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ARUP

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11 August 2017

Dear Norelle

2 Macpherson Street, Warriewood NSW Subdivision and civil works development application

1. Introduction

Meriton commissioned Arup to undertake a traffic and transport review of the proposed Development Application (DA) for 2 Macpherson Street, Warriewood NSW. The subject site is located in the Northern Beaches Council local government area. The site is proposed to be sub-divided into a number of lots with a perimeter road. A concept road layout has been drawn by Bonacci civil engineers, which has been reviewed for its design and interface to the surrounding road network.

It is understood that Northern Beaches Council's provided a pre-lodgement report for a meeting dated 27 June 2017 which noted a number of 'Traffic Related Matters'. This report supports a development application for the proposed roads and provides response to the comments received.

This statement supports the development application for the proposed development and will outline the following:

- Existing transport conditions
- Road network impacts
- Parking provision
- Access arrangements
- Public transport availability
- Pedestrian and cycle linkages

2. Existing conditions

The proposed development site is located at 2 Macpherson Street, Warriewood which is shown in Figure 1.

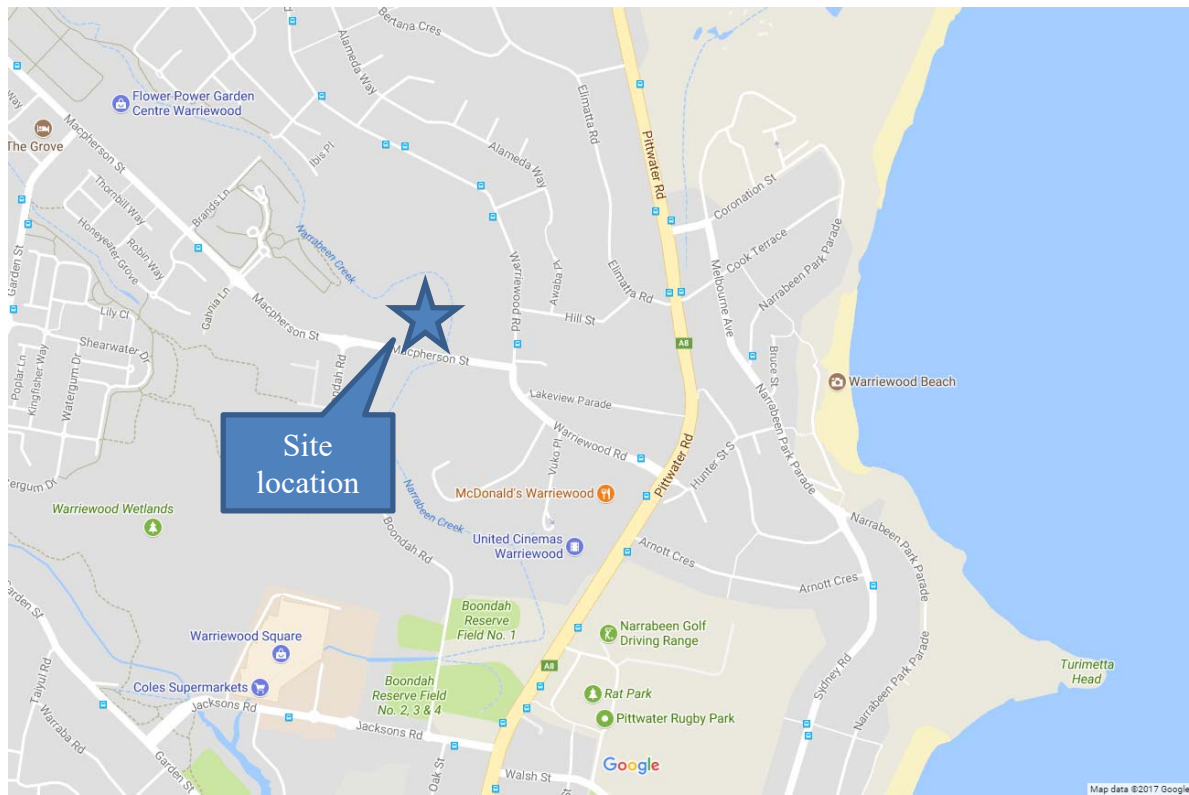


Figure 1: Site location plan

The site is accessed by Macpherson Street, which is a collector connecting to Warriewood Road and subsequently Pittwater Road, which is the main arterial distributor in the area for all regional access. Macpherson Street also connects to Ponderosa Parade in the west, which subsequently connects to Mona Vale Road, the other main arterial distributor.

Macpherson Street is currently undergoing upgrade works as part of the Section 94 Infrastructure Plan for the Warriewood Land Release development area by Council. Works include:

- No. 3 Roundabout at intersection Warriewood Road / Macpherson Street Intersection
- No. 46 Road upgrade including kerb and gutter, footpath and drainage works in Warriewood Road from Macpherson Street to Vuko Place.
- No. 4.3 Road bridge over Narrabeen Creek in Macpherson Street between Boondah Road and Warriewood Road.

The Macpherson Street section adjacent to the site is currently closed for 9 months (since 9 January 2017) for the associated upgrade. Limited access remains on Warriewood Road to Pittwater Road.

Public transport near the site is serviced by bus services. Local bus stops are located along Macpherson Street (181) and Warriewood Road (185, E85 and L85). The express B-line services are also proposed to operate from Narrabeen Golf Driving Range stop approximately 1km south of the site. This will provide a high frequency and high quality service for future users to the City in the future.

Footpaths are currently limited in the area, and cycling is only available in mixed traffic.

3. Meriton development proposal

The Meriton site is made up of a site area of approximately 2.327 hectares, bound by Narrabeen Creek and Macpherson Street. A number of concessions have been made for the flooding and bushfire provisions.

Meriton are proposing a perimeter loop road layout (see Figure 2). This involves two connections to Macpherson Street approximately 100 m apart. The nearest existing intersection is Boondah Road roundabout, which is over 120m away.

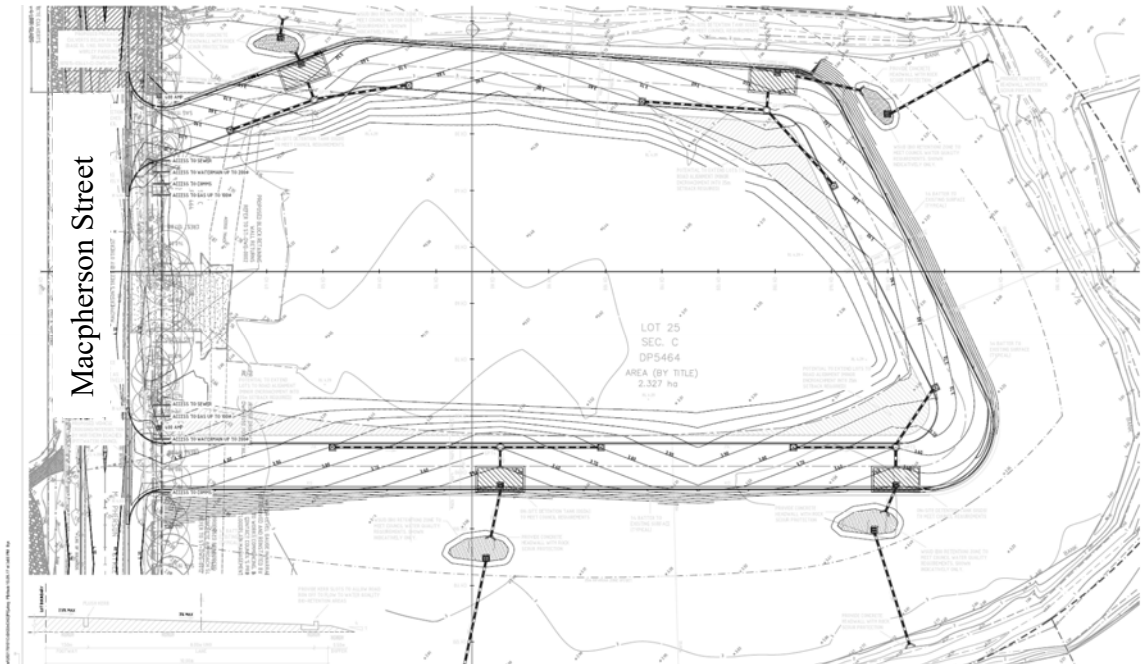


Figure 2: Proposed road layout

4. Transport assessment

Road capacity

RTA Guide for Traffic Generating Development 2002 Table 4.6 identifies that roadway capacity is not solely measured in terms of vehicle throughput capacity. Traffic volume limits are necessary on minor roads as pedestrian safety is of primary concern, and noise is also an important factor. Traffic on any class of road has an impact on the amenity of an area, and the environmental capacity of local streets is an important consideration in planning for the range of uses, perceptions and attitudes to traffic impacts in a particular area.

Given these guidelines, it is expected that the proposed internal road will support a number of driveways and the intended traffic flows. Even a higher traffic generation of low density residential would only yield 1 trip per lot and hence with some 20-30 lots being subdivided, this will be much lower than the 200 vehicles per hour environmental goal for a local street. The Macpherson Street traffic flows are also expected to be in the order of collector environmental flows which are 300 vehicles per hour.

Anticipated pedestrian and traffic flows in the area are not expected to warrant any movement restrictions for access. It should be noted that channelised turn bays are only required when traffic flows are warranted and mixed lane turns are permitted as per the Austroads guidelines. Any right turn bans would only serve to create a large detour for any vehicles trying to access the site, and it would create a number of U-turns at the Boondah Road roundabout. This roundabout is only 22m in diameter which is unsuitable for vehicles larger than an 8.8m long medium rigid vehicle.

Road design

It is proposed to limit the access points to one-way given two access points exist. While one-way road systems generally tend to create a higher speed environment, this will ensure greater capacity and throughput of the proposed road network. It will be more efficient for larger vehicles to be able to enter the eastern access given the geometry, resulting in an anti-clockwise loop. Mandatory 10m No Stopping zones would be used to allow for manoeuvring by the larger vehicles.

The 12.5m heavy rigid vehicle is considered an excessive vehicle specification for the type of road uses expected. It could be considered as design check vehicle which means that it can physically traverse the intersection crossing centrelines, but should not be used as the base design vehicle.

The largest expected vehicle is the standard Environmental Protection Authority garbage vehicle of 10.24m length specified in the 'Waste code for new developments' which would be more appropriate. It should also be noted that the 'NSW Fire Brigade: Guidelines for Emergency Vehicle Access' refers to a general appliance vehicle of 10.1m length (note that an aerial appliance of 12.4m would not be used in this area given there are no proposed multi-storey structures).

A raised threshold treatment may be considered at the access driveways and will need to be designed to meet the Australian Standards for vertical clearance and with reference to the Technical Direction for Continuous footpath treatments (TDT2013/05). This will improve pedestrian amenity in the area. Any refuge islands will not permit larger vehicle movement into and out of the proposed road system.

Austrorads Guide to Road Design Part 4A notes that the centreline for approach roads should be designed as 90 degrees. This indicates that the current arrangement is acceptable provided the centrelines are aligned at 90 degrees when they intersect. The approaches also have 10m of desirable straight approach prior to the curve as noted in Austrorads.

Swept paths have been provided with the appropriate clearances to comply with Australian Standards for Parking Facilities (AS2890). These swept paths on the proposed layout are enclosed with this letter showing adequate access to and from Macpherson Street.

Parking impacts

It is assumed that on-street car parking will be provided at all legal permitted kerbside areas. This will provide a number of spaces for future users including visitors, likely to be unrestricted. Any changes as a result of access driveways within the proposed internal streets will likely still result in a net increase of the potential on-street parking spaces even with the removal of parallel parking on Macpherson Street to facilitate access.

An available perimeter of 333 m exists on the outside kerb. It could therefore be possible to park up to 55 cars on the outside alone, with approximately half that amount on the inside for residential access.

Considering the cross sections over a 10m wide road reserve, this permits a parking lane of 2.1m either side, with a 3.5m travel lane and 1.8m footpath (with 0.5m clearance to any outside barriers). An indicative cross section is shown in Figure 3.

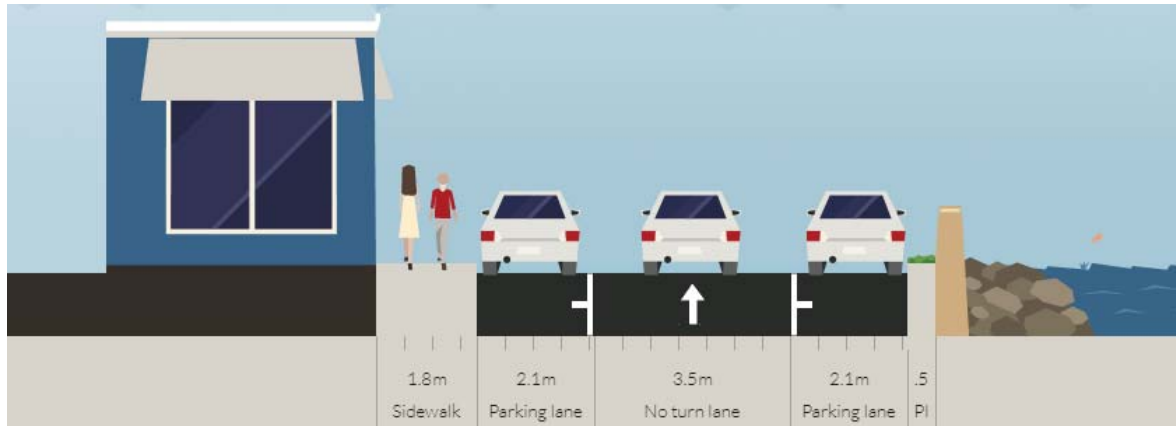


Figure 3: Cross section

5. Summary and conclusions

This letter summarises the proposed road layout for the Meriton site, located at 2 Macpherson Street Warriewood. While there were comments received at the Council pre-lodgement meeting, the potential impacts are considered negligible for the following reasons:

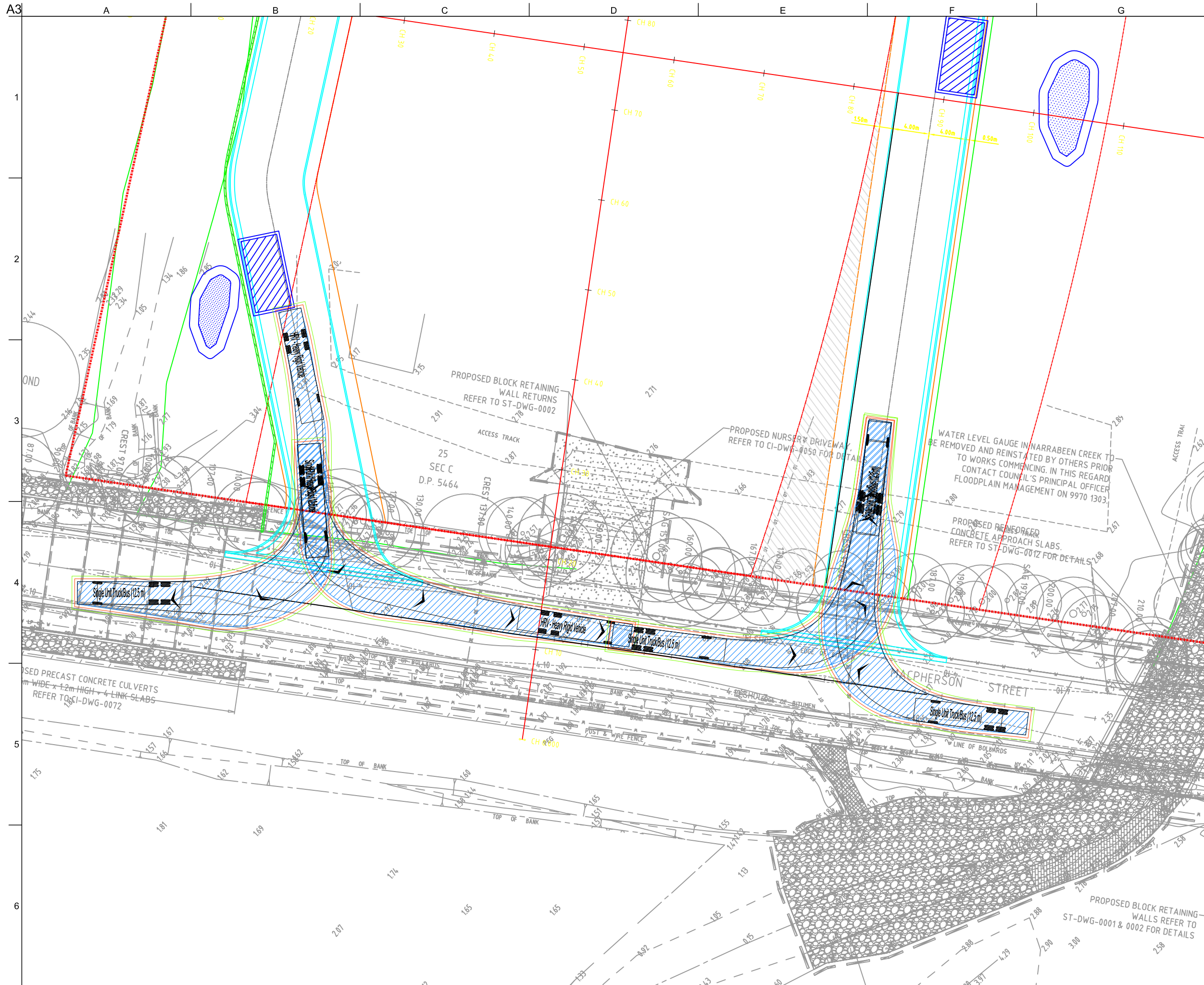
- There is sufficient environmental capacity on surrounding roads to cater for the proposed driveway accesses and potential development traffic flows
- The road has been designed for the largest practical vehicles intended to utilise the proposed road
- No hammerheads or cul-de-sacs would be created and two intersections would provide ample circulation opportunities with the proposed road layout for maximum traffic capacity

I trust this provides sufficient detail in regards to the Council's pre-lodgement meeting and for the development application. If you have any queries, please do not hesitate to contact the undersigned.

Yours sincerely

James Turner
Senior Transport Engineer

Enc Swept path analysis



- Legend**
- Body Envelope
 - 300mm Envelope
 - 600mm Envelope
 - Wheel Envelope

Design Vehicle(s)

HRV - Heavy Rigid Vehicle

Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.417m
Track Width	2.500m
Lock to Lock Time	6.00 sec
Curb to Curb Turning Radius	12.500m

Issue	Date	By	Chkd	Appd
A	11/08/17	JRT	AMH	AMH

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Client
Meriton

Job Title
2 Macpherson St, Warriewood

Drawing Title
**Turning Paths
 12.5m Single Unit Truck/Bus**

Scale at A3
1:400

Discipline
Transport

Drawing Status
Draft

Job No 256447	Drawing No SKT001	Issue A
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