The Hill, Ellerslie

Fast Track Application

Integrated Transportation Assessment Report

30 August 2022

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Report Status	Prepared By	Reviewed By
Report v4	Graham Norman	Leo Hills

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1 INTRODUCTION

Commute has been engaged to prepare an Integrated Transport Assessment (ITA) for a proposed Residential development located at The Hill, Ellerslie.

The site is part of the Ellerslie Racecourse that was formerly used for the steeplechase race which is to be discontinued. Therefore, the land is surplus to requirements of Auckland Thoroughbred Racing Incorporated (ATR) and is proposed to accommodate the following:

- Apartments – 3 bedrooms - 55 units
- Apartments: 1–2-bedroom units - 152 units
- Detached dwellings – 37 units
- Terraced housing - 56 units
- Retirement beds - 57 units
- A café of 150m2

Key transportation considerations of the proposal are as follows:

- Consideration of existing traffic to and from the existing activities within the racecourse site
- The current and future accessibility of the site to the various modes of transport (including public transport, walking and cycling)
- The ability of the surrounding road network to safely and efficiently accommodate trips by all modes generated by proposed development
- Design of the internal road network and ability to service the proposed development

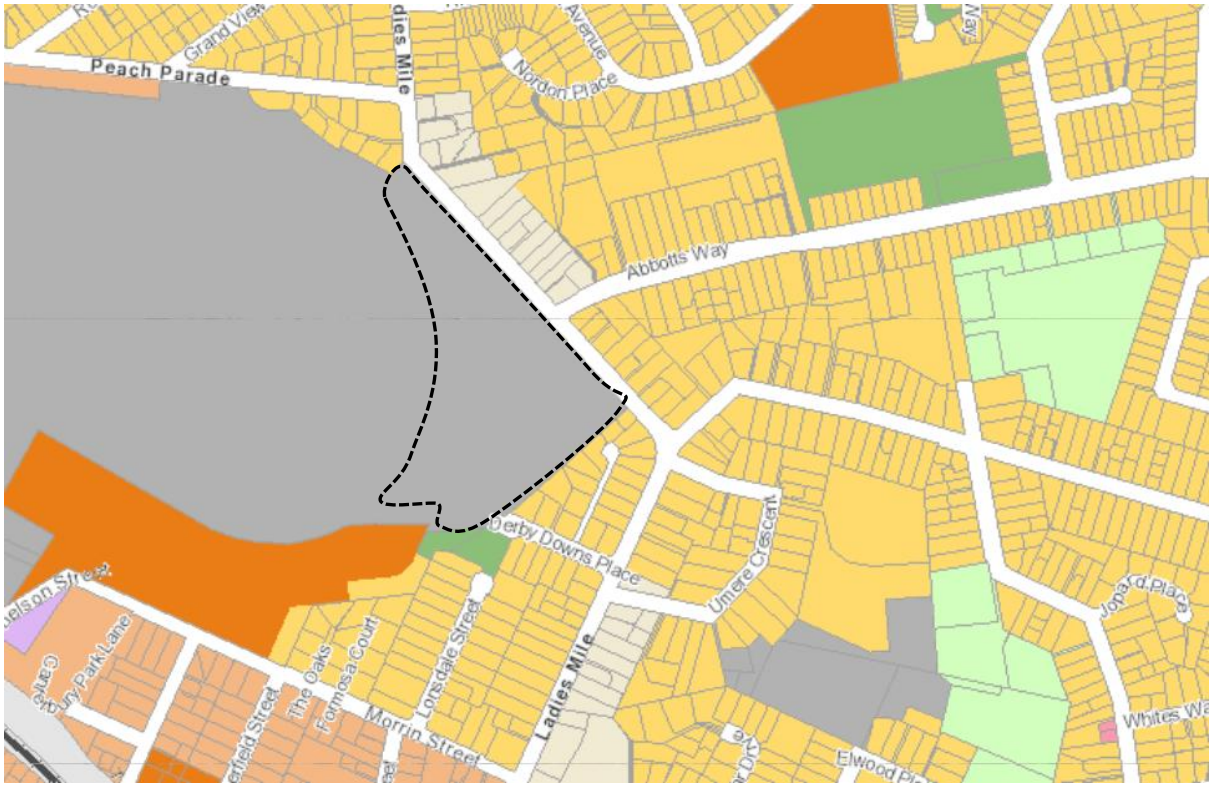
2 EXISTING ENVIRONMENT

2.1 SITE LOCATION

The site includes around 6.2 Ha of land as shown in Figure 2-1. Currently the site is zoned as Special Purpose – Major Recreation Facility zone and is subject to the Ellerslie Racecourse Sub-Precinct provisions. The surrounding land is primarily Mixed housing suburban with some single house zoning on the opposite side of Lades Mile as shown in Figure 2-2.

Figure 2-1: Site Plan

Figure 2-2: Existing Zoning AUP (OiP)



The area is bounded by the Ellerslie Racecourse to the west, Ladies Mile Road to the North and backs onto an existing residential area accessed from Hunterville Court which leads to Derby Downs Place as shown in Figure 2-3.

Figure 2-3: Aerial photo of site

2.2 ROAD NETWORK

2.2.1 LADIES MILE

Ladies Mile in the vicinity of the site is classified as Arterial Roads in the AUP (OP). Photograph 1 and Photograph 2 show Ladies Mile near the site.

Photograph 1: Ladies Mile (looking east)

Photograph 2: Ladies Mile (looking west)

Ladies Mile has a road reserve width of approximately 20m and a sealed carriageway of varying width (between 11-13m)

Ladies Mile generally provides a single lane in each direction with a flush median that tapers out prior to the intersection with Abbotts Way. The intersections of Ladies Mile / Abbotts Ways and Ladies Mile / Marua Road are signal controlled.

There are no cycling facilities provided on Ladies Mile along the northern site frontage. A section of on road cycle lane is provided on Ladies Mile Northbound carriageway to the south of the Marua Road intersection.

In the vicinity of the Abbotts Way intersection, pedestrian footpaths are provided on the northern side of Ladies Mile with no facilities provided on the southern side. The footpath is approximately 1.5 m wide. South of the Marua Road intersection, footpaths are provided on both sides of Ladies Mile.

In the vicinity of the Ladies Mile / Abbotts Way intersection, properties (84-88 Ladies Mile) to the north of the intersection are set below the Ladies Mile carriageway. A laneway provides access to these properties and forms the footpath in this location. The exit to the laneway is located at the Ladies Mile/ Abbotts Way intersection and the vehicle crossing is shared between vehicles and pedestrian waiting to cross Abbotts Way.

All roads in the vicinity of the site have a posted speed limit of 50km/hr.

2.2.2 DERBY DOWNS PLACE

Derby Downs Place is not classified as an Arterial Road in the AUP (OiP). Derby Downs runs in an east-west direction between Ladies Mile and the subject site and currently terminates with a cul de sac. The road reserve width is approximately 20 m with a sealed carriageway of approximately 12 m.

Figure 2-4: Derby Downs Place (looking east)

Derby Downs provides a single lane in each direction with on street parking provided and a footpath on both sides of the road.

2.2.3 ROADS AND STREET MODAL PRIORITY

A Roads and streets framework assessment has been undertaken for Ladies Mile in the vicinity of the development. The *AT Future Connect* classification of the corridor has been considered in both the existing situation and future scenario (10-year timeframe).

The corridor is considered to be classified as a P1 / M2 corridor. In the future this is expected to remain the same. The modal priorities are expected to shift over time as per the diagrams below. The biggest change observed between current and future modal priority is an increased priority for walking and cycling, a slight increase in priority for PT and a reduction in priority for parking. The proposed changes to the external road network have considered this assessment in the development of the proposed changes.

Figure 2-5: Observed modal priority

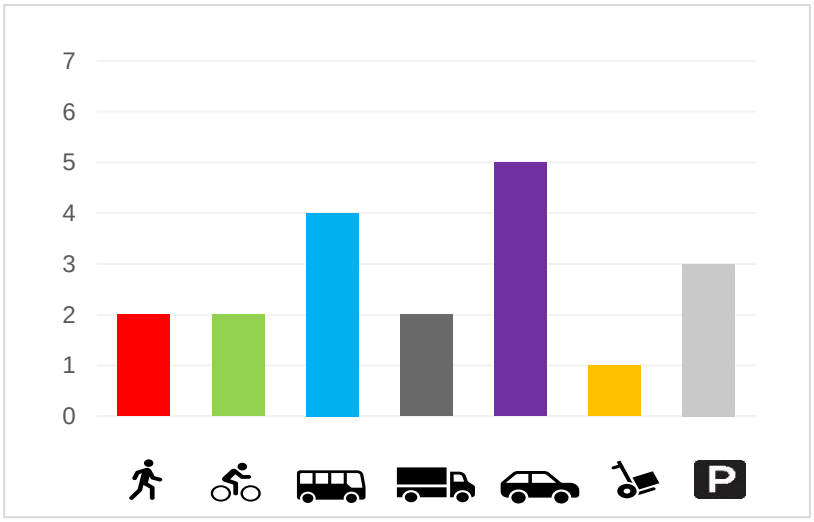
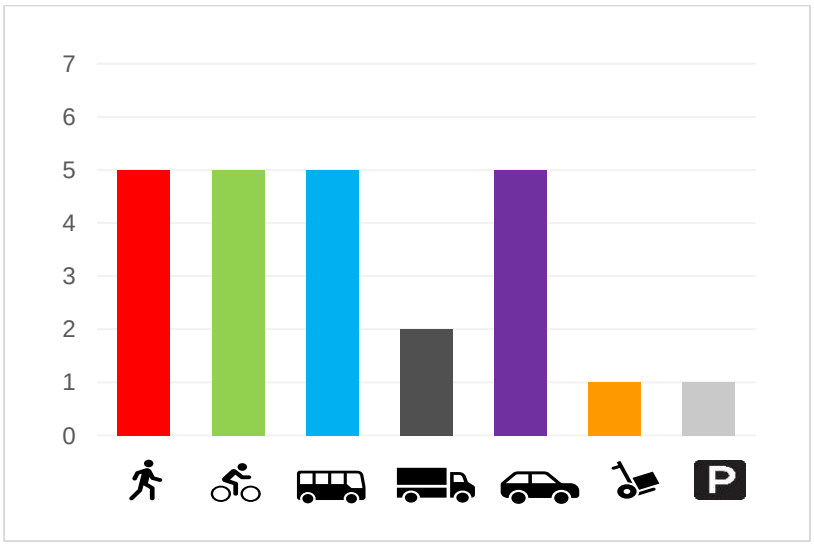


Figure 2-6: Future modal priority



2.3 ACCESSIBILITY

2.3.1 PRIVATE VEHICLES

The proposed development area is well located with regards to road connectivity to the wider Auckland Region. Ladies Mile connects to Main Highway in the south offering connectivity to the Ellerslie Panmure interchange and connects to Remuera Road and offers access to the Greenlane Interchange to the north.

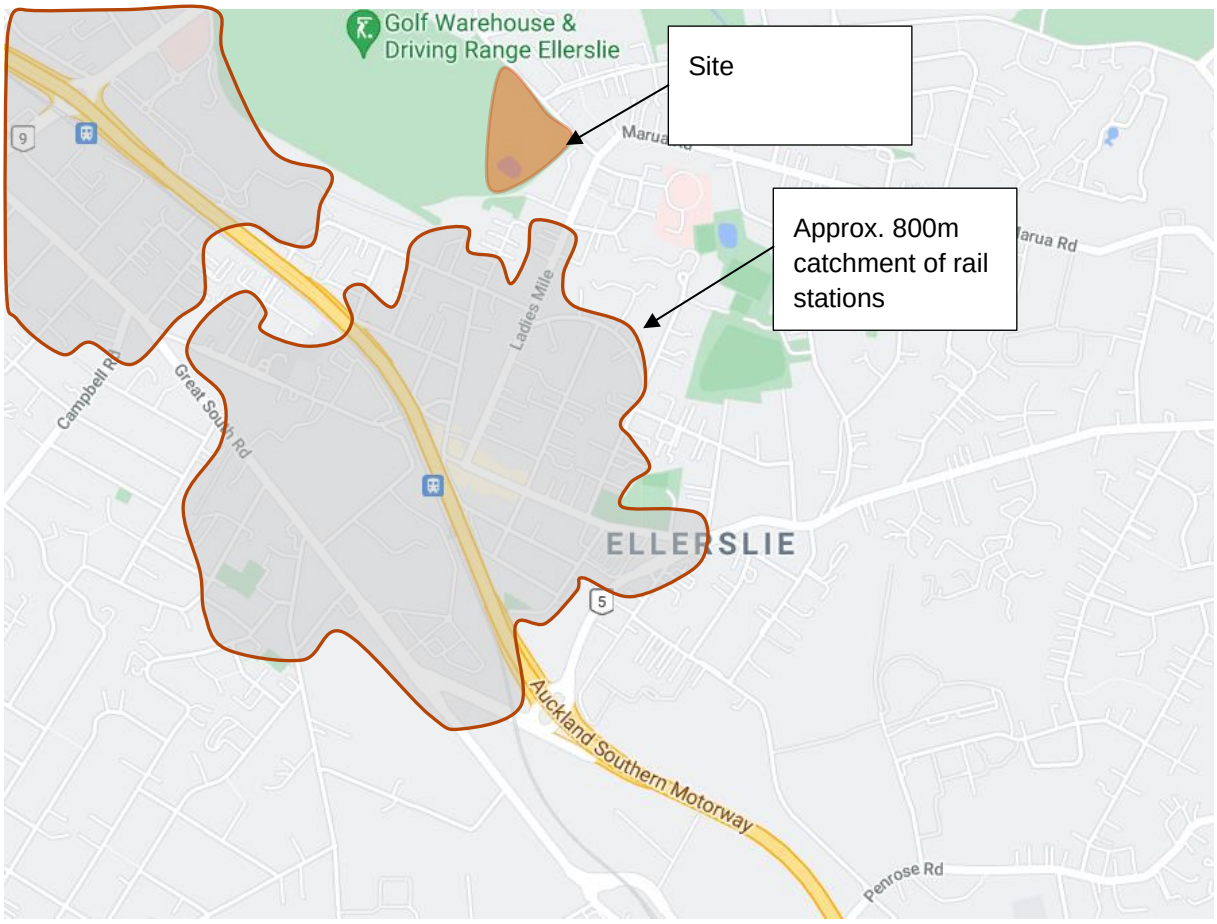
The Ellerslie Town centre is situated some 1km from the site offering a full suite of retail opportunities.

2.3.2 PUBLIC TRANSPORT

The proposed site is located around 800m[1] from the Ellerslie Rail station. From here, connection can be made to a variety of destinations including Newmarket and the city centre to the north, and Penrose and Manukau to the south. Figure 2-7 shows an indicative 800m walking catchment for the Ellerslie rail station. Auckland Council typically consider a walkable catchment of a station to be 800m walking distance. Typically, PT users are prepared to walk 15 min to a high-quality PT facility equating to around 1200-1400m depending on walking ability and constraints.

[1] As the crow flies to the southern boundary

Figure 2-7: Train station catchments

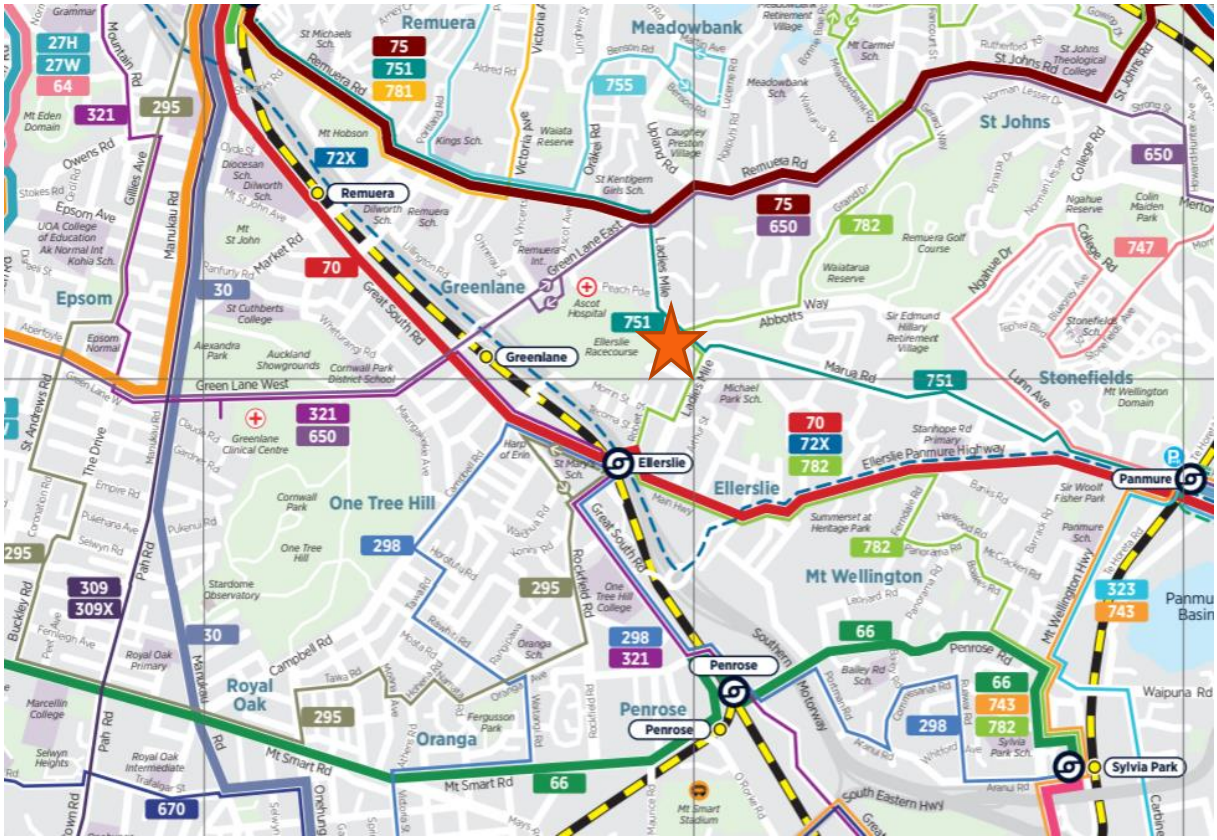


The public transport network is outlined in Figure 2-8. The site is served by a number of bus services with a walking catchment. Specifically:

- Route 751: Provides connectivity between Panmure and Newmarket
- Route 782: Provides connectivity between St Heliers and Sylvia Park

Further services are provided on Green Lane East and Remuera Road but around 750m to Greenlane East and 780m to Remuera Road so less likely to attract passengers from this site.

Figure 2-8: AT public transport network

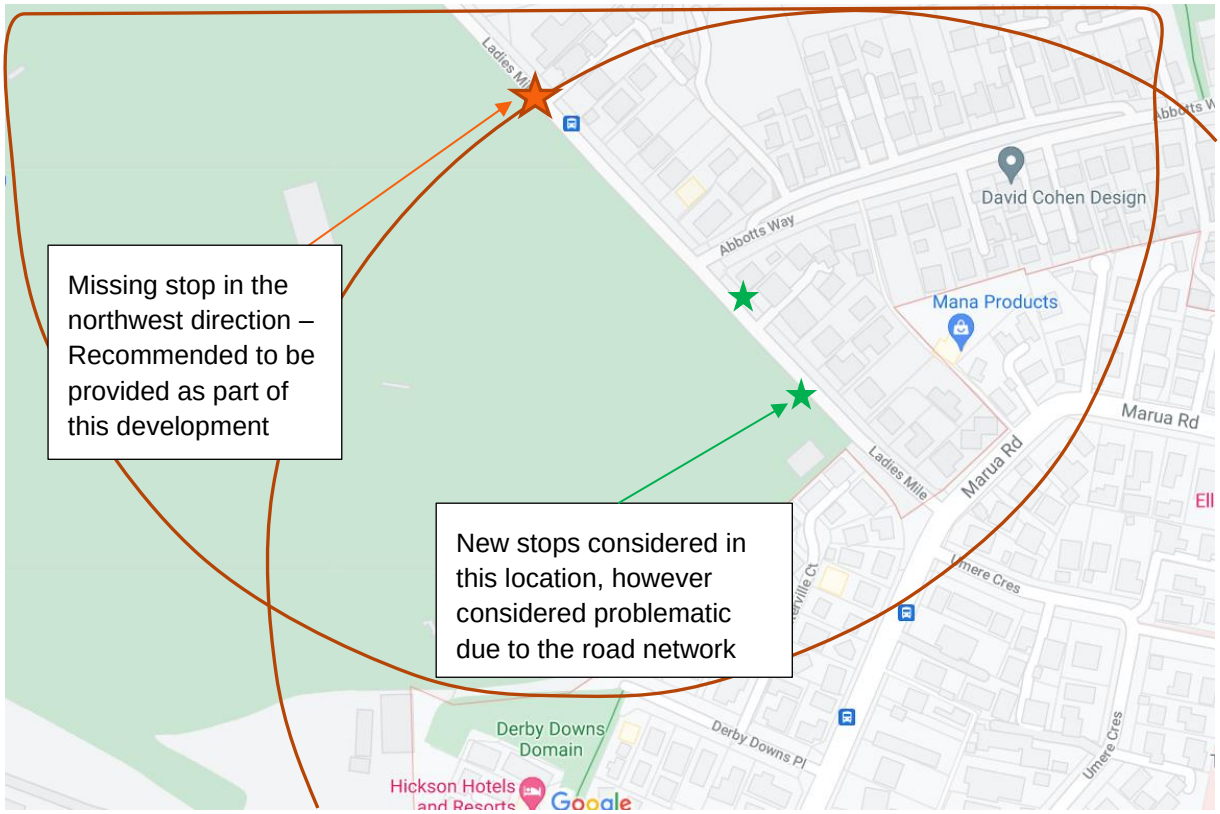


With regards to access to local bus stops, the site has access to a set of stops on Ladies Mile, north of Derby downs and a single stop on Ladies Mile north of the site.

At present, the stop on Ladies Mile north of Abbotts (serving Route 751) is only provided in the southeast direction with no stop on the northwest direction. This is likely due to the lack of footpath provision along the site frontage and lack of active land use. As part of this development, provision of an additional stop on Ladies Mile (north of Abbotts) in the northbound direction is recommended.

Assuming both stop locations serve bus directions, the site is well served with all of the area within 400m of a local bus stop.

Figure 2-9: Local bus stop catchments (400m)



Overall, the site is considered well connected from a PT perspective with the key PT services providing good connectivity for much of the anticipated trip desire lines. As such, the site has a higher than usual potential for PT trip take up and is well suited to intensification.

2.3.3 FUTURE PUBLIC TRANSPORT ENVIRONMENT

The Regional Public Transport Plan 2018 – 2028 identifies the planned public transport services for the next ten-year period.

The RPTP identifies intentions to increase frequency on both the 751 and 782 services in the future (beyond 2028). Frequency of rail services from the Ellerslie rail station are anticipated to increase.

2.3.4 WALKING

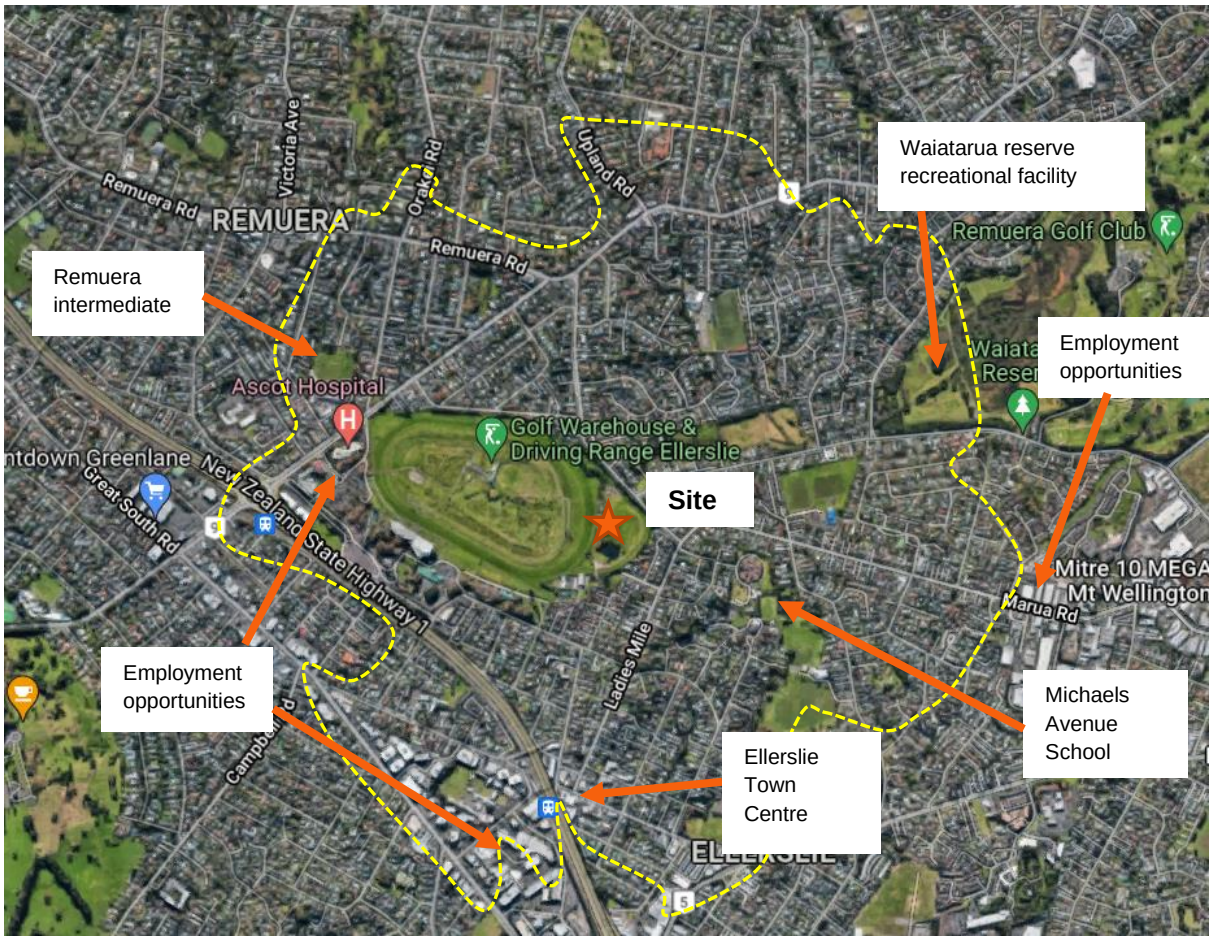
The Austroads Guide to Traffic Engineering Practice Part 13 – Pedestrians indicates that the practical walking distance for non-recreational walking trips is in the order of 1.5 km. Using the practical walking distance of 1.5 km and the 15th percentile walking speed of a typical fit, healthy adult of 1.3 m/s, gives a journey time of some 20 minutes. This is in line with New Zealand data in the Pedestrian Planning and Design Guide, which states that for walking trips, half are more than 10 minutes and 18% are more than 20 minutes.

The primary catchment area for pedestrians has therefore been based on a 1.5 km radius of the centre of the site as shown in with the exception of the proposed site frontage and connectivity through the site and through the neighbouring Ellerslie racecourse area.

Outside the immediate development area, all roads in the vicinity of the site have footpaths provided on both sides of the road.

Overall, the walking facilities on the surrounding network are considered to be at a high standard, with the exception of the proposed site frontage and connectivity through the site and through the neighbouring Ellerslie racecourse area.

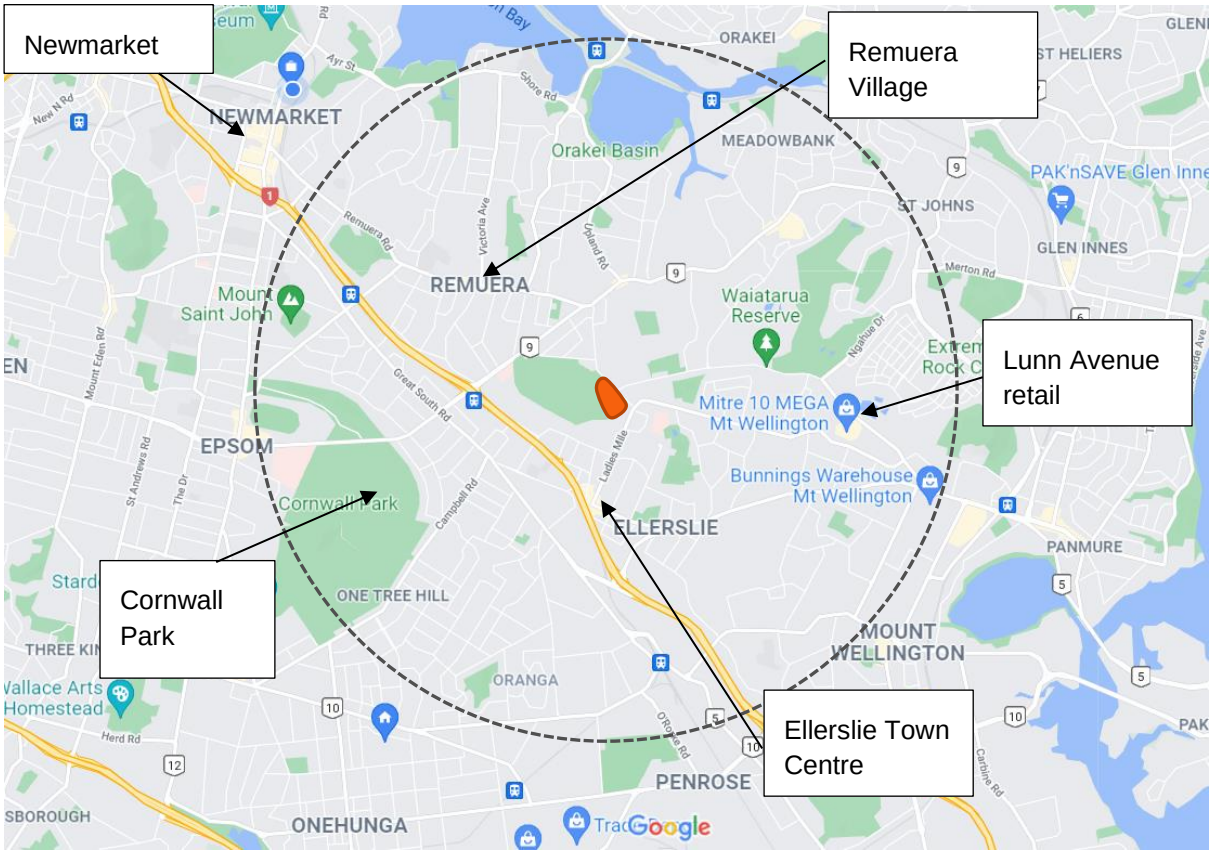
Figure 2-10: Walking Catchment 1.5km from site (Source: Google Maps)



2.3.5 CYCLING

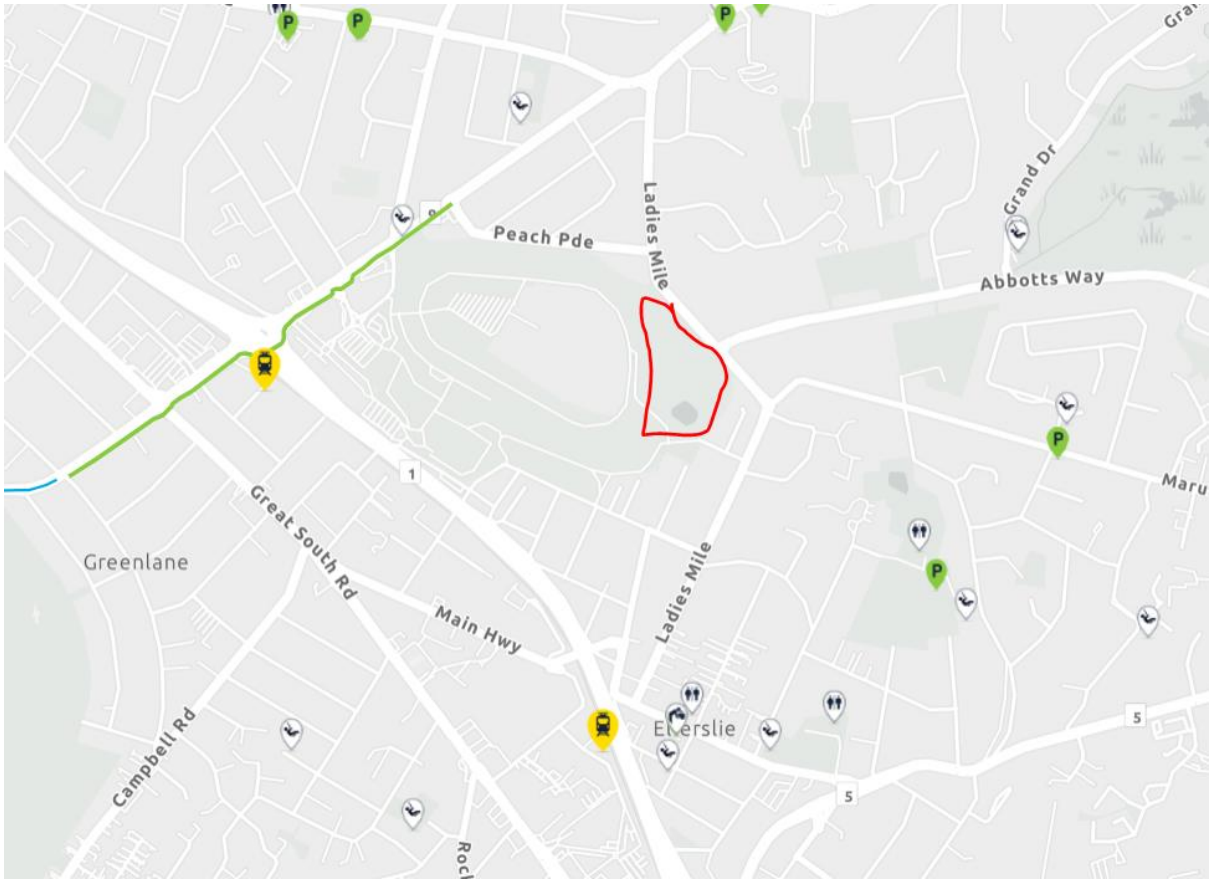
Based on New Zealand Transport Agency Research Report 426, the average cycling trip length is approximately 3 km. This places Ellerslie Town Centre, Remuera town centre and the Lunn Avenue retail area within the cycle catchment. The Newmarket metropolitan centre is just outside of the 3km catchment and is likely to be accessible via bike for some users.

Figure 2-11: Cycling catchment



There are limited dedicated cycle facilities in the vicinity of the site. Ladies Mile has a section of on road cycle lane on the northbound side of the road only. Greenlane, around the SH1 interchange provides a section of shared path.

Figure 2-12: Cycle network around The Hill



With the increasing attractiveness of electric bikes, distances that can reasonably be travelled by bike are increasing. Trips to and from Newmarket are expected to become increasingly attractive for travel via bike.

2.3.6 TRAFFIC VOLUMES

2.3.6.1 AUCKLAND TRANSPORT TRAFFIC VOLUMES

Figure 2-13 outlines traffic volumes of various roads surrounding the site as per surveys completed by Auckland Transport.

Figure 2-13: Traffic Volumes

Road	Location	Date	7-Day ADT (veh/ day)	Peak hour volume (veh/ hr)	
				AM Peak	PM Peak
Ladies Mile	Between Umere and Morrin	19/09/2019	18215	1765	1799

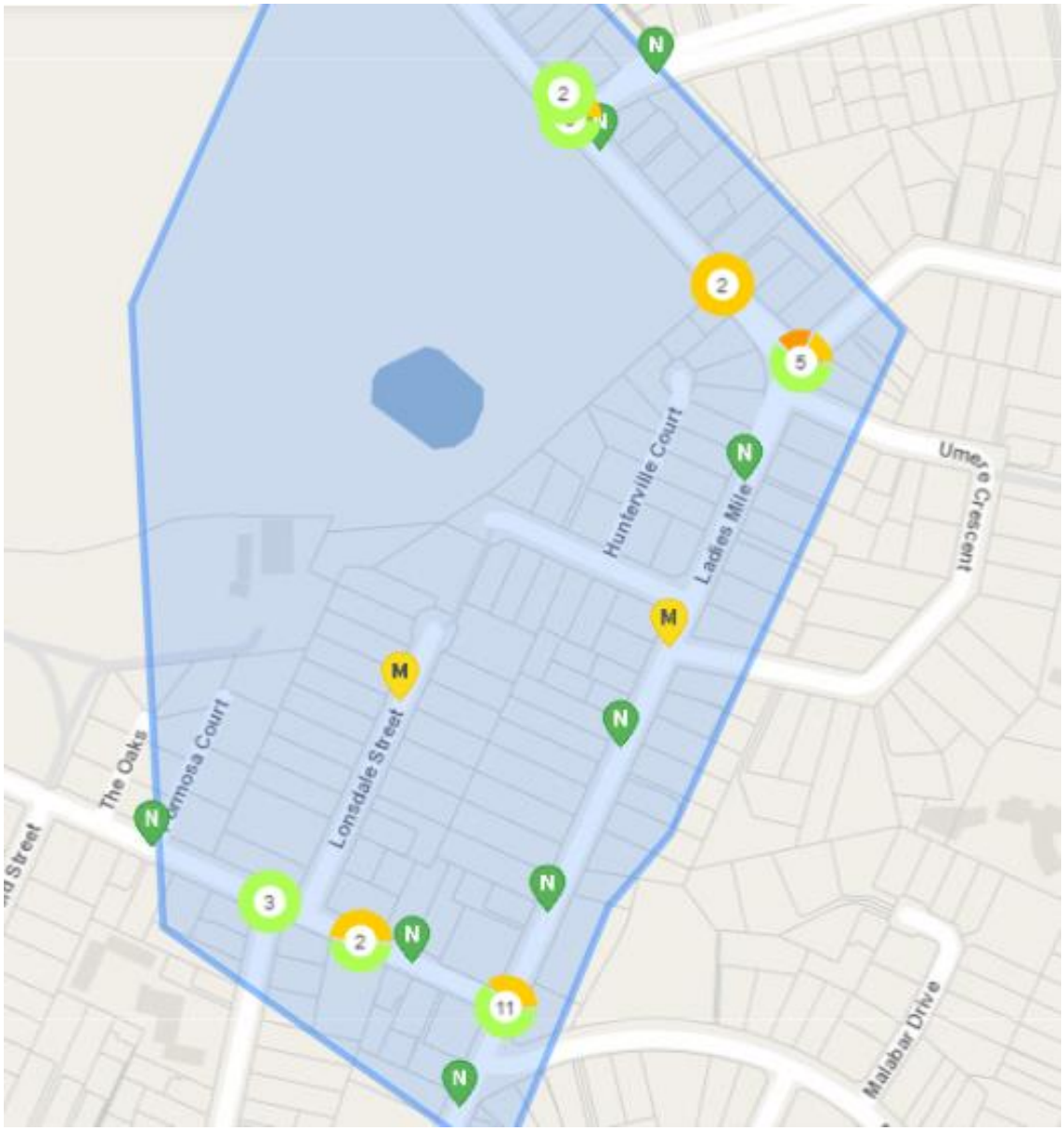
Ladies Mile	Between Richard Farrell and Peach Parade	16/10/2019	11701	1197	1247

No data is available for Derby Downs Place however in a typical day (outside an event at the racecourse) is estimated as being less than 250 vehicles per day.

2.4 CRASH HISTORY

An assessment of the safety record surrounding the site has been carried out using the Waka Kotahi (NZTA) CAS database, for the five-year period between 2016 and 2020 plus any crashes entered into the system for 2021. The search included all reported crashes within the study area shown in the figure below.

Figure 2-14: Crash study area and history for the past 5 years



The crash history for the study area can be summarised as follows:

- The intersection of Ladies Mile and Abbotts Way has a total of 11 crashes recorded. One of these resulted in a minor injury involving a failure to stop at a red light. The remaining 10 non-injury crashes were primarily as a result of failure to stop, rear end crashes and loss of control.
- The intersection of Ladies Mile and Derby Downs Place has two recorded crashes involving one loss of control crash resulting in a minor injury and one crash into a parked vehicle.
- The Marua Road / Ladies Mile intersection has 5 recorded crashes involving a serious injury and minor injury crash. The serious crash involved a loss of control with alcohol suspected. The minor injury crash involved a motorcycle losing control with alcohol suspected. The remaining crashes involved loss of control and rear end type crashes.
- The Morrin Road / Lonsdale intersection has three recorded crashes, two of which resulted in minor injuries. Both minor injury crashes were as a result of loss of control while the non-injury crash involved a collision with a parked vehicle.
- On the midblock sections of Ladies Mile, six crashes have been recorded including two minor injury crashes. These included a rear end with a cyclist and merging / overtaking crash. The remaining non-injury crashes included collisions with parked vehicles and one crash with a vehicle reversing from a vehicle crossing

Overall, the safety assessment of the surrounding transport network does not highlight any significant safety deficiencies. The proposed access positions to the external network do not appear to be overrepresented from a crash perspective and are likely to be able to accommodate additional transport demand if designed appropriately.

3 PROPOSED DEVELOPMENT

3.1 OVERVIEW

The proposed development will look to develop:

- Apartments – 3 bedrooms - 55 units
- Apartments: 1–2-bedroom units - 152 units
- Detached dwellings – 37 units
- Terraced housing - 56 units
- Retirement beds – 57 units
- A café of 150m2

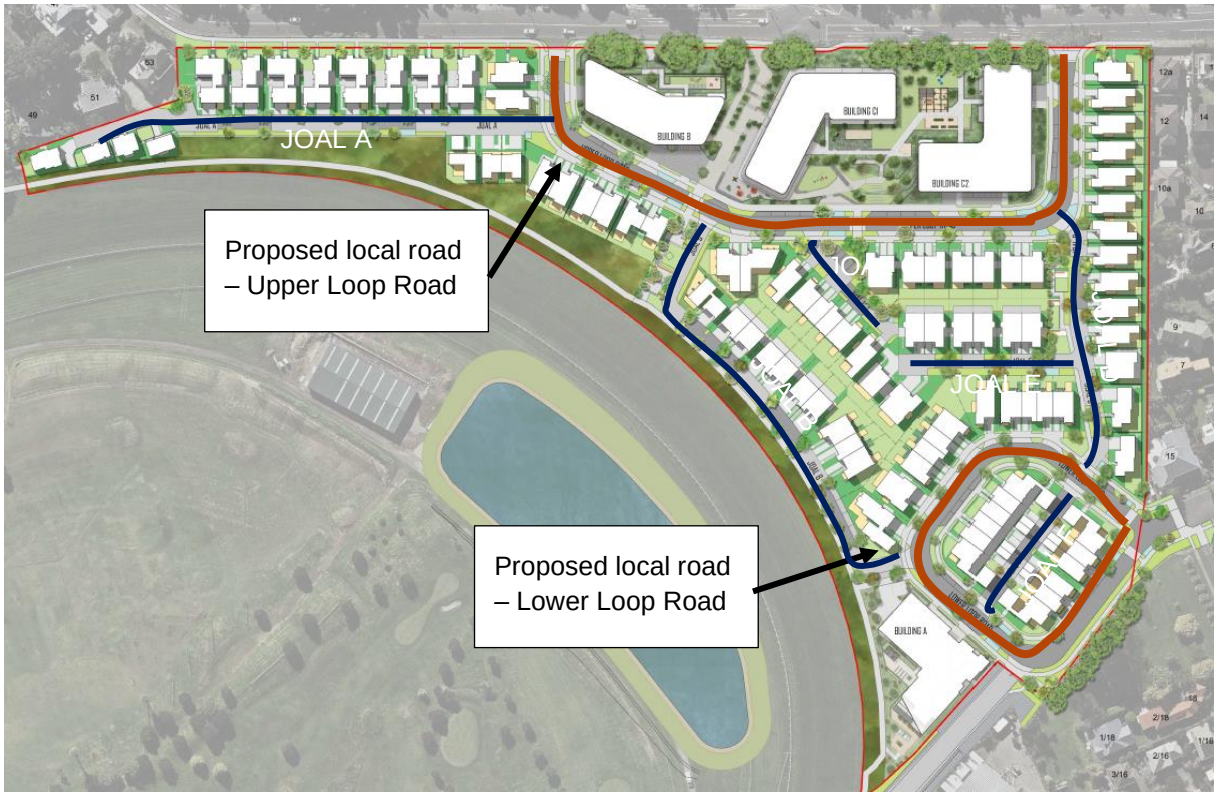
An indicative site plan is shown below in Figure 3-1.

Figure 3-1: Indicative Site Plan the Hill development

3.2 PROPOSED TRANSPORT NETWORK

The proposed network for the development area is shown below in Figure 3-2

Figure 3-2: Proposed Road Layout



As shown, internal to the development area there is a mixture of local roads and JOALs proposed to service the development area.

The key characteristics of the proposed roads are shown below in Table 3-1.

Table 3-1: Key Characteristics of Internal Roading Network

Road	Key Characteristics
JOAL A	- 8.8m boundary to boundary - 3.5 - 5.5m road carriageway - No formal footpaths – shared space arrangement
JOAL B	- 10-17.5m boundary to boundary - 3.5 - 5.5m road carriageway - Separated footpath on one side of the road (2.5m width)
JOAL C	- 9m boundary to boundary - 5.5m road carriageway - No formal footpaths – shared space arrangement - Perpendicular parking bay with 4 spaces
JOAL D	- 10m boundary to boundary - 4.2 - 5.5m road carriageway

	- Separated footpath on one side of the road
JOAL E	- 16.6-8.8m boundary to boundary - 3.5 - 5.5m road carriageway - Separated footpath on one side of the road - Indented parking bays at 2.1m width
JOAL F	- 9m boundary to boundary - 5.5m road carriageway - No formal footpaths – shared space arrangement
Local Road	- 16.0m cross section - 3.0m traffic lanes - 2.35 parking bays with planting - 1.8m footpaths

The above road cross-sections fully comply with Auckland Transport TDM manual and are considered appropriate.

During pre-application meetings and UD panel discussions, the function of JOAL D and JOAL B were discussed in some detail. Both JOAL B and D are desired to provide a continuous walking and cycling connection through the site, whilst managing and discouraging through movements of private vehicles. As such the design of JOAL B and JOAL D has focused on creating a high amenity area for pedestrians, providing access to the properties along the JOAL while reducing the attractiveness to vehicles. This has been achieved through:

- Provision of AT TDM vehicle crossings on either end of the JOAL giving the look of a private road.
- JOAL D has two sections of carriageway narrowing to create one way traffic flow
- JOAL B has four sections of carriageway narrowing to create one way traffic flow
- Different surface treatments
- Planting and landscaping to distinguish the corridor from a regular road.
- Ensure the design prevents views to an exit and connection to a potential egress pathway to the north from the lower loop road.

Overall, the design is considered to sufficiently deter use from private vehicles as through movements. Should issues arise with private vehicle through movements, the application proposes a Review Condition which can be implemented should adverse traffic effects arise once the development is constructed and operational. If private vehicle through movements create adverse traffic effects, then the review condition mechanism enables measures such as bollards (for example) to be put in place to prevent such through movements.

If retractable bollards were put in place, these would need to retract in order for refuge collection to occur. This could be achieved through providing refuge collection contractors a remote / key or retracting at certain times of the day.

Figure 3-3: JOAL D design

Figure 3-4: JOAL B design

In order to assess the likelihood of vehicle rat running on JOAL B and D, an assessment of vehicle routes has been undertaken to understand the travel time of using JOALS vs using roads for various trips in the area. The assessment has assumed an average midblock travel speed for each route and included intersection delay from SIDRA models (as per Section 4.5).

In the AM peak, the predominant movement which would benefit through use of the JOAL is a trip from North to South as shown in Figure 3-5. The assessment shows a lower overall travel time using Ladies Mile. As a result, it is unlikely vehicles will find a route via JOAL D attractive for this trip.

In the PM peak, trips from the south to both Ladies Mile or Abbotts Way have been considered as shown in Figure 3-6. For trips to Abbotts Way, a trip remaining on Ladies Mile has a faster travel time. Travel via JOAL D is not expected to be attractive for this trip.

For a trip to Ladies Mile in the north, the routes via Ladies Mile or via the JOAL are similar in overall travel time (3 seconds difference). Given the design of JOAL D/B and the minimal time benefit associated with this route, rat running is not expected to occur on the JOALS.

Figure 3-5: Assessment of Southbound trips

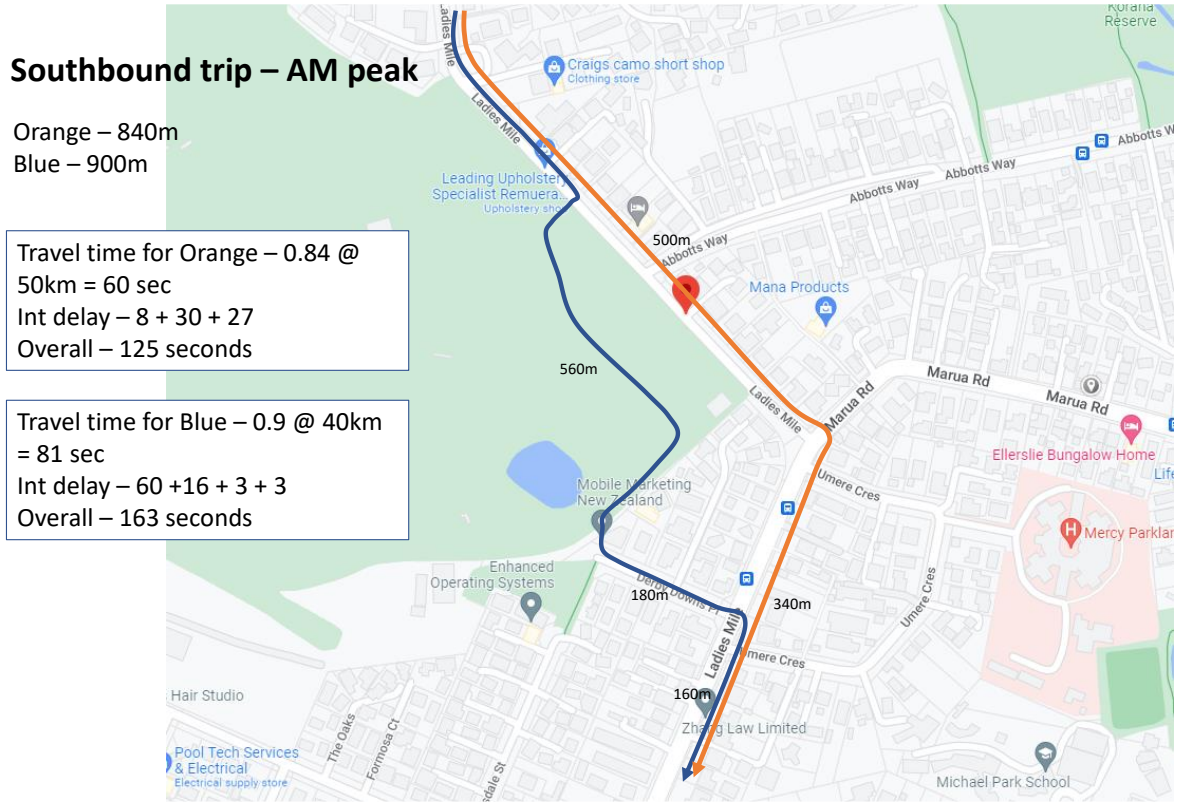
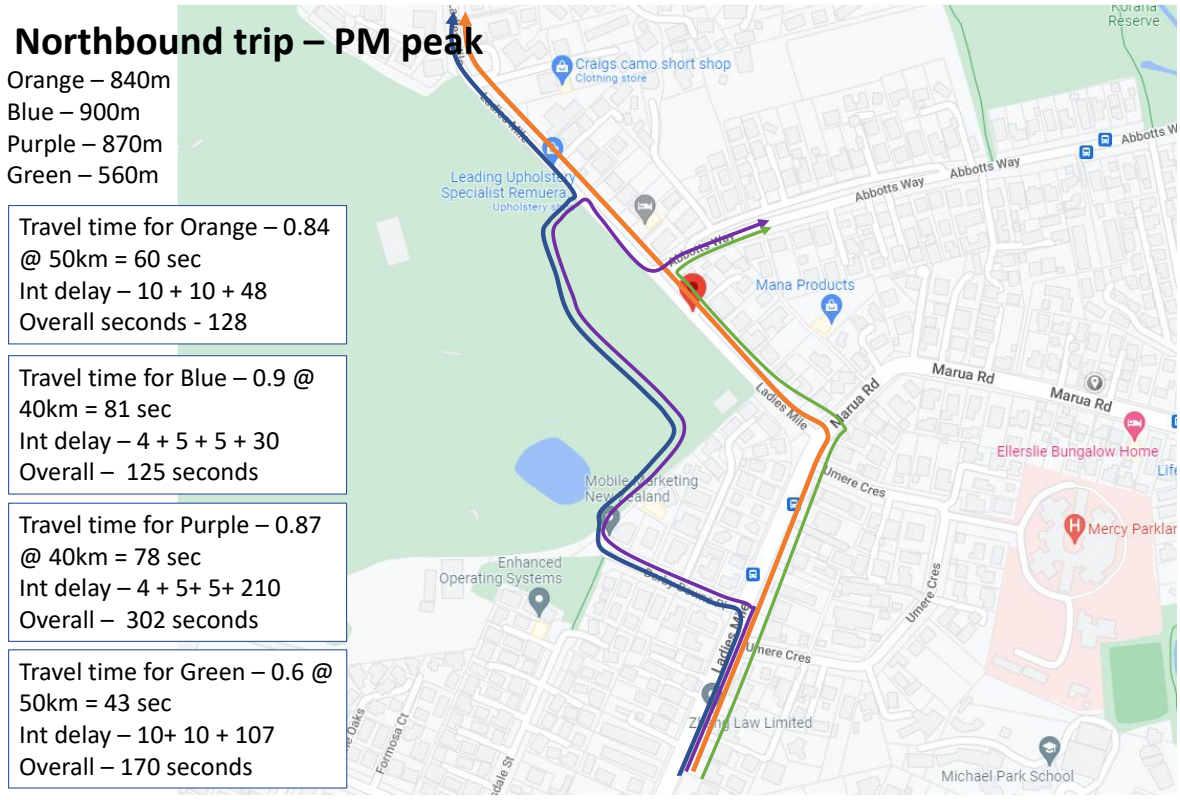


Figure 3-6: Assessment of Northbound trips



3.3 ROAD ACCESS

The site will essentially be served by three vehicular access points including:

- Connection of the Lower Loop Road to Derby Downs Place. The intersection of Derby Downs and Ladies Mile is proposed to be signalised.
- A new intersection on Ladies Mile to the north of the Abbotts Way / Ladies Mile intersection allowing full turning movements. Upgrades to Ladies Mile are proposed in this location to provide a flush median for right turning traffic.
- A new intersection on Ladies Mile south of the Abbotts Way / Ladies Mile intersection allowing left in left out movements only with a raised median to prevent right turning traffic.

3.3.1 SIGHT DISTANCE

The speed limit on the lower Loop Road and Upper Loop Road is posted at 30km/h while Derby Downs and Ladies Mile are posted at 50km/h/. As such all-intersection locations have been reviewed in relation to a posted speed limit of 50km/hr. In terms of Austroads[2] for 50km/hr a Safe Intersection Sight Distance (SISD) of 97m is recommended.

The Upper Loop Road northern access point provides around 140M clear sight distance to the north and 200m+ to the south as demonstrated in Figure 3-7 and Figure 3-8.

The Upper Loop Road southern access point provides around 130M clear sight distance to the south as demonstrated in Figure 3-9. Figure 3-10 shows the sight distance to the north for completeness.

The Derby Downs / Ladies Mile intersection access provides around 170M clear sight distance to the north and over 200m to the south as demonstrated in Figure 3-11 and Figure 3-12.

[2] Austroads Part 4a table 3.2

Figure 3-7: Upper Loop Road North access – looking north

Figure 3-8: Upper Loop Road North access – looking south

Figure 3-9: Upper Loop Road south access – looking south

Figure 3-10: Upper Loop Road south access – looking north

Figure 3-11: Derby Downs / Ladies Mile intersection – looking north

Figure 3-12: Derby Downs / Ladies Mile intersection – looking south

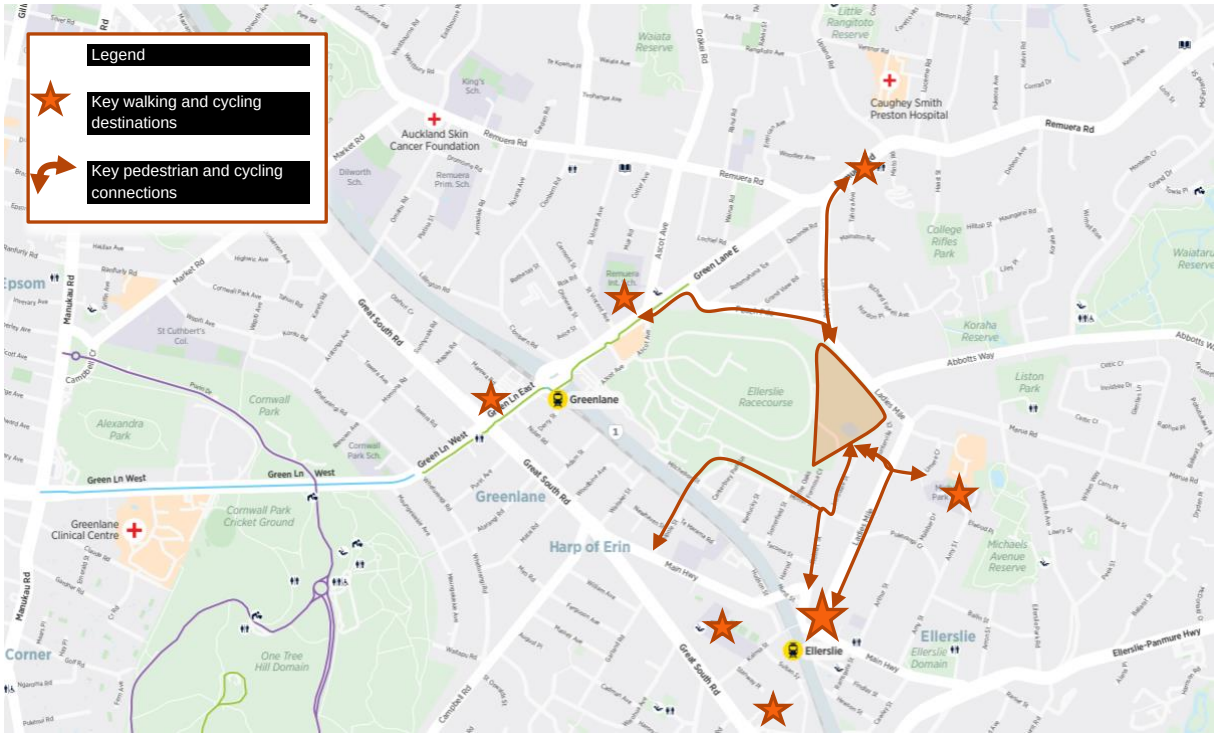
3.4 ACTIVE MODE ACCESS

From an active mode perspective, footpaths are provided on all surrounding roads with the exception of the site frontage on Ladies Mile Road.

The subject site provides connectivity to Ladies Mile, Lonsdale Street (via the reserve) and to Derby Downs Place. Access to the infield of the racecourse will also be available via the proposed tunnel under the track (currently under construction). The proposed development also provides internal connections within the development site including a trackside pathway that connects to Peach Parade and has the potential to connect to future pedestrian connections through the Ellerslie 1 Precinct (when developed in the future).

Figure 3-13 shows the key active mode destinations and likely demand lines from the subject site.

Figure 3-13: Cycle network



3.5 PROPOSED CHANGES TO BUS STOPS

Consideration has also been given to provision of a new set of bus stops between the Ladies Mile / Abbotts Way intersection and the Ladies Mile/ Marua Road intersection. Bus stops in this location would provide operational benefits as these could be used by both the 782 and 751 services.

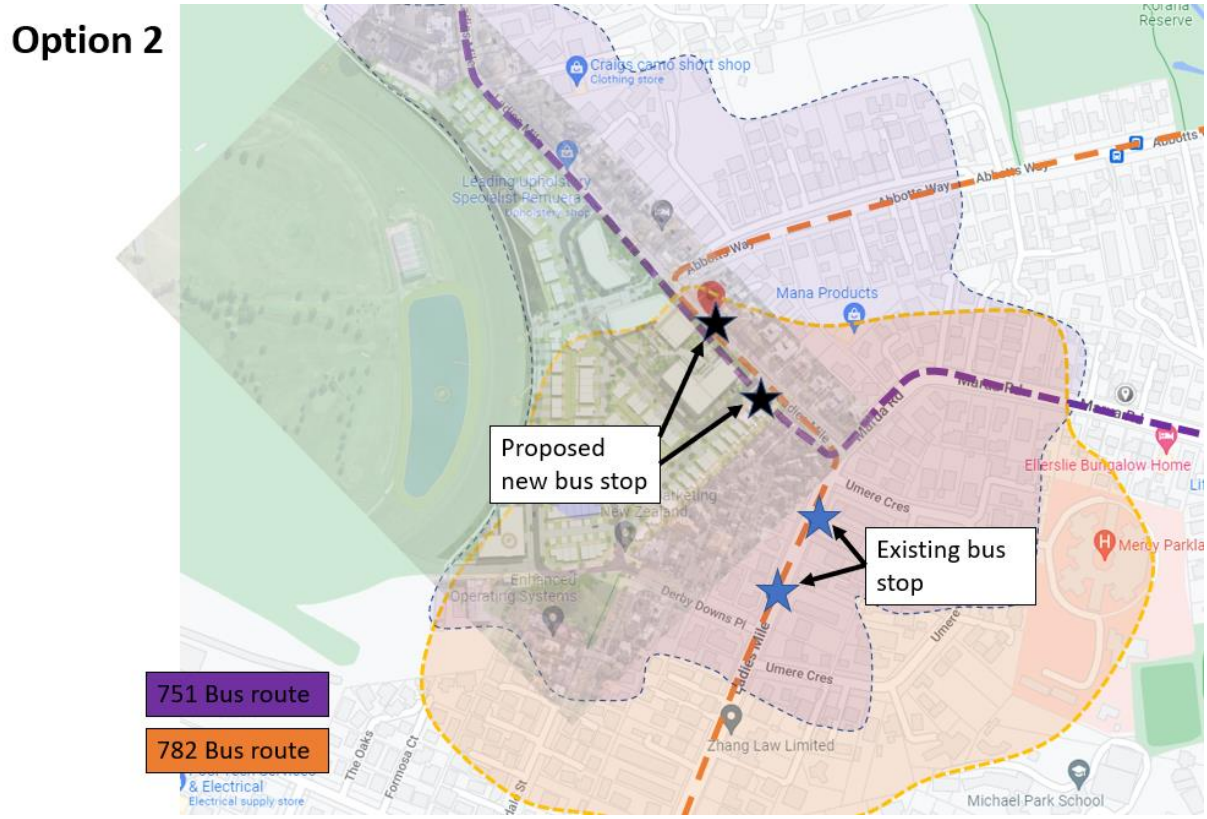
However due to the road network, this is a difficult location to maintain a safe operation for buses to access stops. The primary concern is around northbound buses from Marua Road needing to weave to a bus stop on the kerbside lane on Ladies Mile within a short distance and across a heavy opposing weaving movements from Ladies Mile South approach. This is not considered appropriate or safe with the current road layout. As such, an additional stop north of the Abbotts Way intersection is recommended.

3.5.1 OPTIONS CONSIDERED

Following comments from AT, two options have been considered regarding provision of bus stops. These are outlined in more detail in the Figure 3-14 and Figure 3-15. Option 1 involves provision of a missing Northbound bus stop north of Abbotts Way. Option 2 involves provision of an additional stop and relocation of an existing stop to provide a set of bus stops on Ladies Mile between Marua Road and Abbotts Way.

Figure 3-14: Option 1

Figure 3-15: Option 2



3.5.2 ASSESSMENT OF OPTIONS

Table 3-2 sets out an assessment of each option in terms of implication on both bus service 751 and 782. The assessment focuses on implications to the Hill development and the level of accessibility provided by the respective bus stop positions.

Table 3-2: Assessment of options implications on bus routes

	Option 1	Option 2
Implications on service 751	The whole of the Hill development is within 400m of the proposed bus stop.	The whole of the Hill development is within 400m of the proposed bus stop.
Implications on service 782	Some of the site is outside the 400m catchment of the northbound stop on Ladies Mile (approximately 20%). A portion of the site will need to walk up to 120m additional distance (Approximately 1-2 min).	The whole of the Hill development is within 400m of the proposed bus stop.

Bus service 782 provides connection between Sylvia Park and Mission Bay. This bus route is not expected to attract a large passenger demand from the Hill development and as such, the difference between the options is considered insignificant.

Auckland Transport have indicated that Option 2 is favoured in the long term. However due to the road layout, changes are required at the Marua Road / Ladies Mile intersection in order to place the northbound bus stop in this location. Option 1 is considered to provide an acceptable solution without the need to implement changes to the Marua Road / Ladies Mile intersection and is therefore preferred.

4 TRIP GENERATION

4.1 MODE SHARE

The latest Census 2018[3] data provides a snapshot of current travel pattern in the vicinity of the site. As travel options are improved and density of the surrounding area increase: it is expected that mode share for active modes and public transport will increase. This trend is reflected in both policy direction for transport and forecasts for the region produced by Waka Kotahi and Auckland Transport.

[3] Statistics NZ, 2018. General Census travel to work data

The current mode share for Ellerslie Central and expected mode share for The Hill are outlined in Table 4-1. Reasons why any changes are proposed are set out in the table. Beyond build out of the proposed development, mode share proportions within the wider Auckland Context are expected to continue to shift, likely leading to higher proportions of trips via public transport and active modes.

Table 4-1: Mode share current and forecast trends

Mode	Census for Ellerslie (2018)	Expected mode share for The Hill (2025)	Commentary
Car (drive own or drive company vehicle)	62.3%	55.5%	Reduction due to the nature/density of the development and increase in use of other modes. See Section 4.2 below for a more detailed assessment
Work from home	8.7%	10.0%	Work from home has increased in the COVID pandemic.10% accounts for less than 1 day per week per working person
Car (passenger)	2.1%	2.0%	Expected to follow existing levels
Public Transport- bus	6.5%	10.0%	Improvements to bus services and provision of stops is expected to allow more trips via buses
Public Transport - train	12.0%	14.0%	The site is situated some 1000m from the train station which is outside the typical catchment (based on mean walking distance)
Walking	4.9%	5.0%	This is reflective of the local employment opportunities within the catchment hence assumed to remain similar
Cycling	2.1%	2.1%	Assumed as per existing but likely to increase due to access to significant areas of jobs and retail
Other	1.4%	1.4%	Assumed as per existing

This table represents a base forecast for future mode share. As network conditions change over time and public transport and active mode options improve, further changes will inevitably occur over time.

4.2 ANTICIPATED VEHICLE TRIP GENERATION

The proposed development is anticipated to result in additional vehicle, public transport and active mode demand on the surrounding network.

Trip generation from the site is anticipated to be related to the density and type of housing units provided. Table 4-2 sets out the RTA trip rates by dwelling.

Table 4-2: RTA Trip rates

Type of unit	Daily trips	Peak hour trips
Detached dwelling	8.5	0.85
Medium density flat building: 1-2 bedroom	4-5	0.4-0.5
Medium Density flat building: 3 bedrooms or more	5-6.5	0.5-0.65
High density flat building – metro sub-regional area	3	0.29 trips per unit
Retirement units	2-3	0.2

The expected trip generation of the proposed development is outlined below:

Table 4-3: Likely trip generation based on RTA trip rates

	Units / GFA	Trip rate	Trips (peak hour)
3 bed apartments	55	0.4	22
2 bed apartments	109	0.4	43.6
1.5 bed apartments	43	0.3	12.9
5 bed detached	16	0.85	13.6
4 bed detached	13	0.85	11.05
4 bed duplex	28	0.65	18.2
4 bed terrace	20	0.65	13
3 bed terrace	11	0.65	7.15
3 bed detached	2	0.85	1.7

2 bed detached	2	0.5	1
2 bed duplex	2	0.5	1
Retirement units	57	0.2	11.4
Café	150	5	7.5
		Total trips	164

Current travel demand (based on Census data) shows a mixed distribution of travel around the region. Key destinations include the Penrose and Ellerslie West areas, the airport, East Tamaki, Newmarket and the City Centre. Roughly half the trips from the area are to and from the North, while half are distributed across the southern area.

4.3 TRIP DISTRIBUTION

The traffic distribution throughout the site has been reconsidered based on discussion with Council / Auckland Transport engineers. The internal network, while designed to deter 'rat running' provides internal connection between the various access points to the external network. As such, residents will have a choice on access point to some degree. Table 4-4 below considers the likely number of units which will make use of access via the Upper Loop Road (two priority intersections with Ladies Mile) or the Lower loop road with access onto Derby Downs Place.

Table 4-4: Assumed split of trips by access

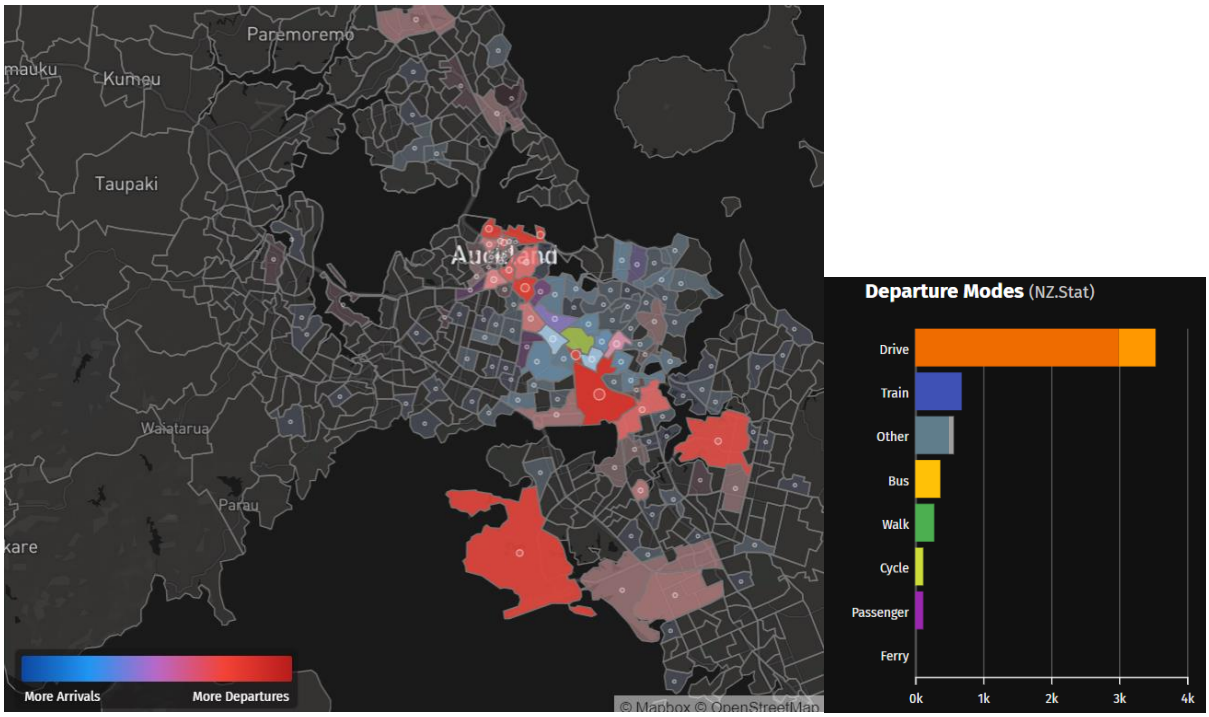
	Trips likely to access Upper Loop Road access points	Trips likely to access Lower Loop Road access point
Apartments	78	
Retirement units		11
Houses	29	38
CAFÉ	8	
Total	115	49
Percentage of trips	70%	30%

The traffic distribution utilised reflects the above split.

Census journey to work data has been considered to inform the likely trip distribution from the site. Trips from the site are focused on the employment areas of the City Centre (and fringe), Airport and

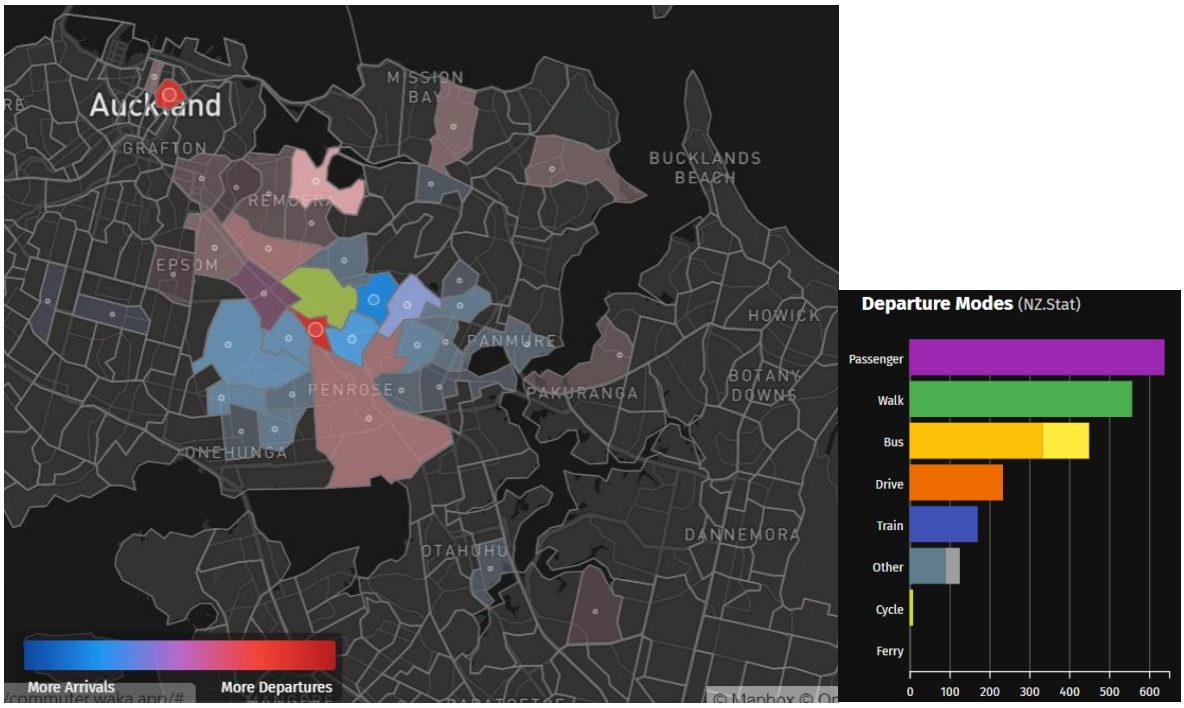
East Tamaki as set out in Figure 4-1. Education related trips are focused on a smaller area within the central isthmus as set out in Figure 4-2.

Figure 4-1 :Ellerslie workplace travel distribution



Education trips are more centralised with the primary destination being Ellerslie West.

Figure 4-2: Ellerslie Education travel distribution



With the proposed development including three access points to the external road network, the expected vehicle trip distribution is outlined in Figure 4-3.

The predominant trips to and from the site for work purposes are set out in Table 4-5.

Table 4-5: Distribution of trips to key destinations

Direction	Approximate % based on Census info
Northwest (towards City Centre and Newmarket)	51
South (Ellerslie, Onehunga, Penrose, East Tamaki, Airport)	44
East (Glen Innes, Panmure, Eastern beaches)	5

For trips to and from the North or South, a number of routes are available for people living at The Hill. The key routes are either via Peach Parade and connection to SH1 via Greenlane or connection to SH1 via Ellerslie or the Tecoma interchange. This choice is expected to be influenced by the connections available from the site.

The trip distribution recognises the 70:30 split set out in distribution across the upper and lower loop Roads as set out in Table 4-4.

Figure 4-3: Trip distribution - AM and PM peak

4.4 EXISTING TRAFFIC

The racecourse access to the infield already provides traffic to the infield for events, racedays, conferences and golf activities. While race day activities are dealt with via temporary traffic management plans, general operating conditions will generate traffic using the infield access tunnel and will join the external road network via the lower loop road and Derby Downs.

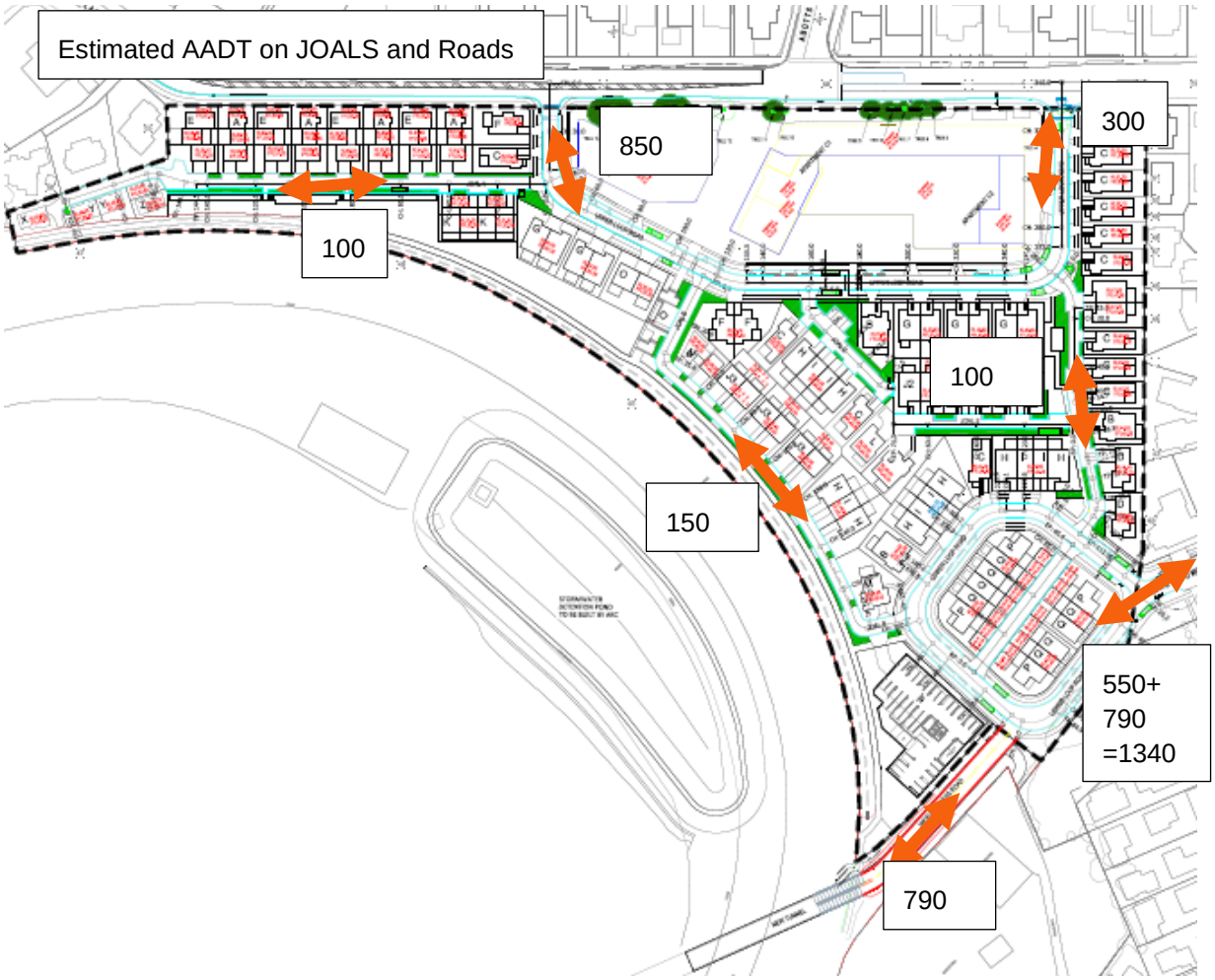
The trips travelling through the site via Derby Downs have been estimated based on surveys of the existing activities onsite undertaken by Traffic Planning Consultants (TPC). As these activities are not part of tis application and cannot currently be surveyed, the analysis undertaken by TPC has been replied upon to estimate traffic associated with these activities. This includes:

- **Golf Warehouse** – 88 trips in the PM peak hour. The split between Ascot Avenue and Derby Downs is estimated at 60% Ascot Avenue and 40% Derby Downs conservatively. Therefore 35 trips in the peak hour for the golf activity or 350 trips per day.
- **Functions** - TPC predict an AM peak demand of around 50-60 vehicles per hour. Approximately 40% of these will come through Derby Downs Place (as opposed to Ascot Ave/Mitchelson Ave). This equates to 24 trips in the peak hour for the functions activity or 240 trips daily.
- **Maintenance** - Existing Maintenance Traffic accessing infield sheds and services from Derby Downs Place = 20 trips in the AM peak hour. This would indicate a weekday total flow of around 200 vpd.

Overall, an additional 79 traffic movements (50% in and 50% out) in all peak hours or 790 trips daily have been included in the assessment to account for this activity.

Figure 4-4 below shows the expected overall daily traffic volumes on both JOALS and local roads within the site based on the trip generation for the Hill site (as per Table 4-4) and traffic travelling through the ATR tunnel as outlined above.

Figure 4-4: Trip generation (daily)



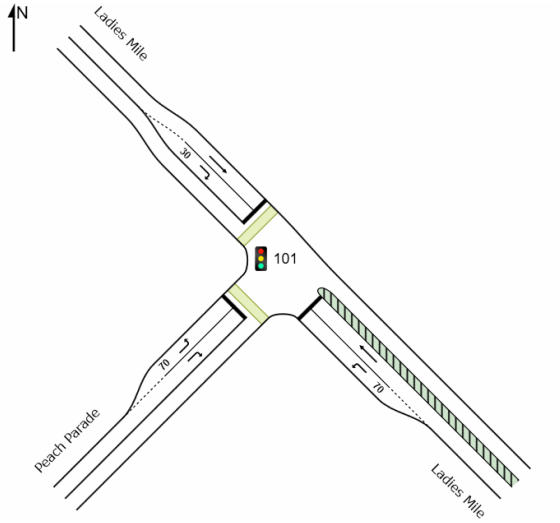
4.5 TRANSPORT MODELLING

In order to assess the operation of the access points to the proposed development, a network SIDRA assessment has been undertaken. The network assessment includes the following intersections:

- Ladies Mile / Peach Parade signalised intersection
- Ladies Mile / Abbotts Way signalised intersection
- Ladies Mile / Marua Road / Umere Crescent
- Ladies Mile / Derby Downs
- Ladies Mile / Umere Crescent south
- Ladies Mile / Morrin Street

With the proposed development, several changes are proposed to the surrounding network including:

Changes to the Ladies Mile / Abbots Way intersection - Removal of left turn slip lane, addition of pedestrian crossings and changes to phasing (see Figure 4-5: Ladies Mile / Peach Parade (existing and proposed)



- Figure 4-6)
- Changes to Ladies Mile / Derby Downs intersection – signalisation of intersection (See Figure 4-8)
- New left in left out intersection - Ladies Mile and Upper Loop Road South (see Figure 4-11)
- New give way intersection proposed – Ladies Mile / Upper Loop Road north (see Figure 4-12)

4.6 COVID EFFECTS

The surveys of traffic in the surrounding area were undertaken in March 2022. At this time COVID 19 red settings were in place with traffic volumes lower than 'Typical' levels.

In order to account for lower overall volumes of traffic and because surveys during non-covid time were not available, SCATS data has been used to estimate the overall traffic reduction during the survey periods.

SCATS data for the intersections of Ladies Mile / Marua Road and Ladies Mile/Abbotts Way intersection have been compared between February 2022 (Red setting) and February 2021 (COVID Alert Level 1) and July 2020 (Alert Level 1). A summary of this comparison is provided below:

Table 4-6: Traffic comparison 2022 vs previous years

	2022	2021	2020
Proportion of traffic on network	100%	117%	118%

As the above analysis suggests, the traffic volumes experienced during the surveys are around 17-18% lower than a 'normal' level. Therefore, a pre COVID test has been included in the assessment with 2021 traffic levels.

4.7 TRAFFIC DATA AND SCENARIOS

Existing traffic flows have been obtained from four surveys undertaken on 15th and 19th February 2022 and 24th and 28th March 2022. SCATS data from the same period has been extracted for the signalised intersections. SCATS data was again obtained for a 2021 period outside of COVID-19

restrictions with Auckland in Alert level 1 between the period 5-10th July 2021. This data has been used to develop a 2021 year intended to reflect "Normal conditions" outside of COVID.

The methodology used to convert 2022 data to pre covid levels is as follows:

- Where SCATS data is available (i.e. signalised intersections), 2021 SCATS data has been adopted.
- For the remaining intersections, upstream or downstream through volumes have been used to increase traffic at the intersection to reflect 2021 conditions
- Data (turning volumes) obtained from AT for the Morrin Road / Ladies Mile intersection has been used for the 2021 Pre COVID assessment.

The overall traffic volumes from the survey information show higher volumes during 2021 (pre COVID) compared with the 2022 volumes. In the AM peak, the overall traffic across the network was around 95% of pre COVID levels in 2022. In the PM peak, the overall traffic was lower at 83% of pre COVID levels.

SIDRA assessment has been undertaken for the following scenarios:

- 2022 Base scenario – Assumes current road network
- 2022 Development Scenario – Assumes proposed changes to the road network
- 2021 Base scenario – Assumes current road network
- 2021 Development Scenario – Assumes proposed changes to the road network

The assessment has looked at two time periods including the AM peak hour (7:45-8:45) and PM peak hour (5:00-6:00 PM).

4.8 BASE MODEL CALIBIRATION

Site visits were undertaken (in April 13th and May 3rd 2022) in the critical AM peak and PM peak periods to observe operation on the network and were used to calibrate the base models.

The following observations were made during the AM peak:

- At the Ladies Mile / Abbotts Way intersection, the most significant queues occurred on the Abbotts Way approach suggesting this phase receives less green time than SIDRA suggests. The queues on Abbotts Way did not clear in a single cycle for over 45 minutes.
- Queuing on Ladies Mile (NW approach) to the Ladies Mile /Abbotts Way intersection occurs in two lanes beyond the bus stop but is occasionally affected by on street parking.
- Ladies Mile (between Abbotts Way and Marua Road (southwest bound) operates as two lanes despite being marked as 1. The lane utilisation at the Marua intersection favours the right turn (central) lane – therefore adjusted in SIDRA.
- Marua Road approach queues in two lanes from the intersection to the north until the corner on Marua Road (around 85m).
- At the Ladies Mile / Abbotts Way intersection, queues of between 4-11 vehicles occurred on Ladies Mile south approach, Queues of between 23-44 vehicles occurred on Abbotts Way approach and between 5-13 vehicles occurred on the Ladies Mile North approach.
- At the Marua Road / Ladies Mile intersection, queues of between 27-60 vehicles were observed on the Marua Road approach, Queues of between 2-6 vehicle on Ladies Mile South approach and queues of 14-24 vehicles occurred on Ladies Mile North approach.

- Queues were observed on Ladies Mile turning into Morrin Street (sometimes back to Marua Road).

The following observations were made during the PM peak:

- Queues from the Abbotts Way / Ladies Mile intersection extended on both the Ladies Mile approaches. On the Southbound lanes, this extended to Peach Parade (around 50 vehicles) for around 15-20 minutes. On the northbound lane, the queue extended through the Marua Road intersection and down to the Morrin Road intersection (100 vehicles).
- Queues on both Marua Road and Abbotts Way were modest (5-10 vehicles).
- Parked vehicles were observed on Ladies Mile around 85m north of the Abbotts Way intersection.
- No parked vehicle were observed on Ladies Mile between Abbotts Way and Marua Road.
- A continuous stream of left turn vehicles was observed from Ladies Mile SW to Ladies NW at the Marua Road intersection. Vehicles make the left turn then immediately get into the right turn lane. This sometimes blocks vehicles from Marua Road wanting to right turn into Ladies Mile.
- A queue extended on Ladies Mile down to the Morrin Road intersection over a 15-20 minute peak period.
- No pedestrians were observed during the observation period.

The observed queue lengths compared to base model 85th in Table 4-7 and Table 4-8 below.

Table 4-7: Observed queue lengths compared to AM peak base models

Intersection	Approach	AM peak observations	2022 AM peak base model	2021 AM peak base model	**Comments on calibration**
Abbotts Way / Ladies Mile	Ladies Mile NW	5-13 vehicles	16	19	Observations showed a longer queue on Abbotts Way with lower queues on other approach. This difference can be explained by the variability in signal timings.
	Abbotts Way	23-44 vehicles	26	28	
	Ladies Mile SE	4-11 vehicles	21	22	
Marua Road / Ladies Mile	Ladies Mile NW	14-24 vehicles	20	22	Observations suggest longer queues on Marua Road with less green time-assigned to this movement. The signal phasing was observed to be highly variable at the intersection and this is supported by SCATS data.
	Marua Road	27-60 vehicles	11	20	
	Ladies Mile SE	2-6 vehicles	8	10	

Derby Downs / Ladies Mile	Derby Downs	0-1 vehicle	0.2	0.3	Good level of calibration.
Morrin / Ladies Mile	Morrin Road	4 vehicles	4	3	Observations show a much longer queue. We expect variability in Ladies Mile NE acting as two lanes is responsible for this. [4]
	Ladies Mile N	65 vehicles – block back to Marua Road intersection	6	12	
Peach Parade / Ladies Mile	Ladies Mile S	15-35 vehicles	25	43	Good level of calibration to the 2021 model.
	Ladies Mile N	5-10 vehicles	11	10	
	Peach Parade	15-35 vehicles	31	28	

Table 4-8: Observed queue lengths compared to PM peak base models

Intersection	Approach	PM Peak observations	2022 PM base model	2021 PM peak base model	**Comments on calibration**
Abbotts Way / Ladies Mile	Ladies Mile NW	50 vehicles	18	45	Observations show a lower level of queuing on Abbotts Way compared with modelling. Expected to be accounted for by the variability of signal phasing at the intersection.
	Abbotts Way	5-10 vehicles	24	27	
	Ladies Mile SE	50 vehicles (to the Marua Road intersection)	28	53	
Marua Road / Ladies Mile	Ladies Mile NW	12-16 vehicles	11	15	Overall good level of calibration for both models.
	Marua Road	5-10 vehicles	11	16	

[4] Around 5m of road with is provided on the Ladies Mile NE approach to the intersection. Mostly this operates as two traffic lanes but if vehicles are not accurately positioned or a vehicle is not confident to underpass, this creates a tailback.

	Ladies Mile SE	Queue through the intersections related to Abbotts Way intersection. Free left turn never obstructed from queuing on Ladies Mile SE approach. Queues of between 2-7 vehicles.	9	9	
Derby Downs / Ladies Mile	Derby Downs	1 vehicle	0.4	1	Good level of calibration.
Morrin Road / Ladies Mile	Morrin Road	5-10 vehicles	6	12	Observations sit between 2021 and 2022 model results.
	Ladies Mile N	1-2 vehicles	3	4	
Peach Parade / Ladies Mile	Ladies Mile S	10-20 vehicles	18	30	Observations align best with 2022 results. 2021 model suggests more queuing than observations.
	Ladies Mile N	5-15 vehicles	12	23	
	Peach Parade	10-30 vehicles sometimes affected by downstream effects of Abbotts Way	19	35	

SCATS data has been used to inform cycle time for each phase in the 2021 and 2022 periods. The phase / cycle time information from SCATS is relatively variable within the peak period. Cycle time appears to be adjusted to manage queuing on Ladies Mile between the intersections. This notion was supported during the site visit observations as green time seemed to favour Ladies Mile movements and resulted in large queues on Abbotts Way and Marua Road over the peak 15-30 minutes.

4.8.1 ABBOTTS WAY / LADIES MILE CALIBRATION

The observation date was around 6 weeks after the survey period. Over this period, traffic volumes have been gradually increasing as more people return to the workplace post COVID. As mentioned above, signal phasing during peak periods is highly variable at this intersection.

In the AM peak period, the queue lengths are broadly consistent with the AM base models with the models indicating shorter queues on Abbotts Way and slightly longer queues on Ladies Mile (N+S). This different is put down to variability in the signal phasing.

In the PM peak period, the predicted queue lengths on Abbotts Way are significantly higher than observed levels. The observations also show larger queues on both Ladies Mile approaches implying the variable signal phasing was favouring the Abbotts Way approach during the observation period.

4.8.2 MARUA ROAD / LADIES MILE CALIBRATION

During the AM peak period, 2022 and 2021 models show a high level of variability. The April / May 2022 observations appear to show good similarities to the 2021 base model albeit with less green time assigned to the Marua Road approach.

During the PM peak period, observations show that queues from the Abbotts Way intersection appear to affect the operation of this intersection. Again, the 2021 model is considered closely aligned with the observed queues. The only exception to this is the Ladies Mile (southeast approach), however the observed queue is actually from the upstream intersection which at the Marua Road / Ladies Mile intersection is a free left turn (and thus does not show up in the model).

4.8.3 OVERALL COMMENTS

Due to the variability of traffic conditions between observation date (April/ May) and survey dates (Feb/March),and well as variability on a day to day basis in the area, together with Covid-19 unpredictability, queues could not be calibrated completely in the models, but the results in SIDRA are considered to be broadly consistent with observations. In any event it is the difference between existing and proposed that is considered important rather than the absolute individual performance.

Signal timing for the Abbotts Way / Ladies Mile has been modified in the development scenario with SIDRA optimising phase times whilst maintain a similar overall cycle time. This has been done as pedestrian crossing changes require the phase times for the intersection to be adjusted to operate effectively.

The results of the Base modes are set out in Section 7.6. The base models show the operation of the Abbotts Way / Ladies Mile intersection to be the critical point on the network.

4.9 ASSUMED LAYOUTS

The assumed network layout for the existing scenario and development scenario are outlined below by intersection. The Derby Downs / Ladies Mile intersection is proposed to be changed from a priority intersection to Signals (as shown in Figure 4-8).

Figure 4-5: Ladies Mile / Peach Parade (existing and proposed)

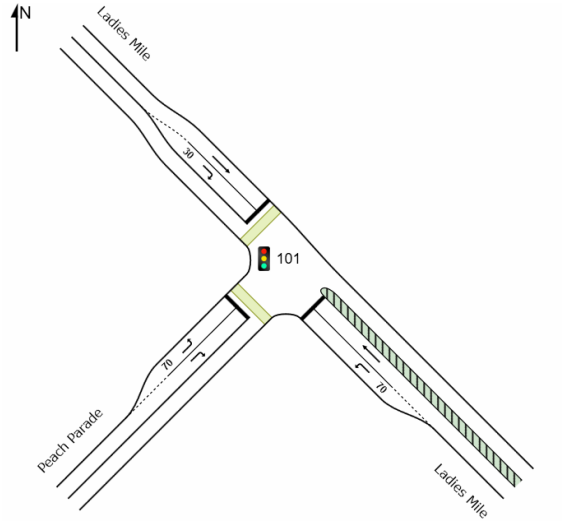
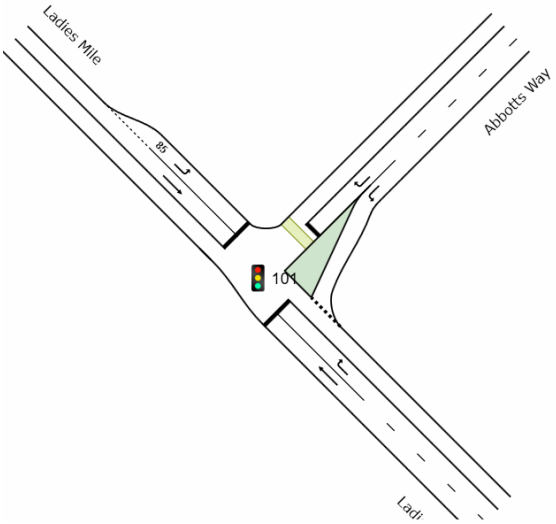


Figure 4-6: Ladies Mile / Abbotts Way layout (existing left and proposed right)



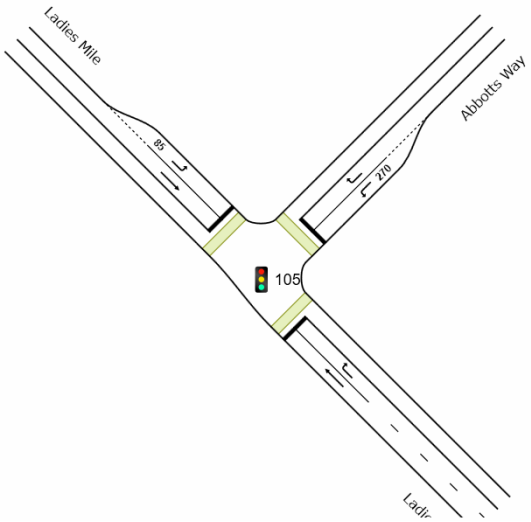


Figure 4-7: Ladies Mile / Marua Road layout (existing and proposed)

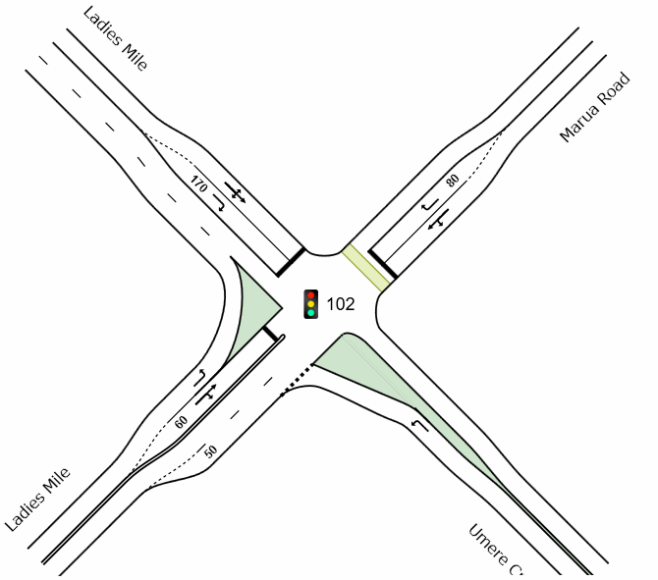


Figure 4-8: Ladies Mile / Derby Downs (existing left and proposed right)

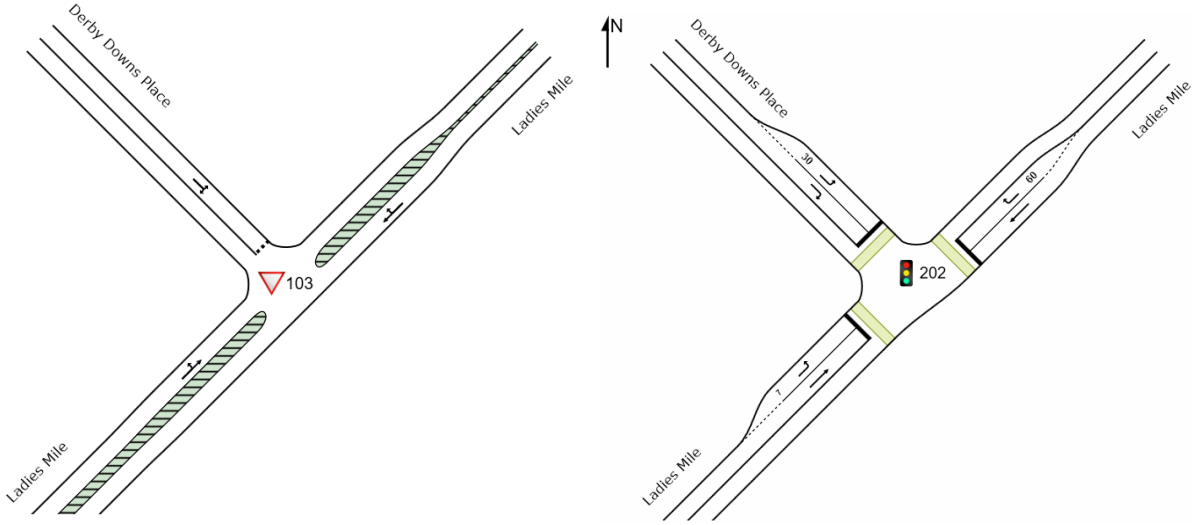


Figure 4-9: Ladies Mile / Umere Cresent layout (existing and proposed)

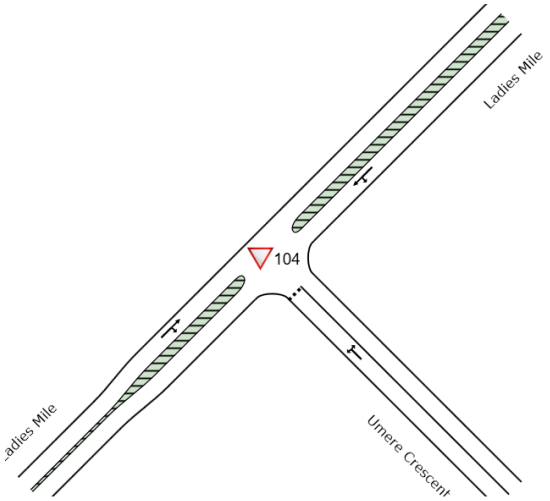


Figure 4-10: Ladies Mile / Morrin layout (existing and proposed)

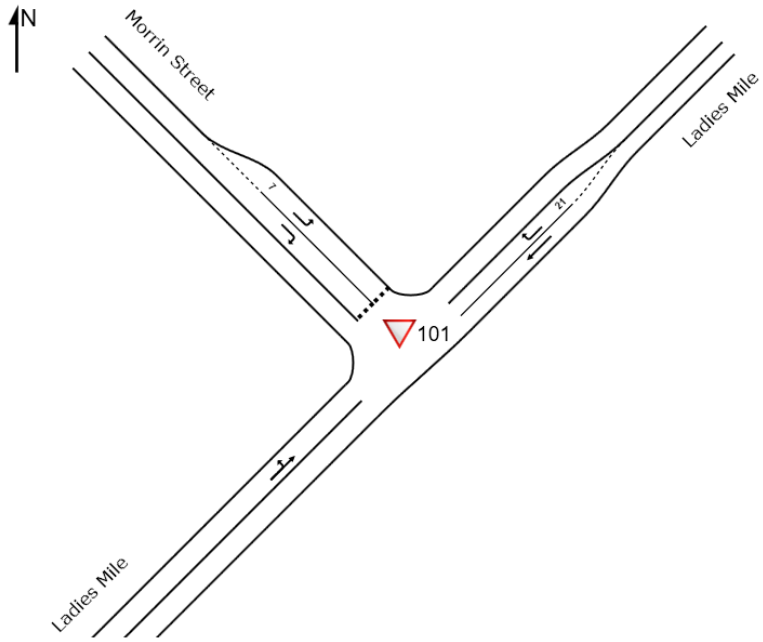


Figure 4-11: Ladies Mile / Upper Loop Road South proposed access (existing and proposed)

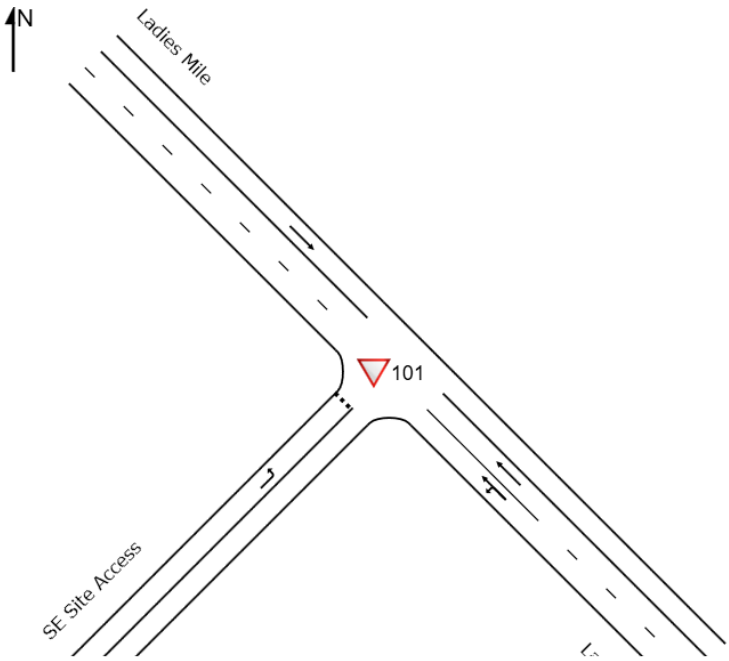
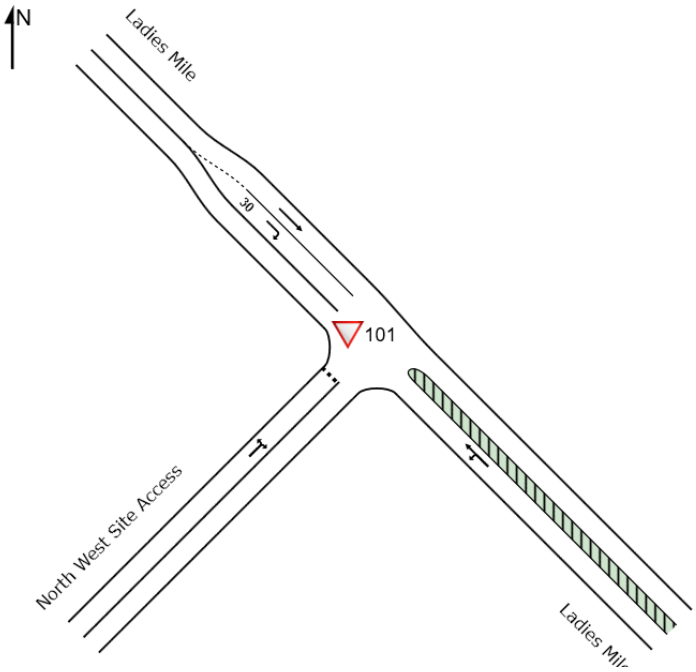


Figure 4-12: Ladies Mile / Upper Loop Road North proposed access (existing and proposed)



Signal phasing and timing has been based on SCATS data for the Ladies Mile / Abbotts Way and Ladies Mile / Marua Road intersections. SCATS data has been used for post development models to provide a basis for comparison against existing operation.

4.10 SIDRA RESULTS

The site movement summaries for each peak period and each scenario (existing and post development) are outlined below. The SIDRA model file is attached to this memo.

Table 4-9: AM peak SIDRA results

	2022 Existing AM				2022 Post AM				2021 Existing AM				2021 Post AM			
Intersection	Degree of saturation (DOS)	Average delay (s)	LOS	85th percentile queue (veh)	Degree of saturation (DOS)	Average delay (s)	LOS	85th percentile queue (veh)	Degree of saturation (DOS)	Average delay (s)	LOS	85th percentile queue (veh)	Degree of saturation (DOS)	Average delay (s)	LOS	85th percentile queue (veh)
Ladies Mile / Peach Parade	0.953	28.6	C	31	0.975	32.4	C	34	0.952	36.3	D	43	0.979	42	D	49
Upper Loop N / Ladies Mile					0.549	1.5	N/a	1.6					0.597	2	N/a	2
Ladies Mile / Abbotts Way	0.927	28.1	C	26	0.909	39.3	D	38	0.908	27.1	C	28	0.948	44	D	48
Upper Loop S / Ladies Mile					0.485	0.2	N/a	0.1					0.536	0.1	N/a	0.1
Ladies Mile / Marua Road	0.704	25.1	C	20	0.741	25.4	C	21	0.808	26.8	C	22	0.831	26.9	C	22
Ladies Mile / Derby Downs	0.464	0.3	N/a	0.2	0.644	10.3	B	22	0.539	0.4	N/a	0.3	0.747	10	B	29
Ladies Mile / Umere	0.501	1.6	N/a	1.6	0.537	2.2	N/a	2	0.549	2.2	N/a	2	0.584	3.2	N/a	3
Ladies Mile / Morrin	0.612	6.6	N/a	6.1	0.672	7.3	N/a	7	0.842	9.3	N/a	12	0.931	12.7	N/a	20

Table 4-10: PM peak SIDRA results

	2022 Existing PM				2022 Post PM				2021 Existing PM				2021 Post PM			
Intersection	Degree of saturation (DOS)	Average delay (s)	LOS	85th percentile queue (veh)	Degree of saturation (DOS)	Average delay (s)	LOS	85th percentile queue (veh)	Degree of saturation (DOS)	Average delay (s)	LOS	85th percentile queue (veh)	Degree of saturation (DOS)	Average delay (s)	LOS	85th percentile queue (veh)
Ladies Mile / Peach Parade	0.709	21.6	C	19	0.767	22.5	C	22	0.906	33.6	C	35.4	0.941	38.4	D	41.7
Upper Loop N / Ladies Mile					0.49	0.6	N/a	0.3					0.582	1.2	N/a	1
Ladies Mile / Abbotts Way	0.873	30.6	C	28	0.877	39.7	D	29	1.180	71.7	E	56	1.053	69.5	E	55
Upper Loop S / Ladies Mile					0.419	0.1	N/a	0					0.515	0.1	N/a	0
Ladies Mile / Marua Road	0.833	21.4	C	11	0.680	19.0	B	12	0.926	23	C	17	0.984	25.6	C	21
Ladies Mile / Derby Downs	0.464	0.5	N/a	1	0.755	10.2	B	22	0.583	0.8	N/a	1	0.831	10.5	B	34
Ladies Mile / Umere	0.466	0.8	N/a	0.7	0.482	0.8	N/a	0.7	0.6	1.3	N/a	1.2	0.619	1.5	N/a	1
Ladies Mile / Morrin	0.532	6.3	N/a	6	0.579	6.7	N/a	6.5	0.787	9.9	N/a	12	0.856	13.6	N/a	16

Full SIDRA movement summaries are included in Appendix B.

4.11 FURTHER TESTS

4.11.1 DERBY DOWNS INTERSECTION

A comparison has been made between the Derby Downs signalised intersection and retaining a priority-controlled intersection. The priority intersection matches what is provided in the existing situation, however traffic on Ladies Mile has been adjusted to account for bunching with upstream and downstream signals[5].

Table 4-11: Sidra results for Derby Downs Intersection comparing signals vs priority

Intersection	Scenario	Degree of saturation (DOS)	Average delay (s)	LOS	85th percentile queue (veh)
Derby Downs / Ladies Mile signalized intersection	2021 AM with development	0.747	10	B	29
	2021 PM with development	0.831	10.5	B	34
Derby Downs / Ladies Mile Priority intersection	2021 AM with development	1.406	19.1 (493s on Derby Downs)	N/A (LOS F on Derby Downs)	19.1
	2021 PM with development	1.038	6.9 (278s on Derby Downs)	N/A (LOS F on Derby Downs)	6.2

The SIDRA results show overall lower queuing and lower delay associated with the priority intersection compared with the signals. However, the Derby Downs approach is subject to large delay and operates above capacity. This has potential to lead to safety issues with drivers taking smaller gaps and driving in an unsafe manner. Overall, to mitigate this potential effect it is recommended to provide signals at the intersection, and this has been incorporated into the design of the proposal.

[5] Based on AT project to signal the Morrin Street / Ladies Mile intersection.

4.12 DISCUSSION ON TRAFFIC EFFECTS

4.12.1 GENERAL

The network in the study area is operating within capacity in the 2022 existing situation during the AM peak and PM peak. With pre COVID traffic levels, the Abbotts Way / Ladies Mile (PM peak) intersection appears to operate above capacity (DOS of greater than 1) due to signal phasing resulting in longer queues on the Abbotts Way approach.

With the addition of development traffic, there is minor additional delay and queuing experienced on the network however the intersections remain at a similar LOS at all intersections accessed in the network during both the AM and PM peaks and with Pre COVID or post COVID traffic flows. It is therefore concluded that the additional traffic from The Hill does not change the existing scenario markedly.

4.12.2 LADIES MILE / PEACH PARADE

At the Ladies Mile /Peach Parade intersection, the intersection is currently operating close to capacity in the AM peak (both 2021 and 2022 years) and within capacity in PM peak period. The development traffic added to the intersection, leads to minor increases in delay and queuing during all periods. In the AM peak, an additional 4-6 seconds of delay and increase in queuing of 3-7 vehicles occurs with LOS remaining at LOS C with 2022 flows and remaining at LOS D with 2021 flows. In the PM peak, additional traffic increases average delay by 1-5 seconds queuing by 3-6 vehicles. In the 2021 year the additional traffic results in a drop in LOS from C to D. This is reflective of the intersection being close to the threshold of change and a minor increase in delay leading to a change in LOS. Critically the intersection remains within capacity with the addition of development traffic.

4.12.3 ABBOTTS WAY / LADIES MILE

At the Abbotts Way / Ladies Mile intersection, the intersection is currently operating within capacity in the AM peak (both 2021 and 2022 years) however the intersection is operating at practical capacity[6] in the PM peak with pre covid traffic flows (2021). The development traffic changes and changes to the layout of the intersection (free left turn removed and signal phasing changed), lead to increases in queuing during all period assessed.
In the critical PM peak hour (2021 demands) the operation remains at a similar level pre and post development traffic being added to the intersection. This highlight sensitivities around signal phasing at this intersection.

4.12.4 MARUA ROAD / LADIES MILE

At the Marua Road / Ladies Mile intersection, the additional traffic movements have a minor increase in delay and queuing in all periods however the LOS remains consistent. This is most noticeable in the PM peak (2021) where the intersection operates close to capacity, but development traffic has a minor effect on delay and queuing.

4.12.5 DERBY DOWNS / LADIES MILE

The proposed signals at Derby Downs Place appear to operate at acceptable levels in both 2021 and 2022 models remaining at LOS B in all cases. The 2021 PM peak scenario experiences the highest

[6]Practical capacity is defined as DOS of less than 0.9

level of queuing with around 21 vehicles expected on the southwest approach but are expected to clear each cycle of the signals.

In the AM peak hour (2021 demands), a queue of 29 vehicles is expected on the Ladies Mile NW approach. This represents a queue to the nearby Marua Road intersection (approximately 170m or 24 vehicles). It is likely signal phasing at this intersection would likely be adjusted to manage queues on this approach to prevent blocking through the Marua Road intersection.

4.12.6 MORRIN ROAD / LADIES MILE

Additional development traffic appears to have an effect on the delay and queuing at the Morrin Road / Ladies Mile intersection. This is most pronounced in the 2021 AM peak where queuing increases from 12 to 20 vehicles on the Ladies Mile approach as a result of the development traffic.

It is understood this intersection has been identified by AT for upgrade and AT are currently considering options in this location. It is likely the upgrade will include signalisation of the intersection. Signalisation of the intersection is expected to increase the overall level of queuing experienced on Ladies Mile but will improved the overall road safety and efficiency of the Morrin Road approach.

4.12.7 OVERALL

Overall, the addition of development traffic to the surrounding network leads to minor increases in vehicle delay and queuing expected on the surrounding intersections. All intersections continue to operate within capacity and at acceptable levels in peak periods with or without development traffic. The one exception being the Abbotts Way / Ladies Mile intersection which is operating above capacity in the 2021 AM peak with and without development traffic.

The proposed signals at Ladies Mile / Derby Downs appear to operate at an acceptable level. Signal phasing will need to manage queues in the AM peak to ensure queue do not extend through the Marua Road intersection.

The intersection of Ladies Mile and Morrin Street is an existing issue (both safety and operationally) and is intended to be upgraded by AT- regardless of this development.

The proposed changes to the Abbotts Way/Ladies Mile and Derby Downs /Ladies Mile intersections involve pedestrian and cycling crossing opportunities significantly in the area.

4.12.8 NETWORK EFFECTS

In the AM peak under existing conditions, the Abbotts Way / Ladies Mile and Morrin Road/Ladies Mile intersections appear to be the key constraints to the network. Signal phasing appears to be adjusted to manage queues on midblock sections between Peach Parade and Abbotts Way and Abbotts Way and Marua Road.

With the addition of development traffic and proposed changes to the intersections, queues at the Abbotts Way intersection and Peach Parade intersection increase and are likely to block to the nearby Marua Road intersection (as already occurs in the PM peak).

The addition of the Derby Downs Signals is likely to lead to queues extending to the Marua Road intersection in the southbound direction. It is likely signal timings would be adjusted to manage this queuing, which would in turn lead to an increase in delay for the Debry Downs approach.

In the PM peak, the Abbotts Way/ Ladies Mile is the critical intersection within the network. In the existing situation, queues extend through the Marua Road intersection and to the Peach Parade intersection during the peak period. With the addition of development traffic, it is expected this existing

queueing will increase incrementally with no fundamental changes expected to the operation of the surrounding network.

5 WIDER TRANSPORT EFFECTS

As a result of the development, additional transport demand is generated from the subject site. This demand is catered for via a range of transport modes. The surrounding road network currently experiences traffic congestion during peak periods with queues frequently observed on the surrounding streets. The surrounding network conditions for general vehicles will contribute to achieving mode shift for the site. As alternative transport options become more competitive for residents, additional trips via active modes and public transport are likely to occur.

The site is considered well positioned to encourage public transport, walking and cycling modes with good access to centres, retail area, employment opportunity and public transport hubs.

The Auckland Plan sets out a vision of a 'Quality Compact City'. In order to achieve this vision, The development strategy identifies the need to develop existing urban areas and growth nodes. While the Hill is not within an identified growth node (albeit adjacent to the Ellerslie Growth node), it represents a unique opportunity for density in an existing, well connected urban area supporting all the outcomes of the quality compact city.

From a transport perspective, the benefits of development of this site can be described as follows:

- Greater productivity and economic growth – The Hill site places people within close proximity of numerous employment opportunities with great access to the major employment centres of the city centre and Newmarket.
- Better use of existing infrastructure – growing within existing urban areas makes more efficient use of existing assets. This is particularly relevant as upgrades to the surrounding network are proposed by the applicant.
- Improved transport outcomes – a compact urban form brings more people closer to their place of work. Greater population density supports faster, more frequent public transport services. Both reduce congestion on the road network and create a more efficient transport network overall

It is acknowledged the traffic modelling shows some increase in delay on surrounding intersections and roads. Much of this additional delay is as a result of changes to the network to make a more hospitable and permeable environment for walking and cycling, something which this area has been deficient in the current situation.

6 PARKING

6.1 VEHICLE PARKING

The Unitary Plan provides the required vehicle parking provision for various zones. For the proposed development the following minimum and maximum rates apply:

Table 6-1: Unitary Plan parking requirements

Residential activity	
Activity	**AUP Parking requirements**

All dwellings in the Terrace Housing & Apartment Buildings zone	No minimum and no maximum
Dwellings – studio	No minimum and no maximum
Dwellings 1 bedroom	No minimum and no maximum
Dwellings – two or more bedrooms	No minimum and no maximum
Business activity	
Activity	**Town centre zone**
Retail (food and beverage)	No minimum and no maximum
All other retail (including supermarkets)	No minimum and no maximum

The proposed parking provision is in accordance with the Unitary Plan provisions.

6.2 ANTICIPATED PARKING DEMAND

As the application is a non-complying activity, the likely parking demand for the site has been assessed to inform any parking related effects for the development.

The proposal includes a range of house typologies. Each typology has been assessed with regard to likely parking demand based on the NZTA 453 research report as set out in Table 6-2. Overall, the site provides more parking than the expected demand and as such is not expected to generate parking demand on the surrounding local road network.

Table 6-2: Assessment of likely parking demand vs supply

Unit / Activity	Parking rate assumed	Likely demand	Provision
Apartments – 207 units	1.2 per unit	248	277 spaces (internal)
Retirement beds - 57 beds	0.9 per unit (RR 453 report)	51	56 beds (internal)
Detached dwellings – 33 units	1.4 per unit	66	225 spaces on lots
Terraced housing - 61 units	1.4 per unit	85	
Café of 150m2	10.6 per 100m2	16	

Visitors	1 per 5 units (detached + terraced) 1 per 20 units (apartments)	19 + 10 =29[7]	37 spaces on street / JOALS
Overall		495	595

6.3 PARKING DIMENSIONS

Parking dimensions have been checked against the AUP requirements as set out in Table E27.6.3.1.1.

Table 6-3: Parking dimensions assessment

Area	Details on provision	Compliance with AUP requirements
Townhouse type A	Double garage 6m x 5.4m, manoeuvring of at least 7.0m	Yes
Townhouse type B	Double garage 6m x 5.4m, manoeuvring of at least 7.0m	Yes
Townhouse type C	Single carport of 2.7m width, 5.0m depth and at least 5.9m manoeuvring	Yes
Townhouse type D	Double garage 6m x 5.4m, manoeuvring of at least 7.0m	Yes
Townhouse type E	Double garage 6m x 5.4m, manoeuvring of at least 7.0m	Yes
Townhouse type F	Single carport of 2.7m width, 5.0m depth and at least 5.9m manoeuvring	Yes
Townhouse type G	Single carport of 2.7m width, 5.0m depth and at least 5.9m manoeuvring	Yes
Townhouse type H	Single carport of 2.7m width, 5.0m depth and at least 5.9m manoeuvring	Yes

[7] Some of the visitor parking demand is expected to be accommodate on each detached dwelling / terraced housing site.

Townhouse type I	Single carport of 2.7m width, 5.0m depth and at least 5.9m manoeuvring	Yes
Townhouse type J	Double garage 6m x 5.4m, manoeuvring of at least 7.0m	Yes
Townhouse type K	Single carport of 2.7m width, 5.0m depth and at least 5.9m manoeuvring	Yes
Townhouse type P	Double carport of 6.0m width, 5.0m depth and at least 7.0manoeuvring	Yes
Townhouse type Q	Single carport of 6.0m width, 5.0m depth and at least 7.0m manoeuvring	Yes
Townhouse type X	Internal garage 3.0 x 6m with Y turning head	Yes
Townhouse type Y	No onsite parking	Yes
Townhouse type Z	Single carport of 3.0m width, 5.0m depth and at least 5.9m manoeuvring	Yes
Apartment Building B	2.6m stall width by 5.0m by 6.3m manoeuvring.	Yes
Apartment Building C1	2.6m stall width by 5.0m by 6.3m manoeuvring.	Yes
Apartment Building C2	2.6m stall width by 5.0m by 6.3m manoeuvring.	Yes
Apartment Building C3	2.6m stall width by 5.0m by 6.3m manoeuvring.	Yes
Apartment Building A – Vivid Living	2.6m stall width by 5.0m by 6.3m manoeuvring.	Yes

Overall, all proposed car parking from onsite is considered to comply with AUP rules.

6.4 CYCLE PARKING

The Unitary Plan requires that cycle parking be provided and Table 6-4 outlines these requirements. Although more than 20 dwellings are proposed in total across this site, many of the dwellings proposed are standalone dwellings or terraces, and therefore short stay cycle parking (intended for the use of visitors) is not required.

For dwellings without a garage, at least one secure, long stay cycle parking space is required. These facilities should be in a secure location, generally not open to the public, where the cycle does not need to be carried up or down stairs. Long stay spaces are for residents of the development.

Table 6-4: Minimum Unitary Plan cycle parking requirements

Activity		Visitor (short stay)	Secure (long stay)
Residential (for developments of >20 dwellings)		1/20 dwellings within a single building	1 per dwelling without a garage
Retirement		1 space plus 1 space per 30 units / apartments	1 per 10 FTE employees
Retail (food and beverage)	Greater than 350m2 GFA	1 space per 350 m^2 GFA	1 per 300 m^2 GFA

Within the Hill development, the apartment buildings and Vivid living complex trigger the need for cycle parking to be provided.

The following bicycle parking requirements are required:

Table 6-5: Bicycle parking provision

Building	Units	AUP bicycle parking	Provision	Compliance?
Apartment Building B and C	208	208 long stay 10 short stay	Each unit is assigned a storage locker within the parking area which is capable of fitting a bicycle. 10 spaces in specific bike parking area for visitors	Yes
Apartment Building A – Vivid Living	10 staff 57 units	1 Space for staff (long stay) 3 short stay spaces for visitors	3 short stay spaces provided. 57m^2 Bike / locker room providing	Yes

			approximately 24 spaces	

As such, all apartment building complies with AUP bicycle parking requirements. This is considered to provide support for the uptake of active modes of transport.

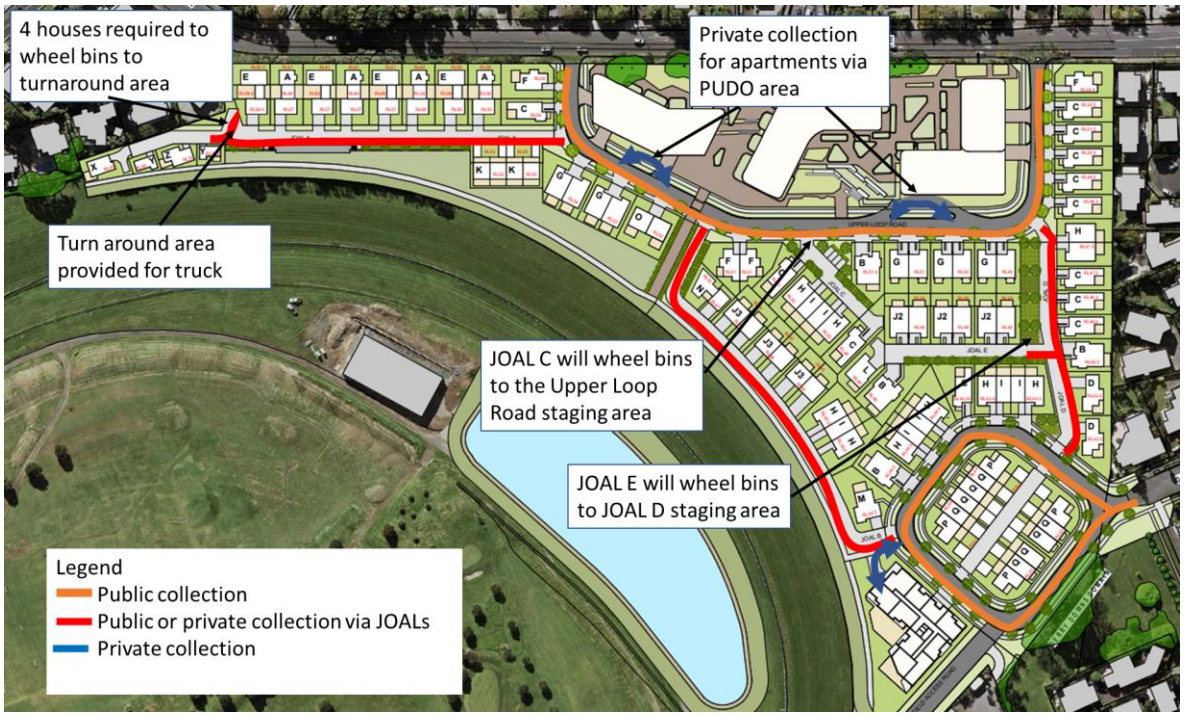
6.4.1 LOADING

For 'retail and industrial' use, sites with less than 300 m^2 GFA require no formal loading. Residential developments do not require loading zones

For the residential portions of the development and café, no formal loading spaces are required. Notwithstanding this, rubbish collection has been considered throughout the site. The majority of dwellings can be serviced by public rubbish collection (including the JOALS). Tracking for a rubbish truck (10.3m truck) has been undertaken and is included in Appendix A.

Rubbish collection for the apartments and Vivid living developments will be provided via a private collection via JOAL B or via the pickup / drop-off PUDO areas provided outside each building.

Figure 6-1: Rubbish collection approach



Loading for the Café will take place via on street parking on the Upper Loop Road or via the Apartment PUDO in the occasion no on street parking is available.

7 ACCESS

7.1 PEDESTRIAN ACCESS

Within the existing situation, the surrounding network has a number of deficiencies from a pedestrian perspective. Ladies Mile has a section of footpath missing on the southern side of the road between

Marua Road to north of Abbotts Way. There are no formal crossing opportunities on Ladies Mile in the vicinity of the site.

The proposed development provides a network of pedestrian paths through and within the site with connections to the external network in a number of positions including:

- Upper Loop Road Northern intersection
- Upper Loop Road Southern intersection
- Derby Downs Place
- Lonsdale Street via the Derby Downs Domain
- Connections to the Ellerslie Racecourse trackside walkway

Importantly, the site provides for permeability from a pedestrian perspective providing which increase route choice for pedestrians and allow for a variety of trips as demonstrated in Figure 7-1. It is considered that the proposed development will therefore provide support for the uptake of the active modes of transport.

Figure 7-1: Pedestrian connectivity to surrounding areas

7.2 VEHICLE ACCESS

Vehicle access to the external road network will occur via either of the three connections:

- Lower Loop Road connection to Derby Downs
- Upper Loop Road / Ladies Mile – northern intersection
- Upper Loop Road / Ladies Mile – southern intersection

No direct residential vehicle crossings to private dwellings are proposed to Ladies Mile. On the Upper and Lower Loop Road, vehicle crossings are proposed to a number of dwellings. All vehicle crossings (including JOALS) are proposed to be designed to Auckland Transport standards (e.g. currently GD017A).

7.3 UNITARY PLAN REQUIREMENT – E27 TRANSPORTATION

7.3.1 WIDTH

Table E27.6.4.3.2 of the Unitary Plan outlines rules regarding vehicle crossing and vehicle access widths. For residential zones (serving 1-2 parking spaces), the Unitary Plan requires the following

- 'A minimum width of 2.75 m (two-way) at the site boundary'; and
- 'A maximum width of 3.0 m (two-way) at the site boundary[8]'.

The AUP makes provision for two adjacent sites to combine vehicle crossings to form a 6.0m shared vehicle crossing.

Generally, the vehicle crossings proposed throughout the Hill development comply with AUP requirements taking the form of individual 3.0m vehicle crossings or combined 6.0m vehicle crossings.

There is one exception to this with a detached dwelling (Type B) on Upper Loop Road with a 5.5m width vehicle crossing proposed serving a double garage as shown in Figure 7-2. This does not comply with the maximum width of 3.0m in the AUP. Given the non-compliance with regards to vehicle crossing width an assessment against the criteria outlined in Rule E27.8.2 (8) of the AUP(OiP) has been undertaken to determine the appropriateness of the proposed vehicle crossing width and is shown in Table 7-1.

[8] Provided that a maximum width of 9.0m is permitted where the crossing needs to accommodate the tracking path of large heavy vehicles

Figure 7-2: Vehicle width non-compliance

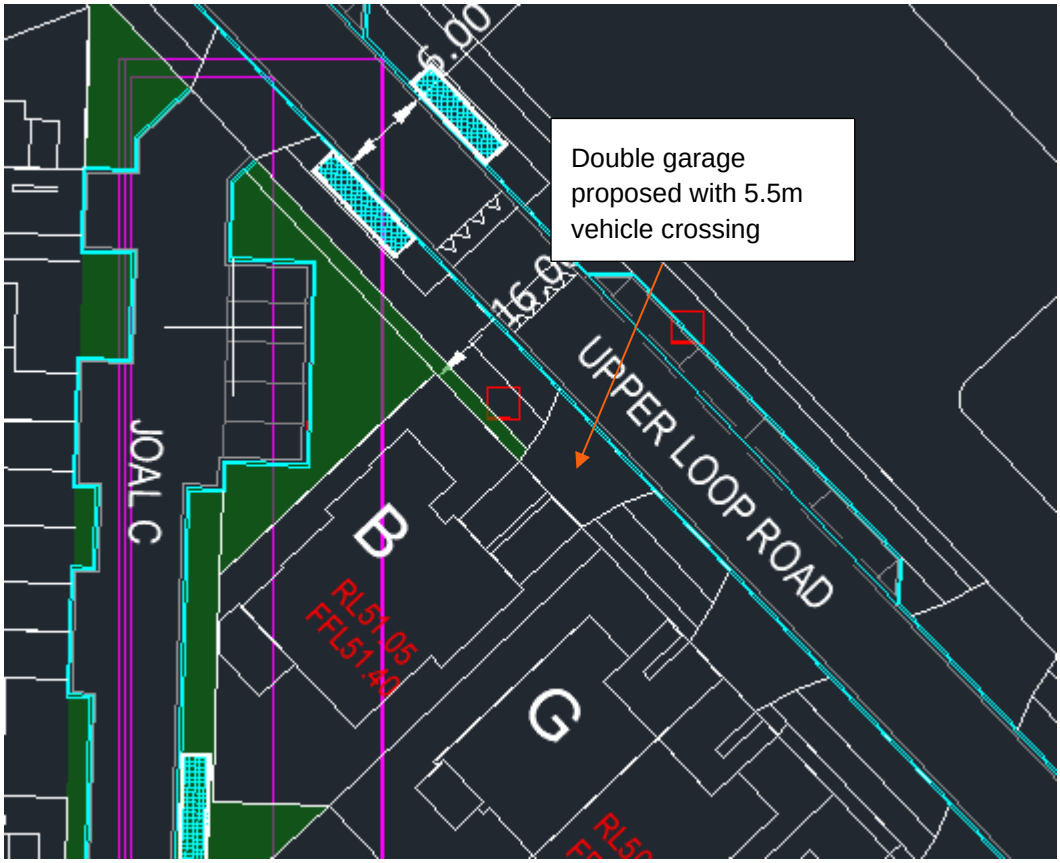


Table 7-1: Assessment Against the Criteria of Rule E27.8.2 (8) of the AUP(OiP)

Assessment Criteria	Comment
E27.8.2 (8) any activity or development which infringes the standards for design of parking and loading areas or access under Standard E27.6.3, E27.6.4.2, E27.6.4.3 and E27.6.4.4:	
(a) effects on the safe and efficient operation of the adjacent transport network having regard to:	
(i) the effect of the modification on visibility and safe sight distances;	The modification does not have any adverse effect on visibility or safe sight distances following development of the proposal. The sight distance available in both directions is considered to be satisfactory and meet the recommendations of RTS-6.
(ii) existing and future traffic conditions including speed, volume, type, current accident rate and the need for safe manoeuvring	The Upper Loop Road is a new road. A 30km/h speed environment is proposed. Traffic volume on the Upper Loop Road is expected to typical of a local road.
(iii) existing pedestrian numbers, and estimated future pedestrian numbers having regard to the level of development provided for in this Plan; or	The pedestrian numbers past the proposed vehicle crossings are expected to be low and expected to focus on the northern side of the Upper Loop road.

Assessment Criteria	Comment
(iv) existing community or public infrastructure located in the adjoining road, such as bus stops, bus lanes and cycleways.	No bus stops are proposed in the site vicinity. No cycleway facilities are proposed.
(b) effects on pedestrian amenity or the amenity of the streetscape, having regard to;	
(i) the effect of additional crossings or crossings which exceed the maximum width; or	The additional crossing width is expected to have a negligible effect on pedestrian amenity.
(ii) effects on pedestrian amenity and the continuity of activities and pedestrian movement at street level in the Business – City Centre Zone, Business – Metropolitan Centre Zone, Business – Town Centre Zone and Business – Local Centre Zone	N/a
(c) the practicality and adequacy of parking, loading and access arrangements having regard to:	
(i) site limitations, configuration of buildings and activities, user requirements and operational requirements;	The proposed dwelling includes a double garage. A reduced width crossing will require more complex reverse manoeuvres over the footpath to get access to the road.
(ii) the ability of the access to accommodate the nature and volume of traffic and vehicle types expected to use the access. This may include considering whether a wider vehicle crossing is required to: • **comply with the tracking curve applicable to the largest vehicle anticipated to use the site regularly.** • **accommodate the traffic volumes anticipated to use the crossing, especially where it is desirable to separate left and right turn exit lanes;** ○ **the desirability of separating truck movements accessing a site from customer vehicle movements;** ○ **the extent to which reduced manoeuvring and parking space dimensions can be accommodated because the parking will be used by regular users familiar with the layout, rather than by casual users, including the number of manoeuvres required to enter and exit parking spaces;** **Note: Parking spaces for regular users can be designed to undertake more than one manoeuvre to enter and exit parking spaces in accordance with AS/NZS 2890.1:2004 Off-Street Parking.**	The vehicle crossing provides access to a single dwelling and will be used by regular users.

Accordingly, it is considered that the access point will have a minor effect on safety of pedestrians and cyclists passing the vehicle crossing. Given the site provides visibility between pedestrians and reserving vehicle, the additional width is considered inconsequential in this circumstance.

7.3.2 DISTANCE TO INTERSECTION

The Unitary Plan E27.6.4.1 (3) requires that vehicle crossings should not be provided within 10m of an intersection or with any other “vehicle crossing restriction” area, measured from boundary projections.

All vehicle crossings are located 10m (or more) away from the nearest intersection.

7.3.3 DISTANCE BETWEEN CROSSINGS

Rule E27.6.4.2.1 specifies that a minimum separation distance of 6m serving the same site be provided and the minimum separation from crossings serving adjacent sites is 2m (however this can be combined to one crossing as long as it is 6m in width or less).

Throughout the site, the separation distance between the proposed crossings is compliant with the AUP rules.

7.3.4 NUMBER OF CROSSINGS

Table E27.6.4.2.1 specifies that one driveway per 25m of frontage (or part thereof) can be provided. Within the proposed development, a single crossing per site is generally provided for sites with direct access to local roads.

The apartments are the exception. Apartment C1 and C2 provides 4 crossings. Given the site has frontage of over 200m along the Upper Loop Road, this complies with AUP requirements.

Apartment B1 provides 3 vehicle crossings with over 90m of frontage on the Upper Loop Road hence complies with the crossing requirements of the AUP.

The development is considered compliant with this requirement.

7.3.5 VEHICLE ACCESS RESTRICTIONS

Rule E27.6.4.1 (3) requires that where a new vehicle crossing is proposed on a site then the site is subject to a vehicle access restriction, whereby vehicle crossings must not be constructed or used to provide vehicle access across that part of a site boundary which is located within 10m of any intersection, or that has frontage to an arterial road.

No crossings are proposed within a vehicle access restriction area.

7.4 GRADIENT OF ACCESS

Rule E27.6.4.4.1 of the Unitary Plan sets out the requirement for the gradient of a vehicle access. As such, the gradient of the access must not be steeper than 1 in 5 for residential dwellings. To avoid the underside of the car striking the ground, access with a change in gradient exceeding 1 in 8 (greater than 12.5 per cent change) at the summit or 1 in 6.7 (15 per cent change) at a sag must include transition sections to achieve adequate ground clearance. Typically, a transition section requires a minimum length of 2m.

In terms of the Unitary Plan, all vehicle accessways must be designed so that where the access adjoins the road there is sufficient space onsite for a platform so that vehicles can stop safely and check for pedestrians and other vehicles prior to exiting. The platform must have a maximum gradient no steeper than 1 in 20 (5 per cent) and a minimum length of 6m.

7.4.1 APARTMENT BUILDINGS

Building C1/2 has a 4m long 1:20 platform immediately adjacent the footpath before steeping to 1:12 grade. The western access provides a 1:40 grade as the access meets the road reserve.

Building B1 provides grade of less than 1:20 for 4m adjacent to the road reserved.

The Vivid Living building gains access off JOAL B.

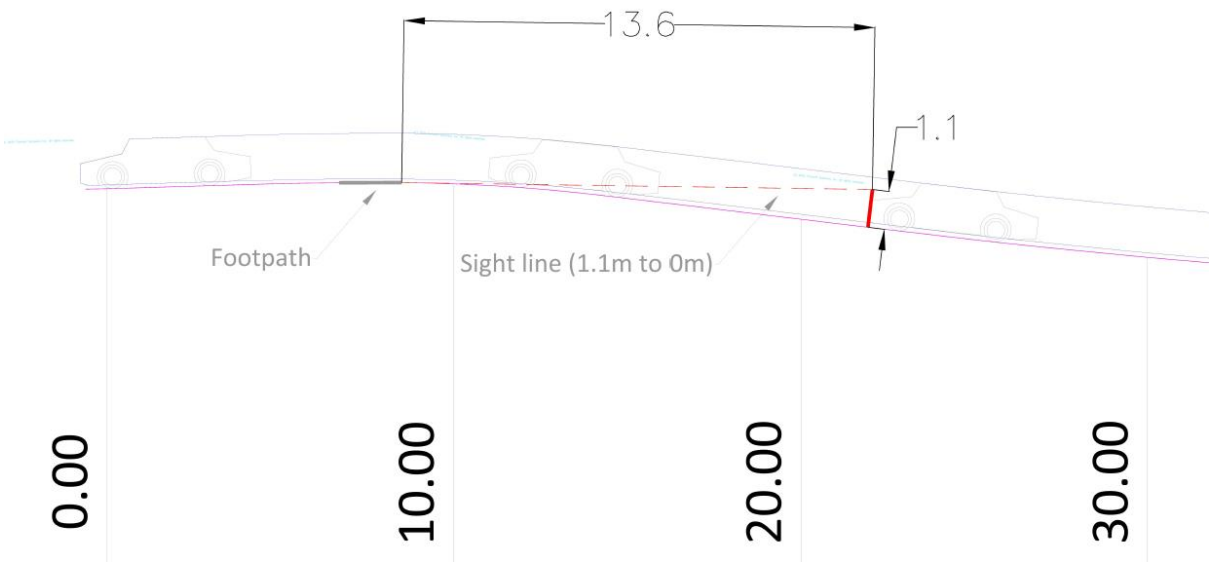
All apartment access is proposed to comply with AUP requirements.

7.4.2 JOALS

All JOALs have been designed with a 4m long 1:20 safety platform immediately adjacent to the road reserve.

An sight distance assessment has been undertaken for JOAL D due to steep grades and a crest in the vertical alignment approaching the footpath (Figure 7-3). Approach sight distance has been assessed between a vehicle (1.1m) and the footpath (at ground level). ASD of 13.6m is provided.

Figure 7-3: Sight distance assessment on JOAL D



Given the JOALS will operate at 20km/h speed environment, the ASD requirement (taking into account the 12% uphill grade) is between 12m and 14m (assuming reaction time of 1.5s and 2 sec respectively). The vertical alignment meets the ASD requirement assuming 1.5second reaction time and is just under the requirement assuming 2 seconds reaction time. The vertical geometry is considered appropriate in this circumstance.

7.4.3 INDIVIDUAL DWELLINGS

A review of vehicle crossings has been undertaken across the site for vehicle crossings meeting the upper and lower loop road. Most of the vehicle crossings meet the requirement for a safety platform with the exception of the following locations.

Table 7-2: Review of vehicle access grade

Road	House type	Grade of access at property boundary
Upper Loop Road (from West to east)	F (Adjacent Ladies Mile/ Upper Loop Road N intersection)	7.5%
	C (Adjacent Upper Loop Road / Ladies Mile S intersection)	2-6%

	F (Adjacent Upper Loop Road / Ladies Mile S intersection)	7-10%
Lower Loop Road	Row of houses on the northern side of Lower Loop Road including B H and I typologies	6-8%

In the above situations, the proposed dwellings intends to provide a 6-10% grade from the site boundary to the garage and retain existing gradients within the road reserve. While complying with maximum gradient and transition requirements, the proposed access points do not provide the required 1:20 platform (5%).

In assessing the effects of not providing the 1:20 platform, we have referred to relevant Australian and New Zealand standards. AS/NZS2890.1[9] requires a 1:20 platform for domestic driveways however notes that a maximum gradient of 1:8 (12.5%) can be applied if all three of the following conditions are met:

(i) The grade is a downgrade for traffic leaving the property and entering the frontage road.
(ii) The user class is Class 1, 1A or 2 only.
(iii) The maximum car park size is –
(1) for entry into an arterial road – 25 car spaces, or
(2) for entry into a local road – 100 car spaces.

In all circumstances outlined in Table 7-2, access is a downgrade from the site to the road reserve, the user class is Class 1A (*residential, domestic and employee parking*) and the maximum car park size is two parking spaces (fronting a local road).

On this basis, Australian and New Zealand standards support the use of 1:8 gradients within the site without a 1:20 platform. Our view is that the effects of the non-provision of the 1:20 platform are acceptable however to mitigate the effects of this non-compliance, we recommend that visibility between vehicles and pedestrians is maximised through the provision of a 'visibility splay' on each side of the crossing near the site boundary. This includes maintaining a 2mx2.5m visibility splay clear of visual obstructions over 1m in height. A condition of consent has been proposed requiring this.

7.5 SIGHT DISTANCE

7.5.1 JOALS AND VEHICLE CROSSINGS

For vehicle crossings or JOALS onto the Upper Loop Road and Lower Loop Road, the RTS-6 Guidelines for Visibility at Driveways document (RTS-6 Guide) indicates that for driveways accessing onto an 'Local Road', with a 30 km/hr operating speed, the required sight distance is 30m. AUSTROADS part 4A also outlines sight distance for domestic driveways using EDD SSID. For a 30km/h speed environment, a sight distance of 35m is required.

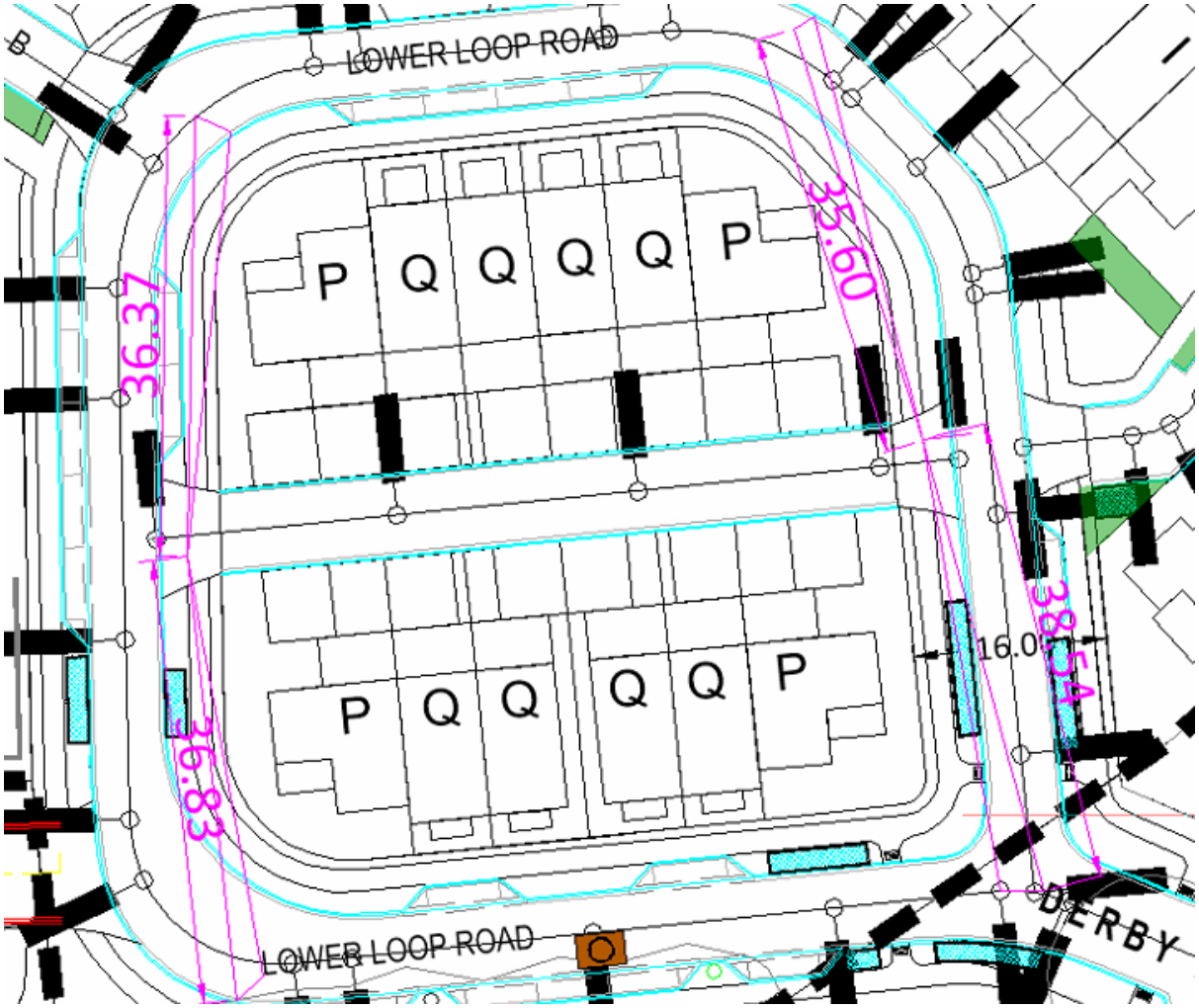
An assessment has been carried out on each of the proposed vehicle crossings using the AUSTROADS requirement of 35m.

All vehicle crossings are considered to comply with the 35m sight distance requirement.

[9] AS/NZS2890.1:2004, Australian/ New Zealand Standard, Parking Facilities Part 1: Off-street car parking, August 2005

JOAL F on the Lower Loop Road is close to the minimum sight distance requirements given the presence of corners either side of the vehicle crossing. The clear sight distance meets the sight distance requirement as shown in Figure 7-4.

Figure 7-4: Sight distance assessment for JOAL F



As such, the proposed vehicle crossing positions are considered to comply with the RTS-6 and AUSTROADS sight distance requirements.

8 INTEGRATION WITH FUTURE TRANSPORT NETWORK

8.1 AT FUTURE CONNECT

Future Connect is Auckland Transports long-term network plan for Auckland's transport system. It identifies the most important parts of the transport network and identifies the most critical issues and opportunities. This is intended to inform AT's 10-year investment programme, with key priority projects identified for funding in the Regional Land Transport Plan (RLTP).

Figure 8-1 and Figure 8-2 show the strategic network around the site and the top-ranking deficiencies and opportunities. In the vicinity of the site, none of the surrounding roads are identified as part of the strategic network and none of the surrounding roads are identified as top-ranking deficiencies and opportunities. Within the Auckland region there are hundreds of corridors identified as top-ranking deficiencies or opportunities of which a smaller portion are identified for funding in the RLTP.

Figure 8-1: AT Future Connect - Strategic network

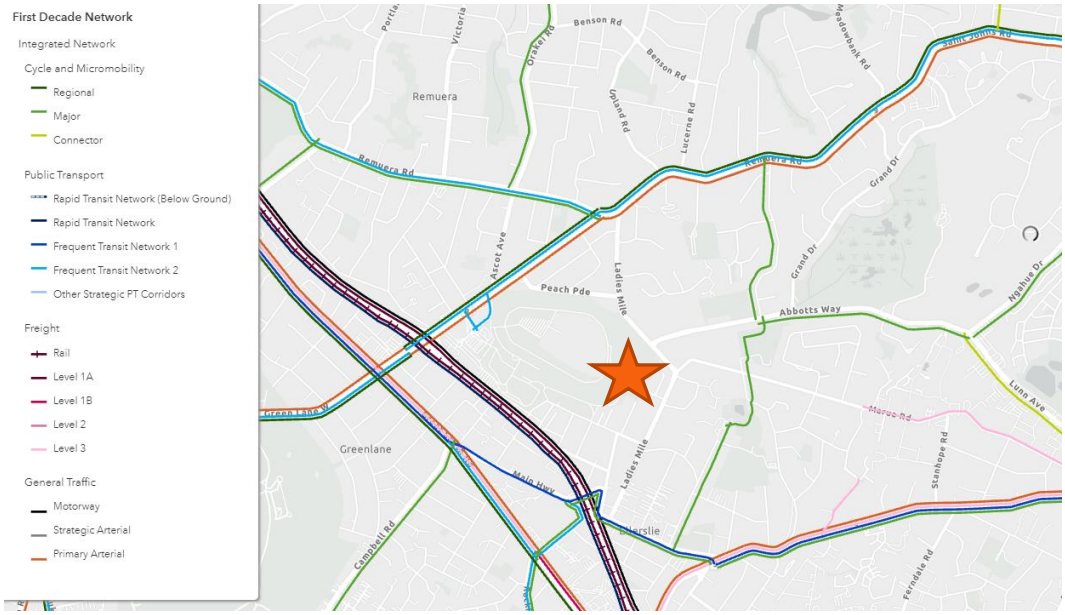
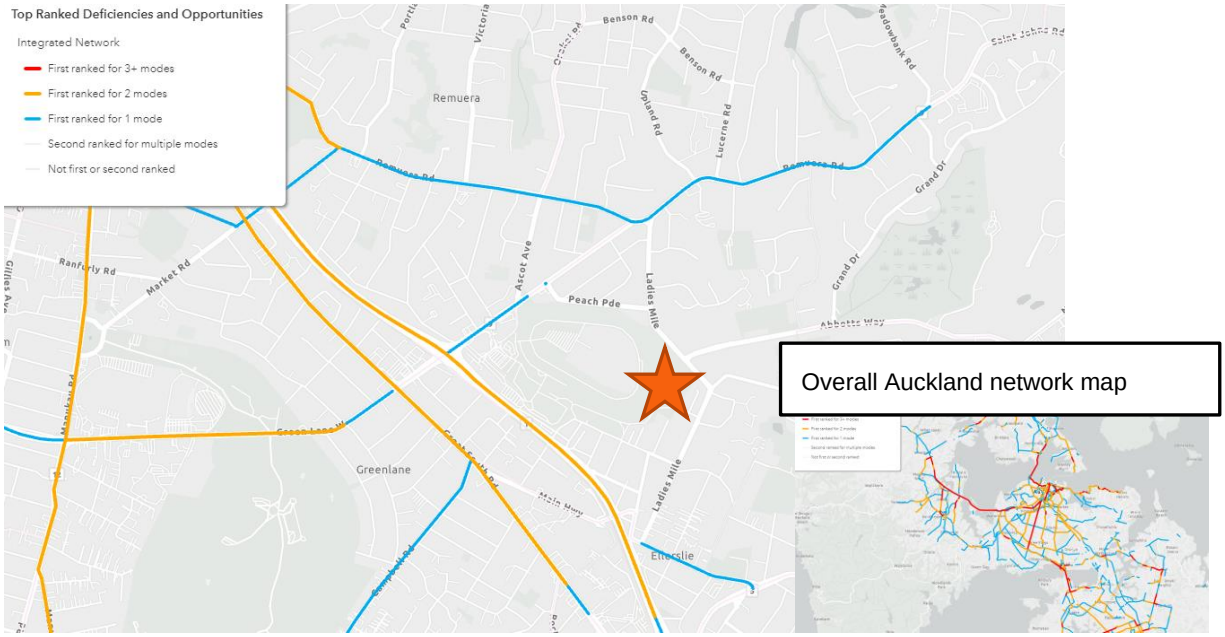


Figure 8-2: AT Future Connect – Top ranking deficiencies and opportunities



The AT Future connect mapping service also show the supporting network behind the strategic network as shown in Figure 8-3 to Figure 8-6. In the vicinity of the site Ladies Mile, Abbotts Way and Marua Road are identified as supporting network for various modes including:

- Ladies Mile (north of Abbotts) and Abbotts way are identified as a Local supporting component to the cycle network.
- Ladies Mile / Abbotts Way and Marua are identified as Connector bus routes.
- Ladies Mile / Abbotts Way and Marua are identified as secondary arterials.
- Ladies Mile / Abbotts Way and Marua are identified either primary or secondary walking routes.

Overall, the surrounding roads of Ladies Mile, Abbotts Way and Marua Road play a supporting role to the networks for general vehicles, PT and cycling and a primary role for pedestrians.

The proposed improvements have a positive effect on the pedestrian environment, completing the footpath network, providing improved crossing opportunities and importantly, providing permeability through the site which improves route options through this area.

The proposed changes to the road network do not preclude the corridors from fulfilling the supporting role they have been identified for.

A portion of the site frontage is identified as part of the local supporting network for cycling. Should AT wish to implement cycle facilities in this location the proposed improvements do not preclude this from occurring.

The western side of Ladies Mile north of Abbotts Way currently has approximately 2 metres of berm between the kerb and the boundary, with no footpath. There is insufficient width for an off-road shared path at present. The proposal would provide some 4.5m width between the kerb and the property boundary, which would provide more than enough room for a 3m shared path.

Figure 8-3: AT Future Connect – Cycle network showing supporting network

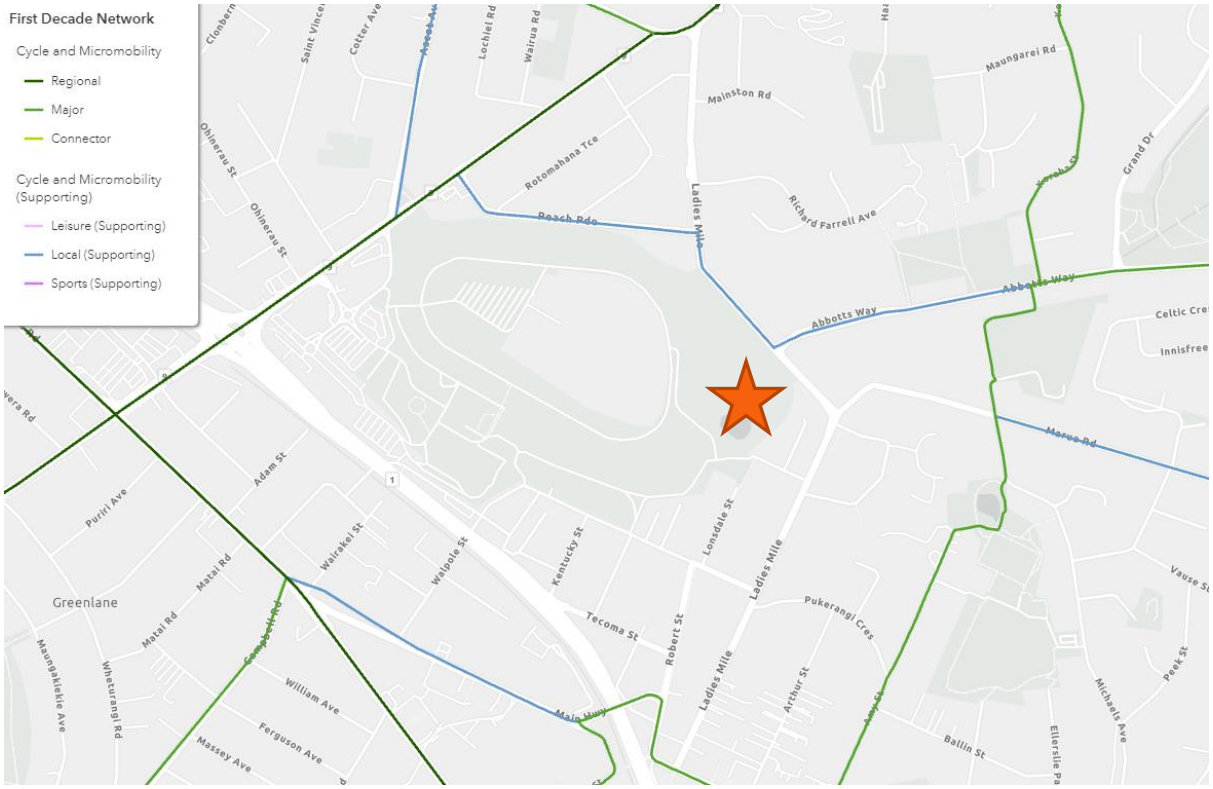


Figure 8-4: AT Future Connect – Public Transport network showing supporting network

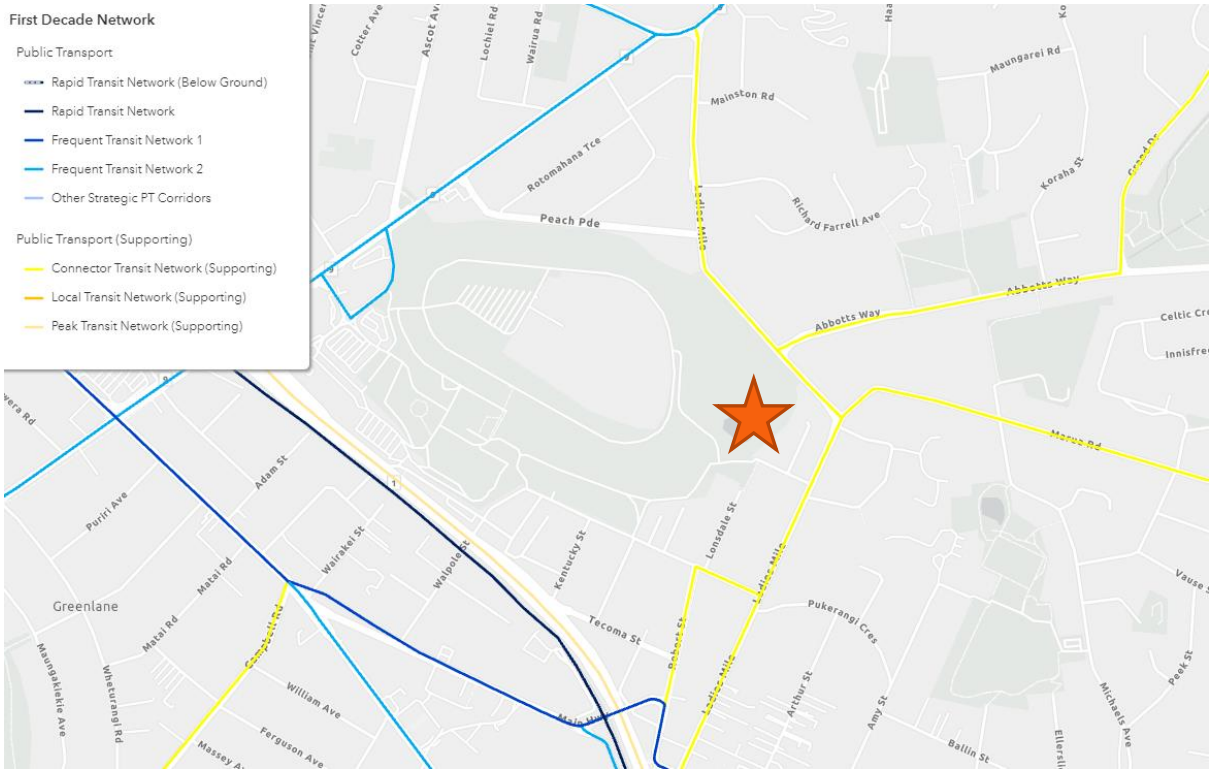


Figure 8-5: AT Future Connect – General vehicle network showing supporting network

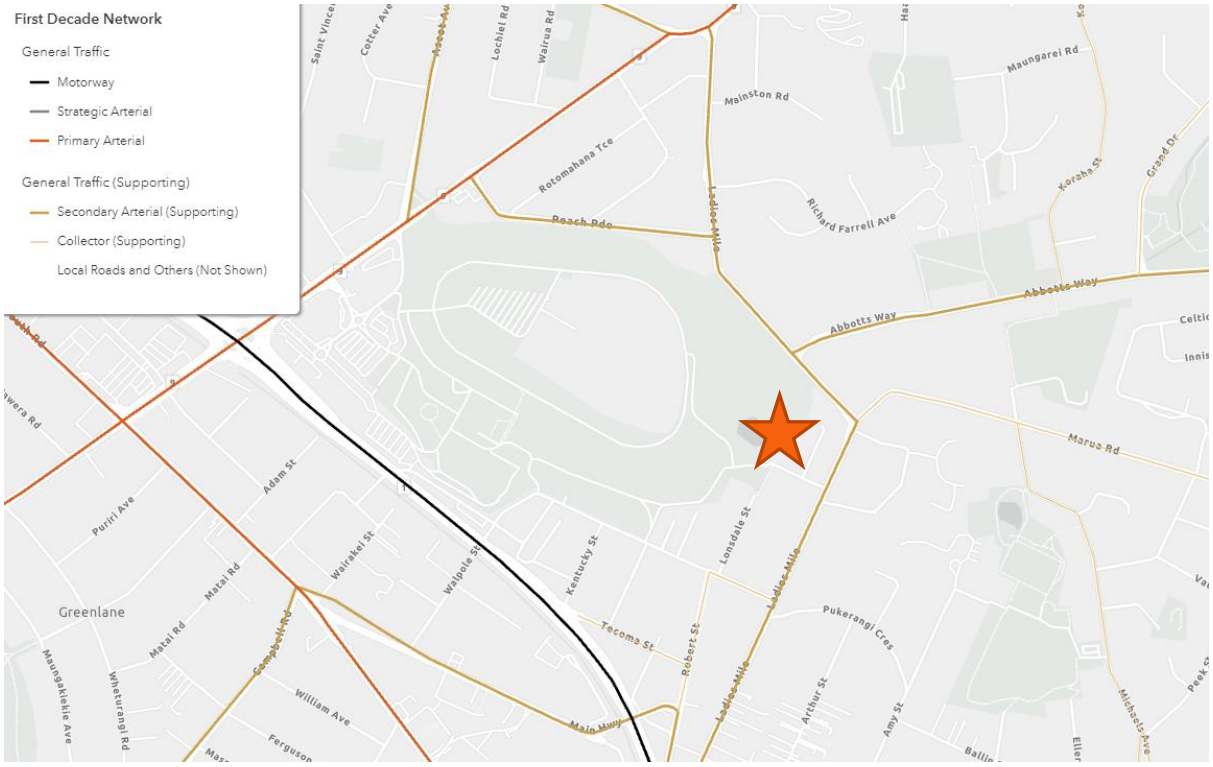
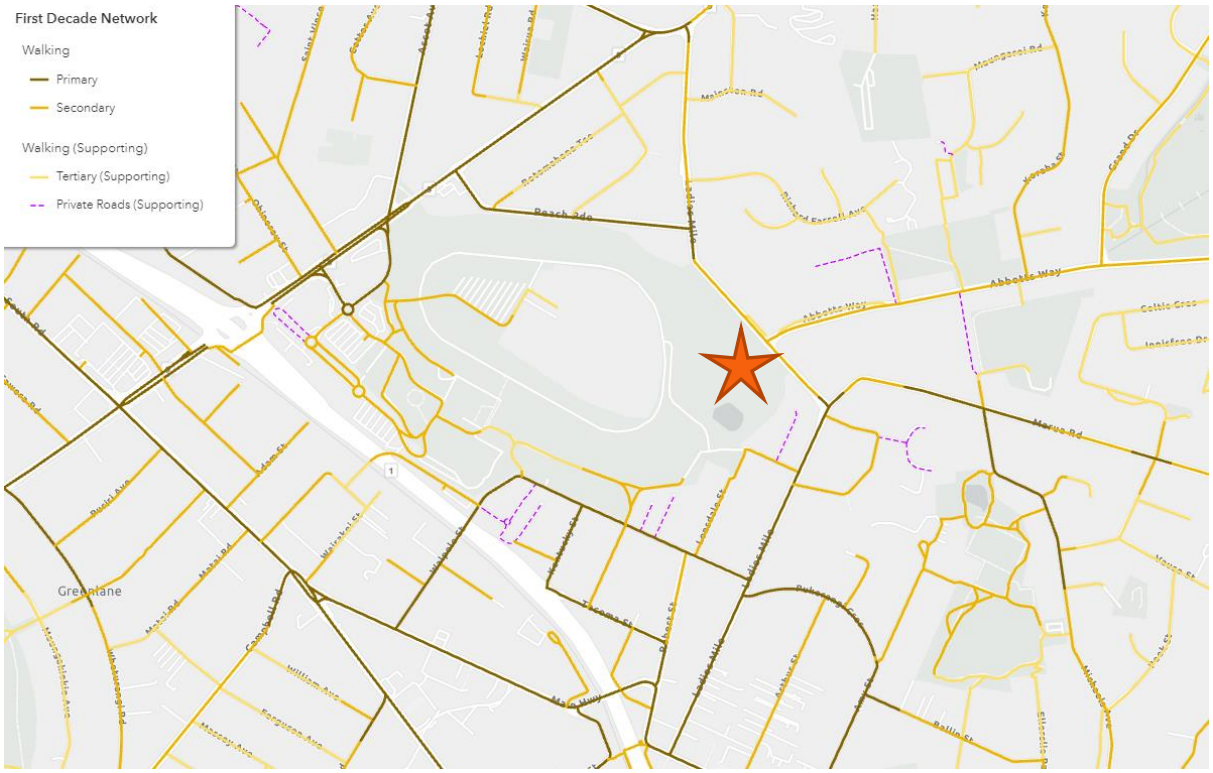


Figure 8-6: AT Future Connect – Walking network showing supporting network



8.2 GENERAL

The following section provides a review of established policy and plans in relation to the proposed development. The documents reviewed comprise:

- Auckland Plan 2050;
- Auckland Regional Land Transport Strategy 2010;
- Auckland Regional Public Transport Plan 2013;
- Sustainable Transport Plan 2006-2016;
- Climate Change policy; and
- AUP (OiP).

8.3 AUCKLAND PLAN

The Auckland Plan 2050 is Auckland Council's long-term spatial strategy to create the world's most liveable city. It shows how Auckland will prepare for an expected one million additional people by 2040 and the additional 400,000 new homes needed to accommodate this increased population. The Auckland Plan has six core outcomes that it seeks to achieve.

The transport and access outcome is that Aucklanders will be able to get where they want to go more easily, safely and sustainably. The directions for this outcome include:

- Better connect people, places, goods and services
- Increase genuine travel choices for healthy, vibrant and equitable Auckland
- Maximise safety and environmental protection

This will include focussing on the following areas

- Make better use of the existing transport networks
- Target the transport investment to the most significant challenges
- Maximise the benefits from transport technology
- Make walking, cycling and public transport preferred choice for many more Aucklanders
- Better integrate land use and transport
- Move to a safe transport system free from death and serious injury
- Develop a sustainable and resilient transport system

In this regard, the Hill site is considered to support a number of the focus areas including,

- making best use of the existing transport network – The Hill development is within an established transport network with minimal changes required to accommodate the proposed development.
- Make walking, cycling and public transport preferred choice for many more Aucklanders – The site is well suited to residents using actives modes and public transport with close proximity to jobs, centres and PT hubs.
- Better integrate land use and transport – The surrounding network is established with existing PT services, and active mode options. Bus Routes 751 and 782 provide access to PT for the whole site and the Ellerslie Train station is within walking distance.
- Move to a safe transport system free from death and serious injury – The surrounding network shows no evidence of systemic safety issues and the development can be accessed in a safe manner.

8.4 REGIONAL POLICY STATEMENT

Urban growth objectives are outlined in Section B2.2 of the AUP (OP), as outlined below:

A quality compact urban form that enables all of the following:

a) a higher-quality urban environment;
b) greater productivity and economic growth;
c) better use of existing infrastructure and efficient provision of new infrastructure;
d) improved and more effective public transport;
e) greater social and cultural vitality;
f) better maintenance of rural character and rural productivity; and
g) reduced adverse environmental effects.

As noted above, the proposed development is located next to a public transport hub with access to a number of existing services (with plans to increase frequency in the future).

Overall, the development location is therefore considered to support a compact sustainable urban form but also offer viable transport alternatives to the private motor vehicle.

The RPS includes a set of objectives and policies around transport within the AUP. The objectives are defined as follows:

B3.3.1. Objectives

(1) Effective, efficient and safe transport that:
a. supports the movement of people, goods and services;
b. integrates with and supports a quality compact urban form;
c. enables growth;
d. avoids, remedies or mitigates adverse effects on the quality of the environment and amenity values and the health and safety of people and communities; and
e. facilitates transport choices, recognises different trip characteristics and enables accessibility and mobility for all sectors of the community.

The Hill development is considered to not adversely affect objective a, while contributing to all of the remaining objectives through the development itself and improvements to the surrounding transport network.

The RPS also states a set of Policies for managing transport infrastructure and Integration of subdivision, use and development with transport as set out in the table below with commentary on how the Hill development responds to the policy.

Policy	
B3.3.2. Integration of subdivision, use and development with transport *(1) Improve the integration of land use and transport by:* *(a) ensuring transport infrastructure is planned, funded and staged to integrate with urban growth;* *(b) encouraging land use development and patterns that reduce the rate of growth in*	A) Required transport upgrades are fully funded by the developer with the exception of Morrin Street / Ladies Mile which is being progressed by AT. Developer contributions will contribute to increases in PT services and wider transport upgrades. B) Development provides density in close proximity to PT services and jobs hence is considered to reduce the rate of private vehicle trips.

demand for private vehicle trips, especially during peak periods; *(c) locating high trip-generating activities so that they can be efficiently served by key public transport services and routes and complement surrounding activities by supporting accessibility to a range of transport modes;* *(d) requiring proposals for high trip-generating activities which are not located in centres or on corridors or at public transport nodes to avoid, remedy or mitigate adverse effects on the transport network;* *(e) enabling the supply of parking and associated activities to reflect the demand while taking into account any adverse effects on the transport system; and* *(f) requiring activities adjacent to transport infrastructure to avoid, remedy or mitigate effects which may compromise the efficient and safe operation of such infrastructure. Managing effects related to transport infrastructure*	c) As above. The site is located in close proximity to PT services and has pedestrian and cycle routes available to jobs and centres. d) N/A e) Parking has been provided to reflect demand and minimise effects on surrounding on street parking supply. f) Transport upgrades have been proposed to mitigate effects and improve safety of the surrounding network.
Improve the integration of land use and transport by: *(6) Require activities sensitive to adverse effects from the operation of transport infrastructure to be located or designed to avoid, remedy or mitigate those potential adverse effects.*	N/a
(7) *Avoid, remedy or mitigate the adverse effects associated with the construction or operation of transport infrastructure on the environment and on community health and safety.*	A Construction Traffic management plan will be provided to manage construction effects.

Overall, the Hill development is considered to contribute to the Transport Objectives and Policies in the Section B2.2 of the AUP (OP).

8.5 AUCKLAND REGIONAL LAND TRANSPORT PLAN

The Auckland Regional Land Transport Plan ("RLTP") forms part of the National Land Transport Programme and represents the combined intentions of the NZ Transport Agency (the Transport

Agency), Auckland Transport (AT), and KiwiRail to respond to growth and other challenges facing Auckland in the next 10 years.

The Development is considered to be compatible with the surrounding transport environment and offers alternatives to the private vehicle.

8.6 AUCKLAND REGIONAL PUBLIC TRANSPORT PLAN

The Auckland Regional Public Transport Plan 2018-2028 ("RPTP") seeks to deliver an improved public transport network in Auckland by increasing public transport frequency along key transport corridors and simplifying ticketing to improve user experience.

The vision of the RPTP is to deliver "*A system with seamless end to end customer journeys that are safe, accessible and reliable".* To deliver on the Auckland Plan, by achieving AT's vision for Auckland's PT system, it needs to deliver

- a continuously improving customer experience;
- services that integrate with surrounding, and lanners, land uses and contribute to placemaking;
- affordable and equitable travel;
- an increasingly safe, secure and sustainable system; and
- improved monitoring and value for money.

The proposed development and proposed changes to bus infrastructure is considered to be supportive of the vision of the RPTP. The development will increase patronage on existing services and changes to the bus infrastructure will have wider positive effects on the PT network.

8.7 AUCKLAND UNITARY PLAN

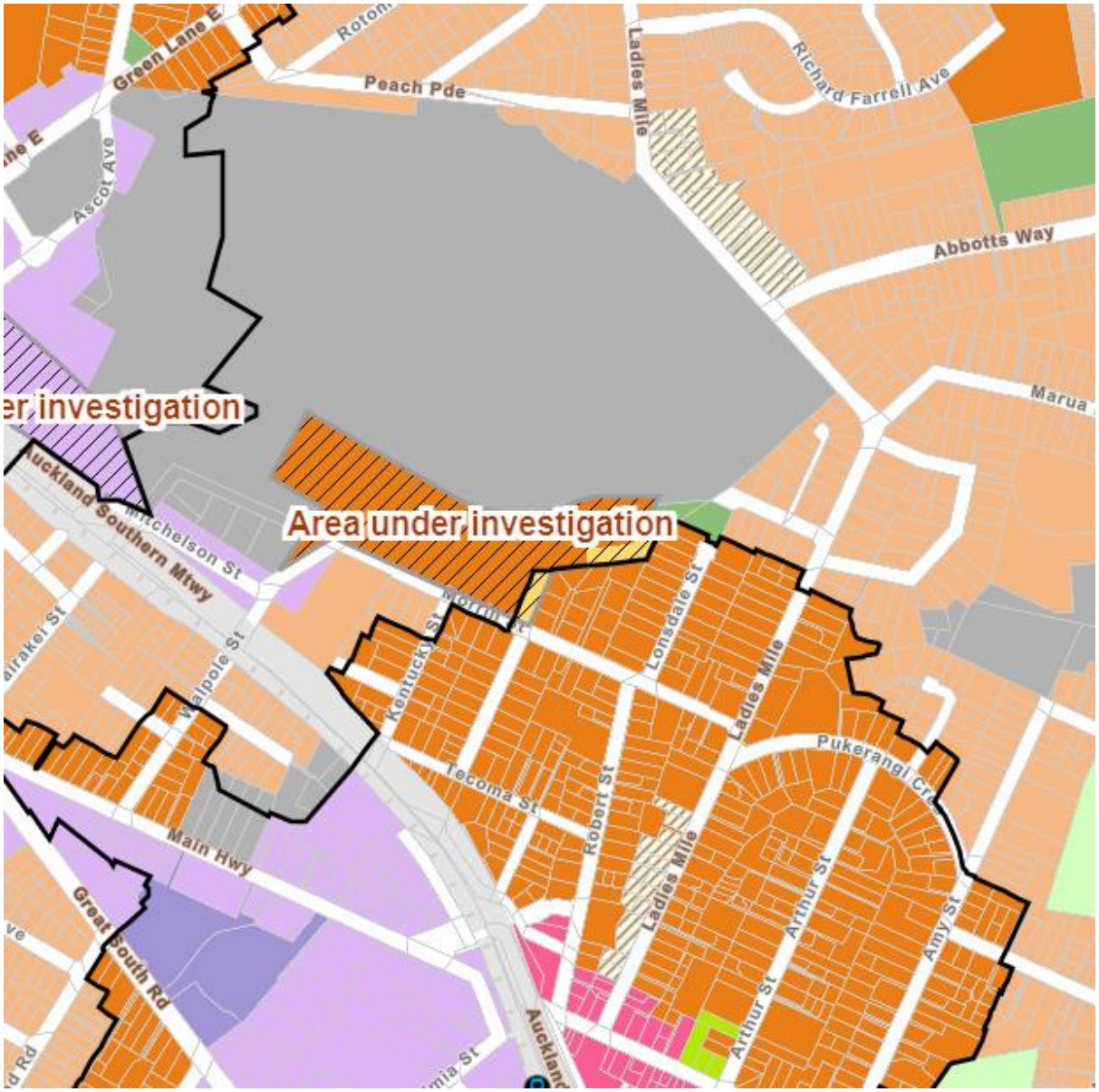
The AUP (OP) has the following objectives with regard to the region's transport infrastructure:

- 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.

Any development within the development area that meets the above objectives, and in particular development that supports a compact form, is therefore considered to align well with the transport objectives of the AUP (OP).

Following the Central government direction set out in the National Policy Statement on Urban Development (NPS-UD) and Medium Density Residential Standard (MDRS), Auckland Council is currently progressing a Plan Change to give effect to these policies. In this particular area, this change involves changes in zoning in the surrounding area to allow more dense development. An extension to the THAB zone to the south of the site around the Ellerslie station is proposed as shown in Figure 8-7. At present much of the surrounding residential land is zoned as Mixed housing Suburban. As part of the proposed changes, this land change to the more permissive Mixed Housing Urban zone.

Figure 8-7: AC Preliminary response viewer for NPS-UD and MDRS



8.8 CLIMATE CHANGE

The Climate Change Response (Zero Carbon) Amendment Act 2019 has come into effect, setting a target for New Zealand to be net zero carbon by 2050. This target is in line with New Zealand's international commitments to the Paris Agreement, which has a long-term goal of limiting global warming to 1.5 degrees above pre-industrial levels.

In May 2021, the Climate Change Commission finalised advice I*nāia tonu nei: a low emissions future for Aotearoa*, to the Government on its first three emissions budgets and direction for its emissions reduction plan 2022 – 2025. The Commission identifies transport as one of the most important sectors for change. It recommends a significant increase in investment in public transport, and active modes, as well as ensuring transport and urban planning focus on developing compact communities, therefore reducing the reliance on and ultimately private car use.

In the Auckland region, a climate emergency was declared on 11th June 2019 with Auckland Council adopting Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan in December 2020. Transport is a priority area

for the plan with transport-related emissions accounting for about 44 per cent of Auckland's total emissions in 2016. About 86 per cent of those are related to travel by road. Between 2007 and 2017, on-road transport emissions increased by about 9 per cent.

The plan acknowledges that big changes will be necessary to achieve the Council's goal of reducing emissions by 50 per cent by 2030.

In late 2021 the Ministry for the Environment released a consultation document Te hau Mārohi ki anamata: Transitioning to a low-emissions and climate-resilient future which describes policies and strategies that Aotearoa New Zealand will take to meet our first emissions budget and transition to a low emissions future. The first Emissions Reduction Plan has just been released in May 2022 (at the end of this SSBC).

In the Emissions Reduction Plans transport priority area, the highest priority is reducing emissions generated by light passenger vehicles and commercial vehicles, given these generate about 80 per cent of on-road emissions. The plan recognises a trend that contributes to emissions is that many short trips are undertaken by private vehicles, while the number of people per vehicle has decreased over time. A large proportion of these trips could be by walking or cycling. Therefore, a key focus for the first carbon budget is to reduce reliance on cars and support people to walk, cycle and use public transport. A specific national target is being proposed to reduce Vehicle Kilometres Travelled (VKT) by cars and light vehicles by 20 per cent by 2035 through providing better travel options and focusing on mode shift.

In this regard, the Hill development is considered highly aligned with the climate change related policy. Due to the location and travel choice available to future residents, the development is considered ideally located to promote walking, cycling and public transport.

8.9 AUCKLAND TRANSPORT CODE OF PRACTICE

The internal road design and road improvements on the surrounding network will follow approved standards namely the Auckland Transport TDM, Austroads and NZS4404.

9 CONSTRUCTION TRAFFIC

The development site is currently vacant but given the topography, significant earthworks are likely onsite. To facilitate bulk earthworks and construction traffic, further assessment will need to be completed once the proposal is consented. This will consider the staging and access points for potential truck movements. Particular consideration will be given to the operation of Ladies Mile.

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

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

Based on experience of constructing similar projects and bearing in mind capacity within the existing road network, with the appropriate Construction Traffic Management Plan in place and the above

measures implemented, it is considered that construction activities can be managed to ensure any generated traffic effects are appropriately mitigated.

10 IMPLEMENTATION PLAN

Table 8 summarises the Implementation of external road upgrades proposed as mitigation for the development.

Figure 10-1: Implementation Plan

Trigger	Upgrade	Comments	Responsibility
Prior to occupation of the 20th dwelling in Superlots 107, 108 and 109.	Ladies Mile / Derby Downs Place – signalised intersection	Intersection upgrade required for development to access network	Developer
Prior to completion of the Upper loop road (Lot 111)	Ladies Mile flush median	Median is proposed to provide safe turning movements into and out of the site.	Developer
Prior to completion of the Upper loop road (Lot 111)	Provision of a solid median for the southern Upper Loop Rd and Ladies Mile intersection	solid median provided to prevent right turns from the southern Ladies Mile/Upper loop road intersection	Developer
Prior to completion of the Upper loop road (Lot 111)	Ladies Mile footpath upgrade along site frontage	Footpath fills a gap in the network with benefits to both Hill residents and others in the surrounding area.	Developer
Prior to occupation of the first dwelling on Superlot 102 (building B) or 103 (building C1/C2)	Upgrade to Ladies Mile / Abbotts Way intersection with pedestrian crossings	Additional pedestrian crossings at the intersection with benefits to both Hill residents and others in the surrounding area.	Developer

Prior to occupation of the first dwelling on Superlot 102 (building B) or 103 (building C1/C2)	Provision of a new northbound bus stops on Ladies Mile north of Abbotts Way	Additional bus stops to serve bus routes passing this section of Ladies Mile. Benefits to both Hill residents and others in the surrounding area	Developer
Prior to occupation of the first dwelling on Superlot 102 (building B) or 103 (building C1/C2)	Relocation of southbound Ladies Mile bus stop	bus stop relocation at AT request to allow two bus services to be consolidated onto one bus stop	Developer

11 CONCLUSION

The proposal intends to develop 358 dwellings on a vacant site on part of the Ellerslie Racecourse known as The Hill. The proposal includes a range of apartment buildings, terraced housing, detached dwellings and retirement units.

Based on our assessment, we conclude the following:

- The proposed development is situated in an ideal position with mode choice for future residents. As such, it is expected the development will enable reduced reliance on single occupancy vehicles.
- Additional traffic associated with the development will have a minor effect on the operation of the surrounding road network.
- The proposed local roads are designed in accordance with the AT TDM standards and will provide an appropriate level of access and amenity for future residents.
- Access points to the external network are considered appropriate to maintain safe and efficient operation of the surrounding network.
- JOALS have been designed in an appropriate manner to reduce vehicle movements and speed while maintaining access and servicing to dwellings.
- The proposed development complies with AUP parking requirements.
- Terraced housing and detached dwellings can be serviced by rubbish trucks without the need for reverse manoeuvres on street.
- Bicycle parking has been provided in line with AUP rules
- A crash history study of the most recent five years of available data within the wider area of the site shows no significant road safety issues which will be exacerbated by the proposed development.
- Vehicle crossings have been designed in accordance with the AT TDM and meet the AUP rules with the exception of one vehicle crossing which exceeds the maximum width. Given the nature of the site and visibility available, this is not considered to result in adverse safety outcomes.

Assuming the upgrades to the external road network as outlined in Section 10 of this report are implemented, we consider the proposed development to be:

- Consistent with the relevant policy and plans within Auckland.
- To have positive effects on the surrounding Public Transport, pedestrian and cycle networks.
- To have minimal discernible effects on vehicle trips travelling through the surrounding area .
- To be designed in an appropriate manner in line with the AT TDM standards and broadly in line with the AUP rules.

Accordingly, it is concluded that there is no traffic engineering or transportation planning reason to preclude acceptance of this proposed development.

Commute Transportation Consultants

ATTACHMENT A – VEHICLE TRACKING ASSESSMENT

ATTACHMENT B – SIDRA MOVEMENT SUMMARIES