## Beveridge Williams

development \& environment consultants

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## Revision Table

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## APPENDICES

## APPENDIX A. DEVELOPMENT PLANS

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## 1 PREAMBLE

### 1.1 Introduction

Beveridge Williams has been engaged by Wallis Watson Nyora Pty Ltd to prepare a Traffic and Transport report for the proposed development located at 379 Lang Lang-Poowong Road, 30 Glovers Road and 951 Yannathan Road, in Nyora. The purpose of this report is to inform the transport, pedestrian and cycling needs and impacts associated with the development.

The following report sets out the findings of this assessment based on the investigations undertaken by Beveridge Williams.

### 1.2 Objectives

Based on the scope of Beveridge Williams engagement the information contained within this assessment has been prepared to respond the following objectives:

- Traffic Impact Considerations.


### 1.3 Facts and Matters Relied Upon

In preparing this assessment, Beveridge Williams have relied upon the following facts, matters and information:

- South Gippsland Planning Scheme;
- Site inspection observations;
- Traffic survey data collected; and
- Plans 0900659 ISSP V02 and 0900659 IDP V10 dated 21 September 2018 prepared by Beveridge Williams.


## 2 EXISTING CONDITIONS

### 2.1 Subject Site

The subject site is located at 379 Lang Lang-Poowong Road, 30 Glovers Road and 951 Yannathan Road in Nyora. The subject site is irregular in shape and comprises of 3 parcels of land with frontages to Lang Lang-Poowong Road of approximately 1.08 km and Yannathan Road of approximately 500 m . Glovers Road runs from the north-west corner of the site along the northern boundary for approximately 1.6 km . Access to the subject site is gained from Lang Lang-Poowong Road on the southern frontage, and Yannathan Road to the site's west. Currently, the site is predominately rural in nature with a limited number of residential dwellings. The subject site encompasses an area of approximately 103ha.

The subject site and the 3 parcels of land which comprise it are displayed in Figure 1.
Figure 1: Subject Site


### 2.2 Site Zoning

All 3 parcels of land were, until recently, zoned for farming use (FZ). A section of the land at 379 Lang Lang-Poowong Road was recently rezoned to General Residential (GRZ1). The planning map is shown in Figure 2.

Figure 2: Zoning Map


### 2.3 Subject Site Context

The land to the north and east of the subject site is predominately rural in nature while the rural town of Nyora is located immediately to the south and west. Lang Lang-Poowong Road is a VicRoads declared arterial road and provides primary access to town towards the north-east.

The locality of the subject site is illustrated in Figure 3.
Figure 3: Subject Site Locality


### 2.4 Road Network

### 2.4.1 Lang Lang-Poowong Road

Lang Lang-Poowong Road is a VicRoads declared arterial road which runs along the subject site's southern boundary. Lang Lang-Poowong Road runs between Drouin-Korumburra Road in the east and the South Gippsland Highway in the west.

In the vicinity of the subject site Lang Lang-Poowong Road is generally aligned in an east-west fashion and comprises a sealed carriageway approximately 8 m in width with a single trafficable lane in each direction. The section of Lang Lang-Poowong Road adjacent to the site operates with a speed limit of $80 \mathrm{~km} / \mathrm{h}$.

The general configuration of Lang Lang-Poowong Road is shown in Figure 4 and Figure 5.
Figure 4: Lang Lang-Poowong Road Looking East


Figure 5: Lang Lang-Poowong Road Looking West


### 2.4.2 Yannathan Road

Yannathan Road is a local road generally aligned in a north-south fashion along the subject site's western boundary. Yannathan Road runs from the intersection with Glovers Road in the north and Watts Road in the south.

In the vicinity of the subject site Yannathan Road comprises of a sealed carriageway approximately 6 m in width with a single trafficable lane in each direction. Yannathan Road operates with a default rural speed limit of $100 \mathrm{~km} / \mathrm{h}$.

The general configuration of Yannathan Road is shown in Figure 6 and Figure 7.
Figure 6: Yannathan Road Looking North


Figure 7: Yannathan Road Looking South


### 2.4.3 Glovers Road

Glovers Road is a local road generally aligned in northwest-southeast fashion along the subject site's north boundary. Glovers Road runs from Yannathan Road in the west and provides access to the land immediately north of the subject site. Glovers Road also runs along the site's eastern boundary running from Lang Lang-Poowong Road and functions as a driveway to a residential dwelling. The section of Glovers Road running along the site's eastern boundary does not meet the section of Glovers Road running along the northern boundary.

The carriageway of Glovers Road is generally unsealed.

### 2.5 Existing Traffic Volumes

### 2.5.1 Lang Lang-Poowong Road \& Yannathan Road Traffic Volumes

Beveridge Williams commissioned traffic tube counts to be undertaken on Lang Lang-Poowong Road and Yannathan Road between Monday 5 February and Monday 12 February 2018. The tube counts indicated that the morning peak for both roads occurred between 8:00am-9:00am, whereas the afternoon peak for Lang Lang-Poowong Road occurred between 3:00pm-4:00pm and for Yannathan Road 4:00-5:00pm. The observed traffic volumes are shown in Table 1.

Table 1: Existing Traffic Volumes

| Road | Av. Daily Traffic Volumes | AM Peak | PM Peak |
| :--- | :---: | :---: | :---: |
| Lang Lang-Poowong Road | $1,423 \mathrm{vpd}$ | 116 vph | 145 vph |
| Yannathan Road | $1,640 \mathrm{vpd}$ | 117 vph | 166 vph |

### 2.5.2 Lang Lang-Poowong Road, Watts Road, Davis Street \& Forster Drive Intersection Turning Movements

Beveridge Williams commissioned the collection of traffic volume data at the intersection of Lang Lang-Poowong Road/Watts Road/Davis Street/Forster Drive on Thursday 8 February 2018. Traffic volumes were collected between 6:30am-9:30am and 3:00pm-6:00pm. The surveys indicated that the morning peak hour occurred between 8:15am-9:15am with the afternoon peak hour occurring between $3: 30$ pm-4:30pm. The peak hour traffic volumes are presented in Figure 8.

Figure 8: Lang Lang-Poowong Road/ Watts Road Intersection Existing Traffic Volumes


### 2.6 Existing Intersection Operations

The existing operations of the Lang Lang-Poowong Road, Watts Road and Forster Drive intersection have been analysed using SIDRA Intersection.

SIDRA Intersection is a computer package developed to assess the operating characteristics of an intersection including Degree of Saturation, Average Delay and 95\%ile queue.

Degree of Saturation (DoS) is the ratio of traffic undertaking a particular movement within the intersection compared to the maximum capacity calculated for that movement. The Level of Service (LoS) of various DoS ranges are described as:

- Up to 0.6 Excellent
- 0.6 to 0.7 Very Good
- 0.7 to 0.8 Good
- 0.8 to 0.9 Fair
- 0.9 to 1.0 Poor
- 1.0+ Very Poor

It is considered acceptable that some critical movements within an intersection operate in the range of 0.9 to 1.0 during peak periods, reflecting actual conditions of a substantial proportion of suburban intersections.

Average Delay is the delay, in seconds, which can be expected over all the vehicles making a particular movement in the intersection during the peak hour.

The $95 \%$ ile Queue represents the maximum queue length, in metres, expected in $95 \%$ of the calculated queue events during the peak hour.

The existing intersection operating characteristics are summarised in Table 2.
Table 2: Lang Lang-Poowong Road, Watts Road \& Forster Drive Intersection Existing Conditions

| Approach | DoS | Average Delay <br> (sec) |  | 95\%ile Queue <br> (m) |
| :--- | :---: | :---: | :---: | :---: |
| AM PEAK HOUR |  |  |  |  |

Review of Table 2 indicates that the intersection of Lang Lang-Poowong Road, Watts Road and Forster Drive operates under 'excellent' conditions.

## 3 PLANNING SCHEME AMENDMENT \& DEVELOPMENT PLAN OVERLAY

### 3.1 Planning Scheme Amendment - C97 Nyora 'General Residential Zone 1’ rezoning

Amendment C97 to the South Gippsland Planning Scheme proposed that land in Nyora can be rezoned from Farming Zone to General Residential Zone 1. The properties affected by the amendment were the 3 land parcels which comprise the site.

The Minister for Planning approved Amendment C97 on 16 June 2016. Currently only 379 Lang LangPoowong Road on the west side of the creek which runs through the site has been rezoned. The rezoned section is shown in Figure 2.

### 3.2 Development Plan Overlay - Schedule 10

Schedule 10 to the development plan overlay (DPO10) applies to the three parcels of land which encompass the subject site; 379 Lang Lang-Poowong Road, 30 Glovers Road and 951 Yannathan Road. The schedule refers to the subject site as 'The Nyora Urban Residential Growth Area' which is identified as being capable of achieving 'high quality, staged residential development over an extended period of time'.

DPO10 contains several conditions and requirements for permits and development plans relating to the site. Section 3 of the DPO10 outlines the requirements for a development plan for the subject site which included:

- A comprehensive Traffic Impact Assessment Report (based on a full development scenario) prepared by a suitably qualified person to the satisfaction of the responsible authority and VicRoads. The report must include:
- The impact of the development on the existing road network and intersections surrounding the land
- Improvement necessary to facilitate the development of the land, including road widening, access points, pedestrian crossing points and safety refuges, cycle lanes etc.
- All intersections and roads impacted as a direct consequence of a full development scenario and costings for intersection and road treatments associated with those impacts.
- A Road Hierarchy Plan for the internal road network across the entire development plan area detailing all roads 'Access Street - Level 1' and above.

The area included within the DPO10 is shown in Figure 9.

Figure 9: Development Plan Overlay 10


## 4 PROPOSAL

### 4.1 General

The proposal includes the development of the sites at 379 Lang Lang-Poowong Road, 30 Glovers Road and 951 Yannathan Road in Nyora, as a residential subdivision. Based on plans 0900659 IDP V10 prepared by Beveridge Williams, it is proposed to develop the site at 379 Lang Lang-Poowong Road into 328 residential lots and a sporting field on the section of the site which has been rezoned as General Residential (GRZ). An indicative site layout for the section of 379 Lang Lang-Poowong Road indicated a lot yield of 160 while an indicative layout for the sites at 30 Glovers Road and 951 Yannathan Road will ultimately contain in the order of 241 residential lots, resulting in approximately 729 lots. The proposed development plan is displayed in Figure 10 and APPENDIX A.

Two primary vehicular access points to the subdivision will be provided via the intersections of a connector street with Yannathan Road in the west and Lang Lang-Poowong Road in the south. An additional vehicle access will be provided from Lang Lang-Poowong Road at the southeast corner of the site. Pedestrian connections from the existing township of Nyora will be provided via open space corridors from Forster Drive and Hatchs Road.

Figure 10: Indicative Development Plan


### 4.2 Proposed Internal Road Network Hierarchy

The proposed internal road network generally comprises a network of Access Streets to provide internal circulation and connects to a Connector Street which in turn provides connection to Yannathan Road, Lang Lang-Poowong Road and the greater road network.

Connector Streets typically comprise an 11.6 m wide road pavement within a 24 m road reserve allowing for two-way traffic flow, kerbside parking and pedestrian paths on both sides of the road. The proposed connector street for this development is to have additional width to accommodate the 2.5 m shared along the north and east side of the road.

Access streets typically comprise a 7.3 m wide road pavement within a 16 m road reserve allowing for two-way traffic flow and intermittent kerbside parking. The footpaths for Access Streets fronting drainage reserves and open space areas are accommodated within the reserve/open space resulting in a road reserve of 14.5 m . Similarly, footpaths for the Access Streets fronting Lang Lang-Poowong Road will be accommodated for within the road reserve of Lang-Lang Poowong Road and will have a resulting road reserve of 14.5 m .

All road cross sections within the development are in accordance with Table 2 the Infrastructure Design Manual (IDM Version 5.10).
The resulting road hierarchy is illustrated in Figure 11.
Figure 11: Proposed Internal Road Hierarchy


### 4.3 Pedestrian and Cycling Connectivity

All proposed internal roads will be provided with footpaths on either side to provide pedestrian connectivity to the surrounding area.

The proposed connector street which is to run internally through the site will be provided with a shared path on the north and east side of the road. This is to be included within a network of shared paths within the subdivision, most of which are to be included within the drainage reserves. The proposal will also include the construction of a shared path along the north side of Lang Lang-Poowong Road from the western end of the Lang Lang-Poowong Road frontage to the site, to the intersection with Forster Drive. This shared path network is shown in Figure 12.
Note 8 of the IDM states that Access Streets do not require separate provision for bicycle traffic. In this regard it is expected that bicycle traffic will be accommodated within the road network.
The proposed development plan also includes pedestrian and cycling connections from the northern extent of Forster Drive and Hatchs Road, these connections are shown in Figure 12.

Figure 12: Shared Path Connections


## 5 TRAFFIC IMPACT CONSIDERATIONS

### 5.1 Subject Site Traffic Generation

It is generally accepted that residential lots generate a vehicular traffic at a rate of 9 vehicle movements per day (with $10 \%$ of movements occurring in the peak hours). In areas of higher density or with access to good public transport lower traffic generation rates can be recorded.

Whilst it is noted that Clause 12.3.1 to the IDM outlines a rate of 10 daily vehicle movements per dwelling, case study data for residential dwellings in similar regional settings typically shows traffic generation at reduced rates of 9 daily vehicle movements per dwelling or less. Subsequently, for the purposes of this assessment, the rate of 9 vehicle movements per day per lot has been adopted. This rate also matches the RTA Guide to Traffic Generating Developments which sets out a daily generation rate of 9 movements for residential dwellings.

Application of this rate to the proposed 729 dwellings equates to a daily traffic generation of approximately 6,561 vehicle movements or 656 movements during the peak hours.

### 5.2 Subject Site Traffic Distribution

As outlined in Section 2.5 traffic volumes along Yannathan Road and Lang Lang-Poowong Road have been recorded. The peak hour traffic volumes along each road were fairly similar with both recording a morning peak of 116vph. During the afternoon peak Yannathan Road experiences approximately 166vph while Lang Lang-Poowong Road experiences approximately 145 vph .

For the purposes of this analysis it has been assumed that the site generated traffic will be distributed onto Yannathan Road and Lang Lang-Poowong Road as per the observed ratio between the peak hour volumes of each road. The traffic generated by the proposed residential lots on the east side of the creek will be distributed via the subdivision access from Yannathan Road and the secondary access from Lang Lang-Poowong Road towards the southeast corner of the site.

Peak hour traffic generation for residential dwellings generally display the following characteristics:

## AM Peak Hour

- $20 \%$ of traffic inbound; and
- $80 \%$ of traffic outbound.


## PM Peak Hour

- $60 \%$ of traffic inbound; and
- $40 \%$ of traffic outbound.

The traffic movements generated through the intersection of Lang Lang-Poowong Road and Watts Road is anticipated to be distributed as per the existing traffic distribution. The anticipated traffic distribution through the proposed site accesses and intersection of Lang Lang-Poowong Road and Watts Road is shown in Figure 13.

Figure 13: Anticipated Peak Hour Traffic Distribution


### 5.3 Traffic Impacts

The anticipated distribution took into consideration the existing distribution through the Lang LangPoowong Road and Watts Road intersection and the anticipated traffic movements generated at the accesses to the site.

Based on the predicted traffic generation rates and distribution, the post development traffic distribution for the Lang Lang-Poowong Road and Watts Road intersection is illustrated in Figure 14.

Figure 14: Post Development Traffic Volumes at Lang Lang-Poowong Road and Watts Road Intersection


Based on these post development traffic volumes, a SIDRA assessment has been undertaken of the Lang Lang-Poowong Road, Watts Road and Forster Drive intersection with the results summarised in Table 3.

Table 3: Lang Lang-Poowong Road, Watts Road and Forster Drive Intersection Future Conditions

| Approach | DoS | Average Delay (sec) | 95\%ile Queue (m) |
| :---: | :---: | :---: | :---: |
| AM PEAK HOUR |  |  |  |
| Lang Lang-Poowong Road (South) | 0.16 | 9 | 4 |
| Lang Lang-Poowong Road (East) | 0.07 | 2 | 2 |
| Forster Drive (North) | 0.01 | 9 | 0 |
| Watts Road (West) | 0.10 | 3 | 3 |
| PM PEAK HOUR |  |  |  |
| Lang Lang-Poowong Road (South) | 0.27 | 9 | 8 |
| Lang Lang-Poowong Road (East) | 0.05 | 3 | 1 |
| Forster Drive (North) | 0.01 | 9 | 0 |
| Watts Road (West) | 0.12 | 3 | 4 |

A review of Table 3 indicates that the intersection of Lang Lang-Poowong Road, Watts Road and Forster Drive will operate under 'excellent' conditions post development of the site.

## 6 DESIGN CONSIDERATIONS

### 6.1 Site Access

Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings provides guidelines in the form of Lane Turn Warrants for the types of T-intersection treatments that should be applied based on peak hour traffic volumes. The proposed accesses from Yannathan Road and Lang Lang-Poowong Road have been analysed against the Lane Turn Warrants in Sections

### 6.1.1 Yannathan Road Access

Based on the peak right turn volume of 63vph as outlined in Figure 13, and through volume along Yannathan Road of 166 vph as outlined in Table 1, Austroads recommends a Short Channelised Right $\mathrm{CHR}(\mathrm{S})$ treatment for the proposed access from Yannathan Road. Based on the peak left turn volume of 134 vph and southbound volume along Yannathan Road of 113 vph , Austroads recommends a Short Auxiliary Left AUL(S) treatment for the proposed access from Yannathan Road.

### 6.1.2 Lang Lang-Poowong Road Primary Access

Based on the peak right turn volume of 68vph as outlined in Figure 13, and through volume along Lang Lang-Poowong Road of 145vph as outlined in Table 1, Austroads recommends a Basic Right (BAR) treatment for the proposed primary access from Lang Lang-Poowong Road. Based on the peak left turn volume of 84 vph and eastbound volume along Lang Lang-Poowong Road of 80 vph , Austroads recommends a Basic Left (BAL) treatment for the proposed primary access from Lang Lang-Poowong Road.

### 6.1.3 Lang Lang-Poowong Road Secondary Access

Based on the peak right turn volume of 20vph as outlined in Figure 13, and through volume along Lang Lang-Poowong Road of 145vph as outlined in Table 1, Austroads recommends a Basic Right (BAR) treatment for the proposed secondary access from Lang Lang-Poowong Road. Based on the peak left turn volume of 25 vph and eastbound volume along Lang Lang-Poowong Road of 80vph, Austroads recommends a Basic Left (BAL) treatment for the proposed primary access from Lang Lang-Poowong Road.

## 7 SUMMARY AND CONCLUSIONS

Based on the preceding analysis, the proposed residential subdivision development located at 379 Lang Lang-Poowong Road, 30 Glovers Road and 951 Yannathan Road in Nyora is considered appropriate from a traffic engineering perspective. A summary of the proposal is as follows:

- It is proposed to develop the subject for the purposes of a residential subdivision;
- The overall combined site is estimated to yield 729 residential lots;
- Access to the site is proposed via an intersection at Yannathan Road, and two along Lang LangPoowong Road;
- The anticipated traffic generation by the proposed development will be approximately 6,561 vehicle movements daily, with 656 movements during the morning and afternoon peak hours;
- The distribution of internal traffic volumes is within daily environmental capacities identified within the IDM;
- The proposed internal road use hierarchy comprises predominantly 16 m Access Streets with 14.5 m Access Streets strategically placed;
- There is a proposed 24 m Connector Street which will run through the middle connecting the sites, which will form a new intersection with Yannathan Road to the west and Lang LangPoowong Road to the south;
- There will be footpath and cyclist connectivity from the site to Forster Drive and Hatchs Road;
- A SIDRA assessment of the Lang Lang-Poowong Road intersection with Watts Road and Forster Drive indicates it will continue to operate under 'excellent' conditions with additional post development traffic.


## APPENDIX A. Development Plans




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