

Traffic Engineering Assessment

**Proposed Rezoning and Residential Subdivision
at
35 & 69-93 Hams Road, Waurnd Ponds**

Prepared For
Echin Pty Ltd and Waurnd Ponds Unit Trust

October, 2018
G21540R-01F

Traffic Engineering Assessment

35 & 69-93 Hams Roads, Waurn Ponds: Proposed Rezoning and Residential Subdivision

Traffic Engineering Assessment

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at

35 & 69-93 Hams Road, Waurn Ponds

Document Control

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1 Introduction

Traffix Group has been engaged by Echin Pty Ltd and Waurn Ponds Unit Trust to undertake a traffic engineering assessment and to prepare a report for the proposed rezoning and residential subdivision located at 35 & 69-93 Hams Road, Waurn Ponds.

This report provides a detailed traffic engineering assessment of the internal road layout and access arrangements and the likely impacts on the surrounding road network of the proposed development with particular regard to assessments and reporting we have undertaken for similar development proposals on the land since 2016.

2 Existing Conditions

2.1 The Site

The subject site is located on the south side of Hams Road in Waurn Ponds.

A locality plan of the site is presented at Figure 1.

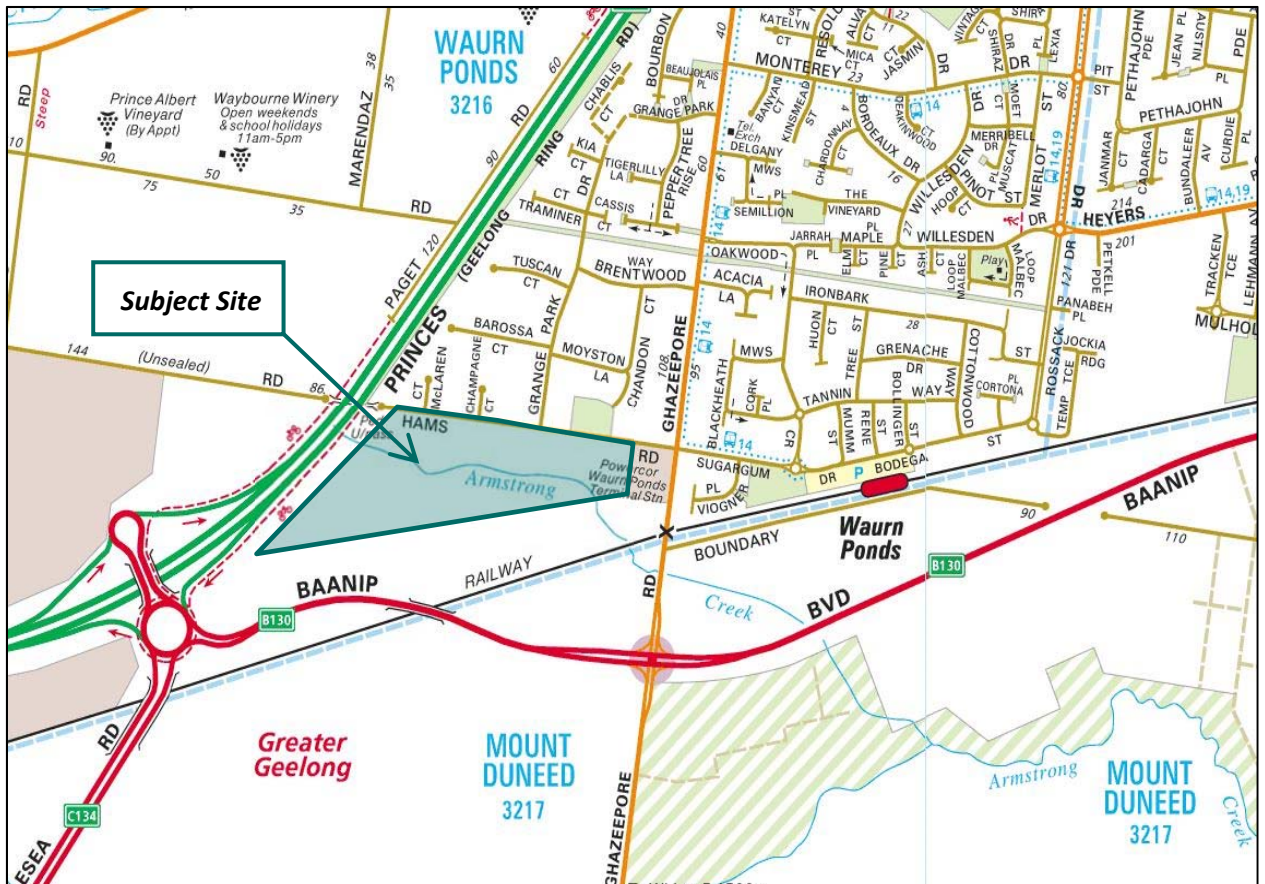


Figure 1: Locality Plan

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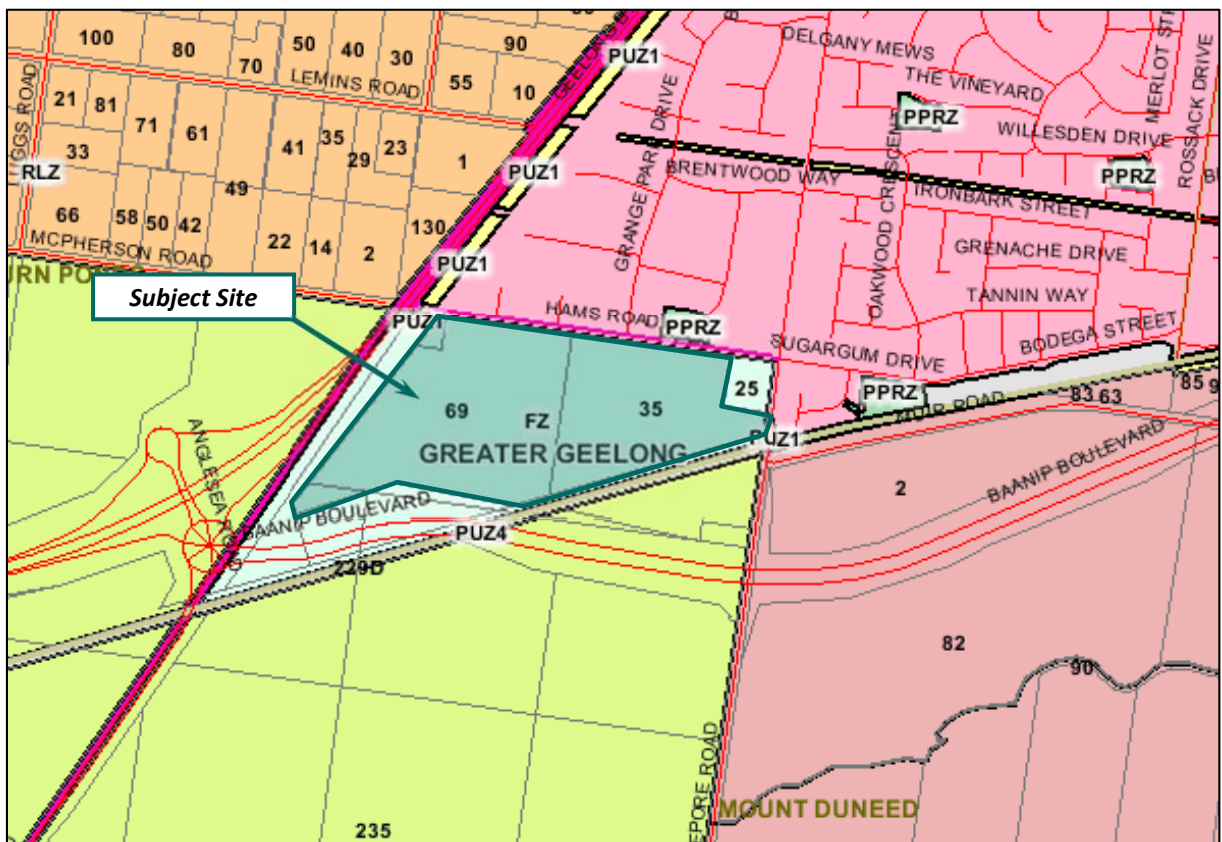
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2.2 Existing Land Use

The subject site is zoned 'Farming Zone (FZ)' under the Greater Geelong Planning Scheme as indicated in Figure 2.

The site is generally free of structures.

Land use within the immediate vicinity of the subject site is generally residential to the north and a power terminal station abuts the northeast corner of the site. Land in the nearby vicinity to the west and south is generally vacant except for Geelong Ring Road which is located to the west and Baanip Boulevard and a railway line which are located to the south.



Source: Planning Scheme Maps Online <http://services.land.vic.gov.au>

Figure 2: Land Use Zoning Map

2.3 Road Network

Hams Road

Hams Road is a local road managed by Council.

Hams Road is aligned in an east-west direction along the northern boundary of the site and includes a 5m wide sealed carriageway which accommodates two-way traffic flow and informal kerbside parking on the north side. A 3.5m wide (approximate) gravel shoulder is located on the south side of the sealed carriageway.

A posted speed limit of 50km/h applied to Hams Road in the vicinity of the site at the time of our most recent inspection.

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Hams Road terminates at its western end adjacent to the site's northwest boundary and a number of existing residential properties on the north side of Hams Road take direct vehicle access to it.

Hams Road, in the vicinity of the site, is shown in Figure 3 and Figure 4.



Figure 3: Hams Road – view east



Figure 4: Hams Road – view west

Ghazepore Road

Ghazepore Road is a higher order road managed by Council.

Ghazepore Road is aligned in a north-south direction to the east of the site and forms a cross-intersection with Hams Road (and Sugargum Drive as the eastern intersection leg).

A posted speed limit of 60km/h applied to Ghazepore Road in the vicinity of Hams Road at the time of our most recent inspection.

Ghazepore Road, in the vicinity of the site, is shown in Figure 5 and Figure 6.



Figure 5: Ghazepore Road – view north



Figure 6: Ghazepore Road – view south

Traffix Group conducted peak period traffic counts at the Hams Road/Ghazepore Road/Sugargum Drive intersection as part of its earlier involvement in this project to determine the peak AM and PM commuter hours. These surveys were undertaken between 4 & 7pm and 7 & 9am on Tuesday 25th and Wednesday 26th October 2016 respectively.

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Full output of the counts is presented at Attachment A, with a summary of the peak AM (7.45-8.45am) and PM (5.15-6.15pm) hours presented in Figure 7.

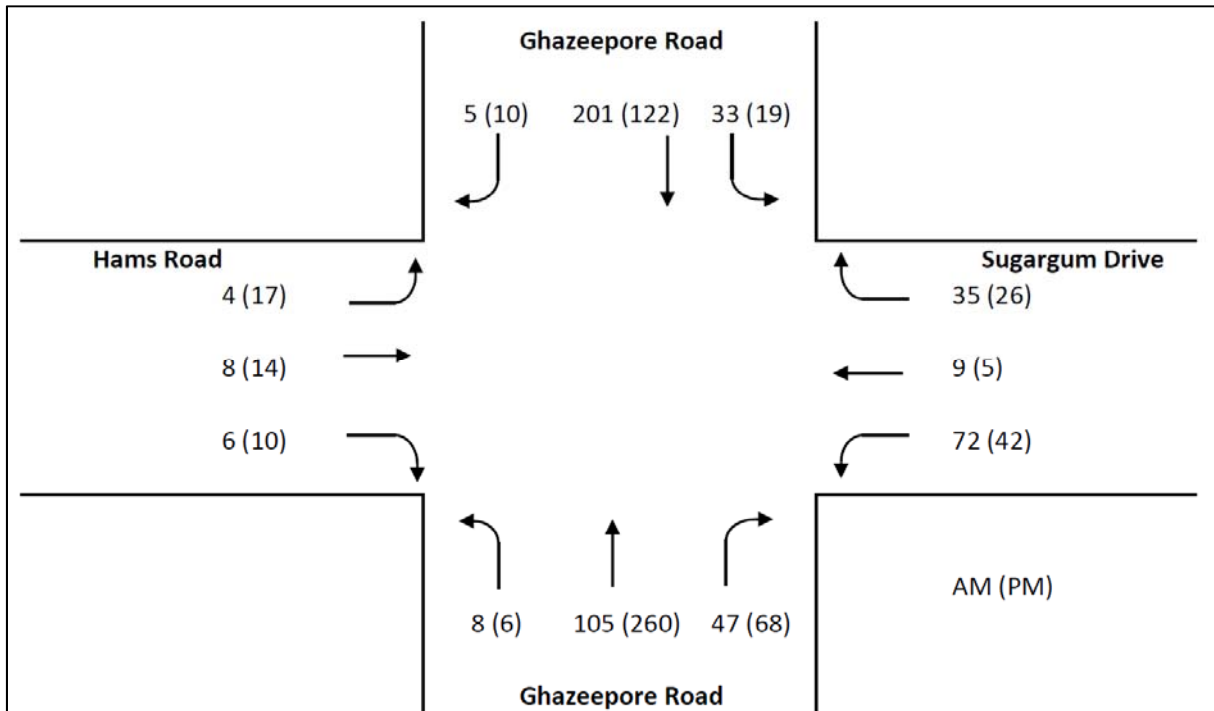


Figure 7: AM and PM Peak Hour Traffic Count

2.4 Crash History

A review of the recent crash history has been undertaken for the past 5 full years of available data (last updated 30 June, 2017). The crash investigation area included the intersection of Hams Road with Ghazeepore Road and Sugargum Drive.

No casualty crashes were recorded within the review area during this period.

2.5 Public Transport

Bus Route No. 14 operates in close proximity to the east of the site, at the intersection of Ghazeepore Road and Sugargum Drive.

This bus route provides a service between Geelong and Waurn Ponds/Deakin University and also provides connections with other public transport options.

The Waurn Ponds Railway Station is also accessible within approximately 500m walking distance of the subject site's eastern boundary. This railway station is located on the Geelong line which provides a connection between Southern Cross Railway Station and Waurn Ponds Railway Station.

Bus Route No. 14 is shown in Figure 8.

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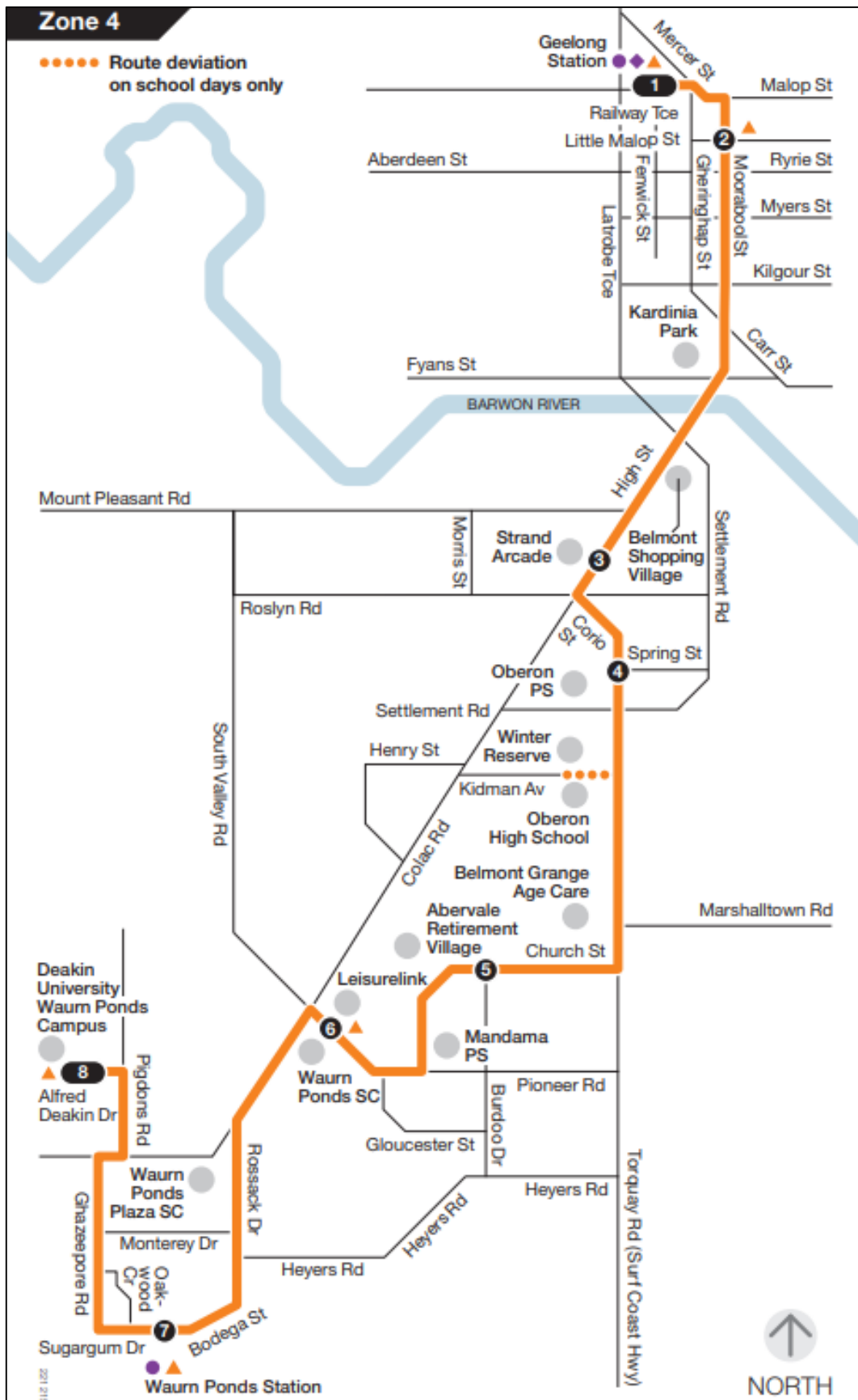


Figure 8: Bus Route No. 14

3 The Proposal

The proposal is to rezone and subdivide the land to ultimately provide approximately 258 residential allotments and two future medium density housing sites for what we understand could accommodate in the order of 45 dwellings in total.

Whilst up to 20 of the proposed residential allotments could have direct vehicle access via Hams Road, the remainder of the site is proposed to be accessed via two connections/intersections with Hams Road as follows:-

69-93 Hams Road

- One is to be located approximately midway along the site's northern boundary diagonally opposite Champagne Court. This is to be a standard access street/access street intersection with no designated turn lanes. The section of the proposed road that is to connect with Hams Road is identified with a wider than necessary road reservation to potentially accommodate wider verges and a central median as discussed in more detail later in this report. This section of road will also accommodate separate entry and exit carriageways to and from the site at this location.

35 Hams Road

- The second is identified towards the site's eastern boundary. This is to be a standard access street/access street intersection with no designated turn lanes and a single entry and exit traffic lane within the site.

The introduction of a specific turn bans is also proposed at the intersection of Hams Road and Grange Park Drive (which extends between Hams Road and Ghazeepore Road to the northeast of the site) as part of this development in order to minimise any potential site generated traffic from using Grange Park Drive.

Also proposed as part of the development is a roundabout at the intersection of Ghazeepore Road and Hams Road to the east of the site as requested by Council throughout our involvement with this site. This is also discussed in greater detail later in this report.

A plan of the proposed subdivision is attached at Attachment B.

4 Internal Traffic Matters

4.1 Traffic Generation and Hierarchy

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 used by VicRoads and is generally regarded as the standard for metropolitan development characteristics.

The RTA Guide sets out the following rates for standard residential dwellings:

- *daily vehicle trips = 9.0 per dwelling*
- *weekday peak hour vehicle trips = 0.85 per dwelling*

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The RTA Guide also recommends a rate of 4 to 5 vehicle trip ends (vte) per dwelling per day for smaller units and flats with up to 2 bedrooms and a rate of 5 to 6.5vte per dwelling per day for larger units or flats with 3 or more bedrooms.

Nevertheless, if we conservatively adopt the standard residential allotments rate for all dwellings, including those future dwellings identified on the medium density housing sites, then it is conservatively predicted that no more than 2,727 daily vehicle trip ends would be generated by the proposed residential allotments.

Of these, we predict that in the order 218 vte would be generated during each commuter peak hour, which is based on the assumption that 8% of daily movements would be generated during each of these peak hours.

We are confident that the ultimate daily traffic volumes along each of the proposed roads will be under the relevant environmental capacity limit based on the proposed layout of roads and the number of proposed allotments as discussed following. In this regard, it is noted that no external (or through) traffic is expected to be generated within the site.

4.2 Road Cross-Sections

All road reservations and cross-sections are proposed to accord with the Greater Geelong Planning Scheme, Infrastructure Design Manual (IDM) and current standards for Greenfields areas as per the current Victorian Planning Authority (VPA) requirements. Each of the proposed road/street types is outlined following, with cross-sections shown at Appendix A of the Traffix Group letter dated 28th March 2018 that is included at Attachment C to this report.

4.2.1 Access Street

The standard access street cross-section is akin to an 'Access Street – Level 2' under Clause 56.06 of the Planning Scheme and is consistent with typical requirements of the VPA. It has an environmental capacity of up to 2,500 to 3,000 vehicles per day (vpd) based on the IDM and Planning Scheme respectively.

Further to the above, it is not uncommon or unacceptable for access street road reservations to be reduced when a park or reservation abuts one side because the associated verge can be less than presented in the standard cross-section. In particular, the 13m wide road reservations as identified on the layout plan are considered to be satisfactory, being consistent with good current practice in order to ensure that all necessary elements can be accommodated including important non-traffic engineering related aspects such as servicing requirements.

The only variation to the above is the short section of the western connection with Hams Road as mentioned previously. In particular, this short (approximately 55m) section of road is to have a 20m wide road reservation which could include wider verges and a narrow central median in order to provide an 'entry' feature for the estate. Separate carriageways are appropriately identified on either side of central median and we believe that the specific cross-section of this short section of road should be determined in consultation with the relevant Council departments as part of the detailed functional design stage of the development.

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4.2.2 Laneway

Two laneways are proposed to provide rear access to several of the proposed allotments.

These laneways are identified as being 7m wide which is in excess of the 5.5m width required at Clause 56 of the Planning Scheme and IDM which also suggest that laneways such as these would have an environmental capacity of up to 300vpd.

4.2.3 Hams Road

Council has previously advised its preferred ultimate cross-section for Hams Road, with the most recent variation that we are aware of being via email dated 19th February 2018, which includes:

- a 2.5m wide shared parking/bicycle lane to the south of the existing northern kerbline,
- two (2) x 3m wide traffic lanes,
- a 1.5m wide designated bicycle lane for westbound cyclists, and
- an approximate 5m southern verge immediately abutting the subject site which is to include 2.2m wide verge side parking spaces adjacent to each allotment that is to take direct property access via Hams Road.

Transport for Victoria (TfV) has subsequently advised in a letter dated 29th June 2018 that it would prefer a 3m wide shared path within the southern verge. The Hams Road cross-sections that are attached to this letter show Council's advised cross-section and clearly demonstrate that there is no ability to also provide a 3m shared path as requested by TfV.

However, we believe that an appropriate outcome that achieves the objectives of both Council and TfV would be to remove the Council requested 1.5m wide on-road bicycle lane on the south side of Hams Road and instead widen and upgrade the Council requested 1.5m wide southern footpath to a 3m wide shared path as requested by TfV.

4.3 Parking Provisions

Except for the short section of divided 'entry' road at the proposed western connection with Hams Road, all local access streets are to be provided with a carriageway width of 7.3m which allows parking to readily occur on both sides of the road whilst maintaining a single through lane for traffic. Alternatively, simultaneous two-way traffic would be possible if parking occurred on only one side of these roads.

Allotments that are to have rear vehicle access via a laneway are to have abutting frontage and/or sideage access streets that will adequately facilitate sufficient on-street parking opportunities¹. Similarly, the four allotments that are to abut the short section of divided 'entry' road are to also have abuttal to Hams Road or an internal access street with a 7.3m wide carriageway. Accordingly, we do

¹ It is noted that two allotments that do not have abuttal to an access street are to be accessed via one of the proposed laneways. However, both of these allotments are located within 25m walking distance of an access street in which appropriate provision is available for on-street visitor parking and the placement of bins prior to collection.

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not believe that it is necessary for parking to necessarily be provided on the short section of divided 'entry' road.

4.4 Access for Service and Emergency Vehicles

The minimum 7.3m wide carriageway roads for the local access streets as discussed in Section 4.2 of this report will adequately facilitate relevant service and emergency vehicles and are consistent with the typical CFA requirements.

Allotments that are to have access via a laneway are to also have abuttal and/or sideage streets which would be appropriate for bins to be placed prior to collection¹.

Two dead end roads that are to be longer than 60m are identified within the site. These roads must be designed with an appropriate turning area, i.e. hammer head, court bowl or similar, that will adequately facilitate Council's waste vehicle and meet the requirements of the CFA for such circumstances.

4.5 Pedestrian and Cycling Provision

The proposed road reservations are such that footpaths can be provided in accordance with the relevant standards and common practice.

Cyclists will simply share the carriageway with other motorists along the proposed access streets.

4.6 Traffic Control

Two cross-intersections are identified within the site and T-intersections are all appropriately staggered in accordance with good current practice.

Clause 56.06-7 of the Planning Scheme suggests that it is desirable for street blocks to be no more than approximately 240m long in order to "... control traffic speed".

The location of control devices we believe should be considered within the subject site to ensure that appropriate speed control objectives are achieved are shown in Figure 9. The actual treatments can be determined as part of detailed design in consultation with Council after a permit has been issued.

In particular, these devices could include raised pavements, reverse priority intersection treatments, T-deviation intersection treatments or similar.

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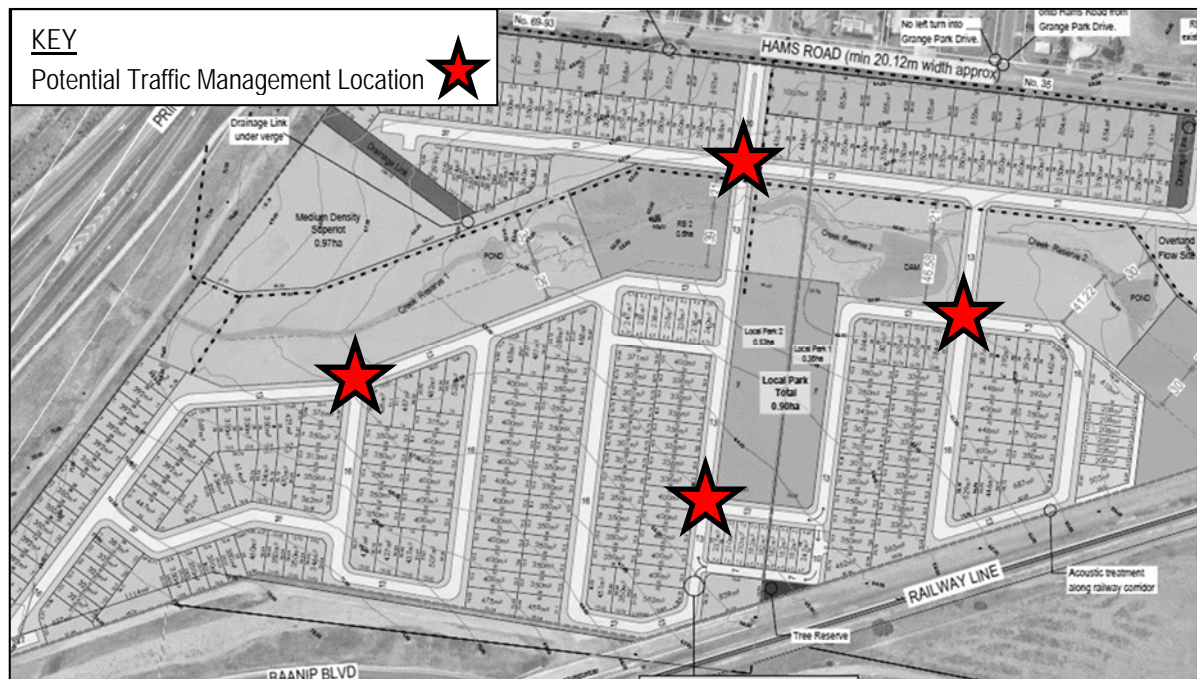


Figure 9: Potential Traffic Control Device Locations

5 External Access Considerations

Hams Road runs along the northern boundary of the site. It terminates at its western end at the northwest corner of the site and connects with Ghazeeopore Road to the east.

It currently provides direct vehicle access to residential properties on the north side of the road and it proposed to also appropriately provide direct Hams Road access to up to 20 dwellings within the subject site.

Two main site connections/intersections are also proposed with Hams Road, being one for each property.

As mentioned previously, one (at 69-93 Hams Road) is located approximately midway along the site's northern boundary diagonally opposite Champagne Court. This is to be a standard access street/access street intersection with no designated turn lanes and separate entry and exit traffic lanes within the site.

As also mentioned previously, the second main site connection/intersection (at 35 Hams Road) is identified towards the site's eastern boundary. This intersection is to also be a standard access street/access street intersection.

We understand that a number of existing nearby residents have raised concern that traffic associated with the future development of the site will use existing streets, namely Grange Park Drive, to the north of the subject site in order to access the wider street network.

In an attempt to address these concerns, the applicant is willing to introduce various treatments including:

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- a left turn ban to prohibit eastbound motorists from turning from Hams Road into Grange Park Drive, and
- a right turn ban to prohibit southbound motorists from turning from Grange Park Drive into Hams Road.

While we do not believe the use of Grange Park Drive would be an attractive access route for future residents of the subject site², the introduction of a turn bans at the Hams Road/Grange Park Drive intersection as suggested would further encourage future residents to use the Ghazeepore Road/Hams Road intersection rather than potentially use Grange Park Drive.

Such treatments are not uncommon, can likely easily be implemented, will be provided at the applicant's cost, and will likely address the concerns of nearby residents.

6 Intersection Analysis (Hams Road/Ghazeepore Road)

For the purposes of this assessment we have assumed that all site generated traffic would use the Hams Road/Ghazeepore Road intersection to access the wider road network.

We have also adopted the conservatively predicted peak hour traffic generation as presented in Section 4.1 and assumed that traffic distribution at the intersection associated with the site generated traffic would be the same as the existing AM and PM splits to and from the north and south along Ghazeepore Road and east along Sugargum Drive.

Based on the above, and assuming an AM and PM departure/arrival split of 70/30 and 30/70 respectively, the predicted site generated traffic at the Hams Road/Ghazeepore Road intersection is as presented in Figure 10, noting that these volumes are based on a larger previous development scheme on the site and are higher than actually envisaged for the current scheme.

For the purposes of the analysis we have also adopted an additional 30%, i.e. 3% per annum for 10 years, growth on existing through traffic along Ghazeepore Road.

We have used the program SIDRA for undertaking this analysis and have adopted all default values except for critical gap and follow-up headway where the requirements set out in the relevant AustRoads Guide have been adopted.

Full output of this analysis is presented at Attachment D which clearly demonstrates that the intersection will continue to function well within acceptable operating conditions following full development of the subject site as generally proposed. In fact, the output suggests that there would be satisfactory post development operating conditions even if substantially more growth occurred than what we have assumed as part of this assessment.

In particular, very low operating outputs have been predicted for all critical criteria including Degree of Saturation, Level of Service, average delay and 95th percentile queue length for both the peak AM and PM commuter hours.

² Grange Park Drive has a lower speed limit than Ghazeepore Road. It also requires motorists to potentially slow, prop and wait at an equivalent number of intersections and private driveways as the Hams Road/Ghazeepore Road route which is only a marginally longer route in terms of distance.

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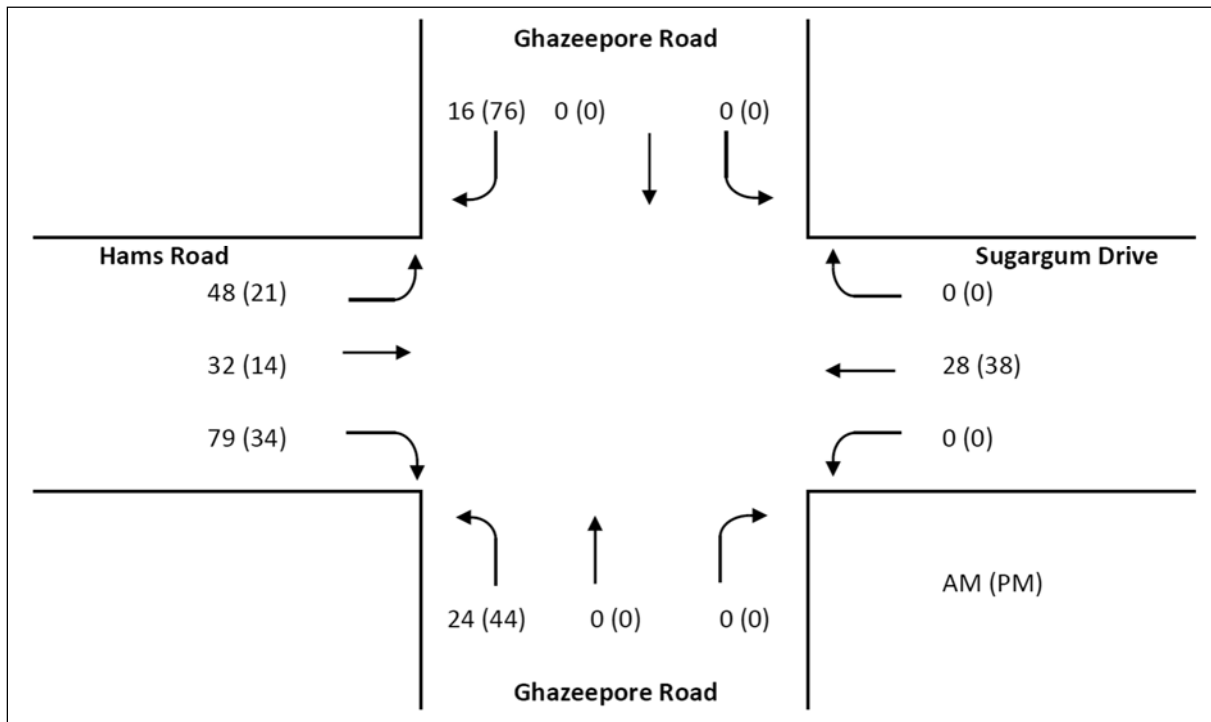


Figure 10: Predicted AM and PM Site Generated Traffic

These results not only suggest that the existing intersection will continue to operate satisfactorily, but it also confirms our earlier comments that there is no reason why future residents of the site would desire to use Grange Park Drive to access the wider road network.

Nevertheless, despite conservative analysis clearly demonstrating that there is no reason in a capacity sense for the existing intersection Ghazeepore Road/Hams Road intersection to be upgraded, Council has requested the provision of a roundabout at the intersection for which we have prepared a concept functional layout plan which incorporates some specific requirements as set out in Council’s email dated 19th February 2018.

A copy of this concept functional layout is attached at Appendix B to the letter that is included at Attachment C of this report, noting that we do not believe that its installation/construction is necessary as part of the initial stages of development on the subject site. Rather, given that our previous investigations (for a slightly more intense development proposal on the site) demonstrate that there is sufficient capacity at the existing intersection to accommodate full development of the site, we see no reason to suggest that the installation/construction of the roundabout couldn’t be delayed until after Statement of Compliance is issued for a certain number of allotments/stages of either Permit as agreed by Council.

Notably, the installation of a roundabout would further increase capacity at the intersection whilst also providing some safety benefits by minimising the potential for conflict to occur between opposing movements.

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7 Conclusions

Having visited the site, perused relevant documents and plans, predicted traffic generation, provided design advice to the internal layout and associated connections with the abutting road network, and undertaken other traffic engineering assessments and analysis, we are of the opinion that:

- a) the proposed road reservations are consistent with what is required to accommodate appropriate carriageways, footpaths, services, etc. in accordance with the relevant standards and current practice,
- b) on-street parking, pedestrian and cycle provisions are identified in a manner that is consistent with the requirements of relevant standards and current practice,
- c) all relevant vehicles will be able to adequately access the site including service and emergency vehicles,
- d) traffic predicted to be generated by the proposed development will easily be accommodated by the existing road network and intersections without any unacceptable impacts,
- e) the installation/construction of the Council required roundabout at the Ghazeepore Road/Hams Road intersection could be delayed until after the initial stages of development on the subject site,
- f) the introduction of specific turn bans at the Hams Road/Grange intersection as discussed in detail earlier in this report would discourage/eliminate the ability for site generated traffic to use Grange Park Drive, and
- g) there are no traffic engineering reasons why a permit should not be granted for the proposed residential subdivision at 35 & 69-93 Hams Road, Waurnd Ponds.

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Attachment A:
(Traffic Volumes
Hams Road/Ghazeepore Road)

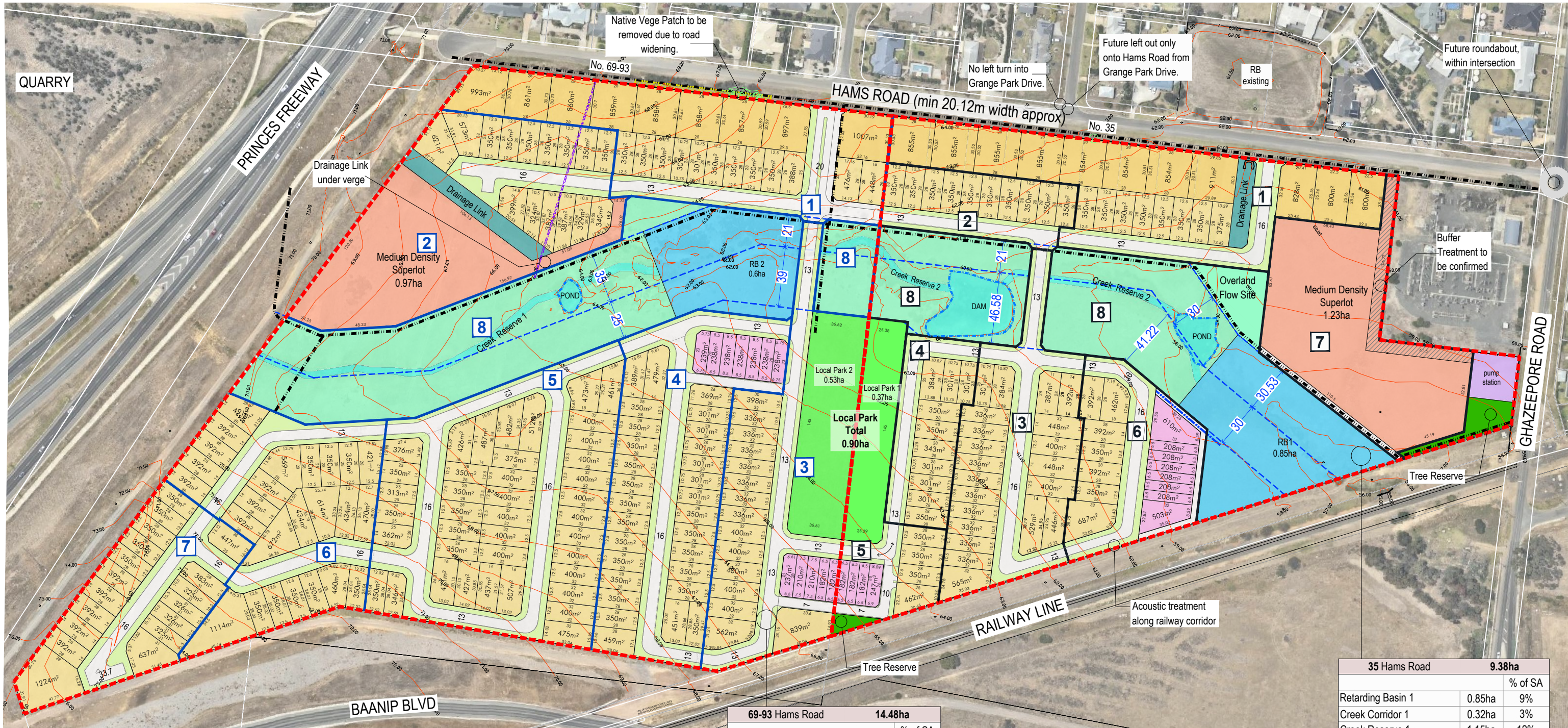
Ghazepore Road/Hams Road/Sugargum Drive

25/10/2016 Time	North Leg			East Leg			South Leg			West Leg			Peak	
	Right Turn	Through	Left Turn	Right Turn	Through	Left Turn	Right Turn	Through	Left Turn	Right Turn	Through	Left Turn	15 min	1 hour
16:00	3	50	5	8	2	9	2	23	1	0	2	0	105	
16:15	3	58	7	7	1	6	4	25	1	1	2	1	116	
16:30	4	44	4	7	2	14	8	23	2	2	1	0	111	
16:45	1	45	4	5	2	15	6	36	2	1	0	0	117	449
17:00	2	61	6	8	2	14	12	19	3	0	0	0	127	471
17:15	2	58	8	11	1	13	12	25	2	2	1	1	136	491
17:30	2	54	9	5	2	11	13	30	2	2	5	1	136	516
17:45	0	48	8	5	3	11	8	22	3	0	2	1	111	510
18:00	1	41	8	14	3	37	14	28	1	2	0	1	150	533
18:15	5	35	5	8	1	18	5	22	2	2	1	2	106	503
18:30	1	21	1	6	1	30	10	27	2	1	1	0	101	468
18:45	0	16	3	10	0	15	9	16	1	3	0	1	74	431
	5	201	33	35	9	72	47	105	8	6	8	4		
26/10/2016	North Leg			East Leg			South Leg			West Leg				
7:00	0	11	6	4	2	9	21	13	0	1	1	0	68	
7:15	1	17	7	4	0	7	27	16	0	5	2	2	88	
7:30	2	27	6	3	0	9	10	26	0	2	0	1	86	
7:45	0	22	6	3	1	9	12	56	1	1	2	1	114	356
8:00	6	25	5	8	4	10	10	56	2	5	6	3	140	428
8:15	2	38	3	7	0	6	24	71	2	2	3	8	166	506
8:30	2	37	5	8	0	17	22	77	1	2	3	5	179	599
8:45	1	23	5	5	2	8	12	56	0	1	0	0	113	598
	10	122	19	26	5	42	68	260	6	10	14	17		

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**Attachment B:
(Proposed Subdivision Plan)**



PLAN NOTES

- Layout is subject to Council approval.
- Site Boundaries and Areas require confirmation via re-establishment survey.
- Further requirements may be needed but not finalized until the appropriate investigations have been reported, including but not limited to:
 - Feature Survey, Flora and Fauna, Arboricultural Survey,
 - Archaeological, Engineering Services, Traffic Engineering.

SOURCE DATA

- Surrounding boundary data via from supplied VICMAP digital data.
- Subject site details features via SMEC Urban Survey 3440895s-01.
- Aerial imagery via from Nearmap under agreement.
- Native Vege patch approx. via Practical Ecology Map 1 08/05/2018 (HZ3).
- Retarding Basin size and location via: Water technology 18/09/18.

DESIGN NOTES

- All existing trees to be removed unless capable of being retained at detailed design phase.
- Creek and RB sites still subject to detailed design approval.
- Larger Lots fronting Hams Rd in accordance with DPO.
- Flood zone area mitigated current Retarding Basin design.
- MD Superlot area adjacent to Power Substation TBC (south may be subject to flooding).
- Courthead layout subject to detailed design Via Traffic Engineers.

LEGEND

- SITE BOUNDARY
- STAGING
- SHARED PATH
- ACCESS FOR RETARDING BASIN 1
- 8M BUFFER WITHIN SUPERLOT (*treatment to be confirmed*)
- EXISTING EASEMENT: TO BE REMOVED (subject to authority approval)
- Ghazepore & Hams Road roundabout: subject to detailed design
- Hams Rd ultimate design: refer to Traffic Report for cross section
- "Patch of Grassy Woodland" within Hams Road southern verge, to be removed due to road widening.

69-93 Hams Road		14.48ha	
			% of SA
Retarding Basin 2	0.60ha		4%
Creek Corridor 2	0.18ha		1%
Creek Reserve 2	1.77ha		12%
Drainage Link	0.13ha		1%
Open Space: Local Park 2	0.53ha		4%
total:	3.21ha		22%
NET DEVELOPABLE AREA		11.27ha	
Local Roads	3.06ha		21%
Tree Reseve	0.00ha		0%
Residential Interface Lots	0.81ha		6%
Residential Lot Area	6.43ha		44%
MD Superlot Area	0.97ha		7%
total:	11.27ha		78%
RESIDENTIAL LOT YIELD (excluding MD sites)			
Standard Residential:	166		
Average:	387m ²		
Residential Interface lots	9		
Average:	895m ²		
Total	175		

35 Hams Road		9.38ha	
			% of SA
Retarding Basin 1	0.85ha		9%
Creek Corridor 1	0.32ha		3%
Creek Reserve 1	1.15ha		12%
Reserve - Overland Flows	0.15ha		2%
Pump Station	0.09ha		1%
Drainage Link	0.07ha		1%
Open Space: Local Park 1	0.37ha		4%
total:	3.00ha		32%
NET DEVELOPABLE AREA		6.38ha	
Local Roads	1.57ha		17%
Tree Reseve	0.11ha		1%
Residential Interface Lots	0.93ha		10%
Residential Lot Area	2.54ha		27%
MD Superlot Area	1.23ha		13%
total:	6.38ha		68%
RESIDENTIAL LOT YIELD (excluding MD sites)			
Standard Residential:	72		
Average:	352m ²		
Residential Interface lots	11		
Average:	847m ²		
Total	83		

Traffic Engineering Assessment

35 & 69-93 Hams Road, Waurin Ponds: Proposed Rezoning and Residential Subdivision

Attachment C:
(Traffix Group letter
28th March 2018)

Our Reference: G21540L-01A

28th March, 2018

Echin Pty Ltd
c/o Taylors
8/270 Ferntree Gully Road
NOTTING HILL VIC 3168

Attention: Roger Cooper

Traffix Group Pty Ltd
ABN 32 100 481 570

Address
Suite 8, 431 Burke Road
Glen Iris Victoria 3146

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

Dear Roger,

PROPOSED RESIDENTIAL SUBDIVISION: 35 & 69-93 HAMS ROAD, WAURN PONDS

We refer to our previous involvement with the proposed residential subdivision at the above site and provide further information in response to various traffic engineering matters that have been raised by Council.

The Proposal

The proposal is for a residential subdivision with approximately 270 standard allotments and 15-20 medium density dwellings. The site is located on the south side of Hams Road, to the west of Ghazeepore Road, and will include the creation of two intersection connections to provide access for the majority of proposed allotments/dwellings. Furthermore, a number of proposed allotments will have direct access via Hams Road, consistent with existing dwellings on the north side of Hams Road.

Proposed Cross-Sections

Hams Road

Council has advised its preferred ultimate cross-section for Hams Road, with the most recent variation via email dated 19th February 2018, including:

- a 2.5m wide shared parking/bicycle lane to the south of the existing northern kerbline,
- two (2) x 3m wide traffic lanes,
- a 1.5m wide designated bicycle lane for westbound cyclists, and
- an approximate 5m southern verge immediately abutting the subject site which is to include 2.2m wide verge side parking spaces adjacent to each allotment that is to take direct property access via Hams Road.

The associated cross-section is attached at Appendix A to this letter.

Internal Roads

Two types of roads are proposed within the subject site, being a laneway and an access street.

The laneway is to have a 5.5m wide trafficable carriageway that is located centrally within a 7m wide road reservation, whilst access streets are to have a 7.3m wide carriageway.

Allotments that are to be accessed via the laneway (which is less than 70m in length) will have access to on-street parking for visitors, etc on a nearby/abutting access street and it would also be appropriate for future residents to walk their refuse bins a short distance to these access streets for collection. It is also noted that a 'paper road' is proposed to abut these allotments which will adequately provide for appropriate designated pedestrian access in addition to shared access along the laneway itself.

The majority of access streets will have a 16m wide road reservation with the 7.3m wide carriageway proposed to be centrally located adjacent to 4.35m wide verges which will include a 1.5m wide footpath. Some of the

access streets will have residential abuttal on one side only, with a creek reserve (or similar) abutting the second side. These access streets are appropriately identified with a slightly narrower (14.5m) wide road reservation which is consistent with good current practice, including within numerous Precinct Structure Plans for greenfield residential subdivision areas.

The associated cross-sections are attached at Appendix A to this letter.

Ghazeepore Road/Hams Road Intersection

Traffix Group undertook detailed traffic generation and distribution assessments and associated post development SIDRA analysis of the existing Ghazeepore Road/Hams Road cross-intersection as part of its previous involvement with this project. This work clearly demonstrated that there is ample capacity at the intersection to easily accommodate the additional traffic that would be generated as a result of the full development of the subject site as proposed. It is also noted that the analysis assessment was for a slightly more intense development proposal that was previously identified for the site for which more traffic would have been generated compared with the scheme that is now proposed.

Nevertheless, Council has requested the provision of a roundabout at the intersection for which we have prepared a concept functional layout plan which incorporates some specific requirements as set out in Council's email dated 19th February 2018.

A copy of this concept functional layout is attached at Appendix B to this letter, noting that we do not believe that its installation/construction is necessary as part of the initial stages of development on the subject site. Rather, given that our previous investigations (for a slightly more intense development proposal on the site) demonstrate that there is sufficient capacity at the existing intersection to accommodate full development of the site, we see no reason to suggest that the installation/construction of the roundabout couldn't be delayed until after Statement of Compliance is issued for a certain number of allotments per site as agreed by Council.

External Local Area Traffic Management

We understand that a number of existing nearby residents have raised concern that traffic associated with the future development of the site will use existing streets, namely Grange Park Drive, to the north of the subject site in order to access the wider street network.

In an attempt to address these concerns, the applicant is willing to introduce various treatments including:

- a left turn ban to prohibit motorists from turning from Hams Road into Grange Park Drive, and
- a reverse priority T-intersection which provides priority to vehicles travelling along the east and south legs of the intersection that will be created at the eastern end of the site.

Whilst we understand that Council has previously suggested that such treatments are unnecessary, they are not uncommon, can likely easily be implemented, will be provided at the applicant's cost, and will likely address the concerns of nearby residents.

Internal Local Area Traffic Management (LATM)

We have been involvement with the approval process for various residential subdivisions within the City of Greater Geelong over the past several years in which a Condition requiring 'the preparation of a LATM plan to the satisfaction of the responsible authority' (or similar) has been included on associated Town Planning Permits. We believe that the same is appropriate in this case.

Please feel free to contact Nathan Woolcock at our Glen Iris office should you have any queries.

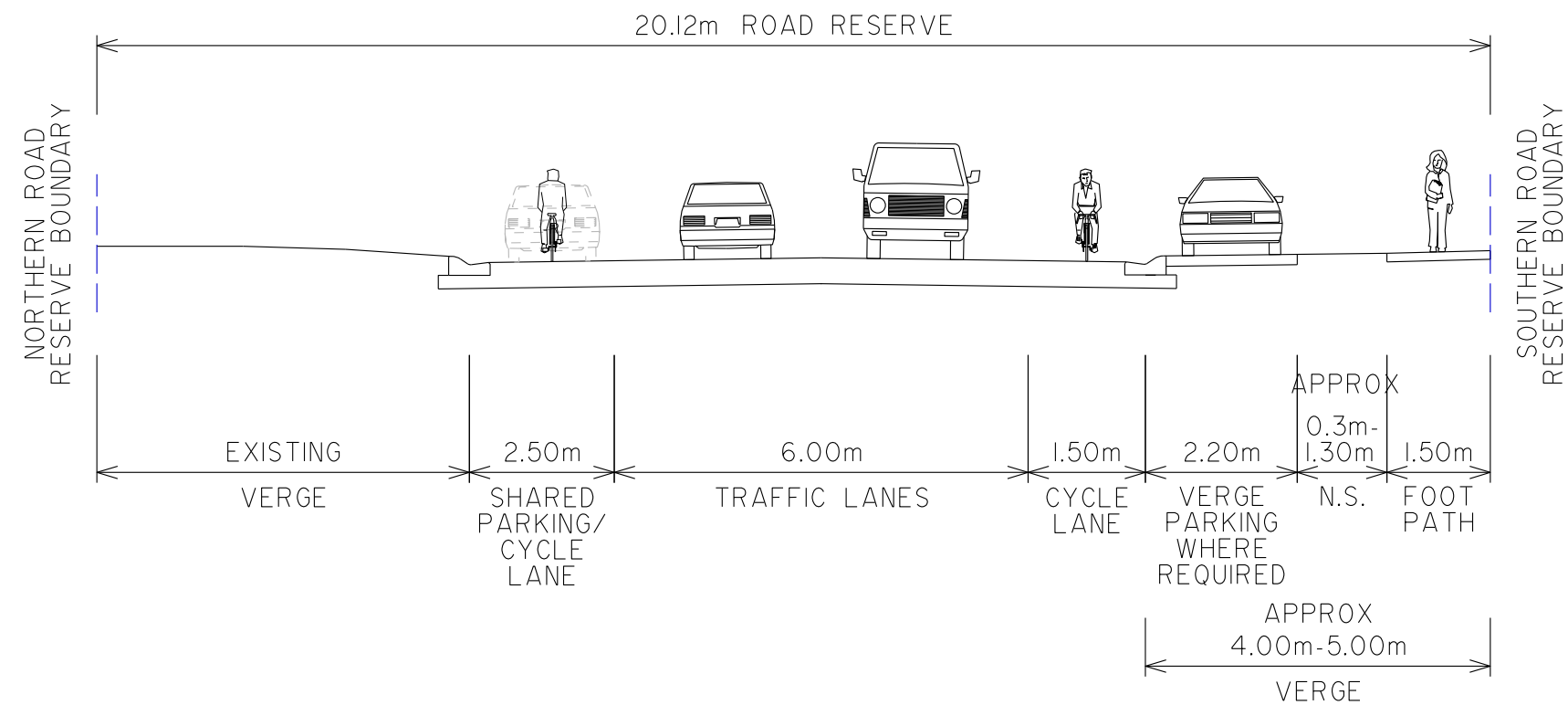
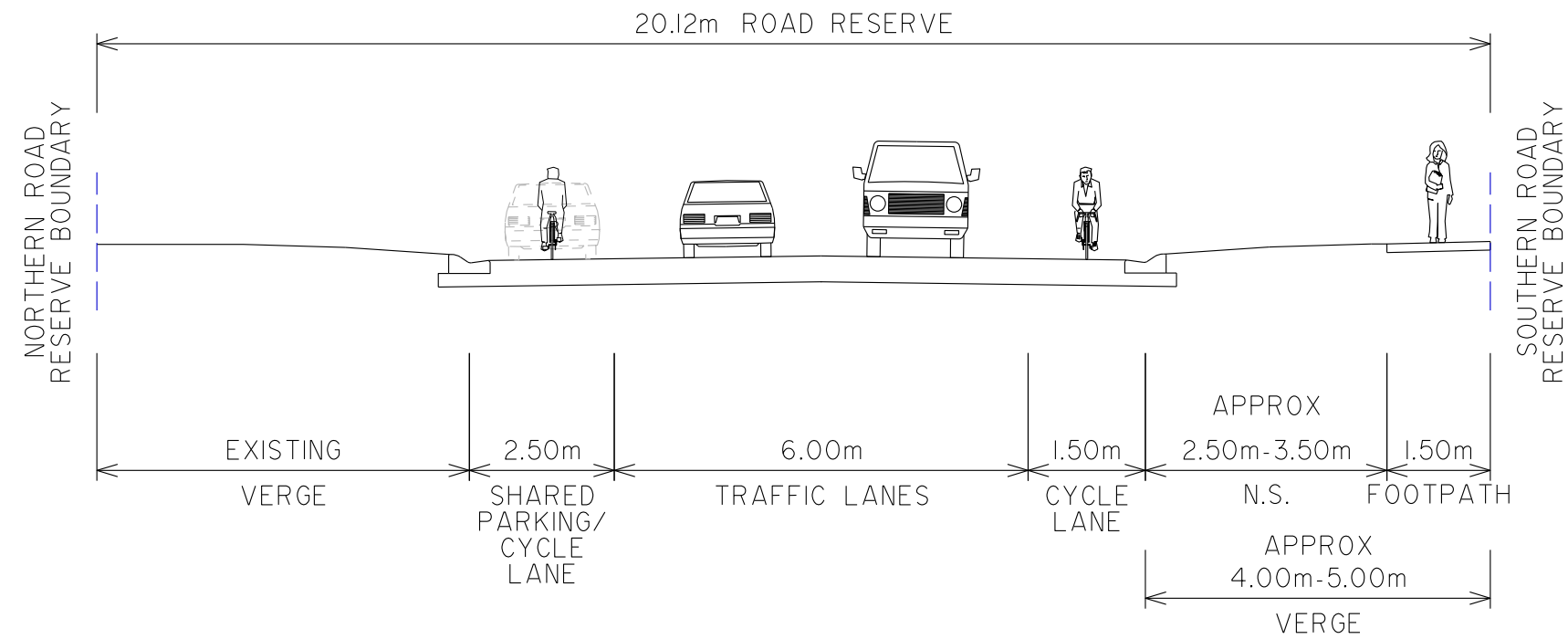
Yours faithfully,
TRAFFIX GROUP PTY LTD



NATHAN WOOLCOCK
Director

Appendix A

ULTIMATE HAMS ROAD

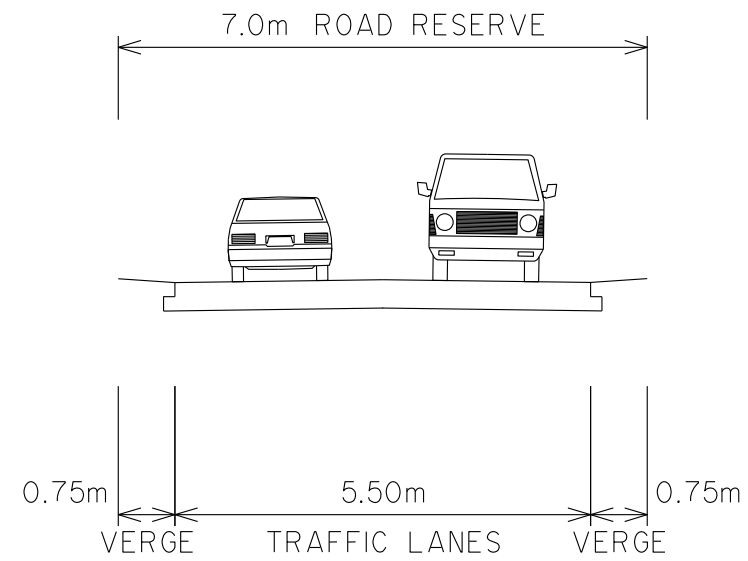


PRELIMINARY PLAN
FOR DISCUSSION
PURPOSES ONLY

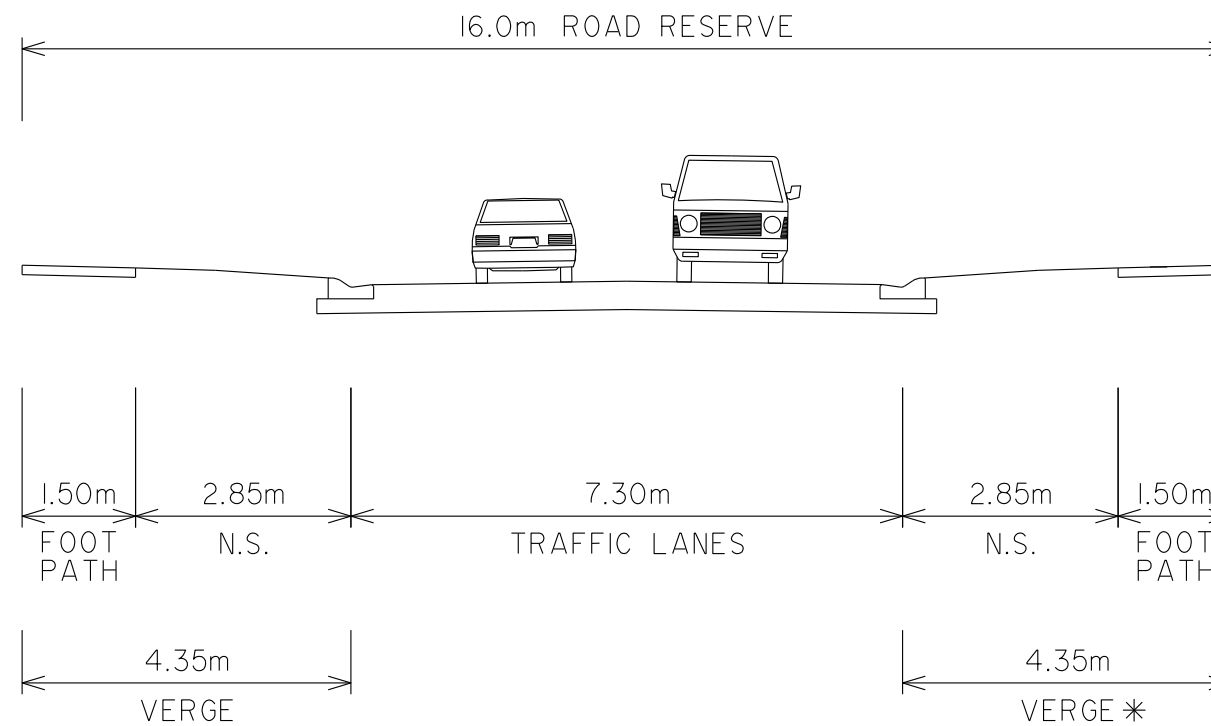
WARNING
BEWARE OF UNDERGROUND SERVICES
The locations of underground services shown are approximate only and their exact position should be proven on site.

ISSUE	ISSUE DESCRIPTION	ISSUE DATE	GENERAL NOTES	DESIGNED	 Traffic Engineers and Transport Planners Suite 8/431 Burke Road TEL: (03) 9822-2888 GLEN IRIS VICTORIA 3146 FAX: (03) 9822-7444 www.traffixgroup.com.au	35 & 69-93 HAMS ROAD, WAURN PONDS		
A	TYPICAL CROSS SECTIONS - AS PER COUNCIL MEMO DATED 29/09/17	12 FEB 2018	1 ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL 2 N.S. - NATURE STRIP	S O'KEEFE 12 FEB 2018		GREATER GEELONG CITY		
B	UPDATED CROSS SECTIONS - AS PER COUNCIL EMAIL DATED 19/02/18	20 FEB 2018		CHECKED/APPROVED N WOOLCOCK 12 FEB 2018		CROSS SECTIONS		
				FILE NAME G21540A-00.dgn		NOT TO SCALE	SHEET No.	DWG No. G21540-02

ACCESS LANE




ACCESS STREET



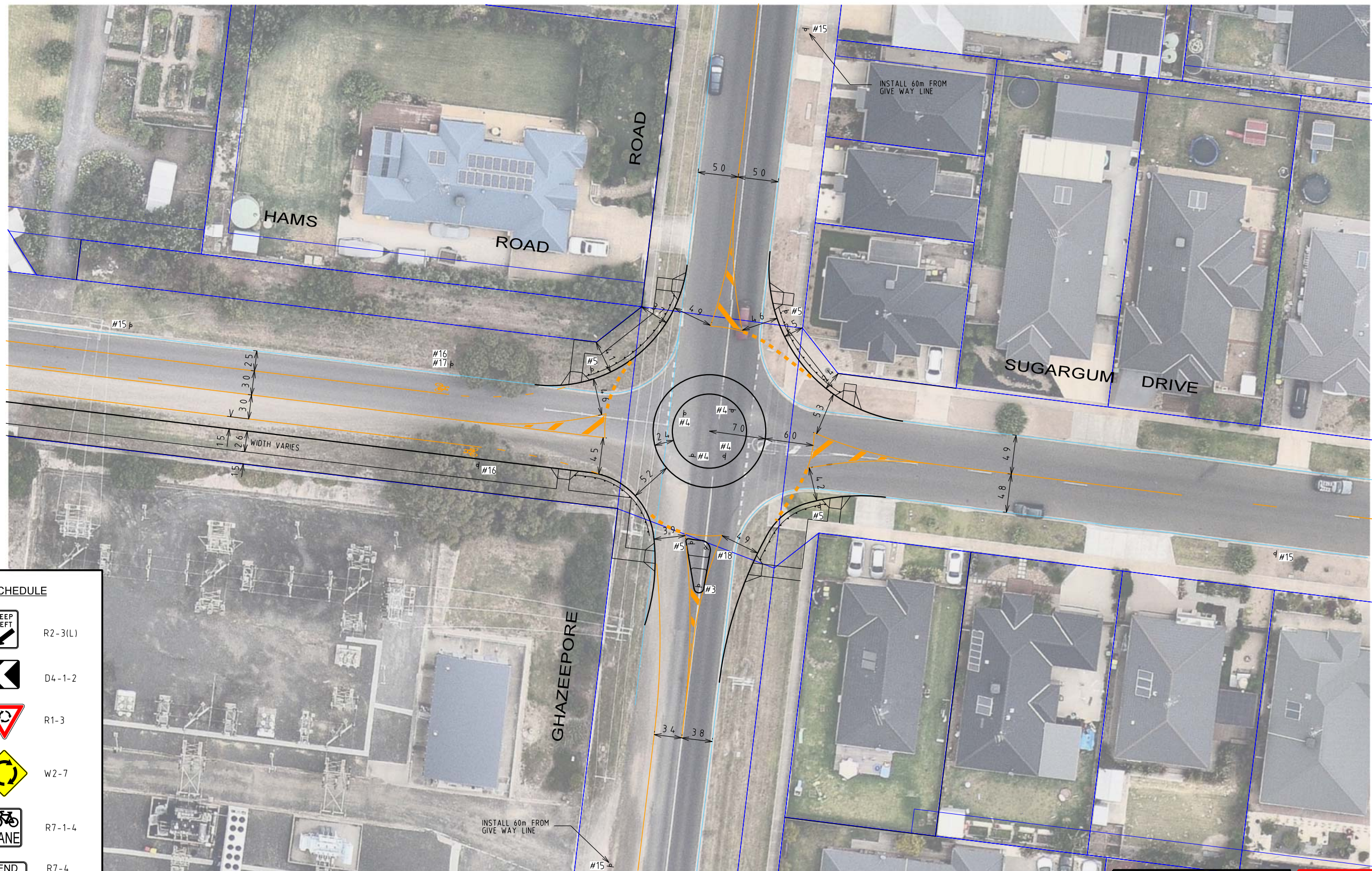
* REDUCED VERGE AND NO FOOTPATH IS ACCEPTABLE ADJACENT TO CREEK RESERVE (OR SIMILAR).

PRELIMINARY PLAN
FOR DISCUSSION
PURPOSES ONLY








WARNING
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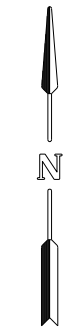
ISSUE	ISSUE DESCRIPTION	ISSUE DATE	GENERAL NOTES	DESIGNED	 Traffic Engineers and Transport Planners Suite 8/431 Burke Road GLEN IRIS VICTORIA 3146 TEL: (03) 9822-2888 FAX: (03) 9822-7444 www.traffixgroup.com.au	35 & 69-93 HAMS ROAD, WAURN PONDS GREATER GEELONG CITY CROSS SECTIONS		
A	TYPICAL CROSS SECTIONS - AS PER COUNCIL MEMO DATED 29/09/17	12 FEB 2018	1 ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL 2 N.S. - NATURE STRIP	S O'KEEFE 12 FEB 2018		NOT TO SCALE	SHEET No.	DWG No. G21540-03
B	UPDATED CROSS SECTIONS - AS PER COUNCIL EMAIL DATED 19/02/18	20 FEB 2018		N WOOLCOCK 12 FEB 2018				

Appendix B



SIGN SCHEDULE

- #3  R2-3(L)
- #4  D4-1-2
- #5  R1-3
- #15  W2-7
- #16  R7-1-4
- #17  R7-4
- #18  D4-V108



MELWAY MAP
REF 464 J10

PRELIMINARY PLAN
FOR DISCUSSION
PURPOSES ONLY

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ISSUE	ISSUE DESCRIPTION	ISSUE DATE
A	CONCEPT LAYOUT PLAN	23 JAN 2018
B	COUNCIL COMMENTS ADDRESSED	21 FEB 2018

GENERAL NOTES

- 1 BASE INFORMATION FROM AERIAL PHOTOGRAPH (SOURCE-NEARMAP NOV 2017)
- 2 ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL
- 3 LOCAL ROAD - GHAZEEPORE ROAD (SPEED ZONE 60km/h)
- HAM ROAD & SUGARGUM DRIVE (SPEED ZONE 50km/h)

--- PEDESTRIAN FENCING / BOLLARDS

DESIGNED
R CARBARNES 23 JAN 2018

CHECKED/APPROVED
N WOOLCOCK 23 JAN 2018

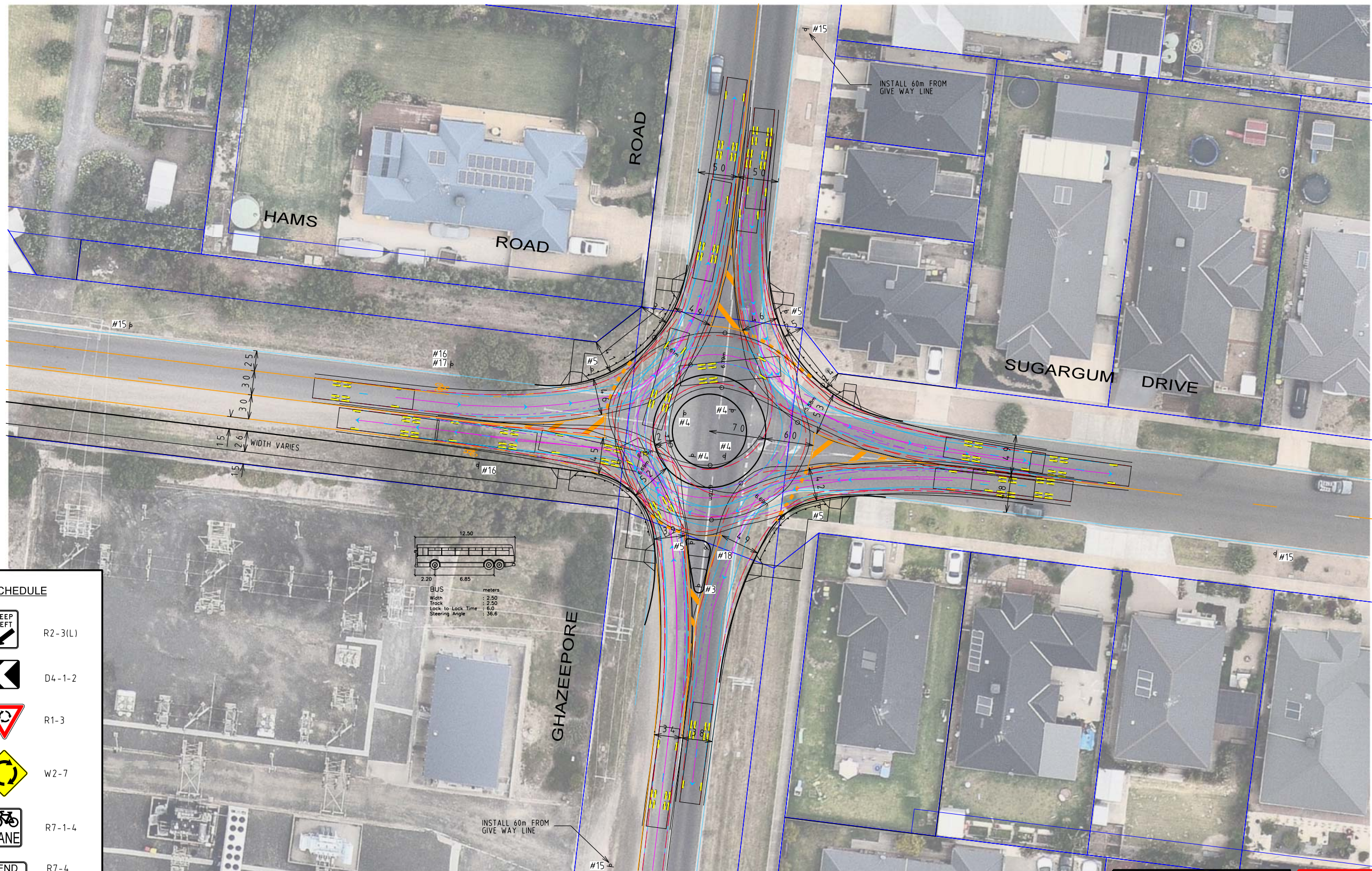
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Traffix Engineers and Transport Planners
Suite 8/431 Burke Road TEL: (03) 9822-2888
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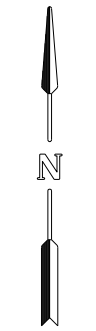
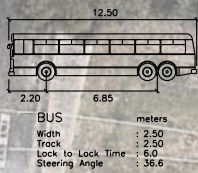
GHAZEEPORE ROAD - WAURN PONDS
HAMS ROAD - SUGARGUM DRIVE
GREATER GEELONG CITY
CONCEPT LAYOUT PLAN

SCALE 0 2.5 5 7.5 10 SHEET No. DWG No. G21540-01



SIGN SCHEDULE

- #3  R2-3(L)
- #4  D4-1-2
- #5  R1-3
- #15  W2-7
- #16  R7-1-4
- #17  R7-4
- #18  D4-V108



MELWAY MAP
REF 464 J10

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--- PEDESTRIAN FENCING / BOLLARDS

DESIGNED
R CARBARNES 23 JAN 2018

CHECKED/APPROVED
N WOOLCOCK 23 JAN 2018

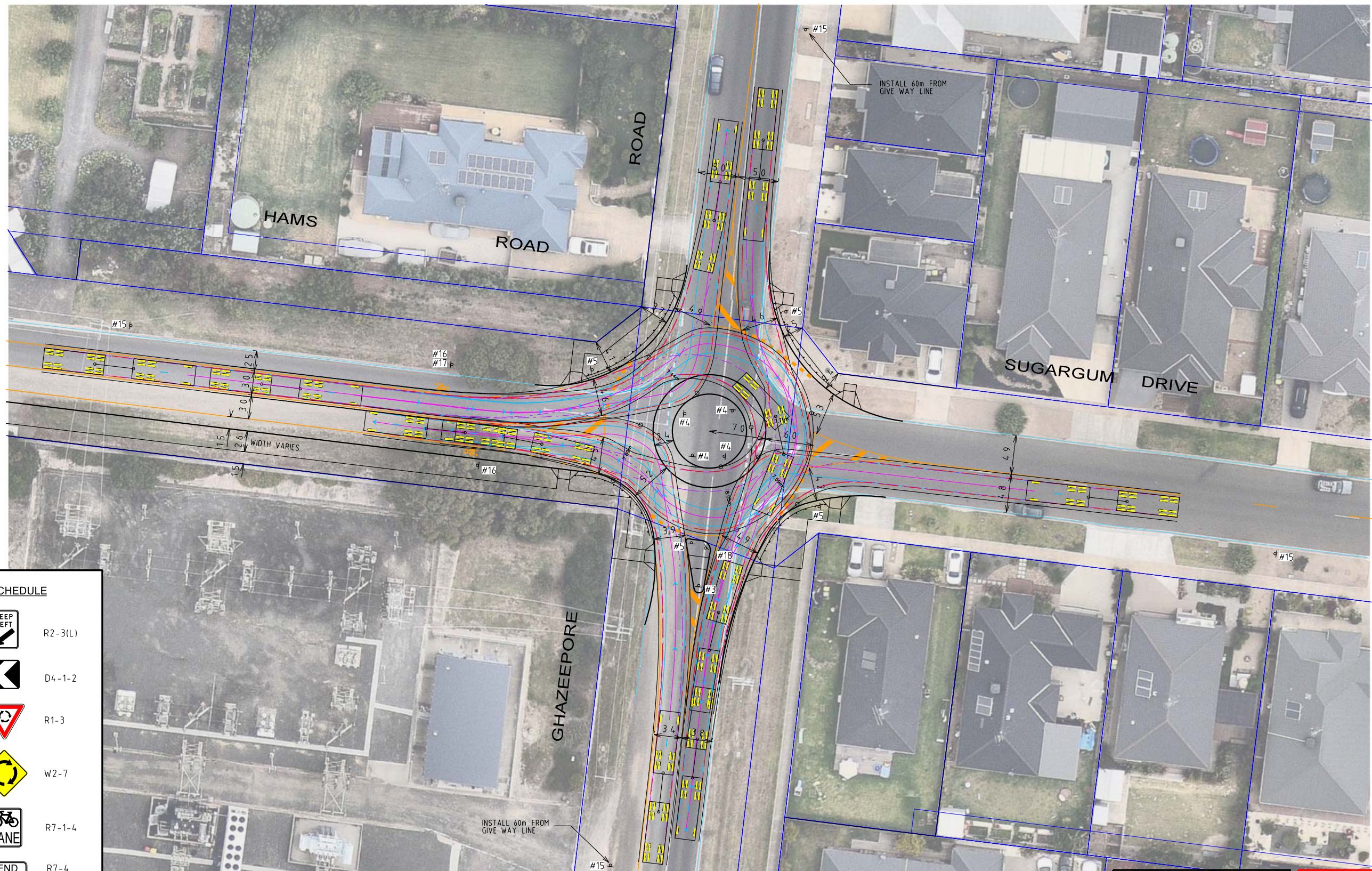
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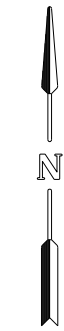
GHAZEEPORE ROAD - WAURN PONDS
HAMS ROAD - SUGARGUM DRIVE
GREATER GEELONG CITY
CONCEPT LAYOUT PLAN

SCALE 0 2.5 5 7.5 10 SHEET No. DWG No. G21540-01



SIGN SCHEDULE

- #3  R2-3(L)
- #4  D4-1-2
- #5  R1-3
- #15  W2-7
- #16  R7-1-4
- #17  R7-4
- #18  D4-V108



MELWAY MAP REF 464 J10

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY

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--- PEDESTRIAN FENCING / BOLLARDS

DESIGNED
R CARBARNES 23 JAN 2018

CHECKED/APPROVED
N WOOLCOCK 23 JAN 2018

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www.traffixgroup.com.au

GHAZEEPORE ROAD - WAURN PONDS
HAMS ROAD - SUGARGUM DRIVE
GREATER GEELONG CITY
CONCEPT LAYOUT PLAN

SCALE 0 2.5 5 7.5 10 SHEET No. DWG No. G21540-01

Traffic Engineering Assessment

35 & 69-93 Hams Road, Waurn Ponds: Proposed Rezoning and Residential Subdivision

Attachment D:
(SIDRA Output)

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

▽ Site: 101 [Post Development AM]

Hams Road/Ghazepore Road/Sugargum Drive Intersection
 Giveaway / Yield (Two-Way)

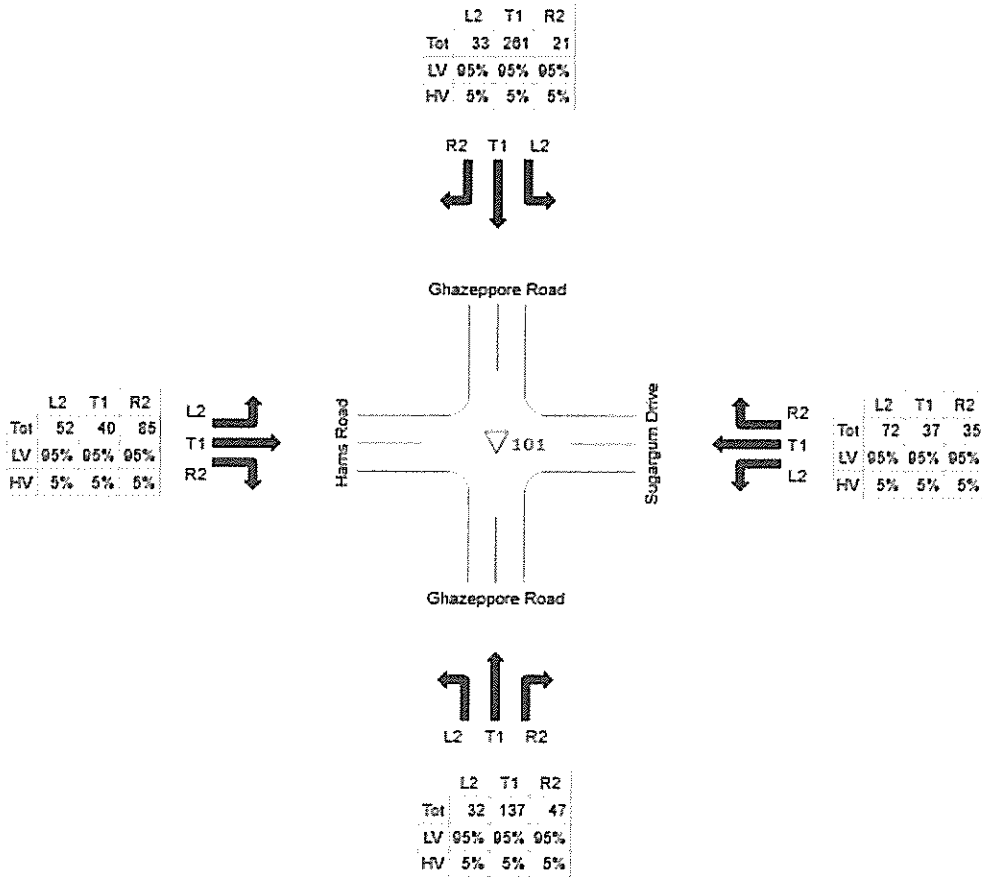
Volume Display Method: Total and %

Total Intersection Volumes (veh)

All Movement Classes: 852

Light Vehicles (LV): 809

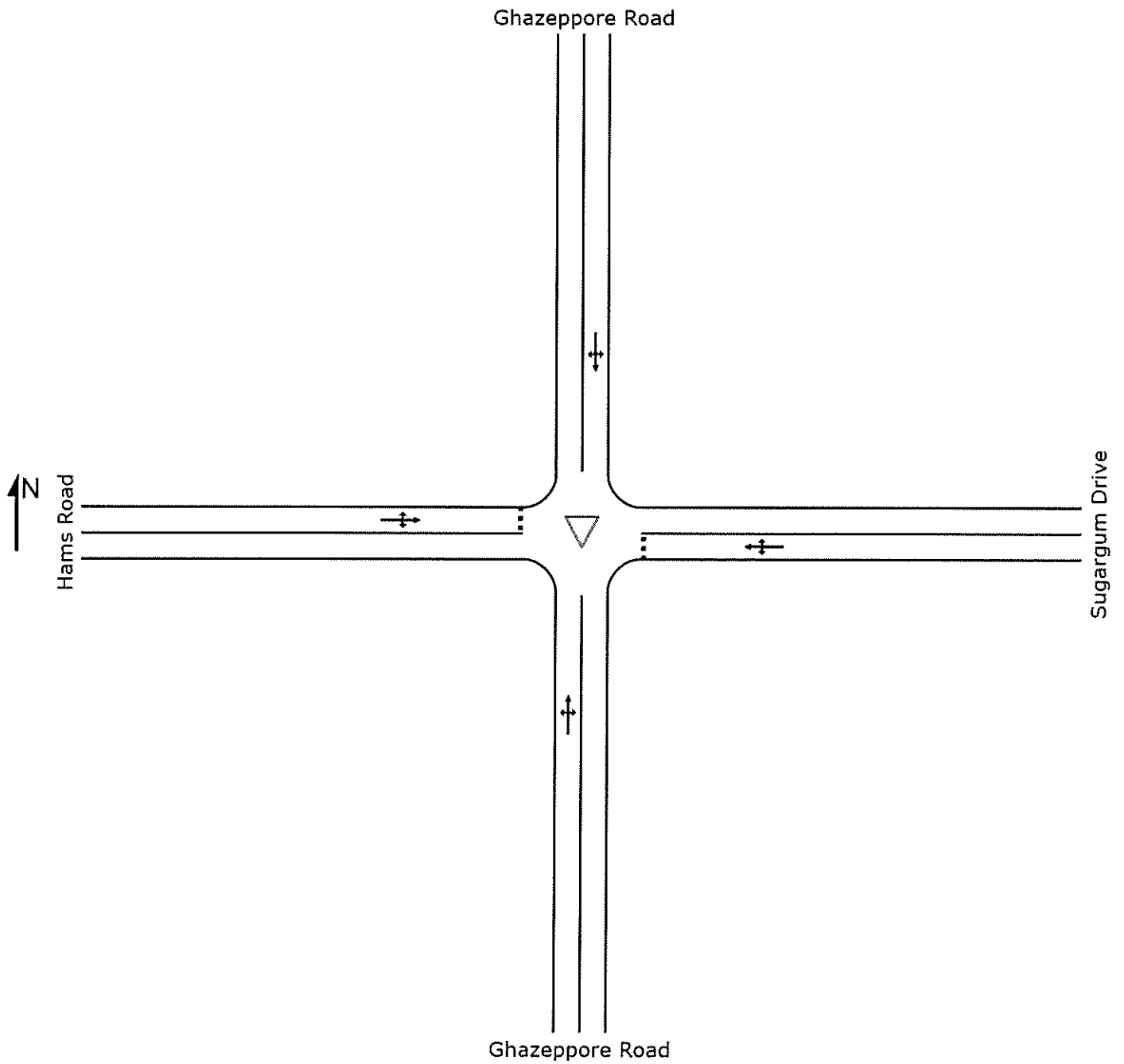
Heavy Vehicles (HV): 43



SITE LAYOUT

▽ Site: Post Development AM

Hams Road/Ghazepore Road/Sugargum Drive Intersection
Giveaway / Yield (Two-Way)



MOVEMENT SUMMARY

Site: Post Development PM

Hams Road/Ghazepore Road/Sugargum Drive Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Ghazepore Road											
1	L2	53	5.0	0.131	5.9	LOS A	0.4	2.7	0.17	0.22	55.5
2	T1	144	5.0	0.131	0.2	LOS A	0.4	2.7	0.17	0.22	57.2
3	R2	49	5.0	0.131	6.0	LOS A	0.4	2.7	0.17	0.22	54.9
Approach		246	5.0	0.131	2.6	NA	0.4	2.7	0.17	0.22	56.3
East: Sugargum Drive											
4	L2	76	5.0	0.139	6.2	LOS A	0.5	3.8	0.32	0.62	52.6
5	T1	45	5.0	0.139	7.1	LOS A	0.5	3.8	0.32	0.62	52.8
6	R2	27	5.0	0.139	6.7	LOS A	0.5	3.8	0.32	0.62	52.1
Approach		148	5.0	0.139	6.6	LOS A	0.5	3.8	0.32	0.62	52.6
North: Ghazepore Road											
7	L2	20	5.0	0.147	6.1	LOS A	0.6	4.2	0.24	0.22	55.3
8	T1	167	5.0	0.147	0.3	LOS A	0.6	4.2	0.24	0.22	57.0
9	R2	91	5.0	0.147	6.1	LOS A	0.6	4.2	0.24	0.22	54.7
Approach		278	5.0	0.147	2.6	NA	0.6	4.2	0.24	0.22	56.1
West: Hams Road											
10	L2	40	5.0	0.109	6.1	LOS A	0.4	2.8	0.31	0.63	52.6
11	T1	29	5.0	0.109	6.9	LOS A	0.4	2.8	0.31	0.63	52.8
12	R2	46	5.0	0.109	6.9	LOS A	0.4	2.8	0.31	0.63	52.1
Approach		116	5.0	0.109	6.6	LOS A	0.4	2.8	0.31	0.63	52.4
All Vehicles		788	5.0	0.147	3.9	NA	0.6	4.2	0.24	0.36	54.9

Level of Service (LOS) Method: Delay (HCM 2000).

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 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.

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

▽ Site: 101 [Post Development PM]

Hams Road/Ghazepore Road/Sugargum Drive Intersection
 Giveaway / Yield (Two-Way)

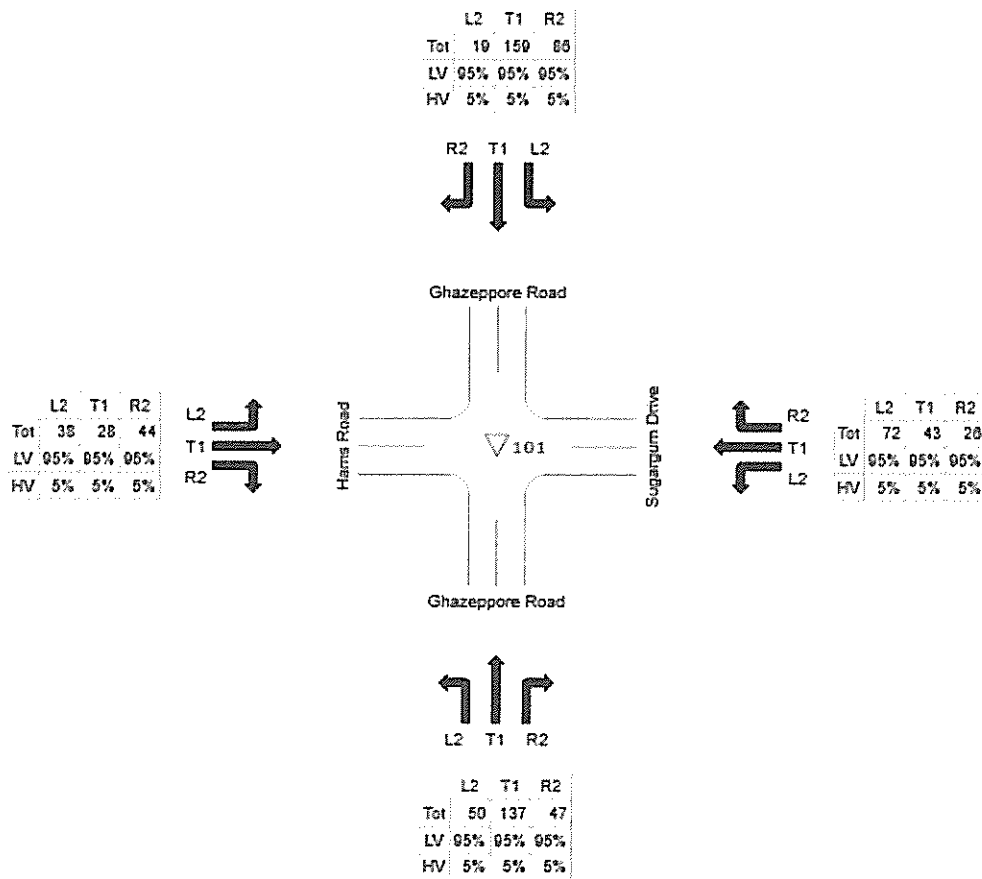
Volume Display Method: Total and %

Total Intersection Volumes (veh)

All Movement Classes: 749

Light Vehicles (LV): 712

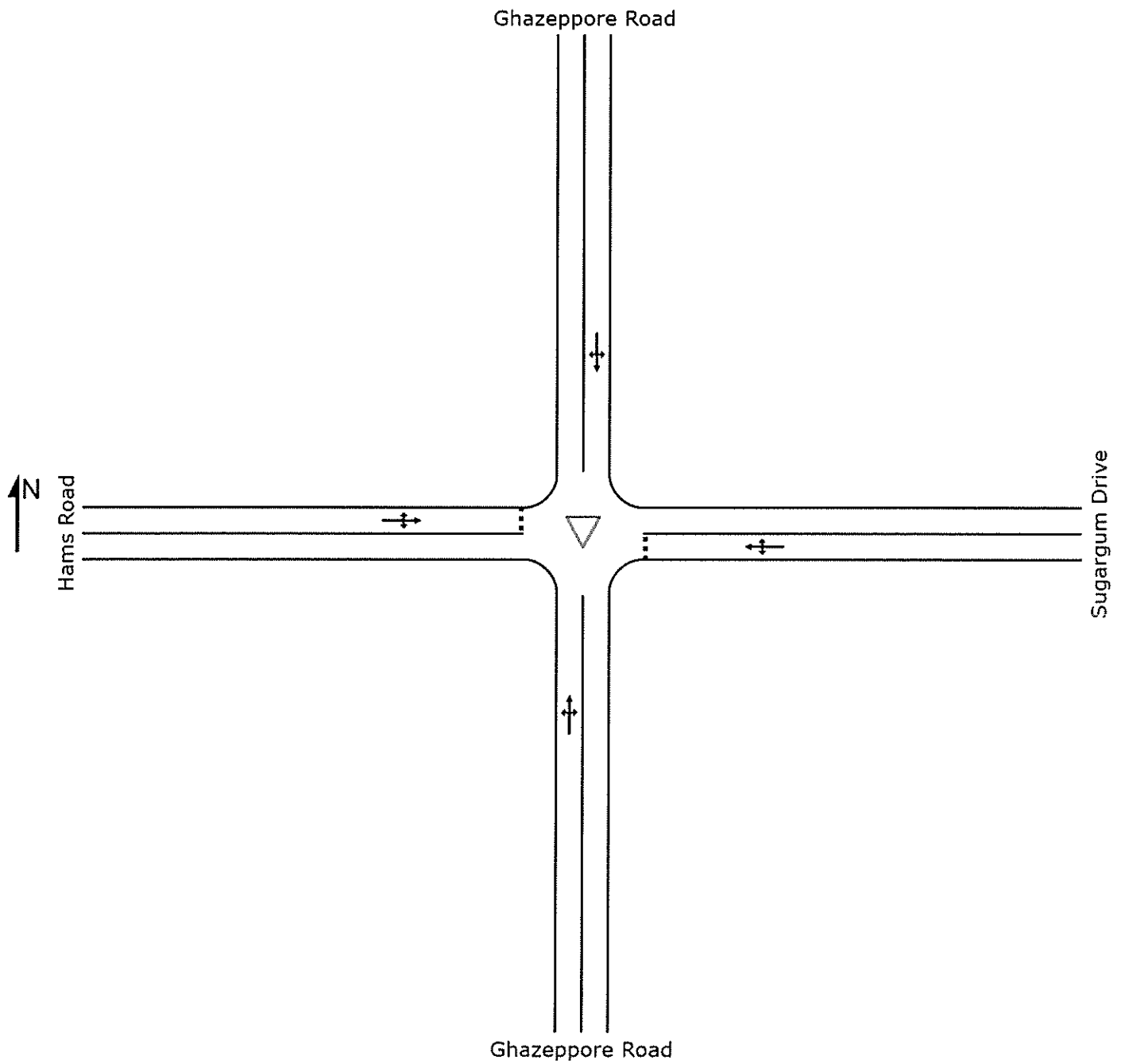
Heavy Vehicles (HV): 37



SITE LAYOUT

▽ Site: Post Development PM

Hams Road/Ghazepore Road/Sugargum Drive Intersection
Giveaway / Yield (Two-Way)



MOVEMENT SUMMARY

▽ Site: Post Development AM

Hams Road/Ghazepore Road/Sugargum Drive Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows 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: Ghazepore Road											
1	L2	34	5.0	0.124	6.3	LOS A	0.4	2.9	0.24	0.20	55.4
2	T1	144	5.0	0.124	0.3	LOS A	0.4	2.9	0.24	0.20	57.2
3	R2	49	5.0	0.124	6.4	LOS A	0.4	2.9	0.24	0.20	54.9
Approach		227	5.0	0.124	2.5	NA	0.4	2.9	0.24	0.20	56.4
East: Sugargum Drive											
4	L2	76	5.0	0.149	6.7	LOS A	0.6	4.1	0.41	0.67	52.4
5	T1	39	5.0	0.149	7.4	LOS A	0.6	4.1	0.41	0.67	52.6
6	R2	37	5.0	0.149	7.0	LOS A	0.6	4.1	0.41	0.67	51.9
Approach		152	5.0	0.149	6.9	LOS A	0.6	4.1	0.41	0.67	52.3
North: Ghazepore Road											
7	L2	35	5.0	0.176	5.8	LOS A	0.2	1.4	0.06	0.10	57.0
8	T1	275	5.0	0.176	0.1	LOS A	0.2	1.4	0.06	0.10	58.8
9	R2	22	5.0	0.176	6.0	LOS A	0.2	1.4	0.06	0.10	56.4
Approach		332	5.0	0.176	1.1	NA	0.2	1.4	0.06	0.10	58.5
West: Hams Road											
10	L2	55	5.0	0.181	6.1	LOS A	0.6	4.7	0.33	0.66	52.4
11	T1	42	5.0	0.181	7.5	LOS A	0.6	4.7	0.33	0.66	52.6
12	R2	89	5.0	0.181	7.0	LOS A	0.6	4.7	0.33	0.66	51.9
Approach		186	5.0	0.181	6.9	LOS A	0.6	4.7	0.33	0.66	52.2
All Vehicles		897	5.0	0.181	3.6	NA	0.6	4.7	0.22	0.34	55.5

Level of Service (LOS) Method: Delay (HCM 2000).

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 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.