30 August 2021

ptc.

Matt Rheuben
SINSW
Level 8
259 George Street
Sydney
NSW 2000

Dear Matt,

1. New Primary School in Edmondson Park – Response to Submissions

ptc. has been engaged by Richard Crookes Constructions on behalf of School Infrastructure NSW (SINSW) to address comments received following the submission of the State Significant Development Application (SSDA) for the proposed development of a new primary school located at Buchan Avenue in Edmondson Park.

This letter has been prepared in response to the following documents:

- Letter dated 21 July 2021 from Liverpool City Council (Council),
- Letter dated 13 July 2021 from Transport for NSW (TfNSW), and
- Letter dated 29 July 2021 from the Department of Planning, Industry & Environment (DPIE).

The individual items are addressed below.

2. Council Comments

2.1 Traffic and Transport

Council Comment

The report should assess traffic impacts of additional vehicular trips generated from the subject development on the surrounding road network and intersections, particularly Buchan Avenue/Faulkner Way intersection.

Response

Edmondson Park Masterplan
The Edmondson Park South DCP (2012) identifies the site south of Buchan Avenue and east of Faulkner as future schools, as shown in Figure 1. Therefore, it can be assumed that the infrastructure within the suburb has been set out to provide sufficient capacity to support the proposed school, and that traffic volumes at the Buchan Avenue / Faulkner Way intersection were included in any intersection modelling as part of developing the master plan.

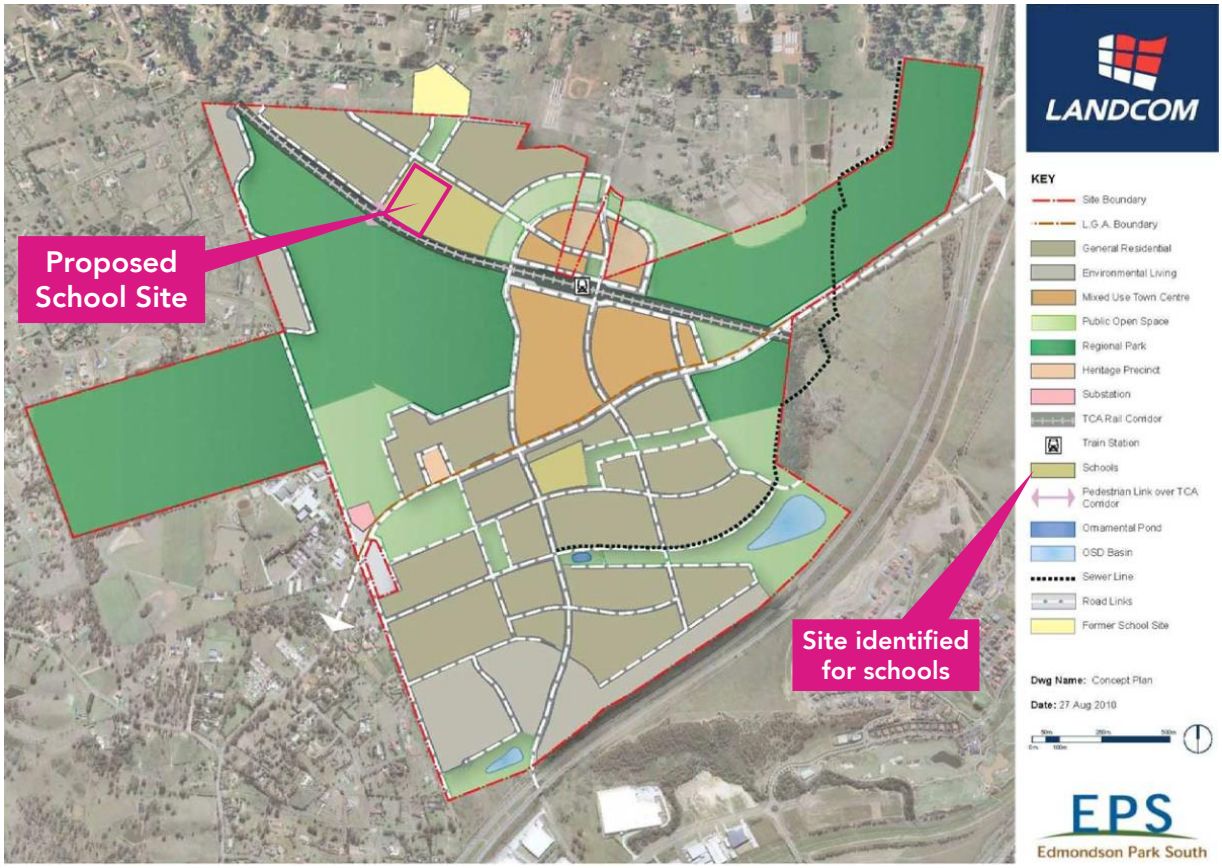

Figure 1 - Edmondson Park South Concept Plan (Source: Edmondson Park DCP 2012, Figure 2)

Previous Traffic Modelling

A VISSIM model of the area has been prepared by AECOM as part of the *Edmondson Park South – Concept Plan MOD 5 Transport Management and Accessibility Plan*, June 2020 (MOD 5 TMAP) and its addendum *Edmondson Park South – Concept Plan MOD 5 Transport Management and Accessibility Plan Addendum*, June 2020 (MOD5 TMAP ADD). Intersections considered relevant to be assessed are shown in Figure 2; The Buchan Avenue / Faulkner Way intersection was not considered relevant.

The analysis captured school traffic volumes for a school with 1,000 students. The VISSIM model analysis shows that the road intersections in the vicinity will generally operate at Los C or better and therefore, the school will be adequately accommodated within the currently proposed road network.

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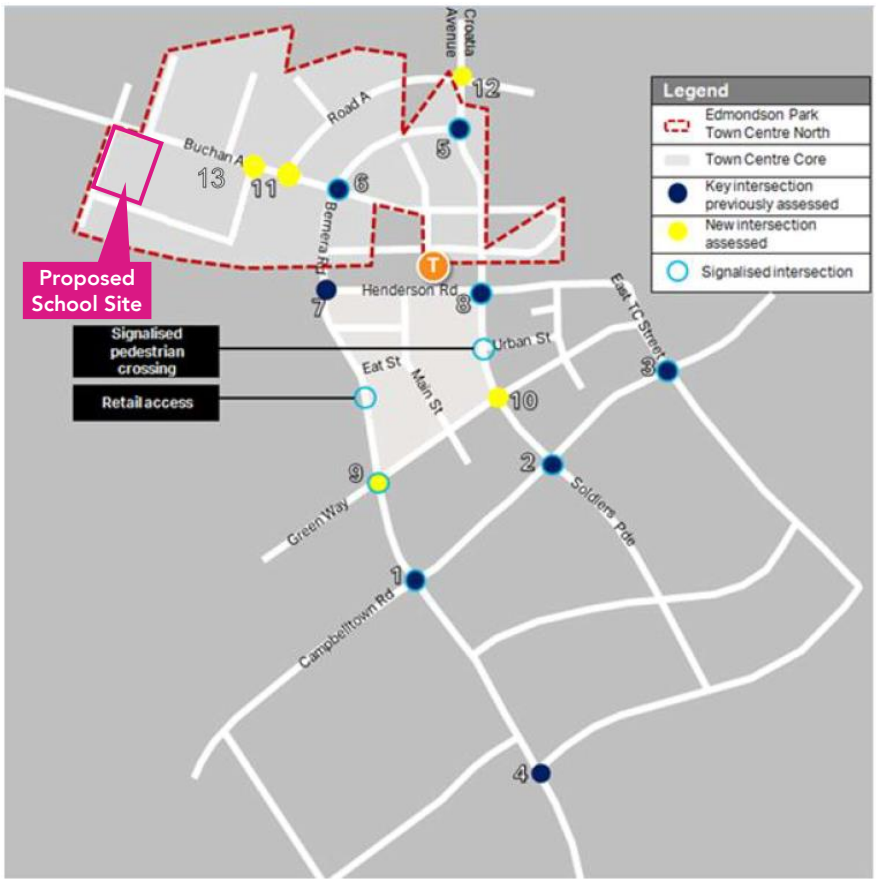

Figure 2 - VISSIM model extent TMAP Addendum (Source: AECOM, 2020)

Traffic surveys

The Edmondson Park South Development Control Plan 2012 outlines the future road network within the Edmondson Park area, excerpt of which is presented in Figure 3. Buchan Avenue is extended to Soldiers Parade and a road network is being planned north of Buchan Avenue. However, as presented in Figure 4 the area north of Buchan Avenue is still under construction and the intersection of Buchan Avenue / Soldiers Parade as marked by the orange circle has not yet been finalised.

As the surrounding road network has not been fully completed, any traffic surveys undertaken in the near future would not represent the planned travel behaviour of the surrounding road network. Additionally, traffic surveys undertaken during the existing COVID restrictions would also not represent the exact travel behaviour. As such, it may not be beneficial to survey and then model the Buchan Avenue / Faulkner Way intersection.

Transport Working Group meetings

Transport Working Group meetings were held on 9th April 2021, 22nd April 2021 and 7th May 2021 and Council attended those meetings. No comments regarding the requirement for additional traffic surveys or analysis on surrounding intersections were made during those meetings.

During the meeting held on 9th August 2021 Council confirmed that no traffic surveys are required.

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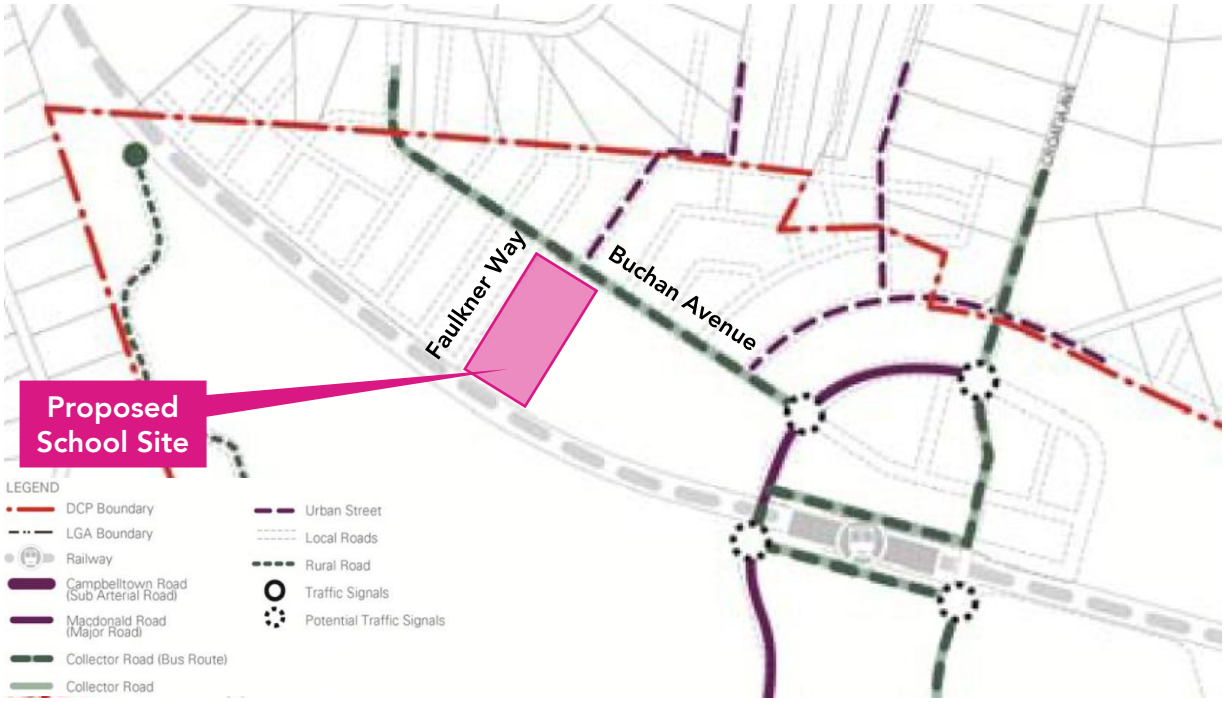

Figure 3 - Street network (Source: Edmondson Park DCP 2012, excerpt from Figure 6)

Figure 4 - Surrounding Roads - Soldiers Parade and Buchan Ave intersection circled in orange (Source: Near Map)

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SIDRA Modelling

Following the TWG meeting held on 9th August 2021, a SIDRA model of the Buchan Avenue / Faulkner Way intersection has been prepared to investigate the traffic impact of the proposed development.

The Buchan Avenue / Faulkner Way intersection has currently no zebra crossings; However, the development proposes to provide pedestrian facilities. This has been considered in this study.

a. Traffic Volumes

The traffic volume information has been derived from the AECOM report *Edmondson Park South – Concept Plan MOD 5 Transport Management and Accessibility Plan*, June 2020 (MOD 5 TMAP), which accounts for a school accommodating 1,000 students.

The mid-block traffic volumes along Buchan Avenue used as a base for the assessment are highlighted in Figure 5. It is noted that the school afternoon peak hour and the network PM peak hours do not generally co-inside, with the school peak occurring around the bell time between 2:30PM - 4:00PM, and the network PM peak hour starting after 5:00PM. Considering this, the afternoon westbound traffic determined by AECOM was reduced to 80% (621) to account for this variance.

The vehicular volumes along Faulkner Way have been derived from ptc.'s calculations for pick-up and drop-off demand and on-street parking availability on Faulkner Way, refer to Section 7.4.1.1 in the TTA.

The traffic volumes along Buchan Avenue and Faulkner Way are shown in Figure 6. The estimated traffic volumes on each approach and direction based on the estimated pick-up and drop-off behaviour and the surrounding land uses are shown in Figure 7.

Table 21 Comparison of 2026 mid-block traffic volumes

Location		Previous traffic volumes (MOD 4)		Revised traffic volumes (MOD 5)	
		AM Peak	PM Peak	AM Peak	PM Peak
Bernera Road (south of Henderson Road)	NB	730	420	763	671
	SB	520	810	831	1,109
Bernera Road (north of Campbelltown Road)	NB	780	630	814	746
	SB	490	1,080	631	960
Soldiers Parade (south of Henderson Road)	NB	250	230	329	436
	SB	140	150	92	113
Soldiers Parade (north of Campbelltown Road)	NB	210	580	198	526
	SB	330	180	473	174
Town Centre East (north of Campbelltown Road)	NB	120	240	170	749
	SB	290	70	568	199
Buchan Avenue (west of Bernera Road)	EB	640	170	801	401
	WB	430	430	402	776
Croatia Avenue (north of Soldiers Parade)	NB	840	340	969	373
	SB	360	970	374	1,235

-> reduced to 80% -> 621

Figure 5 - Mid-block traffic volumes (Source: AECOM)

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Figure 6 - Vehicular Flows

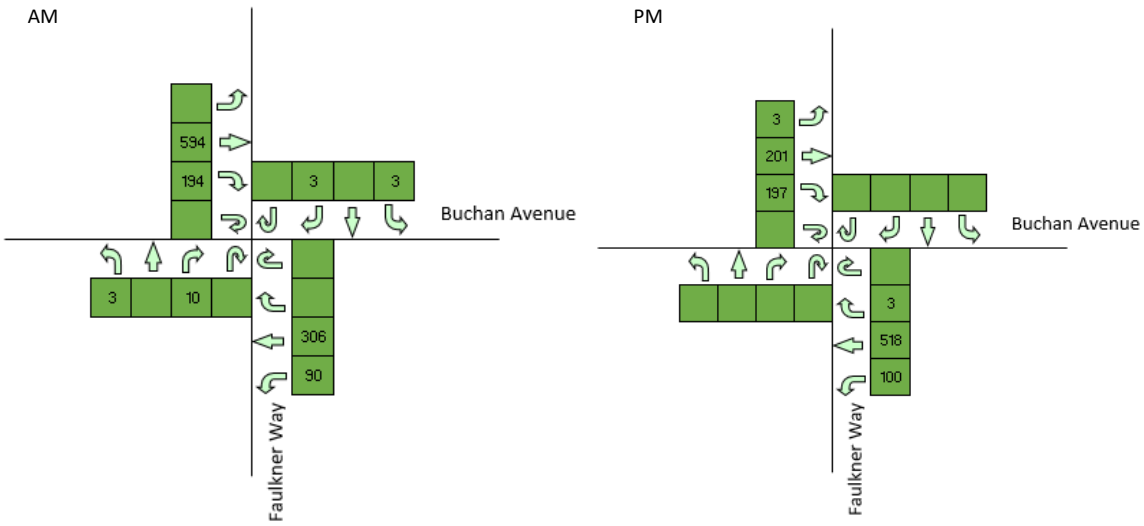

Figure 7 - Peak Hour Traffic Volumes (l: AM, r: PM)

b. Pedestrian Volumes

Pedestrian volumes have been estimated based on the residential areas of students and mode share targets, as per Section 6.2.7 in the TTA. The estimated numbers for students potentially wanting to use the proposed pedestrian facilities are shown in Figure 8.

Figure 9 and Figure 10 present the estimated pedestrian volumes at the proposed zebra crossings at Buchan Avenue and Faulkner Way during the morning and afternoon peak hour respectively. Students travelling by private vehicles are not included in this assessment as those will be dropped-off / picked-up on/from the School side of the street frontages and will not use the zebra crossings.

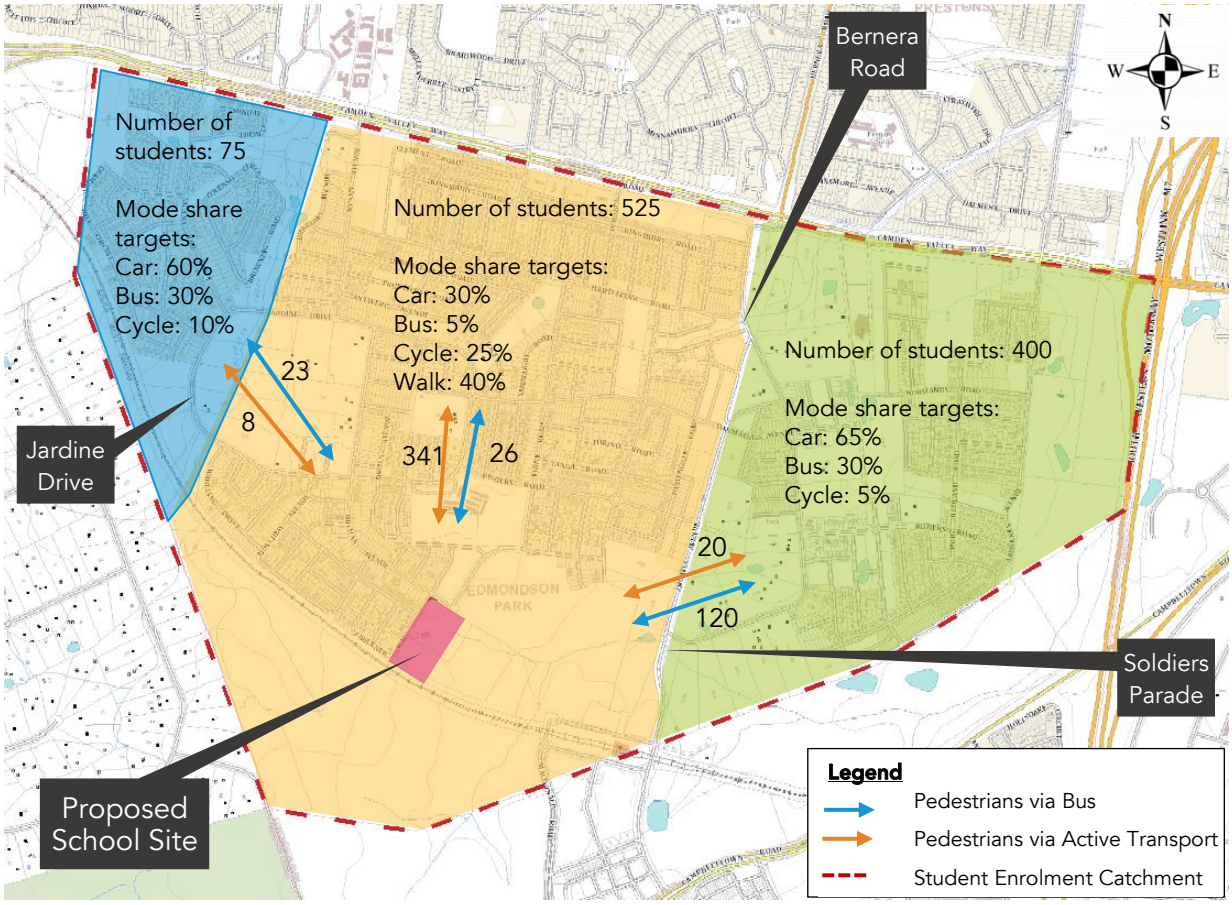

Figure 8 - Travel mode targets

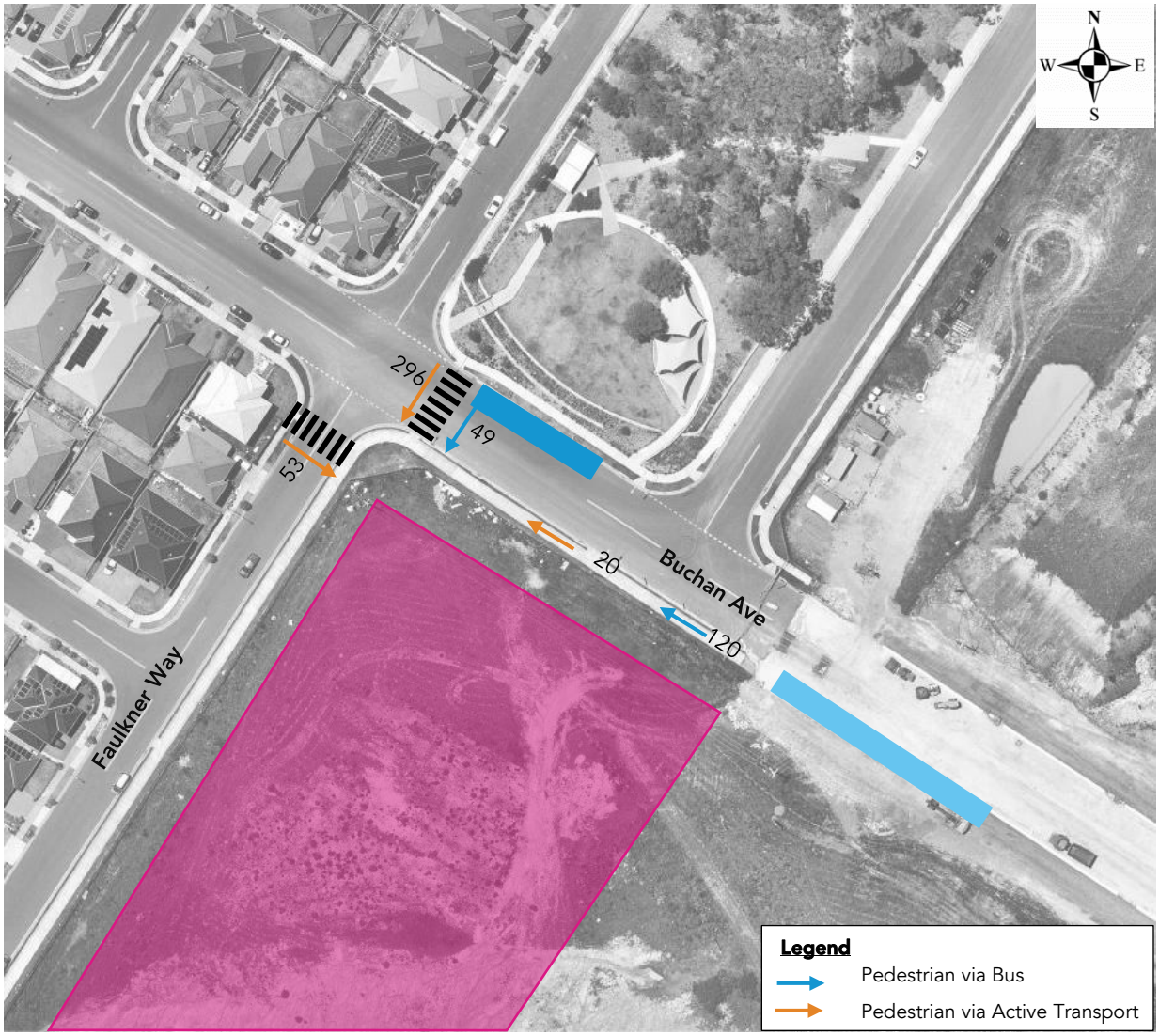

Figure 9 - Pedestrian Flows for the Morning Peak Hour

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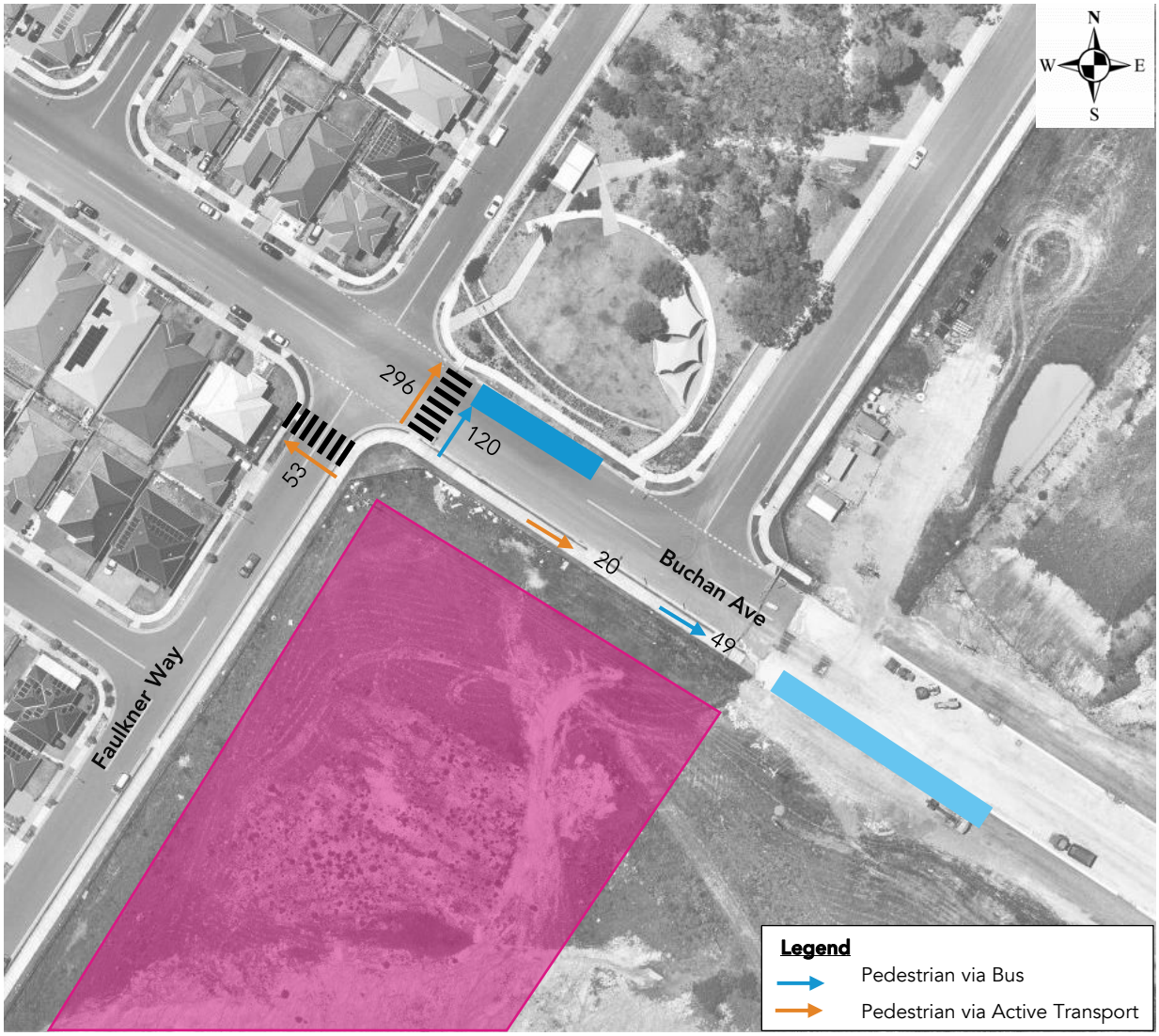

Figure 10 - Pedestrian Flows for the Afternoon Peak Hour

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c. SIDRA Modelling

In order to confirm the current and future operation of the intersection, an assessment has been undertaken using the SIDRA modelling software, which presents a range of performance indicators.

Typically, there are four performance indicators used to summarise the performance of an intersection, being:

- Average Delay – The average delay encountered by all vehicles passing through the intersection. It is often important to review the average delay of each approach as a side road could have a long delay time, while the large free flowing major traffic will provide an overall low average delay.
- Degree of Saturation (DoS) – The total usage of the intersection expressed as a factor of 1 with 1 representing 100% use/saturation (e.g. 0.8=80% saturation).
- 95% Queue lengths (Q95) – is defined to be the queue length in metres that has only a 5-percent probability of being exceeded during the analysis time period. It transforms the average delay into measurable distance units.
- Level of Service (LoS) – This is a categorisation of average delay, intended for simple reference. TfNSW adopts the following bands:

Table 1 - Level of Service Criteria

Level of Service	Average Delay (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	<14	Good operation	
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity. At signals, incidents would cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode
F	>70	Extra capacity required	Extreme delay, major treatment required

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The intersection has been modelled for the following two scenarios:

- Existing scenario: existing intersection arrangement – with no zebra crossing (refer to the figure below).

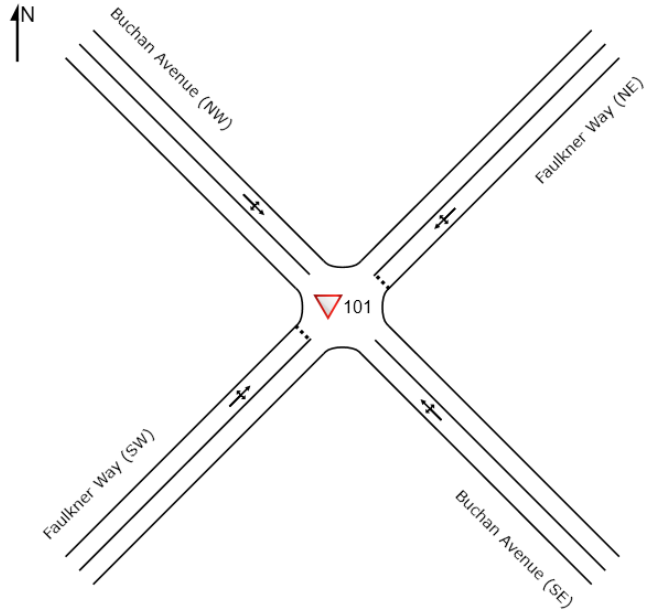

Figure 11 - Existing Scenario – No Zebra Crossing

- Proposed scenario – with zebra crossings (refer to the below figure).

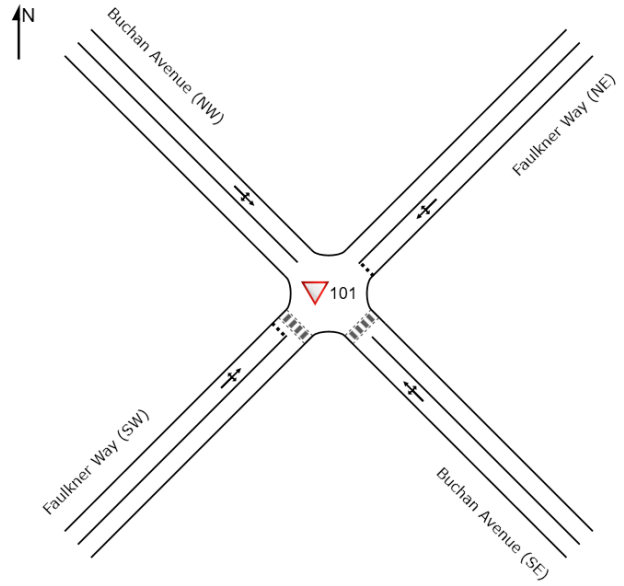

Figure 12 - With Proposed Zebra Crossings

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Table 2 summarises the most relevant SIDRA results for both modelling scenarios. Full SIDRA results can be found in Attachment 1.

Table 2 – SIDRA Modelling Results

Intersection	Period	Scenario	Worst LoS	Delay (s)[1]	Highest DoS (v/s)	Highest Q95 (m)
Buchan Avenue / Faulkner Way	AM Peak	Existing – no zebra crossings	B	18.9	0.496	24.6
		With zebra crossings	D	55.2	1.012	350.1
	PM Peak	Existing – no zebra crossings	A	12.9	0.348	17.3
		With zebra crossings	C	31.1	0.917	168.3

The results of the existing scenario – without zebra crossings – show a LoS A for all turn movements from Buchan Avenue and a minimum LoS B for all turn movements from Faulkner Way in both AM and PM peak hours. The intersection operates with minimum 50% spare capacity and a maximum queue length of 24.6 meters. The results show that the school development does not warrant an upgrade of the Buchan Avenue / Faulkner Way intersection.

With zebra crossings and the estimated number of pedestrians crossing the roads, all turn movements from the north-west approach of Buchan Avenue have a LoS D in the AM peak hour, the arm has a queue length of 350.1 meters and the DoS is above 100%, meaning that there is no spare capacity. Similarly, in the PM peak, the south-east approach of Buchan Avenue has a LoS C on all turn movements, a queue length of 168.3 meters and a 92% DoS. This result can be attributed to the high number of pedestrians using the Buchan Avenue crossing. In accordance with the modelling guidelines, a LoC C is "satisfactory" and D is "operating near capacity", neither of which warrant an upgrade to the intersection.

The LoS of the right turn movement from Faulkner Way southwest is D and C in the morning and afternoon peak hour respectively. This is due to the longer waiting time for vehicles exiting the minor road (Faulkner Way), which is not unusual for minor roads during peaks.

The intersection analysis shows that it is the pedestrian movements at the zebra crossings which are the major factors contributing towards the reduced performance of the intersection during the school peak hours. Vehicular traffic at a roundabout would be affected by pedestrians in the same way traffic at a priority-controlled intersection is affected. Therefore, an upgrade of the Buchan Avenue / Faulkner Way intersection to a roundabout is not likely to improve the overall performance.

It should be noted that the intersection at Buchan Avenue will have a crossing supervisor who will be holding back students and vehicles during the school peak times, which manage the movement of pedestrians and traffic flows.

[1] Delay of the most critical turn movement has been considered

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Council Comment

Buchan Avenue/Faulkner Way intersection is currently a sign-controlled intersection. The intersection in its current configuration will not safely accommodate the expected traffic movements generated from the school. As such, a roundabout treatment is requested at this intersection with provision for pedestrian and cyclists crossings.

The design of the proposed roundabout is to be submitted to Council for "in principle" approval.

Response

As stated in the previous response, the Edmondson Park South Development Control Plan 2012 outlines the subject site to be a school within the masterplan, as shown in Figure 1 above, and specifies the future road network within the Edmondson Park area, an excerpt of which is presented in Figure 3. Based on this it can be assumed that at the time of preparing the masterplan no issues relating to school traffic were identified.

Further, the subsequent modelling undertaken by AECOM did not identify the Buchan Avenue / Faulkner Way intersection as one requiring any upgrades / amendments to its current layout.

Additionally, the road network and the surrounding residential zoned areas are still under construction and it will take a few more years before the area experiences the full traffic demand that has been planned / modelled. Until then it is not seen as required to introduce a roundabout.

During the Transport Working Group meeting dated 7th May 2021, the project responded to Council's suggestion by stating that a roundabout is not seen as required, particularly for safety reasons, as roundabouts are generally more difficult to navigate by young students. No further comments were received from Council.

Following the TWG meeting held on 9th August 2021, a SIDRA model of the Buchan Avenue / Faulkner Way intersection has been prepared to investigate the traffic impact of the proposed development. The results show that the school development does not warrant an upgrade of the Buchan Avenue / Faulkner Way intersection.

Irrespective of the above, a design analysis has been undertaken to determine what effect a roundabout would have on the infrastructure surrounding the intersection.

a) Compliant roundabout

The following section outlines considerations and the physical requirements for a compliant roundabout based on the *Guide to Road Design Part 4B – Roundabouts* (the guide).

The following has been considered:

- Based on Table 4.1 from the guide (refer to Figure 13) and the proposed land use, it is considered more appropriate to use the "desired" instead of the "minimum" radius for the middle island, so that the approaches "*provide sufficient size islands for storage of pedestrians*".
- The minor roads are expected to only require a waste collection vehicle access, hence in Table 4.3 of the guide (refer to Figure 14), the 12.5m single unit truck is selected to determine the required width of the circulating carriageway. The exact width has been interpolated from the table.

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Table 4.1: Guide for selecting the minimum central island radius for a circular roundabout

Desired driver speed on the fastest leg prior to the roundabout (km/h)	Central island radius of a single-lane roundabout (m)		Central island radius of a two-lane roundabout (m)		Speed reduction treatments required prior to the entry curve[1]
	Minimum[5]	Desirable	Minimum[5]	Desirable	
≤ 40[2]	5[4]	10	8	12	No
50[2]	8	11	8	12	No
60[3]	10	12	14	16	No
70[3]	12	18	18	20	No
80[3]	14	22	20	24	Desirable
≥ 90[3]	14	22	20	24	Yes

1 *Refer to Section 4.5.2 for the various types of speed reduction treatments.*
2 *The desirable central island radii listed for these speeds generally provide sufficient size splitter islands for storage of pedestrians combined with desirable entry curvature. The minimum central island radii generally do not. In addition, the desirable values will generally produce a lower overall crash rate than what the minimum values will.*
3 *The desirable central island radii listed for these speeds provide a maximum decrease in speed between the entry curve and a right-turn on the circulating carriageway of 20 km/h. This minimises the number of potential single vehicle crashes on the circulating carriageway. The minimum central island radii are associated with values up to 30 km/h. In addition, the desirable values will generally produce lower overall crash rates than what the absolute values will.*
4 *Minimum central island radius where the design right-turn vehicle is a single unit truck is 7 m.*
5 *The minimum central island radii should typically only be selected for an initial central island radius in constrained brownfield sites. Selection of these radii may lead to some geometric design elements not complying with normal design domain criteria.*

Source: Department of Transport and Main Roads (2014) and Department of Transport and Main Roads (2015).

Figure 13 - Central island radius (Source: Guide to Road Design Part 4b)

Table 4.3: Initial selection of single-lane roundabout circulating carriageway widths

Central island radius[1] (m)	Width required for design vehicles[2] (m)				
	12.5 m single unit truck	19 m semi-trailer	25 m B-double	Type 1 road train	Type 2 road train
5	–	9.2	–	–	–
6	–	8.9	9.9	–	–
8	6.7	8.4	9.4	10.9	–
10	6.3	8.0	8.9	10.4	12.4
12	5.9	7.6	8.5	9.9	11.9
14	5.8	7.2	8.1	9.5	11.4

Figure 14 - Circulation carriageway width (Source: Guide to Road Design Part 4b)

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Figure 15 shows a sketch of the spatial requirements of a compliant roundabout as per the above parameters. The following needs to be considered:

- In order to implement a compliant roundabout, land acquisition would be required. The roundabout would ideally be located centrally at the crossroads, meaning that both properties on the western approach would be affected.
- Moving the roundabout further east along Buchan Avenue would have the following knock-on effect on the surroundings and the infrastructure required for the proposed school:
    - Re-alignment of the minor road (Faulkner Way) would be required
    - The roundabout would impinge on the park area and potentially on the school site
    - The zebra crossings would be located further east and south of the roundabout, away from the pedestrian desire lines
    - Reduction in the quantity of pick-up and drop-off along Buchan Avenue and Faulkner Way
- The bicycle lane would be displaced and would need to be either incorporated into the roundabout (which would require an increased footprint) or taken off road.

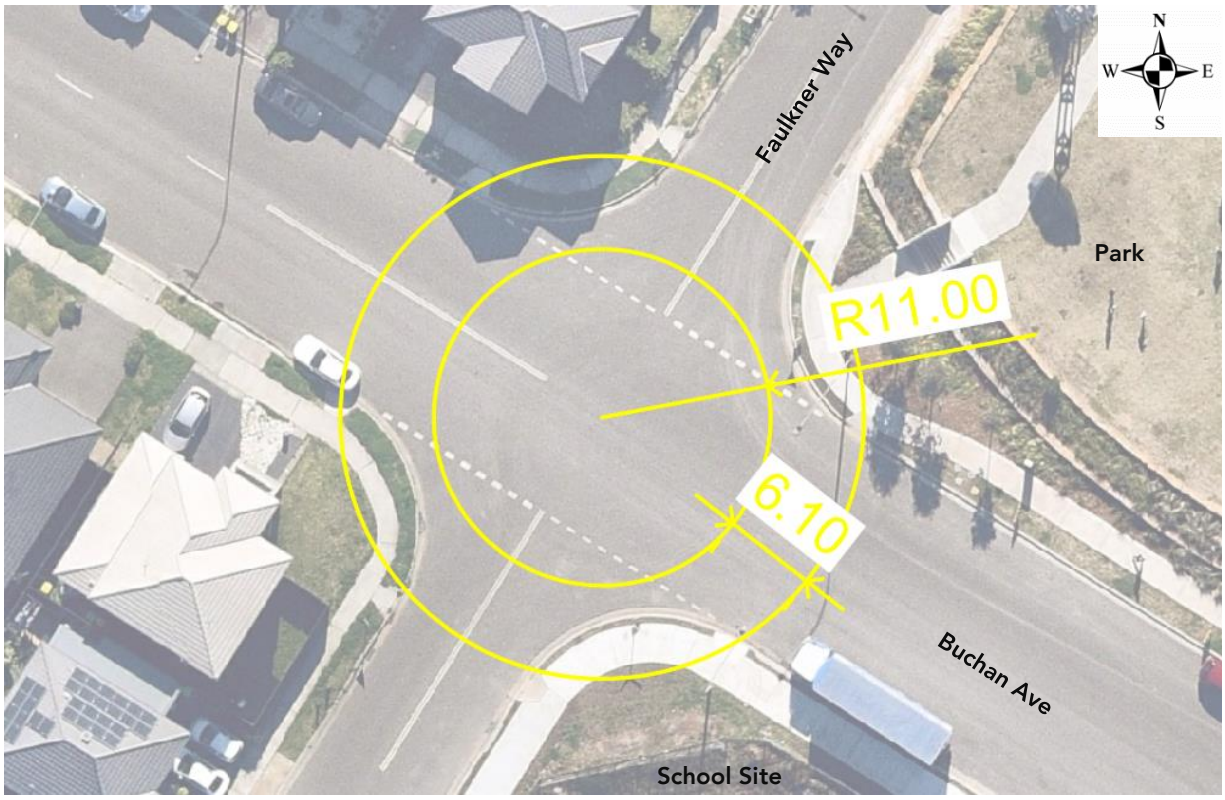

Figure 15 - Spatial requirement of a compliant roundabout

b) Roundabout using the existing intersection footprint

The following outlines the effect of a roundabout design which fits into the existing intersection footprint.

- The zebra crossing at Faulkner Way would need to be located further south due to the swept paths required for a waste truck. The following knock-on effect is created:
    - The crossing would be located away from the pedestrian desire line, which may result in pedestrians crossing informally.
    - The quantity of pick-up and drop-off along Faulkner Way would be reduced.
    - The space between the roundabout and the zebra crossing provides space for informal pick-up and drop-off, which would interfere with pedestrians wanting to cross Faulkner Way.
- The bicycle lane would be displaced and would need to be either incorporated into the roundabout (which would require an increased footprint) or taken off road.

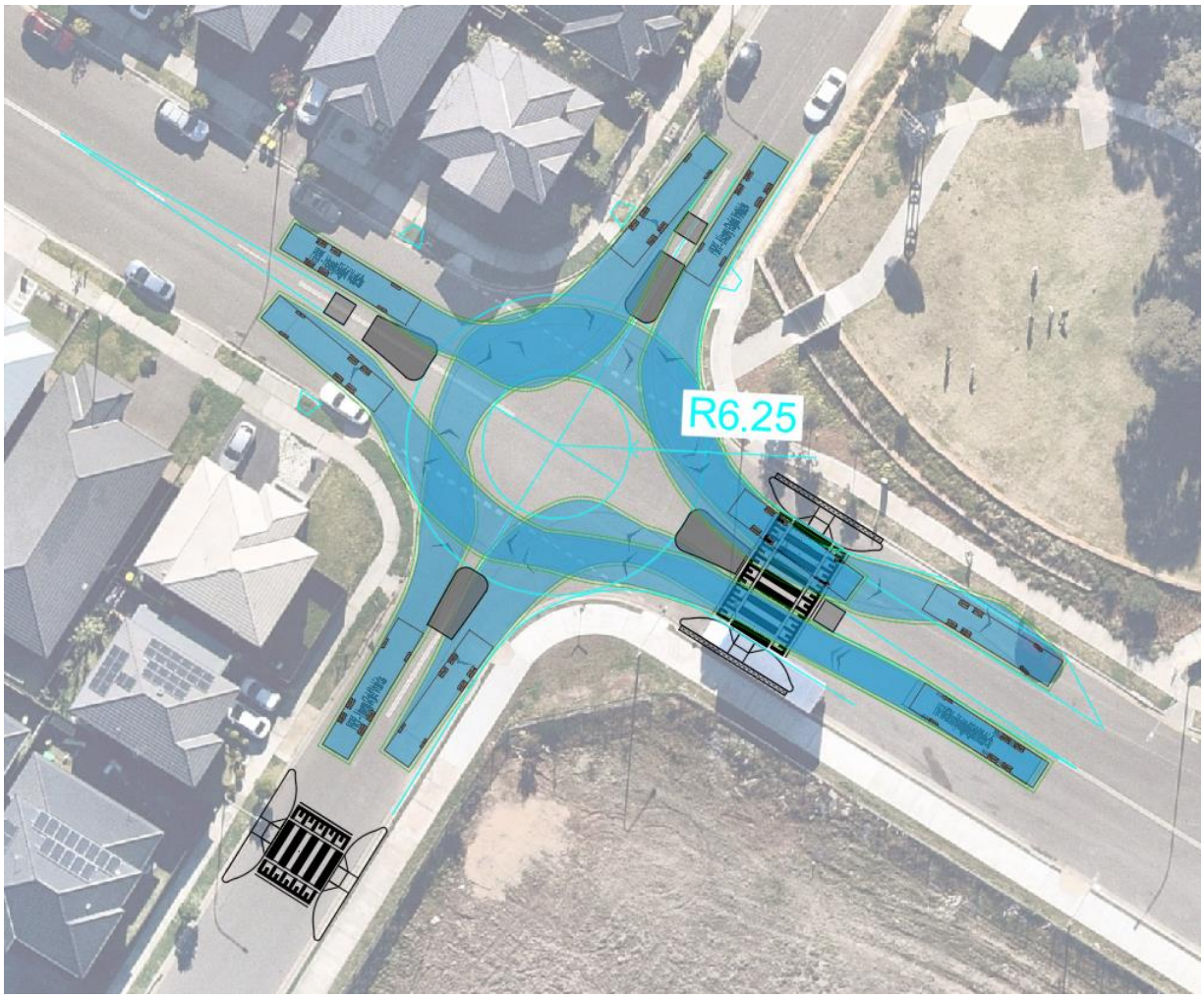

Figure 16 - Roundabout within the existing intersection footprint

c) Conclusion

As outlined in the previous response, a roundabout is not warranted based on traffic modelling, and an implementation of one would have a negative impact on both the development and the surroundings, being potential land acquisition, reduced pick-up and drop-off lane, misalignment of crossings vs. the pedestrian desire lines, displacement of the bike lane, etc.

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Council Comment

Details of the proposed traffic and parking management schemes shall be submitted to Council for "in principle" approval and to Council's Pedestrian, Active Transport and Traffic Committee for endorsement, which include:

a) The roundabout at Buchan Avenue/Faulkner Way intersection with pedestrian/cyclist crossings;

b) The proposed bus zones along Buchan Avenue;

c) The proposed raised marked pedestrian crossings (wombat crossing) on both Buchan Avenue and Faulkner Way;

d) The proposed pick up and drop off parking area along Buchan Avenue and Faulkner Way; and

e) The proposed right turn restriction from Lacey Street into Buchan Avenue with a traffic management plan.

Response

a) See the response above for comments on the roundabout at Buchan Avenue / Faulkner Way.

b) Refer to Section 7.5 and Attachment 2 in the submitted TTA dated 11th June 2021 for the proposed bus zone location and the relevant signage and line marking plans. The bus stop management is described in the School Transport Plan prepared by ptc. on 26th May 2021 (STP).

c) Refer to Section 7.4 and Attachment 2 of the TTA dated 11th June 2021 for discussion on the proposed zebra crossings and relevant signage and line marking plans. The management is described in the STP.

d) Refer to Section 6.2.5, Section 6.2.8 and Section 7.7 of the submitted TTA dated 11th June 2021 for the pick-up and drop-off areas. For the traffic and parking management scheme refer to the STP dated 26th May 2021.

e) Refer to Figure 55 in Section 6.2.5 of the TTA dated 11th June 2021.

During the meeting held on 9th August 2021 Council confirmed that all the above will be assessed as part of the detailed design following the approval of the development.

Council Comment

An application for a new school crossing supervisor should be lodged with TfNSW prior to the opening of the new school.

Response

The Department of Education will apply for a school crossing supervisor prior to the opening of the new school.

Council Comment

Details of the proposed road to the South of the proposed development is to be submitted to Council for review.

Response

The road to the south of the proposed school has been applied for approximately 2 weeks ago and will be constructed by Landcom.

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2.2 Public Transport

Council Comment

The proposed bus route to the school will travel along Buchan Avenue and Soldiers Parade. The Buchan Avenue/Soldiers Parade intersection is designed as left in/left out only. A right turn movement is required at the intersection for the proposed bus route. The revised intersection design which permits the right turn movements for bus is to be submitted to Council for review.

Response

Following consultation with TfNSW, any bus route changes will be made to suit the existing intersection arrangement, i.e. the bus will not need to turn right at the Buchan Avenue / Soldiers Parade intersection.

This was confirmed by John Broady during the meeting held on 9th August 2021.

Council Comment

Details of the proposed bus zones along Buchan Avenue are submitted to Council's Pedestrian, Active Transport and Traffic Committee for endorsement.

Response

Refer to Section 7.5 and Attachment 2 in the submitted TTA dated 11th June 2021 for the proposed bus zone location and the relevant signage and line marking plans.

Council Comment

It is noted that approximately 170 students will require the public bus transportation and will need 3 regular buses for the ultimate school operation. Hence, a bus zone or bay which can accommodate at least 2 buses at any time is required for the school operation.

Response

The bus timetables will be staggered, so that there will be no need to accommodate 2 or more buses at the same time for the proposed development. The recommended bus timetable shown in Table 3 in Section 4.3.6 in the TTA dated 11th June 2021 highlights that only 1 bus stop will be required to service the primary school.

It is noted that a discussion on the length of the bus bay was held during the TWG meetings, and after it was established that this development proposal is for the primary school only, no further comments were made by Council.

Council Comment

An updated school transport plan is to be provided to Council prior to opening of the school.

Response

The School Transport Plan will be updated upon allocation of a principal and will be submitted to Council prior to opening of the school.

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Council Comment

The proposed bus timetable in Table 3 of Traffic and Transport Assessment report is to be submitted to TfNSW and bus operator for endorsement.

Response

The traffic documents, including the Transport and Traffic Assessment have been submitted to TfNSW as part of the SSDA process. No specific comments were raised on this by TfNSW during the RtS.

2.3 Active Transport

Council Comment

It is noted that two marked foot crossings are proposed near the intersection of Buchan Avenue and Faulkner Way. These pedestrian crossings should be incorporated into the required roundabout at the intersection.

Response

Roundabouts are generally more difficult to navigate by young students.

Refer to Section 2.1 discussing the roundabout at the Buchan Avenue / Faulkner Way intersection.

Council Comment

It is recommended that the school crossing is to be installed on Buchan Avenue, east to Lacey Road (Pedestrian connectivity 1). The marked pedestrian crossing on Faulkner Way is to be located further south to the intersection and close to the proposed pedestrian gates.

Response

As shown in Figure 17, there is a significant portion of students residing towards the north and north-west from the proposed school, and they lie within the active transport catchment. The proposed location is seemed to be suitable, as it will provide a crossing opportunity for students arriving on Buchan Avenue / Faulkner Way intersection immediately near the main entry to the proposed school, as presented in Figure 18.

As shown in Figure 19, if the pedestrian crossings on Buchan Avenue and Faulkner Way were relocated further east and south respectively, the crossings would not align with the desire lines for students coming from the north and northwest. This would potentially result in students crossing outside the formalised crossing, which is not acceptable from a child safety perspective. Therefore, relocating the Buchan Avenue crossing east of Lacey Road and further south on Faulkner Way is not considered suitable.

It is noted that the proposed location of the zebra crossing was presented and discussed during the TWG meetings. Following the presentation on the preferred option, no further comments were made by Council.

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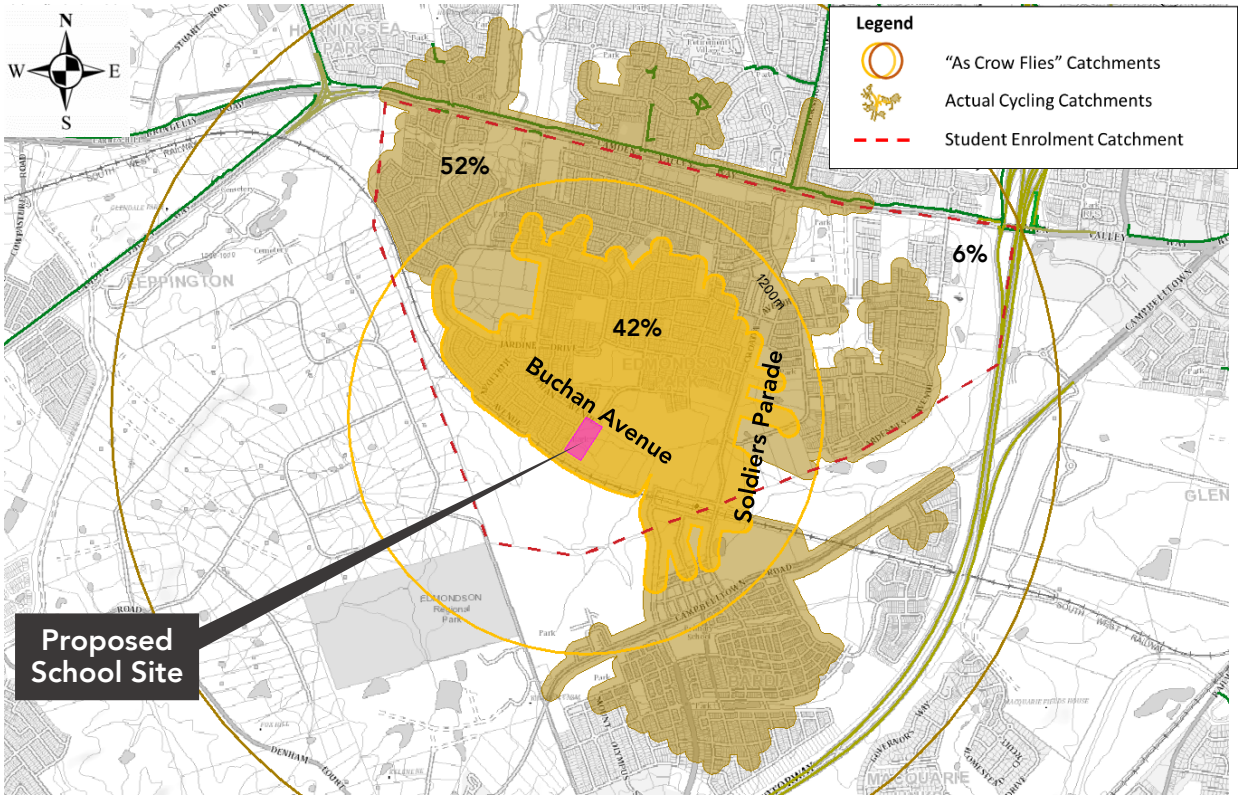

Figure 17 - Active Transport Catchment and Student Population

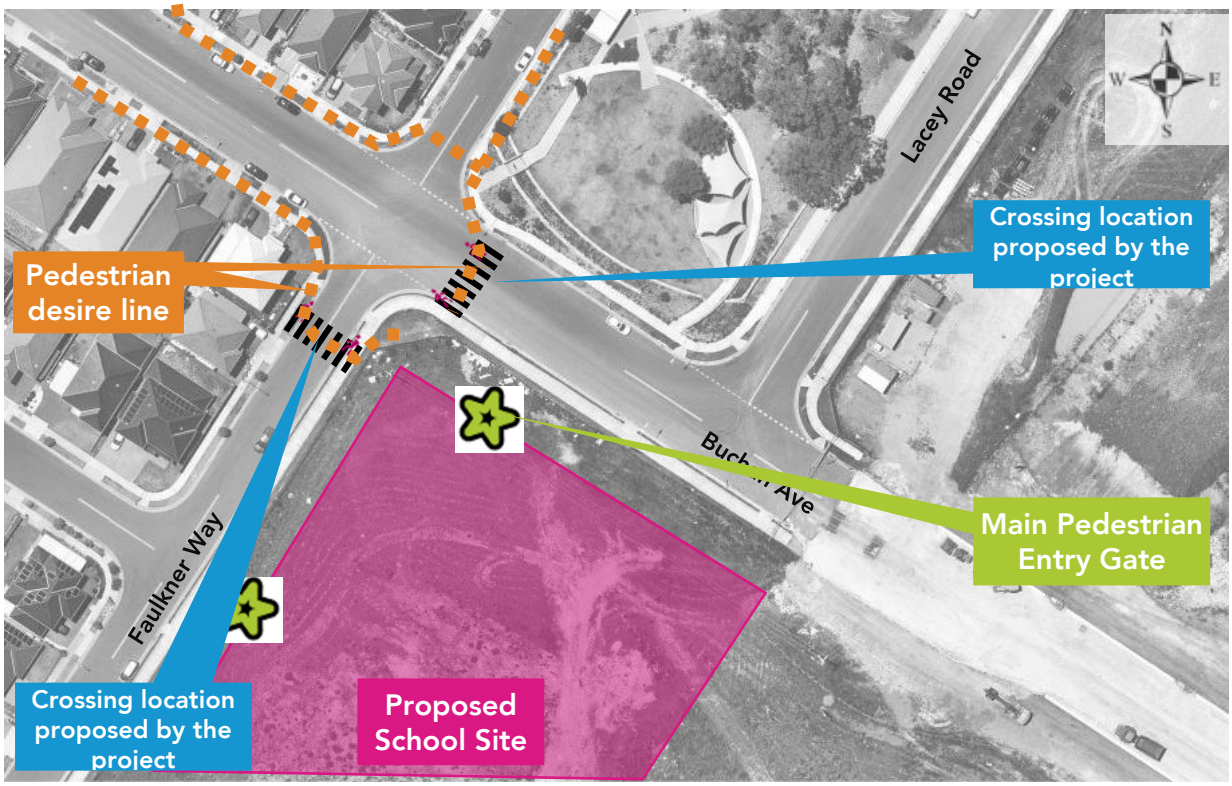

Figure 18 - Proposed Pedestrian Crossing Locations

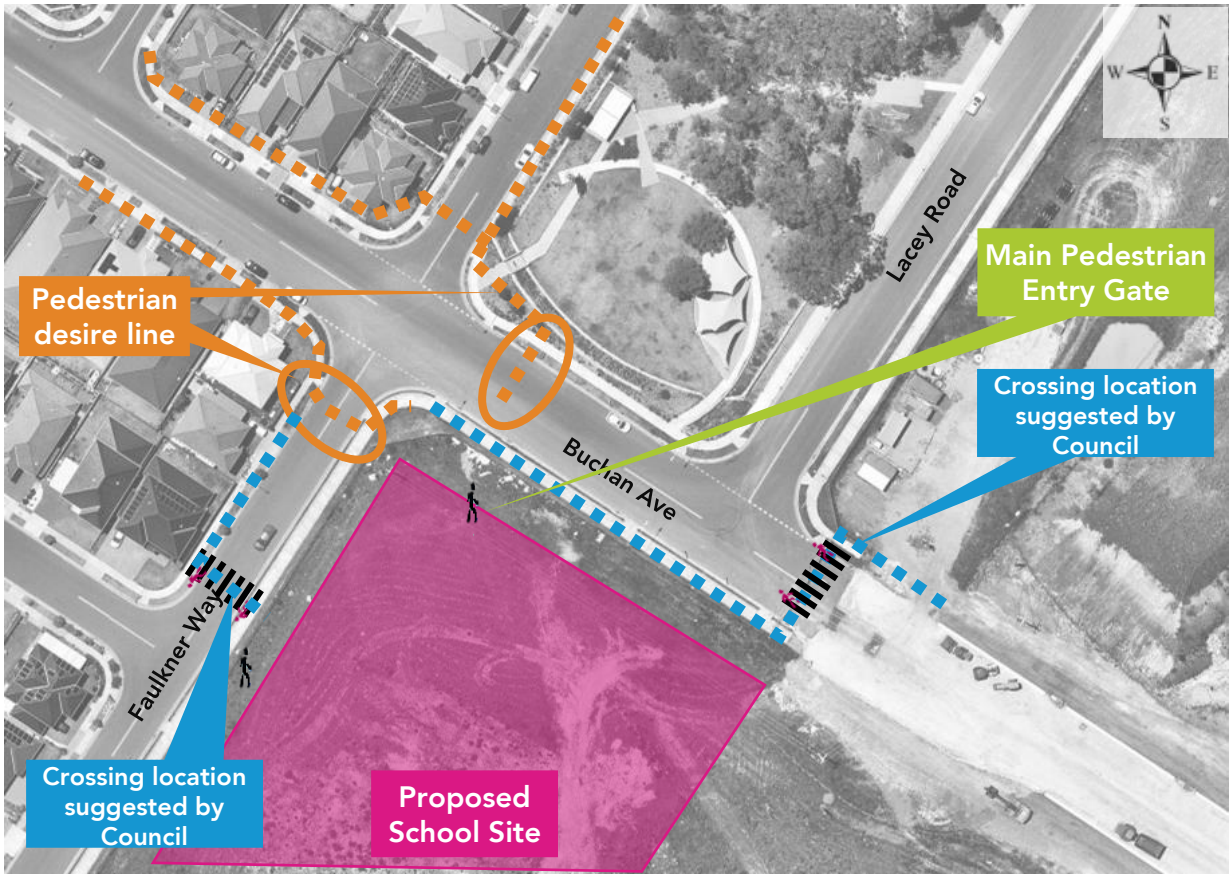

Figure 19 - Council Suggested Pedestrian Crossing Locations

Council Comment

The proposal should consider how the dedicated cyclist facilities connect (safely) to the surrounding cycleway network, as well as the interaction it may have with the public domain (i.e., footpaths, kerb and gutter, trees, parked cars etc).

Response

The cycle network within the enrolment catchment of the proposed school was analysed and gaps have been identified in Section 3.4.2.2 and Section 4.2 of the TTA dated 11th June 2021.

Safe connectivity from the school to the surrounding facilities, including pedestrian (and therefore cycling) desire lines are covered in Section 4.3.3.2 of the TTA dated 11th June 2021 and also in the response to the above comment.

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2.4 Car Parking

Council Comment

The proposed school will have 1,012 students and 40 pre-school places. The school will employ 59 staff and 7 pre-school facility staff. According to Council's DCP requirements, the primary school will require a total of 104 car parking spaces.

- *59 staff @ 1 space per staff = 59 spaces*
- *1012 students @1 space per 30 students = 34 spaces*
- *Childcare: 7 staff @1 space per staff = 7 spaces*
- *40 children @ 1 space per 10 children = 4 spaces*
- *2 accessible car parking spaces*

Since the proposed development has provided for 48 on-site car parking spaces, there is a shortfall of 56 spaces. This on-site car parking space shortage needs to be addressed in the proposed development and to Council satisfaction.

Response

As part of traffic investigations for both upgrades to existing schools and for the development of new schools, SINSW requires a holistic review of measures that would help decrease the use of private vehicles and instead increase walking, cycling and public transport use to commute to and from the school.

A School Transport Plan has been prepared outlining measures to promote active and public transport and carpooling. SINSW is committed to implementing these plans across all new developments. A travel plan coordinator will be employed to coordinate the implementation of these measures and monitor the mode shift.

The school is located in walking distance from a train station and additional buses will be implemented in the future, meaning that it is accessible by alternative transport modes for staff.

It is noted that the proposed car parking provision was discussed during the TWG meeting; No comments were received from Council.

During the meeting held on 9th August 2021, Council agreed that a reduction of parking spaces for staff is acceptable due to the close proximity of the train station to the proposed school. The parking provision associated with students can be accommodated on-street. Below is a summary of Council's parking calculation and the proposed provision:

Council's calculation:	**Proposed provision:**
59 staff @ 1 space per staff = 59 spaces	35 off-street spaces (refer to Table 17 in the TTA) – as per Council's comment made during the meeting, a reduction is acceptable due to the proximity of the train station to the school
1012 students @1 space per 30 students = 34 spaces	39 on-street spaces (refer to Figure 66 in the TTA) – as per Council's comment made during the meeting, parking provision for students can be accommodated on-street
Childcare: 7 staff @1 space per staff = 7 spaces	7 off-street spaces (refer to Table 17 in the TTA)
40 children @ 1 space per 10 children = 4 spaces	6 off-street spaces (refer to Table 17 in the TTA)
2 accessible car parking spaces	2 off-street spaces (refer to Table 18 in the TTA)

Having regard to Council's acceptance to reduce the number of off-street parking spaces for staff and the possibility to utilise on-street parking to offset parking provision for students, the development is considered to provide a sufficient number of parking spaces for the proposed school.

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2.5 Car Parking Design

Council Comment

It is noted that the waste collection vehicle is to use the proposed future south road to exit the subject site. Sufficient turning area should be provided on site to cater for the movement of the waste collection vehicle. Service facilities should be provided on site and located close to service entrances. A designated service vehicle parking space should be provided on site

Response

A number of waste location options are discussed in Section 7.10 in the TTA and shown in Attachment 4 of the TTA. The option chosen is a compromise between the most efficient footprint, the requirement for a waste truck to drive through the car park and the operational distance from the main buildings.

The various options for waste access and the proposed / preferred location were presented during the TWG meeting; No comments were received from Council.

Following the meeting held on 9th August 2021, it is understood that Council accepts the proposed waste collection arrangement given that the south road will be constructed prior to commencement of the school.

Council Comment

As there is a pedestrian entry gate proposed close to the car parking driveway, there is potential for conflicts between the proposed southern pedestrian access and vehicular access to the car park. This potential conflict needs to be addressed in the location and design of the driveway to the car park

Response

The distance between the driveway and the southern gate on Faulkner Way is 3.8 meters, which is considered acceptable to separate pedestrians and vehicles entering a site.

It is noted that this gate is not the main entry gate and will be mainly used by students that are dropped-off / picked-up along Faulkner Way. This gate will be supervised by staff.

2.6 Operational Transport Accessibility Management Plan

The Operational Transport Accessibility Management Plan (OTAMP) must be prepared and must include (but not limited to):

a) The location of all car parking spaces on the school campus and their allocation (i.e. staff, visitor, accessible, emergency, etc.);

b) The location and operational management procedures of the pick-up and drop-off parking located within the site, including staff management/traffic controller arrangements;

c) The location and operational management procedures for the pick-up and drop-off of students by buses and coaches for school drop-off / pick-up, excursions and sporting activities, including staff management/traffic controller arrangements;

d) Staggering of drop-off / pick-up times, with afternoon pick-up times staggered over a one-hour period;

e) Delivery and services vehicle and bus access management arrangements;

f) Management of approved access arrangements;

g) Car parking arrangements and management associated with the proposed use of school facilities by community members;

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h) Maintaining bus accessibility and student waiting areas;

i) Safe parent and student behaviour during drop-off and pick-up;

j) Safe pedestrian movements to the school entrances, minimising vehicle-pedestrian conflicts;

k) Responsibilities of various personnel executing the plan; and

l) Evaluation and monitoring of the School Transport Plan implementation.

Response

The School Transport Plan prepared by **ptc.** on 26th May 2021 (STP) includes the operation and transport management of the School.

The STP has been submitted as part of the SSDA. Apart from the above, no comments have been received from Council.

a) Refer to Section 4.14 and Section 4.15 of the STP for on-school parking provisions and allocation.

b) Preschool pick-up and drop-off parking will be located within the site. Refer to Section 4.14 of the STP for details.

c) Refer to Section 4.13 and Section 4.2 of the STP for buses and coaches drop-off / pick-up and sporting activities respectively.

d) Refer to Section 2.2, Section 3.2 and Section 4.12 of the STP for staggered bell times and pick-up and drop-off arrangements.

e) Refer to Section 4.1.5 of the STP for delivery and service vehicles access. The bus access is not provided on site and will be parked on adjacent bus bays or pick-up / drop-off area depending upon the size and timing as discussed in Section 4.2 of the STP.

f) Refer to Section 3.1 and Section 4.1.1 of the STP for site access.

g) Refer to Section 3.3 of the STP for parking management for community members.

h) Refer to Section 4.1.3 of the STP for bus accessibility.

i) Refer to Section 4.1.2 of the STP for student and parent behaviour during drop-off and pick-up.

j) Refer to Section 4 of the STP for safe pedestrian movements.

k) Refer to Section 4 of the STP to see the responsibilities of various personnel executing the plan.

l) Refer to Section 7 of the STP for monitoring and evaluation.

2.7 Construction and Traffic Management Plan

Council Comment

It is recommended that on-site parking is provided for all the construction vehicles to minimise impacts of construction activities along the adjacent streets

Response

It is proposed to provide 15 on-site parking spaces for construction workers during construction. Details will be finalised in the construction stage CTMP prior to commencement on site.

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Council Comment

The design of the proposed Solider Parade/Bunchan Avenue intersection with the largest construction vehicle turning path analysis is to be submitted to Council for review as part of the CTMP approval.

Response

A swept path assessment for a 25m Prime Movers and a 19m Truck and Dog at Soldiers Parade / Buchan Avenue intersection are presented in Figure 17 and Figure 74 in Section 9.8 of the TTA. AV swept paths are shown in the figure below.

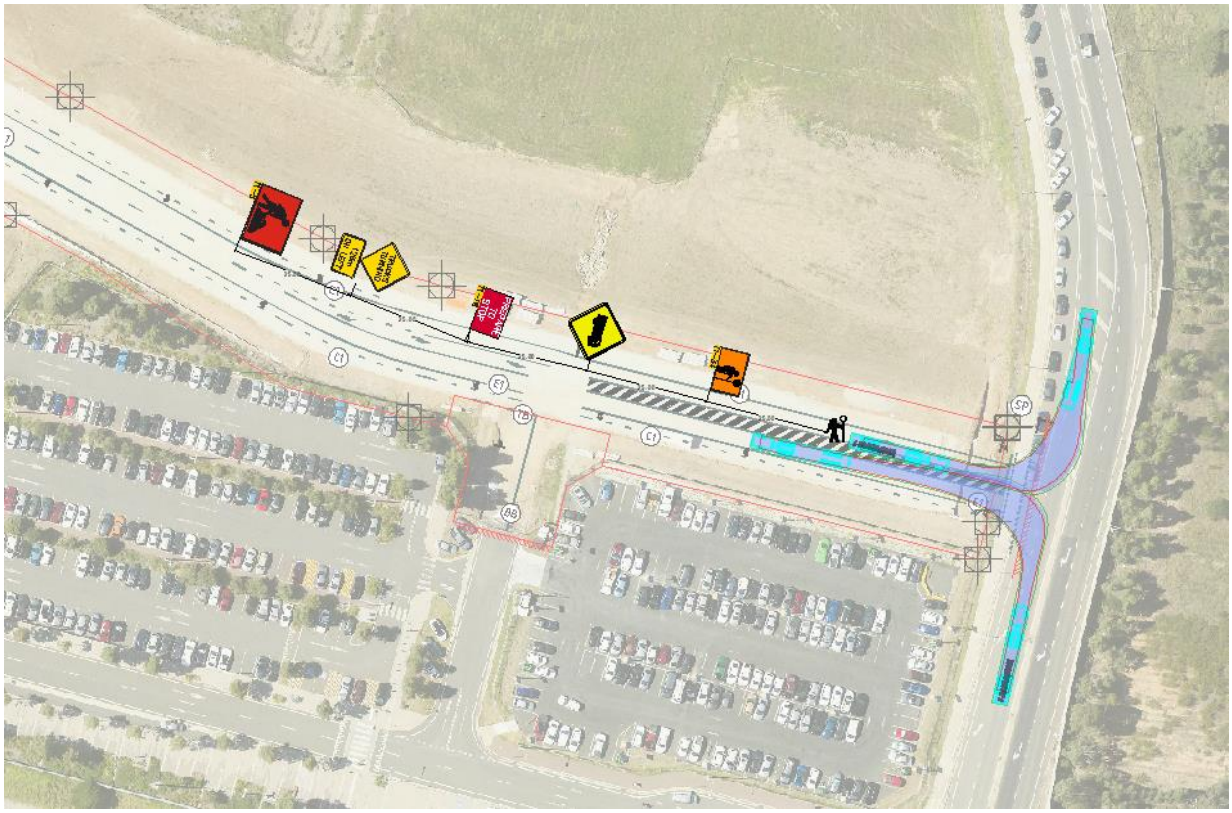

Figure 20 - Buchan Avenue and Soldiers Parade Intersection – AV Movement

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3. TfNSW Comments

3.1 Signage

TfNSW Comment

A significant number of vehicles and pedestrians will access the site at the start and end of the school day. School Zones must be installed along all roads with a direct access point (either pedestrian or vehicular) from the school. School Zones must not to be provided along roads adjacent to the school without a direct access point. Road Safety precautions and parking zones should be incorporated into the neighbouring local road network and 40km/hr School Zones are to be installed in accordance with the conditions below. The consent authority should ensure that parking, drop-off and pick-up zones and bus zones are incorporated in accordance with TfNSW standards.

TfNSW is responsible for speed management along all public roads within the state of New South Wales. That is, TfNSW is the only authorised organisation that can approve speed zoning changes and authorise installation of speed zoning traffic control devices on the road network within New South Wales.

Therefore, the Developer must obtain written authorisation from TfNSW to install School Zone signs and associated pavement markings, and/or remove/relocate any existing Speed Limit signs.

To obtain authorisation, the Developer must submit the following for review and approval by TfNSW, at least eight (8) weeks prior to student occupation of the site:

a. A copy of Council's development Conditions of Consent

b. The proposed school commencement/opening date

c. Two (2) sets of detailed design plans showing the following:

i. School property boundaries

ii. All adjacent road carriageways to the school property

iii. All proposed school access points to the public road network and any conditions

iv. imposed/proposed on their use

v. All existing and proposed pedestrian crossing facilities on the adjacent road network

vi. All existing and proposed traffic control devices and pavement markings on the adjacent road network (including School Zone signs and pavement markings).

vii. All existing and proposed street furniture and street trees.

School Zone signs and pavement marking patches must be removed and installed in accordance with TfNSW approval/authorisation, guidelines and specifications.

All School Zone signs and pavement markings must be installed prior to student occupation of the site.

The Developer must maintain records of all dates in relation to installing, altering, removing traffic control devices related to speed.

Following installation of all School Zone signs and pavement markings the Developer must arrange an inspection with TfNSW for formal handover of the assets to TfNSW. The installation date information must also be provided to TfNSW at the same time. Note: Until the assets are formally handed-over and accepted by TfNSW, TfNSW takes no responsibility for the School Zones/assets.

Response

The school zone application and installation will be undertaken according to the above outlined process.

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3.2 Construction and Traffic Management Plan

TfNSW Comment

The Construction Traffic Management Plan detailing construction vehicle routes, number of trucks, hours of operation, access arrangements and traffic control should be updated and submitted to the Department for approval prior to the issue of a Construction Certificate. The CTMP must be in consultation with Council, and be endorsed by TfNSW. The document can be submitted to development.sco@transport.nsw.gov.au.

Response

A Preliminary CTMP dated 11th June 2021 has been prepared and submitted as part of the SSDA documentation. A revised CTMP to provide a detailed construction program will be prepared and submitted to the Department for approval prior to the issue of Construction Certificate.

It is acknowledged that the CTMP needs to be referred to Council and TfNSW for approval prior to any works commencing.

3.3 Green Travel Plan

TfNSW Comment

Prior to the issue of the first Occupation Certificate, the applicant should prepare an updated Green Travel Plan in consultation with and endorsed by TfNSW. The Green Travel Plan should be submitted to development.sco@transport.nsw.gov.au.

The Green Travel Plan should include, but not be limited to:

a. *analysis of current travel survey data and school postcode data and discussion of how this data has informed the mode share targets and actions of the GTP;*
b. *identifying the number of staff and students within reasonable walking / cycling distance;*
c. *staged mode share targets for staff, students and visitors which reflect a commitment to increase non-car mode share for travel to and from the site;*
d. *implementation strategy that commits to specific actions (including operational procedures to be implemented along with timeframes) to encourage the use of public and active transport and discourage the use of single occupant car travel to access the site;*
e. *details of bicycle parking and dedicated end of trip facilities including but not limited to lockers, showers and change rooms and e-bike charging station(s) for staff and students to support an increase in the non-car mode share for travel to and from the site;*
f. *a Transport Access Guide for staff, students and visitors providing information about the range of travel modes, access arrangements and supporting facilities that service the site;*
g. *a communication strategy for engaging with students, staff and visitors regarding public and active transport use to the site and the promotion of the health and wellbeing benefits of active and non-car travel to the site;*
h. *include a mechanism to monitor the effectiveness of the measures of the plan; and*
i. *the appointment of a Travel Plan Coordinator responsible for implementing the plan and its ongoing monitoring and review, including the delivery of actions and associated mode share targets.*

The Green Travel Plan shall be reviewed annually for at least the first five years and involve surveys, evaluation and review.

Transport for NSW has developed a Travel Plan Toolkit designed for the person or group responsible for developing and implementing a Travel Plan. This toolkit provides the steps, templates and resources for

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developing a comprehensive Travel Plan and may be accessed at: hiips://www.mysydney.nsw.gov.au/travelchoices/tdm

Response

A School Transport Plan dated 26th May 2021 has been submitted as part of the SSDA, which is in lieu of a Green Travel Plan as per the new approach by the Department of Education. Apart from the above, no comments have been received from TfNSW.

All of the points made by TfNSW have been addressed in the School Transport Plan; Below is a reference of sections in which the individual points have been addressed:

a) Refer to Section 2.2

b) Refer to Section 2.2

c) Refer to Section 3 – this is a new school, so a staged approach may not be required

d) Refer to Section 4.3

e) Refer to Section 2.2

f) Refer to Attachment 3

g) Refer to Section 5

h) Refer to Section 6 and Section 7

i) Refer to Section 7

3.4 Traffic and Transport

TfNSW Comment

New pedestrian crossings will need to meet relevant warrants assessment requirements and be approved via Council's Local Traffic Committee.

Response

The proposed zebra crossings meet the warrants; The warrant assessments are presented in Section 7.4.1 in the TTA.

The proposal shall be put forward to Council's Local Traffic Committee.

TfNSW Comment

Any priority controlled intersection treatments will need to be to the satisfaction of Council.

Response

Intersection treatments are currently in negotiation with Council and will be prepared to the satisfaction of Council.

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TfNSW Comment

The Department of Planning, Industry and Environment should be satisfied that adequate parking arrangements for staff are provided on-site.

Response

The DCP requires 66 car spaces for staff - the development provides 42 car spaces which allows parking for 64% of staff.

SINSW has deployed a process of school upgrades which involves a holistic review of measures that would help decrease the use of private vehicles and instead increase walking, cycling and public transport use to commute to and from the school.

This project is proposing to provide 6 bicycle spaces and an end of trip facility for staff to promote active transport.

A School Transport Plan has been prepared outlining measures to promote active and public transport and carpooling. SINSW is committed to implementing these plans across all new developments; A travel plan coordinator will be employed to coordinate the implementation of these measures and monitor the mode shift.

The school is located in walking distance from a train station and additional buses will be implemented in the future, meaning that it is accessible by alternative transport modes for staff.

In light of the above, the development is considered to provide sufficient on-site parking. The proposed school will encourage active modes of transport to mitigate the demand for on-site parking.

TfNSW Comment

The proposed development will generate additional pedestrian movements in the area. Pedestrian safety is to be considered in the vicinity.

Response

As presented in Figure 21, pedestrian crossings are proposed on the eastern and southern arms of the Buchan Avenue / Faulkner Way intersection. These locations have been chosen based on the active transport desire lines and the location of the main school entry gate.

The proposal is to provide raised pedestrian crossings with kerb buildouts to reduce the width of the crossing and pedestrian fencing to reduce the likelihood of students crossing the road at not designated areas. The detail of the proposed zebra crossings across the frontage roads are shown in Figure 22.

The buildouts of the two pedestrian crossings will be connected along the south-eastern corner of Buchan Avenue and Faulkner Way to minimise the footprint of the intersection. This will serve as a traffic calming device and provide a larger pedestrian facility.

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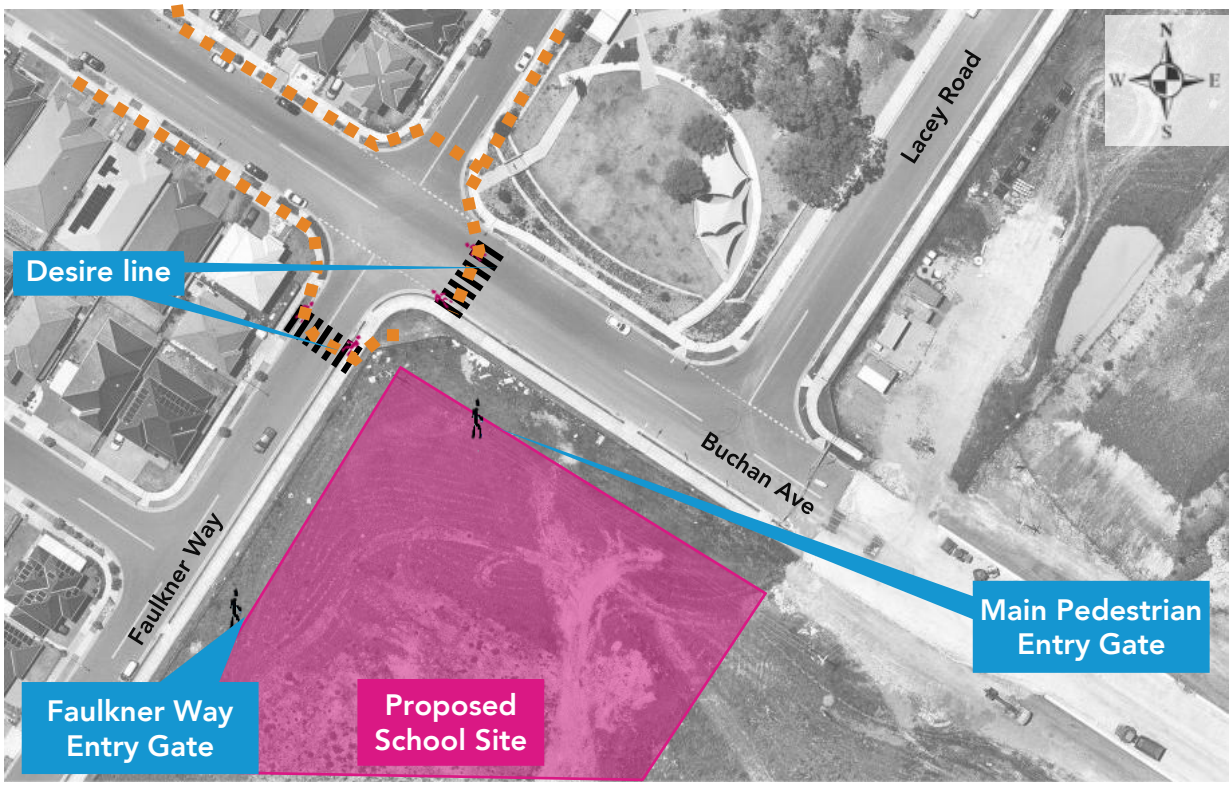

Figure 21 - Recommended Pedestrian Crossings

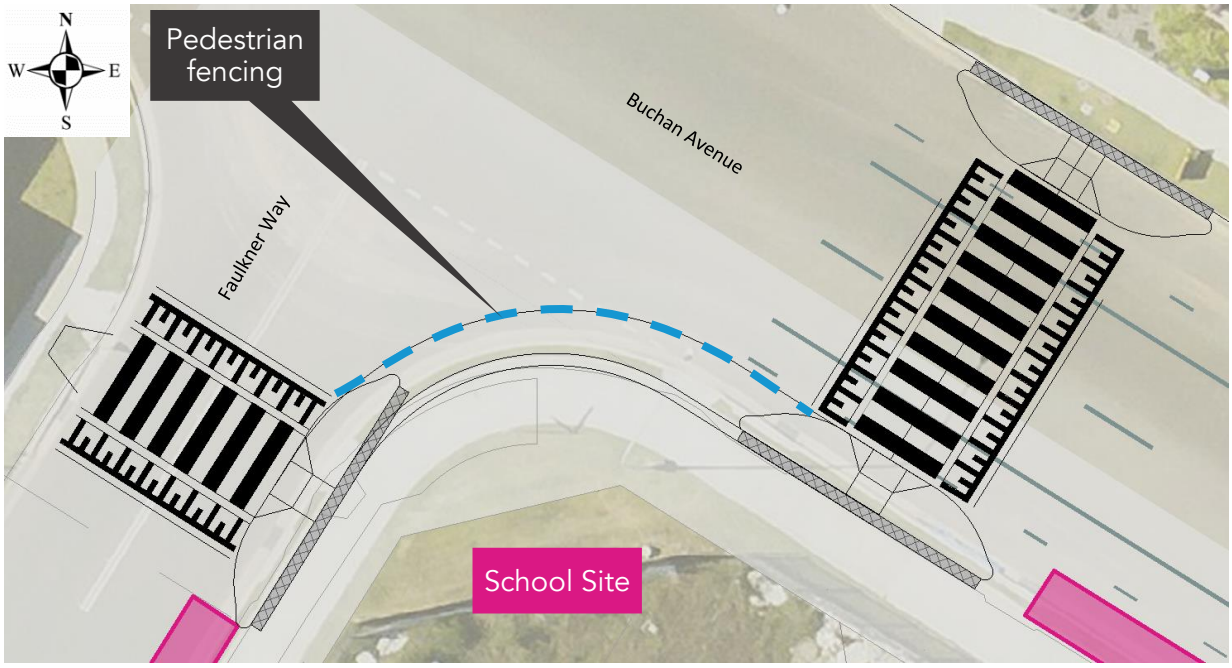

Figure 22 - Pedestrian Crossings Layout

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4. DPIE Comments

4.1 Traffic and Parking

DPIE Comment

Further justification for the shortfall of on-site car parking spaces is required and consideration should be given to increasing the amount of car parking spaces provided on-site.

Response

Refer to Section 2.4 above.

DPIE Comment

The EIS notes that construction worker parking can be provided either on Lot 2 or via on-street parking. In this regard, clearly identify the location and amount of parking spaces available for construction workers on Lot 2.

Response

It is proposed to provide 15 on-site parking spaces for construction workers during construction. Details will be finalised in the construction stage CTMP prior to commencement on site.

DPIE Comment

The consent of the owners of Lot 2 must be provided which confirms construction access, waste storage and construction worker parking are acceptable for the duration of the construction period.

Response

Lot 2 has recently been purchased by the Department of Education. Coordination of the use of the land will be undertaken prior to commencement of construction.

DPIE Comment

The EIS notes that the Transport and Traffic Assessment and School Transport Plan will need to be updated based on updated traffic modelling data provided as part of the broader Edmondson Park Concept Plan modifications. These updated reports must be provided as part of the RtS to provide a final assessment of the traffic impacts associated with the proposal.

Response

Refer to Section 2.1 above. Further, it is noted that there has been no updates on the modelling prepared by Landcom / AECOM since the submission of the SSDA for the new primary school in Edmondson Park, and the timing of any updates in unknown. Therefore, an update of the Transport and Traffic Assessment and the School Transport Plan is not required.

DPIE Comment

Provide details on the future road south of the site including responsible delivery party and expected completion date.

Response

The road to the south of the proposed school will be applied for and constructed by a third party (Landcom).

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4.2 Bus Route

DPIE Comment

Outline discussions with bus service providers about extending, changing, or adding bus routes to service the school.

Response

Discussions were held as part of the Transport Working Group meetings throughout the preparation of the SSDA documentation. The outcome of those discussions is documented in Section 6.2.4.2 of the TTA, and the public transport analysis based on these discussions is presented in Sections 4.3 and 6.2.4 of the TTA dated 11th June 2021.

4.3 Pick-up and Drop-off

DPIE Comment

Demonstrate that Faulkner Way and Buchan Avenue can accommodate the proposed drop-off and pick-up areas including, but not limited to, adequate space for two way traffic flow on the roads during drop-off and pick-up times.

Response

Buchan Avenue and Faulkner Way are 15.4m and 9.6m wide respectively. Buchan Avenue accommodates 2.5m wide parking lanes on either side of the road, and the southern one is proposed to be the pick-up and drop-off lane. This road is also built to provide 1.7m wide cycle lanes and 3.5m wide traffic lanes. Faulkner Way can accommodate a 2.1m wide pick-up and drop-off lane along the school frontage on the eastern side in addition to two through traffic lanes. Therefore, the frontage roads can easily accommodate the pick-up and drop-off while maintaining two-way traffic flow.

Swept paths of vehicles driving along the traffic lanes and an indication of cars parked along the proposed pick-up and drop-off areas along the school frontages are shown in Figure 23.

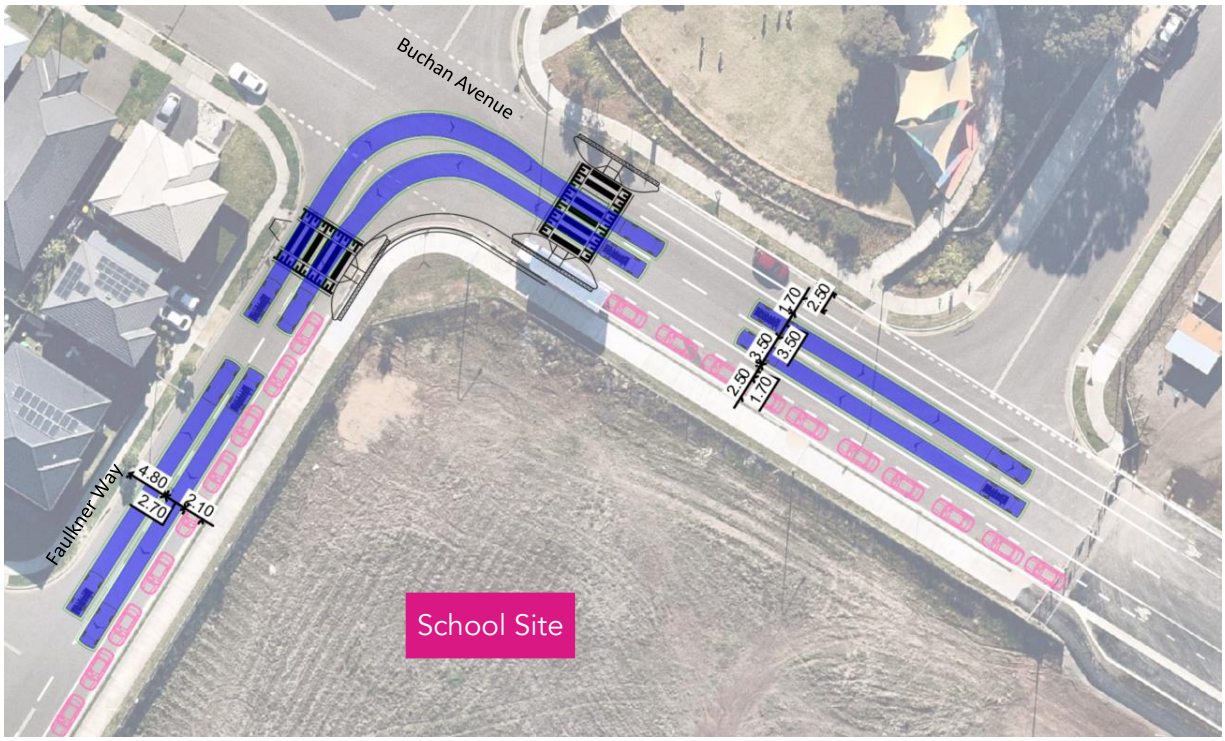

Figure 23 - Pick-up and Drop-off Along Buchan Avenue and Faulkner Way

DPIE Comment

Demonstrate adequate swept paths are available for cars entering and exiting spaces.

Response

Swept paths for vehicles entering and exiting the on-street car spaces along Buchan Avenue and Faulkner Way are shown in Figure 24.

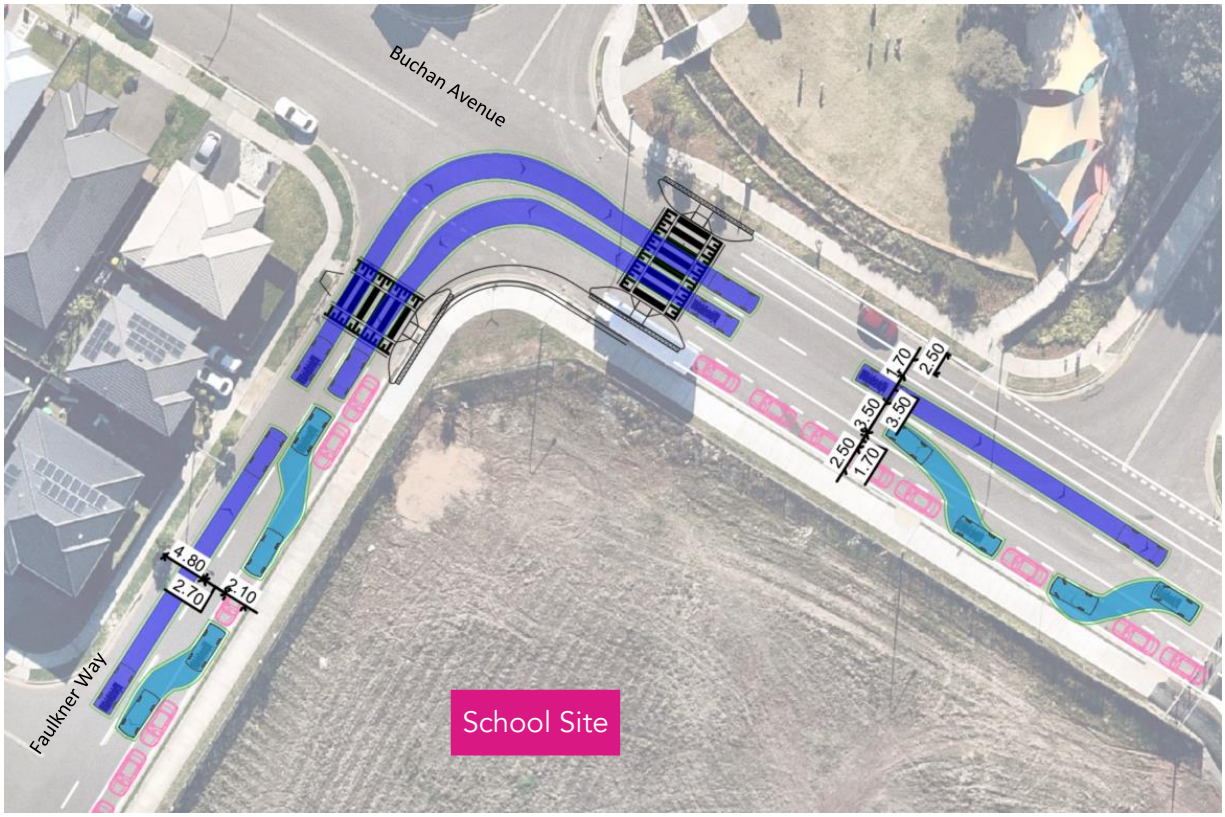

Figure 24 – Swept Paths for Pick-up and Drop-off Along Buchan Avenue and Faulkner Way

4.4 End of Trip Facility

DPIE Comment

Identify the number of staff lockers provided to meet end-of-trip requirements within staff rooms.

Response

The lockers requirements and the proposed provision are shown in Table 3. Based on the Liverpool Council DCP and NSW Planning Guidelines for Walking and Cycling, staff need a total of 6 and 2 lockers respectively. The development proposes to provide 6 lockers within the staff room and therefore, meets the end of trip requirements.

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Table 3 - Lockers for Staff Requirement and Provision

User Group	No of Staff	Racks	Lockers Provision Rate	Lockers Requirement	Lockers Provided
Liverpool DCP					6
Primary School Staff	59	6	1 per employee bicycle space	6	
Preschool Staff	7				
NSW Planning Guidelines for Walking & Cycling 2004					
Primary School Staff	59	6	1 per 3 racks	2	
Preschool Staff	7				

We trust that this letter assists in the assessment of the application. For any further enquiries, please contact our office on (02) 8920 0800.

Kind regards,

Kasia Balsam

Team Leader

Document Control: Prepared by *PS* on *13 August 2021*. Reviewed by *KB/SW* on *13 August 2021*.

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Attachment 1 SIDRA Results

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MOVEMENT SUMMARY

Site: 101 [1a. Buchan Avenue / Faulkner Way - AM Peak - Existing - No Zebra Crossing (Site Folder: AM Peak Hour)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Buchan Avenue (SE)														
4	L2	90	0	95	0.0	0.217	3.5	LOS A	0.0	0.2	0.01	0.11	0.01	39.8
5	T1	306	0	322	0.0	0.217	0.0	LOS A	0.0	0.2	0.01	0.11	0.01	39.6
6	R2	1	0	1	0.0	0.217	7.1	LOS A	0.0	0.2	0.01	0.11	0.01	39.4
Approach		397	0	418	0.0	0.217	0.8	NA	0.0	0.2	0.01	0.11	0.01	39.7
NorthEast: Faulkner Way (NE)														
7	L2	3	0	3	0.0	0.022	6.0	LOS A	0.1	0.5	0.71	0.78	0.71	35.4
8	T1	1	0	1	0.0	0.022	14.7	LOS B	0.1	0.5	0.71	0.78	0.71	35.4
9	R2	3	0	3	0.0	0.022	17.2	LOS B	0.1	0.5	0.71	0.78	0.71	35.2
Approach		7	0	7	0.0	0.022	12.1	LOS A	0.1	0.5	0.71	0.78	0.71	35.3
NorthWest: Buchan Avenue (NW)														
10	L2	1	0	1	0.0	0.496	6.6	LOS A	3.5	24.6	0.39	0.18	0.52	38.9
11	T1	594	0	625	0.0	0.496	1.6	LOS A	3.5	24.6	0.39	0.18	0.52	38.8
12	R2	194	0	204	0.0	0.496	6.7	LOS A	3.5	24.6	0.39	0.18	0.52	38.6
Approach		789	0	831	0.0	0.496	2.8	NA	3.5	24.6	0.39	0.18	0.52	38.7
SouthWest: Faulkner Way (SW)														
1	L2	3	0	3	0.0	0.057	4.4	LOS A	0.2	1.2	0.73	0.81	0.73	34.3
2	T1	1	0	1	0.0	0.057	14.0	LOS A	0.2	1.2	0.73	0.81	0.73	34.3
3	R2	10	0	11	0.0	0.057	18.9	LOS B	0.2	1.2	0.73	0.81	0.73	34.1
Approach		14	0	15	0.0	0.057	15.4	LOS B	0.2	1.2	0.73	0.81	0.73	34.1
All Vehicles		1207	0	1271	0.0	0.496	2.4	NA	3.5	24.6	0.27	0.17	0.35	39.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [1b. Buchan Avenue / Faulkner Way - AM Peak - Proposed - With Zebra Crossings (Site Folder: AM Peak Hour)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Buchan Avenue (SE)														
4	L2	90	0	95	0.0	0.526	7.7	LOS A	4.6	32.4	0.66	0.80	0.96	37.5
5	T1	306	0	322	0.0	0.526	5.8	LOS A	4.6	32.4	0.66	0.80	0.96	37.4
6	R2	1	0	1	0.0	0.526	16.2	LOS B	4.6	32.4	0.66	0.80	0.96	37.2
Approach		397	0	418	0.0	0.526	6.3	NA	4.6	32.4	0.66	0.80	0.96	37.4
NorthEast: Faulkner Way (NE)														
7	L2	3	0	3	0.0	0.026	10.0	LOS A	0.1	0.5	0.79	0.87	0.79	34.8
8	T1	1	0	1	0.0	0.026	16.5	LOS B	0.1	0.5	0.79	0.87	0.79	34.8
9	R2	3	0	3	0.0	0.026	17.2	LOS B	0.1	0.5	0.79	0.87	0.79	34.5
Approach		7	0	7	0.0	0.026	14.0	LOS A	0.1	0.5	0.79	0.87	0.79	34.7
NorthWest: Buchan Avenue (NW)														
10	L2	1	0	1	0.0	1.012	55.2	LOS D	50.0	350.1	1.00	3.37	5.30	25.4
11	T1	594	0	625	0.0	1.012	52.4	LOS D	50.0	350.1	1.00	3.37	5.30	25.3
12	R2	194	0	204	0.0	1.012	53.4	LOS D	50.0	350.1	1.00	3.37	5.30	25.2
Approach		789	0	831	0.0	1.012	52.7	NA	50.0	350.1	1.00	3.37	5.30	25.3
SouthWest: Faulkner Way (SW)														
1	L2	3	0	3	0.0	0.143	4.7	LOS A	0.4	2.7	0.89	0.90	0.89	28.9
2	T1	1	0	1	0.0	0.143	15.6	LOS B	0.4	2.7	0.89	0.90	0.89	28.9
3	R2	10	0	11	0.0	0.143	46.4	LOS D	0.4	2.7	0.89	0.90	0.89	28.7
Approach		14	0	15	0.0	0.143	35.3	LOS C	0.4	2.7	0.89	0.90	0.89	28.8
All Vehicles		1207	0	1271	0.0	1.012	37.0	NA	50.0	350.1	0.89	2.48	3.80	28.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2a. Buchan Avenue / Faulkner Way - PM Peak - Existing - No Zebra Crossing (Site Folder: PM Peak Hour)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Buchan Avenue (SE)														
4	L2	100	0	105	0.0	0.338	3.4	LOS A	0.0	0.3	0.01	0.08	0.01	39.9
5	T1	518	0	545	0.0	0.338	0.0	LOS A	0.0	0.3	0.01	0.08	0.01	39.7
6	R2	3	0	3	0.0	0.338	4.6	LOS A	0.0	0.3	0.01	0.08	0.01	39.5
Approach		621	0	654	0.0	0.338	0.6	NA	0.0	0.3	0.01	0.08	0.01	39.8
NorthEast: Faulkner Way (NE)														
7	L2	1	0	1	0.0	0.007	4.0	LOS A	0.0	0.2	0.50	0.58	0.50	36.6
8	T1	1	0	1	0.0	0.007	10.3	LOS A	0.0	0.2	0.50	0.58	0.50	36.6
9	R2	1	0	1	0.0	0.007	11.8	LOS A	0.0	0.2	0.50	0.58	0.50	36.3
Approach		3	0	3	0.0	0.007	8.7	LOS A	0.0	0.2	0.50	0.58	0.50	36.5
NorthWest: Buchan Avenue (NW)														
10	L2	3	0	3	0.0	0.348	7.7	LOS A	2.5	17.3	0.62	0.44	0.77	37.8
11	T1	201	0	212	0.0	0.348	3.6	LOS A	2.5	17.3	0.62	0.44	0.77	37.6
12	R2	197	0	207	0.0	0.348	7.9	LOS A	2.5	17.3	0.62	0.44	0.77	37.4
Approach		401	0	422	0.0	0.348	5.7	NA	2.5	17.3	0.62	0.44	0.77	37.5
SouthWest: Faulkner Way (SW)														
1	L2	1	0	1	0.0	0.007	5.4	LOS A	0.0	0.2	0.64	0.67	0.64	36.4
2	T1	1	0	1	0.0	0.007	9.4	LOS A	0.0	0.2	0.64	0.67	0.64	36.4
3	R2	1	0	1	0.0	0.007	12.9	LOS A	0.0	0.2	0.64	0.67	0.64	36.2
Approach		3	0	3	0.0	0.007	9.2	LOS A	0.0	0.2	0.64	0.67	0.64	36.3
All Vehicles		1028	0	1082	0.0	0.348	2.6	NA	2.5	17.3	0.25	0.22	0.31	38.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2b. Buchan Avenue / Faulkner Way - PM Peak - Proposed - With Zebra Crossings (Site Folder: PM Peak Hour)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Buchan Avenue (SE)														
4	L2	100	0	105	0.0	0.917	25.5	LOS B	24.0	168.3	0.98	2.28	3.44	31.4
5	T1	518	0	545	0.0	0.917	25.1	LOS B	24.0	168.3	0.98	2.28	3.44	31.3
6	R2	3	0	3	0.0	0.917	27.7	LOS B	24.0	168.3	0.98	2.28	3.44	31.2
Approach		621	0	654	0.0	0.917	25.2	NA	24.0	168.3	0.98	2.28	3.44	31.3
NorthEast: Faulkner Way (NE)														
7	L2	1	0	1	0.0	0.008	6.1	LOS A	0.0	0.2	0.67	0.70	0.67	36.3
8	T1	1	0	1	0.0	0.008	11.3	LOS A	0.0	0.2	0.67	0.70	0.67	36.2
9	R2	1	0	1	0.0	0.008	11.8	LOS A	0.0	0.2	0.67	0.70	0.67	36.0
Approach		3	0	3	0.0	0.008	9.7	LOS A	0.0	0.2	0.67	0.70	0.67	36.2
NorthWest: Buchan Avenue (NW)														
10	L2	3	0	3	0.0	0.566	10.6	LOS A	4.6	32.4	0.71	0.99	1.17	36.5
11	T1	201	0	212	0.0	0.566	7.2	LOS A	4.6	32.4	0.71	0.99	1.17	36.4
12	R2	197	0	207	0.0	0.566	10.8	LOS A	4.6	32.4	0.71	0.99	1.17	36.2
Approach		401	0	422	0.0	0.566	9.0	NA	4.6	32.4	0.71	0.99	1.17	36.3
SouthWest: Faulkner Way (SW)														
1	L2	1	0	1	0.0	0.013	5.8	LOS A	0.0	0.3	0.78	0.79	0.78	34.2
2	T1	1	0	1	0.0	0.013	10.3	LOS A	0.0	0.3	0.78	0.79	0.78	34.2
3	R2	1	0	1	0.0	0.013	31.1	LOS C	0.0	0.3	0.78	0.79	0.78	34.0
Approach		3	0	3	0.0	0.013	15.7	LOS B	0.0	0.3	0.78	0.79	0.78	34.1
All Vehicles		1028	0	1082	0.0	0.917	18.8	NA	24.0	168.3	0.88	1.77	2.54	33.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.