

2-120 Mollers Lane, Leopold

Greater Geelong Planning Scheme Amendment C367 and Planning Permit Application 1463/2016

Traffic Engineering Evidence Statement to Planning Panels Victoria

Date of Statement: 23 November 2018

Date of Inspection: 13 November 2018

Prepared For the Applicant: Mollers Lane Developments Pty Ltd and Pamas Property Pty Ltd

Instructed By: Minter Ellison

Reference: G25341A-01A

IN THE MATTER OF AMENDMENT C367 TO THE GREATER GEELONG PLANNING SCHEME AND PLANNING PERMIT APPLICATION 1463/2016 RELATING TO 2-120 MOLLERS LANE, LEOPOLD.

STATEMENT TO PLANNING PANELS VICTORIA BY JASON LEE WALSH, TRAFFIC ENGINEER

Traffic Engineering Assessment

2-120 Mollers Lane, Leopold: Greater Geelong Planning Scheme Amendment C367 and Planning Permit Application 1463/2016

STATEMENT TO PLANNING PANELS VICTORIA BY JASON LEE WALSH, TRAFFIC ENGINEER

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1 Introduction

I have been instructed by Minter Ellison on behalf of Mollers Lane Developments Pty Ltd and Pamas Property Pty Ltd to undertake a traffic engineering assessment of Greater Geelong Planning Scheme Amendment C367 and Planning Permit Application 1463/2016 pertaining to the proposed rezoning and residential subdivision at 2-120 Mollers Lane, Leopold. I have also been requested to respond to the traffic engineering items in the Panel's Directions to be addressed by the Proponent.

In the course of preparing this statement, I inspected the subject site on 13 November 2018, reviewed development plans and background material, and assessed the car parking and traffic impacts of the proposal.

My qualifications and experience to undertake the following assessment are set out in Appendix A.

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2 History of Amendment

The proponent, Mollers Lane Developments Pty Ltd and Pamas Property Pty Ltd, submitted a combined Planning Scheme Amendment and Planning Permit Application to Greater Geelong City Council.

The Planning Scheme Amendment is to rezone the subject site from Farming Zone (FZ) to General Residential Zone 1 (GRZ1), apply the Design and Development Overlay Schedule 43 (DDO43) and remove the Significant Landscape Overlay Schedule 10 (SLO10) from part of the subject land. The planning application proposes residential subdivision of the land.

In September 2017, Council resolved to endorse the preparation and exhibition of Amendment C367 to the Greater Geelong Planning Scheme, and consider the application for a multi-lot subdivision of land of 2-120 Mollers Lane, Leopold.

The Amendment and planning permit application were placed on exhibition in May – June 2018. The exhibited material included a Transport Impact Assessment Report prepared by ESR Transport Planning (dated 23/01/18).

The exhibited version contemplated in the order of 500 residential lots.

A number of submissions were received, with one submission raising concern with traffic impacts to Mollers Lane. Transport for Victoria was supportive of the amendment but sought the addition of shared paths on connector roads, as well as wider shared paths. Correspondence from VicRoads, dated 12th of November 2018, requires improvements to the intersection of Mollers Lane and Bellarine Highway before statement of compliance for any stage, and then the installation of traffic signals before statement of compliance for the 170th lot.

Following consideration of all submissions, Council resolved to write to the Minister for Planning to request an Independent Panel be appointed to consider the matter.

Amended material, prepared by TGM Group, was circulated. The material included an Overall Development Plan (version Y2), dated 31 October 2018. This plan illustrates 541 lots.

My evidence is based on version Y2 of the Development Plan as it contains more lots than the exhibited version, and consequently will generate more traffic. This implies that if the traffic impacts of version Y2 are acceptable then the traffic impacts of the exhibited version will also be acceptable.

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3 The Proposal

The proposal is for a combined Planning Scheme Amendment and Planning Permit application for a multi-lot subdivision of land at 2-120 Mollers Lane, Leopold.

The Planning Scheme Amendment is to rezone the subject site from Farming Zone (FZ) to General Residential Zone 1 (GRZ1), apply the Design and Development Overlay Schedule 43 (DDO43) and remove the Significant Landscape Overlay Schedule 10 (SLO10) from part of the subject land.

The Development Plan (version Y2) illustrates a total of 541 residential lots, inclusive of 3 larger lots intended for higher density. I am instructed that the higher density lots could accommodate in the order of 20 dwellings realising an overall yield of up to 560 dwellings.

Vehicle access for the proposed subdivision is to be via a number of road connections with Mollers Lane which abuts the site's eastern boundary. As part of the proposed subdivision, Mollers Lane is to be upgraded to a connector street within a widened 22 metre road reserve.

The southern portion of the site also allows for future road connections to development of land to the immediate west.

The existing Mollers Lane intersection with Bellarine Highway is to be signalised as part of the proposed subdivision. The traffic signals are to be installed prior to Statement of Compliance being issued for the 170th lot as consistent with VicRoads' requirements.

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4 Existing Conditions

4.1 Subject Site

The subject site is irregular in shape and is located on the west side of Mollers Lane, immediately south of Bellarine Highway, as shown in the locality plan presented at Figure 1. An aerial photograph of the site and its surrounds is shown at Figure 2.

The site is largely vacant farmland with some existing buildings in the southern part.

The subject site is zoned Farming Zone (FZ) as shown in the Land Zoning Map at Figure 3.

Land use surrounding the site is generally residential to the north and west, and farming uses to the south and east.

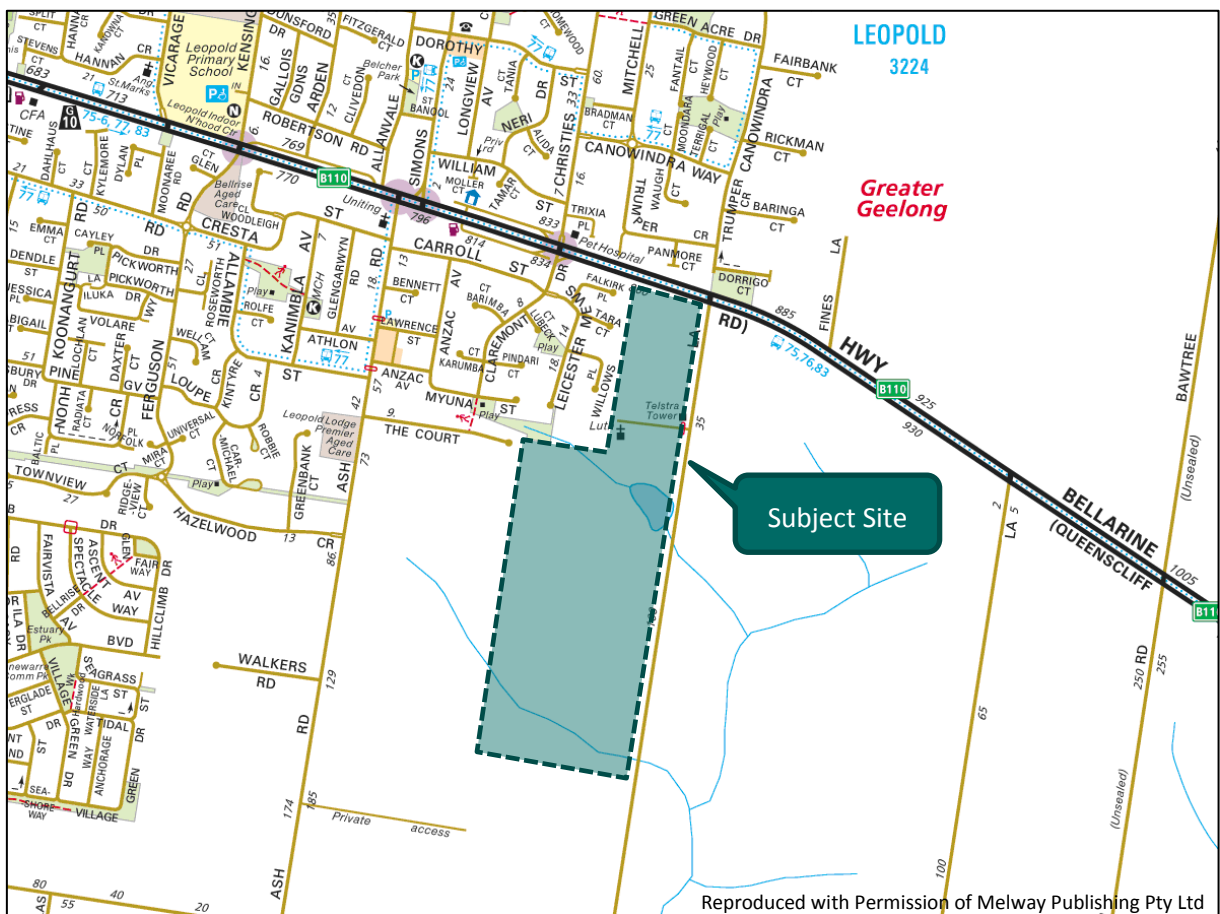


Figure 1: Locality Plan

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Figure 2: Aerial Photograph

Source: Nearmap

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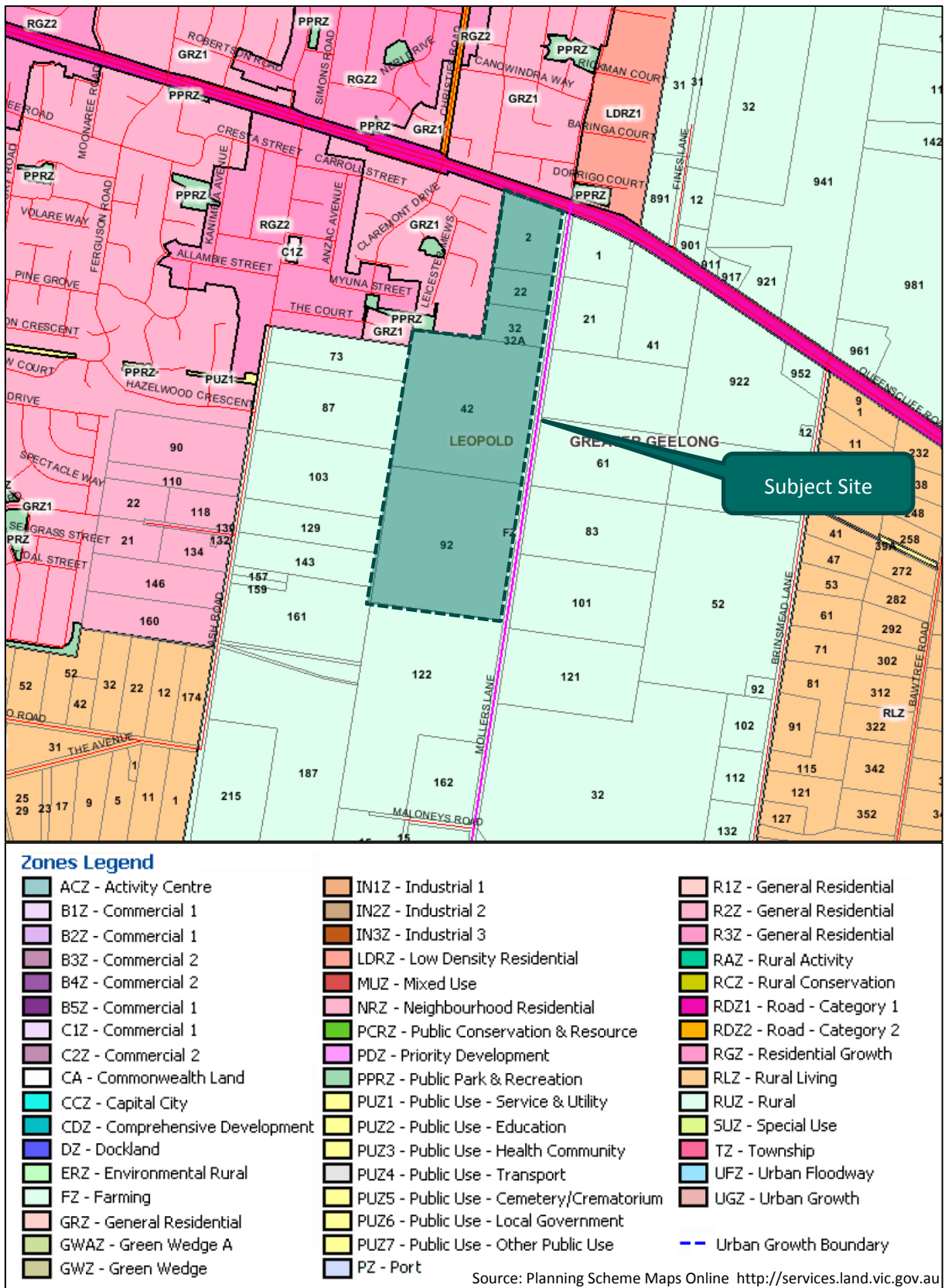


Figure 3: Land Use Zoning Map

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4.2 Background Documents

4.2.1 Leopold Structure Plan

The majority of the subject land is located in the Leopold Structure Plan as shown at Figure 4. This plan was prepared by the City of Greater Geelong (dated September 2011, and amended January 2013).

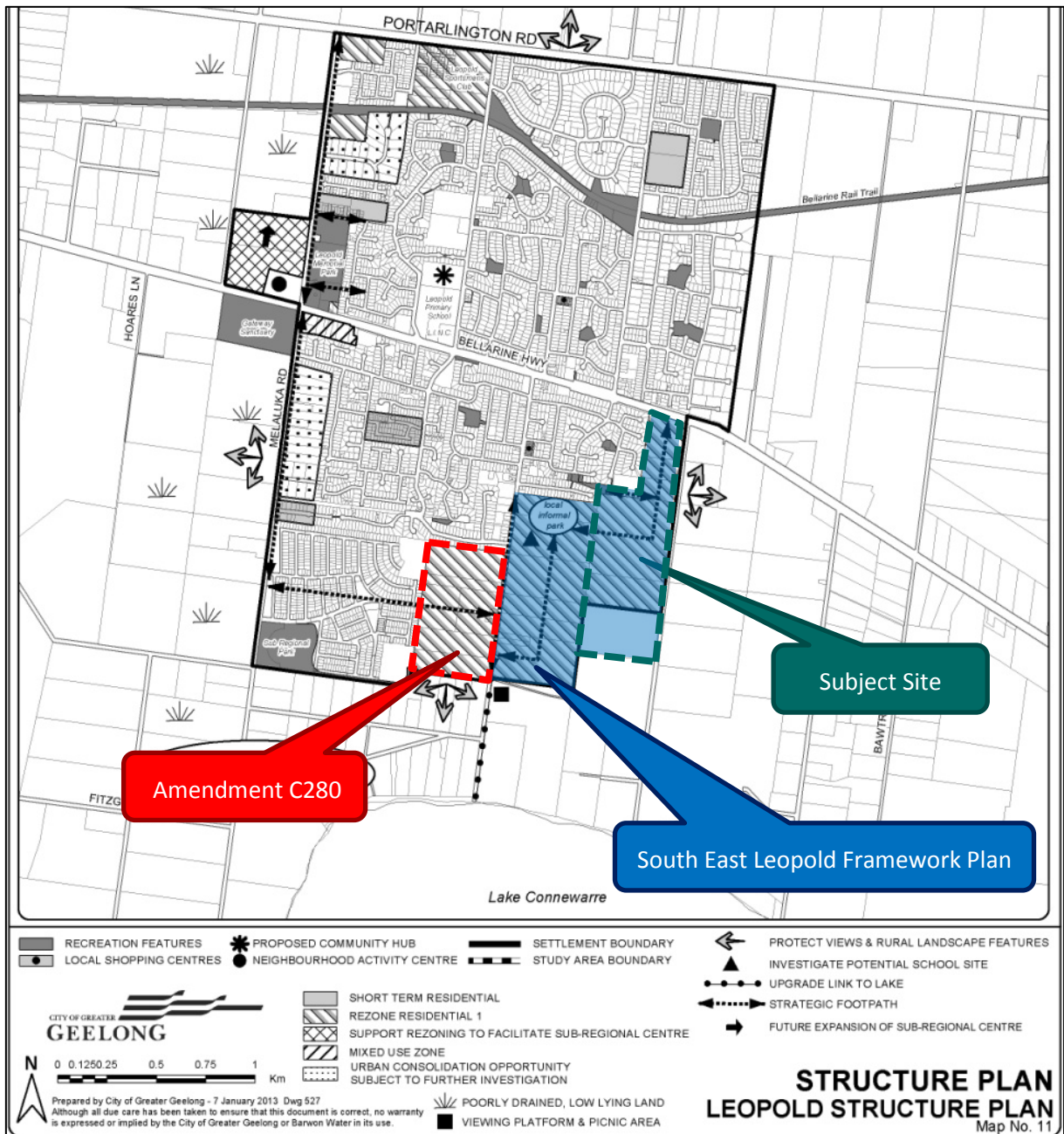


Figure 4: Leopold Structure Plan

The Structure plan also includes future development of land to the west of the subject land on both sides of Ash Road. Land on the western side of Ash Road has been rezoned as part of Amendment C280 to the Greater Geelong Planning Scheme.

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4.2.2 South East Leopold Framework Plan

The subject land is located within part of the South East Leopold Framework plan as shown at Figure 5. The plan was prepared by Tract Consultants (dated January 2016).



Figure 5: South East Leopold Framework Plan

The Framework Plan nominates Mollers Lane as a connector street, and illustrates two east-west connector streets connecting Ash Road and Mollers Lane. The connectors are nominated with a reservation of 22 metres.

The Plan also illustrates the provision of shared paths along the encumbered open space tracts and along the western side of Mollers Lane, as well as the future provision of traffic signals at the intersection of Mollers Road and Bellarine Highway.

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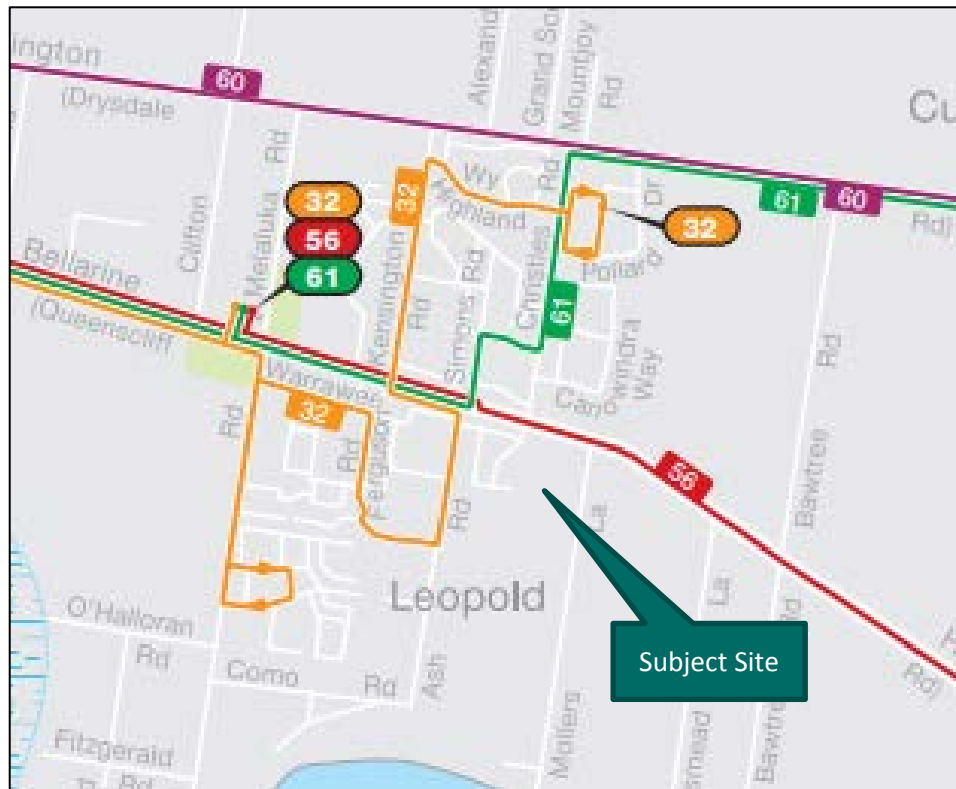
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4.3 Public Transport

Bus Route 56 operates along Bellarine Highway directly past the site and provides a service between Geelong Railway Station and Queenscliff via Leopold and Ocean Grove.

As the area develops it is likely that public transport services will be extended to service the subdivision.

Figure 6 illustrates the nearby and surrounding public transport routes.



Source: Public Transport Victoria

Figure 6: PTV Public Transport Map – Geelong

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5 Traffic Considerations

5.1 Road Network

Mollers Lane is a local road under the control of Council and is aligned in a north-south direction between Bellarine Highway to the north and Lake Connewarre to the south where it terminates. In the vicinity of Bellarine Highway, Mollers Lane has a carriageway width of approximately 6.4 metres which provides a single traffic lane in each direction. Mollers Lane is sealed at its northern end but becomes unsealed approximately 100 metres south of Bellarine Highway.

A speed limit of 80 km/h applies to Mollers Lane in the vicinity of the site.

Bellarine Highway (Queenscliff Road) is an arterial road managed by VicRoads and is a 'Road Zone Category 1' under the Planning Scheme. Bellarine Highway is aligned in a general east-west direction and provides a route between Geelong to the west and Queenscliff to the east. In the vicinity of the subject site, Bellarine Highway has a dual carriageway that accommodates two lanes of traffic in each direction. Sealed shoulders are provided on both sides of the road which facilitate bicycle movements.

A speed limit of 70 km/h applies to Bellarine Highway to the west of Mollers Lane whilst a speed limit of 100km/h applies to the east of Mollers Lane.

The intersection of Bellarine Highway and Mollers Lane operates under standard 'Give Way' conditions and provides for all turning movements, including U-turns on Bellarine Highway. The wide central median allows for a staged right turn movement out of Mollers Lane.

Photographs of the road network are depicted in Figure 7 to Figure 10.



Figure 7: Mollers Lane – View North



Figure 8: Mollers Lane – View South

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Figure 9: Bellarine Highway – View West



Figure 10: Bellarine Highway – View East

5.2 Accident Review

My firm undertook a review of the VicRoads Crashstats database for the last five years of available data (last updated 30th June, 2017). The crash investigation area included Mollers Lane and the intersection of Bellarine Highway / Mollers Lane.

The data identifies that there were no crashes recorded within the review area during this period.

5.3 Existing Traffic Volumes

My firm undertook peak period traffic counts and observations of the intersection of the Bellarine Highway / Mollers Lane intersection during the following periods:

- Wednesday 19th September, 2018 between 4:00pm and 6:00pm, and
- Thursday 20th September, 2018 between 7:00am and 9:00am.

The peak hours were found to occur 7:30-8:30am and 4:15-5:15pm. The recorded AM and PM peak hour volumes are shown at Figure 11.

Based on the recorded traffic volumes it is estimated that Bellarine Highway has a two-way daily volume in the order of 17,000 vehicles.

There is a west bound bias in the morning peak and east bound bias in the afternoon as one might expect with the majority of trips towards Geelong in the morning and returning home in the afternoon.

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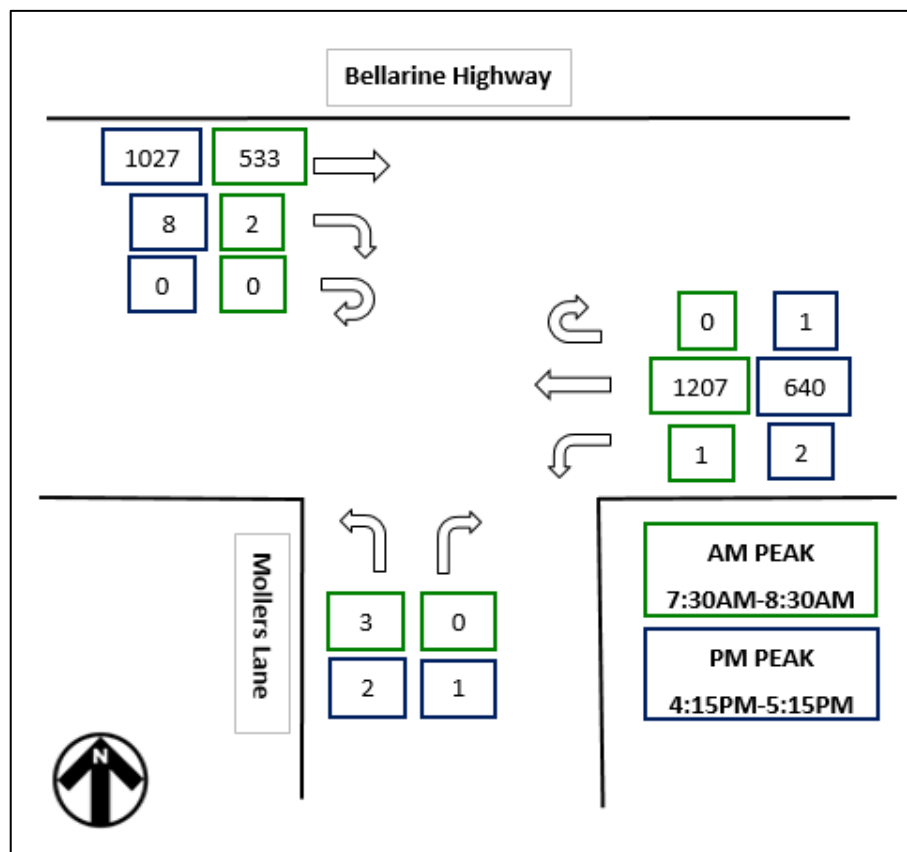


Figure 11: Bellarine Hwy / Mollers Lane Intersection – Existing Peak Hour Traffic Volumes

5.4 Traffic Generation

Traffic generation rates for residential dwellings vary depending on location, size of dwelling, and accessibility to services and public transport. Typically rates between 3 and 10 movements per day, inclusive of 10% of movements in peak hours, are adopted.

In consideration of the locality of the site, and limited public transport accessibility, I will conservatively adopt a traffic generation rate of 10 movements per dwelling per day, inclusive of 1 movement per dwelling in peak hours. This rate is consistent with what Cardno adopted as part of the C280 Amendment.

It is therefore expected that the maximum yield of 560 dwellings will generate 5,600 movements per day, inclusive of 560 movements in peak hours.

5.5 Traffic Distribution

Based on my experience, I have adopted the following entry/exit proportions for site generated residential traffic during the AM and PM peak hours:

- AM Peak Hour – 20% entry and 80% exit.
- PM Peak Hour – 60% entry and 40% exit.

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In consideration of the locality of the site, I have also adopted the following broad distribution.

- 80% to/from the west along Bellarine Highway (towards Geelong).
- 10% to/from the east along Bellarine Highway (towards Ocean Grove and Queenscliff).
- 10% to/from the north via Christies Road.

5.6 Traffic Assessment

5.6.1 General

Future residents of the subdivision will be reliant on access to Mollers Lane, until such time as the land to the west is developed and connects from Ash Road through to the subject land. At this time, traffic will be spread with a likely bias towards Ash Road (accounting for the majority of traffic going to / from the west).

In this regard, the worst case scenario will be if the land to the west is not developed and the subject land is entirely dependent on Mollers Lane and its connection to Bellarine Highway.

My assessment is based on this scenario, and presumes the subject land will fully fund the construction of traffic signals at the intersection of Mollers Lane and Bellarine Highway, as contemplated by the Amendment.

I expect that the Ash Road land will fund improvements to the intersection of Ash Road and Bellarine Highway, if deemed necessary, at the time of development of that land.

5.6.2 Future Traffic Volumes

It is typical when constructing a new set of traffic signals for the analysis to contemplate a 10 year assessment (2029). Furthermore, the application proposes to construct the signals for the 170th lot, so an unsignalised intersection will need to accommodate development of 169 lots. For the purposes of this assessment, I will presume the 170th lot will not receive Statement of Compliance until 2024.

I have adopted a 2% compounded growth rate for through traffic volumes on Bellarine Highway.

Based on the adopted traffic generation, distribution and growth rate, Figure 12 and Figure 13 have been prepared to illustrate the projected future traffic volumes for an unsignalised intersection of Mollers Lane and Bellarine Highway in 2024, and a signalised intersection of Mollers Lane and Bellarine Highway in 2029, respectively.

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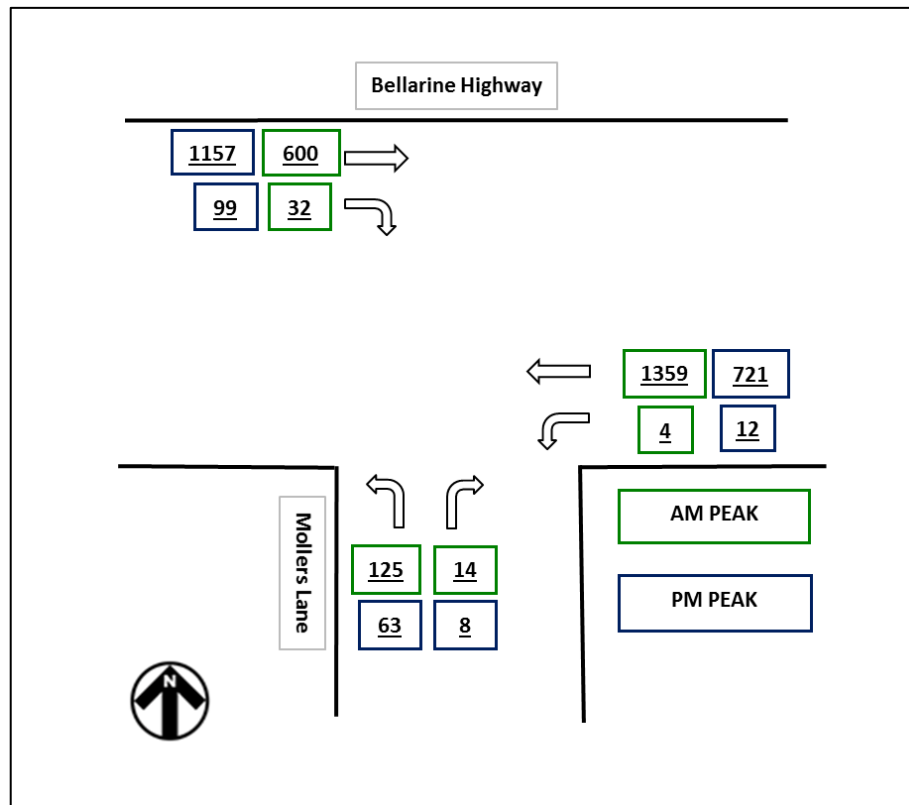


Figure 12: Intersection of Mollers Lane and Bellarine Hwy - 2024 Projected Peak Hour Volumes

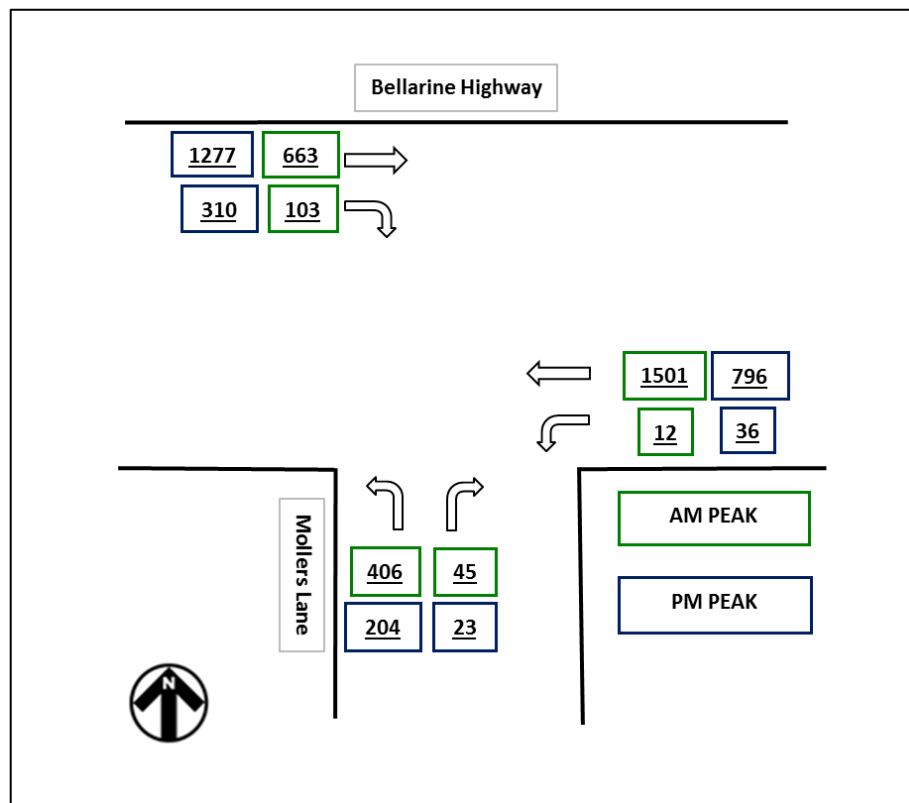


Figure 13: Intersection of Mollers Lane and Bellarine Hwy - 2029 Projected Peak Hour Volumes

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5.6.3 Intersection Analysis

My firm has used SIDRA Intersection 9 to undertake an assessment of the post-development performance of the intersection of Mollers Lane and Bellarine Highway for 2024 (unsignalised) and 2029 (signalised).

SIDRA is a computer simulation package which assesses the operating performance of intersections. A summary of the key outputs follows:

- **Degree of Saturation (DoS)** – The ratio of traffic volume to maximum capacity for a particular turning movement. Various values of degree of saturation and their rating are shown following.

D.O.S.	Rating
Up to 0.6	Excellent
0.6 to 0.7	Very Good
0.7 to 0.8	Good
0.8 to 0.9	Fair
0.9 to 1.0	Poor
Above 1.0	Very Poor

- **Average Delay (Avg. Delay)** – The average delay in seconds for a vehicle making a particular turning movement.
- **95th Percentile Queue (95% Queue)** – The 95% percentile queue is the length in metres which 95 per cent of all observed cycle queues fall below (or 5% exceed) during the peak analysis period.

The model has presumed that a left turn lane on Bellarine Highway will be constructed for the unsignalised intersection, and the model has used the SIDRA default parameters.

For the signalised intersection, the model has adopted a 120 second cycle time with model determined phase times. The remainder of inputs are SIDRA default parameters.

The results of the analysis are summarised in Table 1 and Table 2, with detailed outputs attached as Appendix B.

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Table 1: Intersection Performance – Bellarine Highway / Mollers Lane Unsignalised (2024)

Movement	AM Peak Hour			PM Peak Hour		
	DoS	Avg. Delay (s)	95% Queue (m)	DoS	Avg. Delay (s)	95% Queue (m)
Mollers Lane (L)	0.30	12	9	0.08	9	2
Mollers Lane (R)	0.30	41	9	0.08	22	2
Bellarine Hwy – East (T)	0.38	7	0	0.20	6	0
Bellarine Hwy – East (L)	0.38	0	0	0.20	0	0
Bellarine Hwy – West (T)	0.17	0	0	0.32	0	0
Bellarine Hwy – West (R)	0.19	27	4	0.18	12	5

(L) = left movement, (T) = through movement, (R) = right movement

The results of the analysis show that the unsignalised intersection can accommodate development of 169 lots, and that the intersection will operate in the ‘excellent’ category, with modest queues and delays.

Based on the results, I expect that the intersection is capable of accommodating more than 169 lots, or alternatively the traffic signals getting built later than 2024 for 169 lots.

Table 2: Intersection Performance – Bellarine Highway / Mollers Lane Traffic Signals (2029)

Movement	AM Peak Hour			PM Peak Hour		
	DoS	Avg. Delay (s)	95% Queue (m)	DoS	Avg. Delay (s)	95% Queue (m)
Mollers Lane (L)	0.74	43	160	0.29	31	61
Mollers Lane (R)	0.29	63	20	0.16	63	10
Bellarine Hwy – East (T)	0.01	11	2	0.03	15	6
Bellarine Hwy – East (L)	0.75	21	255	0.45	21	115
Bellarine Hwy – West (T)	0.23	3	34	0.44	3	80
Bellarine Hwy – West (R)	0.24	22	26	0.46	13	58

(L) = left movement, (T) = through movement, (R) = right movement

The analysis demonstrates that the proposed traffic signals can accommodate traffic associated with full development of the land, and operate in the ‘good’ category in the morning peak hour, and ‘excellent’ category in the afternoon peak hour.

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5.6.4 Conclusion

Based on the above assessment, there are no traffic engineering matters that should preclude the rezoning of the land for residential purposes.

Furthermore, with the inclusion of a left turn lane on Bellarine Highway, the intersection of Mollers Lane and Bellarine Highway can accommodate traffic associated with development of 169 lots, and when the intersection of Mollers Lane and Bellarine Highway is signalised the intersection can accommodate traffic from full development of the subject land for up to 560 lots.

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6 Subdivision Layout Assessment

6.1 Road Hierarchy

The proposed subdivision concept plan incorporates the key elements of the South East Leopold Framework Plan. In particular, the plan features:

- Mollers Lane upgraded to a connector street, with a reservation of 22 metres.
- Two east-west connector streets providing a connection between Mollers Lane and the land to the west.
- Local access streets adjacent the encumbered open space tracts.

All other roads within the subdivision will function as local access streets.

I am satisfied that the proposed road hierarchy is appropriate having regard to the ultimate road layout as shown in the South East Leopold Framework Plan, the proposed layout of the subdivision, and the anticipated traffic volumes that are likely to be generated.

6.2 Road Cross Sections

The proposed road reservation widths and cross-sections are to be provided generally in accordance with the requirements set out in Greater Geelong Planning Scheme and the Infrastructure Design Manual (IDM).

6.2.1 Mollers Lane

Mollers Lane is to be upgraded to a connector street, with the existing 20.2 metre road reserve to be widened by approximately 1.8 metres to the west within the subject land.

The proposed cross-section for Mollers Lane, prepared by Traffix Group, is shown at Figure 14, and includes 3.5 metre wide traffic lanes in each direction and a 2.3 metre wide parking lane on the west side only (i.e. adjacent to the proposed lots).

A shared path (2.5 metres) is to be provided on the west side, consistent with the Framework Plan.

I recommend that the western side of the road is provided with kerb and channel, whilst the eastern side (adjacent the Farming Zone) is provided with a shoulder.

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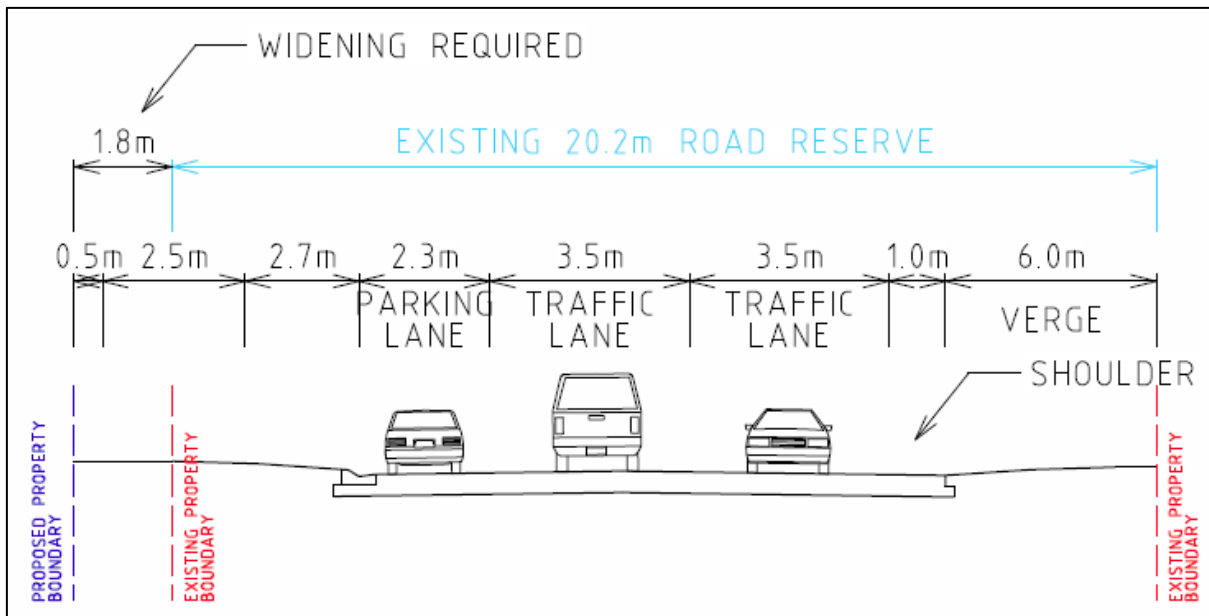


Figure 14: Mollers Lane Cross-Section (22m)

6.2.2 Connector Streets

The two (2) east-west connector streets should be provided with a 22 metre wide road reservation consistent with the Framework Plan.

I note the northern east-west connector is shown with a reservation of 23 metres. From a traffic perspective, there is no need for the reservation to be 23 metres rather than the 22 metres nominated in the Framework Plan.

The proposed connector street cross-section, prepared by TGM Group, is shown at Figure 15, and includes 3.5 metre wide traffic lanes in each direction plus 2.3 metre wide parking lanes on both sides. Footpaths (1.5 metres) are to be provided on both sides.

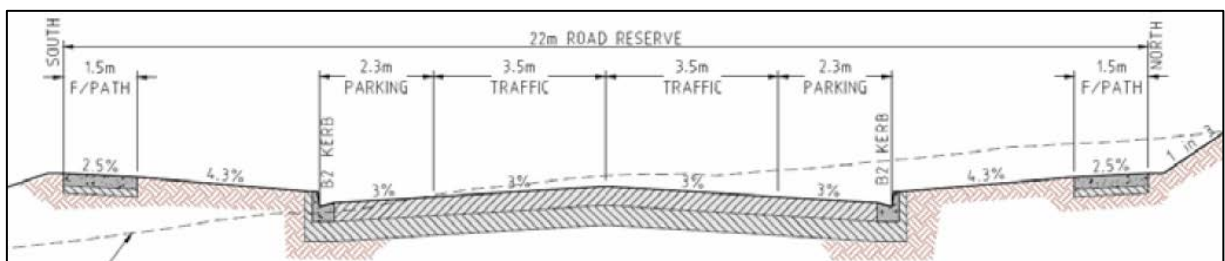


Figure 15: Connector Street Cross-Section (22m)

6.2.3 Local Access Streets

The majority of streets in the subdivision are to be local access streets with a 16 metre wide road reservation including a 7.3 metre wide carriageway. Footpaths (1.5 metres) are to be provided on both sides.

Local access streets adjacent to open space reserves narrow to provide a 14 metre road reservation by a reduction in the verge on the open space side. This is considered appropriate given that a footpath can be accommodated within the adjacent open space reserve.

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The proposed local access street cross-sections, as prepared by TGM Group, are shown at Figure 16 and Figure 17.

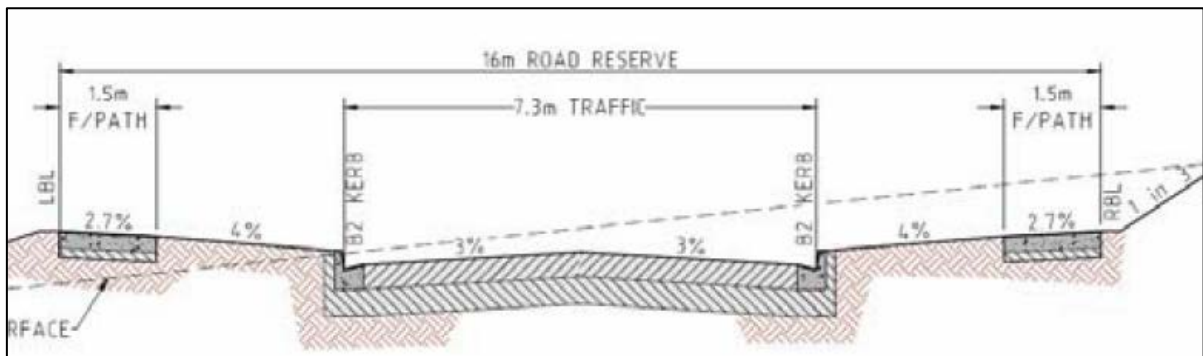


Figure 16: Local Access Street Cross-Section (16m)

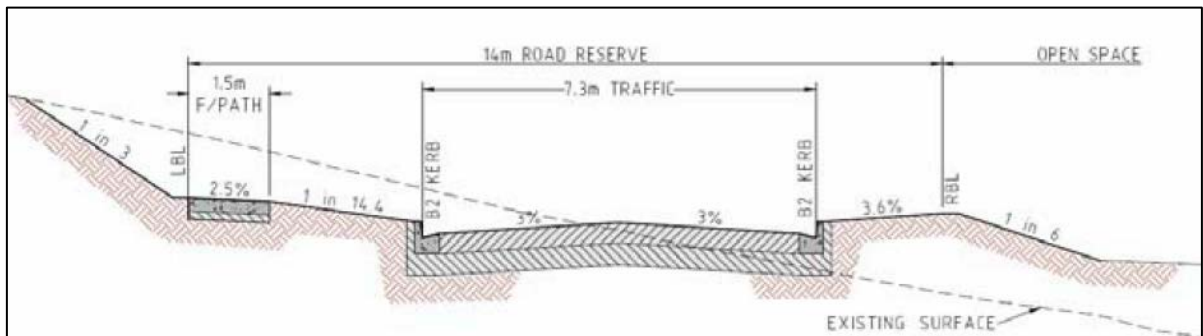


Figure 17: Local Access Street Cross-Section – Open Space Frontage (14m)

6.3 Parking Provision

On-street parking will be provided via designated parking lanes along both sides of the proposed connector streets in accordance with the objectives of the Planning Scheme and IDM. Similarly, an on-street parking lane is to be provided along the west side of Mollers Lane adjacent to the proposed lots.

The 7.3 metre wide carriageway for all local access streets allows for parking to readily occur on both sides of the road whilst maintaining a through lane for traffic. Alternatively, simultaneous two-way traffic would be possible if parking occurred on only one side of these roads.

The proposed provision of on-street parking is consistent with the Planning Scheme and IDM.

6.4 Access for Service and Emergency Vehicles

The 7.3 metre wide carriageway for local access streets will adequately facilitate relevant service and emergency vehicles and are consistent with typical CFA requirements.

Similarly, the connector streets with formal parking lanes on either side of through traffic lanes will also readily facilitate service and emergency vehicles.

Three (3) permanent 'dead-end' extended driveways are proposed through the site. Furthermore, a number of roads will temporarily provide no through access until the adjacent land to the west has developed.

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Each of these permanent or potential temporary dead-end sections are less than 50 metres long and it would be appropriate for residents of these lots to wheel their bins to the nearest through road for collection. Also, the CFA does not require turning provisions at the end of dead-ends which are less than 60 metres long.

6.5 Pedestrian and Cycling Access

Shared paths are to be generally provided in accordance with the South East Leopold Framework Plan as shown at Figure 5. This includes a shared path along the western side of Mollers Lane and also along the lineal open space in the southern and central parts of the site.

Footpaths are to be provided on both sides of the connector streets and local access streets, except where adjacent to the reserves.

I am comfortable that this will adequately service pedestrians and cyclists.

6.6 Public Transport Considerations

Mollers Lane and the two east-west connector streets, with 3.5 metre traffic lanes, are designed to accommodate future bus routes should they eventuate. Buses routes along these streets will allow all lots to be within 400 metres of a bus route.

6.7 Traffic Control

Clause 56.06-7 of the Planning Scheme suggests that it is desirable for street blocks to be no more than approximately 240 metres long in order 'to facilitate pedestrian movement and control traffic speed'.

There are a number of local streets that are longer than 240 metres, which should be treated with local area traffic management treatments to control speed. I note that proposed permit condition 11 addresses this issue and requires the preparation of a local area traffic management plan.

Traffic Engineering Assessment

2-120 Mollers Lane, Leopold: Greater Geelong Planning Scheme Amendment C367 and Planning Permit Application 1463/2016

7 Response to Submissions

7.1 Submission 3

Submission 3 has requested that the proponent construct Mollers Lane south of the subject land through to its termination at Lake Connewarre.

Version Y2 of the Development Plan shows the construction of Mollers Lane from Bellarine Highway to the proposed southern most intersection on subject land with Mollers Lane.

There are no formal facilities provided at the lake, and no other attractions or connections that will result in future residents driving to the south.

To this end, I do not think it is necessary to construct Mollers Lane south of the subject land. Furthermore, as there are no residential properties with direct access to Mollers Lane south of the southern most intersection to the subject land, it is also not necessary to construct that section of Mollers Lane, between the southern most intersection and the southern boundary of the land.

7.2 Transport for Victoria

A submission prepared by Transport for Victoria (TfV) in consultation with VicRoads (dated 18/06/2018) requested that *3 metre wide shared user paths are provided on a single side of the southern and northern connector roads and on Mollers Lane.*

I agree that a shared path should be provided on the west side of Mollers Lane, but not on the connector roads.

The connector roads are provided with a footpath on both sides, and there are shared paths proposed along the linear open space, which effectively run parallel to the connector roads. In this regard, shared paths on the connector roads would be a duplication, and in my view are not necessary.

Furthermore, whilst the two higher order streets in the Development Plan are nominated and have the cross section of connectors, they will experience traffic volumes consistent with a local access street. That is, I do not expect either of the nominated connector streets to have a daily traffic volume higher than 2,000 vehicles. This volume of traffic does not warrant the provision of a shared path, with younger cyclists able to share the footpath, and older cyclists able to share the road.

In relation to the width of the shared path on Mollers Lane and along the linear open space, the Infrastructure Design Manual (IDM) specifies a shared path width of 2.5 metres. Furthermore, Cycling Aspects of Austroads Guides (2017) nominates a shared path width of 2.5 metres for pedestrian and cycling volumes one would expect along the linear open space and Mollers Lane, as per the excerpt shown at Figure 18.

I am therefore satisfied that a shared path width of 2.5 metres is sufficient.

Traffic Engineering Assessment

2-120 Mollers Lane, Leopold: Greater Geelong Planning Scheme Amendment C367 and Planning Permit Application 1463/2016

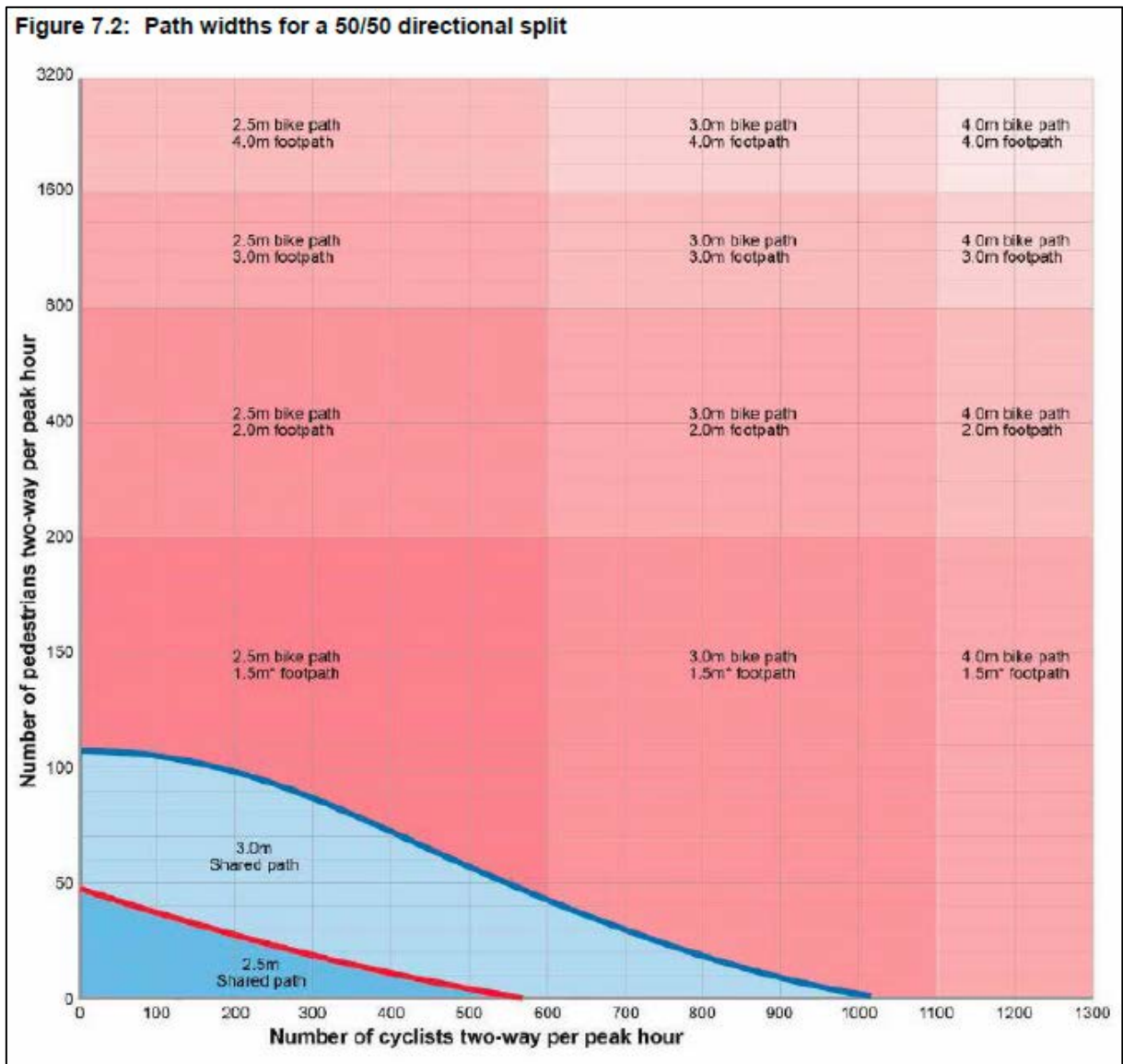


Figure 18: Path Widths (Cycling Aspects of AustRoads Guides, 2017)

Traffic Engineering Assessment

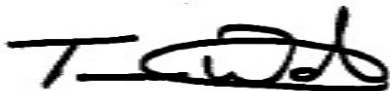
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8 Conclusions

Having undertaken a detailed traffic engineering assessment of Greater Geelong Planning Scheme Amendment C367 and Planning Permit Application 1463/2016 for the proposed residential subdivision at 2-120 Mollers Lane, Leopold, I am of the opinion that:

- a) Development of up to 560 dwellings can be accommodated by Mollers Lane and the broader road network, subject to external traffic works.
- b) The proponent has accepted the proposed VicRoads' conditions that require the provision of a left turn lane on Bellarine Highway at Mollers Lane for development of 169 lots, and then signalisation of this intersection for the 170th lot. These works will comfortably accommodate the projected traffic volumes for 169 lots and then 560 dwellings.
- c) The proposed layout of the subdivision provides for a connective road network, and allows for future connections to development to the west to connect through to Ash Road.
- d) The proposed road reservations and cross sections are appropriate to accommodate traffic, parking, footpaths, services, etc. and will facilitate all relevant user groups in accordance with the Planning Scheme.
- e) All relevant vehicles will be able to adequately access the proposed internal road network, including service and emergency vehicles.
- f) Shared paths are not necessary along the nominated connector streets given the relatively low anticipated traffic volumes and the proposed bicycle routes through the open space reserves.
- g) It is only necessary for Mollers Lane to be constructed between Bellarine Highway and the southernmost intersection of the subject land.
- h) There are no traffic engineering reasons to abandon Greater Geelong Planning Scheme Amendment C367 and Planning Permit Application 1463/2016, subject to appropriate conditions.

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



JASON LEE WALSH
 DIRECTOR
 TRAFFIX GROUP
 23 NOVEMBER 2018

Traffic Engineering Assessment

2-120 Mollers Lane, Leopold: Greater Geelong Planning Scheme Amendment C367 and Planning
Permit Application 1463/2016

Appendix A Qualifications

Traffic Engineering Assessment

2-120 Mollers Lane, Leopold: Greater Geelong Planning Scheme Amendment C367 and Planning Permit Application 1463/2016

Name

Jason Lee Walsh - Director, Traffix Group Pty Ltd

Address

Suite 8, 431 Burke Road
GLEN IRIS
VICTORIA 3146

Qualifications

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

- Bachelor of Civil Engineering, Monash University
- Bachelor of Science, Monash University
- Member, Victorian Planning & Environmental Law Association

Experience

I have over 20 years experience in Traffic Engineering including,

- 1995-2000 at Turnbull Fenner (now Traffix Group), including short term placements at the cities of Bayside and Whittlesea,
- 2000-2011 at Grogan Richards Pty Ltd (now Cardno),
- 2011-present at Traffix Group.

Areas of Expertise

- Car parking and Traffic.
- Traffic advice and assessment of land uses and development proposals to planning authorities, government agencies, corporations and developers (including major residential, retail, food and drink, commercial, industrial, institutional and mixed use projects).
- Preparation and presentation of evidence before VCAT and Panels.

Expertise to Prepare this Assessment

My experience and expertise over the past 20 years, including involvement with varied forms of developments, qualifies me to comment on the traffic implications of the proposed development.

Instructions

I was instructed by Minter Ellison on behalf of Mollers Lane Developments Pty Ltd and Pamas Property Pty Ltd and Pamas Development Pty Ltd to undertake a traffic engineering assessment and prepare an evidence statement for Greater Geelong Planning Scheme Amendment C367 and Planning Permit Application 1463/2016 pertaining to the proposed residential subdivision at 2-120 Mollers Lane, Leopold.

Traffic Engineering Assessment

2-120 Mollers Lane, Leopold: Greater Geelong Planning Scheme Amendment C367 and Planning Permit Application 1463/2016

Facts, Matters and Assumptions Relied Upon

- Panel Directions.
- Proponent's application documents including Traffic Impact Assessment Report prepared by ESR Transport Planning (dated 23 January, 2018).
- Exhibited material.
- Delegated Authority Report prepared by Council (dated 18 October, 2018)
- Submissions.
- South East Leopold Structure Plan prepared by Tract Consultants (dated January 2016).
- Leopold Structure Plan prepared by City of Greater Geelong (dated September 2011, amended January 2013).
- Greater Geelong Planning Scheme.
- Infrastructure Design Manual (IDM).
- Cycling Aspects of AustRoads Guide.
- Site inspection.
- Relevant experience.

Documents Taken into Account

See above.

Identity of Persons Undertaking Work

Jason Walsh as per the evidence statement.

Brent Chisholm (Senior Traffic Engineer, Traffix Group) assisted with preparation of the evidence report.

Timothy Amanatidis (Traffic Engineer, Traffix Group) assisted with preparation of the evidence report.

Summary of Opinions

See Conclusions section of the evidence statement.

Traffic Engineering Assessment

2-120 Mollers Lane, Leopold: Greater Geelong Planning Scheme Amendment C367 and
Planning Permit Application 1463/2016

Appendix B SIDRA Results

MOVEMENT SUMMARY

Site: 1v [Proposed 2024 AM STAGE 1]

Network: N101 [AM PROPOSED]

Staged crossing Stage 1 (Minor Road) at three-way intersection with 5-lane major road. Major road turn lane is treated as a full-length lane.

Site Category: (None)

Giveaway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %				Vehicles veh	Distance m				
South: Mollers Road														
1	L2	132	5.0	132	5.0	0.296	12.0	LOS B	1.2	8.8	0.70	0.92	0.83	54.1
2	T1	15	5.0	15	5.0	0.296	38.2	LOS E	1.2	8.8	0.70	0.92	0.83	49.2
Approach		146	5.0	146	5.0	0.296	14.6	LOS B	1.2	8.8	0.70	0.92	0.83	53.8
East: Bellarine Hwy														
4	L2	4	5.0	4	5.0	0.380	6.5	LOS A	0.0	0.0	0.00	0.00	0.00	64.7
5	T1	1431	5.0	1431	5.0	0.380	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	69.8
Approach		1435	5.0	1435	5.0	0.380	0.1	NA	0.0	0.0	0.00	0.00	0.00	69.8
West: Bellarine Hwy														
12	R2	34	5.0	34	5.0	0.187	27.1	LOS D	0.6	4.3	0.89	0.97	0.93	45.1
Approach		34	5.0	34	5.0	0.187	27.1	NA	0.6	4.3	0.89	0.97	0.93	45.1
All Vehicles		1615	5.0	1615	5.0	0.380	2.0	NA	1.2	8.8	0.08	0.11	0.09	67.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

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.

MOVEMENT SUMMARY

Site: 2 [Proposed 2024 AM STAGE 2]

Network: N101 [AM PROPOSED]

Staged crossing Stage 2 (Median) at three-way intersection with 5-lane major road.

Give-way behaviour assumed at Stage 2.

Site Category: (None)

Giveaway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %				Vehicles veh	Distance m				
South: Median Storage Area														
3	R2	15	5.0	15	5.0	0.018	2.3	LOS A	0.1	0.3	0.46	0.36	0.46	52.3
Approach		15	5.0	15	5.0	0.018	2.3	LOS A	0.1	0.3	0.46	0.36	0.46	52.3
West: Bellarine Hwy														
11	T1	632	5.0	632	5.0	0.167	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	70.0
Approach		632	5.0	632	5.0	0.167	0.0	NA	0.0	0.0	0.00	0.00	0.00	70.0
All Vehicles		646	5.0	646	5.0	0.167	0.1	NA	0.1	0.3	0.01	0.01	0.01	69.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

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.

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MOVEMENT SUMMARY

Site: 1v [Proposed 2024 PM STAGE 1]

Network: N101 [PM PROPOSED]

Staged crossing Stage 1 (Minor Road) at three-way intersection with 5-lane major road. Major road turn lane is treated as a full-length lane.

Site Category: (None)

Giveaway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %				Vehicles	Distance				
South: Mollers Road														
1	L2	66	5.0	66	5.0	0.080	8.5	LOS A	0.3	2.2	0.46	0.69	0.46	58.8
2	T1	8	5.0	8	5.0	0.080	14.6	LOS B	0.3	2.2	0.46	0.69	0.46	57.5
Approach		75	5.0	75	5.0	0.080	9.2	LOS A	0.3	2.2	0.46	0.69	0.46	58.7
East: Bellarine Hwy														
4	L2	13	5.0	13	5.0	0.204	6.4	LOS A	0.0	0.0	0.00	0.02	0.00	64.5
5	T1	759	5.0	759	5.0	0.204	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	69.8
Approach		772	5.0	772	5.0	0.204	0.1	NA	0.0	0.0	0.00	0.01	0.00	69.7
West: Bellarine Hwy														
12	R2	104	5.0	104	5.0	0.183	11.7	LOS B	0.7	5.0	0.64	0.86	0.64	55.7
Approach		104	5.0	104	5.0	0.183	11.7	NA	0.7	5.0	0.64	0.86	0.64	55.7
All Vehicles		951	5.0	951	5.0	0.204	2.1	NA	0.7	5.0	0.11	0.16	0.11	66.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

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.

MOVEMENT SUMMARY

Site: 2 [Proposed 2024 PM STAGE 2]

Network: N101 [PM PROPOSED]

Staged crossing Stage 2 (Median) at three-way intersection with 5-lane major road.

Give-way behaviour assumed at Stage 2.

Site Category: (None)

Giveaway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %				Vehicles veh	Distance m				
South: Median Storage Area														
3	R2	8	5.0	8	5.0	0.022	7.3	LOS A	0.1	0.4	0.73	0.73	0.73	45.9
Approach		8	5.0	8	5.0	0.022	7.3	LOS A	0.1	0.4	0.73	0.73	0.73	45.9
West: Bellarine Hwy														
11	T1	1218	5.0	1218	5.0	0.322	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		1218	5.0	1218	5.0	0.322	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.9
All Vehicles		1226	5.0	1226	5.0	0.322	0.1	NA	0.1	0.4	0.01	0.01	0.01	69.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

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.

MOVEMENT SUMMARY

 **Site: 101 [Proposed 2029 Signals AM]**

New Site

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mollers Road												
1	L2	427	5.0	0.742	43.0	LOS D	21.9	159.7	0.93	0.86	0.94	34.6
3	R2	47	5.0	0.288	62.5	LOS E	2.7	19.6	0.97	0.74	0.97	29.2
Approach		475	5.0	0.742	44.9	LOS D	21.9	159.7	0.93	0.85	0.94	33.9
East: Bellarine Hwy												
4	L2	13	5.0	0.010	11.2	LOS B	0.2	1.6	0.31	0.62	0.31	49.3
5	T1	1580	5.0	0.752	21.4	LOS C	34.9	254.7	0.82	0.75	0.82	44.4
Approach		1593	5.0	0.752	21.3	LOS C	34.9	254.7	0.82	0.75	0.82	44.4
West: Bellarine Hwy												
11	T1	698	5.0	0.229	2.8	LOS A	4.7	34.1	0.25	0.22	0.25	57.3
12	R2	108	5.0	0.239	21.5	LOS C	3.6	26.1	0.75	0.77	0.75	43.3
Approach		806	5.0	0.239	5.3	LOS A	4.7	34.1	0.32	0.30	0.32	54.9
All Vehicles		2874	5.0	0.752	20.7	LOS C	34.9	254.7	0.70	0.64	0.70	44.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement 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	
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P41	West Stage 1	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P42	West Stage 2	53	54.3	LOS E	0.2	0.2	0.95	0.95	
All Pedestrians		158	54.3	LOS E			0.95	0.95	

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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PHASING SUMMARY

 **Site: 101 [Proposed 2029 Signals AM]**

New Site
 Site Category: (None)
 Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times determined by the program

Phase Sequence: Split Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C1

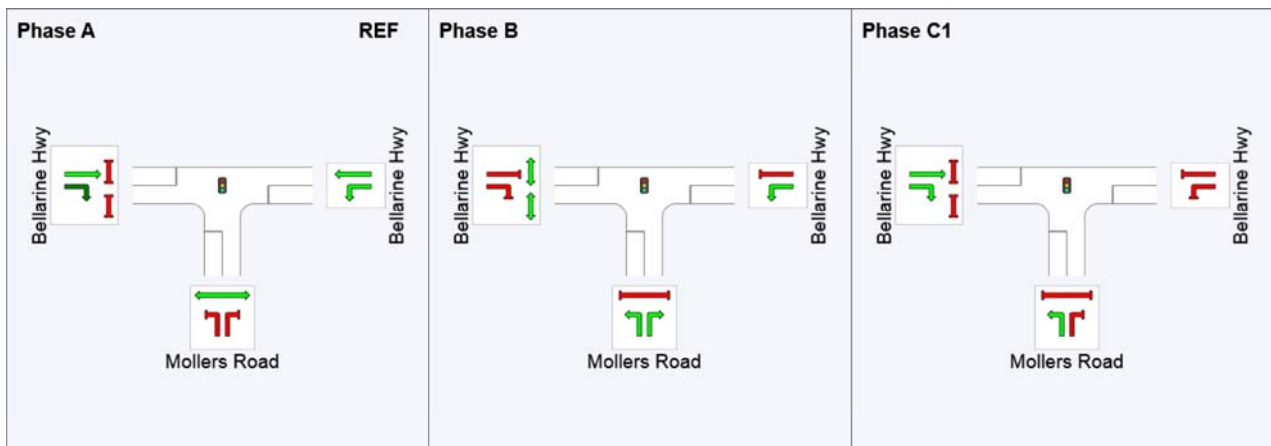
Output Phase Sequence: A, B, C1

Phase Timing Summary

Phase	A	B	C1
Phase Change Time (sec)	0	73	90
Green Time (sec)	67	11	24
Phase Time (sec)	73	17	30
Phase Split	61%	14%	25%

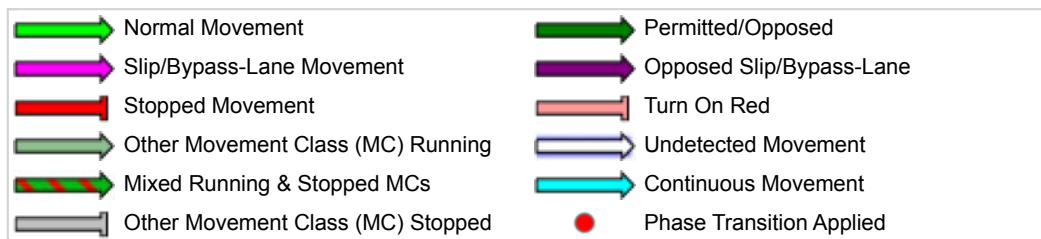
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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MOVEMENT SUMMARY

 **Site: 101 [Proposed 2029 Signals PM]**

New Site

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mollers Road												
1	L2	215	5.0	0.293	31.0	LOS C	8.4	61.1	0.71	0.77	0.71	38.9
3	R2	24	5.0	0.162	62.7	LOS E	1.4	10.0	0.96	0.71	0.96	29.2
Approach		239	5.0	0.293	34.2	LOS C	8.4	61.1	0.74	0.76	0.74	37.7
East: Bellarine Hwy												
4	L2	38	5.0	0.034	14.6	LOS B	0.8	6.0	0.40	0.65	0.40	47.2
5	T1	838	5.0	0.451	21.2	LOS C	15.8	115.4	0.70	0.62	0.70	44.5
Approach		876	5.0	0.451	20.9	LOS C	15.8	115.4	0.69	0.62	0.69	44.6
West: Bellarine Hwy												
11	T1	1344	5.0	0.436	3.3	LOS A	10.9	79.8	0.31	0.28	0.31	56.9
12	R2	326	5.0	0.455	13.4	LOS B	7.9	57.8	0.66	0.78	0.66	47.9
Approach		1671	5.0	0.455	5.3	LOS A	10.9	79.8	0.38	0.38	0.38	54.9
All Vehicles		2785	5.0	0.455	12.7	LOS B	15.8	115.4	0.51	0.49	0.51	49.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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	
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P41	West Stage 1	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P42	West Stage 2	53	54.3	LOS E	0.2	0.2	0.95	0.95	
All Pedestrians		158	54.3	LOS E			0.95	0.95	

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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PHASING SUMMARY

 **Site: 101 [Proposed 2029 Signals PM]**

New Site

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times determined by the program

Phase Sequence: Split Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

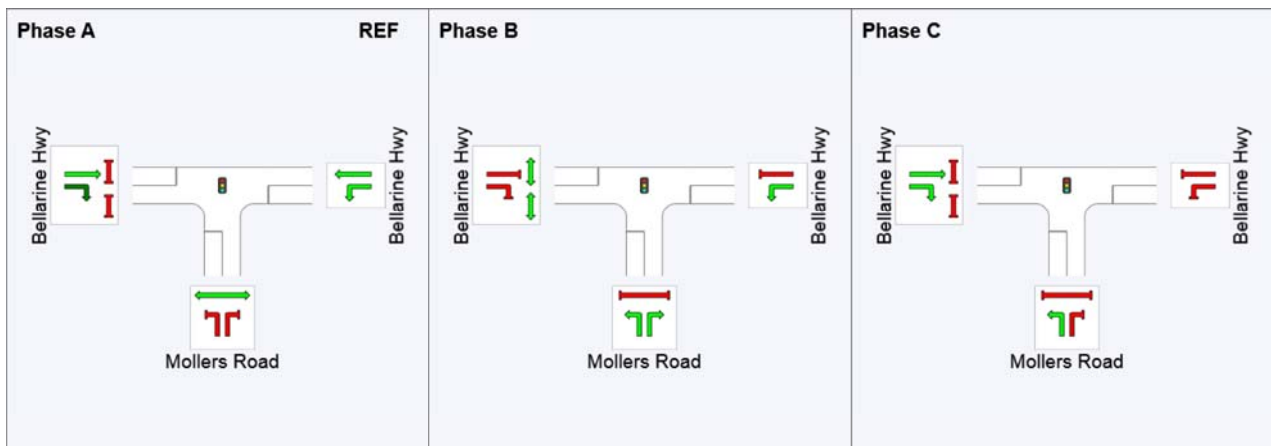
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	65	81
Green Time (sec)	59	10	33
Phase Time (sec)	65	16	39
Phase Split	54%	13%	33%

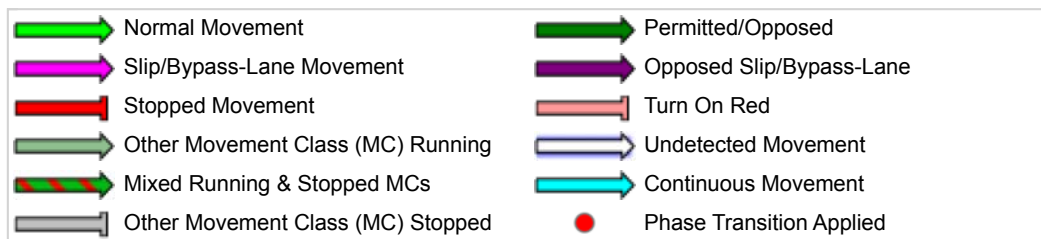
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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