



**SOUTH GIPPSLAND PLANNING SCHEME
AMENDMENT C65
105 OLD KORUMBURRA ROAD, LEONGATHA
TRAFFIC IMPACT ASSESSMENT
STATEMENT OF EVIDENCE**

Prepared By

**J. D. Higgs BE (civil) CE
Director
TTM Consulting (Vic) Pty. Ltd.
Suite 9, 70-80 Wellington Street,
Collingwood Vic 3066**

27 January, 2016

1. INTRODUCTION AND SCOPE

South Gippsland Shire Council has prepared and exhibited Amendment C65 to the South Gippsland Planning Scheme. This statement of evidence references an earlier report (“Shamrock Springs, Proposed Residential Subdivision, Old Korumburra Road, Leongatha, Traffic Impact Assessment”), amended 29th August 2011, which has been used to inform the preparation of the amendment. A copy of that report is appended to this statement. That report was prepared primarily by me or under my instruction.

2. WITNESS EXPERIENCE, PROJECT BACKGROUND AND SCOPE

Witness Name	James Donald Higgs
Qualifications	Bachelor of Engineering (Civil) The University of Melbourne
Position	Director TTM Consulting (Vic) Pty. Ltd. Suite 9, 70-80 Wellington Street, Collingwood Vic 3066
Experience	I have approximately 44 years' experience in Engineering including :- <ul style="list-style-type: none">• One year experience at Shire of Mortlake• Three years' experience at Town of Kyabram• Ten years' experience at City of Knox• One year experience Higgs-TTM Pty. Ltd.• Twenty years' experience at TTM Consulting Pty. Ltd.• Nine years' experience at TTM Consulting (Vic) Pty. Ltd.
Areas of Expertise	I have expertise in road and street design and construction, development traffic impact assessment including traffic and car parking demand generation and parking generation, traffic management and general traffic engineering, road safety and transportation and urban planning with an engineering focus.

Experience

My experience and expertise over the past 44 years includes road design, project assessment, inter disciplinary urban planning, preparation of movement network design codes including Livable Neighbourhoods and Clause 56.06 review, determination of pavement design parameters and numerous car parking and traffic generation assessments of a wide range of land use developments. I am therefore well qualified to provide this assessment in respect of the subject proposal.

Instructions and Existing Relationship

I have been instructed by Best Hooper, on behalf of the Murphy Family to provide a statement that includes :-

- Review of submissions made.
- Overview of traffic implications arising from likely development that would be facilitated by the rezoning.
- Address the VicRoads submission.
- Consider the proposed connectivity to Higg Street and the type of traffic that such a connection should service.

The instructions also include presentation of evidence before the Panel. The instructions are written.

My relationship with the Applicant is of a business nature.

Referenced Material including Facts, Matters and Assumptions

In preparing this statement I have reviewed the following documentation :-

- Amendment C65 documentation as exhibited.
- Relevant sections of the Infrastructure Design Manual.
- Clause 56.06 and Clause 21.15 of the South Gippsland Planning Scheme.
- Section 173 Agreement.
- Submissions regarding Amendment C65, including from VicRoads.

I have also visited the site and surrounds, and noted any relevant changes to streets and intersections since the original Traffic Engineering Assessment Report (“2011 TIAR”) was prepared.

3. THE PROPOSAL IN RESPECT OF TRAFFIC ISSUES

3.1 Rezone Part of 77 Gibson Street to GRZ

The proposal is for 12 hectares to be rezoned, with street connections to Gibson Street and Shingler Street. That differs from the proposal that was the subject of the 2011 TIAR, which was for 15 hectares to be rezoned, including a linkage with Higg Street. No linkage to Higg Street is proposed in the current GRZ proposal.

The “Initial Development Area Plan” by Beveridge Williams indicates 132 residential lots within the 12 hectares of the proposed GRZ area of No. 77 Gibson Street.

The “Initial Development Area Plan” shows a link to Gibson Street only near the southern end of the 12 hectares, whereas the earlier plan and Traffic Impact Assessment allowed for two street linkages to Gibson Street. That would result in a slightly different traffic distribution estimate from that in the original report. Two connections to Gibson Street is a way better design than just one at the south end because travel distances can be shorter including for walking.

3.2 DP09 Area

The approximately 60 hectares (including the 12 hectares of proposed GRZ land) is more or less the same as was considered in the original traffic assessment, with a total yield estimated at around 600 lots.

No Draft Development Plan is presented as part of the exhibited material but the Draft Schedule 9 presumes a “Connector Street” linking between Shingler Street and Worthy Street. That would be something like the Proposed Outline Development Plan prepared by Beveridge Williams as included at Figure 3 in the original Traffic Impact Assessment. Any logical Development Plan for the 60 hectares area would include street connections into Shingler Street. So the presumption of a “Connector Street” linking as described is logical. However care should be exercised with the form of the street as I explain at Section 4.

3.3 Applicability of Original Traffic Impact Assessment

The changes to the proposal from the earlier proposals have no significant outcomes in respect of traffic generation other than on the northern part of Gibson Street.

In my opinion the estimates of traffic on Worthy Street, Higg Street and Shingler Street remain valid. The original report included an error in that 2,300 vehicle trips per day is stated at Section 4.4 (implying 2,200 daily vehicle trips from the 60 hectares development) whereas the diagram at Figure 4 indicates 2,400 daily vehicle trips from the development. Nothing turns on that.

The originally reported form of Shingler Street west of Gibson Street has now been altered with pavement widening having been carried out along the southern side of the street.

Armco guard fence has been placed behind the new kerb presumably to protect an electricity pole with sub-station or similar on it. Some design attention will be needed to accommodate lots and driveways near the pole, to comply with the provision of DPO9 in respect of frontage to Shingler Street.

Gray Street has been substantially upgraded since the original traffic assessment, including new footpath. I do not envisage significant change to traffic distribution consequent to that.

A further error in the amended version of the original traffic assessment is that some of the diagrams in Figures 10-15 have been incorrectly copied from an earlier version of the report. Appended to this statement are the diagrams from those figures as they should have been.

4. DRAFT DPO SCHEDULE 9

The Draft DPO9 makes substantial reference to the “Infrastructure Design Manual” (IDM), in particular to the choice of street forms. Under “Infrastructure Services” the “main access road from Shingler Street to Worthy Street” should be constructed as Collector/Connector Street Level 1.

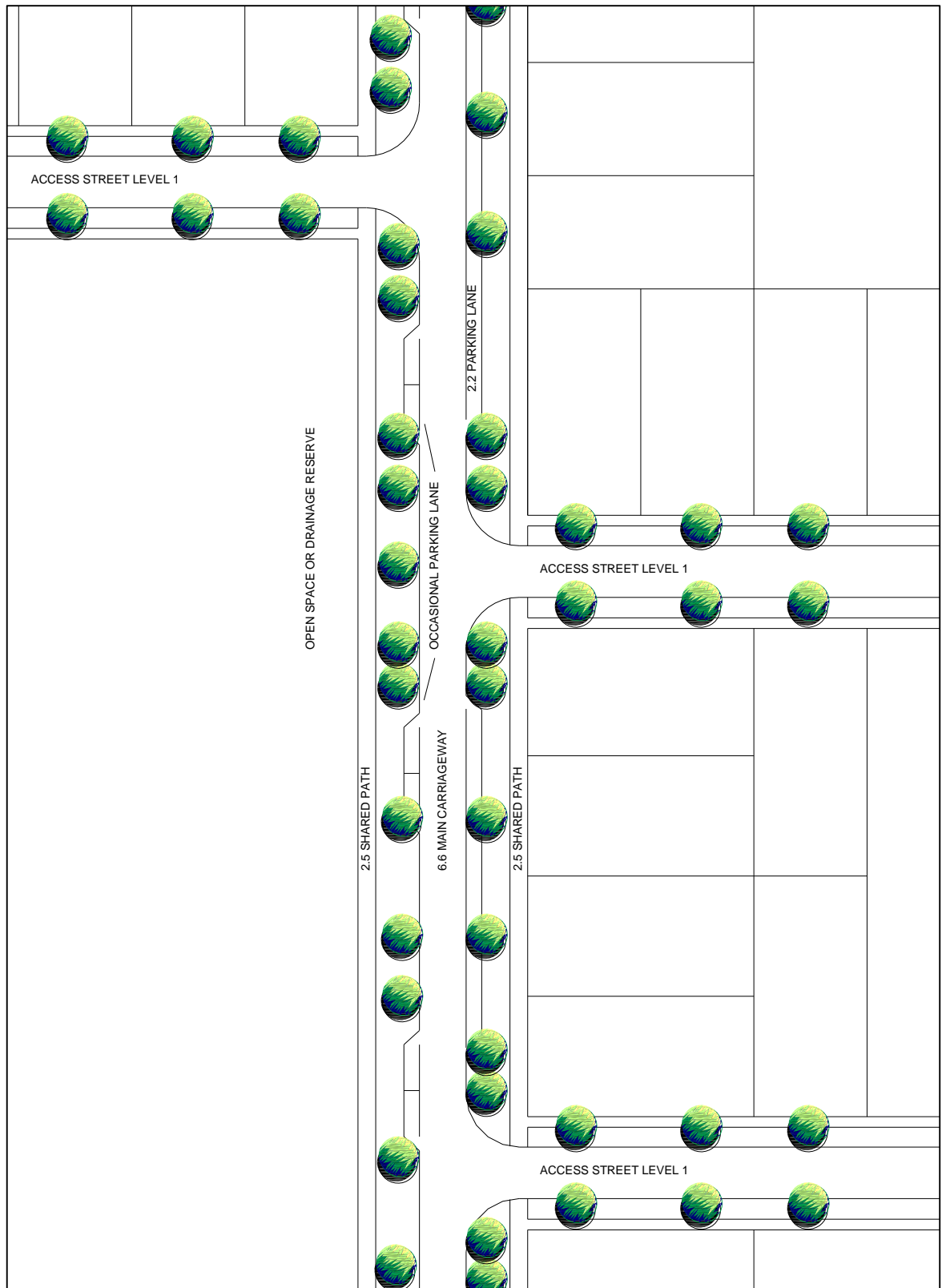
Under IDM Collector/Connector Street Level 1 has a carriageway width of 11 metres, whereas in Clause 56.06 a Connector Street Level 1 has a carriageway width of 13 metres if there is car parking on both sides. Under both “guides” the indicative traffic volume is 3,000 vehicle movements per day.

Under any logical Whole of Site Development Plan the maximum traffic volume on any part of the “main access road” will be around 2,200 vehicle movements per day, although if the IDM edict of estimating traffic from new residential areas on the basis of at least 10 vehicle movements per day is adopted the estimate would be around 2,500 vehicle movements per day at the maximum.

Applying Clause 56.06 street form would suggest “Access Street Level 2” (7.3 metres carriageway width) would be adequate as was set out in the 2011 TIAR. Applying Collector/Connector Street Level 1 from IDM makes more sense than Connector Street Level 1 from Clause 56.06, although neither is as appropriate as Access Street Level 2, with shared path, from Clause 56.06.

The “main access road” will have substantial abuttal to Open Space or Drainage Reserve, against which only limited kerbside parking will be necessary. Provision of a full 11 metres of carriageway in that situation would be excessive, leading to more paved surface to build, drain, maintain and replace as well as encouraging higher traffic speeds than would result from a better design.

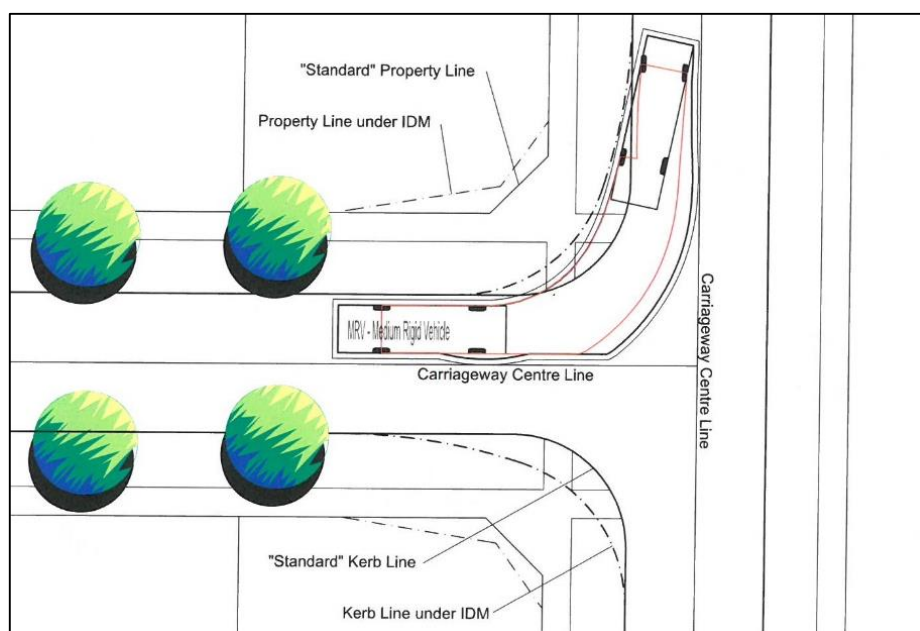
If the Shire is insistent on the IDM street, it should be allowed to be modified where parking is not needed, including at intersections, by omission of the parking lanes and provision of additional nature strip area. An example is shown below.



In the 2011 TIAR it was recommended that Worthy Street be constructed with 7.2 metres of kerb carriageway or 6.2 metres with flush plinthed edges, on the basis that the adjacent low density residential development will generate little or no car parking demand. That recommendation remains valid.

IDM at Section 12.3.8 sets out design parameters for intersections, including that “Road space should be provided such that the design vehicle is able to negotiate a left turn from the left lane without crossing adjacent lanes”.

For Access Street to Access Street (each with 7.3 metres carriageway width) with 8.8 metres service truck the implications are :-



Clearly there are very few intersections that would pass the IDM edict, which would have a very negative impact on urban design and outcomes if followed. In low traffic volume intersections (say combined total daily traffic volume of under 4,000 vehicle movements) in primarily residential areas it is almost invariably appropriate for the design vehicle to be able to use the whole of the carriageway to make turns.

For the reasons described above it is my recommendation that DPO9 not specifically call up all of the provisions of IDM. Further, the Draft DP09 states (page 4) that “all other subdivision roads must at a minimum be constructed to the specifications included in the IDM and agreed to in writing by the Responsible Authority”.

That provision might be referring to pavement and drainage structural issues and/or functional layout arrangements. If the latter is meant then I consider the provision inappropriate as discussed above. If the provision is to remain in a similar form the words “must at a minimum” should be replaced with “should”.

5. VICROADS SUBMISSION

I have reviewed the VicRoads submission dated 8th September, 2015 and comment.

VicRoads expresses concerns about the assumptions made in the initial Traffic Impact Assessment particularly in relation to the proposed traffic movements at the intersections of South Gippsland Highway and Shingler Street, but provides no explanation as to what those concerns might be. The analysis in the 2011 TIAR indicates that there is no need for the development to provide works at the intersection.

The intersection has painted turn lanes that are shorter than would be indicated by current design standards from AustRoads, and the layout is not what would be built today. However the right turn lanes from the north-west could have been painted longer because there is ample sealed pavement available, but VicRoads has chosen to provide what is on the ground.

Aside from those comments I consider the VicRoads submission to be appropriate.

6. SECTION 173 AGREEMENT

The owners of the subject land have made an agreement with Council in respect of provision of external infrastructure. Effectively a contribution of \$8,000 (indexed) per residential lot created is to be paid to the Council, although there is provision for works in lieu of the payments. There is no specification of actual projects to be carried out or any other application of funds. Total contribution is likely to be around \$4.8M at current value. In respect of external roadworks or traffic facilities requirements the major items would be :-

- 400 metres of Worthy Street construction
- 400 metres of Gibson Street construction
- Intersection treatments at :-
 - Brown Street/Worthy Street
 - Shingler Street/Anderson Street depending on VicRoads requirements
 - Shingler Street main access
 - Gibson/Worthy Street
- Various footpaths

I do not envisage the cost of these works exceeding \$2.5M at current values, indicating that there will be significant funds left over for applications other than traffic facilities.

7. SUBMISSIONS

Some submissions express concerns about a range of issues as following, with my comments in italics.

- **Financial Contribution to be Required for Off-Site Infrastructure**

The requirement for off-site infrastructure to be funded through the S173 Agreement contributions is such that Council will be able to fund such works from those contributions, although the Agreement does not specify the works proposed. The first 12 hectares will yield around \$1.1M in contributions, which will allow significant works to be undertaken.

Further, the “Whole of Site” Traffic Impact Assessment together with individual stage reports will nominate the timing for necessary works.

- **Status of 2011 TIAR**

Under DP09 the 2011 TIAR has no status as it currently stands because there have been changes to several boundary conditions, including the preparation of DP09 as it stands or is amended, such that a new Traffic Impact Assessment Report will be required.

Nonetheless I expect that the 2011 TIAR provides an indication of likely external works requirements.

- **Roads Connecting to Gibson Street**

There is an objection in relation to a possible street connecting into Gibson Street at its current southern end. That is not where a street connection is proposed in the Draft Initial Development Area Plan.

- **Connection to Higg Street**

In my opinion a street connection for both vehicular and other traffic should be included in the Development Plan for Whole of Site. That is explained at Section 4.10 in the 2011 TIAR. Vehicular traffic would be limited through design of the street layout, but would provide surveillance for pedestrians above that afforded by houses alone.

A footpath connection from the initial Development Plan area should connect to the existing footpath in Higg Street, and should be constructed early in the development.

8. SUMMARY AND CONCLUSIONS

In my opinion the general conclusions made in the 2011 TIAR remain valid, other than in respect of the street form diagrams that are appended to this statement.

The Draft DP09 is generally appropriate in respect of provision of traffic facilities, other than its reference to the poor design outcomes that would result from strict application of IDM.

The VicRoads submission is appropriate, although there would be little benefit given the Section 173 Agreement.

Submissions in relation to off-site infrastructure works are valid but concerns should be covered by the provisions of the Section 173 Agreement, provided that the Council applies the funds appropriately.

Connection to Higg Street for both vehicular and non-vehicular traffic should be planned into the Whole of Site Development Plan, and footpath connection to the existing footpaths in Higg Street should be part of the Initial Development.

Overall I see no reasons why the rezoning and DPO should not proceed.

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

TTM Consulting (Vic) Pty. Ltd.



J. D. Higgs

APPENDIX

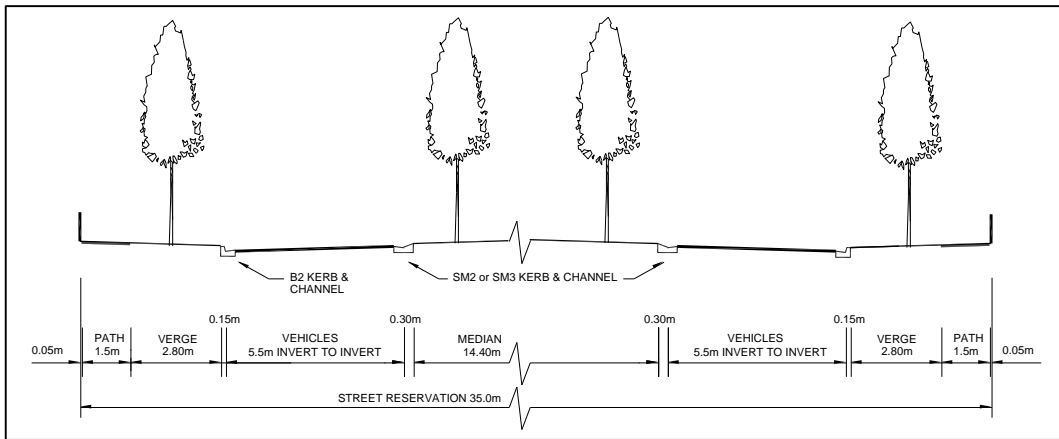


FIGURE 10 : ENTRY BOULEVARD

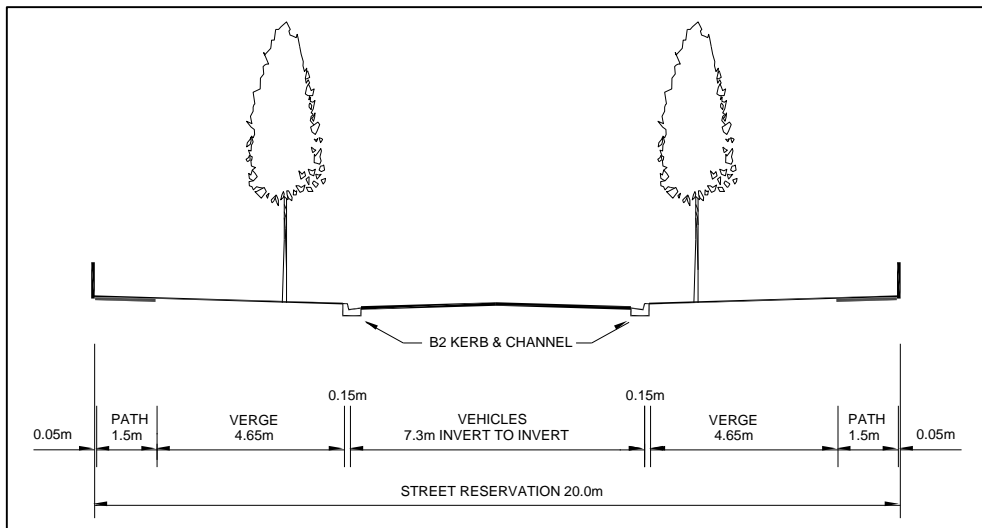


FIGURE 11 : ACCESS STREET LEVEL 2

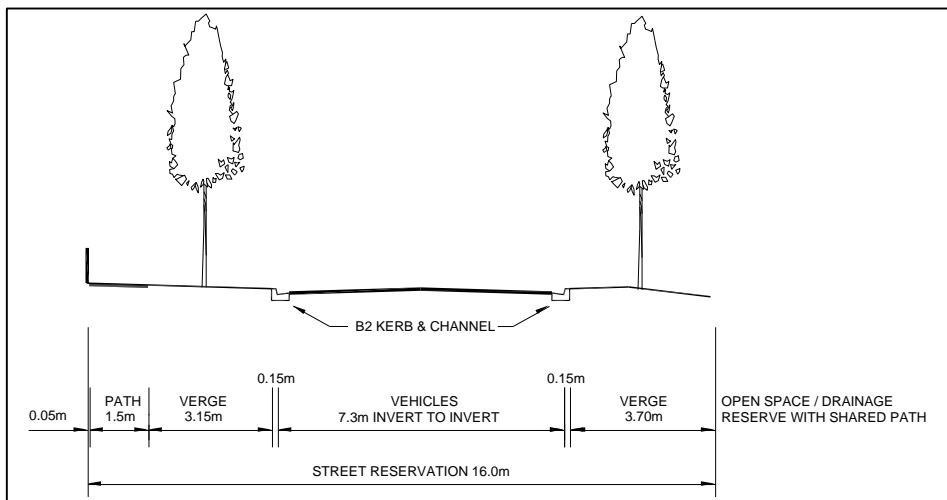


FIGURE 12 : ACCESS STREET LEVEL 2 AS PARK EDGE

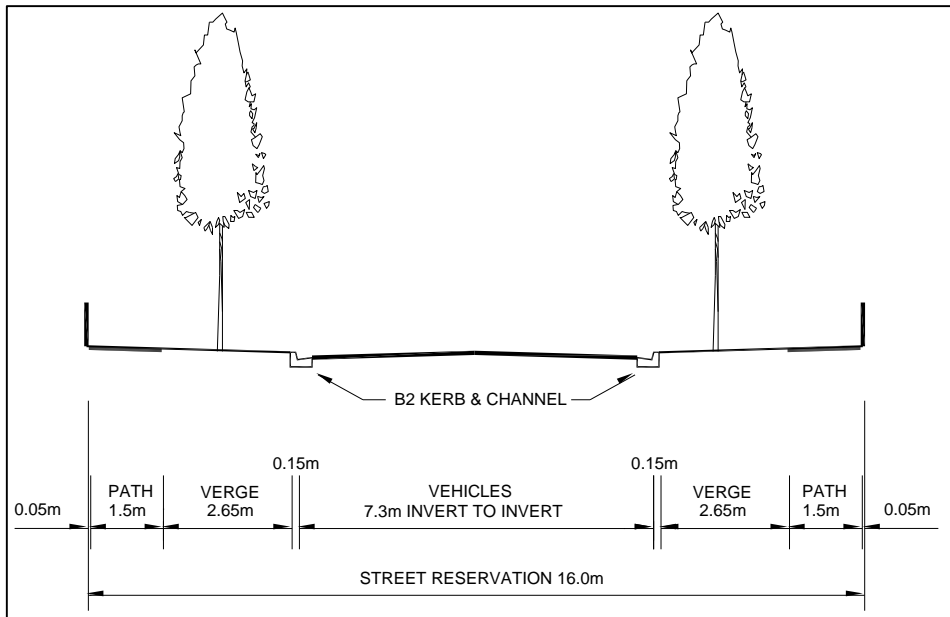


FIGURE 13 : ACCESS STREET LEVEL 1 HOUSING BOTH SIDES

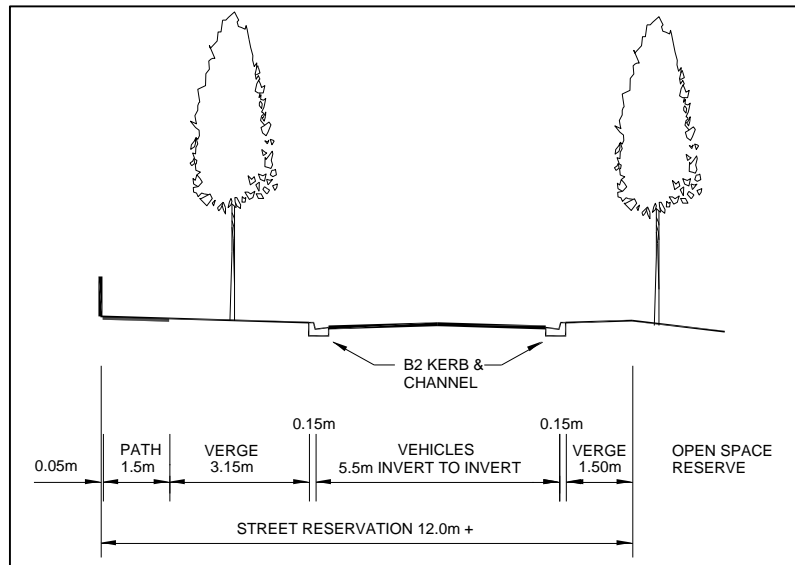


FIGURE 14 : ACCESS PLACE AS PARK EDGE STREET

TTM Consulting (Vic) Pty Ltd



**‘SHAMROCK SPRINGS’
PROPOSED RESIDENTIAL SUBDIVISION
OLD KORUMBURRA ROAD, LEONGATHA
TRAFFIC IMPACT ASSESSMENT**

Prepared By

**TTM Consulting (Vic) Pty. Ltd.
Suite 9,
70-80 Wellington Street,
Collingwood Vic 3066**

For

Murphy Family

**Enquiries : Jim Higgs
Phone : (03) 9419 0911
Fax : (03) 9415 9456
Email : email@ttmconsulting.com.au**

1. INTRODUCTION AND SCOPE

The Murphy Family owns land on the south side of Old Korumburra Road, west of Gibson Street, in Leongatha. A current proposal is to prepare an Outline Development Plan (ODP) to encompass around 60 hectares of the property, and to rezone about 13 hectares of the land contained within the Outline Development Plan.

This report describes the likely traffic impacts of the proposal, and sets out a suite of ameliorating actions to accommodate the expected traffic impacts.

2. THE SITE AND EXISTING CONDITIONS

2.1 Location

The Outline Development Plan land and the land proposed for rezoning are located as shown in Figure 1 below :-

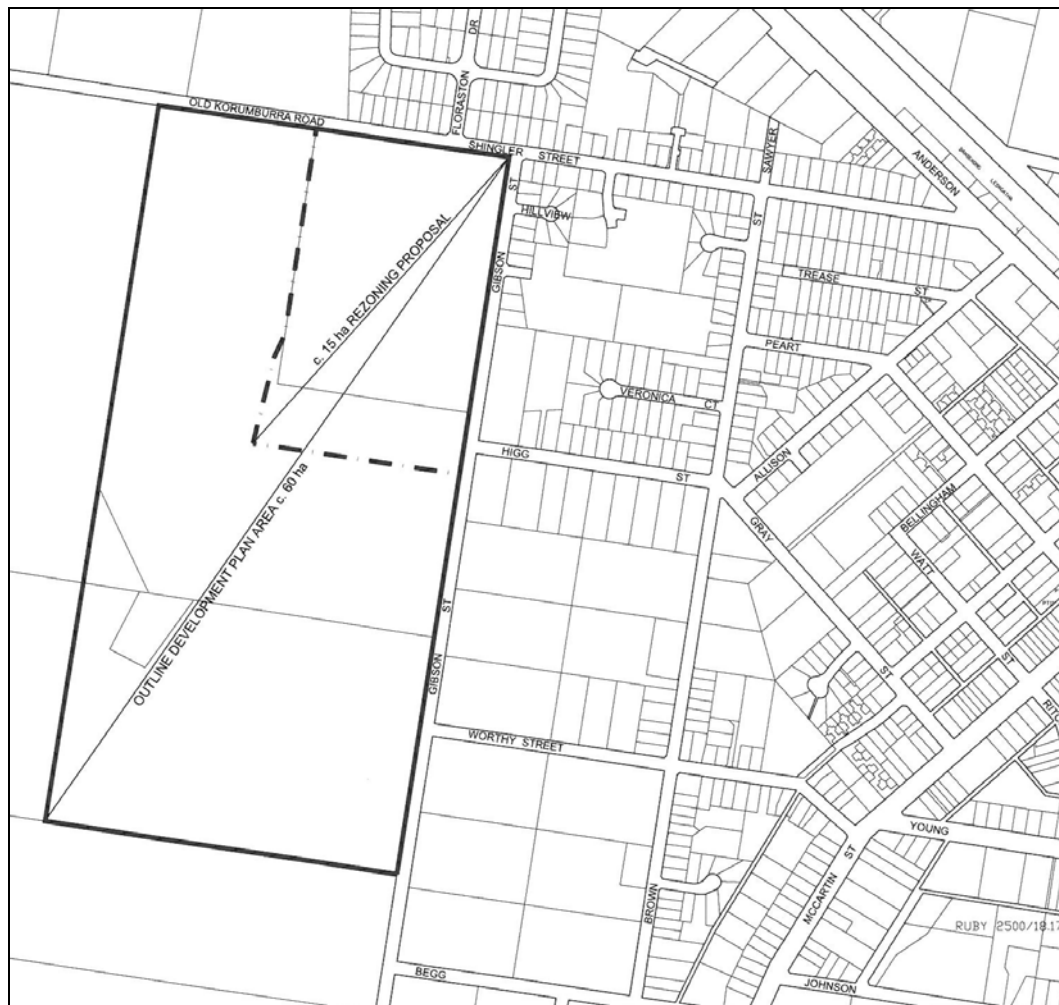


FIGURE 1 : LOCALITY PLAN

The diagram also shows the location of the 15 hectares for which rezoning will be sought.

2.2 Current Land Use

The Outline Development Plan land is currently used for grazing, and contains two houses and several sheds.

2.3 Existing Planning Context

Figure 2 below provides a copy of the current zones within the South Gippsland Planning Scheme for land in the vicinity of the subject land.

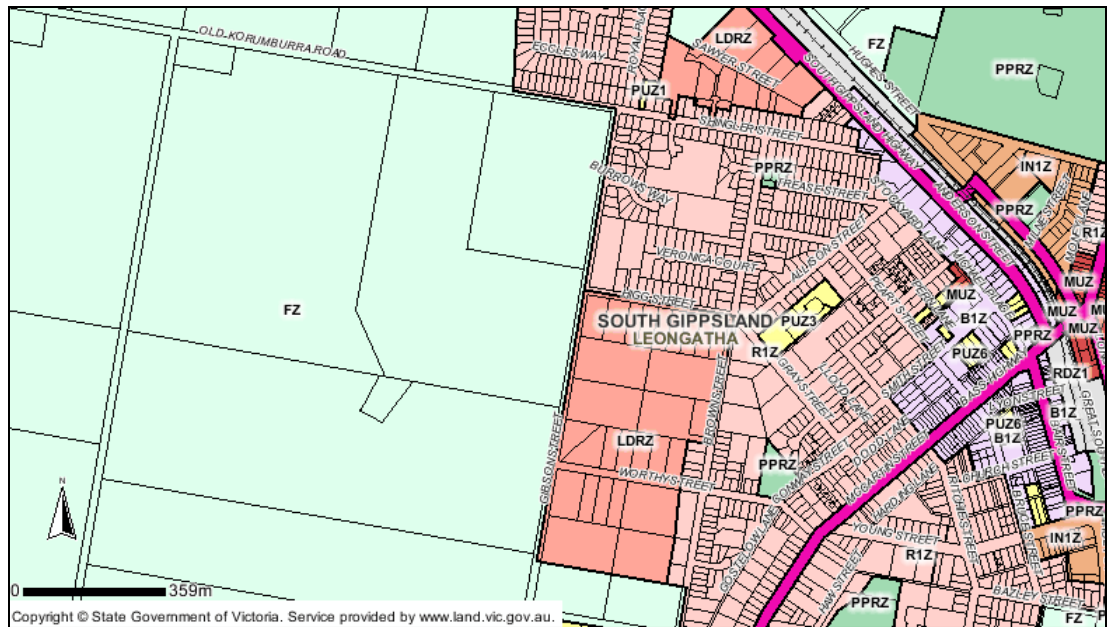


FIGURE 2 :CURRENT ZONING

The proposal to rezone about 15 hectares of the north eastern part of the Outline Development Plan land is simply an extension of the existing Residential 1 zoned land along Gibson Street and Shingler Street.

2.4 Existing Traffic Facilities and Conditions

2.4.1 Overview

This section of the report describes existing traffic facilities that may be significantly impacted by development and occupation of the land within the Outline Development Plan, and which may warrant some ameliorating actions.

2.4.2 Old Korumburra Road/Shingler Street

Across the western part of the frontage of the subject land Old Korumburra Road has a typical “sealed minor rural road” form, with a sealed carriageway of about 5.2 metres width, graveled shoulders and swaled side drains. Traffic volume is estimated at fewer than 500 daily vehicle movements west of the recent subdivision containing Floraston Drive.

In front of the eastern part of the Outline Development Plan land (and the recent subdivision on the northern side of Old Korumburra Road) the carriageway has been kerbed and widened on the northern side to allow for parallel parking in front of the newly created housing lots. Total carriageway width is 8 metres, with an offset “centerline” marked about 4.8 metres from the northern kerb.



SHINGLER STREET LOOKING EAST TOWARDS FLORASTON DRIVE

East of Gibson Street, where there are houses on both sides, Shingler Street has a kerbed carriageway of about 10.6 metres width, in a reservation of 20.12 metres width.



SHINGLER STREET LOOKING WEST FROM JUST EAST OF GIBSON ST

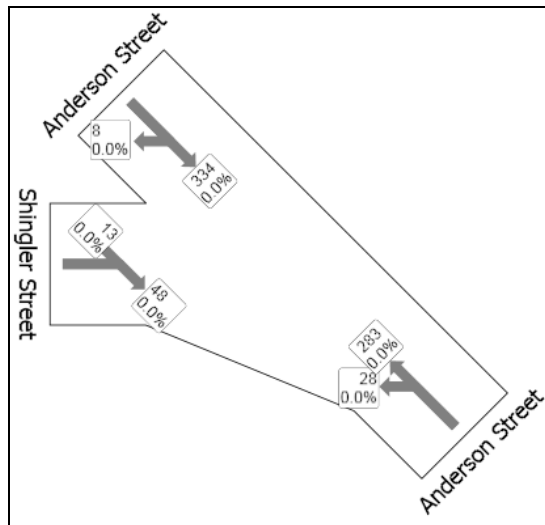
Traffic volume is estimated at around 300 daily vehicle movements at the Floraston Drive intersection, increasing to around 1,000 daily vehicle movements at the Anderson Street intersection.

2.4.3 Shingler Street/Anderson Street Intersection

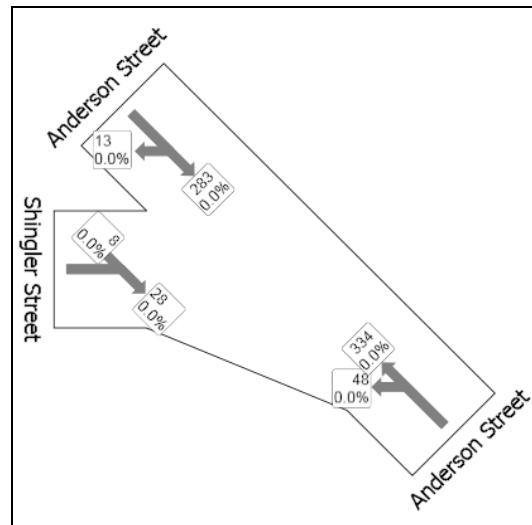
This intersection has a channelized format that “squares” the Shingler Street approach lanes. Auxiliary turn lanes are present in Anderson Street.



On Wednesday November 10th 2010, TTM Consulting (Vic) Pty. Ltd. conducted a turning movement count at the intersection of Anderson Street and Shingler Street, between 4:30pm and 6:00pm. Peak hour was 4:30-5:30pm. Assuming that AM peak hour will be more or less the reverse of the PM peak hour, the following existing turning movements are derived for the AM and PM peak hours :-



EXISTING AM PEAK HOUR



EXISTING PM PEAK HOUR

2.4.4 Gibson Street Northern End

Gibson Street has a sealed (kerbed east side) carriageway adjacent to the conventionally sized residential lots. Sealed carriageway is 7 metres width, with or without kerb.



GIBSON STREET LOOKING SOUTH, KERBED BOTH SIDES SECTION

Current traffic volumes are estimated at around 100 vehicle trips per day at the Shingler Street end, but this will increase as development on the Burrows Way area and further south occurs. Gibson Street at the north end has an environmental capacity of about 2,000 -3,000 vehicles per day on the basis of Clause 56.06 of the South Gippsland Planning Scheme.

2.4.5 Higg Street

Higg Street is currently a *cul de sac* accommodating around 24 house lots, most of which are developed and occupied. Estimate daily traffic is around 100 daily vehicle movements at the Brown Street intersection.

Higg Street has a sealed and kerbed carriageway width of about 6.5 metres, with a narrow footpath on the northern side of the street. Why Higg Street would have a carriageway of 6.5 metres width is a puzzle – it should be either about 5.5 metres or about 7.2 metres because anything between is ambiguous in that it is neither one clear vehicle width past a parked car nor two. Both footpath and southern kerb disappear at the western end.



HIGG STREET WEST END



HIGG STREET EAST END

2.4.5 Gray Street

Gray Street has a single lane sealed pavement near Brown Street, single lane unsealed pavement over a short distance east of the housing abutting near Brown Street, and a kerbed and sealed pavement of about 9.2 metres width east of the Sapphire Court intersection.



GRAY STREET LOOKING SOUTH-EAST FROM NEAR BROWN STREET

West of Sapphire Court we estimate that daily traffic is around 100 vehicle movements.

2.4.6 Worthy Street

East of Brown Street Worthy Street has a kerbed and sealed pavement about 9.2 metres wide. Footpath is absent. Traffic volume is estimated at fewer than 200 daily vehicle movements just east of Brown Street, rising to about 300 vehicle movements per day near McCartin Street. West of Brown Street the carriageway is unsealed, with swales and treed verges. Traffic west of Brown Street is fewer than 100 daily vehicle movements.



WORTHY STREET LOOKING WEST TOWARDS BROWN STREET



**WORTHY STREET WEST OF BROWN STREET,
LOOKING EAST FROM GIBSON STREET**

2.4.7 Brown Street

Brown Street between Shingler Street and Worthy Street has a kerbed and sealed carriageway of 9.2 metres width. South of Worthy Street the Brown Street carriageway has a sealed width of about 5 metres without kerbs. Estimated daily traffic anywhere along Brown Street is fewer than 500 vehicle movements.



BROWN STREET LOOKING SOUTH FROM SOUTH OF SHINGLER STREET



BROWN STREET LOOKING SOUTH FROM NEAR WORTHY STREET

2.4.8 Gibson Street Southern End

Gibson Street near Worthy Street has an unsealed carriageway, with swales and treed verges. Traffic in this section is fewer than about 40 daily vehicle movements at any location.



GIBSON STREET LOOKING NORTH FROM NEAR WORTHY STREET

3. THE PROPOSED OUTLINE DEVELOPMENT PLAN

The plan at Figure 3 shows the proposed Outline Development Plan.



FIGURE 3 : PROPOSED OUTLINE DEVELOPMENT PLAN

This plan has been prepared by Beveridge Williams.

4. TRAFFIC GENERATION AND EXTERNAL IMPACTS

4.1 Basis of Traffic Estimates

Traffic impacts are estimated on the basis of the following criteria :-

- AM Peak Hour Outbound 0.5 vehicles per hour/dwelling
 Inbound 0.3 vehicles per hour/dwelling
- PM peak Hour Outbound 0.3 vehicles per hour/dwelling
 Inbound 0.5 vehicles per hour/dwelling
- Daily Traffic 8.5 vehicle movements per dwelling per day

These rates are from surveys taken by our office and others, and are generally accepted as being conservative.

4.2 Traffic Generation and Assignment to Street Network

4.2.1 Daily Traffic Generation

Total daily traffic generation from the estimated yield of 600 dwellings is estimated at about 5,100 vehicle trips. Some containment of vehicle trips is likely, but this is not allowed so that further conservatism is built into the analysis.

The directional distribution is based on an intuitive assessment of the locations of key attractors and generators of traffic around Leongatha. Most education facilities are most conveniently reached via Worthy Street, jobs are located in commercial and industrial precincts as well as within the McCartin Street core, retail is primarily in the vicinity of McCartin Street, and the key sports and recreation facilities are east of the railway.

We are advised by senior Council staff that a significant proportion of workers from Leongatha work in places including Pakenham, Dandenong, Hallam and surrounding areas, and drive to work. In this analysis we will assume that 10% of workers will travel to and possibly through Korumburra to attend work.

For 600 dwellings we expect a total workforce of around 750 persons (1.25 per dwelling), with 75 travelling west to go to work.

A key issue is the potential use of Sages and Logan's Road by traffic generated from the development of land in the subject Outline Development Plan area. From the proposed intersection in the Outline Development Plan at Old Korumburra Road to the intersection of Sages and Logan's Road and the South Gippsland Highway it is :-

- 4.9 km via Sages and Logan's Road, or
- 5.7 km via Shingler Street and South Gippsland Highway.

Travel times are similar, around 5 minutes by either route, with variables being related to intersection delay at Shingler Street/Anderson Street and the condition of the unsealed surface in Sages and Logan's Road.

In our view some people will take the shorter route, and others will prefer the cleaner route via fully sealed surfaces. There is little science available, so we will assume 50/50 split with car occupancy at 1.1 average.

On that basis up to 70 daily work related vehicle trips could be added to Sages and Logan’s Road by the development and use of the Outline Development Plan land. Some trips for other purposes are also likely to be added to Sages and Logan’s Road from Shamrock Springs, so in this analysis we will allow a further 30 daily vehicle trips.

In our view a reasonable level of traffic that can be accommodated by an unsealed pavement in reasonably good condition is around 300 daily vehicle movements. Current volume would be well under 150 daily movements, and therefore the impacts can be absorbed.

The plan at Figure 4 provides estimated daily traffic generation on both internal proposed streets and connections with the surrounding street network.



FIGURE 4 : ESTIMATED DAILY VEHICULAR TRAFFIC GENERATION

The above traffic distribution estimate is based on an assumption that all reasonably available connection opportunities will be taken. There has been some discussion and debate including Council staff about the appropriateness of linking into Higg Street. If there is no vehicular connection into Higg Street that would leave the easterly links (at Worthy Street and Shingler Street) about 900 metres apart, which would be an extremely poor piece of urban planning. Therefore we strongly recommend the connection, but with design of street layouts internal to Shamrock Springs organized to restrict the traffic loading that may occur on to Higg Street.

This is described in more detail at Section 4.5 in this report.

4.2.2 Peak Period Traffic Generation

The diagrams at Figure 4A below shows estimated peak period vehicle movements that are likely to be generated at the two major street connection points.

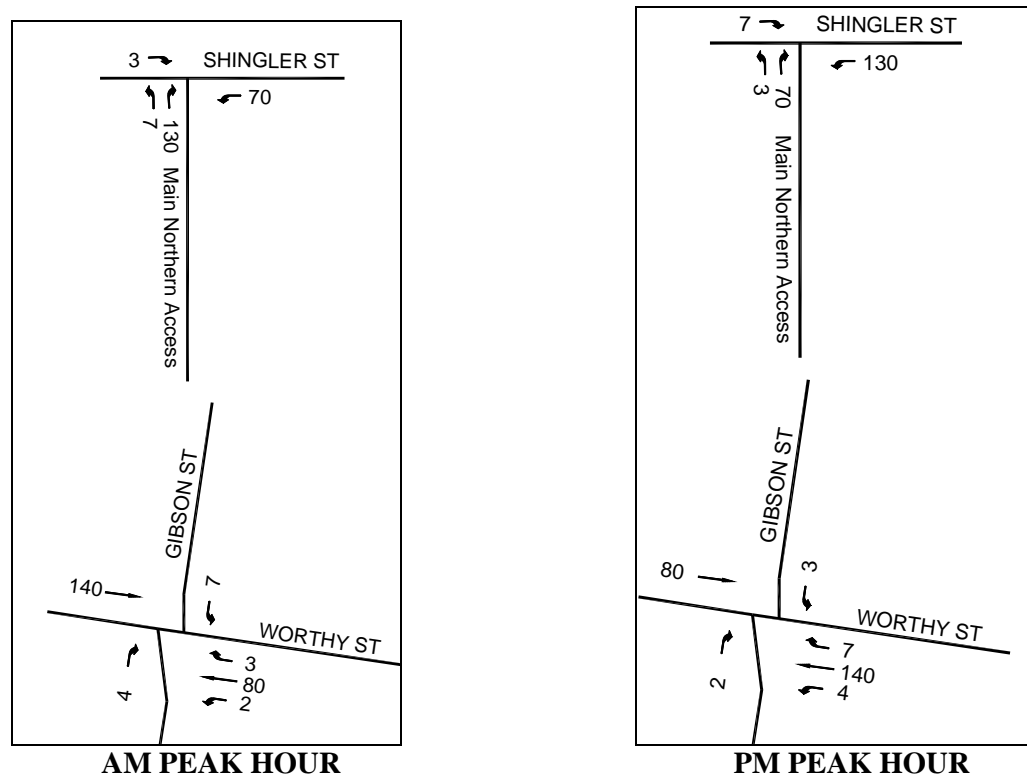
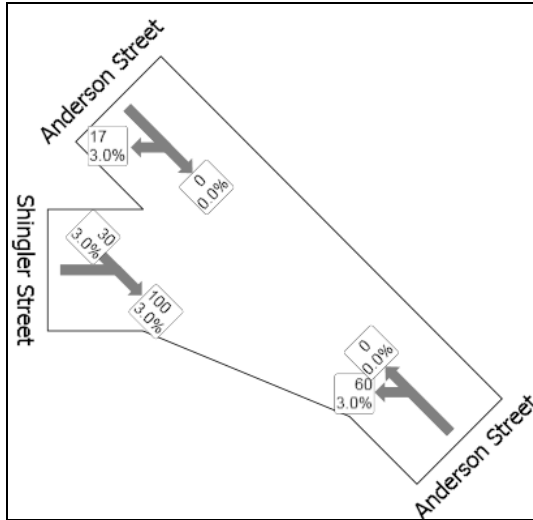


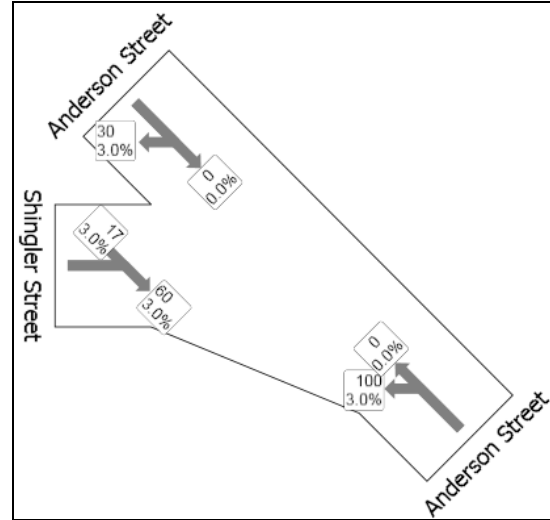
FIGURE 4A : ESTIMATED PEAK HOUR TRAFFIC GENERATION AT KEY POINTS

4.3 Intersection Impacts : Shingler Street/Anderson Street

Peak period traffic movements are used to assess intersection impacts. The only concentration point for traffic associated with the proposal is at the intersection of Shingler Street and Anderson Street. Based on the current distribution of traffic movements at this intersection, and allowing for the traffic generation estimates shown at Figures 4 and 4A, gives the following estimate of peak period vehicle movements :-



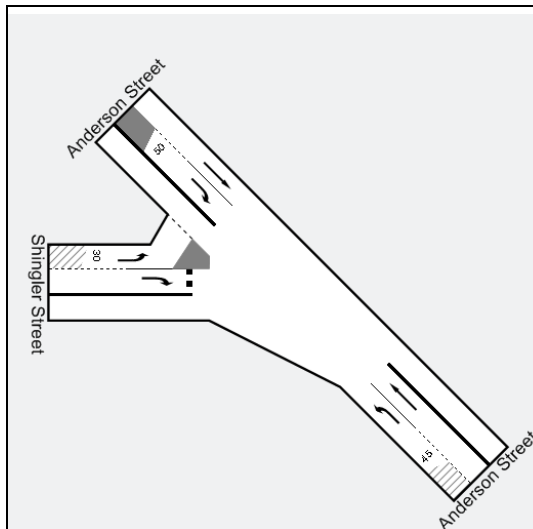
AM PEAK HOUR



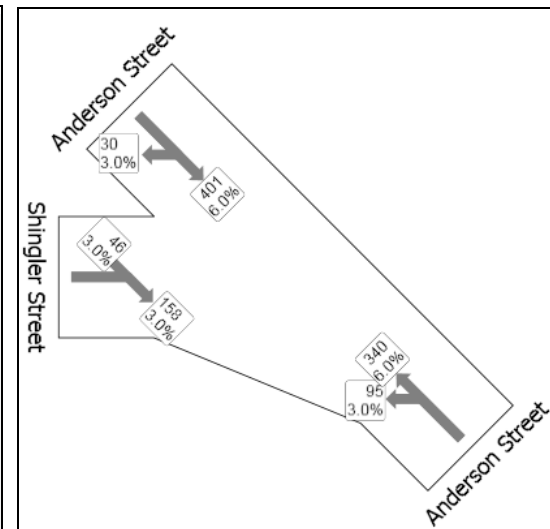
PM PEAK HOUR

Intersection performance analysis is made in this report by adding these movements to the existing counts from Section 2.4.3 of this report, plus a margin of 20% to allow for future growth.

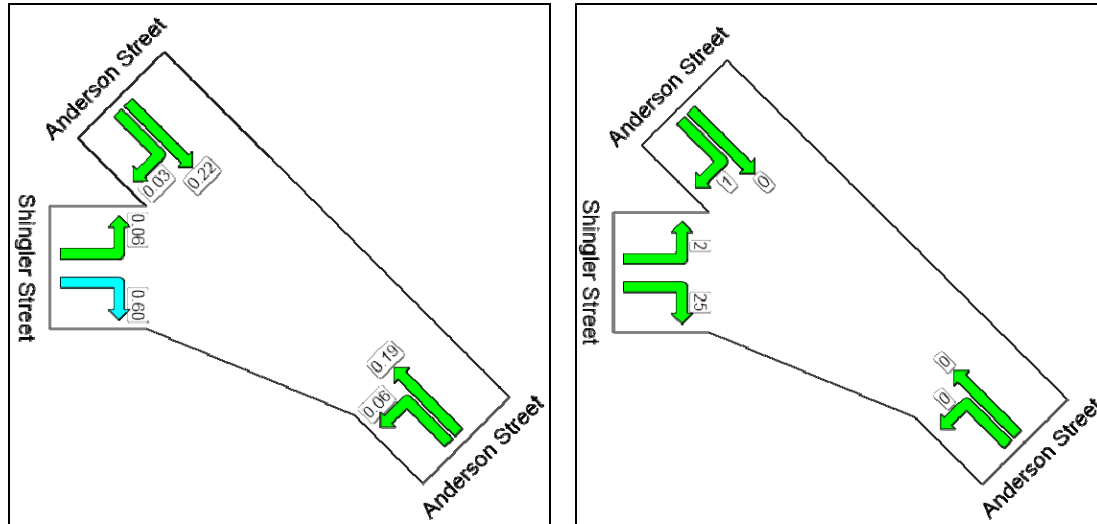
Clearly the critical movement here is the right turn out of Shingler Street during the AM peak hour. Using Sidra the following inputs and outputs give an indication of likely intersection performance :-



INTERSECTION LAYOUT



INPUT VOLUMES AM PEAK HOUR



DEGREE OF SATURATION

95TH PERCENTILE QUEUE (metres)

Clearly there is ample capacity available for accommodation of foreseeable growth in the north-western part of Leongatha.

4.4 Traffic Impact on Worthy Street

Worthy Street is unsealed from Gibson Street through to Brown Street. Existing traffic in that section is that associated with about 12 dwellings in the low density residential area, say about 100 vehicles per day. The additional traffic will take the total to around 2,300 vehicles per day, which warrants a street carriageway of 7.2 metres width between kerbs, or 6.2 metres with flush plinthed edges and swaled drains. Parking demand is close to zero in this segment of Worthy Street due to the low density residential land use that is present on both sides of Worthy Street.

East of Brown Street the AADT will increase to around 2,700 vehicle movements, well within both traffic and environmental capacity for the existing street form.

At the intersection of Brown Street and Worthy Street we recommend that a staggered junction be created with the Worthy Street construction, to ensure slow vehicle speeds through the junction and to highlight its presence. The form of a staggered junction could be similar to that shown in Figure 5 below.



FIGURE 5 : SCHEMATIC CONCEPT FOR STAGGERED JUNCTION

A significant contribution to the construction of Worthy Street west of Brown Street would be a reasonable imposition on the development of the Murphy land.

4.5 Traffic Impact on Higg Street

Adding about 500 daily vehicle trips to Higg Street will take the total to around 650 vehicle movements per day at the eastern end. The existing construction of Higg Street is 6.5 metres carriageway, consistent with something between Access Place and Access Street Level 1 in the ResCode sections of the South Gippsland Planning Scheme. Environmental traffic capacity is thus at least 1,000 vehicles per day.

Footpaths should be extended from the Shamrock Springs development into Higg Street because Higg Street provides the most direct pedestrian connection between Shamrock Springs and the Leongatha Town Centre, and that pedestrian movement should be encouraged.

The presence of vehicular traffic to the street will add to pedestrian security and surveillance, which is a strong reason to ensure that vehicular connectivity is available.

4.6 Gibson Street South

Construction of the southern end of Gibson Street will be necessary for frontage of around 12 dwelling sites. There are 3 existing dwellings in the low density residential zone opposite, on the eastern side of the street.

Estimated AADT for the subject section of Gibson Street is around 100 vehicle movements per day. Access Place (5.5 metres carriageway width) is the appropriate street form.

4.7 Gray Street

Some traffic to/from Higg Street will use Gray Street, which is currently unsealed. In our opinion Gray Street should have a sealed carriageway and footpaths already, a responsibility of the Council.

4.8 Construction of Gibson Street North

The current construction standard of 7 metres of trafficable carriageway is adequate to accommodate the traffic and parking demands associated with the existing and potential abutting development. Where there is no kerb present under the trees in the western verge at the northern end, it may be necessary to provide kerb and channel for drainage and access purposes. That decision should be made in consideration of the trees and drainage requirements, but no additional carriageway is needed.



GIBSON STREET NORTH, LOOKING SOUTH

4.9 Street Connection to Gibson Street North

The diagram below shows the recommended layout for the connection to Gibson Street.

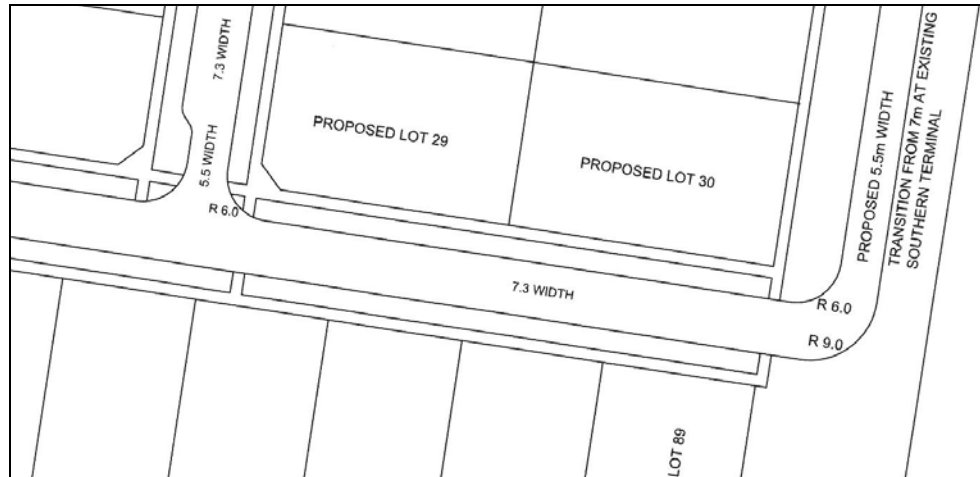


FIGURE 6 : CONNECTION TO GIBSON STREET NORTH

4.10 Connection to Higg Street

At the western end of Higg Street and across the Gibson Street reservation we recommend that the topography be used to create a tight corner connection, with the carriageway at 5.5 metres width. Figure 6 below shows a diagrammatic layout to achieve traffic speed control and to facilitate on street parking near the Higg Street/Gibson Street intersection.

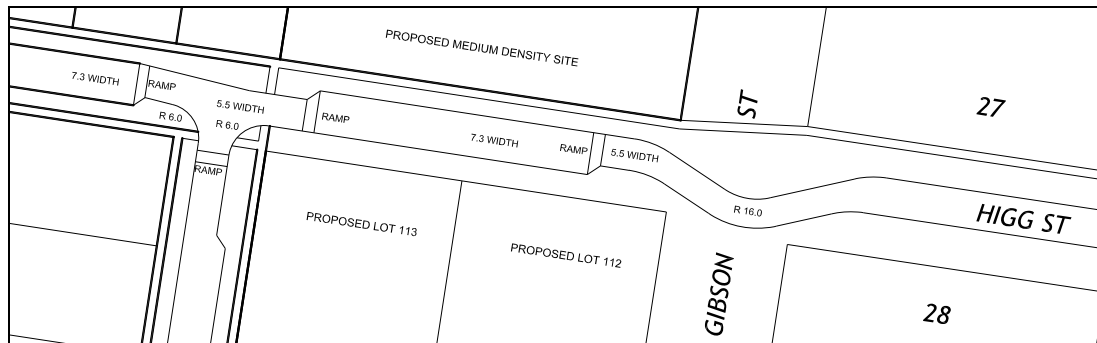


FIGURE 7 : LINK TO HIGG STREET

4.11 Intersection at Shingler Street

The right turn from the west entry movement will be minimal – about 30 daily vehicle movements or fewer than 5 vehicles per hour during peak periods. No separate right turn lane is either desirable or warranted.

Kerbing and parking lane in front of the proposed dwelling sites west of the main entrance is desirable, similar to that provided for the existing dwellings on the northern side of the street.

The entry street should have 5.5 metres wide carriageways either side of the wide central reservation that accommodates the existing large eucalypt tree. These carriageways can interact with Shingler Street as depicted in Figure 7 below. Figure 7 also shows how the street carriageways can intersect south of the large tree.



FIGURE 8 : INTERSECTION AT SHINGLER STREET

4.12 Other External Works Indicated

4.12.1 Intersection Gibson Street and Worthy Street

The Gibson Street legs of this intersection will carry negligible levels of traffic, with few or no movements crossing Worthy Street.

A simple carriageway will be an adequate intersection form.

4.12.2 Intersection Brown Street and Worthy Street

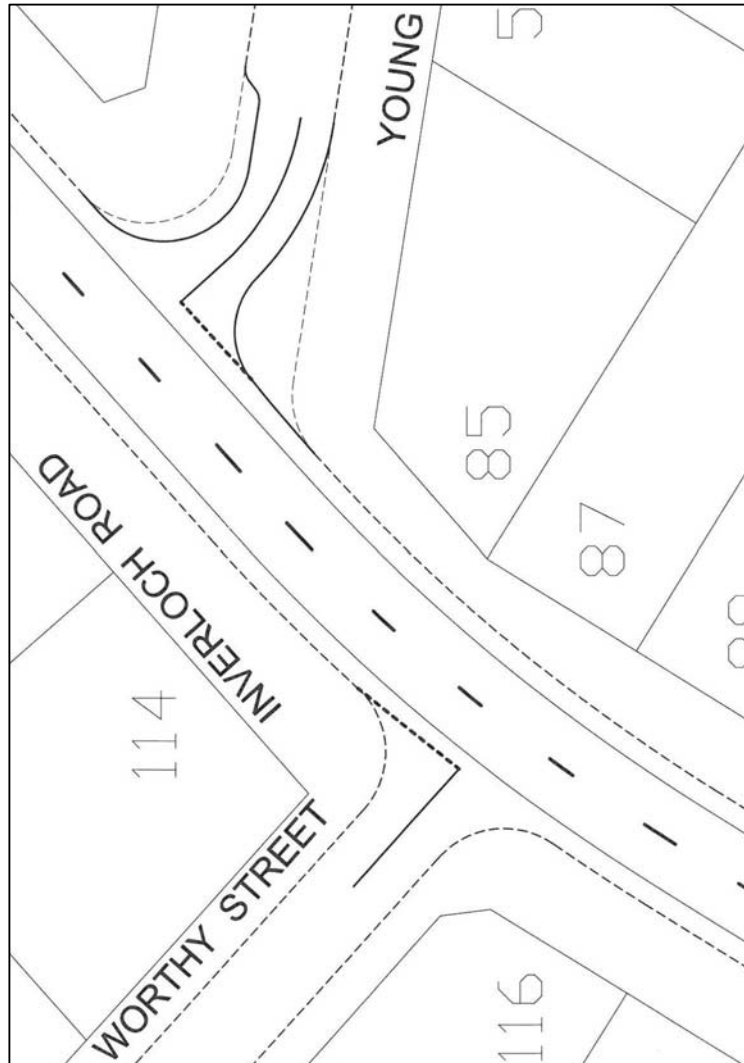
This intersection will have some Brown Street traffic crossing over a substantially increased volume of Worthy Street traffic. Brown Street could be narrowed and staggered through the intersection, to enhance slow speed of crossing traffic. Alternatively a small roundabout could be used, but these are generally a poor piece of urbanism and unnecessary where traffic volumes are low.

4.12.3 Intersection Young Street and Worthy Street with Inverloch Road

Traffic movements between the subject land proposed for rezoning and the schools and other activity nodes on the eastern side of Leongatha will add significantly to the turning movements at the intersections of Worthy Street and Young Street with Inverloch Road.

These intersections are about 40 metres apart, with the offset or “stagger” such that right turners would overlap, which is not the preferred juxtaposition of the side streets. The Young Street intersection has a very wide entry “throat” area, due to a combination of very wide carriageway and the intersection angle at close to 45 degrees. Worthy Street intersects Inverloch Road almost at a right angle.

If the entry “throat” area of the Young Street intersection was squared and tightened so that the excessive pavement is reduced the effective separation could become about 55 metres, which is at least adequate. This would enhance environmental control over vehicle speeds at the junction, shorten the walk distance for pedestrians crossing the intersection, and provide a palette for some landscaping if desired. The diagram at Figure 9 shows how the above would be achieved.



**FIGURE 9 : WORTHY STREET/YOUNG STREET/INVERLOCH ROAD
POSSIBLE STAGGERED JUNCTION**

5. PROVISIONS FOR PUBLIC TRANSPORT

Local bus services in Leongatha may not be available for many years (or decades), but the existing streets in the vicinity of the ODP land that may accommodate bus activity include Shingler Street, Brown Street and Worthy Street. An extension of that potential through the ODP land may be desirable, with the main “spine” street being the obvious link between Shingler Street and Worthy Street.

This street will have low parking demand and low traffic volumes, and 7.3 metres of carriageway width throughout will be adequate and will allow use by a bus service should that ever be provided.

6. APPROPRIATE STREET FORMS FOR ODP

A suite of street forms is chosen from the provisions of Clause 56.06 in the South Gippsland Planning Scheme, and applied (with modification as appropriate) in consideration of future traffic volumes and car parking considerations. The typical sections for these streets are provided in Figure 10-15, and the street forms are proposed to be located as shown in Figure 16.

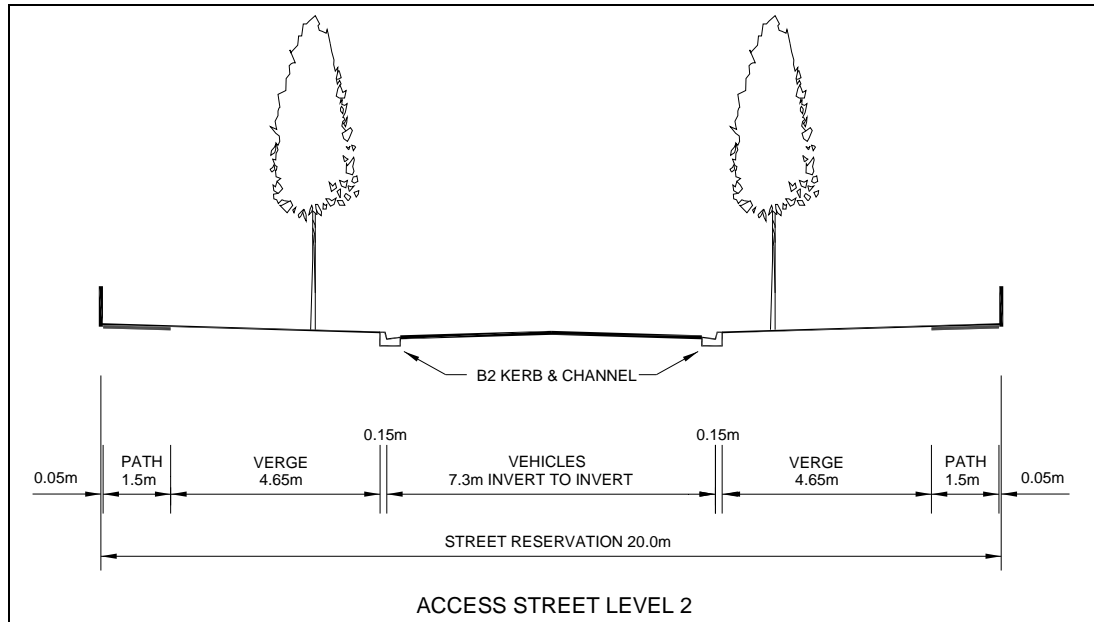


FIGURE 10 : ENTRY BOULEVARD

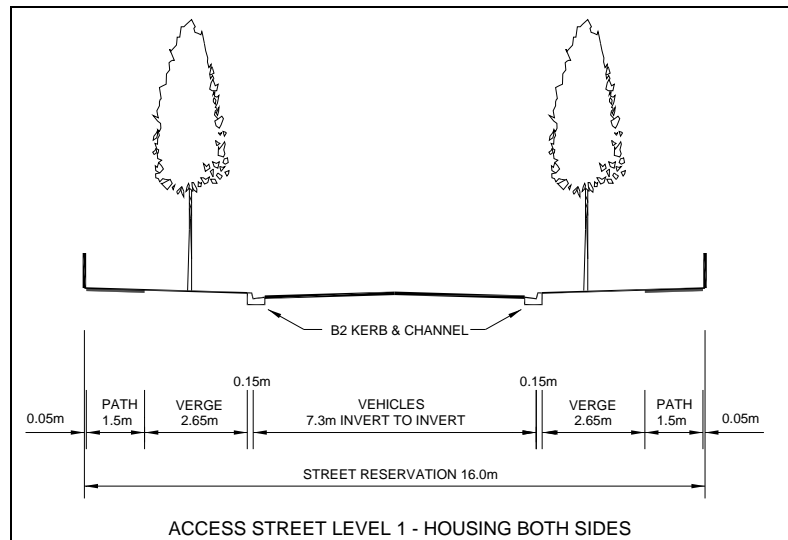


FIGURE 11 : ACCESS STREET LEVEL 2

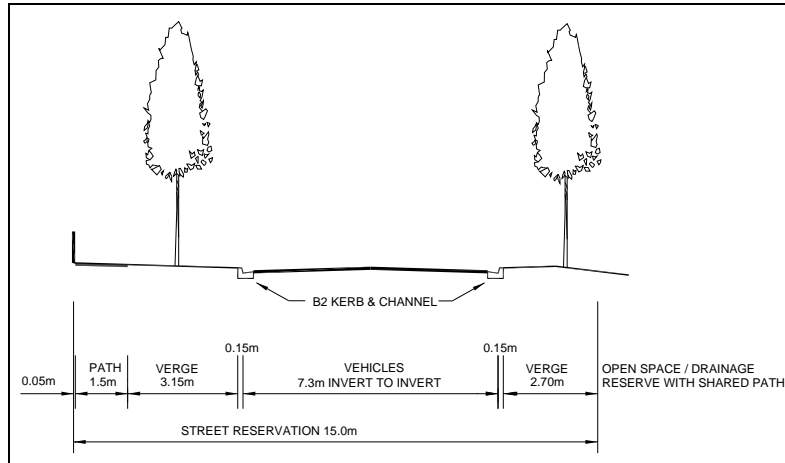


FIGURE 12 : ACCESS STREET LEVEL 1

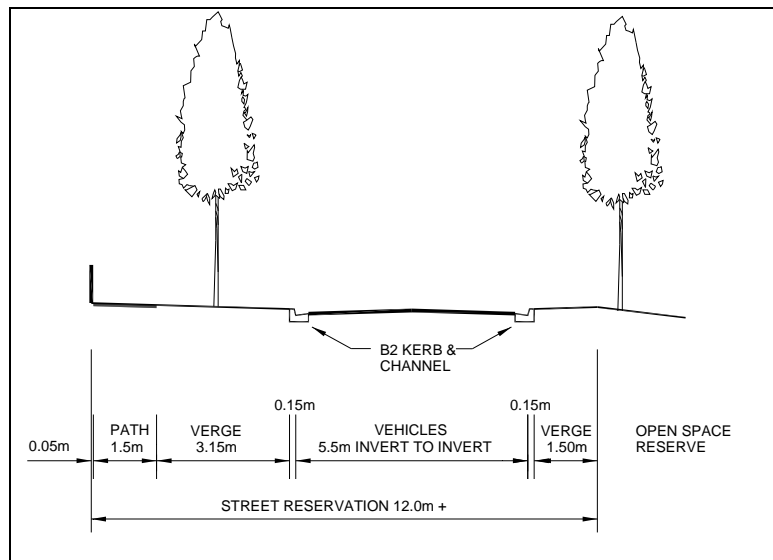


FIGURE 13 : PARK EDGE ACCESS STREET LEVEL 2

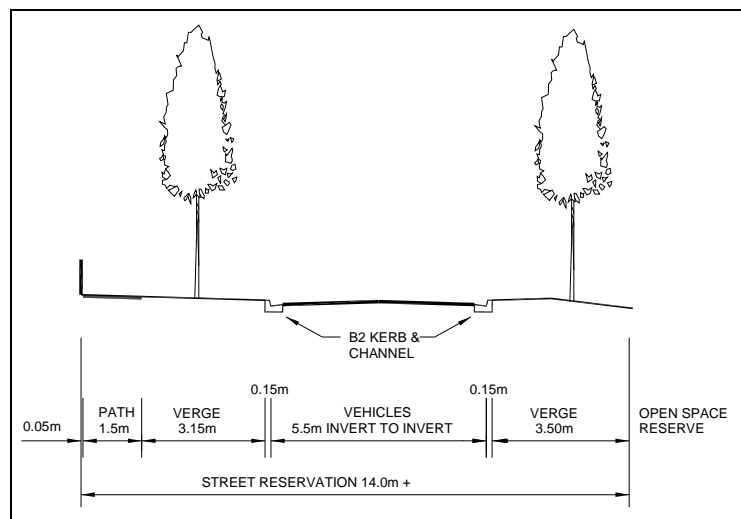


FIGURE 14 : PARK EDGE ACCESS PLACE

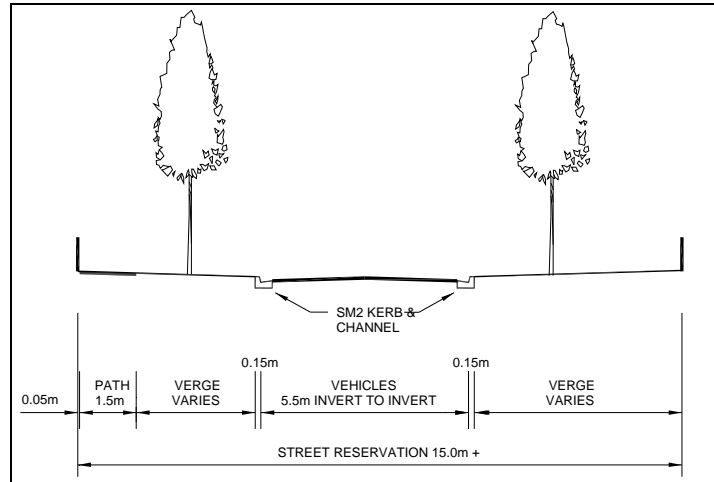


FIGURE 15 : ACCESS PLACE/GIBSON STREET SOUTH

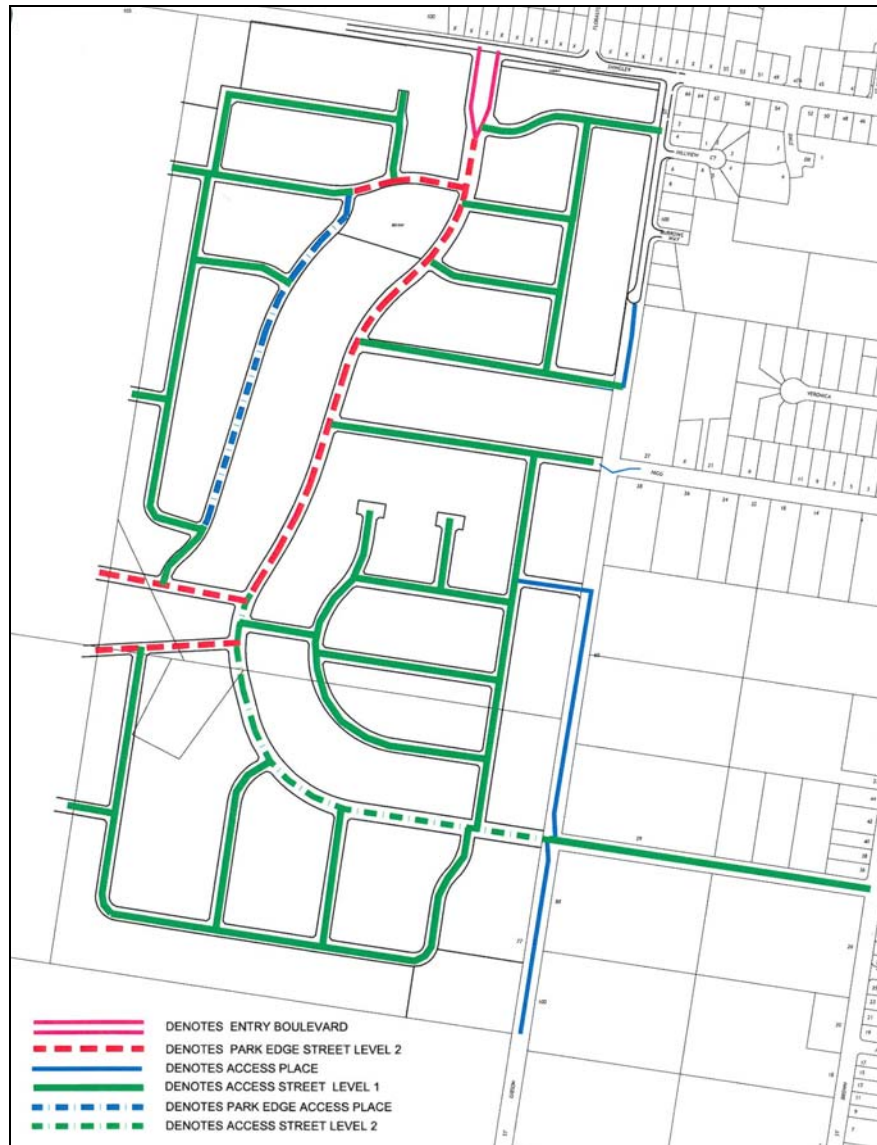


FIGURE 16 : STREET TYPES LOCATED

7. TRAFFIC IMPACTS OF 13 HA STAGE 1 DEVELOPMENT



FIGURE 17 : STAGE 1 DEVELOPMENT PLAN

With approximately 150 lots being proposed in the initial 15 hectares the external traffic generation can be expected at around 1,300 daily vehicle trips. Because of limited connections virtually all of this traffic will be concentrated on to Shingler Street.

The total initial additional traffic on Shingler Street will be less than that associated with full development of the ODP land, and consequently impacts will be less.

Traffic on internal streets will be less than under full development, and consequently no significant traffic issues will result.

A footpath connection into the Higg Street footpath should be provided in conjunction with the Stage 1 development.

Subject to the connections and street form being as proposed for the full ODP land and as described in this report, there are no traffic related reasons for refusal of the proposed rezoning.

8. SUMMARY AND CONCLUSIONS

Subject to the recommendations of this report being conditioned or otherwise achieved there are no transport or traffic engineering reasons why the proposed amendment to the Planning Scheme should not proceed,

The traffic impacts of the proposed Stage 1 development of around 150 lots can be absorbed by the existing movement network.

TTM Consulting (Vic) Pty. Ltd.



J. D. Higgs