Grand Estate, Orewa

Integrated Transport Assessment Report

July 2025

flow
TRANSPORTATION SPECIALISTS

flow
TRANSPORTATION SPECIALISTS

Project:	**Ara Hills, Orewa**
Title:	**Integrated Transport Assessment Report**
Document Reference:	**P:\AVJE\018 Ara Hills Plan Change\4.0 Reporting\R1J230428 Ara Hills_Flow ITA_FINAL.docx**
Prepared by:	**Vanessa Wong, Sagar Malakappa**
Project Manager	**Vanessa Wong**
Reviewed by:	**Mat Collins**

Revisions:

Date	Status	Reference	Approved by	Initials
6 December 2018	A - DRAFT	R1A181206	A Crafer	
11 December 2018	B - DRAFT	R1B181211	A Crafer	
21 January 2019	C - DRAFT	R1C190121	A Crafer	
11 July 2019	D - FINAL	R1D190711	A Crafer	
19 December 2019	E	R1E191219	A Crafer	
30 October 2020	F	R1F201021	A Crafer	
17 March 2021	G	R1G210317	A Crafer	
27 April 2021	H	R1H210427	A Crafer	
8 December 2022	I - DRAFT	R1I221208	M Collins	
28 April 2023	J - FINAL	R1J230428	V Wong	
25 July 2025	K - FINAL	R1J250725	N Harrison	

EXECUTIVE SUMMARY

Flow Transportation Specialists Ltd ("Flow") has been commissioned by AV Jennings Limited to provide an integrated transportation assessment (ITA) for a proposed plan change at Ara Hills (formerly Hall's Farm and Grand Estate) in Orewa in relation to proposed re-zoning for residential, recreation, open space, neighbourhood centre activities and roading.

The land is currently zoned Future Urban with consent granted in August 2017 to subdivide two rural lots for residential development (575 lots) with public and private roading (BUN20441333).

AV Jennings has undertaken a review of the site and they have developed a revised masterplan that seeks to enable up to 900 dwellings on the site, plus a neighbourhood centre and associated roading and green spaces. AV Jennings is seeking a private Plan Change to enable the new masterplan.

The land has the advantage of being in single ownership and it is proposed that the local roading network and associated infrastructure will be installed by the landowners. There is no requirement for a funding agreement for these roads, although there have been discussions with Auckland Transport regarding the additional costs to be contributed by Auckland Transport for changes to the future arterial road extending from the western roundabout at the SH1/Grand Drive interchange to the western boundary of the site. Access to future urban land adjacent to the site will be enabled.

For the purposes of the transport assessment, the development potential of the site has been assumed to be able to accommodate 950 dwellings and 710 m^2 GFA of local shops/convenience/ amenity stores. While the zoning would allow for more local retail than this, this is only likely to occur if there is demand for it, and this is only likely if land outside the plan change to the south and west is developed.

A trip generation rate of 1 vehicle trip per dwelling per peak period, with 10% of these occurring within the site (eg to the local convenience stores, home employment, or local parks) has been assumed. It has been assumed that all vehicle trips will enter and exit the area via Grand Drive at the SH1/Orewa interchange, either crossing to travel to/from Orewa or accessing the motorway to travel north or south. An assessment of the operation of the roundabouts has been undertaken and the additional trips have been found to have a negligible effect on their operation.

In order to provide for pedestrians and cyclists travelling to and from the area, a dedicated bridge will be provided alongside the SH1 overbridge at the Orewa interchange with a shared path along the northern side of Grand Drive connecting to existing shared paths in the vicinity of Arran Drive, as was intended with the August 2017 subdivision consent. This is proposed to be built prior to the completion of 300 dwellings within the Plan Change site and is secured through Subdivision Standards in the Precinct provisions.

Based on the assessment in this report, we conclude that:

- the site has good vehicle and cycling accessibility to Orewa and its schools, shops and amenities
- bus stops on Grand Drive provide services to Orewa and to the Hibiscus Coast Bus Station via Millwater

- the site has direct access to State Highway 1, providing access to the wider Auckland region and beyond, including to the park and ride at the Hibiscus Coast Bus Station
- the effects of the anticipated increase in vehicles are expected to be minor with all surrounding roads and intersections capable of accommodating site-generated traffic
- the identification of the key transport features identified in this report and within the proposed Precinct Plan will assist in ensuring that the key transport outcomes of the Precinct Plan are delivered for the site, in a manner that integrates transport with the existing and future roading network
- the Auckland-wide rules of the Unitary Plan, including a comprehensive set of transport rules under E27, are considered to be appropriate to address the potential for adverse effects, and they will enable assessment of the traffic effects during further consent processes.

Based on the above and the detail in this report, we conclude that the proposed Plan Change is acceptable from a transport planning perspective.

CONTENTS

APPENDICES

1 INTRODUCTION

Flow Transportation Specialists Ltd ("Flow") has been commissioned by AV Jennings Limited to provide an integrated transportation assessment (ITA) for a Plan Change at Ara Hills (formerly Hall's Farm and Grand Estate) in Orewa in relation to proposed re-zoning for residential, recreation, open space and business-neighbourhood centre activities.

The land is currently zoned Future Urban with consent granted in August 2017 to subdivide two rural lots for residential development (575 lots) with public and private roading (BUN20441333). Stages 1, 2 and 3 are currently in the process of being constructed.

AV Jennings has undertaken a review of the site and they have developed a revised masterplan that seeks to enable up to 900 dwellings on the site, plus a neighbourhood centre and associated roading and green spaces. AV Jennings is seeking a private Plan Change to enable the new masterplan.

The Plan Change reflects the revised masterplan and includes zoning the land to enable a mix of residential zoning, together with a neighbourhood centre, recreation, conservation, and open space.

Key transportation considerations of the Plan Change include the accessibility of the site and within the site using various modes of transport and the ability of the internal and surrounding transport network to safely and efficiently accommodate trips generated by potential development.

This ITA includes the following:

- A description of the existing transport environment
- A description of the masterplan and Plan Change
- An assessment of the expected trips generated by the proposed development, and the anticipated transport safety and efficiency effects on the surrounding road network
- Planning and policy framework
- Proposed Precinct provisions.

2 EXISTING ENVIRONMENT

2.1 Site Location

The area proposed for development subdivision is located at Grand Estate in Orewa, which is immediately to the west of State Highway 1 (SH1), accessed at the Grand Drive motorway interchange (exit 394). The area is shown in Figure 1.

Figure 1: Site Location

2.2 Land Use

The land use zoning from the Auckland Unitary Plan (AUP) is shown in Figure 2 and shows the subject site is zoned Future Urban Zone. To the east of SH1, the land use is predominantly residential and the Orewa town centre is classified as business zones. Residential development is occurring immediately to the east of SH1, both north of Grand Drive and to the east and west of Arran Drive. Development occurring to the south includes Wainui East, accessed from motorway ramps at Wainui Road and Millwater Parkway and connects across the motorway at Wainui Road.

In response to the National Policy Statement – Urban Development (NPS-UD) and Medium Density Residential Standards (MDRS), Auckland Council is proposing to increase the enabled density of some residential areas with Orewa and Millwater, as shown in Figure 3

Figure 2: Auckland Unitary Plan Land Use Zoning

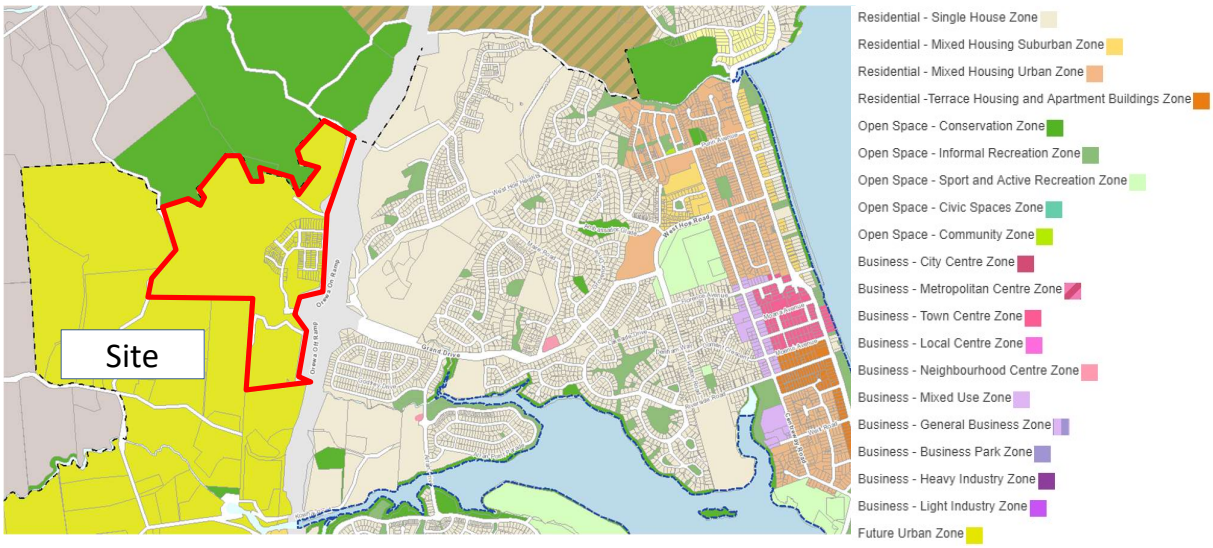
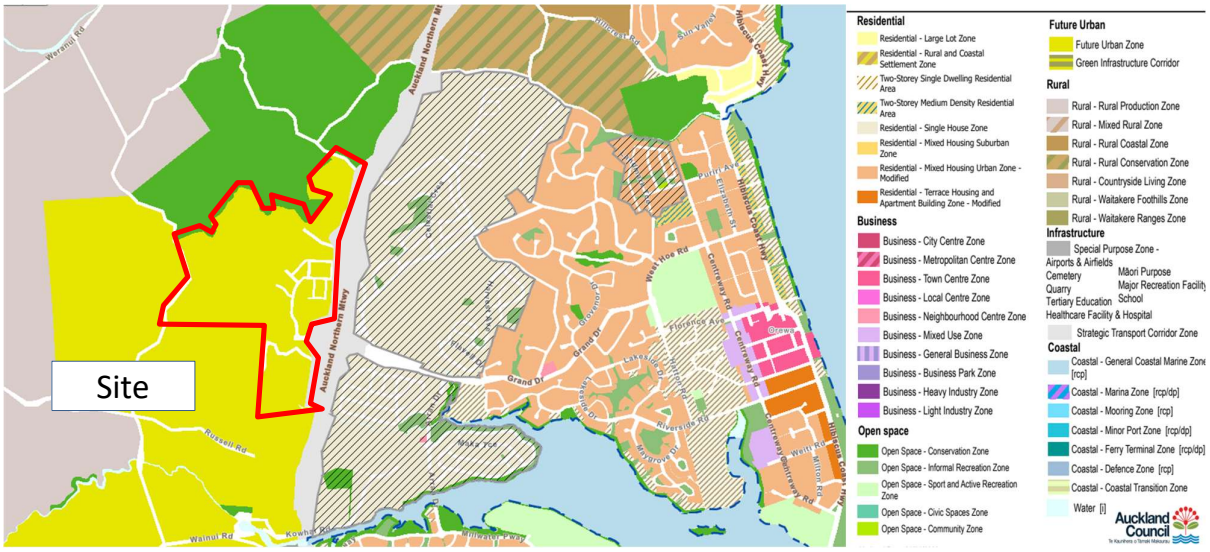


Figure 3: Proposed land use zoning, from the Preliminary response viewer for NPS-UD and MDRS[1]



2.3 Surrounding Transport Network

2.3.1 Road Network

The SH1/Grand Drive interchange is the third and northern interchange providing access to Orewa, the other interchanges being at Silverdale and Wainui. The Hibiscus Coast Bus Station and Park & Ride are located just off the Silverdale motorway interchange, 5 km south, along the motorway from Grand Estate. The Grand Drive interchange has a diamond configuration with roundabouts at each pair of ramps. Grand Drive joins the western roundabout and forms the new T-intersection with Ara Hill Drive (constructed). Ara Hill Drive is the eastern most access to the Ara Hills development.

[1] Preliminary response viewer for NPS-UD and MDRS (April 2022), available online https://aucklandcouncil.maps.arcgis.com/apps/webappviewer/index.html?id=fbdb956a1ddc48799e5cd454d7c6097e

Grand Drive (east of the SH1 interchange) is classified as an arterial road in the AUP and provides access to Orewa in the east. It also provides the last non-tolled route to/from the north, although it has weight restrictions for vehicles exceeding 3500 kg between 7 pm and 7 am. To the east of SH1 it provides one lane in each direction. It widens to provide additional lanes at the Grand Drive/Arran Drive signalised intersection, which is 800 m from the access to the site.

Near the Grand Drive interchange, SH1 has two lanes in each direction separated by a concrete barrier with shoulders on both sides. All the ramps at the interchange comprise a single lane, and each roundabout has a single circulation lane. In between the roundabouts, Grand Drive has a lane in each direction separated by a double yellow line with a footpath on the northern side.

The speed limits and traffic volumes on the four ramps have been obtained from the Traffic Monitoring System (TMS) and the other roads have been obtained from the Auckland Transport Open GIS Data website and are listed in Table 1.

Table 1: Speed Limits and Traffic Count Data, Auckland Transport

Location	Speed Limit km/hr	Count Date	7-Day Average Daily Traffic Volume
SH1 northbound between the northbound off ramp and on ramp	100	December 2019	9,752
SH1 southbound between the southbound off ramp and on ramp	100	December 2019	9,830
Northbound off ramp	100 to 70	2020	4,516
Northbound on ramp	100	2021	638
Southbound off ramp	100 to 70	2021	684
Southbound on ramp	70 to 100	2021	5,007
Grand Drive west of Arran Drive	70	November 2019	12,691

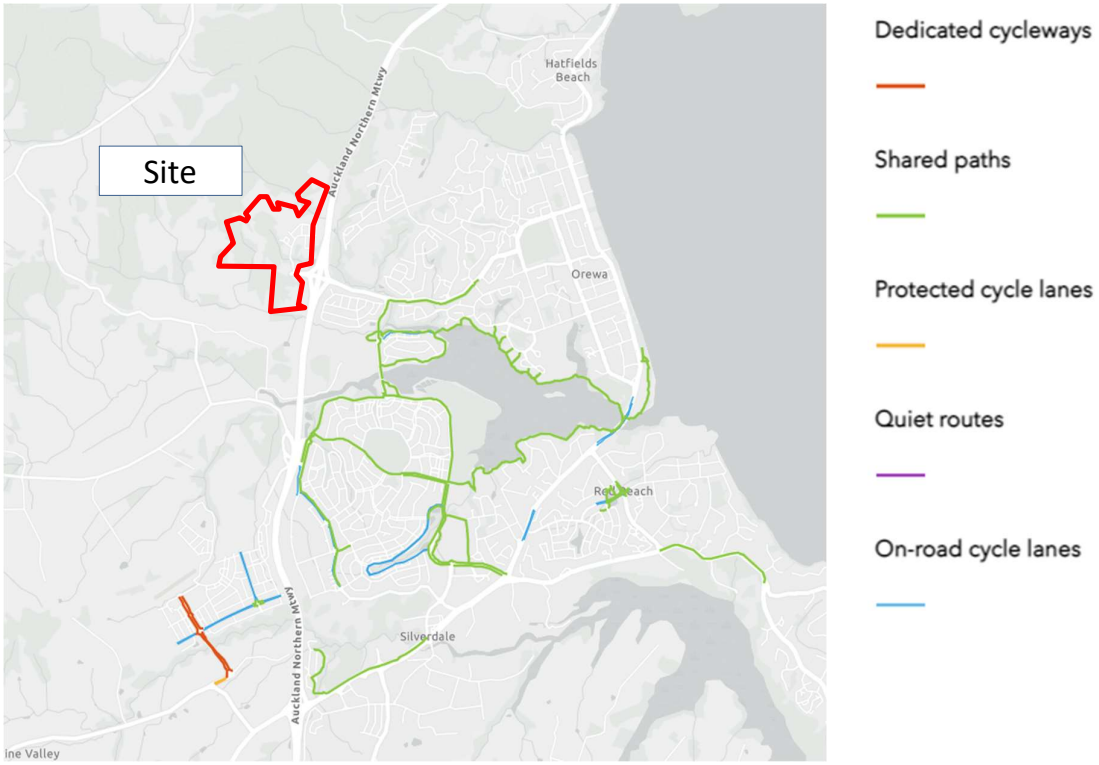
2.3.2 Pedestrian and Cyclist Facilities

Currently there are no footpaths or dedicated cycle facilities along Grand Drive to the west of Arran Drive other than across the motorway overbridge, as shown in the photograph below.

Figure 4: Grand Drive Overbridge view towards western roundabout (Source: googlemaps)

Shared cycle/footpaths are currently provided along the eastern side of Arran Drive and both sides of Grand Drive to the east of Arran Drive, in accordance with the Auckland Cycle Network shown in Figure 5. A footpath is also provided on the western side of Arran Drive.

Figure 5: Auckland Cycle Network Facility Types (existing)[2]



[2] Auckland Transport, November 2022

2.3.3 Public Transport

Bus stops are currently located on Grand Drive, with an eastbound stop 180 m east of Arran Drive and a westbound stop some 400 m east of Arran Drive. These stops serve bus route 985 that runs between the Hibiscus Coast Bus Station and Orewa via Millwater.

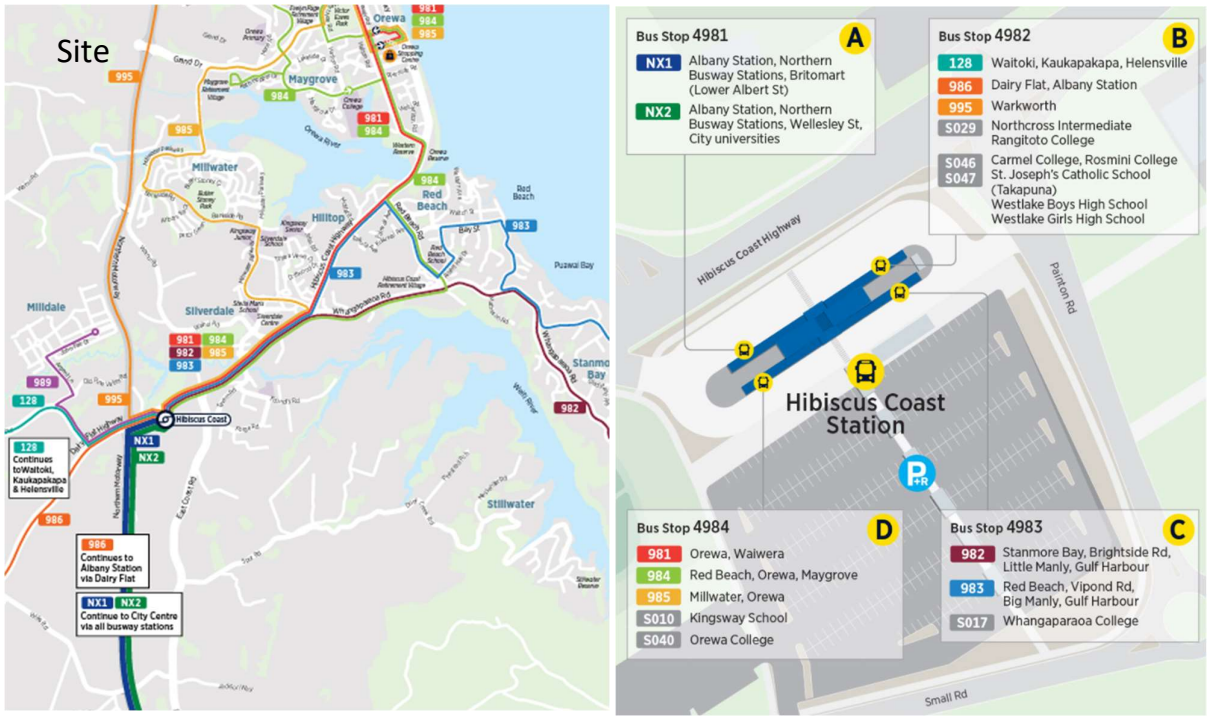
The Hibiscus Coast Bus Station is located on Hibiscus Coast Highway in Silverdale, some 300 m from the SH1/Hibiscus Coast Highway interchange. It provides connections to the following bus services[3]:

- 981: Waiwera or Orewa
- 982: Gulf Harbour and or Manly Shops
- 983: Gulf Harbour, Manly Shops, Coast Plaza
- 984: Orewa via Silverdale
- 985: Orewa via Millwater
- 986: Albany Station via Dairy Flat Highway
- 988: Coast Plaza and Gulf Harbour ferry terminal
- 989: To Milldale
- 995: To Warkworth
- NX1: Britomart via Northern Busway
- NX2: To Auckland University
- 010, 017, 029, 040, 45, 46, 47, 49 and 029: To Schools
- 128: To Hellensville

The Hibiscus Coast bus station has parking for bicycles as well as cars, and accordingly, residents living in the surrounding areas, including the proposed Plan Change site, can access the bus station and transfer to several bus services.

[3] https://at.govt.nz/media/1990522/hibiscus-coast_northern-bus-timetable.pdf

Figure 6: Bus Network in the Vicinity of the Site and Layout of Hibiscus Coast Station[4]



2.3.4 Supporting Growth Alliance – future transport projects

The Supporting Growth Alliance (SGA), a partnership between Auckland Transport and Waka Kotahi NZTA, is proposing long-term transport projects to support urban expansion in the North Auckland Area. This includes

- A new 16km rapid transit corridor from Albany via Dairy Flat and onto Milldale
- Improved public transport connections for the wider area with bus priority on key routes including a high frequency bus route connecting Ōrewa and Silverdale
- 25km of new walking and cycling paths across North Auckland
- Improvements to State Highway 1 (SH1) including additional space to cater for more people moving around in the future, upgraded interchanges at Redvale and Silverdale and a new interchange at Wilks Road.

SGA is currently working towards lodging Notices of Requirement documentation for these routes. The majority of these projects are yet to be funded for delivery. It is anticipated they will be considered for funding in line with the long-term timeframes for the rezoning and release of land by Auckland Council over the next 10-30 years.

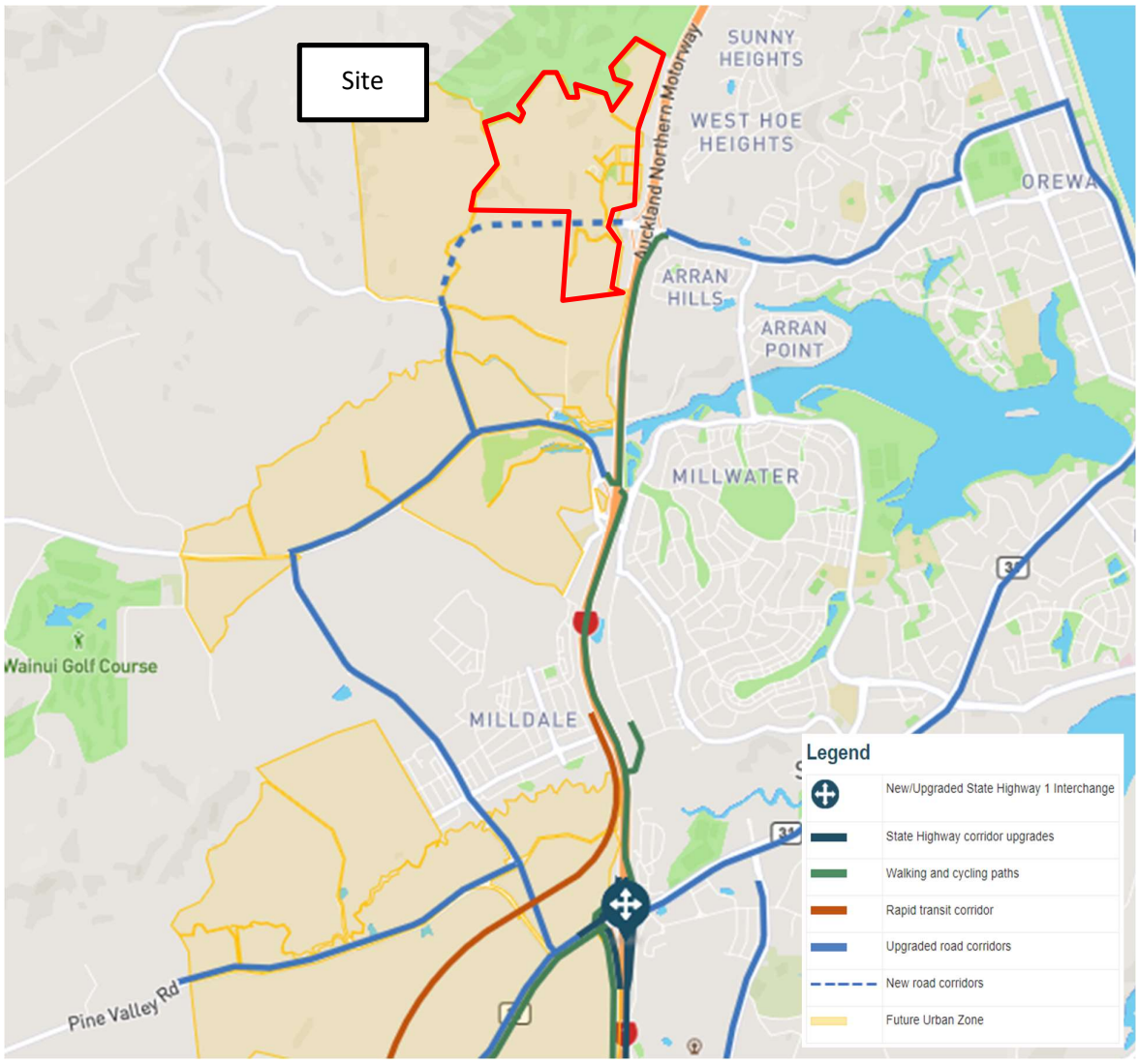
Routes/projects near to Ara Hills are shown in and include

- A new arterial road through the Ara Hills site, which has been future proofed through Ara Hills design for Grand Drive (west)

[4] Bus Station Layout accessed 17/3/21 from https://at.govt.nz/projects-roadworks/hibiscus-coast-bus-station/

- Upgraded corridors for Grand Drive and Upper Orewa Road
- A walking and cycling path along the eastern side of SH1
- Rapid transit corridor extension to Milldale
- Upgrade of Silverdale SH1 Interchange.

Figure 7: Supporting Growth projects[5]



[5] Long term transport connection for North Auckland, Supporting Growth Alliance, available online https://haveyoursay-supportinggrowth.nz/long-term-transport-connections-north-auckland

3 A SUMMARY OF TRANSPORT ASPECTS OF THE MASTERPLAN AND PLAN CHANGE

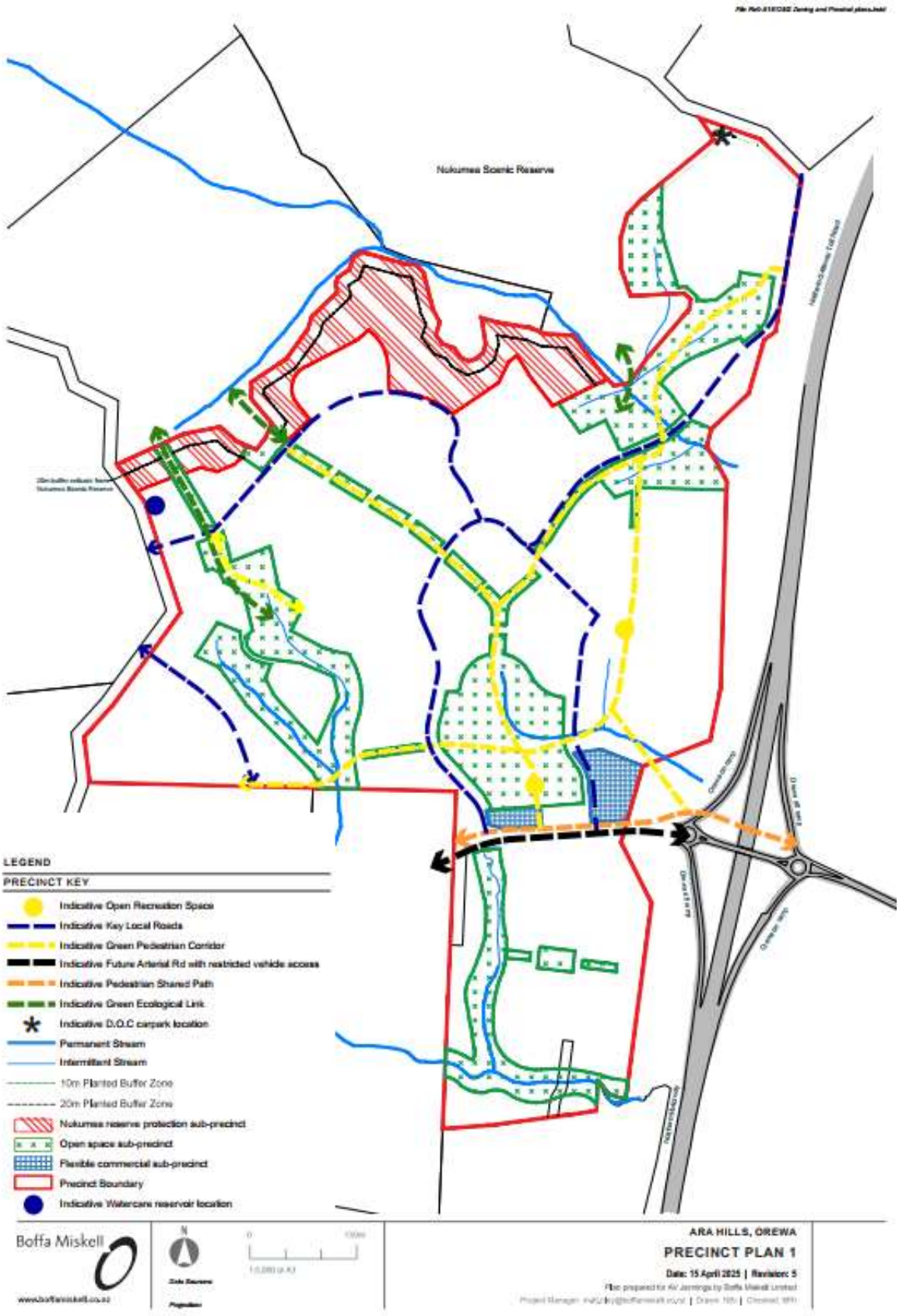
3.1 Overview

The land is currently zoned Future Urban with consent granted in August 2017 to subdivide two rural lots for residential development (575 lots). Currently the first three stages are underway

- Stage 1: 145 dwellings, title issued and housing construction underway
- Stage 2: 116 residential lots and 3 commercial lots, consent granted, currently lodged for Engineering Plan Approval (EPA) for public roads
- Stage 3: 56 dwellings, consent and EPA for public roads approved.

The Plan Change includes zoning the Site to enable a mix of residential zoning, neighbourhood centre, recreation, conservation, and open space, as shown in Figure 8. For the purposes of the transport assessment, it has been assumed that the rezoning could provide up to 950 dwellings supported by 710 m^2 GFA of local shops/convenience stores.

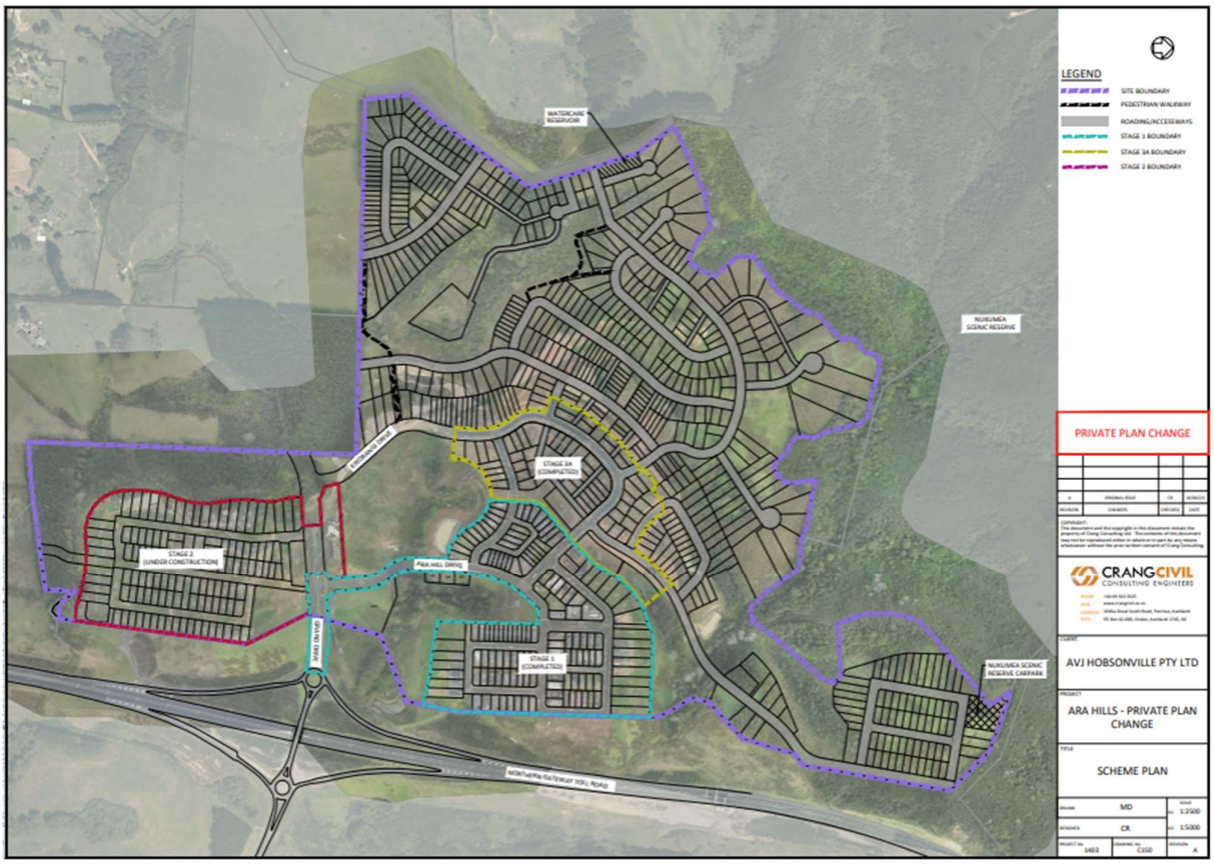
Figure 8: Precinct Plan



3.2 Staging

Figure 9 shows the indicative staging for the development. At full build out 900 dwellings are anticipated, however to allow some conservatism 950 dwellings have been assessed in this ITA.

Figure 9: Staging Plan



3.3 Transport infrastructure improvements

The consented development (BUN20441333) required the provision of the following transport infrastructure improvements:

- Additional approach lane added to northbound off-ramp at the SH1 interchange, which has already been constructed by the developer (Condition 13(l))
- Shared path connecting to Grand Drive/Arran Drive (Condition 13(m), (n), (o) and (p)).

Accordingly, the only improvement that needs to be identified in the Precinct Plan is the shared use path. The delivery of this path is secured through existing conditions of consent for the site, which require the path prior to the code compliance certificate for the dwellings. We understand that the applicant has had extensive with Waka Kotahi for the delivery of the shared use path.

It is anticipated that the future arterial upgrade of Grand Drive will be required when this road is connected to Upper Orewa/Wainui East. As discussed in Section 2.3.4, SGA is currently preparing Notice of Requirement documentation for this future arterial. This arterial upgrade is not required to mitigate

the effects of this Plan Change, nor is it required to enable development within the Plan Change area. However, the Precinct provisions reflect its status as a future arterial road, which we discuss in Section 7.

3.4 Internal transport network

The Precinct Plan includes an indicative network for higher order roads and pedestrian/cycle accessways, which will be supported by additional local roads that will be determined as part of future subdivision consent applications. Due to a number of ecological and topographical constraints, the ability to provide a connected and direct transport network is challenging. To address this, several pedestrian/cycle accessways are included in the Precinct Plan to reduce trip distances and encourage uptake of active transport.

Grand Drive will be extended on the western side of the SH1 interchange, key features include

- Constructed to local road standard, to serve the Ara Hills development area, including on street parking to support the proposed retail land uses (Stage 1 of Grand Drive has been constructed, and Stage 2 is currently lodged with Auckland Transport for Engineering Plan Approval)
- Additional legal width to future proof for a future arterial road classification, should AT choose to upgrade the corridor in the future
- Vehicle access restrictions, to protect the strategic importance of the future arterial corridor
- Intersections will be T-intersections with right turn bays only provided on the arterial road. If the arterial road is extended west traffic signals may be required in the future, however this will be the responsibility of Auckland Transport
- Provision for future bus stops, to be provided by Auckland Transport if bus services are extended to Ara Hills in the future.

Stage 1, 2 and 3 have included new public roads. These have been designed for a 50 km/hr speed limit, but include local area traffic management to achieve a speed environment of 30 km/hr.

The Precinct Plan includes indicative roading connection points at the boundaries of the Precinct, to allow future extension when adjacent land urbanises.

The land has the advantage of being in single ownership and it is proposed that the local roading network and associated infrastructure will be installed by the landowners. There is no requirement for a funding agreement for these roads, although there have been discussions with Auckland Transport regarding the additional costs to be contributed by Auckland Transport for changes to the consented future arterial road extending from the western roundabout at the SH1/Grand Drive interchange to the western boundary of the site.

4 TRIP GENERATION AND DISTRIBUTION

4.1 Modal Split

Statistical data from Census 2018 provides the main means of travel to work for employed people from the Orewa North census zone as follows:[6]

- Drove private or company vehicle 62%
- Other 2%
- Worked at home 26%
- Walked or jogged 5%
- Public bus 4%
- Cycled 1%

Due to the long walking distance to any employment areas from the site, it is unlikely that any residents will walk to and from work, unless they are working within the plan change area itself (for example at the local retail store/café). An estimate of 4% of people will travel by bus as their main transport mode.

4.2 Vehicle Trip Generation

Given the likely vehicle-dominated mode split for those living in the plan change area, a vehicle trip generation rate of 1 per peak hour per residential dwelling has been assumed, which would result in 950 vehicle trips being made per hour during peak hours. Of these, 10% are likely to be internal trips within the plan change area, to the local shops/café and parks, with the remaining 90% having destinations further afield.

The local retail/café area will generate some external trips but given its size, these will generally be local trips within the plan change area and be accounted for in the 10% of trips noted above.

The external vehicle trips (855 per peak hour) have been assumed to have an inbound/outbound split of 20/80 split in the morning peak hour and 65/35 split in the evening peak hour, as per ITE guidance[7].

4.3 Trip Distribution

The trip distribution during the morning peak has been based on the journey to work data collected during the 2018 Census[8]. Data from the Orewa area unit has been used as a reference as Orewa West had very limited responses due to a lack of urban development at the time of the Census.

The data indicates that around a third of the respondents in Orewa commuted to a workplace within the Orewa area and that the majority of commute trips were to and from destinations to the south.

[6] Statistics New Zealand – Commuter View. Data from the Orewa area unit was used as a reference as Orewa West had very limited responses due to a lack of urban development at the time of the Census.
[7] Trip Generation – An ITE (Institute of Transportation Engineering) Information Report, 8th Edition, Volume 2 of 3
[8] Statistics New Zealand – Commuter View

Similar percentages have been assumed for those residents in the proposed Plan Change area. The reverse proportions have been assumed for the evening peak.

Grand Drive/SH1 interchange

- Based on Census data we have assumed the following
- 80%/20% directional split during AM and PM peaks
- 65% of traffic to and from the south
- A small proportion of traffic to and from the north
- The remainder of traffic to and from Orewa to the east.

For the new intersections with Grand Drive we have made the following assumptions

- Ara Hills Drive/Grand Drive
    - 45% of development traffic (excluding Stage 2), with all internalised trips (10% of total trips) turning right as a conservative assumption
- Kikorangi Drive/Grand Drive
    - 55% of development traffic (excluding Stage 2)
- Stage 2 Road/Grand Drive
    - 100% of Stage 2 traffic.

This results in the traffic movements shown in Figure 10 and Figure 11 respectively. We note that Figure 11 focusses on the Ara Hills Drive/Grand Drive intersection as this is the only local road intersection that has been assessed in SIDRA, as it represents the worst case of the three new intersections. Traffic movements at the Stage 2 Road/Grand View Drive and Kikorangi Drive/Grand View Drive are only shown to the extent that they affect vehicle through movements at the Ara Hills Drive/Grand View Drive intersection.

Figure 10: Additional Trip Generation and Distribution during Peak Hours

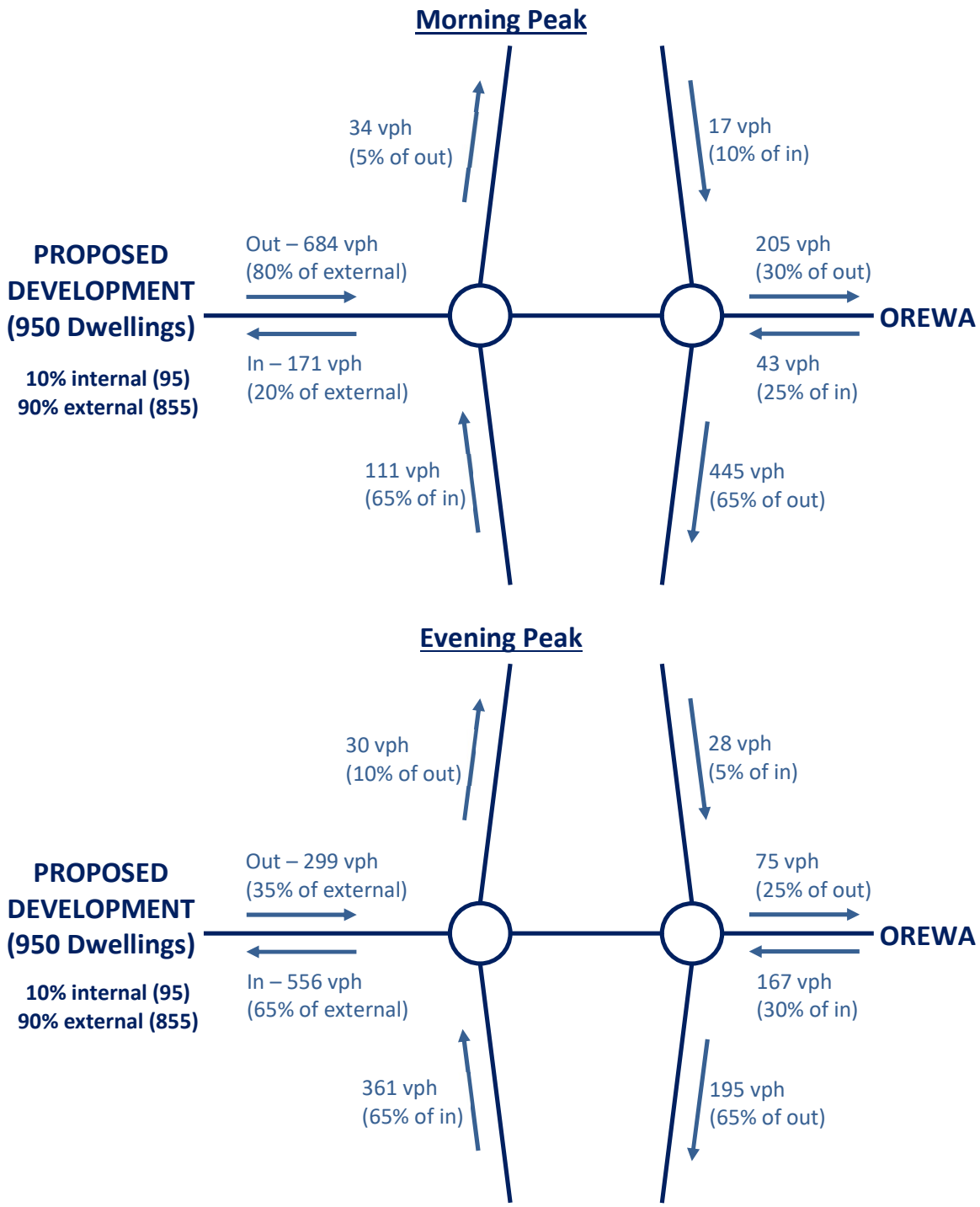
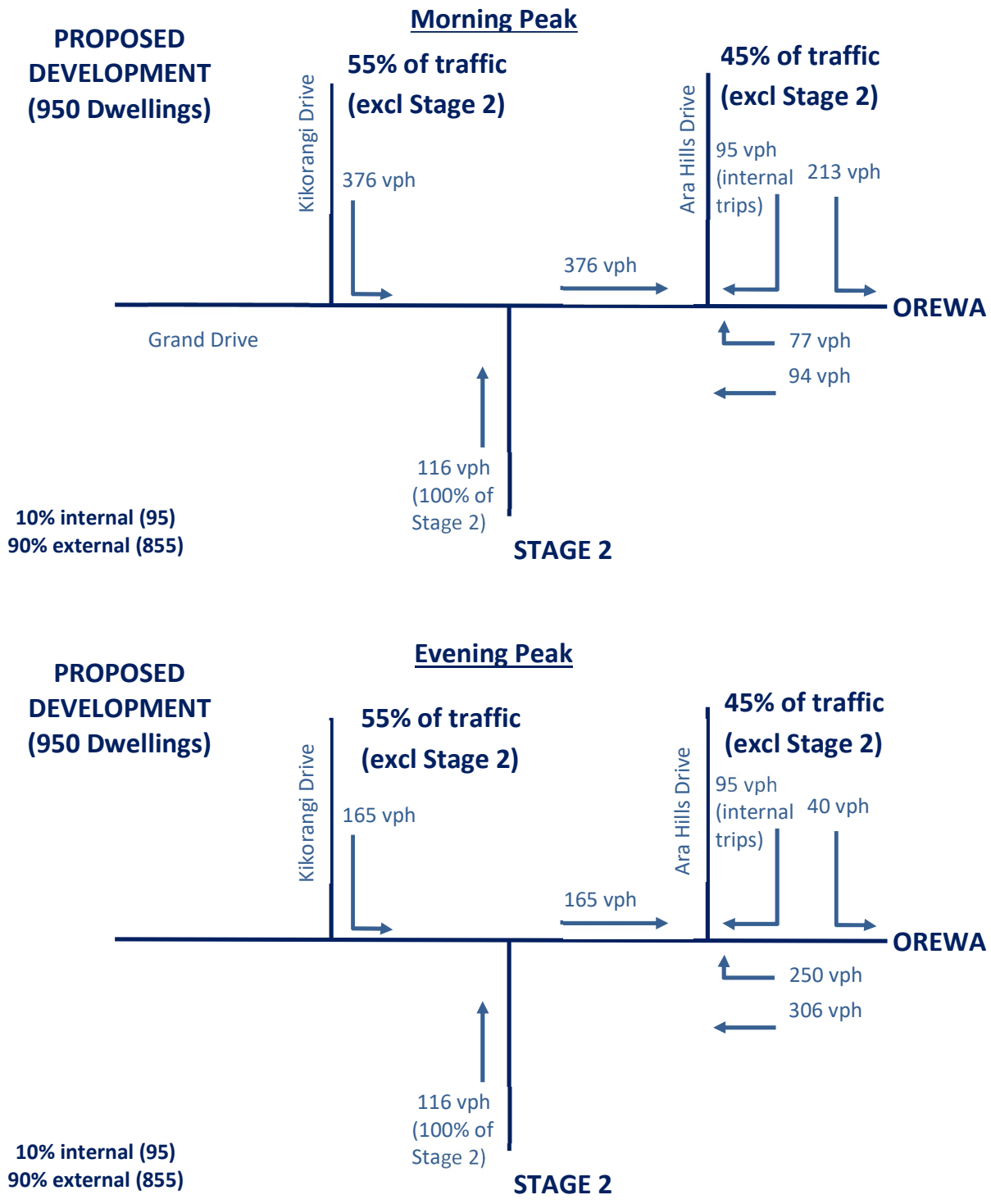


Figure 11: Trip Generation and Distribution for new local road intersections during Peak Hours



5 ASSESSMENT OF EFFECTS

5.1 Road Network Assessment

5.1.1 Grand Drive (east)

Grand Drive carried some 12,691 vehicles per day in November 2019. The additional trips generated by the development will be around 1,900 vehicles per day, comprising 14% of the total existing plus development related traffic. This volume of traffic can be accommodated adequately on a two lane road.

5.1.2 Northern Motorway

The Northern Motorway in the vicinity of the site has adequate capacity to accommodate the traffic anticipated to be generated by the development.

5.1.3 SH1/Grand Drive Interchange

The operation of each roundabout of the SH1/Grand Drive interchange has been assessed using traffic models developed using SIDRA Intersection 8 (SIDRA). These models have compared the operation of the roundabouts assuming current traffic flows with the flows that include the anticipated development traffic, for the morning and evening weekday peak periods.

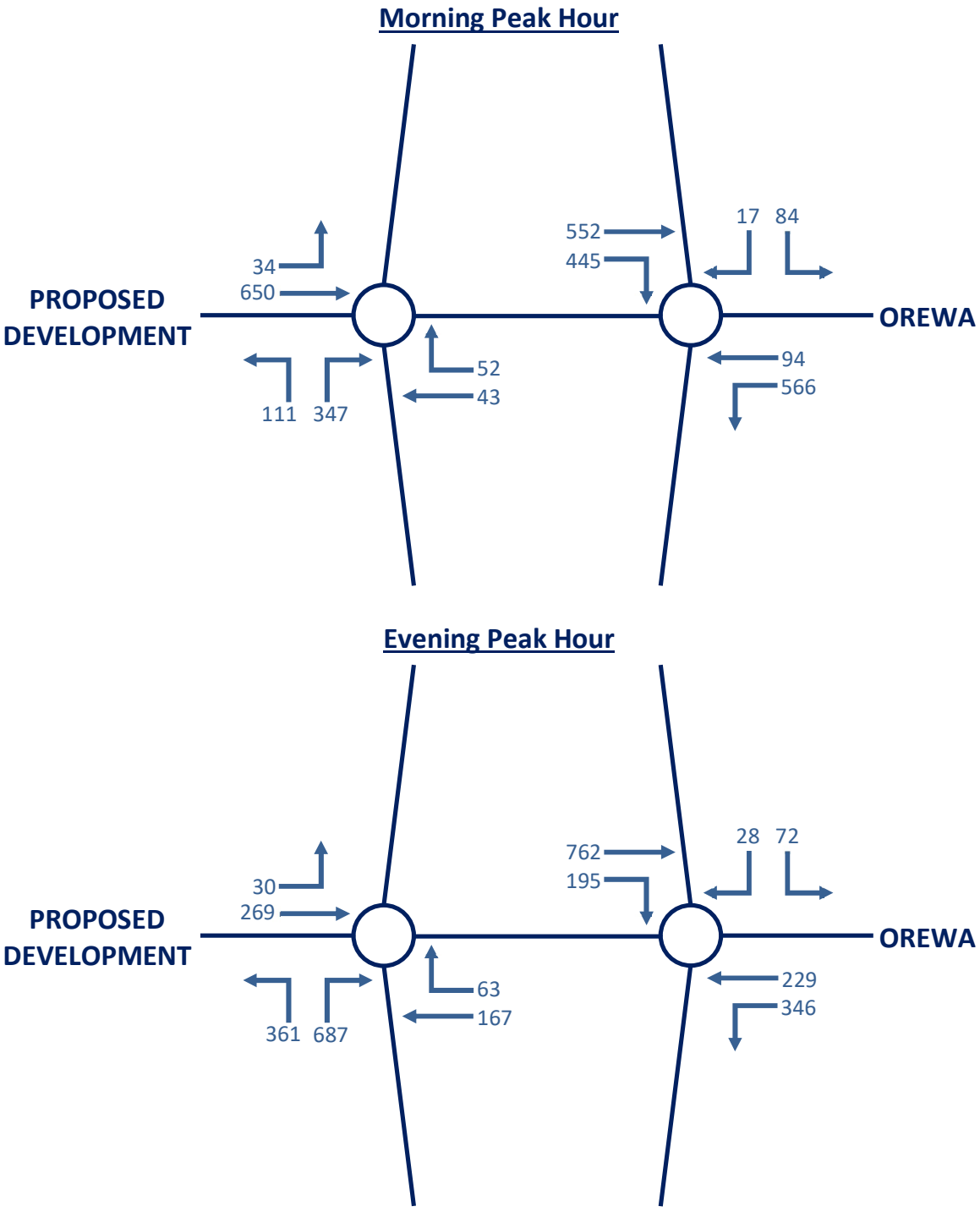
The existing traffic volumes on each of the four ramps have been obtained from the NZ Transport Agency's Traffic Monitoring System (TMS) for the period from Tuesday 31 July 2018 to Thursday 2 August 2018, which reflect periods that are unlikely to have been influenced by public or school holidays among the available data in 2018. The peak hours have been taken as 8 to 9 am for the morning and 5 to 6 pm for the evening. The average of the three-day volumes for the peak hours is shown in Table 2.

Table 2: Mid 2018 Traffic Volumes – vehicles per hour

Road Section	Morning Peak Hour	Evening Peak Hour
Southbound On Ramp	566	346
Northbound Off Ramp	347	687
Northbound On Ramp	52	63
Southbound Off Ramp	84	72

Figure 12 shows the traffic movements at the interchange when adding the anticipated peak hour development traffic to these existing volumes.

Figure 12: Existing plus Development Peak Hour Traffic Volumes – vehicles per hour

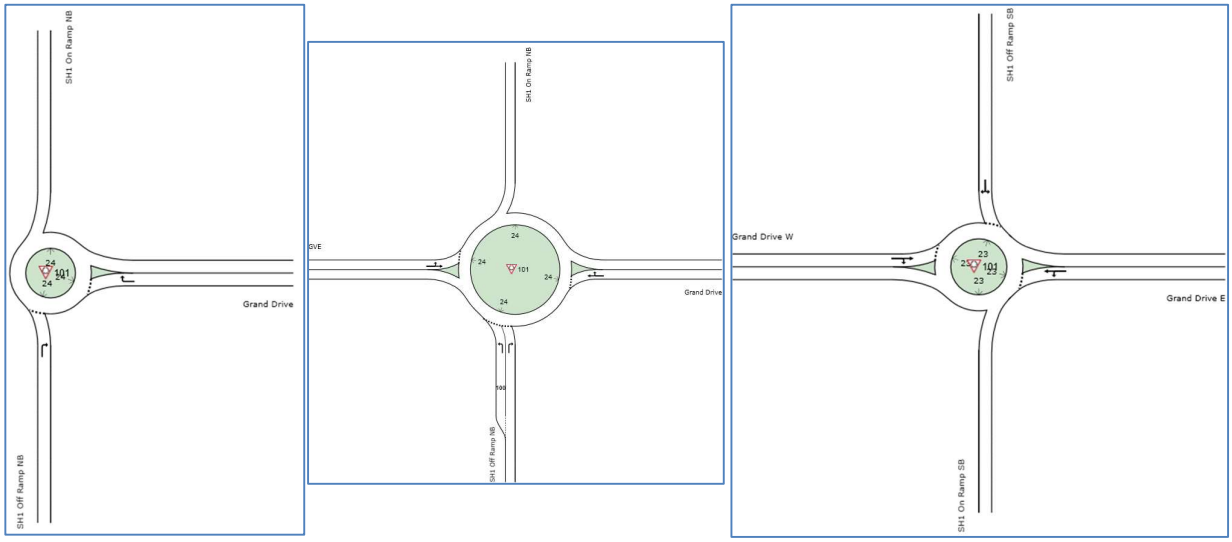


The two roundabouts have been assessed individually using two SIDRA models. The scenarios for each roundabout are the current layout and the current layout plus the Grand Drive (west) to the proposed Plan Change area connected to the western roundabout, with and without the development traffic. The modelled intersection layouts are shown in Figure 13. We note that the western roundabout currently

has two lanes on the SH1 northbound off ramp approach. This includes a 100 m short left turn lane to the Plan Change area, which has been constructed.

Figure 13: SIDRA Modelled Roundabout Layouts

Western roundabout (base) | Western roundabout (with Plan Change) | Eastern roundabout (base and with Plan Change)



Summary outputs from the SIDRA models are shown in the following tables, with more detailed outputs from the SIDRA models shown in Appendix A.

Table 3: Predicted Intersection Performance – Western Roundabout: Morning Peak

Approach	Base (Without Development)			With Development		
	Delay (sec)	LOS	95%ile Queue Length (veh)	Delay (sec)	LOS	95%ile Queue Length (veh)
South: SH1 Off Ramp NB	8	A	1	7	A	1
East: Grand Drive	7	A	0	5	A	0
West: Grand Estate	-	-	-	9	A	8
Intersection	8	A	1	8	A	8

Table 4: Predicted Intersection Performance – Eastern Roundabout: Morning Peak

Approach	Base (Without Development)			With Development		
	Delay (sec)	LOS	95%ile Queue Length (veh)	Delay (sec)	LOS	95%ile Queue Length (veh)
East: Grand Drive E	3	A	0	10	A	8
North: SH1 Off Ramp SB	4	A	0	12	B	1
West: Grand Estate	3	A	0	5	A	0

Intersection	3	A	0	7	A	8

Table 5: Predicted Intersection Performance – Western Roundabout: Evening Peak

Approach	Base (Without Development)			With Development		
	Delay (sec)	LOS	95%ile Queue Length (veh)	Delay (sec)	LOS	95%ile Queue Length (veh)
South: SH1 Off Ramp NB	8	A	4	7	A	4
East: Grand Drive	7	A	0	4	A	0
West: Grand Estate	-	-	-	9	A	4
Intersection	8	A	4	7	A	4

Table 6: Predicted Intersection Performance – Eastern Roundabout: Evening Peak

Approach	Base (Without Development)			With Development		
	Delay (sec)	LOS	95%ile Queue Length (veh)	Delay (sec)	LOS	95%ile Queue Length (veh)
East: Grand Drive E	3	A	0	4	A	4
North: SH1 Off Ramp SB	7	A	1	12	B	1
West: Grand Estate	3	A	0	4	A	0
Intersection	3	A	1	4	A	4

The assessment of the modelling indicates that:

- While queue data has not been available to calibrate the base models, anecdotally there is minimal queueing at peak times and the models are therefore considered to be appropriate for assessing the operation with changes in traffic volumes
- The Level of Service (LOS) for both roundabouts, both scenarios and both peak hours is predicted to be LOS A, except the SH1 southbound off ramp, which is predicted to worsen slightly to B during the morning and evening peak hours with the development. While this approach has relatively low traffic volumes, it gives way to through traffic heading to Orewa and to traffic turning right onto SH1 southbound on ramp
- Even with the development traffic, the western roundabout operates similarly to the base model. This could be attributed to the dedicated left-turn lane on the SH1 northbound off ramp, particularly during the evening peak when the majority of the traffic is heading east to Orewa and west to the development
- There is no significant difference in the length of delays between the base model and with the Plan Change, even for the SH1 southbound off ramp at the eastern roundabout where the difference in delay is 8 seconds in the morning peak and 5 seconds in the evening peak
- The 95th percentile queue lengths are predicted to increase slightly, but no approach is anticipated to have a queue length of more than 8 vehicles for 95% of the time.

Therefore, the additional traffic as a result of the Plan Change through this motorway interchange is likely to have a negligible effect.

The Supporting Growth Programme has been investigating the strategic transport network requirements for development in North Auckland and as such, is best placed to consider the ultimate future form of the motorway interchange. This includes consideration of future development further west/south that will travel via the Main Access Road through the site, as well as development in areas to the east of the Grand Drive interchange.

5.2 Ara Hill Drive / Grand Drive Extension intersection

SIDRA modelling was also done for the Ara Hill Drive / Grand Drive T-intersection. This modelling assumes the current traffic flows including the anticipated development traffic for the morning and evening weekday peak periods.

Modelling was not done for other proposed intersections within the subdivision, for example Kikorangi Drive, as the Ara Hills Drive/Grand Drive intersection will experience the most traffic and is therefore considered to represent the worst case for the congestion assessment. Stage 2 road / Grand Drive intersection is estimated to have low traffic volumes so does not require modelling.

Summary outputs from the SIDRA models are shown in the following tables, with more detailed outputs from the SIDRA models shown in Appendix A.

Table 7: Predicted Intersection Performance – Ara Hill Drive / Grand Drive: Morning Peak

Approach	Base (Without Development)			With Development		
	Delay (sec)	LOS	95%ile Queue Length (veh)	Delay (sec)	LOS	95%ile Queue Length (veh)
North: Ara Hill Drive	N/A	N/A	N/A	8	A	2
East: Grand Drive	N/A	N/A	N/A	3	A	0
West: Grand Drive	N/A	N/A	N/A	0	A	0
Intersection	N/A	N/A	N/A	4	A	2

Table 8: Predicted Intersection Performance – Ara Hill Drive / Grand Drive: Evening Peak

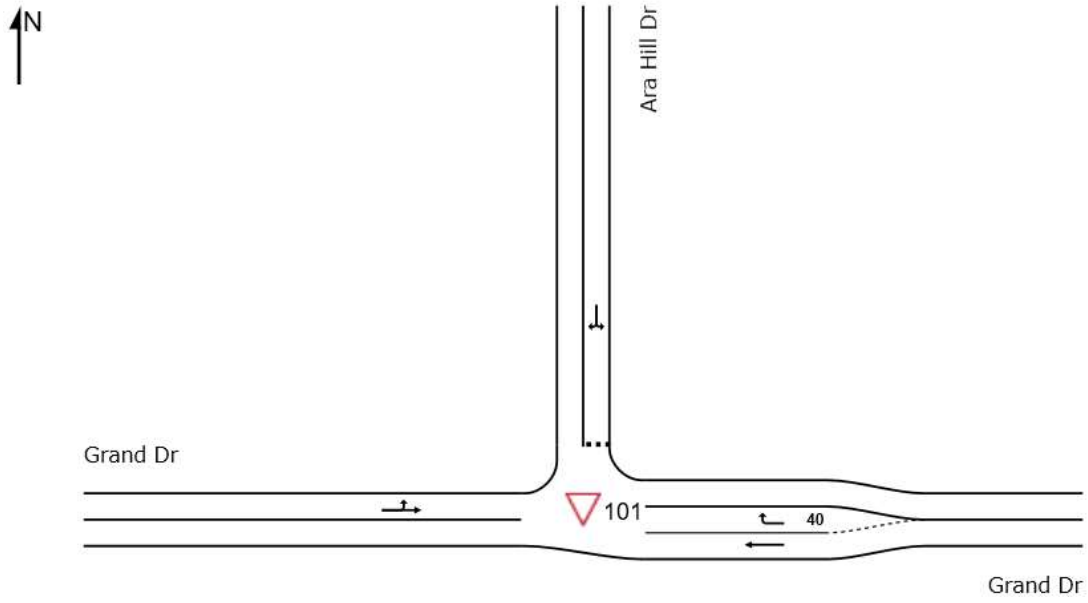
Approach	Base (Without Development)			With Development		
	Delay (sec)	LOS	95%ile Queue Length (veh)	Delay (sec)	LOS	95%ile Queue Length (veh)
North: Ara Hill Drive	N/A	N/A	N/A	10	A	1
East: Grand Drive	N/A	N/A	N/A	2	A	1
West: Grand Estate	N/A	N/A	N/A	0	A	0
Intersection	N/A	N/A	N/A	3	A	1

The assessment of the modelling indicates that:

- There is minimal queueing and a LOS A for all approaches at peak times

- The 95th percentile queue lengths are predicted to be minimal
- The three new intersections with Grand Drive have sufficient capacity to accommodate the Plan Change.

Figure 14: SIDRA modelled Ara Hill Drive / Grand Drive Layout



5.3 Road Safety

The New Zealand Transport Agency's Crash Analysis System (CAS) has been reviewed for any crashes recorded on key roads in the vicinity of the site between 2018 and 2022 (inclusive). The roads reviewed included Grand Drive west of Arran Drive, the Ara Hill Drive / Grand Drive intersection and the four motorway ramps and both roundabouts. The locations of reported crashes (Figure 15 and Figure 16) and a review of the crash history of these roads follow.

Figure 15: Collision Diagram Crashes 2018-2022 inclusive

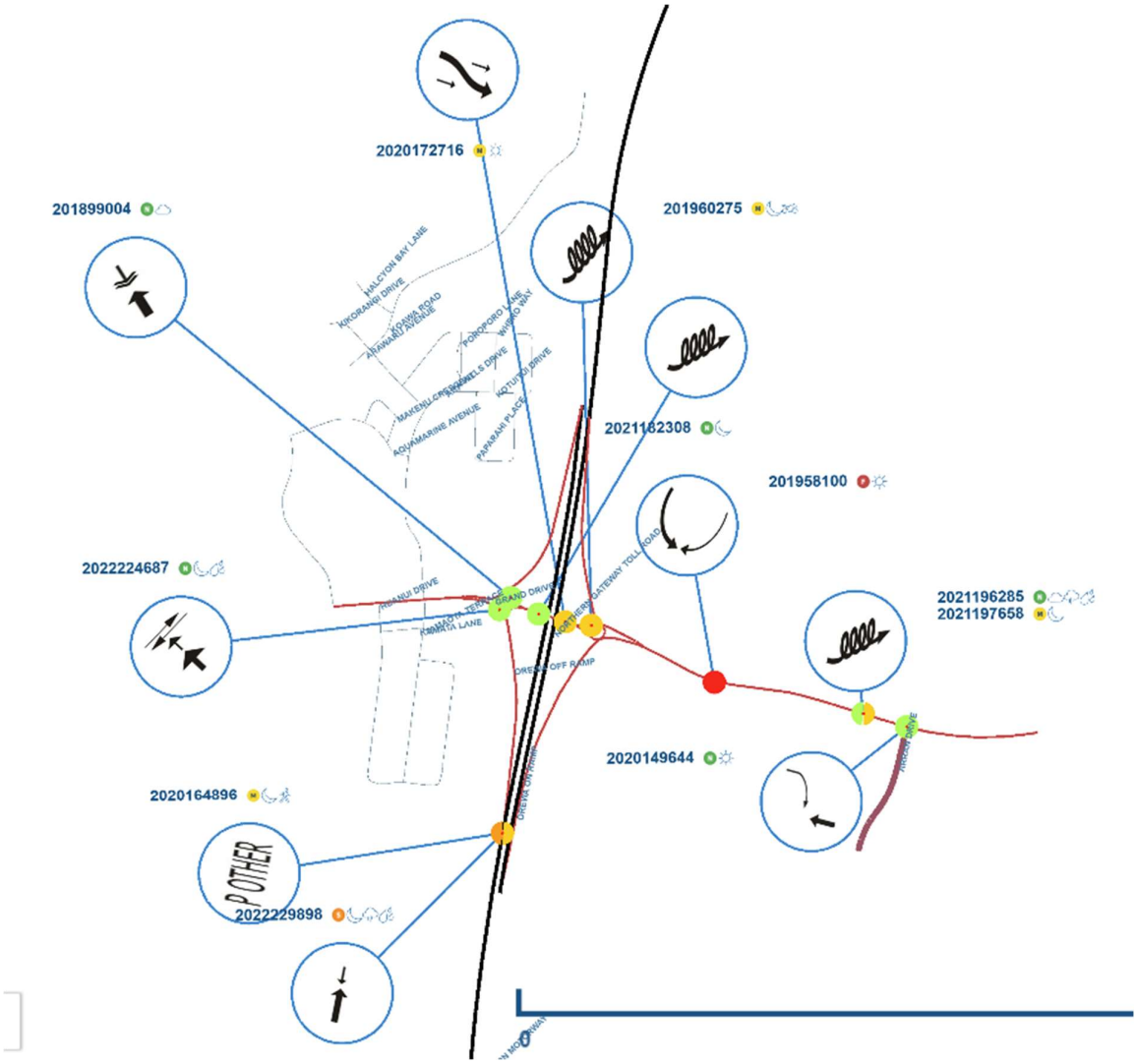
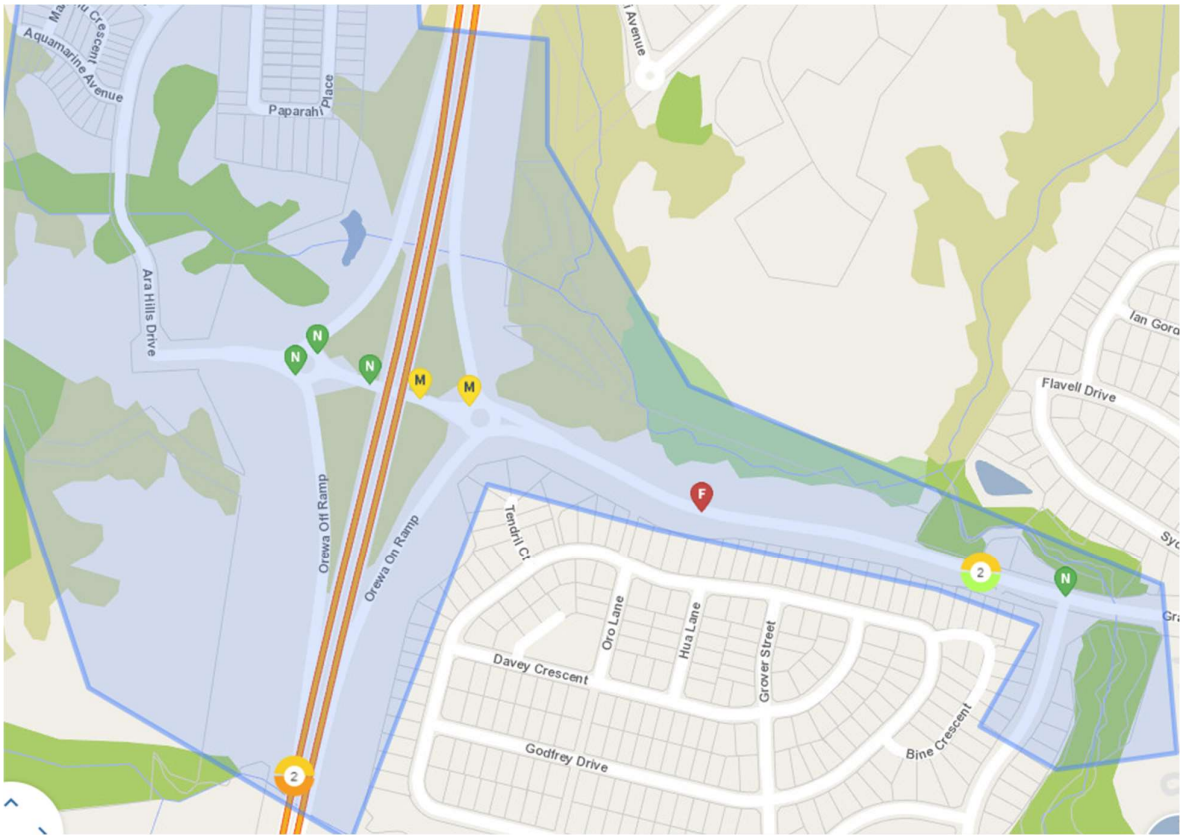


Figure 16: Location of crashes



A total of 11 crashes were reported in the search area. This consisted of 1 fatal, 1 serious injury crashes, 4 minor injury and 5 non-injury crashes

The crashes occurred in the areas grouped below

- 1 crash at the Arran Drive / Grand Drive Street intersection
- 3 crashes between the Grand Drive / SH1 eastern roundabout and Arran Drive / Grand Drive intersection
- 2 crashes on State Highway 1
- 2 crashes on the Grand Drive bridge
- 2 crashes at the western roundabout on Grand Drive / SH1
- 1 crash at the eastern roundabout on Grand Drive / SH1.

The following crash types were reported

- 1 overtaking crashes
- 5 straight road lost control / head on
- 1 bend - lost control / head on
- 2 rear end / obstruction crashes
- 1 crossing / turning crashes

- 1 pedestrian crashes.

The fatal injury crash included

- When a driver was travelling Eastbound on Grand Drive, while the other vehicle was travelling in the opposite direction Westbound. One driver crossed the double yellow centre line and collided head on with the other vehicle, which was reported as being caused by being blinded by the sun and sneezing. When the driver looked back at the road they realised they were on the wrong side.

The serious injury crash included

- When a driver made an illegal u-turn and ended up driving southbound (in lane 2) in the northbound lane on State Highway 1 (near the Orewa off ramp). This vehicle collided with another vehicle and due to the collision the first driver spun out to lane 1 and was hit from the incoming vehicle.

We consider that the Plan Change is unlikely to exacerbate existing safety issues, or create new safety issues.

5.4 Traffic Effects Summary

Overall it is considered that the additional traffic predicted to be generated by the Plan Change can be easily accommodated by the surrounding road network. The effects on the surrounding arterial roads will be no more than minor, and the increase in delays on the turning movements at the motorway interchange are insignificant. The Plan Change is not anticipated to exacerbate any existing safety issues, or create any new issues.

6 PLANNING AND POLICY FRAMEWORK

6.1 Overview

The following section provides a review of the relevant planning and policy frameworks in relation to the Plan Change. These include the following

- Government Policy Statement on Land Transport 2021
- National Policy Statement on Urban Design 2020 – Updated May 2022
- Auckland Plan 2050
- Auckland Regional Land Transport Plan 2021-2031
- Auckland Regional Public Transport Plan 2018-2028
- Auckland Unitary Plan
- Supporting Growth Programme.

6.2 Government Policy Statement on Land Transport 2021[9]

The Government Policy Statement on Land Transport (GPS) sets out the government's priorities for expenditure from the National Land Transport Fund over the next 10 years. The GPS is the government's main statutory lever to ensure investment in land transport by the New Zealand Transport Agency (the Transport Agency) and local government reflects government priorities over this period. The Government's commitments make it clear that transformation of the land transport system is a priority.

The GPS 2021 builds on the strategic direction of GPS 2018 by maintaining the priorities but updating them to align with recent policy work. The Government is proposing to prioritise safety, better transport options, improve freight connections, and climate change.

6.3 National Policy Statement on Urban Development 2020 updated May 2022[10]

The National Policy Statement for Urban Development, Updated May 2022 (NPS-UD) sets out the objectives and policies for planning for well-functioning urban environments under the Resource Management Act 1991. The NPS-UD 2020 came into effect on 20 August 2020, and was updated in May 2022 to incorporate amendments made by section 77S(1) of the Resource Management Act 1991 (as inserted by the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021.

In terms of transport matters,

[9] Available online at https://www.transport.govt.nz/area-of-interest/strategy-and-direction/government-policy-statement-on-land-transport/

[10] Available online at https://environment.govt.nz/publications/national-policy-statement-on-urban-development-2020-updated-may-2022/

- Policy 3 requires that tier 1 urban environments (including Auckland) enable building heights and densities of urban form commensurate with the level of commercial activity and community services within and adjacent to neighbourhood centre zones
- Policy 4 requires district plans applying to tier 1 urban environments to modify the relevant building height or density requirements under Policy 3 only to the extent necessary (as specified in subpart 6) to accommodate a qualifying matter in that area
- Policy 11 requires that the district plans of tier 1, 2, and 3 territorial authorities do not set minimum car parking rate requirements.

This Plan Change responds to Policy 3 and 4 by enabling greater density urban development where feasible, and also reducing the density for some areas due to ecological qualifying matters.

Auckland Council has undertaken a Plan Change to the AUP to give effect to Policy 11.

6.4 Auckland Plan 2050

The Auckland Plan 2050 is the long-term spatial plan which sets the strategic direction for Auckland to ensure Auckland grows in a way that will meet the opportunities and challenges during the next 30 years. The Auckland Plan comprises six main outcome areas, with a specific area for Transport and Access. The three strategic directions identified in Transport and Access are:

- "better connect people, places, good and services"
- increase genuine travel choices for a healthy, vibrant and equitable Auckland
- maximise safety and environmental protection[11].

The Plan seeks increases in the use of public transport, walking and cycling. However, growth in population and employment activity means that congestion is forecast to worsen. The Plan therefore foresees the need for a range of measures to manage congestion in Auckland, including getting much more out of existing infrastructure, maximising new opportunities to influence demand and ensuring investment is targeted to the greatest challenges.

6.5 Auckland Regional Land Transport Plan 2021-2031

The Auckland Regional Land Transport Plan 2021 – 2031 (RLTP)[12] forms part of the National Land Transport Programme and sets out the land transport objectives, policies and measures for the Auckland region over the next 10 years. It includes the land transport activities of Auckland Transport, Auckland Council, Waka Kotahi NZ Transport Agency, KiwiRail, and other agencies.

The RLTP identifies four key challenges

- Climate change and the environment

[11] Auckland Council. 2018. Auckland Plan 2050,available online at https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/auckland-plan/about-the-auckland-plan/docsprintdocuments/section-5-transport.pdf
[12] Auckland Transport RLTP, available online at https://at.govt.nz/media/1985925/appendix-1-regional-land-transport-plan-2021-31.pdf

- Travel options
- Safety
- Access and connectivity.

The following projects are listed in the RLTP and are of relevance to the Plan Change, and are shown in Figure 17

- Funding for the Supporting Growth Programme (investigations only)
- Wainui improvements – item 7
- Penlink – item 8.

Figure 17: RLTP projects relevant to the Plan Change

6.6 Auckland Regional Public Transport Plan 2018-2028

The Auckland Regional Public Transport Plan 2018-2028 (RPTP) describes the public transport network that Auckland Transport proposes for the region. Table 15 of the Plan provides the anticipated capital expenditure between 2018 and 2028. Of relevance are the following committed projects:

- Greenfield transport infrastructure projects, $275mil between 2018/19 to 2027/28
- Rosedale and Constellation Bus Station improvements associated with the extension of the Northern Busway to Albany, $117mil for the period 2018/19 to 2024/25
- Supporting Growth, $81mil for investigation for growth area projects.

6.7 Auckland Unitary Plan

The AUP establishes the regulatory framework for land use and development, including the location and density of future housing and employment growth. It influences where, when, and how population and employment growth will occur about Auckland and sets the rules on how development is expected to occur.

The AUP has three key roles, as set out in Chapter A of the AUP. These are summarised as:

- it describes how the people and communities will manage Auckland's natural and physical resources while enabling growth and development and protecting the things people and communities value
- it provides the regulatory framework to help make Auckland a quality place to live, attractive to people and businesses and a place where environmental standards are respected and upheld
- it is a principal statutory planning document for Auckland.

The AUP has the following objectives with regard to the Auckland region's transport infrastructure:

- *"Land use and all modes of transport are integrated in a manner that enables:*

  (a) the benefits of an integrated transport network to be realised; and

  (b) the adverse effects of traffic generation on the transport network to be managed
- *An integrated public transport, including public transport, walking, cycling, private vehicles and freight, is provided for*
- *Parking and loading supports urban growth and the quality compact urban form*
- *The provision of safe and efficient parking, loading and access is commensurate with the character, scale and intensity of the zone*
- *Pedestrian safety and amenity along public footpaths is prioritised*
- *Road/rail crossings operate safely with neighbouring land use and development."*

While options for walking and cycling and using public transport for employment and education based trips are relatively small, the Hibiscus Coast Bus Station offers an exceptional public transport facility for trips to Auckland's CBD and other town centres. Overall, the development of residential dwellings with a supporting local retail/café on the subject site is considered to align with the transport objectives of the AUP and the proposed zoning aligns well with neighbouring zones.

6.8 Supporting Growth Programme Business Case

The Supporting Growth Programme Business Case (PBC) developed a case for investing in improved arterial and strategic transport networks to respond to anticipated greenfield growth in the Auckland region. It included three recommended programmes for different areas of Auckland, including South, North and the North West.

Section 2.3.4 discusses Supporting Growth projects relevant to the Plan Change.

7 PRECINCT PROVISIONS TO ADDRESS TRANSPORT MATTERS

The AUP includes a comprehensive set of transport objectives, policies, and standards under E27. We consider that Chapter E27 is appropriate to address the potential for localised transport effects of development that are proposed to be enabled through this Plan Change.

The approved subdivision consent for the Site includes conditions relating to transport. Those that we consider have been incorporated into the Precinct Provisions are as follows

Grand Drive extension

- The Grand Drive extension, from the western roundabout at the SH1/Grand Drive interchange, must follow the alignment shown in Precinct Plan 1 to the western boundary of the site. This road must be designed to a local road standard in accordance with relevant Auckland Transport and AUSTROADS design guides.
- The Grand Drive is subject to a vehicle crossing limitation as shown on Precinct Plan 1, with only new road connections provided for along the Indicative Future Arterial
- At its discretion and cost, Auckland Transport may construct this road as an arterial road
- These recommendations are reflected in I553.6.2.7.(1) – (3) of the Precinct Provisions.

Shared Cycle/Footpath Connection to Grand Drive/Arran Drive

The delivery of this path is secured through existing conditions of consent for the site, which require the path prior to the code compliance certificate for the dwellings. We understand that the applicant has had extensive with Waka Kotahi for the delivery of the shared use path

- The facility must provide a 3.5 m usable width across the motorway, with the bridge in a location agreed to by the NZ Transport Agency
- This is reflected in I553.6.2.7.(4) of the Precinct Provisions.

8 SUMMARY AND CONCLUSIONS

Flow has prepared this ITA to support the Ara Hills Plan Change, to re-zone the site from Future Urban Zone to a mix of residential, recreation, open space, business-neighbourhood centre zoning.

Our ITA has considered the potential transport effects that could result from up to 950 dwellings and 710 m^2 GFA of local shops/convenience/ amenity stores. While the zoning would allow for more local retail than this, this is only likely to occur if there is demand for it, and this is only likely if land outside the plan change to the south and west is developed.

Our traffic modelling assessment of the Grand Drive/SH1 interchange and Grand Drive/Ara Hills Drive intersection demonstrates that the peak hour traffic effects of the Plan Change can be accommodated by the existing transport network.

A pedestrian and cycle connection from Ara Hills to the Grand Drive/Arran Drive intersection is proposed to be delivered prior to the completion of 300 dwellings within the site. Precinct provisions are included to protect the strategic importance of the Indicative Future Arterial through the site.

Based on the assessment in this report, we conclude that:

- the site will have good vehicle and cycling accessibility to Orewa and its schools, shops and amenities
- bus stops on Grand Drive provide services to Orewa and to the Hibiscus Coast Bus Station via Millwater, and bus stops will be future proofed on Grand Drive extension to enable AT to run bus services to Ara Hills in the future
- the site excellent access to State Highway 1, providing access to the wider Auckland region and beyond, including to the park and ride at the Hibiscus Coast Bus Station
- the effects of the anticipated increase in vehicles are expected to be minor with all surrounding roads and intersections capable of accommodating site-generated traffic
- The identification of the key transport features identified in this report and within the proposed Precinct Plan will assist in ensuring that the key transport outcomes of the Precinct Plan are delivered for the site, in a manner that integrates transport with the existing and future roading network
- The AUP includes a comprehensive set of transport objectives, policies, and standards under E27. We consider that Chapter E27 is appropriate to address the potential for localised transport effects of development that is proposed to be enabled through this Plan Change.

Based on the above and the detail in this report, it is concluded that the proposed Plan Change is acceptable from a transport planning perspective, and that transport effects of the Plan Change can be managed through the Precinct provisions and Chapter E27 of the AUP.

APPENDIX A SIDRA Model Outputs

Figure A1: Base Model (Without Development) – Western Roundabout – Morning Peak – Movement Summary

MOVEMENT SUMMARY

Site: 101 [West Base AM]

New Site
Site Category: (None)
Roundabout

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: SH1 Off Ramp NB												
3	R2	365	0.0	0.249	7.6	LOS A	1.4	9.7	0.19	0.57	0.19	46.5
Approach		365	0.0	0.249	7.6	LOS A	1.4	9.7	0.19	0.57	0.19	46.5
East: Grand Drive												
6	R2	55	0.0	0.031	7.3	LOS A	0.0	0.0	0.00	0.62	0.00	47.0
Approach		55	0.0	0.031	7.3	LOS A	0.0	0.0	0.00	0.62	0.00	47.0
All Vehicles		420	0.0	0.249	7.6	LOS A	1.4	9.7	0.16	0.58	0.16	46.6

Figure A2: Base Model (Without Development) – Eastern Roundabout – Morning Peak – Movement Summary

MOVEMENT SUMMARY

Site: 101 [East Base AM]

New Site
Site Category: (None)
Roundabout

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Grand Drive E												
4	L2	596	0.0	0.371	2.7	LOS A	0.0	0.0	0.00	0.38	0.00	48.3
5	T1	55	0.0	0.371	2.5	LOS A	0.0	0.0	0.00	0.38	0.00	49.6
Approach		651	0.0	0.371	2.6	LOS A	0.0	0.0	0.00	0.38	0.00	48.4
North: SH1 Off Ramp SB												
7	L2	88	0.0	0.083	4.4	LOS A	0.4	2.9	0.46	0.52	0.46	47.1
Approach		88	0.0	0.083	4.4	LOS A	0.4	2.9	0.46	0.52	0.46	47.1
West: Grand Drive W												
11	T1	365	0.0	0.208	2.5	LOS A	0.0	0.0	0.00	0.29	0.00	49.7
Approach		365	0.0	0.208	2.5	LOS A	0.0	0.0	0.00	0.29	0.00	49.7
All Vehicles		1104	0.0	0.371	2.7	LOS A	0.4	2.9	0.04	0.36	0.04	48.7

Figure A3: Base Model (Without Development) – Western Roundabout – Evening Peak – Movement Summary

MOVEMENT SUMMARY

Site: 101 [West Base PM]

New Site
Site Category: (None)
Roundabout

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: SH1 Off Ramp NB												
3	R2	723	0.0	0.485	7.8	LOS A	3.6	25.4	0.27	0.57	0.27	46.3
Approach		723	0.0	0.485	7.8	LOS A	3.6	25.4	0.27	0.57	0.27	46.3
East: Grand Drive												
6	R2	66	0.0	0.038	7.3	LOS A	0.0	0.0	0.00	0.62	0.00	47.0
Approach		66	0.0	0.038	7.3	LOS A	0.0	0.0	0.00	0.62	0.00	47.0
All Vehicles		789	0.0	0.485	7.7	LOS A	3.6	25.4	0.25	0.57	0.25	46.4

Figure A4: Base Model (Without Development) – Eastern Roundabout – Evening Peak – Movement Summary

MOVEMENT SUMMARY

Site: 101 [East Base PM]

New Site
Site Category: (None)
Roundabout

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Grand Drive E												
4	L2	364	0.0	0.245	2.7	LOS A	0.0	0.0	0.00	0.37	0.00	48.4
5	T1	66	0.0	0.245	2.5	LOS A	0.0	0.0	0.00	0.37	0.00	49.6
Approach		431	0.0	0.245	2.6	LOS A	0.0	0.0	0.00	0.37	0.00	48.5
North: SH1 Off Ramp SB												
7	L2	76	0.0	0.091	6.8	LOS A	0.5	3.5	0.65	0.65	0.65	45.8
Approach		76	0.0	0.091	6.8	LOS A	0.5	3.5	0.65	0.65	0.65	45.8
West: Grand Drive W												
11	T1	723	0.0	0.412	2.5	LOS A	0.0	0.0	0.00	0.29	0.00	49.7
Approach		723	0.0	0.412	2.5	LOS A	0.0	0.0	0.00	0.29	0.00	49.7
All Vehicles		1229	0.0	0.412	2.8	LOS A	0.5	3.5	0.04	0.34	0.04	49.0

Figure A5: With Development – Western Roundabout – Morning Peak – Movement Summary

MOVEMENT SUMMARY

Site: 101 [West GVE AM - 750 units]

New Site
Site Category: (None)
Roundabout

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: SH1 Off Ramp NB												
1	L2	93	0.0	0.327	3.1	LOS A	2.0	13.8	0.27	0.56	0.27	45.5
3	R2	365	0.0	0.327	7.8	LOS A	2.0	13.8	0.27	0.56	0.27	46.9
Approach		458	0.0	0.327	6.9	LOS A	2.0	13.8	0.27	0.56	0.27	46.6
East: Grand Drive												
5	T1	36	0.0	0.052	2.3	LOS A	0.0	0.0	0.00	0.53	0.00	47.9
6	R2	55	0.0	0.052	7.3	LOS A	0.0	0.0	0.00	0.53	0.00	48.2
Approach		91	0.0	0.052	5.4	LOS A	0.0	0.0	0.00	0.53	0.00	48.1
West: GVE												
10	L2	28	0.0	0.564	6.6	LOS A	4.9	34.1	0.74	0.74	0.82	45.9
11	T1	540	0.0	0.564	6.3	LOS A	4.9	34.1	0.74	0.74	0.82	47.0
Approach		568	0.0	0.564	6.4	LOS A	4.9	34.1	0.74	0.74	0.82	47.0
All Vehicles		1117	0.0	0.564	6.5	LOS A	4.9	34.1	0.49	0.65	0.53	46.9

Figure A6: With Development – Eastern Roundabout – Morning Peak – Movement Summary

MOVEMENT SUMMARY

Site: 101 [East GVE AM - 750 units]

New Site
Site Category: (None)
Roundabout

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Grand Drive E												
4	L2	596	0.0	0.637	7.1	LOS A	6.3	43.8	0.74	0.78	0.86	45.7
5	T1	89	0.0	0.637	7.0	LOS A	6.3	43.8	0.74	0.78	0.86	46.7
Approach		685	0.0	0.637	7.1	LOS A	6.3	43.8	0.74	0.78	0.86	45.8
North: SH1 Off Ramp SB												
7	L2	88	0.0	0.144	9.0	LOS A	0.9	6.0	0.75	0.76	0.75	44.3
9	R2	15	0.0	0.144	13.7	LOS B	0.9	6.0	0.75	0.76	0.75	45.6
Approach		103	0.0	0.144	9.7	LOS A	0.9	6.0	0.75	0.76	0.75	44.4
West: Grand Drive W												
11	T1	536	0.0	0.516	2.5	LOS A	0.0	0.0	0.00	0.46	0.00	48.4
12	R2	369	0.0	0.516	7.3	LOS A	0.0	0.0	0.00	0.46	0.00	48.7
Approach		905	0.0	0.516	4.5	LOS A	0.0	0.0	0.00	0.46	0.00	48.5
All Vehicles		1694	0.0	0.637	5.9	LOS A	6.3	43.8	0.35	0.61	0.39	47.2

Figure A7: With Development – Western Roundabout – Evening Peak – Movement Summary

MOVEMENT SUMMARY

Site: 101 [West GVE PM - 750 units]

New Site
Site Category: (None)
Roundabout

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: SH1 Off Ramp NB												
1	L2	300	0.0	0.798	6.5	LOS A	11.4	79.8	0.78	0.72	0.86	44.3
3	R2	723	0.0	0.798	11.2	LOS B	11.4	79.8	0.78	0.72	0.86	45.6
Approach		1023	0.0	0.798	9.8	LOS A	11.4	79.8	0.78	0.72	0.86	45.2
East: Grand Drive												
5	T1	139	0.0	0.117	2.3	LOS A	0.0	0.0	0.00	0.43	0.00	48.7
6	R2	66	0.0	0.117	7.3	LOS A	0.0	0.0	0.00	0.43	0.00	49.1
Approach		205	0.0	0.117	4.0	LOS A	0.0	0.0	0.00	0.43	0.00	48.8
West: GVE												
10	L2	25	0.0	0.392	8.4	LOS A	2.9	20.6	0.90	0.88	0.91	45.1
11	T1	224	0.0	0.392	8.1	LOS A	2.9	20.6	0.90	0.88	0.91	46.2
Approach		249	0.0	0.392	8.1	LOS A	2.9	20.6	0.90	0.88	0.91	46.1
All Vehicles		1478	0.0	0.798	8.7	LOS A	11.4	79.8	0.69	0.70	0.75	45.8

Figure A8: With Development – Eastern Roundabout – Evening Peak – Movement Summary

MOVEMENT SUMMARY

Site: 101 [East GVE PM - 750 units]

New Site
Site Category: (None)
Roundabout

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Grand Drive E												
4	L2	364	0.0	0.446	3.9	LOS A	3.1	21.9	0.46	0.48	0.46	47.0
5	T1	204	0.0	0.446	3.7	LOS A	3.1	21.9	0.46	0.48	0.46	48.2
Approach		568	0.0	0.446	3.8	LOS A	3.1	21.9	0.46	0.48	0.46	47.4
North: SH1 Off Ramp SB												
7	L2	76	0.0	0.143	9.6	LOS A	0.9	6.0	0.77	0.78	0.77	43.7
9	R2	23	0.0	0.143	14.3	LOS B	0.9	6.0	0.77	0.78	0.77	45.0
Approach		99	0.0	0.143	10.7	LOS B	0.9	6.0	0.77	0.78	0.77	44.0
West: Grand Drive W												
11	T1	785	0.0	0.540	2.5	LOS A	0.0	0.0	0.00	0.37	0.00	49.1
12	R2	162	0.0	0.540	7.3	LOS A	0.0	0.0	0.00	0.37	0.00	49.5
Approach		947	0.0	0.540	3.3	LOS A	0.0	0.0	0.00	0.37	0.00	49.2
All Vehicles		1615	0.0	0.540	3.9	LOS A	3.1	21.9	0.21	0.43	0.21	48.2

Figure A9: With Development – Ara Hill Dr / Grand Dr – Morning Peak – Movement Summary

MOVEMENT SUMMARY

▽ **Site: 101 [Ara Hill Dr / Grand Dr - AM]**

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

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
East: Grand Dr												
5	T1	88	0.0	0.046	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
6	R2	81	0.0	0.066	6.0	LOS A	0.3	2.0	0.45	0.62	0.45	45.3
Approach		169	0.0	0.066	2.9	NA	0.3	2.0	0.21	0.30	0.21	47.6
North: Ara Hill Dr												
7	L2	224	0.0	0.367	6.9	LOS A	2.0	13.8	0.56	0.79	0.67	44.7
9	R2	100	0.0	0.367	10.4	LOS B	2.0	13.8	0.56	0.79	0.67	44.3
Approach		324	0.0	0.367	8.0	LOS A	2.0	13.8	0.56	0.79	0.67	44.6
West: Grand Dr												
10	L2	1	0.0	0.204	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	49.5
11	T1	396	0.0	0.204	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		397	0.0	0.204	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
All Vehicles		891	0.0	0.367	3.5	NA	2.0	13.8	0.24	0.34	0.28	47.4

Figure A10: With Development – Ara Hill Dr / Grand Dr – Evening Peak – Movement Summary

MOVEMENT SUMMARY

▽ **Site: 101 [Ara Hill Dr / Grand Dr - PM]**

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

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
East: Grand Dr												
5	T1	322	0.0	0.166	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
6	R2	263	0.0	0.171	5.2	LOS A	0.8	5.9	0.31	0.56	0.31	45.5
Approach		585	0.0	0.171	2.3	NA	0.8	5.9	0.14	0.25	0.14	47.9
North: Ara Hill Dr												
7	L2	42	0.0	0.244	5.2	LOS A	1.0	6.8	0.50	0.72	0.52	43.7
9	R2	100	0.0	0.244	11.6	LOS B	1.0	6.8	0.50	0.72	0.52	43.3
Approach		142	0.0	0.244	9.7	LOS A	1.0	6.8	0.50	0.72	0.52	43.5
West: Grand Dr												
10	L2	1	0.0	0.090	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	49.5
11	T1	174	0.0	0.090	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		175	0.0	0.090	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
All Vehicles		902	0.0	0.244	3.1	NA	1.0	6.8	0.17	0.28	0.17	47.5

APPENDIX B Response to queries from council

flow
TRANSPORTATION SPECIALISTS

19 October 2023

Ila Daniels
Campbell Brown Planning Ltd
AUCKLAND 1144

Sent via email: ila@campbellbrown.co.nz
Copies via email to: bphythian@avjennings.co.nz; korton@avjennings.co.nz

Dear Ila

ARA HILLS PLAN CHANGE – RESPONSE TO QUERIES FROM COUNCIL REGARDING TRANSPORTATION MATTERS

Our responses to the queries that came via Auckland Council are set out below, after each query.

Query: Any road that receives more than 1000 vehicles per day is classified as Collector Road according to Waka Kotahi NZTA.. Internal traffic modelling was not provided as part of the ITA report therefore, we do not know the roads that would receive more than 1000 vehicles per day. Please classify any road that carries more than 1000 vehicle per day as Collector Road in the plan change area.

Response:

The intent is that the internal roads are local roads/streets. This is consistent with Auckland Transport's code of practise, which states that traffic volumes for local roads/streets are "*up to 5,000 vehicles per day*", with collector/connector roads being "*up to 10,000 vehicles per day*".

We note that:

- Based on the assumptions in the ITA (April 2023), the eastern part of Road 1 could carry some 4,000 vehicles per day once the full development potential is reached, with the western section carrying around 3,500 vehicles per day.
- Waka Kotahi's One Network Road Classification, which covers all roads in NZ, suggests different road classifications (eg "access") and correspondingly different typical daily traffic volumes to AT's code of practise. For example, arterial roads are suggested in the ONRC to have typical daily traffic volumes of 5,000 vehicles per day in urban areas, which wouldn't seem to be applicable for Auckland's arterial roads.
- As noted in AT's code of practise, road classification by itself doesn't predetermine the operational or design outcome for the roads in question. Section 4.5 of the CoP notes:

  "It is simply one consideration as part of taking a balanced view of functional requirements and priorities, be they movement priorities or place / liveability priorities, for each segment

along a road corridor. The appropriate balance between movement and place needs to consider the capacity (incorporating the safe movement of people and goods), and character (recognising the role of a road/street in the urban setting and types of buildings/landscape present or planned) of the corridor and acknowledge the role of transport to assist in place-shaping."

- This is what has been undertaken in the preparation of the indicative cross sections that have already been built throughout Stage 1, and are under construction for Stage 2.

Query: Please provide indicative cross sections for the future Arterial, Collector and Local Roads.

Refer to the approved cross sections that stages 1-3A have utilised and have constructed or are under construction, including the interim Grand Drive cross section. These cross sections are attached to this letter (extracted from letters regarding assessment of variations to resource consent for Stage 2 and stage 3A).

The final arterial cross section is being confirmed with the Supporting Growth Alliance/Auckland Transport.

Please don't hesitate to contact either Sagar Malakappa or me if you have any queries regarding the above.

Yours sincerely

Angie Crafer
DIRECTOR

enc: Ara Hills road cross sections

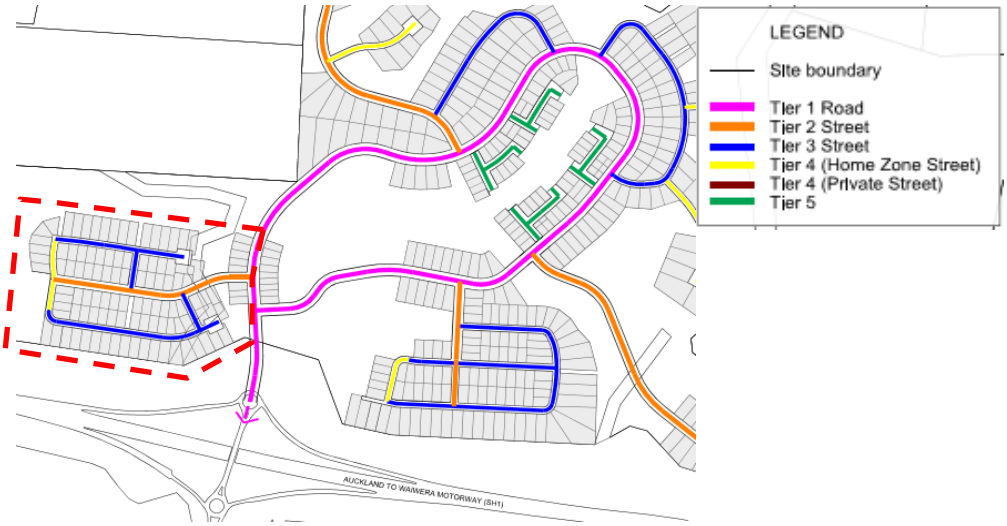
Reference: P:\AVJE\018 Ara Hills Plan Change\4.0 Reporting\L1A231019 Ara Hills_Flow responses.docx - Angie Crafer

1 ROAD CROSS SECTIONS

1.1 Consented road typologies

A hierarchy of road typologies using a five-level tier system and associated cross sections are included in the plans for consent, as identified in drawings[1] prepared by Boffa Miskell Limited ("Boffa plans"). Figure 1 below shows a previous layout of Stage 2 which was included in these drawings.

Figure 1: Road and Street Hierarchy Diagram[2]



Stage 2 was anticipated to include Tier 2, 3 and 4 streets, connecting to a Tier 1 road. The currently consented Stage 8, which is roughly equivalent to the current Stage 3 of development also includes Tier 5 streets. Details of these are provided below.

The Tier 1 roads are identified in the consented drawings as two-lane kerbed roads with a 7 m wide carriageway, 2.5 m wide parking bays interspersed with rain gardens. A shared path of 3 m is included on one side of the road with a 1.8 m footpath on the other side. The cross-sections of the Tier 1 roads are shown in Figure 2 below.

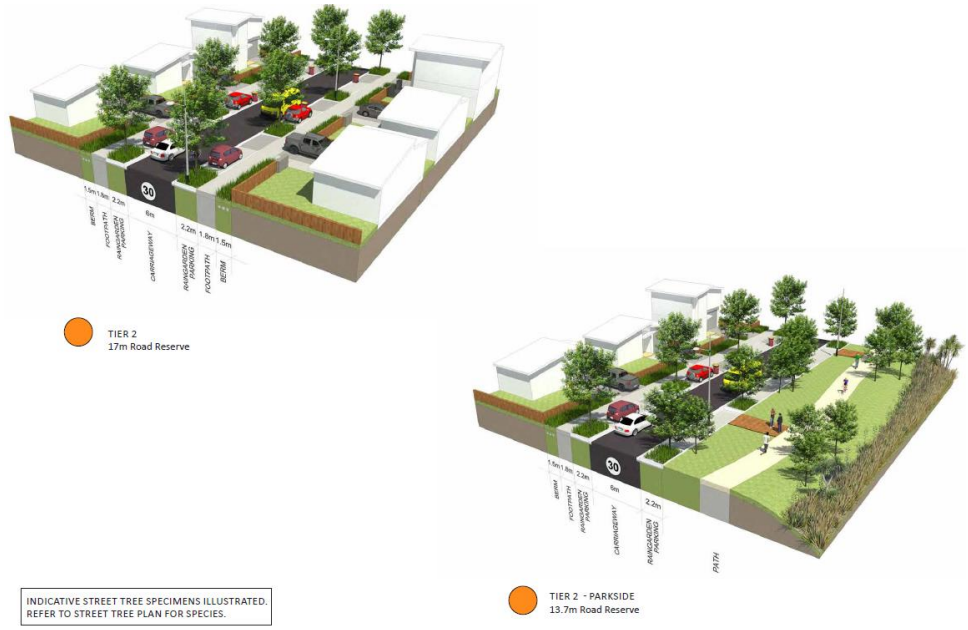
[1] Grand View Estate, Orewa, Street Cross Sections, 5 October 2015, Revision 0, Figures 28, 29, 30, "For Consent" Boffa Miskell

[2] Grand View Estate, Orewa, Street Hierarchy Strategy Diagram, September 2015, Revision B, Figure 26 "For Consent", Boffa Miskell

Figure 2: Cross-sections of Tier 1 Road[3]

The consent plans show a Tier 2 street intersecting with a Tier 1 road and being the primary access into the Stage 2 development. Tier 2 Streets consist of a 6 m wide carriageway, 2.2 m wide parking bays interspersed with raingardens and footpaths along both sides of Tier 2 streets. The cross-sections of the Tier 2 streets are shown in Figure 3 below.

Figure 3: Cross-sections of Tier 2 Streets[4]



[3] Grand View Estate, Orewa, Street Cross Sections – Tier 1, 5 October 2015, Revision 0, Figure 28, "For Consent" Boffa Miskell

[4] Grand View Estate, Orewa, Street Cross Sections – Tier 2, 5 October 2015, Revision 0, Figure 29, "For Consent" Boffa Miskell

In the consented plans, Tier 3 Streets provide access to properties further out within Stage 2. They have a 5.5 m wide carriageway plus 2.2 m wide parking bays and berm along one side. Footpaths are included along one side of the Tier 3 streets.

The consent plans show a Tier 4 (Home Zone) Street within Stage 2 which is proposed to be a shared space whilst providing access to a small number of sites. Tier 5 Streets are included in Stage 8, as short disconnected roads that do not cross the central greenway. The cross-section of Tier 3 and Tier 4 (Home Zone) Streets are shown in Figure 4 below along with Tier 5 Streets.

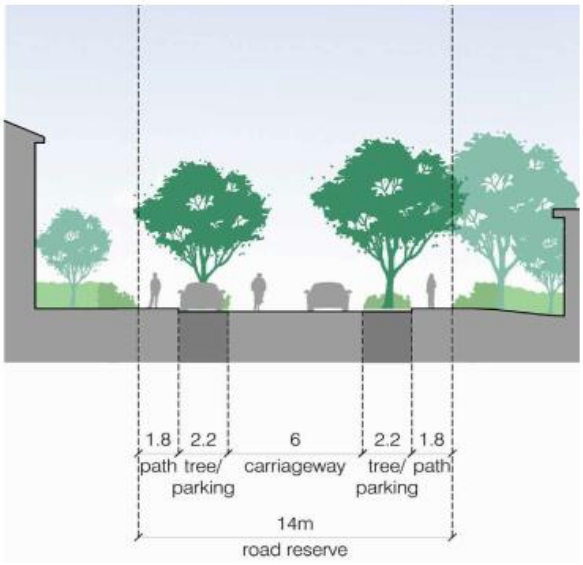
Figure 4: Cross-sections of Tier 3, 4 and 5 Streets[5]

1.2 Stage 2 Public Road Cross Section

The revised road network within the Stage 2 development includes a 14 m wide road reserve and a carriageway width of 6 m (two 3.0 m lanes). A 2.2 m wide berm and a 1.8 m wide footpath is on one side of the road while the other side includes 2.2 m wide parking bays interspersed with raingardens and a 1.8 m wide footpath. Service plinths are located within the properties. The cross-section for the roads in Stage 2 is shown in Figure 5 below.

[5] Grand View Estate, Orewa, Street Cross Sections – Tier 3 and Tier 4, 5 October 2015, Revision 0, Figure 30, "For Consent" Boffa Miskell

Figure 5: Stage 2 Road Cross-Section[6]



1.3 Stage 3a Public Road Cross Sections

The revised road network within the Stage 3A development comprises local roads that include the loop road, neighbourhood streets and rural access roads. Private laneways are also included. The details of each cross-section are described below.

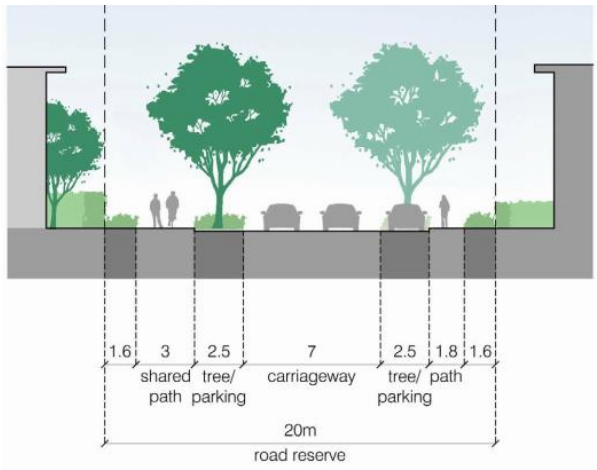
1.3.1 20 m Loop Road (Figure 8) - Road 1 between Entrance Road and Road 40

This road provides the same cross section as the 20 m Tier 1 Road identified in the Boffa consent plans, comprising a 7 m wide carriageway, 2.5 m wide berm and parking bays on both sides of the road, a 3.0 m wide shared path on one side and a 1.8 m wide footpath on the other side. 1.6 m wide service berms are on both sides of the road adjacent to property boundaries.

Within Stage 3A, Road 1 has a similar cross section except the service berm width slightly changes on both sides of the road. The 1.8 m wide footpath is adjacent to a 2.2 m service berm while the 3.0m wide shared path is adjacent to a 1.0 m service berm.

[6] Ara Hills Stage 2 Design Guidance, Streets – Neighbourhood Street - Type 1, 03 September 2021, Oculus

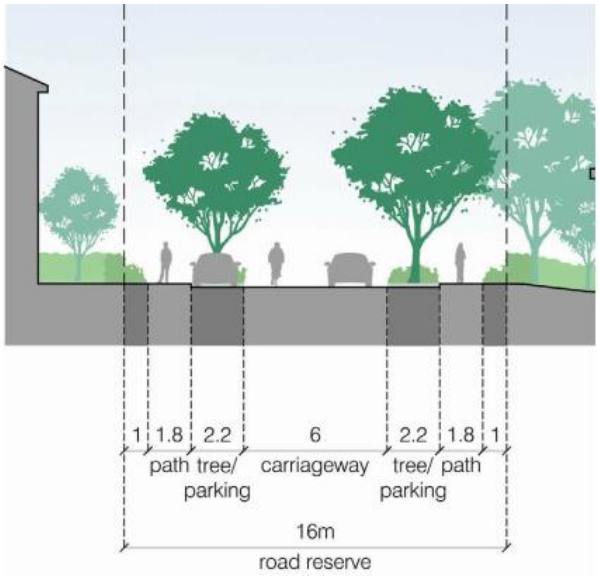
Figure 6: Cross-section of 20 m Road 1 Loop Road[7]



1.3.2 16 m Type 1 Neighbourhood Street (Figure 7) – Road 30 and Road 33

This cross section is similar to the 17 m Tier 2 Streets identified in the Boffa consent plans, comprising a 6 m wide carriageway, 2.2 m wide berm and parking bays on both sides of the road, adjacent to a 1.8 m footpath and 1.0 m service berm on both sides of the road. The only difference is that the Boffa plans show a 1.5 m service berm on both sides of the road.

Figure 7: Cross-section of 16 m Type 1 Neighbourhood Street[8]



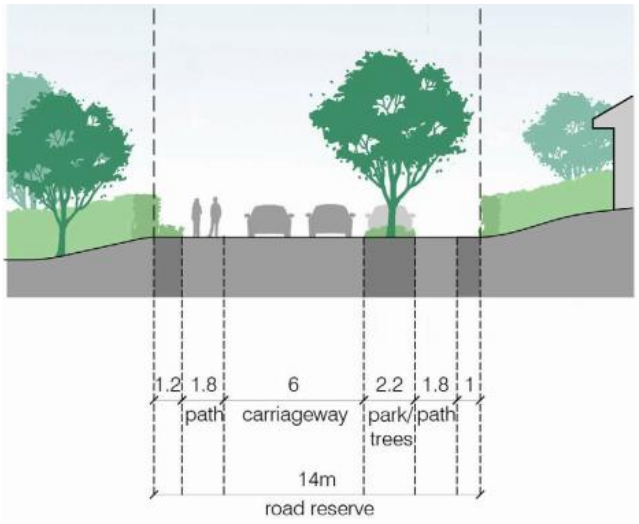
1.3.3 14 m Rural Access Road (Figure 8) – Road 40

This cross section comprises a 6 m wide carriageway, 2.2 m wide berm and parking bay, adjacent to a 1.8 m footpath and a 1.0 m service berm on one side of the road. The other side of the road provides a

[7] Ara Hills Stage 3A Design Guidance, Streets – Loop Road, 13 May 2021, Oculus
[8] Ara Hills Stage 3A Design Guidance, Streets – Neighbourhood Street, 13 May 2021, Oculus

1.8 m footpath (directly adjacent to the roadway) and a 1.2 m service berm. This cross section mainly applies to Road 40 within the extents of Stage 4. Within Stage 3A, the cross section is similar except there is a 6 m berm on the eastern side, which separates the footpath from the roadway to allow for informal tree planting.

Figure 8: Cross-section of 14 m Rural Access Road[9]



[9] Ara Hills Stage 3A Design Guidance, Streets – Rural Access Road, 13 May 2021, Oculus