Jacobs

Memorandum

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Subject	**Review of transport matters - Section 92 information requests**	**Project Name**	New Lynn Primary School - 3094 Great North Road Designation
Attention	Katie Maxwell (Auckland Council)	**Project No.**	IZ131900
From	Jacobs New Zealand Limited (Jacobs)		
Date	10 August 2020		
Copies to	James Puketapu, Chris Horne, Achini Liyanagama, Terri Bell, Andrew Prosser		

1. Introduction

1.1 Purpose of this memorandum

This memorandum has been prepared to address the transport matters raised by Flow Transportation Specialists (Flow) in a formal request from Auckland Council. This request is for further information under section 92 of the Resource Management Act 1991 received by Jacobs from Chris Horne (Incite) on 15 July 2020, relating to the notice of requirement documentation for New Lynn Primary School lodged by the Ministry of Education.

It should be noted that engagement with Auckland Transport has not been undertaken as part of responding to these section 92 information requests.

Auckland Council commissioned Flow to review the following documents to identify whether further information is required:

- Notice of Requirement & Assessment of Environmental Effects Report[1]:
  - Appendix A – Designation Plan[2]; and
  - Appendix E – Integrated Transportation Assessment[3] (ITA).

This memorandum addresses the two requests for further information raised in the *Review of transport matters technical note*[4] received from Flow on 14 July 2020. These requests are summarised in Table 1-1.

[1] Incite Auckland Limited (June 2020) *Notice of Requirement & Assessment of Environmental Effects Report,* Auckland.
[2] Jacobs New Zealand Limited (May 2020) *Designation Plan,* Auckland.
[3] Jacobs New Zealand Limited (May 2020) *New Lynn Primary School - 3094 Great North Road Designation Integrated Transportation Assessment,* Auckland.
[4] Flow Transportation Specialists (July 2020) *New Lynn School Notice of Requirement – Review of Transport Matters technical note,* Auckland Council, Auckland.

Table 1-1 Summary of section 92 requests for further information

Reference	Description	Response
Request 1	Please provide an assessment of the number of peak hour vehicle trips that can be generated by the site without vehicle queueing exceeding the stacking space of the right-turn lanes at the Clark Street/Cambridge Lane and Clark Street/ Great North Road intersections. Please include SIDRA intersection movement outputs for the 2019 flows and 2019 + development flows	Refer to section 2 of this memorandum
Request 2	Please provide a safety assessment for active mode (pedestrians, cyclists, scooters, etc) access to the school. Where mitigations are identified, please comment on the feasibility and timing of implementation	Refer to section 3 of this memorandum

2. Request 1 – assessment of peak vehicle trip generation

Please provide an assessment of the number of peak hour vehicle trips that can be generated by the site without vehicle queueing exceeding the stacking space of the right-turn lanes at the Clark Street/ Cambridge Lane and Clark Street/Great North Road intersections.

Based on the mode share and trip distribution assumptions documented in the ITA[5], the school and ECE are expected to generate the following numbers of private vehicle trips during the peak periods:

- AM peak: 443 vehicles/hour entering the site, 395 vehicles/hour exiting the site; and
- PM peak: 339 vehicles/hour entering the site, 386 vehicles/hour exiting the site.

The ITA and modelling memo identified an opportunity for further signal optimisation including reducing the cycle time for the Cambridge Lane / Clark Street intersection.

2.1 Clark Street/Great North Road intersection

The Clark Street / Great North Road intersection was modelled for the ITA, with and without the estimated traffic volumes generated by the school and ECE development. The SIDRA model results as documented in the ITA did not show a significant impact on the intersection when school traffic was added.

This includes the Clark Street south approach, where the right turning queue in the development scenario is four vehicles in the AM peak. Based on these results, it is not expected that the school development will cause queuing beyond the existing length of the right turn pocket on this approach (approximately 35m, as shown in Figure 2-1).

2.2 Clark Street/Cambridge Lane intersection

The SIDRA models developed for the ITA were used to test the maximum number of vehicles that can be generated by the school without exceeding the available stacking space of the right turn pocket on the north approach of the Clark Street / Cambridge Lane intersection.

[5] Jacobs New Zealand Limited (May 2020) *New Lynn Primary School - 3094 Great North Road Designation Integrated Transportation Assessment,* Auckland.

The number of right turning vehicles were reduced (either removed from the network or reallocated to other routes to the school) to a volume where queue lengths could be accommodated in the 30m of stacking space in the right turn pocket.

The right turn pocket (for vehicles turning right from Clark Street into Cambridge Lane) is approximately 30m long. If the length of the painted median is included, there is about 55m of stacking space for right turning vehicles.

The layout of the Clark Street / Cambridge Lane and Clark Street / Great North Road intersections is shown in Figure 2-1.

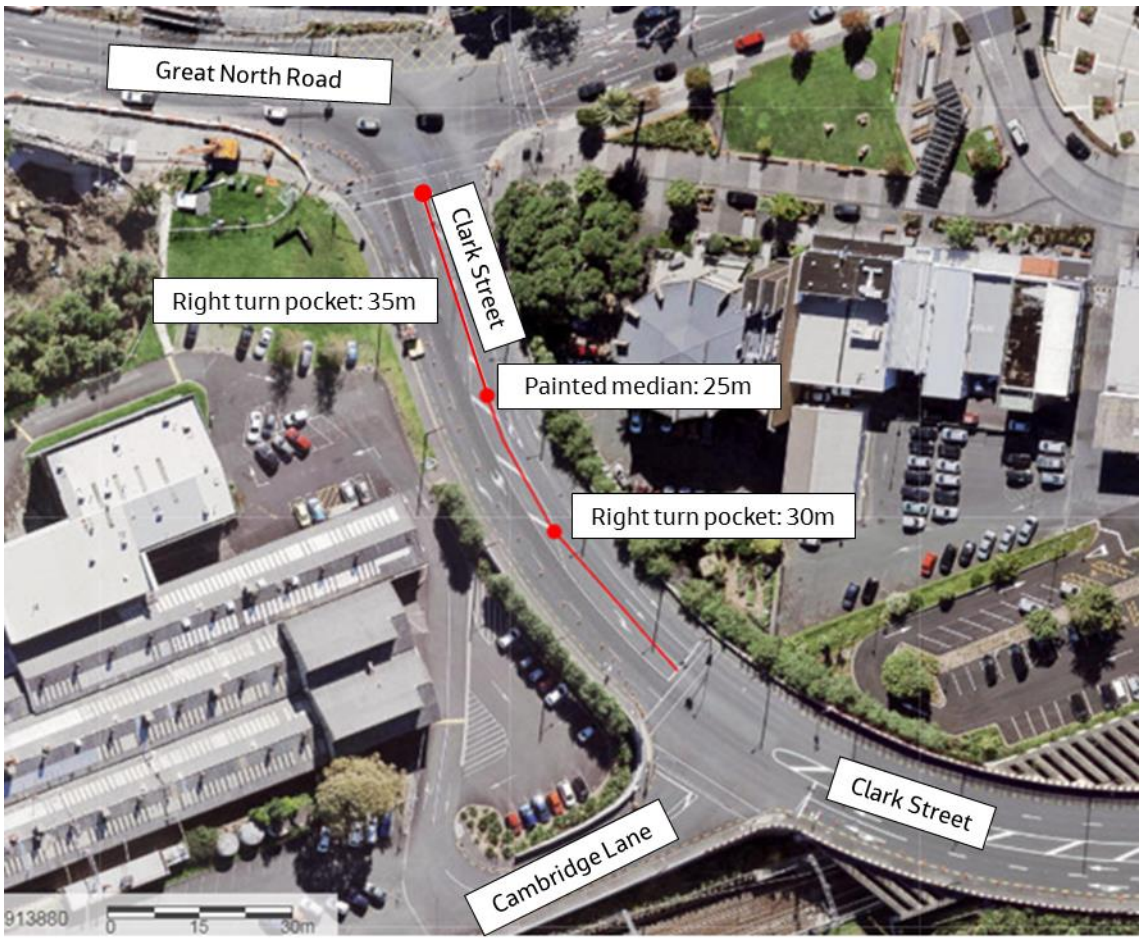

Figure 2-1 Clark Street / Cambridge Lane and Clark Street / Great North Road intersections with right turn stacking space

This response focuses on the AM peak which represents the conservative scenario as the turning volume into the site is higher during the AM peak and the resulting vehicle queues are longer[6]. A reduction in trip generation would apply to both the AM and PM peaks.

The following tests were carried out by incrementally adjusting the total number of vehicle trips generated by the school during the AM peak that would result in a right turn queue length less than 30m under three scenarios:

- **Scenario 1:** A number of vehicles from the right turn in from the north approach and left turn out of the site are removed entirely from the network (i.e. what is the total reduction in trips generated by the school that is required for the right turn queue lengths to reduce to 30m or less);
- **Scenario 2:** Assuming that the right turning vehicles removed would reroute to the south, and adding them to the south approach left turn in / right turn out movement volumes; and
- **Scenario 3:** Removing vehicles from the right turn in and left turn out as per Scenario 1, while optimising the signal timing and cycle time as suggested in the ITA and modelling memo to optimise the volumes that can be accommodated in the right turn pocket.

Table 2-1 shows the vehicle volumes for the turns in and out of the site documented in the ITA (with the proposed school and ECE development) and compares these to Scenarios 1 to 3.

Table 2-1 Vehicle volumes for the north and south approaches and corresponding turns out[7]

Approach lane and turning movement		Vehicle volume (vehicles / hour)			
		ITA modelling	Scenario 1	Scenario 2	Scenario 3
North Approach	Right Turn in	**316 vehicles/hour**	60 vehicles/hour	55 vehicles/hour	165 vehicles/hour
	Left Turn out	**282 vehicles/hour**	26 vehicles/hour	21 vehicles/hour	131 vehicles/hour
South Approach	Left Turn in	**139 vehicles/hour**	139 vehicles/hour	400 vehicles/hour	139 vehicles/hour
	Right Turn out	**115 vehicles/hour**	115 vehicles/hour	376 vehicles/hour	115 vehicles/hour

Table 2-2 to Table 2-6 show the movement summary outputs from SIDRA for the base (no development), ITA modelled values, and Scenarios 1 to 3.

[6] Based on the trip generation assumptions noted in the *New Lynn Primary School - 3094 Great North Road Designation Integrated Transportation Assessment* report.

[7] This number represents the total number of vehicles that can be accommodated in the peak hour without exceeding the 30m turning pocket

Table 2-2 SIDRA movement summary output, AM Peak, Base (no development)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Clark Street (South)												
1	L2	13	8.0	0.157	8.2	LOS A	3.9	28.8	0.24	0.23	0.24	30.8
2	T1	448	8.0	0.157	3.6	LOS A	3.9	28.9	0.24	0.22	0.24	42.9
Approach		461	8.0	0.157	3.7	LOS A	3.9	28.9	0.24	0.22	0.24	42.5
North: Clark Street (North)												
8	T1	751	8.0	0.233	1.5	LOS A	4.2	31.7	0.16	0.14	0.16	46.9
9	R2	6	8.0	0.083	87.2	LOS F	0.5	3.7	0.98	0.66	0.98	5.5
Approach		757	8.0	0.233	2.2	LOS A	4.2	31.7	0.17	0.15	0.17	45.5
West: Cambridge Lane (West)												
10	L2	1	10.0	0.019	80.7	LOS F	0.2	1.2	0.96	0.62	0.96	5.9
12	R2	1	10.0	0.019	80.7	LOS F	0.2	1.2	0.96	0.62	0.96	9.7
Approach		2	10.0	0.019	80.7	LOS F	0.2	1.2	0.96	0.62	0.96	7.9
All Vehicles		1220	8.0	0.233	2.9	LOS A	4.2	31.7	0.20	0.17	0.20	44.0

Table 2-3 SIDRA movement summary output, AM Peak, ITA modelled values

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Clark Street (South)												
1	L2	146	8.0	0.826	60.6	LOS E	18.1	135.0	1.00	0.96	1.17	11.4
2	T1	448	8.0	0.826	55.9	LOS E	18.5	138.4	1.00	0.97	1.16	14.1
Approach		595	8.0	0.826	57.0	LOS E	18.5	138.4	1.00	0.97	1.16	13.4
North: Clark Street (North)												
8	T1	751	8.0	0.384	11.8	LOS B	12.5	93.4	0.52	0.46	0.52	32.6
9	R2	339	8.0	0.836	46.6	LOS D	18.2	136.1	0.84	0.89	1.02	9.2
Approach		1089	8.0	0.836	22.6	LOS C	18.2	136.1	0.62	0.59	0.68	22.3
West: Cambridge Lane (West)												
10	L2	297	10.0	0.821	52.2	LOS D	24.7	187.5	1.00	0.92	1.11	8.6
12	R2	121	10.0	0.821	52.1	LOS D	24.7	187.5	1.00	0.92	1.11	13.5
Approach		418	10.0	0.821	52.1	LOS D	24.7	187.5	1.00	0.92	1.11	10.1
All Vehicles		2102	8.4	0.836	38.2	LOS D	24.7	187.5	0.80	0.76	0.90	16.0

Table 2-4 SIDRA movement summary output, AM Peak, Scenario 1

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Clark Street (South)												
1	L2	146	8.0	0.336	24.4	LOS C	10.3	77.2	0.65	0.66	0.65	19.6
2	T1	448	8.0	0.336	19.7	LOS B	10.6	79.2	0.65	0.59	0.65	26.1
Approach		595	8.0	0.336	20.9	LOS C	10.6	79.2	0.65	0.61	0.65	24.3
North: Clark Street (North)												
8	T1	751	8.0	0.341	9.8	LOS A	10.4	78.1	0.47	0.42	0.47	34.7
9	R2	63	8.0	0.337	59.8	LOS E	3.5	26.5	0.97	0.76	0.97	7.5
Approach		814	8.0	0.341	13.7	LOS B	10.4	78.1	0.51	0.44	0.51	30.4
West: Cambridge Lane (West)												
10	L2	27	10.0	0.330	43.6	LOS D	7.1	54.2	0.86	0.78	0.86	9.8
12	R2	121	10.0	0.330	43.6	LOS D	7.1	54.2	0.86	0.78	0.86	15.2
Approach		148	10.0	0.330	43.6	LOS D	7.1	54.2	0.86	0.78	0.86	14.3
All Vehicles		1557	8.2	0.341	19.3	LOS B	10.6	79.2	0.60	0.54	0.60	25.5

Table 2-5 SIDRA movement summary output, AM Peak, Scenario 2

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Clark Street (South)												
1	L2	421	8.0	0.599	34.4	LOS C	19.3	144.5	0.84	0.82	0.84	15.8
2	T1	448	8.0	0.599	29.7	LOS C	20.3	152.2	0.84	0.74	0.84	21.4
Approach		869	8.0	0.599	32.0	LOS C	20.3	152.2	0.84	0.78	0.84	18.4
North: Clark Street (North)												
8	T1	751	8.0	0.426	18.8	LOS B	14.4	107.4	0.65	0.57	0.65	27.1
9	R2	58	8.0	0.574	68.5	LOS E	3.6	26.6	1.00	0.77	1.05	6.7
Approach		808	8.0	0.574	22.3	LOS C	14.4	107.4	0.68	0.59	0.68	24.4
West: Cambridge Lane (West)												
10	L2	22	10.0	0.607	35.7	LOS D	19.6	148.9	0.86	0.83	0.86	11.4
12	R2	396	10.0	0.607	35.7	LOS D	19.6	148.9	0.86	0.83	0.86	17.3
Approach		418	10.0	0.607	35.7	LOS D	19.6	148.9	0.86	0.83	0.86	17.0
All Vehicles		2096	8.4	0.607	29.0	LOS C	20.3	152.2	0.78	0.72	0.78	20.1

Table 2-6 SIDRA movement summary output, AM Peak, Scenario 3

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Clark Street (South)												
1	L2	146	8.0	0.734	23.1	LOS C	6.1	45.9	0.98	0.94	1.21	20.1
2	T1	448	8.0	0.734	18.4	LOS B	6.3	47.0	0.98	0.93	1.20	26.9
Approach		595	8.0	0.734	19.6	LOS B	6.3	47.0	0.98	0.93	1.20	25.0
North: Clark Street (North)												
8	T1	751	8.0	0.392	6.3	LOS A	4.5	33.6	0.64	0.55	0.64	39.0
9	R2	174	8.0	0.669	24.6	LOS C	3.7	27.3	0.99	0.88	1.18	14.6
Approach		924	8.0	0.669	9.7	LOS A	4.5	33.6	0.70	0.61	0.74	33.3
West: Cambridge Lane (West)												
10	L2	138	10.0	0.824	26.5	LOS C	6.0	45.6	1.00	1.04	1.48	14.3
12	R2	121	10.0	0.824	26.5	LOS C	6.0	45.6	1.00	1.04	1.48	20.7
Approach		259	10.0	0.824	26.5	LOS C	6.0	45.6	1.00	1.04	1.48	17.6
All Vehicles		1778	8.3	0.824	15.5	LOS B	6.3	47.0	0.84	0.78	1.00	27.3

2.3 Findings – 30m Queue

Scenario 1 found that in order to fit within the existing 30m turn pocket, the number of right turning vehicles entering the site during the AM peak would need to be reduced to 60 vehicles/hour, a reduction of 256 vehicles/hour (compared to the assumed traffic generation from the ITA modelling).

Scenario 2 found that assuming the vehicles would reroute to the south does not significantly change the results in terms of queuing on the north approach – the number of vehicles turning right into Cambridge Lane would need to be reduced to 55 vehicles/hour to avoid exceeding the 30m turn pocket length.

The ITA identified an opportunity for further optimisation of this intersection's traffic signals, which has been undertaken under Scenario 3. Scenario 3 found that with signal optimisation of the Clark Street / Great North Road intersection, the number of right turning vehicles would need to be reduced to 165 vehicles/hour, a reduction of 151 vehicles/hour compared to the ITA modelled volumes.

In summary, all scenario testing found that the peak volume of vehicles turning right into Cambridge Lane would have to be considerably reduced in order to avoid exceeding the existing right turn pocket length.

2.4 Findings – Scenario 3 with a 55m Queue

If the 25m painted median on Clark Street is used to extend the queuing space for the right turn into the school, there would be a total of 55m of stacking space. If right turning vehicle queues are limited to 55m along Clark Street, it is not expected that queues will impact on Clark Street / Great North Road intersection operations (based on the modelling results for the Clark Street / Great North Road intersection which estimate queue lengths of four vehicles during the AM peak). However, right turn queue lengths greater than 55m would likely impact on the adjacent Clark Street / Great North Road intersection.

Using the model for Scenario 3, which includes optimised signals, the maximum number of vehicles turning right into the site during the AM peak without exceeding the 55m queue length would be 255 vehicles/hour, as shown in Table 2-7. This is a reduction of 61 vehicles/hour compared to the ITA modelled volumes. The SIDRA movement summary output for this test is shown in Table 2-8.

Table 2-7 Input volumes for the north and south approaches and corresponding turns out, 55m queue[8]

		Vehicle volume (vehicles/hour)	
		ITA modelling	Scenario 3 (55m queue length)
North Approach	Right Turn in	316 vehicles/hour	255 vehicles/hour
	Left Turn out	282 vehicles/hour	221 vehicles/hour
South Approach	Left Turn in	139 vehicles/hour	139 vehicles/hour
	Right Turn out	115 vehicles/hour	115 vehicles/hour

Table 2-8 SIDRA movement summary output, AM Peak, Scenario 3, 55m queue

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Clark Street (South)												
1	L2	146	8.0	0.826	31.4	LOS C	8.3	61.9	1.00	1.04	1.38	17.2
2	T1	448	8.0	0.826	26.7	LOS C	8.5	63.4	1.00	1.04	1.38	22.4
Approach		595	8.0	0.826	27.8	LOS C	8.5	63.4	1.00	1.04	1.38	21.0
North: Clark Street (North)												
8	T1	751	8.0	0.395	7.9	LOS A	5.6	42.1	0.64	0.56	0.64	36.8
9	R2	268	8.0	0.776	29.3	LOS C	7.2	53.9	1.00	0.95	1.28	13.0
Approach		1019	8.0	0.776	13.6	LOS B	7.2	53.9	0.74	0.66	0.81	28.9
West: Cambridge Lane (West)												
10	L2	233	10.0	0.820	29.0	LOS C	9.8	74.6	1.00	1.00	1.33	13.4
12	R2	121	10.0	0.820	29.0	LOS C	9.8	74.6	1.00	1.00	1.33	19.7
Approach		354	10.0	0.820	29.0	LOS C	9.8	74.6	1.00	1.00	1.33	15.9
All Vehicles		1967	8.4	0.826	20.6	LOS C	9.8	74.6	0.86	0.84	1.08	23.3

2.5 Summary

The ITA recommended further optimisation of this intersections traffic signals, which has been adopted as part of Scenario 3.

It is recommended that optimisation of the signals at the Clark Street/ Cambridge Lane intersection and extension of the right turn pocket (to approximately 55m using the existing painted flush median), is undertaken to support the development for the school. This proposed arrangement would accommodate right turn traffic volumes to 255 vehicles/hour which is a reduction of 61 vehicles/hour compared to the ITA modelled volumes. This is the maximum right turn pocket length that can be achieved that will maximise stacking space for queued vehicles but should not impact on Clark Street / Great North Road intersection operations.

However, it should be noted that the estimated number of trips generated by the school is considered to be conservative. Further measures can be identified to reduce the demand to further reduce the potential school generated traffic to meet the 255 vehicles/hour volume such as additional modelling tests (i.e. different traffic assumptions), travel planning and promoting alternative travel modes or parking locations. These mitigation measures have the potential to considerably reduce the number of vehicle trips generated by the school.

Changes to line markings and consultation with Auckland Transport would be required to implement the recommended extension of the right turn pocket on the north approach to the Cambridge Lane / Clark Street intersection.

[8] This number represents the total number of vehicles that can be accommodated in the peak hour without exceeding the 30m turning pocket

3. Request 2 – active mode safety assessment

Please provide a safety assessment for active mode (pedestrians, cyclists, scooters, etc) access to the school. Where mitigations are identified, please comment on the feasibility and timing of implementation.

This section sets out the safety assessment for access to the school for active modes, including pedestrians, cyclists and people on scooters. For the purposes of this assessment it has been assumed that students would be using manual scooters (or 'kick scooters') as opposed to electric scooters.

3.1 Site visit observations

A site visit was undertaken on 24 July 2020 to observe the pedestrian and cyclist environment, vehicle speeds and behaviours and take measurements of pinch points identified along Clark Street. Previous footpath widths documented in the ITA report were based on aerials only.

The site visit observations are summarised in Figure 3-1 and Figure 3-2. The main observations noted relating to the northern side of Clark Street include the following:

- Key area of concern is the footpath along the northern side of Clark Street;
- Footpath widths are generally narrow (under 2m) along the full length with several pinch points as noted (see Figure 3-3);
- No kerbs are provided along the section of the over-bridge structure from near the Cambridge Lane / Clark Street intersection to 60m east of the intersection. Kerbs provide a physical barrier and buffer for any vehicles which leave the carriageway;
- Footpath is along a continuous bend which means vehicles travelling south on Clark Street cannot see pedestrians on the footpath nor on the road ahead and the narrow footpath means a child could step out or fall into live traffic; and
- Bushes / planting on the adjacent property obstruct the footpath, further reducing the effective footpath width for pedestrians and people on scooters (see Figure 3-4).

The main observations noted relating to the southern side of Clark Street include the following:

- Walking west along the southern side of Clark Street from Rankin Avenue, the footpath width is approximately 2.3m wide with a grass verge to the left until the steps which connect to Rankin Avenue (see Figure 3-5);
- From the steps to Cambridge Lane, the footpath is narrow (under 2m wide) and feels confined due to the solid concrete wall over the rail over-bridge (see Figure 3-6);
- No kerbs are provided along the section of the over-bridge structure from near the stairs to the Cambridge Lane / Clark Street intersection. Kerbs provide a physical barrier and buffer for any vehicles which leave the carriageway;
- There are several pinch points due to traffic poles at the intersection of Cambridge Lane / Clark Street; and
- Walking just north from Cambridge towards Great North Road, the footpath is still less than 2m wide and trees overhang the footpath further reducing the effective footpath width for pedestrians and people on scooters.

Whilst on-street cycle lanes are provided in the wider vicinity of the site, no safe cycling facilities are currently provided along the section of Clark Street adjacent to the site.

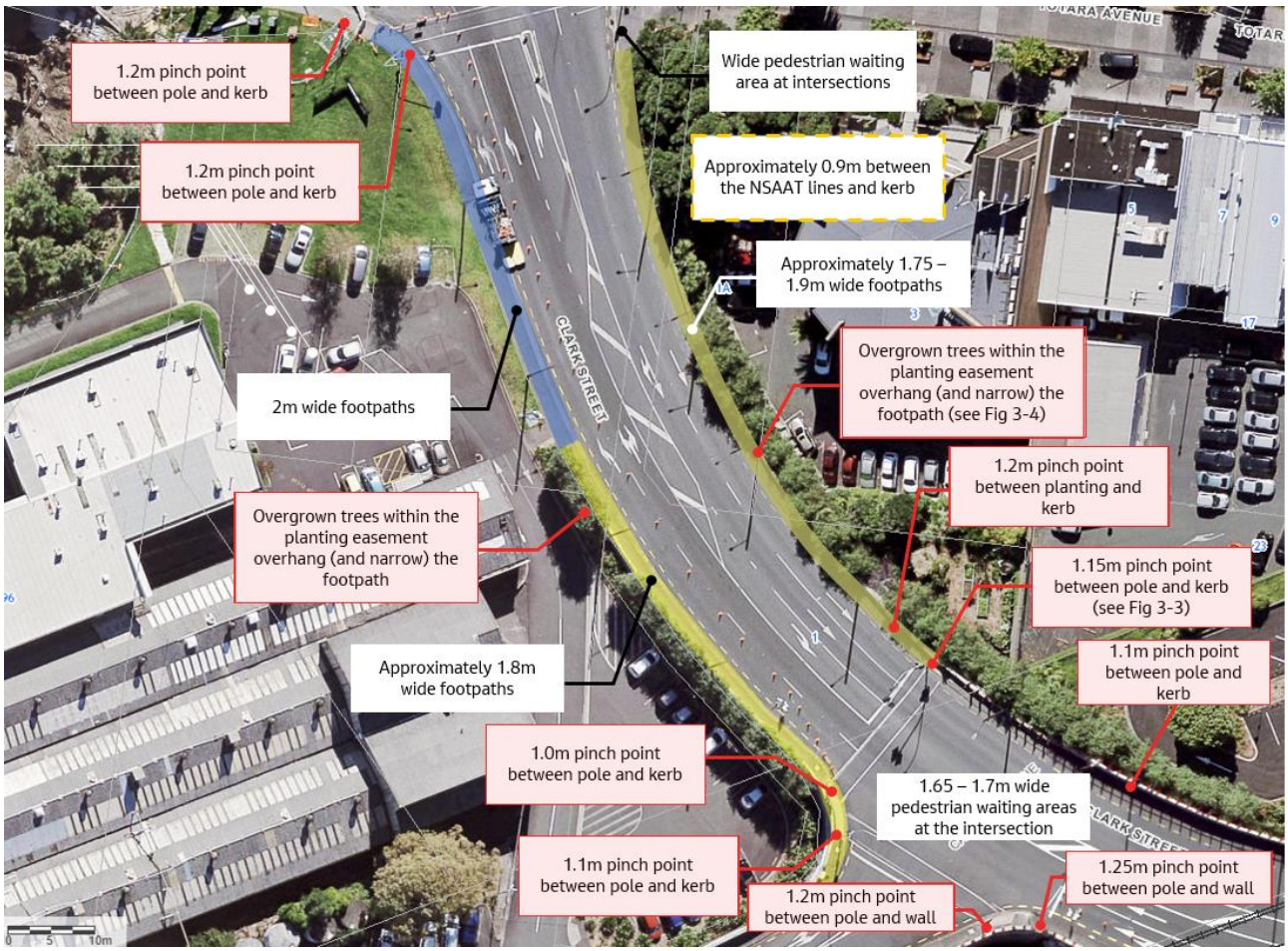

Figure 3-1 Site visit observations and footpath widths for Clark Street north of Cambridge Lane

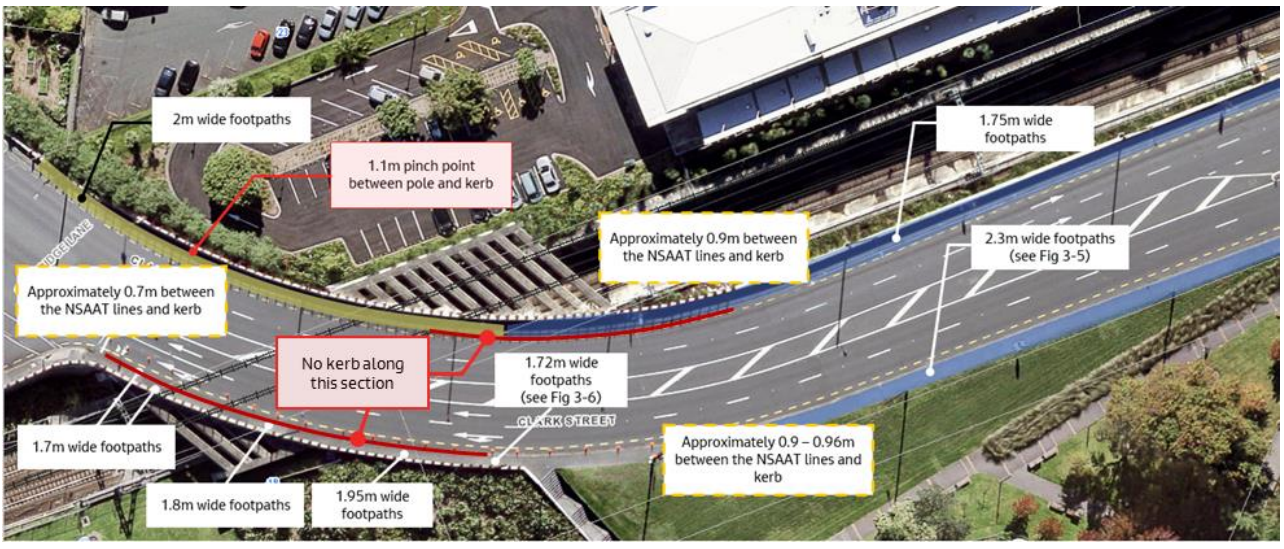

Figure 3-2 Site visit observations and footpath widths for Clark Street south of Cambridge Lane

Figure 3-3 Pinch points at intersection signal pole locations on the northern side of Clark Street

Figure 3-4 Overhanging planting from adjacent property reduces effective footpath width on the northern side of Clark Street

Figure 3-5 Southern footpath on Clark Street toward Rankin Avenue

Figure 3-6 Critical section of the footpath on the southern side of Clark Street

3.2 Proposed school access arrangement for active modes

The proposed school site feasibility concept design and proposed site accessways for pedestrians, scooter users, cyclists and vehicles are shown in Figure 3-7. Figure 3-7 also shows a new pedestrian and cycling connection to the school from Titirangi Road as proposed by the New Lynn Precinct Plan.

To reduce the number of students crossing at the Cambridge Lane / Clark Street intersection, two additional access points have been proposed for the school as shown in Figure 3-7 (one from Great North Road and a mid-block access from Clark Street between the Clark Street/Great North Road and Clark Street/Cambridge Lane intersections). As such it is not expected that many pedestrians will use the footpath on the northern side of Clark Street between Great North Road and Cambridge Lane to access the school (where the existing footpath is narrow).

Figure 3-7 Proposed active mode and vehicle access points to the school and Early Childhood Centre (ECE)

3.3 Footpath capacity assessment

3.3.1 Auckland Transport TDM footpath width recommendations

Auckland Transport's Transport Design Manual (TDM) minimum footpath width dimensions and corresponding maximum pedestrian flows are summarised in Table 3-1. The TDM notes that the width of zones may be reduced where existing site constraints do not allow widening.

The footpath dimensions for the '*alongside parks, schools and other major pedestrian generators*' location is considered most appropriate for Clark Street given its proximity to the school, public transport interchange and the types of users of the footpath (i.e. younger students and caregivers with prams).

Table 3-1 Minimum urban footpath zone dimensions[9]

Location	Max pedestrian flow	Zone				Total width
		Kerb	Street furniture zone / berm	Through route	Frontage / back berm	
Main Street, Mixed use & Centres	80p/minute	0.15m	2.5m	2.4m +	1m (paved)	6.05m +
Alongside parks, schools and other major pedestrian generators						
Outside and around public transport hubs						
Out-of-centre arterial	60p/minute	0.15m	2.2m	1.8m	1m	5.15m +
Neighbourhood Collector						
Local roads in residential areas	50p/minute	0.15m	2.2m	1.8m	1m	5.15m

3.3.2 Active mode trip distributions

All students within the catchment zone for the school and ECE will live within approximately 1.5km of the site and as such, walking to school / ECE is likely to be feasible for a large proportion of students. Figure 3-8 shows the existing distribution of the residential population within the school catchment area.

Based on the population distribution it has been assumed that approximately 30% of students would be travelling to the school from the south and south-eastern areas of the catchment via Clark Street (including students walking, cycling and travelling by private vehicle).

It is noted that these residential population distribution and school travel assumptions do not consider the future West Lynn residential development which is expected to deliver 2,000 new homes to the Crown Lynn site. However, due to the proximity of this development site to the school / ECE and unconfirmed timeframes, it has been assumed that the large majority of this population would walk to school. As the West Lynn development progresses, the proportion of students and children travelling from this area is expected to increase accordingly.

Based on observations during site visits, it is considered that the footpaths along Clark Street (under its current use), are not heavily used by pedestrians nor cyclists. Based on a walking/ cycling mode share of 42% for students and 6% for staff (assumed in the ITA), it is estimated that four staff members and 336 students would potentially walk to school, from within the overall catchment area. It is assumed that 30% of the catchment would be walking from the areas south east of the school site based on residential population distributions. This equates to a minimum of 100 students and one staff member walking from this area.

As a conservative case in terms of pedestrian demand flows, it is assumed that the arrival of all students would be spread over a peak 30 minute period rather than over a peak hour (as assumed for traffic modelling). This could generate pedestrian flows of 202 pedestrians/hour or approximately 4

[9] Auckland Transport (2020) *Transport Design Manual: Engineering Design Code Footpaths and the Public Realm* (accessed on 28 July 2020 at https://at.govt.nz/media/1982225/engineering-design-code-footpaths-and-the-public-realm_compressed.pdf), Auckland

pedestrians/minute which is considerably lower than the maximum pedestrian flows used to develop minimum urban footpath requirements outlined in Auckland Transport's TDM (as per section 3.3.1). Based on these generated pedestrian flows, it is not anticipated that footpath capacity will be an issue; however, the narrow footpaths still present a potential safety concern due to Clark Street being an over dimension route and lack of separation between the footpath and adjacent traffic lane.

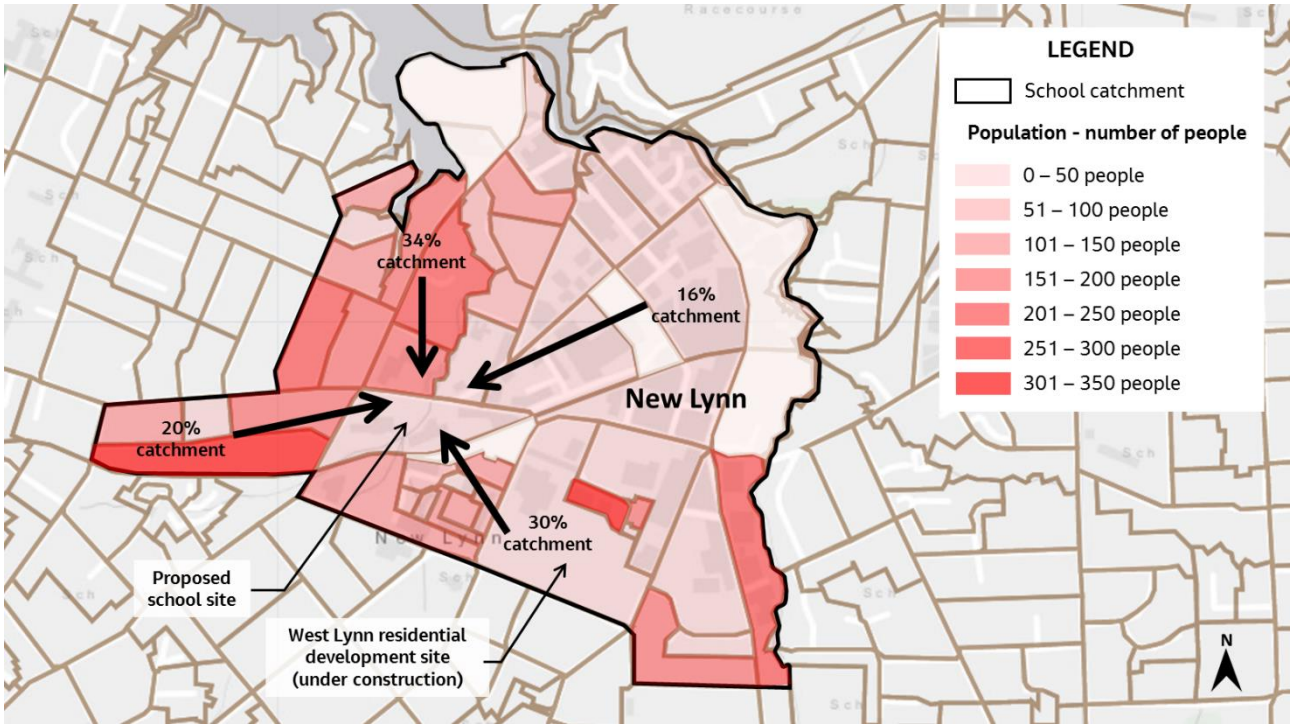

Figure 3-8 Residential population distribution within the school catchment based on 2013 Census data[10]

3.4 Safety mitigation recommendations

3.4.1 Footpath widening

To address safety concerns and provide an adequate width for pedestrian movement, it is recommended that footpath widening is considered on the southern side of Clark Street to the south of Cambridge Lane, in particular the section between the school site and steps leading down to Rankin Avenue. This is to provide additional width for pedestrians walking on the footpath as well as increase pedestrian waiting space at the Clark Street / Cambridge Lane signalised crossing.

It is recommended that a total footpath width of at least 2.55m is provided along the southern side, subject to confirming any constraints of the overbridge structure. This allows for a 2.4m wide footpath through route and a 0.15m wide kerb zone which is in line with TDM minimum footpath width guidance (refer to section 3.3.1). The TDM notes that the footpath frontage zone can be reduced or

[10] Statistics NZ (2013) *2013 Census map – population and dwelling map* (accessed at Site http://archive.stats.govt.nz/StatsMaps/Home/People%20and%20households/2013-census-population-dwelling-map.aspx)

omitted for spatially constrained existing street corridors and a frontage zone should only be provided if the minimum through route width can be achieved.

The current footpath is approximately 1.7m at its narrowest point which could be widened by a minimum of 0.7m into the existing 0.9m wide shoulder. It is recommended that a kerb is provided along the full length of the overbridge (subject to confirmation of any physical design or constraints or drainage requirements of the overbridge structure) and the existing kerb and channel would be shifted to provide for a 0.15m wide kerb zone. To maintain a 0.6m distance between the kerb edge and the edge line and the width of the edge line (0.1m), the two northbound traffic lanes would need to be shifted and realigned. It is estimated that the width of the existing 3.0m wide painted median would need to be reduced by a minimum of 0.55m to accommodate the widened footpath and realigned traffic lanes. These dimensions and are approximations only and are subject to further detailed design including vehicle tracking and confirmation of any design constraints relating to the overbridge structure.

The purpose of the painted median is to provide separation between opposing traffic lanes, and it is not a standard requirement, even for an over dimension vehicle route. Reducing the width of the median or removal of the median on Clark Street altogether (south of Cambridge Lane) should be further investigated and discussed with Auckland Transport.

The ITA report also recommends that the section of footpath immediately adjacent to the school between the Clark Street / Great North Road and Clark Street / Cambridge Lane intersections is widened into the planting easement that currently extends along the school frontage. The existing footpath width is approximately 1.8m along this section and based on an aerial measurement, the width of the easement strip ranges from approximately 2.0 – 3.0m wide. It is estimated that a footpath width of 3.55m should be able to be achieved along this section which allows for a 2.4m through route, 1.0m frontage zone and 0.15m kerb zone. This footpath width is similar to the widths proposed for frontages to recent primary school developments located in Auckland. Widening the footpath will likely require modifications to the existing retaining structure which will be further investigated during future stages. It is noted that Auckland Transport have agreed in principle to use the planting easement to enable the widening of the footpath directly in front of the school.

3.4.2 Safety barriers and railings

Based on the site visit observations and existing road arrangement, it is considered that the main safety issue is the lack of separation between the footpath and the adjacent traffic lane; particularly as Clark Street is an over-dimension vehicle route. Due to the alignment of the overbridge, a motorist may not be able to see if a child was to fall or mistakenly step out into the traffic lane.

It is proposed that the use of a pedestrian railing along Clark Street is considered to mitigate potential safety issues and discussed with Auckland Transport. Railings are proposed in the following locations:

- Southern side of Clark Street between the intersection with the Cambridge Lane access and the stairs leading down to Rankin Avenue; and
- Northern side of Clark Street from 40m north of the intersection with Cambridge Lane to 90m east of the intersection.

The recommended railing is not intended as a road restraint device; rather it is proposed as a measure to “contain” pedestrians within the footpath zone, provide for the safe movement of people and guide pedestrians to safe signalised crossing points. It is recommended that a railing similar to existing

railings provided on Onewa Road or Fanshawe Street (see Figures 3-9 to 3-11) are considered where pedestrians are clearly visible to vehicles (and vice versa). Railings typically do not have infill material.

The railing can be provided within the kerb zone so that the width of the through route zone is not narrowed to be less than 2.4m wide. It is likely that the approval of a railing in this location will need to be considered on a case specific basis by Auckland Transport's Departures Committee.

It is noted that the use of road constraint barriers can introduce safety issues when not used in appropriate locations. The use of a solid or road constraint barriers is not recommended for this location as it may introduce crime prevention through environmental design (CPTED) issues and the feeling of severance for pedestrians. It may also reinforce that this section of the road supports higher traffic speeds and encourages motorists to speed on Clark Street.

Figure 3-9 Pedestrian railings installed on Onewa Road alongside a narrow shared path in close proximity to Northcote Primary School

Figure 3-10 Road constraint devices installed on Onewa Road bend adjacent to Northcote Primary School

Figure 3-11 Safety barriers used to guide pedestrians to formalised crossing points on Fanshawe Street and provide separation between the footpath and adjacent traffic lane

3.4.3 Cycle facilities

Cycling is a viable mode of transport for staff members. On-street cycling facilities are provided along sections of Margan Avenue, Rankin Avenue, Wolverton Street and Clark Street. However, no dedicated facilities are provided along the Clark Street overbridge extension to the site access. The high Clark Street traffic volumes and nature of the road (i.e. over-dimensional route) make this unsuitable for primary school-aged children to safely cycle to school via this route. However, it is recommended that

cycling waiting facilities (i.e. advanced stop boxes) are considered at the intersection of Clark Street and Cambridge Lane to improve safety for those who wish to cycle to school.

4. Mitigation measures

In order to improve safety for active modes to access the site, the ITA recommended the following measures to be considered at the subsequent Outline Plan of Works stage of the project:

- Ministry of Education to engage with Auckland Council on opportunities to widen the Clark Street footpath adjacent to the school site into an existing planting easement to improve pedestrian safety;
    - It is noted that Auckland Transport have agreed in principle for the use of the planting easement to enable the widening of the footpath directly in front of the school.
- Ministry of Education to engage with Auckland Transport on implementing a 40km/h variable speed limit along the road frontage to the site during school start and finish times;
- Two dedicated pedestrian / cyclist accessways to the site are provided, which are completely separated from the main vehicle access; one from Great North Road at the northern site boundary and one from Clark Street at the eastern site boundary; and
- It was also recommended that a Kea Crossing (or school intersection patrol) is located at the Clark Street/ Cambridge Lane intersection to enable the safe crossing of students/ caregivers and staff.

In addition to the above, the following transport recommendations are identified in this memo to be discussed with Auckland Transport in response to the section 92 request:

- Future optimisation of signals at Clark Street / Cambridge Lane intersection, extension of the median right turn pocket on the northern approach to the intersection by 25m (to a total length of 55m), and required changes to line markings;
- Safety railings on the southern side of Clark Street between the intersection with the Cambridge Lane access and the stairs leading down to Rankin Avenue and northern side of Clark Street from 40m north of the intersection with Cambridge Lane to 90m east of the intersection. The exact location/ extent of the railings will need to be further investigated and confirmed at the later stages of the project in consultation with Auckland Transport;
- Cycling waiting facilities (i.e. advanced stop boxes) are considered at the intersection of Clark Street and Cambridge Lane to improve safety for staff members who wish to cycle to school;
- Footpath widening is considered on the south/west side of Clark Street south of Cambridge Lane, in particular between the school site and steps leading down to Rankin Avenue. In order to achieve this, reduction of the width of the existing median on Clark Street and realignment of the two northbound traffic lanes (south of Cambridge Lane) should be discussed with Auckland Transport; and
- Extension of the kerb along the full length of the footpath edge (subject to confirmation of any constraints along the overbridge structure).

It has been confirmed by the Ministry of Education that the recommendations proposed in the ITA and this memorandum, will be completed prior to the opening of the school and ECE. At this stage it is estimated that the school will be open by approximately 2025, depending on demand.

The mitigation measures recommended in this memorandum for consideration are summarised in Figure 4-1. In addition to the physical mitigation measures noted in Figure 4-1, the following safety, operational and travel demand mitigation measures are recommended:

- Optimisation of the signalised Cambridge Lane / Clark Street intersection;
- Implementation of a variable 40km/h speed limit;
- Provision of a patrolled Kea Crossing; and
- Development of a School Travel Plan with Auckland Transport.

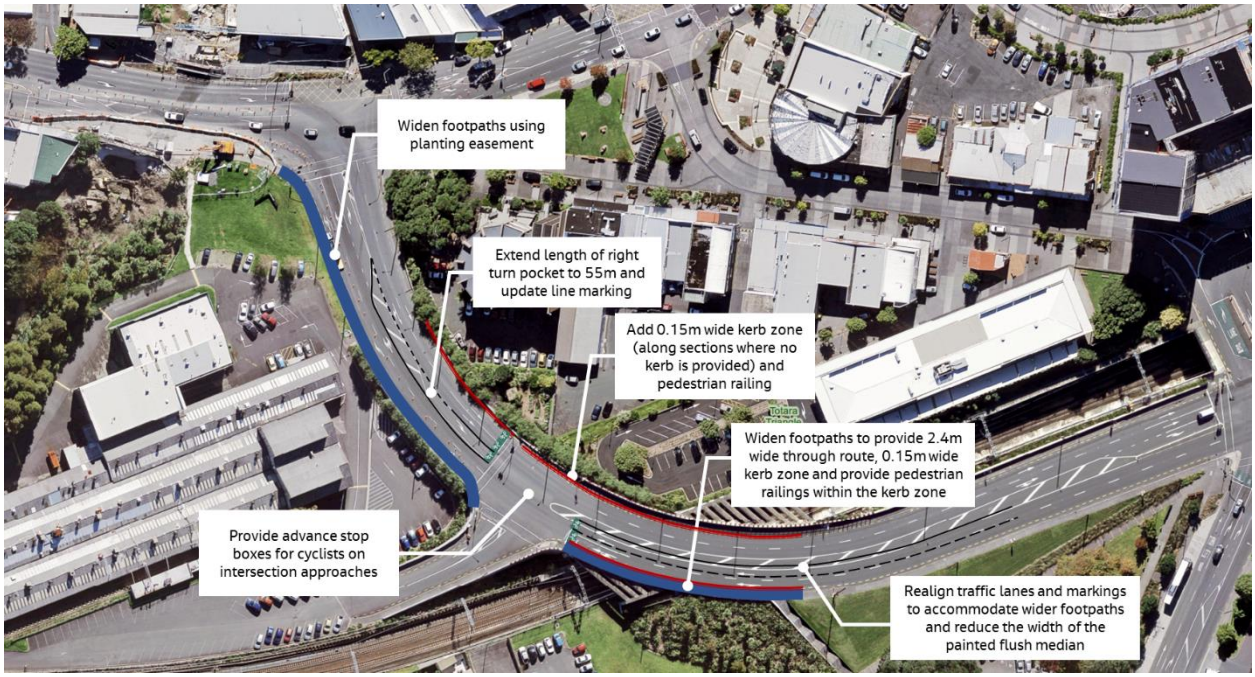

Figure 4-1 Summary of recommended mitigations

5. Next steps

It is recommended that the project team, Auckland Transport, Auckland Council and Flow discuss the recommendations set out in this memorandum and have the recommendations approved in principle.