I hereby give notice that a hearing by commissioners will be held on:

| | |
|---|---|
| **Date:** | **Monday 18 to Friday 22 November 2024** |
| **Time:** | **9.30am** |
| **Meeting room:** | **TBA** |
| **Venue:** | **Level TBA, Auckland Town Hall**<br>**301/317 Queen Street, Auckland** |

# PRIVATE PLAN CHANGE 94

# APPLICATION MATERIAL VOLUME 2

# WAIRAKA PRECINCT IN CARRINGTON ROAD, MT ALBERT

# MINISTRY OF HOUSING AND URBAN DEVELOPMENT – HANNAH MCGREGOR

**COMMISSIONERS**

| | |
|---|---|
| **Chairperson** | **Greg Hill (Chairperson)** |
| **Commissioners** | **Gavin Lister** |
| | **Councillor Chris Darby** |
| | **Vicki Morrison-Shaw** |


**Chayla Walker**
**KAITOHUTOHU WHAKAWĀTANGA**
**HEARINGS ADVISOR**
Telephone: 09 890 2009 or 027 231 5937
Email: chayla.walker@aucklandcouncil.govt.nz
Website: www.aucklandcouncil.govt.nz


**Note:** The reports contained within this document are for consideration and should not be construed as a decision of Council. Should commissioners require further information relating to any reports, please contact the hearings advisor.

## WHAT HAPPENS AT A HEARING

**Te Reo Māori and Sign Language Interpretation**
Any party intending to give evidence in Māori or NZ sign language should advise the hearings advisor at least ten working days before the hearing so a qualified interpreter can be arranged.

**Hearing Schedule**
If you would like to appear at the hearing please return the appearance form to the hearings advisor by the date requested. A schedule will be prepared approximately one week before the hearing with speaking slots for those who have returned the appearance form. If changes need to be made to the schedule the hearings advisor will advise you of the changes.
Please note: during the course of the hearing changing circumstances may mean the proposed schedule may run ahead or behind time.

**Cross Examination**
No cross examination by the applicant or submitters is allowed at the hearing. Only the hearing commissioners are able to ask questions of the applicant or submitters. Attendees may suggest questions to the commissioners and they will decide whether or not to ask them.

**The Hearing Procedure**
The usual hearing procedure is:

- **The chairperson** will introduce the commissioners and will briefly outline the hearing procedure. The Chairperson may then call upon the parties present to introduce themselves. The Chairperson is addressed as Madam Chair or Mr Chairman.
- **The applicant** will be called upon to present their case. The applicant may be represented by legal counsel or consultants and may call witnesses in support of the application. After the applicant has presented their case, members of the hearing panel may ask questions to clarify the information presented.
- **Submitters** (for and against the application) are then called upon to speak. Submitters' active participation in the hearing process is completed after the presentation of their evidence so ensure you tell the hearing panel everything you want them to know during your presentation time. Submitters may be represented by legal counsel or consultants and may call witnesses on their behalf. The hearing panel may then question each speaker.
  - Late submissions: The council officer's report will identify submissions received outside of the submission period. At the hearing, late submitters may be asked to address the panel on why their submission should be accepted. Late submitters can speak only if the hearing panel accepts the late submission.
  - Should you wish to present written evidence in support of your submission please ensure you provide the number of copies indicated in the notification letter.
- **Council Officers** will then have the opportunity to clarify their position and provide any comments based on what they have heard at the hearing.
- The applicant or their representative has the right to summarise the application and reply to matters raised by submitters. Hearing panel members may further question the applicant at this stage. The applicants reply may be provided in writing after the hearing has adjourned.
- **The chair** will outline the next steps in the process and adjourn or close the hearing.
- If adjourned the hearing panel will decide when they have enough information to make a decision and close the hearing. The hearings advisor will contact you once the hearing is closed.

**Please note**
- that the hearing will be audio recorded and this will be publicly available after the hearing
- catering is not provided at the hearing.

## A NOTIFIED PRIVATE PLAN CHANGE TO THE AUCKLAND UNITARY PLAN BY MINISTRY OF HOUSING AND URBAN DEVELOPMENT – HANNAH MCGREGOR

# Te Auaunga Precinct

# Plan Change - Infrastructure Report

[IN-CONFIDENCE:RELEASE EXTERNAL]

# Te Auaunga Precinct - Plan Change Infrastructure Report

Prepared for:

## Ministry of Housing and Urban Development (HUD)

Prepared by:

**mps limited**

29 Chamberlain Street

Grey Lynn, Auckland 1021

| | |
|---|---|
| *Originator:* | Phil Jaggard |
| *Reviewed by:* | Simon Matthews |
| *Client Contact* | Hannah McGregor |
| *Revision* | 1 |
| *Status* | Final |
| *Date* | 20 December 2022 |

# EXECUTIVE SUMMARY

This Infrastructure Plan has been prepared for the Crown (HUD) to support a private plan change application to rezone land within the current Wairaka Precinct, and to amend the existing provisions within the Precinct including a request to rename the precinct "Te Auaunga". The private plan change includes the rezoning of 122,329m2 of Special Purpose – Tertiary Education zoned land and 10,093m2 of Terraced Housing and Apartment Buildings zoned land to Business – Mixed Use and 9,898m2 of Special Purpose – Tertiary Education zoned land to Mixed Housing Urban.

This Precinct is the largest contiguous "brownfields" development site on the Isthmus. It is a critical part of the Council's growth management strategy, including its aspiration to create a quality compact city, and a real opportunity to provide a significant number of new homes in close proximity to a town centre on high frequency public transport routes and within 8km of the city centre.

The Crown supports the Council's aspirations to increase the amount of development with ready access to employment, public transport and services and is facilitating the development project, including through repurposing land formerly owned by Unitec, and partnering with the Rōpū who will develop the land for housing.

This Infrastructure Report provides information to inform the plan change process by confirming that infrastructure can be provided to service the proposed development of the Precinct. From an infrastructure perspective, there is no reason why the proposed plan change application cannot proceed, as the Precinct can be serviced for water, wastewater, stormwater, power, and telecommunications.

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## Tables



## Figures

# 1. INTRODUCTION

## 1.1 Purpose of this Report

The purpose of this report is to assess the engineering and infrastructure aspects associated with the private Plan Change of the Wairaka (Te Auaunga) Precinct. This report provides information with respect to the existing infrastructure located within the Precinct and identifies the proposed infrastructure upgrades and interfaces relating to the proposed development across the Te Auaunga Precinct. Figure 1 and Figure 2, show the land proposed to be rezoned and the proposed height zones for the Precinct.

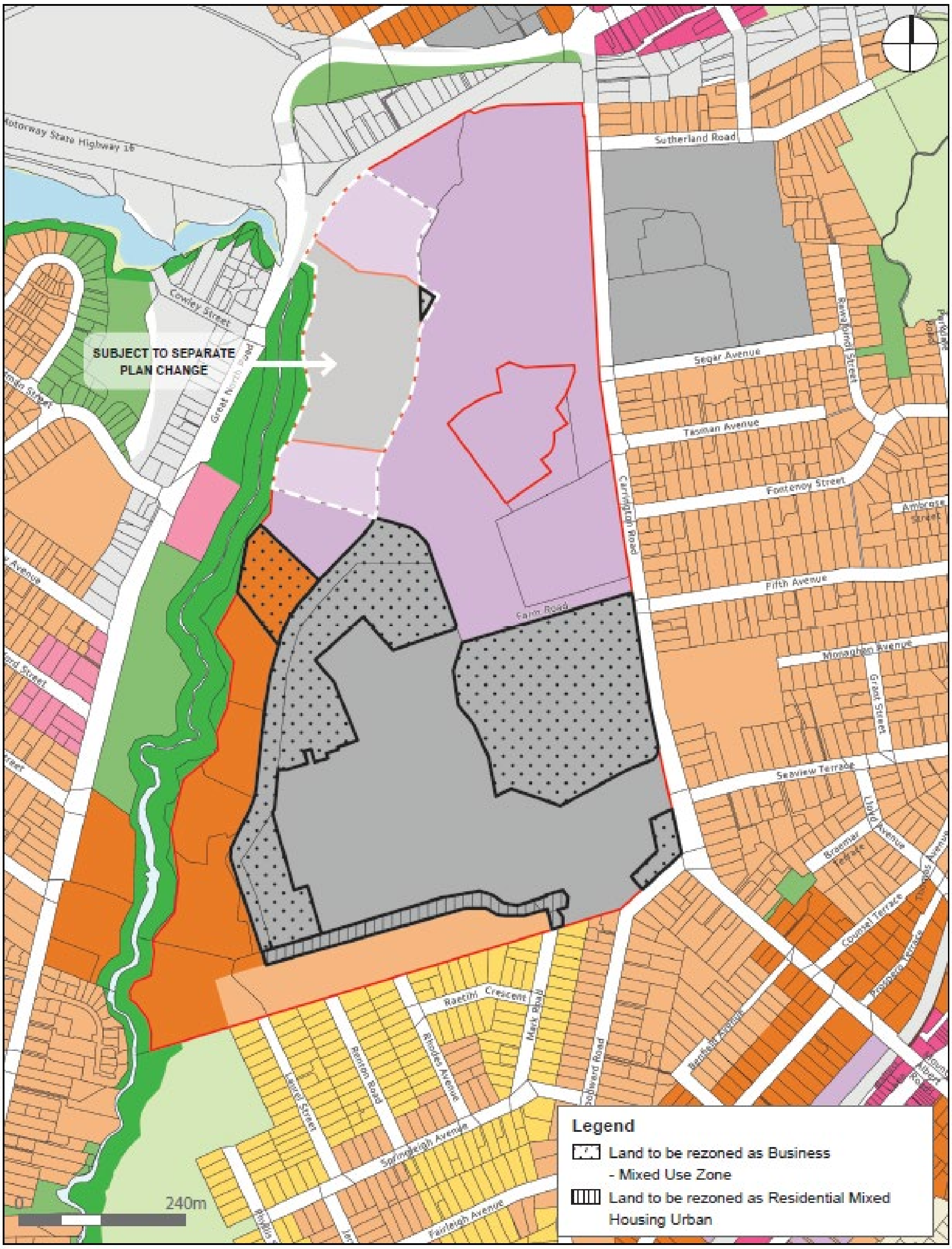


**Figure 1 Land to be rezoned**

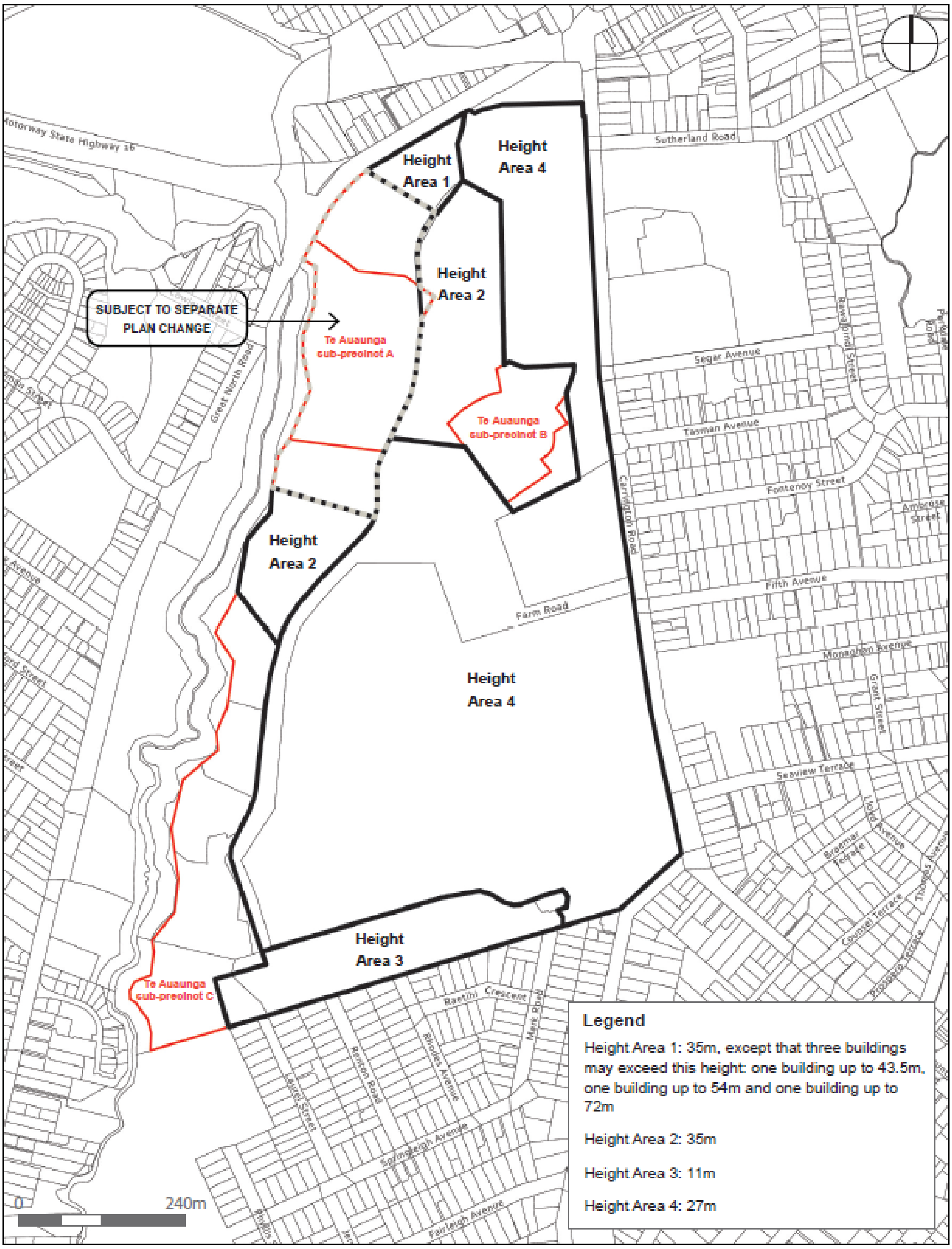


**Figure 2 Proposed Height Zones**

This Infrastructure Plan has been prepared for the Crown (HUD) to support its private plan change application to rezone land within the current Wairaka Precinct, and to amend the existing provisions within the Precinct. The private plan change includes the rezoning of 122,329m$^2$ of Special Purpose – Tertiary Education zoned land and 10,093m$^2$ of Terraced Housing and Apartment Buildings zoned land to Business – Mixed Use and 9,898m$^2$ of Special Purpose –

Tertiary Education zoned land to Mixed Housing Urban. From an infrastructure perspective, it is only the rezoned land and additional height that will influence infrastructure requirements beyond those already assessed and confirmed for the existing Precinct.

The existing Wairaka Precinct covers a 64.5ha block of land bounded by Carrington Road, the North Western Motorway, Te Auaunga (Oakley Creek) and a series of side roads and properties in the Woodward Road corridor in the south. The boundaries of the Precinct are not changed through this plan change application.

The core thrust of the Wairaka Precinct is to facilitate an integrated community consistent with the Council's urban consolidation policies including its aspiration to create a quality compact city. It will provide for growth, jobs, education and associated recreational facilities to the benefit of all residents that will live within the Precinct as well as complement the neighbouring communities of Mt Albert, Pt Chevalier, and Waterview.

This Precinct is the largest contiguous "brownfields" development site on the Isthmus. It is a real opportunity to provide a significant number of new homes adjacent to a town centre on high frequency public transport routes and within 8km of the city centre.

The Crown supports the Council's aspirations to increase the amount of development with ready access to employment, public transport and services and is facilitating the development project, including through repurposing land formerly owned by Unitec, and partnering with the Rōpū who will develop the land for housing.

## 1.2 Scope

This report focuses on the following key infrastructure components:

- Wastewater
- Stormwater
- Water Supply
- Communications
- Electrical

Infrastructure relating to transport is assessed separately, in the Stantec report.

# 2. PROPOSED DEVELOPMENT YIELD

As part of the analysis for the plan change an assessment of potential yield has been undertaken by Tattico. The yield has been used to determine the water and wastewater demands and the associated sizing of the infrastructure to service the Precinct.

The yield analysis has been built around a series of assumptions as follows:

(a) As is common in suburban high intensity residential developments across the isthmus, the development will include a mix of different housing typologies with a focus in key areas on apartments but also a reasonable proportion of terrace housing.

(b) Land efficiency of 75% is assumed. Normally a 65% land efficiency would be provided except that the block analysis already takes account of the open space network and the spine road.

(c) Site efficiency of 50% is achieved with the other 50% being in outlook areas, private open space, communal open space, access and parking.

(d) Within the building, a terrace house achieves 100% efficiency, and an apartment building 80%. In the apartment building the other 20% is in lobbies, corridors, vertical circulation and plant rooms.

(e) Terrace houses are assumed to be either two level or three level walk-ups, in blocks of six terraces, and with an average width of 7m -9m.

(f) For apartments, it is assumed that all apartments would have a complying balcony and that the average apartment size would be 75m².

(g) The maximum permitted size for a supermarket in the precinct would be constructed with development above.

(h) Other retail would be provided with some residential above.

Overall, the yield analysis undertaken by Tattico, estimates a minimum yield of 4,000 dwellings for the Precinct. However, depending on the mix of terrace to apartment product and the size of apartments, the yield could vary giving a realistic yield of 4,000- to 4,500 dwellings. It is estimated that approximately one third of the dwellings will be studio and one-bedroom apartments with an expected occupancy of 1-2 people per dwelling.

For the infrastructure requirements for the plan change the lower limit of 4,000 dwellings has been assumed but with an average occupancy of 3 people per unit. Given the expected actual lower occupancy rates for studio and one-bedroom apartments, 3 people per unit is unlikely once the development is complete. Therefore, the average occupancy assumption per unit is considered conservative in terms of estimating the future population of the development and associated water supply and wastewater demands, with actual demands more than likely to be lower than those estimated in this report. The yields and population are summarised as set out in Table 1 below.

**Table 1: Plan Change Development Scenario**

| Precinct Area | Yield | Population |
|---|---|---|
| North | 1,650 | 4,950 |
| Centre | 1,650 | 4,950 |
| South | 650 | 2,100 |
| **Total** | **4,000** | **12,000** |

It is noted that under different scenarios, a higher development yield of approximately 6,000 dwellings could be achieved. Higher development yields have been used to design and consent the bulk infrastructure works to service the centre and north of the Precinct to future proof the Precinct at low cost. This approach allows for a “dig once” policy for infrastructure as the bulk infrastructure is being installed prior to development plans being finalised. This allows for internal changes to the location and intensity of dwellings, including as development plans are finalised to develop market suitable housing.

# 3. WASTEWATER SYSTEM

## 3.1 Existing Wastewater System

The existing wastewater system is shown in Figure 3 on the next page. The Precinct is served by an extensive private gravity pipe wastewater network, which ultimately drains either westwards or centrally towards the Watercare owned and operated Orakei Main Trunk Sewer (ORM).

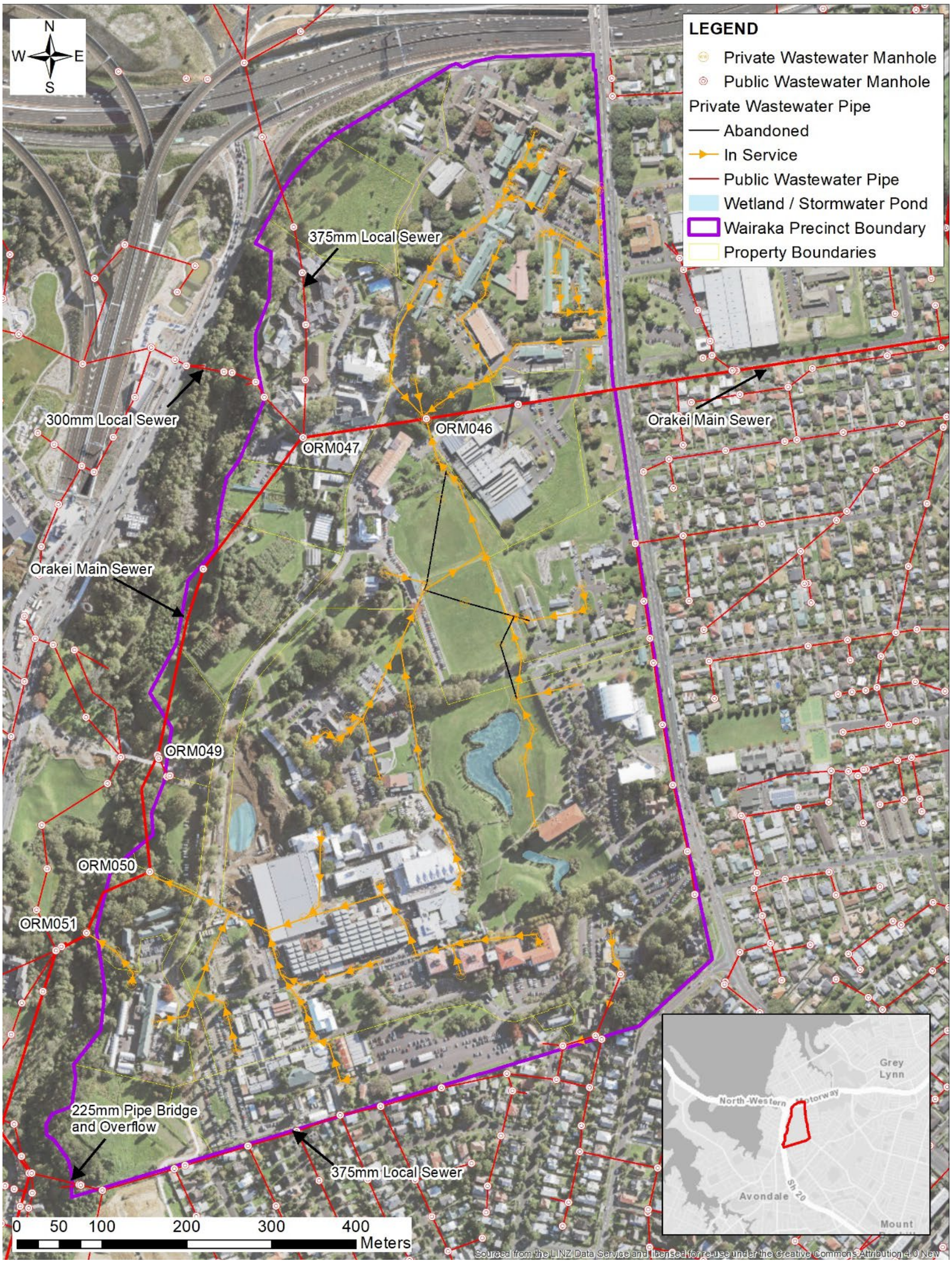


Figure 3 Existing Wastewater System

The ORM passes along the western side of the Precinct, then across the centre of the Precinct draining in an easterly direction. In addition, two Watercare local sewer lines enter the Te Auaunga Precinct from the north, with another local sewer line running parallel to the southern boundary. There are no pump stations or rising mains within or immediately adjacent to the Precinct.

## 3.2 Wastewater Assumptions

The following assumptions have been used in assessing servicing and upgrade requirements for the Precinct.

- A new public network will be constructed and vested to service the proposed development scenario.
- Existing private assets under proposed lots/buildings will be diverted or removed as part of the development works to avoid potential conflicts.
- The existing wastewater network servicing the Unitec campus is sufficiently sized.
- There is a preference for a gravity network and to minimise asset replacements.
- Detailed specific sizing and hydraulic design for the bulk infrastructure to service the centre and north of the Precinct has been adopted.
- Other key infrastructure not included in this area is indicative and sized based upon Watercare's Code of Practice.
- There is a preference to locate new public assets outside development boundaries within road corridors where practical.
- Easement requirements can be accommodated or resolved.
- The Central Interceptor, CC1, CC5 and CC6 trunk sewer upgrades will be completed by Watercare to provide long term trunk capacity to the Central Isthmus that includes the Te Auaunga Precinct. The Central Interceptor is forecasted to be completed by the end of 2026. Watercare has been unable to provide a timeframe at this stage on when CC1, CC5 and CC6 will be complete. However, the Central Interceptor Catchment consents that include CC1, CC5 and CC6 are to achieve compliance with an 80% reduction in the average annual wastewater overflow volume discharged from the Central Interceptor Catchment Network by 2030.
- Wastewater design details and assumptions for the bulk infrastructure to service the centre and north of the Precinct are as provided for in the Carrington Development Backbone Works – Detailed Design Backbone works – Civil Design, Beca (2022) referred to in the enabling works consent (BUN60386270) and the Engineering Plan Approval (EPA) documents submitted and approved under ENG60401889.
- Private wastewater assets within land under the control of either Unitec or Te Whatu Ora – Health New Zealand will continue to be serviced by the existing wastewater pipes and they will undertake any upgrades required to service their sites.

## 3.3 Proposed Key Wastewater Upgrades

### 3.3.1 Wastewater Calculations

Table 2 below provides an indicative summary of the wastewater flows under the plan change development scenario for the entire Precinct.

**Table 2: Wastewater Calculations**

| Development block | Dwellings | Residential Population | ADWF (L/s) | PDWF (L/s) | PWWF (L/s) |
|---|---|---|---|---|---|
| North | 1,675 | 5,025 | 10.5 | 31.4 | 52.3 |
| Centre | 1,675 | 5,025 | 10.5 | 31.4 | 52.3 |
| South | 650 | 1,950 | 4.1 | 12.2 | 20.3 |
| Mason Clinic | N/A | N/A | 2.6 | 7.9 | 15.2 |
| Unitec | N/A | N/A | 3.8 | 11.4 | 25.1 |
| **TOTAL** | **4,000** | **12,000** | **31.4** | **94.3** | **165.3** |

**Notes:**

- Wastewater allowance per person – 180 L/p/day
- ADWF – Average Dry Weather Flow
- PDWF – Peak Dry Weather Flow (3 x ADWF)
- PWWF – Peak Wet Weather Flow (5 x ADWF)
- Occupancy is assumed to be 3 people per dwelling. This is considered conservative as a up to one third of the development will be studio and 1 bedroom with lower occupancy.

### 3.3.2 Local Upgrades

Figure 4 on the next page shows the upgrade requirements for the wastewater system to meet the servicing requirements for the development scenario.


**Figure 4 Proposed Wastewater Upgrade Plan**

### 3.3.3 Transmission Upgrades

The main transmission sewer (the Orakei Main Sewer), that currently services the Precinct was previously assessed by MPS (Wastewater report dated 25 November 2015 attached in

Appendix A) (MPS report) to support the rezoning of land in the Wairaka Precinct through the Proposed Auckland Unitary Plan hearings.

The MPS report assessed the capacity of the trunk wastewater system and the predicted changes to overflow volumes. This report is still considered applicable to the Precinct based on the assumptions in this Infrastructure Plan. The MPS report concluded that:

*"Based on the analysis presented here, the authors consider that the proposed development at Wairaka Precinct can be serviced by the existing Watercare wastewater transmission network until 2030, after which time further growth can be catered for by the construction of the Central Interceptor."*

The potential for issues and/or restrictions on development beyond 2030 were not assessed as Watercare was in the process of developing solutions to service growth across Auckland that included the detailed design of the Central Interceptor. The Central Interceptor (CI) is now under construction and is scheduled to be completed by 2026. It is expected there will be additional transmission capacity to the precinct immediately from 2026, and then as the additional transmission upgrades below are completed as the wastewater load on the Orakei Main Sewer will be reduced and hydraulic backwater effects during wet weather events minimised. At the forecast rate of development within the Precinct, the development is unlikely to exceed the assumptions in the 2015 MPS report and therefore wastewater network capacity is not considered an impediment to development.

In addition to the Central Interceptor upgrade, Watercare has several other transmission upgrades as identified in Figure 5 on the next page. The additional key transmission upgrades applicable to the Te Auaunga Precinct are CC1, CC5 and CC6. Previous Watercare Asset Management Plan identified that the additional transmission upgrades required to connect areas of Auckland to the Central Interceptor would all be completed by 2035 to ensure compliance with its Central Interceptor Network Discharge Consent and to provide for growth across wider Auckland. Resource consents to construct these additional transmission upgrades were obtained as part of the Central Interceptor resource consent process.

The additional transmission upgrades will divert flows away from the Orakei Main Sewer sections that pass through the Precinct. Thereby freeing up capacity for the Precinct's development. A high-level review indicates that the combined effect of Watercare's transmission upgrades will reduce wastewater overflow volumes by 80% by 2030 (consent condition) which should free up sufficient capacity in the Orakei Main Sewer to allow the development of the Precinct to proceed as planned.

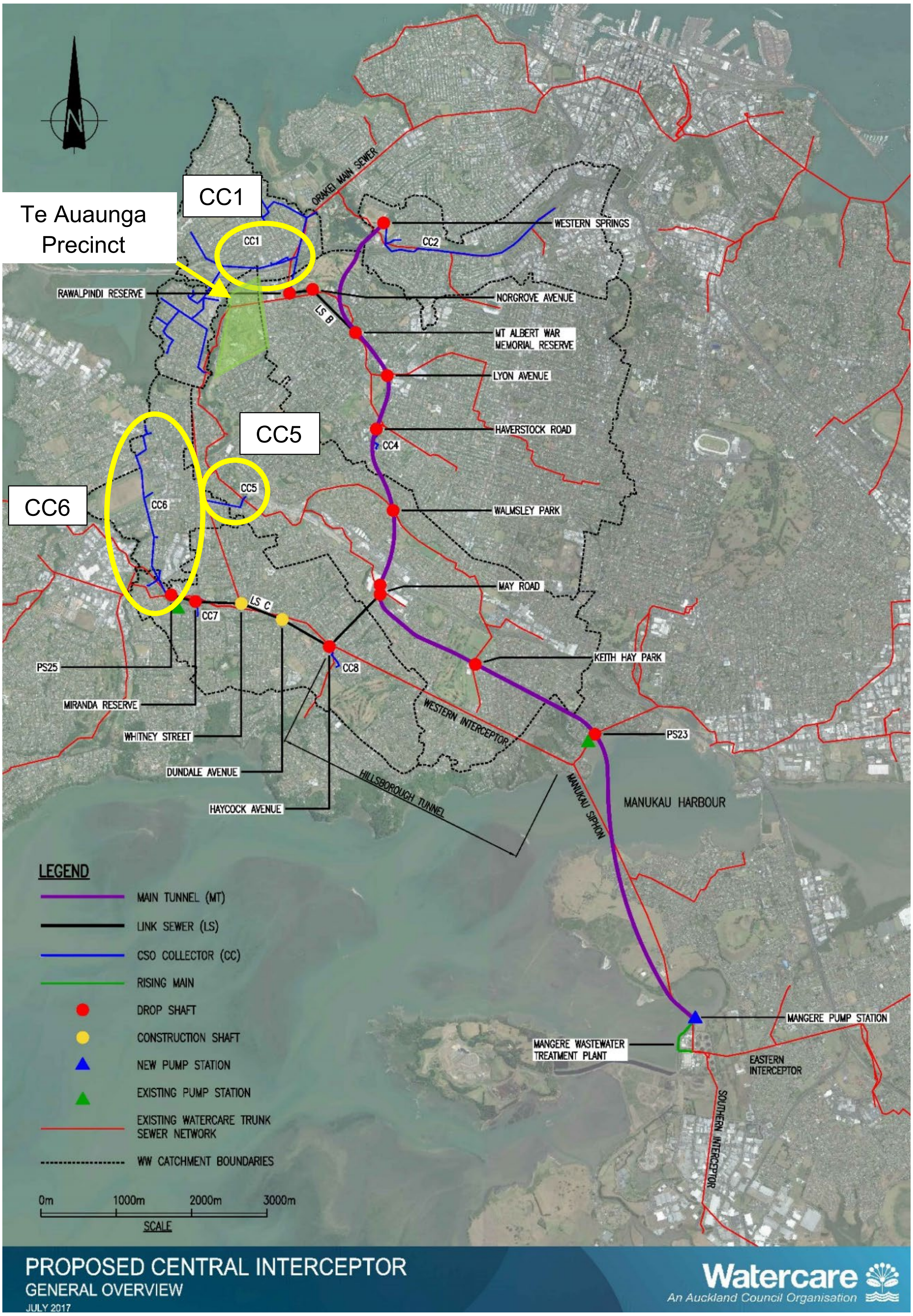


**Figure 5 Proposed Watercare Upgrades**

# 4. STORMWATER SYSTEM

## 4.1 Existing Stormwater System

The existing stormwater system is shown in Figure 6 below with indicative flood plains. The Te Auaunga Precinct is served by an extensive private gravity stormwater network consisting of catch pits, manholes, pipes, streams, natural springs, and wetlands/ponds.

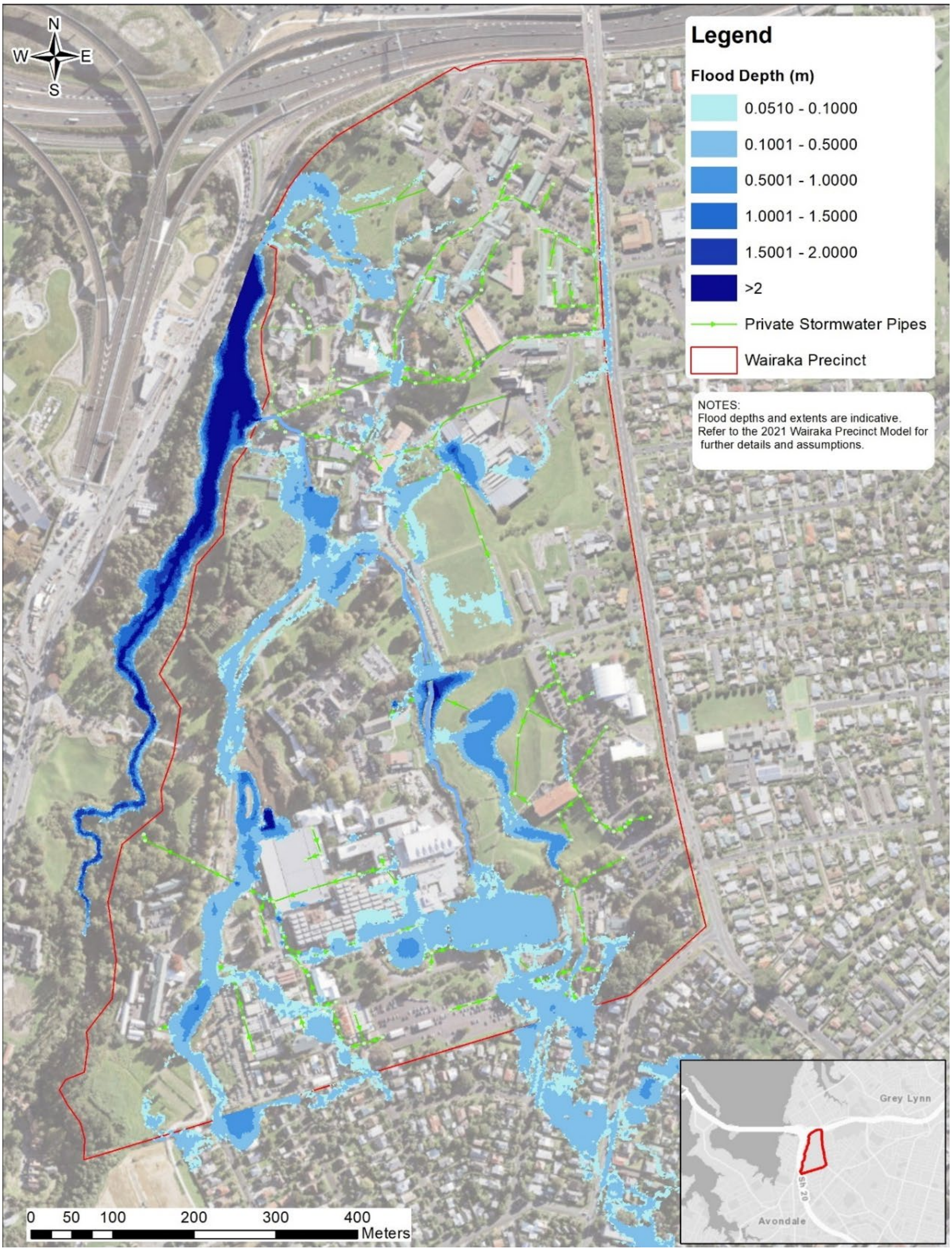


**Figure 6 Existing Stormwater System and Flood Plains**

Public stormwater infrastructure within the Precinct is limited to pipelines located in the south-eastern corner of the Precinct, entering from Mark Road before discharging to the existing central wetland (being an artificially constructed stormwater pond). The public network predominately services the urban drainage catchment to the south along with a small proportion of the southeast corner of the Te Auaunga Precinct. The catchment to the south of the Te Auaunga Precinct is a predominantly soakage catchment with private and public soakholes scattered throughout.

## 4.2 Stormwater Assumptions

The following assumptions have been used in assessing upgrade requirements for the proposed development:

- A new public network will be constructed and vested to service the proposed development scenario.
- Existing private assets under proposed lots/buildings will be diverted or removed as part of the development works to avoid potential conflicts.
- Private stormwater assets within land under the control of either Unitec or Te Whatu Ora – Health New Zealand will continue to be serviced by existing stormwater pipes where sufficient capacity is available or upgraded as per the approved Stormwater Management Plan.
- Detailed specific sizing and hydraulic design for the bulk infrastructure to service the centre and north of the Precinct has been adopted. This was based on 70% impervious, but with an increased allowance for climate change rainfall to 3.9°C. This is above the existing 2.1° C in the Council Code of Practice.
- Other key infrastructure not included in the infrastructure designed to service the centre and north of the Precinct are indicative and sized based upon TP108 and includes an allowance for climate change as per Auckland Council's requirements at 2.1° C. Some pipe sizes have been increased to cater for 100-year storm flows to minimise flood extents.
- There is a preference to locate new public assets outside development boundaries within road corridors where practical.
- Easement requirements can be accommodated or resolved.
- Existing assets within the Mason Clinic site are in good condition and have sufficient capacity (subject to planned diversions) to be utilised using easements in favour of Auckland Council.
- Diversion of catchment flows will reduce flood risks within the Precinct.
- New stormwater treatment will be limited to uncovered carparks, the Spine Road, and Farm Road only. The use of inert roofing material is specified in the Stormwater Management Plan (SMP) discussed further below.
- Stormwater treatment will continue to be provided by the Central wetland.
- Flood plains and overland flow paths within lots will be managed through a combination of earthworks, stream widening, larger pipe upgrades and/or upstream catchment diversions.
- Earthworks will allow the diversion of overland flow paths to road corridors where practical.
- Further stormwater design details and assumptions for the bulk infrastructure designed to service the centre and north of the Precinct as per the Carrington Development

Backbone Works – Detailed Design Backbone works – Civil Design, Beca (2022) referred to in the enabling works consent (BUN60386270) and the Engineering Plan Approval (EPA) documents submitted and approved under ENG60396158.

## 4.3 Proposed Stormwater Upgrades

An SMP has been prepared for the Precinct and was adopted through Schedule 8 of the Region-wide Network Discharge Consent that is held by Healthy Waters, Auckland Council in 2021. The approved SMP, though approved prior to this application, foreshadowed the changes proposed in the private plan change and is therefore consistent with the changes proposed. Therefore, no changes should be required to the approved SMP to accommodate the plan change.

The approved SMP provides the proposed stormwater management approach for the Precinct and demonstrates that it is the best practical option, taking into consideration the existing site features, and the brownfields nature of the development. The outcomes achieved by the Stormwater Management Plan are:

- An integrated stormwater management approach that mitigates the impact of existing and future land use.
- The creation of developable land for mixed and residential land use to support brownfield intensification in Auckland.
- Enhancement of the Wairaka Stream, including daylighting the lower sections where practical.
- Use of low-contaminate generating roofing material.
- Treatment for existing main road corridors and carparks that do not discharge to an existing treatment device.
- Removal of large car parking areas with no treatment devices.
- Upgrades to the stormwater pipe network and overland flow paths to convey flows to Te Auaunga/ Oakley Creek.
- Conveyance of 10-year and 100-year ARI stormwater flows to Te Auaunga/ Oakley Creek.

Figure 7 on the next page identifies the likely extent of network upgrade requirements for the stormwater system to meet the servicing requirements within the Te Auaunga Precinct. The stormwater upgrade plan combines the information from the Stormwater Management Plan and the design of the works in the centre and the north that have been consented and include stormwater treatment devices.

The majority of the pipe sizes for the new and upgraded infrastructure were assessed by WSP as part of development of the SMP for the Precinct during 2021 and again by Beca during the design of the next stages of infrastructure works. As a guide, the majority of the pipe sizes would range between 225mm and 450mm, with some larger pipes of up to say 1050mm to 1200mm required in places. As the detailed design of the Precinct progresses, the final upgrade requirements will continue to be confirmed.

It is important to note that some of the upgrade works identified in the SMP have been completed. Early works included daylighting and upgrading the culvert near the Mason Clinic and construction of the Outfall 6 swale. The early works allow an increase in pass forward conveyance capacity to allow the maximum amount of land to be developed within the Precinct, while providing more green space and enhancing the Wairaka Stream/Awa.

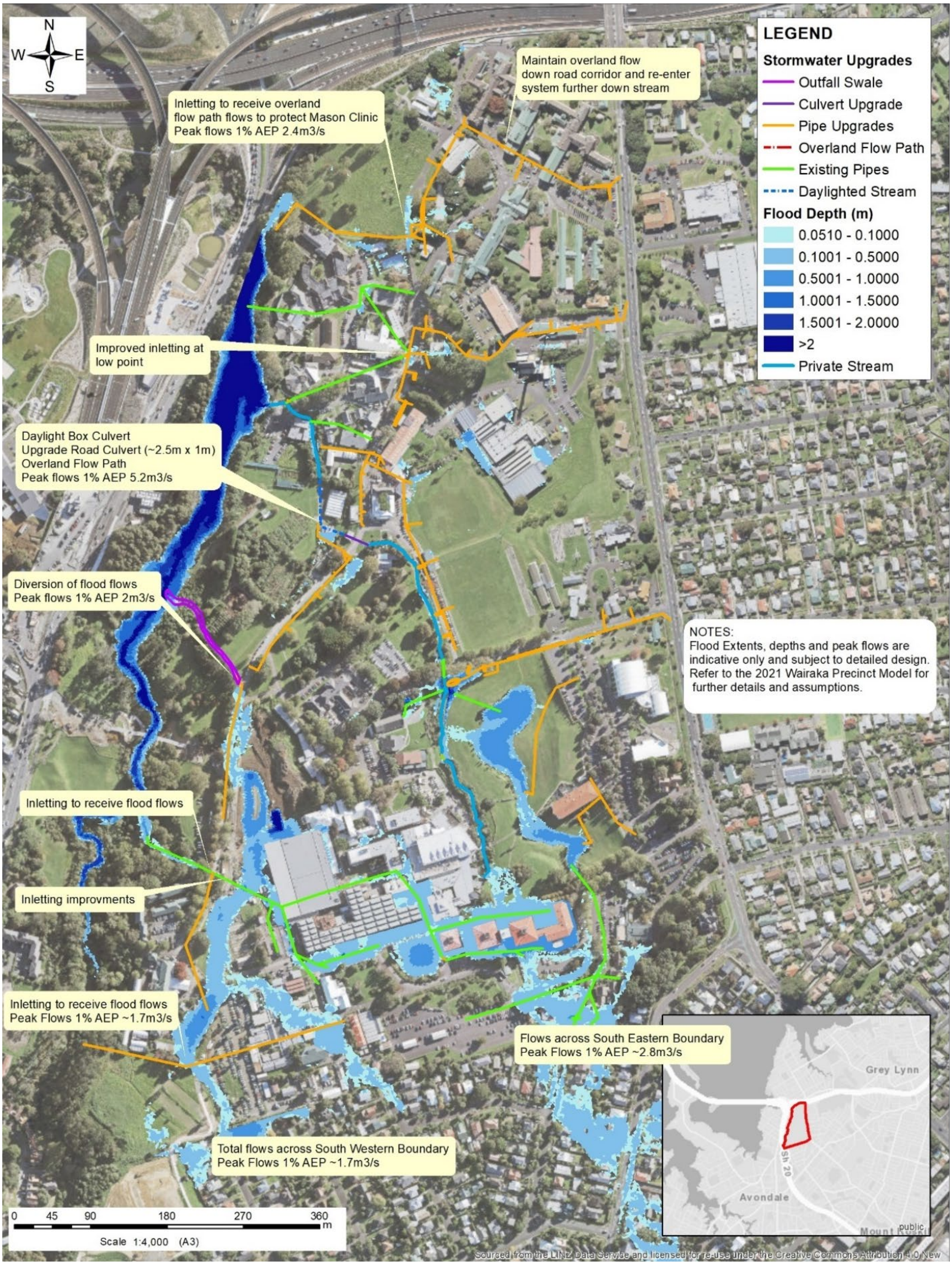


**Figure 7 Proposed Stormwater Upgrade Plan**

# 5. WATER SUPPLY

## 5.1 Existing Water Supply System

The existing water supply system is shown in Figure 8 below.


Figure 8 Existing Water Supply System

The Precinct is served by an extensive private pressure water network ranging in size from 100mm to 200mm internal diameter pipelines. There is no public water supply network within the Precinct with the public system limited to pipelines within the surrounding road network.

The Precinct is predominantly serviced by two supply points from the Konini and Owairaka water supply zones and a third supply point 1 (Great North Road) is currently disconnected but is protected by an easement where the pipe extends over private property on Great North Road. All main public supply points to the Precinct include backflow preventers. In addition, the Precinct is supplemented by numerous small connections to the public network from Great North Road to Carrington Road. There are no existing connections to the public network on the southern boundary.

The Unitec campus is now predominantly serviced through Supply Point 2 due to consolidation of their campus over recent years. The Taylors Laundry and the Mason Clinic sites have their own connection points to the public network. These networks are interconnected with the wider Te Auaunga Precinct network, thereby providing security of supply in the event of a pipe failure on either network or connection point to Watercare's network.

## 5.2 Water Supply Assumptions

The following assumptions have been used in assessing upgrade requirements for the proposed development:

- A new public network will be constructed and vested to service the proposed development scenario.
- Existing private assets under proposed lots/buildings will be diverted or removed as part of the development works to avoid potential conflicts.
- Private water supply assets and connection points within land under the control of either Unitec or Te Whatu Ora – Health New Zealand will continue to be serviced by them.
- Detailed specific sizing and hydraulic design for the centre and north infrastructure works has been adopted.
- The proposed new transmission lines along Carrington Road will be delivered by Watercare.
- New public assets will be located outside development boundaries within road corridors.
- Easement requirements can be accommodated or resolved.
- Further water supply design details and assumptions for the infrastructure works in the centre and north are as detailed in the Carrington Development Backbone Works – Detailed Design Backbone works – Civil Design, Beca (2022) referred to in the enabling works consent (BUN60386270) and the EPA documents submitted and approved under ENG60401889.

## 5.3 Proposed Water Supply Upgrades Proposed Key Wastewater Upgrades

### 5.3.1 Water Supply Calculations

Table 3 below provides an indicative summary of the upper limit of water supply flows under the development scenario for the entire Precinct.

**Table 3: Water Supply Calculations**

| Development block | Dwellings | Residential Population | Average Daily Demand (L/s) | Peak Daily Demand (L/s) | Peak Hourly Demand (L/s) |
|---|---|---|---|---|---|
| North | 1,675 | 5,025 | 11.6 | 17.4 | 43.6 |
| Centre | 1,675 | 5,025 | 11.6 | 17.4 | 43.6 |
| South | 650 | 1,950 | 4.5 | 6.8 | 16.9 |
| Mason Clinic | N/A | N/A | 2.0 | 5.1 | 10.1 |
| Unitec | N/A | N/A | 1.3 | 1.9 | 2.8 |
| **TOTAL** | **4,000** | **12,000** | **31.0** | **48.7** | **117.1** |

**Notes:**

- Water Supply allowance per person – 220 L/p/day
- Peak Daily Demand – 1.5 x Average Daily Demand
- Peak Hourly Demand – 2.5 x Peak Daily Demand
- Occupancy is assumed to be 3 people per dwelling. This is considered conservative as a up to one third of the development will be studio and 1 bedroom with lower occupancy.

### 5.3.2 Water Supply Upgrades

Figure 9 on the next page shows the potential upgrade requirements for the water supply system to meet the servicing requirements for the Precinct. The figure also identifies the transmission upgrades by Watercare outside the Precinct boundary that are required to service the development scenario.

This Infrastructure Report assumes that the Precinct is ultimately serviced from Sutherland Road Bulk Supply Point that is to be upgraded by Watercare.

Previous modelling and discussions with Watercare to date, identified that approximately 4,000 dwellings can be serviced by the upgraded Sutherland Bulk Supply Point (BSP) and water supply pipeline to the Precinct. It is understood that the BSP and the pipeline are in Watercare's Asset Management Plan and budget, as discussion has been progressing on this solution since 2016 when water supply modelling was first completed for the residential development of the Wairaka Precinct. The pipeline itself was included in approved EPA (ENG60401889) and is in delivery.

Discussions over the past year with Watercare identified that to service the Precinct beyond 4,000 dwellings, a new transmission main from Mount Albert may be required to be constructed along Carrington Road. This is due to a lack of overall capacity in the Watercare transmission network to service the development and the wider population growth forecasts in the surrounding suburbs.


**Figure 9 Proposed Water Supply Upgrade Plan**

HUD is continuing to work with Watercare on the timing and extent of transmission upgrades required to service the development in the short-term, through the planned BSP upgrades, and beyond 4,000 dwellings, if required. It is understood further modelling work is planned by Watercare to confirm the timing of wider transmission upgrades. Watercare is progressively updating its servicing strategy for the wider area in response to planned growth and developments in Mount Roskill, Mount Albert, Point Chevalier, and Western Springs.

# 6. ELECTRICAL

## 6.1 Existing Electrical System

The current installed capacity of the Precinct is approximately 6MVA. There are approximately 16 transformers and 5 HV switch-rooms, thought to be a mix of Vector owned and privately owned. Several transformers are in the process of being decommissioned to enable the new infrastructure to be constructed to service the north and centre of the Precinct. There are 4 or 5 local networks off Carrington Road, mainly from Gates 1 and 4, with the majority of low voltage (LV) lines providing local distribution underground.

The majority of the installed power is at the southern end of the Precinct, with 3,700kVA (approximately 68.5%) of the installed capacity located south of Farm Road (i.e. within the Unitec campus area). In addition, there is a low voltage electrical lighting system installed on site.

## 6.2 Electrical Infrastructure Plan

Previous investigations have identified that the maximum potential demand of the entire Te Auaunga Precinct is in the order of 20MVA. The existing network has inadequate capacity to service the proposed ultimate development, the age of the network is unknown, and it is understood that parts of the network have failed and are currently inoperable.

Therefore, installation of new HV power cables including a new lighting network is expected to be constructed in conjunction with the main road corridor upgrades. Vector has been engaged to design the new electrical reticulation that will form the electrical infrastructure network in the centre and north of the Precinct. Vector has raised no concerns around servicing the ultimate capacity of the Precinct through the discussions on the design of the electrical system to service these parts of the Precinct.

The design of the next stages of infrastructure have made provision for sufficient ducts to be installed within the road corridor, with Vector's contractors then installing electrical lines inside the ducts as the development progresses.

It is expected that each lot will have a local transformer sited externally on the plot. Low voltage services from each transformer will then serve the buildings or buildings in the surrounding areas. Vector may require a new HV switch room to facilitate the migration to the enhanced network, and this will need to be determined in coordination with their engineers. The first stage of these works is due to progress alongside the delivery of the works anticipated in consent BUN60386270 and the Engineering Plan Approval (EPA) documents submitted and approved under ENG60396158.

# 7. COMMUNICATIONS

## 7.1 Existing Communications System

Unitec New Zealand operated a site wide communications network across the Precinct until very recently. Unitec has recently decommissioned this network on the land now controlled by the Crown through HUD. It is expected that the projected demand will exceed existing capacity of the existing communication network, therefore it is not able to be repurposed and a new fibre network will be required.

## 7.2 Communications Infrastructure Plan

Chorus' website indicates that Ultra Fibre Broadband (UFB) is available to service the Te Auaunga Precinct. A new communications distribution network from Carrington Road will be constructed as part of the construction of the major road corridors within the Te Auaunga Precinct.

The installation will be similar to the power network, whereby ducting will be installed, with Chorus installing the fibre network. This will allow a ring topology for multiple carriers with an expectation that each lot will have a UFB connection on the plot or internally within the new building. Chorus has raised no concerns around servicing the ultimate capacity of the Precinct through the discussions on the design of communications system to service the centre and north of the Precinct. The first stage of these works is due to progress alongside the delivery of the works anticipated in consent BUN60386270 and the Engineering Plan Approval (EPA) documents submitted and approved under ENG60396158.

# 8. CONCLUSIONS

This Infrastructure Report provides the information pertaining to key infrastructure upgrades and requirements within the Te Auaunga Precinct (excluding transport and roading). The proposed infrastructure works required to service the Precinct include:

- New local wastewater network connecting to the Orakei Main Sewer.
- New upgraded stormwater network including a piped network sized for the 10-year storm, secondary network consisting of overland flow paths within the roads, and treatment of main road corridors and gross pollutant traps, delivered progressively through infrastructure upgrades.
- New local water supply network connecting to an upgraded Sutherland Bulk Supply Point (BSP) by Watercare.
- New additional transmission water mains and BSP in Carrington Road subject to ultimate yield and growth outside the catchment by Watercare.
- New Power and telecommunications ducts and services by Vector and Chorus respectively.

Construction of these new internal networks will progress ahead of the residential development.

From an infrastructure perspective, there is no reason why the proposed plan change application cannot proceed, as the Precinct can be adequately serviced for water, wastewater, stormwater, power, and telecommunications.

# APPENDIX A: MPS Report - Wairaka Precinct (Unitec) Wastewater Servicing

**mps limited**
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25 November 2015

Unitec Institute of Technology
Private Bag 92025
Victoria Street West
Auckland 1142

Attention: Will Smith

## Wairaka Precinct (Unitec) Wastewater Servicing

Dear Will

### 1 Introduction

This letter report outlines the ability of the Watercare wastewater network to service the proposed development at Unitec at the Wairaka Precinct. The letter has been jointly written by Simon Matthews of MPS limited and Tim Lockie of Hydraulic Analysis Limited (HAL).

While Watercare have made it clear they will support Council's objectives around growth and development (especially brownfield redevelopment within the existing urban area), understanding the potential effects is important. As agreed with Watercare, Unitec has used the most recent dynamic wastewater network model to simulate the flows from the development on the network.

This report is intended to form part of Unitec's case seeking the rezoning of the Wairaka Precinct. It has been drafted on the understanding that it will be provided to Watercare for information and comment. The report and modelling results will also ensure Watercare has up to date population and zoning information to inform its ongoing asset planning and investment programme.

### 2 Proposed Development Summary

In common with many of its peers in the New Zealand Tertiary Education Sector, Unitec faces the confluence of several environmental drivers, as well as suffering the outcome of historic decisions, which have resulted in an infrastructure that is no longer fit for its purpose.

Unitec's strategy states that 'we are reframing learning' to create 'highly productive talent that is highly employable'. This institutional imperative not only requires that Practitioners (or Entry Level Professionals (ELPs)) attain core discipline skills and knowledge, but also work ready graduates have attained industry and/or profession exposure.

To achieve this, I understand that Unitec needs to leverage its extensive property portfolio, turning it from an anchor to an asset to drive the Institute forward. Presently Unitec occupies circa 120,000m$^2$ GFA spread across a number of buildings. In the future, in its post transformed state it will occupy only 59,000m$^2$ GFA, consolidating its operation from 53 to 7 hectares.

The balance of the land will accommodate a mixed use urban precinct with residential, commercial office and light retail.

This proposal represents a significant shift in the current development zoning for the site. From a wastewater perspective the site is represented in the Watercare models as an educational facility with additional trade waste flows (such as for the existing laundry facility). As discussed further below, to date Watercare has not assessed any predicted increase demand from Unitec into the future as there has been no certainty around zoning changes.

With a comprehensive submission on the Unitary Plan, Unitec is now in a position to provide some certainty around future zoning for the Wairaka Precinct and therefore it is possible to predict future wastewater flows and assess their effects on Watercare's wastewater network. The Unitec submission included the predicted yields for the site provided as **Attachment A.**

The 64ha Wairaka Precinct is made up of the Unitec site (53.5ha), the Waitemata District Health Board Mason Clinic (3.9ha), the Taylor's Laundry site (2.5ha), and Ngati Whatua land (4.4ha). These are shown in Attachment A with the Unitec site consisting of the Core, Business Partnerships, Student Accommodation and Development Packages 1 to 10.

The full development and build out of the site is expected to take some 20 or so years beginning in 2017 soon after the Unitary Plan becomes operative. The development would therefore be complete around 2036. Details of a low and high scenario for the ultimate predicted yield are provided in Attachment A.

As discussed below, this analysis is based on the Watercare Central Interceptor being completed and operational by 2030 after which time the increased network capacity will be able to accommodate all flows from the Wairaka Precinct. The following development assumptions have been made and confirmed correct by Unitec:

1. Full development of the Wairaka Precinct will occur over a 20 year period from 2017.
2. Although the Core Campus gross floor area decreases into the future there will be no reduction (or increase) in full time equivalent student numbers by the year 2030. From a wastewater loading perspective there is therefore no change.
3. The development of the Unitec land is expected to generally occur in a linear fashion. This means that by 2030 the Unitec Development Packages (1 to 10) will be approximately 70% of their ultimate yield.
4. There will be no change in the operation at Taylors Laundry or the Mason Clinic until after 2030. This is not land owned or controlled by Unitec although still included as part of the eventual development of the Wairaka Precinct. From a wastewater perspective these loads will be assumed unchanged from existing.
5. Development of the Ngati Whatua Land will be fully complete by 2030. This land is separately owned and Unitec understands plans are to move toward full development within 10 years of the zoning being confirmed through the Unitary Plan.
6. Unitec student accommodation will be fully developed by the year 2030 since this is required to support the future campus development plans.
7. Student accommodation to be developed will be fully unitised – that is, 1 student per bed.
8. The apartments to be developed by Unitec would typically have an average of 1.5 persons
9. The town houses to be developed by Unitec would typically have an average of 2.5 persons

Based on these assumptions and (conservatively) using the higher of the predicted yields from Attachment A the following summary table applies.

| | 2030 |
|---|---|
| Unitec Packages 1 to 10 Apartments (70%) | 1013 dwellings or 1520 new people |
| Unitec Packages 1 to 10 Townhouses (70%) | 104 dwellings or 260 new people |
| Unitec Packages 1 to 10 Business (70%) | 52,500m2 GFA increase |
| Unitec Packages 1 to 10 Retail (70%) | 2,170m2 GFA increase |
| Unitec Packages 1 to 10 Community (70%) | 669m2 GFA increase |
| Unitec Student Accommodation (100%) | 1093 beds or 1093 new people |
| Unitec Core Campus | No change to existing student numbers |
| Unitec Business Partnerships (70%) | Included above under business |
| Ngati Whatua Land (100%) | 100 Apartments or 150 new people plus 45 townhouses or 113 new people |
| Mason Clinic, Taylors Laundry, | No change from existing |

**Table 1: Increases in demand from existing situation to 2030.**

## 3. Existing and Future Wastewater Network

The Wairaka Precinct is situated in the Oakley Wastewater Catchment near the top of the Orakei Main Sewer (a bulk sewer that was originally constructed in the early 1900s and was the main sewer which serviced the catchments from Mt Albert, through the CBD, and along to Orakei). The Oakley Wastewater Catchment is partially a combined system (ie the pipes are designed to collect both stormwater and wastewater), and the Oakley Catchment sits within the broader combined western isthmus catchment which has a history of overflow issues.

The Unitec site itself does have a separated stormwater system, but due to its age and lack of good as-built records, it is likely there are at least some direct stormwater inflows to the wastewater system which would contribute to the wet weather response in the area.

As part of a wider study, URS has already investigated the drainage networks and provided the diagram below. They have identified six locations at which flows from the site connect to the Orakei Main Sewer.

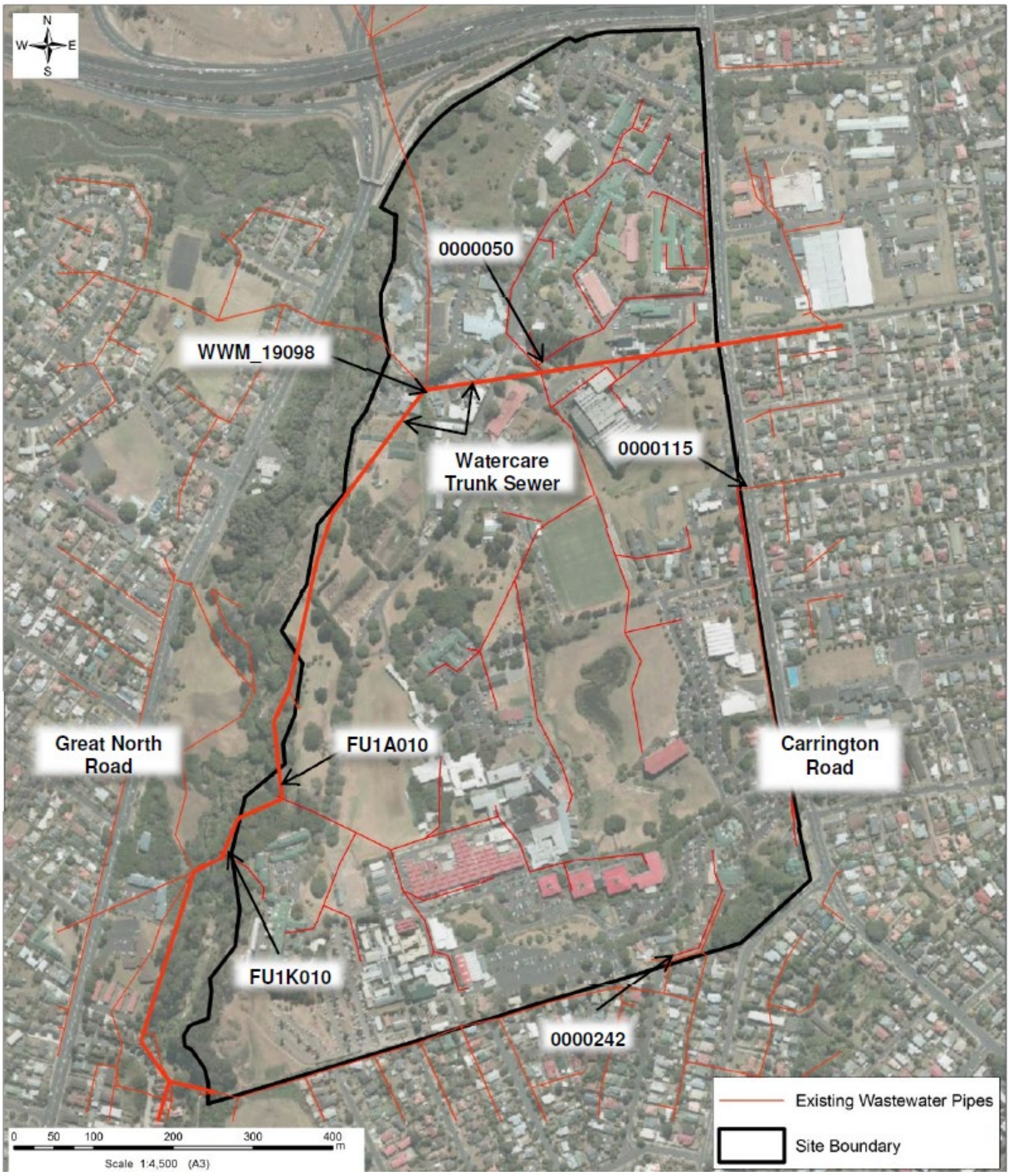



**Figure 1: Existing Wairaka Precinct and Wastewater System.**
**Orakei Main (Trunk) Sewer shown as thick red line**

The fact that the Watercare main sewer runs through the Unitec site and Unitec is therefore able to directly connect to that sewer is a huge advantage for the proposed development. This proposed development is not a situation where there are capacity constraints on local sewers.

Further, Unitec understands that parts of the Mt Albert catchment (Branch 9) have been re-directed to the south to reduce the overall load on the Orakei Main by what is known as the Avondale Diversion. As such, while there are downstream capacity constraints that need to be considered, there is capacity in the Orakei Main through the site itself. The downstream issues are also ultimately addressed by the proposed Central Interceptor programmed for 2030 as discussed below.

There are a significant number of buildings within the Wairaka Precinct which will be demolished. An element of the Wairaka development will be a simple substitution of old inappropriate floor space for new purpose built floor space. Because in these initial stages, the population within the site will not increase, it will not actually lead to an increase in wastewater volumes. These early development projects around the campus core provide the ideal opportunity to review existing private drainage plans and identify any direct stormwater connections to the wastewater system that can be removed and redirected to the stormwater system. New pipes will also reduce infiltration (ie groundwater entering the sewerage system). In addition, as well as having new piping, within the new buildings there are likely to be water efficiency measures introduced such that the wastewater flows per person is likely to decrease.

Although partially offset by reducing inflows, wastewater from the Precinct will increase in time as further development occurs. The key to understanding the effects the wastewater system is to assess the effect of the development just prior to the Central Interceptor being constructed. That effectively represents a worst case, and not an outcome that would occur on day one.

It is also important to consider that there are interim options available to mitigate possible effects on the network other than simply reducing direct inflows to the sewer. For example storage tanks could be used at the Unitec site to attenuate peak flows, an especially viable option when Unitec has such large landholdings. These storage tanks are already used on Watercare's network, to attenuate high flows on existing capacity constrained networks. Effectively, they store the wastewater when flows on the network are high (eg morning and evening peaks or during wet weather events where there significant stormwater inflows), and release the wastewater during periods of low flows.

As with any development, each “development package” as it is release can be considered in terms of its exact timing and incremental effects. The approach of working with Watercare to confirm what (if any) interim mitigation is required for development packages prior to 2030 and the implementation of the Central Interceptor will allow development to proceed now, but with a view of how it will be integrated into the long term solution for the wastewater system.

Similar issues to those described above would be occurring (or will occur), albeit at a smaller scale, at many sites throughout the older suburbs of Auckland that are (or are proposed to) intensify in order to accommodate some of Auckland's expected significant population growth.

## 4. Watercare Central Interceptor

Once the central interceptor is commissioned, currently planned for 2030, then there is a very substantial change in the wastewater capacity for the western isthmus. The Central Interceptor will accommodate current volumes and growth, including wastewater from Wairaka. One of the Central Interceptor link sewers is planned to connect to the Orakei Main just downstream of the Unitec site. Other link sewers are planned to relieve the Orakei Main at different locations.

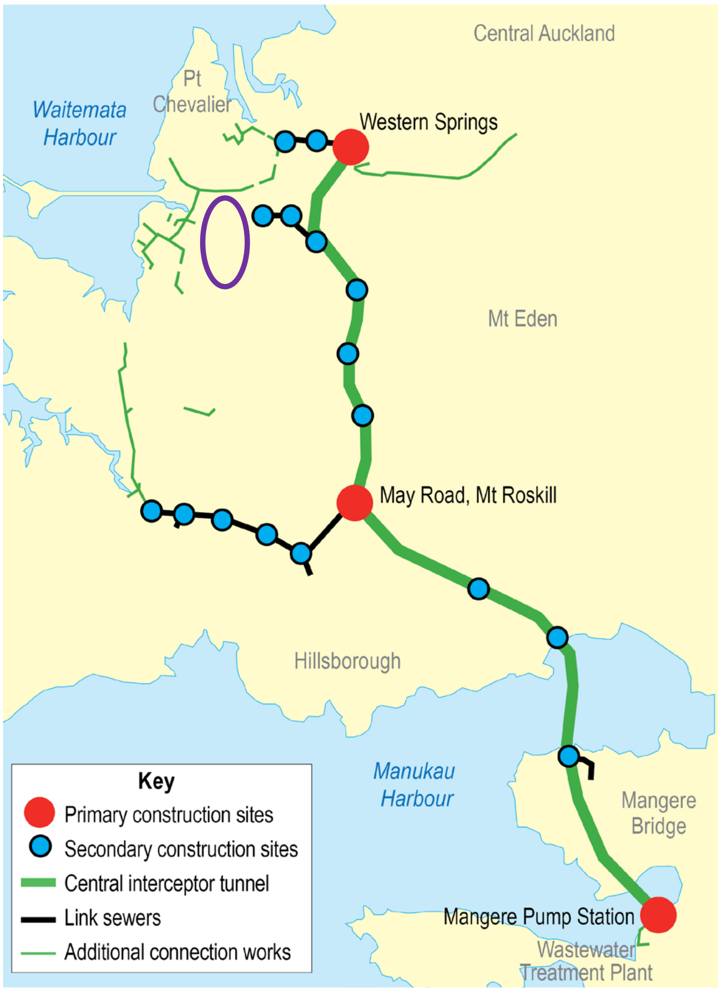



**Figure 2: Central Interceptor Route (*from Watercare fact sheet*) with Unitec site location shown as a purple oval**

Unitec understands that one of the primary purposes of the Central Interceptor will be to reduce pressure on the Orakei Main providing for growth in the central Auckland Area. Although Unitec is proposing a substantial long term development within the site, Unitec is confident that there will not be wastewater constraints on any development.

As Watercare progresses the detailed design of the Central Interceptor they will incorporate new planning information regarding zoning and predicted populations as it becomes available, especially that coming from the Unitary Plan. The predicted yield information provided by Unitec can therefore be used to directly inform the Watercare design process.

## 5. Proposed Unitec Development - Hydraulic Analysis

This section provides an overview of the methodology and findings of the analysis into the hydraulic impact of the Unitec Wastewater loads on Watercare's transmission wastewater network. All the details, including all the modelling assumptions, is provided as Attachment B.

### 5.1 Methodology

With Watercare's permission, Hydraulic Analysis Limited (HAL) was given access to the latest version of the wastewater network Infoworks dynamic model. Two model scenarios were modelled:

1. Base case with residential and commercial populations as predicted for 2030, with the Wairaka Precinct unchanged.
2. Wairaka development case, being the base case but with the increased development as predicted for 2030 at Wairaka Precinct as described above in Table 1.

The Wairaka Precinct 2030 wastewater loads were included in the model directly into the Orakei Main Sewer that passes through the site. The 24 hour profiles used in the existing base case model were extrapolated to allow standard Watercare design flow loads to be applied in the model in a consistent manner.

In the first instance the dry weather flow was modelled to assess if the development would result in any dry weather flow overflows. **Figure 3** shows how the Watercare standard dry weather flow loads derived from the assumed 2030 development at Wairaka Precinct have been adapted to a 24 hour daily profile.

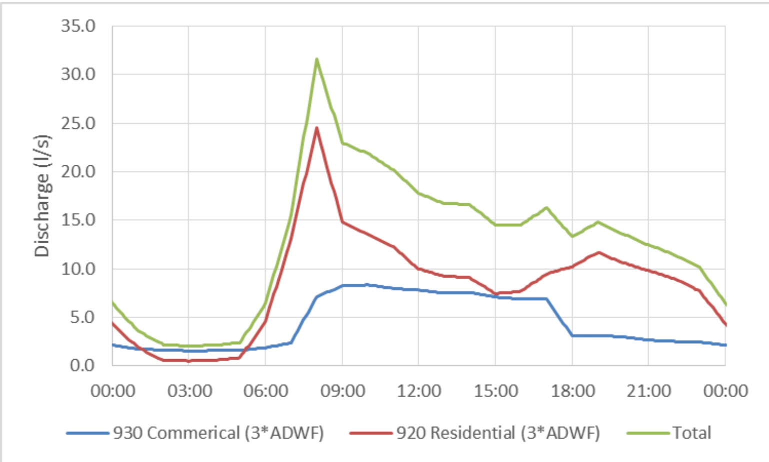



**Figure 3: Wairaka Precinct 24 hour dry weather flow profile (2030 development)**

Wet weather flow was then simulated using a design storm approach, rather than the more comprehensive time series approach which takes considerable more computational time and analysis. Therefore, to represent a range of wet weather different conditions 11 different rainfall events were modelled ranging from a small 3 day return period event up to a 2 year return period event.

As a result of this approach it is not possible to provide a true annual volume and frequency from the overflow points, however, by using 11 different design storms there can be a direct comparison between the base case and Wairaka development case under a range of conditions.

The key to this methodology is that the analysis is a like for like comparison between the two scenarios Base case vs Wairaka development). What is important here is not so much the actual modelling results, but rather the comparison between the scenarios and if the change is significant.

Consistent with the previous Watercare design storm studies, the peak of the event has been timed for around midday as shown in **Figure 4** below. This figure shows one of the 11 design storms being the 6 month return period event.

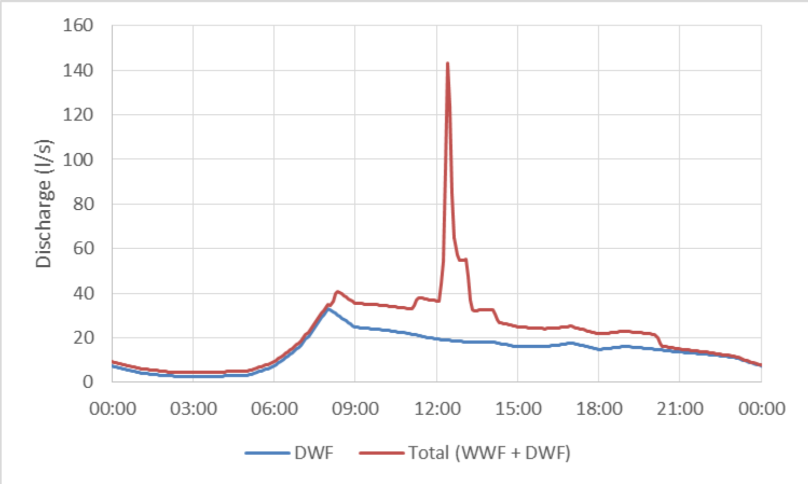



**Figure 4: 6 Wairaka Precinct 6 month design storm 24 hour flow profile (2030 development)**

Under this 6 month design storm scenario, the combined peak flow during wet weather from the proposed development is some 140 litre per second. This peaking factor is much higher than the standard Watercare static design flow parameters, but comes as a result of applying the dynamic 24 hour profile. The peak flows therefore have a level of conservatism.

## 5.2 Results

This results summary focuses on the differences between the Base Case and the Wairaka Development Case. Details of overflow volumes and long sections are provided in Attachment B.

The Auckland Isthmus has been design to have many Engineered Overflow Points, which allow peak wet weather flows to discharge from the sewer at controlled locations. This avoids the sewer surcharging and spilling in an uncontrolled manner from manholes when its capacity in exceeded. Provided there are no dry weather flow discharges, the overflows (during rain events) are typically diluted wastewater with a significant portion of stormwater.

The key Engineered Overflow Points along Orakei Main Sewer, that are likely to be impacted by the Unitec Development are the:

- Scotland St EOP, north east of Wairaka near the bottom of College Hill
- OMS MH38 EOP, just north of Wairaka, near Pasadena School.
- OMS MH51 EOP, on the west side of Wairaka discharging into Oakley Creek

These are by no way the largest overflow points in the isthmus area, but because of their location at or just downstream of Wairaka they are the only locations chosen to assess the effects of the development.

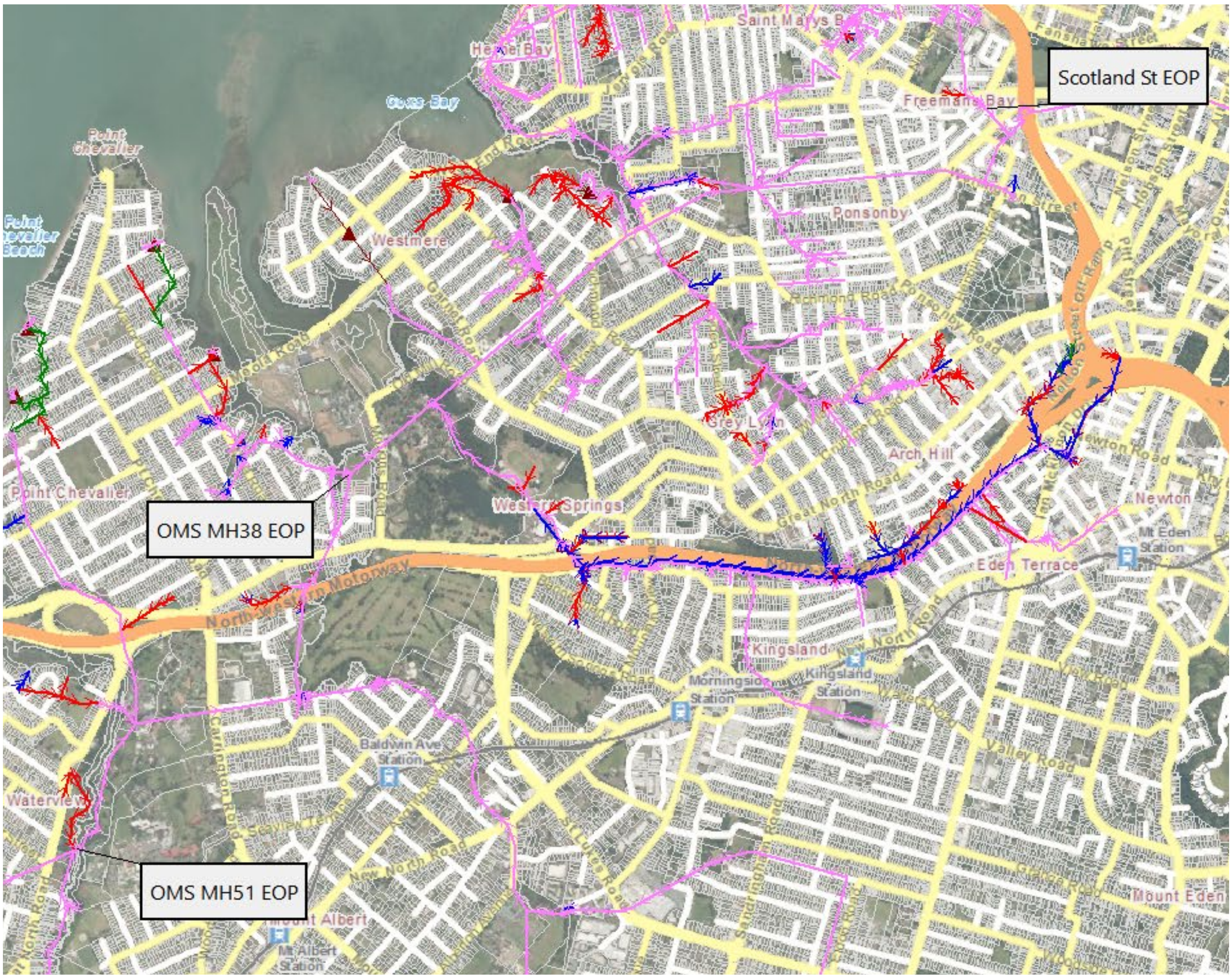



**Figure 5: Location of Key Engineered Overflow Points**

### Dry Weather Flow

During dry weather the flows in the piped network are almost entirely wastewater, with little inflow or infiltration occurring. The dry weather simulation provides a check that no issue are created under everyday operating conditions.

An analysis of model results confirms that for both the Base Case and the Wairaka Development Case there are no dry weather overflows from any of the three key engineered overflow points.

A long section of the Orakei Main Sewer through the Wairaka Precinct is provided in Attachment B (as Figure B9). It shows that at the time of peak flow (around 8:00am) the pipeline is approximately 50% full, still some way from causing dry weather overflow issues.

### Wet Weather Flow

The wet weather simulations are undertaken by adding wet weather inflows to the dry weather flows already in the model so a combined effect is modelled.

As discussed above, a design storm approach was used for the modelling. While this means it is not possible to do extract data for annual overflow frequency and volumes, it is still possible to compare the Base Case and Wairaka Development Case across a range of storms. In total, 11 storms varying in return period were simulated, and summary data is provided in Table 2 below.

| | Base Case | | | Wairaka Development Case | | |
|---|---|---|---|---|---|---|
| | Number of storms | Number of overflows | Total Volume (m3) | Number of storms | Number of overflows | Total Volume (m3) |
| Scotland St | 11 | 9 | 20,934 | 11 | 9 | 20,963 |
| OMS MH38 | 11 | 8 | 79,464 | 11 | 8 | 81,076 |
| OMS MH51 | 11 | 7 | 25,908 | 11 | 7 | 28,451 |

**Table 2: Overview of Change in Overflow Volumes (2030)**

The model results show that the smallest of the design storms do not trigger overflows. Given these events include the dry weather flows as well, it further demonstrates that even with the proposed development in place at 2030, there remains dry weather flow capacity.

The results also show there is no change in the number of storms that trigger overflows between the base case and development, meaning there is unlikely to be any significant change in annual overflow frequencies.

With regard to the overflow volumes discharged from the key engineered overflow points, there is very little change to those sites downstream of the Wairaka Precinct. The only real change is to the volumes at manhole 51 on the Orakei Main Sewer, where the total volume discharged increases by approximately 10%. Given the discharge location directly into Oakley Creek and the fact that during these rainfall events the stormwater flows in the Creek would be elevated, it is difficult to see how this change would create any significant adverse effect over and above that which is already occurring.

## 6. Conclusions

Unitec has engaged with Watercare to undertake a detailed assessment of the predicted effects of the proposed development on the wastewater network. With the network modelling and overall analysis complete it is now possible to draw the following conclusions:

1. In the short term, the wastewater flows generated from the site is likely to decrease due to reduced direct inflows from improved/new pipework, and likely water efficiency measures within new development.
2. Unitec connects directly into the main sewerage system, and Unitec will therefore not be affected by other constraints (or further development) on the local networks. Unitec will also directly benefit from any Watercare upgrades on the main sewerage system. Unitec's infrastructure growth charges will contribute to these upgrades.
3. It is understood that the Central Interceptor will alleviate capacity constraints on the Orakei Main Sewer providing for growth (including full development at Wairaka)
4. The proposed staging means that that approximately 30% of the peak flow development will not be contributing wastewater until close to (or after) the commissioning of the Central Interceptor.
5. The wastewater modelling analysis confirms that for 2030, development at the Wairaka Precinct will not cause any dry weather overflows to occur.
6. The analysis confirms that there would be no significant change to annual overflow frequencies as a result of the development.
7. The analysis also provides an estimation of likely changes to overflow volumes and only one of the many existing overflow points shows any significant increase in volumes and even its site increases by only around 10%. Given its location, this is not thought to create any significant adverse effect on the environment.

8. Any proposed development will, as usual, require an assessment of infrastructure capacity, and if there are any such constraints (bearing in mind that Unitec connects directly to the main sewer), there are mechanisms to mitigate peak flows (eg holding tanks etc).

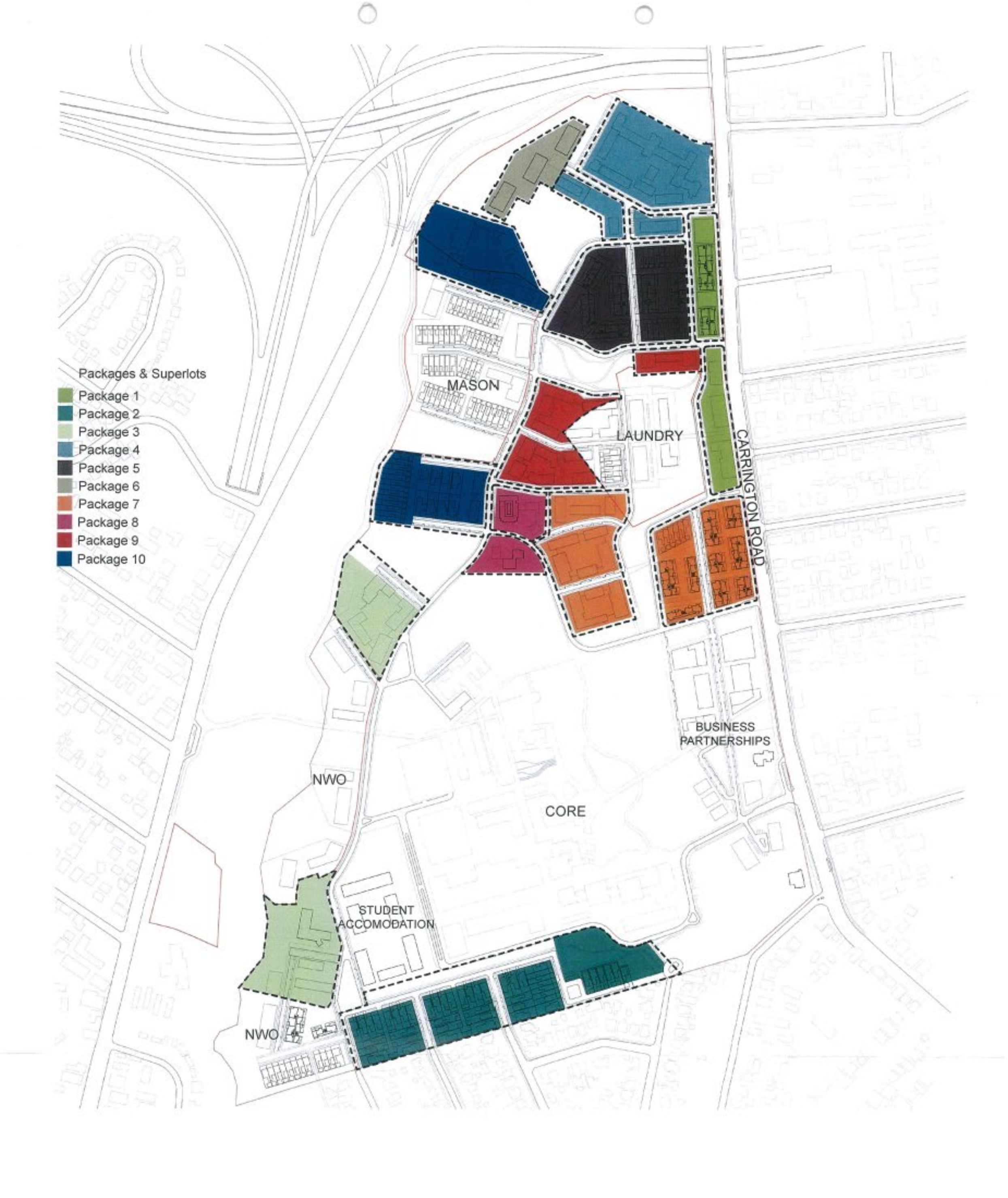
Therefore, based on the analysis presented here, the authors consider that the proposed development at Wairaka Precinct can be serviced by the existing Watercare wastewater transmission network until 2030, after which time further growth can be catered for by the construction of the Central Interceptor.

It is also recommended that Watercare use the development information provided in this report for future planning and modelling analysis. The full built out development load should be incorporated into the ongoing detailed design of the Central Interceptor.

Yours sincerely

**Simon Matthews**
Director mps Limited

## Attachment A – Unitec Predicted Yield



Unitec Indicative Development Areas & Parking Schedule

Higher Density Option 21.10.2015

| PACKAGE | SUPERLOTS (m2) | RESI (m2) | DWELLINGS | | APARTMENTS | APART CARS 1.3/DW | APART CARS 1.5/DW | TOWNHOUSES | TH CARS 2/DW | BUSINESS (m2) | CARS | RETAIL (m2) | CARS | COMMUNITY (m2) | CARS | m2 | DWELLINGS | CARS | m2 | CARS | OTHER CARS | INDIC GFA (m2) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10,045 | 12,750 | 170 | | 170 | 221 | 332 | - | - | | | | | | | | | | | | | 12,750 |
| 2 | 24,155 | 7,800 | 60 | | - | - | - | 60 | 120 | | | | | | | | | | | | | 7,800 |
| 3 | 15,668 | 15,375 | 205 | | 205 | 267 | 400 | - | - | | | | | 500 | 17 | | | | | | | 15,875 |
| 4 | 31,308 | 14,170 | 164 | | 130 | 169 | 254 | 34 | 68 | 1,000 | 17 | 1,200 | 48 | 175 | 6 | | | | | | | 16,545 |
| 5 | 18,300 | 18,580 | 236 | | 220 | 286 | 429 | 16 | 32 | 180 | 3 | 100 | 4 | 180 | 6 | | | | | | | 19,040 |
| 6 | 6,715 | 9,900 | 132 | | 132 | 172 | 257 | - | - | | | | | | | | | | | | | 9,900 |
| 7 | 23,638 | 16,330 | 206 | | 190 | 247 | 371 | 16 | 32 | 5,000 | | 1,000 | | | | | | | | | | 22,330 |
| 8 | 6,916 | - | | | | - | - | | | | | 800 | 32 | 100 | 3 | | | | | | | 900 |
| 9 | 9,984 | 15,000 | 200 | | 200 | 260 | 390 | - | - | | | | | | | | | | | | | 15,000 |
| 10 | 24,085 | 17,990 | 225 | | 200 | 260 | 390 | 23 | 46 | | | | | | | | | | | | | 17,990 |
| Student Accommodation | | | | | | | | | | | | | | | | 41,000 | 1,093 | 182 | | | | 41,000 |
| Core | | | | | | | | | | | | | | | | | | | 59,000 | 1,450 | | 59,000 |
| Business Partnerships | | | | | | | | | | 68,820 | 1,147 | | | | | | | | | | | 68,820 |
| Loading | | | | | | | | | | | | | | | | | | | | | 13 | |
| On Street | | | | | | | | | | | | | | | | | | | | | 634 | |
| UNITEC SITE ONLY | | 127,895 | 1,596 | - | 1,447 | 1,881 | 2,822 | 149 | 298 | 75,000 | 1,167 | 3,100 | 84 | 955 | 32 | 41,000 | 1,093 | 182 | 59,000 | 1,450 | 647 | 306,990 |
| Laundry | | 15,780 | 206 | | 200 | 260 | 390 | 6 | 12 | | | | | | | | | | | | | 15,780 |
| Mason | | 20,955 | 242 | | 191 | 248 | 372 | 51 | 102 | | | | | | | | | | | | | 20,955 |
| NWO land | | 13,350 | 145 | | 100 | 130 | 195 | 45 | 90 | | | | | | | | | | | | | 13,350 |
| TOTAL SITE FIGURES | | 177,980 | 2,189 | - | 1,938 | 2,519 | 3,779 | 251 | 502 | 75,000 | 1,167 | 3,100 | 84 | 955 | 32 | 41,000 | 1,093 | 182 | 59,000 | 1,450 | 647 | 357,085 |

| | |
|---|---|
| TOTAL SITE CARS (1.3/APART) | 6,583 |
| TOTAL SITE CARS (1.5/APART) | 7,843 |

KEY

non Unitec land

NOTE: All areas and numbers indicative only & subject to further testing.

**Assumptions:**

Residential dwelling numbers generally based on 80% GFA efficiency.
Business car numbers based on 1 car per 60m2 of GFA.
Retail car numbers based on 1 car per 25sqm GFA.
Community car numbers based on 1 car per 30sqm GFA.
Student Accommodation dwelling numbers based on average 30m2 per dwelling using 80% GFA efficiency.
Student Accommodation parking allowance 1 car per 6 dwellings.
Loading parking assumption: 3 spaces per 50,000m2 GFA plus 1 additional space per 40,000 GFA

Unitec Indicative Development Areas & Parking Schedule

Lower Density Option 24.09.2015

| PACKAGE | SUPERLOTS (m2) | RESI (m2) | DWELLINGS | | APARTMENTS | APART CARS 1.3/DW | APART CARS 1.5/DW | TOWNHOUSES | TH CARS 2/DW | BUSINESS (m2) | CARS | RETAIL (m2) | CARS | COMMUNITY (m2) | CARS | m2 | DWELLINGS | CARS | m2 | CARS | OTHER CARS | INDIC GFA (m2) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10,045 | 12,750 | 170 | | 170 | 221 | 332 | - | - | | | | | | | | | | | | | 12,750 |
| 2 | 24,155 | 7,800 | 60 | | - | - | - | 60 | 120 | | | | | | | | | | | | | 7,800 |
| 3 | 15,668 | 5,980 | 46 | | - | - | - | 46 | 92 | | | | | 500 | 17 | | | | | | | 6,480 |
| 4 | 31,308 | 14,170 | 164 | | 130 | 169 | 254 | 34 | 68 | 1,000 | 17 | 1,200 | 48 | 175 | 6 | | | | | | | 16,545 |
| 5 | 18,300 | 18,580 | 236 | | 220 | 286 | 429 | 16 | 32 | 180 | 3 | 100 | 4 | 180 | 6 | | | | | | | 19,040 |
| 6 | 6,715 | 9,000 | 120 | | 120 | 156 | 234 | - | - | | | | | | | | | | | | | 9,000 |
| 7 | 23,638 | 16,330 | 206 | | 190 | 247 | 371 | 16 | 32 | 5,000 | | 1,000 | | | | | | | | | | 22,330 |
| 8 | 6,916 | - | | | | - | - | | | | | 800 | 32 | 100 | 3 | | | | | | | 900 |
| 9 | 9,984 | 7,000 | 75 | | 50 | 65 | 98 | 25 | 50 | | | | | | | | | | | | | 7,000 |
| 10 | 24,085 | 6,500 | 50 | | - | - | - | 50 | 100 | | | | | | | | | | | | | 6,500 |
| Student Accommodation | | | | | | | | | | | | | | | | 41,000 | 1,093 | 182 | | | | 41,000 |
| Core | | | | | | | | | | | | | | | | | | | 59,000 | 1,450 | | 59,000 |
| Business Partnerships | | | | | | | | | | 68,820 | 1,147 | | | | | | | | | | | 68,820 |
| Loading | | | | | | | | | | | | | | | | | | | | | 11 | |
| On Street | | | | | | | | | | | | | | | | | | | | | 654 | |
| UNITEC SITE ONLY | | 98,110 | 1,127 | - | 880 | 1,144 | 1,716 | 247 | 494 | 75,000 | 1,167 | 3,100 | 84 | 955 | 32 | 41,000 | 1,093 | 182 | 59,000 | 1,450 | 665 | 277,165 |
| Laundry | | 12,900 | 150 | | 120 | 156 | 234 | 30 | 60 | | | | | | | | | | | | | 12,900 |
| Mason | | 8,840 | 68 | | | - | - | 68 | 136 | | | | | | | | | | | | | 8,840 |
| NWO land | | 8,580 | 66 | | | - | - | 66 | 132 | | | | | | | | | | | | | 8,580 |
| TOTAL SITE FIGURES | | 128,430 | 1,411 | - | 1,000 | 1,300 | 1,950 | 411 | 822 | 75,000 | 1,167 | 3,100 | 84 | 955 | 32 | 41,000 | 1,093 | 182 | 59,000 | 1,450 | 665 | 307,485 |

| | |
|---|---|
| TOTAL SITE CARS (1.3/APART) | 5,682 |
| TOTAL SITE CARS (1.5/APART) | 6,332 |

KEY

non Unitec land

NOTE: All areas and numbers indicative only & subject to further testing.

**Assumptions:**

Residential dwelling numbers generally based on 80% GFA efficiency.
Business car numbers based on 1 car per 60m2 of GFA.
Retail car numbers based on 1 car per 25sqm GFA.
Community car numbers based on 1 car per 30sqm GFA.
Student Accommodation dwelling numbers based on average 30m2 per dwelling using 80% GFA efficiency.
Student Accommodation parking allowance 1 car per 6 dwellings.
Loading parking assumption: 3 spaces per 50,000m2 GFA plus 1 additional space per 40,000 GFA

**UNITEC MASTERPLAN**

**Indicative Development Areas & Parking Provision**

24/10/2015

## Attachment B – Wastewater Model Analysis

## Methodology

<u>Background</u>

To undertake this analysis, Watercare's 'Central Interceptor Model Update – Issue 1' wastewater model has been utilised. This model was developed by Watercare to assess the performance of the Central Interceptor scheme, with a number of differing model scenarios available. For this analysis the 'SP2030NoCI - CI Update Issue 1' network was adopted as the base scenario (see below figure for model scenarios), this model setup represents the trunk wastewater network without the Central Interceptor scheme in place in 2030 (i.e. with resident population adjusted to represent estimated 2030 loads), see Watercare's CI Model Update – Report 01 – 08, September 2014, for details. Innovyze's Infoworks CS 15.5 software version has been adopted.

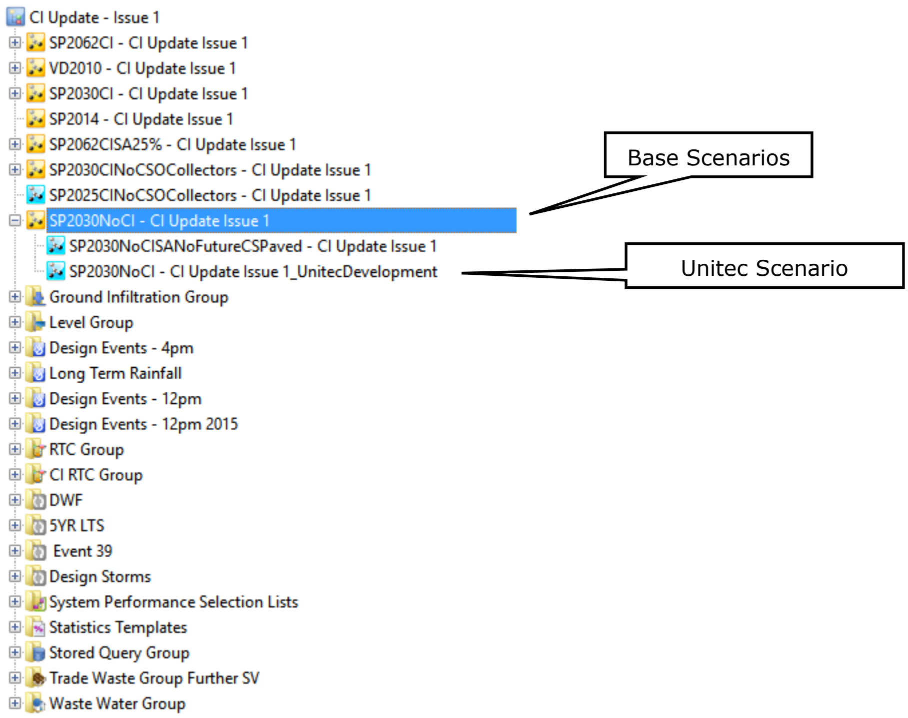



**Figure B1: Model Network Scenarios**

## Model Scenarios

The below table summarises the model scenarios analysed. A design storm analysis approach has been adopted, with detailed outlined below.

| Scenario ID | CI In place | Development Scenario | Hydrology Loads | Unitec Development | LTS Scenarios | DS Scenarios[1] |
|---|---|---|---|---|---|---|
| **SP2030NoCI - CI Update Issue 1** | No | 2030 | CI Update 2030 (2% for Unitec Catchment) | No | None | 3 Day ARI<br>4 Day ARI<br>1 Week ARI<br>2 Week ARI<br>3 Week ARI<br>1 Month ARI<br>2 Month ARI<br>3 Month ARI<br>6 Month ARI<br>1 Year ARI<br>2 Year ARI |
| **SP2030NoCI - CI Update Issue 1_UnitecDevelopment** | No | 2030 | CI Update 2030 (2% for Unitec Catchment) | Yes – see below for load estimate | None | |

**Table B1: Model Scenarios**

[1] Note Design Storm ARI is based on rainfall ARI, and have been developed from rainfall event analysis completed on the Albert Park Rain Gauge, and nesting rainfall durations for each ARI of interest. It is important to note the rainfall ARI does not necessarily correspond with the sewer flow ARI.

## Dry Weather Flow Loads – 2030 Unitec Site

Table B2 below summarises the dry weather flow loads applied to the model to represent the Unitec Development in 2030. While to represent the dynamic nature of these dry weather flow, a residential and commercial diurnal profile was applied to these loads see Figure B2 for the simulated dry weather flow from the proposed Unitec development (where these profiles have been adopted from the CI Model for commercial and residential development).

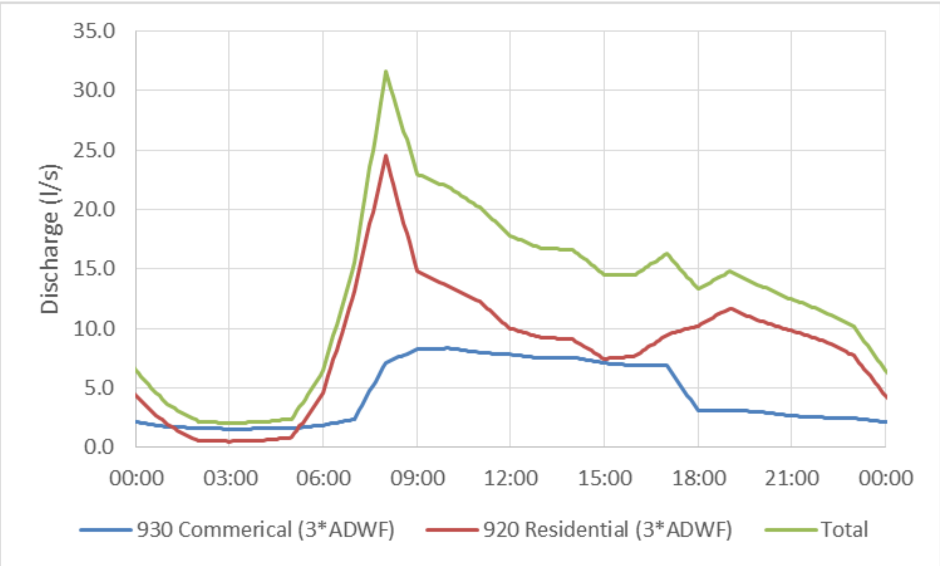



**Figure B2: 2030 Unitec Development Dry Weather Flow Loads**

| Site | 2030 Development Estimate | Resident Loads | | CBD or High Rise Buildings | | | Adopted Diurnal Profile |
|---|---|---|---|---|---|---|---|
| | | Numbers | Average Dry Flow (ADWF)[1] (l/s) | Gross Floor Area (GFA) (m2) | Estimated Number of People[2] | CBD or High Rise Buildings Average Design Flow[2] (l/s) | |
| Unitec Packages 1 to 10 Apartments (70%) | 1013 dwellings or 1520 new people | 1,520 | 3.96 | | | | 920 Residential (3*ADWF) |
| Unitec Packages 1 to 10 Townhouses (70%) | 104 dwellings or 260 new people | 260 | 0.68 | | | | 920 Residential (3*ADWF) |
| Unitec Packages 1 to 10 Business (70%) | 52,500m2 GFA increase | | | 52,500 | 3,500 | 2.63 | 930 Commercial (1.4*ADWF) |
| Unitec Packages 1 to 10 Retail (70%) | 2,170m2 GFA increase | | | 2,170 | 145 | 0.11 | 930 Commercial (1.4*ADWF) |
| Unitec Packages 1 to 10 Community (70%) | 669m2 GFA increase | | | 669 | 45 | 0.03 | 930 Commercial (1.4*ADWF) |
| Unitec Student Accommodation (100%) | 1093 beds or 1093 new people | 1,093 | 2.85 | | | | 920 Residential (3*ADWF) |
| Unitec Core Campus | No change to existing student numbers | | | | | | |
| Unitec Business Partnerships (70%) | Included above under business | | | | | | |
| Ngati Whatua Land (100%) | 100 Apartments or 150 new people plus | 150 | 0.39 | | | | 920 Residential (3*ADWF) |
| | 45 townhouses or 113 new people | 113 | 0.29 | | | | 920 Residential (3*ADWF) |
| Mason Clinic, Taylors Laundry, | No change from existing | | | | | | |
| **Total** | | **3,136** | **8.2** | **55,339** | **3,689** | **2.78** | |

## Table B2: Adopted Dry Weather Loads

[1] ADWF = 225 L/PE/Day from Section 5.3.5.1 Design Flow, Watercare's Water and Wastewater Code of Practice for Land Development and Subdivision

[2] CBD or High Rise Buildings = 1 person per 15m2, with ADWF = 65 l/p/d from Table 5.1, Watercare's Water and Wastewater Code of Practice for Land Development and Subdivision

The additional 2030 Unitec DWF loads, have been applied at Orakei Main Sewer (OMS) Manhole 50 (See Figure B3 below for location). In reality there are likely to be a number of local connections to the Orakei Main Sewer, these have not be modelled as it is assumed that sufficient local capacity will be available to convey flow to the OMS.

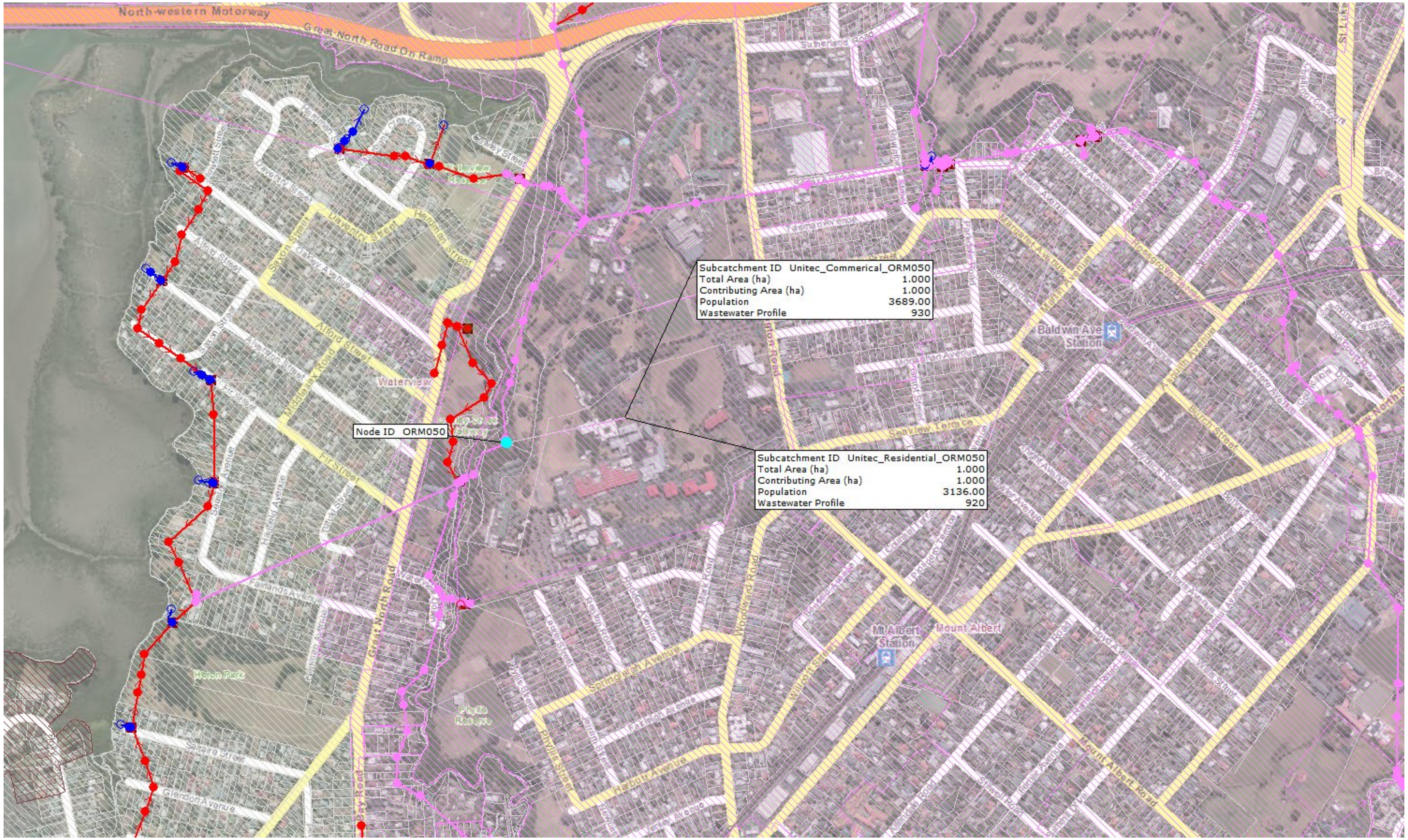



**Figure B3: Unitec 2030 Development Dry Weather Flow Loading Location**

Dry Weather Flow Loads – Existing

In addition to the future Unitec Development loads, there are also loads from the existing site (which includes Taylors Dry Cleaning, Mason Clinic, Unitec Staff and Students) which are assumed to remain unchanged from base (current) scenario. These are represented in the base model as 140 people with an ADWF of 176 L/PE/Day for both model scenarios (Catchments OMS045 & OMS050). The 140 people in the model for the existing Unitec site is very low compared to actual numbers of around 1000 full time equivalents.

The model inputs, however, show that the 140 population has been multiplied by a factor of 6 – presumably as part of the original calibration process. This 6x140 is much closer to the actual 1000 full time equivalents so does seem to represent the flow well.

See the Figure B4 below for simulated DWF profile, and Figure B5 for locations. It is also worth noting that catchment OMS047B_a also represents some contribution from the Unitec site, (with a population 850 people) however as this catchment includes a significant proportion of residential development outside the Unitec Site, for clarity this catchment has not be included in this discussion of loads (though it is still included within the model scenarios).

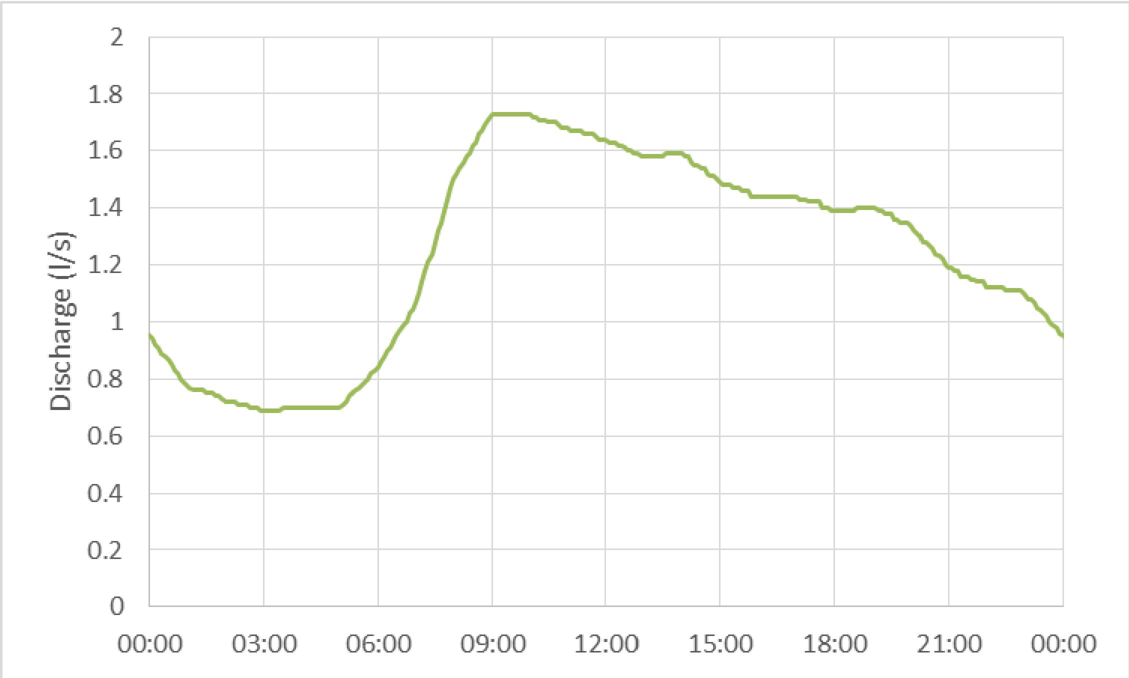



**Figure B4: Base Dry Weather Flow Loads (Taylors Dry Cleaning, Mason Clinic, Unitec Staff and Students)**

Dry Weather Flow Loads – Overall Summary

The below table summarises the simulated Dry Weather flow loads.

| Item | Scenarios Applied | ADWF (l/s) | PDWF (l/s) | Peaking Factor |
|---|---|---|---|---|
| Existing Loads | SP2030NoCI - CI Update Issue 1 | 1.2 | 1.8 | 1.4 |
| Unitec 2030 Loads | SP2030NoCI - CI Update Issue 1_UnitecDevelopment | 13 | 32 | 2.5 |

**Table B3: Dry Weather Loads Summary**

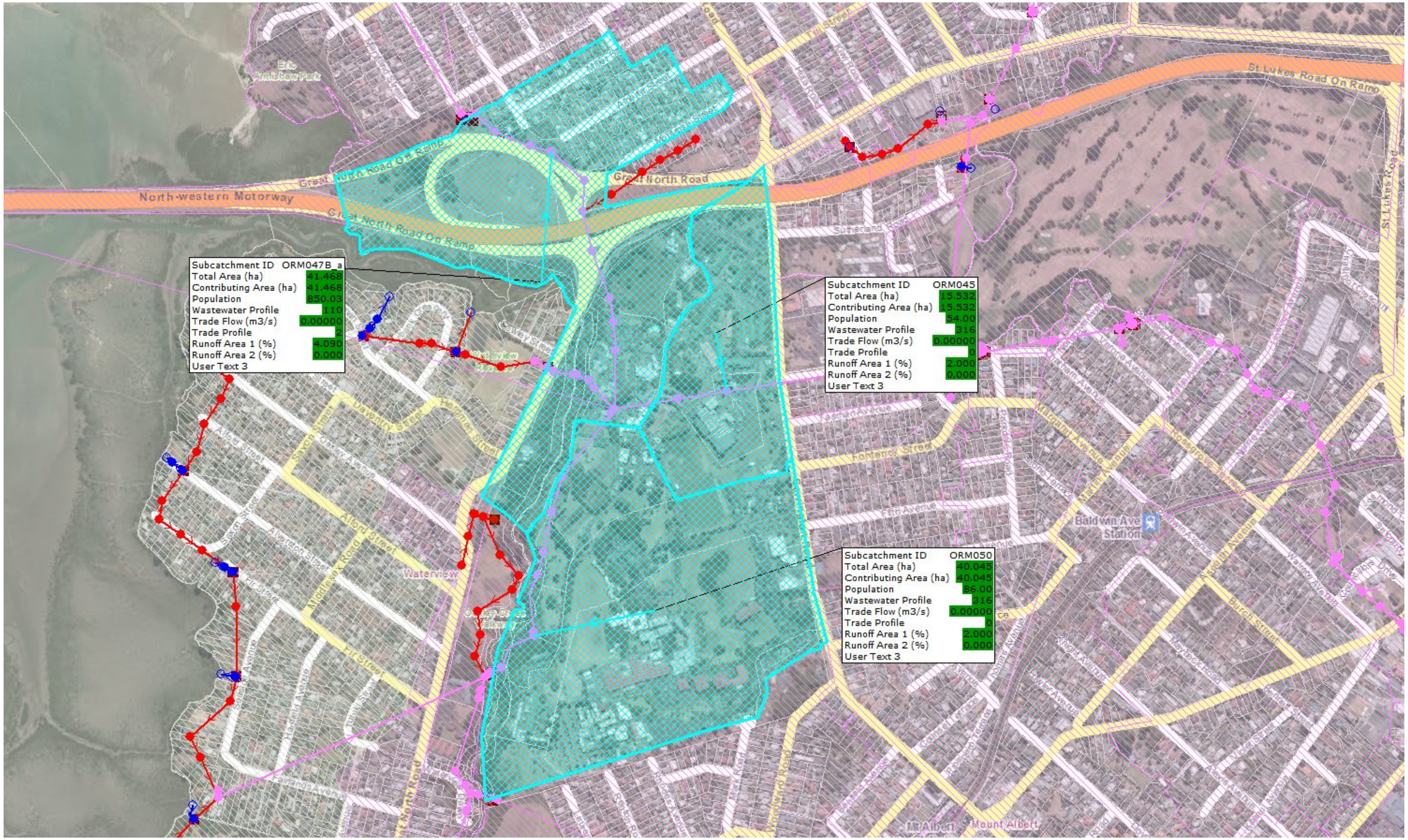



**Figure B5: Base Dry Weather Flow Loads Location (Taylors Dry Cleaning, Mason Clinic, Unitec Staff and Students)**

Wet Weather Flow Loads

Wet Weather loads have been adopted from the SP2030NoCI - CI Update Issue 1, which represents wet weather loads as 2% leakage rate applied to the Area 1 (Paved) contributing surface, while the Area 3 (slow response) & 4 (groundwater) have 2% and 15% contribution respectively. As such there is no change in leakage rates between the two modelled scenarios. Figure B6 below shows the location of contributing catchment flows from the Unitec Site, where two catchments cover this site which connect to OMS MH 50 and MH45 respectively. It is also worth noting that catchment OMS047B_a also represents some contribution from the Unitec site, (with an Area 1 contribution of 4%) however as this catchment includes a significant proportion of residential development outside the Unitec Site, for clarity this catchment has not be included in this discussion of loads (though it is still included within the model scenarios).

A design storm approach has been adopted to the analysis. The alternate approach of using long term time series simulations was not considered warranted in this case due to the onerous computational and analysis requirements.

- 3 Day ARI
- 4 Day ARI
- 1 Week ARI
- 2 Week ARI
- 3 Week ARI
- 1 Month ARI
- 2 Month ARI
- 3 Month ARI
- 6 Month ARI
- 1 Year ARI
- 2 Year ARI

These design storms have been centred so the peak rainfall intensity occurs at 12pm. Nested 24 hour storms were used to represent a worst case (for all durations).

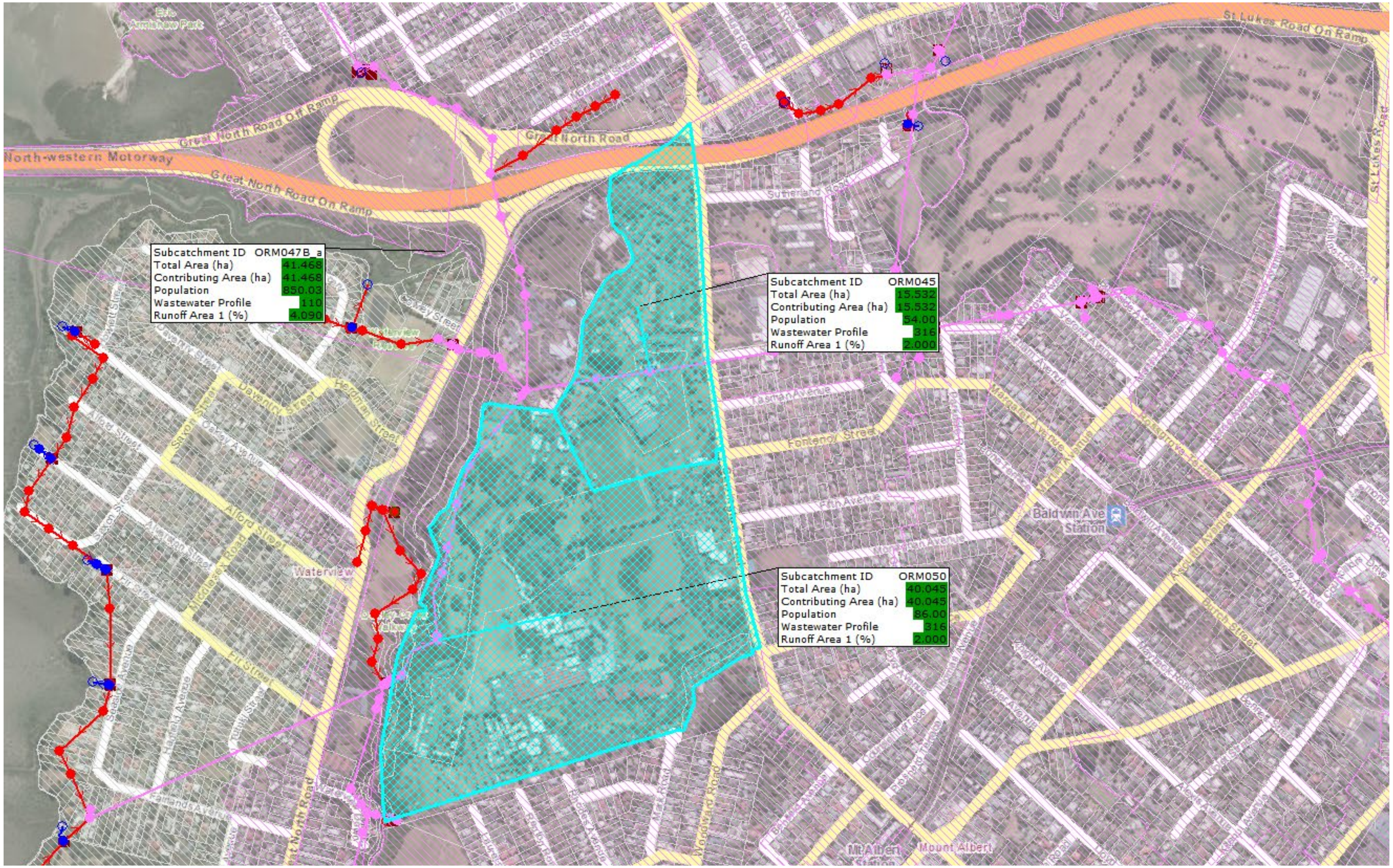



**Figure B6: Wet Weather Flow Loading Locations**

For the 6 Month Design a Peaking Factor of ~12*ADWF is simulated, due to the dynamic response from each rain event the simulated peaking factor will vary. See the below Figure B7 for simulated DWF and WWF response post the Unitec Development.

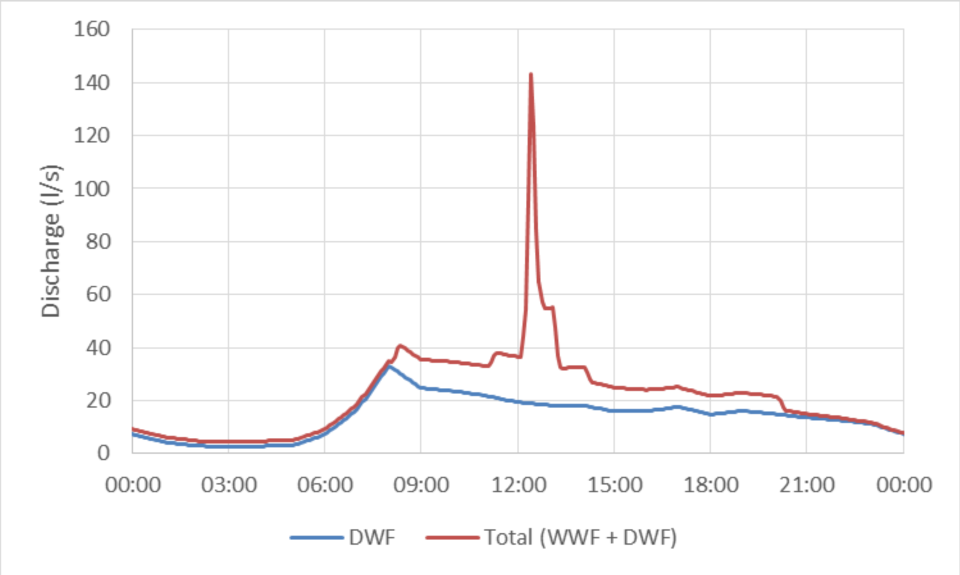



**Figure B7: 6 Month Design Storm – Simulated Inflow from the Unitec 2030 Development Site**

## Simulation Results

The key Engineered Overflow Points along Orakei Main Sewer, that are likely to be impacted by the Unitec Development are the:

- Scotland St EOP
- OMS MH38 EOP
- OMS MH51 EOP

See Figure B8 below for EOP locations.

There are a number of other EOPs, within the catchment but these are assumed to not be influenced by this development.

Figures B9 to B11 show the model results for the hydraulic profiles (long sections) of the Orakei Main under the following scenarios:

- 2030 Loads No CI - DWF With Unitec Development
- 2030 Loads No CI – 1 Week DS Without Unitec Development
- 2030 Loads No CI – 1 Week DS Without Unitec Development

Table B4 below provides a summary of the volumes discharge from the three key engineered overflow point for each of the design storm simulated.

| SP2030NoCI | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EOP Reference ID | Design Storm | | | | | | | | | | | |
| | 3 Day ARI - Albert Park | 4 Day ARI - Albert Park | 1 Week ARI - Albert Park | 2 Week ARI - Albert Park | 3 Week ARI - Albert Park | 1 Month ARI - Albert Park | 2 Month ARI - Albert Park | 3 Month ARI - Albert Park | 6 Month ARI - Albert Park | 1 Year ARI - Albert Park | 2 Year ARI - Albert Park | Total Volume (m3) |
| ORM MH51 | 0 | 0 | 0 | 0 | 1 | 350 | 892 | 1,495 | 3,808 | 8,554 | 10,809 | 25,908 |
| ORM MH38 | 0 | 0 | 0 | 765 | 2,053 | 3,561 | 6,071 | 10,534 | 15,709 | 19,464 | 21,308 | 79,464 |
| Scotland St | 0 | 0 | 119 | 286 | 582 | 1,135 | 1,707 | 2,420 | 3,402 | 5,060 | 6,223 | 20,934 |

| SP2030NoCI Unitec Development | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EOP Reference ID | Design Storm | | | | | | | | | | | |
| | 3 Day ARI - Albert Park | 4 Day ARI - Albert Park | 1 Week ARI - Albert Park | 2 Week ARI - Albert Park | 3 Week ARI - Albert Park | 1 Month ARI - Albert Park | 2 Month ARI - Albert Park | 3 Month ARI - Albert Park | 6 Month ARI - Albert Park | 1 Year ARI - Albert Park | 2 Year ARI - Albert Park | Total Volume (m3) |
| ORM MH51 | 0 | 0 | 0 | 0 | 34 | 461 | 1,053 | 1,720 | 4,360 | 9,270 | 11,554 | 28,451 |
| ORM MH38 | 0 | 0 | 0 | 871 | 2,163 | 3,706 | 6,507 | 10,881 | 15,879 | 19,596 | 21,473 | 81,076 |
| Scotland St | 0 | 0 | 119 | 288 | 587 | 1,141 | 1,710 | 2,419 | 3,402 | 5,065 | 6,233 | 20,963 |

**Table B4: Model Results: Summary of Overflow Volumes**

Review of the model hydraulic performance pre and post the Unitec development, shows that:

- There are no dry weather overflows in either the base case of with the Wairaka development.
- Overflows do not occur for the smallest two design storms modelled, indicating some capacity in the sewer to accept both DWF and small rainfall events.
- The Unitec Development doesn't increase spill frequencies (as assessed with the adopted Design Storms).
- The key overflow points downstream of Unitec (OMS 38 and Scotland St) appear relatively unaffected by the proposed development.
- The biggest effect comes at the overflow point adjacent to Unitec (OMS 51) where the increase in overflow volume is expected to be around 10% (averaged over all design storm simulated)

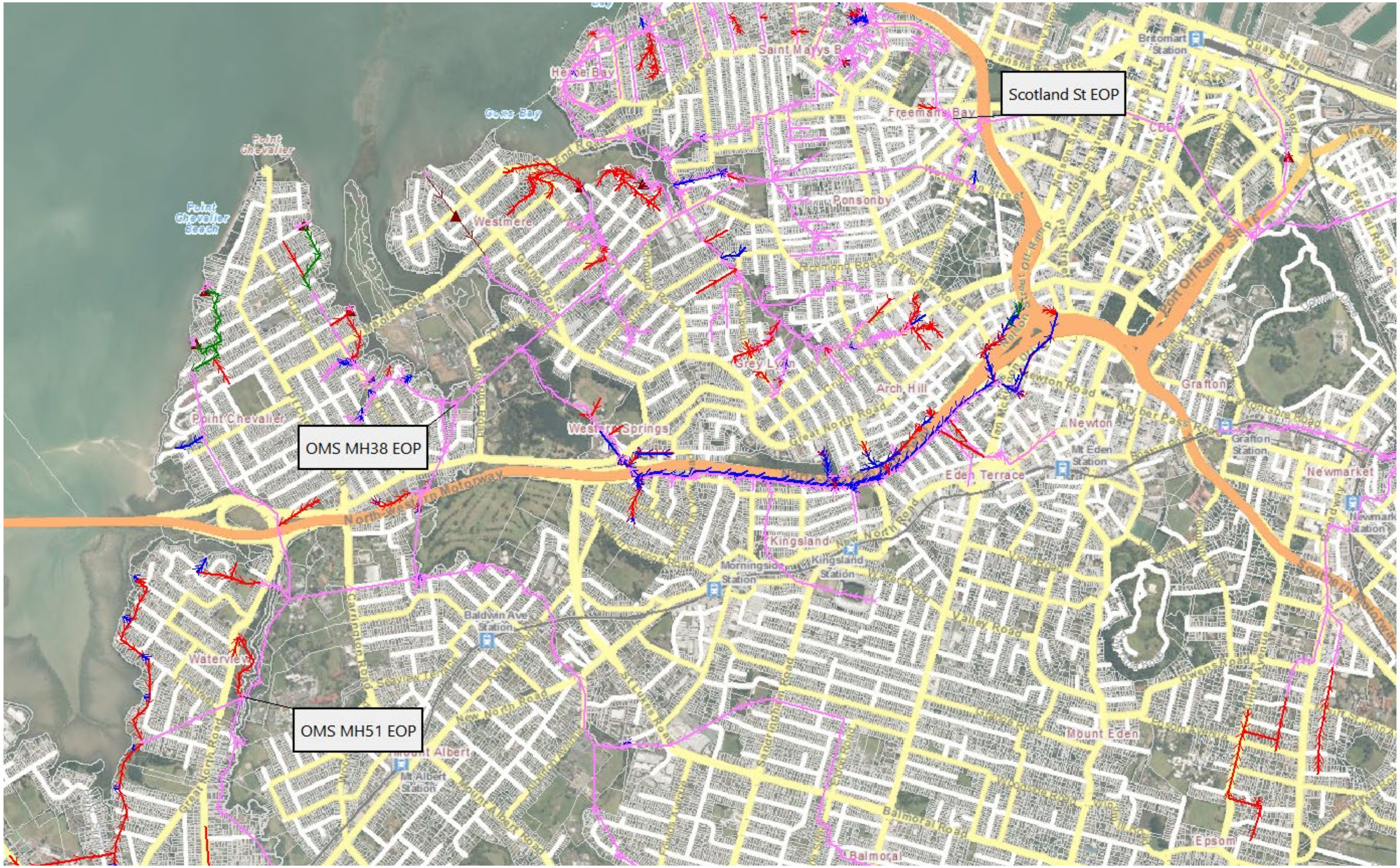



**Figure B8: Location of Engineered Overflow Points (EOPs)**

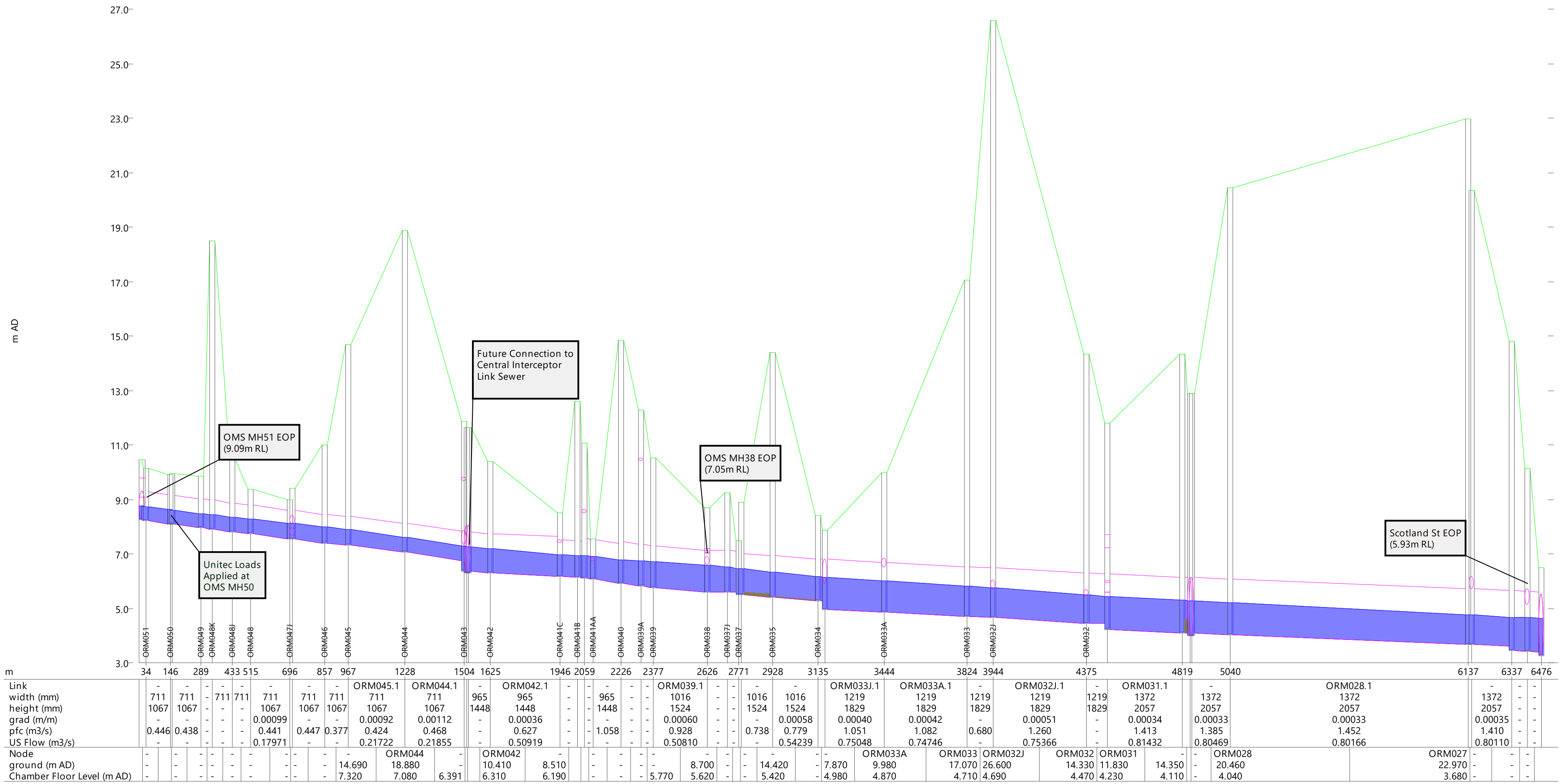



**Figure B9: DWF – SP2030NoCI - CI Update Issue 1 – Hydraulic Profile from OMS MH51 (US of Unitec Site) to OMS MH25**

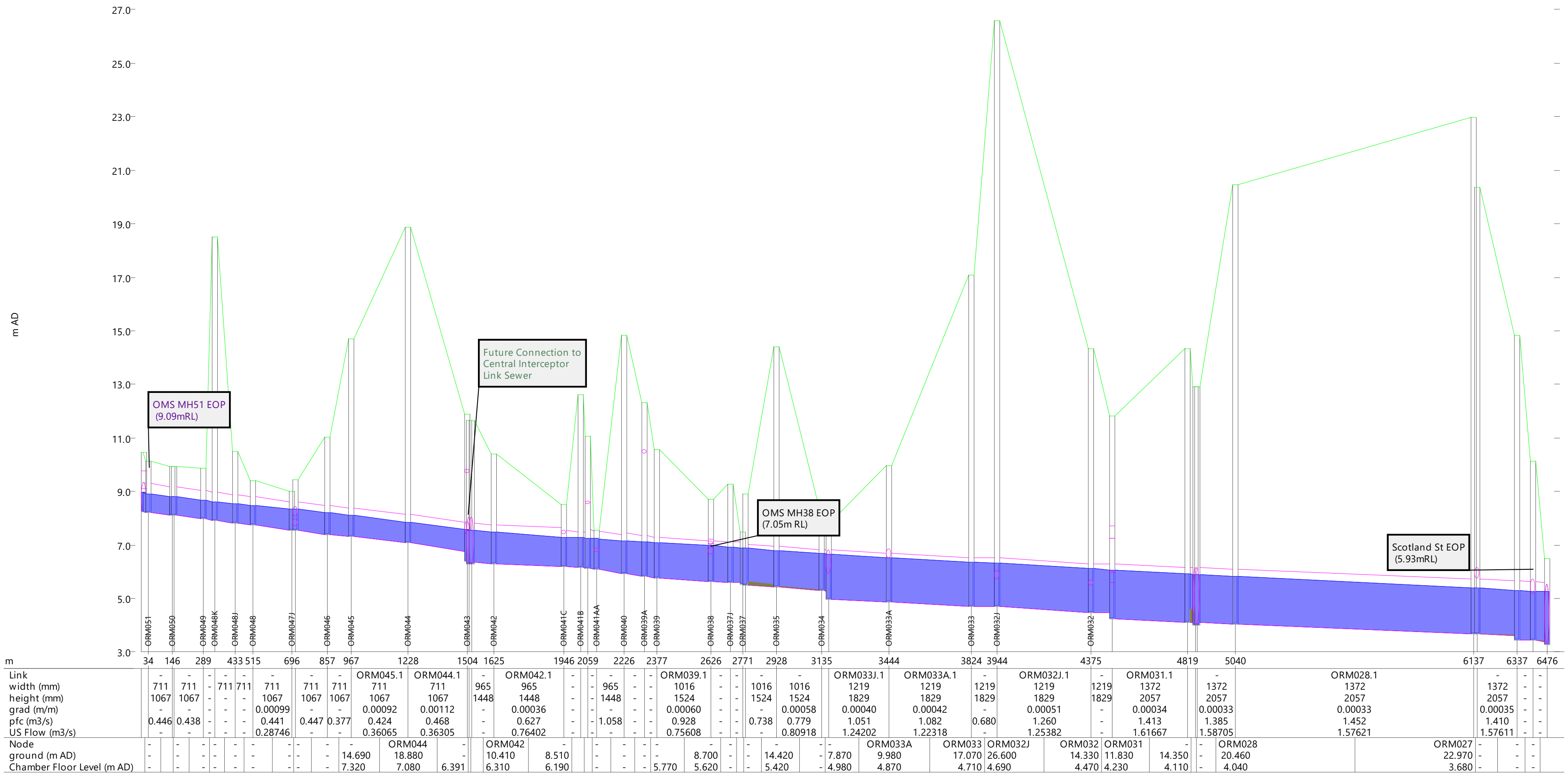



**Figure B10: 1 Week Design Storm – SP2030NoCI - CI Update Issue 1 – Hydraulic Profile from OMS MH51 (US of Unitec Site) to OMS MH25**

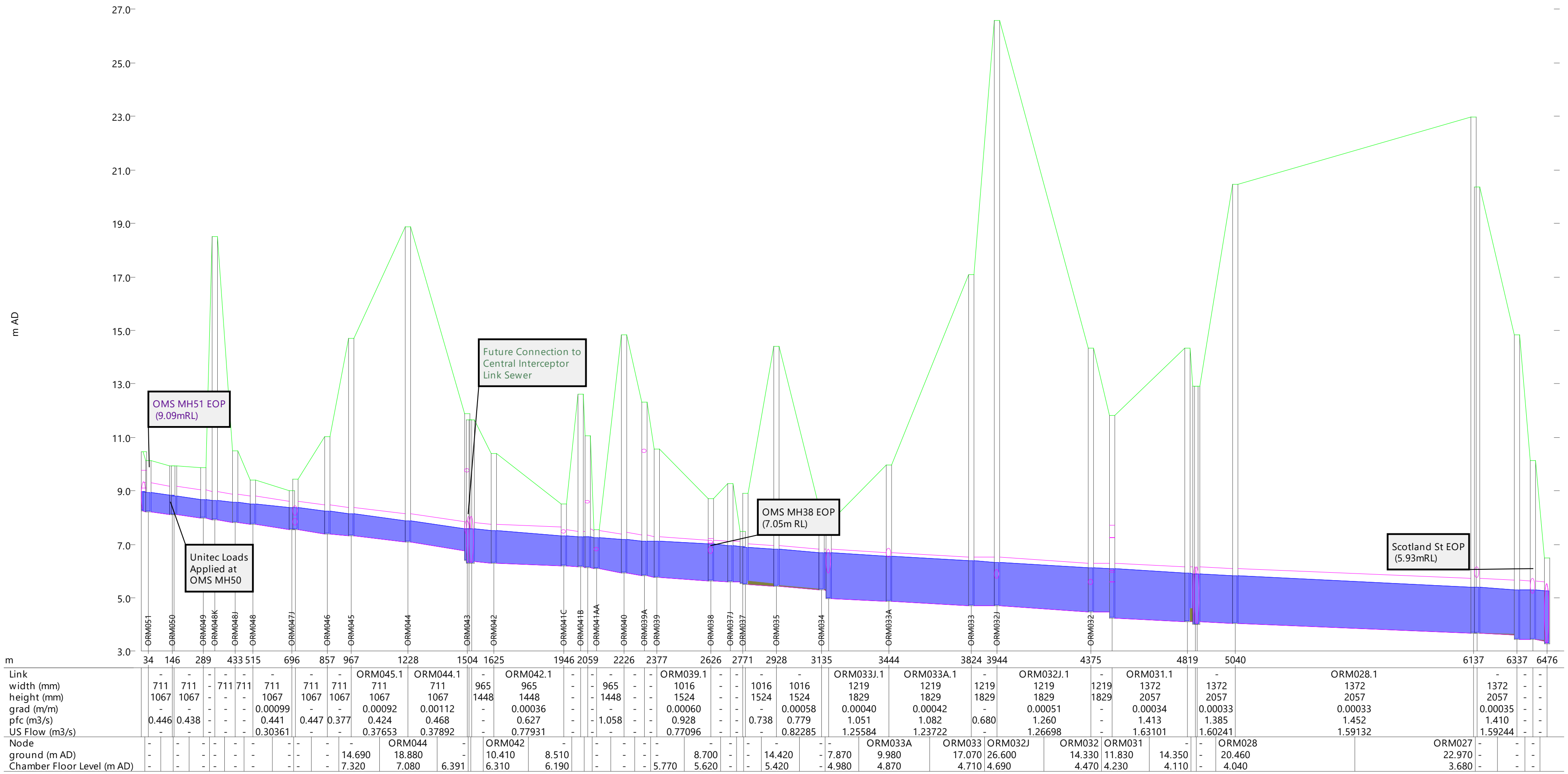



**Figure 11: 1 Week Design Storm – SP2030NoCI - CI Update Issue 1_UnitecDevelopment – Hydraulic Profile from OMS MH51 (US of Unitec Site) to OMS MH25**

# TE AUAUNGA PRECINCT 2023 INTEGRATED TRANSPORT ASSESSMENT

## EXECUTIVE SUMMARY:

## TE AUAUNGA PRECINCT ITA

**STANTEC FOR THE MINISTRY OF HOUSING AND URBAN DEVELOPMENT**

**October 2023**

## OVERVIEW

This executive summary covers several documents which together address transport matters related to the residential development of the Wairaka Precinct (the Precinct), to be renamed the Te Auaunga Precinct. These documents address the Precinct, and the surrounding areas which influence it, and were completed by Stantec for Te Tūāpapa Kura Kāinga – Ministry of Housing and Urban Development (**HUD**).

The **Precinct ITA** now comprises this collection of documents, being:

(a) this Executive Summary and Recommendations summarising key aspects, and setting out specific transport commitments – which supersedes and replaces the 2021 and 2022 Executive Summary documents;

(b) the primary June 2020 ITA document prepared by Stantec (**2020 ITA**) which was accepted by Auckland Council, on the recommendation of Auckland Transport (**AT**), on 30 March 2021 (reference SUB60223011), and anticipates the development of the Precinct for at least 2,049 dwellings by Year 2028;

(c) additional traffic modelling sensitivity testing by Stantec to support the ITA (**October 2020 Memorandum**) which included an assessment of the housing yields at which at least one intersection upgrade between the Precinct and Carrington Road should be delivered; and

(d) the updated "Transport Assessment and Modelling Report" produced in support of the plan change (**2022 TMR**) which anticipates the development of the Precinct for at least 4,000 dwellings by Year 2031.

(e) The responses to Council's C23 queries on transport matters provided as part of the notification process for the Te Auaunga Plan Change, especially where they provide additional material not already covered in the above.

The ITA Executive Summary, which was separately produced to bring together the 2020 ITA and the October 2020 Memorandum, is wholly updated in this document. This 2023 Executive Summary document brings together the key findings from the documents listed above, essentially forming the **2023 ITA**.

It identifies the key commonalities and differences and sets out the basis on which the residential development will proceed, including as established in the up-to-date modelling produced in support of the Te Auaunga Plan Change, which has been lodged with Council in December 2022.

An approved ITA is a requirement of the existing Wairaka Precinct of the Auckland Unitary Plan Operative in Part (**AUP**), with its provisions intended to guide transport matters associated with its development, including the land for residential development and the other uses enabled by the Precinct provisions.

Since the 2020 ITA was approved by Council, there have been some key changes which have been incorporated, particularly via the 2022 TMR:

a) further land ownership changes within the Precinct, including the setting apart of additional land for residential development, which now comprises 39.7 hectares;

b) increased certainty about the timing and scope of the Carrington Road Upgrade, with works now projected to begin in 2025, and to extend from Pt Chevalier and Mt Albert (with bus lanes and protected cycle lanes) rather than solely along the development frontage. As discussed further in the C23 responses, the relevant government funding for the upgrade has been approved through the Infrastructure Acceleration Fund and is explicitly tied to the development proposed within the precinct. As such, despite the Carrington Road Upgrade technically still being in the Business Case stage with Auckland Transport at this time, there is far more certainty about the project than for other transport projects funded through typical channels;

c) further iterations of the Rōpū masterplanning which have advanced the intended staging of retail within the precinct, and the assumptions around carparking, including the percentages of dwellings that will be delivered with low or no carparking, s - being one of the key constraints on added car traffic being generated;

d) detailed design for the internal site infrastructure, including roading design, which has confirmed that the future signalised intersections, where the residential development connects with Carrington Road, will be at ‘Gate 1’ and ‘Gate 3’, due to site constraints within the Precinct near ‘Gate 2’;

e) consideration of development enabled by the proposed Te Auaunga Plan Change, noting the 2020 ITA already anticipated 4,000 dwellings in the longer term, albeit beyond the original traffic model assessment period. The key change in the updated modelling has been to extend the assessment horizon to include more of the development already enabled by the existing zoning and Wairaka Precinct provisions, and to include Auckland Transport's updated network assumptions, which now extend to 2031.

The 2020 ITA, and the updated modelling, take account of all known existing and planned development within the Precinct as of December 2022, and include stated assumptions about other development within the study area. However, the updated modelling no longer assumes a primary school or ECE within the assessment horizon, as there is currently too much uncertainty about the future timing and location of the school to include it in the modelling with any confidence.

The 2022 TMR is accompanied by provisions in the plan change that will set new parameters around when the Precinct ITA will be reviewed and updated. The modelling of the TMR shows the Precinct can support development of 4,000 homes, and associated retail provision, if its assumptions around trip generation, transport upgrades and other improvements and behaviour changes in the wider network hold true. After 4,000 dwellings a new ITA would be required.

A check on these assumptions is proposed at 3,000 homes, to see whether they are bearing out, and determine whether or not the Te Auaunga Precinct 2023 ITA needs to be updated such as to extend or reduce the forecast yields, or to incorporate additional, or fewer, controls on trip generation.

The 2022 TMR builds upon the 2020 ITA, meaning proposals in that ITA, and the October 2020 Memorandum, continue to set the base case for development within the Precinct, but with the updates necessary to incorporate the new assumptions around residential development and the external network – with the most significant change between October 2020 and December 2022 being the increased certainty around the timing and extent of the Carrington Road Upgrade.

In the October 2020 Memorandum, there was identified a need for at least one intersection upgrade to be completed at around 600 homes with code compliance certificates, in order to ensure suitable car and active mode accessibility within and to the Precinct. This commitment was intended to give AT greater confidence that the network would function successfully and safely.

The timing and staging of this first intersection upgrade will now be confirmed with AT in conjunction with engagement on the Carrington Road Upgrade, as there is an opportunity for the intersection upgrade works and the Carrington Road Upgrade works to be completed together.

As previously, the modelling has been prepared for the Precinct as a whole but in the context of the broader network. The traffic modelling study area extends from Pt Chevalier and Great North Road in the north, through to Mt Albert in the south.

The Precinct is currently the largest contiguous brownfields development on the Isthmus, and a key site for the Crown in terms of delivering a high-quality urban environment for Auckland, consistent also with the Council's urban consolidation strategies and planning documents.

With a position much closer to key employment areas than comparable other residential developments, and with the Precinct's good connectivity to all forms of transport, including public transport and active mode networks, the projected transport effects are considered able to be more easily integrated than those of a comparable greenfield development.

## WAIRAKA PRECINCT

The key landowners and traffic generators in the Precinct are:

(a) 39.7ha of Crown land held for housing purposes and intended for medium to high density residential development targeting at least 4,000 dwellings. This land will be developed by the Marutūāhu, Ngāti Whātua and Waiohua-Tāmaki Rōpū, in partnership with the Crown, who will undertake the development on the basis of their rights under their collective Treaty Redress Deed.

(b) Ngāti Whātua Ōrākei, whose 4.4ha block of land in the southern and western portion of the Precinct is targeted for medium density residential development with an expected yield, when combined with the Crown land holdings in the South, of around 500 units out of the 4,000 assumed.

(c) Unitec Institute of Technology (**Unitec**), whose 13.4 ha is currently used as a tertiary education campus. Unitec has a previous ITA for their campus consolidation, now in part superseded. Traffic generation assumed is based on Unitec:

> i. growing the campus to 12,000 FTEs;
>
> ii. constructing two parking buildings; and
>
> iii. making operational changes to the campus with a key focus on public transport and the spreading of teaching time, to achieve a wider distribution of travel time. Current trends of enrolments and changes to teaching since the start of the Covid-19 pandemic have meant that operational changes to teaching practices (such as more teaching online) are already being implemented, making some of the requirements around dedicated parking buildings less critical. Unitec is also beginning to proactively manage demand for its parking, such as by introducing paid parking across much of its campus. The 2020 ITA modelling was based on Unitec’s existing consents, publicly available information on its enrolment trends, and information supplied for a previous 2017 ITA about its intentions. This has not been updated for the 2022 modelling, as the existing information and assumptions are still considered appropriate as a conservative assumption of likely traffic impacts.

(d) Te Whatu Ora – Health New Zealand’s 6ha Mason Clinic block that is a healthcare facility including a forensic hospital service. The 2020 ITA is based on projected growth for this facility, including the growth enabled by Te Whatu Ora – Health New Zealand’s own private plan change (PC 75), and therefore has not needed to be updated for the 2022 modelling contained in the TMR.

(e) the Taylors Laundry site, which currently comprises a commercial laundry and catering service, under a lease to HUD which extends to 2036. The 2022 modelling contained in the 2022 TMR assumes that this will continue to operate at current levels to at least 2031, but without prejudice to commercial negotiations: they may remain longer. The ITA anticipated the transfer of this land for housing noting any changes to the timeframe for the commercial laundry to vacate may only change the order of the forecast dwelling stages within the Precinct but with all these locations accessed by Gates 1, 2 or 3.

As noted above, the ITA was based on current and projected traffic generators in the Precinct whilst also acknowledging the surrounding network traffic via surveyed flows and projected flow changes coordinated with AT's forecasting. This was updated (in a sensitivity testing process) in the October 2020 memorandum, and more comprehensively updated in the December 2022 TMR which also extends the assessment horizon to 2031.

## ASSUMPTIONS UNCHANGED BETWEEN THE 2020 ITA AND THE 2022 TMR

The 2020 ITA was able to anticipate much of the development that is now modelled in the 2022 Memorandum, including the geographic distribution and numbers of dwellings across the areas of the Precinct that are not being rezoned. The 2020 ITA and 2022 TMR also adopt a consistent approach to the development generally, assuming that improved public transport in the wider area, and alternative transport modes, will enable "less-car dominated" residential development.

Other assumptions that have remained the same are:

- The proposals of the plan change regarding permitted height do not in themselves significantly affect the dwelling numbers. While changes in height permitted may slightly modify what number of dwellings might be able to be achieved in each sub-precinct in the north-and-centre, such potential slight shifts in the "centre of gravity" do not affect the traffic outcomes to any significant level, as the areas all use the same internally interconnected links to the wider road network as before.
- The student assumptions for Unitec (9,702 FTE), despite a reduction in size in the tertiary education-zoned area, as it can still incorporate an increase to FTEs in its consolidated campus.
- The trip generation assumptions for the extended Mason Clinic, as its increased area and development intentions were already known in 2020.
- The number and location of vehicle connections to the wider transport network, which remain Gates 1, 2 and 3 for the residential development to Carrington Road, with Gate 4 remaining the key Gate for the Unitec campus, and the permitted connections to the south, which then terminate in the south of the Precinct, which are unchanged through the Te Auaunga Plan Change.
- The level crossing over the rail line at Woodward Road staying in place in all traffic models.

  The assumptions for how much through traffic reductions on Carrington Road will occur due to displacement by the new site traffic.

## KEY DIFFERENCES BETWEEN THE 2020 ITA AND THE 2022 TMR

The key differences between the 2020 ITA and the 2022 TMR are set out in the table below. To fully compare the differences, both documents should be read.

| Area of difference | 2020 ITA | 2022 TMR |
|---|---|---|
| Time period using the background (wider-area) traffic data and Auckland-wide projected values. | Traffic modelling at Years 2024 and 2028 | Extends traffic modelling to 2031 |
| Number of dwellings / years | 2,049 dwelling by Year 2028 | 4,000 dwellings by Year 2031 |
| Distribution and size of dwellings (i.e. different spread for size of bedrooms), | Assumes the same average size of dwellings across the Precinct, at 1.5 bedrooms average | Assumes larger homes towards the south of the Precinct and smaller homes in the higher density north, at 2.5 bedrooms average |
| Retail incl. supermarket | Not in traffic model | Included in traffic model |
| School | 375 students, by Year 2028 | Not in traffic model |
| Taylor's Laundry | Included to Year 2028 | Included to Year 2031 |
| Per-dwelling carparking rate | Slightly less than 1 carpark per dwelling, averaged across the Precinct | 1,000 dwellings with no car parking, with the remaining 3,000 dwellings with an average of 0.7 or less parking spaces per dwelling, averaged across the Precinct |

| | | |
|---|---|---|
| Resident's Parking Schemes (areas surrounding Precinct) | Not assumed / required | Assumed as mitigation measure |
| Trip generation rates | 2020 assumptions | 2022 assumptions (revised down to account for changed factors such as greater parking restraints) |
| Signalised access | Gate 2 and Gate 3, with Gate 1 a LILO (left-in / left-out), once fully implemented | Gate 1 and Gate 3, with Gate 2 a LILO, once fully implemented |
| North-Western Shared Path crossing | Mid-block signalised crossing | Incorporated into Gate 1 signals |
| Carrington Road Upgrade (provision of bus lanes, protected cycle lanes, improved footpaths and various intersection upgrades) | Works starting in 2028, and extending from Woodward Road to Sutherland Road | Works starting in 2025, and extending from the intersections with Great North Road in Pt Chevalier to New North Road in Mt Albert |

## UPDATES TO DWELLINGS

The traffic modelling, as updated, continues to rely on a number of assumptions, and variables, that may change over time. This is why a review of the ITA at 3,000 dwellings occupied is proposed.

The 3,000 dwellings check-in point was selected on the basis of the 2020 ITA, which provided analysis and modelling to support up to 2,049 dwellings, and the 2022 TMR which sets the conditions for up to 4,000 dwellings, based on updated assumptions and variables, and the longer assessment horizon. In general terms, the 2020 ITA assumed development to progress at a rate of an average of 256 new dwellings per year across its 8-year period, whereas the 2022 Modelling assumes an average of 364 new dwellings per year across its 11-year period, but with lower average trip generation.

At 3,000 dwellings the key assumptions and variables to be reviewed will include the trip generation rates, including from the residential development and Unitec, and the performance of the wider network, including the Carrington Road Upgrades and other improvements to public transport.

There may be other changes to the Precinct before 3,000 dwellings which would require an earlier update to the 2022 TMR modelling, such as a primary school and early childhood education proposal, significant changes to Unitec’s projected FTEs or car parking numbers, and any other significant land-use changes that may come about from a shift in government priorities – given the majority of the current landholdings are Crown or Crown entities.

It should be noted that the increase in dwellings from 2,049 to 4,000 does not represent a change in approach nor does the added development largely derive from rezoning in the proposed Te Auaunga Plan Change (with much of the increase being in areas not being rezoned).

The 4,000 dwellings have been signalled previously, with the 2020 ITA and associated processes also clarifying that the traffic model assumptions did not yet cover a full buildout. The impacts / associated mitigation for a larger dwelling number and a longer time horizon had not yet been identified and traffic modelled at the time of the 2020 ITA, unlike in the 2022 TAR.

For clarity, no assessment of dwellings numbers above 4,000 has occurred. Should there be a proposal at some future stage to provide greater dwelling numbers, this would not be aligned with the 2023 ITA composed of the documents set out in this 2023 Executive Summary and would require new assessment processes / a new ITA as set out in the precinct rules.

## CONTEXT

The 2022 ITA and the 2022 TMR both assume, and encourage, greater use of alternate transport modes, including public transport and walking and cycling, through constraining car parking and the improvement of relevant infrastructure and, where applicable, services (more frequent, accessible, and direct routes by bus and train etc).

The proposed residential development will occur, to the extent feasible, as a low-car development. Parking will be limited and there will be a sizeable proportion of dwellings with no carparking. Parking will be provided "unbundled", i.e. prospective dwelling purchasers or tenants are not required to acquire or rent car parking as well. In addition, internal network design and connections to external transport networks will prioritise a high level of access for active modes and public transport to reduce the average levels of car use. Since the 2020 ITA was finalised, the Covid-19 pandemic has also changed travel and commuting habits. These are still to be fully understood but involve more working from home but may also have led to some (at least temporary) increases in private car use over public transport.

The 2020 ITA was informed by a number of significant land use or transport changes affecting the area which support the emphasis on creating a low-car development, which are still relevant to the 2022 TMR, including:

(a) The opening of the Waterview Tunnel and the connection of State Highway 16 and State Highway 20, which has had a significant impact on traffic volumes on Carrington Road. A number of cross-town journeys that previously relied on the arterial route of Mt Albert Road and Carrington Road are now serviced by the south-western and north-western motorways. The 2020 ITA assumes that through redistribution of traffic and growth, Carrington Road will return to previous traffic volumes over time with some level of congestion inevitable. The 2020 ITA and 2022 TMR also both assume that this congestion will result in some redistribution within the network – i.e. shift some existing trips to other times, routes, or modes of traffic, or lead to people to drive less.

(b) The completion of the North-Western Shared Path through to the City Centre, and interconnection with the Waterview / Avondale to New Lynn Shared Path. The cycleway network will also be significantly improved through the Carrington Road Upgrade, and other connections across the wider network.

(c) The increased frequency of trains on the Western rail line, particularly during peak times, which has increased the functionality and service levels for rail passenger transport on this route and compounded some constraints for the ‘at grade’ rail crossing at Woodward Avenue. Further improvements to public transport access to the area are expected to occur with the opening of the City Rail Link, and the longer-term plans for rapid transit along SH16. The Precinct has good access to Baldwin Ave and Mt Albert Train Stations, and at its boundaries is on the edge of the 800-metre catchment used by AT, but within a 1,500-metre catchment practical for end-of-journey trips, particularly with the Carrington Road Upgrade making it easy to access the Mt Albert station safely by bicycle or scooter.

(d) The Carrington Road Upgrade, including dedicated bus and active mode facilities, which AT has now agreed to stage in time to support the residential development. Works are anticipated to start in 2025, and to eventually extend from the Mt Albert Town Centre (New North Road) to the Pt Chevalier Town Centre (Great North Road) including bridge upgrades at SH16 and the Mt Albert Rail Overbridge, which will result in better outcomes for public transport than the more limited upgrade proposed in the 2028 RLTP and 2020 ITA.  As with the 2020 ITA however, the 2022 TMR still assumes that the Town Centre intersections themselves will not be significantly upgraded during the model period.

(e) Ongoing improvements to the high frequency bus services along both Carrington Road and Great North Road. Great North Road is accessed from the Precinct by the Oakley /Te Auaunga Creek overbridge and is therefore the closest public transport for development in the west of the Precinct.

The 2020 ITA and the 2022 TMR modelling take account of known and likely future trends for the precinct and the study area. The Marutūāhu, Ngāti Whātua and Waiohua-Tāmaki Rōpū, in partnership with HUD, are committed to developing the Crown land holdings based on this Te Auaunga Precinct 2023 ITA and the Te Auaunga precinct provisions as amended through the Te Auaunga Plan Change.

## TRAFFIC SIGNALS

In its review of the 2020 ITA, AT officials generally supported the methodology and findings of the Stantec analysis and assumptions but sought the inclusion of a commitment to at least one signal upgrade earlier during the period of the ITA. The signal upgrade was intended to provide safe access to and from Carrington Road from around 600 dwellings.  This commitment was considered necessary due to the (at that time) uncertainty around the Carrington Road Upgrade timeframes

In developing the 2022 TMR, Stantec had the benefit of a commitment by AT to deliver the Carrington Road Upgrade in time to support the development, with works now projected to start in October 2025.

However, as AT is yet to complete its Detailed Business Case for the Carrington Road Upgrade, and due to inherent uncertainties and complexities around major works such as these, there is still the outside possibility that the Rōpū will deliver at least one of the intersection upgrades ahead of Auckland Transport's upgrade.

The preference of all parties is that this intersection upgrade is completed 'in line' with the Carrington Road Upgrade to minimise traffic disruption and remove the need for any rework. However, in the event this is not possible because the Carrington Road Upgrades do not advance as projected, the first intersection upgrade will proceed ahead of the Carrington Road Upgrade.

The sensitivity analysis of the October 2020 Memorandum incorporates a high degree of tolerance should assumptions regarding traffic flows not eventuate. As noted in the October 2020 Memorandum, 600 dwellings with consent code compliance in the areas of the Precinct accessing Carrington Road, was the conservative estimate of the point at which signals would be required, with a possibility that 1,000 + dwellings of this type could in fact be built before signals would be necessary.

In addition, the October 2020 Memorandum was completed on the basis the new, upgraded, traffic signal-controlled intersection would be at or near the vicinity of the current Unitec Gate 2 or, if agreed with AT, an alternative location. The December 2022 TMR anticipates the new upgraded traffic signal-controlled intersection will be at the future Gate 1.

As in the October 2020 Memorandum, any intersection upgrade that proceeds ahead of the Carrington Road Upgrade will be future-proofed to tie into the likely future configuration of the Carrington Road Upgrade as much as possible and is intended to be based on the design for the Carrington Road Upgrade – which all parties anticipate will be available by this time.

## INTERNAL NETWORK AND ACTIVE MODES

The 2020 ITA and 2022 TMR are based on a strongly interconnected road network within the precinct through to Carrington Road, with more restricted access to the adjacent southern residential streets. Limitations to the south are in response to strict controls in the AUP for transport connections in this location, which are unchanged through the Te Auaunga Plan Change. The AUP provisions are particularly targeted at:

(a) discouraging Unitec students from entering the Unitec campus (by vehicle) through the southern roads; and

(b) preventing potential “rat running” of vehicles short-cutting from New North Road to Great North Road avoiding the Woodward Road / Carrington Road intersections.

For completeness, it is also noted that Policies I334.3 (25) and (26) of the AUP’s precinct rules currently do not identify (list) Mark Road, which in the Te Auaunga Plan Change’s new version of Precinct Plan 1 is now shown as connected into the precinct (into the southern area of lower-density housing). However, for avoidance of doubt, the relevant policies are considered to also cover this fourth southern local street despite it not being formally named.

The 2022 TMR, as with the 2020 ITA, is based on the four intersections (“gates”) on Carrington Road identified in the Precinct Plan providing the primary vehicular access, and more minor connections to the southern residential roads. Internal connections between the two areas may be provided by the internal roads but will discourage through traffic and student traffic as required by the Precinct rules. As set out in C23 responses by the applicant, recent planning and Fast Track consents are already giving effect to this intent, with the proposed new southern road connections being split off from the centre-and-north road system via proposed cul-de-sac-ends located west of the Unitec tertiary institute, and only walking and cycling connections crossing the “cut”.

The detailed alignment of the internal roads accessing Carrington Road has been confirmed with Auckland Transport through Engineering Plan Approvals (ENG60396158) but are not significantly different from the alignment previously anticipated – as the internal roads overlay the existing internal network in most areas.

Each traffic model has anticipated interconnectivity between Gates 1, 2 and 3, and therefore the ability to distribute traffic across the gates.  All models have also anticipated that there will not be traffic movement between the south and these centre-and-north gates, except for alternative modes (walking, cycling), as well as the ability to provide at least one key signalised access for the residential development in the centre-and-north of the Precinct on to Carrington Road (i.e. Gate 1 or 2).

The other key requirement – expressed both in the precinct rules, 2020 ITA and the 2022 TMR – is ensuring a high level of active mode safety and convenience. This is to ensure good urban design and transport outcomes by encouraging walking, cycling and access for all modes – for local trips, for access to the wider network, and to public transport (bus stops, train stations etc).

To ensure this access, any sub-Precinct in the precinct, at building consent code compliance certificate time, will be provided with high-quality active mode links to, at least, the Waterview Shared Path in the West and Carrington Road in the East. These sub-precincts will be able to connect into the dedicated cycleways that have been provided through the precinct as part of the Engineering Plan Approvals noted above, which connect south to the Waterview Shared Pathway east/west to Carrington Road at Gate 1 and Gate 3 and traverse the length of Spine Road.

In addition, a safe connection for the North-Western Path will be provided over Carrington Road as part of or near the Gate 1 signals, with the crossing design to be integrated with that of the Carrington Road Upgrade.

Design philosophies for active mode design are set out in the 2020 ITA, and form part of the context for the 2022 TMR.

These aspects are enshrined within the existing precinct provisions and no changes are proposed through the Te Auaunga Plan Change, i.e. development enabled as a result of the plan change will be progressed consistent with this earlier strategy.

## MODELLING ASSUMPTIONS AND RESULTS

The 2022 TMR modelling work by Stantec:

(a) Is a microsimulation model using a AIMSUN software package. It adopted normal, best practice modelling approaches in terms of utilising existing traffic surveys, setting a study area relevant to the precinct but beyond the precinct (Great North Road, New North Road, Carrington Road and Woodward Road and all adjacent streets), assessed peak demand, and calibrated the model to ensure integrity of the data.

(b) Set out a series of scenarios as summarised above. It established a base scenario and then assessed a plan change growth based on 4,000 dwellings and other development such as the retail components, with a future horizon of 2031.

(c) Allocated a trip distribution based on the individual uses within the precinct and allocated that distribution across the roading network (refer section 3.8 of the Stantec 2022 TMR).

The key modelling assumptions are summarised below.

| Modelling Assumptions | Base 2019 | ITA 2028 | Plan Change 2031 |
|---|---|---|---|
| Residential dwellings | ✗ | ✓ (2,049 dwellings) | ✓ (4,000 dwellings) |
| Tertiary Education | ✓ (varied) | ✓ (9,702 FTE students) | ✓ (9,702 FTE students) |
| Commercial / Retail development (supermarket / retail cluster) | ✗ | ✗ | ✓ (1,200 sqm specialty retail, 1,500 sqm supermarket) |
| Primary school / early childhood education | ✗ | ✓ (375 students) | ✗ |
| Mason-clinic (including allowance for growth) | ✓ (121 beds or less) | ✓ (198 beds) | ✓ (198 beds) |
| Taylors Laundry | ✓ | ✓ | ✗ |
| Residential car-parking | ✗ | ✓ (2,049 spaces or less) | ✓ (2,100 spaces or less, with more dwellings) |
| Unitec car parking | ✓ (varies, more than 2,500 spaces) | ✓ (2,500 spaces or less) | ✓ (2,500 spaces or less) |
| Commercial / Retail car parking | ✗ | ✗ | ✓ (75 spaces or less) |
| Resident's parking sold / leased unbundled from dwellings | ✗ | ✓ | ✓ |
| Resident's Parking schemes (areas adjacent to but outside of precinct) | ✗ | ✗ | ✓ |
| Carrington Road Corridor Upgrade (precinct Frontage) | ✗ | ✓ | ✓ |
| Carrington Road Corridor Upgrade (Full length including Woodward New North Road) | ✗ | ✗ | ✓ |
| Carrington Road through traffic reductions, 25% | ✗ | ✓ | ✓ |
| Peak Hour Profile Adjustment | ✗ | ✓ | ✓ |
| Great North Rd / Pt Chevalier Rd / Carrington Rd intersection adjustments (slip lane removal into Great North Road, southbound Carrington Road bus lane) | ✗ | ✓ | ✓ |

| Modelling Assumptions | Base 2019 | ITA 2028 | Plan Change 2031 |
|---|---|---|---|
| Mid-block North-western Path crossing south of Sutherland Road | ✓ (priority) | ✓ (signal) | ✗ (integrated into Gate 1 signal) |
| Gate 1 signalised | ✗ | ✗ (LILO) | ✓ |
| Gate 2 signalised | ✗ | ✓ | ✗ (LILO) |
| Gate 3 signalised | ✗ | ✓ | ✓ |
| Signalised mid-block pedestrian crossing between Gate 3 and 4 | ✗ | ✓ | ✗ |
| Gate 4 signalised | ✓ | ✓ (added lanes) | ✓ (added lanes |
| Carrington Road / Woodward Road intersection signalised | ✗ | ✓ | ✓ |
| Signalised mid-block pedestrian crossing between Benfield Avenue and Willcott St | ✗ | ✗ | ✓ |
| Vehicle connections between Southern precinct area and southern local roads | ✗ | ✓ | ✓ |
| Vehicle connections between the Southern precinct area and the central / northern Precinct areas | ✓ | ✗ | ✗ |
| Vehicle connections between the Southern precinct area and Unitec Core | ✓ | ✗ | ✗ |

Source: Stantec Transport Assessment and Modelling Report 2022 (**2022 TMR)**

As discussed earlier in this executive summary (key differences table) and expanded upon as part of the C23 discussions with Council, some trip generation values for certain activities were reduced compared to the 2020 ITA for the 2022 TMR.

These reductions are considered acceptable for a variety of reasons, starting with the fact that older trip rates were historically conservative and are considered inappropriate for a low-car development. This has been highlighted in the reporting and related C23 responses by comparison with, for example, a range of apartment development trip generation rates from suburban Sydney (with the 2022 TMR still using higher driving rates than these examples).

Historic sources also often implicitly assume that trip generation of development even in already-congested transport environments would not be affected by this existing or new congestion. Instead, it has been shown, including with added material provided as part of the C23 responses, that such congestion does indeed lower traffic generation itself (especially during peak hours) by way of encouraging mode change, or via trips being avoided fully, or deferred to other times.

Additionally, the 2022 TMR assumptions include a greater constraint on available development parking than in the 2020 ITA - both via lowering the average parking per dwelling in the precinct, as well as via the assumption of resident's parking schemes for the surrounding existing areas. The latter are intended to both discourage added trip generation within the precinct, as well as discourage "overspill" parking effects into surrounding suburbs.

Finally, the modelling now assumes greater provision for active modes and public transport via a more substantial / greater length of Carrington Road Upgrade, as well as assessing a point in time several years later (2031 versus 2028) than the 2020 ITA, allowing more time for gradual Auckland-wide modal change away from private cars.

For these reasons the lower trip generation rates described in the 2022 TMR are considered acceptable. They have been "sanity checked" and while found notably lower than those used historically in Auckland, they are achievable in comprehensively planned, parking-constrained and well-located developments such as those proposed for the precinct. Meanwhile, the previously described "check-in" at 3,000 dwellings provides authorities with an ability to assess whether the assumptions eventuate.

The modelling assesses the network, including the four Carrington Road access points. This is set out in section 4 of the 2022 TMR. The key findings are:

a) Great North Road/ Pt Chevalier/ Carrington Road intersection: will perform at expected and appropriate levels, albeit with some increases in delays from the Year 2028 approved base case of the 2020 ITA [Section 4: Table 10, 11, 12 and 13].

b) Gate 1 upgraded intersection (signals) / Carrington Road: will perform well and within acceptable tolerances [Section 4: Table 14,15,16 and 17].

c) Gate 2 upgraded (LILO)/ Carrington Road: an improvement compared to the modelling produced for the 2020 ITA i.e. compared to the 2028 scenario for peak periods [Section 4: Table 18,19,20 and 21].

d) Gate 3 Farm Road upgraded intersection (signals)/ Carrington Road: will perform acceptably at future peak periods [Section 4: Table 22, 23 24 and 25].

e) Gate 4 / Carrington Road: good to moderate performance compared with the Year 2028 base case, with the other gates taking some pressure off Gate 4. Queues increase from the western approach in both peak periods, but these queues are transitory [Section 4: Table 26, 27, 28, 29].

*f)* Woodward Road/ Carrington Road: a decline in performance but remains within generally acceptable parameters. An improvement in the AM peak queue lengths from the 2020 ITA [Section 4: Table 30, 31, 32 and 33].

g) Carrington Road/ New North Road/ Mt Albert Road: performance remains moderate to poor. However this is also the case in the Year 2028 approved base case. The precinct development does not appreciably further degrade the performance of this intersection [Section 4: Table 34, 36, 36 and 37].

h) Woodward Road/ New North Road/ Richardson Road: performance remains moderate, with some improvement compared to the base case in the AM [Section 4: Table 38, 39, 40 and 41].

The modelling demonstrates that the network with the upgrades identified will perform satisfactorily for the scenario of 4,000 dwellings and associated other active development within the precinct including the Mason Clinic, Unitec and the retail area. Some network improvements are due to improved performance in the wider network, but the modelling also demonstrates that the upcoming Carrington Road is beneficial and will improve the performance of buses along this route, and as part of the wider network.

## CONCLUSIONS

The premise of the approval of the 2020 ITA, the October 2020 Memorandum and the 2022 TMR are that:

(a) Together, these documents set out the future transport strategy for the precinct but will be reviewed when the residential development reaches 3,000 dwellings with code compliance certificates. This review is an opportunity to re-validate the assumptions on which these documents are based. Should any assumptions prove to be inaccurate or out of date, then there is the ability to adjust either the land use or transport strategy of the ITA to reflect these.

(b) These documents cover the wider precinct transport related requirements. Individual consent applications will still need to address more fine-grained issues associated with any stage or proposal and be supported by an appropriate transport assessment that also shows compliance with the ITA where relevant, such as in terms of access and parking.

(c) The Precinct will be developed in accordance with the principles of four road connections onto Carrington Road, with an interconnected road network enabling residents/users of the Precinct to access these gates through different internal roads. Additionally, access but not through traffic, will be enabled for a smaller proportion of the overall Precinct development in the southern area, which will connect through existing residential streets to the south.

(d) Gates 1 and 3 will be upgraded in time to provide signalised access, with the timing of the intersection upgrades to be considered alongside the Carrington Road Upgrade by AT. Any intersection upgrade that proceeds ahead of the Carrington Road Upgrade will utilise the Carrington Road Upgrade designs where these have already been finalised but with the modifications necessary for a functional arrangement given this would be an interim upgrade.

(e) All applications for specific development proposals shall compare new yields to date, proposed yields and timing against those assumed within the 2022 TMR as well as the transport implications arising from any differences. The accumulative yields shall also be tracked against the 600 dwellings threshold. Additional trips associated with any non-residential activity not allowed for within these documents shall also count towards the threshold.

The Precinct will be developed to ensure that all new development is provided, early in the development phases, with internal high-quality active mode links to the future internal and external cycling and pedestrian networks, to ensure safe and convenient active mode access to local destinations, the wider network, and public transport services.

# WAIRAKA PRECINCT
# INTEGRATED TRANSPORT ASSESSMENT

**PREPARED FOR MINISTRY OF HOUSING AND URBAN DEVELOPMENT**

June 2020

Stantec

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## REVISION SCHEDULE

| Rev No. | Date | Description | Signature or Typed Name (documentation on file) | | | |
|---|---|---|---|---|---|---|
| | | | Prepared by | Checked by | Reviewed by | Approved by |
| 0 | 01.05.2020 | Draft for initial client review | GS / MR | MR | MMT | MMT |
| 1 | 29/05/2020 | Final draft | GS | MR | MMT | MMT |
| 2 | 04/06/2020 | Final draft | GS | MR | MMT | MMT |

# Executive Summary

This Integrated Transportation Assessment (ITA) for the Wairaka Precinct has been prepared by Stantec, on behalf of the Ministry of Housing and Urban Development (HUD). This ITA is required in order, to fulfil the Auckland Unitary Plan Precinct Rules before any consents for further development within the Precinct can be obtained.

The development will see the Precinct become one of the largest brownfield redevelopments in the Inner Auckland Isthmus. The primary aim of the redevelopment of land acquired by the Crown for medium-density residential development is to improve affordability and quality of urban living with good economic, social, educational and cultural opportunities for residents, employees, students, and other users of the Precinct.

The ITA focuses on assessing the scale of development projected to occur within the next 8 to 10 years, primarily being residential housing in the northern and central Precinct sections owned by the Crown and managed by HUD in partnership with Nga Mana Whenua o Tāmaki Makaurau[1].

The ITA also includes assessment of proposed residential development in the southern area, that is being jointly progressed by Ngāti Whātua Rōpū and the Crown, existing and assumed future activities of Unitec (tertiary education provider), Mason Clinic, and the proposed primary school, early childhood education centre and special needs education centre.

A number of transport upgrades have been identified to enable the proposed land uses to be accommodated. The key upgrades include the "Carrington Road Upgrade" project by Auckland Transport to improve active modes and public transport along the corridor, implementation of traffic signal control at several accesses to the Precinct that currently operate as priority accesses, and a connection of the Precinct's internal road network (for non-through traffic) to existing cul-de-sac roads to the south.

Traffic modelling undertaken within this ITA demonstrates that congestion on the surrounding network may occur once development occurs, but recommended upgrades are anticipated to reduce external impacts in addition to improving people transport capacity on key corridors such as Carrington Road, via improved transport choice for active modes, improved public transport reliability and journey times. Therefore, it is recommended that the planning and delivery of key adjacent projects, such as the Carrington Road Upgrade and the Connected Communities project for New North Road are closely integrated with the Precinct development as it progresses.

Overall, the ITA demonstrates the Precinct's ability to capitalise on the unique opportunities provided by the Inner Isthmus site location and extensive multi-modal transport networks (existing and future both) available. This creates a high-quality, multi-modal, less car-dependent suburb that will be an exemplar in demonstrating how transport and land use can be integrated. From a transport perspective it will support the growing demand for residential development in Auckland in a sustainable manner.

[1] Ngāi Tai ki Tāmaki, Ngāti Tamaoho, Ngāti Te Ata, Te Ākitai Waiohua, Te Kawerau ā Maki, Ngāti Maru, Ngāti Paoa, Ngāti Tamaterā, Ngaati Whanaunga, Te Patukirikiri, Ngāti Whātua Ōrākei, Ngāti Whātua o Kaipara, Te Rūnanga o Ngāti Whātua

# Abbreviations

| | |
|---|---|
| AFC | Auckland Forecasting Centre |
| AT | Auckland Transport |
| AUP | Auckland Unitary Plan |
| CAS | Crash Analysis System |
| CBD | Central Business District |
| CRLL | City Rail Link Limited |
| DHB | District Health Board |
| ECE | Early Childhood Education |
| FRL | Fletcher Residential Limited |
| FTE | Full Time Equivalent |
| GNR | Great North Road |
| HCV | Heavy Commercial Vehicle |
| HUD | Ministry of Housing and Urban Development |
| ITA | Integrated Transportation Assessment |
| ITE | Institute of Transportation Engineers (USA) |
| LILO | Left In, Left Out |
| LOS | Level of Service |
| MOE | Ministry of Education |
| MSM | Macro Strategic Model |
| NZTA | Waka Kotahi NZ Transport Agency |
| PT | Public Transportation |
| SLA | Select Link Analysis |
| TDM | Travel Demand Management |
| TMDG | NZTA's Transport Model Development Guidelines |

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# APPENDICES

# 1. Introduction

The Wairaka Precinct (Precinct), Mount Albert, Auckland extends from the North-western Motorway (SH16) at Point Chevalier south to Woodward Road, and from Oakley Creek / Te Auaunga in the west to Carrington Road in the east. The majority of the Precinct is owned by the Crown and its entities, Unitec Institute of Technology (tertiary education provider), Waitemata District Health Board, in addition to the landholdings of Ngāti Whātua Ōrākei, and one private landowner.

Overall, there is opportunity for substantial development across the Precinct in addition to Unitec and other various smaller commercial activities, primarily residential but also education and potentially business development. The resulting new suburb will be one of the largest redevelopments in the Inner Auckland Isthmus. The Precinct will bring together amenity, connectivity and density in an urban form for the new community being created.

The Ministry of Housing and Urban Development (HUD) and its development partners Nga Mana Whenua o Tāmaki Makaurau[2] are responsible for facilitating the development of land owned by the Crown within the Precinct and appointed Stantec to undertake the assessment work covered in this document.

An Integrated Transport Assessment (ITA) is a core requirement outlined in the Auckland Unitary Plan Precinct Rules to obtain any consents within the Precinct. The ITA focuses on development in the next 8 to 10 years, primarily in the northern and central Precinct sections owned by the Crown.

Within the ITA an assessment on impacts and integration with the southern development areas in the Precinct are considered. The southern areas encompass land owned by Ngāti Whātua Ōrākei and the Crown, as well as existing and assumed future transport impacts for Unitec.

The ITA has been prepared based on previous work undertaken during the Unitary Plan process and by Wairaka Land Company for Unitec, prior to large parts of the Precinct being sold by Unitec to the Crown. Changes that have subsequently occurred in terms of planned development and the surrounding transport environment are also incorporated.

The ITA provides guidance for further approvals of subsequent individual developments within the Precinct, by providing transport and traffic related expectations for developments at a high level, as well as identifying impacts on the surrounding transport networks. A number of further upgrades are recommended or required to allow the relevant development land uses to be accommodated from a transportation perspective.

At a strategic level, the ITA revolves around the aspiration for creation of a multi-modal, less car-dependent suburb than traditional Auckland residential developments, that takes full advantage of the unique opportunities provided by the site location in the Isthmus, with extensive multi-modal transport networks available for residents and visitors.

It is noted that the Auckland Plan 2050 has identified Mount Albert as well as nearby suburbs of Morningside and Saint Lukes as some of the focus development areas in Central Isthmus. Meanwhile, planning documents in the transport space, from Auckland Transport's Regional Land Transport Plan to the Government's National Policy Statement on Land Transport have identified the requirement for increased mode shift away from single-occupancy cars, that the location and proposed transport integration of the Precinct strongly supports.

[2] Ngāi Tai ki Tāmaki, Ngāti Tamaoho, Ngāti Te Ata, Te Ākitai Waiohua, Te Kawerau ā Maki, Ngāti Maru, Ngāti Paoa, Ngāti Tamaterā, Ngaati Whanaunga, Te Patukirikiri, Ngāti Whātua Ōrākei, Ngāti Whātua o Kaipara, Te Rūnanga o Ngāti Whātua

# 2. Existing Transport Environment

## 2.1 Site Location

The Precinct is located in the Auckland suburb of Mount Albert directly adjacent to Carrington Road between Mount Albert Town Centre and Point Chevalier.

Land to the east and south of the site is predominantly residential. Oakley Creek / Te Auaunga and adjacent esplanade areas run north-south to the west of the site, and also Great North Road that runs north-south between the site and the Waterview residential suburb.

Mount Albert Town Centre is around 500m south east of the Precinct, whilst Point Chevalier Town Centre is 200m to the north. Gladstone Primary School, Seaview Terrace are located to the southeast of and adjacent to the Precinct. Saint Francis Primary School is located on Montrose Street, north of SH16. Waterview Primary School is located to the west of Great North Road.

The proposed mixed-use developments in the Precinct will bring benefits to the wider transport network in Auckland, compared to a development located further away. Many new residential developments recently established to cater for Auckland's population growth are located on the outskirts of the current urban area including Albany, Whenuapai, and Silverdale. There are only few areas with opportunities for meaningful larger-scale intensification in the inner suburbs west of the Auckland City Centre.

As much of Auckland's economic activity remains more centrally concentrated, new greenfield development adds to the demands on the transport network via longer trips on already-congested routes. These longer trips are less likely to be undertaken by active modes such as walking and cycling, and public transport networks tend to be less developed.

The Precinct is located around 7km away from the Auckland City Centre. This means typical regular trips to the centre for commuting, education, or other purposes will be shorter, thereby reducing pressure on the network. Shorter travel distances also make non-car modes more attractive, reducing the uptake of private cars in relative terms to outer-edge greenfield development.

## 2.2 External Transport Network

### 2.2.1 General & Vehicular

The Precinct, as described above, is located at the edge of the Auckland Inner Isthmus, in a well-connected part of Auckland with good provisions for all travel modes.

In relation to connections in the immediate vicinity, the Precinct is "land locked" and partly isolated. The land-locking is due primarily to existing geographic and infrastructure barriers such as the Oakley Creek / Te Auaunga gully to the west of the Precinct. Combined with the barrier of the SH16 motorway along the northern edge, and the historical lack of street connectivity to the cul-de-sacs of the adjacent suburbs on the southern edge, this leaves Carrington Road along the eastern edge as the only existing vehicular frontage.

On other frontages, existing connections comprise walking and cycling paths, many that are unattractive, narrow or circuitous. However, creation of the Waterview Shared Path in recent years provides improved local / regional walking and cycling connectivity to the west, via a high-level bridge over the Creek spanning to Alford Street in Waterview and to the south, the neighbouring suburbs and Avondale on the eastern edge of Oakley Creek.

The nature of the site in relation to the immediate environment is shown in Figure 2-1 below.

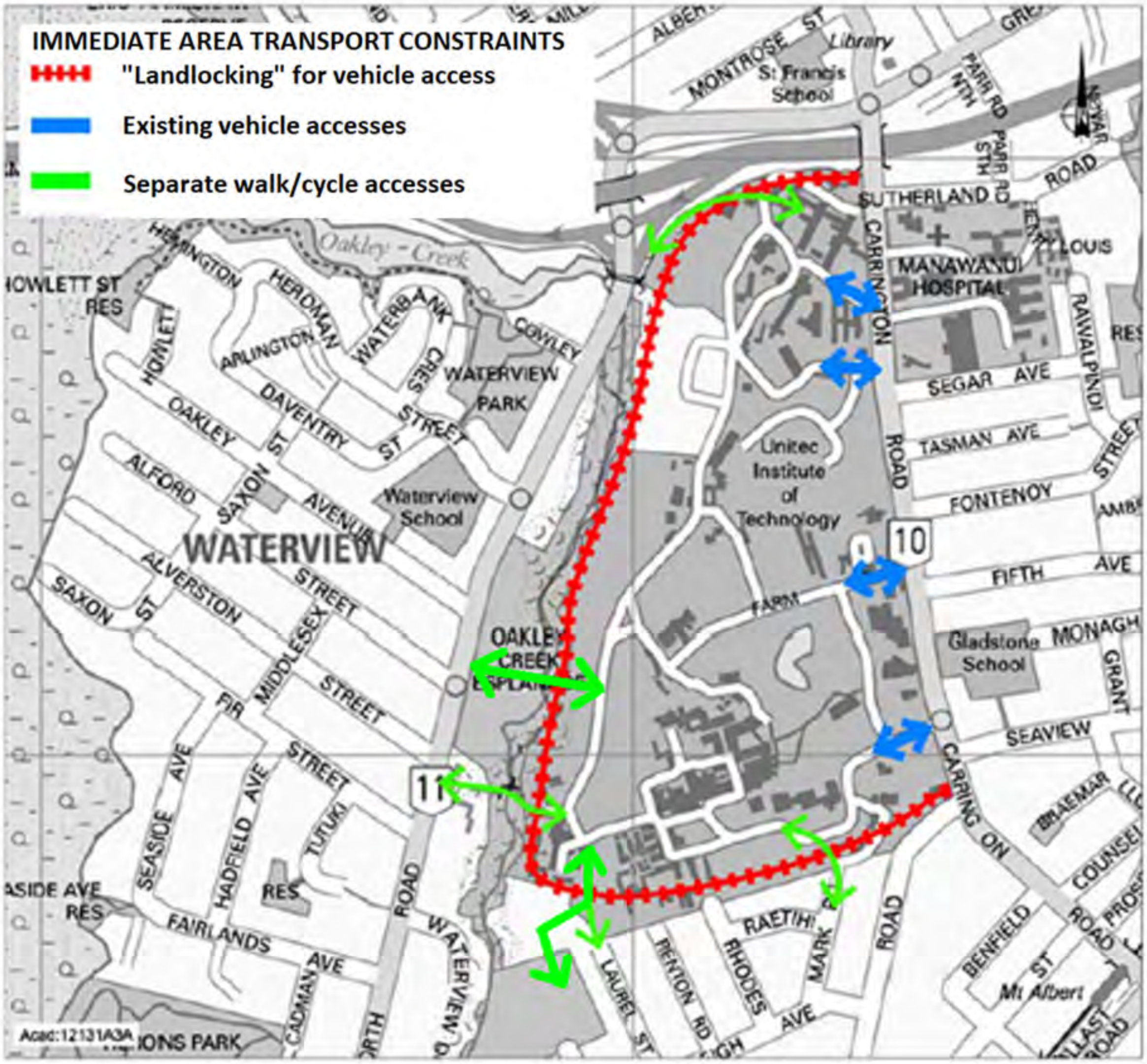


Figure 2-1: The "land locked" nature of the site in the immediate environment

By contrast, the wider area transport network in the vicinity of the Precinct provides good access options for vehicles, as well as several public transport, walking and cycling routes. The multi-modal transport routes are illustrated in Figure 2-2.

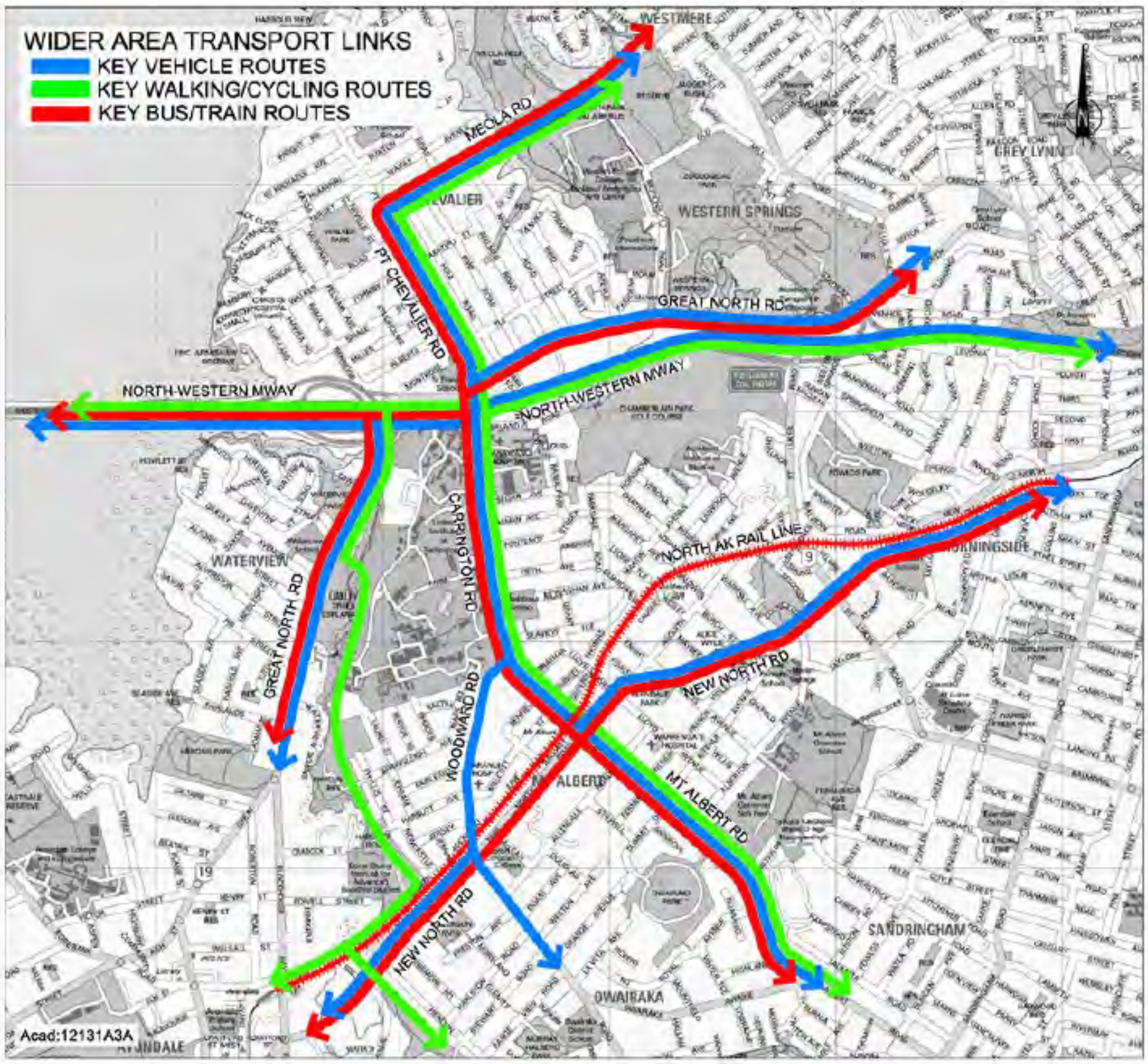


Figure 2-2: Existing multi-modal transport networks around the Precinct

By enhancing links into and through the Precinct, future development will strengthen these wider-area links.

The following ITA sections provide further detail on the existing transport environment, including committed and planned future transport projects surrounding the Precinct.

### 2.2.2 Public Transport (Infrastructure)

There are five northbound and five southbound bus stops on Carrington Road. Four bus stops in each direction are located along the Carrington Road frontage of the Precinct. There are also two bus stops on Great North Road by Alford Street on each side of the Waterview Shared Path bridge, that provides for active mode connection to the bus stops.

There are also bus shoulders on SH16 west of Point Chevalier and peak hour bus lanes on Great North Road east of Point Chevalier, assisting connecting or onward journeys from the Precinct on west-east bus routes.

There are two rail stations within (extended) walking distance from the Precinct, namely the Mt Albert Station and Baldwin Avenue Station, which are consecutive stations along the western Line of the Auckland Rail Network (discussed in more detail in the next section).

The southern edge of the Precinct is within 800m walking distance of the Mount Albert Train Station, that is considered within reasonable walking distance for a high-quality PT service. The centre of the Precinct is around 1,000m from Mount Albert and Baldwin Avenue train station. This distance slightly exceeds the maximum, however it still considered to provide a realistic transport option, particularly if combined with a cycle or scooter trip to the station. Overall, this provides a good connection between the Precinct and the western Rail Line.

Future improvements of relevant public transport infrastructure include:

- City Rail Link tunnel over the coming years (construction started, opening planned to be around 2024) which will significantly reduce the journey times from the west into the City Centre[3] ;
- A new southbound bus lane on Point Chevalier Road, from near Formby Avenue to the town centre (consulted on in December 2019[4]); and
- Bus lanes on Carrington Road between Woodward Road and Point Chevalier Town Centre, as part of the “Carrington Road Upgrade” by AT (discussed in more detail later).

Another potential future improvement, a Frequent Transport Network along SH16 will also assist the Precinct area (proposed as Light Rail, but potential a busway as an initial or alternative solution that also provides many of the relevant benefits). Benefits will particularly accrue if a Point Chevalier station is included, as seems likely. However, this transport infrastructure is considered unlikely to be in place within the 8 to 10-year timeframe covered by this ITA.

### 2.2.3 Public Transport (Services)

The Central Auckland Bus New Network was implemented in 2018. The network surrounding the Precinct is shown in Figure 2-3.


Figure 2-3: New Network around the Precinct

[3] https://www.cityraillink.co.nz/crl-travel-times
[4] https://at.govt.nz/projects-roadworks/point-chevalier-improvements/

The Western Rail Line runs every 10 minutes (during peak hours) between Swanson in the west and Newmarket and City Centre in the east. Two frequent bus routes connect the Mount Albert Train Station with the Precinct, connecting the Precinct to high frequency and quality public transport.

The Precinct has various frequent (at least every 15 minutes, 7am to 7pm) and connector services (at least every 30 minutes, 7am to 7pm) on its surrounding arterial roads including:

- **Outer Link**: Frequent service cross-town circular through Westmere, the City Centre, Parnell, Newmarket, Mt Eden, St Lukes and Mt Albert town centre.
  - AT recently currently consulted on proposed changes to the circular route of this service[5], which are expected to improve journey time and reliability of the overall journey. The route will still pass through Carrington Road and New North Road as per the current operation.
- **Route 66**: Frequent service between Mount Wellington and Point Chevalier through Mt Albert town centre and along Carrington Road.
- **Route 18**: Frequent service between New Lynn and City Centre via the direct route, accessible from the Precinct via Point Chevalier town centre or Great North Road stops.
- **Route 195**: Frequent service between New Lynn and City Centre via Green Bay and Blockhouse Bay Road, accessible from the Precinct via Point Chevalier town centre or Great North Road stops.
- Various other services running between West Auckland, Point Chevalier, and the City Centre

In addition, Unitec currently operate private shuttle bus services that are free to students. These connect the Mount Albert campus to the Waitakere campus (14 services each direction a day), however pick-ups from external bus stops are not included,[6] and the service has limited relevance for existing or future residents.

### 2.2.4 Cycling

The surrounding cycle network around the Precinct is extensive and of high quality for Auckland conditions, albeit with some key deficiencies. The network is shown in Figure 2-4.

The North-western cycleway runs parallel to SH16 across the northern edge of the site and provides an almost fully off-road cycle route between Westgate and the Auckland City Centre.

The Waterview Shared Path was opened in late 2017, as part of the Waterview Connection Project and connects Waterview, the North-western Cycleway and Great North Road at the north western end to Avondale and the SH20 Cycleway at the southern end, following the route of Oakley Creek / Te Auaunga to the west and south of the Precinct.

The Waterview Path also improved walking and cycling connectivity between the Precinct and Waterview via a new bridge over the creek near Alford Street.

In the south, it will link to the future Avondale to New Lynn Shared Path that is currently under construction, providing good links to these suburbs as well as various town centres, schools and event or sports locations along the route.

Carrington Road along the eastern site frontage has painted cycle lanes on both side of the road. While providing a consistent cycle route from Point Chevalier town centre to Mount Albert town centre (and onwards beyond it on Mount Albert Road), the route has no protective separators, therefore is unattractive for many potential riders. It is intended to be upgraded to a protected route as part of the Carrington Road Upgrade (discussed in more detail later).

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[5] https://ourauckland.aucklandcouncil.govt.nz/articles/news/2019/11/have-your-say-on-proposed-changes-to-the-outerlink/

[6] https://www.unitec.ac.nz/current-students/on-campus/shuttle-bus

Protected cycle lanes are also proposed on Point Chevalier Road to the north of the Precinct (consulted on by AT on December 2019[7]), that will link into the cycle facilities around the Precinct, providing improved cycling conditions to and from the north.


Figure 2-4 : Surrounding Cycle Infrastructure Network

### 2.2.5 Walking

The quality of the walking environment to and around the Precinct varies strongly.

Carrington Road adjacent to the Precinct has footpaths on both sides of the road, albeit the footpaths particularly on the western side along the Precinct frontage are relatively narrow, and in some areas hidden by hedges from the road.

Pedestrian connectivity across Carrington Road and over side streets and site accesses in the Precinct frontage area varies between adequate and poor:

- Signalised crossings are provided at the signalised Gate 4 / Carrington Road (albeit a signalised pedestrian crossing is missing on the northern Carrington Road approach to this signal as well).
- There is also a raised walk/cycle priority crossing over Carrington Road south of Sutherland Road, connecting the North-western Cycleway across the road.
- For the rest of the Precinct's Carrington Road frontage, no other crossing assistance is provided across the relatively wide and busy road except for a flush median, including no specific provisions to enable pedestrians to cross easily at bus stops.

[7] https://at.govt.nz/projects-roadworks/point-chevalier-improvements/

The side road intersections with Willcott Street, Woodward Road, Fifth Avenue, Fontenoy Street, Segar Avenue, and Sutherland Road all have pedestrian refuge islands to assist pedestrians, albeit some of the intersections allow fast turns due to their large geometry.

On the western side, the existing Precinct (existing and former Unitec) site gates are generally very wide, often with multiple approach lanes meaning fast vehicle turns are possible with limited to no assistance for pedestrians to cross the gate entrances.

It is intended to upgrade both pedestrian facilities along and across Carrington Road as part of the Carrington Road Upgrade (discussed in more detail later).

In the wider environment, walking benefits from more connectivity options to and from the Precinct than driving, as noted in the earlier comments about the "landlocked" nature of the Precinct. Extra connections to the south and west across Oakley Creek in particular are available. However, many of the (older, non-Waterview Path) connections have at least some sections of very narrow path width and often not accessible for mobility-impaired users.

The increasing popularity of the surrounding shared paths also offers challenges to pedestrians on these routes, as they have to compete with increasing numbers of people on bikes and e-scooters.

## 2.3 Existing Internal Transport Network

The existing internal transport network within the Precinct (currently all private roads) consists of a main loop running north-south along the western side of the precinct, that is connected via other internal roads to four external gates along Carrington Road. The northern three gates are priority control intersections, while the southern-most gate (closest to the Unitec Core) is traffic signal controlled . There are a number of other roads branching off the main loop that serve various areas in the Precinct.

Generally, the internal roads have footpaths, though these are often narrow, one-sided, and have no separation buffer between the carriageway and the footpath space.

Added walking and cycling links within the Precinct comprise the Waterview Shared Path from the northwest to the south as already discussed in Section 2.2.3 and a variety of smaller local shortcuts.

Pedestrian priority (zebra) crossings are available at many locations throughout the site.

The current speed limit within the Precinct is 30km/h with a number of traffic calming devices (raised tables and speed bumps) already located at the crossings and some mid-block sections. These encourage a safer transport environment. However, this speed environment is not fully consistent, with some sections still seeing speeds at inappropriate levels for a campus / future residential area.

## 2.4 Existing Transport Mode Shares

Evaluation on the existing transport mode share of the Precinct considers the latest available (2018) commuter census data, and the latest travel mode survey for the Unitec Mount Albert campus students (2018) and its staff (2016).

### 2.4.1 Area travel to Work Mode Share

For the assessment, a combined area comprising two census area units was reviewed:

- Mount Albert North census area (east of Oakley Creek / Te Auaunga, south of SH16, that includes most of the Precinct, as well as residential areas and Chamberlain Park to the east).
- Mount Albert West census area (south-east of the above, including the main future tertiary education core, and residential areas to the south and south east up the rail line).

The two census areas are shown in Figure 2-5.

It is noted that the census data focuses on residents travelling from the area to work, that may therefore, not specifically capture the travel behaviour of students and staff travelling to the site. This is further discussed based on Unitec students and staff travel mode survey data.

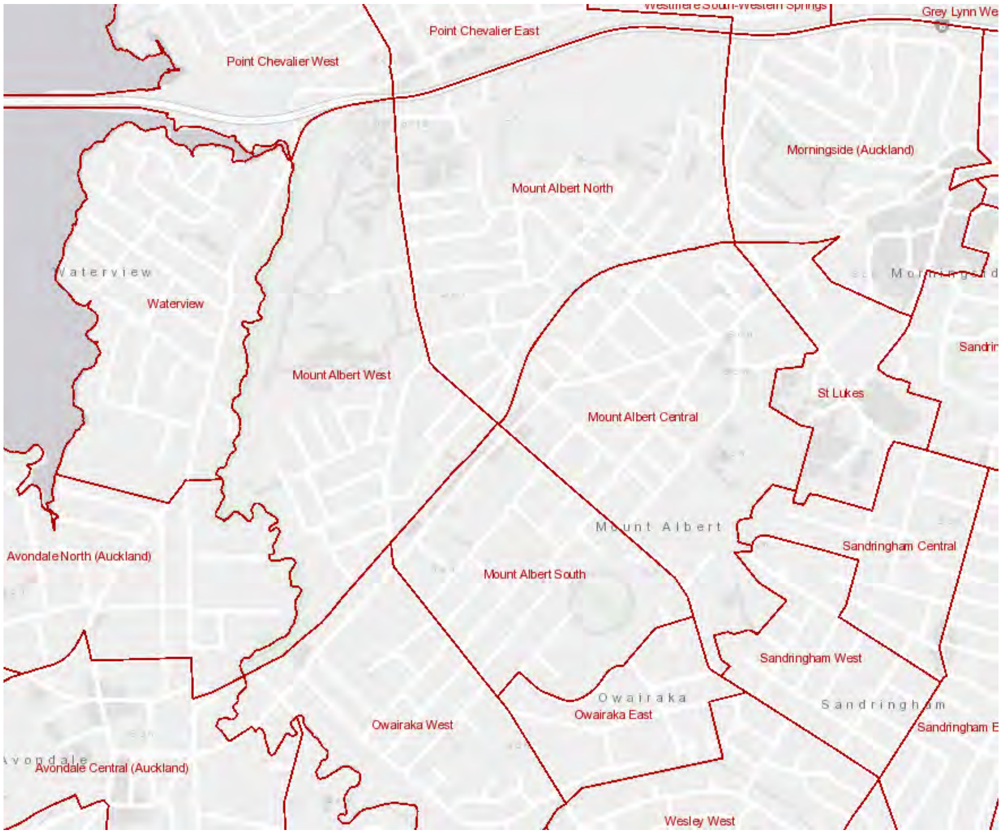


Figure 2-5: Mt Albert North and Mt Albert West Census Areas

The census data for the above areas are presented in Table 2-1, with comparison to the Auckland averages.

Table 2-1: Census 2018 Mode Share of the Local Area Versus Auckland Average

| Travel to Work | Combined Area (Mt Albert North and West census areas) | | Auckland | |
|---|---|---|---|---|
| | **% total** | **% travelling** | **% total** | **% travelling** |
| Worked at Home | 8.2% | | 8.7% | |
| Drove a Private Car or Truck or Van | 53.7% | 58.5% | 59.5% | 65.2% |
| Drove a Company Car or Truck or Van | 7.9% | 8.6% | 10.3% | 11.3% |
| Passenger in a Car or Truck or Van | 2.6% | 2.8% | 4.1% | 4.5% |
| Public Bus | 8.9% | 9.7% | 7.1% | 7.8% |
| Train | 9.7% | 10.5% | 3.0% | 3.2% |
| Bicycle | 3.1% | 3.4% | 1.0% | 1.1% |
| Walked or Jogged | 4.1% | 4.4% | 4.3% | 4.7% |
| Ferry | 0.0% | 0% | 0.6% | 0.7% |
| Other | 1.6% | 1.8% | 1.3% | 1.4% |
| Not elsewhere Included | 0.0% | 0.0% | 0.0% | 0.0% |
| **Totals** | **100.0%** | **100.0%** | **100.0%** | **100.0%** |
| Total private motor vehicle | | 69.9% | | 81.0% |
| Total public transport | | 20.2% | | 11.8% |
| Total active modes | | 7.8% | | 5.8% |

The 2018 Census data identifies that the share of private motor vehicles (the first three categories above) is around 10% less than Auckland average. This is due to the public transport and active modes network improvements that have taken place in the area, and, as stated earlier, the location of the Precinct being closer to the centre of Auckland than many other residential areas.

The level of public transport use is nearly twice the average Auckland levels. With improved train services and new bus network improvements to come, there is potential that this will increase faster than the rise of public transport across Auckland in general.

Active mode travel is around 50% higher than Auckland average levels. This is due in part to substantial growth on key walking and cycling networks, in particular the Waterview Shared Path and North-western Cycleway.

Overall, the census results show that the "starting position" for the Precinct is already better (less private motor vehicle dominated) than for many areas of Auckland.

### 2.4.2 Unitec Student Mode Share

Auckland Transport prepared a Tertiary Student Travel Survey Report in 2014, 2016 and 2018 that includes the Unitec Mount Albert Campus. This provides a snapshot of current travel behaviours at the tertiary core with students and staff continuing to represent a high percentage of traffic movements associated with the Precinct. Results are shown in Table 2-2 below.

**Note:** Due to rounding up / down contained within the original source table, some columns tally up to 1-2% above or below 100%.

Table 2-2: 2014, 2016 and 2018 Results of Tertiary Student Travel Surveys

| Travel mode | 2014 All tertiary institutions | 2016 All tertiary surveyed | 2018 All tertiary surveyed | 2014 Non-CBD tertiary | 2016 Non-CBD tertiary | 2018 Non-CBD tertiary | 2014 Unitec | 2016 Unitec | 2018 Unitec |
|---|---|---|---|---|---|---|---|---|---|
| Walk/run | 13% | 10% | 12% | Not available - smaller survey pool with only 2 non-CBD sites in the 2014 survey | 5% | 7% | 13% | 8% | 9% |
| Cycle | 1% | 1% | 2% | | 1% | 1% | 2% | 2% | 2% |
| Public bus | 32% | 36% | 37% | | 25% | 27% | 27% | 21% | 27% |
| University shuttle bus | 4% | 3% | 2% | | 5% | 2% | 2% | 1% | 1% |
| Train | 8% | 11% | 13% | | 8% | 10% | 11% | 12% | 16% |
| Ferry | 1% | 1% | 1% | | 0% | 0% | 0% | 0% | 0% |
| Drive alone in car | 30% | 27% | 28% | | 42% | 45% | 33% | 40% | 39% |
| As passenger in a car (dropped off) | 4% | 6% | 4% | | 9% | 6% | 3% | 8% | 2% |
| Drove self and others in a car | 4% | 3% | 1% | | 4% | 1% | 6% | 5% | 3% |
| Car passenger (parked near campus) | 2% | 1% | 1% | | 2% | 1% | 2% | 1% | 1% |
| Motorcycle / scooter | 1% | 1% | 1% | | 1% | 1% | 0% | 1% | <1% |
| **Total (may exceed 100% due to source)** | **99%** | **100%** | **102%** | | **102%** | **101%** | **99%** | **99%** | **100%** |
| Total private motor vehicle | 40% | 37% | 35% | | 57% | 54% | 44% | 54% | 45% |
| Total public transport | 45% | 51% | 53% | | 38% | 39% | 40% | 34% | 44% |
| Total active modes | 14% | 11% | 14% | | 6% | 8% | 15% | 10% | 11% |
| **Total** | | | | | | | | | |

As can be seen, student driving levels at Unitec are relatively high (45%) compared to average levels at other Auckland institutions in Auckland (35%), however they compare well against non-CBD institutes surveyed within Auckland (54%).

Student driving levels at the Unitec Mount Albert have also fluctuated (increased between 2014 and 2016 but decreased between 2016 and 2018), unlike a more dependable population-wide trend for reduced driving. There are contributing factors that may influence this including availability of cheap / free parking (which has slowly been constrained over recent years but is still relatively easily available), fuel prices and a move to reduce full-time study that may favour modes able to be used more flexibly off-peak.

However, the volatility visible in the above studies also indicates there is likely to be a high ability to change behaviour by a "carrot and stick" approach of opportunities and constraints.

#### 2.4.3 Unitec Staff Mode Share

Unitec undertook a staff survey in October 2016 to provide a baseline of staff travel modes for future TDM activities. The results are shown in Figure 2-5.

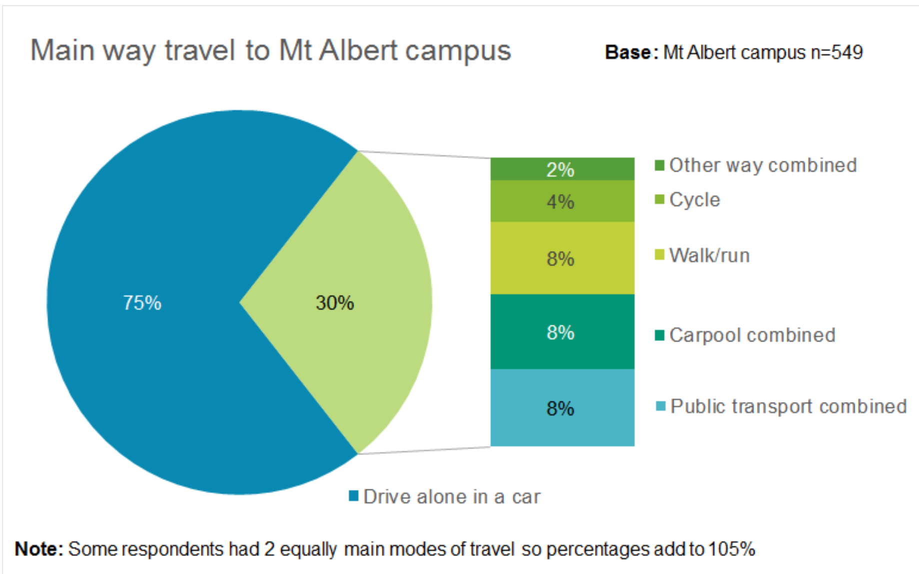


Figure 2-6: Main Mode of Travel to Unitec for Staff, October 2016

The results demonstrate that there is a relatively high level of driving among staff compared to Unitec students, with the overall use of car (including carpool) making up 83% of overall travel mode.

It is noted that there is no similar information available for the small number of existing non-Unitec businesses, or the Mason Clinic staff and visitors. However, these comprise only a small portion of overall trips with assumptions incorporated via existing (surveyed) trip generation and standard survey research literature discussed later in this report. Therefore, close study of their existing travel habits had less relevance to this ITA.

### 2.5 Road Safety

A road safety record search has been undertaken using the NZTA Crash Analysis System for the five-year period from 2015 to 2019, and up to January 2020. The search area included the full length of Carrington Road, Woodward Road, the Precinct and local roads between New North Road and the Precinct. Crashes that occurred on the motorway were discounted and a 50m radius was applied around all intersections. The search area is shown in Figure 2.7.


Figure 2-7: CAS Search Area

During the five-year period considered for the analysis, it is noted that several key infrastructure upgrades have occurred that may have an impact on the safety of the area surrounding the Precinct. For example, the opening of the Waterview Connection on SH20 has resulted in a reduction in traffic around the site and potentially influenced general safety of the arterial roads and intersecting local roads in proximity of the Precinct. Additionally, the traffic signals at New North Road / Carrington Road were changed halfway through the CAS timeframe, with some smaller changes also to lane disciplines at Great North Road / Carrington Road and New North Road / Woodward Road.

A total of 189 crashes have been recorded within the search area over the five-year period. A summary of the reported crashes is provided in the table below.

Table 2-3: CAS Summary Table

| Location | Crash type | | | | Total |
|---|---|---|---|---|---|
| | Fatal | Serious | Minor | Non-injury | |
| Great North Road / Pt Chevalier Road / Carrington Road Intersection | 0 | 0 | 7 | 31 | 38 |
| Carrington Road / Woodward Road intersection | 0 | 0 | 5 | 4 | 9 |
| New North Road / Mt Albert Road/ Carrington Road intersection | 0 | 1 | 5 | 18 | 24 |
| New North Road / Woodward Road / Richardson Road intersection | 0 | 1 | 4 | 28 | 33 |
| Carrington Road Mid-Block | 0 | 5 | 15 | 32 | 52 |
| Woodward Road Mid-Block | 0 | 2 | 6 | 13 | 21 |
| Wairaka Precinct | 0 | 0 | 4 | 0 | 4 |
| Other local roads | 0 | 1 | 1 | 6 | 8 |
| **Total** | **0** | **10** | **47** | **132** | **189** |

The crash record at each of these locations and the impact of any proposed upgrades on the crash record is described in more detail in the following sections. For ease of reporting, only crashes resulting in serious injuries will be discussed in detail. A full list of the crashes can be found at Appendix A

### 2.5.1 Great North Road / Point Chevalier Road / Carrington Road intersection

The Great North Road / Point Chevalier Road / Carrington Road intersection is located at the northern end of the Carrington Road corridor. A total of 38 crashes have been reported at this intersection with seven resulting in injuries, which were all minor.

The crash record at this intersection is considered consistent with that expected for a complex intersection joining two busy arterial roads, with the absence of serious injuries despite the number of total crashes seen as a positive factor.

### 2.5.2 Carrington Road / Woodward Road intersection

The Carrington Road / Woodward Road intersection is currently a priority-controlled intersection that experiences congestion. A total of nine crashes have been reported at this intersection, of which five resulted in minor injuries.

As discussed above, no crossing facilities are currently provided at the intersection to assist pedestrian movement, specifically those walking between the Precinct and Mount Albert Train Station. Despite the absence of safe crossing facilities, no pedestrian crashes have been reported, potentially due to the lack of facilities that deters many pedestrians from trying to cross.

### 2.5.3 New North Road / Mount Albert Road / Carrington Road

The New North Road / Mount Albert Road / Carrington Road intersection is located at the southern end of the Carrington Road corridor. A total of 24 crashes were reported at this intersection with one resulting in serious injuries and five resulting in minor injuries.

The serious injury crash involved a vehicle turning right from New North Road onto Carrington Road colliding with a pedestrian on Carrington Road, who had stopped in the middle of the vehicle lane to clear some rubbish.

The crash record at this intersection is considered consistent with that expected for a complex intersection joining two busy arterial roads.

### 2.5.4 New North Road / Woodward Road / Richardson Road intersection

A total of 33 crashes have been reported at this intersection with one crash resulting in serious injury and four resulting in minor injuries.

The serious crash occurred when a person tried to jump on to the back of a delivery truck as it drove away from the intersection and hit their head on the road. This is not considered to be due to intersection design.

The New North Road / Woodward Road / Richardson Road intersection is located less than 100m south of the western railway line. No reported crashes at this intersection were related to the railway crossing.

### 2.5.5 Carrington Road Mid-Block

A total of 52 crashes have been reported at mid-block sections along Carrington Road. Of the 52 crashes, five resulted in serious injury and 15 resulted in minor injuries.

A cluster of crashes are recorded in the vicinity of the pedestrian crossing south of Sutherland Road. Eight crashes at this location involve vehicles hitting pedestrians or cyclists crossing the road or rear-ending vehicles who stopped or slowed down to allow pedestrians to cross the road. However, this crossing has recently (2019) been upgraded to a raised crossing to emphasise the need for drivers to slow down and give way, that is likely to lead to reduced crash incidents.

It is understood that Auckland Transport considers the corridor as high risk for active modes, in part due to the busy road with limited crossing facilities.

### 2.5.6 Woodward Road Mid-Block

A total of 21 crashes have been reported along the mid-block section on Woodward. Of these, two crashes resulted in serious injury and six in minor injuries.

The railway line crosses Woodward Road around 100m north of New North Road. No crashes were reported involving trains or vehicles that had stopped or slowed to allow a train to pass.

No specific trends have been identified along the Woodward Road corridor. The roads safety record is considered typical for an 800m long corridor that includes four intersections and many driveways.

### 2.5.7 Local Roads

A total of eight crashes have been reported on various local roads within the crash study area. These local roads primarily access the wider road network either via Woodward Road or Carrington Road.

Of the eight crashes, one resulted in serious injury, one resulted in minor injury with the remainder all non-injury crashes. The serious injury crash occurred when a driver reversed out of a petrol station into a pedestrian.

No specific trends or factors have been identified that might impact the road safety record in this area. The crash record is considered typical for the surrounding environment.

### 2.5.8 Wairaka Precinct

A total of four crashes have been reported within the Precinct. Two occurred in the parking area between Gate 3 and Gate 4 and two at driveways to the Mason Clinic. All of these crashes resulted in minor injuries.

All reported crashes are attributed to different factors with no common crash trends identified.

In summary, it is considered that there are no road safety reasons to preclude approval of development in the Precinct and that the proposed infrastructure upgrades discussed later in this report, particularly for Carrington Road, will improve existing road safety conditions.

# 3. Proposed Development

## 3.1 Introduction and Site Vision

Consultants appointed by HUD and Mana Whenua have produced a high-level Masterplan[8] outlining a wider site vision for residential development over the next decade, creating a new suburb.

The Precinct vision and Masterplan identifies how development will contribute to a rapidly growing Auckland, delivering a broader range of homes with high quality open space and community facilities, with good internal and external connections. The intention is to offer improved affordability and quality of urban living with good economic, social, educational and cultural opportunities for residents, employees, students, and other users of the Precinct.

From the Preface of the Masterplan:

> *"A well-designed built environment that respects the whenua is healthy for all people, promoting community wellbeing, activity and walkable neighbourhoods, safety, security and intergenerational living.*
>
> *It's responsive to the place of Mana Whenua and the needs and aspirations of people, now and into the future, inviting innovative use, interaction, productivity and enjoyment.*
>
> *It's integrated, by drawing together the relationships between parts and elements, considering human interfaces at multiple scales, and supporting common goals and aspirations.*
>
> *It's equitable by creating opportunities for all parts of our community. It supports mobility between public and private spaces, parks and buildings, employment, leisure and home. It's resilient to the dynamic and challenging conditions of our time and can adapt and evolve while retaining its essential qualities and values."*

The Masterplan primarily identifies general "bulk and location" planning for the Precinct's Crown land. Whilst there are indications on building form and location, as well as indicative transport layouts, this is not to a detailed level that will, for example, fix future buildings shapes, or internal road locations or layouts and cross-sections. The intention is to achieve an approved ITA setting out the key transport principles and transport-related assumptions of the Masterplan and subsequent HUD planning predominantly in relation to the number of dwellings, roading network with detailed master-planning and subsequent resource consent applications to provide more detail, over time.

[8] A Reference Masterplan & Strategic Framework, Grimshaw, 6th February 2019

## 3.2 Zoning & Precinct Plans

The Unitary Plan provides four key zones in the Precinct, as shown in Figure 3-1:


Figure 3-1: Site zoning as per the Unitary Plan / Precinct Plan

The largest zoning is "special purpose zone" in the south that covers the Unitec (tertiary education) "Core". All teaching activities are being consolidated here, with most activities already having moved to the Core areas. Those activities that remain on HUD land will relocate in subsequent years as leases expire. A secondary "special purpose zone" in the northwest covers the Mason Clinic. It is understood that Waitemata DHB are completing planning to expand this zoning to the north and south to incorporate 2.84 hectares of their expanded site.

The largest portions of Crown land managed by HUD for development are located in the "Business – Mixed Use Zone" in the north and centre of the site. The zoning allows residential development as now envisaged in the HUD Masterplan and includes an existing commercial development (Taylors Laundry) as well as other existing businesses along Carrington Road near Gate 3 / Farm Road.

Along the western edge, a "Residential – Terrace Housing and Apartment Buildings" zone runs along Oakley Creek / Te Auaunga, with mixed ownership, including Ngāti Whātua Ōrākei. Finally, a "Mixed Housing Urban" zone with some specific height limits occurs along the southern boundary, on Crown land.

The Unitary Plan also includes Precinct Plan 1 of Section I334 as shown in Figure 3-2 below, for transport. Section I334 contains objectives, policies, standards and requirements specific to the Precinct.

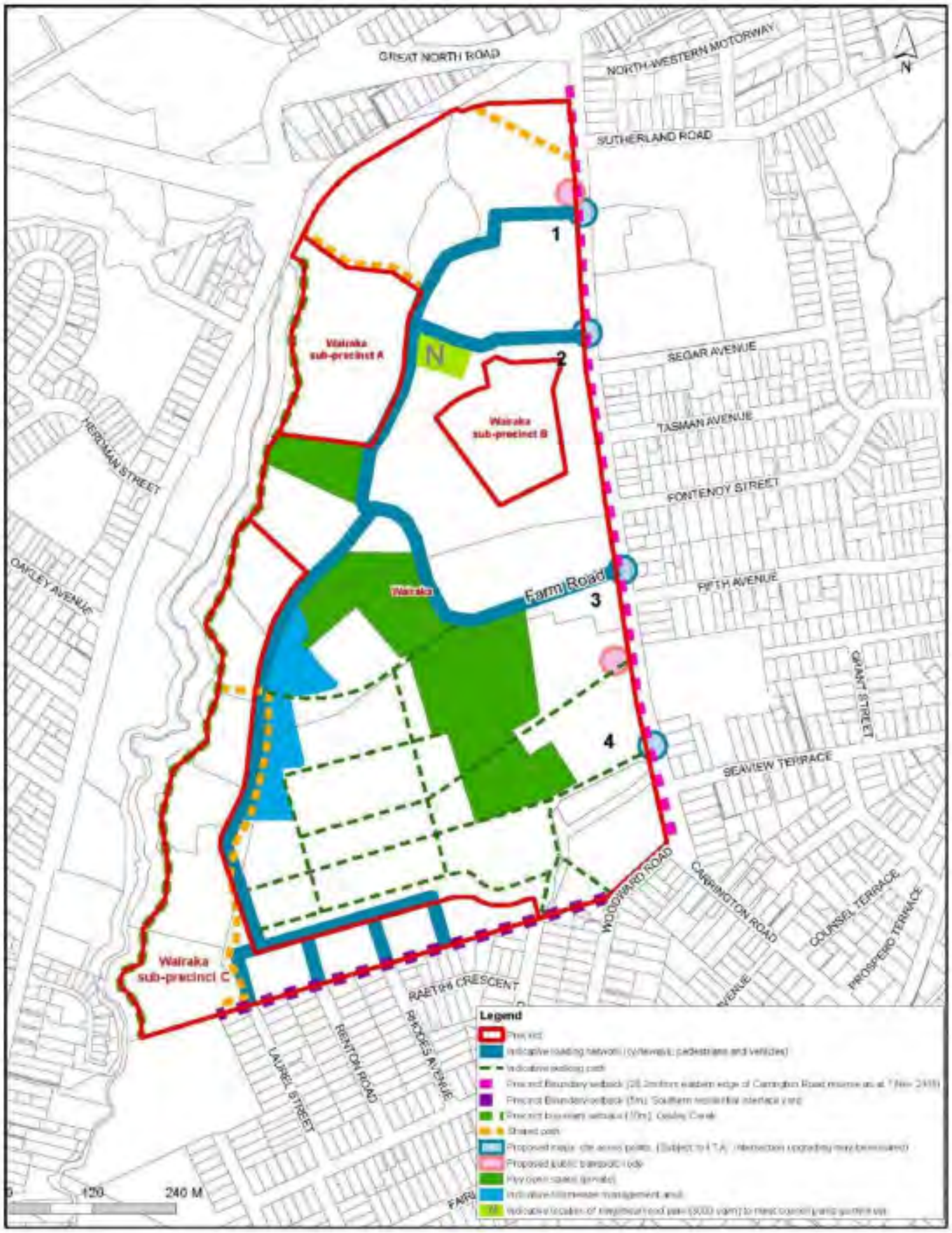


Figure 3-2: Precinct Plan 1 (Transport)

Precinct Plan 1 outlines a number of key features of the future Precinct transport network. These include a main roading network in blue, with smaller vehicular links shown. A north-south spine provides the key vehicular link, with four primary vehicle accessways on to Carrington Road, and vehicular connections to be established with the existing residential road network to the south. Networks are indicative / high level.

As explained in the associated Precinct rules, the Unitary Plan also identifies that the Unitec Core (tertiary education) will not have vehicular links to the rest of the Precinct's internal network (or southern residential streets), with Unitec traffic to use Gate 4.

## 3.3 Staging Areas

HUD have developed an indicative area and staging plan that identifies the various land parcels expected to be developed first. This uses the general areas as shown in Figure 3-3.

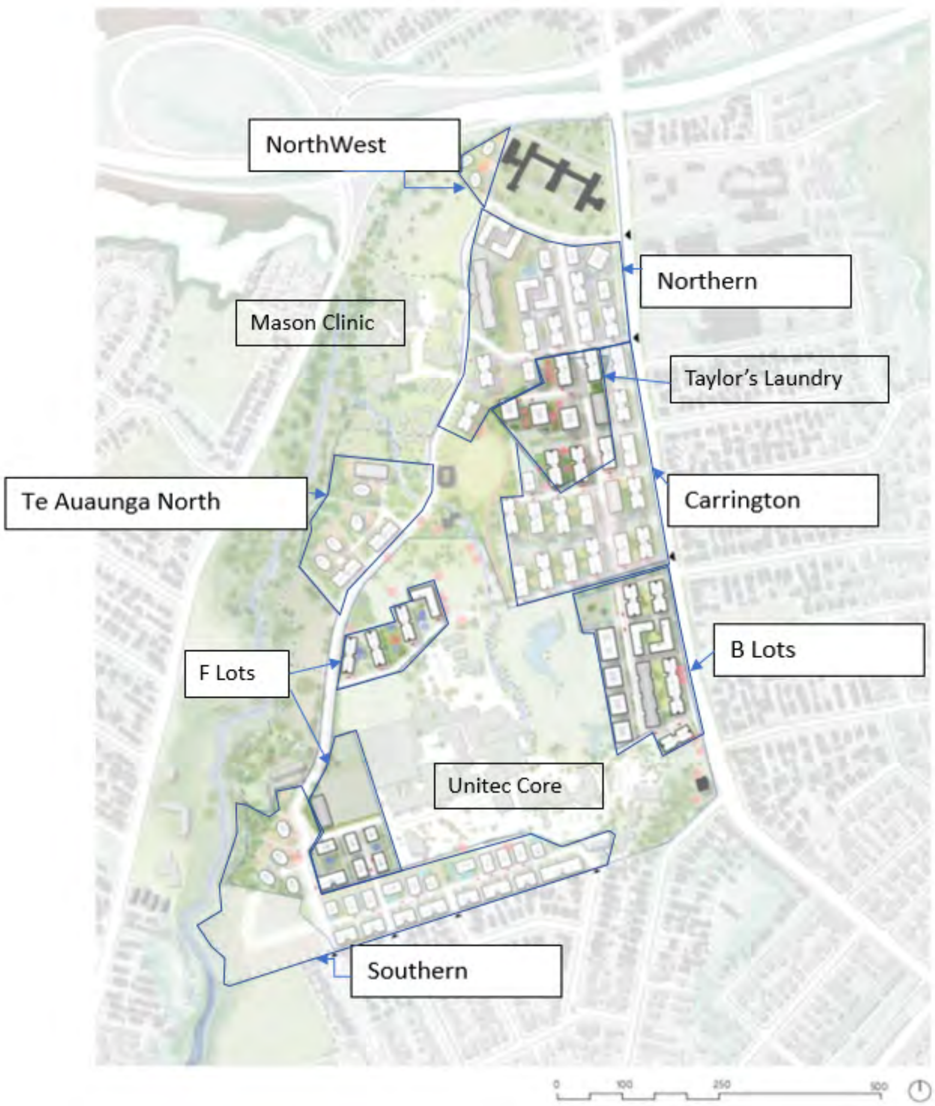


Figure 3-3: Masterplan – Indicative Staging Zones

As shown in the above figure, the key HUD land development areas, that this ITA focusses on, are:

- **Northwest** west of the heritage-protected former Unitec hospital main building
- **Northern** and **Carrington**, both along Carrington Road
- **Te Auaunga North** in the western centre of the Precinct, along Oakley Creek / Te Auaunga
- **Southern** along the southern edge of the Precinct, adjacent to the existing residential areas

**Note**: For the purpose of the ITA the "Southern" area includes the Ngāti Whātua Ōrākei iwi land in the very southwestern part of the southern area. Although this land is not owned by the Crown, it is expected to be developed together with the rest of the southern zone.

However, this "Southern" area excludes further iwi-owned land west of the F-Lots, between the Te Auaunga North area and the Southern area, as this part of the Ngāti Whātua Ōrākei land is not expected to be developed in the near future. This ITA refers to this area as Te Auaunga South.

Additionally, there are some other areas in the Precinct that are expected to see some changes within the ITA timeframe, but do not form part of the HUD development areas:

- **Unitec Core** in the southern centre – based on previous work by Wairaka Land Company for Unitec, some further transformation and site consolidation is expected, with the transport assumptions discussed later in this ITA
- **Mason Clinic** in the northwest – some redevelopment / expansion is planned over the coming decades, with the transport assumptions discussed later in this ITA

Finally, the following areas are assumed to have no significant (re)development for the purposes / timeframes of this ITA. Any proposals to develop these areas at a later stage, or within the ITA timeframes, will require a review as to whether they are significant enough to require an updated ITA.

- **F Lots -** West of the Unitec Core and directly north of the central part of the Southern area. These areas are part of the Unitec (tertiary education provider) land ownership at the time of writing of this ITA.
  - It is possible that these areas may be developed for residential use within the ITA timeframe, should the Crown acquire them.
  - If so, it has been signalled that, at least within the ITA timeframe, they are expected to replace rather than be in addition to some of the Crown residential development assumed further north on the site i.e. even if acquisition and development of the F Lots occurs, the changes to the overall staging plan for this part of the Precinct will mean that the basic assumptions of the ITA and the traffic modelling remain unchanged.
- **B Lots** - Along Carrington Road east of the Unitec Core (owned by Unitec)
- **Taylor's Laundry -** In the northern centre (owned by Taylor's Laundry)
- **Unitec Hospital (Heritage Main Building)** - In the north east (while adaptive re-use is expected to occur at some stage, no development plans are currently assumed within the ITA timeframe); and
- **Te Auaunga South** - Along the western edge of the site between the Te Auaunga North area and Southern area (owned by Ngāti Whātua Ōrākei), as already discussed earlier above.

The ITA traffic modelling will incorporate sensitivity assessment regarding potential traffic impacts of these areas being developed at a later stage.

## 3.4 Staging Levels & Scenarios

The current staging plans by HUD are high level and indicative and may change as development plans move closer to implementation. For the purposes of the development assessed in this report, as agreed with Auckland Transport, two future scenarios are proposed, along with a year when development is assumed to reach this level:[9]

- **Scenario A** – 41% of the 2,500 dwellings envisaged on Crown land, by around 2024
  - Development expected to focus mostly on the "Southern" area and some initial developments in the central and northern HUD areas
- **Scenario B** – 82% of the 2,500 dwellings envisages on Crown land, by around 2028
  - During this period, development is expected to occur largely in the central and northern areas.

The relevant scenarios are considered ambitious (fast development pace), therefore will have a level of robustness with impacts from development likely to progress slower in practice.

If development proceeds different in scope or key assumptions for the external transport environment change, then an updated ITA may be required. However, this ITA has been prepared to consider assessment of an ambitious development programme in the Precinct, thereby seeking to minimise a requirement for any new assessment solely due to a faster development pace than that assumed with a more conservative set of assumptions.

Unlike in previous planning for Wairaka Land Company, the current HUD / ITA development assumptions exclude, within the timeframe for this ITA:

- Significant townhouse developments – currently, only the "Southern" area includes any significant element of townhouse/terrace housing development (for the purposes of the determining the residential trip generation for the ITA traffic modelling, these terrace houses have been grouped together with apartments with similar number of bedrooms. This is discussed in Section 5.8.3.)
- Office / commercial / retail development above that currently present in the Precinct.
- Adaptive re-use of the old Unitec hospital main building (former Carrington Psychiatric Hospital) in the northeast
- Retirement homes or similar care facilities.
- New student housing – Notwithstanding that students may live in homes within the Precinct.

As per the assumptions for residential development above, if material changes to these assumptions occur within the timeframe of the ITA, then an updated ITA may become required.

[9] The levels of development and resulting scenarios / indicative timeframes were agreed with Auckland Transport and their consultants, Flow Ltd, during February 2020.

## 3.5 Proposed Development Levels

The anticipated development levels (dwelling numbers, student/staff numbers etc) for the proposed Precinct land uses assumed in this ITA are discussed below. In general, these ensure a conservative or robust assessment of the proposed development and considered the latest available information relevant to all land uses and related parties.

### 3.5.1 Education Land Uses

Education land uses are presented in terms of the number of full time equivalent (FTE) students and staff.

#### 3.5.1.1 Tertiary Education

The land use assumptions for the Unitec Mount Albert campus have been calculated using a combination of available data on the Unitec website and using the information previous supplied by the Wairaka Land Company to Stantec in association with a previous ITA study (2017) prepared by TDG (the company since acquired by Stantec). HUD acquired the relevant IP of this previous, unfinished ITA as part of their due diligence with Unitec.

Unitec became part of the National Institute of Skills and Technology in April 2020, however it is not yet clear to what extent this, and other changes to the tertiary education environment, will change the assumptions that this ITA relies on, and which have been derived from Unitec's previous plans and publicly available material.

Additionally, COVID-19 impacts on the economy make predictions on future student numbers, and proportions of in-person vs online teaching, uncertain. While student numbers tend to go up during economic downturns, international student numbers may be slower to recover. The two future scenarios assessed in this ITA assume time horizons of four and eight years from now. Therefore, within this ITA several conservative assumptions have been incorporated.

Unitec publishes annual reports that contain information on overall student and staff numbers with corresponding targets each year, amongst other key success indicators. According to the 2018 annual report[10], Unitec's current target was 9,800 FTE students across <u>all</u> its campuses. However, actual student numbers have fallen below this target to 7,897 in the 2018 reporting.

However, a conservative figure has been assumed for Scenario A, by 2024 that the current target of 9,800 FTE students will be achieved.

In relation to Scenario B (2028) it has been assumed that a 10% increase from the Scenario A target allows for possible further growth, to 10,780 total FTE students.

Based on the above target being a combined target inclusive of all Unitec campuses in Auckland, it was necessary to estimate those FTE only applicable to the Mount Albert campus. However, no new data is currently available from Unitec. Historically, Stantec have been provided with actual 2014 FTE students and staff for the Unitec Mount Albert campus. According to the 2014 data, the Unitec Mount Albert campus contributed 90% of overall Unitec student numbers. This proportion is retained for the assessment scenarios and applied to target number discussed above to define the assumed FTE for Unitec in Scenarios' A and B.

Information on potential future Unitec staff numbers are not currently available, and like other factors, likely to be impacted by potential changes to student numbers, operational models etc. Therefore, the proportion of FTE staff numbers to FTE student numbers as reported by Unitec in 2018 (1 staff member per 8.17 students) is applied to the assumed future student numbers to estimate associated staff numbers.

[10] https://www.unitec.ac.nz/sites/default/files/public/documents/Unitec%20Annual%20Report%202018.pdf

Table 3-1: Unitec assumed student and staff numbers

| | Scenario A [FTE equivalents] | Scenario B [FTE equivalents] |
|---|---|---|
| **Students** | 8,820 | 9,702 |
| **Staff** | 1,079 | 1,187 |

#### 3.5.1.2 Primary School, Early Learning Centre and Special Needs Education Centre

The Ministry of Education (MOE) through its transport consultant (Jacobs), have indicated their intention to establish a Primary School, that is co-located in the precinct with an Early Childhood Education Centre (ECE) and Special Needs Education Centre. The exact location and timing is still to be confirmed between MOE and HUD. Therefore, in agreement with the MOE, it has been assumed to be located in the centre of the Precinct i.e. in the wider vicinity of Gate 3 / Farm Road.

At full build-out, it is anticipated that the primary school will accommodate around 750 students, while the ECE and the Special Needs Education Centre will have 50 children and 18 students, respectively. A combined total of 62 full time equivalent staff are anticipated to serve these facilities.

Scenario A assumes that none of the primary school, ECE and special needs education facilities will be operational.

Scenario B assumes the facilities will operate at half of their full capacity, i.e. 375 primary school students, 25 ECE children, and 9 special needs students.

Table 3-2: Primary school (and associated facilities) assumed student and staff numbers

| | Scenario A | Scenario B |
|---|---|---|
| **Primary school students** | 0 | 375 |
| **ECE children** | 0 | 50 (see below explanation) |
| **Special needs students** | 0 | 9 |
| **Staff (FTE equivalents]** | 0 | 31 |

The above assumptions and timing for school roll levels have been agreed with the Ministry of Education, as documented in the memorandum attached at Appendix B. The only difference to the assumptions is that the full ECE complement (50 children) has been assumed, as Auckland Transport indicated that a "half-open" childcare will be unlikely. This assumption change is considered conservative from a transport perspective (added traffic flows).

### 3.5.2 Residential Land Uses

#### 3.5.2.1 Apartments

The Precinct residential development numbers are based on information provided by HUD that includes assumptions for the wider development of HUD-managed Crown land, in addition to initial land to be developed in the southwestern part of the site. Ngāti Whātua intends to partner in the development of the southern Crown land area.

The assessment incorporates a rate of development that corresponds to 1,023 dwellings in Scenario A and 2,049 dwellings in Scenario B as advised by HUD. Based on a total of 2,500 dwellings envisaged for the HUD Crown land owned by the time of the writing of this ITA, Scenario A and Scenario B represent 41% and 82% of HUD's target residential development, respectively.

The dwellings are provided in various apartment typologies categorised according to location within the Precinct or by number of bedrooms, to be discussed further in the trip generation section. A breakdown of the Scenario A and Scenario B residential development on HUD Crown land is shown in **Error! Not a valid bookmark self-reference.**.

Table 3-3: HUD residential development in Scenario A and Scenario B

| Scenario | Indicative Year | Precinct Area | | | | |
|---|---|---|---|---|---|---|
| | | Northwest | Northern | Carrington | Te Auaunga North | Southern |
| **A : 1023 dwellings** (41% of the target HUD residential development) | 2024 | 64 | 282 | 208 | - | 469 |
| **B : 2,049 dwellings** (82% of the target HUD residential development) | 2028 | 96 | 658 | 674 | 152 | 469 |

As can be seen, during Scenario A, development will focus first on the Southern area, and then progressively shift to the centre and northern areas. In relation to Scenario B, the southern areas included in this ITA will largely have been built out, with further development occurring largely to the centre and north.

The residential dwellings will comprise a mixture of apartments, ranging from studios to larger 3-4 bedroom units. However, it is likely that on average, most dwellings will be between 1 and 2 bedrooms. This has been confirmed by HUD, with these smaller typologies being more suitable for the targeted markets than larger dwellings. The precise breakdown will be defined during subsequent individual development stages.

Contrary to earlier Masterplan work undertaken by Wairaka Land Company, there is no student accommodation planned within the timeframe for this ITA and only a comparatively low level of townhouse development is planned, primarily in the Southern area.

### 3.5.3 Commercial Land Uses

The ITA assumptions do not include commercial development, with only existing commercial uses included.

#### 3.5.3.1 Taylor's Laundry

Taylor's Laundry is an existing industrial facility in the north-eastern centre of the Precinct, the northern zone and Carrington zone (please refer to Figure 3-3) that is assumed will continue to operate for the time being.

It is noted that there is possibility for acquisition of this land by HUD in the future, however, this is likely to be outside the timeframes of this ITA. If this assumption changes, an update of the ITA may be required.

#### 3.5.3.2 Retail

It is anticipated that a combination of small format and food & beverage retail will be available to primarily serve residents, students, employees, and other users of the Precinct. However, this will largely comprise existing entities including small café / restaurants in the north and centre, as well as existing facilities within Unitec's Core. No specific added retail or hospitality is assumed in this ITA in either scenario, particularly none that may be expected to attract external visitors (such as supermarkets).

#### 3.5.3.3 Commercial / Offices

There are no (new) office / commercial developments included in the ITA. The small number of existing developments of this type (located primarily within the Unitec Core area) are covered via the wider trip generation assumptions for the Unitec Core, that in turn have been checked against surveyed flows.

A few other smaller commercial entities located in the "Carrington" zone north of Gate 3, such as a veterinary centre, are small in relative impact and expected to be progressively displaced to accommodate HUD development.

### 3.5.4 Other Land Uses

#### 3.5.4.1 Mason Clinic

The existing healthcare facility in the north-western centre of the Precinct (west of the Northern zone and south of the Northwest zone) is currently preparing for an expansion of the relevant "special purposes" zoning north and southwards. The resultant 2.84 hectare reduction in development land for other purposes is already included within the assumptions .

Until the relevant planning processes are completed, the DHB and their transport consultants have only been able to provide indicative information regarding future development levels.

It is understood that Masons Clinic are currently undergoing reconstruction that is expected to happen in several stages. Based on information provided by email[11] by DHB's transport consultants, for Scenario A in 2024, the expected number of treatment beds will be around 121, rising to around 198 by Scenario B's 2028 timeframe.

It is anticipated that these numbers may change as part of the update / rezoning work currently ongoing, but any changes are unlikely to be of a magnitude to change the assessments in this ITA, particularly in relation to the overall Precinct transport impacts.

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[11] Information provided by Flow Transportation (Bronwyn Coomer-Smit) to Stantec on 23/01/2020 via email.

## 3.6 Future Car Parking

### 3.6.1 Overall Parking Philosophy

The Masterplan, and this ITA, have been prepared on the basis that the Precinct will be less car-dependent than previous Auckland suburban and low to medium-density residential developments.

One of the key considerations to avoiding excess car dominance will be a reduced level of car parking, and controls on the use of "public" car parking (in particular on-street parking) to avoid it being excessively used for commuter parking within the Precinct and around it.

### 3.6.2 Residential Parking

The proposed residential land use car parking will be lower than traditionally in Auckland suburban areas. The HUD masterplan discusses various car parking ratios, depending on location within the Precinct and whether on-street parking will be included or only dedicated car parking. It envisages a further per-dwelling parking ratio reduction as the suburb matures and transport trends shift further away from private, single-occupancy car use.

Importantly, in the initial stages, the Masterplan and this ITA assumes that car parking provision will stay under 1 per dwelling, generally ranging from 0.9 to 0.95.

This provides a balance that many households will maintain at least one car, albeit not necessarily meaning they will use it daily, whilst also ensuring that any "mandatory" car parking provided with a purchased apartment will not be at a level to encourage households to own / operate extra cars just because they have already paid for extra car parking.

As one of the first developments to move to detailed design, the development proposed by Ngāti Whātua in the southern area of the Precinct, on Crown and Ngāti Whātua Ōrākei land in the southern area of the Precinct provides a ratio of 0.93 dedicated parking spaces per dwelling[12].

While actual numbers and rates of the final development in this southern area may vary slightly from the 2019 numbers quoted, it shows that the first development likely to occur within the ITA's Precinct follows the overarching strategy of ensuring a level of parking restraint. It is also noted that this southern development will be a mixture of low-rise and mid-rise buildings, whilst mid-rise developments of HUD's development are located more conveniently to public transport. This provides further confidence that a "less than 1 car park per dwelling" ratio will not be exceeded.

The type of car parking provision will vary depending on individual developments. Though the Masterplan indicates combination of dedicated parking buildings serving adjacent residential blocks, as well as more traditional arrangements such as at grade parking, underground and under croft parking, will be utilised.

### 3.6.3 Education Land Use Parking

It is anticipated that Unitec will reduce car parking available for students and staff, respectively convert free car parking to paid car parking, compared to pre-development levels, where there are a high numbers of free parking spaces available (especially if students and staff are willing to walk from other parts of the Precinct). Many of these other parking areas are land subsequently acquired by HUD, therefore will be redeveloped and progressively no longer available for students and staff.

At the time of writing of this ITA, the exact plans for Unitec's car parking are not available, therefore assumptions have been made based on what are considered to be conservative interpretations of previous work undertaken by Wairaka Land Company for Unitec.

[12] Based on information sourced from NGATI WHATUA DEVELOPMENT – MOUNT ALBERT NORTH, FEEDBACK ON ITA document by Terry Church, Flow Transportation for Auckland Transport, dated 30 August 2019.

For the purposes of this ITA it has been assumed that Unitec will proceed with a modified form of their original[13] car parking plan that aligns with consolidation of teaching activities around the Unitec Core in the south. The parking consolidation will be necessary because, as noted above, Unitec have sold off much of the land that accommodated their at-grade car parking.

The main element of this consolidation strategy is to construct more centralised car parking locations, primarily in one or two multi-storey parking buildings within the Unitec Core area, accessed via Gate 4. These will be expected to charge a small parking fee to discourage excessive use as well as help finance the parking building construction. It is understood that Unitec aim to retain around 2,500 car parking spaces for student / staff use, however this will have to be reconfirmed by Unitec at a future stage.

It is possible that particularly during the earlier parts of the ITA timeframe, HUD will continue to allow Unitec to use some future development land owned by the Crown for car parking. This will provide Unitec with an interim option until all car parking is consolidated within the Core.

The primary school is expected to be provided with a small amount of car parking and pick-up / drop-off facilities. However, the school, located within a surrounding new suburb with a very compact student catchment and high levels of walking and cycling amenity, is expected to provide limited car parking compared to typical new schools. Exact numbers have not yet been identified by MOE.

### 3.6.4 On-Street Parking

The level of on-street parking provided will vary depending on location within the Precinct, with "main streets" likely to provide few or no car parking and instead concentrate more on providing dedicated walk and cycle infrastructure. Provision of any on-street parking will be along other side streets instead. Indicative cross-sections are provided later in this ITA.

The specific of on-street parking rate will be set as part of the individual area development applications. It is suggested that this should not exceed 1 per 5 dwellings (0.2 rate per dwelling) and not push overall parking rates above 1 per dwelling.

### 3.6.5 Parking Controls

Residential parking is likely, to be dedicated to individual apartments. However, there is a possibility of some shared use arrangements, whether formal (car share schemes) or for visitor / servicing / delivery parking dedicated to specific apartment developments.

On-street parking spaces will be time or paid parking controlled with a bias towards short-stay usage, i.e. 2 / 3 hour maximum, thereby allowing their primary use to be visitors or uses such as couriers, car share services etc, with the specific time controls and or parking charges to be agreed with Auckland Transport as part of future development proposals and roading resolutions processes.

Unrestricted parking will be avoided to ensure residents do not see on-street parking as dedicated parking for their dwellings.

This ITA does not assume wide-spread parking controls in areas outside the Precinct. However, it is recommended, to minimise the potential for external impacts particularly from Unitec (tertiary education) parking, some controls may be beneficial. Surrounding streets, particularly directly to the south and east of the Unitec Core, may have sections of public on-street car parking restricted (time controls or paid parking) to ensure a level of parking is available at all times of the day for visitors and deliveries etc.

Discussions with Auckland Transport have identified that residential parking schemes are considered unlikely and will only be considered appropriate if parking issues arise for existing areas where sites do not have off-street parking. However, such impacts are not considered likely as it is expected that in the long term, Unitec may retain around 2,500 car parking spaces for its own use, and because the new residential developments, while "parking light" still provide dedicated parking for residents.

[13] As per the transport assessment for the 2015 Campus Consolidation consent - Unitec, Wairaka Campus, Campus Consolidation Project, Transportation Assessment Report, TDG, August 2014

# 4. Proposed Transport Environment

## 4.1 Transport Vision

The future transport vision for the Precinct is guided by the relevant Precinct Plan rules in the Unitary Plan and the principles identified in the Masterplan developed for HUD. The key principle is that of ensuring:

> *"a close-knit, healthy community with seamless access to vital daily services. A place that offers a safe, universally accessible and data-driven alternative to the private car for every journey"*.

Developing this and relevant key requirements (moves[14]) further, the ITA envisages that the Precinct, in particular the Crown-land residential development, will have a transport environment that:

- Provides consistently safety for all road users, with particular emphasis on active modes;
- Provides great convenience for walking, cycling and public transport;
- Avoids excess vehicle dominance (whether for movement or car parking), and avoids "rat-running" opportunities for through traffic and short-cuts for students into the Campus Core;
- Integrates well with existing and future surrounding transport networks; and
- Manages the transport impacts of the new development with a combination of internal and external transport network upgrades.

The key actions to accommodate this transport environment are considered to be:

- Internal road, path and intersection designs that prioritise active modes while reducing vehicle speeds to safe and consistent levels by design (30kph on main internal roads, lower on others);
- Provision of safe and efficient links with Carrington Road and the existing southern residential roads, while discouraging vehicular through connectivity between the two access frontages, as well as between the southern frontage and the Unitec Core;
- Limiting car parking to 1 or less per dwelling, and implementing other operational and infrastructural measures such as cycle storage facilities, bike hire systems and carpool schemes;
- Upgrading Carrington Road for active modes, public transport services and road safety (the related "Carrington Road Upgrade").

All the above measures are not just objectives of the Masterplan and ITA but also in required or strongly implied through the Unitary Plan's precinct rules. They are also required from a practical perspective to ensure that the transport environment achieves high standards, and the large amount of new residential development can be accommodated successfully in an existing suburban environment.

If these measures are not implemented by developments within the Precinct or deferred to later stages / after the ITA timeframes, this may lead to differences in the practical outcomes. This may in particular lead to increases per-dwelling trip generation and congestion levels above and beyond those identified in this ITA's traffic modelling. As a result, this may reduce development levels within the Precinct or require further road capacity upgrades on the surrounding existing transport network.

As such, the "key moves" above are not "good to have" aspirations but crucial and critical to successful development of the proposed suburb from both a density and transport perspective.

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[14] HUD masterplan, Grimshaw, February 2019, Section 3.3.2:

- key move 7 ("Create safe streets with reduced car access to encourage walking, cycling, strolling, sitting and socialising."),
- key move 8 ("Strengthen, enhance and establish new pedestrian and cycleway connections within and through the site") and
- key move 9 ("Support improved public transport connectivity including Carrington Road busway and the possibility for a transit loop within the site.")

## 4.2 Level of Detail in the ITA

Transport elements are discussed to a general level within this ITA, however, the internal road design have not yet proceeded to detail design.

These elements will be refined later as part of individual development proposals under the overarching ITA umbrella. Elements that have already been discussed in the Masterplan, including road cross-sections, will be modified and developed further as part of this ITA that include:

- Description of and indicative plans for the high-level internal network layout, including identifying the form and location of all primary connections to the external transport networks.
- Vehicular traffic modelling identifying, an area-wide network between Point Chevalier town Centre and Mount Albert town centre, the congestion impacts and mitigation requirements of additional vehicular traffic due to the new development comprising:
  - Quantification of key projected network queues and intersection delays;
  - Quantification of projected impacts on general / public transport journey times, in particular on Carrington Road, including identifying impacts of public transport priority measures that are identified to ensure the transport vision; and
  - Identification of key network capacity upgrades required or recommended, whether for general traffic or public transport.
- Indicative cross-sections and concept intersection designs to inform number of lanes, provision of crossings / active mode facilities, overall space requirements for internal roads, external connections, and Carrington Road upgrade.

Not included in the ITA are:

- Specific locations and designs of internal main roads.
  - Main internal streets are assumed to be located in general accordance with and fulfilling the same connective functions as set out in this ITA, particular in relation to existing roads and developments.
  - Future exact location and design however will still be able to change to allow some flexibility and responsiveness to local conditions and development party plans within the Precinct, including parties such as Mason Clinic, Unitec or Ngāti Whātua Ōrākei.
- Locations or designs of minor internal streets - these will be designed as part of individual area developments.
- Trip generation assessments for active mode and public transport. Due to the lack of comparative literature data in a New Zealand context, beneficial impacts of active modes and public transport have been calculated in the context of how they will instead lead to reduced vehicle trip generation.
- Individual intersection designs above concept level.

## 4.3 Transport Connectivity

### 4.3.1 General & Vehicular Connectivity

The proposed high-level connectivity for vehicles in the Precinct are shown in Figure 4-1:

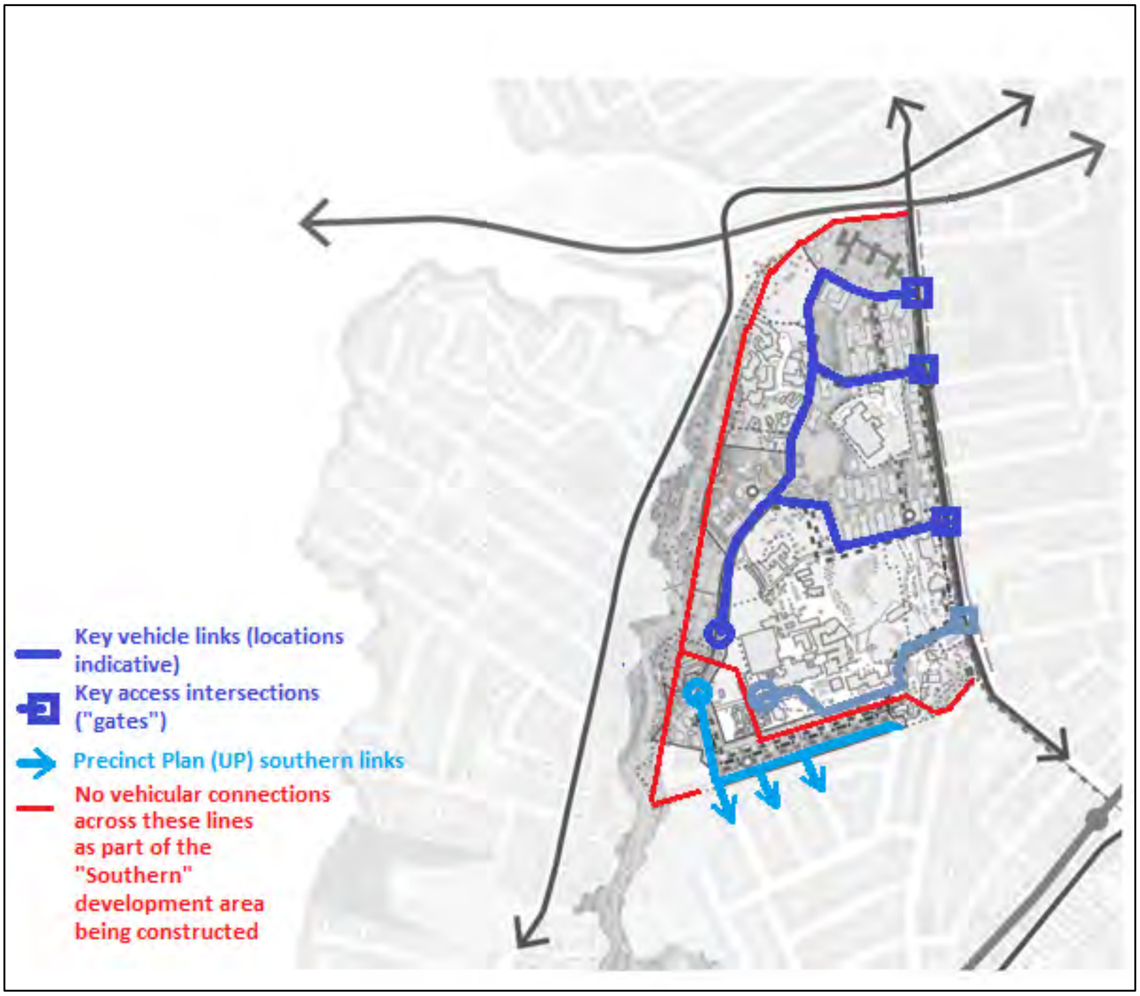



Figure 4-1: Proposed general and vehicular network

As discussed earlier in Section 4.2, the locations of these elements are intentionally high-level. Similarly, minor roads or accesses (such as vehicle crossings) are not shown. These will be designed as part of the detailed development proposals within each area. However, none of these are expected to provide through traffic connections across the red "boundary" lines shown in Figure 4-1 or allow direct access into the Unitec Core from the southern local roads.

Providing a comparison between the proposed layout against the indicative network assumed in the Unitary Plan, Precinct Plan 1 (as shown in Figure 3-1), the following key observations are made:

- The key internal road links and external connections are essentially identical, albeit slightly different in location. This aspect is indicative in all three reference documents: Precinct Plan, Masterplan and ITA;
- There is a further vehicle access / internal link shown for the Unitec Core that is existing (Gate 4), that was simply not highlighted in the Precinct Plan.
- Vehicular connectivity is shown between the existing cul-de-sac roads south of the Precinct and Southern development area as per the Unitary Plan. However, the exact form of these connections to the southern streets is still being developed;
- There are no vehicular links between the southern existing local roads and the Unitec Core area; and
- There are no vehicular links to be built between the Southern development area and central and northern areas of the Precinct as part of the construction of the "Southern" development area currently being advanced as one of the early areas for development.

### 4.3.2 Public Transport Connectivity

The proposed high-level connectivity for public transport in the Precinct is shown in Figure 4-2:

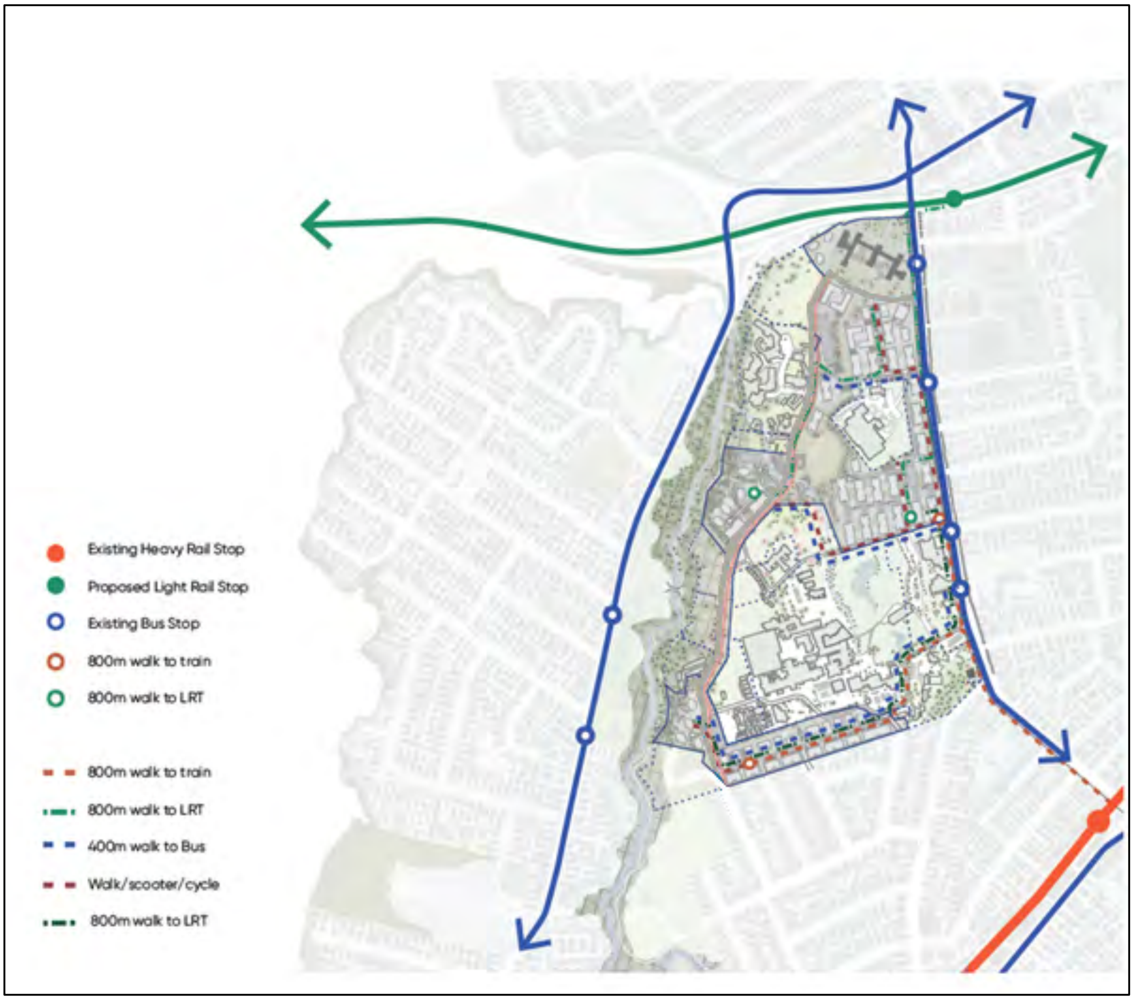



Figure 4-2: Proposed public transport network (indicative)

As indicated in the diagram and discussed earlier at Sections 2.2. / 2.3, the Precinct is surrounded by public transport routes with further improvements anticipated comprising:

- New southbound bus lane on Point Chevalier Road; and
- Bus lanes on Carrington Road along the frontage up to at least Woodward Road; and
- Future Rapid Transit (likely Light Rail) line along SH16 (outside of the ITA timeframe).

The above diagram, extracted from the Masterplan, indicates a number of key existing / potential public transport stops, and indicative walking distances to them. It is worth noting that it does not highlight that the Precinct also has good walking access to the Great North Road stops west of Oakley Creek via the Waterview Shared Path.

Overall, the Precinct is well served by high-frequency public transport within a convenient walking distance. When assuming an e-scooter / train or bike / train combined trip, this convenience will be increased by including convenient access to train stations at either Mount Albert town centre or Baldwin Avenue less than 2km distance from all parts of the Precinct.

The areas least accessible to public transport are the west and southwest of the Precinct. The Masterplan diagram considers the possibility for a bus route travelling on the back edge of the development via Woodward Road, and then along the western spine road, returning via Gate 1 to Carrington Road.

It is understood that this "back route" bus service generally is not supported by Auckland Transport, as it leads to slower bus journey speeds, and because there will be a greater overall benefit to public transport, if the same service frequency was added to Carrington Road, providing "walk up and go" frequencies.

Therefore, there is no allowance within this ITA that such a western "back route" will be implemented. Notwithstanding that, a route could be implemented at a future stage should demand / density make it more sensible. In this case, the proposed link in the internal road currently designed to prevent through traffic will need to be operationally managed i.e. a short section of road that permits buses only but prohibits through vehicle traffic movements.

### 4.3.3 Cycling Connectivity

The proposed high-level cycling connectivity in the Precinct is shown in Figure 4-2:

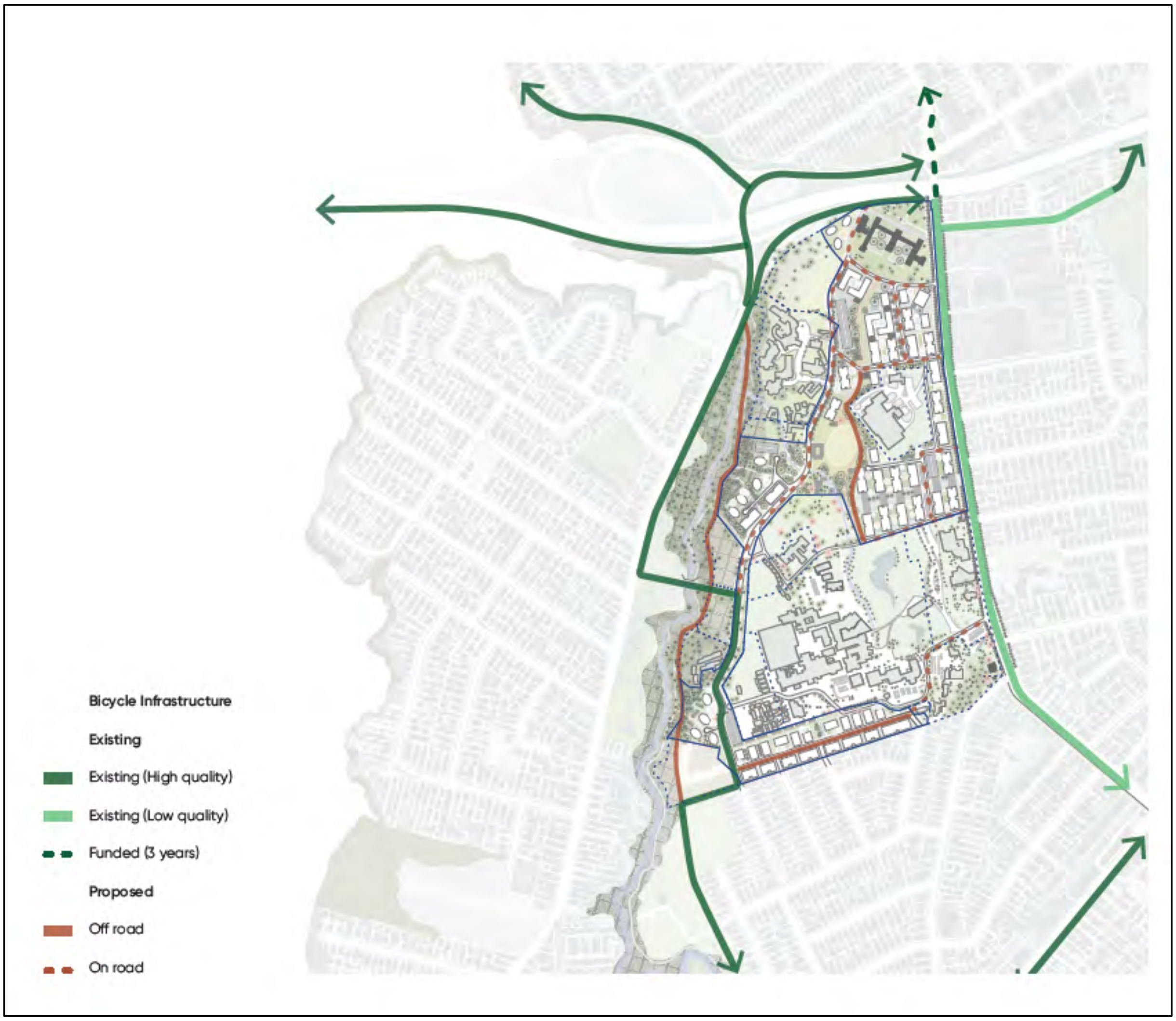



Figure 4-3: Proposed cycling network (indicative)

As can be seen from the diagram extracted from the Masterplan, existing / future cycling routes converge on to the Precinct from all directions, with improvements planned to include:

- Carrington Road Upgrade changing the existing painted cycle lanes to protected bike lanes offering much greater amenity and safety;
- Point Chevalier Road / Meola Road providing new protected cycle lanes, and
- Avondale to New Lynn Shared Path (outside the Masterplan area) with a continuation of Waterview Shared Path (under construction).

Within the Precinct, whilst the above figure shows a number of internal routes, these are high level. Further development of these will include expectations that all main internal roads as shown in Figure 4-1 will be high-quality protected cycle facilities. This is generally already shown in the Masterplan, albeit Gate 3 / Farm Road's cycle facilities in this plan do not currently connect through to the internal spine road, that is deemed important for internal network connectivity.

The Masterplan identifies additional north-south connections in the Precinct that will be beneficial, albeit their location may change as detailed master-planning is completed. Within the consideration of the cycling infrastructure, the following needs to be accounted for:

- Cycle permeability: As identified in the Precinct plans and rules, there will be walk and cycle permeability between all areas including between areas that are to be separated in terms of vehicular travel i.e. for example between the Unitec Core and the Southern development area. Design of development areas will need to show how connectivity will be provided whilst preventing vehicular connectivity.
- Avoidance of new shared paths: Internal cycle paths are assumed to be protected facilities, i.e. not shared paths. This acknowledges that in an environment where both walking and cycling volumes are high, forcing pedestrians and cyclists to share one facility discourages both modes as speeds are different. This is particularly, a problem for the elderly and the young that will compromise accessibility.
- Even compliant shared path designs such as the high-quality Waterview Shared Path in the southwest of the Precinct are already experiencing increased conflicts between walkers and cyclists, far in advance of the additional demand that a large new suburb will place on these routes. However, it is accepted as part of this ITA that existing shared paths in the Precinct are unlikely to be modified to provide separated walking and separate in the near future.
- Protected cycleways despite 30 kph speed limits: It is also important that, despite a slow-speed environment, on the main internal roads, cycling is not assumed to occur on-street. Due to the relatively high development density, even a less car-dominated Precinct will see significant traffic volumes entering and exiting the Precinct on these key links. Requiring people on bikes to ride on-road on high-volumes roads creates amenity and safety issues that undermine mode uptake.
- This is in line with guidance from Auckland Transport's Transport Design Guide (TDM) to avoid on-road riding on busy roads in favour of protected cycle lanes, even if speeds are slower for cyclists.

### 4.3.4 Walking Connectivity

There is currently no specific walking connectivity map available. This is due to the walking network following the same network as general vehicular and cycling connectivity discussed above. However, this will also provide further connectivity in an even more fine-grained network that is currently not able to be shown, even indicatively at this stage. The relevant design will occur during future design stages.

Good walking connectivity across the "vehicle boundaries" have been assumed in this ITA, i.e. to ensure good connectivity for walking into and out of the Unitec Core area.

Wherever possible, new walking connections should be accessible i.e. stair free and mobility-compliant.

## 4.4 Design for Road Safety & Pedestrian/Cyclist Priority

Any detailed design for roads within the Precinct will need to show how the built transport environment will achieve high road safety standards, including safe speeds and high amenity for walking and cycling.

The ITA is not prescriptive as to how this will occur, but any design will need to provide a "self-explaining" street where speed limit signs are an add-on rather than the primary means of communicating appropriate speeds. It will also be important that the design reinforces and prioritises pedestrians, and where appropriate, cyclists rather than assume a default vehicle priority at intersections and crossings.

Guidelines to be used for design of the internal street design to ensure this transport environment include:

1. Formal and by-design speed for 30 kph on all main internal roads and potentially lower on secondary internal roads, including consideration of the following:
    - Vertical traffic calming - Combined as much as possible with walk and cycle crossings, i.e. raised tables such as that shown below, as well as raised tables across side road approaches;
    - Horizontal traffic calming, i.e. avoidance of long, un-interrupted straight stretches of road, use of chicanes or off-set car parking areas;
    - Traffic lane widths set at the minimum for the appropriate design vehicles;
    - Lack of marked centre lines except where legally required i.e. at on the approaches to traffic signals; and
    - Landscaping (in particular trees) positioned close to the carriageway to create "visual friction".
2. Formal and by-design priority for pedestrian /cyclists at intersections, including:
    - Single-lane approaches at all internal intersections with multi-lane approaches to be used only on approaches to Carrington Road vehicle accesses; and
    - Use of mini-roundabouts and raised intersections to ensure all approaches are slowed down, rather than just side roads.
3. Separated cycle facilities on key routes that are likely to accommodate high vehicle volumes even where the design provides for speeds of 30 kph or less.
4. Vehicle crossings to be designed to clearly demonstrate pedestrian and cycle priority.

Figure 4-4: Example of a raised zebra crossing with the Precinct (near Gate 4)

Figure 4-5: One-way separated cycleway – horizontal separation – Tuam Street, Christchurch (photo: Jeanette Ward, via NZTA website)

## 4.5 Example Internal Cross-Sections

In this section, a number of internal road cross-sections are shown that exemplify the level of provision for various modes expected within the Precinct.

It is important to note that these street / path cross-sections differ from the examples in the Masterplan. This is predominantly due to them being developed further on the basis of this ITA and additional input, including showing walking and cycling elements more prominently.

Additionally, it is noted they are not "designs" that have to be used in future Precinct developments. However, it is recommended that any final road designs constructed will, at application time, be compared with these ITA designs to assess whether the quality standards particularly for walking and cycling and road safety have been achieved.

Additionally, there is no reason why future Precinct development road designs will not be able to exceed the quality standards in these examples i.e. for example wider footpaths where beneficial.

### 4.5.1 Main internal street

These will generally be "key links" within the Precinct, as shown in Figure 4-1, particularly the north-south spine road and west-east roads connecting with Carrington Road.

The main internal streets within the Unitec Core (blue-grey) and southern area (light blue) on Figure 4-1 are expected to diverge more from the example cross-sections shown below, as their condition and demands are different and as they tie into a different existing residential street network, particularly for the southern areas. As alluded to above these quality standards and cross-sections are examples and recommendations, rather than fixed designs.

Key quality standards for main internal streets:

1. Overall road corridor width of at least 20m that increases to 25m in the sections approaching Carrington Road to allow an additional turn lane exiting the Precinct and a solid median.
    - If there are sections of severe geographical or existing building constraints, the 20m corridor width may be reduced for local sections, whilst trying to retain the transport amenity and safety functions as much as possible i.e. back berms and landscaping areas will be affected first.
2. Relatively narrow 3.0m traffic lanes balancing the need for occasional access by moving trucks, rubbish collection trucks etc with traffic calming benefits of narrower lanes.
3. Minimum 2.2m width footpaths on each side.
4. Protected cycleways with sufficient separator (minimum 0.8m) from vehicle traffic. The form and location of the cycleway can be flexible, as shown in the example options, i.e. depending on landscaping placement and whether they are formed as two-way cycleways or two one-way cycleways.
5. Landscaping / rain garden areas (2m or more recommended to allow major trees) – location within the cross-section can be flexible, ideally will be located either side of the vehicular carriageway to create a visual narrowing supporting a slow-speed transport environment.
6. No car parking directly on the street.
7. Limited vehicle crossings - Vehicle crossings are not prohibited, but any vehicle crossings shall lead to a smaller number of joint car parking or servicing areas.

Examples of three cross-sections are shown below:

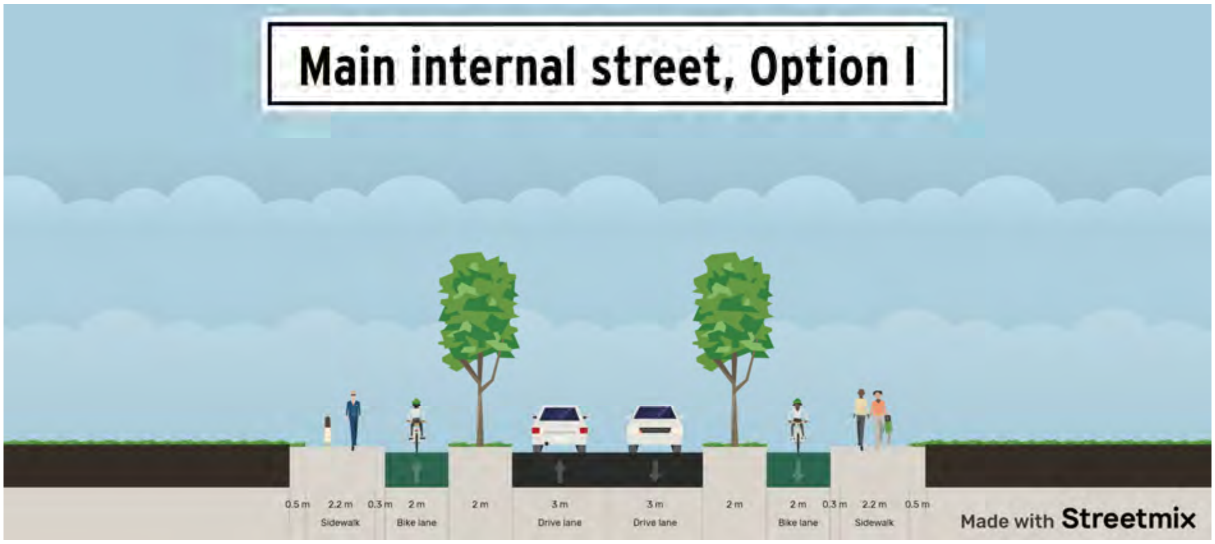



Figure 4-6: Main internal street with landscaping providing the cycle lane buffer

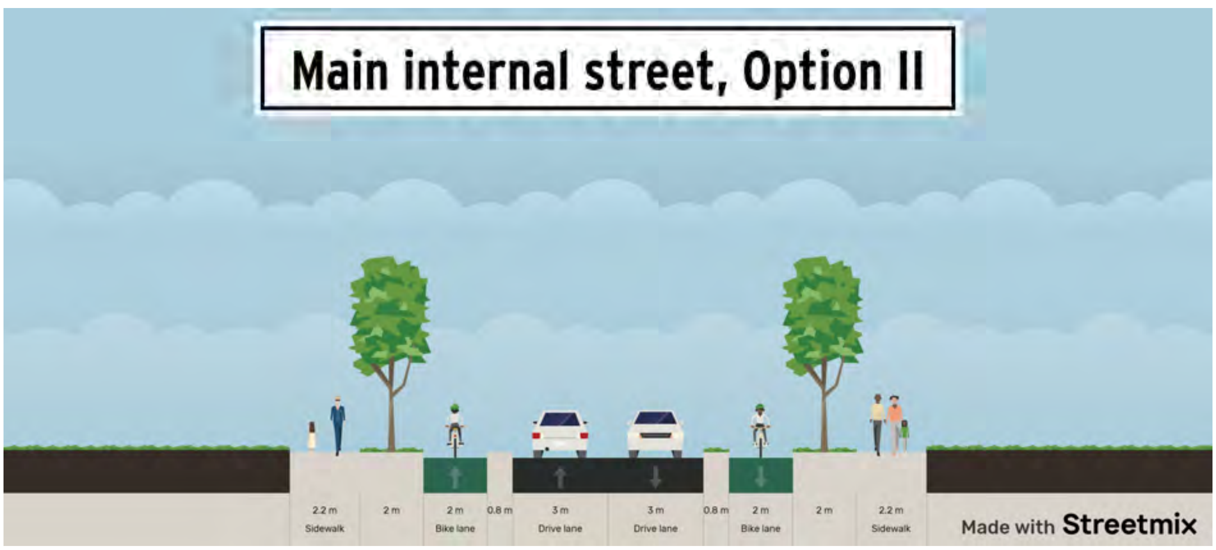



Figure 4-7: Main internal street with landscaping between footpath and cycle lane and separate buffer

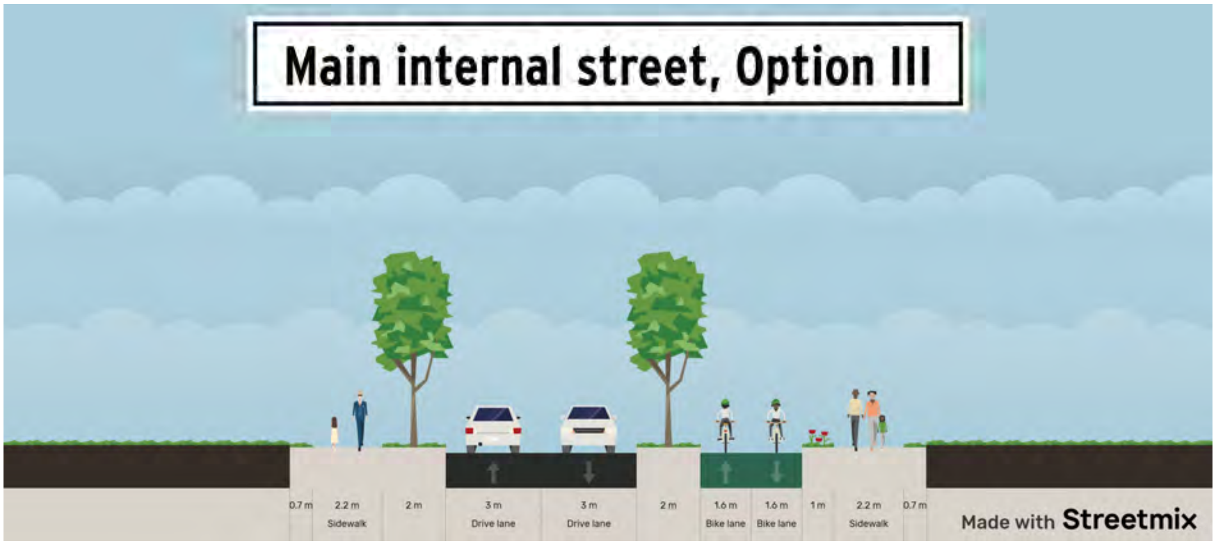



Figure 4-8: Main internal street with a two-way cycleway along one side of the road

An alternative Option 1 arrangement is shown to accommodate two approach lanes and a solid median on the approach to one of the major intersections with Carrington Road as shown in Figure 4-9 below.

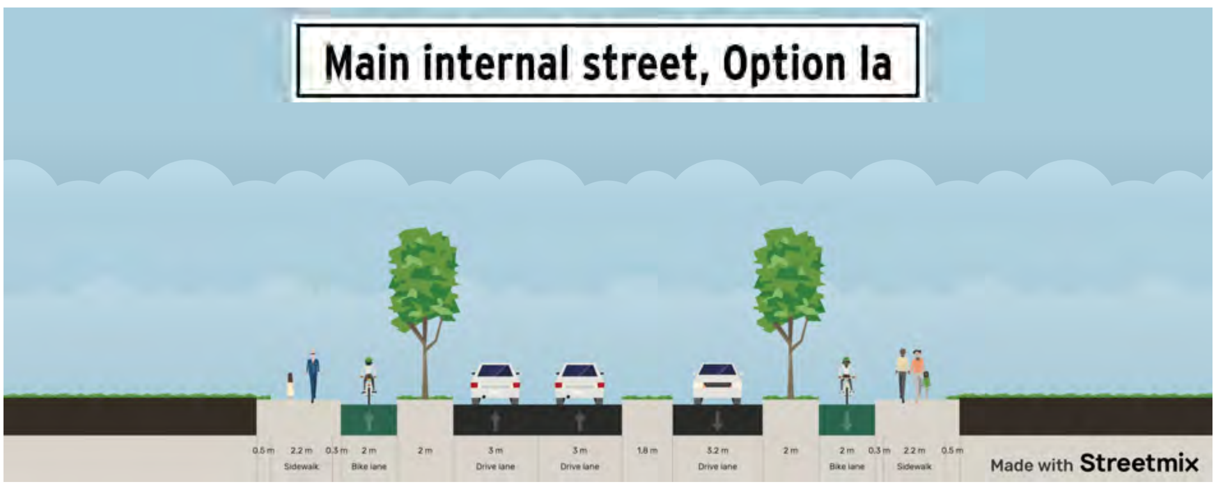



Figure 4-9: Main internal street variant on the approach to Carrington Road (example layout)

### 4.5.2 Minor Roads

There are no specific cross-sections for minor roads or non-road joint access lots (JOALs) provided in this ITA as their form may vary strongly, even within a Precinct area, from "classic" streets with footpaths and recessed parallel parking, to shared spaces / home zone environments.

It is proposed that any design should comply with the intention to provide a high-quality transport environment, in line with the design guidance summarised in Section 4.4.

## 4.6 Carrington Road Upgrade

The Carrington Road Upgrade is the main Precinct-external transport upgrade incorporated into this ITA and will be crucial to accommodate the anticipated development traffic levels as described in Scenario B. This is due to existing Carrington Road deficiencies in walking, cycling and public transport facilities, as well as a lack of safe and convenient vehicular access to / from the Precinct onto Carrington Road.

As discussed earlier, to achieve a reduction in vehicle dominance in the Precinct, thereby a reduced trip generation per dwelling, the convenience of walking, cycling and public transport facilities need to be upgraded. Without the Carrington Road Upgrade, a crucial element to achieve this will be missing.

The Carrington Road Upgrade is included for Auckland Transport funding in the Regional Land Transport Programme 2018-2028. An element of design funding is proposed within the earlier part of the decade, with primary works (indicative construction funding allocation) starting in 2025.[15] This aligns well with Scenario B timescales as it means the upgrade would be completed by around 2028.

### 4.6.1 Mid-block Upgrade

The Carrington Road Upgrade has yet to be designed. However, previous design work undertaken by Auckland Transport identified key improvements likely to be incorporated into the upgrade comprising:

- Improved pedestrian crossing (and where appropriate, cycle crossing) over Carrington Road;
- Improved footpaths, particularly on the western side;
- Upgrading the narrow, paint-only, cycle lanes to cycle lanes with protective separators;
- Provision of bus priority (exact form not confirmed, but the ITA assumes bus-only lanes each way); and
- Improving landscaping / tree planting / stormwater treatment.

Previous Auckland Transport corridor management plans for Carrington Road[16] included example cross-sections as shown in Figure 4-10 and Figure 4-11 below:

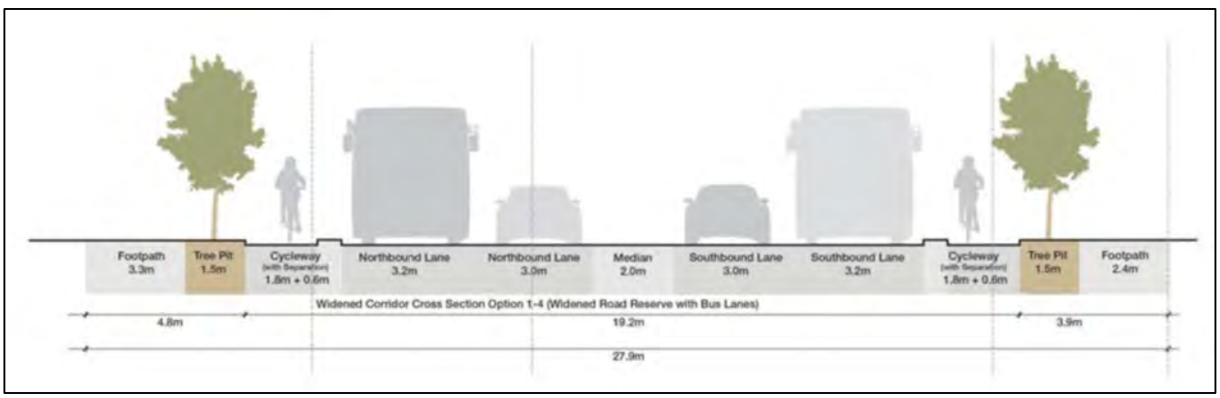



Figure 4-10: Carrington Road Upgrade mid-block cross-section

[15] Regional Land Transport Programme 2018-2028, Auckland Transport, Page 60

[16] Carrington Road / Mt Albert Road Corridor Management Plan, GHD for Auckland Transport, 2014 and subsequent study work by Opus for Auckland Transport testing preferred cross-sections and other corridor upgrade aspects

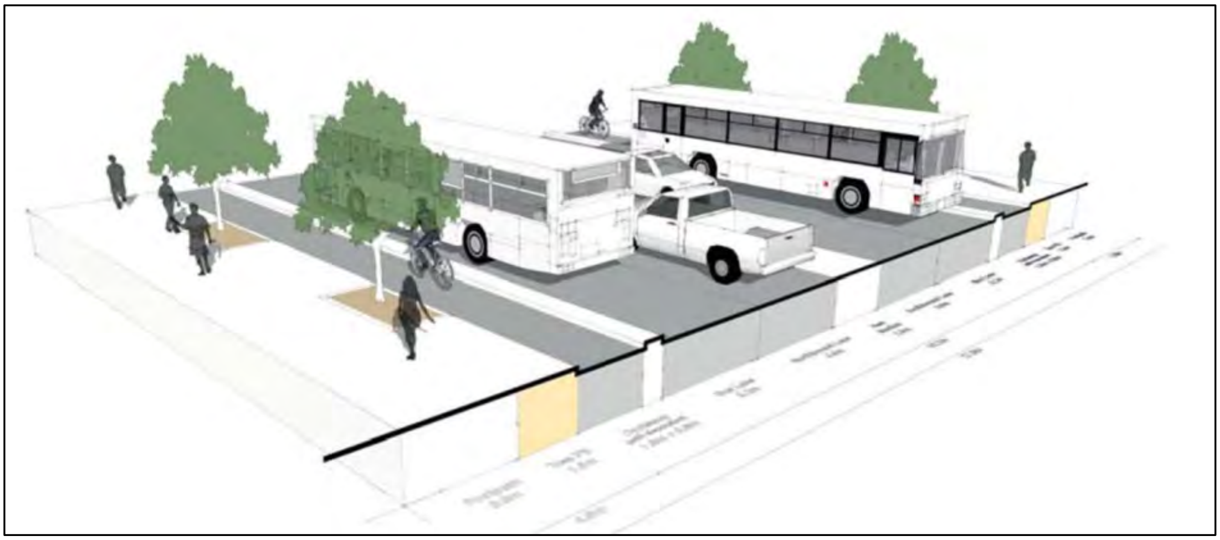


Figure 4-11: Carrington Road Upgrade mid-block visualisation

Similar to the internal cross-sections outlined in Section 4.5, it is not expected or required that future upgrades will precisely follow this cross-section, as long as the overarching outcomes are achieved.

### 4.6.2 Upgrade Extent

As part of the Unitary Plan processes (rezoning of the predominantly Unitec-owned land in the Precinct), agreement was reached that the existing corridor width of Carrington Road would be 28.2m.

Widening was assumed to take place exclusively or almost exclusively on the western side of Carrington Road, on land, that was Unitec-owned and comprises a mixture of Unitec land (southern third) and Crown land (northern two thirds).

The fact that two landholders are involved it is expected to reduce the complexity and delays for any upgrade project compared to road widening along a corridor requiring land acquisition from dozens or hundreds of individual property owners.

In terms of extents, the previous ITAs assumed that the proposed upgrade will extend from and include Great North Rd / Carrington Rd intersection and extend as far south as Woodward Rd / Carrington Rd.

For the purpose of this ITA and associated traffic modelling, while some small changes are assumed at the Great North Road / Carrington Road intersection, the primary Carrington Road Upgrade i.e. added bus lanes in particular, starts south of the SH16 motorway overbridge. This is due to the results of traffic modelling indicating that there was no requirement to add a second southbound lane on the motorway overbridge as previously identified in the 2017 ITA undertaken for Wairaka Land Company.

### 4.6.3 Signalised Precinct Accesses

In the existing transport environment, only one (Gate 4) of the four accesses from Carrington Road into the Precinct is signalised. As development within the Precinct is implemented, there will eventually be a requirement to construct one or more further traffic signal controlled intersections, to:

- Accommodate the added turning volumes,
- Ensure right turns in / out remain safe for all users, specifically once Carrington Road is four-laned via the addition of bus lanes; and
- Improve pedestrian crossing convenience and safety. This is an existing need but will become even more crucial with the addition of two bus lanes.

Based on traffic modelling scenarios and the fact that the addition of two bus lanes is not expected to occur until around 2028, no further traffic signalisation of intersections (Gates, 1,2 and 3) have been included within Scenario A. All traffic entering / exiting have been shown to be accommodated within the existing priority intersections and Gate 4. The results of the modelling are discussed later in this ITA.

The modelling undertaken based on Scenario B development includes the Carrington Road upgrade and signalisation of Gate 2 (just north of Segar Avenue) and Gate 3 / Farm Road. These are anticipated to be the primary vehicular accesses to / from the central and northern development areas. Gate 2 will also continue to be the primary vehicle access / access easement for Mason Clinic and Taylors Laundry.

Gate 1 is not expected to be traffic signal controlled, even in Scenario B. Predominantly this is due to all right turn vehicle movements being accommodated sufficiently at the other gates, and partly to reduce interference with the existing walk/cycle mid-block crossing between Gate 1 and Sutherland Road. Within Scenario B, it is not proposed that Gate 1 will accommodate right turn movements out of the site and will be converted to a left-in / left-out only access.

### 4.6.4 Woodward Road Signals

As part of traffic modelling discussed later in this ITA, sensitivity testing has been undertaken to identify when Woodward Road / Carrington Road will need to be signalised.

As with the access intersections to the north, the eventual signalisation is also in part due to crossing demands for pedestrians and safety impacts of vehicles turning across added lanes arising from the implementation of added lanes within the Carrington Road Upgrade.

It is acknowledged that these lanes are not expected to extend south of the intersection, beyond possibly some short lead-in / lead-out stretches.

The results of traffic modelling demonstrated that signalisation in Scenario A will not be required. Therefore, only Scenario B, with the Carrington Road Upgrade, incorporates this improvement.

### 4.6.5 Unitec Feature Bus Stop and Crossing

Within Scenario B modelling, a new bus stop for improved public transport access to the Unitec Core is included between Gates 3 and 4. This will be accommodated by relocating existing bus stops slightly towards the middle of this mid-block location.

The improvements are also assumed to include bus shelters for waiting passengers and a traffic signal controlled mid-block pedestrian crossing to the southbound stops.

It is noted that as per previous plans, in association with their site redevelopment and consolidation, Unitec intended to improve walking routes between their Core buildings, and this bus stop. This walking route currently via sub-standard footpaths alongside the Gate 4 road will become more attractive, especially if some form of shelter were provided. However, the exact form of this pedestrian link is not currently known.

### 4.6.6 Carrington Road Walk/Cycle Crossings

In Scenario A, it is assumed that no improvements will occur on Carrington Road in terms of crossing opportunities, beyond potentially providing pedestrian refuges in the vicinity of Gate 2 and 3. The existing raised zebra crossing for pedestrians and cyclists located south of Sutherland Road will be retained.

In Scenario B, the pedestrian and cycle crossing to the south of Sutherland Road will be upgraded to a traffic signal controlled mid-block walk / cycle crossing.

As noted earlier in Section 4.6.5, Scenario B also incorporates a new mid-block traffic signal controlled pedestrian crossing between Gate 3 and Gate 4.

## 4.7 Other Transport Assumptions, Infrastructure

### 4.7.1 Southern Roads Connectivity

The provision of an internal through route within the Precinct linking to the southern existing roads had been discussed in the Unitary Plan stage, and is permitted as shown on Precinct Plan 1 provided at Figure 3-2. However, as acknowledged by the Precinct Plan rules, a through route would need to address concerns about the potential for an increase in vehicle traffic on the existing cul-de-sac roads located south of the Precinct, with connections into the core Unitec Campus not permitted, for example.

Previous traffic modelling assumed that an internal connection allowing development traffic will be required to ensure Carrington Road did not have excessive traffic movements, thereby requiring additional widening beyond that previously assumed for local access solutions.

However, changes in development and wider–area base traffic movements around the Precinct led to reconsideration of this link as part of this ITA. As discussed in the traffic modelling section later in this report, the internal link, incorporating development assumptions discussed earlier, is no longer required from a modelling perspective. On this basis, the link was removed from the traffic modelling, and no through connection shown on Figure 4-1.

It is clarified for avoidance of doubt that only through traffic between the southern and eastern frontages is to be deterred. Local development traffic within the Precinct may potentially still be accommodated in the future to serve developments in the centre and north. However, this will not occur during any of the development contemplated in the 'Southern' residential development area, even if this incorporates part of the southern F- Block (refer figure 3-3). This part of the development will be constructed without vehicle connections to either the Unitec Core or the road network to the north.

No matter the facility provision for general vehicles, access may still be provided for rubbish collection vehicles and potentially for public transport services - and will always be provided to ensure easy connectivity for walking and cycling, even where vehicular connections are to be discouraged.

## 4.8 Other Transport Assumptions, Operational

As outside the Southern area, no detailed plans for development have yet been developed beyond the Masterplan and associated bulk and location studies, the following operational measures are conceptual and only described at a high level. However, while not all may eventuate, they are part of the overall suite of initiatives that are available in seeking to reduce vehicle dominance.

### 4.8.1 Car Sharing

It is anticipated that all apartment blocks across the development will be provided with easy access to car sharing facilities. These may range from providing car sharing car parks for third-party operators or ensuring that a car share system is operated specifically for the use of the Precinct, with a dedicated number of vehicles always available to residents.

In either scenario, this will assist with increasing the number of people that are able to live in the Precinct without a car, or with only a single car per household, using the provided share cars mainly when other modes are too inconvenient. This will help reduce the average car ownership rate whilst retaining the benefits of access to cars.

### 4.8.2 Bike & E-Scooter Sharing

It is expected that all apartment blocks across the development will be provided with easy access to bike and e-scooter share facilities. These may range from providing share ranks for third-party operators to use, up to ensuring that a bike e-scooter share system is operated specifically for the use of the Precinct, with a dedicated number of cycles / e-scooters always available to residents.

In either scenario, this will assist with reducing the number of vehicle trips needing to be made (even for residents who have access to a car of their own) and encourage some residents to live without a car.

### 4.8.3 Unbundled car parking

It is expected that purchase of an apartment in the Precinct will not come with “mandatory” car parking.

Instead, at least a part of the provided car parking supply as per Section 3.6 may be sold separately as optional add-ons to an apartment purchase and / or provided as long-term leases. This will allow residents who do not require a car park to purchase an apartment more affordably.

If car parking up-take by residents in this fashion is lower than predicted, this will also allow a more flexible reduction in car parking rate per dwelling as the development proceeds, thereby in line with actually occurring demand rather than trying to predict an acceptable minimum ahead of time.

These arrangements are particularly beneficial for any parking buildings intended to be designed for later adaptive re-use, as they allow more flexible parking allocation even down the track compared to more rigid ownership structures.

### 4.8.4 End of trip facilities

As the proposed new development is almost exclusively residential it will not need to provide end of trip facilities such as showers from a transport perspective. However, all development will still need to provide dedicated, secure bike parking, at minimum Unitary Plan rates or better.

Going beyond this minimum, it is assumed that at least the larger apartment buildings will also provide added facilities such as dedicated storage lockers and e-bike charging facilities.

Non-residential developments across the Precinct, including Unitec and Mason Clinic, are assumed to progressively improve their own trip end facilities over the timeframes included within this ITA, with a focus on work and student commuting use, in line with the Unitary Plan requirements or better. This assumption is also consistent with previous work undertaken by Wairaka Land Company for Unitec.

### 4.8.5 Travel Demand Management

As residential development occurs, it is anticipated that organisations such as body corporates will, as one of their functions, take on at least basic travel demand management functions. Ideally this will be part of the relevant legal instruments. Potential activities include arranging for new residents to receive information about possible travel choices, arranging activation events etc.

Similarly, it is expected that as part of Unitec’s further site consolidation, and move to paid parking etc, there will be greater operational importance on encouraging students and staff to use non-car modes via travel demand management measures.

## 4.9 Summary of Transport Assumptions

The following table summarises key transport assumptions discussed in Section 4, and the relevant scenario they are included within.

| Assumption | Responsibility | Base | Scenario A | Scenario B |
|---|---|---|---|---|
| **Active mode assumptions** | | | | |
| Internal network design prioritising walking and cycling | Developers | ✓ (partial) | ✓ | ✓ |
| Internal 30 kph speed environment design | Developers | ✓ (partial) | ✓ | ✓ |
| Walk/cycle link from Southern development area to central / northern / Unitec areas, (even where vehicle traffic discouraged) | Developers | ✓ | ✓ | ✓ |
| Northwestern Cycleway | NZTA | ✓ | ✓ | ✓ |
| Waterview Shared Path | AT | ✓ | ✓ | ✓ |
| Avondale to New Lynn Shared Path | AT | ✗ | ✓ | ✓ |
| Point Chevalier Rd/Meola Road Cycleway (incl related changes at Carrington / GNR) | AT | ✗ | ✓ | ✓ |
| Carrington Road painted cycle lanes | AT | ✓ | ✓ | ✗ |
| Carrington Road protected cycle lanes along Precinct (as part of Carrington Rd Upgrade) | AT | ✗ | ✗ | ✓ |
| Car share, bike share and travel demand management initiatives readily accessible | Developers / 3rd parties | ✗ | ✓ (partial) | ✓ |
| Reduced parking rates per dwelling (≤1), unbundling parking from apartment purchase | Developers | ✗ | ✓ | ✓ |
| **Public transport assumptions** | | | | |
| Point Chevalier Rd southbound bus lane | AT | ✗ | ✓ | ✓ |
| Carrington Road bus lanes along Precinct (as part of Carrington Rd Upgrade | AT | ✗ | ✗ | ✓ |
| Reduced train journey times from Mt Albert town centre to City Centre due to City Rail Link | CRLL | ✗ | ✗ | ✓ |

| Assumption | Responsibility | Base | Scenario A | Scenario B |
| --- | --- | --- | --- | --- |
| Rapid Transport (likely Light Rail) with Point Chevalier station | MoT / NZTA | ✗ | ✗ | ✗ |
| **General network assumptions** | | | | |
| Signalisation of raised table Carrington Rd walk/cycle crossing south of Sutherland Rd | AT | ✗ | ✗ | ✓ |
| Gate 1 / Carrington Road signalisation | AT / Developers | ✗ | ✗ | ✗ |
| Gate 2 / Carrington Road signalisation | AT / Developers | ✗ | ✗ | ✓ |
| Gate 3 (Farm Road) / Carrington Road signalisation | AT / Developers | ✗ | ✗ | ✓ |
| Mid-block signalised pedestrian crossing at main Unitec Core bus stop | AT / Unitec | ✗ | ✗ | ✓ |
| Gate 4 signalisation | N.A. | ✓ | ✓ | ✓ |
| Woodward Road / Carrington Road traffic signalisation | AT / Developers | ✗ | ✗ | ✓ |
| Connections from Southern development area to southern existing local roads | Developers | ✗ | ✓ | ✓ |
| Connection (vehicular) from the Southern or western (Oakley Creek / Te Auaunga - adjacent) development areas to Unitec Core | Developers / Unitec | ✓ | ✗ | ✗ |
| Level crossing at Woodward Road | KiwiRail | ✓ | ✓ | ✓ |

# 5. Modelling Process

## 5.1 Methodology

A microsimulation traffic model of the Wairaka Precinct and the surrounding area has been developed using the AIMSUN software package to assess the traffic impacts of the proposal on the surrounding road network. The effects of the future infrastructure upgrades in the vicinity of the Precinct are also included in the modelled road network.

In development the model, Stantec have used versions from 2014 - 2015, and 2017 that were prepared in association with previous studies undertaken on Precinct development and draft ITAs prepared. The model has been adjusted to reflect latest land-use assumptions and traffic data obtained through surveys undertaken in 2019 and 2028 forecast traffic volumes from MSM provided by Auckland Forecasting Centre (AFC), that is an Auckland Council, NZ Transport Agency and Auckland Transport partnership.

The base model referred incorporates existing network and traffic data from the October 2019 survey.

The future testing Scenarios A and B have been developed based on network assumptions outlined in Section 4.9, MSM future traffic demand and the latest development as outlined at Section 3.5.

Localised sensitivity testing for additional development traffic at some key intersections has been undertaken using SIDRA to assist with understanding potential traffic impacts on the development of several Precinct zones that have not been included in the assumptions at Section 3.5, as they are unlikely to occur within the ITA assumption timeframes.

## 5.2 Existing Traffic Volumes

Traffic surveys have been undertaken on 17 October 2019 at the following intersections in the AM peak hour (6am to 9am) and PM peak hour (3pm to 6pm):

- Great North Road / Point Chevalier Road / Carrington Road;
- Unitec Gate 1 / Carrington Road;
- Unitec Gate 2 / Carrington Road;
- Unitec Gate 3 (Farm Road) / Carrington Road;
- Unitec Gate 4 / Carrington Road;
- Woodward Road / Carrington Road;
- Woodward Road / New North Rd / Richardson Road;
- Carrington Road / New North Rd / Mount Albert Road;
- Laurel Street / Springleigh Avenue;
- Jerram Street / Springleigh Avenue; and
- Harbutt Avenue / Woodward Rd / Willcott Street.

Traffic counts for the intersections not surveyed in 2019 have been sourced from previous surveys undertaken in association with Precinct development studies in 2014/2015 and 2017.

A seven day tube count was also undertaken on Carrington Road (opposite to 120 Carrington Road, between Gate 3 and Gate 4) between 17 October and 23 October 2020 to ascertain typical traffic demand on Carrington Road. The average weekday daily traffic was 7,889 vehicles per day (vpd), with average AM and PM peak hour traffic at 664 vehicles per hour (vph) and 555 vph, respectively.

A copy of the full traffic counts are provided at Appendix C.

## 5.3 Model Form

The modelled area includes the full extent of Carrington Road, Woodward Road, and the section of New North Road between Carrington Road and Woodward Road, all residential streets branching off Woodward Road and the Precinct internal road network.

The Precinct's external and internal connectivity are described in Section 4.3 and shown in Figure 4-1. The smaller side road links within the Precinct shown below are indicative only, whilst the extent of the model is shown in Figure 5-1.

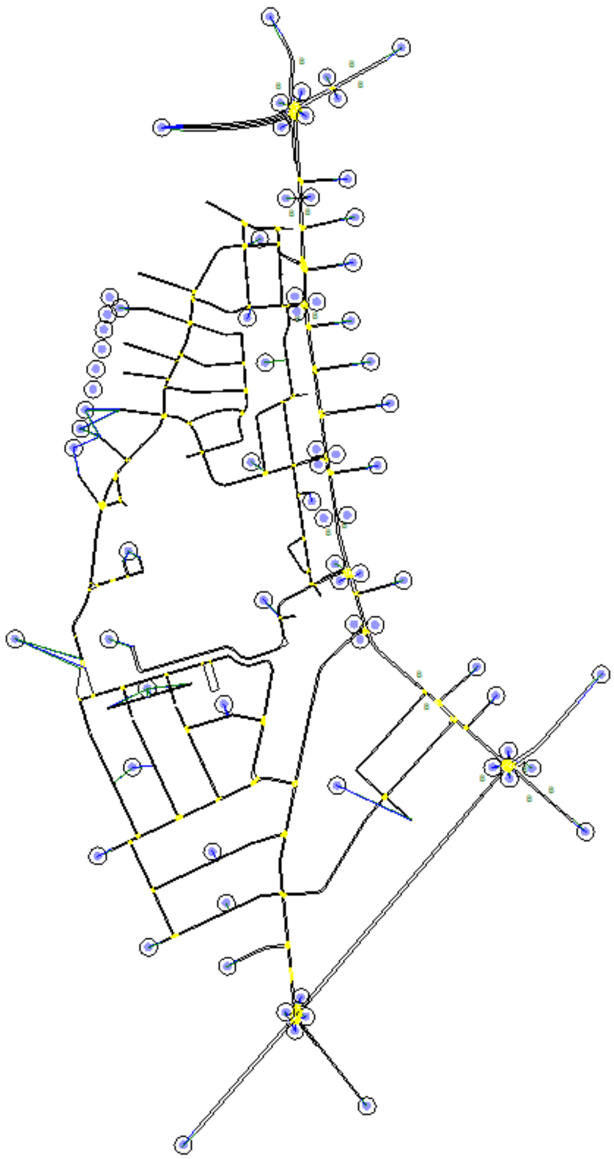


Figure 5-1: Extent of Modelled Area

The micro-simulation models have two hour durations, corresponding to the typical lead-in and lead-out period for more accurate analysis of peak hour statistics. The modelled times are as follows:

- Weekday Morning Peak (“AM') 7:00 - 9:00am.
- Weekday Evening Peak (“PM”) 4:00 - 6:00pm.

In order to verify that the chosen periods for the modelling capture the peak road network times, the following figures illustrate flow variation at 15-minute intervals for the two respective peak periods. The figures show the overall time period surveyed, i.e. three -hour morning and afternoon peak.

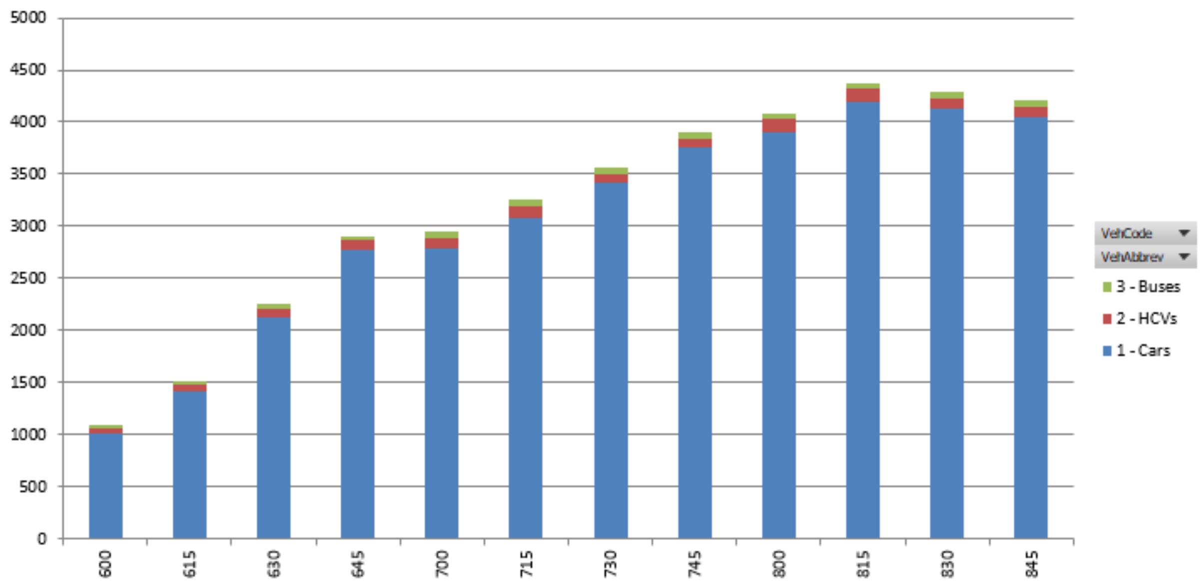



Figure 5-2: AM Peak Period Profile

As can be seen from the graph above, the weekend morning peak traffic volumes tend to increase steadily from the start of the surveyed period, peaking at 8:15am before reducing.

The profile demonstrates that the morning peak period has been appropriately captured within the two-hour model period.

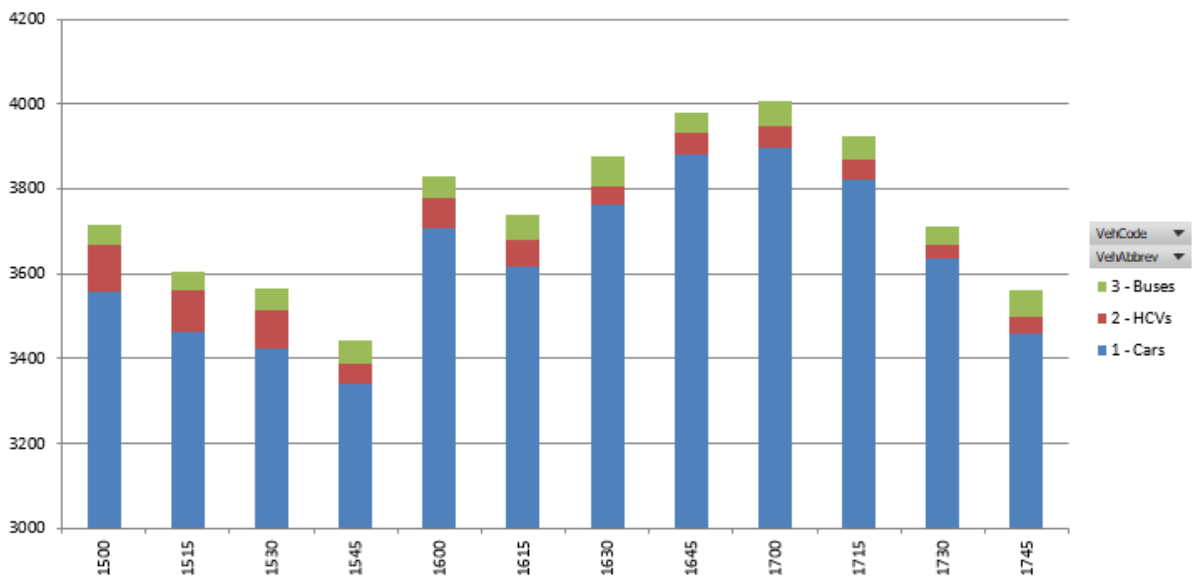



Figure 5-3: PM Peak Period Profile

As can be seen from Figure 5-3, the PM peak period traffic increases at 4:00pm then reduces at 4:15pm, and then continues rising and peaking at 5:00pm. After 5:00pm traffic volumes are seen to noticeably decrease.

The profile demonstrates that the afternoon peak period has been appropriately captured within the two-hour model period.

## 5.4 Calibration

The observed turning counts and volumes from the base model have been compared in order to ensure that the model has been calibrated appropriately. The comparison is included at Appendix C.

The NZTA Transport Model Development Guidelines (TMDG) recommends use of GEH statistics to compare observed and modelled flows for a given peak hour. The GEH statistic is similar in nature to the Chi Squared Statistic but is more applicable to traffic flow comparisons. The equation for calculating the GEH value is given below.

$$GEH = \sqrt{\frac{(m-o)^2}{\frac{(m+o)}{2}}}$$

Where m is the modelled count and o is the observed amount

A model of Carrington Road is considered to fall into model category E of the TMDG. The criteria targets for this model category are 85%, 90% and 95% for the three GEH ranges <5, <7.5 and <10 respectively. The model GEH values, for the AM and PM peak periods, have been compared to the TMDG thresholds described above. All GEH values of the model meet the TMDG thresholds, and are summarised in Table 5-1.

Table 5-1: GEH Statistics Thresholds

| Threshold | TDMG Standard | Model AM | Model PM |
|---|---|---|---|
| <5 | 85% | 93% | 94% |
| <7.5 | 90% | 98% | 98% |
| <10 | 95% | 99% | 100% |

The TMDG also recommends an XY scatter plot of modelled flows (Y) versus observed flows (X) for individual links be presented as a measure of model calibration. XY scatter plots of the observed peak hour turn volumes compared to the modelled volumes are shown in the following figures.

Table 5-2: Morning Peak Hour Modelled vs. Observed Flows Scatter Plot

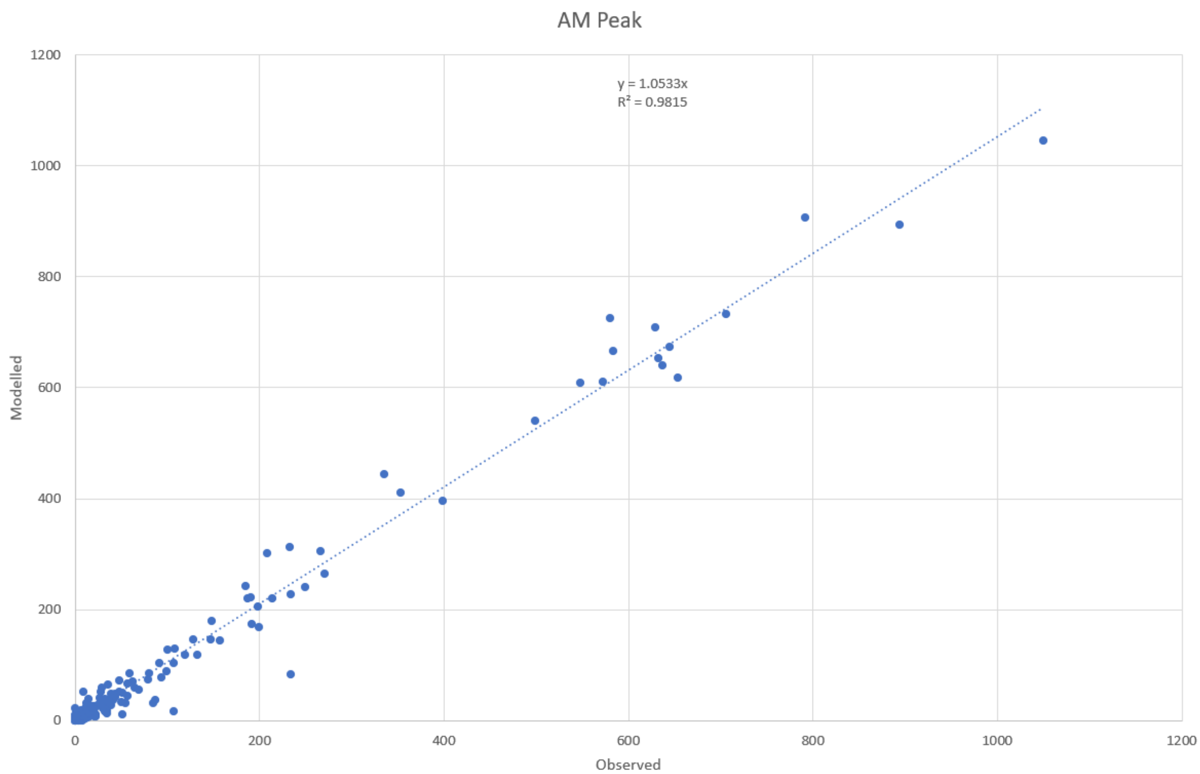
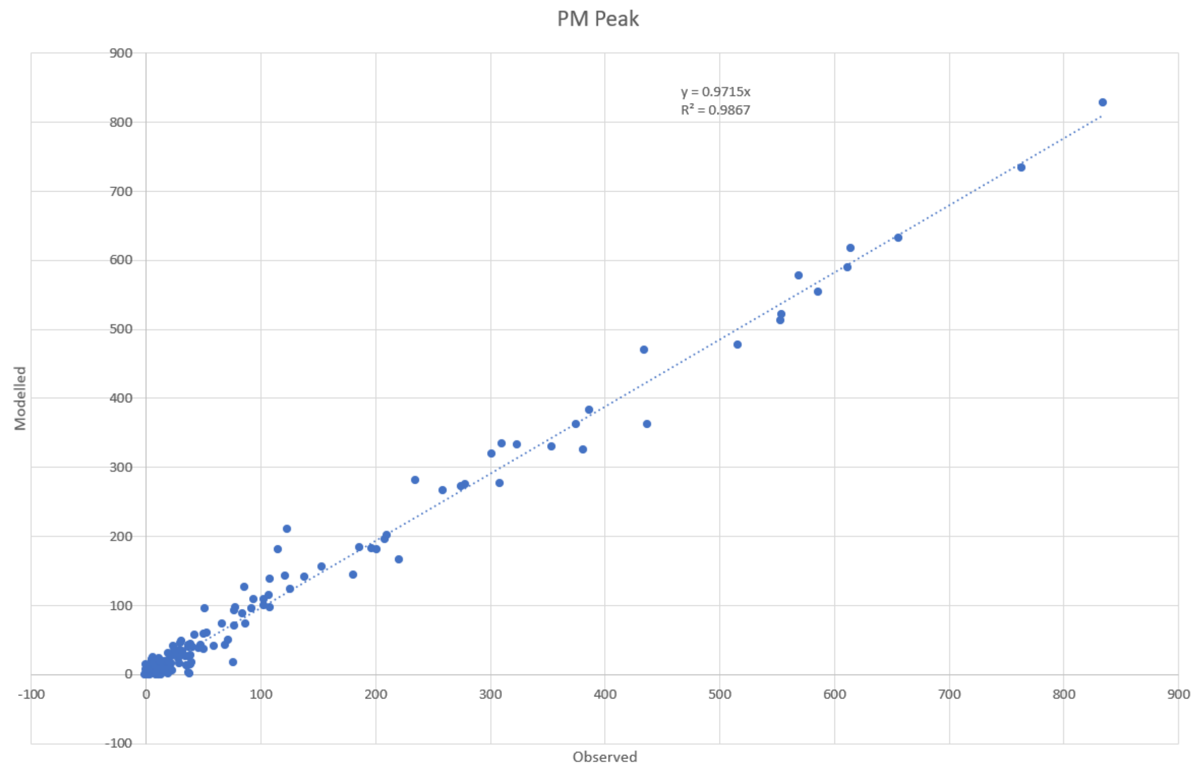


Table 5-3: Afternoon Peak Hour Modelled vs Observed Flows Scatter Plot




From the scatter plots above, it can be seen that for the AM and PM peaks, the modelled flows adequately represent the survey data as all data points lie close to line Y=X, and gradients of the linear regression line is close to 1, i.e. 1.0533 and 0.9715 for the AM and PM Peak respectively. The R squared values for the AM and PM peak are 0.9815 and 0.9867, respectively.

The calibration statistics show that the modelled turn counts match the observed turn counts for the morning and evening survey periods and within the targets set by the TMDG.

## 5.5 Scenario Compilation

The indicative development area and staging included within the modelling is discussed earlier at Sections 3.3 and 3.4 of this ITA. The traffic modelling for the Precinct has assessed the following scenarios for the AM and PM peak hour period:

- **Base Scenario:** Existing network with traffic demand from the October 2019 survey. This represents the situation where the Precinct is not developed and remains operating and with the same land-use currently on the site.
- **Scenario A**: This includes all land use development in the Precinct as discussed in Section 3.5, in addition to transport assumptions and network upgrades outlined at Section 4.9. In terms of the residential development, Scenario A represents 41% of the 2,500 dwellings envisaged on Crown land within the timeframe for this ITA, by around 2024. The development will occur in the southern area, with some initial developments in the central and northern areas.
- **Scenario B**: Scenario B assumes the land use development in the Precinct as discussed in Section 3.5, as well as transport assumptions and network upgrades as outlined in Section 4.9. In terms of the residential development, Scenario B represents 82% of the 2,500 dwellings envisaged on Crown land, by around 2028. By this time, development will occur largely in the central and northern areas of the Precinct.

## 5.6 Initial Modelling

Prior to commencement of the modelling, a meeting was held between Stantec, HUD and AT representatives on 16 February 2020 to discuss and agree the approach and assumptions to be incorporated.

Subsequently, Stantec requested information from Auckland Forecasting Centre (AFC) for inclusion in the modelling, including Select Link Analysis (SLA) for Carrington Road and traversal matrices for a cordon around the Unitec site (covering Great North Road / Carrington Road / Pt Chevalier Road intersection, New North Road / Woodward Road / Richardson Road, and the Mt Albert Rd / New North Road / Carrington Road intersection).

Subsequently, Stantec reviewed and analysed the data from AFC, leading to clarifications requested from AFC where needed. Following this, Stantec integrated the data from AFC into the project Aimsun model. The Aimsun model was then run for Scenario B, with its corresponding assumptions as discussed at the meeting with AT. A copy of the minutes was issued on 17 February 2020 and is attached at Appendix D.

The modelling results demonstrated that the future network will not have sufficient capacity to accommodate the overall forecast demand, based on the initial internal and external network assumptions derived from the AFC data, as well as the original Scenario B trip generation calculations.

The results indicated unrealistic high off-network queues in the AM and PM peak period, in particular on Point Chevalier Road (>700 cars queued in the AM peak and >500 cars queued in the PM peak), on New North Road (south of Richardson Road) in the AM peak (around 400 cars queued), as well as the Great North Road (east of Point Chevalier Road) in the PM peak (>400 cars queued).

The intersections along the study area were also shown to be constrained during the AM peak and/or PM peak, with Level of Service [17](LOS) F and overall intersection delay of over 100 seconds, particularly at Unitec Gate 4 / Carrington Road, Woodward Road / Carrington Road, Carrington Road / New North Road / Mount Albert Road, as well as Woodward Road / New North Road / Richardson Road.

Overall, the modelling results indicated congestion along Carrington Road and surrounding network in the long-term future, resulting from the use of these assumptions of no further adjustment in travel behaviour and traffic distribution beyond the assumptions discussed and agreed with AT.

The full results of this initial Scenario B modelling and the corresponding land use and trip generation assumptions are also included at Appendix D.

A congested network will encourage road users to consider possible alternative travel choices to avoid the delays. People will adapt in various ways; through mode shift (travelling by bus, train or active modes) by changing the times at which they travel (peak spreading), by not undertaking unnecessary trips (reduced total trips generated), or by changing travel route where possible to partially or completely avoid the congested network i.e. using a motorway route instead of a local road. This establishes a new equilibrium, whereby traffic is congested, but not as much as in the first model iteration described above.

This is especially relevant for corridors and intersections with land constraints i.e. Carrington Road and its intersections, particularly after the Carrington Road Upgrade, where the potential for capacity upgrade is limited, but which provide good access to high quality PT services and active mode options (with potential for these to be further improved outside the ITA timeframes).

Accordingly, Stantec has revisited and adjusted the modelling assumptions to better reflect likely changes to future travel behaviour and trip patterns in such a congestion environment. The revised assumptions have been incorporated in the revised Scenario A and Scenario B modelling and are discussed in

[17] Level of service (LOS) is a mechanism used to determine how well a transportation facility is operating from a traveler's perspective. Typically, six levels of service are defined and each is assigned a letter designation from A to F, with LOS A representing the best operating conditions, and LOS F the worst. (Source: https://www.trpc.org/DocumentCenter/View/2798/Appendix-O--Level-of-Service-Standard-and-Measurement

subsequent sections of this ITA. From this point onwards, ‘Scenario A’ and ‘Scenario B’ refer to these revised modelling scenarios with the latest assumptions.

The key changes made to the initial and revised modelling and ITA sections that contains relevant discussions regarding the adjustments are summarised in Table 5-4.

Table 5-4: Changes incorporated between Initial Modelling and Revised Modelling

| Key changes | Initial Modelling | Revised Modelling | ITA Section |
|---|---|---|---|
| **Through Traffic Reduction** | 0% | 25% | 5.7.1.2 |
| **eak Hour Profile (relative to the surveyed two-hour peak traffic)** | 0.56 | 0.52 | 5.7.1.3 |
| **Precinct trip distribution on wider network** | As per the 2019 surveys | Combination of the 2019 surveys and the 2028 MSM data | 5.11.2 |
| **Pass-by reduction for students** | 0% | 10% for Unitec students, 20% for all other students | 5.10 |

## 5.7 Scenario Modelling

### 5.7.1 Background Traffic

#### 5.7.1.1 General Background Traffic

The background traffic incorporated for Scenario A and Scenario B are sourced from the 2028 MSM data. It is noted that there is no MSM data corresponding with the Scenario A timeframes (2024), therefore, 2028 data has also applied to Scenario A, representing a conservative approach.

Information from AFC, including SLA for Carrington Road and traversal matrices for a cordon around the Unitec site have been considered and analysed in determining the appropriateness on the level of background traffic, as shown in the 2028 MSM data, as well as potential reduction in future scenario.

#### 5.7.1.2 Through Traffic Reductions

In both Scenario A and Scenario B, a reduction of 25% has been applied to the through traffic on Carrington Road. This reduction is considered acceptable taking into consideration the level of off-network queues that will otherwise be present, whilst also taking account that it is commonly understood that through traffic will avoid a congested network when alternative routes are available i.e. as with the recently constructed Waterview motorway. The through traffic reduction assumes that the removed trips do not use any part of the modelled network, i.e. they do not become through traffic on Great North Road or New North Road in the immediate vicinity of Carrington Road.

Through traffic is defined as traffic on the section of Carrington Road between the New North Road / Carrington Road / Mount Albert Road intersection and the Point Chevalier / Great North Road / Carrington Road intersection with destinations other than the Precinct or local roads along the section.

#### 5.7.1.3 Peak Hour Profile

A flattening of peak hour profile over the 2-hour period has also been assumed, i.e. the proportion of peak hour traffic to the 2-hour traffic has been reduced from 0.56 to 0.52. This is considered typical within a congested network, i.e. peak spreading (some people travelling slightly earlier or later within the same 2-hour period than they would under more free-flowing conditions).

### 5.7.2 Carrington Road Corridor Upgrade

No mid-block changes are assumed within the model for Scenario A. As described in Section 4.6, the Carrington Road Upgrade is a key external transport upgrade that has been assumed as crucial by the time of Scenario B.

The Carrington Road Upgrade incorporates the addition of bus lanes in each direction of Carrington Road, between Woodward Road and SH16 overbridge, along with additional cycle and pedestrian facilities. This upgrade will provide substantial benefits to the public transport network, as demonstrated later in Section 0.

### 5.7.3 Great North Road / Pt Chevalier Road / Carrington Road

Within both Scenario A and Scenario B, several changes to the northern approach and departure (Point Chevalier Road) have been included. The changes modelled are based on information from the Point Chevalier Improvements project consultation material[18] (consultation by Auckland Transport (AT) completed in December 2019), that includes improvements to walking, cycling and public transport connections through infrastructure upgrades. It is understood that these improvements may be potentially constructed by 2021, therefore have been considered in both Scenario A and Scenario B.

To accommodate better road safety and the new separated cycleway on both sides of Point Chevalier Road, the current left-turn slip lane on Point Chevalier Road (into Great North Road East) is converted to a 20-metre-long short lane that forms part of the signalised northern arm. The outer, short departure lane on Point Chevalier Road is also excluded, resulting in a single northbound departure lane (**Note:** the existing intersection features no double turns into this existing dual lane departure arm).

The AT consultation included a proposed southbound bus lane on Point Chevalier Road, from just south of Wakatipu Street to near Great North Road. This new bus lane has not been included in the model, due to the northern extent of the project model only extending around 80m north of this intersection, and the bus lane is likely to not come all the way to the intersection, based on consultation plans.

Scenario B also includes the new northbound and southbound bus lanes on Carrington Road:

- The northbound bus lane is assumed to finish just before the SH16 overbridge
- Similarly, the single southbound general lane on Carrington Road away from Great North Road crosses the overbridge before the southbound bus lane then starts south of Sutherland Road
- As set out above, no widening / works is required on the motorway overbridge. If the final design for the Carrington Road Upgrade by AT does include widening and bus lanes of the overbridge, this would therefore result in greater potential bus / general capacity than assumed in the model even for Scenario B. However, to avoid doubt, this ITA does not assume any changes to the overbridge and is thus conservative in terms of assessing potential network and bus impacts.

The lane arrangements on Great North Road approaches remain as existing in both Scenario A and Scenario B. The proposed intersection layout, as modelled in Aimsun under Scenario A and B, is shown in Figure 5-4

[18] https://at.govt.nz/projects-roadworks/point-chevalier-improvements/

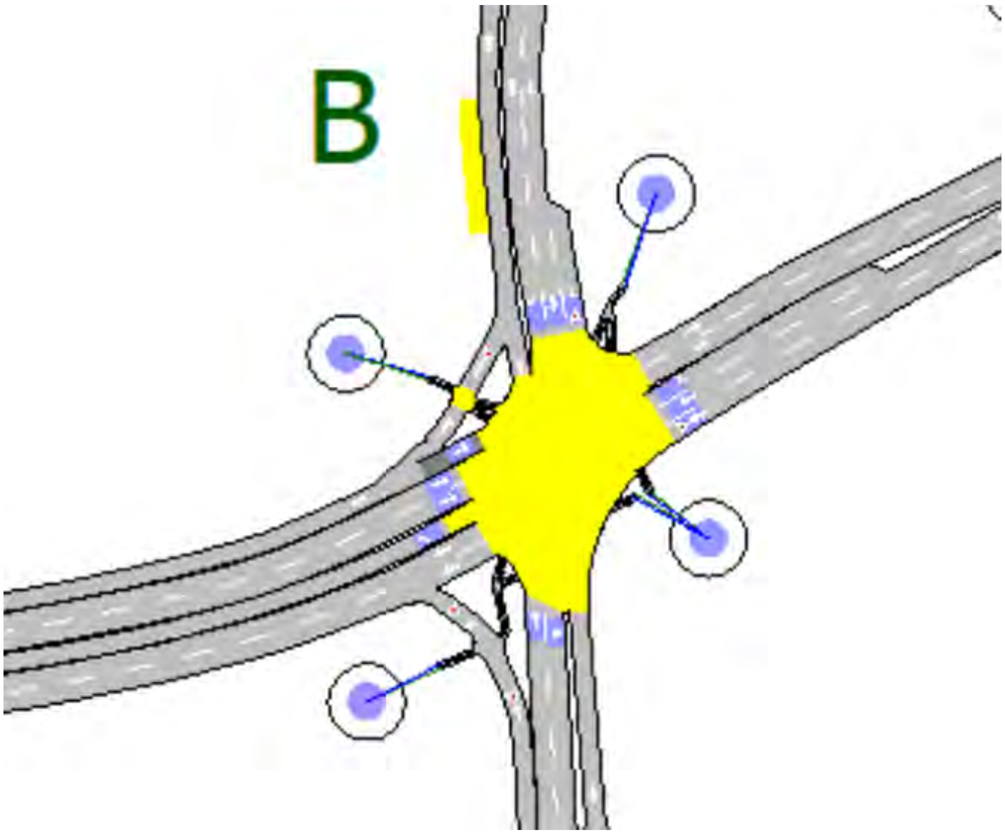



Figure 5-4: Proposed Great North Road / Pt Chevalier Road / Carrington Road Intersection Layout – Extracted from Aimsun model.

### 5.7.4 Carrington Road / Woodward Road Intersection

Carrington Road / Woodward Road currently comprises a give-way priority-controlled intersection. Results of modelling do not indicate that signalisation is required from a capacity perspective in Scenario A, and the intersection remains as per the base layout.

However, as discussed earlier, signalisation of this intersection is considered necessary for the longer term, to cater for pedestrian crossing as well as to ensure safety for traffic turning across multiply lanes once the bus lanes on Carrington Road are implemented.

Therefore, while it can remain as a priority intersection under scenario A, the intersection is assumed to be signalised in Scenario B. The modelled signalised intersection layout is shown below, with the additional bus lane on each direction on Carrington Road.

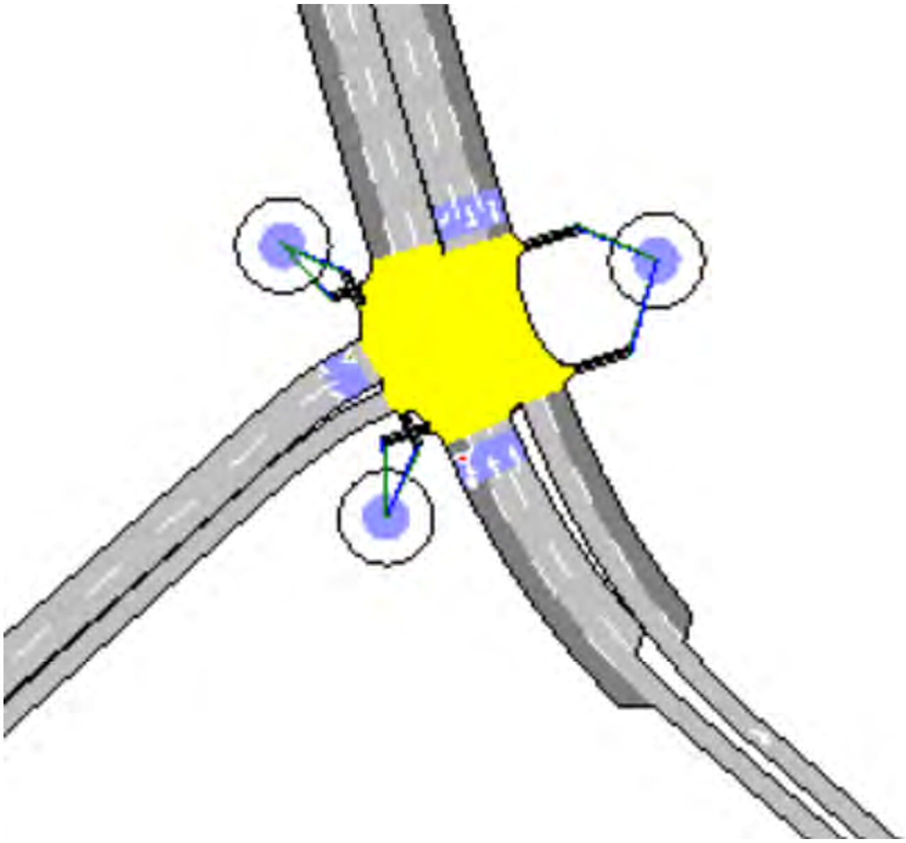


Figure 5-5: Proposed Woodward Road / Carrington Road Intersection for Scenario B – Extract from Aimsun model.

### 5.7.5 New North Road / Woodward Road / Richardson Road

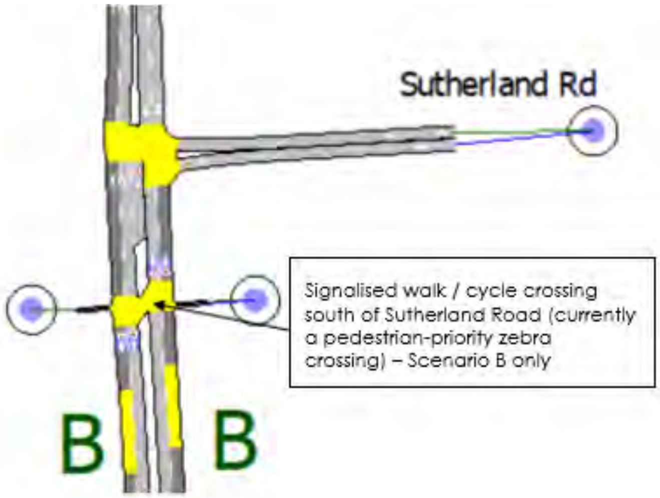
There are no changes to the existing layout of the New North Road / Woodward Road / Richardson Road in Scenario A and Scenario B.

### 5.7.6 Pedestrian/Cyclist Crossings over Carrington Road

As per Section 4, Scenario A does not assume model-relevant upgrades to pedestrian and cyclist crossings over Carrington Road.

Within Scenario B signalisation of the existing walk and cycle crossing south of Sutherland Road, as well as a new mid-block signalised crossing serving the primary Unitec Core related bus stop are included.

For the latter, coordinated signal phasing has been assumed between the midblock crossing and adjacent "Gate 3" and "Gate 4" intersections. Adjacent existing bus stops have also been slightly relocated to place them downstream of each crossing side. The crossings as included in the model are shown below:



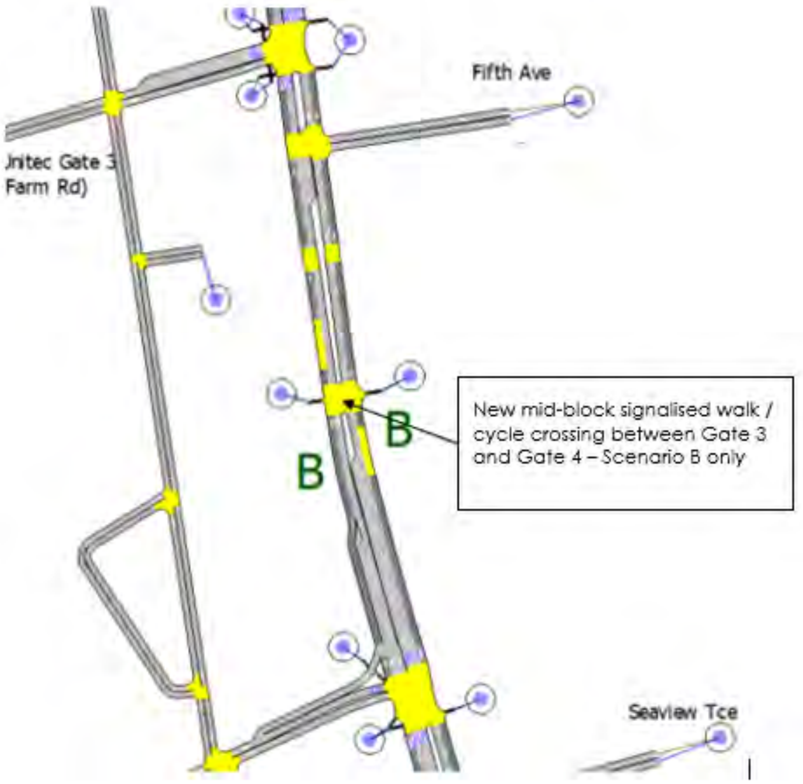




Figure 5-6: Proposed Mid-Block Crossings along Carrington Road – Extract from Aimsun model

### 5.7.7 Precinct Vehicle Accesses

This section discusses the modelling parameters for the four Precinct accesses off Carrington Road.

- **Gate 1**
  - Gate 1 is retained as a priority intersection in Scenario A and Scenario B.
  - However, in Scenario B, Gate 1 will potentially be relocated slightly north, and connect with Carrington Road opposite the driveway serving the healthcare facility around 100m south of Sutherland Road. Scenario B will also see this access accommodate only left-in / left-out movements (LILO arrangement) to reduce queuing generated by potential right-turning vehicles from Carrington Road extending towards Great North Road. As identified in the modelling results, it is considered that sufficient right turning capacity is provided at the nearby signalised access at Gate 2 to serve the demands of the northernmost part of the Precinct.
- **Gate 2 and Gate 3**
  - These gates will form the primary vehicular accesses to / from the central and northern areas of the Precinct. However, in Scenario A, the scale of development in these areas means that there is no requirement to signalise them, based on model iteration work.
  - It is proposed to signalise these intersections in Scenario B, once the scale of development increases turning flows, additional bus lanes along Carrington Road create a four-lane environment, and also to accommodate pedestrian crossings on all arms to facilitate pedestrian and cyclist access to the Precinct.
  - Gate 2 will remain the primary access to Mason Clinic and Taylor's Laundry in Scenario A and B.
- **Gate 4**
  - Gate 4 is the primary access to the Unitec Core and is currently the only signalised intersection into the Precinct. Pedestrian crossing facilities are provided on the western and southern arms of the intersection. No changes are proposed to occur at this intersection in Scenario A
  - In Scenario B, the intersection predominantly remains the same, with the exception of the additional bus lane in each direction on Carrington Road.

### 5.7.8 Internal Street Connection

As noted earlier in Section 4.7.1, an internal north-south connection for through traffic between the southern zone and the central and northern development areas of the Precinct is not assumed in the model, to ensure appropriate (conservative) testing.

### 5.7.9 Summary of Model Assumptions

The following table summarises the key network assumptions relevant to each modelling scenario.

Table 5-5: Summary of Modelling Assumptions

| Modelling Assumptions | Base | Scenario A | Scenario B |
|---|---|---|---|
| Precinct development assumptions (See Section 3.5 and Section 5.9) | ✗ | ✓ | ✓ |
| Carrington Road Corridor Upgrade | ✗ | ✗ | ✓ |
| Carrington Road through traffic reductions | ✗ | ✓ | ✓ |
| Peak Hour Profile Adjustment | ✗ | ✓ | ✓ |
| Carrington Road Corridor Upgrade (bus lanes) | ✗ | ✗ | ✓ |
| Great North Rd / Pt Chevalier Rd / Carrington Rd intersection adjustments (slip lane removal into GNR) | ✗ | ✓ | ✓ |
| Carrington Road / Woodward Road intersection signalised | ✗ | ✗ | ✓ |
| Gate 1 signalised | ✗ | ✗ | ✗ (Becomes LILO) |
| Gate 2 signalised | ✗ | ✗ | ✓ |
| Gate 3 signalised | ✗ | ✗ | ✓ |
| Gate 4 signalised | ✓ | ✓ | ✓ (added lanes) |
| Mid-block crossing south of Sutherland Road signalised instead of zebra/cycle priority | ✗ | ✗ | ✓ |
| Signalised mid-block pedestrian crossing between Gate 3 and Gate 4 | ✗ | ✗ | ✓ |
| Connections from southern development area to southern local roads | ✗ | ✓ | ✓ |

## 5.8 Trip Generation

### 5.8.1 Overview and Methodology

The vehicle trip generation rates for the various land uses in the Precinct have been calculated through a number of methods. The methods consider existing traffic flows within and surrounding the Precincts, the likely influence of future transportation environment around the Precinct to the travel modes, and also literature research and historical values. The trip generation rates have also been chosen considering the outcomes of the initial Scenario B modelling, as outlined in Section 5.6.

Careful consideration is required in estimating trip generation rates for the Precinct, particularly as trip rates are estimated for approximately four and eight years into the future, and assume, particularly for Scenario B, infrastructure and congestion-assisted mode shift.

Over-optimistic calculations will underestimate the traffic impacts, while over-conservative calculation may lead to over-provision of capacity and subsequently induced demand.

The balancing of these two conflicting factors is expected to be through two main methods:

- Selection of trip rates that assume less car traffic but are not overly aspirational. **Note:** Several discussions on this matter between the project internal and external parties have occurred over several months during the preparation of the ITA, as previously mentioned.
- Regular review of the trip generation assumptions against actual generation (once development occurs) to correspond with the Precinct Rules requirement for traffic impact re-assessment of the Precinct. This will be a requirement for future ITA updates.

The following sections discuss the trip generation rates chosen for the various land uses and how they were sourced and derived. The full list of trip rates for the various land uses within the Precinct and the total trip generated in Scenario A and Scenario B are included at Appendix E.

### 5.8.2 Education Trip Rates

#### 5.8.2.1 Tertiary Education Trip Rates

Unitec student trip rates has been obtained through literature research, according to the Institute of Transportation Engineers (ITE) Trip Generation Manual (2017 edition)19. The manual identifies that the typical trip rates for junior and community college are 0.11 trips per peak hour per FTE student/staff.

Considered as a base rate, this compares well with a previous survey undertaken in 2014 at the Precinct, where it was found that the overall peak hour trip rate averaged across the FTE student and staff was 0.129 trips per hour. The 2014 surveys excluded the Taylor's Laundry and Masons Clinic trips, however they did not exclude the other business activities in the southern part of the site and therefore are considered very conservative.

It is considered that by the time of the Scenario A development level, there will be growing multi-modal accessibility around the Precinct. Moreover, there is a likelihood of more remote learning as well as a higher variability of course schedules at Unitec, which may see fewer trips associated with the institution in the AM and PM peak hours. Therefore, a 10% reduction to the above original base rate is considered reasonable, that brings the trip rate for students down to 0.10.

In the longer term, by the time the Scenario B development level is achieved, it is expected that the transport environment around the Precinct has evolved even further to provide much higher accessibility through multi-modal transport, specifically bus and train services. Furthermore, as outlined in Section 5.6, it is expected that the future congestion on the transport network adjacent to the Precinct will further encourage alternative travel behaviour. As such, a 30% reduction to the above peak hour base rate is considered reasonable, bringing the trip rate for students down to 0.08.

[19] ITE Trip Generation Manual (2017)

Unitec staff trip generation has been calculated considering the latest available information from the Mount Albert staff travel survey, and how it compares with the latest tertiary student travel survey. Based on 2014, 2016, and 2018 Tertiary Student Travel Surveys, the average share of car travel (all types) for the Unitec Mount Albert students is 47%. In comparison, the 2016 staff travel survey indicates that 83% of Unitec Mount Albert staff travelled by car (including carpooling). Based on these data, the proportion of car travel among staff is 1.8 times higher than among students. This translates to a base trip rate of 0.20 for Unitec staff.

Similar to students, it is considered that staff travel behaviour will be directly influenced by the transport environment as well as potential teaching approach that Unitec may adopt in the future. The same levels of reduction to the base trip rate have therefore been applied, resulting in staff trip rates of 0.18 and 0.14 for Scenario A and Scenario B, respectively. These assumptions have been applied before the considerations that are likely to apply as tertiary institutions adapt to the impact of Covid-19.

Table 5-6: Student and Staff Trip Rates

| | Scenario A<br>AM and PM peak hour trip rate / FTE | Scenario B<br>AM and PM peak hour trip rate / FTE |
|---|---|---|
| Students | 0.10 | 0.08 |
| Staff | 0.18 | 0.14 |

#### 5.8.2.2 Primary School, Early Childhood Education, and Special Needs Education Centre Trip Rates

The primary school, early childhood education, and special needs education centre students and staff trip rates are discussed in a technical memo titled 'Wairaka Precinct Primary School – Transport Assumptions and Vehicle Trip Generation' prepared by Stantec dated 16 December 2019. The memo is attached at Appendix B.

As previously discussed, the MOE have indicated that for the purposes of traffic assessments on the Precinct, any 2026 or earlier traffic model shall not include a school, whereas by around 2028 to 2030, it is assumed that the schools will be operating at half capacity.

As Scenario A is expected to occur before 2026, it does not contain any school trips, whilst for Scenario B the school trips, as set out in the aforementioned MOE memo are summarised in the table below

Table 5-7: Students and Staff Trip Rates (Primary, ECE, and Special Needs Education Centre)

| | Scenario B<br>AM peak hour trip rate | Scenario B<br>PM peak hour trip rate |
|---|---|---|
| Students – Primary School | 0.5 trips / student | 0.13 trips / student |
| Students – Early Childhood Education | 1 trip / student | 0.25 trips / student |
| Students – Special Needs Education | 1.8 trips/ student | 0.45 trips / student |
| Staff (General) | 0.5 trips / staff | 0.33 trips / staff |

### 5.8.3 Residential Trip Rates

Residential trip rates for the various residential land uses have been developed based on trip rates agreed by AT for the southern area development, as documented in the Transport Assessment Report for Unitec Masterplan Stage 1 by Commute, dated 4 July 2019.

The trip rates based on residential uses that form the base rates used for residential dwellings in this ITA are shown in the table below.

Table 5-8: Base Residential Trip Rates

| Housing Typology | Base Peak Hour Trip Rate / Dwelling (as per the Commute memo) |
|---|---|
| Studio and 1/1.5 Bedroom without parking | 0.35 |
| 1/1.5 Bedroom without parking | 0.35 |
| 1.5 Bedroom with parking | 0.40 |
| 2 Bedroom | 0.50 |
| 2.5 Bedroom | 0.65 |
| 3 and 4 Bedroom | 0.85 |

At this stage, except for the southern area development, the Masterplanning of the HUD site has not gone above massing exercises and some typical block / building level layouts. Therefore, no proposed land use split currently exists.

The Masterplan focuses on 1-bedroom and 2-bedroom apartments, with very few 3-bedroom and / or 4-bedroom units proposed. The site-wide HUD average for car parking is proposed to be under 1 per unit.

Therefore, it is considered that the "1.5 bedroom with [one space of] parking" typology is a good interim default assumption for all the balance of the 2,500 proposed dwellings outside the southern area. The likely inclusion of a small number of larger apartments in the actual build-out will, in a vehicle trip generation sense, be balanced by the presence of studios and 1-bedroom apartments, of which some will have zero car parks, thereby correspondingly lower generation.

In Scenario A, it has been assumed that the above base trip rates apply to residential land use in all areas within the Precinct. This is considered conservative, as some trip reduction is likely to occur given the increasing multi-modal accessibility around the Precinct, that will be located much closer to existing public transport facilities than the southern areas, whereby the above base rates were agreed.

For Scenario B, it is considered appropriate to apply different reduction levels to different zones within the Precinct, based on their geographical proximity to Carrington Road and Great North Road, and the public transport / active modes provisions anticipated in the future. The reductions applied to the various zones for Scenario B are discussed below.

#### 5.8.3.1 Southern area

Under Scenario B, the dwellings within the Southern area are assumed to have trip rates that are 5% lower than the above base rates.

As discussed at the AT / HUD / Stantec meeting on 16 February 2020, previously no reduction has been proposed. However, a reduction is now considered appropriate given the likelihood of congestion in the surrounding network in 2028 that will strongly encourage at least some future mode shift or other changes in travel behaviour, including in the southern area.

#### 5.8.3.2 Te Auaunga North zone

Under Scenario B, the dwellings within the Te Auaunga zones are assumed to have trip rates 10% lower than the above base rates. Although not discussed at the AT / HUD / Stantec meeting on 16 February 2020, this reduction was proposed and documented in the corresponding meeting minutes that were issued on 17 February 2020, attached at Appendix D.

The reduction considers that this zone will have good access (less than 400m) to main PT routes on Great North Road via the new Oakley Creek / Te Auaunga pedestrian bridge. Although this zone is located 500m away from Carrington Road, and therefore does not have the same level of PT accessibility as the

Northern, North-west, and Carrington areas, the Te Auaunga North area is still considered better than the southern area in terms of public transport accessibility. Therefore, it sees less reduction than most areas, but more than the Southern area.

#### 5.8.3.3 North-west, Northern, Carrington zones

Under Scenario B, dwellings within the North-west, Northern and Carrington zones are assumed to have trip rates that are 25% lower than the base rates. It is noted that a reduction of 20% was agreed at the AT / HUD / Stantec meeting on 16 February 2020, due to the anticipated quality of walking and cycling access to Carrington Road and the public transport provisions surrounding the Precinct.

The reduction has since been increased slightly to 25% to account for the anticipated congestion in the surrounding network that will drive a stronger mode shift.

The residential trip rates for Scenario A and Scenario B are summarised in the table below.

Table 5-9: Residential Trip Rates for Scenario A and Scenario B modelling

| Zone(s) | Scenario A Peak Hour Trip Rate | Scenario B Peak Hour Trip Rate |
|---|---|---|
| Studio and 1/1.5 bedroom without parking | | |
| Southern | 0.35 | 0.33 |
| Te Auaunga North | 0.35 | 0.32 |
| North-West, Northern, Carrington | 0.35 | 0.26 |
| 1.5 bedroom with parking | | |
| Southern | 0.40 | 0.38 |
| Te Auaunga North | 0.40 | 0.36 |
| North-West, Northern, Carrington | 0.40 | 0.30 |
| 2 bedroom | | |
| Southern | 0.50 | 0.48 |
| Te Auaunga North | 0.50 | 0.45 |
| North-West, Northern, Carrington | 0.50 | 0.38 |
| 2.5 bedroom | | |
| Southern | 0.65 | 0.62 |
| Te Auaunga North | 0.65 | 0.59 |
| North-West, Northern, Carrington | 0.65 | 0.49 |
| 3 and 4 bedroom | | |
| Southern | 0.85 | 0.81 |
| Te Auaunga North | 0.85 | 0.77 |
| North-West, Northern, Carrington | 0.85 | 0.64 |

### 5.8.4 Other Trip Rates

#### 5.8.4.1 Taylors Laundry

The traffic impact of Taylor's Laundry is assumed to be unchanged in both Scenario A and B, as it is assumed that there is no significant change to its operation within the timeframes for this ITA.

Therefore, instead of analysing trip rates for the business, the traffic models have used the existing trips surveyed in 2014 at approximately 21 trips and 35 trips in the AM and PM peak hours, respectively.

#### 5.8.4.2 Mason Clinic

The Mason Clinic's traffic impacts have incorporated the estimated future peak hour trips based on the projections of the future numbers of patients' beds according to the 2019 Mason Clinic Masterplan, in comparison with the number of beds and the corresponding trip generation as surveyed in 2016. These trips have been provided by Flow Transportation (DHB's transport consultants), as discussed in Section 3.5.4.1.

The Mason Clinic trips are presented in the table below.

Table 5-10: Peak Hour Trips for Mason Clinic (source: Flow Transportation)

| | AM Peak Hour Trips | PM Peak Hour Trips |
|---|---|---|
| Scenario A | 100 | 39 |
| Scenario B | 156 | 61 |

## 5.9 Resulting Trips

A summary of the resulting vehicle trips in Scenario A and Scenario B are provided in the following table.

Table 5-11: Summary of Precinct Trips

| Overall Precinct Trips | AM Peak Hour | PM Peak Hour |
|---|---|---|
| Scenario A | 1,670 | 1,623 |
| Scenario B | 2,089 | 1,813 |

The full list of trips corresponding to both future scenarios from all land uses in the Precinct is included at Appendix E.

The following sections of the report will discuss the results of the traffic modelling on the surrounding transport network, and how bus networks in particular can be improved to improve overall people transport capacity, rather than vehicular capacity alone.

## 5.10 Secondary Trip Generation

New development within an already urban area is likely to draw a percentage of traffic from the surrounding road network rather than directly adding to the existing traffic volumes on nearby streets.

Vehicle trips generated by a development can be separated into primary and secondary trips. Secondary trips can further be split into pass-by trips and diverted trips. Figure 5-7 below diagrammatically summarises the different trip types.

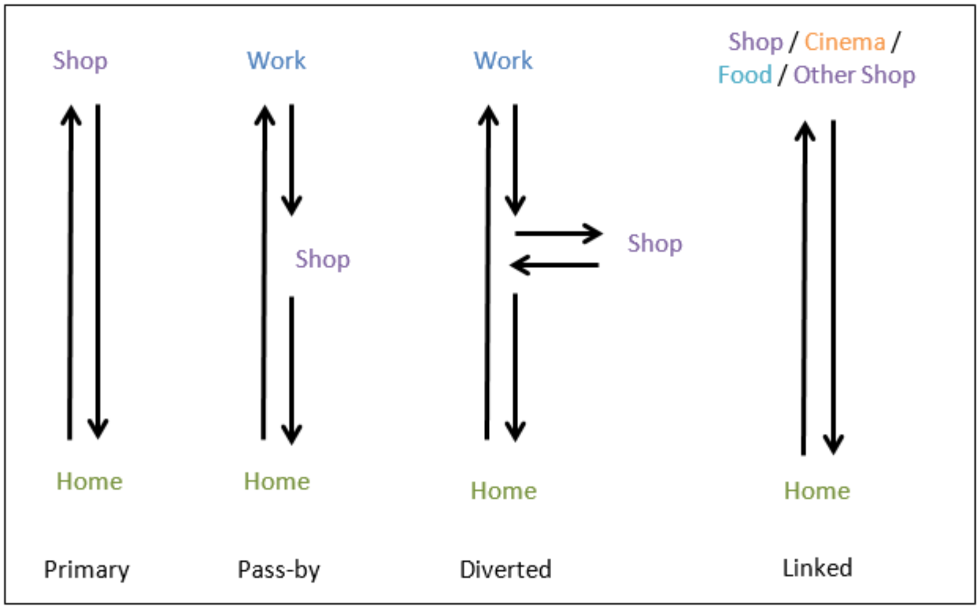



Figure 5-7: Trip Types

Currently the Precinct only has road frontage onto Carrington Road. No secondary trips through any internal links between the two frontages are assumed (as these links, if provided in reality at all, are to discourage through traffic – and are not present at all in the ITA model).

Any pass-by trips generated will therefore currently and in the future be using Carrington Road as part of their journey. Diverted trips will most likely be traffic that are currently using Great North Road or New North Road. The only secondary trips considered in this assessment are pass-by trips.

Of the land use activities proposed within the Precinct, the primary school, the early childhood education centre and Unitec, are the only activities that are considered likely to result in relevant secondary trips generation. These trips would involve parents able to drop off / pick up younger students on their way to / from work, or older students of Unitec carpooling with others who are heading in similar direction or attending the campus briefly for a single class or other purposes before continuing on with their journey along Carrington Road.

There is currently limited data available on what percentage of trips generated by a new school are secondary trips, specifically in relation to a newly constructed school within an urban environment.

The City of Spokane in Washington, USA[20] includes pass-by trip rates percentages for elementary (primary) and high (secondary) schools of 30% and 20% respectively. Research data on the pass-by trip rates for education land uses higher than secondary schools are not readily available.

Therefore, to remain conservative, a pass-by trip adjustment rate of 20% has been assumed for the primary, early childcare and special education students (in Scenario B), whilst a pass-by trip adjustment rate of only 10% has been assumed for Unitec students (Scenario A and Scenario B). These rates have been incorporated in the morning and evening peak periods. Conservatively, no secondary trips rates are considered to occur for staff at the schools and Unitec.

No research data on the potential diverted trip rates for education activity is available, therefore diverted trips associated with the Precinct have conservatively not been included in the assessment.

[20] Appendix C – *ITE Trip Rates, Pass-By Trips and Trip Length Adjustment Factors Used in Fee Schedule* from Spokane Municipal Code Section 17D.075.200

## 5.11 Trip Distribution

### 5.11.1 Inbound / Outbound Spit

The ITE Manual has been used to calculate the inbound and outbound trip distributions of the various activities within the Precinct. The split of the existing activities within the Precinct (Unitec, Taylors Laundry and Mason Clinic) were determined using the previous site survey by TDG (2014) that was undertaken for Unitec[21].

The distribution used in the modelling and data source for each activity is summarised in Table 5-12.

Table 5-12: Inbound / Outbound Trip Distribution Splits

| Activity | AM PEAK | | PM PEAK | | Source |
|---|---|---|---|---|---|
| | In-bound | Out-bound | In-bound | Out-bound | |
| Unitec students | 84% | 16% | 43% | 57% | From TDG Surveys (2014) |
| Unitec staff | 84% | 16% | 43% | 57% | From TDG Surveys (2014) |
| Primary School, ECE, Special Needs Students & staff | 55% | 45% | 49% | 51% | ITE Manual - Elementary School |
| Studios & 1/1.5 bed apartments | 20% | 80% | 65% | 35% | ITE Manual - Apartment |
| 2 and 2.5 bed apartments | 20% | 80% | 65% | 35% | ITE Manual - Apartment |
| 3 and 4 bed Apartments | 20% | 80% | 65% | 35% | ITE Manual - Apartment |
| Taylors Laundry | 50% | 50% | 50% | 50% | From TDG Surveys (2014) |
| Business Partnerships | 88% | 12% | 17% | 83% | ITE Manual - General Office Building |
| Mason Clinic | 85% | 15% | 20% | 80% | From TDG Surveys (2014) |

### 5.11.2 Wider Network Distribution

The trip distribution adopted in Scenario A and Scenario B are based on observed 2019 surveys and the MSM year 2028 data. The network distribution is shown in Table 5-13.

[21] As per the transport assessment for the 2015 Campus Consolidation consent - Unitec, Wairaka Campus, Campus Consolidation Project, Transportation Assessment Report, TDG, August 2014

Table 5-13: Network Distribution

| | AM Peak | | PM Peak | |
|---|---|---|---|---|
| | From Precinct | To Precinct | From Precinct | To Precinct |
| New North Road (West) | 13% | 25% | 21% | 15% |
| Richardson Road | 8% | 10% | 8% | 12% |
| Mt Albert Road | 20% | 24% | 20% | 15% |
| New North Road (East) | 5% | 2% | 2% | 5% |
| Great North Road (East) | 28% | 8% | 12% | 14% |
| Pt Chevalier Road | 11% | 11% | 15% | 14% |
| Great North Road (West) | 15% | 20% | 22% | 25% |
| North | 54% | 39% | 49% | 53% |
| South | 46% | 61% | 51% | 47% |

# 6. Model Results

The main intersections in the model have been analysed to assess the impact of the proposed development on the surrounding rod network. Comparisons have been made between the base, Scenario A and Scenario B, for the AM and PM peak periods l. The AM peak hour is from 7:45 to 8:45am, and PM peak hour is from 4:45pm to 5:45pm.

This section also outlines the travel time for general traffic and buses along key routes through the network, as a further measure of network performance especially from a transport system use perspective.

## 6.1 Intersection Results

The key intersections modelled are as follows:

- Great North Road / Pt Chevalier Road / Carrington Road;
- Unitec Gate 1 / Carrington Road;
- Unitec Gate 2 / Carrington Road;
- Unitec Gate 3 / Carrington Road;
- Unitec Gate 4 / Carrington Road;
- Woodward Road / Carrington Road;
- Carrington Road / New North Road / Mount Albert Road; and
- Woodward Road / New North Road / Richardson Road.

These intersections represent the major intersections along the Carrington Road, and main access locations into the Precinct.

The modelling results for each intersection are tabulated in Table 6-1 to

Table 6-32, in terms of average delay per vehicle (in seconds) and Level of Service (LOS), and 95th percentile queue length per approach (in metres).

### 6.1.1 Great North Road / Point Chevalier Road / Carrington Road

Table 6-1: Great North Road / Point Chevalier Road / Carrington Road - AM Peak Results

| Intersection | Approach | Base - Signal | | Scenario A - Signal | | Scenario B - Signal | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | **AM Peak** | | | | | | |
| **Great North Road / Pt Chevalier Road / Carrington Road** | S Left | 9 | E | 14 | E | 15 | E |
| | S Thru | 82 | | 95 | | 97 | |
| | S Right | 85 | | 93 | | 97 | |
| | E Left | 81 | E | 72 | F | 73 | F |
| | E Thru | 65 | | 60 | | 62 | |
| | E Right | 79 | | 106 | | 130 | |
| | N Left | 72 | F | 104 | F | 110 | F |
| | N Thru | 89 | | 94 | | 99 | |
| | N Right | 81 | | 87 | | 88 | |
| | W Left | 16 | D | 29 | F | 25 | F |
| | W Thru | 50 | | 97 | | 105 | |
| | W Thru (Bus) | 32 | | 50 | | 48 | |
| | W Right | 108 | | 154 | | 170 | |
| **Intersection Total – AM Peak** | | **61** | **E** | **77** | **E** | **89** | **F** |

Table 6-2: 95th Percentile Queue per Approach in AM Peak

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - Signal | | | | Scenario A - Signal | | | | Scenario B - Signal | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| **Great North Road / Pt Chevalier Road / Carrington Road** | **AM Peak** | | | | | | | | | | | |
| | 158 | 66 | 119 | 166 | 163 | 100 | 155 | 238 | 141 | 96 | 159 | 242 |

Based on the results above the following can be summarised:

**Base Scenario :**

Worst Movement: western right turn – 108 seconds delay.

Worst approach: northern arm – LOS F

Overall Intersection: LOS E with 61 seconds delay

Queues: 166m (34 vehicles) on western arm

**Scenario A**

Worst Movement: western right turn – 154 seconds delay. An increase of 46 seconds compared to the Base.

Worst approach: eastern, northern, and western arms – LOS F.

Overall Intersection: LOS E with 77 seconds delay. An increase of 16 seconds compared to the base.

Queues 238m (48 vehicles) on western arm. An increase of 72m (14 vehicles) compared to the base.

**Scenario B**

Worst Movement: western right turn – 170 seconds delay. An increase of 62 seconds compared to the Base.

Worst approach: eastern, northern, and western arms – LOS F

Overall Intersection: LOS F with 89 seconds delay. An increase of 28 seconds compared to the base.

Queues: 242m (49 vehicles) on western arm. An increase of 76m (15vehicles compared to the base.

Table 6-3: Great North Road / Pt Chevalier Road / Carrington Road - PM Peak Results

| Intersection | Approach | Base - Signal | | Scenario A - Signal | | Scenario B - Signal | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | **PM Peak** | | | | | | |
| **Great North Road / Pt Chevalier Road / Carrington Road** | S Left | 16 | D | 23 | E | 20 | E |
| | S Thru | 69 | | 99 | | 104 | |
| | S Right | 69 | | 76 | | 79 | |
| | E Left | 58 | E | 65 | E | 71 | E |
| | E Thru | 53 | | 48 | | 49 | |
| | E Right | 105 | | 90 | | 91 | |
| | N Left | 67 | E | 82 | E | 95 | F |
| | N Thru | 81 | | 72 | | 85 | |
| | N Right | 79 | | 61 | | 69 | |
| | W Left | 10 | C | 17 | E | 18 | E |
| | W Thru | 40 | | 50 | | 50 | |
| | W Thru(Bus) | 38 | | 49 | | 47 | |
| | W Right | 64 | | 141 | | 180 | |
| **Intersection Total – PM Peak** | | **54** | **D** | **68** | **E** | **72** | **E** |

Table 6-4: 95th Percentile Queue per Approach in PM Peak

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - Signal | | | | Scenario A - Signal | | | | Scenario B - Signal | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| **Great North Road / Pt Chevalier Road / Carrington Road** | **PM Peak** | | | | | | | | | | | |
| | 88 | 169 | 165 | 42 | 141 | 193 | 150 | 39 | 123 | 213 | 150 | 44 |

Based on the results above the following can be summarised:

**Base Scenario :**

Worst Movement: eastern right turn – 105 seconds delay.

Worst approach: eastern and northern arms – LOS E

Overall Intersection: LOS D with 54 seconds delay

Queues: z169m (34 vehicles) on eastern arm

**Scenario A:**

Worst Movement: western right turn – 141 seconds delay. An increase of 77 seconds compared to the Base

Worst approach: all arms – LOS E

Overall Intersection: LOS E with 68 seconds delay. An increase of 14 seconds compared to the base

Queues: 193m (39 vehicles) on eastern arm. An increase of 24m (5 vehicles) compared to the base

**Scenario B:**

Worst Movement: western right turn – 180 seconds delay. An increase of 116 seconds compared to the Base

Worst approach: northern arm – LOS F

Overall Intersection: LOS E with 72 seconds delay. An increase of 18 seconds compared to the base

Queues: 213m (43 vehicles) on eastern arm. An increase of 44m (9 vehicles) compared to the base.

There are increases in delay at this intersection during AM and PM peaks, particularly the approach on Great North Road from the west in Scenario B.

Overall, the modelling results of this intersection during the AM and PM peak periods indicate that the development will not have a material impact on the overall operation.

### 6.1.2 Unitec Gate 1 / Carrington Road

Table 6-5: Unitec Gate 1 / Carrington Road - AM Peak Results

| Intersection | Approach | Base - Priority | | Scenario A - Priority | | Scenario B – Priority, Left-in/Left-out from Gate 1 | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | AM Peak | | | | | | |
| Unitec Gate 1 / Carrington Road | S Left | 6 | A | 13 | B | 12 | D |
| | S Thru | 5 | | 13 | | 29 | |
| | S Right | 0 | | 0 | | 0 | |
| | E Left | 0 | A | 0 | A | 0 | A |
| | E Right | 0 | | 0 | | 0 | |
| | N Left | 0 | C | 0 | C | 0 | A |
| | N Thru | 1 | | 1 | | 0 | |
| | N Right | 19 | | 21 | | N/A | |
| | W Left | 21 | D | 32 | D | 88 | F |
| | W Right | 31 | | 25 | | N/A | |
| **Intersection Total – AM Peak** | | **31** | **D** | **32** | **D** | **88** | **F** |

Table 6-6: 95th Percentile Queue per Approach in AM Peak

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - Priority | | | | Scenario A - Priority | | | | Scenario B – Priority, Left-in/Left-out from Gate 1 | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| | AM Peak | | | | | | | | | | | |
| **Unitec Gate 1 / Carrington Road** | 21 | -- | 21 | 8 | 0 | -- | 7 | 0 | 49 | -- | 21 | 30 |

Based on the results above the following can be summarised:

**Base Scenario :**

Worst Movement: western right turn – 31 seconds delay.

Worst approach: western arm – LOS D

Overall Intersection: LOS D with 31 seconds delay

Queues: 21m (4 vehicles) on southern and northern arms

**Scenario A:**

Worst Movement: western left turn – 32 seconds delay. An increase of 11 seconds compared to the base.

Worst approach: western arm – LOS D

Overall Intersection: LOS D with 32 seconds delay. An increase of 1 second compared to the base.

Queues: 7m (1 vehicle) on northern arm. A decrease of 14m (3 vehicles) compared to the base.

**Scenario B:**

Worst Movement: western left turn – 88 seconds delay. An increase of 67 seconds compared to the Base.

Worst approach: western arm – LOS F

Overall Intersection: LOS F with 88 seconds delay. An increase of 57 seconds compared to the base.

Queues: 49m (10 vehicles) on southern arm. An increase of 28m (6 vehicles) compared to the base.

Table 6-7: Unitec Gate 1 / Carrington Road - PM Peak Results

| Intersection | Approach | Base - Priority | | Scenario A - Priority | | Scenario B – Priority, Left-in/Left-out from Gate 1 | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | | **PM Peak** | | | | | |
| **Unitec Gate 1 / Carrington Road** | S Left | 1 | B | 11 | B | 6 | A |
| | S Thru | 1 | | 12 | | 10 | |
| | S Right | 13 | | 0 | | 0 | |
| | E Left | 15 | C | 37 | F | 13 | E |
| | E Right | 22 | | 96 | | 41 | |
| | N Left | 2 | B | 3 | C | 4 | A |
| | N Thru | 1 | | 1 | | 1 | |
| | N Right | 14 | | 16 | | N/A | |
| | W Left | 15 | C | 35 | E | 32 | D |
| | W Right | 18 | | 24 | | N/A | |
| **Intersection Total – PM Peak** | | **22** | **C** | **96** | **F** | **41** | **E** |

Table 6-8: 95th Percentile Queue per Approach in PM Peak

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - Priority | | | | Scenario A - Priority | | | | Scenario B – Priority, Left-in/Left-out from Gate 1 | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| **Unitec Gate 1 / Carrington Road** | **PM Peak** | | | | | | | | | | | |
| | 0 | -- | 16 | 11 | 21 | -- | 16 | 7 | 42 | -- | 21 | 21 |

Based on the results above the following can be summarised:

**Base Scenario :**

| | |
|---|---|
| Worst Movement: | eastern right turn – 22 seconds delay. |
| Worst approach: | eastern and western arms – LOS C |
| Overall Intersection: | LOS C with 22 seconds delay |
| Queues: | 16m (3 vehicles) on northern arm |

**Scenario A:**

| | |
|---|---|
| Worst Movement: | eastern right turn – 96 seconds delay. An increase of 74 seconds compared to the Base. |
| Worst approach: | eastern arm – LOS F |
| Overall Intersection: | LOS F with 96 seconds delay. An increase of 74 second compared to the base. |
| Queues**:** | 21m (4 vehicles) on southern arm. An increase of 21m (4 vehicles) compared to the base. |

**Scenario B:**

| | |
|---|---|
| Worst Movement: | eastern right turn – 41 seconds delay. An increase of 19 seconds compared to the Base. |
| Worst approach: | eastern arm – LOS E |
| Overall Intersection : | LOS E with 41 seconds delay. An increase of 19 seconds compared to the base. |
| Queues: | 42m (8 vehicles) on southern arm. An increase of 42m (8 vehicles) compared to the base. |

The results of the modelling demonstrates that Gate 1 AM performance remains good in Scenario A, with extra development traffic only small delays in movements. In Scenario B, even with a LILO arrangement, left turns out are delayed compared to the base case. However, this is internally within the development, not Carrington Road traffic, thus the overall Level of Service result is somewhat misleading. Unlike Gate 2, this gate is also not intended to provide a main egress to the wider network, only a secondary option.

During the PM, performance of Gate 1 reduces during Scenario A, then improves again in Scenario B with incorporation of a LILO arrangement. However, the delays primarily affect right turns out of one single (eastern) vehicle crossing only, rather than any of the through movements or development flows.

No notable queue length increase is predicted during both peak periods, with the highest increase being the south approach of Carrington Road. This is likely to be a downstream effect from the adjacent intersections (Great North Road / Pt Chevalier Road / Carrington Road and/or the midblock pedestrian crossing south of Sutherland Road), however at this magnitude it is not considered a notable increase.

It is noted that queue length is not reported for the eastern vehicle crossing, due to the unknown current and future traffic volumes at this vehicle crossing.

### 6.1.3 Unitec Gate 2 / Carrington Road

Table 6-9: Unitec Gate 2 / Carrington Road - AM Peak Results

| Intersection | Approach | Base - Priority | | Scenario A - Priority | | Scenario B – Signal | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | AM Peak | | | | | | |
| **Unitec Gate 2 / Carrington Road** | S Thru | 5 | A | 10 | B | 36 | D |
| | N Thru | 0 | B | 0 | B | 8 | B |
| | N Right | 11 | | 12 | | 53 | |
| | W Left | 14 | D | 29 | D | 33 | C |
| | W Right | 27 | | 33 | | 34 | |
| **Intersection Total – AM Peak** | | **27** | **D** | **33** | **D** | **26** | **C** |

Table 6-10: 95th Percentile Queue per Approach in AM Peak

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - Priority | | | | Scenario A - Priority | | | | Scenario B – Signal | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| | AM Peak | | | | | | | | | | | |
| **Unitec Gate 2 / Carrington Road** | 82 | -- | 8 | 8 | 112 | -- | 8 | 24 | 123 | -- | 57 | 44 |

Based on the results above the following can be summarised:

**Base Scenario :**

Worst Movement: western right turn – 27 seconds delay.

Worst approach: western arm – LOS D

Overall Intersection : LOS D with 27 seconds delay

**Queues**: 82m (17 vehicles) on southern arm

**Scenario A:**

Worst Movement: western right turn – 33 seconds delay. An increase of 6 seconds compared to the Base.

Worst approach: western arm – LOS D

Overall Intersection : LOS D with 33 seconds delay. An increase of 6 seconds compared to the base.

Queues: 112m (23 vehicles) on southern arm. An increase of 30m (6 vehicles) compared to the base.

**Scenario B:**

Worst Movement: northern right turn – 53 seconds delay. An increase of 42 seconds compared to the Base.

Worst approach: southern arm – LOS D

Overall Intersection: LOS C with 26 seconds delay. A decrease of 1 second compared to the base.

Queues: 1 23m (25 vehicles) on southern arm. An increase of 41m (8 vehicles) compared to the base.

Table 6-11: Unitec Gate 2 / Carrington Road - PM Peak Results

| Intersection | Approach | Base - Priority | | Scenario A - Priority | | Scenario B – Signal | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | **PM Peak** | | | | | | |
| **Unitec Gate 2 / Carrington Road** | S Thru | 1 | A | 13 | B | 11 | B |
| | N Thru | 0 | A | 0 | A | 5 | B |
| | N Right | 7 | | 9 | | 59 | |
| | W Left | 9 | C | 29 | E | 39 | D |
| | W Right | 18 | | 35 | | 49 | |
| **Intersection Total – PM Peak** | | **18** | **C** | **35** | **E** | **13** | **B** |

Table 6-12: 95th Percentile Queue per Approach in PM Peak

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - Priority | | | | Scenario A - Priority | | | | Scenario B – Signal | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| **Unitec Gate 2 / Carrington Road** | **PM Peak** | | | | | | | | | | | |
| | 7 | -- | 0 | 7 | 42 | -- | 7 | 8 | 54 | -- | 63 | 38 |

Based on the results above the following can be summarised:

**Base Scenario :**

Worst Movement: western right turn – 18 seconds delay.

Worst approach: western arm – LOS C

Overall Intersection: LOS C with 18seconds delay

Queues: 7m (1 vehicle) on southern and western arms

**Scenario A:**

Worst Movement: western right turn – 35 seconds delay. An increase of 17 seconds compared to the Base.

Worst approach: western arm – LOS E

Overall Intersection: LOS E with 35 seconds delay. An increase of 17 seconds compared to the base.

Queues: 42m (8 vehicles) on southern arm. An increase of 35m (7 vehicles) compared to the base.

**Scenario B:**

Worst Movement: northern right turn – 59 seconds delay. An increase of 52 seconds compared to the Base.

Worst approach: western arm – LOS D

Overall Intersection: LOS B with 13 seconds delay. An increase of 22 seconds compared to the base.

Queues: 63m (13 vehicles) on northern arm. An increase of 63m (13 vehicles) compared to the base.

The intersection of Gate 2 and Carrington Road in Scenario A and Scenario B generally is shown to have good to moderate performance, with similar delays to the base model. The signalisation of Gate 2 in Scenario B slightly improves overall performance and delay at the intersection compared to the base.

It is noted that the increase in queue lengths is largely attributable to the signalisation of the intersection (that results in the through flows having to stop, where previously they were able to proceed directly). Importantly, the queues within the Precinct (thus the distances needed for potential multi-lane approach cross-sections within the site) is limited to less than 50m in both scenarios.

### 6.1.4 Unitec Gate 3 / Carrington Road

Table 6-13: Unitec Gate 3 / Carrington Road - AM Peak Results

| Intersection | Approach | Base - Priority | | Scenario A - Priority | | Scenario B – Signal | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| **Unitec Gate 3 / Carrington Road** | **AM Peak** | | | | | | |
| | S Left | 2 | A | 2 | A | 14 | B |
| | S Thru | 1 | | 2 | | 19 | |
| | N Thru | 1 | A | 1 | B | 3 | B |
| | N Right | 8 | | 13 | | 54 | |
| | W Left | 5 | C | 12 | D | 48 | D |
| | W Right | 17 | | 32 | | 56 | |
| **Intersection Total – AM Peak** | | **17** | **C** | **32** | **D** | **19** | **B** |

Table 6-14: 95th Percentile Queue per Approach in AM Peak

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - Priority | | | | Scenario A - Priority | | | | Scenario B – Signal | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| **Unitec Gate 3 / Carrington Road** | **AM Peak** | | | | | | | | | | | |
| | 53 | -- | 7 | 0 | 54 | -- | 17 | 26 | 105 | -- | 28 | 25 |

Based on the results above the following can be summarised:

**Base Scenario :**

Worst Movement: western right turn – 17 seconds delay.

Worst approach: western arm – LOS C

Overall Intersection: LOS C with 17 seconds delay

Queues: 53m (11 vehicles) on southern arm

**Scenario A:**

Worst Movement: western right turn – 32 seconds delay. An increase of 15 seconds compared to the Base.

Worst approach: western arm – LOS D

Overall Intersection: LOS D with 32 seconds delay. An increase of 15 seconds compared to the base.

Queues: 54m (11 vehicles) on southern arm. No increase compared to the base.

**Scenario B:**

Worst Movement: western right turn – 56 seconds delay. An increase of 39 seconds compared to the Base.

Worst approach: western arm – LOS D

Overall Intersection: LOS B with 19 seconds delay. An increase of 2 seconds compared to the base.

Queues: 105m (21 vehicles) on southern arm. An increase of 52m (10 vehicles) compared to the base.

Table 6-15: Unitec Gate 3 / Carrington Road - PM Peak Results

| Intersection | Approach | Base - Priority | | Scenario A - Priority | | Scenario B – Signal | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | **PM Peak** | | | | | | |
| **Unitec Gate 3 / Carrington Road** | S Left | 1 | A | 5 | A | 15 | B |
| | S Thru | 1 | | 5 | | 15 | |
| | N Thru | 1 | A | 5 | B | 15 | C |
| | N Right | 5 | | 10 | | 64 | |
| | W Left | 3 | B | 28 | F | 31 | D |
| | W Right | 12 | | 56 | | 53 | |
| **Intersection Total – PM Peak** | | **12** | **B** | **56** | **F** | **22** | **C** |

Table 6-16: 95th Percentile Queue per Approach in PM Peak

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - Priority | | | | Scenario A - Priority | | | | Scenario B – Signal | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| **Unitec Gate 3 / Carrington Road** | **PM Peak** | | | | | | | | | | | |
| | 32 | -- | 7 | 7 | 65 | -- | 54 | 87 | 91 | -- | 89 | 46 |

Based on the results above the following can be summarised:

**Base Scenario :**

Worst Movement: western right turn – 12 seconds delay.

Worst approach: western arm – LOS B

Overall Intersection: LOS B with 12 seconds delay

Queues: 32m (6 vehicles) on southern arm

**Scenario A:**

Worst Movement: western right turn – 56 seconds delay. An increase of 44 seconds compared to the base.

Worst approach: western arm – LOS F

Overall Intersection: LOS F with 56 seconds delay. An increase of 44 seconds compared to the base.

Queues: 87m (18 vehicles) on western arm. An increase of 80m (16 vehicles) compared to the base.

**Scenario B:**

Worst Movement: northern right turn – 64 seconds delay. An increase of 59 seconds compared to the base.

Worst approach: western arm – LOS D

Overall Intersection: LOS C with 22 seconds delay. An increase of 10 seconds compared to the base.

Queues: 91m (18 vehicles) on southern arm. An increase of 59m (12 vehicles) compared to the base.

The intersection of Gate 3 and Carrington Road in Scenario A and Scenario B generally is shown to have good to moderate performance, with similar delays to the base model. While there is a decline in the overall performance of the intersection in Scenario A, the extent of additional delays is considered acceptable, particular for an interim layout. The later signalisation of Gate 3 in Scenario B results in the overall performance and delay at the intersection in the long term improving again.

Importantly, the queues within the Precinct (and thus the distances needed for potential multi-lane approach cross-sections within the site) is limited to less than 50m in Scenario B (once signals are installed).

### 6.1.5 Unitec Gate 4 / Carrington Road

Table 6-17: Unitec Gate 4 / Carrington Road - AM Peak Results

| Intersection | Approach | Base - Signal | | Scenario A - Signal | | Scenario B – Signal | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| **Unitec Gate 4 / Carrington Road** | **AM Peak** | | | | | | |
| | S Left | 15 | B | 13 | B | 18 | C |
| | S Thru | 13 | | 13 | | 28 | |
| | N Thru | 20 | C | 29 | D | 10 | C |
| | N Right | 36 | | 76 | | 51 | |
| | W Left | 2 | B | 3 | C | 2 | C |
| | W Right | 33 | | 54 | | 51 | |
| **Intersection Total – AM Peak** | | **18** | **B** | **25** | **C** | **24** | **C** |

Table 6-18: 95th Percentile Queue per Approach in AM Peak

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - Signal | | | | Scenario A - Signal | | | | Scenario B – Signal | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| **Unitec Gate 4 / Carrington Road** | **AM Peak** | | | | | | | | | | | |
| | 64 | -- | 105 | 18 | 72 | -- | 146 | 36 | 64 | -- | 33 | 68 |

Based on the results above the following can be summarised:

**Base Scenario :**

Worst Movement: northern right turn – 36 seconds delay.

Worst approach: northern arm – LOS C

Overall Intersection: LOS B with 18 seconds delay

Queues: 105m (21 vehicles) on northern arm

**Scenario A:**

Worst Movement : northern right turn – 76 seconds delay. An increase of 40 seconds compared to the base.

Worst approach: northern arm – LOS D

Overall Intersection: LOS C with 25 seconds delay. An increase of 7 seconds compared to the base.

Queues: 146m (30 vehicles) on northern arm. An increase of 41m (8 vehicles) compared to the base.

**Scenario B:**

Worst Movement: northern right turn and western right turn – 51 seconds delay. An increase of 15 seconds and 18 seconds, respectively, compared to the Base.

Worst approach: All arms – LOS C

Overall Intersection: LOS C with 24 seconds delay. An increase of 6 seconds compared to the base.

Queues: 68m (14 vehicles) on western arm. An increase of 50m (10 vehicles) compared to the base.

Table 6-19: Unitec Gate 4 / Carrington Road - PM Peak Results

| Intersection | Approach | Base - Signal | | Scenario A - Signal | | Scenario B – Signal | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | **AM Peak** | | | | | | |
| **Unitec Gate 4 / Carrington Road** | S Left | 13 | B | 13 | B | 12 | B |
| | S Thru | 14 | | 13 | | 18 | |
| | N Thru | 29 | C | 28 | D | 16 | B |
| | N Right | 42 | | 78 | | 35 | |
| | W Left | 2 | B | 4 | D | 1 | C |
| | W Right | 27 | | 65 | | 39 | |
| **Intersection Total – PM Peak** | | **21** | **C** | **28** | **C** | **19** | **B** |

Table 6-20: 95th Percentile Queue per Approach in PM Peak

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - Signal | | | | Scenario A - Signal | | | | Scenario B – Signal | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| | **PM Peak** | | | | | | | | | | | |
| **Unitec Gate 4 / Carrington Road** | 39 | -- | 78 | 49 | 57 | -- | 144 | 124 | 45 | -- | 83 | 59 |

Based on the results above the following can be summarised:

**Base Scenario :**

Worst Movement: northern right turn – 42 seconds delay.

Worst approach: northern arm – LOS C

Overall Intersection: LOS C with 21 seconds delay

Queues: 78m (16 vehicles) on northern arm

**Scenario A:**

Worst Movement : northern right turn – 78 seconds delay. An increase of 36 seconds compared to the base.

Worst approach: northern and western arms – LOS D

Overall Intersection: LOS C with 28 seconds delay. An increase of 7 seconds compared to the base.

Queues: 144m (29 vehicles) on northern arm. An increase of 66m (13 vehicles) compared to the base.

**Scenario B:**

| | |
|---|---|
| Worst Movement: | western right turn – 39 seconds delay. An increase of 12 seconds compared to the base. |
| Worst approach: | western arm – LOS C |
| Overall Intersection: | LOS B with 19 seconds delay. A decrease of 2 seconds compared to the base. |
| Queues**:** | 83m (17 vehicles) on northern arm. An increase of 5m (1 vehicle) compared to the base. |

The intersection of Gate 4 and Carrington Road in Scenario A and Scenario B generally is shown to have a good to moderate performance, with very similar LOS and delays compared to the base model. This is expected, given that in Scenario B, a more evenly distributed turning traffic is anticipated between the signalised Gate 2, Gate 3, and Gate 4 accesses, therefore reducing potential further pressure on Gate 4.

Generally, queue lengths are fairly consistent across the base model, Scenario A and Scenario B. It is noted that queue length increases are predicted on the north and west approaches in Scenario A in the PM peak, however a similar level of reduction at these approaches are predicted in Scenario B. This may be a temporary result of some vehicles from the centre of the Precinct redirecting to Gate 4 in Scenario A, when Gate 4 remains the only signalised access.

### 6.1.6 Woodward Road / Carrington Road

Table 6-21: Woodward Road / Carrington Road - AM Peak Results

| Intersection | Approach | Base - Priority | | Scenario A - Priority | | Scenario B – Signal | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| **Woodward Road / Carrington Road** | **AM Peak** | | | | | | |
| | S Left | 2 | A | 1 | A | 21 | C |
| | S Thru | 1 | | 1 | | 26 | |
| | N Thru | 2 | B | 2 | B | 4 | A |
| | N Right | 10 | | 14 | | 23 | |
| | W Left | 15 | C | 23 | D | 36 | D |
| | W Right | 23 | | 35 | | 47 | |
| **Intersection Total – AM Peak** | | **23** | **C** | **35** | **D** | **25** | **C** |

Table 6-22: 95th Percentile Queue per Approach in AM Peak

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - Priority | | | | Scenario A - Priority | | | | Scenario B – Signal | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| **Woodward Road / Carrington Road** | **AM Peak** | | | | | | | | | | | |
| | 45 | -- | 34 | 100 | 45 | -- | 19 | 102 | 98 | -- | 31 | 200 |

Based on the results above the following can be summarised:

**Base Scenario :**

Worst Movement: western right turn – 23 seconds delay

Worst approach: western arm – LOS C

Overall Intersection: LOS C with 23 seconds delay

Queues: 100m (20 vehicles) on northern arm

**Scenario A:**

Worst Movement: western right turn – 35 seconds delay. An increase of 12 seconds compared to the base.

Worst approach: western arm – LOS D

Overall Intersection: LOS D with 35 seconds delay. An increase of 12 seconds compared to the base.

Queues: 102m (20 vehicles) on western arm. No increase from the base.

**Scenario B:**

Worst Movement: western right turn – 47 seconds delay. An increase of 24 seconds compared to the base.

Worst approach: western arm – LOS D

Overall Intersection: LOS C with 25 seconds delay. An increase of 2 seconds compared to the base.

Queues: 200m (40 vehicles) on western arm. An increase of 100m (20 vehicles) compared to the base.

Table 6-23: Woodward Road / Carrington Road - PM Peak Results

| Intersection | Approach | Base - Priority | | Scenario A - Priority | | Scenario B – Signal | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| **Woodward Road / Carrington Road** | **PM Peak** | | | | | | |
| | S Left | 1 | A | 1 | A | 13 | B |
| | S Thru | 1 | | 1 | | 14 | |
| | N Thru | 1 | A | 3 | B | 3 | A |
| | N Right | 8 | | 13 | | 14 | |
| | W Left | 5 | B | 11 | D | 11 | B |
| | W Right | 13 | | 27 | | 25 | |
| **Intersection Total – PM Peak** | | **13** | **B** | **27** | **D** | **11** | **B** |

Table 6-24: 95th Percentile Queue per Approach in PM Peak

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - Priority | | | | Scenario A - Priority | | | | Scenario B – Signal | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| **Woodward Road / Carrington Road** | **PM Peak** | | | | | | | | | | | |
| | 40 | -- | 28 | 25 | 43 | -- | 64 | 54 | 53 | -- | 47 | 31 |

Based on the results above the following can be summarised:

**Base Scenario :**

Worst Movement: western right turn – 13 seconds delay.

Worst approach: western arm – LOS B

Overall Intersection: LOS B with 13 seconds delay

Queues: 40m (8 vehicles) on southern arm

**Scenario A:**

Worst Movement: western right turn – 27 seconds delay. An increase of 14 seconds compared to the Base.

Worst approach: western arm – LOS D

Overall Intersection: LOS D with 27 seconds delay. An increase of 14 seconds compared to the base.

Queues: 64m (13 vehicles) on northern arm. An increase of 36m (7 vehicles) compared to the base.

**Scenario B:**

Worst Movement: western right turn – 25 seconds delay. An increase of 12 seconds compared to the base.

Worst approach: southern and western arms – LOS B

Overall Intersection: LOS B with 11 seconds delay. A decrease of 2 seconds compared to the base.

Queues: 53m (11 vehicles) on southern arm. An increase of 13m (2 vehicles) compared to the base.

The Woodward Road / Carrington Road intersection in Scenario has a moderate to good performance, with delays increasing compared to the base model, but not to a degree considered problematic for a major intersection like this. This supports the assessment that signalisation is not yet required in Scenario A. Signalisation in Scenario B provides modelled results better than the base delays, despite higher volumes.

Queue lengths comparison between the base model and the future scenarios generally show no real difference, apart for the west approach in Scenario B in the AM peak as highlighted above. This increase in queue length corresponds to the higher volumes expected at the intersection.

### 6.1.7 Carrington Road / New North Road / Mt Albert Road

Table 6-25: Carrington Road / New North Road / Mt Albert Road - AM Peak Results

| Intersection | Approach | Base - Signal | | Scenario A - Signal | | Scenario B - Signal | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | **AM Peak** | | | | | | |
| **Carrington Road / New North Road / Mt Albert Road** | S Left | 182 | F | 44 | D | 44 | E |
| | S Thru | 184 | | 46 | | 49 | |
| | S Right | 180 | | 78 | | 85 | |
| | E Left | 50 | F | 5 | D | 7 | D |
| | E Thru | 35 | | 40 | | 41 | |
| | E Right | 279 | | 113 | | 113 | |
| | N Left | 125 | F | 46 | D | 49 | E |
| | N Thru | 136 | | 47 | | 50 | |
| | N Right | 67 | | 89 | | 89 | |
| | W Left | 141 | F | 69 | E | 79 | E |
| | W Thru | 128 | | 62 | | 62 | |
| | W Right | 168 | | 67 | | 63 | |
| **Intersection Total – AM Peak** | | **122** | **F** | **52** | **D** | **53** | **D** |

Table 6-26: 95th Percentile Queue per Approach in AM Peak

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - Signal | | | | Scenario A - Signal | | | | Scenario B - Signal | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| | **AM Peak** | | | | | | | | | | | |
| **Carrington Road / New North Road / Mt Albert Road** | 188 | 80 | 187 | 302 | 116 | 31 | 138 | 107 | 140 | 33 | 193 | 144 |

Based on the results above the following can be summarised:

**Base Scenario :**

Worst Movement: eastern right turn – 279 seconds delay.

Worst approach: All arms – LOS F

Overall Intersection: LOS F with 122 seconds delay

Queues: 302m (62 vehicles) on western arm

**Scenario A:**

Worst Movement: eastern right turn – 113 seconds delay. A decrease of 116 seconds compared to the Base.

Worst approach: western arm – LOS E

Overall Intersection: LOS D with 52 seconds delay. A decrease of 70 seconds compared to the base.

Queues: 138m (28 vehicles) on northern arm. A decrease of 49m (10 vehicles) compared to the base.

**Scenario B:**

Worst Movement: western right turn – 113 seconds delay. A decrease of 116 seconds compared to the Base.

Worst approach: southern, northern, and western arms – LOS E

Overall Intersection: LOS D with 53 seconds delay. A decrease of 69 seconds compared to the base.

Queues: 193m (39 vehicles) on northern arm. An increase of 6m (1 vehicle) compared to the base.

Table 6-27: Carrington Road / New North Road / Mt Albert Road – PM Peak Results

| Intersection | Approach | Base - Signal | | Scenario A - Signal | | Scenario B - Signal | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| **Carrington Road / New North Road / Mt Albert Road** | **PM Peak** | | | | | | |
| | S Left | 104 | F | 44 | D | 44 | D |
| | S Thru | 115 | | 45 | | 46 | |
| | S Right | 111 | | 59 | | 61 | |
| | E Left | 50 | E | 29 | D | 44 | E |
| | E Thru | 94 | | 79 | | 98 | |
| | E Right | 90 | | 85 | | 102 | |
| | N Left | 139 | F | 46 | E | 48 | E |
| | N Thru | 144 | | 47 | | 49 | |
| | N Right | 91 | | 84 | | 89 | |
| | W Left | 56 | E | 78 | F | 72 | F |
| | W Thru | 65 | | 89 | | 78 | |
| | W Right | 71 | | 112 | | 111 | |
| **Intersection Total – PM Peak** | | **80** | **F** | **57** | **E** | **66** | **E** |

Table 6-28: 95th Percentile Queue per Approach in PM Peak

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - Signal | | | | Scenario A - Signal | | | | Scenario B - Signal | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| **Carrington Road / New North Road / Mt Albert Road** | **PM Peak** | | | | | | | | | | | |
| | 86 | 115 | 165 | 89 | 94 | 100 | 165 | 72 | 88 | 108 | 160 | 64 |

Based on the results above the following can be summarised:

**Base Scenario :**

Worst Movement: northern through – 144 seconds delay.

Worst approach: southern and northern arms – LOS F

Overall Intersection: LOS F with 80 seconds delay

Queues: 165m (33 vehicles) on northern arm

**Scenario A:**

Worst Movement: western right turn – 112 seconds delay. An increase of 41 seconds compared to the base.

Worst approach: western arm – LOS F

Overall Intersection: LOS E with 57 seconds delay. A decrease of 23 seconds compared to the base.

Queues: 165m (33 vehicles) on northern arm. No change compared to the base.

**Scenario B:**

Worst Movement: western right turn – 111 seconds delay. A decrease of 40 seconds compared to the base.

Worst approach: western arm – LOS F

Overall Intersection: LOS E with 66 seconds delay. A decrease of 14 seconds compared to the base.

Queues: 160m (32 vehicles) on northern arm. A decrease of 5m (1 vehicle) compared to the base.

The Carrington Road / New North Road / Mount Albert Road intersection consistently shows a moderate to poor performance on most approaches in the base and future scenarios. However, a notable improvement in delays is predicted on the Carrington Road and Mount Albert Road approaches (north and south, respectively), and generally in the AM peak. The queue lengths are also predicted to reduce on the majority of approaches in Scenario A and Scenario B.

This improvement from the AM base case can be attributed largely to the future change in demand along the wider network (i.e. this change is considered largely driven by non-development flow reduction assumptions on the basis of other network change assumptions provided by AT).

Under these assumptions, it can be clearly shown that the intersection does not degrade in performance due to the Precinct development.

### 6.1.8 Woodward Road / New North Road / Richardson Road

Table 6-29: Woodward Road / New North Road / Richardson Road - AM Peak Results

| Intersection | Approach | Base - Signal | | Scenario A - Signal | | Scenario B - Signal | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | **AM Peak** | | | | | | |
| **Woodward Road / New North Road / Richardson Road** | S Left | 44 | D | 24 | C | 30 | C |
| | S Thru | 56 | | 32 | | 35 | |
| | S Right | 35 | | 24 | | 25 | |
| | E Left | 32 | C | 26 | C | 28 | C |
| | E Thru | 31 | | 23 | | 25 | |
| | E Right | 58 | | 46 | | 52 | |
| | N Left | 45 | D | 12 | C | 15 | D |
| | N Thru | 55 | | 32 | | 35 | |
| | N Right | 54 | | 33 | | 37 | |
| | W Left | 30 | C | 22 | C | 26 | C |
| | W Thru | 27 | | 21 | | 23 | |
| | W Right | 48 | | 39 | | 38 | |
| **Intersection Total – AM Peak** | | **35** | **C** | **25** | **C** | **28** | **C** |

Table 6-30: 95th Percentile Queue per Approach in AM Peak

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - Signal | | | | Scenario A - Signal | | | | Scenario B - Signal | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| **Woodward Road / New North Road / Richardson Road** | **AM Peak** | | | | | | | | | | | |
| | 122 | 25 | 117 | 83 | 56 | 21 | 26 | 46 | 77 | 20 | 37 | 56 |

Based on the results above the following can be summarised:

**Base Scenario:**

Worst Movement: eastern right turn – 58 seconds delay.

Worst approach: southern and northern arms – LOS D

Overall Intersection: LOS C with 35 seconds delay

Queues: 122m (25 vehicles) on southern arm

**Scenario A:**

Worst Movement: eastern right turn – 46 seconds delay. A decrease of 12 seconds compared to the base.

Worst approach: All arms – LOS C

Overall Intersection: LOS C with 25 seconds delay. A decrease of 10 seconds compared to the base.

Queues: 56m (11 vehicles) on southern arm. A decrease of 66m (13 vehicles) compared to the base.

**Scenario B:**

Worst Movement: eastern right turn - 52 seconds delay. A decrease of 6 seconds compared to the base.

Worst approach: Northern arm – LOS D

Overall Intersection: LOS C with 28 seconds delay. A decrease of 7 seconds compared to the base.

Queues: 77m (16 vehicles) on southern arm. A decrease of 45m (9 vehicle) compared to the base.

Table 6-31: Woodward Road / New North Road / Richardson Road - PM Peak Results

| Intersection | Approach | Base - Signal | | Scenario A - Signal | | Scenario B - Signal | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | **PM Peak** | | | | | | |
| **Woodward Road / New North Road / Richardson Road** | S Left | 31 | D | 30 | C | 36 | D |
| | S Thru | 43 | | 38 | | 44 | |
| | S Right | 35 | | 29 | | 33 | |
| | E Left | 39 | D | 35 | C | 36 | D |
| | E Thru | 37 | | 34 | | 35 | |
| | E Right | 96 | | 77 | | 87 | |
| | N Left | 40 | D | 29 | D | 22 | D |
| | N Thru | 52 | | 42 | | 46 | |
| | N Right | 51 | | 43 | | 44 | |
| | W Left | 19 | B | 21 | C | 23 | C |
| | W Thru | 20 | | 20 | | 21 | |
| | W Right | 45 | | 42 | | 43 | |
| **Intersection Total – PM Peak** | | **35** | **D** | **32** | **C** | **35** | **C** |

Table 6-32: 95th Percentile Queue per Approach in PM Peak

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - Signal | | | | Scenario A - Signal | | | | Scenario B - Signal | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| **Woodward Road / New North Road / Richardson Road** | **PM Peak** | | | | | | | | | | | |
| | 71 | 74 | 123 | 36 | 73 | 60 | 111 | 29 | 92 | 62 | 124 | 32 |

**Base Scenario :**

**Worst Movement** : eastern right turn – 96 seconds delay.

**Worst approach**: southern, eastern, and northern arms – LOS D

**Overall Intersection**: LOS D with 35 seconds delay

**Queues** : 123m (25 vehicles) on northern arm

**Scenario A:**

Worst Movement: eastern right turn – 77 seconds delay. A decrease of 19 seconds compared to the base.

Worst approach: northern arm – LOS D

Overall Intersection: LOS C with 32 seconds delay. A decrease of 3 seconds compared to the base.

Queues: 111m (23 vehicles) on northern arm. A decrease of 12m (2 vehicles) compared to the base.

**Scenario B:**

Worst Movement: eastern right turn - 87 seconds delay. A decrease of 9 seconds compared to the base.

Worst approach: southern, eastern, and northern arms – LOS D

Overall Intersection: LOS C with 35 seconds delay. No change from the base.

Queues: 124m (25 vehicles) on northern arm. No change from the base.

The Woodward Road / New North Road / Richardson Road intersection consistently has an overall moderate performance in all scenarios modelled. It is noted that in the AM peak, the performance and delays at the south approach have improved in Scenario A and Scenario B, compared to the base model, that can be largely attributed to the reduction in the overall demand forecasted for the intersection by AT, even with the development traffic.

Consequently, reduction in queue lengths are also apparent in Scenario A and Scenario B, compared to the base model.

## 6.2 Car Journey Travel Time

### 6.2.1 Travel Time Route Overview

Journey Travel time analysis for cars has been undertaken along the sections between Point Chevalier Road / Great North Road / Carrington Road and New North Road / Carrington Road, in a clockwise and anti-clockwise direction between Woodward Road / Carrington Road, and New North Road / Carrington Road intersections.

Existing travel times along these sections were surveyed on 17 October 2019, between 6:00 – 9:00am and 3:00 – 6:00pm. The length of each segment of the routes surveyed, and corresponding average morning / afternoon peak hour travel speeds observed during the time of the survey are shown in Figure 6-1 and Figure 6-2.

The two routes, referred to as 'Route 1' and 'Route 2' are detailed below, along with the corresponding survey segments shown in Figure 6-1 and Figure 6-2**.**

**Route 1 -** Comprises the following sections:

a) Point Chevalier Road / Great North Road / Carrington Road to Carrington Road / Unitec Gate 4 (segment 1 and 2)

b) Carrington Road / Unitec Gate 4 to Carrington Road / Woodward Road (segment 3)

c) Carrington Road / Woodward Road to Carrington Road / New North Road (segment 4)

d) Carrington Road / New North Road to New North Road / Woodward Road (segment 5)

e) New North Road / Woodward Road to Woodward Road / Rail Crossing (segment 6)

f) Woodward Road / Rail Crossing to Woodward Road / Carrington Road (segment 7)

g) Woodward Road / Carrington Road to Carrington Road / Unitec Gate 4 (segment 8)

h) Carrington Road / Unitec Gate 4 to Carrington Road / Great North Road / Point Chevalier Road (segment 9 and 10)

**Route 2 -** Comprises the following sections:

a) Point Chevalier Road / Great North Road / Carrington Road to Carrington Road / Unitec Gate 4 (segment 1 and 2)

b) Carrington Road / Unitec Gate 4 to Carrington Road / Woodward Road (segment 3)

c) Carrington Road / Woodward Road to Woodward Road / Rail Crossing (segment 4)

d) Woodward Road / Rail Crossing to Woodward Road / New North Road (segment 5)

e) Woodward Road / New North Road to New North Road / Carrington Road (segment 6)

f) New North Road / Carrington Road to Carrington Road / Woodward Road (segment 7)

g) Carrington Road / Woodward Road to Carrington Road / Unitec Gate 4 (segment 8)

h) Carrington Road / Unitec Gate 4 to Carrington Road / Great North Road (segment 9 and 10)

The travel time analysis for Route A and B during the AM and PM peak hours are shown in Table 6-33 to Table 6-36. Journey Travel times from the 2019 surveys are also included (referred to as 'Observed Travel Time') to provide a reference to the existing situation.

The results are presented as cumulative travel time from origin point of the first segment (segment 1), to the destination point of the last segment (segment 8). For each route, the sections are referred to as Sections 1a-1h and Sections 2a-2h for Route 1 and Route 2 respectively, corresponding to the alphabetic point formatting above. The difference between the observed travel time and the modelled travel time for each scenario are also included, with negative values indicating faster travel time associated with Scenario A or Scenario B, relative to the observed travel time.

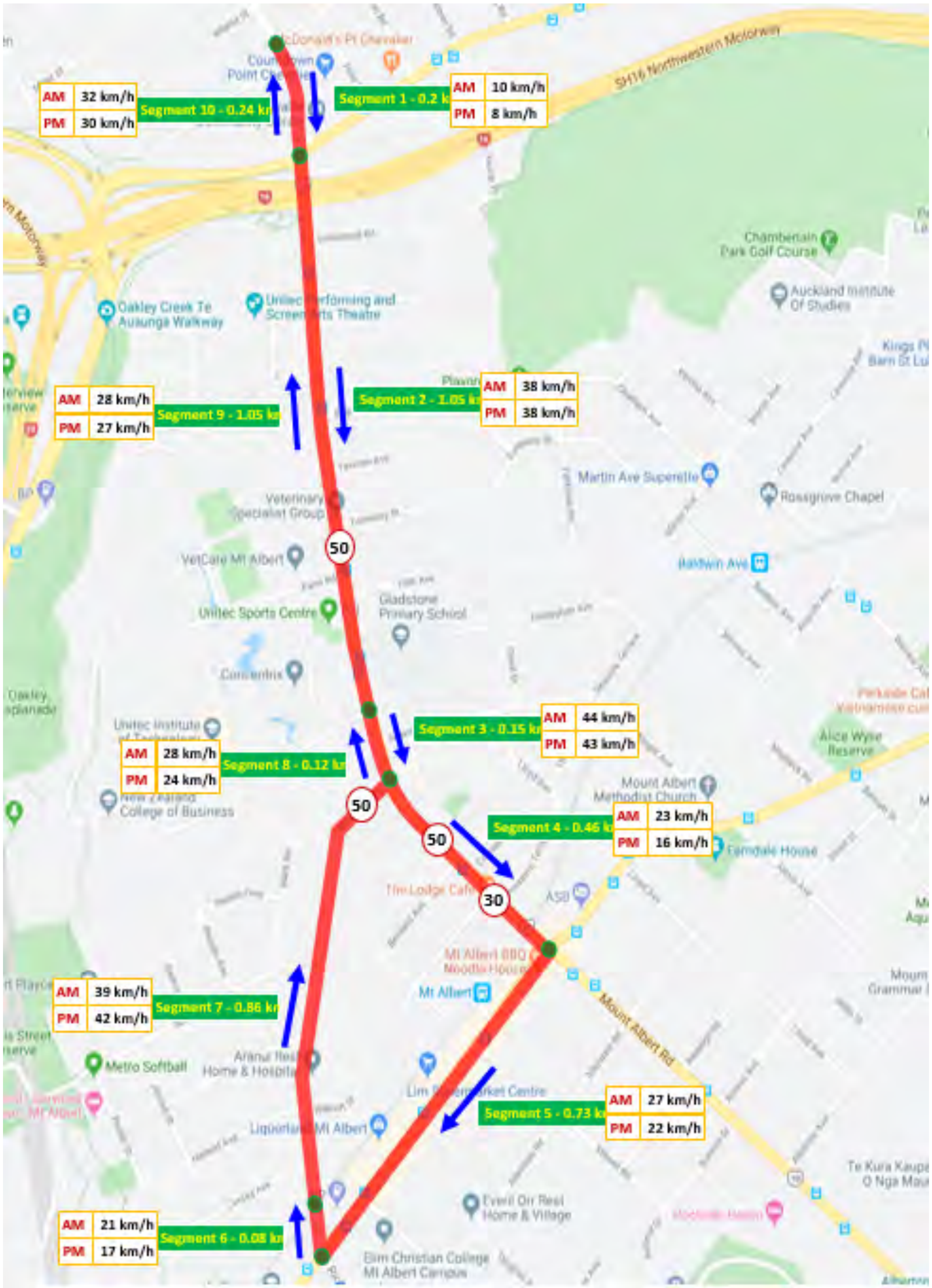



Figure 6-1: Route 1 (clockwise direction), source: Matrix.

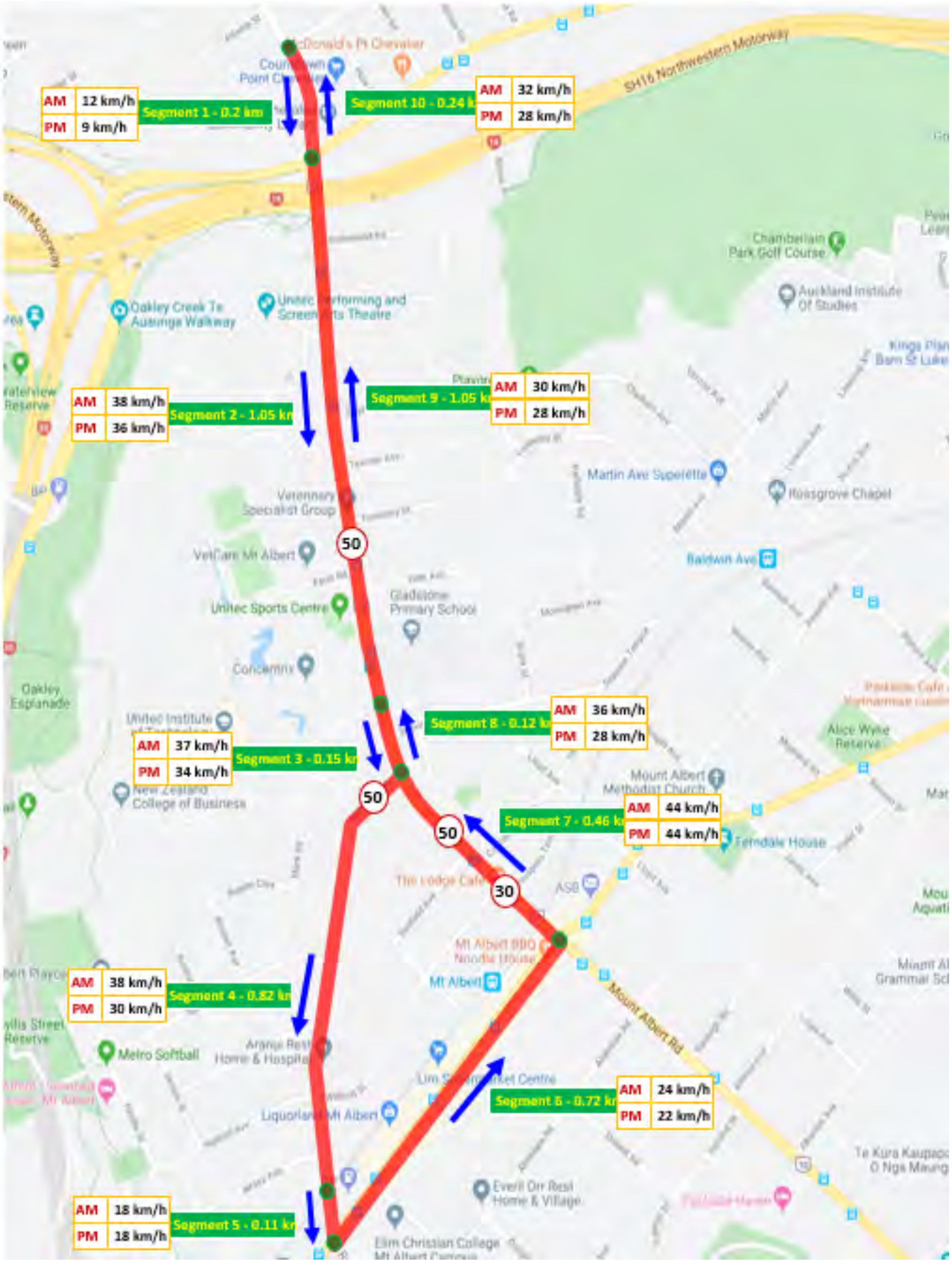


Figure 6-2: Route 2 (anti-clockwise), source: Matrix

### 6.2.2 Car Travel Time Route 1

Table 6-33: Cumulative Travel Time along Route 1 – AM Peak

| Route 1 | Cumulative Travel Time (in seconds) | | | | |
|---|---|---|---|---|---|
| | Observed | Scenario A (Modelled) | Difference between Scenario A and Observed | Scenario B (Modelled) | Difference between Scenario B and Observed |
| **AM Peak** | | | | | |
| Section 1a | 104 | 108 | 4 | 93 | -11 |
| Section 1b | 118 | 117 | -1 | 104 | -14 |
| Section 1c | 205 | 233 | 28 | 221 | 16 |
| Section 1d | 313 | 323 | 10 | 318 | 5 |
| Section 1e | 341 | 349 | 8 | 344 | 2 |
| Section 1f | 426 | 426 | 0 | 431 | 5 |
| Section 1g | 444 | 445 | 1 | 461 | 17 |
| Section 1h | 590 | 653 | 64 | 747 | 157 |
| **%Difference (Observed vs Scenario)** | | **11%** | | **27%** | |

Table 6-34: Cumulative Travel Time along Route 1 – PM Peak

| Route 1 | Cumulative Travel Time (in seconds) | | | | |
|---|---|---|---|---|---|
| | Observed | Scenario A (Modelled) | Difference between Scenario A and Observed | Scenario B (Modelled) | Difference between Scenario B and Observed |
| **PM Peak** | | | | | |
| Section 1a | 104 | 122 | 19 | 118 | 14 |
| Section 1b | 119 | 133 | 14 | 128 | 10 |
| Section 1c | 249 | 254 | 5 | 243 | -6 |
| Section 1d | 383 | 380 | -3 | 375 | -8 |
| Section 1e | 417 | 406 | -11 | 401 | -16 |
| Section 1f | 492 | 473 | -19 | 470 | -22 |
| Section 1g | 515 | 493 | -23 | 494 | -21 |
| Section 1h | 659 | 719 | 59 | 715 | 56 |
| **%Difference (Observed vs Scenario)** | | **9%** | | **8%** | |

The tables above demonstrate that Scenario A sees a minor increase in travel time in AM peak and PM peak, at 11% and 9% respectively, compared to the observed level.

Scenario B also sees an overall increase in travel time, that is more prominent during the AM peak. The increase is considered moderate to medium during the AM (27%) and minor in the PM (8%)

Generally, the increase in travel times projected for the Carrington Road section are balanced by travel time reductions on other segments. The movement contributing to the increase in travel time is primarily the segments between Carrington Road / Unitec Gate 4 to Carrington Road / Great North Road.

### 6.2.3 Car Travel Time Route 2

Table 6-35: Cumulative Travel Time along Route 2 - AM Peak

| Route 2 | Cumulative Travel Time (in seconds) | | | | |
|---|---|---|---|---|---|
| | Observed | Scenario A (Modelled) | Difference between Scenario A and Observed | Scenario B (Modelled) | Difference between Scenario B and Observed |
| **AM Peak** | | | | | |
| Section 2a | 104 | 108 | 4 | 93 | -11 |
| Section 2b | 118 | 117 | -1 | 120 | 3 |
| Section 2c | 200 | 194 | -7 | 199 | -1 |
| Section 2d | 241 | 207 | -34 | 217 | -25 |
| Section 2e | 374 | 321 | -53 | 336 | -38 |
| Section 2f | 411 | 352 | -59 | 392 | -20 |
| Section 2g | 430 | 370 | -60 | 423 | -7 |
| Section 2h | 575 | 578 | 3 | 709 | 134 |
| **%Difference (Observed vs Scenario)** | | **0%** | | **23%** | |

Table 6-36: Cumulative Travel Time along Route 2 - PM Peak

| Route 2 | Cumulative Travel Time (in seconds) | | | | |
|---|---|---|---|---|---|
| | Observed | Scenario A (Modelled) | Difference between Scenario A and Observed | Scenario B (Modelled) | Difference between Scenario B and Observed |
| **PM Peak** | | | | | |
| Section 2a | 104 | 122 | 19 | 118 | 14 |
| Section 2b | 119 | 133 | 14 | 139 | 20 |
| Section 2c | 217 | 218 | 0 | 227 | 9 |
| Section 2d | 256 | 237 | -19 | 254 | -2 |
| Section 2e | 374 | 360 | -14 | 370 | -4 |
| Section 2f | 411 | 391 | -20 | 414 | 2 |
| Section 2g | 435 | 411 | -24 | 437 | 2 |
| Section 2h | 579 | 637 | 59 | 658 | 80 |
| **%Difference (Observed vs Scenario)** | | **10%** | | **14%** | |

The tables above demonstrate that in Scenario A, an overall increase of 10% is predicted during the PM peak relative to the observed travel times, whilst no increase is predicted in the AM peak.

During the AM and PM peak periods, Scenario B is predicted to see an increase in travel times of 23% and 14%, respectively. Again, the movement contributing to the increase in travel time is primarily the segments between Carrington Road / Unitec Gate 4 to Carrington Road / Great North Road.

Overall, it can be concluded that the travel times for general traffic on the network surrounding the Precinct in both future scenarios are generally comparable to the observed travel time, using the wider-area assumptions provided.

## 6.3 Bus Journey Travel Time

The journey travel times for the buses along Carrington Road, between Point Chevalier Road / Great North Road / Carrington Road and New North Road / Carrington Road / Mount Albert Road have been modelled separately. The comparison between bus travel times in the base and future models for the sections of Carrington Road between the Great North Road / Pt Chevalier Road / Carrington Road and Carrington Road/Woodward Road, in both directions are provided in Table 6-37.

The comparisons are presented separately for AM and PM peak periods.

Table 6-37: Comparison of Bus and Car Travel Time on Carrington Road

| Section | Bus Travel Times (seconds) | | |
|---|---|---|---|
| | Base Model (no bus lanes) | Scenario A (no bus lanes) | Scenario B (with bus lanes) |
| **AM Peak** | | | |
| **Southbound -Carrington Road** (Pt Chevalier/Great North Road to Woodward Road) | 199 | 210<br>(11 seconds longer than the base) | 190<br>(9 seconds faster than the base) |
| **Northbound – Carrington Road** (Woodward Road to Pt Chevalier/Great North Road) | 284 | 328<br>(44 seconds longer than the base) | 285<br>(no change from the base) |
| **PM Peak** | | | |
| **Southbound -Carrington Road** (Pt Chevalier/Great North Road to Woodward Road) | 207 | 231<br>(24 seconds longer than the base) | 203<br>(4 seconds faster than the base) |
| **Northbound – Carrington Road** (Woodward Road to Pt Chevalier/Great North Road) | 267 | 339<br>(72 seconds longer than the base) | 318<br>(51 seconds longer than the base) |

Bus travel times in Scenario A are longer than the bus travel times in the base model, with the differences ranging from 11 seconds (southbound, AM peak) to 72 seconds (northbound, PM peak). With the new bus lanes in Scenario B, the bus travel times are generally predicted to return to the base scenario levels.

An exception to this is the bus travel time in the northbound direction in the PM peak, where an increase of 51 seconds persists relative to the base model. This can be attributed to the higher delay on the southern approach of the Great North Road / Pt Chevalier Road / Carrington Road intersection in the PM peak (as discussed in Section 6.1.1), and as buses are required to merge with general traffic at the end of the northbound bus lane prior to the SH16 overbridge.

It is noted that the traffic model assumes that buses will stop for approximately 20 seconds at each bus stop along the corridor, for boarding and alighting passengers. These additional seconds are included in the bus travel times reported above. Given that there are three bus stops in each direction along Carrington Road in the future scenarios, this equates to approximately 60 seconds of additional time. This is considered conservative as there will be instances where no passengers need to board and alight at one or more stops along Carrington Road. Service times could potentially be improved by consolidating stops.

The traffic model currently does not include full bus priority measures at intersections i.e. left turn general traffic competes at these locations with bus through traffic (left turners turn from within the bus lane). This delays buses, particularly where left turns are held (delayed) to first allow through pedestrian or bike movements across the side roads. It is likely that the design of the future Carrington Road Upgrade may include added bus priority measures at key intersections to reduce or avoid intersection specific delays.

Similarly, the model assumes that the bus lanes do not extend across the SH16 motorway overbridge all the way to Great North Road but stop in the general vicinity of Sutherland Road. Extending at least some bus priority across the bridge would result in significant delay improvement for services. However, this would require either a full rebuild of the overbridge (for bus lanes each way), or the relocation of some walk/cycle facilities onto a clip-on structure (which could then allow enough space for an added narrow bus lane in at least one direction on the existing bridge). However, the scope of the ITA currently do not provide certainty for such changes, and as such they were not included.

Overall, the above demonstrates that the future Carrington Road Upgrade is beneficial and will sufficiently sustain the public transport operation along the corridor. Without it, buses would perform at general traffic flow delays plus stop delays and delays to re-enter traffic streams, while also further holding up general traffic while sitting in stops. Particularly if combined with further intersection bus priority measures, the greater accessibility and reliability for buses will compensate for the longer travel times for general traffic (as previously discussed) and support the vision for a more balanced mode share on the transport network surrounding the Precinct.

## 6.4 Carrington Road Flows

The peak hour traffic volumes on Carrington Road, between Unitec Gate 3 and Gate 4, recorded by the 7-day tube count surveys (2014 and 2019) and modelled in Scenario A and Scenario B are presented in Table 6-38 shows

Table 6-38: Carrington Road Peak Hour Traffic Flow

| Time | AM Peak Hour (veh/hr) | | | PM Peak Hour (veh/hr) | | |
|---|---|---|---|---|---|---|
| | Northbound | Southbound | Combined | Northbound | Southbound | Combined |
| 2014 (survey) | 1031 | 702 | 1733 | 583 | 647 | 1230 |
| 2019 (survey) | 664 | 549 | 1213 | 555 | 577 | 1132 |
| Scenario A (model) | 842 | 699 | 1541 | 735 | 870 | 1605 |
| Scenario B (model) | 994 | 714 | 1708 | 741 | 947 | 1688 |

The table above shows lower peak hour traffic flows on Carrington Road in 2019 compared to 2014, which can be attributed largely to the opening of the Waterview motorway in 2017).

The table also shows a general increasing trend in traffic flows in both directions and peak periods, between 2019 and Scenario B. It is noted that the level of traffic flows predicted in Scenario B are comparable with the AM morning peak flows observed in 2014, which provides some indication that the corridor will have sufficient capacity to cater for the future flows.

## 6.5 Sensitivity Tests (SIDRA)

### 6.5.1 Background

The modelling within this ITA has been undertaken on 82% of the potential residential build out in the Precinct, as agreed with Auckland Transport and their consultants, Flow Ltd, in February 2020.

During the meeting between HUD / AT / Stantec on 16 February 2020 an agreement was reached that sensitivity testing of the key intersections along Carrington Road will be undertaken using SIDRA software, to better understand whether the Scenario B Aimsun modelling results has identified appropriate long-term footprints and forms of these key intersections.

The sensitivity testing has been undertaken by adding a further 10% to the Precinct-related traffic to the intersection flows created by Scenario B. This includes traffic generated by all activities and land uses within the Precinct (including Unitec), and not just the residential traffic only. The use of an additional 10% of <u>all</u> Precinct traffic is considered to represent a robust analysis.

Trip distribution applied to the additional 10% traffic is assumed as the same as in the standard scenarios, as the new development will not form new access routes or have any likelihood of being different in origin-destination patterns than immediately adjacent residential development.

A detailed breakdown of the Scenario B directional demands for AM and PM peak at each intersection along Carrington Road are included at Appendix F. The demands are further split into the following vehicle types; Car (general non-precinct related traffic), CarU (precinct-related traffic), Bus, and HCV (heavy vehicles). These demands have been input directly into SIDRA Intersection for the sensitivity testing.

The intersections that have been subject to sensitivity testing are:

1. **Great North Road / Pt Chevalier Road / Carrington Road.**

   The Aimsun modelling results of the intersection indicate that it will be operating close to capacity, and at LOS F in Scenario B. As such, this intersection is already under significant pressure.

2. **Gate 3 / Carrington Road**

   The performance of Gate 3 in its signalised form is in general satisfactory, whether with its existing priority intersection layout under the base scenario and Scenario A, as well as when it is signalised under Scenario B. However, this intersection is the one most likely to see added trip demand should further development eventuate in the areas excluded in the ITA assumptions (in particular the F Lots and B Lots), and therefore has also been subjected to sensitivity testing.

3. **Woodward Road / Carrington Road**

   Similar to the Gate 3 / Carrington Road intersection, the Woodward Road / Carrington Road intersection has been included in the sensitivity testing to account for the potential development of several Precinct areas in proximity that have not been included in the ITA timeframe.

A summary of the sensitivity results in terms of the delay (in seconds), 95th percentile queue length (in metres), and the level of service (LOS) are shown in Table 6-39 to Table 6-41. The tables compare the aforementioned performance indicators between Scenario B (as modelled in Aimsun) and the Scenario B + 10% Precinct Traffic.

It is noted that the SIDRA results for Scenario B have been compared with the corresponding Aimsun results and generally found to be in alignment in terms of delay and LOS. Therefore, no further calibration has been applied to the SIDRA files for each intersection.

### 6.5.2 Great North Road / Pt Chevalier Road / Carrington Road SIDRA

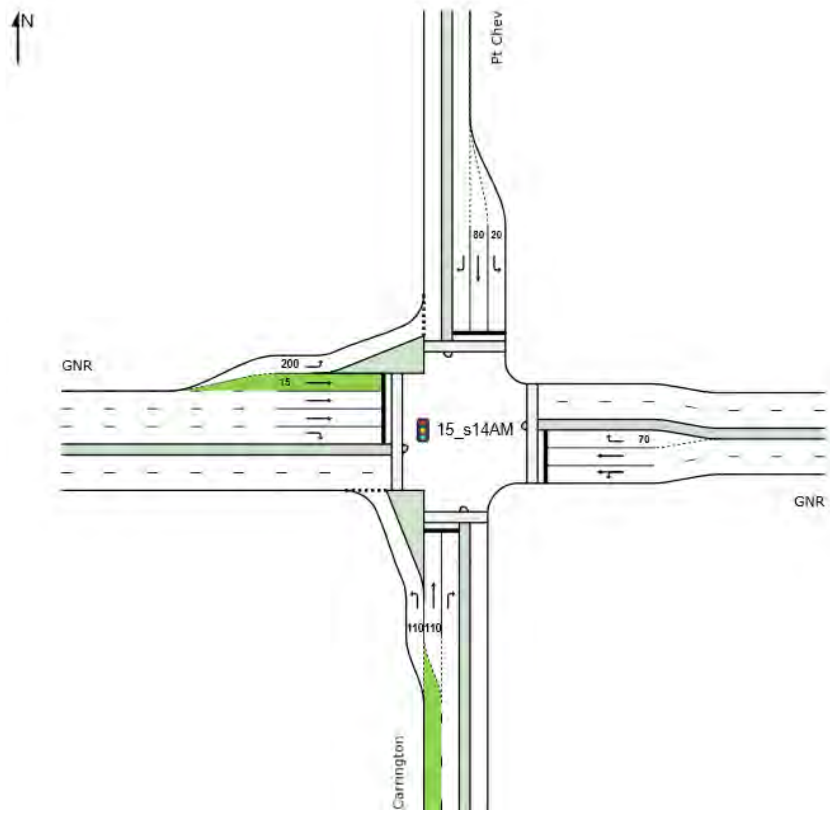



Figure 6-3: SIDRA layout for Great North Road / Point Chevalier Road / Carrington Road (green sections represent bus lanes).

Table 6-39: Sensitivity Test Results for Great North Road / Point Chevalier Road / Carrington Road intersection

| Intersection Approach | Scenario B | | | | | | Scenario B Sensitivity Test (+10% Precinct Traffic) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Approach | | | Intersection | | | Approach | | | Intersection | | |
| | Delay (s) | 95%ile Queue (m) | LOS | Delay (s) | 95%ile Queue (m) | LOS | Delay (s) | 95%ile Queue (m) | LOS | Delay (s) | 95%ile Queue (m) | LOS |
| | AM Peak | | | | | | | | | | | |
| South (Carrington Rd) | 85 | 275 | F | 89 | 420 | F | 117 | 372 | F | 109 | 471 | F |
| East (Great North Rd) | 58 | 98 | E | | | | 58 | 97 | E | | | |
| North (Pt Chev Rd) | 81 | 242 | F | | | | 96 | 287 | F | | | |
| West (Great North Rd) | 101 | 420 | F | | | | 123 | 471 | F | | | |
| | PM Peak | | | | | | | | | | | |
| South (Carrington Rd) | 58 | 107 | E | 65 | 257 | E | 65 | 108 | E | 76 | 300 | E |
| East (Great North Rd) | 86 | 257 | F | | | | 108 | 300 | F | | | |
| North (Pt Chev Rd) | 68 | 219 | E | | | | 76 | 249 | E | | | |
| West (Great North Rd) | 49 | 205 | D | | | | 54 | 233 | D | | | |

The results of the sensitivity analysis undertaken on Great North Road / Point Chevalier Road / Carrington Road show further, substantial increases in delay on various approaches. This identifies that as already indicated, the northern end of the network is unlikely to be able to accommodate further traffic flows.

However, it has to be considered that:

- This extra traffic is expected to occur at least 10-20 years from now, and only if development proceeds at the fast pace assumed in this ITA and then continues in further areas;
- The intersection has limited realistic potential to improve capacity – in combination with the adjacent motorway the vicinity has already one of the widest traffic environments across Auckland (16 lanes), and further added lanes will not be feasible without severe impacts on both the town centre, and on downstream intersections (moving the queues); and
- The model adds this extra 10% traffic but does not include any assumptions for traffic reductions in the background volumes associated with a further mode shift in Auckland.

As such, it is considered that the results indicate more towards even stronger long-term actions towards reducing single-occupancy car trips, via projects such as the proposed SH16 Rapid Transit (Light Rail) service, that will reduce through traffic currently using the motorway parallel-routes.

It could also indicate that any Precinct development beyond that assumed within this ITA will need to be even more stringently restricted in terms of car use, that shall be progressively feasible with improved mode choice options likely to be available two decades from now.

### 6.5.3 Unitec Gate 3 / Carrington Road SIDRA

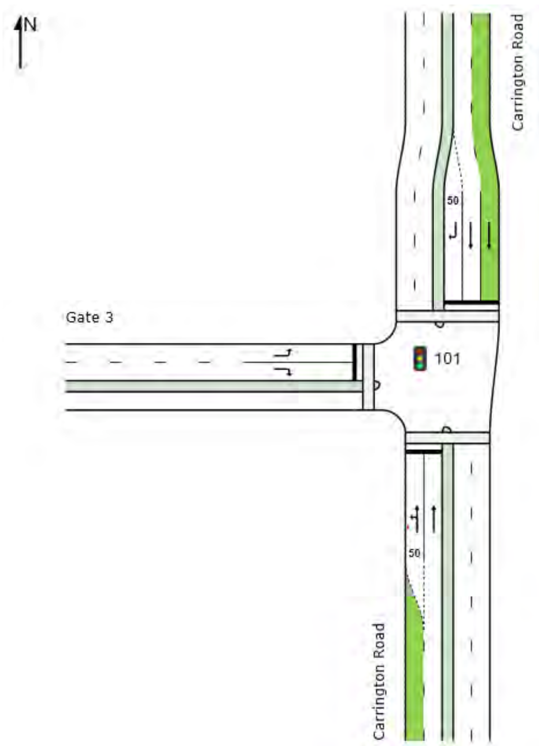



Figure 6-4: SIDRA layout for Gate 3 / Carrington Road (green sections represent bus lanes)

Table 6-40: Sensitivity Test Results for the Gate 3 / Carrington Road intersection

| Intersection Approach | Scenario B | | | | | | Scenario B Sensitivity Test (+10% Precinct Traffic) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Approach | | | Intersection | | | Approach | | | Intersection | | |
| | Delay (s) | 95%ile Queue (m) | LOS | Delay (s) | 95%ile Queue (m) | LOS | Delay (s) | 95%ile Queue (m) | LOS | Delay (s) | 95%ile Queue (m) | LOS |
| | AM Peak | | | | | | | | | | | |
| South (Carrington Rd) | 29 | 312 | C | 27 | 312 | C | 32 | 358 | C | 30 | 358 | C |
| North (Carrington Road) | 20 | 163 | B | | | | 21 | 178 | C | | | |
| West (Gate 3) | 53 | 35 | D | | | | 58 | 42 | E | | | |
| | PM Peak | | | | | | | | | | | |
| South (Carrington Rd) | 34 | 210 | C | 29 | 215 | C | 29 | 214 | C | 27 | 232 | C |
| North (Carrington Road) | 23 | 215 | C | | | | 23 | 232 | C | | | |
| West (Gate 3) | 33 | 40 | C | | | | 38 | 50 | D | | | |

The table above shows that there will small differences between the results for Scenario B and Scenario B plus 10% additional Precinct-related traffic. The intersection will operate at acceptable LOS with the additional 10% Precinct-related traffic.

There are some minor increases in queue lengths on Carrington Road, however, these are 95%ile queue lengths, therefore not representative of a typical peak hour situation at this intersection. These increases are also expected to be able to be readily accommodated on Carrington Road. Accordingly, the results do not indicate any need for a wider intersection footprint.

The results, however, provide valuable information regarding the length of dual-lane approach width that future site-internal design should provide (or at least future-proof) within the site on Farm Road. With or without the additional 10% of Precinct-related traffic, queue length on Farm Road is expected to be in the order of 40 – 50m. For comparison, the length of Farm Road between Carrington Road and the internal north-south road along the west of the sports fields is approximately 250m, and therefore can readily accommodate the expected queues.

### 6.5.4 Woodward Road / Carrington Road

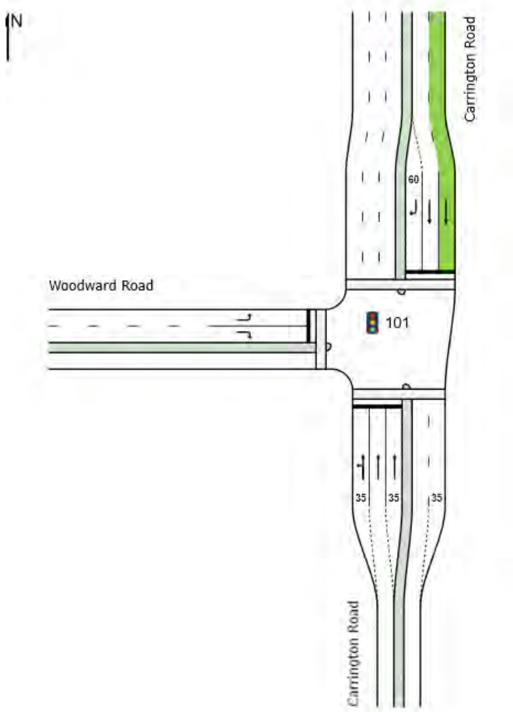



Figure 6-5: SIDRA layout for Woodward Road / Carrington Road (green sections represents bus lanes)

Table 6-41: Sensitivity Test Results for the Woodward Road / Carrington Road Intersection

| Intersection Approach | Scenario B | | | | | | Scenario B Sensitivity Test (+10% Precinct Traffic) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Approach | | | Intersection | | | Approach | | | Intersection | | |
| | Delay (s) | 95%ile Queue (m) | LOS | Delay (s) | 95%ile Queue (m) | LOS | Delay (s) | 95%ile Queue (m) | LOS | Delay (s) | 95%ile Queue (m) | LOS |
| | AM Peak | | | | | | | | | | | |
| South (Carrington Rd) | 27 | 56 | C | 19 | 84 | B | 28 | 61 | C | 19 | 94 | B |
| North (Carrington Road) | 17 | 81 | B | | | | 17 | 86 | B | | | |
| West (Woodward Rd) | 15 | 84 | B | | | | 16 | 94 | B | | | |
| | PM Peak | | | | | | | | | | | |
| South (Carrington Rd) | 31 | 39 | C | 19 | 110 | B | 32 | 41 | C | 23 | 154 | C |
| North (Carrington Road) | 18 | 110 | B | | | | 25 | 154 | C | | | |
| West (Woodward Rd) | 12 | 45 | B | | | | 12 | 48 | B | | | |

The table above shows that there are small differences between results for Scenario B and Scenario B plus 10% additional Precinct related traffic, and intersection will continue operating at acceptable LOS with the additional 10% Precinct-related traffic.

As with the other two intersections above, some minor increases are predicted in terms of the 95%ile queue lengths on the approaches, however are not considered significant and are expected to be able to be readily accommodated on Carrington Road and Woodward Road accordingly.

## 6.6 Overall Modelling Result Summary

As can be seen within this section, the addition of development traffic onto the network leads to a general reduction in Level of Service, particularly at the northern end of the network. At the southern end, the performance results are much better, and in some cases even see improvement, in part due to AT assumptions of wider-area traffic reducing due to network changes.

General vehicle journey times similarly see no degradation overall, though mid-block travel along Carrington Road sees increases compared to the lower base traffic volume situation. This is again balanced by improvements in the southern part of the network.as per the 2028 MSM data provided by AT as a base for the traffic model.

Additionally, bus journey time analysis shows that Carrington Road bus routes will see clear benefits from the new bus lanes proposed as part of the Carrington Road Upgrade, albeit to ensure consistent advantage of public transport over single-occupancy cars, more intersection-specific bus priority would be required at key locations in addition to the mid-block bus lanes.

General vehicle capacity increases (such as much larger arterial road intersections at the network edges or added general lanes on Carrington Road) are not considered feasible without prohibitive impacts on surrounding town centres in particular. This is also borne out by the additional sensitivity testing, which identifies the key issue as being congested existing arterial/arterial intersections such as Great North Road / Carrington Road, rather than intersections into or closer to the Precinct.

Therefore, it is considered that the model results indicate that the future Carrington Road Upgrade project, and projects such as the Connected Communities project for New North Road, should consider the impacts of the Precinct's expected development into their assumptions [22] to ensure that the impacts are properly considered in the wider network as well as the short and medium distances assessed in this ITA.

However, the added development in the Precinct is already zoned, and creates much less impact on Auckland's overall transport network – including on motorways like SH16 and streets like Great North Road - in this location than if it were located at the end of a motorway further outside the city.

Therefore it is considered that the conclusion to be taken from these modelling results should be an even greater focus on ensuring both the Precinct and Auckland's transport network progress on mode shift, which needs to continue and accelerate in the longer term beyond the current ITA timeframe. This is likely to include further public transport infrastructure, active mode improvements and further restricting car parking rates per dwellings.

[22] As agreed with Auckland Transport and their consultants, Flow Ltd, during February 2020.

# 7. Policy and Precinct Rules

The following sections compare the transport provisions assumed in this ITA against the objectives of the transport section in the Auckland Unitary Plan Operative in Part. It also compares the ITA assumptions against the directly relevant provisions contained in the objectives, policies and rules of the Wairaka Precinct Plan within the Unitary Plan.

## 7.1 Auckland Unitary Plan, Section E27 Transport

The Auckland Unitary Plan Operative in Part (AUP-OP) outlines the following objectives in Section E27 – Transport:
Land use and all modes of transport are integrated in a manner that enables:

i) the benefits of an integrated transport network to be realised.

ii) the adverse effects of traffic generation on the transport network to be managed.

iii) An integrated transport network including public transport, walking, cycling, private vehicles and freight, is provided for.

iv) Parking and loading supports urban growth and the quality compact urban form.

v) The provision of safe and efficient parking, loading and access is commensurate with the character, scale and intensity of the zone.

vi) Pedestrian safety and amenity along public footpaths is prioritised.

vii) Road/rail crossings operate safely with neighbouring land use and development.

The Precinct development aligns well with the above objectives. In particular Objective I II and III are supported by both the internal provision of active mode links, and the connecting to public transport links that are planned for in and around the Precinct, which will be significantly enhanced once the Carrington Road Upgrade occurs.

Objective II also aligns with the proposed reduction of parking provision for the residential and education land uses, as well as the strong focus of road safety in the design, which reduces adverse impacts.

Objective IV is supported by the proposed reduction of parking provision as well. Albeit for both Objective IV as with Objective V, the specific design to support these objectives will be covered in later design stages, which will be underpinned by the design philosophies – particularly those related to road safety – covered in the ITA and expected for any development proposals within it.

Objective VI is a key of the ITA and the Precinct, as high-quality pedestrian provisions and related road safety are necessary not just for this objective in itself, but also to support many of the other objectives of the development

Objective VII also aligns well with the intention design of internal roads ensure slow-speeds and pedestrian prioritisation, as well as provision of new safe crossing facilities along Carrington Road. This ensures that connectivity and safety are maintained for all transport modes between land uses inside and outside of the Precinct.

## 7.2 Wairaka Precinct Rules

The following rules have been excerpted from the Precinct Rules (Auckland Unitary Plan, Operative in Part, Section I334) for their traffic and transport relevance:

Table 7-1: Precinct Rules Compliance Table

| Numbering | Description | Compliance |
|---|---|---|
| **Objectives** | | |
| I334.2(1) | The provision for a high quality of tertiary education institution and accessory activities in the precinct is continued, while also providing for growth, change and diversification of activities | Complies |
| I334.2(2) | Comprehensive planning and integrated development of all sites within the precinct is achieved | Complies |
| I334.2(3) | A mix of residential, business, tertiary education and community activities is provided, which maximises the efficient and effective use of land | Complies |
| I334.2(4) | The healthcare/hospital facility, accessory activities and associated buildings, structures and infrastructure in Sub-precinct A (Mason Clinic) are provided for | Complies – access is provided effectively as is during Scenario A, and improved (traffic signals at Gate 2) in Scenario B |
| I334.2(5) | The commercial laundry service and accessory activities and associated buildings, structures and infrastructure in Sub-precinct B are provided for | Complies – access is provided effectively as is during Scenario A, and improved (traffic signals at Gate 2) in Scenario B |
| I334.2(6) | Identified heritage values are retained through the adaptation of the scheduled buildings and retention of identified trees, together with the management of the historic heritage, and Māori sites of significance on Oakley Creek land, and the contribution they make to the precinct's character and landscape, are recognised, protected and enhanced in the precinct | Not directly related to the ITA |
| I334.2(7) | Open spaces, cycling and pedestrian linkages from the Precinct to the wider area and neighbouring suburbs, including linkages between activities and open space nodes, are provided for and enhanced | Complies – key focus area of the ITA and requirement for individual development area design |
| I334.2(8) | Development and/or subdivision within the precinct facilitates a transport network that:<br>(a) Integrates with, and avoids, remedies or mitigates adverse effects on the safety and efficiency of, the transport network within the precinct and the surrounding area, including providing any upgrades to the surrounding network; and<br>(b) Facilitates transport choices by providing for pedestrians, cyclists, public transport facilities, and vehicles | (a) Complies – key focus of the ITA and requirement for development area design<br>(b) Complies – key focus of the ITA and requirement for development area design |

| Numbering | Description | Compliance |
|---|---|---|
| I334.2(9) | Development of any roads connecting to the existing roading network to the south of the Precinct must be subject to specific resource consent processes to ensure that any private or public road connections must:<br>(a) Avoid these southern connections becoming a direct vehicle entrance for the Special Purpose - Tertiary Education Zone; and<br>(b) Be designed to minimise the amenity effects on existing residents | (a) Complies – no such vehicular link proposed<br>(b) Complies – traffic volume assumptions using the links are limited in the model to the "Southern" development area uses, and design will prioritise residential amenity via reduced speeds, and active mode priority within the Precinct, and ancillary design in the adjacent streets being developed as part of the Southern development area |
| I334.2(10) | An integrated urban environment is created, which:<br>(a) Incorporates high quality built form and urban design<br>(b) Recognises, protects and enhances the environmental attributes of Wairaka in planning and development of the Precinct;<br>(c) Avoids, mitigates and remedies adverse effects on the environment and existing stormwater, wastewater and road/s infrastructure, recognising that the precinct stormwater system services areas beyond Wairaka;<br>(d) Is developed in a comprehensive manner, which complements and fits within the landscape and character of the surrounding environment, and<br>(e) Contributes positively to the Mt Albert, Waterview and Point Chevalier communities | Not directly related to the ITA |
| I334.2(11) | Provide for retail, food and beverage and commercial services in identified locations to serve local demand within the Wairaka Precinct and at a scale and configuration which does not adversely affect the role, function and amenity of the Point Chevalier and Mt Albert town centres | Not directly related to the ITA |
| **Policies** | | |
| I334.3(1) | Enable and provide for a wide range of activities, including education, business, office, research, health, recreation, residential accommodation, community facilities and appropriate accessory activities | Not directly related to the ITA |
| I334.3(2) | Respond to future demand and changes in the manner of learning and the desire to integrate business and education within the Special Purpose - Tertiary Education Zone | Not directly related to the ITA |

| Numbering | Description | Compliance |
| --- | --- | --- |
| I334.3(3) | Recognise the benefits of allocating a high quality tertiary education institution within a diverse urban environment. | Not directly related to the ITA |
| I334.3(4) | Promote comprehensive planning by enabling integrated development in accordance with the precinct plan that provides for any of the following:<br>(a) Tertiary education and associated research, and community activities;<br>(b) Provision for the ongoing operation of the Mason Clinic;<br>(c) Provision for the operation of the commercial laundry service;<br>(d) Residential accommodation;<br>(e) Economic development and employment;<br>(f) Public infrastructure that is integrated with existing infrastructure, recognising that Wairaka receives stormwater from an upstream sub-catchment;<br>(g) Integrated transport and land use planning through the development of the precinct;<br>(h) Traffic management, including provision of pedestrian and cycle facilities, integration with public transport, parking provision and management;<br>(i) Identification and protection of significant landscape features, the adaptation of the scheduled historic buildings, identified trees and open space network;<br>(j) Public road and open space access to the Oakley Creek reserve; or<br>(k) Pedestrian and cycle connections to Point Chevalier, Waterview and Mt Albert | This section includes numerous key foci of the ITA<br>(a) Complies<br>(b) Complies<br>(c) Complies<br>(d) Complies<br>(e) Complies<br>(f) Not directly related to the ITA<br>(g) Complies – key focus of the ITA<br>(h) Complies – key focus of the ITA<br>(i) Not directly related to the ITA<br>(j) Complies – a network of main internal roads is to be vested as public roads as part of the development process, securing this access - in addition to existing access easements such as the Waterview Shared Path<br>(k) Complies – key focus of the ITA |
| I334.3(5) | Promote economic activity and provide for employment growth that will create opportunities for students, graduates and residents of the precinct and Auckland. | Not directly related to the ITA |
| I334.3(6) | Encourage a mix of residential lifestyles and housing typologies to cater for a diverse residential community at Wairaka | Not directly related to the ITA |
| I334.3(7) | Provide for a mix of residential and business activities which will enable development of a residential core to the Wairaka Precinct | Not directly related to the ITA |
| I334.3(8) | Enable a broad range of educational, research, laboratory, office and business uses which meet the needs and respond to future changes in teaching, learning, and research requirements for a modern campus environment | Not directly related to the ITA |

| Numbering | Description | Compliance |
|---|---|---|
| I334.3(9) | Provide for a broad range of business, office, innovation and research activities which will encourage employment and economic development to locate in Wairaka, including those which benefit from the co-location with a tertiary education institution | Not directly related to the ITA |
| I334.3(10) | Enable subdivision and development that is compatible with and sensitive to the ecological qualities of the Oakley Creek and the Motu Manawa Marine Reserve. | Not directly related to the ITA |
| I334.3(11) | Encourage the retention and adaptation of the heritage and character buildings, and elements identified within the precinct | Not directly related to the ITA |
| I334.3(12) | Provide for the adaptation of the scheduled part of the heritage building for economically viable activities which ensure ongoing economic sustainability for this building and its integration into the Wairaka Precinct | Not directly related to the ITA |
| I334.3(13) | Require new buildings to be designed in a manner that provides for a high standard of amenity, recognises landscape values and, where appropriate, enhances the streetscape and gateway locations of the precinct | Not directly related to the ITA |
| I334.3(14) | Require proposals for new buildings, structures and infrastructure or additions to existing buildings, structures and infrastructure adjoining or adjacent to the scheduled historic heritage buildings, and/or the significant ecological area of Oakley Creek to be sympathetic and provide contemporary and high-quality design, which enhances the precinct's built form and natural landscape | Not directly related to the ITA |
| I334.3(15) | Provide for public open space, including a neighbourhood park in the northern portion of the precinct | Not directly related to the ITA |
| I334.3(16) | Provide public connections to Oakley Creek from Carrington Road through public roads and open space, giving quality public access to this ecological area | Complies – a network of main internal roads is to be vested as public roads as part of the development process, securing this access - in addition to existing access easements such as the Waterview Shared Path |
| I334.3(17) | Require development to maintain and provide a varied and integrated network of pedestrian and cycle linkages, open space and plazas within the precinct | Complies – key focus of the ITA |
| I334.3(18) | Require the key pedestrian and cycle linkages through the precinct to be direct and convenient, well designed, safe and improve connectivity for all users | Complies – key focus of the ITA |
| I334.3(19) | Establish a network of roads which give public access through the precinct and a pedestrian and cycling connections to the Oakley Creek and Waterview pedestrian/cycle bridge | Complies – key focus of the ITA |

| Numbering | Description | Compliance |
|---|---|---|
| I334.3(20) | Require subdivision and development to be integrated with transport planning and infrastructure in a way that:<br>(a) Avoids, remedies or mitigates the adverse effects of the development on the transport network;<br>(b) Integrates with rail, bus, pedestrian and cycle connections;<br>(c) Implements as a minimum the transport elements within the Precinct Plan;<br>(d) Supports the provision of passenger transport services, linking to key public transport nodes such as the Mount Albert train station and Point Chevalier public transport services;<br>(e) Minimises traffic effects on pedestrian and residents' safety and amenity;<br>(f) Minimises overflow parking on roads occurring in the vicinity of the precinct; and<br>(g) Stages subdivision and development with necessary surrounding transport network infrastructure and upgrades where adverse effects on the transport network cannot be avoided, remedied and mitigated. | This section includes numerous key foci of the ITA<br>(a) Complies – key focus of the ITA<br>(b) Complies – key focus of the ITA<br>(c) Complies – key focus of the ITA<br>(d) Complies – key focus of the ITA<br>(e) Complies – key focus of the ITA<br>(f) Will comply<br>(g) Will comply |
| I334.3(21) | Enable parking areas to service the scheduled heritage building | Will comply – future development area design matter |
| I334.3(22) | Manage the expected traffic generated by activities in the precinct to avoid, remedy and mitigate adverse effects on the safety and efficiency of the surrounding transport network, particularly at peak times. For the purpose of this precinct, the surrounding transport network comprises Carrington Road, the Precinct's existing and proposed access points to Carrington Road, the Carrington Road/Woodward Road intersection, the Woodward Road/New North Road intersection, the Carrington Road/New North Road and Carrington Road/Great North Road intersections, Laurel Street, Renton Road, Rhodes Avenue and the other local roads bounded by Carrington Road, New North Road, and Oakley Creek | Complies – key focus of the ITA (including by having the traffic model area extend beyond the named areas) |
| I334.3(23) | Require an integrated transport assessment for the precinct for any new development greater than 2,500m² gross floor area in the Business - Mixed Use Zone or greater than 1,000m2 gross floor area in the residential zones, unless that additional development was assessed as part of an earlier assessment of transportation effects that is no more than two years old | Will comply – future development area design matter |

| Numbering | Description | Compliance |
|---|---|---|
| I334.3(24) | Require an integrated transport assessment for the precinct as part of any southern road connection (public or private), the first subdivision in the Business - Mixed Use and residential zones (other than for controlled activities) or for any new development greater than 2,500m2 gross floor area in the Business - Mixed Use Zone or greater than 1,000m2 gross floor area in the residential zones | Will comply – future development area design matter |
| I334.3(25) | Avoid parking buildings within the Special Purpose - Tertiary Education Zone having direct access from Laurel Street, Renton Road, Rhodes Avenue (or any extension of those roads) or the western road shown on the precinct plan | Will comply & link not assumed in traffic model |
| I334.3(26) | Avoid direct vehicle access between the Special Purpose - Tertiary Education Zone and Laurel Street, Renton Road, Rhodes Avenue (or any extension of those roads) | Will comply & link not assumed in traffic model |
| I334.3(27) | Manage potential adverse amenity effects from buildings at the precinct boundary by:<br>(a) Establishing a 5m yard and graduated building heights to the southern residential interface<br>(b) Establishing a 10m setback from the boundary of land that fronts Oakley Creek<br>(c) Require graduated building heights and locate higher buildings away from the precinct boundary | Not directly related to the ITA |
| I334.3(28) | Encourage built form, activities, public open spaces and infrastructure to be planned and designed on a comprehensive land area basis, rather than on an individual site basis. | Not directly related to the ITA |
| I334.3(29) | Provide for the retail (including food and beverage) activities in identified locations of the precinct which:<br>(a) meets the needs of the campus;<br>(b) serves local demand within the precinct; and<br>(c) creates the opportunity for retail (including food and beverage) activities in the Historic Heritage overlay | Not directly related to the ITA |
| I334.3(30) | Limit retail activities (including food and beverage) fronting or accessed directly from Carrington Road, restricting the number and size of supermarkets, preventing the concentration of retail activities at a single location, and placing caps on the size of retail tenancies and the overall gross floor area of retail in order to not adversely affect the role, function and amenity of the Point Chevalier and Mount Albert town centres | Not directly related to the ITA |
| I334.3(31) | Apply the subdivision controls of the zoning to the subsequent subdivision of the precinct or sub-precinct, subject to that subdivision also meeting the requirements of the precinct plan. | Not directly related to the ITA |

| Numbering | Description | Compliance |
|---|---|---|
| I334.3(32) | Provide for the range of healthcare and related accessory activities of the Mason Clinic in sub-precinct A | Not directly related to the ITA |
| I334.3(33) | Enable detailed site-specific planning of the Mason Clinic to reflect how the healthcare/hospital facility will be used and developed in sub-precinct A | Not directly related to the ITA |
| I334.3(34) | Limit the scale of accessory activities so they do not undermine the role of the precinct or result in adverse traffic effects, but still meet the requirements of those who work, live or use services and activities in this sub-precinct A | Not directly related to the ITA |
| I334.3(35) | Provide for the range of light manufacturing and servicing activities associated with the commercial laundry service for sub-precinct B | Not directly related to the ITA |
| I334.3(36) | Enable detailed site-specific planning of the commercial laundry service to reflect how the facility will be used and developed in sub-precinct B | Not directly related to the ITA |
| I334.3(37) | Limit the scale of accessory activities so they do not undermine the role of the sub-precinct B or result in adverse traffic effects, but still meet the requirements of those who work or use services and activities in this sub-precinct | Not directly related to the ITA |
| I334.3(38) | Recognise that should the commercial laundry service and associated activities on this sub-precinct B relocate from Wairaka, then the activities and controls of the Wairaka Precinct would apply | Will comply |
| I334.3(39) | Provide a broad range of residential activities adjacent to the Oakley Creek and residential neighbourhoods to the south of the sub-precinct C | Not directly related to the ITA |
| I334.3(40) | Provide quality dwellings which face west across Oakley Creek, providing passive surveillance of the public lands within Oakley Creek Valley and sub-precinct C | Not directly related to the ITA |
| **Standards** | | |
| I334.6.1(1) | Where floodlights are located adjacent to a residential zone, the hours of operation must not extend beyond:<br>(a) 10pm Monday to Saturday; and<br>(b) 7.30pm Sunday and Public Holidays. | Not directly related to the ITA |
| I334.6.1(2) | Floodlights must comply with the lighting standards in E24.6 Auckland-wide Standards – Lighting. | Not directly related to the ITA |
| I334.6.2(1) | The following thresholds apply in this precinct:<br>(a) The total gross floor area of retail (including food and beverage and supermarket) must not exceed 6500m2 for the whole precinct:<br>(b) The total gross floor area of retail (including food and beverage) within the Business - Mixed Use Zone must not exceed 4500m2; and<br>(c) The total gross floor area of retail (including food and beverage) within the Special Purpose - Tertiary Education Zone must not exceed 3000m2. | (a) Complies – no (or no threshold-exceeding) development of this type assumed in this ITA. Assumptions include existing uses of this type only<br>(b) See a) above<br>(c) See a) above |

| Numbering | Description | Compliance |
|---|---|---|
| I334.6.2(2) | The total gross floor area of retail (including food and beverage) in the Historic Heritage Place must not exceed 1000 m2 subject to Standard I334.6.2(1)(a) above | No such retail assumed in the ITA / in the ITA timeframes |
| I334.6.2(3) | All retail activities adjacent within 100m of to the supermarket must not exceed 1200m2 | No such activity assumed in the ITA |
| I334.6.2(4) | Any supermarket, adjacent to and accessed from Farm Road, must not have vehicle access or parking directly off Carrington Road | No such activity assumed in the ITA |
| I334.6.3(1) | All subdivision and development of the land in the precinct must be consistent with the approved stormwater management plan. | Not directly related to the ITA |
| I334.6.4(1) | Standards in the table below apply rather than underlying zone heights unless specified. Buildings must not exceed the heights as set out below: *[TABLE OMITTED IN ITA]* | Not directly related to the ITA |
| I334.6.5(1) | At least 20 per cent of a site within the precinct must be landscaped, provided that the area of landscaping may be proportionately reduced by any required common areas of landscaping within the zone approved by the Council and protected by consent conditions. | Not directly related to the ITA |
| I334.6.6(1) | Buildings on land within Sub-precinct C adjoining residential zoned land outside the precinct and to the south must be set back a minimum width of 5m from the external precinct boundary. Planting requirements of Standards H13.6.5 and H13.6.6 Business - Mixed Use Zone apply | Not directly related to the ITA |
| I334.6.6(2) | Buildings on land adjoining Open Space - Conversation zoned land outside the precinct must be set back a minimum width of 10m from the external precinct boundary. Planting requirements of Standards H13.6.5 and H13.6.6 Business - Mixed Use Zone apply | Not directly related to the ITA |
| I334.6.6(3) | Buildings on land fronting Carrington Road must be set back a minimum width of 28.2m when measured from the eastern edge of the Carrington Road reserve as at 1 November 2015. This setback area may be used for walkways, cycleways, public transport facilities, site access, street furniture, outdoor dining and cafes. Other areas within the 28.2m not used for these activities must be landscaped. This setback does not apply once the road widening affecting the Wairaka Precinct Carrington Road frontage has been vested in the Auckland Council | Not directly related to the ITA |
| I334.6.7(1) | In addition to any notable tree, Subject to Standard I334.6.7(2) below, the following trees identified in I334.11.2 Precinct plan 2 – protected trees and in Table I334.6.7.1 below must not be altered, removed or have works undertaken within the dripline except as set out in I334.6.7(2) below. Trees located within an existing or future road-widening area along Carrington Road frontage are not subject to this control. | Not directly related to the ITA |

| Numbering | Description | Compliance |
|---|---|---|
| I334.6.7(2) | Tree works to the trees identified below must be carried out in accordance with all of the provisions applying to Notable Trees in D13 Notable Tree Overlay, with the exception that up to 20 per cent of live growth may be removed in any one year. *[TABLE OMITTED IN ITA]* | Not directly related to the ITA |
| I334.6.8(1) | The primary traffic access to the precinct must be from Carrington Road at locations shown on the Precinct Plan | Complies |
| I334.6.8(2) | Any retail (including food and beverage) fronting the southern bus node, must not have vehicle access directly off Carrington Road | No such activity assumed in the ITA |
| I334.6.9(1) | No parking is required for activities located within the scheduled heritage building other than for the provision of loading requirements | Will comply. No development plans within the heritage building (Unitec Hospital) are assumed within the ITA / ITA timeframes |
| I334.6.9(2) | There must be no parking provided at the bus node for retail activities | No such activity assumed in the ITA |

# 8. Conclusions

In summary, and as described in this assessment, the proposed development of the Precinct will comply with the Precinct objectives, policies and rules as set out in the Unitary Plan.

Furthermore, it will form a best practice example of integrating transport and land use in a suburban setting, and support Auckland's need for more residential development with reduced region-wide transport demands via shorter average trip distances and greater ability to use non-car modes than in comparable developments further away from the centre of the city. This allows more development to be supported by putting less demand on the mutually used transport infrastructure.

The future Precinct is envisioned and committed to providing a transport environment within it, and a network integration to the outside, which support walking, cycling, public transport use and micro-mobility modes, provide a high level of road safety, and discourage reliance on private cars.

Traffic modelling undertaken as part of this assessment shows that, even with reduced private vehicle trip generation, it is not feasible to provide a large new residential development without added private vehicle congestion on the surrounding transport network. However, the proposed upgrades will significantly reduce external impacts compared to a "classic" car-centric suburban development model. At the same time, assumed changes will significantly increase people transport capacity on key corridors such as Carrington Road, by improving safety and convenience for active modes, and improving public transport reliability and journey times. Further upgrades in this regard above and beyond the ITA assumptions are considered the most realistic way of improving transport conditions.

To maximise the transport and land use-integration, the proposed Carrington Road Upgrade has been identified as the key external project on which the landowners and developers of the Precinct and authorities should cooperate on, and where landowners can ensure, by allowing AT to acquire the required land for widening, that the project is much more readily deliverable than in typical suburban environments.

In regards to longer-term further development in the Precinct (beyond the timeframes of this ITA), it is likely that further strategic change would be the most suitable way to enable this, such as significant public transport improvements along State Highway 16 and arterial roads such as Great North Road and New North Road, as well as an even stronger focus on reducing car parking rates per dwelling.

# Appendices

# Appendix A CAS List

## Mt Albert

**Saved sites**

Mt Albert

**Crash severity**

Fatal Crash, Serious Crash, Minor Crash, Non-Injury Crash

**Crash year**

2015 — 2020

## Plain English report

**189 results from your query.**

Showing 20 100 1000 results at once.

1-189 of 189

| Crash road | Distance | Direction | Side road | ID | Date | Day of week | Time | Description of events | Crash factors | Surface condition | Natural light | Weather | Junction | Control | Crash count fatal | Crash count severe | Crash count minor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CARRINGTON RD** | 162m | S | FIFTH AVENUE | 201968284 | 22/05/2019 | Wed | 18:23 | Ute1 NDB on Carrington Rd lost control but did not leave the road, Ute1 hit bus at bus stop | UTE1, alcohol test above limit or test refused, other inattentive | Dry | Dark | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **CARRINGTON RD** | | I | GREAT NORTH ROAD | 201976182 | 01/08/2019 | Thu | 12:45 | Car/Wagon1 DIRN on CARRINGTON RD hit rear end of Car/Wagon2 stop/slow for queue | CAR/WAGON1, other inattentive | Null | Overcast | Light rain | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **CARRINGTON RD** | | I | NEW NORTH ROAD | 201897728 | 08/08/2018 | Wed | 07:10 | Car/Wagon1 DIRN on CARRINGTON RD changing lanes to left hit Car/Wagon2 | CAR/WAGON1, too far left | Null | Unknown | Null | Nil (Default) | Unknown | 0 | 0 | 0 |
| **CARRINGTON RD** | | I | NEW NORTH ROAD | 201895886 | 28/11/2018 | Wed | 15:20 | Truck1 NDB on NEW NORTH ROAD overtaking Car/Wagon2 | TRUCK1, too far left | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **CARRINGTON RD** | | I | PROSPERO TERRACE | 201977706 | 13/08/2019 | Tue | 17:18 | Bus1 SDB on CARRINGTON ROAD, MOUNT ALBERT, AUCKLAND hit rear end of Car/Wagon2 stop/slow for signals | CAR/WAGON2, alcohol test below limit BUS1, other inattentive, wrong pedal/foot slipped | Wet | Dark | Light rain | Nil (Default) | Unknown | 0 | 0 | 0 |
| **CARRINGTON RD** | 60m | N | SEAVIEW TERRACE | 201967987 | 15/09/2019 | Sun | 13:19 | Car/Wagon1 NDB on Carrington road hit Car/Wagon2 merging from the left | CAR/WAGON1, drugs suspected, speed on straight CAR/WAGON2, did not check/notice another party from other dirn, failed to give way at priority traffic control | Dry | Bright sun | Fine | T Junction | Give way | 0 | 0 | 1 |

| Crash road | Distance | Direction | Side road | ID | Date | Day of week | Time | Description of events | Crash factors | Surface condition | Natural light | Weather | Junction | Control | Crash count fatal | Crash count severe | Crash count minor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CARRINGTON RD** | | I | STUDHOLME ST | 2018100346 | 26/11/2018 | Mon | 12:45 | Car/Wagon1 NDB on Carrington Road turning right hit Car/Wagon2 turning right into AXROAD | CAR/WAGON2, failed to give way at priority traffic control CAR/WAGON1, turned right from incorrect lane | Dry | Overcast | Fine | T Junction | Stop | 0 | 0 | 0 |
| **CARRINGTON RD** | 36m | S | SUTHERLAND ROAD | 201951487 | 12/03/2019 | Tue | 08:20 | SUV1 NDB on Carrington rd hit Cyclist2 (Age 42) turning right against | SUV1, alcohol test below limit, did not check/notice another party from other dirn, failed to notice signs | Dry | Overcast | Fine | Nil (Default) | Unknown | 0 | 1 | 0 |
| **CARRINGTON RD** | 30m | N | SUTHERLAND ROAD | 201963292 | 07/08/2019 | Wed | 08:45 | Car/Wagon1 SDB on CARRINGTON ROAD, POINT CHEVALIER, AUCKLAND hit Cyclist2 (Age 32) turning right against | CAR/WAGON1, did not check/notice another party from other dirn CYCLE2, driving or riding in pedestrian space | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 1 | 0 |
| **CARRINGTON RD** | | I | WILLCOTT STREET | 201970104 | 07/06/2019 | Fri | 16:30 | Car/Wagon1 SDB on CARRINGTON ROAD hit Car/Wagon2 turning right onto AXROAD from the left, Car/Wagon1 hit retaining wall | CAR/WAGON1, alcohol test below limit CAR/WAGON2, alcohol test below limit, did not check/notice another party from other dirn, failed to give way at priority traffic control | Dry | Overcast | Fine | T Junction | Give way | 0 | 0 | 0 |
| **CARRINGTON ROAD** | 0m | | | 201517038 | 16/09/2015 | Wed | 16:35 | Motorcycle1 NDB on CARRINGTON ROAD hit Car/Wagon2 turning right onto AXROAD from the left | MOTORCYCLE1, other inattentive, travelled straight ahead from turning lane or flus CAR/WAGON2, failed to give way turning to non-turning traffic, ENV: entering or leaving other commercial | Dry | Overcast | Fine | Driveway | Stop | 0 | 1 | 0 |
| **CARRINGTON ROAD** | 0m | | | 201544924 | 26/08/2015 | Wed | 08:30 | Cycle1 SDB on CARRINGTON ROAD sideswiped by Car/Wagon2 SDB on CARRINGTON ROAD turning left | CAR/WAGON2, did not check/notice another party behind, new driver/under instruction | Dry | Bright sun | Fine | T Junction | Traffic Signals | 0 | 0 | 0 |
| **CARRINGTON ROAD** | 0m | | | 201736682 | 19/04/2017 | Wed | 18:40 | Car/Wagon1 SDB on CARRINGTON ROAD hit rear end of Car/Wagon2 stop/slow for signals | CAR/WAGON1, following too closely | Dry | Dark | Fine | T Junction | Traffic Signals | 0 | 0 | 0 |
| **CARRINGTON ROAD** | 0m | | | 201743156 | 15/06/2017 | Thu | 22:00 | Car/Wagon1 NDB on Carrington Rd hit Car/Wagon2 turning right onto AXROAD from the left | CAR/WAGON1, did not stop at steady red light | Dry | Dark | Fine | T Junction | Traffic Signals | 0 | 0 | 0 |
| **CARRINGTON ROAD** | 100m | N | | 201545288 | 24/08/2015 | Mon | 08:45 | Moped1 NDB on CARRINGTON ROAD sideswiped by Car/Wagon2 NDB on CARRINGTON ROAD turning left | MOPED1, other wrong lane or position CAR/WAGON2, did not check/notice another party behind, other inattentive, ENV: entering or leaving car parking building/area | Dry | Bright sun | Fine | Driveway | Unknown | 0 | 0 | 0 |

| Crash road | Distance | Direction | Side road | ID | Date | Day of week | Time | Description of events | Crash factors | Surface condition | Natural light | Weather | Junction | Control | Crash count fatal | Crash count severe | Crash count minor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CARRINGTON ROAD** | 0m | | | 201541410 | 04/05/2015 | Mon | 12:40 | Car/Wagon1 NDB on CARRINGTON ROAD hit Car/Wagon2 turning right onto AXROAD from the left | CAR/WAGON2, did not stop at steady red light CAR/WAGON1, did not stop at steady red light, ENV: entering or leaving other commercial | Dry | Bright sun | Fine | Driveway | Traffic Signals | 0 | 0 | 0 |
| **CARRINGTON ROAD** | 110m | N | | 201611954 | 18/04/2016 | Mon | 16:08 | Car/Wagon1 SDB on CARRINGTON ROAD hit rear end of Truck2 stop/slow for queue | CAR/WAGON1, wrong pedal/foot slipped | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 1 |
| **CARRINGTON ROAD** | 20m | S | | 201611965 | 05/04/2016 | Tue | 19:10 | Car/Wagon2 turning right hit by oncoming Cycle1 NDB on CARRINGTON ROAD | CAR/WAGON2, did not check/notice another party from other dirn, failed to give way turning to non-turning traffic | Dry | Dark | Fine | Driveway | Nil | 0 | 0 | 1 |
| **CARRINGTON ROAD** | 0m | | | 201750144 | 19/09/2017 | Tue | 13:15 | Car/Wagon1 NDB on CARRINGTON ROAD hit PEDESTRIAN crossing road from right side | PEDESTRIAN2, pedestrian running across, heedless of traffic | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **CARRINGTON ROAD** | 100m | N | BENFIELD AVENUE | 201715129 | 28/06/2017 | Wed | 09:30 | Car/Wagon1 NDB on CARRINGTON ROAD hit SUV2 U-turning from same direction of travel | SUV2, failed to give way turning to non-turning traffic, windws/helmet/glsses misted\dirty, wipers useless | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 1 |
| **CARRINGTON ROAD** | | I | COUNSEL TERRACE | 201655240 | 25/11/2016 | Fri | 17:30 | Car/Wagon2 turning right hit by oncoming Motorcycle1 SDB on CARRINGTON ROAD | CAR/WAGON2, did not check/notice another party from other dirn, failed to give way when waved through by other dri MOTORCYCLE1, motor vehicle in cycle lane | Null | Overcast | Null | T Junction | Give way | 0 | 0 | 0 |
| **CARRINGTON ROAD** | | I | FARM ROAD | 201547529 | 22/09/2015 | Tue | 16:00 | Car/Wagon1 SDB on CARRINGTON ROAD hit rear end of Car/Wagon2 stop/slow for signals | CAR/WAGON1, failed to notice car slowing, stopping/stationary | Dry | Overcast | Fine | T Junction | Traffic Signals | 0 | 0 | 0 |
| **CARRINGTON ROAD** | 15m | S | FARM ROAD | 201644364 | 28/07/2016 | Thu | 09:00 | Car/Wagon1 NDB on CARRINGTON ROAD hit rear end of Car/Wagon2 stop/slow for queue | CAR/WAGON1, following too closely | Dry | Bright sun | Mist or Fog | Nil (Default) | Unknown | 0 | 0 | 0 |
| **CARRINGTON ROAD** | 110m | S | FIFTH AVENUE | 201742518 | 28/06/2017 | Wed | 18:00 | Car/Wagon1 NDB on Carrington Road hit rear end of Car/Wagon2 stop/slow for queue | CAR/WAGON1, failed to notice car slowing, stopping/stationary, following too closely | Dry | Dark | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **CARRINGTON ROAD** | | I | FIFTH AVENUE | 201745528 | 26/07/2017 | Wed | 18:30 | Car/Wagon1 NDB on CARRINGTON ROAD hit rear end of Car/Wagon2 stop/slow for queue | CAR/WAGON1, failed to notice car slowing, stopping/stationary | Dry | Dark | Null | T Junction | Give way | 0 | 0 | 0 |

| Crash road | Distance | Direction | Side road | ID | Date | Day of week | Time | Description of events | Crash factors | Surface condition | Natural light | Weather | Junction | Control | Crash count fatal | Crash count severe | Crash count minor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CARRINGTON ROAD** | 10m | N | FONTENOY ST | 201510067 | 06/01/2015 | Tue | 12:50 | Car/Wagon1 NDB on CARRINGTON ROAD hit Car/Wagon2 crossing at right angle from right | CAR/WAGON1, swerved to avoid vehicle CAR/WAGON2, failed to give way entering roadway from driveway, misjudged another vehicle, new driver/under instruction, ENV: entering or leaving other commercial | Dry | Bright sun | Fine | Driveway | Unknown | 0 | 0 | 2 |
| **CARRINGTON ROAD** | | I | FONTENOY ST | 201649523 | 24/09/2016 | Sat | 23:45 | Van1 NDB on CARRINGTON ROAD hit Car/Wagon2 merging from the right | CAR/WAGON2, failed to give way at priority traffic control | Wet | Dark | Light rain | T Junction | Give way | 0 | 0 | 0 |
| **CARRINGTON ROAD** | | I | FONTENOY ST | 201734040 | 07/03/2017 | Tue | 15:35 | Cycle1 SDB on CARRINGTON ROAD sideswiped by Truck2 SDB on CARRINGTON ROAD turning left | TRUCK2, did not check/notice another party behind, failed to give way turning to non-turning traffic | Wet | Overcast | Fine | T Junction | Give way | 0 | 0 | 0 |
| **CARRINGTON ROAD** | 300m | S | GREAT NORTH ROAD | 201545026 | 21/08/2015 | Fri | 12:20 | Car/Wagon1 NDB on CARRINGTON ROAD hit rear end of Car/Wagon2 stop/slow for queue | CAR/WAGON1, following too closely CAR/WAGON2, suddenly braked | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **CARRINGTON ROAD** | | I | GREAT NORTH ROAD | 201736762 | 30/04/2017 | Sun | 09:15 | Car/Wagon1 NDB on CARRINGTON ROAD hit rear of left turning Car/Wagon2 NDB on CARRINGTON ROAD | CAR/WAGON1, following too closely | Wet | Overcast | Light rain | Crossroads | Give way | 0 | 0 | 0 |
| **CARRINGTON ROAD** | | I | GREAT NORTH ROAD | 201547598 | 05/10/2015 | Mon | 13:30 | Car/Wagon1 NDB on CARRINGTON ROAD hit rear end of Car/Wagon2 stop/slow for signals | CAR/WAGON1, failed to notice car slowing, stopping/stationary | Dry | Bright sun | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **CARRINGTON ROAD** | 30m | S | GREAT NORTH ROAD | 201738754 | 13/05/2017 | Sat | 23:54 | Van1 NDB on Carrington road hit rear end of Car/Wagon2 stop/slow for queue | VAN1, alcohol test above limit or test refused | Dry | Dark | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **CARRINGTON ROAD** | 30m | S | GREAT NORTH ROAD | 201644535 | 28/07/2016 | Thu | 17:50 | Car/Wagon1 NDB on CARRINGTON ROAD hit rear end of Car/Wagon2 stopped/moving slowly | CAR/WAGON1, following too closely, new driver/under instruction | Wet | Dark | Light rain | Nil (Default) | Unknown | 0 | 0 | 0 |
| **CARRINGTON ROAD** | | I | GREAT NORTH ROAD | 201535421 | 05/06/2015 | Fri | 18:45 | Car/Wagon1 SDB on CARRINGTON ROAD changing lanes to left hit Car/Wagon2 | CAR/WAGON2, did not check/notice another party behind | Wet | Dark | Light rain | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **CARRINGTON ROAD** | 5m | S | GREAT NORTH ROAD | 201538965 | 02/06/2015 | Tue | 18:30 | Car/Wagon1 NDB on CARRINGTON ROAD hit rear end of Car/Wagon2 stop/slow for signals | CAR/WAGON1, failed to notice car slowing, stopping/stationary, ENV: heavy rain | Wet | Dark | Heavy rain | Crossroads | Traffic Signals | 0 | 0 | 0 |

| Crash road | Distance | Direction | Side road | ID | Date | Day of week | Time | Description of events | Crash factors | Surface condition | Natural light | Weather | Junction | Control | Crash count fatal | Crash count severe | Crash count minor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CARRINGTON ROAD** | | I | NEW NORTH ROAD | 201713411 | 07/03/2017 | Tue | 07:30 | Car/Wagon1 EDB on Carrington Rd / Mt Albert Rd intersection hit rear of Cyclist2 (Age 42) EDB on Carrington Rd / Mt Albert Rd intersection turning right from centre line | CAR/WAGON1, misjudged another vehicle | Dry | Bright sun | Fine | Crossroads | Traffic Signals | 0 | 0 | 1 |
| **CARRINGTON ROAD** | 15m | S | PARR ROAD NORTH | 201640803 | 03/06/2016 | Fri | 14:00 | Car/Wagon1 NDB on CARRINGTON ROAD changing lanes to left hit Truck2 | CAR/WAGON1, cut in after overtaking | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **CARRINGTON ROAD** | | I | PROSPERO TERRACE | 201952041 | 19/03/2019 | Tue | 09:00 | SUV1 NDB on Carrington Road hit rear of Car/Wagon2 NDB on Carrington Road turning right from centre line | SUV1, alcohol test below limit, failed to notice car slowing, stopping/stationary, other attention diverted CAR/WAGON2, alcohol test below limit | Dry | Overcast | Fine | T Junction | Stop | 0 | 0 | 1 |
| **CARRINGTON ROAD** | 5m | N | PROSPERO TERRACE | 201534536 | 23/03/2015 | Mon | 13:10 | Van1 NDB on CARRINGTON ROAD lost control turning left, Van1 hit non specific kerb, non specific other | VAN1, lost control when turning, new driver/under instruction, wrong pedal/foot slipped, ENV: entering or leaving other commercial | Dry | Bright sun | Fine | Driveway | Nil | 0 | 0 | 0 |
| **CARRINGTON ROAD** | | I | PROSPERO TERRACE | 201634288 | 15/03/2016 | Tue | 07:40 | Car/Wagon1 NDB on CARRINGTON ROAD changing lanes to left hit Truck2 | CAR/WAGON1, did not check/notice another party behind, suddenly turned | Dry | Bright sun | Fine | T Junction | Nil | 0 | 0 | 0 |
| **CARRINGTON ROAD** | | I | PROSPERO TERRACE | 201612151 | 19/04/2016 | Tue | 17:44 | Car/Wagon2 turning right hit by oncoming Cycle1 SDB on CARRINGTON ROAD | CAR/WAGON2, did not check/notice another party from other dirn, failed to give way at priority traffic control | Dry | Overcast | Fine | T Junction | Nil | 0 | 0 | 1 |
| **CARRINGTON ROAD** | 50m | N | SEAVIEW TERRACE | 201647218 | 07/09/2016 | Wed | 14:20 | Car/Wagon1 NDB on CARRINGTON ROAD hit rear end of Car/Wagon2 stop/slow for PEDESTRIAN | CAR/WAGON1, other inattentive | Dry | Overcast | Fine | Driveway | Unknown | 0 | 0 | 0 |
| **CARRINGTON ROAD** | 60m | S | SEAVIEW TERRACE | 201641922 | 22/06/2016 | Wed | 12:45 | Car/Wagon1 SDB on CARRINGTON ROAD hit rear end of Car/Wagon2 stop/slow for queue | CAR/WAGON1, following too closely | Wet | Overcast | Heavy rain | Nil (Default) | Unknown | 0 | 0 | 0 |
| **CARRINGTON ROAD** | 40m | N | SEAVIEW TERRACE | 201636521 | 09/04/2016 | Sat | 21:15 | Car/Wagon1 NDB on CARRINGTON ROAD hit rear end of Car/Wagon2 stop/slow for signals | CAR/WAGON1, alcohol test below limit, following too closely | Dry | Dark | Fine | T Junction | Traffic Signals | 0 | 0 | 0 |
| **CARRINGTON ROAD** | 20m | N | SEAVIEW TERRACE | 201840450 | 23/05/2018 | Wed | 16:45 | Van1 SDB on CARRINGTON ROAD hit rear end of Car/Wagon2 stopped/moving slowly | VAN1, following too closely | Dry | Overcast | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |

| Crash road | Distance | Direction | Side road | ID | Date | Day of week | Time | Description of events | Crash factors | Surface condition | Natural light | Weather | Junction | Control | Crash count fatal | Crash count severe | Crash count minor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CARRINGTON ROAD** | | I | SEAVIEW TERRACE | 201516949 | 02/07/2015 | Thu | 08:40 | Car/Wagon1 NDB on CARRINGTON ROAD turning right hit Pedestrian2 (Age 30) crossing SIDEROAD from left | CAR/WAGON1, new driver/under instruction, other did not see or look for other party, PEDESTRIAN2, other pedestrian crossing road | Dry | Bright sun | Fine | T Junction | Give way | 0 | 0 | 1 |
| **CARRINGTON ROAD** | | I | SEAVIEW TERRACE | 201519586 | 22/12/2015 | Tue | 15:43 | Cycle1 EDB on CARRINGTON ROAD hit Car/Wagon2 crossing at right angle from right | CYCLE1, driving or riding in pedestrian space CAR/WAGON2, other visibility limited, speed approaching a traffic control | Dry | Bright sun | Fine | T Junction | Stop | 0 | 0 | 1 |
| **CARRINGTON ROAD** | 50m | N | SEAVIEW TERRACE | 201642496 | 26/06/2016 | Sun | 00:48 | Car/Wagon1 NDB on CARRINGTON ROAD lost control; went off road to left, Car/Wagon1 hit non specific guard rail, non specific tree | CAR/WAGON1, lost control - road conditions, ENV: slippery road due to rain | Wet | Dark | Light rain | Nil (Default) | Unknown | 0 | 0 | 0 |
| **CARRINGTON ROAD** | 150m | N | SEGAR AVENUE | 201616312 | 23/09/2016 | Fri | 22:30 | Car/Wagon1 SDB on Carrington Rd lost control; went off road to left, Car/Wagon1 hit non specific pole | CAR/WAGON1, alcohol test above limit or test refused, too far left | Dry | Dark | Fine | Nil (Default) | Unknown | 0 | 1 | 0 |
| **CARRINGTON ROAD** | | I | SEGAR AVENUE | 201844796 | 20/07/2018 | Fri | 12:09 | Car/Wagon1 SDB on SAGER ROAD, MOUNT ALBERT, AUCKLAND hit Car/Wagon2 turning right onto AXROAD from the left | CAR/WAGON1, alcohol test below limit CAR/WAGON2, alcohol test below limit, failed to give way at priority traffic control | Dry | Bright sun | Fine | T Junction | Give way | 0 | 0 | 0 |
| **CARRINGTON ROAD** | 150m | S | SUTHERLAND ROAD | 201615480 | 25/08/2016 | Thu | 10:00 | Car/Wagon1 SDB on Carrington rd hit rear end of Motorcycle2 stopped/moving slowly | CAR/WAGON1, following too closely | Wet | Overcast | Heavy rain | Nil (Default) | Unknown | 0 | 0 | 1 |
| **CARRINGTON ROAD** | 40m | S | SUTHERLAND ROAD | 201619641 | 28/10/2016 | Fri | 07:30 | Car/Wagon1 NDB on Carrington Road hit Cyclist2 (Age 34) crossing | CAR/WAGON1, did not stop, other failed to give way | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 1 |
| **CARRINGTON ROAD** | 20m | S | SUTHERLAND ROAD | 201515087 | 26/05/2015 | Tue | 16:30 | SUV1 NDB on CARRINGTON ROAD hit Car/Wagon2 turning right onto AXROAD from the left | CAR/WAGON2, failed to give way entering roadway from driveway, ENV: other non-commercial | Wet | Overcast | Light rain | Driveway | Unknown | 0 | 0 | 1 |
| **CARRINGTON ROAD** | 40m | S | SUTHERLAND ROAD | 201712859 | 14/04/2017 | Fri | 14:45 | Car/Wagon1 SDB on Carrington road hit Pedestrian2 (Age 54) crossing road from right side | CAR/WAGON1, did not check/notice another party from other dirn, failed to give way to a pedestrian, PEDESTRIAN2, suddenly stepped onto pedestrian crossing | Wet | Overcast | Light rain | Nil (Default) | Unknown | 0 | 0 | 1 |
| **CARRINGTON ROAD** | 40m | S | SUTHERLAND ROAD | 201741262 | 29/05/2017 | Mon | 15:12 | Car/Wagon1 SDB on CARRINGTON ROAD hit rear end of VEHB stop/slow for PEDESTRIAN | CYCLE2, driving or riding in pedestrian space | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |

| Crash road | Distance | Direction | Side road | ID | Date | Day of week | Time | Description of events | Crash factors | Surface condition | Natural light | Weather | Junction | Control | Crash count fatal | Crash count severe | Crash count minor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CARRINGTON ROAD** | | I | SUTHERLAND ROAD | 201833922 | 27/02/2018 | Tue | 11:38 | Car/Wagon1 WDB on CARRINGTON ROAD and/or Car/Wagon2 cut corner/swung wide and collided head on | CAR/WAGON1, swung wide at intersection CAR/WAGON2, cutting corner at intersection | Dry | Bright sun | Null | T Junction | Give way | 0 | 0 | 0 |
| **CARRINGTON ROAD** | 40m | S | SUTHERLAND ROAD | 201614530 | 17/06/2016 | Fri | 12:45 | Car/Wagon1 NDB on CARRINGTON ROAD hit Pedestrian2 (Age 21) crossing road from left side | CAR/WAGON1, failed to give way to a pedestrian, failed to see another party wearing dark clothing | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 1 |
| **CARRINGTON ROAD** | 50m | S | SUTHERLAND ROAD | 201639294 | 28/05/2016 | Sat | 11:00 | Van1 NDB on CARRINGTON ROAD hit rear end of Car/Wagon2 stop/slow for PEDESTRIAN | VAN1, following too closely | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **CARRINGTON ROAD** | 80m | S | SUTHERLAND ROAD | 201714630 | 25/05/2017 | Thu | 09:15 | Car/Wagon1 SDB on Carrington Rd hit Cyclist2 (Age 34) turning right against | CYCLE2, other misjudged speed, distance or position CAR/WAGON1, did not check/notice another party from other dirn | Wet | Overcast | Mist or Fog | Nil (Default) | Unknown | 0 | 1 | 0 |
| **CARRINGTON ROAD** | 60m | S | TASMAN AVENUE | 201649118 | 02/10/2016 | Sun | 15:30 | Car/Wagon1 SDB on Carrington Road hit VEHB manoeuvring, Car/Wagon1 hit non specific pole | CAR/WAGON1, new driver/under instruction, too far left | Wet | Overcast | Light rain | Nil (Default) | Unknown | 0 | 0 | 0 |
| **CARRINGTON ROAD** | | I | WOODWARD ROAD | 201617624 | 17/11/2016 | Thu | 11:25 | SUV1 NDB on Carrington road hit Car/Wagon2 turning right onto AXROAD from the left | SUV1, did not stop at steady red light, other attention diverted | Wet | Bright sun | Null | T Junction | Traffic Signals | 0 | 0 | 1 |
| **CARRINGTON ROAD** | | I | WOODWARD ROAD | 201541274 | 05/07/2015 | Sun | 22:17 | Car/Wagon1 SDB on CARRINGTON ROAD hit rear of Car/Wagon2 SDB on CARRINGTON ROAD turning right from centre line | CAR/WAGON1, alcohol test above limit or test refused, failed to notice indication of vehicle in front | Dry | Dark | Fine | T Junction | Give way | 0 | 0 | 0 |
| **CARRINGTON ROAD** | | I | WOODWARD ROAD | 201518867 | 19/11/2015 | Thu | 13:40 | Truck2 turning right hit by oncoming Car/Wagon1 NDB on CARRINGTON ROAD | TRUCK2, did not check/notice another party from other dirn, failed to give way turning to non-turning traffic | Dry | Overcast | Fine | T Junction | Give way | 0 | 0 | 1 |
| **CARRINGTON ROAD** | 40m | N | WOODWARD ROAD | 201539369 | 27/05/2015 | Wed | 22:00 | Car/Wagon1 NDB on CARRINGTON ROAD lost control; went off road to right, Car/Wagon1 hit non specific fence | CAR/WAGON1, alcohol suspected, other lost control, speed on straight, stolen vehicle | Dry | Dark | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **CARRINGTON ROAD** | | I | WOODWARD ROAD | 201740804 | 24/05/2017 | Wed | 18:15 | Car/Wagon1 SDB on CARRINGTON ROAD hit rear of Car/Wagon2 SDB on CARRINGTON ROAD turning right from centre line | CAR/WAGON1, wrong way in one way street, motorway or roundabou | Wet | Dark | Heavy rain | T Junction | Give way | 0 | 0 | 0 |

| Crash road | Distance | Direction | Side road | ID | Date | Day of week | Time | Description of events | Crash factors | Surface condition | Natural light | Weather | Junction | Control | Crash count fatal | Crash count severe | Crash count minor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CARRINGTON ROAD** | | I | WOODWARD ROAD | 201512160 | 27/02/2015 | Fri | 10:30 | Bus2 turning right hit by oncoming Cycle1 NDB on CARRINGTON ROAD | BUS2, did not check/notice another party from other dirn, failed to give way turning to non-turning traffic | Wet | Overcast | Fine | T Junction | Give way | 0 | 0 | 1 |
| **CARRINGTON ROAD** | | I | WOODWARD ROAD | 201657444 | 07/07/2016 | Thu | 15:23 | SUV2 turning right hit by oncoming Cycle1 NDB on Carrington Road | SUV2, failed to give way turning to non-turning traffic | Wet | Overcast | Light rain | T Junction | Give way | 0 | 0 | 0 |
| **FAIRLEIGH AVENUE** | 100m | E | JERRAM ST | 201617698 | 07/11/2016 | Mon | 14:57 | Car/Wagon1 EDB on Fairleigh avenue, Mt Albert hit parked veh, Car/Wagon1 hit non specific parked | CAR/WAGON1, alcohol suspected, drugs suspected | Dry | Overcast | Fine | Nil (Default) | Unknown | 0 | 1 | 0 |
| **FARM ROAD** | 50m | W | CARRINGTON ROAD | 201543802 | 04/08/2015 | Tue | 13:15 | Car/Wagon1 WDB on FARM ROAD hit Car/Wagon2 merging from the right | CAR/WAGON2, failed to give way entering roadway from driveway, ENV: other non-commercial | Dry | Bright sun | Fine | Driveway | Unknown | 0 | 0 | 0 |
| **FIFTH AVENUE** | 40m | E | CARRINGTON ROAD | 201518216 | 23/08/2015 | Sun | 14:00 | Car/Wagon1 EDB on FIFTH AVENUE hit rear of Car/Wagon2 EDB on FIFTH AVENUE turning right from left side | CAR/WAGON1, failed to notice indication of vehicle in front, overtaking at a junction, ENV: entering or leaving private house / farm | Dry | Bright sun | Fine | Driveway | Nil | 0 | 0 | 2 |
| **GREAT NORTH RD** | 42m | N | CARRINGTON ROAD | 201961443 | 11/03/2019 | Mon | 15:45 | Truck1 SDB on GREAT NORTH RD overtaking Car/Wagon2 | CAR/WAGON2, alcohol test below limit TRUCK1, alcohol test below limit, too far left | Dry | Overcast | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **GREAT NORTH RD (CWC)** | | I | CARRINGTON RD | 201897789 | 14/08/2018 | Tue | 13:55 | Car/Wagon1 DIRN on GREAT NORTH RD (CWC) hit rear end of Car/Wagon2 stop/slow for signals | CAR/WAGON1, following too closely | Dry | Overcast | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **GREAT NORTH RD (CWC)** | | I | CARRINGTON RD | 201954413 | 18/01/2019 | Fri | 07:34 | Ute1 EDB on Great North Road hit rear end of Car/Wagon2 stop/slow for signals | UTE1, failed to notice car slowing, stopping/stationary | Dry | Overcast | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **GREAT NORTH RD (CWC)** | 25m | E | POINT CHEVALIER ROAD | 201961625 | 13/03/2019 | Wed | 14:47 | SUV1 WDB on GREAT NORTH ROAD hit SUV2 manoeuvring | SUV1, misjudged own vehicle | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **GREAT NORTH ROAD** | | I | CARRINGTON ROAD | 201833973 | 08/03/2018 | Thu | 10:38 | load or trailer from Truck1 EDB on Carrington Road hit VEHB | TRUCK1, alcohol test below limit, load, speed entering corner/curve | Dry | Bright sun | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **GREAT NORTH ROAD** | | I | CARRINGTON ROAD | 201834810 | 03/03/2018 | Sat | 21:10 | Car/Wagon1 WDB on Great north road hit Car/Wagon2 crossing at right angle from right | CAR/WAGON1, alcohol test below limit, did not stop at steady red light CAR/WAGON2, alcohol test below limit | Dry | Dark | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **GREAT NORTH ROAD** | 30m | E | CARRINGTON ROAD | 201533425 | 07/02/2015 | Sat | 02:06 | Car/Wagon1 EDB on GREAT NORTH ROAD lost control; went off road to left, Car/Wagon1 hit non specific building, non specific street furniture, non specific traffic sign, | CAR/WAGON1, other lost control, speed on straight | Dry | Dark | Fine | Nil (Default) | Nil | 0 | 0 | 0 |

| Crash road | Distance | Direction | Side road | ID | Date | Day of week | Time | Description of events | Crash factors | Surface condition | Natural light | Weather | Junction | Control | Crash count fatal | Crash count severe | Crash count minor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **GREAT NORTH ROAD** | | I | CARRINGTON ROAD | 201551946 | 28/11/2015 | Sat | 17:00 | Car/Wagon1 EDB on GREAT NORTH ROAD lost control turning right, Car/Wagon1 hit non specific pole | CAR/WAGON1, lost control when turning, speed entering corner/curve | Wet | Overcast | Fine | Crossroads | Give way | 0 | 0 | 0 |
| **GREAT NORTH ROAD** | | I | CARRINGTON ROAD | 201545023 | 15/08/2015 | Sat | 15:00 | Car/Wagon1 NDB on GREAT NORTH ROAD hit Car/Wagon2 crossing at right angle from right | CAR/WAGON1, did not stop at steady red light | Wet | Overcast | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **GREAT NORTH ROAD** | | I | CARRINGTON ROAD | 201742810 | 19/06/2017 | Mon | 11:17 | Car/Wagon1 WDB on Great North Road changing lanes/overtaking to right hit Car/Wagon2 | CAR/WAGON1, did not check/notice another party from other dirn | Dry | Overcast | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **GREAT NORTH ROAD** | 10m | W | CARRINGTON ROAD | 201646043 | 16/08/2016 | Tue | 18:15 | Car/Wagon1 EDB on Great North Road hit rear end of Car/Wagon2 stop/slow for obstruction | CAR/WAGON2, alcohol test below limit CAR/WAGON1, other inattentive, other mechanical, parking brake failed/defective | Dry | Twilight | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **GREAT NORTH ROAD** | | I | CARRINGTON ROAD | 201712052 | 25/03/2017 | Sat | 16:24 | Car/Wagon1 WDB on Great north road hit SUV2 turning right onto AXROAD from the left | CAR/WAGON1, failed to give way at priority traffic control, failed to notice control | Dry | Bright sun | Fine | Crossroads | Traffic Signals | 0 | 0 | 2 |
| **GREAT NORTH ROAD** | 5m | W | POINT CHEVALIER ROAD | 201545418 | 11/08/2015 | Tue | 08:50 | Car/Wagon1 EDB on GREAT NORTH ROAD hit rear end of Car/Wagon2 stop/slow for signals | CAR/WAGON1, failed to notice car slowing, stopping/stationary | Null | Overcast | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **GREAT NORTH ROAD** | | I | POINT CHEVALIER ROAD | 201843230 | 22/06/2018 | Fri | 18:00 | Car/Wagon2 turning right hit by oncoming SUV1 EDB on GREAT NORTH ROAD | SUV1, did not stop at steady red light | Dry | Overcast | Null | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **MOUNT ALBERT ROAD** | | I | NEW NORTH ROAD | 201533096 | 17/03/2015 | Tue | 14:31 | Car/Wagon1 NDB on MOUNT ALBERT ROAD hit rear end of Truck2 stop/slow for signals | CAR/WAGON1, following too closely, speed on straight | Dry | Bright sun | Fine | Multileg | Traffic Signals | 0 | 0 | 0 |
| **MOUNT ALBERT ROAD** | 100m | S | NEW NORTH ROAD | 201544917 | 01/09/2015 | Tue | 12:00 | Car/Wagon1 NDB on MOUNT ALBERT ROAD hit Car/Wagon2 turning right onto AXROAD from the left | CAR/WAGON2, didnt look/notice other party - visibility obstruc, failed to give way entering roadway from driveway, ENV: entering or leaving private house / farm, visibility limited by parked vehicle | Dry | Bright sun | Fine | Driveway | Unknown | 0 | 0 | 0 |
| **MOUNT ALBERT ROAD** | 30m | S | NEW NORTH ROAD | 201814036 | 19/05/2018 | Sat | 09:40 | Car/Wagon1 SDB on Mt Albert Rd hit Pedestrian2 (Age 13) crossing road from right side | CAR/WAGON1, alcohol test below limit, PEDESTRIAN2, pedestrian looking the wrong way, stepping out from behind vehicle | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 1 |
| **MOUNT ALBERT ROAD** | | I | NEW NORTH ROAD | 201817167 | 22/08/2018 | Wed | 08:54 | Car/Wagon1 SDB on NEW NORTH ROAD, MOUNT ALBERT, AUCKLAND hit Pedestrian2 (Age 52) crossing road | CAR/WAGON1, alcohol test below limit, did not check/notice another party from other dirn, PEDESTRIAN2, failed to see another party wearing dark clothing, pedestrian working on road | Dry | Overcast | Fine | Crossroads | Traffic Signals | 0 | 1 | 0 |

| Crash road | Distance | Direction | Side road | ID | Date | Day of week | Time | Description of events | Crash factors | Surface condition | Natural light | Weather | Junction | Control | Crash count fatal | Crash count severe | Crash count minor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MOUNT ALBERT ROAD** | 30m | S | NEW NORTH ROAD | 201976993 | 08/08/2019 | Thu | 11:35 | Car/Wagon1 NDB on Mount Albert Road hit rear end of Van2 stop/slow for queue | VAN2, alcohol test below limit CAR/WAGON1, alcohol suspected, drugs suspected, failed to notice car slowing, stopping/stationary VAN3, alcohol test below limit | Wet | Overcast | Light rain | Nil (Default) | Nil | 0 | 0 | 0 |
| **MT ALBERT RD** | 73m | S | NEW NORTH ROAD | 201895918 | 02/12/2018 | Sun | 15:45 | Car/Wagon1 NDB on MOUNT ALBERT ROAD hit Car/Wagon2 turning right onto AXROAD from the left | CAR/WAGON2, failed to give way entering roadway from driveway | Dry | Bright sun | Fine | Driveway | Nil | 0 | 0 | 0 |
| **MT ALBERT RD (SANDRINGHAM)** | | I | NEW NORTH ROAD | 201898719 | 16/10/2018 | Tue | 11:35 | Truck1 DIRN on MT ALBERT RD (SANDRINGHAM) changing lanes to left hit Car/Wagon2 | TRUCK1, too far left | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **NEW NORTH RD** | | I | CARRINGTON ROAD | 201899839 | 19/11/2018 | Mon | 15:10 | Bus1 SDB on NEW NORTH ROAD changing lanes/overtaking to right hit Car/Wagon2 | BUS1, alcohol test below limit, incorrect merging/diverging manoeuvre, other failed to give way CAR/WAGON2, alcohol test below limit | Dry | Overcast | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **NEW NORTH RD** | | I | RICHARDSON ROAD | 201971233 | 18/06/2019 | Tue | 07:00 | Car/Wagon1 NDB on NEW NORTH ROAD hit rear end of Car/Wagon2 stop/slow for signals | CAR/WAGON1, failed to notice car slowing, stopping/stationary | Dry | Dark | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **NEW NORTH RD** | 84m | S | WOODWARD ROAD | 201959114 | 15/02/2019 | Fri | 22:48 | Left scene1 DIRN on NEW NORTH RD changing lanes to left hit Car/Wagon2 | LEFT SCENE1, cut in after overtaking, speed on straight CAR/WAGON2, alcohol test below limit | Dry | Dark | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **NEW NORTH ROAD** | | I | CARRINGTON ROAD | 201655055 | 12/12/2016 | Mon | 13:53 | Car/Wagon1 NDB on new north rd overtaking Car/Wagon2 | CAR/WAGON1, too far left | Dry | Overcast | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **NEW NORTH ROAD** | 40m | E | CARRINGTON ROAD | 201816329 | 19/07/2018 | Thu | 17:40 | Car/Wagon1 WDB on NEW NORTH ROAD, MOUNT ALBERT, AUCKLAND hit Pedestrian2 (Age 21) crossing road from left side | PEDESTRIAN2, miscellaneous pedestrian, pedestrian walking across heedless of traffic | Dry | Dark | Fine | Nil (Default) | Unknown | 0 | 0 | 1 |
| **NEW NORTH ROAD** | 20m | E | CARRINGTON ROAD | 201553837 | 08/11/2015 | Sun | 15:45 | Car/Wagon1 EDB on NEW NORTH ROAD hit Car/Wagon2 parking/unparking | CAR/WAGON1, did not check/notice another party from other dirn | Dry | Overcast | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **NEW NORTH ROAD** | 20m | N | CARRINGTON ROAD | 201844294 | 20/06/2018 | Wed | 17:18 | Car/Wagon1 NDB on NEW NORTH ROAD hit rear end of Van2 stop/slow for queue | CAR/WAGON1, failed to notice car slowing, stopping/stationary | Wet | Dark | Null | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **NEW NORTH ROAD** | | I | CARRINGTON ROAD | 201512784 | 18/05/2015 | Mon | 21:14 | Car/Wagon1 WDB on NEW NORTH ROAD hit Car/Wagon2 crossing at right angle from right | CAR/WAGON1, alcohol test below limit, did not stop at steady red light | Dry | Bright sun | Fine | Crossroads | Traffic Signals | 0 | 0 | 2 |
| **NEW NORTH ROAD** | 15m | S | CARRINGTON ROAD | 201654331 | 24/11/2016 | Thu | 17:15 | Car/Wagon1 NDB on NEW NORTH ROAD hit rear end of Van2 stop/slow for queue | CAR/WAGON1, attention diverted by navigation device, failed to notice car slowing, stopping/stationary | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |

| Crash road | Distance | Direction | Side road | ID | Date | Day of week | Time | Description of events | Crash factors | Surface condition | Natural light | Weather | Junction | Control | Crash count fatal | Crash count severe | Crash count minor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NEW NORTH ROAD** | 30m | N | CARRINGTON ROAD | 201741948 | 02/06/2017 | Fri | 07:15 | Car/Wagon1 SDB on NEW NORTH ROAD changing lanes/overtaking to right hit Car/Wagon2 | CAR/WAGON1, did not check/notice another party from other dirn | Dry | Bright sun | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **NEW NORTH ROAD** | 30m | S | CARRINGTON ROAD | 201534596 | 25/04/2015 | Sat | 15:05 | Car/Wagon1 EDB on NEW NORTH ROAD hit rear end of Car/Wagon2 stop/slow for queue | CAR/WAGON1, following too closely, other inattentive | Dry | Bright sun | Fine | Nil (Default) | Nil | 0 | 0 | 0 |
| **NEW NORTH ROAD** | | I | MOUNT ALBERT ROAD | 201730672 | 04/01/2017 | Wed | 17:45 | Car/Wagon2 turning right hit by oncoming Car/Wagon1 SDB on New North Road | CAR/WAGON2, did not stop at steady red light | Dry | Overcast | Fine | Multileg | Traffic Signals | 0 | 0 | 0 |
| **NEW NORTH ROAD** | | I | MOUNT ALBERT ROAD | 201848754 | 26/09/2018 | Wed | 06:20 | Car/Wagon1 NDB on NEW NORTH ROAD, MOUNT ALBERT, AUCKLAND hit Car/Wagon2 crossing at right angle from right | CAR/WAGON2, alcohol test below limit, did not stop at steady red light CAR/WAGON1, alcohol test below limit | Dry | Bright sun | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **NEW NORTH ROAD** | | I | MOUNT ALBERT ROAD | 201911047 | 01/01/2019 | Tue | 00:18 | Car/Wagon1 NDB on NEW NORTH ROAD hit rear end of Car/Wagon2 stop/slow for signals | CAR/WAGON1, following too closely, other inappropriate speed | Wet | Dark | Light rain | Crossroads | Traffic Signals | 0 | 0 | 1 |
| **NEW NORTH ROAD** | 30m | S | MOUNT ALBERT ROAD | 201743583 | 30/06/2017 | Fri | 14:15 | Bus1 NDB on NEW NORTH ROAD changing lanes to left hit Car/Wagon2 | BUS1, misjudged own vehicle | Dry | Bright sun | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **NEW NORTH ROAD** | 25m | S | MOUNT ALBERT ROAD | 201647856 | 18/08/2016 | Thu | 06:15 | Car/Wagon1 SDB on NEW NORTH ROAD hit Car/Wagon2 parking/unparking | CAR/WAGON2, did not check/notice another party behind | Dry | Dark | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **NEW NORTH ROAD** | | I | RICHARDSON ROAD | 201518090 | 13/11/2015 | Fri | 08:30 | Car/Wagon1 EDB on NEW NORTH ROAD hit rear end of Car/Wagon2 stop/slow for cross traffic | CAR/WAGON1, following too closely, other inattentive | Dry | Bright sun | Null | T Junction | Give way | 0 | 0 | 1 |
| **NEW NORTH ROAD** | | I | RICHARDSON ROAD | 201511840 | 15/03/2015 | Sun | 09:15 | passenger fell while boarding Truck1 | TRUCK1, intentionally leaving/boarding moving vehicle | Dry | Overcast | Fine | Crossroads | Traffic Signals | 0 | 1 | 0 |
| **NEW NORTH ROAD** | 110m | W | RICHARDSON ROAD | 201655128 | 13/12/2016 | Tue | 22:30 | Car/Wagon1 EDB on New North Rd hit Car/Wagon2 merging from the left , Car/Wagon2 hit non specific parked | CAR/WAGON2, failed to signal in time, misjudged own vehicle | Dry | Dark | Fine | Driveway | Nil | 0 | 0 | 0 |
| **NEW NORTH ROAD** | | I | RICHARDSON ROAD | 201737585 | 21/04/2017 | Fri | 17:20 | Car/Wagon1 NDB on New North Road changing lanes to left hit Car/Wagon2 | CAR/WAGON1, other vehicle controls | Dry | Overcast | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **NEW NORTH ROAD** | 10m | S | RICHARDSON ROAD | 201536679 | 24/05/2015 | Sun | 10:00 | Car/Wagon1 NDB on NEW NORTH ROAD hit rear end of Car/Wagon2 stop/slow for signals | CAR/WAGON1, following too closely | Wet | Overcast | Light rain | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **NEW NORTH ROAD** | 70m | W | RICHARDSON ROAD | 201635269 | 04/04/2016 | Mon | 09:20 | Truck1 NDB on NEW NORTH ROAD hit rear of left turning SUV2 NDB on NEW NORTH ROAD | SUV2, failed to signal in time TRUCK1, swerved to avoid vehicle | Dry | Bright sun | Fine | Driveway | Nil | 0 | 0 | 0 |

| Crash road | Distance | Direction | Side road | ID | Date | Day of week | Time | Description of events | Crash factors | Surface condition | Natural light | Weather | Junction | Control | Crash count fatal | Crash count severe | Crash count minor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NEW NORTH ROAD** | | I | RICHARDSON ROAD | 201755263 | 27/11/2017 | Mon | 09:15 | Car/Wagon1 NDB on New north road overtaking SUV2 | SUV2, too far right CAR/WAGON1, too far left | Dry | Overcast | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **NEW NORTH ROAD** | 60m | E | RICHARDSON ROAD | 201834374 | 10/03/2018 | Sat | 10:45 | Car/Wagon1 NDB on Nnr hit rear end of Car/Wagon2 stop/slow for queue | CAR/WAGON1, following too closely, new driver/under instruction | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **NEW NORTH ROAD** | | I | RICHARDSON ROAD | 201533406 | 18/02/2015 | Wed | 16:45 | Truck1 NDB on NEW NORTH ROAD overtaking Car/Wagon2 | TRUCK1, blind spot, misjudged another vehicle | Dry | Bright sun | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **NEW NORTH ROAD** | 20m | N | RICHARDSON ROAD | 201531955 | 17/01/2015 | Sat | 13:36 | Car/Wagon1 SDB on NEW NORTH ROAD hit rear end of Car/Wagon2 stop/slow for signals | CAR/WAGON1, following too closely | Dry | Bright sun | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **NEW NORTH ROAD** | 30m | N | RICHARDSON ROAD | 201534681 | 28/02/2015 | Sat | 20:30 | Car/Wagon2 turning right hit by oncoming Car/Wagon1 SDB on NEW NORTH ROAD | CAR/WAGON2, didnt look/notice other party - visibility obstruc, failed to give way when waved through by other dri, ENV: other non-commercial | Dry | Bright sun | Fine | Driveway | Nil | 0 | 0 | 0 |
| **NEW NORTH ROAD** | 15m | N | RICHARDSON ROAD | 201539660 | 16/06/2015 | Tue | 07:15 | Car/Wagon1 SDB on NEW NORTH ROAD hit rear end of Car/Wagon2 stop/slow for signals | CAR/WAGON1, failed to notice car slowing, stopping/stationary | Dry | Dark | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **NEW NORTH ROAD** | | I | WOODWARD ROAD | 201531027 | 02/01/2015 | Fri | 13:35 | Car/Wagon1 SDB on NEW NORTH ROAD hit Car/Wagon2 crossing at right angle from right | CAR/WAGON2, did not stop at steady red light | Dry | Bright sun | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **NEW NORTH ROAD** | | I | WOODWARD ROAD | 201730150 | 01/01/2017 | Sun | 13:45 | Van1 NDB on New North Rd hit rear end of SUV2 stop/slow for signals | VAN1, failed to notice control | Dry | Overcast | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **NEW NORTH ROAD** | 140m | W | WOODWARD ROAD | 201742273 | 17/06/2017 | Sat | 13:30 | Car/Wagon1 EDB on NEW NORTH ROAD changing lanes/overtaking to right hit Car/Wagon2 | CAR/WAGON1, did not check/notice another party from other dirn, weaving or cut in on multi-lane roads | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **NEW NORTH ROAD** | 70m | S | WOODWARD ROAD | 201738114 | 21/02/2017 | Tue | 09:39 | Car/Wagon2 turning right hit by oncoming Car/Wagon1 SDB on New North Road | CAR/WAGON2, did not check/notice another party from other dirn, failed to give way when waved through by other dri | Dry | Bright sun | Fine | Driveway | Nil | 0 | 0 | 0 |
| **NEW NORTH ROAD** | 15m | W | WOODWARD ROAD | 201511277 | 26/01/2015 | Mon | 14:40 | Car/Wagon1 NDB on NEW NORTH ROAD hit rear end of Car/Wagon2 stop/slow for signals | CAR/WAGON1, failed to notice car slowing, stopping/stationary | Dry | Bright sun | Fine | Crossroads | Traffic Signals | 0 | 0 | 1 |
| **NEW NORTH ROAD** | | I | WOODWARD ROAD | 201550100 | 30/11/2015 | Mon | 09:50 | Car/Wagon1 EDB on NEW NORTH ROAD hit rear end of Car/Wagon2 stop/slow for signals | CAR/WAGON1, following too closely | Dry | Overcast | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **NEW NORTH ROAD** | | I | WOODWARD ROAD | 201713805 | 20/05/2017 | Sat | 11:30 | Van1 SDB on Woodward Rd hit SUV2 crossing at right angle from right | SUV2, did not stop at steady red light, failed to notice control | Wet | Overcast | Fine | Crossroads | Traffic Signals | 0 | 0 | 1 |

| Crash road | Distance | Direction | Side road | ID | Date | Day of week | Time | Description of events | Crash factors | Surface condition | Natural light | Weather | Junction | Control | Crash count fatal | Crash count severe | Crash count minor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NEWCASTLE TERRACE** | 150m | S | JERSEY AVENUE | 201720863 | 25/12/2017 | Mon | 15:00 | Car/Wagon1 SDB on NEWCASTLE TERRACE hit Pedestrian2 (Age 51) | CAR/WAGON1, other postion on road | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 1 |
| **POINT CHEVALIER ROAD** | | I | GREAT NORTH ROAD | 201735249 | 16/03/2017 | Thu | 17:50 | Car/Wagon1 SDB on POINT CHEVALIER ROAD hit rear end of VEHB stopped/moving slowly | CAR/WAGON1, too far left | Dry | Bright sun | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **POINT CHEVALIER ROAD** | | I | GREAT NORTH ROAD | 201837554 | 13/04/2018 | Fri | 10:15 | Van1 SDB on POINT CHEVALIER ROAD hit rear end of Car/Wagon2 stop/slow for cross traffic | VAN1, following too closely | Dry | Overcast | Fine | T Junction | Give way | 0 | 0 | 0 |
| **POINT CHEVALIER ROAD** | 10m | W | SH 16 | 201516682 | 03/08/2015 | Mon | 06:43 | Motorcycle1 EDB on POINT CHEVALIER ROAD lost control; went off road to left | MOTORCYCLE1, lost control under braking, speed on straight, suddenly braked, ENV: slippery road due to rain | Wet | Dark | Fine | T Junction | Nil | 0 | 0 | 1 |
| **RICHARDSON RD (OWAIRAKA)** | | I | NEW NORTH RD | 201899288 | 09/11/2018 | Fri | 16:38 | Car/Wagon1 NDB on RICHARDSON ROAD, MOUNT ALBERT, AUCKLAND hit rear end of Ute2 stop/slow for signals | CAR/WAGON1, attention diverted by passengers, failed to notice car slowing, stopping/stationary | Dry | Overcast | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **RICHARDSON RD (OWAIRAKA)** | | I | NEW NORTH ROAD | 201963877 | 08/04/2019 | Mon | 22:15 | Car/Wagon1 NDB on RICHARDSON ROAD hit rear end of SUV2 stop/slow for signals | CAR/WAGON1, failed to notice car slowing, stopping/stationary | Dry | Dark | Null | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **RICHARDSON RD (OWAIRAKA)** | 35m | S | NEW NORTH ROAD | 201963958 | 09/04/2019 | Tue | 22:45 | Car/Wagon1 NDB on RICHARDSON ROAD, MOUNT ALBERT, AUCKLAND lost control; went off road to left, Car/Wagon1 hit power pole | CAR/WAGON1, alcohol test below limit, fatige due to long day (working/recreation), too far left | Dry | Dark | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **RICHARDSON RD (OWAIRAKA)** | | I | NEW NORTH ROAD | 201967134 | 03/09/2019 | Tue | 10:00 | Truck1 NDB on Richardson Road hit Ute2 crossing at right angle from right | TRUCK1, alcohol test below limit UTE2, alcohol test below limit, did not stop at steady red light | Dry | Overcast | Fine | Crossroads | Traffic Signals | 0 | 0 | 2 |
| **RICHARDSON ROAD** | 60m | S | NEW NORTH ROAD | 201750221 | 02/09/2017 | Sat | 11:00 | Car/Wagon1 SDB on RICHARDSON ROAD hit parked veh, Car/Wagon1 hit non specific parked | CAR/WAGON1, too far left | Dry | Bright sun | Null | Nil (Default) | Unknown | 0 | 0 | 0 |
| **RICHARDSON ROAD** | | I | NEW NORTH ROAD | 201850162 | 18/06/2018 | Mon | 20:20 | Car/Wagon1 NDB on WOODWARD ROAD, MOUNT ALBERT, AUCKLAND hit Car/Wagon2 merging from the left | CAR/WAGON1, alcohol test above limit or test refused, evading enforcement, speed entering corner/curve | Wet | Dark | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **RICHARDSON ROAD** | 50m | S | NEW NORTH ROAD | 201839264 | 13/05/2018 | Sun | 14:28 | Car/Wagon1 SDB on RICHARDSON ROAD, MOUNT ALBERT, AUCKLAND hit parked veh, Car/Wagon1 hit non specific parked | CAR/WAGON1, alcohol test below limit, attention diverted by food, cigarettes, beverages, too far left | Dry | Overcast | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |

| Crash road | Distance | Direction | Side road | ID | Date | Day of week | Time | Description of events | Crash factors | Surface condition | Natural light | Weather | Junction | Control | Crash count fatal | Crash count severe | Crash count minor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **RICHARDSON ROAD** | | I | NEW NORTH ROAD | 201848023 | 06/09/2018 | Thu | 19:00 | Car/Wagon1 SDB on New north road hit rear end of Car/Wagon2 stop/slow for signals | CAR/WAGON1, alcohol test below limit, following too closely CAR/WAGON2, alcohol test below limit | Wet | Dark | Light rain | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **RICHARDSON ROAD** | 30m | S | NEW NORTH ROAD | 201550107 | 11/12/2015 | Fri | 17:30 | Car/Wagon1 NDB on RICHARDSON ROAD hit rear end of Car/Wagon2 stop/slow for queue | CAR/WAGON1, following too closely, other inattentive | Dry | Overcast | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **RICHARDSON ROAD** | 70m | S | NEW NORTH ROAD | 201642124 | 08/07/2016 | Fri | 00:41 | Car/Wagon1 NDB on Richardson road hit Car/Wagon2 headon on straight, Car/Wagon1 hit non specific parked | CAR/WAGON1, alcohol test above limit or test refused, too far right, ENV: heavy rain, slippery road due to rain | Wet | Dark | Heavy rain | Nil (Default) | Unknown | 0 | 0 | 0 |
| **RICHARDSON ROAD** | | I | NEW NORTH ROAD | 201841620 | 06/06/2018 | Wed | 14:56 | Truck1 NDB on Richardson Road, Mount Albert hit rear end of Car/Wagon2 stop/slow for signals | TRUCK1, failed to notice car slowing, stopping/stationary | Wet | Overcast | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **RICHARDSON ROAD** | | I | WOODWARD ROAD | 201646413 | 23/08/2016 | Tue | 16:30 | SUV1 NDB on RICHARDSON ROAD hit rear end of Car/Wagon2 stop/slow for signals | CAR/WAGON2, emotionally upset/road rage SUV1, failed to notice car slowing, stopping/stationary, impaired ability due to old age | Dry | Overcast | Fine | Crossroads | Traffic Signals | 0 | 0 | 0 |
| **SH 16** | 0m | | | 201513775 | 04/06/2015 | Thu | 17:30 | Car/Wagon1 WDB on SH 16 changing lanes to left hit Motorcycle2 | CAR/WAGON1, did not check/notice another party behind, other inattentive MOTORCYCLE2, following too closely, misjudged own vehicle, ENV: slippery road due to rain | Wet | Dark | Light rain | Nil (Default) | Unknown | 0 | 0 | 1 |
| **SH 16** | 0m | | | 201649134 | 01/09/2016 | Thu | 07:10 | Car/Wagon1 EDB on Shwy 16 hit rear end of Car/Wagon2 stop/slow for queue | CAR/WAGON1, failed to notice car slowing, stopping/stationary, following too closely | Dry | Overcast | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **SH 16** | 15m | E | | 201737666 | 28/03/2017 | Tue | 10:45 | Car/Wagon1 EDB on Sh16 hit rear end of Car/Wagon2 stop/slow for queue | CAR/WAGON1, failed to notice car slowing, stopping/stationary, following too closely | Dry | Overcast | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **SH 16** | 0m | | | 201630453 | 03/01/2016 | Sun | 18:37 | Van1 WDB on SH 16 lost control; went off road to left, Van1 hit non specific guard rail | VAN1, alcohol test below limit, fatige due to long day (working/recreation) | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **SH 16** | | I | WATERVIEW OFF WBD | 201817081 | 23/06/2018 | Sat | 16:50 | Car/Wagon1 WDB on SH 16 hit rear end of Motorcycle2 stop/slow for queue | CAR/WAGON1, alcohol test below limit, attention diverted by food, cigarettes, beverages, failed to notice car slowing, stopping/stationary MOTORCYCLE2, alcohol test below limit | Dry | Bright sun | Fine | T Junction | Nil | 0 | 0 | 1 |

| Crash road | Distance | Direction | Side road | ID | Date | Day of week | Time | Description of events | Crash factors | Surface condition | Natural light | Weather | Junction | Control | Crash count fatal | Crash count severe | Crash count minor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SH 16** | | I | WATERVIEW OFF WBD | 201645525 | 12/08/2016 | Fri | 17:51 | Car/Wagon1 WDB on Sh16 hit rear end of Car/Wagon2 stop/slow for queue | CAR/WAGON1, attention diverted by navigation device, following too closely | Dry | Twilight | Fine | T Junction | Nil | 0 | 0 | 0 |
| **SH 16** | | I | WATERVIEW OFF WBD | 201516059 | 08/08/2015 | Sat | 02:27 | Car/Wagon1 WDB on SH 16 lost control but did not leave the road, Car/Wagon1 hit non specific guard rail | CAR/WAGON1, alcohol test above limit or test refused, other lost control, ENV: slippery road due to rain | Wet | Dark | Light rain | T Junction | Nil | 0 | 0 | 1 |
| **SH 16** | | I | WATERVIEW OFF WBD | 201637733 | 26/03/2016 | Sat | 17:35 | Car/Wagon1 WDB on SH 16 changing lanes to left hit SUV2 | CAR/WAGON1, did not check/notice another party from other dirn | Dry | Bright sun | Fine | T Junction | Nil | 0 | 0 | 0 |
| **SH 16** | | I | WATERVIEW OFF WBD | 201748737 | 15/08/2017 | Tue | 14:50 | Car/Wagon1 WDB on SH 16 hit rear end of Motorcycle2 stop/slow for queue | CAR/WAGON1, failed to notice car slowing, stopping/stationary | Dry | Overcast | Fine | T Junction | Give way | 0 | 0 | 0 |
| **SH 16** | | I | WATERVIEW OFF WBD | 201618056 | 21/11/2016 | Mon | 08:33 | Car/Wagon1 EDB on State highway 16 changing lanes/overtaking to right hit Motorcycle2 | CAR/WAGON1, did not check/notice another party from other dirn, other inattentive | Dry | Bright sun | Fine | T Junction | Nil | 0 | 0 | 1 |
| **SPRINGLEIGH AVE** | 20m | E | Renton Road | 201895555 | 03/11/2018 | Sat | 22:00 | Car/Wagon1 DIRN on SPRINGLEIGH AVENUE hit parked veh, Car/Wagon1 hit parked (unattended) vehicle, roadwork cone, Car/Wagon2 hit kerb | CAR/WAGON1, too far left | Dry | Dark | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **SPRINGLEIGH AVENUE** | 50m | E | LAUREL ST | 201846980 | 10/08/2018 | Fri | 08:10 | Car/Wagon1 EDB on SPRINGLEIGH AVENUE hit SUV2 reversing along road | SUV2, did not check/notice another party behind | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **SPRINGLEIGH AVENUE** | 20m | E | RENTON ROAD | 201633716 | 29/02/2016 | Mon | 11:45 | Truck1 EDB on SPRINGLEIGH AVENUE hit parked veh, Truck1 hit non specific parked | CAR/WAGON2, sudden illness | Wet | Overcast | Light rain | Nil (Default) | Unknown | 0 | 0 | 0 |
| **SUTHERLAND ROAD** | 30m | E | CARRINGTON ROAD | 201732076 | 20/01/2017 | Fri | 09:35 | Cycle1 WDB on SUTHERLAND ROAD hit turning VEHB | CYCLE2, failed to give way entering roadway from driveway | Dry | Overcast | Fine | Driveway | Nil | 0 | 0 | 0 |
| **WATERVIEW OFF WBD** | 30m | W | SH 16 | 201653591 | 10/11/2016 | Thu | 18:15 | Car/Wagon1 WDB on Great north road off ramp hit rear end of Car/Wagon2 stop/slow for queue | CAR/WAGON1, following too closely | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **WATERVIEW OFF WBD** | 40m | W | SH 16 | 201553089 | 19/12/2015 | Sat | 18:09 | Car/Wagon1 WDB on WATERVIEW OFF WBD hit rear end of SUV2 stop/slow for queue | CAR/WAGON1, following too closely CAR/WAGON3, following too closely VAN4, attention diverted fiding intersection, house, etc, other mechanical | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |

| Crash road | Distance | Direction | Side road | ID | Date | Day of week | Time | Description of events | Crash factors | Surface condition | Natural light | Weather | Junction | Control | Crash count fatal | Crash count severe | Crash count minor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **WATERVIEW OFF WBD** | 30m | W | SH 16 | 201720502 | 14/12/2017 | Thu | 18:52 | Car/Wagon1 WDB on Northwestern motorway hit rear end of Car/Wagon2 stop/slow for queue | CAR/WAGON2, alcohol test below limit CAR/WAGON1, alcohol test above limit or test refused, failed to notice car slowing, stopping/stationary, following too closely SUV3, alcohol test below limit | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 1 |
| **WILLCOTT ST** | 70m | S | CARRINGTON ROAD | 201840551 | 19/05/2018 | Sat | 12:30 | Car/Wagon1 SDB on WILLCOTT ST hit parked veh, Car/Wagon1 hit non specific parked | CAR/WAGON1, too far left | Wet | Overcast | Null | Nil (Default) | Unknown | 0 | 0 | 0 |
| **WILLCOTT ST** | 170m | E | WOODWARD ROAD | 201536292 | 11/04/2015 | Sat | 13:57 | Car/Wagon1 WDB on WILLCOTT ST overtaking hit Car/Wagon2 WDB on WILLCOTT ST turning right, Car/Wagon1 hit non specific parked | CAR/WAGON1, other inattentive, overtaking vehicle signalling right turn, ENV: entering or leaving private house / farm | Dry | Bright sun | Fine | Driveway | Unknown | 0 | 0 | 0 |
| **WOODWARD RD** | 15m | S | FAIRLEIGH AVE | 201898528 | 29/09/2018 | Sat | 06:55 | Car/Wagon1 SDB on WOODWARD ROAD, MOUNT ALBERT, AUCKLAND hit Car/Wagon2 headon on straight , Car/Wagon2 hit parked (unattended) vehicle | CAR/WAGON1, too far right CAR/WAGON2, alcohol test above limit or test refused | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **WOODWARD RD** | 33m | S | SPRINGLEIGH AVE | 201898283 | 13/09/2018 | Thu | 09:00 | Car/Wagon1 DIRN on WOODWARD RD hit parked veh, Car/Wagon1 hit parked (unattended) vehicle | CAR/WAGON1, too far left | Dry | Bright sun | Null | Nil (Default) | Unknown | 0 | 0 | 0 |
| **WOODWARD ROAD** | | I | CARRINGTON ROAD | 201612314 | 13/04/2016 | Wed | 21:47 | Car/Wagon1 SDB on WOODWARD ROAD lost control turning right, Car/Wagon1 hit non specific tree | CAR/WAGON1, alcohol test below limit, lost control under acceleration, lost control when turning | Dry | Dark | Fine | T Junction | Give way | 0 | 0 | 3 |
| **WOODWARD ROAD** | 170m | W | CARRINGTON ROAD | 201758369 | 26/11/2017 | Sun | 05:45 | SUV1 NDB on Woodward Rd lost control; went off road to right, SUV1 hit non specific tree | SUV1, alcohol suspected, fatigue due to lack of sleep | Dry | Twilight | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **WOODWARD ROAD** | 100m | S | CARRINGTON ROAD | 201517335 | 11/10/2015 | Sun | 00:26 | Motorcycle1 SDB on WOODWARD ROAD hit parked veh, Motorcycle1 hit non specific parked | MOTORCYCLE1, fatige due to long day (working/recreation), too far left, ENV: street lighting inadequate | Dry | Dark | Fine | Nil (Default) | Nil | 0 | 0 | 1 |
| **WOODWARD ROAD** | | I | CARRINGTON ROAD | 201818132 | 16/09/2018 | Sun | 17:30 | Car/Wagon1 SDB on Woodward Road lost control turning right, Car/Wagon1 hit non specific kerb, non specific tree | CAR/WAGON1, alcohol suspected, lost control when turning | Dry | Overcast | Fine | T Junction | Give way | 0 | 0 | 1 |
| **WOODWARD ROAD** | 60m | N | HARBUTT AVENUE | 201616346 | 21/09/2016 | Wed | 08:15 | Car/Wagon1 NDB on Woodward Rd lost control turning right, Car/Wagon1 hit non specific pole | CAR/WAGON1, lost control when turning, speed entering corner/curve | Wet | Overcast | Light rain | Nil (Default) | Unknown | 0 | 0 | 1 |

| Crash road | Distance | Direction | Side road | ID | Date | Day of week | Time | Description of events | Crash factors | Surface condition | Natural light | Weather | Junction | Control | Crash count fatal | Crash count severe | Crash count minor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **WOODWARD ROAD** | | I | HARBUTT AVENUE | 201644161 | 22/07/2016 | Fri | 18:53 | Van1 NDB on Woodward rd hit Car/Wagon2 turning right onto AXROAD from the left | CAR/WAGON2, did not check/notice another party from other dirn, failed to give way at priority traffic control VAN1, other lost control | Wet | Dark | Heavy rain | Crossroads | Stop | 0 | 0 | 0 |
| **WOODWARD ROAD** | 40m | S | HARBUTT AVENUE | 201820314 | 22/11/2018 | Thu | 21:15 | Car/Wagon1 NDB on Woodward Rd, Mt Albert hit Car/Wagon2 headon on straight | CAR/WAGON1, alcohol test above limit or test refused, speed on straight, too far right | Dry | Dark | Fine | Nil (Default) | Unknown | 0 | 0 | 1 |
| **WOODWARD ROAD** | 15m | N | JERSEY AVENUE | 201538925 | 12/05/2015 | Tue | 13:50 | Car/Wagon1 NDB on WOODWARD ROAD hit Car/Wagon2 U-turning from same direction of travel | CAR/WAGON2, did not check/notice another party behind, ENV: slippery road due to rain | Wet | Overcast | Light rain | Nil (Default) | Unknown | 0 | 0 | 0 |
| **WOODWARD ROAD** | 60m | N | NEW NORTH ROAD | 201740895 | 22/05/2017 | Mon | 20:15 | SUV1 SDB on WOODWARD ROAD hit rear end of Car/Wagon2 stopped/moving slowly | SUV1, failed to notice car slowing, stopping/stationary | Dry | Dark | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **WOODWARD ROAD** | 20m | N | RICHARDSON ROAD | 201545192 | 09/08/2015 | Sun | 03:10 | Car/Wagon1 SDB on WOODWARD ROAD hit Car/Wagon2 manoeuvring, Car/Wagon1 hit non specific parked | CAR/WAGON1, did not check/notice another party behind, ENV: entering or leaving service station | Dry | Dark | Fine | Driveway | Nil | 0 | 0 | 0 |
| **WOODWARD ROAD** | 100m | N | SPRINGLEIGH AVENUE | 201711807 | 06/03/2017 | Mon | 20:10 | Car/Wagon1 SDB on Woodward Road hit Pedestrian2 (Age 7) crossing road from left side | PEDESTRIAN2, pedestrian running across, heedless of traffic, ENV: visibility limited by parked vehicle | Dry | Dark | Fine | Nil (Default) | Unknown | 0 | 1 | 0 |
| **WOODWARD ROAD** | 40m | S | SPRINGLEIGH AVENUE | 201711474 | 07/03/2017 | Tue | 07:12 | Car/Wagon1 SDB on Woodward hit parked veh, Car/Wagon1 hit non specific parked, Car/Wagon2 hit non specific parked | CAR/WAGON1, attention diverted by food, cigarettes, beverages, too far left | Dry | Overcast | Fine | Nil (Default) | Unknown | 0 | 0 | 1 |
| **WOODWARD ROAD** | 100m | N | SPRINGLEIGH AVENUE | 201842441 | 16/06/2018 | Sat | 10:08 | Car/Wagon1 NDB on WOODWARD ROAD, MOUNT ALBERT, AUCKLAND hit parked veh, Car/Wagon1 hit non specific parked, Car/Wagon2 hit non specific tree | CAR/WAGON1, alcohol test below limit, too far left | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **WOODWARD ROAD** | 160m | N | SPRINGLEIGH AVENUE | 201736219 | 11/04/2017 | Tue | 17:30 | Truck1 NDB on WOODWARD ROAD hit parked veh, Truck1 hit non specific parked | TRUCK1, too far left | Dry | Twilight | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **WOODWARD ROAD** | 190m | N | SPRINGLEIGH AVENUE | 201755573 | 26/11/2017 | Sun | 12:20 | SUV1 NDB on Woodward road lost control; went off road to right, SUV1 hit non specific tree | SUV1, other postion on road | Dry | Overcast | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **WOODWARD ROAD** | 30m | S | SPRINGLEIGH AVENUE | 201550061 | 24/11/2015 | Tue | 09:18 | Car/Wagon1 SDB on WOODWARD ROAD hit parked veh, Car/Wagon1 hit non specific parked | CAR/WAGON1, other attention diverted, too far left | Dry | Bright sun | Fine | T Junction | Stop | 0 | 0 | 0 |

| Crash road | Distance | Direction | Side road | ID | Date | Day of week | Time | Description of events | Crash factors | Surface condition | Natural light | Weather | Junction | Control | Crash count fatal | Crash count severe | Crash count minor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **WOODWARD ROAD** | | I | SPRINGLEIGH AVENUE | 201814097 | 17/03/2018 | Sat | 07:56 | Van2 turning right hit by oncoming Car/Wagon1 NDB on Woodward Road, Mt Albert | CAR/WAGON1, alcohol test below limit VAN2, alcohol test below limit, did not check/notice another party from other dirn, failed to give way turning to non-turning traffic | Dry | Overcast | Fine | T Junction | Stop | 0 | 0 | 1 |
| **WOODWARD ROAD** | 50m | N | WILLCOTT ST | 201647018 | 29/08/2016 | Mon | 15:55 | Car/Wagon1 SDB on WOODWARD ROAD hit parked veh, Car/Wagon1 hit non specific parked | CAR/WAGON1, too far left | Dry | Bright sun | Null | Nil (Default) | Unknown | 0 | 0 | 0 |
| **WOODWARD ROAD** | 50m | S | WILLCOTT ST | 201738092 | 28/03/2017 | Tue | 17:10 | Car/Wagon1 SDB on Woodward Rd hit rear end of Car/Wagon2 stopped/moving slowly | CAR/WAGON1, alcohol test above limit or test refused, failed to notice car slowing, stopping/stationary | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 0 |
| **WOODWARD ROAD** | | I | WILLCOTT ST | 201510983 | 20/04/2015 | Mon | 17:35 | Moped1 SDB on WOODWARD ROAD hit Car/Wagon2 crossing at right angle from right | MOPED1, did not check/notice another party from other dirn, failed to give way at priority traffic control | Dry | Bright sun | Fine | Crossroads | Stop | 0 | 0 | 1 |
| **WOODWARD ROAD** | | I | WILLCOTT ST | 201638430 | 10/05/2016 | Tue | 20:28 | Car/Wagon1 SDB on WOODWARD ROAD lost control; went off road to left , Car/Wagon2 hit non specific traffic island | CAR/WAGON1, swerved to avoid vehicle CAR/WAGON2, did not check/notice another party from other dirn, failed to give way at priority traffic control | Dry | Dark | Fine | Crossroads | Stop | 0 | 0 | 0 |
| **Z** | 120m | W | CARRINGTON ROAD | 201614799 | 28/07/2016 | Thu | 08:40 | Car/Wagon1 NDB on Unnamed Road hit Pedestrian2 (Age 26) crossing road from left side | CAR/WAGON1, attention diverted fiding intersection, house, etc, failed to give way to a pedestrian, PEDESTRIAN2, other pedestrian crossing road | Dry | Overcast | Null | Nil (Default) | Unknown | 0 | 0 | 1 |
| **Z ACCESSWAY** | 450m | N | FARM ROAD | 201720686 | 14/12/2017 | Thu | 07:15 | Cycle1 SDB on Carrington rd hit Car/Wagon2 merging from the right | CAR/WAGON2, did not check/notice another party from other dirn, failed to give way at priority traffic control | Dry | Bright sun | Fine | Crossroads | Stop | 0 | 0 | 1 |
| **Z BP STATION** | 50m | E | WOODWARD ROAD | 201614239 | 20/03/2016 | Sun | 12:45 | SUV1 NDB on Z BP STATION hit Pedestrian2 (Age 82) | SUV1, did not check/notice another party behind, ENV: other visibility limited | Wet | Overcast | Heavy rain | Nil (Default) | Unknown | 0 | 1 | 0 |
| **Z CPK** | 100m | N | SEAVIEW TERRACE | 201613754 | 23/06/2016 | Thu | 15:35 | Car/Wagon1 SDB on Z CPK hit Car/Wagon2 manoeuvring | CAR/WAGON1, did not check/notice another party behind | Dry | Bright sun | Fine | Nil (Default) | Unknown | 0 | 0 | 1 |
| **Z MASON CLINIC DWY** | 330m | W | CARRINGTON ROAD | 201714180 | 09/05/2017 | Tue | 07:35 | Car/Wagon1 SDB on Unnamed road, Unitec complex overtaking hit Car/Wagon2 SDB on Unnamed road, Unitec complex turning right , Car/Wagon2 hit non specific fence | CAR/WAGON1, other overtaking | Dry | Bright sun | Fine | Driveway | Nil | 0 | 0 | 1 |

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# Appendix B Memo: Wairaka Precinct Primary School - Transport Assumptions and Vehicle Trip Generation

# Memo

| | | | |
|---|---|---|---|
| To: | Hannah McGregor | From: | Gabriela Surja, Max Robitzsch, Mark Moslin-Thomas |
| | Ministry of Housing and Urban Development | | Stantec |
| File: | 310203609 | Date: | December 16, 2019 |

**Reference: Wairaka Precinct Primary School - Transport Assumptions and Vehicle Trip Generation**

## INTRODUCTION

Stantec, as part of the work for the Ministry of Housing and Urban Development (HUD) on the Wairaka Precinct Integrated Transport Assessment (ITA), has produced this memorandum setting out our understanding, and proposed assumptions, for a future primary school within the Wairaka Precinct that is expected to be established by the Ministry of Education (MoE).

This memo documents the assessment and the general transport assumptions associated with it, for review and consideration by the MoE and its transport consultants Jacobs.

This memorandum has been updated based on provision of the initial draft, with corrections provided by MoE's consultants, received by email on 11 December 2019 from Terri Bell (Jacobs). The changes relate to correcting total students numbers (to 750 general primary school students at full build-out, and 62 FTE staff for the school, the early childhood education and the special needs facility together), as well as clarifying that any traffic model in the 2026 or earlier timeframe will not include the school, and any 2028-2030 timeframe traffic model will include the school, at half final capacity.

## BACKGROUND

Based on discussions with MoE at a meeting on 13 November 2019 and in subsequent email conversations, it is understood that a primary school (but no secondary school) is intended to be established in the Wairaka Precinct at some (yet to be determined) time. The following are understood to be the general assumptions that the MoE has already identified (without prejudice) to assist Stantec and HUD:

- long-term capacity of the primary school will be approximately 750 students, with approximately 62 full time equivalent staff (this includes staff for the other associated facilities discussed below);
- The school is expected to also provide for and be co-located with a further 50 early childhood education places and 18 special needs student places;
- The location of the school is likely to be in the centre of the Precinct, in the general vicinity of the Farm Road / Carrington Road intersection (old Unitec Gate 3) access, and
- While the exact timeframes for establishment of the school are unknown, and will be at least in part dependent on the speed of residential development within the Precinct, the MoE has indicated that any traffic model of the 2026 or earlier should not include a school, whereas by around 2028 to 2030, the ITA should assume that approximately half the student and staff numbers cited above will be in place (as well as half the early childhood and special needs student numbers).

Discussions were also held with MoE regarding the transport assumptions for the new school. A number of general assumptions are made below based on these discussions:

- As the school is explicitly intended for the Precinct residents, and is bracketed by two other nearby primary schools (Waterview Primary to the west, and Gladstone Primary to the east), and as the school is expected to be located in the centre of the Precinct, no part of the school catchment is expected to be more than 500-700m away. Much of the catchment will be in mid-density blocks even closer.

- The school will be at the heart of an already traffic-calmed, walking and cycling friendly existing environment - the Precinct is, for example, already a 30 kph speed limit zone today. The future transport vision for Wairaka Precinct is identified by HUD as being highly active mode (walking and cycling) focused, with emphasis of these modes on priority over cars, and with a high-quality road safety environment.

- In combination, it is expected that a very high proportion of the school roll will walk, bike or scooter to school. This is intended to be encouraged by the operational model of the school, and by detailed design of the transport features around the school and in the Precinct in general.

- MoE noted that there is likely to be a high incidence of students being driven to the school among the special needs students (both due to impairments, and due to these students potentially living in a wider catchment than the general primary school students), and that similarly, the early childhood education centre may see higher driving rates compared to the general student rates.

- However, it is accepted that even if these uses are catered for to allow practical car pick-up and drop-off, the overall population of students will be encouraged not to be driven to school. This includes for example, ensuring that any pick-up-and-drop-off facilities are prioritised for (or potentially exclusive to) users that are dependent on them, rather than encouraging their use by general roll students and their parents – which would risk replicating classical “school gate [vehicle] chaos”.

Overall, it is considered that the school is extremely well placed to be an exemplar for a walk- and cycle-friendly environment with very high levels of safe and convenient active mode travel to school. This has informed the subsequent (vehicle) trip generation assumptions of this memorandum.

## TRIP GENERATION SOURCES AND ASSUMPTIONS

Information about mode share and vehicle trip generation from the following sources has been taken into account in the assessment of the proposed trip generation:

Mode share

- HD011 Mode share of journeys to school, aged 5-12 (%) (2010/14), Ministry of Transport, NZ

  55% of journeys by children of primary school age in New Zealand between 2010 and 2014 were as car passengers. The average mode shares for walking, public transport, and cycling were 29%, 12%, and 2%, respectively.

- HD013 Mode share of journeys to school by region, aged 5-12 (2010/14), Ministry of Transport, NZ

  In the Auckland region, 54% of journeys by children of primary school age between 2010 and 2014 were car passengers on the school journey. The second highest mode share was walking at 38%, followed by public transport at around 5%. This indicate that the car mode share for primary students in Auckland is similar to the average for New Zealand.

- StatsNZ News: Car streets ahead for travel to work and education (2019)[1] , NZ

  According to the 2018 Census, 39.1% of all New Zealand students got to their place of education as a passenger in a car, truck or van. 'Student' includes people from preschoolers up to adult learners. There is an indication that it is "typical for many working parents to drop their children at school or preschool on their way to work, as 87.7 percent of passengers were aged less than 15 years".

Vehicle trip generation

- Trip Generation Manual (2017), ITE (Institute of Transportation Engineers), USA

  Based on 35 elementary schools surveyed across the United States between 1980s and 2010s, the vehicle trip generation per student in the AM and PM peak hour of adjacent street traffic is 0.67 and 0.17 respectively.

- Trip Generation Surveys, Schools, Analysis Report (2014), Roads and Maritime Services, NSW Australia

  The Sydney metropolitan primary schools demonstrated average peak vehicle trip rates of 0.67 and 0.53 in the school AM and PM peak periods respectively.

  It should be noted that the peak periods referred to in this document correspond to the schools' peak periods as opposed to the general adjacent road network peak periods. As this assessment refer to the adjacent road network peak periods instead, it is noted that particularly for the PM peak, the school trip generation will be significantly lower as the majority of school trips have occurred prior to the adjacent network's PM peak period. Compare the ITE trip rate differences cited above regarding AM and PM differences during the network peak.

To assess the likelihood (and realistic maximum) of non-car travel mode share to primary schools, Stantec also contacted Auckland Transport (Community Transport team) and received 2019 travel survey data from 12 of the best-performing primary schools across Auckland (results averaged between AM and PM results). These results are shown below in Table 1.

[1] https://www.stats.govt.nz/news/car-streets-ahead-for-travel-to-work-and-education

**Table 1: Predicted Travel survey results for a selection of Auckland primary schools, 2019**

| School Name | Walk | Walking School Bus | Cycle | Bus | Family Car | Friends Car | Scooter | Train | Ferry | Other | Car / Walk 400m | 2019 Average - Total | Non-car % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Browns Bay School | 42% | 4% | 0% | 0% | 19% | 1% | 1% | 0% | 0% | 0% | 32% | 100% | 47% |
| Chaucer School | 44% | 1% | 5% | 1% | 34% | 2% | 2% | 0% | 0% | 1% | 9% | 100% | 54% |
| Churchill Park School | 40% | 2% | 1% | 0% | 30% | 2% | 3% | 0% | 0% | 0% | 22% | 100% | 46% |
| Clendon Park School | 52% | 0% | 0% | 0% | 38% | 1% | 0% | 0% | 0% | 0% | 9% | 100% | 53% |
| Colwill School | 57% | 0% | 0% | 0% | 27% | 0% | 1% | 0% | 0% | 7% | 7% | 100% | 65% |
| Devonport School | 56% | 1% | 5% | 0% | 25% | 1% | 4% | 0% | 1% | 0% | 7% | 100% | 68% |
| Flat Bush School | 57% | 0% | 0% | 0% | 30% | 1% | 0% | 0% | 0% | 1% | 12% | 100% | 57% |
| Glenavon School | 58% | 3% | 2% | 0% | 17% | 2% | 2% | 0% | 0% | 1% | 14% | 100% | 67% |
| Glenfield Primary School | 57% | 3% | 0% | 0% | 33% | 0% | 0% | 0% | 0% | 3% | 4% | 100% | 63% |
| St Thomas School (Auckland) | 46% | 2% | 2% | 3% | 37% | 1% | 0% | 0% | 0% | 1% | 7% | 100% | 55% |
| Sunnyvale School | 43% | 2% | 0% | 0% | 40% | 0% | 0% | 0% | 0% | 0% | 15% | 100% | 45% |
| Waikowhai School | 69% | 0% | 4% | 2% | 26% | 0% | 0% | 0% | 0% | 0% | 0% | 100% | 74% |

The non-car percentage excludes the "family car", "friends car" and "car/walk" results.

As can be seen, the three best-performing schools achieve a non-car mode share of 74%, 68% and 67%.

Student vehicle trip assumptions

Based on the above, it is considered that a non-car mode share of 70% is realistic. This is considering the short distances between dwellings and the school and the intention to specifically design the school operation and the surrounding Precinct for active mode safety and convenience. There would appear to be no reason why the new school at Wairaka would not be able to be among the top performers in the future.

Inverting the 70% non-car total, a 30% "car passenger" share is therefore assumed, leading to 0.6 trips / student (in and out) in the AM network peak hour.

The pick-up period in the afternoon will largely occur much earlier than the general road network PM peak. Therefore, it is assumed that the students' PM network peak hour trip generation is 25% of that of the AM network peak hour (this correlates with the results in the US study cited earlier).

Staff vehicle trip assumptions

Staff driving rates tend to be included in surveyed trip generation rates for schools but need to be discussed separately in a first principles assessment. Separate staff trip rates are conservatively estimated to be 0.5 trips / staff member in AM network peak hour and 0.33 trips / staff member in the PM peak network peak hour (two thirds of the AM peak value). This implies overall driving rates (during the overall day) of significantly over 50%, thus being conservative.

Considering the low number of staff (31 in the 2028/2030 model timeframe) compared to overall future resident and student numbers in the Precinct, separating out staff trips does not lead to a likelihood of any significant change in traffic modelled network impacts even if the staff have significantly higher or lower driving rates at this school than assumed above. Therefore, no in-depth further assessment of comparative staff driving rates has occurred,

## FURTHER ASSUMPTIONS

Early childhood education vehicle trip assumptions

The vehicle trip generation of the early childhood centre will be affected by similar factors as those discussed earlier in relation to the primary school trip generation - but is likely to see much higher incidences of being driven to the care facility. However, the overall impact is likely to be limited, as there will be only 25 such children assumed in the traffic model by 2028-2030, and many will be transported as part of linked trips (see later below).

For simplicity, it is proposed that these (25) children have twice the trip rate of primary school children. This represents a 60% "being driven" rate. The remainder are assumed to be brought to the facility by caregivers on foot or by bicycle, noting the close proximity to the residences.

Special needs students' vehicle trip assumptions

It has been assumed that most or nearly all of the nine (9) special needs students have three times the trip rate of primary school children. This represents a 90% "being driven" rate, in part because they come from a wider catchment, and in part due to their higher likelihood of dependence on mobility aids and assistance. From a traffic generation perspective this is a minimal demand, and also conservatively ignores that some of these students may arrive in the same vehicle picking them up from different residences.

Special needs student demands are more likely to affect the design of the pickup and drop-off zone (suitability for vans and wheelchair access etc.) rather than have any significant impact on the trip generation

Mode share over time

It is considered unlikely at this stage that the traffic model for the Wairaka Precinct ITA will model a time horizon far enough away to assume that the full 700 student roll will be in place. This will be a matter of revisiting the traffic model and the Precinct ITA at a future stage, as already envisaged in the Precinct rules.

As such, while mode share will change further in the future, this assessment only discusses projected mode share and trip generation at a point in time approximately 8 to 10 years from now (late 2020s).

Wider network assumptions

The traffic model will include a number of wider network assumptions. These are likely to include matters such as the Carrington Road Upgrade (currently funded in the 10-year programme for the second half of the 2020s). However, since (as discussed earlier) effectively all students are assumed to come from within the Precinct, and the primary wider network changes affect the external interface instead of the internal network, no specific sensitivity scenarios for the presence or absence of infrastructure are deemed required for the school. If, closer to the time of the school's establishment, factors come to light that would materially affect trip generation or catchment, this can be covered in a school-specific assessment if required.

Vehicle occupancy

Conservatively, it is assumed that among cars being used to drive children to the primary school, each has an average occupancy of 1.2 children (i.e. every fifth car brings two children to the primary school / child care).

Linked trip commentary (for later traffic model assignment)

Given the background of the proposed school, it is considered that there will be a high portion of walking and cycling trips. However, it is acknowledged that it is common for 'linked-trips' to occur where a parent or caregiver drops off a student on their way to work, particularly in the AM peak period.

The later traffic models will assume that approximately half of all car trips to and from the school are linked trips (originating in the Precinct, travelling to the school, and then travelling onwards to another external destination – and reverse for the PM peak), while the other half are entirely new trips (very short car trips both originating and finishing within the Precinct after pick-up or drop-off at the school). Considering that none of the car trips would be more than some 800m, this is considered a conservatively high assumption.

For staff, it is conservatively assumed that all staff live outside the Precinct.

## TRIP GENERATION

Based on the above information and assumptions, the proportions of students that will travel to school by car (as a passenger) in each enrollment scenario has been estimated.

Table 2 and 3 outlines the summary trip generation assumed for the student and staff numbers.

**Table 2: Predicted car mode share for students / children**

| **Scenario 2028/2030** incl. allowances for childcare and special needs | **Estimated Percentage as car passenger:** | **AM peak hour trip rate** (first principles) | **AM peak hour Trip rate** (including 1.2 children car occupancy) | **PM peak hour Trip rate** (incl 1.2 children car occupancy, 0.25 PM peak factor) | **AM peak trips** (in and out 50/50) | **PM peak trips** (in and out 50/50) |
|---|---|---|---|---|---|---|
| 375 general roll students | 30% | 0.6 trips / child | 0.5 trips / child | 0.13 trips / child | 188 | 49 |
| 25 early childhood centre children | 60% | 1.2 trips / child | 1 trip / child | 0.25 trips / child | 25 | 6 |
| 9 special needs students | 90% | 1.8 trips / child | 1.8 tips / child | 0.45 trips / child | 16 | 4 |
| Total | | | | | 229 | 59 |

**Table 3: Predicted car mode share for staff**

| **Scenario 2028/2030** | | | **AM peak hour Trip rate** | **PM peak hour Trip rate** | **AM peak trips** (in 100%) | **PM peak trips** (out 100%) |
|---|---|---|---|---|---|---|
| 31 staff (total, all facilities) | | | 0.5 trips / staff | 0.33 trips / staff | 16 | 10 |

Memo

## SUMMARY

This memorandum sets out the core transport-related assumptions for a potential future primary school in the Wairaka Precinct, as based on discussions with the Ministry of Education and their consultants, and research undertaken by Stantec. It is prepared to document these assumptions for inclusion in a precinct wide ITA (Integrated Transport Assessment) for the Wairaka Precinct.

The assumptions include a primary school that has a school roll of approximately 375 children by around 2028-2030, with 25 early childhood education students and 9 special needs students also provided for in the collocated facilities, with a total of 31 staff. In the longer run (outside of the traffic model timeframe of the ITA), it is expected that these numbers are likely to double.

The location of the school expected to be in or near the centre of the Precinct, will allow very high non-car mode share to be realized among primary school students, with a 70% mode share of walking cycling and public transport, in line with other high-performing primary schools already existing in Auckland.

To assess the remaining impact of vehicle trips created by the remaining car mode share, a first principles assessment (underpinned by existing research) has been undertaken, which indicates that the trip generation to be included in the traffic model is 245 vehicle trips (student and staff) in the morning peak, and 69 vehicle trips (student and staff) during the afternoon (general network) peak.

# Appendix C Traffic Counts and Calibration Results

**Observed vs Modelled Turn Counts (Cars Only)**
AM Peak (07:45-08:45)

| | Count | % | Target |
|---|---|---|---|
| <5 | 143 | 93% | 85% |
| <7.5 | 150 | 98% | 90% |
| <10 | 151 | 99% | 95% |
| All | 153 | | |

| Intersection | Approach | Turn | Observed | Modelled | Difference | Difference (%) | GEH |
|---|---|---|---|---|---|---|---|
| Carrington Rd / New North Rd / Mount Albert Rd | S | Right | 107 | 102 | -5 | -4 | 0.5 |
| | S | Thru | 192 | 173 | -19 | -10 | 1.4 |
| | S | Left | 19 | 25 | 6 | 33 | 1.3 |
| | E | Right | 120 | 118 | -2 | -2 | 0.2 |
| | E | Thru | 199 | 204 | 5 | 3 | 0.4 |
| | N | Right | 59 | 85 | 26 | 45 | 3.1 |
| | N | Thru | 147 | 145 | -2 | -1 | 0.2 |
| | N | Left | 108 | 130 | 22 | 20 | 2.0 |
| | W | Left | 48 | 71 | 23 | 49 | 3.0 |
| | W | Right | 15 | 38 | 23 | 155 | 4.5 |
| | W | Thru | 792 | 907 | 115 | 14 | 3.9 |
| Carrington Rd / Prospero Tce | E | Right | 1 | 8 | 7 | 660 | 3.2 |
| | E | Left | 31 | 21 | -10 | -32 | 1.9 |
| | N | Left | 8 | 10 | 2 | 30 | 0.8 |
| | S | Right | 21 | 14 | -7 | -33 | 1.6 |
| Carrington Rd / Willcott St | W | Left | 234 | 83 | -151 | -65 | 12.0 |
| | N | Right | 35 | 18 | -18 | -50 | 3.4 |
| | S | Left | 20 | 14 | -6 | -30 | 1.5 |
| Carrington Rd / Counsel Tce | E | Right | 2 | 14 | 12 | 615 | 4.3 |
| | E | Left | 51 | 33 | -18 | -35 | 2.8 |
| | N | Left | 9 | 7 | -2 | -23 | 0.7 |
| | S | Right | 70 | 55 | -15 | -22 | 1.9 |
| Carrington Rd / Benfield Ave | W | Right | 5 | 5 | -1 | -10 | 0.2 |
| | W | Left | 107 | 17 | -90 | -84 | 11.5 |
| | N | Right | 2 | 12 | 10 | 480 | 3.7 |
| Woodward Rd / Carrington Rd | N | Right | 191 | 221 | 30 | 16 | 2.1 |
| | N | Thru | 233 | 312 | 79 | 34 | 4.8 |
| | W | Left | 654 | 617 | -37 | -6 | 1.5 |
| | S | Thru | 399 | 395 | -4 | -1 | 0.2 |
| | S | Left | 22 | 7 | -15 | -68 | 3.9 |
| Seaview Tce / Carrington Rd | E | Right | 20 | 25 | 5 | 27 | 1.1 |
| | E | Left | 80 | 73 | -7 | -9 | 0.8 |
| | N | Left | 22 | 22 | 0 | 1 | 0.0 |
| | S | Right | 94 | 77 | -17 | -18 | 1.8 |
| Unitec Gate 4 / Carrington Rd | N | Right | 200 | 167 | -33 | -16 | 2.4 |
| | N | Thru | 336 | 444 | 108 | 32 | 5.4 |
| | W | Right | 39 | 39 | 0 | -1 | 0.1 |
| | S | Thru | 633 | 653 | 20 | 3 | 0.8 |
| | S | Left | 267 | 305 | 38 | 14 | 2.2 |
| | W | Left | 25 | 27 | 2 | 8 | 0.4 |
| Fifth Av / Carrington Rd | E | Right | 33 | 38 | 5 | 15 | 0.9 |
| | E | Left | 19 | 14 | -5 | -24 | 1.1 |
| | N | Left | 12 | 10 | -2 | -15 | 0.5 |
| | S | Right | 9 | 10 | 1 | 8 | 0.2 |
| Unitec Gate 3 / Carrington Rd | N | Right | 92 | 103 | 11 | 12 | 1.1 |
| | N | Thru | 573 | 610 | 37 | 7 | 1.5 |
| | S | Thru | 584 | 665 | 81 | 14 | 3.3 |
| | S | Left | 57 | 43 | -14 | -24 | 1.9 |
| Fontenoy St / Carrington Rd | E | Right | 21 | 26 | 5 | 24 | 1.1 |
| | E | Left | 65 | 58 | -7 | -11 | 0.9 |
| | N | Left | 11 | 14 | 3 | 29 | 0.9 |
| | S | Right | 10 | 6 | -4 | -37 | 1.3 |
| Segar Ave / Carrington Rd | E | Right | 48 | 51 | 3 | 6 | 0.4 |
| | E | Left | 12 | 7 | -5 | -43 | 1.7 |
| | N | Left | 9 | 12 | 3 | 33 | 0.9 |
| | S | Right | 4 | 3 | -1 | -20 | 0.4 |
| Unitec Gate 2 / Carrington Rd | N | Right | 36 | 65 | 29 | 81 | 4.1 |
| | N | Thru | 645 | 673 | 28 | 4 | 1.1 |
| | W | Right | 14 | 4 | -10 | -69 | 3.2 |
| | W | Left | 9 | 51 | 42 | 466 | 7.7 |
| | S | Thru | 629 | 708 | 79 | 12 | 3.0 |
| | S | Left | 27 | 39 | 12 | 45 | 2.1 |
| Great North Rd / Point Chevalier Rd / Carrington Rd | S | Thru | 188 | 221 | 33 | 17 | 2.3 |
| Carrington Rd / New North Rd / Mount Albert Rd | E | Left | 38 | 39 | 1 | 2 | 0.1 |
| Great North Rd / Point Chevalier Rd / Carrington Rd | S | Right | 209 | 302 | 93 | 44 | 5.8 |
| | N | Right | 271 | 265 | -6 | -2 | 0.4 |
| | N | Thru | 129 | 146 | 17 | 13 | 1.4 |
| | E | Right | 44 | 47 | 3 | 8 | 0.5 |
| | E | Thru | 100 | 88 | -12 | -12 | 1.2 |
| | W | Right | 499 | 540 | 41 | 8 | 1.8 |
| | W | Thru | 1050 | 1045 | -5 | 0 | 0.1 |
| | S | Left | 185 | 242 | 57 | 31 | 3.9 |
| | W | Left | 637 | 640 | 3 | 1 | 0.1 |
| | N | Left | 52 | 49 | -3 | -5 | 0.4 |
| Unitec Gate 1 / Carrington Rd | N | Right | 101 | 128 | 27 | 27 | 2.5 |
| | N | Thru | 706 | 733 | 27 | 4 | 1.0 |
| | W | Left | 30 | 58 | 28 | 94 | 4.2 |
| | W | Right | 4 | 7 | 3 | 63 | 1.1 |
| | S | Thru | 580 | 725 | 145 | 25 | 5.7 |
| | S | Left | 36 | 31 | -5 | -14 | 0.9 |

**Observed vs Modelled Turn Counts (Cars Only)**
AM Peak (07:45-08:45)

| | Count | % | Target |
|---|---|---|---|
| <5 | 143 | 93% | 85% |
| <7.5 | 150 | 98% | 90% |
| <10 | 151 | 99% | 95% |
| All | 153 | | |

| Intersection | Approach | Turn | Observed | Modelled | Difference | Difference (%) | GEH |
|---|---|---|---|---|---|---|---|
| Woodward Rd / New North Rd / Richardson Rd | N | Thru | 133 | 119 | -14 | -11 | 1.3 |
| | N | Right | 81 | 85 | 4 | 5 | 0.5 |
| | E | Right | 34 | 20 | -14 | -40 | 2.6 |
| | E | Left | 63 | 69 | 6 | 9 | 0.7 |
| | E | Thru | 234 | 226 | -8 | -3 | 0.5 |
| | S | Right | 57 | 67 | 10 | 17 | 1.3 |
| | S | Left | 39 | 48 | 9 | 22 | 1.3 |
| | W | Left | 353 | 410 | 57 | 16 | 2.9 |
| | W | Thru | 894 | 893 | -1 | 0 | 0.0 |
| | W | Right | 158 | 145 | -13 | -8 | 1.1 |
| | N | Left | 28 | 52 | 24 | 85 | 3.8 |
| Woodward Rd / Jersey Ave | W | Left | 4 | 8 | 4 | 93 | 1.5 |
| | W | Right | 6 | 9 | 3 | 43 | 1.0 |
| | S | Left | 1 | 21 | 20 | 1980 | 6.0 |
| Woodward Rd / Harbutt Ave / Willcott St | S | Left | 8 | 15 | 7 | 84 | 2.0 |
| | S | Thru | 548 | 608 | 60 | 11 | 2.5 |
| | S | Right | 85 | 31 | -54 | -63 | 7.1 |
| | W | Right | 13 | 31 | 18 | 135 | 3.8 |
| | W | Left | 52 | 10 | -42 | -80 | 7.4 |
| | W | Thru | 23 | 10 | -13 | -55 | 3.1 |
| | N | Thru | 214 | 219 | 5 | 2 | 0.4 |
| | N | Right | 10 | 10 | 0 | -3 | 0.1 |
| | N | Left | 33 | 16 | -17 | -51 | 3.4 |
| | E | Left | 35 | 12 | -23 | -65 | 4.7 |
| | E | Thru | 6 | 0 | -6 | -98 | 3.4 |
| | E | Right | 5 | 5 | -1 | -10 | 0.2 |
| Harbutt Ave / Jerram St | E | Right | 2 | 13 | 11 | 560 | 4.1 |
| | E | Thru | 4 | 11 | 7 | 183 | 2.6 |
| | N | Left | 7 | 17 | 10 | 147 | 3.0 |
| | N | Right | 4 | 0 | -4 | -100 | 2.8 |
| | W | Thru | 16 | 12 | -4 | -24 | 1.0 |
| | W | Left | 1 | 0 | -1 | -100 | 1.4 |
| Woodward Rd / Fairleigh Ave | S | Left | 3 | 7 | 4 | 123 | 1.7 |
| | N | Right | 1 | 5 | 4 | 430 | 2.4 |
| | W | Right | 18 | 26 | 8 | 43 | 1.6 |
| | W | Left | 5 | 9 | 4 | 80 | 1.5 |
| Fairleigh Ave / Jerram St | E | Right | 0 | 1 | 1 | -- | 1.6 |
| | E | Left | 0 | 9 | 9 | -- | 4.2 |
| | N | Left | 4 | 6 | 2 | 60 | 1.1 |
| | N | Thru | 8 | 9 | 1 | 6 | 0.2 |
| | S | Right | 1 | 9 | 8 | 760 | 3.5 |
| | S | Thru | 2 | 5 | 3 | 130 | 1.4 |
| Springleigh Ave / Jerram St | S | Left | 1 | 5 | 4 | 360 | 2.2 |
| | S | Right | 9 | 1 | -8 | -86 | 3.4 |
| | W | Right | 0 | 8 | 8 | -- | 3.9 |
| | W | Thru | 15 | 6 | -9 | -59 | 2.7 |
| | E | Left | 8 | 7 | -1 | -11 | 0.3 |
| | E | Thru | 7 | 4 | -3 | -49 | 1.5 |
| Springleigh Ave / Laurel St | W | Left | 1 | 0 | -1 | -100 | 1.4 |
| | W | Thru | 23 | 8 | -16 | -67 | 4.0 |
| | N | Right | 5 | 7 | 2 | 42 | 0.9 |
| | N | Left | 16 | 6 | -10 | -63 | 3.1 |
| | E | Thru | 10 | 4 | -6 | -63 | 2.4 |
| | E | Right | 8 | 0 | -8 | -100 | 4.0 |
| Springleigh Ave / Renton Rd | N | Left | 9 | 11 | 2 | 23 | 0.7 |
| | E | Right | 2 | 11 | 9 | 445 | 3.5 |
| Springleigh Ave / Rhodes Ave | E | Right | 1 | 0 | -1 | -100 | 1.4 |
| | N | Left | 8 | 18 | 10 | 123 | 2.7 |
| | N | Right | 1 | 0 | -1 | -100 | 1.4 |
| Woodward Rd / Springleigh Ave | N | Right | 27 | 29 | 2 | 8 | 0.4 |
| | W | Left | 42 | 37 | -5 | -11 | 0.7 |
| | W | Right | 55 | 31 | -24 | -43 | 3.6 |
| | S | Left | 39 | 28 | -11 | -29 | 2.0 |
| Springleigh Ave / Mark Rd | N | Left | 31 | 26 | -5 | -17 | 1.0 |
| | N | Right | 1 | 0 | -1 | -100 | 1.4 |
| | E | Right | 44 | 42 | -2 | -5 | 0.3 |
| | W | Left | 4 | 0 | -4 | -100 | 2.8 |
| Unitec Gate 3 / Carrington Rd | W | Right | 12 | 4 | -8 | -69 | 3.0 |
| | W | Left | 12 | 21 | 9 | 78 | 2.3 |
| Carrington Rd / Willcott St | W | Right | 87 | 37 | -50 | -57 | 6.3 |
| Woodward Rd / Carrington Rd | W | Right | 14 | 14 | 0 | 1 | 0.1 |
| Great North Rd / Point Chevalier Rd / Carrington Rd | E | Left | 149 | 178 | 29 | 20 | 2.3 |
| Woodward Rd / New North Rd / Richardson Rd | S | Thru | 250 | 240 | -10 | -4 | 0.7 |

**Observed vs Modelled Turn Counts (Cars Only)**
PM Peak (16:45-17:45)

| | Count | % | Target |
|---|---|---|---|
| <5 | 147 | 94% | 85% |
| <7.5 | 153 | 98% | 90% |
| <10 | 156 | 100% | 95% |
| All | 156 | | |

| Intersection | Approach | Turn | Observed | Modelled | Difference | Difference (%) | GEH |
|---|---|---|---|---|---|---|---|
| Carrington Rd / New North Rd / Mount Albert Rd | S | Right | 53 | 60 | 7 | 14 | 1.0 |
| | S | Thru | 153 | 156 | 3 | 2 | 0.2 |
| | S | Left | 37 | 40 | 3 | 8 | 0.5 |
| | E | Right | 126 | 123 | -3 | -3 | 0.3 |
| | E | Thru | 763 | 734 | -29 | -4 | 1.1 |
| | N | Right | 115 | 181 | 66 | 57 | 5.4 |
| | N | Thru | 138 | 141 | 3 | 2 | 0.2 |
| | N | Left | 77 | 71 | -6 | -8 | 0.7 |
| | W | Left | 51 | 96 | 45 | 88 | 5.2 |
| | W | Right | 42 | 57 | 15 | 36 | 2.2 |
| | W | Thru | 310 | 334 | 24 | 8 | 1.4 |
| Carrington Rd / Prospero Tce | E | Right | 6 | 5 | -1 | -15 | 0.4 |
| | E | Left | 30 | 28 | -2 | -8 | 0.4 |
| | N | Left | 4 | 5 | 1 | 23 | 0.4 |
| | S | Right | 11 | 10 | -1 | -10 | 0.3 |
| Carrington Rd / Willcott St | W | Left | 35 | 13 | -22 | -63 | 4.5 |
| | N | Right | 34 | 26 | -8 | -25 | 1.5 |
| | S | Left | 66 | 74 | 8 | 12 | 0.9 |
| Carrington Rd / Counsel Tce | E | Right | 7 | 14 | 7 | 103 | 2.2 |
| | E | Left | 59 | 41 | -18 | -31 | 2.6 |
| | N | Left | 6 | 6 | 0 | 0 | 0.0 |
| | S | Right | 39 | 43 | 4 | 11 | 0.7 |
| Carrington Rd / Benfield Ave | W | Right | 2 | 1 | -1 | -30 | 0.5 |
| | W | Left | 8 | 2 | -6 | -79 | 2.9 |
| | N | Right | 10 | 12 | 2 | 22 | 0.7 |
| | S | Left | 13 | 0 | -13 | -99 | 5.0 |
| Woodward Rd / Carrington Rd | N | Right | 437 | 363 | -74 | -17 | 3.7 |
| | N | Thru | 323 | 333 | 10 | 3 | 0.5 |
| | W | Left | 278 | 276 | -2 | -1 | 0.1 |
| | S | Thru | 259 | 266 | 7 | 3 | 0.4 |
| | S | Left | 39 | 14 | -25 | -63 | 4.8 |
| Seaview Tce / Carrington Rd | E | Right | 10 | 19 | 9 | 91 | 2.4 |
| | E | Left | 87 | 74 | -14 | -16 | 1.5 |
| | N | Left | 46 | 38 | -8 | -17 | 1.2 |
| | S | Right | 84 | 88 | 4 | 4 | 0.4 |
| Unitec Gate 4 / Carrington Rd | N | Right | 72 | 50 | -22 | -31 | 2.8 |
| | N | Thru | 516 | 477 | -39 | -8 | 1.8 |
| | W | Right | 197 | 183 | -14 | -7 | 1.0 |
| | S | Thru | 375 | 363 | -12 | -3 | 0.6 |
| | S | Left | 107 | 114 | 7 | 7 | 0.7 |
| | W | Left | 121 | 142 | 21 | 17 | 1.8 |
| Fifth Av / Carrington Rd | E | Right | 19 | 21 | 2 | 9 | 0.4 |
| | E | Left | 10 | 10 | 0 | -4 | 0.1 |
| | N | Left | 22 | 15 | -7 | -31 | 1.6 |
| | S | Right | 14 | 18 | 4 | 29 | 1.0 |
| Unitec Gate 3 / Carrington Rd | N | Right | 92 | 95 | 3 | 3 | 0.3 |
| | N | Thru | 553 | 512 | -41 | -7 | 1.8 |
| | S | Thru | 434 | 470 | 36 | 8 | 1.7 |
| | S | Left | 50 | 36 | -14 | -27 | 2.1 |
| Fontenoy St / Carrington Rd | E | Right | 5 | 9 | 4 | 82 | 1.5 |
| | E | Left | 28 | 23 | -5 | -19 | 1.0 |
| | N | Left | 32 | 34 | 2 | 7 | 0.4 |
| | S | Right | 28 | 34 | 6 | 21 | 1.1 |
| Segar Ave / Carrington Rd | E | Right | 41 | 40 | -2 | -4 | 0.2 |
| | E | Left | 6 | 5 | -1 | -15 | 0.4 |
| | N | Left | 29 | 34 | 5 | 19 | 1.0 |
| | S | Right | 7 | 3 | -4 | -51 | 1.6 |
| Unitec Gate 2 / Carrington Rd | N | Right | 6 | 25 | 19 | 317 | 4.8 |
| | N | Thru | 656 | 631 | -25 | -4 | 1.0 |
| | W | Right | 19 | 18 | -1 | -6 | 0.3 |
| | W | Left | 31 | 48 | 17 | 53 | 2.6 |
| | S | Thru | 569 | 577 | 8 | 1 | 0.3 |
| | S | Left | 7 | 5 | -2 | -23 | 0.6 |
| Great North Rd / Point Chevalier Rd / Carrington Rd | S | Thru | 208 | 196 | -12 | -6 | 0.8 |
| Carrington Rd / New North Rd / Mount Albert Rd | E | Left | 50 | 58 | 8 | 17 | 1.1 |
| Great North Rd / Point Chevalier Rd / Carrington Rd | S | Right | 210 | 201 | -9 | -4 | 0.6 |
| | N | Right | 554 | 522 | -33 | -6 | 1.4 |
| | N | Thru | 186 | 183 | -3 | -1 | 0.2 |
| | E | Right | 78 | 97 | 19 | 24 | 2.0 |
| | E | Thru | 586 | 553 | -33 | -6 | 1.4 |
| | W | Right | 235 | 281 | 46 | 20 | 2.9 |
| | W | Thru | 275 | 273 | -2 | -1 | 0.1 |
| | S | Left | 301 | 320 | 19 | 6 | 1.1 |
| | W | Left | 386 | 383 | -3 | -1 | 0.2 |
| | N | Left | 37 | 43 | 6 | 15 | 0.9 |
| Unitec Gate 1 / Carrington Rd | N | Right | 24 | 41 | 17 | 69 | 2.9 |
| | N | Thru | 612 | 590 | -22 | -4 | 0.9 |
| | W | Left | 77 | 92 | 15 | 19 | 1.6 |
| | W | Right | 29 | 27 | -3 | -9 | 0.5 |
| | S | Thru | 614 | 617 | 3 | 1 | 0.1 |
| | S | Left | 8 | 5 | -3 | -41 | 1.3 |

**Observed vs Modelled Turn Counts (Cars Only)**

PM Peak (16:45-17:45)

| | Count | % | Target |
|---|---|---|---|
| <5 | 147 | 94% | 85% |
| <7.5 | 153 | 98% | 90% |
| <10 | 156 | 100% | 95% |
| All | 156 | | |

| Intersection | Approach | Turn | Observed | Modelled | Difference | Difference (%) | GEH |
|---|---|---|---|---|---|---|---|
| Woodward Rd / New North Rd / Richardson Rd | N | Thru | 221 | 166 | -55 | -25 | 4.0 |
| | N | Right | 201 | 181 | -21 | -10 | 1.5 |
| | E | Right | 23 | 5 | -18 | -77 | 4.7 |
| | E | Left | 94 | 109 | 15 | 16 | 1.5 |
| | E | Thru | 834 | 828 | -6 | -1 | 0.2 |
| | S | Right | 86 | 127 | 41 | 47 | 3.9 |
| | S | Left | 103 | 109 | 6 | 6 | 0.6 |
| | W | Left | 123 | 211 | 88 | 71 | 6.8 |
| | W | Thru | 354 | 330 | -24 | -7 | 1.3 |
| | W | Right | 108 | 97 | -11 | -10 | 1.0 |
| | N | Left | 31 | 32 | 1 | 4 | 0.2 |
| Woodward Rd / Jersey Ave | N | Right | 0 | 14 | 14 | -- | 5.4 |
| | W | Left | 0 | 7 | 7 | -- | 3.6 |
| | W | Right | 14 | 7 | -8 | -54 | 2.3 |
| | S | Left | 12 | 13 | 1 | 12 | 0.4 |
| Woodward Rd / Harbutt Ave / Willcott St | S | Left | 30 | 45 | 15 | 51 | 2.5 |
| | S | Thru | 308 | 277 | -31 | -10 | 1.8 |
| | S | Right | 39 | 28 | -11 | -28 | 1.9 |
| | W | Right | 16 | 19 | 3 | 20 | 0.8 |
| | W | Left | 29 | 16 | -14 | -47 | 2.9 |
| | W | Thru | 8 | 4 | -4 | -55 | 1.8 |
| | N | Thru | 381 | 325 | -56 | -15 | 3.0 |
| | N | Right | 6 | 20 | 14 | 233 | 3.9 |
| | N | Left | 38 | 1 | -37 | -98 | 8.4 |
| | E | Left | 48 | 43 | -6 | -11 | 0.8 |
| | E | Thru | 19 | 1 | -18 | -97 | 5.9 |
| | E | Right | 9 | 0 | -9 | -100 | 4.2 |
| Harbutt Ave / Jerram St | E | Right | 11 | 23 | 12 | 105 | 2.8 |
| | E | Thru | 24 | 31 | 7 | 29 | 1.3 |
| | N | Left | 6 | 11 | 5 | 80 | 1.7 |
| | N | Right | 13 | 0 | -13 | -97 | 4.9 |
| | W | Thru | 11 | 17 | 6 | 58 | 1.7 |
| | W | Left | 1 | 1 | -1 | -50 | 0.6 |
| Woodward Rd / Fairleigh Ave | S | Left | 9 | 12 | 3 | 33 | 0.9 |
| | N | Right | 10 | 9 | -1 | -9 | 0.3 |
| | W | Right | 5 | 10 | 5 | 98 | 1.8 |
| | W | Left | 3 | 9 | 6 | 187 | 2.3 |
| Fairleigh Ave / Jerram St | E | Right | 5 | 4 | -2 | -30 | 0.7 |
| | E | Left | 4 | 6 | 2 | 45 | 0.8 |
| | N | Left | 3 | 4 | 1 | 23 | 0.4 |
| | N | Thru | 11 | 5 | -6 | -51 | 2.0 |
| | S | Right | 2 | 5 | 3 | 135 | 1.5 |
| | S | Thru | 11 | 19 | 8 | 70 | 2.0 |
| Springleigh Ave / Jerram St | S | Left | 5 | 20 | 15 | 306 | 4.3 |
| | S | Right | 9 | 2 | -7 | -77 | 2.9 |
| | W | Right | 1 | 7 | 6 | 600 | 3.0 |
| | W | Thru | 15 | 9 | -7 | -43 | 1.9 |
| | E | Left | 37 | 2 | -35 | -94 | 7.9 |
| | E | Thru | 40 | 17 | -23 | -59 | 4.4 |
| Springleigh Ave / Laurel St | W | Left | 3 | 0 | -3 | -100 | 2.4 |
| | W | Thru | 21 | 11 | -10 | -50 | 2.6 |
| | N | Right | 1 | 2 | 1 | 120 | 0.9 |
| | N | Left | 10 | 4 | -7 | -65 | 2.5 |
| | E | Thru | 76 | 17 | -59 | -78 | 8.7 |
| | E | Right | 11 | 0 | -11 | -100 | 4.7 |
| Springleigh Ave / Renton Rd | N | Left | 3 | 6 | 3 | 83 | 1.2 |
| | E | Right | 5 | 22 | 17 | 334 | 4.6 |
| Springleigh Ave / Rhodes Ave | E | Right | 10 | 0 | -10 | -100 | 4.5 |
| | W | Left | 1 | 0 | -1 | -70 | 0.9 |
| | N | Left | 3 | 6 | 3 | 113 | 1.6 |
| | N | Right | 2 | 0 | -2 | -100 | 2.0 |
| Woodward Rd / Springleigh Ave | N | Right | 69 | 42 | -27 | -39 | 3.6 |
| | W | Left | 22 | 26 | 4 | 16 | 0.7 |
| | W | Right | 16 | 10 | -6 | -35 | 1.5 |
| | S | Left | 19 | 30 | 11 | 57 | 2.2 |
| Springleigh Ave / Mark Rd | N | Left | 14 | 10 | -4 | -29 | 1.2 |
| | N | Right | 2 | 0 | -2 | -100 | 2.0 |
| | E | Right | 25 | 33 | 8 | 33 | 1.5 |
| | W | Left | -1 | 0 | 1 | 100 | 0.0 |
| Unitec Gate 3 / Carrington Rd | W | Right | 18 | 19 | 1 | 3 | 0.1 |
| | W | Left | 103 | 100 | -4 | -3 | 0.3 |
| Carrington Rd / Willcott St | W | Right | 37 | 27 | -11 | -28 | 1.9 |
| Woodward Rd / Carrington Rd | W | Right | 9 | 10 | 1 | 7 | 0.2 |
| Great North Rd / Point Chevalier Rd / Carrington Rd | E | Left | 108 | 138 | 30 | 28 | 2.7 |
| Woodward Rd / New North Rd / Richardson Rd | S | Thru | 181 | 144 | -38 | -21 | 2.9 |

# Appendix D Meeting Minutes - Stantec / HUD / AT, 16 February 2020

Meeting note: Wairaka Precinct ITA

9.30 – 10.45am, 13 February 2020, Stantec Offices, 111 Carlton Gore, Auckland

**Attendees**

Terry Church, Flow (TC), Mitra Prasad (AT), Max Robitzsch, Stantec (MR), Hannah Mcgregor, HUD (HM), Trevor Lee Joe, Stantec (TLJ), Gabriela Surja, Stantec (GS), Tony Wicker, Stantec (TW)

**Discussion**

1) <u>Development and trip generation scenarios</u>

Terry Church (TC) noted:

- Agree in principle with the approach where there will be two scenarios of A @ roughly 40 percent HUD land buildout in 2024 and B @ roughly 80 percent in 2028 (acknowledging the years are indicative only and mainly intended for estimating background traffic)

- Considers there is some risk in not anticipating the 100% build out and potential further third-party development (NWO etc), and thus potentially underestimate the required long-term footprint of some internal roads and intersections with Carrington. Considers that full AIMSUN modelling of such greater build-out / other development not required - but suggests sensitivity testing of the key intersections onto Carrington with SIDRA.

Max Robitzsch (MR) responded that:

- Once 2028 modelling is nearing completion, Stantec will look at intersections which are close to capacity and test them with SIDRA for potential additional load, maybe in the order of 10-20% extra, and assess whether they are likely to "tip" and require consideration of added setbacks around intersections or key internal roads for potential extra capacity in the future.

2) <u>Trip generation assumptions</u>

- TC noted it is acceptable to have leaned on what was agreed between AT and Fletchers Living (FRL) for residential trip rates in the southwest, but with lower car ownership there is the potential for replacement vehicle trips – ubers, taxis etc. So TC raised whether it was appropriate to reduce trips by as much as 20% in B scenario, despite mode change trends.

- MR considered that these uber-style vehicle trips aren't primarily commuter-style trips from suburban locations, and that the proposed reductions would apply to zones located in a medium-density development close to a major PT spine. The resulting reduced rate also aligned well with literary research for similar medium-density development in suburban areas (relevant background research being provided as part of ITA).

- MR also clarified that the "rear" (western) residential areas are not proposed to be reduced in the same way even in B scenario, accounting for their greater walking distances to PT.

- With these clarifications, it was agreed that:

- Scenario A (~2024): all residential areas within the Precinct to adopt the same trip generation as the FRL rates for the Southern Precinct, and TC noted that this was, if anything, a conservative approach and some partial reductions might in fact occur (Note: Scenario A assumptions will stay unreduced unless further tweaks agreed).

- Scenario B (~2028): there will be 20% trip generation reduction from FRL residential rates for the zones with better walking and cycling access to Carrington Road and PT, i.e. the North-west, Northern, and Carrington zones as per the map of the first tab of the assumptions spreadsheet.

- It was noted that the Te Auaunga North zone has good access to main PT routes on Great North Road (short walking distance across Oakley Creek pedestrian bridge), however a trip generation reduction is not currently proposed for this zone.

    - Post-meeting note from Stantec: On further consideration, while the Te Auaunga North zone's approximate centre is just under 500m away from Carrington Road, it is much closer to this PT route than Fletchers southwestern zone. It is also less than 400m walking distance away from the bus stops of further frequent bus services on Great North Road (at Alford St intersection), providing extra accessibility.

    - As such, it is considered that not reducing this zone at all even in the longer-term scenario is too conservative. It is proposed to stay un-reduced in Scenario A, but that by Scenario B, it receive a 10% trip reduction, half that of the zones closer to Carrington Road.

*WDHB's Mason Clinic*

- Stantec confirmed incorporated based on a slightly slowed-down development approach i.e. that there is no increase in traffic until later on in their development timeframe, as the initial works are only replacement beds, but will check

- Stantec confirmed understanding that for the next couple of years, Mason Clinic is set to replace existing facilities/beds. Stantec to confirm the approach that has been taken for determining the future trip generation for Mason Clinic.

    - Post meeting note from Stantec: The trip generation for the future years have been determined by comparing the number of beds in 2016 with the future number of beds according to the Mason Clinic's latest masterplan, and adjusting the trip generation proportionally based on the 2016 Mason Clinic traffic survey. This is considered conservative as it does not consider any potential travel mode shift that is likely to happen in the future.

*Ministry of Education Primary School site*

- TC noted although based on Ministry of Education information that the school (primary, ECE and special education) will be operating at 50% capacity by 2028/2030, it is likely that an ECE will only begin operation at the intended full capacity of 50 children  not 25, due to commercial reasons. Traffic modelling for Scenario B (2028) is to assume 50 ECE students.

- For the primary school, TC suggested a sensitivity test on the capacity of Gate 3 for a 100% primary school enrolment to test long-term impacts. Similarly, TC noted that modelling for school drop off/ pick up (pass by and link diverted trips) needed to include traffic from throughout the site, coming from different directions, going to different exits, etc, rather than just being applied on one link.

- TC noted that the assumption of the PM peak hour trip rate being 25% of the AM peak hour trip rate seems a bit too high for the primary, ECE and special needs students. However, fine to leave it as is at the present time (partly as this assumption has been agreed with MOE).

- Although the assumption of 70% active mode and 30% car proportions for the primary school appear reasonable under appropriate transport conditions, and while acknowledging the very local school roll catchment, TC noted there is no way to influence infrastructure provision outside the school at NOR stage (i.e. MOE will not be contributing to the transport network itself). Therefore, provision for this level of walking / cycling needs to be anticipated by HUD at the design stage.

- MR noted, and HM agreed, that high-quality provision of walk/cycle infrastructure was key for the development's success overall and would be "baked in" as much as the ITA step reasonably allowed, for example via standard cross-sections and related space allowances for active modes. The Precinct rules and AT's requirements for vested new roads (key routes within the Precinct are to be vested) also require good active mode provision.

- Agreed between participants that detailed design of the internal street layout can be dealt through future consents/EPAs. For the Precinct ITA and the model itself, Stantec will produce a 'skeleton road network' that will show the main connections within the Precinct indicatively only, without finer-grain links, or claiming to show exact road alignments.

- However, as noted above, cross-sections will be provided for typical internal roads, with separate cross-sections for added capacity (if/where required) closer to Carrington Road and/or the school (depending on location, "added capacity" could mean more provision for active modes on key routes within the Precinct, rather than vehicle capacity).

- Similarly, concept layouts are also going to be prepared for the Carrington Road intersection accesses to/from the Precinct (the "gates" in the old Unitec parlance). These concepts will serve primarily to establish minimum intersection footprints required, rather than to set a fixed design for AT or HUD. This will also consider PT priority and active mode space needs.

*Residential typology assumptions*

- TC noted that he had some reservations regarding the blanket use of 1.5 bedroom with parking (1 car park) assumption for ALL of the HUD assumption development units (except for those in the FLR zone) in the trip generation assumptions.

- In this regard, MR and HM explained that the masterplanning of the site had not gone substantially above massing exercises and some typical block / building level layouts. As such, unlike the FRL southwestern development, no proposed typology split exists yet.

- The masterplan in its proposed examples focused strongly on 1 bedroom and 2 bedroom apartments, with very few 3 bedroom and no 4 bedroom units envisaged. Additionally, the site-wide HUD average for car parking is proposed to be under 1 per unit.

- As such, it is considered that a 1.5 bedroom assumption, with 1 car park each, is a good default value in the absence of future design. The inclusion of a number of larger apartments in the actual build-out will, in a vehicle trip generation sense, be balanced by the presence of studios and 1 bedroom apartments, some of which will have zero car parks.

3) Modelling (Methodology and Assumptions)

- Discussion occurred related to volume comparisons between the 2028 MSM plots and the 2019 survey. There is some difference in the level of traffic generated by the Precinct between the 2028 MSM and Stantec's Scenario B (~2028), roughly 300-400 extra vehicles in the AM peak, and a slightly more tidal (residential, leaving the area) pattern.

- However, in the larger scale of things, the 2028 MSM already includes significant development in the Precinct, which will which help with validity of the wider background data of the 2028 model being used in the ITA.

- The localised New North Road future vehicle traffic reductions, as observed from a comparison between the 2028 MSM data and 2019 survey data, are considered to be due to the ATAP Connected Community assumptions (provision for greater PT priority etc)

- Stantec has requested (currently awaiting) the 2018 MSM uncalibrated model data from the Auckland Forecasting Centre (AFC).

- Post-meeting note from Stantec: For the background traffic assumptions of the A scenario (no MSM model available for 2024), an interpolation between current and future (2028 MSM) traffic flows will be undertaken

- TC noted that it would not be necessary to re-run the MSM model but MSM data will be useful to help predict trip patterns in the area for the modelling. Noted that MSM is not a congestion model (i.e. it is a regional model) so it won't be as accurate in predicting mid-block traffic, or defined intersection layouts.

- TC suggested that the AFC be requested to undertake a Select Link Analysis (SLA) of links north and south of Gate 3, to understand where the traffic on Carrington Road is travelling from and to. This will help understanding the % of through traffic and how much background traffic could potentially be displaced by added local traffic.

- Stantec to request from AFC a cordon around the Precinct (including the main intersections of Pt Chev/Great North Road/Carrington Road and New North Road/) to assist in creating an O/D matrix and understand trip patterns related to these external junctions, and which flows would likely be affected by through traffic reduction assumptions – as well as identify the likely levels of such reductions.

4) Carrington Road (General)

- Discussed the impact of the Connected Communities project, which is likely to displace traffic off New North Road and Great North Road. Further discussion about the likely geographic constraints of the Carrington Road Upgrade, i.e. whether AT's eventual project would include the SH16 overbridge (maybe, but potentially not beyond measures such as walk/cycle clip-ons to free up road space as envisaged in the 2017 unfinished ITA) or extend further south past Woodward as far as Mt Albert Town Centre intersection (likely not, as the rail overbridge is a major constraint, and even if it was replaced, any gains there would then immediately be constrained again by the town centre itself).

- Regarding PT, TC noted that AT focus is generally targeting LOS C for PT corridors (ambitious) but with reliability the overriding key goal where this is not feasible. The modelling / ITA can assume that the future cross-sections of Carrington Road comprises two bus lanes (one in each direction), two general traffic lanes and walking / cycling facilities (fully protected cycleway etc). Intersection upgrades should provide reasonable level of PT priority.

- Post-meeting note by Stantec: Stantec will seek information from AFC regarding the high-level assumptions for Carrington Road and the modelled parts of GNR and NNR within the 2028 MSM model to ensure that there is no "double counting" of assumptions/upgrades.

- TC noted that AT (Gavin Smith) is only in the early stages of considering what might be required for a Business Case for the upgrade of Carrington Road. As such, the ITA will assist all stakeholders by identifying both demands and constraints better, which can then assist with future discussions.

# Appendix E Trip Generation per Land Use - Scenario A and Scenario B

| Colour code | Zones | Notes |
|---|---|---|
| Agreed with AT | Southern | Current FRL/NWO landholding |
| Agreed with developer / organisation | Northern | Current Crown landholding |
| Existing data/ Based on historical survey /2015 TA | Carrington | Current Crown landholding |
| To be confirmed | North-West | Current Crown landholding |
| | Te Auaunga North | Current Crown landholding |
| | Unitec Core | Area owned by Unitec, including F blocks and B blocks |
| | Taylor's | Area owned by Taylor's Laundry |

| Future trip generation factor | |
|---|---|
| Tertiary | 0.9 |
| Residential (North-We | 1 |
| Residential (Te Auaung | 1 |
| Residential (Southern | 1 |

## SCENARIO A

| Land Use / Activity | Developers / organisation | Development (Year 4 since development) | Zone | Unit | Total development per activity | Notes re. development assumption | AM Trip rate | AM Source | AM Trips | PM Trip rate | PM Source | PM Trips | Total trips AM (vehicles/hour) | Total trips PM (vehicles/hour) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Education | | | | FTE | 9,899 | | | | | | | | 1065 | 1065 |
| Tertiary Education | Unitec | | | | 9,899 | | | | | | | | 1065 | 1065 |
| Students | | 8820 | Unitec Core | FTE | | Based on the future target enrolment of 9800 (as per the Unitec Annual Report 2018), factored by 90% to consider the proportion of the number of students at the Mt Albert campus to the overall Unitec student numbers at both campuses. | 0.10 | The base rate of 0.11 is based on Trip Generation Manual (2017) Trip rate for Junior/Community College in general urban/suburban area, and cross-checks with past trip surveys. A reduction of 10% has been applied to the base rate to account for a growing multi-modal accessibility. | 873 | 0.10 | The base rate of 0.11 is based on Trip Generation Manual (2017) Trip rate for Junior/Community College in general urban/suburban area, and cross-checks with past trip surveys. A reduction of 10% has been applied to the base rate to account for a growing multi-modal accessibility. | 873 | | |
| Staff | | 1079 | Unitec Core | FTE | | Estimated based on the 2018 (latest) proportion of staff to students, factored to account for the projected future student FTE. | 0.18 | Based on the 2014, 2016, and 2018 Tertiary Student Travel Surveys, the average share of car travel (all types) for the Unitec Mt Albert students is 47%. In comparison, the 2016 staff travel survey indicates that 83% of Unitec Mt Albert staff travelled by car (including carpool). The proportion of the %car mode share for students and staff is assumed to be 47% to 83%, (i.e. 1 : 1.8) and as a result, the staff trip rate is assumed to be 1.8x higher than the student base rate. Similar to the student trip rate, the staff trip rate has been reduced by 10% to account for growing multi-modal accessibility. | 192 | 0.18 | Based on the 2014, 2016, and 2018 Tertiary Student Travel Surveys, the average share of car travel (all types) for the Unitec Mt Albert students is 47%. In comparison, the 2016 staff travel survey indicates that 83% of Unitec Mt Albert staff travelled by car (including carpool). The proportion of the %car mode share for students and staff is assumed to be 47% to 83%, (i.e. 1 : 1.8) and as a result, the staff trip rate is assumed to be 1.8x higher than the student base rate. Similar to the student trip rate, the staff trip rate has been reduced by 10% to account for growing multi-modal accessibility. | 192 | | |
| Residential | | | | Dwelling units / beds ( | 1023 | | | | | | | | 483 | 483 |
| Studio and 1 / 1.5 bedroom without parking | | | | | 98 | | | | | | | | 34 | 34 |
| | Fletchers / NWO | 98 | Southern | Dwelling units | | Based on the information provided by HUD to Stantec in email dated 9/12/2019 and according to the FRL masterplan dated 10/9/2019 | 0.35 | Trip generation based on Transport Assessment Report for Unitec Masterplan Stage 1 by Commute, dated 4 July 2019. Number of units based on the Masterplan Draft 03 dated 10/9/2019 | 34 | 0.35 | Trip generation based on Transport Assessment Report for Unitec Masterplan Stage 1 by Commute, dated 4 July 2019. Number of units based on the Masterplan Draft 03 dated 10/9/2019 | 34 | | |
| | HUD | 0 | Northern | Dwelling units | | all HUD dwellings are assumed as "1.5 bedroom apartments with parking" due to the expected housing types and parking provisions indicated in the HUD Masterplan (Feb 2019). | 0.35 | As per the trip rates agreed between Fletchers/NWO and AT for the southwest of the Precinct above (conservative) | 0 | 0.35 | As per the trip rates agreed between Fletchers/NWO and AT for the southwest of the Precinct above (conservative) | 0 | | |
| | | 0 | Carrington | Dwelling units | | as above | 0.35 | as above | 0 | 0.35 | as above | 0 | | |
| | | 0 | North-West | Dwelling units | | as above | 0.35 | as above | 0 | 0.35 | as above | 0 | | |
| | | 0 | Te Auaunga North | Dwelling units | | as above | 0.35 | as above | 0 | 0.35 | as above | 0 | | |
| | Unitec | 0 | Unitec Core | Dwelling units | | Assumed none as no information available | 0.35 | as above | 0 | 0.35 | as above | 0 | | |
| 1.5 Bedroom with parking | | | | | 565 | | | | | | | | 226 | 226 |
| | Fletchers / NWO | 11 | Southern | Dwelling units | | Based on the information provided by HUD to Stantec in email dated 9/12/2019 and according to the FRL masterplan dated 10/9/2019 | 0.4 | Trip generation based on Transport Assessment Report for Unitec Masterplan Stage 1 by Commute, dated 4 July 2019. Number of units based on the Masterplan Draft 03 dated 10/9/2019 | 4 | 0.4 | Trip generation based on Transport Assessment Report for Unitec Masterplan Stage 1 by Commute, dated 4 July 2019. Number of units based on the Masterplan Draft 03 dated 10/9/2019 | 4 | | |
| | HUD | 282 | Northern | Dwelling units | | all HUD dwellings are assumed as "1.5 bedroom apartments with parking" due to the expected housing types and parking provisions indicated in the HUD Masterplan (Feb 2019). | 0.4 | As per the trip rates agreed between Fletchers/NWO and AT for the southwest of the Precinct above (conservative) | 113 | 0.4 | As per the trip rates agreed between Fletchers/NWO and AT for the southwest of the Precinct above (conservative) | 113 | | |
| | | 208 | Carrington | Dwelling units | | as above | 0.4 | as above | 83 | 0.4 | as above | 83 | | |
| | | 64 | North-West | Dwelling units | | as above | 0.4 | as above | 26 | 0.4 | as above | 26 | | |
| | | 0 | Te Auaunga North | Dwelling units | | as above | 0.4 | as above | 0 | 0.4 | as above | 0 | | |
| | Unitec | 0 | Unitec Core | Dwelling units | | Assumed none as no information available | 0.4 | as above | 0 | 0.4 | as above | 0 | | |
| 2 Bedroom | | | | | 183 | | | | | | | | 92 | 92 |
| | Fletchers / NWO | 183 | Southern | Dwelling units | | Based on the information provided by HUD to Stantec in email dated 9/12/2019 and according to the FRL masterplan dated 10/9/2019 | 0.5 | Trip generation based on Transport Assessment Report for Unitec Masterplan Stage 1 by Commute, dated 4 July 2019. Number of units based on the Masterplan Draft 03 dated 10/9/2019 | 92 | 0.5 | Trip generation based on Transport Assessment Report for Unitec Masterplan Stage 1 by Commute, dated 4 July 2019. Number of units based on the Masterplan Draft 03 dated 10/9/2019 | 92 | | |
| | HUD | 0 | Northern | Dwelling units | | all HUD dwellings are assumed as "1.5 bedroom apartments with parking" due to the expected housing types and parking provisions indicated in the HUD Masterplan (Feb 2019). | 0.5 | As per the trip rates agreed between Fletchers/NWO and AT for the southwest of the Precinct above (conservative) | 0 | 0.5 | As per the trip rates agreed between Fletchers/NWO and AT for the southwest of the Precinct above (conservative) | 0 | | |
| | | 0 | Carrington | Dwelling units | | as above | 0.5 | as above | 0 | 0.5 | as above | 0 | | |
| | | 0 | North-West | Dwelling units | | as above | 0.5 | as above | 0 | 0.5 | as above | 0 | | |
| | | 0 | Te Auaunga North | Dwelling units | | as above | 0.5 | as above | 0 | 0.5 | as above | 0 | | |
| | Unitec | 0 | Unitec Core | Dwelling units | | Assumed none as no information available | 0.5 | as above | 0 | 0.5 | as above | 0 | | |
| 2.5 Bedroom | | | | | 95 | | | | | | | | 62 | 62 |
| | Fletchers / NWO | 95 | Southern | Dwelling units | | Based on the information provided by HUD to Stantec in email dated 9/12/2019 and according to the FRL masterplan dated 10/9/2019 | 0.65 | Trip generation based on Transport Assessment Report for Unitec Masterplan Stage 1 by Commute, dated 4 July 2019. Number of units based on the Masterplan Draft 03 dated 10/9/2019 | 62 | 0.65 | Trip generation based on Transport Assessment Report for Unitec Masterplan Stage 1 by Commute, dated 4 July 2019. Number of units based on the Masterplan Draft 03 dated 10/9/2019 | 62 | | |
| | HUD | 0 | Northern | Dwelling units | | all HUD dwellings are assumed as "1.5 bedroom apartments with parking" due to the expected housing types and parking provisions indicated in the HUD Masterplan (Feb 2019). | 0.65 | As per the trip rates agreed between Fletchers/NWO and AT for the southwest of the Precinct above (conservative) | 0 | 0.65 | As per the trip rates agreed between Fletchers/NWO and AT for the southwest of the Precinct above (conservative) | 0 | | |
| | | 0 | Carrington | Dwelling units | | as above | 0.65 | as above | 0 | 0.65 | as above | 0 | | |
| | | 0 | North-West | Dwelling units | | as above | 0.65 | as above | 0 | 0.65 | as above | 0 | | |

**Colour code**
- Agreed with AT
- Agreed with developer / organisation
- Existing data/ Based on historical survey /2015 TA
- To be confirmed

| Zones | Notes |
|---|---|
| Southern | Current FRL/NWO landholding |
| Northern | Current Crown landholding |
| Carrington | Current Crown landholding |
| North-West | Current Crown landholding |
| Te Auaunga North | Current Crown landholding |
| Unitec Core | Area owned by Unitec, including F blocks and B blocks |
| Taylor's | Area owned by Taylor's Laundry |

| Future trip generation factor | |
|---|---|
| Tertiary | 0.9 |
| Residential (North-We | 1 |
| Residential (Te Auaung | 1 |
| Residential (Southern : | 1 |

## SCENARIO A

| Land Use / Activity | Developers / organisation | Development (Year 4 since development) | Zone | Unit | Total development per activity | Notes re. development assumption | AM Trip rate | AM Source | AM Trips | PM Trip rate | PM Source | PM Trips | Total trips AM (vehicles/hour) | Total trips PM (vehicles/hour) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | Te Auaunga North | Dwelling units | | as above | 0.65 | as above | 0 | 0.65 | as above | 0 | | |
| | Unitec | 0 | Unitec Core | Dwelling units | | Assumed none as no information available | 0.65 | as above | 0 | 0.65 | as above | 0 | | |
| 3 and 4 Bedroom | | | | | 82 | | | | | | | | 70 | 70 |
| | Fletchers / NWO | 82 | Southern | Dwelling units | | Based on the information provided by HUD to Stantec in email dated 9/12/2019 and according to the FRL masterplan dated 10/9/2019 all HUD dwellings are assumed as "1.5 bedroom apartments with parking" due to the expected housing types and parking provisions indicated in the HUD Masterplan (Feb 2019). | 0.85 | Trip generation based on Transport Assessment Report for Unitec Masterplan Stage 1 by Commute, dated 4 July 2019. Number of units based on the Masterplan Draft 03 dated 10/9/2019 As per the trip rates agreed between Fletchers/NWO and AT for the southwest of the Precinct above (conservative) | 70 | 0.85 | Trip generation based on Transport Assessment Report for Unitec Masterplan Stage 1 by Commute, dated 4 July 2019. Number of units based on the Masterplan Draft 03 dated 10/9/2019 As per the trip rates agreed between Fletchers/NWO and AT for the southwest of the Precinct above (conservative) | 70 | | |
| | HUD | 0 | Northern | Dwelling units | | | 0.85 | | 0 | 0.85 | | 0 | | |
| | | 0 | Carrington | Dwelling units | | as above | 0.85 | as above | 0 | 0.85 | as above | 0 | | |
| | | 0 | North-West | Dwelling units | | as above | 0.85 | as above | 0 | 0.85 | as above | 0 | | |
| | | 0 | Te Auaunga North | Dwelling units | | as above | 0.85 | as above | 0 | 0.85 | as above | 0 | | |
| | Unitec | 0 | Unitec Core | Dwelling units | | Assumed none as no information available | 0.85 | as above | 0 | 0.85 | as above | 0 | | |
| Student Housing | | | | | 0 | | | | | | | | 0 | 0 |
| | Unitec | 0 | Unitec Core | Beds | | Assumed none as the existing student housing in Southern zone will be replaced by housing, and no information is available on new development. | 0.08 | Assumes 1 car park per 6 student beds, and 50% of carpark owners driving | 0 | 0.08 | Assumes 1 car park per 6 student beds, and 50% of carpark owners driving | 0 | | |
| Commercial | | | | | 65 | | | | | | | | 21 | 35 |
| Services | Taylors Laundry | 65 | Taylor's | 100 sqm | 65 | As per existing area of Taylor's Laundry. | n/a | Survey 2014 and existing land use | 21 | n/a | Survey 2014 and existing land use | 35 | 21 | 35 |
| Business Partnerships / Offices | | 0 | Unitec Core | 100 sqm | 0 | Assumed none as no information available. | 1.92 | 0.2 higher than the RTA Guide's updated study of 10 PT friendly office developments in Sydney (located outside CBD), NSW, 2013 - Sydney rate is 1.6 per 100m2 GFA in morning peak hour. | 0 | 1.44 | 0.2 higher than the RTA Guide's updated study of 10 PT friendly office developments in Sydney (located outside CBD), NSW, 2013 - Sydney rate is 1.2 per 100m2 GFA in evening peak hour. | 0 | 0 | 0 |
| Other land uses | | | | | 121 | | | | | | | | 100 | 39 |
| Health | Mason Clinic | 121 | Northern | beds | 121 | Based on the 2019 Mason Clinic Masterplan, as provided to Stantec by Flow. | n/a | Based on the comparison between the expected number of beds by 2024 and the actual number of beds in 2016, and accordingly factoring the actual trips generated by Masons Clinic as surveyed in 2016. Note numbers are as provided by Flow on 23/01/2020 via email. | 100 | n/a | Based on the comparison between the expected number of beds by 2024 and the actual number of beds in 2016, and accordingly factoring the actual trips generated by Masons Clinic as surveyed in 2016. Note numbers are as provided by Flow on 23/01/2020 via email. | 39 | 100 | 39 |
| **Grand total trips** | | | | | | | | | | | | | 1670 | 1623 |

| Colour code |
|---|
| Agreed with AT |
| Agreed with developer / organisation |
| Existing data/ Based on historical survey /2015 TA |
| To be confirmed |

| Zones | Notes |
|---|---|
| Southern | Current FRL/NWO landholding |
| Northern | Current Crown landholding |
| Carrington | Current Crown landholding |
| North-West | Current Crown landholding |
| Te Auaunga North | Current Crown landholding |
| Unitec Core | Area owned by Unitec, including F blocks and B blocks |
| Taylor's | Area owned by Taylor's Laundry |

| Future trip generation factor | |
|---|---|
| Tertiary | 0.7 |
| Residential (North-West, Northern, C | 0.75 |
| Residential (Te Auaunga North) | 0.9 |
| Residential (Southern and Unitec Co | 0.95 |

## SCENARIO B

| Land Use / Activity | Developers / organisation | Development (Year 8 since development) | Zone | Unit | Total development per activity | Notes re. development assumption | AM Trip rate | AM Source | AM Trips | PM Trip rate | PM Source | PM Trips | Total trips AM (vehicles/hour) | Total trips PM (vehicles/hour) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Education | | | | FTE | 11,354 | | | | | | | | 1181 | 985 |
| Tertiary Education | Unitec | | | | 10,889 | | | | | | | | 912 | 912 |
| Students | | 9702 | Unitec Core | FTE | | Assuming 10% increase from the Scenario A student numbers. | 0.08 | Assuming 30% reduction in trip rate compared to Scenario A (student base trip rate of 0.11), based on the network congestion pushing more people onto PT and active modes, particularly since PT and active modes have been increased in quality too with Carrington. The reduction also takes into account that there is a higher likelihood for remote learning to become more common at this stage of the future. | 747 | 0.08 | Assuming 30% reduction in trip rate compared to Scenario A (student base trip rate of 0.11), based on the network congestion pushing more people onto PT and active modes, particularly since PT and active modes have been increased in quality too with Carrington. The reduction also takes into account that there is a higher likelihood for remote learning to become more common at this stage of the future. | 747 | | |
| Staff | | 1187 | Unitec Core | FTE | | Assuming 10% increase from the Scenario A staff numbers. | 0.14 | Assuming 30% reduction in trip rate compared to Scenario A (staff base trip rate of 0.20), based on the network congestion pushing more people onto PT and active modes, particularly since PT and active modes have been increased in quality too with Carrington. The reduction also takes into account that there is a higher likelihood for remote working to become more common at this stage of the future. | 165 | 0.14 | Assuming 30% reduction in trip rate compared to Scenario A (staff base trip rate of 0.20), based on the network congestion pushing more people onto PT and active modes, particularly since PT and active modes have been increased in quality too with Carrington. The reduction also takes into account that there is a higher likelihood for remote working to become more common at this stage of the future. | 165 | | |
| Primary School | MoE | | | | 406 | | | | | | | | 203 | 57 |
| Students | | 375 | Carrington | FTE | | Based on information provided from MoE and their consultants, as documented in Wairaka Precinct Primary School - Transport Assumption and Vehicle Trip Generation memo dated 16/12/2019 by Stantec | 0.5 | Assumes 30% of all children being driven (0.3 trips per FTE), then doubled as creates in and out trip (0.6 trips per FTE), then factored assuming 1.2 children/car occupancy (0.5 trips per FTE) | 188 | 0.13 | Assumed as 25% of AM peak hour trips, as school finishes before network peak | 47 | | |
| Staff | | 31 | Carrington | FTE | | Based on information provided from MoE and their consultants, as documented in Wairaka Precinct Primary School - Transport Assumption and Vehicle Trip Generation memo dated 16/12/2019 by Stantec | 0.5 | Assumes 50% of staff travel to work by car (0.5 trips per FTE), but unlike students, this is a one-way trip only, so no doubling. Assumes 1 person / car occupancy | 16 | 0.33 | Assumed as two thirds of AM volume, i.e. most teachers stay longer than students and more likely to drive in PM network peak | 10 | | |
| Early Childhood Education | MoE | | | | 50 | | | | | | | | 50 | 13 |
| Students | | 50 | Carrington | FTE | | Updated to 100% of target full roll capacity of 50 as per AT's direction due to commerciality reasons. Previously set as 25 (50% capacity) based on information provided from MoE and their consultants, as documented in Wairaka Precinct Primary School - Transport Assumption and Vehicle Trip Generation memo dated 16/12/2019 by Stantec. | 1 | Assumes 60% of all children being driven (0.6 trips per FTE), then doubled as creates in and out trip (1.2 trips per FTE), then factored assuming 1.2 children/car occupancy (1 trip per FTE). | 50 | 0.25 | Assumed as 25% of AM peak hour trips, as school finishes before network peak | 13 | | |
| Special Needs Education | MoE | | | | 9 | | | | | | | | 16 | 4 |
| Students | | 9 | Carrington | FTE | | Based on information provided from MoE and their consultants, as documented in Wairaka Precinct Primary School - Transport Assumption and Vehicle Trip Generation memo dated | 1.8 | Assumes 90% of all children being driven (0.9 trips per FTE), then doubled as creates in and out trips (1.8 trips per FTE) | 16 | 0.45 | Assumed as 25% of AM peak hour trips, as school finishes before network peak | 4 | | |
| Residential | | | | Dwelling units / beds (l | 2049 | | | | | | | | 732 | 732 |
| Studio and 1 / 1.5 bedroom without parking | | | | | 98 | | | | | | | | 33 | 33 |
| | Fletchers / NWO | 98 | Southern | Dwelling units | | Based on the information provided by HUD to Stantec in email dated 9/12/2019 and according to the FRL masterplan dated 10/9/2019 | 0.3325 | Trip generation for the Southern and Unitec Core sub-precincts are assumed as 5% lower than the corresponding base rates applied in Scenario A, due to the likelihood of congestion in the surrounding network at this stage of the future which will strongly encourage mode shift or other changes in travel behaviour. | 33 | 0.3325 | Trip generation for the Southern and Unitec Core sub-precincts are assumed as 5% lower than the corresponding base rates applied in Scenario A, due to the likelihood of congestion in the surrounding network at this stage of the future which will strongly encourage mode shift or other changes in travel behaviour. | 33 | | |
| | HUD | 0 | Northern | Dwelling units | | all HUD dwellings are assumed as "1.5 bedroom apartments with parking" due to the expected housing types and parking provisions indicated in the HUD Masterplan (Feb 2019). | 0.2625 | Trip generation for the Northern, Carrington and North-West sub-precincts are assumed as 25% lower than the corresponding base rates applied in Scenario A, due to their proximity and ease of access to PT provisions, PT and active modes upgrades, and the expected mode shift across Auckland. | 0 | 0.2625 | Trip generation for the Northern, Carrington and North-West sub-precincts are assumed as 25% lower than the corresponding base rates applied in Scenario A, due to their proximity and ease of access to PT provisions, PT and active modes upgrades, and the expected mode shift across Auckland. | 0 | | |
| | | 0 | Carrington | Dwelling units | | as above | 0.2625 | as above | 0 | 0.2625 | as above | 0 | | |
| | | 0 | North-West | Dwelling units | | as above | 0.2625 | as above | 0 | 0.2625 | as above | 0 | | |
| | | 0 | Te Auaunga North | Dwelling units | | as above | 0.315 | Trip generation for the Te Auaunga North sub-precinct is assumed as 10% lower than the base rate applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will encourage mode shift. The reduction considers that this sub-precinct has good access (less than 400m) to main PT routes on GNR (via the new Oakley Creek pedestrian bridge). Although it is located almost 500m away from Carrigton Road and therefore does not enjoy the same level of PT accessibility as the Northern, North-west, and Carrington sub-precicnts, the Te Auaunga North sub-precinct is still considered better than the Southern (Fletcher) sub-precicnt in terms of PT accessibility. | 0 | 0.315 | Trip generation for the Te Auaunga North sub-precinct is assumed as 10% lower than the base rate applied in Scenario A, due to the likelihood of congestion in the surrounding network at this stage of the future which will encourage mode shift. The reduction considers that this sub-precinct has good access (less than 400m) to main PT routes on GNR (via the new Oakley Creek pedestrian bridge). Although it is located almost 500m away from Carrigton Road and therefore does not enjoy the same level of PT accessibility as the Northern, North-west, and Carrington sub-precicnts, the Te Auaunga North sub-precinct is still considered better than the Southern (Fletcher) sub-precicnt in terms of PT accessibility. | 0 | | |

| Colour code | | Zones | Notes |
|---|---|---|---|
| Agreed with AT | | Southern | Current FRL/NWO landholding |
| Agreed with developer / organisation | | Northern | Current Crown landholding |
| Existing data/ Based on historical survey /2015 TA | | Carrington | Current Crown landholding |
| To be confirmed | | North-West | Current Crown landholding |
| | | Te Auaunga North | Current Crown landholding |
| | | Unitec Core | Area owned by Unitec, including F blocks and B blocks |
| | | Taylor's | Area owned by Taylor's Laundry |

| Future trip generation factor | |
|---|---|
| Tertiary | 0.7 |
| Residential (North-West, Northern, C | 0.75 |
| Residential (Te Auaunga North) | 0.9 |
| Residential (Southern and Unitec Co | 0.95 |

# SCENARIO B

| Land Use / Activity | Developers / organisation | Development (Year 8 since development) | Zone | Unit | Total development per activity | Notes re. development assumption | AM Trip rate | AM Source | AM Trips | PM Trip rate | PM Source | PM Trips | Total trips AM (vehicles/hour) | Total trips PM (vehicles/hour) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Unitec | 0 | Unitec Core | Dwelling units | | Assumed none as no information available | 0.3325 | Trip generation for the Southern and Unitec Core sub-precincts are assumed as 5% lower than the corresponding base rates applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will strongly encourage mode shift or other changes in travel behaviour. | 0 | 0.3325 | Trip generation for the Southern and Unitec Core sub-precincts are assumed as 5% lower than the corresponding base rates applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will strongly encourage mode shift or other changes in travel behaviour. | 0 | | |
| 1.5 Bedroom with parking | | | | | 1591 | | | | | | | | 487 | 487 |
| | Fletchers / NWO | 11 | Southern | Dwelling units | | Based on the information provided by HUD to Stantec in email dated 9/12/2019 and according to the FRL masterplan dated 10/9/2019 | 0.38 | Trip generation for the Southern and Unitec Core sub-precincts are assumed as 5% lower than the corresponding base rates applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will strongly encourage mode shift or other changes in travel behaviour. | 4 | 0.38 | Trip generation for the Southern and Unitec Core sub-precincts are assumed as 5% lower than the corresponding base rates applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will strongly encourage mode shift or other changes in travel behaviour. | 4 | | |
| | HUD | 658 | Northern | Dwelling units | | all HUD dwellings are assumed as "1.5 bedroom apartments with parking" due to the expected housing types and parking provisions indicated in the HUD Masterplan (Feb 2019). | 0.3 | Trip generation for the Northern, Carrington and North-West sub-precincts are assumed as 25% lower than the corresponding base rates applied in Scenario A, due to their proximity and ease of access to PT provisions, PT and active modes upgrades, and the expected mode shift across Auckland. | 197 | 0.3 | Trip generation for the Northern, Carrington and North-West sub-precincts are assumed as 25% lower than the corresponding base rates applied in Scenario A, due to their proximity and ease of access to PT provisions, PT and active modes upgrades, and the expected mode shift across Auckland. | 197 | | |
| | | 674 | Carrington | Dwelling units | | as above | 0.3 | as above | 202 | 0.3 | as above | 202 | | |
| | | 96 | North-West | Dwelling units | | as above | 0.3 | as above | 29 | 0.3 | as above | 29 | | |
| | | 152 | Te Auaunga North | Dwelling units | | as above | 0.36 | Trip generation for the Te Auaunga North sub-precinct is assumed as 10% lower than the base rate applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will encourage mode shift. The reduction considers that this sub-precinct has good access (less than 400m) to main PT routes on GNR (via the new Oakley Creek pedestrian bridge). Although it is located almost 500m away from Carrigton Road and therefore does not enjoy the same level of PT acessibility as the Northern, North-west, and Carrington sub-precicnts, the Te Auaunga North sub-precinct is still considered better than the Southern (Fletcher) sub-precicnt in terms of PT accessibility. | 55 | 0.36 | Trip generation for the Te Auaunga North sub-precinct is assumed as 10% lower than the base rate applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will encourage mode shift. The reduction considers that this sub-precinct has good access (less than 400m) to main PT routes on GNR (via the new Oakley Creek pedestrian bridge). Although it is located almost 500m away from Carrigton Road and therefore does not enjoy the same level of PT acessibility as the Northern, North-west, and Carrington sub-precicnts, the Te Auaunga North sub-precinct is still considered better than the Southern (Fletcher) sub-precicnt in terms of PT accessibility. | 55 | | |
| | Unitec | 0 | Unitec Core | Dwelling units | | Assumed none as no information available | 0.38 | Trip generation for the Southern and Unitec Core sub-precincts are assumed as 5% lower than the corresponding base rates applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will strongly encourage mode shift or other changes in travel behaviour. | 0 | 0.38 | Trip generation for the Southern and Unitec Core sub-precincts are assumed as 5% lower than the corresponding base rates applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will strongly encourage mode shift or other changes in travel behaviour. | 0 | | |
| 2 Bedroom | | | | | 183 | | | | | | | | 87 | 87 |
| | Fletchers / NWO | 183 | Southern | Dwelling units | | Based on the information provided by HUD to Stant | 0.475 | Trip generation for the Southern and Unitec Core sub-precinct | 87 | 0.475 | Trip generation for the Southern and Unitec Core sub-precincts are a | 87 | | |
| | HUD | 0 | Northern | Dwelling units | | all HUD dwellings are assumed as "1.5 bedroom apa | 0.375 | Trip generation for the Northern, Carrington and North-West s | 0 | 0.375 | Trip generation for the Northern, Carrington and North-West sub-pr | 0 | | |
| | | 0 | Carrington | Dwelling units | | as above | 0.375 | as above | 0 | 0.375 | as above | 0 | | |
| | | 0 | North-West | Dwelling units | | as above | 0.375 | as above | 0 | 0.375 | as above | 0 | | |
| | | 0 | Te Auaunga North | Dwelling units | | as above | 0.45 | Trip generation for the Te Auaunga North sub-precinct is assur | 0 | 0.45 | Trip generation for the Te Auaunga North sub-precinct is assumed a | 0 | | |
| | Unitec | 0 | Unitec Core | Dwelling units | | Assumed none as no information available | 0.475 | Trip generation for the Southern and Unitec Core sub-precinct | 0 | 0.475 | Trip generation for the Southern and Unitec Core sub-precincts are a | 0 | | |
| 2.5 Bedroom | | | | | 95 | | | | | | | | 59 | 59 |
| | Fletchers / NWO | 95 | Southern | Dwelling units | | Based on the information provided by HUD to Stantec in email dated 9/12/2019 and according to the FRL masterplan dated 10/9/2019 | 0.6175 | Trip generation for the Southern and Unitec Core sub-precincts are assumed as 5% lower than the corresponding base rates applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will strongly encourage mode shift or other changes in travel behaviour. | 59 | 0.6175 | Trip generation for the Southern and Unitec Core sub-precincts are assumed as 5% lower than the corresponding base rates applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will strongly encourage mode shift or other changes in travel behaviour. | 59 | | |
| | HUD | 0 | Northern | Dwelling units | | all HUD dwellings are assumed as "1.5 bedroom apartments with parking" due to the expected housing types and parking provisions indicated in the HUD Masterplan (Feb 2019). | 0.4875 | Trip generation for the Northern, Carrington and North-West sub-precincts are assumed as 25% lower than the corresponding base rates applied in Scenario A, due to their proximity and ease of access to PT provisions, PT and active modes upgrades, and the expected mode shift across Auckland. | 0 | 0.4875 | Trip generation for the Northern, Carrington and North-West sub-precincts are assumed as 25% lower than the corresponding base rates applied in Scenario A, due to their proximity and ease of access to PT provisions, PT and active modes upgrades, and the expected mode shift across Auckland. | 0 | | |
| | | 0 | Carrington | Dwelling units | | as above | 0.4875 | as above | 0 | 0.4875 | as above | 0 | | |
| | | 0 | North-West | Dwelling units | | as above | 0.4875 | as above | 0 | 0.4875 | as above | 0 | | |
| | | 0 | Te Auaunga North | Dwelling units | | as above | 0.585 | Trip generation for the Te Auaunga North sub-precinct is assumed as 10% lower than the base rate applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will encourage mode shift. The reduction considers that this sub-precinct has good access (less than 400m) to main PT routes on GNR (via the new Oakley Creek pedestrian bridge). Although it is located almost 500m away from Carrigton Road and therefore does not enjoy the same level of PT acessibility as the Northern, North-west, and Carrington sub-precicnts, the Te Auaunga North sub-precinct is still considered better than the Southern (Fletcher) sub-precicnt in terms of PT accessibility. | 0 | 0.585 | Trip generation for the Te Auaunga North sub-precinct is assumed as 10% lower than the base rate applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will encourage mode shift. The reduction considers that this sub-precinct has good access (less than 400m) to main PT routes on GNR (via the new Oakley Creek pedestrian bridge). Although it is located almost 500m away from Carrigton Road and therefore does not enjoy the same level of PT acessibility as the Northern, North-west, and Carrington sub-precicnts, the Te Auaunga North sub-precinct is still considered better than the Southern (Fletcher) sub-precicnt in terms of PT accessibility. | 0 | | |

| Colour code | | Zones | Notes |
|---|---|---|---|
| Agreed with AT | | Southern | Current FRL/NWO landholding |
| Agreed with developer / organisation | | Northern | Current Crown landholding |
| Existing data/ Based on historical survey /2015 TA | | Carrington | Current Crown landholding |
| To be confirmed | | North-West | Current Crown landholding |
| | | Te Auaunga North | Current Crown landholding |
| | | Unitec Core | Area owned by Unitec, including F blocks and B blocks |
| | | Taylor's | Area owned by Taylor's Laundry |

| Future trip generation factor | |
|---|---|
| Tertiary | 0.7 |
| Residential (North-West, Northern, ( | 0.75 |
| Residential (Te Auaunga North) | 0.9 |
| Residential (Southern and Unitec Co | 0.95 |

# SCENARIO B

| Land Use / Activity | Developers / organisation | Development (Year 8 since development) | Zone | Unit | Total development per activity | Notes re. development assumption | AM Trip rate | AM Source | AM Trips | PM Trip rate | PM Source | PM Trips | Total trips AM (vehicles/hour) | Total trips PM (vehicles/hour) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Unitec | 0 | Unitec Core | Dwelling units | | Assumed none as no information available | 0.6175 | Trip generation for the Southern and Unitec Core sub-precincts are assumed as 5% lower than the corresponding base rates applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will strongly encourage mode shift or other changes in travel behaviour. | 0 | 0.6175 | Trip generation for the Southern and Unitec Core sub-precincts are assumed as 5% lower than the corresponding base rates applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will strongly encourage mode shift or other changes in travel behaviour. | 0 | | |
| 3 and 4 Bedroom | | | | | 82 | | | | | | | | 66 | 66 |
| | Fletchers / NWO | 82 | Southern | Dwelling units | | Based on the information provided by HUD to Stantec in email dated 9/12/2019 and according to the FRL masterplan dated 10/9/2019 | 0.8075 | precincts are assumed as 5% lower than the corresponding base rates applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will strongly encourage mode shift or other changes in travel behaviour. | 66 | 0.8075 | Trip generation for the Southern and Unitec Core sub-precincts are assumed as 5% lower than the corresponding base rates applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will strongly encourage mode shift or other changes in travel behaviour. | 66 | | |
| | HUD | 0 | Northern | Dwelling units | | all HUD dwellings are assumed as “1.5 bedroom apartments with parking” due to the expected housing types and parking provisions indicated in the HUD Masterplan (Feb 2019). | 0.6375 | Trip generation for the Northern, Carrington and North-West sub-precincts are assumed as 25% lower than the corresponding base rates applied in Scenario A, due to their proximity and ease of access to PT provisions, PT and active | 0 | 0.6375 | Trip generation for the Northern, Carrington and North-West sub-precincts are assumed as 25% lower than the corresponding base rates applied in Scenario A, due to their proximity and ease of access to PT provisions, PT and active modes upgrades, and the | 0 | | |
| | | 0 | Carrington | Dwelling units | | as above | 0.6375 | as above | 0 | 0.6375 | as above | 0 | | |
| | | 0 | North-West | Dwelling units | | as above | 0.6375 | as above | 0 | 0.6375 | as above | 0 | | |
| | | 0 | Te Auaunga North | Dwelling units | | as above | 0.765 | Trip generation for the Te Auaunga North sub-precinct is assumed as 10% lower than the base rate applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will encourage mode shift. The reduction considers that this sub-precinct has good access (less than 400m) to main PT routes on GNR (via the new Oakley Creek pedestrian bridge). Although it is located almost 500m away from Carrigton Road and | 0 | 0.765 | Trip generation for the Te Auaunga North sub-precinct is assumed as 10% lower than the base rate applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will encourage mode shift. The reduction considers that this sub-precinct has good access (less than 400m) to main PT routes on GNR (via the new Oakley Creek pedestrian bridge). Although it is located almost 500m away from Carrigton Road and therefore does not enjoy the same level of PT acessibility | 0 | | |
| | Unitec | 0 | Unitec Core | Dwelling units | | Assumed none as no information available | 0.8075 | Trip generation for the Southern and Unitec Core sub-precincts are assumed as 5% lower than the corresponding base rates applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will strongly encourage mode shift or other changes in travel behaviour. | 0 | 0.8075 | Trip generation for the Southern and Unitec Core sub-precincts are assumed as 5% lower than the corresponding base rates applied in Scenario A, due to the likelihood of congestion in the surrouding network at this stage of the future which will strongly encourage mode shift or other changes in travel behaviour. | 0 | | |
| Student Housing | | | | | 0 | | | | | | | | 0 | 0 |
| | Unitec | 0 | Unitec Core | Beds | | Assumed none as the existing student housing in Southern zone will be replaced by housing, and no information is available on new development. | 0.08 | Assumes 1 car park per 6 student beds, and 50% of carpark owners driving | 0 | 0.08 | Assumes 1 car park per 6 student beds, and 50% of carpark owners driving | 0 | | |

| Colour code | |
|---|---|
| Agreed with AT | |
| Agreed with developer / organisation | |
| Existing data/ Based on historical survey /2015 TA | |
| To be confirmed | |

| Zones | Notes |
|---|---|
| Southern | Current FRL/NWO landholding |
| Northern | Current Crown landholding |
| Carrington | Current Crown landholding |
| North-West | Current Crown landholding |
| Te Auaunga North | Current Crown landholding |
| Unitec Core | Area owned by Unitec, including F blocks and B blocks |
| Taylor's | Area owned by Taylor's Laundry |

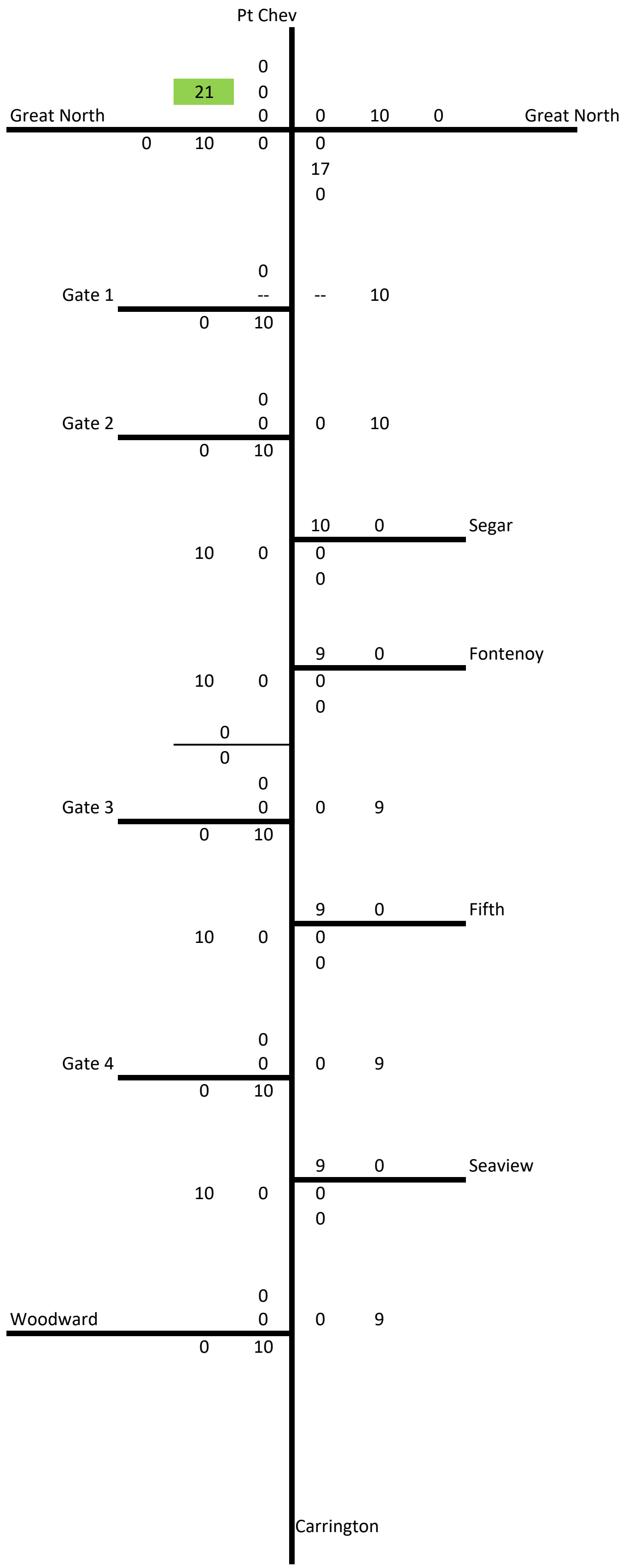
| Future trip generation factor | |
|---|---|
| Tertiary | 0.7 |
| Residential (North-West, Northern, C | 0.75 |
| Residential (Te Auaunga North) | 0.9 |
| Residential (Southern and Unitec Co | 0.95 |

# SCENARIO B

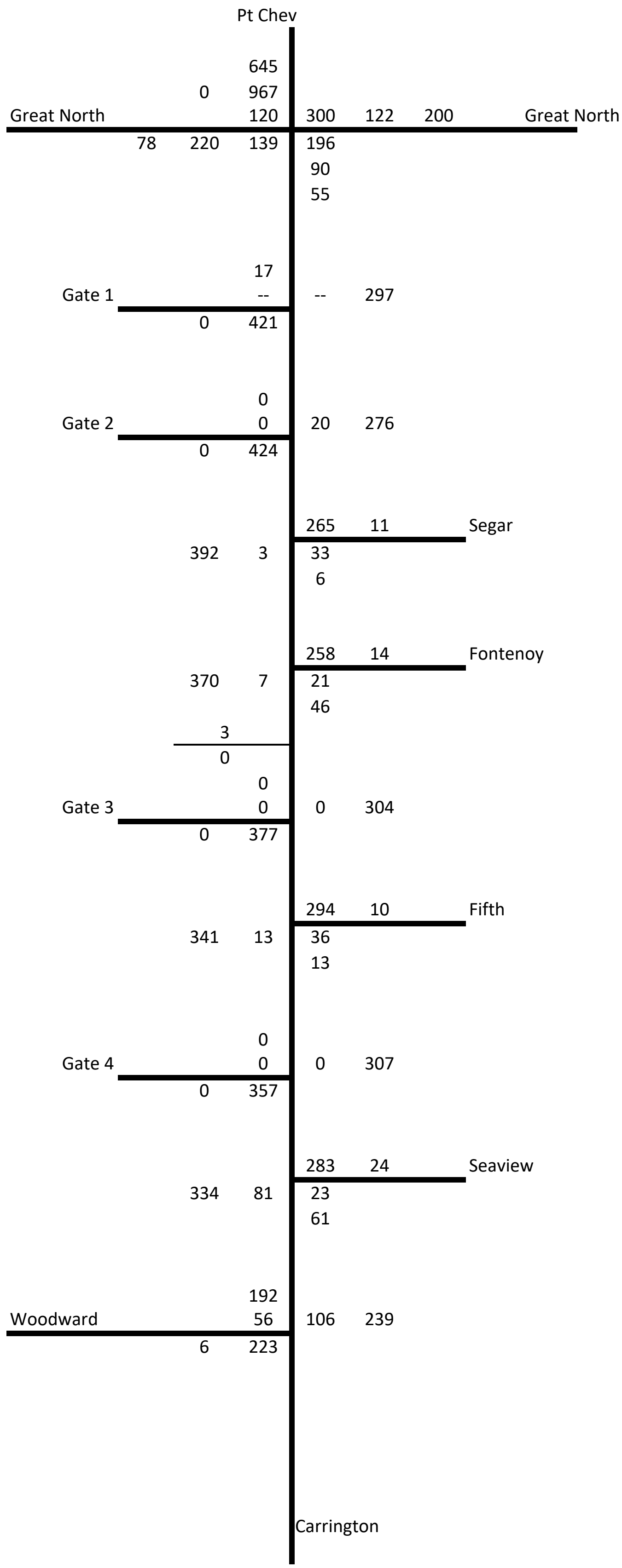
| | | | | | | | AM | | | PM | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use / Activity | Developers / organisation | Development (Year 8 since development) | Zone | Unit | Total development per activity | Notes re. development assumption | Trip rate | Source | Trips | Trip rate | Source | Trips | Total trips AM (vehicles/hour) | Total trips PM (vehicles/hour) |
| Commercial | | | | | 65 | | | | | | | | 21 | 35 |
| Services | Taylors Laundry | 65 | Taylor's | 100 sqm | 65 | As per existing area of Taylor's Laundry. | n/a | Assume no change from Scenario A. Based on survey 2014 and existing land use. | 21 | n/a | Assume no change from Scenario A. Based on survey 2014 and existing land use. | 35 | 21 | 35 |
| Business Partnerships / Offices | | 0 | Unitec Core | 100 sqm | 0 | Assumed none as no information available. | 1.6 | As per the RTA Guide's updated study of 10 PT friendly office developments in Sydney (located outside CBD), NSW, 2013 - Sydney rate is 1.6 per 100m2 GFA in morning peak hour. | 0 | 1.2 | As per the RTA Guide's updated study of 10 PT friendly office developments in Sydney (located outside CBD), NSW, 2013 - Sydney rate is 1.2 per 100m2 GFA in evening peak hour. | 0 | 0 | 0 |
| Other land uses | | | | | 198 | | | | | | | | 156 | 61 |
| Health | Mason Clinic | 198 | Northern | beds | 198 | Based on the 2019 Mason Clinic Masterplan, as provided to Stantec by Flow. | n/a | Based on the comparison between the expected number of beds by 2027 and the actual number of beds in 2016, and accordingly factoring the actual trips generated by Masons Clinic as surveyed in 2016. Note numbers are as provided by Flow on 23/01/2020 via email. | 156 | n/a | Based on the comparison between the expected number of beds by 2027 and the actual number of beds in 2016, and accordingly factoring the actual trips generated by Masons Clinic as surveyed in 2016. Note numbers are as provided by Flow on 23/01/2020 via email. | 61 | 156 | 61 |
| **Grand total trips** | | | | | | | | | | | | | **2089** | **1813** |

# Appendix F Breakdown of Traffic Flows for Sensitivity Tests

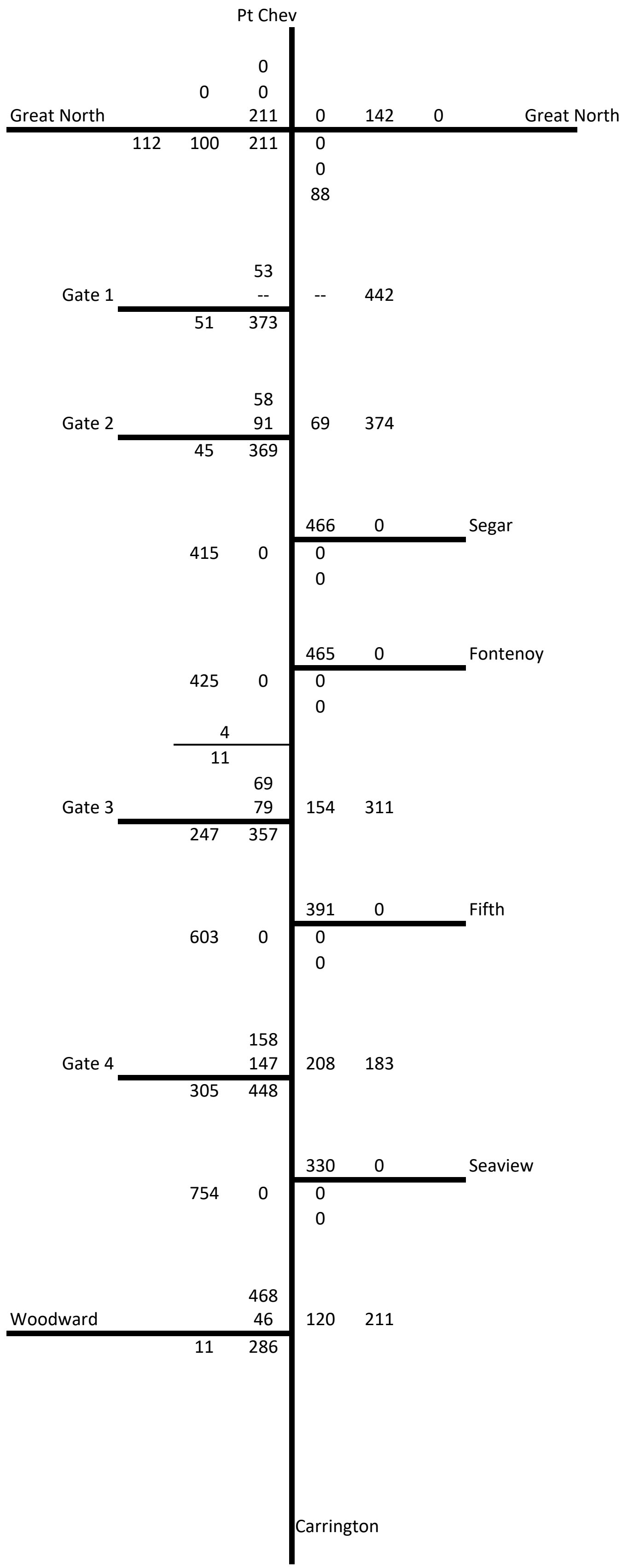
**AM Peak**
**Buses**



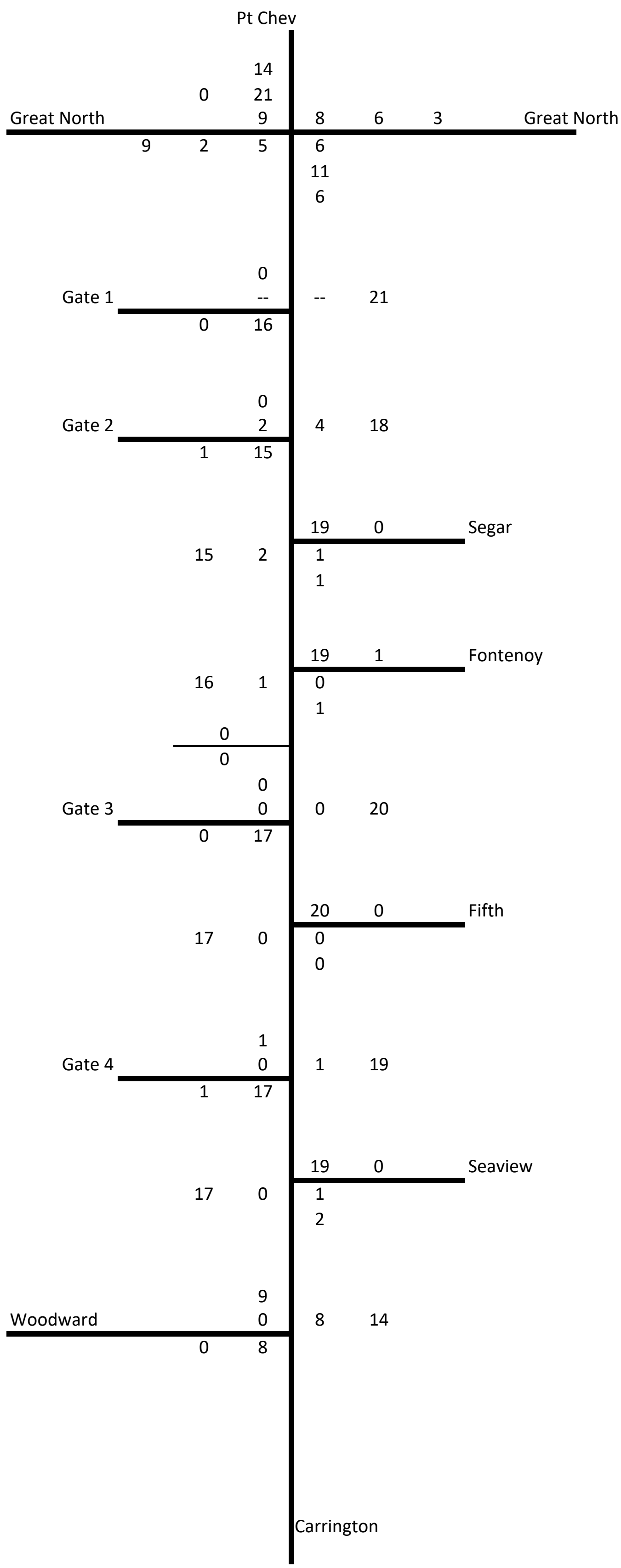
**AM Peak**
**Cars (Non-Precinct Traffic)**



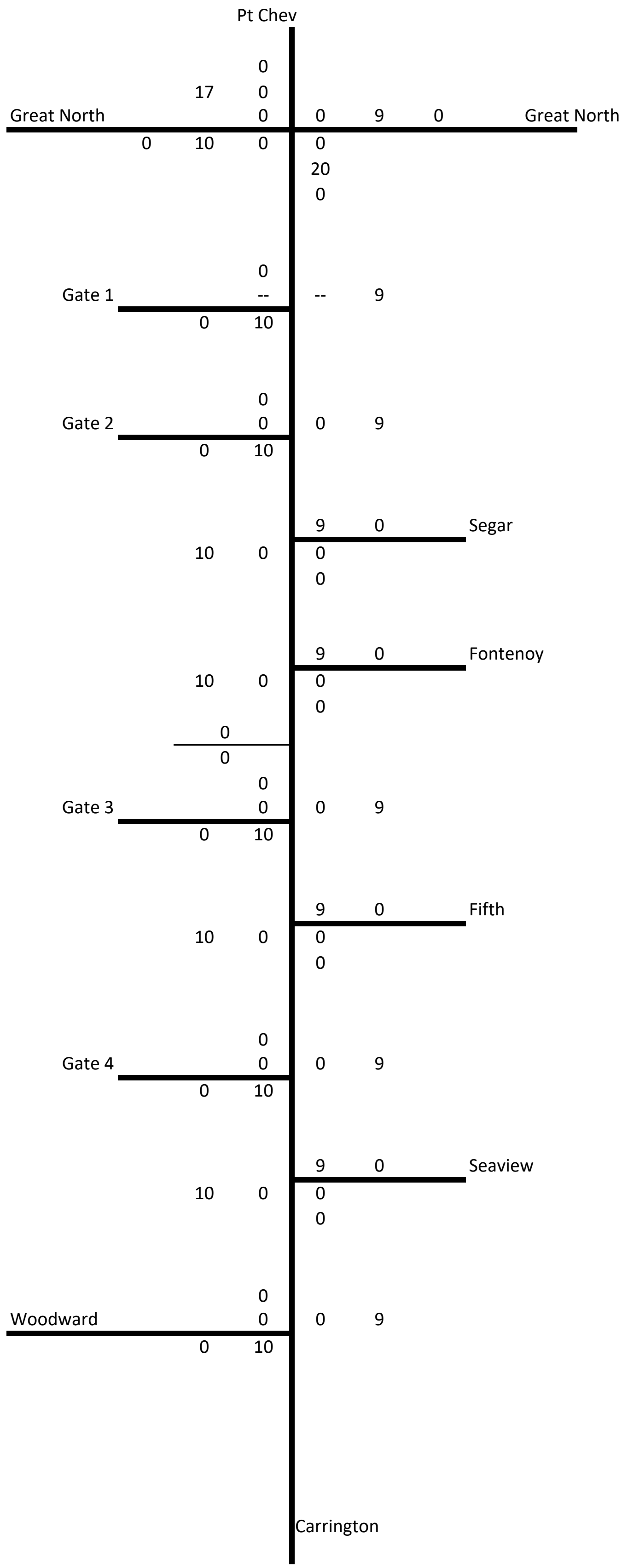
**AM Peak**
**CarsU (Precinct-related Traffic)**



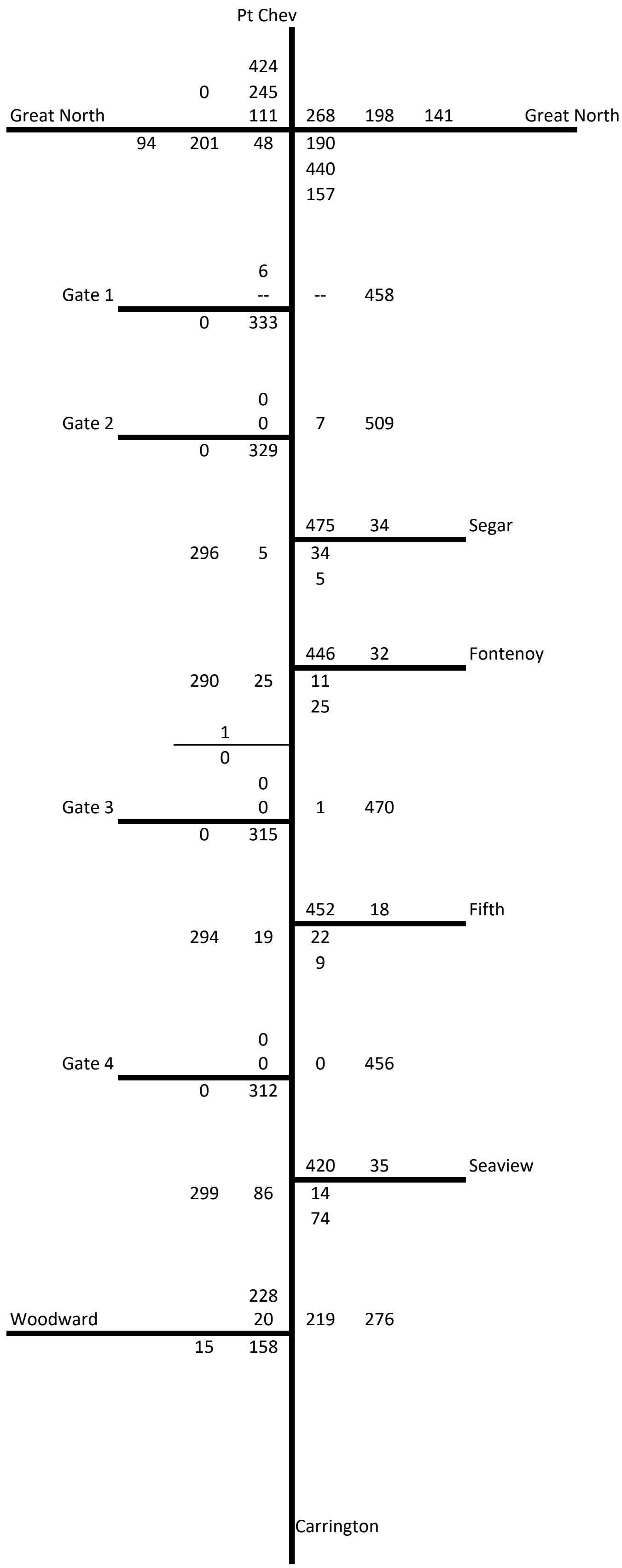
**AM Peak**
**HCVs**


Pt Chev
14
0 21
Great North 9 8 6 3 Great North
9 2 5 6
11
6
0
Gate 1 -- -- 21
0 16
0
Gate 2 2 4 18
1 15
19 0 Segar
15 2 1
1
19 1 Fontenoy
16 1 0
1
0
0
0
Gate 3 0 0 20
0 17
20 0 Fifth
17 0 0
0
1
Gate 4 0 1 19
1 17
19 0 Seaview
17 0 1
2
9
Woodward 0 8 14
0 8
Carrington

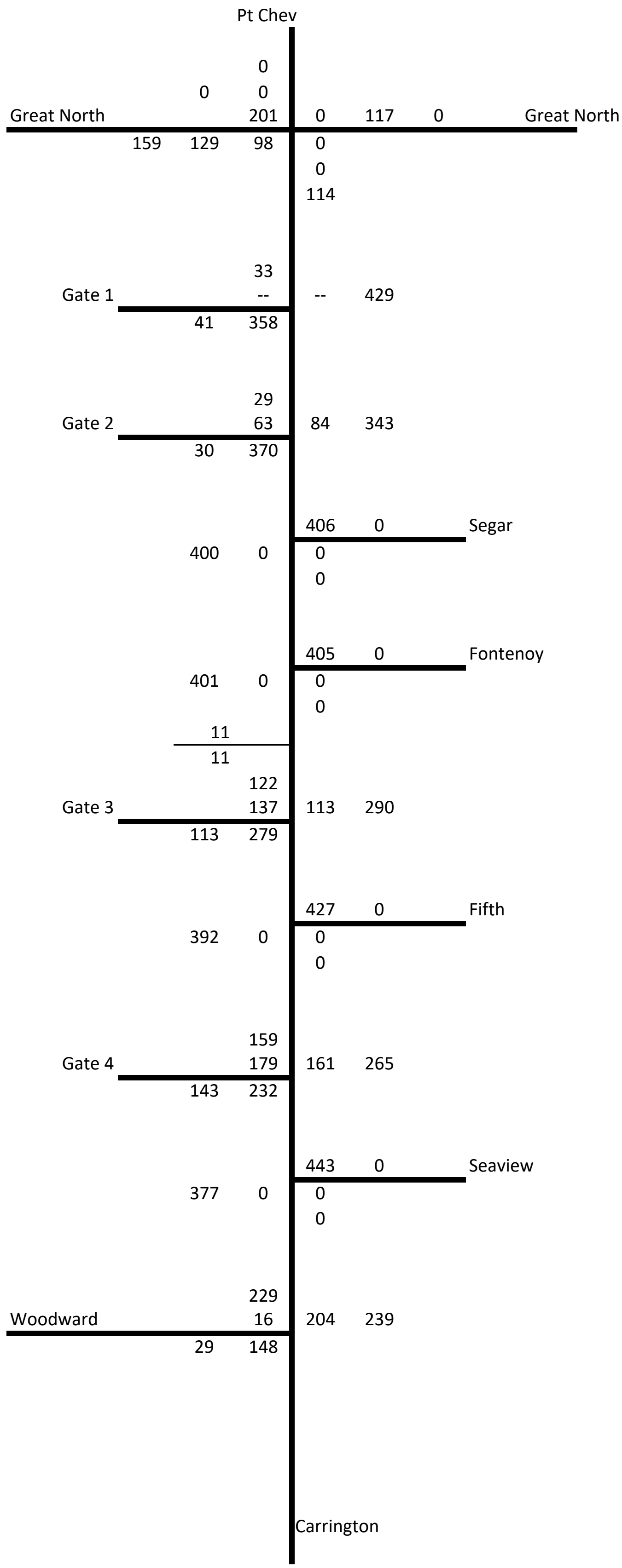
**PM Peak**
**Buses**



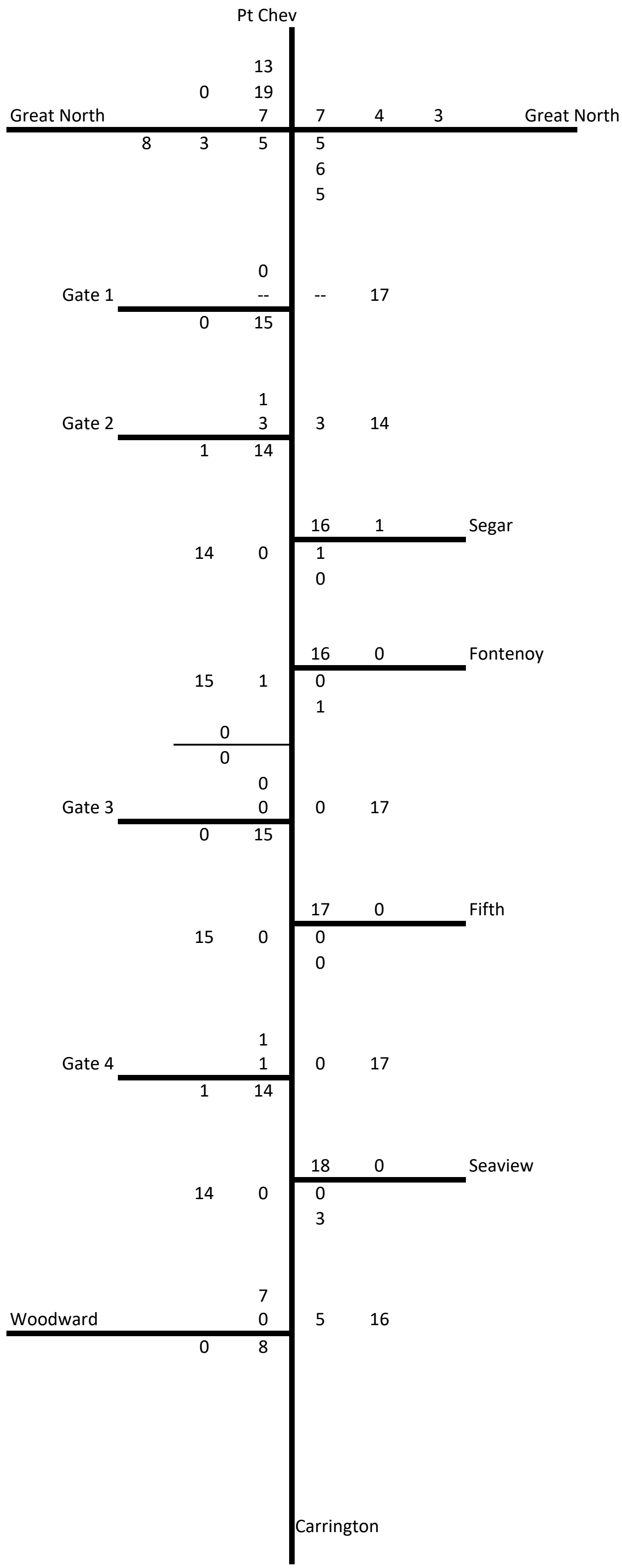
**PM Peak**
**Cars (Non-Precinct Traffic)**



**PM Peak**
**CarsU (Precinct-related Traffic)**



**PM Peak**
**HCVs**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Carrington

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# Memorandum

## Wairaka Precinct ITA

**October 2020**

Integrated Transport Assessment - Memorandum - Additional Sensitivity Modelling

### Introduction

In June 2020, Stantec released an Integrated Transport Assessment ("ITA") on behalf of Ministry of Housing and Urban Development ("HUD") for their proposals associated with the Wairaka Precinct, and the Precinct overall.

As part of their review of the ITA, Auckland Transport ("AT") have requested further clarifications and sensitivity modelling analyses. This memorandum outlines the additional modelling undertaken that has been agreed in discussions between AT and HUD.

AT requested confirmation that future infrastructure, in particular at the Carrington Road entrances into the Precinct, will have sufficient capacity to accommodate vehicular traffic flows, should some assumptions made in the ITA do not eventuate. Specifically, this related to reductions in traffic reductions on Carrington Road, associated with traffic unrelated to the precinct development, that AT considers may not in reality occur. These reductions were included in the ITA assumptions due to network congestion discouraging such trips, thereby leading to a proportion of existing users diverting onto different routes, alternative modes or transport, or travelling during different times (Reference Section 5.6, Table 5-4 of the ITA).

Through discussions between AT and HUD agreement has been reached that a sensitivity analysis scenario excluding these reductions will be particularly important for the future implementation of traffic signals at the Gate 2 / Carrington Road intersection, that is anticipated to be the first upgraded site access.

This memorandum discusses the modelling undertaken to demonstrate the potential impact in this regard.

### Modelling Scope

The ITA (June 2020) as well as assumptions associated with AT's future plans Carrington Road wider upgrades will be revisited during the medium to long-term. As such, the modelling agreed to be required is relatively limited.

Using SIDRA localised intersection model software, Gate 2 / Carrington Road has been modelled for a weekday AM and PM peak period. All other gates / intersections are excluded from this analysis scope, as per agreement between AT and HUD.

Modelling will cover one development stage / scenario, being a variant to Scenario B included in the ITA (June 2020). The same input and development assumptions will be included as outlined in Scenario B. However, the through-traffic reductions included in the ITA to account for potential congestion-caused redirection and reductions will be reversed on Carrington Road. This through traffic has been manually added back into the intersection flows to represent a worst-case scenario, and is considered a robust assessment for that reason. It covers a medium timeframe of around 8 years with a high development buildout level (around 80% of the HUD land development).

Other scenarios / staging have not been modelled, including no non-signalised baseline or earlier-stage (Scenario A of ITA) options with lower development assumptions. The wider-area models have also not been re-run for this local test.

### Vehicle Turning Flow Adjustments

The turning vehicle flows and turning movements incorporated into the modelling are provided in the analysis result sheets attached at **Attachment A**.

As the SIDRA model has no peak factoring, input flows and flows used by SIDRA indicated on the Attachment A sheets are identical.

In comparing the input flows, the re-inclusion of through traffic movements leads to changes to traffic in the Gate 2 model, as summarised in the table below:

Table 1: Changes in Flows With (ITA) and Without through Traffic Reductions

| | Northbound on Carrington Road [vehicles / hour] | Southbound on Carrington Road [vehicles / hour] |
|---|---|---|
| AM peak hour through flows with through traffic reduction | 815 | 660 |
| **Total AM peak hour intersection flows with reduction (all turns)** | **1,780** | |
| AM peak hour through flows without through traffic reduction | 885 (+70) | 714 (+54) |
| **Total AM peak hour intersection flows without reduction (all turns)** | **1,904 (+124)** | |
| | | |
| PM peak hour through flows with through traffic reduction | 730 | 894 |
| **Total PM peak hour intersection flows with reduction (all turns)** | **1,855** | |
| PM peak hour through flows without through traffic reduction | 803 (+73) | 989 (+95) |
| **Total PM peak hour intersection flows without reduction (all turns)** | **2,023 (+168)** | |

### Intersection Layout – Carrington Road / Gate 2

The intersection layout (extracted from SIDRA) modelled for the Carrington Road / Gate 2 intersection is shown in Figure 1 below. This provides bus priority as additional lanes, as discussed between AT and HUD, to eventually tie into the anticipated future Carrington Road Upgrade bus facilities. Additionally, a dedicated left turn lane for northbound traffic into the Wairaka Precinct is included, rather than assuming left turning vehicles will queue in the bus lane, that will cause added delays. A dedicated left-turn lane also allows safer and more convenient pedestrian and cyclist crossing phasing on the Gate 2 side road, a key feature of encouraging active modes. Finally, the model assumes pedestrian crossings on all legs. **Note:** In reality these pedestrian crossings would operate as signalised walk/cycle crossings, but this is not considered to have notable impacts for a sensitivity test of this type.

The SIDRA model assumes this signal initially being only a local upgrade, in advance of the wider Carrington Road Upgrade. Therefore, the additional bus and left turn lanes will eventually merge back into the existing layout, until such a time as the adjacent corridor is upgraded. By modelling accordingly (with the resulting lane lengths), this correctly represents an interim period before a corridor upgrade.

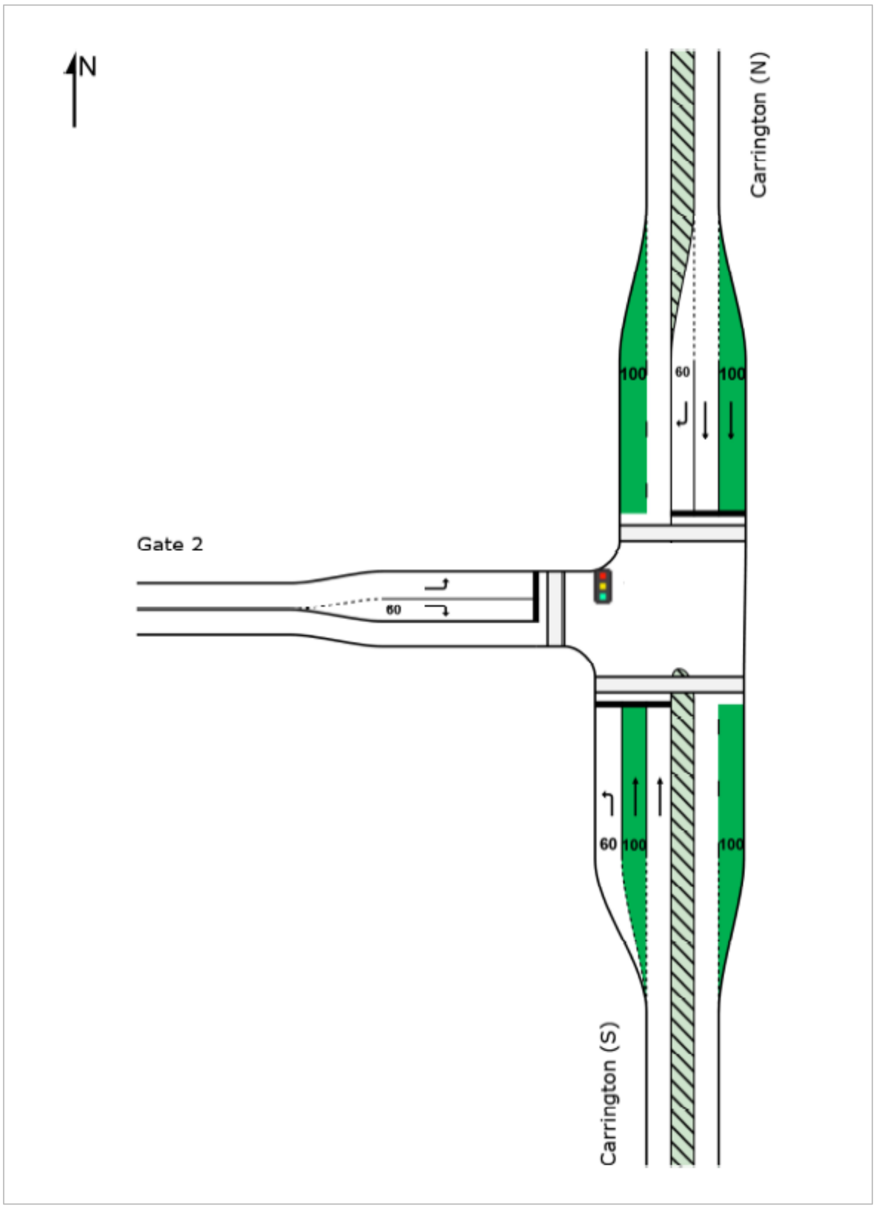


Figure 1: Intersection signal layout used in all scenarios (SIDRA Layout)

## SIDRA Modelling Results

A copy of the SIDRA modelling results are provided at Attachment A. In undertaking this analysis, the “with through traffic reduction” modelling was run first, allowing SIDRA to set a cycle time for a signalised baseline using ITA flows. Then SIDRA modelling was re-run, using the “without through traffic reduction” flows. This resulted in some initially un-intuitive results, in particular, the PM peak having <u>better</u> average performance (delays) despite an increase in traffic flows.

Following a review of the modelling it was identified that this was due to SIDRA  increasing the total cycle times (from 80s to 90s in the AM, and from 110 seconds to 140 seconds in the PM) to improve vehicular throughput.

It is considered, particularly for the PM peak period, that 140 second cycle times may be too high, considering the associated downsides for active modes of long waiting periods for pedestrians and cyclists, even though there will be a reduction in vehicular delays.

Therefore, in association with the “without through traffic reductions” (higher) flow scenarios, one scenario was run once with a SIDRA-optimised (longer) cycle time, and once based on the retained earlier cycle times SIDRA with the reduced flows. This allows a better comparison of impacts.

A summary of the analyses results are provided in the table below, whilst the SIDRA modelling results output is attached at Attachment A.

Table 2: Key performance indicators for three scenarios assessed (all scenarios are identical in representing a 2028 modelling year, and around 80% buildout development, as per ITA Scenario B)

| | With through traffic reductions scenario (**lower flows**), cycle time set by SIDRA | Without through traffic reductions scenario (**higher flows**), cycle time set by SIDRA | Without through traffic reductions scenario (**higher flows**), cycle time forced to be same as set by SIDRA for lower flows (shorter) |
|---|---|---|---|
| AM peak hour, average delays [s] | 23.3 | 24.3 | 33.4 |
| AM peak hour, average delays, worst turn [s] | 39.6<br>(RT from Gate 2) | 44.5<br>(RT from Gate 2) | 47.5<br>(northbound THRU) |
| AM peak hour, longest 95th percentile queue [m] | 238.0<br>(northbound THRU) | 289.0<br>(northbound THRU) | 347.8<br>(northbound THRU) |
| | | | |
| PM peak hour, average delays [s] | 21.2 | 18.7 | 33.8 |
| PM peak hour, average delays, worst turn [s] | 53.1<br>(RT from Gate 2) | 67.7<br>(RT from Gate 2) | 53.1<br>(RT from Gate 2) |
| PM peak hour, longest 95th percentile queue [m] | 236.6<br>(southbound THRU) | 233.9<br>(southbound THRU) | 419.3<br>(southbound THRU) |

As can be seen from the results above, the intersection is predicted to perform well overall, never falling below Level of Service (LOS) C during any of the six modelling scenarios. The anticipated highest delays are considered acceptable for a traffic signal-controlled intersection on a very busy arterial road, especially considering they tend to mostly affect development-traffic right turns, not through traffic movements.

Increases in delays (with no through traffic reduction occurring) will depend to some degree on whether or not the signals are optimised for vehicle traffic. This applies even more so for queue lengths. Based on the SIDRA results all vehicle turning flow lengths i.e. excluding Carrington Road through traffic queue lengths have been shown to be less than the 60m used as indicative turn lane lengths. Queues on Carrington Road, as noted, are longer.

However, it is noted that these queue lengths are considered somewhat irrelevant anyway, as the localised model cannot include impacts from upstream and downstream intersections, that during peak hours are expected to “override” localised queueing effects.

More importantly, the results show that no matter whether the reduced or non-reduced flows are used, the proposed traffic signal controlled intersection will not represent a “weak link” in the future Carrington Road environment, performing well for a very busy intersection.

# Attachment A

# MOVEMENT SUMMARY

## Site: 13_B1_am [Gate 2 - AM Peak - With Through Traffic Reduction - 80s Cycle - SIDRA Set]

AM Peak
Site Category: (None)
Signals - Fixed Time Coordinated    Cycle Time = 80 seconds (Site Practical Cycle Time)

**Movement Performance - Vehicles**

| Mov ID | Turn | Demand Flows Total veh/h | Demand Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate | Aver. No. Cycles | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Carrington (S) | | | | | | | | | | | | |
| 1 | L2 | 47 | 2.1 | 0.038 | 9.1 | LOS A | 0.6 | 4.3 | 0.35 | 0.61 | 0.35 | 44.0 |
| 2 | T1 | 815 | 3.2 | 0.866 | 27.8 | LOS C | 33.4 | 238.0 | 0.95 | 0.99 | 1.11 | 36.2 |
| Approach | | 862 | 3.1 | 0.866 | 26.7 | LOS C | 33.4 | 238.0 | 0.92 | 0.97 | 1.07 | 36.6 |
| North: Carrington (N) | | | | | | | | | | | | |
| 8 | T1 | 660 | 4.1 | 0.756 | 14.3 | LOS B | 16.9 | 121.5 | 0.69 | 0.63 | 0.71 | 41.8 |
| 9 | R2 | 83 | 3.6 | 0.310 | 38.6 | LOS D | 3.0 | 21.7 | 0.93 | 0.76 | 0.93 | 32.5 |
| Approach | | 743 | 4.0 | 0.756 | 17.0 | LOS B | 16.9 | 121.5 | 0.72 | 0.65 | 0.74 | 40.5 |
| West: Gate 2 | | | | | | | | | | | | |
| 10 | L2 | 82 | 1.2 | 0.131 | 24.4 | LOS C | 2.2 | 15.7 | 0.73 | 0.72 | 0.73 | 37.2 |
| 12 | R2 | 93 | 2.2 | 0.376 | 39.9 | LOS D | 3.5 | 24.6 | 0.95 | 0.77 | 0.95 | 32.2 |
| Approach | | 175 | 1.7 | 0.376 | 32.6 | LOS C | 3.5 | 24.6 | 0.85 | 0.74 | 0.85 | 34.3 |
| All Vehicles | | 1780 | 3.4 | 0.866 | 23.3 | LOS C | 33.4 | 238.0 | 0.83 | 0.81 | 0.91 | 37.9 |

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

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 50 | 34.3 | LOS D | 0.1 | 0.1 | 0.93 | 0.93 |
| P3 | North Full Crossing | 50 | 34.3 | LOS D | 0.1 | 0.1 | 0.93 | 0.93 |
| P4 | West Full Crossing | 50 | 34.3 | LOS D | 0.1 | 0.1 | 0.93 | 0.93 |
| All Pedestrians | | 150 | 34.3 | LOS D | | | 0.93 | 0.93 |

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


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# MOVEMENT SUMMARY

## Site: 13_B2_am [Gate 2 - AM Peak - Without Through Traffic Reduction - 80s Cycle - Forced]

AM Peak
Site Category: (None)
Signals - Fixed Time Coordinated    Cycle Time = 80 seconds (Site User-Given Cycle Time)

**Movement Performance - Vehicles**

| Mov ID | Turn | Demand Flows Total veh/h | Demand Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate | Aver. No. Cycles | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Carrington (S) | | | | | | | | | | | | |
| 1 | L2 | 47 | 2.1 | 0.038 | 9.1 | LOS A | 0.6 | 4.3 | 0.35 | 0.61 | 0.35 | 44.0 |
| 2 | T1 | 885 | 2.9 | 0.942 | 47.5 | LOS D | 48.9 | 347.8 | 1.00 | 1.25 | 1.43 | 30.3 |
| Approach | | 932 | 2.9 | 0.942 | 45.6 | LOS D | 48.9 | 347.8 | 0.96 | 1.22 | 1.38 | 30.8 |
| North: Carrington (N) | | | | | | | | | | | | |
| 8 | T1 | 714 | 3.8 | 0.814 | 17.1 | LOS B | 21.0 | 150.1 | 0.74 | 0.72 | 0.81 | 40.5 |
| 9 | R2 | 83 | 3.6 | 0.310 | 38.6 | LOS D | 3.0 | 21.7 | 0.93 | 0.76 | 0.93 | 32.5 |
| Approach | | 797 | 3.8 | 0.814 | 19.3 | LOS B | 21.0 | 150.1 | 0.76 | 0.72 | 0.82 | 39.5 |
| West: Gate 2 | | | | | | | | | | | | |
| 10 | L2 | 82 | 1.2 | 0.131 | 24.4 | LOS C | 2.2 | 15.7 | 0.73 | 0.72 | 0.73 | 37.2 |
| 12 | R2 | 93 | 2.2 | 0.376 | 39.9 | LOS D | 3.5 | 24.6 | 0.95 | 0.77 | 0.95 | 32.2 |
| Approach | | 175 | 1.7 | 0.376 | 32.6 | LOS C | 3.5 | 24.6 | 0.85 | 0.74 | 0.85 | 34.3 |
| All Vehicles | | 1904 | 3.2 | 0.942 | 33.4 | LOS C | 48.9 | 347.8 | 0.87 | 0.97 | 1.10 | 34.3 |

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

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 50 | 34.3 | LOS D | 0.1 | 0.1 | 0.93 | 0.93 |
| P3 | North Full Crossing | 50 | 34.3 | LOS D | 0.1 | 0.1 | 0.93 | 0.93 |
| P4 | West Full Crossing | 50 | 34.3 | LOS D | 0.1 | 0.1 | 0.93 | 0.93 |
| All Pedestrians | | 150 | 34.3 | LOS D | | | 0.93 | 0.93 |

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

# MOVEMENT SUMMARY

## Site: 13_B2_am [Gate 2 - AM Peak - Without Through Traffic Reduction - 90s Cycle - SIDRA Set]

AM Peak
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Site Practical Cycle Time)

**Movement Performance - Vehicles**

| Mov ID | Turn | Demand Flows Total veh/h | Demand Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate | Aver. No. Cycles | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Carrington (S) | | | | | | | | | | | | |
| 1 | L2 | 47 | 2.1 | 0.036 | 8.9 | LOS A | 0.6 | 4.4 | 0.32 | 0.61 | 0.32 | 44.1 |
| 2 | T1 | 885 | 2.9 | 0.880 | 29.8 | LOS C | 40.7 | 289.3 | 0.95 | 0.99 | 1.10 | 35.5 |
| Approach | | 932 | 2.9 | 0.880 | 28.7 | LOS C | 40.7 | 289.3 | 0.92 | 0.97 | 1.06 | 35.9 |
| North: Carrington (N) | | | | | | | | | | | | |
| 8 | T1 | 714 | 3.8 | 0.766 | 13.2 | LOS B | 18.9 | 135.1 | 0.64 | 0.59 | 0.65 | 42.3 |
| 9 | R2 | 83 | 3.6 | 0.322 | 43.2 | LOS D | 3.4 | 24.5 | 0.94 | 0.76 | 0.94 | 31.2 |
| Approach | | 797 | 3.8 | 0.766 | 16.3 | LOS B | 18.9 | 135.1 | 0.67 | 0.61 | 0.68 | 40.8 |
| West: Gate 2 | | | | | | | | | | | | |
| 10 | L2 | 82 | 1.2 | 0.137 | 27.8 | LOS C | 2.6 | 18.0 | 0.74 | 0.72 | 0.74 | 36.0 |
| 12 | R2 | 93 | 2.2 | 0.387 | 44.5 | LOS D | 3.9 | 27.7 | 0.96 | 0.77 | 0.96 | 30.9 |
| Approach | | 175 | 1.7 | 0.387 | 36.7 | LOS D | 3.9 | 27.7 | 0.86 | 0.75 | 0.86 | 33.1 |
| All Vehicles | | 1904 | 3.2 | 0.880 | 24.3 | LOS C | 40.7 | 289.3 | 0.81 | 0.80 | 0.88 | 37.5 |

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

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 50 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P3 | North Full Crossing | 50 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| P4 | West Full Crossing | 50 | 39.3 | LOS D | 0.1 | 0.1 | 0.94 | 0.94 |
| All Pedestrians | | 150 | 39.3 | LOS D | | | 0.94 | 0.94 |

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

# MOVEMENT SUMMARY

## Site: 13_B1_pm [Gate 2 - PM Peak - With Through Traffic Reduction - 110s Cycle - SIDRA Set]

PM Peak
Site Category: (None)
Signals - Fixed Time Coordinated    Cycle Time = 110 seconds (Site Practical Cycle Time)

**Movement Performance - Vehicles**

| Mov ID | Turn | Demand Flows Total veh/h | Demand Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate | Aver. No. Cycles | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Carrington (S) | | | | | | | | | | | | |
| 1 | L2 | 29 | 3.4 | 0.022 | 8.9 | LOS A | 0.4 | 3.0 | 0.29 | 0.59 | 0.29 | 44.1 |
| 2 | T1 | 730 | 3.3 | 0.657 | 17.0 | LOS B | 26.1 | 185.9 | 0.74 | 0.67 | 0.74 | 40.5 |
| Approach | | 759 | 3.3 | 0.657 | 16.7 | LOS B | 26.1 | 185.9 | 0.72 | 0.67 | 0.72 | 40.7 |
| North: Carrington (N) | | | | | | | | | | | | |
| 8 | T1 | 894 | 2.7 | 0.874 | 18.4 | LOS B | 33.3 | 236.6 | 0.66 | 0.66 | 0.73 | 39.9 |
| 9 | R2 | 97 | 3.1 | 0.398 | 52.7 | LOS D | 4.9 | 35.2 | 0.96 | 0.78 | 0.96 | 28.9 |
| Approach | | 991 | 2.7 | 0.874 | 21.8 | LOS C | 33.3 | 236.6 | 0.69 | 0.67 | 0.75 | 38.5 |
| West: Gate 2 | | | | | | | | | | | | |
| 10 | L2 | 33 | 3.0 | 0.062 | 34.6 | LOS C | 1.3 | 9.1 | 0.75 | 0.69 | 0.75 | 33.7 |
| 12 | R2 | 72 | 4.2 | 0.319 | 53.1 | LOS D | 3.6 | 26.3 | 0.95 | 0.76 | 0.95 | 28.8 |
| Approach | | 105 | 3.8 | 0.319 | 47.3 | LOS D | 3.6 | 26.3 | 0.89 | 0.74 | 0.89 | 30.2 |
| All Vehicles | | 1855 | 3.0 | 0.874 | 21.2 | LOS C | 33.3 | 236.6 | 0.71 | 0.67 | 0.75 | 38.7 |

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

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 50 | 49.3 | LOS E | 0.1 | 0.1 | 0.95 | 0.95 |
| P3 | North Full Crossing | 50 | 49.3 | LOS E | 0.1 | 0.1 | 0.95 | 0.95 |
| P4 | West Full Crossing | 50 | 49.3 | LOS E | 0.1 | 0.1 | 0.95 | 0.95 |
| All Pedestrians | | 150 | 49.3 | LOS E | | | 0.95 | 0.95 |

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


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# MOVEMENT SUMMARY

## Site: 13_B2_pm [Gate 2 - PM Peak - Without Through Traffic Reduction - 110s Cycle - Forced]

PM Peak
Site Category: (None)
Signals - Fixed Time Coordinated    Cycle Time = 110 seconds (Site User-Given Cycle Time)

| Movement Performance - Vehicles | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mov ID | Turn | Demand Flows Total veh/h | HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | Distance m | Prop. Queued | Effective Stop Rate | Aver. No. Cycles | Average Speed km/h |
| South: Carrington (S) | | | | | | | | | | | | |
| 1 | L2 | 29 | 3.4 | 0.022 | 8.9 | LOS A | 0.4 | 3.0 | 0.29 | 0.59 | 0.29 | 44.1 |
| 2 | T1 | 803 | 3.0 | 0.725 | 18.1 | LOS B | 30.6 | 217.6 | 0.78 | 0.72 | 0.78 | 40.1 |
| Approach | | 832 | 3.0 | 0.725 | 17.8 | LOS B | 30.6 | 217.6 | 0.77 | 0.71 | 0.77 | 40.2 |
| North: Carrington (N) | | | | | | | | | | | | |
| 8 | T1 | 989 | 2.4 | 0.960 | 43.9 | LOS D | 59.1 | 419.3 | 0.80 | 0.97 | 1.09 | 31.3 |
| 9 | R2 | 97 | 3.1 | 0.398 | 52.7 | LOS D | 4.9 | 35.2 | 0.96 | 0.78 | 0.96 | 28.9 |
| Approach | | 1086 | 2.5 | 0.960 | 44.7 | LOS D | 59.1 | 419.3 | 0.81 | 0.96 | 1.08 | 31.0 |
| West: Gate 2 | | | | | | | | | | | | |
| 10 | L2 | 33 | 3.0 | 0.062 | 34.6 | LOS C | 1.3 | 9.1 | 0.75 | 0.69 | 0.75 | 33.7 |
| 12 | R2 | 72 | 4.2 | 0.319 | 53.1 | LOS D | 3.6 | 26.3 | 0.95 | 0.76 | 0.95 | 28.8 |
| Approach | | 105 | 3.8 | 0.319 | 47.3 | LOS D | 3.6 | 26.3 | 0.89 | 0.74 | 0.89 | 30.2 |
| All Vehicles | | 2023 | 2.8 | 0.960 | 33.8 | LOS C | 59.1 | 419.3 | 0.80 | 0.84 | 0.94 | 34.2 |

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

| Movement Performance - Pedestrians | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Distance m | Prop. Queued | Effective Stop Rate |
| P1 | South Full Crossing | 50 | 49.3 | LOS E | 0.1 | 0.1 | 0.95 | 0.95 |
| P3 | North Full Crossing | 50 | 49.3 | LOS E | 0.1 | 0.1 | 0.95 | 0.95 |
| P4 | West Full Crossing | 50 | 49.3 | LOS E | 0.1 | 0.1 | 0.95 | 0.95 |
| All Pedestrians | | 150 | 49.3 | LOS E | | | 0.95 | 0.95 |

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


Organisation: STANTEC NEW ZEALAND | Processed: Wednesday, 14 October 2020 5:16:29 p.m.
Project: P:\Oracle Onwards\Ministry of Housing & Urban Development\310203609 Unitec Mt Albert\4.0 Technical\4.9 Transportation\Sidra \Gate2_sensitivity_tests_.sip8

# MOVEMENT SUMMARY

## Site: 13_B2_pm [Gate 2 - PM Peak - Without Through Traffic Reduction - 140s Cycle - SIDRA Set]

PM Peak
Site Category: (None)
Signals - Fixed Time Coordinated    Cycle Time = 140 seconds (Site Practical Cycle Time)

**Movement Performance - Vehicles**

| Mov ID | Turn | Demand Flows Total veh/h | Demand Flows HV % | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue Vehicles veh | 95% Back of Queue Distance m | Prop. Queued | Effective Stop Rate | Aver. No. Cycles | Average Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Carrington (S) | | | | | | | | | | | | |
| 1 | L2 | 29 | 3.4 | 0.021 | 8.4 | LOS A | 0.4 | 3.2 | 0.24 | 0.58 | 0.24 | 44.4 |
| 2 | T1 | 803 | 3.0 | 0.654 | 16.6 | LOS B | 32.9 | 233.9 | 0.67 | 0.62 | 0.67 | 40.7 |
| Approach | | 832 | 3.0 | 0.654 | 16.3 | LOS B | 32.9 | 233.9 | 0.66 | 0.62 | 0.66 | 40.9 |
| North: Carrington (N) | | | | | | | | | | | | |
| 8 | T1 | 989 | 2.4 | 0.871 | 11.5 | LOS B | 33.0 | 233.9 | 0.52 | 0.49 | 0.53 | 43.2 |
| 9 | R2 | 97 | 3.1 | 0.447 | 67.6 | LOS E | 6.3 | 45.3 | 0.97 | 0.78 | 0.97 | 25.8 |
| Approach | | 1086 | 2.5 | 0.871 | 16.5 | LOS B | 33.0 | 233.9 | 0.56 | 0.52 | 0.57 | 40.8 |
| West: Gate 2 | | | | | | | | | | | | |
| 10 | L2 | 33 | 3.0 | 0.070 | 46.4 | LOS D | 1.7 | 12.1 | 0.79 | 0.70 | 0.79 | 30.4 |
| 12 | R2 | 72 | 4.2 | 0.355 | 67.7 | LOS E | 4.7 | 33.7 | 0.97 | 0.77 | 0.97 | 25.8 |
| Approach | | 105 | 3.8 | 0.355 | 61.0 | LOS E | 4.7 | 33.7 | 0.91 | 0.75 | 0.91 | 27.1 |
| All Vehicles | | 2023 | 2.8 | 0.871 | 18.7 | LOS B | 33.0 | 233.9 | 0.62 | 0.57 | 0.62 | 39.8 |

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

**Movement Performance - Pedestrians**

| Mov ID | Description | Demand Flow ped/h | Average Delay sec | Level of Service | Average Back of Queue Pedestrian ped | Average Back of Queue Distance m | Prop. Queued | Effective Stop Rate |
|---|---|---|---|---|---|---|---|---|
| P1 | South Full Crossing | 50 | 64.3 | LOS F | 0.2 | 0.2 | 0.96 | 0.96 |
| P3 | North Full Crossing | 50 | 64.3 | LOS F | 0.2 | 0.2 | 0.96 | 0.96 |
| P4 | West Full Crossing | 50 | 64.3 | LOS F | 0.2 | 0.2 | 0.96 | 0.96 |
| All Pedestrians | | 150 | 64.3 | LOS F | | | 0.96 | 0.96 |

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


Organisation: STANTEC NEW ZEALAND | Processed: Wednesday, 14 October 2020 5:16:30 p.m.
Project: P:\Oracle Onwards\Ministry of Housing & Urban Development\310203609 Unitec Mt Albert\4.0 Technical\4.9 Transportation\Sidra \Gate2_sensitivity_tests_.sip8

# Te Auaunga Plan Change - Transport Assessment & Traffic Modelling Report

PREPARED FOR MINISTRY OF HOUSING AND URBAN DEVELOPMENT | DECEMBER 2022

We design with community in mind

Stantec

# Revision Schedule

| Rev No | Date | Description | Signature of Typed Name (documentation on file) | | | |
|---|---|---|---|---|---|---|
| | | | **Prepared by** | **Checked by** | **Reviewed by** | **Approved by** |
| **V1** | | First draft for client / planner review | TLJ/ZC | MR | DJM | DJM |
| **V2** | | Second draft for review | TLJ/ZC | MR | DJM | |
| **V3** | | Final Draft | TLJ/ZC | MR | DJM | DJM |
| **V4** | 20/12/2022 | Final | TLJ/ZC | MR | DJM | DJM |

This document was prepared by Stantec New Zealand ("Stantec") for the Ministry of Housing and Urban Development (the "Client"). The conclusions in the Report titled *Te Auaunga Plan Change - Transport Assessment & Traffic Modelling Report*, are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

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# Quality Statement

| Project manager | Project technical lead |
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| **Don McKenzie** | Max Robitzsch |

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| **REVIEWED BY**<br>Don McKenzie | 20 / 12 / 2022 |
| **APPROVED FOR ISSUE BY**<br>Don McKenzie | 20 / 12 / 2022 |

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# Executive summary

This report summarises the traffic modelling and relevant other transport aspects of a plan change proposal for rezoning and residential intensification in the Wairaka Precinct (proposed to be renamed Te Auaunga) in Auckland, together with the establishment of a retail cluster already provided for in the zoning, but not previously assessed in traffic flow terms.

To enable effective integration of this significant level of development into the existing transport environment without inappropriate disruption, the development needs to progress beyond a number of “Status Quo” assumptions historically forming part of large new residential developments in Auckland.

As with the 2020 ITA, but in some cases strengthened in form, the reporting instead assumes a Te Auaunga Precinct planned from the outset to encourage transport alternatives. This is to incentivise use of public transport, walking and cycling, while disincentivising private car use among residents and visitors, via both design and operation. The assumptions and conditions necessary to achieve the required mode shift are available to the Te Auaunga Precinct both in terms of its location as well as its proposed design and infrastructure, as set out in this report to follow.

It is important to note that the increase in development intensity is not solely due to the proposed rezoning of some areas within the precinct. Instead, it is in large degree due to the traffic modelling extending the assessment horizon to include more of the development already signalled by the existing zoning and precinct provisions. The purpose of now including an extended time period in the model is to assess these impacts alongside those of the rezoning itself. This report’s assumptions and conclusions, if approved through the plan change process, would be expected to sit alongside the previously approved 2020 ITA as a companion document.

As was identified in the work related to the new traffic modelling covered in this December 2022 Report, the additional residential and retail development requires an even stronger focus on non-car-based access. Key assumption changes going beyond those of the 2020 ITA include a more stringent (pro-rata) constraint on residential car parking, the assumption of resident’s parking schemes being established to avoid creating added parking pressure (and added trip generation) via people parking in surrounding suburbs, and incorporation of a more extensive Carrington Road Upgrade (with bus lanes and protected cycle lanes) extending as far as New North Road.

The key zoning changes are the rezoning of 122,329m² of “Special purpose – Tertiary Education Zone” to “Business – Mixed Use” zoning intended for residential housing is accompanied by the rezoning of two smaller other areas from “Terrace Housing and Apartment Buildings” to “Business – Mixed Use” in the centre, and a “Special purpose – Tertiary Education Zone” area to “Residential Mixed Housing Urban” along the southern edge of the Unitec core area.

The Te Auaunga Plan Change traffic modelling also, above and beyond the impacts of the rezoning alone, incorporates recent changes in the masterplan assumptions. The most significant of these changes are:

- a modelling horizon year of 2031 rather than 2028;
- an inclusion of a small supermarket and supporting specialty retail,
- An increase of residential dwellings modelled from previously 2,049 to now 4,000, and an increase in average dwelling size from 1.5 bedrooms to 2.5 bedrooms, albeit without a commensurate increase of car parking.

At the same time, a primary school previously included at 50% of its long-term roll in year 2028 has been omitted at year 2031, as the actual year of it being developed currently remains uncertain.

Overall, compared to the results of the approved 2020 ITA, there are a variety of changes to traffic Levels of Service / delays. These vary widely and are not all decreases in performance, as individual intersections are affected differently by the changed layout assumptions and increased flows. At the southern end of the network, performance results are also somewhat dependent on longer-term flow reduction assumed in the wider Auckland traffic model in this area, and the added capacity on the approach to the Mt Albert intersection from a rebuild / widening of the rail overbridge.

Bus journey time analysis shows that the Carrington Road bus routes will see clear benefits from the new bus lanes proposed as part of the Carrington Road Upgrade, albeit to ensure consistent advantage of public transport over single-occupancy cars, more intersection-specific bus priority would be beneficial at key locations in addition to the mid-block bus lanes. This particularly applies at the “ends” of the model (Great North Road and New North Road).

In a wider sense, this report indicates that the transport impacts of the proposed intensification and the rezoning enabled by the plan change can be adequately integrated into the surrounding transport network. This conclusion is however predicated upon key constraints to trip generation rates (in particular the parking constraints) and improvements to active modes and public transport (in particular the extended Carrington Road Upgrade) both being in place.

If these assumptions are given effect to, then, combined with the good existing transport accessibility and the central location that the Te Auaunga Precinct enjoys, the transport effects of the new development are considered acceptable, and will place a much-reduced burden on Auckland’s transport networks compared to a development of similar size further outside the Auckland Isthmus.

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# 1 Introduction

This report on the Te Auaunga Plan Change discusses the traffic aspects of a proposal to intensify residential development in the Wairaka Precinct (the “precinct”) in Auckland, as it is currently defined in Section I334 of Auckland Council’s Unitary Plan Operative in Part (“Unitary Plan”) (the “December 2022 Report”).

The primary change consists of 122,329m² of “Special Purpose - Tertiary Education Zone” proposed to be rezoned to “Business – Mixed Use” zoning. This land, in three blocks, is located in the southern part of the centre of the precinct, in the west and east of what is generally called the “Unitec Core”, where the Unitec tertiary education institute is located after having progressively consolidating activities there from the wider precinct. There is a further small triangle of land adjacent to the Mason Clinic to the north that is to changes from “Special Purpose – Healthcare Facility and Hospital Zone” to “Business Mixed Use” as part of this plan change. However, it is intended to be vested as road, and does not affect the transport matters discussed in this report.

One further block of approximately 10,093m² in the northwest, currently zoned “Terrace Housing and Apartment Buildings” is also proposed to be rezoned as “Business – Mixed Use”.

Finally, the Te Auaunga Plan Change proposes to rezone approximately 9,898m2 of “Special Purpose - Tertiary Education Zone” to “Residential Mixed Housing Urban”, in the south of the area.

The areas proposed to be rezoned are identified in Figure 1 below:

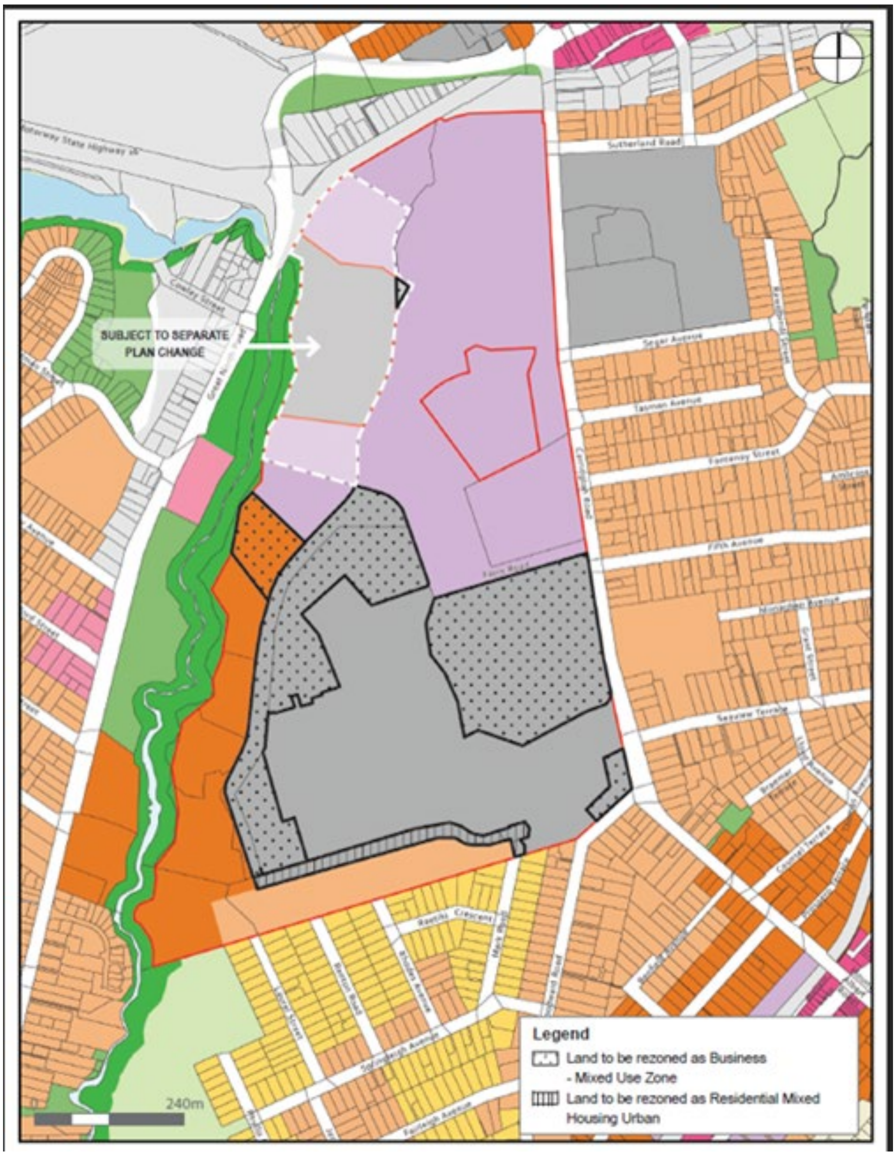


**Figure 1: Areas to be rezoned**

The purpose of the Te Auaunga Plan Change is to enable development of multi-storey, residential housing on the rezoned mixed-use land, similar to that envisaged in other parts of the precinct already zoned "Business – Mixed use".

Stantec has previously prepared an Integrated Transport Assessment ("2020 ITA") covering the entire precinct for the Ministry of Housing and Urban Development, "HUD". That 2020 ITA discussed all transport aspects, from the overall transport philosophy of the proposed new community to how development would fulfil precinct rules and manage transport and traffic integration. The reporting included producing and assessing a wider-area traffic model – up to the assumptions for a Year 2028 scenario. On 30 March 2021, Auckland Council, after discussion with HUD and Auckland Transport ("AT"), approved the ITA. This document is referred to as the "2020 ITA" in this report.

While the 2020 ITA included the areas now proposed to be rezoned, the tertiary education areas were not assumed to have any traffic generation (at least not by Year 2028), beyond that assumed for the tertiary education institute itself. As such, a key traffic and transport matter for assessment during the Te Auaunga Plan Change process is the extent of additional traffic impacts resulting from development of these areas that will be enabled by the proposed rezoning to Business – Mixed Use.

At the same time, HUD has now instructed Stantec to also assess increased residential and commercial (retail) development in the other areas of the precinct not being rezoned. While this further residential development aligns with the zoning of the unchanged areas, the 2020 ITA did not yet include it for the Year 2028 horizon.

Overall, the Te Auaunga Plan Change is not considered to change the character of development proposed in the precinct, or the general transport approaches, only the intensity of development. In consequence therefore, this report largely concentrates on traffic modelling matters only. It does not represent a "new ITA" in and of itself, with the precinct rules / the 2020 ITA already having envisaged further intensified housing, and the overall appropriate transport environment to cater for it, but rather forms one of the three documents comprising the Te Auaunga Precinct 2022 ITA as set out in the 2022 Executive Summary provided with the Te Auaunga Plan Change application.

The relevant provision and assessments of the 2020 ITA are considered as remaining appropriate, except where this report states changed assumptions or mitigations that have been identified during the updated traffic modelling.

To assist with usability, both this December 2022 Report and the Te Auaunga Plan Change application will explicitly (and where appropriate, in tabulated form), discuss which assumptions remain the same and which would change if the Te Auaunga Plan Change is approved.

The Te Auaunga Plan Change's assumptions will be covered in depth in the following report, however the most important assumptions compared to the 2020 ITA can be summarised as:

- The traffic modelling scenario is for the Year 2031, instead of Years 2024 and 2028. Background (wider-area) traffic data has also been updated to 2031 using Auckland-wide projected values.
- The model now covers 4,000 residential dwellings by Year 2031, compared to a total of 2,049 dwellings by Year 2028 considered within the 2020 ITA.
- The model somewhat modifies the distribution of dwellings (i.e. different spread for size of bedrooms)
- The model now includes retail development, including a supermarket (previously assumed to be developed only after the model scenario timeframe).
- The model now assumes a primary school (and associated early childhood education) will only be implemented at some stage after Year 2031 – where in the 2020 ITA by 2028 the school had reached 375 students, half the long-term roll.
- The model now assumes that the commercial operations of the Taylor's Laundry site will have ceased by Year 2031, while they were still included in the Year 2028 scenario in the 2020 ITA.
- The model reduces the per-dwelling car parking rate. Instead of a previous rate of less than 1 car park per dwelling, a total of 1,000 dwellings are now proposed to have no car parking, while the remaining 3,000 dwellings will have an average of 0.7 or less parking spaces per dwelling (average across the precinct).
- The model adjusts a number of trip generation rates downwards (less motor vehicle traffic) based on various assumption changes since the 2020 ITA's production.
- The model now assumes that Gate 1 will be an all-movements signal, with Gate 2 being a left-in / left-out give-way intersection by 2031 (reversing the functionality of the two northern-most gates switch compared to the 2020 ITA). Associated with this, the nearby North-Western Shared Path crossing over Carrington Road is now proposed to be integrated into the Gate 1 signals rather than assumed to be signalised as a separate mid-block crossing.
- The model now assumes that the Carrington Road Upgrade (provision of bus lanes, protected cycle lanes, improved footpaths and various intersection upgrades) extends along the entirety of Carrington Road, from the intersections with Great North Road in Point Chevalier to New North Road in Mt Albert, including additional lanes on upgraded / replaced motorway and rail overbridges – rather than the upgrade only covering the precinct frontage.

The following key elements remain the same, or essentially the same, as in the 2020 ITA and its supporting transport model:

- The geographic distribution and numbers of dwellings across the areas of the precinct that are not being rezoned.
- The student assumptions for Unitec (9,702 FTE), despite a reduction in size in the tertiary education-zoned area.
- The trip generation assumptions for the extended Mason Clinic currently undergoing its own Plan Change (Proposed Private Plan Change 75: Mason Clinic) - noting that the 2020 ITA model already allowed for the same increases since put forward in the transport documentation for Plan Change 75.
- The number and location of vehicle connections to the wider transport network.
- The assumptions for how much through traffic reductions on Carrington Road would occur due to displacement by the new site traffic.
- The focus on “less-car dominated” residential development via improving alternative transport options, including improving public transport.

# 2 Assumption Changes

As set out in the introduction, this December 2022 Report does not intend to replace the 2020 ITA, as the overall transport moves set out therein stay the same. At the same time, the work extends to more than simply adding some additional vehicle traffic to the traffic model and re-running it to assess intersection performance and journey times, and has therefore been packaged together to form the Te Auaunga Precinct 2022 ITA as described in the 2022 Executive Summary included in the Te Auaunga Plan Change application.

This is not only because some of the key activity area assumptions and the scenario year have changed, but also because a number of other “wider” assumption changes have occurred. These both cover changes in the assumed future network; for example, the extension of the “Carrington Road Upgrade”, to other changes made after iterative work within the applicant team to identify optimisations and mitigation needed to ensure appropriate traffic performance.

This section of the report discusses the key assumption changes in more depth. In Table 9, the report later provides a table setting out a summary of all key assumption changes on the traffic model.

Where the below section does not discuss something – for example, the basic form of the AIMSUN model, or the calibration process – this can be reviewed in the 2020 ITA’s modelling section.

## 2.1 Modelling Years / Scenarios

The 2020 ITA had a “Base” (2019 road layout and traffic) scenario, as well as a Scenario A (Year 2024) and a Scenario B (Year 2028). The December 2022 Report will discuss the “Base” and “Scenario B” scenarios again (albeit renamed “Base 2019” and “ITA 2028”) as well as a new “Plan Change 2031” scenario. The first two are not new modelling – they are re-provided mainly to allow easier comparison with the previous work and the approved 2020 ITA.

The future year horizon adopted for the Te Auaunga Plan Change 2031 was adopted for a number of reasons:

- Several years have passed since the original modelling was developed in 2019-2020.
- The significant additional residential development proposed to be enabled is unlikely to happen immediately – it primarily extends the upper ceiling, rather than the development speed.
- The primary infrastructure upgrade to the wider roading network (the “Full Upgrade” along all of Carrington Road discussed later in this report) is unlikely to be (fully) in place by 2028, as it is more substantial than the upgrade discussed in the 2020 ITA.
- The 2031 timeframe aligns with the new wider-area Auckland traffic model data available from Auckland’s Macro Strategic Model (“MSM”) (available model data for periods after 2031 remains relatively unrefined and is thus much less useful for local-area traffic modelling such as the plan change model).

As in the 2020 ITA, no modelling for periods after the chosen longer-term scenario has been undertaken. If any future development above and beyond the activity area assumptions is proposed, a future ITA will update the corresponding assumptions and revise the traffic model as required.

## 2.2 Proposed Development Levels

The below sections align with the order of Section 3.5, Proposed Development Levels, in the 2020 ITA.

### 2.2.1 Education Land Uses

Despite the Te Auaunga Plan Change rezoning land currently zoned “tertiary education”, the Te Auaunga Plan Change modelling assumes the same level of future student and staff at Unitec in the 2031 scenario as in the 2020 ITA for 2028, i.e. 9,702 students and 1,187 staff (all FTE equivalents). These forecast numbers are several years old and predate reorganisation that is currently ongoing in the tertiary education sector - however, in the absence of formalised updated forecasts, this was retained as per before.

Unlike tertiary education, the primary school and associated special needs students and early childhood education components, as well as the related staff, are assumed to not be present in the 2031 scenario. While the 2020 ITA assumed a 50% roll of students and staff for a new primary school in 2028, there is now understood to be insufficient certainty about the timing and location of the future primary school to enable the traffic modelling to incorporate it. At the point in time this information is available, the ITA and/or modelling work may need to be updated.

## 2.2.2 Residential Land Uses

One key outcome of the Te Auaunga Plan Change would be the increase in enabled residential development (assuming the Te Auaunga Plan Change is granted as set out in this report) from the 2,049 dwellings discussed in the 2020 ITA to 4,000 dwellings. This number of extra dwellings are expected to be developed in an iterative fashion considering the likely external traffic impacts and amount of rezoned land available.

The proposed additional 1,951 extra dwellings are proposed to be located in the west of the Unitec core, in the area sometimes referred to as the "F-Blocks" with approximately 155 dwellings, and 483 dwellings in the east of the Unitec site, along Carrington Road in the area sometimes referred to as the "B-Blocks". These areas are the primary proposed areas for rezoning as shown in Figure 1 earlier. Existing development in these zones (where present – some low-intensity development exists along the Carrington Road frontage between Gate 3 and 4 in particular) is assumed as removed prior to development for the purposes of this traffic model.

The residential development in the other areas of the precinct not being rezoned (i.e. the 2,049 dwellings) are located essentially in the same locations as in the previous model.

The 2020 ITA, while noting that there was some flexibility in the breakdown of different dwelling sizes from one to four bedrooms, largely assumed an "average" of an "1.5 bedrooms with parking" typology. Information on other sizes, where available, was largely based on masterplanning that had been completed at that time (now further advanced). It was acknowledged that the 1.5 bedrooms was a simplification, and in practice would be somewhat more varied - with the key traffic constraint allowing certainty despite this being the overall dwelling cap, and the site-wide parking constraint (1 or fewer spaces per dwelling average). This has been discussed in Appendix D of the original 2020 ITA.

Subsequent discussions between HUD and development partners identified that there were some concerns that the bedroom average was somewhat too small on average, i.e. that it was sensible to plan for larger average dwellings. After discussion, it was decided that a significant number of larger developments would be included. However – as will be discussed later – a significant number (one third) of all dwellings would now have zero car parking, and the car parking average for the remainder would be reduced further. This assists with limiting the vehicular impacts of not only increasing the overall dwelling numbers, but also increasing the average size of the dwellings.

Actual bedroom spreads may still vary somewhat. Again, the overall cap and the car parking average will provide the required transport certainty even if, for example, some 3-4 bedroom dwellings are built as well, despite these – and 2-bedroom dwellings – not being explicitly included in this current dwelling schedule.

The new and old distribution spread is shown in Table 1 below.

**Table 1: Dwelling Size Distribution**

| Dwelling size | 2028 ITA<br>Number of dwellings | 2031 Plan Change<br>Number of dwellings |
|---|---|---|
| Studios / 1-bedrooms / 1.5-bedrooms (without parking) | 98 | 1,000 |
| 1.5 bedrooms (with parking) | 1,591 | 1,250 |
| 2 bedrooms (with parking) | 183 | 0 |
| 2.5 bedrooms (with parking) | 95 | 1,750 |
| 3 and 4 bedrooms (with parking) | 82 | 0 |
| Totals | 2,049 | 4,000 |

The distribution is applied pro-rata (i.e. if an area has 400 dwellings, it is assumed to have 100 1.5-bedroom dwellings without parking, 125 1.5-bedrooms with parking, and 175 2.5-bedrooms with parking dwellings). In practice, this may vary somewhat across the precinct, however the variation is not expected to be so substantial, and the distances and access arrangements not so great that this would lead to any marked impacts to the traffic model if the weighting ends up slightly different.

It is important to note that the above distribution change has been applied for all residential development across the precinct, not just the areas proposed to be rezoned through the Te Auaunga Plan Change.

## 2.2.3 Commercial Land Uses

The 2020 ITA had only one "commercial" use by 2028, being Taylor's Laundry. This has a lease running until 2036.

Additionally, the 2031 scenario now assumes a new metro-sized supermarket with 1,500sqm retail floor space, with a surrounding specialty retail cluster of 1,200sqm retail floor space. These activities had not been included in the 2028 scenario of the HUD plans approved with the 2020 ITA. Now, with the modelling scenario moved out to 2031, and with further advanced masterplanning, these retail components are assumed to be operating by 2031.

Retail floor space represents a proportion of Gross Leasable Floor Area (GLFA), the standard assessment metric in retail transport assessments. For the purposes of the Te Auaunga Plan Change, an estimated conversion factor of 1.2 has been adopted for the supermarket to convert retail floor space to GLFA and 1.1 for the specialty retail. This results in 1,800sqm GLFA for the supermarket and 1,320sqm GLFA for the specialty retail. This is considered appropriate as specialty retail would likely have a smaller back-of-house areas than the supermarket.

The proposed supermarket / retail cluster is to be located off Farm Road (Gate 3), close to Carrington Road – as envisaged in the operative Wairaka Precinct provisions. This cluster is assumed to be primarily to serve the local catchment within the precinct, with size and store focus not intended to draw “destination traffic” – albeit it is accepted that some traffic passing on Carrington Road and some existing populations east of Carrington Road will shop here.

### 2.2.4 Other Land Uses

The only other land use discussed in the approved 2020 ITA is the Mason Clinic in the northwest of the precinct. Since the preparation of the 2020 ITA, the clinic has been the subject of its own Plan Change (Proposed Private Plan Change 75: Mason Clinic) to expand within the precinct.

However, the approved 2020 ITA had already allowed for this expansion of the Mason Clinic in the 2028 scenario in discussion with the then District Health Board’s traffic consultants. The since-lodged Proposed Private Plan Change 75 retains the same assumptions (including the same trip generation). As such, there is no change required for the 2031 Te Auaunga Plan Change scenario compared to the 2020 ITA 2028 scenario, as both already allow for the plan change expansion of the clinic.

## 2.3 Car Parking

The below sections generally align with the order of Section 3.6, Future Car Parking, in the 2020 ITA (except where additional elements related to commercial and retail parking are addressed).

Car parking availability, especially for residential and retail uses, is a key determinant of external traffic impacts of the development. The Te Auaunga Plan Change modifies a number of car parking assumptions, both for the rezoned areas, and the overall precinct. Parking is, on average, being constrained more than was previously assumed in the 2020 ITA.

The following parking constraints are explicit assumptions underpinning the Te Auaunga Plan Change and the associated changes to the wider precinct, as providing significantly more parking would also create significantly more traffic than assumed within the traffic model.  The impacts of the parking constraint on the chosen trip generation rates are discussed in more detail at the end of this section.

### 2.3.1 Residential Parking

In the 2020 ITA 2028 scenario, the key residential parking assumption was a provision of “less than 1 car park space per dwelling” across the average of the precinct. This has been constrained further. Out of the 4,000 dwellings, at least 1,000 are assumed to provide no car parking at all, while the remaining 2,000 will provide 0.7 or less car parking spaces average. In total, this means that the overall residential development component will have a maximum of 2,100 car parking spaces, as set out in Table 2 below:

**Table 2: Car Parking Distribution**

| | Number of dwellings | Maximum parking rate per dwelling | Resulting maximum parking spaces |
|---|---|---|---|
| Studios/1 & 1.5-bedrooms (without parking) | 1,000 | 0 | 0 |
| 1.5-bedrooms (with parking) | 1,250 | 0.7 | 875 |
| 2.5-bedrooms (with parking) | 1,750 | 0.7 | 1,225 |
| Totals | 4,000 | N.A. | 2,100 |

As before in the 2020 ITA, the assumption is also that residential car parking provided will generally be “unbundled”, i.e. it will be offered for lease or purchase separately from the residential dwellings. This will assist with not only identifying the true level of demand, but also make purchasing or renting in the precinct more affordable and thus attractive to the type of residents who are happy to use alternative modes of transport.

### 2.3.2 Commercial / Retail Parking

To limit the potential for excessive trip generation, and acknowledging the focus on the nearby precinct, rather than a wider retail catchment, the supermarket and surrounding retail cluster will have a cap on car parking, with the supermarket being limited to 50 car parks or less (representing a rate of 1/36sqm GLFA or less), and the retail cluster being limited to 25 car parks or less (representing a rate of 1/52sqm GLFA or less). This limit of 75 spaces or less includes on-street parking in the precinct at or near the cluster, whether the streets are proposed to be public or private.

For clarity, the proposed rates above are provided mainly for context to how they were derived. As parking in a retail cluster is in practice somewhat or even mostly independent of what specific retail tenancy is visited, the allocated "split" between the supermarket and specialty retail parking can could change. This would not be expected to have any impact on the traffic modelling discussed in this report as long as the total of retail parking remains at approximately 75 spaces.

The limitation Is explicitly intended to ensure that retailers focus on serving the immediate surrounding neighbourhood, with local residents being able to walk or cycle to the shops or at least, when shopping by car, undertaking their shopping this via pass-by trip on the way home with minimal additional car traffic being generated. The limitation (already included in the precinct rules prior to the Te Auaunga Plan Change) on the size of the supermarket will also assist with ensuring the retail does not become an attractor for more distant catchments.

### 2.3.3 Education Parking

No changes to the education parking assumptions are made compared to the 2020 ITA (except for no new parking being provided for new primary school and any early childhood education activities – as these developments are now assumed to only occur after the assessment period).

It is noted that with the assumptions for the tertiary education area not changing, the "up to 2,500 car parks" assumed to be provided by Unitec represent more than 50% of the car parking expected across the precinct, even after the significant increase in residential activity proposed.

It may be beneficial for Unitec and the overall transport network in the area to consider a future car parking and overall transport approach that emphasises alternative modes more strongly, especially in light of the much-improved conditions expected along Carrington Road after the upgrade. However, considering the lack of confirmed updates for Unitec's future plans, this Te Auaunga Plan Change assessment does not assume any reduced car parking for Unitec.

Unitec has however confirmed to HUD that it will not be providing any of its potential surplus car parking for rent or purchase by residential tenants of the wider precinct - it intends to implement measures to reserve its parking for staff and students only. This is important to the assumptions in this report, because if Unitec provides any notable added residential parking this could significantly skew the trip generation of the precinct.

The only exception to the above would be the possibility of shared carparking, but if this occurs, any such parking provided by Unitec to the use of residents will be counted towards the maximum carparking discussed in Table 2.

### 2.3.4 On-Street Parking

No changes to the on-street parking philosophy within the precinct are proposed compared to the 2020 ITA. On-street parking, while provided, is intended to be relatively limited in scale.

### 2.3.5 Parking Controls

Two further parking assumptions are key for the Te Auaunga Plan Change, relating to the wider parking environment. Firstly, it is assumed that any on-street parking that may be provided within the precinct will generally be time-limited (i.e. targeted at short term visitors and similar uses, and not suitable for residential longer-term parking). This is identical to the 2020 ITA.

Secondly, it is assumed that once significant residential development occurs, AT should implement residential parking schemes in the surrounding neighbourhoods for existing residents, especially to the south and east of the precinct. This differs from the 2020 ITA where (for 2,049 dwellings) such schemes were seen as less important.

It is acknowledged that the latter (resident's parking schemes) cannot be agreed or conditioned as part of the current Te Auaunga Plan Change process, requiring separate legal and consultative processes by AT. However, it is explicitly noted that such schemes are assumed as an appropriate response to the residential intensification proposed, (nearly 2,000 additional dwellings with many having no, or low car parking numbers). Without residential parking schemes, vehicular traffic generation of the area could rise more than expected or modelled, despite parking constraints within the precinct, with some of the new residents parking additional cars in the surrounding neighbourhoods. With minimum parking no longer able to be prescribed through the Unitary Plan, the use of resident's parking schemes may now also find more application in Auckland in any case.

## 2.4 Transport Network Changes

The Te Auaunga Plan Change assumes a number of transport network (infrastructure) changes that were not fully assumed in the 2020 ITA. These flow into the network modelling but also in some cases, are factors in assuming modified trip generation rates. The key changes in network assumptions are given below.

### 2.4.1 Full Carrington Road Upgrade

Recent discussions between government, Auckland Transport and HUD have identified that to support the proposed residential intensification within the site, the upgrade of Carrington Road should ideally cover not only the precinct frontage (as assumed in the 2020 ITA) but should be extended along the full length of the corridor from Great North Road to New North Road, inclusive of the motorway and rail over-bridges. The extension primarily affects Carrington Road between Woodward Road and New North Road, which previously did not see significant change.

While exact design and timing of such a "Full Upgrade" (as it is being referred to within this Te Auaunga Plan Change report) are still being developed, it was agreed with HUD that the Full Upgrade should be included in the 2031 assumptions for the Te Auaunga Plan Change, with certain design assumptions being made for the future layout (essentially extending the geographic extent of the design assumed during the 2020 ITA).

As such, the 2031 traffic model scenario now includes bus lanes along the full length of Carrington Road on both sides of the carriageway and has the existing rail overbridge near New North Road replaced or widened to a total of five lanes from the current three lanes. This will effectively provide the ability to extend bus lanes to the New North Road / Carrington Road / Mt Albert Road intersection.

Assumptions at the SH16 motorway overbridge are more consistent with the previous 2020 ITA model, which already assumed moving walking and cycling facilities partly or fully onto clip-on bridges to avoid a full bridge rebuild.

While not directly affecting the traffic model, the assumptions also include the existing painted cycle lanes for the section from Woodward Road to New North Road being upgraded to protected cycle lanes. Together with more incremental pedestrian improvements, these assumptions assist in supporting the significant components of "low-car / no-car" development proposed in the precinct by making it safer and more convenient to walk, scooter, bike or bus to and from the precinct – which in turn supports the reduced trip generation rates applied in the model.

### 2.4.2 Intersection Upgrades

#### 2.4.2.1 Great North Road / Pt Chevalier Road / Carrington Road

Within both the 2020 ITA 2028 scenario and Te Auaunga Plan Change 2031 scenarios, several changes to the northern approach and departure (Point Chevalier Road) have been included as set out already in the 2020 ITA. The changes modelled are based on information from the Point Chevalier Improvements project consultation material[1] (consultation by AT completed in December 2019). It is understood that only minor changes (which do not affect the Te Auaunga Plan Change traffic model) have occurred since, and this project is still intended to proceed in advance of the modelled timeframes as of this writing.

The 2031 scenario also includes the new northbound and southbound bus lanes on Carrington Road. At this intersection, they are incorporated as follows:

- The northbound bus lane is assumed to still finish just before the SH16 overbridge, similar to the 2028 scenario, splitting into three lanes, one for each turn option.
- The new southbound bus lane on Carrington Road away from Great North Road is added, starting just south of the intersection proper (i.e. including over the overbridge). This (and walk/cycle works on the east side) will require some physical realignment of the northbound lanes.

As set out in the 2020 ITA, no mandatory structural widening is assumed on the motorway overbridge (even with the "Full Upgrade" as discussed above). The added space for the bus lane is assumed to be gained from relocating at least some of the walk / cycle facilities off the current bridge onto clip-on facilities. If the final design for the Full Upgrade does include more substantial rebuilds and/or widening, this would result in greater potential bus and general traffic movement capacity than assumed – for example, by taking the northbound bus lane closer to Great North Road.

However, to avoid doubt, this assessment does not assume any such more extensive changes to the overbridge and is thus conservative in terms of assessing potential network and bus impacts, pending finalisation of the Full Upgrade

[1] https://at.govt.nz/projects-roadworks/point-chevalier-improvements/

design. The proposed intersection layout, as modelled in the Aimsun traffic modelling under the Te Auaunga Plan Change 2031 scenario, is shown in Figure 2.

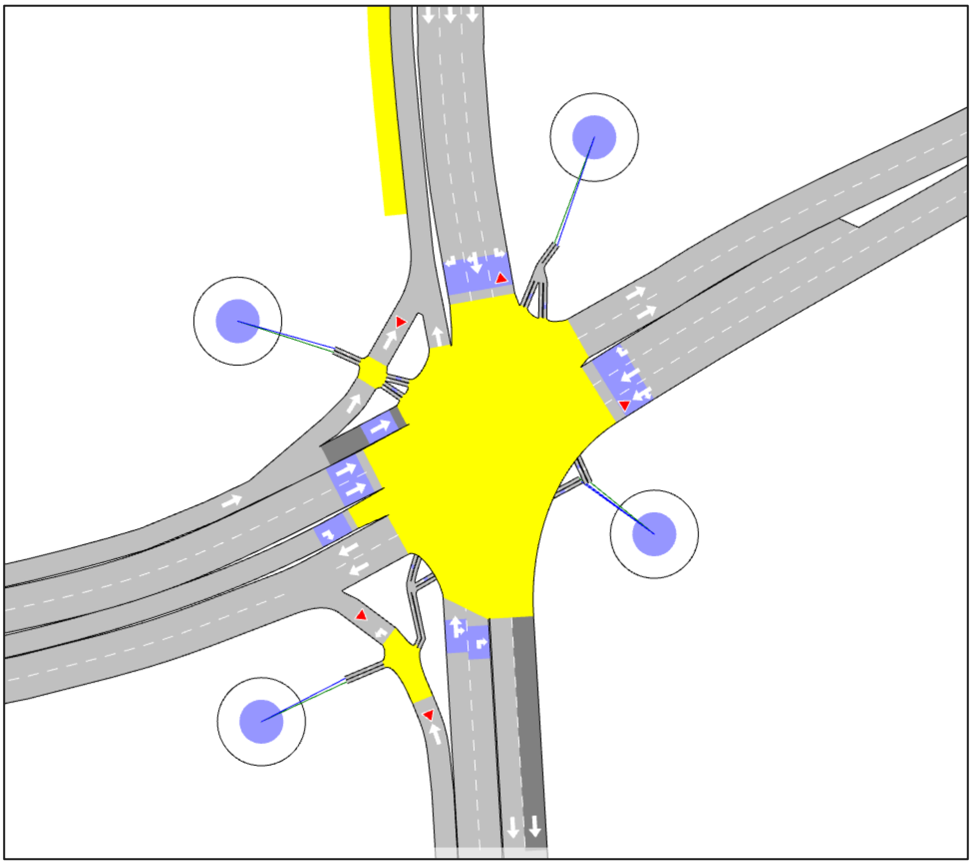

**Figure 2: Proposed Great North Road / Pt Chevalier Road / Carrington Road Layout**

It should be noted that the Te Auaunga Plan Change 2031 scenario includes shared through/right turn lanes on both the northern and southern approaches, which is a variation on the 2020 ITA 2028 scenario which only has dedicated lanes. The proposed signal phasing (diamond right phasing for the eastern and western approaches and split phasing for the northern and southern approaches) allow for the shared lane arrangements.

#### 2.4.2.2 Gate 1 / 2 & NW Path Crossing

The primary change in terms of how motor vehicle traffic is proposed to enter and exit from the precinct is a proposed functional reversal between Gate 1 and Gate 2, which also affects the future layout of the crossing of the North-western Shared Path over Carrington Road.

Subsequent to discussions with and further investigation by HUD's development partners since the 2020 ITA, it was decided that Gate 1 would function more effectively as the primary northern vehicular access into the precinct, whereas previous iterations had this located at Gate 2 (closer to Segar Avenue).

The change was driven by a variety of reasons, but primarily is understood to be due to the difficulties of upgrading the internal road network connecting Gate 2 to the internal spine road to the higher standard expected for the main vehicular connection, particularly with a dedicated cycleway. While this link ("Road 2") will still be provided and upgraded, Gate 2 is now proposed to be (by the time of the 2031 Scenario) a left-in / left-out only connection to Carrington Road.

All-movements connectivity with Carrington Road to/from the northern part of the precinct is thus now planned to be provided via Gate 1, where the 2031 scenario now shows a signalised intersection.

A related matter is the future functionality of the current priority crossing for walking and cycling over Carrington Road south of Sutherland Road. When the assumption was that Gate 2 would be the signal, not Gate 1, the crossing was assumed to be signalised as part of the Carrington Road Upgrade (i.e. once the road became four-laned). With Gate 1 now a new signal located much closer to the current crossing location, it has been assumed that the crossing is removed fully, and instead integrated into the northern side of the Gate 1 signals as a two-way bike signal crossing.

#### 2.4.2.3 Carrington Road / Woodward Road Intersection

The Carrington Road / Woodward Road intersection is currently formed as a give-way priority-controlled intersection. The modelled signalised intersection layout is shown below in Figure 3.

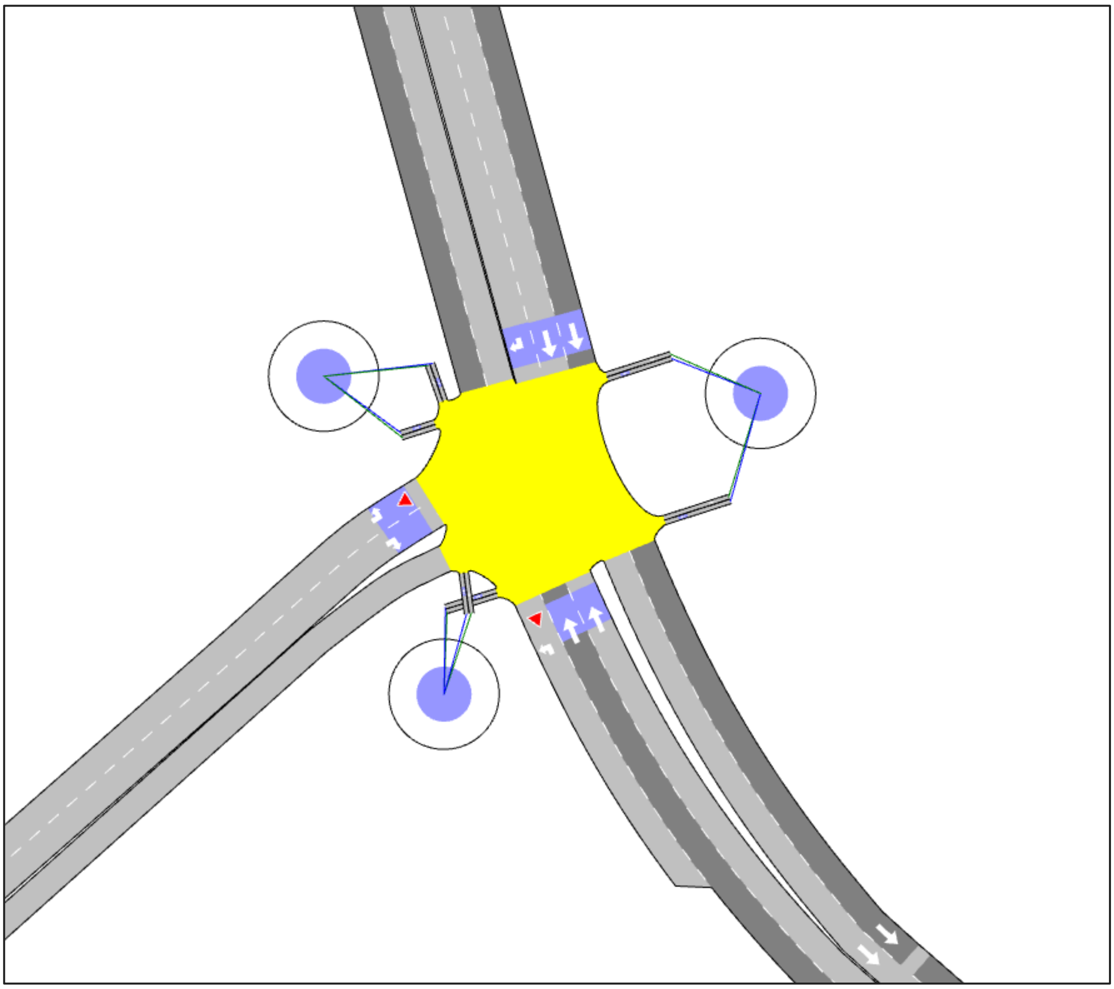

**Figure 3: Proposed Woodward Road / Carrington Road layout**

It should be noted that this layout differs from the 2020 ITA 2028 scenario in that it has the approaching and departing bus lanes on Carrington Road south of Woodward Road, but also has a separate northbound left turn lane into Woodward Road so that left turners will interfere less with northbound bus movements (see extended discussion below).

#### 2.4.2.4 Intersection bus priority

To assist with ensuring bus priority even in a congested network, the updated design for Carrington Road in the 2031 traffic model now assumes certain added features.

For northbound intersections – at the four gates to the precinct, but also at Woodward Road – the left turn lane into the precinct / into Woodward Road is designed as a separate / additional lane from the northbound bus lane. In short, the design aims to ensure that left turners do not block the northbound bus function, unless in typical bus lane designs, where for the last 50m ahead of the limit line, left turners are allowed to drive in the bus lane.

While in theory it would have been possible to provide such priority southbound as well, the five affected intersections along the frontage all undertake their road widening to the west. Providing this “left turn separation” bus priority on southbound designs as well would result in the need for land take on third parties to the east and / or result in “bending out” the intersection further to the west for southbound through lanes (i.e. deviating from a direct southbound path) to fit in the lane. For these reasons, this kind of bus priority is assumed northbound only, with left-turners into the residential areas to the east of Carrington Road assumed to be sharing the bus lanes over the last 50m.

It is acknowledged that the width requirements of such an added bus priority lane may create some constraints at intersections along the route, within the previously agreed corridor width of 28.2m.

However, initial conceptual assessment indicates that such an approach (with five lanes) should be feasible with an acceptable level of Departures from Standards in the intersection area, albeit it could affect aspects such as street tree provision in the relevant area. This can be reviewed further in the design process for the Full Upgrade.

### 2.4.3 Other Network Changes

While the Full Upgrade has been modelled as providing two lanes each way between Woodward Road and New North Road, there is some uncertainty at this time as to what mid-block pedestrian crossing options would be provided in this long block without other signalised options, to reduce severance across the proposed four lanes. As such, the model, in the 2031 Scenario, now includes a mid-block pedestrian crossing west of Willcott Street. This would reduce the maximum length between signalised crossings from approximately 450m to 250m on one side and 200m on the other side. To avoid encouraging rat-running, and travel pattern changes in the adjacent residential suburbs, this crossing has not been co-located with any potential new intersection signals (i.e. none of the side roads between Woodward Road and New North Road are proposed to be signalised).

Conversely to the above crossing addition, the 2028 Scenario included a mid-block signalised pedestrian crossing between Gate 3 and 4, which has now been removed in the 2031 Scenario. This because the length between the signalised pedestrian crossings at the nearby gates will be only around 250m, and accordingly this block does not require the previously proposed mid-block crossing.

As one further change, the model now assumes bus lanes on New North Road between Carrington Road and Woodward Road, with the bus lanes ending around 100m before the intersection. This layout is based on the ADTA model provided by the Auckland Forecasting Centre.

### 2.4.4 Key Network Elements Unchanged

No significant changes from the 2028 scenario model (except for the addition of the bus lanes on Carrington Road) have been assumed at the various other intersections not specifically mentioned above.

For avoidance of doubt, as per the 2028 scenario, the 2031 scenario model also does not assume an internal north-south connection for motor vehicle traffic between the southern zone on one hand and the central and northern development areas of the precinct on the other hand. This is not assumed in the model to ensure appropriate (conservative) testing (particularly of the Carrington Road sections near Woodward Road), and to reduce future increases to traffic flows through the existing local roads south of the precinct, as per existing precinct rules.

For clarity, the traffic model assumes that Mark Road is also connected up to the future internal road network in the southern zone (without permitting motor vehicle connections to the Unitec Core or the central and northern areas). The current Precinct Plan 1 shows four southbound indicative internal roads, but only three are clearly linked up to their named existing southern road connections – Laurel Street, Renton Road and Rhodes Ave – with the fourth in the east unclear as to whether it is intended to connect to an existing road or not.

## 2.5 Trip generation

To retain the standard structure of the traffic modelling section, changes to trip generation assumptions (from the June 2020 ITA to the Te Auaunga Plan Change) are covered within later modelling sections.

Without prejudicing the discussion in those sections, the key changes covered some further reductions in trip generation for residential development, and a “new” section regarding retail trip generation.

# 3 Modelling

## 3.1 Methodology

A microsimulation traffic model of the precinct and the surrounding area was developed for the 2020 ITA of the precinct using the AIMSUN software package to assess the traffic impacts of the proposal on the surrounding road network. The effects of the future infrastructure upgrades (up to an assumed 2028 year) in the vicinity of the precinct were also included in the modelled road network.

In developing the model, Stantec used versions from 2014 - 2015, and 2017 that were prepared in association with previous studies undertaken on precinct developments and draft ITAs prepared. The model has now been adjusted to reflect the latest land-use assumptions and traffic data obtained through surveys undertaken in 2019 and using 2028/2031 forecast traffic volumes from the MSM strategic model provided by Auckland Forecasting Centre[2] (AFC).

The base model referred to within this assessment incorporates existing network and traffic data obtained from the October 2019 surveys. These are considered to remain relevant, as they represent pre-Covid numbers that are expected to remain conservative compared to current traffic patterns.

A future testing scenario, hereafter referred to as the Te Auaunga Plan Change 2031 scenario, has now been developed based on network assumptions described earlier in this report, MSM future traffic demands and the latest development proposals and impacts from the rezoning proposals described earlier in this report.

## 3.2 Existing Traffic Volumes

Traffic surveys for the base model were undertaken on 17 October 2019. These surveys remain unchanged, and as noted above are considered to remain relevant, as they represent pre-Covid numbers that are expected to remain conservative compared to current traffic patterns. The survey details can be reviewed in Section 5.2 of the 2020 ITA.

## 3.3 Model Form, Peak Profile and Calibration

The modelled area has not changed from the 2020 ITA, and includes the full extent of Carrington Road, Woodward Road, and the section of New North Road between Carrington Road and Woodward Road, all residential streets branching off Woodward Road and the precinct internal road network.

It is acknowledged that parts of the precinct-internal network – specific positions of roads etc – may by now slightly differ from recent plans by the development partners.

However, there are no fundamental (functional) changes in how different areas within the precinct connect to each other (or are intentionally disconnected) in terms of vehicle movements.

Also, key changes that could lead to substantial impacts have been incorporated – in particular changes to the four gate access intersections discussed in Section 2.4 earlier.

The extent of the model is shown in Figure 4.

[2] A partnership between Auckland Council, Waka Kotahi | NZ Transport Agency and Auckland Transport.

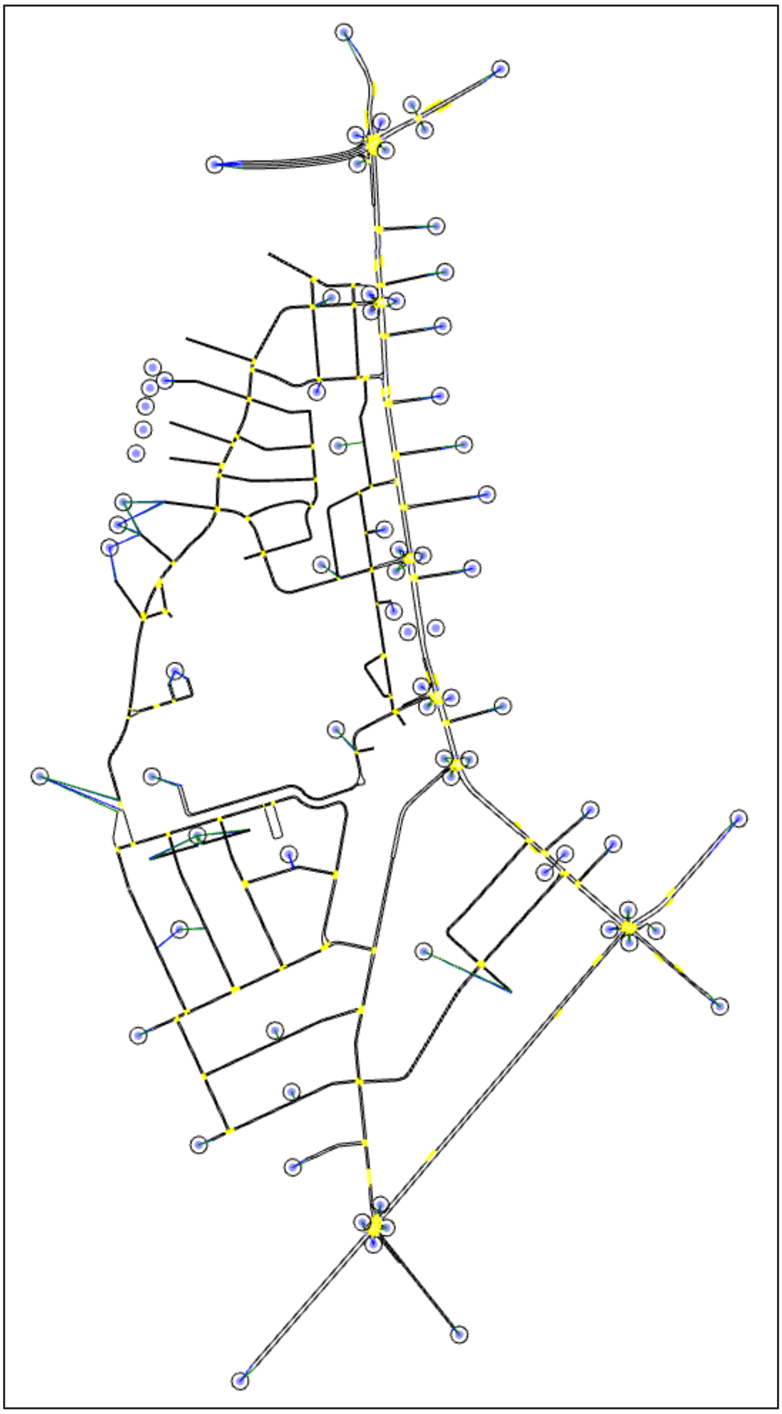

**Figure 4: Extent of Modelled Area**

The micro-simulation models have two-hour durations, corresponding to the typical lead-in and lead-out period for more accurate analysis of peak hour statistics. The modelled times are as follows:

- Weekday Morning Peak ("AM') 7:00 - 9:00am.
- Weekday Evening Peak ("PM") 4:00 - 6:00pm.

For discussion of peak profiles and model calibration, please refer to Section 5.3 and 5.4 of the 2020 ITA.

## 3.4 Scenario Compilation

The indicative development area and staging included within the modelling has been discussed in Section 2. The traffic modelling for the precinct has assessed the following scenarios for the AM and PM peak hour periods:

- **Base Scenario:** Existing network with traffic demand from the October 2019 survey. This represents the situation where the precinct is not developed (existing 2019 but being very similar to the current situation as of 2022) and remains operating and with the same land-use currently on the site.
- **ITA 2028**: This scenario was the longest-reach scenario assessed and reported in the 2020 ITA. In terms of development above existing, the 2028 scenario primarily represented adding 2,049 dwellings, and a primary school.
- **Plan Change 2031**: This scenario represents further residential intensification, including those stemming from the rezoning proposed in the Te Auaunga Plan Change, modelled at a slightly later date. In terms of development above existing, the scenario primarily represents adding 4,000 dwellings, plus a supermarket and retail cluster, and excludes the primary school components of the 2020 ITA 2028 scenario.

The in-depth scenario assumptions and development levels were discussed earlier, in Section 2.2 in particular.

## 3.5 Background Traffic

### 3.5.1 General Background Traffic

The background traffic incorporated for the 2020 ITA 2028 and Te Auaunga Plan Change 2031 scenarios have been sourced from the 2028 and 2031 MSM data.

Information from AFC, including Select Link Analysis for Carrington Road and traversal matrices for a cordon around the Unitec site have been considered and analysed in determining the appropriateness on the level of background traffic, as shown in the 2028 MSM data, as well as potential reduction in future scenario.

### 3.5.2 Through Traffic Reductions

In both the 2020 ITA 2028 and Te Auaunga Plan Change 2031 scenarios, a reduction of 25% has been applied to the through traffic on Carrington Road. This reduction is considered appropriate taking into consideration the level of off-network queues that will otherwise be present, whilst also taking account that it is commonly understood that through traffic will avoid a congested network when alternative routes are available i.e. as with the Waterview motorway. The through-traffic reduction assumes that the removed trips do not use any part of the modelled network, i.e. they do not become through traffic on Great North Road or New North Road in the immediate vicinity of Carrington Road.

Through-traffic is defined as traffic on the section of Carrington Road between the New North Road / Carrington Road / Mount Albert Road intersection and the Point Chevalier / Great North Road / Carrington Road intersection with destinations other than the precinct or local roads along the section.

### 3.5.3 Peak Hour Profile

A flattening of peak hour profile over the 2-hour period has also been assumed. That is to say, the proportion of peak hour traffic to the 2-hour traffic has been reduced from 0.56 to 0.52. This is considered typical within a congested network where some people choose to travel slightly earlier or later within the same 2-hour period than they would under more free-flowing conditions.

This remains unchanged from what was adopted within the 2028 scenario.

## 3.6 Trip Generation

### 3.6.1 Overview and Methodology

The vehicle trip generation rates for the various land uses in the precinct have been calculated through a number of methods. The methods consider existing traffic flows within and surrounding the precinct, the likely influence of the future transportation environment around the precinct, as well as literature research and historical values.

Careful consideration is required in estimating trip generation rates for the precinct, particularly as trip rates are estimated for approximately nine years into the future, and assume future infrastructure, behaviour change and congestion-assisted mode shift away from private motor cars. Over-optimistic calculations will underestimate the traffic impacts, while over-conservative calculations may lead to over-provision of capacity and subsequently induce demand.

Trip generation rates have been reduced – in some elements notably so – compared to the 2020 ITA – as the new development assumptions reduce pro-rata car parking (and for some dwellings provide no car parking at all), while at the same time, some enhanced infrastructure upgrades for active modes and public transport are assumed (see preceding Sections 2 and 3 of this Te Auaunga Plan Change report).

The following sections discuss the trip generation rates chosen for the various land uses and how they were sourced and derived. The full list of trip rates for the various land uses within the precinct and the total trip generated in the Te Auaunga Plan Change 2031 scenario are included in **Appendix A**.

### 3.6.2 Education Trip Rates

The 2020 ITA at Year 2028 assumed a peak trip generation rate of 0.08vph/ student for students and 0.14vph/FTE based on the assumed transport environment at the time of writing. The full Carrington Road Upgrade (provision of bus lanes, protected cycle lanes, improved footpaths and various intersection upgrades) is assumed to be in place by 2031 which provides much higher accessibility to Unitec through multi-modal transport than what was assumed in the 2020 ITA at Year 2028.

A trip generation rate of 0.07vph/ FTE for students and 0.12vph /FTE for staff has been adopted to reflect this. This represents an approximately 15% reduction to previous assumptions.

### 3.6.3 Residential Trip Rates

Trip rates for residential dwellings are largely affected by the much reduced (pro-rata) residential car parking in the development now assumed, coupled with residents parking schemes preventing residents from displacing some of the reduced demand in surrounding areas instead, and due to improved accessibility by alternative modes.

#### 3.6.3.1 Studio and 1/1.5 bedroom without parking

The previous 2020 ITA assumed "zero car parking" dwellings to have trip rates of 0.33 vph / dwelling. It is considered that such a rate is very high, unrealistically high in fact - but it is acknowledged that the rate was not interrogated more robustly at the time.

Considering that "zero car parking" dwellings now represent a significant part of the overall development, this brings about more practical constraints on making private car trips "despite" the zero car parking, and by necessity will need to be marketed widely to residents who are in fact willing and able to live a low or no-car lifestyle. It is assumed that these residential dwellings will generate no vehicle trips. However, a trip rate of 0.05vph / dwelling has been adopted to account for some remnant vehicle trips associated with Ubers, taxis or private ride sharing.

#### 3.6.3.2 1.5 bedroom and 2.5 bedroom with parking

As described earlier, the pro-rata parking for residential dwellings has been constrained further since the 2020 ITA and this and the other factors and constraints will result in a lower trip generation.

The Transport for New South Wales (formerly the Roads and Maritime Services') published an updated technical direction to the Guide to Traffic Generation Development in 2013 (**2013 TfNSW Report**). The 2013 TfNSW Report provided updated residential trip generation rates for high density residential flat dwellings based on more recent traffic surveys undertaken in Sydney, Hunter and Illawarra. All surveyed developments were greater than six storeys, close to public transport and residential in nature. It is considered that of the three cities included in the 2013 TfNSW Report, Sydney is the most applicable to Auckland and has been used as a basis for the Te Auaunga Plan Change trip rates.

Of most relevance to the Te Auaunga Plan Change is the surveyed trip rate per parking space. Whilst the Te Auaunga Plan Change is planning 1.5-to-2.5-bedroom dwellings, a "0.7 parking space per dwelling or less" rate is assumed, compared to the previous "1 parking space per dwelling or less" rate. Therefore, the trip generation is likely to be less than traditional residential developments with one parking space per dwelling.

Table 3 below summarises the average Sydney trip rates and the equivalent trip rate for a 1.5- and 2.5-bedroom dwelling – particular emphasis should be placed on the "per car park" rates.

**Table 3: 2013 TfNSW Trip Generation Rates**

| | Average Sydney Trip Rate | | 1.5 bedroom Trip Rate | | 2.5 bedroom Trip Rate | |
|---|---|---|---|---|---|---|
| | AM | PM | AM | PM | AM | PM |
| Vehicle trips per unit | 0.19 | 0.15 | 0.19 | 0.15 | 0.19 | 0.15 |
| Vehicle trips per car space | 0.15 | 0.12 | 0.11 | 0.08 | 0.11 | 0.08 |
| Vehicle trips per bedroom | 0.09 | 0.07 | 0.14 | 0.11 | 0.23 | 0.18 |

These rates are considerably lower than the trip generation rates used in the June 2020 ITA.

To reflect that fact, but to also acknowledge that public transport in Auckland is not yet as extensive as in Sydney, even in a well-placed location such as the precinct, rates were chosen that represented a halfway average between the 2020 ITA trip generation rates for the 1.5-bedroom and the average surveyed Sydney trip rate per unit (the higher of trip rate per unit, per parking space and per bedroom). For the 2.5-bedroom dwellings, the 2020 ITA 2028 trip rates have therefore been reduced by an effective 30%.

The residential trip rates for the Te Auaunga Plan Change are summarised in the table below - noting that the differences within the zones are derived from the distance to the nearest PT stops. I.e. the southern zone has the longest walking or cycling distances to nearby PT services, while the central and north areas of the precinct are much closer to services on Carrington Road and Great North Road. Further discussion on this precinct-internal PT access factoring is provided in is Section 5.8.3 Residential Trip Rates of the 2020 ITA.

**Table 4: Adopted residential trip generation rates**

| Zone(s) | AM | PM |
|---|---|---|
| **Studio and 1-/1.5-bedroom without parking** | | |
| All Zones | 0.05 | 0.05 |
| **1.5-bedroom with parking** | | |
| Southern | 0.29 | 0.27 |
| Northern, Carrington, North-West, B Lots | 0.25 | 0.23 |
| Te Auaunga North, F Lots | 0.28 | 0.26 |
| **2.5-bedroom** | | |
| Southern (less PT accessibility) | 0.43 | 0.43 |
| Northern, Carrington, North-West, B Lots | 0.34 | 0.34 |
| Te Auaunga North, F Lots (less PT accessibility) | 0.41 | 0.41 |

## 3.6.4 Commercial / Retail Trip Rates

### 3.6.4.1 Taylor’s Laundry

As noted earlier in this report the Taylor’s Laundry facilities are expected to remain on-site until 2036, unless an earlier end to the lease is negotiated. The 2031 traffic model has not included the small component of traffic associated with this use. In case the activity runs beyond 2031 in practice, actual trip generation from this area of the precinct would be expected to be minimally higher than modelled, up 21 trips in the AM peak hour and 35 trips in the PM peak hour (based on previous surveys specifically assessing the facility trip generation).

While not specifically assessed as a sensitivity scenario, the addition of 21 and 35 trips would represent barely 1% of all precinct trips in the AM peak, and 1.5% in the PM peak, and even less when compared to the overall traffic flows on Carrington Road. As such, the possibility of this added generation overlapping for a few years with the full 2031 scenario’s residential development is not considered likely to cause any notable changes to results or conclusions.

### 3.6.4.2 Supermarket

The traffic generation behaviour of supermarket retail has a relatively significant body of literature associated with it, including New Zealand specific data. Conservative (i.e. car-dominated) PM peak rates range around 12-13 trips / 100 sqm GFA[3] and the Transport for New South Wales (TfNSW) guidelines indicate a rate of 15.5 trips / 100sqm Gross Leasable Floor Area (GLFA) which is the unit used in the TfNSW for calculating trip generation for retail activities. The use of such rates as the base rate is therefore considered conservatively high.

It is considered that for a small local supermarket (as opposed to a large “destination supermarket” such as the much larger Pak’ N Save less than 2km away at Mt Albert), which is also co-located with substantial walkable residential activity nearby, a 25% traffic reduction from the TfNSW rate in the next decade is considered appropriate.

[3] New Zealand Trips and Parking Data Base, as well as TDG Surveys for Auckland stand-alone supermarkets from the 2000s

It is noted that there are already several supermarkets in Auckland that demonstrate such traffic generation rates. Additionally, it should also be noted that parking will be constrained to a maximum of 50 car parks for the supermarket, which also provides a further measure of restraint for generated traffic movements.

Based on the above, a supermarket trip generation rate of 11.6vph/100sqm has been adopted for the evening peak hour. This is still conservatively high considering it represents around 100 arriving trips / hour for a 50 car park store.

It is assumed that the morning trip rate will be approximately 20% of the generally much busier evening trip rate.

#### 3.6.4.3 Other Retail

The type and location of the proposed small format retail is not able to be determined with sufficient accuracy at this stage. However, like the supermarket, it is expected to generally serve the local community, rather than be a destination.

To ensure a reasonable allowance is made for the traffic generated by it, the assessment assumes a trip rate of 3.5vph / 100 sqm GLFA. This appears generally appropriate considering standard literature[4] and the fact that much of this retail will serve local needs, as well as sitting in a very multi-modal environment. Similarly, to the supermarket itself, there will also be a parking constraint, with only a further 25 car parks additional above the 50 supermarket spaces.

As discussed earlier in the report, while rates discussed here assume a 50 spaces / 25 spaces split between supermarket and specialty retail, it is considered that in practice, trip generation rates are not expected to be affected by the on-site physical allocation between the uses, as long as the overall spaces are approximately 75 in the total area.

It is assumed that the morning trip rate will be 30% of the evening trip rate.

### 3.6.5 Mason Clinic

There is no change in the trip generation of the Mason Clinic for the 2031 Te Auaunga Plan Change scenario compared to the 2020 ITA 2028 scenario. As before, the trip generation rate is based upon surveyed flows scaled up – see 2020 ITA for discussion.

### 3.6.6 Trip Generation Summary

The table below summarises the rates applied to the model scenarios:

**Table 5: Trip generation rates in 2020 ITA 2028 and Te Auaunga Plan Change 2031 scenarios**

| Activity | Zone | Units | 2028 ITA Trip Rate | 2031 Plan Change Trip Rate |
|---|---|---|---|---|
| Tertiary Education | | Per Student | 0.08 | 0.07 |
| | | Per FTE | 0.14 | 0.12 |
| Studio and 1/1.5 bedroom | All Zones | Per dwelling | 0.33 | 0.05 |
| 1.5 Bedroom with parking | Southern | Per dwelling | 0.38 | 0.27-0.29 |
| | Northern | Per dwelling | 0.3 | 0.25-0.23 |
| | Carrington | Per dwelling | 0.3 | 0.25-0.23 |
| | North-West | Per dwelling | 0.3 | 0.25-0.23 |
| | Te Auaunga North | Per dwelling | 0.36 | 0.26-0.28 |
| | F Lots | Per dwelling | - | 0.26-0.28 |
| | B Lots | Per dwelling | - | 0.23-0.25 |
| 2.5 Bedroom | Southern | Per dwelling | 0.62 | 0.43 |
| | Northern | Per dwelling | 0.49 | 0.34 |
| | Carrington | Per dwelling | 0.49 | 0.34 |

[4] Specialty retail, secondary retail - Guide to Traffic Generating Developments, RTA New South Wales, 2002 Edition, and 2013 Update

| | | | | |
|---|---|---|---|---|
| | North-West | Per dwelling | 0.49 | 0.34 |
| | Te Auaunga North | Per dwelling | 0.59 | 0.41 |
| | F Lots | Per dwelling | - | 0.41 |
| | B Lots | Per dwelling | - | 0.34 |
| Supermarket | Carrington | Per 100sqm GLFA | - | 11.6 in PM, 2.3 in AM |
| Retail | Carrington | Per 100sqm GLFA | - | 3.5 in PM, 2.4 in AM |
| Mason Clinic | Northern | Per Bed | 0.79 / bed in AM and 0.31 / bed in PM | 0.71 / bed in AM, 0.28 / bed in PM |

A summary of the resulting total vehicle trips in the 2020 ITA 2028 and Te Auaunga Plan Change 2031 scenarios is also provided in the following table.

**Table 6: Summary of Precinct Trips**

| Overall Precinct Trips | AM Peak Hour | PM Peak Hour |
|---|---|---|
| 2020 ITA 2028 | 2,089 | 1,813 |
| Te Auaunga Plan Change 2031 | 2,042 | 2,103 |

## 3.7 Secondary Trip Generation

New development within an established urban area is likely to draw a percentage of traffic from the surrounding road network rather than directly adding to the existing traffic volumes on nearby streets.

Vehicle trips generated by a development can be separated into primary and secondary trips. Secondary trips can further be split into pass-by trips and diverted trips. **Figure 5** below illustrates the different trip types.

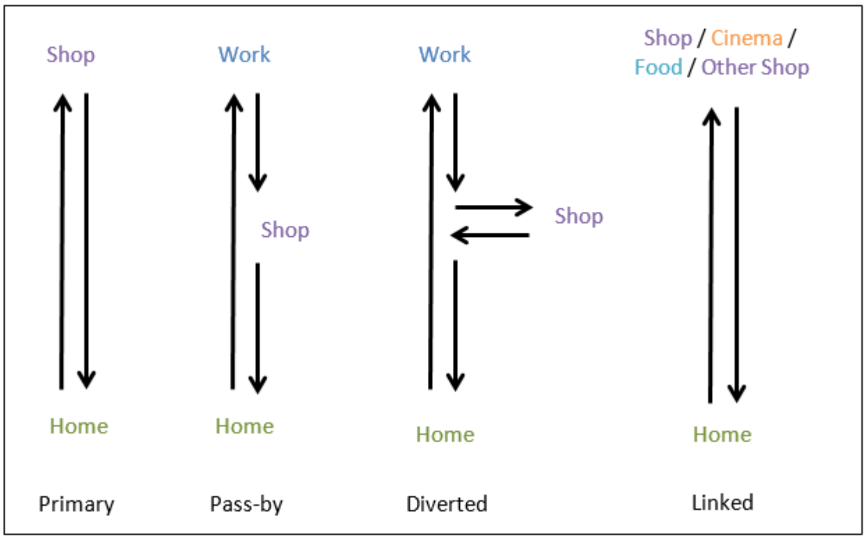


**Figure 5: Trip Types**

Currently the precinct only has road frontage onto Carrington Road. No secondary trips through any internal links between the two frontages are assumed (such through links would be designed to discourage through traffic – and are not present at all in the Te Auaunga Plan Change model in any case).

Any pass-by trips generated will therefore currently and in the future be using Carrington Road as part of their journey. Diverted trips will most likely be traffic that are currently using Great North Road or New North Road. The only secondary trips considered in this assessment are pass-by trips.

Of the activities proposed, the supermarket and Unitec are the only activities that are likely to result in secondary trips being generated. Secondary trip rates vary for different developments and are primarily dependent upon the passing traffic volumes and other similar developments in the surrounding area.

Compared to the 2020 ITA, the main added assessment for the Te Auaunga Plan Change is for appropriate retail pass-by trip rates. The ITE Trip Generation Manual has been used to determine the secondary trip rates for the supermarket. Other retail activities within the precinct are intended to cater primarily for other activities in the precinct and it is considered that secondary trips will not be generated by these activities.

Currently there are (often far larger) supermarkets located on the corner of Pt Chevalier Road and Great North Road, on New North Road approximately 500m south-west of New North Road / Mt Albert / Carrington Road, at St Lukes shopping mall and at Lynn Mall in New Lynn.

It is considered that the proposed smaller-scale supermarket will not generate any notable diverted trip types given the coverage and proximity of these well-established supermarkets. Only pass-by trips will be considered for the proposed supermarket.

As stated in the ITE Trip Generation Manual, secondary trip rates vary between 52% and 75% with pass-by trip rates varying between 19% and 57%. The average pass-by trip rate is 36%. For the purposes of this assessment, a conservative estimate of 20% has been adopted.

Unitec-related secondary trips would involve Unitec students carpooling with others who are travelling in a similar direction or attending the campus briefly for a single class or other purposes before continuing on with their journey along Carrington Road. Research data on the pass-by trip rates for tertiary education land uses are not readily available. Therefore, to remain conservative, a pass-by trip adjustment rate of 10% has been assumed for Unitec students. This rate has been incorporated in the morning and evening peak periods. Conservatively, no secondary trips rates are considered to occur for Unitec staff. This is consistent with the assumptions in the 2020 ITA.

No research data on the potential diverted trip rates for education activity is available, therefore diverted trips associated with the precinct have conservatively not been included in the assessment.

## 3.8 Trip Distribution

### 3.8.1 Inbound / Outbound Spit

The ITE Manual has been used to calculate the inbound and outbound trip distributions of the various activities within the precinct. The split of the existing activities within the precinct (Unitec and Mason Clinic) were determined using the previous site survey by Stantec (previously TDG) in 2014 that was undertaken for Unitec[5].

The distribution used in the modelling and data source for each activity is summarised in **Table 7.**

**Table 7: Inbound / Outbound Trip Distribution Splits**

| Activity | AM PEAK | | PM PEAK | | Source |
|---|---|---|---|---|---|
| | In-bound | Out-bound | In-bound | Out-bound | |
| Unitec students | 84% | 16% | 43% | 57% | From Stantec Surveys (2014) |
| Unitec staff | 84% | 16% | 43% | 57% | From Stantec Surveys (2014) |
| Studios & 1/1.5 bed apartments | 20% | 80% | 65% | 35% | ITE Manual - Apartment |
| 1.5 and 2.5 bed apartments | 20% | 80% | 65% | 35% | ITE Manual - Apartment |
| Mason Clinic | 85% | 15% | 20% | 80% | From Stantec Surveys (2014) |
| Supermarket | 62% | 38% | 51% | 49% | ITE Manual – Supermarket |
| Other Retail | 48% | 52% | 44% | 56% | ITE Manual – Specialty Retail Centre |

[5] As per the transport assessment for the 2015 Campus Consolidation consent - Unitec, Wairaka Campus, Campus Consolidation Project, Transportation Assessment Report, TDG, August 2014

### 3.8.2 Wider Network Distribution

The trip distribution adopted in the future scenarios are based on observed 2019 surveys and the MSM data provided by the AFC. The network distribution is shown in **Table 8.**

**Table 8: Network Distribution**

| | AM Peak | | PM Peak | |
|---|---|---|---|---|
| | From Precinct | To Precinct | From Precinct | To Precinct |
| New North Road (West) | 13% | 25% | 21% | 15% |
| Richardson Road | 8% | 10% | 8% | 12% |
| Mt Albert Road | 20% | 24% | 20% | 15% |
| New North Road (East) | 5% | 2% | 2% | 5% |
| Great North Road (East) | 28% | 8% | 12% | 14% |
| Pt Chevalier Road | 11% | 11% | 15% | 14% |
| Great North Road (West) | 15% | 20% | 22% | 25% |
| North | 54% | 39% | 49% | 53% |
| South | 46% | 61% | 51% | 47% |

### 3.8.3 Summary of Model Assumptions

The following table provides a high-level summary of key assumptions relevant to each modelling scenario.

**Table 9: Summary of Modelling Assumptions**

| Modelling Assumptions | Base 2019 | ITA 2028 | Plan Change 2031 |
|---|---|---|---|
| Residential dwellings | ✗ | ✓ (2,049 dwellings) | ✓ (4,000 dwellings) |
| Tertiary Education | ✓ (varied) | ✓ (9,702 FTE students) | ✓ (9,702 FTE students) |
| Commercial / Retail development (supermarket / retail cluster) | ✗ | ✗ | ✓ (1,200 sqm specialty retail, 1,500 sqm supermarket) |
| Primary school / early childhood education | ✗ | ✓ (375 students) | ✗ |
| Mason-clinic (including allowance for growth) | ✓ (121 beds or less) | ✓ (198 beds) | ✓ (198 beds) |
| Taylors Laundry | ✓ | ✓ | ✗ |
| Residential car-parking | ✗ | ✓ (2,049 spaces or less) | ✓ (2,100 spaces or less, with more dwellings) |
| Unitec car parking | ✓ (varies, more than 2,500 spaces) | ✓ (2,500 spaces or less) | ✓ (2,500 spaces or less) |
| Commercial / Retail car parking | ✗ | ✗ | ✓ (75 spaces or less) |
| Resident's parking sold / leased unbundled from dwellings | ✗ | ✓ | ✓ |
| Resident's Parking schemes (areas adjacent to but outside of precinct) | ✗ | ✗ | ✓ |
| Carrington Road Corridor Upgrade (precinct Frontage) | ✗ | ✓ | ✓ |
| Carrington Road Corridor Upgrade (Full length including Woodward New North Road) | ✗ | ✗ | ✓ |
| Carrington Road through traffic reductions, 25% | ✗ | ✓ | ✓ |
| Peak Hour Profile Adjustment | ✗ | ✓ | ✓ |
| Great North Rd / Pt Chevalier Rd / Carrington Rd intersection adjustments (slip lane removal into Great North Road, southbound Carrington Road bus lane) | ✗ | ✓ | ✓ |

| Modelling Assumptions | Base 2019 | ITA 2028 | Plan Change 2031 |
|---|---|---|---|
| Mid-block North-western Path crossing south of Sutherland Road | ✓ (priority) | ✓ (signal) | ✗ (integrated into Gate 1 signal) |
| Gate 1 signalised | ✗ | ✗ (LILO) | ✓ |
| Gate 2 signalised | ✗ | ✓ | ✗ (LILO) |
| Gate 3 signalised | ✗ | ✓ | ✓ |
| Signalised mid-block pedestrian crossing between Gate 3 and 4 | ✗ | ✓ | ✗ |
| Gate 4 signalised | ✓ | ✓ (added lanes) | ✓ (added lanes |
| Carrington Road / Woodward Road intersection signalised | ✗ | ✓ | ✓ |
| Signalised mid-block pedestrian crossing between Benfield Avenue and Willcott St | ✗ | ✗ | ✓ |
| Vehicle connections between Southern precinct area and southern local roads | ✗ | ✓ | ✓ |
| Vehicle connections between the Southern precinct area and the central / northern Precinct areas | ✓ | ✗ | ✗ |
| Vehicle connections between the Southern precinct area and Unitec Core | ✓ | ✗ | ✗ |

# 4 Model Results

The main intersections in the model have been analysed to assess the impact of the proposed Te Auaunga Plan Change development on the surrounding rod network. Comparisons of the results have been made between the base 2019, 2020 ITA 2028 and Te Auaunga Plan Change 2031 scenarios for the weekday AM and PM peak hours. The AM peak hour assessed is from 7:45 to 8:45am, and PM peak hour is from 4:45pm to 5:45pm.

This section also outlines the travel time for general traffic and buses along key routes through the network, as a further measure of network performance especially from a transport system use perspective.

## 4.1 Intersection Results

The key intersections modelled are as follows:

- Great North Road / Pt Chevalier Road / Carrington Road
- Unitec Gate 1 / Carrington Road
- Unitec Gate 2 / Carrington Road
- Unitec Gate 3 / Carrington Road
- Unitec Gate 4 / Carrington Road
- Woodward Road / Carrington Road
- Carrington Road / New North Road / Mount Albert Road; and
- Woodward Road / New North Road / Richardson Road.

These intersections represent the major intersections along the Carrington Road, and main access locations into the precinct.

The modelling results for each intersection are tabulated in **Table 10** to **Table 41** in terms of average delay per vehicle (in seconds) and Level of Service (LOS), and 95th percentile queue length per approach (in metres).

### 4.1.1 Great North Road / Point Chevalier Road / Carrington Road

**Table 10: Great North Road / Point Chevalier Road / Carrington Road - AM Peak Results**

| Intersection | Approach | Base - 2019 | | ITA - 2028 | | Plan Change - 2031 | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| **Great North Road / Pt Chevalier Road / Carrington Road** | **AM Peak** | | | | | | |
| | S Left | 9 | E | 15 | E | 9 | E |
| | S Thru | 82 | | 97 | | 76 | |
| | S Right | 85 | | 97 | | 69 | |
| | E Left | 81 | E | 73 | F | 46 | E |
| | E Thru | 65 | | 62 | | 55 | |
| | E Right | 79 | | 130 | | 104 | |
| | N Left | 72 | F | 110 | F | 43 | E |
| | N Thru | 89 | | 99 | | 74 | |
| | N Right | 81 | | 88 | | 68 | |
| | W Left | 16 | D | 25 | F | 14 | E |
| | W Thru | 50 | | 105 | | 111 | |
| | W Thru (Bus) | 32 | | 48 | | 39 | |
| | W Right | 108 | | 170 | | 78 | |
| **Intersection Total – AM Peak** | | **61** | **E** | **89** | **F** | **69** | **E** |

**Table 11: 95th Percentile Queue per Approach in AM Peak**

| Intersection | 95$^{th}$ Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - 2019 | | | | ITA - 2028 | | | | Plan Change - 2031 | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| **Great North Road / Pt Chevalier Road / Carrington Road** | **AM Peak** | | | | | | | | | | | |
| | 158 | 66 | 119 | 166 | 141 | 96 | 159 | 242 | 136 | 65 | 92 | 161 |

Based on the results above the following can be summarised:

**Base Scenario:**

Worst Movement: western right turn – 108 seconds delay
Worst approach: northern approach – LOS F
Overall Intersection: LOS E with 61 seconds delay
Queues: 166m on western approach

**2020 ITA 2028 Scenario:**

| | |
|---|---|
| Worst Movement: | western right turn – 170 seconds delay. An increase of 62 seconds compared to the Base. |
| Worst approach: | eastern, northern, and western approaches – LOS F |
| Overall Intersection: | LOS F with 89 seconds delay. An increase of 28 seconds compared to the Base. |
| Queues: | 242m on western approach. An increase of 76m compared to the Base. |

**Te Auaunga Plan Change 2031 Scenario:**

| | |
|---|---|
| Worst Movement: | western through movement – 111 seconds delay. An increase of 61 seconds compared to the Base and an increase of 6 seconds compared to the 2020 ITA 2028 scenario |
| Worst approach: | all approaches – LOS E |
| Overall Intersection: | LOS E with 69 seconds delay. An increase of eight seconds compared to the Base and a decrease of 20 seconds compared to the 2020 ITA 2028 scenario |
| Queues: | 161m on western approach. A decrease of 5m compared to the Base and a decrease of 81m compared to the 2020 ITA 2028 scenario |

**Table 12: Great North Road / Pt Chevalier Road / Carrington Road - PM Peak Results**

| Intersection | Approach | Base - 2019 | | ITA - 2028 | | Plan Change - 2031 | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | PM Peak | | | | | | |
| Great North Road / Pt Chevalier Road / Carrington Road | S Left | 16 | D | 20 | E | 18 | D |
| | S Thru | 69 | | 104 | | 74 | |
| | S Right | 69 | | 79 | | 48 | |
| | E Left | 58 | E | 71 | E | 68 | E |
| | E Thru | 53 | | 49 | | 59 | |
| | E Right | 105 | | 91 | | 89 | |
| | N Left | 67 | E | 95 | F | 50 | E |
| | N Thru | 81 | | 85 | | 83 | |
| | N Right | 79 | | 69 | | 71 | |
| | W Left | 10 | C | 18 | E | 8 | D |
| | W Thru | 40 | | 50 | | 35 | |
| | W Thru (Bus) | 38 | | 47 | | 32 | |
| | W Right | 64 | | 180 | | 114 | |
| **Intersection Total – PM Peak** | | **54** | **D** | **72** | **E** | **59** | **E** |

**Table 13: 95th Percentile Queue per Approach in PM Peak**

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - 2019 | | | | ITA - 2028 | | | | Plan Change - 2031 | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| Great North Road / Pt Chevalier Road / Carrington Road | PM Peak | | | | | | | | | | | |
| | 88 | 169 | 165 | 42 | 141 | 193 | 150 | 39 | 91 | 166 | 115 | 181 |

Based on the results above the following can be summarised:

**Base Scenario:**

Worst Movement: eastern right turn – 105 seconds delay
Worst approach: eastern and northern approaches – LOS E
Overall Intersection: LOS D with 54 seconds delay
Queues: 169m on eastern approach

**2020 ITA 2028 Scenario:**

Worst Movement: western right turn – 180 seconds delay. An increase of 116 seconds compared to the Base
Worst approach: northern approach – LOS F
Overall Intersection: LOS E with 72 seconds delay. An increase of 18 seconds compared to the Base
Queues: 193m on eastern approach. An increase of 24m compared to the Base

**Te Auaunga Plan Change 2031 Scenario:**

Worst Movement: western right turn – 114 seconds delay. An increase of 50 seconds compared to the Base but a decrease of 66 seconds compared to the 2020 ITA 2028 scenario
Worst approach: eastern, northern and western approaches – LOS E
Overall Intersection: LOS E with 59 seconds delay. An increase of five seconds compared to the Base and a decrease of 13 seconds compared to the 200 ITA 2028 scenario
Queues: 181m on western approach. An increase of around 140m compared to the Base and ITA 2028 scenarios

The modelling indicates that there are likely to be increases in delay at this intersection during AM and PM peaks when comparing the Te Auaunga Plan Change 2031 scenario with the Base. However, in comparing the modelled Te Auaunga Plan Change 2031 with the previous 2020 ITA 2028 scenarios, there are improvements noted for both peak periods.

Overall, the modelling results for the AM and PM peak periods indicate that the intersection will perform at expected and appropriate levels for the Te Auaunga Plan Change 2031 scenario.

### 4.1.2 Gate 1 / Carrington Road

**Table 14: Gate 1 / Carrington Road - AM Peak Results**

| Intersection | Approach | Base - 2019 | | ITA - 2028 | | Plan Change - 2031 | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| Gate 1 / Carrington Road | AM Peak | | | | | | |
| | S Left | 6 | A | 12 | D | 25 | C |
| | S Thru | 5 | | 29 | | 27 | |
| | S Right | 0 | | 0 | | - | |
| | E Left | 0 | A | 0 | A | - | - |
| | E Right | 0 | | 0 | | - | |
| | N Left | 0 | C | 0 | A | - | C |
| | N Thru | 1 | | 0 | | 14 | |

| Intersection | Approach | Base - 2019 | | ITA - 2028 | | Plan Change - 2031 | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | N Right | 19 | | N/A | | 57 | |
| | W Left | 21 | D | 88 | F | 30 | D |
| | W Right | 31 | | N/A | | 55 | |
| **Intersection Total – AM Peak** | | **31** | **D** | **88** | **F** | **27** | **C** |

**Table 15: 95th Percentile Queue per Approach in AM Peak**

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - 2019 | | | | ITA - 2028 | | | | Plan Change - 2031 | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| **Gate 1 / Carrington Road** | **AM Peak** | | | | | | | | | | | |
| | 21 | -- | 21 | 8 | 49 | -- | 21 | 30 | 49 | - | 67 | 74 |

The above results need to be considered in light of the 2020 ITA 2028 Scenario having a private vehicle crossing included in the model on the opposite (eastern side) of the LILO Gate 1 access. In the “all movements” signal design now assumed for Gate 1, a fourth arm was not considered practical, and the eastern-side vehicle access function is assumed to be provided at a somewhat relocated position (north or south relative to Gate 1). As such, no eastern access is reported on for the Te Auaunga Plan Change 2031 scenario results.

Based on the results above the following can be summarised:

**Base Scenario:**

| | |
|---|---|
| Worst Movement: | western right turn – 31 seconds delay |
| Worst approach: | western approach – LOS D |
| Overall Intersection: | LOS D with 31 seconds delay |
| Queues: | 21m on southern and northern approaches |

**2020 ITA 2028 Scenario:**

| | |
|---|---|
| Worst Movement: | western left turn – 88 seconds delay. An increase of 67 seconds compared to the Base |
| Worst approach: | western approach – LOS F |
| Overall Intersection: | LOS F with 88 seconds delay. An increase of 57 seconds compared to the Base |
| Queues: | 49m on southern approach. An increase of 28m compared to the Base |

**Te Auaunga Plan Change 2031 Scenario:**

| | |
|---|---|
| Worst Movement: | northern right turn – 57 seconds delay. An increase of 38 seconds compared to the Base |
| Worst approach: | western approach – LOS D |
| Overall Intersection: | LOS C with 27 seconds delay. An improvement compared to the Base and 2020 ITA 2028 scenarios |
| Queues: | 74m on northern approach. An increase of around 66m compared to the Base scenario and 44m compared to the 2020 ITA 2028 scenario |

**Table 16: Gate 1 / Carrington Road - PM Peak Results**

| Intersection | Approach | Base - 2019 | | ITA - 2028 | | Plan Change - 2031 | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | PM Peak | | | | | | |
| Gate 1 / Carrington Road | S Left | 1 | B | 6 | A | 31 | C |
| | S Thru | 1 | | 10 | | 26 | |
| | S Right | 13 | | 0 | | - | |
| | E Left | 15 | C | 13 | E | - | - |
| | E Right | 22 | | 41 | | - | |
| | N Left | 2 | B | 4 | A | - | C |
| | N Thru | 1 | | 1 | | 18 | |
| | N Right | 14 | | N/A | | 72 | |
| | W Left | 15 | C | 32 | D | 39 | D |
| | W Right | 18 | | N/A | | 47 | |
| **Intersection Total – PM Peak** | | **22** | **C** | **41** | **E** | **27** | **C** |

**Table 17: 95th Percentile Queue per Approach in PM Peak**

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - 2019 | | | | ITA - 2028 | | | | Plan Change - 2031 | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| Gate 1 / Carrington Road | PM Peak | | | | | | | | | | | |
| | 0 | -- | 16 | 11 | 21 | -- | 16 | 7 | 51 | -- | 123 | 33 |

Based on the results above the following can be summarised:

**Base Scenario:**

Worst Movement: eastern right turn – 22 seconds delay
Worst approach: eastern and western approaches – LOS C
Overall Intersection: LOS C with 22 seconds delay
Queues: 16m on northern approach

**2020 ITA 2028 Scenario:**

Worst Movement: eastern right turn – 41 seconds delay. An increase of 19 seconds compared to the Base
Worst approach: eastern approach – LOS E
Overall Intersection: LOS E with 41 seconds delay. An increase of 19 seconds compared to the Base
Queues: 42m on southern approach. An increase of 42m compared to the Base

**Te Auaunga Plan Change 2031 Scenario:**

| | |
|---|---|
| Worst Movement: | northern right turn – 72 seconds delay. An increase of around 60 seconds compared to the Base |
| Worst approach: | western approach – LOS D |
| Overall Intersection: | LOS C with 27 seconds delay. An increase of five seconds compared to the Base and a decrease of 14 seconds compared to the 2020 ITA 2028 scenario |
| Queues: | 123m on northern approach. An increase of around 107m compared to the Base and 2020 ITA 2028 scenarios |

The Gate 1 intersection is proposed to be signalised as part of the Te Auaunga Plan Change 2031 upgrade works. From a technical perspective, the overall LOS for a priority intersection is typically based on the delay for the worst movement (as the through movements are generally unimpeded) whilst for signalised intersections the overall LOS is based on all movements.

The results of the modelling indicate a general decline in performance between the Te Auaunga Plan Change 2031 scenario and the Base scenario. However, this is not considered surprising considering the switch from a priority intersection on a one-lane-each-way road to a traffic signal on a two-lanes-each-way road also catering for more traffic.

Improvements are anticipated for the vehicles exiting the precinct in the AM peak (particularly the left turn movement out) and the LOS for the exiting movements remains the same when comparing the Te Auaunga Plan Change 2031 and 2020 ITA 2028 scenarios in the PM peak.

An increase in queuing is observed in the Te Auaunga Plan Change 2031 scenario, particularly the northern and western approaches but this is to be expected given the signalisation of the intersection.

Overall, the modelling predicts that the intersection will perform well within acceptable tolerances for the busiest periods of the day.

### 4.1.3 Gate 2 / Carrington Road

**Table 18: Gate 2 / Carrington Road - AM Peak Results**

| Intersection | Approach | Base - 2019 | | ITA - 2028 | | Plan Change - 2031 | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | AM Peak | | | | | | |
| **Gate 2 / Carrington Road** | S Left | - | - | - | - | 10 | B |
| | S Thru | 5 | A | 36 | E | 14 | |
| | N Thru | 0 | B | 8 | F | 6 | A |
| | N Right | 11 | | 53 | | - | |
| | W Left | 14 | D | 33 | E | 37 | E |
| | W Right | 27 | | 34 | | - | |
| **Intersection Total – AM Peak** | | **27** | **D** | **53** | **F** | **37** | **E** |

**Table 19: 95th Percentile Queue per Approach in AM Peak**

| Intersection | 95$^{th}$ Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - 2019 | | | | ITA - 2028 | | | | Plan Change - 2031 | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| **Gate 2 / Carrington Road** | AM Peak | | | | | | | | | | | |
| | 82 | -- | 8 | 8 | 123 | -- | 57 | 44 | 87 | - | 0 | 74 |

Based on the results above the following can be summarised:

**Base Scenario:**

Worst Movement: western right turn – 27 seconds delay
Worst approach: western approach – LOS D
Overall Intersection: LOS D with 27 seconds delay
Queues: 82m on southern approach

**2020 ITA 2028 Scenario:**

Worst Movement: northern right turn – 53 seconds delay. An increase of 42 seconds compared to the Base
Worst approach: northern approach – LOS F
Overall Intersection: LOS F with 48 seconds delay. An increase of 26 seconds compared to the Base
Queues: 112m on southern approach. An increase of 30m compared to the Base

**Te Auaunga Plan Change 2031 Scenario:**

Worst Movement: western left turn – 37 seconds delay. An increase of 23 seconds compared to the Base but no significant difference compared to the ITA 2028 scenario
Worst approach: western approach – LOS E
Overall Intersection: LOS E with 37 seconds delay. A decline in performance of around 10 seconds compared to the Base but an improvement of around 16 seconds compared to the 2020 ITA 2028 scenario
Queues: 87m on southern approach. An increase of 5m compared to the Base scenario and an decrease of around 36m compared to the 2020 ITA 2028 scenario

**Table 20: Gate 2 / Carrington Road - PM Peak Results**

| Intersection | Approach | Base - 2019 | | ITA - 2028 | | Plan Change - 2031 | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | PM Peak | | | | | | |
| **Gate 2 / Carrington Road** | S Left | - | - | - | - | 4 | A |
| | S Thru | 1 | A | 11 | B | 6 | |
| | N Thru | 0 | A | 5 | F | 7 | A |
| | N Right | 7 | | 59 | | - | |
| | W Left | 9 | C | 39 | E | 19 | C |
| | W Right | 18 | | 49 | | - | |
| **Intersection Total – PM Peak** | | **18** | **C** | **59** | **F** | **19** | **C** |

**Table 21: 95th Percentile Queue per Approach in PM Peak**

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - 2019 | | | | ITA - 2028 | | | | Plan Change - 2031 | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| **Gate 2 / Carrington Road** | PM Peak | | | | | | | | | | | |
| | 7 | -- | 0 | 7 | 54 | -- | 63 | 38 | 46 | - | 25 | 29 |

Based on the results above the following can be summarised:

**Base Scenario:**

Worst Movement: western right turn – 18 seconds delay
Worst approach: western approach – LOS C
Overall Intersection: LOS C with 18 seconds delay
Queues: 7m on southern and western approaches

**2020 ITA 2028 Scenario:**

Worst Movement: northern right turn – 59 seconds delay. An increase of 52 seconds compared to the Base.
Worst approach: northern approach – LOS F
Overall Intersection: LOS F with 59 seconds delay. An increase of 41 seconds compared to the Base
Queues: 63m on northern approach. An increase of 63m compared to the Base

**Te Auaunga Plan Change 2031 Scenario:**

Worst Movement: western left turn – 19 seconds delay. An increase of 10 seconds compared to the Base and a decrease of 20 seconds compared to the 2020 ITA 2028 scenario
Worst approach: western approach – LOS C
Overall Intersection: LOS C with 19 seconds delay. Similar to the Base but a decrease of 40 seconds compared to the 2020 ITA 2028 scenario
Queues**:** 46m on the southern approach. An increase of 39m compared to the Base and a decrease of 8m compared to the 2020 ITA 2028 scenario

Under the Te Auaunga Plan Change 2031 scenario the Gate 2 / Carrington Road intersection is proposed to be converted to a left-in, left-out intersection (unsignalised).

Overall, the modelled intersection performance for the Te Auaunga Plan Change 2031 scenario shows a decline compared to the Base but an improvement compared to the 2020 ITA 2028 scenarios in both peak periods.

### 4.1.4 Gate 3 (Farm Road) / Carrington Road

**Table 22: Gate 3 / Carrington Road - AM Peak Results**

| Intersection | Approach | Base - 2019 | | ITA - 2028 | | Plan Change - 2031 | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | AM Peak | | | | | | |
| Gate 3 / Carrington Road | S Left | 2 | A | 14 | B | 7 | B |
| | S Thru | 1 | | 19 | | 14 | |
| | N Thru | 1 | A | 3 | B | 13 | C |
| | N Right | 8 | | 54 | | 59 | |
| | W Left | 5 | C | 48 | D | 38 | D |
| | W Right | 17 | | 56 | | 48 | |
| **Intersection Total – AM Peak** | | **17** | **C** | **19** | **B** | **20** | **C** |

**Table 23: 95th Percentile Queue per Approach in AM Peak**

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - 2019 | | | | ITA - 2028 | | | | Plan Change - 2031 | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| Gate 3 / Carrington Road | AM Peak | | | | | | | | | | | |
| | 53 | -- | 7 | 0 | 105 | -- | 28 | 25 | 64 | - | 65 | 37 |

Based on the results above the following can be summarised:

**Base Scenario :**

Worst Movement: western right turn – 17 seconds delay

Worst approach: western approach – LOS C
Overall Intersection: LOS C with 17 seconds delay
Queues: 53m on southern approach

**2020 ITA 2028 Scenario:**

Worst Movement: western right turn – 56 seconds delay. An increase of 39 seconds compared to the Base
Worst approach: western approach – LOS D
Overall Intersection: LOS B with 19 seconds delay. An increase of two seconds compared to the Base
Queues: 105m on southern approach. An increase of 52m compared to the Base

**Te Auaunga Plan Change 2031 Scenario:**

Worst Movement: northern right turn – 59 seconds delay. An increase of 51 and five seconds compared to the Base and 2020 ITA 2028 scenarios respectively
Worst approach: western approach – LOS D
Overall Intersection: LOS C with 20 seconds delay. Generally consistent with the Base and 2020 ITA 2028 scenarios
Queues: 65m on northern approach. An increase of 58m compared to the Base and 37m compared to the 2020 ITA 2028 scenario

**Table 24: Gate 3 / Carrington Road - PM Peak Results**

| Intersection | Approach | Base - 2019 | | ITA - 2028 | | Plan Change - 2031 | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | PM Peak | | | | | | |
| Gate 3 / Carrington Road | S Left | 1 | A | 15 | B | 30 | C |
| | S Thru | 1 | | 15 | | 26 | |
| | N Thru | 1 | A | 15 | C | 20 | C |
| | N Right | 5 | | 64 | | 77 | |
| | W Left | 3 | B | 31 | D | 35 | D |
| | W Right | 12 | | 53 | | 50 | |
| **Intersection Total – PM Peak** | | **12** | **B** | **22** | **C** | **32** | **C** |

**Table 25: 95th Percentile Queue per Approach in PM Peak**

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - 2019 | | | | ITA - 2028 | | | | Plan Change - 2031 | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| Gate 3 / Carrington Road | PM Peak | | | | | | | | | | | |
| | 32 | -- | 7 | 7 | 91 | -- | 89 | 46 | 94 | - | 149 | 65 |

This gate will see the majority of the retail cluster motor vehicle traffic (this being intended to be located close to Gate 3). It should be noted that in particular, some egress traffic at this access is expected to egress via a LILO access located between Gate 1 and 2. Should this not be provided, some pattern shift may occur, with more traffic exiting Gate 3.

Based on the results above the following can be summarised:

**Base Scenario:**

Worst Movement: western right turn – 12 seconds delay
Worst approach: western approach – LOS B
Overall Intersection: LOS B with 12 seconds delay
Queues: 32m on southern approach

**2020 ITA 2028 Scenario:**

Worst Movement: northern right turn – 64 seconds delay. An increase of 59 seconds compared to the Base
Worst approach: western approach – LOS D

Overall Intersection: LOS D with 22 seconds delay. An increase of 10 seconds compared to the Base
Queues: 91m on southern approach. An increase of 59m compared to the Base

**Te Auaunga Plan Change 2031 Scenario:**

Worst Movement: northern right turn – 77 seconds delay. An increase of 72 seconds compared to the Base and 13 seconds compared to the 2020 ITA 2028 scenario
Worst approach: western approach – LOS D
Overall Intersection: LOS C with 32 seconds delay. An increase of 20 seconds compared to the Base and 10 seconds compared to the 2020 ITA 2028 scenario
Queues: 149m on northern approach. An increase of 142m compared to the Base and 60m compared to the 2020 ITA 2028 scenario

The modelling indicates a gradual decline in performance from the Base scenario to the 2020 ITA 2028 scenario and subsequently the Te Auaunga Plan Change 2031 scenario. However, the overall intersection performance for the Te Auaunga Plan Change 2031 model (LOS C for the AM and PM peak hours) is considered to be acceptable for the future peak periods.

### 4.1.5 Gate 4 / Carrington Road

**Table 26: Gate 4 / Carrington Road - AM Peak Results**

| Intersection | Approach | Base - 2019 | | ITA - 2028 | | Plan Change - 2031 | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | AM Peak | | | | | | |
| Gate 4 / Carrington Road | S Left | 15 | B | 18 | C | 10 | B |
| | S Thru | 13 | | 28 | | 13 | |
| | N Thru | 20 | C | 10 | C | 13 | C |
| | N Right | 36 | | 51 | | 68 | |
| | W Left | 2 | B | 2 | C | 8 | D |
| | W Right | 33 | | 51 | | 75 | |
| Intersection Total – AM Peak | | 18 | B | 24 | C | 20 | C |

**Table 27: 95th Percentile Queue per Approach in AM Peak**

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - 2019 | | | | ITA - 2028 | | | | Plan Change - 2031 | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| Gate 4 / Carrington Road | AM Peak | | | | | | | | | | | |
| | 64 | -- | 105 | 18 | 64 | -- | 33 | 68 | 40 | - | 41 | 95 |

Based on the results above the following can be summarised:

**Base Scenario:**

Worst Movement: northern right turn – 36 seconds delay
Worst approach: northern approach – LOS C
Overall Intersection: LOS B with 18 seconds delay
Queues: 105m on northern approach

**2020 ITA 2028 Scenario:**

Worst Movement: northern right turn and western right turn – 51 seconds delay. Increases of 15 seconds and 18 seconds, respectively, compared to the Base
Worst approach: All approaches – LOS C
Overall Intersection: LOS C with 24 seconds delay. An increase of six seconds compared to the Base

Queues: 68m on western approach. An increase of 50m compared to the Base

**Te Auaunga Plan Change 2031 Scenario:**

Worst Movement: northern right turn and western right turn – 68 and 75 seconds delay. Increases of 32 seconds and 42 seconds, respectively, compared to the Base. Compared to the 2020 ITA 2028 scenario the respective increases are 17 and 24 seconds for the same movements
Worst approach: western approach – LOS D
Overall Intersection: LOS C with 20 seconds delay. An increase of two seconds compared to the Base and a decrease of four seconds compared to the 2020 ITA 2028 scenario
Queues: 95m on western approach. An increase of 77m compared to the Base and an increase of 27 meters compared to the 2020 ITA 2028 scenario

**Table 28: Gate 4 / Carrington Road - PM Peak Results**

| Intersection | Approach | Base - 2019 | | ITA - 2028 | | Plan Change - 2031 | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | | **AM Peak** | | | | | |
| **Gate 4 / Carrington Road** | S Left | 13 | B | 12 | B | 13 | B |
| | S Thru | 14 | | 18 | | 20 | |
| | N Thru | 29 | C | 16 | B | 23 | C |
| | N Right | 42 | | 35 | | 56 | |
| | W Left | 2 | B | 1 | C | 7 | D |
| | W Right | 27 | | 39 | | 68 | |
| **Intersection Total – PM Peak** | | **21** | **C** | **19** | **B** | **26** | **C** |

**Table 29: 95th Percentile Queue per Approach in PM Peak**

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - 2019 | | | | ITA - 2028 | | | | Plan Change - 2031 | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| **Gate 4 / Carrington Road** | **PM Peak** | | | | | | | | | | | |
| | 39 | -- | 78 | 49 | 45 | -- | 83 | 59 | 38 | - | 102 | 177 |

Based on the results above the following can be summarised:

**Base Scenario:**

Worst Movement: northern right turn – 42 seconds delay
Worst approach: northern approach – LOS C
Overall Intersection: LOS C with 21 seconds delay
Queues: 78m on northern approach

**2020 ITA 2028 Scenario:**

Worst Movement: western right turn – 39 seconds delay. An increase of 12 seconds compared to the Base.
Worst approach: western approach – LOS C
Overall Intersection: LOS B with 19 seconds delay. A decrease of two seconds compared to the Base
Queues: 83m on northern approach. An increase of 5m compared to the Base

**Te Auaunga Plan Change 2031 Scenario:**

Worst Movement: western right turn – 68 seconds delay. An increase of around 41 and 29 seconds compared to the Base and ITA 2028 scenarios respectively
Worst approach: western approach – LOS D
Overall Intersection: LOS C with 26 seconds delay. A marginal increase compared to the Base and ITA 2028 scenarios

Queues: 177m on western approach. Increases of 128m and 118m compared to the Base and ITA 2028 scenarios respectively

The modelling indicates Gate 4 and Carrington Road in both future scenarios generally show a good to moderate performance, with very similar overall LOS and delays compared to the Base scenario. This is expected, given that in the future scenarios, a more evenly distributed turning traffic pattern is anticipated between the signalised Gate 1, Gate 3, and Gate 4 accesses, therefore reducing potential further pressures on Gate 4.

Generally, the largest queue length increases are noted on the western approach in both peak periods. However, these queues are typically transitory in nature and tend to dissipate relatively quickly at the action of the signals.

### 4.1.6 Woodward Road / Carrington Road

**Table 30: Woodward Road / Carrington Road - AM Peak Results**

| Intersection | Approach | Base - 2019 | | ITA - 2028 | | Plan Change - 2031 | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | AM Peak | | | | | | |
| Woodward Road / Carrington Road | S Left | 2 | A | 21 | C | 20 | C |
| | S Thru | 1 | | 26 | | 32 | |
| | N Thru | 2 | B | 4 | A | 6 | B |
| | N Right | 10 | | 23 | | 52 | |
| | W Left | 15 | C | 36 | D | 73 | E |
| | W Right | 23 | | 47 | | 73 | |
| **Intersection Total – AM Peak** | | **23** | **C** | **25** | **C** | **36** | **D** |

**Table 31: 95th Percentile Queue per Approach in AM Peak**

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - 2019 | | | | ITA - 2028 | | | | Plan Change - 2031 | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| | AM Peak | | | | | | | | | | | |
| Woodward Road / Carrington Road | 45 | -- | 34 | 100 | 98 | -- | 31 | 200 | 76 | - | 44 | 83 |

Based on the results above the following can be summarised:

**Base Scenario :**

Worst Movement: western right turn – 23 seconds delay
Worst approach: western approach – LOS C
Overall Intersection: LOS C with 23 seconds delay
Queues: 100m on northern approach

**2020 ITA 2028 Scenario:**

Worst Movement: western right turn – 47 seconds delay. An increase of 24 seconds compared to the Base
Worst approach: western approach – LOS D
Overall Intersection: LOS C with 25 seconds delay. An increase of two seconds compared to the Base
Queues: 200m on western approach, an increase of 100m compared to the Base

**Te Auaunga Plan Change 2031 Scenario:**

Worst Movement: western left and right turn – 73 seconds delay. An increase of 50-60 seconds compared to the Base and an increase of 26-37 seconds compared to the 2020 ITA 2028 scenario
Worst approach: western approach – LOS E
Overall Intersection: LOS D with 36 seconds delay. Increase of 13 seconds compared to the Base and 11 seconds compared to the 2020 ITA 2028 scenario

Queues: 83m on western approach. Decreases of 17m compared to the Base and 117m compared to the 2020 ITA 2028 scenario

**Table 32: Woodward Road / Carrington Road - PM Peak Results**

| Intersection | Approach | Base - 2019 | | ITA - 2028 | | Plan Change - 2031 | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | **PM Peak** | | | | | | |
| **Woodward Road / Carrington Road** | S Left | 1 | A | 13 | B | 35 | C |
| | S Thru | 1 | | 14 | | 31 | |
| | N Thru | 1 | A | 3 | A | 8 | B |
| | N Right | 8 | | 14 | | 27 | |
| | W Left | 5 | B | 11 | B | 32 | C |
| | W Right | 13 | | 25 | | 39 | |
| **Intersection Total – PM Peak** | | **13** | **B** | **11** | **B** | **23** | **C** |

**Table 33: 95th Percentile Queue per Approach in PM Peak**

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - 2019 | | | | ITA - 2028 | | | | Plan Change - 2031 | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| **Woodward Road / Carrington Road** | **PM Peak** | | | | | | | | | | | |
| | 40 | -- | 28 | 25 | 53 | -- | 47 | 31 | 50 | - | 52 | 55 |

Based on the results above the following can be summarised:

**Base Scenario :**

Worst Movement: western right turn – 13 seconds delay
Worst approach: western approach – LOS B
Overall Intersection: LOS B with 13 seconds delay
Queues: 40m on southern approach

**2020 ITA 2028 Scenario:**

Worst Movement: western right turn – 25 seconds delay. An increase of 12 seconds compared to the Base
Worst approach: southern and western approaches – LOS B
Overall Intersection: LOS B with 11 seconds delay. A decrease of two seconds compared to the Base
Queues: 53m on southern approach. An increase of 13m compared to the Base

**Te Auaunga Plan Change 2031 Scenario:**

Worst Movement: western right turn – 39 seconds delay. An increase of 26 seconds compared to the Base and an increase of 14 seconds compared to the 2020 ITA 2028 scenario
Worst approach: southern and western approaches – LOS C
Overall Intersection: LOS C with 23 seconds delay. An increase of around 10 to 12 seconds compared to the Base and 2020 ITA 2028 scenarios
Queues: 55m on western approach. An increase of 30m compared to the Base and an increase of 24m compared to the 2020 ITA 2028 scenario

The modelling indicates that a decline in performance is anticipated at the Woodward Road / Carrington Road intersection in comparing the Te Auaunga Plan Change 2031 scenario with the other two scenarios. However, an overall intersection LOS D and LOS C is considered generally acceptable for the AM and PM peak hours, respectively.

When comparing the queue lengths from the modelling, there is a noticeable improvement noted in the AM peak between the Te Auaunga Plan Change 2031 scenario and the 2020 ITA 2028 scenario. The PM peak hour queues are generally similar for all three scenarios.

### 4.1.7 Carrington Road / New North Road / Mt Albert Road

**Table 34: Carrington Road / New North Road / Mt Albert Road - AM Peak Results**

| Intersection | Approach | Base - 2019 | | ITA - 2028 | | Plan Change - 2031 | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | AM Peak | | | | | | |
| Carrington Road / New North Road / Mt Albert Road | S Left | 182 | F | 44 | E | 45 | E |
| | S Thru | 184 | | 49 | | 50 | |
| | S Right | 180 | | 85 | | 94 | |
| | E Left | 50 | F | 7 | D | 49 | E |
| | E Thru | 35 | | 41 | | 56 | |
| | E Right | 279 | | 113 | | 60 | |
| | N Left | 125 | F | 49 | E | 31 | E |
| | N Thru | 136 | | 50 | | 50 | |
| | N Right | 67 | | 89 | | 116 | |
| | W Left | 141 | F | 79 | E | 92 | F |
| | W Thru | 128 | | 62 | | 97 | |
| | W Right | 168 | | 63 | | 97 | |
| **Intersection Total – AM Peak** | | **122** | **F** | **53** | **D** | **71** | **E** |

**Table 35: 95th Percentile Queue per Approach in AM Peak**

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - 2019 | | | | ITA - 2028 | | | | Plan Change - 2031 | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| Carrington Road / New North Road / Mt Albert Road | AM Peak | | | | | | | | | | | |
| | 188 | 80 | 187 | 302 | 140 | 33 | 193 | 144 | 125 | 29 | 93 | 191 |

Based on the results above the following can be summarised:

**Base Scenario:**

Worst Movement: eastern right turn – 279 seconds delay
Worst approach: All approaches – LOS F
Overall Intersection: LOS F with 122 seconds delay
Queues: 302m on western approach

**2020 ITA 2028 Scenario:**

| | |
|---|---|
| Worst Movement: | western right turn – 113 seconds delay. A decrease of 116 seconds compared to the Base |
| Worst approach: | southern, northern, and western approaches – LOS E |
| Overall Intersection: | LOS D with 53 seconds delay. A decrease of 69 seconds compared to the Base |
| Queues: | 193m on northern approach. An increase of 6m compared to the Base |

**Te Auaunga Plan Change 2031 Scenario:**

| | |
|---|---|
| Worst Movement: | northern right turn – 116 seconds delay. Increase of 49 seconds compared to the Base and an increase of 27 seconds compared to the 2020 ITA 2028 scenario |
| Worst approach: | western approach – LOS F |
| Overall Intersection: | LOS E with 71 seconds delay. A decrease of 51 seconds compared to the Base and an increase of 18 seconds compared to the 2020 ITA 2028 scenario |
| Queues: | 191m on western approach. A decrease of 111m compared to the Base and an increase of 47m compared to the 2020 ITA 2028 scenario |

**Table 36: Carrington Road / New North Road / Mt Albert Road – PM Peak Results**

| Intersection | Approach | Base - 2019 | | ITA - 2028 | | Plan Change - 2031 | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| Carrington Road / New North Road / Mt Albert Road | PM Peak | | | | | | |
| | S Left | 104 | F | 44 | D | 83 | F |
| | S Thru | 115 | | 46 | | 88 | |
| | S Right | 111 | | 61 | | 135 | |
| | E Left | 50 | E | 44 | E | 62 | E |
| | E Thru | 94 | | 98 | | 65 | |
| | E Right | 90 | | 102 | | 60 | |
| | N Left | 139 | F | 48 | E | 24 | E |
| | N Thru | 144 | | 49 | | 52 | |
| | N Right | 91 | | 89 | | 90 | |
| | W Left | 56 | E | 72 | F | 110 | F |
| | W Thru | 65 | | 78 | | 118 | |
| | W Right | 71 | | 111 | | 119 | |
| **Intersection Total – PM Peak** | | **80** | **F** | **66** | **E** | **75** | **E** |

**Table 37: 95th Percentile Queue per Approach in PM Peak**

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - 2019 | | | | ITA - 2028 | | | | Plan Change - 2031 | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| Carrington Road / New North Road / Mt Albert Road | PM Peak | | | | | | | | | | | |
| | 86 | 115 | 165 | 89 | 88 | 108 | 160 | 64 | 169 | 88 | 114 | 77 |

Based on the results above the following can be summarised:

**Base Scenario:**

Worst Movement: northern through – 144 seconds delay
Worst approach: southern and northern approaches – LOS F
Overall Intersection: LOS F with 80 seconds delay
Queues: 165m on northern approach

**2020 ITA 2028 Scenario:**

Worst Movement: western right turn – 111 seconds delay. A decrease of 40 seconds compared to the Base
Worst approach: western approach – LOS F
Overall Intersection: LOS E with 66 seconds delay. A decrease of 14 seconds compared to the Base
Queues: 160m on northern approach. A decrease of 5m compared to the Base

**Te Auaunga Plan Change 2031 Scenario:**

Worst Movement: southern right turn – 135 seconds delay. Increase of 24 seconds and 74 seconds compared to the Base and 2020 ITA 2028 scenarios respectively
Worst approach: southern and western approaches – LOS F
Overall Intersection: LOS E with 75 seconds delay. A decrease of five seconds compared to the Base but an increase of nine seconds compared to the 2020 ITA 2028 scenario
Queues: 169m on southern approach. An increase of around 80m compared to the Base and 2020 ITA 2028 scenarios

The Carrington Road / New North Road / Mount Albert Road intersection consistently shows a moderate to poor performance on most approaches in both the base and future scenarios. Whilst a decline in performance is noted between the Te Auaunga Plan Change 2031 and 2020 ITA 2028 scenarios, a marginal PM peak improvement is noted between the Plan Change 2031 and Base scenario, with a significant AM improvement largely driven by the wider-strategic modelled demands derived from the MSM model.

As indicated by the modelling, the intersection does not degrade in performance appreciably due to the further precinct development.

### 4.1.8 Woodward Road / New North Road / Richardson Road

**Table 38: Woodward Road / New North Road / Richardson Road - AM Peak Results**

| Intersection | Approach | Base - 2019 | | ITA - 2028 | | Plan Change - 2031 | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| | AM Peak | | | | | | |
| Woodward Road / New North Road / Richardson Road | S Left | 44 | D | 30 | C | 23 | C |
| | S Thru | 56 | | 35 | | 28 | |
| | S Right | 35 | | 25 | | 23 | |
| | E Left | 32 | C | 28 | C | 31 | C |
| | E Thru | 31 | | 25 | | 27 | |
| | E Right | 58 | | 52 | | 47 | |
| | N Left | 45 | D | 15 | D | 11 | C |
| | N Thru | 55 | | 35 | | 32 | |
| | N Right | 54 | | 37 | | 31 | |
| | W Left | 30 | C | 26 | C | 21 | B |
| | W Thru | 27 | | 23 | | 19 | |
| | W Right | 48 | | 38 | | 35 | |
| **Intersection Total – AM Peak** | | **35** | **C** | **28** | **C** | **24** | **C** |

**Table 39: 95th Percentile Queue per Approach in AM Peak**

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - 2019 | | | | ITA - 2028 | | | | Plan Change - 2031 | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| Woodward Road / New North Road / Richardson Road | AM Peak | | | | | | | | | | | |
| | 122 | 25 | 117 | 83 | 77 | 20 | 37 | 56 | 44 | 27 | 41 | 42 |

Based on the results above the following can be summarised:

**Base Scenario:**

| | |
|---|---|
| Worst Movement: | eastern right turn – 58 seconds delay |
| Worst approach: | southern and northern approaches – LOS D |
| Overall Intersection: | LOS C with 35 seconds delay |
| Queues: | 122m on southern approach |

**2020 ITA 2028 Scenario:**

| | |
|---|---|
| Worst Movement: | eastern right turn - 52 seconds delay. A decrease of six seconds compared to the Base |
| Worst approach: | Northern approach – LOS D |
| Overall Intersection: | LOS C with 28 seconds delay. A decrease of seven seconds compared to the Base |
| Queues: | 77m on southern approach. A decrease of 45m compared to the Base |

**Te Auaunga Plan Change 2031 Scenario:**

| | |
|---|---|
| Worst Movement: | eastern right turn - 47 seconds delay. A decrease of 11 seconds compared to the Base and a decrease of five seconds compared to the 2020 ITA 2028 scenario. |
| Worst approach: | Northern, eastern and southern approaches – LOS C |
| Overall Intersection: | LOS C with 24 seconds delay. Decreases of 11 seconds and four seconds compared to the Base and 2020 ITA 2028 scenarios |
| Queues: | 44m on southern approach. Decreases of 78m and 33m compared to the Base and 2020 ITA 2028 scenarios respectively |

**Table 40: Woodward Road / New North Road / Richardson Road - PM Peak Results**

| Intersection | Approach | Base - 2019 | | ITA - 2028 | | Plan Change - 2031 | |
|---|---|---|---|---|---|---|---|
| | | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS |
| Woodward Road / New North Road / Richardson Road | PM Peak | | | | | | |
| | S Left | 31 | D | 36 | D | 38 | D |
| | S Thru | 43 | | 44 | | 46 | |
| | S Right | 35 | | 33 | | 33 | |
| | E Left | 39 | D | 36 | D | 41 | D |
| | E Thru | 37 | | 35 | | 38 | |
| | E Right | 96 | | 87 | | 82 | |
| | N Left | 40 | D | 22 | D | 40 | D |
| | N Thru | 52 | | 46 | | 49 | |
| | N Right | 51 | | 44 | | 49 | |
| | W Left | 19 | B | 23 | C | 25 | C |
| | W Thru | 20 | | 21 | | 20 | |
| | W Right | 45 | | 43 | | 46 | |
| **Intersection Total – PM Peak** | | **35** | **D** | **35** | **C** | **37** | **D** |

**Table 41: 95th Percentile Queue per Approach in PM Peak**

| Intersection | 95th Percentile Queue (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base - 2019 | | | | ITA - 2028 | | | | Plan Change - 2031 | | | |
| | S | E | N | W | S | E | N | W | S | E | N | W |
| **Woodward Road / New North Road / Richardson Road** | **PM Peak** | | | | | | | | | | | |
| | 71 | 74 | 123 | 36 | 92 | 62 | 124 | 32 | 93 | 78 | 119 | 35 |

Based on the results above the following can be summarised:

**Base Scenario :**

Worst Movement: eastern right turn – 96 seconds delay
Worst approach: southern, eastern, and northern approaches – LOS D
Overall Intersection: LOS D with 35 seconds delay
Queues: 123m on northern approach

**2020 ITA 2028 Scenario:**

Worst Movement: eastern right turn - 87 seconds delay. A decrease of 9 seconds compared to the Base
Worst approach: southern, eastern, and northern approaches – LOS D
Overall Intersection: LOS C with 35 seconds delay. No change from the Base
Queues**:** 124m (25 vehicles) on northern arm. No change from the Base

**Te Auaunga Plan Change 2031 Scenario:**

Worst Movement: eastern right turn - 82 seconds delay. A decrease of 14 seconds compared to the Base and five seconds compared to the 2020 ITA 2028 scenario
Worst approach: all approaches – LOS D
Overall Intersection: LOS D with 37 seconds delay. Practically the same as the Base and 2020 ITA 2028 scenarios
Queues**:** 119m on northern approach. Practically the same as the Base and 2020 ITA 2028 scenarios

The Woodward Road / New North Road / Richardson Road intersection consistently demonstrates an overall moderate performance in all scenarios modelled. It is noted that in the AM peak, the performance of the intersection improves for both future scenarios compared to the base scenario. Once again, this can largely be attributed to the reduction in the overall demand forecast for the intersection by the wider regional model, even accounting for the development traffic.

## 4.2 Car Journey Travel Time

### 4.2.1 Travel Time Route Overview

Journey Travel time analysis for cars has been undertaken along the sections between Point Chevalier Road / Great North Road / Carrington Road and New North Road / Carrington Road, in a clockwise and anti-clockwise direction between Woodward Road / Carrington Road, and New North Road / Carrington Road intersections.

Existing travel times along these sections were surveyed on 17 October 2019, between 6:00 – 9:00am and 3:00 – 6:00pm. The length of each segment of the routes surveyed, and corresponding average morning / afternoon peak hour travel speeds observed during the time of the survey are shown in **Figure 6** and **Figure 7.**

The two routes, referred to as 'Route 1' and 'Route 2' are detailed below, along with the corresponding survey segments shown in **Figure 6** and **Figure 7.**

**Route 1** - Comprises the following sections:

a) Point Chevalier Road / Great North Road / Carrington Road to Carrington Road / Gate 4 (segment 1 and 2)
b) Carrington Road / Gate 4 to Carrington Road / Woodward Road (segment 3)
c) Carrington Road / Woodward Road to Carrington Road / New North Road (segment 4)
d) Carrington Road / New North Road to New North Road / Woodward Road (segment 5)
e) New North Road / Woodward Road to Woodward Road / Rail Crossing (segment 6)
f) Woodward Road / Rail Crossing to Woodward Road / Carrington Road (segment 7)
g) Woodward Road / Carrington Road to Carrington Road / Gate 4 (segment 8)
h) Carrington Road / Gate 4 to Carrington Road / Great North Road / Point Chevalier Road (segment 9 and 10)

**Route 2 -** Comprises the following sections:

a) Point Chevalier Road / Great North Road / Carrington Road to Carrington Road / Gate 4 (segment 1 and 2)
b) Carrington Road / Gate 4 to Carrington Road / Woodward Road (segment 3)
c) Carrington Road / Woodward Road to Woodward Road / Rail Crossing (segment 4)
d) Woodward Road / Rail Crossing to Woodward Road / New North Road (segment 5)
e) Woodward Road / New North Road to New North Road / Carrington Road (segment 6)
f) New North Road / Carrington Road to Carrington Road / Woodward Road (segment 7)
g) Carrington Road / Woodward Road to Carrington Road / Gate 4 (segment 8)
h) Carrington Road / Gate 4 to Carrington Road / Great North Road (segment 9 and 10)

The travel time analysis for Route A and B during the AM and PM peak hours are shown in **Table 42** to **Table 45**. Journey Travel times from the 2019 surveys are also included (referred to as 'Observed Travel Time') to provide a reference to the existing situation.

The results are presented as cumulative travel time from origin point of the first segment (segment 1), to the destination point of the last segment (segment 8). For each route, the sections are referred to as Sections 1a-1h and Sections 2a-2h for Route 1 and Route 2 respectively, corresponding to the alphabetic point formatting described above. The difference between the observed travel time and the modelled travel time for each scenario are also included, with negative values indicating faster travel time associated with Scenario A or Scenario B, relative to the observed travel time.

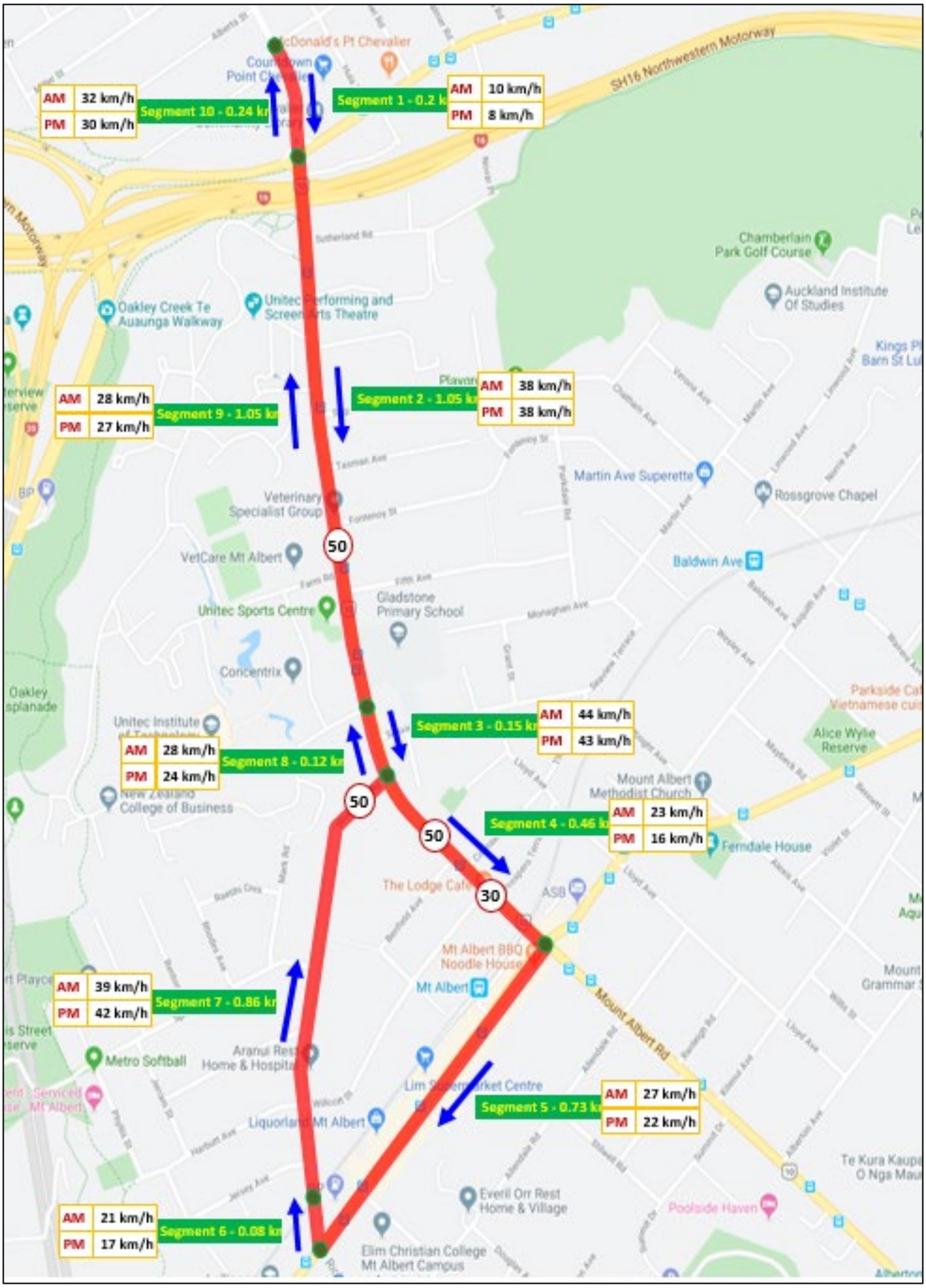


**Figure 6: Route 1 (clockwise direction), source: Matrix.**

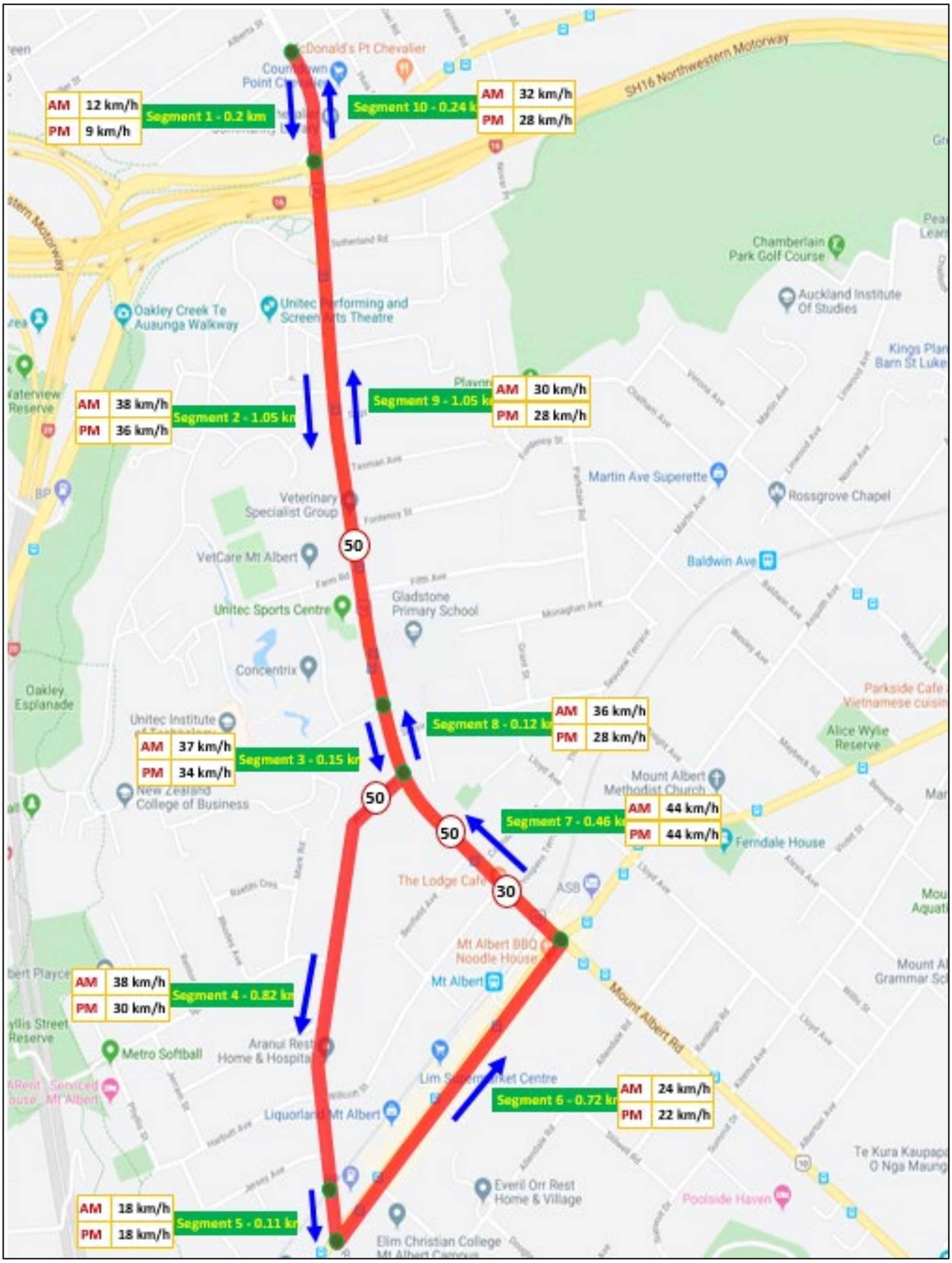


**Figure 7: Route 1 (anti-clockwise direction), source: Matrix.**

### 4.2.2 Car Travel Time Route 1

**Table 42: Cumulative Travel Time along Route 1 – AM Peak**

| Route 1 | Cumulative Travel Time (in seconds) | | | | |
|---|---|---|---|---|---|
| | Observed | ITA 2028 (Modelled) | Difference compared to Observed | Plan Change 2031 | Difference compared to Observed |
| **AM Peak** | | | | | |
| Section 1a | 104 | 93 | -11 | 104 | 0 |
| Section 1b | 118 | 104 | -14 | 115 | -3 |
| Section 1c | 205 | 221 | +16 | 249 | +49 |
| Section 1d | 313 | 318 | +5 | 340 | +27 |
| Section 1e | 341 | 344 | +2 | 366 | +25 |
| Section 1f | 426 | 431 | +5 | 491 | +66 |
| Section 1g | 444 | 461 | +17 | 527 | +83 |
| Section 1h | 590 | 747 | +157 | 725 | +136 |
| **%Difference (Observed vs Scenario)** | | **+27%** | | **+23%** | |

**Table 43: Cumulative Travel Time along Route 1 – PM Peak**

| Route 1 | Cumulative Travel Time (in seconds) | | | | |
|---|---|---|---|---|---|
| | Observed | ITA 2028 | Difference compared to Observed | Plan Change 2031 | Difference compared to Observed |
| **PM Peak** | | | | | |
| Section 1a | 104 | 118 | +14 | 146 | +43 |
| Section 1b | 119 | 128 | +10 | 161 | +42 |
| Section 1c | 249 | 243 | -6 | 291 | +42 |
| Section 1d | 383 | 375 | -8 | 425 | +42 |
| Section 1e | 417 | 401 | -16 | 451 | +34 |
| Section 1f | 492 | 470 | -22 | 540 | +48 |
| Section 1g | 515 | 494 | -21 | 565 | +50 |
| Section 1h | 659 | 715 | +56 | +768 | +108 |
| **%Difference (Observed vs Scenario)** | | **+8%** | | **+16%** | |

The modelling indicates that in the AM peak hour, the overall travel time for Te Auaunga Plan Change 2031 scenario is around 23% higher than the Base. However, the Te Auaunga Plan Change 2031 travel time along Route 1 is lower than the 2020 ITA 2028 travel time by around 3%.

Increased travel times on Route 1 are also noted in the PM peak hour for both future scenarios (compared to the Base), with generally higher times anticipated in the Te Auaunga Plan Change 2031 scenario compared to the 2020 ITA 2028 scenario. However, the overall travel time increases are considered acceptable in light of the proposed intensification of uses, and new signalised intersections being provided.

### 4.2.3 Car Travel Time Route 2

**Table 44: Cumulative Travel Time along Route 2 - AM Peak**

| Route 2 | Cumulative Travel Time (in seconds) | | | | |
|---|---|---|---|---|---|
| | Observed | ITA 2028 | Difference compared to Observed | Plan Change 2031 | Difference compared to Observed |
| **AM Peak** | | | | | |
| Section 2a | 104 | 93 | -11 | 104 | +1 |
| Section 2b | 118 | 120 | +3 | 172 | +54 |
| Section 2c | 200 | 199 | -1 | 251 | +51 |
| Section 2d | 241 | 217 | -25 | 264 | +23 |
| Section 2e | 374 | 336 | -38 | 386 | +12 |
| Section 2f | 411 | 392 | -20 | 447 | +36 |
| Section 2g | 430 | 423 | -7 | 459 | +29 |
| Section 2h | 575 | 709 | +134 | 658 | +82 |
| **%Difference (Observed vs Scenario)** | | **+23%** | | **+14%** | |

**Table 45: Cumulative Travel Time along Route 2 - PM Peak**

| Route 2 | Cumulative Travel Time (in seconds) | | | | |
|---|---|---|---|---|---|
| | Observed | ITA 2028 | Difference compared to Observed | Plan Change 2031 | Difference compared to Observed |
| **PM Peak** | | | | | |
| Section 2a | 104 | 118 | +14 | 146 | +43 |
| Section 2b | 119 | 139 | +20 | 180 | +61 |
| Section 2c | 217 | 227 | +9 | 279 | +62 |
| Section 2d | 256 | 254 | -2 | 298 | +42 |
| Section 2e | 374 | 370 | -4 | 439 | +65 |
| Section 2f | 411 | 414 | +2 | 501 | +90 |
| Section 2g | 435 | 437 | +2 | 529 | +94 |
| Section 2h | 579 | 658 | +80 | 731 | +152 |
| **%Difference (Observed vs Scenario)** | | **+14%** | | **+26%** | |

For Route 2, the modelling indicates that travel times increase by just over 10% for the AM peak for the Te Auaunga Plan Change 2031 future scenario compared to the Base. However, an improvement in travel time of around 7% along Route 2 is observed between the Te Auaunga Plan Change 2031 scenario and the 2020 ITA 2028 scenario.

In the PM peak period, the Te Auaunga Plan Change 2031 scenario is predicted to see an increase in travel times of around 26% over the Base and around 11% over the 2020 ITA 2028 scenario.

Overall, it can be concluded that the travel times for general traffic on the network surrounding the precinct in both future scenarios are generally higher than the observed travel time, using the wider-area assumptions provided.

## 4.3 Bus Journey Travel Time

The journey travel times for the buses along Carrington Road, between Point Chevalier Road / Great North Road / Carrington Road and New North Road / Carrington Road / Mount Albert Road have been modelled separately.

The comparison between bus travel times in the base and future models for the sections of Carrington Road between the Great North Road / Pt Chevalier Road / Carrington Road and Carrington Road/Woodward Road, in both directions are provided in **Table 46.**

The comparisons are presented separately for AM and PM peak periods.

**Table 46: Comparison of Bus Travel Time on Carrington Road**

| Section | Bus Travel Times (seconds) | | |
|---|---|---|---|
| | **Base Model (no bus lanes)** | **ITA 2028** | **Plan Change 2031** |
| **AM Peak** | | | |
| **Southbound -Carrington Road** (Pt Chevalier/Great North Road to Woodward Road) | 199 | 190 (9 seconds faster than the base) | 200 (similar to the base) |
| **Northbound – Carrington Road** (Woodward Road to Pt Chevalier/Great North Road) | 284 | 285 (no change from the base) | 282 (2 seconds faster than the base) |
| **PM Peak** | | | |
| **Southbound -Carrington Road** (Pt Chevalier/Great North Road to Woodward Road) | 207 | 203 (4 seconds faster than the base) | 201 (6 seconds faster than the base) |
| **Northbound – Carrington Road** (Woodward Road to Pt Chevalier/Great North Road) | 267 | 318 (51 seconds slower than the base) | 295 (28 seconds slower than the base) |

It is noted that the traffic model assumes that buses will stop for an average of 20 seconds at each bus stop along the corridor, for boarding and alighting passengers. These additional seconds are included in the bus travel times reported above. Given that there are three bus stops in each direction along Carrington Road in the future scenarios, this equates to approximately 60 seconds of additional time each direction.

Comparing the Te Auaunga Plan Change 2031 and Base scenarios, the model indicates improvements in bus travel times along the Carrington Road corridor in the northbound direction during the AM peak and in the southbound direction in the PM peak. These are the critical directions of travel in both peak hours. In the southbound direction during the AM peak the bus travel time essentially the same as the Base.

With respect to the bus travel time in the northbound direction in the PM peak, where an increase of 28 seconds persists relative to the Base scenario, this can generally be attributed to the higher delay on the southern approach of the Great North Road / Pt Chevalier Road / Carrington Road intersection in the PM peak as buses are required to merge with general traffic at the end of the northbound bus lane prior to the SH16 over-bridge.

In comparing the Te Auaunga Plan Change 2031 scenario with the 2020 ITA 2028 scenario, the bus travel time in the southbound direction is around 10 seconds slower during the AM peak. However, improvements are noted for the northbound AM peak and the PM peak in both directions, with the most noticeable improvement being 23 seconds in the northbound direction.

As noted earlier, the model assumes that the bus lanes do not extend across the SH16 motorway over-bridge all the way to Great North Road but stop in the general vicinity of Sutherland Road. Extending at least some bus priority across the bridge would result in significant delay improvement for services. However, this would require either the extension of the bus lane closer to the intersection at cost to performance of non-bus movements, or a full rebuild of the over-bridge (for bus lanes each way rather than just southbound, as achieved by relocating the cycle facility onto a clip-on).

Overall, the above demonstrates that the Full Upgrade of Carrington is beneficial and will sufficiently sustain the public transport operation along the corridor. Without it, buses would perform at general traffic flow delays plus stop delays and delays to re-enter traffic streams, while also further holding up general traffic while sitting in stops.

Particularly if combined with further intersection bus priority measures, the greater accessibility and reliability for buses will compensate for the longer travel times for general traffic (as previously discussed) and support the objective of encouraging greater public transport use to and from the precinct. It will also support the wider network, where the road serves several Frequent Network bus routes.

## 4.4 Carrington Road Flows

The peak hour traffic volumes on Carrington Road, between Gate 3 and Gate 4, recorded by the 7-day tube count surveys (2014 and 2019) and modelled in the future scenarios are presented in **Table 47.**

**Table 47: Carrington Road Peak Hour Traffic Flow**

| Time | AM Peak Hour (veh/hr) | | | PM Peak Hour (veh/hr) | | |
|---|---|---|---|---|---|---|
| | Northbound | Southbound | Combined | Northbound | Southbound | Combined |
| 2014 (survey) | 1,031 | 702 | 1,733 | 583 | 647 | 1,230 |
| 2019 (survey) | 664 | 549 | 1213 | 555 | 577 | 1,132 |
| 2028 ITA | 994 | 714 | 1,708 | 741 | 947 | 1,688 |
| 2031 Plan Change | 1,087 | 754 | 1,841 | 842 | 1,045 | 1,886 |

The table above shows lower peak hour traffic flows on Carrington Road in 2019 compared to 2014, which can be attributed largely to the opening of the Waterview motorway and tunnel in 2017.

The table also shows a general increasing trend in traffic flows in both directions and peak periods, between 2019 and 2031. It is noted that the level of traffic flows predicted in the Te Auaunga Plan Change 2031 scenario are comparable with the AM morning peak flows observed in 2014, which provides some indication that the corridor will have sufficient capacity to cater for the future flows.

# 5 Summary & Conclusions

As can be seen from the results of the modelling, the changes to development traffic leads to changes in Level of Service / delays compared to the 2020 ITA. These changes are not always negative, despite the additional traffic from an extended modelling horizon and added dwellings due to the rezoned areas. The varying patterns of change (rather than a simple decline in performance) are due to the model now also including modifications to previous trip generation assumptions (mainly based on reduction of pro-rata residential car parking provided) and due to network assumption changes, such as switching the signalisation of Gate 2 to Gate 1 instead.

At the southern end, performance results are also affected due to AT/AFC assumptions of the effect of wider-area traffic reductions due to network changes, and the new assumption of a "Full Upgrade" of all of Carrington Road's length including a rail over-bridge replacement with added lanes.

General vehicle journey times see no or quite limited degradation overall, though mid-block travel along Carrington Road sees increases compared to the lower base traffic volume situation. This is again balanced by improvements in the southern part of the network as per the MSM projections provided by AT/AFC as a base for the traffic model.

Bus journey time analysis shows that the Carrington Road bus routes will see clear benefits from the new bus lanes proposed as part of the Carrington Road Upgrade, albeit to ensure consistent advantage of public transport over single-occupancy cars, more intersection-specific bus priority would be beneficial at key locations in addition to the mid-block bus lanes. This particularly applies at the "ends" of the model (Great North Road and New North Road).

Further, general vehicle capacity increases (such as much larger arterial road intersections at the network edges or added general lanes on Carrington Road) are not considered feasible without prohibitive impacts on surrounding town centres in particular and would not be in line with policy and objectives for the precinct.

The model results (and development impacts) should be considered as part of the assumptions of other projects in the wider vicinity (such as Connected Communities designs for New North Road) to ensure that the impacts are properly considered in the wider network, as well as the more local areas of the network assessed in this report.

In a wider sense, this report indicates that the transport impacts of the proposed rezoning being sought, as well as the added residential intensification modelled (the latter of which is already allowed by the existing zoning) can be adequately integrated. This conclusion is however predicated upon the assumption that some relatively substantial changes in the transport environment serving the Te Auaunga Plan Change area are in place. Without such changes, the assessed modelling results and overall transport network performance would risk being undermined by additional car-centric traffic.

Key assumptions that would need to occur in practice to achieve the projected outcomes would include a (more extensive) Carrington Road Upgrade focused on public transport and active modes, significant constraints on car parking for the proposed residential and retail activities, as well as implementing measures intended to prevent displacing potential parking demand into surrounding suburbs and streets.

If these assumptions are given effect to, then, combined with the good existing transport accessibility and the central location that the Te Auaunga Plan Change location enjoys, the transport effects of the rezoning and intensification sought by the Te Auaunga Plan Change are considered acceptable, and will place a much-reduced burden on Auckland's transport networks compared to a development of similar size located further outside the Auckland Isthmus.

**Stantec New Zealand**

# Appendices

We design with community in mind

# Appendix A Trip General Table

| Land Use / Activity | Developers / organisation | Development (Year 8 since development) | Zone | Unit | Total development per activity | AM Trip rate | AM Trips | PM Trip rate | PM Trips | Total trips AM (vehicles/hour) | Total trips PM (vehicles/hour) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Education | | | | FTE | 10,889 | | | | | 820 | 820 |
| Tertiary Education | Unitec | | | | 10,889 | | | | | 820 | 820 |
| Students | | 9,702 | Unitec Core | FTE | | 0.07 | 672 | 0.07 | 672 | | |
| Staff | | 1,187 | Unitec Core | FTE | | 0.12 | 148 | 0.12 | 148 | | |
| Primary School | MoE | | | | 0 | | | | | 0 | 0 |
| Students | | 0 | Carrington | FTE | | 0.42 | 0 | 0.105 | 0 | | |
| Staff | | 0 | Carrington | FTE | | 0.45 | 0 | 0.3 | 0 | | |
| Early Childhood Education | MoE | | | | 0 | | | | | 0 | 0 |
| Students | | | Carrington | FTE | | 1 | 0 | 0.25 | 0 | | |
| Special Needs Education | MoE | | | | 0 | | | | | 0 | 0 |
| Students | | | Carrington | FTE | | 1.8 | 0 | 0.45 | 0 | | |
| Residential | | | | Dwelling units / beds (Unitec h | 4000 | | | | | 992 | 967 |
| Studio and 1 / 1.5 bedroom without parking | | | | | 1000 | | | | | 50 | 50 |
| | Fletchers / NWO | 109 | Southern | Dwelling units | | 0.05 | 5 | 0.05 | 5 | | |
| | | 374 | Northern | Dwelling units | | 0.05 | 19 | 0.05 | 19 | | |
| | | 254 | Carrington | Dwelling units | | 0.05 | 13 | 0.05 | 13 | | |
| | | 43 | North-West | Dwelling units | | 0.05 | 2 | 0.05 | 2 | | |
| | | 60 | Te Auaunga North | Dwelling units | | 0.05 | 3 | 0.05 | 3 | | |
| | | 39 | F Lots | Dwelling units | | 0.05 | 2 | 0.05 | 2 | | |
| | HUD | 121 | B Lots | Dwelling units | | 0.05 | 6 | 0.05 | 6 | | |
| | Unitec | | Unitec Core | Dwelling units | | 0.05 | 0 | 0.05 | 0 | | |
| 1.5 Bedroom with parking | | | | | 1250 | | | | | 315 | 290 |
| | Fletchers / NWO | 136 | Southern | Dwelling units | | 0.29 | 39 | 0.27 | 36 | | |
| | | 468 | Northern | Dwelling units | | 0.25 | 115 | 0.23 | 105 | | |
| | | 317 | Carrington | Dwelling units | | 0.25 | 78 | 0.23 | 71 | | |
| | | 54 | North-West | Dwelling units | | 0.25 | 13 | 0.23 | 12 | | |
| | | 75 | Te Auaunga North | Dwelling units | | 0.28 | 21 | 0.26 | 19 | | |
| | | 48 | F Lots | Dwelling units | | 0.28 | 13 | 0.26 | 12 | | |
| | HUD | 151 | B Lots | Dwelling units | | 0.25 | 37 | 0.23 | 34 | | |
| | Unitec | | Unitec Core | Dwelling units | | | 0 | | 0 | | |
| 2 Bedroom | | | | | 0 | | | | | 0 | 0 |
| | Fletchers / NWO | | Southern | Dwelling units | | | 0 | | 0 | | |
| | | | Northern | Dwelling units | | | 0 | | 0 | | |
| | | | Carrington | Dwelling units | | | 0 | | 0 | | |
| | | | North-West | Dwelling units | | | 0 | | 0 | | |
| | HUD | | Te Auaunga North | Dwelling units | | | 0 | | 0 | | |
| | Unitec | | Unitec Core | Dwelling units | | | 0 | | 0 | | |
| 2.5 Bedroom | | | | | 1750 | | | | | 626 | 626 |
| | Fletchers / NWO | 190 | Southern | Dwelling units | | 0.43 | 82 | 0.43 | 82 | | |
| | HUD | 655 | Northern | Dwelling units | | 0.34 | 224 | 0.34 | 224 | | |
| | | 444 | Carrington | Dwelling units | | 0.34 | 151 | 0.34 | 151 | | |
| | | 76 | North-West | Dwelling units | | 0.34 | 26 | 0.34 | 26 | | |
| | | 106 | Te Auaunga North | Dwelling units | | 0.41 | 43 | 0.41 | 43 | | |
| | | 68 | F Lots | Dwelling units | | 0.41 | 28 | 0.41 | 28 | | |
| | | 211 | B Lots | Dwelling units | | 0.34 | 72 | 0.34 | 72 | | |
| | Unitec | | Unitec Core | Dwelling units | | | 0 | | 0 | | |
| 3 and 4 Bedroom | | | | | 0 | | | | | 0 | 0 |
| | Fletchers / NWO | | Southern | Dwelling units | | | 0 | | 0 | | |
| | HUD | | Northern | Dwelling units | | | 0 | | 0 | | |
| | | | Carrington | Dwelling units | | | 0 | | 0 | | |
| | | | North-West | Dwelling units | | | 0 | | 0 | | |
| | | | Te Auaunga North | Dwelling units | | | 0 | | 0 | | |
| | Unitec | | Unitec Core | Dwelling units | | | 0 | | 0 | | |
| Student Housing | | | | | 0 | | | | | 0 | 0 |
| | Unitec | | Unitec Core | Beds | | | 0 | 0.00 | 0 | | |
| Commercial | | | | | 0 | | | | | 0 | 0 |
| Services | Taylors Laundry | | Taylor's | 100 sqm | 0 | n/a | | n/a | | 0 | 0 |
| Business Partnerships / Offices | | 0 | Unitec Core | 100 sqm | 0 | 1.6 | 0 | 1.2 | 0 | 0 | 0 |
| Retail | | | | | 3120 | | | | | 74 | 255 |
| Supermarket | | 1800 | Carrington Retail | 100 sqm | 1800 | 2.325 | 41.85 | 11.625 | 209.25 | 42 | 209 |
| Other Retail (F&B) | | 1320 | Carrington Retail | 100 sqm | 1320 | 2.415 | 31.878 | 3.45 | 45.54 | 32 | 46 |
| Other land uses | | | | | 198 | | | | | 156 | 61 |
| Health | Mason Clinic | 198 | Northern | beds | 198 | n/a | 156 | n/a | 61 | 156 | 61 |
| **Grand total trips** | | | | | | | | | | **2042** | **2103** |

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# Te Auaunga Private Plan Change

## Ecological Impact Assessment

**Revision 2**

Prepared for Ministry of Housing and Urban Development by Morphum Environmental Ltd

**ATTACHMENT 7.1**

**ADDITIONAL INFORMATION REQUEST**

**TRANSPORT**

This attachment sets out the questions and responses to the clause 23 request (request for additional information) from the Council on the original plan change. This addresses the matters related to transport.

This attachment sets out the topic, Council's question, the technical expert who prepared the response and the additional information sought by the Council.

**'Proposed Plan Change xx (Private) – Te Auaunga'**
***Amending I334 Wairaka Precinct***
**Applicant:** Te Tūāpapa Kura Kāinga - Ministry of Housing and Urban Development
**Address:** 1-139 Carrington Road, Mt Albert
**Proposed activities:** PPC – Partial Rezoning and Revised (currently Wairaka) Precinct Provisions

**Overview of applicant Response**

1 This is a combined response for questions T1, T2, T3, T5 & T5.

2 These questions largely focus on the ITA document (Stantec, June 2020, approved by Auckland Council March 2021).

3 While the approved ITA remains relevant for the plan change application, significant parts – including matters such as the queried development assumptions and trip generation rates – have since changed, and instead are referenced in the Te Auaunga Plan Change - Transport Assessment & Traffic Modelling Report, referenced herein as the "TMR" (Stantec, December 2022). The TMR also identified which of the previous ITA assumptions remain valid (such as the overall transport environment and related principles). Thus both documents have to be read together to assess the plan change application. These documents were included in the package of documents contained in Appendix 5 to the plan change request: "Te Auaunga Precinct 2022: Integrated Transport Assessment".

4 As such, we will refer to the updated statements made in the TMR, rather than those in the original ITA being queried in the responses to these questions.

| | |
|---|---|
| **Specific request T1** | With reference to ITA Section 5.8 and Appendix E please provide evidence to confirm consistency of the new heights proposed under the PC with trip generation assumptions in the ITA, including correlation between building height and gross floor area / development yield, and in turn, trip generation. |

| | |
|---|---|
| | Please also provide an alternative higher trip generation scenario, in the event that higher development yields could be achieved under the new permitted height limits (see Planning P1 below). |
| **Reasons for request T1** | The AEE / Section 32 Report refers to areas within the precinct where increased height is to be permitted, to in turn enable additional growth. However, it is not clear as to how this has informed the assessment of trip generation potential within the ITA, in Section 5.8 and Appendix E, with regards to correlating increased building heights with corresponding increases in gross floor area, numbers of residential apartments and other related land-use metrics.<br><br>Further analysis of the correlation between building heights, development yield and consequent trip generation potential is therefore considered appropriate in order to understand the full potential longer-term transport effects of the proposal.<br><br>Please note that this analysis should be informed by any updated yield information as a result if RFI P1 below. |

**Applicant response**

**Consistency of new heights with trip generation assumptions**

1 Regarding the influence of added height on trip generation, there is no direct influence of this on the traffic modelling, as the traffic model is fundamentally based on a number of dwellings, rather than building heights. As such, while changes in height proposed do play a role in changing the number of dwellings that HUD considers can be provided, traffic modelling is solely based on assessing the impacts created by the targeted number of residential dwellings (and other activities, where relevant).

2 As heights are not changing to the same level across the whole precinct, changes in height enabled by the plan change could in practice lead to changes in traffic distribution *within* the precinct - with more traffic originating, as a percentage of all precinct traffic, from some areas than before.

3 For clarity, it is acknowledged that when the traffic-modelled number of dwellings was increased from the ITA assumptions to the TMR (plan change) assumptions, the increase was distributed linearly (i.e. all internal areas were factored to the same degree).

4 This was done in this more simplified manner because HUD and the development partners cannot yet identify the exact numbers of dwellings for the various areas within the centre and north of the precinct, only the overall maximum assumption being sought – these being the scale of dwellings and associated trip generations used in the TMR modelling (superseding the ITA).

5 However, the precinct is spatially relatively small – excluding the southern zones (disconnected in motor vehicle terms from the central and northern areas), the maximum distances are around 800m. The central and northern areas are also interconnected for motor vehicle purposes, and their only links to the wider network are via the same "gates" all connecting onto Carrington Road.

6 Small changes in the "centre of gravity" might be caused by local height changes being more substantial in one area compared to another area, or one area seeing slightly more intensive development than the other. However, for the above reasons, they will tend to quickly redistribute themselves within the precinct based on traffic conditions at the "gates" (path of least resistance based on congestion and roading design). All such traffic in any case will travel along the same external route (Carrington Road). As such, the slight simplification is not considered to have any material impacts on the assessment of traffic impacts undertaken within the TMR.

7 It should also be noted that a significant part of the "added development" now being traffic modelled is not in fact additional proposed density created by either zoning changes or permitted height changes – rather a large part of the added density represents a simple extension of the modelling horizon to a point where more of the already permitted density is assumed to have been constructed. Further discussion on the difference between the yield enabled by the operative provisions and the new plan change requested precinct provisions has been provided by John Duthie in clause 23 response P8B.

**Alternative higher trip generation scenario**

8 Regarding the request for an "alternative higher trip generation scenario", this is not considered necessary, as the ITA / TMR already sets effective traffic-related limits of development via the maximum development assessed (as per Section 3 of the ITA, for 2,049 dwellings by 2028, respectively as per Section 2 of the TMR, for 4,000 dwellings by 2031 – plus the relevant other non-dwelling activities within the precinct for each scenario).

9 If HUD, or one of the development partners in the precinct, proposed to substantially change or exceed these assumptions in the future, this would then not be in accordance with the ITA, including the TMR. Accordingly, this would then lead, at that time, to a requirement to provide a new or revised assessment to exceed those levels (and/or an updated ITA / traffic model), as required by the proposed precinct provisions.

10 As such, an "alternative higher trip generation scenario" for potential "higher yields" has relevance only if such a proposal for more development is made in the future. It is not a scenario that HUD seeks direct or indirect approval for with this plan change application.

**Specific request T2** Please provide further clarity for the choice of trip rate reductions cited in section 5.8.2.1 of the ITA, namely:

- 10% reduction in tertiary education Trip Rates, based on 'likelihood of remote learning'

- 30% reduction in tertiary education trips, due to behavioural change influenced by network congestion

And similarly for the choice of trip rate reduction cited in section 5.8.3.3:

- 25% reduction in residential trip rates in the North-west, northern and Carrington Zones, due to congestion driving a stronger mode shift (compared to 20% agreed with AT)

The above percentage reductions should be supported by appropriate quantitative evidence, for example, in relation to the impacts of remote learning on education trip generation, or the influence of severe congestion on encouraging modal shift.

Please also confirm whether these percentage reductions have been agreed with AT.

**Reasons for request T2** In the absence of reasonable evidence to support the proposed reductions, and confirmation of their agreed use with the Road Controlling Authority (AT), it is not possible to verify that a fair and robust assessment of trip generation and transport network performance has been undertaken.

**Applicant response**

**Trip rate reductions**

1 Section 3.6. Table 5 of the TMR contains a summary of the trip generation rate changes between the ITA traffic model and the TMR traffic model.

2 Before addressing specific rates, it is useful to set out the overall approach to trip generation rates.

3 Having identified a specific level of development sought (which is largely enabled by the zoning and enabled heights even <u>before</u> the plan change; refer discussion in T1), traffic and transport work in preparation for the plan change focussed as much on <u>reducing</u> (car) traffic generation as on <u>accommodating</u> it. This is in line with both the precinct's policies[1], the approved ITA's transport vision[2] and Government policy.[3]

4 However, in the review of traffic models and their assumptions, there is often an approach of assuming "conservative" trip generation rates as a default, to be "on the safe side" - or to undertake modelling with such higher rates (i.e. as sensitivity tests) which then become treated as "de facto" impacts being discussed.

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[1] Auckland Unitary Plan Operative in Part, I334.3 Policy 22 – "*Manage the expected traffic generated by activities in the precinct to avoid, remedy and mitigate adverse effects on the safety and efficiency of the surrounding transport network, particularly at peak times….".*

[2] Section 4.1 of the approved ITA – *"…the ITA envisages that the Precinct… will have a transport environment that: Avoids excess vehicle dominance (whether for movement or car parking)…".*

[3] New Zealand Government Emissions Reduction Plan 2022, Summary Document – *"… reduce the total kilometres light vehicles travel by 20 per cent by 2035.".*

5 HUD, advised by Stantec, acknowledges that using conservative rates historically generated by Auckland developments – even some apartment developments – would lead to significantly higher traffic (congestion and parking) impacts than described in the TMR.

6 These impacts would likely result in a need to either reduce the proposed development, significantly increase vehicular capacity on surrounding roads, or accept higher levels of congestion. Clearly, none of the three outcomes are desirable. In practice, significant capacity increases for private motor vehicles would also be prohibitively expensive / impractical, and arguably would run contrary to overarching policies such as the ones cited above.

7 However, as set out in the ITA and TMR, the precinct is very well-suited to medium-high density residential development from a transport perspective. It will see significantly reduced traffic impacts overall for Auckland averages – both in terms of trips generated and trip lengths (VKT created) – than the same number of dwellings created in greenfields locations on Auckland's fringe. This is even before acknowledging the reduced mode share for public transport and active modes possible in such further-out greenfield locations.

8 As such, any discussion about trip generation assumptions for the precinct that may be considered as "aspirational" by reviewers should focus not on increasing the trip generation "to be safe".

9 Instead, discussion should focus on what measures (physical, operational or in terms of review conditions) – "carrots and sticks" – are necessary to give authorities confidence that the trip generation rates assumed will eventuate in reality.

10 The applicant team considers that such significant measures are already being proposed, with strict car parking constraints being the most immediate ("stick"), and improvements to non-car modes being the other main change ("carrot").

*Education trip rates*

11 Regarding the specific education trip rate query, we consider that the question seems to mis-identify the (most relevant) rates being applied in the TMR.

12 It is correct that a 10% reduction to historically appropriate tertiary education trip generation rates is proposed for the 2024 Scenario A of the ITA, rising to a reduction of 30% by the 2028 Scenario B.

13 However, the TMR further reduces this - reducing the original 0.11 trips / student during the peak hour to 0.07, a reduction of about 36% in total, or roughly one third reduction (see Section 5.8.2.1 of the ITA and Section 3.6 of the TMR).

14 While this is obviously a significant and aspirational change, this reduction is a combination of many various "carrot and stick" factors on the (driving) behaviour of Unitec's students – not just one factor in isolation. The influences include:

(a) Remote learning: The current tertiary education realignment in New Zealand makes it somewhat more difficult to identify remote learning policy offerings likely to be typical in the future. However, this is now significantly more typical than before Covid and is likely to form a large part of any student's learning experience. This also includes more informal cooperation by students as well, rather than necessarily meeting for group projects at the Unitec site.

(b) 2023 Census data – expected to be available before the plan change hearing – is likely to also assist with a better post-Covid data base regarding remote learning / working levels.

(c) Unitec's Travel Demand Management – the Travel Plan for Mt Albert Campus (2020-2021)[4] sees potential to reduce car traffic by a third (which is the same level as the TMR assumes) and focusses on the development of a carpooling system and encouragement of active commutes. It states:

> *"Over the next few years, as campus retracts back to the core, we will have less space for parking. This is our opportunity to develop a campus that supports healthy, sustainable travel choices."*

(d) Congestion impacts: For example, where students choose to travel earlier or (where feasible) later, or switching to other transport modes such as bus, train & walk, or cycling because increased congestion as identified in the TMR makes driving a less attractive mode in relative terms than it is now. This is especially relevant as projects such as the Carrington Road Upgrade at the same time aim to improve public transport and active modes.

(e) Research into demand peak spreading is discussed in detail in New Zealand Research Report No 241[5] and a number of other studies e.g. [emphasis added]:

> *"As congestion increases in urban road networks, there is a tendency for the distribution of traffic during peak periods to become more uniform, as journeys are **delayed or deliberately re-timed** to avoid the worst parts of the peak periods".*[6]

(f) An example from Christchurch[7], refer below, shows Tram Road on-ramp traffic volumes pre-Western Belfast Bypass (WBB) completion in 2017 and post-completion in 2018. It shows traffic demand profile peaked at around 6:30am earlier in 2017 as people chose to travel earlier to avoid congestion compared to 7:30am peak after the completion of WBB. The difference in travel demand during any specific time peak hour was around 10%-25% upwards / downwards, showing that congestion can directly affect demand.

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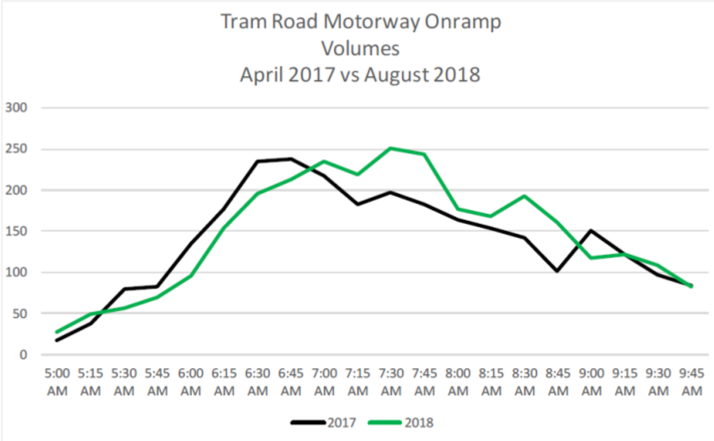
4 https://oneplanet.unitec.ac.nz/wp-content/uploads/2022/02/Travel-Plan-2020-and-2021.pdf.

5 https://www.nzta.govt.nz/assets/resources/research/reports/241/241-Research-into-traffic-peak-spreading.pdf.

6 https://assets.highwaysengland.co.uk/roads/road-projects/a2-bean-ebbsfleet-junction-improvements/Orders/I.8+DMRB+Part+1+Traffic+Appraisal.pdf.

7 Cited in "NZ Modelling User Group (MUGs) Micro Time-of-Day Choice Research Validation of Existing MTC Methods", report by Stantec, V4, August 2021.




(g) Public transport improvements: The assumptions made in the TMR are for vehicle traffic levels in 2031, some eight years from the time of production of the TMR. Despite recent difficulties for public transport patronage in Auckland caused by Covid effects and driver shortages, it is considered realistic to expect that access by public transport to the precinct will significantly improve in the coming eight years from its already very good accessibility levels.

(h) The ITA discusses the expected changes in Section 4, while the TMR also discusses further public transport-related improvements (particularly an extended Carrington Road Upgrade scope) in Section 2.4.

(i) Active mode improvements: Similar to the public transport improvements, safer and more convenient ways to walk, cycle or scooter to the precinct will also assist in reducing the trip generation rates. Making connections to and from the Western Line train stations more accessible also boosts multi-modal trips (walk-train, cycle-train).

(j) The ITA discusses the expected changes in Section 4, while the TMR also discusses further public transport-related improvements (particularly an enlarged Carrington Road Upgrade scope) in Section 2.4.

(k) Unitec charging for car parking – the site survey of existing trip generation at the Unitec site in 2014 was undertaken at a time when car parking in the precinct was both plentiful and fully free.[8] Unitec's parking availability has since shrunk substantially, and Unitec have confirmed to HUD that car parking will in the future be charged. This will make driving to the Unitec campus significantly less attractive.

15 All these assumptions are expected to significantly reduce the historically "suburban" driving patterns among Unitec students as Auckland urbanises further.

16 In regard to "sanity checking" the projected total reduction, it is useful to assess the car mode share percentages of other New Zealand tertiary institutes. While the 45% driving (driver or passenger) mode share rate found for Unitec students in 2018 is unlikely in the foreseeable future to drop to the 4% to 13% driving mode shares achieved at City Centre and City Centre Fringe tertiary education institutes in Auckland[9] an effective "one third reduction" as per the trip rate assumptions only requires this 45% to drop to 30%.

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8 In 2014, there were approximately 2,650 car parks available to students and staff, based on *Report on Car Parking at Unitec Campuses For Commercialisation of Car Parking for Unitec, Silvereye, 2014*.

9 Section 2.4.2 of the ITA and Table 4.3, Auckland Transport Tertiary Student Travel Survey 2018.

*Residential trip rates*

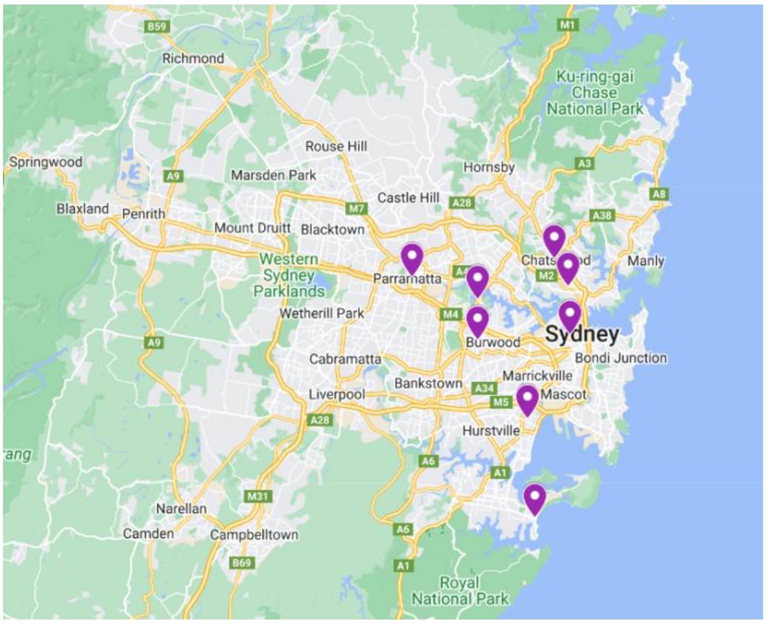
17 Regarding the question on further residential trip generation rate reductions in the North-west, northern and Carrington areas in the ITA, we refer to the discussion in Section 5.8.3.3 of the ITA. While the added increase from 20% to 25% was not explicitly agreed again with Auckland Transport, it is noted that the ITA has since been approved by Auckland Council – this included extensive Auckland Transport feedback to Council. As such, the ITA rates, including these reductions can be considered the agreed baseline, from which further changes in the TMR proceed.

18 In this regard, as set out in the TMR, significant further changes in assumptions have occurred since the ITA. This is in part because some of the rates in the ITA are considered by HUD as rates that were chosen in 2020 "to be safe", rather than to represent rates resulting from more stringent "carrot and stick" measures to reduce private car travel to and from the development.

19 The inclusion of more stringent measures than in the ITA – most substantially, a significant reduction of car parking compared to the ITA assumptions – also results in a need to differentiate more between different trip generation rates for different types of dwellings. This includes differentiating rates by the average level of car parking (if any) the dwellings will provide.

20 This is discussed in detail in Section 3.6.3 of the TMR and broken down by areas before being summarised in Appendix A of the TMR.

21 The TMR in these sections also discusses surveys by Transport for New South Wales (formerly Roads and Maritime Services). Published as far back as 2013, this survey data supports reduced rates as being realistic. The relevant study assessed trip generation rates of urban apartments with good public transport access in Sydney. The areas where surveys took place are shown below:



22 The trip generation study in Sydney covered high density residential areas that comprised mostly 2+ bedrooms. The number of dwellings at the surveyed developments ranged between 28 and 234 dwellings with an average of 100 dwellings per development and the parking ratio per dwelling ranged between 0.64 to 1.60 with an average rate of 1.24 parking spaces per apartment.

23 For the proposed development at Wairaka, out of the 4,000 dwellings, at least 1,000 are intended to provide no car parking at all, while the remaining 2,000 will provide 0.7 or less car parking spaces per apartment on average. Such parking ratio per dwelling is therefore towards the lower rate of the surveyed data in Sydney.

24 In addition to that, as set out in the TMR's relevant section, the rates for the 2031 traffic model remain still higher than the Sydney rates:

> *…represented a halfway average between the 2020 ITA trip generation rates for the 1.5-bedroom and the average surveyed Sydney trip rate per unit (the higher of trip rate per unit, per parking space and per bedroom).*

25 The survey data identifies that while chosen rates are notably lower than applied in Auckland in the past, they are far from unrealistic in comprehensively planned, parking-constrained and well-located developments such as those proposed for the precinct.

**Specific request T3** Please assess options for southern connections to the Precinct (via Laurel Street / Renton Road / Rhodes Avenue), but with access limited to walking and cycling and potential public transport use.

**Reasons for request T3** While any vehicular access via Laurel Street, Renton Road and Rhodes Avenue would require a change to Wairaka Precinct Rule I334.3(26), which currently precludes direct vehicle access to and from the south, an arrangement allowing for access limited to use by sustainable modes of travel could contribute toward strategic aims to achieve modal shift.

The ITA references a previously considered 'back route' bus service following the north-south spine and looping via Carrington Road at both ends of the Precinct, which AT previously did not support due to slow service speeds compared to Carrington Road.

However, a potential variation to this proposal could include a re-routing of such a bus service via a new bus-only link to the south of the Precinct, which would provide buses with the advantage of a shorter-distance route compared to general traffic.

The ITA acknowledges previous consideration towards additional access to the Precinct from the south, and while it confirms that the arterial road network to the southeast of the precinct is currently not forecast to experience significant congestion issues which would warrant new road connections, a bus service serving the main spine road through the Precinct could have wider-spread benefits for trips generated within the Precinct.

**Applicant response**

**Precinct provisions**

1 To clarify in response to the question, neither the existing precinct objectives and rules nor those proposed in the plan change specifically prohibit vehicular connectivity from the southern existing residential roads into the precinct as such; rather, the various objectives, standards and matters of control / matters of discretion that intended to:

(a) discourage direct vehicular access from these southern roads into the tertiary education site and/or any tertiary education parking buildings (e.g. policy 26 referenced in the clause 23 request and non-complying activity A30);

(b) discourage "rat running" through the precinct to avoid Carrington Road congestion; and

(c) retain a residential character for the southern streets.

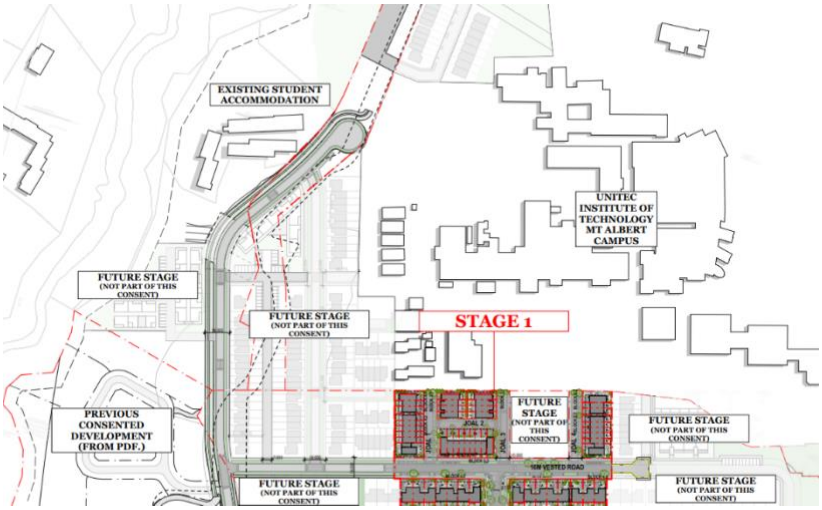
2 Extensions of the existing roads into the precinct provided that a cul-de-sac is maintained will be a permitted activity (A27) and extensions into the precinct as a public road are a restricted discretionary activity (A29), including specifically to provide vehicular connections to the western road within the precinct as sought through the plan change.

3 For the avoidance of doubt, neither the ITA, the ITA traffic modelling, or the updated assumptions in the Te Auaunga Plan Change – Transport Assessment & Traffic Modelling Report (*TMR*) include any vehicular connectivity between the northern and central areas of the precinct (in this regard including the Unitec tertiary education area) and the southern residential zones within the precinct and the southern existing roads. There is a clear "cut" in the traffic model preventing cross-traffic.

4 For completeness, it is also noted that Policies I334.3 (25) and (26) currently do not identify (list) Mark Road, which in the plan change's version of Precinct plan 1 is proposed to also be shown as connected into the precinct. However, for avoidance of doubt, the relevant policies (and the statements made below) are considered by HUD to also cover this fourth southern local street.

**Existing consents**

5 For context, it is noted that the Wairaka Precinct Stage 1 development recently consented under the COVID-19 Recovery (Fast-track Consenting) Act 2020 authorises extensions to Laurel Street and Rhodes Avenue, including separated cycle and pedestrian facilities. Together with the consented Spine Road through the 'backbone' consent (BUN60386270) the existing precinct provisions are therefore now increasingly being translated into actual physical roading details, i.e. development envisages turning heads at the "cut" preventing vehicular cross-connections, as shown below in an excerpt from the Stage 1 application's masterplan.




6 While not directly affecting the plan change (which does not propose specific roading designs, nor proposes to modify the relevant parts of the precinct rules), these plans are a good representation of what the traffic models in the ITA/TMR assume – that the "cut" will include a form of (ideally physical) barrier to vehicle connectivity, while active mode connections across the "cut" remain uninterrupted. It is also understood that there is the possibility that not all internal roads necessary for such a link will be vested as public roads by the development partners.

**Walking and cycling connections**

7 The Wairaka Precinct Stage 1 consent also demonstrates how cycle and pedestrian connections are proposed to be provided in the precinct.

**Bus-only route**

8 Regarding the possibility of a "back route" bus service travelling through the southern residential roads and then connecting onwards along the Spine Road across such a "cut", it is considered that there is nothing within the precinct rules as written that would prohibit this, nor would the changes now proposed as part of the plan change modify any relevant rules. However, there would arguably be a need for any such proposal to show how a "bus only" link would be implemented in such a way to discourage private car use. Signage alone would be considered highly unlikely to be sufficient.

9 Auckland Transport over the last ten years has implemented an ambitious overhaul of its public transport network (the "New Network"), which re-prioritised bus services onto main corridors – to achieve greater frequencies, better reliability, and the ability to implement bus priority more effectively.

10 A "back route" through the precinct would appear to be contrary to the service design objectives and relevant public transport planning policy by Auckland Transport. For example, Auckland Transport says the following on their own website regarding the removal of bus stops/routes from some streets as part of the New Network re-organisation of routes [emphasis added]:

> 25.1 *Some of the factors we consider when removing bus services from a street include low all-day patronage, <u>road layout constraints,</u> [alternative] <u>access to frequent services, and shortening the routes to make them quicker and more direct.</u>*

11 These factors weigh particularly in cases where a back route would run parallel to, and in-between, two nearby Frequent Transport Network corridors whose stops are well accessible from the vast majority of the Precinct (stops on Great North Road and Carrington Road). It would also arguably undermine planned bus priority improvement on Carrington Road as part of the Carrington Road Upgrade.

12 In summary, it is not considered necessary or appropriate to provide specific provision for such a service in the precinct provisions themselves. There is nothing in the plan change that prevents such a "back route" from being implemented in the future, should there be changes to public transport service planning guidance, or changed local conditions that would make such a route more desirable.

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| **Specific request T4** | Please provide an assessment based on the Woodward Road Level Crossing not being removed. |
| **Reasons for request T4** | The Table in Section 4.9 'Summary of Transport Assumptions' assumes completion of the Level Crossing Removal in all modelled scenarios. It is uncertain at this stage what the timing of those works would be (updates from KiwiRail / AT would be beneficial in that respect).<br><br>In the event that this work does not take place by the time of completion of Plan Change development and other transport proposals, an analysis should be provided of the level of operational effects on the adjoining road network.<br><br>Further detail on this proposal would be beneficial for background context and understanding the timing and nature of adverse effects on the adjoining road network. Possible considerations could include development staging to align with the Rail Crossing works being completed and construction works being timed to avoid the construction phase of Carrington Road corridor improvements. |

**Applicant response**

1 The transport reviewer appears to have read Table 4.9's relevant row as "Level crossing removal at Woodward Road".

2 The table's relevant row however states "Level crossing at Woodward Road" (no mention of removal). That is, the ITA (and the TMR) retain the level crossing in their traffic models in all scenarios and apply modelled penalties (to replicate the effect of periods of crossing closure) to car traffic along this route.

3 In earlier discussions (prior to the 2020 ITA model being finalised), it had been considered whether the removal (grade separation) of the Woodward Road level crossing would have been a beneficial change. However, tests found that in terms of the traffic models, removal did not create significant benefits.

4 Therefore, while there may well be advantages from a potential future removal of the crossing, perhaps as part of a future Auckland Transport/KiwiRail level crossing removal programme, the level crossing was retained in all models, and the table row states this.

| | |
|---|---|
| **Specific request T5** | Please provide a schedule of transport improvements and interventions with 'trigger points' in the form of development milestones (e.g. nos. dwellings, completion of other land use activities), at which particular improvements are deemed to be required. Please also include anticipated timescales based on latest information available. |
| **Reasons for request T5** | While Section 4.9 of the ITA lists Transport Assumptions and interventions included in the traffic modelling scenarios, many of these are notably dependent on other parties for funding and delivery, such as the Carrington Road upgrade works to be delivered by AT.<br><br>Following recent discussions with AT, it is understood that the timeline for delivery of the Carrington Road improvements is subject to ongoing uncertainty and may extend beyond the horizons assumed for the traffic modelling scenarios (of 2024 and 2028 for Scenarios A and B respectively).<br><br>Trigger points for individual transport improvements according to levels of development completed may ultimately be seen as more appropriate, to ensure that transport effects will be mitigated in a timely manner.<br><br>It is also appropriate to revisit the traffic modelling scenarios with regard to the assessment years and particular improvements assumed in each scenario, in the event that the full package of Carrington Road improvements cannot be delivered by the respective time horizons. |

**Applicant response**

**Carrington Road upgrade**

1 In December 2022, the Government announced $113 million in funding for the Carrington Road upgrade. That funding, which was provided through the Infrastructure Acceleration Fund, is explicitly tied to the development proposed within the precinct.

2 Auckland Council (and then Auckland Transport (*AT*)) were successful in their application to the government for this standalone, competitive, grant funding round – which was not part of regular ATAP or other funding streams – as they committed to meet criteria that required the Carrington Road upgrade works timeframe to enable the housing development, and included a 2025 physical works start date. These documents can be supplied by AT. While it is appreciated that a project of this scale will always have a measure of delivery uncertainty around it, in terms of design, consenting and construction timeframes, it is not considered accurate by HUD – as one of the parties to the relevant contracts mentioned above – to characterise the status of the upgrade as having "ongoing uncertainty".

**Assumptions and trigger points**

3 The answer to this question can be found in the "assumptions" sections of the ITA (Section 3 for development and Section 4 for transport assumptions) and TMR (Section 2 for development and transport updates to the ITA). This is further summarised in tables in Section 4.9 of the ITA and Section 3.8.3 of the TMR respectively.

4 These sections of the ITA and TMR already provide an essentially "three stage" trigger point process which also identifies the key mitigations required:

(a) Scenario A in the ITA (i.e. to allow up to 1,023 dwellings, limited external road network changes are required beyond the first signalisation of an additional access "gate" – i.e. no Carrington Road Upgrade is required).[10]

(b) Scenario B in the ITA (i.e. to allow up to 2,049 dwellings, the Carrington Road Upgrade needs to be implemented (along the precinct frontage only) including added signalised intersections along the length including Woodward Rd).

(c) The TMR scenario (i.e. to allow up to 4,000 dwellings, the Carrington Road Upgrade needs to implemented along the length of Carrington Road, not just the precinct frontage).

5 While these scenarios each have assumed horizon years (2024, 2028 and 2031 respectively), it is considered that the level of development and assumed mitigation represent the most relevant scenarios in response to the stated query.

6 As such, there is not considered to be any need for or benefit from modelling other time horizons "in case of non-delivery" (or only partial delivery) of the extended Carrington Road Upgrade.

7 If such non-delivery occurred, this would simply mean that development could only occur up to the assumptions of the "lower" scenario that does not yet include the missing upgrade, as new development in the precinct will be assessed for consistency with any existing ITA applying to the proposed development. Alternatively, an applicant for development could undertake new modelling and/or an update of the ITA at that time to assess alternate ways of ensuring appropriate mitigation. (Refer proposed matter of discretion I334.8.1(1A)(f)(i).)

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[10] It is noted for avoidance of doubt that approval of the ITA was contingent on further sensitivity modelling on AT request. This led to an agreement that the first access "gate" may need to be signalised after 600 dwellings (Gate 2 in the ITA assumptions, since proposed to instead be Gate 1 by the local development parties and modified accordingly in the TMR). This approved arrangement essentially creates an agreed **fourth scenario** (lowest-intensity in comparison), for which no signalisation or Precinct-external road upgrades (beyond tie-in adjustments at the "gates") are deemed necessary at all.

8 However, the already-modelled scenarios represent a logically stepped increase in both development levels and mitigation, including assessing at what development levels the basic and extended Carrington Road Upgrades become necessary.

9 Therefore, the request is already considered fulfilled by the application documents.

**'Proposed Plan Change xx (Private) – Te Auaunga'**
***Amending I334 Wairaka Precinct***

**Applicant:** Te Tūāpapa Kura Kāinga – Ministry of Housing and Urban Development
**Address:** 1-139 Carrington Road, Mt Albert
**Proposed activities:** PPC – Partial Rezoning and Revised (currently Wairaka) Precinct Provisions

| | |
|---|---|
| **Specific request** | Please update the proposed Precinct Plan to show a shared path connection in the northern part of the precinct, to replace the linkage lost through proposed PC75. |
| **Reasons for request** | It is understood that consideration has been given to an alternative shared path route. This should be illustrated on the Precinct Plan for consideration. Note that the intention to replace this path was referred to in the 11 May 2021 MHUD letter (see also OS6). |
| **Applicant response provided by** | John Duthie, Tattico |

**Applicant response**

1 The Precinct plan map update provided with the clause 23 response package and reproduced for ease of reference below shows the proposed walking and cycling path connection in the northern part of the precinct. The new path section is proposed to run from approximately where the Northwestern Shared Path's boardwalk section finishes, travelling between Building 1 and the open space to connect to Carrington Road in the vicinity of the current path crossing south of Sutherland Road. The purpose of the new path section is to provide connectivity for future residents in the centre and north of the precinct.

2 Although we understand some alternatives have also been investigated by Council/ Auckland Transport (*AT*), the advantages of placing the path in this location are considered to be:

(a) there is sufficient space in this location to fully separate pedestrians and cyclists, avoiding the user conflicts that sometimes arise with shared paths;

(b) it separates cycling traffic heading further west (or east) from cyclists heading north/south, who are likely to continue along the separate cycleway within the precinct (also shown on the Precinct plan), which creates additional capacity for cycling;

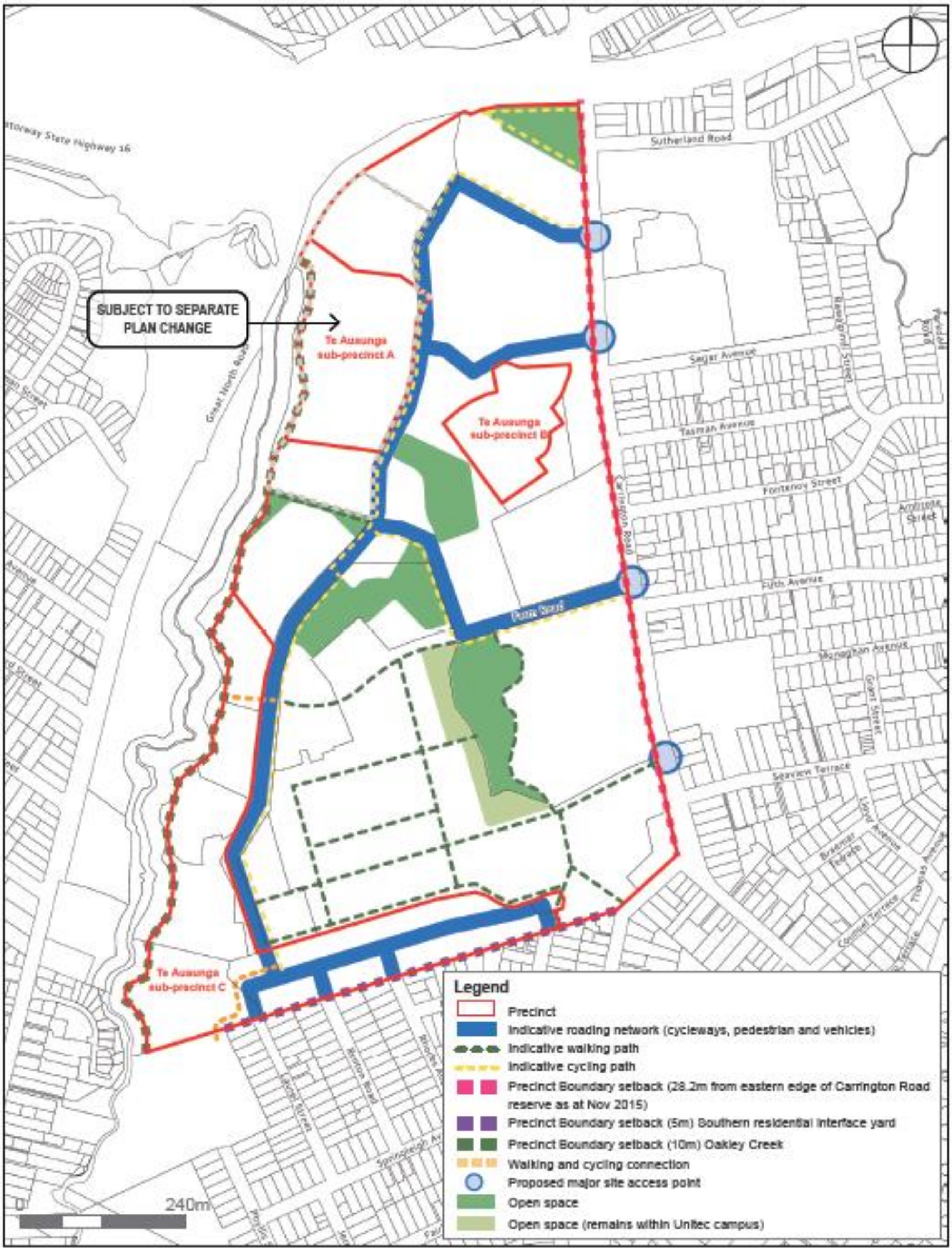
(c) it assists with Crime Prevention Through Environmental Design and open space activation, through generating additional foot and cycling traffic adjacent to public open space; and

(d) it improves connectivity / directness from the west towards the expected location of the long-term signalised crossing of the path over a wider Carrington Road.

3 HUD has had a number of discussions with AT over this alignment. The final alignment shown on the plan below and included in the updated set of Precinct plan maps provided for the clause 23 UD8 response, has been agreed with AT as being appropriate to provide a local connection for future residents of the precinct.

## I334.10. Precinct plans

### I334.10.1 Te Auaunga: Precinct Plan 1



**‘Proposed Plan Change xx (Private) – Te Auaunga’**
***Amending I334 Wairaka Precinct***
**Applicant:** Te Tūāpapa Kura Kāinga - Ministry of Housing and Urban Development
**Address:** 1-139 Carrington Road, Mt Albert
**Proposed activities:** PPC – Partial Rezoning and Revised (currently Wairaka) Precinct Provisions

| | |
|---|---|
| **Question** | T(F)1 |
| **Specific request** | T(F)1 Subject to ongoing discussion and agreement with Auckland Transport (AT), please provide up to date traffic modelling assessment of the effects of the plan change on the adjoining road network, based on the latest information available in relation to road and intersection layouts associated with the Carrington Road Upgrade, and any other appropriate updates. Please also confirm the key assumptions adopted in agreement with AT in relation to trip generation, modal share, any discounts applied to through traffic on Carrington Road, etc. |
| **Reasons for request** | It is understood that the scope and details for the Carrington Road upgrade project, as assumed in traffic modelling undertaken to date, are still to be confirmed with AT. Areas of uncertainty include issues which appear to be significant in nature with regards to potential traffic effects, e.g. widening of bridging points over SH16 Motorway and railway over-bridge, use of priority lanes for bus priority versus ‘T2’, future intersection forms. |
| **Applicant response provided by** | Max Robitzsch, Stantec |

**Applicant response**

1 The HUD applicant team and the Auckland Transport Team are regularly engaging with each other to ensure that important assumptions are aligned, and the eventual design of the Carrington Road Upgrade will fulfil the requirements of the plan change and the transport network overall.

2 However, the Carrington Road Upgrade design is not finalised, as Auckland Transport is still proceeding through a business case process (and associated design process). There are a variety of factors that are either changing currently or may potentially change further as the design process concludes.

3 In particular, Auckland Transport is currently working through testing further assumptions related to peak hour trip generation and through-traffic discount impacts. However, some aspects of this latest AT model are still incomplete, and thus their outputs are currently not useful for comparison – as agreed by both the HUD team and Auckland Transport’s consultants working on the business case model.

4 Such an iterative process is not unusual, particularly where designs are being progressed further by Auckland Transport during the plan change process (rather than after) – as is necessary in this case to meet the tight timeframes for a proposed 2025 construction start. Any significant infrastructure project like the Carrington Road Upgrade will see some level of assumption set or design modifications once work is undertaken at this level.

5 Further changes are likely to be introduced through the plan change processes post-notification – it is perfectly normal that traffic models change or are assessed further through this process.

6 As such, there is no "agreed" or "finalised" modelling / assumption set currently available. However, a memorandum is attached to this response as Attachment 7.2 assessing the key differences in assumptions, layouts and outcomes between the plan change model (as provided by the applicant and discussed in the December 2022 TAR) and the most recent Auckland Transport model provided in July 2023.

7 To briefly summarise, the comparison report agrees that input assumptions are comparable, that there are some differences in design (road) layout and model coding, and that outcomes are also roughly comparable – with a significant exception, being PM peak performance at the southeastern end of the model (i.e. the Mt Albert town centre). In this area, the current Auckland Transport modelling predicts poorer performance than the applicant's model.

8 The difference, in the opinion of the applicant team, derives from a number of factors, the most important one being that the applicant's model has assumed a new rail overbridge west of the New North Road, with a total of five traffic lanes, whereas the Auckland Transport model currently retains the existing arrangement for this section with three lanes.

9 It is understood that the AT team does not consider the upgrade scope will include a new rail overbridge. However, the applicant team considers that there are likely to be less-costly opportunities to increase vehicular and public transport capacity on the Carrington Road approach to this intersection, for example by moving active modes onto clip-on bridges or separate structures, allowing the existing overbridge to be reverted back to the pre-2019 layout, with four traffic lanes, providing more capacity and/or more flexible signal arrangements than assumed in the current AT model.

10 Additionally, it is considered by the applicant team that the current arrangements for New North Road / Carrington Road / Mt Albert Road signal phasing assumed in the reviewed AT model's signal can and should be optimised further, in particular to prioritise southbound New North Road traffic more over the (very small) northbound right turn flow from New North Road into Mt Albert Road.

11 In terms of bus lanes versus transit lanes, the differing assumptions do lead to somewhat differing outcomes for bus services in both models. As communicated before, the applicant team prefers the use of bus lanes. This would be with an emphasis on considering bus priority on the wider network approaching the model area to overcome the issues that have led to the transit lanes being investigated, rather than adding more car capacity by creating lanes able to be used by private car drivers.

12 However, these differences are not considered problematic at a fundamental level for the plan change, as this is essentially an operational matter (i.e. the bus lane / transit lane operation is easily able to be changed with markings and signage, and could therefore be phased in), so this is not considered a matter that needs to be resolved now. In fact it is something that Auckland Transport can also modify post-implementation if required.

13 It is therefore considered that the above matters can be resolved through further work by the AT team, with coordination with the applicant team, during or subsequent to the plan change process. There is therefore considered no necessity for such model differences to preclude notification, considering the overall outcomes between the two models are not seen as having insurmountable differences, and work is ongoing to align them where necessary.

14 The reference above to the traffic model analysis is set out in Attachment 7.2.

**‘Proposed Plan Change xx (Private) – Te Auaunga’**
***Amending I334 Wairaka Precinct***
**Applicant:** Te Tūāpapa Kura Kāinga - Ministry of Housing and Urban Development
**Address:** 1-139 Carrington Road, Mt Albert
**Proposed activities:** PPC – Partial Rezoning and Revised (currently Wairaka) Precinct Provisions

| | |
|---|---|
| **Question** | T(F)2 |
| **Specific request** | T(F)2 Please undertake an assessment of parking effects on nearby residential streets resulting from development enabled by the plan change, in the event that parking controls indicated in the ITA, including Residential Parking Schemes, are not progressed by AT. |
| **Reasons for request** | It is understood that AT have yet to agree in principle to the parking controls proposed in the ITA, including residential parking schemes in the surrounding streets, aimed at mitigating against parking and traffic related impacts which are otherwise expected to occur as a result of the Plan Change. |
| **Applicant response provided by** | Max Robitzsch, Stantec |

**Applicant response**

1 The query requests an assessment of parking effects on nearby residential streets – i.e. a prediction of potential “parking overspill”, in the event that parking controls including Residential Parking Schemes are not implemented. The applicant team considers that such an assessment would provide limited benefit to the assessment of the plan change application, given that:

- The applicant has accepted and acknowledged that the risk of parking overspill is real and substantial – independent of the exact level of impacts – and consider that Residential Parking Schemes are both necessary and appropriate to prevent these impacts.[11]

- It is very difficult to implement a project with the ambition to achieve a lower car dependency than relied upon by its surrounding neighbourhood without implementing measures such as Residential Parking Schemes to manage “parking overspill”. This is because – as discussed further below – behaviour change will require both incentives and disincentives. The alternative is that new projects like this one will gravitate toward the status quo in terms of car dependency, which is a poor outcome when considered against a range of strategic objectives held by Auckland Transport and Auckland Council.

[11] Sections 2.3.5, Section 3.6.3 and 3.8.3 of the Te Auaunga Plan Change – Transport Assessment & Traffic Modelling Report, referenced as the “TMR” (Stantec, December 2022).

2 As such, it is considered that Auckland Transport should use the abilities ("tools in the toolbox") they have been given by Auckland Council to appropriately respond to intensification and work in concert with the applicant to enable the realisation of the wider outcomes being sought for both the plan change area and the wider transport network.

3 Further, an assessment of parking effects on nearby residential streets would also be limited in practical application, as it would need to combine a wide variety of (not yet agreed) assumptions:

- Any quantified assessment would need to use data from historical Auckland developments – which are far more highly car-centric than the proposed development is intended to be. In addition, any use of quantified assumptions for a less car-centric development, such as from overseas developments, could be considered speculative in the Auckland context, and would solely invite discussions between experts as to whether assumptions are "conservative enough".

- Any assessment would struggle to find exactly comparable conditions in literature or surveys, with both similar rates of (on-site) parking being provided and being in similar transport environments and similar locations in the wider urban environment (distance from workplaces etc).

- Any such assessment would, by necessity, need to make assumptions about future factors that are out of control of the applicant. These would include how AT's public transport network performs 5-10 years into the future, how much intensification unrelated to the applicant development areas will occur in the potential overspill areas, and what fuel / electricity prices or taxes are applied to cars in the future.

- Again, any "optimistic" assessments of these crucial factors could easily be challenged as speculative, leading to assessments that lean heavily towards a conservative historical "predict and provide (extra car parking)" approach - treating high car parking demand as, essentially, a fact of life to be accommodated.

4 It is important to note that the above does not mean that the applicant team considers parking overspill as an unlikely or irrelevant risk. The applicant's team however considers that a study trying to assess the <u>specific intensity and extent</u> of the impact provides little practical benefit to the assessment of the plan change, because it risks being no more than a speculative "<u>worst-case estimate"– of an impact that all parties are seeking to avoid</u>.

5 Additionally, the applicant has acknowledged that controlling (limiting) car parking opportunities for new residents of the precinct / plan change area is crucial not just to reducing the impacts of <u>parked</u> cars, but also the impacts of <u>moving</u> cars (trip generation). In short, providing residents access to extra parking above the limited ratios proposed in the application (within or without the precinct / plan change area) will inevitably lead to significantly more car trips and thus more congestion than predicted. [12]

[12] Clause 23 responses, TF2, Trip Generation, particularly paragraphs 3, 9 and 10 – Stantec

6 With these statements made, the applicant considers that a more appropriate approach in terms of planning for a well-functioning urban environment should focus on preventing parking overspill – instead of discussing what the potential levels of such an impact (without restrictions) would be, and whether, for example, the likely impacts by year X might reach Street Y, or only as far as Street Z.

7 As set out in the TMR and in the original Integrated Transport Assessment (ITA)[13], the plan change area / precinct is very well set up to enable high levels of public transport and active mode use, with projects such as the Carrington Road Upgrade further improving these modes.

8 However, all other things being equal, many new residents may still lean towards an historic Auckland "default" of higher car ownership and usage – because in key ways, car use currently remains easier than other options. Without the "stick" of constraining the ability of new residents to park their cars (above the 0.7 or fewer spaces per dwelling average assumed), the "carrots" of high-quality alternatives available are unlikely to be sufficient alone to generate the mode shift necessary to achieve both the applicant, and Auckland Council's objectives.

9 The TMR acknowledged[14] that the plan change process itself cannot require the implementation of Residential Parking Schemes, as these depend on separate processes (including consultation) by Auckland Transport. However, this does not mean that the tool itself is problematic, or that Auckland Transport does not have the ability to implement such schemes if they consider them an appropriate tool.

10 Residential Parking Schemes have been implemented successfully in various areas of Auckland, particularly in the inner isthmus around the city centre, where they are effective at controlling external parking demand into these areas. It is acknowledged that this is mainly discouraging the "work end" of commuter car trips, whereas in the proposed environment, they are intended to deter residential parking (and higher levels of ownership of cars by new residents);– i.e. they would function at the "home end" of the typical trip (although they may also act to incentivise public transport use for other existing users of surrounding on-street parking by those visiting the precinct to work or study).

11 In practice, the implementation and administration of such schemes would therefore not need to be any different than for existing schemes, meaning Auckland Transport can choose to respond to (or ideally, get ahead of) parking overspill occurring by implementing an existing process.

12 We are also aware that concerns have been raised, including by Auckland Transport, about the ongoing costs of Residential Parking Schemes (both for Auckland Transport, and in fees for residents). In terms of annual permit fees for existing residents, many will have off-street car parks and may not need permits. For others, the typical fees are considered to represent a non-trivial but still quite limited fee for, essentially, a year-long priority use right to a public resource.

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[13] ITA document, Stantec, June 2020, approved by Auckland Council March 2021.

[14] Section 2.3.5 of the TMR

13 For Auckland Transport, they have not provided the costs of administering such a scheme (technically, extending the administration of existing schemes to new areas). However, it is considered likely that the costs of doing so would pale compared to the costs of providing fewer dwellings or providing those dwellings further out of the isthmus, and the related costs of more cars being driving – and being driving for longer distances – on Auckland's already congested networks.

14 Costs and disbenefits from such extra traffic are manifold for Auckland overall and Auckland Transport in particular, ranging from to impacts on health, climate change and traffic injuries to more direct costs for maintenance of roads, construction costs for the widening roads and enlarging of intersections (cumulative across Auckland, not just in the plan change area).

15 In summary, providing a quantified assessment of the impacts of not implementing parking constraints would, by necessity, be highly speculative, and tend towards assuming very negative outcomes in an attempt to "ground" itself via limited and historically car-centric data.

16 Auckland Council, via Auckland Transport, has the legal ability to control who is allowed to park in a public street, and can thus control / prevent the discussed impacts. Other tools of similar effectiveness are not known, and historical responses such as providing more parking on-site will in fact undermine key policy outcomes and lead to further traffic impacts. Residential Parking Schemes are a proven tool to help achieve the precinct / plan change aims of housing intensification, and related policies of achieving transport mode change, without excessive disruption.

## Document Control

**Client Name:** Ministry of Housing and Urban Development

**Project Name:** Wairaka Precinct Plan Change

**Project Number:** P02916

**Document:** Ecological Impact Assessment

## Revision History

| Status | Date Issued | Author | Reviewed By | Released By |
|---|---|---|---|---|
| Draft – Client Issue | 12/11/2021 | Jason Smith | Mark Lowe | Dean Watts |
| Final | 22/06/2022 | Jason Smith | Mark Lowe | Dean Watts |
| Revisions 2 | 10/11/2022 | Jason Smith | Mark Lowe | Dean Watts |

## Reviewed by:

**Reviewer:** Mark Lowe **Signature:**

## Released by:

**Reviewer:** Dean Watts **Signature:**

# Executive Summary

Morphum Environmental Limited (Morphum) has been engaged by the Ministry of Housing and Urban Development (HUD) to prepare an Ecological Impact Assessment to support its application for a Private Plan Change. The Te Auaunga Private Plan Change seeks to amend the provisions of the Wairaka Precinct of the Auckland Unitary Plan: Operative in Part (AUP:OP) to better provide for the comprehensive redevelopment of the land. Land within the precinct has been acquired by HUD for housing purposes. HUD intends to redevelop the land in a manner more aligned with Business – Mixed Use purposes, than what the existing Special Purpose – Tertiary Education provisions, and the existing Business – Mixed Use provisions would currently support.

The purpose of the precinct, as currently described in the AUP:OP and retained through this plan change, is to provide for a diverse urban community. The precinct is located on the border of the primarily residential suburbs of Mt Albert and Waterview. The precinct includes the Unitec Campus, comprising buildings and educational facilities, a Marae, and areas of greenspace and landscaping including the Sanctuary Mahi Whenua. Oakley Creek (Te Auaunga) borders the precinct on the western boundary. Te Auaunga's riparian margin includes mature areas of mixed native and exotic vegetation that have been scheduled in the AUP:OP as a Significant Ecological Area (SEA_T_6008).

The Wairaka Stream originates in front of the Marae from an underground spring originating from the Mt Albert basalt aquifer and has a rich cultural significance to local Māori. Base flows are further supplemented by stormwater runoff from the site and surrounding Mt Albert catchment. The Wairaka Stream flows north through the precinct and is partially piped and culverted before it meets the confluence with Te Auaunga. Te Auaunga ultimately discharges to the upper reaches of the Waitematā Harbour south of SH16 at the Great North Road interchange.

The AUP:OP identifies the presence of notable trees throughout the site. In addition to any notable tree, the precinct identifies trees that must not be altered, removed or have works undertaken within the dripline in Table I334.6.7.1 (except as set out in I334.6.7(2)). Identified Trees are located in two main clusters, one along the north western boundary of the site includes 14 trees, and one in the center, in the vicinity of the Arts and Architecture School building, includes 15 trees. Vegetation on the site potentially offers roosting and nesting habitat for native and exotic birds, as well as potential habitat for other terrestrial fauna including lizards and bats - both of which have been recorded nearby.

It is unlikely that the change in zoning would significantly increase the level of light, noise or traffic movements within the precinct above the existing environment. The change in zoning does not increase the amount of these activities enabled by the current precinct provisions. With regards to ecological values, the additional building height is also considered unlikely to be noticeable, above the existing effects already anticipated by the current operative precinct provisions.

A Stormwater Management Plan (SMP) has been prepared and has been incorporated into Auckland Council's Network Discharge Consent. The SMP provisions are an improvement, given the previous lack of any on provisions in this regard.

The plan change retains the landscaping provisions of the underlying zones. Whilst primarily for the benefit of visual amenity of the precinct, landscaping also provides for the opportunity increase native vegetation cover and associated ecosystem services.

The revised provisions of the Te Auaunga Precinct in relation to open space is considered to be a negligible effect on ecological value. The centralised open space was always to be managed as a stormwater management area and maintained for as mown grass for this purpose. Any changes that may result from the amendments to the location of open space within the precinct are unlikely to result in any significant changes in this regard.

No amendments are proposed to the regional or district provisions of the Auckland Unitary Plan: Operative in Part that apply to activities, such as land disturbance and potentially vegetation clearance, that could potentially be undertaken in the future for the redevelopment of the site. Similarly, no changes are proposed which would affect the Auckland-wide provisions which relate to activities to streams, such as the standards which relate to the removal of existing structures, or the diversion of streams, and associated disturbance and discharges.

The changes proposed, being principally the change from one urban zone to another, do not significantly change the type of activities that can occur, or the level of physical development that is provided for as they relate to ecological considerations. Consequently, it is considered that the plan change results in a barely distinguishable or very slight change from effects enabled by the existing provisions. Where changes have been proposed, such as through the adopted SMP and the associated reduction in stormwater runoff, in conjunction with the treatment requirements, the ecological effects are likely to be positive.

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# Figures



# Tables

# 1. Introduction

## 1.1. Scope

Morphum Environmental Limited (Morphum) has been engaged by the Ministry of Housing and Urban Development (HUD) to prepare an Ecological Impact Assessment (EcIA) to support its application for a Private Plan Change. The Te Auaunga Private Plan Change seeks to amend the provisions of the Wairaka Precinct of the Auckland Unitary Plan: Operative in Part (AUP:OP) to better provide for the comprehensive redevelopment of the land. Land within the precinct has been acquired by HUD for housing purposes. HUD intends to redevelop the land in a manner more aligned with Business – Mixed Use purposes, than what the existing Special Purpose – Tertiary Education provisions, and the existing Business – Mixed Use provisions would currently support.

An EcIA is required to provide a description of the precinct, the surrounding area and the current ecological values, as well as a description and evaluation of the plan change request and associated potential effects as they relate to ecological matters.

## 1.2. Site Overview

The precinct is located on the border of the primarily residential suburbs of Mt Albert and Waterview. The precinct includes the Unitec Campus, comprising buildings and educational facilities, a Marae, and areas of greenspace and landscaping including the Sanctuary Mahi Whenua. The North-Western motorway and the Waterview connection is located along the northern and north-western boundaries of the precinct.

Oakley Creek (Te Auaunga) borders the precinct on the western boundary. Te Auaunga's riparian margin includes mature areas of mixed native and exotic vegetation that have been scheduled in the AUP:OP as a Significant Ecological Area (SEA_T_6008). Beyond Te Auaunga the residential suburb of Waterview extends to the coastal marine area forming the upper reaches of the Waitematā Harbour. Traherne Island and the Motu Manawa (Pollen Island) Marine Reserve, which feature a complex matrix of coastal ecotypes including shell banks, saltmarshes and mangroves, lie further offshore.

The Wairaka Stream originates in front of the Marae from an underground spring originating from the Mt Albert basalt aquifer and has a rich cultural significance to local Māori. Base flows are further supplemented by stormwater runoff from the site and surrounding Mt Albert catchment. The Wairaka Stream flows north through the precinct and is partially piped and culverted before it meets the confluence with Te Auaunga. Te Auaunga ultimately discharges to the upper reaches of the Waitematā Harbour south of SH16 at the Great North Rd interchange.

An overview of the Te Auaunga Precinct with ecological features of note are shown on the Map in Appendix 1.

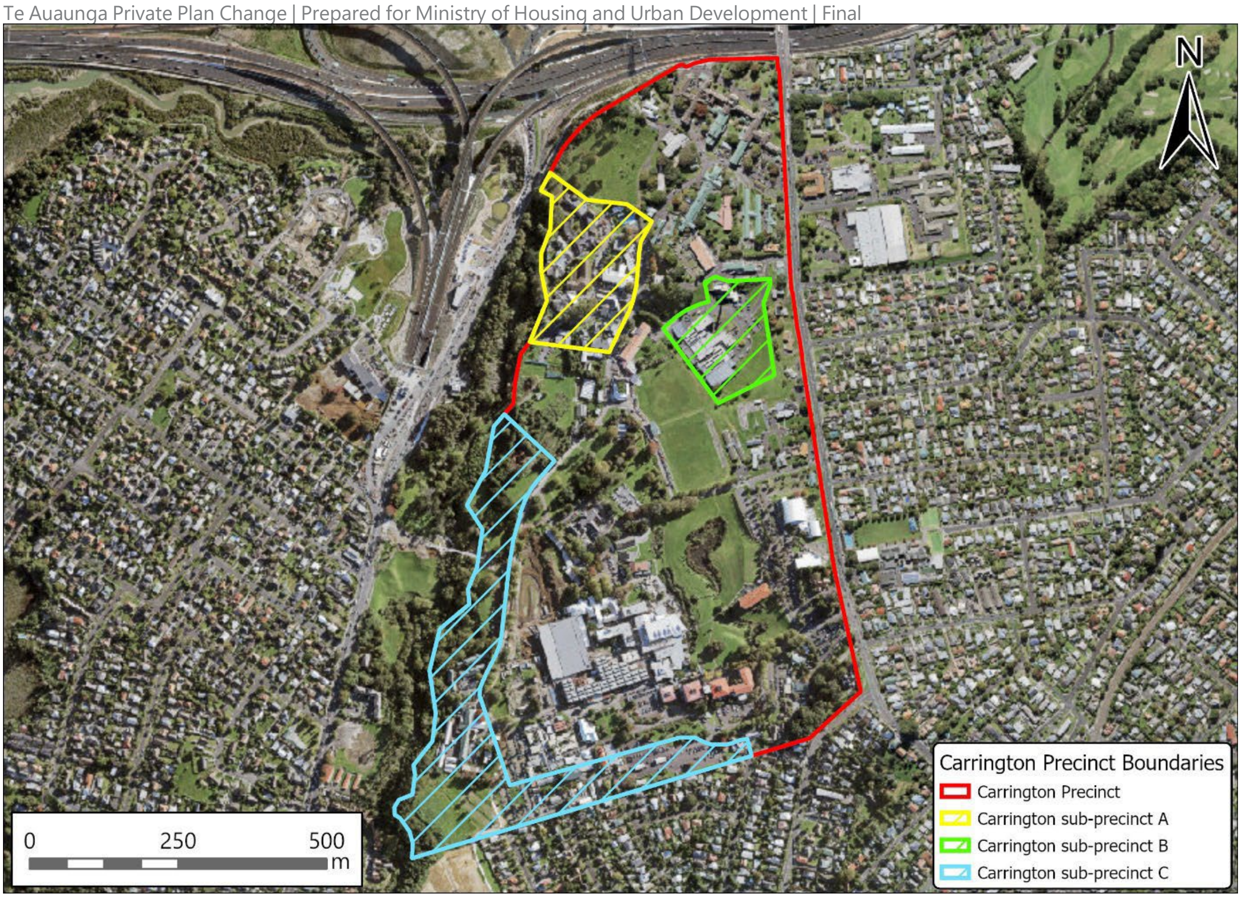


Figure 1: Wairaka Precinct (current)

## 1.3. Wairaka Precinct

The Wairaka Precinct is proposed to be renamed as Te Auaunga Precinct.

The purpose of the precinct, as currently described in the AUP:OP and retained through this plan change, is to provide for a diverse urban community. The existing precinct provisions recognise particular attributes which contribute to the amenity of the precinct and the surrounding area and these are required to be retained through the development of the precinct. These include the following:

- The significant ecological area of Te Auaunga.
- An open space network linking areas within the precinct.
- A network of pedestrian and cycleway linkages that integrate with the area network.
- The Wairaka Stream and the landscape amenity this affords.
- The Historic Heritage overlay of the former Hospital and identified trees on site.

In addition, Objective I334.2(10) (b) seeks to create an integrated urban environment which recognises, protects and enhances the environmental attributes of the Wairaka Precinct in its planning and development. The general policies of the precinct provide for subdivision and development that is compatible with and sensitive to the ecological qualities of Te Auaunga and the Motu Manawa Marine Reserve.

The precinct provisions also note that a comprehensive stormwater management plan should be prepared to accompany an application for subdivision or development within the precinct.

A significant proportion of the land to which this plan change relates is largely related to educational uses. Making a plan change necessary to enable a more diverse range of urban uses.

# 2. Current Ecological Values

A site visit was undertaken on 17 March 2021. The site visit was undertaken by a suitably qualified and experienced environmental scientist and involved detailed site characterisation and mapping of ecological features. During these surveys all vegetation types and ecological features of note were surveyed, described and any fauna observations were also recorded. Ecological features of note are shown on the Map in Appendix 1.

## 2.1. Ecological Context

The Te Auaunga Precinct is within the Tamaki Ecological District. 6.9% of the Tamaki Ecological District remains in indigenous vegetation. This vegetation has been highly modified from early Polynesian occupation through to more recent urban development (Lindsay *et al*., 2009).

The current extent of ecosystems located along the Te Auaunga includes treeland, exotic forest, exotic scrub, broadleaf species scrub/forest, and planted vegetation (Singers *et al*. 2017). Vegetation across the site and surrounding area is predicted to have originally comprised of pūriri (*Vitex Lucens*) and totara (*Podocarpus totara*) forest across alluvial terraces, with the inclusion of Taraire (*Beilschmiedia tarairi*) on flat to rolling land, and kahikatea (*Dacrycarpus dacrydioides*) across narrow river valleys and wide flood plains (Singers, *et al*. 2017).

## 2.2. Catchment and Receiving Environment

The Oakley stormwater catchment is approximately 1,265 ha of primarily residential land. The catchment has significant (more than 25%) impervious surface. The Landcare Research (2020) Land Cover Database version 5.0 describes the land cover as predominantly Built-Up area, intermixed with small fragments of Indigenous Forest and Urban Parkland/Open Space. Built up areas are considered as commercial, industrial or residential buildings, including associated infrastructure and amenities; having less than 10% indigenous cover and "very little native biodiversity remains in these environments."

Te Auaunga feeds into the Oakley Creek estuary, within a Category 1 Marine SEA (SEA-M1-53) in the Waitematā Harbour. Approximately 420 m offshore, a significant wading bird habitat area designated within this SEA (SEA_M1_53W1-2) provides important roosting, nesting and feeding grounds for shore birds and waders. Traherne Island and the Motu Manawa (Pollen Island) Marine Reserve, lie further offshore.

## 2.3. Site Description

The Te Auaunga Precinct is located on a relatively steep (over 30 degrees), western facing slope. The land slopes down from Carrington Road, towards Te Auaunga.

Land use and vegetation coverage within the site is diverse. A substantial portion of the site is given over to existing buildings currently occupied by the Mason Clinic, Unitec and Taylors Laundry, as well as the associated carparking facilities. The site also features areas of open space, some of which is used for a range of activities including community gardens and landscaping. The SEA on the western boundary partially extends into the western boundary of the precinct. There are no other SEAs within the precinct.

The spring-fed Wairaka Stream arises near the center of the site and flows through on a roughly north-western alignment before discharging through to Te Auaunga. There are artificially constructed stormwater ponds in the precinct's west, behind Unitec's Trades Building and in the central green space referred to as the central wetland. There are no other watercourses onsite.

## 2.4. Terrestrial Values

### 2.4.1. Existing Vegetation

The main vegetation types present within the precinct are identified in Table 1, Figure 2 provides representative photographs of each of these community types.

The AUP:OP identifies the presence of notable trees throughout the site. In addition to any notable tree, the precinct identifies trees that must not be altered, removed or have works undertaken within the dripline in Table (except as set out in I334.6.7(2)). Identified Trees are located in two main clusters, one along the northwestern boundary of the site includes 14 trees, and one in the center, in the vicinity of the Arts and Architecture School building, includes 15 trees.

Vegetation on the site potentially offers roosting and nesting habitat for native and exotic birds, as well as potential habitat for other terrestrial fauna including lizards and bats, both which have been recorded nearby. Table 1, below provides an assessment of the vegetation communities ecological values utilising the assessment matters from the Environment Institute of Australia and New Zealand (EIANZ) 2018 Ecological Impact Assessment Guidelines, as outlined in Appendix 1.

**Table 1: Main Vegetation Community Types**

| Vegetation Type | Description |
|---|---|
| Mown grass | Areas of mown grass includes the open space around the central wetland, including the playing field to the north, as well as, areas to the west around the Sanctuary Gardens and Women's Suffrage Gardens. |
| Rank Grass | Interspersed throughout the precinct, grassed areas that would appear to no longer be subject to active management. The largest area of this vegetation type is located immediately north of the Mason Clinic. |
| Exotic riparian vegetation | Low-lying exotic riparian vegetation, including nasturtium (*Tropaeolum majus*), privet (*Ligustrum* spp.), red hot poker (*Kniphofia*) and brush wattle (*Paraserianthes lophantha*) is present along the Wairaka Stream, particularly below the central wetland. |
| Native riparian vegetation | An established section of regenerating native riparian vegetation is located around the Wairaka Stream, from the headwaters through the open space area down to a culvert beneath the western internal road, and then again approximately 80 m from the end of the box culvert into the Mason Clinic Site. |
| Mature mixed canopy | Groves of mature native and exotic species can be found interspaced throughout the precinct, Notably in the South-eastern corner. Native species include pohutakawa (*Metrosideros excelsa*) and kahikatea with a regenerating understory of native karo (*Pittosporum crassifolium*) and karamu (*Coprosma robusta*). |
| Notable and Identified Trees | Six notable trees and 47 identified trees are spread across the precinct. These are located in two main clusters, one along the northwestern boundary that includes 14 trees, and one in the centre of the site in the vicinity of the Unitec corporate office that includes 15 trees. Individual trees and smaller groupings are located throughout the precinct. |

**Mown Grass**

**Rank Grass**

**Native Riparian Vegetation**

**Exotic Riparian Vegetation**

**Mature Mixed Canopy**

**Notable and Identified Trees**

Figure 2: Indicative Site Photographs

Table 2: Assessment of Current Terrestrial Values

| Assessment Matter | Ecological Value (EIANZ, 2018) | Reasoning |
|---|---|---|
| Representativeness | **Low** | The vegetation communities within the precinct are not typical or characteristic of the structure and composition that would naturally be found at this location. The site has been heavily modified by past vegetation clearance, as can be seen when the vegetation within the precinct is compared to the riparian vegetation around Te Auaunga. Limited ecological value other than as for habitat for tolerant native species. Notwithstanding that individual trees (mainly exotics) are of arboriculture merit as demonstrated by the existing protection. |
| Rarity/distinctiveness | **Low** | The vegetation communities within the precinct are not considered to be rare in terms of scarcity of species, communities, habitats or ecosystem types and reflect similar landscapes in urban catchments. Species, habitats, or ecological features present are not considered to be prone or at risk of local or national loss or extinction. |
| Diversity and pattern | **Low** | The vegetation communities within the precinct are not considered to represent a natural diversity of species or habitat types. |
| Ecological context | **Moderate** | The vegetation communities within the precinct are considered to potentially provide foraging, nesting habitat functions, mainly for tolerant species but the presence or use of the site by At-Risk indigenous species cannot be categorically ruled out. Value reduced due to the proximity of higher quality habitat around Te Auaunga. |

### 2.4.2. Avifauna

The paucity of native or exotic vegetation is reflected in the species of birds recorded from within precinct, which are a typical assemblage of species that can inhabit or make use of landscaping vegetation in an urban setting. Incidental birdlife noted during the site visits were limited to common garden species, refer to Table 3 below. No 'Threatened' or 'At Risk' species were recorded within the precinct.

Previous five minute bird surveys undertaken within the Te Auaunga corridor have identified 17 species of birds dominated by common introduced and native birds with no Threatened or At Risk species (Boffa Miskell Ltd, 2014). It is likely that these common species may be found throughout the precinct.

Table 3: Bird Species Observed

| Common name | Scientific name | Threat Status (Robertson *et al.* 2017) |
|---|---|---|
| Australian Magpie | *Gymnorhina tibicen* | Introduced and naturalised |
| Common Myna | *Acridotheres tristis* | Introduced and naturalised |
| Eurasian Blackbird | *Turdus merula* | Introduced and naturalised |
| House Sparrow | *Paser domesticus* | Introduced and naturalised |
| New Zealand Kingfisher | *Todiramphus sanctus vagans* | Not Threatened |
| North Island Fantail | *Rhipidura fulginosa placabilis* | Not Threatened |
| Pukeko | *Porphyrio melanotus melanotus* | Not Threatened |
| Skylark | *Alauda arvensis* | Introduced and naturalised |
| Song Thrush | *Turdus philomelos* | Introduced and naturalised |

| | | |
|---|---|---|
| Spur Wing Plover | *Vanellus miles* | Not Threatened |
| Welcome Swallow | *Hirundo neoxena neoxena* | Not Threatened |

### 2.4.3. Herpetofauna

Given the project scope, a detailed search for native herpetofauna was not undertaken. Suitable lizard habitat was limited to isolated areas of rank grassland, riparian vegetation (both native and exotic) and the area of Mixed Mature Canopy environments.

Details of native lizard species reported to be present elsewhere in the Tamaki Ecological District are listed in Table 4. Previous lizard surveys undertaken along the Oakley Creek walkway in association with the Waterview walking and cycling facility and Waterview Connection have identified populations of copper skinks and it is considered likely that these lizards may be found on site. Copper skink have recently (2021) been assigned a threat status of 'At Risk – Declining' by the Department of Conservation under the qualifier C(1). C(1) denotes a current large population, with ongoing or predicated decline (Hitchmough *et al.* 2021).

Geckos are unlikely to have persisted within the precinct due to the site's history of habitat modification and the lack of any substantial native vegetation which makes it unlikely that native geckos would recolonise the site naturally. Ornate skinks are generally found within heavily forested, and protected, coastal vegetation; such cover is not found within the precinct.

The exotic plague skink (*Lampropholis delicata*) is likely to be present, given its wide distribution in the Auckland Region.

Table 4: Native Lizards Found in the Wider Tamaki Ecological District

| **Species** | **Common Name** | **Threat Status (Hitchmough *et al.* 2021).** |
|---|---|---|
| Oligosoma aeneum | Copper skink | At Risk - Declining |
| Oligosoma ornatum | Ornate skink | At Risk - Declining |
| Mokopirirakau granulatus | Forest gecko | At Risk - Declining |
| Naultinus elegans | Elegant gecko | At Risk - Declining |

### 2.4.4. Bats

Populations of the native long-tailed bat (*Chalinolobus tuberculatus*) are known in the Waitakere Ranges. Long-tailed bats feed on the wing and often feed on riparian and forest margins where invertebrate life is more abundant. Native bats often utilise streams as movement corridors and can forage over 50 km in a single night along watercourses.

Long-tailed bats prefer to roost in larger, older, canopy trees with cavities, epiphytes and loose bark. Such habitat is found within the adjacent SEA vegetation. Given the proximity of the SEA vegetation along Te Auaunga it is possible that long-tailed bats could forage within the precinct, although the likelihood of any roosting occurring is considered negligible given the proximity of higher quality roosting habitat along Te Auaunga.

Short-tailed bats prefer deep-forest habitat and are associated with old growth indigenous forest. The only known population of short-tailed bats known to the Auckland region is found on Little Barrier Island. As such their presence within the precinct is considered extremely unlikely.

## 2.5. Freshwater Values

The Wairaka Stream is a tributary of Te Auaunga and is the primary freshwater feature located within the precinct. The stream is fed by an underground spring originating from the Mt Albert basalt aquifer. The aquifer spring provides constant base flows throughout the year, along with treated stormwater runoff from the site and part of the wider catchment which enters the stream beside Farm Road.

A watercourse assessment was undertaken on the Wairaka Stream in 2012 as part of the Oakley Creek Watercourse Management Plan (Morphum, 2012). This describes the stream channel as comprising stable volcanic substrate with some potential for erosion. Riparian vegetation along the length of Wairaka Stream comprises sections of established native vegetation, flax planting in front of the marae (Pā harakeke), mown grass, and isolated mature exotic trees. Numerous freshwater fish were recorded along the length of the Wairaka Stream, including bullies, populations of adult inanga, galaxiids and eels.

The stream is piped under Farm Road and modified beyond this to form a pond in the Women's Suffrage Garden. The stream is culverted under the main north-south road beside the Pumphouse building and, at the time of the site visit, was then piped through a 70 m long concrete box culvert (approximately 1 m x 1 m), past the bee-keepers hives and Sanctuary Gardens. Within the Mason Clinic site, the stream returns to a natural channel through native riparian vegetation behind building 32 and flows through a planted wetland area at the confluence with Te Auaunga.

A Stream Ecological Valuation (SEV) was undertaken in the downstream reaches of the Wairaka Stream by Estrin and Phillips (2014) to measure the health of the stream below the piped reach. The Wairaka Stream scored an overall value of 0.58, indicating moderate ecological function. Water temperature control and dissolved oxygen levels were reported to be good over the full reach length. The primary limiting factors were the lack of habitat provision, and the organic matter in the stream.

Table 5 provides a summary of the site's current freshwater ecological values utilising the assessment matters from EIANZ (2018).

Table 5: Assessment of Current Freshwater Values

| Assessment Matter | Ecological Value (EIANZ, 2018) | Reasoning |
|---|---|---|
| Representativeness | **Low** | The Wairaka Stream is reasonably characteristic of a first order, permanent waterway in an urban catchment where it flows through the precinct. |
| Rarity/distinctiveness | **Moderate** | A spring-fed stream in urban Auckland is considered distinctiveness although not rare |
| Diversity and pattern | **Low** | The Wairaka Stream is not considered to represent a high level of natural diversity or complexity. |
| Ecological context | **Moderate** | The Wairaka Stream is not considered to be notable in an ecological context. The first order stream offers little by way of riparian habitat and contributes little by way of habitat and other ecological functions to the wider catchment.<br>Notwithstanding the above, it has been assessed as having a Moderate ecological value using the SEV methodology and the potential for Longfin eel (At Risk – Declining) to utilise the stream as habitat. |

## 2.6. Summary of Ecological Values

The current ecological values from within the precinct have been described based on onsite, in-field observations in conjunction with a review of the available literature and databases. A summary of this information is presented in Table 6 based on the Environment Institute of EIANZ (2018) guidelines.

The onsite vegetation is considered to be of low ecological value. The vegetation within the precinct, as described in section 2.4, should not be confused with the SEA vegetation surrounding Te Auaunga.

Whilst onsite fauna observations were limited to common species, the use of this area by threatened species such as long-tailed bats and native herpetofauna, whilst considered unlikely, cannot categorically be ruled out. Therefore, a conservative approach has been taken where it is assumed such species may be found with the precinct, notwithstanding that the probability of species being present within the precinct is considered unlikely. For bats, the site offers minimal foraging and roosting opportunities and there is also much higher quality habitat in the immediate area. As such, although bats have been ascribed a Very High ecological value, the actual probability that bats would be found within the precinct is negligible. For herpetofauna, habitat and foraging opportunities are also limited, such that the probability that any threatened species would be found within the precinct is negligible.

Table 6: Assessment of Current Ecological Values

| Impact | Ecological Value (EIANZ, 2018) | Reasoning |
|---|---|---|
| Vegetation | **Low** | Area rates Low or Very Low for majority of assessment matters and Moderate for one (Representativeness, Rarity/distinctiveness, Diversity and pattern, Ecological context). |
| Avifauna | **Low** | Indigenous species presence limited to nationally and locally common species. |
| Herpetofauna | **High** | Actual species presence is likely to be limited to abundant copper skinks, or pest species. Although without detailed surveys the presence of other species cannot be categorically ruled out. |
| Bats | **Very High** | Actual species presence is unlikely, although potential intermittent use by long-tailed bats cannot be categorically ruled out; notwithstanding actual habitat and foraging values are low. |
| Freshwater Values | **Moderate** | Area rates Low for two and Moderate for two assessment matters (Representativeness, Rarity/distinctiveness, Diversity and pattern, Ecological context). |
| Native Freshwater Fish | **High** | Records indicate that the Wairaka Stream support a range of native freshwater fish, and potentially including At Risk – Declining Longfin eel. |

# 3. Proposal

The Te Auaunga Private Plan Change seeks to amend the provisions of the (Wairaka) precinct to better provide for the comprehensive redevelopment of the site. Changes sought aim to better provide for the built form outcomes envisaged for the future development. In summary, the changes proposed are to:

- Rezone the land acquired from Unitec from Special Purpose – Tertiary Education to Business – Mixed Use zone.
- Amend wording to update the vernacular throughout the precinct to reflect the cultural values and priorities of the Rōpū.
- Amend the precinct provisions to provide for a range of urban activities and the built form outcomes envisaged for the future development, including enabling additional building height across the precinct.
- Delete the precinct-specific landscaping standards, to retain that of the underlying zone.

Additionally, small areas within the plan change are proposed to be rezoned from Residential - Terrace Housing and Apartment Building Zone, and Residential – Mixed Housing Urban Zone, to Business Mixed Use.

Open space is also proposed to be reconfigured. Key changes in the open space include a reduction in the extent of open space area around the central stormwater pond; the introduction of a dedicated open space north of the old Oakley Hospital Building and the site surrounds on the motorway interchange and to the west of Farm Road.

No changes are proposed in relation to:

- The riparian yard.
- Any provisions relating to the identified trees.
- Any provisions relating to SEA_T_6008 (Oakley Creek).
- Existing requirements for Stormwater Management Plans (SMPs).

Access is retained through to Te Auaunga.

Full details of the proposed plan change are provided in the plan change application and accompanying section 32 report prepared by Tattico 2022.

# 4. Ecological Impact Assessment

The current ecological values of the areas that would be impacted by the likely future activities that are enabled by the plan change are summarised below. The baseline for assessing the ecological effects is taken as the current Special Purpose – Tertiary zoning. The purpose of the Te Auaunga Precinct remains to provide for a diverse urban community. The change from a Special Purpose to a business zone does not enable any specific activities that would impact on ecological values.

It is unlikely that the change in zoning would significantly increase the level of light, noise or traffic movements within the precinct above the existing environment. The change in zoning does not increase the amount of these activities enabled by the current precinct provisions. The additional building height, and changes to the landscaping standards are also considered unlikely to be noticeable, above the existing effects already anticipated by the current operative precinct provisions.

## 4.1. Stormwater

Stormwater discharges can be conceptually separated into two different types of potential effects: hydrological and the effects on water quality in the receiving environment. The changes in hydrology from increased impervious surface coverage, unless managed, can have a significant adverse effect on streams within the catchment including accelerating river and stream erosion and bank instability, and creating hydrological conditions that do not support healthy aquatic ecosystems. The building material used, and the type of activities undertaken can also generate a range of contaminants that can be mobilised and discharged offsite with the stormwater. Both point source and diffuse discharges from urban activities can affect freshwater quality and ecosystem health.

A Stormwater Management Plan (SMP) has been prepared by mps limited, which has been incorporated into Auckland Council's Network Discharge Consent (NDC). The SMP also satisfies the Te Auaunga Precinct and AUP:OP requirements for a SMP. The SMP provisions are summarised below:

- All new buildings will use low-contaminate generating roofing material.
- Treatment is proposed for the backbone roading network, which will be decided upon in consultation with Auckland Transport, noting that the future public roads are considered unlikely to meet the threshold at which stormwater quality treatment must be provided.
- All carparks with greater than 30 parking spaces (per development lot) will be provided with at-source stormwater treatment where the stormwater discharge does not already go to a stormwater treatment device within the precinct.

No stormwater retention or detention of stormwater flows beyond any existing measures are proposed. The use of hydrology mitigation is deemed unnecessary for the plan change area as:

- The banks and bed of the watercourses being formed largely of volcanic rock and are erosion resistant. Appropriate outfall design and erosion protection measures will be sufficient to ensure erosion risk is not exacerbated.
- The catchment is not within a Stormwater Management Area (SMAF) zone.
- Any small storm detention onsite would likely negatively impact Te Auaunga by coinciding flow from the precinct with peak flows in the main channel.

As it relates to ecological values, the SMP provisions are an improvement on the lack of any provisions in this regard.

## 4.2. Landscaping

The plan change seeks to delete the current standard relating to landscaping (I334.6.5(1)), and to rely on the landscaping provisions of the underlying zones. Whilst primarily for the benefit of visual amenity of the precinct, landscaping also provides for the opportunity increase native vegetation cover and associated ecosystem services.

## 4.3. Amendments to the Open Space

The revised provisions of the Te Auaunga Precinct in relation to open space is considered to be a negligible effect on ecological values. The centralised open space was always to be managed as a stormwater management area and maintained for as mown grass for this purpose. Any changes that may result from the amendments to the location of open space within the precinct are unlikely to result in any significant changes in this regard.

## 4.4. Provisions of the AUP:OP

No amendments are proposed to the regional or district provisions of the AUP:OP that apply to activities, such as land disturbance and potentially vegetation clearance, that could potentially be undertaken in the future for the redevelopment of the site. Similarly, no changes are proposed which would affect the Auckland-wide provisions which relate to activities to streams, such as the standards which relate to the removal of existing structures, or the diversion of streams, and associated disturbance and discharges.

Should any resource consent be required for any of the activities identified, including vegetation clearance and/or earthworks, consents would still be required under the existing provisions of the AUP:OP.

Should any resource consent be required for any of the activities identified, then Auckland Council would have the ability, through the usual resource consenting process, to place conditions on the consent to mitigate any identified effects.

## 4.5. The Wildlife Act 1953

The Wildlife Act (1953) absolutely protects all native lizards, bats and birds (unless listed as a in Schedule 5). It is an offence to disturb or kill these species. Consequently, a permit under the Wildlife Act would be required for any (potential) harm to these species.

The plan change does not impact upon this requirement.

## 4.6. Ecological Impact Assessment

The changes proposed, as summarised in section 3, being principally the change from one urban zone to another, does not significantly change the type of activities that can occur, or the level of physical development that is provided for. Consequently, it is considered that the plan change results in a barely distinguishable or very slight change from effects enabled by the existing provisions, as summarised in Table 7 below. Where changes have been proposed, such as through the adopted SMP and the associated reduction in stormwater runoff, in conjunction with the treatment requirements, the environmental effects are likely to be positive.

Table 7: Magnitude and Level of Effect

| Ecological Component | Ecological Value (EIANZ, 2018) | Magnitude of Effect | Level of Effect |
|---|---|---|---|
| Vegetation | Low | Negligible | **Very Low** |
| Avifauna | Low | Negligible | **Very Low** |
| Herpetofauna | High | Negligible | **Very Low** |
| Bats | Very High | Negligible | **Low** |
| Freshwater | Moderate | Positive | **Net Gain** |
| Native Freshwater Fish | High | Negligible | **Very Low** |

The level of effect on the site's ecological values from the proposed activities has been assessed as Low – Net Gain. The plan change does not fundamentally change the level of development that could occur on the site, and therefore the level of change that could occur to ecological values. The EIANZ guidelines provide a range for the Level of Effect from Very High – Net Gain, there is no option for 'neutral' or 'no change'. The description of a Low level of effect from EIANZ (2018) is: Minor shift away from baseline conditions. Change may be discernible, but underling character, composition, or attributes of the site will be similar to pre-development, which is considered to be an appropriate description of the effects that may arise on ecological values following the ranting of this private plan change request.

# 5. Conclusions

The Te Auaunga Private Plan Change seeks to amend the provisions of the Wairaka Precinct of the Auckland Unitary Plan: Operative in Part to better provide for the comprehensive redevelopment of the land. Land within the precinct has been acquired by the Ministry of Housing and Urban Development for housing purposes. The Ministry of Housing and Urban Development intends to redevelop the land in a manner more aligned with Business – Mixed Use purposes, than what the existing Special Purpose – Tertiary Education provisions, and the existing Business – Mixed Use provisions would currently support. The purpose of the precinct, as currently described in the Auckland Unitary Plan: Operative in Part and retained through this plan change, is to provide for a diverse urban community.

It is unlikely that the change in zoning would significantly increase the level of light, noise or traffic movements within the precinct above the existing environment. The change in zoning does not increase the amount of these activities enabled by the current precinct provisions. The additional building height is also considered unlikely to be noticeable, above the existing effects already anticipated by the current operative precinct provisions.

A Stormwater Management Plan has been prepared by mps limited, which has been incorporated into Auckland Council's Network Discharge Consent. The Stormwater Management Plan provisions are an improvement on the lack of any current provisions in this regard.

The revised provisions of the Te Auaunga Precinct in relation to open space is considered to be a negligible effect. The centralised open space was always to be managed as a stormwater management area and maintained as mown grass for this purpose. Any changes that may result from the amendments to the location of open space within the precinct are unlikely to result in any significant changes in this regard.

The changes proposed, being principally the change from one urban zone to another, do not significantly change the type of activities that can occur, or the level of physical development that is provided for. Consequently, it is considered that the plan change results in a barely distinguishable or very slight change from effects enabled by the existing provisions. Where changes have been proposed, such as through the adopted SMP and the associated reduction in stormwater runoff, in conjunction with the treatment requirements, the environmental effects are likely to be positive.

The level of effect on the site's ecological values from the proposed activities has been assessed as Low – Net Gain. The plan change does not fundamentally change the level of development that could occur on the site, and therefore the level of change that could occur to ecological values.

# 6. References

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# Appendix 1 Map

# TE AUAUNGA PRIVATE PLAN CHANGE

MORPHUM
environmental


Identified Trees
Permanent Stream
Culvert
Stormwater Management Device
Spring / Puna O Wairaki
Te Auaunga Precinct
Marine SEA
Terrestrial SEA

Client Ministry for Housing and Urban Development

Project **TE AUAUNGA PLAN CHANGE**

0 100 200 m

Project no. P02916
Date 17 Jun 2022
Drawn DB
Approved JS

Z:\Projects\Government\HUD\P02916 Carrington Plan Change\GIS\ArcPro\P02916_arcpro Layout: Carrington_Precinct_A3

# Appendix 2 EIANZ Assessment Methodology

Table 8: Assigning Value To Species, Vegetation And Habitats (from EIANZ, 2018)

| Value | Species Values | Vegetation/Habitat Values |
|---|---|---|
| Very High | Nationally threatened species found in the (Zone of Influence) ZOI1 either permanently or seasonally | Area rates High for 3 or four attributes (Representativeness, Rarity/distinctiveness, Diversity and pattern, Ecological context). Likely to be national important and recognised as such |
| High | Species listed as At Risk – Declining, found in the ZOI either permanently or seasonally | Area rates High for 2 of the attributes, Moderate and Low for the remainder, or<br>Area rates High for 1 assessment matters, Moderate for the remainder<br>Likely to be regionally important and recognised as such |
| Moderate | Species listed as any other category of At Risk, found in the ZOI either permanently or seasonally, or<br>Locally (ED) uncommon or distinctive species | Area rates High for 1 assessment matters, Moderate and Low for the remainder, or<br>Area rates Moderate for 2 or more of the attributes, Low or Very Low for the remainder<br>Likely to be important at the level of the Ecological District |
| Low | Nationally and locally common indigenous species | Area rates Low or Very Low for majority of assessment matters and Moderate for 1<br>Limited ecological value other than as for habitat for tolerant native species |
| Negligible | Exotic species, including pest species having recreational value | Area rates Very Low for 3 matters and Moderate, Low or Very Low for remainder |

[1] The Zone of Influence (ZOI) refers to all land, water bodies and receiving environments that could be potentially impacted by the project.

Table 9: Criteria for Describing Magnitude of Effect (from EIANZ, 2018)

| Magnitude | Description |
|---|---|
| Very High | Total loss of or major alteration to key features of the baseline condition causing a fundamental change or complete loss of the character, composition, or attributes of the site. |
| High | Major loss or major alteration to key features of the baseline condition causing a fundamental change of the character, composition, or attributes of the site. |
| Moderate | Loss or alteration of one or more key features of the baseline condition causing a partial change to the character, composition, or attributes of the site. |
| Low | Minor shift away from baseline conditions. Change may be discernible but underling character, composition, or attributes of the site will be similar to pre-development. |
| Negligible | Very slight change from existing baseline condition. Change barely distinguishable. |

Table 10: Criteria for Describing Level of Effects (from EIANZ, 2018)

| | | Ecological Value | | | | |
|---|---|---|---|---|---|---|
| | | **Very High** | **High** | **Moderate** | **Low** | **Negligible** |
| **Magnitude** | **Very High** | Very High | Very High | High | Moderate | Low |
| | **High** | Very High | Very High | Moderate | Low | Very Low |
| | **Moderate** | High | High | Moderate | Low | Very Low |
| | **Low** | Moderate | Low | Low | Very Low | Very Low |
| | **Negligible** | Low | Very Low | Very Low | Very Low | Very Low |
| | **Positive** | Net gain | Net gain | Net gain | Net gain | Net gain |

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**ATTACHMENT 8.1**

**ECOLOGICAL ADDITIONAL INFORMATION REQUEST**

This attachment sets out the questions and responses to the clause 23 request (request for additional information) from the Council on the original plan change. This addresses the matters related to ecology. It should be read in conjunction with the Ecology Report at Attachment 8.

This attachment sets out the topic, Council's question, the technical expert who prepared the response and the additional information sought by the Council.

All references to appendices refer to the documents contained in Attachment 8.2.

**TOPIC: ECOLOGICAL MAP**

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|---|---|
| **Specific request** | Please provide a map identifying the spatial extent and area (m2) of vegetation types, streams and wetlands. |
| **Applicant response provided by** | Jason Smith – Morphum Environmental Limited |

**Applicant response**

1 A new map has been provided showing the requested updates, please refer to Appendix 1.

2 Note that areas of rank grass previously mapped have not been included as this area has been modified and as of 31/03/2023 and is now largely a construction site and has been denuded of vegetation.

3 Refer Appendix 1.

**TOPIC: ECOLOGICAL VALUE**

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| **Specific request** | Please provide fuller descriptions of the diversity (flora and fauna communities) and structure (canopy, subcanopy, ground cover) of identified areas of ecological value and categorise, where appropriate, in accordance with Auckland Council's indigenous ecosystem types (e.g e.g. WF4, WF8, Singers et al. 2017). |
| **Applicant response provided by** | Jason Smith – Morphum Environmental Limited |

**Applicant response**

1 Owing to the historical modifications of the precinct (see the photo-series provided in Appendix 2) the vegetation remaining on-site is not reflective of any naturally occurring vegetation community.

2 The majority of the vegetation on-site is comprised of individual exotic trees. Singers et al. (2017) provides 2 categories for where exotic vegetation dominates: Exotic Forest (EF) and Exotic Scrub (ES). Given these species would normally comprise a canopy these areas would be best described as EF, which is described as: Forest vegetation with >50% cover of exotic species in the canopy. The isolated mature trees are generally without a sub-canopy with a groundcover of mown grass. This would include the willows (Salix spp.) that had been considered in the 'Exotic riparian vegetation'.

3 Where vegetation has not been maintained for amenity purposes, including the 'Mature mixed canopy', the canopy is comprised of individual specimens of pohutakawa (Metrosideros excelsa) and kahikatea (Dacrycarpus dacrydioides), there are also mature specimen trees likely planted and being maintained as ornamentals including large puriri (Vitex lucens), Norfolk Island pines (Araucaria heterophylla), magnolia and Moreton Bay fig (Ficus macrophylla). The understory is comprised of self-seeded natives, largely karamu (Coprosma robusta), karo (Pittosporum crassifolium), tarata (Pittosporum eugenioides), and less commonly, juvenile nikau (Rhopalostylis sapida), karaka (Corynocarpus laevigatus) and kawakawa (Piper excelsum). Groundcover is majority leaf litter with a garden bed of Agapanthus alongside Mt Albert Road. Owing to the dominance of exotics, the area would be most appropriately captured by the EF: in Singers et al 2017.

4 For the vegetation categorised as 'Native riparian vegetation', the canopy is limited to a mixture of manuka (Leptospermum scoparium) and kanuka (Kunzea ericoides), the understory, where present is comprised of large flax and karamu. Owing to the dominance of manuka, such areas would be best captured by the Singers et al. 2017 category of VS3: Manuka, kanuka scrub.

5 A Current Ecological Value Assessment utilising the EIANZ assessment framework has been set out for each vegetation type in Appendix 3. Note that in disaggregating the values assessment across the different vegetation types gives three different values; overall these average 'Low' ecological value which is consistent with the EcIA and commensurate with the extent of each different vegetation type.

6 Refer Appendix 1, Appendix 2, Appendix 3.

**TOPIC: ROCK FOREST**

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|---|---|
| **Specific request** | Further to E2 (above), please provide commentary on the potential presence of rock forest with descriptions of substrate where vegetation cover is mapped in RFI E1 (above). |
| **Applicant response provided by** | Jason Smith – Morphum Environmental Limited |

**Applicant response**

1 There is no rock forest present within the plan change area. References to rock forest in the riparian margins of Te Auaunga/Oakley Creek are noted from the literature review, there are records of rock forest in the riparian margins of Te Auaunga, notably in Phyllis Street and Harbutt Reserves which are to the south of the plan change area. There are two exposed rock outcrops within the plan change area which are either unvegetated or covered with exotic grasses. Elsewhere exposed rock has been fashioned into a rock wall to the south of the Central Wetland.

**Applicant response**

1 The desktop review for avifauna has been updated and expanded to include a wider area, please refer to Table 1 in Appendix 4.

2 The only significant changes to the vegetation community within the precinct since the Boffa Miskell Assessment (2014) is the maturation of the planting associated with the stormwater management device alongside the Trades Building/Farm Road; and the removal of individual large specimen trees or amenity garden vegetation from the northern half of the precinct.

3 The vegetation currently present was planted during the construction of the 'Stormwater Management Device' and includes kowhai (Sophora microphylla), flax (Phormium tenax)

and cabbage trees (Cordyline australis) interspersed amongst a ground cover of oioi (Apodasmia similis). The area also features a range of pest plants that have colonised the area including wattle species (Acacia spp.), dock species (Rumex spp.), inkweed (Phytolacca octandra), black nightshade (Solanum nigrum), broad-leaved fleabane (Erigeron bonariensis), wild carrot (Daucus carota) and exotic grasses (kikuyu, Cenchrus clandestinus) in the terrestrial margin.

4 The vegetation community on the riparian margin of the 'Central Wetland' is comprised of the native riparian vegetation community described above, generally only a single pole deep. Raupo has establish in the near-shore margin.

5 The surface water within the stormwater management devices are covered in a mixture of aquatic weeds such as both willow weed (Persicaria maculosa) and water pepper (Persicaria hydropiper).

6 Whilst the desktop review includes a wider range of native avifauna, the stormwater management devices would not be considered to provide habitat for the majority of these coastal species.

7 The At Risk or Threatened species noted from the desktop review could conceptually include banded rail (At Risk – Declining) and gull species (At Risk or Threatened depending on species).

8 However, the riparian margin is a relatively small area, and isolated from areas of similar habitat by stream reaches that lack overhead cover which banded rail would utilise as movement corridors. Furthermore, given the exposed nature of the small area (being largely surrounded by mown grass and in close proximity to existing urban development) the area is unlikely to provide habitat for banded rail.

9 Gull species have adapted to forage within a wide range of urban environments. The vegetation near the stormwater management devices will comprise a very small portion of similar low-quality nesting/foraging habitat within the home range for any gull species.

10 Refer Appendix 4.

**TOPIC: TERRESTRIAL FAUNA: INDIGENOUS BIRDS**

**Specific request** Please provide an updated database review of indigenous bird species to account for potential and intermittent presence of At Risk or Threatened species, particularly aquatic species around the wetland, where vegetation will have matured since the Boffa Miskell assessment. Please also provide commentary on the effects of the proposed plan change on any additionally identified species, with respect to urban intensification, increased building height and reduction in extent of open space.

**Applicant response provided by** Jason Smith – Morphum Environmental Limited

**Applicant response**

1 The desktop review for avifauna has been updated and expanded to include a wider area, please refer to Table 1 in Appendix 4.

2 The only significant changes to the vegetation community within the precinct since the Boffa Miskell Assessment (2014) is the maturation of the planting associated with the stormwater management device alongside the Trades Building/Farm Road; and the removal of individual large specimen trees or amenity garden vegetation from the northern half of the precinct.

3 The vegetation currently present was planted during the construction of the 'Stormwater Management Device' and includes kowhai (Sophora microphylla), flax (Phormium tenax) and cabbage trees (Cordyline australis) interspersed amongst a ground cover of oioi (Apodasmia similis). The area also features a range of pest plants that have colonised the area including wattle species (Acacia spp.), dock species (Rumex spp.), inkweed (Phytolacca octandra), black nightshade (Solanum nigrum), broad-leaved fleabane (Erigeron bonariensis), wild carrot (Daucus carota) and exotic grasses (kikuyu, Cenchrus clandestinus) in the terrestrial margin.

4 The vegetation community on the riparian margin of the 'Central Wetland' is comprised of the native riparian vegetation community described above, generally only a single pole deep. Raupo has establish in the near-shore margin.

5 The surface water within the stormwater management devices are covered in a mixture of aquatic weeds such as both willow weed (Persicaria maculosa) and water pepper (Persicaria hydropiper).

6 Whilst the desktop review includes a wider range of native avifauna, the stormwater management devices would not be considered to provide habitat for the majority of these coastal species.

7 The At Risk or Threatened species noted from the desktop review could conceptually include banded rail (At Risk – Declining) and gull species (At Risk or Threatened depending on species).

8 However, the riparian margin is a relatively small area, and isolated from areas of similar habitat by stream reaches that lack overhead cover which banded rail would utilise as movement corridors. Furthermore, given the exposed nature of the small area (being largely surrounded by mown grass and in close proximity to existing urban development) the area is unlikely to provide habitat for banded rail.

9 Gull species have adapted to forage within a wide range of urban environments. The vegetation near the stormwater management devices will comprise a very small portion of similar low-quality nesting/foraging habitat within the home range for any gull species.

10 Refer Appendix 4.

**TOPIC: TERRESTRIAL FAUNA: BATS**

**Specific request** Please justify why the likelihood of bat roosting habitat is considered 'negligible' if potential roost habitat along Te Auaunga is considered to hold potential and given that native bats have very large home ranges. Further, if potential bat habitat is acknowledged as possible within the precinct, please comment on the potential effects of the plan change, including urban intensification (including increased light levels, building height) and reduction in open space on access by bats to potential foraging, flight and roost habitat (e.g. mature tree groves), noting that bats use open spaces and wetlands and other water bodies.

**Applicant response provided by** Jason Smith – Morphum Environmental Limited

**Applicant response**

1 Bat habitat within the precinct has been considered as negligible on the basis that the vegetation within the precinct has been managed over a significant period of time for amenity purposes and as such lacks the hollows and cavities that would provide bat roosts. This is exemplified by the photographs provided in Appendix 5 that demonstrate how lower or fallen limbs have been anthropogenically removed to prevent the occurrence of hollows.

2 The potential for bats to utilise such trees is further reduced by the isolated nature of the individual trees within the precinct, and the existing urban development.

3 Should Auckland Council take an alternative view, it is noted that the plan change seeks to vary existing precinct provisions (as set out in section 3 of the EcIA) which already provide for significant development within the precinct, and therefore which would not substantially alter the current planning provisions that would impact on bat values given these existing provisions and the current urbanisation of the catchment which includes the north-western motorway, Great North Road and the associated fly-overs.

4 There is a greater extent of higher quality bat roosting and foraging habitat outside of the plan change area, within the riparian margin of Te Auaunga, where vegetation has not been actively maintained. The exotic canopy trees (including copses of pines, oaks and gum spp. would have the loose bark and hollows for bat roosts).

5 Refer Appendix 5.

**TOPIC: WETLANDS**

**Specific request** Please provide evidence to illustrate that both of these wetlands individually are classified as "a deliberately constructed wetland", and therefore are excluded from the definition of "natural inland wetland" as defined in the NPS-FM.

Update Map in Appendix 1 of the Ecological Report accordingly.

**Applicant response provided by** Jason Smith – Morphum Environmental Limited

**Applicant response**

1 The 'Stormwater Management Device' is deliberately constructed. As evident from the photo-series provided in Appendix 2, there is no natural watercourse in this location preceding the construction of the stormwater management device in (2015 – 2017).

2 The earliest aerial imagery available for the area of the 'Central Wetland' (1940) is after any natural vegetation has been cleared and the catchment transformed for agricultural purposes. The historic aerial imagery is interpreted to show that a drain has been created in this area, evidenced by the straight, linear and well-defined watercourse. The area lacks any darker colouration in the immediately area surrounding the watercourse that would indicate a wetland.

3 The artificial nature of the 'wetland' aspect is elaborated on in the memorandum from Auckland Council prepared for Unitec's resource consent application for damming of water and use of an existing dam on the bed of a tributary of Oakley Creek for stormwater treatment in 2015 and attached as Appendix 6. This memorandum considers that the Central Wetland was formed deliberately as a dam for constructing and demonstrating stormwater ponds.

4 Note that this is not considered to be a natural wetland as defined in the NPS:FM; however, given the previous occurrence of a waterway in this location it could still be considered a modified element of a natural watercourse (stream) for the purposes of the Auckland Unitary Plan and Resource Management Act.

5 The plan change does not propose any amendments to the provisions of E3 (streamworks) in the AUP nor any activities that would detract from the value, or opportunity to restore these waterbodies.

6 Refer Appendix 2, Appendix 6.

## TOPIC: WETLAND MAP

**Specific request** Map and describe the natural wetland referred to in the ecological report at the confluence with Te Auaunga.

Please update Map in Appendix 1 of the Ecological Report accordingly.

**Applicant response provided by** Jason Smith – Morphum Environmental Limited

**Applicant response**

1 Through the Mason Clinic, the Wairaka Stream remains heavily incised and lined by rock and would be considered to reflect a stream environment.

2 As the Wairaka Stream exits the Mason Clinic site, within the riparian vegetation as the stream reaches the lower relief of Te Auaunga, it would appear that the stream frequently floods. There is an isolated stand of Purei (Carex secta) on the true left bank and where groundcover exists it is dominated by alligator weed.

3 Based on the previous site investigations (as this area is off-limits to the public for public safety), this area could pass the rapid test for wetland vegetation depending on the sample location.

4 Refer to Figure 2 in Appendix 7 for an indicative site photograph, which was taken from the point marked Photo point 2 in the map provided as Appendix 1.

5 This is outside of the plan change area, and the plan change does not propose any amendments to the provisions of the AUP nor any activities that would detract from the value, or opportunity to restore this area.

6 Refer Appendix 1, Appendix 7.

## TOPIC: WETLAND ADJACENT TO THE COASTAL MARINE AREA

**Specific request** Please provide a description of the habitat immediately above the Coastal Marine Area (CMA), with an assessment against the criteria of a natural inland wetland (as set out in the NPS-FM).

**Applicant response provided by** Jason Smith – Morphum Environmental Limited

**Applicant response**

1 The CMA, in this area is defined in the AUP as the seaward side of Great North Road (ID: 159; NZTM Point X: 1751960.23, NZTM Point Y: 5917779.09).

2 The riparian area immediately above Great North Road is not consistent with the definition of a natural inland wetland in the NPS:FM (as of April 2023) as it would not meet the first criterion. The area is not a wetland (as defined in the Act). In this location Te Auaunga is well defined by the heavily incised stream bed/banks, with the stream approximately 2 m below the floodplain comprised of a similar vegetation community as of the rest of the riparian margin of Te Auaunga (a mixture of exotics in the tree canopy, and a native understory; ground cover is comprised heavy of leaf litter, alluvial deposits that are likely to have been deposited after recent heavy rainfall, ground cover vegetation where present was the exotic pest plant Hedera helix (Ivy) and Tradescantia.

3 The area is not a wetland. It is also noted that this area is outside of the plan change extent.

4 Refer Figure 3, Appendix 8.

**TOPIC: STREAMS**

| | |
|---|---|
| **Specific request** | Please provide a map of the section of Wairaka Stream that has been/is proposed for daylighting.<br><br>Update Map in Appendix 1 of the Ecological Report accordingly. |
| **Applicant response provided by** | Jason Smith – Morphum Environmental Limited |

**Applicant response**

1 This was shown in the map provided as Appendix 1 of the original EcIA. Please refer to Appendix 1 map of EcIA.

2 Note that, as shown in Figure 4 in Appendix 9, a section of the daylighting has already occurred.

3 An updated stream length of potential daylighting opportunity is shown in Appendix 1. Approximately 2/3rds of daylighting remain.

4 Refer Appendix 1, Appendix 9.

**TOPIC: NATIONAL POLICY STATEMENTS**

| | |
|---|---|
| **Specific request** | Please provide an assessment of the Plan Change Request against the NZCPS, including an assessment of effects on the Significant Ecological Area – Marine, immediately adjacent to the site. |
| **Reasons for request** | Section 75 of the RMA states that a district plan must give effect to the New Zealand Coastal Policy Statement (NZCPS). As the Plan Change area is located within the coastal environment, the provisions of the NZCPS are relevant matters for consideration for a Plan Change Request. |
| **Applicant response provided by** | John Duthie of Tattico |
| **Applicant response** | |

**Background**

1. This clause 23 request asks for an assessment of this plan change against the National Policy Statement on Freshwater Management (*NPS:FW*).

2. This response should be read in the context of the information set out in the Morphum response to clause 23 requests E1-E9.

3. This response relies on the ecological assessment, including the identification of streams and wetlands. Tattico have taken this ecological analysis and assessed that in the context of the NPS:FW, including an analysis against whether the National Environmental Standards on Freshwater Management (*NES:FW*) apply.

4. The Morphum report identifies that:

a. The only stream/river within the precinct is the Wairaka Stream which runs from the southern central portion of the precinct at the Puna, first flowing north and then west to join into Te Auaunga/Oakley Creek.

b. There are no other streams or natural wetlands within the precinct.

5. There is an artificial wetland in the southern portion of the precinct. This was created in circa 1960s by Unitec as part of an environmental research study into stormwater management techniques.

6. There is also an artificial wetland on the western side of the Unitec campus within the Crown owned land. This was intended to treat stormwater run-off from the new Unitec Trades building. However, Council changed its preferred method for treating stormwater, generally preferring other methods within the treatment train process. This included using non-contaminating roofing and cladding materials on the Unitec Trades building. Identification of this artificial stormwater pond on Precinct plan 1 is accordingly proposed to be removed as part of this plan change.

7. This plan change does not seek to modify any of the Auckland-wide provisions or overlay provisions. All the standard controls on streams, wetlands, water quality and significant ecological areas, to the extent that they are relevant, continue to apply within the precinct.

8. In addition to these Auckland-wide rules, the precinct provisions maintain the existing open space classifications over the Puna and Wairaka Stream, as shown within Precinct plan 1. This is unchanged by the plan change.

9. As referenced above, the only stream within the precinct is the Wairaka Stream. The plan change does not propose any amendment to any provisions in the Auckland Unitary Plan (Operative in Part) (*AUP*) relevant to the protection of Wairaka Stream. Furthermore, the backbone consent, which the Marutūāhu and Waiohua-Tāmaki Rōpū have obtained, gave approval to the daylighting of the portion of Wairaka Stream immediately west of the Spine Road, where it ran within a box culvert through both the Crown and Te Whatu Ora – Health New Zealand owned land parcels. These works have been completed on the Crown land, with the stream now partially daylighted and the significant landscape revegetation in place.

10. The artificial stormwater wetland in the east comprises two ponds, a small pond in the south which drains into the larger wetland in the more central part of the precinct. The central wetland is an artificial wetland. Notwithstanding that it is artificial, it is retained under this plan change and identified within an area of "open space" on Precinct plan 1.

**NPS:FW**

11. The NPS:FW sets a range of policies designed to protect rivers, streams and natural wetlands. It sets a hierarchy of objectives with *the health and well-being of water bodies and freshwater ecosystems* listed as the first priority. Wairaka Stream is retained and protected through the various AUP provisions (including the precinct). This primary objective is therefore satisfied.

12. The NPS:FW relevant policies are set out below:

**Policy 1**: Freshwater is managed in a way that gives effect to Te Mana o te Wai.

**Policy 2**: Tangata whenua are actively involved in freshwater management (including decision-making processes), and Māori freshwater values are identified and provided for.

**Policy 3**: Freshwater is managed in an integrated way that considers the effects of the use and development of land on a whole-of-catchment basis, including the effects on receiving environments.

**Policy 4**: Freshwater is managed as part of New Zealand's integrated response to climate change.

**Policy 5**: Freshwater is managed (including through a National Objectives Framework) to ensure that the health and well-being of degraded water bodies and freshwater ecosystems is improved, and the health and well-being of all other water bodies and freshwater ecosystems is maintained and (if communities choose) improved.

**Policy 6**: There is no further loss of extent of natural inland wetlands, their values are protected, and their restoration is promoted.

**Policy 7**: The loss of river extent and values is avoided to the extent practicable.

**Policy 8**: The significant values of outstanding water bodies are protected.

**Policy 9**: The habitats of indigenous freshwater species are protected.

13. The plan change will give effect to these policies. In particular:

    a. The Puna and Wairaka Stream are protected through the AUP wide provisions and the open space identification on Precinct plan 1.

    b. Objective 10, as proposed to be amended through the plan change, states:

    > An integrated urban environment is created, which:
    >
    > …
    >
    > (b) Recognises, protects and enhances the environmental attributes of the precinct in its planning and development;

    c. Virtually all built development (with very limited exceptions) and all subdivisions will trigger resource consent to enable appropriate Council assessment of development.

    d. The Rōpū have been involved in the development of the plan change and in the identification of the open space areas protection of the Wairaka Stream and Puna.

    e. The Wairaka Stream is considered in the context of the Stormwater Management Plan adopted by Council for the whole precinct.

    f. There is no loss of natural streams through this plan change. In fact, the daylighting of part of the stream has enhanced its ecology in terms of the planting of native vegetations along the stream margins and creating a more natural stream bed and banks.

14. In addition, while identification of the smaller artificial wetland within the precinct is proposed to be removed, the largest artificial wetland is retained.

**NES:FW**

15. The NES:FW primarily relate to development consents and the resource consent process. They are not directly relevant to the plan change.

16. Having said that, the development within the precinct undertaken to date clearly demonstrates the workings of the NES:FW in that the Marutūāhu and Waiohua-Tāmaki Rōpū resource consent sought approval for daylighting of the Wairaka Stream, and also for a water-sensitive design for the new Outfall #6, which provided for above-ground conveyance of stormwater within a large planted swale. These works have been completed and put in place to a high standard.

**Summary**

17. As set out above, demonstrably this plan change is consistent and, to the extent required, retains mechanisms to protect the Wairaka Stream in accordance with the objectives of the NPS:FW. This is set out in both the objectives and policies in the precinct provisions and the relevant open space identification provisions of Precinct plan 1.

**TOPIC: NATIONAL COASTAL POLICY STATEMENT**

| | |
|---|---|
| **Specific request** | New Zealand Coastal Policy Statement Assessment<br><br>*E(F)1 Please provide a response to E10 of the original Clause 23request, in respect of the NZCPS***.** |
| **Reasons for request** | This request was for an assessment against the New Zealand Coastal Policy Statement because of the proximity to the coastal marine area and SEA Marine. |
| **Applicant response provided by** | John Duthie of Tattico |
| **Applicant response** | |

This application undertakes an assessment against the New Zealand Coastal Policy Statement (NZCPS).

The Te Auaunga Precinct is not on or adjoining the coast, but is in reasonable proximity and within the Oakley Creek catchment which drains into the Waitematā Harbour and, in particular, the Motumānawa/Pollen Island marine reserve.

This response sets out the objectives of the NZCPS, and then comments on the relevant aspects of this plan change request in terms of the six relevant NZCPS objectives.

**Objective 1**

To safeguard the integrity, form, functioning and resilience of the coastal environment and sustain its ecosystems, including marine and intertidal areas, estuaries, dunes and land, by:

- maintaining or enhancing natural biological and physical processes in the coastal environment and recognising their dynamic, complex and interdependent nature;
- protecting representative or significant natural ecosystems and sites of biological importance and maintaining the diversity of New Zealand's indigenous coastal flora and fauna; and
- maintaining coastal water quality, and enhancing it where it has deteriorated from what would otherwise be its natural condition, with significant adverse effects on ecology and habitat, because of discharges associated with human activity.

**Assessment:**

- The use and activities that occur within the precinct are physically separated from the marine environment by Great North Road and the motorway interchange. The potential impact is primarily through water quality issues as the Te Auaunga Precinct is within the Oakley Creek catchment.
- The Motumānawa/Pollen Island marine reserve is identified as an important and significant natural ecosystem protected under the Marine Reserves Act 1971. The Te Auaunga Precinct is physically removed from that land / marine area. The potential impact is again through water quality issues.

- Stormwater is managed through a treatment train process.  This is addressed elsewhere in the plan change application and in the technical report by MPS.
- The precinct is subject to the full suite of AUP(OP) Auckland Wide provisions relating to Water quality, discharges, stormwater and land disturbance.  The plan change does not seek to avoid or modify any of these key environmental controls.  Future developments will need to meet the water quality standards applying under the Unitary Plan provisions, or apply for specific consents.
- Wastewater connections will be to the public wastewater network and will be coordinated with Watercare.
- The AUP(OP) erosion and sediment control standards will apply to any development to ensure control of sediment and erosion.
- Protection yards are applied along the Oakley Creek to protect the native bush and native vegetation which in turn will assist in protecting the marine environment.
- The enhancement of water quality needs to be part of an overall Council response to the larger catchment.  Significant investment is already in place or underway with infrastructure upgrades like the Central Interceptor, and in stormwater management, measures and with enhanced erosion and sediment controls; these are intended to cumulatively make a difference over time in the enhancement of water quality within the harbour.

### Objective 2

To preserve the natural character of the coastal environment and protect natural features and landscape values through:

- recognising the characteristics and qualities that contribute to natural character, natural features and landscape values and their location and distribution;
- identifying those areas where various forms of subdivision, use, and development would be inappropriate and protecting them from such activities; and
- encouraging restoration of the coastal environment.

**Assessment:**

- Te Auaunga Precinct is removed from the coastal environment.  As such development of the Precinct enabled by the plan change will have minimal impact on the character of the coast.
- Essentially the environment is separated by the Waterview State Highway 16/22 motorway interchange and Great North Road.
- The precinct is embedded within a major metropolitan area.  It is already an urban environment.
- The precinct has long been identified as a key location to give effect to the Council’s urban consolidation policies.  The scale and level of development to be enabled by the plan change is appropriate and will have no direct impact on the coastal environment.
- Because the precinct does not adjoin the coastal environment, there is no direct opportunity to enhance the landscape feature of the coastal environment.

### Objective 3

To take account of the principles of the Treaty of Waitangi, recognise the role of tangata whenua as kaitiaki and provide for tangata whenua involvement in management of the coastal environment by:

- recognising the ongoing and enduring relationship of tangata whenua over their lands, rohe and resources;
- promoting meaningful relationships and interactions between tangata whenua and persons exercising functions and powers under the Act;
- incorporating mātauranga Māori into sustainable management practices; and
- recognising and protecting characteristics of the coastal environment that are of special value to tangata whenua.

**Assessment:**

- The ongoing development of this precinct directly involves Marutūāhu, Waiohua-Tāmaki Rōpū and Ngāti Whātua as supporters of this plan change and with an ongoing role including as future owners within the precinct.
- This plan change request, and the Crown initiatives on this land, recognise the ongoing relationship with tangata whenua over the land. This will see iwi groups have eventual ownership and development opportunity of significant portions of the precinct.

### Objective 4

To maintain and enhance the public open space qualities and recreation opportunities of the coastal environment by:

- recognising that the coastal marine area is an extensive area of public space for the public to use and enjoy;
- maintaining and enhancing public walking access to and along the coastal marine area without charge, and where there are exceptional reasons that mean this is not practicable providing alternative linking access close to the coastal marine area; and
- recognising the potential for coastal processes, including those likely to be affected by climate change, to restrict access to the coastal environment and the need to ensure that public access is maintained even when the coastal marine area advances inland.

**Assessment:**

- The walkway and cycleway network within the precinct connects to the north-western cycleway and walkway network and the Te Auaunga walkway. This gives good public access and recreational opportunity, connecting the stream walkway to the coastal walkway.
- There are no parts of the Precinct that adjoin the coast and therefore the plan change can not directly contribute to public open space and recreational opportunities on the coast.

### Objective 5

To ensure that coastal hazard risks taking account of climate change, are managed by:

- locating new development away from areas prone to such risks;
- considering responses, including managed retreat, for existing development in this situation; and
- protecting or restoring natural defences to coastal hazards.

**Assessment:**

- The precinct is not subject to coastal inundation or any other natural hazard processes associated with hazard risk and climate change in the coastal environment.
- The normal AUP(OP) controls on natural hazards and risk apply to this precinct, and no changes are sought to the Auckland-wide provisions.

## Objective 6

To enable people and communities to provide for their social, economic, and cultural wellbeing and their health and safety, through subdivision, use, and development, recognising that:

- the protection of the values of the coastal environment does not preclude use and development in appropriate places and forms, and within appropriate limits;
- some uses and developments which depend upon the use of natural and physical resources in the coastal environment are important to the social, economic and cultural wellbeing of people and communities;
- functionally some uses and developments can only be located on the coast or in the coastal marine area;
- the coastal environment contains renewable energy resources of significant value;
- the protection of habitats of living marine resources contributes to the social, economic and cultural wellbeing of people and communities;
- the potential to protect, use, and develop natural and physical resources in the coastal marine area should not be compromised by activities on land;
- the proportion of the coastal marine area under any formal protection is small and therefore management under the Act is an important means by which the natural resources of the coastal marine area can be protected; and
- historic heritage in the coastal environment is extensive but not fully known, and vulnerable to loss or damage from inappropriate subdivision, use, and development.

**Assessment:**

- This land has been subject to live urban zoning for high density residential development and associated mixed use and tertiary education uses for over a decade.
- This activity does not rely on any use of natural and physical resources of the coastal environment.
- No functions are directly located on coastal land.
- There is no impact on coastal habitat.
- There is no impact on the extent of the Motumānawa/Pollen Island marine reserve.
- There is no subdivision adjoining the coast.

## Objective 7

To ensure that management of the coastal environment recognises and provides for New Zealand's international obligations regarding the coastal environment, including the coastal marine area.

**Assessment:**

- Not applicable.

**Appendix 1: Map**

# TE AUAUNGA PRIVATE PLAN CHANGE

MORPHUM environmental


Note: Trees not otherwise classified are individual mature specimen trees or have recently been removed.

Z:\Projects\Government\HUD\P02916 Carrington Plan Change\GIS\ArcPro\P02916_arcpro Layout: Carrington_Precinct_A3 Mar 23

Rock Outcrop

**Vegetation Area**

- Exotic riparian vegetation (2,605 m²)
- Native riparian vegetation (3,085 m²)
- Mature mixed canopy (5,807 m²)

**Watercourses**

- Piped Section
- Wairaka Stream
- Stormwater Management Device
- Wairaka Precinct

Client Ministry for Housing and Urban Development

Project **TE AUAUNGA**

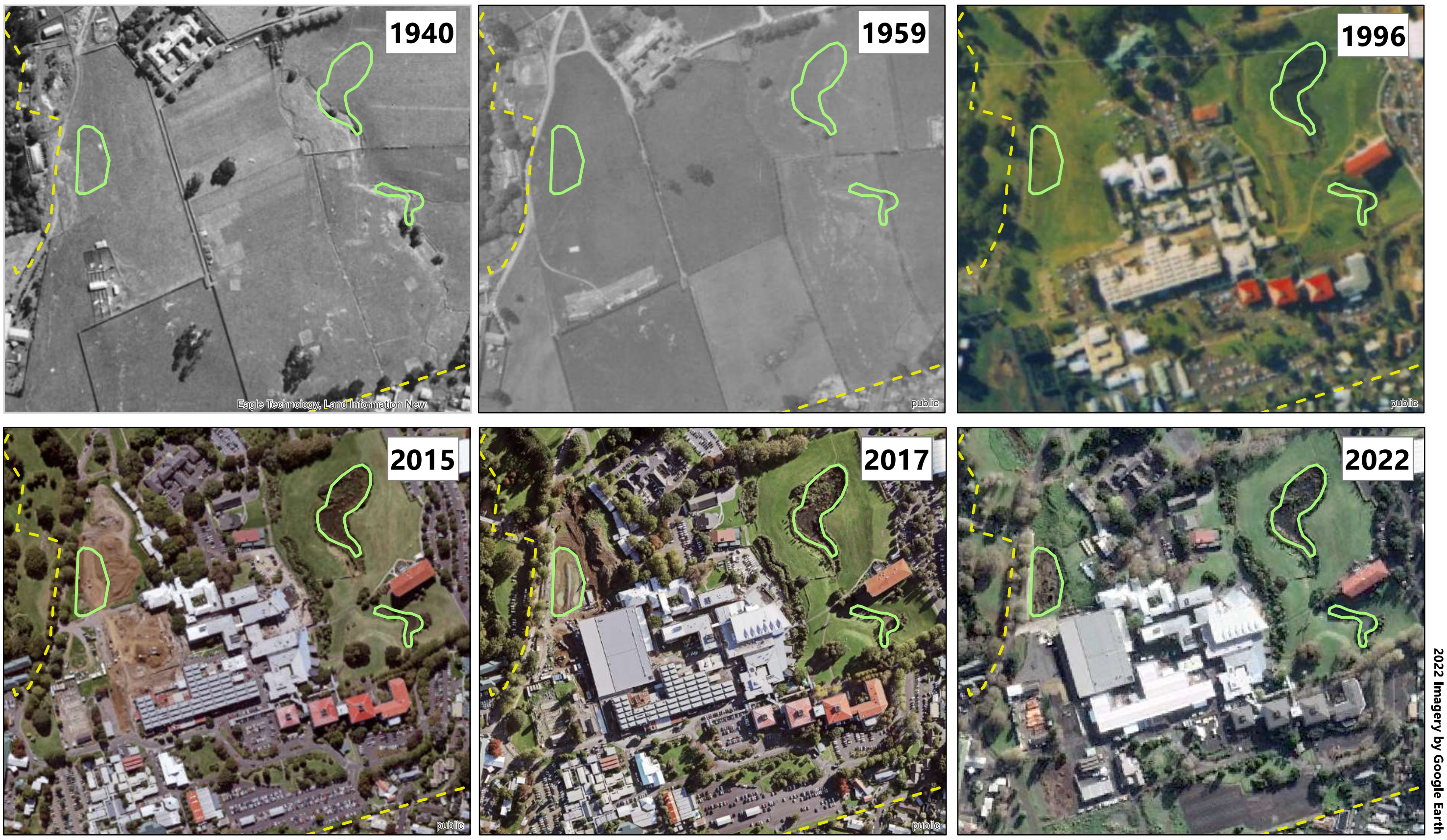
0 100 200 m

| | |
|---|---|
| Project no. | P02916 |
| Date | 4 Apr 2023 |
| Drawn | CU |
| Approved | JS |

**Appendix 2: Photo-schedule**

# HISTORIC IMAGERY SHOWING UNITEC WETLANDS

MORPHUM environmental




Wairaka Site Boundary

'Wetlands'

Client MINISTRY FOR HOUSING AND URBAN DEVELOPMENT

Project **TE AUAUNGA**

0 150 300 m

Project no. P02916

Date 3 Apr 2023

Drawn CU

Approved JS

**Appendix 3: Ecological Values Assessment**

| Vegetation Type | EIANZ (2018) Assessment matter | Assessed value | Reasoning |
|---|---|---|---|
| Exotic riparian vegetation | Representativeness | Very Low | Vegetation with typical structure and composition that would be found in a community of exotic trees in urban Auckland. Exotic species dominate. |
| | Rarity/distinctiveness | Very Low | Common, exotic species commonly encountered in urban Auckland. |
| | Diversity and pattern | Very Low | A low species diversity of common exotic species |
| | Ecological context | Low | Although not of individual species merit, the riparian nature of this vegetation provides importance ecological service functions, albeit to a limited degree. Important functions include stepping stone for native fauna moving across the wider landscape and a degree of shade and overland filtration for the streams |
| | **Overall** | **Negligible** | |
| Native riparian vegetation | Representativeness | Low | Vegetation is not of the typical structure and composition that would be found in a natural vegetation community. Reflects the planted nature of this vegetation and commonality across urban Auckland. |
| | Rarity/distinctiveness | Moderate | As a myrtle, manuka threat status has been recently revised to 'At Risk', vegetation is not otherwise rare or distinct. Manuka/kanuka scrub has a regional IUCN threat status of least concern. |
| | Diversity and pattern | Low | Diversity is well below what would naturally have occurred in manuka/kanuka scrub historically and pattern is limited to a single ecotone along the riparian margin |

| Vegetation Type | EIANZ (2018) Assessment matter | Assessed value | Reasoning |
|---|---|---|---|
| | Ecological context | Moderate | The riparian nature of this vegetation provides importance ecological service functions, albeit to a limited degree. Important functions include stepping stone for native fauna moving across the wider landscape and a degree of shade and overland filtration for the watercourses. Value has increased to reflect the habitat provisioning and foraging opportunities for native fauna |
| | **Overall** | **Moderate** | |
| Mature mixed canopy | Representativeness | Very Low | The vegetation type here is not reflective of any natural vegetation community. |
| | Rarity/distinctiveness | Moderate | As a myrtle, pohutakawa threat status has been recently revised to 'At Risk'. The specific species assemblage is of species commonly found throughout Auckland, even in urban environs. |
| | Diversity and pattern | Very Low | The vegetation communities within the precinct are not considered to represent a natural diversity of species or habitat types. |
| | Ecological context | Low | The vegetation potentially provide foraging, nesting habitat functions, mainly for disturbance tolerant species, given proximity to road way. |
| | **Overall** | **Low** | |

3008442

## Appendix 4: Bird Records

Table 1: (31/03/2023)

| Common name | Scientific name | Threat Status (Robertson et al. 2016) |
|---|---|---|
| **Species noted previously (2022)** | | |
| Australian Magpie | Gymnorhina tibicen | Introduced and naturalised |
| Common Myna | Acridotheres tristis | Introduced and naturalised |
| Eurasian Blackbird | Turdus merula | Introduced and naturalised |
| House Sparrow | Paser domesticus | Introduced and naturalised |
| New Zealand Kingfisher | Todiramphus sanctus vagans | Not Threatened |
| North Island Fantail | Rhipidura fulginosa placabilis | Not Threatened |
| Pukeko | Porphyrio melanotus melanotus | Not Threatened |
| Skylark | Alauda arvensis | Introduced and naturalised |
| Song Thrush | Turdus philomelos | Introduced and naturalised |
| Spur Wing Plover | Vanellus miles | Not Threatened |
| Welcome Swallow | Hirundo neoxena neoxena | Not Threatened |
| **Additional records (2023) – Within Wairaka Precinct** | | |
| Silverye | Zosterops lateralis lateralis | Not Threatened |
| Tui | Prosthemadera novaeseelandiae novaeseelandiae | Not Threatened |
| Goldfinch | Carduelis carduelis | Introduced and Naturalised |
| Common pheasant | Phasianus colchicus | Introduced and Naturalised |
| Black-backed gull | Larus dominicanus | Threatened – Nationally Critical |
| Mallard | Anas platyrhynchos | Introduced and Naturalised |
| **Additional records (2023) – from outside Wairaka Precinct** | | |
| Pied shag | Phalacrocorax varius | At Risk - Recovering |
| White faced heron | Egretta novaehollandiae | Not Threatened |
| South Island pied stilt | Haematoups finschi | Not Threatened |
| Red-billed gull | Chroicocephalus novaehollandiae | At- Risk |
| New Zealand Pigeon | Hemiphaga novaeseelandiae | Not Threatened |
| Pied stilt | Himantopus leucocephalus | Not Threatened |
| Little shag | Microcarbo melanoleucos | Not Threatened |
| *Bar-tailed godwit | Limosa lapponica | At Risk |

| | | |
|---|---|---|
| Buff-banded rail | Gallirallus philippensis | At Risk – Declining |
| *Variable oyster catcher | Haematopus unicolor | At Risk - Recovering |
| *Wrybill | Anarhynchus frontalis | Threatened - Nationally Vulnerable |
| Harrier hawk | Circus approximans | Not Threatened |
| Paradise duck | Tadorna variegata | Not Threatened |
| *Caspian tern | Hydroprogne caspia | Threatened - Nationally Vulnerable |
| Royal spoonbill | Platalea regia | At Risk – Naturally Uncommon |
| *White fronted tern | Sterna striata | Threatened – Naturally Critical |
| *Far eastern curlew | Numenius madagascariensis | Non-resident Native - Vagrant |
| *New Zealand dotterel | Charadrius obscurus | At Risk – Recovering |
| Black billed gull | Chroicocephalus bulleri | Threatened – Naturally Critical |

*Denotes coastal species unlikely to be found in the plan change area.

**Appendix 5: Actively managed vegetation**

**Figure 1:** Pine that would otherwise be considered potential roosts, note scars that have healed over where lower vegetation has been removed.

## Appendix 6: NRSI memo

# Notification determination and resource consent decision report for a discretionary activity under the Resource Management Act 1991

| | |
|---|---|
| Subject: | To authorise the damming of water with and use of an existing dam on the bed of a tributary of Oakley Creek, Mt Albert for stormwater treatment. |
| To: | Greg Murphy, Team Leader: Water Allocation |
| From: | Stephen Crane, Senior Consents & Compliance Advisor |
| Date: | 12 August 2015 |

## 1.0 APPLICATION DESCRIPTION

**Application and Property Details**

| | |
|---|---|
| Applicant Name: | Unitec Institute of Technology |
| Consent Application Number: | 33526 |
| File Number: | 8256 |
| Activity: | Discretionary |
| Site Address/Location: | 1 Carrington Road, Mt Albert, Auckland |

## 2.0 PROPOSAL, SITE AND LOCALITY DESCRIPTION

### 2.1 Reason for application

Consent is required under the Proposed Auckland Unitary Plan (PAUP) rule H.4.17.1 and Rule 6.5.62 in the Auckland Council Regional Plan: Air Land and Water.

The dam does not comply with rules 6.5.52 and 6.5.56 because the catchment area is greater than 40 ha, and although the dam is a stormwater dam in an urban area, it is not required to meet the conditions of a consent to divert and discharge stormwater required under chapter 5 of this plan.

### 2.2 Proposal and site description

The applicant owns a 51.5 ha property, on the west side of Carrington Road, Mt Albert. The applicant has made an application no. 33526 to replace existing consent no. 8256 (file Kr 928256) to dam water with a 5m high on-stream dam located on a tributary of Oakley Creek, 530m upstream of the confluence with the main stem, granted in April 1992, and expiring on 31 December 2006. The dam is for a stormwater detention / quality pond and located on Lot 2 DP 406935 (CT 424414).

A full description of the proposal is provided in the application titled Application for Resource Consent to dam surface water, received 7 December 2006 prepared by Glenn Huggard (hereby referred to as the Application Report).

The existing dam has been in place since 1992 however consent for the damming of water expired in 2006. The dam was constructed for demonstration stormwater ponds. The embankment and spillway designs were developed following extensive hydrological analysis of present and future flood flow conditions. The design calculations by Beca Carter Hollings and Ferner dated March 1991 are held on file 8256. Also on file is the report "Maintenance Manual, Carrington Polytechnic Sediment Stormwater Ponds, August 1992" prepared by Beca Carter Hollings & Ferner Ltd.

The dam and impoundment has the following specifications:

The 5m high dam is well finished with a grassed embankment. The dam crest is approximately 3m in width at its maximum height of RL 20.6m. From this point the width of the downstream toe of the dam is approximately 47m to the invert of the downstream watercourse at RL 15.6m. The length of the dam crest is approximately 130m as measured along the length of the pond at its outlet end (eastern). The slope of the downstream embankment is 1V: 10H.

The invert of the 11m wide flood spillway is at RL 20.0m (600mm deep below the dam crest). The invert of the outlet weir to the 1050mm diameter service spillway pipe, and normal pond water level, is at RL 19.5m with 500mm freeboard.

There have been no changes to the dam since its construction in 1992. The original water permit however had calculated the dam height at 3.1m. This measurement was taken from the RL of the outlet pipe and not at the invert of the watercourse to which the pipe structure discharged into. As a result the height of the dam has been recalculated at 5m. The impoundment surface area is 5300 m$^2$ and the volume is 7500 m$^3$. The catchment area is 42 ha.

The dam is located on-stream.

A site visit to the dam proposed location was completed by AC sediment control advisor Matt Byrne On 20 July 2009.

## 2.3 Catchment description

The Oakley Creek catchment is in the AC Waitemata surface water management area. The AC has no surface water allocation management plan for this management area of stream catchments. No minimum flow or water availability for this stream catchment, or any other stream catchment in the Auckland region, has been set in the Auckland Council Regional Plan: Air, Land and Water 2010.

The Oakley Creek catchment is one of several stream catchments which discharge into the Waitemata Harbour. The Oakley Creek catchment rises to an elevation of 100m at the Hillsborough Road ridge. The western area of the Oakley Creek catchment is comprised of Waitemata Group sandstone while the catchment to the NE of the creek is dominated by basaltic lava flow derived from Mt Albert. The interface of the two lithology generally forms the Oakley Creek stream channel.

All building on the Unitec campus have numbers. The dammed watercourse (with no official stream number) flows northward under the campus Farm Road and to the west of the sports fields, is piped for 100m between buildings 033 and 035, flows through the separate Mason Clinic property of Waitemata Health Ltd, and discharges into the main stem of Oakley Creek at map reference NZTM 1751955mE 5917570mN. The stream is not denoted as Natural Stream Management Area in chapter 3 and maps of the Auckland Council Regional Plan (Air, Land and Water).

The dam impounds the lower of two stormwater detention and quality ponds located on the Unitec campus. The campus site is comprised of office buildings with classrooms with car parks, sports fields and meeting houses / buildings located across the campus. The immediate area surrounding the two ponds is currently moderately sloped banks which are grassed while the ponds themselves have a healthy abundance of native vegetation normally associated with stormwater ponds and wetlands.

The catchment above the ponds is comprised of a residential area of Mt Albert running back up to New North Road at 50m above msl. Piped stormwater from parts of this area is reticulated and discharged at the head of the ponds. Additional stormwater from the surrounding campus roads, buildings and pervious areas also contribute to pond flows.

The area of the catchment where the dam and stormwater ponds were constructed comprises basalt overlain by alluvium. Alluvial material from the stream channel was removed prior to construction of the dam.

The dam discharges water to the remaining stream channel which, when studied during the site visit, was approximately 1m wide with and average depth of 0.3m. Flows observed during the site visit 20 July 2009 were abundant with the visual colour and clarity of the stream appearing good. The stream from the discharge point of the dam meanders through the campus and is occasionally piped beneath road crossings and campus buildings. Its length from the dam to the receiving environment of Oakley Creek is approximately 530m.

There is another small unnamed stream (also with no official stream number), flowing through a small part of the Unitec campus, that arises at a spring known as Te Wai Unuroa o Wairaka (The long drink of Wairaka) located at map reference NZTM

1752255mE 5917000mN adjacent to Building #180. The spring fed stream discharges into the dammed stream about 200m downstream of the spring source.

**Fig 1 Oakley Creek and Dam site**


The Unitec e-Learning site provides the following information about the spring which is of significance to iwi: "The numerous subterranean streams and tunnels around the Mt Albert region and extending to Riu ki Uta (Three Kings) was known as the Ara Tomo O Ruarangi (tunnel entrance of Ruarangi) and was used extensively by a people known as Turehu (a supposed light skinned race who came early to Aotearoa) or Patupaiarehe to escape from their enemies.

When Mataatua canoe made its way north from Whakatane with Puhi in command, they made landfall near the Whau River. With him was his younger brother, priestly sister Muriwai and niece Wairaka. Wairaka was already famous when she acted quickly and saved the Mataatua canoe from the rocks at the mouth of the Whakatane River. Before swimming out to the canoe, she uttered the statement Kia whakatane au i ahau (let me act like a man) hence the name, Whakatane. Wairaka's home here was Te Pou of Wairaka, now known as Owairaka or Mt Albert. Wairaka's people stayed on here and intermarried with the people of Rakataura (Tainui) and Ohomairangi (Te Arawa).

Springs surfaced everywhere around Mt Albert, including the spring that gushes out on campus. When Wairaka was thirsty, she demanded water and stamped her foot on the ground. Fresh water gushed out of the ground. This spring is known as Te Wai Unuroa o Wairaka (The long drink of Wairaka). Some iwi refer to Rakataura as being the rangatira who led the 'Turehu' people at the time, whilst others refer to Ruarangi. Regarding nga wai unuroa o Wairaka (the long drink of Wairaka) – the ancestress from Ngati Awa, some iwi refer to Nga wai o Raka-taura (the waters of Rakataura).

The spring here on campus was highly valued for drinking and for the rituals of thanks-giving and ceremonials. It offered relief to the sick, as well as for healing, bathing, irrigation and was a constant provider of food. To locate the spring follow the stream past the Marae, Puukenga, and Red Lecture Theatre. The spring lies just past the bridge that spans the stream".

Stream flows

Stream minimum flows, dam bypass flows, and water availability are commonly expressed in terms of the stream mean annual low flow (MALF or $Q_{2.3}$). This is the flow that the stream would naturally recess to on average only once every 2.3 years. It is calculated from an analysis of continuous long term flow records at a site, often measured with a weir. The MALF and other flow statistics in stream catchments with few flow records can be assessed from comparison with other catchments that do have such long flow records. The specific discharge (SD) is the flow per unit area of catchment expressed in litres per second per square kilometre (l/s/km$^2$). It can be used to predict flows in other stream catchments.

There is no regular summer manual flow gauging site on the stream that runs through the Unitec campus site. Determining a MALF for the stream requires reference to records from other streams. Stream flow specific discharges tend to reflect the underlying geology. The surface geology of the dam catchment comprises Mt Albert basalt flows. On the main stem of Oakley Creek there is the AC Oakley Creek @ Richardson Rd continuous flow measuring site with a catchment area of 6.2 km$^2$. The site was installed in September 2012. With such a short flow record it is not possible to calculate an accurate MALF from the record.

There is also a flow site Meola @ Motions Rd on the adjacent Meola Creek with a catchment area of 12.9 km$^2$. The MALF for this site is 41 l/s and MALF specific discharge $SD_{2.3}$ 3.2 l/s/km$^2$. The flow at this site recessed to the MALF about 18 to 24 February and 6 to 14 March 2014. The concurrent flow at AC Oakley Creek @ Richardson Rd site in these periods was about 25 l/s. This suggests that the MALF for this site is about 25 l/s and MALF specific discharge $SD_{2.3}$ for the 6.2 $km^2$ catchment area is 4 $l/s/km^2$.

There will be infiltration from the basalt geology catchment into the stormwater pipes upstream of the applicant's dam in summer conditions. The catchment area at the applicant's dam site is 0.42 $km^2$, and the natural mean annual low flow, based on a specific discharge of 4 $l/s/km^2$, is therefore estimated as 1.7 l/s.

### 2.4 Background

In 1992, the Auckland Regional Council (ARC) granted consent for a Water Permit to Carrington Polytechnic (Unitec Institute of Technology) to dam an unnamed tributary of the Oakley Creek, Mt Albert. The purpose of the water permit was to create a dam associated with the creation of two stormwater quality / detention ponds at the Carrington Polytechnic campus. This water permit expired on 31 December 2006. Associated consents are stormwater discharge no. 8257 (file Br 928246) and streamworks no. 28690 (file Lu 17268).

In August 2006, Unitec applied for a for a replacement consent to authorise the existing dam. After a lengthy correspondence period, a site visit was undertaken by representatives of the then ARC on 20 July 2009, in order to assess the existing stormwater ponds and the dam structure. Further assessment of an associated stormwater discharge permit no.8257 (file 928246) which expires 31 December 2027, was also undertaken in order to assess the appropriateness of granting a replacement consent for the existing damming of water.

A comprehensive stormwater discharge consent no. 24973 (file 10752) was granted in June 2001 for the whole Oakley Creek catchment, and expires December 2032.

### 2.5 Other activities considered

There are no other activities being considered with this application.

## 3.0 NOTIFICATION ASSESSMENT

### 3.1 Assessment of permitted baseline

The permitted baseline only applies to permitted activities on the subject site. If the baseline is applied, then the relevant permitted baseline is ACRP:ALW Rule 6.5.52 "The damming of water with an existing dam as at 23 October 2001 on the bed of a permanent stream subject to conditions including that the dam structure shall be no greater than 4m in height and catchment no greater than 40 ha".

This constitutes the permitted baseline and these adverse effects may be discounted as the level of adverse effect arising from those permitted activities has been deemed to be acceptable. It is only any other or further adverse effects arising from the proposal over and above the permitted baseline which are to be assessed.

The dam has a catchment area of 42 ha and crest height of 5 m, and is therefore greater than the permitted activity. Most water in a dam is held in the top 1-2m. Due to the potential of this dam impoundment to hold a substantially greater amount of water, and the potential complexity of effects associated with the proposed activity, the permitted baseline does not provide a useful comparison for the purpose of discounting effects.

### 3.2 Assessment of effects on the environment Section 95(2)(a)

The following assessment of the adverse effects of the activity on the environment addresses the activity's actual and potential effects, and any mitigating factors. Where appropriate the assessment criteria of the Auckland Council Regional Plan: Air, Land, Water (ACRP:ALW) policy 6.4.42 and 6.4.45 regarding damming water are used as the context for assessing the potential adverse environmental effects arising from the proposal. The stream at the dam location has permanent flow and so the dam is an on-stream dam.

<u>Values of Oakley Creek</u>

In terms of chapters 2 and 3 of the ACRP:ALW values and management Areas, the Oakley Creek stream does not have any Wetland management areas; and is not a Natural Stream, Water Supply or High Use Stream Management Area. It is an Urban Stream management area.

<u>Effects on fish passage</u>

Dams pose barriers that can prevent fish from accessing habitat necessary for specific life-cycle stages.

There is currently poor fish passage into the ponds as there is a vertical concrete wall constructed as part of the pond's outlet structure. It is expected however that limited fish passage is available to some native climbing species since fish passage from Oakley Creek to the discharge outlet of the pond appears suitable.

Fish passage on this dam is not required since, although there is a large catchment, there is no length of permanent stream upstream of the dam impoundment. There is no habitat upstream of the dam because it is fed by reticulated stormwater. A stormwater pipe discharges just upstream of the dam. While the dam impoundment is poor quality fish habitat, the stream downstream would provide better habitat.

<u>Effects on stream flows, habitat and water quality</u>

Damming water can reduce water levels and change flow regimes (including the natural flow variability) downstream. These changes can result in: an increase in the frequency and duration of low flows; poorer water quality including decreased dissolved oxygen concentrations and increased stream water temperatures; and a reduction in available in-stream habitat, including that attributable to the drowning or inundation of the section of stream behind the dam.

Passing of low flows is required due to the moderate habitat quality of the main stem of Oakley creek. Based on the 42 ha dam catchment area, and a mean annual low flow specific discharge for the Oakley Creek catchment of 4 l/s/km$^2$, the mean annual low flow is therefore estimated as 1.7 l/s.

No water is taken from the dam, and so maintaining the service spillway will suffice for passing low flows, since water that flows into the impoundment also flows out and downstream less any evaporation and seepage loss. There are no surface water take consents or other dams in the stream catchment.

Therefore a bypass flow of all natural inflow is required. This may be achieved by flow through the service spillway.

The dam has been in existence for approximately 21 years and the current wetland plantings that occupy the margins of the stormwater quality / detention pond provide adequate shading. The dam's margins wide sward of native plants adds to the visual amenity of the property, as well as providing habitat for bird life. It is considered that the dam does not create a negative impact on the surrounding properties amenity values.

Effects on dam safety, flooding, erosion and drainage

The damming of water carries with it a risk that the dam will fail, with potential damage to the downstream environment, including freshwater ecosystems, property, people, communities and infrastructure. The maintenance and enforcement of standards on dam design, construction, operation and maintenance will reduce the risk of dam failure. The dam hazard category was determined using the Dam Safety Guidelines (TP109, ARC, 2000). The ARC dam hazard category is "Low". Monitoring and management of the dam structure will avoid any effects of the dam caused by potential structural failure.

The applicant has provided details of the monitoring and maintenance program that is regularly carried out on the dam. Provided this monitoring and maintenance program continues to be administered, no further measures to avoid, remedy or mitigate adverse effects are considered necessary.

There are no downstream wetlands to be affected. The watercourse downstream of the dam to Oakley Creek is almost wholly contained on the Applicants property. The dam is fed by reticulated stormwater from the contributing catchment. There is no open stream above the dam. Overflow travels downstream through an unnamed tributary of the Oakley Creek for approximately 530m before discharging into the main stem (stream no. 081200) of the Oakley Creek at the property boundary.

A visual inspection of the downstream environment was undertaken on 20 July 2009 and at that time no adverse effects on the stream channel as a result of the dam were noted. The damming of surface water within the pond attenuates upstream flows and provides regularly managed flows into the stream channel below the dam. The outflow from the dam discharges via a 1050mm diameter culvert onto a concrete apron and rip rap. Based on visual observation of the channel downstream of the dam, it is considered that the present scenario does not result in channel geomorphology effects that are more than minor.

**Conclusion**

With regard to the above criteria, consideration must be given to the fact that the existing dam has been in place for 21 years. A healthy margin of native riparian vegetation has established along the banks of the dam's associated stormwater pond and wetland type plants have also established within the ponds. The stormwater ponds attenuate up-catchment flows and when available, provide for continuous flows to the downstream environment. While fish passage is not ideal, some passage is available, albeit limited to climbing species. Furthermore, given the dam's existing state, it is not considered practicable to include any requirements for installation of a low flow by-pass structure, to require decommissioning or removal of the dam, to require any financial contributions or to require any other mitigation measures.

The current application for a replacement consent does not propose to alter in any way the dam, its associated structures or the stormwater quality / detention ponds.

It is considered that any actual or potential adverse effects of the proposed activity on the environment as identified above will be less than minor. This conclusion is based on undertaking the proposed measures to ensure that the dam operation meets current standards for dam safety, and passing of low flows is implemented, to avoid, remedy or mitigate potential effects in accordance with the application documents and subject to adherence with the recommended conditions of consent.

## 3.3 Request or rule: Sections 95A to 95E

Pursuant to Section 95A(2)(b), (c), and (3)(a), the applicant has not requested public notification and no National Environmental Standard or rule in the Regional Plan requires or precludes public or limited notification.

Pursuant to Section 95A(4) there are no special circumstances to warrant public notification.

Pursuant to Section 95C(2) and (3) further information as requested was provided by the set deadline, and a report was not commissioned.

## 3.4 Identification of affected parties

Pursuant to section 95E it is determined that no other persons are considered adversely affected by the activity.

There is a small unnamed stream (also with no official stream number), flowing through a small part of the Unitec campus, that arises at a spring known as Te Wai Unuroa o Wairaka. The spring is of significance to iwi. The dam is not located on, and will not affect this spring-fed tributary.

A low flow bypass condition is included to ensure that the damming does not cause cumulative effects on the receiving environment.

The stream discharges into the flat floodplain of an open grassed park-like grounds of the Unitec campus, immediately downstream of the dam on the applicant's own property. There are no buildings or structures in this immediate area, other than those of the applicant. The property of Waitemata Health Ltd is 400m downstream of the dam. No other person will be adversely affected by the application to dam water with the on-stream dam. Therefore written approvals were not required from any person by the Council.

### 3.5 Recommendation on notification

It is recommended that this application be processed on a non-notified basis because:

- The adverse effects on the environment of the activity for which consent is sought will be no more than minor.
- There are no persons considered adversely affected by the granting of this consent.
- The applicant has not requested public notification and no National Environmental Standard or rule in the Regional Plan requires public or limited notification.

| | |
|---|---|
| Stephen Crane | Stephen Crane |
| **Senior Consents and Compliance Advisor, Natural Resources and Specialist Input, Resource Consents.** | |
| Date: | 12/8/2015 |

### 3.6 Notification determination

Acting under delegated authority, and for the reasons set out in the above assessment and recommendation, this application shall be processed on a non-notified basis.

Auckland Council
Te Kaunihera o Tāmaki Makaurau

Andrew Benson

A P Benson

**Team Manager: Water**
**Natural Resources and Specialist Input, Resource Consents**
Date: 13/8/15

## 4.0 ASSESSMENT OF APPLICATION

### 4.1 Assessment of effects on the environment: Section 104(1)(a)

The assessment of adverse effects undertaken for the purpose of the notification decision concluded that adverse effects were no more than minor. That assessment is also relevant for the purpose of the assessment required under s104(1)(a). In addition the following positive environmental effects have been identified: the damming of water provides stormwater treatment for the applicant's property and upstream.

### 4.2 Statutory considerations: Section 104(1)(b)

**Auckland Council Regional Plan : Air Land and Water**

The following objectives and policies of the Auckland Council Regional Plan (Air, Land and Water) are considered relevant to the damming of water: 6.3.2, 6.3.5, 6.3.7, 6.4.1, 6.4.2, 6.4.40, 6.4.42, 6.4.45, and 6.4.47.

Comments

With adequate mitigation the proposal will not have more than minor adverse effects on the environment. Policy 6.4.42 and 6.4.45 sets out appropriate mitigation for damming proposals. In this case, passing of low flows, and dam maintenance measures are considered as appropriate required mitigation. Financial contributions and further wetland creation are not considered appropriate in this case. Dam removal is not considered necessary.

The proposal is consistent with maintaining the stream natural values. The effects of the dam on fish passage upstream are minor because, although there is a large catchment, there is no length of permanent stream upstream of the dam impoundment. There is no habitat upstream of the dam because it is fed by reticulated stormwater. A stormwater pipe discharges just upstream of the dam.

The dam was specifically designed for a stormwater detention / quality pond, and will therefore enhance the water quality in the Oakley Creek stream.

Sufficient flow will be passed down the service spillway pipe to attract and allow passage of fish up into the dam impoundment. The dam is designed to improve rather than reduce water quality down-stream of the dam. It is not proposed that there be new tall riparian vegetation on the stream downstream of the dam since that would not be consistent with the open grassed park-like grounds of the Unitec campus.

Maintenance of downstream flow regimes will be provided for, due to the consent condition requirement to pass low flows through the service spillway pipe, and that no water is being taken from the dam. There are no downstream lawful water users to be adversely affected.

It is therefore considered that there is no unmitigated impact on the natural character of the environment or effects on flora and fauna. The proposal is consistent with Tangata Whenua values identified in the Regional Plan.

One of the matters that applications for damming shall be assessed against (policy 6.4.42 (f) and 6.4.45(d)) is remedial measures and ongoing operation and maintenance to ensure those dams' safety performance standards are being met. The dam structure has been inspected by engineers who report that the dam overall hazard rating is low. No dam remediation (repairs) are required, although ongoing maintenance and monitoring are required by the recommended consent conditions 8 to 12 to minimise the potential for the dam to be a safety concern.

The recommended monitoring is consistent with the hazard rating for the dam. Flooding as a result of the structure is not considered to be an issue. Bed aggradation or impeded drainage on adjacent properties is unlikely. This dam application is being considered individually, since there are no cumulative effects of other existing dams in the catchment.

Land instability/bank erosion is not a concern. The dam is not expected to have effects more than minor on hydrological flows or water quality, subject to implementing mitigation. Therefore there would be no more than minor adverse effect on people, communities or habitat. No wetlands have been identified in the vicinity of the dam. A review condition is recommended in line with policy 6.4.44.

There were no adverse effects on any wetland, wähi tapu or archaeological site.

It is concluded that the proposed activity is consistent with the provisions of the ACRP: ALW, subject to compliance with the recommended conditions of consent. In particular it is noted that the dam design, construction, operation and maintenance, has been addressed through conditions. Sufficient water will be retained in the natural water body to protect instream values, tangata whenua traditions (e.g. mahinga kai) and natural character and amenity values.

**Consideration of the provisions of the Proposed Auckland Unitary Plan (PAUP)**

For the damming of surface water and use of a dam on the bed of rivers and streams, the relevant objectives and policies of the Proposed Auckland Unitary Plan

(PAUP) are contained in Part 2, Chapter C, Sub section 5.15.2 – Water quantity, allocation and use, Policies 11 to 16; Part 2 Chapter E Sub section 7.3 - Overlay objectives and policies High Use Stream and Natural Stream Management Areas, and Part 5 Appendix 5.2 Table 1 River and stream minimum flow and availability. The relevant regional rules are contained in Part 3 Chapter H: Natural Resources sub section 4.17- Taking, using, damming and diversion of water and drilling.

In summary, the intent of the policies of the PAUP is quite similar to those of the ACRP: ALW. .

Overall, I have applied greater weight to the operative plan provisions in my assessment.

**Other statutory documents**

An assessment has been undertaken of the proposed activity against the relevant provisions of the:

- National Environmental Standard
- National Policy Statement: *Freshwater Management 2011*
- Auckland Council Regional Policy Statement
- Proposed Auckland Unitary Plan.

It is concluded that the proposed activity is consistent with the relevant provisions of the plans and policy statements, subject to compliance with the recommended conditions of consent.

### 4.3 Other relevant matters: Section 104(1)(c)

There are no other matters considered relevant and reasonably necessary to determine the application.

### 4.4 Consideration of Part 2 matters

Policy to address the potential adverse effects of damming water on a permanent stream have been set in the ACRP: ALW. Consultation was undertaken with Iwi in the development of this Plan. As the proposed mitigation is consistent with the Plan policy, it is concluded that the proposal will not adversely affect matters of national importance, including the relationship of Maori with the water resources under s 6(e).

As the adverse effects of the proposed activity on the environment can be satisfactorily avoided, remedied or mitigated, and as the proposal is consistent with and not contrary to the statutory direction, it is concluded the proposal meets the purpose and principles of the RMA and is a sustainable use, development and protection of natural and physical resources, in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and their health and safety while -

a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and

c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

Having considered the Matters of national importance, Other matters, and the requirement to take into account the principles of the Treaty of Waitangi, it is concluded that the proposal will not adversely affect any of those matters.

### 4.5 Duration of consent: Section 123

Policy 6.4.13 of the ACRP: ALW provides for the setting of concurrent duration and review dates of consents within a catchment or aquifer, to allow management of water damming, takes and discharges in an integrated manner. The applicant did not did not apply for a specific duration of consent.

Most of the related water take consents in the same AC Auckland Isthmus surface water management area expire in 2021 and will likely be replaced with a term of 15 years to expire in 2036. It is considered appropriate to set a term of 21 years for this consent so that the expiry date will be consistent with the future 2036 expiry date of other surface water consents in the same management area.

A term of 21 years is considered an appropriate balance between the likelihood of change in the activity and water requirements over the term of consent, and the need to provide security of tenure to reflect investment in infrastructure.

The consent will therefore expire on 31 May 2036 with provision to review the conditions in June 2016 and at not less than five yearly intervals thereafter. This recommendation is made in accordance with policy 6.4.13 of the ACRP: ALW. The review condition allows the AC to take into account a range of information, including results of previous monitoring and changed environmental knowledge, in determining whether or not the conditions of consent should be changed.

## 5.0 RECOMMENDATION

### 5.1 Adequacy of information:

The above assessment is based on the information submitted as part of the application. It is considered that the information submitted is sufficiently comprehensive to enable the consideration of the above matters on an informed basis:

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a. The level of information provides a reasonable understanding of the nature and scope of the proposed activity as it relates to the relevant district and/or regional plan.

b. The extent and scale of any adverse effects on the environment are able to be assessed.

c. Persons who may be adversely affected are able to be identified.

### 5.2 Recommendation

It is recommended that pursuant to Sections 104, 104B, and 108 of the RMA, consent is granted to the discretionary activity application by Unitec Institute of Technology to dam water with and use an existing dam on the bed of a tributary of Oakley Creek, Mt Albert for stormwater treatment at 1 Carrington Road, Mt Albert, Auckland being consent application 33526.

The reasons for this decision are as follows:

1. It is considered that the overall adverse effects on the receiving environment are no more than minor. Subject to the imposition of conditions, the effects can be further avoided, remedied or mitigated.

2. The proposal is considered to be consistent with the relevant provisions of the NES, Regulations, NPS, ACRPS, ACRP:ALW, PAUP, and in particular, the integrated management of the Region's natural and physical resources.

3. The proposal will be consistent with Part 2 of the Resource Management Act 1991 by promoting the sustainable management of natural and physical resources. Overall it is considered that the cumulative safeguards of Section 5(2)(a) to (c) have been met and the proposal thereby meets the purpose of the RMA.

### 5.3 Conditions

Recommended conditions of consent are provided following the draft Reason for decision.

### 5.4 Report by:

| | |
|---|---|
| Stephen Crane | Stephen Crane |
| **Senior Consents and Compliance Advisor, Natural Resources and Specialist Input, Resource Consents.** | |
| Date: | 12/8/2015 |

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## RESOURCE CONSENT 33526 SECTION 104 AND 108 DECISION

### Application Description

Consent to dam water

### Application and Property Details

| | |
|---|---|
| Consent Holder: | Unitec Institute of Technology |
| Consent Application Number: | 33526 |
| File Number | 8256 |
| Site Address: | 1 Carrington Road, Mt Albert, Auckland |
| Legal Description: | Lot 2 DP 406935 |

## DECISION UNDER DELEGATED AUTHORITY

Acting under delegated authority pursuant to Sections 104, 104B and 108 of the RMA, consent is granted to the discretionary activity application by Unitec Institute of Technology to dam water with and use an existing dam on the bed of a tributary of Oakley Creek, Mt Albert for stormwater treatment.

**Signed under Delegated Authority**

Andrew Benson

AP Benson

**Team Manager: Water**
**Natural Resources and Specialist Input, Resource Consents**

Date: 13/8/15

### Reasons for this decision

The reasons for this decision are as follows:

1. It is considered that the overall adverse effects on the receiving environment are no more than minor. Subject to the imposition of conditions, the effects can be further avoided, remedied or mitigated.

2. The proposal is considered to be consistent with the relevant provisions of the NES, Regulations, NPS, ARPS, ACRP: ALW, PAUP, and in particular, the integrated management of the Region's natural and physical resources.

3. The proposal will be consistent with Part 2 of the Resource Management Act 1991 by promoting the sustainable management of natural and physical resources. Overall it is considered that the cumulative safeguards of Section 5(2)(a) to (c) have been met and the proposal thereby meets the purpose of the RMA.

## CONDITIONS

Pursuant to Section 108 of the RMA, this consent shall be subject to the following conditions:

### General conditions

#### Activity in accordance with plans

1. The damming of water with and use of an existing dam on the bed of a tributary of Oakley Creek, Mt Albert on land legally described as Lot 2 DP 406935 (C.T. 414414) for stormwater treatment shall be carried out in accordance with the plans and all information submitted with the application, detailed below and all referenced by Council as Resource Consent Application 33526.

#### All charges paid

2. This consent (or any part thereof) shall not commence until such time as the following charges, which are owing at the time the Council's decision is notified, have been paid in full:

   (a) All fixed charges relating to the receiving, processing and granting of this resource consent under section 36(1) of the Resource Management Act 1991 (RMA); and

   (b) All additional charges imposed under section 36(3) of the RMA to enable the Council to recover its actual and reasonable costs in respect of this application, which are beyond challenge.

3. The consent holder shall pay any subsequent further charges imposed under section 36 of the RMA relating to the receiving, processing and granting of this resource consent within 20 days of receipt of notification of a requirement to pay the same, provided that, in the case of any additional charges under section 36(3) of the RMA that are subject to challenge, the consent holder shall pay such amount as is determined by that process to be due and owing, within 20 days of receipt of the relevant decision.

4. The consent holder shall pay the council any further monitoring charge or charges to recover the actual and reasonable costs incurred to ensure compliance with the conditions attached to this consent/s.

   Advice Note:

   The initial monitoring charge is to cover the cost of inspecting the site, carrying out tests, reviewing conditions, updating files, etc., all being work to ensure compliance with the resource consent. In order to recover actual and reasonable costs, inspections, in excess of those covered by the base fee paid, shall be charged at the relevant hourly rate applicable at the time. The consent holder will be advised of the further monitoring charge or charges as they fall due. Such further charges are to be paid within one month of the date of invoice. Only after all conditions of the resource consent have been met, will the council issue a letter confirming compliance on request of the consent holder.

**Access to property**

5. That the servants or agents of the Council shall be permitted access to the relevant parts of the property at all reasonable times for the purpose of carrying out inspections, surveys, investigations, tests, measurements or taking samples.

**Specific conditions dam water consent 33526**

**Term of consent / duration**

6. The damming of water permit 33526 shall expire on 31 May 2036 unless it has lapsed, been surrendered or been cancelled at an earlier date pursuant to the RMA.

**Works**

7. The dam shall be constructed and maintained in accordance with the following dimensions and standards:

- A 5 metre high earth fill dam, crest length 130 metres, crest width 3 metres.
- A maximum impoundment surface area of 5300 square metres and approximate impoundment volume of 7500 cubic metres.
- Flood spillway trapezoidal shape 11 metres wide base and 0.60 metres freeboard below dam crest.
- A flood spillway capable of safely passing a 1% Annual Exceedance Probability (AEP) flood flow with minimal damage to the flood spillway.

**Significant remedial works**

8. In the event of any significant remedial works being required as a result of damage or safety improvements to the dam, spillways, low flow bypass or fish passage, then works shall be completed as soon as possible. Within 20 working days of completion of the remedial works a certificate from a suitably qualified engineering professional shall be supplied to the Team Leader Consents and Compliance – Water Allocation certifying that the engineer has supervised the remedial works, that the works have been satisfactorily completed and that the design intent of the remedial works have been met.

Advice Note:

*Other consents such as stream works consents may be required before any remedial works can be undertaken. In addition, there may be other regional or district plan provisions that may apply – for example sediment control measures in the Proposed Auckland Unitary Plan and Regional Plan: Sediment Control. It is the Consent*

*Holder's responsibility to determine what other consents are required and to obtain these before undertaking any works.*

**Passing of Low Flows**

9. All natural dam inflow shall be passed downstream of the dam at all times.

**Dam safety and maintenance**

10. The dam, spillways, low flow bypass and associated structures shall be operated and maintained to ensure that, at all times, they are structurally sound, pose no undue risk to human life, property, or the natural environment, and are able to perform satisfactorily to their approved design standard.

***Advice Note:***

*Tasks associated with the maintenance of the dam include those necessary to minimise damage (including wave lap, vegetation and stock management), scour, and erosion along with any structural maintenance of the dam and associated facilities. Trees or large vegetation can weaken the structural stability of the dam, create seepage pathways and impede visual inspection and hence should not be allowed to grow on the dam. If the crest of the dam is to be used as a stock race, then the dam will need protecting with suitable measures such as covering the crest of the dam with gravel, fencing the sides of the crest, and diverting stormwater away from the upstream and downstream dam faces.*

**Dam Inspection**

11. The dam, spillway, low flow bypass and associated structures shall be inspected at six monthly intervals and during/after extreme weather events in accordance with the "Maintenance Manual, Carrington Polytechnic Sediment Ponds, prepared by BCH&F Ltd, August 1992" and Check Sheet appended to that manual.

***Advice Note:***

*A sample inspection sheet is attached in Appendix 1 of this consent to provide guidance to the Consent Holder as to the type of matters that should be addressed when an inspection is carried out. Inspections by a suitably qualified engineering professional should be undertaken if there are any significant changes to the dam, spillways, low flow bypass or associated structures.*

**Professional Dam Inspection**

12. The dam, spillway, low flow bypass and associated structures shall be inspected by a suitably qualified engineering professional in 2020 and 2030 to check the structural integrity and functioning of the dam and associated structures, and to advise on any upgrade or maintenance works that are required. A copy of the inspection report is to

be provided to the Team Leader Consents and Compliance Water Allocation within 30 days of the inspection.

**Five Yearly Report**

13. A report (including photographs) shall be submitted to the Team Leader Consents and Compliance Water Allocation by 30 June 2020 and subsequently at intervals of not more than five years thereafter. The report shall contain: Inspection records of the dam, low flow pass and other associated structures; Any maintenance works carried out during the previous five years and plans for any future works.

**Review**

14. Pursuant to Section 128 of the RMA, the conditions of this consent may be reviewed by the Team Leader at the Consent Holder's cost:

(a) In June 2016 and subsequently at intervals of not less than five years thereafter in order to:

(i) deal with any adverse effect on the environment which may arise or potentially arise from the exercise of this consent and which it is appropriate to deal with at a later stage or

(ii) vary the operating, monitoring and reporting requirements, mitigation measures and performance standards in order to take account of information, including the results of previous monitoring and changed environmental knowledge, on: water flow and level regimes, including bypass flow requirements; water quality; instream biota, including the functioning of aquatic ecosystems and fish passage; dam safety performance;

(b) In the case of a coastal, water or discharge permit, to provide compliance with rules in any regional plan relating to use of water, water or air quality etc. (refer section 128(1)(b) of the RMA) that have been made operative since the commencement of consent.

(c) In the case of a coastal, water or discharge permit, to provide compliance with any relevant National Environmental Standard that has been made since the commencement of consent.

(d) At any time, if it is found that the information made available to the council in the application contained inaccuracies which materially influenced the decision and the effects of the exercise of the consent are such that it is necessary to apply more appropriate condition.

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## Appendix 1: Example Routine Visual Inspection Checklist for an Embankment Dam

| Item No. | Description | Observation/Comment |
|---|---|---|
| E1 | Record reservoir level (e.g. metres above mean sea level) | |
| E2 | Is there reservoir shoreline instability or erosion? | |
| E3 | Is the upstream face showing any erosion, instability, depression or cracking? | |
| E4 | Is the dam crest showing any deformation, misalignment, depressions or cracking? | |
| E5 | Is the left abutment showing any instability or seepage, including where the dam embankment contacts with the abutment? | |
| E6 | Is the right abutment showing any instability or seepage, including where the dam embankment contacts with the abutment? | |
| E7 | Is the downstream face showing any instability, deformation, depression, cracking or seepage? | |
| E8 | Is the dam toe showing any erosion or seepage? | |
| E9 | Measure the total dam seepage (e.g. time to fill 1 litre container, or mm head over a 90 degree v-notch weir) | |
| E10 | Is the service or flood spillway entrance obstructed? Is the spillway, including the outlet, damaged or eroded? | |
| Other Comments and Observations (e.g. unusual events since last inspection, vegetation issues, operating issues etc). | | |

## ADVICE NOTES

1. The consent holder shall obtain all other necessary consents and permits, including those under the Building Act 2004, and the Historic Places Trust Act 1993. This consent does not remove the need to comply with all other applicable Acts (including the Property Law Act 2007), regulations, relevant Bylaws, and rules of law. This consent does not constitute building consent approval. Please check whether a building consent is required under the Building Act 2004. Please note that the approval of this resource consent, including consent conditions specified above, may affect a previously issued building consent for the same project, in which case a new building consent may be required. If not all resource consents have been applied for, it remains the responsibility of the consent holder to obtain any and all necessary resource consents required under the relevant requirements of the Resource Management Act 1991.

2. If you disagree with any of the above conditions, or disagree with the additional charges relating to the processing of the application you have a right of objection pursuant to Sections 357A or 357B of the RMA. Any objection must be made in writing to Council within 15 working days of notification of the decision.

3. Section 138 RMA specifies the conditions relating to surrender of a resource consent. A consent authority may refuse to accept the surrender of part of a resource consent where that may: affect the integrity of the consent; affect the ability of the consent holder to meet other conditions of the consent; or lead to an adverse effect on the environment. There also remains some liability to the person surrendering the resource consent under (3)(a) and (b) of this section. This liability relates to breaches of conditions of consent occurring before surrender and to the completion of work required to give effect to the consent. The Council would be unlikely to allow the surrender of this consent under section 138(2)(c) without supporting information indicating that no on-going risk was posed to human health and safety, or the environment. The consent holder is advised that before the consent can be surrendered, the dam will have to meet the requirements of the permitted activity rules in the ARC's relevant regional plan.

## DEFINTIONS

| | |
|---|---|
| ACRPS: | means Auckland Council Regional Policy Statement |
| Council: | means The Auckland Council |
| HGMPA: | means Hauraki Gulf Marine Park Act 2000 |
| NES | means National Environmental Standard |
| NPS | means National Policy Statement |
| NZCPS: | means New Zealand Coastal Policy Statement 2010 |
| RMA: | means Resource Management Act 1991 and all amendments |
| Team Leader: | means Auckland Council Team Leader (Water Allocation) or nominated Auckland Council staff acting on the relevant Team Leader's behalf |

## Appendix 7: 'Wetland' near the confluence of the Wairaka and Te Auaunga

**Figure 2:** Wairaka Stream through the Mason Clinic

**Appendix 8: Te Auaunga**

**Figure 3:** Te Auaunga immediately upstream of Great North Road culvert.

## Appendix 9: Daylighting opportunity photographs

**Figure 4:** Recently (post-March 2021) daylight reach of Wairaka

**Figure 5:** Remaining daylighting opportunity

# WAIRAKA PRECINCT

## Plan Change Request to Auckland Unitary Plan

(Including a request to change the precinct name to Te Auaunga)

## Heritage Impact Assessment

December 2022

dpa architects

83 Victoria Road, P.O. Box 32-318
Devonport, Auckland, New Zealand
admin@dpaarchitects.co.nz
Ph. (09) 445 8544

## 1 Introduction

This report concerns an area of land in the north west corner of a larger site which was originally part of the Oakley Hospital complex. After the hospital closed, the site was purchased by the Unitec Institute of Technology and the Hospital was incorporated into the campus. The Institute subsequently vacated the Former Oakley Hospital Building and consolidated its campus on the southern part of the site. The land previously occupied by the hospital and then Unitec became known as the Wairaka Precinct after the promulgation of Auckland's Unitary Plan (notified in 2014) (the precinct).

The precinct is now administered by the Ministry of Housing and Urban Development (HUD) and HUD is supporting three Rōpū with development rights to the site who are in the process of developing a masterplan for its redevelopment. HUD has now instigated a Private Plan Change lodged in December 2022 to enable the redevelopment of the precinct.

The intention is for the precinct to provide for a diverse urban community which will include extensive redevelopment for residential activities, ongoing development of the education facility, as well as enabling the provision of community, recreational and social activities. Some commercial uses will also be catered for.

Across the precinct a range of building heights will be provided for that correspond to the topography of the land and recognise the sensitivity of neighbouring sites. Greater heights will be enabled in areas where potential adverse effects can be managed. In the northwest corner of the site, buildings of additional height are envisaged to act as landmarks for the northern part of the development and to support the urban legibility of the precinct in the wider landscape.

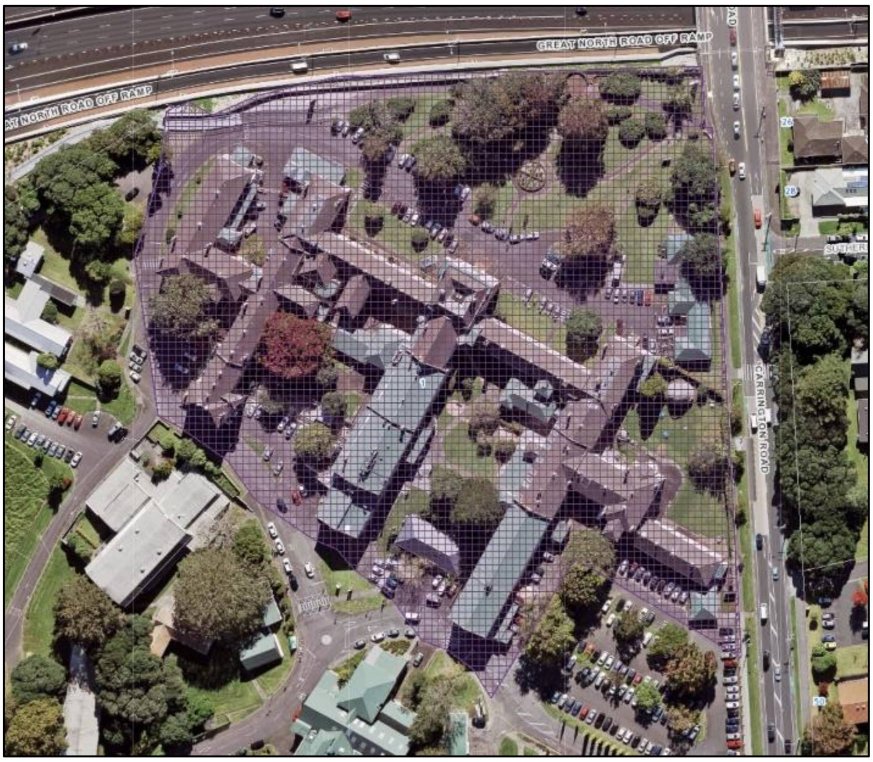
Parts of the precinct are currently zoned Special Purpose – Tertiary Education and Special Purpose – Healthcare Facility and Hospital and the plan change seeks to have this land rezoned Business: Mixed Use and Residential: Mixed Housing Urban.

The Plan Change also seeks to rename the Wairaka Precinct as the Te Auaunga Precinct. The Te Auaunga Precinct extends from the north western motorway in the north through to Woodward Road in the south and from Te Auaunga Waterway in the west through to Carrington Road in the east.

## 2 Background

The Former Oakley Hospital Building located at 1 Carrington Road, Mount Albert was constructed as a psychiatric hospital and continued in the role until 1992 when the site was purchased by Unitec Institute of Technology. It was then used to accommodate the School of Architecture and Design and other faculties. Unitec eventually vacated the building and consolidated its campus on the southern part of the site.

The Former Oakley Hospital Building is scheduled in the Auckland Unitary Plan (Operative in Part) as a Category A Historic Heritage Place. Part of the building is identified as a primary feature, while all buildings and structures constructed after 1905 are excluded. The scheduled item includes an Extent of Place which encompasses the whole of the main building and extends out to the boundary of the precinct with Great North Road in the north and Carrington Road in the east.




Former Oakley Hospital Main Building and Extent of Place in the Auckland Unitary Plan

The Former Oakley Hospital Building is also listed as a Category 1 historic place by Heritage New Zealand Pouhere Taonga. As there was human activity on the site prior to the year 1900, it will also be designated as an archaeological site under the Heritage New Zealand Pouhere Taonga Act 2014.

## 3 Purpose of Report

The area of land in the northwest corner of the site is immediately adjacent to the Extent of Place associated with the Former Oakley Hospital building. Under the proposed Plan Change specific provision for taller buildings in this location is sought. The buildings will be in relatively close proximity to the western end of the scheduled building but will not intrude into the Extent of Place.

The purpose of the report is to assess the impact of the proposed Plan Change on the heritage values of the Former Oakley Hospital Main Building and the Extent of Place and to outline aspects of the proposal that are considered to mitigate potential negative impacts on the heritage values of those places.

The report was commissioned by John Duthie, Director of Tattico Limited on behalf of HUD and was written by Dave Pearson, principal of DPA Architects.

## 4 Outline of Plan Change

As noted, the area that is the subject of this report is located in the north west corner of the precinct and immediately to the west of the Former Oakley Hospital Building. Within this area, it is proposed to enable buildings of a greater height than would otherwise be permitted in the underlying zone as a way of contributing to Auckland Council's proposals for population intensification to add diversity to the housing typologies offered on the site. A cluster of buildings may also provide a recognisable landmark which would help to define the northern part of the site.

As the area is generally away from other proposed residential areas, well separated from neighbouring residential suburbs, affords views over the upper Waitemata Harbour / Waitakere Ranges and back to Central Auckland and has good sun orientation, is the applicant's planning, landscape and urban design experts consider that this part of the precinct is eminently suitable for high rise development. This area is labelled as Height Area 1 on 1334.10.3 Te Auaunga: Precinct Plan 3 – Te Auaunga Additional Height.

In areas where taller buildings are proposed, additional controls will be introduced around wind, separation of buildings and maximum dimensions of floor plates. Detailed design criteria will be provided to ensure all buildings and taller buildings, in particular, achieve a high quality of design and functionality. In particular, in Height Area 1, the Plan Change provides for buildings of up to 35 metres in height with one building enabled up to 72 metres, one building to 54 metres and one building to 43.5 metres. The diagonal floor plate dimensions of the taller buildings are limited to ensure they have a slender form. Maximum tower plan dimensions are indicated in Figure 1334.6.11.2. A 14 metre building to building setback is also proposed.

Detailed assessment criteria are proposed to ensure the buildings attain a design standard of high quality. These are found in section 1334.8 Assessment – Restricted Discretionary Activities.

Also Included in the policies of the Te Auaunga Precinct is Policy 1334.3 (4)(i) which requires the identification and protection of significant landscape features, the adaptation of the scheduled historic buildings, identified trees and integrated open space network. Policy 1334.3 (11) also encourages the retention and adaptation of the heritage and character buildings.

The existing Wairaka Precinct provisions protect 47 trees. No change is proposed to the protected trees as part of this proposed plan change. The protected trees are shown on diagram 1334.10.2 Te Auaunga Precinct Plan 2 – Protected Trees. Trees that ae protected on the site include a number of mature pōhutukawa and other native and exotic trees along the north western boundary of Height Area 1.

## 5 Impact of Plan Change on Heritage

The proposed Plan Change will enable buildings of additional height to be constructed in relatively close proximity to the scheduled Former Oakley Hospital Building.

Although the proposed buildings will be outside the Extent of Place, the enabled development will potentially impact the heritage values of the former hospital. In particular, the proposed buildings will change the setting associated with the Former Oakley Hospital Building in that they will be located relatively close to its north west corner and will be visible above the Former Oakley Hospital Building when viewed from the north east. Any new buildings within Height Area 1 should be positioned and orientated having regard to their impact on the heritage values of the Former Oakley Hospital Building.

## 6 Mitigating Factors

The proposal endeavours to use the land of the Former Oakley Hospital site in the most efficient way by locating buildings of additional height in an area in the north west that will result in the least impact on the heritage values to the scheduled building.

The principal facade of the Former Oakley Hospital Building faces northeast and was built in two stages between 1864 and 1881. Historically, this view was also the most prominent and there was a vehicle entry located at what is now the junction of Carrington Road and the Great North Road. A driveway from the gate led to a turning circle in front of the main entrance. This traditional entry was severed with the construction of the North-western Motorway and the vehicular entrance to the site was relocated to the rear of the building on Carrington Road.

Oakley Hospital 1890s.

A distant view of the Former Oakley Hospital Building can still be had from the Point Chevalier shops and the building is also visible from Carrington Road. These views of the building and the landscaped area in front of the building will not be affected by the Plan Change.

The rear of the Former Oakley Hospital Building will also be visible from the new backbone road that will be formed leading from Carrington Road. The road carriageway will become the future south west edge of the building before turning through a right angle to extend further into the precinct. Consent has been granted to remove part of the central and eastern wing to facilitate this new road alignment.

As noted, the proposed Plan Change will potentially result in the construction of three new high rise buildings in proximity to the Former Oakley Hospital Building. The taller buildings when viewed from the northwest will act as a landmark and a symbol of a new urban environment. Viewed from the northwest, a group of protected trees along the boundary currently screens the Former Oakley Hospital Building from view. Under the proposed Plan Change, due to the tree protection rule, there will be effectively a 10 metre boundary setback within which the new buildings will not be able to encroach to ensure the trees remain.

The new buildings will therefore not change the current situation where the trees prevent a view of the Former Oakley Hospital Building from this aspect. The trees will, however, have the effect of reducing the bulk of the new buildings from this viewpoint.

As noted, the Plan Change will enable the construction of a group of new high-rise buildings in close proximity to a corner of the Former Oakley Hospital Building. By way of comparison, the Pacifica Hotel in Customs Street East, Auckland Central rises to a height of 178 metres above street level. Across the road at a distance of some 20 metres is a group of significantly lower four and five storey heritage buildings within the Britomart Precinct. The two building typologies co-exist harmoniously as part of the city scape and reflect the typical evolution of a city.

As described above, the policies of the Te Auaunga Precinct encourage the retention and adaptation of the scheduled heritage building, however very relevantly the Former Oakley Hospital Building will require costly seismic upgrades to meet the relevant building code requirements, as well as other significant works to adapt the building to a viable future use. It is hoped that construction of intensive residential development on the precinct will provide financial support to help achieve these policies.

## 7 Conclusion

The site of the Former Oakley Hospital in Point Chevalier was purchased by the Unitec Institute of Technology after the hospital closed. The building was then subsequently occupied and then vacated by Unitec and became known as the Wairaka Precinct with the adoption of the Auckland Unitary Plan.

Three Rōpū are in the process of preparing a master plan for the site supported by HUD which has instigated a Private Plan Change to enable the precinct to be developed. The Plan Change also seeks to rename the precinct as the Te Auaunga Precinct. The Precinct includes policies that encourage the retention and adaptation of heritage buildings on the site including the Former Oakley Hospital.

Under the Plan Change, an area of land in the north-western corner of the precinct adjacent to the Extent of Place associated with the Former Oakley Hospital Building and close to the building itself will be set aside as Height Area 1 within which buildings will be able to be constructed to a greater height than would otherwise be permitted in the underlying zone. The site is generally considered to be suitable for the location of taller buildings which will act as a landmark to the north of the site and symbolise the changing character of the site to an urban environment.

Due to the close proximity of Height Area 1 to the Former Oakley Hospital, any new buildings, and particularly those of additional height, will have an impact on the heritage values of the Former Oakley Hospital. However, a juxtaposition of heritage buildings and taller new buildings in close proximity is a characteristic of modern cities and one that can be seen in Auckland CBD. Any new buildings should still be sited having regard to their impact on the Former Oakley Hospital.

As noted, the policies of the Te Auaunga Precinct encourage the retention and adaptation of heritage buildings in the precinct. Any adaptation of the Former Oakley

Hospital building will require substantial funding and the hope is that construction of the new buildings and development of the Precinct will facilitate financial contributions to support the retention of the heritage building.

Dave Pearson B Arch ANZIA
Principal DPA Architects

23 December 2022

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**fig. 1** former asylum building, 1 carrington road.

# former oakley hospital main building and extent of place

## 1 carrington road auckland

# assessment of effects on historic heritage

for

## ministry of housing and urban development

final- july 2023

| Issue history | Date |
|---|---|
| Draft version for internal review | 15-05-2023 |
| Revised draft version for internal review | 09-06-2023 |
| Revised draft version for internal review | 20-06-2023 |
| Revised draft version for internal review | 08-07-2023 |
| FINAL | 11-07-2023 |

Prepared for:
Hannah Mcgregor
Land Acquisition and Development Team
Ministry of Housing and Urban Development (HUD)



Auckland, July 2023

## contents

# 1. executive summary

The historic heritage place (building and defined Extent of Place (**EOP**)) formerly known as the former Oakley Hospital Main Building, and also known variously as Whau Asylum, Carrington Hospital and, more recently, Unitec Building One will be affected to a minor degree by the proposed height increases in Height Area 1. Overall, the proposed change in height in Height Area 1 adjacent to the west of, but beyond the EOP associated with, the former Oakley Hospital is unlikely to have a significant adverse effect on its historic heritage values.

The analysis of heritage elements for previous planning applications has focused on the historic building fabric and the chronology of development on the associated site (that being within the associated EOP). This report considers the wider setting and environmental context of the scheduled historic heritage place and how effects arising from the proposed Te Auaunga Precinct Private Plan Change can be appropriately considered against those recognised historic heritage values and in the context of adjacent zoning that seeks residential intensification outcomes.

The proposed Height Area 1 is intended to become a marker of the wider northern portion of the site which can be observed from the longer reaches of the western area of the region. The western site edge has dense planting which currently obscures the historic building. The building was not designed to be appreciated from this range and consequently makes only a slight contribution to the area. Installing large landmark buildings in this location is an appropriate approach considering effects on historic heritage values that can be achieved without causing any change to how the historic heritage place is understood and appreciated.

The proposed change to Height Area 1 offers better clarity to the consideration of potential effects of built form (notably height) within the setting of the former Oakley Hospital. The proposed arrangement of the three building sites and their respective maximum heights provides a spatial layering which illustrates how the depth and scale of the development sites, combined with the advantage of the natural and substantial changes in ground level, might allow the historic building to remain appreciable as a prominent feature in the wider townscape context.

The architectural emphasis of the historic former Oakley Hospital Main Building is strongly horizontal and it relies on the open space around it recognised by the defined EOP, specifically to the front as illustrated in view VS6 in commanding its prominent position in the townscape and open space setting. The operative Auckland Unitary Plan (**AUP**) allows height in this area that surpasses the ridgeline of the historic building. The proposed additional height changes the backdrop to the former Oakley Hospital Main Building, but it would remain nonetheless appreciable as a prominent building within the wider area. The articulation of the open space in the foreground of the Oakley Hospital Main Building could be enhanced to support the development site as a permeable threshold to the local town centre of Point Chevalier.

Overall, the proposed change in height is unlikely to have a substantial effect on the interior shading of the historic building and, in some cases, the effects appear to lessen. The formerly long views from these wards and corridors will become shorter in some locations, but the proposed height increase will not worsen the effects from shading from those generated by the currently operative controls.

## 2. commission

**archifact – architecture & conservation ltd** (Archifact) was commissioned by Ministry of Housing and Urban Development (**HUD**) in March 2023.

## 3. brief

The brief for the project required Archifact to undertake an independent and objective professional assessment with respect to the proposed private plan change to rezone land within the current Wairaka Precinct and to amend the provisions within the existing precinct, including a request to rename the precinct "Te Auaunga" (the **Te Auaunga Plan Change**).

The operative Wairaka Precinct comprises 64.5 ha of land partially bordered by Carrington Road, Oakley Creek (Te Auaunga), and the North-Western Motorway. The southern end of the precinct is contained by Woodward Road and a series of smaller side roads with residential plots forming the southernmost edge.

The elements of the plan change are set out in full in the application materials, including specifically the Planning Report including section 32 assessment, prepared by Tattico, dated 21 December 2022.

Of relevance to this heritage assessment, the plan change proposes identification of areas within the precinct where additional height can be accommodated, including in proximity to the former Oakley Hospital Main Building.

Although included in the Wairaka Precinct, the land apportioned to the Mason Clinic (Sub-precinct A), is excluded from the proposed plan change and is being addressed in a separate process. There are no historic heritage elements in that area.

Archifact have been appointed by HUD to provide advice in relation to potential adverse effects on historic heritage values at the former Oakley Hospital and site, specifically providing consideration of those effects arising from development potential enabled in Height Areas 1, 2, & 4as they are described in the Te Auaunga Plan Change and are new to the Plan Change as they are not included in the operative Wairaka Precinct. The Auckland Council RMA Clause 23 *Requests and Response* includes matters relating to effects on historic heritage[1] which specially seeks comment on impacts of increased buildings heights in Height Areas 1, 2, and 4 as these areas are in close proximity to the former Oakley Hospital Main Building and its associated EOP. The proposed heights in these areas are appropriate to their respective locations to the west (Area 1), south (Area 2) and north and east (Area 4) and also respond to, and are positively influenced by, their respective topographic condition.

Height Area 1 is proposed to accommodate increased heights from that currently enabled at 27m to provide for heights proposed at 35m generally, plus three towers at 43.5m, 54m, and 72m.

This commission complements that being undertaken by Dave Pearson Architects as a separate independent assessment.

---

[1] AUP RMA Clause 23 *Requests and Responses*, section H, items H1-H12.

# 4. identification of the place

## 4.1 address

1 Carrington Road
Mount Albert
Auckland

NZTM reference: N:1752284
W:5917843

## 4.2 ownership

The site is owned by the Ministry of Housing and Urban Development.

## 4.3 legal description

LOT 5 DP 314949

## 4.4 local authority status

The former Oakley Hospital Main Building is located within the subject site at 1 Carrington Road, within the operative Wairaka Precinct under the AUP.
The Te Auaunga Plan Change applies to the land on which the former Oakley Hospital, also known variously as, Whau Asylum, Carrington Hospital, and more recently Unitec Building One, is located. The former Oakley Hospital Main Building and its EOP are listed in the AUP *Schedule 14.1 Schedule of Historic Heritage* (Schedule ID 01618) as a Category A historic place. The listing includes the interiors and excludes "*all buildings and structures constructed after 1905, whether attached to the Oakley Hospital Main Building or freestanding; all vegetation within the extent of place; all post 1905 modifications to the interior of the Oakley Hospital Main Building*".[2]

This Category A heritage place is identified as having recognised historic heritage values of:

- Historic (a);
- Social (b);
- Physical Attributes (f);
- Aesthetic (g); and
- Context (h).

## 4.5 heritage new zealand pouhere taonga listing

The subject place at 1 Carrington Road, Mount Albert, the building and the site, is listed as Item 96 in the New Zealand Heritage List/Rārangi Kōrero administered by Heritage New Zealand Pouhere Taonga (**HNZPT**) as a Category 1 historic place.

## 4.6 archaeological status

It is acknowledged that the site, having been associated with human activity before 1900, may be defined, in accordance with Sections 6a(i) and 6b of the Heritage New Zealand Pouhere Taonga Act 2014, as an archaeological site.

2 AUP Schedule 14.1 list entry 01618

The ArchSite Archaeological Recording Scheme administered by the New Zealand Archaeological Association records an archaeological site immediately to the south and southeast of the central wing of the Oakley/Carrington Hospital building as R11/3365. This archaeological site is recorded as representing:

> "*at least three outbuildings constructed prior to 1900 that were connected with the occupation of Oakley/Carrington Hospital. These are visible in an 1890 plan of the asylum (PWD16667), and detailed further in a 1903 plan showing alterations to the main hospital building at that time. These were noted to be a 'workshop', 'boiler house' and 'drying shed'*".[3] The record also records that "*these buildings are subsurface now under landscaped areas of grass, courtyards and private roads. Test pits show subsurface compacted scoria floors remain in some locations.*"[4]

An application for an Authority must be made to HNZPT for any activities that will or may modify or destroy the whole or any part of any archaeological site.

## 5. planning policy context

The government's National Policy Statement on Urban Development (NPS-UD) came into force in August 2020. In response, changes to the AUP to allow for greater building heights and densities in urban Auckland are being considered through Proposed Plan Change 78 - *Intensification*. Proposed Plan Change 80 to the AUP, seeks amendments to the AUP's Chapter B Regional Policy Statement (**RPS**) to support Proposed Plan Change 78 – *Intensification*. Request H3 to Appendix 1 of the Auckland Council RMA Clause 23 *Requests and Responses* seeks to test the proposed plan change against the AUP RPS objectives and policies. These matters are considered below.

Chapter B2 addresses urban growth and development and includes (amongst other matters) in the *Issues* at B2.1(6) the maintenance and enhancement of the quality of the environment, both natural and built. This is supported by *Policies* (development capacity) at B2.2.2(2)(g) that protect "*natural and physical resources that have been scheduled in the Unitary Plan in relation to natural heritage, Mana Whenua, natural resources, coastal environment, historic heritage and special character*".

*Objectives* for a quality built environment at B2.3.1(1)(a) target a quality built environment where subdivision, use, and development (amongst other matters) should respond "*to the intrinsic qualities and physical characteristics of the site and area, including its setting*". This is supported by *Policies* at B2.3.2(1) that manage the form and design of subdivision, use and development so that development:

> (a) *supports the planned future environment, including its shape, landform, outlook, location and relationship to its surroundings, including landscape and heritage.*

At B2.4 (*residential growth*) is addressed through *Objectives* at B2.4.1(2) that target residential areas that are attractive, healthy, and safe with quality development in keeping with the planned built character of the area. *Policies* at B2.4.2(2) enable higher residential intensities in areas closest to centres, the public transport network,

3 NZAA Site Number R11/3365, https://archsite.eaglegis.co.nz/NZAA/Site/?id=R11/3365
4 ditto

large social facilities, education facilities, tertiary education facilities, healthcare facilities and existing or proposed open space. At B2.4.4(c) the *Policy* provides for lower residential intensity in areas where there are “natural and physical resources that have been scheduled in the Unitary Plan in relation to natural heritage, Mana Whenua, natural resources, coastal environment, historic heritage and special character”.[5] At B2.4.2(5)(a) the *Policy* looks to:

> “*avoid intensification”* where there are “*natural and physical resources that have been scheduled in the Unitary Plan in relation to natural heritage, Mana Whenua, natural resources, coastal environment, historic heritage or special character*”

It is noted that this *Policy* is qualified “*where such intensification is inconsistent with the protection of the scheduled natural or physical resources or with the avoidance or mitigation of the natural hazard risks*”. In this case, the proposed intensification is not considered to be inconsistent with the protection[6] of the scheduled former Oakely Hospital.

B5 of the AUP provides RPS provisions concerning the identification and management of Auckland’s distinctive historic heritage and special character values and includes (amongst other matters) *Issues* at B5.1 that recognise that:

> (1) *Auckland’s distinctive historic heritage is integral to the region’s identity and important for economic, social, and cultural well-being*.

and

> (2) *Historic heritage needs active stewardship to protect it from inappropriate subdivision, use and development*.

*Objectives* that guide historic heritage target protection in accordance with s6(f) of the RMA and at B5.2.1 include:

> (1) *Significant historic heritage places are identified and protected from inappropriate subdivision, use and development*.

and

> (2) *Significant historic heritage places are used appropriately and their protection, management and conservation are encouraged, including retention, maintenance and adaptation*.

These *Objectives* are supported by *Polices* that address the protection of scheduled significant historic heritage places at B5.2*.2* that include at:

> (6) *Avoid significant adverse effects on the primary features of significant historic heritage places which have outstanding significance well beyond their immediate environs including:*
>
> *(a) the total or substantial demolition or destruction of any of the primary features of such places;*

The primary features of the historic former Oakley Hospital building are defined in the AUP at Schedule 14.3 (refer Figures 4 and 5 below). The consented works to the former Oakley Hospital (unrelated to the proposed Te Auaunga Plan Change) include

5 AUP Chapter B2.4.2(4)(c)
6 See RMA s6(f)

partial demolition of post-1905 extensions to the historic building. These elements are distinctly expressed in the AUP as not being primary features and as such are recognised as having lesser historic heritage significance. The proposed Te Auaunga Plan Change does not include any amendments that conflict with the existing consents and, in heritage terms, does not present any conflict to the consented works currently underway.

*(b) the relocation or removal of any of the primary features of such places away from their original site and context.*

The proposed Te Auaunga Plan Change does not require the relocation or removal of any of the primary features of the former Oakley Hospital.

(7) *Avoid where practicable significant adverse effects on significant historic heritage places. Where significant adverse effects cannot be avoided, they should be remedied or mitigated so that they no longer constitute a significant adverse effect.*

The EOP is also recorded in the AUP to identify the surroundings associated with the historic heritage values of the place which contribute directly to its significance or allow it to be understood and appreciated. The development enabled through the Proposed Plan Change avoids physical encroachment within the EOP and capitalises on the topography in Height Area 1 where greatest height is proposed as the land falls away from the former Oakley Hospital. While there may be a perceived visual relationship between the Proposed Plan Change heights and the scale or the former Oakely Hospital and its EOP, that height and development in accordance with it is behind and to the side of the principal formal visual relationship to the northern elevation of the Hospital building.

and,

(8) *Encourage new development to have regard to the protection and conservation of the historic heritage values of any adjacent significant historic heritage places.*

New development enabled through the Proposed Plan Change responds appropriately to the historic heritage values of the former Oakley Hospital Building and its associated EOP. The spatial condition which the former Hospital Building frames (both to the north and into the associated formal landscape and EOP, and to the south and the lesser scaled courtyard spaces framed by the wings of the building are protected and conserved.

B5.4 of the RPS provides and explanation and reasons for the adaption of provisions associated with historic heritage values, noting that:

> "*Historic heritage helps people to understand and appreciate their history, culture and identity. Historic heritage places contribute to Auckland's distinctiveness as a visitor destination and to its economic vitality. The recognition, protection, conservation and appropriate management of historic heritage places will help future generations appreciate what these places mean to the development of the region. Historic heritage places are a finite resource that cannot be duplicated or replaced.*
>
> *There are two key components in managing historic heritage places and areas:*

- *the recognition of their significance, which may include multiple values, and protection of places with significant values through restrictions on demolition and modification;*

- *the protection of their values through appropriate use of them (including adaptive re-use) and appropriate management of their context, including other activities which may affect them.*"[7]

## 6. methodology

This report offers an independent and objective professional assessment of the potential impact on historic heritage values of the existing scheduled building at 1 Carrington Road, Auckland relative to the proposed Height Areas 1, 2 & 4 as they are described in the Te Auaunga Plan Change. This report also takes into account guidance from HNZPT where it considers where land is essential for retaining and interpreting heritage significance as well as considerations for new buildings to be introduced to the surroundings.[8]

The RMA recognises historic heritage as a matter of national importance and, at s6(f), protects historic heritage from inappropriate subdivision, use, and development. The RPS of the AUP at Chapter B5 includes at B5.1 *Issues* that recognise:

(1) *Auckland's distinctive historic heritage is integral to the region's identity and important for economic, social, and cultural well-being; and,*

(2) *Historic heritage needs active stewardship to protect it from inappropriate subdivision, use and development.*

In a manner similar to the Learning Quarter Precinct provisions in the AUP, a best practice approach to considering effects arising from the Te Auaunga Plan Change on adjacent historic heritage values found in the former Oakley Hospital Main Building and its associated EOP provides an appropriate lens through which to consider potential adverse effects. As such, Objectives that target the recognition, protection, and enhancement of heritage values including historic heritage places, Māori sites of significance, and notable trees and the contribution they make should be considered. Open spaces and pedestrian connections to the wider context, including connections between activities and open spaces, should also be provided for and enhanced.

This assessment has been based on information available at the time. A site visit was conducted on 30th March 2023. The building is currently secured, and interior access is not possible. Access to the east and south-east ends of the building were not possible, due in part to construction works that are underway. Access to proposed Height Area 1 and to the wider site to a medium distance was possible and considered sufficient to meet the requirements of the brief at this stage.

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This assessment is based on the proposals that have been prepared for the precinct level plan change and described in the associated reports:

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7 AUP Chapter B5.4

8 *Sustainable Management of Historic Heritage Guidance, Information Sheet 16 'Assessing Impacts on the Surroundings associated with Historic Heritage'*

- Wairaka Precinct: Plan Change Request to Auckland Unitary Plan, Tattico 21 December 2022;

- Te Auaunga Private Plan Change: Assessment of Landscape and Visual Effects, Boffa Miskell 21 December 2022, updated in 2023; and,

- Te Auaunga Private Plan Change: Urban Design Assessment, Boffa Miskell 21 December 2022.

# 7. site and context

## 7.1 location

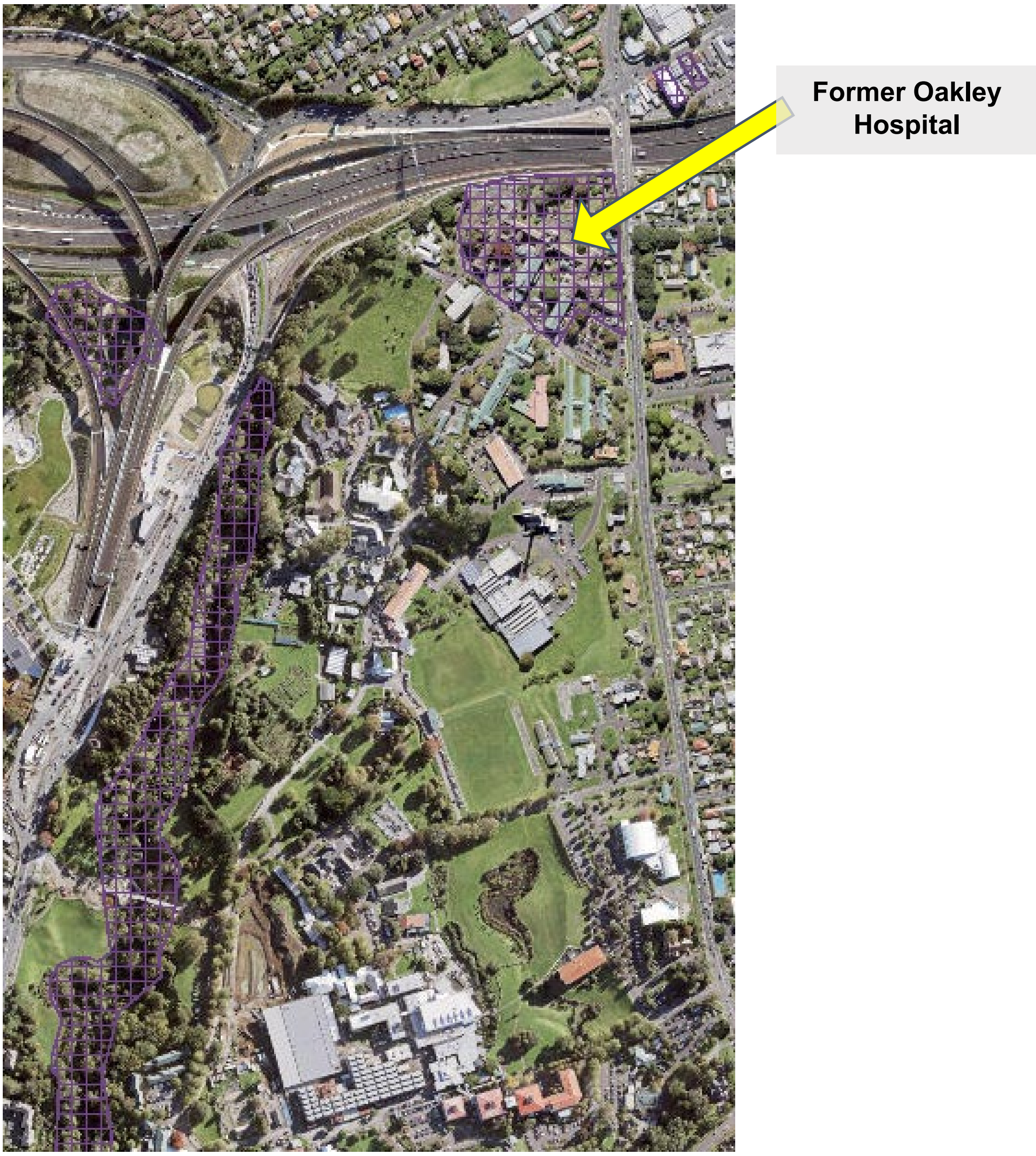


**Fig. 2** Site aerial showing the former Oakley Hospital Main Building and associated Extent of Place (arrowed), its associated Extent of Place (purple hatch), and its wider surrounding context. True north is directly up the page. (Auckland Council GeoMaps GIS Viewer, 2023)

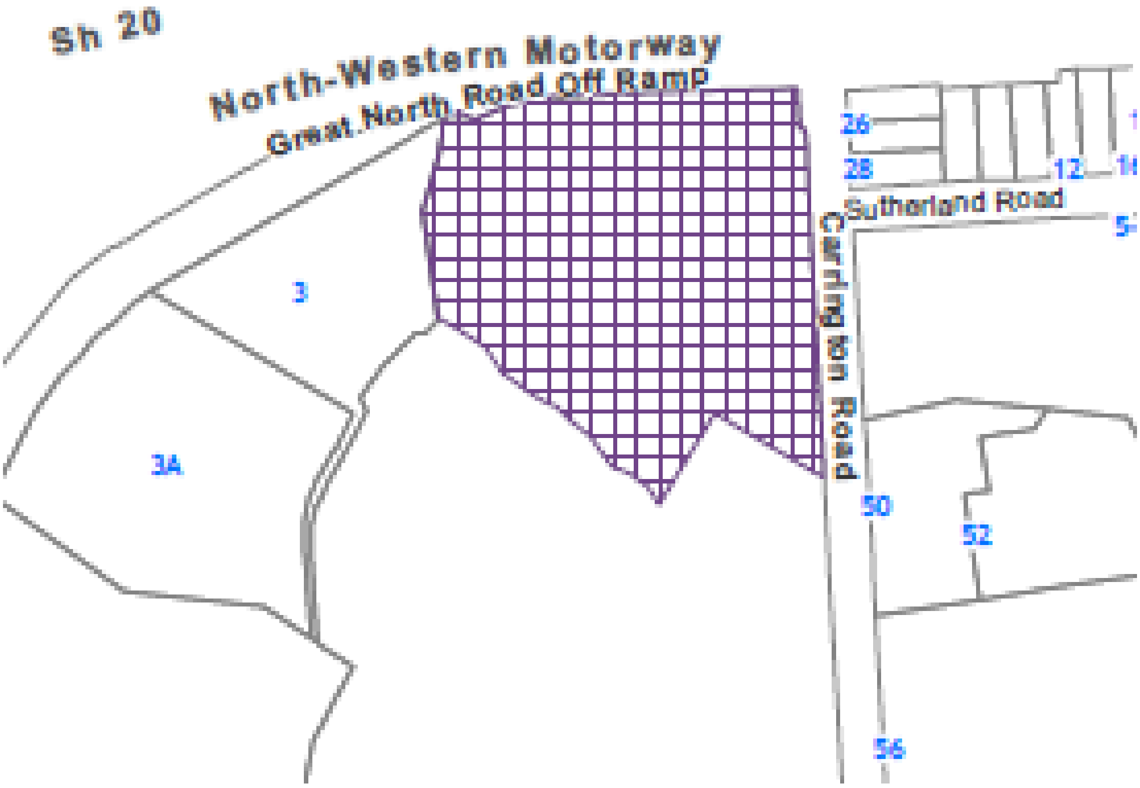


**Fig. 3** Extent of Place shown hatched, from AUP 2016 GIS planning maps. (Auckland Council GeoMaps GIS Viewer, 2023)

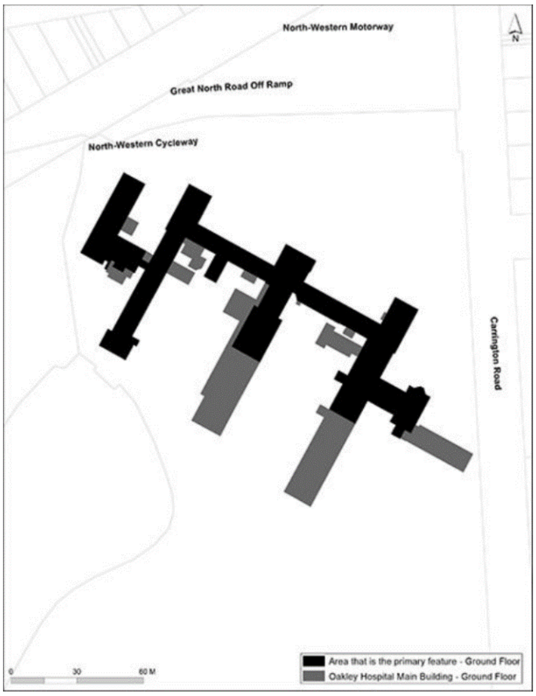


**Fig. 4**: Ground floor, primary features diagram, Auckland Unitary Plan 2016

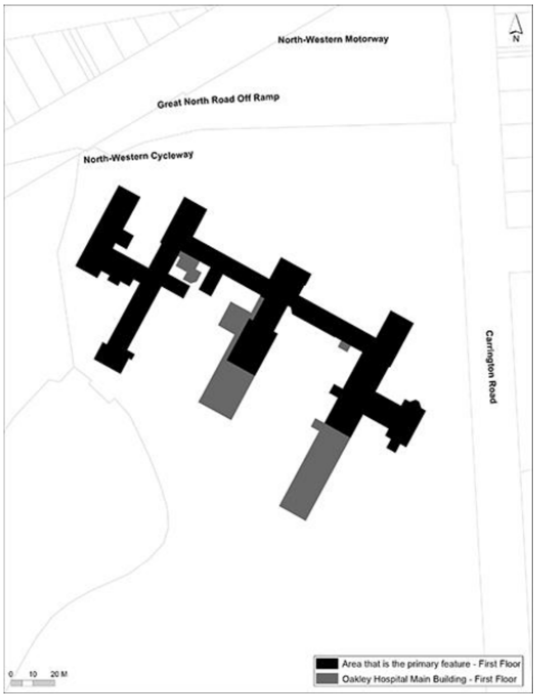


**Fig 5**: First floor, primary features diagram, Auckland Unitary Plan 2016

The primary features of the historic building are defined in the AUP at Schedule 14.3 (refer Figures 4 and 5 above). The areas in black indicate the parts of the building that make a high contribution to its historic heritage values. The grey areas are later additions of lesser significance, or represent intrusive elements that do not support the historic heritage values. The EOP is also recorded in the AUP to identify the surroundings associated with the historic heritage values of the place which contribute directly to its significance or allow it to be understood and appreciated. The AUP describes EOP as:

> *'The extent of place comprises the area that is integral to the function, meaning and relationships of the place and illustrates the historic heritage values identified for the place. The provisions relating to a historic heritage place apply within the area mapped as the extent of place on the Plan maps, including the airspace.'*[9]

The EOP for the former Oakley Hospital Main Building reflects the building's complex form and acknowledges that it should be experienced 'in the round' and not simply from any one specific viewpoint. Kinetic views of the place are also accessed from further distances and the EOP associated with the principal-built form offers a spatial relief which assists in maintain the historic heritage values of the place and its prominence in its townscape context and setting.

## 8. recent planning history

Works are currently in progress within the precinct to upgrade and future-proof road entrances to provide access to the consented and planned residential development.

Resource Consent (LUC60386272) authorises the construction of new a multi-modal road that will improve access for pedestrians, cyclists and a variety of vehicles at the closest point to the Point Chevalier shops. The road is designed to provide a high degree of accessibility to existing infrastructure and is partially constrained by the topography of the site which includes substantial retaining walls and gradients. Figure 6 below illustrates the location of the consented road alignment in the vicinity of the former Oakley Hospital Main Building.

The consented works include partial demolition of post-1905 extensions to the historic building. These elements are distinctly expressed in the AUP as not being primary features and as such are recognised as having lesser historic heritage significance. The proposed Te Auaunga Plan Change does not include any amendments that conflict with the existing consents and, in heritage terms, does not present any conflict to the consented works currently underway.

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[99] Auckland Unitary Plan – Operative in Part 2016, Part D17 Historic Heritage Overlay, p.2

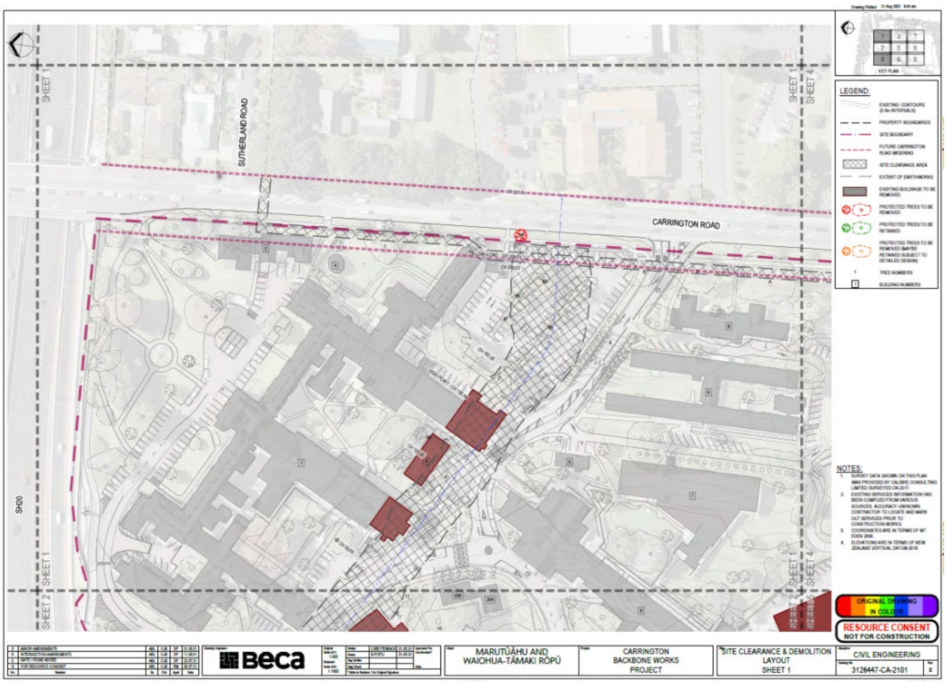



**Fig. 6**: Consented multi-modal road access showing partial demolition of the non-primary features of the historic building.

# 9. review of extent of place and historical landscape setting

The analysis of heritage elements for previous planning applications has focused on the historic building fabric and the chronology of development on the associated site (that being within the associated EOP). This report considers the wider setting and environmental context of the scheduled historic heritage place and how effects arising from the proposed Te Auaunga Precinct Private Plan Change can be appropriately considered against those recognised historic heritage values and in the context of adjacent zoning that seeks residential intensification outcomes.

The contribution of the surroundings of the hospital to its historic heritage value are considerable given the medical and social context within which treatment and attitudes to the mentally ill were being addressed at the time of its establishment. In Britain, the Lunacy Act 1845 made the provision of asylums (particularly for paupers) the responsibility of respective county administrations. This is considered the start of an 'asylum era' which spurred impressive building projects and variations of a new building typology. As is the case for the former Oakley Hospital, many of these designs were issued to the colonies and, although spurned as mere patterns by local architects, were re-worked into meaningful tender documents and robustly constructed with local knowledge and experience. The approach of the Lunacy Act was comprehensive in requiring asylum projects to be properly managed, inspected and regulated with design standards.

> *"The construction, arrangement, and government of Asylums for the Insane are subjects at this time so important, in consequence of the new asylums about to be built in England and Wales, and in Ireland, as well to deserve very careful consideration... The recovery of the curable, the improvement of the curable, the comfort and happiness of all the patients, should therefore steadily be kept in view by the architect from the moment when he commences his plan"*[10]

10 Connolly, J., *The Construction and Government of Lunatic Asylums*, 1847: reprint with Introduction by Hunter, R., and Macalpine, I., London, Dawsons of Pall Mall, 1968

Institutions such as hospitals, schools, and the police broadly adopted a similar approach to their buildings in the mid-late 19th century. This involved making the buildings as appealing as possible to their users. Some of the considerations related to this included using domestically scaled elevations, warm toned bricks and clear hierarchies to openings to indicate the public access routes. The 1994 Conservation Plan for the building also notes the particular influence that military designs have had on buildings of this scale and use type where it notes:

> *'The design of these buildings was greatly influenced by the work of military engineers and, in particular, the work of Sir Edmund du Cane (1830-1903), the designer of Wormwood Scrubs prison, he brought to the design of these institutions concepts of hygiene, economy and functionalism. His prison plans were logical and clean with integrated system of heating and ventilation. Typically, these buildings were based on a series of parallel wings connected by covered ways and this principle was rapidly adapted to hospital design as a means of preventing the spread of infections and allowing the introduction of light and air into individual rooms.*
>
> *Although by the standards of today the new institutions may be seen to have been harsh and austere, they represented a significant shift from a system which had previously either physically tormented such people or left them to fend for themselves - whether inside an institution or out. The sense of civic obligation to such persons meant that funds - albeit limited – were always assured to guarantee continuity of care, food and shelter."*[11]

## 9.1 dual aspect

The historic building is a threshold to the local town centre of Point Chevalier. The nature of the original use as an asylum necessarily created a defensible edge between the two locations. This is particularly evident in the minimal number of openings in the principal façade, with only one entry to the building shown at ground level on the early plans. Early photographs show the boundary treatments of the hospital to be low-rise and relatively open without planting obscuring any part of a building designed to be state of the art for its time. The large, landscaped gardens to the front of the building allowed for natural surveillance from both the interior of the building and the local streets of town centre, perhaps providing sufficient time and space for any untoward events to be dealt with efficiently. The rear elevations of the historic building have a decidedly different quality to the front, offering two contained 'airing courts' with the E-shaped floor-plate of the principal building.

The middle of the 19th century introduced developments in health care that are considered positive advancements by contemporary standards. As well as improving science around the need for hygiene and anaesthesia in surgery during the early 19th century, mental health care was experiencing a shift from being security-focused to understanding the elements of successful rehabilitation. This approach is very evident in the architecture of the former Oakley Hospital Main Building with the inclusion of the 'airing courts' to the rear of the building and the generous composition of fenestration featured in the wards and corridors allowing light and air to flow throughout the building.

The role of the outlook and aspect in the restoration of patients to better health was increasingly considered important as well as it being an opportunity to connect to nature, which was thought to be an effective way to calm the mind. To this end the

[11] Former Carrington Psychiatric Hospital Avondale, A Conservation Plan, Salmond Architects, Second Draft. July 1994

hospital provided long views from some wards, kitchen gardens, small animal farming and daily exercise in the female and male airing courts.

### 9.2 sequence of spaces

There remains a clear opportunity within the precinct in the vicinity of the former Oakley Hospital Main Building to enhance the responses to the architecture and location of the historic building. This is reflected, in part, in the Boffa Miskell Open Space Framework (December 2016) document, based on Auckland Council Open Space Provision Policy 2016 illustrated at Figure 7 (below). Understanding the arrangement of the existing building will help to inform future uses and how the place can best be adapted to inform identity and sense of place for new and existing communities in a positive and truly functional manner. The architecture of the existing building has a strict hierarchy of spaces which stem from the principal elevation through to the rear of the site which navigates substantial land contours with terraces and later built form.

### 9.3 desire lines

The currently uncoordinated arrangement of landscape planting, boundary treatments, 20th century road network modifications including the incursion of the North-Western Motorway (SH16) in a deep cut between the local town centre and hospital building, security measures and discrete educational use have cumulatively severed the historic building from the local town centre. The amended precinct plan, in proposing to formalise the extent of place in front of the building as open space, creates an opportunity to adapt elements within the title boundary to better interconnect the building with surrounding infrastructure, and the adjacent town centre, including through intuitively navigated pedestrian and cycle routes.

### 9.4 kinetic views

The setting of the former Oakley Hospital is such that it is experienced from a range of places and at a variety of scales. The dynamic nature of the road network to the north of the site also applies the scale of speed to vehicles travelling at 80 and 100kms/hr. The opportunity to appreciate a two-storey, horizontal building from such position is fleeting at best. At this scale, the historic building is a backdrop. As traffic speeds decrease, cyclists and pedestrians are able to navigate the paths along Great North Road and Carrington Road as well as within the site at a pace which has better opportunity to experience the building and its immediate surrounds in a pleasant way.

The proposed Height Area 1 is intended to become a marker of the wider northern portion of the site which can be observed from the longer reaches of the western area of the region. The western site edge has dense planting which currently obscures the historic building. The building was not designed to be appreciated from this range and consequently makes only a slight contribution to the area. Installing large landmark buildings in this location is an appropriate approach considering effects on historic heritage values that can be achieved without causing any change to how the historic heritage place is understood and appreciated.

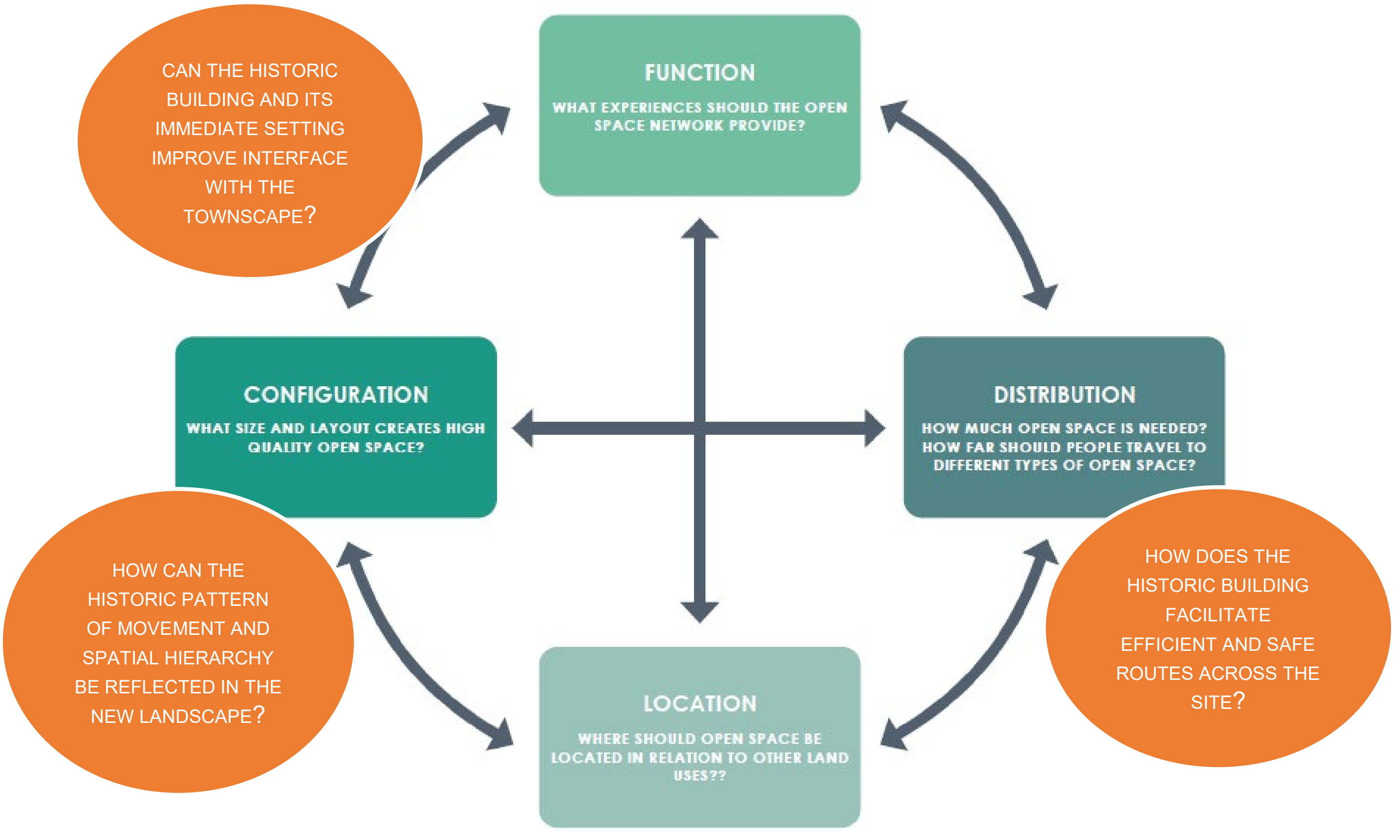
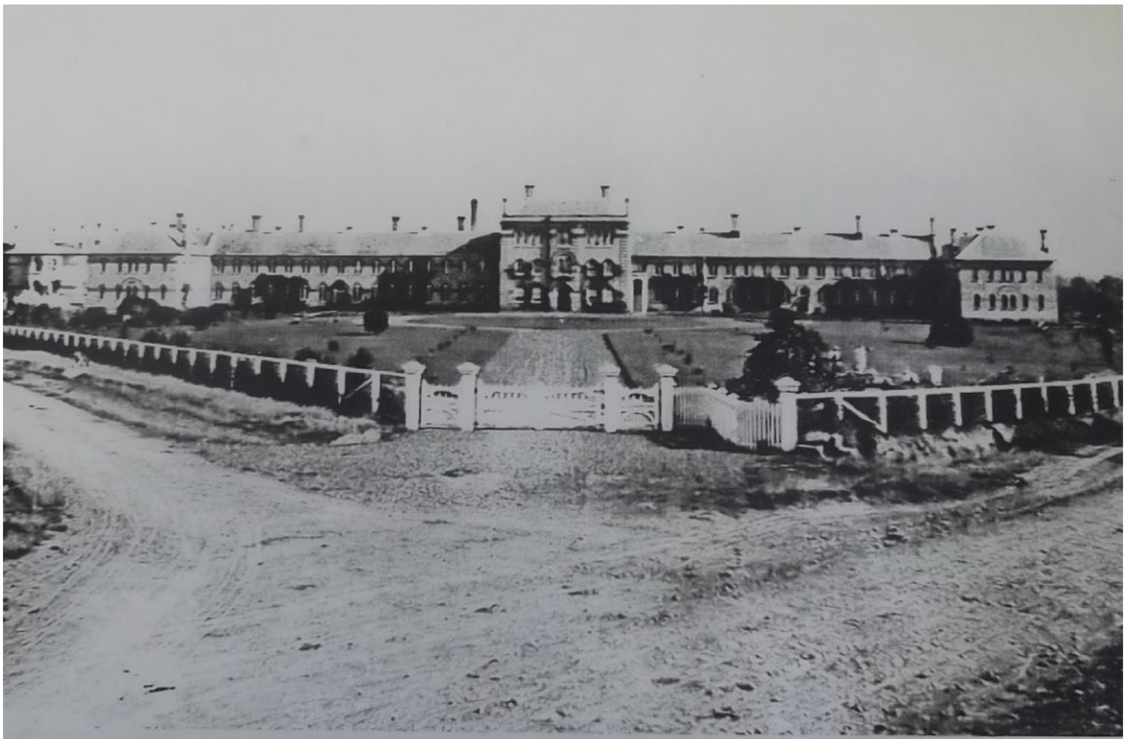



**Figure 7:** Excerpt from Boffa Miskell Open Space Framework (December 2016) document, based on Auckland Council Open Space Provision Policy 2016, with heritage opportunities added here in orange.



Carrington Hospital building from the north entrance ca.1895, *Auckland Institute and Museum*, neg C21

**Fig. 8:** 19th century image of the principal elevation showing the low-rise boundary treatment and visual permeability as well as the early earthwork ha-ha level change. [12] Penny Cliffin presentation

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**Fig. 9:** 1940 aerial view of Carrington Hospital and surrounds. The cyan line running east-west indicates where the site was modified to accommodate the North-Western Motorway in the 1960s.

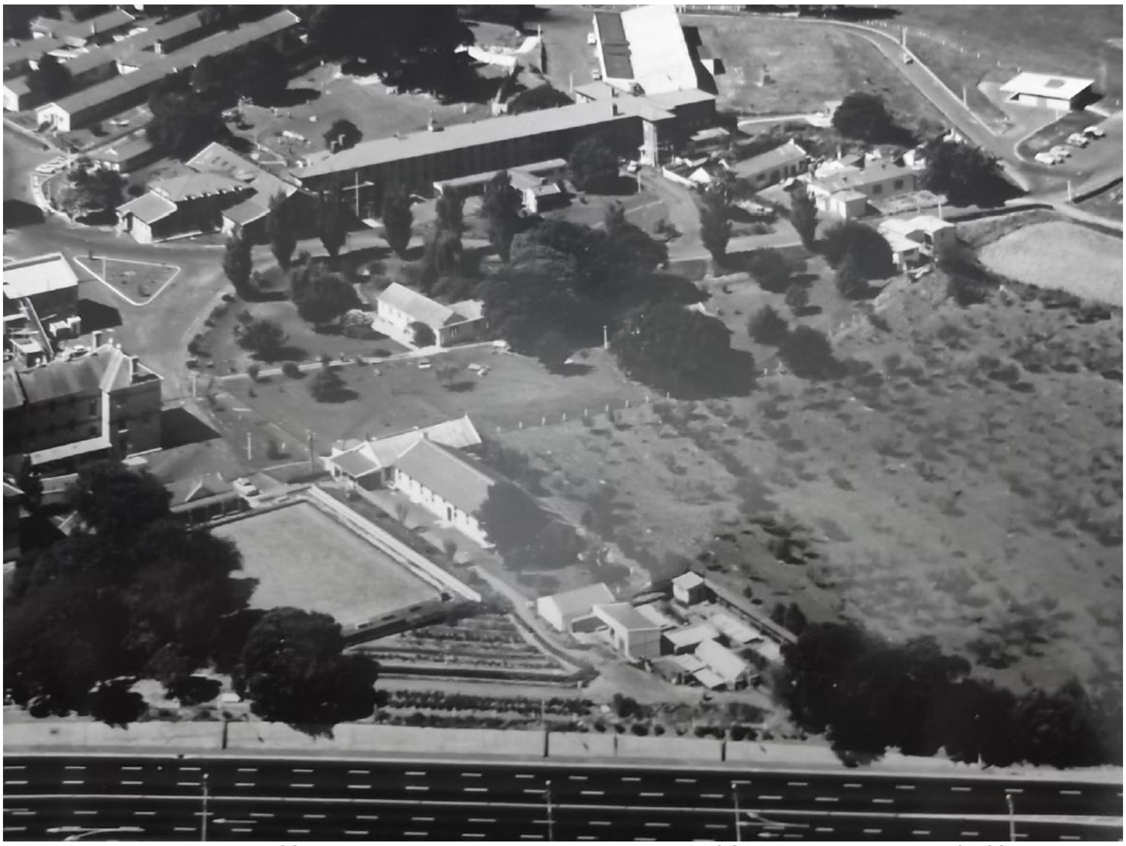

**Fig. 10:** Aerial view of former bowling green and southeast corner of Carrington Hospital to left of frame.


**Fig. 11:** Photograph of former bowling green in use to the south-west corner of the former Oakley Hospital Building.[13].

**Fig. 12:** 2023 photograph, area in vicinity of former bowls lawn, showing retained ground possibly associated to the former green.

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13 Cliffin, P.F. (2012). Unitec Arboretum. CITYPLANTastic, 8th International Conference, World in Denmark, University of Copenhagen, Copenhagen. 27-29 June

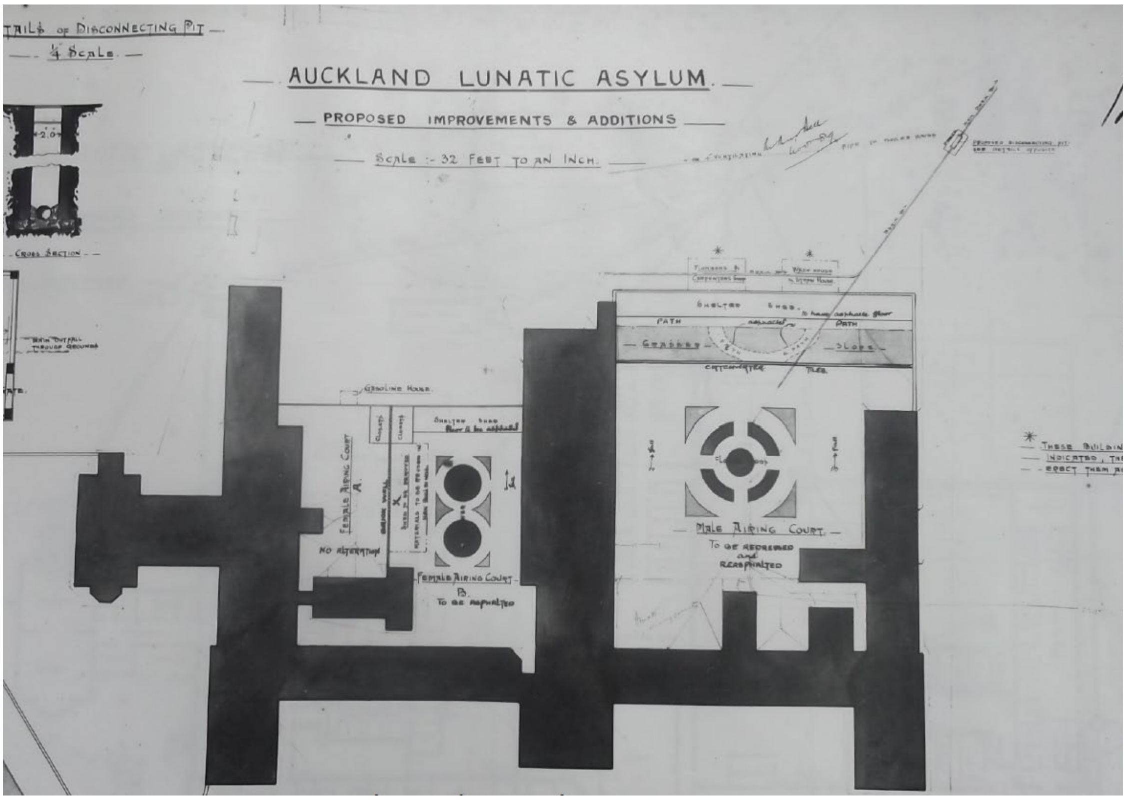


**Fig. 13**: Early plan of exterior spaces featuring Female and Male 'Airing Courts', gradients to manage ground level changes and a shelter shed in addition to a range of building services and facilities[14].

[14] Ibid.

## 10. summary statement of significance

The historic heritage values attributed to the former Oakley Hospital Main Building are recognised in the AUP list description as being related to:

- historical
- social
- physical attributes
- aesthetic
- context

**historical**
The former Oakley Hospital is a prominent example of a specific type of institution during the formative years of asylum architecture in the mid-19th century. The building has a high degree of intactness and integrity, particularly through the principal stages of development prior to 1905, that reveal how care and treatment were administered to residents. The arrangement of the building also indicates ancillary activities and accommodations for staff.

**social**
The building is representative of 19th century society's changing attitudes to the mentally unwell and the emerging knowledge around the importance of sanitation and infection control. The establishment of such institutions also reflects society's emerging duty of care to the less fortunate.

**physical attributes**
The former Oakley Hospital Main Building is a prominent building for the region and is best understood and experienced in the round as a complex structure. It benefits from being appreciable at a range of scales from a variety of locations and is afforded visual and spatial relief through relatively low-lying or undeveloped surroundings.

**aesthetic**
The design and layout of the building have their origins in Britain and were part of a 19th century focus on asylum architecture. The design was necessarily adapted in New Zealand for a detailed tender. The local knowledge and craftmanship of the masons who built the asylum have influenced its proportions and some of the finer details that remain evident. The polychromatic brickwork and careful detailing reflect various periods of development and contribute to the integrity of composition of the building.

**context**
The immediate environs of the former asylum building are recognised and protected through the EOP annotation within the AUP. Importantly, the EOP recognises that the building has equal interest between the formal hierarchy of the principal elevation and the more prosaic activities at the rear. The building is experienced and understood in the round, with the formal façade presenting a defensible edge to the local townscape and the less strictly arranged courtyards at the rear filtering various pathways through the building into the hinterland.

### 10.1 assessment of the contribution of the development site to historic heritage value

The precinct has had a long association with the genesis of the historic place through a formative period of Auckland's history. As a large institutional building with a residential population, the former Oakley Hospital and later tertiary institution has had a substantial impact on the identity of the area through its historical uses. The former Oakley Hospital was encouraged towards self-sufficiency and subsistence living both as a form of rehabilitation and as a function of introducing early infrastructure to the local area.  This is partly why the generous farm site was initially chosen for the asylum building commission.  The activities related to the principal functions of the hospital appear to have been contained around the immediate vicinity while other parts of the development site have accommodated various activities and buildings that are distinct from the historic heritage nature of the former asylum building.

Some of the experiments on the wider site included allotment gardens, animal rearing, an innovative sewage system, and swimming baths apparently built by resident labour. The only remnant of these ancillary occupations of the principal building is the levelled pitch of the lawn bowls green.  Despite being barely discernible within the existing landscape, the bowls green holds some interest and is representative of how the principal building productively occupied the larger site.  Understanding the former Oakley Hospital within a wider site context supports the social and historical values that informed its design and operation for mental health care in the 19$^{th}$ century.

# 11. assessment of effects on historic heritage values

## 11.1 scope

The Te Auaunga Plan Change has potential to affect the historic heritage values of the former Oakley Hospital Main Building and its associated recognised EOP. This report assesses these potential effects. The relevant proposed plan change provisions address in increase in maximum height in Height Areas 1, 2 and 4 as notated on proposed Precinct plan 3.

## 11.2 built form and character

The Te Auaunga Plan Change includes the following relevant policies in the precinct provisions:

(11) Encourage the retention and adaptation of the heritage and character building, and elements identified within the precinct.

(12) Provide for the adaptation of the scheduled part of the heritage building for economically viable activities which ensure ongoing economic sustainability for this building and its integration into the Te Auaunga Precinct.

(13) Require new buildings to be designed in a manner that provides for a high standard of amenity, recognises landscape values and, where appropriate, enhances the streetscape and gateway locations of the precinct.

(14) Require proposals for new buildings, structures and infrastructure or additions to existing buildings, structures and infrastructure adjoining or adjacent to the significant ecological area of Te Auaunga to be sympathetic and provide contemporary and high-quality design, which enhances the precinct's built form and natural landscape.

(14A) Provide for taller buildings in the north western part of the precinct in this landmark location with enhanced outlook across the Waitemata Harbour and Waitakere Ranges, but in a location removed from residential neighbourhoods outside the precinct. Request H4 to Appendix 1 of the Auckland Council RMA Clause 23 *Requests and Responses* seeks to test the appropriateness of locating buildings of additional height in the site's northwester corner (Height Area 1) and considers this to be the development area of the most potential visual impact on the scheduled building's historic heritage values. The nature of this corner should be considered in the round as this location within the site overall acts as a fulcrum or hinge point to the massing and the dynamic views that receive the potential massing within and beyond the site. The topography of this hinge point, falling away from the heritage building and site, mitigates the simple defects of dominance in a locally distinctive and site specific way (a matter of clarification raised at H5).(14B) Provide for additional height in the central and northern parts of the precinct, recognising the topographical and locational characteristics of this part of the precinct, and the ability to provide greater housing choice, increase land efficiency, benefit from the significant views and outlook from the precinct, and leverage the proximity and amenity of Te Auaunga.

A new Policy 14AA is to be included in the precinct provisions as below:

*Policy I334.3(14AA):*

*Require proposals for new high rise buildings adjacent to the former Oakley Hospital scheduled historic heritage building to provide sympathetic contemporary and high quality design which enhances the precinct's built form.*

This policy reinforces approaches to ensuring that new high rise buildings adjacent to the former Oakley hospital (including its associated extent of place) are appropriate and responsive to that specific context.

With reference to proposed Precinct plan 3, reproduced below:

- Height Area 1 is proposed to accommodate increased heights from that currently enabled at 27m to provide for heights proposed at 35m generally, plus three towers with heights of 43.5m, 54m, and 72m.

- Height Area 2 is proposed to accommodate increased heights from the 27m currently enabled to 35m. It is an area within the site overall where greater height can be appropriately conserved and is bordered by Height Area 4 and its respective enabled height and massing of 27m to its eastern edges and by the lower topographic areas of the site to the east of the Oakley Creek.

- Height Area 4, specifically along Carrington Road, currently provides for an 18m building height at the road frontage stepping up to 27m 20m back from the existing precinct boundary. The proposed plan change seeks to enable 27m height at the street frontage, subject to specific design controls to manage and protect appearance and good design.

I334.10. Precinct plans

I334.10.3 Te Auaunga: Precinct Plan 3 - Te Auaunga Height

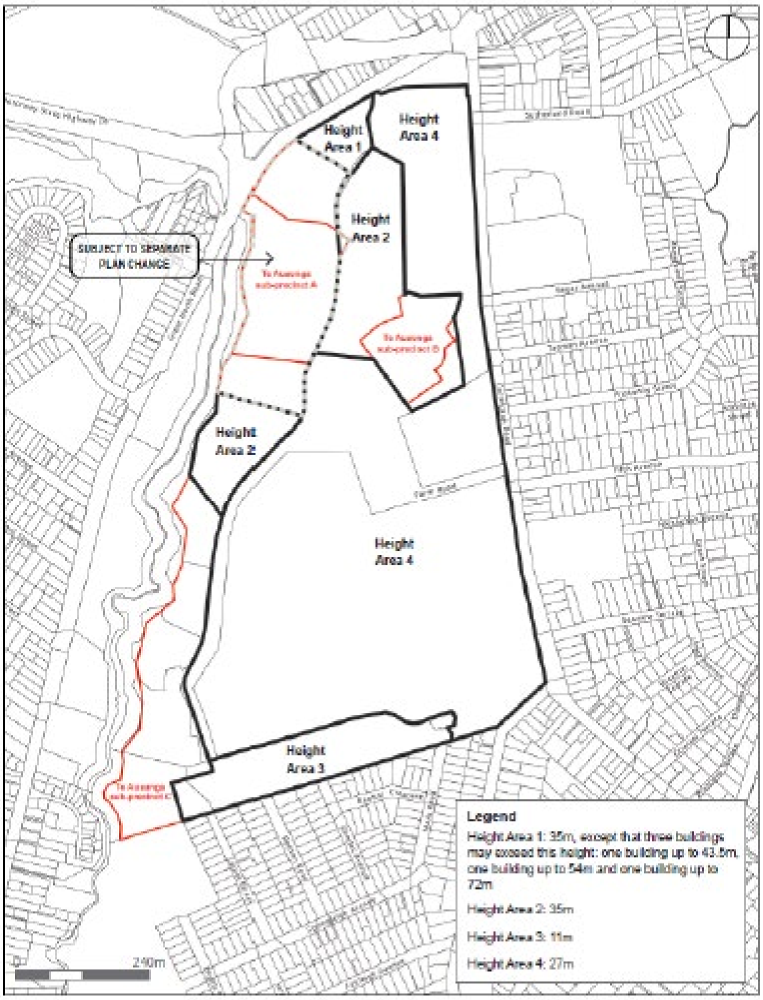


**Figure 14**: Proposed Precinct Plan 3, describing the four proposed Height Areas.

In association with the wider consultant team, we have collectively approached consideration of the effects arising from the Te Auaunga Plan Change request for increased height controls and the potential for an appropriate height mindful of the heritage built and landscape context that lends distinctive value to the former Oakley Hospital Main Building and its associated EOP by looking at a number of key themes, including:

a) **The immediate and wider historic context**. This has involved careful consideration of the proposed maximum heights adjacent to the heritage site.

b) **Site permeability**. Before looking at building form studies on the site, the compositional role of each of those potentials and the spaces between these elements and their relationship to the heritage site has been considered through exercises such as the Boffa Miskell *Urban Design Assessment*[15] and the revised shading diagrams produced by Boffa Miskell received on the 5th of July 2023.

c) **The spaces between the buildings** (including the heritage building and its respective EOP as recognised in the AUP) have been considered relative

15 Boffa Miskell *Te Auaunga / Private Plan Change Urban Design Assessment*, 21 December 2022

to the proposed maximum heights sought through the Te Auaunga Plan Change. This has led to an understanding of the sensitivity to the heritage site's permeability (visual and pedestrian) and the relationship between built form, which informs the design of the new building to those site-specific sensitivities. In a design sense, this is reflected in the recognition that the heritage of the site lends a particular and distinctive value to the adjoining site context to which any proposed design should respond.

d) **Mass, scale and proportion** relative to the immediate relationship with the heritage EOP arising from the proposed height standards sought. The future resolution of the vertical proportion and articulation of any potential the façade treatment in response to height is recognised as relevant to an appropriate site-specific response.

e) **The ground plane.** Consideration of the ground plane and the potential for the proposed building heights promoted through the plan change to respond at a pedestrian scale to the space between buildings and to the historic heritage values of the former Oakley Hospital's spatial values; something that varies through the proposed plan change.

f) **View points and visual simulations.** These not only test the proposed plan change and the maximum height promoted, but acknowledge the immediate, surrounding, and more distant contexts. The views developed by Boffa Miskell anticipate matters of landscape and visual sensitivity, and these views afford opportunity to test the height promoted by the proposed plan change its appropriateness in the immediate historic heritage, near, and distant contexts.

### 11.3 visual impact

A range of views have been selected and assessed as part of the *Landscape and Visual Effects Assessment*, prepared by Boffa Miskell in 2022 and updated in 2023. Two of these views, VS5 and VS6 show the former Oakley Hospital Main Building and associated EOP in a prominent position and have been assessed here for impacts related to historic heritage significance arising from the proposed plan change and the additional height it seeks to enable.

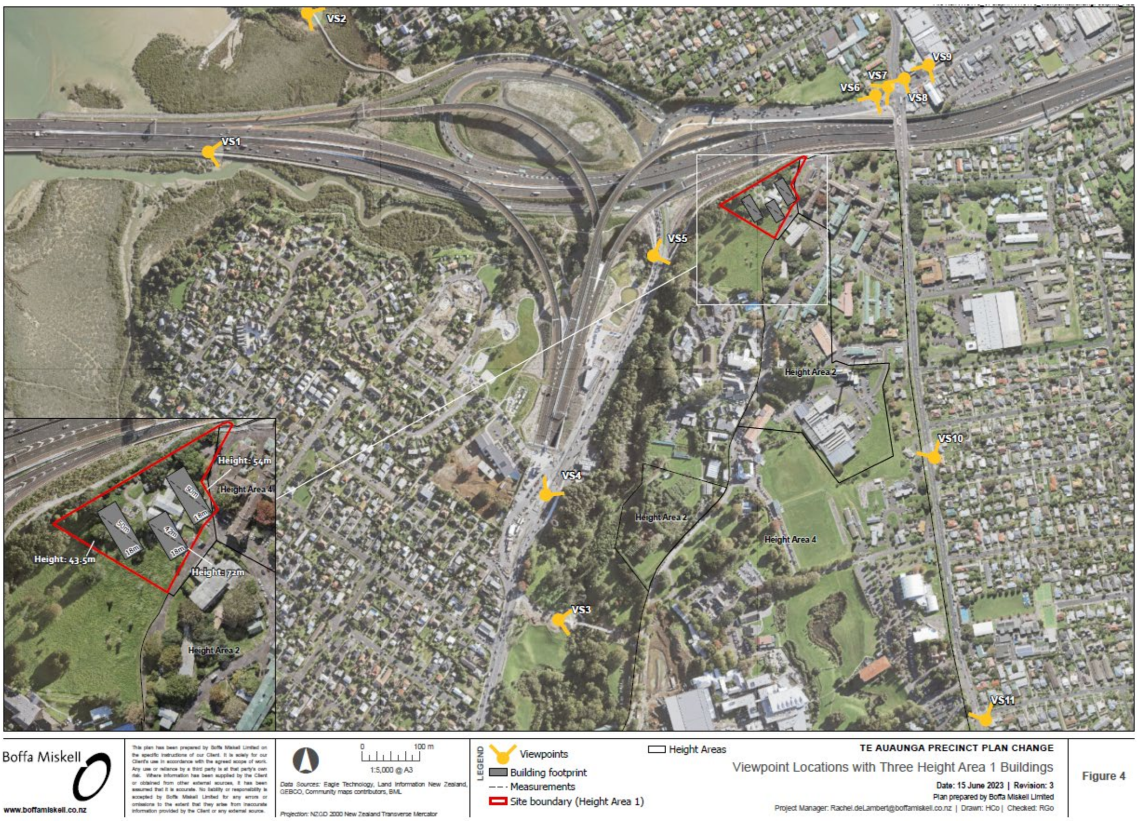


**Figure15:** Viewpoint locations map prepared for Assessment of Landscape and Visual effects by Boffa Miskell (June 2023)

*Existing View*

*Note: Model for plan change includes the consented the road network*

*Plan Change enabled height and massing*

Operative enabled height and massing

Note: Model for plan change includes the consented the road network

Plan Change enabled height and massing

**Figure16:** VS7A - Verified view prepared for Assessment of Landscape and Visual Effects by Boffa Miskell (June 2023)

The main effects of the Te Auaunga Plan Change on the historic heritage values of the former Oakley Hospital are associated with how the principal historic building is viewed and understood within its historic context. Verified views taken from the local town centre (Fig.15 & 16) compare the existing condition with what is enabled under the operative Wairaka Precinct and the height increase proposed to be enabled by the Te Auaunga Plan Change, including specific building footprints.

The operative Wairaka Precinct enables buildings of 27m in height to the west and south of the former Oakley Hospital Main Building. Such anticipated development will form a contemporary backdrop to the historic building beyond its recognised Extent of Place. The former Oakley Hospital has been appreciated historically as one of the largest buildings in the area and the proposed plan change offers further clarity on how height controls will influence the layout of the tall buildings and their impact on the understanding and experience of the historic place. The operative AUP allows for a tall building mass to the rear of the former Oakley Hospital in both Height Area 1 (to the west of the former Oakley Hospital site) and Height Area 4 (to the north and east). The baseline massing breaks the ridgeline of the historic building and changes its backdrop, but maintains its formal relationship to the north and engaged with its Extent of Place.

The primary proposed change to Height Area 4 is to enable buildings of 27m in height along Carrington Road. This change is not perceptible in these views (Figure 16) and, overall, is considered to have a negligible effect on the historic heritage significance of the former Oakley Hospital and its associated Extent of Place.

The proposed change to Height Area 1 from 27m to 35m responds, in part, to the distinctive topography of this area, as it falls away and below the general ground level of the former Oakley Hospital site and supports great height relative to that topographic condition. The proposed plan change offers better clarity to the consideration of potential effects of built form (notably height) within the setting of the former Oakley Hospital. The indicative arrangement of the three tower building sites and their respective maximum heights, while not enshrined in the plan change, provide a spatial layering which illustrates how the depth and scale of the development sites, combined with the advantage of the natural and substantial changes in ground level, might ensure the historic building remains appreciable as a prominent feature in the wider townscape context. In a similar way, the proposed plan change seeks to increase height in Height Area 2 from the 27m height currently enabled to 35m. In a similar way to the site-specific response to the topographic condition of the site recognised in the Height Area 1 the proposed plan change recognises, the Height Area 2 south of the former Oakley Hospital site falls away and below the relative level of the former Oakley Hospital site platform. The proposed increase in height will have a negligible effect on the historic heritage values of the former Oakley Hospital as the site topography mitigates effects of dominance.

The emphasis of the historic former Oakley Hospital Main Building is strongly horizontal and it relies on the open space around it recognised by the defined EOP, specifically to the front as illustrated in view VS6 in commanding its prominent position in the townscape and open space setting. The operative AUP allows height in this area that surpasses the ridgeline of the historic building. The proposed additional height changes the backdrop to the former Oakley Hospital Main Building, but it would remain nonetheless appreciable as a prominent building within the wider area. The articulation of the open space in the foreground of the Oakley Hospital Main Building could be enhanced to support the development site as a permeable threshold to the local town centre of Point Chevalier.

Existing View

Note: Model for plan change includes the consented the road network

Plan Change enabled height and massing

**Figure 17:** VS 6A Verified view prepared for Assessment of Landscape and Visual Effects by Boffa Miskell (June 2023). Gt. North Rd and Pt. Chevalier Rd looking West


**Figure 18:** VS 6B Verified view prepared for Assessment of Landscape and Visual Effects by Boffa Miskell (June 2023). Gt. North Rd and Pt. Chevalier Rd looking West

Request H1 to Appendix 1 of the Auckland Council RMA Clause 23 *Requests and Responses* seeks to test "*various views of the Oakley Hospital Main Building as experienced in the local landscape*" and the following images provide a basis for that consideration and demonstrates how the Oakley Hospital Main Building and its space in front remains a primary focus within that viewing context framed behind by the development potential enables by the operative and Plan Change height and massing provisions. The Plan Change enabled height and massing breaks up and articulates that foil against which the Main Building is read more than the single mass enabled by the operative provisions.


**Figure 19:** VS 8A Verified view prepared for Assessment of Landscape and Visual Effects by Boffa Miskell (June 2023). Intersection Gt North Road and Pt Chevalier Road looking West.

*Operative enabled height and massing*

*Note: Model for plan change includes the consented the road network* *Plan Change enabled height and massing*

**Figure 20:** VS 8B Verified view prepared for Assessment of Landscape and Visual Effects by Boffa Miskell (June 2023). Intersection Gt North Road and Pt Chevalier Road looking West.

## 11.4 shading effects

The potential for overshading of the former Oakley Hospital Main Building and its associated EOP could affect historic heritage values that are associated with its architectural, aesthetic, and social values.

The design of the historic building was purposeful in including generous fenestration to the wards and corridors which allowed fresh air and light into the interior. While most of the ventilation was mechanically controlled into the building, the large windows provided aspect and prospect to recuperating residents and their attendant staff. This quality of place is important in understanding the historic building as a state-of-the-art facility of its time. Excessive overshading could compromise the quality of the former Oakley Hospital Main Building and affect those historic heritage values.

The potential effects of taller buildings proposed to be enabled by the Te Auaunga Plan Change in shading the former Oakley Hospital Main Building and its associated EOP are compared to the currently operative provisions for the Wairaka Precinct in the following Boffa Miskell-produced studies.

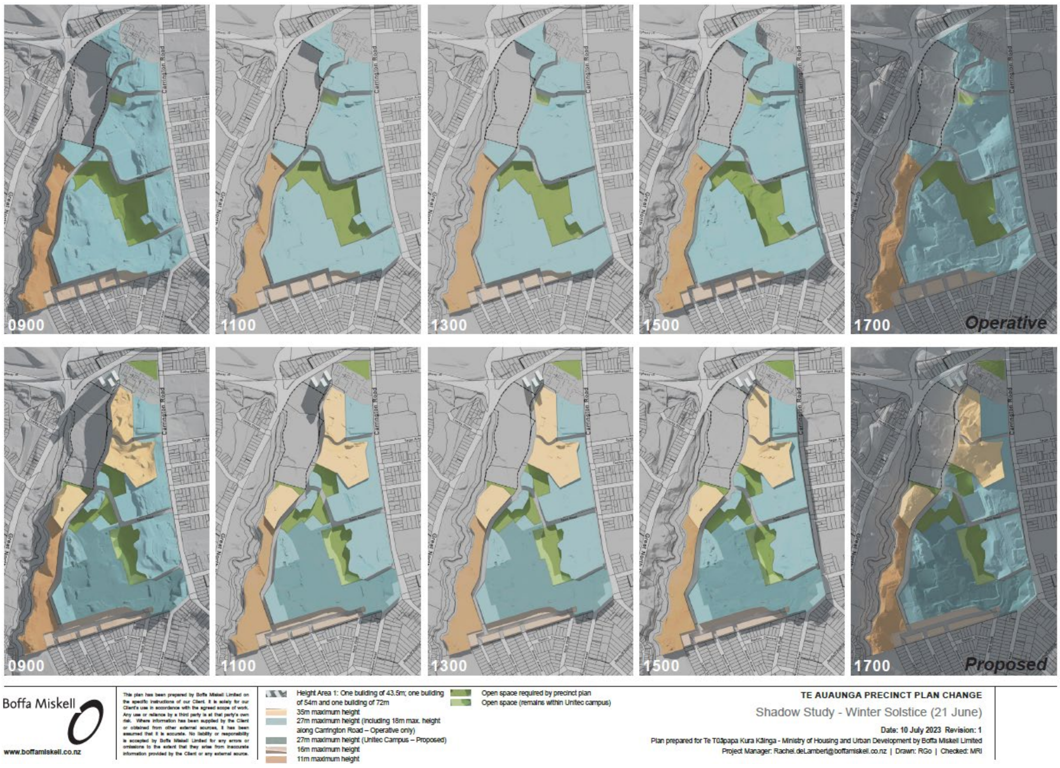


**Figure 21:** Shadow Study prepared by Boffa Miskell, 10 July 2023, - Winter Solstice (21 June) showing Operative AUP effects (top) and Proposed Plan effects (below).

Winter Solstice modelling (Fig.21) shows that the proposed plan would reduce the over-shading effect to a less than minor level over the former Oakley Hospital Main Building at the west end of the historic building.

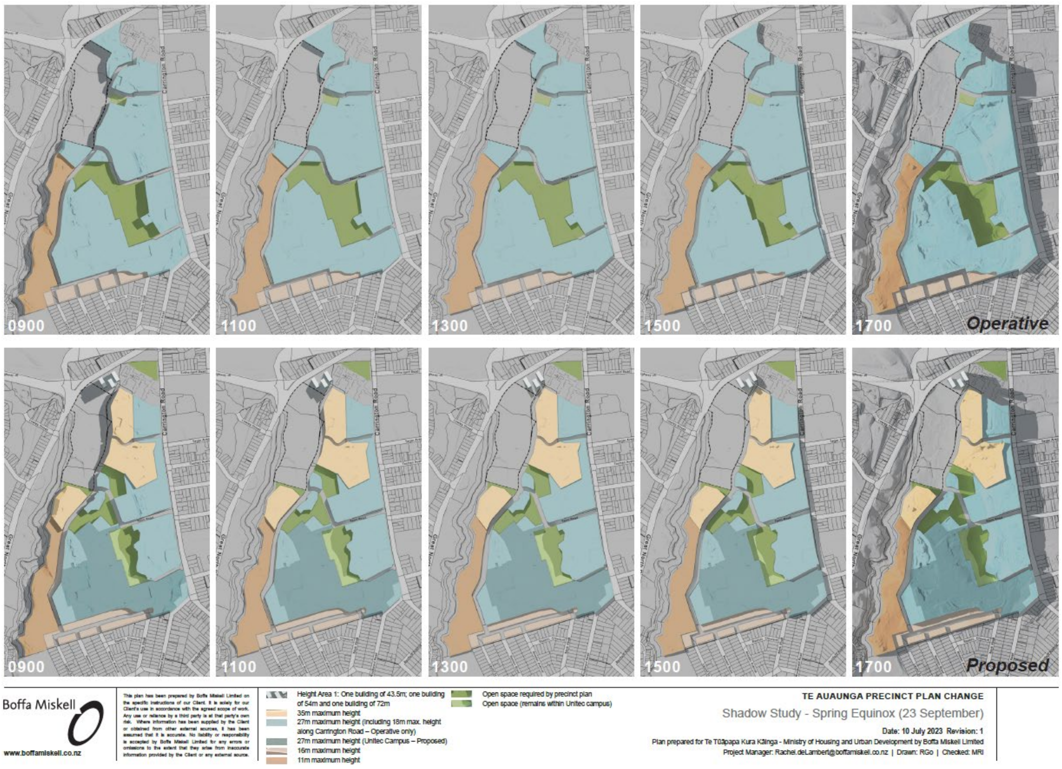


**Figure 22:** Shadow Study prepared by Boffa Miskell 10 July 2022, Spring Equinox (23 September). Showing Operative AUP effects above Proposed Plan effects.

Spring Equinox modelling (Fig.22, above) shows that the minor over-shading effect at 1500hrs would reduce to a less than minor level across the southern elements of the former Oakley Hospital Main Building. The diagrams also indicate that while shading across the majority of the building would be evident at 1700hrs at the Spring Equinox, the principal elevation of the building would remain in more even daylight for longer periods.

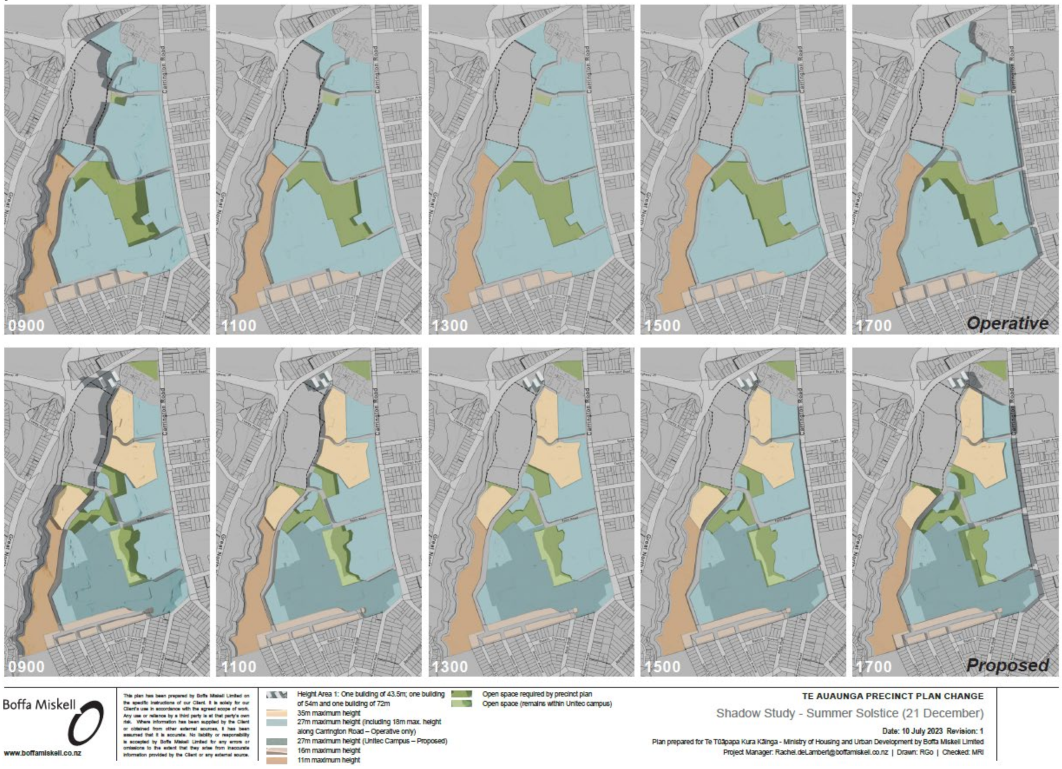


**Figure 23**: Shadow Study prepared by Boffa Miskell 10 July 2022, Summer Solstice (21 December). Showing Operative Plan effects above Proposed Plan effects.

Summer Solstice modelling (Fig.23, above) shows that the quality of over-shading will change from a deep shadow with a sharp edge to a slightly broader shadow that partially intrudes into the former Male Airing Court, but leaves the principal elevation to the west end in daylight for longer. The change in effect in this instance is considered to be neutral.

The Shadow Studies prepared for the *Urban Design Assessment* by Boffa Miskell demonstrate that the proposed articulated built form of three towers will likely reduce the overshading effects on the historic building in comparison to the operative AUP potential overall. The excerpts in this report are considered to represent a legible change in effect. The balance of the modelling is not considered to have potential to affect the historic heritage values and appreciation or experience of the former asylum building.

Overall, the proposed change in height is unlikely to have a substantial effect on the interior shading of the historic building and, in some cases, the effects appear to lessen. The formerly long views from these wards and corridors will become shorter in some locations, but the proposed height increase will not worsen the effects from shading from those generated by the currently operative controls.

### 11.5 traffic and transport

The most dramatic change to the historic place during the 20th century has been the modification to the front (north) of the former Oakley Hospital site to enable the North-Western Motorway to be built in the 1960s. A large section of the formal garden frontage was lost to the new below grade road network. This modification severed the former Oakley Hospital from the local town centre shops and irrevocably changed the historic contribution of the former Oakley Hospital within the wider townscape.

The motorway overbridge is an inhospitable environment from where the historic building is unlikely to be appreciated and the mature trees further obscure a visual connection between the two places. The intersection of Great North Road and Carrington Road is cluttered with traffic signals and road management measures, so that the historic place is further obscured from the local town centre.

The operative Wairaka Precinct allows taller buildings in the Height Area 1, proposed through the Te Auaunga Plan Change, which lies to the west of the former Oakley Hospital. The proposed plan change articulates the taller building heights across the proposed heights of 43.5m, 54m, and 72m further moderated by the particular topography that falls away and below that that contains the former Oakley Hospital site. The effect of pulling proposed building footprints back from the boundary edges affords further spatial relief in Height Area 1.

The historic former Oakley Hospital Main Building, framed as it is by its associated EOP, would remain in the foreground, but would not be the largest structure in the area. As the 1994 Conservation Plan notes, the building has historically been prominent as the largest building in the local area. It is noted that the operative provisions of the AUP change this aspect. The foreground of the former Oakley Hospital is already compromised by a modern roading network, and the existing access driveway should not be adapted or co-opted to manage the additional traffic demands. The proposed Te Auaunga Precinct plan change would not change the existing provisions that protect this aspect of the former Oakley Hospital and it is acknowledged that the alignment of the road network in the proposed precinct plan is not proposed to impact the building more than what has been consented.

### 11.6 vegetation

Schedule 14.1 of the AUP specifically excludes the vegetation within the EOP from the listing protections. This allows some existing trees and planting to be changed without resource consent. There are 15 specimens on the ‘identified trees’ list in the operative Wairaka Precinct that are within the same land parcel as the former Oakley Hospital. The Te Auaunga Plan Change does not propose any amendment to the identified trees list.

The mature trees in the formal garden area of the former Oakley Hospital are tall and obscure views to and from the principal elevation. Trees could be managed (replaced or removed) to improve the visual connection of the historic place with the wider townscape and would assist in preserving the historic building’s prominent and aesthetic scale within the context of increasing density to other parts of the precinct.

## 12. conclusion

The proposed Te Auaunga Plan Change request seeks to accommodate increased heights from that currently enabled in the operative Wairaka Precinct. This includes increases from 27m in Height Area 1 to and to 35m generally plus three towers at 43.5m, 54m, and 72m, from 27m in Height Area 2 to 35m, and from 18m in the 20m setback to Carrington Road in Height Area 4 to 27m. A range of building heights are applied across the precinct that recognise the favourable size, location and topography of the land within the precinct. These heights recognise the relative sensitivities of adjoining and adjacent neighbouring properties, with greater height applied to areas where the potential adverse effects can be managed within the precinct. In the north-western corner of the precinct height is also proposed to act as a landmark for the development, supporting the urban legibility of the precinct.

Policies that support the Objectives include requirements that new buildings be designed in a manner that respects existing buildings, provides for amenity, protects heritage values and, where appropriate, enhances the streetscape and gateway locations of the campuses. Similarly, new buildings or additions to existing buildings adjoining or adjacent to scheduled historic heritage places should be sympathetic and provide contemporary and high-quality design which enhances the historic built form. That is not a requirement however that relies on the form and scale of the historic heritage assets as a baseline for the establishment of height per se.

The proposed change to Height Area 1 offers better clarity to the consideration of potential effects of built form (notably height) within the setting of the former Oakley Hospital. The indicative arrangement of the three building sites and their respective maximum heights provides a spatial layering which illustrates how the depth and scale of the development sites, combined with the advantage of the natural and substantial changes in ground level, might allow the historic building to remain appreciable as a prominent feature in the wider townscape context.

The architectural emphasis of the historic former Oakley Hospital Main Building is strongly horizontal and it relies on the open space around it recognised by the defined EOP, specifically to the front as illustrated in view VS6 in commanding its prominent position in the townscape and open space setting. The operative AUP allows height in this area that surpasses the ridgeline of the historic building. The proposed additional height changes the backdrop to the former Oakley Hospital Main Building, but it would remain nonetheless appreciable as a prominent building within the wider area. The articulation of the open space in the foreground of the Oakley Hospital Main Building could be enhanced to support the development site as a permeable threshold to the local town centre of Point Chevalier.

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# Carrington Backbone Works project: archaeological assessment

**report to**
**Beca Ltd**
**and**
**Marutūāhu and Waiohua-Tāmaki Rōpū**

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Ella Ussher

Reviewed by: ..............................................
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Date: 12 August 2021
Reference: 21-1204




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# Carrington Backbone Works project: archaeological assessment

## 1 Introduction

The Carrington Residential Development is a large-scale development project which will create up to 4,000 housing units within the Wairaka Precinct on land situated between Carrington Road and Te Auaunga / Oakley Creek. The Carrington Development is located within the Auckland Unitary Plan's Wairaka Precinct alongside existing Unitec Campus facilities, the Mason Clinic and Taylor's Laundry. The Crown currently holds 29ha of the future development land which is right of first refusal land in Treaty settlement (the Ngā Mana Whenua o Tāmaki Makaurau Collective Redress Deed and Act). The Rōpū parties to this Redress Deed, in partnership with Te Tūāpapa Kura Kāinga / the Ministry of Housing Urban Development (HUD) are undertaking this development project. Beca Limited (Beca) have been commissioned by the Marutūāhu Rōpū and Waiohua-Tāmaki Rōpū (the Rōpū) to undertake investigation, engineering design and assessment for major infrastructure (the Backbone works) for the Centre/ North of the land. The Backbone works will be constructed to support this part of the future Carrington Development within Lots 1, 5 and 6 DP 515012, Lot 3 DP 314949, Lots 1 and 2 DP 531496 and Lot 5 DP 515012. Several pre-European Maori and historic archaeological sites are recorded nearby on the banks of Te Auaunga / Oakley Creek and in the grounds of the former Oakley/ Carrington Hospital and current Unitec campus. The main building of Oakley/Carrington Hospital is also a Category A Scheduled Heritage Extent of Place within the Auckland Unitary Plan (Item 1618), excluding the additions made after 1905, and is a Category 1 Historic Place on the Heritage New Zealand Pouhere Taonga (HNZPT) List / Rārangi Korero (Item 96). An archaeological assessment of effects is required in support of resource consent applications to Auckland Council and archaeological authority applications to Heritage New Zealand Pouhere Taonga (HNZPT). Dale Paice of Beca, on behalf of Marutūāhu and Waiohua-Tāmaki Rōpū, commissioned this assessment from CFG Heritage Ltd.

### *1.1 Statutory requirements*

All archaeological sites, whether recorded or not, are protected by the provisions of the Heritage New Zealand Pouhere Taonga Act 2014 and may not be destroyed, damaged or modified without an authority issued by Heritage New Zealand Pouhere Taonga (HNZPT).

An archaeological site is defined in the Heritage New Zealand Pouhere Taonga Act as:

(a) any place in New Zealand, including any building or structure (or part of a building or structure), that—
  (i) was associated with human activity that occurred before 1900 or is the site of the wreck of any vessel where the wreck occurred before 1900; and
  (ii) provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand; and

(b) includes a site for which a declaration is made under section 43(1).

The Resource Management Act 1991 (RMA) requires City, District and Regional Councils to manage the use, development, and protection of natural and physical resources in a way that provides for the wellbeing of today's communities while safeguarding the options of future generations. The protection of historic heritage from inappropriate subdivision, use, and development is identified as a matter of national importance (Section 6f).

Historic heritage is defined as those natural and physical resources that contribute to an understanding and appreciation of New Zealand's history and cultures, derived from archaeological, architectural, cultural, historic, scientific, or technological qualities.

Historic heritage includes:

- historic sites, structures, places, and areas

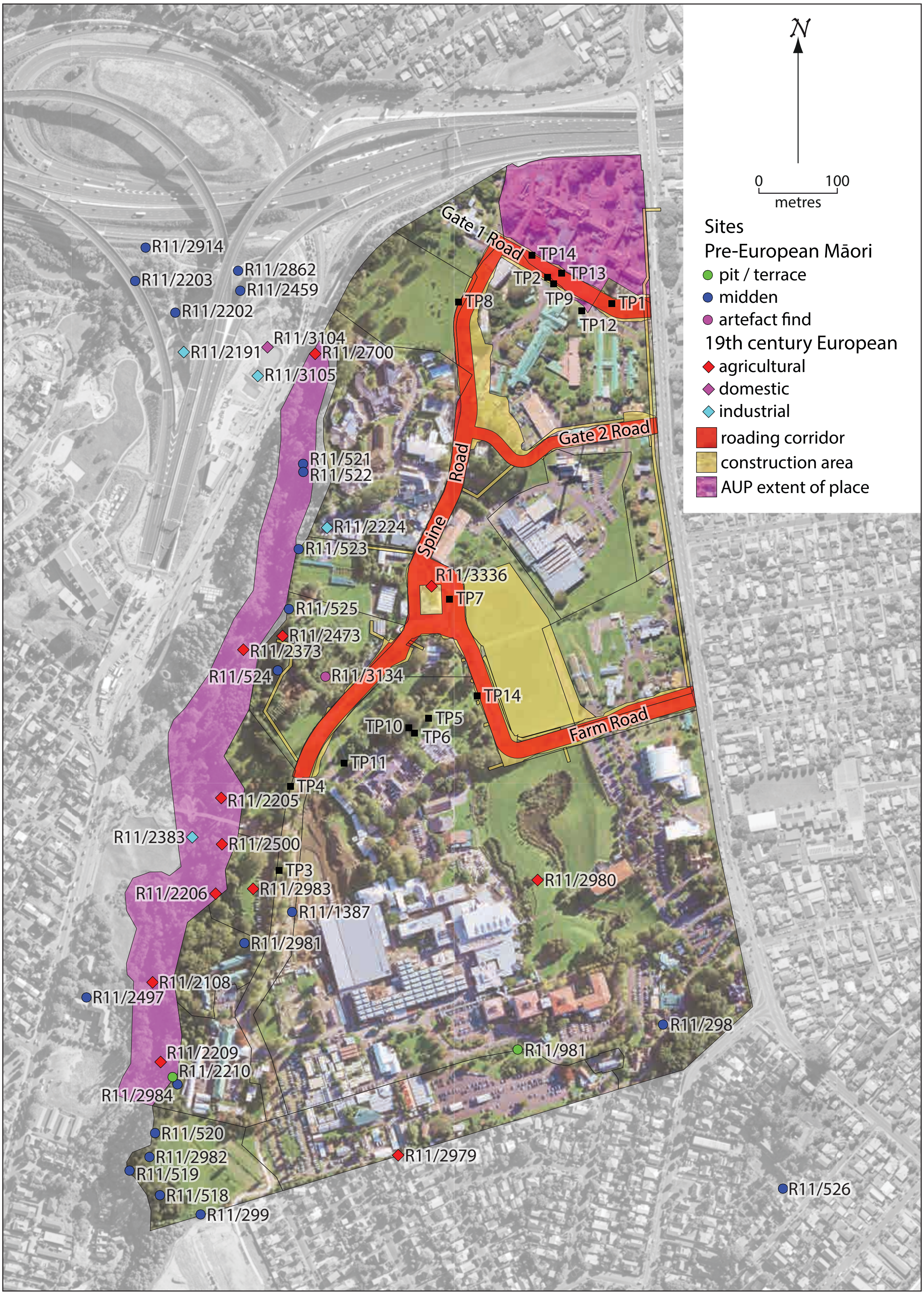


*Figure 1. Location of proposed backbone works in relation to recorded archaeological sites and the Te Auaunga / Oakley Creek and Oakley Hospital Main Building Heritage Extents of Place.*

- archaeological sites;
- sites of significance to Maori, including wahi tapu;
- surroundings associated with the natural and physical resources (RMA Section 2).

These categories are not mutually exclusive and some archaeological sites may include above ground structures or may also be places that are of significance to Maori.

Where resource consent is required for any activity the assessment of effects is required to address cultural and historic heritage matters.

## 2 Methodology

The New Zealand Archaeological Association (NZAA) Site Recording Scheme (SRS) was searched for records of archaeological sites. The digital library of archaeological reports held by Heritage New Zealand Pouhere Taonga was searched for previous works in Waterview. Old maps and plans held by Land Information New Zealand (LINZ) were reached using Quick Map software. The area was checked on the Auckland Council Geomaps server for areas of recorded heritage and recorded archaeological surveys, and the Cultural Heritage Inventory (CHI) was accessed where necessary for more information on these. The HNZPT New Zealand Heritage List / Rārangi Kōrero was accessed for information on listed heritage sites. A site visit was conducted on foot by Ella Ussher of CFG Heritage Ltd on 29 April, 20 May and 6 August 2021.

## 3 Background

The study area is in the Auckland Volcanic Field, a Quaternary basalt field. The Auckland volcanic field is a well-preserved volcanic landform covering about 100 $km^2$ of the Auckland urban area (Craig and Cruickshank 2015). It forms a gently rolling surface with numerous volcanic cones rising above it. Lava caves and tunnels are common features within some of the Auckland flows (Edbrooke 2001: 8).

The study area is located within the catchment of Te Auaunga/ Oakley CreekThe highest points in the catchment are Maungawhau / Mt Eden, Ōwairaka / Te Ahi-kā-a-Rakataura/ Mt Albert and Te Tātua-a-Riukiuta / Three Kings, from which water feeds down the valley and creek systems in a north westerly direction and discharges at the Meola reef (Berry 2007: 29). Much of this area was modified through Public Works drainage programmes of the early 20th century, especially areas of Te Auaunga / Oakley Creek during the Depression era of the 1930s.

### *3.1 Pre-European Māori*

Pre-European Maori settlement of the area was primarily around the pa at Owairaka / Mt Albert and Te Whau / Blockhouse Bay (Oates 1994). Settlement and land use concentrated on the coastal margins of the Waitematā Harbour, the Whau River and Te Auaunga / Oakley Creek. The Whau River was an important feature for local Māori, and was used as a portage and food source. This portage, linking the Waitematā and Manukau Harbours, worked as part of a larger network of portages in operation around north west Auckland (Hooker 1997). It was also a seasonal hunting ground for the migratory bar-tailed godwit which, heavy with fat for their migration to Siberia, were only able to gain enough altitude to skim over the trees of the portage where they would be ambushed and struck down by hunters hiding in the canopy (Sewell 1984: 3).

Close to the project area, within what is now Te Whare Wananga o Wairaka campus (Unitec Ōwairaka), is the spring fed Wairaka stream which would have been an important natural resource. Early Māori occupants of the Ōwairaka/ Te Ahi-kā-a-Rakataura / Mount Albert area utilised Te Auaunga / Oakley Creek and its catchment to support settlement, and gathered fresh water, crayfish, eels, and shellfish from the wider area. Abundant crops of flax and raupo around the waterway were commonly used to make clothing, roofing and matting, and stands of native timber, particularly karaka, facilitated the construction of whare, storage houses and defensive palisading (Matthews and Matthews 2009).

### *3.2 Historic period settlement in Ōwairaka (Mt Albert) and the Auckland Lunatic Asylum / Carrington Hospital*

European settlement spread outwards from central Auckland from 1840 onwards, with settlement initially focussed on the waterways and coastlines. Farming was undertaken with the rich soils, and various industries including pottery and brick making, flour milling, and tanning took place along the rivers (Farley and Clough 2016).

In 1859 John Thomas, a flour miller from Devon, bought 8 acres of land along Oakley Creek and secured the water rights up to the waterfall (Farley et al. 2017). Thomas established a flour mill on the south side of the Te Auaunga/ Oakley Creek, which traded as the Star Mills although it was generally known as Thomas's Mill. In 1879 the Garrett Brothers purchased the property and established a tannery.

The purpose-built Auckland Lunatic Asylum was constructed in 1866 on the neighbouring property across Te Auaunga / Oakley Creek at Allotments 30, Parish of Titirangi, due to overcrowding at previous facilities at Auckland Hospital (*New Zealand Herald*, 6 September 1866: 3). Later in 1879, the Crown purchased Allotments 31, 32 and 33, Parish of Titirangi, from Joseph Howard for the sum of £4200 (Deeds Index A2/129-131, Archives New Zealand) for the purpose of establishing a farm to feed the patients and provide work for them. These properties and the hospital were recorded in SO 1992 from 1879. Many of the farm buildings can still be seen in aerial photographs from 1940 of the hospital grounds, including the piggery built in the 1880s along with the milking sheds and hay store, and the farm manager's house built around 1882 (Figure 2). An article in the *New Zealand Herald* (9 November 1889) mentions the presence of a substantial orchard, dairy (Figure 3) and piggery, which was said to contain "some 50 to 60 pigs, a cross on the Berkshire".

The Auxiliary Asylum building was established in 1884 due to a need for greater accommodation capacity for patients, but later destroyed by fire in 1894 (*Auckland Star*, 21 December 1894:4). A replacement building, Auxiliary No.1 (current Building 048), was built in 1896 (*Appendices to the Journal of the House of Representatives [AJHR]*, 1897 H7: 2), later becoming known as Oakleigh Hall in the 1920s and was used as a 'parole villa' for 150 men (*AJHR*, 1926 H7: 9). A number of other buildings were constructed on the hospital grounds, including workshops, a boiler room and drying room (1880s). Elsewhere on the property accommodation for the Medical Superintendent was built in 1909 (later used to house female patients) and 1930 (Penman House), as well as Auxiliary No.2 (1913) and Auxiliary No.3 (1915) hospitals.

Water supply for cooking, bathing and cleaning was primarily obtained from two sources; a large number of cisterns within the roof structure of the building, and from a well (*New Zealander*, 1 December 1865: 3). The supply of water appears to have been satisfactory for some years however it was noted that the 5 acres of land near Te Auaunga/ Oakley Creek had a good spring of water, and it would be advantageous to purchase the land (*AJHR*, 1883 H3:6 ). A reservoir and pumping-station was completed in 1897 (*AJHR*, 1898 H7: 5), however by 1900 it became apparent that the rapidly expanding Auckland region's water supply was causing concern and the Asylum agreed to pump excess water to Western Springs (*New Zealand Herald*, 23 February 1900: 3). Later in 1904, a larger pumping station was built to the southeast of the proposed area of works, to cater for greater demand for water supply. Ultimately in early 1909 the Mount Albert Road Board sought to take over control of the springs from the Public Works Department in exchange for supplying water to the Asylum at no more than £150 (*Auckland Star*, 6 January 1909:9), which was agreed to in 1910.

### *3.3 Archaeological background*

Several archaeological reports have been completed for the wider area around Waterview, several of which have focused on the Te Auaunga/ Oakley Creek surrounds. Several surveys have been conducted along this esplanade previously, with the majority of sites recorded in 2003 and one in 1995.

In 1987 Fredericksen conducted an archaeological survey of the Oakley Psychiatric Hospital Grounds (Fredericksen 1987). This involved the survey of 2 relatively small areas within the Hospital grounds, labelled as Blocks A and B. From this a stone wall was identified as pre-1900, this is now

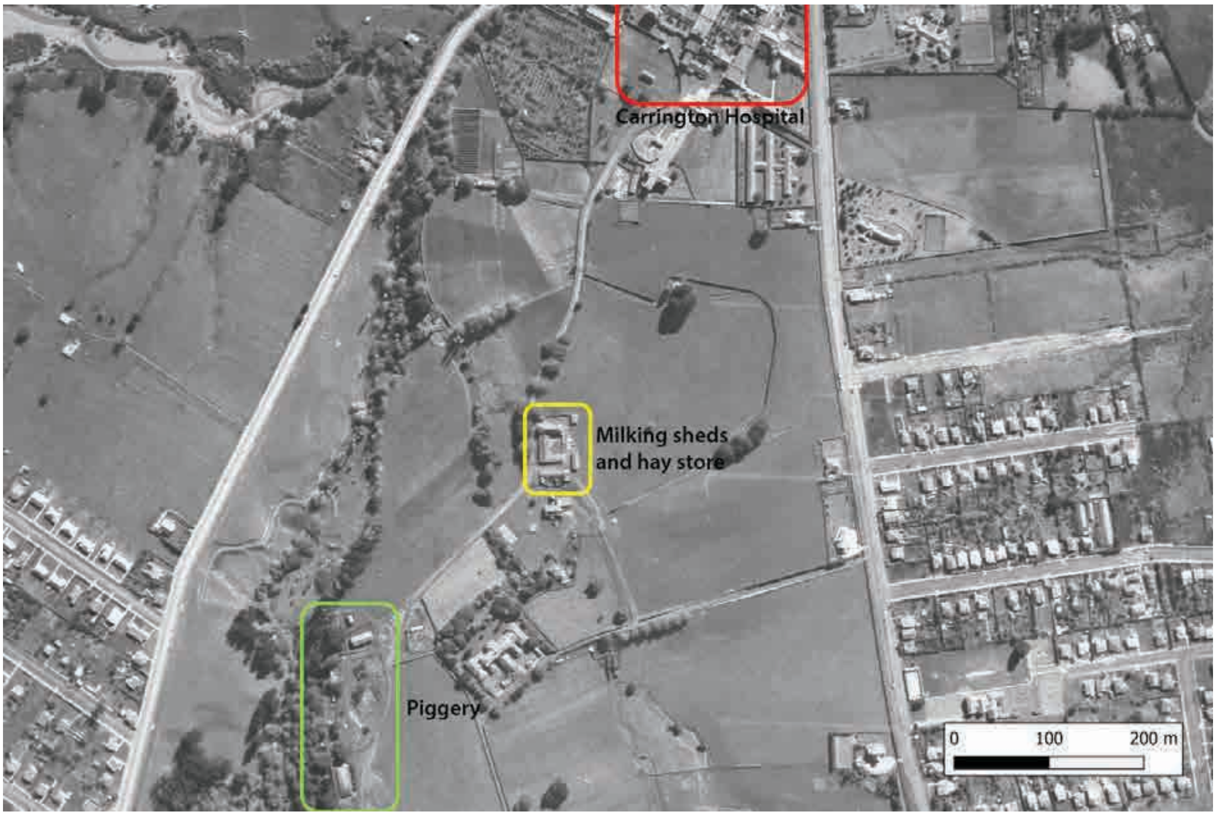


*Figure 2. 1940 aerial photograph showing Carrington Hospital and the associated farm buildings.*

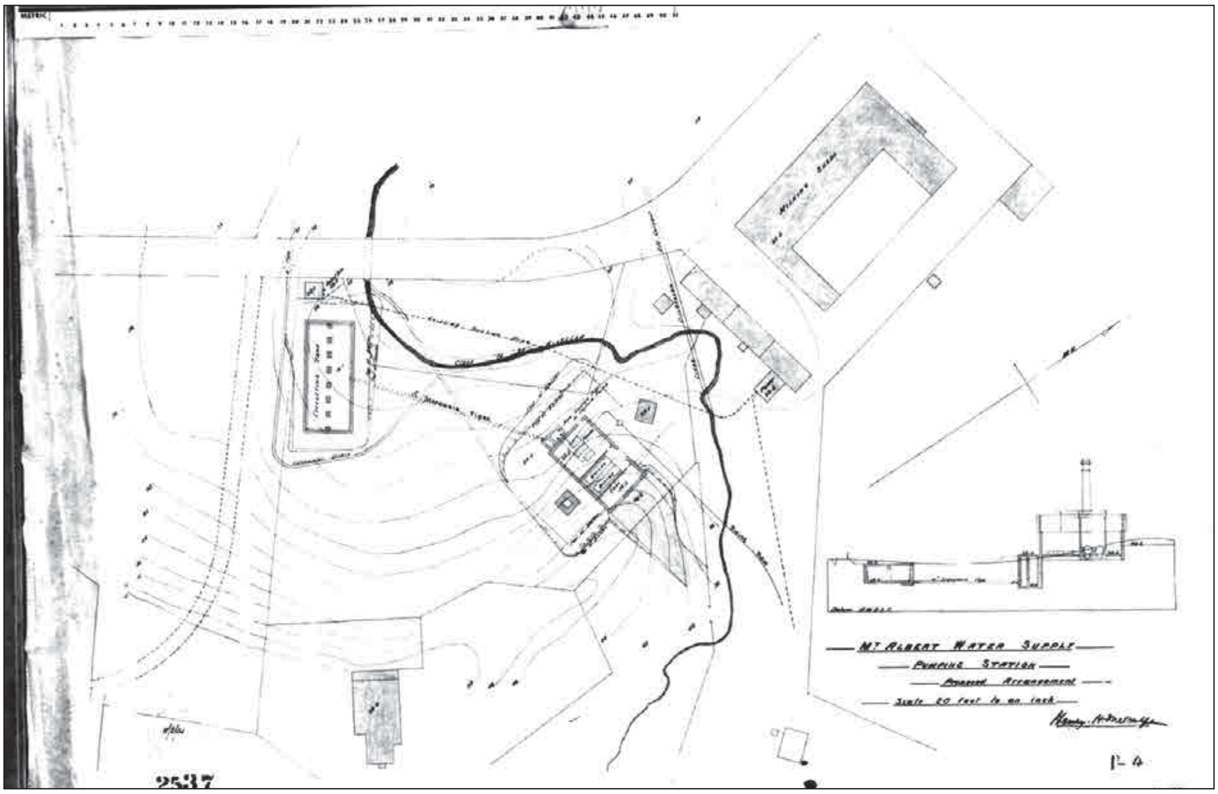

*Figure 3. 1903 Plan for the pump house showing milking sheds to the north (Archives New Zealand ABZK 24411 W5433 PWD20686/1)*

recorded as R11/2980. Block B was found to have a terrace, 2 depressions, a European stone alignment and a shell scatter. One of the depressions appeared to be natural, the other had concrete chunks in the fill. The stone alignment was aligned with the fence, and he determined that this was probably modern and associated with building the adjacent road. The terrace he determined has mixed soils probably from pre-European Māori gardening. The shell scatter he determined was about 2 x 2m and was archaeological, this is now recorded as R11/1387.

Between 2000 and 2015 Druskovich completed a number of field surveys and monitoring works near Te Auaunga/ Oakley Creek. From 2000 to 2010 several surveys were conducted as part of preliminary investigations for the Waterview Connection project (Druskovich 2010), several bridge replacements were monitored along the Te Auaunga/ Oakley Creek walkway (Druskovich 2009b), works associated with the upgrade of facilities around the Te Auaunga/ Oakley Creek waterfall were monitored (Druskovich 2011), and community planting as part of the Revegetation Programme for the Te Auaunga/ Oakley Creek Walkway was monitored (Druskovich 2015). During these, a number of new sites were recorded within 200 m of the project area, including a possible mill (R11/2205), several drystone retaining walls (R11/2473, R11/2500), a drystone walled race (R11/2205) and several bridges and a drystone wall (R11/2373). In addition, site R11/524 was impacted to a minor extent by the planting, and a midden sample was subsequently taken for analysis and a radiocarbon date collected. This returned a result of cal AD 1454–1651 (Druskovich 2015).

In 2010 Clough et al. completed an assessment of effects report as part of the Waterview Connection project. Later in 2012 Shakles et al. undertook a field survey in the Te Auaunga / Oakley Creek / Waterview area as part of the Central Interceptor project but no new archaeological sites were recorded during the survey. Clough and Burnett completed an archaeological assessment of the Waterview Shared Path proposal in 2015. This identified a stone wall (R11/2979) that was previously unrecorded as an archaeological site despite being subject to a heritage Covenant. The final report for the Waterview Shared Path was completed in 2017 (Farley et al 2017). The affected sites were a drystone wall (R11/2979) and a midden (R11/1387), and these excavations revealed deep deposits connected with the demolition of hospital and farm buildings, as well as rubbish disposal on the banks above Te Auaunga / Oakley Creek, as well as intact pre-European Māori occupation on the flats above. In 2015 Foster carried out an archaeological assessment of the Unitec grounds south of Farm Road. This identified a number of archaeological sites within that area and noted that just one site, R11/1387, was to be affected by the proposed development. Farley, Low and Clough (2017) also drafted a preliminary heritage assessment of the properties included in this current field assessment for the Wairaka Land Company.

As part of the Carrington Backbone Works Programme so far, Ussher (2021) carried out an assessment of archaeological effects for a proposed stormwater outfall corridor near the banks of Te Auaunga / Oakley Creek. This assessment identified a previously unrecorded shell midden (R11/3313) within the area of the proposed works, as well as several heritage features including a drystone wall that may have been connected to the asylum farm, and noted significant amounts of modern as well as historic cultural material and scattered shell on the slopes above Te Auaunga / Oakley Creek.

## 4 Field visit

The route of the proposed backbone footprint was walked over by Ella Ussher of CFG Heritage Ltd. This was primarily a visual survey as well as close examination of exposed soil around tree roots and the base of buildings, and a gum spear was used to probe for subsurface archaeological features or deposits. Eleven spade-width test pits were dug s to investigate the levels of modern disturbance along the routes. The location of the test pits is shown on Figure 1.

### *4.1 Roading*

The new Spine Road alignment runs from the southwest corner of the Oakley / Carrington Hospital building (Building 001) south to meet the existing private road route to the west of the Auxiliary 2 building. Spine Road follows the route of the existing private road to the southern extent of the proposed works. Gate 1 Road will connect the northern end of Spine Road to Carrington Road. The proposed works runs through the south-western, central and south-eastern wings of the Oakley / Carrington Hospital building, before crossing the existing carpark to Carrington Road. Gate 2 Road runs south of Gate 1 Road connecting Carrington Road to Spine Road. Finally, the existing Farm Road will be upgraded and connect to Spine Road to the north of Building 028.

The proposed Gate 1 Road works follows the general existing alignment of the private Gate 1 Road, however while the current road skirts Building 001, the proposed works will involve some demolition of elements of the building. TP1 dug within one of the grassed berms in the existing carpark at the start of the alignment showed that services run through these areas at least 300 mm below the surface. The proposed alignment then runs through the south-eastern, central and south-western wings of Building 001, and the courtyards between these which are a mixture of landscaped lawn and carparks. This option will involve at least partial demolition of the southern wings of the building that are within the Scheduled Category A Historic Heritage Extent of Place for the Oakley / Carrington Hospital in the AUP (Item 1618). A 1940 aerial photograph also shows several buildings, now demolished, within the extent of the works (Figure 5). An 1890 plan of the hospital shows two of these to the south and southeast of the central wing of the building (Figure 6), and a 1903 plan of the alterations and additions to the main hospital building note that at this time these were a workshop and drying shed (Figure 7). Three test pits (TP2, TP9 and TP13) were dug in this location between the central and south-eastern wings of Building 001. Both TP2 and TP13 (Figure 8) contained a very compacted surface of crumbled scoria at 200 mm and 450 mm below the surface respectively. This layer was below a 200 mm thick charcoal-stained mixed clay subsoil with brick fragments in TP13, but in TP2 there was a mixed clay with gravel and roof slate fragments, above this same compacted surface. TP9 did not contain this compacted surface but appeared to have been recently modified due to the presence of a very mixed silty clay subsoil with yellow clay pockets to 300 mm, with no natural subsoil encountered. Similarly, between the central and south-western wings of Building 001, a building is visible in the 1940 aerial bordering this courtyard on its southern extent. TP14 dug in this location showed a possible small concrete foundation at 230 mm below the surface, surrounded by larger scoria gravel and cut into a layer of very compacted small scoria gravel and charcoal at 380 mm, similar to that seen in TP2 and TP13. It is clear that despite recent landscaping, there are both existing and subsurface features connected with the Oakley/Carrington Hospital building within the proposed footprint of works.

The northern end of Spine Road begins at the southwest corner of the hospital and runs south through the location of the old Asylum Gardens, mostly following the route of the existing private road but having a significantly wider footprint (20 m). A test pit (TP8) dug to the west of the driveway showed a topsoil to 100 mm below the surface, above a mixed friable brown silty clay with pockets of yellow clay to 300 mm (Figure 9). No base of this layer was found, and this indicates that the area has been recently disturbed, which fits with aerial imagery that shows exposed soil in the location over the last 5 years. Gate 2 Road travels east from Spine Road widening the existing private road. The area is already heavily modified and so no test pits were dug in this location.

The proposed Farm Road works include upgrades and widening of the existing private road from Carrington Road to just east of the Auxiliary Hospital (Building 048) carpark, and then north towards Building 028. This building includes several modern elements to the northeast, with a courtyard wing to the south that includes a 1970s 'brutalist' concrete building while the north of the courtyard is defined by the old milking shed / dairy building built in the 1880s–1890s, recorded as site R11/3336 during this assessment (Figure 10). The east, west and southern wings of the building were built in the same footprint as some of the other original dairy buildings (Figure 11) mentioned earlier. Farm Road connects to Spine Road just north of this building, within the footprint of the existing Building 023 and extends east into the neighbouring sports fields. A 1940 aerial photograph shows one building, likely one of the hay sheds associated with the milking shed / dairy complex, extending onto the edge of the sports fields and outside the footprint of the existing private road and parking (Figure 12). TP7 showed that there is a large amount of building material on and just below the surface in this location and extending north towards Building 028, including brick and granite, to a depth of at least 100 mm. The concentration of this material meant that the test pit could not be dug deeper than this. This material may be connected with the old hay sheds or the southern elements of the dairy enclosure once located in this area, but may also be evidence of more recent building demolition. An open landscaped area is proposed within the Backbone works, surrounding Building 028, at the intersection of Farm and Spine Roads and Wairaka Stream. A 1903 plan showing the planned pumping station designed by H. Metcalfe, indicate that several buildings were already constructed at in the area to be landscaped, including one building housing a previous pump for the Asylum supply. The larger of the buildings appear to be associated with the dairy complex, with the pump building behind. No earthworks plans have been provided for the proposed landscaping in this area, and so these works have not been included in this assessment.

Spine Road upgrades will continue south from the intersection with Farm Road, widening the existing private road on its western side initially, and then the eastern side within a grassed area by the old Pump House (Building 033) built in 1904. The proposed works will not impact on the extent of the Pump House buildings. Further south, Spine Road upgrades will then involve widening the existing road to Unitec to the north of the asylum farm piggery building (R11/2983) and within the vicinity of other farm buildings and enclosures, identified in Ussher (2021), within the greater piggery complex. No surface evidence of these buildings and enclosures remains within the area of proposed works, however there are troughs and drainage set in concrete pads on a lava flow 100 m to the south (Figure 13). These surface features have been included in the SRS for the piggery (R11/2983). The topsoil in an area immediately to the north of these features was removed for earthworks associated with the Waterview Shared Path construction, monitored by Farley et al. (2017). They reported that the topsoil in this area included modern material including concrete and asphalt chunks, fragments of metal, along with pieces of plastic, ceramic, and glass. Three test pits were also excavated as part of these works, in a transect running down towards Te Auaunga / Oakley Creek. These showed various layers of fill used to level the ground surface above the natural basalt flow. The lower layers of fill closer to the creek included mid-20th century material, indicating that the levelling, at least in this location, was likely associated with the demolition of the farm enclosures in the late 1960s.

Two spade-width test pits were dug further south along the existing main Unitec private road near the piggery (TP3 and TP4), spaced 100 m apart. Both pits showed a mixed subsoil containing charcoal, scoria, red chert and compacted clay below 100 mm of topsoil. This is very similar to the subsoil identified in a spade-width test pit within the Stormwater Outfall 06 immediately to the north of the farm buildings. Due to the compaction of the subsoil, it is possibly connected with a building floor or the old farm road from the main hospital building. It is therefore possible that subsurface evidence of the greater piggery complex remains within the areas of proposed works to the east and west of the existing private road.

### *4.2 Electrical and communications corridor*

Both the electrical and communications corridors will involve trenching in the proposed roading corridors for Gate 2, Spine and Farm Roads and therefore were assessed in conjunction with these.

### *4.3 Stormwater*

The Carrington Backbone works involve the construction of several new stormwater reticulation lines and treatment devices. Most of these are within the extent of works for roading and hence are covered in Section 4.1. Six new stormwater lines are proposed outside the extent of proposed roading works, encouraging runoff from Spine Road and Farm Road to Wairaka Stream. The northernmost of these will be constructed west of Spine Road through the current horticultural buildings with another running in a similar direction 100 m south of this. This area is already heavily modified by these existing buildings and it is unlikely that subsurface archaeological deposits remain in this location. Another line will connect the stormwater lines on Spine Road to the Stormwater Outfall 06, in an area already assessed for this section of the Backbone works (Ussher 2021). Additional stormwater lines discharge at regular intervals along Farm Road into the parallel reach of Wairaka Stream (Figure 14). One of these will be on the southern side of the existing culvert under Farm Road. The age of this culvert is unclear, but it is possible that this is the dam constructed in 1900 to harness the

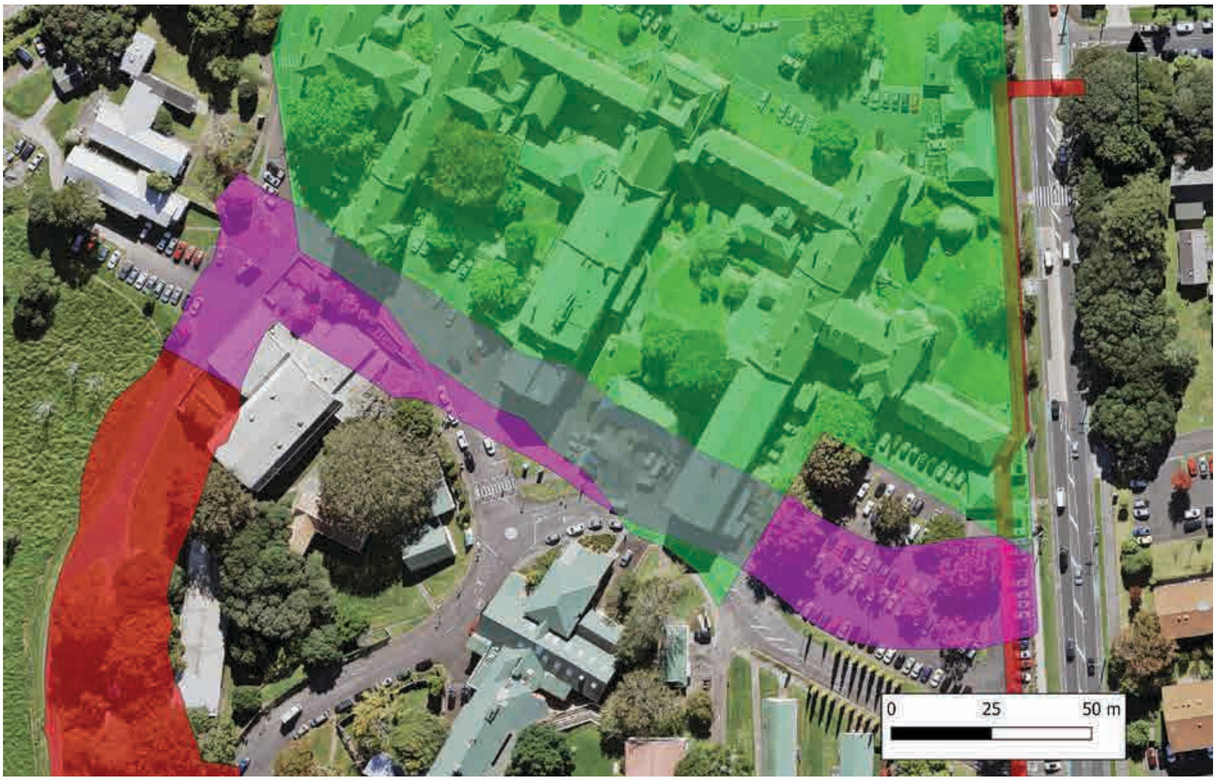


*Figure 4. Northern (purple) and southern (red) Gate 1 Road options and Oakley/Carrington Hospital building Historic Heritage Extent of Place in the AUP (Item 1618) (green).*

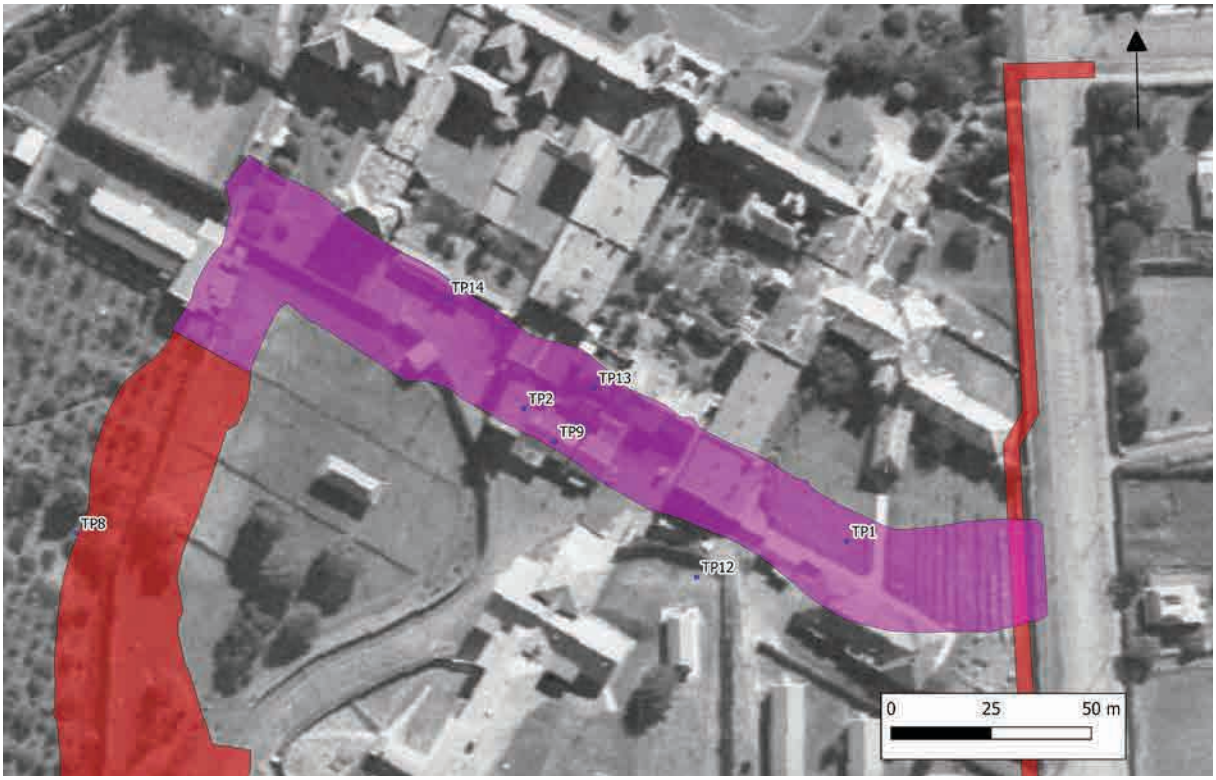


*Figure 5. 1940 aerial image showing hospital and associated buildings within proposed northern (purple) and southern (red) Gate 1 Road works, and test pits dug during this assessment.*


*Figure 6. 1890 plan of the asylum grounds showing several buildings to the south of the main hospital building (circled in red) (Archives New Zealand ABZK 24411 W5433 PWD16667/1).*


*Figure 7. 1903 plan of the alterations and additions to the hospital building showing 'workshop' and 'drying shed' within the area of proposed northern Gate 1 Road works (purple), and test pits dug during this assessment (Archives New Zealand ABZK 24411 W5433 PWD20686/1).*

*Figure 8. TP13 showing compacted fine scoria surface possibly connected with old workshop buildings.*

*Figure 9. Location of TP8 in extent of proposed Spine Road within old Asylum Gardens.*

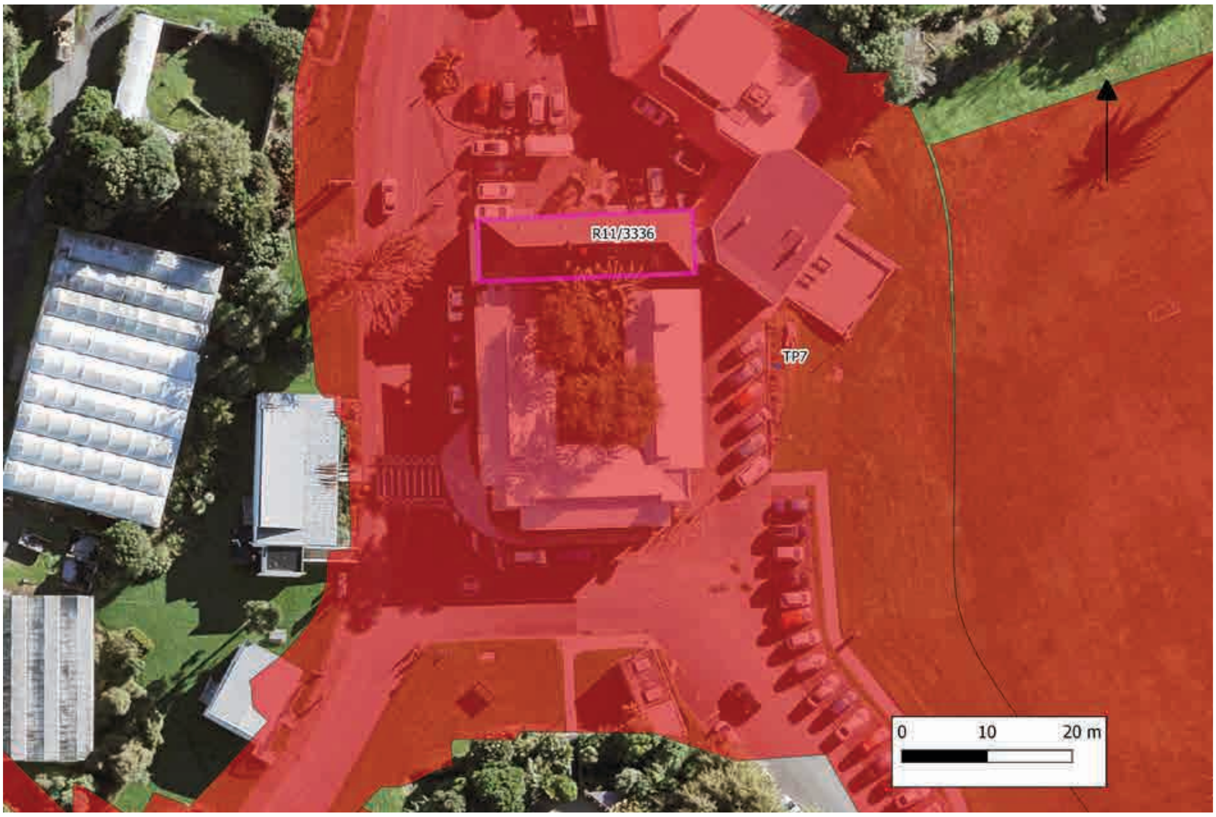


*Figure 10. Northern wing of Building 028 recorded as the old milking shed/dairy site R11/3336, in relation to proposed extent of works (red).*

*Figure 11. Old milking sheds/dairy to the right of the photograph, recorded as site R11/3336.*

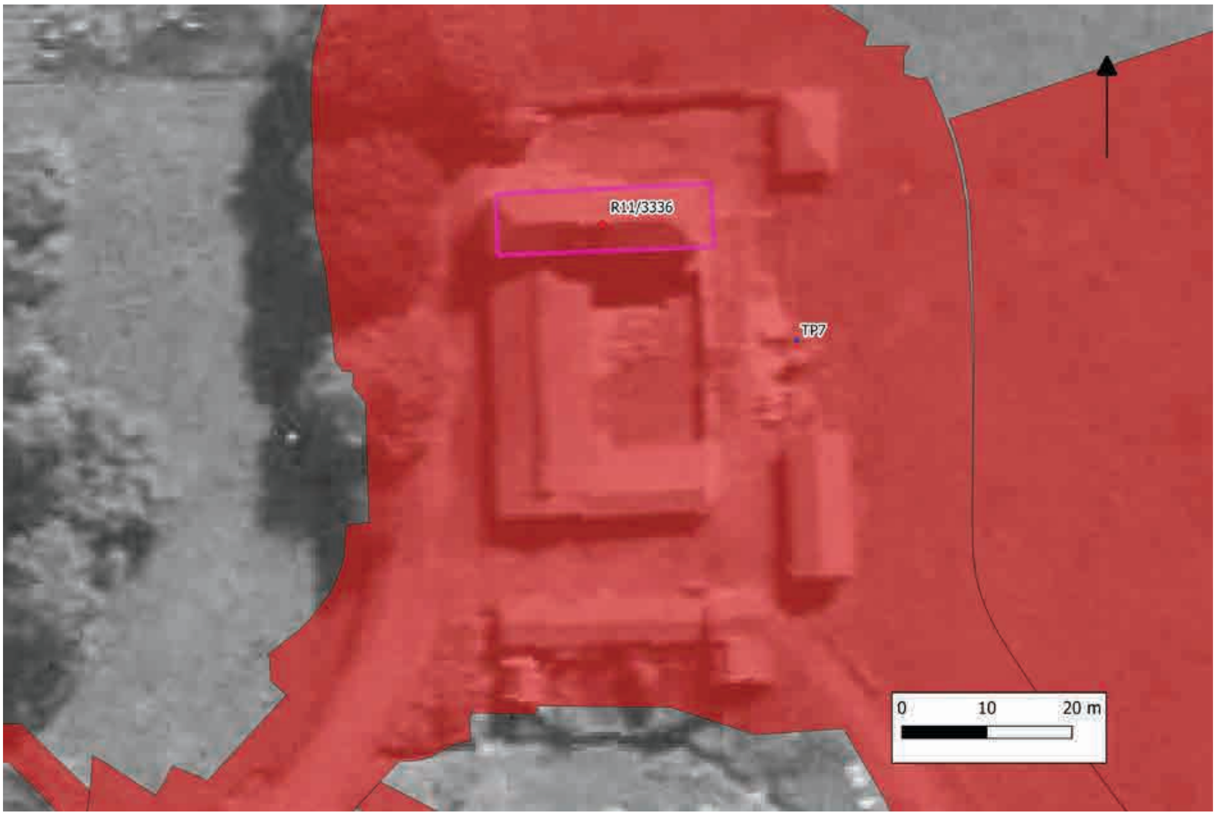


*Figure 12. 1940 aerial photograph showing remaining dairy building (pink) and other associated buildings within the complex in relation to the proposed roading earthworks (red) and TP7.*

*Figure 13. Location of recorded enclosure associated with piggery R11/2983 .*

stream for Auckland's Auxiliary water supply. If this is the case, it has clearly been recently modified by the placement of a pvc pipe in the centre for stormwater flow from Farm Road (Figure 15)). The section of Wairaka Stream north of the culvert has been modified from the 1950s to create and then subsequently remove a driveway to the Farm Manager's House (site R11/3331), as well as for landscaping. TP14 dug within the proposed works near Wairaka Stream showed a modified clay subsoil with rusted nails, brick fragments, charcoal and yellow clay pockets above bedrock at 400 mm below the surface. There is also a visible layer of demolition material within the eastern side of the stream close to the old dairy location, probably from the demolition of the southern elements of that complex in the 1970s. The stream is stone-lined but again it is difficult to establish the antiquity of this feature, as these changes from the 1950s onwards would undoubtedly have disturbed any earlier work on the stream.

### *4.4 Wastewater*

Works involve the construction of several new wastewater lines and most of these are within the extent of works for roading and hence are covered in Section 4.1, but four are not. A wastewater line will be constructed parallel to Carrington Road and Gate 2 Road and then down the slope between Gate 2 Road and Spine Road, but this area has already been modified by buildings and an existing abandoned sanitary sewer. Another wastewater line will run parallel to the Stormwater 06 Outfall for around 70 m (Figure 17) before turning northeast along the top of the slope above Te Auaunga / Oakley Creek. This area has already been assessed for the 06 Outfall and the proposed works will also impact recorded shell midden R11/3313. The route then follows an existing gravel driveway that heads towards the Te Auaunga / Oakley Creek walkway, most of which is covered in modern building material or a line of established macrocarpa trees. The line then turns west down


*Figure 14. Location of stormwater trenching from proposed Farm Road into Wairaka Stream (red area) in relation to existing stone culvert (purple), original driveway to farm manager's house (light blue dashed).*

*Figure 15. Dam and culvert on southern side of Farm Road in vicinity of new stormwater trenching.*

*Figure 16. View southeast along Farm Road and stormwater trenching alignments to Wairaka Stream.*

the steeper slope above the creek to a new satellite manhole near the existing Orakei Main Sewer. One shell midden (R11/524) and a drystone wall (R11/2473) have been recorded within this area on the banks of Te Auaunga / Oakley Creek and would likely be impacted by this wastewater line. The nature of this impact is assessed in Section 5.5 and proposed mitigation in Section 5.6. The shell midden is subsurface and so could not be relocated, but the wall was photographed and a GPS point taken (Figure 18). A final wastewater will be trenched south from Farm Road to a manhole north of the planted wetland surrounding the spring at the head of the Wairaka Stream (Figure 19).

### *4.5 Water reticulation*

The Carrington Backbone works involve the construction of several new water reticulation lines. Most of these are within the extent of works for the roading and are covered in Section 4.1, but two lines were outside these. One line will run parallel to Carrington Road, being north and south from the Gate 1 Road intersection, and south from Gate 2 Road to Farm Road intersection. The only area within this line that has a likelihood of encountering intact subsurface archaeological deposits would be the section north of Gate 1 Road (Figure 20), as this passes the eastern wing of Oakley / Carrington Hospital and is within the Scheduled Heritage Extent of Place in the AUP for the building (ID 1618) but will not impact the primary features recorded within the AUP. Another line extends south from Gate 2 Road into Taylor's Laundry, an area which has already been heavily modified for that commercial premise. A third line will run from Spine Road towards the Old Pump House building (Building 033) through a currently grassed area and landscaped area. It is possible that there may be subsurface features of the original Wairaka Stream and pump supply for the hospital, as well as the later 1904 Pump House pipework, within this location (Figure 21).

*Figure 17. Start of proposed wastewater line near R11/3313.*

*Figure 18. Stone wall  R11/2473 in wastewater alignment above Te Auauanga / Oakley Creek (scale = 1 m).*

*Figure 19. Location of proposed wastewater line running south from Farm Road to planted wetland.*

*Figure 20. Route of water line between Carrington Hospital building and Carrington Road, in the Scheduled Historic Heritage Extent of Place for Oakley / Carrington Hospital in the AUP (ID 1618).*

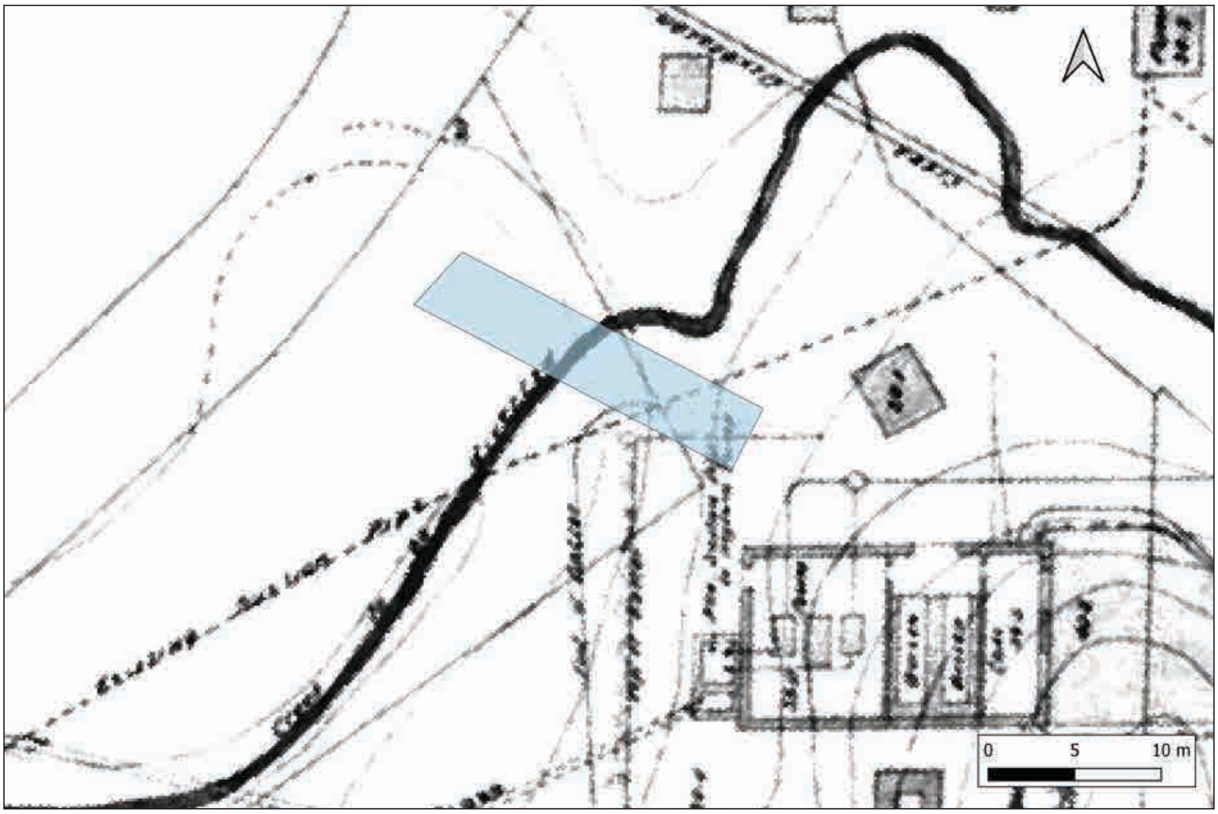


*Figure 21. 1903 plan showing Wairaka Stream and pipework in relation to proposed water line (blue).*

### *4.6 Summary*

Overall, the extent of the proposed Backbone works including the routes of the new Spine, Gate 1, Farm and Gate 2 Roads as well as the proposed stormwater, wastewater and water reticulation lines have a number of recorded and potential subsurface pre-European Māori and historic archaeological deposits along them, as well as extending into the Scheduled Heritage Extent of Place for Oakley/Carrington Hospital Main Building Scheduled Heritage Extent of Place (ID 0618) in the AUP. The following sections of this report assess the nature and scale of those effects and proposed mitigations.

## 5 Assessment

The following assessments of values and significance relate only to archaeological values. Other interested parties, in particular mana whenua, may hold different values regarding the proposed development.

### *5.1 Assessment of archaeological values, pre-European Māori shell midden R11/3313 and R11/524*

| | |
|---|---|
| Condition | All shell midden are subsurface. The only form of site damage, if any, is likely to be from landscaping and vegetation planting/removal. |
| Rarity | Other shell midden have been found nearby on the banks above Te Auaunga / Oakley Creek and further inland on the Unitec grounds (i.e. R11/298, R11/981 and R11/1387), and so this is a common site type in the area. |
| Context | The midden is connected with pre-European Māori occupation in the vicinity of Te Auaunga / Oakley Creek and inland from this waterway on the slopes below Ōwaikara/ Mt Albert, specifically resource extraction and food processing techniques. |
| Information | Few in situ shell midden have been recorded within the area, most being modified or redeposited, and little is known about associated occupation and settlement. There is the potential for further scientific information on these aspects of pre-European Māori lifeways to be recovered by archaeological means during the proposed works. If charcoal or other datable material is found within a secure context, it could provide temporal information about the site. |
| Amenity | The sites are currently on private land and so have low amenity value. |
| Cultural | The cultural values of the site can only be determined by the mana whenua. |

### *5.2 Assessment of archaeological values, potential historic occupation associated with milking sheds and dairy complex R11/3336 and piggery complex R11/2983*

| | |
|---|---|
| Condition | The milking shed building is in very good condition, however the dairy buildings to the south have been replaced with new buildings in the same footprint. The piggery has been destroyed but some troughs and stone wall foundations remain. There is also reasonable cause to suspect that features relating to these farm buildings may exist subsurface. The most common form of site damage is likely to be from landscaping on the Unitec campus. |
| Rarity | Potential deposits will share rarity values with sites such R11/2373, R11/2205, R11/3331 and R11/2500 representing early Pākeha industry around Te Auaunga/ Oakley Creek, and the establishment and use of Carrington Hospital. |
| Context | Any deposits exposed will tie into the wider context of historic occupation of Ōwairaka/ Te Ahi-kā-a-Rakataura/ Mt Albert, specifically around the Te Auaunga/ Oakley Creek waterway and Carrington Hospital. |
| Information | There is the potential for scientific information to be recovered by archaeological means if archaeological material is uncovered during works. |

| | |
|---|---|
| Amenity | The sites are currently on private land and so the sites have low amenity value |
| Cultural | Any potential subsurface historic deposits relate to the historic Pākeha occupation of the property. |

### *5.3 Assessment of archaeological values, drystone retaining wall R11/2473*

| | |
|---|---|
| Condition | The drystone wall was only visible in some places along its full extent due to being surrounded by long kikuyu grass and also an overburden from the gravel track above. Sections remain in fair condition but others appear to have stones removed. The most common form of site damage is likely to be from landscaping on the Unitec campus. |
| Rarity | Potential deposits will share rarity values with sites such R11/3336, R11/3331, R11/2373, R11/2205, R11/3331 and R11/2500 representing early Pākeha industry around Te Auaunga/ Oakley Creek, and the establishment and use of Carrington Hospital. |
| Context | Any deposits exposed will tie into the wider context of historic occupation of Ōwairaka, specifically around the Oakley Creek waterway and Carrington Hospital. |
| Information | There is the potential for scientific information to be recovered by archaeological means if archaeological material is uncovered during works. |
| Amenity | The site is currently on private land and therefore has low amenity value. |
| Cultural | Any potential subsurface historic deposits relate to the historic Pākeha occupation of the property. |

### *5.4 Assessment of effects*

The proposed works will involve some cut and fill to increase the existing and new private road corridors up to 25 m with shared paths, cycle paths, planting and lighting on either side. These works will involve earthworks to a maximum depth of 2.5 m, although often much less than this, across the four proposed road upgrades assessed within the Backbone works for the Carrington Residential Development Program (Gate 1 Road, Gate 2 Road, Farm Road and Spine Road). The route of these roads mostly follow the existing driveways, with some slight modification, in particular where Farm Road proposed to connect with Spine Road. The trenching for stormwater and wastewater will involve earthworks to a maximum depth of 3 m, while water reticulation, electrical and communications trenching will be no deeper than 1.5 m. Where trenching is cut through basalt a rock breaker on a 40 tonne digger may be required. Vibration associated with rock breaking has the potential to adversely affect heritage buildings. These proposed works will likely directly impact on the known site extent of recorded shell midden site R11/3313, and drystone retaining wall R11/2473 and the Scheduled Oakley/ Carrington Hospital building Historic Heritage Extent of Place in the AUP (Item 1618), as well as the possible site extent and occupation associated with the asylum farm milking sheds site R11/3336 and piggery R11/2983, and shell midden site R11/524 (Figure 1).

A separate assessment of built heritage has been commissioned from Dave Pearson Architects and no assessment of the standing buildings is made here, although it should be noted that all pre-1900 buildings are defined as archaeological sites under the Heritage New Zealand Pouhere Taonga Act 2014. Any partial or full demolition of buildings may expose pre-1900 archaeological features associated with the occupation of nearby buildings, such as the Oakley / Carrington Hospital. Such pre-1900 features may be found both inside and outside the Historic Heritage Extent of Place of the buildings.

### *5.5 Mitigation of effects*

All earthworks within unmodified ground at Lots 1, 5 and 6 DP 515012; Lot 3 DP 314949; and Lots 1 and 2 DP 531496 should be monitored by an archaeologist to mitigate the potential loss of heritage to the works. Those works should focus on gaining archaeological material suitable for midden analysis and radiocarbon dating if evidence is found for pre-European Māori occupation on the property to gather information on the chronology of settlement. All works should follow standard archaeological procedure involved when archaeological contexts are exposed, including plan and stratigraphic profile drawings. The excavation within unmodified ground should be undertaken with only a flat-edged bucket in fine spits under the instruction of an archaeologist to expose stratigraphic layers and potential archaeological features. Where rock breaking is required close to heritage buildings, whether scheduled in the AUP or not, a suitable buffer zone should be established around each building and alternative methods to minimise or eliminate vibration should be used. An assessment by Marshall Day Acoustics (Shanks 2021) has recommended monitoring vibration levels during any rock breaking within 8 m of any building and this particularly applies to pre-1900 buildings.

## 6 Recommendations

These recommendations are only made based on the archaeological potential that has been outlined above. Any other values associated with special interest groups, including tangata whenua, can only be determined by them. It is recommended that:

- Demolition of the pre-1900 part of Building 28, recorded as site R11/3336, should be avoided;
- an authority to destroy, damage or modify pre-European Māori shell midden R11/3313 andR11/524; drystone retaining wall R11/2473; and possible occupation associated with asylum milking sheds R11/3336 and piggery R11/2983, within Lots 1, 5 and 6 DP 515012; Lot 3 DP 314949; and Lots 1 and 2 DP 531496; and Lot 5 DP 515012 be applied for from Heritage New Zealand Pouhere Taonga (HNZPT) under Section 45 of the Heritage New Zealand Pouhere Taonga Act 2014;
  - note that this is a legal requirement;
  - no authority should be applied for without consultation with the appropriate tangata enua authorities; evidence of consultation, and views expressed, will be required by HNZPT, and will be considered when deciding about the granting of the authority
  - note that the application process may take 20–40 working days from the date of acceptance, and following issue there is a period of 15 working days during which earthworks cannot commence to allow for appeals to the Environment Court;
- in the event of kōiwi (human remains) being uncovered during any future construction, work should cease immediately and mana whenua should be contacted so that suitable arrangements can be made;
- since archaeological survey cannot always detect sites of traditional significance to Māori, or wahi tapu, the appropriate mana whenua authorities should be consulted regarding the possible existence of such sites, and the recommendations in this report.

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**ATTACHMENT 12**

**ADDITIONAL INFORMATION REQUEST**

**HERITAGE/ARCHAEOLOGY**

This attachment sets out the questions and responses to the clause 23 request (request for additional information) from the Council on the original plan change. This attachment first addresses the matters related to heritage, and then those related to archaeology. Where these matters are covered in other reports, these are cross-referenced. These particularly relate to the visual assessment, between new built form and the former Oakley Hospital building. These visual assessments are addressed in attachment 4.

This attachment sets out the topic, Council's question, the technical expert who prepared the response and the additional information sought by the Council.

**TOPIC: VISUAL IMPACT ON THE FORMER OAKLEY HOSPITAL BUILDING**

**Specific request H1**

Boffa Miskell Assessment of Landscape and Visual Effects: Graphic Supplement - Visualisations - Please provide further visual simulation viewpoints that show the (full extent) of the proposed and operative enabled new development within the context of the Oakley Hospital Main Building from:

- the Point Chevalier Town Centre (Figure 1); and
- Carrington Road (south of the motorway bridge) (Figure 2).

*Figure 1: The Oakley Hospital Main Building viewed from the western edge of Point Chevalier Town Centre.*

*Figure 2: The Oakley Hospital Main Building and front garden viewed from Carrington Road.*

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| **Reasons for request H1** | These are additional key views of the Oakley Hospital Main Building as experienced in the local landscape. The request has also been guided by the following statements in the HIA (p.5):<br><br>*"A distant view of the Former Oakley Hospital Building can still be had from the Point Chevalier shops and the building is also visible from Carrington Road. These views of the buildings and the landscaped area in front of the building will not be affected by the Plan Change."*<br><br>From the western edge of Point Chevalier Town Centre, the symmetrical frontage of the scheduled building is captured (compared to existing viewpoints VS5 and VS6); and from Carrington Road (heading south), views of the building within its immediate garden setting (EOP) are experienced.<br><br>(It is noted that the L5 request notes that that response may be combined with the RFI in H1.) |
| **Specific request H2** | Boffa Miskell Assessment of Landscape and Visual Effects: Graphic Supplement - Visualisations - Please provide further (or annotated) visual simulations that show the height of new buildings as enabled in the operative precinct plan. |
| **Reasons for request H2** | To assist in determining the potential visual/dominance impacts generated by the proposed new development relative to that currently enabled in the operative precinct plan. |
| **Applicant response provided by** | Rachel de Lambert of Boffa Miskell |
| **Applicant response** | |

1. Eleven visual simulations have now been prepared to show the development enabled by the operative provisions as well as the proposed heights.

2. Four visual simulations are provided showing views to the Former Oakley Hospital Building from viewpoints in Point Chevalier. They are VS6, VS7, VS8 and VS9. These locations have been selected as they best show clear views to the northern frontage of the building with proposed development adjacent and behind. They include two additional visual simulations at the request of Council's landscape architect peer reviewer, refer to the updated set of visual simulations in the Landscape and Visual Effects Graphic Supplement dated June 2023 (issue date 16 June) and updated Assessment of Landscape and Visual Effects dated 3 July 2023.

3. No further additional visual simulations have been prepared in respect of this request as visual simulations have already been provided from those locations with the clearest available views.

These visual simulations are addressed in the Boffa Miskell analysis at attachment 4

**TOPIC: HERITAGE ASSESSMENT**

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| **Applicant response provided by** | Adam Wild and Veronica Cassin, Archifact and John Duthie, Tattico |
| **Overview of applicant response** | |

1. This is a combined response for questions H3, H4 and H5 on the Former Oakley Hospital Building.

2. Mr Wild and Ms Cassin of Archifact have undertaken a full assessment of the Former Oakley Hospital Building in the context of this plan change. Their report is attached as part of this clause 23 response package. Questions H3, 4 and 5 are fully addressed in the Archifact report. This summary is to assist the Council in referencing that report.

| | |
|---|---|
| **Specific request H3** | Please provide a detailed assessment of effects (including cumulative effects) of the entire PPC on the historic heritage values of the Oakley Hospital Main Building. |

Heritage-related AUP RPS objectives and policies, including B2.3.2.(1)(a); B5.2.1.; and B5.2.2.(6-8), are relevant to this assessment. Please also consider within the context of the building's conservation plan[1] and heritage assessment[2].

**Reasons for request H3**

The HIA acknowledges that:

> *"…the enabled development will **potentially impact** the heritage values of the former hospital." (p.4) and "…any new buildings, and particularly those of additional height, **will have an impact** on the heritage values of the Former Oakley Hospital."* (p.6) (emphasis added).

However, the level and extent of this impact on the historic heritage values (particularly aesthetic (incl. landmark) and context values) of the Oakley Hospital Main Building and on its overall significance as a Category A historic heritage place, is unclear.

Furthermore, focus is currently placed on the impact generated by development in Height Area 1, with less mention of impacts (including cumulative impacts) of increased building heights across the precinct, particularly in Height Areas 2 and 4, which are in similarly close proximity to the scheduled place.

**Applicant response**

1. Mr Wild and Ms Cassin, in their analysis, address the effects of development at length. The report sets out:

    a. The methodology used (section 6 of the report).

    b. The identification of the place (section 4 of the report).

    c. Planning policy (section 5 of the report). This gives an analysis of the heritage aspects of the plan change in terms of the relevant Regional Policy Statement provisions. It compliments clause 23 response P3.

    d. Site and context and recent history (sections 7 and 8 of the report).

    e. Review of the extent of place and landscape setting (section 9 of the report).

    f. Statement of heritage significance (section 10 of the report).

    g. Assessment of the heritage effects of this plan change, including an assessment under section D17.8 of the Auckland Unitary Plan (Operative in Part) (*AUP*) (section 11 of the report).

    h. The conclusions as to the impact of this plan change and the development enabled under the plan change in terms of the heritage values of the building (section 12 of the report).

2. In terms of the heritage values of the building:

    a. The Former Oakley Hospital Building and extent of place is protected under the Auckland overlay rules relating to heritage protection and the accompanying schedules. There is no change to those provisions through this plan change.

    b. The northern formal landscape gardens of the Former Oakley Hospital Building have been significantly impacted by the historic development of the North-Western Motorway which has severed a large portion of this land with associated changes to access and layout. The remnant gardens are identified as an open space location within the plan change. If there is an effect, it will be to provide a higher level of protection to these areas than the current extent of place classification of the heritage provisions of the AUP.

c. The plan change strengthens the policies on adaptive reuse of heritage and character buildings for retail and other activities. Adaptive reuse is identified as an important method to assist in heritage conservation. The retail provisions already provide for the opportunity for retail floor space within the Former Oakley Hospital Building. The introduction of new Policy 30A simply reinforces this opportunity for heritage restoration through adaptive reuse.

3. The plan change introduces a particular height area adjacent to the Former Oakley Hospital Building. This was considered in the original reports provided by Mr Pearson. A second, independent, heritage opinion was sought as part of these clause 23 responses which is provided in the response by Mr Wild and Ms Cassin in their report.

4. The Archifact report addresses these matters in some detail.

5. The report's executive summary states:

> Overall, the proposed change in height in Height Area 1 adjacent to the west of, but beyond the EOP associated with, the former Oakley Hospital is unlikely to have a significant adverse effect on its historic heritage values.

**Specific request H4**

The HIA states (p.5):

> *"…locating buildings of additional height in an area in the north west…will result in the least impact on the heritage values to the scheduled building."*

Please explain why this is considered to be the case.

**Reasons for request H4**

The location of the buildings of additional height in the site's northwest corner (Height Area 1) means that they will be located adjacent to and viewed within the immediate context of the Oakley Hospital Main Building. Given the proximity of Height Area 1 and the considerable increase in building height sought, it would seem that this location has the potential to result in the greatest (rather than the least) visual impact on the scheduled building's historic heritage values.

It is therefore important to understand what has informed this critical statement.

**Applicant response**

1. Mr Wild / Ms Cassin address at length the proposal to create a high rise residential opportunity to the south-west of the Former Oakley Hospital Building. This is referenced throughout the report.

2. The report states:

> Installing large landmark buildings in this location is an appropriate approach considering effects on historic heritage values that can be achieved without causing any change to how the historic heritage place is understood and appreciated.

3. The report further states:

> The proposed change to Height Area 1 offers better clarity to the consideration of potential effects of built form (notably height) within the setting of the former Oakley Hospital. The proposed arrangement of the three building sites and their respective maximum heights provides a spatial layering which illustrates how the depth and scale of the development sites, combined with the advantage of the natural and substantial changes in ground level, might allow the historic building to remain appreciable as a prominent feature in the wider townscape context.
>
> The architectural emphasis of the historic former Oakley Hospital Main Building is strongly horizontal and it relies on the open space around it recognised by the defined EOP, specifically to the front as illustrated in view VS6 in commanding its prominent position in the townscape and open space setting. The operative Auckland Unitary Plan

> (AUP) allows height in this area that surpasses the ridgeline of the historic building. The proposed additional height changes the backdrop to the former Oakley Hospital Main Building, but it would remain nonetheless appreciable as a prominent building within the wider area. The articulation of the open space in the foreground of the Oakley Hospital Main Building could be enhanced to support the development site as a permeable threshold to the local town centre of Point Chevalier.
>
> Overall, the proposed change in height is unlikely to have a substantial effect on the interior shading of the historic building and, in some cases, the effects appear to lessen. The formerly long views from these wards and corridors will become shorter in some locations, but the proposed height increase will not worsen the effects from shading from those generated by the currently operative controls.

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| **Specific request H5** | Please clarify what aspects of the PC are considered mitigating factors from a built heritage perspective. |
| **Reasons for request H5** | The HIA incorporates a section titled 'Mitigating Factors' (p.5), however, it is not entirely clear what these factors are considered to be.<br><br>Given the significant changes envisioned by the PPC and the resultant potential for visual dominance effects, it is important to understand what measures are considered to mitigate effects on both the scheduled Oakley Hospital Main Building and the precinct's broader historic landscape. |

**Applicant response**

1. Visual effects are also raised in H3 and H4.

2. The Archifact report directly addresses visual effects on the Former Oakley Hospital Building, in particular the report addresses:

   a. the location of the greater height zone relative to the heritage features and landscaping to the north of the Former Oakley Hospital Building; and

   b. its visibility from key public spaces including Great North Road, Carrington Road and the Point Chevalier town centre.

3. The conclusions provided in clause 23 response to H4 equally apply to H5.

4. The Arhifact report addresses a series of views of the heritage building in the context of new height controls in the precinct with reference to the visual simulations prepared and assessed as part of the Landscape and Visual Effects Assessment, prepared by Boffa Miskell in 2022 and updated in 2023 as provided in this clause 23 response package. The report describes the effects as:

   > The operative AUP allows for a tall building mass to the rear of the former Oakley Hospital in both Height Area 1 (to the west of the former Oakley Hospital site) and Height Area 4 (to the north and east). The baseline massing breaks the ridgeline of the historic building and changes its backdrop, but maintains its formal relationship to the north and engaged with its Extent of Place.

5. The analysis identifies that the visual simulations that have been prepared demonstrate:

   > …how the Oakley Hospital Main Building and its space in front remains a primary focus within that viewing context framed behind by the development potential enables by the operative and Plan Change height and massing provisions. The Plan Change enabled height and massing breaks up and articulates that foil against which the Main Building is read more than the single mass enabled by the operative provisions.

6. The executive summary of the Archifact report states:

   > The proposed change to Height Area 1 offers better clarity to the consideration of potential effects of built form (notably height) within the setting of the former Oakley Hospital. The proposed arrangement of the three building sites and their respective maximum heights provides a spatial layering which illustrates how the depth and scale

of the development sites, combined with the advantage of the natural and substantial changes in ground level, might allow the historic building to remain appreciable as a prominent feature in the wider townscape context.

7. Visual effects are also assessed in the updated Boffa Miskell Landscape and Visual Effects Assessment and clause 23 response L7.

8. With respect to the reference to "mitigation" in the clause 23 request, the application of the matters of discretion, assessment criteria and policies will ensure a high quality of development. In particular, a new Policy 14AA is introduced (refer clause 23 response H7). With this addition, the precinct provisions and the zone / Overlay Heritage provisions of the AUP provide for appropriate development and management of the effects of such development, including around and adjacent to the Former Oakley Hospital Building.

**TOPIC: HERITAGE POLICY**

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| **Specific request** | The HIA states (p4):<br><br>*"Detailed assessment criteria are proposed to ensure the buildings attain a design standard of high quality. These are found in section 1334.8 Assessment – Restricted Discretionary Activities."* and<br><br>*"Any new buildings within Height Area 1 should be positioned and orientated having regard to their impact on the heritage values of the Former Oakley Hospital Building."*<br><br>Please clarify which assessment criteria have been relied on and if (or how) the provision sought in the HIA has been met. |
| **Reasons for request** | Section I334.8.1.(1A)(b) Assessment – RDA, Matters of Discretion – 'Building form and character' provides several assessment criteria, none of which appear to have regard to the effects of the new development on the historic heritage values of the Oakley Hospital Main Building. It is therefore unclear what assessment criteria have been relied upon in the HIA and if they are considered to appropriately safeguard and manage the heritage values of the scheduled building. It is noted that the HIA seeks that new buildings be 'positioned' and 'orientated' to have regard to their impact on the heritage values of the Oakley Hospital Main building, but this does not appear to have been incorporated into the new precinct provisions. It would be beneficial to understand whether this has a bearing on the HIA findings.<br><br>Note: See also issue raised below in relation to the sufficiency of the provisions proposed. |
| **Applicant response provided by** | Matt Riley, Boffa Miskell; Dave Pearson, DPA Architects; John Duthie, Tattico; and Adam Wild, Archifact |

**Applicant response**

1. A new policy I334.3(14AA) is proposed as follows:

> Require proposals for new high rise buildings adjacent to the former Oakley Hospital scheduled historic heritage building to provide sympathetic contemporary and high quality design which enhances the precinct's built form.

2. It is also proposed to amend assessment criterion I334.8.2(1B), which relates to assessment of taller buildings in Height Area 1, to include reference to the new policy.

3. This change will enable the relationship (and therefore degree of compatibility) between taller new buildings adjacent to the Former Oakley Hospital Building and the scheduled building to be assessed.

4. This matter is also addressed in response to clause 23 requests H3, H4, H5, H7 and L8 and the report by Archifact attached to this clause 23 response package.

**TOPIC: HERITAGE POLICY**

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|---|---|
| **Specific request** | Please explain why reference to the scheduled building has been removed altogether from existing provision I334.3.(14). |
| **Reasons for request** | It is not clear why this reference has been deleted.<br>Note: See also issue raised below in relation to the sufficiency of the provisions proposed. |
| **Applicant response provided by** | John Duthie of Tattico |

**Applicant response**

**Proposed Changes to Policy 14 and the Introduction of Policies 14A and 14AA**

1 Policy 14 was amended as per the set of proposed precinct provisions provided with the application materials to focus this policy on the relationship of development with the significant ecological area.

2 The requested private plan change has been further amended following the clause 23 requests from the Council.

3 This includes a change to Policy 14 and the introduction of a new Policy 14AA to respond to the refocussing of Policy 14 on the significant ecological area relationship and to provide a policy with a particular reference to heritage.

4 Policy 14 continues to refer to landscaping treatment adjacent to Te Auaunga.

5 A separate policy 14AA relating to heritage buildings is inserted as follows:

> Require proposals for new high rise buildings adjacent to the former Oakley Hospital scheduled historic heritage building to provide sympathetic contemporary and high quality design which enhances the precinct's built form

*Reasons*

6 Policy 14:

(a) The changes to Policy 14 are essentially to promote native plants within landscaping adjacent to Te Auaunga / Oakley Creek.

(b) This is an important consideration for mana whenua. This plan change seeks to support that by promoting the use of native species in this key landscape and cultural corridor. Te Auaunga / Oakley Creek was an important portage route for Māori. Ensuring that the interface between the precinct and the Te Auaunga valley is appropriately landscaped with native species is reinforced through this policy.

7 Heritage:

(a) The juxtaposition of the Former Oakley Hospital Building and the new development potential for high rise in the north-western corner of the precinct, is addressed in clause 23 responses H4 and H5.

(b) Mr Wild has undertaken a detailed assessment of this proposal. His report is attached to this clause 23 response package and is referred to in several of the clause 23 responses.

(c) Mr Wild's analysis carefully examines the appropriateness of locating tall high-rise buildings adjacent to the heritage structure. These responses are also set out in clause 23 response H3, H4 and H5.

(d) Mr Wild states:

> The proposed Height Area 1 is intended to become a marker of the wider northern portion of the site which can be observed from the longer reaches of the western area of the region. The western site edge has dense planting which currently obscures the historic building. The building was not designed to be appreciated from this range and consequently makes only a slight contribution to the area. Installing large landmark buildings in this location is an appropriate approach considering effects on historic heritage values that can be achieved without causing any change to how the historic heritage place is understood and appreciated.

(e) Mr Wild's report identifies that all the objectives and policies relating to the scheduled heritage building and extent of place as set out in Chapter D17 of the Auckland Unitary Plan (Operative in Part) (*AUP*) apply to this precinct. These provisions manage the effects on heritage of any modifications, alterations or additions to the heritage building and any new buildings or structures within the extent of place.

(f) Mr Wild concludes:

> Policies that support the Objectives include requirements that new buildings be designed in a manner that respects existing buildings, provides for amenity, protects heritage values and, where appropriate, enhances the streetscape and gateway locations of the campuses. Similarly, new buildings or additions to existing buildings adjoining or adjacent to scheduled historic heritage places should be sympathetic and provide contemporary and high-quality design which enhances the historic built form. That is not a requirement however that relies on the form and scale of the historic heritage assets as a baseline for the establishment of height per se.

(g) The new Policy 14AA recognises (in association with Policy 14A) that new high rise built form and scale is appropriate in this location, and can occur consistently with protecting historic heritage values. The provisions of Policy 14AA provide for the "sympathetic contemporary and high-quality design" of the new high-rise buildings to enhance the precinct's built form, which includes the Former Oakley Hospital Building.

**TOPIC: HERITAGE FEATURES**

| | |
|---|---|
| **Specific request** | Proposed policy 30A states: |

*"Encourage the adaptive re-use of the existing buildings with historic value for retail activity."*

Also relevant is existing Policy 11, which states:

*"Encourage the retention and adaptation of the heritage and character buildings, and elements identified within the precinct."*

Please provide further details about which existing buildings are being referred to here and (in relation to Policy 30A) how their historic value has been/will be determined.

Once identified, please advise what further provisions will be put in place to ensure appropriate outcomes for these buildings (including the Pump House) in the context of the PPC.

**Reasons for request**

There are several existing (late nineteenth and early twentieth century) buildings within the Te Auaunga Precinct that have a strong association with the historical development of the hospital site, contribute to its sense of place, and have potential (or known) historic heritage values. This includes the Pump House (which is understood will be protected via restrictive covenant). These buildings are both broadly and more specifically acknowledged in a number of the PPC supporting and background documentation.

DPA's HIA positively references how "policies are included [in the precinct provisions] to encourage the retention and adaptation of heritage buildings on the site including the Former Oakley Hospital." (p.6)

Boffa Miskell's Assessment of Landscape and Visual Effects goes further by identifying 'key buildings and features' on the site (Figure 4, p.7).

CFG Heritage's Archaeological Assessment (Carrington Backbone Works project) also identifies several historic buildings associated with the early hospital site.

At this stage, the identity of the 'heritage and character buildings' and 'existing buildings with historic value' referred to in the policies are uncertain. To provide greater clarity and avoid confusion in the application of the policies, it would be helpful to have these buildings clearly set out in the precinct plan (in a similar way to trees). There is also the question of whether the objectives, policies and assessment criteria should go further in acknowledging these key features in the precinct's landscape – e.g. Objective (I334.2.(6); Policy I334.3(4)(i).

**Applicant response provided by**

John Duthie, Tattico

**Applicant response**

1 The question seeks to:

(a) identify existing heritage features protected within the precinct; and

(b) address "appropriate outcomes" for these buildings.

**Heritage Buildings / Features**

2 There is only one scheduled heritage building within the precinct and that is the Former Oakley Hospital Building at the northern end of the precinct.

3 This is a substantial Category 1 Historic Place listed on the New Zealand Heritage List Rārangi Kōrero.

4 The Oakley Hospital Main Building is also scheduled in the Auckland Unitary Plan (Operative in Part) (*AUP*) Schedule 14: Historic Heritage Schedule (ID1618) and the building and its extent of place are subject to the D17 Historic Heritage Overlay. There is no change to the existing protection of the building afforded through the operative AUP provisions proposed as part of this plan change.

5 In addition, in accordance with the resource consent BUN60386270 conditions, the Pumphouse (B33) will be protected by way of covenant. This protection includes the original Pumphouse but excludes the modern annex.

6 The Precinct plan could identify the Pumphouse as being subject to a separate covenant if the Council so requests. However, that is not the practice elsewhere in the AUP, and therefore is not proposed.

7 The third protected heritage element within the precinct is the stone wall along the southern boundary. This is an archaeological feature protected by covenant with Heritage New Zealand Pouhere Taonga, and also – as with the other archaeological features within the precinct – under the Heritage New Zealand Pouhere Taonga Act 2014. Neither of these features are currently specifically identified and scheduled within the AUP.

8 The Precinct plan could identify the stone wall as being subject to a separate covenant, if the Council so requests. However, that is not the practice elsewhere in the AUP, and therefore is not proposed.

9 Neither the Pumphouse nor the stone wall warrant protection beyond the standard controls within the Heritage New Zealand Pouhere Taonga Act 2014 or the AUP.

10 For completeness, I record that there are no protected or identified heritage buildings within the Unitec campus area. This plan change makes no alteration to that situation, nor would it be appropriate to do so. While the precinct needs to be advanced as one integrated development, effectively the Unitec property is out of scope in terms of any changes promoted as part of this plan change request.

11 No changes are proposed to the Precinct plan.

12 No other buildings structures, or features are proposed to be protected as part of this plan change request.

**Heritage provisions**

13 With respect to the operative AUP provisions and proposed precinct provisions that address the protection of historic heritage:

(a) The existing objectives and policies are robust and appropriate for the heritage protection of these features.

(a) The objectives and policies section of the precinct make it clear that these objectives and policies are in addition to the AUP overlay objectives and policies including part D17: Historic Heritage Overlay.

(b) Those objectives and policies have been tested during the original AUP process and found to be appropriate to protect heritage across Auckland.

(c) The specific precinct objectives and policies deal with the particular elements relating to this precinct.

(d) The adaptive reuse of heritage buildings is a long understood and supported technique. Demonstrably the Former Oakley Hospital Building is not fit for purpose for mental health treatment in New Zealand. In fact, it reflects an era where the knowledge and treatment methods used for mental health are now considered unacceptable. If this heritage building is to be retained, then it requires adaptive reuse.

(e) The objectives and policies of this precinct signal the support for adaptive reuse including the opportunity for some retail usage within this building.

(f) Equally, the Pumphouse is no longer required for its original purpose. It does not function as part of the Auckland potable water supply. Its protection relies on its adaptive reuse. The objectives and policies provide for this.

(g) HUD does not propose any changes to the precinct provisions relating to heritage, as it considers these are fit for purpose.

**TOPIC: HERITAGE PROVISIONS**

| | |
|---|---|
| **Specific request** | It is noted with concern that the proposed plan change provisions give little weight to historic heritage and do not enable greater consideration and assessment to be given to the effects of new development on the historic heritage values of the Oakley Hospital Main Building. – see, for instance I334.3.(14) Policies – Built Form and Character; I334.8.1.(1B) Assessment RDA - Matters of Discretion; I334.8.1.(5)(d)(iv) Assessment RDA - Matters of Discretion; 1334.8.2.(1A)(b)(i) Assessment RDA – Assessment criteria and 1334.8.2.(1B)(a) Assessment RDA – Assessment criteria.<br><br>The Oakley Hospital Main Building is a Category A historic heritage place of outstanding significance well beyond its immediate environs (AUP) and a Category 1 heritage place of special or outstanding historical or cultural significance (HNZPT). It has stood as a distinctive and recognisable landmark in the local landscape for over 150 years. Its landscape qualities are noted in its conservation plan as such:<br><br>"The former hospital building is a major local landmark and dominates its immediate setting. It is of regional importance that existing views |

and the landmark significance of the building remain unaffected by external changes and internal developments.”

Ensuring that the PPC is considered within the context of this significant heritage place and enabling its heritage values to be appropriately protected and managed (as directed in RPS B5. objectives and policies) is therefore considered to be imperative. This cannot be achieved if the precinct provisions neglect to require proposals to be sympathetic to adjacent historic heritage and fail to enable greater consideration and assessment to be given to the relationship between the new development and the Oakley Hospital Main Building.

It is noted that more targeted historic heritage policies and criteria, together with tailored design guidelines, are included in other precincts that enable/have enabled the large-scale (residential) development of sites with heritage values (e.g. Hobsonville Point, Kingseat).

The applicant is encouraged to propose more appropriate provisions to recognise this issue.

| | |
|---|---|
| **Applicant response provided by** | John Duthie of Tattico |

**Applicant response**

1. This is a non-clause 23 comment.

2. The question suggests the plan change “gives little weight to historic heritage”, and does not give consideration to the effects of new development on the heritage building.

3. The plan change gives full consideration to the scheduled Former Oakley Hospital Building:

    (a) The Former Oakley Hospital Building is the only historic heritage place within the precinct scheduled within the Auckland Unitary Plan (Operative in Part) (*AUP*). Its scheduling is unchanged through this process, i.e. there is <u>no change</u> to the heritage provisions or schedules; and there is <u>no change</u> to the ‘*extent of place’* which applies to the site surrounds.

    (b) This plan change is not seeking to remove any heritage features or amend any heritage identification including this building’s ‘extent of place’. The Council has set the schedules for protected features and buildings, and what is the appropriate extent of place.

    (c) Separately two other features within the precinct are, or will be, protected by covenants, being the southern heritage stone wall and the Pumphouse.

    (d) The same assessment criteria for heritage buildings in terms of objectives, policies, activity classification, and assessment criteria, apply to the Former Oakley Hospital Building as applies to any other Category 1 building within the region.

    The plan change is very careful to adopt and incorporate all these provisions.

(e) The Auckland Unitary Plan (Operative in Part), through identifying the extent of place, has determined the area in which there should be control of buildings / structures adjacent to the heritage building. This locational extent remains. There is no additional or different development rights sought within the "extent of place".

(f) If the reason for the non-clause 23 comment is related to new development in the area adjacent to the heritage building, that has been extensively addressed in the report by Mr Adam Wild of Archifact. This work was commissioned to give a second opinion to complement the original report done by Mr Pearson of DPA.

The work of Mr Wild is attached to this clause 23 response package.

(g) This response should be read in conjunction with response H3, H4, H5 and H7, including reference to a new Policy 14AA included in the updated precinct provisions provided as part of the clause 23 response package addressing the quality of high rise buildings adjacent to the Former Oakley Hospital Building.

**TOPIC: OAKLEY HOSPITAL BUILDING OCCUPATION**

| | |
|---|---|
| **Specific request** | It is noted that the scheduled Oakley Hospital Main Building is currently unoccupied and due to the lengthy timeframes anticipated for the staged redevelopment of the precinct, there is concern that the building is at risk of vandalism and/or falling into a state of disrepair. Whilst it is acknowledged that the PC has the potential to positively enable new opportunities to support adaptive reuse (including earthquake strengthening), there is no clear understanding of when this might occur. From a good practice conservation standpoint, understanding what commitment has been made to utilise this significant heritage place and safeguard its historic fabric in the short to medium term is important. |
| **Applicant response provided by** | John Duthie, Tattico |
| **Applicant response** | |

1 This is a non-clause 23 comment/question.

2 The plan change sets up and encourages a range of adaptive reuses of the Former Oakley Hospital Building. That could include residential offices, retail and/or community facilities within the building itself.

3 There are significant interdependencies between the timing of this plan change, and the timing of heritage restoration and adaptive reuse. These matters will be worked through between Heritage New Zealand Pouhere Taonga and the Rōpū.

**TOPIC: ARCHAEOLOGICAL ASSESSMNET**

| | |
|---|---|
| **Specific request** | Please provide a historic heritage assessment that addresses the full plan change area and the actual or potential effects of all forms of development, in particular activities involving land disturbance such as building platforms, roads and tracks, utility connections, retaining structures, fencing and planting. |
| **Reasons for request** | The archaeological assessment provided has been prepared in support of previous applications for backbone infrastructure works. This assessment does not assess the full plan change area or proposal.<br><br>The assessment should specifically refer to the criteria in the AUP's RPS, part B5 (historic heritage) and identify how any adverse effects on any significant historic heritage place/s identified within the proposed plan change area will be managed in accordance with the B5 objectives and policies.<br><br>Recent reporting should also be drawn from in any updated assessment – i.e.:<br><br>• Shakles, R., Burnett, Z. and Farley, G. September 2022. Proposed Residential Subdivision, Wairaka Precinct, Carrington Road, Mt Alert, Auckland: Archaeological Assessment. Prepared for Ngāti Whātua Ōrākei – Whai Rawa by Clough and Associates Ltd.<br><br>• Usher, E. August 2022. Carrington Stormwater Outfall 06: Final Report (HNZPTA Authority 2021/777). CFG Heritage report to Heritage New Zealand Pouhere Taonga, BECA Ltd, The Ministry of Housing and Urban Development and Marutūāhu and Waiohua-Tāmaki Rōpū.<br><br>Further, the 1879 field book supporting cadastral plan SO 1992 may also be of use to determine other heritage buildings, features and areas of archaeological potential associated to the Whau Lunatic Asylum (later Carrington Psychiatric Hospital) and Farm (LINZ Recollect – Field Book 0312 pages 0312-039 to 0312-046). |
| **Applicant response provided by** | John Duthie, Tattico |
| **Applicant response** | |

1 This plan change is subject to the full Auckland Wide provisions of the Auckland Unitary Plan (Operative in Part) (*AUP*). This includes all heritage matters. It is obviously also subject to the Heritage New Zealand Pouhere Taonga Act 2014, and the protections for archaeological features. The plan change does not seek to modify any of these regulatory controls over development.

2 The archaeological assessments provided address the majority of the precinct. Additional assessments are able to be prepared in support of any further land disturbance activities, which will require resource consent and, likely, archaeological authorities.

3 The plan change does not increase the area that is available for development – the existing precinct is fully enabled for activities with the potential to disturb the land and subsurface environment, as the precinct is – in its entirety – zoned for either Special Purpose – Tertiary Education, Mixed Housing – Urban, Terraced Housing and Apartment Buildings, Special Purpose – Healthcare Facility and Hospital and Business – Mixed Use. All of these zones enable development that may involve land disturbance, building platforms, roads and tracks, utility connections, retaining structures, fencing and planting, including within the open space areas.

4 Any material development (excluding minor additions) triggers a resource consent enabling the Council to determine whether to require a further archaeological assessment.

5 The GFC archaeological assessment provides a precinct wide assessment of the Heritage NZ and AC databases and the known history of the precinct. The more detailed inspection relates to the backbone consent. It is not practical, necessary or appropriate to do a full precinct survey over approximately 64ha; particularly given the area is already development-enabled and given the ability to require an assessment as part of future development applications.

**TOPIC: STONE WALL**

| | |
|---|---|
| **Specific request** | Please provide details of how it is proposed to identify / protect the pre-1900 stone wall (NZAA R11/2979) located along the southern boundary of the plan change area. |
| **Reasons for request** | The protection of this feature should be provided for in the plan change. |
| **Applicant response provided by** | John Duthie, Tattico |

**Applicant response**

1 The stone wall along the southern boundary (NZAA R11/2979) is protected by a heritage covenant between Heritage New Zealand – Pouhere Taonga and Ngāti Whātua Ōrākei Whai Rawa. No change to that covenant is proposed through this plan change.

**TOPIC: STONE WALL PROTECTION**

| | |
|---|---|
| **Specific request** | Please provide a copy of the Memorandum of Understanding between Heritage New Zealand and Wairaka Land Company Limited (as agent for Unitec Institute of Technology) regarding the identification, protection and management of cultural and heritage resources within the Wairaka Precinct |
| **Reasons for request** | A copy of this document should be provided to council and where relevant evidence also provided outlining any effects arising from the plan change. |
| **Applicant response provided by** | John Duthie, Tattico |

**Applicant response**

1 HUD is not a party to the agreement between Heritage New Zealand Pouhere Taonga (*HNZPT*) and the Wairaka Land Company, had never received a copy of this agreement, and is not bound in any way by this agreement.

2 On request from HUD, the Council provided a copy of the agreement to HUD on 1 March 2023 for review. Our review of the agreement shows:

(a) Neither HUD, nor the Crown are a party to this agreement.

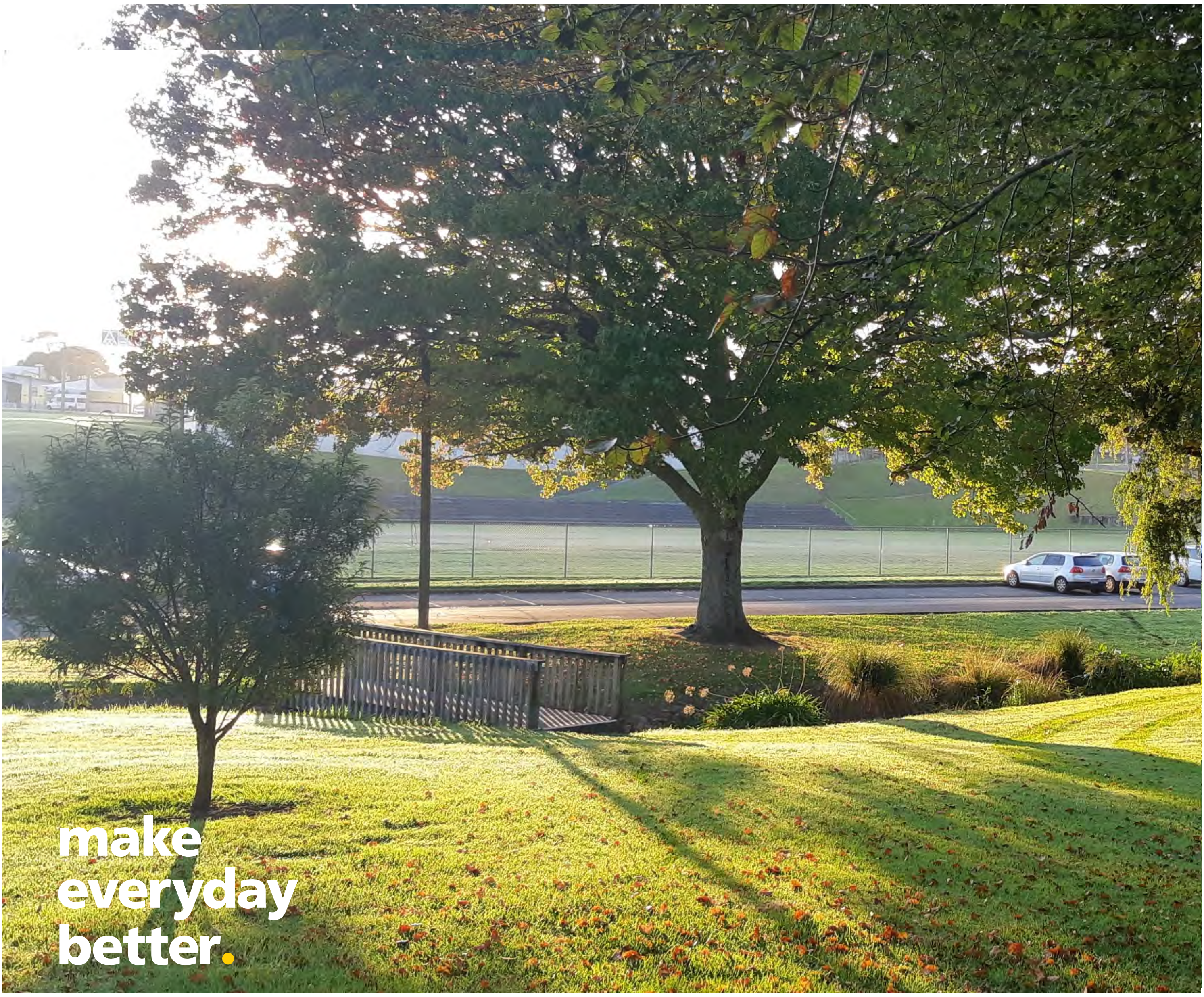
(b) The agreement is irrelevant to this private plan change request and proceedings.

3 Notwithstanding that the Crown is not a party to the agreement, the Crown understands that the stone wall referenced in the agreement is an archaeological feature under the Heritage New Zealand Pouhere Taonga Act 2014, that there is a protective covenant between Ngāti Whātua Ōrākei and HNZPT in respect of it, and as such it is protected. That protection is afforded through the legislation and the covenant, and does not rely on any private agreement such as the agreement referenced in this clause 23 request.

# Carrington Site-wide Contaminated Soils Management Plan

Prepared for Marutūāhu Rōpū and Waiohua-Tāmaki Rōpū
Prepared by Beca Limited

**26 January 2022**

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## Revision History

| Revision Nº | Prepared By | Description | Date |
|---|---|---|---|
| 1 | Mia Uys | Initial | 30/06/2021 |
| 2 | Mia Uys | Document for Council Review | 07/07/2021 |
| 3 | Mia Uys | Updated Site Area | 21/09/2021 |
| 4 | Mia Uys | Updated with Council Comments | 16/11/2021 |
| 5 | Mia Uys | Updated with Council Comments | 26/01/2022 |

## Document Acceptance

| Action | Name | Signed | Date |
|---|---|---|---|
| Prepared by | Mia Uys | | 26/01/2022 |
| Reviewed by | Phillip Ware Suitably Qualified and Experienced Practitioner | | 26/01/2022 |
| Approved by | Dale Paice | Dale Paice Digitally signed by Dale Paice DN: E=Dale.Paice@beca.com, CN=Dale Paice, OU=Users, OU=New Zealand, DC=beca, DC=net Date: 2022.01.26 15:58:02+13'00' | 26/01/2022 |
| on behalf of | Beca Limited | | |

## Contents

## Appendices

# Glossary

| Abbreviation | Definition |
|---|---|
| ACD | Asbestos Containing Dust. This is dust or debris that has settled within a workplace and is, or is assumed to be, contaminated with asbestos. |
| ACM | Asbestos Containing Material. This can be a product or material containing any amount or percentage of asbestos by volume. ACMs come in many different forms and contain varying levels of asbestos fibres. |
| ACOP | Approved Code of Practice. A document giving practical guidance on compliance. Specifically relates to the Health and Safety a Work (Asbestos) Regulations 2016. |
| AMP | Asbestos Management Plan. |
| AOA | Asset Owner Approval. Approval from Auckland Council to undertake works on a closed landfill. |
| ARCP | Asbestos Removal Control Plan |
| Asbestos | The fibrous form of the mineral silicates belonging to any one or a combination of the serpentine and amphibole groups of rock-forming minerals, including actinolite, amosite (brown asbestos), anthophyllite, crocidolite (blue asbestos), chrysotile (white asbestos), or tremolite. |
| Asbestos Assessor | Licensed by WorkSafe to undertake clearance inspections following Class A and Class B asbestos removal works |
| Asbestos Regulations | Regulations made under the Health & Safety at Work (Asbestos) Regulations 2016 which control management of and work with ACMs, their removal and disposal together with the responsibilities of employers, managers, employees, contractors, visitors, and designers. |
| Asbestos Waste | Waste containing asbestos is normally deemed as being hazardous waste and stringent regulations apply for carriage on the highways and its disposal. |
| asl | Above Sea Level. |
| AT | Auckland Transport. |
| AUP | Auckland Unitary Plan |
| bgl | Below Ground Level. |
| BTEX | Benzene, Toluene, Ethylbenzene and Xylenes. |
| Class A | Removal work involving asbestos that requires a Class A licensed asbestos removalist, usually involving friable asbestos. |
| Class B | Removal work involving asbestos that requires a Class B licensed asbestos removalist, usually involving non-friable asbestos or ACM. |
| CLMG | Contaminated Land Management Guidelines. |
| Competent Person | As defined by WorkSafe, undertakes clearance inspections following Class B Asbestos removal works |
| CSM | Conceptual Site Model |
| DSI | Detailed Site Investigation |
| ESCP | Erosion and Sediment Control Plan |
| Friable | Asbestos or ACM in a powder form or able to be crumbled, pulverised, or reduced to a powder by hand pressure when dry |

| Abbreviation | Definition |
|---|---|
| GAMAS | New Zealand Guidelines for Assessing and Managing Asbestos in Soils |
| HAIL | Hazardous Activity and Industry List |
| Independent Licensed Asbestos Assessor | A person who is licensed by WorkSafe New Zealand to conduct air monitoring and clearance inspections for friable and non-friable asbestos projects. |
| IANZ | International Accreditation New Zealand |
| Licensed asbestos removalist | A PCBU with a Class A or Class B license for asbestos removal. |
| MfE | Ministry for the Environment |
| NESCS | National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health |
| Non-friable material | Asbestos or ACM. For the purposes of this definition, asbestos and ACM include material containing asbestos fibres reinforced with a bonding compound |
| 'Piece of land' | As defined in the NESCS (Regulation 5.7) as: "The piece of land is a piece of land that is prescribed by 1 of the following:<br>a) An activity or industry described in the HAIL is being undertaken on it:<br>b) An activity or industry described in the HAIL has being undertaken on it:<br>c) It is more likely than not that an activity or industry described in the HAIL is being or has been undertaken on it." |
| PCBU | Person conducting a business or undertaking. |
| PCBs | Polychlorinated biphenyl |
| PPE | Personal Protective Equipment such as overalls, masks, gloves etc. |
| RAP | Remediation Action Plan |
| RMA | Resource Management Act. |
| RPE | Respiratory Protective Equipment such as either a full or half face mask. |
| SCS | Soil Contaminant Standard |
| Site-wide CSMP | Site-wide Contaminated Soils Management Plan |
| SPH | Separate Phase Hydrocarbons |
| SQEP | Suitably Qualified and Experienced Practitioner. |
| SVR | Site Validation Report |
| Trace Level | Trace level means an average concentration over any eight-hour period of less than 0.01 asbestos fibres per millilitre of air.' |
| Unlicensed | Work involving asbestos that does not require a licensed asbestos removalist. |

# 1 Introduction

## 1.1 Overview of Proposed Development

The Carrington Residential Development is a large-scale development project which will create up to 4,000 housing units within the Wairaka Precinct on land situated between Carrington Road and Te Auaunga / Oakley Creek.

The Carrington Development is located within the Auckland Unitary Plan's Wairaka Precinct alongside existing Unitec Campus facilities, the Mason Clinic and Taylor's Laundry. The Crown currently holds 29ha of the future development land which is right of first refusal land in Treaty settlement (the Ngā Mana Whenua o Tāmaki Makaurau Collective Redress Deed and Act). The Rōpū parties to this Redress Deed, in partnership with Te Tūāpapa Kura Kāinga / the Ministry of Housing Urban Development (HUD) are undertaking this development project.

## 1.2 Scope

Beca Limited (Beca) has been commissioned by the Marutūāhu Rōpū and Waiohua-Tāmaki Rōpū (the Rōpū) and the HUD to prepare a Site-wide Contaminated Soils Management Plan (CSMP) for the management of contaminated soils during enabling works, including the Backbone infrastructure extent and future Carrington Development. The area of interest in this report ("the Site") is shown on **Figure 1-1**.


Figure 1-1: Site boundary and location of the investigation area (Image sourced from Land Information New Zealand).

## 1.3 Purpose of the Site-wide CSMP

The purpose of this Site-wide CSMP is to identify procedures that shall be undertaken during future earthworks at the Site that may involve the disturbance and movement of contaminated soils. The Site-wide CSMP also applies to any development at the Site where a change in land use is occurring even if soil disturbance is not occurring. The procedures within this Site-wide CSMP have been informed by the listed contaminated land investigations reports and various phases of localised soil sampling for earthworks projects within the wider area completed to date:

- URS New Zealand Limited (23 June 2014) Unitec Mount Albert Campus Redevelopment – Preliminary Site Investigation Report.
- WSP New Zealand Limited (June 2017) Phase 1 Environmental Due Diligence and Development Project – Wairaka Precinct Masterplan. Unitec Institute of Technology.

- WSP New Zealand Limited (August 2017) Stage 2 Detailed Site Investigation Land Development Project – Wairaka Precinct Masterplan. Unitec Institute of Technology.
- Beca Limited (22 September 2021) Carrington Development Contaminated Land Gap Analysis Report.

Implementation of this Site-wide CSMP is intended to mitigate significant potential human health risks, reduce adverse contamination impacts upon the receiving environment (generation of dusts and off-site migration) and provide guidance for disposal options for the removal of surplus soil, groundwater or stormwater during future works.

Any amendments made to the Site-wide CSMP are to be approved by a Suitably Qualified and Experienced Practitioner (SQEP).

## 1.4 Scope of Site-wide CSMP

The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations, 2011 (NESCS) applies to land which currently has, or historically had, a potentially contaminating activity or industry undertaken on it as described in the Ministry for the Environment (MfE) Hazardous Activities and Industries List (HAIL). Five 'trigger activities' which are undertaken on HAIL land are controlled by the NESCS; these are: soil disturbance, change in land use, subdivision, soil sampling, and removal of underground fuel tanks.

This Site-wide CSMP has been prepared to identify appropriate controls for the management of potential land contamination related to all of the above 'trigger activities' with the exception of soil sampling which should be designed by a SQEP in all situations as standard.

## 1.5 Consents and Regulatory Compliance

This Site-wide CSMP has been prepared in general accordance with:

- Ministry for the Environment (MfE) Contaminated Land Management Guidelines No.1 – Reporting on Contaminated Sites in New Zealand and No.5 – Site Investigation and Analysis (2021).
- Health and Safety at Work (Asbestos) Regulations, 2016.
- Approved Code of Practice: Management and Removal of Asbestos (2016) (ACoP, WorkSafe, 2016).
- New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ, 2017) (herein referred to as the GAMAS).

This Site-wide CSMP has been prepared to support consent applications for the enabling works including the Backbone Infrastructure Works and to facilitate all proposed future development of the Site for residential use. It is noted that some projects may be subject to a separate resource consent which may include additional consent conditions or controls. Those undertaking soil disturbance activities should check if the works are subject to additional resource consent conditions that may not be included within this Site-wide CSMP.

# 2 Site Description

## 2.1 Site Location

The Site is located off Carrington Road, Mount Albert, Auckland, New Zealand. It is located approximately 6 kilometres west of the Auckland Central Business District between Te Auaunga/Oakley Creek on the western boundary and Carrington Road to the east. Refer to **Figure 1-1** for the area defined in this report as 'the Site'.

The existing buildings located at the Site were previously used as the main Unitec education campus. The campus operations have been consolidated in an area south of the Site, with the buildings on the Site now unused. The surrounding area comprises a range of activities including Unitec, (an educational campus facility recently consolidated to an area of approximately twenty-four hectares in a southern portion), the Mason clinic, Taylors laundry, recreational parks and areas intended for redevelopment which will include various future land uses including public open space and residential land use.

## 2.2 Summary of Geology, Hydrogeology and Hydrology

The Geology and hydrogeology information summarised in this section has been adopted from the Beca Limited Carrington Backbone Works Geotechnical Factual Report dated 28 May 2021 and the 2017 DSI dated August 2017.

The published geological map of the area (Edbrooke,2001) indicates the wider area to be generally underlain by the Auckland Volcanic Field (AVF), with the northern portion, being underlain by the East Coast Bays formation (ECBF) of the Waitemata Group.

The Auckland Volcanic Field consists of various volcanic cones, explosion craters, lava flows, tuff rings, scoria, basalt, and basanite. Lava caves and tunnels are common features within some Auckland Volcanic Field basalt lava flows. Volcanic landforms and features are generally well-preserved owing to its geologically recent deposition. The Site location lies within a 2-kilometre distance of Mount Albert, a relic scoria cone of a quaternary aged eruption (~120,000 years ago).

The East Coast Bays Formation of the Waitemata Group is described as consisting of *"alternating, decimetre-bedded, graded sandstones and laminated mudstones*". The local geology is shown in **Figure 2-1**.

The 2017 DSI reported that the groundwater at the Site is influenced by the underlying geology of the Site, in particular the basalt flow. Underlying and bordering the basalt rock is the Waitemata Group, which exhibits low permeability characteristics, therefore containing groundwater flow within the basalt extent.

The Te Auaunga/Oakley Creek and Wairaka Stream intercepts the Site as shown in **Figure 2-1**. The Wairaka Stream is located along the centre of the Site and flows in a north-westerly direction before discharging into Te Auaunga/ Oakley Creek on the western boundary of the Site. Te Auaunga/ Oakley Creek is located along the western boundary of the Site. Te Auaunga/ Oakley Creek drains into the Waitemata Harbour to the north of the Site.

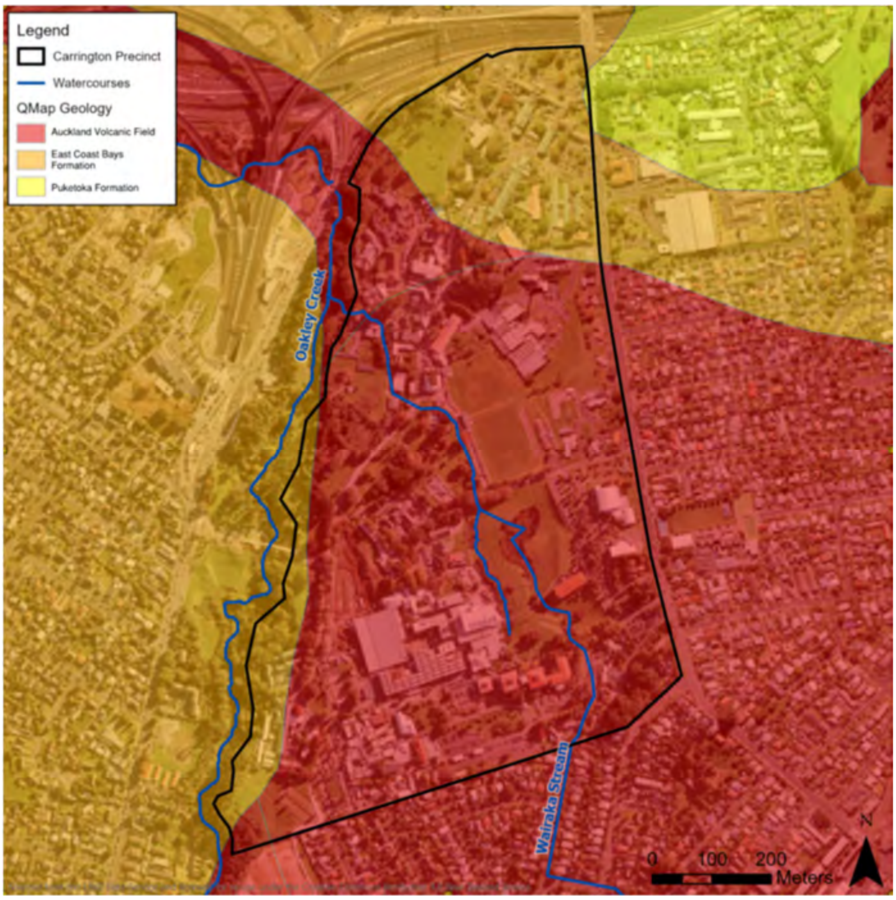



Figure 2-1: Published site geology and surface water. (Image sourced from Land Information New Zealand dated 2017 and geological information from GNS Science).

## 2.3 Sensitive Receptors

The sensitive receptors identified at and around the Site include the underlying soil and groundwater, current and future site users, construction and maintenance workers during redevelopment works, the surface water streams and the surrounding residential and commercial site users, including Unitec students, Mason clinic patients, staff and residents and those employed by Taylors Laundry

## 2.4 Summary of Site History

The Unitec campus site was founded and establish at this location in 1967. Formerly, the Site was the location of the Carrington Hospital (building 1) which was built in 1860. In more recent years, these facilities were evacuated, and the campus activities consolidated in a portion of land located directly south of the Site. The majority of the Site was used as facilities relating to the Unitec campus and facilities used for educational purposes.

## 2.5 Summary of Potential Contamination

### 2.5.1 Identified HAIL Areas

This section reflects information from the following documents:

- URS New Zealand Limited (23 June 2014) Unitec Mount Albert Campus Redevelopment – Preliminary Site Investigation Report
- WSP New Zealand Limited (June 2017) Phase 1 Environmental Due Diligence and Development Project – Wairaka Precinct Masterplan. Unitec Institute of Technology.

- Beca Limited (22 September 2021) Carrington Development Contaminated Land Gap Analysis Report.

HAIL activities, as historically or currently being undertaken at the Site, which may have resulted in soil contamination as identified in the PSI reports are summarised in **Appendix A.** The HAIL map is shown in **Figure 2-2. This HAIL map should be reviewed prior to any works being undertaken.** Note that majority of HAIL areas were assigned to existing or demolished building footprints. However, depending on the HAIL activities, the HAIL areas should conservatively extend further than the building footprint with the distances set out in **Table 2-1**. Where visual markers are unable to determine the location of the HAIL areas and GPS or other measuring tools would have to be used, then the error margins of these tools should be considered.

All additional reviews of the HAIL map and any prepared contamination assessment reports will be provided to the Consent Holder. The Consent Holder will maintain their records with an up-to-date HAIL and Investigation Plan, detailing the HAILs and any soil investigation results undertaken across the Site.

Table 2-1: Extent of HAIL areas around building footprints.

| Activities (HAIL codes) | Extent of HAIL areas around HAIL areas set out on Figure 2-2 (in meters) |
|---|---|
| Stormwater ponds and cesspits (G6) | 5m |
| Electrical Transformers (B2) | 2m |
| Workshops, Scrap Yards and Bulk Chemical Storage (A2, F4, G4) | 5m |
| Current and former chemical storage including fuel storage and use (A1, A17) | 5m |
| Current and former market gardens, sports turfs, laboratories and pharmaceutical manufacturing facilities and greenhouses (A3, A14, A10) | Not applicable (0m) |
| Historical uncontrolled fill material and landfill (G3, G5) | Not applicable (0m) |
| Asbestos containing material and lead-based paint from buildings and demolished buildings (E1, I) | 2m |

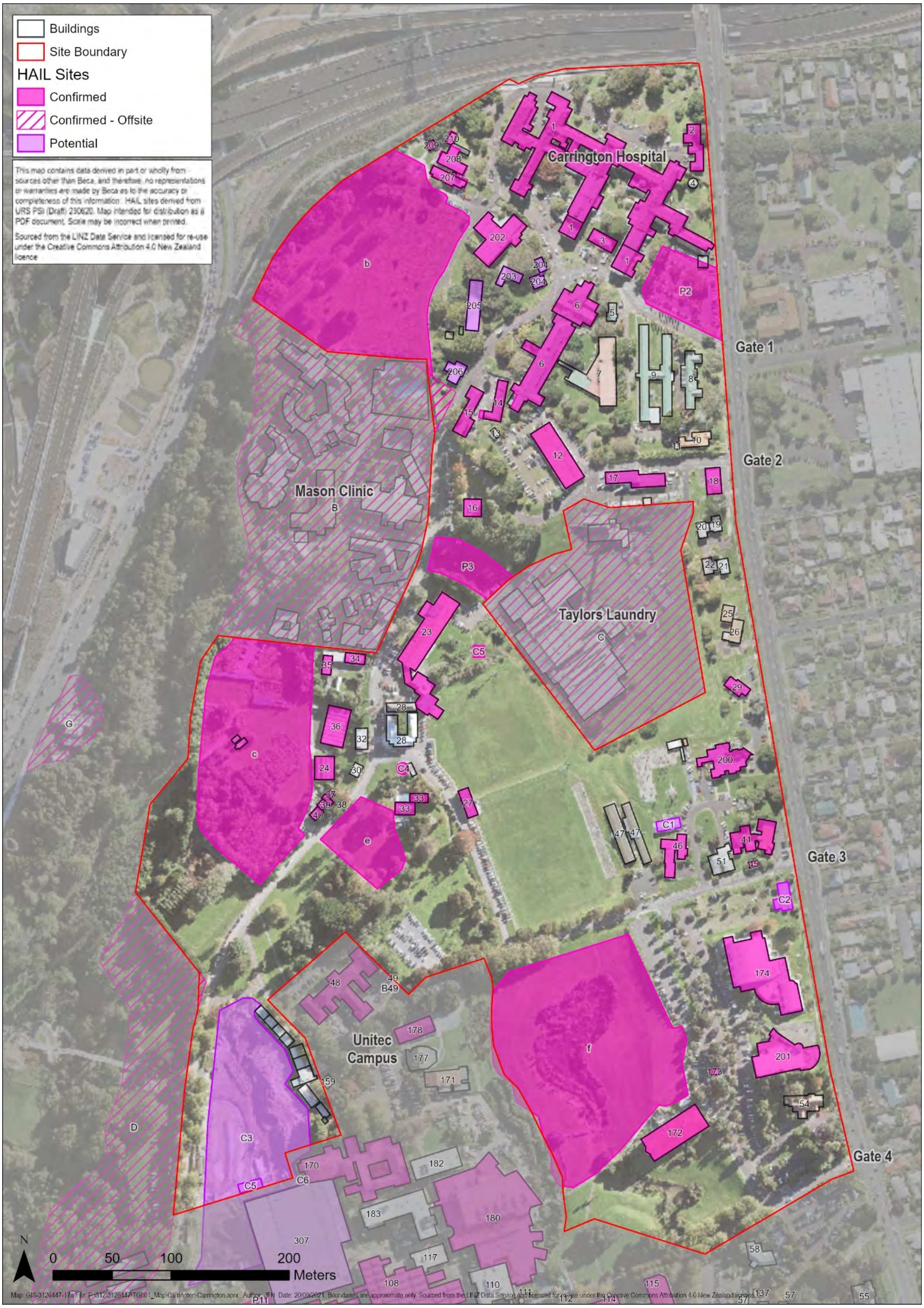



Figure 2-2: Carrington Development Site-wide CSMP HAIL Map.

### 2.5.2 Soil Sampling Investigations

- A previous assessments comprised a combined geotechnical and environmental site investigation. The contaminated land investigation findings were reported in a Phase 2 (2017 DSI) report[1].
- The DSI included a review of various previous reports including the 2017 PSI and Consolidated ACM Reports and Documentation prepared by Dowdell & Associates Limited (Dowdell) dated 2017 (not seen by Beca to date).
- Both soil and groundwater were identified to have potentially been impacted, and the potential for volatilised vapour impacts couldn't be discounted in some areas.
- The soil and groundwater investigation comprised 83 soil sampling locations including 40 drilled boreholes (28 of which were converted to groundwater monitoring wells), 39 hand auger locations and four surface sample locations. In some instances, the sampling did not target HAIL areas and only recovered samples from geotechnical boreholes.
- Selected representative soil samples were analysed for contaminants of concern comprising total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene and xylene (BTEX compounds), polycyclic aromatic hydrocarbons (PAHs), metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc), organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), phenoxy acid herbicides, polychlorinated biphenyls (PCBs), volatile halogenated compounds (VHCs), phenols and asbestos (using a combination of qualitative and quantitative methods). Limited sampling was also undertaken for boron, formaldehyde and cyanide in targeted locations where these were considered potential contaminants of concern.
- Results from the analysis of soil samples identified concentrations of benzo(a)pyrene eq., arsenic, lead, asbestos in bulk materials, chromium, and PAHs (total) above Soil Contaminant Standard ($SCSs_{(health)}$) for a residential land use and in some instances exceeding the adopted Environmental Risk Criteria in samples recovered from the general vicinity of Buildings 1, 3, 12, 16, 17, between building 23 and the sports fields, 'area e', 33, 35, 37-40, 202, 207 and 208.
- Groundwater samples collected from all monitoring wells were analysed for TPH, BTEX compounds, PAHs, metals, OCPs, OPPs, phenoxy acid herbicides, PCBs and phenols. Select samples were also analysed for biological contaminants, VHCs, formaldehyde, cyanide and boron in selected locations.
  - Groundwater levels across the site were calculated to range from 8.214 m RL to 40.258 m RL.
  - Results from the analysis of groundwater samples identified concentrations of copper, nickel, and zinc were elevated above ANZECC (2000) Trigger values for freshwater (80% protection) in samples recovered from 16 of the recovered 28 samples across the site.
- The report concluded that due to the limited sampling that had been undertaken, it was not possible to delineate specific contaminant hot spots or have confidence that all contamination issues have been identified.
- Where fill was noted to potentially refer to HAIL G3 activities, it was not considered by Beca that these are not HAIL areas on a 'more likely than not' level of certainty.

[1] WSP (August 2017) Stage 2 Detailed Site Investigation Land Development Project – Wairaka Precinct Masterplan. Unitec Institute of Technology.

- The limited number of soil sampling results that can be used to further evaluate HAIL delineation from the 2014 and 2017 PSI. The number of soil samples and exceedances of adopted screening criteria is summarised in **Appendix A**.

### 2.5.3 Contaminants of Concern - Asbestos

Asbestos is a contaminant of concern due to the likely presence of asbestos in soils related to the age of existing buildings and development across the majority of the Site where ACM was historically used in construction materials and/or where buildings that historically contained ACM were demolished. Under the NESCS there are no SCS for asbestos, therefore the soil concentrations should be assessed against the soil guideline values set out in the GAMAS *Table 5 Soil Guideline Values* to establish the potential risks to human health exposure for the specific land-use scenarios. Low level asbestos is considered to be <0.001% w/w FA and/or AF.

Work involving asbestos in soil is defined as one of four categories within the GAMAS, dependent on the concentrations of asbestos recorded within air or soil. **Table 2-2** presents a summary of the four work scenario categories and the relevant Tier 1 health risk quantities/ concentrations of asbestos within various forms for each category taken from the GAMAS.

Table 2-2: Summary of Asbestos Works Scenarios and Guideline Values

| ACM Type | Unlicensed asbestos work | Asbestos related work | Licensed Class B asbestos work* | Licensed Class A asbestos work* |
|---|---|---|---|---|
| Concentrations of asbestos fibres within air | <0.01 f/ml | <0.01 f/ml | ≥ 0.01 f/ml | ≥ 0.01 f/ml |
| Concentration of Fibrous Asbestos or Asbestos Fines (FA/AF) within soil | ≤ 0.001% w/w | > 0.001% w/w | > 0.01% w/w | > 1% w/w |
| Concentration of ACM within soil | ≤ 0.01% w/w | > 0.01% w/w | > 1% w/w | - |

**Class A and Class B asbestos removal require the works to be undertaken by a licensed asbestos removalist. The removalist will implement an Asbestos Control Removal Plan to undertake any licensed works.*

The SQEP will determine which class the works fall under based on soil sampling and laboratory results if asbestos is considered a contaminant of concern.

If the trace level in air is likely to be exceeded while undertaking soil disturbance, this work must comply with the asbestos removal obligations under the Asbestos Regulations.

A Tier 2 risk assessment can be undertaken by the SQEP to reduce the conservative approach that the Tier 1 soil guideline values set in the GAMAS. The Tier 2 risk assessment methodology is set out in the GAMAS and will take into account:

- Depth of contamination
- Asbestos physical form or condition
- Asbestos physico-chemical nature
- Matrix type
- Soil moisture content
- Land use
- Duration of exposure
- Exposure frequency

### 2.5.4 Contaminants of Concern – Non-Asbestos Contaminants

The potential risk to human health risk should be assessment by comparing soil sampling results to screening criteria in accordance with the hierarchy defined by Ministry for the Environment (MfE) Contaminated Land Management Guidelines No.2 (MfE, 2002) based on the relevant land-use scenarios.

The risk posed by the discharge of contaminants in soil should be assessed against the following guidelines:

- Auckland Unitary Plan Operative in Part Table E30.6.1.4.1 – Permitted Activity Soil Acceptance Criteria.
- Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (MfE, 1999); Soil acceptance criteria for protection of groundwater quality (Table 4.20).

The human health and environmental risks from the majority of the other contaminants of concern (e.g. heavy metals, hydrocarbons, pesticides etc.) can be managed through the implementation of standard good practice procedures such as the use of gloves to reduce dermal contact, avoiding entering excavations, appropriate disposal, good handwashing practices and installation of erosion sediment control measures.

If contaminants of concern are determined to pose a risk to the environment or human health, that the SQEP considers, cannot be addressed by the controls set out within this Site-wide CSMP, a project specific Environmental Management Plan (EMP) or Remediation Action Plan (RAP) will be required.

### 2.5.5 Exposure Routes

Based on the Conceptual Site Model (CSM) set out in the 2017 PSI, the potential contamination exposure routes have been identified as set out in **Table 2-3**.

Table 2-3: Conceptual Site Model for the Carrington Development works adapted from the 2017 PSI.

| Potential Contaminant Sources** | Potential Receptors | Potential Pathways (Migration and Exposure) |
|---|---|---|
| **Uncontrolled fill material and landfills**<br><br>May include building waste containing asbestos and lead.<br>Hydrocarbon compounds including TPHs and PAHs<br>Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc)<br>Organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), organonitrate pesticides (ONPs) and herbicides<br>Asbestos<br>Ground gas (unlikely unless significant quantity of putrescible material present) | • Soil<br>• Groundwater (not applicable to asbestos)<br>• Groundwater resources for public consumption (not applicable to asbestos)<br>• Construction and maintenance workers during development works<br>• Future residents and users of the site following development<br>• Wairaka Stream, Oakley Creek and downgradient surface water (not applicable to asbestos unless via sediment runoff).<br>• Surrounding residential and commercial site users. | Potential migration pathways for the contaminants of concern include:<br>• Airborne migration of dust, vapour or fibres<br>• Surface runoff containing impacted soil or dissolved contaminants<br>• Infiltration of contaminants in soil<br>• Groundwater transport through soil, including in preferential pathways (service trenches, along lower permeability soils).<br><br>Potential exposure pathways comprise:<br>• Ecological exposure via soil and water ingestion and habitation<br>• Inhalation of dust, vapour or fibres<br>• Ingestion or dermal contact with impacted soil, including surface soils during excavation work<br>• Ingestion of or dermal contact with impacted surface water or extracted groundwater. |
| **Asbestos containing material and lead-based paint from buildings and demolished buildings** | • Soil<br>• Groundwater resources for public consumption (lead only)<br>• Current site users<br>• Construction and maintenance workers during development works or other<br>• Future residents and users of the site following development<br>• Wairaka Stream, Oakley Creek and downgradient surface water (lead only)<br>• Surrounding residential and commercial site users (lead only as asbestos does not migrate via groundwater or soil). | Potential migration pathways for the contaminants of concern include:<br>• Airborne migration of dust or fibres<br>• Surface runoff containing impacted soil or dissolved contaminants<br>• Infiltration of contaminants in soil<br>Groundwater transport through soil, including in preferential pathways (service trenches, along lower permeability soils).<br><br>Potential exposure pathways comprise:<br>• Inhalation of dust, vapour or fibres<br>• Ingestion of or dermal contact with impacted soil, including surface soils and during excavation work |

| Potential Contaminant Sources** | Potential Receptors | Potential Pathways (Migration and Exposure) |
| --- | --- | --- |
| | | • Ingestion of or dermal contact with impacted surface water or extracted groundwater. |
| **Current and former market gardens and greenhouses**<br><br>Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc)<br>Organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), organonitrate pesticides (ONPs) and herbicides<br>Asbestos (from building structures) | • Soil and groundwater<br>• Groundwater resources for public consumption<br>• Current site users<br>• Construction and maintenance workers during development works or other<br>• Future residents and users of the site following development<br>• Wairaka Stream, Oakley Creek and downgradient surface water<br>• Surrounding residential and commercial site users. | Potential migration pathways for the contaminants of concern include:<br>• Airborne migration of dust, vapour or fibres<br>• Surface runoff containing impacted soil or dissolved contaminants<br>• Infiltration of contaminants in soil<br>Groundwater transport through soil, including in preferential pathways (service trenches, along lower permeability soils).<br><br>Potential exposure pathways comprise:<br>• Ecological exposure via soil and water ingestion and habitation<br>• Inhalation of dust, vapour or fibres<br>• Ingestion of or dermal contact with impacted soil, including surface soils and during excavation work<br>• Ingestion of or dermal contact with impacted surface water or extracted groundwater. |
| **Current and former chemical storage including fuel storage and use**<br><br>Dependent on the type of chemicals stored but may include pharmaceuticals, fuels, herbicides, pesticides, laboratory chemicals etc. | • Soil and groundwater<br>• Groundwater resources for public consumption<br>• Current site users<br>• Construction and maintenance workers during development works or other<br>• Future residents and users of the site following development<br>• Wairaka Stream, Oakley Creek and downgradient surface water<br>• Surrounding residential and commercial site users. | Potential migration pathways for the contaminants of concern include:<br>• Airborne migration of dust, vapour or fibres<br>• Surface runoff containing impacted soil or dissolved contaminants<br>• Infiltration of contaminants in soil<br>• Groundwater transport through soil, including in preferential pathways (service trenches, along lower permeability soils).<br><br>Potential exposure pathways comprise:<br>• Ecological exposure via soil and water ingestion and habitation<br>• Inhalation of dust, vapour or fibres |

| Potential Contaminant Sources** | Potential Receptors | Potential Pathways (Migration and Exposure) |
| --- | --- | --- |
| | | • Ingestion of or dermal contact with impacted soil, including surface soils and during excavation work<br>• Ingestion of or dermal contact with impacted surface water or extracted groundwater. |
| **Electrical transformers**<br><br>Copper, Lead, Tin and Mercury<br>Hydrocarbon compounds including TPHs<br>PCBs<br>Asbestos (from thermal insulators) | • Soil and groundwater<br>• Groundwater resources for public consumption<br>• Current site users<br>• Construction and maintenance workers during development works or other<br>• Future residents and users of the site following development<br>• Wairaka Stream, Oakley Creek and downgradient surface water<br>• Surrounding residential and commercial site users. | Potential migration pathways for the contaminants of concern include:<br>• Airborne migration of dust, vapour or fibres<br>• Surface runoff containing impacted soil or dissolved contaminants<br>• Infiltration of contaminants in soil<br>• Groundwater transport through soil, including in preferential pathways (service trenches, along lower permeability soils).<br><br>Potential exposure pathways comprise:<br>• Ecological exposure via soil and water ingestion and habitation<br>• Inhalation of dust, vapour or fibres<br>• Ingestion of or dermal contact with impacted soil, including surface soils and during excavation work<br>• Ingestion of or dermal contact with impacted surface water or extracted groundwater. |
| **Workshops**<br><br>Hydrocarbon compounds including TPHs, BTEX, VOCs PAHs and phenolic compounds<br>Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc) | • Soil and groundwater<br>• Groundwater resources for public consumption<br>• Current site users<br>• Construction and maintenance workers during development works or other<br>• Future residents and users of the site following development<br>• Wairaka Stream, Oakley Creek and downgradient surface water<br>• Surrounding residential and commercial site users. | Potential migration pathways for the contaminants of concern include:<br>• Airborne migration of dust and vapour<br>• Surface runoff containing impacted soil or dissolved contaminants<br>• Infiltration of contaminants in soil<br>• Groundwater transport through soil, including in preferential pathways (service trenches, along lower permeability soils).<br><br>Potential exposure pathways comprise: |

| Potential Contaminant Sources** | Potential Receptors | Potential Pathways (Migration and Exposure) |
| --- | --- | --- |
| | | • Ecological exposure via soil and water ingestion and habitation<br>• Inhalation of dust, vapour or fibres<br>• Ingestion of or dermal contact with impacted soil, including surface soils and during excavation work<br>• Ingestion of or dermal contact with impacted surface water or extracted groundwater. |
| **Stormwater ponds and cesspits**<br><br>Hydrocarbon compounds including TPHs<br>Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc)<br>Asbestos<br>Coliforms and bacteria | • Soil and groundwater<br>• Groundwater resources for public consumption<br>• Current site users<br>• Construction and maintenance workers during development works or other<br>• Future residents and users of the site following development<br>• Wairaka Stream, Oakley Creek and downgradient surface water<br>• Surrounding residential and commercial site users. | Potential migration pathways for the contaminants of concern include:<br>• Airborne migration of dust, vapour or fibres<br>• Surface runoff containing impacted soil or dissolved contaminants<br>• Infiltration of contaminants in soil<br>• Groundwater transport through soil, including in preferential pathways (service trenches, along lower permeability soils).<br><br>Potential exposure pathways comprise:<br>• Ecological exposure via soil and water ingestion and habitation<br>• Inhalation of dust, vapour or fibres<br>• Ingestion of or dermal contact with impacted soil, including surface soils and during excavation work<br>• Ingestion of or dermal contact with impacted surface water or extracted groundwater. |

** Identified COCs related to the different activities may vary.

# 3 Management Approach

## 3.1 General Requirements

This section sets out general management procedures and requirements.

1. The Consent Holder will be responsible for the implementation of this Site-wide CSMP throughout the duration of the Site construction works. Typically, physical works contractors will take on responsibility for specific requirements and provisions of the CSMP when they are engaged to do works.
2. All personnel involved in the Site construction works are to be familiar with this Site-wide CSMP and ensure that the requirements of this Site-wide CSMP have been followed.
3. A copy of this Site-wide CSMP is to remain available onsite at all times so that reference can be made to it when undertaking any site works.
4. The Site-wide CSMP is intended to assist the Site Contractor/s in meeting their legal obligations related to potentially contaminated soils with respect to health, safety and the environment. It is not intended to cover the general site safety procedures required for typical excavation and construction activities at the Site. The Site-wide CSMP is not intended to relieve the Contractor of their legal responsibilities.
5. Excavation, demolition and construction activities at the Site may be subject to other controls/rules/policies under the relevant district and regional plans, including but not limited to, NESCS. Any conditions imposed by the regulatory authorities must be adhered to. However, it is expected that this Site-wide CSMP will be incorporated into any consent/permit involving excavation/disturbance work at the Site so that the risks associated with contaminated soils are managed appropriately.

## 3.2 Roles and Responsibilities

This Site-wide CSMP shall be implemented and managed by the relevant responsible parties. For each project to be completed under this Site-wide CSMP the roles outlined in **Table 3-1** should be identified and recorded within Works Completion Reporting (refer **Section 10.2**).

Table 3-1: Roles and Responsibilities

| Role | Responsibility |
|---|---|
| **Consent Holder** | Responsible for overseeing approval and implementation of this Site-wide CSMP. |
| **Contaminated Land Specialist** | The Contaminated Land Specialist registered as a Suitably Qualified and Experienced Practitioner (SQEP) shall be responsible for:<br>• Assessing the adequacy of available soil sampling results or determining the scope of soil sampling required if results are not already available.<br>• Advising on the Sections of this Site-wide CSMP to be followed during works.<br>• Provision of ground contamination advice during the works and undertake periodic inspections during the works.<br>• Undertaken completion reporting on conclusion of the works.<br>• Advising the Consent Holder and their subcontractors on procedures if unexpected contamination is encountered during the works. |
| **Licenced Asbestos Removalist** | A licenced asbestos removalist will be responsible for any Class A or Class B asbestos removal works. |

| Role | Responsibility |
| --- | --- |
| **Lead Contractor** | • The Contractor shall be responsible for ensuring works are undertaken in accordance with requirements of the Site-wide CSMP and other relevant plans/documentation.<br>• Inform the Consent Holder and Auckland Council, as required, relating to contamination incidents. |
| **Site Supervisor(s)** | • The Site supervisor(s) of the Contractor must read, understand and implement the Site-wide CSMP in the field and ensure site workers comply with this management plan.<br>• The Site supervisor shall ensure all workers are inducted, wear appropriate personal protective equipment and follow basic hygiene procedures and be aware of the symptoms of contamination toxicity and health risks (as identified by the SQEP for the particular project).<br>• The Site supervisor shall monitor for signs of contamination (using an excavation spotter if deemed necessary) and manage the implementation of control measures and safety precautions.<br>• Report on incidents relating to presence of contamination. |

Note: The Contaminated Land Specialist, Contractor, and Site Supervisors may be different for each sub development site.

# 4 Pre-Works Procedures

## 4.1 Task Sequence

Activities to be undertaken on confirmed or potential HAIL sites need to be assessed prior to the activity being carried out. This section discusses the required procedures to follow prior to undertaking the following activities:

- Change in Land use and/or Subdivision
- Soil disturbance, remedial works and/or fuel storage systems removal works or;
- Where both these are to be undertaken

A task sequence flowchart detailing the decision-making process, when undertaking the listed activities, are set out in **Appendix B**.

## 4.2 Change in Land Use and Subdivision

Depending on the available information to date (from the existing soil sampling / DSI findings), the SQEP shall assess whether the change in land-use or subdivision will result in a change in risk profile e.g. site use changes from commercial to residential use, including child care facilities where surface soils are exposed (but where no soil disturbance is required). Additional soil sampling may be required to adequately assess the risk. Soil sampling results should be compared with the appropriate human health risk criteria based on the relevant land use scenario.

If the SQEP identifies contamination that presents a risk that cannot be managed by the procedures within this Site-wide CSMP, a project site-specific Remediation Action Plan (RAP) and site validation report (SVR) or works closure report (WCR) will be completed. These reports should provide sufficient information to cover NESCS and E30 requirements with the support of this site-wide CSMP.

Council will be notified of any proposed land-use change (as applicable under the NESCS) or subdivision activities. If a change in risk profile presents, then commentary around relevant Sections of the management plans (or updates to the management plan) should be included in the Council notification. See **Section 5** for details.

Refer to **Appendix B** for the sequence of tasks required when undertaking these activities.

## 4.3 Soil Disturbance and Fuel Storage Systems Removal - Contaminated Land Works Categories

The task sequence set out in **Appendix B** should be followed for all projects involving soil disturbance, remedial works and removal or replacement of fuel storage systems.

Depending on the available information to date (from the existing soil sampling / DSI findings or future investigations), the proposed works will be categorised into one of four categories (1-4) as summarised in **Appendix B**. On top of the basic definition of Categories 3 and 4 in **Appendix B**, the GAMAS enables use of Tier 2 risk assessment to review controls needed based on the potential for trace fibres in air (<0.01 fibres/mL) to be exceeded which may result in an area that initially presents as Category 4 being re assessed as Category 3.

For works that will involve the removal or replacement of a fuel storage system and surrounding soil, the SQEP will undertake an assessment in general accordance with the MfE Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand.

As detailed in **Section 2.5.4**, if the SQEP identifies contamination that presents a risk that cannot be managed by the procedures within this Site-wide CSMP, a project specific EMP/RAP will be completed, or additional procedures added to this Site-wide CSMP.

It should be noted that there were only two locations where fuel tanks may still remain buried (potentially) on site (Hail ID 12, 16 and 18). No details around the exact locations of such tanks were identified and may likely not exist or have been removed.

Table 4-1: Soil Disturbance Categories

| Category number | Contamination Status of Soils | Site-wide CSMP Procedures |
|---|---|---|
| 1 | No contamination identified: All targeted COC concentrations are below background (or consistent with background), and below human health (set out in the NESCS and GAMAS for the relevant land-use scenario) and environmental guideline values (set out in AUP E30.6.1.4.).<br>*Good practice handling and management protocols to be implemented* | **Sections 6 and 10** |
| 2 | Low level contamination (including asbestos) with levels reflecting risk generally below human health (set out in the NESCS and GAMAS for the relevant land-use scenario) and environmental guideline values (set out in AUP E30.6.1.4.).<br>*Unlicensed asbestos work scenario (refer Table 2-2)* | **Sections 6, 7 and 10** |
| 3 | Contamination above human health (set out in the NESCS and GAMAS for the relevant land-use scenario) and environmental guideline values (set out in AUP E30.6.1.4.) or if asbestos is present in concentrations considered within the *asbestos related work scenario (refer Table 2-2).*<br>If soil disturbance quantities are greater than 200m$^3$, then Council need to be notified 5 days prior to undertaking earthworks. | **Sections 6, 8 and 10** |
| 4 | Contamination above human health (set out in the NESCS and GAMAS for the relevant land-use scenario) and environmental guideline values (set out in AUP E30.6.1.4.).<br>*Asbestos concentrations within the licensed asbestos work scenario-Class A or B (refer Table 2-2).*<br>If soil disturbance quantities are greater than 200m$^3$, then Council need to be notified 5 days prior to undertaking earthworks. | **Sections 6, 9 and 10** |

## 4.4 Considerations for Additional Soil Sampling / Detailed Site Investigation

To determine the need for further soil sampling / a DSI, the SQEP in conjunction with the Consent Holder's assigned Project Manager will consider numerous factors, including:

- The likely presence of contamination.
- Site size / volume of proposed soil disturbance.
- Ease of access for the investigation.
- Need to determine disposal criteria in advance of the works.
- Change in risk profile.

For larger projects it is likely a DSI will be undertaken on the basis that a DSI may provide a better cost: benefit ratio, compared to not completing a DSI and assuming full controls/conservative disposal sites are required/selected.

If a DSI cannot be completed due to access restrictions, e.g., undertaking the DSI will cause significant disruption / impact on the Consent Holder operations, and in the opinion of the SQEP it is likely that contamination may present at a level that could result in a human health or environmental risk, the proposed works will be undertaken as Category 3 (see **Table 4-1**). This allows for all material to be treated as contaminated in the absence of site evidence and is likely to be applied to areas where minimal soil disturbance is proposed.

## 4.5 Overview of Requirements

**Table 4-2** presents a high-level summary of the requirements for each works category. Refer to **Sections 6 to 10** for detail each procedure.

Table 4-2: Summary Table of Requirements

| | Cat 1 | Cat 2 | Cat 3 | Cat 4 |
|---|---|---|---|---|
| **Regulatory Notification Requirements** | | | | |
| Council notification of removal of procedures from Site-wide CSMP | ✓ | ✓ | ✓ | ✓ |
| Council notification prior to works | ✗+ | ✗+ | ✓+ | ✓+ |
| WorkSafe notification | ✗ | ✗ | ✗ | ✓ |
| Completion Reporting@ | ✓ | ✓ | ✓ | ✓ |
| **General Procedures** | | | | |
| Standard Procedures (set out by the Consent Holder and project manager) | ✓ | ✓ | ✓ | ✓ |
| Stormwater Control Procedures | ✓ | ✓ | ✓ | ✓ |
| Erosion and Sediment Control Procedures | ✓ | ✓ | ✓ | ✓ |
| Dust Management | ✓ | ✓ | ✓ | ✓^ |
| Soil Excavation/Disturbance Procedures | ✗ | ✓ | ✓ | ✓ |
| Unexpected Contamination Discovery | ✓ | ✓ | ✓ | ✓ |
| Soil Re-use and Disposal | ✓ | & | & | & |
| Groundwater Management | ✗ | ✗ | ✓ | ✓ |
| General Site Monitoring | ✗ | ✗ | ✓ | ✓ |
| Temporary Stockpile Procedures | ✗ | ✗ | ✓ | ✓ |
| Emergency Procedures | ✗ | ✗ | ✓ | ✓ |
| Licensed Contractor Required | ✗ | ✗ | ✗ | ✓ |
| **Work Area Controls** | | | | |
| Control air monitoring | ✗ | ✗ | # | ✓ |
| Establishment of Asbestos Work Area | ✗ | ✗ | ✓ | ✓ |

| | Cat 1 | Cat 2 | Cat 3 | Cat 4 |
|---|---|---|---|---|
| **Decontamination** | | | | |
| Removal of visible soil from equipment/ plant / machinery | ✘ | ✓ | ✓ | ✓ |
| Personal Decontamination | ✘ | ✘ | ✓ | ✓ |
| Equipment / machinery decontamination by wet/ dry method and assessment by competent person or SQEP | ✘ | ✘ | ✓ | ✓ |
| **Inspections / Monitoring** | | | | |
| Clearance Inspection/ Validation | ✘ | ✘ | ✘ | ✓ |

@Reporting requirements dependent upon project soil disturbance volume and whether undergoing subdivision or a change in land use

^ Enhanced dust suppression may be required

# Air monitoring requirements to be determined by the SQEP following assessment of the soil sampling / DSI results

+ If soil disturbance is greater than 200m$^3$ for Category 3 and Category 4 works or if subdivision or land use change is being undertaken (any Category)

& All soils can likely be re-used on site, where SQEP consider it appropriate

## 4.6 PPE/ RPE Requirements

**Table 4-3** provides a summary of the indicative PPE/ RPE requirements for each works category related to contaminated land hazards only (additional task specific PPE may be required). The SQEP can change the required PPE/RPE based on the soil sampling results / tier 2 risk assessment.

Table 4-3: Summary of PPE/ RPE Requirements

| PPE/ RPE | Cat 1 | Cat 2 | Cat 3 | Cat 4 |
|---|---|---|---|---|
| Safety Boots | ✓ | ✓ | ✓ | ✓ |
| Cloth overalls/ long sleeved clothing | ✘ | ✓ | ✘ | ✘ |
| Disposable overshoes and Category 3, Type 5 Disposal Coveralls | ✘ | ✘ | ✓ | ✓ |
| Protective gloves for any personnel handling ACM | ✘ | ✓ | ✓ | ✓ |
| Safety Glasses | + | + | ✓ | ✓ |
| Disposable P2 mask or half face P2/P3 respirator with particulate filter. Consideration of the use of full-face respirators if friable ACM is identified. | ✘ | ✘ | ✓ | ✓ |

# PPE / RPE requirements to be determined by the SQEP following assessment of the soil sampling / DSI results.

+ Task dependent

## 4.7 Additional Consent Conditions

It is noted that some projects may be subject to a separate resource consent which may include additional consent conditions or controls. Contractors should always check if the works are subject to additional resource consent conditions that may not be included within this Site-wide CSMP.

# 5 Regulatory Notification Requirements

## 5.1 Council Notification

### 5.1.1 Changes to Site-wide CSMP

If procedures are to be removed from the Site-wide CSMP the amendments will be provided to the relevant team leader at Auckland Council (Regulatory Council).

### 5.1.2 Change in Land Use and Sub-Division Notification

For projects where only a change in land use or sub-division is to occur (see **Section 4.2**), then Council shall be notified of the proposed changes and how it will relate to the existing HAIL sites. In the event where the changes will incur a change in risk profile, Council will be notified a minimum of five days prior any works (other than soil disturbance work). A summary of the mitigation / remediation that has been undertaken to mitigate any ongoing risks, including any long-term management requirements will be included in the Council notification.

### 5.1.3 Soil Disturbance Works Notification

As noted in **Section 4.5** Council will be notified of any land disturbance works to be carried out as Category 3 or Category 4 works greater than 200m$^3$ at least 5 days prior to commencement of work. A DSI or soil sampling results, if completed, and/or relevant description of contaminants will be included in the notification.

Any works undertaken as Category 1 and Category 2 or Category 3 and 4 works < 200m$^3$ does not require council notification, prior to works commencing, under this Site-wide CSMP. Reporting of works start may be required under other consent requirements. The works completion register listing all works undertaken under this Site-wide CSMP and all associated prepared contamination reports will be provided to Council annually. Refer to **Section 10** for further details.

## 5.2 Work Safe Notification

Any works to be undertaken as Category 4 (licensed Class A or Class B asbestos works) will be notified to WorkSafe as required by the Health and Safety at Work (Asbestos) Regulations 2016 regulation 34. This notification is to be undertaken by the Licenced Removal Contractor.

# 6 Category 1 Works: General Procedures

The procedures within this section are general procedures that are applicable to all soil disturbance or remedial works undertaken.

## 6.1 Good Practice Procedures

The Consent Holder shall maintain industry good practice processes for all works undertaken under this Site-wide CSMP in line with the following guidelines:

- Worksafe Excavation Safety Good Practice Guidelines, 2016
- Auckland Council Guideline Document (GD05) Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region, 2016
- Worksafe Approved Code of Practice: Management and Removal of Asbestos (ACoP, 2016)
- Good Practice Guide for Assessing and Managing the Environmental Effects of Dust Emissions, 2016
- BRANZ New Zealand Guidelines for Assessing and Managing Asbestos in Soil (2017)

Standard good practices include training and induction, a permit to dig system, Job Safety and Environment Analysis (JSEA), contractors Health & Safety Plan (CHSP) and contractors Construction Management Plan (CMP) will also be completed as required.

- Prevent the generation of dust and wear a P2 dust mask if dust is generated.

## 6.2 General Site Monitoring

The following site monitoring activities should be undertaken by the Site Supervisor whilst disturbance of potentially contaminated land is being undertaken:

- Informal inspections to check compliance with this Site-wide CSMP and note any issues to be rectified.
- Ensuring that dust control measures are implemented, including ensuring trucks are using dust covers.
- Inspections as required by environmental control procedures e.g. sediment control devices inspected daily to ensure that they are installed correctly, operating effectively and are properly maintained.
- Ensure that a spill kit is available onsite, and that the Contractor's staff are suitably trained in its use; and
- All machine operators / drivers should ensure all machinery is free of oil leaks prior to use and only re-fuel machinery in designated areas.

For works that are of a duration of two weeks or more **weekly formal site inspections** are to be completed by the Site Supervisor to check compliance with this Site-wide CSMP. Site specific checklists will be developed by the Contractor to check compliance. Issues will be noted if they present significant environmental risks (e.g. noise, dust, spoil management).

Triggered inspections will be undertaken and recorded in response to the following:

- Complaints – upon receiving a complaint, the complaint should be noted, and an inspection of the area affected or involved undertaken. Complaints should be reported to the Consent holder project manager who should co-ordinate with a Stakeholder and Engagement team to resolve.
- Extreme weather – site control measures will be inspected immediately before, during and after extreme weather (as appropriate).
- Post incident inspections will be undertaken immediately following accidental spills or other incidents or emergencies and after "near miss" events. Any follow-up action/response will be document and appropriately closed out.

## 6.3 Dust Control Procedures and Air Quality Monitoring

Dust generating activities should be adequately managed. The stockpiling of soils during excavation should be minimised and, where possible, material directly loaded into trucks if planned to be taken off-site. Trucks and trailers should be covered to mitigate the risks of inadvertent spillages and dust dispersal during transport. The most effective way to control construction site dust is through good on-site housekeeping and mitigation measures including:

- Reduction of vehicle speeds on site.
- Minimising drop heights from loaders.
- Ensuring soil is covered when being transported by truck if required.
- Limiting access to the working area to essential vehicles and personnel only.
- Trucks and excavators entering the work area can have their wheels, tracks or buckets scraped washed or brushed down prior to leaving the work area if required.
- Where windy conditions persist and potential for dust generation is present; consideration should be given to use of light sprays to dampen the immediate excavation surfaces. Excessive wetting causing run-off or ponding of water should be avoided.
- Consideration should be given to dampening and/or covering soil stockpiles, if required.
- Minimise the time soil is exposed by backfilling or cover exposed soil.

Additional dust control procedures are set out in Sections 8 and 9 depending on the asbestos works scenario.

The following hierarchy of actions is proposed in the event that dust discharges occur from the works:

- The wearing of dust masks shall be implemented in the event that visible dust is generated. If dusts are discharging beyond the boundary of the work area the following actions shall be implemented immediately:
  - Increase wetting of the exposed materials until discharges are mitigated. Consider employing automated suppression systems if problems are recurring.
  - Cover or temporarily backfill excavations to address discharges while alternative mitigation measures are implemented. Alternative mitigation measures may start with revising operational procedures, for example, significantly reducing open areas in conjunction with the controls described above. However, if the discharges persist, professional advice should be sought in order to define appropriate control measures.

Air quality monitoring is not a requirement within the guidelines for ‘unlicensed asbestos works’ or ‘asbestos related works’, however it can be determined to be required at the discretion of the SQEP. Air quality monitoring will be required during earthworks if the following listed conditions apply (based on best practice methods listed in the ACoP):

- If there is uncertainty about whether the airborne contamination standard for asbestos is likely to be exceeded.
- When it is not clear if new or existing control measures are effective.
- When modifications or changes in work methods have occurred that may adversely affect worker exposure.
- If there is evidence (for example, dust deposits outside the work area) that control measures are not adequate or have deteriorated.
- When there has been an uncontrolled disturbance of asbestos.

**The requirement for air monitoring will be determined by the SQEP upon review of the soil investigation results. If determined to be required, the SQEP will advise on the scope of air monitored needed.**

## 6.4 Erosion and Sediment Control Management

Erosion and sediment controls shall be installed by the Contractor prior to earthworks commencing and shall be designed for the treatment of surface water runoff in general accordance with GD05. At minimum the following should be considered:

- Avoid work in heavy rain where soil runoff cannot be prevented.
- Keeping the site clean.
- Silt fences and runoff diversion bunds and swales shall be utilised where appropriate to capture sediment in surface water runoff. While the works involve a significant excavation there may be areas around the perimeter where runoff of sediment could enter the stormwater system. These areas should be appropriately sealed off.
- Erosion and sediment controls shall be checked regularly and maintained in good working condition.
- Erosion and sediment control measures will be upgraded/modified where necessary. Sediment fences will be replaced if the fabric is ripped or otherwise damaged.
- The weather conditions along with the performance of the erosion and sediment control measures will be monitored.
- Erosion and sediment control measures shall remain in place until the earthworks is complete.

The appropriateness of these measures is dependent upon a number of factors including size of site, the surrounding receiving environment and type and contamination concentrations. The SQEP may determine that the GD05 erosion and sediment controls are not appropriate where some of these specific scenarios. In these instances, appropriate ESC measures should be set out in a site-specific Erosion and Sediment Control Plan (ESCP) and/or amendments to the relevant sections of this Contaminated Soils Management Plan.

Major earthworks projects may also have project-side ESCP that would set out additional controls for the Contractors to adhere to.

## 6.5 Stormwater Control Procedures

Any surface run-off water or perched groundwater, encountered within the excavation area requiring removal must be considered potentially contaminated, and must either:

- Be disposed of by a licenced liquid waste contractor; or
- Pumped to sewer, providing the relevant permits are obtained; or
- Discharged to the stormwater system or surface waters provided testing demonstrates compliance with the Australian and New Zealand Environment Conservation Council (ANZECC) Guidelines for Fresh and Marine Water Quality (2000) for the protection of 80 percent of freshwater species, with the exception of benzene where the 95 percent protection level shall apply, and that it is free from petroleum hydrocarbons.
- Copies of permits or disposal receipts need to be retained for Site Validation/Works Completion reports.

Stormwater runoff should preferably be maintained onsite and allowed to infiltrate wherever possible to reduce the volume of water and material discharged. Cesspit protection measures such as filter socks and sandbags should be used to trap any sediment from collected runoff.

## 6.6 Imported Material

Material imported to site should be cleanfill or otherwise suitable for its proposed use (and agreed with the SQEP). Records must be provided by the Contractor to demonstrate that any imported material is obtained from a quarry or other certified source. Material shall not be imported from any site that is, or would be considered, a HAIL site (MfE, 2011), unless sampled by a SQEP to show that it is suitable for the intended land use and is acceptable to the Consent Holder.

Cleanfill is defined by MfE (2002) as:

*"Material that when buried will have no adverse effect on people or the environment. Cleanfill material includes virgin natural materials such as clay, soil and rock, and other inert materials such as concrete or brick that are free of:*

- *combustible, putrescible, degradable or leachable components*
- *hazardous substances*
- *products or materials derived from hazardous waste treatment, hazardous waste stabilisation or hazardous waste disposal practices*
- *materials that may present a risk to human or animal health such as medical and veterinary waste, asbestos or radioactive substances*
- *liquid waste.*"

Cleanfill is defined in AUP Chapter J as:

"…*natural material such as clay, gravel, sand, soil and rock which has been excavated or quarried from areas that are not contaminated with manufactured chemicals or chemical residues as a result of industrial, commercial, mining or agricultural activities.*

*Excludes:*

- *hazardous substances and material (such as municipal solid waste) likely to create leachate by means of biological breakdown*
- *product and materials derived from hazardous waste treatment, stabilisation and disposal practices*
- *materials such as medical and veterinary waste, asbestos, and radioactive substances*
- *soil and fill material which contain any trace element specified in Table E30.6.1.4.2 at a concentration greater than the background concentration in Auckland soils specified*
- *sulfidic ores and soils; combustible components*
- *more than 5% by volume of inert manufactured materials (e.g. concrete, brick, tiles)*
- *more than 2% by volume of attached biodegradable material (e.g. vegetation)*"

Material not meeting the definition of cleanfill but representing material that is considered by a SQEP to be suitable for its intended use may be imported providing that prior approval has been sought and granted by Auckland Council, and that all consent conditions can be meet. It should be noted that the re-classification of material with presence of low-level contamination is currently under review. The updated classification should be considered once taking effect.

## 6.7 Soil Re-use and Disposal

Soil within Category 1 will likely meet the definition of cleanfill or managed fill. The material classification is dependent on the interpretation of the owner/operator of the receiving site.

Where soil is being relocated to an alternate area at the Site, a sampling program should be set in place to determine if material is suitable and new risks are not introduced. A minimum sampling density of 1/500m$^3$ and 1/1000m$^3$ shall be adopted, dependent on the advice from the SQEP.

The offsite receiving site may require additional sampling to satisfy the suitability of such materials. Approval from the receiving site shall be obtained by the Contractor prior to transportation.

Offsite disposal of contaminated soil must be to a facility consented to accept such material. Acceptance of excavated materials to be disposed offsite (landfills or other approved locations) shall be obtained prior to works commencing. The Contractor must retain copies of all disposal receipts/documentation and provide these to the Consent Holder within 2 weeks of the completion of works in the particular sub stage of development being undertaken by that Contractor.

## 6.8 Unexpected Contamination Discovery

The procedures outlined in this section provide the Contractor with protocols to identify potential contamination if suspected contaminated soils or hazardous materials are discovered during the excavation works. These protocols will enable the appropriate action to avoid exposure of contaminants to site workers or dispersion of contaminants to the wider site.

Contamination indicators or hazardous materials may include but are not limited to:

- Unusual odours.
- Discoloured or stained water seepage and soils.
- Petroleum hydrocarbon contaminated soil, visual sheens and/or free product.
- Liquid waste, putrescible waste, household refuse and any material that normally would be sent to a licensed landfill.
- Any visible suspected Asbestos Containing Material (ACM) (noting that the majority of ACM contamination at the Site is in the form of FA/AF (likely as a result of demolition/removal of pipe lagging etc).
- Intact or broken drums and containers.

During the earthworks on site, the Contractor shall actively monitor for the conditions/materials specified above. In the event that any of the above indicators are identified, the Contractor should take the following actions:

- Unless the source is identified (i.e. known AC pipe), stop all earthworks within a 5 m radius of the area where the suspected material/ emission/ discharge has been reported.
- Immediately notify the person in charge of the physical works and the SQEP.
- Cordon off the area as practicable with a suitable barrier.
- Work shall not resume or commence within a 5 m radius of the area unless authorised by the Consent Holder or the appropriate person as nominated in the physical works contract.

The Site Supervisor shall contact the Consent Holder who will consult with the SQEP and advise on the appropriate course of action. The SQEP shall:

- Notify the regulatory authority (Auckland Council) that contamination has been discovered and contingency action is being implemented.
- Characterise the contamination by collecting samples for chemical laboratory analysis, if required.
- Where the material characteristics have been established, the SQEP will advise the Site Supervisor as to whether the materials may remain on site or what remedial measures are required to manage this material on-site, or the options available to disposal of this material off-site.
- Instruct relevant staff/contractors so that all appropriate information such as location and quantity of material and off-site weighbridge dockets are recorded.

# 7 Category 2 Works

The following section outlines general controls for the disturbance of soil in areas designated by the SQEP as **Category 2** and/or **'unlicensed asbestos works'** scenario.

## 7.1 Soil Excavation/Disturbance Procedures

The following procedures should be followed for any earthworks associated with the project:

- If excavators are used during the works, they should be 'closed cab'.
- Re-usable PPE, like half or full-face respirator masks should be cleaned and any waste would require appropriate disposal.
- All contaminated material removed from site shall be disposed of as per the procedures set out in **Section 7.3**.

## 7.2 On-Site Soil Re-use and Relocation

**The suitability for the re-use of soils will be dependent on the findings of the soil sampling investigation and this will be communicated by the SQEP following assessment of the results.**

Material will be re-useable on site, and would be encouraged, should the COC concentrations not exceed the targeted environmental and human health risk criteria. In this situation it would be preferable if re-used material is located below an imported layer of clean material or under handstand, roads, or structures.

In the event where unexpected contamination is discovered, discussions with the SQEP should be held to determine what material may be suitable for reuse and where. Input may be necessary from a Geotechnical Engineer.

## 7.3 Off-Site Soil Disposal

The soil sampling results will inform the disposal classification. The excavation, handling and off-site removal of the material shall be managed by the Contractor as follows:

- Offsite disposal of contaminated soil must be to a facility consented to accept such material. Approval shall be obtained by the Contractor prior to transportation.
- The material classification is dependent on the interpretation of the owner/operator of the receiving site and at their risk. The offsite receiving site may require additional sampling to satisfy the suitability of such materials.
- All trucks shall be covered before leaving site and any soils brushed off wheels to avoid tracking onto public roads. Should the Site become wet and material adheres to wheels a wheel wash facility shall be installed and truck wheels washed before exiting the Site.
- Dependent on the requirements of the receiving facility/ landfill truck lining or soil wrapping may be required.
- Chain of Custody procedures will be followed to enable tracking of the spoil and confirm disposal at the landfill facility.
- Waste manifests / weigh bridge receipts will be retained as proof of disposal.
- The Contractor must retain copies of all disposal receipts/documentation and provide these to the Consent Holder within five days of receipt.

## 7.4 Decontamination

Equipment, plant and / or machinery used during earthworks should have all bulk soil removed prior to demobilisation / removal from site.

# 8 Category 3 Works

The following section outlines controls for the disturbance of soil in areas designated by the SQEP as **Category 3**. Refer to **Section 8.11** for the **'asbestos related works'** scenario controls.

## 8.1 Personal Control Measures

PPE/ RPE requirements related to management of contamination are summarised in **Table 4-2**. Workers may be exposed to contaminants via the inhalation, accidental ingestion of, or skin contact with soil and/or groundwater and/or surface water. To prevent this exposure standard good practice earthworks procedures should be followed by workers who are likely to come into direct contact with contaminated soil and/or water.

The following personal control measure should be used:

- Avoid hand to mouth contact.
- Wash hands and face prior to eating, drinking or smoking.
- No eating or drinking within the excavation area.
- Wash any skin abrasions immediately and treat to prevent infections.
- Avoid where practical personnel entering excavations (i.e. outside of plant and machinery).
- When any signs of dust generation are likely, or as directed by the SQEP, a suitable face mask should be worn.
- Follow any additional requirements in the Contractor (Site Specific) Health and Safety Plan.

Further hazards may be identified during the course of the works by the Contractor who is expected to review any new work element. Subsequently, the Contractor need to assess whether there are any new associated hazards, and whether these can be eliminated, isolated or minimised and update their plans accordingly. The Contractor shall then instruct all staff on the health and safety procedures associated with the new hazard and update the works management plan.

## 8.2 General Site Monitoring

The following site monitoring activities should be undertaken by the Site Supervisor whilst disturbance of potentially contaminated land is being undertaken:

- Informal inspections to check compliance with this Site-wide CSMP and note any issues to be rectified.
- Ensuring that dust control measures are implemented, including ensuring trucks are using dust covers.
- Inspections as required by environmental control procedures e.g. sediment control devices inspected daily to ensure that they are installed correctly, operating effectively and are properly maintained.
- Ensure that a spill kit is available onsite, and that the Contractor's staff are suitably trained in its use; and

All machine operators / drivers will ensure all machinery is free of oil leaks prior to use and only re-fuel machinery in designated areas.

For works that are of a duration of one week or more, a more formal weekly site inspection should be completed by the Site Supervisor to check compliance with this Site-wide CSMP. Site specific checklists will be developed by the Contractor to check compliance. Issues will be noted if they present significant environmental risks (e.g. noise, dust, spoil management).

Triggered inspections will be undertaken and recorded in response to the following:

- Complaints – upon receiving a complaint, the complaint should be noted, and an inspection of the area affected or involved undertaken. Complaints should be reported to the Consent Holder and Contractor.
- Extreme weather – site control measures will be inspected immediately before, during and after extreme weather (as appropriate).

- Post incident inspections will be undertaken immediately following accidental spills or other incidents or emergencies and after “near miss” events. Any follow-up action/response will be document and appropriately closed out.

## 8.3 Emergency Procedures

Emergency procedures appropriate to the proposed works shall be established prior to the start of works and the responding emergency personnel should be notified of the presence of contamination. A copy of this Site-wide CSMP should be available so it can be referred to by emergency personnel, if necessary.

Should an incident occur on site which may result in any unauthorised discharges (vapour, odour, water, soil, separate phase hydrocarbons (SPH etc.), the Contractor’s site supervisor will take control of the situation and coordinate the efforts of all site occupants to minimise the impact. Ultimately, in the event, albeit unlikely, that uncontrollable discharges occur from the Site, emergency response and evacuation procedures, including provisions for notifying and managing neighbouring site users, shall be implemented. The emergency response and evacuation procedures shall be specified in the project specific health and safety plan.

## 8.4 Stormwater Control Procedures

Cesspit protection measures such as filter socks and sandbags should be used to trap any sediment from collected runoff. Sediment captured from the excavation of potentially contaminated material shall be managed in the same manner as soils requiring off-site disposal, as described in **Section 8.9**. All diversion bunds (if required) shall be designed and constructed to accommodate and divert the overland flow and stormwater around live construction zones and also prevent sediment-laden water from leaving the works area.

Stormwater will be managed according to project specific ESCP, anticipated to be required as part of major earthworks consent requirements. If no project specific ESCP exist, refer to **Section 6.4** and **Section 6.5** for minimum controls to be in place.

If disposal to the stormwater network is not possible, then accumulated stormwater should be disposed of to an appropriate facility.

## 8.5 Groundwater Management Procedures

If groundwater is encountered during excavation works, the Contractor shall:

- Contain groundwater within the excavation and not allow it to discharge across the Site surface.
- If dewatering is required, the pumped groundwater discharge shall be diverted into a tank or pond. The groundwater may be disposed to stormwater only if laboratory testing of water indicates it is appropriate to do so and this has been agreed with the SQEP and appropriate operator.
- If dewatering is required, the pumped groundwater could be discharged to the Auckland Council reticulated wastewater system (trade waste) with prior approval.

If unexpected groundwater contamination is encountered the following controls shall be implemented:

- The area in which unexpected contamination conditions have been encountered shall be isolated so that stormwater from this area can be separated from that generated across the wider site; and
- If dewatering is required, the effluent should be contained for testing prior to disposal.
- Excess water within the site (including stormwater in the case of a rainfall event) will need to be filtered using a 5-micron filter or equivalent methodology and the filters must be treated as contaminated and disposed of as asbestos waste if not tested prior.

Refer to **Section 6.8** for indicators of potential contamination.

## 8.6 Temporary Stockpile Procedure

Stockpiling on site shall be minimised. If required, the following stockpiling procedures shall be applied:

- Stockpiles shall be maintained at a low level (no more than 3.0 m in height).
- Stockpiles shall be sited within an area away from the main working area to minimise potential contact by site workers.
- Stockpiled materials shall be placed on suitable material (i.e. polythene sheet) to prevent contaminants leaching into clean soils, and in an area where water and sediment runoff cannot be controlled.
- Stockpiled material shall be covered by a suitable material (such as polythene) to prevent the ingress of rainwater into the material and therefore minimise the potential for generation of leachate or sediment in stormwater.

## 8.7 Soil Excavation/Disturbance Procedures

The following procedures should be followed for any earthworks associated with the project:

- If excavators are used during the works, they should be 'closed cab'.
- Re-usable PPE, like half or full-face respirator masks should be cleaned and any waste would require appropriate disposal.
- All contaminated material removed from site shall be disposed of as per the procedures set out in **Section 8.10**.

## 8.8 On-Site Soil Reuse and Relocation

**The suitability for the re-use or relocation of soils will be dependent on the findings of the soil sampling investigation and this will be communicated by the SQEP following assessment of the results.**

The re-use of material on the Site from Category 3 areas is not be permitted unless it is subject to a Remediation Action Plan (RAP) that is submitted to Auckland Council for approval by the SQEP. Any Category 3 soil re-use onsite from areas requiring soil disturbance is likely to require installation of a suitable capping layer or placement under a hardstand or structure. Should areas of known soil contamination above human health or environmental screening values be relocated on-site it is also likely that the RAP will require some form of ongoing management upon completion of the soil disturbance works (refer **Section 10.1**)

In the event where unexpected contamination is discovered (refer to **Section 6.8**), discussions with the SQEP should be held to determine what material may be suitable for reuse and where. Input may be necessary from a Geotechnical Engineer.

## 8.9 Off-Site Soil Disposal

The soil sampling results will inform the disposal classification. The excavation, handling and off-site removal of the material shall be managed by the Contractor as follows:

- Offsite disposal of contaminated soil must be to a facility consented to accept such material. Approval shall be obtained by the Contractor prior to transportation.
- The material classification is dependent on the interpretation of the owner/operator of the receiving site and at their risk. The offsite receiving site may require additional sampling to satisfy the suitability of such materials.
- All trucks shall be covered before leaving site and any soils brushed off wheels to avoid tracking onto public roads. Should the Site become wet and material adheres to wheels a wheel wash facility shall be installed and truck wheels washed before exiting.
- Dependent on the requirements of the receiving facility/ landfill truck lining or soil wrapping may be required.

- Chain of Custody procedures will be followed to enable tracking of the spoil and confirm disposal at the landfill facility.
- Waste manifests / weigh bridge receipts will be retained as proof of disposal.
- The Contractor will retain copies of all disposal receipts/documentation and provide these to the Consent Holder within five days of receipt.

## 8.10 Decontamination

Equipment, plant and / or machinery used during earthworks should have all bulk soil removed prior to demobilisation / removal from site.

## 8.11 Asbestos-Specific Controls

### 8.11.1 Establishment of Asbestos Work Area

The extent of the controlled area will be set by the Contractor with the objective of preventing unacceptable exposure to personnel working outside of the exclusion zone.

The following procedures should be implemented before earthworks begin:

- Signs and barriers must be erected around the area of works to warn of the danger and to prevent unauthorised entry. Signage wording must include ‘Low level asbestos removal in progress’ or similar. An exclusion zone should be set up with safety tape and signage placed a minimum of ten metres from the removal area, where practicable. If this is not practicable, the SQEP must approve reduction of separation distances. All barriers and warning signs shall remain in place until all removal work has been completed.
- Access to asbestos removal area by other work parties will only be allowed during ‘tools down’ periods under the direct supervision of the Contractor and when wearing appropriate PPE and RPE.
- Establishment of a truck loading area and decontamination area must be set up adjacent to asbestos work area, to prevent machinery and trucks from trafficking asbestos contaminated soils outside the ‘asbestos work area’ and contaminating otherwise asbestos free materials.
- Assess the removal area to establish the appropriate controls for the protection of health, safety, and environment.

### 8.11.2 Control Air Monitoring

**The requirement for air monitoring will be determined by the SQEP upon review of the soil investigation results. If determined to be required, the SQEP will advise on the scope of air monitored needed.**

Control air monitoring is not a requirement within the guidelines for ‘asbestos related works’, however it can be determined to be required at the discretion of the SQEP. Air quality monitoring will be required during earthworks if the following listed conditions apply (based on best practice methods listed in the ACoP):

- If there is uncertainty about whether the airborne contamination standard for asbestos is likely to be exceeded.
- When it is not clear if new or existing control measures are effective.
- When modifications or changes in work methods have occurred that may adversely affect worker exposure.
- If there is evidence (for example, dust deposits outside the work area) that control measures are not adequate or have deteriorated.
- When there has been an uncontrolled disturbance of asbestos.

### 8.11.3 Dust Control Procedures

Moisture is the most important control measure for mitigating airborne asbestos fibres.

Dust suppression mitigation systems should be implemented, operating at all times during earthworks when soil is deemed dry (i.e. less than 10 % moisture). This can be achieved via the addition of water. Consider enhancing dust suppression measures by addition of surfactants and polymers if sensitive receptors were identified in close proximity to the works.

#### 8.11.4 Soil Excavation / Disturbance Procedures

The ACoP recommends best practice procedures for asbestos waste containment and disposal. The following general methodology / procedures should be followed for any earthworks associated with soil disturbance:

- If excavators are used during the works, they should ideally be 'closed cab'. Should open cabs be used, operators are required to wear appropriate PPE and RPE as detailed in **Table 4-3.**
- All contaminated material removed from site shall be disposed of as per the procedures set out in **Section 8.11.7**.

#### 8.11.5 Temporary Stockpile Procedure

Stockpiling of asbestos containing material is not recommended, however should stockpiling be required the following apply (in addition to the procedures in **Section 8.6**):

- Asbestos contaminated soils must be placed in a fenced area and warning signs erected, where applicable.
- Asbestos contaminated soil stockpiles shall be placed on sheeting or similar to prevent contamination of underlying clean material. Care must be taken to ensure that the integrity of the sheeting is not damaged during handling or transportation.
- The stockpiled material shall be covered and secured with geotextile or a polythene cover to prevent rainfall or wind induced erosion and dust.

#### 8.11.6 On-Site Soil Reuse or Relocation

**The suitability for the re-use of soils will be dependent on the findings of the soil sampling investigation and this will be communicated by the SQEP following assessment of the results.**

The re-use of material on the Site from Category 3 areas is not be permitted unless it is subject to a Remediation Action Plan (RAP) that is submitted to Auckland Council for approval by the SQEP. Any Category 3 soil re-use onsite from areas requiring soil disturbance is likely to require installation of a suitable capping layer or placement under a hardstand or structure. Should areas of known soil contamination above human health or environmental screening values be relocated on-site it is also likely that the RAP will require some form of ongoing management upon completion of the soil disturbance works (refer **Section 10.1**)

An Asbestos Management Plan (AMP) including long-term management requirements will be prepared at the time that long term use is established.

In the event where unexpected contamination is discovered (refer to **Section 6.8**), discussions with the SQEP should be held to determine what material may be suitable for reuse and where.

#### 8.11.7 Off-Site Soil Disposal

The soil sampling results will inform the disposal classification. Typically, material containing asbestos is considered to not meet the definition of cleanfill, and therefore disposal as managed fill or contaminated fill will be likely, depending on the resource consent conditions of the facility accepting the material.

The excavation, handling and off-site removal of the material shall be managed by the Contractor as follows where category 3 soils are confirmed:

- Offsite disposal of contaminated soil must be to a facility consented to accept such material. Approval shall be obtained by the receiving site prior to transportation.

- The material classification is dependent on the interpretation of the owner/operator of the receiving site and at their risk. The offsite receiving site may require additional sampling to satisfy the suitability of such materials.
- All trucks shall be covered before leaving site and any soils brushed off wheels to avoid tracking onto public roads. Should the Site become wet and material adheres to wheels a wheel wash facility shall be installed and truck wheels washed before exiting.
- Dependent on the requirements of the receiving facility/ landfill truck lining or soil wrapping may be required.
- Chain of Custody procedures will be followed to enable tracking of the spoil and confirm disposal at the landfill facility.
- Waste manifests / weigh bridge receipts will be retained as proof of disposal.
- The Contractor shall maintain a register of soil movements and records such as location of excavation, disposal location, quantity of material and off-site weighbridge documents. The Contractor must retain copies of all disposal receipts/documentation and provide these to the Consent Holder within five days of receipt.
- Should it be necessary to temporarily store asbestos waste prior to transport for disposal then all plastic bags containing the waste shall be held in leak-proof metal containers or bins suitably marked and held in a secured area displaying appropriate warning signs.

#### 8.11.8 Decontamination

i. Personal Decontamination

Prior to work commencing, a decontamination area will be identified. The decontamination area will be located up-wind of the works area and items available in this area should include but not be limited to:

- Labelled asbestos waste bags (with a minimum thickness of 200μm).
- Water spray bottle.
- ‘Wet wipes’/Alcohol wipes.
- Spare suits, boot covers, and gloves.

Personal decontamination should be undertaken as outlined in the ACoP.

Once the asbestos related work is complete, workers must return to the decontamination area. Before stepping into the decontamination area, workers must spray water over coveralls, head, face, hands, and feet to adhere any loose asbestos fibres to the PPE. Workers must then wipe any exposed areas of skin and the externals of the mask down with baby wipes (around eyes and hands).

Workers must then put used baby wipes into the labelled asbestos waste bag available.

To remove coveralls, fold back the hood onto itself, and continue this rolling method from top to bottom, until the suit has been rolled inside of itself. Sleeves should be pulled inside out and rolled into the body of the suit. The aim of this is to contain the surface of the suit, that may have asbestos fibres attached, inside itself and avoid transference to other surfaces. Wrap gloves into the folds of the suit and flip the booties inside out (these must be rolled into the suit as well). Place the rolled bundle into the labelled asbestos waste bag.

Wipe down hands, face, and all surfaces and edges of RPE with baby wipes a second time before turning upwind and removing RPE. If a disposable respirator was used, workers must place this in the asbestos waste bag. If a re-usable respirator was used, wipe down the inside with alcohol wipes to prevent mould, and place in its designated carry case.

Once all asbestos containing waste is placed in the bag, it should be goose neck tied closed for transport. If the asbestos waste bag is full and ready for disposal it should be double bagged in 200 μm plastic, each bag individually goose-necked and sealed with PVC tape. This bag should be placed in the designated asbestos storage area for disposal at an appropriate waste facility.

All disposable PPE used during removal works are to be considered asbestos containing waste and are to be disposed of appropriately.

ii. Equipment Decontamination

All handheld items and equipment (e.g. spades) used during earthworks which have come in contact with potentially asbestos contaminated soils must be;

- Decontaminated using wet or dry decontamination methods as outlined in the ACoP (i.e. fully dismantled, and cleaned under controlled conditions); or
- Placed in sealed containers (and only used for asbestos removal work); or
- Disposed of as asbestos waste.

Plant and machinery used during earthworks should have all visible soil removed and a visual assessment undertaken by a competent person or SQEP prior to demobilisation from site.

#### 8.11.9 Clearance Inspection and Site Validation

There is no requirement in the Health and Safety at Work (Asbestos) Regulations (2016) for a visual inspection to be undertaken by a Licensed Asbestos Assessor or Competent Person for ‘asbestos related works’.

Additionally, there is no requirement in the ‘asbestos in soils NZ guideline’ for site validation to be undertaken by a Contaminated Land Practitioner for ‘asbestos related works’.

# 9 Category 4 Works

The following section outlines general controls for the disturbance of soil in areas designated by the SQEP as **Category 4** and considered **'Licensed Class A or Class B Asbestos Removal Works'.** A licensed asbestos removalist contractor will have to undertake works considered as **Category 4**. All management procedures as set out in **Section 8** for **Category 3** works will also apply to **Category 4** works with the additional requirements as set out in this section.

Following completion of the soil sampling the SQEP will determine if the works meet the Class A or Class B works scenario. It is envisaged there is a low likelihood a Class A licence will be triggered for soil disturbance, unless significant quantities of buried friable asbestos waste is encountered.

## 9.1 Requirements for Licensed Asbestos Removalists

Class A or Class B asbestos removal works are required to be undertaken by a WorkSafe licensed asbestos removal company. WorkSafe expects licensed asbestos removalists to, *'act with integrity and carry out asbestos removal work with professionalism and with care to their workers and other people. All the asbestos removal works undertaken by a licensed asbestos removalist must be undertaken in accordance with the requirements of the Health and Safety at Work Act 2015 (the Act), the Health and Safety at Work (Asbestos) Regulation 2016 (the Regulations) and other relevant health and safety regulations'.*[2]

Any works undertaken as Category 4 will be undertaken by an appropriately licensed asbestos removalist registered on WorkSafe's public register of asbestos licences.[3]

## 9.2 Asbestos Removal Control Plan (ARCP)

The licensed asbestos removal company shall prepare an Asbestos Removal Control Plan (ARCP) in accordance with Appendix H of the ACOP. The ARCP will include:

- Details of how the asbestos removal will be carried out, including the method to be used and the tools, equipment, and PPE to be used.
- Details of the asbestos to be removed, including the location, type, and condition of the asbestos.
- Detailed description of the asbestos removal area for the work and any air monitoring points (by means of a site plan).
- Details of the means of transport and disposal of the asbestos waste.

## 9.3 Notification Requirements

WorkSafe is required to be notified of works undertaken as Class A or Class B licensed asbestos removal at least five days in advance of the works commencing.

The Notification of Licensed Asbestos Removal form is available from WorkSafe's website: www.worksafe.govt.nz.

Copies of all WorkSafe correspondence must be retained onsite at all times in the onsite folder with all other relevant information, including this Site-wide CSMP.

## 9.4 Control Air Monitoring

Control air monitoring is a requirement under the Health and Safety Regulations (Asbestos) 2016 for all Class A asbestos removal work, as well as during Class B removal work when airborne asbestos fibres have the

[2] April 2021. WorkSafe Asbestos Licensing Removalist Applicant Guidelines.
[3] https://www.worksafe.govt.nz/the-toolshed/registers/asbestos-licence-holder-register/

potential to exceed trace level (trace level being set by WorkSafe as <0.01 fibres/mL of air). The potential for airborne asbestos fibres to exceed trace level will be determined by the SQEP or asbestos assessor/competent person.

A control air monitoring strategy should be developed by an independent "Competent Person" (as defined by WorkSafe) specifically for the works (if Class A, or if air monitoring is determined to be required for Class B).

## 9.5 Clearance Inspections and Site Validation

Following licensed asbestos removal works, a visual inspection is required to be undertaken by a Competent Person (Class B) or licensed Asbestos Assessor (Class A or B) as defined by WorkSafe. This inspection will include, but not be limited to, the area of asbestos removal, the adjacent areas where trucks have been loaded with asbestos containing material, and any machinery used in the excavation of the asbestos containing material. Where a licensed asbestos assessor is required, they should be chosen by the Consent Holder independent of the Contractor.

Access to the asbestos removal area will be restricted until the visual inspection has been undertaken and documentation stating the Site is "safe to re-occupy" has been issued.

In preparation of the visual inspection, all asbestos containing waste must have been removed from the Site or be appropriately sealed (in the case of capping contaminated soil).

Should the project managers wish for the Site to be classified as remediated of asbestos in soil, Site Validation will need to be undertaken and overseen by a SQEP who will issue a Site Validation Report. This will include soil samples to validate that impacted material has been removed as per the remedial targets.

The SQEP must forward all field data/results and clearance/closure documentation to the Consent Holder assigned specialist asbestos manager.

# 10 Post Works Procedures

## 10.1 Long Term Management

The soil disturbance works will be undertaken to enable facilitation of the Consent Holder projects or site development works. Not all soil disturbance works aims to remediate the Site of potentially contaminated soil.

The PCBU, that will manage or control the works at the Site, must ensure that a written plan (RAP or AMP) is prepared wherever contamination is known to have either been left in-situ or re-used onsite to manage the risk of residual contaminated materials (including asbestos) at the Site. In areas where potential asbestos contaminated soil is left in-situ an ongoing site management plan should be prepared by the SQEP to control future activities where remaining asbestos and other residual contaminants exist in soils that do not require immediate remedial action or disturbance as part of development. RAP and/or AMPs including long term management requirements will be prepared at the time that long term use is established.

## 10.2 Works Completion Reporting

### 10.2.1 Annual Soil Disturbance

The Consent Holder shall maintain and update a Works Completion Register of all projects where soil disturbance works was carried out. The register will record all soil disturbance undertaken, regardless of volume.

For projects where works will span multiple reporting periods, approximate soil disturbance volumes undertaken in each period will be provided (where available) and the project noted as 'ongoing'.

Any Site Validation or Contamination Assessment Reports will be issued to Council for their records.

The register will also include a site plan showing the location of each project for the period.

**The works completion register will be provided to Council for years where more than 200m$^3$ were carried out. The register will summarise the works undertaken under the provisions of the global NESCS/ AUP consent. The annual reporting timeframes will be confirmed upon the receipt of the consent conditions.**

A template for the works completion register is included as **Appendix C**.

### 10.2.2 Soil Disturbance Volumes Greater than 200 m$^3$

**A Works Completion Report shall be submitted to the Council for their record for any projects involving soil disturbance volumes greater than 200 m$^3$.** The report will be submitted to Council within three months of the completion of the works.

The report will be prepared by the SQEP in accordance with the MfE Contaminated Land Management Guidelines No. 1: Reporting on Contaminated Sites in New Zealand, and will include:

- A summary of the works undertaken, including the location and dimensions of the excavations carried out and the volume of soil excavated.
- Details and results of any testing, including validation testing, undertaken and interpretation of the results.
- Records/evidence of the appropriate disposal for any material removed from the Site.
- The mitigation and management measures applied to soil contamination remaining on site, if applicable.
- Records of any unexpected contamination encountered during the works and response actions, if applicable.
- Long term site management and monitoring plan, if applicable.

- Reports of any complaints, health and safety incidents related to contamination, and/or contingency events during the earthworks.
- A record of any deviations from this CSMP, if applicable.
- A statement certifying that all works have been carried out in accordance with the requirements of the global consent and the Site is safe for the intended use without any further remediation.

# 11 Limitations

This report has been prepared by Beca Ltd (Beca) solely for Marutūāhu Rōpū and Waiohua-Tāmaki Rōpū (Client).

This report is prepared solely for the purpose of managing contaminated soils during the Carrington Development Project works. Beca accepts no liability to any other person for their use of or reliance on this report, and any such use or reliance will be solely at their own risk.

In preparing this report Beca has relied on key information including the following:

- URS New Zealand Limited (23 June 2014) Unitec Mount Albert Campus Redevelopment – Preliminary Site Investigation Report
- WSP (June 2017) Phase 1 Environmental Due Diligence and Development Project – Wairaka Precinct Masterplan. Unitec Institute of Technology.
- WSP (August 2017) Stage 2 Detailed Site Investigation Land Development Project – Wairaka Precinct Masterplan. Unitec Institute of Technology.
- Beca Limited (22 September 2021) Desk-based Contamination Assessment – Gap Analysis Wairaka Precinct Development

Unless specifically stated otherwise in this report, Beca has relied on the accuracy, completeness, currency and sufficiency of all information provided to it by, or on behalf of, the Client or any third party, including the information listed above, and has not independently verified the information provided. The reports listed above that have been provided to Beca as 'Draft' have been relied upon as if they are 'final'. Beca accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the information provided.

The contents of this report are based upon our understanding and interpretation of current legislation and guidelines ("Standards") as consulting professionals and should not be construed as legal opinions or advice. Unless special arrangements are made, this report will not be updated to take account of subsequent changes to any such Standards.

This report should be read in full, having regard to all stated assumptions, limitations and disclaimers.

# A

## Appendix A – HAIL Areas List

## List of HAIL areas and potential contaminants of concern

| HAIL ID | Applicable HAIL Code | Source | Comment | HAIL Identified | Number of Targeted Soil Sampling Locations | Potential Contaminants of Concern |
|---|---|---|---|---|---|---|
| | | | | | **HAIL activities undertaken at the site** | |
| 1 | E1, A2, A14 | 2014 PSI | Historically used a psychiatric hospital | E1 Asbestos exterior cladding and exterior and underfloor pipe insulation<br>A2 2x Dangerous Goods Cabinets<br>A14 Pharmaceutical manufacture, blending, mixing or formulation | 4 soil samples. One exceedance of adopted human health criteria for arsenic. | Asbestos,<br>Listed by URS as "Type of storage TBC" – Recommend adopting SVOC//TPH/Metals Pharmaceutical storage – recommend adopting a range or organic and non-organic commonly stored chemicals as CoC (may require a library search for contaminants for testing purposes) |
| 2 | E1 | 2014 PSI | Historically used a psychiatric hospital. Site has been modified since the 2014 URS HAIL report was released. | E1 Asbestos roof | | Asbestos |
| 3 | B2 | 2014 PSI | Historically used a psychiatric hospital | B2 Power transformer | 3 soil sample locations. Two samples exceeded of adopted human health criteria for Benzo(a)Pyrene equivalence. | PCBs, hydrocarbons, trace elements |
| 6 | E1 | 2014 PSI | Historically used a psychiatric hospital | E1 Asbestos pipe insulation | 2 sampling locations. Once sample exceeding the environmental risk criteria for copper. | Asbestos |
| 12 | E1, A17 | 2014 PSI | Historically used as District Hospital Board as inwards good store and logistics | E1 Asbestos roof, drains, sumps & ground 2m from pipes<br>A17 Underground storage systems (probably diesel) in car park west of building, no tank removal report exists | 1 sampling location.<br>1 bulk asbestos containing material detected. | Asbestos, petroleum hydrocarbons |
| 14 | A2 | 2014 PSI | | A2 Chemical bulk storage | | Listed by URS as "Type of storage TBC" – Recommend adopting SVOC/VOC/TPH/Metals |
| 15 | A2 | 2014 PSI | Historically used a psychiatric hospital | A2 Chemical bulk storage | | Listed by URS as "Type of storage TBC" – Recommend adopting SVOC/VOC/TPH/Metals |
| 16 | E1, A17, A3, G6 | 2014 PSI | Historically used as mortuary and embalming (with underground cesspit) and earthworks/filled. | E1 Asbestos pipe insulation debris<br>A17 Self-contained diesel generation<br>A3 Commercials analytic laboratory<br>G6 Wastewater treatment (cesspit) | 4 sampling locations. One exceedance of adopted human health criteria for arsenic. | Asbestos<br>Diesel<br>Listed by URS as "Type of storage TBC" – Recommend adopting SVOC//TPH/Metals, Formaldehyde, nitrates, lead, mercury, biological hazards. |
| 17 | A2, B2, A17 | 2014 PSI | | A2 Workshop with standalone dangerous goods storage<br>B2 Transformer<br>A17 Underground storage system (probably petrol) just north of building removed in 1990s | 1 sampling location. Once sample exceeding the environmental risk criteria for nickel. | Petroleum hydrocarbons.,<br>Listed by URS as "Type of storage TBC" – Recommend adopting SVOC//TPH/Metals |
| 18 | A1, A17 | 2014 PSI | 1996 proposed Mobil Training Centre (petrol station) | A1 Agrichemicals. A17 Storage Tanks | | Listed by URS as "Type of storage TBC" – Recommend adopting SVOC//TPH/Metals |
| 23 | B2, A10 | 2014 PSI | Historical horticultural building | B2 Power transformer. A10 Pesticide use | 1 sampling location. | PCBs, hydrocarbons, trace elements, herbicides, organophosphates, organochlorides. |
| 24 | A10 | 2014 PSI | | A10 Greenhouse | Additional investigation undertaken by Beca Limited May 2021. Detailed Site Investigation Report for Wairaka Stream Daylighting Works at Unitec Campus Mount Albert Auckland | Trace elements, herbicides, organophosphates, organochlorides. |
| 27 | A10 | 2014 PSI | | A10 Sports turf | | Listed by URS as "Type of storage TBC" – Recommend adopting OCP/ONP/Metals |
| 29 | A14 | 2014 PSI | | A14 Pharmaceutical manufacture, blending, mixing or formulation | | Pharmaceutical storage – recommend adopting a range or organic and non-organic commonly stored chemicals as CoC (may require a library search for contaminants for testing purposes) |
| 33 | B2 | 2014 PSI And 2017 DSI | | B2 Power transformer and | | PCBs, hydrocarbons, trace elements |
| C4 | G5 | 2017 DSI and Beca 2021 | Fill noted in 2017 DSI report | G5: Waste to land north of building 33. | 1 sample location. Exceeded human health and environmental criteria for arsenic, lead and chromium. Zinc and nickel exceeded the targeted environmental criteria (at various depths). | PCBs, hydrocarbons, trace elements, asbestos |
| 34 | A17 | 2014 PSI | | A17 Utility shed, small quantities of chemicals, fuels, paints. | 2 sample locations. Exceeded human health criteria for arsenic. Exceeded environmental criteria for nickel. | Listed by URS as "Type of storage TBC" – Recommend adopting SVOC/VOC/TPH/Metals |
| 35 | F4 | 2014 PSI | | F4 Fuel storage, vehicle refuelling and repair | | Hydrocarbons including PAHs, solvents and metals combined in waste oil. |
| 36 | A10 | 2014 PSI | | A10 Greenhouse (constructed 1995) | Additional investigation undertaken by Beca Limited May 2021. Detailed Site Investigation Report for Wairaka Stream | Trace elements, herbicides, organophosphates, organochlorides. Type of storage TBC. |

| HAIL ID | Applicable HAIL Code | Source | Comment | HAIL Identified | Number of Targeted Soil Sampling Locations | Potential Contaminants of Concern |
|---|---|---|---|---|---|---|
| | | | | | Daylighting Works at Unitec Campus Mount Albert Auckland | |
| 41 | E1, A14 | 2014 PSI | Historically used a psychiatric hospital | E1 Asbestos pipe insulation in roof space and soffits<br>A14 Pharmaceutical manufacture, blending, mixing or formulation | 1 soil sampling location. | Asbestos. Range of chemicals and solvents. |
| 45 | B2 | 2014 PSI | | B2 Power transformer. | | PCBs, hydrocarbons, trace elements |
| 46 | A14 | 2014 PSI | | A14 Pharmaceutical manufacture, blending, mixing or formulation | 1 soil sampling location. | Pharmaceutical storage – recommend adopting a range or organic and non-organic commonly stored chemicals as CoC (may require a library search for contaminants for testing purposes) |
| 48 | B2 | 2014 PSI | Historically used a psychiatric hospital | B2 Power transformer | | PCBs, hydrocarbons, trace elements |
| 49 | No HAIL code assigned | 2014 PSI | Unconfirmed whether this is building 49. | Chemical/fuel storage | | Listed by URS as “Type of storage TBC” – Recommend adopting SVOC/VOC/TPH/Metals |
| 108 | E1, F4, B2, A17, A2 | 2014 PSI | | E1 Asbestos cement exterior cladding including roof<br>F4 Automotive workshop<br>B2 Transformer<br>A2 Several Dangerous Goods Stores<br>A17 Underground storage system (petrol) south of building- filled with sand | | Asbestos, hydrocarbons, petroleum hydrocarbons, solvents, trace elements, PCBs, industrial gases including LPG, acetylene and oxygen. Type of storage TBC – recommend adopting a range or organic and non-organic commonly stored chemicals as CoC (may require a library search for contaminants for testing purposes) |
| 114 | E1, A3 | 2014 PSI | | E1 Asbestos cement exterior cladding including roof, gutters, drains, sumps and ground 2m from downpipe.<br>A3 Commercial analytical laboratories with several Dangerous Goods Stores | | Asbestos. Type of storage TBC. |
| 115 | E1, A10 | 2014 PSI | | E1 Asbestos cement exterior cladding including roof, gutters, drains, sumps and ground 2m from downpipe<br>A10 Pesticide storage and use, laboratories | | Asbestos, trace elements, herbicides, organophosphates, organochlorides. |
| 170 | B2 | 2014 PSI | | B2 Power transformer | | PCBs, hydrocarbons, trace elements. |
| 172 | B2 | 2014 PSI | | B2 Power transformer | | PCBs, hydrocarbons, trace elements. |
| 173 | B2 | 2014 PSI | | B2 Power transformer | | PCBs, hydrocarbons, trace elements. |
| 174 | B2 | 2014 PSI | | B2 Power transformer | | PCBs, hydrocarbons, trace elements. |
| 178 | A10 | 2014 PSI | Noted fill up to 0.9m, horticultural activities (in car park north east of building) | A10 Market gardens | | Trace elements, herbicides, organophosphates, organochlorides. |
| 180 | B2 | 2014 PSI | | B2 Power transformer | | PCBs, hydrocarbons, trace elements. |
| 200 | A14 | 2014 PSI | Noted fill up to 0.5m | A14 Pharmaceutical manufacture, blending, mixing or formulation | 2 sampling locations. | Pharmaceutical storage – recommend adopting a range or organic and non-organic commonly stored chemicals as CoC (may require a library search for contaminants for testing purposes) |
| 201 | A10 | 2014 PSI | Historical sports field | A10 Sports turf | | Trace elements, herbicides, organophosphates, organochlorides. |
| 202 | E1, A14 | 2014 PSI | Historical psychiatric hospital residence | E1 Asbestos cement exterior cladding including roof, gutters, drains, sumps and ground 2m from downpipe<br>A17 Possible chemicals and fuel storage<br>A14 Pharmaceutical manufacture, blending, mixing or formulation | 1 soil sampling location. | Asbestos,<br>Listed by URS as “Type of storage TBC” – Recommend adopting SVOC/VOC/TPH/Metals Pharmaceutical storage – recommend adopting a range or organic and non-organic commonly stored chemicals as CoC (may require a library search for contaminants for testing purposes) |
| 203 | No HAIL code assigned | 2014 PSI | | Possible chemicals and fuel storage. | 1 soil sampling location. | Listed by URS as “Type of storage TBC” – Recommend adopting SVOC/VOC/TPH/Metals |
| 204 | No HAIL code assigned | 2014 PSI | | Possible chemicals and fuel storage | 1 soil sampling locations. 1 sample exceeded the adopted human health criteria for lead | Listed by URS as “Type of storage TBC” – Recommend adopting SVOC/VOC/TPH/Metals |
| 205 | No HAIL code assigned | 2014 PSI | | Possible chemicals and fuel storage | | Listed by URS as “Type of storage TBC” – Recommend adopting SVOC/VOC/TPH/Metals |
| 206 | No HAIL code assigned | 2014 PSI | | Possible chemicals and fuel storage | 1 sampling location. | Listed by URS as “Type of storage TBC” – Recommend adopting SVOC/VOC/TPH/Metals |
| 207 | A10, A14 | 2014 PSI | Historical horticultural use and psychiatric hospital residence | A10 Market gardens<br>A14 Pharmaceutical manufacture, blending, mixing or formulation | 2 soil sampling locations. One sample exceeded the adopted human health criteria for Benzo(a)pyrene eq. | Trace elements, herbicides, organophosphates, organochlorides. Range of chemicals and solvents (may require a library search for contaminants for testing purposes). |
| 208 | A10, A14 | 2014 PSI | Historical horticultural use and psychiatric hospital residence | A10 Market gardens<br>A14 Pharmaceutical manufacture, blending, mixing or formulation | | Trace elements, herbicides, organophosphates, organochlorides. Range of chemicals and solvents (may require a library search for contaminants for testing purposes). |
| 209 | A10, A14 | 2014 PSI | Historical horticultural use and psychiatric hospital residence | A10 Market gardens.<br>A14 Pharmaceutical manufacture, blending, mixing or formulation | | Trace elements, herbicides, organophosphates, organochlorides. Range of chemicals and solvents (may require a library search for contaminants for testing purposes). |

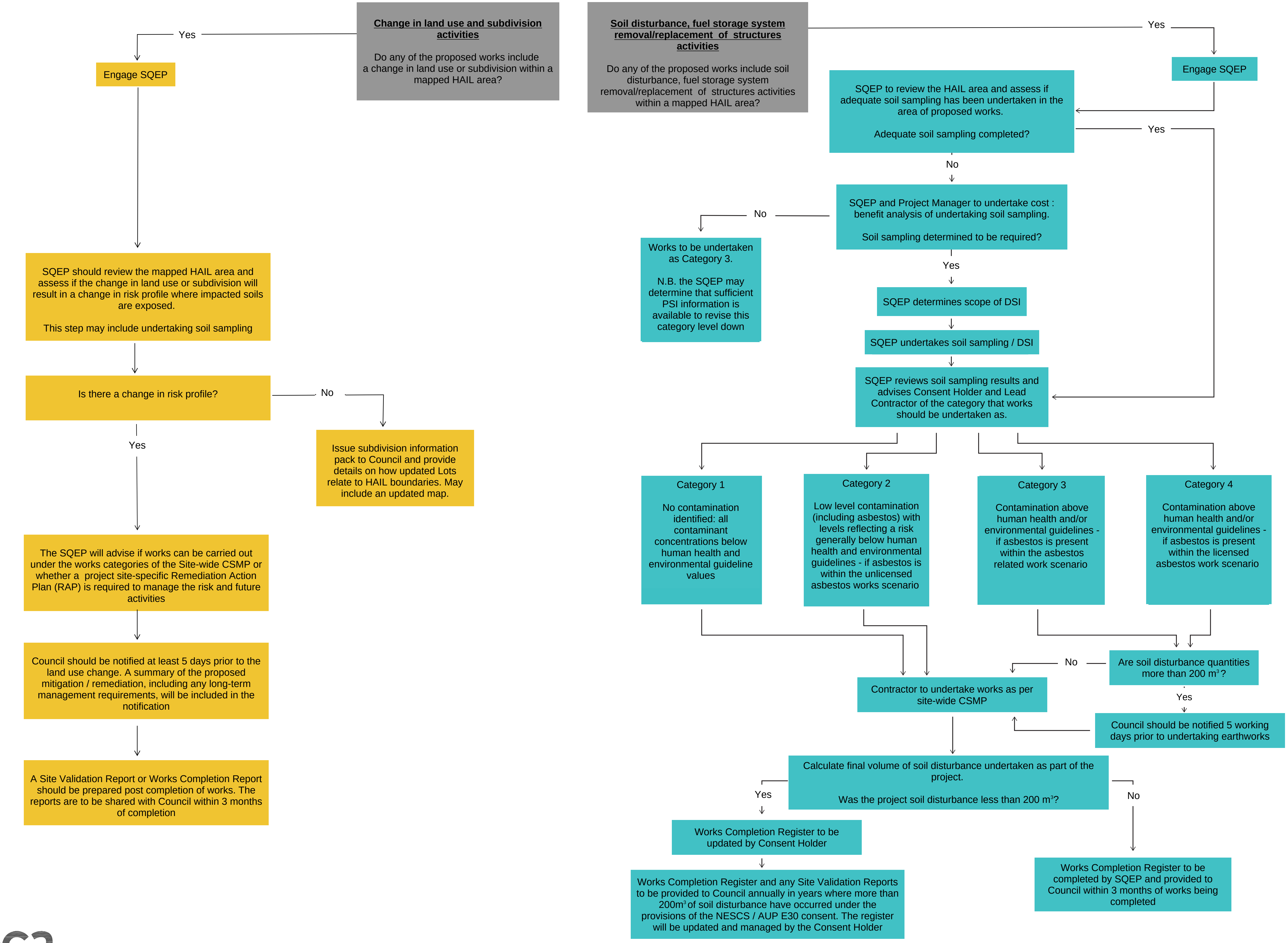
| HAIL ID | Applicable HAIL Code | Source | Comment | HAIL Identified | Number of Targeted Soil Sampling Locations | Potential Contaminants of Concern |
|---|---|---|---|---|---|---|
| 210 | A10, A14 | 2014 PSI | Historical horticultural use and psychiatric hospital residence | A10 Market gardens.<br>A14 Pharmaceutical manufacture, blending, mixing or formulation | | Trace elements, herbicides, organophosphates, organochlorides. Range of chemicals and solvents (may require a library search for contaminants for testing purposes). |
| 312 | A10 | 2014 PSI | Historical horticultural use and market gardens | A10 Market gardens | | Trace elements, herbicides, organophosphates, organochlorides. |
| 313 | A10 | 2014 PSI | Historical horticultural use and market gardens | A10 Market gardens | | Trace elements, herbicides, organophosphates, organochlorides. |
| 310-311 | A10 | 2014 PSI | Historical horticultural use and market gardens | A10 Market gardens | | Trace elements, herbicides, organophosphates, organochlorides. |
| 37-40 | G6, A10, A1 | 2014 PSI | | G6 Composting plant.<br>A10 Greenhouse (constructed 1995)<br>A1 Agrichemicals | 1 sampling location. One sample exceeded the adopted human health criteria for arsenic. | Trace elements, herbicides, organophosphates, organochlorides. Type of storage TBC. |
| B | A10 | 2014 PSI | Historical horticultural activities | A10 Market gardens | 7 soil sampling locations. Four samples exceeded the adopted human health criteria for arsenic and lead. One sample exceeded the adopted human health criteria for Benzo(a)pyrene | Trace elements, herbicides, organophosphates, organochlorides. |
| c | A10 | 2014 PSI And Beca 2021 | | A10 Market gardens | 2017 DSI: 3 sampling locations. One sample exceeded the adopted human health criteria for arsenic.<br>Additional investigation undertaken by Beca Limited May 2021. Detailed Site Investigation Report for Wairaka Stream Daylighting Works at Unitec Campus Mount Albert Auckland | Trace elements, herbicides, organophosphates, organochlorides. |
| C1 | E1, I | Beca 2021 | Demolished building. Identified 2021 | E1 Asbestos in a deteriorated condition<br>I Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health and the environment | | Asbestos and lead |
| C2 | E1, I, A14 | Beca 2021 | Demolished building originally labelled 44 and 52. Area subject to previous potential HAIL categories including chemical/fuel storage and Pharmaceutical storage and manufacturing | E1 Asbestos in a deteriorated condition<br>I Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health and the environment<br>A14 Pharmaceutical manufacture, blending, mixing or formulation | | Asbestos and lead, listed by URS as "Type of storage TBC" – Recommend adopting a range or organic and non-organic commonly stored chemicals as CoC (may require a library search for contaminants for testing purposes) |
| C3 | G5 | Beca 2021 | Appears filled likely from construction works undertaken at surrounding areas, potentially containing fill. Identified 2021 – possibly contains traces of asbestos from contoured fill from buildings demolished to the south in 2016. | G5 Waste disposal to land | | Construction and building waste including Asbestos, TPHs and heavy metals |
| d | ~~A10~~ Removed HAIL code | 2014 PSI & Beca 2021 | Barns against northern boundary – unknown use | A10 Sports turf | 7 soil sampling locations (Beca 2021). One sample exceeded the adopted human health criteria for arsenic but 95% Upper Confidence Level Arsenic Concentration of Arsenic across sports field is not above adopted human health risk criteria. | Trace elements, herbicides, organophosphates, organochlorides. |
| C5 | | Beca 2021 | | G5 Waste disposal to land | 1 soil sampling location. One sample exceeded the adopted human health criteria for arsenic. | |
| e | G3 | 2014 PSI | Potential fill, former residential property and barn (west of building 33) | G3 Landfill site | | Trace elements |
| f | I | 2014 PSI | Run-off collection point | I Accumulation of contaminants | | Dependent on contaminants associated with catchments. |
| P2 | A10 | 2014 PSI | Horticultural activities | A10 Market gardens | 2 soil sample locations. | Trace elements, herbicides, organophosphates, organochlorides. |
| P3 | G3 and A10 | 2014 PSI | Potential fill, pastoral land | G3 Landfill site | 2 soil sample locations. | Trace elements, herbicides, organophosphates, organochlorides. |
| **HAIL activities undertaken on neighbouring sites** | | | | | | |

| HAIL ID | Applicable HAIL Code | Source | Comment | HAIL Identified | Number of Targeted Soil Sampling Locations | Potential Contaminants of Concern |
|---|---|---|---|---|---|---|
| B | A14, A3, G4 | 2014 PSI | Historical storage of scrap metal | A14 Pharmaceutical manufacture, blending, mixing or formulation A3 Commercial analytical laboratory<br>G4 Scrap yard | | No contaminants of concern are likely to migrate to the subject site in sufficient quantity to result in a risk to human health or the environment. |
| C | A5 | 2014 PSI | Currently operating as Taylors Laundry | A5 Dry cleaning | 4 sampling locations around the facility (upgradient and downgradient of the facility). | Volatile hydrocarbons including trichloroethylene, 1,1,1- trichloroethane, tetrachloroethene and carbon tetrachloride. |
| D | G3 | 2014 PSI | Potentially uncontrolled fill | G3 Waste disposal to land | | No contaminants of concern are likely to migrate to the subject site in sufficient quantity to result in a risk to human health or the environment |
| G | F7 | 2014 PSI | BP Petrol Station (1356 Great North Road, Waterview) | F7 Service station | | Total Petroleum hydrocarbons including BTEX |

# B

## Appendix B – Task Sequence Flowchart

# Task Sequence Flowchart for Activities on HAIL Sites




prepared by Beca

**Change in Land use and Subdivision**

**Soil Disturbance and Fuel Storage Systems Removal**

# C

## Appendix C – Works Completion Register

# Annual Register of Soil Disturbance Volumes Less than 200 $m^3$

| Project Name# | Project Ref. | Project Manager | SQEP Contact and Company | Contractor and Company | Site Supervisor and Company | Date of Works | Site-wide CSMP Category of Works | Volume of Soil Disturbance | Volume of Off-site Soil Disposal | Location of Off-site Soil Disposal* | Unexpected Contamination Discovery^ |
|---|---|---|---|---|---|---|---|---|---|---|---|
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*#Site location plan showing area of earthworks and any contamination assessments reports needs to be provided*

** Disposal dockets to be attached.*

*^ If unexpected contamination is discovered a record of the discovery is to be attached. The record should include:*

- *A description of the material (with photographs)*
- *Notification to and any correspondence with Auckland Council*
- *Testing results undertaken by the SQEP*
- *Summary of remedial measures undertaken by the Contractor (as advised by the SQEP)*

# RECORD OF TITLE
# UNDER LAND TRANSFER ACT 2017
# FREEHOLD
**Search Copy**

R.W. Muir
Registrar-General
of Land

**Identifier** **58980**
**Land Registration District** **North Auckland**
**Date Issued** 19 May 2003

**Prior References**
NA129A/860 NA139B/956

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**Estate** Fee Simple
**Area** 7718 square metres more or less
**Legal Description** Lot 2 Deposited Plan 314949
**Registered Owners**
Whai Rawa Property Holdings LP

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**Interests**

Appurtenant hereto is a drainage right specified in Easement Certificate C247153.4 - 14.3.1991 at 2:43 pm(affects part)

The easements specified in Easement Certificate C247153.4 are subject to Section 309 (1) (a) Local Government Act 1974

Appurtenant hereto is an electricity right created by Transfer D036499.13 - 22.8.1996 at 10.40 am(affects part)

Appurtenant hereto are electricity and gas rights created by Transfer D036499.16 - 22.8.1996 at 10.40 am(affects part)

Appurtenant hereto are electricity and water supply rights created by Transfer D036499.17 - 22.8.1996 at 10.40 am(affects part)

Appurtenant hereto is a water supply easement created by Easement Instrument 5495622.1 - 21.2.2003 at 9:00 am(affects part)

5590341.6 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 19.5.2003 at 9:00 am

5590341.7 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 19.5.2003 at 9:00 am

Appurtenant hereto is a right of way, electricity, telecommunications & water supply easements created by Easement Instrument 5590341.13 - 19.5.2003 at 9:00 am

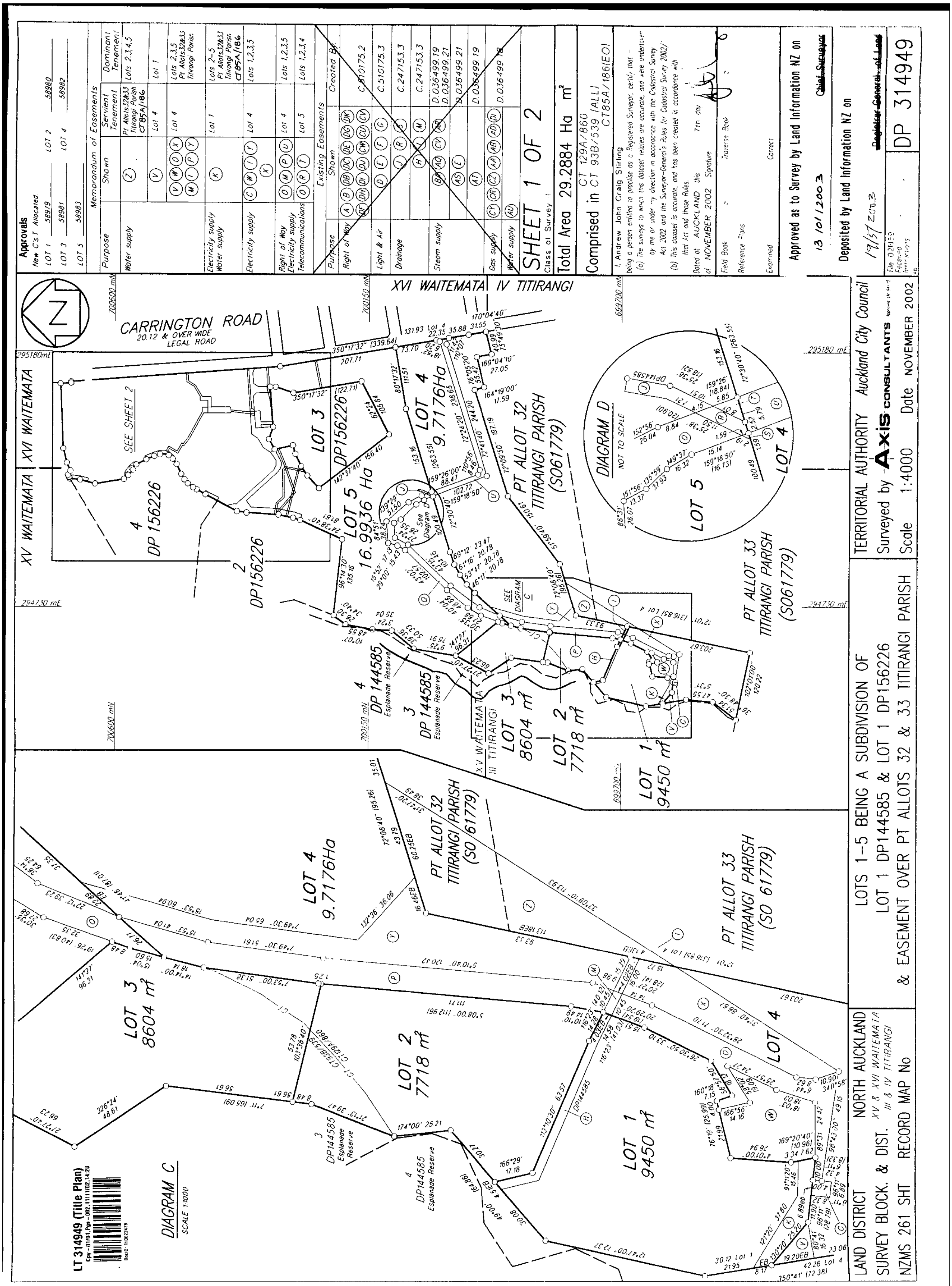
The easements created by Easement Instrument 5590341.13 are subject to Section 243 (a) Resource Management Act 1991

Appurtenant hereto is a water supply easement created by Easement Instrument 5590341.15 - 19.5.2003 at 9:00 am

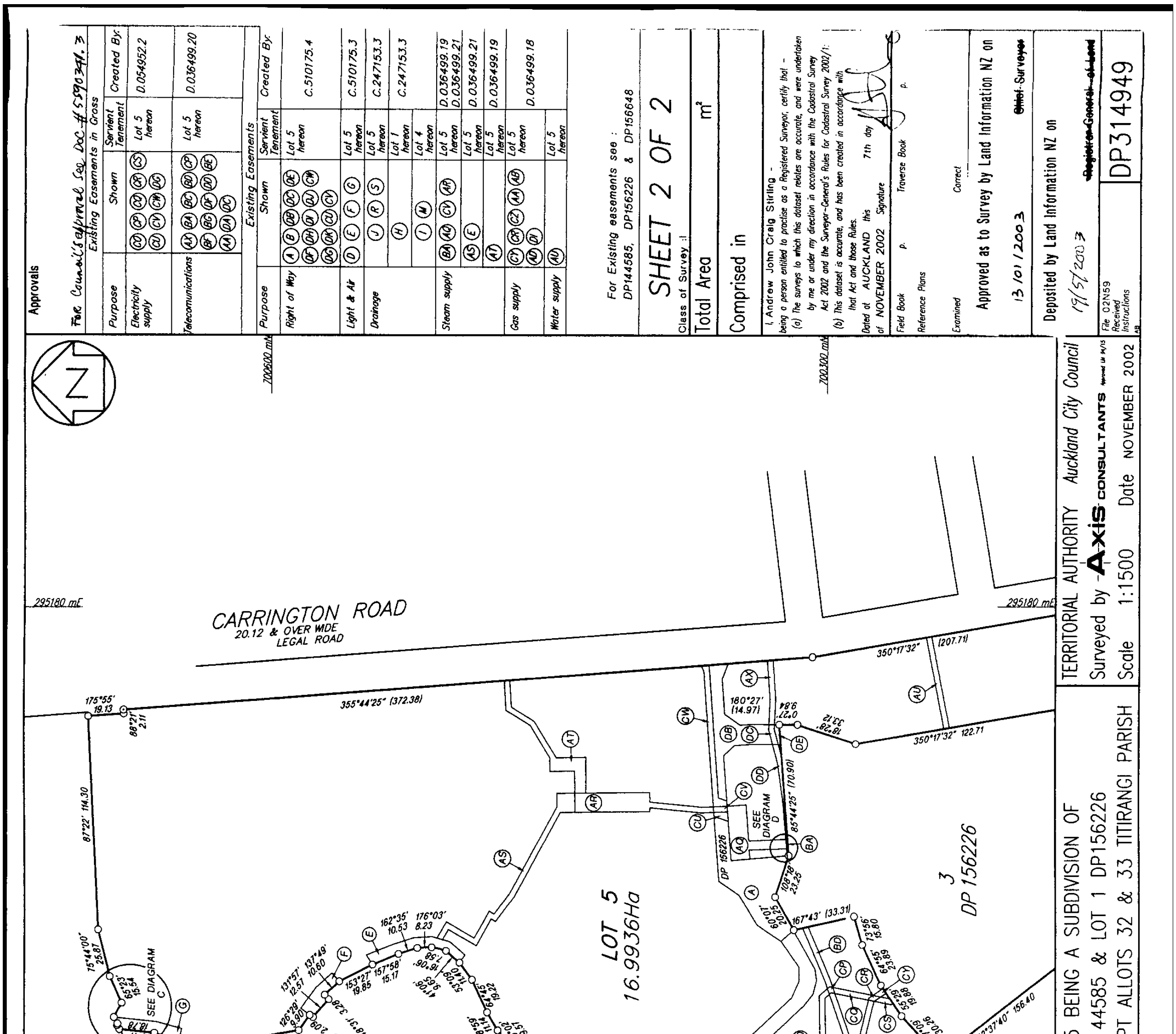
The easement created by Easement Instrument 5590341.15 is subject to Section 243 (a) Resource Management Act 1991

10055951.6 Mortgage to Bank of New Zealand - 25.5.2015 at 4:12 pm

10960876.1 Variation of Mortgage 10055951.6 - 5.12.2017 at 5:36 pm



SHEET 1 OF 2
Total Area 29.2884 Ha m²
Comprised in CT 129A/860 CT 93B/539 (ALL) CT85A/186(EO)
Approvals
Memorandum of Easements
Existing Easements
DIAGRAM D
NOT TO SCALE
DIAGRAM C
SCALE 1:1000
CARRINGTON ROAD
20.12 & OVER WIDE LEGAL ROAD
XVI WAITEMATA IV TITIRANGI
XV WAITEMATA
XVI WAITEMATA
SEE SHEET 2
LOT 1
9450 m²
LOT 2
7718 m²
LOT 3
8604 m²
LOT 4
9.7176Ha
LOT 5
16.9936 Ha
DP156226
PT ALLOT 32 TITIRANGI PARISH (SO61779)
PT ALLOT 33 TITIRANGI PARISH (SO61779)
DP 144585
Esplanade Reserve
Approved as to Survey by Land Information NZ on
13/01/2003
Deposited by Land Information NZ on
19/5/2003
DP 314949
TERRITORIAL AUTHORITY Auckland City Council
Surveyed by AXIS CONSULTANTS
Scale 1:4000 Date NOVEMBER 2002
LOTS 1-5 BEING A SUBDIVISION OF LOT 1 DP144585 & LOT 1 DP156226
& EASEMENT OVER PT ALLOTS 32 & 33 TITIRANGI PARISH
LAND DISTRICT NORTH AUCKLAND
SURVEY BLOCK. & DIST. XV & XVI WAITEMATA III & IV TITIRANGI
NZMS 261 SHT RECORD MAP No
LT 314949 (Title Plan)


Approvals
For Council's approval see Doc # 5590341.3
Existing Easements in Gross
Purpose | Shown | Servient Tenement | Created By
Electricity supply | (CO) (CP) (CQ) (CR) (CS) (CU) (CV) (CW) (CX) | Lot 5 hereon | D.054952.2
Telecommunications | (AX) (BA) (BC) (BD) (CP) (BF) (BG) (DF) (DD) (DE) (AA) (DA) (DC) | Lot 5 hereon | D.036499.20
Existing Easements
Purpose | Shown | Servient Tenement | Created By
Right of Way | (A) (B) (DB) (DC) (DE) (DF) (DH) (DI) (DJ) (CW) (DG) (DK) (CU) (CY) | Lot 5 hereon | C.510175.4
Light & Air | (D) (E) (F) (G) | Lot 5 hereon | C.510175.3
Drainage | (J) (R) (S) | Lot 5 hereon | C.247153.3
(H) | Lot 1 hereon
(I) (M) | Lot 4 hereon | C.247153.3
Steam supply | (BA) (AQ) (CV) (AR) | Lot 5 hereon | D.036499.19 D.036499.21
(AS) (E) | Lot 5 hereon | D.036499.21
(AT) | Lot 5 hereon | D.036499.19
Gas supply | (CY) (CR) (CZ) (AA) (AB) (AU) (DI) | Lot 5 hereon | D.036499.18
Water supply | (AU) | Lot 5 hereon
For Existing easements see : DP144585, DP156226 & DP156648
SHEET 2 OF 2
Class of Survey :I
Total Area m²
Comprised in
I, Andrew John Craig Stirling - being a person entitled to practise as a Registered Surveyor, certify that -
(a) The surveys to which this dataset relates are accurate, and were undertaken by me or under my direction in accordance with the Cadastral Survey Act 2002 and the Surveyor-General's Rules for Cadastral Survey 2002/1;
(b) This dataset is accurate, and has been created in accordance with that Act and those Rules.
Dated at AUCKLAND this 7th day of NOVEMBER 2002 Signature
Field Book p. Traverse Book p.
Reference Plans
Examined Correct
Approved as to Survey by Land Information NZ on
13/01/2003
Chief Surveyor
Deposited by Land Information NZ on
19/5/2003
Registrar-General of Land
DP314949
File 02N59 Received Instructions
TERRITORIAL AUTHORITY Auckland City Council
Surveyed by AXIS CONSULTANTS
Scale 1:1500 Date NOVEMBER 2002
LOTS 1-5 BEING A SUBDIVISION OF LOT 1 DP144585 & LOT 1 DP156226
& EASEMENT OVER PT ALLOTS 32 & 33 TITIRANGI PARISH
LAND DISTRICT NORTH AUCKLAND
SURVEY BLOCK. & DIST. XV & XVI WAITEMATA III & IV TITIRANGI
NZMS 261 SHT RECORD MAP No
CARRINGTON ROAD
20.12 & OVER WIDE LEGAL ROAD
LOT 5
16.9936Ha
3 DP156226
4 DP156226
2 DP156226
AUCKLAND-KUMEU (NORTH-WESTERN) MOTORWAY
DIAGRAM C
NOT TO SCALE
DIAGRAM D
NOT TO SCALE
SEE DIAGRAM C
SEE DIAGRAM D
295180 mE
294880 mE
700600 mN
700300 mN

# RECORD OF TITLE
# UNDER LAND TRANSFER ACT 2017
# FREEHOLD

**Search Copy**

R.W. Muir
Registrar-General
of Land

**Identifier** **58981**
**Land Registration District** **North Auckland**
**Date Issued** 19 May 2003

**Prior References**
NA129A/860 NA139B/956

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**Estate** Fee Simple
**Area** 8604 square metres more or less
**Legal Description** Lot 3 Deposited Plan 314949
**Registered Owners**
Whai Rawa Property Holdings LP

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**Interests**

Appurtenant hereto is a drainage right specified in Easement Certificate C247153.4 - 14.3.1991 at 2:43 pm(affects part)

The easements specified in Easement Certificate C247153.4 are subject to Section 309 (1) (a) Local Government Act 1974

Appurtenant hereto is an electricity right created by Transfer D036499.13 - 22.8.1996 at 10.40 am(affects part)

Appurtenant hereto are electricity and gas rights created by Transfer D036499.16 - 22.8.1996 at 10.40 am(affects part)

Appurtenant hereto are electricity and water supply rights created by Transfer D036499.17 - 22.8.1996 at 10.40 am(affects part)

Appurtenant hereto is a water supply easement created by Easement Instrument 5495622.1 - 21.2.2003 at 9:00 am(affects part)

5590341.6 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 19.5.2003 at 9:00 am

5590341.7 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 19.5.2003 at 9:00 am

Appurtenant hereto is a right of way, electricity, telecommunications & water supply easements created by Easement Instrument 5590341.13 - 19.5.2003 at 9:00 am

The easements created by Easement Instrument 5590341.13 are subject to Section 243 (a) Resource Management Act 1991

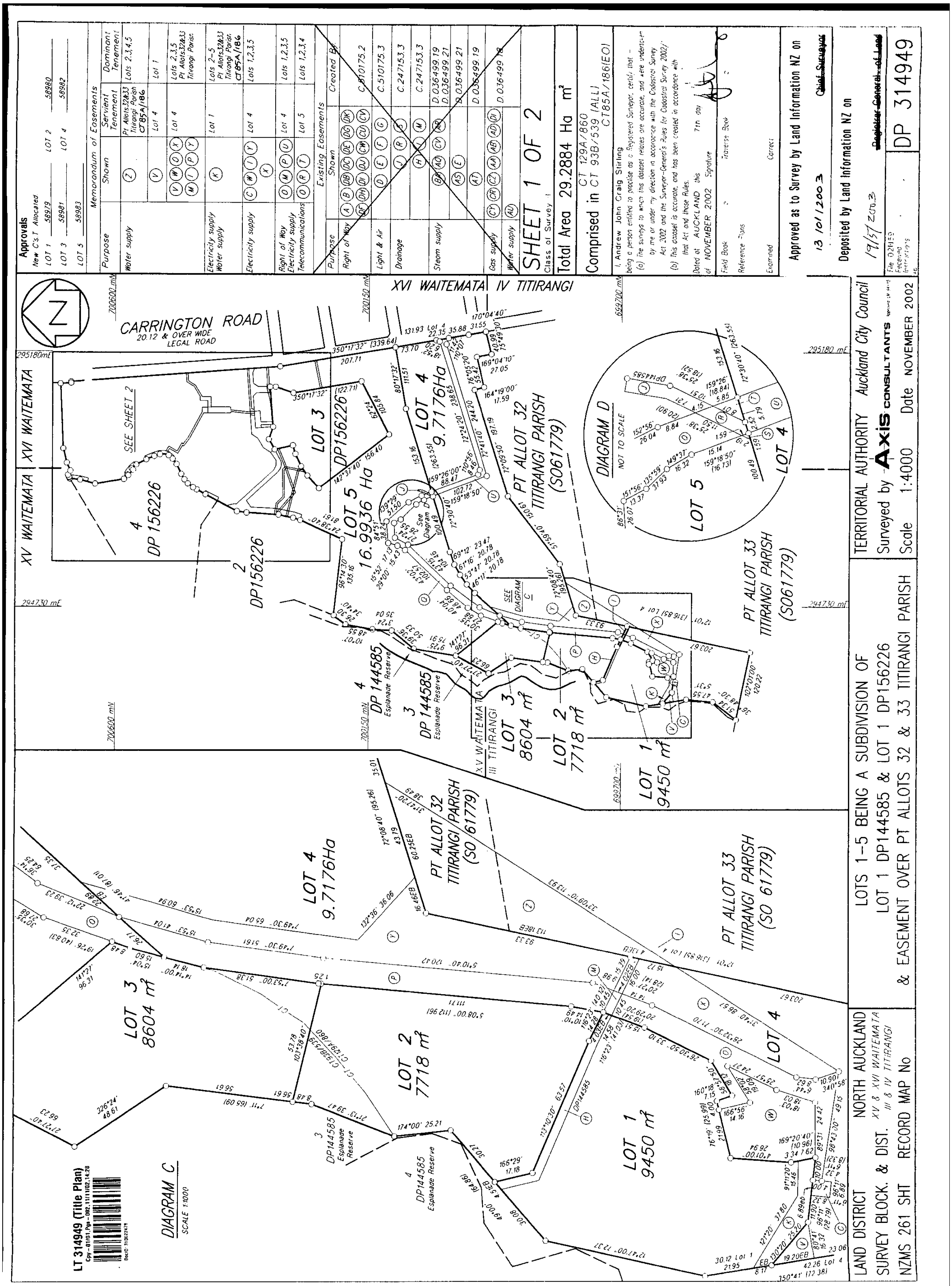
Appurtenant hereto is a water supply easement created by Easement Instrument 5590341.15 - 19.5.2003 at 9:00 am

The easement created by Easement Instrument 5590341.15 is subject to Section 243 (a) Resource Management Act 1991

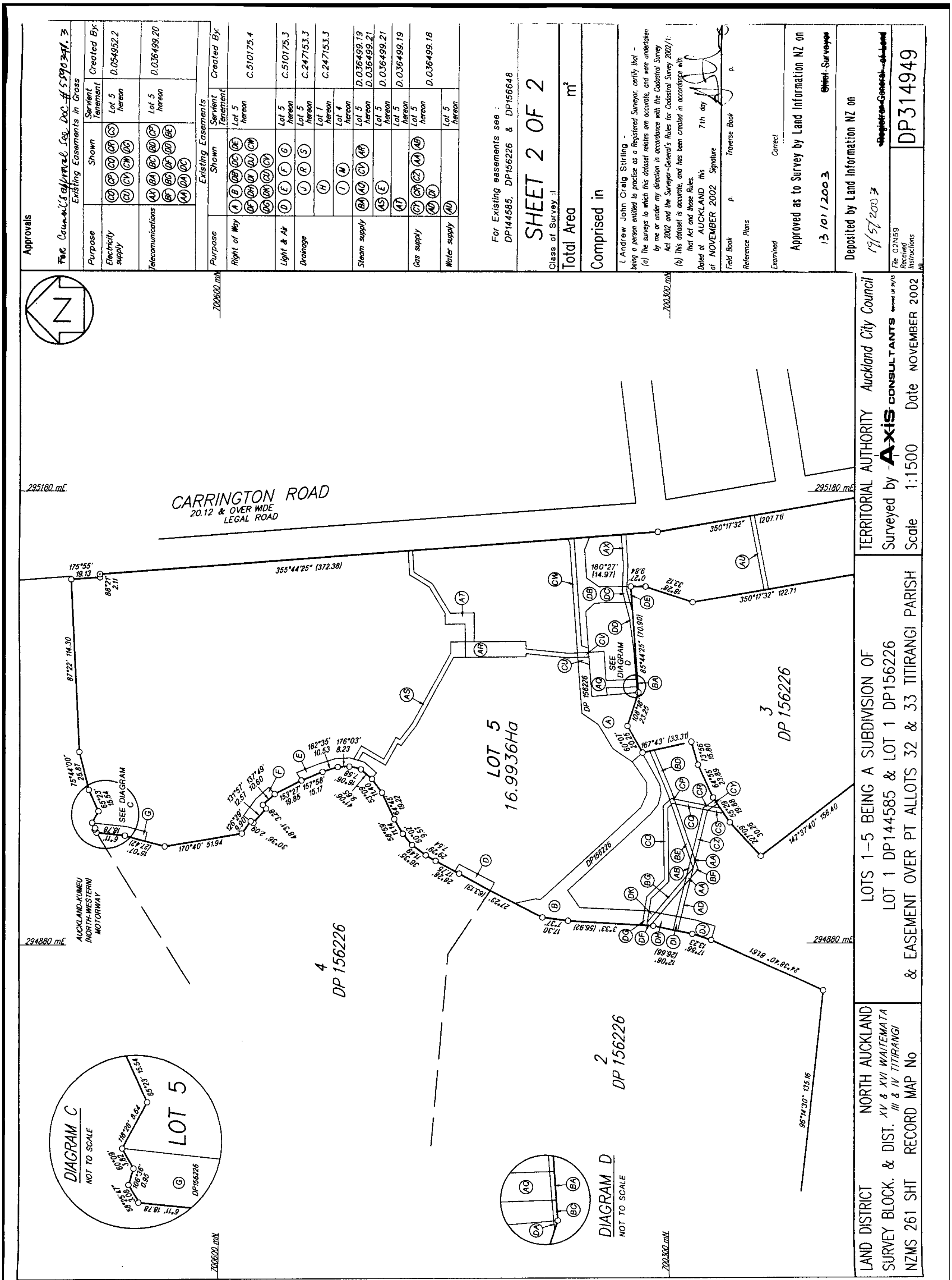
10055951.6 Mortgage to Bank of New Zealand - 25.5.2015 at 4:12 pm

10482469.1 Compensation Certificate pursuant to Section 19 Public Works Act 1981 by Auckland Council - 28.6.2016 at 1:49 pm

10960876.1 Variation of Mortgage 10055951.6 - 5.12.2017 at 5:36 pm



Approvals
New C's T Allocated
LOT 1 58979 LOT 2 58980
LOT 3 58981 LOT 4 58982
LOT 5 58983
Memorandum of Easements
Purpose
Shown
Servient Tenement
Dominant Tenement
Water supply
Electricity supply
Right of Way
Telecommunications
Existing Easements
Created By
Light & Air
Drainage
Steam supply
Gas supply
SHEET 1 OF 2
Total Area 29.2884 Ha
Comprised in CT 129A/860 CT 93B/539 (ALL) CT85A/186(EO)
Approved as to Survey by Land Information NZ on
13/01/2003
Deposited by Land Information NZ on
19/5/2003
DP 314949
CARRINGTON ROAD
20.12 & OVER WIDE LEGAL ROAD
XVI WAITEMATA IV TITIRANGI
XV WAITEMATA
SEE SHEET 2
LOT 3
DP156226
LOT 5
16.9936 Ha
LOT 4
9.7176Ha
PT ALLOT 32 TITIRANGI PARISH (SO61779)
PT ALLOT 33 TITIRANGI PARISH (SO61779)
DIAGRAM D
NOT TO SCALE
4 DP 156226
2 DP156226
4 DP144585 Esplanade Reserve
3 DP144585 Esplanade Reserve
LOT 3 8604 m²
LOT 2 7718 m²
LOT 1 9450 m²
DIAGRAM C
SCALE 1:1000
LT 314949 (Title Plan)
TERRITORIAL AUTHORITY Auckland City Council
Surveyed by Axis CONSULTANTS
Scale 1:4000 Date NOVEMBER 2002
LOTS 1-5 BEING A SUBDIVISION OF
LOT 1 DP144585 & LOT 1 DP156226
& EASEMENT OVER PT ALLOTS 32 & 33 TITIRANGI PARISH
LAND DISTRICT NORTH AUCKLAND
SURVEY BLOCK. & DIST. XV & XVI WAITEMATA III & IV TITIRANGI
NZMS 261 SHT RECORD MAP No


Approvals
For Council's approval see Doc # 5590341.3
Existing Easements in Gross
Purpose | Shown | Servient Tenement | Created By
Electricity supply | DD CP DQ DR CS CU CV CW DG | Lot 5 hereon | D.054952.2
Telecommunications | AX BA BC BD CP BF BG DF DJ BE AA DA DC | Lot 5 hereon | D.036499.20
Existing Easements
Purpose | Shown | Servient Tenement | Created By
Right of Way | A B DB DC DE DF DH DI DJ CW DG DK CU CV | Lot 5 hereon | C.510175.4
Light & Air | D E F G | Lot 5 hereon | C.510175.3
Drainage | J R S | Lot 5 hereon | C.247153.3
H | Lot 1 hereon | C.247153.3
I M | Lot 4 hereon
Steam supply | BA AQ CV AR | Lot 5 hereon | D.036499.19 D.036499.21
AS E | Lot 5 hereon | D.036499.21
AT | Lot 5 hereon | D.036499.19
Gas supply | CY CR CZ AA AB AU DI | Lot 5 hereon | D.036499.18
Water supply | AU | Lot 5 hereon
For Existing easements see : DP144585, DP156226 & DP156648
SHEET 2 OF 2
Class of Survey :I
Total Area m²
Comprised in
I, Andrew John Craig Stirling - being a person entitled to practise as a Registered Surveyor, certify that -
(a) The surveys to which this dataset relates are accurate, and were undertaken by me or under my direction in accordance with the Cadastral Survey Act 2002 and the Surveyor-General's Rules for Cadastral Survey 2002/1;
(b) This dataset is accurate, and has been created in accordance with that Act and those Rules.
Dated at AUCKLAND this 7th day of NOVEMBER 2002 Signature
Field Book p. Traverse Book p.
Reference Plans
Examined Correct
Approved as to Survey by Land Information NZ on 13/01/2003
Chief Surveyor
Deposited by Land Information NZ on 19/5/2003
Registrar-General of Land
File 02N59 Received Instructions
DP314949
TERRITORIAL AUTHORITY Auckland City Council
Surveyed by AXIS CONSULTANTS
Scale 1:1500 Date NOVEMBER 2002
LOTS 1-5 BEING A SUBDIVISION OF LOT 1 DP144585 & LOT 1 DP156226 & EASEMENT OVER PT ALLOTS 32 & 33 TITIRANGI PARISH
LAND DISTRICT NORTH AUCKLAND
SURVEY BLOCK. & DIST. XV & XVI WAITEMATA III & IV TITIRANGI
NZMS 261 SHT RECORD MAP No
CARRINGTON ROAD 20.12 & OVER WIDE LEGAL ROAD
LOT 5 16.9936Ha
3 DP 156226
4 DP 156226
2 DP 156226
AUCKLAND-KUMEU (NORTH-WESTERN) MOTORWAY
SEE DIAGRAM C
SEE DIAGRAM D
DIAGRAM C NOT TO SCALE
DIAGRAM D NOT TO SCALE
295180 mE
294880 mE
700600 mN
700300 mN
355°44'25" (372.38)
350°17'32" (207.71)
350°17'32" 122.71
142°37'40" 156.40
96°14'30" 135.16
24°38'40" 81.61
170°40' 51.94
81°22' 114.30
175°55' 19.13
75°44'00" 25.87
85°44'25" (70.90)

# RECORD OF TITLE
# UNDER LAND TRANSFER ACT 2017
# FREEHOLD

**Search Copy**

R.W. Muir
Registrar-General
of Land

**Identifier** **799989**
**Land Registration District** **North Auckland**
**Date Issued** 09 April 2018

**Prior References**
783985 NA88C/325

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**Estate** Fee Simple
**Area** 3.6655 hectares more or less
**Legal Description** Lot 2 Deposited Plan 515012
**Purpose** State Housing

**Registered Owners**
Her Majesty the Queen

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**Interests**

Excluding coal and other minerals contained in Deeds Index A2/131 (affects part formerly Section 2 SO 493517)

Appurtenant to part formerly Section 2 SO 493517 are water supply & electricity supply easements created by Easement Instrument 5590341.14 - 19.5.2003 at 9:00 am

The easements created by Easement Instrument 5590341.14 are subject to Section 243 (a) Resource Management Act 1991

7938135.1 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 16.9.2008 at 9:00 am (affects part formerly Section 2 SO 493517)

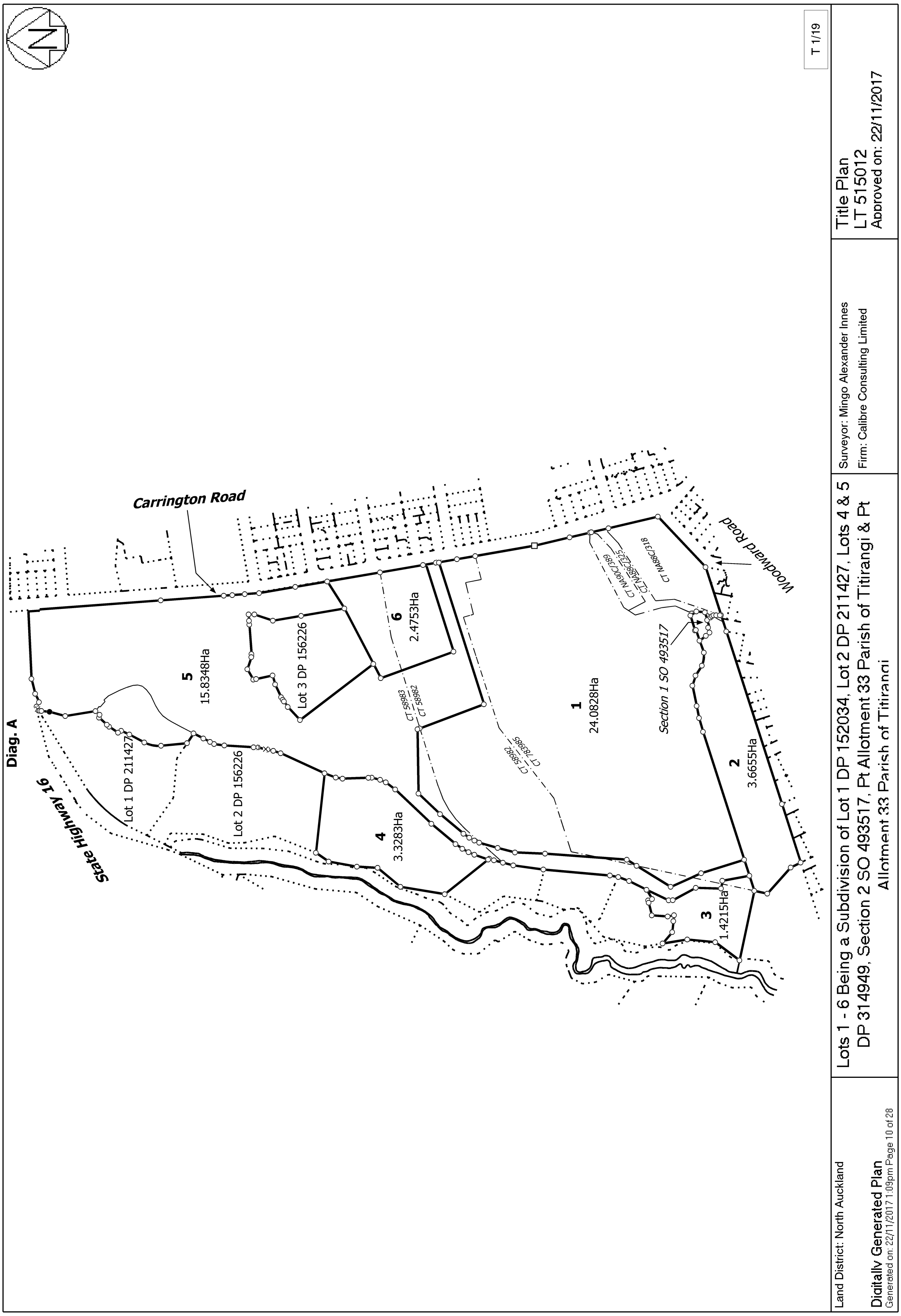
9889354.1 Certificate under section 148 of the Nga Mana Whenua o Tamaki Makaurau Collective Redress Act 2014 that the within land is RFR land as defined in section 118 and is subject to Subpart 1 of Part 4 of the Act (which restricts disposal, including leasing of the land) - 10.11.2014 at 7:00 am (affects part formerly Section 2 SO 493517)

9918485.1 Certificate under section 148 of the Nga Mana Whenua o Tamaki Makaurau Collective Redress Act 2014 that the within land is RFR land as defined in section 118 and is subject to Subpart 1 of Part 4 of the Act (which restricts disposal, including leasing of the land) - 5.12.2014 at 7:00 am (affects part formerly Part Allotment 33 Parish of Titirangi contained in NA88C/325)

Subject to a right to drain sewage over parts marked LL & NN, right to convey electricity, telecommunications and computer media over parts marked LL & MM, right to convey water over parts marked OO & PP, right of way (pedestrian) over part marked KA and a right of way (vehicle) over parts marked QQ & RR, all on DP 515012 created by Easement Instrument 10743528.2 - 28.3.2017 at 7:00 am

10818525.1 Compensation Certificate pursuant to Section 19 Public Works Act 1981 by Auckland Council - 13.6.2017 at 3:59 pm (affects part formerly Section 2 SO 493517)

11076921.4 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 9.4.2018 at 2:00 pm



T 1/19
Title Plan
LT 515012
Approved on: 22/11/2017
Surveyor: Mingo Alexander Innes
Firm: Calibre Consulting Limited
Lots 1 - 6 Being a Subdivision of Lot 1 DP 152034, Lot 2 DP 211427, Lots 4 & 5 DP 314949, Section 2 SO 493517, Pt Allotment 33 Parish of Titirangi & Pt Allotment 33 Parish of Titirangi
Land District: North Auckland
Digitally Generated Plan
Generated on: 22/11/2017 1:09pm Page 10 of 28
Carrington Road
Woodward Road
State Highway 16
Diag. A
5
15.8348Ha
6
2.4753Ha
1
24.0828Ha
2
3.6655Ha
3
1.4215Ha
4
3.3283Ha
Lot 3 DP 156226
Lot 1 DP 211427
Lot 2 DP 156226
Section 1 SO 493517
CT 58983
CT 58982
CT 783985

# RECORD OF TITLE
# UNDER LAND TRANSFER ACT 2017
# FREEHOLD
## Search Copy

R.W. Muir
Registrar-General
of Land

**Identifier** **58979**
**Land Registration District** **North Auckland**
**Date Issued** 19 May 2003

**Prior References**
NA129A/860

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**Estate** Fee Simple
**Area** 9450 square metres more or less
**Legal Description** Lot 1 Deposited Plan 314949
**Registered Owners**
Whai Rawa Property Holdings LP

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**Interests**

Appurtenant hereto is a drainage right specified in Easement Certificate C247153.4 - 14.3.1991 at 2:43 pm

Subject to a drainage right over part marked H on DP 314949 specified in Easement Certificate C247153.4 - 14.3.1991 at 2:43 pm

The easements specified in Easement Certificate C247153.4 are subject to Section 309 (1) (a) Local Government Act 1974

Appurtenant hereto is a water supply easement created by Easement Instrument 5495622.1 - 21.2.2003 at 9:00 am

5590341.6 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 19.5.2003 at 9:00 am

5590341.7 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 19.5.2003 at 9:00 am

Appurtenant hereto is a right of way, electricity, telecommunications & water supply easements created by Easement Instrument 5590341.13 - 19.5.2003 at 9:00 am

Subject to electricity & water supply easements over part marked K on DP 314949 created by Easement Instrument 5590341.13 - 19.5.2003 at 9:00 am

The easements created by Easement Instrument 5590341.13 are subject to Section 243 (a) Resource Management Act 1991

Subject to a water supply & electricity supply easements over part marked K on DP 314949 created by Easement Instrument 5590341.14 - 19.5.2003 at 9:00 am

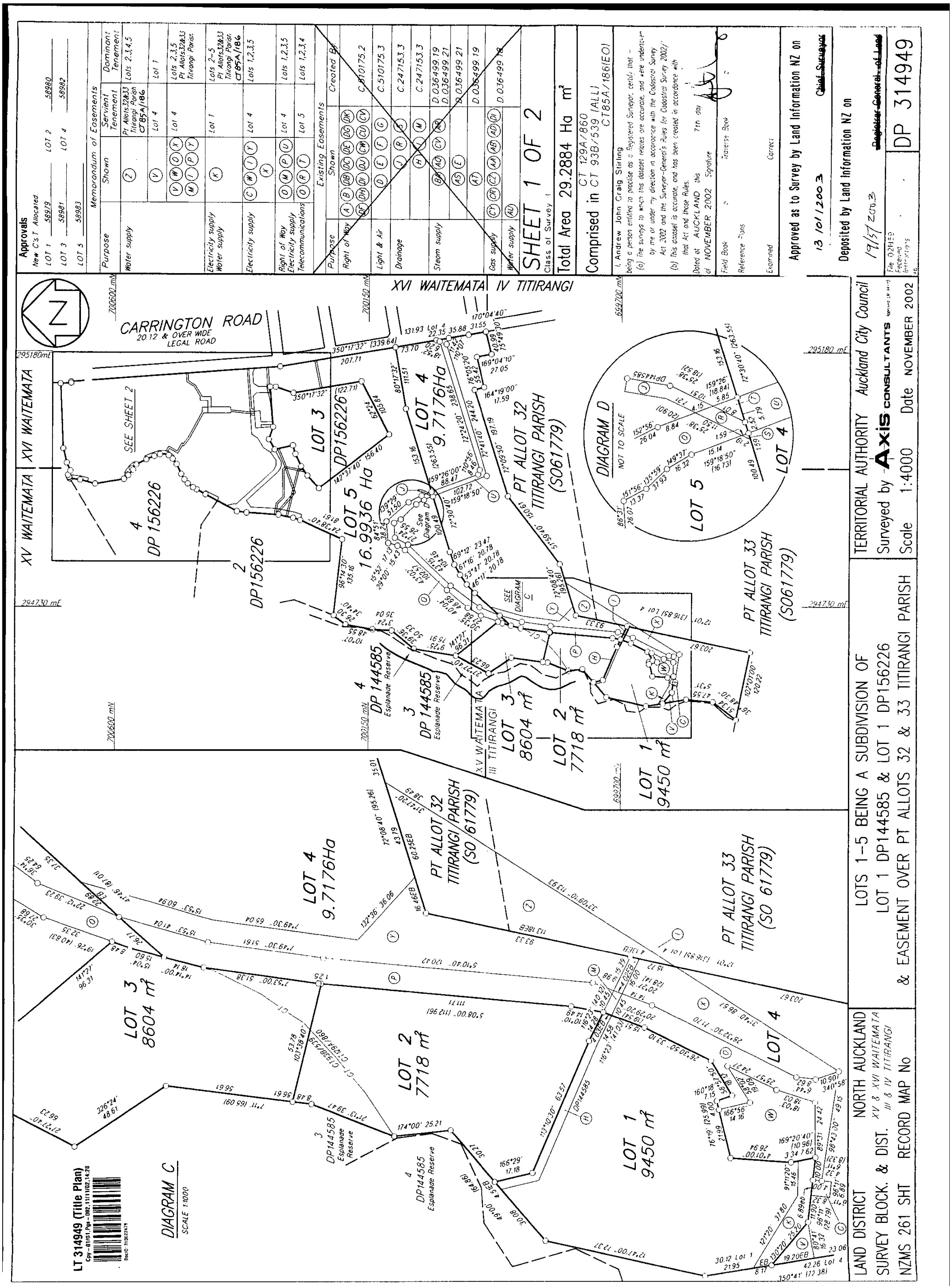
The easements created by Easement Instrument 5590341.14 are subject to Section 243 (a) Resource Management Act 1991

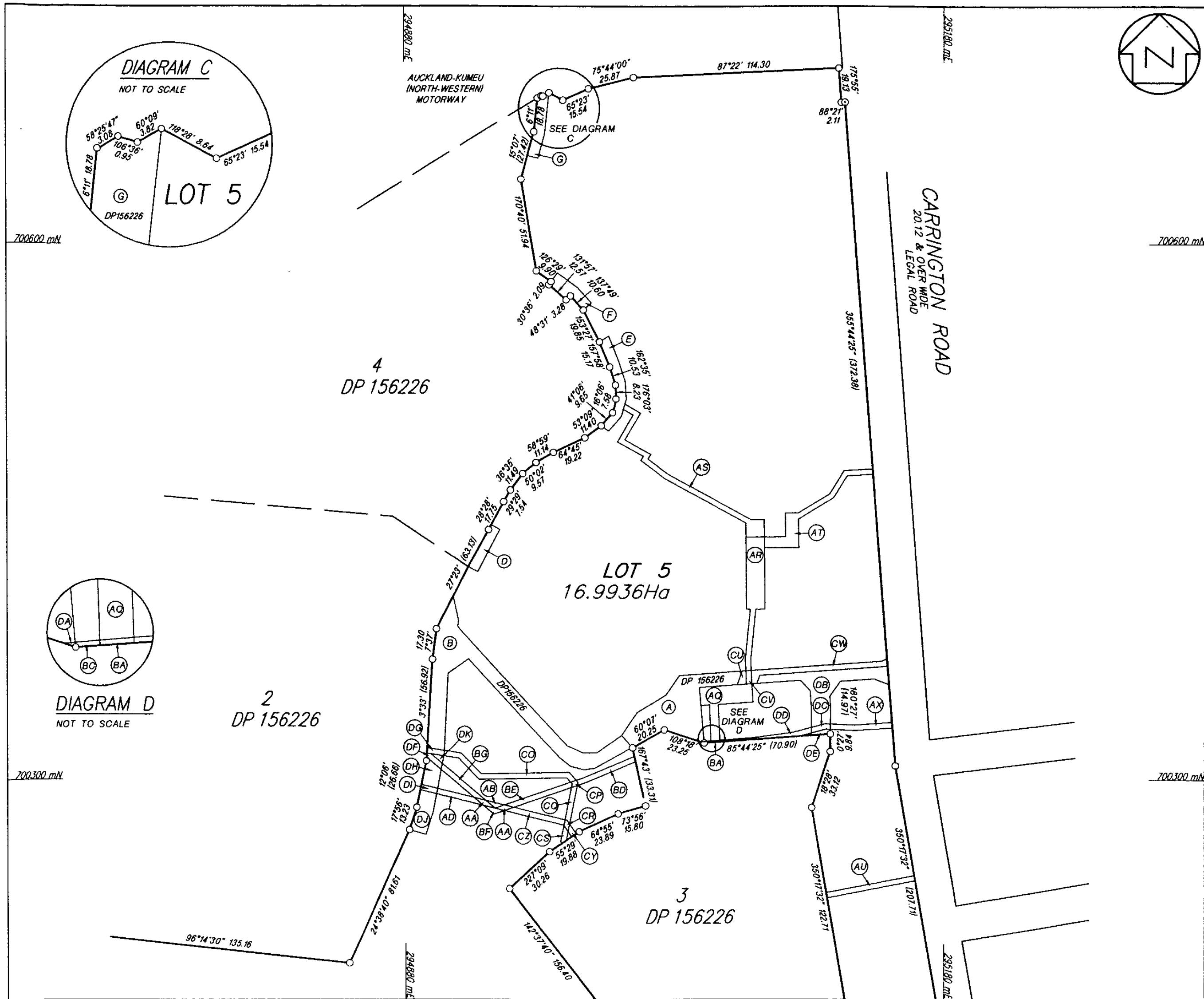
5590341.17 Lease Term 100 years commencing on the 13.2.2003 CT 91127 issued - 19.5.2003 at 9:00 am

10055951.6 Mortgage to Bank of New Zealand - 25.5.2015 at 4:12 pm

10960876.1 Variation of Mortgage 10055951.6 - 5.12.2017 at 5:36 pm

11547038.1 Variation of Lease 5590341.17 - 25.5.2020 at 11:34 am


DP 314949
SHEET 1 OF 2
Class of Survey I
Total Area 29.2884 Ha m²
Comprised in CT 129A/860 CT 93B/539 (ALL) CT85A/186(EO)
Approved as to Survey by Land Information NZ on
13 / 01 / 2003
Deposited by Land Information NZ on
19/5/2003
TERRITORIAL AUTHORITY Auckland City Council
Surveyed by AXIS CONSULTANTS
Scale 1:4000 Date NOVEMBER 2002
LOTS 1-5 BEING A SUBDIVISION OF LOT 1 DP144585 & LOT 1 DP156226
& EASEMENT OVER PT ALLOTS 32 & 33 TITIRANGI PARISH
LAND DISTRICT NORTH AUCKLAND
SURVEY BLOCK. & DIST. XV & XVI WAITEMATA III & IV TITIRANGI
NZMS 261 SHT RECORD MAP No
Approvals
Memorandum of Easements
Existing Easements
CARRINGTON ROAD
20.12 & OVER WIDE LEGAL ROAD
XVI WAITEMATA IV TITIRANGI
XV WAITEMATA
SEE SHEET 2
LOT 3 DP156226
LOT 5 16.9936 Ha
LOT 4 9.7176Ha
PT ALLOT 32 TITIRANGI PARISH (SO61779)
PT ALLOT 33 TITIRANGI PARISH (SO61779)
4 DP 156226
2 DP156226
4 DP 144585 Esplanade Reserve
3 DP 144585 Esplanade Reserve
LOT 3 8604 m²
LOT 2 7718 m²
LOT 1 9450 m²
DIAGRAM D
NOT TO SCALE
DIAGRAM C
SCALE 1:1000
LT 314949 (Title Plan)




**Approvals**

For Council's approval See Doc #5590341.3

| Existing Easements in Gross | | | |
|---|---|---|---|
| Purpose | Shown | Servient Tenement | Created By |
| Electricity supply | CO CP CQ CR CS CU CV CW DC | Lot 5 hereon | D.054952.2 |
| Telecommunications | AX BA BC BD CP BF BG DF DD BE AA DA DC | Lot 5 hereon | D.036499.20 |

| Existing Easements | | | |
|---|---|---|---|
| Purpose | Shown | Servient Tenement | Created By |
| Right of Way | A B DB DC DE DF DH DI DJ CW DG DK CU CV | Lot 5 hereon | C.510175.4 |
| Light & Air | D E F G | Lot 5 hereon | C.510175.3 |
| Drainage | J R S | Lot 5 hereon | C.247153.3 |
| | H | Lot 1 hereon | C.247153.3 |
| | I M | Lot 4 hereon | |
| Steam supply | BA AQ CV AR | Lot 5 hereon | D.036499.19 D.036499.21 |
| | AS E | Lot 5 hereon | D.036499.21 |
| | AT | Lot 5 hereon | D.036499.19 |
| Gas supply | CY CR CZ AA AB AD DI | Lot 5 hereon | D.036499.18 |
| Water supply | AU | Lot 5 hereon | |

For Existing easements see : DP144585, DP156226 & DP156648

SHEET 2 OF 2

Class of Survey :I

Total Area m²

Comprised in

I, Andrew John Craig Stirling - being a person entitled to practise as a Registered Surveyor, certify that -
(a) The surveys to which this dataset relates are accurate, and were undertaken by me or under my direction in accordance with the Cadastral Survey Act 2002 and the Surveyor-General's Rules for Cadastral Survey 2002/1:
(b) This dataset is accurate, and has been created in accordance with that Act and those Rules.
Dated at AUCKLAND this 7th day of NOVEMBER 2002 Signature

Field Book p. Traverse Book p.

Reference Plans

Examined Correct

Approved as to Survey by Land Information NZ on 13/01/2003 ~~Chief Surveyor~~

Deposited by Land Information NZ on 19/5/2003 ~~Registrar-General of Land~~

File 02N59
Received
Instructions

DP314949

| | | |
|---|---|---|
| LAND DISTRICT NORTH AUCKLAND<br>SURVEY BLOCK. & DIST. XV & XVI WAITEMATA III & IV TITIRANGI<br>NZMS 261 SHT RECORD MAP No | LOTS 1-5 BEING A SUBDIVISION OF<br>LOT 1 DP144585 & LOT 1 DP156226<br>& EASEMENT OVER PT ALLOTS 32 & 33 TITIRANGI PARISH | TERRITORIAL AUTHORITY Auckland City Council<br>Surveyed by - AXIS CONSULTANTS<br>Scale 1:1500 Date NOVEMBER 2002 |

# RECORD OF TITLE
# UNDER LAND TRANSFER ACT 2017
# FREEHOLD

**Search Copy**

R.W. Muir
Registrar-General
of Land

| | |
|---|---|
| **Identifier** | **799990** |
| **Land Registration District** | **North Auckland** |
| **Date Issued** | 09 April 2018 |

**Prior References**

58982 783985

| | |
|---|---|
| **Estate** | Fee Simple |
| **Area** | 1.4215 hectares more or less |
| **Legal Description** | Lot 3 Deposited Plan 515012 |
| **Purpose** | State Housing |

**Registered Owners**

Her Majesty the Queen

**Interests**

Excluding coal and other minerals contained in Deeds Index A2/131 (affects part formerly Section 2 SO 493517)

Appurtenant to part formerly Lot 4 DP 314949 is a drainage right specified in Easement Certificate C247153.4 - 14.3.1991 at 2:43 pm

The easements specified in Easement Certificate C247153.4 are subject to Section 309 (1) (a) Local Government Act 1974

Appurtenant to part formerly Lot 4 DP 314949 is a right of way, electricity, telecommunications & water supply easements created by Easement Instrument 5590341.13 - 19.5.2003 at 9:00 am

Subject to a right of way, electricity supply & telecommunications easements over parts marked OA & OC, water supply easement over parts marked WA, OA, OC & V and electricity supply easement over parts marked XC & WA, all on DP 515012 created by Easement Instrument 5590341.13 - 19.5.2003 at 9:00 am

The easements created by Easement Instrument 5590341.13 are subject to Section 243 (a) Resource Management Act 1991

Subject to a water supply easement over parts marked V, WA, OA & OC on DP 515012 created by Easement Instrument 5590341.14 - 19.5.2003 at 9:00 am

Appurtenant to part formerly Section 2 SO 493517 are water supply & electricity supply easements created by Easement Instrument 5590341.14 - 19.5.2003 at 9:00 am

The easements created by Easement Instrument 5590341.14 are subject to Section 243 (a) Resource Management Act 1991

Appurtenant to part formerly Lot 4 DP 314949 is a water supply easement created by Easement Instrument 5590341.15 - 19.5.2003 at 9:00 am

The easement created by Easement Instrument 5590341.15 is subject to Section 243 (a) Resource Management Act 1991

7938135.1 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 16.9.2008 at 9:00 am (affects part formerly Section 2 SO 493517)

9889354.1 Certificate under section 148 of the Nga Mana Whenua o Tamaki Makaurau Collective Redress Act 2014 that the within land is RFR land as defined in section 118 and is subject to Subpart 1 of Part 4 of the Act (which restricts disposal, including leasing of the land) - 10.11.2014 at 7:00 am (affects part formerly Section 2 SO 493517)

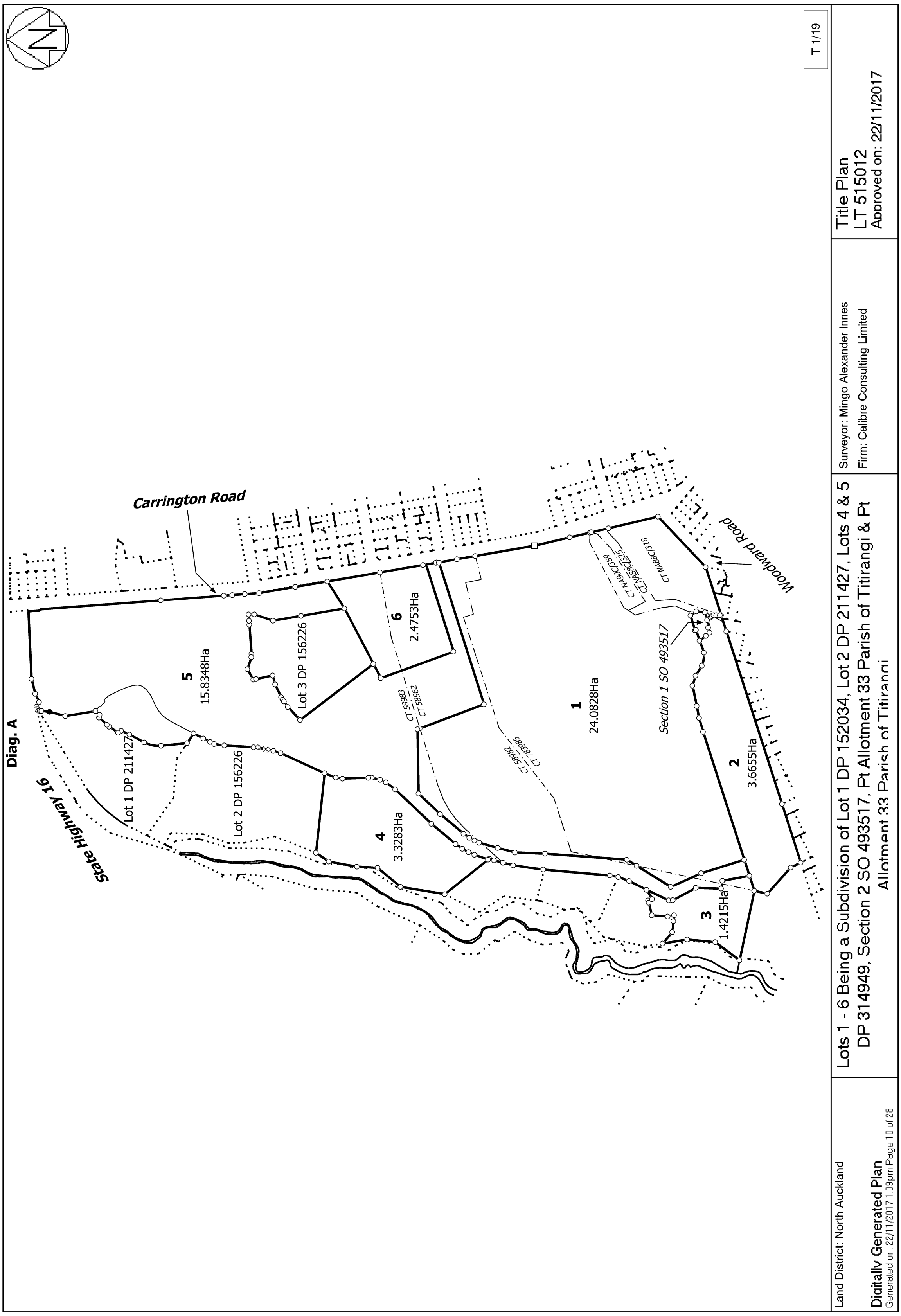
9918192.1 Certificate under section 148 of the Nga Mana Whenua o Tamaki Makaurau Collective Redress Act 2014 that the within land is RFR land as defined in section 118 and is subject to Subpart 1 of Part 4 of the Act (which restricts disposal, including leasing of the land) - 5.12.2014 at 7:00 am (affects part formerly Lot 4 DP 314949)

10818525.1 Compensation Certificate pursuant to Section 19 Public Works Act 1981 by Auckland Council - 13.6.2017 at 3:59 pm

11076921.4 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 9.4.2018 at 2:00 pm

Appurtenant hereto is a right of way, right to convey electricity, telecommunications, water supply and right to drain stormwater & wastewater created by Easement Instrument 11076921.5 - 9.4.2018 at 2:00 pm

The easements created by Easement Instrument 11076921.5 are subject to Section 243 (a) Resource Management Act 1991


Title Plan
LT 515012
Approved on: 22/11/2017
Surveyor: Mingo Alexander Innes
Firm: Calibre Consulting Limited
Lots 1 - 6 Being a Subdivision of Lot 1 DP 152034, Lot 2 DP 211427, Lots 4 & 5 DP 314949, Section 2 SO 493517, Pt Allotment 33 Parish of Titirangi & Pt Allotment 33 Parish of Titirangi
Land District: North Auckland
Digitally Generated Plan
Generated on: 22/11/2017 1:09pm Page 10 of 28
T 1/19
Carrington Road
Woodward Road
State Highway 16
Diag. A
5
15.8348Ha
6
2.4753Ha
1
24.0828Ha
2
3.6655Ha
3
1.4215Ha
4
3.3283Ha
Lot 3 DP 156226
Lot 1 DP 211427
Lot 2 DP 156226
Section 1 SO 493517
CT 58983
CT 58982
CT 783985

# RECORD OF TITLE
# UNDER LAND TRANSFER ACT 2017
# FREEHOLD

**Guaranteed Search Copy issued under Section 60 of the Land Transfer Act 2017**

R.W. Muir
Registrar-General
of Land

**Identifier** **NA93B/541**
**Land Registration District** **North Auckland**
**Date Issued** 17 June 1993

**Prior References**
NA85D/293

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**Estate** Fee Simple
**Area** 2.5304 hectares more or less
**Legal Description** Lot 3 Deposited Plan 156226
**Purpose** State Housing purpose
**Registered Owners**
Her Majesty the Queen

---

**Interests**

C489391.2 Resolution pursuant to Section 321(3)(c) Local Government Act 1974 - Produced 15.6.1993 at 2.39 pm and entered 17.6.1993 at 9.00 am

C491423.1 Subject to conditions pursuant to Section 461(1) Local Government Act 1974 and certifying that a private drain passes through and serves the within land - 22.6.1993 at 2.08 pm

Appurtenant hereto is a right of way specified in Easement Certificate C510175.4 - 24.8.1993 at 2.56 pm

The easements specified in Easement Certificate C510175.4 are subject to Section 243 (a) Resource Management Act 1991

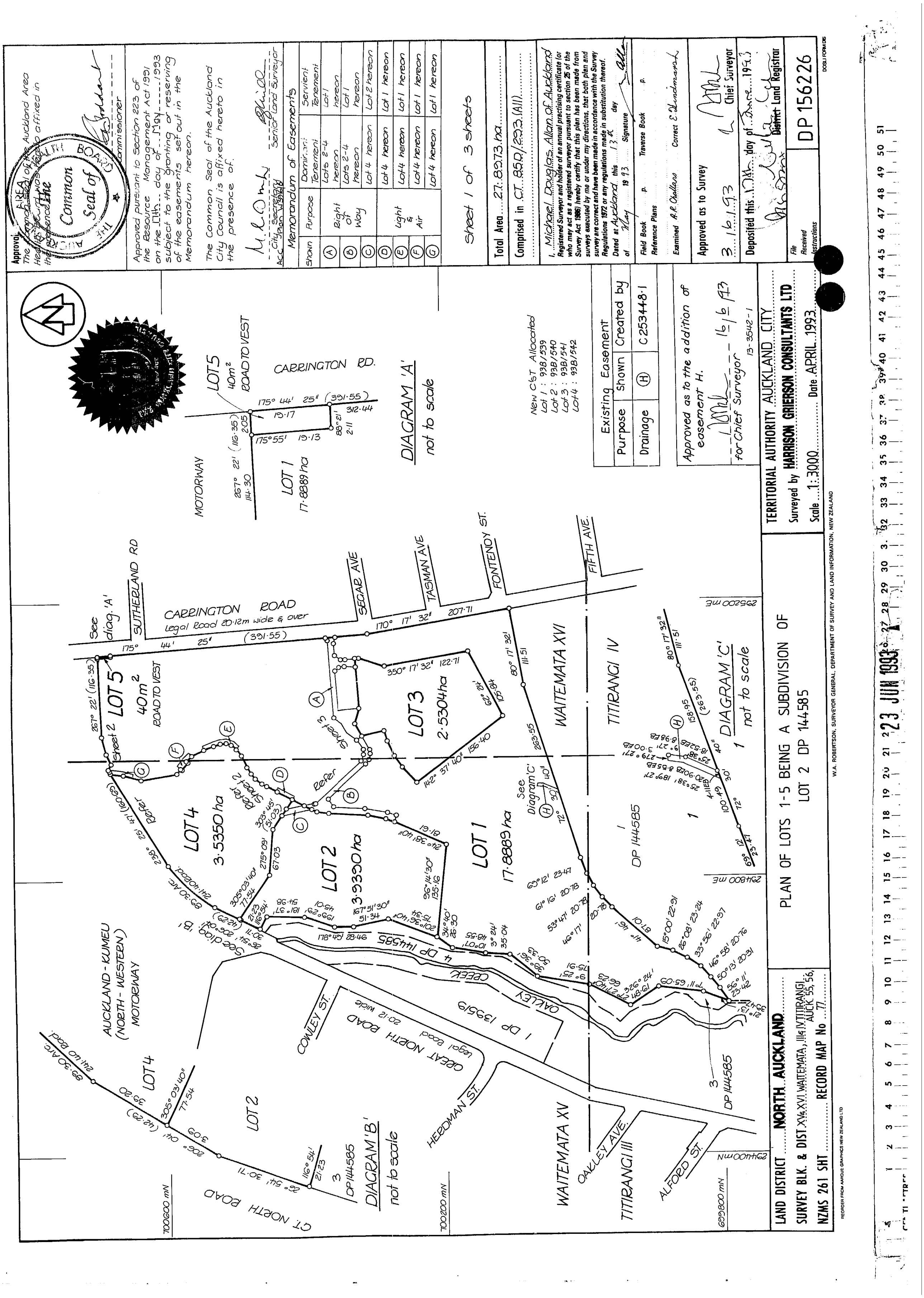
Subject to an electricity right (in gross) over part marked T on DP 156648 in favour of Mercury Energy Limited created by Transfer D036499.7 - 22.8.1996 at 10.40 am

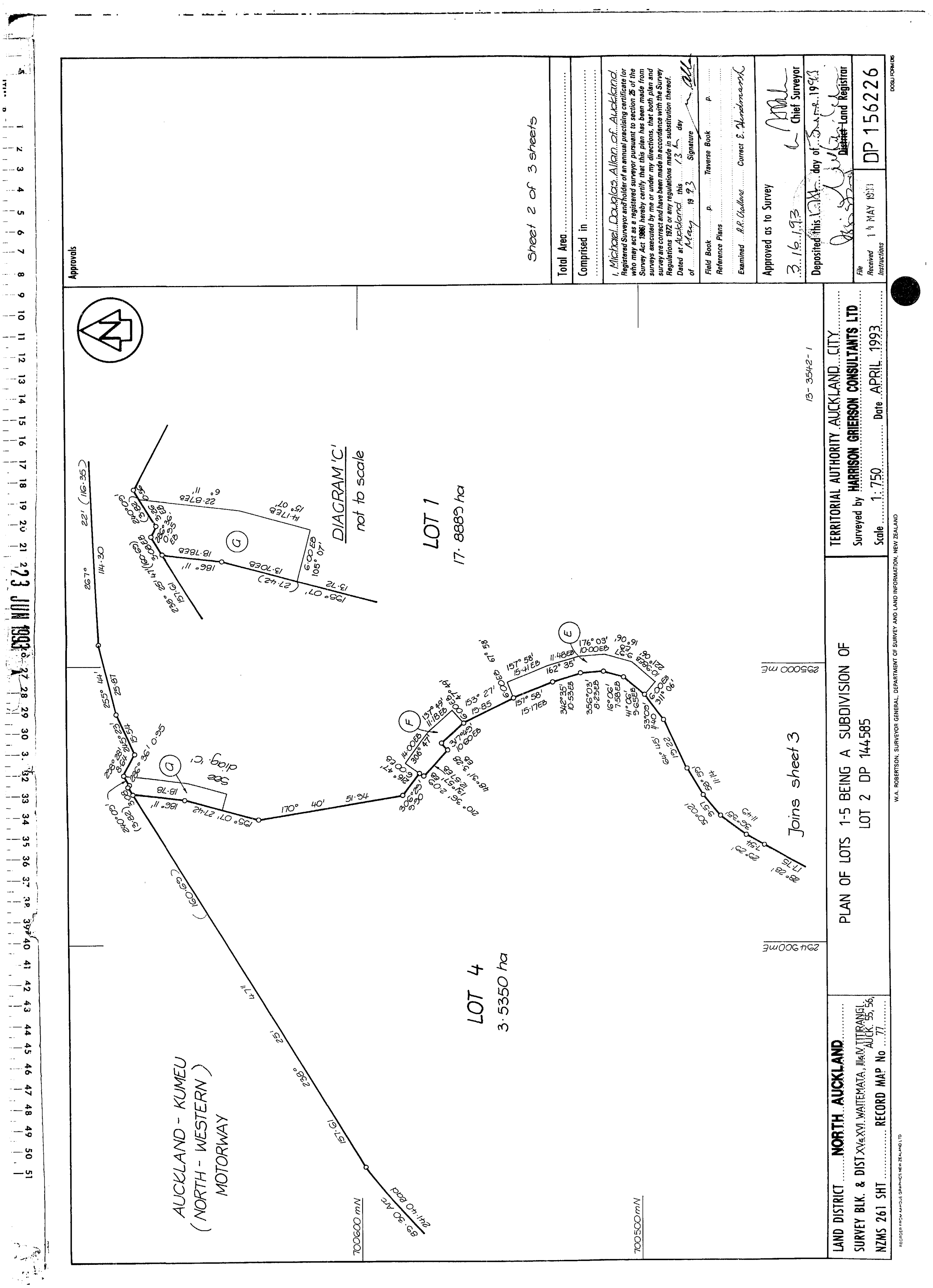
Subject to a telecommunications right (in gross) over parts marked AZ, AY & BB on DP 156648 in favour of Telecom New Zealand Limited created by Transfer D036499.10 - 22.8.1996 at 10.40 am

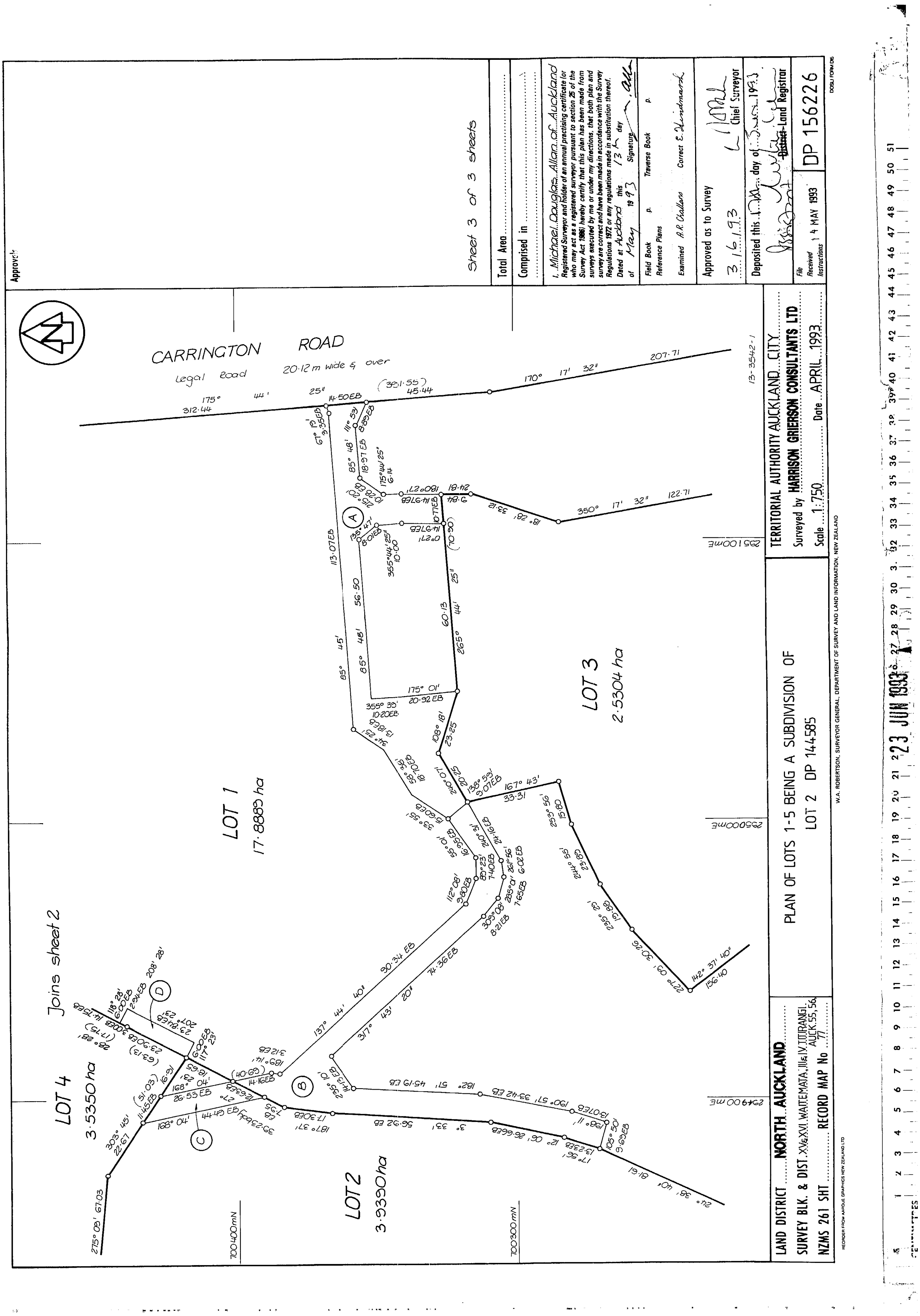
Subject to an electricity right over parts marked AO & AZ on DP 156648 created by Transfer D036499.13 - 22.8.1996 at 10.40 am

Appurtenant hereto are gas rights created by Transfer D036499.15 - 22.8.1996 at 10.40 am

Appurtenant hereto is a water supply right created by Transfer D036499.18 - 22.8.1996 at 10.40 am


PLAN OF LOTS 1-5 BEING A SUBDIVISION OF LOT 2 DP 144585
DP 156226
TERRITORIAL AUTHORITY AUCKLAND CITY
Surveyed by HARRISON GRIERSON CONSULTANTS LTD
Scale 1:3000
Date APRIL 1993
LAND DISTRICT NORTH AUCKLAND
NZMS 261 SHT
RECORD MAP No 77
Sheet 1 of 3 sheets
Total Area 27.8973 ha
Memorandum of Easements
Existing Easement
Drainage
C253448.1
CARRINGTON ROAD
Legal Road 20.12m wide & over
SUTHERLAND RD
SEGAR AVE
TASMAN AVE
FONTENOY ST.
FIFTH AVE.
MOTORWAY
AUCKLAND - KUMEU (NORTH - WESTERN) MOTORWAY
GREAT NORTH ROAD
COWLEY ST.
HERDMAN ST.
OAKLEY AVE.
ALFORD ST.
OAKLEY CREEK
WAITEMATA XVI
WAITEMATA XV
TITIRANGI IV
TITIRANGI III
LOT 1 17.8889 ha
LOT 2 3.9390 ha
LOT 3 2.5304 ha
LOT 4 3.5350 ha
LOT 5 40 m² ROAD TO VEST
DIAGRAM 'A' not to scale
DIAGRAM 'B' not to scale
DIAGRAM 'C' not to scale
DP 144585
1 DP 135519
23 JUN 1993


Sheet 2 of 3 sheets
Approvals
Total Area
Comprised in
I, Michael Douglas Allan of Auckland
Dated at Auckland this 13 day of May 1993
Field Book
Reference Plans
Traverse Book
Examined
Approved as to Survey
3.16.93
Chief Surveyor
Deposited this 14th day of June 1993
District Land Registrar
DP 156226
Received 14 MAY 1993
TERRITORIAL AUTHORITY AUCKLAND CITY
Surveyed by HARRISON GRIERSON CONSULTANTS LTD
Scale 1:750 Date APRIL 1993
PLAN OF LOTS 1-5 BEING A SUBDIVISION OF
LOT 2 DP 144585
LAND DISTRICT NORTH AUCKLAND
NZMS 261 SHT RECORD MAP No 77
DIAGRAM 'C'
not to scale
LOT 1
17·8889 ha
LOT 4
3·5350 ha
AUCKLAND - KUMEU
( NORTH - WESTERN )
MOTORWAY
Joins sheet 3
see diag. 'C'
295000 mE
294900 mE
700600 mN
700500 mN
23 JUN 1993


Sheet 3 of 3 sheets
CARRINGTON ROAD
Legal Road 20.12 m wide & over
LOT 1
17.8883 ha
LOT 2
3.9390 ha
LOT 3
2.5304 ha
LOT 4
3.5350 ha
Joins sheet 2
Total Area
Comprised in
Approved as to Survey
Chief Surveyor
Deposited this
District Land Registrar
DP 156226
TERRITORIAL AUTHORITY AUCKLAND CITY
Surveyed by HARRISON GRIERSON CONSULTANTS LTD
Scale 1:750
Date APRIL 1993
PLAN OF LOTS 1-5 BEING A SUBDIVISION OF LOT 2 DP 144585
LAND DISTRICT NORTH AUCKLAND
SURVEY BLK. & DIST. XV & XVI WAITEMATA, III & IV TITIRANGI
NZMS 261 SHT
RECORD MAP No
23 JUN 1993

# RECORD OF TITLE
# UNDER LAND TRANSFER ACT 2017
# FREEHOLD

**Guaranteed Search Copy issued under Section 60 of the Land Transfer Act 2017**

R.W. Muir
Registrar-General
of Land

| | |
|---|---|
| **Identifier** | **1017462** |
| **Land Registration District** | **North Auckland** |
| **Date Issued** | 26 August 2021 |

**Prior References**
799992

| | |
|---|---|
| **Estate** | Fee Simple |
| **Area** | 15.8242 hectares more or less |
| **Legal Description** | Section 3 Survey Office Plan 520006 |
| **Purpose** | State Housing |

**Registered Owners**
Her Majesty the Queen

**Interests**

Excluding coal and other minerals contained in Deeds Index A2/130 and Deeds Index A2/131 (affects part formerly Section 2 SO 493517)

Subject to a right (in gross) to water supply over parts marked BY & DZ, water supply and drainage over part marked NC and drainage over parts marked EA & FA, all on SO 520006 in favour of The Auckland Area Health Board created by Gazette Notice C001939.2 - 9.6.1989 at 11:48 am

Subject to a drainage right over parts marked I, J, M & R on SO 520006 specified in Easement Certificate C247153.4 - 14.3.1991 at 2:43 pm

Appurtenant to part formerly Lot 4 DP 314949 is a drainage right specified in Easement Certificate C247153.4 - 14.3.1991 at 2:43 pm

The easements specified in Easement Certificate C247153.4 are subject to Section 309 (1) (a) Local Government Act 1974

C491423.1 Subject to conditions pursuant to Section 461(1) Local Government Act 1974 and certifying that a private drain passes through and serves the within land - 22.6.1993 at 2.08 pm (affects part formerly Lot 5 DP 314949)

Subject to a right of way over parts marked XA, B, DA, DB, DC, DE, DF, DG, DH, DI, DJ, DK, CU, CV & CW on SO 520006 specified in Easement Certificate C510175.4 - 24.8.1993 at 2.56 pm

Appurtenant to part formerly Lot 2 DP 211427 are rights of way specified in Easement Certificate C510175.4 - 24.8.1993 at 2.56 pm

The easements specified in Easement Certificate C510175.4 are subject to Section 243 (a) Resource Management Act 1991

Subject to an electricity right over part marked C on SO 520006 created by Transfer D036499.8 - 22.8.1996 at 10:40 am

Subject to a telecommunications right over part marked C on SO 520006 created by Transfer D036499.12 - 22.8.1996 at 10:40 am

Appurtenant to part formerly Lot 5 DP 314949 is an electricity right created by Transfer D036499.13 - 22.8.1996 at 10.40 am

Appurtenant to part formerly Lot 2 DP 211427 are gas rights created by Transfer D036499.14 - 22.8.1996 at 10.40 am

Appurtenant to part formerly Lot 5 DP 314949 are electricity and gas rights created by Transfer D036499.16 - 22.8.1996 at 10.40 am

Subject to an electricity right over part marked AP and a water supply right over part marked E on SO 520006 created by Transfer D036499.17 - 22.8.1996 at 10.40 am

Appurtenant to part formerly Lot 5 DP 314949 are electricity and water supply rights created by Transfer D036499.17 - 22.8.1996 at 10.40 am

Subject to a water supply right over part marked AU on SO 520006 created by Transfer D036499.18 - 22.8.1996 at 10.40 am

Subject to a steam supply right over parts marked AT, BA, AQ, CV and AR on SO 520006 created by Transfer D036499.19 - 22.8.1996 at 10.40 am

Subject to a telecommunications right (in gross) over parts marked AX, BA, BC, BD, BE, AA, BF, BG, CP, DF, DD, DA & DC on SO 520006 in favour of Telecom New Zealand created by Transfer D036499.20 - 22.8.1996 at 10.40 am

Subject to an electricity right (in gross) over parts marked CO, CP, CQ, CR, CS, CU, CV, CW & DG on SO 520006 in favour of Mercury Energy Limited created by Transfer D054952.2 - 10.10.1996 at 2.42 pm

5590341.6 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 19.5.2003 at 9:00 am (affects parts formerly Lot 2 DP 211427 & Lot 5 DP 314949)

Subject to a right of way over part marked NA on SO 520006 created by Easement Instrument 5590341.12 - 19.5.2003 at 9:00 am

The easement created by Easement Instrument 5590341.12 is subject to Section 243 (a) Resource Management Act 1991

Subject to a right of way, electricity supply and telecommunications easements over parts marked OB, M, P, UA, UB, Q, R & T, water supply easement over parts marked X, M, I, P, YA, WB & OB and electricity supply easement over parts marked WB, I, YA & X, all on SO 520006 created by Easement Instrument 5590341.13 - 19.5.2003 at 9:00 am

Appurtenant to parts formerly Lot 2 DP 211427 and Lots 4-5 DP 314949 are a right of way, electricity, telecommunications & water supply easements created by Easement Instrument 5590341.13 - 19.5.2003 at 9:00 am

The easements created by Easement Instrument 5590341.13 are subject to Section 243 (a) Resource Management Act 1991

Subject to a water supply easement over parts marked WB, OB, X, M, I, P & YA on SO 520006 created by Easement Instrument 5590341.14 - 19.5.2003 at 9:00 am

Appurtenant to part formerly Section 2 SO 493517 are water supply and electricity supply easements created by Easement Instrument 5590341.14 - 19.5.2003 at 9:00 am

The easements created by Easement Instrument 5590341.14 are subject to Section 243 (a) Resource Management Act 1991

Subject to a water supply easement over parts marked JB, BY, NC, DZ, EA & H on SO 520006 created by Easement Instrument 5590341.15 - 19..2003 at 9:00 am

Appurtenant to parts formerly Lot 2 DP 211427 and Lots 4-5 DP 314949 is a water supply easement created by Easement Instrument 5590341.15 - 19.5.2003 at 9:00 am

The easement created by Easement Instrument 5590341.15 is subject to Section 243 (a) Resource Management Act 1991

Subject to a right of way (in gross) over parts marked A & D on SO 520006 in favour of the Auckland City Council created by Transfer 7130709.2 - 24.11.2006 at 9:00 am

7938135.1 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 16.9.2008 at 9:00 am (affects part formerly Section 2 SO 493517)

9889354.1 Certificate under section 148 of the Nga Mana Whenua o Tamaki Makaurau Collective Redress Act 2014 that the within land is RFR land as defined in section 118 and is subject to Subpart 1 of Part 4 of the Act (which restricts disposal, including leasing of the land) - 10.11.2014 at 7:00 am (affects part formerly Section 2 SO 493517)

9918192.1 Certificate under section 148 of the Nga Mana Whenua o Tamaki Makaurau Collective Redress Act 2014 that the within land is RFR land as defined in section 118 and is subject to Subpart 1 of Part 4 of the Act (which restricts disposal, including leasing of the land) - 5.12.2014 at 7:00 am (affects parts formerly Lot 2 DP 211427 and Lots 4-5 DP 314949)

10818525.1 Compensation Certificate pursuant to Section 19 Public Works Act 1981 by Auckland Council - 13.6.2017 at 3:59 pm (affects parts formerly Lot 4 DP 314949 and Section 2 SO 493517)

11076921.4 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 9.4.2018 at 2:00 pm

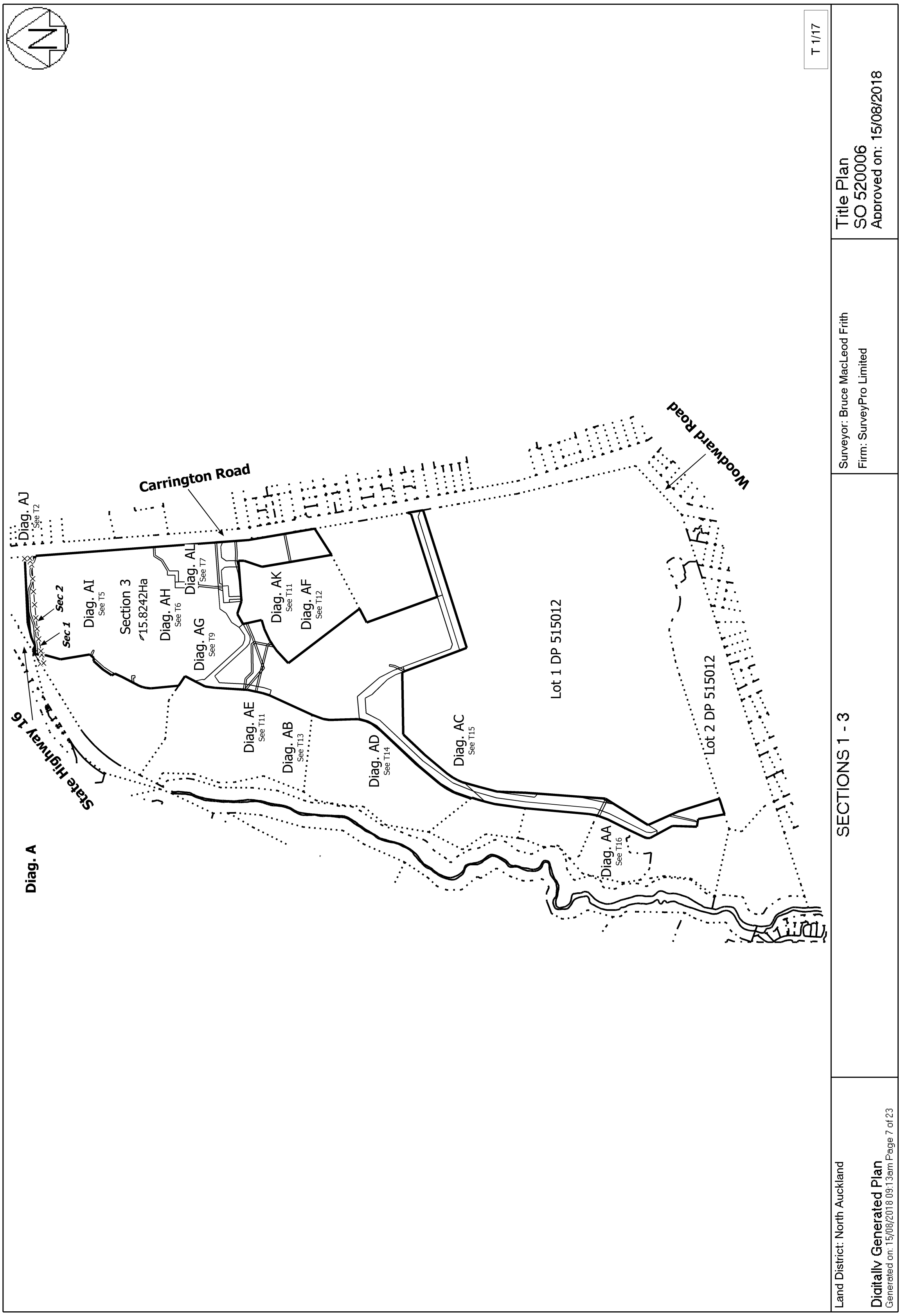
Subject to a right of way, right to convey electricity, telecommunications, water supply and right to drain stormwater and wastewater over parts marked UA, ZA, UB, T, R, Q, P, M, OB & WB on SO 520006 created by Easement Instrument 11076921.5 - 9.4.2018 at 2:00 pm

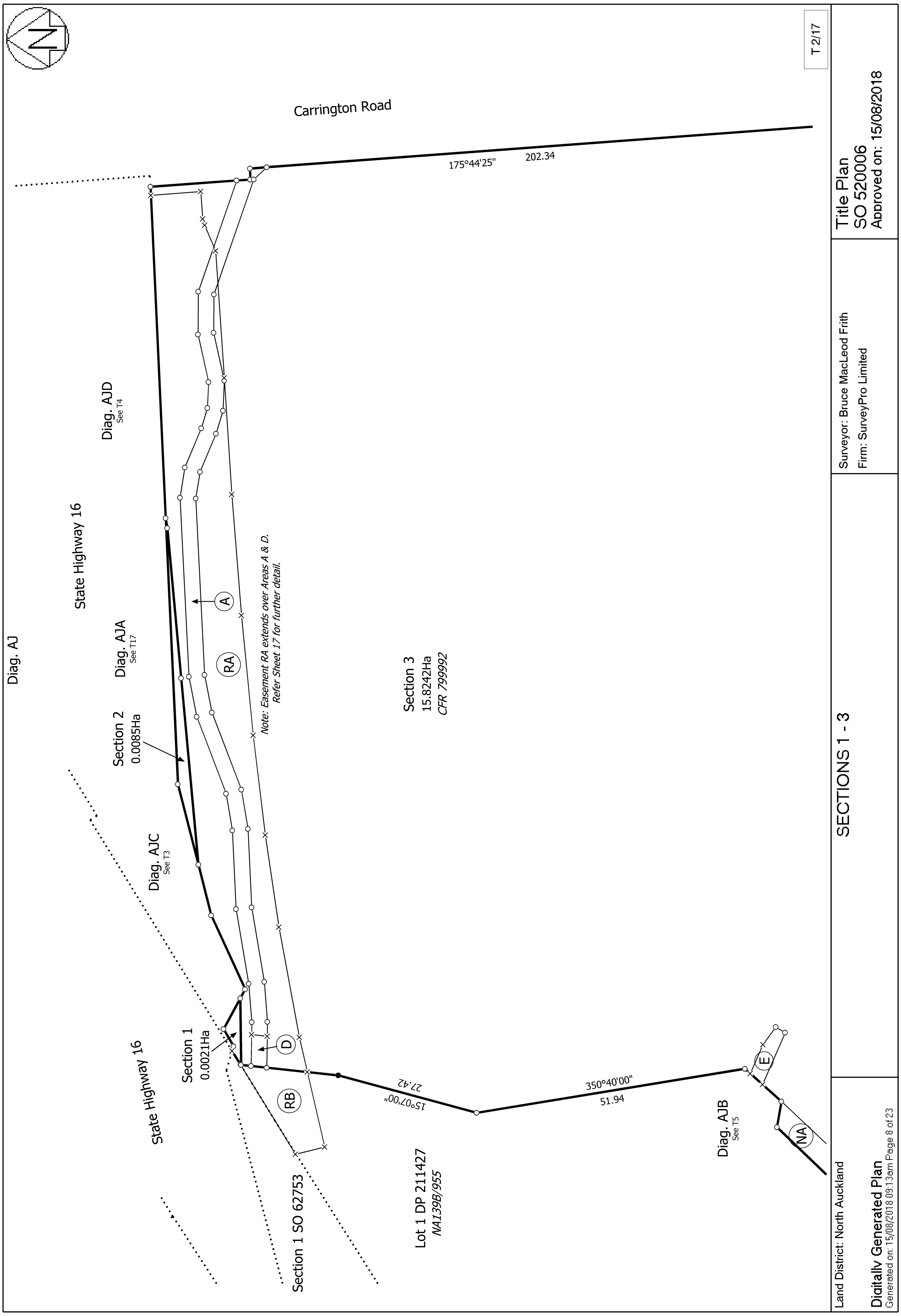
The easements created by Easement Instrument 11076921.5 are subject to Section 243 (a) Resource Management Act 1991

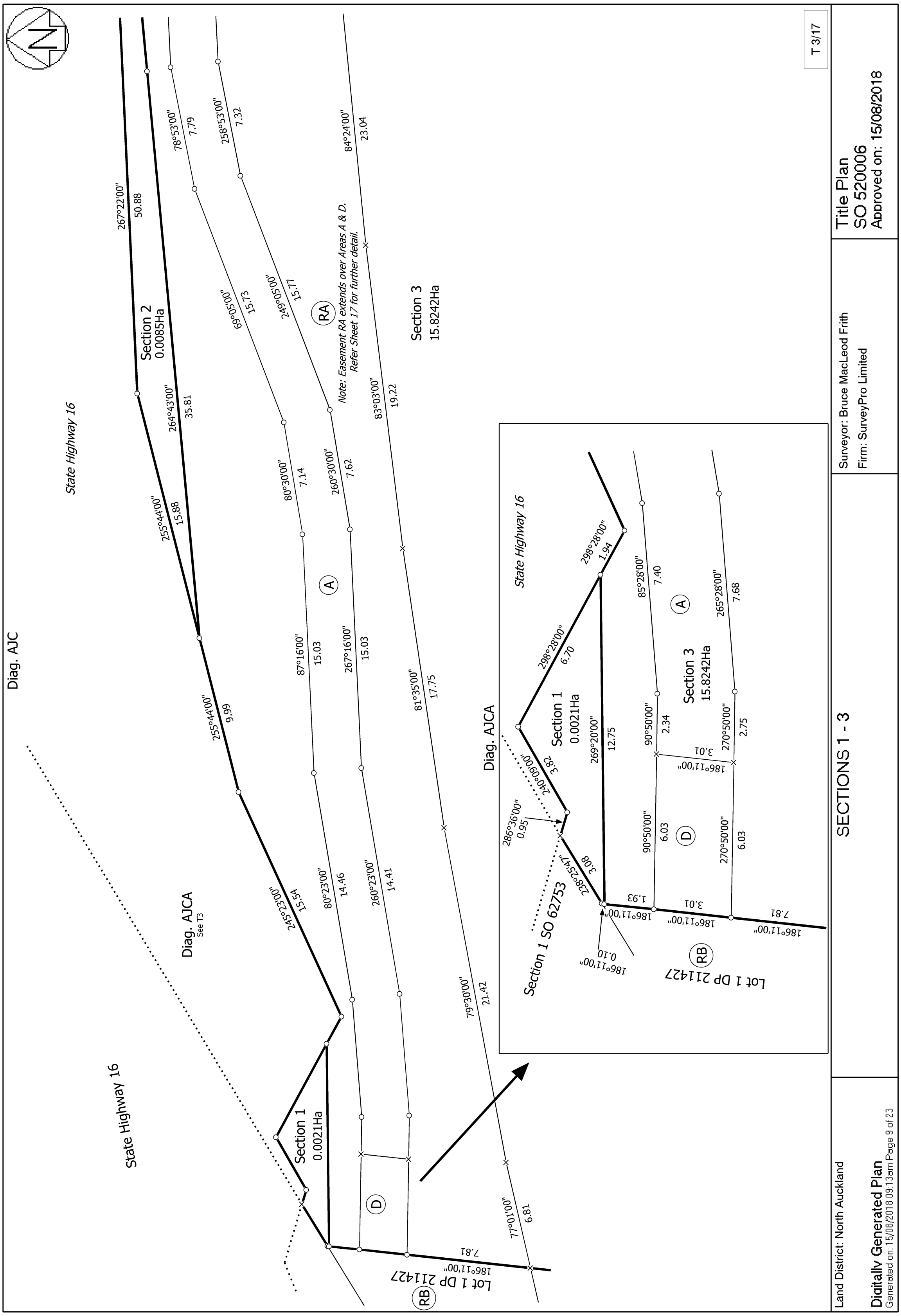
Appurtenant hereto is a right of way created by Easement Instrument 12134873.1 - 5.7.2021 at 12:40 pm

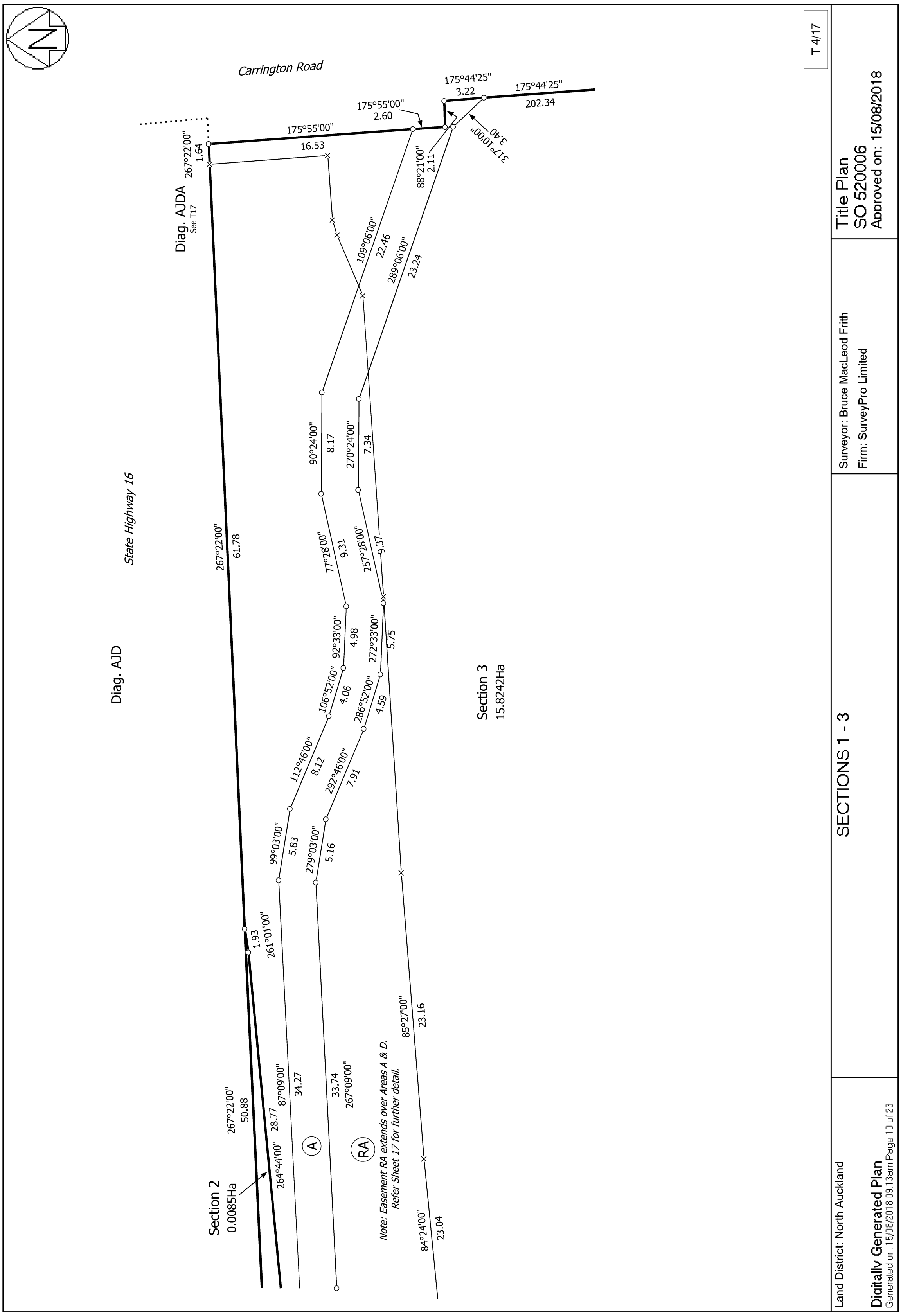
Subject to a right of support for rock anchors (in gross) over part marked RA on SO 520006 in favour of Her Majesty the Queen for use in connection with a road created by Gazette Notice 12228881.3 - 26.8.2021 at 4:11 pm

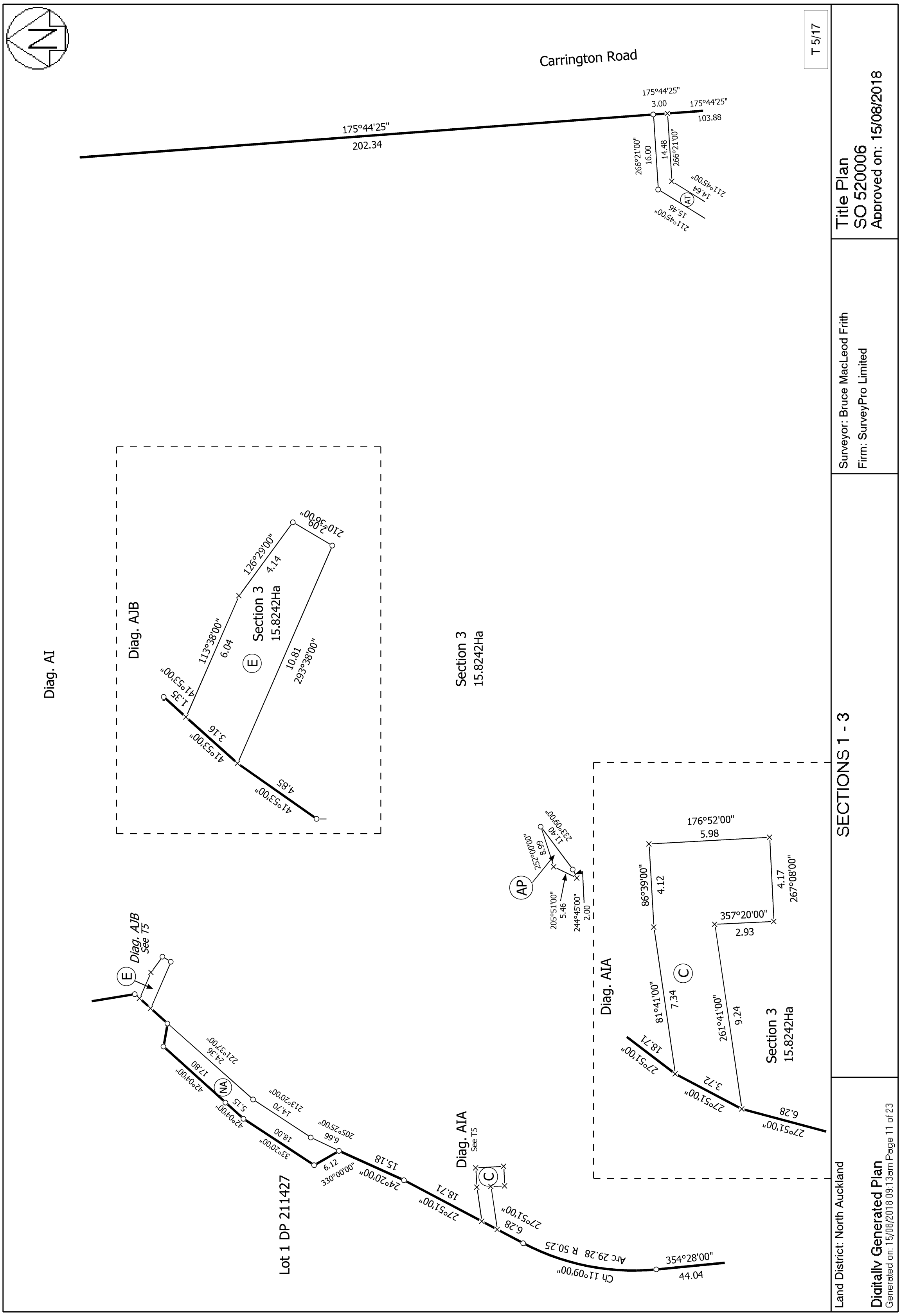
12841624.1 Covenant pursuant to Section 108(2)(d) Resource Management Act 1991 - 28.9.2023 at 1:38 pm

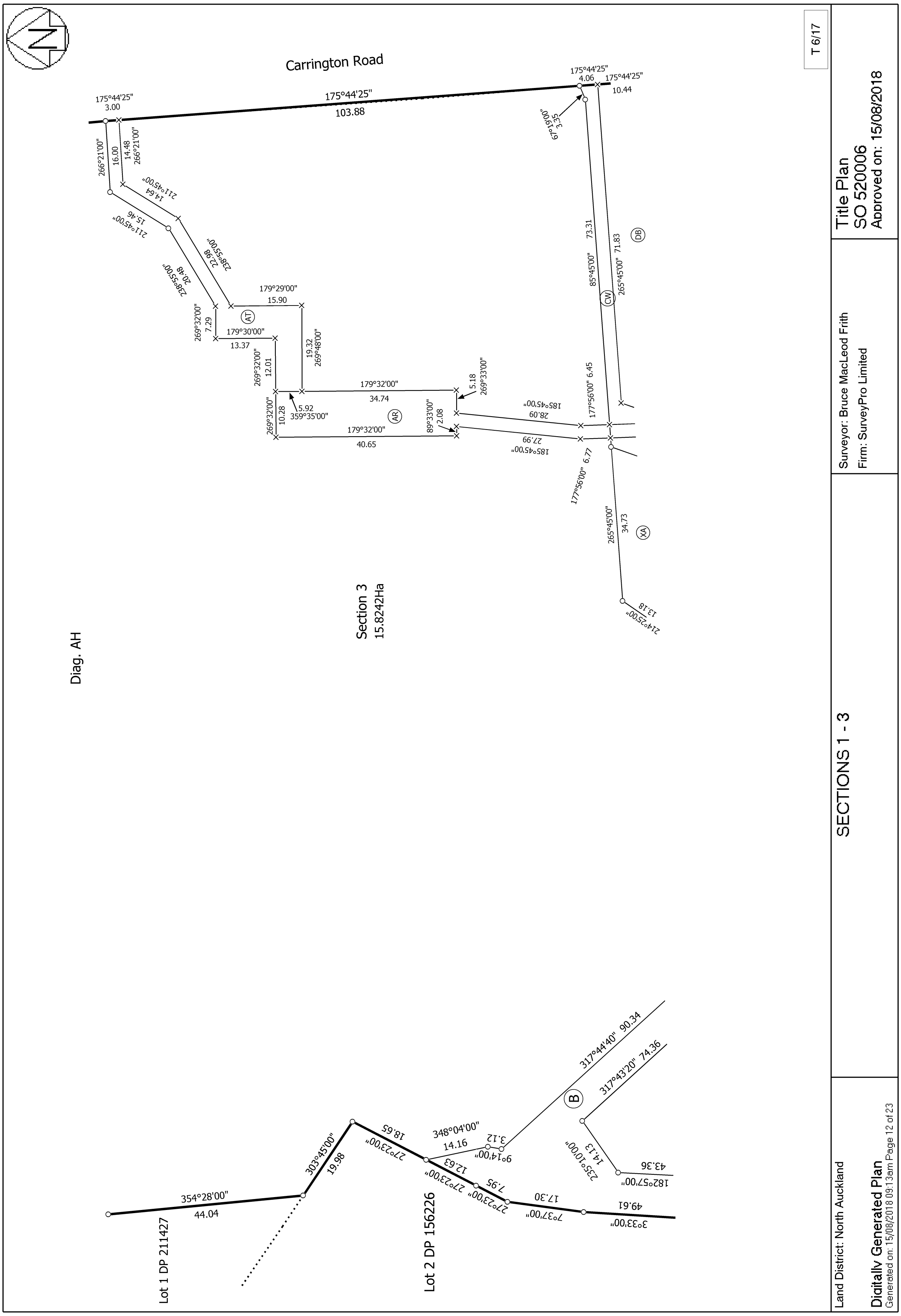

T 1/17
Title Plan
SO 520006
Approved on: 15/08/2018
Surveyor: Bruce MacLeod Frith
Firm: SurveyPro Limited
SECTIONS 1 - 3
Land District: North Auckland
Digitally Generated Plan
Generated on: 15/08/2018 09:13am Page 7 of 23
Carrington Road
Woodward Road
State Highway 16
Diag. A
Diag. AJ
See T2
Diag. AI
See T5
Sec 2
Sec 1
Section 3
15.8242Ha
Diag. AH
See T6
Diag. AL
See T7
Diag. AG
See T9
Diag. AK
See T11
Diag. AF
See T12
Diag. AE
See T11
Diag. AB
See T13
Diag. AD
See T14
Diag. AC
See T15
Diag. AA
See T16
Lot 1 DP 515012
Lot 2 DP 515012

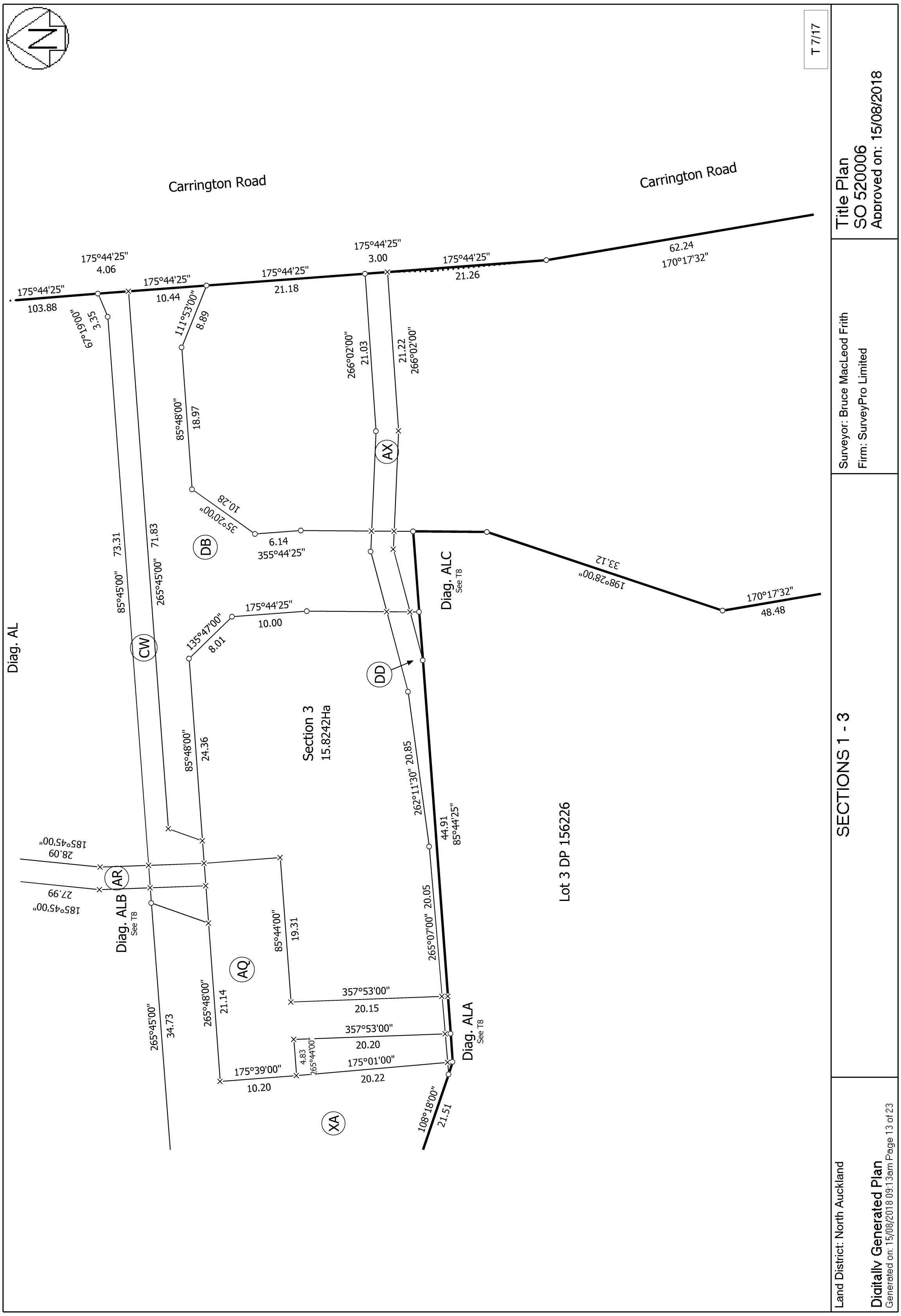

T 2/17
Carrington Road
175°44'25"
202.34
Title Plan
SO 520006
Approved on: 15/08/2018
Surveyor: Bruce MacLeod Frith
Firm: SurveyPro Limited
SECTIONS 1 - 3
Land District: North Auckland
Digitally Generated Plan
Generated on: 15/08/2018 09:13am Page 8 of 23
Diag. AJD
See T4
State Highway 16
Diag. AJ
Diag. AJA
See T17
A
RA
Note: Easement RA extends over Areas A & D.
Refer Sheet 17 for further detail.
Section 3
15.8242Ha
CFR 799992
Section 2
0.0085Ha
Diag. AJC
See T3
Section 1
0.0021Ha
D
State Highway 16
RB
27.42
15°07'00"
350°40'00"
51.94
E
Diag. AJB
See T5
NA
Section 1 SO 62753
Lot 1 DP 211427
NA139B/955

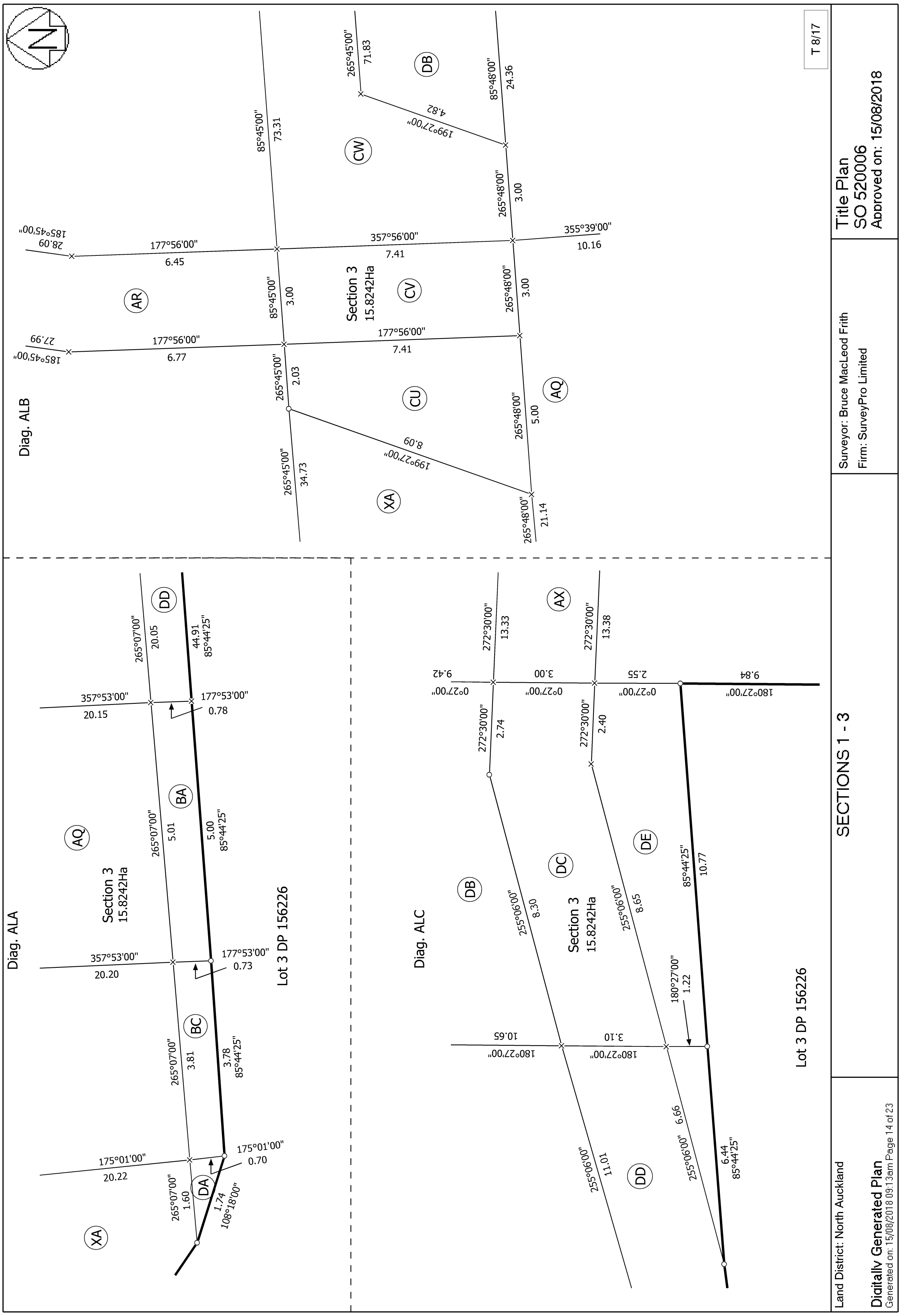

State Highway 16
Diag. AJC
Diag. AJCA See T3
Section 1 0.0021Ha
Section 2 0.0085Ha
Section 3 15.8242Ha
Note: Easement RA extends over Areas A & D. Refer Sheet 17 for further detail.
RA
A
D
RB
Lot 1 DP 211427
Section 1 SO 62753
Diag. AJCA
T 3/17
Title Plan
SO 520006
Approved on: 15/08/2018
Surveyor: Bruce MacLeod Frith
Firm: SurveyPro Limited
SECTIONS 1 - 3
Land District: North Auckland
Digitally Generated Plan
Generated on: 15/08/2018 09:13am Page 9 of 23

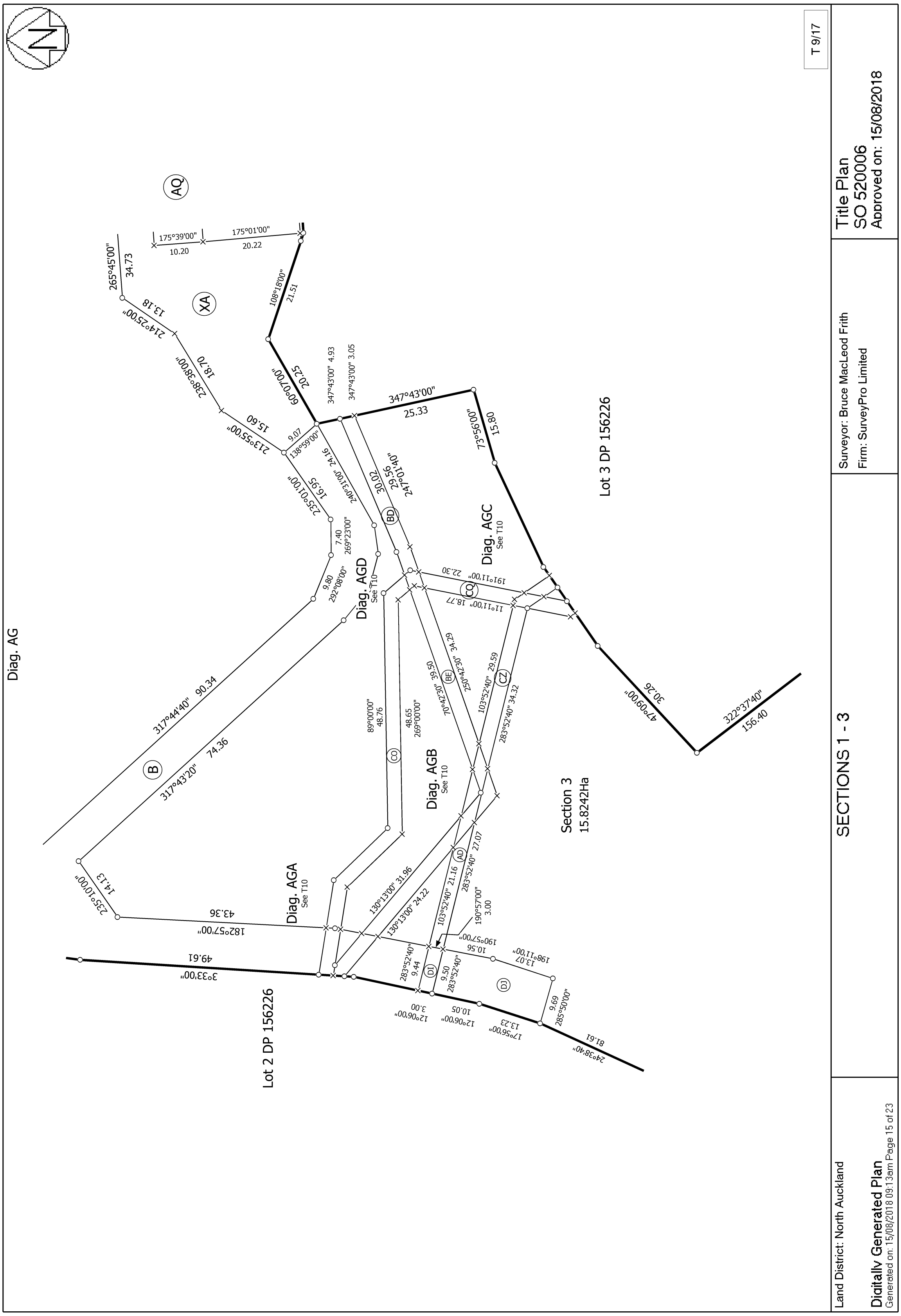

Carrington Road
State Highway 16
Diag. AJDA
See T17
Diag. AJD
Section 2
0.0085Ha
Section 3
15.8242Ha
A
RA
Note: Easement RA extends over Areas A & D.
Refer Sheet 17 for further detail.
175°55'00"
16.53
175°55'00"
2.60
175°44'25"
3.22
175°44'25"
202.34
317°10'00"
3.40
88°21'00"
2.11
267°22'00"
1.64
109°06'00"
22.46
289°06'00"
23.24
90°24'00"
8.17
270°24'00"
7.34
77°28'00"
9.31
257°28'00"
9.37
92°33'00"
4.98
272°33'00"
5.75
106°52'00"
4.06
286°52'00"
4.59
112°46'00"
8.12
292°46'00"
7.91
99°03'00"
5.83
279°03'00"
5.16
267°22'00"
61.78
1.93
261°01'00"
87°09'00"
34.27
33.74
267°09'00"
85°27'00"
23.16
84°24'00"
23.04
267°22'00"
50.88
28.77
264°44'00"
T 4/17
Title Plan
SO 520006
Approved on: 15/08/2018
Surveyor: Bruce MacLeod Frith
Firm: SurveyPro Limited
SECTIONS 1 - 3
Land District: North Auckland
Digitally Generated Plan
Generated on: 15/08/2018 09:13am Page 10 of 23

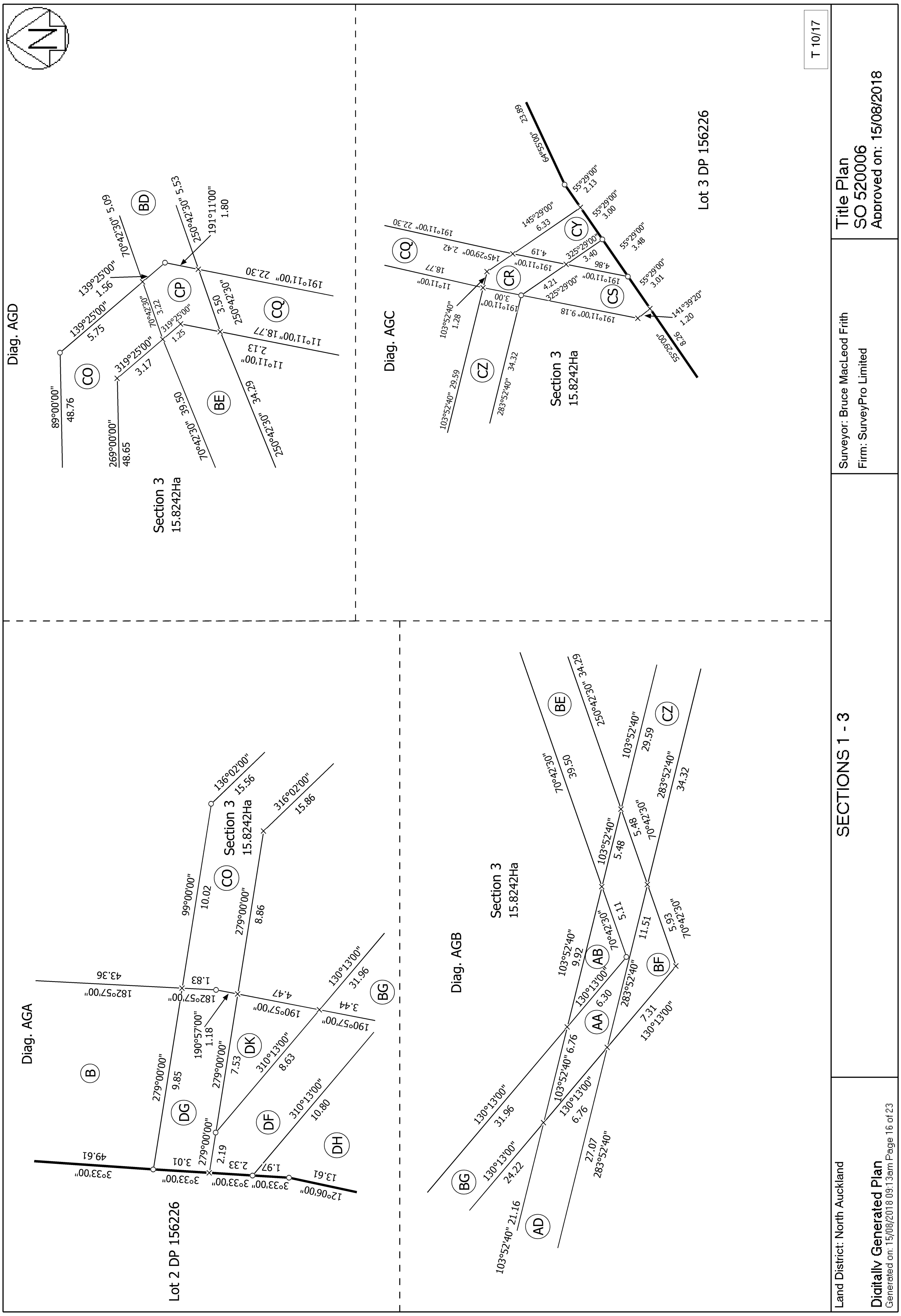

T 5/17
Carrington Road
175°44'25"
202.34
175°44'25"
3.00
175°44'25"
103.88
266°21'00"
16.00
14.48
266°21'00"
Diag. AI
Diag. AJB
Section 3
15.8242Ha
Section 3
15.8242Ha
Diag. AIA
Section 3
15.8242Ha
Diag. AJB
See T5
Diag. AIA
See T5
Lot 1 DP 211427
Title Plan
SO 520006
Approved on: 15/08/2018
Surveyor: Bruce MacLeod Frith
Firm: SurveyPro Limited
SECTIONS 1 - 3
Land District: North Auckland
Digitally Generated Plan
Generated on: 15/08/2018 09:13am Page 11 of 23

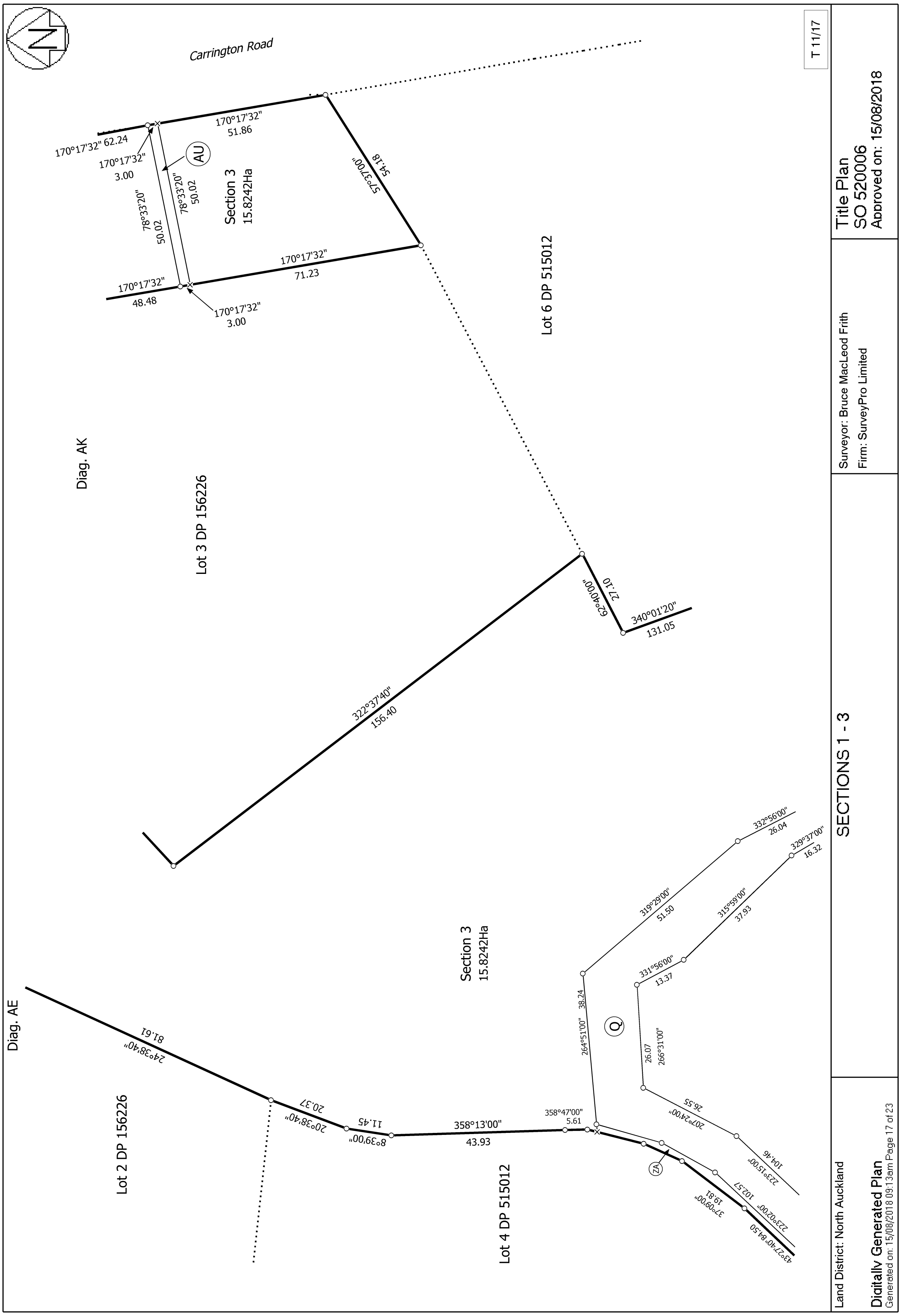

Carrington Road
Section 3
15.8242Ha
Diag. AH
Lot 1 DP 211427
Lot 2 DP 156226
T 6/17
Title Plan
SO 520006
Approved on: 15/08/2018
Surveyor: Bruce MacLeod Frith
Firm: SurveyPro Limited
SECTIONS 1 - 3
Land District: North Auckland
Digitally Generated Plan
Generated on: 15/08/2018 09:13am Page 12 of 23

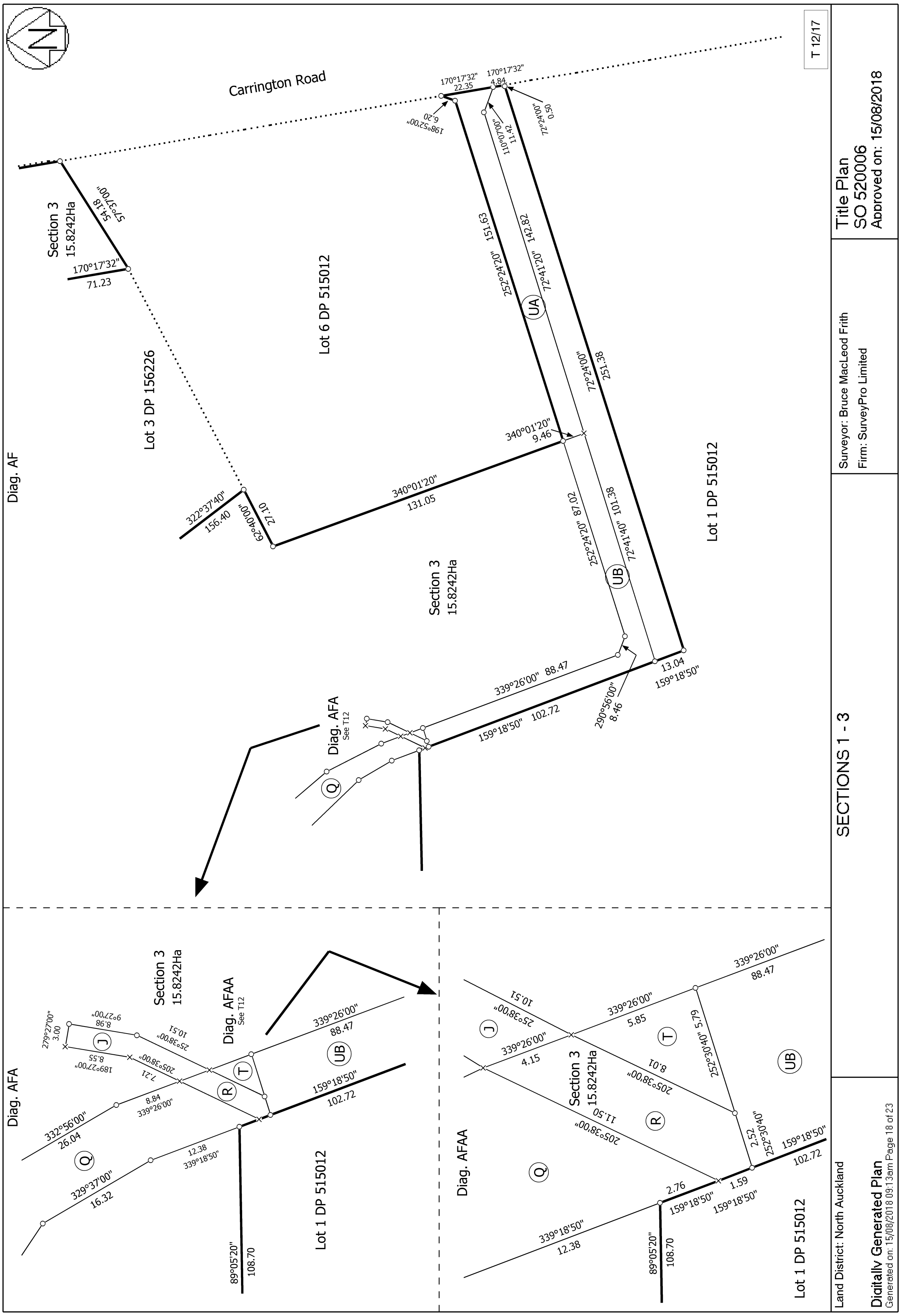

Title Plan
SO 520006
Approved on: 15/08/2018
T 7/17
Surveyor: Bruce MacLeod Frith
Firm: SurveyPro Limited
SECTIONS 1 - 3
Land District: North Auckland
Digitally Generated Plan
Generated on: 15/08/2018 09:13am Page 13 of 23
Carrington Road
Carrington Road
Section 3
15.8242Ha
Lot 3 DP 156226
Diag. AL
Diag. ALB
See T8
Diag. ALC
See T8
Diag. ALA
See T8
CW
DB
AX
DD
AR
AQ
XA
175°44'25"
103.88
175°44'25"
4.06
175°44'25"
10.44
175°44'25"
21.18
175°44'25"
3.00
175°44'25"
21.26
62.24
170°17'32"
67°19'00"
3.35
111°53'00"
8.89
85°48'00"
18.97
35°20'00"
10.28
6.14
355°44'25"
266°02'00"
21.03
21.22
266°02'00"
85°45'00"
73.31
265°45'00"
71.83
33.12
198°28'00"
170°17'32"
48.48
135°47'00"
8.01
175°44'25"
10.00
85°48'00"
24.36
262°11'30"
20.85
44.91
85°44'25"
185°45'00"
28.09
27.99
185°45'00"
85°44'00"
19.31
265°07'00"
20.05
357°53'00"
20.15
357°53'00"
20.20
265°45'00"
34.73
265°48'00"
21.14
175°39'00"
10.20
4.83
265°44'00"
175°01'00"
20.22
108°18'00"
21.51

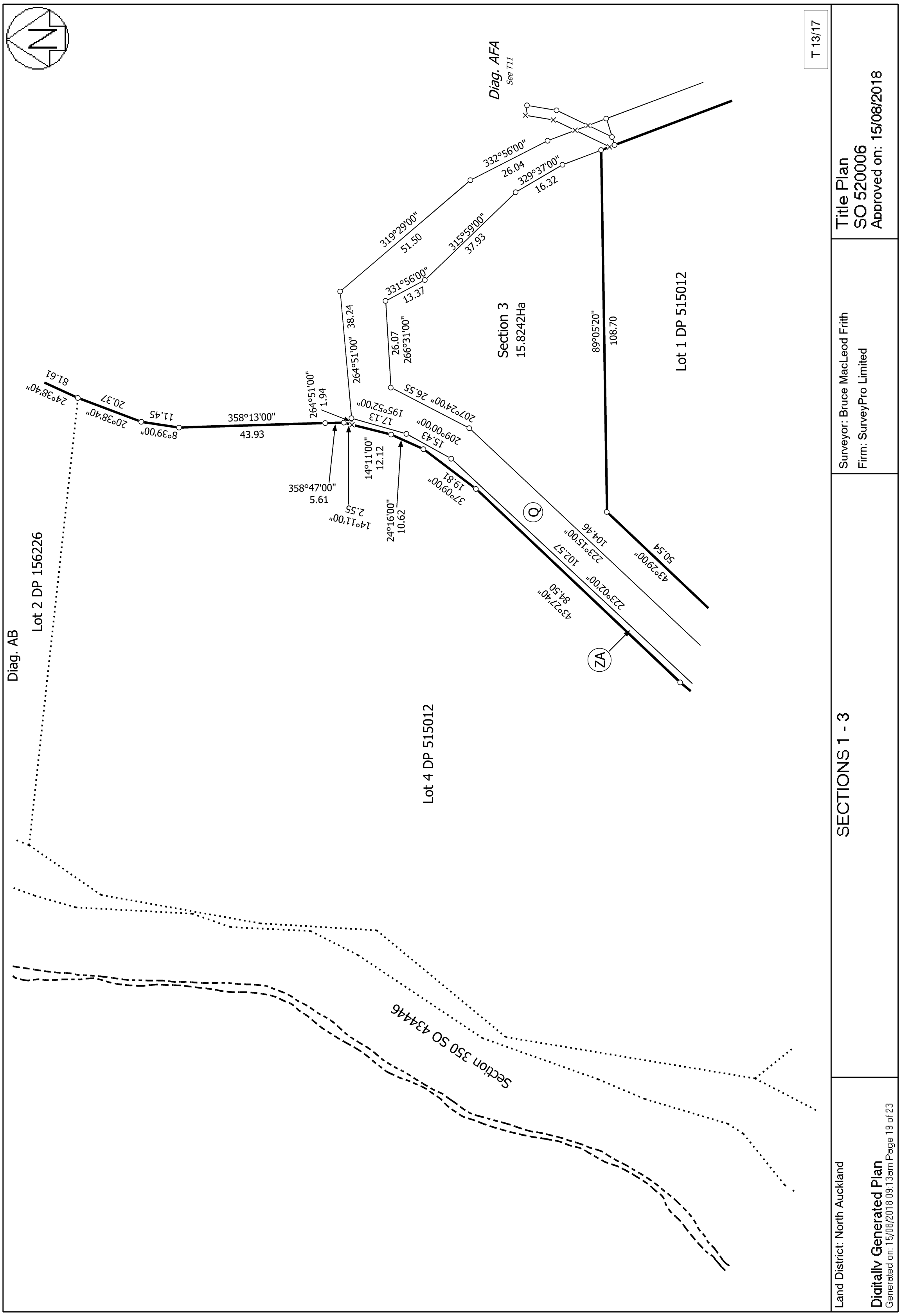

Title Plan
SO 520006
Approved on: 15/08/2018
Surveyor: Bruce MacLeod Frith
Firm: SurveyPro Limited
SECTIONS 1 - 3
Land District: North Auckland
Digitally Generated Plan
Generated on: 15/08/2018 09:13am Page 14 of 23
T 8/17
Diag. ALB
Diag. ALA
Diag. ALC
Section 3
15.8242Ha
Lot 3 DP 156226
AR
AQ
CW
DB
CV
CU
XA
DD
BA
BC
DA
AX
DC
DE
85°45'00"
73.31
265°45'00"
71.83
85°48'00"
24.36
199°27'00"
4.82
265°48'00"
3.00
177°56'00"
6.45
357°56'00"
7.41
355°39'00"
10.16
185°45'00"
28.09
265°45'00"
3.00
27.99
6.77
2.03
5.00
8.09
34.73
21.14
265°07'00"
20.05
44.91
85°44'25"
357°53'00"
20.15
177°53'00"
0.78
5.01
5.00
20.20
0.73
3.81
3.78
175°01'00"
20.22
0.70
1.60
1.74
108°18'00"
272°30'00"
13.33
13.38
9.42
0°27'00"
3.00
2.55
9.84
180°27'00"
2.74
2.40
255°06'00"
8.30
8.65
10.77
1.22
10.65
3.10
6.66
11.01
6.44

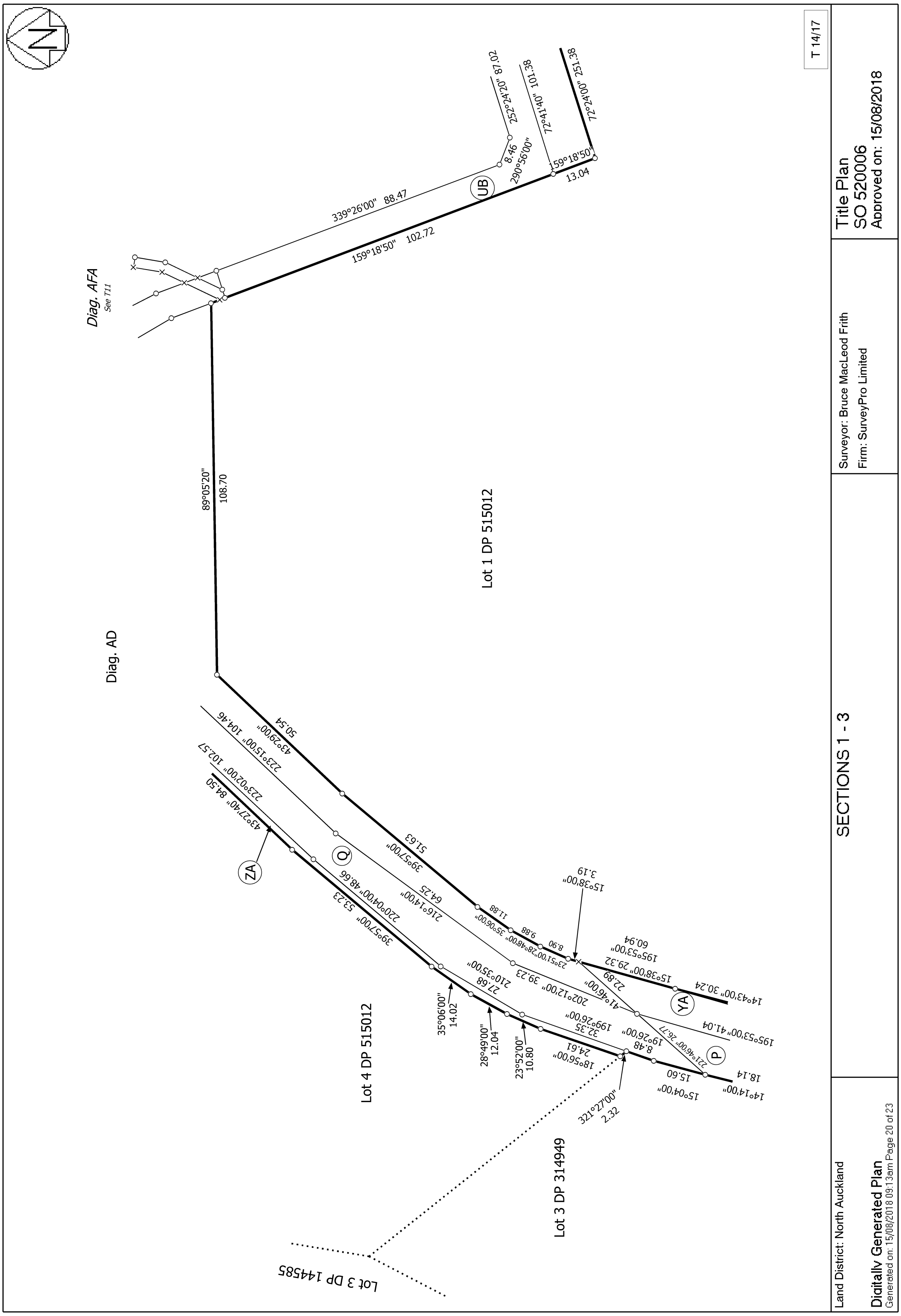

T 9/17
Title Plan
SO 520006
Approved on: 15/08/2018
Surveyor: Bruce MacLeod Frith
Firm: SurveyPro Limited
SECTIONS 1 - 3
Land District: North Auckland
Digitally Generated Plan
Generated on: 15/08/2018 09:13am Page 15 of 23
Lot 3 DP 156226
Lot 2 DP 156226
Section 3
15.8242Ha
Diag. AG
Diag. AGA
See T10
Diag. AGB
See T10
Diag. AGC
See T10
Diag. AGD
See T10
322°37'40" 156.40
47°09'00" 30.26
317°44'40" 90.34
317°43'20" 74.36
182°57'00" 43.36
3°33'00" 49.61
24°38'40" 81.61
347°43'00" 25.33

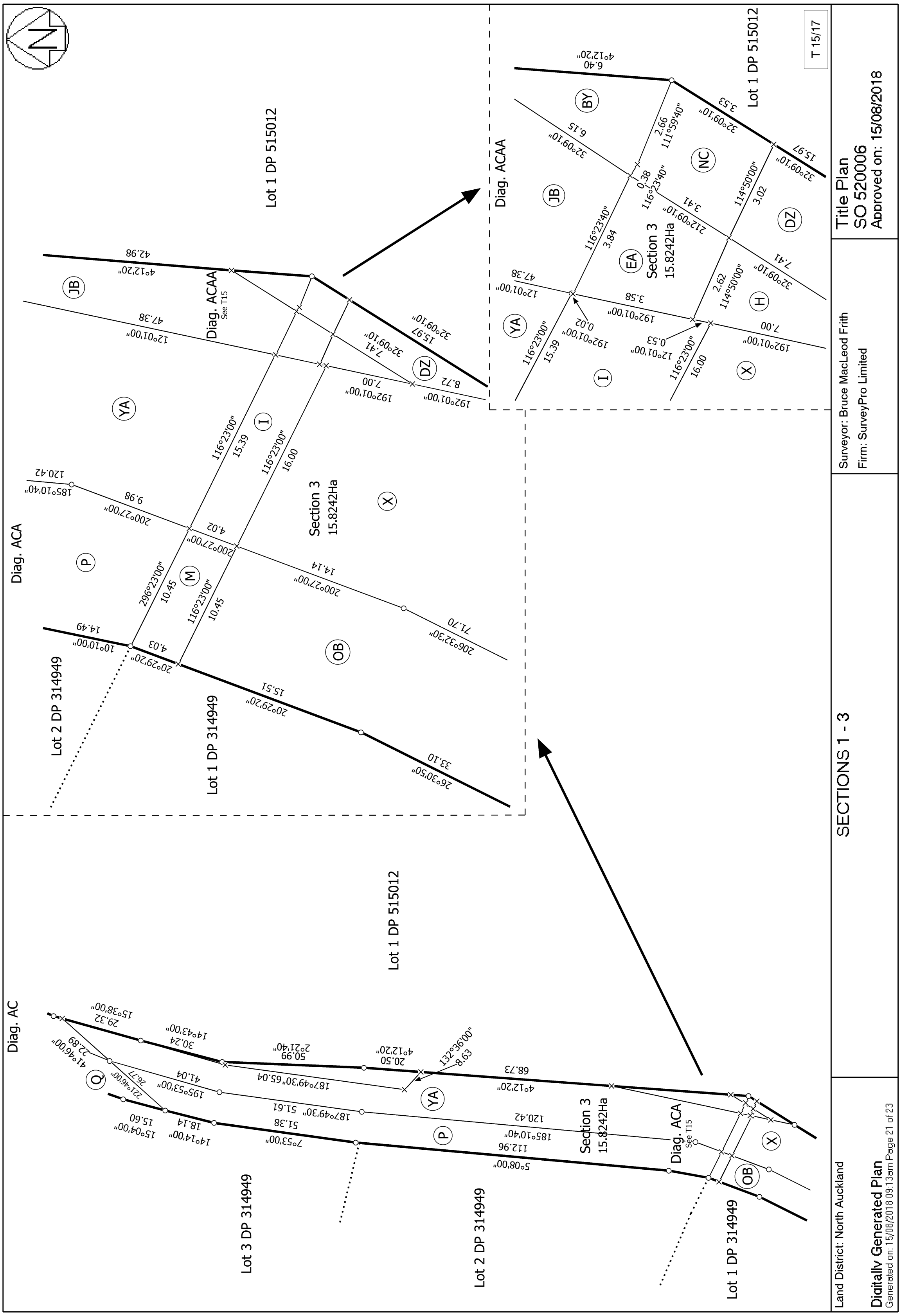

Title Plan
SO 520006
Approved on: 15/08/2018
T 10/17
Surveyor: Bruce MacLeod Frith
Firm: SurveyPro Limited
SECTIONS 1 - 3
Land District: North Auckland
Digitally Generated Plan
Generated on: 15/08/2018 09:13am Page 16 of 23
Diag. AGD
Diag. AGC
Diag. AGA
Diag. AGB
Section 3
15.8242Ha
Lot 3 DP 156226
Lot 2 DP 156226

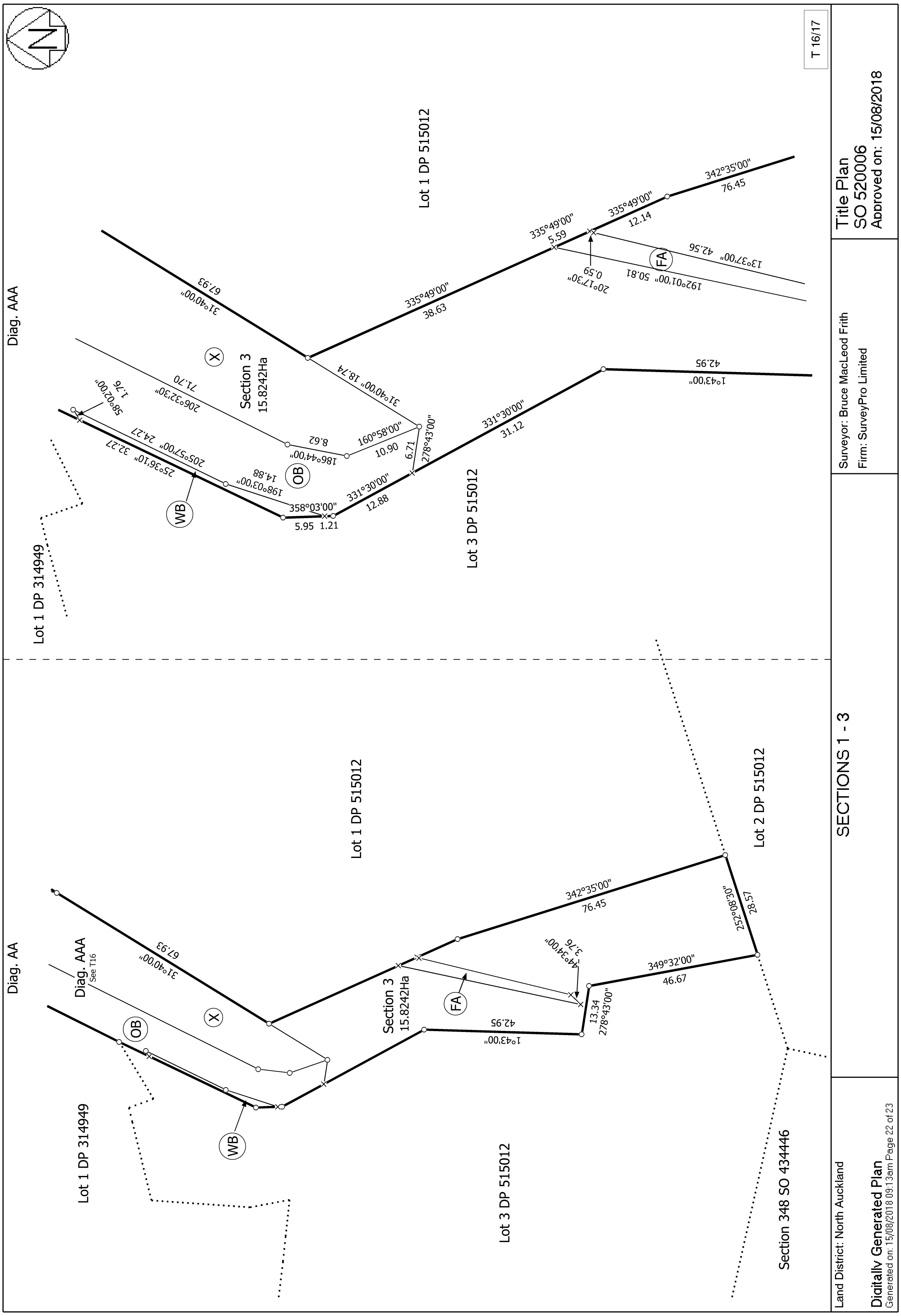

Carrington Road
T 11/17
Title Plan
SO 520006
Approved on: 15/08/2018
Surveyor: Bruce MacLeod Frith
Firm: SurveyPro Limited
SECTIONS 1 - 3
Land District: North Auckland
Digitally Generated Plan
Generated on: 15/08/2018 09:13am Page 17 of 23
170°17'32" 62.24
170°17'32" 51.86
170°17'32" 3.00
AU
78°33'20" 50.02
78°33'20" 50.02
57°37'00" 54.18
Section 3
15.8242Ha
170°17'32" 71.23
170°17'32" 48.48
170°17'32" 3.00
Lot 6 DP 515012
Diag. AK
Lot 3 DP 156226
62°40'00" 27.10
340°01'20" 131.05
322°37'40" 156.40
332°56'00" 26.04
329°37'00" 16.32
319°29'00" 51.50
315°59'00" 37.93
Section 3
15.8242Ha
331°56'00" 13.37
Diag. AE
24°38'40" 81.61
264°51'00" 38.24
Q
26.07 266°31'00"
20°38'40" 20.37
8°39'00" 11.45
358°13'00" 43.93
358°47'00" 5.61
207°24'00" 26.55
223°15'00" 104.46
Lot 2 DP 156226
ZA
223°02'00" 102.57
37°09'00" 19.81
43°27'40" 84.50
Lot 4 DP 515012

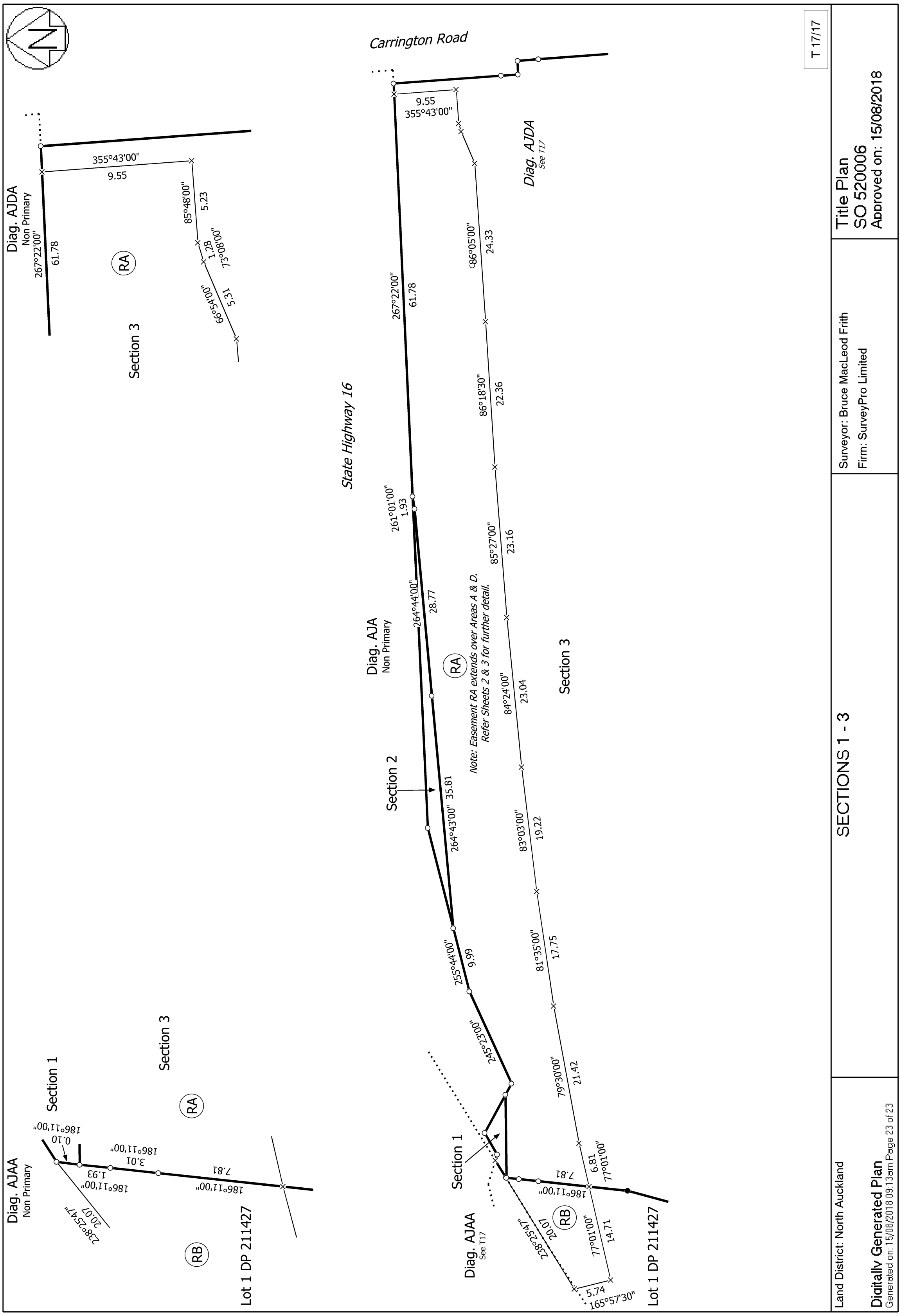

T 12/17
Title Plan
SO 520006
Approved on: 15/08/2018
Surveyor: Bruce MacLeod Frith
Firm: SurveyPro Limited
SECTIONS 1 - 3
Land District: North Auckland
Digitally Generated Plan
Generated on: 15/08/2018 09:13am Page 18 of 23
Carrington Road
Section 3
15.8242Ha
Lot 6 DP 515012
Lot 3 DP 156226
Lot 1 DP 515012
Diag. AF
Diag. AFA
See T12
Diag. AFAA
UA
UB
Q
J
R
T
170°17'32"
22.35
170°17'32"
4.84
198°52'00"
6.20
110°07'00"
11.42
72°24'00"
0.50
57°37'00"
54.18
170°17'32"
71.23
252°24'20"
151.63
72°41'20"
142.82
72°24'00"
251.38
340°01'20"
9.46
340°01'20"
131.05
322°37'40"
156.40
62°40'00"
27.10
252°24'20"
87.02
72°41'40"
101.38
339°26'00"
88.47
13.04
159°18'50"
290°56'00"
8.46
159°18'50"
102.72
279°27'00"
3.00
9°27'00"
8.98
189°27'00"
8.55
25°38'00"
10.51
205°38'00"
7.21
8.84
339°26'00"
332°56'00"
26.04
329°37'00"
16.32
12.38
339°18'50"
89°05'20"
108.70
4.15
5.85
8.01
11.50
252°30'40"
5.79
2.52
2.76
1.59


T 13/17
Title Plan
SO 520006
Approved on: 15/08/2018
Surveyor: Bruce MacLeod Frith
Firm: SurveyPro Limited
SECTIONS 1 - 3
Land District: North Auckland
Digitally Generated Plan
Generated on: 15/08/2018 09:13am Page 19 of 23
Diag. AFA
See T11
Section 3
15.8242Ha
Lot 1 DP 515012
Lot 4 DP 515012
Lot 2 DP 156226
Diag. AB
Section 350 SO 434446
Q
ZA
319°29'00"
51.50
332°56'00"
26.04
329°37'00"
16.32
315°59'00"
37.93
331°56'00"
13.37
264°51'00" 38.24
26.07
266°31'00"
89°05'20"
108.70
207°24'00" 26.55
195°52'00"
17.13
209°00'00"
15.43
37°09'00"
19.81
223°15'00"
104.46
223°02'00"
102.57
43°27'40"
84.50
43°29'00"
50.54
264°51'00"
1.94
358°13'00"
43.93
358°47'00"
5.61
14°11'00"
12.12
14°11'00"
2.55
24°16'00"
10.62
8°39'00"
11.45
20°38'40"
20.37
24°38'40"
81.61


Title Plan
SO 520006
Approved on: 15/08/2018
Surveyor: Bruce MacLeod Frith
Firm: SurveyPro Limited
SECTIONS 1 - 3
Land District: North Auckland
Digitally Generated Plan
Generated on: 15/08/2018 09:13am Page 20 of 23
T 14/17
Lot 1 DP 515012
Lot 4 DP 515012
Lot 3 DP 314949
Lot 3 DP 144585
Diag. AD
Diag. AFA
See T11
UB
Q
ZA
YA
P
339°26'00" 88.47
159°18'50" 102.72
252°24'20" 87.02
72°41'40" 101.38
72°24'00" 251.38
8.46
290°56'00"
159°18'50"
13.04
89°05'20"
108.70
50.54
43°29'00"
223°15'00" 104.46
223°02'00" 102.57
43°27'40" 84.50
51.63
39°57'00"
64.25
216°14'00"
220°04'00" 48.66
39°57'00" 53.23
15°38'00"
3.19
195°53'00"
60.94
15°38'00" 29.32
14°43'00" 30.24
195°53'00" 41.04
210°35'00"
27.68
39.23
202°12'00"
41°46'00"
22.89
199°26'00"
32.35
19°26'00"
8.48
18°56'00"
24.61
15.60
15°04'00"
18.14
14°14'00"
35°06'00"
14.02
28°49'00"
12.04
23°52'00"
10.80
321°27'00"
2.32


Title Plan
SO 520006
Approved on: 15/08/2018
T 15/17
Surveyor: Bruce MacLeod Frith
Firm: SurveyPro Limited
SECTIONS 1 - 3
Land District: North Auckland
Digitally Generated Plan
Generated on: 15/08/2018 09:13am Page 21 of 23
Lot 1 DP 515012
Lot 2 DP 314949
Lot 1 DP 314949
Lot 3 DP 314949
Section 3
15.8242Ha
Diag. AC
Diag. ACA
Diag. ACAA
See T15


Title Plan
SO 520006
Approved on: 15/08/2018
T 16/17
Surveyor: Bruce MacLeod Frith
Firm: SurveyPro Limited
SECTIONS 1 - 3
Land District: North Auckland
Digitally Generated Plan
Diag. AAA
Diag. AA
Section 3
15.8242Ha
Lot 1 DP 515012
Lot 3 DP 515012
Lot 1 DP 314949
Lot 2 DP 515012
Section 348 SO 434446
X
OB
WB
FA
342°35'00"
76.45
335°49'00"
12.14
5.59
38.63
31°40'00" 67.93
331°30'00"
31.12
12.88
1°43'00" 42.95
278°43'00"
252°08'30"
28.57
349°32'00"
46.67
13.34



T 17/17
Title Plan
SO 520006
Approved on: 15/08/2018
Surveyor: Bruce MacLeod Frith
Firm: SurveyPro Limited
SECTIONS 1 - 3
Land District: North Auckland
Digitally Generated Plan
Generated on: 15/08/2018 09:13am Page 23 of 23
Carrington Road
State Highway 16
Section 1
Section 2
Section 3
Diag. AJDA
Non Primary
Diag. AJDA
See T17
Diag. AJA
Non Primary
Diag. AJAA
Non Primary
Diag. AJAA
See T17
Note: Easement RA extends over Areas A & D.
Refer Sheets 2 & 3 for further detail.
Lot 1 DP 211427
Lot 1 DP 211427
RA
RB
355°43'00"
9.55
267°22'00"
61.78
85°48'00"
5.23
1.28
73°08'00"
66°54'00"
5.31
86°05'00"
24.33
86°18'30"
22.36
85°27'00"
23.16
84°24'00"
23.04
83°03'00"
19.22
81°35'00"
17.75
79°30'00"
21.42
77°01'00"
6.81
14.71
261°01'00"
1.93
264°44'00"
28.77
264°43'00"
35.81
255°44'00"
9.99
245°23'00"
186°11'00"
0.10
1.93
3.01
7.81
238°25'47"
20.07
5.74
165°57'30"

# RECORD OF TITLE
# UNDER LAND TRANSFER ACT 2017
# FREEHOLD

**Guaranteed Search Copy issued under Section 60 of the Land Transfer Act 2017**

R.W. Muir
Registrar-General
of Land

**Identifier** **868264**
**Land Registration District** **North Auckland**
**Date Issued** 11 November 2019

**Prior References**
799991

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**Estate** Fee Simple
**Area** 2.1229 hectares more or less
**Legal Description** Lot 2 Deposited Plan 531496
**Purpose** State Housing
**Registered Owners**
Her Majesty the Queen

---

**Interests**

C491423.1 Subject to conditions pursuant to Section 461(1) Local Government Act 1974 and certifying that a private drain passes through and serves the within land - 22.6.1993 at 2.08 pm

Appurtenant hereto is an electricity right created by Transfer D036499.13 - 22.8.1996 at 10.40 am

Appurtenant hereto is a electricity and gas right created by Transfer D036499.16 - 22.8.1996 at 10.40 am

Appurtenant hereto is a electricity and water supply right created by Transfer D036499.17 - 22.8.1996 at 10.40 am

5590341.6 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 19.5.2003 at 9:00 am

Appurtenant hereto is a right of way and electricity, telecommunications and water supply easements created by Easement Instrument 5590341.13 - 19.5.2003 at 9:00 am

The easements created by Easement Instrument 5590341.13 are subject to Section 243 (a) Resource Management Act 1991

Appurtenant hereto is a water supply easement created by Easement Instrument 5590341.15 - 19.5.2003 at 9:00 am

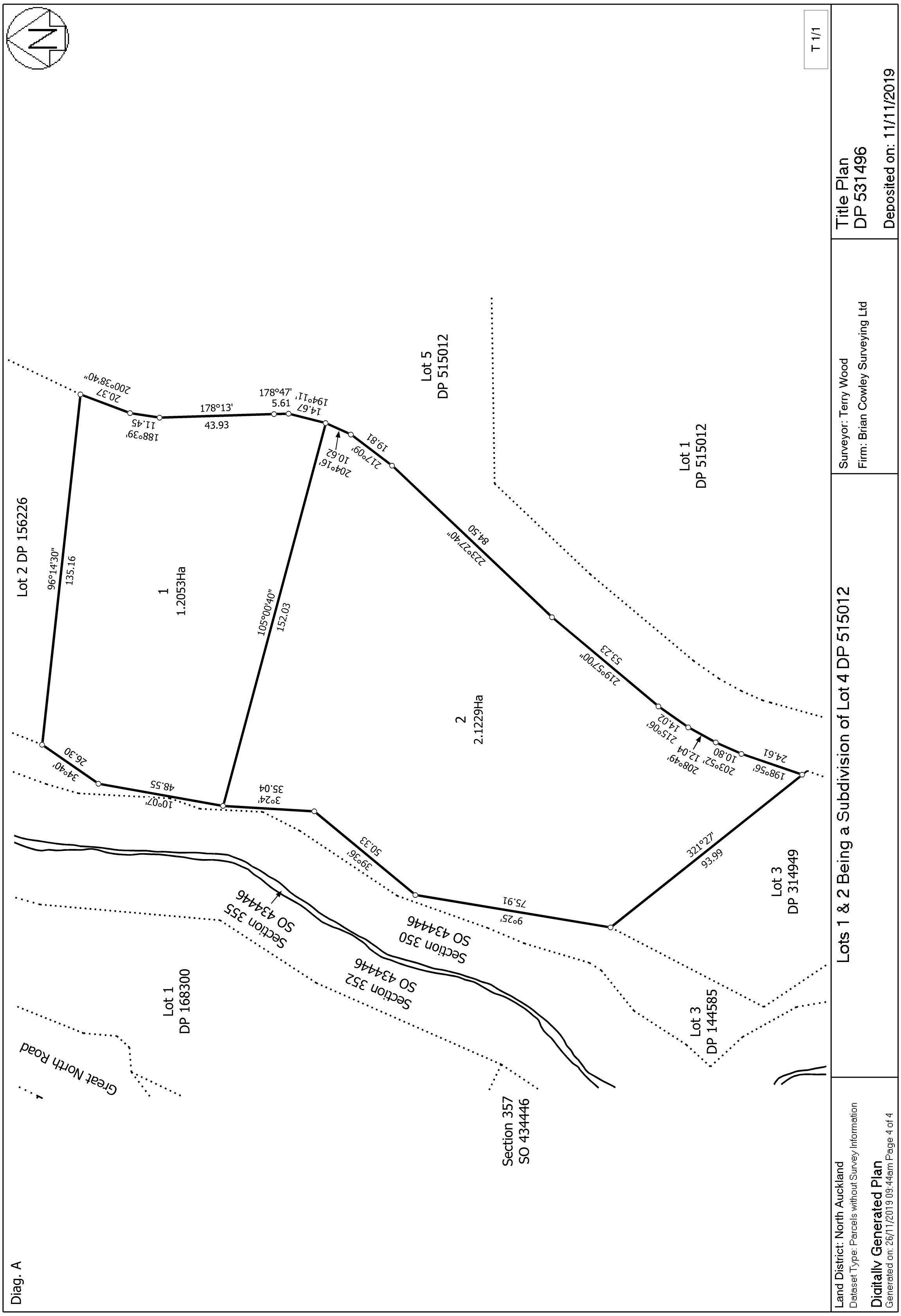
The easement created by Easement Instrument 5590341.15 is subject to Section 243 (a) Resource Management Act 1991

9918192.1 Certificate under section 148 of the Nga Mana Whenua o Tamaki Makaurau Collective Redress Act 2014 that the within land is RFR land as defined in section 118 and is subject to Subpart 1 of Part 4 of the Act (which restricts disposal, including leasing of the land) - 5.12.2014 at 7:00 am

11076921.4 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 9.4.2018 at 2:00 pm

Appurtenant hereto is a right of way and a right to convey electricity, water supply and telecommunications and right to drain stormwater and wastewater created by Easement Instrument 11076921.5 - 9.4.2018 at 2:00 pm

The easements created by Easement Instrument 11076921.5 are subject to Section 243 (a) Resource Management Act 1991


Title Plan
DP 531496
Deposited on: 11/11/2019
T 1/1
Surveyor: Terry Wood
Firm: Brian Cowley Surveying Ltd
Lots 1 & 2 Being a Subdivision of Lot 4 DP 515012
Land District: North Auckland
Dataset Type: Parcels without Survey Information
Digitally Generated Plan
Generated on: 26/11/2019 09:44am Page 4 of 4
Diag. A
Lot 5
DP 515012
Lot 1
DP 515012
Lot 2 DP 156226
1
1.2053Ha
2
2.1229Ha
Lot 3
DP 314949
Lot 3
DP 144585
Lot 1
DP 168300
Section 355
SO 434446
Section 350
SO 434446
Section 352
SO 434446
Section 357
SO 434446
Great North Road
200°38'40"
20.37
188°39'
11.45
178°13'
43.93
178°47'
5.61
194°11'
14.67
204°16'
10.62
217°09'
19.81
223°27'40"
84.50
219°57'00"
53.23
215°06'
14.02
208°49'
12.04
203°52'
10.80
198°56'
24.61
321°27'
93.99
9°25'
75.91
39°36'
50.33
3°24'
35.04
10°07'
48.55
34°40'
26.30
96°14'30"
135.16
105°00'40"
152.03

# RECORD OF TITLE
# UNDER LAND TRANSFER ACT 2017
# FREEHOLD

**Guaranteed Search Copy issued under Section 60 of the Land Transfer Act 2017**

R.W. Muir
Registrar-General
of Land

**Identifier** **799993**
**Land Registration District** **North Auckland**
**Date Issued** 09 April 2018

**Prior References**
58982 58983

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**Estate** Fee Simple
**Area** 2.4753 hectares more or less
**Legal Description** Lot 6 Deposited Plan 515012
**Purpose** State Housing
**Registered Owners**
Her Majesty the Queen

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**Interests**

Appurtenant to part formerly Lot 4 DP 314949 is a drainage right specified in Easement Certificate C247153.4 - 14.3.1991 at 2:43 pm

The easements specified in Easement Certificate C247153.4 are subject to Section 309 (1) (a) Local Government Act 1974

C491423.1 Subject to conditions pursuant to Section 461(1) Local Government Act 1974 and certifying that a private drain passes through and serves the within land - 22.6.1993 at 2.08 pm (affects part formerly Lot 5 DP 314949)

Appurtenant to part formerly Lot 5 DP 314949 is an electricity right created by Transfer D036499.13 - 22.8.1996 at 10.40 am

Appurtenant to part formerly Lot 5 DP 314949 are electricity and gas rights created by Transfer D036499.16 - 22.8.1996 at 10.40 am

Appurtenant to part formerly Lot 5 DP 314949 are electricity and water supply rights created by Transfer D036499.17 - 22.8.1996 at 10.40 am

5590341.6 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 19.5.2003 at 9:00 am (affects part formerly Lot 5 DP 314949)

Appurtenant hereto is a right of way, electricity, telecommunications & water supply easements created by Easement Instrument 5590341.13 - 19.5.2003 at 9:00 am

The easements created by Easement Instrument 5590341.13 are subject to Section 243 (a) Resource Management Act 1991

Appurtenant hereto is a water supply easement created by Easement Instrument 5590341.15 - 19.5.2003 at 9:00 am

The easement created by Easement Instrument 5590341.15 is subject to Section 243 (a) Resource Management Act 1991

9918192.1 Certificate under section 148 of the Nga Mana Whenua o Tamaki Makaurau Collective Redress Act 2014 that the within land is RFR land as defined in section 118 and is subject to Subpart 1 of Part 4 of the Act (which restricts disposal, including leasing of the land) - 5.12.2014 at 7:00 am

10818525.1 Compensation Certificate pursuant to Section 19 Public Works Act 1981 by Auckland Council - 13.6.2017 at 3:59 pm (affects part formerly Lot 4 DP 314949)

11076921.4 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 9.4.2018 at 2:00 pm

Appurtenant hereto is a right of way, right to convey electricity, telecommunications, water supply and right to drain stormwater & wastewater created by Easement Instrument 11076921.5 - 9.4.2018 at 2:00 pm

The easements created by Easement Instrument 11076921.5 are subject to Section 243 (a) Resource Management Act 1991


Land District: North Auckland

Digitally Generated Plan
Generated on: 22/11/2017 1:09pm Page 10 of 28

Lots 1 - 6 Being a Subdivision of Lot 1 DP 152034, Lot 2 DP 211427, Lots 4 & 5 DP 314949, Section 2 SO 493517, Pt Allotment 33 Parish of Titirangi & Pt Allotment 33 Parish of Titirangi

Surveyor: Mingo Alexander Innes
Firm: Calibre Consulting Limited

Title Plan
LT 515012
Approved on: 22/11/2017

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

**Guaranteed Search Copy issued under Section 60 of the Land Transfer Act 2017**

R.W. Muir
Registrar-General
of Land

| | |
|---|---|
| **Identifier** | **1071371** |
| **Land Registration District** | **North Auckland** |
| **Date Issued** | 30 June 2022 |

**Prior References**
799988

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| | |
|---|---|
| **Estate** | Fee Simple |
| **Area** | 10.6452 hectares more or less |
| **Legal Description** | Section 2-5 Survey Office Plan 573867 |
| **Purpose** | State Housing Purposes |

**Registered Owners**
Her Majesty the Queen

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**Interests**

Excluding coal and other minerals contained in Deeds Index A2/130 and Deeds Index A2/131 (affects the part sections 2,3 and 4 SO 573867 formerly Section 2 SO 493517)

Subject to a drainage right (in gross) over part Section 2 SO 573867 marked FB, a water supply right (in gross) over part section 3 SO 573867 marked BC and BD, and a drainage right (in gross) over part section 4 SO 573867 marked G all on SO 573867 in favour of The Auckland Area Health Board created by Gazette Notice C001939.2 - 9.6.1989 at 11:48 am

Subject to a drainage right over part Section 3 SO 573867 marked S on SO 573867 specified in Easement Certificate C247153.4 - 14.3.1991 at 2:43 pm

Appurtenant to the parts of Sections 2,3 and 4 SO 573867 formerly Lot 4 DP 314949 is a drainage right specified in Easement Certificate C247153.4 - 14.3.1991 at 2:43 pm

The easements specified in Easement Certificate C247153.4 are subject to Section 309 (1) (a) Local Government Act 1974

C491423.1 Subject to conditions pursuant to Section 461(1) Local Government Act 1974 and certifying that a private drain passes through and serves the within land - 22.6.1993 at 2.08 pm (affects the part section 3 SO 573867 formerly Lot 5 DP 314949)

Appurtenant to the part section 3 SO 573867 formerly Lot 5 DP 314949 is an electricity right created by Transfer D036499.13 - 22.8.1996 at 10.40 am

Appurtenant to the part section 3 SO 573867 formerly Lot 5 DP 314949 are electricity and gas rights created by Transfer D036499.16 - 22.8.1996 at 10.40 am

Appurtenant to the part Section 3 SO 573867 part formerly Lot 5 DP 314949 are electricity and water supply rights created by Transfer D036499.17 - 22.8.1996 at 10.40 am

5590341.6 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 19.5.2003 at 9:00 am (affects the part section 3 SO 573867 formerly Lot 5 DP 314949)

Subject to a water supply & electricity supply easement over part section 3 SO 573867 marked YB on SO 573867 created by Easement Instrument 5590341.13 - 19.5.2003 at 9:00 am

Appurtenant to the part sections 2,3 and 4 SO 573867 formerly Lot 4 DP 314949 and the part section 3 SO 573867 formerly Lot 5 DP 314949 is a right of way, electricity, telecommunications & water supply easements created by Easement Instrument 5590341.13 - 19.5.2003 at 9:00 am

The easements created by Easement Instrument 5590341.13 are subject to Section 243 (a) Resource Management Act 1991

Subject to a water supply easement over part section 3 SO 573867 marked YB on SO 573867 created by Easement Instrument 5590341.14 - 19.5.2003 at 9:00 am

Appurtenant to the part of sections 2,3 and 4 SO 573867 formerly Section 2 SO 493517 are water supply & electricity supply easements created by Easement Instrument 5590341.14 - 19.5.2003 at 9:00 am

The easements created by Easement Instrument 5590341.14 are subject to Section 243 (a) Resource Management Act 1991

Subject to a water supply easement over part section 3 SO 573867 marked JC, BC and BD all on SO 573867 created by Easement Instrument 5590341.15 - 19.5.2003 at 9:00 am

Appurtenant to part sections 2, 3 and 4 SO 573867 formerly Lot 4 DP 314949 and the part section 3 SO 573867 formerly Lot 5 DP 314949 is a water supply easement created by Easement Instrument 5590341.15 - 19.5.2003 at 9:00 am

The easement created by Easement Instrument 5590341.15 is subject to Section 243 (a) Resource Management Act 1991

7938135.1 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 16.9.2008 at 9:00 am (affects sections 2,3 and 4 SO 573867 formerly Section 2 SO 493517)

9889354.1 Certificate under section 148 of the Nga Mana Whenua o Tamaki Makaurau Collective Redress Act 2014 that the within land is RFR land as defined in section 118 and is subject to Subpart 1 of Part 4 of the Act (which restricts disposal, including leasing of the land) - 10.11.2014 at 7:00 am (affects sections 2, 3 and 4 SO 573867 formerly Section 2 SO 493517)

9918192.1 Certificate under section 148 of the Nga Mana Whenua o Tamaki Makaurau Collective Redress Act 2014 that the within land is RFR land as defined in section 118 and is subject to Subpart 1 of Part 4 of the Act (which restricts disposal, including leasing of the land) - 5.12.2014 at 7:00 am (affects sections 2,3 and 4 SO 573867 formerly Lot 4 DP 314949 and section 3 SO 573867 formerly Lot 5 DP 314949)

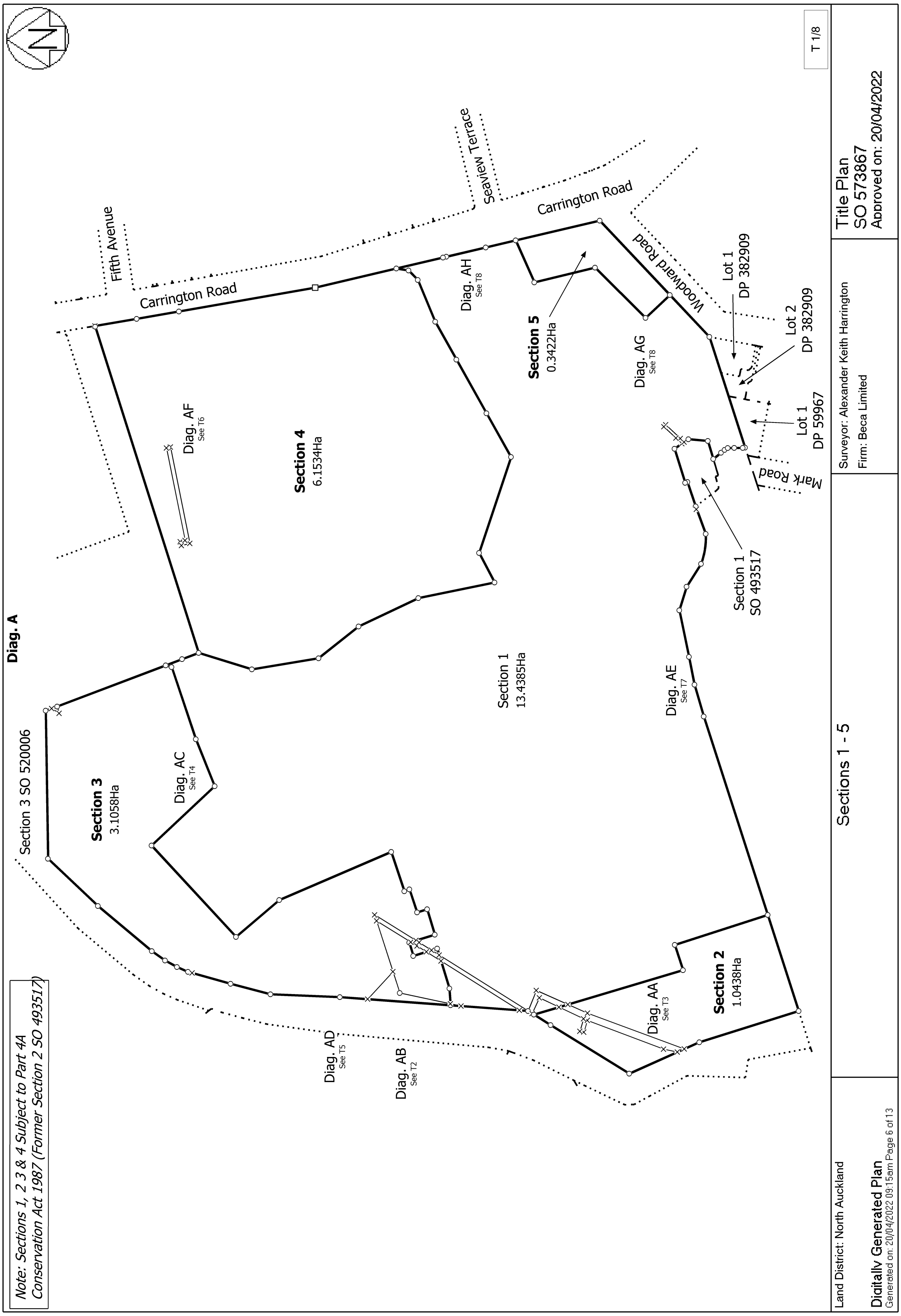
9918485.1 Certificate under section 148 of the Nga Mana Whenua o Tamaki Makaurau Collective Redress Act 2014 that the within land is RFR land as defined in section 118 and is subject to Subpart 1 of Part 4 of the Act (which restricts disposal, including leasing of the land) - 5.12.2014 at 7:00 am (affects section 5 SO 573867)

Subject to Section 11 of the Crown Minerals Act 1991 (affects the part of sections 2,3 and 4 SO 573867 formerly Section 2 SO 493517)

Subject to Part IVA of the Conservation Act 1987 (affects the parts of Sections 2,3 and 4 SO 573867 formerly Section 2 SO 493517)

10818525.1 Compensation Certificate pursuant to Section 19 Public Works Act 1981 by Auckland Council - 13.6.2017 at 3:59 pm (affects Sections 2 and 4 SO 573867 and the part of Section 3 SO 573867 formerly Lot 4 DP 314949 and Section 2 SO 493517)

11076921.4 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 9.4.2018 at 2:00 pm


T 1/8
Title Plan
SO 573867
Approved on: 20/04/2022
Surveyor: Alexander Keith Harrington
Firm: Beca Limited
Sections 1 - 5
Land District: North Auckland
Digitally Generated Plan
Generated on: 20/04/2022 09:15am Page 6 of 13
Diag. A
Note: Sections 1, 2 3 & 4 Subject to Part 4A
Conservation Act 1987 (Former Section 2 SO 493517)
Fifth Avenue
Seaview Terrace
Carrington Road
Carrington Road
Woodward Road
Mark Road
Lot 1
DP 382909
Lot 2
DP 382909
Lot 1
DP 59967
Section 1
SO 493517
Section 3 SO 520006
Section 1
13.4385Ha
Section 2
1.0438Ha
Section 3
3.1058Ha
Section 4
6.1534Ha
Section 5
0.3422Ha
Diag. AA
See T3
Diag. AB
See T2
Diag. AC
See T4
Diag. AD
See T5
Diag. AE
See T7
Diag. AF
See T6
Diag. AG
See T8
Diag. AH
See T8

# RECORD OF TITLE
# UNDER LAND TRANSFER ACT 2017
# FREEHOLD

**Guaranteed Search Copy issued under Section 60 of the Land Transfer Act 2017**

R.W. Muir
Registrar-General
of Land

**Identifier** **867815**
**Land Registration District** **North Auckland**
**Date Issued** 11 November 2019

**Prior References**
NA139B/955

---

| | |
|---|---|
| **Estate** | Fee Simple |
| **Area** | 9893 square metres more or less |
| **Legal Description** | Lot 2 Deposited Plan 531494 |
| **Purpose** | State Housing |

**Registered Owners**
Her Majesty the Queen

---

**Interests**

C491423.1 Subject to conditions pursuant to Section 461(1) Local Government Act 1974 and certifying that a private drain passes through and serves the within land - 22.6.1993 at 2.08 pm

Appurtenant hereto is a right of way specified in Easement Certificate C510175.4 - 24.8.1993 at 2.56 pm

The easements specified in Easement Certificate C510175.4 are subject to Section 243 (a) Resource Management Act 1991

Subject to an electricity right (in gross) over part marked B on DP 531494 in favour of Mercury Energy Limited created by Transfer D036499.8 - 22.8.1996 at 10.40 am

Subject to a telecommunications right (in gross) over part marked B on DP 531494 in favour of Telecom New Zealand Limited created by Transfer D036499.12 - 22.8.1996 at 10.40 am

Appurtenant hereto is a gas right created by Transfer D036499.14 - 22.8.1996 at 10.40 am

Subject to a water supply right over part marked E on DP 531494 created by Transfer D036499.17 - 22.8.1996 at 10.40 am

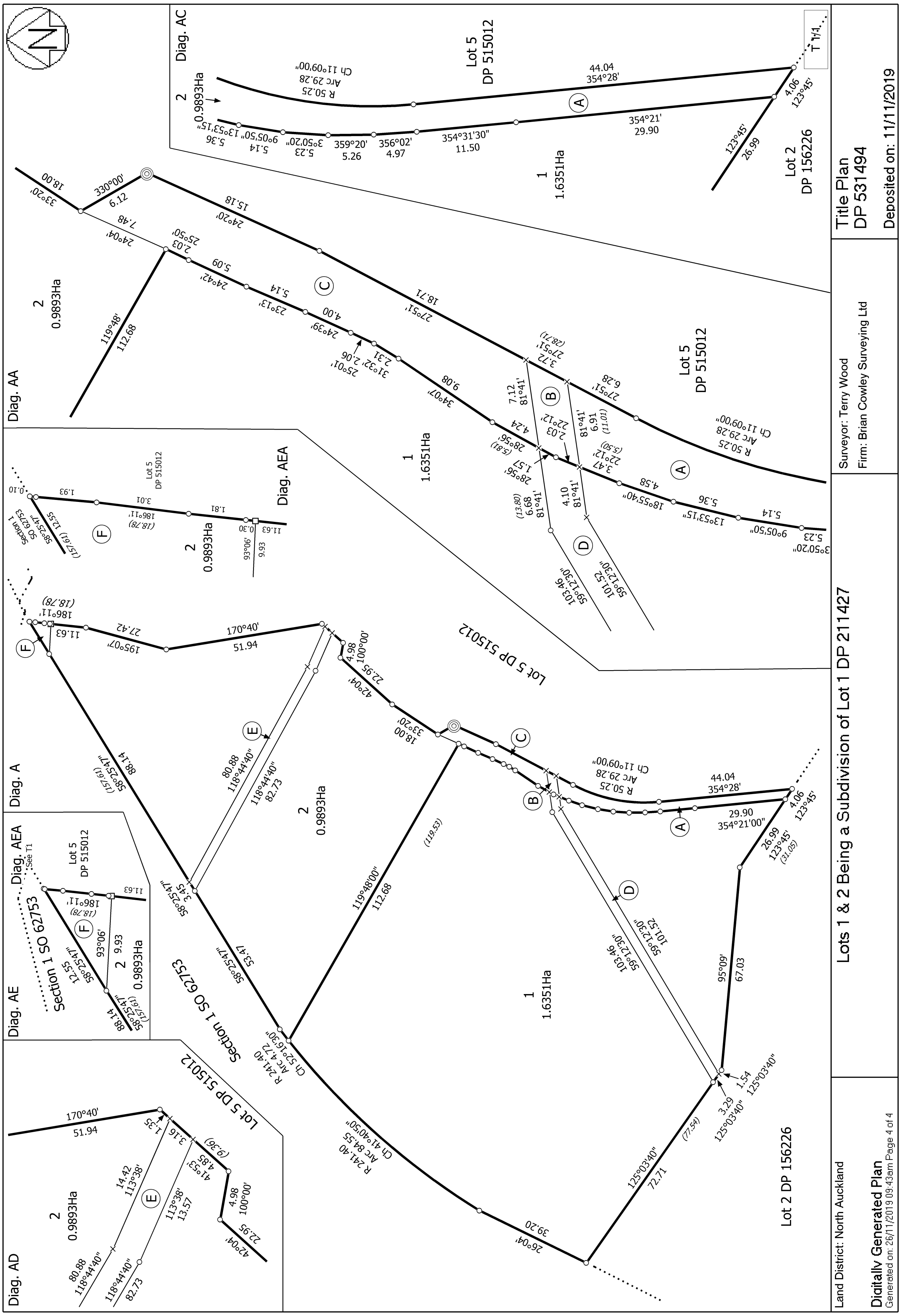
Appurtenant hereto is a right of way created by Easement Instrument 5590341.12 - 19.5.2003 at 9:00 am

The easement created by Easement Instrument 5590341.12 is subject to Section 243 (a) Resource Management Act 1991

Subject to a right of way (in gross) over part marked F on DP 531494 in favour of the Auckland City Council created by Transfer 7130709.1 - 24.11.2006 at 9:00 am

Subject to a right of way over part marked A, B and C on DP 531494 created by Easement Instrument 12134873.1 - 5.7.2021 at 12:40 pm

Subject to a right of support for rock anchors (in gross) over part marked RB on SO 520006 in favour of Her Majesty the Queen for use in connection with a road created by Gazette Notice 12228881.3 - 26.8.2021 at 4:11 pm


Title Plan
DP 531494
Deposited on: 11/11/2019
Lots 1 & 2 Being a Subdivision of Lot 1 DP 211427
Surveyor: Terry Wood
Firm: Brian Cowley Surveying Ltd
Land District: North Auckland
Digitally Generated Plan
Lot 5 DP 515012
Lot 2 DP 156226
Section 1 SO 62753
1
1.6351Ha
2
0.9893Ha
Diag. A
Diag. AA
Diag. AC
Diag. AD
Diag. AE
Diag. AEA

# RECORD OF TITLE
# UNDER LAND TRANSFER ACT 2017
# FREEHOLD

**Search Copy**

R.W. Muir
Registrar-General
of Land

**Identifier** **782088**
**Land Registration District** **North Auckland**
**Date Issued** 28 March 2017

**Prior References**
424414

| | |
|---|---|
| **Estate** | Fee Simple |
| **Area** | 1002 square metres more or less |
| **Legal Description** | Section 1 Survey Office Plan 493517 |
| **Purpose** | Technical institute |

**Registered Owners**
Her Majesty the Queen

**Interests**

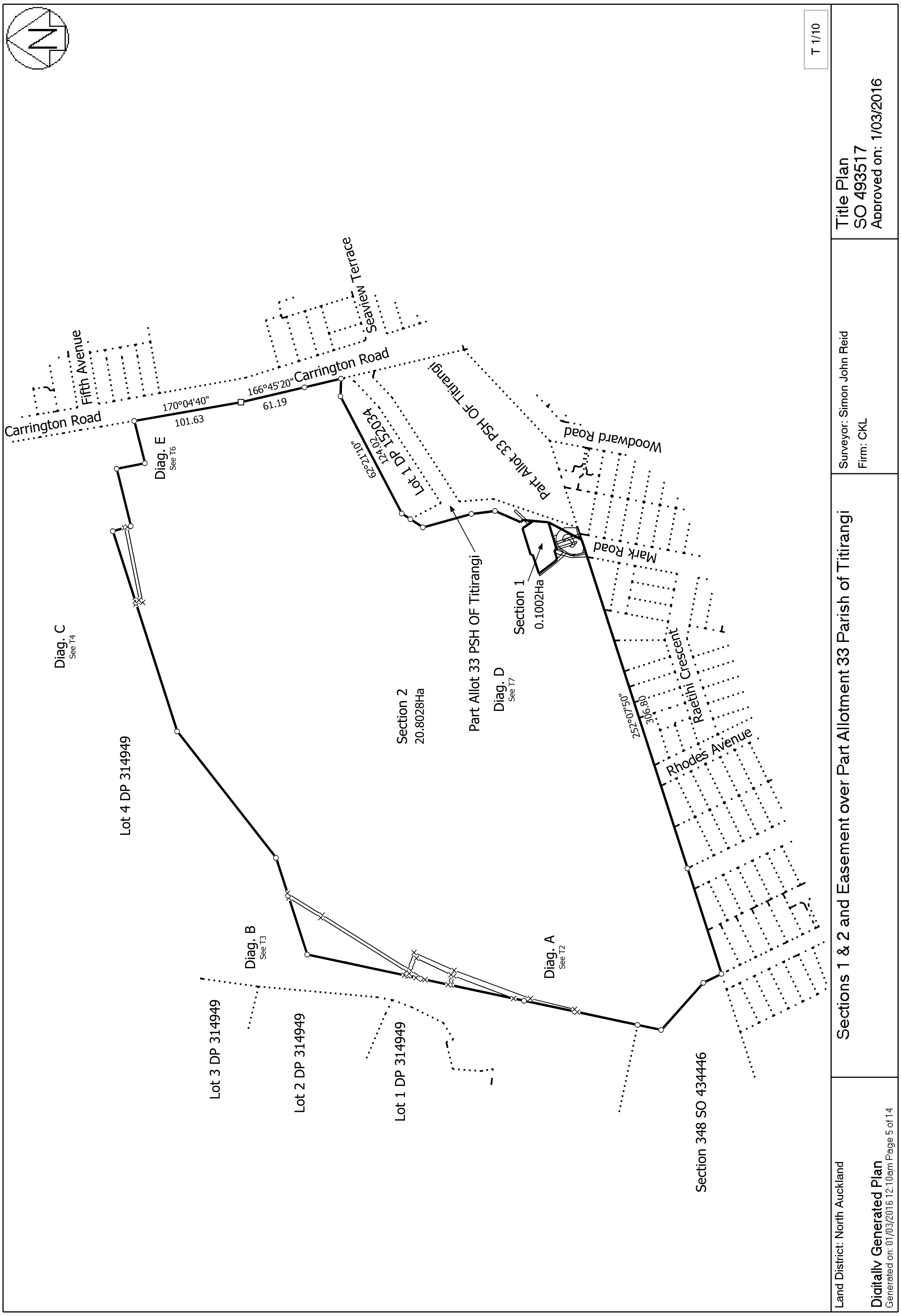
Appurtenant hereto are water supply & electricity supply easements created by Easement Instrument 5590341.14 - 19.5.2003 at 9:00 am

The easements created by Easement Instrument 5590341.14 are subject to Section 243 (a) Resource Management Act 1991

7938135.1 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 16.9.2008 at 9:00 am

9889354.1 Certificate under section 148 of the Nga Mana Whenua o Tamaki Makaurau Collective Redress Act 2014 that the within land is RFR land as defined in section 118 and is subject to Subpart 1 of Part 4 of the Act (which restricts disposal, including leasing of the land) - 10.11.2014 at 7:00 am

Appurtenant hereto are rights of way (vehicle), rights of way (pedestrian), rights to drain water and sewage and rights to convey water, electricity, telecommunications and computer media created by Easement Instrument 10743528.2 - 28.3.2017 at 7:00 am



T 1/10
Title Plan
SO 493517
Approved on: 1/03/2016
Surveyor: Simon John Reid
Firm: CKL
Sections 1 & 2 and Easement over Part Allotment 33 Parish of Titirangi
Land District: North Auckland
Digitally Generated Plan
Generated on: 01/03/2016 12:10am Page 5 of 14
Carrington Road
Carrington Road
Fifth Avenue
Seaview Terrace
170°04'40"
101.63
166°45'20"
61.19
Lot 1 DP 152034
124.02
62°21'10"
Part Allot 33 PSH OF Titirangi
Woodward Road
Mark Road
Raetihi Crescent
Rhodes Avenue
252°07'50"
306.80
Section 1
0.1002Ha
Section 2
20.8028Ha
Part Allot 33 PSH OF Titirangi
Diag. A
See T2
Diag. B
See T3
Diag. C
See T4
Diag. D
See T7
Diag. E
See T6
Lot 4 DP 314949
Lot 3 DP 314949
Lot 2 DP 314949
Lot 1 DP 314949
Section 348 SO 434446

# RECORD OF TITLE
# UNDER LAND TRANSFER ACT 2017
# FREEHOLD

**Search Copy**

R.W. Muir
Registrar-General
of Land

**Identifier** **579605**
**Land Registration District** **North Auckland**
**Date Issued** 07 March 2012

**Prior References**
424413

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**Estate** Fee Simple
**Legal Description** Section 348 Survey Office Plan 434446
**Registered Owners**
Whai Rawa Development LP

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**Interests**

FOR AREA SEE SO 434446

Appurtenant hereto are water supply & electricity supply easements created by Easement Instrument 5590341.14 - 19.5.2003 at 9:00 am

The easements created by Easement Instrument 5590341.14 are subject to Section 243 (a) Resource Management Act 1991

7938135.1 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 16.9.2008 at 9:00 am

Subject to Part IVA Conservation Act 1987

Subject to Section 11 Crown Minerals Act 1991

8625652.1 Notice pursuant to Section 18 Public Works Act 1981 - 1.11.2010 at 7:00 am

9003108.1 Land Covenant in Gazette Notice 9003108.1 - 7.3.2012 at 7:00 am

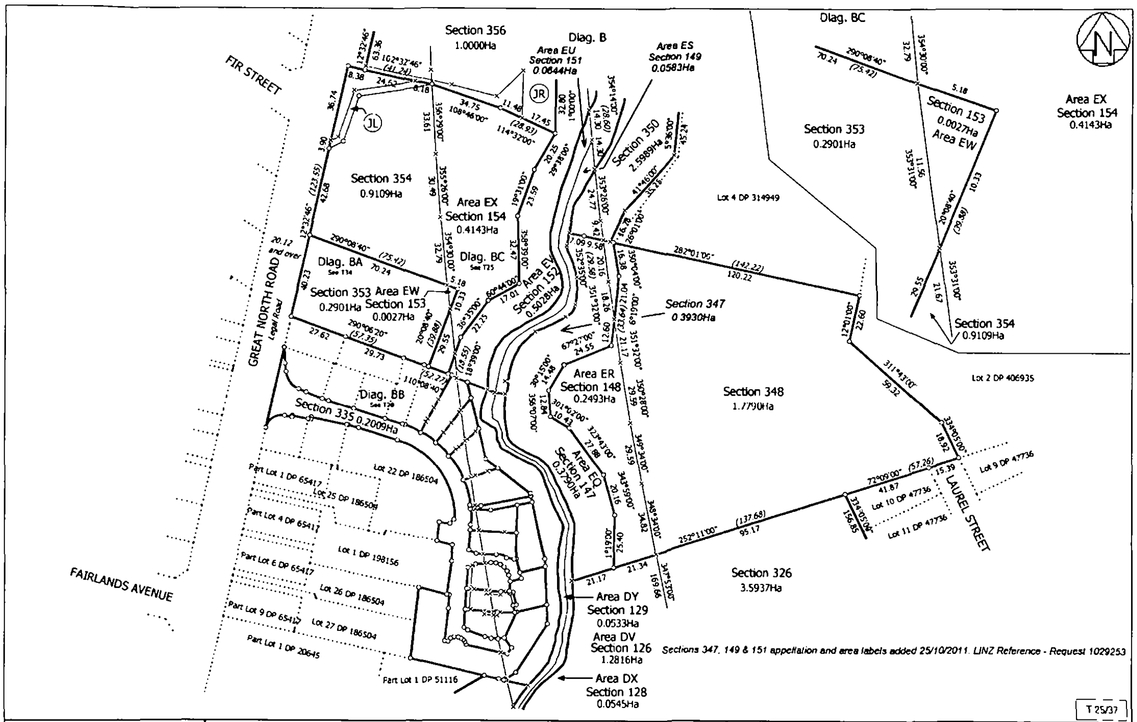
9187772.2 Heritage Covenant pursuant to Section 8 Historic Places Act 1993 - 19.9.2012 at 6:33 pm

10055951.6 Mortgage to Bank of New Zealand - 25.5.2015 at 4:12 pm

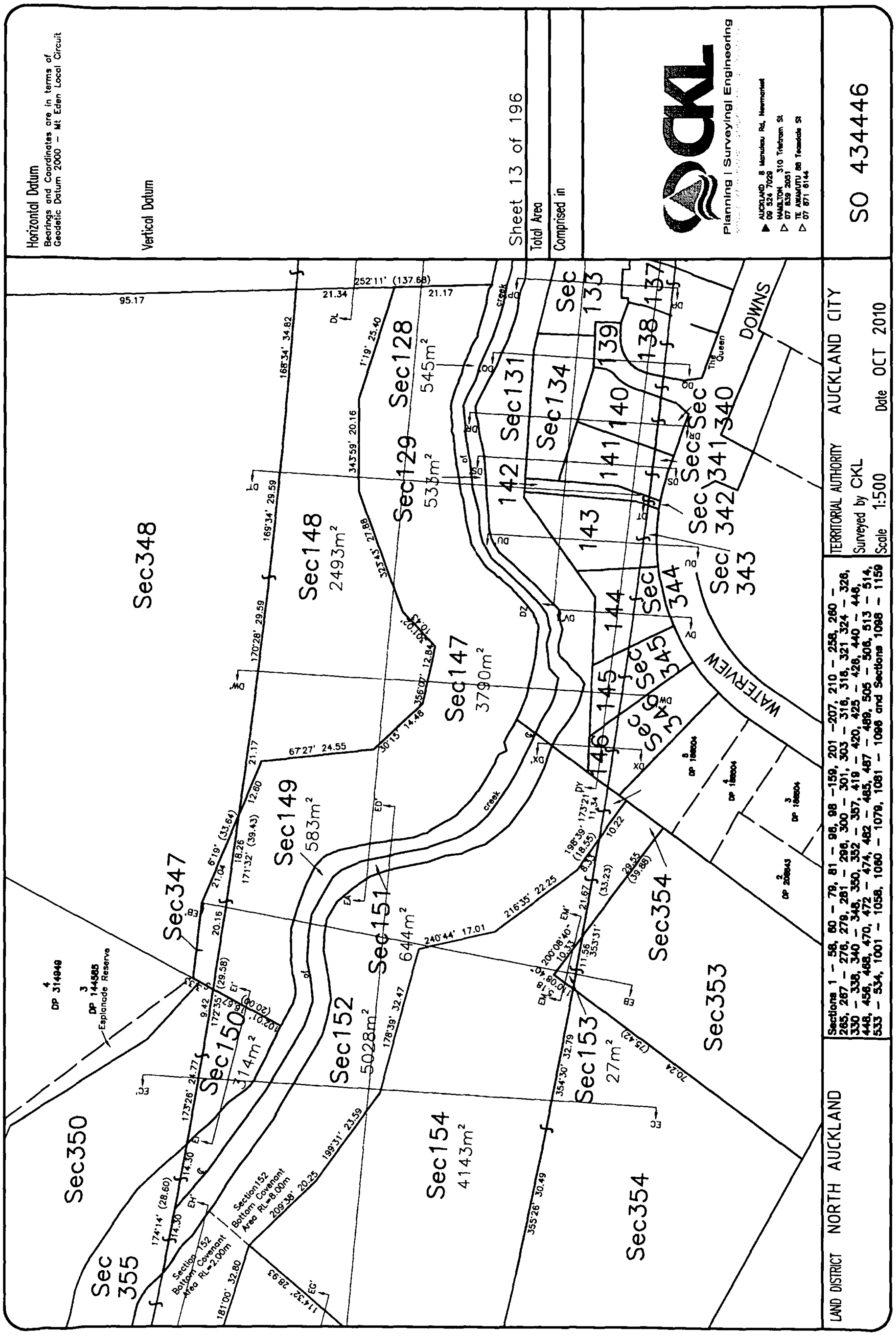
10482469.1 Compensation Certificate pursuant to Section 19 Public Works Act 1981 by Auckland Council - 28.6.2016 at 1:49 pm

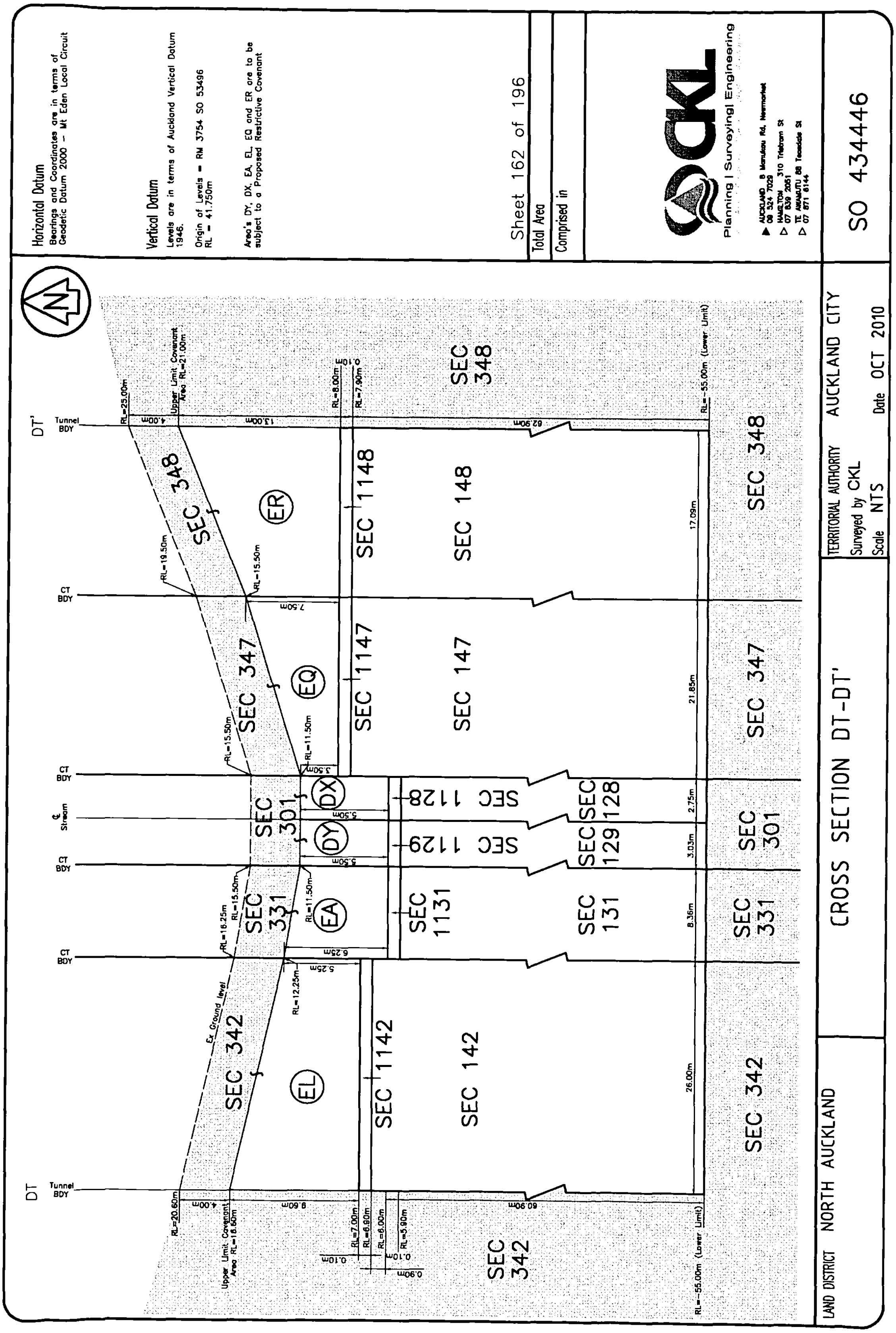
10960876.1 Variation of Mortgage 10055951.6 - 5.12.2017 at 5:36 pm

**Title Diagram 579605**
Cpy - 01/01,Pgs - 005,26/03/12,13:47
DocID: 513192943

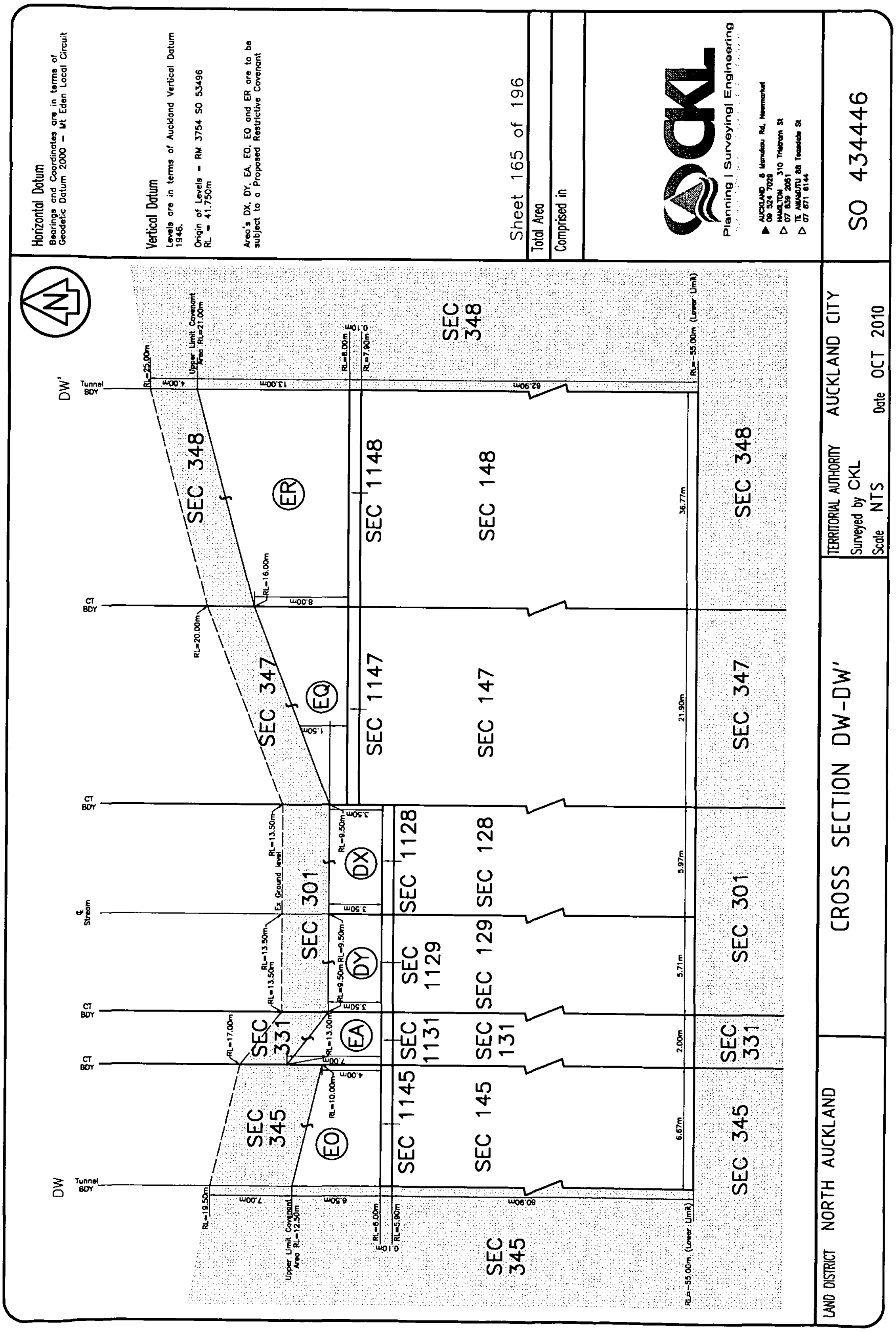


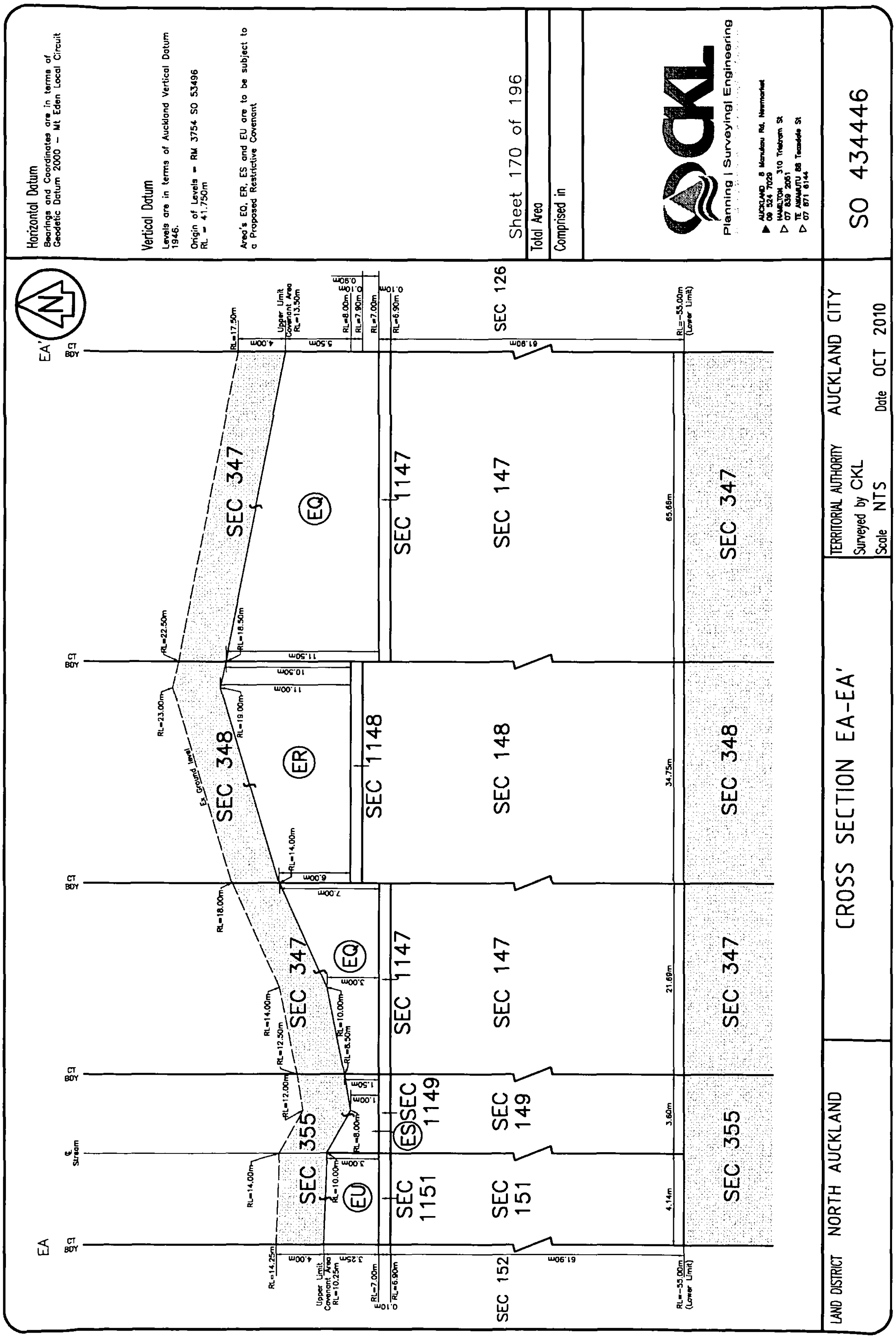

| | | | |
|---|---|---|---|
| Land District North Auckland<br>Digitally Generated Plan<br>Generated on 05/03/2012 09:37am Page 82 of 94 | Sections 1 - 58, 60 - 79, 81 - 96, 98 -159, 201 - 207, 210 - 258, 260 - 265, 267 - 276, 279, 281 - 296, 300 - 301, 303 - 316, 318, 321, 324 - 326, 330 - 338, 340 - 348, 350, 352 - 357, 419 - 420, 425 - 426, 440 - 446, 448, 456, 468, 470, 472 - | Surveyor Simon John Reid<br>Firm CKL | Title Plan<br>SO 434446<br>Approved on 14/03/2011 |


Horizontal Datum
Bearings and Coordinates are in terms of Geodetic Datum 2000 – Mt Eden Local Circuit
Vertical Datum
Sheet 13 of 196
Total Area
Comprised in
CKL
Planning | Surveying | Engineering
SO 434446
TERRITORIAL AUTHORITY AUCKLAND CITY
Surveyed by CKL
Scale 1:500
Date OCT 2010
LAND DISTRICT NORTH AUCKLAND
Sec348
Sec148 2493m²
Sec147 3790m²
Sec149 583m²
Sec128 545m²
Sec129 533m²
Sec151 644m²
Sec152 5028m²
Sec150 314m²
Sec153 27m²
Sec154 4143m²
Sec347
Sec350
Sec 355
Sec353
Sec354
WATERVIEW
DOWNS



Horizontal Datum
Bearings and Coordinates are in terms of Geodetic Datum 2000 – Mt Eden Local Circuit
Vertical Datum
Levels are in terms of Auckland Vertical Datum 1946.
Origin of Levels = RM 3754 SO 53496
RL = 41.750m
Area's DY, DX, EA, EL, EQ and ER are to be subject to a Proposed Restrictive Covenant
Sheet 162 of 196
Total Area
Comprised in
CKL
Planning | Surveying | Engineering
SO 434446
TERRITORIAL AUTHORITY AUCKLAND CITY
Surveyed by CKL
Scale NTS
Date OCT 2010
CROSS SECTION DT-DT'
LAND DISTRICT NORTH AUCKLAND
SEC 348
SEC 1148
SEC 148
SEC 347
SEC 1147
SEC 147
SEC 301
SEC 1128
SEC 128
SEC 1129
SEC 129
SEC 331
SEC 1131
SEC 131
SEC 342
SEC 1142
SEC 142
ER
EQ
DX
DY
EA
EL
Ex Ground level
Tunnel BDY
CT BDY
Stream
Upper Limit Covenant Area RL=21.00m
Upper Limit Covenant Area RL=18.60m
RL=-55.00m (Lower Limit)


Horizontal Datum
Bearings and Coordinates are in terms of Geodetic Datum 2000 – Mt Eden Local Circuit
Vertical Datum
Levels are in terms of Auckland Vertical Datum 1946.
Origin of Levels – RM 3754 SO 53496
RL = 41.750m
Area's DX, DY, EA, EO, EQ and ER are to be subject to a Proposed Restrictive Covenant
Sheet 165 of 196
Total Area
Comprised in
CKL
Planning | Surveying | Engineering
SO 434446
TERRITORIAL AUTHORITY AUCKLAND CITY
Surveyed by CKL
Scale NTS
Date OCT 2010
CROSS SECTION DW-DW'
LAND DISTRICT NORTH AUCKLAND
SEC 348
SEC 1148
SEC 148
SEC 347
SEC 1147
SEC 147
SEC 301
SEC 1128
SEC 128
SEC 1129
SEC 129
SEC 331
SEC 1131
SEC 131
SEC 345
SEC 1145
SEC 145
ER
EQ
DX
DY
EA
EO
DW
DW'
Tunnel BDY
CT BDY
Stream
Upper Limit Covenant Area RL=21.00m
Upper Limit Covenant Area RL=12.50m
Ex Ground level
RL=-55.00m (Lower Limit)


Horizontal Datum
Bearings and Coordinates are in terms of Geodetic Datum 2000 - Mt Eden Local Circuit
Vertical Datum
Levels are in terms of Auckland Vertical Datum 1946.
Origin of Levels = RM 3754 SO 53496
RL = 41.750m
Area's EQ, ER, ES and EU are to be subject to a Proposed Restrictive Covenant
Sheet 170 of 196
Total Area
Comprised in
CKL
Planning | Surveying | Engineering
SO 434446
TERRITORIAL AUTHORITY AUCKLAND CITY
Surveyed by CKL
Scale NTS
Date OCT 2010
CROSS SECTION EA-EA'
LAND DISTRICT NORTH AUCKLAND
SEC 347
SEC 348
SEC 355
SEC 1147
SEC 1148
SEC 1149
SEC 1151
SEC 147
SEC 148
SEC 149
SEC 151
SEC 126
SEC 152
EQ
ER
ES
EU
EA
EA'
CT BDY
Stream
Ex. Ground level
Upper Limit Covenant Area
RL=-55.00m (Lower Limit)

# RECORD OF TITLE
# UNDER LAND TRANSFER ACT 2017
# FREEHOLD

**Guaranteed Search Copy issued under Section 60 of the Land Transfer Act 2017**

R.W. Muir
Registrar-General
of Land

**Identifier** **867814**
**Land Registration District** **North Auckland**
**Date Issued** 11 November 2019

**Prior References**
NA139B/955

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**Estate** Fee Simple
**Area** 1.6351 hectares more or less
**Legal Description** Lot 1 Deposited Plan 531494
**Registered Owners**
Health New Zealand

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**Interests**

C491423.1 Subject to conditions pursuant to Section 461(1) Local Government Act 1974 and certifying that a private drain passes through and serves the within land - 22.6.1993 at 2.08 pm

Appurtenant hereto is a right of way specified in Easement Certificate C510175.4 - 24.8.1993 at 2.56 pm

The easements specified in Easement Certificate C510175.4 are subject to Section 243 (a) Resource Management Act 1991

Subject to an electricity right (in gross) over part marked D on DP 531494 in favour of Mercury Energy Limited created by Transfer D036499.8 - 22.8.1996 at 10.40 am

Subject to a telecommunications right (in gross) over part marked D on DP 531494 in favour of Telecom New Zealand Limited created by Transfer D036499.12 - 22.8.1996 at 10.40 am

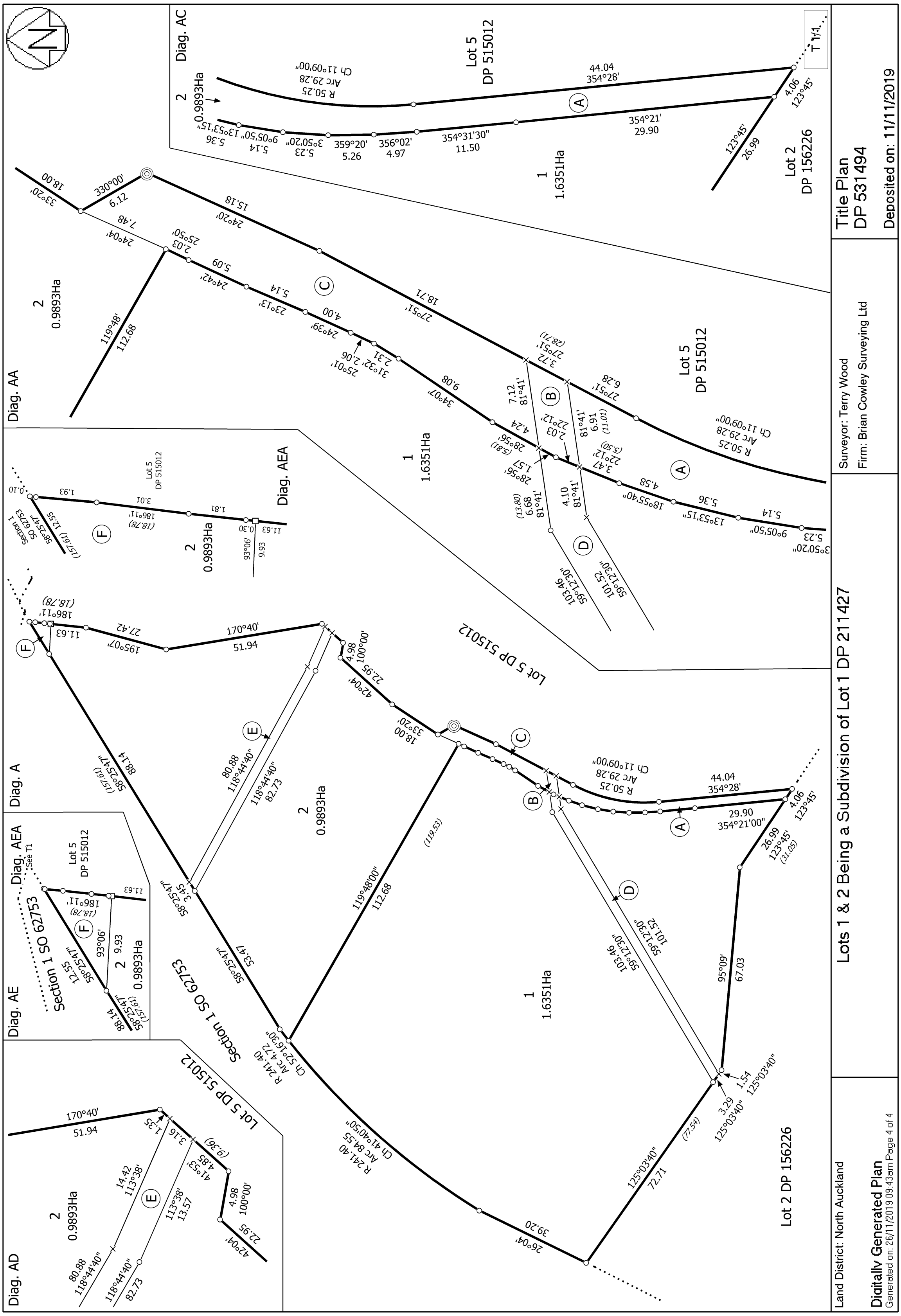
Appurtenant hereto is a gas right created by Transfer D036499.14 - 22.8.1996 at 10.40 am

Appurtenant hereto is a right of way created by Easement Instrument 5590341.12 - 19.5.2003 at 9:00 am

The easement created by Easement Instrument 5590341.12 is subject to Section 243 (a) Resource Management Act 1991

Appurtenant hereto is a right of way created by Easement Instrument 12134873.1 - 5.7.2021 at 12:40 pm

12784143.1 CERTIFICATE PURSUANT TO SECTION 77 BUILDING ACT 2004 THAT THIS RECORD OF TITLE IS SUBJECT TO THE CONDITION IMPOSED UNDER SECTION 75(2) (ALSO AFFECTS NA93B/540 ) - 29.9.2023 at 9:51 am


Title Plan
DP 531494
Deposited on: 11/11/2019
Surveyor: Terry Wood
Firm: Brian Cowley Surveying Ltd
Lots 1 & 2 Being a Subdivision of Lot 1 DP 211427
Land District: North Auckland
Digitally Generated Plan
Lot 5 DP 515012
Lot 2 DP 156226
Section 1 SO 62753
1
1.6351Ha
2
0.9893Ha
Diag. A
Diag. AA
Diag. AC
Diag. AD
Diag. AE
Diag. AEA

# RECORD OF TITLE
# UNDER LAND TRANSFER ACT 2017
# FREEHOLD

**Guaranteed Search Copy issued under Section 60 of the Land Transfer Act 2017**

R.W. Muir
Registrar-General
of Land

**Identifier** **868263**
**Land Registration District** **North Auckland**
**Date Issued** 11 November 2019

**Prior References**
799991

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**Estate** Fee Simple
**Area** 1.2053 hectares more or less
**Legal Description** Lot 1 Deposited Plan 531496
**Registered Owners**
Health New Zealand

---

**Interests**

C491423.1 Subject to conditions pursuant to Section 461(1) Local Government Act 1974 and certifying that a private drain passes through and serves the within land - 22.6.1993 at 2.08 pm

Appurtenant hereto is an electricity right created by Transfer D036499.13 - 22.8.1996 at 10.40 am

Appurtenant hereto is a electricity and gas right created by Transfer D036499.16 - 22.8.1996 at 10.40 am

Appurtenant hereto is a electricity and water supply right created by Transfer D036499.17 - 22.8.1996 at 10.40 am

5590341.6 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 19.5.2003 at 9:00 am

5590341.7 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 19.5.2003 at 9:00 am

Appurtenant hereto is a right of way and electricity, telecommunications and water supply easements created by Easement Instrument 5590341.13 - 19.5.2003 at 9:00 am

The easements created by Easement Instrument 5590341.13 are subject to Section 243 (a) Resource Management Act 1991

Appurtenant hereto is a water supply easement created by Easement Instrument 5590341.15 - 19.5.2003 at 9:00 am

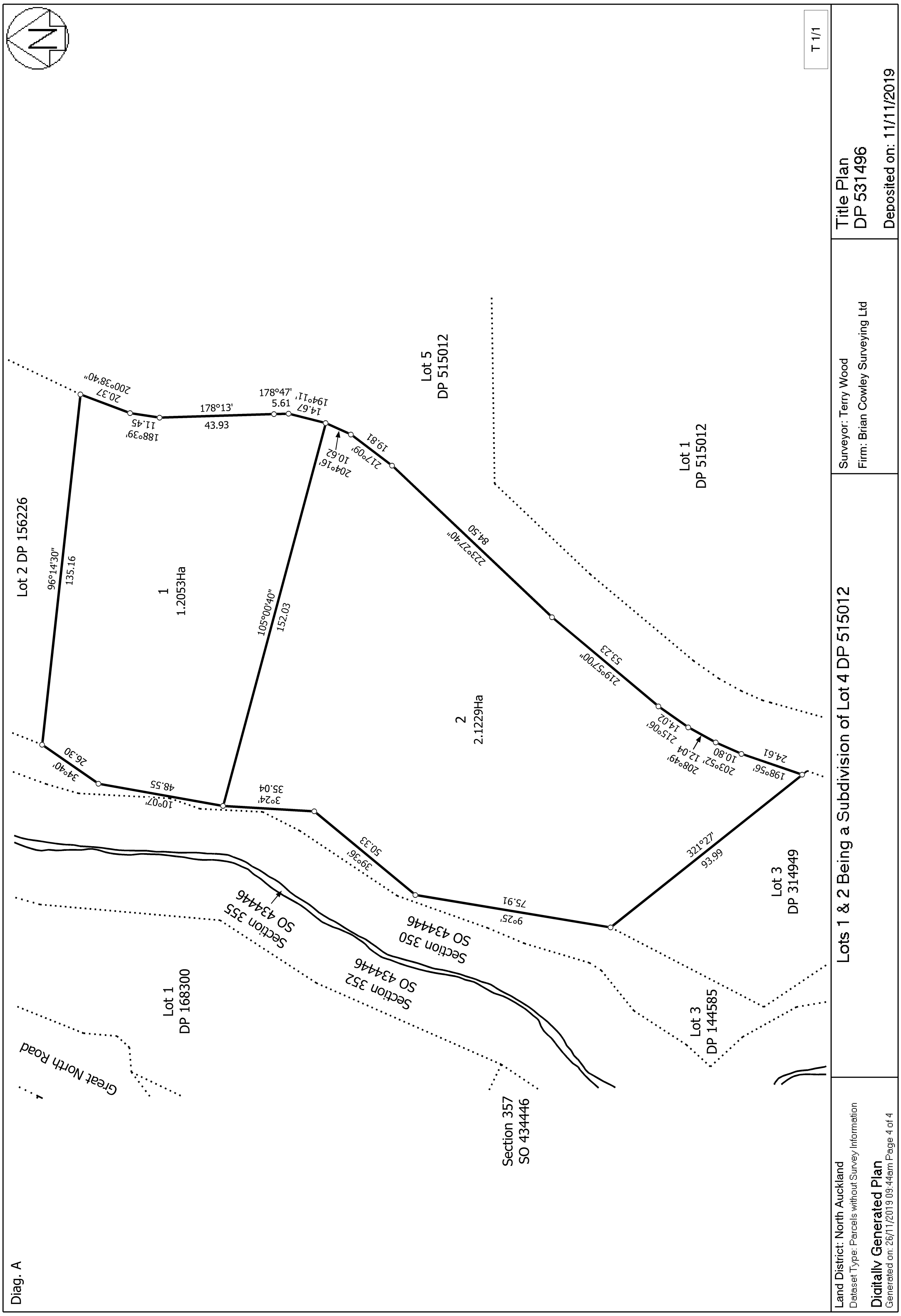
The easement created by Easement Instrument 5590341.15 is subject to Section 243 (a) Resource Management Act 1991

9918192.1 Certificate under section 148 of the Nga Mana Whenua o Tamaki Makaurau Collective Redress Act 2014 that the within land is RFR land as defined in section 118 and is subject to Subpart 1 of Part 4 of the Act (which restricts disposal, including leasing of the land) - 5.12.2014 at 7:00 am

11076921.4 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 9.4.2018 at 2:00 pm

Appurtenant hereto is a right of way and a right to convey electricity, water supply and telecommunications and right to drain stormwater and wastewater created by Easement Instrument 11076921.5 - 9.4.2018 at 2:00 pm

The easements created by Easement Instrument 11076921.5 are subject to Section 243 (a) Resource Management Act 1991


T 1/1
Title Plan
DP 531496
Deposited on: 11/11/2019
Surveyor: Terry Wood
Firm: Brian Cowley Surveying Ltd
Lots 1 & 2 Being a Subdivision of Lot 4 DP 515012
Land District: North Auckland
Dataset Type: Parcels without Survey Information
Digitally Generated Plan
Generated on: 26/11/2019 09:44am Page 4 of 4
Diag. A
1
1.2053Ha
2
2.1229Ha
Lot 5
DP 515012
Lot 1
DP 515012
Lot 2 DP 156226
Lot 3
DP 314949
Lot 3
DP 144585
Lot 1
DP 168300
Section 355
SO 434446
Section 350
SO 434446
Section 352
SO 434446
Section 357
SO 434446
Great North Road
96°14'30"
135.16
105°00'40"
152.03
200°38'40"
20.37
188°39'
11.45
178°13'
43.93
178°47'
5.61
194°11'
14.67
204°16'
10.62
217°09'
19.81
223°27'40"
84.50
219°57'00"
53.23
215°06'
14.02
208°49'
12.04
203°52'
10.80
198°56'
24.61
321°27'
93.99
9°25'
75.91
39°36'
50.33
3°24'
35.04
10°07'
48.55
34°40'
26.30

# RECORD OF TITLE
# UNDER LAND TRANSFER ACT 2017
# FREEHOLD

**Guaranteed Search Copy issued under Section 60 of the Land Transfer Act 2017**

R.W. Muir
Registrar-General
of Land

**Identifier** **NA93B/540**
**Land Registration District** **North Auckland**
**Date Issued** 17 June 1993

**Prior References**
NA85D/293

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**Estate** Fee Simple
**Area** 3.9390 hectares more or less
**Legal Description** Lot 2 Deposited Plan 156226
**Registered Owners**
Health New Zealand

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**Interests**

C489391.2 Resolution pursuant to Section 321(3)(c) Local Government Act 1974 - Produced 15.6.1993 at 2.39 pm and entered 17.6.1993 at 9.00 am

C491423.1 Subject to conditions pursuant to Section 461(1) Local Government Act 1974 and certifying that a private drain passes through and serves the within land - 22.6.1993 at 2.08 pm

Appurtenant hereto is a right of way specified in Easement Certificate C510175.4 - 24.8.1993 at 2.56 pm

Subject to a right of way over part marked C on DP 156226 specified in Easement Certificate C510175.4 - 24.8.1993 at 2.56 pm

The easements specified in Easement Certificate C510175.4 are subject to Section 243 (a) Resource Management Act 1991

C582654.1 CAVEAT BY WAITEMATA HEALTH LIMITED - 28.3.1994 AT 10.52 AM

Subject to an electricity right (in gross) over parts marked I, J, K, L, M and N on Plan 156648 in favour of Mercury Energy Limited created by Transfer D036499.9 - 22.8.1996 at 10.40 am

Subject to a telecommunications right (in gross) over parts marked AG, N, M, K, J and I on Plan 156648 in favour of Telecom New Zealand Limited created by Transfer D036499.11 - 22.8.1996 at 10.40 am

Subject to a gas right over parts marked AJ, AI, K, J and AM on Plan 156648 created by Transfer D036499.14 - 22.8.1996 at 10.40 am

Subject to a gas right over parts marked AE, AF, AG, N, AH, K, AI and AJ on Plan 156648 created by Transfer D036499.15 - 22.8.1996 at 10.40 am

Subject to an electricity right over parts marked AL, AN and AE on Plan 156648 and a gas right over parts marked AJ, AK and AL on Plan 156648 created by Transfer D036499.16 - 22.8.1996 at 10.40 am

Appurtenant hereto is a steam supply right created by Transfer D036499.19 - 22.8.1996 at 10.40 am

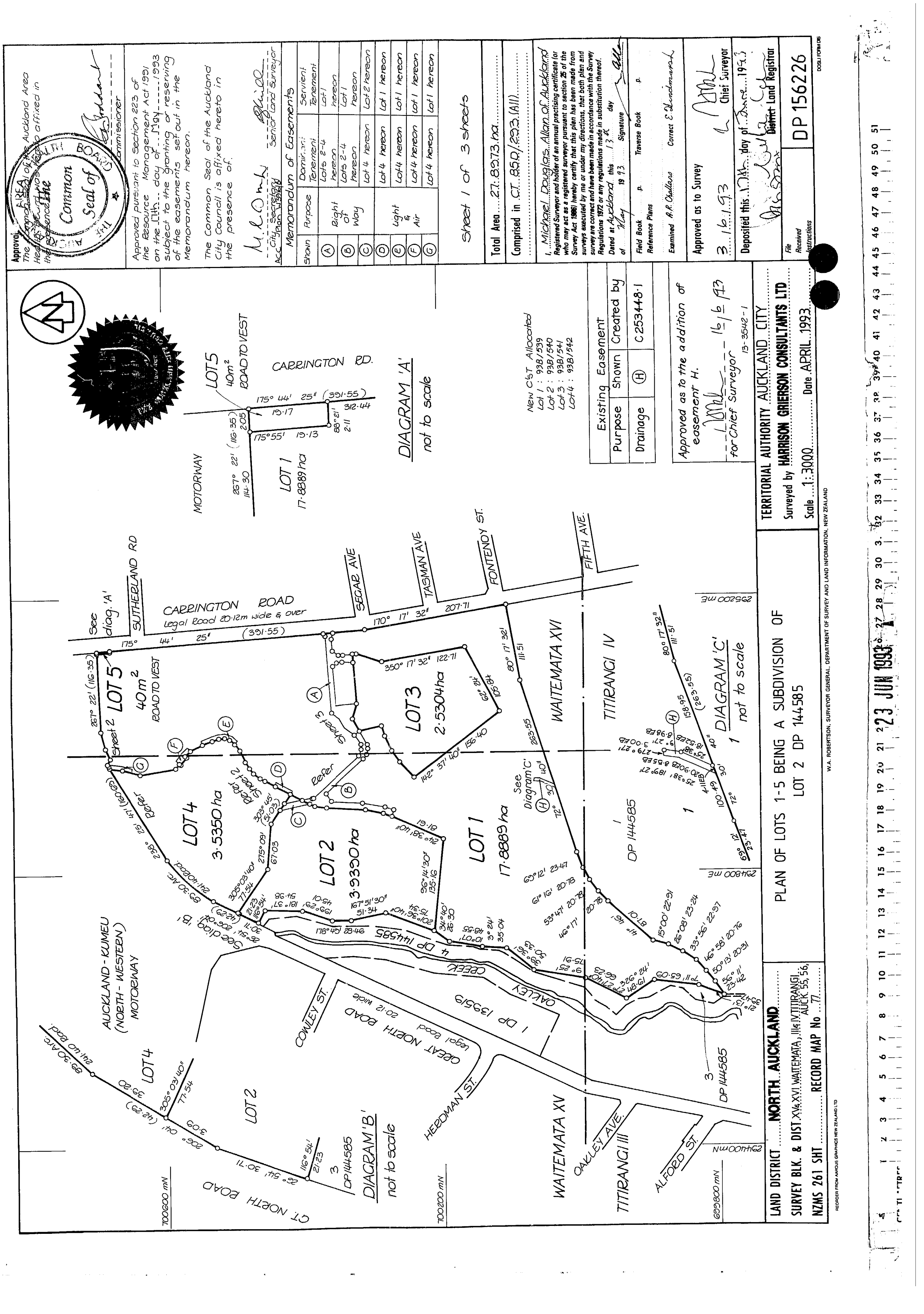
Subject to a gas supply right (in gross) over part marked H on Plan 156648 in favour of Auckland Gas Company Limited created by Transfer D054952.1 - 10.10.1996 at 2.42 pm

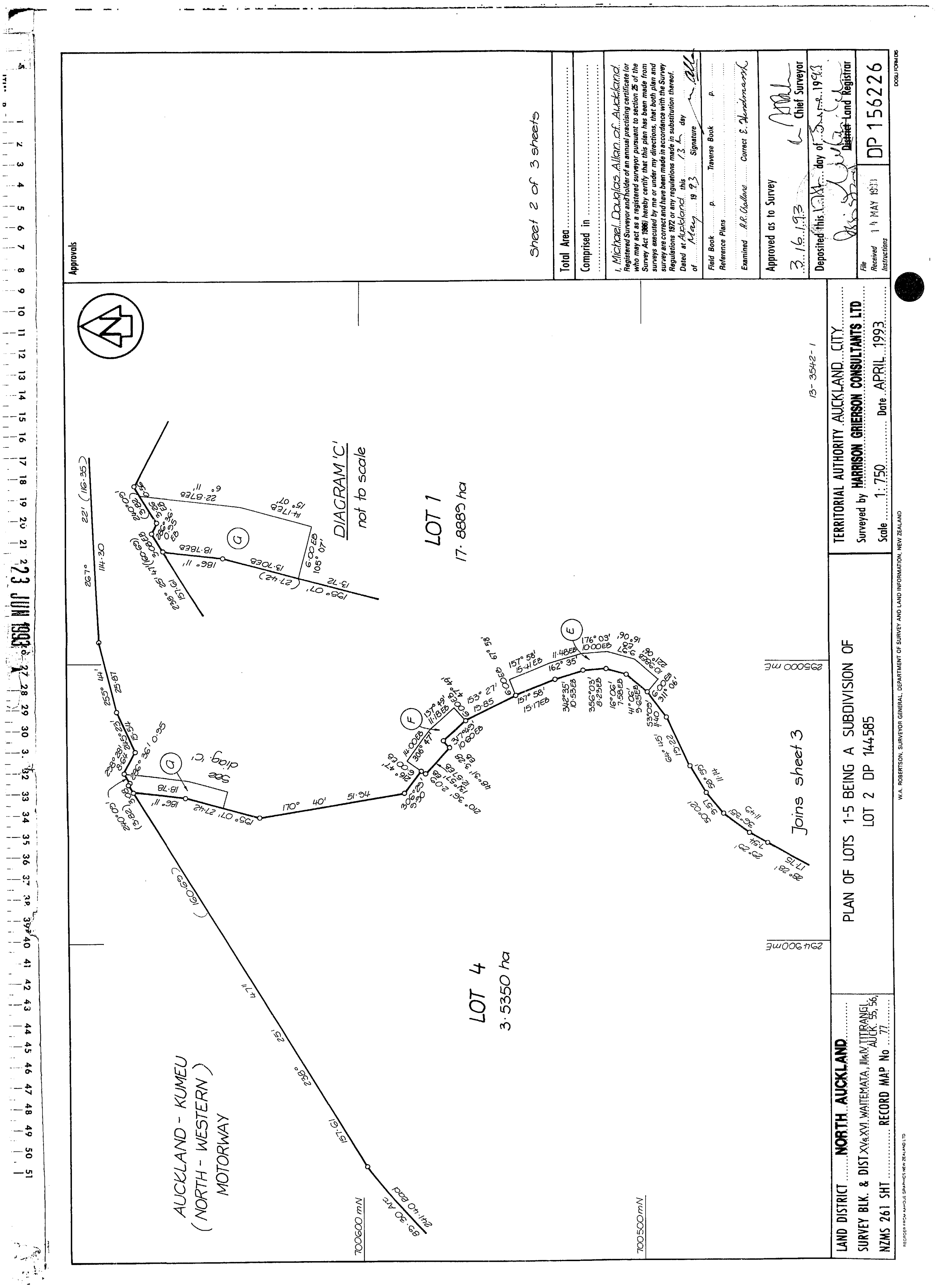
9918192.1 Certificate under section 148 of the Nga Mana Whenua o Tamaki Makaurau Collective Redress Act 2014 that the within land is RFR land as defined in section 118 and is subject to Subpart 1 of Part 4 of the Act (which restricts disposal, including leasing of the land) - 5.12.2014 at 7:00 am

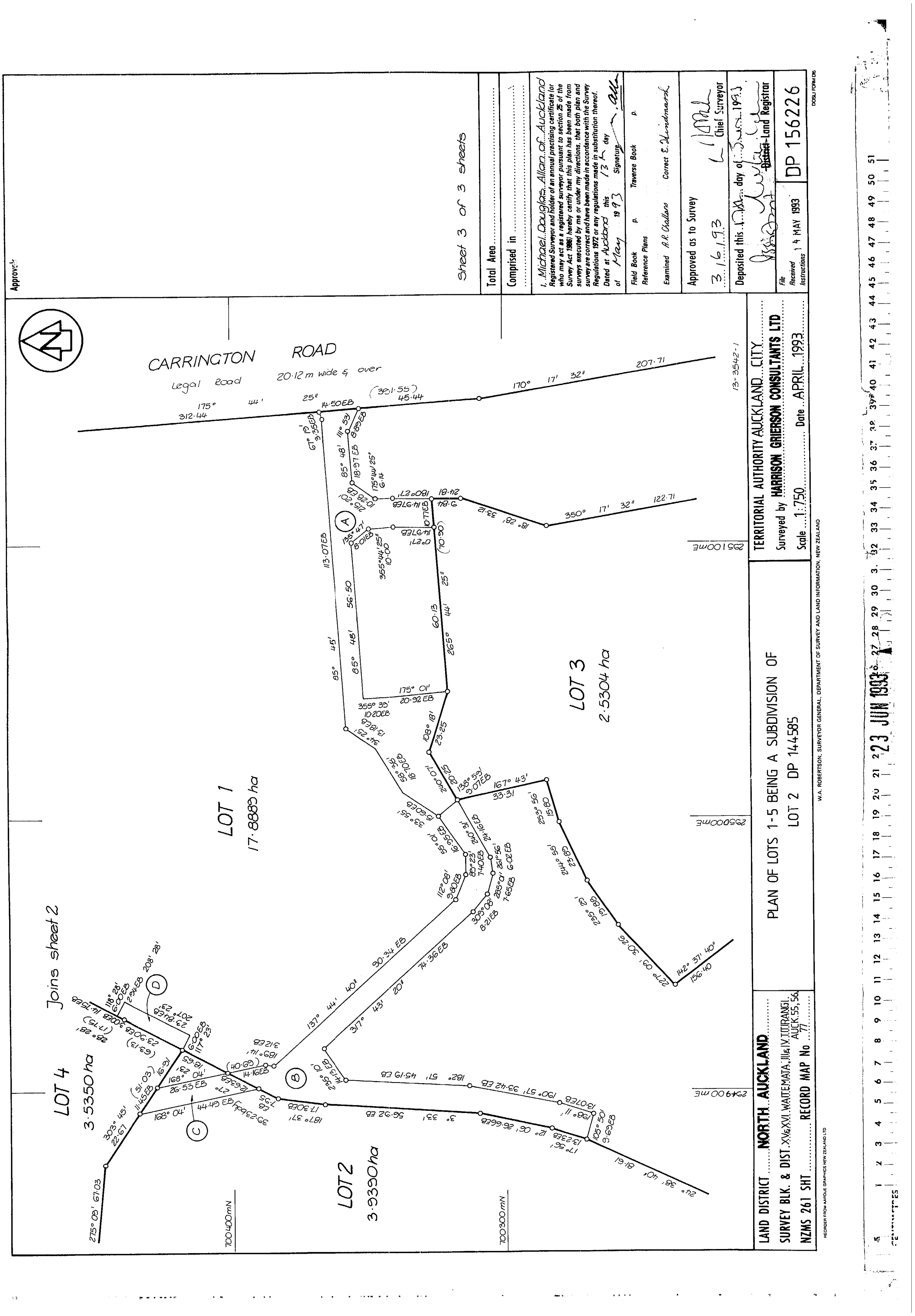
10916326.1 Notification that a building consent issued pursuant to Section 72 Building Act 2004 identifies inundation as a natural hazard - 27.9.2017 at 2:15 pm

Subject to a right (in gross) to convey electricity over parts marked A, B, C on DP 562166 in favour of Vector Limited created by Easement Instrument 12200344.2 - 27.9.2021 at 5:06 pm

12784143.1 CERTIFICATE PURSUANT TO SECTION 77 BUILDING ACT 2004 THAT THIS RECORD OF TITLE IS SUBJECT TO THE CONDITION IMPOSED UNDER SECTION 75(2) (ALSO AFFECTS 867814 ) - 29.9.2023 at 9:51 am


DP 156226
PLAN OF LOTS 1-5 BEING A SUBDIVISION OF LOT 2 DP 144585
TERRITORIAL AUTHORITY AUCKLAND CITY
Surveyed by HARRISON GRIERSON CONSULTANTS LTD
Scale 1:3000
Date APRIL 1993
LAND DISTRICT NORTH AUCKLAND
Sheet 1 of 3 sheets
Total Area 27.8973 ha
LOT 1 17.8889 ha
LOT 2 3.9390 ha
LOT 3 2.5304 ha
LOT 4 3.5350 ha
LOT 5 40 m² ROAD TO VEST
CARRINGTON ROAD
DIAGRAM 'A' not to scale
DIAGRAM 'B' not to scale
DIAGRAM 'C' not to scale
Memorandum of Easements
23 JUN 1993


Approvals
Sheet 2 of 3 sheets
Total Area
Comprised in
I, Michael Douglas Allan of Auckland
Field Book
Reference Plans
Examined
Approved as to Survey
Chief Surveyor
Deposited this
District Land Registrar
DP 156226
14 MAY 1993
TERRITORIAL AUTHORITY AUCKLAND CITY
Surveyed by HARRISON GRIERSON CONSULTANTS LTD
Scale 1:750 Date APRIL 1993
PLAN OF LOTS 1-5 BEING A SUBDIVISION OF
LOT 2 DP 144585
LAND DISTRICT NORTH AUCKLAND
RECORD MAP No 77
LOT 1
17.8889 ha
LOT 4
3.5350 ha
DIAGRAM 'C'
not to scale
AUCKLAND - KUMEU
( NORTH - WESTERN )
MOTORWAY
Joins sheet 3
23 JUN 1993
700600 mN
700500 mN
295000 mE
294900 mE


CARRINGTON ROAD
Legal Road 20.12 m wide & over
LOT 1
17.8883 ha
LOT 2
3.9390 ha
LOT 3
2.5304 ha
LOT 4
3.5350 ha
Joins sheet 2
Sheet 3 of 3 sheets
Total Area
Comprised in
Approved as to Survey
3.6.93
Chief Surveyor
Deposited this
District Land Registrar
DP 156226
TERRITORIAL AUTHORITY AUCKLAND CITY
Surveyed by HARRISON GRIERSON CONSULTANTS LTD
Scale 1:750 Date APRIL 1993
PLAN OF LOTS 1-5 BEING A SUBDIVISION OF
LOT 2 DP 144585
LAND DISTRICT NORTH AUCKLAND
NZMS 261 SHT
RECORD MAP No 77
23 JUN 1993

| Record oftitle | Legaldescription | Address |
|---|---|---|
| **Land owned by His Majesty the King for State housing purposes** | | |
| 799989 | Lot 2 Deposited Plan515012 | 26 Rhodes Avenue |
| 799990 | Lot 3 Deposited Plan515012 | 127 Carrington Road |
| 799993 | Lot 6 Deposited Plan515012 | 99 Carrington Road |
| 867815 | Lot 2 Deposited Plan531494 | 3 Carrington Road |
| 868264 | Lot 2 Deposited Plan531496 | 119B Carrington Road |
| 1017462 | Section 3 Survey Office Plan520006 | 1 Carrington Road |
| 1071371 | Sections 2 – 5 Survey Office Plan573867 | 131 Carrington Road |
| NA93B/541 | Lot 3 Deposited Plan156226 | 1A Carrington Road |
| **Land owned by Whai Rawa Development LP** | | |
| 579605 | Section 348 Survey Office Plan434446 | 36 Laurel Street |
| **Land owned by Whai Rawa Property Holdings LP** | | |
| 58979 | Lot 1 Deposited Plan314949 | 125 Carrington Road |
| 58980 | Lot 2 Deposited Plan314949 | 123 Carrington Road |
| 58981 | Lot 3 Deposited Plan314949 | 121 Carrington Road |
| **Land owned by Health New Zealand** | | |
| 867814 | Lot 1 Deposited Plan531494 | 3A Carrington Road |
| 868263 | Lot 1 Deposited Plan531496 | 119A Carrington Road |
| NA93B/540 | Lot 2 Deposited Plan156226 | 81A Carrington Road |
| **Land held by His Majesty the King for a technical institute** | | |
| 782088 | Section 1 Survey Office Plan 493517 | 24 Mark Road |