TraffixGroup

Traffic Engineers and Transport Planners

Hume Planning Scheme Amendment C207
Sunbury South PSP
60 Gellies Road, Wildwood

Planning Panels Victoria

Panel Hearing Date: Thursday, 14th September, 2017

Report Date: 11th August, 2017

Prepared For: Tranteret Pty Ltd

STATEMENT TO PLANNING PANELS VICTORIA BY HENRY TURNBULL, TRAFFIC ENGINEER

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Traffic Engineering Assessment

Hume Planning Scheme Amendment C207
Sunbury South Precinct Structure Plan

60 Gellies Road, Wildwood

Document Control

Issue No.	Type	Date	Prepared By	Approved By
A	Final	11/08/2017	D. Milder/H. Turnbull	H. Turnbull

Our Reference: G23360R-02A

Table of Contents

1 Executive Summary

1.1 Introduction

I have been retained by Tranteret Pty Ltd in August 2017 to undertake traffic engineering assessments and prepare traffic evidence in relation to the Sunbury South Precinct Structure Plan (PSP).

Specifically, I have been engaged to determine from a traffic engineering point of view if the land at 60 Gellies Road has potential for residential development.

In preparing this report, I have undertaken discussions with VPA and VicRoads' officers and have relied upon the facts, matters and assumptions detailed in Appendix A.

1.2 Qualifications and Experience

Appendix A contains a statement setting out my qualifications and experience, and the other matters raised by "Planning Panels Victoria – Planning Panels – Expert Evidence".

Appendix B contains my CV.

1.3 Summary of Opinions

Having inspected the site, perused relevant documents and plans, engaged in discussions with the road authority and undertaken traffic engineering assessments, I am of the opinion that:

a) the ultimate signalised intersection of Melbourne-Lancefield Road/Gellies Road will provide excellent access to land abutting Gellies Road,

b) I expect that the future traffic demands on Gellies Road will warrant either a duplication of the Bridge, or other traffic control measures,

c) a signalised control would allow a peak hour volume in the order of 1,000 vph,

d) the future residential development of the site would generate traffic volumes in the order of 90 movements per hour, and

e) there are no traffic engineering reasons why the land at 60 Gellies Road should not be marked for future residential development.

2 Existing Conditions

2.1 Subject Site

The subject site is located at the south side of Gellies Road, approximately 250 metres east of the Gellies Road Emu Creek bridge (the Bridge) as shown in Figure 1 below.

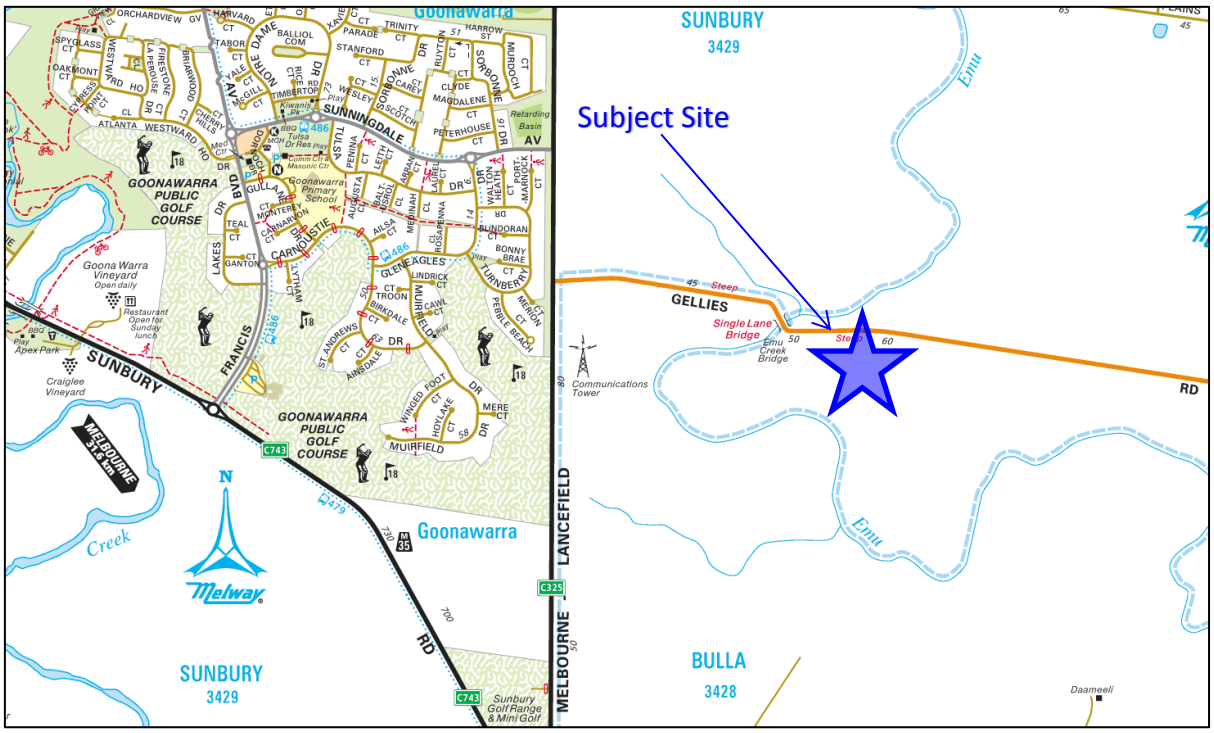

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Figure 1: Locality Plan

The site is currently farming land with a single residence. Vehicle access is taken from the eastern end of the site via Gellies Road.

An aerial view of the site is shown in Figure 2 below.

Source: www.nearmap.com.au

Figure 2: Aerial View

2.2 Existing Road Network

Gellies Road

Gellies Road is a rural collector road under the management of Hume City Council. In the vicinity of the subject site, the Gellies Road carriageway has a variable width between 5.7m and 6.3m which accommodates simultaneous two-way traffic movements.

At Emu Creek, Gellies Road narrows to form a single lane bridge. Give Way and advanced warning signs are installed on the west approach to the Bridge.

Photographs of Gellies Road in the vicinity of the subject site are presented below.

Figure 3: Gellies Road view West (East of Bridge)

Figure 4: Gellies Road view East (East of Bridge)

Figure 5: Gellies Road view East (West of Bridge)

Figure 6: Gellies Road view West (at Bridge)

3 Sunbury South PSP

The VPA website describes the Sunbury South PSP as follows:

> *The Victorian Planning Authority (VPA), in consultation with Hume City Council and Government agencies, has prepared the Sunbury South Precinct Structure plan (PSP) to guide new urban development in Sunbury.*
>
> *The Sunbury South PSP will provide up to 11,800 homes to accommodate a population of more than 33,000. The precinct will deliver a new Major Town Centre, two new employment areas, regional parklands along Jacksons Creek, as well as a Jacksons Creek road crossing, a new train station near Jacksons Hill, and a range of local schools, sporting fields and community facilities.*
>
> *The PSP applies to approximately 1,798 hectares of land generally bounded by Watsons Road and the Jacksons Creek to the south, Gellies Road and the Emu Creek to the north and north-east, the transmission line easement to the east and Vineyard Road to the west. The precinct abuts a number of existing communities within the Sunbury township, including Goonawarra and Jacksons Hill.*

The relevant sections of the Sunbury South PSP which affect the land located at 60 Gellies Road, Wildwood, are described below.

3.1 Land Use

The site is currently zoned Rural Conservation Zone – Schedule 1 (RCZ1).

Under the draft Sunbury South Precinct Structure Plan (PSP), the land is nominated as non-urban land and service open space in conservation area, as shown in Figure 7 below.

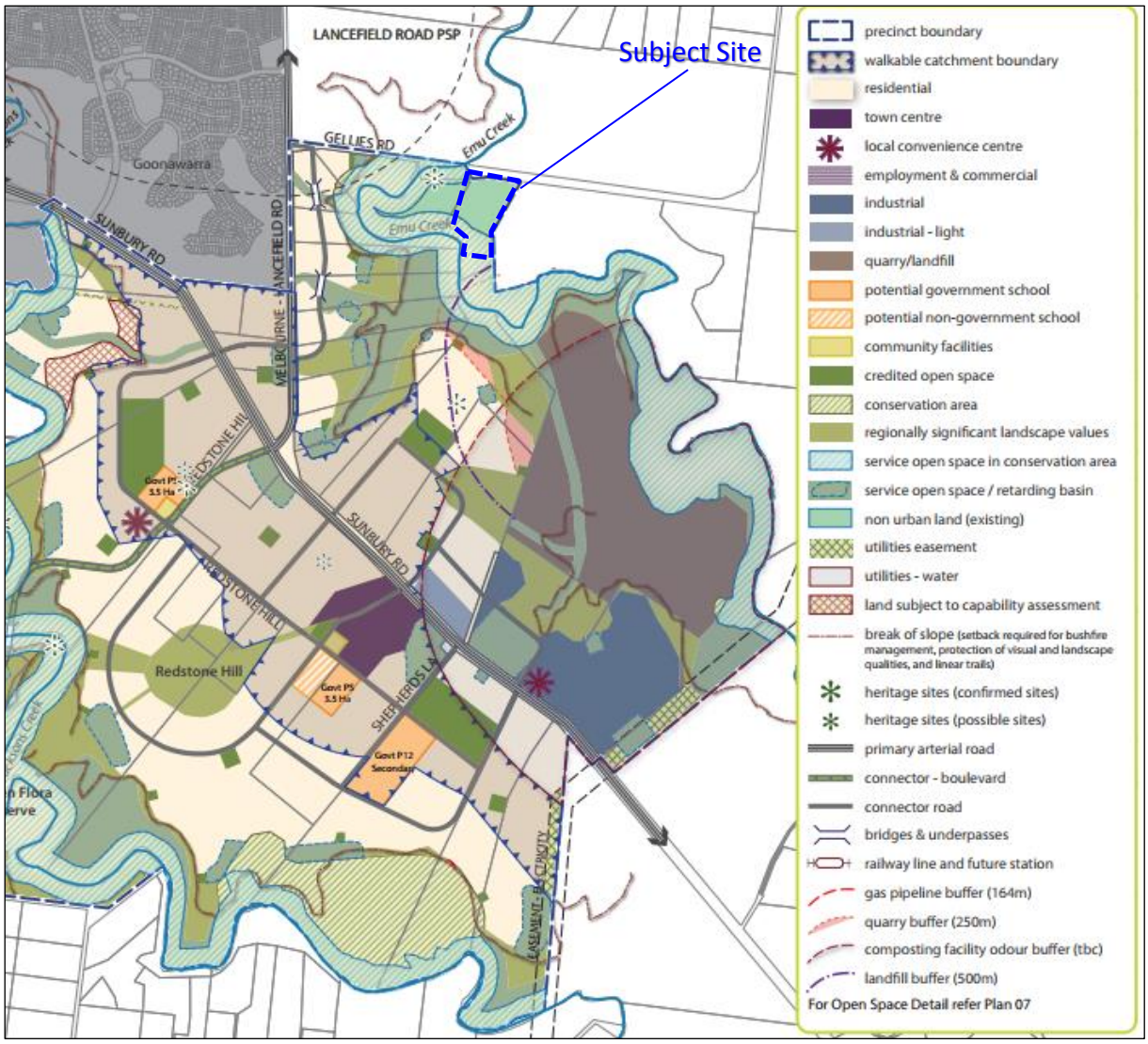


Figure 7: Sunbury South PSP – Future Urban Structure

3.2 Road Network

Figure 8 below shows the draft PSP street network plan.

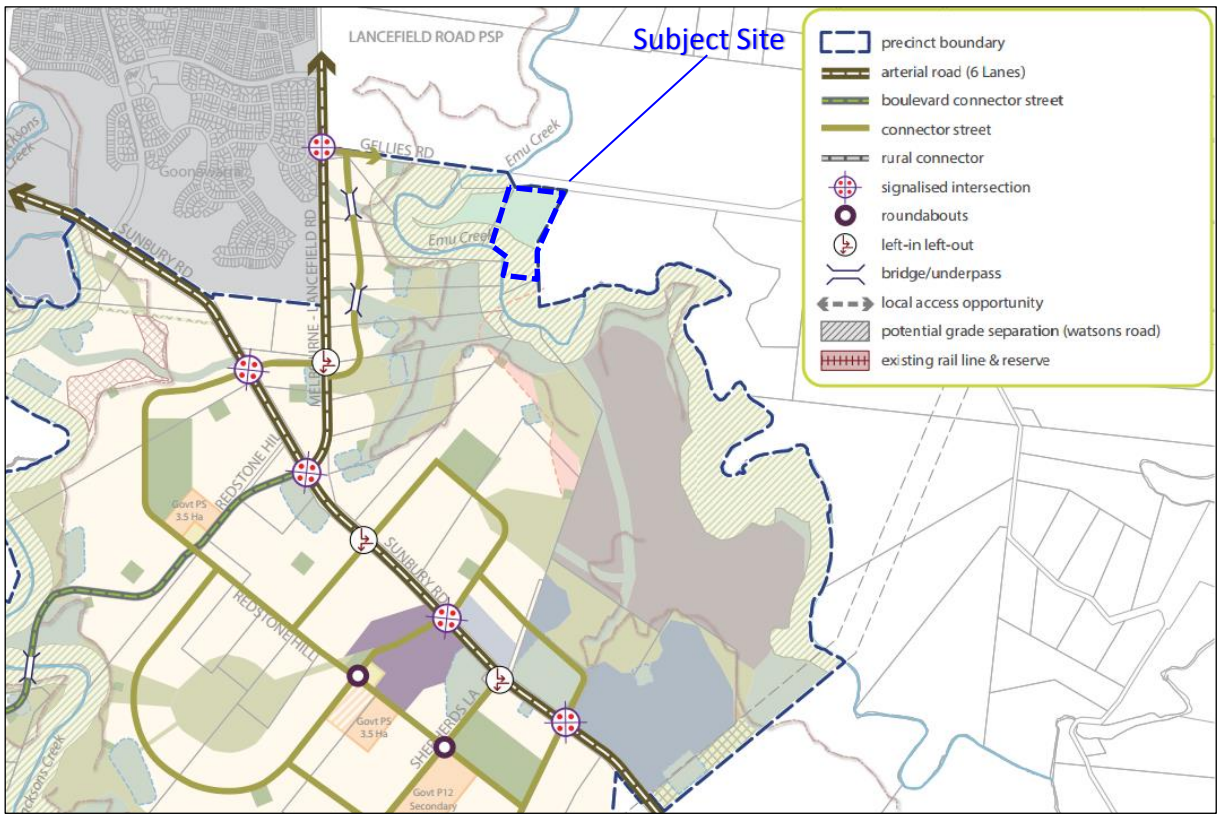


Figure 8: Sunbury South PSP – Street Network Plan

In relation to the subject site and surrounds, the street network plan shows:

- Gellies Road will be designated as a connector street, and
- the intersection of Melbourne-Lancefield Road/Gellies Road will ultimately be a signalised T-intersection. The signalisation of this intersection allows for excellent access at Gellies Road and any development for land that abuts the road.

4 Submission

Richard Strates in his letter to the VPA dated 6th February, 2017 made a submission on behalf of Tranteret Pty Ltd that, at 60 Gellies Road, the approximate 6.5 hectares of land fronting Gellies Road extending back to the 190 metre contour line be identified as "residential" and the balance of the land beyond the 190 metre contour line to 150 metre contour line which slopes back towards the Emu Creek be identified as "BCS growling grass frog conservation area".

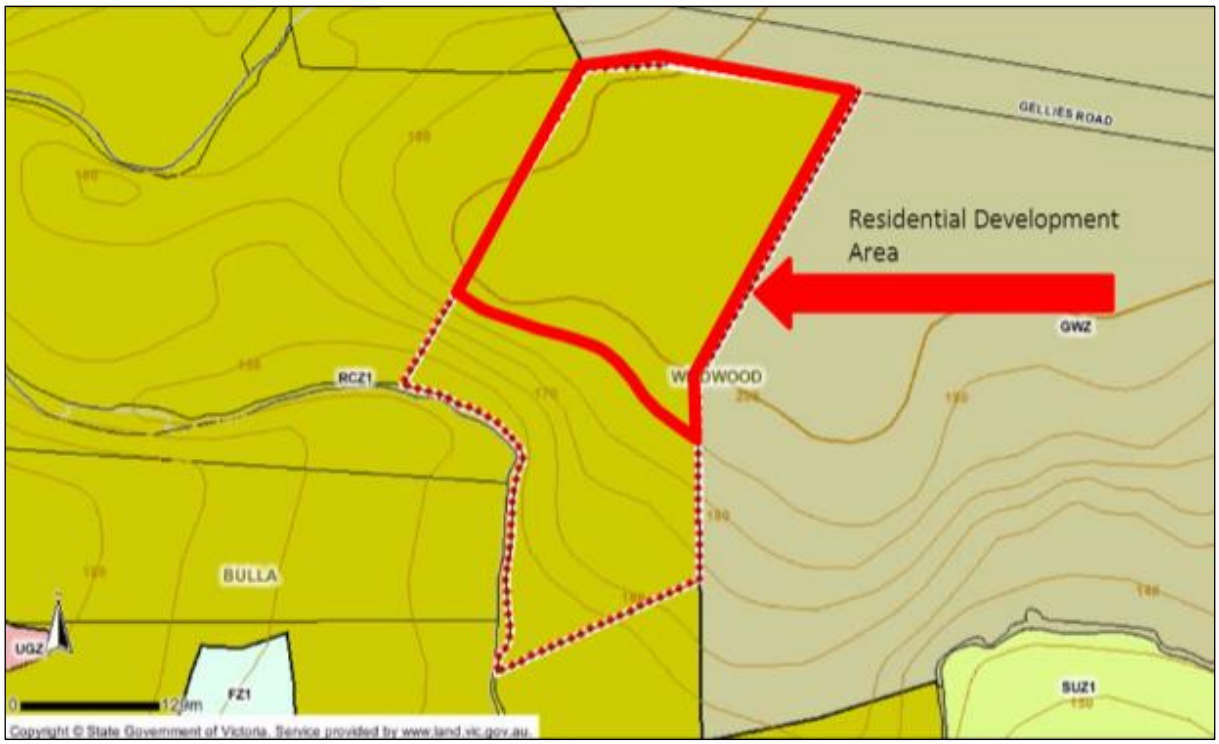


Figure 9: Developable Site Area

5 Traffic Engineering Assessments

5.1 Existing Traffic Volumes

Traffix Survey collected road volume data along Gellies Road, between Melbourne-Lancefield Road and the Bridge for 24 hrs from 2pm on Tuesday 8th August, 2017. The surveys identified a peak two-way hourly traffic volume of 72 vehicles from 5pm-6pm.

The daily traffic along this Gellies Road was recorded to be 655 vehicles with 7.3% of those being commercial vehicles.

A detailed copy of the traffic volume data is attached at Appendix C.

5.2 Possible Traffic Generation

I understand that the subject site plus a small portion of the site to the west would provide in the order of seven hectares of developable residential land.

If I assume a standard dwelling rate of 15 lots per hectare, a total of 105 lots could be developed.

The RTA Guide to Traffic Generating Developments (2002) (RTA Guide) sets out traffic generation rates based on survey data collected in New South Wales for a range of land uses. This guide is referred to in the Austroads Guide which is used by VicRoads, and is generally regarded as the standard for metropolitan development characteristics.

The RTA Guide sets out the following relevant traffic generation rates for dwelling houses:

- *Daily vehicle trips = 9 per dwelling per day*
- *Weekday peak hour vehicle trips = 0.85 per dwelling per day*

Accordingly, the proposed developable area may generate up to 945 vehicles per day with in the order of 90 movements being generated in each of the AM and PM peak hours.

This would effectively double the existing peak hour traffic volumes on Gellies Road.

5.3 Gellies Road Capacity

Gellies Road is marked to be a future connector street. In my experience, connector streets typically have a capacity in excess of 3,000 vehicles per day and the potential traffic generated by development of the subject site could easily be accommodated.

I note that the Bridge, in its current form, is a limiting factor to the safe operation of Gellies Road as a rural collector under current traffic demand.

5.4 The Bridge Capacity

I am of the opinion that the existing single lane arrangement of the Bridge, which is controlled by GIVE WAY signs on the west approach is approaching safe operational capacity given it is within a 100km/h environment.

I expect that in the future, traffic demand on Gellies Road due to future development and other increases in local and through traffic movements will increase substantially and warrant a duplication of the Bridge.

5.5 Possible Interim Treatments

The existing GIVE WAY signs are standard intersection signs which are not entirely suitable to this situation.

As a first measure of control, the speed limit should be reduced to at least 80km/h, preferably as low as 60km/h.

A supporting sign could also be erected which stated "Give way to on-coming traffic".

The next level of control might be a formal STOP sign in conjunction with the "Give way to on-coming traffic" signs.

The final interim measure would involve signalised control of the Bridge, which for a relatively small cost would increase the operational peak hour capacity across the Bridge to 1,000 vehicles.[1]

The table below shows SIDRA outputs for a signalised arrangement.

The model allows for unidirectional travel across the bridge at any one time and an allowance of 20 seconds clearance time.

Table 1: Summary of SIDRA Outputs

Volume	Cycle Time	Degree of Saturation	Average Delay (sec)	95th Percentile Queue (m)
200 vph (100 in each direction)	60 Seconds	0.460	28.6	21.8
1,000 vph (500 in each direction)	120 Seconds	0.871	51.5	233.1

From the table it can be seen that a peak hour traffic capacity of 1,000 vph can be accommodated with a signalised bridge arrangement.

Importantly, if the subject land were to be developed, the delay and queues associated with this arrangement would be well within acceptable limits.

A detailed copy of the SIDRA output is presented at Appendix D.

[1] A peak hour flow in the order of 1,000 vph is consistent with a daily volume of 10,000 vpd.

6 Summary of Opinions

Having inspected the site, perused relevant documents and plans, engaged in discussions with the road authority and undertaken traffic engineering assessments, I am of the opinion that:

a) the ultimate signalised intersection of Melbourne-Lancefield Road/Gellies Road will provide excellent access to land abutting Gellies Road,

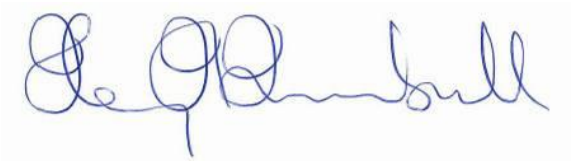
b) I expect that the future traffic demands on Gellies Road will warrant either a duplication of the Bridge, or other traffic control measures,

c) a signalised control would allow a peak hour volume in the order of 1,000 vph,

d) the future residential development of the site would generate traffic volumes in the order of 90 movements per hour, and

e) there are no traffic engineering reasons why the land at 60 Gellies Road should not be marked for future residential development.

I have made all the inquiries that I believe are desirable and appropriate and there are no matters of significance which I regard as relevant which, to the best of my knowledge, have been withheld from the Panel.



HENRY H TURNBULL, RFD
B.E.(Civil), M.I.E.Aust., M.I.T.E., F.V.P.E.L.A.
11th August, 2017

Appendix A:
Practice Note – PNVCAT2
Expert Evidence

STATEMENT OF WITNESS

Name

Henry Hume Turnbull

Position

Principal Consultant, Traffix Group

Address

Suite 8, 431 Burke Road
GLEN IRIS
VICTORIA 3146

Qualifications

My qualifications and membership of professional associations are as follows:-

- My educational qualifications and membership of professional associations are as follows:-
- Bachelor of Civil Engineering, University of Melbourne
- Life Member, Institute of Transportation Engineers
- Member, Institution of Engineers, Australia
- Life Fellow, Victorian Planning & Environmental Law Association

Experience

I have approximately 40 years' experience in Engineering including:

- ten years Country Roads Board of Victoria,
- two years with TTM Consulting, and
- twenty-eight years with Turnbull Fenner Pty Ltd/Traffix Group Pty Ltd.
- Additional activities and appointments include:-
- Sessional member, Planning Panels Victoria (1982-2017
- Member, Priority Development Panel (2004 - 2010)
- Councillor, Shire of Euroa (1980-1983)
  Shire President (1982-1983)
- President, Victorian Planning and Environmental Law Association (1999-2002)
  Life Fellow, Victorian Planning and Environmental Law Association (2003)
- Bail Justice (Victoria)

Area of Expertise

I have substantial experience and expertise in major road design and construction, contract administration, road construction material and construction methods, development impact assessment, including traffic generation and parking generation characteristics, traffic management and general traffic engineering, road safety and transportation planning.

I was a member of the former Ministers for Planning Advisory Committees making a review of Clause 52.06 (Car Parking) that led to changes being incorporated into the scheme on 5th June, 2012.

Disclosure of Interests

I disclose that I have no private relationship with the Planning Scheme Amendment applicant. Traffix Group has worked with other companies involved in this application.

These relationships have not impacted on my ability to provide impartial Expert Evidence to the Panel.

Engagement and Scope of Report

I was retained by Tranteret Pty Ltd in August 2017 to undertake traffic engineering assessments and prepare traffic evidence in relation to Amendment C207 to the Hume Planning Scheme.

Facts and Assumptions

As detailed in evidence.

Reference Documents

I have reviewed the following documents as part of my assessment:

- Amendment C207 Explanatory Report,
- Sunbury South Precinct Structure Plan (exhibition version dated November 2016),
- Relevant sections of the Hume Planning Scheme, and
- Relevant experience.

Summary of Opinions

See Conclusions section of the evidence statement.

Provisional Opinions

Not applicable.

Identity of Persons Undertaking Work

Henry H Turnbull as per the evidence statement.

Daniel Milder (Traffic Engineer, Traffix Group) assisted with preparation of the evidence report.

Report Completeness

Final report.

Appendix B: CV

Curriculum Vitae
Henry Turnbull

TraffixGroup
Traffic Engineers and Transport Planners

Position Principal Consultant

Contact Details (03) 9822 2888
henry@traffixgroup.com.au

Qualifications Bachelor of Civil Engineering
(Melbourne University)

Professional Affiliations Life Member, Institute of Transportation Engineers
Member, Institution of Engineers Australia
Life Fellow, Victorian Planning and Environmental Law Association (VPELA)

Work Experience Traffix Group (1988 – current)
TTM Consulting Pty Ltd (1986 –1988)
Peat Marwick Hungerfords (1982 – 1986)
Country Roads Board (1972 –1982)

Transport Planning

Skills & Experience

- Preparation of Traffic Impact Assessment Reports (TIAR) and Evidence for presentation at VCAT and Planning Panels for a range of land-use developments.
- Other significant commissions include:
  - Co-ordination of a development contribution plan for the City of Maribyrnong including extensive traffic investigations and assessments.
  - Preparation of Parking Precinct Plans for Ocean Grove and Belmont (City of Greater Geelong).
  - TAC funding strategies and priority assessment for VicRoads – Northern Region.
  - Preston and Fairfield Parking and Access Strategy Studies including Parking Precinct Plans.
- Preparation of transport planning studies and Integrated Travel Plans including consideration of sustainable transport modes and green travel plans, pedestrian access, bicycle paths, parking and access to public transport.
- Provision of advice on traffic engineering and transport planning issues for major infrastructure projects for government and private clients.
- Extensive stakeholder interaction and consultation with community bodies on technical transport issues and project planning issues.
- Management of numerous other projects including local and district traffic management studies, heavy vehicle route assessments, pedestrian safety research, public transport passenger surveys and route studies, property rezoning and health care projects.

Strategic Planning & Statutory Planning

Skills & Experience

- Regularly appointed as a Planning Panel member by the Minister for Planning with over thirty years experience as a sessional Planning Panel member.
- Relevant major Panels and Advisory Committees include:
  - Armstrong Creek Urban Framework Plan
  - Armstrong Creek North East Industrial Precinct Structure Plan.
  - Traralgon Bypass.
  - Webb Dock EES.
  - Melbourne Airport Rail Link.
- Served successive Governments on Advisory Committees to assist with policy development, including the:
  - Priority Development Panel Steering Committee on the development of Practice Notes for Parking Precinct Plans.
  - Advisory Committee reviewing Clause 52.06 Carparking in the VPPs.
- Significant experience and expertise in the provision of traffic engineering and transport planning advice to support the development of structure plans, site/precinct plans and development contribution plans.
- Skills include working as part of project teams, analysis and design of transport projects and consultation with stakeholders and the community.
- Relevant projects include:
  - Toolern Structure Plan.
  - Greenvale R1 Precinct Structure Plan.
  - Greenvale R3 Precinct Structure Plan.
  - Sale, Wurruk and Longford Structure Plan.

Significant Appointments Sessional Member Planning Panels Victoria (1982 - 2017)
Member Priority Development Panel (2004 - 2010)
Member Growth Areas Authority Expert Panels for Urban Planning and Urban Design. (Appointed 2010)

Key Activities Councillor, Shire of Euroa, 1980 – 1983 (Shire President, 1982 – 1983)
President, VPELA, 1999 - 2002
Bail Justice (Victoria)

Appendix C:
Traffic Volume Data

Traffic Data Collection Services

Traffix Survey Pty Ltd
ABN 57 120 461 510

Address
Suite 8, 431 Burke Road
Glen Iris Victoria 3146

Contact
Telephone 03 9822 2888
Facsimile 03 9822 7444
survey@traffixgroup.com.au
www.traffixgroup.com.au

Gellies Road, Wildwood

Between

Lancefield Road & Bridge

Prepared for

Traffix Group Pty Ltd

August 2017

Reference: 38970161

TRAFFIC COUNT SUMMARY

TraffixSurvey
Traffic Data Collection Services

Gellies Road, Wildwood

At: mid-block

Between

Lancefield Road & Bridge

CUSTOMER:	Traffix Group Pty Ltd	**MAP REF:**	383 C5
TYPE COUNT:	7 days, Speed Vol Class	**ACTUAL DURATION:**	2 days
DATE START:	08/08/17	**DATE FINISH:**	09/08/17
TIME START:	1400	**TIME FINISH:**	1300
DIRECTION-1:	Eastbound	**DIRECTION-2:**	Westbound
COUNTER NO:		**SPEED LIMIT:**	80
CLASSES:	1 - 12	**SPEEDS:**	All

ALL VEHICLES	Eastbound	Westbound	COMBINED
24 Hour Week Day Average	295	360	655
24 Hour 7 Day Average	295	360	655
A.M. Peak Hour Volume	39	29	64
A.M. Peak Hour	0700-0759	0800-0859	0700-0759
P.M. Peak Hour Volume	28	49	72
P.M. Hour	1600-1659	1700-1759	1700-1759

COMMERCIAL VEHICLE	Eastbound	Westbound	COMBINED
Total Volume	20	28	48
%	6.8%	7.8%	7.3%

SPEEDS	Eastbound % Vol.	Westbound % Vol.	COMBINED % Vol.
>119km/h	0.0	0.0	0.0
>109km/h	0.0	0.0	0.0
>99km/h	0.0	0.6	0.3
>89km/h	2.4	5.8	4.3
>79km/h	11.2	19.2	15.6
>69km/h	46.8	48.9	47.9
>59km/h	77.3	82.2	80.0
>49km/h	95.9	95.3	95.6
>39km/h	99.3	99.4	99.4
>29km/h	100.0	99.7	99.8
>19km/h	100.0	99.7	99.8
85%ile	77.6	80.8	79.2
Mean	67.8	69.8	68.9

Notes

Traffix Survey Traffic Count
Traffic Volume Analysis

Traffic Data Collection Services

Site No: 3897016
Site location: Gellies Road, Wildwood
Between : Lancefield Road & Bridge
Direction : Eastbound
Time range: 1400 08/08/17 to 1300 09/08/17
Filters: Class: 1-12, Speeds: All

Date		*	09/08/17*					AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	.	.	0	.	.	.	.	0	0
0100-0159	.	.	0	.	.	.	.	0	0
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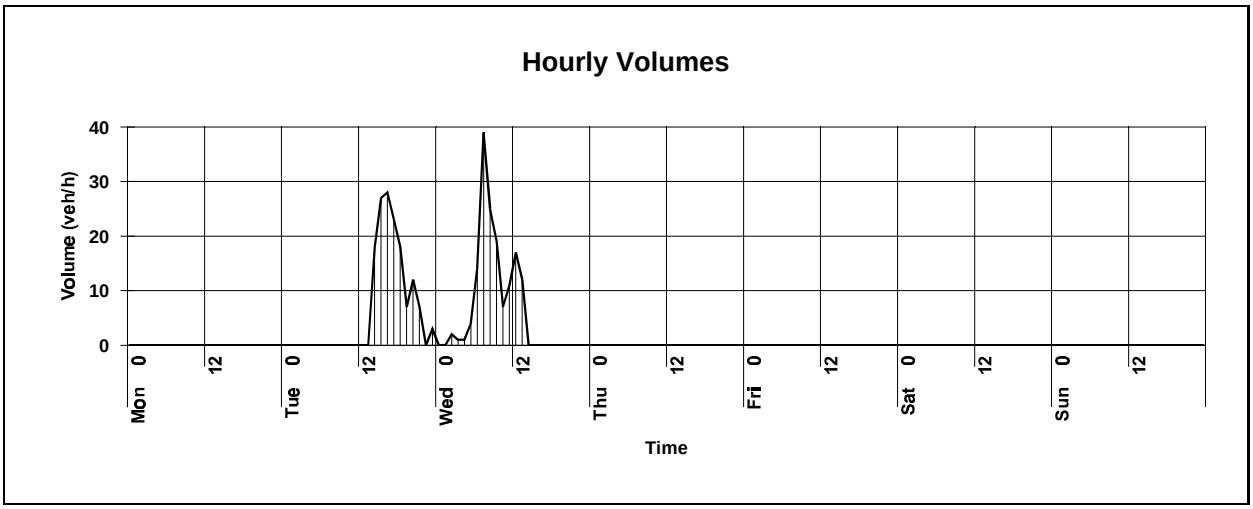
1200-1259	.	.	***17***	.	.	.	.	17	17
1300-1359	.	.	12	.	.	.	.	12	12
1400-1459	.	18	.	.	.	.	.	18	18
1500-1559	.	27	.	.	.	.	.	27	27
1600-1659	.	***28***	.	.	.	.	.	28	28
1700-1759	.	23	.	.	.	.	.	23	23
1800-1859	.	18	.	.	.	.	.	18	18
1900-1959	.	7	.	.	.	.	.	7	7
2000-2059	.	12	.	.	.	.	.	12	12
2100-2159	.	7	.	.	.	.	.	7	7
2200-2259	.	0	.	.	.	.	.	0	0
2300-2359	.	3	.	.	.	.	.	3	3
TOTALS									
12Hr 7-19	0	114	***130***	0	0	0	0	244	244
24Hr 0-24	0	143	***152***	0	0	0	0	295	295
24/12 Fact	#DIV/0!	1.25	1.17	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.21	1.21
AM HR	#N/A	#N/A	***0700-0759***	#N/A	#N/A	#N/A	#N/A		
PEAK	0	0	***39***	0	0	0	0		
PM HR	#N/A	***1600-1659***	1200-1259	#N/A	#N/A	#N/A	#N/A		
PEAK	0	***28***	17	0	0	0	0		

. Data not included in Summary Averages



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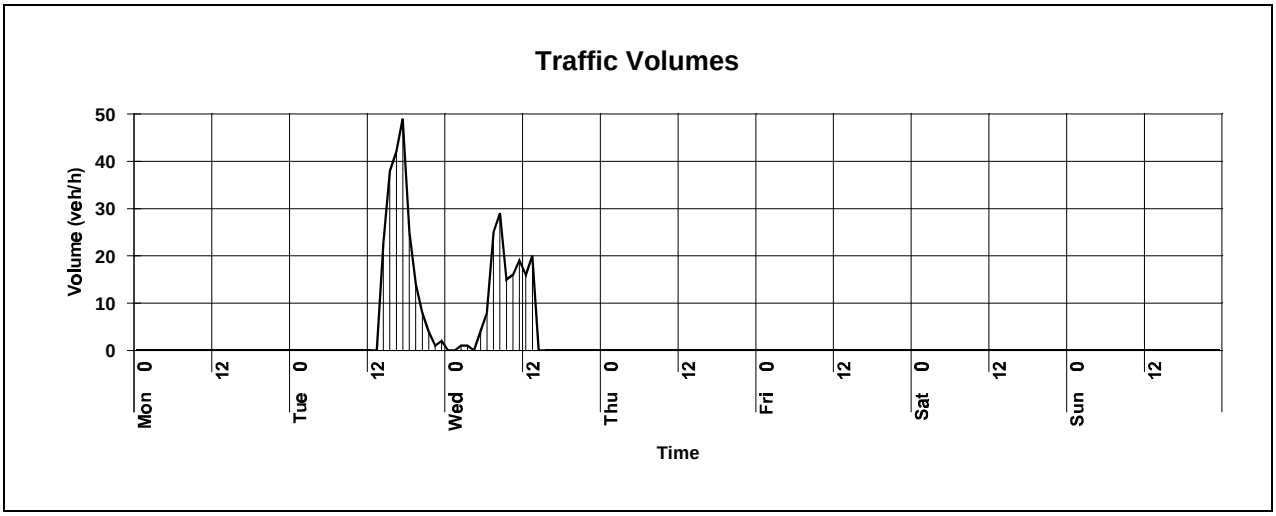
Date		*	09/08/17*					AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	.	.	0	.	.	.	.	0	0
0100-0159	.	.	0	.	.	.	.	0	0
0200-0259	.	.	1	.	.	.	.	1	1
0300-0359	.	.	1	.	.	.	.	1	1
0400-0459	.	.	0	.	.	.	.	0	0
0500-0559	.	.	4	.	.	.	.	4	4
0600-0659	.	.	8	.	.	.	.	8	8
0700-0759	.	.	25	.	.	.	.	25	25
0800-0859	.	.	***29***	.	.	.	.	29	29
0900-0959	.	.	15	.	.	.	.	15	15
1000-1059	.	.	16	.	.	.	.	16	16
1100-1159	.	.	19	.	.	.	.	19	19
1200-1259	.	.	16	.	.	.	.	16	16
1300-1359	.	.	***20***	.	.	.	.	20	20
1400-1459	.	23	.	.	.	.	.	23	23
1500-1559	.	38	.	.	.	.	.	38	38
1600-1659	.	42	.	.	.	.	.	42	42
1700-1759	.	***49***	.	.	.	.	.	49	49
1800-1859	.	25	.	.	.	.	.	25	25
1900-1959	.	14	.	.	.	.	.	14	14
2000-2059	.	8	.	.	.	.	.	8	8
2100-2159	.	4	.	.	.	.	.	4	4
2200-2259	.	1	.	.	.	.	.	1	1
2300-2359	.	2	.	.	.	.	.	2	2
TOTALS									
12Hr 7-19	0	***177***	140	0	0	0	0	317	317
24Hr 0-24	0	***206***	154	0	0	0	0	360	360
24/12 Fact	#DIV/0!	1.16	1.10	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.14	1.14
AM HR	#N/A	#N/A	***0800-0859***	#N/A	#N/A	#N/A	#N/A		
PEAK	0	0	***29***	0	0	0	0		
PM HR	#N/A	***1700-1759***	1300-1359	#N/A	#N/A	#N/A	#N/A		
PEAK	0	***49***	20	0	0	0	0		

. Data not included in Summary Averages



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Traffic Volume Analysis

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Traffic Data Collection Services

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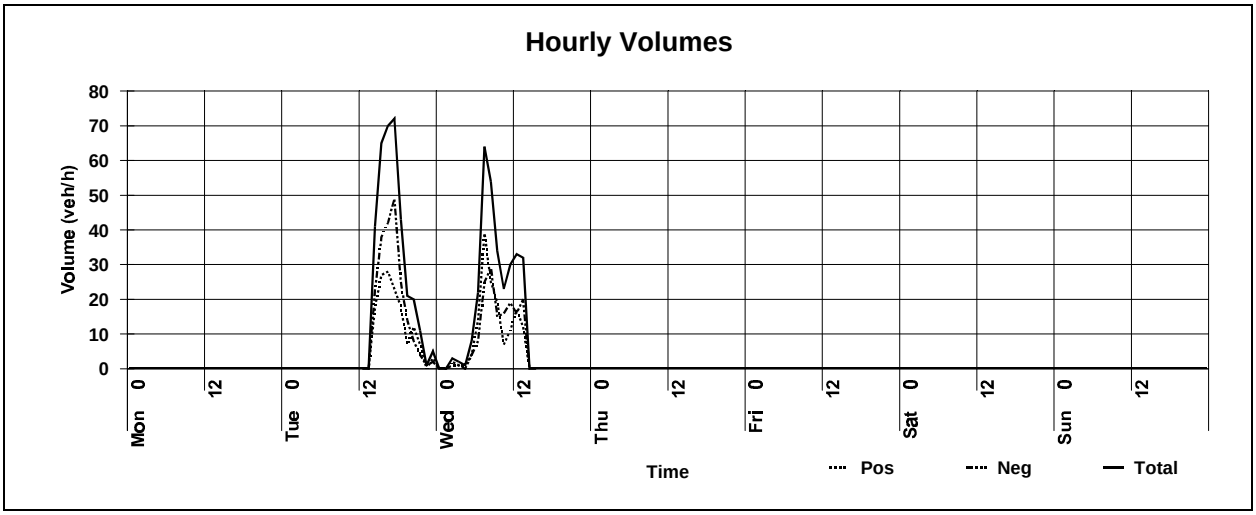
Date		*	09/08/17*					AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	.	.	0	.	.	.	.	0	0
0100-0159	.	.	0	.	.	.	.	0	0
0200-0259	.	.	3	.	.	.	.	3	3
0300-0359	.	.	2	.	.	.	.	2	2
0400-0459	.	.	1	.	.	.	.	1	1
0500-0559	.	.	8	.	.	.	.	8	8
0600-0659	.	.	22	.	.	.	.	22	22
0700-0759	.	.	***64***	.	.	.	.	64	64
0800-0859	.	.	54	.	.	.	.	54	54
0900-0959	.	.	34	.	.	.	.	34	34
1000-1059	.	.	23	.	.	.	.	23	23
1100-1159	.	.	30	.	.	.	.	30	30
1200-1259	.	.	***33***	.	.	.	.	33	33
1300-1359	.	.	32	.	.	.	.	32	32
1400-1459	.	41	.	.	.	.	.	41	41
1500-1559	.	65	.	.	.	.	.	65	65
1600-1659	.	70	.	.	.	.	.	70	70
1700-1759	.	***72***	.	.	.	.	.	72	72
1800-1859	.	43	.	.	.	.	.	43	43
1900-1959	.	21	.	.	.	.	.	21	21
2000-2059	.	20	.	.	.	.	.	20	20
2100-2159	.	11	.	.	.	.	.	11	11
2200-2259	.	1	.	.	.	.	.	1	1
2300-2359	.	5	.	.	.	.	.	5	5
TOTALS									
12Hr 7-19	0	***291***	270	0	0	0	0	561	561
24Hr 0-24	0	***349***	306	0	0	0	0	655	655
24/12 Fact	#DIV/0!	1.20	1.13	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.17	1.17
AM HR	#N/A	#N/A	***0700-0759***	#N/A	#N/A	#N/A	#N/A		
PEAK	0	0	***64***	0	0	0	0		
PM HR	#N/A	***1700-1759***	1200-1259	#N/A	#N/A	#N/A	#N/A		
PEAK	0	***72***	33	0	0	0	0		

. Data not included in Summary Averages



Appendix D:
SIDRA Outputs

MOVEMENT SUMMARY

Site: 101 [Gellies Road Bridge]

Gellies Road Bridge
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Gellies Road											
5	T1	100	7.3	0.460	28.6	LOS C	2.9	21.8	0.97	0.76	40.8
Approach		100	7.3	0.460	28.6	LOS C	2.9	21.8	0.97	0.76	40.8
West: Gellies Road											
11	T1	100	7.3	0.460	28.6	LOS C	2.9	21.8	0.97	0.76	40.8
Approach		100	7.3	0.460	28.6	LOS C	2.9	21.8	0.97	0.76	40.8
All Vehicles		200	7.3	0.460	28.6	LOS C	2.9	21.8	0.97	0.76	40.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Gellies Road Bridge]

Gellies Road Bridge
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Gellies Road											
5	T1	500	7.3	0.871	51.5	LOS D	31.3	233.1	1.00	1.01	32.4
Approach		500	7.3	0.871	51.5	LOS D	31.3	233.1	1.00	1.01	32.4
West: Gellies Road											
11	T1	500	7.3	0.871	51.5	LOS D	31.3	233.1	1.00	1.01	32.4
Approach		500	7.3	0.871	51.5	LOS D	31.3	233.1	1.00	1.01	32.4
All Vehicles		1000	7.3	0.871	51.5	LOS D	31.3	233.1	1.00	1.01	32.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.