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Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

7th October 2020 Reference: 190226.16FC

United Cinemas
4 Vuko Place, Warriewood
Attention: Sam Mustaca

LETTER OF RESPONSE TO RMS COMMENTS FOR PROPOSED LEISURE AND ENTERTAINMENT PRECINCT AT CNR PARK STREET & WARLTERS STREET, PORT MACQUARIE

Dear Sam,

1 Responses to RMS Letter

Reference is made to your request to provide Letter of Response to RMS Comments for the Proposed Leisure and Entertainment Precinct at CNR Park Street & Warlters Street, Port Macquarie (Concept Site layout in **Annexure A**). The plans provided in **Annexure A** are in the process of being further modified to address Council's concerns, as shown in **Annexure B**. One of the modifications involves the removal of direct vehicle exit onto Warlters Street from the basement car park. The revised exit location being relocated to directly access the internal right of way. This letter is in response to RMS (now TfNSW)'s comments within a letter dated 26 November 2019. The comments made by Council relevant to traffic and parking are shown below (italicised) with *M^CLaren Traffic Engineering*'s (MTE) response thereafter.

> *Council should be satisfied that the impact of the proposed development does not adversely impact the safety and efficiency of the TCS at the adjacent intersection (ie, by increased queueing or increased points of conflict within close proximity to the signals).*

MTE Response: MTE has assessed the existing and future performance of the Park Street / Warlters Street intersection. Future performances were analysed immediately after the development, as well as over a 10-year growth horizon. The overall levels of service for each condition (as determined from SIDRA) is summarised in **Table 1**, with more detailed results reproduced in **Annexure C**. It is noted that the network peak is expected to occur between 3-5pm, whilst the development is expected to peak between 5-8pm. The traffic impact assessment has assumed these two peaks overlap and is therefore a highly conservative estimation.

TABLE 1: PARK ST / WARLTERS ST TRAFFIC IMPACT ANALYSIS (SIDRA VERSION 8)

Scenario	Peak Period	Intersection Level of Service	Average Delay (sec/veh)
Existing Scenario	Friday PM	A	7.2
	Saturday Midday	A	7.5
	Saturday PM	A	6.2
Future Scenario (Post Development)	Friday PM	A	11.7
	Saturday Midday	A	11.7
	Saturday PM	A	10.0
Future Scenario (10-year Growth Horizon + Development)	Friday PM	A	11.1
	Saturday Midday	A	11.3
	Saturday PM	A	9.4

It is evident from **Table 1** that the existing Level of Service (LoS) is maintained under all tested scenarios. Further, with respect to vehicular queueing at the Park Street / Warlters Street signalised intersection the right turn bay does not overflow.

> *Council should be satisfied that through and turning traffic has been adequately addressed. Please refer to Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings and Australian Standard 2890.1 – Off Street Car Parking*

MTE Response: The proposal includes the provision of 436 total car parking spaces (including 160 basement spaces and 276 within the existing Kmart site). The proposed driveway is designed as a Category 4 driveway in accordance with *Table 3.1* and *Table 3.2* of *AS2890.1:2004*, reproduced in **Annexure D**. Therefore, it is not required to be provided as an intersection. Through and turning traffic has been adequately addressed in MTE's traffic impact analysis summarised in **Table 1**.

> *It is noted that an additional gap is to be provided in the median section of Warlters Street, to allow an additional right turn into and out of the site at the eastern side of the Kmart parking area. Warlters Street is a 2-lane road with provision of on-street parking in sections of the roadway. No Austroads assessment of the new right-turn facility has been provided; particularly, to assess the appropriate storage length of the right turn bay; or the impact of the new turn on the existing right-turn facility further to the west.*

MTE Response: The existing driveway to Kmart is a private driveway which does not provide access to the subject site; therefore, access is proposed via a new driveway at the location of the site's legal right of way. The intent of this right of way is to provide vehicular access to the subject site.

The relevant Austroads Guide for auxiliary turning lanes for public road intersections is *Austroads Guide to Road Design Part 4A*. The proposed auxiliary lane provides access to private driveways rather than public roads; therefore it is the opinion of MTE that this Guide does not necessarily apply to these right turn auxiliary lanes. Nonetheless, the auxiliary right turn lanes are compliant with the Austroads Guide, as summarised in **Annexure E**.

The right turn from Warlters Street is expected to experience a 95th percentile queue of 43.1 metres after 10 years of growth along Park Street. Warlters Street's West approach includes two (2) right turn lanes, the shortest of which is approximately 45m in length, whilst the other existing right turn lane is of unlimited length. Therefore, the expected right turn queue from Warlters Street onto Park

Street can be wholly accommodated within the existing intersection geometry. This right turn, as well as the right turns into the Kmart carpark and the subject site are summarised in **Annexure F**.

2 SIDRA Analysis Calibration and Assumptions

In order to calibrate the SIDRA analysis for the signalised intersection of Park Street / Warlters Street, MTE obtained historical SCATS data files which correspond to the dates of MTE's traffic survey, being the 2nd-3rd November 2018. The SCATS data is summarised for the three (3) relevant peaks within **Table 2**. The SIDRAs have been calibrated to the average cycle time range.

TABLE 2: SCATS HISTORICAL DATA SUMMARY

Time Period	Phases	Min-Max Cycle Time Range (sec)	Average Cycle Time Range (sec)
Friday PM (4-5pm)	A, C	47-129	78-84
Saturday Midday (12-1pm)	A, B, C	54-123	85-105
Saturday PM (4-5pm)	A, C	52-319(1)	68-145(1)

Note (1): A 319-second cycle time is unusual and would have occurred when there was no demand from Warlters Street.

2.1 Traffic Distribution

The traffic distribution utilised by MTE has been reproduced in **Annexure G** and is summarised as follows:

- 5% to/from the north via the Bay Street / Park Street intersection
- 25% to/from the northwest via the Bay Street / Park Street intersection
- 70% to/from the south via the Warlters Street / Park Street intersection

It is noted that the traffic distribution is conservatively weighted toward Warlters Street. This means that the right turn queue from Warlters Street onto Park Street is conservatively high.

2.2 Sensitivity Assessment

As summarised in **Annexure F**, the 95th percentile queues do not overflow the right turn bay capacities, even after 10 years of background traffic growth. Although this is the case, the SIDRA analysis includes the following conservative measures, which makes the results a worst-case assessment.

- Traffic distribution is conservatively weighted toward access from Warlters Street. It is reasonable to assume more traffic will exit toward the north onto Park Street.
- Each land use has been assessed to peak at the same time, whereas they are expected to be spread over a few hours.
- The Friday and Saturday evening network peak and the site peak have been assumed to overlap. The Friday and Saturday evening network peaks are between 3:15-4:15pm and 5:00-6:00pm, respectively, whilst the site peak is later for both evenings. This is a significant factor in the development's favour in terms of sensitivity assessment.
- The manager's residence has been included in the traffic generation, although it will not typically be occupied;
- The function centre is assumed to be 100% occupied during all peaks. This is not likely to occur regularly.

- Dual use with the surrounding town centre has not been considered for cinema demand. It is highly likely that some portion of cinema patrons will already be in the Settlement City area for other purposes (i.e. foreshore walk or Settlement City Shopping Centre).
- The existing cinema within the Port Macquarie CBD is expected to draw patrons away from the subject site. The Warriewood cinema is not within close proximity to another cinema, therefore, the underpinning data is expected to represent a conservatively high parking demand.

3 Summary

In summary, MTE has responded to the RMS letter. The following items are relevant to note.

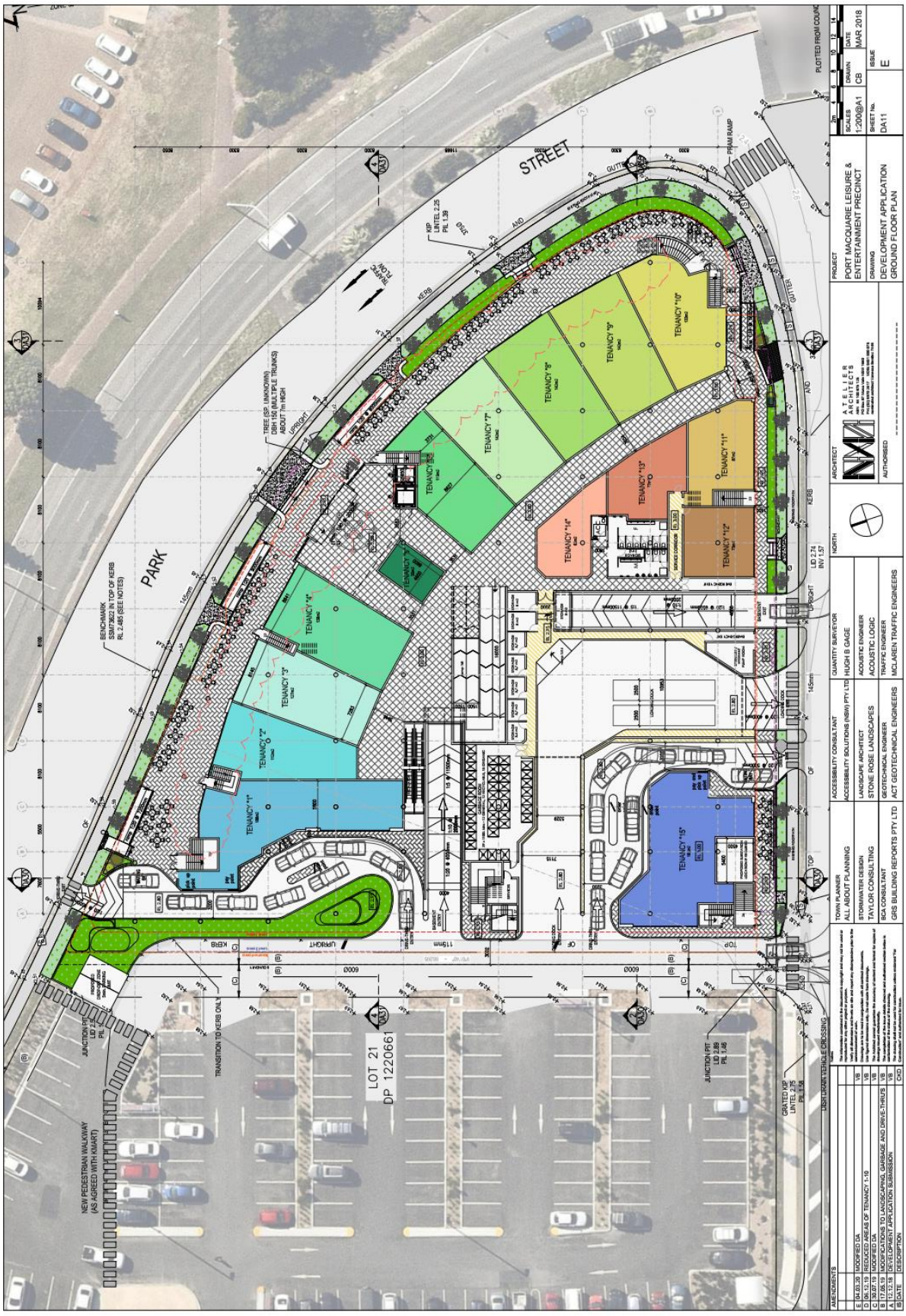
- The Park Street / Warlters Street intersection is expected to operate at LoS "A" in the future condition inclusive of 10 years background traffic growth.
- The proposed driveway is a Category 4 driveway in accordance with *AS2890.1:2004* and therefore does not require treatment as a public road intersection.
- Although it is not mandatory to apply the Austroads guideline in this scenario, the auxiliary right turn lanes are compliant with *Section 5.2* and *Section 7.8 of Austroads Guide to Road Design Part 4A.*
- The right turn bays into the existing Kmart access, the proposed driveway and onto Park Street (from Warlters Street) can accommodate the expected 95th percentile queues post-development, inclusive of 10 years of background traffic growth.
- The traffic impact analysis is a worst-case assessment for reasons summarised in **Section 2.2** of this letter.

Please contact Mr Daniel Fonken or the undersigned on 8355 2440 should you require further information or assistance.

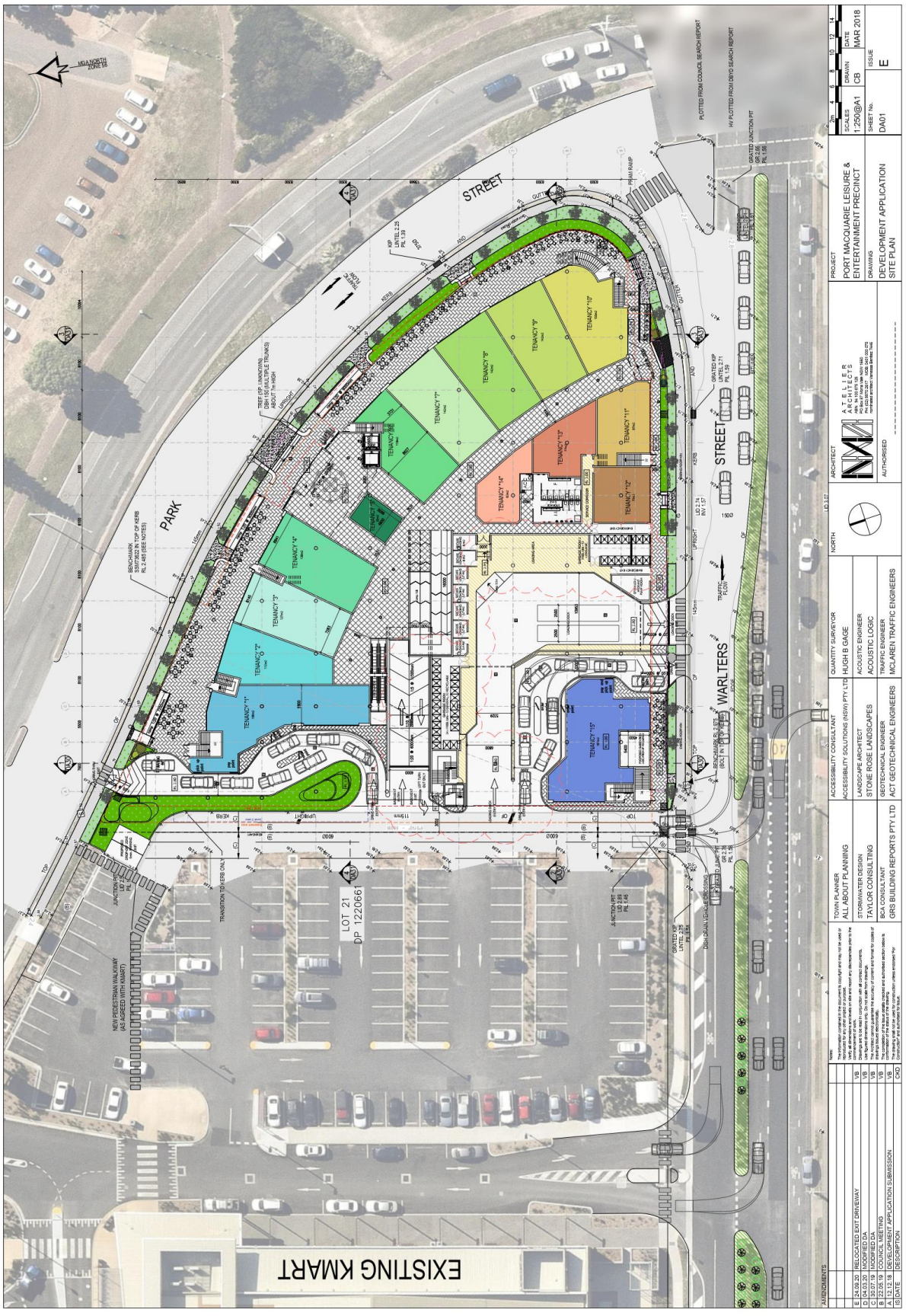
Yours faithfully
M^{c}Laren Traffic Engineering

Craig M^{c}Laren
Director
BE Civil, Grad Dip (Transport Engineering), MAITPM, MITE
RPEQ 19457
RMS Accredited Level 3 Road Safety Auditor [1998]
RMS Accredited Traffic Management Plan Designer [2018]

ANNEXURE A: SITE PLAN



ANNEXURE B: POTENTIAL SITE PLAN



ANNEXURE C: SIDRA ANALYSIS RESULTS

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay (sec/veh)[2]	Level of Service[3]	Control Type	Worst Movement (LoS)	95th Percentile Queue
Park Street / Warlters Street Existing Conditions	Friday PM	0.28	7.2	**A**	Signals	RT from Warlters Street	5.1 veh (36.4m) Park Street
	Saturday Midday	0.33	7.5	**A**		RT from Warlters Street	6.9 veh (48.7m) Park Street
	Saturday PM	0.17	6.2	**A**		RT from Warlters Street	2.6 veh (18.2m) Park Street
Park Street / Warlters Street Future (Post Development)	Friday PM	0.44	11.7	**A**	Signals	RT from Warlters Street	10.3 veh (72.7m) Park Street
	Saturday Midday	0.50	11.7	**A**		RT from Warlters Street	12.9 veh (90.9m) Park Street
	Saturday PM	0.26	10	**A**		RT from Warlters Street	4.6 veh (32.5m) Park Street
Park Street / Warlters Street Future (10yr + Development)	Friday PM	0.50	11.1	**A**	Signals	RT from Warlters Street	11.9 veh (84.2m) Park Street
	Saturday Midday	0.58	11.3	**A**		RT from Warlters Street	16.2 veh (113.9m) Park Street
	Saturday PM	0.29	9.4	**A**		RT from Warlters Street	5.2 veh (36.2m) Park Street

NOTES:

(1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.

(2) The average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.

(3) The level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.

(4) 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.

ANNEXURE D: AS28909.1:2004 EXCERPTS

TABLE 3.1

SELECTION OF ACCESS FACILITY CATEGORY

Class of parking facility (see Table 1.1)	Frontage road type	Access facility category				
		Number of parking spaces (Note 1)				
		<25	25 to 100	101 to 300	301 to 600	>600
1,1A	Arterial	1	2	3	4	5
	Local	1	1	2	3	4
2	Arterial	2	2	3	4	5
	Local	1	2	3	4	4
3,3A	Arterial	2	3	4	4	5
	Local	1	2	3	4	4

NOTES:

1 When a car park has multiple access points, each access should be designed for the number of parking spaces effectively served by that access.

2 This Table does not imply that certain types of development are necessarily suitable for location on any particular frontage road type. In particular, access to arterial roads should be limited as far as practicable, and in some circumstances it may be preferable to allow left-turn-only movements into and out of the access driveway.

TABLE 3.2

ACCESS DRIVEWAY WIDTHS

metres

Category	Entry width	Exit width	Separation of driveways
1	3.0 to 5.5	(Combined) (see Note)	N/A
2	6.0 to 9.0	(Combined) (see Note)	N/A
3	6.0	4.0 to 6.0	1 to 3
4	6.0 to 8.0	6.0 to 8.0	1 to 3
5	To be provided as an intersection, not an access driveway, see Clause 3.1.1.		

NOTE: Driveways are normally combined, but if separate, both entry and exit widths should be 3.0 m min.

ANNEXURE E: AUXILIARY LANE ASSESSMENT

Memorandum
McLaren Traffic Engineering
August 2020
Reference: 190226.11FA

DECELERATION LANE CALCULATIONS FOR THE AUXILIARY RIGHT TURN LANES AT WARLTERS STREET, PORT MACQUARIE

As a part of the DA for the Port Macquarie cinema complex, a new right turn bay into the site from Warlters Street has been proposed, as depicted in **Figure 1**. Mr Grant Burge from Port Macquarie Council has questioned the adequacy of the proposed right turn bay, as well as the existing right turn bay, which has been shortened as a result of the proposal.

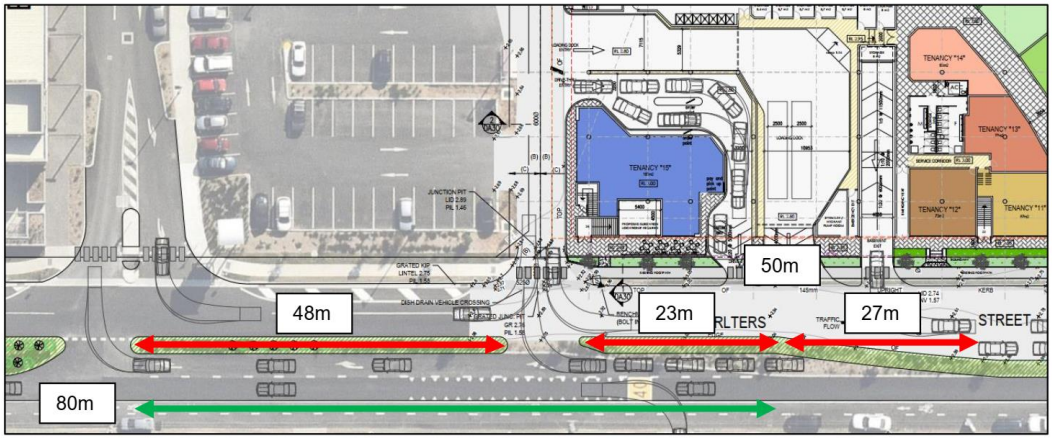


FIGURE 1: PROPOSED RIGHT TURN ARRANGEMENTS

Reference is made to *Section 5.2* and *Section 7.8* of *Austroads Guide to Road Design (Part 4A)*, which provides road design guidelines for deceleration lanes. The relevant formulae and tables are reproduced in the Annexure to this report. It is noted that there is no mandatory requirement to provide an auxiliary lane at private driveways. In any case, MTE has assessed the existing and proposed auxiliary lanes purely for exercise purposes.

The length of the deceleration lane on a level grade depends heavily on the approach speed and the design speed of the exit curve. The right turn lane requires vehicles to be able to stop prior to turning right, therefore the design speed of the exit curve is 0 km/h. The purpose of the following calculations is to determine the maximum permissible approach speed for each right turn bay given known deceleration lane lengths, exit curve speed and deceleration rate as shown below.

Equations

$$V^2 = V_o^2 + 2aD$$
$$B = D + S$$

Knowns

$Total\ length\ of\ auxiliary\ lane\ (B) = 48m\ (western) and\ 50m\ (eastern)$
$Storage\ length\ western\ (S) = 6.0m$ (length of one vehicle queue space, SIDRA queue = 2.2m)
$Storage\ length\ eastern\ (S) = 7.2m$ (95th percentile queue for the right turn movement - SIDRA)
$Deceleration\ length\ (D) = 42m\ (western) and\ 42.8m (eastern)$
$Acceleration\ rate\ (a) = -2.5m/s^2$ (*Table 5.2* of Austroads Guide)
$Exit\ curve\ velocity\ (V) = 0km/h$ (Stop condition)
$Initial\ velocity\ (V_o) = unknown$

Kmart Existing Access Right Turn Lane (western)

The calculation for the existing access right turn lane is provided below:

$$B = D + S$$
$$D = B - S$$
$$D = 48m - 6.0m = \mathbf{42m}$$

$$V^2 = V_o^2 + 2aD$$
$$V_o^2 = V^2 - 2aD$$
$$V_o = \sqrt{(V^2 - 2aD)}$$
$$V_o = \sqrt{0 - (2 * -\frac{2.5m}{s^2} * 42m)}$$
$$\boldsymbol{V_o} = 14.49\frac{\text{m}}{\text{s}} = \mathbf{52.2\ km/h}$$

As shown, a vehicle can be traveling up to 52.2 km/h in order to have enough deceleration length to utilise the proposed 48m length deceleration lane into the existing Kmart access. The posted speed limit along Warlters Street is 50km/h outside school periods and 40 km/h during school periods. Therefore, the proposed 48m deceleration lane satisfies the Austroads Guide.

Diverge length L_d

The diverge length in accordance with *Table 5.2* of the Austroads Guide for a 50 km/h design speed is 27m. This should be provided along the turn bay as shown in **Figure 2** to satisfy the Austroads Guide.

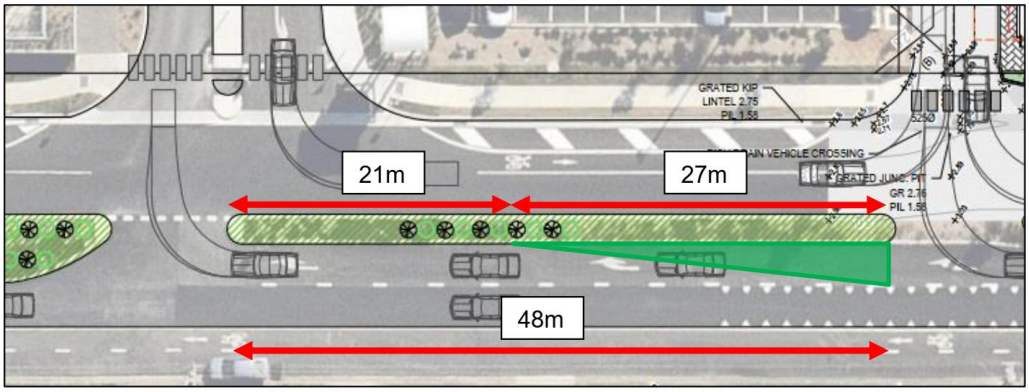


FIGURE 2: DIVERGE LENGTH FOR PROPOSED KMART DECELERATION LANE

Proposed Access Right Turn Lane (eastern)

The calculation for the proposed access right turn lane is provided below:

$$B = D + S$$
$$D = B - S$$
$$D = 50m - 7.2m = \mathbf{42.8m}$$

$$V^2 = V_o^2 + 2aD$$
$$V_o^2 = V^2 - 2aD$$
$$V_o = \sqrt{(V^2 - 2aD)}$$
$$V_o = \sqrt{0 - (2 * -\frac{2.5m}{s^2} * 42.8m))}$$
$$\boldsymbol{V_o} = 14.63\frac{\text{m}}{\text{s}} = \mathbf{52.7\ km/h}$$

As shown, a vehicle can be traveling up to 52.7 km/h in order to have enough deceleration length to utilise the proposed 50m length deceleration lane into the existing Kmart access. The posted speed limit along Warlters Street is 50 km/h outside school periods and 40 km/h during school periods. Therefore, the proposed 50m deceleration lane satisfies the Austroads Guide.

Diverge length L_d

The diverge length in accordance with *Table 5.2* of the Austroads Guide for a 50 km/h design speed is 27m. This is consistent with what is proposed in the site plan (reproduced in **Figure 3**).

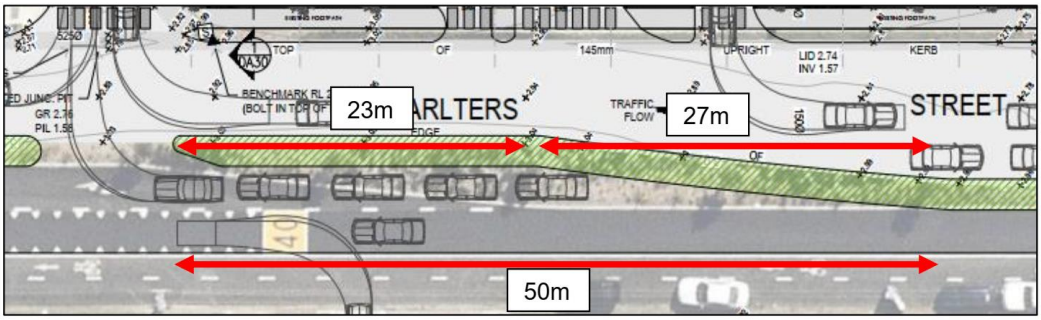
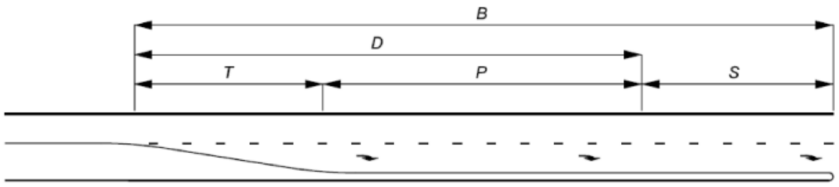


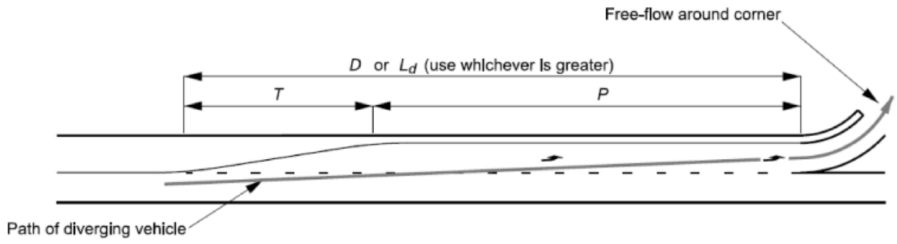
FIGURE 3: DIVERGE LENGTH FOR PROPOSED KMART DECELERATION LANE

AUSTROADS Guide to Road Design Excerpts

Figure 5.1: Components of a deceleration turning lane



(a) Deceleration to a stop condition



(b) Deceleration to a turning speed

Source: Based on Department of Main Roads (2006)[14].

Table 5.2: Deceleration distances required for cars on a level grade

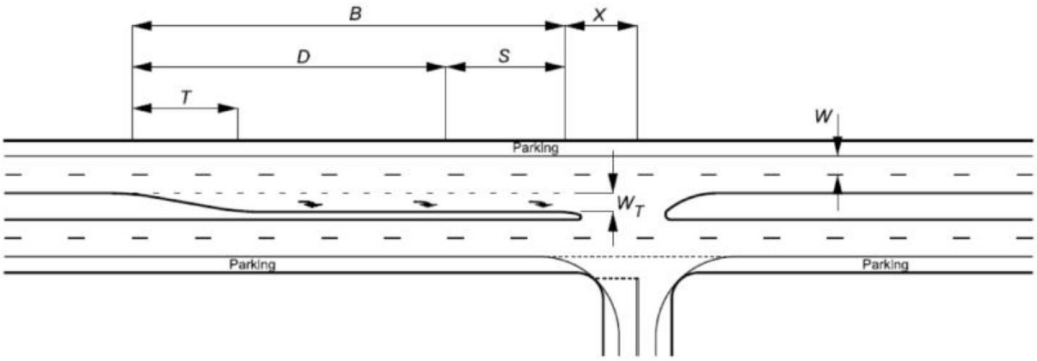
Design speed of approach road (km/h)	Length of deceleration D – including diverge taper *T* (m)										Diverge length L_d[3] for lane widths (m)	
	Stop condition[1] (m)		Design speed of exit curve (km/h)[2]									
	0	0	20	30	40	50	60	70	80	90	3.5 m[4]	3.0 m[4]
	Comfortable 2.5 m/s²	Maximum 3.5 m/s²	Comfortable average rate of deceleration 2.5 m/s²									
50	40	30	30	25	15						33	27
60	55	40	50	40	30	15					40	33
70	75	55	70	60	50	40	20				47	40
80	100	70	95	85	75	60	45	25			54	44
90	125	90	120	110	100	85	70	50	25		60	50
100	155	110	150	140	130	115	100	80	55	30	67	57
110	185	135	180	175	160	150	130	110	90	60	74	62

1 *Rates of deceleration are: 2.5 m/s² for comfortable deceleration; 3.5 m/s² is the maximum for design purposes.*
2 *Speed of exit curve depends on radius and crossfall (Figure 5.2).*
3 *Distance Ld assumes a lateral rate of movement of 1.5 m/s.*
4 *Example lane widths – use actual lateral shift distance of vehicle.*

Notes:
The pink shading indicates that the deceleration lengths given are greater than the diverge length. The length of the deceleration lane should be based on these values.
The green shading indicates that the diverge length is greater than the deceleration length. In these cases, the length of the deceleration lane should be based on the diverge length (the values shown in yellow shading).
Adjust for grade using Table 5.3.

Source: Department of Main Roads (2006)[15].

Figure 7.8: Urban channelised right-turn treatment (CHR)



Notes:

- *This diagram does not show any specific bicycle facilities. Where required bicycle facilities should be provided in accordance with this Part.*
- *A raised concrete median in the minor road may be used with this treatment.*
- *The dimensions of the treatment are defined thus:*

W = *Nominal through lane width (m) (including widening for curves).*

W_T = *Nominal width of turn lane (m), including widening for curves based on the design turning vehicle. Desirable minimum = W, absolute minimum = 3.0 m.*

B = *Total length of auxiliary lane including taper, diverge/deceleration and storage (m).*

D = *Diverge/deceleration length including taper – Table 5.2 (adjust for grade using the 'correction to grade' factor in Table 5.3).*

T = *Physical taper length (m) given by Equation 5 being:* $T = \frac{0.33VW_T}{3.6}$

S = *Storage length (m) is the greater of:*

1. *length of one design turning vehicle*
2. *(calculated car spaces –1) x 8 m or use computer program (e.g. aaSIDRA).*

V = *Design speed of major road approach (km/h).*

X = *Distance based on design vehicle turning path, refer to Design Vehicles and Turning Path Templates (Austroads 2013f).*

Source: Department of Main Roads (2006)[33].

ANNEXURE F: RIGHT TURN BAY ASSESSMENT – 10 YEAR GROWTH ASSESSMENT

Right Turn	Peak Period	95th Percentile Queue(1) (m)	Available Queue Length (m)
Warlters St → Existing Kmart Entrance	Friday PM	1.3m	48m
	Saturday Midday	2.0m	
	Saturday PM	0.7m	
Warlters St → Proposed Kmart Entrance	Friday PM	7.2m	50m
	Saturday Midday	5.5m	
	Saturday PM	4.4m	
Warlters St → Park St	Friday PM	38.9m	45m
	Saturday Midday	43.1m	
	Saturday PM	19.6m	

Note: 95th percentile queues include the full development traffic loads for each peak

ANNEXURE G: TRAFFIC DISTRIBUTION

INCOMING TRAFFIC DISTRIBUTION

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Note: (1) Some of this 30% is assumed to exit from the drivethrough exit onto Park Street, though it has been assessed as above

DEPARTING TRAFFIC DISTRIBUTION