

Our Ref: 16111

3 April 2019

Scentre Group
85 Castlereagh Street
SYDNEY NSW 2000

Attention: Mr Anthony Iannuzzi

Dear Anthony,

**RE: WESTFIELD WARRINGAH MALL REDEVELOPMENT AMENDED STAGE 2 DA
ADDITIONAL TRAFFIC MODELLING**

As requested, please find herein The Transport Planning Partnership's (TPPP) additional traffic assessment for the above proposed development with consideration to comments raised by Roads and Maritime Services.

Background

In August 2018 TPPP prepared a traffic impact assessment to accompany a development application to the Northern Beaches Council for a proposed expansion of the Westfield Warringah Mall Shopping Centre. The development application seeks approval to add an additional 9,847m² of floor area with a corresponding 418 net additional car parking spaces as part of the Stage 2 proposed expansion at the Centre. In addition, the development application seeks approval to provide an additional egress from the Centre into Condamine Street (in the southbound direction) as well as converting Dale Street into a two-way road.

The traffic assessment included traffic capacity analysis of nearby intersections to assess the traffic effects of the proposed additional floor area and proposed changes to access arrangements.

The traffic assessment included traffic capacity analysis with and without the proposed works associated with the Brookvale Community Health Centre proposed by NSW Health Infrastructure (i.e. proposed right turn from William Street to Pittwater Road (North) and the construction of a pedestrian bridge to replace the at-grade crossing).

Roads and Maritime Services (Roads and Maritime) has conducted a review of the development application and made comments in relation to the traffic assessment.

TTPP has prepared this letter to present the findings of additional intersection modelling and address comments raised by Roads and Maritime in their letter dated 10 December 2018 which was subsequently superseded by their letter dated 15 January 2019.

Roads and Maritime's Comments

The comments in their letter dated 15 January 2019 can be summarised as follows:

- proposed right turn out of William Street is no longer proposed
- the pedestrian bridge will provide additional green time to bus and general traffic movements and not to be allocated to Warringah Mall traffic
- works associated with the Brookvale Community Health Centre will not provide additional traffic capacity and the proposed egress will reduce traffic capacity, and
- Dale Street southbound right turn traffic will be affected by traffic from the Centre and the Dale Street northbound right turn traffic will not be able turn into Cross Street due to the capacity of the storage area on Cross Street between Pittwater Road and Dale Street.

Roads and Maritime has requested for the following information to be provided:

- amended plans are to be provided showing the proposed Condamine Street egress relocated so that the intersection is presented as a standard entry/egress and any additional green time afforded by the pedestrian bridge is not to be allocated to Warringah Mall traffic
- concept plans with swept path to be submitted, and
- further information is required to address the issue of capacity of the storage area on Cross Street between Pittwater Road and Dale Street.

Access Options

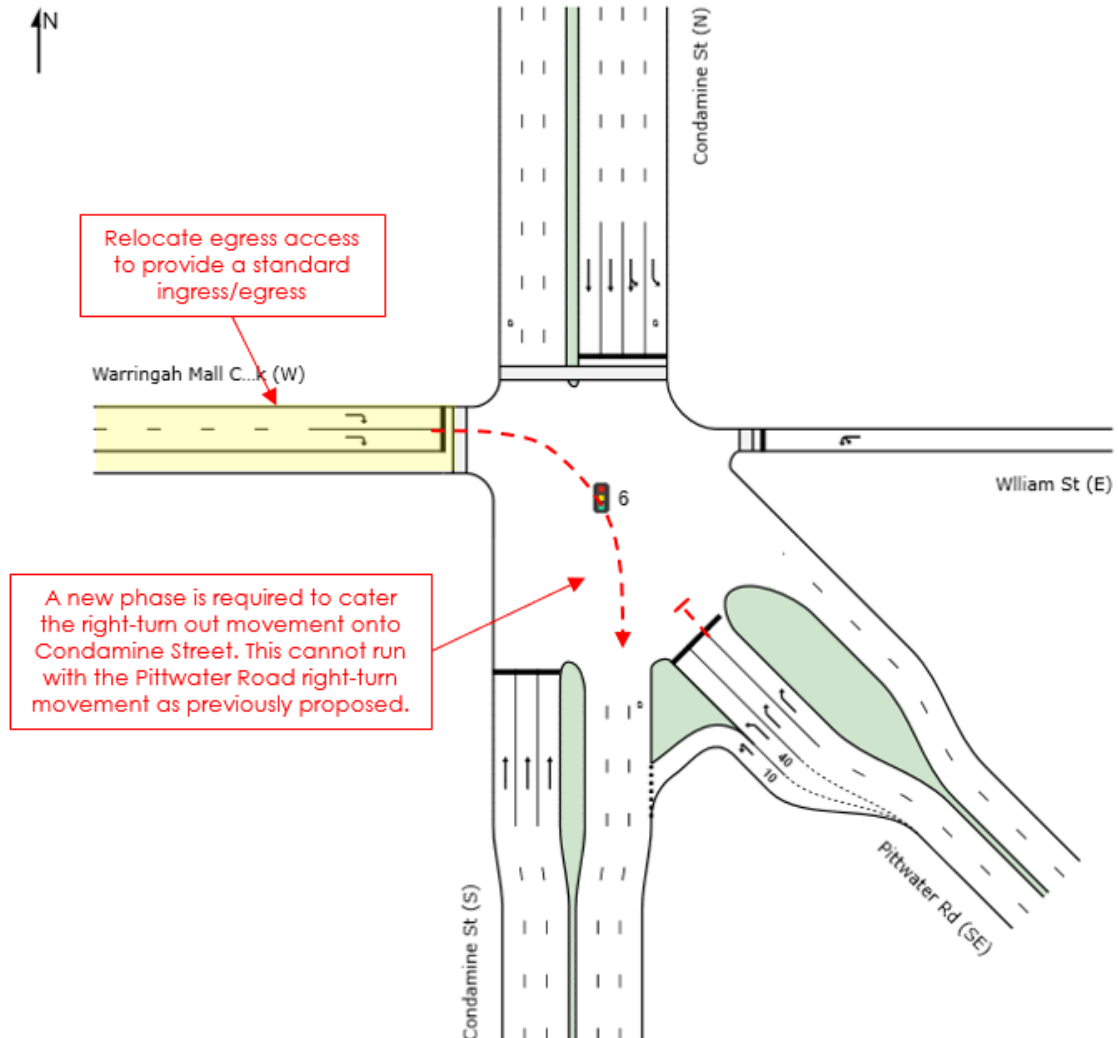
TTPP has conducted additional traffic assessment to address the issues raised by Roads and Maritime. In conducting the additional traffic assessment, the following access options have considered.

Provision of a Standard Ingress/Egress Access onto Condamine St (Option A)

This option (Option A) reflects Roads and Maritime's comments to provide a standard ingress and egress arrangement. Under this option, an additional signal phase would be required to cater for the right-turn egress movement onto Condamine Street. This means less green time for existing movements at this Condamine Street-William Street intersection, which may not be supported by Roads and Maritime.

The standard ingress/egress access on Condamine Street is shown in Figure 1.

Figure 1: Standard Ingress/Egress on Condamine St (Option A)

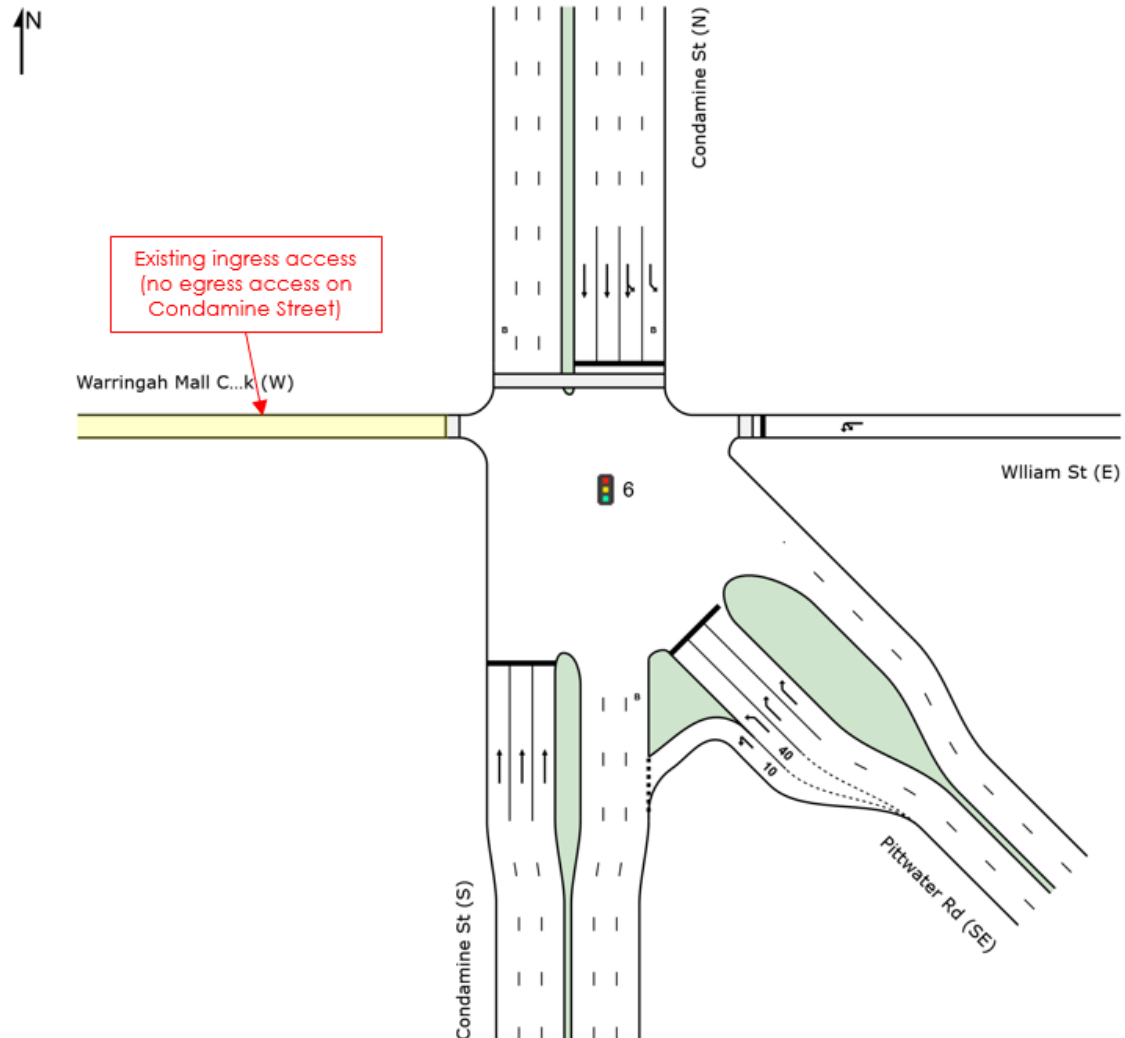


Removal of Egress Access on Condamine St (Option B)

Under this option (Option B), the Stage 2 development traffic would be accommodated using existing access arrangements i.e. no proposed egress off Condamine Street. This means that all traffic from Centre wanting to travel southbound along Condamine Street would be accommodated on Cross Street (instead of using the proposed Condamine Street egress as proposed in Option A above).

This access arrangement is shown in Figure 2.

Figure 2: No Egress on Condamine St (Existing Access Arrangements, Option B)



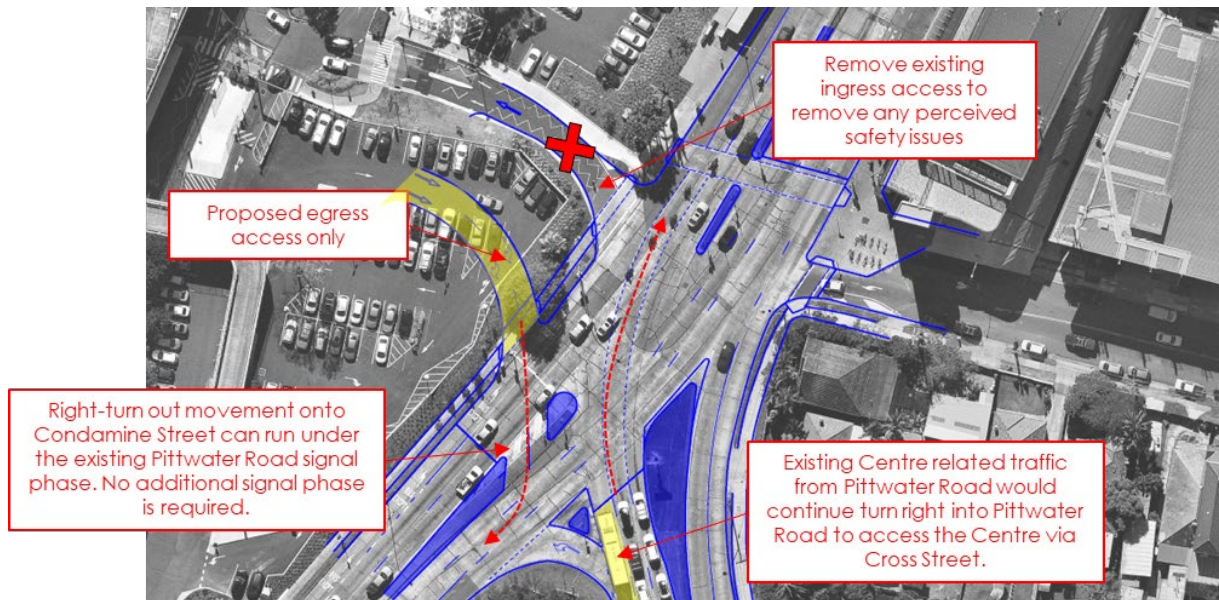
Egress Access Only on Condamine St (Option C)

This option (Option C) removes the existing ingress access on Condamine Street, opposite William Street, to accommodate a proposed egress access only to cater for right-turn movement onto Condamine Street similar to the original proposed Condamine Street egress detailed in the DA traffic assessment. This option is consistent with Roads and Maritime request to provide a standard egress on Condamine Street.

This right turn egress will be configured in such a way to enable the right turn movement from the Centre to operate in the same signal phase as the Pittwater Road northbound traffic movement such that no additional signal phase is required. This is similar to that previously proposed at this location (as reported in the original DA traffic assessment report), but involves the removal of the existing ingress access.

This arrangement is shown in Figure 3.

Figure 3: Egress Access only on Condamine St (Option C)



Dale St One/Two-way Access (Scenarios 5 and 6)

The previous assessment included the proposal to convert Dale Street into a two-way road to assist with alleviating traffic demand on existing site access points, particularly at the Green Street site access point. Under a one-way access option on Dale Street which is consistent with existing access arrangement, traffic would leave the site from Green Street onto Cross Street.

The two-way Dale Street option is shown in Figure 4. The one-way Dale Street option is shown in Figure 5.

Figure 4: Proposed Dale St Two-Way Arrangements (Scenario 5)

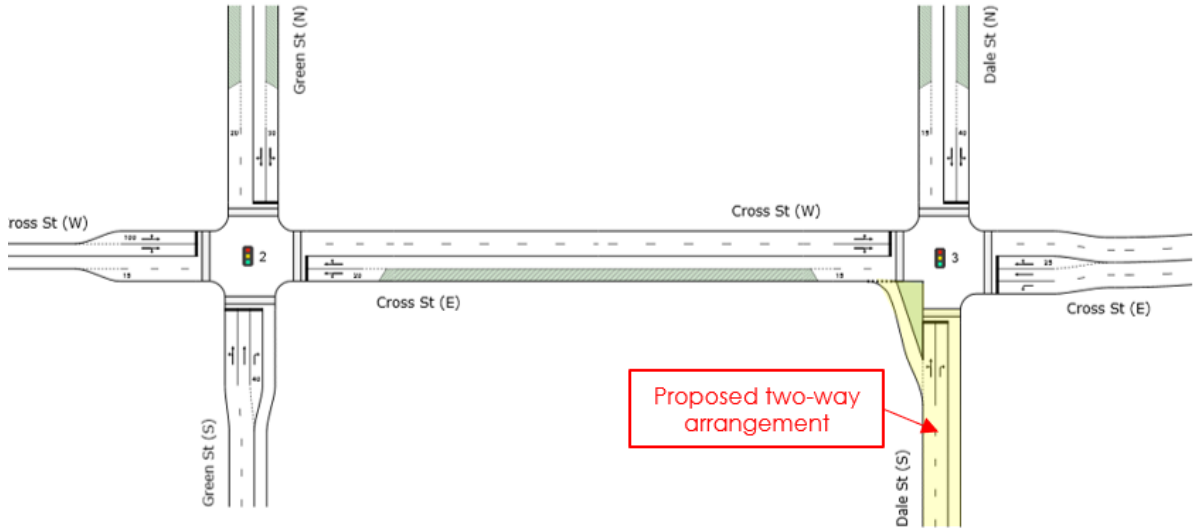
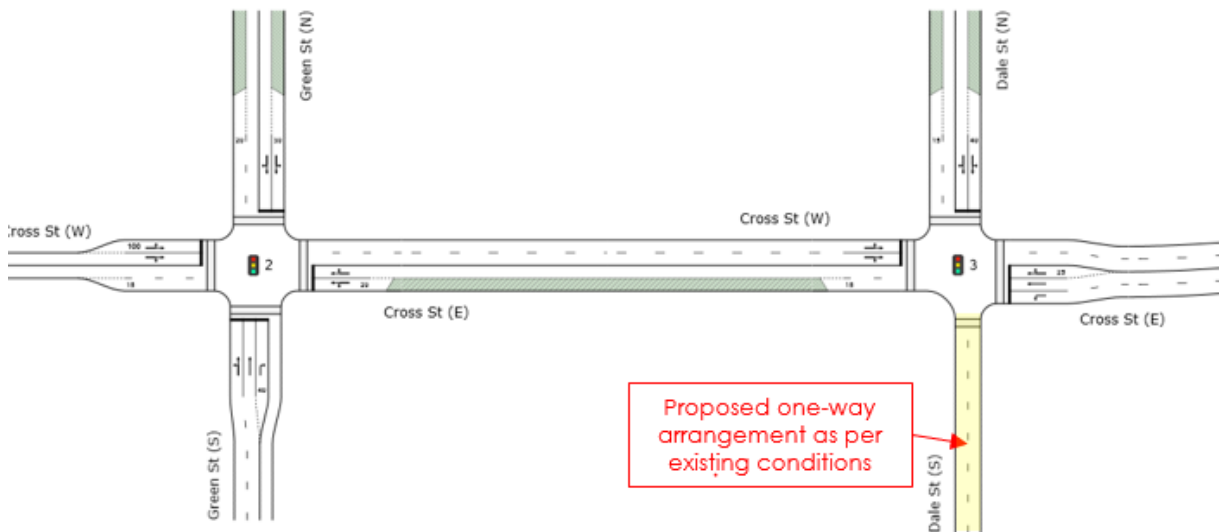


Figure 5: Dale St One-Way Arrangements (Existing Conditions, Scenario 6)



Modelling Results

The modelling scenarios are summarised in Table 1.

Table 1: Modelling Scenarios

Access Options	Scenario	
	Scenario 5 (Dale Street Two Way)	Scenario 6 (Dale Street One Way)
A. Standard Ingress/Egress at Condamine Street-William Street	Scenario 5A	Scenario 6A
B. Removal of Egress Access on Condamine Street (Existing Access Arrangements)	Scenario 5B	Scenario 6B
C. Egress Access Only on Condamine Street (Removal of Existing Ingress Access)	Scenario 5C	Scenario 6C

It is noted that all of the above scenarios assume that the at-grade pedestrian crossing across Pittwater Road near William Street will be retained as per existing conditions. Similarly, the above scenarios do not permit right turn movement out of William Street into Pittwater Road. These assumptions are consistent with Roads and Maritime's comments.

A summary of the modelling results is provided in Table 2 and Table 3 for Scenario 5 (with Access Options A to C) and Scenario 6 (with Access Options A to C) respectively. Table 2 and Table 3 also include modelling results for Scenario 4 as report in the DA traffic assessment report which relates to Stage 2 development traffic and proposed access changes on Condamine Street and Cross Street.

Table 2: Scenario S5 Modelling Results (Dale St Two-Way)

Intersection	Scenario 4 (With No HI Works) [§]				Option A – Standard Access on Condamine St				Option B – No Egress on Condamine St				Option C – Egress Access Only on Condamine St			
	Thursday Peak		Saturday Peak		Thursday Peak		Saturday Peak		Thursday Peak		Saturday Peak		Thursday Peak		Saturday Peak	
	Delay	LoS	Delay	LoS	Delay	LoS	Delay	LoS	Delay	LoS	Delay	LoS	Delay	LoS	Delay	LoS
Green St-Cross St	26	B	22	B	26	B	22	B	26	B	22	B	25	B	22	B
Dale St-Cross St	19	B	25	B	19	B	25	B	871	F	2,344	F	20	B	25	B
Pittwater Rd-Cross St	43	D	34	C	43	D	34	C	61	E	34	C	56	D	37	C
Pittwater Rd-Shopping Centre Access	1	A	1	A	1	A	1	A	1	A	1	A	1	A	1	A
Pittwater Rd-William St	38	C	34	C	94	F	103	F	41	C	31	C	38	C	37	C
Condamine St-Old Pittwater Rd	40	C	25	B	30	C	25	B	24	B	22	B	40	C	25	B
Old Pittwater Rd-Shopping Centre Access	3	A	2	A	3	A	2	A	3	A	2	A	3	A	2	A

[§] denotes modelling results for Scenario 4 from the original DA traffic assessment report dated August 2018 which does not include works proposed as part of the Brookvale Community Health Centre proposed by Health Infrastructure

Table 3: Scenario S6 Modelling Results (Dale St One-Way)

Intersection	Scenario 4 (With No HI Works) [§]			Option A – Standard Access on Condamine St			Option B – No Egress on Condamine St			Option C – Egress Access Only on Condamine St						
	Thursday Peak		Saturday Peak	Thursday Peak		Saturday Peak	Thursday Peak		Saturday Peak	Thursday Peak		Saturday Peak				
	Delay	LoS	Delay	LoS	Delay	LoS	Delay	LoS	Delay	LoS	Delay	LoS				
Green St-Cross St	26	B	22	B	26	B	23	B	86	F	319	F	25	B	23	B
Dale St-Cross St	19	B	25	B	17	B	16	B	17	B	16	B	17	B	17	B
Pittwater Rd-Cross St	43	D	34	C	41	C	34	C	124	F	73	F	56	D	35	C
Pittwater Rd-Shopping Centre Access	1	A	1	A	1	A	1	A	1	A	1	A	1	A	1	A
Pittwater Rd-William St	38	C	34	C	94	F	103	F	41	C	29	C	38	C	38	C
Condamine St-Old Pittwater Rd	40	C	25	B	30	C	25	B	24	B	22	B	40	C	25	B
Old Pittwater Rd-Shopping Centre Access	3	A	2	A	3	A	2	A	3	A	2	A	3	A	2	A

[§] denotes modelling results for Scenario 4 from the original DA traffic assessment report dated August 2018 which does not include works proposed as part of the Brookvale Community Health Centre proposed by Health Infrastructure

Under the above modelling options, the following key points are noted:

- Option A involves providing a standard ingress/egress access on Condamine Street as requested by Roads and Maritime would result in unsatisfactory intersection performance (LoS F) at the Pittwater Road-William Street intersection as a new signal phase is required to accommodate right turn movements out onto Condamine Street. Extensive delays and queuing will also be experienced for vehicles exiting the Centre onto Condamine Street. To address this issue, additional green time would be required to accommodate Centre related traffic. This means less green time on Pittwater Road and Condamine Street, which is unlikely to be supported by Roads and Maritime as it would affect the signal coordination on Pittwater Road. This is applicable to both Scenarios 5 and 6.
- Option B examines an access arrangement in which there is no egress to Condamine Street and traffic wanting to travel southbound would do so via the existing vehicle access arrangements on Cross Street. This would result in traffic capacity issues on Cross Street between Green Street and Pittwater Road. This unsatisfactory network performance is unlikely to be supported by Roads and Maritime. Additional lane capacity on Cross Street would need to be considered between Dale Street and Pittwater Road, particularly the right-turn lane capacity onto Pittwater Road. These changes will require land to be provided to Roads and Maritime on Cross Street and Pittwater Road site frontages. However, both the Green Street and Dale Street would continue to experience traffic capacity stress with or without the Cross Street additional capacity discussed above. These issues exist in Scenario 5 and 6.
- Option C involves providing an egress access only on Condamine Street which is consistent with the previous proposal. However, this option also involves the removal of the existing ingress access on Condamine Street, opposite William Street, to provide a standard egress as requested by Roads and Maritime. This means traffic accessing the Centre from Pittwater Road (south) that used to rely on the ingress opposite William Street would do so in the future via Cross Street. This would result in an increased left-turn demand on Pittwater Road (south) onto Cross Street (west) which already operates poorly due to traffic capacity issues on Cross Street. This option would require a new (uncontrolled) left turn slip lane provided on Pittwater Road (south) at Cross Street to maintain an acceptable intersection performance at the Pittwater Road-Cross Street intersection. The above identified issues relate to both Scenarios 5 and 6.
- The option to convert Dale Street to two-way will assist alleviate traffic demand at the Green Street access onto Cross Street in Options A and C. In Options A and C, this is not expected to result in any adverse traffic issues on the network as the model indicates that eastbound queues on Cross Street on approach to Pittwater Road do not (on average) queue beyond the Dale Street access.
- The option to retain Dale Street as one-way will address Roads and Maritime's concerns regarding right turn issues from Dale Street onto Cross Street. The modelling shows that the additional traffic generated by the Stage 2 development on the Cross Street access would continue to operate at a satisfactory level of service (LoS B) if an egress access is provided on Condamine Street. Otherwise, this access would operate poorly due to traffic capacity issues on Cross Street as outlined above.

In recognition of the above, an egress access on Condamine Street is required to maintain satisfactory network performance on Cross Street.

A summary of the response to Roads and Maritime comments is provided in Table 4.

Table 4: Response to Roads and Maritime Comments

RMS Comment	TPP Response
<p>1. Existing traffic arrangements on William Street are to remain unchanged. The at grade pedestrian crossing on Condamine Street is to be included in all future plans.</p>	<p>It is noted that the previous traffic assessment conducted by TPPP included options with and without the proposed works associated with the Brookvale Community Health Centre.</p> <p>The current traffic assessment continues to retain the traffic arrangements on William Street and the at grade pedestrian crossing on Condamine Street.</p>
<p>2. Capacity is reduced due to the increase in all red times for all existing phases due to the re-location of the stop lines.</p>	<p>The current traffic assessment has allowed for this by increasing the amber time by two seconds for the relevant traffic signal phases. This is based on the additional travel distance through the intersection due to the stop lines being pushed back with an assumed travel speed of 10km/hr.</p>
<p>3. Amended plans are to be provided to show the proposed egress on Condamine Street to be relocated so that the intersection is presented with a standard entry/egress. Increased red times are also required on signal phases if the stop line is to be relocated.</p>	<p>Based on the updated traffic modelling, it is recommended that an egress only access be provided on Condamine Street. This means that the existing ingress access would need to be removed to provide a standard egress arrangement, as per Roads and Maritime's comments. It is however noted that a new ingress access on Pittwater Road between William Street and Cross Street is required to maintain an acceptable intersection performance at Pittwater Road-Cross Street intersection.</p>
<p>4. Concept design plans with supporting swept paths to be submitted.</p>	<p>TPPP has previously provided this. However, upon agreement from Roads and Maritime, further amended plans will be prepared reflecting the proposed arrangement.</p>
<p>5. The proposed Dale Street two-way conversion will affect southbound right-turn traffic from Dale Street into Cross Street. Vehicles may also not be able to turn out from the Centre onto Cross Street due to limited storage capacity for eastbound traffic on Cross Street between Pittwater Road and Dale Street.</p>	<p>The modelling indicates that there would be some downstream queueing on Cross Street on approach to Pittwater Road during "heavy egress periods". This issue is exacerbated if no egress access on Condamine Street can be provided.</p> <p>Notwithstanding this, if an egress access can be provided on Condamine Street, the model shows (on average), eastbound queues on Cross Street on approach to Pittwater Road do not generally queue beyond the Dale Street access. Additional right-turn lane capacity on Cross Street between Dale Street and Pittwater Road may need to be considered to address the "heavy egress periods" – i.e. the 85th percentile queue length. However, overall, it is noted that the Cross Street-Dale Street access would continue to operate satisfactory under one- or two-way access arrangements if an egress access is provided on Condamine Street.</p>

Conclusion

From the modelling results contained herein, it can be concluded that the proposed Condamine Street egress together with the retention of the existing ingress at the Pittwater Road intersection with William Street (as originally proposed in the DA traffic assessment) would continue to provide satisfactory intersection performance for all intersections assessed in the future.

It is TTPP's opinion that the proposed access arrangement at the Pittwater Road intersection with William Street would provide an efficient access arrangement at this intersection and is unlikely to lead to any safety concerns. If Roads and Maritime continues to be concerned of the safety of the proposed arrangement, this could be approved subject to a road safety audit.

Any safety issues identified by the road safety audit that can not be satisfactorily resolved, an alternative option would be to revert to Option C as assessed in this letter. This option, as it removes the existing ingress, does not have any safety concerns raised by Roads and Maritime and would also provide satisfactory intersection performance.

In the light of the above, it is recommended for the proposed egress and ingress arrangement as proposed in the DA traffic assessment be adopted.

We trust the above is to your satisfaction. Should you have any queries regarding the above or require further information, please do not hesitate to contact the undersigned on 8437 7800.

Yours sincerely,



Michael Lee
Director