

Proposed Residential Development
**Avon and Beechworth Roads,
Pymble**

TRAFFIC AND PARKING ASSESSMENT REPORT

10 December 2012

Ref 12454

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1. INTRODUCTION

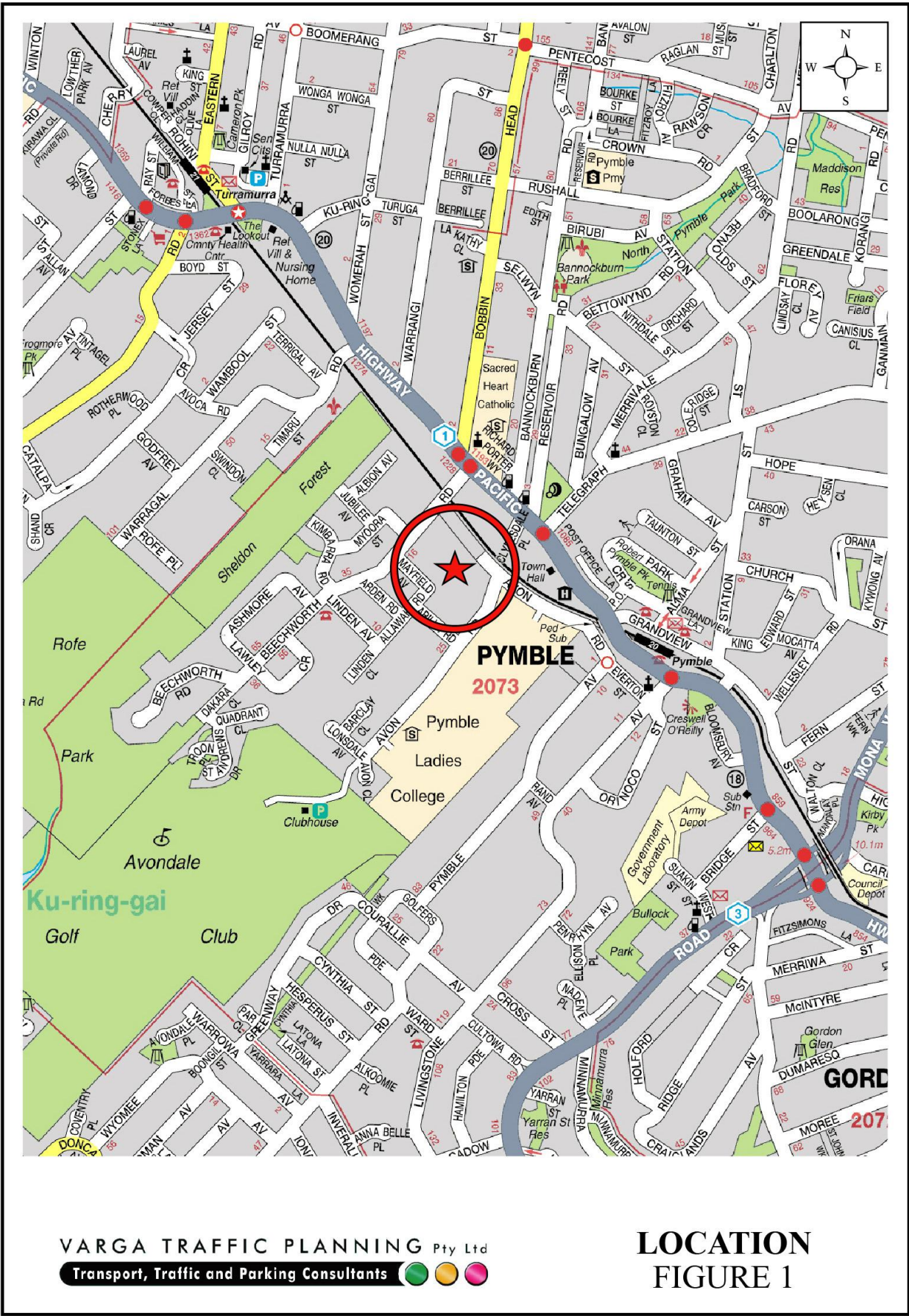
This report has been prepared to accompany an application for a residential development proposal located in Avon Road and Beechworth Road, Pymble (Figures 1 and 2).

The subject site is currently occupied by a number of dwelling houses which are to be demolished to facilitate the proposed residential development.

Vehicular access to the proposed residential development is to be provided via two driveways to be located in Avon Road and a single driveway which is to be located in Beechworth Road. The location of the proposed driveways generally coincides with the location of the existing driveways which already provide vehicular access to the site.

The purpose of this report is to assess the traffic and parking implications of the development proposal and to that end this report:

- describes the site and provides details of the development proposal
- reviews the road network in the vicinity of the site, and the traffic conditions on that road network
- estimates the traffic generation potential of the development proposal
- assesses the traffic implications of the development proposal in terms of road network capacity
- reviews the geometric design features of the proposed basement car parking facilities for compliance with the relevant codes and standards
- assesses the adequacy and suitability of the quantum of off-street car parking provided on the site.





2. PROPOSED DEVELOPMENT

Site

The subject site is located immediately to the south of the North Shore railway line, and has street frontages to Avon Road and to Beechworth Road.

The site is readily accessible by public transport, being located approximately 600m walking distance from Pymble Railway Station. A pedestrian underpass beneath the Pacific Highway connects Avon Road to the railway station and also provides pedestrian access to the local shops and services such as the Commonwealth Bank and the Australia Post agency.

The subject site is currently occupied by three dwelling houses, each with a separate vehicular access driveway to either Avon Road or to Beechworth Road.

Proposed Development

The proposed development envisages the construction of 4 new residential apartment buildings with basement carparking facilities. A total of 297 residential apartments are proposed as set out in the table below:

Proposed Residential Development				
	Number of Units	Resident Parking	Visitor Parking	Total Parking
Building 1	44 units	51 spaces	4 spaces	55 spaces
Building 3	77 units	87 spaces	8 spaces	95 spaces
Building 4	89 units	95 spaces	9 spaces	104 spaces
Building 5	63 units	64 spaces	6 spaces	70 spaces
TOTAL	273 units	297 spaces	27 spaces	324 spaces

Vehicular access to Building 1 is to be provided via a new two-way driveway located in approximately the same position as the existing driveway which currently provides access to the dwelling house located at No. 5 Avon Road.

Vehicular access to Buildings 3 and 4 is to be provided via a new driveway located in approximately the same position as the existing vehicular access driveway currently serving No. 1 Avon Road.

Vehicular access to Building 5 is to be provided via a new driveway located in approximately the same position as the existing driveway which currently provides vehicular access to No. 4 Beechworth Road.

A number of pedestrian paths within the site will connect the various buildings with Avon Road and Beechworth Road, enabling direct pedestrian access through the site from Beechworth Road to Pymble Railway Station.

Plans of the proposed development have been prepared by *Marchese + Partners International Pty Ltd* and are to be reproduced in the following pages.



3. TRAFFIC ASSESSMENT

Road Hierarchy

The road hierarchy allocated to the road network in the vicinity of the site by the Roads and Maritime Services is illustrated on Figure 3.

The Pacific Highway is classified by the RMS as a *State Road* and provides the key north-south road link in the area. It typically carries three traffic lanes in each direction, with opposite traffic flows separated by a central concrete median island.

Ryde Road/Mona Vale Road is also classified by the RMS as a *State Road* and provides a road link between Mona Vale in the north to Blakehurst in the south. It typically 3 traffic lanes in each direction, with additional lanes provided at key intersections to accommodate turning movements.

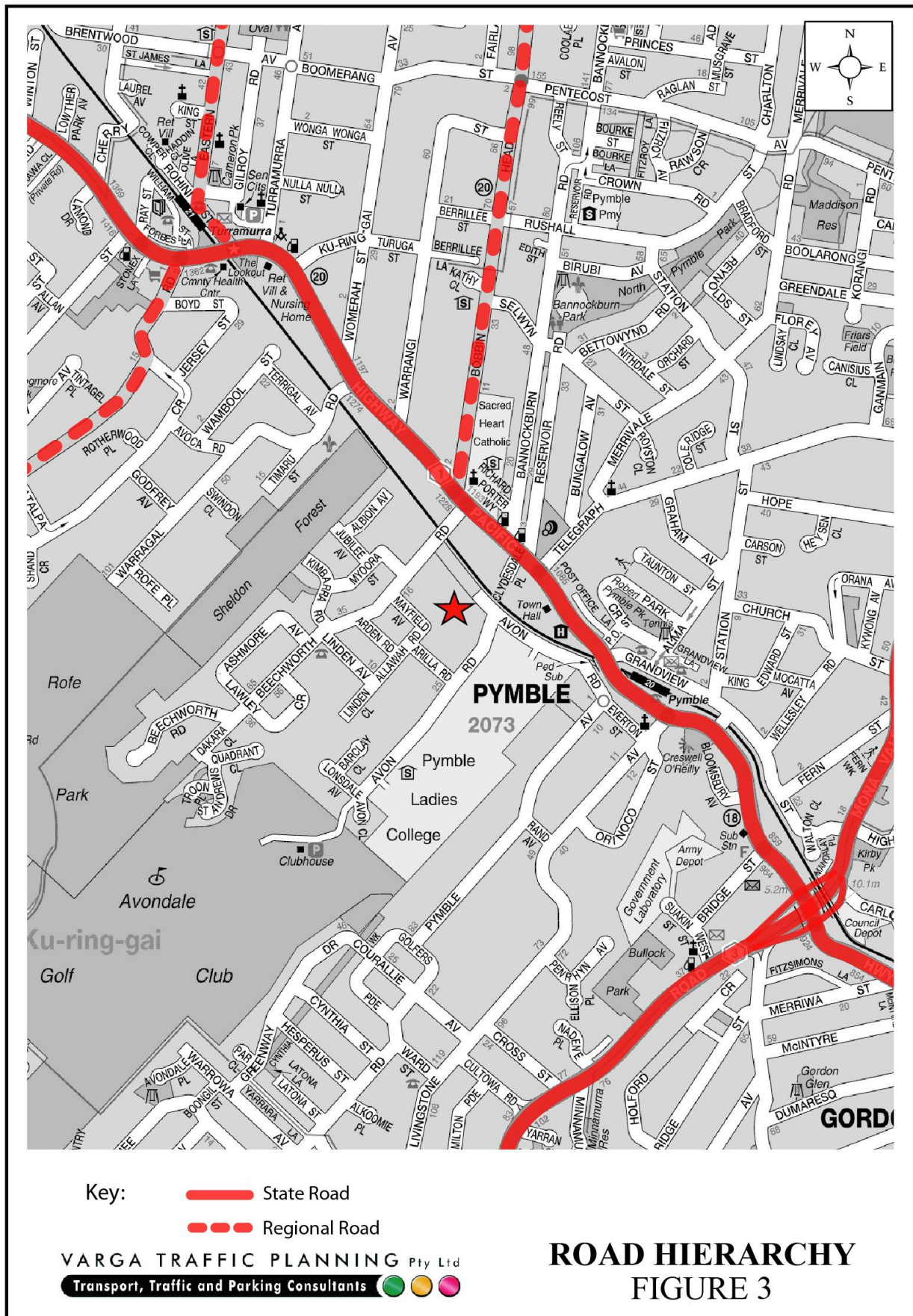
Bobbin Head Road is classified by the RMS as a *Regional Road* and provides a secondary north-south road link between Pymble and Ku-ring-gai Chase National Park. It typically carries 1 traffic lane in each direction.

Avon Road and Beechworth Road are local, unclassified roads which perform the function of *collector routes*, providing access from the surrounding residential area to the classified RMS arterial road network.

Existing Traffic Controls

The existing traffic controls which apply to the road network in the vicinity of the site are illustrated on Figure 4. Key features of those traffic controls are:

- a 60 km/h SPEED LIMIT in the Pacific Highway
- a 50 km/h SPEED LIMIT on all other local roads in the surrounding area



- TRAFFIC SIGNALS in the Pacific Highway where it intersects with Beechworth Road and with Livingstone Road
- 40 km/h SCHOOL ZONES in Avon Road adjacent to the railway line, and to the south of Arilla Road.

Existing Traffic Conditions

An indication of the existing traffic conditions on the road network in the vicinity of the site is provided by detailed peak period traffic surveys undertaken as part of this traffic study. The traffic surveys were undertaken during the morning and afternoon commuter peak periods at the following locations:

Pacific Highway/Livingstone Road
Pacific Highway/Beechworth Road
Pacific Highway/Bobbin Head Road
Avon Road/Access to Number 1 Avon Road
Avon Road/Arilla Road

The results of the peak hour traffic surveys reveal that:

- two-way traffic flows on the Pacific Highway are typically in the order of 4500 vehicles per hour (vph) during commuter peak periods
- two-way traffic flows in Livingstone Road are typically in the order of 600-900 vph during peak periods
- two-way traffic flows in Bobbin Head Road are typically in the order of 700 vph during the morning and afternoon peak periods
- traffic flows in Beechworth Road are typically in the order of 350-550 vph in peak periods
- two-way traffic flows in Avon Road are typically in the order of 350-500 vph, and

- two-way traffic flows in Arilla Road are typically in the order of 400 vph during peak periods.

Projected Traffic Generation

An indication of the traffic generation potential of the proposed development is provided by reference to the RMS publication *Guide to Traffic Generating Developments, Section 3 - Landuse Traffic Generation (October 2002)*.

The RMS *Guidelines* are based on extensive surveys of a wide range of land uses and nominate the following traffic generation rates which are applicable to the development proposal:

High Density Residential Flat Buildings in Sub-Regional Centres

0.29 peak hour vehicle trips per dwelling

The RMS *Guidelines* also make the following observation in respect of high density residential flat buildings:

Definition

A high density residential flat building refers to a building containing 20 or more dwellings. This does not include aged or disabled persons housing. *High density residential flat buildings* are usually more than 5 levels, have basement level carparking and are located in close proximity to public transport services. The building may contain a component of commercial use.

Factors

The above rates include visitors, staff, service/delivery and on-street movements such as taxis and pick-up/set-down activities.

The proposed development satisfies each of the above RMS criteria for a high density residential development, particularly in respect of the site's proximity to public transport services.

Application of the above traffic generation rate to the development proposal yields a traffic generation potential of 79 vph.

However, discussions with the Department of Planning and Infrastructure have indicated that consideration should also be given to using a higher traffic generation rate of 0.4 vph/unit. That higher traffic generation rate is usually applied to high density residential developments which may *NOT* be readily accessible by public transport eg; developments which are *NOT* located within easy walking distance of a suburban railway station.

In this instance, it is considered that the subject site is readily accessible by public transport, being located an easy 600m (or less) walking distance to Pymble Railway Station, along a relatively flat route.

However, a comparison of the two traffic generation rates reveals that the *difference* between the two traffic generation rates is relatively minor, resulting in a *difference* of less than 10 vph per building, or a cumulative difference of just 30 vph as set out in the table below:

Comparison of Projected Traffic Generation Rates				
	Number of Units	Traffic Generation Rate		Nett Difference
		0.29 vph/unit	0.40 vph/unit	
Building 1	44 units	12.8 vph	17.6 vph	4.8 vph
Building 3	77 units	22.3 vph	30.8 vph	8.5 vph
Building 4	89 units	25.8 vph	35.6 vph	9.8 vph
Building 5	63 units	18.3 vph	25.2 vph	6.9 vph
TOTAL	273 units	79.2 vph	109.2 vph	30.0 vph

Accordingly, given the relatively minor difference in outcomes between the two traffic generation rates, the higher traffic generation rate of 0.4 vph/unit has been adopted to provide a more *rigorous* traffic assessment.

Traffic Assessment – Road Network Capacity

The traffic implications of development proposals primarily concern the effects that any *additional* traffic flows generated by the development may have on the operational performance of the nearby road network. Those effects can be assessed using the SIDRA capacity analysis program as is widely used by the RMS and many LGA's for this purpose. Criteria for evaluating the results of SIDRA capacity analysis are reproduced in the following pages.

The results of the SIDRA capacity analysis are summarised in the table below, revealing that:

- the Pacific Highway/Livingstone Road intersection will continue to operate at *Level of Service “B”* under the projected additional traffic flows, with increases in total average vehicle delays of less than 2 seconds per vehicle
- the intersection of Pacific Highway/Beechworth Road North will also continue to operate at *Level of Service “B”*, with increases in total average vehicle delays in the order of 3-4 seconds per vehicle
- the intersection of Avon Road/Arilla Road will continue to operate at *Level of Service “A”*, with no appreciable change in total average vehicle delays.

The SIDRA capacity analysis program was also used to assess the operational performance of the site access driveways which are planned to serve the site. The results of that analysis reveal that each of the proposed vehicular access driveways will operate at *Level of Service “A”* and with absolutely minimal delays at all times.

RESULTS OF SIDRA CAPACITY ANALYSIS												
	EXISTING						PROPOSED					
	AM PEAK			PM PEAK			AM PEAK			PM PEAK		
	LOS	D/S	AVD	LOS	D/S	AVD	LOS	D/S	AVD	LOS	D/S	AVD
Pacific Hwy/Livingstone Rd	B	0.794	24.7	B	0.854	19.4	B	0.835	26.3	B	0.878	21.0
Pacific Hwy/Beechworth Rd	B	0.716	14.8	B	0.903	15.0	B	0.758	18.7	B	0.924	17.3
Pacific Hwy/Bobbin Head Rd	B	0.746	19.5	B	0.88	16.0	B	0.746	19.5	B	0.819	16.0
Avon Rd/Arilla Rd	A	0.247	4.4	A	0.265	4.8	A	0.250	4.5	A	0.175	4.9
Avon Rd/Bldgs 3 & 4 Site Access	A	0.148	0.6	A	0.108	0.4	A	0.161	1.3	A	0.158	1.5
Avon Rd/ Bldg 1 Site Access	-	-	-	-	-	-	A	0.151	2.5	A	0.117	0.5
Beechworth Rd/Bldg 5 Site Access	-	-	-	-	-	-	A	0.176	1.2	A	0.134	0.8

LOS – Level of Service; D/S – Degree of Saturation; AVD – Total Average Vehicle Delays (sec/veh)

In summary, the results of the capacity analysis indicate that the proposed residential development will not have any unacceptable traffic implications in terms of road network capacity, and that there will not be any road improvements or intersection upgrades required to accommodate the projected additional traffic flows.

Evaluation of the Need of a Road Link between Arilla Road and Beechworth Road

It has been suggested that consideration be given to providing a road link across the site between Beechworth Road and Avon Road to augment the local road network. The suggested road link across the site would duplicate the existing link between Avon Road and Beechworth Road via Mayfield Avenue and Arilla Road.

The provision of a through-site road link could potentially provide increased flexibility for residents of the proposed development. It could also provide an alternate route for existing local traffic currently using Mayfield Avenue/Arilla Road.

However, an analysis of the traffic flows expected to be generated by the proposed residential development suggests that:

- traffic generated by Buildings 1, 3 and 4 would primarily use Livingstone Avenue to access the Pacific Highway, and
- traffic generated by Building 5 would primarily use Beechworth Road to access the Pacific Highway.

Thus the only traffic generated by the site which would benefit from a through-site road link would be traffic approaching Building 5 from the north, or traffic departing Buildings 1, 3 and 4 with a destination towards the north. However those particular approach/departure movements are expected to generate *less than 15 vph* combined, and can be satisfactorily accommodated using the existing Mayfield Avenue/Arilla Road route when proceeding from Avon Road to Beechworth Road. An internal through-site link is therefore *NOT* required to accommodate traffic flows generated by the site.

The capacity analysis of the Avon Road/Arilla Road route also indicates that the existing local traffic flows travelling between Avon Road and Beechworth Road are satisfactorily accommodated on the existing road network. In particular, the capacity analysis indicates that the Avon Road/Arilla Road intersection operates at *Level of Service "A"* and with minimal delays under both the existing and projected future traffic volumes. The results of that capacity analysis indicate that there would be little benefit to be gained in terms of local

traffic movements if *another* road link was constructed between Avon Road and Beechworth Road across the site, as the existing local traffic movements are satisfactorily accommodated using the existing road network.

Accordingly, it is clear that there is *NO* benefit to be gained by either local traffic or development traffic through the provision of another road link between Avon Road and Beechworth Road. The provision of a through-site road link between Avon Road and Beechworth Road is therefore considered to be unnecessary.

Through-Site Pedestrian Link

Whilst a through-site road link would be of no benefit to the operation of the surrounding road network, the provision of a through-site *pedestrian link* between Avon Road and Beechworth Road is considered to be essential because:

- a through-site *pedestrian link* would significantly enhance the public transport options available to occupants to Building 5 when walking to/from Pymble Railway Station, and
- the provision of a through-site *pedestrian link* would also improve the public transport accessibility of other local residents walking to/from Pymble Railway Station, particularly residents living in the Myoora Street/Jubilee Avenue precinct who would benefit from the shorter walking distance to the railway station (compared with using the existing walking route via Arilla Road).

Accordingly, it is considered that a through-site road link is unnecessary and would be of little benefit to road users, however the provision of a through-site *pedestrian link* is considered essential as it would significantly enhance pedestrian accessibility to/from Pymble Railway Station and the nearby local shops and services.

4. PARKING IMPLICATIONS

Existing Kerbside Parking Restrictions

The existing kerbside parking restrictions which apply to the road network in the vicinity of the site are illustrated on Figure 5. Key features of those parking restrictions are:

- CLEARWAY restrictions along both sides of the Pacific Highway during peak periods
- BUS ZONES on both sides of the Pacific Highway at regular intervals
- PARKING restrictions in Beechworth Road on the approaches to the Pacific Highway intersection
- generally UNRESTRICTED kerbside parking elsewhere on the local road network.

Off-Street Parking Provisions

The off-street parking requirements applicable to the development proposal are specified in Council's *Development Control Plan No.43 – Car Parking (1998)* document in the following terms:

High Density Residential Flat Buildings

1 bedroom apartments:	1.0 space per dwelling
2 bedroom apartments:	1.0 space per dwelling
3 bedroom apartments:	1.5 spaces per dwelling
Visitors:	1.0 space per 4 dwellings

Application of the above parking requirements to the retail and residential components of the development proposal yields an off-street parking requirement of 364 spaces as set out below:

Proposed Development - DCP No.43 Parking Requirements

Residential (273 Apartments):	296.0 spaces
Residential Visitors:	68.2 spaces
TOTAL:	364.2 spaces



The proposed development makes provision for a total of 324 off-street car parking spaces, comprising 297 residential spaces, 27 residential visitor spaces, thereby resulting in a “shortfall” of 40 spaces when assessed under Council’s *DCP No.43*.

Reference is also made to the parking rates specified in Council’s former *Development Control Plan (Town Centres) 2010, Section 3A.27 – Mixed-Use Development Car Parking Provision* document as follows:

Residential Component within Mixed-Use Development

Studio:	0.0 spaces per dwelling (min)	0.5 spaces per dwelling (max)
1-Bedroom Apartments:	0.6 spaces per dwelling (min)	1.0 spaces per dwelling (max)
2-Bedroom Apartments:	1.0 spaces per dwelling (min)	1.25 spaces per dwelling (max)
3-Bedroom Apartments:	1.0 spaces per dwelling (min)	1.5 spaces per dwelling (max)
Visitors:	1.0 spaces per 6 dwellings	1.0 spaces per 6 dwellings

Application of the above parking requirements to the retail and residential components of the development proposal yields an off-street parking requirement of between 288 spaces and 373 spaces as set out below:

Proposed Development – Former Town Centres DCP 2010 Parking Requirements

Residential (273 Apartments):	242.2 spaces (min)	327.8 spaces (max)
Residential Visitors:	45.5 spaces (min)	45.5 spaces (max)
TOTAL	287.7 spaces (min)	373.3 spaces (max)

The proposed development makes provision for a total of 324 off-street car parking spaces, thereby satisfying the former *Town Centre DCP* parking requirements.

By way of further comparison, reference is made to the parking rates nominated in the former Roads and Traffic Authority’s (now RMS) publications *Guide to Traffic Generating Developments, Section 5 – Parking Requirements for Specific Land Uses (October 2002)*.

The parking rates nominated in the RMS *Guidelines* are based on extensive surveys of a wide range of land uses and nominates the following off-street parking requirements which are relevant to the development proposal.

High Density Residential Flat Buildings (Metropolitan Sub-Regional Centres)

1 bedroom apartments:	0.6 spaces per dwelling
2 bedroom apartments:	0.9 spaces per dwelling
3 bedroom apartments:	1.4 spaces per dwelling
Visitors:	1.0 space per 5 dwellings

Application of the above parking rates to the various components of the development proposal yields an off-street parking requirement of 284 parking spaces as set out below:

Proposed Development – RMS Parking Requirements

Residential (273 Apartments):	234.1 spaces
Residential Visitors:	54.6 spaces
TOTAL:	288.7 spaces

The proposed development makes provision for a total of 324 off-street carparking spaces, thereby satisfying the requirements specified in the *RMS Guidelines*.

In summary, the foregoing assessment has found that the proposed provision of 324 off-street carparking spaces as part of the development proposal:

- results in a shortfall of 40 carparking spaces when assessed in accordance with DCP No. 43
- falls within the range of the minimum and maximum parking requirements specified by the former *Town Centres DCP 2010*, and
- satisfies the requirements specified by the *RMS Guidelines*, resulting in a surplus of approximately 35 spaces.

Accordingly, the parking provisions incorporated in the development proposal are considered to be “constrained” when assessed in accordance with the more generous requirements specified by DCP 43, and are generally in keeping with the parking requirements specified by the former *Town Centre’s DCP* and the *RMS Guidelines* which more specifically address the parking needs of high density residential developments with good access to public transport services, having regard for the proximity of the site to Pymble Railway Station.

APPENDIX A

SIDRA CAPACITY ANALYSIS MOVEMENT SUMMARIES

MOVEMENT SUMMARY

Site: Existing AM

Pacific Hwy & Livingstone Rd, Pymble

Signals - Fixed Time Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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
South: Pacific Hwy (S)											
1	L	249	0.4	0.794	44.9	LOS D	11.9	83.9	0.77	0.85	25.3
2	T	1479	4.3	0.740	29.1	LOS C	41.2	299.2	0.84	0.77	31.9
Approach		1728	3.8	0.794	31.4	LOS C	41.2	299.2	0.83	0.78	30.8
North: Pacific Hwy (N)											
8	T	2674	1.8	0.667	7.6	LOS A	32.4	230.0	0.50	0.46	47.7
9	R	318	0.3	0.780	69.1	LOS E	22.7	159.2	1.00	0.88	19.3
Approach		2992	1.6	0.780	14.2	LOS A	32.4	230.0	0.55	0.51	41.7
West: Livingstone Rd (W)											
10	L	111	0.0	0.757	74.6	LOS F	15.2	106.9	1.00	0.88	17.2
12	R	284	0.4	0.757	76.0	LOS F	15.2	106.9	1.00	0.88	17.0
Approach		395	0.3	0.757	75.6	LOS F	15.2	106.9	1.00	0.88	17.1
All Vehicles		5115	2.2	0.794	24.7	LOS B	41.2	299.2	0.68	0.63	33.9

Level of Service (LOS) Method: Delay (RTA NSW).

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 used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P7	Across W approach	53	20.3	LOS C	0.1	0.1	0.52	0.52
All Pedestrians		53	20.3	LOS C			0.52	0.52

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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SIDRA INTERSECTION 5.1.12.2089

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MOVEMENT SUMMARY

Site: Existing PM

Pacific Hwy & Livingstone Rd, Pymble

Signals - Fixed Time Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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
South: Pacific Hwy (S)											
1	L	119	0.0	0.266	15.3	LOS B	2.8	19.3	0.35	0.70	41.0
2	T	2263	1.7	0.846	17.9	LOS B	60.0	426.2	0.81	0.77	38.2
Approach		2382	1.6	0.846	17.8	LOS B	60.0	426.2	0.79	0.76	38.3
North: Pacific Hwy (N)											
8	T	1815	0.8	0.505	3.9	LOS A	17.1	120.8	0.31	0.29	52.8
9	R	148	0.0	0.854	89.1	LOS F	11.8	82.5	1.00	0.93	16.7
Approach		1963	0.8	0.854	10.3	LOS A	17.1	120.8	0.36	0.34	45.7
West: Livingstone Rd (W)											
10	L	92	0.0	0.849	86.7	LOS F	13.5	94.7	1.00	0.94	16.9
12	R	226	0.0	0.849	87.7	LOS F	13.5	94.7	1.00	0.95	16.8
Approach		318	0.0	0.849	87.4	LOS F	13.5	94.7	1.00	0.95	16.8
All Vehicles		4663	1.2	0.854	19.4	LOS B	60.0	426.2	0.62	0.60	37.6

Level of Service (LOS) Method: Delay (RTA NSW).

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 used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P7	Across W approach	53	9.4	LOS A	0.1	0.1	0.35	0.35
All Pedestrians		53	9.4	LOS A			0.35	0.35

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: Proposed AM

Pacific Hwy & Livingstone Rd, Pymble

Signals - Fixed Time Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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
South: Pacific Hwy (S)											
1	L	262	0.4	0.835	47.9	LOS D	12.8	89.8	0.82	0.86	24.4
2	T	1483	4.3	0.742	29.1	LOS C	41.4	300.5	0.84	0.77	31.9
Approach		1745	3.7	0.835	32.0	LOS C	41.4	300.5	0.84	0.79	30.6
North: Pacific Hwy (N)											
8	T	2691	1.8	0.678	8.2	LOS A	34.0	241.3	0.52	0.48	47.1
9	R	323	0.3	0.817	72.6	LOS F	23.9	167.6	1.00	0.90	18.7
Approach		3014	1.6	0.817	15.1	LOS B	34.0	241.3	0.57	0.53	40.9
West: Livingstone Rd (W)											
10	L	111	0.0	0.828	78.8	LOS F	17.9	125.2	1.00	0.93	16.6
12	R	337	0.3	0.828	79.5	LOS F	17.9	125.2	1.00	0.94	16.6
Approach		448	0.2	0.828	79.4	LOS F	17.9	125.2	1.00	0.94	16.6
All Vehicles		5207	2.2	0.835	26.3	LOS B	41.4	300.5	0.70	0.65	33.0

Level of Service (LOS) Method: Delay (RTA NSW).

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 used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P7	Across W approach	53	20.3	LOS C	0.1	0.1	0.52	0.52
All Pedestrians		53	20.3	LOS C			0.52	0.52

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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SIDRA INTERSECTION 5.1.12.2089

Project: \\vtp_nas\data\Data\Jobs01\Jobs\Tram\SIDRA\12454 Avon Rd, Pymble\PAC_LIVP.sip

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INTERSECTION

MOVEMENT SUMMARY

Site: Proposed PM

Pacific Hwy & Livingstone Rd, Pymble

Signals - Fixed Time Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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
South: Pacific Hwy (S)											
1	L	172	0.0	0.404	16.6	LOS B	4.4	30.8	0.38	0.72	40.0
2	T	2280	1.7	0.878	20.6	LOS B	65.1	462.6	0.87	0.83	36.3
Approach		2452	1.6	0.878	20.3	LOS B	65.1	462.6	0.84	0.82	36.6
North: Pacific Hwy (N)											
8	T	1819	0.8	0.511	4.2	LOS A	17.9	126.2	0.32	0.30	52.3
9	R	165	0.0	0.833	86.0	LOS F	12.9	90.3	1.00	0.91	17.1
Approach		1984	0.8	0.833	11.0	LOS A	17.9	126.2	0.38	0.35	45.0
West: Livingstone Rd (W)											
10	L	92	0.0	0.833	84.6	LOS F	13.8	96.4	1.00	0.93	17.1
12	R	239	0.0	0.833	85.6	LOS F	13.8	96.4	1.00	0.93	17.0
Approach		331	0.0	0.833	85.4	LOS F	13.8	96.4	1.00	0.93	17.1
All Vehicles		4767	1.1	0.878	21.0	LOS B	65.1	462.6	0.66	0.63	36.5

Level of Service (LOS) Method: Delay (RTA NSW).

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 used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P7	Across W approach	53	10.5	LOS B	0.1	0.1	0.37	0.37
All Pedestrians		53	10.5	LOS B			0.37	0.37

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Processed: Friday, 9 November 2012 2:53:04 PM

SIDRA INTERSECTION 5.1.12.2089

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MOVEMENT SUMMARY

Site: Existing AM

Pacific Hwy & Beechworth Rd, Pymble

Signals - Fixed Time Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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
South: Pacific Hwy (S)											
1	L	242	0.0	0.679	19.1	LOS B	36.0	257.8	0.59	0.95	39.7
2	T	1772	3.8	0.679	12.1	LOS A	36.2	261.6	0.60	0.55	42.9
Approach		2014	3.4	0.679	13.0	LOS A	36.2	261.6	0.59	0.60	42.5
North: Pacific Hwy (N)											
8	T	2963	1.6	0.704	12.0	LOS A	39.4	279.8	0.61	0.57	43.2
Approach		2963	1.6	0.704	12.0	LOS A	39.4	279.8	0.61	0.57	43.2
West: Beechworth Rd (W)											
10	L	180	0.0	0.389	37.6	LOS C	11.2	78.1	0.89	0.95	27.2
12	R	149	0.7	0.716	66.8	LOS E	9.9	69.8	0.93	0.83	19.9
Approach		329	0.3	0.716	50.8	LOS D	11.2	78.1	0.91	0.90	23.3
All Vehicles		5306	2.2	0.716	14.8	LOS B	39.4	279.8	0.62	0.60	40.8

Level of Service (LOS) Method: Delay (RTA NSW).

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 used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	62.6	LOS F	0.2	0.2	0.91	0.91
P7	Across W approach	53	7.7	LOS A	0.1	0.1	0.32	0.32
All Pedestrians		106	35.1	LOS D			0.62	0.62

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Processed: Friday, 9 November 2012 2:50:57 PM

SIDRA INTERSECTION 5.1.12.2089

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MOVEMENT SUMMARY

Site: Existing PM

Pacific Hwy & Beechworth Rd, Pymble

Signals - Fixed Time Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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
South: Pacific Hwy (S)											
1	L	102	0.0	0.890	22.0	LOS B	68.9	488.0	0.82	0.98	38.7
2	T	2691	1.4	0.890	15.0	LOS B	69.2	490.0	0.83	0.78	40.1
Approach		2793	1.4	0.890	15.2	LOS B	69.2	490.0	0.83	0.79	40.1
North: Pacific Hwy (N)											
8	T	2001	0.7	0.571	7.9	LOS A	25.7	181.0	0.45	0.41	47.6
Approach		2001	0.7	0.571	7.9	LOS A	25.7	181.0	0.45	0.41	47.6
West: Beechworth Rd (W)											
10	L	154	0.0	0.417	60.9	LOS E	10.3	72.3	0.93	0.99	21.0
12	R	97	0.0	0.903	78.7	LOS F	7.0	49.0	0.92	0.90	18.0
Approach		251	0.0	0.903	67.8	LOS E	10.3	72.3	0.93	0.96	19.7
All Vehicles		5045	1.0	0.903	15.0	LOS B	69.2	490.0	0.68	0.65	40.5

Level of Service (LOS) Method: Delay (RTA NSW).

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 used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	66.3	LOS F	0.2	0.2	0.94	0.94
P7	Across W approach	53	6.5	LOS A	0.1	0.1	0.29	0.29
All Pedestrians		106	36.4	LOS D			0.62	0.62

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Processed: Friday, 9 November 2012 2:50:59 PM

SIDRA INTERSECTION 5.1.12.2089

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MOVEMENT SUMMARY

Site: Proposed AM

Pacific Hwy & Beechworth Rd, Pymble

Signals - Fixed Time Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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
South: Pacific Hwy (S)											
1	L	246	0.0	0.724	22.8	LOS B	41.8	299.8	0.68	0.94	37.2
2	T	1772	3.8	0.724	16.3	LOS B	42.1	304.2	0.68	0.64	39.4
Approach		2018	3.4	0.724	17.1	LOS B	42.1	304.2	0.68	0.67	39.1
North: Pacific Hwy (N)											
8	T	2968	1.6	0.746	15.9	LOS B	45.4	322.3	0.70	0.66	39.9
Approach		2968	1.6	0.746	15.9	LOS B	45.4	322.3	0.70	0.66	39.9
West: Beechworth Rd (W)											
10	L	197	0.0	0.373	40.8	LOS C	11.7	81.6	0.86	0.96	26.1
12	R	166	0.6	0.758	63.8	LOS E	10.9	76.3	0.89	0.85	20.5
Approach		363	0.3	0.758	51.3	LOS D	11.7	81.6	0.87	0.91	23.2
All Vehicles		5349	2.2	0.758	18.7	LOS B	45.4	322.3	0.71	0.68	37.8

Level of Service (LOS) Method: Delay (RTA NSW).

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 used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	57.2	LOS E	0.2	0.2	0.87	0.87
P7	Across W approach	53	9.7	LOS A	0.1	0.1	0.36	0.36
All Pedestrians		106	33.5	LOS D			0.62	0.62

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Processed: Friday, 9 November 2012 2:50:13 PM

SIDRA INTERSECTION 5.1.12.2089

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MOVEMENT SUMMARY

Site: Proposed PM

Pacific Hwy & Beechworth Rd, Pymble

Signals - Fixed Time Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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
South: Pacific Hwy (S)											
1	L	119	0.0	0.914	25.8	LOS B	76.8	543.5	0.88	0.98	36.3
2	T	2691	1.4	0.914	18.5	LOS B	76.9	544.8	0.88	0.84	37.5
Approach		2810	1.4	0.914	18.8	LOS B	76.9	544.8	0.88	0.85	37.5
North: Pacific Hwy (N)											
8	T	2018	0.7	0.586	8.9	LOS A	27.5	193.7	0.47	0.44	46.5
Approach		2018	0.7	0.586	8.9	LOS A	27.5	193.7	0.47	0.44	46.5
West: Beechworth Rd (W)											
10	L	159	0.0	0.411	63.3	LOS E	10.6	74.3	0.92	0.99	20.6
12	R	101	0.0	0.924	74.1	LOS F	7.0	49.0	0.91	0.85	18.7
Approach		260	0.0	0.924	67.5	LOS E	10.6	74.3	0.92	0.94	19.8
All Vehicles		5088	1.0	0.924	17.3	LOS B	76.9	544.8	0.72	0.69	38.7

Level of Service (LOS) Method: Delay (RTA NSW).

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 used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	64.4	LOS F	0.2	0.2	0.93	0.93
P7	Across W approach	53	7.1	LOS A	0.1	0.1	0.31	0.31
All Pedestrians		106	35.7	LOS D			0.62	0.62

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Processed: Friday, 9 November 2012 2:50:14 PM

SIDRA INTERSECTION 5.1.12.2089

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MOVEMENT SUMMARY

Site: Existing AM

Pacific Hwy & Bobbin Head Rd, Pymble

Signals - Fixed Time Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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
South: Pacific Hwy (S)											
2	T	1805	3.7	0.578	4.8	LOS A	22.0	158.7	0.37	0.35	51.3
3	R	147	0.7	0.746	81.0	LOS F	11.0	77.5	1.00	0.86	17.4
Approach		1952	3.5	0.746	10.6	LOS A	22.0	158.7	0.42	0.39	45.2
East: Bobbin Head Rd (E)											
4	L	211	1.4	0.465	57.4	LOS E	13.1	92.9	0.90	0.81	19.9
6	R	268	0.4	0.723	80.0	LOS F	10.0	70.2	1.00	0.86	16.5
Approach		479	0.8	0.723	70.1	LOS E	13.1	92.9	0.96	0.84	17.8
North: Pacific Hwy (N)											
7	L	111	3.6	0.736	24.6	LOS B	43.6	310.3	0.70	0.99	36.1
8	T	2752	1.6	0.736	16.9	LOS B	44.2	313.7	0.71	0.66	39.1
Approach		2863	1.7	0.736	17.2	LOS B	44.2	313.7	0.71	0.68	39.0
All Vehicles		5294	2.3	0.746	19.5	LOS B	44.2	313.7	0.62	0.58	36.9

Level of Service (LOS) Method: Delay (RTA NSW).

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 used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	11.6	LOS B	0.1	0.1	0.39	0.39
All Pedestrians		53	11.6	LOS B			0.39	0.39

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Processed: Friday, 9 November 2012 2:52:25 PM

SIDRA INTERSECTION 5.1.12.2089

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MOVEMENT SUMMARY

Site: Existing PM

Pacific Hwy & Bobbin Head Rd, Pymble

Signals - Fixed Time Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Hwy (S)											
2	T	2676	1.4	0.818	6.0	LOS A	47.5	336.1	0.55	0.52	49.2
3	R	169	0.6	0.806	83.2	LOS F	13.0	91.2	1.00	0.89	17.6
Approach		2845	1.3	0.818	10.6	LOS A	47.5	336.1	0.57	0.55	44.7
East: Bobbin Head Rd (E)											
4	L	168	0.0	0.399	60.2	LOS E	10.4	73.1	0.90	0.81	21.2
6	R	204	0.0	0.749	85.9	LOS F	7.8	54.8	1.00	0.86	17.0
Approach		372	0.0	0.749	74.3	LOS F	10.4	73.1	0.95	0.84	18.6
North: Pacific Hwy (N)											
7	L	177	0.0	0.631	13.5	LOS A	5.7	40.1	0.39	0.83	43.2
8	T	1833	0.8	0.633	12.7	LOS A	33.2	233.9	0.58	0.54	42.6
Approach		2010	0.7	0.633	12.8	LOS A	33.2	233.9	0.56	0.56	42.7
All Vehicles		5227	1.0	0.818	16.0	LOS B	47.5	336.1	0.60	0.57	40.0

Level of Service (LOS) Method: Delay (RTA NSW).

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 used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	10.5	LOS B	0.1	0.1	0.37	0.37
All Pedestrians		53	10.5	LOS B			0.37	0.37

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Processed: Friday, 9 November 2012 2:52:27 PM

SIDRA INTERSECTION 5.1.12.2089

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INTERSECTION

MOVEMENT SUMMARY

Site: Proposed AM

Pacific Hwy & Bobbin Head Rd, Pymble

Signals - Fixed Time Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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
South: Pacific Hwy (S)											
2	T	1822	3.7	0.583	4.9	LOS A	22.4	161.5	0.38	0.35	51.3
3	R	147	0.7	0.746	81.0	LOS F	11.0	77.5	1.00	0.86	17.4
Approach		1969	3.5	0.746	10.6	LOS A	22.4	161.5	0.42	0.39	45.2
East: Bobbin Head Rd (E)											
4	L	211	1.4	0.465	57.4	LOS E	13.1	92.9	0.90	0.81	19.9
6	R	268	0.4	0.723	80.0	LOS F	10.0	70.2	1.00	0.86	16.5
Approach		479	0.8	0.723	70.1	LOS E	13.1	92.9	0.96	0.84	17.8
North: Pacific Hwy (N)											
7	L	111	3.6	0.737	24.6	LOS B	43.8	311.4	0.71	0.99	36.0
8	T	2757	1.6	0.737	16.9	LOS B	44.4	314.8	0.71	0.66	39.0
Approach		2868	1.7	0.737	17.2	LOS B	44.4	314.8	0.71	0.68	38.9
All Vehicles		5316	2.3	0.746	19.5	LOS B	44.4	314.8	0.62	0.58	36.9

Level of Service (LOS) Method: Delay (RTA NSW).

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 used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	11.6	LOS B	0.1	0.1	0.39	0.39
All Pedestrians		53	11.6	LOS B			0.39	0.39

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Processed: Friday, 9 November 2012 2:51:42 PM

SIDRA INTERSECTION 5.1.12.2089

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INTERSECTION

MOVEMENT SUMMARY

Site: Proposed PM

Pacific Hwy & Bobbin Head Rd, Pymble

Signals - Fixed Time Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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
South: Pacific Hwy (S)											
2	T	2681	1.4	0.819	6.0	LOS A	47.7	338.2	0.55	0.53	49.2
3	R	169	0.6	0.806	83.2	LOS F	13.0	91.2	1.00	0.89	17.6
Approach		2850	1.3	0.819	10.6	LOS A	47.7	338.2	0.58	0.55	44.6
East: Bobbin Head Rd (E)											
4	L	168	0.0	0.399	60.2	LOS E	10.4	73.1	0.90	0.81	21.2
6	R	204	0.0	0.749	85.9	LOS F	7.8	54.8	1.00	0.86	17.0
Approach		372	0.0	0.749	74.3	LOS F	10.4	73.1	0.95	0.84	18.6
North: Pacific Hwy (N)											
7	L	177	0.0	0.637	13.6	LOS A	5.8	40.9	0.39	0.84	43.1
8	T	1850	0.8	0.638	12.8	LOS A	33.7	237.5	0.58	0.54	42.6
Approach		2027	0.7	0.638	12.8	LOS A	33.7	237.5	0.57	0.57	42.6
All Vehicles		5249	1.0	0.819	16.0	LOS B	47.7	338.2	0.60	0.58	40.0

Level of Service (LOS) Method: Delay (RTA NSW).

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 used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	10.5	LOS B	0.1	0.1	0.37	0.37
All Pedestrians		53	10.5	LOS B			0.37	0.37

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: Existing AM

Avon Rd & Arilla Rd, Pymble
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Avon Rd (E)											
5	T	87	0.0	0.190	0.5	LOS A	1.0	6.9	0.24	0.00	38.0
6	R	190	0.5	0.190	5.4	LOS A	1.0	6.9	0.24	0.60	35.9
Approach		277	0.4	0.190	3.9	NA	1.0	6.9	0.24	0.41	36.6
North: Arilla Rd (N)											
7	L	152	0.0	0.247	6.2	LOS A	1.1	7.4	0.24	0.51	35.6
9	R	57	0.0	0.247	6.6	LOS A	1.1	7.4	0.24	0.69	35.3
Approach		209	0.0	0.247	6.3	LOS A	1.1	7.4	0.24	0.56	35.5
West: Avon Rd (W)											
10	L	48	0.0	0.054	4.5	LOS A	0.0	0.0	0.00	0.60	36.7
11	T	55	0.0	0.054	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		103	0.0	0.054	2.1	NA	0.0	0.0	0.00	0.28	38.4
All Vehicles		589	0.2	0.247	4.4	NA	1.1	7.4	0.20	0.44	36.5

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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.

SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Existing PM

Avon Rd & Arilla Rd, Pymble
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Avon Rd (E)											
5	T	72	0.0	0.169	0.7	LOS A	0.8	5.9	0.30	0.00	45.6
6	R	163	0.0	0.169	7.5	LOS A	0.8	5.9	0.30	0.69	42.3
Approach		235	0.0	0.169	5.4	NA	0.8	5.9	0.30	0.48	43.3
North: Arilla Rd (N)											
7	L	46	0.0	0.079	8.1	LOS A	0.3	2.0	0.29	0.58	41.8
9	R	18	0.0	0.079	8.4	LOS A	0.3	2.0	0.29	0.73	41.6
Approach		64	0.0	0.079	8.2	LOS A	0.3	2.0	0.29	0.62	41.8
West: Avon Rd (W)											
10	L	64	0.0	0.084	6.4	LOS A	0.0	0.0	0.00	0.76	43.3
11	T	96	0.0	0.084	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		160	0.0	0.084	2.6	NA	0.0	0.0	0.00	0.31	47.1
All Vehicles		459	0.0	0.169	4.8	NA	0.8	5.9	0.19	0.44	44.3

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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.

SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Proposed AM

Avon Rd & Arilla Rd, Pymble
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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: Avon Rd (E)											
5	T	87	0.0	0.201	0.5	LOS A	1.0	7.3	0.24	0.00	38.0
6	R	204	0.5	0.201	5.4	LOS A	1.0	7.3	0.24	0.60	35.9
Approach		291	0.3	0.201	3.9	NA	1.0	7.3	0.24	0.42	36.5
North: Arilla Rd (N)											
7	L	152	0.0	0.250	6.3	LOS A	1.1	7.4	0.24	0.51	35.5
9	R	57	0.0	0.250	6.7	LOS A	1.1	7.4	0.24	0.69	35.3
Approach		209	0.0	0.250	6.4	LOS A	1.1	7.4	0.24	0.56	35.4
West: Avon Rd (W)											
10	L	48	0.0	0.054	4.5	LOS A	0.0	0.0	0.00	0.60	36.7
11	T	55	0.0	0.054	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		103	0.0	0.054	2.1	NA	0.0	0.0	0.00	0.28	38.4
All Vehicles		603	0.2	0.250	4.5	NA	1.1	7.4	0.20	0.44	36.4

Level of Service (LOS) Method: Delay (RTA NSW).
 Vehicle movement LOS values are based on average delay per movement
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 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.
 SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Proposed PM

Avon Rd & Arilla Rd, Pymble
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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: Avon Rd (E)											
5	T	72	0.0	0.175	0.7	LOS A	0.9	6.2	0.30	0.00	45.6
6	R	171	0.0	0.175	7.5	LOS A	0.9	6.2	0.30	0.68	42.3
Approach		243	0.0	0.175	5.5	NA	0.9	6.2	0.30	0.48	43.2
North: Arilla Rd (N)											
7	L	46	0.0	0.079	8.1	LOS A	0.3	2.1	0.29	0.58	41.8
9	R	18	0.0	0.079	8.4	LOS A	0.3	2.1	0.29	0.73	41.6
Approach		64	0.0	0.079	8.2	LOS A	0.3	2.1	0.29	0.62	41.7
West: Avon Rd (W)											
10	L	64	0.0	0.084	6.4	LOS A	0.0	0.0	0.00	0.76	43.3
11	T	96	0.0	0.084	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		160	0.0	0.084	2.6	NA	0.0	0.0	0.00	0.31	47.1
All Vehicles		467	0.0	0.175	4.9	NA	0.9	6.2	0.20	0.44	44.2

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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.

SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Existing AM

Avon Rd & Proposed Northern Access Driveway
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Avon Rd (E)											
5	T	285	0.7	0.148	0.9	LOS A	1.0	7.4	0.38	0.00	37.4
6	R	1	0.0	0.148	5.9	LOS A	1.0	7.4	0.38	0.76	36.1
Approach		286	0.7	0.148	1.0	NA	1.0	7.4	0.38	0.00	37.4
North: Access Rd (N)											
7	L	1	0.0	0.003	7.9	LOS A	0.0	0.1	0.43	0.49	34.5
9	R	1	0.0	0.003	8.3	LOS A	0.0	0.1	0.43	0.64	34.3
Approach		2	0.0	0.003	8.1	LOS A	0.0	0.1	0.43	0.56	34.4
West: Avon Rd (W)											
10	L	1	0.0	0.105	4.5	LOS A	0.0	0.0	0.00	0.70	36.7
11	T	204	0.0	0.105	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		205	0.0	0.105	0.0	NA	0.0	0.0	0.00	0.00	40.0
All Vehicles		493	0.4	0.148	0.6	NA	1.0	7.4	0.22	0.01	38.4

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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.

SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Existing PM

Avon Rd & Proposed Northern Access Driveway
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Avon Rd (E)											
5	T	209	0.0	0.108	0.6	LOS A	0.7	4.9	0.30	0.00	46.4
6	R	1	0.0	0.108	7.4	LOS A	0.7	4.9	0.30	0.89	43.0
Approach		210	0.0	0.108	0.7	NA	0.7	4.9	0.30	0.00	46.3
North: Access Rd (N)											
7	L	1	0.0	0.003	8.6	LOS A	0.0	0.1	0.34	0.53	41.4
9	R	1	0.0	0.003	8.9	LOS A	0.0	0.1	0.34	0.65	41.2
Approach		2	0.0	0.003	8.7	LOS A	0.0	0.1	0.34	0.59	41.3
West: Avon Rd (W)											
10	L	1	0.0	0.076	6.4	LOS A	0.0	0.0	0.00	0.92	43.3
11	T	147	0.0	0.076	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		148	0.0	0.076	0.0	NA	0.0	0.0	0.00	0.01	49.9
All Vehicles		360	0.0	0.108	0.4	NA	0.7	4.9	0.18	0.01	47.7

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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.

SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Proposed AM

Avon Rd & Proposed Northern Access Driveway
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Avon Rd (E)											
5	T	290	0.7	0.161	1.0	LOS A	1.1	8.0	0.39	0.00	37.3
6	R	13	0.0	0.161	6.0	LOS A	1.1	8.0	0.39	0.75	36.1
Approach		303	0.7	0.161	1.2	NA	1.1	8.0	0.39	0.03	37.2
North: Access Rd (N)											
7	L	42	0.0	0.070	6.7	LOS A	0.3	1.8	0.37	0.56	35.2
9	R	10	0.0	0.070	7.2	LOS A	0.3	1.8	0.37	0.74	35.0
Approach		52	0.0	0.070	6.8	LOS A	0.3	1.8	0.37	0.59	35.2
West: Avon Rd (W)											
10	L	1	0.0	0.111	4.5	LOS A	0.0	0.0	0.00	0.70	36.7
11	T	215	0.0	0.111	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		216	0.0	0.111	0.0	NA	0.0	0.0	0.00	0.00	40.0
All Vehicles		571	0.4	0.161	1.3	NA	1.1	8.0	0.24	0.07	38.0

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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.

SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Proposed PM

Avon Rd & Proposed Northern Access Driveway
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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: Avon Rd (E)											
5	T	226	0.0	0.158	0.7	LOS A	1.0	6.9	0.31	0.00	46.1
6	R	52	0.0	0.158	7.4	LOS A	1.0	6.9	0.31	0.82	42.8
Approach		278	0.0	0.158	1.9	NA	1.0	6.9	0.31	0.15	45.4
North: Access Rd (N)											
7	L	10	0.0	0.016	8.1	LOS A	0.1	0.4	0.30	0.57	41.8
9	R	3	0.0	0.016	8.4	LOS A	0.1	0.4	0.30	0.71	41.6
Approach		13	0.0	0.016	8.2	LOS A	0.1	0.4	0.30	0.60	41.8
West: Avon Rd (W)											
10	L	1	0.0	0.077	6.4	LOS A	0.0	0.0	0.00	0.92	43.3
11	T	150	0.0	0.077	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		151	0.0	0.077	0.0	NA	0.0	0.0	0.00	0.01	49.9
All Vehicles		442	0.0	0.158	1.5	NA	1.0	6.9	0.20	0.12	46.8

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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.

SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Proposed AM

Avon Rd & Proposed Southen Access Driveway
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Avon Rd (E)											
5	T	291	0.0	0.151	4.1	LOS A	2.5	17.8	0.71	0.00	35.4
6	R	1	100.0	0.151	11.0	LOS A	2.5	17.8	0.71	0.84	34.7
Approach		292	0.3	0.151	4.1	NA	2.5	17.8	0.71	0.00	35.4
North: Access Rd (N)											
7	L	11	0.0	0.019	6.6	LOS A	0.1	0.5	0.36	0.53	35.3
9	R	3	0.0	0.019	7.0	LOS A	0.1	0.5	0.36	0.69	35.1
Approach		14	0.0	0.019	6.7	LOS A	0.1	0.5	0.36	0.56	35.3
West: Avon Rd (W)											
10	L	1	0.0	0.106	4.5	LOS A	0.0	0.0	0.00	0.70	36.7
11	T	205	0.0	0.106	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		206	0.0	0.106	0.0	NA	0.0	0.0	0.00	0.00	40.0
All Vehicles		512	0.2	0.151	2.5	NA	2.5	17.8	0.41	0.02	37.1

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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.

SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Proposed PM

Avon Rd & Proposed Southen Access Driveway
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Avon Rd (E)											
5	T	227	0.0	0.117	0.6	LOS A	0.8	5.4	0.30	0.00	46.4
6	R	1	0.0	0.117	7.4	LOS A	0.8	5.4	0.30	0.89	43.0
Approach		228	0.0	0.117	0.6	NA	0.8	5.4	0.30	0.00	46.3
North: Access Rd (N)											
7	L	3	0.0	0.005	7.9	LOS A	0.0	0.1	0.29	0.55	42.0
9	R	1	0.0	0.005	8.2	LOS A	0.0	0.1	0.29	0.67	41.8
Approach		4	0.0	0.005	8.0	LOS A	0.0	0.1	0.29	0.58	41.9
West: Avon Rd (W)											
10	L	1	0.0	0.075	6.4	LOS A	0.0	0.0	0.00	0.92	43.3
11	T	145	0.0	0.075	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		146	0.0	0.075	0.0	NA	0.0	0.0	0.00	0.01	49.9
All Vehicles		378	0.0	0.117	0.5	NA	0.8	5.4	0.19	0.01	47.6

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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.

SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Proposed AM

Beechworth Rd & Proposed Site Access
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Beechworth Rd (S)											
2	T	342	0.0	0.176	1.2	LOS A	1.3	9.4	0.43	0.00	37.0
3	R	1	0.0	0.176	6.1	LOS A	1.3	9.4	0.43	0.77	36.1
Approach		343	0.0	0.176	1.2	NA	1.3	9.4	0.43	0.00	37.0
East: Proposed Site Access Driveway (E)											
4	L	1	0.0	0.063	12.6	LOS A	0.2	1.5	0.62	0.59	31.8
6	R	21	0.0	0.063	13.0	LOS A	0.2	1.5	0.62	0.83	31.7
Approach		22	0.0	0.063	13.0	LOS A	0.2	1.5	0.62	0.82	31.7
North: Beechworth Rd (N)											
7	L	4	0.0	0.126	4.5	LOS A	0.0	0.0	0.00	0.70	36.7
8	T	242	0.0	0.126	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		246	0.0	0.126	0.1	NA	0.0	0.0	0.00	0.01	39.9
All Vehicles		611	0.0	0.176	1.2	NA	1.3	9.4	0.27	0.04	37.9

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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.

SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Proposed PM

Beechworth Rd & Proposed Site Access
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Beechworth Rd (S)											
2	T	255	0.0	0.134	0.5	LOS A	0.9	6.1	0.27	0.00	46.7
3	R	4	0.0	0.134	6.6	LOS A	0.9	6.1	0.27	0.96	43.0
Approach		259	0.0	0.134	0.6	NA	0.9	6.1	0.27	0.01	46.6
East: Proposed Site Access Driveway (E)											
4	L	1	0.0	0.011	8.7	LOS A	0.0	0.3	0.41	0.48	34.8
6	R	5	0.0	0.011	9.1	LOS A	0.0	0.3	0.41	0.65	34.7
Approach		6	0.0	0.011	9.0	LOS A	0.0	0.3	0.41	0.62	34.7
North: Beechworth Rd (N)											
7	L	17	0.0	0.061	5.6	LOS A	0.0	0.0	0.00	0.88	43.2
8	T	102	0.0	0.061	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		119	0.0	0.061	0.8	NA	0.0	0.0	0.00	0.13	48.9
All Vehicles		384	0.0	0.134	0.8	NA	0.9	6.1	0.19	0.06	47.1

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

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.

SIDRA Standard Delay Model used.

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