ratio:consultants

8 Gwynne Street
Cremorne VIC 3121
ABN 93 983 380 225

ratio.com.au

T +61 3 9429 3111
F +61 3 9429 3011
E
mail@ratio.com.au

To	Deanne Sheppard (VPA)
From	Manesha Ravji
CC	Tina Webb (VPA); Anna Wilkins (Ratio)
Regarding	Wallan East Precinct Structure Plan (PSP) – First Principles Assessment
Date	31 January 2022
Reference Number	17425T
Document Number	17425T-MEM02-D03

Dear Deanne,

Ratio Consultants have now completed a first principles traffic generation assessment based on the draft Future Urban Structure (FUS) for the Wallan East PSP area. Our assessment and preliminary findings are outlined as follows:

1 Overview

The Wallan East PSP is in the North Growth Corridor and is approximately 140 Hectares (Ha) in size. The location of the subject PSP is outlined in Figure 1.1:

Figure 1.1: Aerial Image of PSP Study Area

The PSP area is bounded by Epping-Kilmore Road to the east, Wallan-Whittlesea Road to the south, the Melbourne to Sydney rail line to the west, and Kelby Lane to the north.

The PSP area is currently utilised for predominantly farming uses, with several large non-farming single dwelling residential properties also located within the PSP area.

The Wallan Train Station is located to the immediate west of the PSP. Beyond the train station land uses are predominantly residential and commercial/industrial.

The draft FUS for the PSP area is outlined in Figure 1.2:

Figure 1.2: Wallan East PSP FUS

As outlined in Figure 1.2, the PSP area will primarily consist of residential uses with a potential government school, a Local Town Centre (LTC), and local community facilities.

The draft FUS includes the provision of two North-South Connector Streets and an East-West Boulevard Connector Street. The East-West Boulevard Connector will serve as the precinct's central spine, providing a high amenity link through the PSP and access to the Local Town Centre and train station investigation area.

It is understood that the 'investigation area' shown on the draft FUS could potentially be a commuter car park for the Wallan Train Station catering for some 1,500 commuter parking spaces. It is possible that access to this car park could ultimately be via the PSP East-West Boulevard Connector Street due to grade constraints associated with the potential road over rail grade separation on Wallan-Whittlesea Road restricting direct access to the car park from Wallan-Whittlesea Road.

2 Preliminary Traffic Generation Assessment

2.1 Land Use Summary

The land uses by the transport zones within the PSP area (shown in Figure 1.2) are summarised Table 2.1:

Table 2.1: Land Use Summary

Transport Zone	Land Use Quantum				
	Residential (no. households)	School (no. enrolments)	Community Facilities (sqm)	LTC – Retail (sqm)	LTC – Non-Retail (sqm)
1	0				
2	293				
3	255				
4	211				
5	45	646	2,000	3,000	600
6	133				
7	303				
8	217				
9	284				
10	260				
Total	**2,002**	**646**	**2,000**	**3,000**	**600**

2.1 Daily Traffic Generation Summary

A first principles traffic generation assessment was undertaken to confirm the appropriateness of the draft FUS road network.

It is highlighted that this assessment is a high-level assessment and provides a broad indication of the traffic volumes likely to be generated by the Wallan East PSP area.

In undertaking the first principles assessment a single traffic generation rate for all residential dwellings was adopted, regardless of the dwelling density type to allow for a conservative assessment.

The adopted daily traffic generation rates for the various land uses within the PSP are summarised in Table 2.2:

Table 2.2: Adopted Daily Traffic Generation Rates

Land Use	Daily Traffic Generation Rate	Internal Trip Reduction Factor [6]
LTC – Non Retail [1]	4.6 trips / 100 sqm GFA	
LTC - Retail [2]	121 trips / 100 sqm GFA	
School [3]	1.5 trips / enrolment	
Residential [4]	7.3 trips / dwelling	25% [6]
Community Facilities [5]	4.6 trips / 100 sqm GFA	

[1] Rate sourced from the New South Wales (NSW) Roads and Maritime Services (RMS) "Guide to Traffic Generating Developments- Updated Traffic Surveys" Technical Direction paper dated August 2013 (RMS Technical Note) for business parks and industrial estates.

[2] Rate sourced from the NSW Roads and Traffic Authority "Guide to Traffic Generating Developments" report, dated October 2002 for shopping centres (0-10,000sqm).

[3] Rate sourced from the NSW RMS 2014 "Trip Generation Surveys of Schools in the Greater Sydney Area" report which reports an average daily trip rate of 1.6 trips per student for schools in both metropolitan and regional areas.

[4] Rate based on surveys of subdivisions undertaken by Ratio Consultants in Epping, Altona Meadows and Greenvale and surveys undertaken by GTA Consultants for Wallara Waters Stage 1.

[5] Rate for business uses adopted given that the nature of the community facilities is yet to be refined.

[6] Based on Section 3.3 of the NSW Roads and Traffic Authority "Guide to Traffic Generating Developments" report, dated October 2002. It is assumed that 25% of all residential trips generated by PSP will be internal to the PSP to/from other uses within the PSP area.

The resulting traffic generation for each of the transport zones at full development is summarised in Table 2.3:

Table 2.3: Expected Daily Traffic Generation By Zone

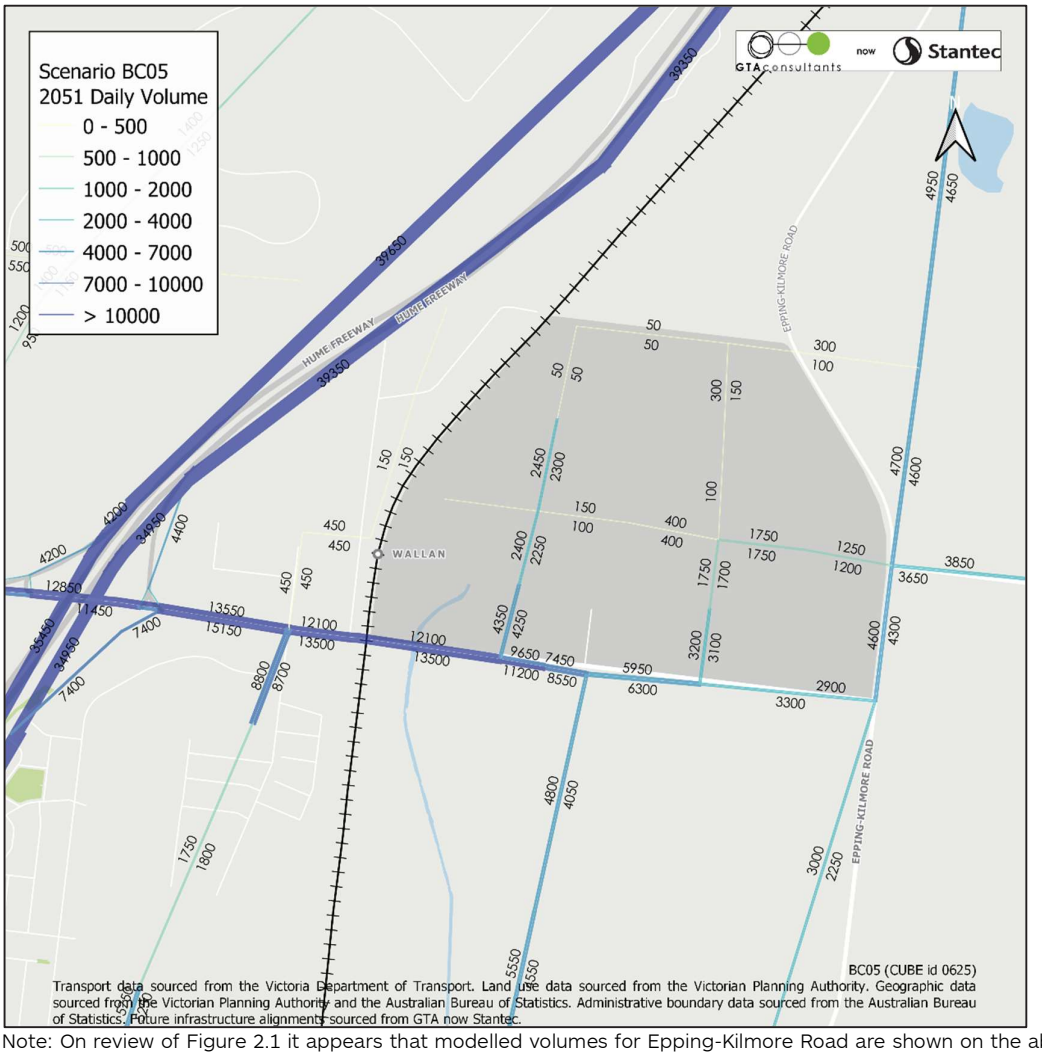
Zone	Daily Traffic Generation (vpd)					
	Residential (no. households)	School (no. enrolments)	Community Facilities (sqm)	LTC – Retail (sqm)	LTC – Non-Retail (sqm)	Zone Total
1	0	0	0	0	0	0
2	1,604	0	0	0	0	1,604
3	1,398	0	0	0	0	1,398
4	1,153	0	0	0	0	1,153
5	247	1,034	92	3,630	28	5,031
6	731	0	0	0	0	731
7	1,659	0	0	0	0	1,659
8	1,190	0	0	0	0	1,190
9	1,556	0	0	0	0	1,556
10	1,422	0	0	0	0	1,422
Total	**10,959**	**1,034**	**92**	**3,630**	**28**	**15,742**

As outlined in Table 2.2, the PSP is expected to generate some 15,742 vehicle movements per day (vpd) onto the wider road network.

2.2 Background Traffic Volumes and Distribution Patterns

Background traffic volumes and the distribution of trips generated by the PSP have been sourced from daily strategic modelling outputs prepared by Stantec on behalf of the VPA for the North Growth Corridor. The provided 2051 daily volume plot is outlined in Figure 2.1:

Figure 2.1: 2051 Daily Strtegic Modelling Outputs



Note: On review of Figure 2.1 it appears that modelled volumes for Epping-Kilmore Road are shown on the above plot, however the alignment of the modelled volumes is inaccurately mapped.

The strategic modelling indicates that both Wallan-Whittlesea Road and Epping Kilmore Road will carry volumes reflective of a 2-way, 4-lane Arterial Road (12,000 – 40,000 vpd)[1] in 2050 with ample spare capacity.

[1] As per the VPA PSP Note "Our Roads: Connecting People"

Figure 2.1 further indicates that the Wallan East PSP area is expected to generate some 17,900 vpd onto the surrounding road network. The first principles assessment outlined in Table 2.3 suggests that the PSP area will generate 15,742 vpd onto the surrounding road network. The strategic model is therefore predicting daily volumes approximately 12% greater than the first principles assessment.

This difference could potentially be the result of differences in land use inputs for the PSP area within the strategic model and/or lower internal trip proportions being modelled as a result of the model's macro character. Notwithstanding the outputs of the strategic model and the first principles assessment are comparable indicating that the strategic model is a suitable basis for assessing the strategic travel patterns for the PSP area.

Based on the strategic modelling outputs the following directional distributions for the Wallan East PSP generated traffic have been derived:

Table 2.3: Derived Traffic Distribution

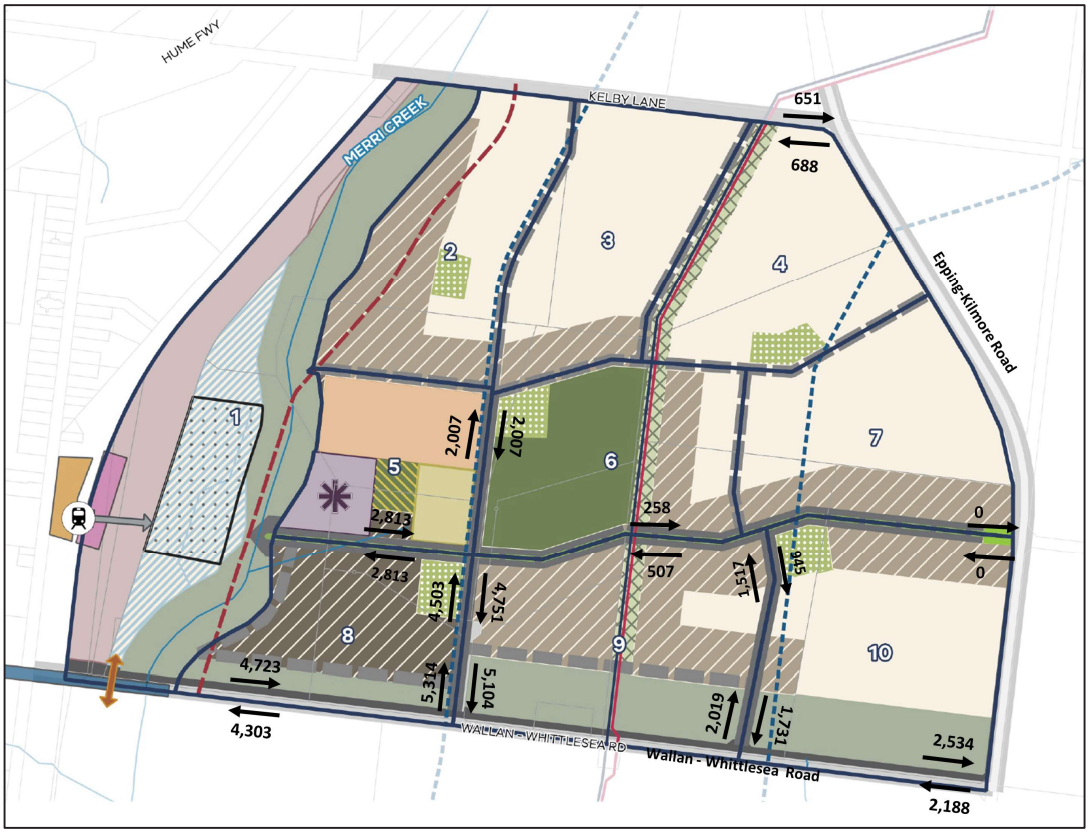
Direction	Proportion of trips to/from
North via Epping – Kilmore Road	10%
South via Epping Kilmore Road	30%
West via Wallan-Whittlesea Road	60%
Total	**100%**

3 Suitability of the PSP Road Network

3.1 PSP Generated Traffic Assessment

In ordered to assess the suitability of the PSP road network (see Figure 1.2), the PSP generated traffic volumes by transport zone (see Table 2.3) were distributed onto the road network in accordance with the distributions outlined in Table 2.3 through static distribution spreadsheet modelling. The resulting daily traffic volumes are outlined in Figure 3.1:

Figure 3.1: Expected PSP Daily Traffic Volumes (vpd)



The VPA PSP Note "Our Roads: Connecting People" notes that Connector Streets should provide for up to approximately 7,000 vpd and when volumes exceed this, additional links to the Arterial Road network may be required. Furthermore, the desirable capacity of a Boulevard Connector Street is 12,000vpd as outlined in Table 4 of the VPA Engineering Design and Construction Manual for Subdivisions in Growth Areas (December 2019). It is however noted that the Austroads theoretical capacity of a two-way, two-lane road in an urban environment is 18,000vpd[2].

Based on the above outlined desirable capacities and the daily volumes presented Figure 3.1, the PSP East-West Boulevard Connector Street and the eastern-most North-South Connector Street are expected to operate within their associated desirable capacity ranges.

It is however noted that the western-most North-South Connector Street is expected to carry some 10,418vpd at is southern end, above the desirable capacity for a Connector Street. It is therefore recommended this Connector Street be upgraded to a Boulevard Connector Street between Wallan-Whittlesea Road and the PSP East-West Boulevard Connector Street.

[2] Table 6.1 of Austroads Guide to Traffic Management Part 3: Transport Study and Analysis Methods notes that the typical mid-block capacity for urban roads with interrupted flow is 900 vehicles/hour/lane for an undivided road. Applying a peak hour to daily conversion factor of 10 results in a daily road capacity of 18,000vpd for an undivided two-way two-lane road.

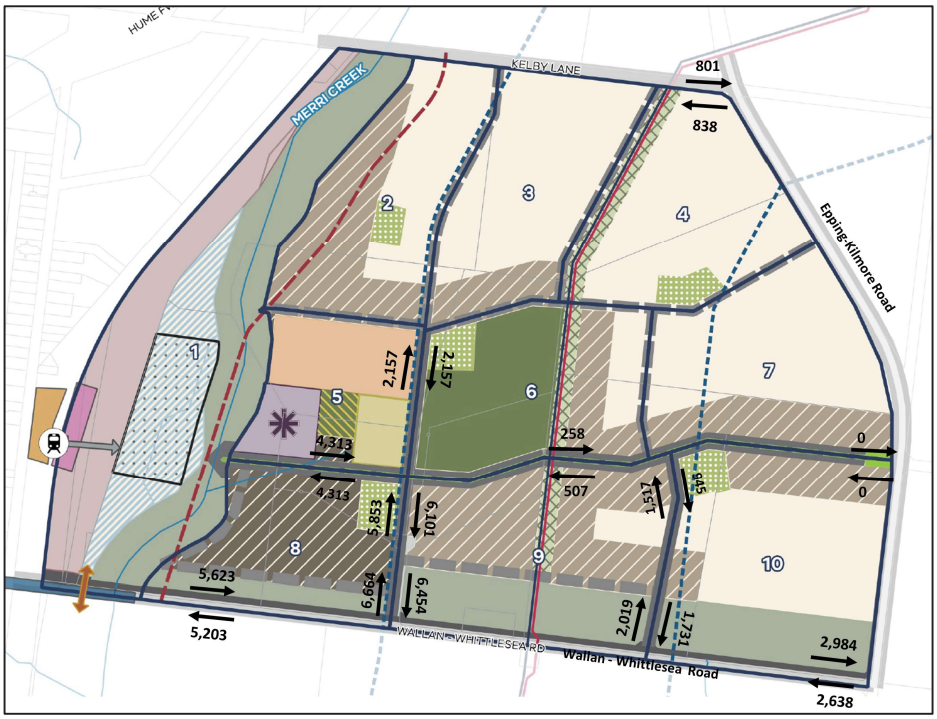
3.2 Sensitivity Test: PSP Generated Traffic Assessment + Train Station Commuter Car Park

As previously outlined in Section 1, it is understood that the 'investigation area' shown on the draft FUS could potentially be a future commuter car park for the Wallan Train Station catering for some 1,500 commuter parking spaces. It is possible that access to this car park could ultimately be via the PSP East-West Boulevard Connector Street due to grade constraints associated with the potential road over rail grade separation on Wallan-Whittlesea Road restricting direct access from Wallan-Whittlesea Road.

If each car park was to generate two vehicle movements per day (one car parked in each space per day), the car park could generate up to 3,000 vehicle movements per day.

The resulting PSP + Train Station Car Park generated traffic volumes are outlined in Figure 3.2:

Figure 3.2: Expected PSP + Train Station Car Park Daily Traffic Volumes (vpd)



Based on the traffic volumes outlined in Figure 3.2, the portion of the East-West Boulevard Connector Street between the potential Train Station Car Park and the western-most North-South Connector Street would carry some 8,626vpd. These volumes are reflective of Boulevard Connector Street.

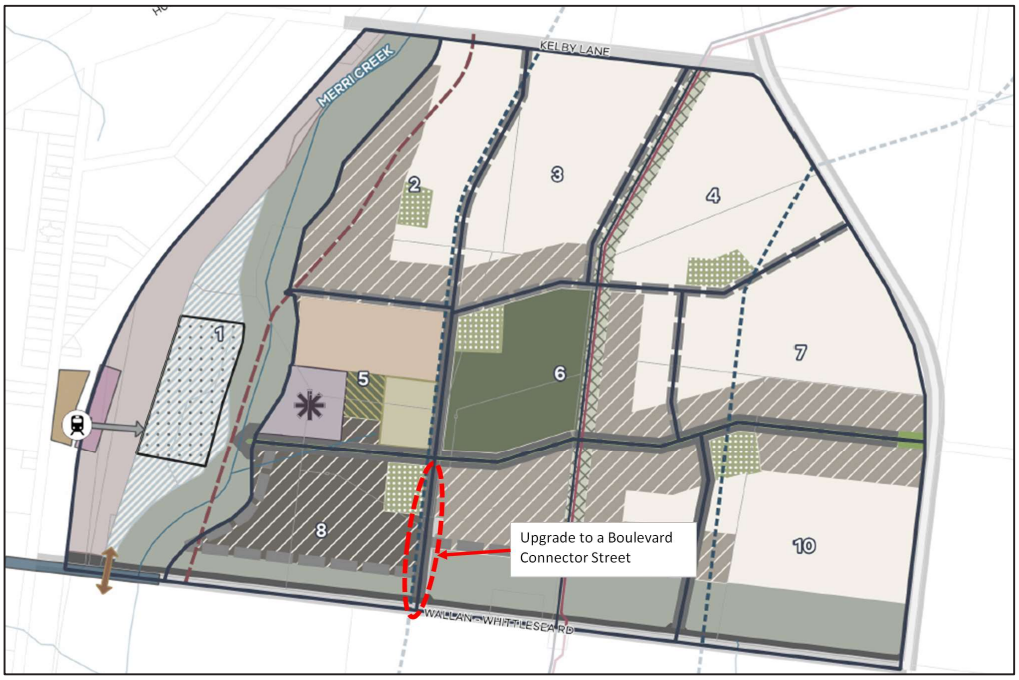
The western-most North-South Connector Street is expected to carry volumes in the order of 13,118vpd at its southern end. Whilst these volumes are greater than the desirable capacity of a Boulevard Connector Street (12,000vpd) they are still comfortably within the Austroads theoretical capacity of a two-way, two-lane road (18,000vpd).

The above preliminary analysis indicates that the PSP road network has the capacity to cater for traffic generated by the potential Train Station Car Park noting that further investigation into appropriate intersection layouts at the Wallan-Whittlesea Road/ North-South Connector Street and the North-South Connector Street/East-West Boulevard Connector Street would be necessary as part of the Train Station Car Park feasibility assessments.

4 Summary

Based on the outcomes of the first principles traffic analysis the following changes are recommended to the FUS:

Figure 4.1: Recommended Changes to the Connector Street Network



Please do not hesitate to contact me directly should you have any queries or require further information.

Regards

Manesha Ravji
Associate