

Our Ref.: G10200L-01E

1st December, 2017

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Dear Sir,

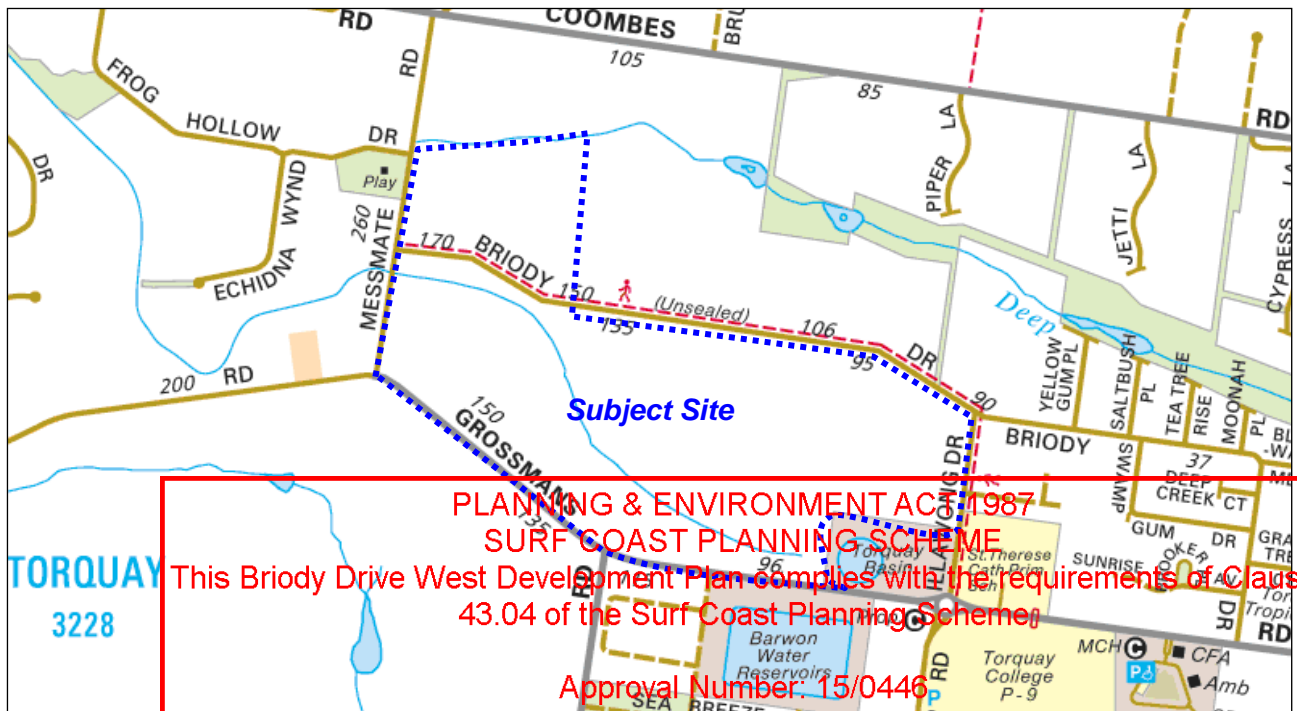
**BRIODY DRIVE, TORQUAY – DEVELOPMENT PLAN
TRAFFIC ENGINEERING ADVICE**

We refer to your request to provide additional advice regarding the impacts of the proposed rezoning and subsequent residential sub-division at Briody Drive, Torquay on the nearby Briody Drive/Messmate Road and Messmate Road/Grossmans Road intersections.

This letter is to supplement our previous report dated September, 2009 (attached at Appendix A).

The Proposal

The site consists of some 17 properties located on the north side of Grossmans Road and both sides of Briody Drive in Torquay, as shown in the locality plan at Figure 1.



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 Approval Number: 15/0446
 Date: 1/12/2017 Sheet No: 1 of 36
Figure 1: Locality Plan
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The site has been rezoned as General Residential Zone – Responsible (GRZ) Authority. We understand the applicant is seeking approval of a Development Plan.

The development plan identifies a total of 474 lots to be developed across the site.

A copy of the development plan (dated 30th November, 2017) is attached at Appendix B.

Existing Traffic Volumes

Existing traffic volume information for key roads within the Torquay Jan Juc area was provided by Surf Coast Shire to assist in the assessing the impacts of the Spring Creek PSP area on the local road network.

This data was sourced to update those used in our previous report. The updated volumes are outlined in Table 1 below.

Table 1: Recent Traffic Data

| | Grossmans Road | Messmate Road |
|------------------------------------|---|--|
| Location | Between Messmate Road and Duffield Road | Between Grossmans Road and Messmate Road |
| AM Peak Hour Flow (two-way) | 330 veh | 170 veh |
| PM Peak Hour Flow (two-way) | 310 veh | 170 veh |

We note that the 'Torquay/Jan Juc Strategy Review – Transportation Infrastructure Assessment' (May 2006) included surveys undertaken by Council in January 2005 that identified daily volumes on Grossmans Road of 3,260 vehicles (two-way).

This indicates that there has been little-to-no growth in the area over the eight year period between these figures and the one outlined in Table 1. However, we understand that the Grossman Road Council offices have since relocated. As a major traffic generator in the area, it is possible that this caused a reduction in traffic that offset any natural growth in the area.

Traffic Generation & Distribution

As per our previous report (see attached at Appendix A) the proposal is assumed to generate 10 trip ends per lot giving 4,740 new vehicle trips per day of which 474 will occur during the peak periods (assuming a 10% daily-to-peak ratio).

Traffic has been assumed to be distributed as follows:

- During the AM peak 80% of traffic will depart and 20% will arrive;
- During the PM peak 30% of traffic will depart and 70% will arrive;
- 45% of traffic will travel to/from the north towards Coombes Road via Messmate Road;
- 28% will travel to/from the south towards the Torquay Town Centre via Illawong Drive and Grossmans Road;
- 14% will travel to/from the south towards Beach Road and Surf City via Illawong Drive and Eton Road;
- 13% will travel to/from the south on Duffields Road towards Jan Juc of which;
 - 50% will do so via Messmate Road and Grossmans Road and
 - 50% will do so via Illawong Drive and Grossmans Road.

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 SURF COAST PLANNING SCHEME
 This Briody Drive West Development Plan complies with the requirements of Clause
 43.04 of the Surf Coast Planning Scheme
 Approval Number: 15/0446
 Date: 7/12/2017 Sheet No: 2 of 36
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Accordingly, the anticipated traffic generation at the Messmate Road/Briody Drive intersection and the Grossmans Road/Messmate Road intersection is outlined at Figure 2.

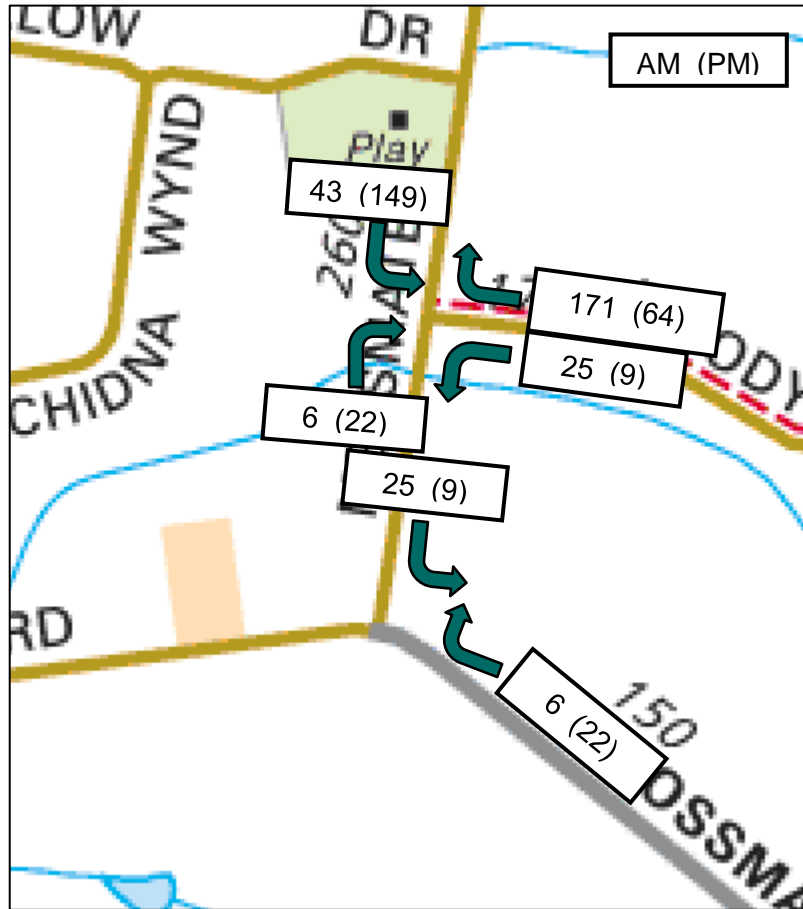


Figure 2: Anticipated Traffic Generation

Traffic Impacts

Traffix Group has been engaged by Surf Coast Shire Council to undertake traffic engineering assessments of the Spring Creek Structure Plan, including Traffic generation and distributions.

For the purposes of assessing the traffic impacts of the proposed development the following assumptions have been adopted for the traffic on the surrounding road network:

- Traffic volumes estimated for the Spring Creek Structure Plan as part of our work for Council have been used in this analysis;
- A roundabout is proposed to be constructed at the intersection of Messmate Road/Grossmans Road as part of the Spring Creek Structure Plan;
- 2% traffic growth over ten years assumed for the existing volumes on Messmate Road and Grossmans Road¹.

Using these assumptions, the traffic impacts of the development on the Messmate Road/Grossmans Road and Messmate Road/Briody Drive intersections have been assessed using the intersection modelling software package SIDRA.

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 SURF COAST PLANNING SCHEME
 This Briody Drive West Development Plan complies with the requirements of Clause 43.04 of the Surf Coast Planning Scheme
 Approval Number: 15/0446
 Date: 7/12/2017 Sheet No: 3 of 36
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¹ This will provide for a robust assessment, given that Grossmans Road was observed to have negligible growth between 2005 and 2015

The results of the analysis are outlined in Tables 2 & 3.

Table 2: Results of SIDRA Analysis – Messmate Road and Grossmans Road Intersection

| Approach | Degree of Saturation | Average Delay (secs) | 95%ile Queue (m) |
|-----------------------|----------------------|----------------------|------------------|
| AM | | | |
| Messmate Road (south) | 0.308 | 10.9 | 14.0 |
| Grossmans Road (east) | 0.354 | 9.2 | 18.5 |
| Messmate Road (north) | 0.177 | 7.9 | 7.5 |
| Grossmans Road (west) | 0.194 | 10.2 | 8.3 |
| PM | | | |
| Messmate Road (south) | 0.144 | 9.7 | 6.0 |
| Grossmans Road (east) | 0.335 | 9.8 | 16.3 |
| Messmate Road (north) | 0.360 | 7.9 | 18.4 |
| Grossmans Road (west) | 0.146 | 8.5 | 5.9 |

PLANNING & ENVIRONMENT ACT 1987
SURF COAST PLANNING SCHEME
 This Briody Drive West Development Plan complies with the requirements of Clause 43.04 of the Surf Coast Planning Scheme

 Approval Number: 15/0446
 Date: 7/12/2017 Sheet No: 4 of 36

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Table 3: Results of SIDRA Analysis – Briody Drive & Messmate Road Intersection

| Approach | Degree of Saturation | Average Delay (secs) | 95%ile Queue (m) |
|-----------------------|----------------------|----------------------|------------------|
| AM | | | |
| Messmate Road (south) | 0.267 | 0.1 | 0.4 |
| Briody Drive (east) | 0.372 | 13.6 | 11.4 |
| Messmate Road (north) | 0.109 | 1.2 | 0.0 |
| PM | | | |
| Messmate Road (south) | 0.150 | 1.1 | 1.9 |
| Briody Drive (east) | 0.147 | 12.5 | 3.4 |
| Messmate Road (north) | 0.288 | 1.6 | 0.0 |

We note that a Degree of Saturation (DOS) of up to 0.8 is generally considered to be acceptable operating conditions for unsignalised intersections. The peak DOS for the Messmate Road/Grossmans Road and Messmate Road/Briody Drive intersections is 0.362 (AM Peak) and 0.407 (AM Peak) respectively.

Accordingly, both intersections can easily accommodate the additional traffic anticipated from the subject site without the need for remedial works.

Additionally, we note that the average delay experienced by motorists is up to 13.9 seconds at Briody Drive/Messmate Road intersection and queue lengths of up to 18.6 metres at Messmate Road/Grossmans Road Intersection. These delays and queues are short and do not represent any significant impact to the operation of the intersections, noting that both intersections will operate at Level of Service A.

A copy of the SIDRA output is attached at Appendix C.

Review of Crash History

A review of the crash history of the intersections was undertaken using the VicRoads Open Data Portal for the five year period extending January 2012-December 2016. We note that no crashes have been recorded at either intersection over this period.

Accordingly, there is nothing in the crash history to suggest any existing safety deficiency that would have to be addressed as a result of the development of the subject site.

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 SURF COAST PLANNING SCHEME
 This Briody Drive West Development Plan complies with the requirements of Clause 43.04 of the Surf Coast Planning Scheme

Approval Number: 15/0446
 Date: 7/12/2017 Sheet No: 5 of 36

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Provision of Additional Connections to Grossmans Road

Council previously specified that two new road connections should be provided between Briody Drive and Grossmans Road (provided the new intersections can be accommodated while minimising impacts on significant roadside vegetation).

In our assessment of the future traffic volumes arising from the development of this area, we found the provision of additional road connections to Grossmans Road would be not be required to meet the normal sub-divisional requirements. We found that the volume of traffic generated by the subject site did not warrant additional connections between Briody Drive and Grossmans Road.

The impact on native vegetation would need to be considered in any sub-divisional proposal and as there is no traffic engineering imperative for multiple connections, we are of the opinion that there should not be a requirement to provide any additional road links.

Conclusions

As outlined above, the proposed roundabout intersection, to be constructed as part of the Spring Creek Structure Plan, at Messmate Road/Grossmans Road and unsignalised intersection at Briody Drive/Messmate Road have ample capacity to accommodate the anticipated traffic to be generated by the subject site. Additionally, there is no history of crashes at either intersection that may indicate a safety deficiency.

Accordingly, there is nothing to suggest that any mitigation works would be required at either intersection as a result of the development of land for residential purposes at Briody Drive, Torquay.

We trust this is sufficient for now. Should you have any questions regarding the above, please contact Daniel Milder or Henry Turnbull at our Glen Iris office.

Yours faithfully,

TRAFFIX GROUP PTY LTD



HENRY H TURNBULL

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Approval Number: 15/0446

Date: 7/12/2017 Sheet No: 6 of 36

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Approval Number: 15/0446
Date: 7/12/2017 Sheet No: 7 of 36

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PROPOSED RESIDENTIAL REZONING DUE DILIGENCE

BRIODY DRIVE, TORQUAY

TRAFFIC IMPACT ASSESSMENT REPORT

Prepared for

ST. QUENTIN CONSULTING

SEPTEMBER, 2009

OUR REFERENCE: 10200R6163.DOC

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Approval Number: 15/0446

Date: 7/12/2017 Sheet No: 8 of 36

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Directors Henry H Turnbull Charmaine C Dunstan William D de Waard Donald J Robertson
Senior Associates Nathan B Woolcock Anthony J Coyle Associate Ross G Thomson

PROPOSED RESIDENTIAL REZONING DUE DILIGENCE

BRIODY DRIVE, TORQUAY

TRAFFIC IMPACT ASSESSMENT REPORT

Study Team: Henry Turnbull
B.E. (Civil), M.I.E. Aust., M.I.T.E., F.V.P.E.L.A., CPEng

Jodie Rankin
B.E. (Civil) Hons

Our Reference: 10200R6163.doc



Prepared By



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Date: 7/12/2017 Sheet No. 9 of 36

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1 INTRODUCTION

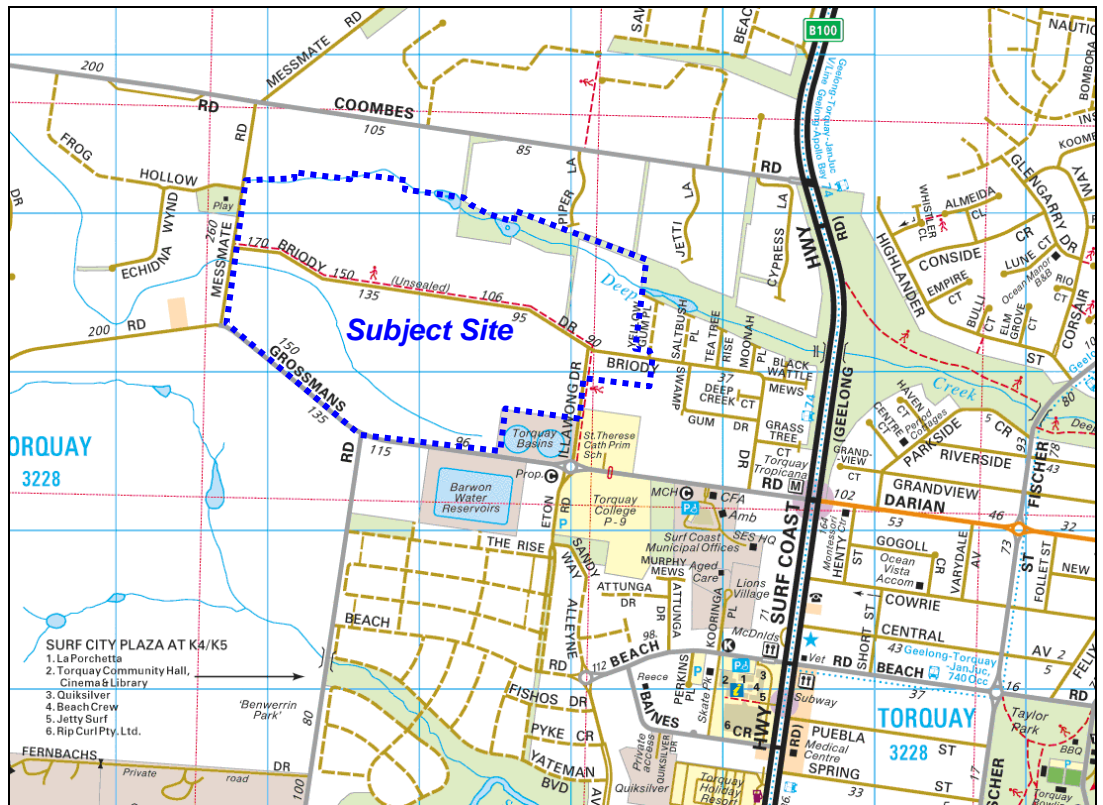
Traffix Group has been engaged by St. Quentin Consulting to undertake a traffic impact assessment and to prepare a due diligence report for the possible rezoning of land surrounding Briody Drive in Torquay.

This report provides a traffic engineering assessment of the development with particular attention to the traffic generation and impacts.

2 EXISTING CONDITIONS

2.1 The Site

The subject site comprises 34 properties located on the north side of Grossmans Road and on both sides of Briody Drive in Torquay, as presented in the locality plan at Figure 1 below.



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The site is irregular in shape, with an area of approximately 50 hectares (excluding existing roads) and frontages to Messmate Road, Grossmans Road and Millawong Drive, with Briody Drive extending in an east-west direction through the centre of the site.

This Briody Drive West Development Plan complies with the requirements of Clause 43.04 of the Surf Coast Planning Scheme

Approval Number: 15/0446
Date: 17/02/2016 Sheet No. 1 of 3

Most of the properties within the subject land are occupied by a single dwelling (28 dwellings in total, on 34 properties).

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Figure 2: Subject Site – Aerial View

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43.04 of the Surf Coast Planning Scheme

Approval Number: 15/0446
Date: 7/12/2017 Sheet No: 11 of 36

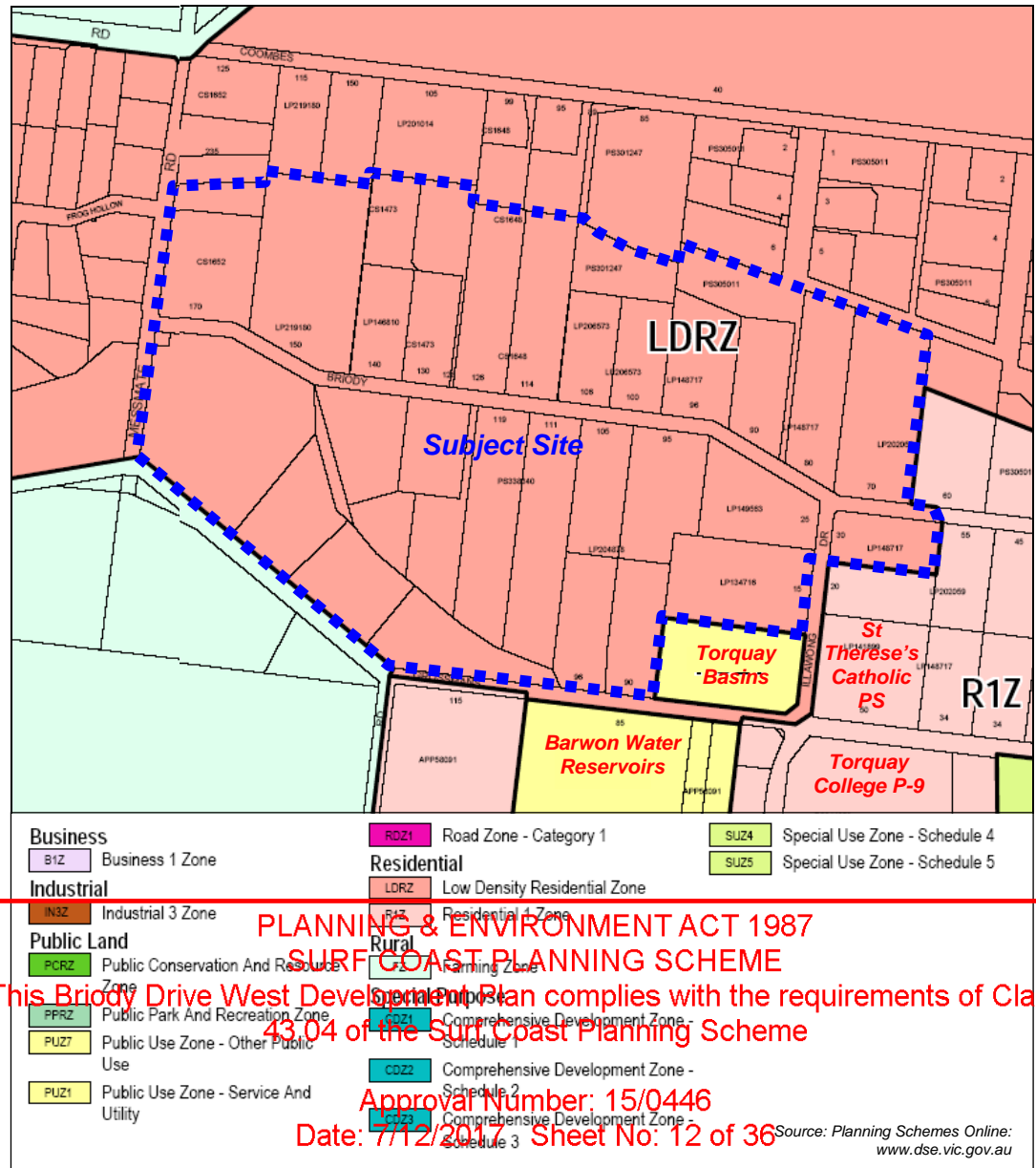
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2.2 Existing Land Use

The site is currently zoned Low Density Residential Zone (LDRZ) as indicated in Figure 3 below.

Surrounding land uses include low density residential development to the north and west and rural land to the southwest.

Torquay Basins are located on the northwest corner of the Grossmans Road/ Illawong Drive intersection and Barwon Water Reservoirs are located on the south side of Grossmans Road, west of Illawong Drive. To the east of Illawong Drive, St Therese's Catholic Primary School is located on the north side of Grossmans Road, and Torquay College (Prep – Year 9) is located on the south side. The Children's Services Hub, Surf Coast Shire Council Offices, CFA, Ambulance and SES Headquarters are located to the east of Torquay College, with residential development opposite (on the north side of Grossmans Road).



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 Figure 3: Land Use Zoning
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2.3 Road Network

Briody Drive

Briody Drive is a local access street that runs in a north-south and east-west direction between Grossmans Road and Messmate Road.

It is currently configured with 2 different cross-sections along its length. Between Grossmans Road and Illawong Drive, Briody Drive is configured with a 7.3 metres wide sealed carriageway set within a 20m road reserve.

Between Illawong Drive and Messmate Road, Briody Drive is configured with a 7m wide unsealed carriageway set within a 20m road reserve, with a 2 metre wide concrete footpath on the north side.

Both sections of Briody Drive have a 50km/h speed limit.



**Figure 4: Briody Drive
(east of Illawong Drive) looking east**



**Figure 5: Briody Drive
(west of Illawong Drive) looking west**

The intersection between Briody Drive and Illawong Drive is a modified T-intersection which gives priority to vehicle travelling between Illawong Drive and the western leg of Briody Drive. This intersection is shown below.



**Figure 6: Briody Drive looking west at
intersection with Illawong Drive**



**Figure 7: Briody Drive looking east at
intersection with Illawong Drive**

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SURF COAST PLANNING SCHEME
This Briody Drive West Development Plan complies with the requirements of Clause
43.04 of the Surf Coast Planning Scheme

Approval Number: 15/0146
Date: 7/12/2017 Sheet No. 15 of 36

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Grossmans Road

Grossmans Road forms an east-west collector road link through Torquay between the Surf Coast Highway and Anglesea Road. The road also continues to the east of the Surf Coast Highway changing name to Darian Road.

Traffic signals are provided at the Grossmans Road/Surf Coast Highway/Darian Road intersection, and a roundabout is provided at the Grossmans Road/Eton Road/Illawong Drive intersection. A school crossing is located within the section of Grossmans Road between the Surf Coast Highway and Eton Road/Illawong Drive adjacent to Torquay Primary School and St Therese Catholic Primary School.

In the section between the Surf Coast Highway and Eton Road/Illawong Drive, Grossmans Road is generally 16.2 metres wide including angle parking on the south side of the road and parallel parking on the north side. The road is located within a 25.9 metre wide reservation and includes 8.7 metres clear width in the middle of the road for through traffic lanes and a manoeuvring area adjacent to the angle parking. To the west of Illawong Drive, Grossmans Road narrows to 6 metres.

A 50mk/h speed limit applies to Grossmans Road between Surf Coast Highway and Illawong Drive which reduces to 40km/h at school pick-up and drop-off times (8am – 9:30am and 2:30pm – 4pm). The speed limit increases to 80km/h approximately 200 metres west of Illawong Drive.

A 4 metre wide shared path exists on the south side of Grossmans Road in the Surf Coast Highway to Eton Road/Illawong Drive section with a narrow footpath provided on the north side of the road in the section between the school crossing and Eton Road.



Figure 8: Grossmans Road looking East towards Illawong Drive

Figure 9: Grossmans Road looking West towards Illawong Drive

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SURF COAST PLANNING SCHEME
This Briody Drive West Development Plan complies with the requirements of Clause 43.04 of the Surf Coast Planning Scheme

Approval Number: 15/0446
Date: 7/12/2017 Sheet No: 14 of 36

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Messmate Road

Messmate Road is a rural access road which extends from the Surf Coast Highway/South Beach Road intersection on a diagonal alignment through to Coombes Road and Grossmans Road.

Between Coombes Road and Grossmans Road, Messmate Road is configured with a 6.1 metre sealed carriageway with unsealed shoulders, within a 20 metre road reservation. An 80km/h speed limit applies in this section. A 2 metre wide concrete footpath has been recently constructed on the west side of Messmate Road between Briody Drive and Frog Hollow. A gravel footpath extends north from Frog Hollow to Coombes Road.

North of Coombes Road, Messmate Road has a 5.8 metre wide unsealed carriageway.



Figure 10: Messmate Road looking North **Figure 11: Messmate Road looking South**

At the T-intersection of Messmate Road/Grossmans Road, a deceleration lane (25 metre lane plus 15 metre taper) is provided for vehicles turning right from Grossmans Road into Messmate Road.

This intersection is shown below.



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Figure 12: Grossmans Road looking west to Messmate Road **Figure 13: Grossmans Road looking east from Messmate Road**

Approval Number: 15/0446
Date: 7/12/2017 Sheet No: 15 of 26
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Illawong Drive

Illawong Drive is a local access street that runs in a north-south direction between Grossmans Road and Briody Drive. It extends directly to the north of the roundabout at Grossmans Road/Eton Road.

Illawong Drive is configured with a 7m unsealed carriageway (between bollards) set within a 20m road reservation with a permanent speed limit of 40km/h. On-street parking is available along Illawong Drive and a 2 metre wide concrete footpath has been recently constructed on the east side.



Figure 14: Illawong Drive looking North

Figure 15: Illawong Drive looking South

Coombes Road

Coombes Road is identified as a collector street in Council's hierarchy. It extends to the west of the Surf Coast Highway providing a connection through to Anglesea Road. Coombes Road has an operating speed of 80km/h between 100 metres west of Messmate Road and the Surf Coast Highway (changes from 100km/h) and is configured with a 5.5 metre sealed carriageway with gravel shoulders (approx. 1.5 metres) within a 20 metre road reservation.



Figure 16: Coombes Road looking East to Surf Coast Highway

Figure 17: Coombes Road looking West

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This Briody Drive West Development Plan complies with the requirements of Clause 43.04 of the Surf Coast Planning Scheme

Approval Number: 15/0446

Date: 7/12/2017 Sheet No: 16 of 36

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Eton Road

Eton Road is a local access street that runs in a north-south direction between Grossmans Road and a dead end. Development plans of the area indicate that in the future Eton Road will provide a connection between Grossmans Road and Beach Road.

Eton Road is configured with an 8m sealed carriageway with 1.5m gravel shoulders along its western side, indented angle parking along its eastern side and a 1.5m footpath along its eastern edge all set within a 20m road reservation with a permanent speed limit of 40km/h. Eton Road intersects with Grossmans Road and Illawong Drive at a roundabout.



Figure 18: Eton Road looking North



Figure 19: Eton Road looking South

Duffields Road

Duffields Road is a local collector road which extends approximately 2.8km in a north-south direction between Grossmans Road (approximately mid-way along the subject site frontage) and Sunset Strip in Jan Juc. It intersects Great Ocean Road at a signalised cross-intersection approximately 2km south of Grossmans Road.

In the vicinity of Grossmans Road, Duffields Road is constructed with a 6.4 metre (approx.) sealed carriageway with no kerb or channel, and an 80km/h speed limit applies.



Figure 20: Duffields Road looking North



Figure 21: Duffields Road looking South

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SURF COAST PLANNING SCHEME
This Briody Drive West Development Plan complies with the requirements of Clause 43.04 of the Surf Coast Planning Scheme
Approval Number: 15/0446
Date: 7/12/2017 Sheet No: 17 of 36
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2.4 Traffic Data

Surf Coast Shire Council undertook tube counts on roads within and surrounding the subject site on various dates between August and September, 2005, as part of a traffic study for Grossmans Road.

The results of these traffic counts are shown in Figure 16 below.

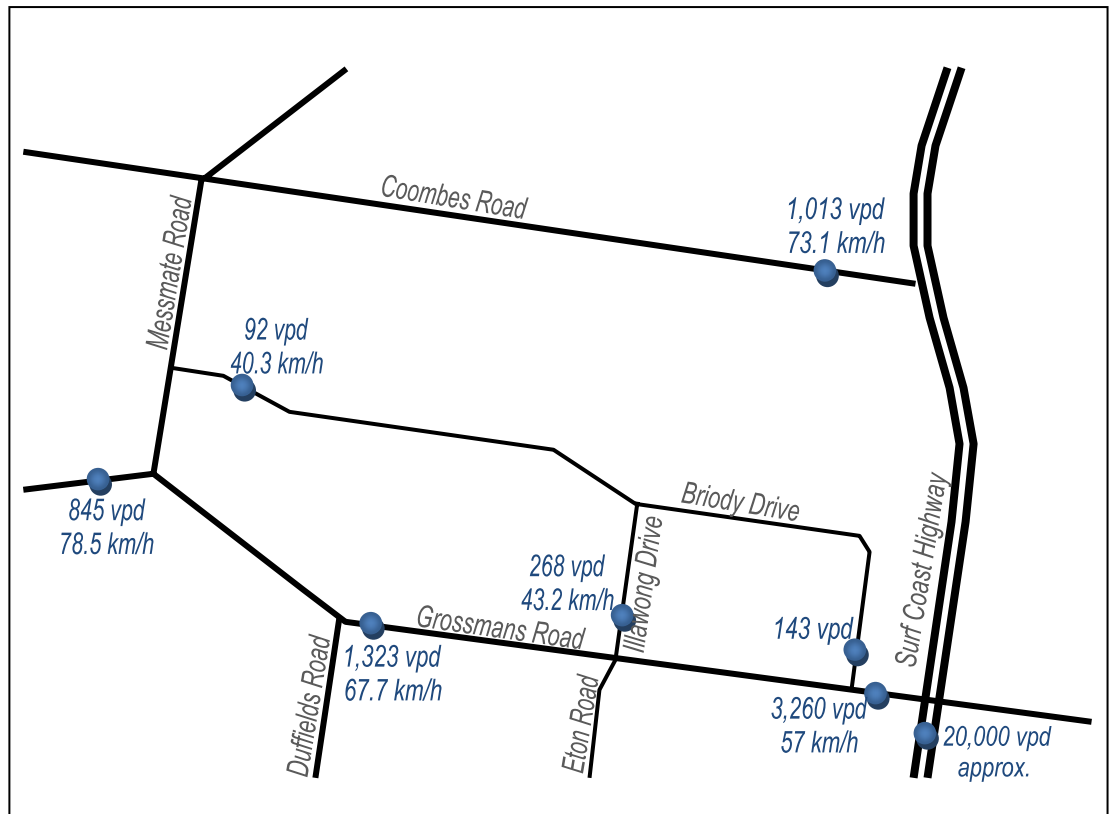


Figure 22: Two-Way Daily Traffic Volumes (2005)

These counts demonstrate that:-

- traffic volumes in Briody Drive and Illawong Drive are consistent with low density residential streets and do not show significant traffic impacts from non-residential land use in Grossmans Road, and
- the significantly greater traffic volume experienced in the section of Grossmans Road to the east of the Eton Road/Illawong Drive intersection compared to the section to the west of the intersection gives some idea of the extent of the traffic generated by the schools and Council buildings (in the order of 1,500 vehicle movements per day). It is noted however that some of the traffic to the west of Eton Road is also likely to be associated with the schools and Council.

This Briody Drive West Development Plan complies with the requirements of Clause 43.04 of the Surf Coast Planning Scheme

Approval Number: 15/0446

Date: 7/12/2017 Sheet No: 18 of 36

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Council undertook turning movement counts at the Grossmans Road/Eton Road/Illawong Drive intersection on Tuesday 30th August, 2005. This survey was conducted during the morning and afternoon peak periods, and the queuing of vehicles through the intersection was observed by survey staff. The results of this survey are shown in Table 1 and Figure 23.

Table 1: Peak Hour Vehicle Movements at Grossmans Road/Eton Road

| MOVEMENT (code) | AM PEAK 8.00-9.00AM | PM PEAK 3.00-4.00PM |
|------------------------------------|------------------------|------------------------|
| 'U' Turn from East (1) | 197 | 120 |
| Through Traffic East to West (2) | 69 | 73 |
| Right Turn East to North (3) | 34 | 48 |
| Left Turn East to South (4) | 27 | 34 |
| Through Traffic West to East (5) | 142 | 65 |
| Left Turn North to East (6) | 14 | 60 |
| Right Turn South to East (7) | 37 | 74 |
| Through Traffic North to South (8) | 1 | 0 |
| Through Traffic South to North (9) | 2 | 0 |

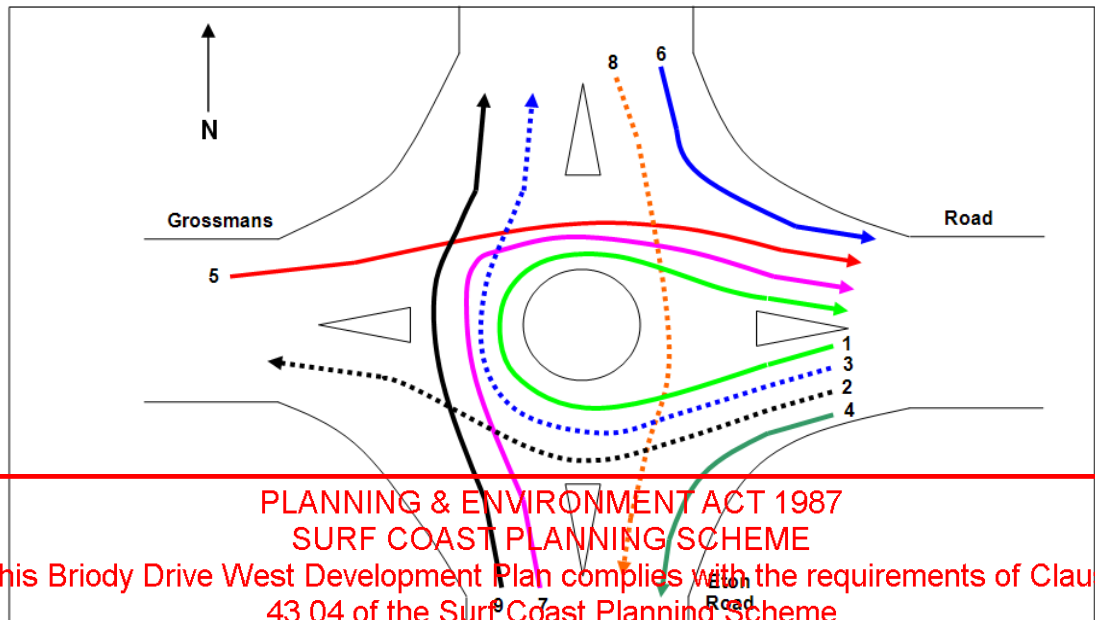


Figure 23: Movements at Grossmans Road/Eton Road/Illawong Drive Intersection

Approval Number: 15/0446

Date: 7/12/2017 Sheet No: 19 of 36

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2.5 Public Transport

Public transport services currently operating in Torquay consist entirely of buses. These bus services include school buses, local bus services and a V/Line service which connects townships along the Great Ocean Road. Public bus services within Torquay are shown in Figure 24 below.

The nearest bus stop to the subject site is located at the Surf Coast Highway/ Grossmans Road intersection, approximately 600 metres east of Illawong Drive. The majority of the subject site is not currently located within 800 metres walking distance of public transport.

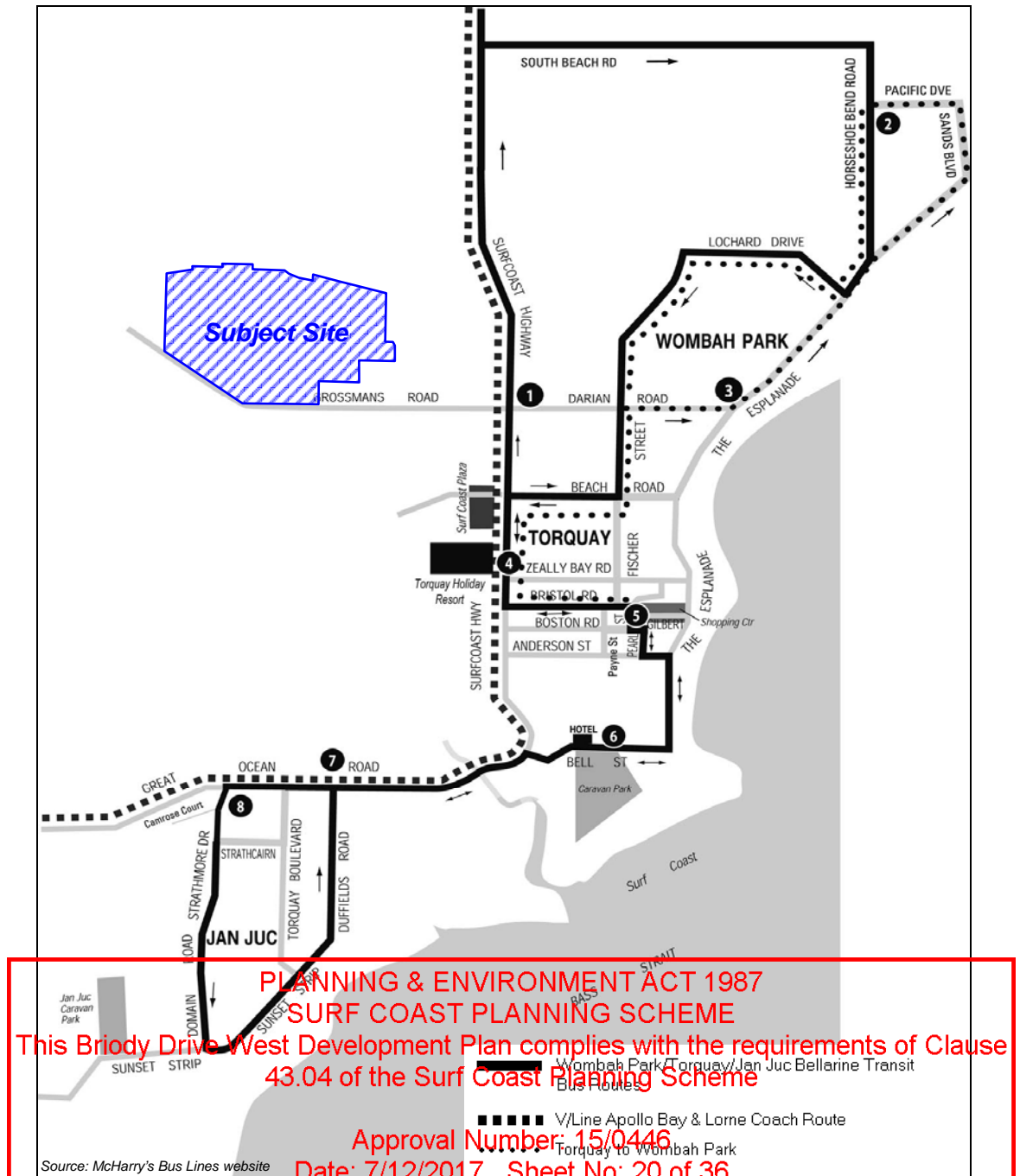


Figure 24: Torquay Public Transport Map
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3 THE PROPOSAL

The proposal is to rezone the subject site from Low Density Residential Zone (LDRZ) to Residential 1 Zone (R1Z) to facilitate subdivision of the site at conventional densities.

We understand that Council has indicated that lot densities for this area should be in the order of 12 dwellings per hectare.

Based on a total site area of 50 hectares and setting aside 10% (5 hectares) for usable public open space, the total development area is in the order of 45 hectares. Accordingly, the estimated yield for the subject site is 540 dwellings.

This is considered to be a conservative upper limit for the purposes of analysis, because the subject site contains established vegetation which will need to be protected, and accordingly is likely to result in a reduced overall developable area.

4 TRAFFIC GENERATION

Standard residential dwellings within suburban areas typically generate in the order of 8 – 10 vehicle trip-ends per day, with approximately 10% occurring in the peak hours.

Traffic generation rates for residential development within Torquay may differ from standard residential development in metropolitan suburban areas due to a number of factors including age structure of residents (e.g. retirees typically make fewer daily trips than families), and also not all dwellings may be occupied during the “off-peak” season due to the tourist nature of Torquay¹.

A survey of the Rocklea Avenue precinct (in Torquay) undertaken in November 2004 revealed a traffic generation rate of 7.2 vehicle trip-ends per dwelling per day, with 0.71 vehicle trip-ends per dwelling during the peak hour.

A survey of the Delview Drive precinct (in Jan Juc) undertaken in June 2005 revealed a traffic generation rate of 10.1 vehicle trip-ends per day (the date of this count is not known but is likely to have been during the mid-year school holidays having regard to the high traffic generation rate).

Conservatively adopting a rate of 10 vehicle trip-ends per dwelling per day equates to 5,400 vehicle trip-ends per day generated by the subject site (540 dwellings), of which 280 vehicle trip-ends per day are already on the surrounding road network (28 existing dwellings on the subject site).

PLANNING & ENVIRONMENT ACT 1987
SURF COAST PLANNING SCHEME
This Briody Drive West Development Plan complies with the requirements of Clause
43.04 of the Surf Coast Planning Scheme

Approval Number: 15/0446
Date: 7/12/2017 Sheet No: 21 of 36

¹ The 1996 ABS Census indicated a dwelling occupancy rate of 60% for Victoria as a whole, compared with an occupancy rate of 71% for Torquay West. The ABS Census is undertaken in August, i.e. off-peak.

5 TRAFFIC DISTRIBUTION

The 'Torquay/Jan Juc Strategy Review – Transport Infrastructure Assessment' (May, 2006) was prepared by Traffix Group for Surf Coast Shire Council, and included a traffic model which included future residential development to the year 2021.

The traffic distribution assumptions adopted in the Torquay Strategy traffic model for the Briody Drive precinct were as follows:

- 45% to/from external destinations outside of Torquay/Jan Juc, i.e. towards Geelong and Melbourne (work, recreational, secondary/tertiary education, etc),
- 33% to/from Torquay West (Grossmans Road education precinct and Surf City),
- 3% to/from Bell Street commercial precinct,
- 17% to/from Gilbert Street (Torquay Town Centre including supermarkets), and
- 3% to/from the future industrial precinct (Torquay North West).

We note that the majority of the subject site is within easy walking distance of the Grossmans Road education precinct and accordingly the overall traffic generation per dwelling is likely to be less than adopted in the Torquay Strategy for this area.

Having regard to the traffic distribution assumptions adopted in the Torquay Strategy and the surrounding road layout, the following traffic distribution assumptions have been adopted for the subject site:

- 45% west to Messmate Road towards Coombes Road, which will then be distributed as follows:
 - 70% west along Coombes Road to Anglesea Road (towards Geelong/Melbourne)
 - 20% north-east along Messmate Road to Surf Coast Highway
 - 10% east along Coombes Road to Surf Coast Highway (towards Geelong/Melbourne)
- 55% south towards Grossmans Road, which will then be distributed as follows:
 - 50% to Surf Coast Highway (towards the Town Centre)
 - 25% to Duffields Road (south towards Jan Juc)
 - 25% to Eton Road (through to Beach Road and Surf City)

PLANNING & ENVIRONMENT ACT 1987
SURF COAST LOCAL GOVERNMENT
This Briody Drive West Development Plan complies with the requirements of Clause 45.04 of the Surf Coast Planning Scheme
Based on the above traffic distribution assumptions and conservatively adopting a traffic generation rate of 10 vehicle trip-ends per day (despite the precinct being easy walking distance of the education precinct), the estimated two-way daily traffic volumes generated by the subject site at full residential development are set out in Figure 25 below.
Approval Number: 15/0248
Date: 7/12/2017 Sheet No: 22 of 36

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Bill Cathcart

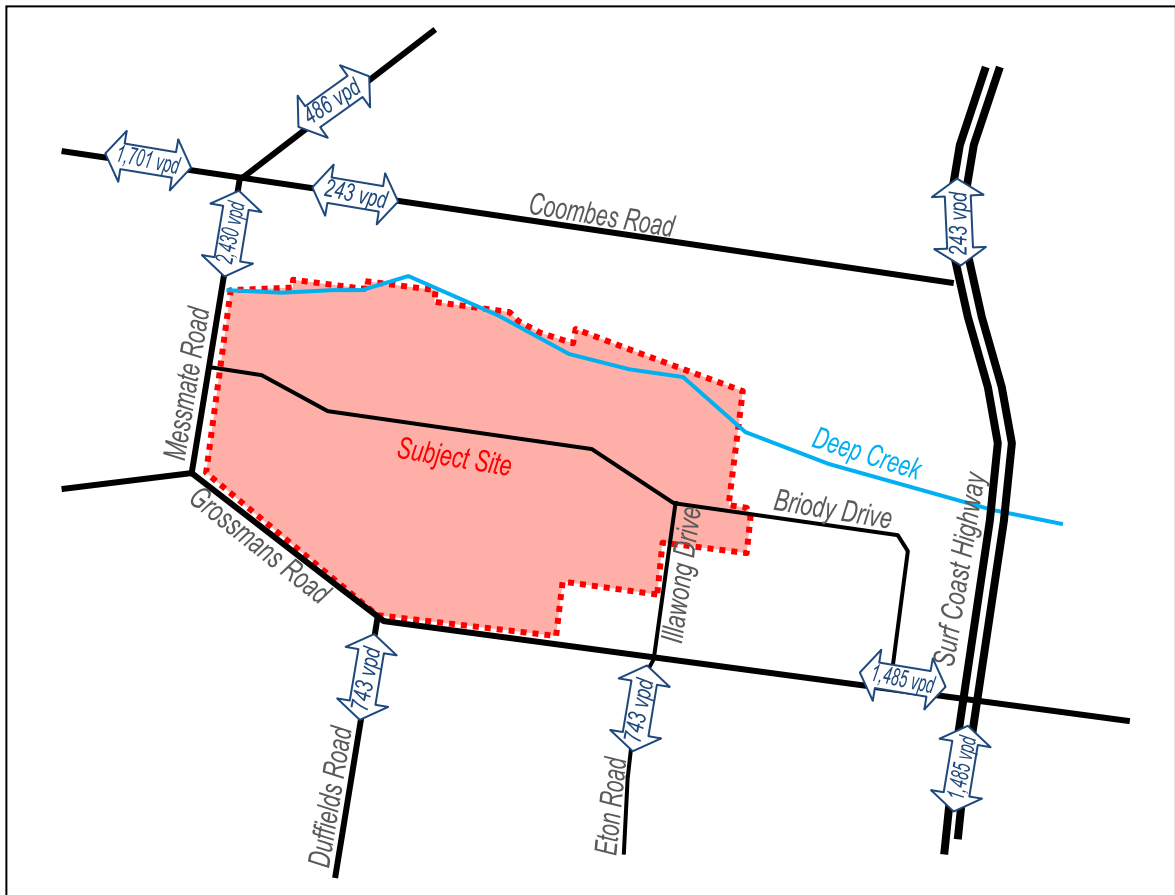


Figure 25: Two-Way Daily Traffic Volumes Generated by the Subject Site

6 OTHER DEVELOPMENTS

The following future developments will impact on traffic flows nearby to the subject site, particularly on Grossmans Road, Eton Road and Duffields Road:

- A 95-place childcare centre is proposed to be constructed on the south-west corner of the Grossmans Road/Eton Road intersection.
- Torquay College and St. Therese's Catholic Primary School are expected to experience increased enrolments in the future as the population of Torquay increases.
- Within the Torquay West area (south of Grossmans Road and east of Duffields Road) there is ultimately anticipated to be approximately 1,011 residential dwellings (increase from 306 dwellings in this area as of the 2006 ABS Census).

PLANNING & ENVIRONMENT ACT 1987
 SURF COAST PLANNING SCHEME
 This Briody Drive West Development Plan complies with the requirements of Clause 43.04 of the Surf Coast Planning Scheme

Approval Number: 15/0446
 Date: 7/12/2017 Sheet No: 23 of 36

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 Bill Cathcart

7 REVIEW OF COUNCIL STRATEGY

The objectives of the 'Torquay/Jan Juc Strategy Review – Transport Infrastructure Assessment' (May, 2006) were as follows:

- to establish a road hierarchy in Torquay and Jan Juc that takes into account projected population growth, public transport routes and non-motorised transport,
- to identify future transport infrastructure improvements required to cater for projected population and tourism growth up to 2021 and the cost of providing works, and
- to develop proposals for enhanced public transport.

The subject site is included within the 'Briody Drive' sub-area identified in Council's Strategy (bounded by Coombes Road, Surf Coast Highway, Grossmans Road and Messmate Road), and it was estimated that ultimately, the number of dwellings would increase from 79 currently, up to approximately 700. This estimate (provided by Council) was based on a density of 9 lots per hectare for developable land south of Deep Creek, and allowing for existing dwellings on one hectare lots.

The table below shows the modelled traffic volumes nearby to the subject site (from the Torquay Strategy) during peak and off-peak seasons, assuming full build out of residential areas in Torquay to the year 2021.

Table 2: Future Traffic Volumes – Torquay Strategy Model

| Location | Surveyed* | Base Case | | Future | |
|--|-----------|-----------|-----------|-----------|-----------|
| | | Off-Peak | Peak | Off-Peak | Peak |
| Briody Drive (south end) | 143 vpd | 128 vpd | 171 vpd | 1,135 vpd | 1,513 vpd |
| Grossmans Road | 3,260 vpd | 1,518 vpd | 2,230 vpd | 5,649 vpd | 7,873 vpd |
| Messmate Road (south of Coombes Road) | - | 1,579 vpd | 2,273 vpd | 2,460 vpd | 3,503 vpd |
| Duffields Road (at Spring Creek) | 2,495 vpd | 2,439 vpd | 3,503 vpd | 3,880 vpd | 5,500 vpd |
| Coombes Road | 1013 vpd | 356 vpd | 549 vpd | 3,018 vpd | 4,125 vpd |

* Where survey volumes are available, it is noted that the existing volumes don't always match the modelled base case volumes, due to the assumption in the model that future road links already exist.

The future traffic volumes on Briody Drive will be consistent with a Level 1 Access Street. Messmate Road, Duffields Road and Coombes Road will be Connector Roads, and Grossmans Road will be a local main road in the vicinity of Surf Coast Highway.

We note that the significantly higher volume on Grossmans Road in the future during the peak compared with existing conditions is due to the assumption in the model that the Grossmans Road education precinct will be one of key attractors in Torquay. However during the peak holiday season, the actual future traffic volume is likely to be less than predicted by the model.

There are 44 low-density residential properties north of Deep Creek. The subject site comprises roughly 75% of developable residential land south of Deep Creek, and is proposed to contain in the order of 540 properties. If the remaining 25% of residential land south of Deep Creek (to the east of the subject site) were developed at the same density it could ultimately accommodate an additional 180 properties (approximately). Accordingly, the full build-out of the Briody Drive sub-area would accommodate a total of 764 properties assuming conventional residential densities south of Deep Creek and continuing the existing low density north of Deep Creek.

This is approximately 9% higher than assumed in the traffic modelling undertaken for the Torquay Strategy review.

However, we are satisfied that the traffic volume estimates undertaken in the Torquay Strategy review are still relevant and appropriate for the following reasons:

- The actual number of dwellings able to be accommodated on the subject site is likely to be less than the assumed density of 12 lots per hectare due to the need to conserve significant vegetation.
- Traffic generation assumptions within the Torquay Strategy model are conservative (10 vehicle trip-ends per day was adopted in the model but the surveyed rate in nearby Torquay West was only 7.2 vehicle trip-ends per day).
- The Torquay Strategy model assumes that a third of trips generated by the Briody Drive sub-area will be distributed to the Grossmans Road/Surf City areas. However the subject site is within walking distance of the Grossmans Road education precinct so there is likely to be a higher proportion of walking/cycling trips and lesser vehicle trips generated by this area.
- The increase of traffic on Grossmans Road during the 'peak' season is likely to be less than predicted by the model due to the schools being closed during school holidays.

We are satisfied that overall, the traffic volume estimates and recommendations for road works set out in Council's Strategy are appropriate for the area surrounding the subject site.

Ultimate road upgrades nearby to the site (as recommended in the Torquay Strategy) include:

- Surf Coast Highway/South Beach Road/Messmate Road intersection upgrade (traffic signals or a large two-lane roundabout).
- Surf Coast Highway/Coombes Road intersection upgrade (signalised cross-intersection when land east of Surf Coast Highway is developed).
- Surf Coast Highway/Grossmans Road/Debian Road intersection upgrade (possible phasing changes and/or turn lane extensions as volumes increase in the future to access the school precinct).
- Coombes Road urbanisation (increase from 5.5m to 7.0m, provide auxiliary turn lanes at intersections and limit direct property access to future abutting residential development) – suggested timing is when adjoining land is developed or when Geelong Bypass is complete, whichever comes first.
- Coombes Road/Messmate Road intersection upgrade (signalised roundabout to be considered in the medium term, after the Geelong Bypass is completed).

PLANNING & ENVIRONMENT ACT 1987
SURF COAST PLANNING SCHEME
This Briody Drive West Development Plan complies with the requirements of Clause 43.04 of the Surf Coast Planning Scheme
Approval Number: 15/0446
Date: 7/12/2017 Sheet No: 25 of 36
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Sir Cameron

The trigger for the Coombes Road upgrades is as a result of the proposed use of Coombes Road as the preferred east-west access to Anglesea Road to connect with the Geelong Bypass Road.

The Torquay/Jan Juc Strategy indicates that ultimately there will be in the order of 12,296 dwellings within the Torquay/Jan Juc area, of which 6,955 will be new dwellings (post 2005).

For the Coombes Road upgrade, it may be appropriate for the subject site to contribute a proportion of the cost to upgrade Coombes Road. Council (or other sources) would need to fund the component generated by the existing dwellings within Torquay and Jan Juc. New developments could contribute a proportion based on calculation of shared usage. This would need to be set up via a Development Contributions Plan (DCP).

Surf Coast Highway intersections are under VicRoads' control, however a proportion of the upgrade costs may also be included in any DCP based upon a calculation of shared usage.

We note that the developer may also be required to "urbanise" existing roads abutting the development on one side (adjoining the subject site), which is likely to include a minor widening and construction of kerb and channel. This would apply to Grossmans Road and Messmate Road (along the site frontage only), as well as sealing Briody Drive and Illawong Drive (these roads are already wide enough).

With respect to the upgrading of Illawong Drive, Council has recently proposed to construct this road through a Special Charges Scheme whereby benefiting lot owners (including St Therese School) would be required to contribute proportionally based on a calculation of shared usage.

PLANNING & ENVIRONMENT ACT 1987
SURF COAST PLANNING SCHEME
This Briody Drive West Development Plan complies with the requirements of Clause
43.04 of the Surf Coast Planning Scheme

Approval Number: 15/0446
Date: 7/12/2017 Sheet No: 26 of 36

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Bill Cathcart

8 INTERNAL SUBDIVISION REQUIREMENTS

8.1 Road Hierarchy

Based on the estimated traffic volumes shown in Figure 25, all of the roads within the subdivision (including Briody Drive and Illawong Drive) will have low volumes and will operate as local access streets and access places.

An access place is defined under Clause 56.06-8 of the Surf Coast Planning Scheme as being ... *“a minor street providing local residential access with shared traffic, pedestrian and recreation use, but with pedestrian priority”*.

An access street is defined under Clause 56.06-8 as being ... *“a street providing local residential access where traffic is subservient, speed and volume are low and pedestrian and bicycle movements are facilitated”*.

8.2 Road Cross Sections

Statutory requirements for road cross-sections are set out at Clause 56.06-8 of the Surf Coast Planning Scheme as per Table 3 below.

Table 3: Clause 56 – Road Design Requirements

| Design Requirement | Access Place | Access Street – Level 1 | Access Street – Level 2 |
|---|--|--|---|
| Traffic Volume | 300 – 1,000 vpd | 1,000 – 2,000 vpd | 2,000 – 3,000 vpd |
| Carriageway Width & Parking Provision within Street Reservation | 5.5m with 1 hard standing verge parking space per 2 lots, or 5.5m with parking on carriageway (one side, appropriately signed) | 5.5m with 1 hard standing verge parking space per 2 lots | 7 – 7.5m with parking permitted both sides of carriageway |
| Verge Width | 7.5m minimum total width (for services, min. 3.5m one side, min. 2.5m other side) | 4m minimum each side | 4.5m minimum each side |
| Road Reservation | minimum 13m | minimum 19.5m | 16 – 16.5m |
| Footpath Provision | Not required for 5 dwellings or less otherwise 1.5m (on one side only) offset minimum 1m from kerb | 1.5m both sides, offset minimum 1m from kerb | 1.5m both sides, offset minimum 1m from kerb |

This Briody Drive West Development Plan complies with the requirements of Clause 43.04 of the Surf Coast Planning Scheme

Approval Number 15/0446
Date 7/12/2017 Sheet No: 27 of 36

Both Briody Drive and Illawong Drive are approximately 7 metres wide within a 20 metre reservation, with a 2 metre wide shared path on one side. The 7 metre wide

carriageway is consistent with the requirements for a Level 2 access street capable of accommodating up to 3,000 vehicles per day.

We are satisfied that these roads will be suitable to accommodate the ultimate traffic volumes resulting from full development of the subject area without any road widening.

We note that they will need to be upgraded to a sealed urban standard with kerb and channel, consistent with the recent upgrading of Briody Drive east of Illawong Drive.

All other roads within the development area are likely to carry less than 1,000 vehicles per day, and accordingly could be constructed with a 5.5 metre wide (minimum) carriageway within a 13.5 metre (minimum) road reservation, in accordance with the requirements for a Level 1 Access Street, as set out in Clause 56.06-8 of the Surf Coast Planning Scheme.

8.3 Parking Provision

On-street parking is able to be provided within the carriageway of each of the roads within the site. The 7 metre wide carriageway for Briody Drive and Illawong Drive will be sufficient for parking to readily occur on both sides of the road whilst maintaining a through lane for traffic.

The 5.5 metre wide (minimum) carriageways for lower order access streets and access places will be sufficient to accommodate parking on one side.

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

We recommend that double crossovers be provided to adjoining lots wherever possible in order to maximise the provision of on-street parking spaces and also maximise manoeuvring areas into and out of the proposed lots.

8.4 Traffic Management

The road layout within the subject site should be designed in accordance with the speed controlling objectives of the Surf Coast Planning Scheme and current traffic engineering practice.

Notably, long straight sections of road should be avoided unless speed controlling measures are introduced. Uncontrolled cross-intersections should be avoided as they increase the risk of crashes. Staggered T-intersections are preferred.

If cross-intersections are provided, roundabouts should be considered to control traffic movements. These also act as a speed controlling measure. However, the design of any roundabouts will need to take into consideration access requirements for service and emergency vehicles.

This Briody Drive West Development Plan complies with the requirements of Clause 43.04 of the Surf Coast Planning Scheme

The ultimate two-way daily traffic volumes on Messmate Road and Grossmans Road along the site frontage are consistent with a collector road status and accordingly we note that it would not be inappropriate for future abutting residential lots to take direct access to these roads subject to 'urbanisation' of the roads, including widening, installation of kerb and channel and a reduced speed limit on Grossmans Road past the site. However new driveways would need to consider potential sight distance issues at bends and crests.

Approval Number: 15/0446

Date: 7/12/2017 Sheet No: 28 of 36

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Bill Cathcart

8.5 Pedestrian Access

Clause 56.06-5 of the Surf Coast Planning Scheme specifies the following detailed walking and cycling network objectives:

Footpaths, shared paths, cycle paths and cycle lanes should be designed to:

- *Be part of a comprehensive design of the road or street reservation.*
- *Be continuous and connect.*
- *Provide for public transport stops, street crossings for pedestrians and cyclists and kerb crossovers for access to lots.*
- *Accommodate projected user volumes and mix.*
- *Meet the requirements of (Clause 56.06-8).*
- *Provide pavement edge, kerb, channel and crossover details that support safe travel for pedestrians, footpath bound vehicles and cyclists, perform required drainage functions and are structurally sound.*
- *Provide appropriate signage.*
- *Be constructed to allow access to lots without damage to the footpath or shared path surfaces.*
- *Be constructed with a durable, non-skid surface.*
- *Be of a quality and durability to ensure:*
 - *safe passage for pedestrians, cyclists, footpath bound vehicles and vehicles,*
 - *discharge of urban run-off,*
 - *preservation of all-weather access,*
 - *maintenance of a reasonable, comfortable riding quality, and*
 - *a minimum 20 year life span.*
- *Be accessible to people with disabilities and include tactile ground surface indicators, audible signals and kerb ramps required for the movement of people with disabilities.*

New streets created within the proposed subdivision should take into consideration the above requirements.

In particular, we recommend that all streets and access places (except if serving less than 5 dwellings) should include a 1.5 metre wide footpath on at least one side of the road.

PLANNING & ENVIRONMENT ACT 1987
SURF COAST PLANNING SCHEME
This Briody Drive West Development Plan complies with the requirements of Clause 43.04 of the Surf Coast Planning Scheme

Approval Number: 15/0446
Date: 7/12/2017 Sheet No: 29 of 36

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9 CONCLUSIONS

Having visited the site, perused relevant documents and plans and undertaken an assessment of the traffic generation, we are of the opinion that:

- a) the traffic volume estimates and recommendations for road works set out in Council's Strategy for Torquay/Jan Juc are appropriate for the area surrounding the subject site,
- b) when the subject site is developed, a contribution may be required towards the costs associated with upgrades recommended in the Torquay/Jan Juc Strategy including upgrading of Coombes Road and the Surf Coast Highway intersections and such contributions would need to be calculated based on usage and formalised within a Development Contributions Plan (DCP) for the whole of Torquay,
- c) it would be appropriate for the existing roads abutting the subject site to be "urbanised" on the side which adjoins the subject site as part of the development, including a minor widening and construction of kerb and channel and a footpath (this may apply to Grossmans Road and Messmate Road),
- d) Briody Drive and Illawong Drive should be sealed (including construction of kerb and channel consistent with the recent upgrade of Briody Drive east of Illawong Drive) when the subject site is developed if not completed prior (noting Council's proposed Special Charge Scheme for construction of Illawong Drive),
- e) with the exception of Briody Drive and Illawong Drive, all of the new roads within the subject site are likely to carry less than 1,000 vehicles per day and should be designed in accordance with the requirements set out in Clause 56.06-8 for Access Places and Level 1 Access Streets including 5.5 metre wide carriageways as a minimum with 4 metre wide verges on both sides,
- f) the road layout within the subject site should be designed in accordance with the speed controlling objectives of the Surf Coast Planning Scheme and current traffic engineering practise, and
- g) consideration should be given to pedestrian access through the site including provision of 1.5 metre wide footpaths on at least one side of each street.

PLANNING & ENVIRONMENT ACT 1987
SURF COAST PLANNING SCHEME

This Briody Drive West Development Plan complies with the requirements of Clause 43.04 of the Surf Coast Planning Scheme

Approval Number: 15/0446

Date: 7/12/2017 Sheet No: 30 of 36

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PLANNING & ENVIRONMENT ACT 1987
SURF COAST PLANNING SCHEME

This Briody Drive West Development Plan complies with the requirements of Clause
43.04 of the Surf Coast Planning Scheme

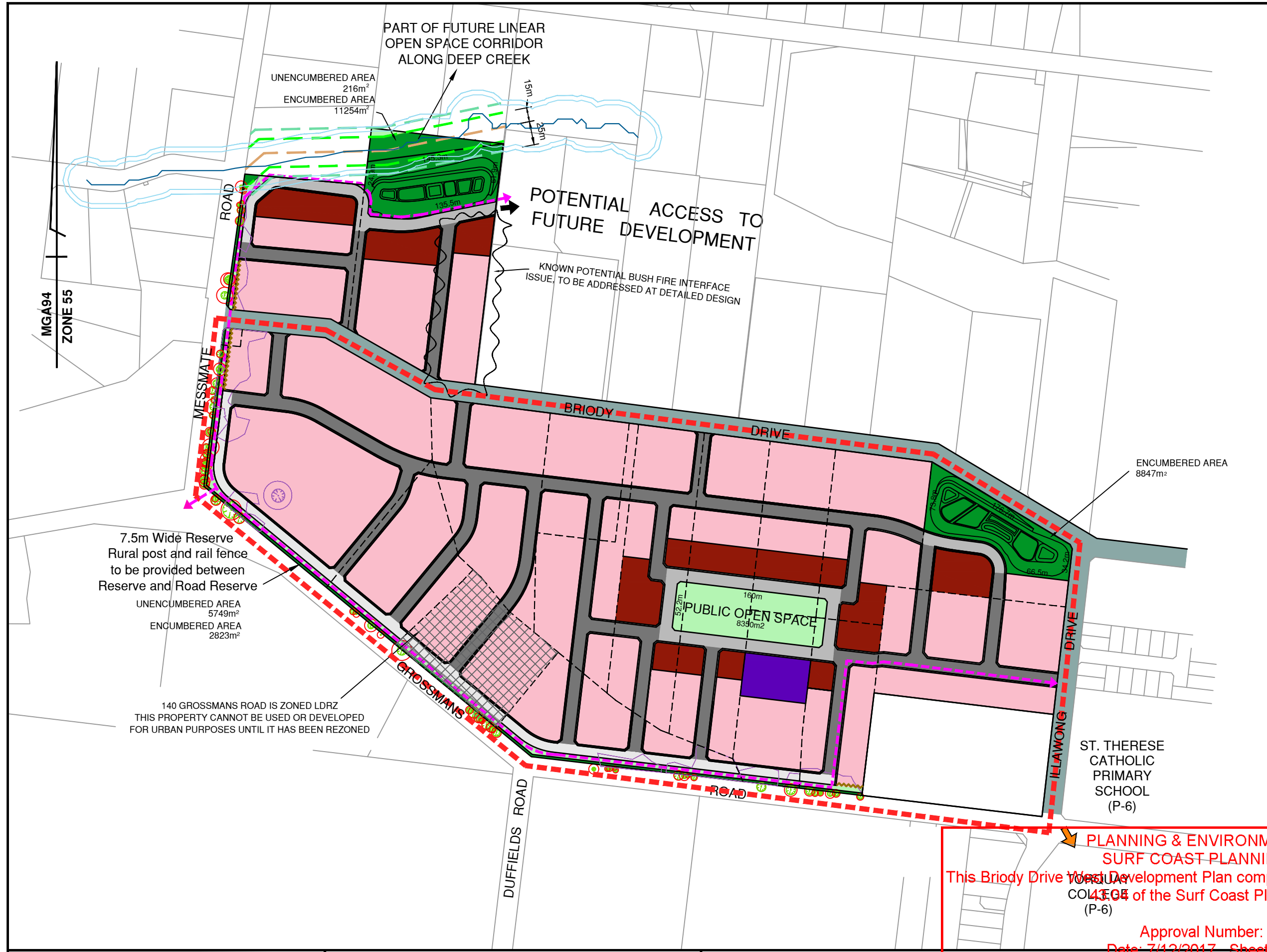
Approval Number: 15/0446

Date: 7/12/2017 Sheet No: 31 of 36

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Development Plan



| LEGEND | |
|--|---|
| RESIDENTIAL DENSITIES | |
| | HIGHER DENSITY (350m ²) 2.45Ha / 28.5 Lots per Ha / 70 lots |
| | STANDARD DENSITY (450m ²) 18.23 Ha / 22.2 Lots per Ha / 404 lots |
| | MULTI-UNIT SITE |
| NOTE: SECTION 1 & 2 USES THAT ARE PERMISSIBLE WITHIN THE ZONE WILL BE CONSIDERED ON THEIR MERITS. | |
| ROAD NETWORK | |
| | ACCESS STREET LEVEL 2 |
| | 16m WIDE ROAD RESERVE |
| | 14.5m WIDE ROAD RESERVE |
| | 11.5m WIDE ROAD RESERVE |
| OPEN SPACE / DRAINAGE | |
| | ENCUMBERED OPEN SPACE |
| | UNENCUMBERED OPEN SPACE |
| | CENTRELINE OF CREEK |
| | TREES IN LARGE PATCHES |
| | TREE WITH TREE PROTECTION ZONE |
| NOTE: WHERE THE TREE PROTECTION ZONE ENCROACHES IN TO RESIDENTIAL LOTS A BUILDING RESTRICTION SHALL BE APPLIED. | |
| OTHER | |
| | POTENTIAL FUTURE BUS ROUTE |
| | 2.5m WIDE SHARED PATH |
| | DIRECTION TO SCHOOLS & COMMUNITY FACILITIES |
| | EXISTING TITLE BOUNDARIES |
| | FOOTPATH |
| | FENCE PROVISIONS |

7.5m Wide Reserve
Rural post and rail fence
to be provided between
Reserve and Road Reserve
UNENCUMBERED AREA
5749m²
ENCUMBERED AREA
2823m²

140 GROSSMANS ROAD IS ZONED LDRZ
THIS PROPERTY CANNOT BE USED OR DEVELOPED
FOR URBAN PURPOSES UNTIL IT HAS BEEN REZONED

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SURF COAST PLANNING SCHEME
This Briody Drive West Development Plan complies with the requirements of Clause 43.04 of the Surf Coast Planning Scheme

Approval Number: 15/0446
Date: 7/12/2017 Sheet No: 32 of 36

ST. QUENTIN
Surveyors • Town Planners • Engineers
51 LITTLE FYANS STREET,
P.O. BOX 919, GEELONG 3220
TELEPHONE (03) 5201 1811 FAX (03) 5229 2909

DEVELOPMENT PLAN (NEW LAYOUT)
BRIODY DRIVE - WEST
TORQUAY

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Bill Cathcart

| | |
|---------------------|------------------------|
| DRAWN CM | LEVEL DATUM - |
| DRAWING REF 9827 | DWG DATE 30/11/2017 |
| VERSION 23 | SCALE 1:4000 |
| A3 | |

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SURF COAST PLANNING SCHEME

This Briody Drive West Development Plan complies with the requirements of Clause
43.04 of the Surf Coast Planning Scheme

Approval Number: 15/0446

Date: 7/12/2017 Sheet No: 33 of 36

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SIDRA Results

MOVEMENT SUMMARY

 **Site: 1 [Grossmans/Messmate - AM Ultimate]**

Grossmans Road & Messmate Road
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------|------|---------------|-------------------|------------------|-------------------|------------|--------------|-----------------------------|--------------------|
| Mov ID | OD Mov | Demand Flows | | Deg. Satn v/c | Average Delay sec | Level of Service | 95% Back of Queue | | Prop. Queued | Effective Stop Rate per veh | Average Speed km/h |
| | | Total veh/h | HV % | | | | Vehicles veh | Distance m | | | |
| South: Messmate Road (south) | | | | | | | | | | | |
| 1 | L2 | 1 | 10.0 | 0.308 | 9.6 | LOS A | 1.8 | 14.0 | 0.66 | 0.78 | 58.5 |
| 2 | T1 | 196 | 10.0 | 0.308 | 10.3 | LOS B | 1.8 | 14.0 | 0.66 | 0.78 | 59.7 |
| 3 | R2 | 53 | 10.0 | 0.308 | 13.3 | LOS B | 1.8 | 14.0 | 0.66 | 0.78 | 59.0 |
| Approach | | 249 | 10.0 | 0.308 | 10.9 | LOS B | 1.8 | 14.0 | 0.66 | 0.78 | 59.5 |
| East: Grossmans Road (east) | | | | | | | | | | | |
| 4 | L2 | 14 | 10.0 | 0.354 | 6.7 | LOS A | 2.4 | 18.5 | 0.32 | 0.62 | 59.5 |
| 5 | T1 | 158 | 10.0 | 0.354 | 7.3 | LOS A | 2.4 | 18.5 | 0.32 | 0.62 | 60.8 |
| 6 | R2 | 276 | 10.0 | 0.354 | 10.4 | LOS B | 2.4 | 18.5 | 0.32 | 0.62 | 60.1 |
| Approach | | 447 | 10.0 | 0.354 | 9.2 | LOS A | 2.4 | 18.5 | 0.32 | 0.62 | 60.3 |
| North: Messmate Road (north) | | | | | | | | | | | |
| 7 | L2 | 109 | 10.0 | 0.177 | 7.1 | LOS A | 1.0 | 7.5 | 0.37 | 0.61 | 60.8 |
| 8 | T1 | 49 | 10.0 | 0.177 | 7.7 | LOS A | 1.0 | 7.5 | 0.37 | 0.61 | 62.1 |
| 9 | R2 | 32 | 10.0 | 0.177 | 10.8 | LOS B | 1.0 | 7.5 | 0.37 | 0.61 | 61.4 |
| Approach | | 191 | 10.0 | 0.177 | 7.9 | LOS A | 1.0 | 7.5 | 0.37 | 0.61 | 61.3 |
| West: Grossmans Road (west) | | | | | | | | | | | |
| 10 | L2 | 53 | 10.0 | 0.194 | 9.8 | LOS A | 1.1 | 8.3 | 0.65 | 0.76 | 59.0 |
| 11 | T1 | 95 | 10.0 | 0.194 | 10.4 | LOS B | 1.1 | 8.3 | 0.65 | 0.76 | 60.3 |
| 12 | R2 | 1 | 10.0 | 0.194 | 13.5 | LOS B | 1.1 | 8.3 | 0.65 | 0.76 | 59.6 |
| Approach | | 148 | 10.0 | 0.194 | 10.2 | LOS B | 1.1 | 8.3 | 0.65 | 0.76 | 59.8 |
| All Vehicles | | 1036 | 10.0 | 0.354 | 9.5 | LOS A | 2.4 | 18.5 | 0.46 | 0.67 | 60.2 |

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

Roundabout LOS Method: Same as Signalised Intersections.

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.

Roundabout Capacity Model: SIDRA Standard.

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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Organisation: TRAFFIX GROUP PTY LTD | Processed: Wednesday, 21 June 2017 12:02:40 PM

Project: P:\Synergy\Projects\GRP1\GRP10200\Survey\SIDRA Results\2017\Grossmans-Messmate.sip7

PLANNING & ENVIRONMENT ACT 1987
SURF COAST PLANNING SCHEME
 This Briody Drive West Development Plan complies with the requirements of Clause
 43.04 of the Surf Coast Planning Scheme

Approval Number: 15/0446
 Date: 7/12/2017 Sheet No: 34 of 36

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 Bill Cathcart

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MOVEMENT SUMMARY

 **Site: 1 [Grossmans/Messmate - PM Ultimate]**

Grossmans Road & Messmate Road
Roundabout

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------|------|-----------|---------------|------------------|-------------------|------------|--------------|---------------------|---------------|
| Mov ID | OD Mov | Demand Flows | | Deg. Satn | Average Delay | Level of Service | 95% Back of Queue | | Prop. Queued | Effective Stop Rate | Average Speed |
| | | Total veh/h | HV % | v/c | sec | | Vehicles veh | Distance m | | per veh | km/h |
| South: Messmate Road (south) | | | | | | | | | | | |
| 1 | L2 | 1 | 10.0 | 0.144 | 8.5 | LOS A | 0.8 | 6.0 | 0.55 | 0.69 | 59.2 |
| 2 | T1 | 98 | 10.0 | 0.144 | 9.1 | LOS A | 0.8 | 6.0 | 0.55 | 0.69 | 60.4 |
| 3 | R2 | 26 | 10.0 | 0.144 | 12.2 | LOS B | 0.8 | 6.0 | 0.55 | 0.69 | 59.8 |
| Approach | | 125 | 10.0 | 0.144 | 9.7 | LOS A | 0.8 | 6.0 | 0.55 | 0.69 | 60.3 |
| East: Grossmans Road (east) | | | | | | | | | | | |
| 4 | L2 | 40 | 10.0 | 0.335 | 7.7 | LOS A | 2.1 | 16.3 | 0.50 | 0.68 | 59.2 |
| 5 | T1 | 137 | 10.0 | 0.335 | 8.4 | LOS A | 2.1 | 16.3 | 0.50 | 0.68 | 60.4 |
| 6 | R2 | 168 | 10.0 | 0.335 | 11.4 | LOS B | 2.1 | 16.3 | 0.50 | 0.68 | 59.8 |
| Approach | | 345 | 10.0 | 0.335 | 9.8 | LOS A | 2.1 | 16.3 | 0.50 | 0.68 | 59.9 |
| North: Messmate Road (north) | | | | | | | | | | | |
| 7 | L2 | 206 | 10.0 | 0.360 | 7.1 | LOS A | 2.4 | 18.4 | 0.41 | 0.61 | 60.6 |
| 8 | T1 | 147 | 10.0 | 0.360 | 7.7 | LOS A | 2.4 | 18.4 | 0.41 | 0.61 | 61.9 |
| 9 | R2 | 63 | 10.0 | 0.360 | 10.8 | LOS B | 2.4 | 18.4 | 0.41 | 0.61 | 61.2 |
| Approach | | 417 | 10.0 | 0.360 | 7.9 | LOS A | 2.4 | 18.4 | 0.41 | 0.61 | 61.2 |
| West: Grossmans Road (west) | | | | | | | | | | | |
| 10 | L2 | 32 | 10.0 | 0.146 | 8.0 | LOS A | 0.8 | 5.9 | 0.49 | 0.64 | 60.2 |
| 11 | T1 | 105 | 10.0 | 0.146 | 8.6 | LOS A | 0.8 | 5.9 | 0.49 | 0.64 | 61.5 |
| 12 | R2 | 1 | 10.0 | 0.146 | 11.7 | LOS B | 0.8 | 5.9 | 0.49 | 0.64 | 60.8 |
| Approach | | 138 | 10.0 | 0.146 | 8.5 | LOS A | 0.8 | 5.9 | 0.49 | 0.64 | 61.2 |
| All Vehicles | | 1025 | 10.0 | 0.360 | 8.8 | LOS A | 2.4 | 18.4 | 0.47 | 0.65 | 60.6 |

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

Roundabout LOS Method: Same as Signalised Intersections.

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.

Roundabout Capacity Model: SIDRA Standard.

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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PLANNING & ENVIRONMENT ACT 1987
SURF COAST PLANNING SCHEME
 This Briody Drive West Development Plan complies with the requirements of Clause
 43.04 of the Surf Coast Planning Scheme

Approval Number: 15/0446
 Date: 7/12/2017 Sheet No: 35 of 36

Digitally Signed by the Responsible Authority
 Bill Cathcart

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MOVEMENT SUMMARY

 **Site: 1 [Messmate Road/Briody Drive - AM Peak]**

Messmate Road/Briody Drive
Stop (Two-Way)

| Movement Performance - Vehicles | | | | | | | | | | | |
|---------------------------------|--------|--------------------------|------------|---------------|-------------------|------------------|--------------------------------|------------|--------------|-----------------------------|--------------------|
| Mov ID | OD Mov | Demand Flows 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 per veh | Average Speed km/h |
| South: Messmate Road | | | | | | | | | | | |
| 2 | T1 | 509 | 0.0 | 0.267 | 0.0 | LOS A | 0.1 | 0.4 | 0.01 | 0.01 | 59.9 |
| 3 | R2 | 6 | 0.0 | 0.267 | 6.3 | LOS A | 0.1 | 0.4 | 0.01 | 0.01 | 57.6 |
| Approach | | 516 | 0.0 | 0.267 | 0.1 | NA | 0.1 | 0.4 | 0.01 | 0.01 | 59.9 |
| East: Briody Drive | | | | | | | | | | | |
| 4 | L2 | 26 | 0.0 | 0.372 | 9.6 | LOS A | 1.6 | 11.4 | 0.56 | 1.03 | 48.6 |
| 6 | R2 | 180 | 0.0 | 0.372 | 14.2 | LOS B | 1.6 | 11.4 | 0.56 | 1.03 | 48.1 |
| Approach | | 206 | 0.0 | 0.372 | 13.6 | LOS B | 1.6 | 11.4 | 0.56 | 1.03 | 48.2 |
| North: Messmate Road | | | | | | | | | | | |
| 7 | L2 | 45 | 0.0 | 0.109 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.13 | 57.2 |
| 8 | T1 | 164 | 0.0 | 0.109 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.13 | 58.8 |
| Approach | | 209 | 0.0 | 0.109 | 1.2 | NA | 0.0 | 0.0 | 0.00 | 0.13 | 58.5 |
| All Vehicles | | 932 | 0.0 | 0.372 | 3.3 | NA | 1.6 | 11.4 | 0.13 | 0.26 | 56.5 |

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.

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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PLANNING & ENVIRONMENT ACT 1987
SURF COAST PLANNING SCHEME
 This Briody Drive West Development Plan complies with the requirements of Clause 43.04 of the Surf Coast Planning Scheme

Approval Number: 15/0446
 Date: 7/12/2017 Sheet No: 36 of 36

Digitally Signed by the Responsible Authority
 Bill Cathcart

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