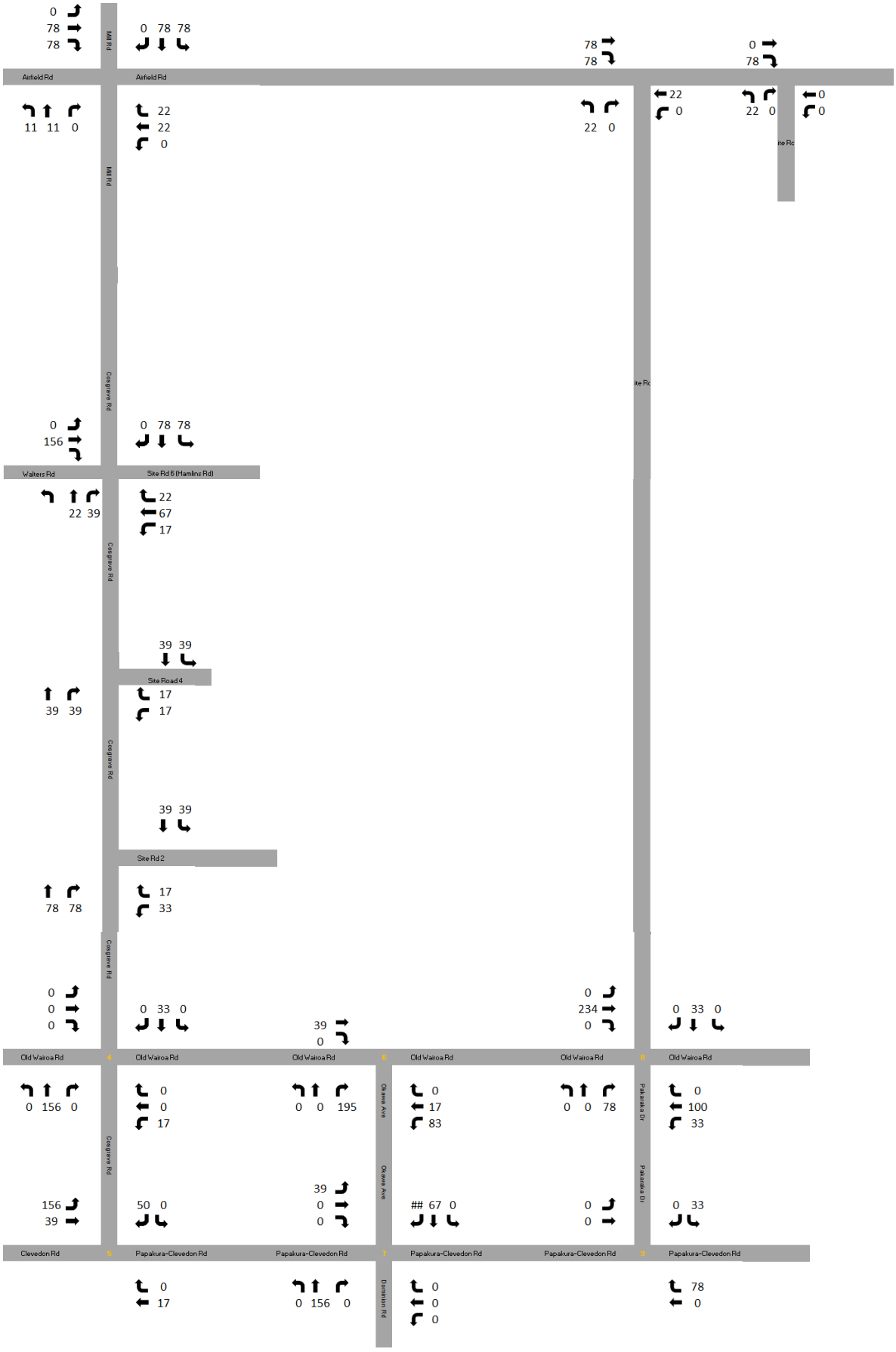


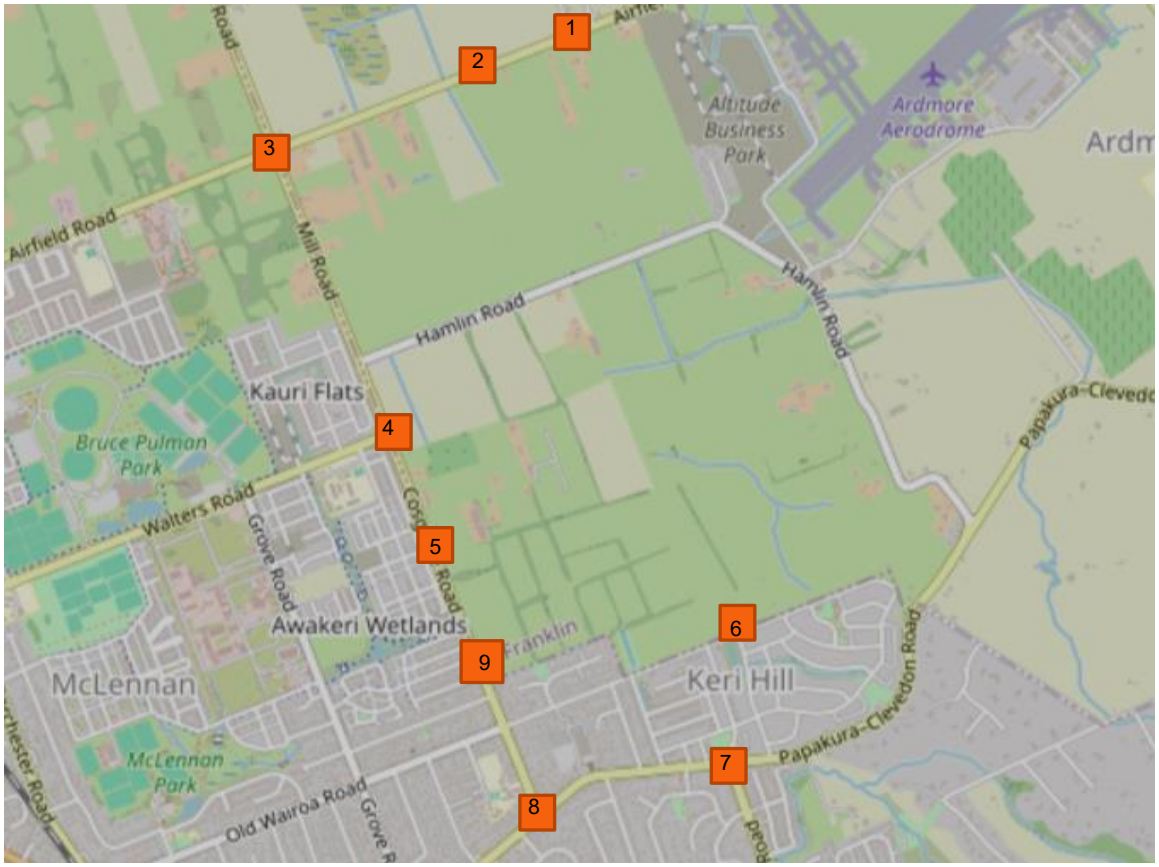
**Figure 9-3: Site Vehicle Trips Distribution in the PM Peak Hour**



## 9.3 INTERSECTION UPGRADES

While the emphasis will be on public transport and active modes, it is considered that there will likely need to be a number of local network intersection upgrades. These upgrades are to serve both private car but also facilitate public transport and safe active modes. The anticipated upgrades are shown on Figure 9-4 below.

**Figure 9-4: Proposed External Intersection Upgrades**



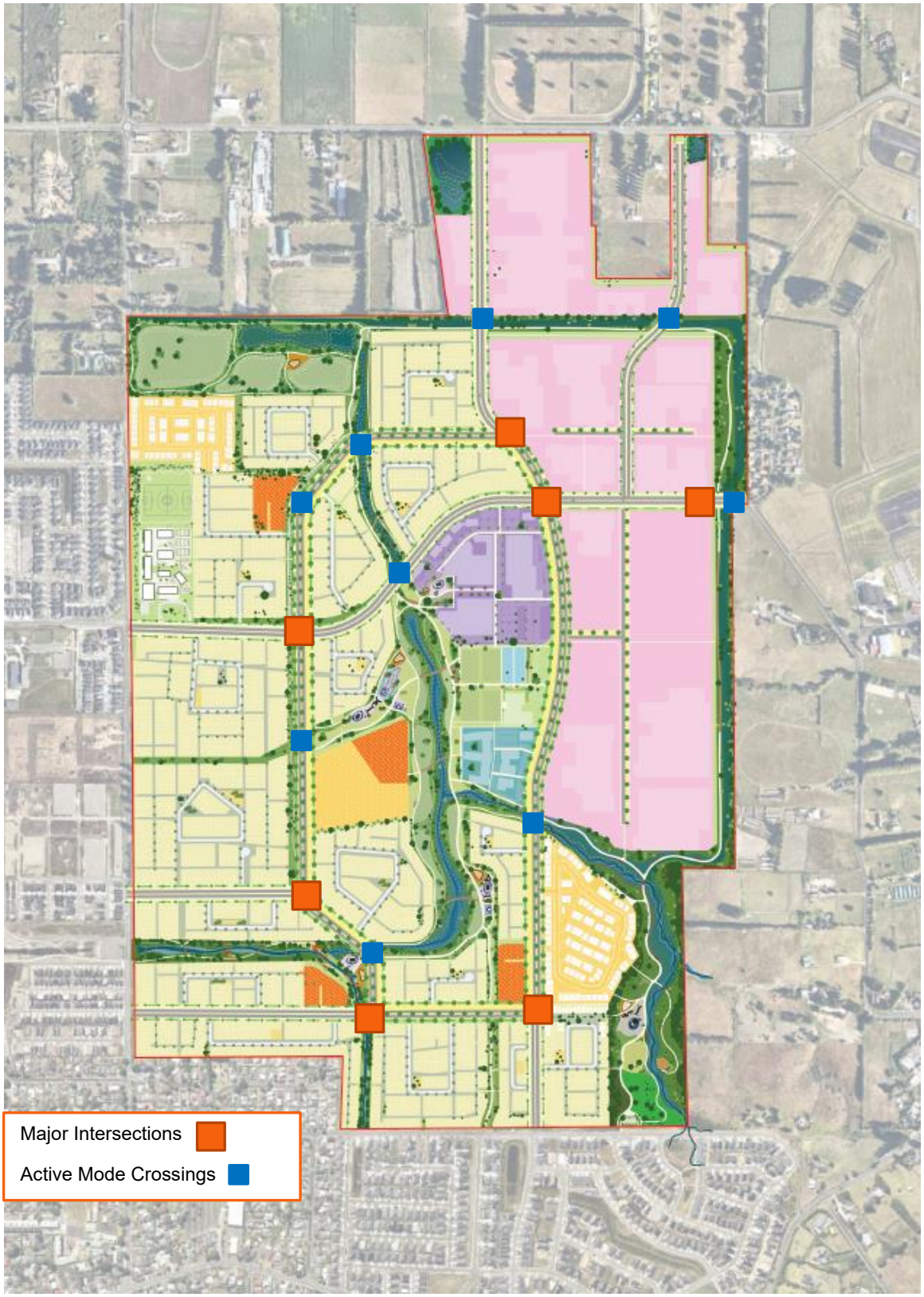

- Upgrade 1 – Airfield Road / Road 7
  - Currently, there is no intersection here as Road 7 has not been constructed yet, however when Road 7 is constructed, it is proposed that this will be a priority-controlled intersection.
- Upgrade 2 – Airfield Road / Road 1
  - Similar to above, there is currently no intersection here as Road 1 has not been constructed yet, however when Road 1 is constructed, it is proposed that this will also be a priority-controlled intersection.
- Upgrade 3 – Airfield Road / Mill Road
  - Currently, the Airfield Road / Mill Road intersection is in the form of a single-lane roundabout. It is proposed that this is upgraded to be signal-controlled and to having two lanes on the north and south Mill Road approaches and retaining a single lane on the east and west Airfield Road approaches.
- Upgrade 4 – Cosgrave Road / Walters Road / Hamlin Road (Road 6)
  - Currently Hamlin Road does not align with Walters Road, therefore the intersection exists as Cosgrave Road / Walters Road. It is proposed to realign Hamlin Road in-line with Walters Road and upgrade this

intersection to be signal controlled. Additionally, it is proposed to add one approach bypass lane and one exit bypass lane on Cosgrave Road south, one approach bypass lane on Walters Road, one approach bypass lane on Cosgrave Road north, and one approach and one exit lane on Hamlin Road once it has been realigned.

- Upgrade 5 – Cosgrave Road / Road 4
  - Currently, there is no intersection here as Road 4 has not been constructed, however when Road 4 is constructed, it is proposed that this will be a signalised intersection.
- Upgrade 6 – Pakaraka Drive / Old Wairoa Road / Road 1
  - Currently, Road 1 has not been constructed, therefore the intersction exists between Pakaraka Drive / Old Wairoa Road and is priority-controlled. It is proposed that this intersection is upgraded to be signalised and an approach bypass lane is added on Old Wairoa Road east and Old Wairoa Road west.
- Upgrade 7 – Okawa Avenue / Clevedon Road / Dominion Road / Papakura-Clevedon Road
  - Currently, this intersection is priority-controlled, and it is proposed to upgrade this intersection to be signalised. Additionally, it is proposed to add an approach lane on Dominion Road, an approach lane on Okawa Avenue, an approach bypass lane on Clevedon Road and an approach bypass lane on Papakura-Clevedon Road.
- Upgrade 8 – Cosgrave Road / Clevedon Road / Papakura-Clevedon Road
  - Currently, this intersection is priority-controlled, and it is proposed to upgrade this intersection to be signalised. Additionally, it is proposed to add an approach bypass lane on Clevedon Road.
- Upgrade 9 – Cosgrave Road / Road 2 / Bellbird Street
  - Currently, Road 2 has not been constructed therefore the intersection exists between Cosgrave Road / Bellbird Street and is priority-controlled. It is proposed that when Road 2 is constructed, this intersection is upgraded to be signalised and an approach bypass lane is added on Cosgrave Road north.

There will also need to be a number of internally controlled intersections within Sunfield. These are likely to be signalised to accommodate both the vehicular movements (including the loop road bus priority) as well as the safe and efficient crossing of roads for active modes.

**Figure 9-5: Internal Intersection Upgrades**



## 9.4 VEHICLE TRAFFIC EFFECTS

Figures 9-6 and 9-7 below show the existing traffic volumes + a growth factor of 20% (2% for 10 years) + additional traffic volumes generated by the development for the AM and PM peak hours respectively. It should be noted that the volumes provided in the figures below and used for SIDRA modelling are worst-case-scenario volumes – obtained by utilising the upper end of trip rates when calculating the number of trips.

**Figure 9-6: Total Traffic Volumes at Intersections During AM Peak Hour**

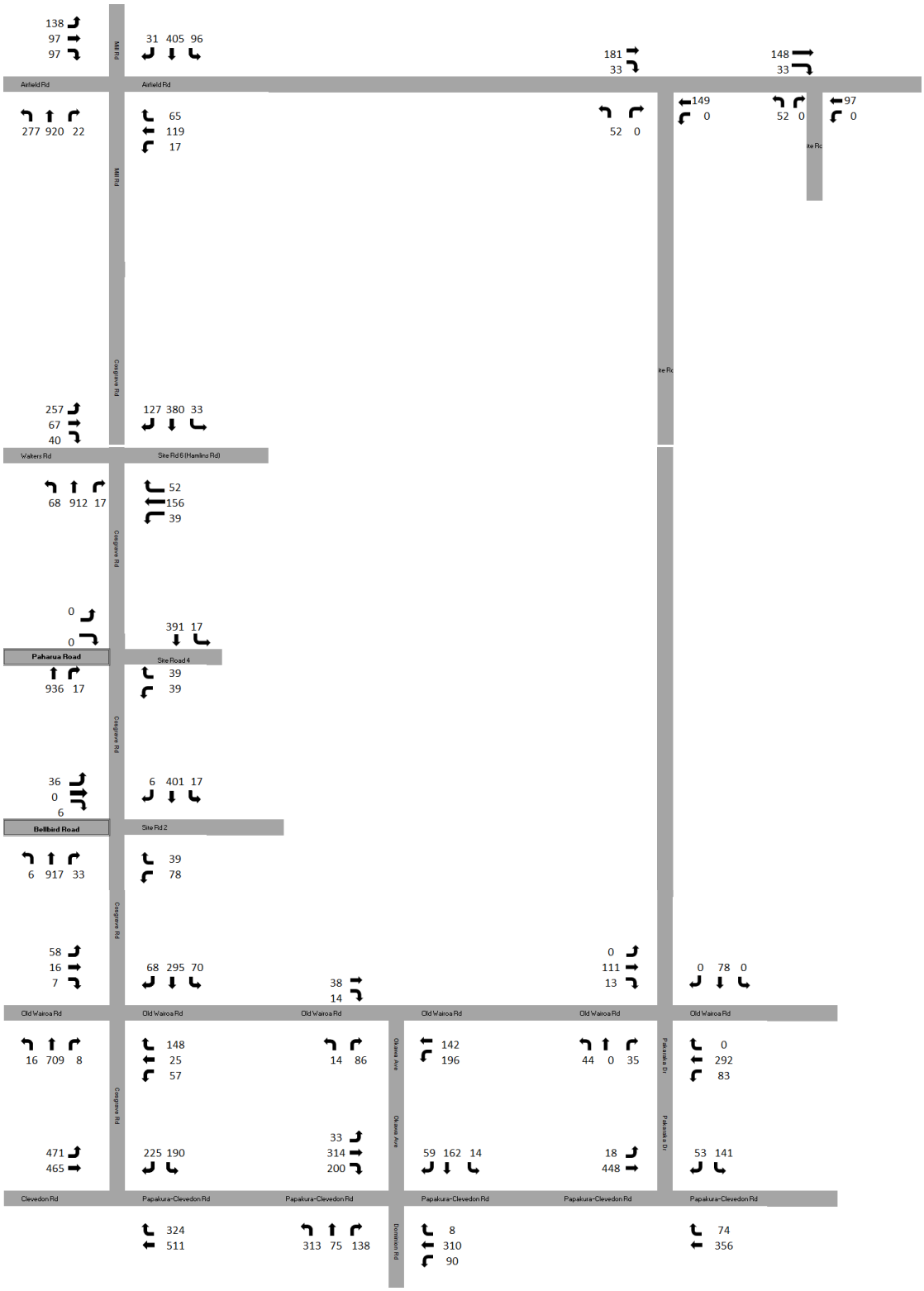
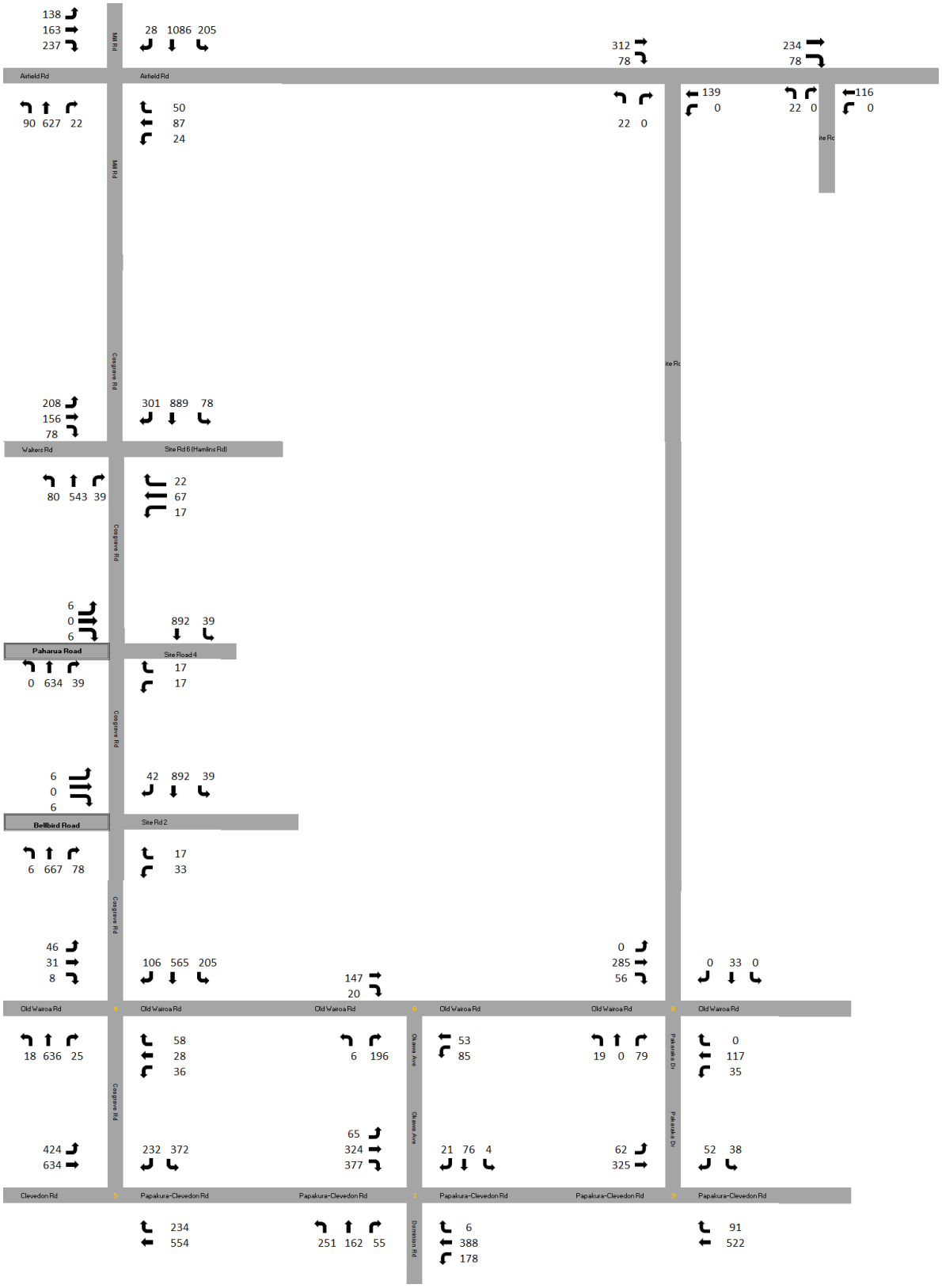


**Figure 9-7: Total Traffic Volumes at Intersections During PM Peak Hour**



Traffic modelling has been undertaken using the traffic volumes from Figures 9-6 and 9-7 above (**1,112 vph** as discussed in Section 8.2 of this report), and future intersection layouts to understand the operation of the 11 intersections listed in Table 9-1. It should be noted that the Okawa Avenue / Old Wairoa Road and Pakaraka Drive / Papakura-Clevedon Road intersections are not proposed to be upgraded as part of this development.

**Table 9-1: Modelled Intersections**

| Intersection | Future Layout |
|---|---|
| Cosgrave Road / Walters Road / Hamlin Road (Road 6) | Traffic Signals |
| Cosgrave / Road 4 | Traffic Signals |
| Cosgrave / Road 2 / Bellbird Street | Traffic Signals |
| Cosgrave Road / Clevedon Road / Papakura-Clevedon Road | Traffic Signals |
| Okawa Avenue / Old Wairoa Road | Priority T-Intersection |
| Okawa Ave / Papakura-Clevedon Rd / Dominion Rd / Clevedon Rd | Traffic Signals |
| Pakaraka Drive / Old Wairoa Road / Road 1 | Priority T-Intersection |
| Pakaraka Drive / Papakura-Clevedon Rd | Priority T-Intersection |
| Airfield Road / Mill Road | Traffic Signals |
| Airfield Road / Road 1 | Priority T-Intersection |
| Airfield Road / Road 7 | Priority T-Intersection |

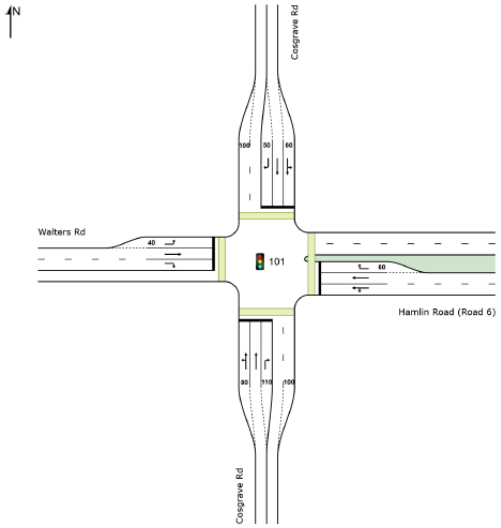
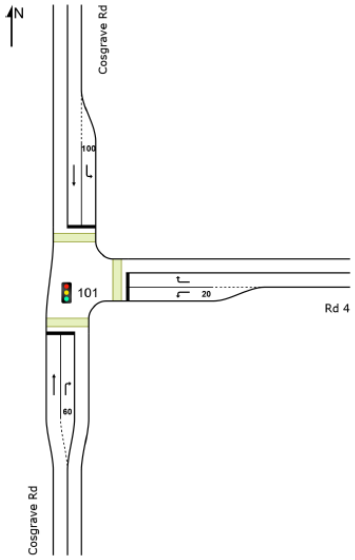
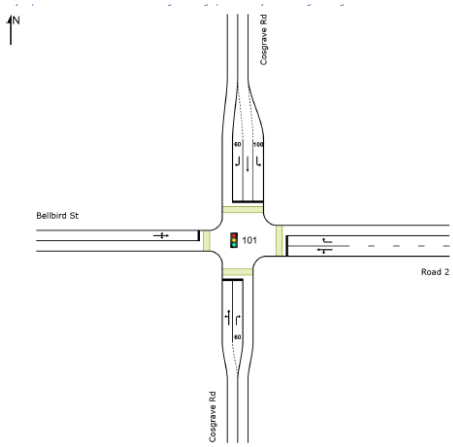
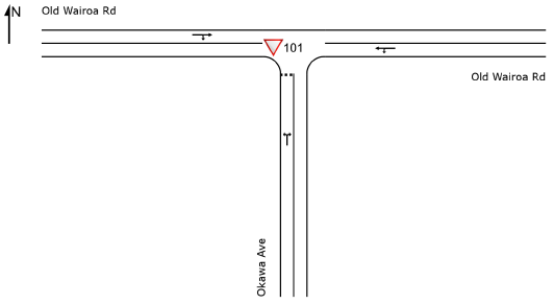
This modelling has been undertaken using SIDRA Intersection Version 9 for the proposed future intersection layouts and volumes in year 2033. As mentioned above, the future volumes are the summation of the existing volumes, site traffic, and background growth.

### 9.4.1 FUTURE TRAFFIC OPERATIONS

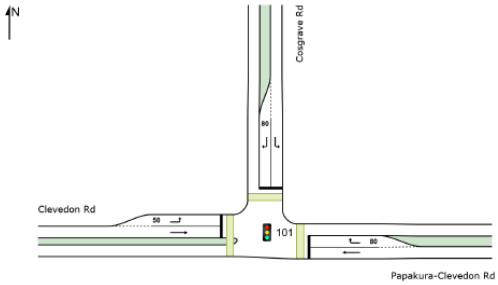
The future traffic layouts are summarised in Table 9-2 with the operations for the 11 intersections are summarised in

Table 9-3 to Table 9-13. The SIDRA layouts adopted as well as the movement summaries for each intersection during the two peak hours assessed are included in **Appendix B**.

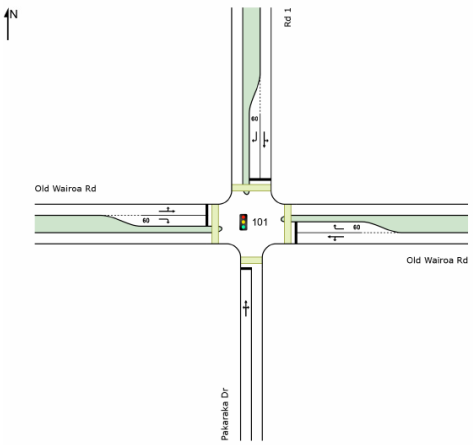
**Table 9-2: Future Intersection Layouts**

| | |
|---|---|
| **Cosgrave Road / Walters Road / Hamlin Road (Road 6)** | **Cosgrave Road / Road 4** |
|  |  |
| **Cosgrave Road / Road 2 / Bellbird Street** | **Okawa Avenue / Old Wairoa Road** |
|  |  |

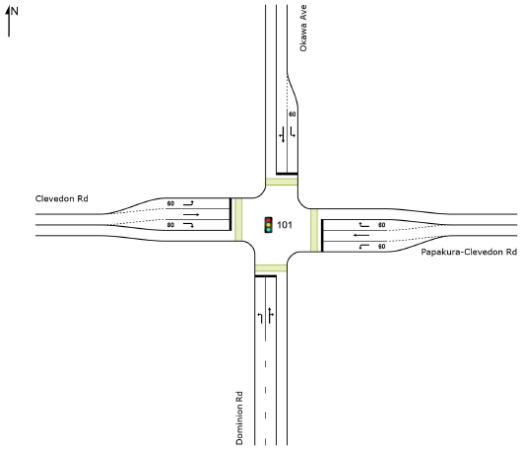
## Cosgrave Road / Clevedon Road / Papakura-Clevedon Road



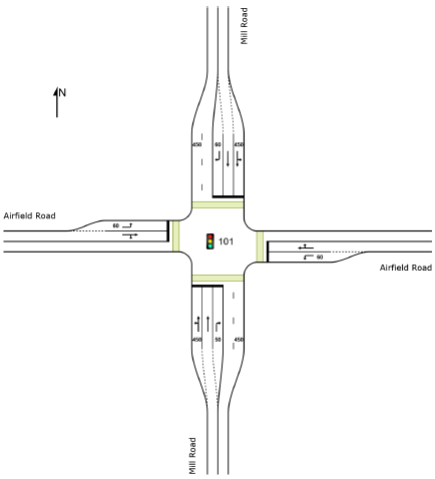

## Pakaraka Drive / Old Wairoa Road / Road 1



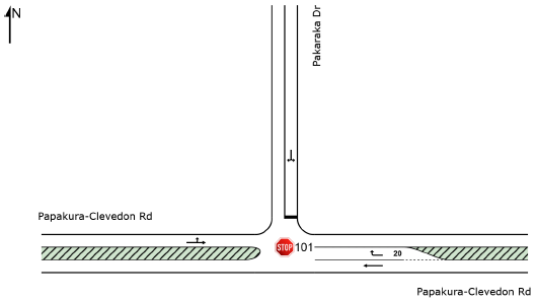

## Okawa Ave / Clevedon Rd / Dominion Road / Papakura – Clevedon Road



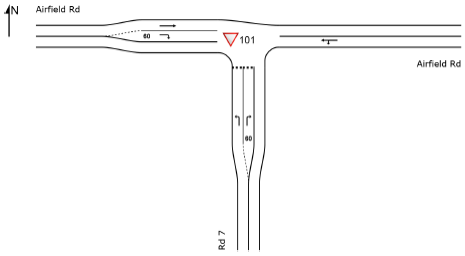

## Airfield Road / Mill Road




## Pakaraka Drive / Papakura-Clevedon Road




## Airfield Road / Road 7




## Airfield Road / Road 1

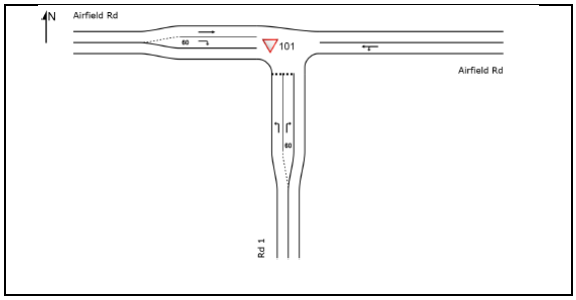



**Table 9-3: Future Cosgrave Road / Walters Road / Hamlin Road Forecast Signal Operations**

| Approach | Mvmt. | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | DoS % | LOS | 95th %ile Queue (m) | DoS % | LOS | 95th %ile Queue (m) |
| Cosgrave Road (South) | LT | 0.51 | D | 118 | 0.43 | D | 90 |
| | TH | 0.87 | D | 244 | 0.73 | D | 163 |
| | RT | 0.10 | E | 7 | 0.49 | E | 20 |
| Cosgrave Road (North) | LT | 0.19 | C | 36 | 0.55 | E | 115 |
| | TH | 0.32 | C | 68 | 0.94 | E | 386 |
| | RT | 0.74 | E | 55 | 0.74 | E | 138 |
| Walters Road (West) | LT | 0.63 | D | 72 | 0.68 | D | 70 |
| | TH | 0.27 | D | 25 | 0.65 | E | 73 |
| | RT | 0.17 | D | 15 | 0.34 | E | 35 |
| Hamlin Road (East) | LT | 0.18 | D | 17 | 0.17 | D | 18 |
| | TH | 0.90 | E | 69 | 0.17 | E | 18 |
| | RT | 0.33 | E | 21 | 0.08 | E | 7 |

**Table 9-4: Future Cosgrave Road / Road 4 Forecast Signal Operations**

| Approach | Mvmt. | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | DoS % | LOS | 95th %ile Queue (m) | DoS % | LOS | 95th %ile Queue (m) |
| Cosgrave Road (South) | TH | 0.80 | C | 298 | 0.56 | B | 153 |
| | RT | 0.10 | E | 7 | 0.27 | E | 20 |
| Road 4 (East) | LT | 0.10 | D | 14 | 0.05 | D | 7 |
| | RT | 0.23 | E | 16 | 0.12 | E | 8 |
| Cosgrave Road (North) | LT | 0.02 | B | 3 | 0.04 | C | 8 |
| | TH | 0.33 | A | 76 | 0.78 | C | 277 |

**Table 9-5: Future Cosgrave Road / Road 2 / Bellbird Street Forecast Signal Operations**

| Approach | Mvmt. | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | DoS % | LOS | 95th %ile Queue (m) | DoS % | LOS | 95th %ile Queue (m) |
| Cosgrave Road (South) | LT | 0.86 | D | 344 | 0.65 | C | 192 |
| | TH | 0.86 | D | 344 | 0.65 | C | 192 |
| | RT | 0.38 | F | 15 | 0.77 | E | 38 |
| Road 2 (East) | LT | 0.28 | D | 31 | 0.12 | D | 13 |
| | TH | 0.28 | E | 31 | 0.12 | E | 13 |
| | RT | 0.34 | E | 17 | 0.15 | E | 7 |
| Cosgrave Road (North) | LT | 0.02 | B | 3 | 0.04 | C | 7 |
| | TH | 0.36 | B | 87 | 0.85 | D | 325 |
| | RT | 0.07 | E | 3 | 0.42 | F | 19 |
| Bellbird Street (West) | LT | 0.22 | D | 15 | 0.09 | C | 4 |
| | TH | 0.22 | E | 15 | 0.09 | D | 4 |
| | RT | 0.22 | E | 15 | 0.09 | D | 4 |

**Table 9-6: Future Cosgrave Road / Clevedon Road / Papakura-Clevedon Road Forecast Signal Operations**

| Approach | Mvmt. | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | DoS % | LOS | 95th %ile Queue (m) | DoS % | LOS | 95th %ile Queue (m) |
| Papakura-Clevedon Road (East) | TH | 0.56 | B | 132 | 0.42 | A | 72 |
| | RT | 0.83 | D | 130 | 0.94 | E | 99 |
| Cosgrave Road (North) | LT | 0.27 | C | 47 | 0.65 | C | 106 |
| | RT | 0.84 | E | 94 | 0.93 | E | 96 |
| Clevedon Road (West) | LT | 0.47 | C | 94 | 0.35 | C | 55 |
| | TH | 0.87 | D | 189 | 0.97 | E | 308 |

**Table 9-7: Future Okawa Avenue / Old Wairoa Road Forecast Priority Control Operations**

| Approach | Mvmt. | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | DoS % | LOS | 95th %ile Queue (m) | DoS % | LOS | 95th %ile Queue (m) |
| Okawa Avenue (South) | LT | 0.12 | A | 3 | 0.24 | A | 7 |
| | RT | 0.12 | A | 3 | 0.24 | A | 7 |
| Old Wairoa Road (East) | LT | 0.19 | A | 0 | 0.08 | A | 0 |
| | TH | 0.19 | A | 0 | 0.08 | A | 0 |
| Old Wairoa Road (West) | TH | 0.04 | A | 1 | 0.09 | A | 1 |
| | RT | 0.04 | A | 1 | 0.09 | A | 1 |

**Table 9-8: Future Okawa Avenue / Clevedon Road / Dominion Road / Papakura-Clevedon Road Forecast Signal Operations**

| Approach | Mvmt. | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | DoS % | LOS | 95th %ile Queue (m) | DoS % | LOS | 95th %ile Queue (m) |
| Dominion Road (South) | LT | 0.84 | D | 117 | 0.43 | C | 47 |
| | TH | 0.51 | C | 64 | 0.88 | E | 92 |
| | RT | 0.51 | D | 64 | 0.88 | E | 92 |
| Papakura-Clevedon Road (East) | LT | 0.30 | D | 28 | 0.48 | D | 59 |
| | TH | 0.88 | D | 121 | 0.97 | F | 203 |
| | RT | 0.07 | D | 3 | 0.02 | D | 2 |
| Okawa Avenue (North) | LT | 0.03 | C | 3 | 0.01 | C | 1 |
| | TH | 0.78 | D | 75 | 0.38 | D | 33 |
| | RT | 0.78 | D | 75 | 0.38 | D | 33 |
| Clevedon Road (West) | LT | 0.08 | C | 9 | 0.17 | D | 20 |
| | TH | 0.66 | C | 96 | 0.72 | D | 113 |
| | RT | 0.88 | E | 78 | 0.95 | E | 180 |

**Table 9-9: Future Pakaraka Drive / Old Wairoa Road / Road 1 Forecast Signal Operations**

| Approach | Mvmt. | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | DoS % | LOS | 95th %ile Queue (m) | DoS % | LOS | 95th %ile Queue (m) |
| Pakaraka Drive (South) | LT | 0.30 | D | 21 | 0.34 | C | 24 |
| | TH | 0.30 | C | 21 | 0.34 | C | 24 |
| | RT | 0.30 | D | 21 | 0.34 | C | 24 |
| Old Wairoa Road (East) | LT | 0.63 | C | 93 | 0.37 | C | 34 |
| | TH | 0.63 | C | 93 | 0.37 | C | 34 |
| | RT | 0.01 | D | 0 | 0.01 | D | 0 |
| Road 1 (North) | LT | 0.29 | D | 22 | 0.11 | C | 8 |
| | TH | 0.29 | C | 22 | 0.11 | C | 8 |
| | RT | 0.004 | D | 0 | 0.003 | C | 0 |
| Old Wairoa Road (West) | LT | 0.20 | C | 25 | 0.68 | C | 69 |
| | TH | 0.20 | C | 25 | 0.68 | C | 69 |
| | RT | 0.11 | D | 4 | 0.37 | D | 14 |

**Table 9-10: Future Pakaraka Drive / Papakura-Clevedon Road Forecast Priority Control Operations**

| Approach | Mvmt. | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | DoS % | LOS | 95th %ile Queue (m) | DoS % | LOS | 95th %ile Queue (m) |
| Papakura-Clevedon Road (East) | TH | 0.20 | A | 0 | 0.30 | A | 0 |
| | RT | 0.08 | A | 2 | 0.08 | A | 3 |
| Pakaraka Road (North) | LT | 0.34 | B | 11 | 0.21 | A | 5 |
| | RT | 0.34 | C | 11 | 0.21 | C | 5 |
| Papakura-Clevedon Road (West) | LT | 0.26 | A | 0 | 0.21 | A | 0 |
| | TH | 0.26 | A | 0 | 0.21 | A | 0 |

**Table 9-11: Future Airfield Road / Mill Road Forecast Signals Operations**

| Approach | Mvmt. | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | DoS % | LOS | 95th %ile Queue (m) | DoS % | LOS | 95th %ile Queue (m) |
| Mill Road (South) | LT | 0.87 | C | 236 | 0.52 | B | 154 |
| | TH | 0.87 | D | 236 | 0.52 | D | 154 |
| | RT | 0.22 | E | 8 | 0.36 | F | 15 |
| Airfield Road (East) | LT | 0.04 | C | 5 | 0.07 | E | 12 |
| | TH | 0.76 | D | 86 | 0.63 | E | 77 |
| | RT | 0.76 | D | 86 | 0.63 | E | 77 |
| Mill Road (North) | LT | 0.37 | B | 59 | 0.96 | E | 462 |
| | TH | 0.37 | C | 67 | 0.96 | F | 462 |
| | RT | 0.30 | E | 12 | 0.42 | F | 17 |
| Airfield Road (West) | LT | 0.37 | C | 29 | 0.26 | D | 40 |
| | TH | 0.62 | D | 59 | 0.90 | F | 234 |
| | RT | 0.62 | C | 59 | 0.90 | E | 234 |

**Table 9-12: Future Airfield Road / Road 1 Forecast Priority Control Operations**

| Approach | Mvmt. | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | DoS % | LOS | 95th %ile Queue (m) | DoS % | LOS | 95th %ile Queue (m) |
| Road 1 (South) | LT | 0.04 | A | 1 | 0.02 | A | 1 |
| | RT | 0.001 | A | 0 | 0.002 | A | 0 |
| Airfield Road (East) | LT | 0.08 | A | 0 | 0.08 | A | 0 |
| | TH | 0.08 | A | 0 | 0.08 | A | 0 |
| Airfield Road (West) | TH | 0.10 | A | 0 | 0.17 | A | 0 |
| | RT | 0.02 | A | 1 | 0.05 | A | 2 |

**Table 9-13: Future Airfield Road / Road 7 Forecast Priority Control Operations**

| Approach | Mvmt. | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | DoS % | LOS | 95th %ile Queue (m) | DoS % | LOS | 95th %ile Queue (m) |
| Road 7 (South) | LT | 0.04 | A | 1 | 0.02 | A | 1 |
| | RT | 0.001 | A | 0 | 0.002 | A | 0 |
| Airfield Road (East) | LT | 0.06 | A | 0 | 0.07 | A | 0 |
| | TH | 0.06 | A | 0 | 0.07 | A | 0 |
| Airfield Road (West) | TH | 0.08 | A | 0 | 0.13 | A | 0 |
| | RT | 0.02 | A | 1 | 0.05 | A | 2 |

All priority-controlled intersections are shown to operate well in the future, with spare capacity, low delays (as shown by the level of services being C or better), and the queues being minimal. This applies to the two intersections modelled on Airfield Road as well as the intersection of Pakaraka Drive and Papakura-Clevedon Road and Okawa Avenue / Old Wairoa Road. An assessment of the development site access onto Cosgrave Road was undertaken and found to operate acceptably from a capacity perspective.

The signalised intersections are also shown to operate acceptably, with majority of movements experiencing acceptable levels of delay. The movements that operate near industry accepted thresholds are summarised below:

- Airfield Road / Mill Road
  - In the AM and PM peak hours, the right-turn movements from Mill Road (north) and Mill Road (south) both operate at a LOS E / F.
  - In the PM peak hour, all movements from Airfield Road (east), the left-turn from Mill Road (north), and the right-turn from Airfield Road (west) operate at a LOS E.
  - In the PM peak hour, the right-turn from Mill Road (south), the through movement from Airfield Road (west) and the through and right-turn movements from Mill Road (north) operate at a LOS F.
- Cosgrave Road / Clevedon Road / Papakura-Clevedon Road
  - In the AM and PM peak hours, the right-turn movement from Cosgrave Road (north) operates at LOS E.
  - In the PM peak hour, the right-turn from Papakura-Clevedon Road and the through movement from Clevedon Road both operate at LOS E.
- Cosgrave Road / Road 2 / Bellbird Street
  - In the AM and PM peak hours, the right-turn movements from Cosgrave Road (south), Cosgrave Road (north) and Road 2 operate at LOS E / F. Additionally, the through movement from Road 2 operates at LOS E.
  - In the AM peak hour, the through and right-turn movements from Bellbird Street operate at LOS E.
- Cosgrave Road / Road 4
  - In the AM and PM peak hours, the right-turn movements from Cosgrave Road south and Road 4 operate at LOS E.
- Cosgrave Road / Walters Road / Hamlin Road (Road 6)

  - In the AM and PM peak hours, the right-turn movements from Cosgrave Road (south), Cosgrave Road (north), Hamlin Road (east) and the through movement from Hamlin Road (east) operate at a LOS E.
  - In the PM peak hour, the left-turn and through movements from Cosgrave Road (north) and the through and right-turn movements from Walters Road (west) and Hamlin Road (east) operate at a LOS E.
- Okawa Avenue / Clevedon Road / Dominion Road / Papakura-Clevedon Road
  - In the AM and PM peak hours, the right-turn movement from Clevedon Road operates at LOS E.
  - In the PM peak hour, the through and right-turn movements from Dominion Road operate at a LOS E and the through movement from Papakura-Clevedon Road operates at a LOS F.

Overall, the operations of the signals are considered to meet industry accepted thresholds and for this reason are considered acceptable. It is also important to remember that the operations are for the peak hours in a 10-year horizon period, and therefore the intersection will operate better than the results show majority of the time.

## 9.5 CURRENT DEFICIENCIES

As part of the development of the development site, an urban street network will be provided with appropriate connections to proposed Collector and Arterial Roads surrounding the site. The surrounding transport network has some existing deficiencies which can be described as follows:

- Lack of Mode Choice – currently the area has below average access to public transport and a lack of safe and attractive walking and cycling access. In order to achieve mode share within the development site, provision of travel choice should be provided as development of the community occurs. Frequent bus services, as well as continuous pedestrian and cycle facilities, will be required as part of the development (see Section 9); and
- Active Mode connections to Key Destinations – pedestrian and cycle demand from the development site is likely to be focused on key destinations in the surrounding area, including the local schools and Papakura Town Centre.

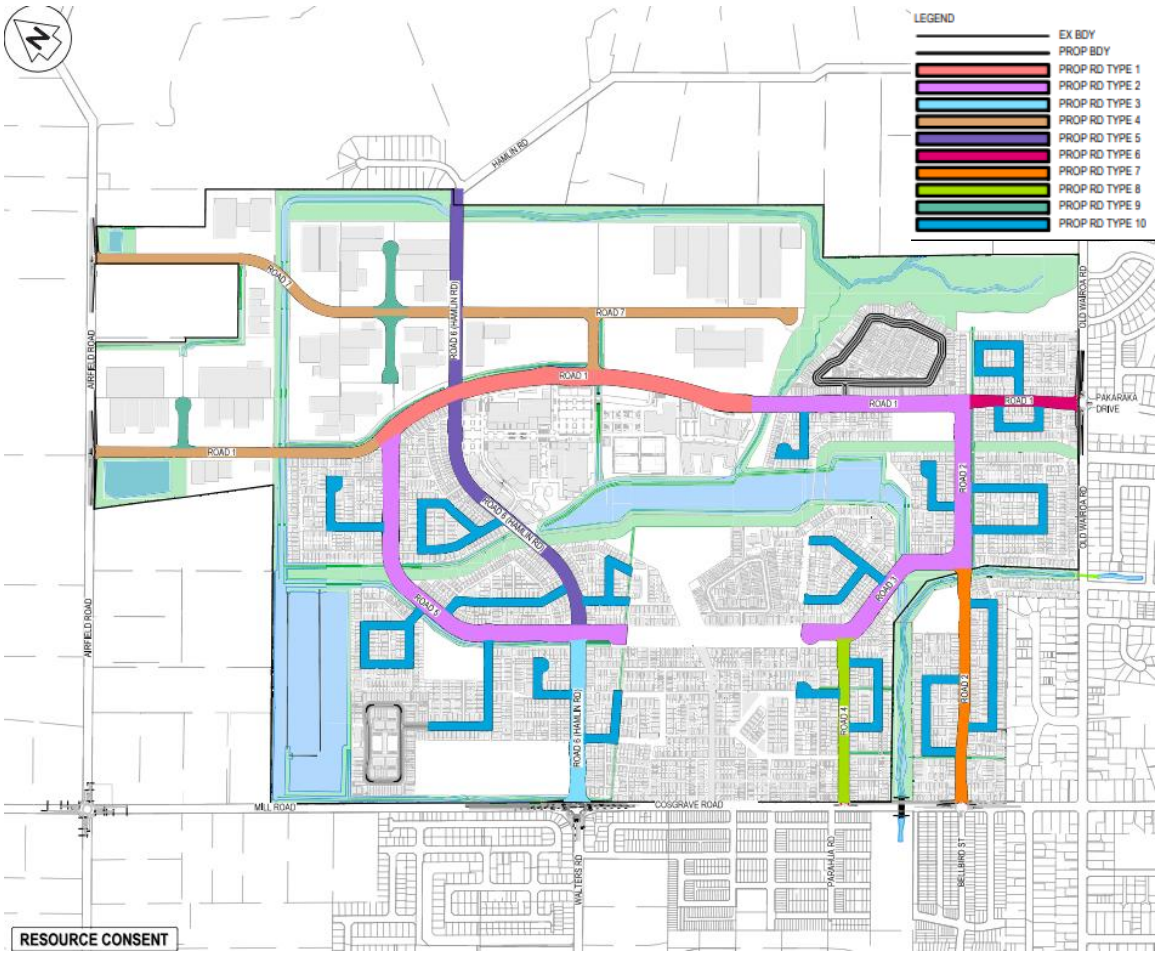
# 10 INTERNAL LAYOUT

## 10.1 ROAD LAYOUT (GENERAL)

The site connects to the wider road network at various locations including Old Wairoa Road, Cosgrave Road, Airfield Road, and Mill Road.

Internal to the site, the proposed development includes 31 local roads. Figure 10-1 below shows the proposed internal road layout and the connections to the wider road network.

**Figure 10-1: Proposed Internal Road Layout**




Overall, it is considered that the proposed road network within the development site is adequately designed and provides suitable connections to the existing road network.

## 10.2 ROAD CROSS SECTIONS

Table 10-1 below shows the cross sections of the proposed internal roads. In this regard there are eight types of roads being proposed.

**Table 10-1: Road Cross Sections**

| Roads | Road Reserve Width | Lane Width | Pedestrian Footpath Width | Parking Provisions |
|---|---|---|---|---|
| **32.0m Road with Industrial Traffic & Cycle & Private Busway** | 32m | 3.5m wide separate busway lanes and 3.5m wide carriageway lanes plus 3.0m median (17.0m total) | Footpath provided on both sides of the road (2.0m-2.1m). Two-way Cycle path on one side of 3.0m width. | NA |
| **32.0m Road with Typical Traffic & Cycle & Private Busway** | 32m | 3.5m wide separate busway lanes and 3.5m wide carriageway (14.0m total) | Footpath provided on both sides of the road (2.0m-2.1m). Two-way Cycle path on one side of 3.0m width. | NA |

| | | | | |
|---|---|---|---|---|
| **20.0m Road with Industrial Traffic & Cycle** | 20m | 3.5m in either direction plus 3.0m median (10.0m total width) | Footpath provided on both sides with 2.8m and 1.8m width. | NA |
| **25.0m Road with Industrial Traffic & Cycle** | 25m | 3.5m in either direction plus 3.0m median (10.0m total width) | Footpath provided on both sides with 2.0m and 1.9m width. 3.0m cycleway on one side. | NA |
| **30.0m Road with Industrial Traffic & Cycle & General Lanes** | 30m | 3.5m wide general lanes in either direction. 3.0m wide carriageway in either direction plus 3.0m median (16.0m total width) | 3.6m wide combined footpath and cycleway on either side. | NA |
| **20.0m Residential Collector Road** | 20m | 3.5m in either direction (7.0m total width) | Footpath provided on both sides of 2.0m and 1.9m width. 3.0m wide cycleway on one side. | NA |
| **16.0m Residential Local Road** | 16m | 3.0m in either direction (6.0m total width) | 2.0m width on both sides | 2.65m allocated on one side for street tree / street light / parking |
| **16.0m Industrial Local Road** | 16m | 3.5m in either direction plus 3.0m median (10.0m total width) | 1.8m width on both sides | NA |

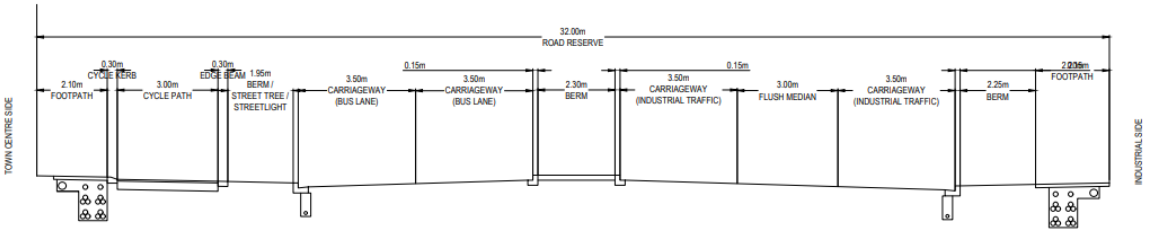
It is noted that the carriageway width will have localised widening at the bends to accommodate truck movements where required.

An assessment has been undertaken of the proposed new roads against the local road cross-sectional requirements in the Auckland Transport Design Manual (ATDM) standards.

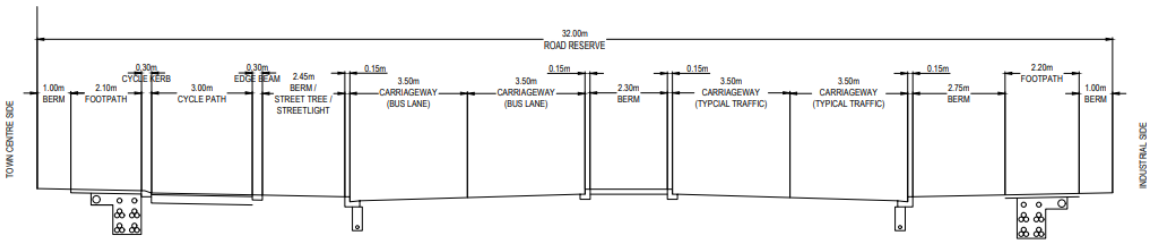
The proposed road reserve, lane width and footpath dimensions comply with the applicable cross-section in the ATDM and are considered appropriate.

The cross sections of the proposed roads and JOALs are shown in Figure 10-2.

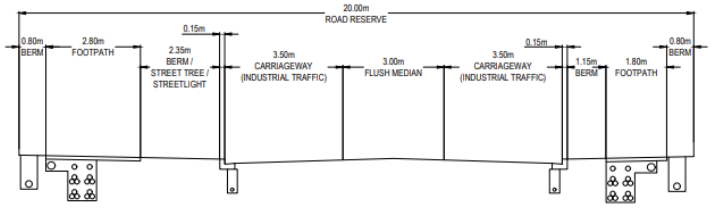
**Figure 10-2: Road Cross Sections**



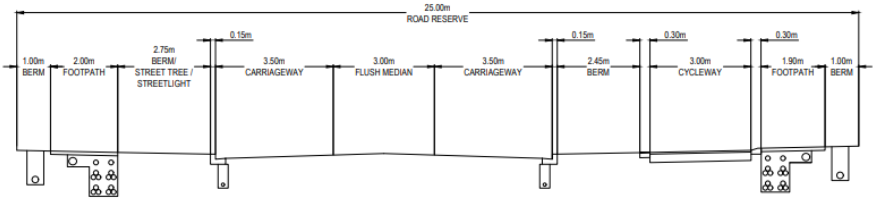

A-A C341 32.0m ROAD WITH INDUSTRIAL TRAFFIC & CYCLE & PRIVATE BUSWAY
SCALE 1:100 @ A3




A1-A1 C341 32.0m ROAD WITH TYPICAL TRAFFIC & CYCLE & PRIVATE BUSWAY
SCALE 1:100 @ A3

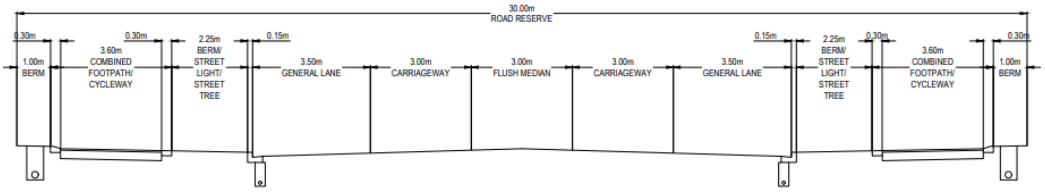



B-B C343 20.0m ROAD WITH INDUSTRIAL TRAFFIC & CYCLE
SCALE 1:100 @ A3



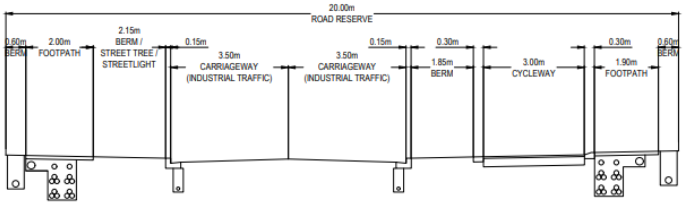

C-C
C344

25.0m ROAD WITH INDUSTRIAL TRAFFIC & CYCLE
SCALE 1:100 @ A3



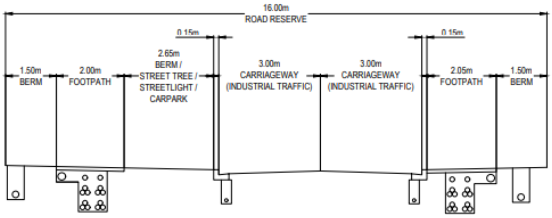

C1-C1
C344

30.0m ROAD WITH INDUSTRIAL TRAFFIC & CYCLE & GENERAL LANES
SCALE 1:100 @ A3



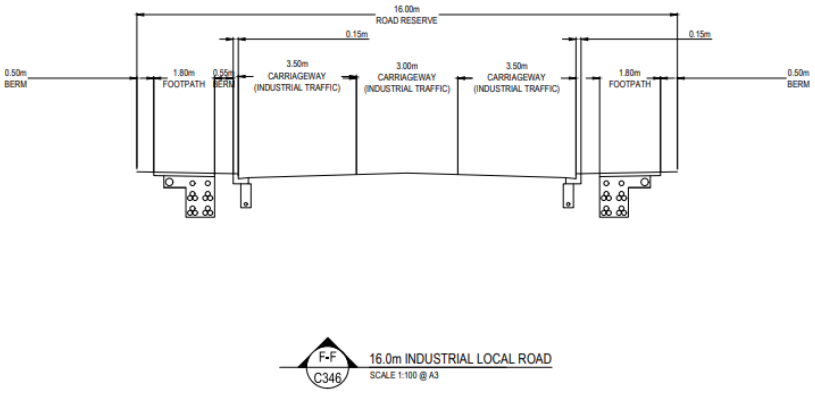

D-D
C345

20.0m RESIDENTIAL COLLECTOR ROAD
SCALE 1:100 @ A3




E-E
C346

16.0m RESIDENTIAL LOCAL ROAD
SCALE 1:100 @ A3




Overall, all road / pedestrian footpath / cycle-lanes and berm / parking areas comply with ATDM.

## 10.3 VEHICLE TRACKING

The ATDM requires that local roads must be capable of accommodating:

- Mid-block (residential):
  - Simultaneous movement of an AT 6.3m van and 10.3m truck
- Intersections:
  - 10.3m truck (essentially a public collection rubbish truck) using full road width to turn

For local roads accommodating bus routes (including Sunfield loop), the roads must be capable of accommodating:

- Midblock:
  - 13.5m bus not crossing the marked centreline to avoid penetrating opposing traffic lane
- Intersections:
  - 12.6m bus and 13.5m bus staying in their lane

For roads accommodating industrial, the roads must be capable of accommodating:

- Midblock:
  - 19.45m semi-trailer not crossing the marked centreline to avoid penetrating opposing traffic lane
- Intersections:
  - 19.45m semi-trailer staying in lane on major (or crossing) road, and using all width on minor (or terminating) road

Vehicle tracking has been undertaken for the roads within the proposed internal road network. The following parameters were used for vehicle tracking:

- 500mm body clearance for vans and trucks;
- Body clearance provided to the kerb and any oncoming vehicle (where simultaneous movement is occurring); and

- 15km/h speed when turning within intersections

Vehicle tracking demonstrates various sections or roads / intersections cannot fully accommodate simultaneous movements of all vehicles above. Vehicle tracking is shown in **Attachment B** and demonstrates the above requirements .

There are minor areas that require slight widening to accommodate the anticipated vehicles. This widening of kerbs will not however change the overall lot layout however **it is recommended that vehicle tracking is checked again at the EPA stage to ensure compliance**.

## 10.4 INTERNAL LOCAL ROAD INTERSECTIONS

### 10.4.1 GENERAL

A number of intersections have been proposed within the development, with all being characterised as either local / local road, priority-controlled, or signal controlled. As discussed in Section 11.1, each intersection has been designed to accommodate the simultaneous turning manoeuvres of various vehicles depending on road type use (eg residential vs industrial)

It is noted that all intersections between driveways of private properties and proposed local roads across the 'Sunfield Loop' busway, where vehicles are required to cross over the bus lane, are shown to be signalised. This is to ensure vehicles can safely cross the busway.

The majority of the collector type roads are proposed to also be signalised to safely accommodate both vehicular traffic and pedestrians / cyclists.

It has been assumed that all proposed local roads will have a speed limit of 50km/hr for the purpose of the sight distance assessment, though it should be noted that in reality road users will likely travel at lower speeds, particularly through the residential areas and cul-de-sacs.

### 10.4.2 SAFE INTERSECTION SIGHT DISTANCE (SISD)

Safe Intersection Sight Distance (SISD) is the minimum distance that should be provided on the major road at any intersection, for a driver on the major road to observe a vehicle moving into a collision position from the minor road and to decelerate to a stop before reaching the collision point.

#### 10.4.2.1 PRIORITY-CONTROLLED INTERSECTIONS - INTERNAL

All internal priority-controlled intersections as part of this proposal will be controlled with give way road markings. As stated above, sight distance has been calculated based on 50km/h, which is considered the worst-case operating speed of the road.

The Austroads: Guide to Road Design Part 4A Table 3.2 requires for intersections on a 50 km/h carriageway that a safe sight distance of 97m be provided.

A sight distance assessment has been undertaken to assess whether all the proposed priority-controlled intersections can provide a sight distance of 97m in all directions.

The intersections that were not able to achieve a sight distance of at least 97m in at least one direction are outlined below in Table 11-1.

**Table 11-1: SISD Non-Compliant Intersections**

| Intersection | SISD Western/Left Direction | SISD Eastern/Right Direction |
|---|---|---|
| **Road 16 / Road 16** | 63 metres | 70 metres |
| **Road 10 / Road 11** | 83+ metres | 71 metres |

In the case on the two intersections above which do not meet the SISD requirements in at least one direction, the limited sight distance is the result of another intersection, corner, or end of road. Given the residential nature of these roads and vehicles turning corners or into intersections will be travelling at a much slower speed than 50km/hr, the lower sight distances are considered to be acceptable.

#### 10.4.2.2 PRIORITY-CONTROLLED INTERSECTIONS – EXTERNAL

The following connections from the site to the external road network are proposed to be priority-controlled:

- Airfield Road / Road 1; and
- Airfield Road / Road 7.

The Austroads: Guide to Road Design Part 4A Table 3.2 requires for intersections on an 80 km/h carriageway that a safe sight distance of 159m be provided.

It is considered that both these intersections meet the above requirement given the straight alignment of Airfield Road.

## 10.5 LONGITUDINAL GRADIENTS

### 10.5.1 GENERAL

With reference to the Auckland Transport TDM "*gradients should not be steeper than 8%, but may be increased above 8% where topographical constraints exist. Maximum gradient with departure from standard should be as low as possible and may not exceed 12.5% for vesting as public road".*

### 10.5.2 LOCAL ROADS

In this regard, with reference to the *"215010-M-C300-C350"* drawing set prepared by Maven Associates, the steepest gradient on the proposed local roads is 3.4% which is well below the maximum gradient as per Auckland Transport's requirements.

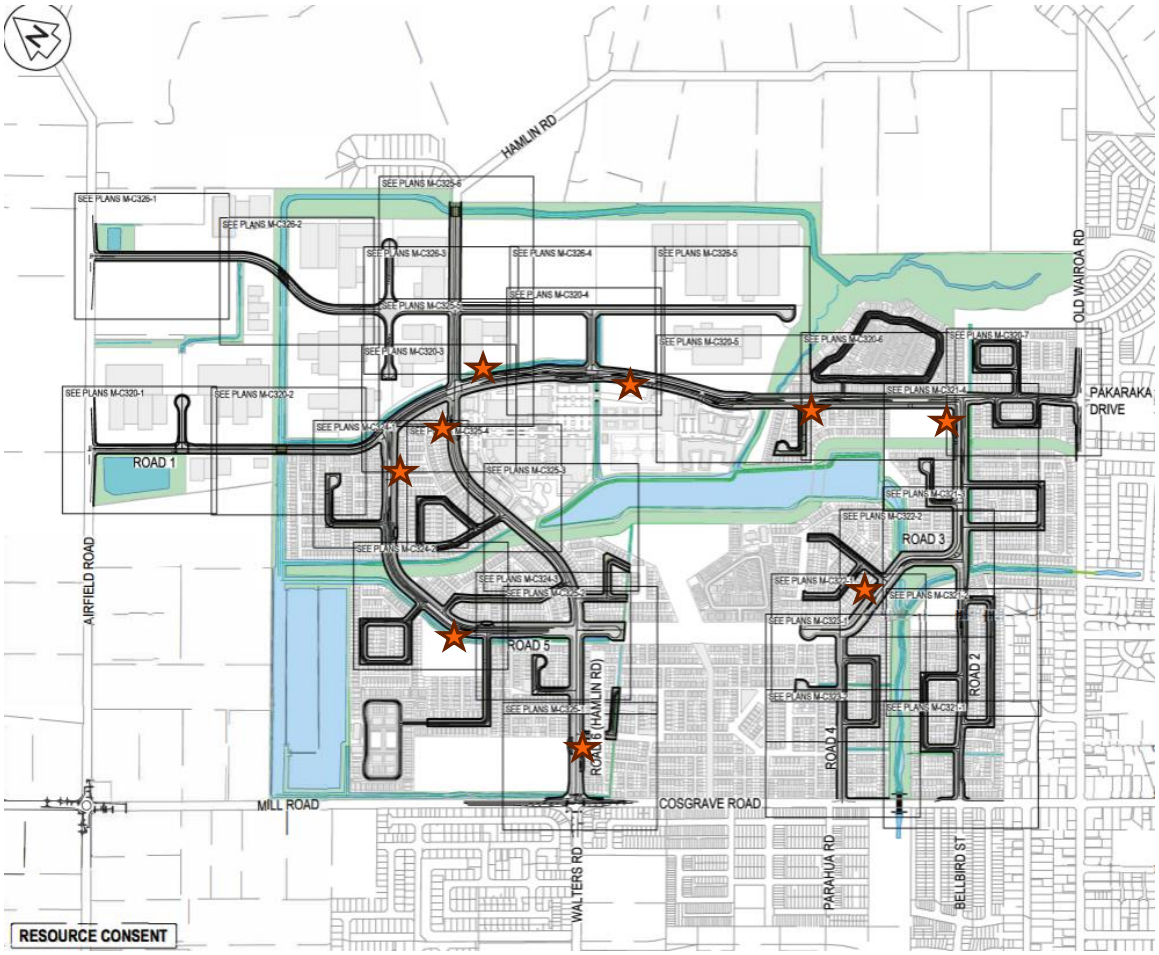
### 10.5.3 JOALS

No information has been provided in regard to the gradients of the proposed JOALs however given the entire site is relatively flat and the maximum gradient of the proposed local roads is 3.4% it is anticipated that the gradient of the JOALs / accessways will also be well under the maximum as per Auckland Transport's requirements.

## 10.6 BUS STOPS

A total of 9 bus stops are proposed within the Sunfield development. Figure 10-3 below shows the proposed bus stop locations within the site.

**Figure 10-3: Proposed Bus Stop Locations**




## 10.7 INTERNAL AREAS

With the car-less design proposed, the lanes around the residential dwellings will not be required to cater for typical residential traffic. Rather the residents that have a car will park in areas around “hubs” and walk to their dwelling. As a result, the laneways will only need to cater for weekly rubbish collection and emergency access (fire / ambulance). Figure 10-4 shows a typical residential hub arrangement.

**Figure 10-4: Typical Residential Areas**


# 11 REVIEW OF GENERAL MITIGATION

## 11.1 PARKING

### 11.1.1 GENERAL

The Sunfield site is proposed to be a car-less development where private car travel is discouraged. One of the ways of discouraging private car travel is to make owning a car difficult in the development and providing a multitude of readily accessible and enabled alternatives (e.g. public transport, walking, cycling, purpose-built neighbourhoods).

### 11.1.2 RESIDENTIAL

As previously discussed, the parking rates for residential include:

- Only 1 in every 10 dwellings will have on-lot car parks;
- Visitor parking will be provided at the same 1 in every 10 dwelling ratio;
- The provision of car share spaces at Sunfield at a ratio of 1 in every 11.5 dwellings;

As noted previously, the National Policy Statement on Urban Development (NPS-UD) required Auckland Council to remove car parking minimums from the Auckland Unitary Plan. The removal of minimums occurred on 11 February 2022. Employment

The current Unitary Plan would have parking for office at a minimum of 1 per 45 sqm and at a maximum of 1 per 30 sqm (depending on zone). The Unitary Plan also has a City Fringe at a maximum of 1 per 60 sqm and City Centre of 1 per 200 sqm.

For Industrial the Unitary Plan now contains no minimum or maximum rates.

Given parking for the residential use only provides 10% of typical parking numbers, it is considered appropriate to consider a similar stance for employment. As such the following is considered appropriate:

- Maximum of 1 per 300 sqm for office; and
- Maximum rate of 1 per 500 sqm for manufacturing / warehouse / industrial.

## 11.2 PUBLIC TRANSPORT

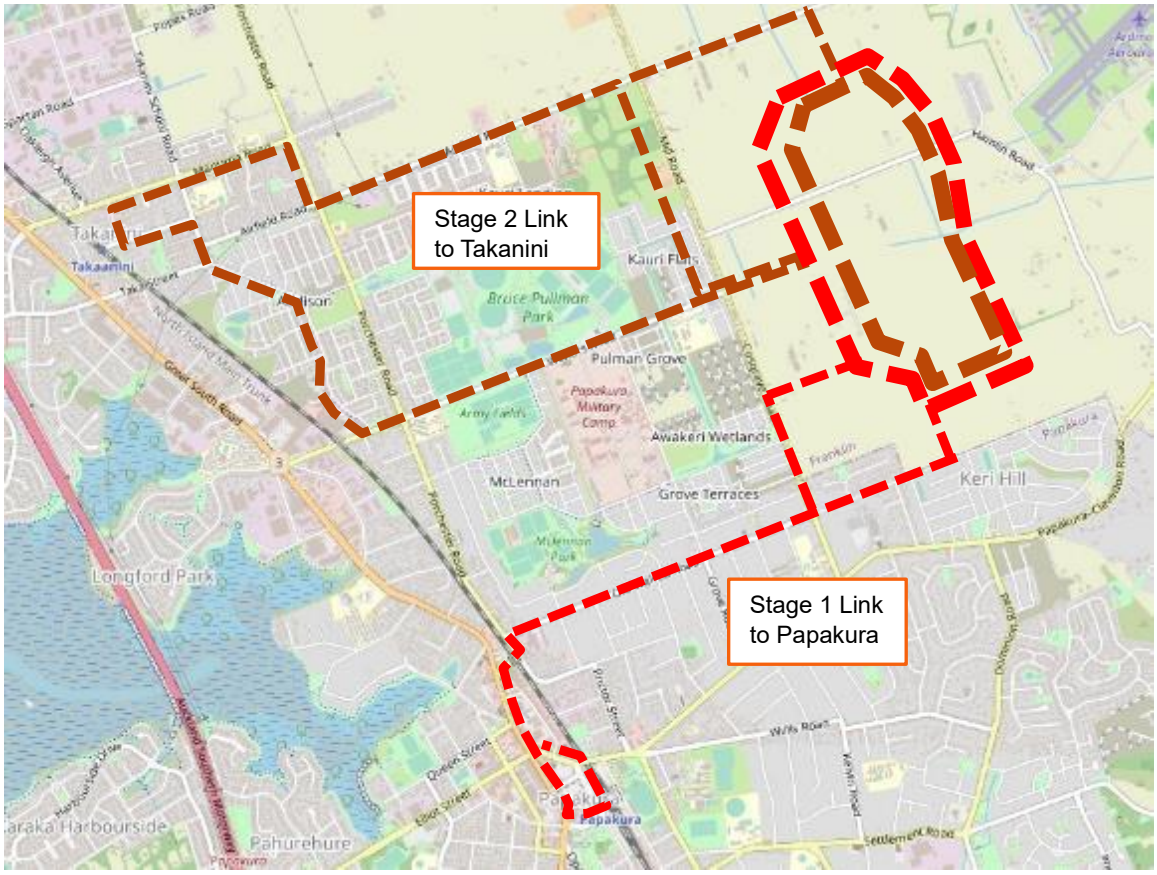
### 11.2.1 SUNFIELD VISION

A key component of the Sunfield vision is the provision of a public transport network with a fleet of vehicles that operate continuously. The vehicles will:

- Travel around internally using the loop road;
- Link the site (initially) to the Papakura station and Town Centre and then Takanini Rail Station and Town Centre in subsequent stages; and
- Be operated by Sunfield thereby removing financial requirement of Auckland Transport which so often occurs in other greenfield developments.

Figure 11-1 below shows the intended routes of these vehicles.

**Figure 11-1: Public Transport Routes**




Based on the modal analysis in Section 7.1 of this report, the public transport provision is expected to cater for a significant proportion of movement throughout Sunfield (and external). The analysis shows that up to 60% of all movement will need to be made using public transport.

The analysis shows that this equates to about 3,000-3,500 people per hour (during the peak hour) using the Sunfield public transport system (both externally and internally). This translates to around 1,000 people per hour internally and 2,600 externally per hour (both residential and employment). The number of buses required to accommodate this number of people depends on the capacity of the vehicle. Assuming a seating capacity of 40 people this translates to up to 88 bus movements per hour.

The journey from the edge of the site to Papakura Train Station is likely to take 6-9 minutes in the morning peak period (assuming no stopping) and thus the return journey for the bus will be in the order of 20 minutes.

The internal loop road is in the order of 3.6km in length. Assuming an average travelling speed of 40km/hr (5.4 minutes), a total of 11 stops taking 20 seconds each (3.5 minutes) the total travel time for one internal bus loop would be 9 minutes. As such the total return journey would be around 30 minutes.

As such each bus would accommodate 2 return journeys. To accommodate 88 bus journeys this would require 44 vehicles. This would be in the long term with the number proposed expected to match demand.

With the total loop being approximately 8.6km (3.6km internally and 5km external) and assuming 22 vehicles in each direction this translates to an average headway (or gap between buses) of 400m.

### 11.2.2 EXTERNAL DESTINATIONS

Given the high use of public transport anticipated, an assessment of the likely travel times via public transport to larger facilities / destinations has been made. Table 11-1 summarises key destinations.

**Table 11-1: Public Transport Key Destinations**

| Wider Attractions | Distance | Method | Likely Time[6] |
|---|---|---|---|
| Auckland CBD | 30 km | Sunfield Bus / train | 1 hr 20 mins |
| Auckland Airport | 20 km | Sunfield Bus / train / airbus at Puhinui | 1 hr 5 mins |
| Albany | 50 km | Sunfield Bus / train / northern Express | 2 hr 10 min |
| Sylvia Park | 25 km | Sunfield Bus / train (swapping train at Otahuhu) | 1 hr |
| Manukau | 14 km | Sunfield Bus / Bus 33 | 55 mins |

[6] Assuming 10-minute wait between Sunfield bus and train

| | | | |
|---|---|---|---|
| New Lynn | 35 km | Sunfield Bus / train / (swapping train at Newmarket) | 1 hr 40 mins |

## 11.3 WALKING AND CYCLING UPGRADES

A further key component of the Sunfield Vision is the provision of an active transport network both internally and externally to the site. The active modes consist of:

- Travel around internally using the loop road as well as the primary roads and shared spaces and off-road paths; and
- Linking the site to the Papakura Rail Station and Town Centre and Takanini Rail Station and Town Centre by way of cycling / pedestrian facilities.

Figure 11-2 below shows the intended routes of the active transport network.

**Figure 11-2: Active Transport Network**


It is noted that small sections of Walters Road (in particular near Cosgrave Road) already have cycle lanes partly constructed.

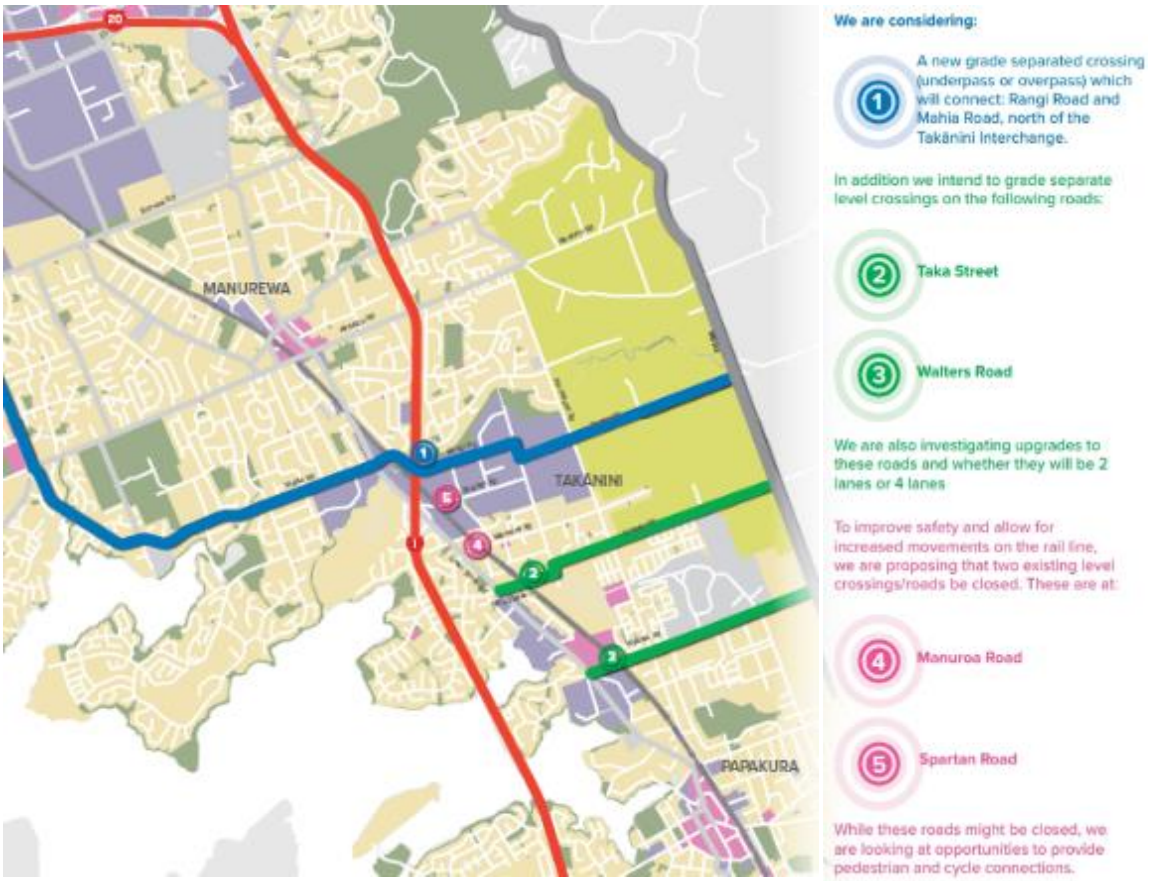
The detail of the cycle lanes / upgrades will need to be designed / constructed with Auckland Transport.

## 11.4 WIDER ISSUES

Access to the site to the wider network requires all vehicles travelling to the west (to access the Southern Motorway) to cross at-grade rail crossings (at either Manuroa Road, Taka Street, Walters Road). There is currently a focus to remove these level rail crossings due to the safety concerns. As such, additional growth from Sunfield will increase traffic and therefore periods of congestion across the rail tracks. Supporting Growth Alliance (SGA) have released a document as shown in Figure 11-3 below. This includes:

- Closing the level crossings of Manuroa Road and Spartan Roads
- Grade separating Taka Street and Walters Road
- A new grade separated crossing (underpass or overpass) which will connect Rangi Road and Mahia Road (via Popes Road), north of the Takānini Interchange.

**Figure 11-3: Takanini Rail Upgrades**[7]




Further, Mill Road provides northbound and southbound access and connectivity to other centres via various modes. The National Government has indicated Mill Road Stage 1 will be undertaken as a Road of National Significance (RONS).

## 11.5 TRAVEL DEMAND MANAGEMENT PLAN

Travel Demand Management Plan (Travel Plans) are typically prepared for employment and educational activities with the aim of reducing car dependency, particularly in peak commuting periods. Travel Plans usually include the operational measures that can be put in place to support such a reduction in car dependency. The plans can include matters concerning the management of parking areas, the provision for active transport facilities, the promotion for public transport, and the provision for shared transport programmes.

[7] [7] https://www.greaterauckland.org.nz/2018/10/05/transport-growth-networks-south/supporting-growth-south-takanini/

A Travel Plan sets out how travel demand is to be managed for a particular site or proposal to:

- maximise the efficient use of transport networks and systems;
- promote and enable the use of more sustainable and active modes of transport such as public transport, walking and cycling, and carpooling, ride sharing, car sharing and micro mobility as alternatives to sole occupancy private cars; and
- manage the efficient use of limited resources such as car parking and loading areas.

It is considered that a Travel Plan for the employment zone would be beneficial for both the site and the surrounding transport network. The Travel Plan could be continuously updated and refined based on changes in the area (e.g. changes in bus routes, congestion area), and could consider methods such as minimising freight / deliveries to the area during times of peak network congestion.

As detailed earlier in the assessment, it is envisaged that a key part of the Travel Plan would be the requirement for 75% of the movements relating to the warehouse distribution operation to be confined to off-peak only (being the hours outside of Monday to Friday 7-9am and 4-6pm).

The creation and implementation of Travel Plans within Auckland is common practice and is supported by Auckland Transport.

## 11.6 MONITORING

It is recognised that this development is essentially a first for New Zealand. As a result, it is considered that careful monitoring of initial stages of the development is needed to ensure the measures proposed have the desired result of significantly reducing private car travel (both internal and externally).

This monitoring should measure the travel modes of residents / workers including a continuous traffic count of the external links to the wider roading network to ensure private car travel is minimised as planned.

# 12 POTENTIAL ISSUES AND MITIGATION PLANS

## 12.1 GENERAL

It is recognised that Sunfield proposes a very different way of managing travel (both internally and externally). As a result, there are some very specific and unusual potential issues with the proposal as noted in the following sections.

## 12.2 ILLEGAL PARKING

It is considered that there is a strong potential for parking in other areas of the site (other than designated areas in the hubs) including over berms and in the shared spaces. In this regard the following measures are anticipated:

- The design of all areas should ensure parking on berms is impossible to occur. This could include planting, bollards and fencing. In this regard with a typical 6m carriageway currently being pursued by Auckland Transport in green field developments, this allows for parking on-street. Based on the Engineering Plan Approval and the resolution process, this suggest ample parking may well exist on-street by the time the road is constructed. This will need to be managed with Auckland Transport to ensure this parking cannot occur.
- Covenants (or similar) to be placed on homeowners/ residents with regards to parking; and
- Enforcement of no parking in the neighbourhoods generally and in the hub areas outside designated parking areas.

## 12.3 PARKING OFF-SITE

With a significantly constrained parking provision there is a strong possibility of residents (and potentially workers) parking in existing residential areas outside Sunfield and then walking / taking the public transport available to / from Sunfield to their car. As a result, the reduction in traffic generation would not eventuate. The residential areas considered most susceptible to this is shown in Figure 12-1 below which shows an approximate 2km distance (30-minute walking) from any point on the site.

**Figure 12-1: Potential Off-Site Parking**


These areas will need to be monitored to ensure no residents from Sunfield park off site.

In this regard it is noted that:

- Covenants (or similar) can be placed on Sunfield homeowners / residents with regards to parking (i.e. not having a car); and
- There are measures such as resident parking schemes that can be implemented by Council to ensure only local residents park in the areas shown in Figure 10-1 above.

## 12.4 LOADING AND SERVICING

All deliveries / loading will primarily occur through the local hubs and from the primary roads within the neighbourhoods. Within these neighbourhoods are service hubs are located within 75m of every house. They contain:

- Refuse and recycling
- Cycle Storage
- Loading bays for service vehicles and pick-up and drop off services
- Post and courier boxes

## 12.5 EMERGENCY VEHICLES

Preliminary analysis has been undertaken to ensure a fire truck can access the site through the loop road primary road and shared space. From these locations it is considered that the requirements of the NZ Fire Service “emergency vehicle access guidelines” and “NZ Fire Service firefighting water supply code of practice” can be met.

In particular all houses will be no more than 135m from a fire hydrant / fire truck. This will need to be reconfirmed in detail though later stages of design.

### 12.6 RIDE HAILING

There will likely be a greater reliance on UBER type vehicles within Sunfield. Dedicated areas (pick-up / drop-off) in all Hubs should be considered for these vehicles as well as shared use vehicles (e.g. CityHop).

These vehicles will also need to be managed throughout the neighbourhood centres.

## 13 CONSTRUCTION TRAFFIC

The development site is currently unoccupied for the most part. To facilitate construction, access will be established on Cosgrave Road to accommodate truck movements to and from the development.

As is typical with a development of this scale, it is recommended that a Construction Traffic Management Plan (CTMP) should be required as a condition. It is considered that this Construction Traffic Management Plan should include:

- Construction dates and hours of operation including any specific non-working hours for traffic congestion/noise etc, aligned with normally accepted construction hours in the Auckland Region;
- Truck route diagrams between the site and external road network;
- Temporary traffic management signage/details for both pedestrians and vehicles, to manage the interaction of these road users with heavy construction traffic;
- Details of site access/egress over the entire construction period and any limitations on truck movements. All egress points should be positioned to achieve appropriate sight distances; and
- Application for Traffic Management Plan approval and Corridor Access Request to Auckland Transport.

Based on previous experience the implementation of an appropriate CTMP will ensure that construction activities of this scale can be managed to ensure any generated traffic effects are appropriately mitigated.

## 14 IMPLEMENTATION PLAN

As stated previously in this assessment, there are a number of roading, and infrastructure projects programmed for the area. Several projects are directly relevant to the development site, and these are therefore included in the Implementation Plan summarised in Table 14-1 below.

**Table 14-1: Implementation Plan**

| Project | Responsibility | Upgrade | Trigger / timing |
|---|---|---|---|
| **Intersection upgrade – Cosgrave Road / Walters Road / Hamlin Road (Road 6)** | Developer / Auckland Transport | Traffic Signals | After first 50 dwellings within the development site.<br>To be completed as part of the Stage 1 works, noting that the intersection upgrade relates just to the signalisation of the intersection and not the construction of the entire 'realigned Hamlin Road'. |
| **New/Upgrade Intersection – Cosgrave Road / Clevedon Road / Papakura-Clevedon Road** | Developer / Auckland Transport | New signalised intersection and bypass lane on Clevedon Road. | Required prior to any dwellings are occupied as currently operates below industry accepted thresholds.<br>To be completed as part of the Staged works which occurs following the completion of Stage 1. |
| **Intersection upgrade – Okawa Ave / Clevedon Rd / Dominion Rd / Papakura-Clevedon Rd** | Developer / Auckland Transport | Traffic signals | Dependant on exact staging. Likely needed early in development of the development site due to existing capacity issues.<br>To be completed as part of the Stage 4 works. |
| **New/Upgrade Intersection – Cosgrave Road / Road 4** | Developer | Traffic signals for the two roads on Cosgrave Road, a priority-controlled intersection is anticipated on Old Wairoa Road | Required prior to any dwellings accessed via the respective roads are occupied.<br>To be completed as part of the Stage 2 works. |
| **New/Upgrade Intersection – Cosgrave Road / Road 2 / Bellbird Street** | Developer | New signalised intersection with bypass lane on Cosgrave Road (north). | Dependant on exact staging. Likely needed early in development of the development site due to existing capacity issues.<br>To be completed as part of the Stage 1 works. |
| **Intersection Upgrade – Airfield Road / Mill Road** | Developer | Traffic signals. | Dependant on exact staging. Likely needed when development occurs with access to Airfield Road.<br>To be completed as part of either the Stage 18 works or Stage 19 works, whatever occurs first. |
| **New/Upgrade Intersection – Airfield Road / Road 1** | Developer | New priority-controlled intersection. | Access to Airfield Road<br>To be completed as part of the Stage 19 works. |

| Project | Responsibility | Upgrade | Trigger / timing |
|---|---|---|---|
| **New/Upgrade Intersection – Airfield Road / Road 7** | Developer | New priority-controlled intersection. | Access to Airfield Road.<br>To be completed as part of the Stage 18 works. |
| **New/Upgrade Intersection – Pakaraka Drive / Old Wairoa Road / Road 1** | Developer | New signalised intersection and approach lane on Old Wairoa Road. | Link to Old Wairoa Road.<br>To be completed as part of the Stage 4 works. |
| **Pedestrian link** | Developer | Upgrade Old Wairoa Road (northern side frontage of development site) to include a pedestrian footpath adjacent to the development area. | Required with any development accessed off Old Wairoa Road.<br>To be completed as part of the Stage 3 works to Road 1 and balance as part of Stage 4 works. |
| **Pedestrian and cycling links** | Developer / Auckland Transport | Connect the development site to key local destinations by providing improved active mode facilities on Cosgrave Road between Walters Road and Clevedon Road. | Required with any development of the development site.<br>To be completed as part of the Stage 2 works. |
| **Public transport** | Recommend that this be a joint venture between Auckland Transport and the Developer | A frequent service is required between the development site and Papakura Town Centre. The wider area would benefit by this service being a public bus, which is why a joint venture is recommended. | Difficult to implement straight away (no demand). Likely warranted at 300-500 dwellings. However interim bus / shuttle service should be considered early / during initial stages of development.<br>To be implemented at the conclusion of the Stage 3 works. At this point there would be 890 lots completed and assuming 50% are occupied, this would be 445 dwellings. |
| **New street network through the development site** | Developer | As the development site develops the internal road network will be required. Pedestrian / cycling provisions to be included on collector roads as per Figure 4-1. | Any site with frontage to a new street.<br>To be completed as part of the works for the respective staging plan. |

It is recommended that the above table be incorporated within the provisions that specify what the structural elements of the internal roads are to include (such as public transport provision, separated cycle facilities, parking).

## 15 CONCLUSION

Sunfield Developments Limited is proposing to development the Sunfield Masterplanned Community. Sunfield is designed to be a 15-minute sustainable neighbourhood to

provide residents access to most, if not all, resident needs within a short walk or bike ride from their home, including schooling, employment, medical services, restaurants and bars, recreational spaces, retail, and food supplies. Sunfield is designed on eight core principles, with the most fundamental principle being to enable 'Car-less living'.

Critical to this are;

- Significant limitations in the number of cars on the site (generally 10% of a more standard development);
- Provision of frequent and privately funded public transport system linking both internally within the site and the wider network (including town centres and major train stations);
- Encouraging active transport modes through reduction in car ownership.
- The creation and introduction of a Traffic Plan across the employment zone.
- Implementation of the requirement for 75% of the movements relating to the warehouse distribution operation to be confined to off-peak only (being the hours outside of Monday to Friday 7-9am and 4-6pm)

It is anticipated that any future development, would provide the transport network upgrades described in this assessment.

It is recognised that this development is essentially a first for New Zealand. As a result, it is considered that carefully monitoring of initial stages of the development is needed to ensure the measures proposed have the desired result of significantly reducing private car travel (both internal and externally).

# APPENDIX A: MODE SHARE ANALYSIS

**SUNFIELD MODE SPLIT ANALYSIS**

| RESIDENTIAL | | | EXTERNAL TRAFFIC | | |
|---|---|---|---|---|---|
| Mode Splits | | | Those To / From Sunfield | | |
| | | Movement | % Internal | Internal | External |
| Public Transport | 60% | 1891 | 50% | 945 | 945 |
| Walk | 15% | 473 | 80% | 378 | 95 |
| Cycle | 5% | 158 | 70% | 110 | 47 |
| Carshare | 0% | 0 | 20% | 0 | 0 |
| Private Vehicle (including ride-sha | 20% | 630 | 20% | 126 | 504 |
| | 100% | 3151 | | 1560 | 1591 |
| | | | | | |
| Dwellings | 4000 | | | | |
| Occupancy | 3.2 | | | | |
| Trips During Peak Hour | 25% | | | | |
| Total Trips | 3151 | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Census Data | | | | | |
| Auckland | | | | | |
| Occupied Dwellings | 498789 | | | | |
| Aucklnd Population | 1571718 | | | | |
| Average Occupancy | 3.2 | | | | |

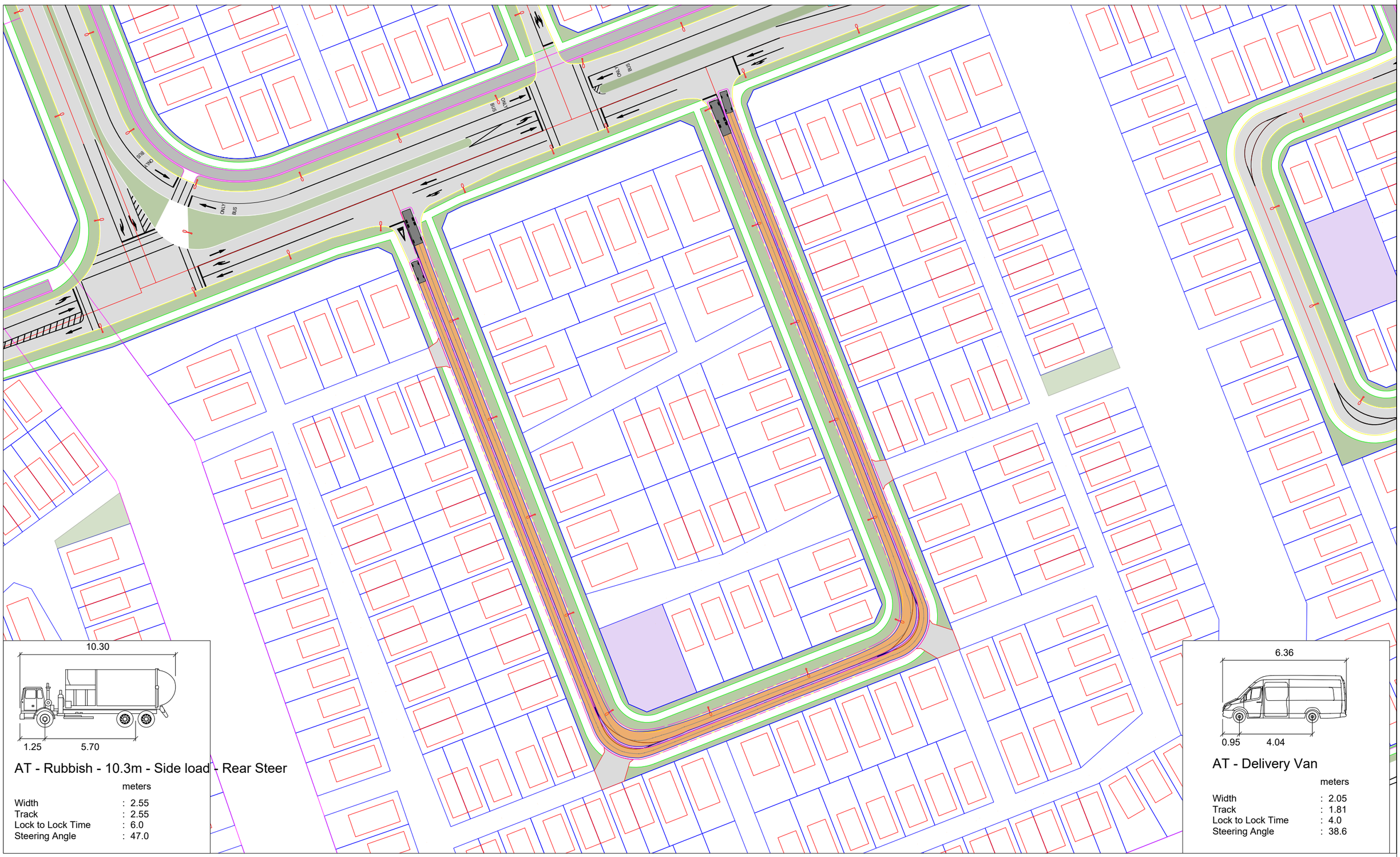
| EMPLOYMENT | | 45725 | office | 914.5 |
|---|---|---|---|---|
| | | 280885 | ind / man | 2107 |
| Mode | | | | 3021 |
| Public Transport | 60% | 1813 | | |
| Walk | 15% | 453 | | |
| Cycle | 5% | 151 | | |
| Carshare | 2% | 60 | | |
| Private Vehicle (inc rides | 18% | 544 | | |
| | 100% | **3021** | | |

| MEDICAL | | 7610 | medical | 669.68 |
|---|---|---|---|---|
| | | | | |
| Mode | | | | 670 |
| Public Transport | 60% | 402 | | |
| Walk | 15% | 100 | | |
| Cycle | 5% | 33 | | |
| Carshare | 2% | 13 | | |
| Private Vehicle (including | 18% | 121 | | |
| | 100% | **670** | | |

TOTAL

| | PEOPLE | | | | VEHICLES | | | PEOPLE PER VEHICLE | |
|---|---|---|---|---|---|---|---|---|---|
| | TOTAL | | Internal | External | Total | Internal | External | | EXTERNAL VEHICLES |
| Public Transport | 4105 | | 945 | 3160 | 103 | 103 | 103 | 40 | 103 |
| Walk | 1026 | | 378 | 648 | 1026 | 378 | 648 | 1 | 0 |
| Cycle | 342 | | 110 | 232 | 342 | 110 | 232 | 1 | 0 |
| Carshare | 74 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Private Vehicle (including rideshare | 1295 | | 126 | 1169 | 1079 | 105 | 974 | 1.2 | 1169 |
| | **6,842** | | **1,560** | **5,208** | **2,550** | **696** | **1,956** | | 1271 |

# APPENDIX B VEHICLE TRACKING







AT - Rubbish - 10.3m - Side load - Rear Steer

| | meters |
|---|---|
| Width | : 2.55 |
| Track | : 2.55 |
| Lock to Lock Time | : 6.0 |
| Steering Angle | : 47.0 |




AT - Delivery Van

| | meters |
|---|---|
| Width | : 2.05 |
| Track | : 1.81 |
| Lock to Lock Time | : 4.0 |
| Steering Angle | : 38.6 |

**Revision notes:**

| Rev: | Date: | Notes: |
|---|---|---|
| | | |

**Drawn by:** IS
J002635

**Client:**

**Project:** SUNFIELD MASTERPLANNED COMMUNITY

**Drawing Title:** VEHICLE TRACKING ASSESSMENT
MIDBLOCK - LOCAL ROAD 14

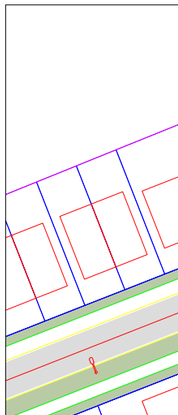
**Date:** FEBRUARY 2025

**Scale @ A3:** 1:1000

**Revision:** A

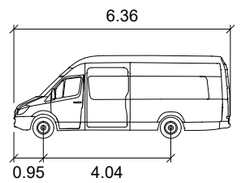
commute TRANSPORTATION CONSULTANTS

**Figure:** A1




AT - Rubbish - 10.3m - Side load - Rear Steer

| | meters |
|---|---|
| Width | : 2.55 |
| Track | : 2.55 |
| Lock to Lock Time | : 6.0 |
| Steering Angle | : 47.0 |




AT - Delivery Van

| | meters |
|---|---|
| Width | : 2.05 |
| Track | : 1.81 |
| Lock to Lock Time | : 4.0 |
| Steering Angle | : 38.6 |

**Revision notes:**

| Rev: | Date: | Notes: |
|---|---|---|
| | | |

**Drawn by:** IS
J002635

**Client:**

**Project:** SUNFIELD MASTERPLANNED COMMUNITY

**Drawing Title:** VEHICLE TRACKING ASSESSMENT
MIDBLOCK - LOCAL ROAD 13

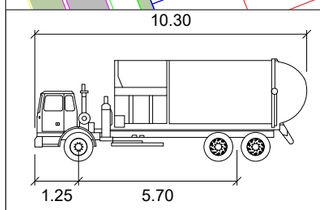
**Date:** FEBRUARY 2025

**Scale @ A3:** 1:1000

**Revision:** A

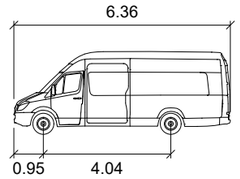
commute TRANSPORTATION CONSULTANTS

**Figure:** A2




AT - Rubbish - 10.3m - Side load - Rear Steer

| | meters |
|---|---|
| Width | : 2.55 |
| Track | : 2.55 |
| Lock to Lock Time | : 6.0 |
| Steering Angle | : 47.0 |




AT - Delivery Van

| | meters |
|---|---|
| Width | : 2.05 |
| Track | : 1.81 |
| Lock to Lock Time | : 4.0 |
| Steering Angle | : 38.6 |

**Revision notes:**

| Rev: | Date: | Notes: |
|---|---|---|

**Drawn by:** IS
J002635

**Client:**

**Project:** SUNFIELD MASTERPLANNED COMMUNITY

**Drawing Title:** VEHICLE TRACKING ASSESSMENT
MIDBLOCK - LOCAL ROAD 11

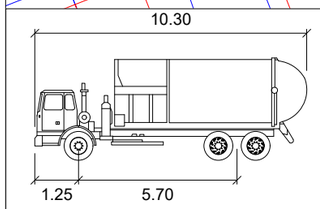
**Date:** FEBRUARY 2025

**Scale @ A3:** 1:500

**Revision:** A

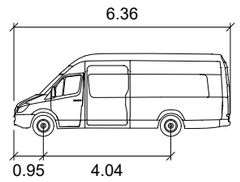
commute TRANSPORTATION CONSULTANTS

**Figure:** A3




AT - Rubbish - 10.3m - Side load - Rear Steer

| | meters |
|---|---|
| Width | : 2.55 |
| Track | : 2.55 |
| Lock to Lock Time | : 6.0 |
| Steering Angle | : 47.0 |




AT - Delivery Van

| | meters |
|---|---|
| Width | : 2.05 |
| Track | : 1.81 |
| Lock to Lock Time | : 4.0 |
| Steering Angle | : 38.6 |

**Revision notes:**

| Rev: | Date: | Notes: |
|---|---|---|
| | | |

**Drawn by:**
IS
J002635

**Client:**

**Project:**
SUNFIELD MASTERPLANNED COMMUNITY

**Drawing Title:**
VEHICLE TRACKING ASSESSMENT
MIDBLOCK - LOCAL ROAD 27

**Date:**
FEBRUARY 2025

**Scale @ A3:**
1:500

**Revision:**
A

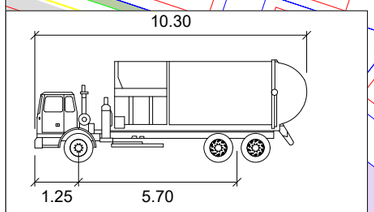
commute
TRANSPORTATION CONSULTANTS

**Figure:**
A4

BUS STOP

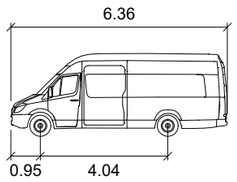
BUS STOP

BUS STOP




AT - Rubbish - 10.3m - Side load - Rear Steer

| | meters |
|---|---|
| Width | : 2.55 |
| Track | : 2.55 |
| Lock to Lock Time | : 6.0 |
| Steering Angle | : 47.0 |




AT - Delivery Van

| | meters |
|---|---|
| Width | : 2.05 |
| Track | : 1.81 |
| Lock to Lock Time | : 4.0 |
| Steering Angle | : 38.6 |

**Revision notes:**

| Rev: | Date: | Notes: |
|---|---|---|
| | | |

**Drawn by:** IS
J002635

**Client:**

**Project:** SUNFIELD MASTERPLANNED COMMUNITY

**Drawing Title:** VEHICLE TRACKING ASSESSMENT
MIDBLOCK - LOCAL ROAD 27

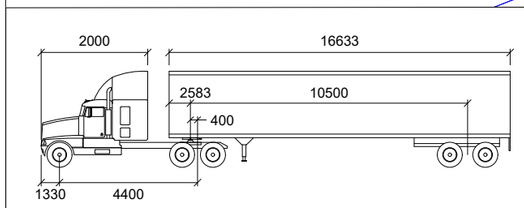
**Date:** FEBRUARY 2025

**Scale @ A3:** 1:1000

**Revision:** A

commute TRANSPORTATION CONSULTANTS

**Figure:** A5




AT HPMV 19.45 Semi

mm

| | | | |
|---|---|---|---|
| Tractor Width | : 2500 | Lock to Lock Time | : 6.0 |
| Trailer Width | : 2500 | Steering Angle | : 24.1 |
| Tractor Track | : 2500 | Articulating Angle | : 70.0 |
| Trailer Track | : 2500 | | |

**Revision notes:**

| Rev: | Date: | Notes: |
|---|---|---|
| | | |

**Drawn by:**
IS
J002635

**Client:**

**Project:**
SUNFIELD MASTERPLANNED COMMUNITY

**Drawing Title:**
VEHICLE TRACKING ASSESSMENT
MIDBLOCK & INTERSECTION - INDUSTRIAL CUL-DE-SAC

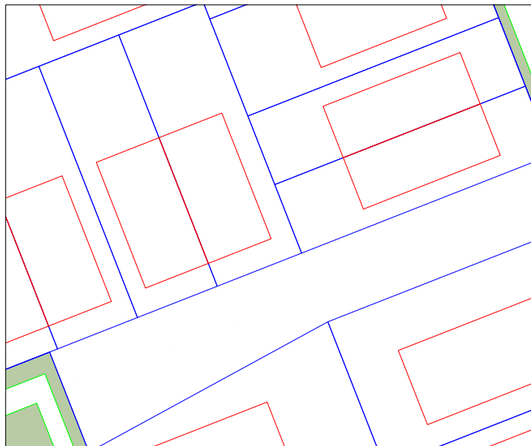
**Date:**
FEBRUARY 2025

**Scale @ A3:**
1:500

**Revision:**
A

commute TRANSPORTATION CONSULTANTS

**Figure:**
B1




AT HPMV 19.45 Semi

mm

| | | | |
|---|---|---|---|
| Tractor Width | : 2500 | Lock to Lock Time | : 6.0 |
| Trailer Width | : 2500 | Steering Angle | : 24.1 |
| Tractor Track | : 2500 | Articulating Angle | : 70.0 |
| Trailer Track | : 2500 | | |

**Revision notes:**

| Rev: | Date: | Notes: |
|---|---|---|
| | | |

**Drawn by:**
IS
J002635

**Client:**

**Project:**
SUNFIELD MASTERPLANNED COMMUNITY

**Drawing Title:**
VEHICLE TRACKING ASSESSMENT
MIDBLOCK - INDUSTRIAL ROAD 1

**Date:**
FEBRUARY 2025

**Scale @ A3:**
1:500

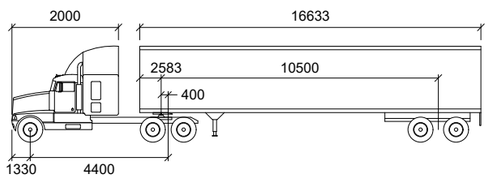
**Revision:**
A

commute TRANSPORTATION CONSULTANTS

**Figure:**
B2

ONLY
BUS

BUS
ONLY




AT HPMV 19.45 Semi

mm

| | | | |
|---|---|---|---|
| Tractor Width | : 2500 | Lock to Lock Time | : 6.0 |
| Trailer Width | : 2500 | Steering Angle | : 24.1 |
| Tractor Track | : 2500 | Articulating Angle | : 70.0 |
| Trailer Track | : 2500 | | |

**Revision notes:**

| Rev: | Date: | Notes: |
|---|---|---|
| | | |

**Drawn by:**
IS
J002635

**Client:**

**Project:**
SUNFIELD MASTERPLANNED COMMUNITY

**Drawing Title:**
VEHICLE TRACKING ASSESSMENT
INTERSECTION - INDUSTRIAL ROAD 1 / ROAD 6

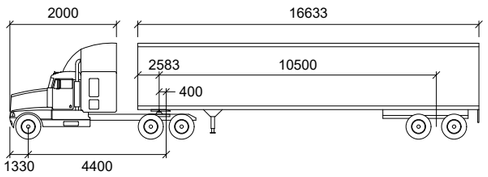
**Date:**
FEBRUARY 2025

**Scale @ A3:**
1:400

**Revision:**
A

commute
TRANSPORTATION CONSULTANTS

**Figure:**
B3




AT HPMV 19.45 Semi

mm

| | | | |
|---|---|---|---|
| Tractor Width | : 2500 | Lock to Lock Time | : 6.0 |
| Trailer Width | : 2500 | Steering Angle | : 24.1 |
| Tractor Track | : 2500 | Articulating Angle | : 70.0 |
| Trailer Track | : 2500 | | |

**Revision notes:**

| Rev: | Date: | Notes: |
|---|---|---|
| | | |

**Drawn by:**
IS
J002635

**Client:**

**Project:**
SUNFIELD MASTERPLANNED COMMUNITY

**Drawing Title:**
VEHICLE TRACKING ASSESSMENT
INTERSECTION - INDUSTRIAL ROAD 1 / ROAD 7

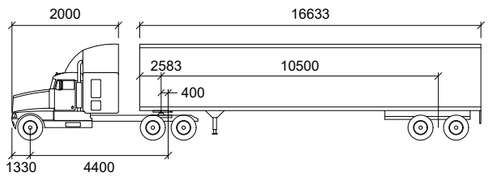
**Date:**
FEBRUARY 2025

**Scale @ A3:**
1:400

**Revision:**
A

commute TRANSPORTATION CONSULTANTS

**Figure:**
B4




AT HPMV 19.45 Semi

mm

| | | | |
|---|---|---|---|
| Tractor Width | : 2500 | Lock to Lock Time | : 6.0 |
| Trailer Width | : 2500 | Steering Angle | : 24.1 |
| Tractor Track | : 2500 | Articulating Angle | : 70.0 |
| Trailer Track | : 2500 | | |

**Revision notes:**

| Rev: | Date: | Notes: |
|---|---|---|
| | | |

**Drawn by:**
IS
J002635

**Client:**

**Project:**
SUNFIELD MASTERPLANNED COMMUNITY

**Drawing Title:**
VEHICLE TRACKING ASSESSMENT
INTERSECTION - INDUSTRIAL ROAD 1 / ROAD 7

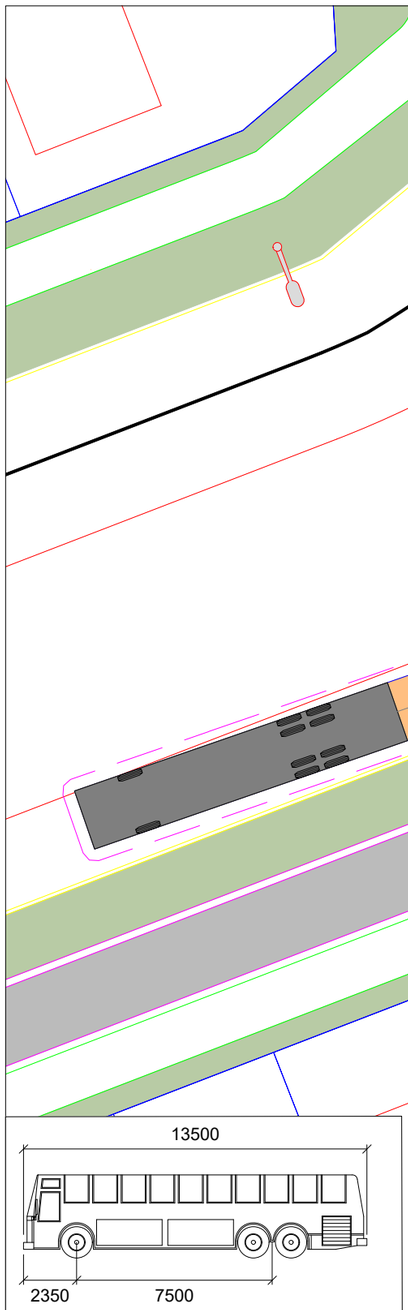
**Date:**
FEBRUARY 2025

**Scale @ A3:**
1:400

**Revision:**
A

commute TRANSPORTATION CONSULTANTS

**Figure:**
B5




AT BUS 13.5m

| | | mm |
|---|---|---|
| Width | : | 2500 |
| Track | : | 2500 |
| Lock to Lock Time | : | 6.0 |
| Steering Angle | : | 49.3 |

**Revision notes:**

| Rev: | Date: | Notes: |
|---|---|---|
| | | |

**Drawn by:**
IS
J002635

**Client:**

**Project:**
SUNFIELD MASTERPLANNED COMMUNITY

**Drawing Title:**
VEHICLE TRACKING ASSESSMENT
BUS LANE - ROAD 1 / ROAD 5

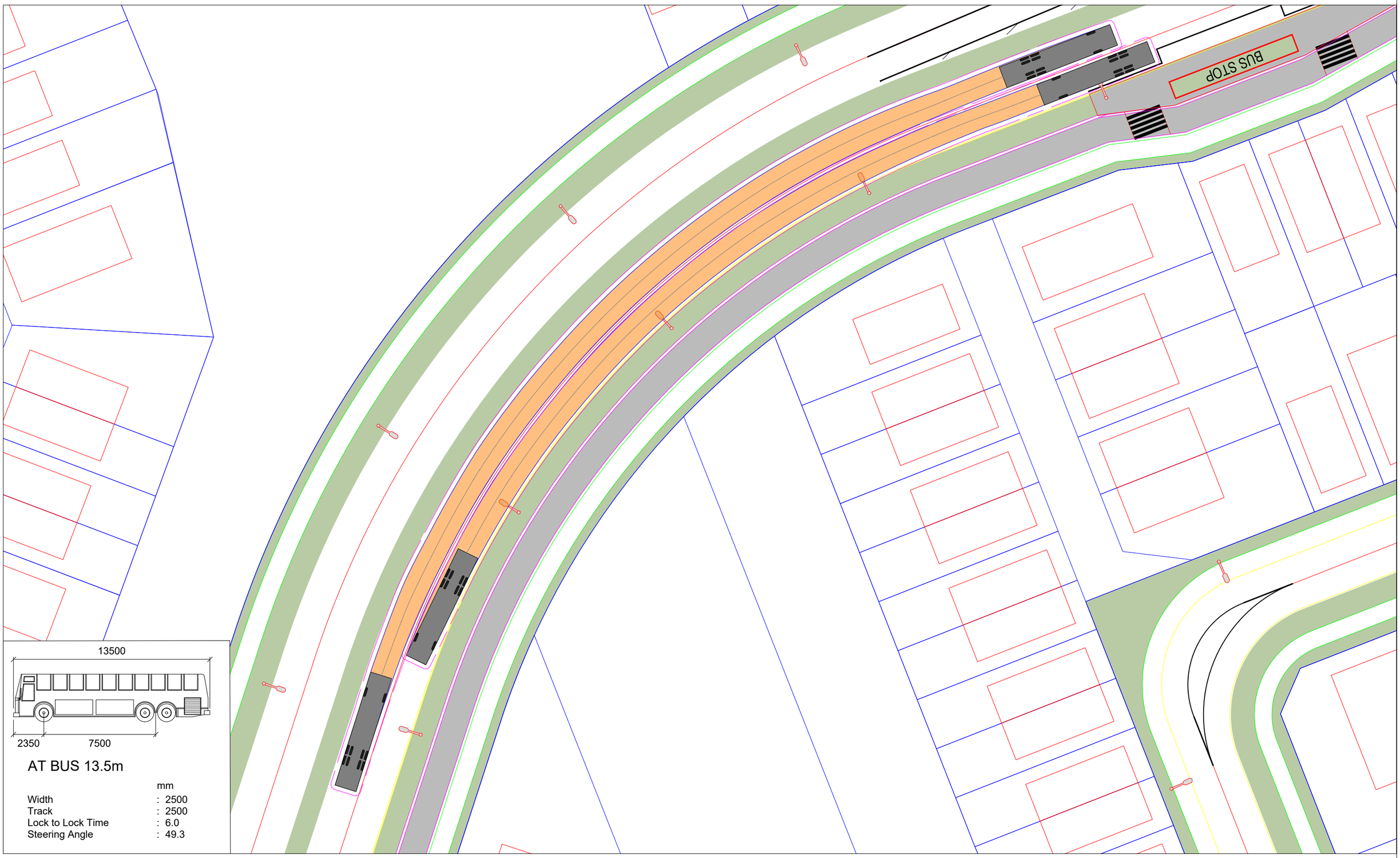
**Date:**
FEBRUARY 2025

**Scale @ A3:**
1:250

**Revision:**
A

commute
TRANSPORTATION CONSULTANTS

**Figure:**
C1







AT BUS 13.5m

| | mm |
|---|---|
| Width | : 2500 |
| Track | : 2500 |
| Lock to Lock Time | : 6.0 |
| Steering Angle | : 49.3 |

**Revision notes:**

| Rev: | Date: | Notes: |
|---|---|---|
| | | |

**Drawn by:** IS
J002635

**Client:**

**Project:** SUNFIELD MASTERPLANNED COMMUNITY

**Drawing Title:** VEHICLE TRACKING ASSESSMENT
BUS LANE - ROAD 5

**Date:** FEBRUARY 2025

**Scale @ A3:** 1:400

**Revision:** A

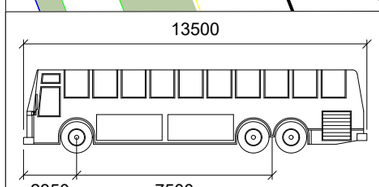
commute TRANSPORTATION CONSULTANTS

**Figure:** C2

BUS ONLY

BUS ONLY

13500



2350 7500

AT BUS 13.5m

| | mm |
|---|---|
| Width | : 2500 |
| Track | : 2500 |
| Lock to Lock Time | : 6.0 |
| Steering Angle | : 49.3 |

**Revision notes:**

| Rev: | Date: | Notes: |
|---|---|---|
| | | |

**Drawn by:**
IS
J002635

**Client:**

**Project:**
SUNFIELD MASTERPLANNED COMMUNITY

**Drawing Title:**
VEHICLE TRACKING ASSESSMENT
BUS INTERSECTION - ROAD 3 / ROAD 12

**Date:**
FEBRUARY 2025

**Scale @ A3:**
1:250

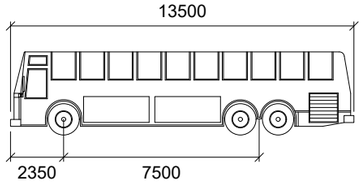
**Revision:**
A

commute TRANSPORTATION CONSULTANTS

**Figure:**
C3

BUS STOP

13500



2350 7500

AT BUS 13.5m

| | | mm |
|---|---|---|
| Width | : | 2500 |
| Track | : | 2500 |
| Lock to Lock Time | : | 6.0 |
| Steering Angle | : | 49.3 |

**Revision notes:**

| Rev: | Date: | Notes: |
|---|---|---|
| | | |

**Drawn by:**
IS
J002635

**Client:**

**Project:**
SUNFIELD MASTERPLANNED COMMUNITY

**Drawing Title:**
VEHICLE TRACKING ASSESSMENT
BUS INTERSECTION - ROAD 1 / ROAD 12

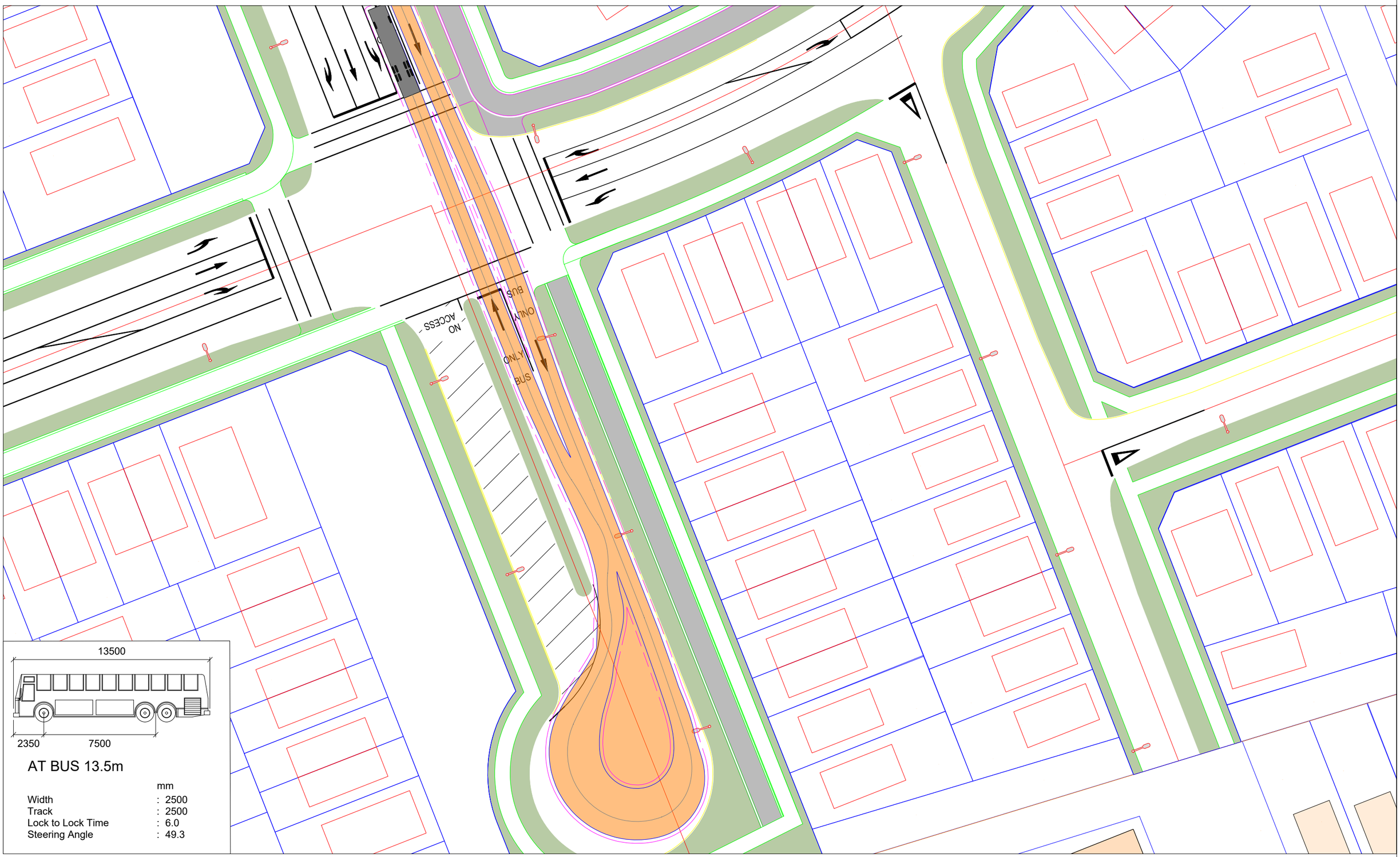
**Date:**
FEBRUARY 2025

**Scale @ A3:**
1:500

**Revision:**
A

commute TRANSPORTATION CONSULTANTS

**Figure:**
C4







AT BUS 13.5m

| | mm |
|---|---|
| Width | : 2500 |
| Track | : 2500 |
| Lock to Lock Time | : 6.0 |
| Steering Angle | : 49.3 |

**Revision notes:**

| Rev: | Date: | Notes: |
|---|---|---|
| | | |

**Drawn by:**
IS
J002635

**Client:**

**Project:**
SUNFIELD MASTERPLANNED COMMUNITY

**Drawing Title:**
VEHICLE TRACKING ASSESSMENT
BUS INTERSECTION - ROAD 1 / ROAD 6

**Date:**
FEBRUARY 2025

**Scale @ A3:**
1:500

**Revision:**
A

commute TRANSPORTATION CONSULTANTS

**Figure:**
C5