

25 March 2020

181210 TAAA

Point Polaris  
Level 25, Tower 3, International Towers  
300 Barangaroo Avenue  
Barangaroo NSW 2000

Attention: Rob Hain

## Forestway Shopping Centre Redevelopment Road Safety Review

Dear Rob,

This document outlines the findings of an independent road safety review, including a design assessment and site visits, for a proposed intersection at the Forestway Shopping Centre, as illustrated in Figure 1 below.

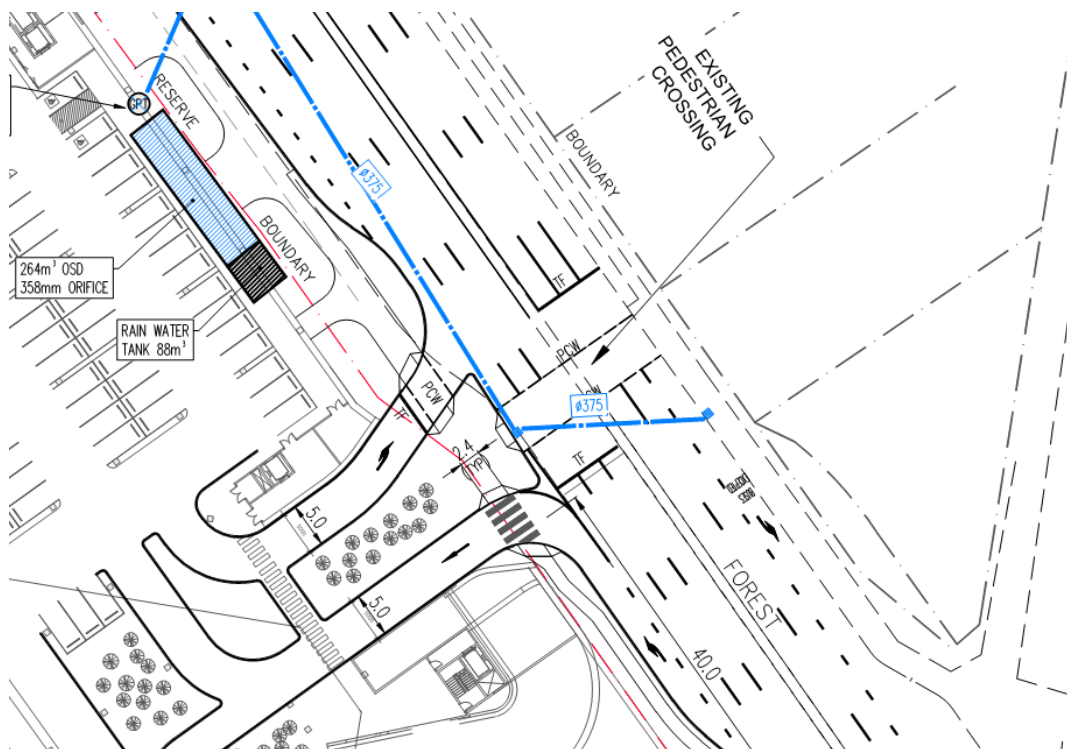


Figure 1: Proposed entry/exit intersection (note – signalised pedestrian crossing is existing)

This Road Safety Review provides design recommendations for consultation with the design team. We seek to proactively ameliorate the safety issues which have been independently identified.

The civil engineering drawings which have been reviewed as part of this assessment include:

- SKC06 [P6] – 21/02/2020 – Siteworks Plan Level B1
- SKC22 [P7] – 21/02/2020 – B99 Turning Path Plan Exit Ramps to Forest Way

## Site Observations

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The extent of site observations included the existing signalised pedestrian crossing on Forest Way, and the Forest Way frontage generally between Russell Avenue and Warringah Road.

Site inspections were undertaken during the following periods:

- Tuesday 3<sup>rd</sup> March 2020, between approximately 4:30pm and 5:30pm (evening peak)
- Wednesday 18<sup>th</sup> March 2020, between approximately 2:45pm and 3:45pm (afternoon peak)
- Thursday 19<sup>th</sup> March 2020, between approximately 8:00am and 9:00am (morning peak)

The site inspections were undertaken by two traffic engineers independent of the design team, Michael Babbage and Grace Carpp, who are also road safety auditors.

Pedestrian activity along the site frontage was mostly based on the arrival of buses and the drop-off of passengers. After each bus arrival, up to approximately 10 pedestrians would typically walk to the signalised crossing, with some others walking directly into the shopping centre. For dedicated school bus services, passengers were roughly split between those who would cross the road, enter the shopping centre, or wait to catch another bus. The frequency of bus arrivals was low enough for pedestrian queues to clear the signalised crossing prior to any additional arrivals.

Additional pedestrian activity was generated by the shopping centre, with movements directly into the existing car park. Movements between the shopping centre and the bus stop on the east side were notable, including relatively high numbers of school children. This demand also included people rushing from the shopping centre to make the end of a flashing red pedestrian signal.

Volumes of pedestrians walking along the site frontage (not associated with the shopping centre or buses) were low in both directions, but some were observed.

Some pedestrians took shortcuts diagonally across the intersection, toward the bus stops downstream from the crossing on both sides of the road. These shortcuts were typically minor, however some significant shortcuts (such as directly from the indented northbound bus bay) were observed. Shortcuts at the north-east and south-west occasionally involved pedestrians moving between stopped vehicles. On a small number of occasions, the overlap of pedestrian movements at the centre of the road resulted in a crowd width greater than the available opening in the median island.

For the morning and afternoon peak periods, pedestrian volumes were recorded as follows:

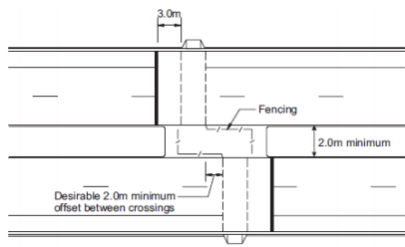
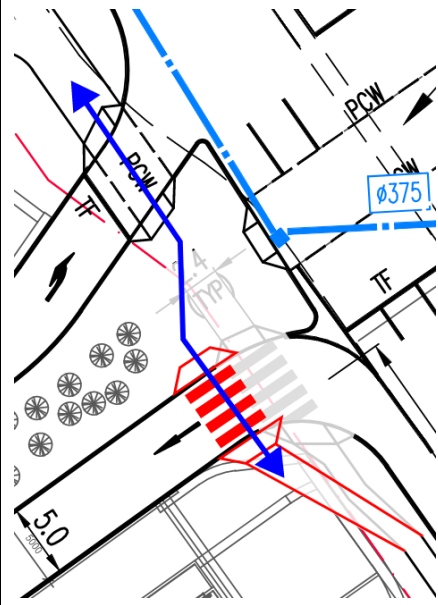
- **AM (8:15am – 9:15am)**
  - 106 movements across Forest Way
  - 103 movements north of the crossing
  - 9 movements south of the crossing
- **PM (3:00pm – 4:00pm)**
  - 195 movements across Forest Way
  - 181 movements north of the crossing
  - 18 movements south of the crossing

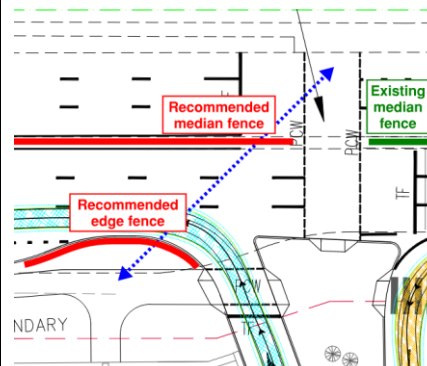
Southbound vehicle flows (toward Warringah Road) would frequently queue up to and beyond the signalised crossing. Drivers generally adhered to road rules and stopped clear of the crossing, however some minor volumes of queuing across the crossing were observed. It is noted that the intersection of Forest Way and Warringah Road is currently undergoing road works and will experience major changes to traffic flows on completion of the Northern Beaches Hospital Road Upgrade project.

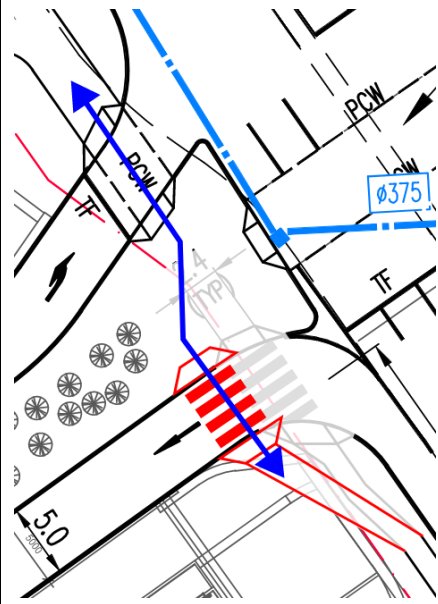
## Key Findings & Recommendations

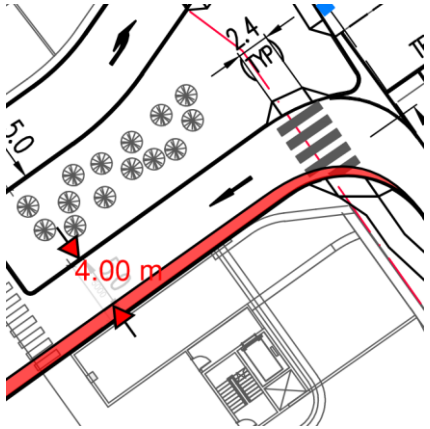
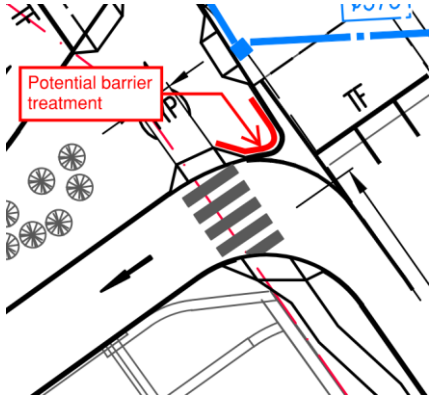
On review of the proposed design (as per the list of drawings given above) and the current site, the table below details the potential road safety issues identified, along with recommended solutions.

A draft copy of these findings and recommendations were provided to the civil engineer. Review and consultation has resulted in the outcomes for the design as listed below. These outcomes have been incorporated into a draft design update as attached to this document.

Findings	Recommendations	Suggested Layout	Outcomes (+ see attached)
<p><b><u>1. Inconsistent Crossing Treatments</u></b></p> <p>For pedestrians walking northbound along the frontage of the site, the proposed works would provide a marked pedestrian zebra crossing (at the vehicle entry lane) followed by a signalised pedestrian crossing (at the vehicle exit lane).</p> <p>The differing treatments may be confused by users, – if a pedestrian has right-of-way across one lane, they could assume they have right-of-way across an additional lane immediately following and proceed into an active vehicle lane.</p> <p>This is particularly the case where there is no significant change in road function between the two driveways, in contrast to pedestrians continuing to the crossing at Forest Way where there is a major change in road function</p>	<p>Provide an offset between the two driveway crossings to alert pedestrians to the change in environment and require an active change in behaviour between the two crossings.</p> <p>An example for a mid-block crossing (from the Queensland Department of Transport and Main Roads Supplement to Austroads Guide to Road Design Part 4) is shown below.</p> 		<p>The pedestrian footpath route will be required to be within the road reserve. Movement of the zebra crossing within the site would be outside the road reserve and would interfere with a proposed plant room for the development.</p> <p>As an alternative, an inverse solution is proposed – the zebra crossing can be moved slightly closer to the road, and the signalised crossing further within the site. This proposal also has the added benefit of providing additional pedestrian storage space on the island by increasing the distance between the Forest Way crossing and the driveway crossing.</p>

Findings	Recommendations	Suggested Layout	Outcomes (+ see attached)
<p>and pedestrians may be more alert.</p> <p>It is acknowledged that volumes of pedestrians along the frontage are relatively low and the main development desire line does not follow these crossings, however this risk item carries a high consequence due to potential pedestrian-vehicle collisions.</p>			
<p><b><u>2. Diagonal Shortcuts</u></b></p> <p>Pedestrians cutting diagonally across the road, or rushing for a flashing signal, has been observed at the current site. The provision of the new signalised exit lane on an alternating signal cycle would increase safety risks around this space. Pedestrians cutting diagonally from the crossing westbound toward the northbound bus stop (under a green pedestrian signal) would be crossing the vehicle exit lane (which would also have a green signal). Vehicle volumes exiting the site are likely to be low enough to create inconsistent streams and gaps in traffic, which could give a false impression of a safe gap for pedestrians.</p>	<p>Provide pedestrian fencing along the edge of road reserve (north of the exit driveway lane) to deter pedestrian shortcuts in this area.</p> <p>Provide pedestrian fencing along the road median (consistent with the existing treatment south of the crossing) to further deter pedestrian shortcuts.</p>		<p>An additional pedestrian fence can be incorporated into the design, subject to Transport for NSW concurrence for works on the median of the state road.</p> <p>Completion of these works may also require confirmation of any works related to Northern Beaches Hospital Road Upgrade, which involved replacement of the existing median fence.</p>

Findings	Recommendations	Suggested Layout	Outcomes (+ see attached)
<p><b><u>3. Visibility of Pedestrians at Entry Driveway</u></b></p> <p>The entry driveway requires drivers to give way to pedestrians at a marked pedestrian zebra crossing. Pedestrians travelling northbound would be immediately to the left of approaching vehicles, on the passenger side, at the point of decision for the driver. Visibility to an approaching pedestrian may be difficult and poor, with a potential risk of collision.</p>	<p>Move the zebra crossing further within the site, to provide a more head-on approach to the crossing and a more typical arrangement for all users.</p> <p>Following any changes, ensure pedestrian visibility is maintained around the plant room area such as by a splay or chamfer.</p> <p>This change would also satisfy the recommended offset of crossings.</p>		<p>Due to the proposed offset crossing in Item 1, and other site restrictions, the zebra crossing could not be moved further within the site.</p> <p>It is proposed that zig-zag line marking be provided within the turning lane to alert drivers, plus advance warning signage.</p>

Findings	Recommendations	Suggested Layout	Outcomes (+ see attached)
<p><b><u>4. Width of Entry and Exit Driveways</u></b></p> <p>The entry and exit driveways are each 5 metres wide. This is much wider than would typically be required for single lane car movements, particularly as demonstrated by the swept path analysis for B99 vehicles. The excess width may encourage higher-than-normal vehicle speeds through these spaces, which could pose a hazard for pedestrians.</p> <p>Requirement for larger vehicles such as delivery and service vehicles is not shown in the swept path drawings.</p>	<p>Reduce the lane width at both the entry and exit driveway to act as a traffic calming measure and slow vehicles in areas with pedestrian interaction.</p> <p>This change would also increase physical clearances to walls adjacent to each driveway.</p>		<p>The lane width can be reduced within the site. The lane width at the corners is suggested to be retained at the current design width.</p> <p>Lane width within the deceleration is also already low (3.0m) which should assist in traffic calming.</p>
<p><b><u>5. Pedestrian Vulnerability to Errant Vehicles</u></b></p> <p>The deceleration lane at the entry driveway ends in a tight left-hand turn into the site. In the event of an errant vehicle being unable to make this turn, the vehicle would travel directly onto the pedestrian island in front of the signalised crossing, which is a designated waiting and queuing space for pedestrians.</p>	<p>Provide a vehicle crash barrier at the pedestrian island, to protect pedestrians waiting at the signalised crossing.</p> <p>Reduction in lane width (as recommended above) would act as a traffic calming measure which would also help to improve pedestrian vulnerability risks.</p>		<p>An F-type concrete barrier could be provided at this location, subject to detailed design and finalisation of the pedestrian crossing location.</p>

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## Conclusion

On the basis of the above design changes, we believe that the road safety risks which have been identified to date have been considered and addressed.

This assessment shall not be construed as relieving any other party of their responsibilities or liabilities, and the need for continued Safety in Design considerations throughout the detailed design and construction of this site.

Should you require anything further please contact the undersigned.

Yours faithfully,

**TAYLOR THOMSON WHITTING (NSW) PTY LTD**  
in its capacity as trustee for the  
**TAYLOR THOMSON WHITTING NSW TRUST**



**MICHAEL BABBAGE**  
Senior Traffic Engineer

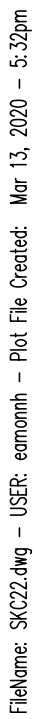
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## Attachments

- SKC22 [P8] – B99 Turning Paths Plan Exit Ramps to Forest Way



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Scale : A1	Drawn	Authorised
1:200	AS	
Job No	Drawing No	Revision
181210	SKC22	P8
Plot File Created: Mar 13, 2020 - 5:32pm		