29 November 2023

21-558

Ms Kasey Zhai
Barker and Associates Ltd
Auckland

Dear Ms Zhai

167-173 Pilkington Road Clause 23 Further Information

As discussed, I have reviewed the Clause 23 request for further information received from Auckland Council and I am pleased to set out that information below.

Before setting out the requested information it is worth reflecting on the relevance of traffic modelling when considering the potential effects of trip generation associated with a plan change such as is proposed.

The transport effects of rezoning land is addressed in the Regional Policy Statement in section B3.

B3.3.2. Policies

Integration of subdivision, use and development with transport

(5) 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 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.

The Regional Policy Statement makes a distinction between locating intensification within areas that can be served by modes other than the private car and those areas where the car is the only practical mode. It is areas where alternative modes of transport are limited where traffic effects are required to be readily avoided, remedied or mitigated.

In relation to this context under the Auckland Unitary Plan, my responses to the Clause 23 request for further information are set out below.

1. T1 TRAFFIC VOLUMES

Existing roads Section 3.2 of ITA *Please provide an assessment to determine whether the static traffic volumes on adjoining roads are a result of the local network operating at capacity as opposed to being a result of flattened traffic demand?*

I have obtained the traffic count data from Auckland Transport and attached the hourly plot for the 2022 data below.

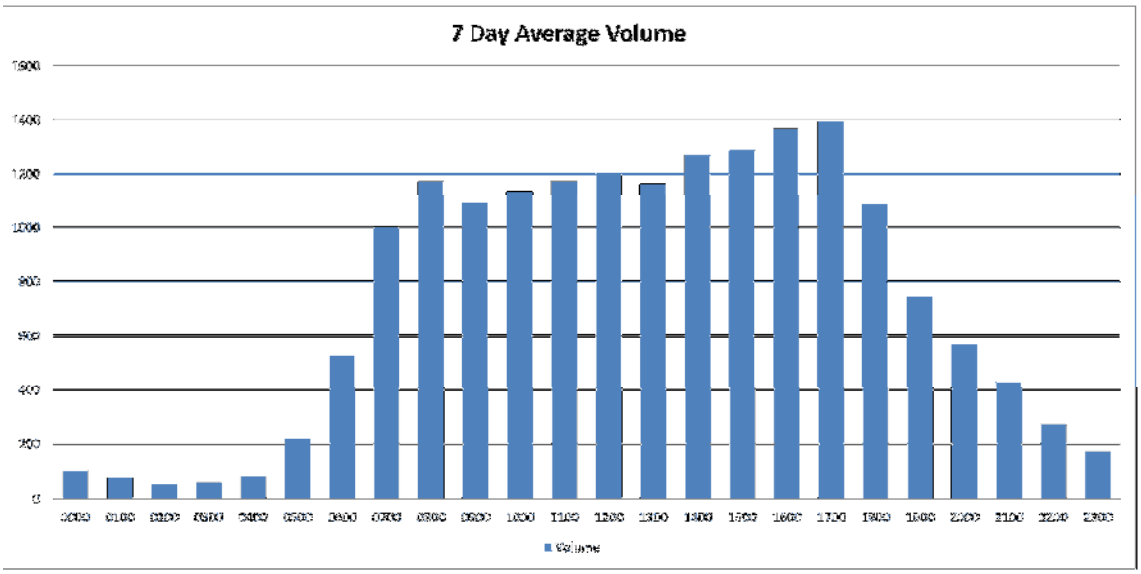

Figure 1 Apirana Road Traffic 2022

As can be seen the Apirana Road count has a distinct evening peak hour which indicates there is spare capacity at other times of the day. The lack of any noticeable annual growth shown in the

ITA cannot therefore be the result of the road or adjacent intersections being at capacity throughout the day. This is reinforced by the fact there are queues at times in the two peak periods and not throughout the day.

In terms of assessing the Plan Change we needn't be concerned about any capacity issues because the intensification of land adjacent to rail stations is not in any way dependent on the availability of spare road capacity. Indeed centres are the very places that are usually already busy.

2. T2 AT CYCLEWAYS PROGRAMME

Section 3.5 & 3.6 of ITA *Please include construction timeframes for Auckland Transport's Links to Glen Innes Cycleways project in the ITA.*

We understand that the Links to Glen Innes project is a funded and committed project for Auckland Transport. Barker and Associates have addressed this issue in more detail separately.

3. T3 WALKING AND CYCLING SPEED ASSUMPTION

Section 3.5 & 3.6 of ITA *Please provide the underlying walking and cycling speed assumptions*

The walking and cycling diagrams have been prepared using the Traveltime.com app without changing default walking and cycling speeds. The default walking speed is 1.4m/s. This results in a slightly smaller catchment than has been used by Auckland Council for PC78. Had we simply adopted Auckland Council's own catchment then it would cover the entirety of the site.

The Traveltime app notes the following:

> *"The cycling model uses any routes where cycling is permitted (including cycle paths), while not allowing routes where cycling is not possible (e.g motorways).*
>
> *"The cycling speed on any particular route is determined by the associated change in elevation, ranging from 5 km/h on a steep incline to 60 km/h on a steep decline." https://help.traveltime.com/article/How-does-the-cycling-model-work"*

4. T4 CRASH RECORDS

Section 3.7 of ITA

Please advise whether any of the crashes involved pedestrians or cyclists.

None of the reported crashes involved a pedestrian. One reported crash at the Pilkington Road roundabout involved a cyclist as shown in red below.

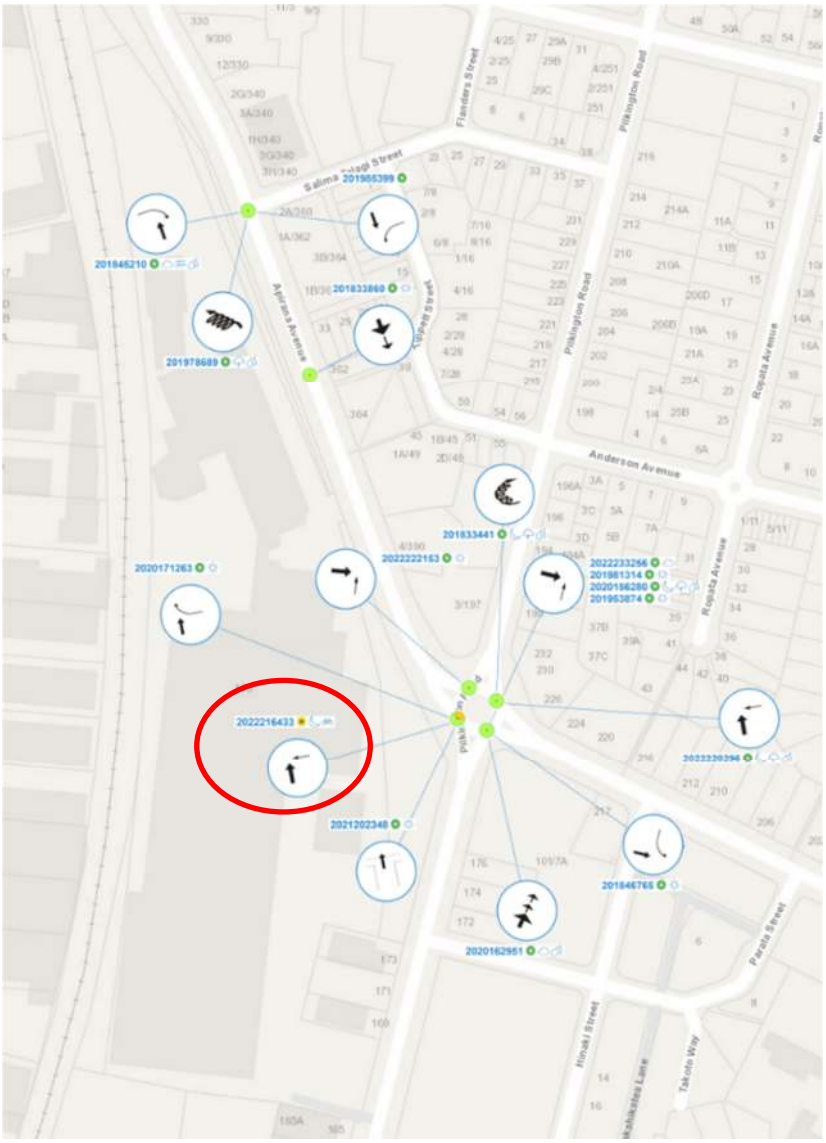

Figure 2 Cycle Crash 2022 (shown in red)

The crash occurred in February 2022 at 5:45 am during darkness. A car entering the Pilkington Road roundabout from the south failed to giveway to a 14 year old cyclist already on the roundabout despite the cyclist having lights and wearing a high visibility top.

5. T5 NEIGHBOURING DEVELOPMENTS

Section 3.10 of ITA

Please describe the potential development that will occur in the vicinity, including the wider Tāmaki Regeneration Programme

Barker and Associates have written a description of the other developments in the area that have been built or are being built as part of the Tāmaki Regeneration Programme. Their assessment addresses this issue from a planning perspective and from the viewpoint of what is required by the Regional Policy Statement.

6. T6 TRIP RATES

Section 6.2 of ITA
Please add the correct trip rate for terraced houses in table 3, and confirm rates are peak hourly trip rates.

There is a typo where the report says 5.75 it should say 0.575. (5.75 was the daily rate). This will be corrected in the ITA. The change does not require any consequential changes to the modelling already carried out.

7. T7 TRIP RATES

Section 6.2 of ITA
Please confirm the source of the trip rates used for non-residential activities in table 4 and confirm rates are peak hourly trip rates

All non-residential trip rates are taken from the RTA Guide to Traffic Generating Development[1] and are peak hour. Not all activities have their peak at the same time but I have taken an average in any case. It makes little difference to the result as described in the ITA.

Activity	Published Trip rate	Source
Commercial services	2.0 per 100sqm	RTA Guide Section 3.5 Office and Commercial
Restaurants	5.0 per 100sqm	RTA Guide Section 3.7.2 Restaurants
Medical	8.8 per 100sqm	RTA Guide Section 3.11.2 Extended Hours Medical Centres

[1] Guide to Traffic Generating Development 2002, New South Wales RTA.

Day-care	9 per 100sqm	RTA Guide Section 3.11.3 Childcare Centres based on 0.7 trips per child/7.8sqm per child x 100 = 8.97 trips/100sqm
Shops	12.3 per 100sqm	RTA Guide Section 3.6.1 Table 3.1 Floor areas 0sqm to 10,000sqm
Average Rate	7.4 per 100sqm	

Table 1 Source of Non-Residential Trip Rates

8. T8 TRAFFIC FORECASTS

Section 6.2 of ITA

Please outline how figures 29 and 30 relating to future peak hour traffic flows have been developed. Specifically:

a. When were the underlying intersection surveys collected?

b. What is the peak hour for the evening period?

c. Has an allowance for the removal of existing activity on site been made?

d. Has an allowance for growth and/or the addition of other consented/anticipated development (other than the under construction Tāmaki Regeneration Programme build)? Is all traffic generation anticipated to be (new) primary trips on the network?

What is the basis of the trip distribution assumptions used?

Reason

It is important to understand the traffic flow assumptions underpinning this assessment, and to be confident that the calculations have been made accurately for both roundabouts.

[Note that the Auckland Forecasting Centre may be able to assist in providing future traffic volumes.]

A) The traffic was counted on Thursday 9 February 2022.

B) The peak hour for the evening peak was 1645pm to 1745 pm.

C) Yes, the gateways at the site were counted and those trips were subtracted from the totals.

D) No general growth has been added because the traffic counts show there has not been any general traffic growth. The Pilkington Road counts indicate a small decline in traffic over time but this has not been extrapolated forward.

E) The distribution of traffic was developed from the observed counts but modified to reflect the location of likely work destinations. The eight development areas scheduled in the indicative development plan were assumed as internal zones and six external zones were assumed as follows: Merton Rd, Apirana Ave North, Line Road, Pilkington Road North, Tripoli Road, and Pilkington Road south. These external links were then assigned a share of origins and destinations to reflect work and non work trips that might occur based on a broad catchment.

The largest share of morning peak trips were assigned to the south to reflect the strong influence of south Auckland employment zones on travel from the neighbouring two statistical areas of Point England and Glen Innes.

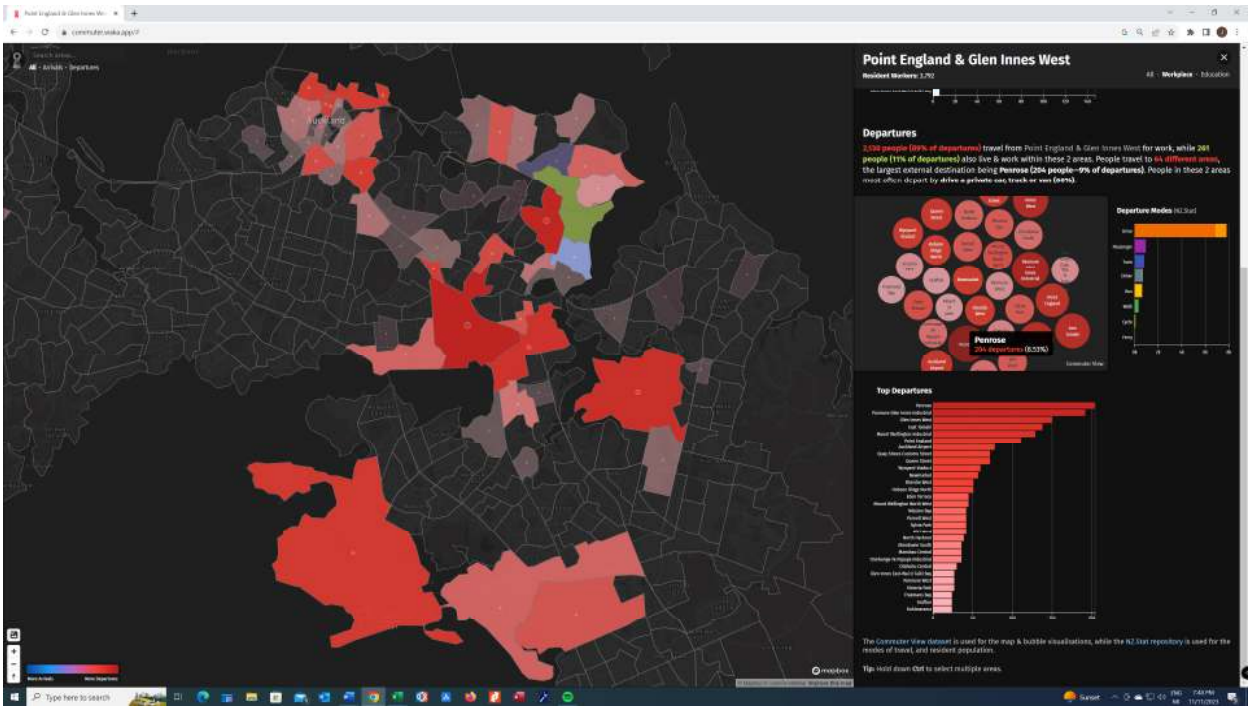

Figure 3 Census Journey to Work from Point England and Glen Innes 2018

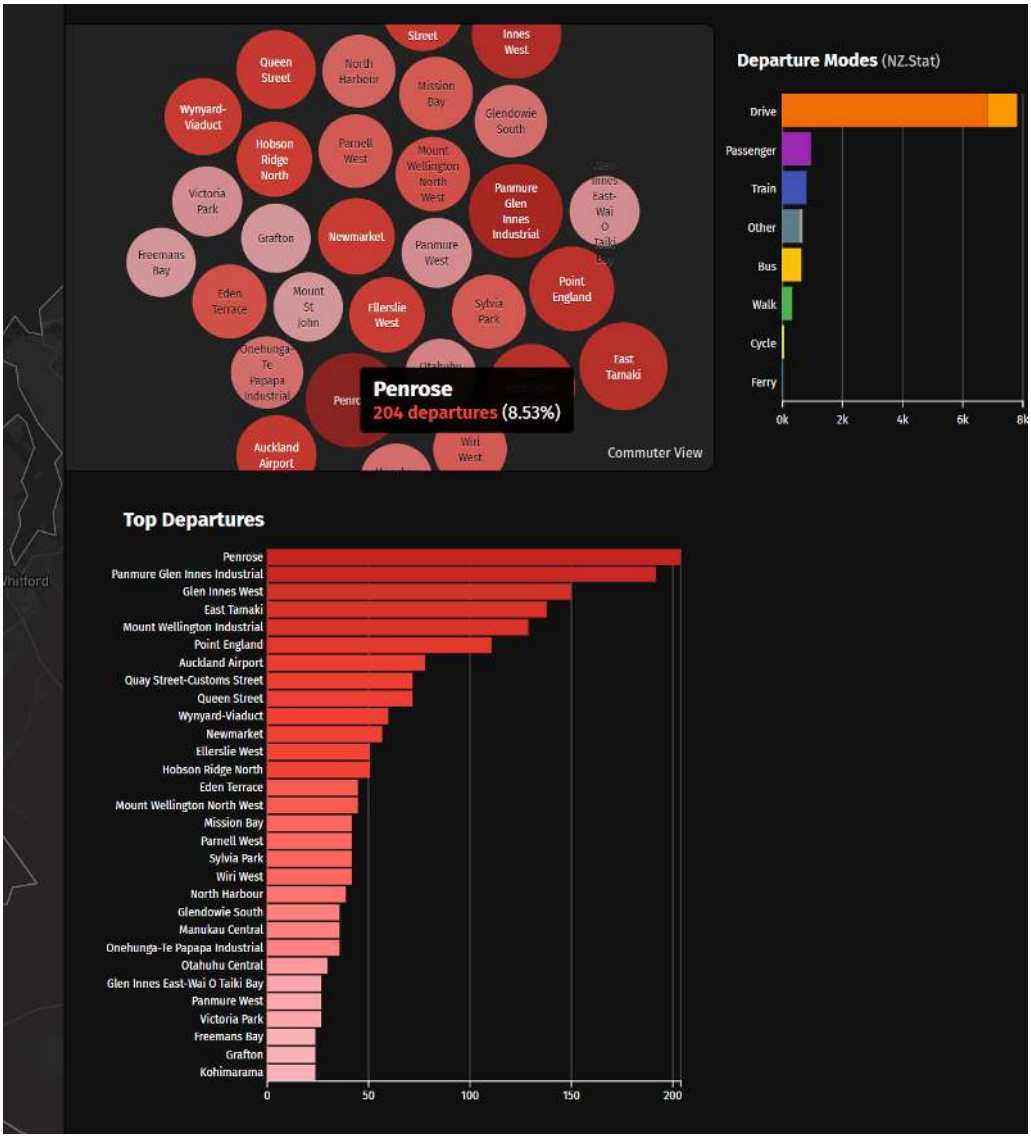

Figure 4 Work Destinations from Point England and Glen Innes 2018

8.1 Comment on Need for Modelling

The traffic flow assumptions included in the assessment are that the existing flows have been counted, the existing gateway flows have been subtracted, the additional flow generated by the development opposite which had not yet opened was added and then the development traffic was added. The purpose of the assessment is not to accurately predict future traffic flows on the frontage roads but to demonstrate the broad level of traffic effects of the proposed plan change. We chose not to use an approach based on regional traffic modelling because a large network model would not answer any questions relevant to this plan change proposal.

9. T9 SIDRA MODELLING

Section 6.4 & 65.5 of ITA
Please provide the Sidra intersection models and confirm whether the existing Sidra models' performance has been calibrated against observed roundabout performance (e.g. current observed delays or queue lengths in peak hours)?

The SIDRA models will be provided. These have not been calibrated against delays because they are not intended to be used for an economic assessment of options. The intention was that the models would demonstrate that the proposed plan change would not result in extreme congestion. Further to this, there is no point in carrying out a calibration given that the testing carried out below shows that the AT project will create oversaturated flow conditions at the Merton Road roundabout. No amount of calibration can make the model a reliable estimator of traffic queues and delays once the roundabout is overloaded.

10. T10 SIDRA MODELLING MERTON ROAD ROUNDABOUT

Section 6.4 & 6.5 of ITA
Please undertake a sensitivity test for the Merton Road roundabout to reflect the reduced capacity shown in figure 10 of the ITA?

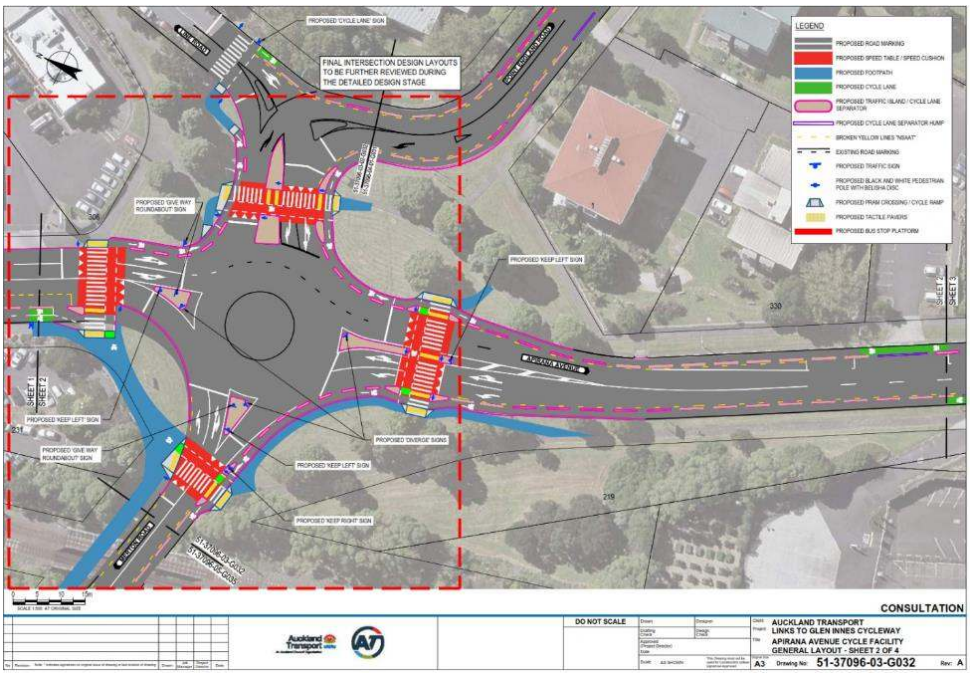

Figure 5 AT Links to Glen Innes

The reduction in capacity proposed by AT consists of the following changes at the Merton Road roundabout:

- Removal of one departure lane on Merton Road,
- Removal of one departure lane on Apirana Road north of the roundabout;
- Removing through traffic from the right hand approach lane on Line Road;
- Removing through traffic from the left hand approach lane on Apirana Road south of the roundabout.
- The installation of zebra crossings on all four approaches.

To model these changes in SIDRA I have added staged crossings and assumed a flow of 30 pedestrians per hour on each crossing.

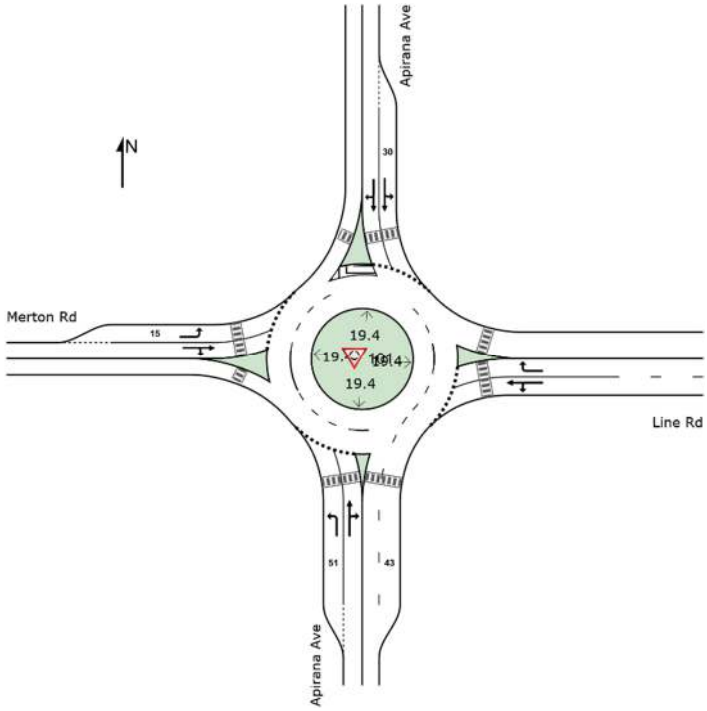

Figure 6 Modified Sidra

As requested I have modelled the impact of these changes by adding them all to the morning and evening base networks. (i.e. without the development). This allows us to see the capacity impact of the proposed works as shown below. I have then added on the development to show the incremental effect of the Plan Change.

Approach	Movement	Existing Morning Peak Traffic			Morning Peak Traffic With AT Capacity Reduction			Future Morning Peak Traffic		
		Degree of Saturation	Ave Delay (sec)	LOS	Degree of Saturation	Ave Delay (sec)	LOS	Degree of Saturation	Ave Delay (sec)	LOS
Apirana Ave South	Left	0.445	17.0	B	0.361	10.9	B	0.425	10.4	B
	Through	0.924	43.1	D	0.734	12.4	B	0.759	13.1	B
	Right	0.924	47.3	D	0.734	16.7	B	0.759	17.4	B

Line Rd	Left	0.734	17.4	B	1.142	152.6	F	1.170	176.0	F
	Through	0.828	19.8	B	1.142	152.6	F	1.170	175.6	F
	Right	0.828	24.2	C	0.510	19.3	B	0.522	19.9	B
Apirana Ave North	Left	0.301	11.0	B	0.303	11.0	B	0.316	11.3	B
	Through	0.839	20.6	C	0.843	20.8	C	0.879	24.9	C
	Right	0.839	28.1	C	0.843	28.5	C	0.879	33.5	C
Merton Rd	Left	0.588	13.1	B	0.582	12.9	B	0.605	14.0	B
	Through	0.666	13.1	B	0.660	12.9	B	0.701	14.7	B
	Right	0.666	18.2	B	0.660	18.0	B	0.701	19.8	B
All	All movements	0.924	23.3	C	1.142	48.7	D	1.170	54.3	E

Table 2 – Morning Peak Traffic at Merton Rd Roundabout Before and After

We see from the results that the AT project will reduce capacity to a point where oversaturated flow conditions will occur. The issue is that the reduction of departure lanes on Merton Road and Apirana Road north requires the removal of through traffic from one of the approach lanes on Line Road. That will result in a Level of Service F condition on Line Road and a significant queue.

However it is a valid option for AT to favour pedestrian safety over traffic flow in a town centre close to a station.

The proposed Plan Change will make a minimal difference to this result, and will have lesser impact on traffic conditions.

The evening peak was then modelled on the same basis. The result below shows that the proposed works have less of an impact in the evening.

Approach	**Movement**	**Existing Evening Peak Traffic**			**Evening Peak after AT Capacity Reduction**			**Future Evening Peak Traffic**		
		Degree of Saturation	Ave Delay (sec)	LOS	Degree of Saturation	Ave Delay (sec)	LOS	Degree of Saturation	Ave Delay (sec)	LOS
Apirana Ave South	Left	0.364	9.1	A	0.305	7.9	A	0.366	7.9	A
	Through	0.689	11.6	B	0.658	8.9	A	0.661	8.9	A
	Right	0.689	15.9	B	0.658	13.2	B	0.661	13.3	B
Line Rd	Left	0.532	11.9	B	0.867	23.9	C	0.909	31.1	C
	Through	0.553	10.6	B	0.867	23.5	C	0.909	30.6	C
	Right	0.553	15.1	B	0.248	15.5	B	0.257	16.0	B
Apirana Ave North	Left	0.310	11.8	B	0.312	11.8	B	0.329	12.1	B
	Through	0.863	25.2	C	0.869	25.8	C	0.915	33.1	C
	Right	0.863	32.6	C	0.869	33.2	C	0.915	42.0	D
Merton Rd	Left	0.522	10.3	B	0.521	10.2	B	0.529	10.5	B

	Through	0.639	10.7	B	0.638	10.7	B	0.668	11.5	B
	Right	0.639	15.7	B	0.638	15.7	B	0.668	16.5	B
All	All movements	0.863	15.9	B	0.869	17.7	B	0.915	21.1	C

Table 3 – Evening Peak Traffic at Merton Rd Roundabout Before and After

11. T11 LEVEL OF SERVICE FOR PEDESTRIANS

Please provide an assessment of the level of service to be provided for pedestrians. This should focus on the connections across Apirana Avenue to other likely destinations and take into account AT's proposed zebra crossings at the Merton Road/Apirana Avenue roundabout.

Static pedestrian capacity methods were developed by Fruin and later incorporated into the Highway Capacity Manual. Fruin showed that a footpath capacity could be defined in terms of pedestrians per minute per foot width of sidewalk. The Highway capacity Manual gives the capacity of a footpath as 75 pedestrians per min per metre[2]. In this case the capacity is:

1.8m x 75p/min/m = 135 pedestrians per minute = 8100 pedestrians per hour.

Alternatively we can calculate Level of Service limits from the flow rates given in column 3 of Table 18-3 below.

Volume to capacity (v/c) ratio can be computed assuming 75 p/min/m for capacity. Exhibit 18-3 lists the criteria for pedestrian LOS on walkways. It includes the service measure of space and the supplementary criteria of unit flow rate, speed, and v/c ratio. Note that LOS thresholds summarized in Exhibit 18-3 do not account for platoon flow, but instead assume average flow throughout the effective width.

EXHIBIT 18-3. AVERAGE FLOW LOS CRITERIA FOR WALKWAYS AND SIDEWALKS

LOS	Space (m^2/p)	Flow Rate (p/min/m)	Speed (m/s)	v/c Ratio
A	> 5.6	≤ 16	> 1.30	≤ 0.21
B	> 3.7–5.6	> 16–23	> 1.27–1.30	> 0.21–0.31
C	> 2.2–3.7	> 23–33	> 1.22–1.27	> 0.31–0.44
D	> 1.4–2.2	> 33–49	> 1.14–1.22	> 0.44–0.65
E	> 0.75–1.4	> 49–75	> 0.75–1.14	> 0.65–1.0
F	≤ 0.75	variable	≤ 0.75	variable

Figure 7 HCM 2000 Pedestrian Capacity

The Effective Walkway Width is the width of the footpath less any interference caused by buildings, trees or poles that protrude taking into account that people cannot walk squashed up

[2] HCM 2000 page 18-4

against a building. In this case the footpath along the site frontage has a wide front and back berm and no physical impediments so no reduction is required for the calculations.

This results in Level of Service boundaries as shown in Table 4.

LOS Threshold	Flow p/min/m	Total Width (m)	Edge Correction (m)	Useable width (m)	Flow rate ped/min	Capacity ped/hr
A/B	16	1.8	0	1.8	29	1728
B/C	23	1.8	0	1.8	41	2484
C/D	33	1.8	0	1.8	59	3564
D/E	49	1.8	0	1.8	88	5292
E/F	75	1.8	0	1.8	135	8100

Table 4 Level of Service Thresholds for Apirana & Pilkington Footpath

This means that provided the footpath carries fewer than 1728 people per hour then it will operate at level of service A and the footpath will not operate at level of service F unless the demand increases to 8100 pedestrians per hour. Based on the development enabled by the plan change, it is expected that a level of service A will be maintained. We can conclude the footpath capacity is not an issue for the plan change.

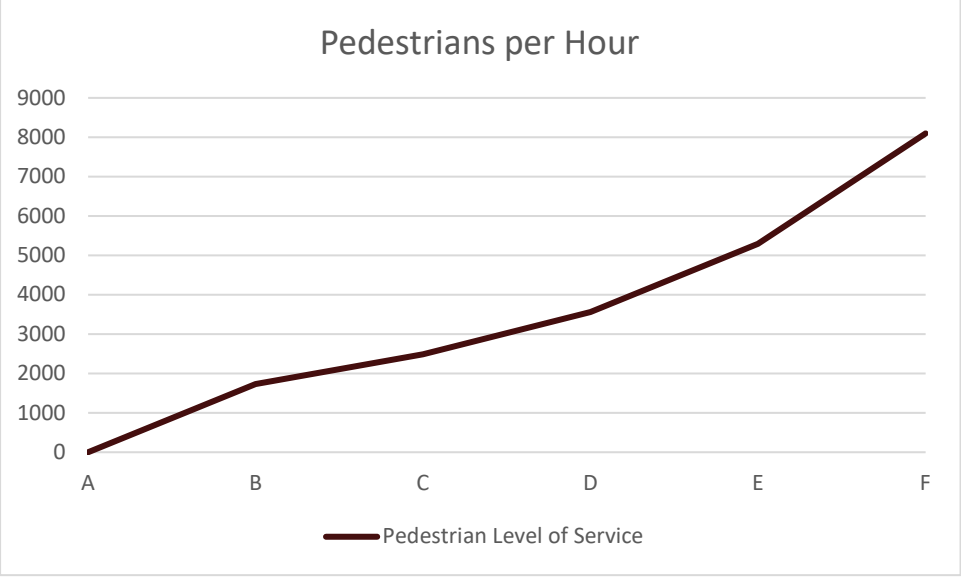

Figure 8 Lower Bound of Footpath Level of Service

I look forward to discussing these matters with you.

John Parlane BE(Civil), BApplEcon, CM Eng. NZ

Consulting Traffic Engineer

Parlane & Associates Ltd