TraffixGroup
Traffic Engineers and Transport Planners

Traffix Group Pty Ltd
ABN 32 100 481 570

Address
Suite 8, 431 Burke Road
Glen Iris Victoria 3146

Contact
Telephone 03 9822 2888
Facsimile 03 9822 7444
admin@traffixgroup.com.au
www.traffixgroup.com.au

BROMPTON LODGE, CRANBOURNE

PRECINCT STRUCTURE PLAN

TRAFFIC ENGINEERING ASSESSMENT

PREPARED FOR

WOLFDENE PTY LTD

TRAFFIC ENGINEERING ASSESSMENT

PRECINCT STRUCTURE PLAN

AT

BROMPTON LODGE, CRANBOURNE

Document Control:

Issue No.	Type	Date	Prepared By	Approved By
A	Initial Draft	12/03/2013	A Liang	R Thomson
B	Draft Final	30/04/2013	A Liang	R Thomson
C	Final (Submitted to VicRoads)	27/08/2013	A Liang	R Thomson
D	Final (Amended to address VicRoads comments)	07/03/2014	A Liang	R Thomson
E	Final (Amended to incorporate SEGCTM)	26/05/2014	A Liang	R Thomson
F	Final (Amended development plan)	10/06/2014	A Liang	R Thomson

Our Reference: G14772-01F

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

1. INTRODUCTION

Traffix Group has been engaged by Watsons Pty Ltd on behalf of Wolfdene Pty Ltd to provide traffic engineering assistance for the development of a Precinct Structure Plan (PSP) for the Brompton Lodge site at 1050 Western Port Highway in Cranbourne.

This report includes a detailed assessment of traffic generation and distribution for three critical stages of the proposed development at Brompton Lodge and a discussion of the proposed access arrangements and internal road network.

2. BACKGROUND

2.1. LOGICAL INCLUSIONS

In 2009, the Logical Inclusions Advisory Committee was established to review land to be incorporated into the State Government's Urban Growth Boundary (UGB). The purpose of the UGB is to set a clear boundary for the outward development of metropolitan Melbourne. With the support of the Metropolitan Planning Authority (MPA) and City of Casey, the Brompton Lodge site[1] – a triangular block of land bounded by Western Port Highway, Cranbourne-Frankston Road and Ballarto Road reservation – was formally included into the UGB for future development as part of the review process.

2.2. PSP PROCESS

The inclusion of Brompton Lodge into the UGB enabled the land to be developed through a Precinct Structure Plan (PSP). The PSP is a structured process to develop the road network, housing, employment and services for future communities in the area. As part of the PSP process for Brompton Lodge, Traffix Group has been engaged to provide detailed assessments of traffic impacts onto the surrounding external road network following development of the site.

2.3. WESTERN PORT HIGHWAY PROJECT

VicRoads are in the process of planning the upgrade of the Western Port Highway to a freeway standard. The preferred alignment has been developed after consultation with community stakeholders and land is in the process of being reserved in the Planning Scheme for the upgrade. The preferred alignment includes an overpass of Western Port Highway at Ballarto Road with no direct connection between the two roads and a full diamond interchange at Cranbourne-Frankston Road. The Western Port Highway upgrade allows for Ballarto Road to be extended to the east to connect to Cranbourne-Frankston Road.

As part of the Western Port Highway upgrade, VicRoads had undertaken modelling to predict future traffic volumes on a number of arterial roads and major local roads in the vicinity of the Brompton Lodge site including Western Port Highway, Cranbourne-Frankston Road, Ballarto Road and Pearcedale Road.

[1] Known as 'Casey Area 1' in the Logical Inclusions Advisory Committee *Report No. 2: South East Growth Area* published on 11 November 2011

2.4. TRAFFIC VOLUMES

Modelling for future traffic volumes in the surrounding road network has been sourced from the Melbourne Planning Authority (MPA) as follows:

- Future volumes for 2046 based on the South East Growth Corridor Traffic Model (SEGCTM).

In addition, the following existing traffic data has also been obtained:

- Traffic volumes from City of Casey of 12 hour turning movement counts between 7am-7pm at the Ballarto Road/Western Port Highway intersection undertaken on 1 April 2009.
- Through traffic volumes from VicRoads on Western Port Highway, Cranbourne-Frankston Road, Ballarto Road, Pearcedale Road and Woodlands Road for 2011.

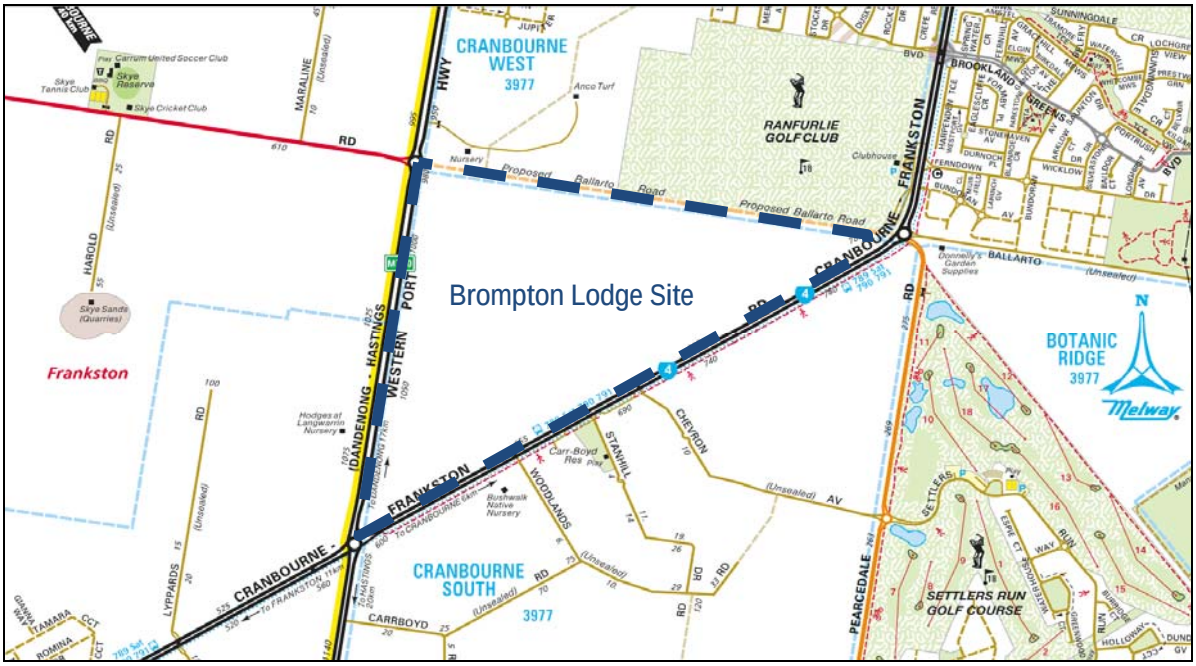
For the purposes of this assessment, the following annual growth rates had been applied to the abovementioned existing traffic data to estimate existing volumes for 2014 (used for assessing the 2014 interim stage):

- Western Port Highway – 5%
- Cranbourne-Frankston Road west of Western Port Highway – 4%
- Cranbourne-Frankston Road between Western Port Highway & Pearcedale Road – 3%
- Cranbourne-Frankston Road east of Pearcedale Road – 4%
- Ballarto Road west of Western Port Highway – 2%
- Pearcedale Road south of Cranbourne-Frankston Road – 5%

3. EXISTING CONDITIONS

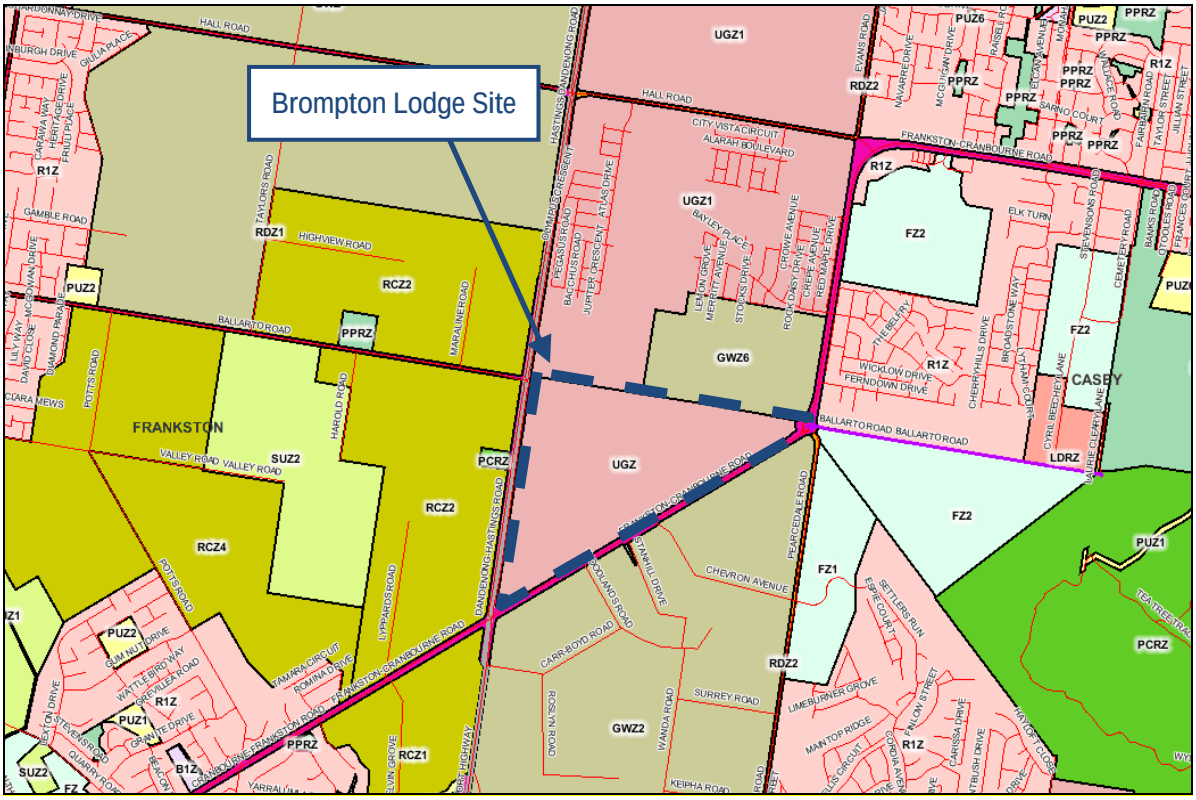
The Brompton Lodge site is triangular in shape (encompassing an area approximately 103.5ha) and is bounded by Cranbourne-Frankston Road to the southeast, Western Port Highway to the west, and the unused Ballarto Road reservation to the north. A locality map of the site is shown at Figure 1.

The site is located entirely within an Urban Growth Zone as shown in the Casey Planning Scheme at Figure 2. Planning zones in the site's greater surroundings include Urban Growth Zone to the north, Residential Zone to the west and east, and Green Wedge Zone to the south. Significant land uses within the vicinity of the site include a number of golf courses to the north and east, and the Royal Botanic Gardens Cranbourne to the east which also has an access onto Ballarto Road.



Reproduced with permission from Melway Publishing Pty Ltd

Figure 1: Locality Map



Source: Planning Maps Online, DPCD

Figure 2: Planning Zone Map

3.1. ROAD NETWORK

Western Port Highway (also known as Dandenong-Hastings Road) is an arterial road under the jurisdiction of VicRoads that spans in a north-south direction between the South Gippsland Highway and Frankston-Flinders Road. Within the vicinity of the subject site it consists of a four lane carriageway separated by a central median.

Cranbourne-Frankston Road is an arterial road under the jurisdiction of VicRoads that spans in an east-west direction between Monahans Road to McMahons Road. Within the vicinity of the subject site it consists of a four lane carriageway separated by a central median.

Ballarto Road is an arterial road under the jurisdiction of VicRoads that spans in an east-west direction between Western Port Highway and Dandenong-Frankston Road. An unsealed section of Ballarto Road continues eastward from Cranbourne-Frankston Road to the Royal Botanic Gardens Cranbourne, with a gap between Western Port Highway and Cranbourne-Frankston Road separating the two sections. The section to the west of Western Port Highway consists of a single carriageway (with one lane in each direction).

Pearcedale Road is a major Council road that spans in a north-south direction between Cranbourne-Frankston Road and Baxter-Tooradin Road. Within the vicinity of the subject site it consists of a two lane carriageway.

Woodlands Road is a local Council road that spans in a north-south direction between Cranbourne-Frankston Road to a dead end approximately 150m east of Stanhill Drive. Within the vicinity of the subject site it consists of a single carriageway accommodating traffic in both directions.

Chevron Avenue is a local Council road that spans in an east-west direction between Pearcedale Road and Cranbourne-Frankston Road. Within the vicinity of the subject site it consists of a single carriageway accommodating traffic in both directions.

4. PROPOSAL

A PSP is being developed for the Brompton Lodge site to facilitate residential development and a Neighbourhood Activity Centre (NAC).

The PSP takes into account the proposed upgrade of the Western Port Highway including the grade separation and removal of the existing intersection at Ballarto Road, and the eastern extension of Ballarto Road to connect to Cranbourne-Frankston Road.

The ultimate yield for the Precinct Structure Plan is in the order of 1,500 lots and a Neighbourhood Activity Centre (NAC) with an area of 8,300m^2. Development plans provided by Wolfdene are attached at Appendix A.

4.1. VEHICLE ACCESSIBILITY

The proposed access arrangements for the site includes two signalised access points (termed in this report as 'Western Signals' and 'Eastern Signals') to Cranbourne-Frankston Road on the southern boundary of the site, and two unsignalised access points to the future Ballarto Road extension on the northern boundary of the site (termed in this report as 'Western Ballarto Access' and 'Eastern Ballarto Access').

It is understood that Council intend to construct the missing section of Ballarto Road between Western Port Highway and Cranbourne-Frankston Road as an ultimate dual carriageway road, and that the southern carriageway is to be constructed as part of the Brompton Lodge development. Residential lots that form part of the development site are proposed to have direct frontage to this road.

The 'Western Signals' access to Cranbourne-Frankston Road comprises of a cross intersection with Woodlands Road approximately 600m east of Western Port Highway. The 'Eastern Signals' access comprises of a T-intersection and is located approximately 670m east of Woodlands Street and 800m west of the existing roundabout at Pearcedale Road. The proposed NAC is to be located adjacent to the 'Eastern Signals'.

The 'Western Ballarto Access' is proposed to ultimately form a cross intersection linking into the north-south connector road of the future Cranbourne West development area to the north. This intersection would ultimately be signalised in the event that Ballarto Road ultimately becomes a four lane arterial road. The 'Eastern Ballarto Access' is proposed to remain an unsignalised T-intersection.

4.2. STAGING AND ACCESS

The PSP is proposed to be delivered in 20 stages commencing at the northwest corner of the site with each stage comprising the development of between 30 to 120 residential lots. For the initial stages the upgrade of Western Port Highway is unlikely to have commenced and it is proposed to construct a temporary access to form the east leg of the existing Western Port Highway/Ballarto Road roundabout. For traffic safety reasons, it is understood that the Metropolitan Planning Authority (MPA) considers a 300 dwelling limit to be appropriate for estates that only use one vehicle access point connecting to the external road network. Only one vehicle access point to the external road network is proposed for the initial stages of the Brompton Lodge development. For the purposes of this assessment we have considered the initial stages to accommodate 270 dwellings (representing full development of the first five stages), which falls within the 300 dwelling limit advocated by the MPA.

Following completion of these initial stages, it is proposed to construct the 'Western Signals' to the site from Cranbourne-Frankston Road forming a signalised cross intersection at Woodlands Avenue. These two access points will work in tandem until the 'Eastern Signals' are constructed or until the Western Port Highway upgrade occurs when the Ballarto Road connection to Western Port Highway is removed.

The construction of the full length of Ballarto Road would coincide with the final stage of development and as lots are developed fronting this road.

5. TRAFFIC IMPACT

5.1. TRAFFIC GENERATION AND DISTRIBUTION

The following section details the traffic generation and traffic distribution methodology and assumptions adopted for the intersection capacity analysis presented in Section 5.2.

5.1.1. Traffic Generation

Residential

A conservative assumption for the total number of daily vehicle movements per residential lot for outer metropolitan residential developments is 10 vehicle movements per lot. Following completion of the NAC, it is anticipated that 15% of these trips will be internal trips as the destination for these trips will be to services that are already provided for within the NAC. Traffic generated from the residential lots at each of the three scenarios is shown at Table 1.

Table 1: Residential Generated Traffic

	Scenario	Total	Internal	External
Daily Volume	Interim	2,700	0	2,700
	Intermediate	10,700	0	10,700
	Ultimate	15,000	2,250	12,750
Peak Hour Volume	Interim	270	0	270
	Intermediate	1,070	0	1,070
	Ultimate	1,500	225	1,275

Neighbourhood Activity Centre (NAC)

For the purposes of predicting traffic generation associated with the NAC, the *RTA Guide to Traffic Generating Developments* (the RTA Guide) has been relied upon. The RTA Guide was developed by the Roads and Traffic Authority of NSW and can be used as a guideline for estimating traffic generation for retail developments such as those commonly found in a NAC. In particular, Table 3.1 of Section 3 – 'Land Use Traffic Generation' of the RTA Guide specifies peak hour and daily traffic generation rates of 12.5 and 121 vehicle trips per 100m^2 of gross leasable floor area (GLFA) for a Friday and Thursday respectively. We consider this to be appropriate rates to use for the NAC (conservatively assuming that its 8,300m^2 area is GLFA). The external trips generated by the NAC can be calculated (as shown in Table 2) by subtracting the internal trips generated by the residential development within the development.

Table 2: NAC Generated Traffic

	Total	Internal	External
Daily Volume	10,043	2,250	7,793
Peak Hour Volume	1,038	225	813

Based on our experience, a proportion of visitors to activity centres are drivers who are already on the road network as part of another trip. For the purposes of this assessment, this proportion is taken as 50% (i.e. 50% of external visitors to the NAC have made a trip for the exclusive purpose of visiting the NAC and not as an intermediate destination as part of a trip somewhere else). This assumption was used for the ultimate scenario assessment presented later in the report.

5.1.2. Traffic Distribution

An assessment of the likely distribution of traffic generated from the site has been made having regard to the external road network and areas of activity in the greater vicinity of the site's surroundings.

Based on our assessments, it is our opinion that traffic from the site will most likely be heading to and from the north due to the greater number of employment areas, services and facilities, as well as the Monash Freeway which would carry the majority of city bound traffic. The activity centres of Frankston (west of the site) and Cranbourne (east of the site) were considered to be the next two most likely destination points, while traffic heading south towards Hastings was assumed to represent the smallest distribution of the total site traffic generation. Traffic distributions adopted for the assessment are shown at Table 3.

Table 3: Site Traffic Distribution Percentages

	Origin/Destination			
	North	South	East	West
Percentage	60%	5%	15%	20%

Tables showing how traffic from the development is expected to be distributed to the external road network based on the traffic distribution percentages shown at Table 3 at the three critical stages of the development are attached in Appendix B.

5.1.3. Peak Hour Splits

From our experience, peak hour vehicle trips going to and from the site for AM and PM periods generally adopted for outer metropolitan residential land uses are as follows:

- AM peak period – 20% arrivals, 80% departures
- PM peak period – 60% arrivals, 40% departures

AM and PM peak hour splits for the NAC have been adopted as follows:

- AM peak period – 90% arrivals, 10% departures
- PM peak period – 50% arrivals, 50% departures

The peak hour volumes were assumed to be 10% of the daily trips for all assessments.

5.2. INTERSECTION CAPACITY ANALYSIS

An assessment of traffic impact from the development has been undertaken at three critical stages as follows:

- Interim scenario allowing for approximately 270 lots with the only access via the Western Port Highway/Ballarto Road roundabout.
- Intermediate scenario when 1,070 lots are developed with access available from the 'Western Signals' and assuming that the Ballarto Road overpass has been constructed.
- Ultimate scenario when all 1,500 lots and the NAC are developed with access via two signalised access points to Cranbourne-Frankston Road and three access points to the future Ballarto Road extension.

SIDRA assessments have been undertaken for the site's signalised access points and arterial road intersections in each scenario. The operating conditions described in the SIDRA User Guide, shown in Table 4 below, have been used to assess the intersection performances. Summaries of the SIDRA outputs are attached at Appendix C.

Table 4: SIDRA Intersection Operating Performance Ratings

Rating	Degree of Saturation (DOS)	Level of Service (LOS)
Excellent	DOS < 0.6	LOS A
Very Good	0.6 < DOS < 0.7	LOS B
Good	0.7 < DOS < 0.8	LOS C
Fair	0.8 < DOS < 0.9	LOS D
Poor	0.9 < DOS < 1.0	LOS E
Very Poor	DOS > 1.0	LOS F

5.3. INTERIM SCENARIO

For the purposes of our assessment full development of up to 270 lots has been assumed for the interim scenario. The only access point to the external road network is located at the north of the site which will connect to a new eastward extension of Ballarto Road from the Ballarto Road/Western Port Highway intersection. Only the Ballarto Road/Western Port Highway intersection has been assessed in detail given it will be the only access point for vehicles driving to and from the Brompton Lodge site in the interim scenario.

5.3.1. Site Traffic Generation and Distribution

By adopting the traffic generation and distribution assumptions from Section 5.1, the anticipated site generated volumes and distribution is shown in Table 5.

Table 5: Interim Scenario Site Traffic Distribution

	Origin/Destination			
	North	South	West	East
Percentage	60%	5%	20%	15%
Daily Trips	4,980	415	1,660	1,245
Peak Hour Trips	498	42	166	125

It was assumed that all eastbound traffic will turn left onto Cranbourne-Frankston Road at the north approach of the Western Port Highway/Cranbourne-Frankston Road intersection in order to head east. As such, all eastbound traffic was counted as having a south distribution at the Ballarto Road/Western Port Highway intersection. Figure 3 shows the distribution of arrival and departure vehicle trips at the Ballarto Road/Western Port Highway intersection during the peak hour periods by adopting the peak hour splits from Section 5.1.3.

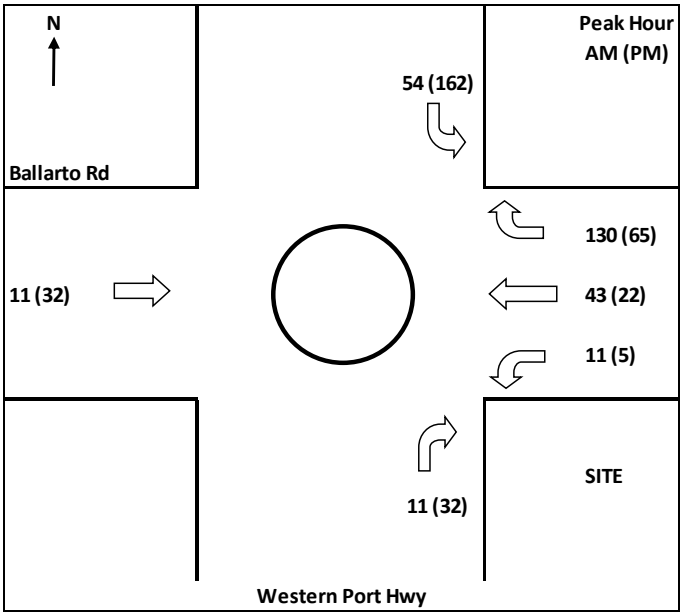


Figure 3: Interim Scenario Site Generated Volumes and Distribution

5.3.2. Arterial Road Volumes and Distribution

Data of traffic volumes from 2011 on the arterial roads adjacent to the Brompton Lodge site have been obtained from VicRoads and calibrated to the year 2014 using the annual growth rates outlined in Section 2.4. This includes annual growth rates of 5% for Western Port Highway and 2% for Ballarto Road west of Western Port Highway.

The distribution of external traffic at the Ballarto Road/Western Port Highway intersection have been based on distributions calculated from a 12 hour intersection turning movement count (7am-7pm) undertaken by VicRoads in April 2009.

Based on the above, Figure 4 below depicts the distribution of calibrated 2014 volumes for the AM and PM peak hours at the intersection.

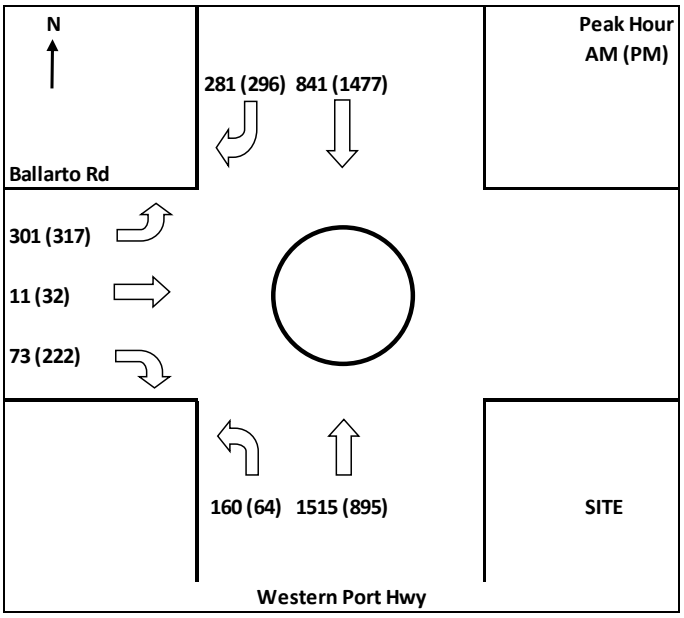


Figure 4: Ballarto Rd/Western Port Hwy Calibrated 2014 Volumes and Distributions

Figure 5 below presents the overall predicted traffic volumes and distributions during the peak hours at Ballarto Road/Western Port Highway following development of the first 270 lots.

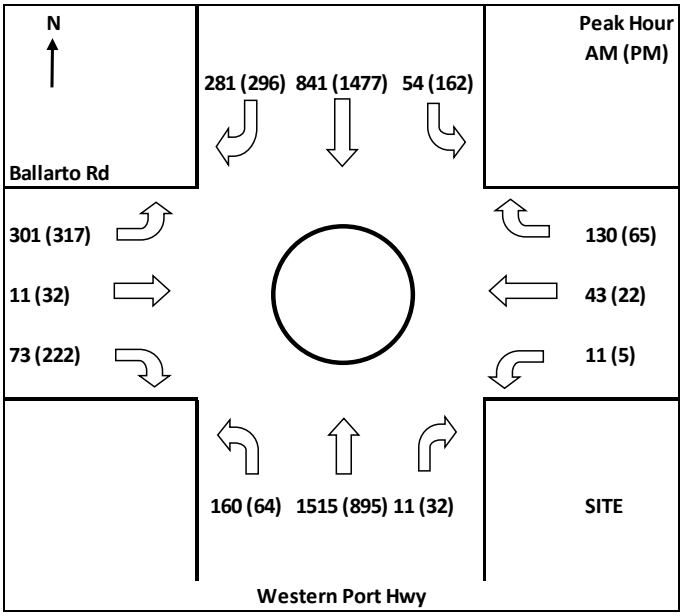


Figure 5: Ballarto Rd/Western Port Hwy Post-Development Volumes and Distributions

5.3.3. SIDRA Intersection Assessment

SIDRA analysis has been undertaken for the interim scenario future traffic volumes and distributions at Ballarto Road/Western Port Highway as presented in Figure 5. Figure 6 shows the intersection layout adopted for the analysis and Table 6 presents the key intersection performance indicators in the AM and PM peak hours.

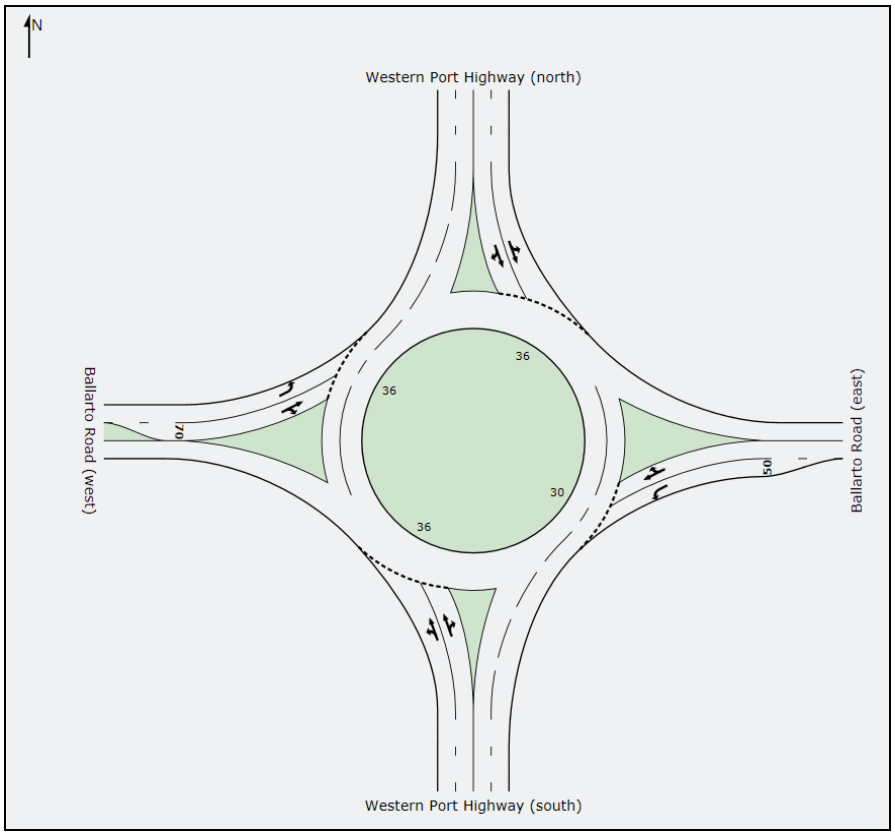


Figure 6: SIDRA Intersection Layout – Ballarto Rd/Western Port Hwy Interim Scenario

The intersection layout shows it is proposed to construct two approach lanes and a single departure lane on the eastern leg, with the approach lanes consisting of a shared through/right lane and an exclusive left turn lane.

Table 6: Key Intersection Parameters – Ballarto Rd/Western Port Hwy Interim Scenario

AM Peak				
Approach	Degree of Saturation	Average Delay (sec)	95th Percentile Queue Length (m)	Level of Service
Western Port Hwy (south)	0.790	19.7	92.2	LOS B
Ballarto Rd (east)	0.216	12.4	7.1	LOS B
Western Port Hwy (north)	0.408	13.3	24.3	LOS B
Ballarto Rd (west)	0.558	20.6	30.0	LOS C
PM Peak				
Approach	Degree of Saturation	Average Delay (sec)	95th Percentile Queue Length (m)	Level of Service
Western Port Hwy (south)	0.462	13.5	27.5	LOS B
Ballarto Rd (east)	0.232	16.9	9.9	LOS B
Western Port Hwy (north)	0.801	17.1	93.5	LOS B
Ballarto Rd (west)	0.379	17.0	14.7	LOS B

The SIDRA analysis indicates that the addition of an eastern leg to the existing Ballarto Road/Western Port Highway as part of the development of the first 270 lots will operate satisfactorily. The southern approach through movement will be the most critical movement in the AM peak hour and the northern approach through movement will be the most critical movement in the PM peak hour. The most critical Degree of Saturation of 0.801 is within the SIDRA 'fair' performance rating.

A plan of the functional layout of the Ballarto Road access via the roundabout at Western Port Highway for the interim scenario is attached at Appendix D.

5.4. INTERMEDIATE SCENARIO

The intermediate scenario assumes full development for Stages 1 to 15 with a total yield in the order of 1,070 dwellings. Following the grade separation of the Western Port Highway/Ballarto Road intersection it is anticipated that most traffic from the development will use the 'Western Signals' at Cranbourne-Frankston Road, although a small amount of traffic may continue to use Ballarto Road to head west towards Frankston and Seaford. The critical intersection assessed in this stage is the 'Western Signals' at Cranbourne-Frankston Road where most of the traffic will access the site.

5.4.1. Site Traffic Generation and Distribution

Adopting the traffic generation and distribution assumptions from Section 5.1, the anticipated site generated volumes and distribution is shown in Table 7.

Table 7: Intermediate Scenario Site Traffic Distribution

	Origin/Destination			
	North	South	West	East
Percentage	60%	5%	20%	15%
Daily Trips	6,420	535	2,140	1,605
Peak Hour Trips	642	54	214	161

To determine the volume of site traffic using the 'Western Signals' or Ballarto Road overpass at Western Port Highway, an assessment into the likely route of traffic from each of the stages heading to/from the north, south, west and east has been made. Full results of this analysis can be found in Appendix B.

Figure 7 shows the distribution of site arrival and departure vehicle trips at the 'Western Signals' and Ballarto Road overpass at Western Port Highway during the AM and PM peak hour periods by adopting the peak hour splits from Section 5.1.3.

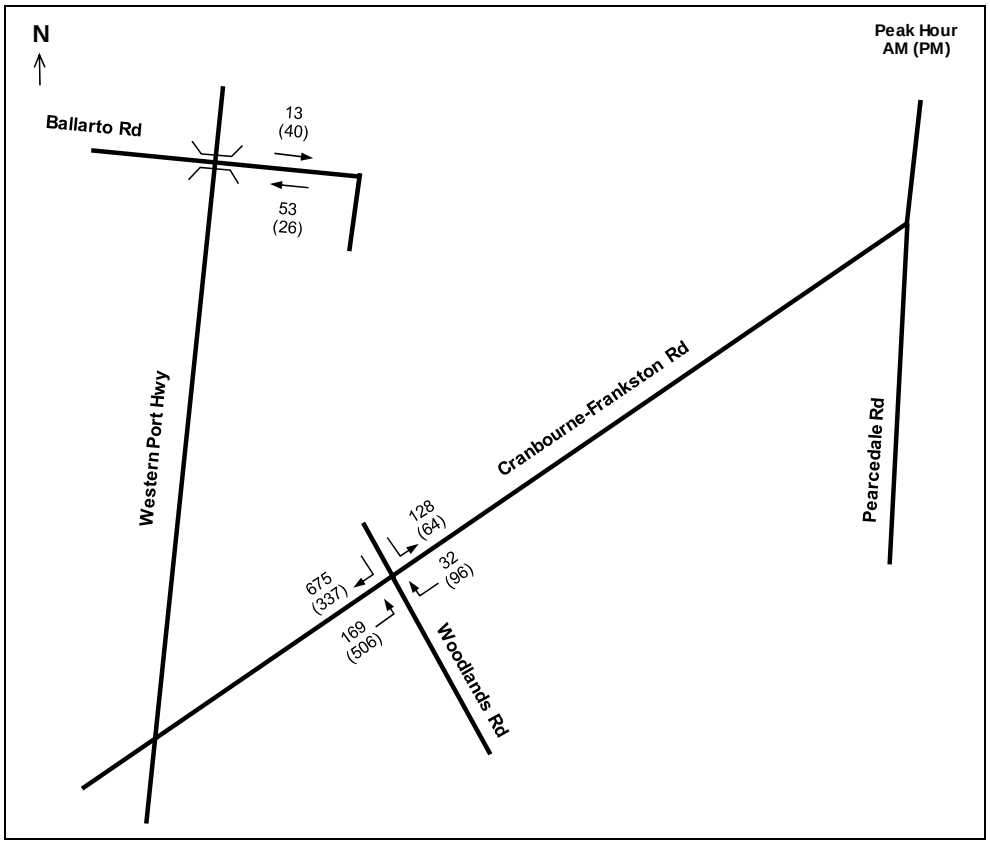


Figure 7: Intermediate Scenario Site Generated Volumes and Distribution

5.4.2. Arterial Road Volumes and Distribution

To determine the traffic volumes on the arterial roads in the intermediate scenario, an interpolation between the predicted 2046 volumes (based on the South East Growth Corridor Traffic Model) and the 2014 volumes (documented previously) was undertaken. The volumes for the intermediate scenario have been interpolated to represent the year 2024, which would reflect the first ten years of coinciding with the intermediate scenario.

The interpolation accounts for consistent yearly external growth rates along the existing arterial road network and assumes that Ballarto Road between Western Port Highway and Cranbourne-Frankston Road has not been constructed. For the purposes of the analysis, annual growth rates outlined in Section 2.4 had been adopted.

Woodlands Road volumes were obtained from City of Casey. A seven day count had been undertaken in February 2012 with the peak hour volumes taken over a weekday average and it is assumed that there will be no change to this traffic in 2024. Distributions of residential from Woodlands Road were assumed to be the same as those applied to the Brompton Lodge site. Traffic heading between Woodlands Road and Brompton Lodge was considered negligible in the intermediate scenario.

An estimate of the likely distribution of the external traffic at the Western Port Highway/Cranbourne Frankston Road and Cranbourne-Frankston Road/Pearcedale Road intersections has been made for the year 2024 to reflect the intermediate scenario. Figure 8 below depicts the estimated peak hour vehicle turning movements at the 'Western Signals' in the year 2024 for the intermediate scenario excluding development traffic.

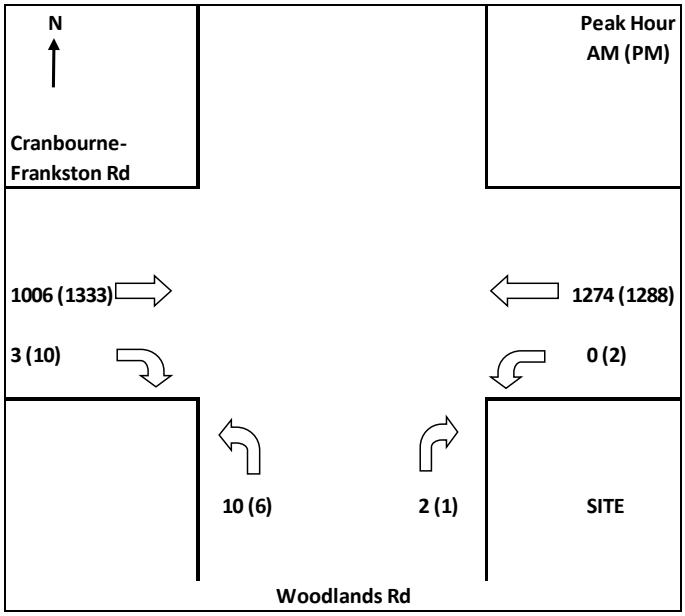


Figure 8: 'Western Signals' Predicted External Volumes and Distributions

Figure 9 below presents the overall predicted traffic volumes and distributions during the peak hours at the 'Western Signals' combining the development and external traffic at the intermediate scenario.

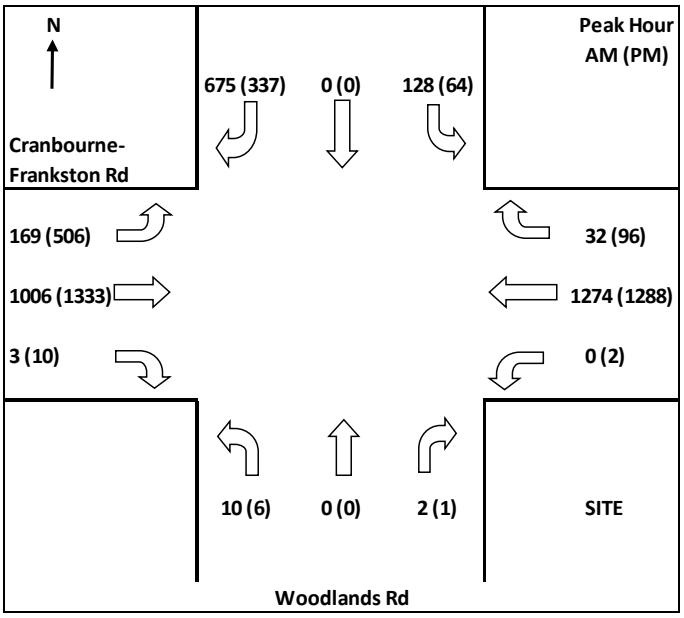


Figure 9: Intermediate Scenario 'Western Signals' Post-Development Volumes and Distributions

5.4.3. SIDRA Intersection Assessment

SIDRA analysis has been undertaken for the intermediate scenario future traffic volumes and distributions at the 'Western Signals' intersection presented in Figure 9. Figure 10 shows the intersection layout adopted for the analysis and Table 8 presents the key intersection performance indicators in the AM and PM peak hours for the intermediate scenario.

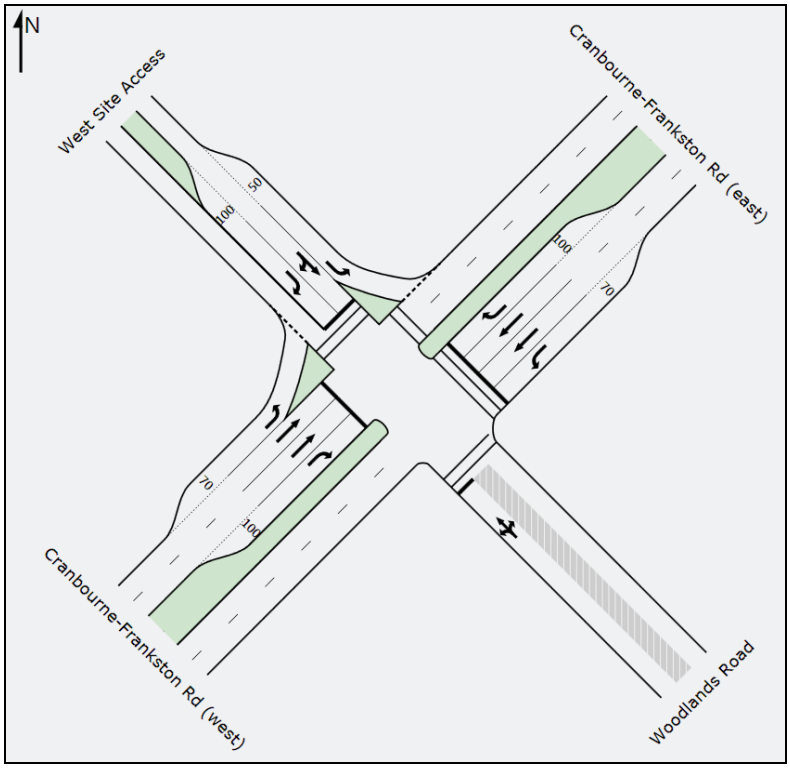


Figure 10: SIDRA Intersection Layout – 'Western Signals' Intermediate Scenario

The proposed layout incorporates auxiliary right and left turn lanes on the Cranbourne-Frankston Road approaches with left turn slip lanes provided to and from the site access. The site access is proposed to incorporate two right turn lanes including a shared through/right lane and an exclusive right turn lane. It is proposed to operate the site with split phasing for the site access and Woodlands Road given the significant imbalance in traffic volumes.

Table 8: Key Intersection Parameters – 'Western Signals' Intermediate Scenario

AM Peak				
Approach	Degree of Saturation	Average Delay (sec)	95th Percentile Queue Length (m)	Level of Service
Woodlands Rd (SE)	0.042	56.2	5.0	LOS E
Cranbourne-Frankston Rd (NE)	0.804	33.3	252.4	LOS C
Brompton Lodge Access (NW)	0.808	49.9	160.0	LOS D
Cranbourne-Frankston Rd (SW)	0.635	25.0	174.0	LOS C
PM Peak				
Approach	Degree of Saturation	Average Delay (sec)	95th Percentile Queue Length (m)	Level of Service
Woodlands Rd (SE)	0.025	55.5	3.0	LOS E
Cranbourne-Frankston Rd (NE)	0.684	25.7	212.0	LOS C
Brompton Lodge Access (NW)	0.686	55.4	73.5	LOS E
Cranbourne-Frankston Rd (SW)	0.708	19.1	223.8	LOS B

The SIDRA analysis indicates that the development of the 'Western Signals' as part of the development of the first 1,070 lots will operate satisfactorily. The right turn out of the Brompton Lodge site is the most critical movement in the AM peak hour, and the through movement at the southwest approach on Cranbourne-Frankston Road is the most critical movement in the PM peak hour. The critical Degree of Saturation is 0.808 which is within the SIDRA 'fair' performance rating.

Functional layout plans for the 'Western Signals' intersection have been based on the existing four lane cross-section of Cranbourne-Frankston Road and are attached at Appendix E. This appendix also includes functional layout plans for the activity centre access and 'Eastern Signals' intersection on Cranbourne-Frankston Road based on the existing four lane cross-section of Cranbourne-Frankston Road. It is noted that the plans include bus priority lanes as required by Council.

5.5. ULTIMATE SCENARIO

The ultimate scenario assumes full development of Brompton Lodge with a total yield in the order of 1,500 dwellings and an 8,300m^2 NAC. The site will be accessed via two signalised access points ('Western Signals' and 'Eastern Signals') connecting to Cranbourne-Frankston Road, and three unsignalised access points connecting to Ballarto Road ('Western Ballarto Access, 'Centre Ballarto Access' and 'Eastern Ballarto Access'). The ultimate scenario assumes that Ballarto Road has been extended between Western Port Highway and Pearcedale Road.

The two signalised access points are considered to be most critical due to the higher traffic volumes and have been analysed in detail.

5.5.1. Site Traffic Generation and Distribution

Adopting the traffic generation and distribution assumptions from Section 5.1, the anticipated site generated volumes and distributions for the residential component and the NAC are shown in Table 9.

Table 9: Ultimate Scenario Site Traffic Distribution

Origin/Destination	Percentage	Residential		NAC	
		Daily Trips	Peak Hour Trips	Daily Trips	Peak Hour Trips
North	60%	7,650	765	4,676	488
South	5%	638	64	390	41
West	20%	2,550	255	1,559	163
East	15%	1,913	191	1,169	122

To determine the volume of site traffic utilising either the 'Western Signals' or 'Eastern Signals', an assessment into the likely route of traffic from each of the stages heading to/from the north, south, west and east has been made. It should be noted that it was assumed all external traffic accessing the NAC would utilise the 'Eastern Signals'. Full results of this analysis can be found in Appendix B.

Figure 11 shows the distribution of arrival and departure vehicle trips at the 'Western Signals' and 'Eastern Signals' during the AM and PM peak hour periods by adopting the splits from Section 5.1.

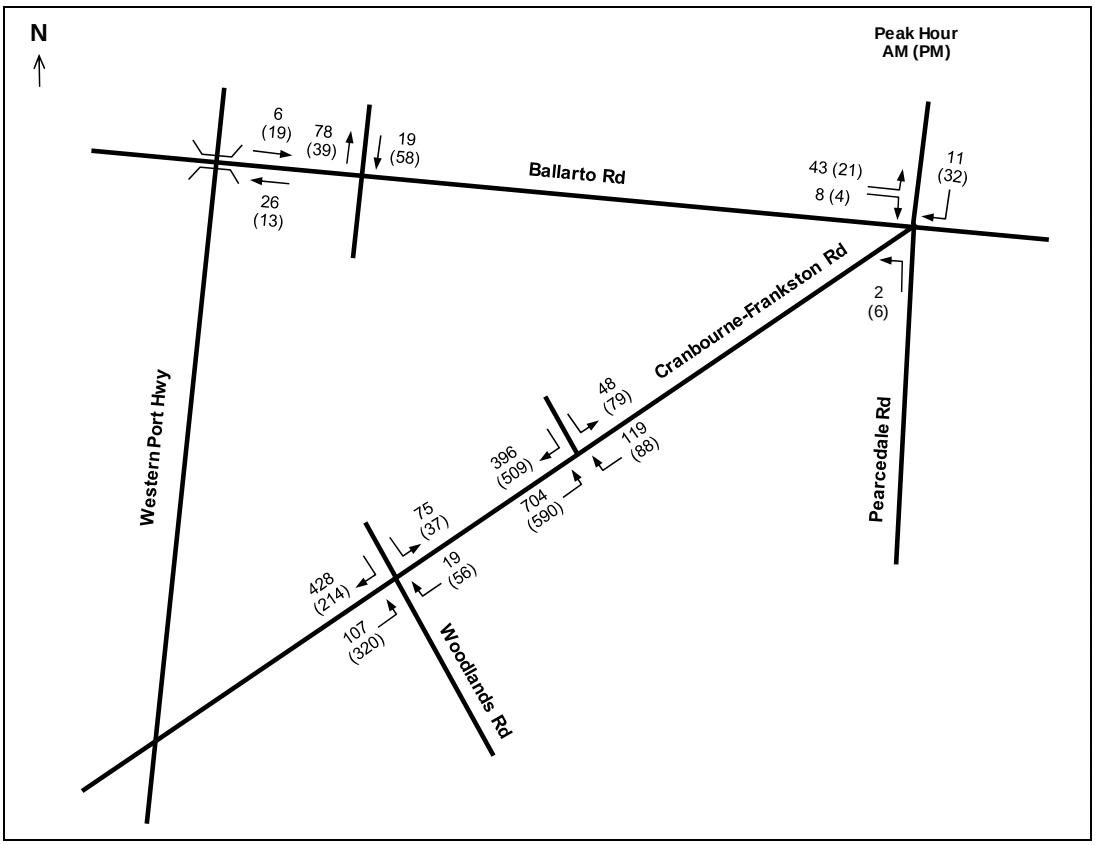


Figure 11: Ultimate Scenario Site Generated Volumes and Distribution

5.5.2. Arterial Road Volumes and Distribution

Data for 2046 arterial road volumes has been obtained from the South East Growth Corridor Traffic Model (SEGCTM). The SEGCTM used for this analysis is based on the Victorian Integrated Transport Model (VITM).

It is noted that the SEGCTM does not include any traffic generated from development of the Brompton Lodge site. Volumes in the model have also been expressed as PCU (Passenger Car Unit) volumes in which heavy vehicle volumes are converted into standard car volumes by a multiplication factor. It is understood that the VITM uses factors of 1.3 and 2.3 for rigid trucks and articulated trucks.

The SEGCTM 2046 arterial road volumes are provided for both the AM and PM peak hours.

Figure 12 depicts the predicted arterial road volumes on the adjacent road network used in the ultimate scenario assessment. It is noted that although not shown in Figure 12, the same volumes and distributions of Woodlands Road traffic from the intermediate scenario have been included for the ultimate scenario assessments.

Figure 13 presents the overall predicted traffic volumes and some of the distributions during the peak hours at the 'Western Signals', 'Eastern Signals' and Cranbourne-Frankston Road/Pearcedale Road/Ballarto Road intersection following full development of the Brompton Lodge site incorporating site generated and external traffic volumes. Note that in this diagram some of the external through traffic on Cranbourne-Frankston Road is directed into the proposed NAC (50% of the externally generated traffic by the NAC is assumed to be traffic already on the road network).

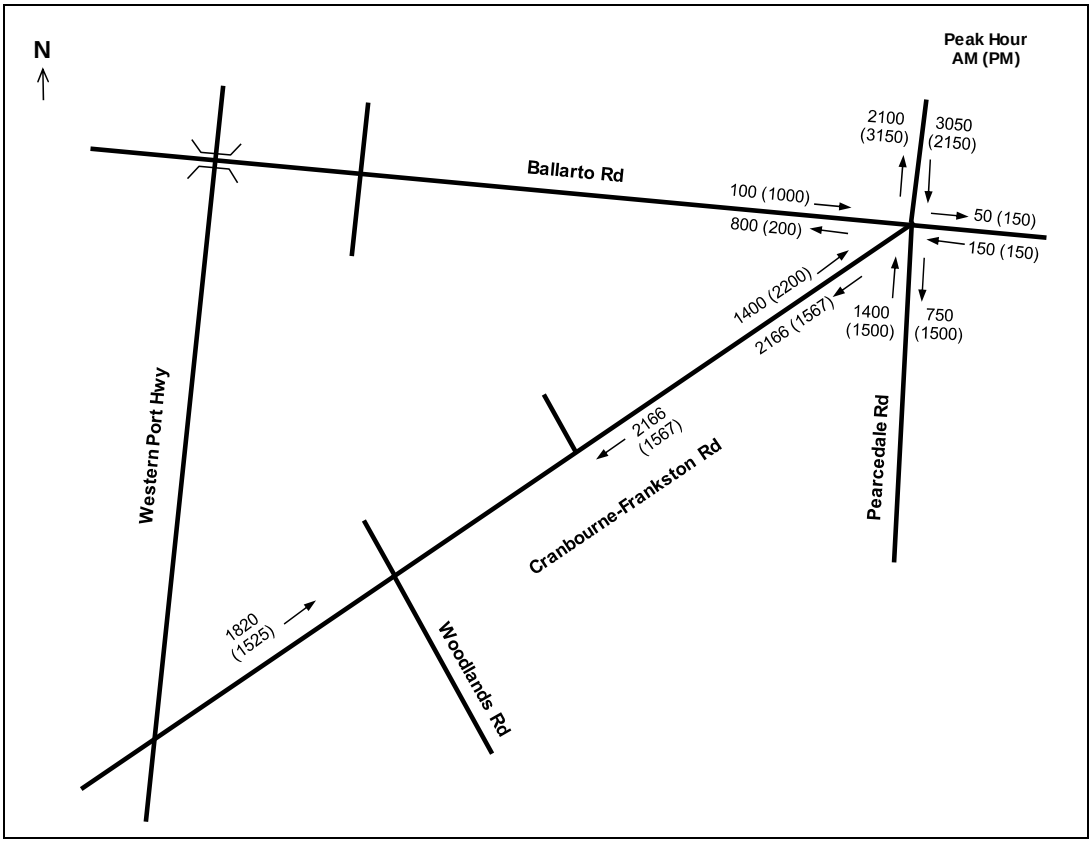


Figure 12: SEGCTM 2046 Predicted Arterial Traffic Volumes

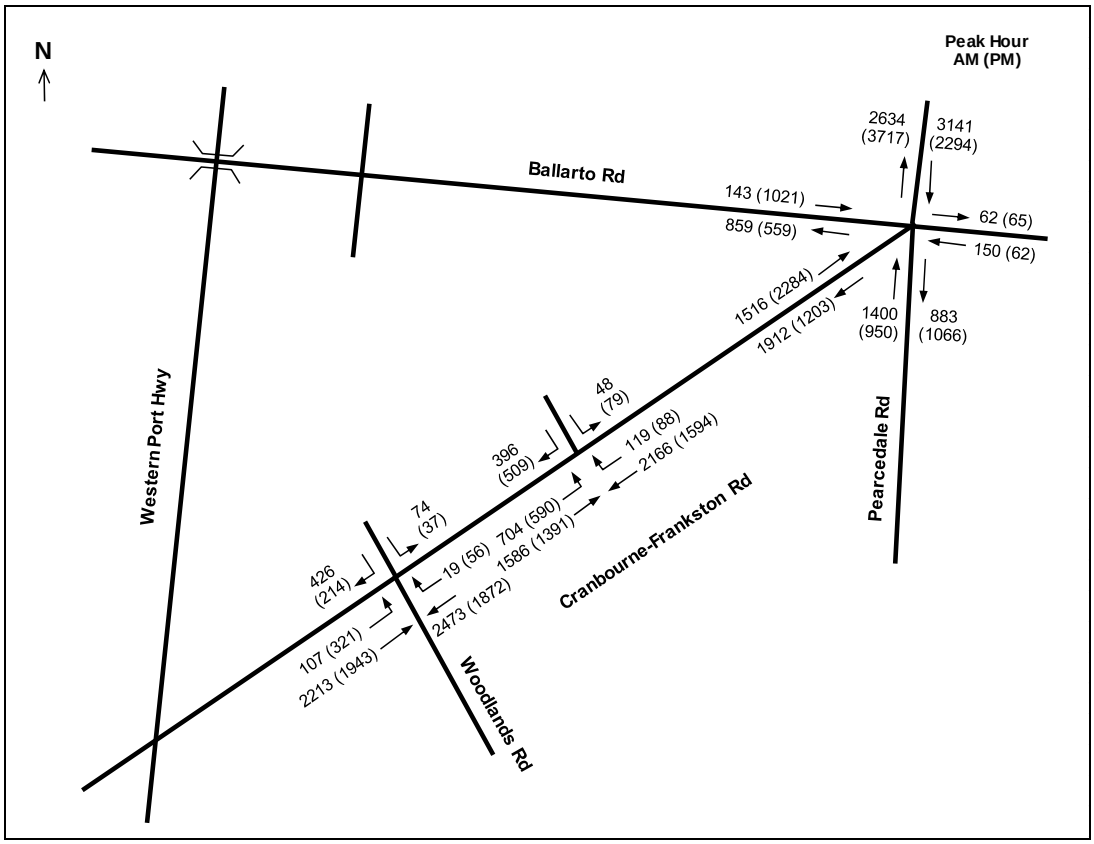


Figure 13: Ultimate Scenario Post-Development Traffic Volumes

5.5.3. SIDRA Intersection Assessment

SIDRA analysis has been undertaken for the ultimate scenario future traffic volumes and distributions for the 'Western Signals' and 'Eastern Signals'. Figure 14 and Figure 15 show the intersection layouts adopted for the analysis and Table 10 and Table 11 present the key intersection performance indicators in the AM and PM peak hours for the ultimate scenario.

It is noted that for the purposes of the SIDRA analysis, heavy vehicle volumes have been considered as a percentage of the total traffic volume, which is consistent with the previous SIDRA analysis for other scenarios. However, this would result in conservative volumes for heavy vehicles on the arterial roads due to the SEGCTM model expressing total traffic volumes as PCU (Passenger Car Unit), in which heavy vehicle volumes have already been factored in the total traffic volumes as a multiplication of a standard car unit.

'Western Signals'

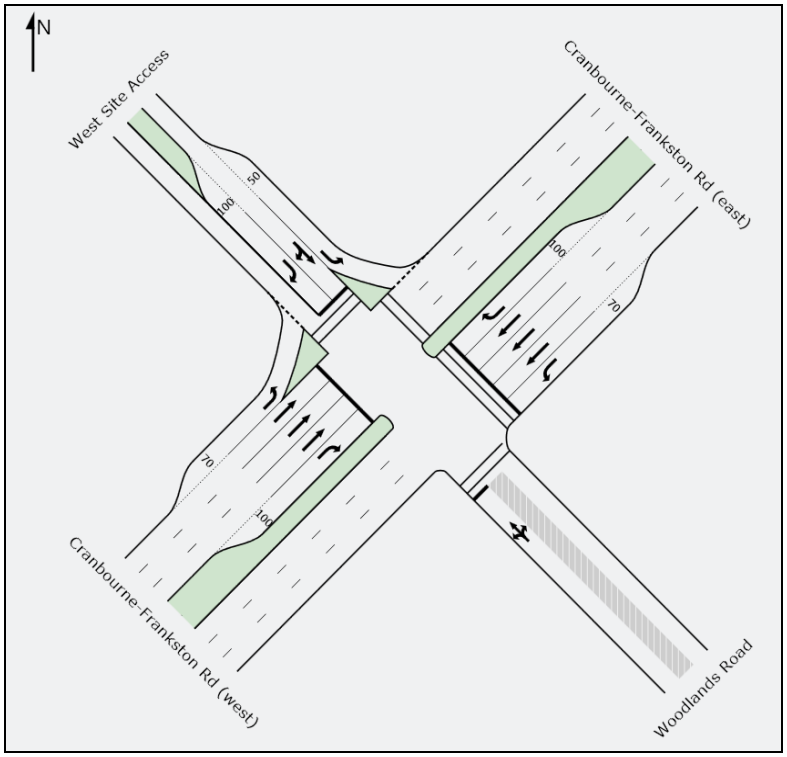


Figure 14: SIDRA Intersection Layout – 'Western Signals' Ultimate Scenario

It is understood that VicRoads has ultimately proposed that Cranbourne-Frankston Road will accommodate three through traffic lanes in both directions. Accordingly, this ultimate cross-section has been assumed for the SIDRA analysis for the ultimate scenario.

Table 10: Key Intersection Parameters – 'Western Signals' Ultimate Scenario

AM Peak				
Approach	Degree of Saturation	Average Delay (sec)	95th Percentile Queue Length (m)	Level of Service
Woodlands Rd (SE)	0.048	58.6	4.7	LOS E
Cranbourne-Frankston Rd (NE)	0.835	25.9	314.8	LOS C
Brompton Lodge Access (NW)	0.822	60.2	100.1	LOS E
Cranbourne-Frankston Rd (SW)	0.748	21.3	250.3	LOS C
PM Peak				
Approach	Degree of Saturation	Average Delay (sec)	95th Percentile Queue Length (m)	Level of Service
Woodlands Rd (SE)	0.031	57.6	3.1	LOS E
Cranbourne-Frankston Rd (NE)	0.644	21.3	190.0	LOS C
Brompton Lodge Access (NW)	0.414	52.1	43.9	LOS D
Cranbourne-Frankston Rd (SW)	0.656	18.6	202.4	LOS B

The through movement at the northeast approach on Cranbourne-Frankston Road (heading southwest) was found to be the critical movement in the AM peak hour. The through movement and right movement at the northwest approach on the Brompton Lodge Access was found to be the next most critical movement, also in the AM peak hour. The results suggested that the AM peak hour was found to be more critical than the PM peak hour. The critical Degree of Saturations of 0.835 (northeast approach on Cranbourne-Frankston Road) and 0.822 (northwest approach on Brompton Lodge Access) is within the SIDRA 'fair' performance rating.

'Eastern Signals'

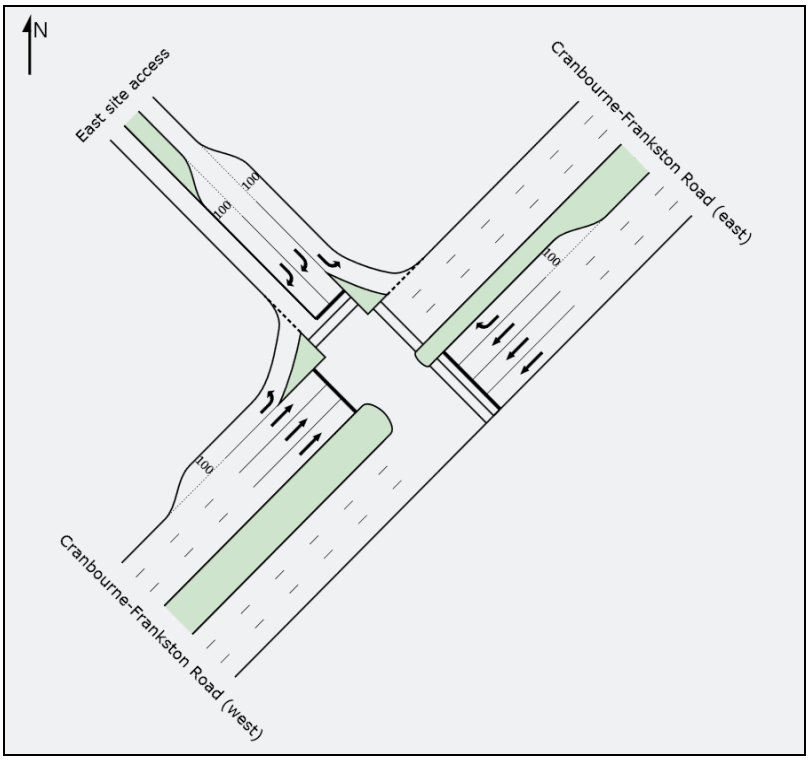


Figure 15: SIDRA Intersection Layout – 'Eastern Signals' Ultimate Scenario

The proposed layout provides for an auxiliary right turn lane at the northeast approach on Cranbourne-Frankston Road. Three through lanes are proposed on the northeast and southwest approaches on Cranbourne-Frankston Road to match the ultimate cross-section for Cranbourne-Frankston Road proposed by VicRoads. For the site access, left turn slip lanes are provided to and from the site, and it is proposed to include two exclusive right turn lanes at the site access approach.

Table 11: Key Intersection Parameters – 'Eastern Signals' Ultimate Scenario

AM Peak				
Approach	Degree of Saturation	Average Delay (sec)	95th Percentile Queue Length (m)	Level of Service
Cranbourne-Frankston Rd (NE)	0.632	12.4	155.7	LOS B
Brompton Lodge Access (NW)	0.569	50.5	79.6	LOS D
Cranbourne-Frankston Rd (SW)	0.633	16.0	152.3	LOS B
PM Peak				
Approach	Degree of Saturation	Average Delay (sec)	95th Percentile Queue Length (m)	Level of Service
Cranbourne-Frankston Rd (NE)	0.552	16.6	130.7	LOS B
Brompton Lodge Access (NW)	0.559	41.4	105.6	LOS D
Cranbourne-Frankston Rd (SW)	0.554	19.8	148.4	LOS B

Overall, the through movement at the southwest approach on Cranbourne-Frankston Road (heading northeast) was found to be the critical movement in both the AM peak hour and PM peak hour. The critical Degree of Saturation of 0.633 is within the SIDRA 'excellent' performance rating. Functional layout plans for the ultimate Cranbourne-Frankston Road intersections, including the 'left in/left out' access to the activity centre based on the ultimate six lane cross section are attached at Appendix F. For these plans the existing on-road bicycle lanes are replaced with 3m wide shared paths.

Cranbourne-Frankston Road / Ballarto Road / Pearcedale Road

It is understood that at present the anticipated layout and type of intersection (i.e. roundabout, signals, etc.) at Cranbourne-Frankston Road / Ballarto Road / Pearcedale Road has not yet been determined. As such, no SIDRA analysis has been undertaken at this intersection as part of this assessment, given that traffic capacity will be dependent on the layout and type of intersection.

5.6. PROPOSED INTERSECTION LOCATIONS

5.6.1. Cranbourne-Frankston Road

The proposed access arrangement involves the installation of two signalised intersections to provide access into the site from Cranbourne-Frankston Road over a length of 2,070m. This is generally in accordance with VicRoads internal 'Access Management Policies' which suggests that signalised intersections should be 800m apart on limited access urban arterial roads such as Cranbourne-Frankston Road.

We note that due to the volume of traffic that is expected to access the site from Cranbourne-Frankston Road it would not be appropriate to provide only a single signalised access point over this length as this would be likely to result in greater delays and queuing along Cranbourne-Frankston Road due to the amount of opposing traffic that would require longer signal phases to operate for opposing movements.

During the intermediate condition the location of the 'Western Signals' to the existing Western Port Highway/Cranbourne-Frankston Road roundabout will be approximately 600m. In the ultimate condition the Western Port Highway/Cranbourne-Frankston Road intersection will be grade separated and the spacing between the 'Western Signals' and the future intersection at the Western Port Highway freeway ramps will be reduced to approximately 470m. Also in the ultimate condition, the

location of the 'Eastern Signals' to the future five legged roundabout at Pearcedale Road/Cranbourne-Frankston Road is approximately 800m. The distance between the 'Eastern Signals' and 'Western Signals' will be approximately 700m in both the intermediate and ultimate conditions. We consider that the distances between the signalised intersections and other major intersections in the intermediate and ultimate conditions to be appropriate in providing for an acceptable operation between the site's access points and the surrounding road network. The proposed location of the two signalised intersections are sufficient to contain right turn lanes from adjacent intersections without requiring them to overlap, and SIDRA analysis suggests that the intersection spacing is sufficient that queues from one intersection will not extend through another.

In addition to the two signalised access points it is also proposed to provide a separate 'left in/left out' access to the NAC from Cranbourne-Frankston Road. This access is proposed to be provided approximately 180m to the west of the 'Eastern Signals'. This separate access point to the NAC is considered appropriate and will relieve pressure on the 'Eastern Signals'. The proposed spacing is sufficient that traffic exiting the site at this location should generally not be impacted by traffic queues from the 'Eastern Signals'.

5.6.2. Ballarto Road

In the ultimate stage there will be two permanent access points proposed to the Ballarto Road extension: the 'Western Ballarto Access' and 'Eastern Ballarto Access' located approximately 500m and 1km east of the Western Port Highway respectively.

The 'Western Ballarto Access' will form a cross intersection that would continue as a north-south connector road into the Cranbourne West development area to the north. It would be appropriate for this intersection to be controlled by a single lane roundabout in the event that the Ballarto Road extension is constructed as a connector road or by traffic signals in the event that Ballarto Road is ultimately upgraded to a four lane arterial road. It is understood that the Ballarto Road extension will ultimately be constructed as a boulevard connector road with a 32m reservation or a four lane arterial within a 34m reservation, however a decision is yet to be made by VicRoads and Council (see Section 5.8.2).

The remaining access point to Ballarto Road should operate sufficiently as an unsignalised intersection, with auxiliary left and right turn lanes provided in Ballarto Road to provide access into the site without delaying through traffic.

It is proposed that the temporary access (located approximately 250m east of the existing roundabout at Western Port Highway) serving the Brompton Lodge site in the interim stage would be removed at the time when the Ballarto Road overpass over the Western Port Highway is constructed.

5.7. SIGHT DISTANCE

This section provides an assessment of sight distance at the Brompton Lodge access points closest to Western Port Highway (i.e. 'Western Signals' and 'Western Ballarto Access').

The purpose of the assessment is to investigate whether sight distance may be restricted due to the proposed vertical alignment of Cranbourne-Frankston Road and Ballarto Road due to the future provision of overpasses at the Western Port Highway (i.e. in the ultimate stage).

Longitudinal section plans were obtained from VicRoads for both Cranbourne-Frankston Road and Ballarto Road to undertake the assessment. These plans are shown at Figure 16 and Figure 17 and also include the approximate locations of the proposed access points. The plans extend approximately 180m to 200m to the east beyond the proposed access point locations.

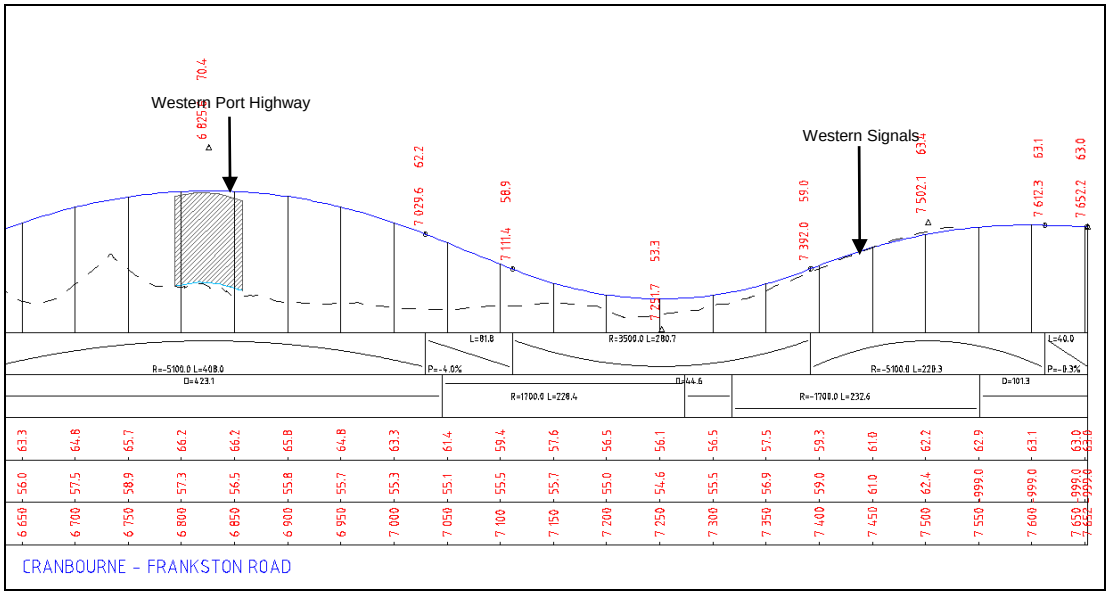


Figure 16: Cranbourne-Frankston Road Longitudinal Section

Figure 16 shows that the Western Port Highway is located at the peak of a 408m long summit curve. Heading east there is an 82m downgrade at 4% followed by a 281m sag curve and a 220m summit curve. The location of the 'Western Signals' is located approximately 50m along the 220m summit curve to the east of the highway.

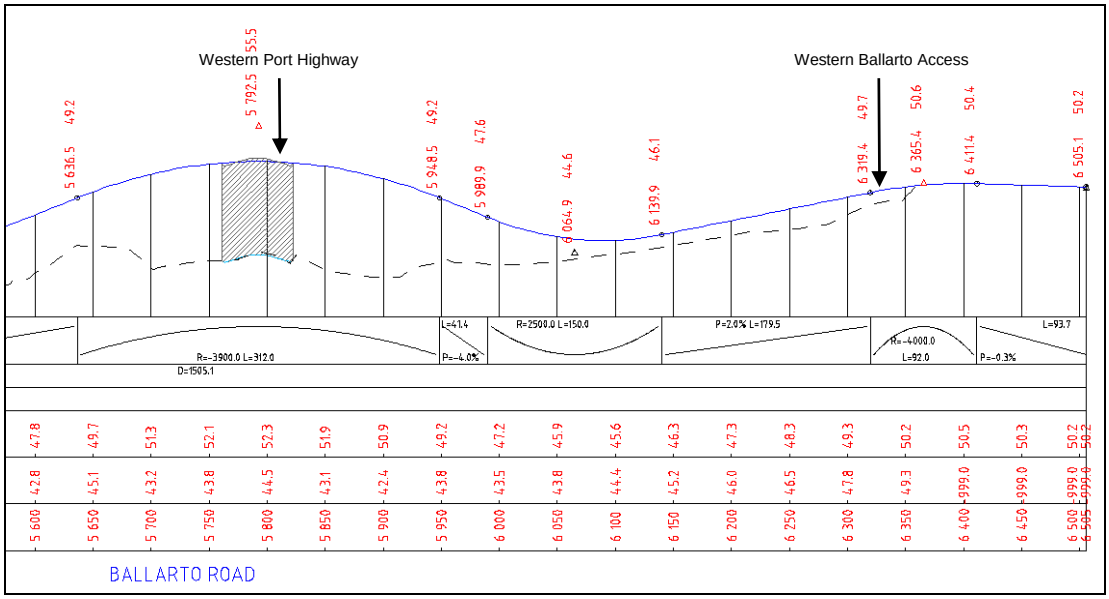


Figure 17: Ballarto Road Longitudinal Section

Figure 17 shows that the Western Port Highway is located at the peak of a 312m long summit curve. Heading east there is a 41m downgrade at 4% followed by a 150m sag curve and then a 180m upgrade at 2%. The location of the 'Western Ballarto Access' is approximately at the end of the 2% upgrade and the beginning of a 92m long summit curve.

The assessment was undertaken by measuring the approximate sight distance to either side of the access points (assuming a driver eye height of 1.1m and object height of 1.25m). The *Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections* (the 'Austroads Guide') was used to calculate the required Safe Intersection Sight Distance (SISD). The sight distance is deemed adequate if it is greater than the required SISD. A summary of the sight distance assessment is described as follows:

'Western Signals' (Cranbourne-Frankston Road)

- Based on an 80km/h speed limit on Cranbourne-Frankston Road, standard values for other Austroads Guide parameters and grade correction factors provided in the Austroads Guide, the SISD was calculated to be 175m to the west and 188m to the east.
- The available sight distance based on the longitudinal section plan shown at Figure 16 is estimated to be in excess of 400m to the west and approximately 200m to the east which is close to the edge of the longitudinal section that has been provided.

'Western Ballarto Access'

- Based on an 80km/h speed limit on Ballarto Road, standard values for other Austroads Guide parameters and grade correction factors provided in the Austroads Guide, the SISD was calculated to be 177m to the west and 185m to the east.
- The available sight distance based on the longitudinal section plan shown at Figure 17 was estimated to be in excess of 400m to the west and approximately 200m to the east which is close to the edge of the longitudinal section that has been provided.

We are satisfied that based on an assessment of longitudinal section plans of Cranbourne-Frankston Road and Ballarto Road, the provision of sight distance will be adequate at both the 'Western Signals' and 'Western Ballarto Access' in the ultimate stage.

5.8. ROAD CROSS SECTIONS

5.8.1. Internal Roads

The internal road network, proposed intersection controls, and carriageway widths are considered to be generally provided in accordance with the specifications outlined by the Metropolitan Planning Authority and provide for a practical outcome.

5.8.2. Ballarto Road

It is understood that Council has nominated the ultimate cross section of the Ballarto Road extension to be either a two lane boulevard connector within a 32m cross section, or a four lane arterial within a 34m cross section, however a decision is yet to be made in conjunction with VicRoads.

The 32m boulevard connector cross section option would consist of two 5.8m wide carriageways separated by a 6.4m wide median. Each carriageway would consist of a single 3.5m traffic lane and a 2.3m wide parking lane, with a verge width of 7m incorporating a 3m wide shared path. A diagram of this cross section is shown at Figure 18.

The 34m four lane arterial cross section option would consist of two 7.7m wide carriageways separated by a 6.0m wide median. Each carriageway would consist of two traffic lanes, one 3.5m wide and the other 4.2m wide. A 5.5m wide clear zone would be maintained from the kerb to the shared path. Bus stops can be accommodated within this clear zone. A diagram of the cross section is shown at Figure 19.

In order to implement either cross section it will be necessary to widen the existing reservation for Ballarto Road of approximately 29m by a minimum of approximately 3m to the south. It is considered that the Brompton Lodge development will contribute to the construction of the Ballarto Road extension by constructing a single carriageway along the alignment of the ultimate southern carriageway. This interim carriageway will need to be constructed at a width that is no less than 9.3m wide in order to accommodate two way traffic and a parking lane prior to the construction of the northern carriageway in the event that direct residential abuttal is proposed on the south side. The boulevard connector road option for Ballarto Road would support direct residential abuttal; however this would not be desirable if Ballarto Road would ultimately function as an arterial road.

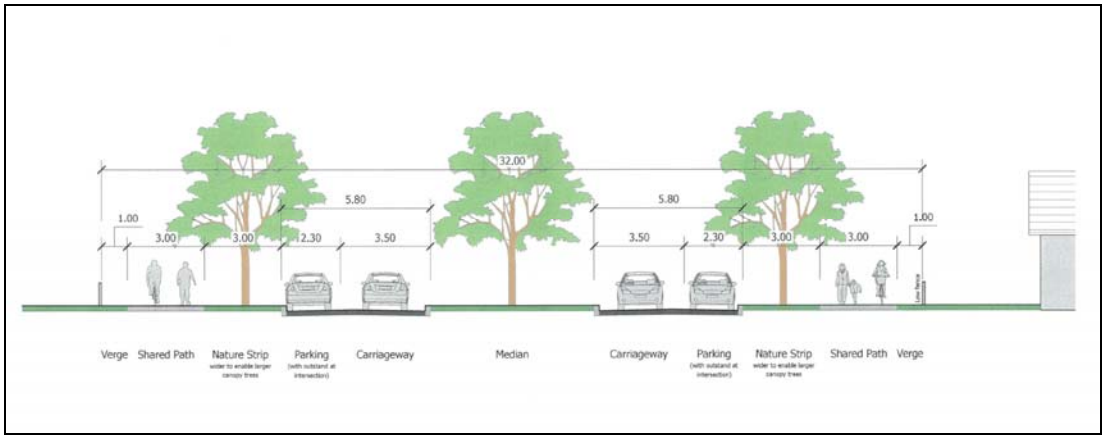


Figure 18: Ballarto Road 32m Boulevard Connector Cross Section

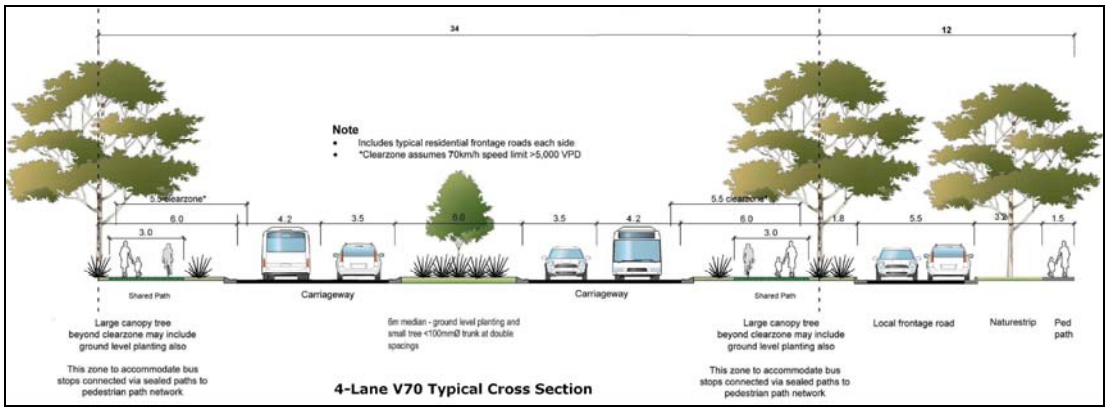


Figure 19: Ballarto Road 34m Four Lane Arterial Cross Section

6. CONCLUSION

Having undertaken a detailed traffic engineering assessment for the proposed Brompton Lodge Precinct Structure Plan, we are of the opinion that:

a) The proposed interim access arrangement involving the construction of an east leg to the existing roundabout at Ballarto Road/Western Port Highway will operate sufficiently in order to provide access for the development of 270 residential lots,

b) The proposed construction of a signalised cross intersection where Woodlands Road currently intersects with Cranbourne Frankston Road ('Western Signals') is appropriate and can accommodate anticipated traffic volumes in the intermediate scenario (1,070 lots for Stages 1 to 15) as the predominant access point to the site following grade separation of the Ballarto Road/Western Port Highway intersection,

c) Two signalised access points and an unsignalised 'left in/left out' access to Cranbourne-Frankston Road and one unsignalised access and either a four leg roundabout or signalised cross-intersection on Ballarto Road is appropriate to provide access to the site, depending on whether Ballarto Road will ultimately be developed as a boulevard connector or four lane arterial road,

d) The proposed access points will be able to accommodate future traffic generated by the ultimate development of the site incorporating 1,500 lots and an 8,300m^2 Neighbourhood Activity Centre without causing detrimental impacts to the surrounding road network,

e) The proposed site access locations and forms of intersection control along Cranbourne-Frankston Road and the future Ballarto Road extension are appropriate,

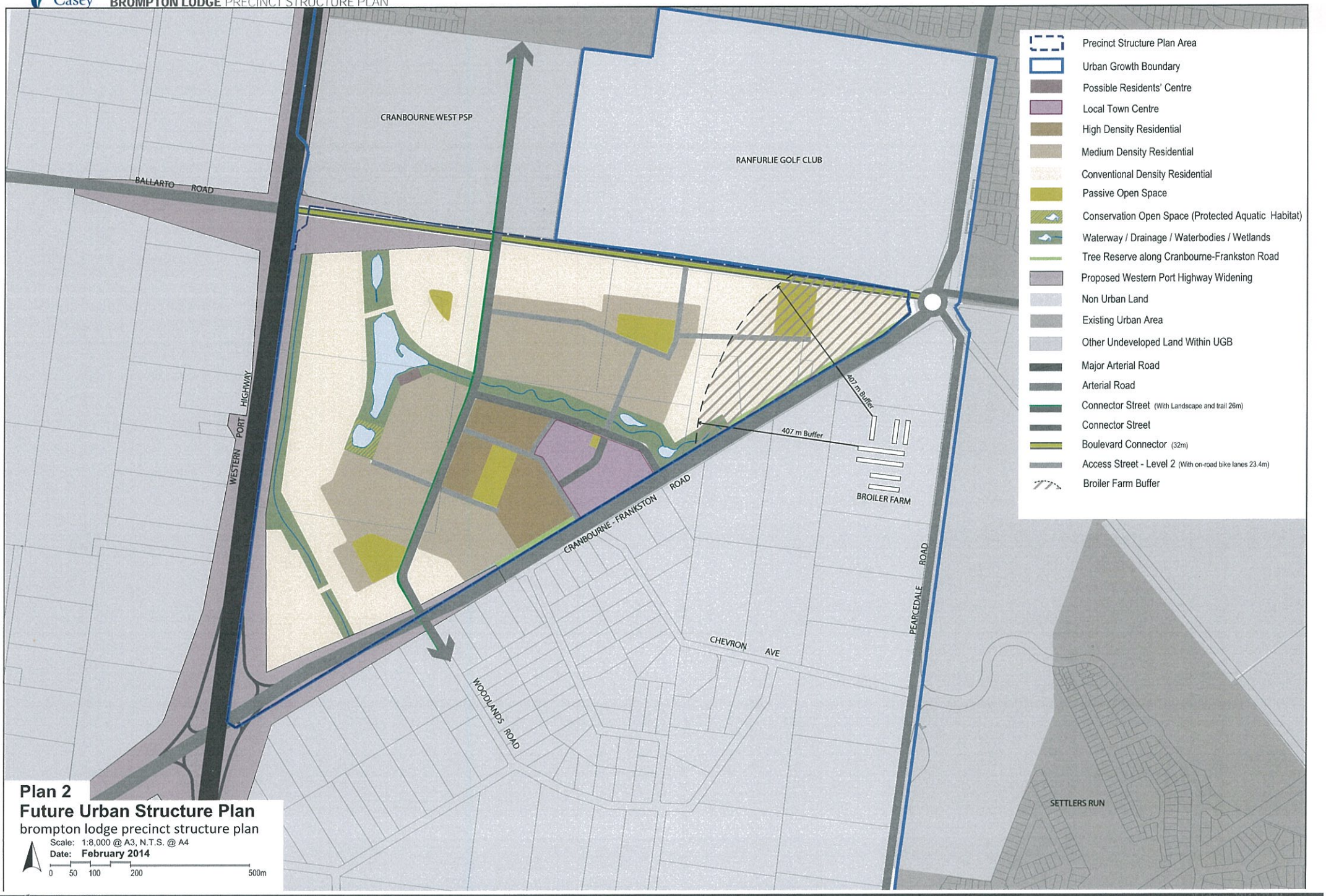
f) The future unsignalised T-intersection along the Ballarto Road extension should incorporate left and right turn auxiliary lanes,

g) Sight distance to and from the western access points to the Brompton Lodge site is found to be satisfactory in the ultimate stage following the construction of the Cranbourne-Frankston Road and Ballarto Road overpasses at Western Port Highway, and

h) There are no traffic engineering reasons why the development as outlined in the Precinct Structure Plan should not be approved.

APPENDIX A

DEVELOPMENT PLANS



Plan 2
Future Urban Structure Plan
brompton lodge precinct structure plan
Scale: 1:8,000 @ A3, N.T.S. @ A4
Date: February 2014
0 50 100 200 500m

APPENDIX B

TRAFFIC GENERATION AND DISTRIBUTION

Interim Scenario

Residential Site Traffic Access Point Distribution

			To/From			
			North	South	West	East
	Dwellings	Veh Trips	60%	5%	20%	15%
Stage 1	50	500	300	25	100	75
Stage 2	70	700	420	35	140	105
Stage 3	70	700	420	35	140	105
Stage 4	50	500	300	25	100	75
Stage 5	30	300	180	15	60	45
Total trips - daily		2700	1620	135	540	405
Total trips - peak hour		270	162	14	54	41

Ballarto Road/Western Port Highway intersection

Intermediate Scenario

Residential Site Traffic Access Point Distribution

			To/From			
			North	South	West	East
	Dwellings	Veh Trips	60%	5%	20%	15%
Stage 1	50	500	300	25	100	75
Stage 2	70	700	420	35	140	105
Stage 3	70	700	420	35	140	105
Stage 4	50	500	300	25	100	75
Stage 5	30	300	180	15	60	45
Stage 6	100	1000	600	50	200	150
Stage 7	40	400	240	20	80	60
Stage 8	100	1000	600	50	200	150
Stage 9	120	1200	720	60	240	180
Stage 10	100	1000	600	50	200	150
Stage 11	60	600	360	30	120	90
Stage 12	60	600	360	30	120	90
Stage 13	70	700	420	35	140	105
Stage 14	60	600	360	30	120	90
Stage 15	90	900	540	45	180	135
Total trips - daily		10700	6420	535	2140	1605
Total trips - peak hour		1070	642	54	214	161

Ballarto Road overpass

Western Signals

Total trips - daily

	North	South	West	East	Total
Ballarto Road overpass	0	0	660	0	660
Western Signals	6420	535	1480	1605	10040

Total trips - peak hour

	North	South	West	East	Total
Ballarto Road overpass	0	0	66	0	66
Western Signals	642	54	148	161	1004

Ultimate Scenario

Residential Site External Traffic Access Point Distribution

			To/From			
			North	South	West	East
	Dwellings	Veh Trips	60%	5%	20%	15%
Stage 1	50	425	255	21	85	64
Stage 2	70	595	357	30	119	89
Stage 3	70	595	357	30	119	89
Stage 4	50	425	255	21	85	64
Stage 5	30	255	153	13	51	38
Stage 6	100	850	510	43	170	128
Stage 7	40	340	204	17	68	51
Stage 8	100	850	510	43	170	128
Stage 9	120	1020	612	51	204	153
Stage 10	100	850	510	43	170	128
Stage 11	60	510	306	26	102	77
Stage 12	60	510	306	26	102	77
Stage 13	70	595	357	30	119	89
Stage 14	60	510	306	26	102	77
Stage 15	90	765	459	38	153	115
Stage 16	90	765	459	38	153	115
Stage 17	120	1020	612	51	204	153
Stage 18	80	680	408	34	136	102
Stage 19	60	510	306	26	102	77
Stage 20	80	680	408	34	136	102
Total trips - daily		12750	7650	638	2550	1913
Total trips - peak hour		1275	765	64	255	191

Western Ballarto Access
Western Signals
Eastern Signals
Roundabout Access
Overpass Access

Total trips - daily

	North	South	West	East	Total
Cranbourne West	969	0	0	0	969
Western Signals	3723	391	1241	931	6286
Eastern Signals	2958	149	986	446	4539
Roundabout Access	0	98	0	536	633
Overpass Access	0	0	323	0	323

Total trips - peak hour

	North	South	West	East	Total
Cranbourne West	97	0	0	0	97
Western Signals	372	39	124	93	629
Eastern Signals	296	15	99	45	454
Roundabout Access	0	10	0	54	63
Overpass Access	0	0	32	0	32

APPENDIX C
SIDRA RESULTS

MOVEMENT SUMMARY

Site: AM Interim (270)

Western Port Highway/Ballarto Road
Interim AM Peak
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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: Western Port Highway (south)											
1	L	168	5.0	0.790	19.7	LOS B	12.6	92.2	0.91	0.94	59.8
2	T	1595	5.0	0.790	19.7	LOS B	12.6	92.2	0.93	0.97	59.0
3	R	12	2.0	0.790	20.8	LOS C	12.1	88.1	0.94	1.10	41.2
Approach		1775	5.0	0.790	19.7	LOS B	12.6	92.2	0.93	0.97	58.9
East: Ballarto Road (east)											
4	L	12	2.0	0.022	10.0	LOS B	0.1	0.6	0.64	0.74	47.1
5	T	45	2.0	0.216	7.1	LOS A	1.0	7.1	0.68	0.66	47.3
6	R	137	2.0	0.216	14.3	LOS B	1.0	7.1	0.68	0.92	44.5
Approach		194	2.0	0.216	12.4	LOS B	1.0	7.1	0.67	0.85	45.2
North: Western Port Highway (north)											
7	L	57	2.0	0.408	5.8	LOS A	3.3	24.3	0.35	0.50	50.4
8	T	885	5.0	0.408	11.9	LOS B	3.3	24.3	0.36	0.56	67.2
9	R	296	5.0	0.408	18.9	LOS B	3.2	23.6	0.37	0.74	61.3
Approach		1238	4.9	0.408	13.3	LOS B	3.3	24.3	0.36	0.60	64.8
West: Ballarto Road (west)											
10	L	317	5.0	0.558	20.1	LOS C	4.1	30.0	0.96	1.04	58.4
11	T	12	2.0	0.212	9.6	LOS A	1.1	8.1	0.86	0.90	45.4
12	R	77	5.0	0.212	24.3	LOS C	1.1	8.1	0.86	0.97	55.8
Approach		405	4.9	0.558	20.6	LOS C	4.1	30.0	0.93	1.02	57.5
All Vehicles		3612	4.8	0.790	17.2	LOS B	12.6	92.2	0.72	0.84	59.8

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM Interim (270)

Western Port Highway/Ballarto Road
Interim PM Peak
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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: Western Port Highway (south)											
1	L	67	5.0	0.462	14.3	LOS B	3.8	27.5	0.70	0.75	64.2
2	T	942	5.0	0.462	13.5	LOS B	3.8	27.5	0.71	0.73	63.8
3	R	34	2.0	0.462	13.8	LOS B	3.5	25.6	0.72	0.88	46.2
Approach		1043	4.9	0.462	13.5	LOS B	3.8	27.5	0.71	0.74	63.2
East: Ballarto Road (east)											
4	L	5	2.0	0.018	14.6	LOS B	0.1	0.7	0.87	0.82	42.9
5	T	23	2.0	0.232	11.6	LOS B	1.4	9.9	0.93	0.95	44.0
6	R	68	2.0	0.232	18.8	LOS B	1.4	9.9	0.93	0.98	41.2
Approach		97	2.0	0.232	16.9	LOS B	1.4	9.9	0.93	0.97	41.9
North: Western Port Highway (north)											
7	L	171	2.0	0.801	9.7	LOS A	12.7	92.2	0.87	0.79	47.5
8	T	1555	5.0	0.801	16.4	LOS B	12.8	93.5	0.89	0.80	61.5
9	R	312	5.0	0.801	24.3	LOS C	12.8	93.5	0.93	0.87	56.7
Approach		2037	4.7	0.801	17.1	LOS B	12.8	93.5	0.90	0.81	59.5
West: Ballarto Road (west)											
10	L	334	5.0	0.361	14.6	LOS B	2.0	14.7	0.74	0.80	62.9
11	T	34	2.0	0.379	7.3	LOS A	2.0	14.5	0.74	0.71	46.5
12	R	234	5.0	0.379	21.9	LOS C	2.0	14.5	0.74	0.96	58.3
Approach		601	4.8	0.379	17.0	LOS B	2.0	14.7	0.74	0.86	60.0
All Vehicles		3778	4.7	0.801	16.1	LOS B	12.8	93.5	0.82	0.80	60.0

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Cranbourne-Frankston Rd - West Access - AM Intermediate

Cranbourne-Frankston Road/West Site Access
Intermediate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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 East: Woodlands Road											
21	L	11	2.0	0.042	56.9	LOS E	0.7	5.0	0.90	0.69	23.5
22	T	1	2.0	0.042	48.6	LOS D	0.7	5.0	0.90	0.62	23.8
23	R	2	2.0	0.042	56.5	LOS E	0.7	5.0	0.90	0.69	23.5
Approach		14	2.0	0.042	56.2	LOS E	0.7	5.0	0.90	0.69	23.5
North East: Cranbourne-Frankston Rd (east)											
24	L	1	2.0	0.003	27.6	LOS C	0.0	0.2	0.57	0.63	34.1
25	T	1341	5.0	0.804	32.3	LOS C	34.6	252.4	0.93	0.86	30.3
26	R	34	2.0	0.368	71.7	LOS E	2.0	14.6	1.00	0.72	20.2
Approach		1376	4.9	0.804	33.3	LOS C	34.6	252.4	0.94	0.86	29.9
North West: West Site Access											
27	L	135	2.0	0.300	13.0	LOS B	2.4	17.0	0.38	0.69	44.3
28	T	1	2.0	0.808	49.3	LOS D	22.5	160.0	1.00	0.91	23.4
29	R	711	2.0	0.808	56.9	LOS E	22.5	160.0	0.98	0.91	23.5
Approach		846	2.0	0.808	49.9	LOS D	22.5	160.0	0.89	0.87	25.4
South West: Cranbourne-Frankston Rd (west)											
30	L	178	2.0	0.139	8.1	LOS A	0.8	5.7	0.14	0.63	49.0
31	T	1059	5.0	0.635	27.7	LOS C	23.8	174.0	0.83	0.74	32.5
32	R	3	2.0	0.034	69.0	LOS E	0.2	1.3	0.97	0.63	20.7
Approach		1240	4.6	0.635	25.0	LOS C	23.8	174.0	0.73	0.73	34.2
All Vehicles		3476	4.1	0.808	34.5	LOS C	34.6	252.4	0.85	0.81	29.9

Level of Service (LOS) Method: Delay (HCM 2000).
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 used.

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
P9	Across SE approach	53	21.6	LOS C	0.1	0.1	0.60	0.60
P11	Across NE approach	53	40.0	LOS E	0.1	0.1	0.82	0.82
P12	Across NE approach	53	36.0	LOS D	0.1	0.1	0.78	0.78
P13	Across NW approach	53	22.8	LOS C	0.1	0.1	0.62	0.62
All Pedestrians		212	30.1	LOS D			0.70	0.70

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: Cranbourne-Frankston Rd - West Access - PM Intermediate

Cranbourne-Frankston Road/West Site Access
Intermediate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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 East: Woodlands Road											
21	L	6	2.0	0.025	56.5	LOS E	0.4	3.0	0.89	0.67	23.6
22	T	1	2.0	0.025	48.3	LOS D	0.4	3.0	0.89	0.60	23.9
23	R	1	2.0	0.025	56.2	LOS E	0.4	3.0	0.89	0.67	23.7
Approach		8	2.0	0.025	55.5	LOS E	0.4	3.0	0.89	0.66	23.6
North East: Cranbourne-Frankston Rd (east)											
24	L	2	2.0	0.005	22.2	LOS C	0.1	0.4	0.49	0.65	37.2
25	T	1356	5.0	0.684	22.4	LOS C	29.0	212.0	0.80	0.73	35.4
26	R	101	2.0	0.662	69.3	LOS E	6.1	43.5	1.00	0.82	20.7
Approach		1459	4.8	0.684	25.7	LOS C	29.0	212.0	0.81	0.73	33.7
North West: West Site Access											
27	L	67	2.0	0.174	15.1	LOS B	1.4	9.7	0.42	0.68	42.6
28	T	1	2.0	0.686	55.1	LOS E	10.3	73.5	1.00	0.84	22.1
29	R	355	2.0	0.686	63.0	LOS E	10.3	73.5	1.00	0.84	22.0
Approach		423	2.0	0.686	55.4	LOS E	10.3	73.5	0.91	0.82	23.9
South West: Cranbourne-Frankston Rd (west)											
30	L	533	2.0	0.421	8.3	LOS A	3.2	22.5	0.18	0.65	48.8
31	T	1403	5.0	0.708	22.9	LOS C	30.7	223.8	0.82	0.74	35.1
32	R	11	2.0	0.069	64.3	LOS E	0.6	4.2	0.95	0.68	21.7
Approach		1946	4.2	0.708	19.1	LOS B	30.7	223.8	0.64	0.72	37.9
All Vehicles		3837	4.2	0.708	25.7	LOS C	30.7	223.8	0.74	0.73	34.1

Level of Service (LOS) Method: Delay (HCM 2000).
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 used.

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
P9	Across SE approach	53	16.0	LOS B	0.1	0.1	0.52	0.52
P11	Across NE approach	53	52.3	LOS E	0.2	0.2	0.93	0.93
P12	Across NE approach	53	47.7	LOS E	0.2	0.2	0.89	0.89
P13	Across NW approach	53	17.1	LOS B	0.1	0.1	0.53	0.53
All Pedestrians		212	33.3	LOS D			0.72	0.72

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: Cranbourne-Frankston Rd - West Access - AM Ultimate - 2046

Cranbourne-Frankston Road/West Site Access
Ultimate AM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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 East: Woodlands Road											
21	L	8	2.0	0.048	60.0	LOS E	0.7	4.7	0.92	0.69	22.8
22	T	2	2.0	0.048	51.8	LOS D	0.7	4.7	0.92	0.63	23.0
23	R	2	2.0	0.048	59.5	LOS E	0.7	4.7	0.92	0.68	22.9
Approach		13	2.0	0.048	58.6	LOS E	0.7	4.7	0.92	0.68	22.8
North East: Cranbourne-Frankston Rd (east)											
24	L	1	2.0	0.002	20.7	LOS C	0.0	0.2	0.46	0.64	38.2
25	T	2603	5.0	0.835	25.6	LOS C	43.1	314.8	0.90	0.85	33.5
26	R	20	2.0	0.218	70.7	LOS E	1.2	8.5	0.99	0.70	20.5
Approach		2624	5.0	0.835	25.9	LOS C	43.1	314.8	0.90	0.85	33.3
North West: West Site Access											
27	L	78	2.0	0.225	16.9	LOS B	1.8	12.7	0.47	0.70	41.1
28	T	1	2.0	0.822	59.8	LOS E	14.1	100.1	1.00	0.93	21.1
29	R	451	2.0	0.822	67.6	LOS E	14.1	100.1	1.00	0.93	21.1
Approach		529	2.0	0.822	60.2	LOS E	14.1	100.1	0.92	0.89	22.8
South West: Cranbourne-Frankston Rd (west)											
30	L	113	2.0	0.084	8.0	LOS A	0.4	2.6	0.11	0.63	49.2
31	T	2329	5.0	0.748	21.9	LOS C	34.3	250.3	0.83	0.76	35.6
32	R	2	2.0	0.023	68.5	LOS E	0.1	0.9	0.97	0.61	20.8
Approach		2444	4.9	0.748	21.3	LOS C	34.3	250.3	0.80	0.75	36.1
All Vehicles		5611	4.6	0.835	27.2	LOS C	43.1	314.8	0.86	0.81	32.9

Level of Service (LOS) Method: Delay (HCM 2000).
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 used.

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
P9	Across SE approach	53	14.5	LOS B	0.1	0.1	0.49	0.49
P11	Across NE approach	53	54.2	LOS E	0.2	0.2	0.95	0.95
P12	Across NE approach	53	49.5	LOS E	0.2	0.2	0.91	0.91
P13	Across NW approach	53	15.5	LOS B	0.1	0.1	0.51	0.51
All Pedestrians		212	33.4	LOS D			0.71	0.71

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: Cranbourne-Frankston Rd - West Access - PM Ultimate - 2046

Cranbourne-Frankston Road/West Site Access
Ultimate PM
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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 East: Woodlands Road											
21	L	5	2.0	0.031	58.8	LOS E	0.4	3.1	0.91	0.67	23.1
22	T	1	2.0	0.031	50.5	LOS D	0.4	3.1	0.91	0.61	23.3
23	R	2	2.0	0.031	58.3	LOS E	0.4	3.1	0.91	0.67	23.2
Approach		8	2.0	0.031	57.6	LOS E	0.4	3.1	0.91	0.66	23.1
North East: Cranbourne-Frankston Rd (east)											
24	L	2	2.0	0.004	20.8	LOS C	0.1	0.4	0.46	0.65	38.1
25	T	1964	5.0	0.630	19.7	LOS B	26.0	190.0	0.74	0.67	37.2
26	R	59	2.0	0.644	73.6	LOS E	3.7	26.3	1.00	0.79	19.9
Approach		2025	4.9	0.644	21.3	LOS C	26.0	190.0	0.75	0.68	36.2
North West: West Site Access											
27	L	39	2.0	0.104	13.9	LOS B	0.7	5.1	0.38	0.67	43.6
28	T	2	2.0	0.414	50.8	LOS D	6.2	43.9	0.95	0.76	23.2
29	R	225	2.0	0.414	58.7	LOS E	6.2	43.9	0.95	0.79	23.1
Approach		266	2.0	0.414	52.1	LOS D	6.2	43.9	0.87	0.77	24.8
South West: Cranbourne-Frankston Rd (west)											
30	L	338	2.0	0.257	8.1	LOS A	1.5	10.6	0.14	0.64	49.0
31	T	2045	5.0	0.656	20.2	LOS C	27.7	202.4	0.76	0.69	36.8
32	R	7	2.0	0.080	69.6	LOS E	0.4	3.1	0.98	0.66	20.6
Approach		2391	4.6	0.656	18.6	LOS B	27.7	202.4	0.67	0.68	38.1
All Vehicles		4691	4.6	0.656	21.8	LOS C	27.7	202.4	0.72	0.69	36.1

Level of Service (LOS) Method: Delay (HCM 2000).
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 used.

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
P9	Across SE approach	53	14.5	LOS B	0.1	0.1	0.49	0.49
P11	Across NE approach	53	54.2	LOS E	0.2	0.2	0.95	0.95
P12	Across NE approach	53	49.5	LOS E	0.2	0.2	0.91	0.91
P13	Across NW approach	53	15.5	LOS B	0.1	0.1	0.51	0.51
All Pedestrians		212	33.4	LOS D			0.71	0.71

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: Cranbourne-Frankston Rd - East Access - AM Ultimate - 2046

Cranbourne-Frankston Road/East Site Access
AM Peak Ultimate
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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
North East: Cranbourne-Frankston Road (east)											
25	T	2244	5.0	0.566	9.4	LOS A	21.3	155.7	0.54	0.49	45.7
26	R	125	2.0	0.632	65.6	LOS E	7.3	52.3	1.00	0.81	21.5
Approach		2369	4.8	0.632	12.4	LOS B	21.3	155.7	0.56	0.51	43.2
North West: East site access											
27	L	51	2.0	0.078	12.0	LOS B	0.8	5.9	0.33	0.67	45.2
29	R	417	2.0	0.569	55.1	LOS E	11.2	79.6	0.96	0.82	24.0
Approach		467	2.0	0.569	50.5	LOS D	11.2	79.6	0.89	0.80	25.3
South West: Cranbourne-Frankston Road (west)											
30	L	741	2.0	0.633	9.5	LOS A	7.7	54.5	0.28	0.69	47.6
31	T	1669	5.0	0.544	19.0	LOS B	20.9	152.3	0.70	0.63	37.8
Approach		2411	4.1	0.633	16.0	LOS B	20.9	152.3	0.57	0.65	40.4
All Vehicles		5247	4.2	0.633	17.5	LOS B	21.3	155.7	0.60	0.60	39.4

Level of Service (LOS) Method: Delay (HCM 2000).
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 used.

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
P11	Across NE approach	53	45.9	LOS E	0.2	0.2	0.88	0.88
P12	Across NE approach	53	44.2	LOS E	0.2	0.2	0.86	0.86
P13	Across NW approach	53	16.0	LOS B	0.1	0.1	0.52	0.52
All Pedestrians		159	35.4	LOS D			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: Cranbourne-Frankston Rd - East Access - PM Ultimate - 2046

Cranbourne-Frankston Road/East Site Access
PM Peak Ultimate
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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
North East: Cranbourne-Frankston Road (east)											
25	T	1678	5.0	0.487	13.8	LOS B	17.9	130.7	0.60	0.54	41.7
26	R	93	2.0	0.552	66.6	LOS E	5.4	38.6	1.00	0.78	21.3
Approach		1771	4.8	0.552	16.6	LOS B	17.9	130.7	0.62	0.55	39.7
North West: East site access											
27	L	83	2.0	0.116	12.2	LOS B	1.4	10.1	0.34	0.68	45.1
29	R	536	2.0	0.559	45.9	LOS D	14.8	105.6	0.88	0.82	26.7
Approach		619	2.0	0.559	41.4	LOS D	14.8	105.6	0.81	0.80	28.2
South West: Cranbourne-Frankston Road (west)											
30	L	621	2.0	0.509	8.7	LOS A	5.4	38.1	0.22	0.66	48.4
31	T	1464	5.0	0.554	24.5	LOS C	20.3	148.4	0.77	0.69	34.3
Approach		2085	4.1	0.554	19.8	LOS B	20.3	148.4	0.61	0.68	37.6
All Vehicles		4475	4.1	0.559	21.5	LOS C	20.3	148.4	0.64	0.65	36.7

Level of Service (LOS) Method: Delay (HCM 2000).
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 used.

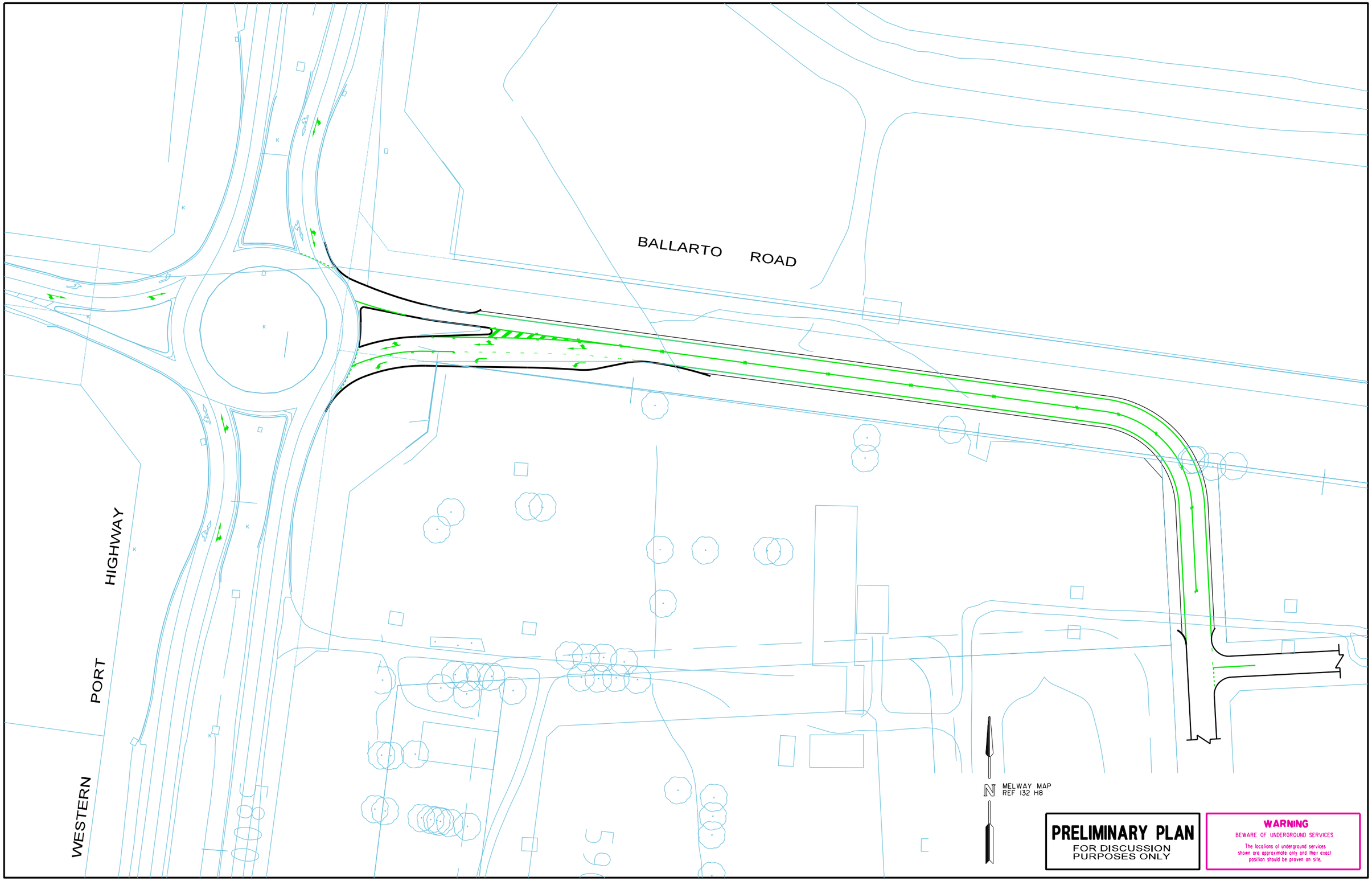
Movement Performance - Pedestrians

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
P11	Across NE approach	53	36.8	LOS D	0.1	0.1	0.78	0.78
P12	Across NE approach	53	35.3	LOS D	0.1	0.1	0.77	0.77
P13	Across NW approach	53	21.0	LOS C	0.1	0.1	0.59	0.59
All Pedestrians		159	31.0	LOS D			0.71	0.71

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.

APPENDIX D

BALLARTO ROAD INTERIM ACCESS FUNCTIONAL LAYOUT PLANS



REVISION	REVISION NOTES	REVISION DATE

GENERAL NOTES
1. BASE INFORMATION FROM AERIAL IMAGE & SURVEY FILE (TRAFFIX)2106.dwg

DESIGNED	G. RAKITA 14 JULY 2013
CHECKED/APPROVED	R.THOMSON 15 JULY 2013
FILE NAME	GRP14772-01.dgn
ISSUE	A

TraffixDesign
Traffic Engineering Design and Survey
Suite 8/431 Burke Road TEL : (03) 9822-2888
GLEN IRIS, VICTORIA 3146 FAX : (03) 9822-7444
www.traffixgroup.com.au

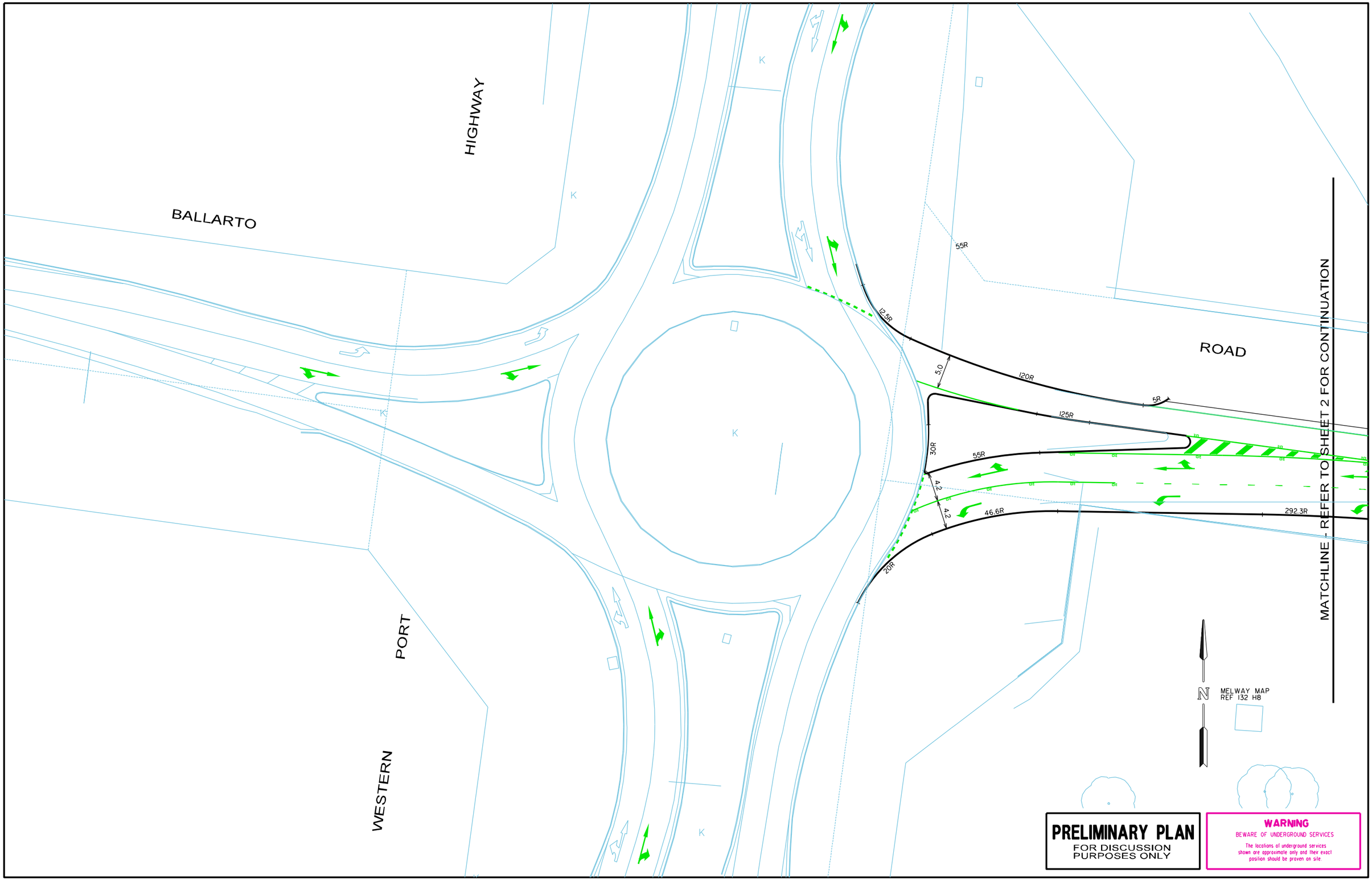
BALLARTO ROAD / WESTERN PORT HIGHWAY

CRANBOURNE WEST

CITY OF CASEY

FUNCTIONAL LAYOUT - INTERIM

SCALE 0 5 10 15 20 | SHEET No. 4 of 4 | DWG No. G14772-04



REVISION	REVISION NOTES	REVISION DATE

GENERAL NOTES
1. BASE INFORMATION FROM AERIAL IMAGE & SURVEY FILE (TRAFFIX)2106.dwg

DESIGNED	G. RAKITA 14 JULY 2013
CHECKED/APPROVED	R.THOMSON 15 JULY 2013
FILE NAME	GRP14772-01.dgn
ISSUE	A

TraffixDesign
Traffic Engineering Design and Survey
Suite 8/431 Burke Road TEL : (03) 9822-2888
GLEN IRIS, VICTORIA 3146 FAX : (03) 9822-7444
www.traffixgroup.com.au

BALLARTO ROAD / WESTERN PORT HIGHWAY
CRANBOURNE WEST
CITY OF CASEY

FUNCTIONAL LAYOUT - INTERIM

SCALE 0 2.5 5 7.5 10 | SHEET No. 1 of 4 | DWG No. G14772-01

BALLARTO

ROAD

MATCHLINE - REFER TO SHEET 1 FOR CONTINUATION

MATCHLINE - REFER TO SHEET 3 FOR CONTINUATION

20R

20R

292.3R

100R

1.0

3.5

3.5

1.0

33R

24R

N

MELWAY MAP
REF 132 H8

PRELIMINARY PLAN
FOR DISCUSSION
PURPOSES ONLY

WARNING
BEWARE OF UNDERGROUND SERVICES
The locations of underground services shown are approximate only and their exact position should be proven on site.

REVISION	REVISION NOTES	REVISION DATE

GENERAL NOTES
1. BASE INFORMATION FROM AERIAL IMAGE & SURVEY FILE (TRAFFIX)2106.dwg

DESIGNED	G RAKITA 14 JULY 2013
CHECKED/APPROVED	R THOMSON 15 JULY 2013
FILE NAME	GRP14772-01.dgn
ISSUE	A

TraffixDesign
Traffic Engineering Design and Survey
Suite 8/431 Burke Road GLEN IRIS, VICTORIA 3146
TEL : (03) 9822-2888
FAX : (03) 9822-7444
www.traffixgroup.com.au

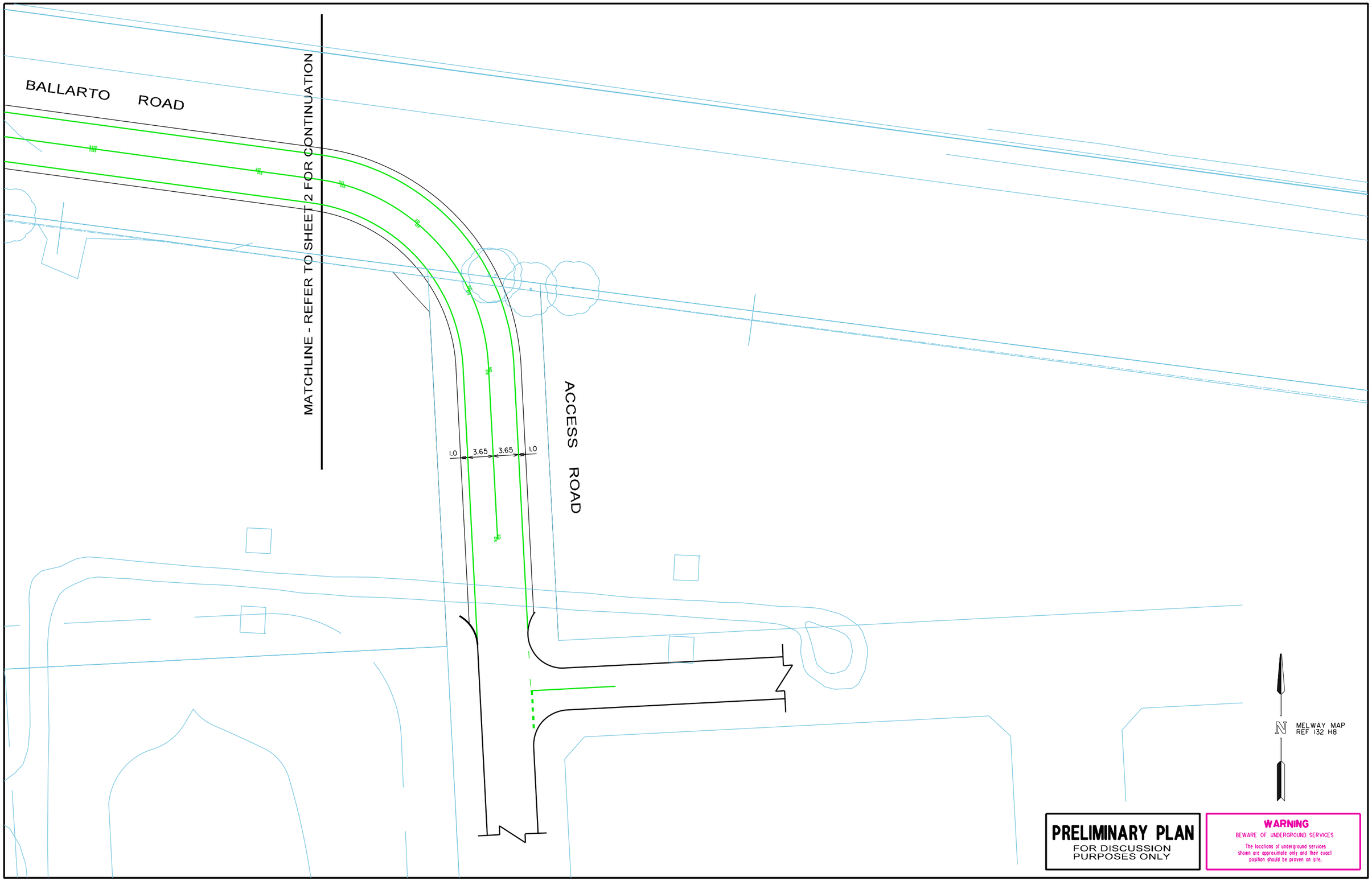
BALLARTO ROAD / WESTERN PORT HIGHWAY
CRANBOURNE WEST
CITY OF CASEY

FUNCTIONAL LAYOUT - INTERIM

SCALE 0 2.5 5 7.5 10

SHEET No. 2 of 4

DWG No. G14772-02



PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY

WARNING
BEWARE OF UNDERGROUND SERVICES
The locations of underground services shown are approximate only and their exact position should be proven on site.

REVISION	REVISION NOTES	REVISION DATE

GENERAL NOTES
1. BASE INFORMATION FROM AERIAL IMAGE & SURVEY FILE (TRAFFIX)2106.dwg

DESIGNED G. RAKITA 14 JULY 2013
CHECKED/APPROVED R. THOMSON 15 JULY 2013
FILE NAME GRP14772-01.dgn
ISSUE A

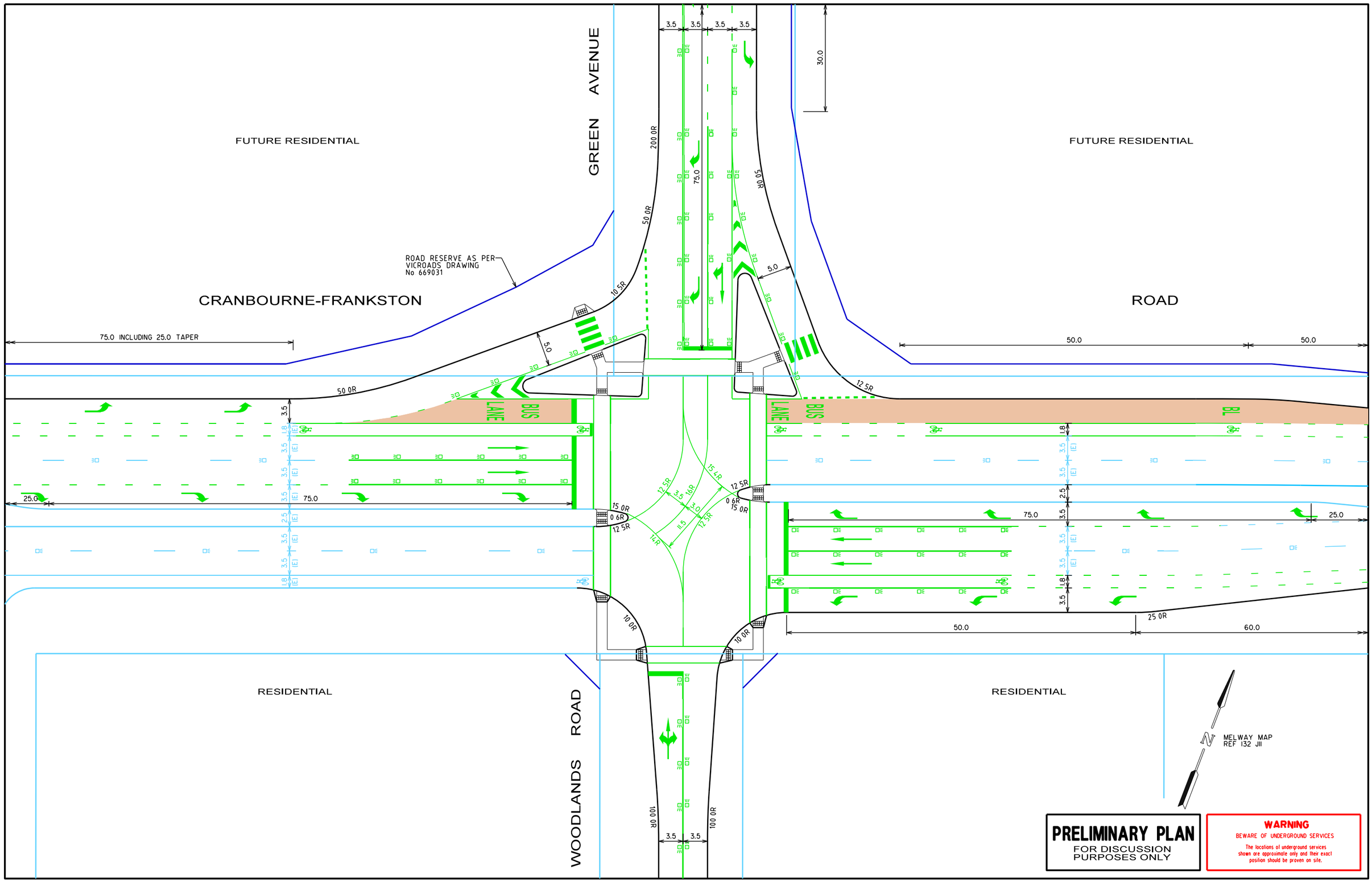
TraffixDesign
Traffic Engineering Design and Survey
Suite 8/431 Burke Road TEL : (03) 9822-2888
GLEN IRIS, VICTORIA 3146 FAX : (03) 9822-7444
www.traffixgroup.com.au

BALLARTO ROAD / WESTERN PORT HIGHWAY
CRANBOURNE WEST
CITY OF CASEY
FUNCTIONAL LAYOUT - INTERIM

SCALE 0 2.5 5 7.5 10 | SHEET No. 3 of 4 | DWG No. G14772-03

APPENDIX E

CRANBOURNE-FRANKSTON ROAD INTERIM ACCESS FUNCTIONAL LAYOUT PLANS



REVISION	REVISION NOTES	REVISION DATE
B	BUS JUMP LANES ADDED AND ROAD RESERVES MODIFIED TO SUIT	06 MARCH 2014

GENERAL NOTES

1 BASE INFORMATION FROM SURVEY FILE No 003UD2000MplanRevN dwg
2 ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL
3 MAIN ROAD - CRANBOURNE-FRANKSTON ROAD (SPEED ZONE 80km/h)
4 ALL PROPOSED FOOTPATHS AND PRAM CROSSINGS ARE TO BE CONSTRUCTED WITH TACTILE GROUND SURFACE INDICATORS TO DDA COMPLIANCE GUIDELINES REFER TO AS 1428 4 2009

DESIGNED	P DEHN 29 MAY 2013
CHECKED/APPROVED	R THOMSON 29 MAY 2013
FILE NAME	G14772-03 dgn
ISSUE	B

TraffixDesign
Traffic Engineering Design and Survey
Suite 8/431 Burke Road TEL : (03) 9822-2888
GLEN IRIS, VICTORIA 3146 FAX : (03) 9822-7444
www.traffixgroup.com.au

CRANBOURNE-FRANKSTON ROAD
CRANBOURNE SOUTH
CITY OF CASEY
FUNCTIONAL LAYOUT PLAN - INTERIM

SCALE 0 2.5 5 7.5 10 | SHEET No. | DWG No. G14772-03

FUTURE RESIDENTIAL

FUTURE ACTIVITY CENTRE

CRANBOURNE - FRANKSTON ROAD

RESIDENTIAL

RESIDENTIAL

CHEVRON AVENUE

25.0
75.0
30.0R
30.0R
8.5R
50.0R
4.0
4.0
30.0R
10.5R
8.5R
15.0R
3.5
1.8
3.5 (E)
20.0 (E)
70.0 (E)
60.0 (E)
75.0 (E)
20.0 (E)
10.0
5.0

FOR CONTINUATION REFER TO GRP14772-05

MELWAY MAP REF 132 J11

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY

WARNING
BEWARE OF UNDERGROUND SERVICES
The locations of underground services shown are approximate only and their exact position should be proven on site.

REVISION	REVISION NOTES	REVISION DATE
B	LAYOUT CHANGED TO LEFT-IN / LEFT-OUT AND ROAD RESERVES MODIFIED TO SUIT	06 MARCH 2014

GENERAL NOTES

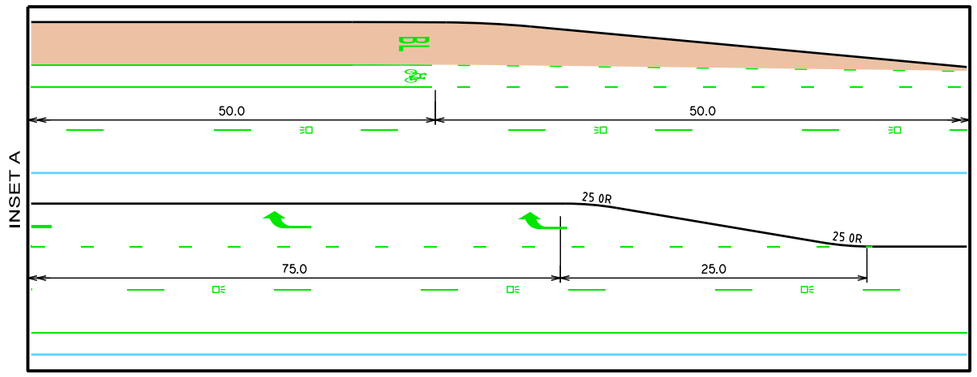
1 BASE INFORMATION FROM SURVEY FILE No 003UD2000MplanRevN.dwg
2 ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL
3 MAIN ROAD - CRANBOURNE-FRANKSTON ROAD (SPEED ZONE 80km/h)
4 ALL PROPOSED FOOTPATHS AND PRAM CROSSINGS ARE TO BE CONSTRUCTED WITH TACTILE GROUND SURFACE INDICATORS TO DDA COMPLIANCE GUIDELINES REFER TO AS 1428.4 2009

DESIGNED P DEHN 29 MAY 2013
CHECKED/APPROVED R THOMSON 29 MAY 2013
FILE NAME G14772-03.dgn
ISSUE B

TraffixDesign
Traffic Engineering Design and Survey
Suite 8/431 Burke Road GLEN IRIS, VICTORIA 3146
TEL : (03) 9822-2888
FAX : (03) 9822-7444
www.traffixgroup.com.au

CRANBOURNE-FRANKSTON ROAD
CRANBOURNE SOUTH
CITY OF CASEY
FUNCTIONAL LAYOUT PLAN - INTERIM

SCALE 0 2.5 5 7.5 10
SHEET No.
DWG No. G14772-04



FUTURE ACTIVITY CENTRE

FUTURE RESIDENTIAL

ROAD RESERVE AS PER VICROADS DRAWING No. 669031

CRANBOURNE - FRANKSTON ROAD

RESIDENTIAL

BUS LANE

BUS LANE

MELWAY MAP REF 132 J11

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY

WARNING
BEWARE OF UNDERGROUND SERVICES
The locations of underground services shown are approximate only and their exact position should be proven on site.

FOR CONTINUATION REFER TO GRP14772-04

FOR CONTINUATION REFER TO INSET A

REVISION	REVISION NOTES	REVISION DATE
B	BUS JUMP LANES ADDED AND ROAD RESERVES MODIFIED TO SUIT	06 MARCH 2014

GENERAL NOTES

1 BASE INFORMATION FROM SURVEY FILE No 003UD2000MplanRevN.dwg
2 ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL
3 MAIN ROAD - CRANBOURNE-FRANKSTON ROAD (SPEED ZONE 80km/h)
4 ALL PROPOSED FOOTPATHS AND PRAM CROSSINGS ARE TO BE CONSTRUCTED WITH TACTILE GROUND SURFACE INDICATORS TO DDA COMPLIANCE GUIDELINES REFER TO AS 1428.4 2009

DESIGNED	P DEHN 29 MAY 2013
CHECKED/APPROVED	R THOMSON 29 MAY 2013
FILE NAME	G14772-03.dgn
ISSUE	B

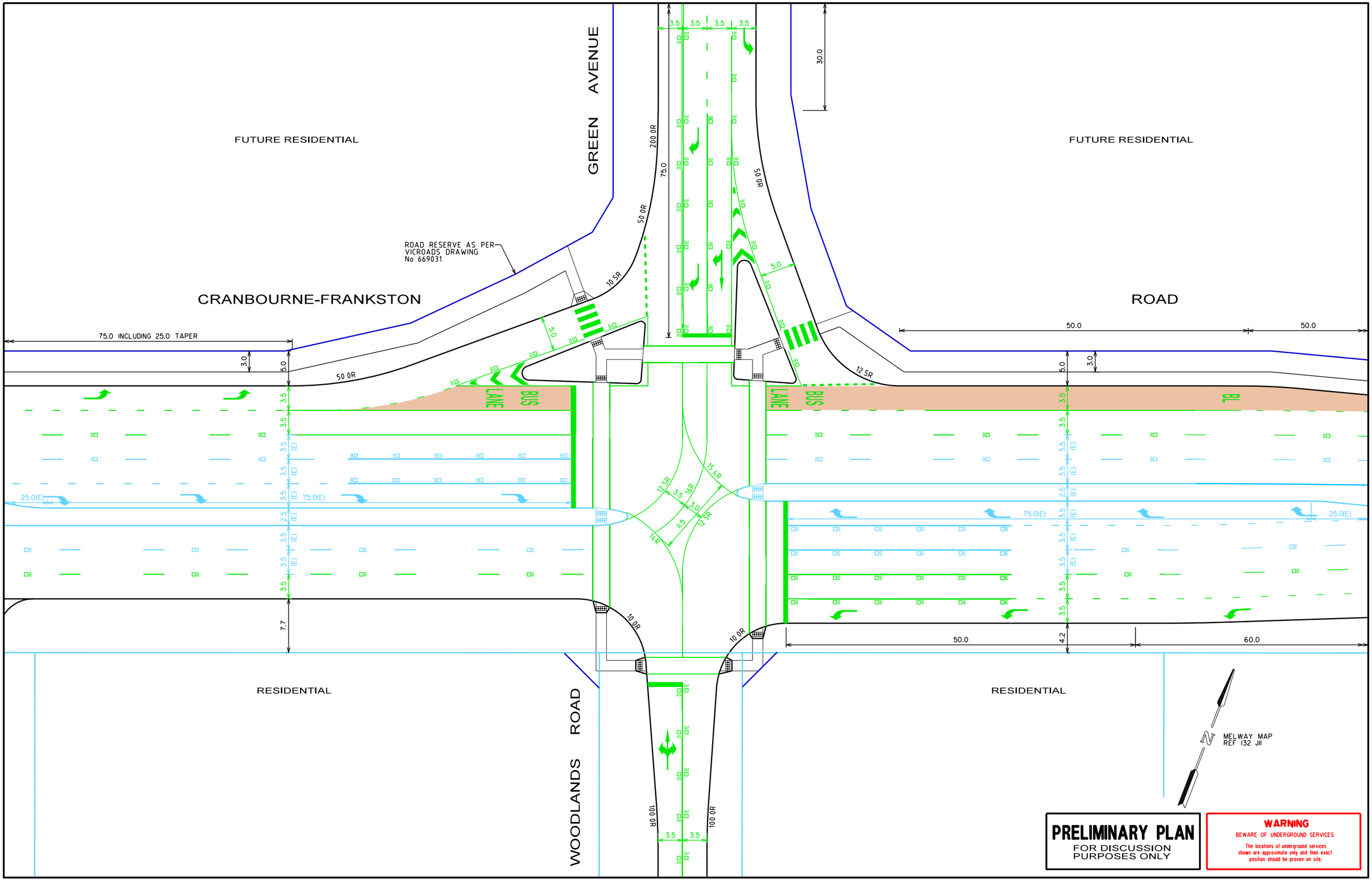
TraffixDesign
Traffic Engineering Design and Survey
Suite 8/431 Burke Road GLEN IRIS, VICTORIA 3146
TEL : (03) 9822-2888 FAX : (03) 9822-7444
www.traffixgroup.com.au

CRANBOURNE-FRANKSTON ROAD
CRANBOURNE SOUTH
CITY OF CASEY
FUNCTIONAL LAYOUT PLAN - INTERIM

SCALE 0 2.5 5 7.5 10 | SHEET No. | DWG No. G14772-05

APPENDIX F

CRANBOURNE-FRANKSTON ROAD ULTIMATE ACCESS FUNCTIONAL LAYOUT PLANS



PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY

WARNING
BEWARE OF UNDERGROUND SERVICES
The locations of underground services shown are approximate only and their exact position should be proven on site.

REVISION	REVISION NOTES	REVISION DATE

GENERAL NOTES

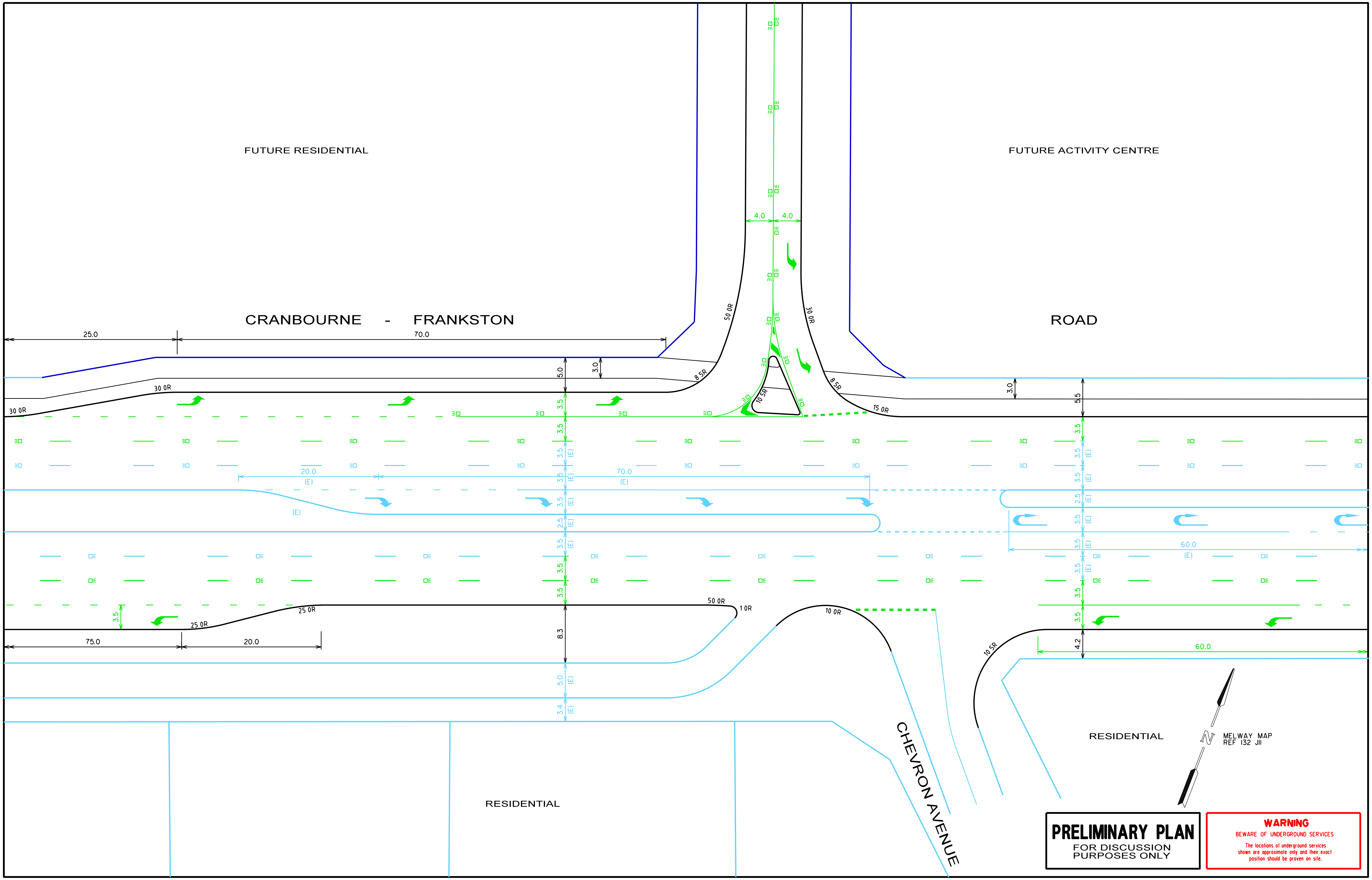
1 BASE INFORMATION FROM SURVEY FILE No 003UD2000MplanRevN dwg
2 ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL
3 MAIN ROAD - CRANBOURNE-FRANKSTON ROAD (SPEED ZONE 80km/h)
4 ALL PROPOSED FOOTPATHS AND PRAM CROSSINGS ARE TO BE CONSTRUCTED WITH TACTILE GROUND SURFACE INDICATORS TO DDA COMPLIANCE GUIDELINES REFER TO AS 1428 4 2009

DESIGNED	G RAKITA 07 MARCH 2014
CHECKED/APPROVED	R THOMSON 07 MARCH 2014
FILE NAME	G14772-04 dgn
ISSUE	A

TraffixDesign
Traffic Engineering Design and Survey
Suite 8/431 Burke Road TEL : (03) 9822-2888
GLEN IRIS, VICTORIA 3146 FAX : (03) 9822-7444
www.traffixgroup.com.au

CRANBOURNE-FRANKSTON ROAD
CRANBOURNE SOUTH
CITY OF CASEY
FUNCTIONAL LAYOUT PLAN - ULTIMATE

SCALE	SHEET No.	DWG No.
0 2.5 5 7.5 10		G14772-06



PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY

WARNING
BEWARE OF UNDERGROUND SERVICES
The locations of underground services shown are approximate only and their exact position should be proven on site.

REVISION	REVISION NOTES	REVISION DATE

GENERAL NOTES

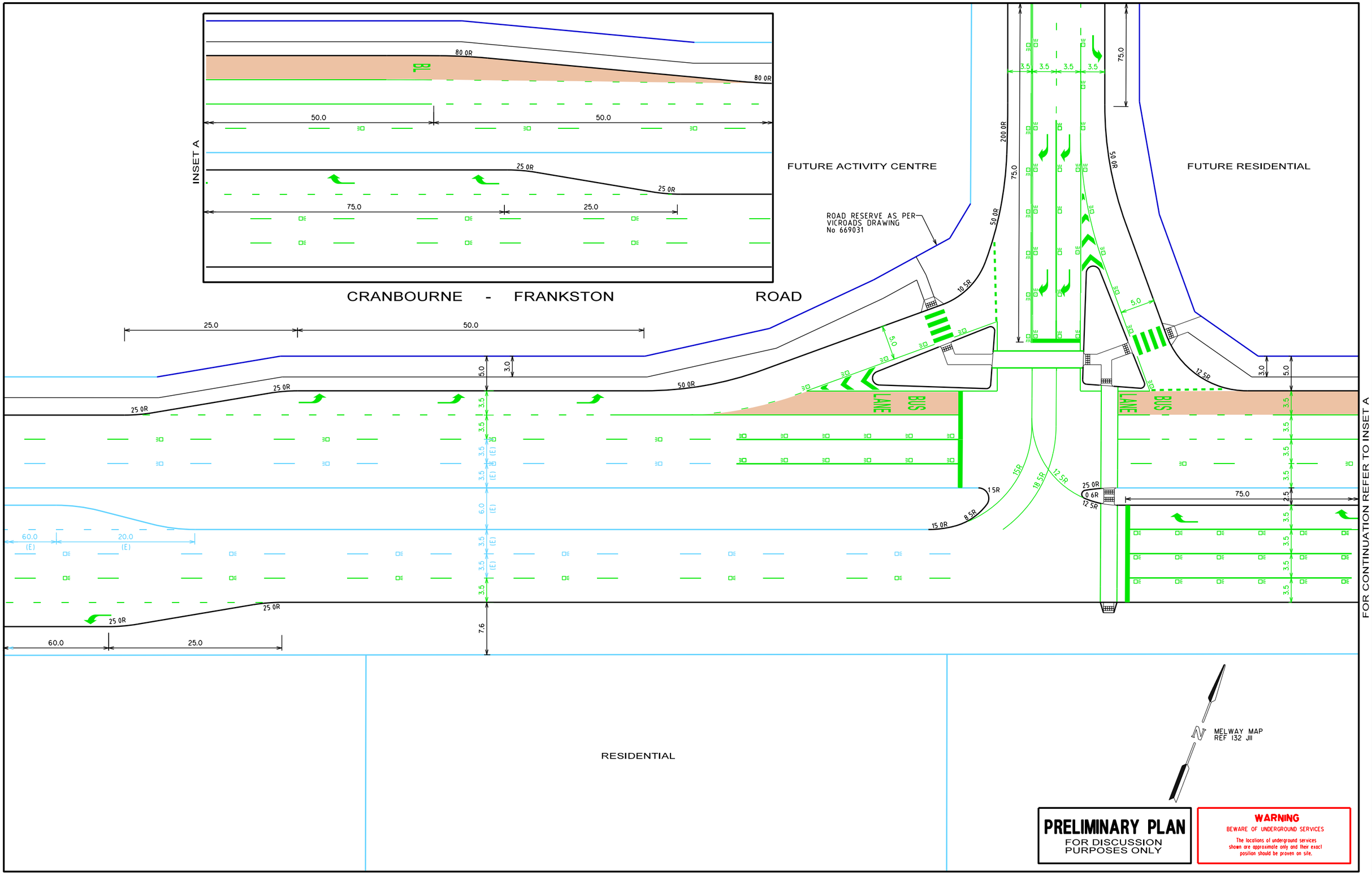
1. BASE INFORMATION FROM SURVEY FILE No 003UD2000MplanRevN dwg
2. ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL
3. MAIN ROAD - CRANBOURNE-FRANKSTON ROAD (SPEED ZONE 80km/h)
4. ALL PROPOSED FOOTPATHS AND PRAM CROSSINGS ARE TO BE CONSTRUCTED WITH TACTILE GROUND SURFACE INDICATORS TO DDA COMPLIANCE GUIDELINES REFER TO AS 1428.4 2009

DESIGNED: G RAKITA 07 MARCH 2014
CHECKED/APPROVED: R THOMSON 07 MARCH 2014
FILE NAME: G14772-04 dgn
ISSUE: A

TraffixDesign
Traffic Engineering Design and Survey
Suite 8/431 Burke Road TEL : (03) 9822-2888
GLEN IRIS, VICTORIA 3146 FAX : (03) 9822-7444
www.traffixgroup.com.au

CRANBOURNE-FRANKSTON ROAD
CRANBOURNE SOUTH
CITY OF CASEY
FUNCTIONAL LAYOUT PLAN - ULTIMATE

SCALE 0 2.5 5 7.5 10 | SHEET No. | DWG No. G14772-07



REVISION	REVISION NOTES	REVISION DATE

GENERAL NOTES

1 BASE INFORMATION FROM SURVEY FILE No 003UD2000MplanRevN.dwg
2 ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL
3 MAIN ROAD - CRANBOURNE-FRANKSTON ROAD (SPEED ZONE 80km/h)
4 ALL PROPOSED FOOTPATHS AND PRAM CROSSINGS ARE TO BE CONSTRUCTED WITH TACTILE GROUND SURFACE INDICATORS TO DDA COMPLIANCE GUIDELINES REFER TO AS 1428.4 2009

DESIGNED	G RAKITA 07 MARCH 2014
CHECKED/APPROVED	R THOMSON 07 MARCH 2014
FILE NAME	G14772-04.dgn
ISSUE	A

TraffixDesign
Traffic Engineering Design and Survey
Suite 8/431 Burke Road GLEN IRIS, VICTORIA 3146
TEL : (03) 9822-2888 FAX : (03) 9822-7444
www.traffixgroup.com.au

CRANBOURNE-FRANKSTON ROAD
CRANBOURNE SOUTH
CITY OF CASEY
FUNCTIONAL LAYOUT PLAN - ULTIMATE

SCALE 0 2.5 5 7.5 10 | SHEET No. | DWG No. G14772-08