



Mr Philip Lidbury

South Old Bar Precinct 3 Consortium
PO Box 510
Forster NSW 2428

Dear Philip,

Precinct 3 Old Bar DA Traffic Engineering Review

South Old Bar Precinct 3 Consortium (the client) are currently preparing a Development Application for Precinct 3 at Old Bar NSW.

A number of issues have arisen that require traffic engineering advice on aspects of the proposed Precinct 3 road design and traffic management measures as to whether they can be altered from previous recommendations.

This letter and accompanying material outlines the review conducted by Better Transport Futures on behalf of the South Old Bar Precinct 3 Consortium. The review has been conducted following a site inspection, and consideration of the relevant road authority guidelines, and design standards, and industry practice.

A. KEY FINDINGS

Our work has reached the following conclusions:

1. Feature Boulevard

Narrowing of the road carriageway width is considered acceptable on traffic engineering grounds, for the planned function as a collector road. Removal of the central median is considered satisfactory.

2. Wyden Street and Forest Lane Traffic Calming

A combination of carriageway narrowing, 2 way slow points, T intersection treatments are recommended to aid in controlling vehicle speeds on these streets. Technically it is preferable to install at least 4 treatments, and optimally 5 treatments in Wyden Street, and 2 treatments in Forest Lane.

3. Wyden St / Forest Lane Intersection Treatment

Standard priority control as a 'T' intersection will operate at very good levels of service at this junction.

4. Precinct 3 Staging Intersection Upgrade Options

SKM analysis suggests roundabout control is not warranted on technical capacity grounds alone. LoS 'A' and 11.5 seconds, and the forecast flows presented in the report suggests priority control I will be sufficient. It is likely that the junction can perform at technically satisfactory performance levels for at least 50% and possibly 75% without introducing roundabout control. However this should be tested by applying intersection modelling tools as follows, to ensure individual movement combinations do not present any undue delay and safety concerns.



Recommendation:

1. Set up a traffic survey and analysis monitoring program.
2. Review intersection performance at 25% development levels.
3. Test forecast flows against actual surveyed results.
4. Repeat at 25% intervals until peak intersection Level of Service drops to 'C', then reduce testing interval to 10% increase in development yield.
5. Plan for roundabout upgrade when performance drops to LoS 'D'

5. Proposed Bus Route Amendment

Bus Route Amendment is recommended to better serve Precinct 3 recreational facilities.

B. TECHNICAL REVIEW

Further commentary and material supporting the above findings are attached to this letter.

C. FURTHER ENQUIRIES

If you have any questions about the review, or any of the material provided please contact me on 0409 250773.

I would be pleased to discuss the results of my review at a convenient time for you.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Mark Waugh'.

Mark Waugh
Director

Attachments

- | | |
|---|--------------------------------------|
| A | Technical Review Notes |
| B | Recommended LATM Treatment Locations |
| C | Traffic Calming Reference Material |

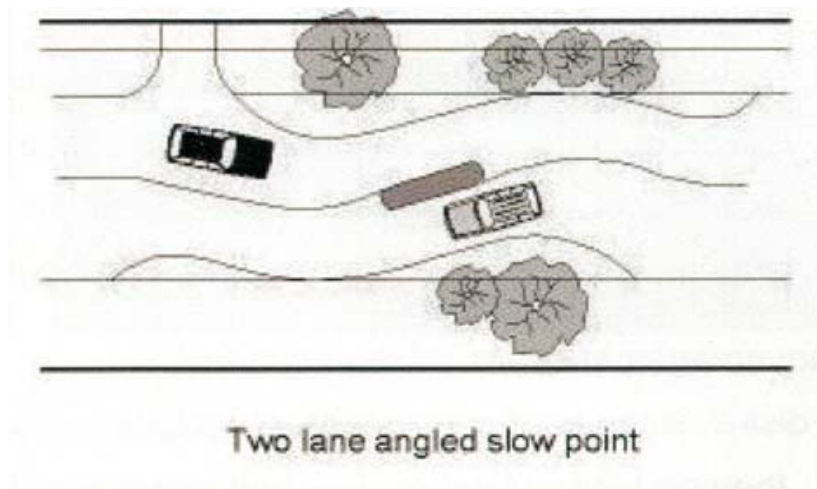
Attachment A – Technical Review Notes

Item	Comment
1. FEATURE BOULEVARD	Narrowing of the road carriageway width is considered acceptable on traffic engineering grounds, for the planned function as a collector road. Removal of the central median is considered satisfactory.
a) <i>Reduction of Carriageway width to 11 m</i>	A carriageway width of 11 metres is consistent with a collector road standard as defined in Councils road design standards. This is considered to be consistent and acceptable for the function being performed in the road hierarchy, and the forecast traffic volumes
b) Traffic Volumes	SKM forecast traffic volumes for the Collector road north of Forest Lane were only 130 vph in peak conditions. Allowing for a range of 8% to 12 % peak to daily flows, this suggests a range of 1100 to 1600 vpd. Which is well less than the 6000 vpd nominated by Council in its Characteristics for Geometric Road Design.
c) <i>Median Treatment</i>	Deletion of the median treatment is considered satisfactory, and in general access and movement terms desirable. Given the relatively low forecast volumes on this route, it will eliminate unnecessary travel along the route cause by vehicles not being able to turn right directly into private driveways.
2. TRAFFIC CALMING	<p>A combination of carriageway narrowing, 2 way slow points, T intersection treatments are recommended to aid in controlling vehicle speeds on these streets. Technically it is preferable to install at least 4 treatments, and optimally 5 treatments in Wyden Street, and 2 treatments in Forest Lane.</p> <p>Wyden Street has a lot of direct property access along the street, which impacts on the opportunities to provide enough traffic calming measures to be effective in terms of speed control. It is recommended that a combination of carriageway narrowing and median island treatments be implemented, so that the wide and open alignment of Wyden Street is broken up along its length.</p> <p>Wyden Street is approximately 800 metres in length between its intersection with Old Bar Road and Forest Lane. This suggests a minimum of 4, and possibly 5 devices to achieve the desired speed environmental outcomes.</p> <p>A suggested pattern of devices and locations are included as Attachment B</p> <p>Forest Lane is not effected by direct property access and so there is some flexibility in the placement of traffic calming devices. It is also recommended that a combination of carriageway narrowing and median island treatments be implemented, so that the wide and open alignment of Forest Lane Street is broken up along its length. The existing carriageway narrowing at the existing culvert can be part of the treatments.</p> <p>Forest Lane is approximately 500 metres from its intersection with Wyden Street to Bluehaven Drive. This suggests a minimum of 2, and possibly 3 devices to achieve the desired speed environmental outcomes. A suggested pattern of devices is included as Attachment B.</p>

WYDEN STREET
TREATMENTS

Recommended Wyden Street Treatments:

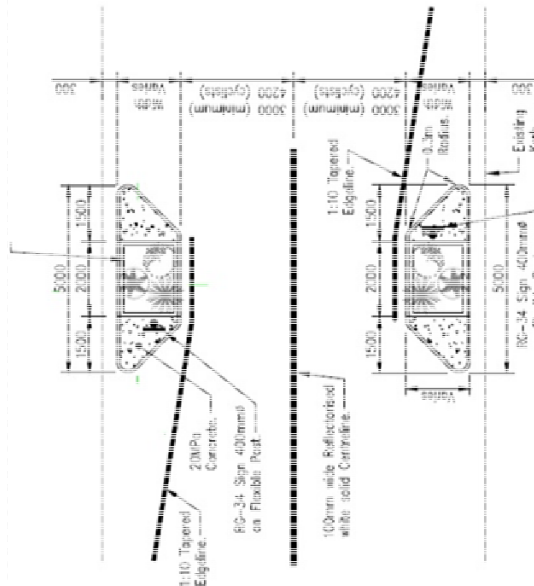
- 2 lane slow point immediately north of No 58-60 Wyden St This is north of Clerke St, and in the vicinity of the crest in Wyden Street (An alternative would be to install a carriageway narrowing, but this has limited effect on speed control)



Source: Austroads 2008
Sample – (For illustrative purposes only)

WYDEN STREET

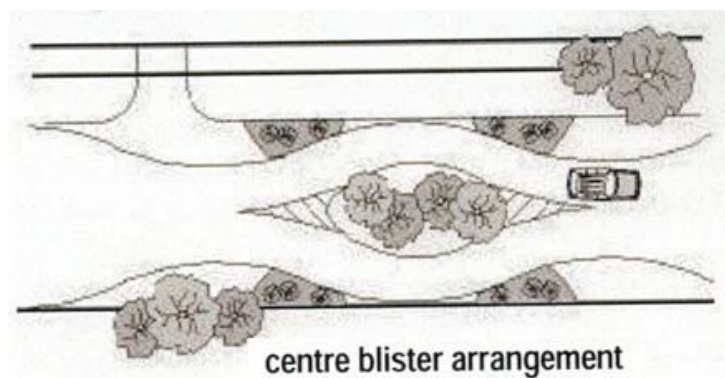
b) Carriageway narrowing in the vicinity of 46-48 Wyden Street.



Source ATCOP

<https://at.govt.nz/media/807636/ATCOP-Drawing-set-Chapter-8-Traffic-Calming.pdf>

(Alternate acceptable would be a median island treatment)

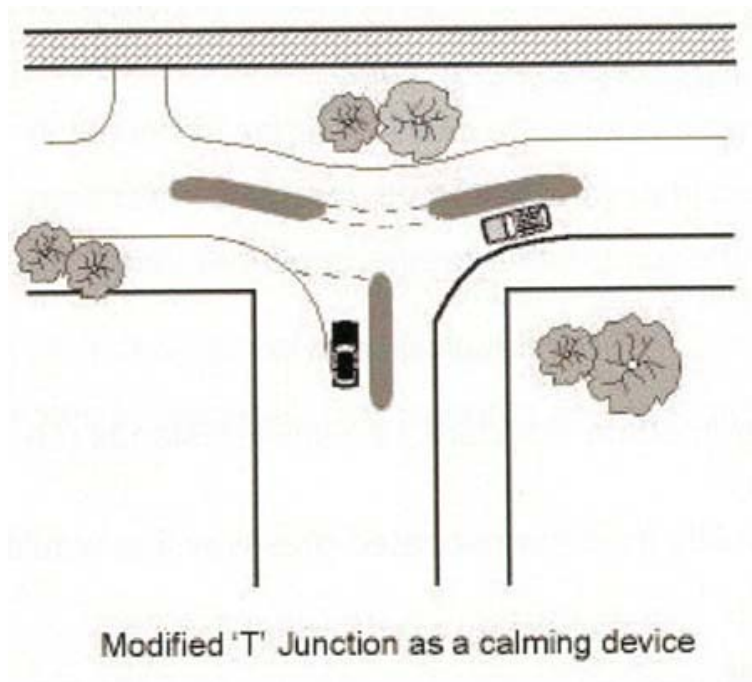


Source: Austroads 2008

Sample – (For illustrative purposes only)

WYDEN STREET

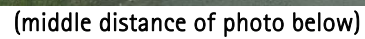
c) Modified 'T' junction treatment at Wyden Street/Kodi Close intersection



Source: Austroads 2008

Sample – (For illustrative purposes only)

d) Carriageway narrowing in vicinity of No 13 Wyden Street



Sample – (For illustrative purposes only)

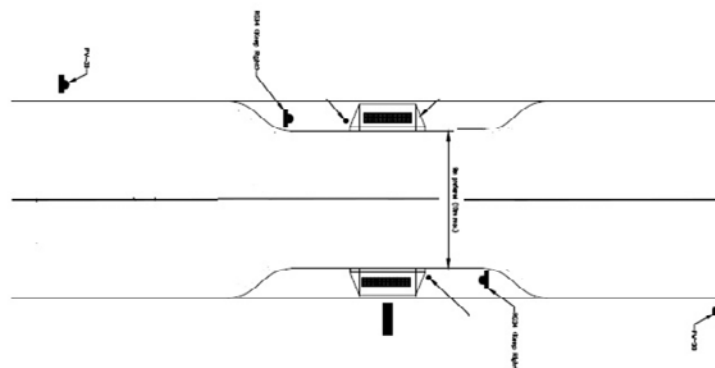
Item	Comment
FOREST LANE	<p>Forest Lane Treatments:</p> <p>Recommendation is for 2 x carriageway narrowing treatments (Side Islands) placed along the length of Forest lane between Wyden Street, and the existing culvert (carriageway narrowing). It is understood a bus stop is proposed along this stretch of Forest lane. A treatment placed in the vicinity of the bus stop would be able to assist in pedestrian movements across the street.</p> <p>Recommended Locations for Forest Lane are shown in Attachment B</p>

f) Sample carriageway narrowing treatments (Side islands)



Source: Austroads 2008

g) Sample pedestrian refuge style carriageway narrowing (Side islands)



Item	Comment																	
3 Wyden St / Forest Lane Intersection Treatment	Standard priority control as a 'T' intersection will operate at very good levels of service.																	
a) Road Function	Both Wyden Street and Forest Lane have been identified as collector roads which is consistent with Council's Geometric Road Design (Refer Table D1.5 Characteristics of Roads in Residential Subdivisions Road Networks. Greater Taree City Council Development Design Specification D1 Geometric Road Design (Urban and Rural) Updated Feb 2006)																	
b) Traffic Volumes	<p>The mid-block forecast peak volumes nominated by SKM are: Wyden St (nth of Forest Lane) – 210 vph Forest Lane east of Collector Road – 230 vph</p> <p>These represent the two way peak flows on the existing two legs of the subject intersection. The third leg to the south of Forest Lane can only have a reduced combination of these flows, depending on the predicted turning movements applied.</p> <p>In my view these predicted traffic volumes are quite light, and would suggest daily two way traffic volumes in the order of 1800 to 2800 vpd (depending on the peak factor adopted, generally in the range 8%-12%) Such volumes would put these roads at the functional level of local streets or low order collector roads.</p>																	
c) Unsignalised Minor Road Intersections	<p>At intersections carrying light crossing and turning volumes, the capacity figures for uninterrupted flow generally apply for the approach roads. Table 4.1 indicates the maximum traffic volume combinations for uninterrupted flow conditions. It is unnecessary to flare intersection approaches or carry out an intersection analysis when the combinations of major road and minor road volumes are less than those in the Table below.</p> <p>Table 1 — Intersection Capacity - Uninterrupted Flow Conditions</p> <table><tr><th>Major Road Type¹</th><th>Major Road Flow (vph)²</th><th>Minor Road Flow (vph)³</th></tr><tr><td rowspan="3">Two-lane</td><td>400</td><td>250</td></tr><tr><td>500</td><td>200</td></tr><tr><td>650</td><td>100</td></tr><tr><td rowspan="3">Four -lane</td><td>1000</td><td>100</td></tr><tr><td>1500</td><td>50</td></tr><tr><td>2000</td><td>25</td></tr></table>	Major Road Type ¹	Major Road Flow (vph) ²	Minor Road Flow (vph) ³	Two-lane	400	250	500	200	650	100	Four -lane	1000	100	1500	50	2000	25
Major Road Type ¹	Major Road Flow (vph) ²	Minor Road Flow (vph) ³																
Two-lane	400	250																
	500	200																
	650	100																
Four -lane	1000	100																
	1500	50																
	2000	25																
<p>Source: Adapted from Guide to Traffic Engineering Practice – Part 5 : Intersections at Grade</p> <p>Notes:</p> <p>1. Major road is through road (i.e. has priority).</p> <p>2. Major road design volumes include through and turning movements.</p> <p>3. Minor road design volumes include through and turning volumes.</p>																		
d) Performance	<p>The SKM Traffic Report indicates that the junction of Wyden Street with Forest lane would operate under a Level of Service (LoS) 'A', and delays of only 11 seconds. This would suggest that a roundabout treatment is not warranted on technical capacity grounds.</p> <p>Reviewing the threshold limits shown in Table 1 above, the forecast peak traffic flows on Wyden Street and Forest land are below one of the threshold combinations, and so it is likely the traffic conditions at the junction will be at or very close to uninterrupted flow conditions. This means that:</p> <p>a) Intersection analysis is not necessary</p> <p>b) Standard priority control as a 'T' intersection will operate at very good levels of service.</p>																	

Item	Comment
4 Precinct 3 Staging Intersection Upgrade Options	<p>SKM analysis suggests roundabout control is not warranted on technical capacity grounds alone. LoS 'A' and 11.5 seconds, and the forecast flows presented in the report suggests priority control I will be sufficient. It is likely that the junction can perform at technically satisfactory performance levels for at least 50% and possibly 75% without introducing roundabout control. However this should be tested by applying intersection modelling tools as follows, to ensure individual movement combinations do not present any undue delay and safety concerns.</p> <p>Recommendation:</p> <ol style="list-style-type: none"> 1. Set up a traffic survey and analysis monitoring program. 2. Review intersection performance at 25% development levels. 3. Test forecast flows against actual surveyed results. 4. Repeat at 25% intervals until peak intersection Level of Service drops to 'C', then reduce testing interval to 10% increase in development yield. <p>Plan for roundabout upgrade when performance drops to LoS 'D'</p>
a) <i>Road Function</i>	Both Forest Lane and the Feature Boulevard (Collector Rd) have been identified as collector roads which is consistent with Council's Geometric Road Design (Refer Table D1.5 Characteristics of Roads in Residential Subdivisions Road Networks. Greater Taree City Council Development Design Specification D1 Geometric Road Design (Urban and Rural) Updated Feb 2006)
b) <i>Traffic Volumes</i>	<p>The mid-block forecast peak volumes nominated by SKM are:</p> <p>Forest Lane east of Collector Road – 230 vph</p> <p>Feature Boulevard (Collector Rd) Nth of Forest – 130 vph</p> <p>Feature Boulevard (Collector Rd) Sth of Forest – 130 vph (Assumption See text below)</p> <p>These represent the two way peak flows on the existing two legs of the subject intersection. Flows have not been nominated for the fourth leg to the south of Forest Lane. Assuming the proportion of development yield for Precinct 3 is the same north and south of Forest Lane, the assumption here is that flows on the southern leg would be comparable to those north of Forest Lane.</p> <p>Again, as with the Wyden Rd/ Forest Lane junction, these predicted traffic volumes are quite light, and would suggest daily two way traffic volumes in the order of 1800 to 2800 vpd (depending on the peak factor adopted, generally in the range 8%-12%) Such volumes would put these roads at the functional level of local streets or low order collector roads.</p>
c) <i>Performance</i>	<p>The SKM Traffic Report indicates that the junction of Forest Lane with the Feature Boulevard (Collector Rd) would operate under a Level of Service A, and delays of only 11.5 seconds. (Ref SKM Pg. 44)</p> <p>Whilst the proposed roundabout would provide some traffic calming benefits, a roundabout is not warranted on technical capacity grounds.</p> <p>Reviewing the threshold limits shown in Table 1 above, the forecast peak traffic flows on Forest Lane / Feature Boulevard (Collector Rd) are below one of the threshold combinations, and so it is likely the traffic conditions at the junction will be at or very close to uninterrupted flow conditions. This means that:</p> <ol style="list-style-type: none"> c) Intersection analysis is not necessary d) Standard priority control as a 'T' intersection will operate at very good levels of service. <p>Depending on the balance of actual turning movements, the junction is likely to perform well on capacity grounds as a priority controlled intersection to at least 50%, possibly 75% of development yields. (Based on the SKM forecast intersection performance.)</p> <p>Recommendation:</p> <ol style="list-style-type: none"> 1. Set up a traffic survey and analysis monitoring program. 2. Review intersection performance at 25% development levels. 3. Test forecast flows against actual surveyed results. 4. Repeat at 25% intervals until peak intersection Level of Service drops to 'C', then reduce testing interval to 10% increase in development yield. 5. Plan for roundabout upgrade when performance drops to LoS 'D'

Item			Comment
5	Proposed Bus Route Amendment		Bus Route Amendment is Recommended to better serve Precinct 3 recreational facilities.
	a) Bus Route Planning guidelines		The NSW Government has outlined coverage guidelines for public transport planning (Ref: Ministry of Transport, Service Planning Guidelines, Ministry of Transport, June 2006) These principles have been carried forward in more recent planning such as the Integrated Public Transport Service Planning Guidelines (TfNSW 2013) Although these focus on the Sydney Metropolitan area they are consistent with the earlier work and illustrate a commitment to achieving the outcomes of the guidelines. The fundamental service coverage sought is for 90% of households to be within 400 metres (as the crow flies) of a bus stop during the day time, and 800 metres (as the crow flies) to a bus route during the night.
	b) Local Conditions		The network coverage of the currently nominated bus route would appear to meet the guidelines. However of note also in the Precinct 3 planning are the recreational facilities located at the south of the precinct. The additional route length proposed is not significant in its impact on the overall route performance, and it does offer the added benefit of serving the local playing fields which are likely to be used by a range of school and sporting clubs, and people of all ages.

Attachment B – Recommended LATM Treatment Locations



Attachment C -Traffic Calming Reference Material

TRAFFIC CALMING REVIEW MATERIAL

a) *Speed Environment* The posted speed limit of 50 km/h is not sufficient to manage travel speeds on these road alignments. The road pavements are excessively wide, and straight, for the traffic volumes that are experienced. There is a significant potential for drivers to exceed the local speed limit of 50kph. Traffic Calming devices are strongly recommended to aid in speed control.

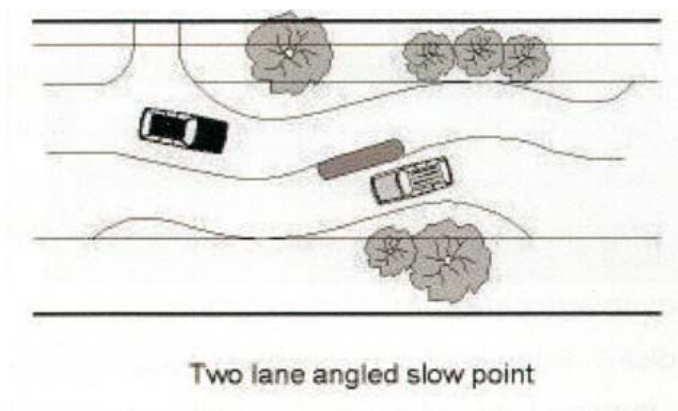
b) *Traffic Calming Devices* The introduction of traffic calming devices is usually related to a desire for speed control, or in some cases to act as a deterrent of use of a particular route, and hence as a volume reduction device. In the case of old bar, the dominant requirement is one of speed control. Speed control devices can be categorised according to their geometry.

Horizontal Deflection Devices include roundabouts, single & two lane slow points, central medians & median islands, partial street closures, street narrowing, axial shifts, and conscious use of street parking.



Sample Entry Threshold Treatment

Source: Main Roads Western Australia, Local Area Traffic Management, Document No: D08#102211, Revision: 2C



Sample Two Way Slow Point Treatment

Source: Austroads 2008



Sample Blister (Median) Island Treatment

Source: Main Roads Western Australia, Local Area Traffic Management, Document No: D08#102211, Revision: 2C

Vertical Deflection Devices include raised thresholds or platforms, speed humps or in some cases dips. Any devices used need to be highly visible and provide drivers with sufficient warning to slow down on the approaches to the device.

Past experience of the author indicates that vertical speed control devices such as speed humps are very unpopular in residential applications. This is due to the noise generated by passing vehicles, particularly when they do not reduce approach speed to the advised level.

Horizontal displacement is preferable, and with some deflection as a means to control vehicle speeds. Consideration must also be given to bus movements, and garbage truck movements along the route. The AMCORD design guidelines provide a useful reference for considering the spacing of traffic calming devices or slow points.

With a local speed limit of 50kph the suggested spacing of devices is 120–155 metres.

Target design speed (km/h) (m)	Maximum leg length* between 20 km/h slow points
30	75–100
40	100–160
50	120–155

* Leg length is defined as the distance between intersections or junctions, or points and locations where vehicles must slow to a maximum of 20 km/h.

Table 3: Street leg length and design speed*.

Source: AMCORD, A notional Resource Document for Residential Development, Commonwealth of Australia 1995

NOTE

VERTICAL DEFLECTION DEVICES ARE NOT RECOMMENDED IN THIS APPLICATION

c) *Designing for Cyclists*

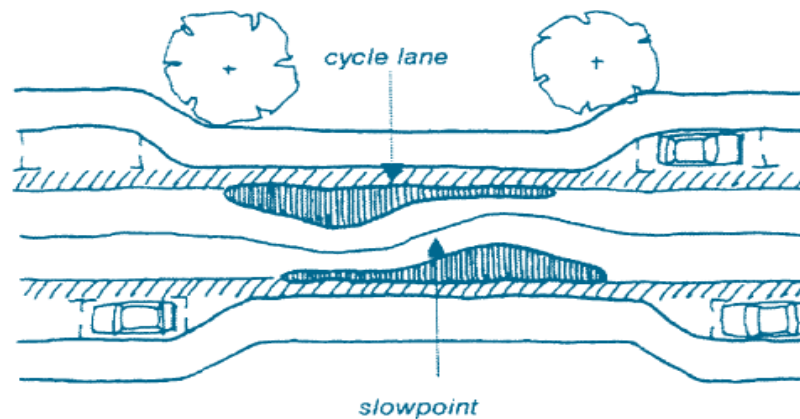


Figure 3: Designing for cyclists at vehicle slow point.

Source: AMCORD, A notional Resource Document for Residential Development, Commonwealth of Australia 1995

The width of both Wyden Street and Forest Lane is sufficient to allow for the above type of treatment providing for cyclists. It also allows the existing street drainage to be retained.

d) *Pedestrian Considerations*

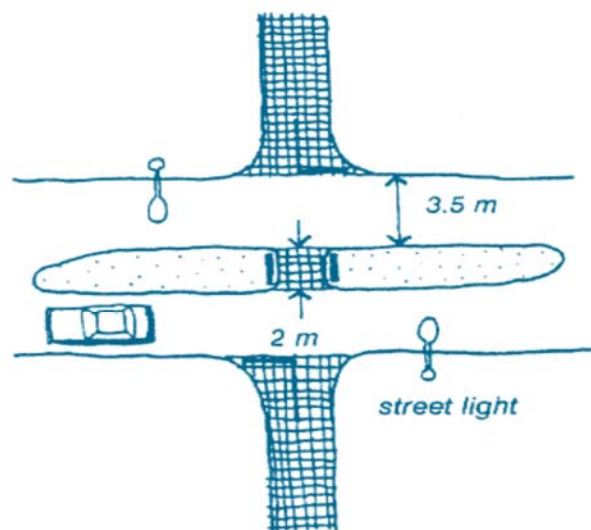


Figure 4: Safe pedestrian crossing point on higher traffic volume streets.

Source: AMCORD, A notional Resource Document for Residential Development, Commonwealth of Australia 1995

This type of treatment is considered helpful in promoting pedestrian safety and traffic calming, where streets are built unusually wide in some local neighbourhoods.

This would be an acceptable alternate treatment to the pedestrian refuge style carriageway narrowing (side islands)

e) *Modified T Junction Treatments*

An additional treatment that can be considered is to place a carriageway narrowing within the confines of a local intersection. This is sometime referred to as a modified 'T' intersection treatment. It can also be combined with a reversal of the normal priority control at an intersection to as a further traffic calming feature. **(Not recommended here)**

Some examples of treatments are shown in the following photographs.

Modified 'T' Intersection



Source: Main Roads Western Australia, Local Area Traffic Management, Document No: D08#102211, Revision: 2C

References

1. AMCORD, A notional Resource Document for Residential Development, Commonwealth of Australia 1995
2. Greater Taree City Council Development Design Specification D1 Geometric Road Design (Urban and Rural) Updated Feb 2006)
3. Guide to Traffic Engineering Practice – Part 5 Intersections at Grade, Austroads , June 2005
4. Guide to Traffic Management – Part 8 LATM, Austroads 2008
5. West Australian Main Roads Department Local Area Traffic Management Document No: D08#102211, Revision: 2C, Date amended: 17-Sep-2013
https://www.mainroads.wa.gov.au/BuildingRoads/StandardsTechnical/RoadandTrafficEngineering/TrafficManagement/Pages/Local_Area_Traffic_Management.aspx#TOCh43
6. Resident's Toolkit – Traffic Control Device Local Area Traffic Management, City of Unley, South Australia
[file:///C:/Users/mark.waugh/Downloads/Traffic_Control_Device_Toolkit_-_August_2014%20\(1\).pdf](file:///C:/Users/mark.waugh/Downloads/Traffic_Control_Device_Toolkit_-_August_2014%20(1).pdf)
7. ATCOP – Auckland Transport Code of Practice