Wonthaggi North East

Precinct Structure Plan
Transport Impact Assessment

Prepared by: Stantec Australia Pty Ltd for Bass Coast Shire Council
on 10/11/2021
Reference: V106370
Issue #: L

GTAconsultants now Stantec

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Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
L	10/11/21	Updated Final	Ajanthan Pillai	Andrew Farran	Andrew Farran	

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EXECUTIVE SUMMARY

Executive Summary

The Wonthaggi North East Precinct Structure Plan (PSP) area skirts the north and east of the existing Wonthaggi township and is generally bound by Fuller Road to the west, Heslop Road to the north and private land holdings to the east and south.

The PSP area is currently occupied by predominantly farming uses, with a combination of low density residential and industrial uses also provided. In the future, the PSP area is envisaged to accommodate up to 4,000 residential dwellings, commercial and industrial enterprises, community facilities and open space. A future PSP road network has been developed, which includes a combination of connector and local access roads. The PSP road network has been developed to cater for vehicles, pedestrians and cyclists.

The PSP road network will include the upgrade of Heslop Road between Korumburra Road and Fuller Road. This link could form part of a future bypass around Wonthaggi, however, it is noted that it is not proposed to specifically deliver a bypass as part of the PSP.

Strategic transport modelling has been completed to determine the future traffic volumes on key roads within and surrounding the PSP Area. The strategic modelling includes the PSP land uses and incorporates background growth up to the year 2046.

The future road network has been modelled with and without a future bypass . The modelling indicates that without the bypass, existing traffic volumes on Bass Highway through the town centre are anticipated to increase by approximately 50% to 20,000vpd. Reference to typical design capacity guidelines would suggest that under this scenario Bass Highway would be on the cusp of requiring duplication. The modelling with the bypass indicates that Bass Highway would experience more modest increases of approximately 10% to 14,000vpd.

Future intersection layouts have been identified for key future intersections along Bass Highway, Korumburra-Wonthaggi Road (referred to as Korumburra Road throughout this report) and Heslop Road (typically with PSP connector roads). The identified intersection layouts and future traffic volumes (without the bypass) have been used to inform SIDRA INTERSECTION modelling for each intersection. The intersection modelling indicates that each of the future intersections within the PSP area are anticipated to operate with a Level of Service C or better. The intersection modelling indicates that the Bass Highway / McKenzie Street / Graham Street and Bass Highway / Korumburra Road intersections are anticipated to be operating near capacity following the full development of the PSP area.

An assessment of the midblock capacity of each of the key roads within and surrounding the PSP Area indicates that each road is anticipated to operate within its theoretical capacity.

It is acknowledged that some issues were raised as part of the Tranche 1 Standing Advisory Committee which resulted in further transport investigations and updates to this transport report.

In summary, the proposed road network and intersection layouts are considered to represent an appropriate and functional transport outcome for the PSP area and broader Wonthaggi township.

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1. INTRODUCTION

1.1. Background

The Wonthaggi North East Precinct Structure Plan (PSP) is a growth area project that aims to deliver a vibrant community where people can live, work and shop. The PSP area skirts the north and east of the existing Wonthaggi township and is generally bound by Fuller Road to the west, Heslop Road to the north, and private land holdings to the east and south.

The PSP Area is envisaged to accommodate the following land uses:

- up to 4,000 residential dwellings
- commercial and industrial enterprises
- community facilities
- open space.

The Wonthaggi North East PSP is currently being prepared by the Bass Coast Shire Council and Victorian Planning Authority (VPA) in consultation with state authorities (such as the Department of Transport), landowners and major stakeholders.

1.2. Purpose of this Report

GTA, Now Stantec (GTA) has been engaged to provide input into the required transport network to support the development of the PSP area and to undertake traffic modelling for the PSP (and broader Wonthaggi road network) and translate the outputs into road cross sections and concept intersection designs for input to the PSP and Development Contributions Plan (DCP) process.

This report includes the following:

- Section 2: Overview of existing transport context
- Section 3: Background review of previous relevant studies
- Section 4: Overview of proposed PSP
- Section 5: Transport modelling (strategic and intersection) of PSP
- Section 6: Concept Layout Plans and costings

1.3. Updates to Report by Issue

GTA was initially engaged by Bass Coast Shire Council in late 2016 to provide transport engineering services for the Wonthaggi North East PSP Project. Between 2016 and now (late 2021) there have been a number of minor and major revisions to this report. The major changes to the various report issues are summarised in Table 1.1.

Table 1.1: Key Updates to Report

Date	Report Issue	Key Update
Early 2019	Issue E onwards	**Wentworth Road Modification** The PSP was updated to reflect the presence of a wetland reserve along Heslop Road. Further studies into the area revealed that the proposed connector boulevard would have traversed the wetland reserve, representing an unacceptable environmental impact on the community. As such, the PSP road network was updated to avoid passing through the proposed wetland reserve. This was achieved by connecting St Clair Boulevard directly to Heslop Road to the east of the wetland reserve rather than through an upgrade of Wentworth Road north of St Clair Boulevard, as was previously proposed. The superseded PSP road network is shown on the left and the updated PSP road network is shown on the right.   As shown above, the main change to the road network to reflect these findings is the realignment of St Clair Boulevard and truncation of Wentworth Road. In the context of the overall PSP the proposed changes are relatively minor and accordingly the strategic modelling was not updated as part of this revised report, noting that no material changes would be expected to model outcomes. This report has been updated to include an updated concept layout plan to reflect the revised road network alignment and associated intersection costing (IN-02).
Late 2019	Issue G onwards	**John Street Link** The PSP was updated to address localised vehicle access constraints for the commercial land uses along Bass Highway. As a result, a new roundabout was provided on Bass Highway at John Street between St Clair Boulevard and Carneys Road. Similar to the earlier change, the proposed changes were relatively minor and accordingly the strategic modelling was not updated as part of the revised report. Indeed, the introduction of the new roundabout would reduce vehicle demands at the adjacent intersections on Bass Highway at Carneys Road and St Clair Boulevard.
Late 2020 to late 2021	Issue K onwards	**Concept Layout Plans, Service Considerations and Costings** A number of changes to the concept layout plans, service considerations and costings were undertaken, including: • Each of concept layout plans (IN-01 to IN-08) and costings have been updated to include further consideration regarding utility investigations (refer Section 6.2 for further discussion). • To avoid relocating the existing South Gippsland Water asset within the Fuller Road road reserve the future Fuller Road carriageway is to be realigned to the centre of the existing road reserve (refer Appendix F). • The Korumburra Road / McGibbonys Road intersection (IN-07) has been constructed so the cost in the DCP will reflect the cost agreed in the relevant landowner agreement. However, the existing McGibbonys Road carriageway between Korumburra Road and the PSP Area is not constructed to a suitable standard to cater for the forecast PSP generated traffic demands. As such, the 245m section of McGibbonys Road, connecting Korumburra Road to the PSP Area, will need to be upgraded to cater for the development of the PSP. The inclusion of this upgrade is considered appropriate for inclusion in the DCP Item (refer Section 6 & Appendix F).

Date	Report Issue	Key Update
		• The St Clair Boulevard / Korumburra Road intersection (IN-04) design has been updated to include an 80km/h design speed on the northeast approach (i.e. to slow vehicles travelling into Wonthaggi on Korumburra Road) as per the requirements of Regional Roads Victoria. The associated costing for the intersection has been updated accordingly (refer Section 6.2 and Appendix F). • Finally, the Bass Highway / St Clair Boulevard intersection (IN-06) concept layout has been revised to annotate the land take requirement. There has been no physical change to the proposed intersection layout (refer Appendix F).

1.4. References

In preparing this report, reference has been made to the following:

- Bass Coast Planning Scheme
- Wonthaggi Access and Movement Study, July 2020
- Wonthaggi Activity Centre Plan, January 2021
- Draft Bass Coast Planning Scheme Amendment C152basc Referral 3 - Victorian Planning Authority Projects Standing Advisory Committee Interim Report, June 2021
- 'Wonthaggi Road Network Action Plan' prepared by URS for Bass Coast Shire Council, dated 6 July 2012
- 'Wonthaggi North East Growth Area Development Plan', prepared by CPG Australia, dated November 2009
- 'Wonthaggi Development Plan: Traffic Impact Assessment' prepared by CPG Australia, dated December 2009
- traffic surveys undertaken by GTA as referenced in the context of this report
- an inspection of the area and its surrounds
- other documents as nominated.

2. EXISTING TRANSPORT CONTEXT

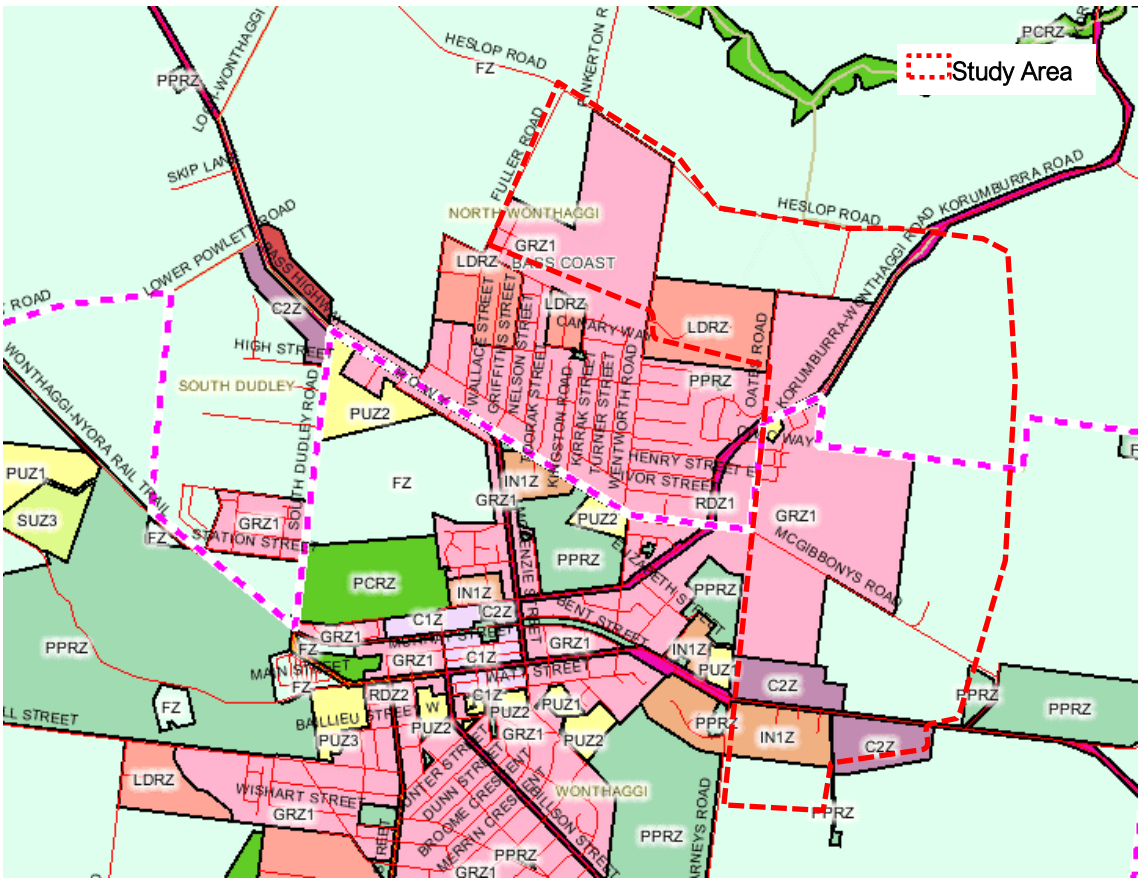
2.1. Subject Area

The subject area is in northern Wonthaggi, loosely bordered by Fuller Road to the west, Heslop Road to the north and the Bass Highway to the south.

The areas surrounding the site are largely residential and rural, with recreation and industrial areas located further south.

The location of the subject site and the surrounding environs is shown in Figure 2.1.

Figure 2.1: Land Zoning Map



(Reproduced from Land Channel web site)

2.2. Road Network

2.2.1. Overview

Three arterial roads (regional highways) managed by the Department of Transport converge in the Wonthaggi township.

Bass Highway (M420/460) connects the South Gippsland Highway near Lang Lang to the north with Leongatha to the east of Wonthaggi. Bass Highway provides the primary connection between the Bass Coast Local Government Area and metropolitan Melbourne. It also provides the most convenient link between Wonthaggi and Inverloch to the east and extends through South Gippsland linking to the South Gippsland Highway and Strzelecki Highway. In the vicinity of Wonthaggi, it is configured with a single traffic lane in each direction, with parking lanes on both sides of the road. Bass Highway forms a key freight route servicing the needs of the broader Gippsland region. Direct vehicle access is provided to the properties fronting the Bass Highway within the Wonthaggi township.

Korumburra-Wonthaggi Road (C437) connects Wonthaggi to Korumburra approximately 30km to the northeast. It is configured with a single traffic lane in each direction. Direct vehicle access is provided to the properties between Bass Highway and Wentworth Road (i.e. older part of town), with direct vehicle access generally restricted or facilitated via a service road east of Wentworth Road (i.e. newer part of town).

Cape Paterson Road (C435) connects Wonthaggi to Cape Paterson approximately 8km to the south. It also forms a secondary tourist link between Wonthaggi and Inverloch, although is less convenient than the Bass Highway. It is configured with a single traffic lane in each direction. Occasional direct vehicle access is provided to the properties abutting Cape Paterson Road in the Wonthaggi township.

Wentworth Road, Fuller Road and Oates Road are municipal roads (managed by Council), generally aligned in a north-south direction, that service the study area. These roads primarily service existing residential properties at their southern ends. Loch-Wonthaggi Road and Heslop Road are rural roads to the north and west boundaries of the study area.

The characteristics of the key roads within and surrounding the study area are summarised in Table 2.1. Photos of the key roads are provided in Appendix A

It is noted that the indicative daily traffic volume capacities presented in the table have been sourced from the following:

- Arterial Roads: Austroads Guide
- Council Roads: Clause 56.06 of the Bass Coast Planning Scheme
- Unsealed Roads: Australian Road Research Board (ARRB) Unsealed Roads Manual 'Guidelines to Good Practice' (March 2009).

Table 2.1: Existing Road Characteristics

Road	Classification	Carriageway Surface	Carriageway Width (approx.)	Parking Provisions	Speed Limit	Existing Daily Traffic Volume (Two Way)[1]	Indicative Daily Traffic Volume Capacity	Footpaths
Bass Highway (north of Wonthaggi)	Arterial Road	Sealed	7.0m	None	100km/h	9,752 vpd	18,000 vpd	None
Bass Highway (in Wonthaggi)	Arterial Road	Sealed	Varies	Dedicated parking lane both sides	Typically 60km/h	13,012 vpd	18,000 vpd	Both sides
Bass Highway (east of Wonthaggi)	Arterial Road	Sealed	7.0m	None	100km/h	9,150 vpd	18,000 vpd	None
Korumburra-Wonthaggi Road (at Oates Road)	Arterial Road	Sealed	7.0m	None	60km/h	2,155 vpd	18,000 vpd	None
Cape Paterson Road / Billson Street (at Broome Crescent)	Arterial Road	Sealed	8.0m	Informal verge parking	60km/h	2,255 vpd	18,000 vpd	Both sides
South Dudley Road	Connector Road	Sealed	7.0m	None	80km/h	4,500 vpd [2]	7,000 vpd	East side only
Loch Wonthaggi Road	Local Road	Sealed	6.0m	None	100km/h	778 vpd	3,000 vpd	None
Heslop Road	Local Road	Unsealed	7.0m	Both sides of carriageway	Unsignposted	136 vpd	250 vpd	None
Fuller Road	Local Road	Sealed south of Vicars Avenue	7.0m	Both sides of carriageway	50km/h	NA	3,000 vpd	East side only
Wentworth Road	Local Road	Sealed to Oxford Way	7.5m	Both sides of carriageway	50km/h	2,775 vpd	3,000 vpd	West side only
Oates Road	Local Road	Unsealed	7.0m	None	50km/h	NA	250 vpd	None
John Street	Local Road	Unsealed	6.0m	None	50km/h	NA	250 vpd	none

[1] Weekday average for the week commencing 18/10/2016
[2] Based on turning movement counts undertaken on 19 October 2016 and adopting a peak-to-daily ratio of 10%.

2.2.2. Traffic Volumes

GTA commissioned peak hour traffic movement counts at various intersections on Wednesday 19 October 2016. In addition, 24 hour, 7-day tube counts were undertaken at strategic locations within and surrounding the study area for the week commencing Tuesday 18 October 2016.

The AM and PM peak hour traffic volumes are shown in Figure 2.2 and Figure 2.3, respectively.

Figure 2.2: Existing AM Peak Hour Traffic Volumes

Figure 2.3: Existing PM Peak Hour Traffic Volumes

An overview of the average daily traffic volumes at key locations surrounding the study area is shown in Figure 2.4.

Figure 2.4: Existing Daily Traffic Volumes

2.2.3. Existing Freight Routes

The VicRoads gazetted network for B-double vehicles on arterial and municipal roads is presented in Figure 2.5.

Figure 2.5: VicRoads B-Double Network – Wonthaggi Township

(Source: VicRoads Website: Victoria's gazetted B-Double Network)

Figure 2.5 indicates that each of the VicRoads roads servicing Wonthaggi are approved B-double routes. In addition, the Bass Highway through Wonthaggi is also an approved Oversize and Overmass route (OSOM).

A summary of the existing heavy vehicle traffic volumes on the arterial road network surrounding Wonthaggi are provided in Table 2.2.

Table 2.2: Heavy Vehicle Traffic Volume Summary

Location	Daily Total Traffic Volumes	Daily Heavy Vehicle Traffic Volumes	Percentage Heavy Vehicles
Bass Highway (north of Wonthaggi)	9,752	976	10%
Bass Highway (in Wonthaggi)	13,012	706	5.4%
Bass Highway (east of Wonthaggi)	9,150	649	7.1%
Korumburra-Wonthaggi Road (north east of Wonthaggi)	2,155	166	7.7%
Cape Paterson Road (south of Wonthaggi)	2,255	129	5.7%

2.3. Public Transport

Wonthaggi is serviced by several regional buses, as summarised in Table 2.3.

Table 2.3: Bus Services in Wonthaggi

Route Description	Significant Destinations On Route	Frequency On/Off Peak
Wonthaggi - Dudley - Wonthaggi	Biggs Drive bus interchange, McKenzie Street, Bass Hwy, Dudley Street	2 hours/2.5 hours
Wonthaggi - Leongatha via Inverloch	McKenzie Street, Biggs Drive bus interchange, Toorak Road, The Esplanade, Bass Hwy, Leongatha Railway Station, Leongatha Secondary College	One service per day
Wonthaggi - South Wonthaggi - Wonthaggi	Biggs Drive bus interchange, Wonthaggi Hospital	1.5 hours/2 hours
Wonthaggi - Traralgon via Leongatha	Traralgon Station, Latrobe Regional Hospital, Morwell Bus Interchange, Leongatha Railway Station, Biggs Drive bus interchange	3 hours
Wonthaggi - Wonthaggi North - Wonthaggi	Biggs Drive bus interchange, Wonthaggi YMCA, Wentworth Road, Dowling Street	1.5 hours/2 hours
Wonthaggi Town Service (Cape Paterson)	Cape Paterson Rd, Biggs Drive bus interchange	2 hours

The Wonthaggi town service is aligned in a circuit around the town. Travel times on the bus are greater than typical driving times. This is reflected in the relatively low mode share to bus presented later in this section.

2.4. Active Travel

Pedestrian Facilities

Pedestrian footpaths are generally provided on both sides of roads within the Wonthaggi town centre and on major roads accessing the town (such as Bass Highway and Korumburra-Wonthaggi Road). Pedestrian paths are provided on one side of Wentworth Road and Fuller Road accessing the PSP Area. In general, pedestrian footpaths are currently not provided on the lower order streets within residential areas of Wonthaggi.

Bass Coast Rail Trail

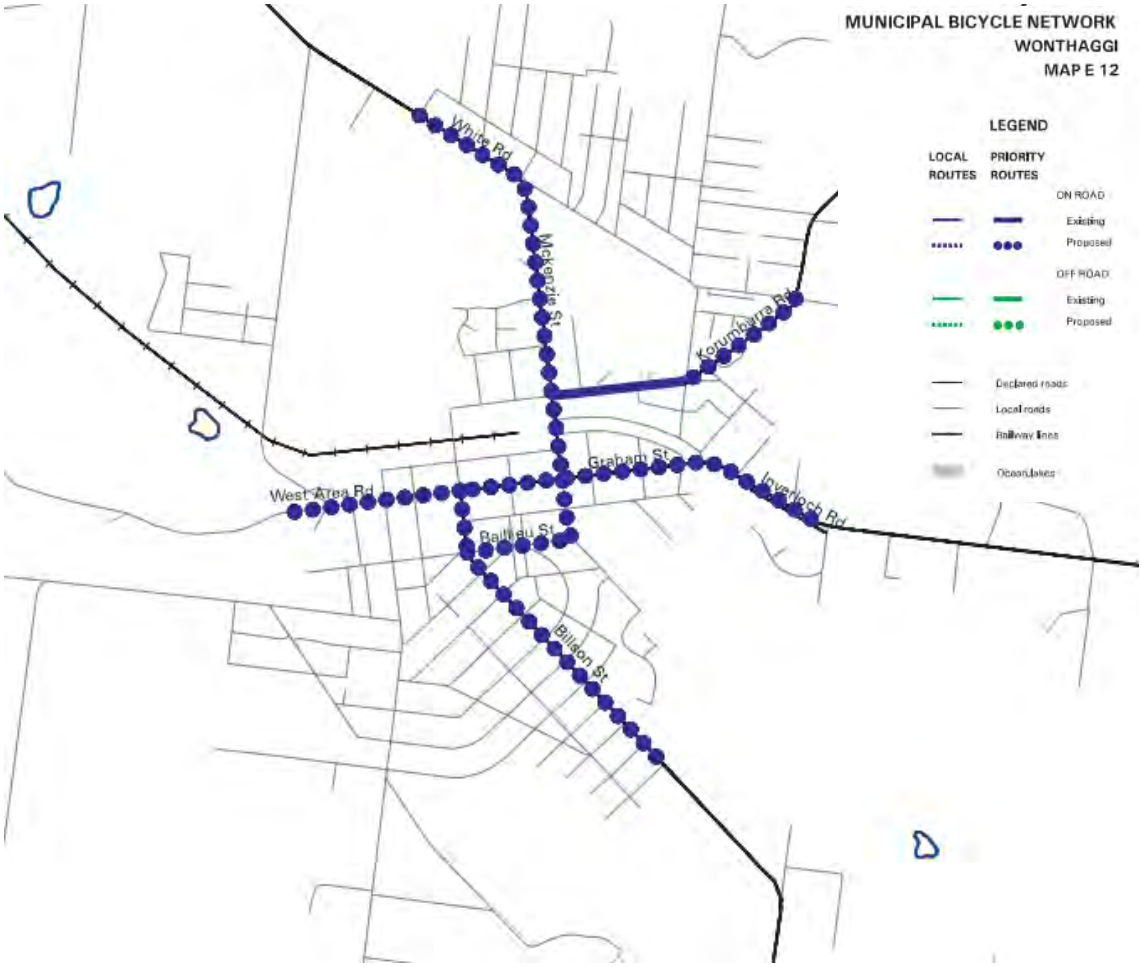
The Bass Coast Rail Trail is a 17km off-road trail that connects Wonthaggi with the townships of Kilcunda and Anderson to the west. The trail follows the former rail line that previously serviced the precinct. The trail is suitable for pedestrians, cyclists and horse riders. The trail terminates at the Billson Street (south of the McKenzie Street unused road reserve) after passing through the town.

Municipal Bicycle Networks

The Municipal Bicycle Networks (MBN) represent the core bicycle networks in regional Victorian cities. Maps have been developed for thirty-six MBNs for towns and cities in regional Victoria. These networks include existing and proposed on-road and off-road facilities and are managed by the responsible local Council. Department of Transport plans to systematically expand the bicycle planning tools available to cities, towns and centres in regional areas to be commensurate with those provided for metropolitan Melbourne.

The MBN for Wonthaggi is shown in Figure 2.6[1]. The Rail Trail and Cape Pattterson Road bike lanes do not form part of the MBN.

Figure 2.6: Municipal Bicycle Network for Wonthaggi



Source: VicRoads Website

2.5. Accident History

A review of the reported casualty accident history for the roads and intersections adjoining the study area has been sourced from Department of Transport CrashStats accident database. This database records all accidents causing injury that have occurred in Victoria since 1987 (as recorded by Victorian Police) and categorises these accidents as follows:

- Fatal injury: at least one person was killed in the accident or died within 30 days as a result of the accident.
- Serious injury: at least one person was sent to hospital as a result of the accident.
- Other injury: at least one person required medical treatment as a result of the accident.

A summary of the accidents in the vicinity of the site for the last available five year period (2015-2019) is presented in Figure 2.7.

[1] Further information regarding the PBN and BPRs is available at https://www.vicroads.vic.gov.au/traffic-and-road-use/cycling/bicycle-network-planning

Figure 2.7: Wonthaggi Casualty Accident History Overview

Data obtained from CrashStats indicates that a total of 48 crashes were recorded for the indicated region in the last five-year period, including 7 serious and 41 other type accidents. It is noted that many of these crashes (36) are located within the Wonthaggi city centre (indicated by the red box).

There have been three accidents within the PSP Area, including:

- Heslop Road / Korumburra Road intersection
- Bass Highway / Carneys Road intersection
- Fuller Road (approximately 200m south of Heslop Road).

2.6. Existing Travel Behaviour

Guidance on existing travel behaviour within Wonthaggi has been sourced from the Australian Bureau of Statistics (ABS) 2011 Census data, which provides information regarding journey to work mode choices. Data for Wonthaggi and the nearby local government areas has been extracted to determine the variance in travel behaviour between the different locations. This data is provided in Table 2.4.

Table 2.4: Journey to Work by Place of Residence

Location [1]	Mode of Transport				
	Public Transport	Car	Bicycle	Walk	Other
Wonthaggi & Wonthaggi North (Postcode 3995)	1%	90%	1%	6%	2%
Bass Shire Council Area	1%	90%	1%	6%	2%
South Gippsland Council Area	1%	86%	1%	9%	3%
Baw Baw Council Area	2%	90%	0%	5%	3%

[1] Includes all employees regardless of wok location (i.e. in or out of their LGA of residence).

As presented in Table 2.4, there is a high level of car dependence for travel within Wonthaggi and surrounding regions.

2.7. Existing Residential Traffic Generation Rates

GTA undertook peak hour traffic surveys of an existing residential precinct in Dudley South to determine the existing residential traffic generation rate. The surveys captured the traffic generated by the residential properties bound by South Dudley Road, Alexander Road, Hull Street and Station Street. A summary of the survey results are provided in Table 2.5.

Table 2.5: Existing Residential Traffic Generation Rate

Peak Hour	Time of Peak	Peak Hour Traffic Movements			No. of Dwellings Accessed	Peak Hour Traffic Generation Rate
		In	Out	Total		
AM	8:15-9:15	36	75	111	160	0.69
PM	4:00-5:00	78	54	132		0.83

The existing surveyed peak hour traffic generation rates of 0.69 and 0.83 are similar to the residential traffic generation rates of 0.71 and 0.78 for the AM and PM peak hours respectively presented in the RMS Guide for Traffic Generating Developments (Technical Direction dated August 2013).

3. BACKGROUND DOCUMENT REVIEW

3.1. Wonthaggi Road Network Action Plan Report

The Wonthaggi Road Network Action Plan (WRNAP) was prepared by URS Australia Pty Ltd, on behalf of Bass Coast Shire Council, with the final report released in July 2012. The WRNAP develops the findings and recommendations of the Wonthaggi CBD Traffic Impact Study completed in 2010.

The assessment identifies a number of existing and anticipated future issues, including:

- The Murray Street / Bass Highway (McKenzie Street) and Korumburra-Wonthaggi Road Road / Bass Highway (McKenzie Street) intersections are identified as currently (2010) operating at capacity.
- A number of intersections along the Bass Highway, within the town centre, are identified as operating above their theoretical capacities in the future.
- Limited pedestrian facilities are provided linking the various uses within the CBD.
- Limited dedicated cycling facilities are provided within the town centre.
- "Rat running" from commercial vehicles occurs as a result of existing congestion in the town centre.

As a result of the outcomes from the previous Wonthaggi CBD Traffic Impact Study the WRNAP recommends a number of infrastructure upgrades to Wonthaggi CBD (and surrounds), including:

- Signalisation of the Bass Highway (McKenzie Street) / Korumburra-Wonthaggi Road intersection.
- Provision of a two-lane roundabout at the Bass Highway (McKenzie Street) / Bass Highway (Graham Street) intersection.
- Review of CBD parking provisions.
- The introduction of a Wonthaggi Bypass.

Of particular relevance to the PSP is the proposed Wonthaggi Bypass, with the preferred route identified through the proposed PSP Area. The WRNAP suggests that the Bypass could be constructed in two stages, as summarised in Table 5.1.

Table 3.1: Proposed Bypass Route (WRNAP)

Stage	Existing Road Reserve	Connecting	Distance
1	Heslop Road	North of Wonthaggi to Korumburra-Wonthaggi Road	4.9km
2	Greenfield corridor	East of Wonthaggi to Korumburra-Wonthaggi Road	3.6km

The indicative alignment of the proposed Bypass route is illustrated in Figure 4.1.

Figure 3.1: Proposed Bypass Route (WRNAP)

(Source: Figure 4.3 of the WRNAP, prepared by URS, dated 6 JULY 2016)

3.2. Wonthaggi North East Growth Area Development Plan

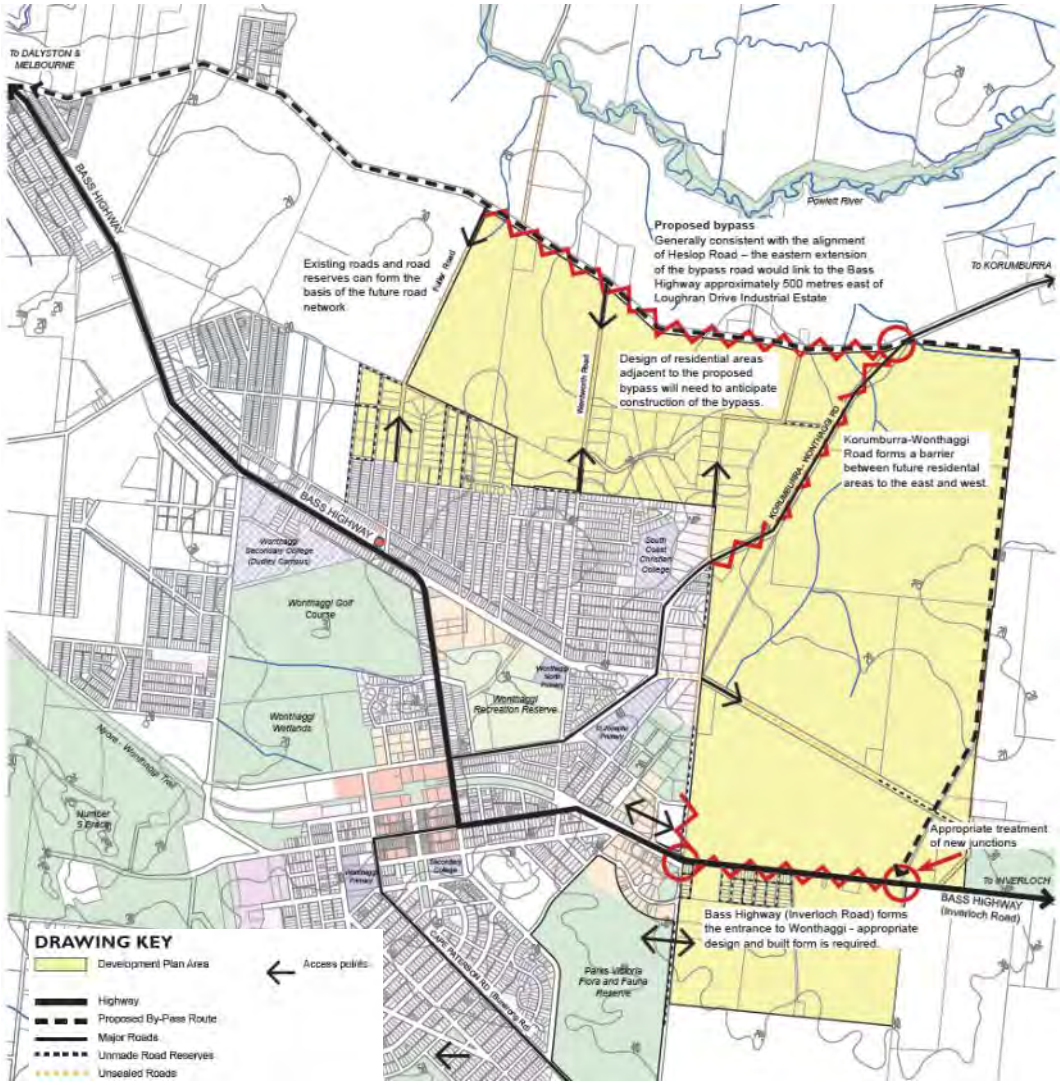
The Wonthaggi North East Growth Area Development Plan was prepared by CPG (November 2009). The document considers the infrastructure requirements to service the Wonthaggi Dalyston Structure Plan (2008). The study area for the Development Plan generally aligns with the proposed PSP Area. The study considered an approximate development yield of 4,000 dwellings, as well as an activity centre, open space and employment areas.

A Traffic Impact Assessment report (December 2009) was prepared to accompany the Development Plan documentation. The assessment considered an interim development scenario (+20 years), rather than a full build out of the study area, which included 1,540 dwellings and 43ha of industrial development.

The future traffic generation of the development was determined by applying "industry standard" traffic generation rates to the proposed development yield. Of particular note, a daily traffic generation rate of 7 movements per dwelling was adopted for the proposed residential uses. The development (+20 year design horizon) was anticipated to generate approximately 15,500 vehicle trips per day. An assessment of the post development traffic capacity of the surrounding road network was undertaken.

An overview of the site context and movement plan is presented in Figure 3.2.

Figure 3.2: Site Context Plan – Movement



(Source Figure Two, page 39 of the CPG Report, dated November 2009)

A number of strategic initiatives and recommended mitigation works are detailed in the report, including the following relevant to the PSP Area:

- Provision of a 50m wide road reservation to accommodate a future Bypass route.
- Provision of a two-lane roundabout at the Bass Highway (McKenzie Street) / Korumburra-Wonthaggi Road intersection.
- Signalisation of the Bass Highway (McKenzie Street) / Bass Highway (Graham Street) intersection.
- Construction of all intersections between the proposed Bypass, Bass Highway and Korumburra-Wonthaggi Road as two-lane roundabouts.
- Various upgrades to the Bass Highway, including the introduction of auxiliary turn lanes, medians and roundabouts (30m diameter central island).
- An upgrade to Korumburra-Wonthaggi Road to include auxiliary turn lanes, wide sealed shoulders and bike lanes. Two-lane roundabouts should be provided at all future intersections with connector roads and Korumburra-Wonthaggi Road.

3.3. Clause 18 of the Planning Scheme

Clause 18 of the Planning Scheme is designed to reflect the intent of State Government guidance and contains objectives and strategies in relation to transport which are relevant to this development, including, but not limited to:

- Create a safe and sustainable transport system by integrating land-use and transport.
- Plan or regulate new uses or development of land near an existing or proposed transport route to avoid detriment to, and where possible enhance the service, safety and amenity desirable for that transport route in the short and long terms.
- Facilitate and safeguard pedestrian and cyclists access to public transport.
- Promote the use of sustainable personal transport.
- Integrate planning for cycling with land use and development planning and encourage as alternative modes of travel.
- Achieve greater use of public transport by increasing densities, maximising the use of existing infrastructure and improving the viability of the public transport operation.

4. WONTHAGGI NORTH EAST PSP

4.1. Indicative Land Uses

The PSP area skirts the north and east of the existing Wonthaggi township and is generally bound by Fuller Road to the west, Heslop Road to the north and private land holdings to the east and south. A summary of the indicative land uses to be provided within the Wonthaggi North PSP Area is provided in Table 4.1.

Table 4.1: Land Use Forecasts

Land Use	Size
Residential	4,000 dwellings
Village Hub	1 x 2,000sqm
Community Hub	2 x 500sqm
Convenience Centres	4,500sqm (3 x convenience centres)

An overview of the proposed future road layout and land use distribution is presented in Figure 4.1 on the following page.

4.2. Road Network

4.2.1. Hierarchy

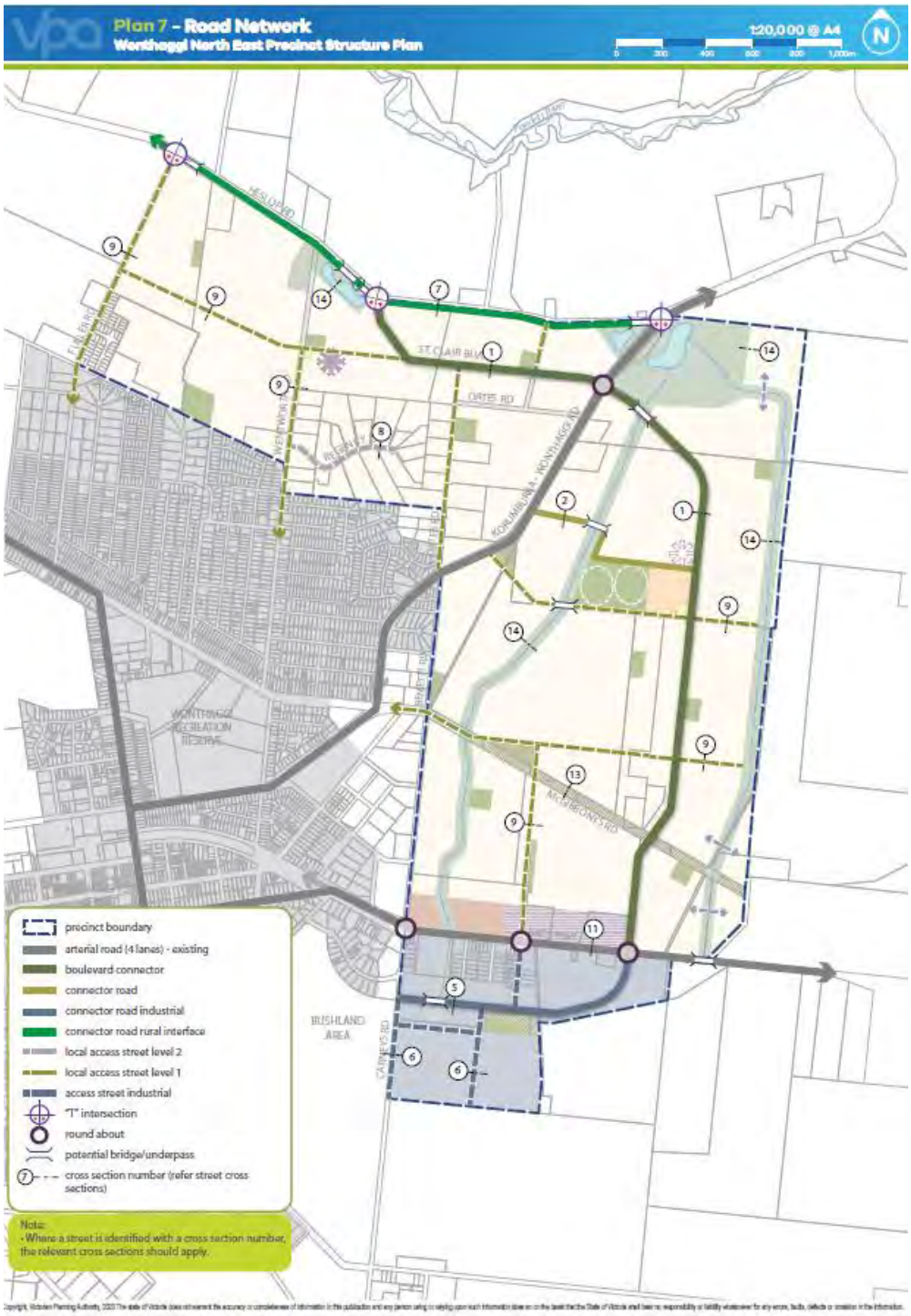
An overview of the proposed future road network to be delivered as part of the PSP is illustrated in Figure 4.1. The road network plan shows all connector streets and above, as well as some local access streets (but not all). The majority of lower order road network is not shown on the plans and will be delivered as part of the future subdivision applications.

It is noted that any future bypass road is not proposed to be delivered as part of the PSP. The PSP will however deliver an upgraded Heslop Road (to a rural connector road standard) between Fuller Road and Korumburra Road. This link could form the first stage of a potential future bypass subject to further discussion between Bass Coast Shire Council and the Department of Transport.

Other key features of the proposed PSP Area road network include:

- A future boulevard connector road (known as St Clair Boulevard) connecting Heslop Road to Korumburra Road and Bass Highway
- Three new connections to Bass Highway east of the town centre (at St Clair Boulevard, John Street and Carneys Road)
- Continuation of Oates Road, Wentworth Road and Fuller Road into the PSP Area
- A new major intersection to Korumburra Road (at St Clair Boulevard).
- An upgraded McGibbonys Road connecting the PSP to Korumburra Road (noting that the existing road link between Korumburra Road and the PSP is not considered an appropriate standard to accommodate the additional transport demands generated by the PSP).

Figure 4.1: PSP Road Network Plan

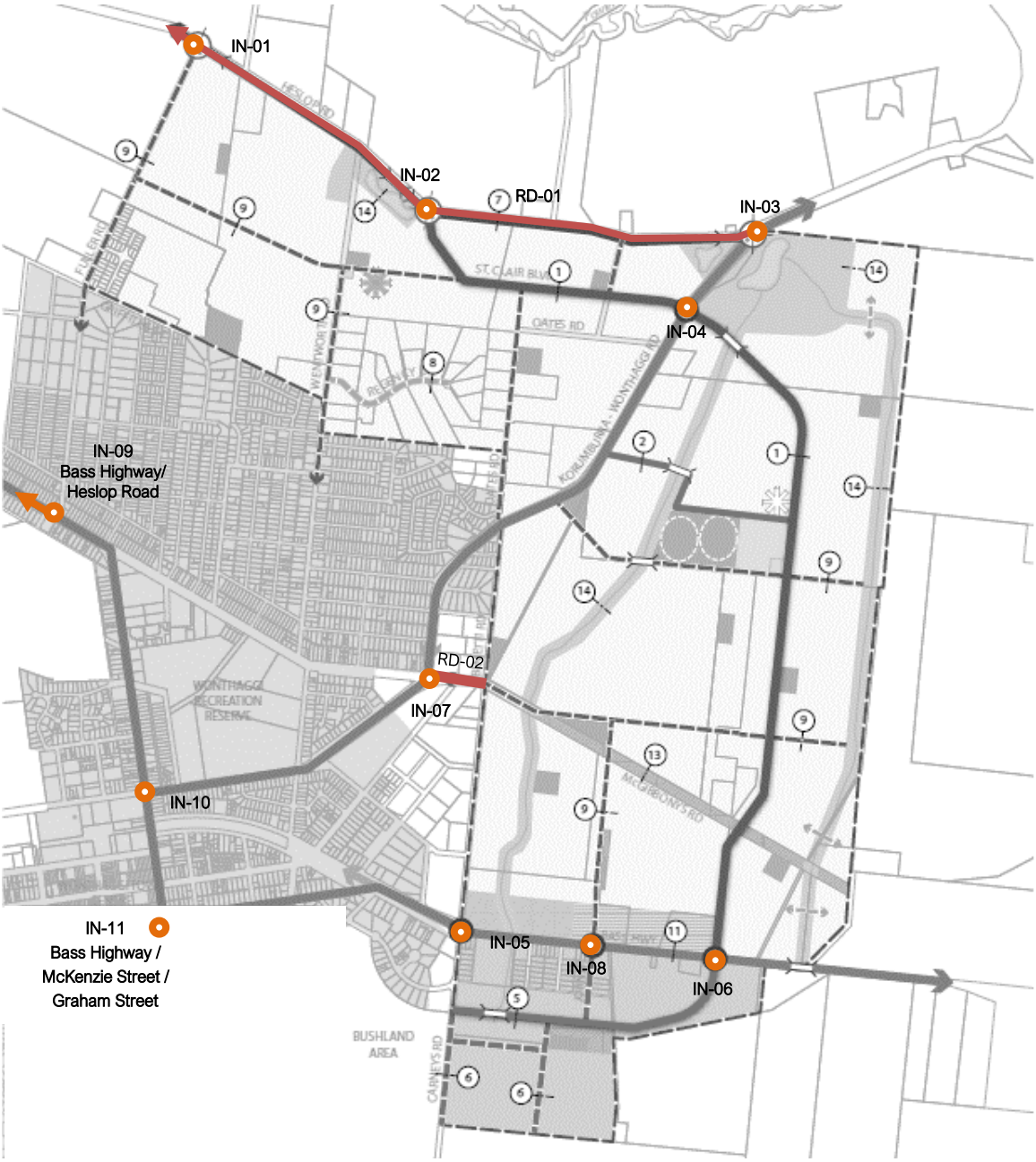


The PSP Area proposes a number of different road types, including various types of boulevard connectors, connectors and local access streets. The proposed cross-sections of each of these road types are provided in Appendix B.

4.2.2. Proposed Intersection Layouts

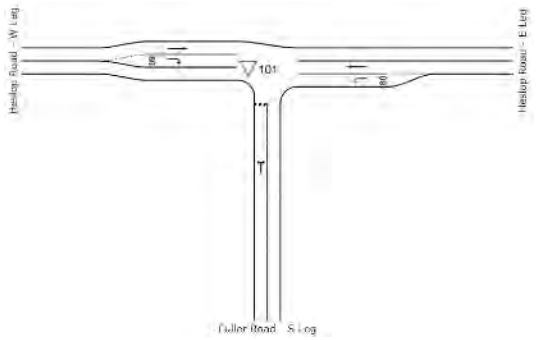
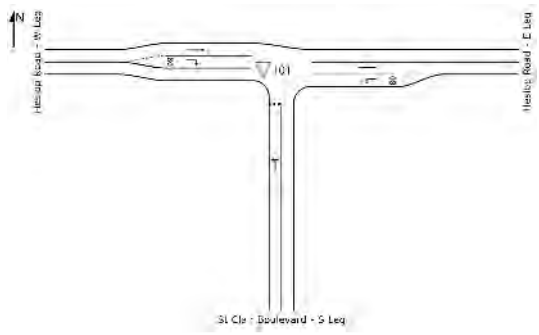
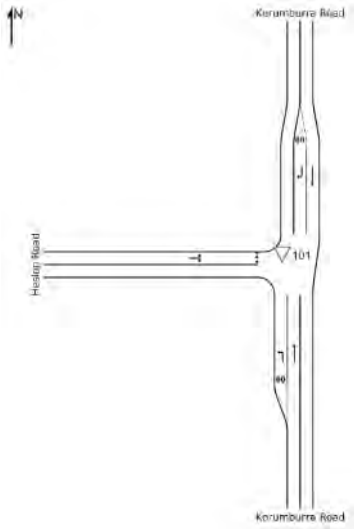
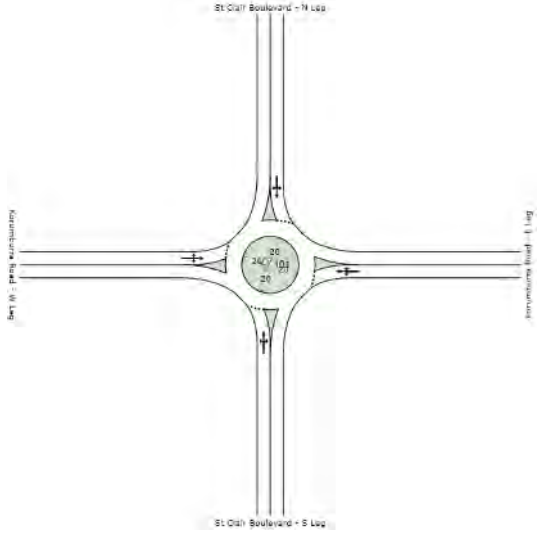
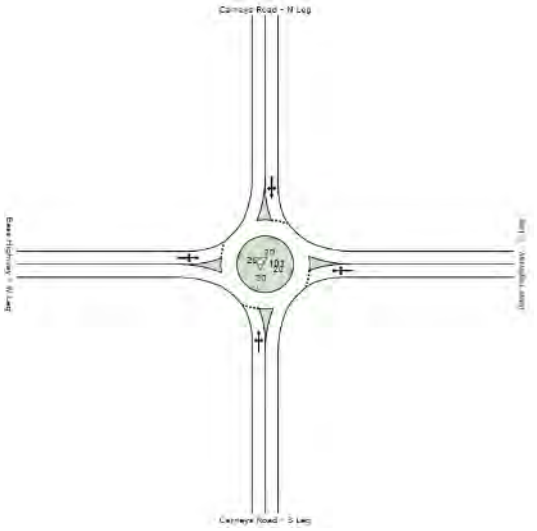
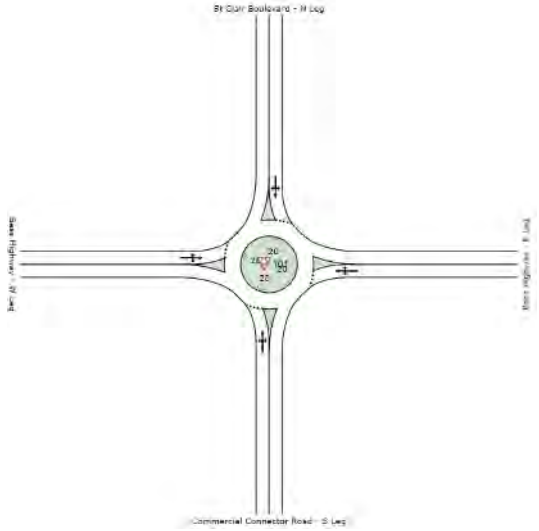
The indicative intersection layouts for each of the key intersections within and surrounding the PSP Area are presented in Table 4.2. The locations of each of the intersections within the PSP Area are shown in Figure 4.2. Each intersection has been identified as IN-01 to IN-11. The intersection control (signalised, roundabout, priority controlled, etc.) for each of the intersections has been determined having regard for the future traffic volumes, pedestrian activity and hierarchy of link.

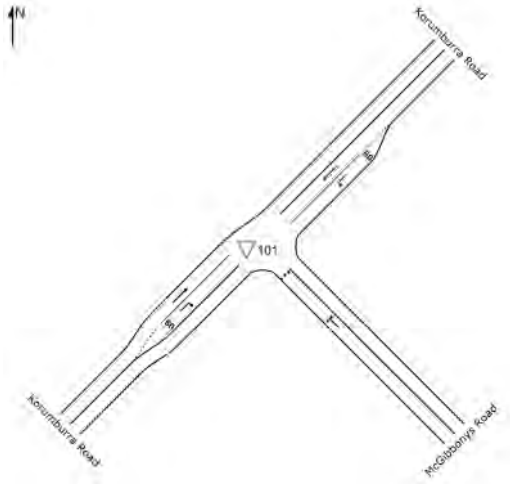
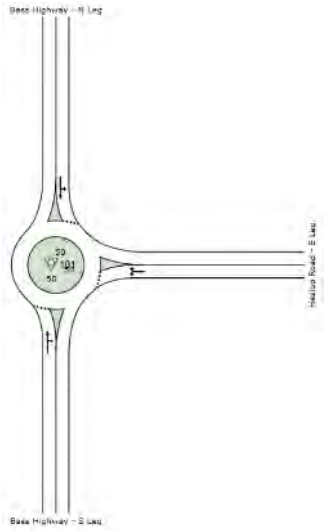
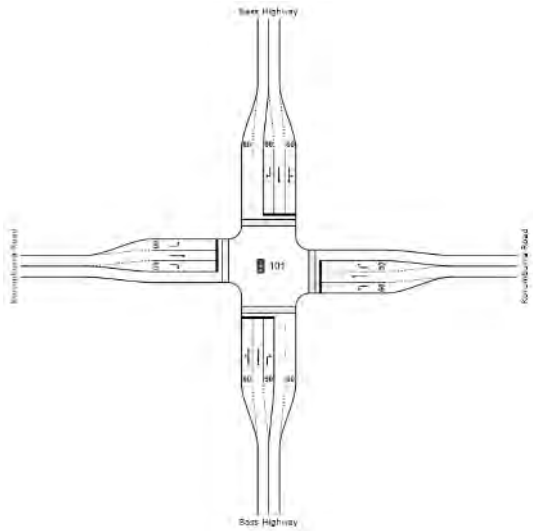
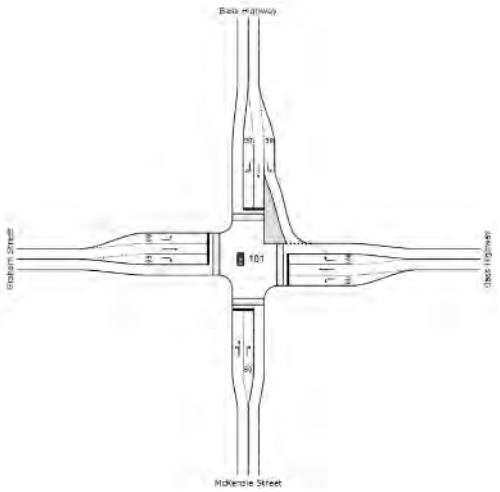
Figure 4.2: Overview of Intersections Modelled in SIDRA



It is noted that IN-09, IN-10 and IN-11 are located outside of the PSP Area and as such, these intersections will not be provided as part of the Wonthaggi North PSP or DCP.

Table 4.2: Summary of Proposed Intersection Treatments

Proposed Intersection Layout	
IN-01 Heslop Road / Fuller Road	**IN-02** Heslop Road / St Clair Boulevard
	
IN-03 Korumburra Road / Heslop Road	**IN-04** Korumburra Road / St Clair Boulevard
	
IN-05 Bass Highway / Carneys Road	**IN-06** Bass Highway / St Clair Boulevard
	

Proposed Intersection Layout	
IN-07 Korumburra Road / McGibbonys Road  *(Already Constructed)*	**IN-08** Bass Highway / John Street 
IN-09 Bass Highway / Heslop Road (Future Bypass)  *(excluded from the DCP)*	**IN-10** Bass Highway / Korumburra Road  ***(Already Constructed)***
IN-11 Bass Highway / McKenzie Street / Graham Street  *(excluded from the DCP)*	-

4.3. Public Transport

The 'Public Transport: Guidelines for Land Use and Development' document prepared by the former Department of Transport (DoT) provides guidance on the recommended public transport provisions and coverage for new developments. Specifically, the document states the following for bus routes:

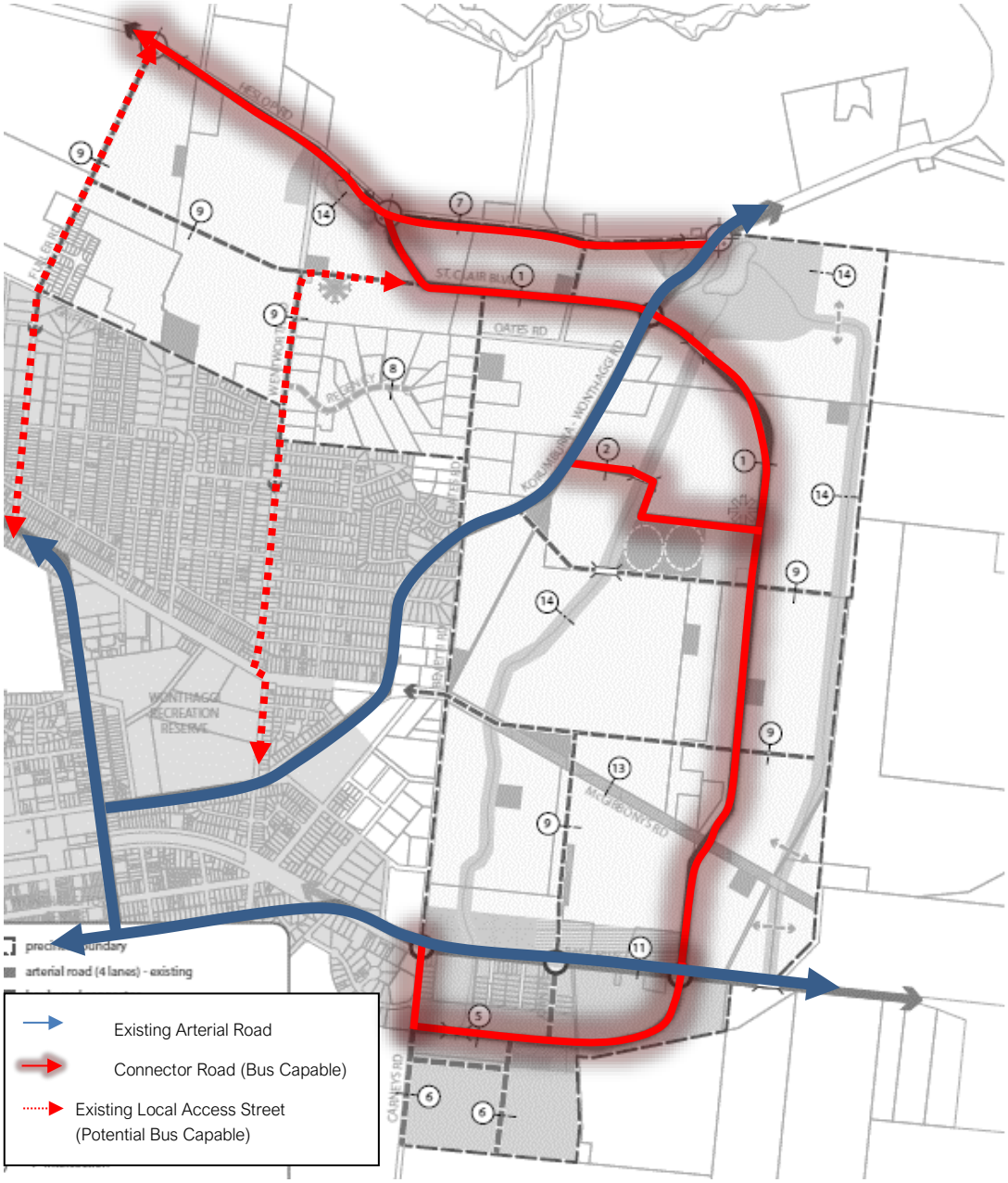
> *"Neighbourhoods should be designed for bus routes on strategically located connector roads so that dwellings will be within 400 metres of a bus route."*

In this regard, the PSP Area includes a number of boulevard connector and standard connector roads that will be able to accommodate future bus services. There may also be opportunities to provide future bus services along Fuller Road and Wentworth Road connecting the PSP Area to the existing residential areas. Any bus routes along these roads may require modifications to the existing roads to ensure that buses can adequately travel along these routes (this could involve restricting on-street parking to one side of the carriageway only).

As detailed in Section 2, there are limited existing regular public transport facilities servicing the existing Wonthaggi township (i.e. inter-town or regional services only). As a result of the uplift in population from the PSP, a local bus servicing the PSP area and the existing township will become more viable.

The bus capable roads are illustrated in Figure 4.3.

Figure 4.3: PSP Bus Capable Roads



4.4. Cycling and Pedestrians

The proposed road cross-sections provided in Section 4.2.2 indicate that each of the proposed roads within the PSP Area would be configured with pedestrian facilities on both sides of the carriageway. The connector level roads would be configured with either on-road or shared path bike facilities. Additional shared paths are proposed along the open space/drainage corridors as well as on the south side of Heslop Road.

The bicycle and pedestrian facilities proposed to be delivered as part of the PSP Area should be integrated into the existing and proposed Council bicycle and pedestrian network.

In this respect, it is recommended that a set of pedestrian operated signals (or an alternate crossing treatment) be considered on the Bass Highway approximately 150 to 200m east of the Bass Highway / Carneys Road intersection (IN-05) connecting the proposed shared path that runs parallel to the western drainage corridor.

Signalised pedestrian crossings would be provided at the future Bass Highway / McKenzie Street / Graham Street (IN-07) and Bass Highway / Korumburra Road (IN-08) intersections. These future crossings would cater for pedestrians accessing the town centre from Wonthaggi North. Notwithstanding, there would be opportunities to provide additional pedestrian operated signals on Bass Highway linking the PSP Area to the western side of Bass Highway (i.e. to Wonthaggi Secondary College).

5. TRANSPORT MODELLING

5.1. Strategic Modelling

5.1.1. VITM Model

Strategic transport modelling has been undertaken using the Victorian Integrated Transport Model (VITM) to understand the likely traffic increases as a result of the PSP on the existing surrounding and proposed future road network.

The Victorian Integrated Transport Model (VITM) is a tool developed by the Department of Economic Development, Jobs, Transport and Resources (DEDJTR) to assist in the planning of road and public transport infrastructure in Victoria. VITM is a multimodal strategic model that uses future population, employment and land use data projections to forecast travel behaviour and the impacts of changes to the road and public transport networks. VITM contains all major freeways, main arterials and connector roads. In this instance, the model has been refined to include a number of higher order access streets that exist in Wonthaggi.

The model is a link-based traffic model which is implemented in the CUBE Voyager software environment (developed by Citilabs). The model version that has been used for this project was obtained from DEDJTR in June 2016, version VITM2016_160317_V1_2. This is the latest release of the model from the DEDJTR and includes the most up-to-date land use forecasts and future road network projections.

5.1.2. Modelling Assumptions

The following assumptions have been made in the VITM review:

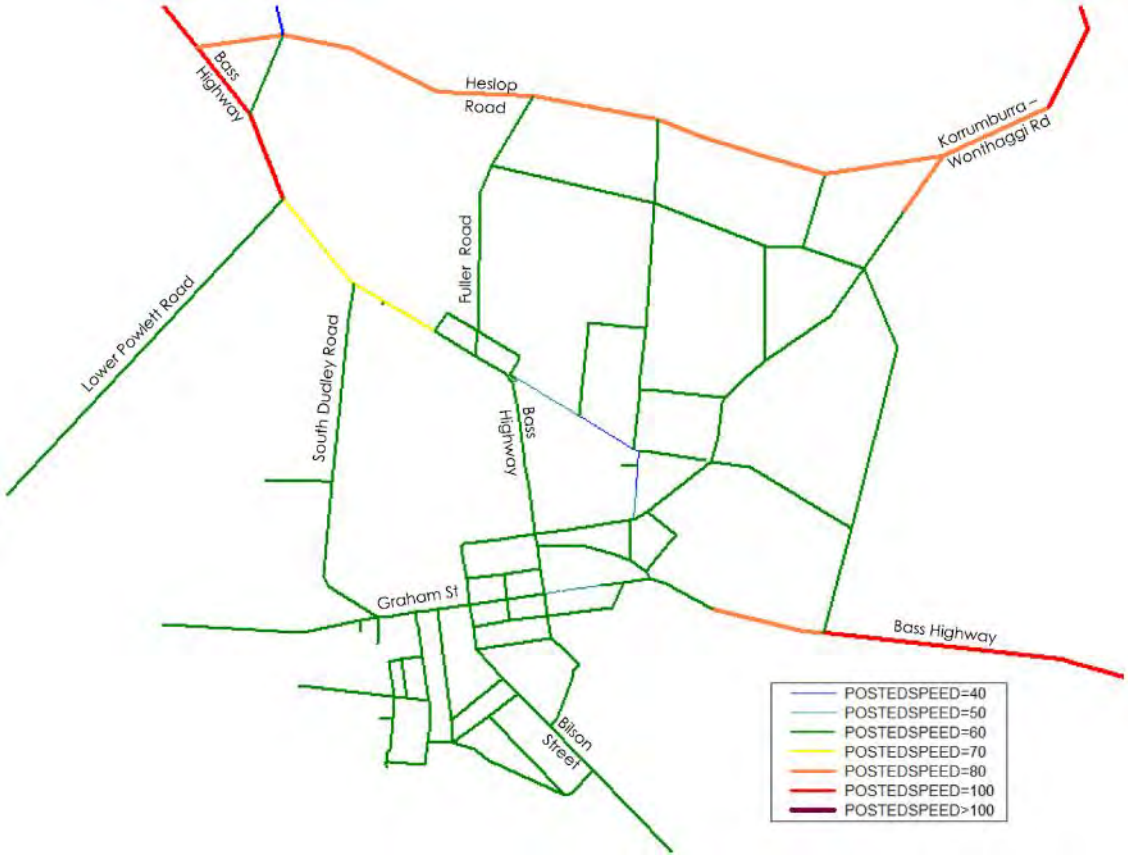
- Post development modelling to year 2046[2].
- Inclusion of the full build-out of the PSP including land use and road network.
- Three road network scenarios have been modelled, as follows:
  - No Bypass (representing the PSP Area)
  - Fringe Alignment Bypass
  - Kirrak Road Alignment Bypass.

The Bypass options have been presented to illustrate the potential traffic volume reductions on the road network through Wonthaggi town centre.

The modelled road network and assumed speeds for the PSP Area (no bypass) are presented in Figure 5.1. It is noted that each road link has been modelled as a single lane in each direction.

[2] This is a longest range modelling year available in VITM. In reality,,the PSP will likely be developed over a longer timeframe.

Figure 5.1: Modelled Road Network Configuration and Link Speeds



Note: The modelled road network was based on the PSP Network initially proposed (circa 2017). Since this time the PSP road network has been updated to include additional road links that have not been incorporated into updated VITM modelling. However, it is noted that road links have generally been added and not removed which means that the traffic volume identified as part of the VITM modelling will likely be spread across multiple links rather than concentrated on one link.

5.1.3. Land Use and Population Forecasts

The indicative land uses and yields for the PSP Area used for the transport modelling were agreed with Council and are presented in Table 5.1. The proposed dwellings, community centres and activity centres have been distributed into 8 zones throughout the PSP Area, which were used as the basis for the modelling. The zones are shown indicatively in Figure 5.2.

Figure 5.2: NGGA Modelling Zones Adopted in VITM

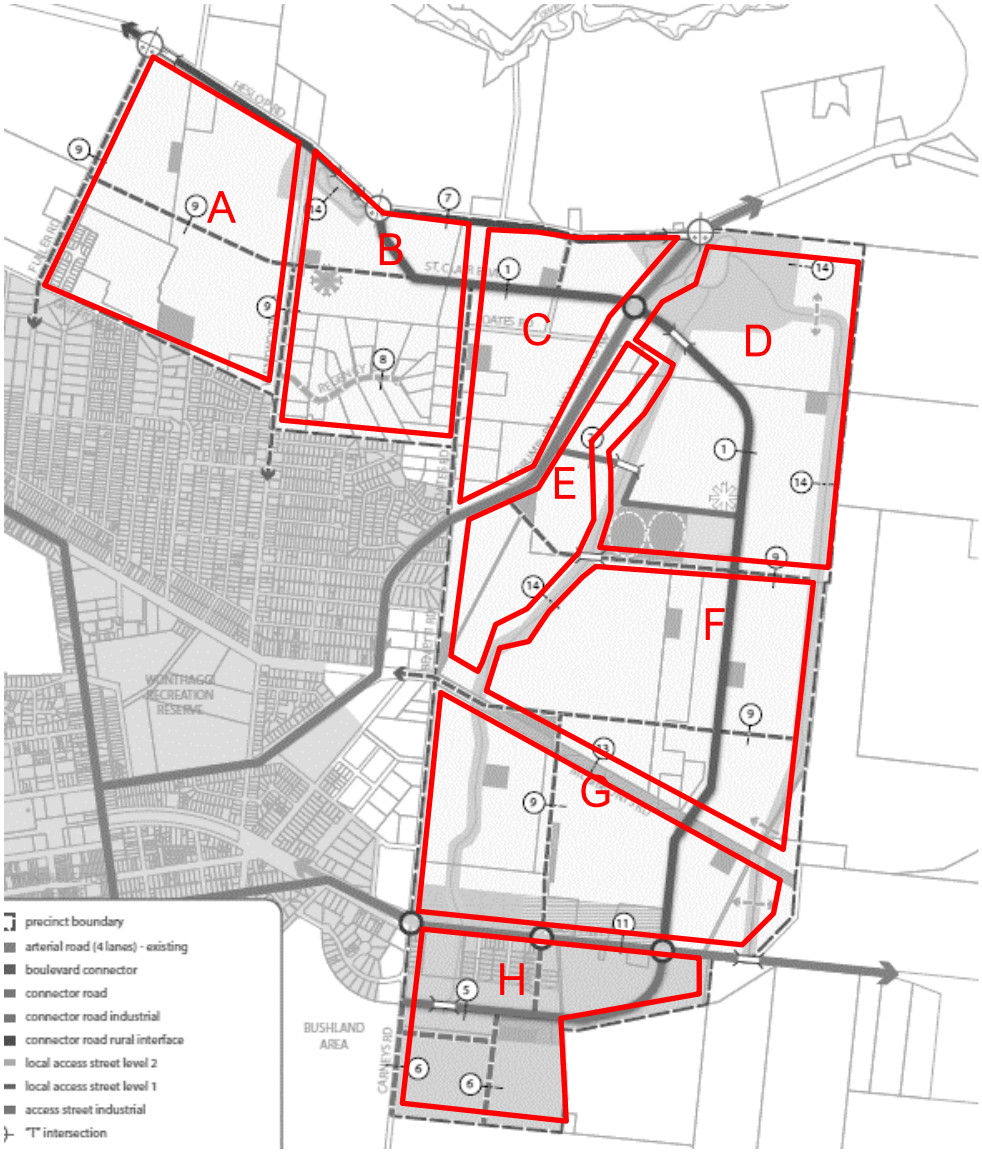


Table 5.1: NGGA Modelling Zones – Land Use Yield and Population Projections

Zone Number	No. of Dwellings	Community Centres	Activity Centre (sqm)
A	577	1	3,000sqm
B	395	-	-
C	352	-	-
D	631	1	3,000sqm
E	316	-	-
F	856	-	-
G	486	-	-
H	388	-	-
Total	**4,000**	**2**	**6,000sqm**

The dwellings have generally been distributed proportionally between the zones based on the size of each zone, whilst the indicative locations of the other uses has been agreed with Council officers. The community and activity centres have been coded into VITM as an overall number of antiipcated employees, rather than specific floor area estimates.

5.1.4. Traffic Generation Estimates

Estimates of the future traffic generation of the PSP Area have been extracted from VITM. The VITM traffic estimates are based on demographic, car ownership, mode share data and future land use forecasts.

The traffic generation shown in the model outputs only includes traffic that travels external to each modelling zone. Trips that occur entirely within a model zone (e.g. a trip from a house to a school or shops that are within the same zone) do not appear in the model outputs. Therefore, the overall daily traffic generation of each household will be higher than the trips shown in the model.

From the modelling, a summary of the anticipated external traffic generation from the indicative development scenario for the PSP Area as a whole is provided in Table 5.2.

Table 5.2: PSP Area External Traffic Generation Estimates

Period	Traffic Generation [1]		
	Productions	Attractions	Total
AM Peak Hour	3,050vpd	2,050vpd	5,100vpd
PM Peak Hour	2,350vpd	3,400vpd	5,750vpd
Daily	13,550vpd	13,750vpd	27,300vpd

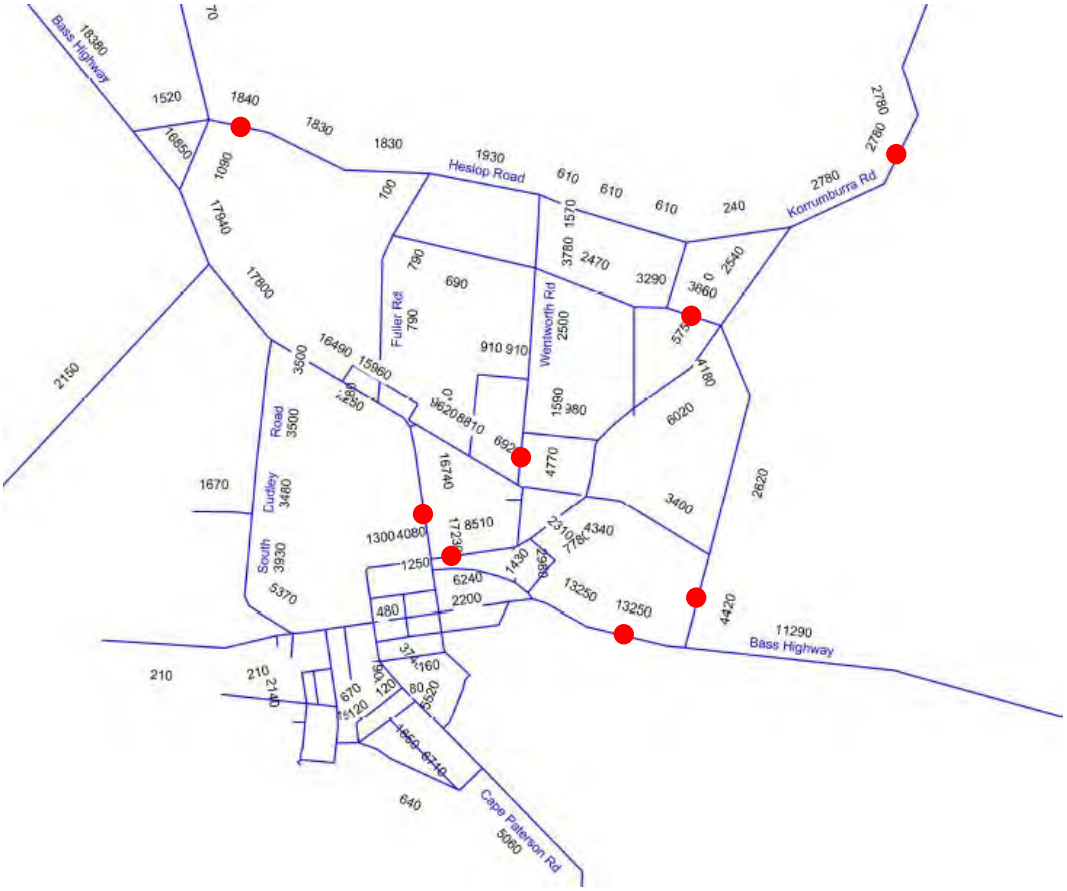
[1] Presented values are for the no bypass 2046 option. Transport network options 1A and 1B will deliver similar values.

The PSP Area is broadly expected to generate in the order of 27,300 external vehicle movements per day. This value equates to approximately 6.8 vehicle movements per dwelling per day.

5.1.5. Road Network Volumes

A summary of the existing (2016) and post development (2046) daily traffic volumes on key internal and external road links following the full development of the PSP Area is presented in Figure 5.3 and Table 5.3, with full plots presented in Appendix C. The red dots on Figure 5.3 represent the count locations presented in Table 5.3.

Figure 5.3: VITM Daily Traffic Volume Plot – No Bypass Option (Wonthaggi)



Note: The modelled road network was based on the PSP Network initially proposed (circa 2017). Since this time the PSP road network has been updated to include additional road links that have not been incorporated into updated VITM modelling. However, it is noted that road links have generally been added and not removed which means that the traffic volume identified as part of the VITM modelling will likely be spread across multiple links rather than concentrated on one link.

Table 5.3: Post Development (Year 2046) Traffic Volumes on Key Roads

Location	Daily Two-Way Traffic Volume 2046 (vpd)			
	2016 Existing Conditions	2046 No Bypass	2046 Fringe Bypass	2046 Kirrak Road Alignment
Bass Highway (east of town centre)	8,500	13,300	10,800	10,400
Bass Highway (north of town centre)	13,000	17,200	14,400	14,600
Bypass (east of town)	NA	NA	3,100	2,600
Heslop Road / Bypass (north of town)	NA	1,800	4,900	4,500
Korumburra Road (east of Bass Highway)	6,200	9,100	8,300	8,300
Korumburra Road (east of Heslop Road)	1,700	2,800	2,800	2,800
Saint Clair Boulevard (north of Bass Highway)	NA	4,400	2,500	2,900
Saint Clair Boulevard (west of Korumburra Road)	NA	3,700	3,700	4,200
Wentworth Road (north of Korumburra Road)	3,300	4,800	4,500	5,700

vpd denotes vehicles per day, rounded to the nearest 100vpd.

Table 5.3 indicates that the PSP Area is expected to result in significant increases in traffic volumes on key roads in the vicinity of the PSP Area compared with the 2016 existing volumes.

The modelling indicates that under the no bypass scenario that Bass Highway and Korumburra Road are predicted to experience the greatest increases in traffic volumes (i.e. roughly double their existing levels).

St Clair Boulevard is predicted to carry daily traffic volumes of between 2,500 and 4,400vpd, whilst daily traffic volumes on Wentworth Road (north of Korumburra Road) are predicted to increase by 1,500vpd.

Whilst not proposed as part of the PSP, should a bypass eventually be delivered, it is predicted that only modest traffic volume increases would occur on Bass Highway and Korumburra Road in the town centre when compared with the existing conditions.

5.1.6. Peak Hour Volumes

The daily link plot traffic volumes have been converted to peak hour turning movements with the outputs presented in Appendix D. The peak hour traffic volumes have been developed having regard for the following:

- Interpolation of the strategic modelling (i.e. daily link plots)
- Factoring up the existing traffic volume counts by the percentage difference between the 2016 and 2046 modelling scenario outputs
- Applying a 10% peak hour to daily ratio to the strategic modelling link plots
- Engineering judgement (i.e. reassigning traffic following the signalisation of Bass Highway and Korumburra Road).

The resultant peak hour traffic volume estimates have been used to inform the detailed intersection modelling.

5.2. SIDRA Intersection Modelling

The future operation of key intersections has been assessed using *SIDRA INTERSECTION 7*[3], a computer based modelling package which calculates intersection performance.

The commonly used measure of intersection performance is referred to as the *Degree of Saturation (DOS)*. The DOS represents the flow-to-capacity ratio for the most critical movement on each leg of the intersection. For signalised intersections and roundabouts, a DOS of around 0.95 has been typically considered the 'ideal' limit (or 0.90 for unsignalised intersections), beyond which queues and delays increase disproportionately[4]. The Level of Service (LOS) for an intersection is determined based on the DOS of the intersection, with the parameters set out at the bottom of the page.

Table 5.4 presents a summary of the anticipated operation of the intersections identified above, with full results presented in Appendix E of this report. The SIDRA models have been prepared assuming the intersection layouts presented in Table 4.2.

[3] Program used under license from Akcelik & Associates Pty Ltd.

[4] SIDRA INTERSECTION adopts the following criteria for Level of Service assessment:

Level of Service		Intersection Degree of Saturation (DOS)		
		Unsignalised Intersection	Signalised Intersection	Roundabout
A	Excellent	<=0.60	<=0.60	<=0.60
B	Very Good	0.60-0.70	0.60-0.70	0.60-0.70
C	Good	0.70-0.80	0.70-0.90	0.70-0.85
D	Acceptable	0.80-0.90	0.90-0.95	0.85-0.95
E	Poor	0.90-1.00	0.95-1.00	0.95-1.00
F	Very Poor	>=1.0	>=1.0	>=1.0

Table 5.4: SIDRA INTERSECTION Post Development Operation

No.	Intersection	Peak Hour	DOS	Average Delays (secs)	95th Percentile Queue (m)
IN-01	Heslop Road / Fuller Road	AM	0.06	2	1
		PM	0.06	2	1
IN-02	Heslop Road / St Clair Boulevard	AM	0.14	4	4
		PM	0.07	4	2
IN-03	Korumburra Road / Heslop Road	AM	0.14	2	3
		PM	0.11	2	2
IN-04	Korumburra Road / St Clair Boulevard	AM	0.33	7	15
		PM	0.55	7	34
IN-05	Bass Highway / Carneys Road	AM	0.84	11	119
		PM	0.82	9	95
IN-06	Bass Highway / St Clair Boulevard	AM	0.74	9	74
		PM	0.75	8	71
IN-07	Korumburra Road / McGibbonys Road	AM	Not assessed as part of this study (Refer to Section 5.4.4)		
		PM			
IN-08	Bass Highway / John Street	AM	Not assessed as part of this study [1]		
		PM			
IN-09	Bass Highway / Heslop Road	AM	0.77	4	14
		PM	0.59	3	49
IN-10	Bass Highway / Korumburra Road	AM	0.90	44	251
		PM	0.92	42	257
IN-11	Bass Highway / McKenzie Street / Graham Street	AM	0.90	47	138
		PM	0.99	67	280

[1] Specific modelling of this intersection has not been completed as part of this study, however, the intersection is expected to operate similarly to IN-05 and IN-06 which are also configured as single lane roundabouts.

As described earlier, a DOS of around 0.95 for signalised intersections and 0.90 for unsignalised intersections has traditionally been considered the practical limit beyond which intersection performance is unsatisfactory, as beyond this value queues and delays increase disproportionately. On this criterion, the calculated DOS suggest that the nominated intersections can generally be expected to operate satisfactorily following full development of the PSP. It is noted that the Bass Highway / Korumburra Road and Bass Highway / McKenzie Street / Graham Street intersections are both predicted to be operating near their capacities (further discussion regarding this is provided in the following sections). Typically, when an intersection is operating at or near its capacity vehicles seek to take alternate routes. In this instance that could include a future bypass or alternatively using the local road network to avoid these intersections.

The post development level of service (based on DOS) for each of the intersections for the AM and PM peak hours is presented in Figure 5.4 and Figure 5.5.

Figure 5.4: Overview of AM Peak Hour – Intersection Level of Service

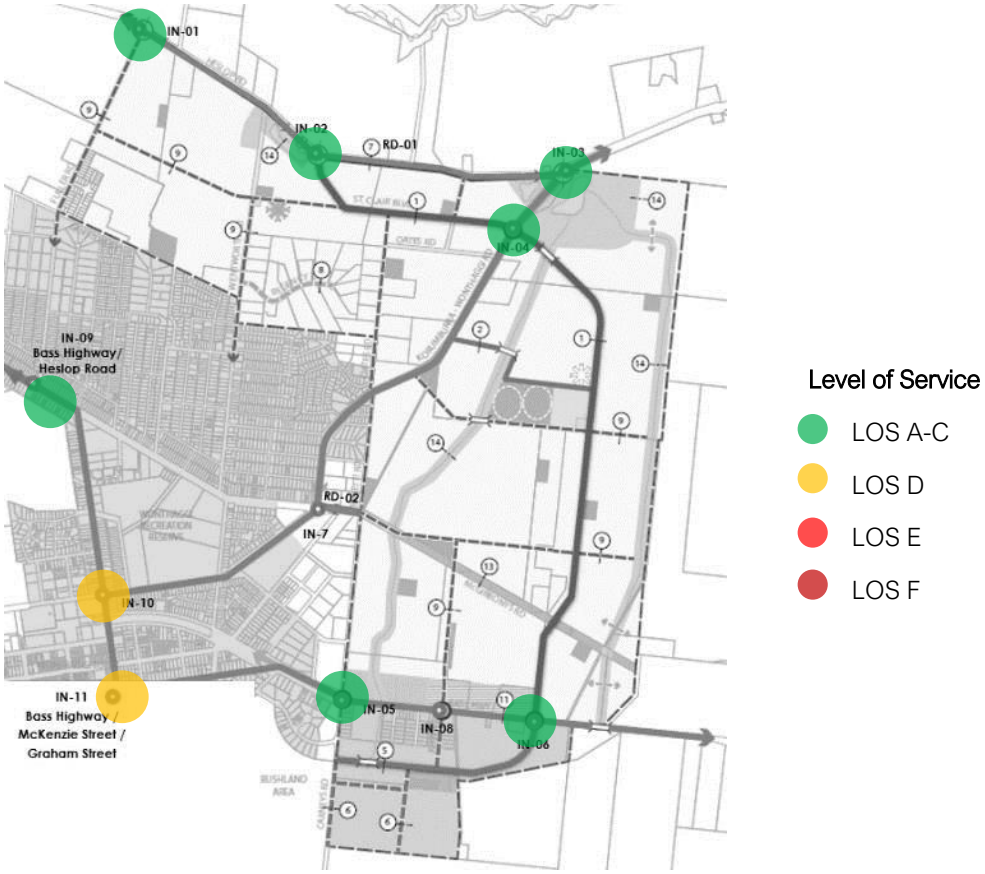
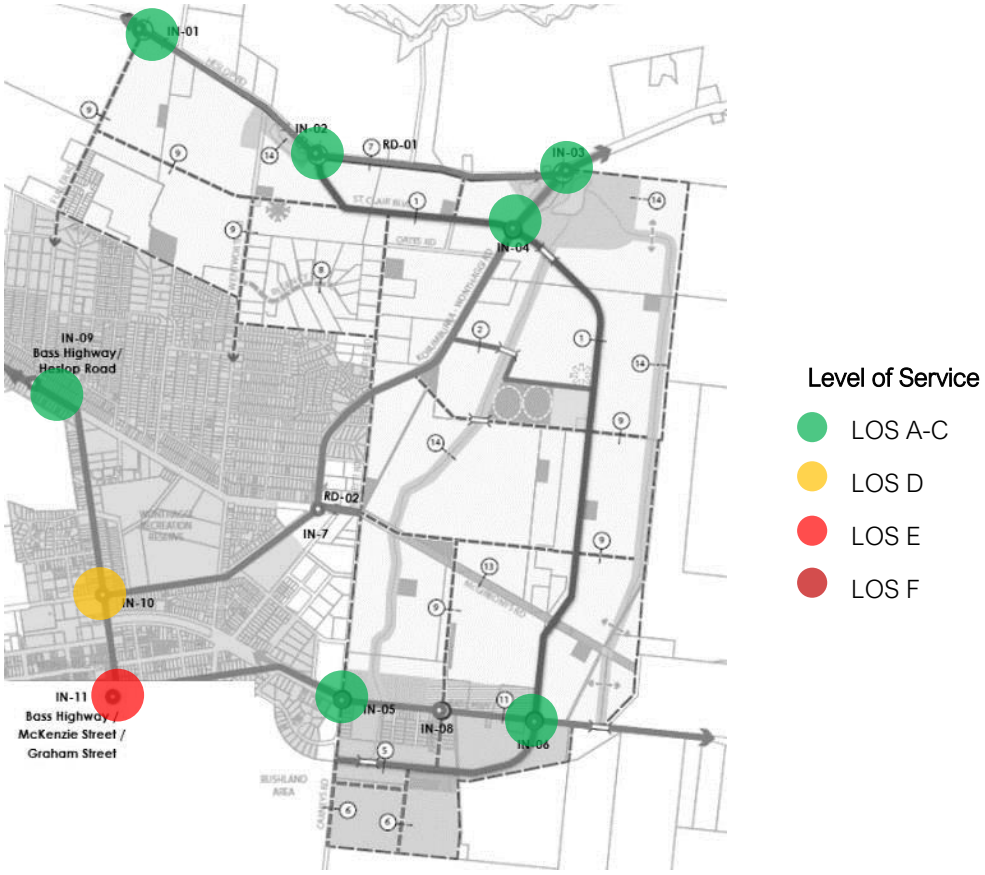


Figure 5.5: Overview of PM Peak Hour – Intersection Level of Service



5.3. Midblock Capacity

The midblock capacity assessment assesses the forecast future traffic demands against the indicative two-way volume capacity of a road. The capacity of each road varies depending on a number of factors, such as number of traffic lanes, carriageway width, property access, on-street car parking, land use frontages, etc. The future indicative capacities of each of the roads have been sourced from Austroads, VPA and Clause 56.06 of the Bass Coast Planning Scheme.

An assessment of the midblock capacity of the key roads within and surrounding the PSP Area has been undertaken with a summary of the results provided in Table 5.5.

Table 5.5: Midblock Capacity Assessment

Road (Location)	Indicative Daily Capacity	Daily Traffic Volume (vpd)			Adequacy of Road Link
		Existing (2016)	Additional	Post Development (2046)	
Bass Highway (east of town centre)	~18,000vpd	8,500	+4,800	13,300	✓
Bass Highway (north of town centre)	~18,000vpd	13,000	+4,200	17,200	✓
Heslop Road / Bypass (north of town)	~7,000vpd	<100	+1,700	1,800	✓
Korumburra Road (east of Bass Highway)	~18,000vpd	6,200	+2,900	9,100	✓
Korumburra Road (east of Heslop Road)	~18,000vpd	1,700	+1,100	2,800	✓
Saint Clair Boulevard (north of Bass Highway)	~7,000vpd	NA	+4,400	4,400	✓
Saint Clair Boulevard (west of Korumburra Road)	~7,000vpd	NA	+3,700	3,700	✓
Wentworth Road (north of Korumburra Road)	~7,000vpd	3,300	+1,500	4,800	✓

Table 5.5 indicates that each of the key roads within and surrounding the PSP Area is anticipated to operate within their theoretical daily volume capacities, noting that Bass Highway (north of the town centre) is approaching capacity.

5.4. Other Considerations

5.4.1. Bass Highway Capacity

Following the development of the PSP area (and assuming no bypass) Bass Highway is predicted to carry almost 18,000vpd. Based on Austroads design guidance, an arterial road with a single lane in each direction has a theoretical traffic volume capacity in the order of 18,000 vehicles per day. In reality, a road with a single lane in each direction can carry up to 20,000 to 25,000vpd prior to additional through capacity being required (i.e. duplication). However, it will become increasingly difficult for vehicles to enter Bass Highway from the side roads at priority controlled intersections as the daily traffic volumes increase. Localised capacity enhancements (above those identified in this report) may be required at intersections along the corridor to maintain sufficient access to the lower order road network.

The capacity constraint on the Bass Highway corridor is reflected in Figure 5.4 and Figure 5.5 which indicate that the two main intersections within the town centre will be operating with LOS D or worse during the AM and PM peak hours.

5.4.2. Bypass Requirement / Seasonal Traffic Volumes

The expectant future traffic volumes on Bass Highway immediately north of the town centre are 18,400vpd without the bypass. As discussed above, the Bass Highway corridor is anticipated to be operating at or near capacity without the bypass.

This will be exacerbated during busier summer months when traffic volumes in the region increase. During these infrequent events increased queues and delays will be experienced along the Bass Highway intersections.

The expectant future traffic volumes on Bass Highway immediately north of the town centre are 14,600vpd with the bypasson the Kirrak Road alignment (preferred option).

The strategic modelling indicates that with the bypass(either alignment) the traffic volumes through the town centre reduce significantly such that each of the intersections within the town centre would operate with a LOS C or better. Indeed, the daily traffic volumes on the Bass Highway corridor would only experience modest increases if the bypassis provided. This suggests that the lower order intersections provided along the corridor would continue to operate at similar levels to currently experienced without the need for further capacity enhancement works should the bypassbe provided.

5.4.3. Bass Highway / Korumburra Road Intersection (IN-10)

Since the initial preparation of this report, the upgraded signalised intersection has been delivered by Regional Roads Victoria.

5.4.4. Korumburra Road / McGibbonys Road (IN-07)

The intersection requirements and resultant operation of the Korumburra Road / McGibbonys Road intersection have been assessed by TTM Consulting as part of a separate subdivision planning permit application and has been subsequently constructed.

The intersection layout includes chanellised left and right turn lanes on Korumburra Road and a shared left and right turn lane on McGibbonys Road. Reference to the turn lane warrants presented in the Austroads Guide (Part 4a Unisgnalised Intersections) against the anticipated future traffic volumes at the intersection suggests that the proposed intersection geometry is appropriate.

Therefore, the operation of the intersection has not been re-assessed as part of this study.

6. INTERSECTION CONCEPT LAYOUTS AND COSTINGS

6.1. Concept Layouts

GTA has prepared concept layout plans for each of the key intersections within and surrounding the PSP Area. The concept layout plans are provided in Appendix F. Additionally, the recommended initial and ultimate future cross-sections of Bass Highway between Carneys Road and St Clair Boulevard are also provided in Appendix F.

Generally, the concept designs have been prepared in accordance with the requirements of the relevant Austroads Guides, including the Austroads Guide to Road Design Part 4A: Unsignalised Intersections and Part 4B: Roundabouts. A summary of the design considerations that have informed the concept designs is provided below:

- The desirable minimum dimensions have generally been adopted from the Austroads Guide.
- The designs seek to minimise any third-party land acquisition requirements.
- The designs seek to minimise infrastructure requirements.
- Incorporate design recommendations from Regional Roads Victoria (September 2020).

A summary of the design considerations is provided on each of the concept layout plans (including design speed, design vehicle, etc.).

6.2. Costings

6.2.1. Assumptions and Exclusions

GTA has prepared opinions of probable cost for each of the intersections. The opinions of probable cost have been based on the following assumptions and exclusions:

Assumptions:

- A 9% project management fee has been applied to all estimates
- A 30% contingency has been applied as the order of magnitude estimates have been based on desktop study only without a site inspection.
- Asphalt re-sheeting has been included for the approaches of the intersection only.
- Existing services relocations and facilitation including lowering or realignment thereof were included as per the advises from respective authority as much as possible based on concept layout plan with the base of Aerial map and Dial Before You Dig (DBYD).
- Protection of underground services during construction are included and are based on advice from the respective authorities.
- Price escalation is not included in the estimate.
- No allowance has been made for night-works if required.

Exclusions:

- Design and documentation fees or authority fees, charges, levies and overview including insurances, bank guarantees.
- Land acquisition.
- Any allowance for abnormal weather conditions.

6.2.2. Utility Services Considerations

A Safety Management Study (SMS) workshop was undertaken in June 2021 and included representatives from VPA and relevant utility service providers. The SMS identified implications on proposed land use and guidance on construction management requirements where necessary.

Following on from the SMS workshop, GTA has undertaken further investigations into the utility services requirements at each of the intersection. Specifically, the updated assessment has further regard for the following:

- Transmission pressure gas pipeline owned by Multinet Gas
- High pressure gas pipeline owned by Multinet Gas
- Desalination pipe owned by South Gippsland Water
- Distribution Water Main owned by South Gippsland Water
- Telecommunications assets owned by Telstra and NBN

GTA has undertaken initial liaison with each of the utility providers to determine indicative costs to protect or relocate affected services. The findings from these additional investigations are provided in Appendix G. A summary of the utilities provided at each of the intersections is provided in Table 6.1.

Table 6.1: Services Located at Each Intersection

Intersection No.	Intersection Name	Electricity	Gas	Water	Telstra	NBN
IN-01	Heslop Road / Fuller Road	✓	-	✓	✓	-
IN-02	Heslop Road / St Clair Boulevard	✓	-	✓	-	-
IN-03	Korumburra Road / Heslop Road	-	✓	✓	✓	-
IN-04	Korumburra Road / St Clair Boulevard	-	✓	✓	✓	-
IN-05	Bass Highway / Carneys Road	✓	✓	✓	✓	✓
IN-06	Bass Highway / St Clair Boulevard	✓	-	✓	✓	✓
IN-08	Bass Highway / John Street	✓	-	✓	✓	✓

6.2.3. Opinion of Probable Costs

The opinion of probable cost for each intersection is provided in Table 6.2, with a detailed breakdown of the costs also provided at Appendix F. The below costs include consideration of the service protection and/or relocations identified above.

Table 6.2: Opinion of Probable Costs (based on 2021 estimates)

Intersection No.	Intersection Name	Opinion of Probable Cost	
		Without Contingency	With Contingency
IN-01	Heslop Road / Fuller Road	$1,617,000	$2,002,000
IN-02	Heslop Road / St Clair Boulevard	$1,593,000	$1,971,000
IN-03	Korumburra Road / Heslop Road	$2,209,000	$2,734,000
IN-04	Korumburra Road / St Clair Boulevard	$2,539,000	$3,142,000
IN-05	Bass Highway / Carneys Road	$2,959,000	$3,651,000
IN-06	Bass Highway / St Clair Boulevard	$4,194,000	$5,175,000
IN-07	Korumburra Road / McGibbonys Road		Already Constructed
IN-08	Bass Highway / John Street	$2,032,000	$2,506,000
RD-01	Heslop Rd (from Fuller Rd to Korumburra-Wonthaggi Rd)	$3,640,000	$4,505,000
RD-02	McGibbonys Road (245m construction of Local Access Street Level 2)	$876,000	$1,084,000

A.SITE PHOTOS

A

APPENDIX: SITE PHOTOS

Figure A.1: Wentworth Road – Looking North

Figure A.2: Heslop Road – Looking East

APPENDIX: SITE PHOTOS

Figure A.3: Korumburra Road – Looking West

Figure A.4: Bass Highway – Looking North

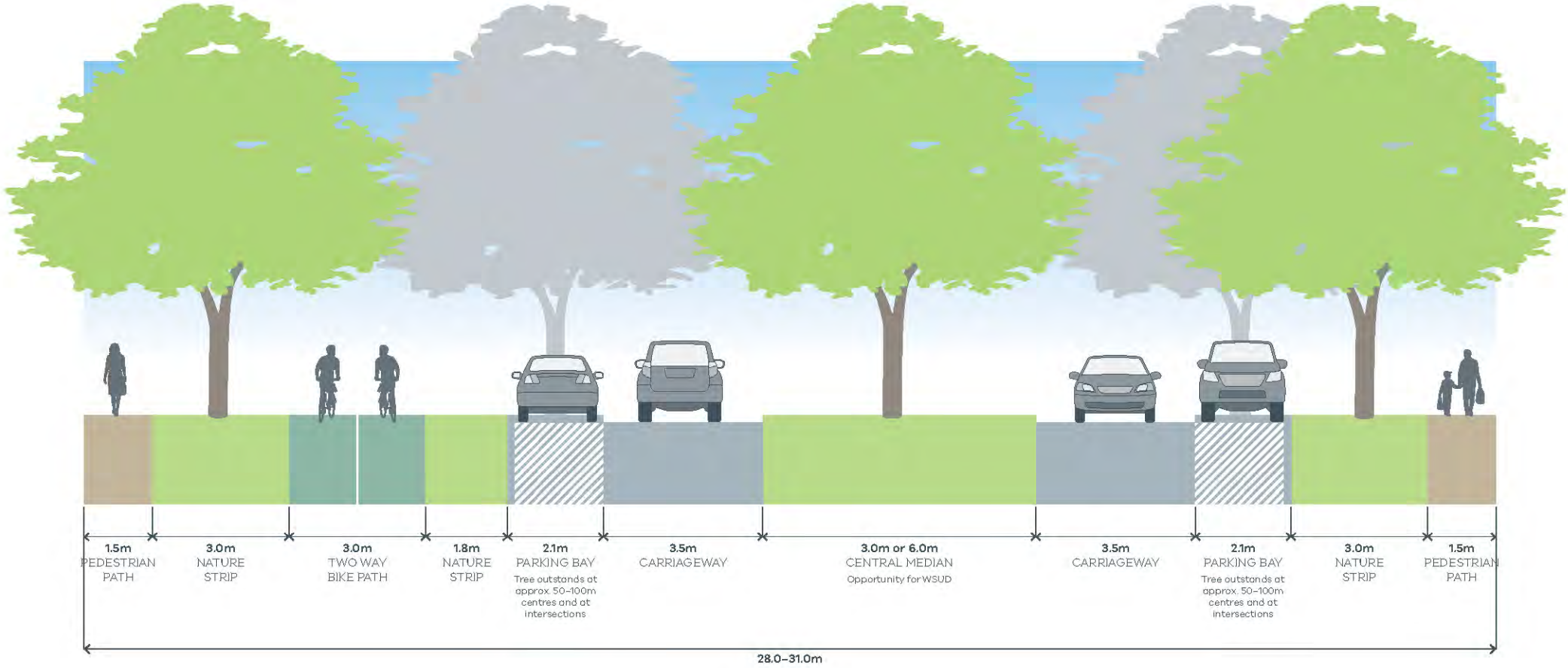
APPENDIX: SITE PHOTOS

Figure A.5: Fuller Road – Looking North

Figure A.6: Oates Road – Looking South

B.PSP CROSS-SECTIONS

B

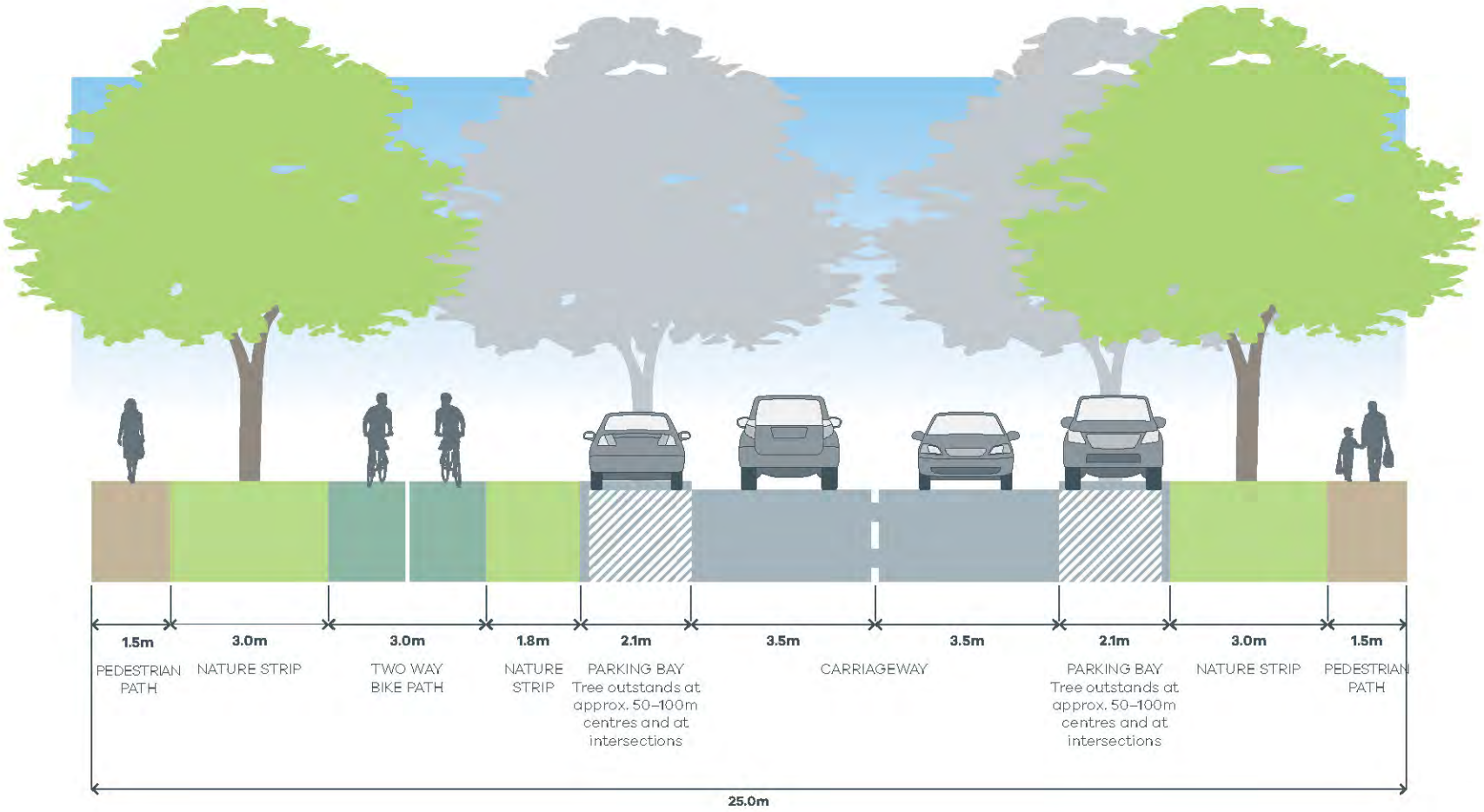


NOTES:

- Include a central median with large canopy trees to create a boulevard effect. Trees are to be centrally planted in median.
- Topsoil used in central medians is to be sandy loam, with a minimum depth of 200mm. The surface of medians is to be free-draining with a minimum cross fall of 2%, and is to be planted with warm season grasses.
- In areas where high pedestrian volumes are expected (e.g. around schools and town centres), central medians should be paved with harder wearing surfaces such as granitic sand or other pavements. Canopy tree planting must be incorporated into additional paved area.
- Any garden beds in central medians are to be offset 1.5m from back of kerb.
- Kerb to central median is to be SM2 semi-mountable kerb.
- Depending on the location of breaks in the median, provide intermediate pedestrian crossing points to accommodate mid-block crossings.
- An alternative boulevard treatment can be achieved through a wider verge on one side capable of accommodating a double row of canopy trees.
- Variations to indicative cross-section may include water sensitive urban design (WSUD) outcome. These could includebut are not limited to bioretention tree planter systems and/or median bioretention swales. Such variations must be to the satisfaction of the responsible authority.

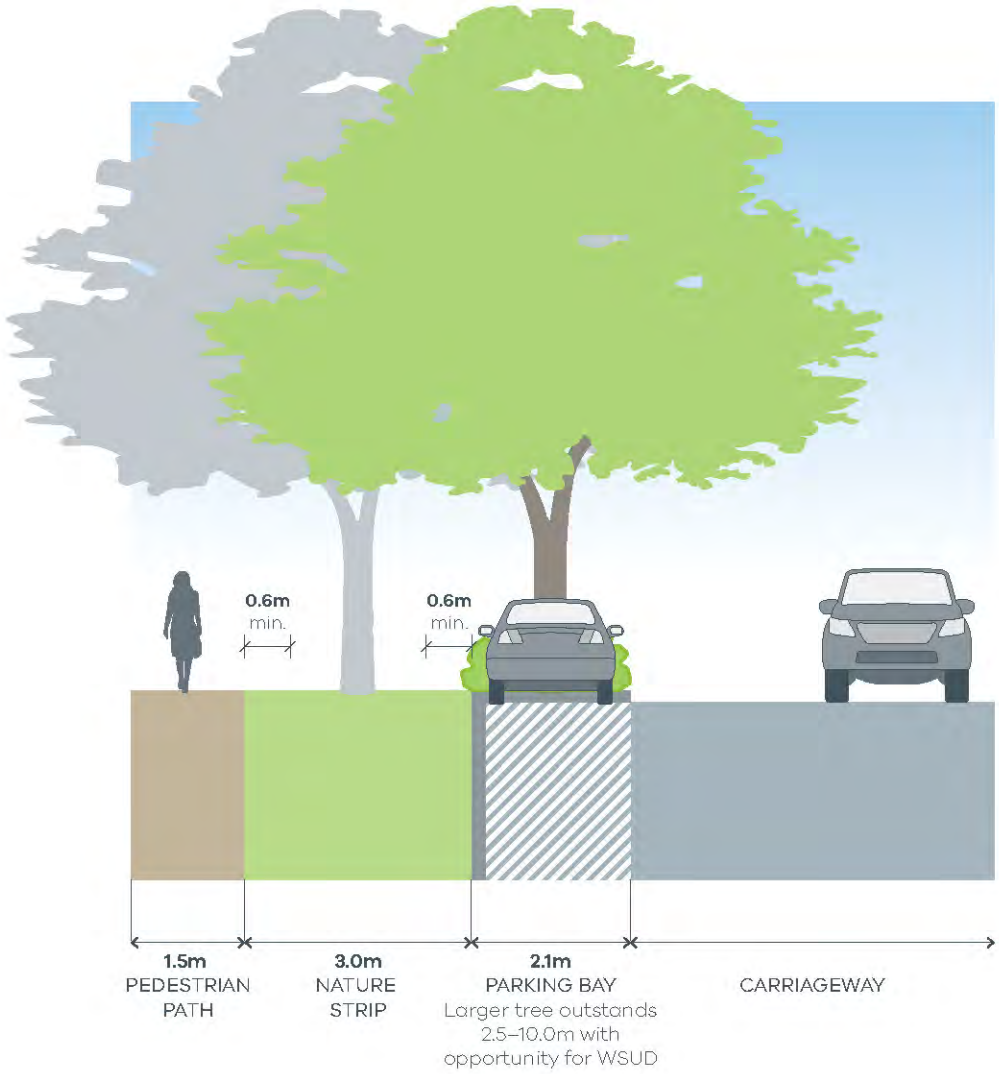
Section 1 - Connector Street (28.0 - 31.0m) Boulevard Residential

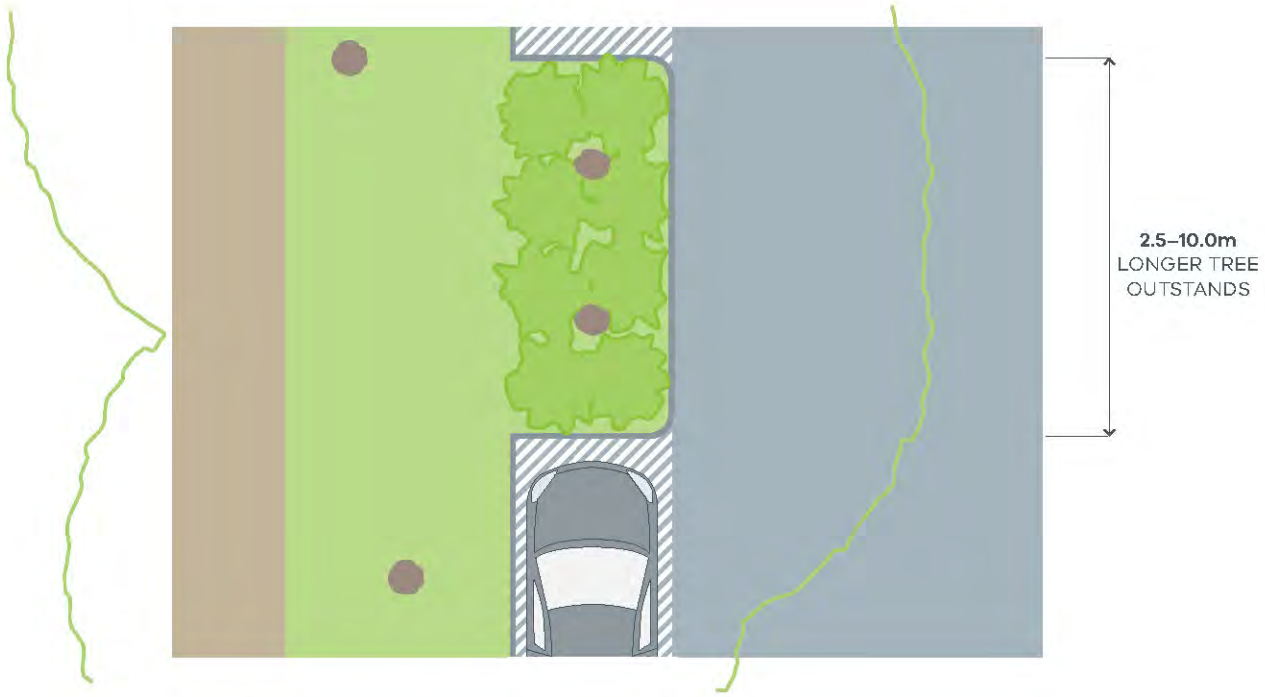
Victorian Planning Authority



NOTES:

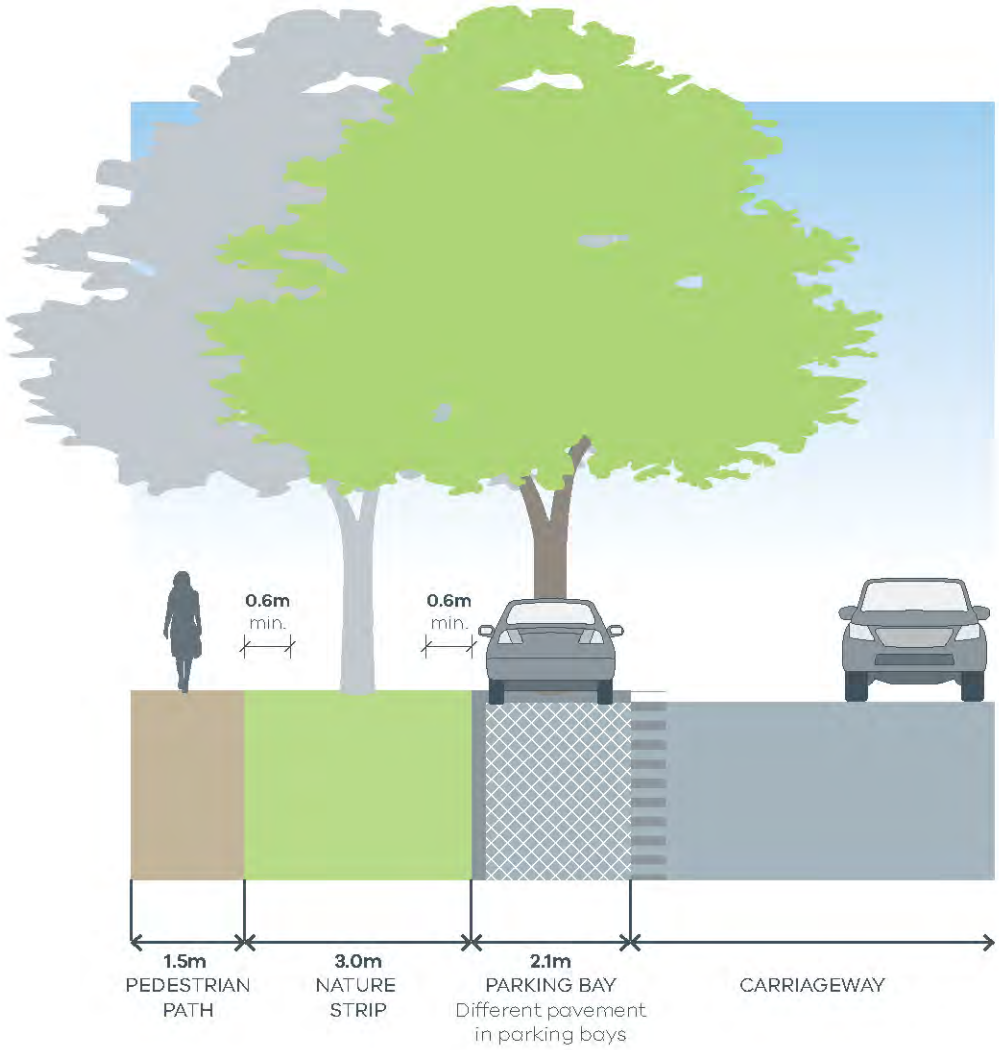
- Minimum street tree mature height 15 metres.
- All kerbs are to be B2 Barrier Kerb.
- Where roads abut school drop-off zones and thoroughfares, grassed nature strip should be replaced with pavement. Canopy tree planting must be incorporated into any additional pavement.
- Variations to indicative cross-section may include water sensitive urban design (WSUD) outcome. These could include but are not limited to bioretention tree planter systems and/or median bioretention swales. Such variations must be to the satisfaction of the responsible authority.

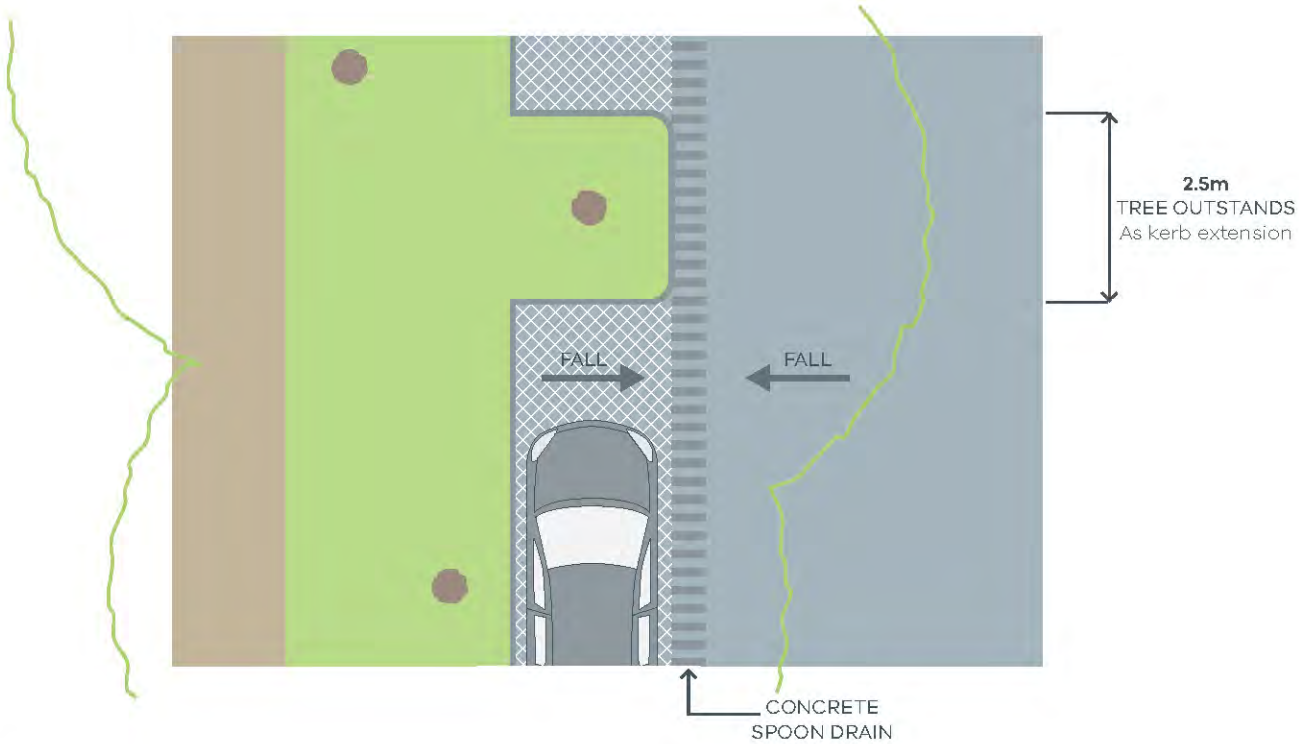




NOTES:

- For allotments with frontages of 13m or greater tree outstand lengths can be increased to accommodate more trees, garden bed planting and WSUD treatments
- Provide a minimum distance of 6.0m between outstands and adjacent driveways



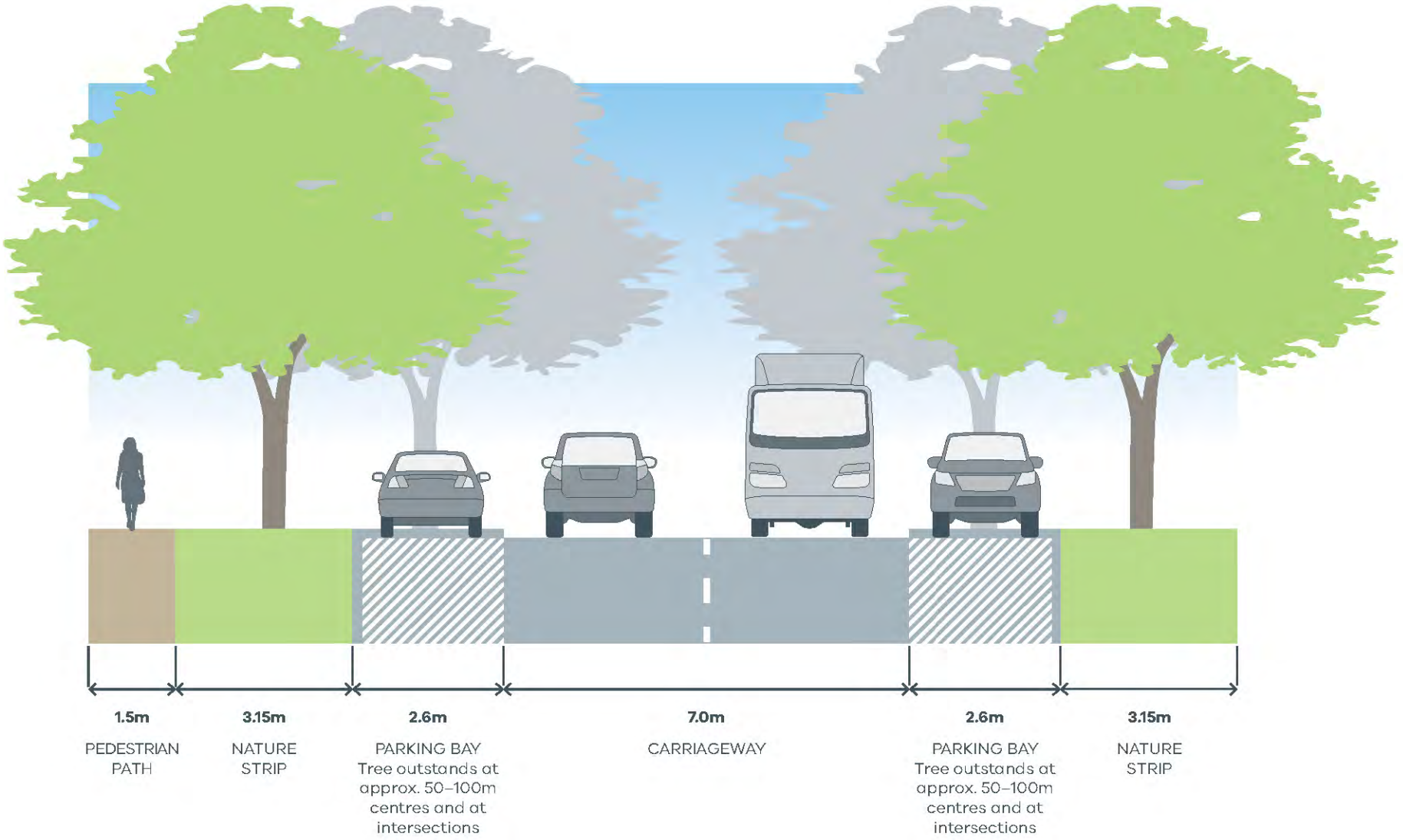


NOTES:

- A pavement treatment other than asphalt applied to parking bays
- Spoon drain between carriageway and parking bay shown as an alternative drainage treatment

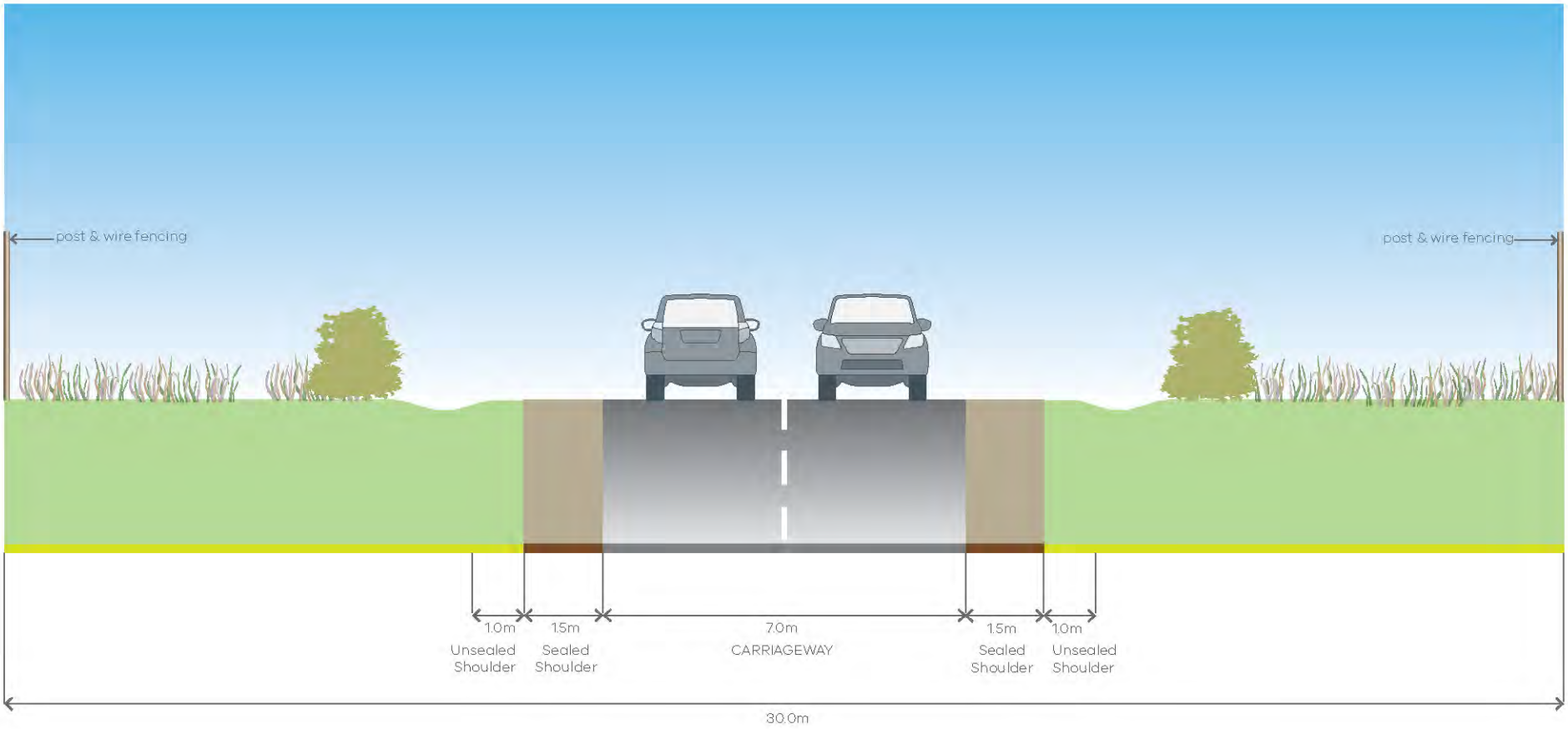
NOTES:

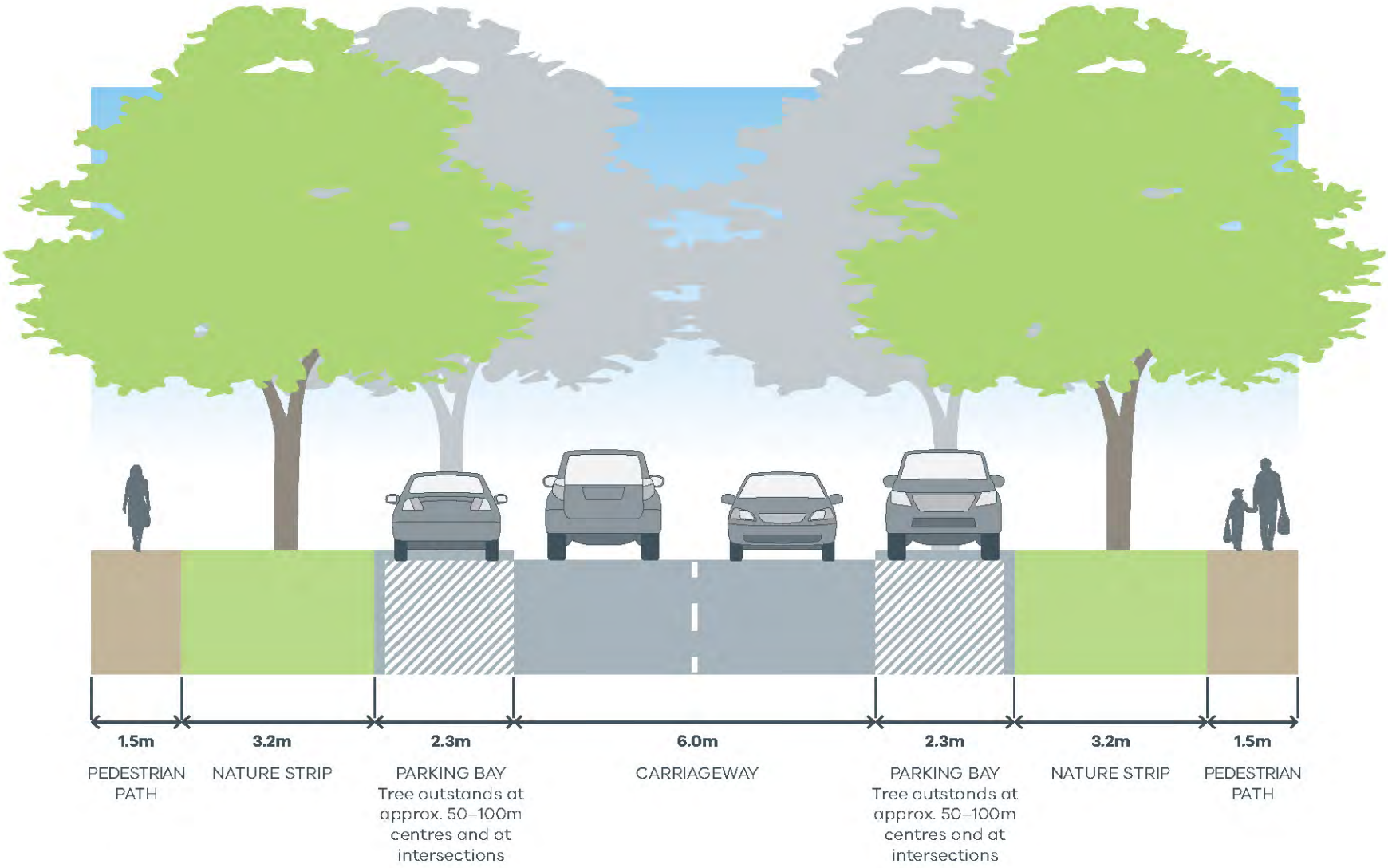
- Minimum street tree mature height 15 metres.
- All kerbs are to be B2 Barrier Kerb.
- Where roads abut thoroughfares, grassed nature strip should be replaced with pavement. Canopy tree planting must in incorporated into any additional pavement.
- Variations to indicative cross-section may include water sensitive urban design (WSUD) outcome. These could include but are not limited to bioretention tree planter systems and/or median bioretention swales. Such variations must be to the satisfaction of the responsible authority.



NOTE:

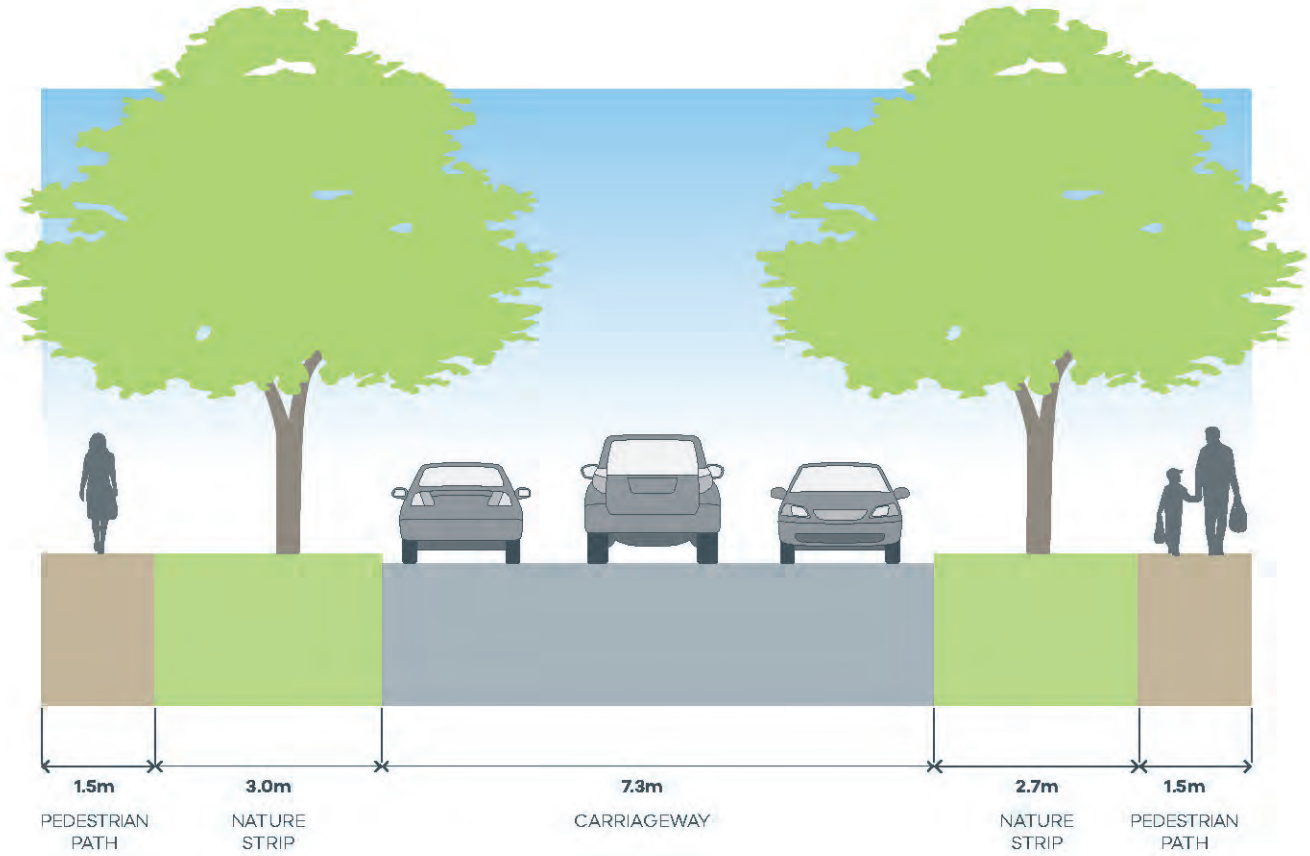
Can be modified to incorporate 2.5m shared path with reduced nature strip width if identified as accommodating bicycle path in Plan 10 of the PSP


post & wire fencing
post & wire fencing
1.0m
Unsealed Shoulder
1.5m
Sealed Shoulder
7.0m
CARRIAGEWAY
1.5m
Sealed Shoulder
1.0m
Unsealed Shoulder
30.0m



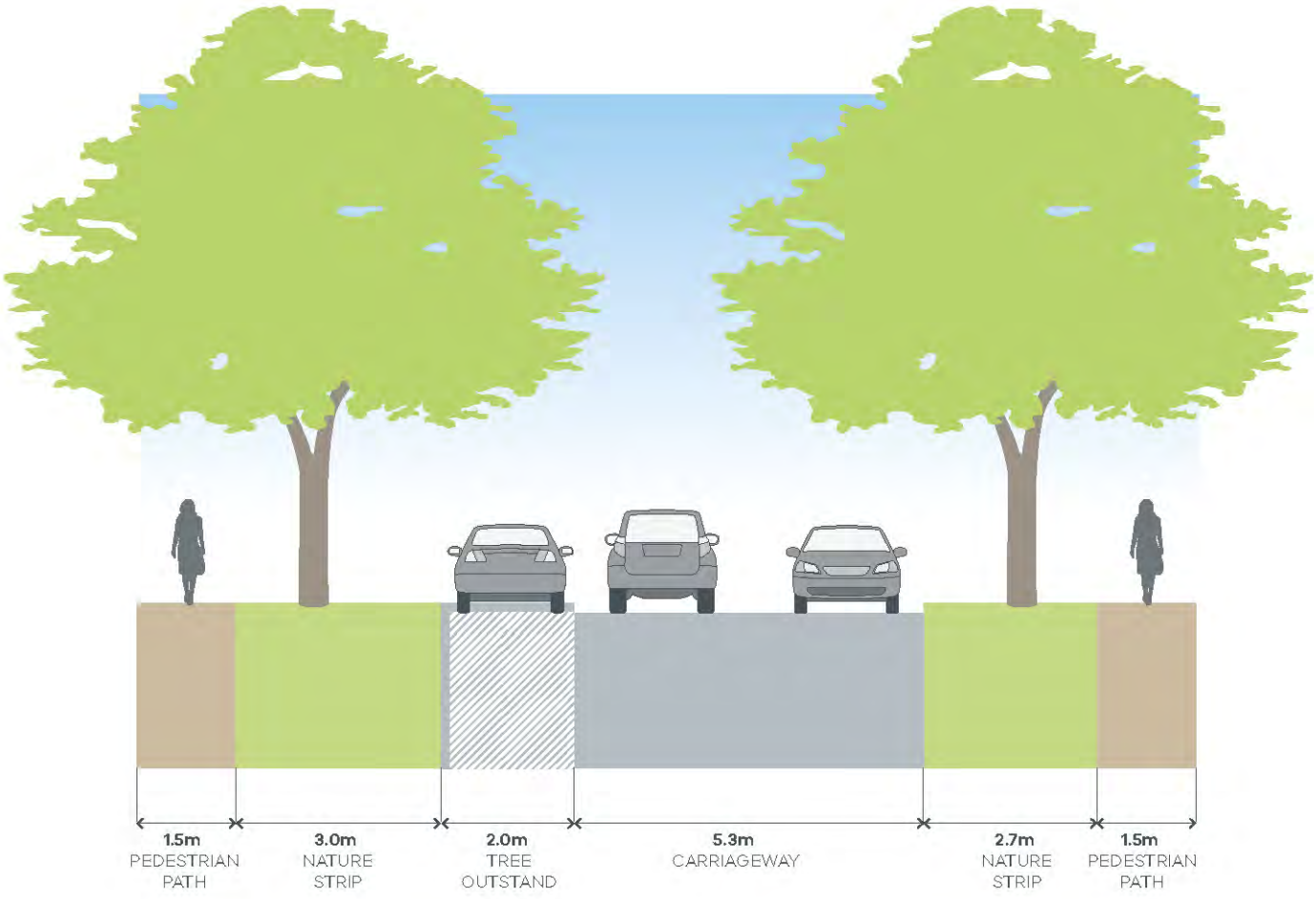
NOTES:

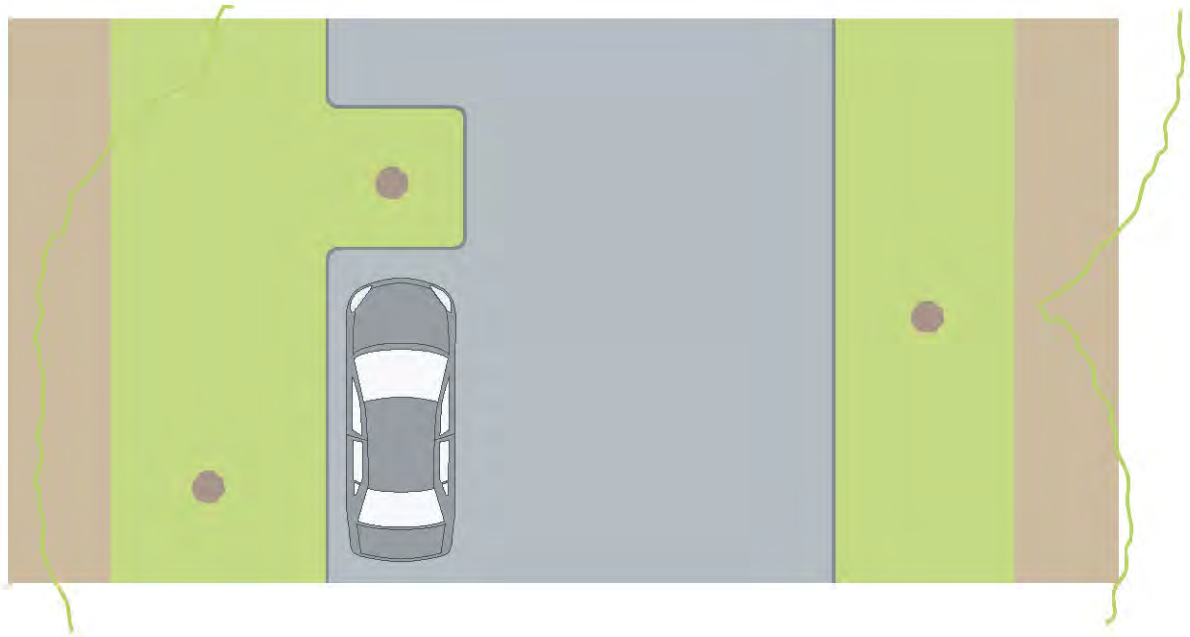
- Minimum street tree mature height 12 metres
- All kerbs are to be B2 Barrier Kerb



NOTES:

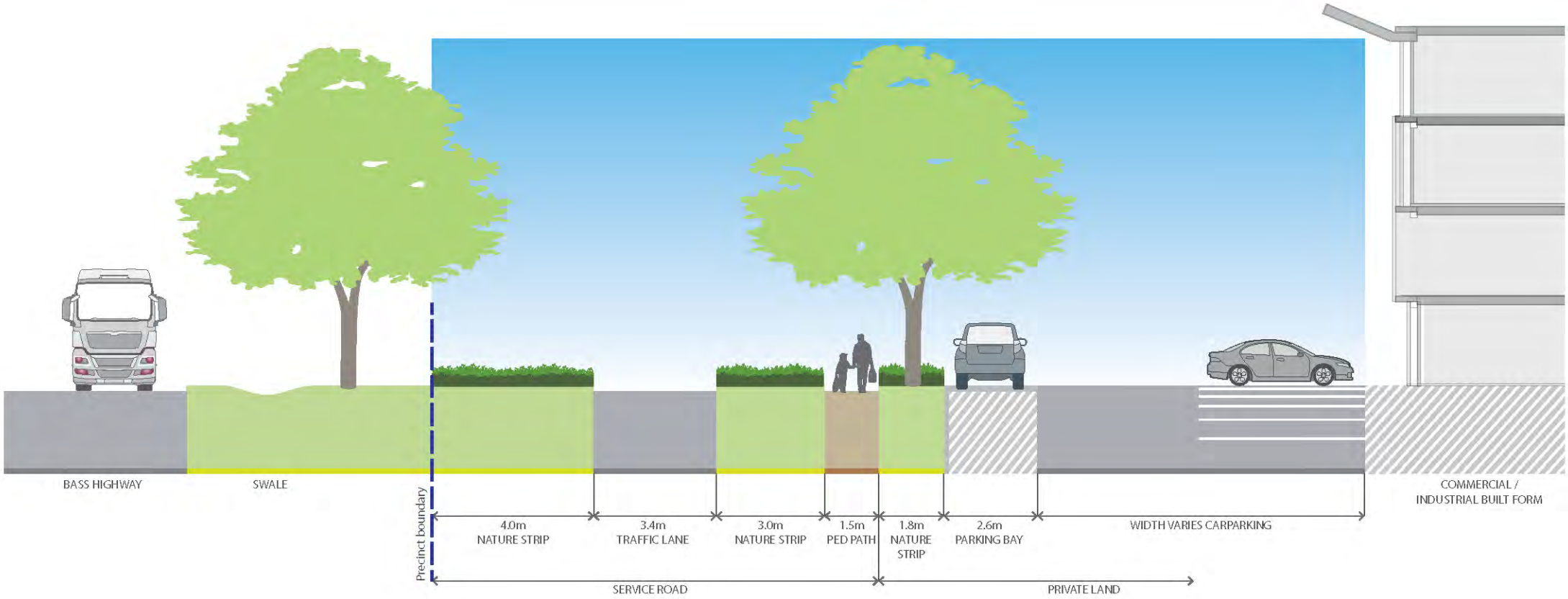
- Minimum street tree mature height 15 metres
- All kerbs are to be B2 Barrier Kerb
- The western edge of Fuller Road behind the kerb and channel may be amended to provide an appropriate rural interface

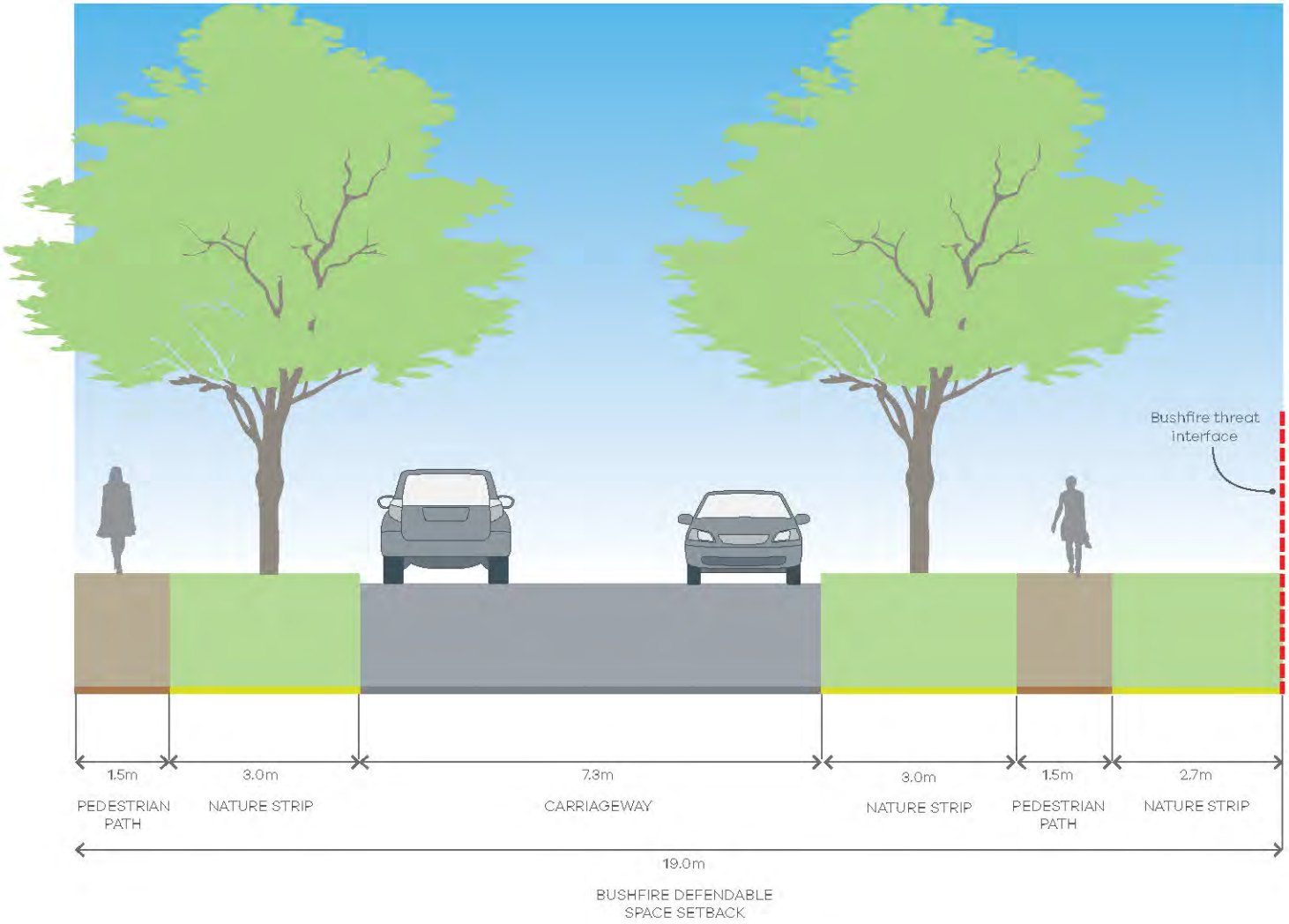




NOTES:

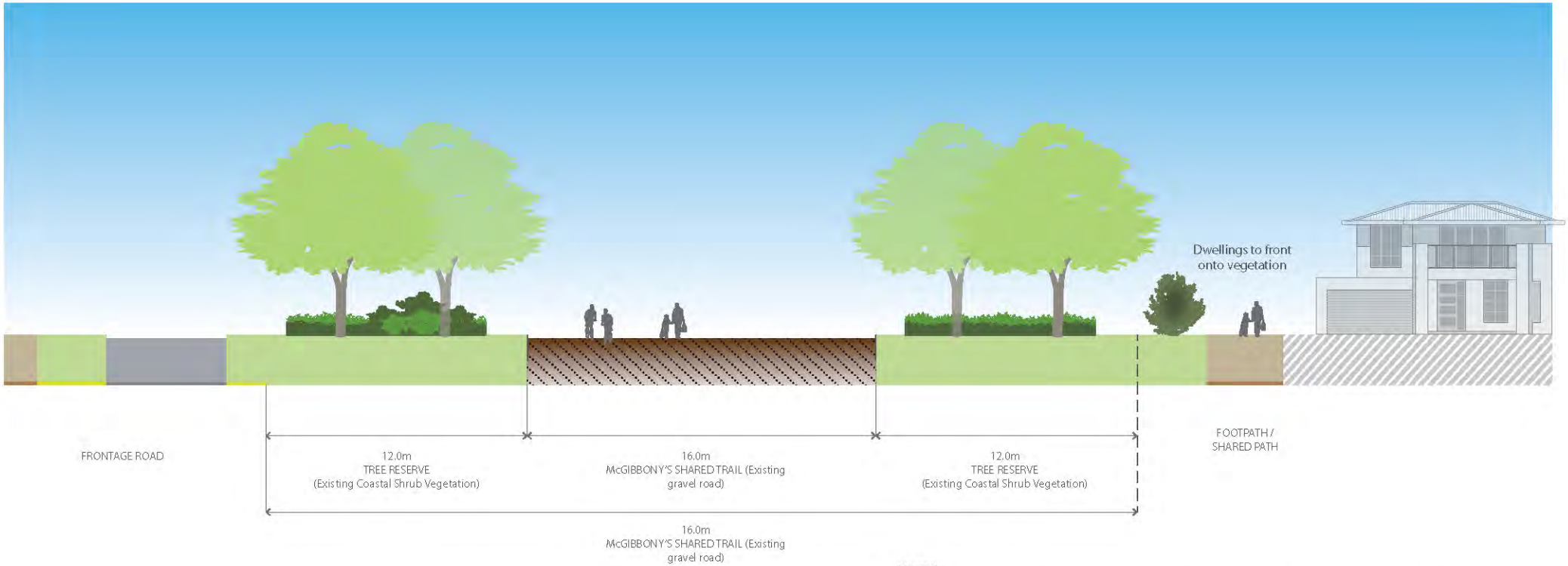
- Include tree outstands at approx 50 – 100m centres on one side only
- Road design to ensure passage of emergency vehicles is accommodated
- Functional layout of the kerb outstands to be to the satisfaction of the responsible authority


BASS HIGHWAY
SWALE
Precinct boundary
4.0m
NATURE STRIP
3.4m
TRAFFIC LANE
3.0m
NATURE STRIP
1.5m
PED PATH
1.8m
NATURE
STRIP
2.6m
PARKING BAY
WIDTH VARIES CARPARKING
COMMERCIAL /
INDUSTRIAL BUILT FORM
SERVICE ROAD
PRIVATE LAND



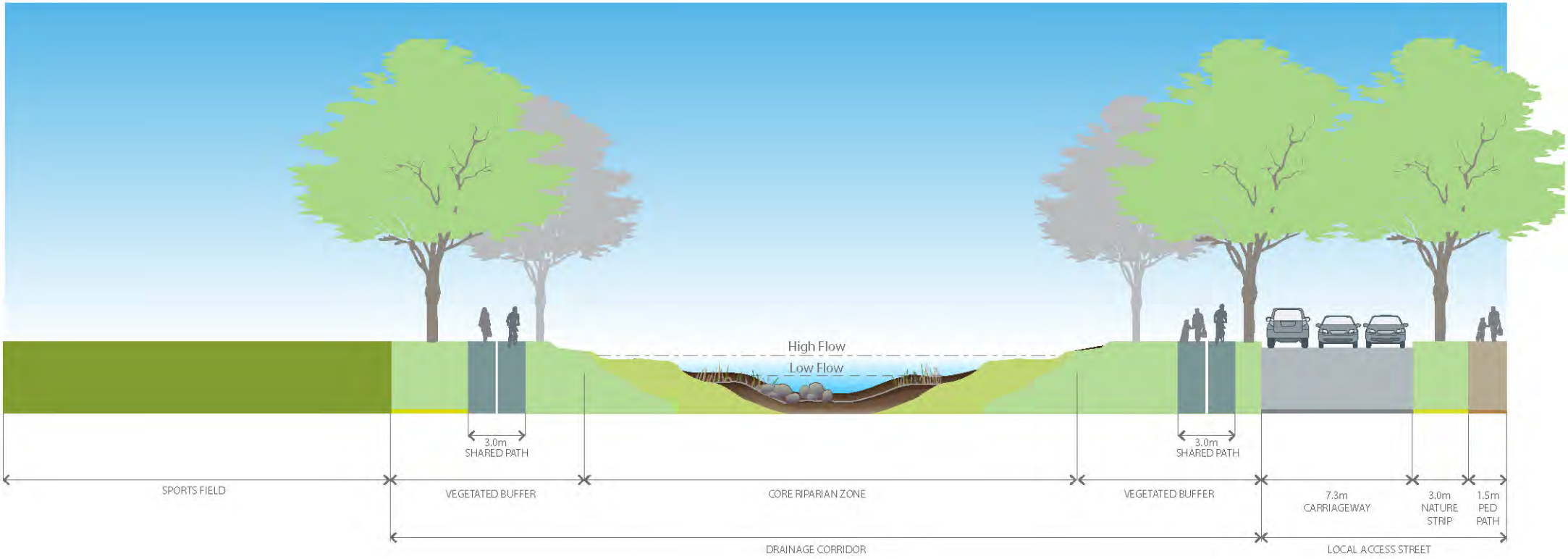
NOTES:

- Road reserve width required is varied dependent on the fire risk and the design response required to ensure bushfire defendable space and building setback distance standards are met.
- BAL 12.5 requirement 19m bushfire defendable space setback achieved through 19m cross section
- Where there is an edge road adjacent to the precinct boundary, the requirement for one pedestrian path can be considered.



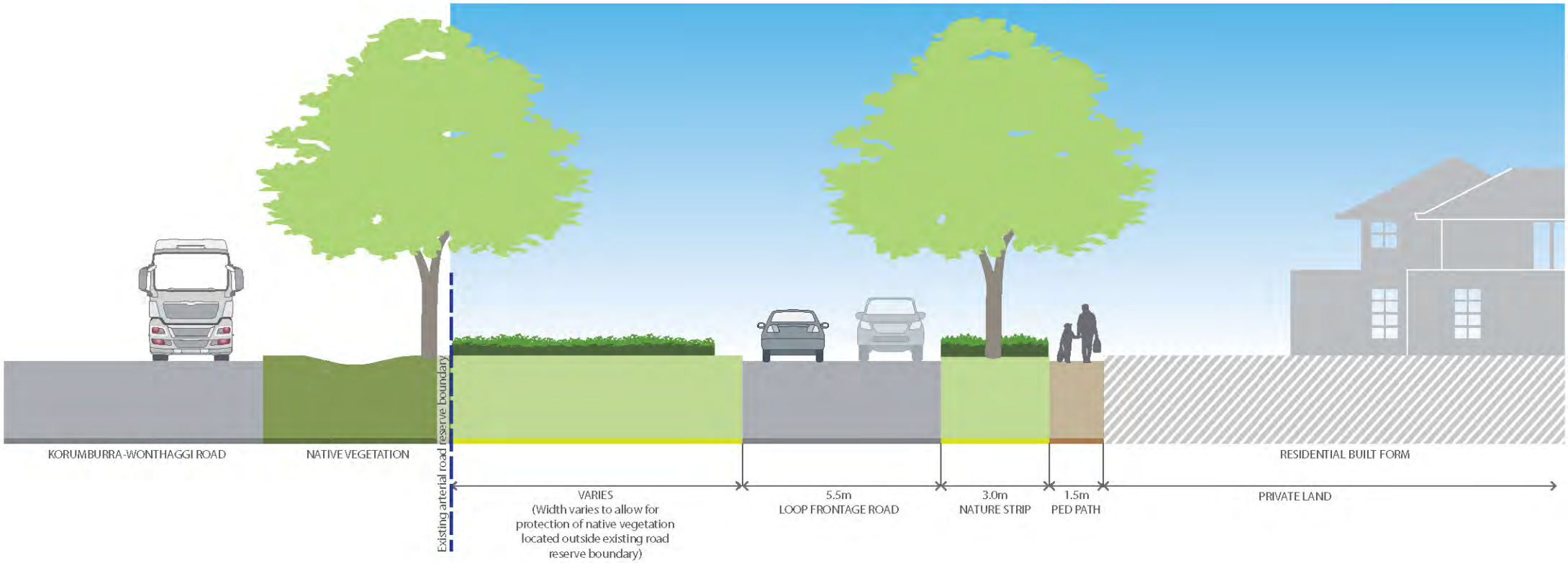
NOTES:

- Frontage along the reserve may be a combination of dwellings directly fronting onto the reserve, frontage roads or open space (refer Concept Plan - McGibbonys Road Interface.
- Road Crossings should be made at natural breaks in the tree reserve.
- Bollards to be provided to prevent car access.
- Vegetation at ground level should managed to ensure sight lines through the reserve to provide safety and passive surveillance.



NOTES:

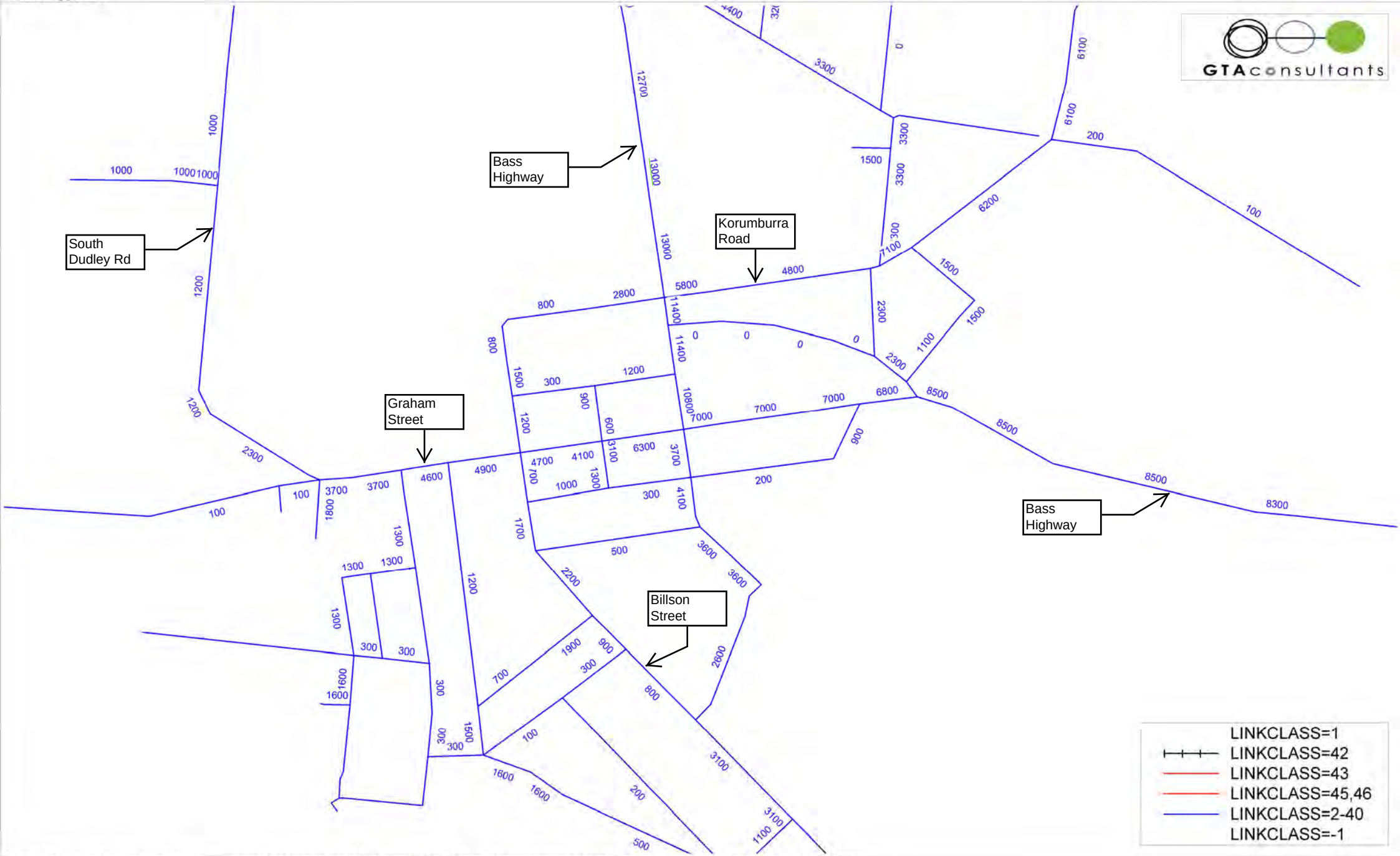
- Waterway widths subject to approval by the responsible authority.
- Shared path placement is shown for both sports field and local access street interfaces for indicative purposes. The shared path network is shown on Plan 9.
- Minimum street tree mature size height 12 metres.
- Verge widths may be reduced where roads abut open space with the consent of the Responsible Authority and relevant Service Authority.
- Road reserve width required is variable dependent on the fire risk and the design response required to ensure bushfire defendable space and building setback distance standards are met


KORUMBURRA-WONTHAGGI ROAD
NATIVE VEGETATION
Existing arterial road reserve boundary
VARIES
(Width varies to allow for protection of native vegetation located outside existing road reserve boundary)
5.5m
LOOP FRONTAGE ROAD
3.0m
NATURE STRIP
1.5m
PED PATH
RESIDENTIAL BUILT FORM
PRIVATE LAND

C. VITM DAILY TRAFFIC VOLUME PLOTS

C

Statewide Victorian Integrated Transport Model (SVITM)
Daily Vehicle Volume Year 2016
Base Case
Wonthaggi CBD



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28/03/2017

cube

Statewide Victorian Integrated Transport Model (SVITM)
V106370 - Wonthaggi North PSP
2016 Base Case - Daily Volume Plot

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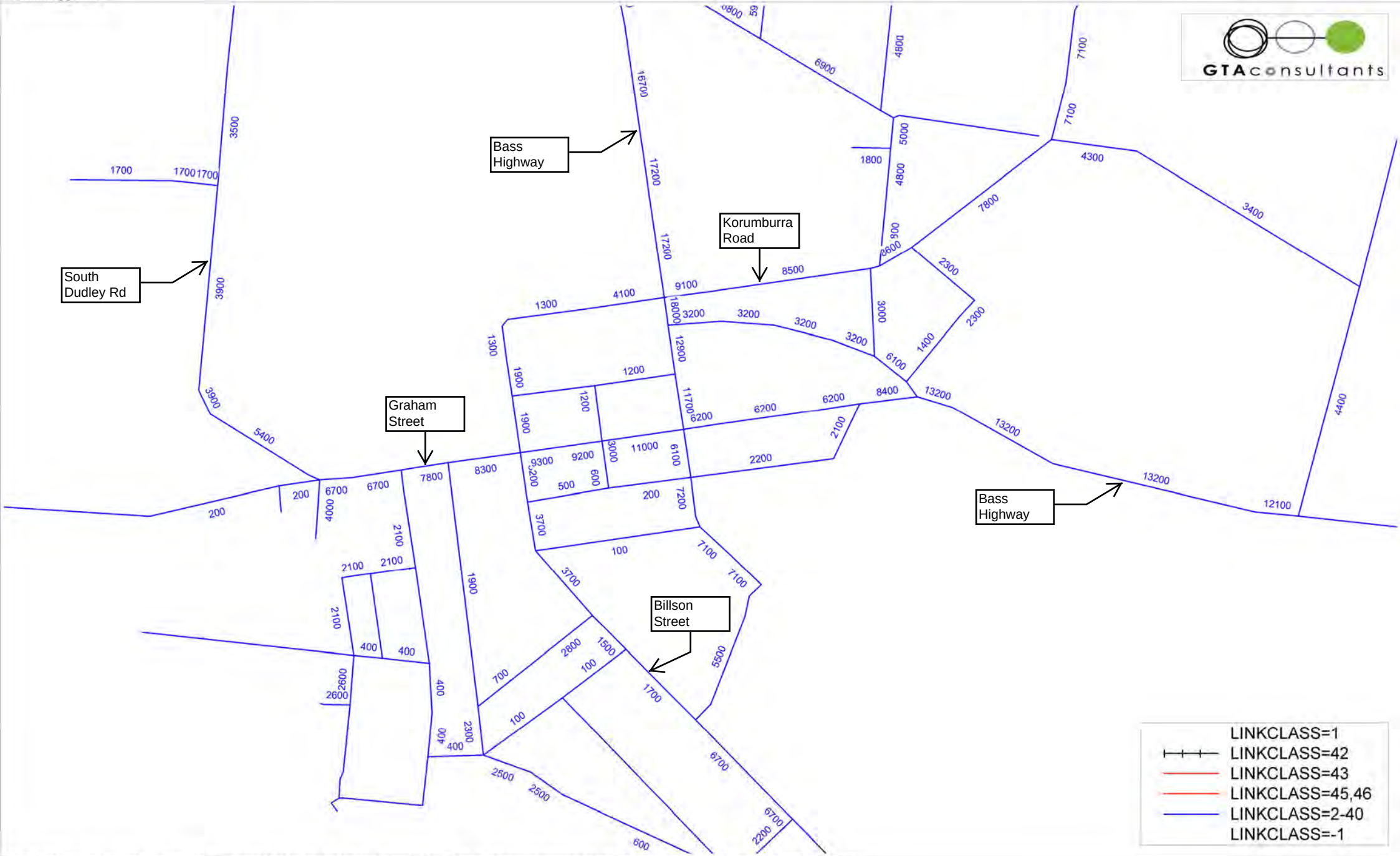
4/04/2017

Statewide Victorian Integrated Transport Model (SVITM)
Daily Vehicle Volume Year 2046
Reference Case
Wonthaggi CBD



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28/03/2017

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Statewide Victorian Integrated Transport Model (SVITM)
V106370 - Wonthaggi North PSP
2046 Reference Case - Daily Volume Plot

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4/04/2017

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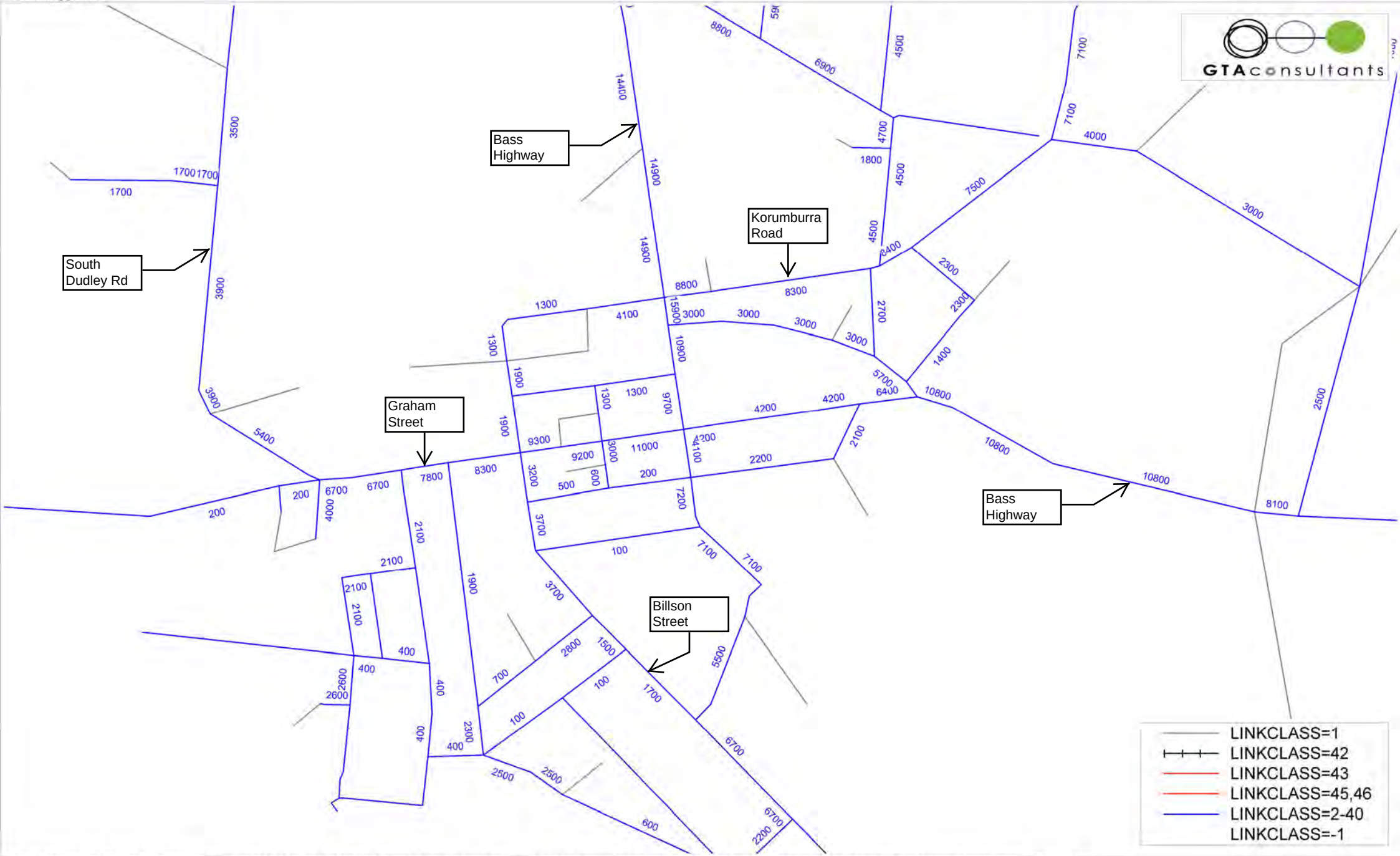
Statewide Victorian Integrated Transport Model (SVITM)
Daily Vehicle Volume Year 2046
Growth Area Fringe Bypass Option
Wonthaggi CBD



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28/03/2017

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Statewide Victorian Integrated Transport Model (SVITM)
V106370 - Wonthaggi North PSP
2046 Growth Area Fringe Bypass Option - Daily Volume Plot

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4/04/2017

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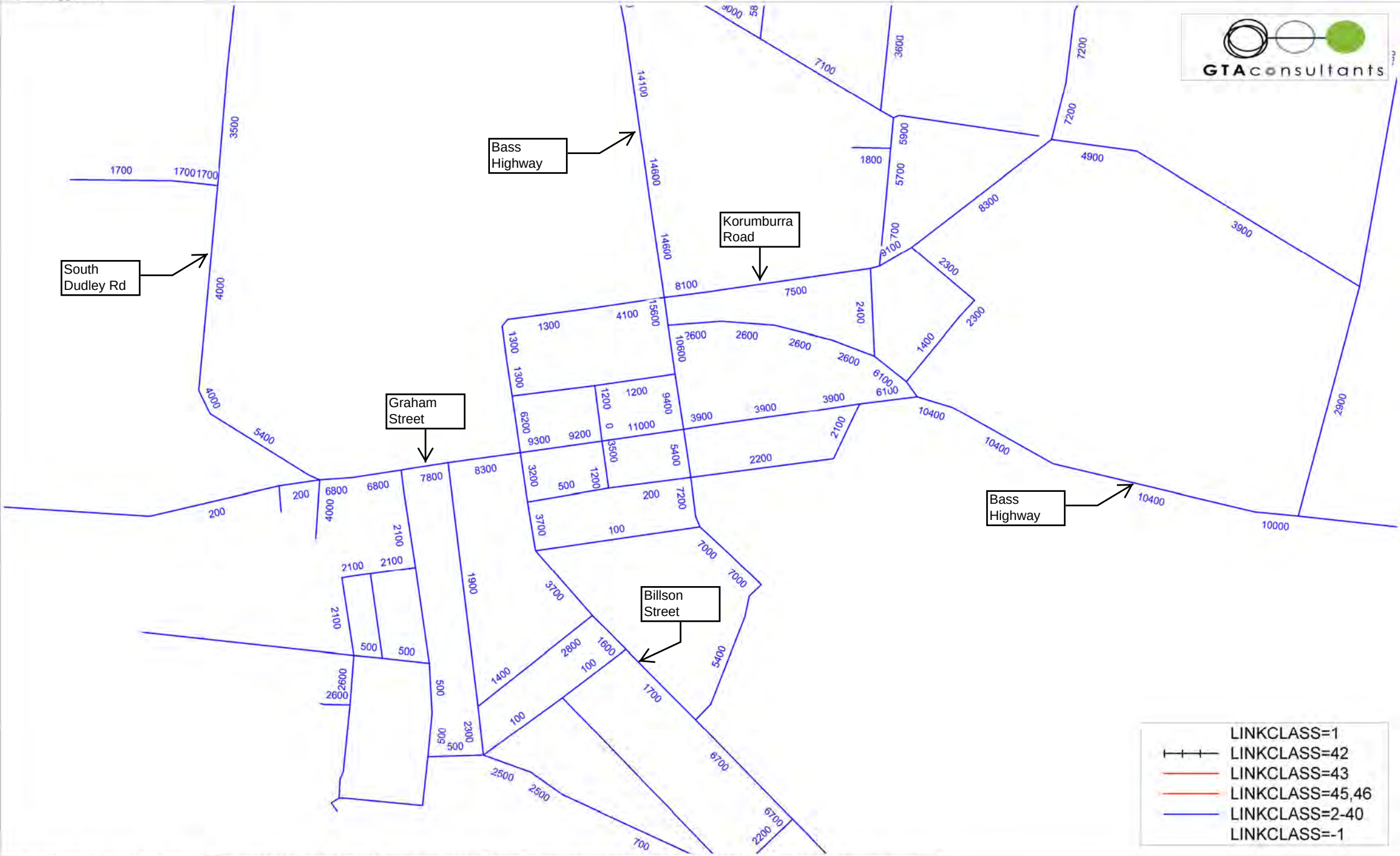
Statewide Victorian Integrated Transport Model (SVITM)
Daily Vehicle Volume Year 2046
Kirrak Road Bypass Option
Wonthaggi CBD



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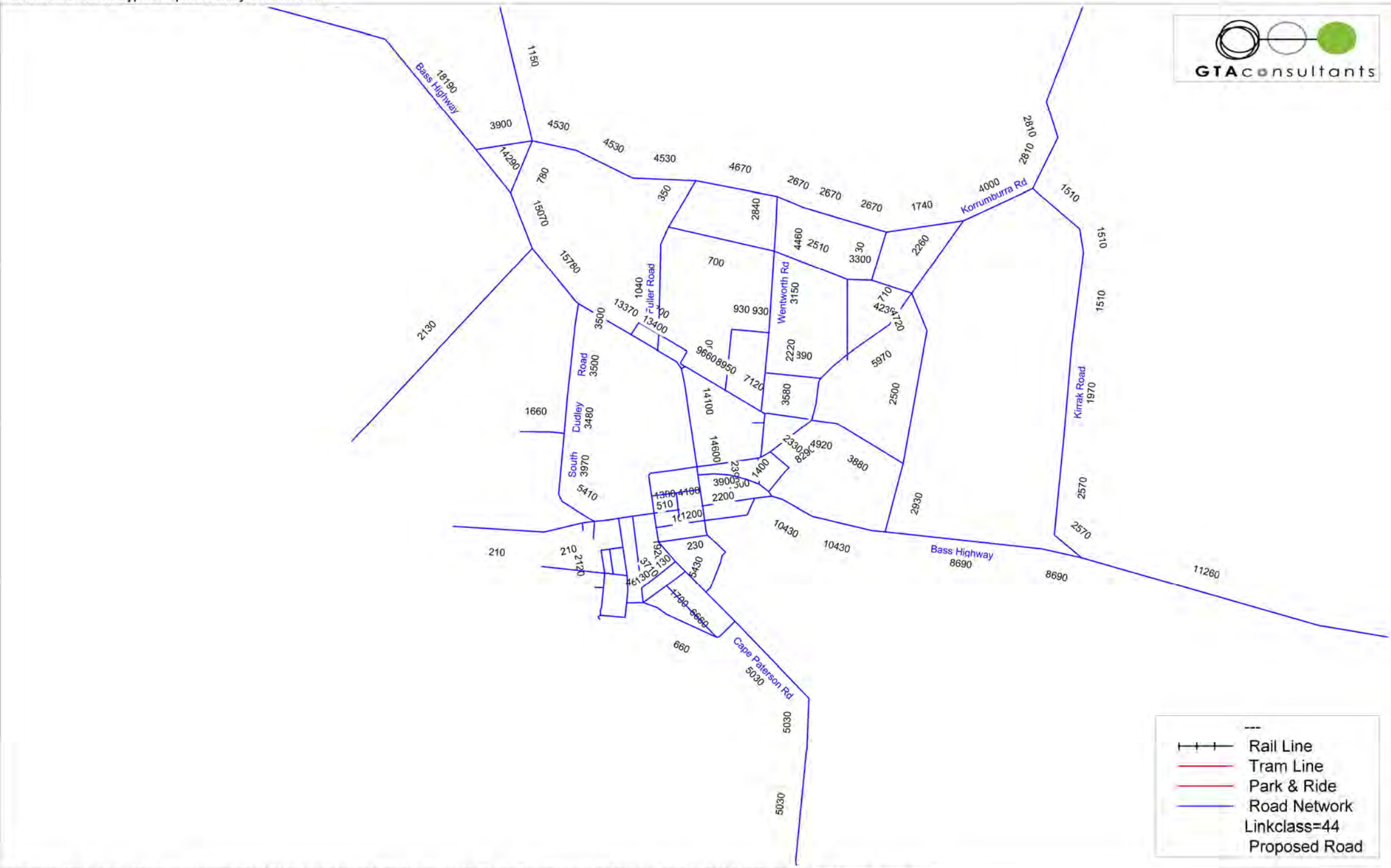
28/03/2017

cube

Statewide Victorian Integrated Transport Model (SVITM)
V106370 - Wonthaggi North PSP
2046 Kirrak Road Bypass Option - Daily Volume Plot



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4/04/2017

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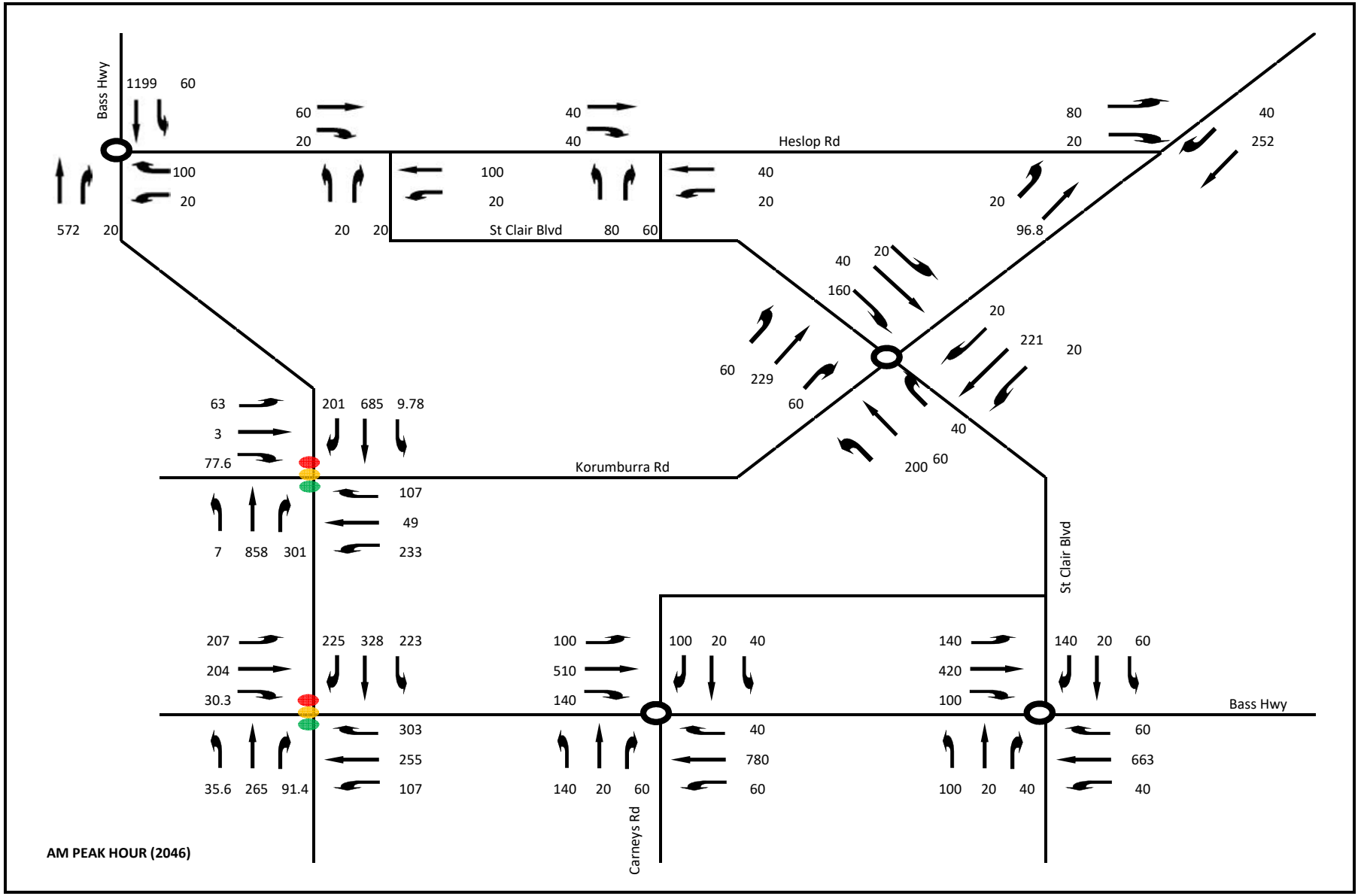
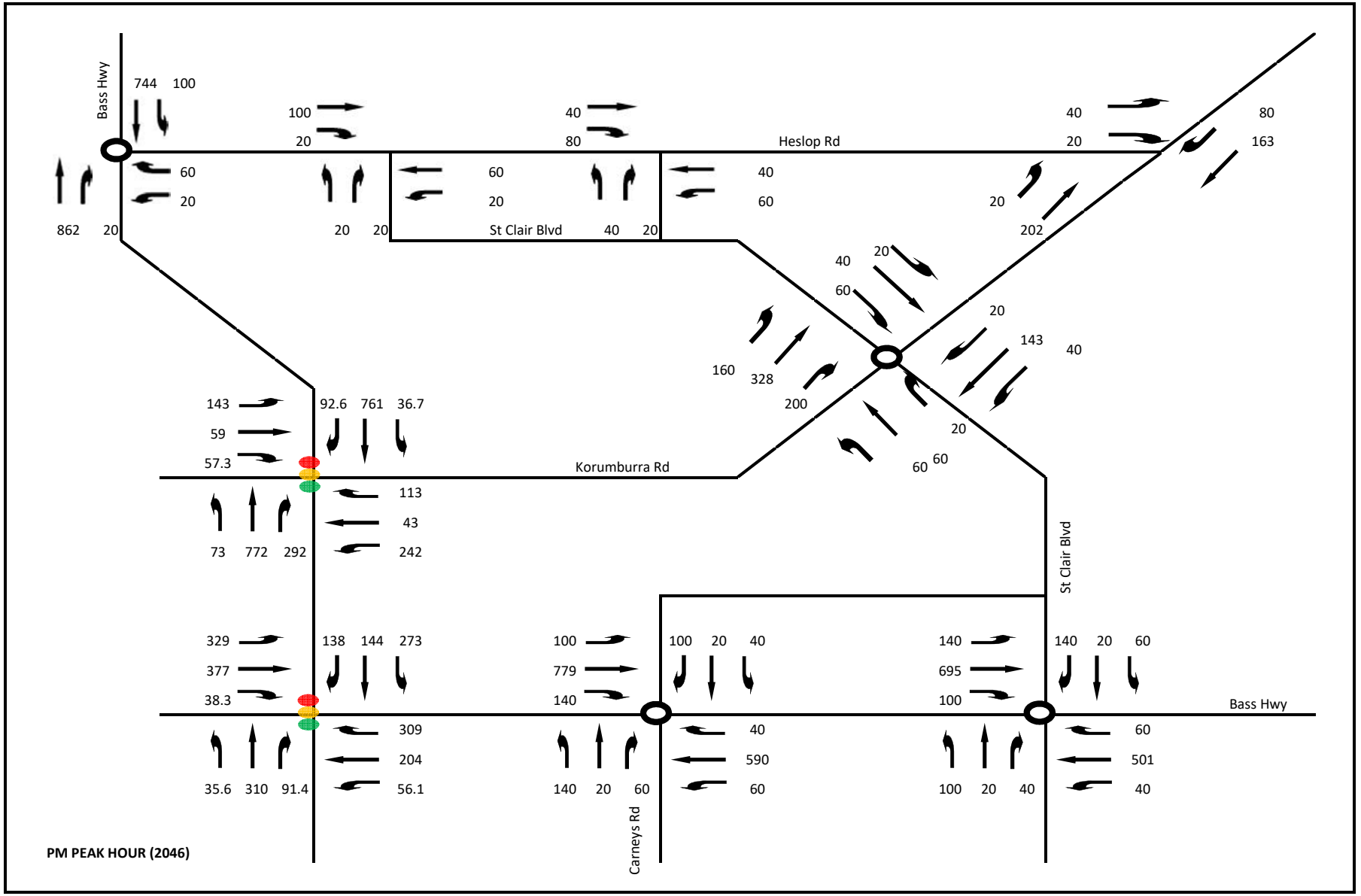
D. PEAK HOUR TRAFFIC VOLUME ESTIMATES

D


Bass Hwy
1199
60
572
20
100
20
60
20
20
20
40
40
100
20
20
20
Heslop Rd
St Clair Blvd
80
60
40
20
80
20
20
96.8
40
252
40
160
20
60
229
60
20
221
20
40
200
60
Korumburra Rd
63
3
77.6
201
685
9.78
107
49
233
7
858
301
St Clair Blvd
207
204
30.3
225
328
223
303
255
107
35.6
265
91.4
100
510
140
100
20
40
40
780
60
140
20
60
Carneys Rd
140
420
100
140
20
60
Bass Hwy
60
663
40
100
20
40
AM PEAK HOUR (2046)


Bass Hwy
744 100
862 20
60
20
100
20
20 20
40
80
60
20
St Clair Blvd
40 20
40
60
Heslop Rd
40
20
80
163
20
202
40
20
60
160
328
200
20
143
40
20
60 60
143
59
57.3
92.6 761 36.7
Korumburra Rd
113
43
242
73 772 292
St Clair Blvd
329
377
38.3
138 144 273
309
204
56.1
35.6 310 91.4
100
779
140
100 20 40
40
590
60
140 20 60
Carneys Rd
140
695
100
140 20 60
Bass Hwy
60
501
40
100 20 40
PM PEAK HOUR (2046)

E. SIDRA INTERSECTION RESULTS

E

MOVEMENT SUMMARY

Site: 101 [AM Bass Highway / Carneys Road]

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: Carneys Road - S Leg											
1	L2	147	5.0	0.562	19.1	LOS B	5.3	38.6	1.00	1.11	44.5
2	T1	21	5.0	0.562	19.3	LOS B	5.3	38.6	1.00	1.11	45.4
3	R2	63	5.0	0.562	24.0	LOS C	5.3	38.6	1.00	1.11	45.3
Approach		232	5.0	0.562	20.4	LOS C	5.3	38.6	1.00	1.11	44.8
East: Bass Highway - E Leg											
4	L2	63	5.0	0.845	11.8	LOS B	15.7	118.5	0.97	0.94	49.3
5	T1	821	10.0	0.845	12.2	LOS B	15.7	118.5	0.97	0.94	50.4
6	R2	42	5.0	0.845	16.7	LOS B	15.7	118.5	0.97	0.94	50.4
Approach		926	9.4	0.845	12.4	LOS B	15.7	118.5	0.97	0.94	50.3
North: Carneys Road - N Leg											
7	L2	42	5.0	0.256	9.3	LOS A	1.7	12.4	0.81	0.85	49.4
8	T1	21	5.0	0.256	9.5	LOS A	1.7	12.4	0.81	0.85	50.5
9	R2	105	5.0	0.256	14.1	LOS B	1.7	12.4	0.81	0.85	50.4
Approach		168	5.0	0.256	12.3	LOS B	1.7	12.4	0.81	0.85	50.2
West: Bass Highway - W Leg											
10	L2	105	5.0	0.616	5.0	LOS A	6.3	47.4	0.56	0.54	52.5
11	T1	537	10.0	0.616	5.4	LOS A	6.3	47.4	0.56	0.54	53.6
12	R2	147	5.0	0.616	9.9	LOS A	6.3	47.4	0.56	0.54	53.6
Approach		789	8.4	0.616	6.2	LOS A	6.3	47.4	0.56	0.54	53.5
All Vehicles		2116	8.2	0.845	10.9	LOS B	15.7	118.5	0.81	0.80	50.7

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

MOVEMENT SUMMARY

Site: 101 [AM Bass Highway / Heslop Road (North)]

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: Bass Highway - S Leg											
2	T1	602	10.0	0.424	2.8	LOS A	3.8	28.6	0.42	0.30	58.3
3	R2	21	5.0	0.424	10.2	LOS B	3.8	28.6	0.42	0.30	59.6
Approach		623	9.8	0.424	3.1	LOS A	3.8	28.6	0.42	0.30	58.4
East: Heslop Road - E Leg											
4	L2	21	10.0	0.272	18.5	LOS B	2.3	16.7	1.00	0.92	44.4
6	R2	105	5.0	0.272	25.1	LOS C	2.3	16.7	1.00	0.92	46.6
Approach		126	5.8	0.272	24.0	LOS C	2.3	16.7	1.00	0.92	46.2
North: Bass Highway - N Leg											
7	L2	63	5.0	0.773	2.9	LOS A	13.7	103.7	0.28	0.25	56.9
8	T1	1262	10.0	0.773	2.5	LOS A	13.7	103.7	0.28	0.25	59.4
Approach		1325	9.8	0.773	2.5	LOS A	13.7	103.7	0.28	0.25	59.3
All Vehicles		2075	9.5	0.773	4.0	LOS A	13.7	103.7	0.37	0.30	58.0

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

MOVEMENT SUMMARY

Site: 101 [AM Peak - Future]

Bass Highway & Korumburra Road
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	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: Bass Highway											
1	L2	7	5.0	0.409	24.8	LOS C	10.9	82.6	0.71	0.62	44.5
2	T1	903	10.0	0.889	31.5	LOS C	28.7	218.3	0.81	0.83	39.5
3	R2	317	5.0	0.883	59.3	LOS E	17.8	130.0	1.00	0.99	30.1
Approach		1227	8.7	0.889	38.6	LOS D	28.7	218.3	0.86	0.87	36.6
East: Korumburra Road											
4	L2	245	5.0	0.351	28.8	LOS C	8.4	61.6	0.75	0.78	39.9
5	T1	52	5.0	0.210	43.1	LOS D	2.3	16.9	0.93	0.70	35.2
6	R2	113	5.0	0.897	67.9	LOS E	6.5	47.3	1.00	1.01	28.0
Approach		409	5.0	0.897	41.3	LOS D	8.4	61.6	0.84	0.83	35.2
North: Bass Highway											
7	L2	10	5.0	0.394	30.6	LOS C	9.4	71.0	0.78	0.67	41.5
8	T1	721	10.0	0.857	34.3	LOS C	23.3	177.3	0.88	0.86	38.4
9	R2	169	5.0	0.859	62.1	LOS E	9.3	68.2	1.00	0.97	29.4
Approach		901	9.0	0.859	39.5	LOS D	23.3	177.3	0.90	0.87	36.3
West: Korumburra Road											
10	L2	66	5.0	0.123	32.9	LOS C	2.3	17.1	0.76	0.73	38.2
11	T1	3	5.0	0.013	41.0	LOS D	0.1	1.0	0.89	0.57	35.9
12	R2	82	5.0	0.651	58.8	LOS E	4.2	30.8	1.00	0.81	30.1
Approach		151	5.0	0.651	47.1	LOS D	4.2	30.8	0.89	0.77	33.3
All Vehicles		2689	8.0	0.897	39.8	LOS D	28.7	218.3	0.87	0.86	36.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
P2	East Full Crossing	53	27.4	LOS C	0.1	0.1	0.74	0.74
P3	North Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
P4	West Full Crossing	53	21.2	LOS C	0.1	0.1	0.65	0.65
All Pedestrians		211	34.3	LOS D			0.82	0.82

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [AM Peak - Future]

Bass Highway & McKenzie Street & Graham Street
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: McKenzie Street											
1	L2	38	5.0	0.901	62.0	LOS E	18.2	133.0	1.00	1.07	30.5
2	T1	279	5.0	0.901	56.4	LOS E	18.2	133.0	1.00	1.07	31.0
3	R2	96	5.0	0.281	43.6	LOS D	4.1	29.8	0.90	0.77	34.4
Approach		413	5.0	0.901	53.9	LOS D	18.2	133.0	0.98	1.00	31.7
East: Bass Highway											
4	L2	113	5.0	0.299	42.0	LOS D	4.7	34.4	0.89	0.77	34.9
5	T1	268	10.0	0.698	41.1	LOS D	12.6	95.8	0.98	0.85	35.9
6	R2	319	10.0	0.876	58.1	LOS E	17.8	135.1	1.00	0.98	30.2
Approach		700	9.2	0.876	49.0	LOS D	17.8	135.1	0.97	0.90	32.9
North: Bass Highway											
7	L2	235	10.0	0.195	9.0	LOS A	2.9	22.2	0.35	0.65	51.4
8	T1	345	5.0	0.871	50.9	LOS D	18.9	137.9	1.00	1.03	32.7
9	R2	237	10.0	0.651	45.7	LOS D	10.9	82.7	0.97	0.83	33.6
Approach		817	7.9	0.871	37.4	LOS D	18.9	137.9	0.80	0.86	36.9
West: Graham Street											
10	L2	225	10.0	0.866	60.5	LOS E	12.5	94.8	1.00	0.97	29.6
11	T1	222	10.0	0.809	50.2	LOS D	11.6	88.1	1.00	0.95	32.9
12	R2	33	5.0	0.121	46.0	LOS D	1.4	10.3	0.90	0.72	33.5
Approach		480	9.7	0.866	54.8	LOS D	12.5	94.8	0.99	0.94	31.3
All Vehicles		2409	8.1	0.901	47.0	LOS D	18.9	137.9	0.92	0.91	33.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	37.1	LOS D	0.1	0.1	0.86	0.86
P2	East Full Crossing	53	39.7	LOS D	0.1	0.1	0.89	0.89
P3	North Full Crossing	53	42.4	LOS E	0.1	0.1	0.92	0.92
P4	West Full Crossing	53	41.5	LOS E	0.1	0.1	0.91	0.91
All Pedestrians		211	40.2	LOS E			0.90	0.90

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [AM Bass Highway / St Clair Boulevard]

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: Commercial Connector Road - S Leg											
1	L2	105	5.0	0.340	11.6	LOS B	2.5	18.2	0.94	0.94	49.0
2	T1	21	5.0	0.340	11.9	LOS B	2.5	18.2	0.94	0.94	50.1
3	R2	42	5.0	0.340	16.5	LOS B	2.5	18.2	0.94	0.94	50.0
Approach		168	5.0	0.340	12.9	LOS B	2.5	18.2	0.94	0.94	49.3
East: Bass Highway - E Leg											
4	L2	42	5.0	0.742	8.7	LOS A	9.7	73.6	0.84	0.80	51.3
5	T1	698	10.0	0.742	9.1	LOS A	9.7	73.6	0.84	0.80	52.4
6	R2	63	5.0	0.742	13.5	LOS B	9.7	73.6	0.84	0.80	52.4
Approach		803	9.3	0.742	9.4	LOS A	9.7	73.6	0.84	0.80	52.4
North: St Clair Boulevard - N Leg											
7	L2	63	5.0	0.292	7.9	LOS A	1.9	13.7	0.74	0.81	50.3
8	T1	21	5.0	0.292	8.1	LOS A	1.9	13.7	0.74	0.81	51.5
9	R2	147	5.0	0.292	12.7	LOS B	1.9	13.7	0.74	0.81	51.3
Approach		232	5.0	0.292	11.0	LOS B	1.9	13.7	0.74	0.81	51.1
West: Bass Highway - W Leg											
10	L2	147	5.0	0.541	4.9	LOS A	4.8	35.6	0.49	0.53	52.9
11	T1	442	10.0	0.541	5.2	LOS A	4.8	35.6	0.49	0.53	54.1
12	R2	105	5.0	0.541	9.8	LOS A	4.8	35.6	0.49	0.53	54.1
Approach		695	8.2	0.541	5.8	LOS A	4.8	35.6	0.49	0.53	53.8
All Vehicles		1898	8.0	0.742	8.6	LOS A	9.7	73.6	0.71	0.71	52.4

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

MOVEMENT SUMMARY

Site: 101 [AM Heslop Road / Fuller Road]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: Fuller Road - S Leg											
1	L2	21	5.0	0.043	6.0	LOS A	0.2	1.2	0.26	0.57	52.6
3	R2	21	5.0	0.043	7.0	LOS A	0.2	1.2	0.26	0.57	52.4
Approach		42	5.0	0.043	6.5	LOS A	0.2	1.2	0.26	0.57	52.5
East: Heslop Road - E Leg											
4	L2	21	5.0	0.012	5.6	LOS A	0.0	0.0	0.00	0.58	53.4
5	T1	105	5.0	0.056	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		126	5.0	0.056	0.9	NA	0.0	0.0	0.00	0.10	58.8
West: Heslop Road - W Leg											
11	T1	63	5.0	0.033	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	21	5.0	0.017	6.0	LOS A	0.1	0.5	0.23	0.56	52.3
Approach		84	5.0	0.033	1.5	NA	0.1	0.5	0.06	0.14	57.9
All Vehicles		253	5.0	0.056	2.1	NA	0.2	1.2	0.06	0.19	57.3

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.

MOVEMENT SUMMARY

Site: 101 [AM Heslop Road / St Clair Boulevard]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	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: St Clair Boulevard - S Leg											
1	L2	84	5.0	0.138	5.8	LOS A	0.6	4.1	0.15	0.56	52.9
3	R2	63	5.0	0.138	6.6	LOS A	0.6	4.1	0.15	0.56	52.7
Approach		147	5.0	0.138	6.1	LOS A	0.6	4.1	0.15	0.56	52.8
East: Heslop Road - E Leg											
4	L2	21	5.0	0.012	5.6	LOS A	0.0	0.0	0.00	0.58	53.4
5	T1	42	5.0	0.022	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		63	5.0	0.022	1.9	NA	0.0	0.0	0.00	0.19	57.6
West: Heslop Road - W Leg											
11	T1	42	5.0	0.022	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	42	5.0	0.032	5.7	LOS A	0.1	0.9	0.16	0.56	52.5
Approach		84	5.0	0.032	2.9	NA	0.1	0.9	0.08	0.28	56.0
All Vehicles		295	5.0	0.138	4.3	NA	0.6	4.1	0.10	0.40	54.7

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.

MOVEMENT SUMMARY

Site: 101 [AM Korumburra Road / Heslop Road]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	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: Korumburra Road											
1	L2	21	5.0	0.012	5.6	LOS A	0.0	0.0	0.00	0.58	53.4
2	T1	102	5.0	0.054	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		123	5.0	0.054	1.0	NA	0.0	0.0	0.00	0.10	58.7
North: Korumburra Road											
8	T1	265	5.0	0.140	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	42	5.0	0.034	6.0	LOS A	0.1	1.0	0.23	0.57	52.3
Approach		307	5.0	0.140	0.8	NA	0.1	1.0	0.03	0.08	58.8
West: Heslop Road											
10	L2	84	5.0	0.107	6.0	LOS A	0.4	2.9	0.23	0.57	52.6
12	R2	21	5.0	0.107	9.5	LOS A	0.4	2.9	0.23	0.57	52.3
Approach		105	5.0	0.107	6.7	LOS A	0.4	2.9	0.23	0.57	52.5
All Vehicles		536	5.0	0.140	2.0	NA	0.4	2.9	0.06	0.18	57.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [AM Korumburra Road / St Clair Boulevard]

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: St Clair Boulevard - S Leg											
1	L2	211	5.0	0.333	6.7	LOS A	2.1	15.3	0.63	0.70	52.6
2	T1	63	5.0	0.333	6.9	LOS A	2.1	15.3	0.63	0.70	53.9
3	R2	42	5.0	0.333	11.5	LOS B	2.1	15.3	0.63	0.70	53.8
Approach		316	5.0	0.333	7.4	LOS A	2.1	15.3	0.63	0.70	53.1
East: Korumburra Road - E Leg											
4	L2	21	5.0	0.259	5.5	LOS A	1.6	11.4	0.51	0.58	52.9
5	T1	233	5.0	0.259	5.8	LOS A	1.6	11.4	0.51	0.58	54.2
6	R2	21	5.0	0.259	10.4	LOS B	1.6	11.4	0.51	0.58	54.0
Approach		275	5.0	0.259	6.1	LOS A	1.6	11.4	0.51	0.58	54.1
North: St Clair Boulevard - N Leg											
7	L2	21	5.0	0.230	5.9	LOS A	1.3	9.8	0.54	0.69	51.2
8	T1	42	5.0	0.230	6.2	LOS A	1.3	9.8	0.54	0.69	52.4
9	R2	168	5.0	0.230	10.8	LOS B	1.3	9.8	0.54	0.69	52.3
Approach		232	5.0	0.230	9.5	LOS A	1.3	9.8	0.54	0.69	52.2
West: Korumburra Road - W Leg											
10	L2	63	5.0	0.292	4.6	LOS A	1.9	14.0	0.37	0.51	53.3
11	T1	241	5.0	0.292	4.9	LOS A	1.9	14.0	0.37	0.51	54.6
12	R2	63	5.0	0.292	9.5	LOS A	1.9	14.0	0.37	0.51	54.5
Approach		367	5.0	0.292	5.6	LOS A	1.9	14.0	0.37	0.51	54.3
All Vehicles		1189	5.0	0.333	7.0	LOS A	2.1	15.3	0.51	0.61	53.5

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

MOVEMENT SUMMARY

Site: 101 [PM Bass Highway / Carneys Road]

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: Carneys Road - S Leg											
1	L2	147	5.0	0.379	9.9	LOS A	2.7	20.0	0.89	0.91	50.0
2	T1	21	5.0	0.379	10.1	LOS B	2.7	20.0	0.89	0.91	51.2
3	R2	63	5.0	0.379	14.8	LOS B	2.7	20.0	0.89	0.91	51.1
Approach		232	5.0	0.379	11.2	LOS B	2.7	20.0	0.89	0.91	50.4
East: Bass Highway - E Leg											
4	L2	63	5.0	0.675	7.5	LOS A	7.4	55.6	0.77	0.74	51.8
5	T1	621	10.0	0.675	7.9	LOS A	7.4	55.6	0.77	0.74	52.9
6	R2	42	5.0	0.675	12.4	LOS B	7.4	55.6	0.77	0.74	52.9
Approach		726	9.3	0.675	8.1	LOS A	7.4	55.6	0.77	0.74	52.8
North: Carneys Road - N Leg											
7	L2	42	5.0	0.428	16.3	LOS B	3.5	25.5	1.00	1.04	45.2
8	T1	21	5.0	0.428	16.5	LOS B	3.5	25.5	1.00	1.04	46.2
9	R2	105	5.0	0.428	21.2	LOS C	3.5	25.5	1.00	1.04	46.1
Approach		168	5.0	0.428	19.4	LOS B	3.5	25.5	1.00	1.04	45.9
West: Bass Highway - W Leg											
10	L2	105	5.0	0.822	5.7	LOS A	12.6	95.2	0.82	0.58	51.5
11	T1	820	10.0	0.822	6.1	LOS A	12.6	95.2	0.82	0.58	52.7
12	R2	147	5.0	0.822	10.6	LOS B	12.6	95.2	0.82	0.58	52.7
Approach		1073	8.8	0.822	6.6	LOS A	12.6	95.2	0.82	0.58	52.6
All Vehicles		2199	8.3	0.822	8.6	LOS A	12.6	95.2	0.83	0.70	51.8

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

MOVEMENT SUMMARY

Site: 101 [PM Bass Highway / Heslop Road (North)]

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: Bass Highway - S Leg											
2	T1	907	10.0	0.586	2.7	LOS A	6.4	48.5	0.38	0.28	58.6
3	R2	21	5.0	0.586	10.0	LOS B	6.4	48.5	0.38	0.28	59.9
Approach		928	9.9	0.586	2.9	LOS A	6.4	48.5	0.38	0.28	58.7
East: Heslop Road - E Leg											
4	L2	21	5.0	0.093	6.9	LOS A	0.6	4.3	0.72	0.72	51.2
6	R2	63	5.0	0.093	13.9	LOS B	0.6	4.3	0.72	0.72	54.2
Approach		84	5.0	0.093	12.1	LOS B	0.6	4.3	0.72	0.72	53.4
North: Bass Highway - N Leg											
7	L2	105	5.0	0.521	2.8	LOS A	4.8	36.3	0.17	0.24	57.6
8	T1	783	10.0	0.521	2.4	LOS A	4.8	36.3	0.17	0.24	60.2
Approach		888	9.4	0.521	2.4	LOS A	4.8	36.3	0.17	0.24	59.9
All Vehicles		1901	9.4	0.586	3.1	LOS A	6.4	48.5	0.29	0.28	59.0

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

MOVEMENT SUMMARY

Site: 101 [PM Peak - Future]

Bass Highway & Korumburra Road
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	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: Bass Highway											
1	L2	77	5.0	0.322	20.7	LOS C	10.1	76.0	0.58	0.56	46.1
2	T1	813	10.0	0.701	17.6	LOS B	21.2	160.9	0.66	0.61	46.3
3	R2	307	5.0	0.894	70.1	LOS E	20.6	150.5	1.00	0.98	27.6
Approach		1197	8.4	0.894	31.3	LOS C	21.2	160.9	0.74	0.70	39.4
East: Korumburra Road											
4	L2	255	5.0	0.387	35.6	LOS D	10.9	79.9	0.79	0.79	37.1
5	T1	45	5.0	0.192	51.7	LOS D	2.4	17.7	0.93	0.70	32.5
6	R2	119	5.0	0.884	76.8	LOS E	8.0	58.1	1.00	0.97	26.2
Approach		419	5.0	0.884	49.1	LOS D	10.9	79.9	0.86	0.83	32.7
North: Bass Highway											
7	L2	39	5.0	0.425	32.1	LOS C	13.1	99.1	0.76	0.67	40.6
8	T1	801	10.0	0.924	45.3	LOS D	33.7	256.2	0.84	0.90	34.4
9	R2	55	5.0	0.618	71.1	LOS E	3.5	25.2	1.00	0.78	27.4
Approach		895	9.5	0.924	46.3	LOS D	33.7	256.2	0.85	0.88	34.0
West: Korumburra Road											
10	L2	151	5.0	0.373	48.3	LOS D	7.5	54.9	0.89	0.79	32.9
11	T1	62	5.0	0.263	52.3	LOS D	3.4	24.6	0.94	0.72	32.3
12	R2	60	5.0	0.448	65.9	LOS E	3.6	26.0	1.00	0.76	28.4
Approach		273	5.0	0.448	53.1	LOS D	7.5	54.9	0.93	0.77	31.7
All Vehicles		2784	7.9	0.924	40.9	LOS D	33.7	256.2	0.81	0.79	35.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	27.4	LOS C	0.1	0.1	0.68	0.68
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	17.1	LOS B	0.1	0.1	0.53	0.53
All Pedestrians		211	38.3	LOS D			0.78	0.78

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [PM Peak - Future]

Bass Highway & McKenzie Street & Graham Street
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: McKenzie Street											
1	L2	38	5.0	0.960	97.3	LOS F	32.9	240.2	1.00	1.16	23.6
2	T1	326	5.0	0.960	91.7	LOS F	32.9	240.2	1.00	1.16	23.9
3	R2	96	5.0	0.616	79.7	LOS E	7.0	51.4	1.00	0.79	25.7
Approach		460	5.0	0.960	89.7	LOS F	32.9	240.2	1.00	1.08	24.2
East: Bass Highway											
4	L2	59	5.0	0.058	20.8	LOS C	1.9	13.7	0.47	0.68	43.7
5	T1	215	10.0	0.267	28.1	LOS C	9.8	74.3	0.68	0.57	41.1
6	R2	325	10.0	0.956	99.3	LOS F	29.7	225.4	1.00	1.02	22.5
Approach		599	9.5	0.956	66.1	LOS E	29.7	225.4	0.83	0.83	28.5
North: Bass Highway											
7	L2	287	10.0	0.266	13.9	LOS B	7.7	58.3	0.43	0.68	48.1
8	T1	152	5.0	0.354	52.4	LOS D	9.3	67.9	0.89	0.73	32.3
9	R2	145	10.0	0.967	109.4	LOS F	13.3	101.0	1.00	1.04	21.2
Approach		584	8.7	0.967	47.6	LOS D	13.3	101.0	0.69	0.78	33.4
West: Graham Street											
10	L2	346	10.0	0.592	35.3	LOS D	17.0	129.5	0.73	0.79	37.2
11	T1	397	10.0	0.987	98.8	LOS F	36.8	279.8	0.92	1.17	22.9
12	R2	40	5.0	0.257	76.4	LOS E	2.8	20.5	0.97	0.74	26.2
Approach		783	9.7	0.987	69.6	LOS E	36.8	279.8	0.84	0.98	27.8
All Vehicles		2426	8.5	0.987	67.2	LOS E	36.8	279.8	0.83	0.92	28.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	27.7	LOS C	0.1	0.1	0.61	0.61
P2	East Full Crossing	53	53.0	LOS E	0.2	0.2	0.84	0.84
P3	North Full Crossing	53	39.0	LOS D	0.2	0.2	0.72	0.72
P4	West Full Crossing	53	53.0	LOS E	0.2	0.2	0.84	0.84
All Pedestrians		211	43.2	LOS E			0.75	0.75

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [PM Bass Highway / St Clair Boulevard]

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: Commercial Connector Road - S Leg											
1	L2	105	5.0	0.257	9.2	LOS A	1.7	12.6	0.82	0.84	50.6
2	T1	21	5.0	0.257	9.4	LOS A	1.7	12.6	0.82	0.84	51.8
3	R2	42	5.0	0.257	14.0	LOS B	1.7	12.6	0.82	0.84	51.7
Approach		168	5.0	0.257	10.4	LOS B	1.7	12.6	0.82	0.84	51.0
East: Bass Highway - E Leg											
4	L2	42	5.0	0.597	6.5	LOS A	5.4	41.0	0.72	0.69	51.9
5	T1	527	10.0	0.597	6.9	LOS A	5.4	41.0	0.72	0.69	53.1
6	R2	63	5.0	0.597	11.4	LOS B	5.4	41.0	0.72	0.69	53.1
Approach		633	9.2	0.597	7.3	LOS A	5.4	41.0	0.72	0.69	53.0
North: Internal Spine Connector Road - N Leg											
7	L2	63	5.0	0.438	12.9	LOS B	3.5	25.5	0.95	1.01	47.1
8	T1	21	5.0	0.438	13.1	LOS B	3.5	25.5	0.95	1.01	48.1
9	R2	147	5.0	0.438	17.8	LOS B	3.5	25.5	0.95	1.01	48.1
Approach		232	5.0	0.438	16.0	LOS B	3.5	25.5	0.95	1.01	47.8
West: Bass Highway - W Leg											
10	L2	147	5.0	0.752	5.4	LOS A	9.5	71.2	0.68	0.55	52.2
11	T1	732	10.0	0.752	5.8	LOS A	9.5	71.2	0.68	0.55	53.4
12	R2	105	5.0	0.752	10.3	LOS B	9.5	71.2	0.68	0.55	53.3
Approach		984	8.7	0.752	6.2	LOS A	9.5	71.2	0.68	0.55	53.2
All Vehicles		2017	8.1	0.752	8.0	LOS A	9.5	71.2	0.73	0.67	52.3

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

MOVEMENT SUMMARY

Site: 101 [PM Heslop Road / Fuller Road]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: Fuller Road - S Leg											
1	L2	21	5.0	0.043	5.8	LOS A	0.2	1.2	0.20	0.56	52.8
3	R2	21	5.0	0.043	7.0	LOS A	0.2	1.2	0.20	0.56	52.5
Approach		42	5.0	0.043	6.4	LOS A	0.2	1.2	0.20	0.56	52.7
East: Heslop Road - E Leg											
4	L2	21	5.0	0.012	5.6	LOS A	0.0	0.0	0.00	0.58	53.4
5	T1	63	5.0	0.033	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		84	5.0	0.033	1.4	NA	0.0	0.0	0.00	0.14	58.2
West: Heslop Road - W Leg											
11	T1	105	5.0	0.056	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	21	5.0	0.016	5.8	LOS A	0.1	0.5	0.18	0.56	52.4
Approach		126	5.0	0.056	1.0	NA	0.1	0.5	0.03	0.09	58.6
All Vehicles		253	5.0	0.056	2.0	NA	0.2	1.2	0.05	0.19	57.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [PM Heslop Road / St Clair Boulevard]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: St Clair Boulevard - S Leg											
1	L2	42	5.0	0.059	5.8	LOS A	0.2	1.6	0.13	0.56	53.0
3	R2	21	5.0	0.059	7.0	LOS A	0.2	1.6	0.13	0.56	52.7
Approach		63	5.0	0.059	6.2	LOS A	0.2	1.6	0.13	0.56	52.9
East: Heslop Road - E Leg											
4	L2	63	5.0	0.035	5.6	LOS A	0.0	0.0	0.00	0.58	53.4
5	T1	42	5.0	0.022	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		105	5.0	0.035	3.4	NA	0.0	0.0	0.00	0.35	55.9
West: Heslop Road - W Leg											
11	T1	42	5.0	0.022	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	84	5.0	0.066	5.9	LOS A	0.3	2.0	0.22	0.57	52.3
Approach		126	5.0	0.066	4.0	NA	0.3	2.0	0.14	0.38	54.6
All Vehicles		295	5.0	0.066	4.2	NA	0.3	2.0	0.09	0.41	54.7

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.

MOVEMENT SUMMARY

Site: 101 [PM Korumburra Road / Heslop Road]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	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: Korumburra Road											
1	L2	21	5.0	0.012	5.6	LOS A	0.0	0.0	0.00	0.58	53.4
2	T1	213	5.0	0.113	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		234	5.0	0.113	0.5	NA	0.0	0.0	0.00	0.05	59.3
North: Korumburra Road											
8	T1	172	5.0	0.091	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	84	5.0	0.076	6.6	LOS A	0.3	2.2	0.34	0.61	52.0
Approach		256	5.0	0.091	2.2	NA	0.3	2.2	0.11	0.20	57.1
West: Heslop Road											
10	L2	42	5.0	0.078	6.5	LOS A	0.3	2.1	0.38	0.63	51.8
12	R2	21	5.0	0.078	9.9	LOS A	0.3	2.1	0.38	0.63	51.6
Approach		63	5.0	0.078	7.7	LOS A	0.3	2.1	0.38	0.63	51.8
All Vehicles		553	5.0	0.113	2.1	NA	0.3	2.2	0.10	0.19	57.3

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.

MOVEMENT SUMMARY

Site: 101 [PM Korumburra Road / St Clair Boulevard]

New Site
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	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: St Clair Boulevard - S Leg											
1	L2	63	5.0	0.137	5.3	LOS A	0.7	5.4	0.45	0.56	53.2
2	T1	63	5.0	0.137	5.5	LOS A	0.7	5.4	0.45	0.56	54.5
3	R2	21	5.0	0.137	10.1	LOS B	0.7	5.4	0.45	0.56	54.4
Approach		147	5.0	0.137	6.0	LOS A	0.7	5.4	0.45	0.56	53.9
East: Korumburra Road - E Leg											
4	L2	21	5.0	0.207	5.7	LOS A	1.2	8.6	0.51	0.61	52.6
5	T1	151	5.0	0.207	5.9	LOS A	1.2	8.6	0.51	0.61	53.9
6	R2	42	5.0	0.207	10.6	LOS B	1.2	8.6	0.51	0.61	53.7
Approach		214	5.0	0.207	6.8	LOS A	1.2	8.6	0.51	0.61	53.7
North: St Clair Boulevard - N Leg											
7	L2	21	5.0	0.156	7.3	LOS A	0.9	6.8	0.67	0.74	51.0
8	T1	42	5.0	0.156	7.5	LOS A	0.9	6.8	0.67	0.74	52.2
9	R2	63	5.0	0.156	12.2	LOS B	0.9	6.8	0.67	0.74	52.1
Approach		126	5.0	0.156	9.8	LOS A	0.9	6.8	0.67	0.74	51.9
West: Korumburra Road - W Leg											
10	L2	168	5.0	0.550	4.9	LOS A	4.7	34.4	0.47	0.55	52.7
11	T1	345	5.0	0.550	5.2	LOS A	4.7	34.4	0.47	0.55	53.9
12	R2	211	5.0	0.550	9.8	LOS A	4.7	34.4	0.47	0.55	53.8
Approach		724	5.0	0.550	6.5	LOS A	4.7	34.4	0.47	0.55	53.6
All Vehicles		1212	5.0	0.550	6.8	LOS A	4.7	34.4	0.50	0.58	53.5

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

F. CONCEPT LAYOUTS AND OPINION OF PROBABLE COSTS

F

V106370: Wonthaggi North East PSP - Heslop Rd / Fuller Rd						
Civil Construction						
Date	**10/29/2021**					
Basis of Estimate						
This cost estimate is based on GTA plan V106370-SK01 P3 dated 30 Aug 2021 (Taper end along Heslop Road and 50m along Fuller Road)						
	Heslop Rd / Fuller Rd - Proposed T intersection					
Item	**Description of works**	**Quantity**	**Unit**	**Rate**	**Amount**	**Comments**
1.00	**SITEWORKS AND EARTHWORKS**					
1.01	Site preparation	1	Item	$ 10,000.00	$ 10,000.00	
1.02	Earthworks	1980	m^3	$ 40.00	$ 79,200.00	
1.03	Subgrade improvement	2200	m^2	$ 60.00	$ 132,000.00	
1.04	Proving existing services	1	Item	$ 5,000.00	$ 5,000.00	
2.00	**ROAD PAVEMENT**					
2.01	Asphalt Pavement	4400	m^2	$ 150.00	$ 660,000.00	450mm deep heavy duty pavement
3.00	**CONCRETE WORKS**					
3.01	Kerb and channel	320	Lm	$ 70.00	$ 22,400.00	SM2 or Council equivalent
3.02	Concrete footpath	540	m^2	$ 125.00	$ 67,500.00	
3.03	Concrete median works	0	m^2	$ 130.00	$ -	
3.04	Pram ramp works	4	Item	$ 1,250.00	$ 5,000.00	To be DDA compliant
4.00	**DRAINAGE**					
4.01	Drainage - pipes	40	Lm	$ 250.00	$ 10,000.00	300mm dia RCP Class 2, RRJ
4.02	Drainage - pits	6	No	$ 1,850.00	$ 11,100.00	900 x 900 side entry pits
4.03	Drainage – Sub-soil drainage	300	Lm	$ 55.00	$ 16,500.00	100mm dia grade 1000 AG drain with screening backfill
4.04	Drainage – Miscellaneous (Description)	6	Item	$ 1,250.00	$ 7,500.00	SSD Pit/ flush out riser/ outlet
5.00	**TRAFFIC**					
5.01	Traffic Signals	0	Item	$ 350,000.00	$ -	
5.02	Traffic Safety (barriers etc)	1	Item	$ 30,000.00	$ 30,000.00	To protect exisiting Electrical poles
6.00	**LANDSCAPE**					
6.01	Tree Removals & replacement	6	No	$ 500.00	$ 3,000.00	
6.02	Landscaping - median works		m^2	$ 50.00	$ -	
6.03	Landscaping - batter and back of kerb works	600	m^2	$ 80.00	$ 48,000.00	
7.00	**STREET LIGHTING**					
7.01	Street Lighting	3	No	$ 12,800.00	$ 38,400.00	
8.00	**MISCELLANEOUS**					
8.01	Line marking	1	Item	$ 3,000.00	$ 3,000.00	
8.02	Regulatory Signage	1	Item	$ 2,500.00	$ 2,500.00	
8.03	Works maintenance – up to 1 year	1	Item	$ 20,000.00	$ 20,000.00	
8.04	Landscape maintenance – 1yr/2 summers	1	Item	$ 5,000.00	$ 5,000.00	Including traffic management
9.00	**OTHER**					
9.01	Telstra services relocation/ Protection works	1	Item	$ 25,000.00	$ 25,000.00	*This is a broad level estimate only - email confirmation*
9.02	NBN services relocation/Protection works	1	Item	$ 30,000.00	$ 30,000.00	*This is a broad level estimate only - email confirmation*
9.03	*Gas services relocation/Protection works*	*1*	*Item*		*$ -*	
9.04	*Water and Sewer services relocation/Protection works*	*1*	*Item*	*$ 50,000.00*	*$ 50,000.00*	*This is a broad level estimate only - email confirmation*
9.05	*Electrical services relocation/Protection works*	*1*	*Item*		*$ -*	
	SUB-TOTAL WORKS				**$ 1,281,100.00**	
10.00	**DELIVERY**					
10.01	Council Fees (Council assets only)	3.25	%		$ 41,635.75	
10.02	Department of Transport Fees	1	%		$ 12,811.00	
10.03	Traffic Management	5	%		$ 64,055.00	
10.04	Environmental Management	0.5	%		$ 6,405.50	
10.05	Survey/Design	5	%		$ 64,055.00	
10.06	Supervision & Project Management	9	%		$ 115,299.00	
10.07	Site Establishment	2.5	%		$ 32,027.50	
10.08	Contingency - Overall (Item 1.1 to 9.7)	30	%		$ 384,330.00	
	SUB-TOTAL DELIVERY				**$ 720,618.75**	
11	**TOTAL ESTIMATED COST**				**$ 2,001,718.75**	

Assumptions and exclusions:

1. Design and documentation fees or authority fees, charges, levies and overview including insurances and bank guarantees have been included as per VPA recommended percentages.
2. Approximate cost of protection and/or relocation of underground services during construction is included (broad level estimate only subject to validation and confirmation)
3. A 30% contingency has been applied to the engineer's opinion of probable costs based on the information from Concept layout and without a site inspection
4. This engineers opinion of probable cost is based on the drawings listed above and further changes may arise following subsequent additional investigations and detailed design development.
5. Specific construction works including rock boring, rock blasting or rock excavation and removal have been excluded as geotechnical conditions are yet to be confirmed.
6. This estimate also excludes allowance for abnormal weather conditions.
7. GST is excluded.
8. Land acquisition is excluded
9. Price escalation is excluded.
10. The above opinion of probable costs should be considered current to the date of the document only. GTA now Stantec cannot provide any form of assurance that the costings provided will not change due to changes in design and/or future costs of materials. The future outcome may vary, and this variation may be material.
This potential for variation should be considered in any circumstances where the costings are to be used for high level budgeting purposes, even in the short term.
Any party requiring detailed costing for quoting or construction purposes should seek a detailed cost estimate from a suitably qualified quantity surveyor.

V106373: Wonthaggi North East PSP - Heslop Rd / St Clair Boulevard

Civil Construction

Date **10/29/2021**

Basis of Estimate

This cost estimate is based on GTA plan V106373-01 P2 dated 22 July 2021

Heslop Rd / St Clair Boulevard - Proposed T Intersection with 50m in St Claire Blvd

Item	Description of works	Quantity	Unit	Rate	Amount	Comments
1.00	**SITEWORKS AND EARTHWORKS**					
1.01	Site preparation	1	Item	$ 10,000.00	$ 10,000.00	
1.02	Earthworks	1620	m^3	$ 40.00	$ 64,800.00	
1.03	Subgrade improvement	1440	m^2	$ 60.00	$ 86,400.00	
1.04	Proving existing services	1	Item	$ 2,500.00	$ 2,500.00	
2.00	**ROAD PAVEMENT**					
2.01	Asphalt Pavement	3600	m^2	$ 150.00	$ 540,000.00	450mm deep heavy duty pavement
3.00	**CONCRETE WORKS**					
3.01	Kerb and channel	570	Lm	$ 70.00	$ 39,900.00	SM2 or Council equivalent
3.02	Concrete footpath	1230	m^2	$ 125.00	$ 153,750.00	
3.03	Concrete median works	0	m^2	$ 130.00	$ -	
3.04	Pram ramp works	4	Item	$ 1,250.00	$ 5,000.00	To be DDA compliant
4.00	**DRAINAGE**					
4.01	Drainage - pipes	120	Lm	$ 250.00	$ 30,000.00	300mm dia RCP Class 2, RRJ
4.02	Drainage - pits	12	No	$ 1,850.00	$ 22,200.00	900 x 900 side entry pits
4.03	Drainage – Sub-soil drainage	570	Lm	$ 55.00	$ 31,350.00	100mm dia grade 1000 AG drain with screening backfill
4.03	Drainage – Miscellaneous (Description)	8	Item	$ 1,250.00	$ 10,000.00	SSD Pit/ flush out riser/ outlet
5.00	**TRAFFIC**					
5.01	Traffic Signals	0	Item	$ 350,000.00	$ -	
5.02	Traffic Safety (barriers etc)	1	Item	$ 50,000.00	$ 50,000.00	To protect exisiting Electrical poles
6.00	**LANDSCAPE**					
6.01	Tree removals	120	No	$ 500.00	$ 60,000.00	
6.02	Landscaping - batter, median & back of kerb works	900	m^2	$ 80.00	$ 72,000.00	
7.00	**STREET LIGHTING**					
7.01	Street Lighting	4	No	$ 12,800.00	$ 51,200.00	
8.00	**MISCELLANEOUS**					
8.01	Line marking	1	Item	$ 4,000.00	$ 4,000.00	
8.02	Regulatory Signage	1	Item	$ 3,500.00	$ 3,500.00	
8.03	Works maintenance – up to 1 year	1	Item	$ 20,000.00	$ 20,000.00	
8.04	Landscape maintenance – 1yr/2 summers	1	Item	$ 5,000.00	$ 5,000.00	Including traffic management
9.00	**OTHER**					
9.01	Water and Sewer services relocation/Protection works	0	Item		$ -	No impact - email confirmation
9.02	*Electrical services relocation/Protection works*	*0*	*Item*		*$* -	Protection may be required (Refer item 5.02)
	SUB-TOTAL WORKS				**$ 1,261,600.00**	
10.00	**DELIVERY**					
10.01	Council Fees (Council assets only)	3.25	%		$ 41,002.00	
10.02	Department of Transport Fees	1	%		$ 12,616.00	
10.03	Traffic Management	5	%		$ 63,080.00	
10.04	Environmental Management	0.5	%		$ 6,308.00	
10.05	Survey/Design	5	%		$ 63,080.00	
10.06	Supervision & Project Management	9	%		$ 113,544.00	
10.07	Site Establishment	2.5	%		$ 31,540.00	
10.08	Contingency - Overall (Item 1.1 to 9.7)	30	%		$ 378,480.00	
	SUB-TOTAL DELIVERY				**$ 709,650.00**	
11	**TOTAL ESTIMATED COST**				**$ 1,971,250.00**	

Assumptions and exclusions:

1. Design and documentation fees or authority fees, charges, levies and overview including insurances and bank guarantees have been included as per VPA recommended percentages.
2. Approximate cost of protection and/or relocation of underground services during construction is included (broad level estimate only subject to validation and confirmation)
3. A 30% contingency has been applied to the engineer's opinion of probable costs based on the information from Concept layout without a site inspection
4. This engineers opinion of probable cost is based on the drawings listed above and further changes may arise following subsequent additional investigations and detailed design development.
5. Specific construction works including rock boring, rock blasting or rock excavation and removal have been excluded as geotechnical conditions are yet to be confirmed.
6. This estimate also excludes allowance for abnormal weather conditions.
7. GST is excluded.
8. Land acquisition is excluded
9. Price escalation is excluded.
10. The above opinion of probable costs should be considered current to the date of the document only. GTA now Stantec cannot provide any form of assurance that the costings provided will not change due to changes in design and/or future costs of materials. The future outcome may vary, and this variation may be material.
This potential for variation should be considered in any circumstances where the costings are to be used for high level budgeting purposes, even in the short term.
Any party requiring detailed costing for quoting or construction purposes should seek a detailed cost estimate from a suitably qualified quantity surveyor.

V106370: Wonthaggi North East PSP - Heslop Rd / Korumburra-Wonthaggi Road (Up to the taper end on Korumburra-Wonthaggi Road & 60m along Heslop Road)

Civil Construction

Date **10/13/2021**

Basis of Estimate

This cost estimate is based on GTA plan V106370-SK04 P2 dated 28 July 2021

	Heslop Rd / Korumburra-Wonthaggi Road - Proposed T intersection					
Item	**Description of works**	**Quantity**	**Unit**	**Rate**	**Amount**	**Comments**
1.00	**SITEWORKS AND EARTHWORKS**					
1.01	Site preparation	1	Item	$ 15,000.00	$ 15,000.00	
1.02	Earthworks	1335	m^3	$ 40.00	$ 53,400.00	
1.03	Subgrade improvement	1185	m^2	$ 60.00	$ 71,100.00	Existing Asphalt Pavement
1.04	Proving existing services	1	Item	$ 7,500.00	$ 7,500.00	
2.00	**ROAD PAVEMENT**					
2.01	Asphalt Pavement	2670	m^2	$ 150.00	$ 400,500.00	600mm deep heavy duty pavement
2.02	Asphalt resheet works with type V or H asphalt	2280	m^2	$ 50.00	$ 114,000.00	
3.00	**CONCRETE WORKS**					
3.01	Kerb and channel	280	Lm	$ 70.00	$ 19,600.00	SM2 or Council equivalent
3.02	Concrete footpath	150	m^2	$ 125.00	$ 18,750.00	
3.03	Concrete median works	0	m^2	$ 130.00	$ -	
3.04	Pram ramp works	4	Item	$ 1,250.00	$ 5,000.00	To be DDA compliant
4.00	**DRAINAGE**					
4.01	Drainage - pipes	60	Lm	$ 250.00	$ 15,000.00	300mm dia RCP Class 2, RRJ
4.02	Drainage - pits	6	No	$ 1,850.00	$ 11,100.00	900 x 900 side entry pits
4.03	Drainage – Sub-soil drainage	280	Lm	$ 55.00	$ 15,400.00	100mm dia grade 1000 AG drain with screening backfill
4.03	Drainage – Miscellaneous (Description)	6	Item	$ 1,250.00	$ 7,500.00	SSD Pit/ flush out riser/ outlet
4.04	Drainage – Miscellaneous (Description)	1	Item	$ 40,000.00	$ 40,000.00	Bux Culvert Extension
5.00	**TRAFFIC**					
5.01	Traffic Signals	0	Item	$ 350,000.00	$ -	
5.02	Traffic Safety (barriers etc)	0	Item	$ 50,000.00	$ -	
6.00	**LANDSCAPE**					
6.01	Tree removals & replacements	10	No	$ 500.00	$ 5,000.00	
6.02	Landscaping - batter, median & back of kerb works	1200	m^2	$ 80.00	$ 96,000.00	
7.00	**STREET LIGHTING**					
7.01	Street Lighting	5	No	$ 12,800.00	$ 64,000.00	
8.00	**MISCELLANEOUS**					
8.01	Line marking	1	Item	$ 4,000.00	$ 4,000.00	
8.02	Regulatory Signage	1	Item	$ 3,000.00	$ 3,000.00	
8.03	Works maintenance – up to 1 year	1	Item	$ 20,000.00	$ 20,000.00	
8.04	Landscape maintenance – 1yr/2 summers	1	Item	$ 5,000.00	$ 5,000.00	Including traffic management
8.05	End Terminals - Guard fence (MASH)	6	No	$ 6,000.00	$ 36,000.00	
8.06	Guard Fence Protection	540	Lm	$ 80.00	$ 43,200.00	Culvert endwall protection
9.00	**OTHER**					
9.01	Telstra services relocation/ Protection works	1	Item	$ 500,000.00	$ 500,000.00	*This is a broad level estimate only - email confirmation*
9.02	NBN services relocation/Protection works	1	Item	$ 50,000.00	$ 50,000.00	*This is a broad level estimate only - email confirmation*
9.03	Gas services relocation/Protection works	1	Item	$ 80,000.00	$ 80,000.00	*Email confirmation from Multinet and gas main crossing need to be protected*
9.04	Water and Sewer services relocation/Protection works	1	Item	$ 50,000.00	$ 50,000.00	*Email confirmation - no impact on existing water asset but protection need to be provided*
9.05	*Electrical services relocation/Protection works*	*0*	*Item*		*$ -*	
	SUB-TOTAL WORKS				**$ 1,750,050.00**	
10.00	**DELIVERY**					
10.01	Council Fees (Council assets only)	3.25	%		$ 56,876.63	
10.02	Department of Transport Fees	1	%		$ 17,500.50	
10.03	Traffic Management	5	%		$ 87,502.50	
10.04	Environmental Management	0.5	%		$ 8,750.25	
10.05	Survey/Design	5	%		$ 87,502.50	
10.06	Supervision & Project Management	9	%		$ 157,504.50	
10.07	Site Establishment	2.5	%		$ 43,751.25	
10.08	Contingency - Overall (Item 1.1 to 9.7)	30	%		$ 525,015.00	
	SUB-TOTAL DELIVERY				**$ 984,403.13**	
11	**TOTAL ESTIMATED COST**				**$ 2,734,453.13**	

Assumptions and exclusions:

1. Design and documentation fees or authority fees, charges, levies and overview including insurances and bank guarantees have been included as per VPA recommended percentages.
2. Approximate cost of protection and/or relocation of underground services during construction is included (broad level estimate only subject to validation and confirmation)
3. A 30% contingency has been applied to the engineer's opinion of probable costs based on the information from Concept layout and without a site inspection
4. This engineers opinion of probable cost is based on the drawings listed above and further changes may arise following subsequent additional investigations and detailed design development.
5. Specific construction works including rock boring, rock blasting or rock excavation and removal have been excluded as geotechnical conditions are yet to be confirmed.
6. This estimate also excludes allowance for abnormal weather conditions.
7. GST is excluded.
8. Land acquisition is excluded
9. Price escalation is excluded.
10. The above opinion of probable costs should be considered current to the date of the document only. GTA now Stantec cannot provide any form of assurance that the costings provided will not change due to changes in design and/or future costs of materials. The future outcome may vary, and this variation may be material.
This potential for variation should be considered in any circumstances where the costings are to be used for high level budgeting purposes, even in the short term.
Any party requiring detailed costing for quoting or construction purposes should seek a detailed cost estimate from a suitably qualified quantity surveyor.

V106370: Wonthaggi North East PSP - Korumburra-Wonthaggi Rd / St Clair Blvd						
Civil Construction						
Date	**10/13/2021**					
Basis of Estimate						
This cost estimate is based on GTA plan V106370-SK10 P5 dated 27 August 2021 (Limit of works as highlighted)						
	Korumburra-Wonthaggi Rd / St Clair Blvd - Proposed Roundabout - Option 2					
Item	**Description of works**	**Quantity**	**Unit**	**Rate**	**Amount**	**Comments**
1.00	**SITEWORKS AND EARTHWORKS**					
1.01	Site preparation	1	Item	$ 15,000.00	$ 15,000.00	
1.02	Earthworks	2065	m^3	$ 40.00	$ 82,600.00	
1.03	Subgrade improvement	1180	m^2	$ 60.00	$ 70,800.00	
1.04	Proving existing services	1	Item	$ 10,000.00	$ 10,000.00	
2.00	**ROAD PAVEMENT**					
2.01	Asphalt Pavement	2950	m^2	$ 150.00	$ 442,500.00	600mm deep heavy duty pavement
2.02	Asphalt resheet works with type V or H asphalt	200	m^2	$ 50.00	$ 10,000.00	
3.00	**CONCRETE WORKS**					
3.01	Kerb and channel	1120	Lm	$ 70.00	$ 78,400.00	SM2 or Council equivalent
3.02	Concrete footpath	360	m^2	$ 125.00	$ 45,000.00	
3.03	Concrete median works	1500	m^2	$ 130.00	$ 195,000.00	
3.04	Pram ramp works	8	Item	$ 1,250.00	$ 10,000.00	To be DDA compliant
4.00	**DRAINAGE**					
4.01	Drainage - pipes	160	Lm	$ 250.00	$ 40,000.00	300mm dia RCP Class 2, RRJ
4.02	Drainage - pits	20	No	$ 1,850.00	$ 37,000.00	750 x 1000 side entry pits
4.03	Drainage – Sub-soil drainage	1380	Lm	$ 55.00	$ 75,900.00	100mm dia grade 1000 AG drain with screening backfill
4.03	Drainage – Miscellaneous (Description)	8	Item	$ 1,250.00	$ 10,000.00	SSD Pit/ flush out riser/ outlet
5.00	**TRAFFIC**					
5.01	Traffic Signals	0	Item	$ 350,000.00	$ -	
5.02	Traffic Safety (barriers etc)	0	Item	$ 50,000.00	$ -	
6.00	**LANDSCAPE**					
6.01	Tree removals & replacements	120	No	$ 500.00	$ 60,000.00	
6.02	Landscaping - batter, median & back of kerb works	1150	m^2	$ 80.00	$ 92,000.00	
7.00	**STREET LIGHTING**					
7.01	Street Lighting	8	No	$ 12,800.00	$ 102,400.00	
8.00	**MISCELLANEOUS**					
8.01	Line marking	1	Item	$ 5,000.00	$ 5,000.00	
8.02	Regulatory Signage	1	Item	$ 4,000.00	$ 4,000.00	
8.03	Works maintenance – up to 1 year	1	Item	$ 20,000.00	$ 20,000.00	
8.04	Landscape maintenance – 1yr/2 summers	1	Item	$ 5,000.00	$ 5,000.00	Including traffic management
9.00	**OTHER**					
9.01	*Telstra services relocation/ Protection works*	*1*	*Item*	*$ 450,000.00*	*$ 450,000.00*	*This is a broad level estimate only - email confirmation*
9.02	*NBN services relocation/Protection works*	*1*	*Item*	*$ 100,000.00*	*$ 50,000.00*	*This is a broad level estimate only - email confirmation*
9.03	*Gas services relocation/Protection works*	*1*	*Item*	*$ 50,000.00*	*$ 50,000.00*	*Authority confirmation required*
9.04	*Water and Sewer services relocation/Protection works*	*1*	*Item*	*$ 50,000.00*	*$ 50,000.00*	*This is a broad level estimate only, subject to verification by authority. SGW are highly likely to arrange to renew this main and divert around roundabout instead (timing dependant)*
9.05	*Electrical services relocation/Protection works*	*0*	*Item*		*$ -*	
	SUB-TOTAL WORKS				**$ 2,010,600.00**	
10.00	**DELIVERY**					
10.01	Council Fees (Council assets only)	3.25	%		$ 65,344.50	
10.02	Department of Transport Fees	1	%		$ 20,106.00	
10.03	Traffic Management	5	%		$ 100,530.00	
10.04	Environmental Management	0.5	%		$ 10,053.00	
10.05	Survey/Design	5	%		$ 100,530.00	
10.06	Supervision & Project Management	9	%		$ 180,954.00	
10.07	Site Establishment	2.5	%		$ 50,265.00	
10.08	Contingency - Overall (Item 1.1 to 9.7)	30	%		$ 603,180.00	
	SUB-TOTAL DELIVERY				**$ 1,130,962.50**	
11	**TOTAL ESTIMATED COST**				**$ 3,141,562.50**	

Assumptions and exclusions:

1. Design and documentation fees or authority fees, charges, levies and overview including insurances and bank guarantees have been included as per VPA recommended percentages.
2. Approximate cost of protection and/or relocation of underground services during construction is included (broad level estimate only subject to validation and confirmation)
3. A 30% contingency has been applied to the engineer's opinion of probable costs based on the information from Concept layout and without a site inspection
4. This engineers opinion of probable cost is based on the drawings listed above and further changes may arise following subsequent additional investigations and detailed design development.
5. Specific construction works including rock boring, rock blasting or rock excavation and removal have been excluded as geotechnical conditions are yet to be confirmed.
6. This estimate also excludes allowance for abnormal weather conditions.
7. GST is excluded.
8. Land acquisition is excluded
9. Price escalation is excluded.
10. The above opinion of probable costs should be considered current to the date of the document only. GTA now Stantec cannot provide any form of assurance that the costings provided will not change due to changes in design and/or future costs of materials. The future outcome may vary, and this variation may be material.
This potential for variation should be considered in any circumstances where the costings are to be used for high level budgeting purposes, even in the short term.
Any party requiring detailed costing for quoting or construction purposes should seek a detailed cost estimate from a suitably qualified quantity surveyor.

V106370: Wonthaggi North East PSP - Bass Hwy / Carneys Rd						
Civil Construction						
Date	**10/13/2021**					
Basis of Estimate						
This cost estimate is based on GTA plan V106370-01-01-P7 dated 30 Aug 2021 (approximately 55m of each leg)						
	Bass Hwy / Carneys Rd - Proposed Roundabout					
Item	**Description of works**	**Quantity**	**Unit**	**Rate**	**Amount**	**Comments**
1.00	**SITEWORKS AND EARTHWORKS**					
1.01	Site preparation	1	Item	$ 15,000.00	$ 15,000.00	
1.02	Earthworks	1260	m^3	$ 40.00	$ 50,400.00	
1.03	Subgrade improvement	1680	m^2	$ 60.00	$ 100,800.00	Existing Asphalt
1.04	Proving existing services	1	Item	$ 20,000.00	$ 20,000.00	
2.00	**ROAD PAVEMENT**					
2.01	Asphalt Pavement	2100	m^2	$ 150.00	$ 315,000.00	600mm deep heavy duty pavement
2.02	Asphalt resheet works with type V or H asphalt	1240	m^2	$ 50.00	$ 62,000.00	
3.00	**CONCRETE WORKS**					
3.01	Kerb and channel	610	Lm	$ 70.00	$ 42,700.00	SM2 or Council equivalent
3.02	Concrete footpath	600	m^2	$ 125.00	$ 75,000.00	
3.03	Concrete median works	1450	m^2	$ 130.00	$ 188,500.00	
3.04	Pram ramp works	8	Item	$ 1,250.00	$ 10,000.00	To be DDA compliant
4.00	**DRAINAGE**					
4.01	Drainage - pipes	120	Lm	$ 250.00	$ 30,000.00	300mm dia RCP Class 2, RRJ
4.02	Drainage - pits	14	No	$ 1,850.00	$ 25,900.00	750 x 1000 side entry pits
4.03	Drainage – Sub-soil drainage	610	Lm	$ 55.00	$ 33,550.00	100mm dia grade 1000 AG drain with screening backfill
4.04	Drainage – Miscellaneous (Description)	8	Item	$ 1,250.00	$ 10,000.00	SSD Pit/ flush out riser/ outlet
4.05	Drainage – Miscellaneous (Description)	4	Item	$ 3,000.00	$ 12,000.00	End Wall
5.00	**TRAFFIC**					
5.01	Traffic Signals	0	Item	$ 350,000.00	$ -	
5.02	Traffic Safety (barriers etc)	0	Item	$ 50,000.00	$ -	
6.00	**LANDSCAPE**					
6.01	Tree removals & replacements	40	No	$ 500.00	$ 20,000.00	
6.02	Landscaping - batter, median & back of kerb works	650	m^2	$ 80.00	$ 52,000.00	
7.00	**STREET LIGHTING**					
7.01	Street Lighting	8	No	$ 12,800.00	$ 102,400.00	
8.00	**MISCELLANEOUS**					
8.01	Line marking	1	Item	$ 6,000.00	$ 6,000.00	
8.02	Regulatory Signage	1	Item	$ 5,000.00	$ 5,000.00	
8.03	Works maintenance – up to 1 year	1	Item	$ 25,000.00	$ 25,000.00	
8.04	Landscape maintenance – 1yr/2 summers	1	Item	$ 6,000.00	$ 6,000.00	Including traffic management
9.00	**OTHER**					
9.01	*Telstra services relocation/ Protection works*	*1*	*Item*	*$ 500,000.00*	*$ 500,000.00*	*This is a broad level estimate only - email confirmation*
9.02	*NBN services relocation/Protection works*	*1*	*Item*	*$ 150,000.00*	*$ 150,000.00*	*This is a broad level estimate only - email confirmation*
9.03	*Gas services relocation/Protection works*	*1*	*Item*	*$ 100,000.00*	*$ 100,000.00*	*This is a broad level estimate only, subject to verification by authority*
9.04	*Water and Sewer services relocation/Protection works*	*1*	*Item*	*$ 100,000.00*	*$ 100,000.00*	*Email confirmation*
9.05	*Electrical services relocation/Protection works*	*1*	*Item*	*$ 250,000.00*	*$ 250,000.00*	*Verbal confirmation for full works only*
	SUB-TOTAL WORKS				**$ 2,307,250.00**	
10.00	**DELIVERY**					
10.01	Council Fees (Council assets only)	3.25	%		$ 74,985.63	
10.02	Department of Transport Fees	1	%		$ 23,072.50	
10.03	Traffic Management	7	%		$ 161,507.50	
10.04	Environmental Management	0.5	%		$ 11,536.25	
10.05	Survey/Design	5	%		$ 115,362.50	
10.06	Supervision & Project Management	9	%		$ 207,652.50	
10.07	Site Establishment	2.5	%		$ 57,681.25	
10.08	Contingency - Overall (Item 1.1 to 9.7)	30	%		$ 692,175.00	
	SUB-TOTAL DELIVERY				**$ 1,343,973.13**	
11	**TOTAL ESTIMATED COST**				**$ 3,651,223.13**	

Assumptions and exclusions:

1. Design and documentation fees or authority fees, charges, levies and overview including insurances and bank guarantees have been included as per VPA recommended percentages.
2. Approximate cost of protection and/or relocation of underground services during construction is included (broad level estimate only subject to validation and confirmation)
3. A 30% contingency has been applied to the engineer's opinion of probable costs based on the information from Concept layout without a site inspection
4. This engineers opinion of probable cost is based on the drawings listed above and further changes may arise following subsequent additional investigations and detailed design development.
5. Specific construction works including rock boring, rock blasting or rock excavation and removal have been excluded as geotechnical conditions are yet to be confirmed.
6. This estimate also excludes allowance for abnormal weather conditions.
7. GST is excluded.
8. Land acquisition is excluded
9. Price escalation is excluded.
10. The above opinion of probable costs should be considered current to the date of the document only. GTA now Stantec cannot provide any form of assurance that the costings provided will not change due to changes in design and/or future costs of materials. The future outcome may vary, and this variation may be material.
This potential for variation should be considered in any circumstances where the costings are to be used for high level budgeting purposes, even in the short term.
Any party requiring detailed costing for quoting or construction purposes should seek a detailed cost estimate from a suitably qualified quantity surveyor.

V106370: Wonthaggi North East PSP - Bass Hwy / St Clair Blvd						
Civil Construction						
Date	**10/13/2021**					
Basis of Estimate						
This cost estimate is based on GTA plan V106370-01-03-P7 dated 27 Aug 2021 (Approximately 150m of the Bass Highway legs and 50m of the Saint Claire Boulevard legs)						
	Bass Hwy / St Clair Blvd - Proposed Roundabout					
Item	**Description of works**	**Quantity**	**Unit**	**Rate**	**Amount**	**Comments**
1.00	**SITEWORKS AND EARTHWORKS**					
1.01	Site preparation	1	Item	$ 15,000.00	$ 15,000.00	
1.02	Earthworks	2568	m^3	$ 40.00	$ 102,720.00	
1.03	Subgrade improvement	2140	m^2	$ 60.00	$ 128,400.00	
1.04	Proving existing services	1	Item	$ 10,000.00	$ 10,000.00	
2.00	**ROAD PAVEMENT**					
2.01	Asphalt Pavement	4280	m^2	$ 150.00	$ 642,000.00	600mm deep heavy duty pavement
2.02	Asphalt resheet works with type V or H asphalt	1400	m^2	$ 50.00	$ 70,000.00	
3.00	**CONCRETE WORKS**					
3.01	Kerb and channel	1550	Lm	$ 70.00	$ 108,500.00	SM2 or Council equivalent
3.02	Concrete footpath	1080	m^2	$ 125.00	$ 135,000.00	
3.03	Concrete median works	4230	m^2	$ 130.00	$ 549,900.00	
3.04	Pram ramp works	8	Item	$ 1,250.00	$ 10,000.00	To be DDA compliant
4.00	**DRAINAGE**					
4.01	Drainage - pipes	150	Lm	$ 250.00	$ 37,500.00	375mm dia RCP Class 2, RRJ
4.02	Drainage - pits	12	No	$ 1,850.00	$ 22,200.00	750 x 1000 side entry pits
4.03	Drainage – Sub-soil drainage	950	Lm	$ 55.00	$ 52,250.00	100mm dia grade 1000 AG drain with screening backfill
4.04	Drainage – Miscellaneous (Description)	12	Item	$ 1,250.00	$ 15,000.00	SSD Pit/ flush out riser/ outlet
5.00	**TRAFFIC**					
5.01	Traffic Signals	0	Item	$ 350,000.00	$ -	
5.02	Traffic Safety (barriers etc)	0	Item	$ 50,000.00	$ -	
6.00	**LANDSCAPE**					
6.01	Tree removals & replacements	20	No	$ 500.00	$ 10,000.00	
6.02	Landscaping - batter, median & back of kerb works	3550	m^2	$ 80.00	$ 284,000.00	
7.00	**STREET LIGHTING**					
7.01	Street Lighting	16	No	$ 12,800.00	$ 204,800.00	
8.00	**MISCELLANEOUS**					
8.01	Line marking	1	Item	$ 6,000.00	$ 6,000.00	
8.02	Regulatory Signage	1	Item	$ 5,000.00	$ 5,000.00	
8.03	Works maintenance – up to 1 year	1	Item	$ 25,000.00	$ 25,000.00	
8.04	Landscape maintenance – 1yr/2 summers	1	Item	$ 7,000.00	$ 7,000.00	Including traffic management
9.00	**OTHER**					
9.01	*Telstra services relocation/ Protection works*	*1*	*Item*	*$ 500,000.00*	*$ 500,000.00*	*This is a broad level estimate only - email confirmation*
9.02	*NBN services relocation/Protection works*	*1*	*Item*	*$ 150,000.00*	*$ 50,000.00*	*This is a broad level estimate only - email confirmation*
9.03	*Water and Sewer services relocation/Protection works*	*1*	*Item*	*$ 100,000.00*	*$ 100,000.00*	*High-level estimate only*
9.04	*Electrical services relocation/Protection works*	*1*	*Item*	*$ 180,000.00*	*$ 180,000.00*	*Verbal confirmation for full works only*
	SUB-TOTAL WORKS				**$ 3,270,270.00**	
10.00	**DELIVERY**					
10.01	Council Fees (Council assets only)	3.25	%		$ 106,283.78	
10.02	Department of Transport Fees	1	%		$ 32,702.70	
10.03	Traffic Management	7	%		$ 228,918.90	
10.04	Environmental Management	0.5	%		$ 16,351.35	
10.05	Survey/Design	5	%		$ 163,513.50	
10.06	Supervision & Project Management	9	%		$ 294,324.30	
10.07	Site Establishment	2.5	%		$ 81,756.75	
10.08	Contingency - Overall (Item 1.1 to 9.7)	30	%		$ 981,081.00	
	SUB-TOTAL DELIVERY				**$ 1,904,932.28**	
11	**TOTAL ESTIMATED COST**				**$ 5,175,202.28**	

Assumptions and exclusions:

1. Design and documentation fees or authority fees, charges, levies and overview including insurances and bank guarantees have been included as per VPA recommended percentages.
2. Approximate cost of protection and/or relocation of underground services during construction is included (broad level estimate only subject to validation and confirmation)
3. A 30% contingency has been applied to the engineer's opinion of probable costs based on the information from Concept layout and without a site inspection
4. This engineers opinion of probable cost is based on the drawings listed above and further changes may arise following subsequent additional investigations and detailed design development.
5. Specific construction works including rock boring, rock blasting or rock excavation and removal have been excluded as geotechnical conditions are yet to be confirmed.
6. This estimate also excludes allowance for abnormal weather conditions.
7. GST is excluded.
8. Land acquisition is excluded
9. Price escalation is excluded.
10. The above opinion of probable costs should be considered current to the date of the document only. GTA now Stantec cannot provide any form of assurance that the costings provided will not change due to changes in design and/or future costs of materials. The future outcome may vary, and this variation may be material.
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Any party requiring detailed costing for quoting or construction purposes should seek a detailed cost estimate from a suitably qualified quantity surveyor.

V106370: Wonthaggi North East PSP - John Street/Bass Highway						
Civil Construction						
Date	**10/13/2021**					
Basis of Estimate						
This cost estimate is based on GTA plan V106370-01-02-P7 dated 27 August 2021 (approximately 55m of each leg)						
	John Street/Bass Highway - Proposed Roundabout					
Item	**Description of works**	**Quantity**	**Unit**	**Rate**	**Amount**	**Comments**
1.00	**SITEWORKS AND EARTHWORKS**					
1.01	Site preparation	1	Item	$ 15,000.00	$ 15,000.00	
1.02	Earthworks	1356	m^3	$ 40.00	$ 54,240.00	
1.03	Subgrade improvement	1130	m^2	$ 60.00	$ 67,800.00	
1.04	Proving existing services	1	Item	$ 10,000.00	$ 10,000.00	
2.00	**ROAD PAVEMENT**					
2.01	Asphalt Pavement	2260	m^2	$ 150.00	$ 339,000.00	600mm deep heavy duty pavement
2.02	Asphalt resheet works with type V or H asphalt	1040	m^2	$ 50.00	$ 52,000.00	
3.00	**CONCRETE WORKS**					
3.01	Kerb and channel	770	Lm	$ 70.00	$ 53,900.00	SM2 or Council equivalent
3.02	Concrete footpath	420	m^2	$ 125.00	$ 52,500.00	
3.03	Concrete median works	860	m^2	$ 130.00	$ 111,800.00	
3.04	Pram ramp works	8	Item	$ 1,250.00	$ 10,000.00	To be DDA compliant
4.00	**DRAINAGE**					
4.01	Drainage - pipes	80	Lm	$ 250.00	$ 20,000.00	375mm dia RCP Class 2, RRJ
4.02	Drainage - pits	8	No	$ 1,850.00	$ 14,800.00	750 x 1000 side entry pits
4.03	Drainage – Sub-soil drainage	770	Lm	$ 55.00	$ 42,350.00	100mm dia grade 1000 AG drain with screening backfill
4.04	Drainage – Miscellaneous (Description)	8	Item	$ 1,250.00	$ 10,000.00	SSD Pit/ flush out riser/ outlet
5.00	**TRAFFIC**					
5.01	Traffic Signals	0	Item	$ 350,000.00	$ -	
5.02	Traffic Safety (barriers etc)	0	Item	$ 50,000.00	$ -	
6.00	**LANDSCAPE**					
6.01	Tree removals	0	No	$ 160.00	$ -	
6.02	Landscaping - batter, median & back of kerb works	850	m^2	$ 50.00	$ 42,500.00	
7.00	**STREET LIGHTING**					
7.01	Street Lighting	8	No	$ 12,800.00	$ 102,400.00	
8.00	**MISCELLANEOUS**					
8.01	Line marking	1	Item	$ 5,000.00	$ 5,000.00	
8.02	Regulatory Signage	1	Item	$ 4,000.00	$ 4,000.00	
8.03	Works maintenance – up to 1 year	1	Item	$ 20,000.00	$ 20,000.00	
8.04	Landscape maintenance – 1yr/2 summers	1	Item	$ 6,000.00	$ 6,000.00	Including traffic management
9.00	**OTHER**					
9.01	*Telstra services relocation/ Protection works*	*1*	*Item*	*$ 450,000.00*	*$ 450,000.00*	*This is a broad level estimate only - email confirmation*
9.02	*NBN services relocation/Protection works*	*1*	*Item*	*$ 150,000.00*	*$ 50,000.00*	*This is a broad level estimate only - email confirmation*
9.03	*Water and Sewer services relocation/Protection works*	*1*	*Item*	*$ 50,000.00*	*$ 50,000.00*	*Email confirmation*
9.04	*Electrical services relocation/Protection works*	*0*	*Item*		*$ -*	
	SUB-TOTAL WORKS				**$ 1,583,290.00**	
10.00	**DELIVERY**					
10.01	Council Fees (Council assets only)	3.25	%		$ 51,456.93	
10.02	Department of Transport Fees	1	%		$ 15,832.90	
10.03	Traffic Management	7	%		$ 110,830.30	
10.04	Environmental Management	0.5	%		$ 7,916.45	
10.05	Survey/Design	5	%		$ 79,164.50	
10.06	Supervision & Project Management	9	%		$ 142,496.10	
10.07	Site Establishment	2.5	%		$ 39,582.25	
10.08	Contingency - Overall (Item 1.1 to 9.7)	30	%		$ 474,987.00	
	SUB-TOTAL DELIVERY				**$ 922,266.43**	
11	**TOTAL ESTIMATED COST**				**$ 2,505,556.43**	

Assumptions and exclusions:

1. Design and documentation fees or authority fees, charges, levies and overview including insurances and bank guarantees have been included as per VPA recommended percentages.
2. Approximate cost of protection and/or relocation of underground services during construction is included (broad level estimate only subject to validation and confirmation)
3. A 30% contingency has been applied to the engineer's opinion of probable costs based on the information from Concept layout without a site inspection
4. This engineers opinion of probable cost is based on the drawings listed above and further changes may arise following subsequent additional investigations and detailed design development.
5. Specific construction works including rock boring, rock blasting or rock excavation and removal have been excluded as geotechnical conditions are yet to be confirmed.
6. This estimate also excludes allowance for abnormal weather conditions.
7. GST is excluded.
8. Land acquisition is excluded
9. Price escalation is excluded.
10. The above opinion of probable costs should be considered current to the date of the document only. GTA now Stantec cannot provide any form of assurance that the costings provided will not change due to changes in design and/or future costs of materials. The future outcome may vary, and this variation may be material.
This potential for variation should be considered in any circumstances where the costings are to be used for high level budgeting purposes, even in the short term.
Any party requiring detailed costing for quoting or construction purposes should seek a detailed cost estimate from a suitably qualified quantity surveyor.

V106370: Wonthaggi North East PSP - Heslop Rd (from Fuller Rd to Korumburra-Wonthaggi Rd)						
Civil Construction						
Date	**10/29/2021**					
Basis of Estimate						
This cost estimate is based on google aerial map only (No Fuller Road and Wentworth Road intersections)						
	Heslop Rd (from Fuller Rd to Korumburra-Wonthaggi Rd 1800m)					
Item	**Description of works**	**Quantity**	**Unit**	**Rate**	**Amount**	**Comments**
1.00	**SITEWORKS AND EARTHWORKS**					
1.01	Site preparation	1	Item	$ 10,000.00	$ 10,000.00	
1.02	Earthworks	6700	m^3	$ 40.00	$ 268,000.00	
1.03	Subgrade improvement	3200	m^2	$ 60.00	$ 192,000.00	
1.04	Proving existing services	1	Item	$ 25,000.00	$ 25,000.00	
2.00	**ROAD PAVEMENT**					
2.01	Asphalt Pavement	15400	m^2	$ 120.00	$ 1,848,000.00	450mm deep heavy duty pavement
2.02	Road shoulder pavement	4400	m^2	$ 50.00	$ 220,000.00	
3.00	**CONCRETE WORKS**					
3.01	Kerb and channel		Lm	$ 70.00	$ -	
3.02	Concrete footpath		m^2	$ 125.00	$ -	
3.03	Concrete median works		m^2	$ 130.00	$ -	
3.04	Pram ramp works		Item	$ 1,250.00	$ -	To be DDA compliant
4.00	**DRAINAGE**					
4.01	Drainage - pipes	60	Lm	$ 250.00	$ 15,000.00	300mm dia RCP Class 2, RRJ
4.02	Drainage - pits	12	No	$ 1,850.00	$ 22,200.00	900 x 900 side entry pits
4.03	Drainage – Sub-soil drainage		Lm	$ 55.00	$ -	100mm dia grade 1000 AG drain with screening backfill
4.04	Drainage – Miscellaneous (Description)	1	Item	$ 50,000.00	$ 50,000.00	Table drain and others
5.00	**TRAFFIC**					
5.01	Traffic Signals	0	Item	$ 350,000.00	$ -	
5.02	Traffic Safety (barriers etc)	1	Item	$ 50,000.00	$ 50,000.00	To protect exisiting Electrical poles
6.00	**LANDSCAPE**					
6.01	Tree Removals	60	No	$ 500.00	$ 30,000.00	
6.02	Landscaping - median works	0	m^2	$ 50.00	$ -	
6.03	Landscaping - batter and back of kerb works	1200	m^2	$ 80.00	$ 96,000.00	
7.00	**STREET LIGHTING**					
7.01	Street Lighting	0	No	$ 12,800.00	$ -	Not included
8.00	**MISCELLANEOUS**					
8.01	Line marking	1	Item	$ 15,000.00	$ 15,000.00	
8.02	Regulatory Signage	1	Item	$ 7,000.00	$ 7,000.00	
8.03	Works maintenance – up to 1 year	1	Item	$ 25,000.00	$ 25,000.00	
8.04	Landscape maintenance – 1yr/2 summers	1	Item	$ 10,000.00	$ 10,000.00	Including traffic management
9.00	**OTHER**					
9.01	Telstra services relocation/ Protection works	1	Item		$ -	
	SUB-TOTAL WORKS				**$ 2,883,200.00**	
10.00	**DELIVERY**					
10.01	Council Fees (Council assets only)	3.25	%		$ 93,704.00	
10.02	Department of Transport Fees	1	%		$ 28,832.00	
10.03	Traffic Management	5	%		$ 144,160.00	
10.04	Environmental Management	0.5	%		$ 14,416.00	
10.05	Survey/Design	5	%		$ 144,160.00	
10.06	Supervision & Project Management	9	%		$ 259,488.00	
10.07	Site Establishment	2.5	%		$ 72,080.00	
10.08	Contingency - Overall (Item 1.1 to 9.7)	30	%		$ 864,960.00	
	SUB-TOTAL DELIVERY				**$ 1,621,800.00**	
11	**TOTAL ESTIMATED COST**				**$ 4,505,000.00**	

Assumptions and exclusions:

1. Design and documentation fees or authority fees, charges, levies and overview including insurances and bank guarantees have been included as per VPA recommended percentages.
2. Approximate cost of protection and/or relocation of underground services during construction is included (broad level estimate only subject to validation and confirmation)
3. A 30% contingency has been applied to the engineer's opinion of probable costs based on the information from Concept layout and without a site inspection
4. This engineers opinion of probable cost is based on the drawings listed above and further changes may arise following subsequent additional investigations and detailed design development.
5. Specific construction works including rock boring, rock blasting or rock excavation and removal have been excluded as geotechnical conditions are yet to be confirmed.
6. This estimate also excludes allowance for abnormal weather conditions.
7. GST is excluded.
8. Land acquisition is excluded
9. Price escalation is excluded.
10. The above opinion of probable costs should be considered current to the date of the document only. GTA now Stantec cannot provide any form of assurance that the costings provided will not change due to changes in design and/or future costs of materials. The future outcome may vary, and this variation may be material.
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Any party requiring detailed costing for quoting or construction purposes should seek a detailed cost estimate from a suitably qualified quantity surveyor.

V106370: Wonthaggi North East PSP - McGibbonys Road (245m internal road with the cross section of 20.0m)

Civil Construction

Date **10/13/2021**

Basis of Estimate

This opinion of probable cost estimate is for 245m internal road with the cross section of 20.0m (2.3m parking lane + 3.0 traffic lane in each direction = 10.6m wide carriageway)

Korumburra Road & McGibbonys Road Intersection Upgrade

Item	Description of works	Quantity	Unit	Rate	Amount	Comments
1.00	**SITEWORKS AND EARTHWORKS**					
1.01	Site preparation	1	Item	$ 5,000.00	$ 5,000.00	
1.02	Earthworks	1060	m^3	$ 40.00	$ 42,400.00	
1.03	Subgrade improvement	600	m^2	$ 60.00	$ 36,000.00	
1.04	Proving existing services	1	Item	$ 15,000.00	$ 15,000.00	
2.00	**ROAD PAVEMENT**					
2.01	Asphalt Pavement	2650	m^2	$ 140.00	$ 371,000.00	450mm deep heavy duty pavement
2.02	Road shoulder pavement	600	m^2	$ 50.00	$ 30,000.00	
3.00	**CONCRETE WORKS**					
3.01	Kerb and channel		Lm	$ 70.00	$ -	
3.02	Concrete footpath		m^2	$ 125.00	$ -	
3.03	Concrete median works		m^2	$ 130.00	$ -	
3.04	Pram ramp works		Item	$ 1,250.00	$ -	To be DDA compliant
4.00	**DRAINAGE**					
4.01	Drainage - pipes	110	Lm	$ 250.00	$ 27,500.00	300mm dia RCP Class 2, RRJ
4.02	Drainage - pits	10	No	$ 1,850.00	$ 18,500.00	900 x 900 side entry pits
4.03	Drainage – Sub-soil drainage		Lm	$ 55.00	$ -	100mm dia grade 1000 AG drain with screening backfill
4.04	Drainage – Miscellaneous (Description)	1	Item	$ 20,000.00	$ 20,000.00	Table drain and others
5.00	**TRAFFIC**					
5.01	Traffic Signals	0	Item	$ 350,000.00	$ -	
5.02	Traffic Safety (barriers etc)	1	Item	$ 10,000.00	$ 10,000.00	To protect exisiting Electrical poles
6.00	**LANDSCAPE**					
6.01	Tree Removals	10	No	$ 500.00	$ 5,000.00	
6.02	Landscaping - median works	0	m^2	$ 50.00	$ -	
6.03	Landscaping - batter and back of kerb works	500	m^2	$ 80.00	$ 40,000.00	
7.00	**STREET LIGHTING**					
7.01	Street Lighting	4	No	$ 12,800.00	$ 51,200.00	Not included
8.00	**MISCELLANEOUS**					
8.01	Line marking	1	Item	$ 5,000.00	$ 5,000.00	
8.02	Regulatory Signage	1	Item	$ 4,000.00	$ 4,000.00	
8.03	Works maintenance – up to 1 year	1	Item	$ 10,000.00	$ 10,000.00	
8.04	Landscape maintenance – 1yr/2 summers	1	Item	$ 3,000.00	$ 3,000.00	Including traffic management
9.00	**OTHER**					
9.01	Telstra services relocation/ Protection works	1	Item		$ -	
	SUB-TOTAL WORKS				**$ 693,600.00**	
10.00	**DELIVERY**					
10.01	Council Fees (Council assets only)	3.25	%		$ 22,542.00	
10.02	Department of Transport Fees	1	%		$ 6,936.00	
10.03	Traffic Management	5	%		$ 34,680.00	
10.04	Environmental Management	0.5	%		$ 3,468.00	
10.05	Survey/Design	5	%		$ 34,680.00	
10.06	Supervision & Project Management	9	%		$ 62,424.00	
10.07	Site Establishment	2.5	%		$ 17,340.00	
10.08	Contingency - Overall (Item 1.1 to 9.7)	30	%		$ 208,080.00	
	SUB-TOTAL DELIVERY				**$ 390,150.00**	
11	**TOTAL ESTIMATED COST**				**$ 1,083,750.00**	

Assumptions and exclusions:

1. Design and documentation fees or authority fees, charges, levies and overview including insurances and bank guarantees have been included as per VPA recommended percentages.
2. Approximate cost of protection and/or relocation of underground services during construction is included (broad level estimate only subject to validation and confirmation)
3. A 30% contingency has been applied to the engineer's opinion of probable costs based on the information from Concept layout and without a site inspection
4. This engineers opinion of probable cost is based on the drawings listed above and further changes may arise following subsequent additional investigations and detailed design development.
5. Specific construction works including rock boring, rock blasting or rock excavation and removal have been excluded as geotechnical conditions are yet to be confirmed.
6. This estimate also excludes allowance for abnormal weather conditions.
7. GST is excluded.
8. Land acquisition is excluded
9. Price escalation is excluded.
10. The above opinion of probable costs should be considered current to the date of the document only. GTA now Stantec cannot provide any form of assurance that the costings provided will not change due to changes in design and/or future costs of materials. The future outcome may vary, and this variation may be material.
This potential for variation should be considered in any circumstances where the costings are to be used for high level budgeting purposes, even in the short term.
Any party requiring detailed costing for quoting or construction purposes should seek a detailed cost estimate from a suitably qualified quantity surveyor.

NOTES

DESIGN SPEED: 80KM/H
POSTED SPEED: 80KM/H
DESIGN VEHICLE: 12.5m SU TRUCK

LEGEND

EXISTING SERVICES

O/H ELECTRICITY
T TELSTRA
W WATER

HESLOP ROAD
LIMIT OF WORKS
80.0 DIVERGE LENGTH
25.0 TAPER
75.0 STORAGE
3.5 3.5 (E)(E)
12.5
10.0
15.0
PROPOSED INTERSECTION AND FULLER ROAD TO BE SHIFTED EAST TO THE CENTRE OF THE ROAD RESERVE
3.5 3.5 (E)(E)
3.3
6.0
2.5
80.0 DIVERGE LENGTH
3.5 3.5 (E)(E)
2.5
70.0 STORAGE
FULLER ROAD
6.0 (E)
LIMIT OF WORKS
ROAD
25.0 TAPER
3.5 3.5 (E)(E)
LIMIT OF WORKS
N

PLOTTED BY : awhale ON 30-Aug-21 AT 2:45:30 PM

GTA consultants
NOW Stantec

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PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

DESIGNED A. WHALE	DESIGN CHECK H. GIRGIN
APPROVED BY H. GIRGIN	DATE ISSUED 30 AUGUST 2021

SCALE A3 0 10 20 1:1000
CAD FILE NO. V106370-SK01-P3.dgn

WONTHAGGI NORTH EAST PSP
HESLOP ROAD / FULLER ROAD
INTERSECTION 1
CONCEPT LAYOUT
DRAWING NO. V106370-SK01 ISSUE P3

NOTES

DESIGN SPEED: 80KM/H
POSTED SPEED: 80KM/H
DESIGN VEHICLE: 12.5m SU TRUCK
EXISTING ROAD RESERVE
PROPOSED ROAD RESERVE

LEGEND

EXISTING SERVICES

O/H ELECTRICITY
W WATER

HESLOP ROAD
ST CLAIRE BOULEVARD
LIMIT OF WORKS
80.0 DIVERGE
25.0 TAPER
75.0 STORAGE
15.0
10.0
3.5
2.5
5.0
1.5
1.8
3.0
2.1
6.0
N

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PRELIMINARY PLAN
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WARNING
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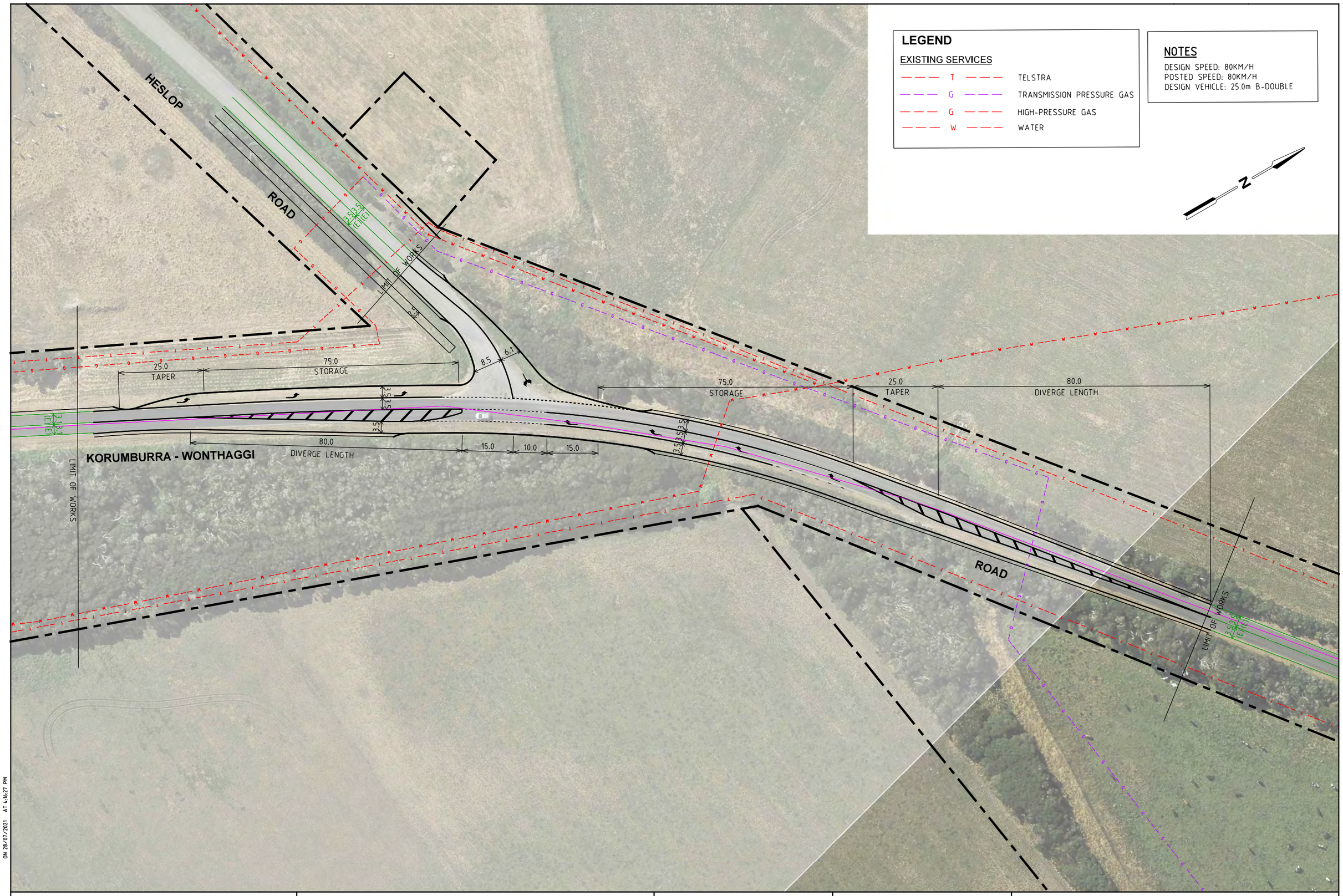
DESIGNED A. WHALE	DESIGN CHECK A. DELL'ISOLA
APPROVED BY A. FARRAN	DATE ISSUED 22 JULY 2021

SCALE A3 0 5 10 1:1000
CAD FILE NO. V106373-01-P2.dgn

WONTHAGGI NORTH EAST PSP
HESLOP ROAD / ST CLAIRE BOULEVARD
INTERSECTION 2
CONCEPT LAYOUT
DRAWING NO. V106373-01 ISSUE P2

PLOTTED BY : hangao ON 22/07/2021 AT 5:55:16 PM



LEGEND

EXISTING SERVICES

- T — TELSTRA
- G — TRANSMISSION PRESSURE GAS
- G — HIGH-PRESSURE GAS
- W — WATER

NOTES

DESIGN SPEED: 80KM/H
POSTED SPEED: 80KM/H
DESIGN VEHICLE: 25.0m B-DOUBLE

N

ON 28/07/2021 AT 4:16:27 PM

PLOTTED BY : hangao

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WARNING
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DESIGNED J.MAURO	DESIGN CHECK -
APPROVED BY H.GIRGIN	DATE ISSUED 28 JULY 2021

SCALE A3 — 0 10 20 — 1:1000

CAD FILE NO. V106370-SK04-P2.dgn

WONTHAGGI NORTH EAST PSP
HESLOP ROAD / KORUMBURRA - WONTHAGGI ROAD
INTERSECTION 3
CONCEPT LAYOUT

DRAWING NO. V106370-SK04 ISSUE P2

NOTES

DESIGN SPEED: 60KM/H SOUTH, EAST, WEST APPROACH
80KM/H NORTH APPROACH

POSTED SPEED: 60KM/H SOUTH, EAST, WEST APPROACH
80KM/H NORTH APPROACH

DESIGN VEHICLE: 25.0m B-DOUBLE

EXISTING PROPERTY BOUNDARIES

PROPOSED PROPERTY BOUNDARIES

ENTRY PATH RADII

70.0m CRITERION 2 SIGHT DISTANCE
(5s GAP ON ARTERIAL ROAD)

LEGEND

EXISTING SERVICES

O/H ELECTRICITY

T TELSTRA

G HIGH-PRESSURE GAS

W WATER

SAINT CLAIR ROAD

KORUMBURRA - WONTHAGGI

BOULEVARD

LIMIT OF WORKS

LAND ACQUISITION
A= 1170m sqr

LAND ACQUISITION
A= 1066m sqr

EXISTING WATER MAIN WILL BE RENEWED AT A LATER STAGE. ROAD AND INTERSECTION DESIGN WILL NEED TO BE COORDINATED WITH SOUTH GIPPSLAND WATER

R53.0 R52.2 R51.9 R4.0 R4.5 R200 R460

64.9 54.8 30.0 15.0 12.0 10.7 55.0 42.2 9.0 8.5

N

PLOTTED BY : awhale ON 27-Aug-21 AT 11:31:17 AM

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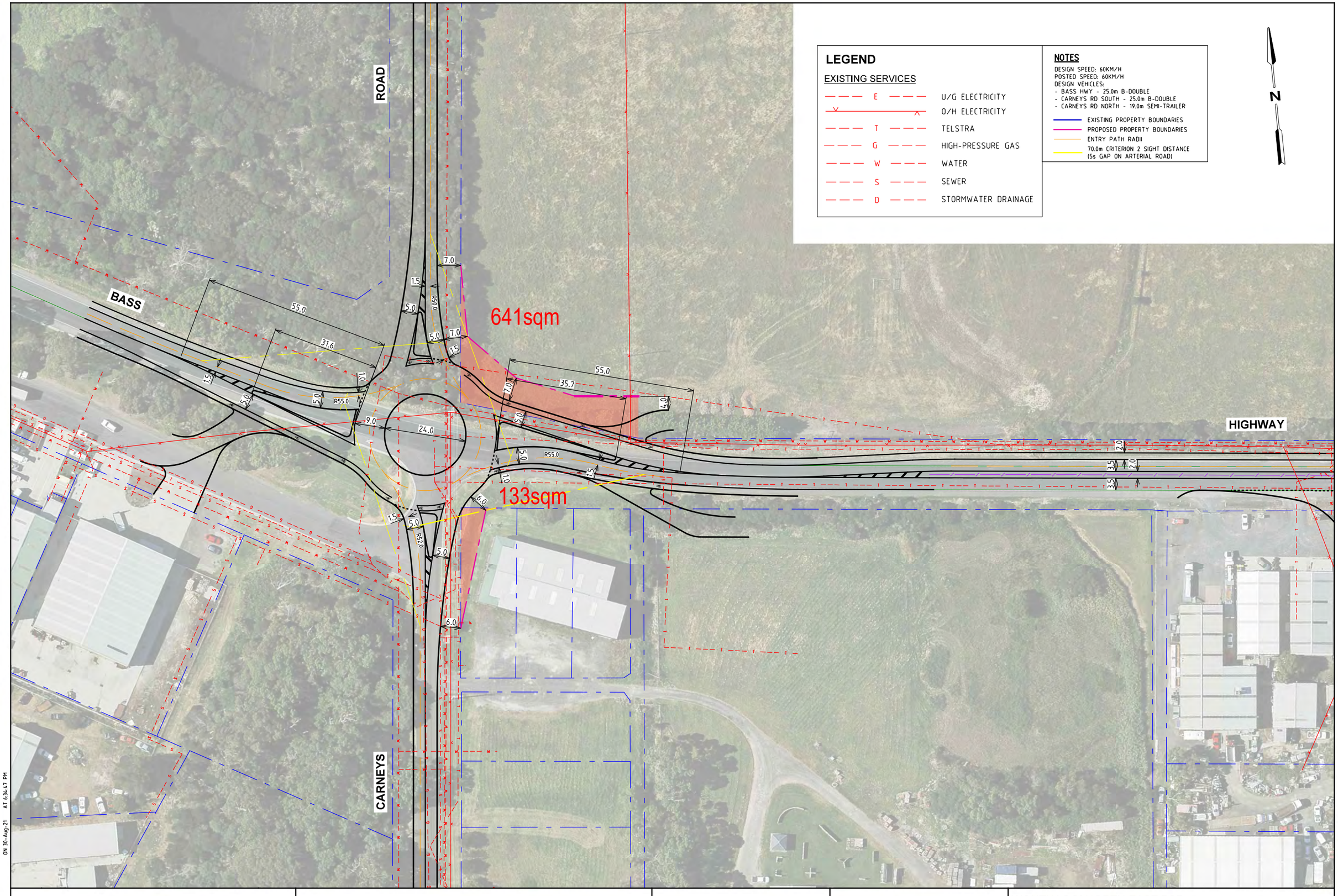
DESIGNED A. WHALE	DESIGN CHECK A. DELL'ISOLA
APPROVED BY A. FARRAN	DATE ISSUED 27 AUGUST 2021

SCALE A3 0 10 20 1:1000

CAD FILE NO. V106370-SK10-P5.dgn

WONTHAGGI NORTH EAST PSP
KORUMBURRA - WONTHAGGI RD / ST CLAIRE BLVD
INTERSECTION 4 - OPTION 2
CONCEPT LAYOUT

DRAWING NO. V106370-SK10 ISSUE P5



LEGEND

EXISTING SERVICES

- E — U/G ELECTRICITY
- O/H ELECTRICITY
- T — TELSTRA
- G — HIGH-PRESSURE GAS
- W — WATER
- S — SEWER
- D — STORMWATER DRAINAGE

NOTES

DESIGN SPEED: 60KM/H
POSTED SPEED: 60KM/H
DESIGN VEHICLES:
- BASS HWY - 25.0m B-DOUBLE
- CARNEYS RD SOUTH - 25.0m B-DOUBLE
- CARNEYS RD NORTH - 19.0m SEMI-TRAILER

- EXISTING PROPERTY BOUNDARIES
- PROPOSED PROPERTY BOUNDARIES
- ENTRY PATH RADII
- 70.0m CRITERION 2 SIGHT DISTANCE (5s GAP ON ARTERIAL ROAD)

N

ON 30-Aug-21 AT 6:34:47 PM
PLOTTED BY : awhale

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DESIGNED A. WHALE	DESIGN CHECK A. DELLISOLA
APPROVED BY A. FARRAN	DATE ISSUED 30 AUGUST 2021

SCALE A3 — 0 10 20 — 1:1000

CAD FILE NO. V106372-01-P7.dgn

WONTHAGGI NORTH EAST PSP
BASS HIGHWAY ROAD WIDENING
BASS HIGHWAY & CARNEYS ROAD PROPOSED ROUNDABOUT CONCEPT LAYOUT

DRAWING NO. V106370-01-01 SHEET 01 OF 03 ISSUE P7

LEGEND

EXISTING SERVICES

- E — U/G ELECTRICITY
- O/H ELECTRICITY
- T — TELSTRA
- W — WATER

NOTES

DESIGN SPEED: 60KM/H
POSTED SPEED: 60KM/H
DESIGN VEHICLES:
- BASS HWY - 25.0m B-DOUBLE
- JOHN ST SOUTH - 25.0m B-DOUBLE
- JOHN ST NORTH - 19.0m SEMI-TRAILER

- EXISTING PROPERTY BOUNDARIES
- PROPOSED PROPERTY BOUNDARIES
- ENTRY PATH RADII
- 70.0m CRITERION 2 SIGHT DISTANCE (5s GAP ON ARTERIAL ROAD)

N

382sqm
321sqm
224sqm
330sqm

BASS HIGHWAY
JOHN STREET
VERE STREET

55.0
30.0 STORAGE
25.0 TAPER
24.0
9.0
R50.8
R51.4
R50.0
R50.0

ON 30-Aug-21 AT 6:35:14 PM
PLOTTED BY : awhale

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WARNING
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DESIGNED A. WHALE
DESIGN CHECK A. DELLISOLA
APPROVED BY A. FARRAN
DATE ISSUED 30 AUGUST 2021

SCALE A3 0 10 20 1:1000
CAD FILE NO. V106372-01-P7.dgn

WONTHAGGI NORTH EAST PSP
BASS HIGHWAY ROAD WIDENING
BASS HIGHWAY & JOHN STREET - PROPOSED ROUNDABOUT CONCEPT LAYOUT
DRAWING NO. V106370-01-02 SHEET 02 OF 03 ISSUE P7

NOTES

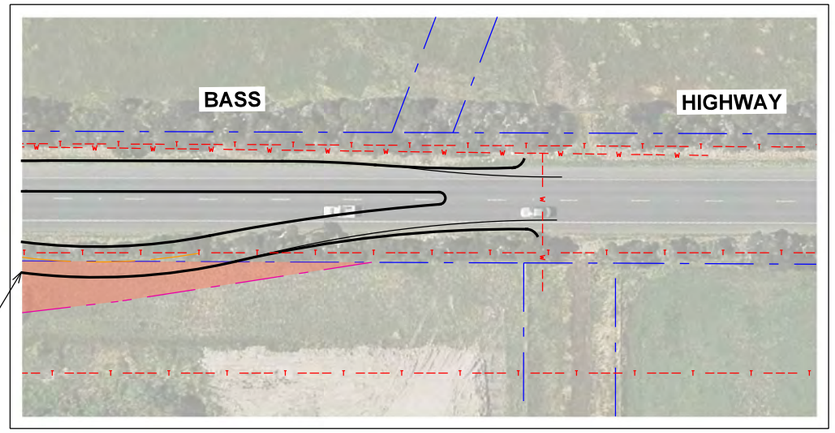
DESIGN SPEED:
- BASS HWY - 80KM/H
- ST CLAIRE BLVD - 60KM/H

POSTED SPEED:
- BASS HWY - 80KM/H
- ST CLAIRE BLVD - 60KM/H

DESIGN VEHICLE:
- BASS HWY - 25.0m B-DOUBLE
- ST CLAIRE BLVD - 19.0m SEMI-TRAILER

EXISTING PROPERTY BOUNDARIES
PROPOSED PROPERTY BOUNDARIES
ENTRY PATH RADII
70.0m CRITERION 2 SIGHT DISTANCE (5s GAP ON ARTERIAL ROAD)

N



INSET

FOR CONTINUATION REFER TO RIGHT OF PAGE

LEGEND

EXISTING SERVICES

- E — U/G ELECTRICITY
- O/H ELECTRICITY
- T — TELSTRA
- W — WATER

7.4 2 13.5 6.0 3.5 2.1 7.4

BOULEVARD

1551sqm

793sqm

BASS

HIGHWAY

2.0 3.5 2.0 3.5

918sqm

1509sqm

FOR CONTINUATION REFER TO INSET

CLAIR

7.4 2 13.5 6.0 3.5 2.1 7.4

SAINT

ON 30-Aug-21 A1 6.35:57 PM

PLOTTED BY : awhale

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PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING
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THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

DESIGNED B. KLINKO	DESIGN CHECK A. DELLISOLA
APPROVED BY A. FARRAN	DATE ISSUED 30 AUGUST 2021

SCALE A3 0 10 20 1:1000

CAD FILE NO. V106372-01-P7.dgn

WONTHAGGI NORTH EAST PSP
BASS HIGHWAY ROAD WIDENING
BASS HWY & ST CLAIRE BLVD - PROPOSED ROUNDABOUT CONCEPT LAYOUT

DRAWING NO. V106370-01-03 SHEET 03 OF 03 ISSUE P7

G. SERVICE & UTILITY CONSIDERATIONS

Stantec

Memo

To:	Andrew Farran Melbourne	From:	Ajanthan Pillai Melbourne
File:	V214020	Date:	October 15, 2021

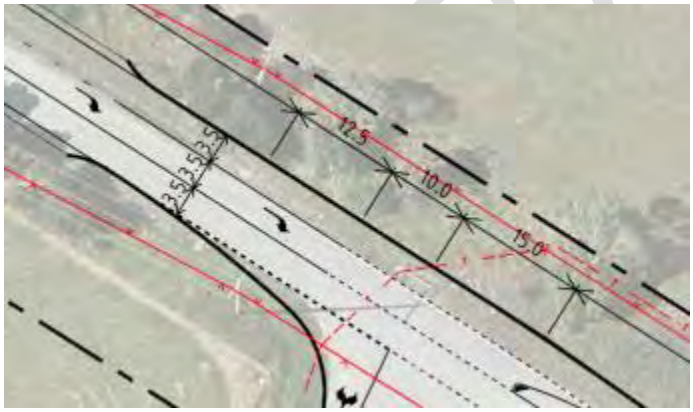
Reference: V214020

Existing utility services were investigated as part of the Safety Management Study. This investigation was not carried our previously and included part of high-level cost estimate.

It is noted that below utility services investigations are based on Dial Before You Dig (DBYD) information only. Further investigation needs to be carried out to confirm the exact location of the utility services by site visit and service proving for further accuracy. Again, the below findings are preliminary in nature based on DBYD information and authorities discussion thorough emails only.

INTERSECTION 01 (HESLOP ROAD/FULLER ROAD INTERSECTION, NORTH WONTHAGGI)

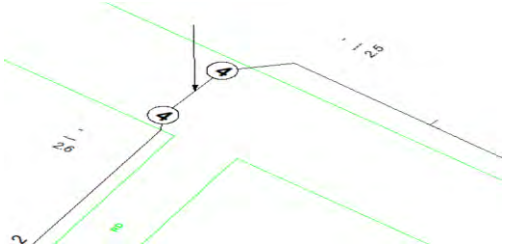
- **Electricity** – There are high voltage overhead electrical cable located either side of Heslop Road. There is an electrical pole located adjacent to proposed eastern approach left turn lane. Impact on this electrical pole may be avoided by relocating the proposed intersection towards north based on feature and level survey (next stage of investigation – during functional or detailed design). The potential relocation of the intersection was supported by South Gippsland Water as well.



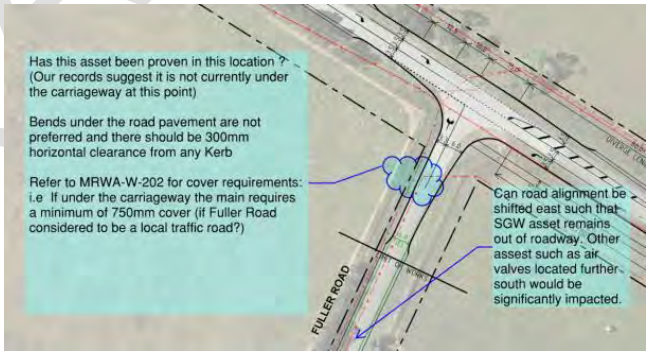
- **Gas** – No multinet underground gas pipe is located within the proximity of proposed intersection as per DBYD information.

- **Telstra** – There is a Telstra conduit located along northern side of Heslop Road and then cross the intersection at western side of intersection with two Telstra pits at either side of Heslop Road. Highly likely two of these Telstra pits need to be relocated as part of these road works and the Telstra conduits may need to be lowered or protected. There is copper cable within the Telstra conduit and transferred to NBN now.

Reference: V214020



- **Water** – 400mm diameter HDPE water main belongs to South Gippsland Water (SGW) is located at southern side of Heslop Road (most likely this water main is located along the property boundary and this need to be conformed on site via site inspection and /or service proving). Further, the continuation of this watermain is crossing fuller road at southern side of intersection with valves at either side of the road. The depth of water main is unknown at this stage and protection/ relocation may required as part of the road works. Further the proposed alignment along Fuller Road needs to be shifted towards eastern in order to avoid any impoact to the existing water main along western side of Fuller Road.
  Refer the text from SGW regarding this water main.
  "The 400 HDPE main along Fuller Rd and Heslops Rd is the "DP5 to Lance Creek Water Treatment Plant" pipeline and contains Desalinated water hence is known as the Desalination Line. Asset is typically 1.2m deep but need to be proven on site"

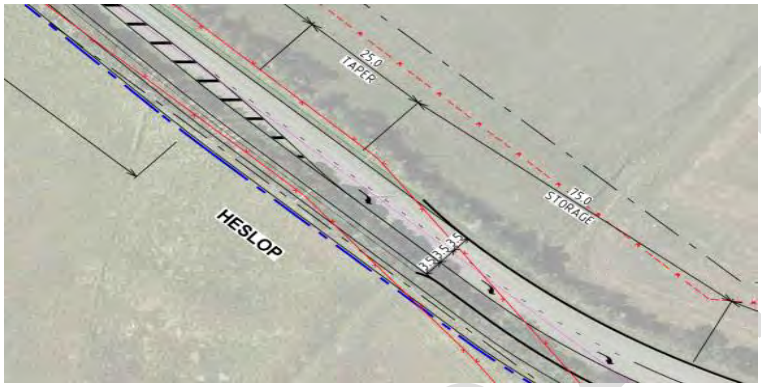


9.00	OTHER		
9.01	Telstra services relocation/ Protection works	$25,000.00	*This is a broad level estimate only - email confirmation*
9.02	NBN services relocation/Protection works	$30,000.00	*This is a broad level estimate only - email confirmation*
9.03	*Gas services relocation/Protection works*	$ -	
9.04	*Water and Sewer services relocation/Protection works*	*$50,000.00*	*This is a broad level estimate only - email confirmation*
9.05	*Electrical services relocation/Protection works*	$ -	

Reference: V214020

INTERSECTION 02 (HESLOP ROAD/ ST CLAIRE BLVD INTERSECTION, NORTH WONTHAGGI)

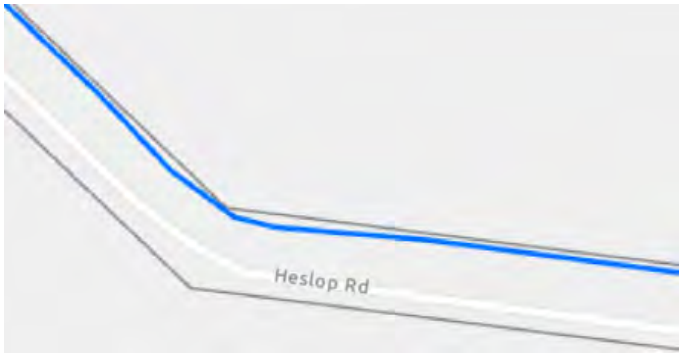
- **Electricity** – There are high voltage overhead electrical cable located at either side of Heslop Road and crossing the road just before proposed ST Claire Blvd. There is an electrical pole located adjacent to proposed footpath and through lane at southern side of Heslop Road. Impact on this electrical pole may be avoided by relocating the proposed through lane towards north or footpath to southern side of Heslop Road based on feature and level survey (next stage of investigation – during functional or detailed design).



- **Gas** – No multinet underground gas pipe is located within the proximity of proposed intersection as per DBYD information.

- **Telstra** - No Telstra or any other communication services are located within the proximity of proposed intersection as per DBYD information.

- **Water** – 400mm diameter HDPE water main belongs to South Gippsland Water (SGW) is located at northern side of Heslop Road (most likely this water main is located along the property boundary and this need to be confirmed on site via site inspection and /or service proving). No impact is expected due to proposed intersection works subject to watermain location as per the DBYD information.
  Refer the text from SGW regarding this water main.
  "The 400 HDPE main along Fuller Rd and Heslops Rd is the "DP5 to Lance Creek Water Treatment Plant" pipeline and contains Desalinated water hence is known as the Desalination Line. Asset is typically 1.2m deep but need to be proven on site"



Reference: V214020

INTERSECTION 03 (KORUMBURRA WONTHAGGI ROAD/HESLOP ROAD INTERSECTION, ST CLAIRE)

- **Electricity** – No electricity overhead cable or underground conduits are located within the proximity of proposed intersection as per DBYD information.

- **Gas** – There is a 150mm diameter gas transfer main (Transmission Pressure) is located along southern side of Korumburra Wonthaggi Road then cross the road towards northern to reach the gas transfer station (840-DW-PN-003). This is the significant assets belongs to Multinet gas. The 150mm diameter gas distribution main (High Pressure main) is crossing Heslop Road towards south and running along western side of Korumburra Wonthaggi Road. It is recommended to carry out the site visit in order to see the preliminary impact of this asset due to proposed intersection.

  Working within the vicinity of gas transfer main is provided below.

No excavations within 3 metres of this asset are permitted without the prior approval of Pipelines Security – (refer to contact details in Cover Letter)

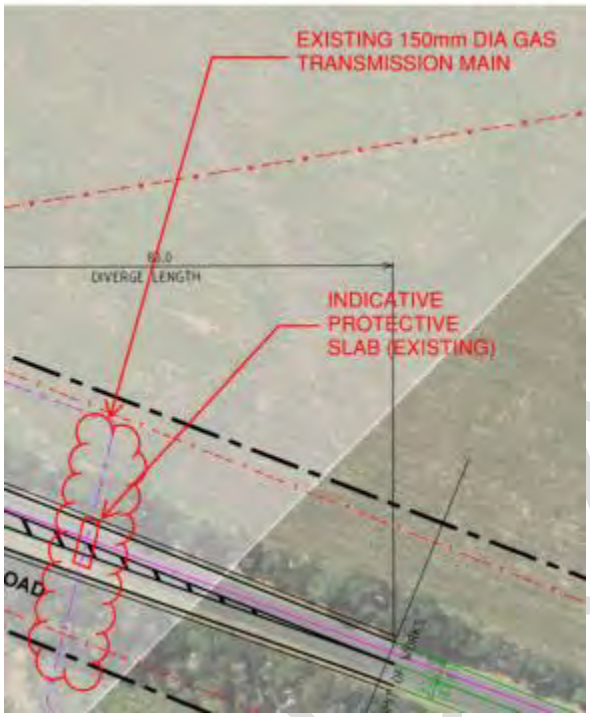
MINIMUM GAS TRANSMISSION CLEARANCES:

- **300mm** from the top of the pipeline to the underside of road pavement boxing.
- **1.0 metre** between all underground electrical cables, either crossing or parallel to gas transmission pipelines.
- **300mm** between the pipeline and any installation up to 1.5 metres wide which is crossing the pipeline.
- **500mm** between the pipeline and any installation over 1.5 metres wide which is crossing the pipeline.
- **500mm** between the pipeline and an installation laid parallel to the pipeline.
- **1.0 metre** between all gas transmission pipelines and earthing stakes.
- **3 metres** between the pipeline and an installation that could add excessive loads to the pipeline.
- **3 metres** between the pipeline and an installation that could require underpinning should the need to expose the pipeline arise.

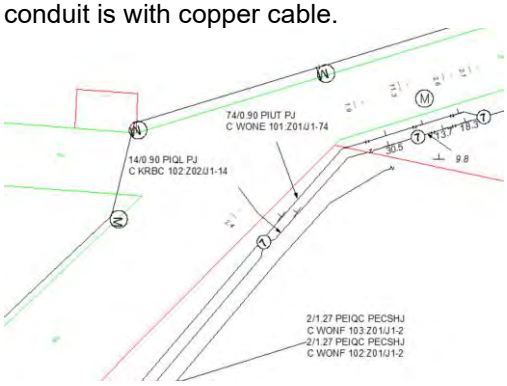
Service proving results of the gas transfer main as per below.

Name	UTILITY	Position X	Position Y	Elevation	Top of Service RL	DEPTH	NOTE
ph1	GAS	379816.102	5728589.226	14.536	12.726	1.81	200mm s
ph2.1	GAS	379820.447	5728591.856	14.513	13.413	1.1	conc cover slab unable to expose top of asset

ph2.2	GAS	379820.881	5728591.114	14.534	13.434	1.1	conc cover slab unable to expose top of asset
ph3	GAS	379827.549	5728594.068	14.467	12.327	2.14	200mm s
ph4	GAS	379831.888	5728596.036	14.528	12.548	1.98	200mm s

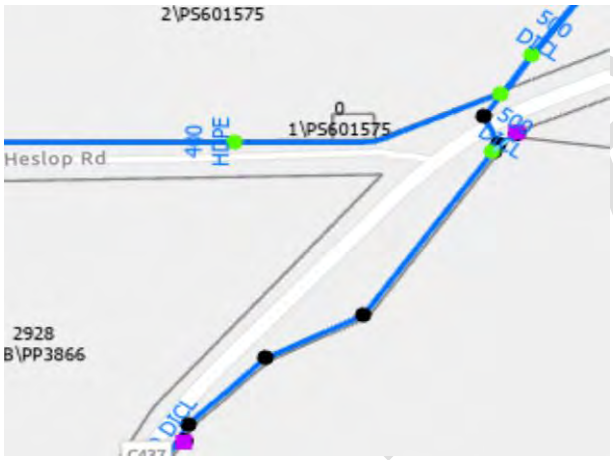


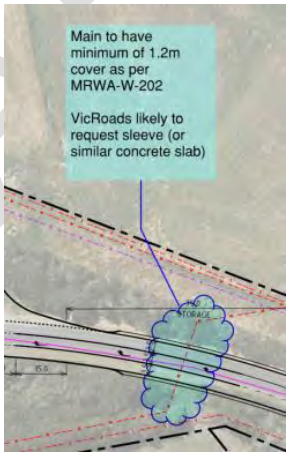
- **Telstra** – There is a Telstra services along northern and southern side of Korumburra Wonthaggi Road and across Heslop Road with marker post either side. Highly likely these conduits are located along property boundary and need to be confirmed on site. Depth of Telstra conduit crossing across Heslop Road is unknown and this may need to be lowered or protected during construction depends on the location, proposed pavement composition and depth. All of the cables are optic fibre except eastern side conduit is with copper cable.



- **Water** – 400mm diameter HDPE water main belongs to South Gippsland Water (SGW) is located at northern side of Heslop Road (most likely this water main is located along the property boundary and this need to be conformed on site via site inspection and /or service proving). No impact is expected due to proposed intersection works subject to watermain location.
  Refer the text from SGW regarding this water main.
  "The 400 HDPE main along Fuller Rd and Heslop Rd is the "DP5 to Lance Creek Water Treatment Plant" pipeline and contains Desalinated water hence is known as the Desalination Line. Asset is typically 1.2m deep but need to be proven on site"

  500mm diameter DICL is located along southern side of Korumburra Wonthaggi Road with crossing just north of intersection. This is a distribution a main as per the text from SGW. The depth of this water main crossing needs to be investigated further in order to decide the protection measures as much as possible.
  Refer the text from SGW regarding this water main.
  The 500 DICL main along Korumburra – Wonthaggi Rd is the "Wonthaggi Distribution Main" and contains potable water supplied from the Lance Creek Water Treatment Plant. VPA consultants have recently performed depth confirmation of this main at various locations





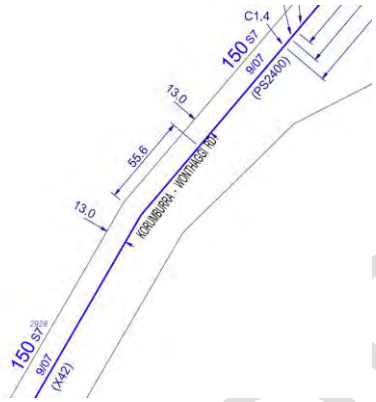
9.00	OTHER		
9.01	Telstra services relocation/ Protection works	$ 500,000.00	*This is a broad level estimate only - email confirmation*
9.02	NBN services relocation/Protection works	$ 50,000.00	*This is a broad level estimate only - email confirmation*
9.03	Gas services relocation/Protection works	$ 80,000.00	*Email confirmation from Multinet and gas main crossing need to be protected*
9.04	Water and Sewer services relocation/Protection works	$ 50,000.00	*Email confirmation - no impact on existing water asset but protection need to be provided*

Reference: V214020

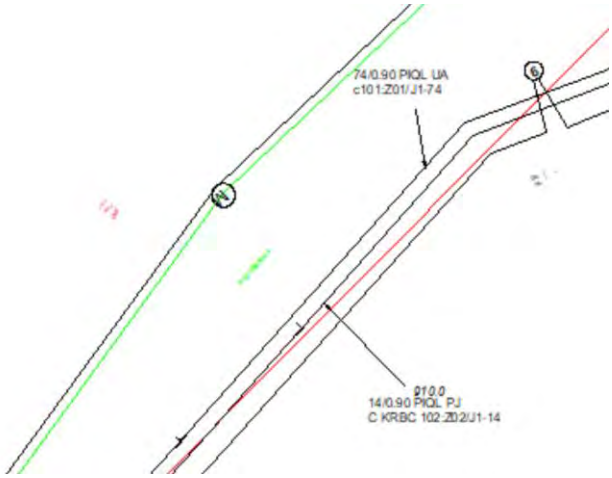
INTERSECTION 04 (KORUMBURRA WONTHAGGI ROAD/ SAINT CLAIRE BOULEVARD INTERSECTION, ST CLAIR)

- **Electricity** – No electricity overhead cable or underground conduits are located within the proximity of proposed intersection as per DBYD information. There is an overhead electrical cable located further south of proposed intersection and this won't have any impact on proposed concept design (current format).

- **Gas** – 150mm diameter multinet underground gas main (high pressure distribution main) is located at northern side of Korumburra Wonthaggi Road within the proximity of proposed intersection as per DBYD information. This gas main may impact due proposed Saint Claire Boulevard connection depend on the depth and location and need to be investigated on site.

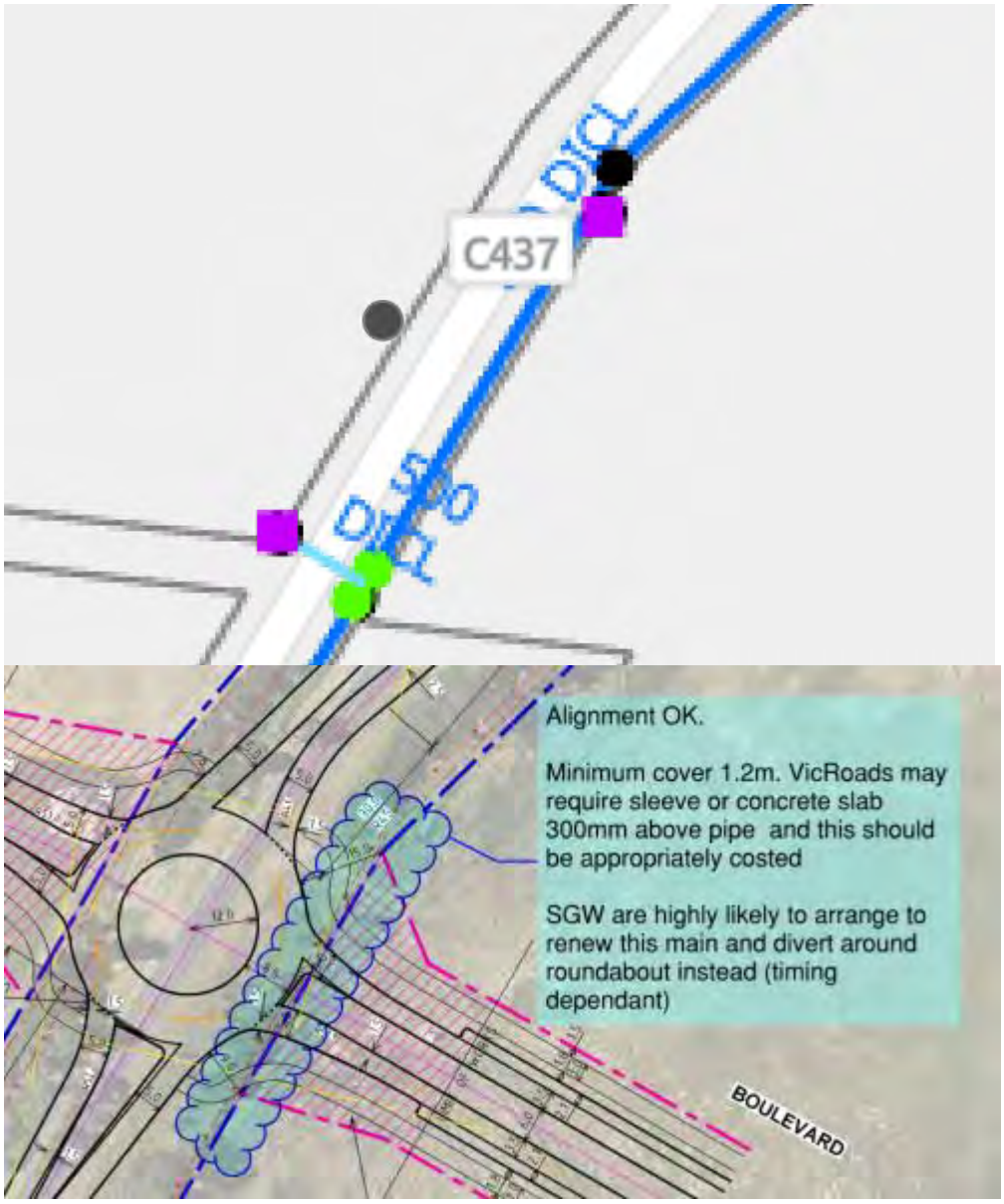


- **Telstra** – There is a Telstra services along northern and southern side of Korumburra Wonthaggi Road as per DBYD information. These Telstra assets may impact due proposed Saint Claire Boulevard connection depend on the depth and location and need to be investigated on site. Western side conduit is with optic fibre cable and eastern side conduit is with copper cable.



Reference: V214020

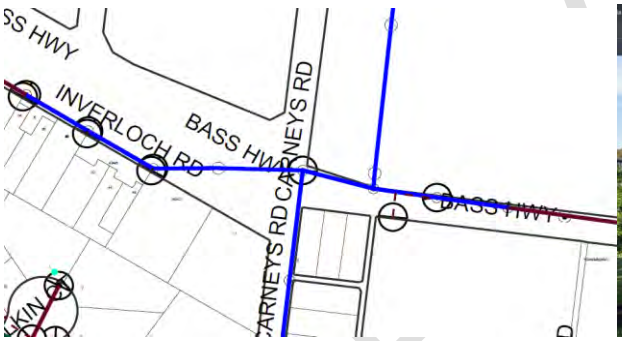
- **Water** – 500mm diameter DICL is located along southern side of Korumburra Wonthaggi Road. This is a distribution a main as per the text from SGW. The location and depth of this water main needs to be investigated further in order to decide the protection measures as much as possible.
  Refer the text from SGW regarding this water main.
  The 500 DICL main along Korumburra – Wonthaggi Rd is the "Wonthaggi Distribution Main" and contains potable water supplied from the Lance Creek Water Treatment Plant. VPA consultants have recently performed depth confirmation of this main at various locations



9.00	OTHER		
9.01	*Telstra services relocation/ Protection works*	*$450,000.00*	*This is a broad level estimate only - email confirmation*
9.02	*NBN services relocation/Protection works*	*$50,000.00*	*This is a broad level estimate only - email confirmation*
9.03	*Gas services relocation/Protection works*	*$50,000.00*	*Authority confirmation required*
9.04	*Water and Sewer services relocation/Protection works*	*$50,000.00*	*This is a broad level estimate only, subject to verification by authority. SGW are highly likely to arrange to renew this main and divert around roundabout instead (timing dependent)*

INTERSECTION 05 (BASS HIGHWAY/ CARNEYS ROAD INTERSECTION, WONTHAGGI)

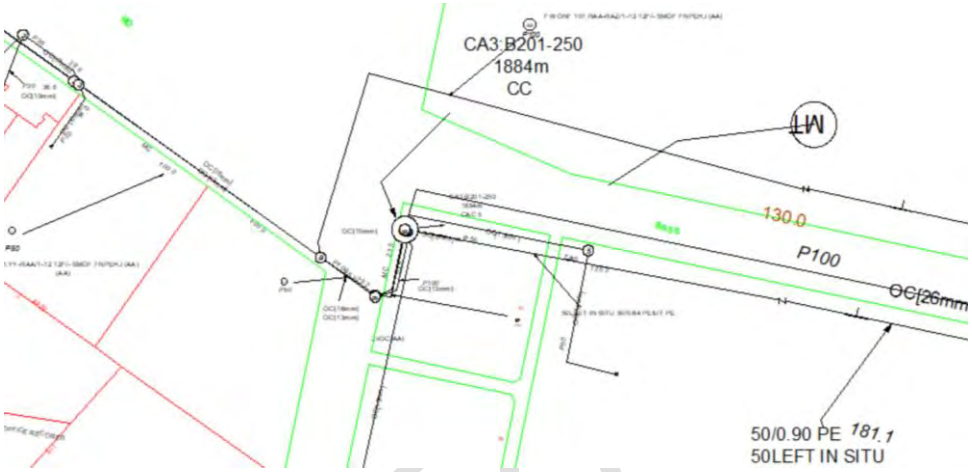
- **Electricity** – There are high voltage overhead electrical cable located at northern side of Bass Highway. The two of the electrical poles located at northern side of intersection need to be relocated based on the proposed intersection works.



- **Gas** – There is a 63mm diameter P8 multinet underground gas main is located along southern side of Bass Highway and eastern side of Carneys Road as per DBYD information. Proposed intersection works will have minimal impact on this gas main. The location and depth of this gas main across Carney Road needs to be investigated further in order to decide the protection measures as much as possible.

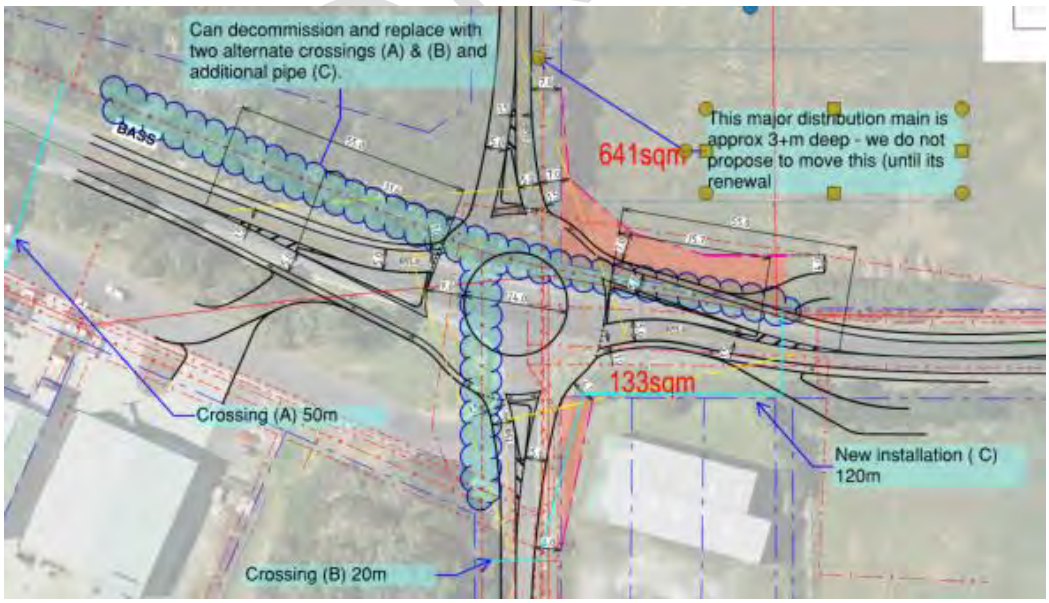
Reference: V214020

Telstra – There are multiple Telstra services located within the intersection mainly both side of Bass Highway (Eastern side of intersection) as per DBYD information. Further, there is another Telstra services located southern side of Bass Highway at western side of intersection. Some of these Telstra services will be impacted due to proposed intersections works. The location of the Telstra services and depth need to be investigated further in order to understand the exact impact and mitigation works. Optic fibre crossing is on the North side of the road that turns and runs to the South. Copper cables are on the Southeast corner of the Bass Hwy and Carneys Rd.



- **NBN** – NBN service is also located similar to Telstra as per above. Mostly Telstra and NBN services will be located within the shared conduit. The further investigation needs to be carried out in order confirm the relationship with Telstra services and exact alignment and depth to assess the impact due to proposed intersection.

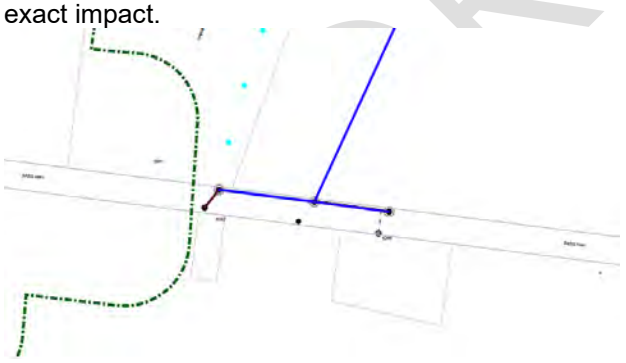
- **Water** – 100mm diameter CICL water main belongs to South Gippsland Water (SGW) is located Northern side of Bass Highway. Carneys Road contain 100mm diameter PVC water main at western side and 100mm diameter AC and 200mm diameter AC at eastern side as per the DBYD information. These pipe and pits may be impacted due to proposed intersection works. The further investigation needs to be carried out to find the exact alignment and depth then assess the impact due to proposed intersection.



9.00	**OTHER**		
9.01	*Telstra services relocation/ Protection works*	*$ 500,000.00*	*This is a broad level estimate only - email confirmation*
9.02	*NBN services relocation/Protection works*	*$ 150,000.00*	*This is a broad level estimate only - email confirmation*
9.03	*Gas services relocation/Protection works*	*$ 100,000.00*	*This is a broad level estimate only, subject to verification by authority*
9.04	*Water and Sewer services relocation/Protection works*	*$ 100,000.00*	*Email confirmation*
9.05	*Electrical services relocation/Protection works*	*$ 250,000.00*	*Verbal confirmation for full works only*

INTERSECTION 06 (BASS HIGHWAY/ SAINT CLAIR BLVD INTERSECTION, WONTHAGGI)

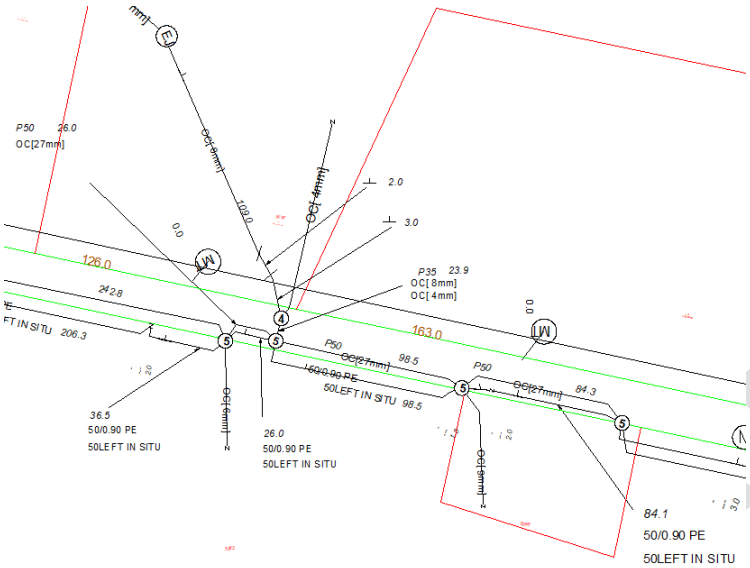
- **Electricity** – There are high voltage overhead electrical cable located northern side of Bass Highway as per the DBYD information. One or two electrical poles need to be relocated or underground the cables due to proposed roundabout works. Further investigation needs to be carried out in order to assess he exact impact.



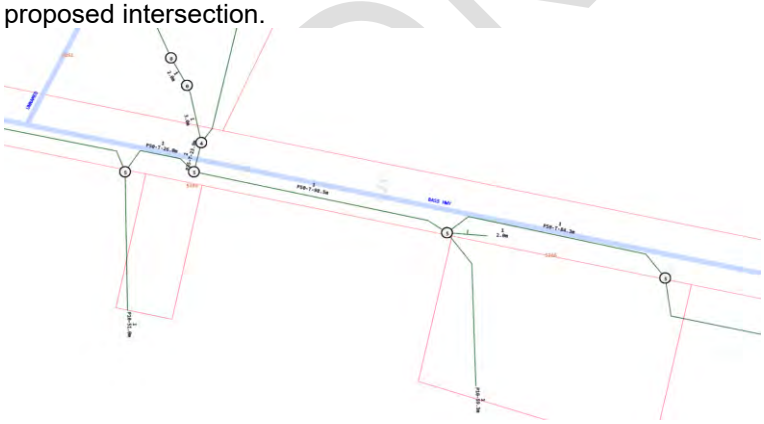
- **Gas** – No multinet underground gas pipe is located within the proximity of proposed intersection as per DBYD information.

- **Telstra** - There are multiple Telstra services with pits located within the intersection at both side of Bass Highway as per DBYD information. Some of the pits and services conduits may need to be relocated as part of the proposed roundabout works. The further investigation needs to be carried out to find the exact alignment then assess the impact due to proposed intersection.

Reference: V214020



- **NBN** – NBN service is also located similar to Telstra as per above. Mostly Telstra and NBN services will be located within the shared conduit. The further investigation needs to be carried out in order confirm the relationship with Telstra services and exact alignment and depth to assess the impact due to proposed intersection.



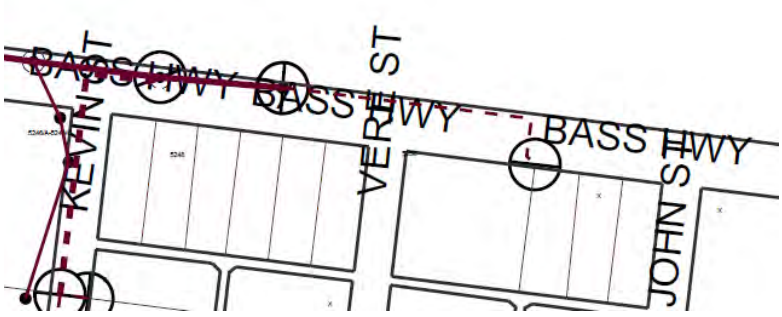
- **Water** – 100mm diameter PVC water main belongs to South Gippsland Water (SGW) is located northern side of Bass Highway (most likely this water main is located along the property boundary and this need to be conformed on site via site inspection and /or service proving). No major impact is expected due to proposed intersection works subject to watermain location.

Reference: V214020

9.00	OTHER		
9.01	*Telstra services relocation/ Protection works*	*$ 500,000.00*	*This is a broad level estimate only - email confirmation*
9.02	*NBN services relocation/Protection works*	*$ 50,000.00*	*This is a broad level estimate only - email confirmation*
9.03	*Water and Sewer services relocation/Protection works*	*$100,000.00*	*High-level estimate only*
9.04	*Electrical services relocation/Protection works*	*$ 180,000.00*	*Verbal confirmation for full works only*

INTERSECTION 08 (BASS HIGHWAY/ JOHN STREET INTERSECTION, WONTHAGGI)

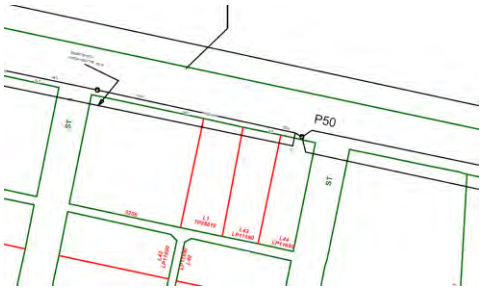
- **Electricity** – There is low voltage underground electrical cable located at northern side of Bass Highway just eastern side of proposed roundabout as per DBYD information. This may need o be relocated or lowered within part of intersection works.



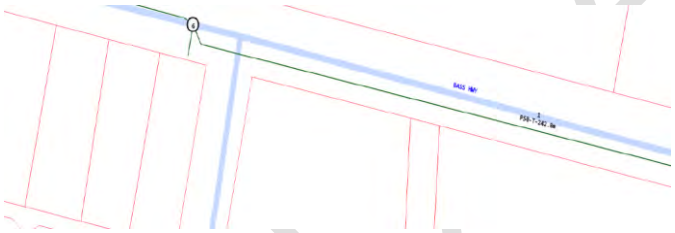
- **Gas** – No multinet underground gas pipe is located within the proximity of proposed intersection as per DBYD information.

Reference: V214020

- **Telstra** - There are multiple Telstra services with pits located within the intersection at both side of Bass Highway as per DBYD information. Some of the pits and services conduits may need to be relocated as part of the proposed roundabout works. The further investigation needs to be carried out to find the exact alignment then assess the impact due to proposed intersection.

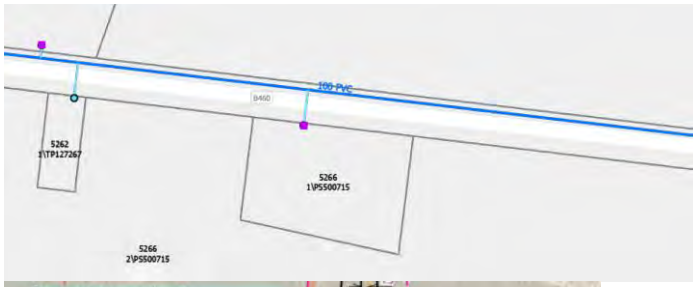


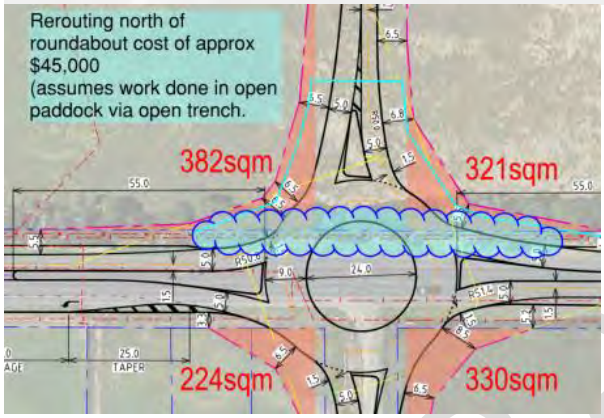
- **NBN** – NBN service is also located similar to Telstra as per above. Mostly Telstra and NBN services will be located within the shared conduit. The further investigation needs to be carried out in order confirm the relationship with Telstra services and exact alignment and depth to assess the impact due to proposed intersection.



- **Water** – 100mm diameter PVC water main belongs to South Gippsland Water (SGW) is located northern side of Bass Highway as per the DBYD information. No major impact is expected due to proposed intersection works subject to watermain location.

Reference: V214020





9.00	**OTHER**		
9.01	*Telstra services relocation/ Protection works*	*$ 450,000.00*	*This is a broad level estimate only - email confirmation*
9.02	*NBN services relocation/Protection works*	*$50,000.00*	*This is a broad level estimate only - email confirmation*
9.03	*Water and Sewer services relocation/Protection works*	*$ 50,000.00*	*Email confirmation*

Naturally, should you have any questions or require any further information, please do not hesitate to contact me on (03) 9851 9600.

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Associate

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