Traffix Group

Traffic Engineering Assessment

Amendment C155 to the Glen Eira Planning Scheme

East Village Planning Panel

Date of Statement: 22 November 2019
Date of Inspection: 19 November 2019

Prepared for: Griffith Avenue Pty Ltd, Fordtrans Pty Ltd and Make 246 EBRB Pty Ltd
Instructed By: Planning & Property Partners Pty Ltd

Reference: G24360A-01

STATEMENT TO PLANNING PANELS VICTORIA BY JASON LEE WALSH, TRAFFIC ENGINEER

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1. Introduction

I have been instructed by Planning & Property Partners Pty Ltd on behalf of Griffith Avenue Pty Ltd, Fordtrans Pty Ltd and Make 246 EBRB Pty Ltd (the Landowners) to undertake a traffic engineering assessment of Amendment C155 to the Glen Eira Planning Scheme.

My qualifications and experience to undertake the following assessment are set out in Appendix A.

In the course of preparing this statement, I inspected the subject site most recently on 19th November 2019, and have reviewed background material and the associated draft documentation relating to the Amendment including:

- East Village Structure Plan 2018 -2031.
- East Village Access and Movement Report – GTA October 2018.
- East Village Comprehensive Development Plan – VPA December 2018.
- East Village Development Contribution Plan – VPA October 2018.

I have been instructed to consider the above documentation, in addition to:

- The *Traffix Group* memorandum titled 'Without Prejudice – East Village – Development Contributions Plan – Proposed Extent of Traffic Infrastructure Works', dated 1 November 2019, and the subsequent "Without Prejudice – Memorandum" dated 18th November 2019.
- The proposed landowner revisions to the Future Urban Structure Plan (Plan 1) and other proposed changes to the CDP and Amendment documents (including the landowner proposed road cross-sections).

These memorandums are attached as Appendix B.

My firm was initially engaged in mid 2018 to provide preliminary advice to the Landowners with regard to the documentation that was being prepared by VPA in relation to the proposed Amendment. Members of my team were involved with providing that preliminary advice.

On 27th February 2019, I attended a meeting with VPA, GTA, Council and the Landowners to discuss the traffic infrastructure works proposed by the CDP and DCP.

On 8th September 2019, I attended a meeting with GTA, Council and the Landowners to further discuss the DCP works in anticipation of the Panel Hearing.

At both meetings, I expressed my views with regard to rationalising the extent of works proposed by the CDP and DCP.

2. East Village Precinct

A Comprehensive Development Plan (CDP) for a mixed-use precinct named East Village has been prepared by the Victorian Planning Authority (VPA) in conjunction with Glen Eira City Council.

The proposed East Village Precinct applies to approximately 24 hectares of land located approximately 12 kilometres south-east of Melbourne CBD in Bentleigh East, with North Road forming the northern boundary and East Boundary Road the western boundary.

The location of the proposed precinct in Bentleigh East is provided at Figure 1.

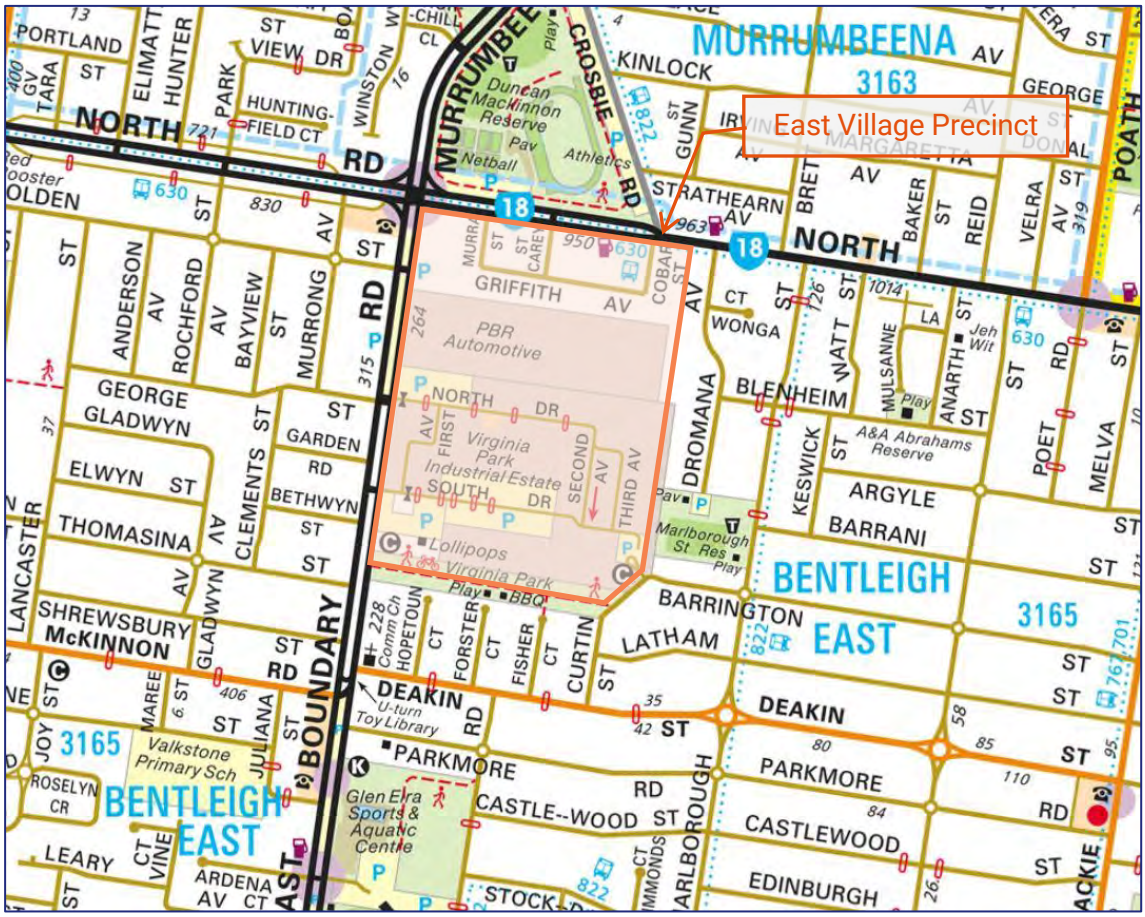


Figure 1: East Village – Bentleigh East

The East Village CDP aims to redevelop and renew the existing precinct, introducing a mixture of new land uses including employment and residential.

Background studies were undertaken in 2017 and after a process of Community Engagement in 2017 and 2018, VPA handed the Amendment to Council for exhibition and endorsement.

Council endorsed the Amendment and it went on exhibition in September / October 2019.

3. Existing Conditions

3.1. Subject Site

The subject site is located on the south-east corner of the North Road and East Boundary Road intersection.

The precinct is predominantly rectangular in shape with frontages to North Road and East Boundary Road Street of approximately 415 metres and 590 metres, respectively. The precinct includes existing Council roads of Griffith Avenue, Carey Street, Cobar Street and Murra Street.

The site is currently improved with mixed/commercial uses, including Virginia Business Park Centre, Bentleigh Fitness Centre and a number of industrial parcels. The north-eastern corner of the site includes six residential dwellings fronting North Road and Cobar Street.

An aerial image of the subject site is presented in Figure 2.

Figure 2: Aerial Image – Subject Site

3.2. Planning Zones

The subject site is located across two different zones. The northern half of the precinct is located within an Industrial Zone – Schedule 1 (IN1Z), and the southern half of the precinct is located within a Commercial 1 Zone (C1Z) and Commercial 2 Zone (C2Z) as presented at Figure 3.

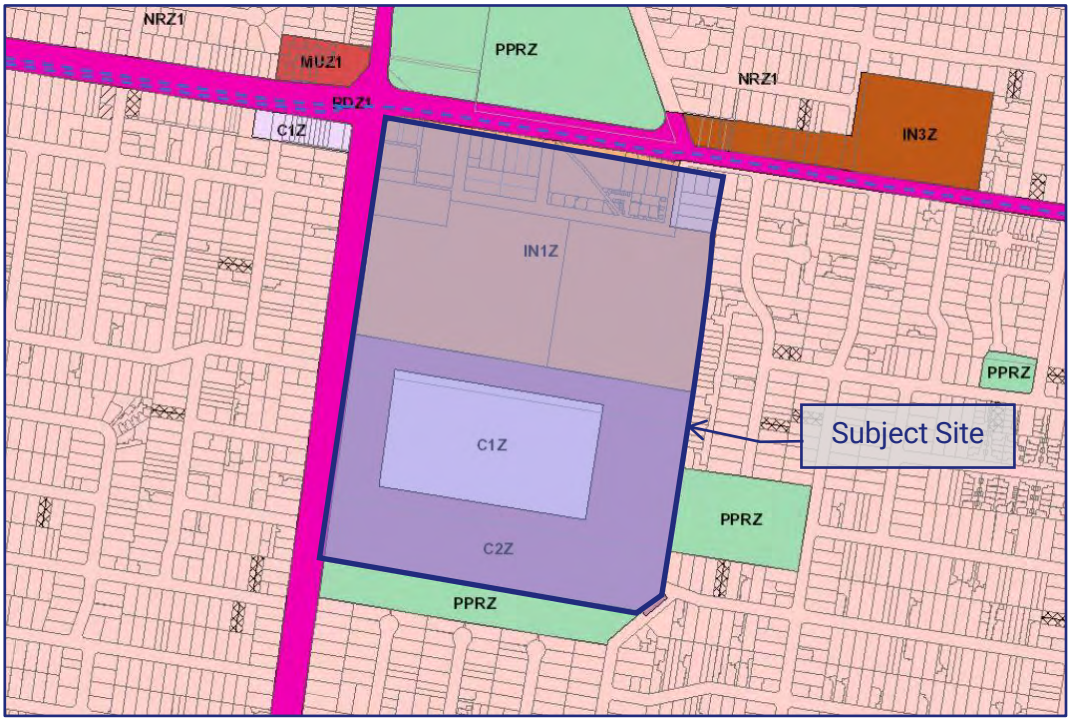


Figure 3: Land Use Zoning Map - Glen Eira

Land uses surrounding the site are generally residential, with some Industrial and Mixed / Commercial Zoning fronting North Road, and Public Use Zoning (for Park Reserves) to the north, east and south. Significant land uses include:

- **Duncan Mackinnon Reserve**, located immediately north of the precinct, across North Road.
- **St. Patrick's Primary School**, located approximately 550 metres north of the precinct.
- **McKinnon Primary School**, located approximately 720 metres west of the precinct.
- **Glen Eira Sports and Aquatic Centre,** located approximately 400 metres to the south.

A Public Acquisition Overlay (POA) applies to North Road generally between Carey Street in the west and Eastgate Street in the east. It is noted the POA within this section overlaps on top of a high percentage of residential properties with frontage to North Road. In the vicinity of the precinct, between Carey Street and Marlborough Street, the POA only applies to the southern side of North Road as shown in Figure 4.

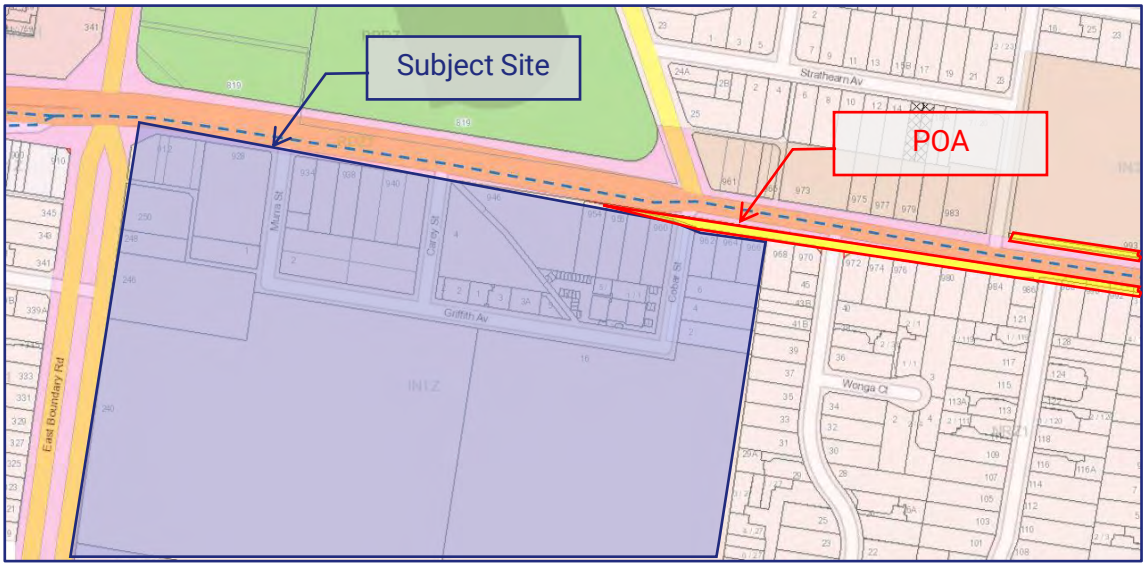


Figure 4: Public Acquisition Overlay Extents

3.3. Road Network

North Road is a State Arterial Road within a Road Zone – Category 1 of the Planning Scheme. North Road extends in an east-west direction between Princes Highway in the east and continues through to the Brighton foreshore in the west. East of Princes Highway, North Road continues as Wellington Road.

Proximate to the precinct, North Road varies in its construction as follows:

- At the intersection with Cobar Street, and continuing west, North Road has a single carriageway with two through traffic lanes in each direction, widening at Cobar Street to provide a central right turn lane to Cobar Street / Crosbie Road.

  East of Cobar Street, the existing North Road reservation extends approximately 8.4 metres within the lots which front North Road to provide a total road reserve of 27 metres. East of Marlborough Street this reduces to a 20 metre road reserve.

- Between East Boundary Road and Cobar Street, North Road is divided, with a central median and typically three through lanes in each direction, with back to back right turns for movements into East Boundary Road (northbound) and Carey Street (southbound).

  The road reserve width along this section is approximately 31-33 metres. At the south-east corner of North Road / East Boundary Road, there is an existing splay of approximately 15 metres (E-W) x 10 metres (N-S). Parking for the existing Repco property sits within this road reserve.

- West of East Boundary Road, North Road remains as a divided road, with generally two lanes of through traffic in each direction, however service roads on both sides of the road provide for local access.

North Road has a posted speed limit of 70km/h west of Cobar Street, reducing to 60km/h east of Cobar Street.

East Boundary Road is a State Arterial Road within a Road Zone – Category 1 of the Planning Scheme.

East Boundary Road is aligned in a north-south direction, between South Road and North Road. East Boundary Road continues south from South Road as Rowans Road and continues north from North Road as Murrumbeena Road.

In the vicinity of the precinct, East Boundary Road provides for typically two traffic lanes, a bicycle lane and a parking lane in each direction, separated by a wide central median.

Along the site frontage, between Molden Street and George Street, the central median provides for at-grade car parking, which is internally accessed. South of North Drive, the median is vegetated. Median openings provide for access at South Drive and North Drive (and George Street)

A posted speed of 70km/h applies to East Boundary Road.

Murrumbeena Road is an extension of East Boundary Road north of North Road. It is also a State Arterial Road located in a Road Zone – Category 1 of the Planning Scheme.

North of its intersection with North Road, Murrumbeena Road provides separate traffic, bicycle and parking lanes in each direction.

Murra Street, Carey Street and Cobar Street are local streets that extend between Griffith Avenue in the south and North Road in the north. They are all provided with a carriageway width of approximately 7.6 metres providing a single lane of two-way traffic with kerbside parallel parking on both sides.

They provide local access to properties on Griffith Avenue and the existing commercial uses fronting North Road.

Griffith Avenue is a local street which runs east-west between Murra Street and Cobar Street, with a pavement width of approximately 7.6 metres accommodating parking on both sides of the road.

Crosbie Street is a local Council road that is oriented in a northwest-southeast direction between North Road in the southeast (forming a cross intersection with Cobar Street) and Murrumbeena Road in the northwest (forming a cross intersection with Leila Road). Crosbie Street provides local access to dwellings as well as access and parking for Duncan Mackinnon Reserve.

It has a carriageway width of approximately 15.2 metres accommodating a single lane of traffic in each direction, with kerbside parallel parking on the eastern side and angled parking on the western side.

Leila Road is a local residential street that extends west from Murrumbeena Road that forms a cross intersection with Crosbie Road at Murrumbeena Road.

North Drive and South Drive are private accessways that extend east from East Boundary Road. They provide access for the Virginia Park Business Park.

George Street is a local Council street that aligns generally in an east-west direction between East Boundary Road in the east and Lancaster Street in the west. George Street has a carriageway width of approximately 7.0 metres accommodating a single lane of two-way traffic with kerbside parallel parking on both sides.

3.4. Sustainable Modes of Transport

3.4.1. Bicycle Accessibility

North Road and East Boundary Road are identified as Bicycle Routes within the Principal Bicycle Network.

Bicycle lanes are provided on East Boundary Road and Murrumbeena Road providing for a key north-south route through Bentleigh East. However, the lanes do not extend through the intersection with North Road.

North Road does not provide for any dedicated bicycle facilities.

Other informal routes exist throughout the surrounding residential road network.

3.4.2. Public Transport

The site is currently served by bus services along North Road and East Boundary Road.

The nearest train services are available at Murrumbeena Station, which is located approximately 1.8 kilometres to the north of the site and is accessible via bus connections.

Table 1 summarises the available services in the vicinity of the site, whilst Figure 5 illustrates the surrounding public transport network and Figure 6 shows the bus stops located near the site.

Table 1: Public Transport Services in the Vicinity of the Subject Site

Service	Route	Walking Distance to Node
Bus Route 627	Moorabbin Station - Chadstone SC (via Bentleigh)	Site Frontage to East Boundary Rd
Bus Route 630	Elwood - Monash Uni (via Gardenvale & Ormond & Huntingdale)	Site Frontage to North Rd
Bus Route 822	Chadstone SC - Sandringham (via Murrumbeena & Southland SC)	~150m north
Bus Route 978 (Night Bus)	Elsternwick - Ormond - Huntingdale - Mulgrave - Dandenong (returns via Princes Hwy)	~680m east
Bus Route 626	Middle Brighton - Chadstone (via McKinnon & Carnegie)	~700m east
Murrumbeena Station (Cranbourne Line, Pakenham Line)	Cranbourne – Melbourne CBD; Pakenham – Melbourne CBD	~1.8km north
Ormond Station (Frankston Line)	Frankston – Melbourne CBD	~2.1km west

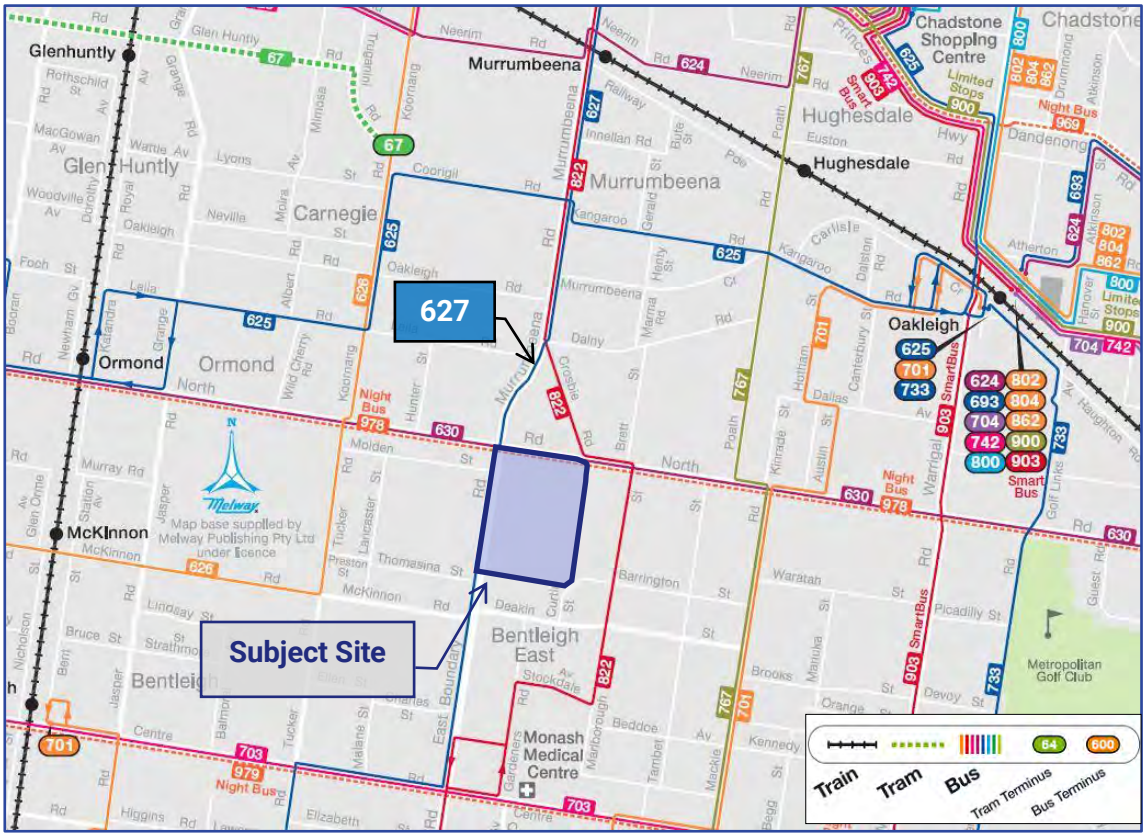


Figure 5: PTV Public Transport Map – Glen Eira

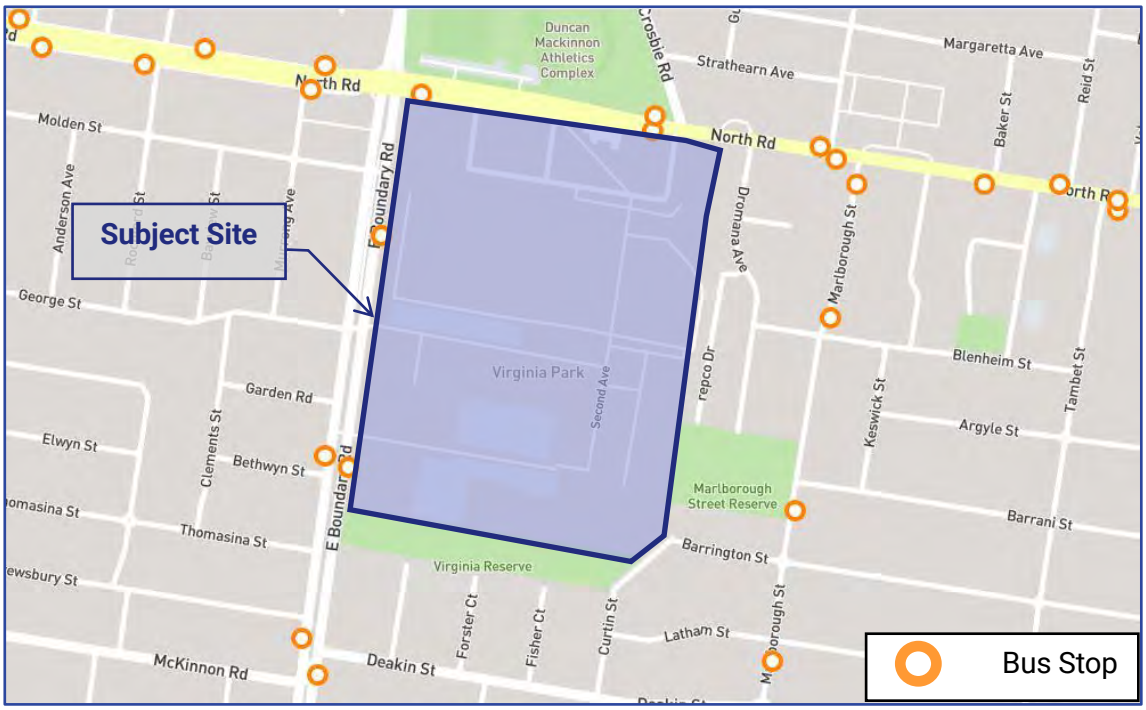


Figure 6: Bus Stops - Vicinity of the Site

3.5. Crash Statistic

A review of the crash history has been undertaken for the past 5 years of available data (last updated October, 2019) for the area immediately surrounding the subject site and the intersection of North Road/East Boundary Road as shown in Figure 7.

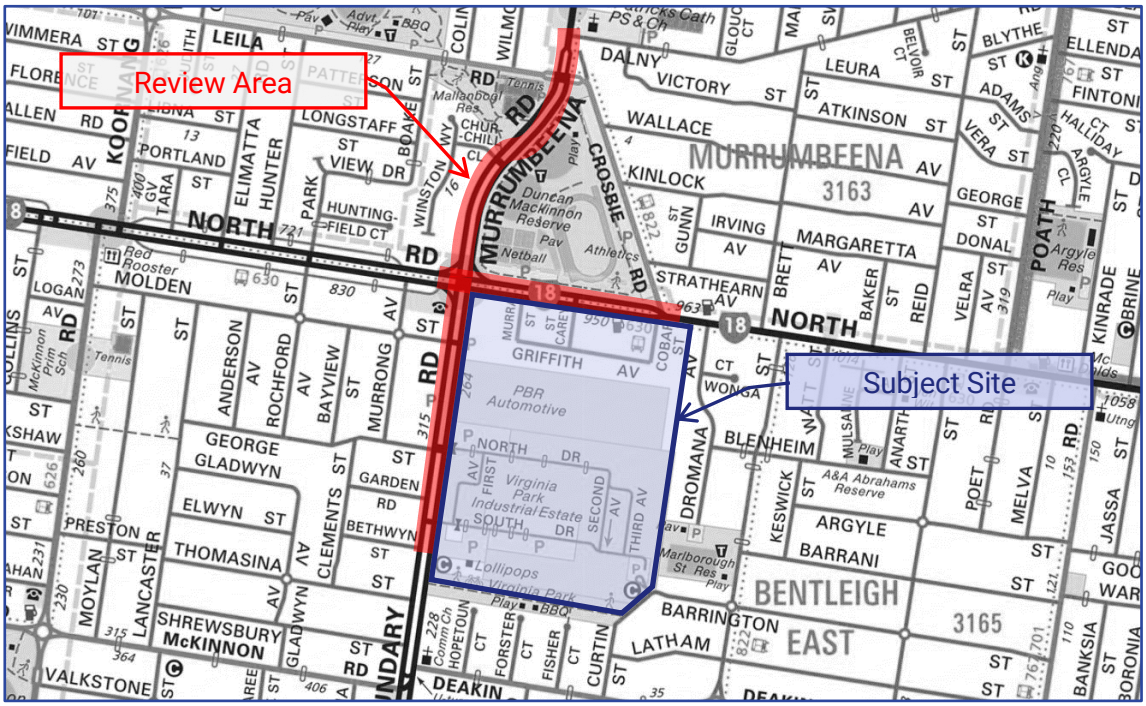


Figure 7: CrashStats Review Area

Crashes recorded in the review are as summarised in Table 2.

Table 2: Crash Statistics

Location	Date	Time	Severity	Condition	DCA Code
1. North Rd 21m West of Murrumbeena Rd	24/10/2015	08.50.00	Other	Day, Clear, Dry	130 – Vehicles in Same Lanes, Rear End Collision
2. North Rd 36m West of Murrumbeena Rd	21/04/2016	16.00.00	Other	Day, Clear, Dry	130 – Vehicles in Same Lanes, Rear End Collision
3. North Rd 51m West of Murrumbeena Rd	20/06/2015	13.30.00	Other	Day	130 – Vehicles in Same Lanes, Rear End Collision
4. North Rd at Murrumbeena Rd	20/06/2015	06.00.00	Serious	Dark, Street Lights On, Clear	130 – Vehicles in Same Lanes, Rear End Collision
5. North Rd at Murrumbeena Rd	17/07/2016	20.29.00	Serious	Dark, Street Lights On, Clear	130 – Vehicles in Same Lanes, Rear End Collision
6. North Rd at Murrumbeena Rd	17/03/2017	13.00.00	Other	Day, Clear, Dry	131 - Vehicles in Same Lanes, Left Rear Collision

Location	Date	Time	Severity	Condition	DCA Code
7. North Rd at Murrumbeena Rd	25/04/2017	12.00.00	Other	Day, Raining, Wet	131 - Vehicles In Same Lanes, Left Rear Collision
8. North Rd at Murrumbeena Rd	17/06/2017	11.05.00	Other	Day	173 – Right Off Carriageway into Object/ Parked Vehicle
9. North Rd at Murrumbeena Rd	3/09/2018	06.50.00	Other	Day, Clear, Dry	131 - Vehicles in Same Lanes, Left Rear Collision
10. North Rd at Murrumbeena Rd	27/09/2018	17.50.00	Serious	Day, Clear, Dry	173 – Right Off Carriageway into Object/ Parked Vehicle
11. East Boundary Rd 43m South of Murrumbeena Rd	11/01/2014	16.30.00	Other	Day, Clear, Dry	100 - Right Off Carriageway into Object/Parked Vehicle
12. Murrumbeena Rd 26m North of North Rd	21/12/2015	17.15.00	Other	Day, Clear, Dry	163 - Ped Near Side. Ped Hit by Vehicle from The Right.
13. Murrumbeena Rd 49m North of North Rd	19/04/2018	16.29.00	Other	Day, Clear, Dry	133 - Vehicle Collides with Vehicle Parked on Left of Road
14. East Boundary Rd 7m North of South Dr	9/08/2017	15.30.00	Serious	Day, Clear, Dry	135 – Vehicles from Same Direction, Lane Change Left
15. East Boundary Rd at George Street	2/01/2014	14.51.00	Other	Day, Clear, Dry	130 – Vehicles in Same Lanes, Rear End Collision
16. East Boundary Rd at George Street	15/09/2014	10.10.00	Serious	Day, Clear, Dry	111 – Vehicles from Adjacent Directions, Right Far
17. East Boundary Rd at George Street	20/10/2014	15.40.00	Other	Day, Clear, Dry	147 – Vehicle Collides with Vehicle Emerging from a Driveway
18. North Rd 196m East of Murrumbeena Rd	9/04/2015	08.20.00	Serious	Day, Clear, Dry	134 – Vehicles from Same Direction, Lane Change Right
19. North Rd 173m West of Crosbie Rd	18/10/2014	13.27.00	Other	Day, Clear, Dry	133 – Vehicles in Parallel Lanes, Lane Side Swipe
20. North Rd at Crosbie Rd	5/04/2017	20.00.00	Other	Dark, Street Lights On, Clear	119 - Other Adjacent
21. North Rd at Crosbie Rd	13/01/2015	18.15.00	Other	Day, Clear, Wet	174 – Out of Control on Carriageway

4. East Village Comprehensive Development Plan & Development Contributions Plan (As Exhibited)

4.1. Proposed Land Use

The East Village Comprehensive Development Plan (CDP) provides information of the precinct which guides land use and infrastructure. The exhibited East Village Precinct includes a mixture of uses, comprising office, retail, residential and community uses.

Figure 8 illustrates the exhibited East Village Future Urban Structure with a summary of the assumed development schedule provided in Table 3.

Figure 8: East Village CDP – Proposed Land Use

Table 3: East Village CDP - Contemplated Land Uses

Use	No. / Size
Office	80,000 m^2
Retail	12,000 m^2
Residential	3,000 dwellings
School	~800 secondary school students

4.2. Transport and Movement Plan (CDP)

The East Village CDP, as exhibited, identifies the following key road infrastructure components:

- North Drive is to be provided as a public 23 metre road, extending east from a new signalised intersection with East Boundary Road (opposite George Street).
- South Drive is to be provided as a public 27 metre Connector Street, extending east from a new signalised intersection with East Boundary Road.
- Cobar Street is nominated as a future public connector street which is intended to extend south past Griffith Avenue to connect North Drive and South Drive.

  South of Griffith Avenue, Cobar Street is nominated with a road reserve of 27 metres.

  North of Griffith Avenue, it appears that Cobar Street is intended to remain within the exiting road reserve, flaring only at the intersection with North Road which is intended to be controlled by traffic signals.
- A number of local streets are nominated within the CDP to provide internal access, including retention of Murra Street, Carey Street and Griffith Avenue.

  The intersections of Murra Street and Carey Street with North Road will be restricted to left-in / left-out.

With regard to Active Transport, the CDP nominates a shared path running from East Boundary Road through to North Road along South Drive and Cobar Street (including the extension).

Bus stops are shown proposed on East Boundary Road south of North Drive.

Pavement treatments with pedestrian priority are nominated on North Drive and South Drive within the site.

Figure 9 illustrates the Transport and Movement Plan from the CDP, whilst Figure 10 through to Figure 14 illustrate the exhibited road cross sections within the precinct.

The CDP includes a number of Requirements and Guidelines in relation to Access, Parking, Integrated Transport and Walking and Cycling.

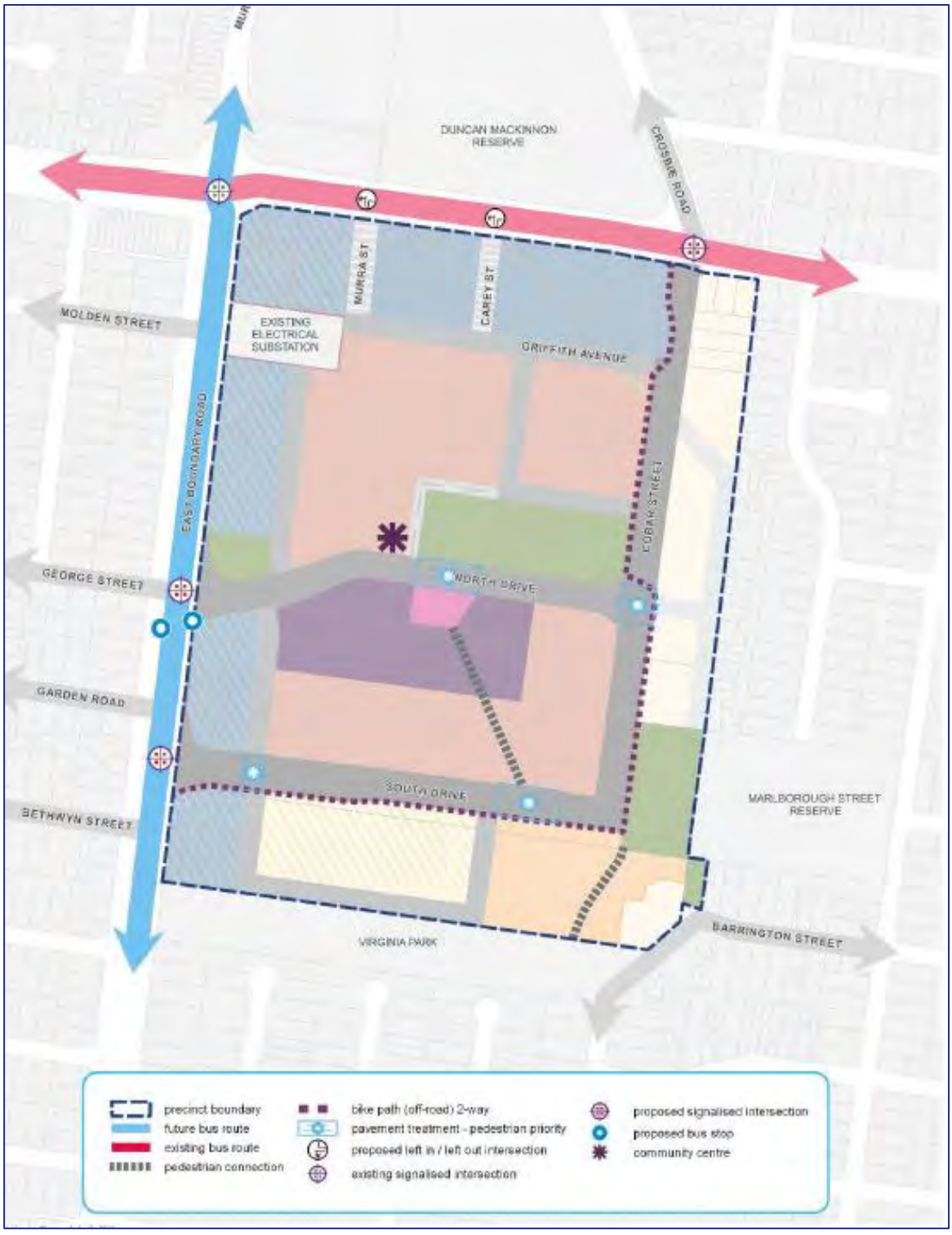


Figure 9: East Village CDP – Transport and Movement Plan

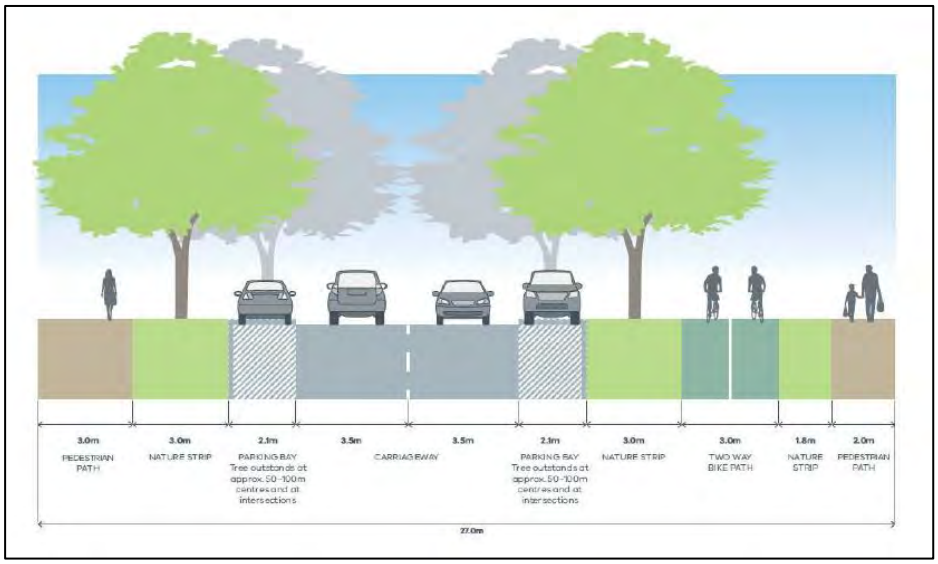


Figure 10: 27m Connector Street

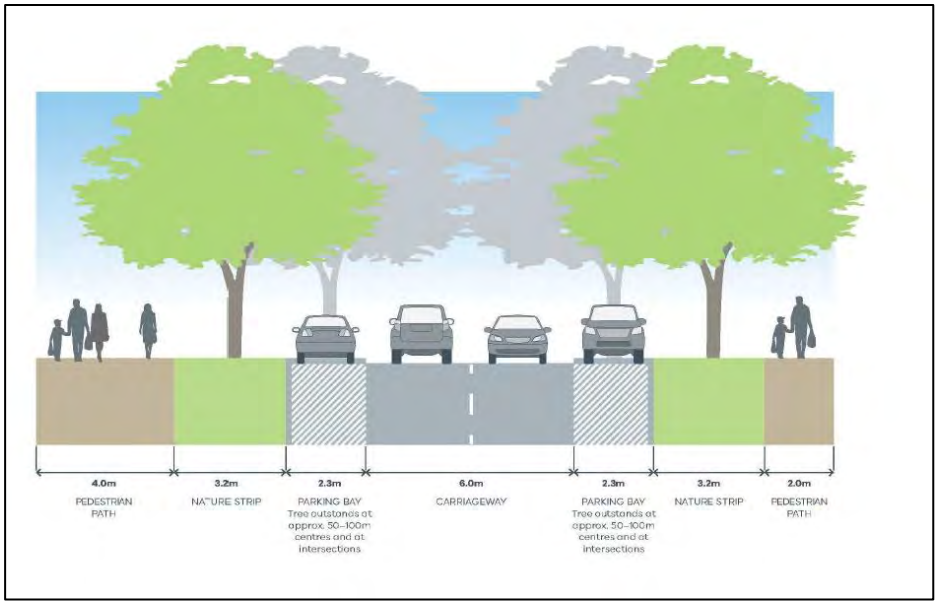


Figure 11: 23m North Drive

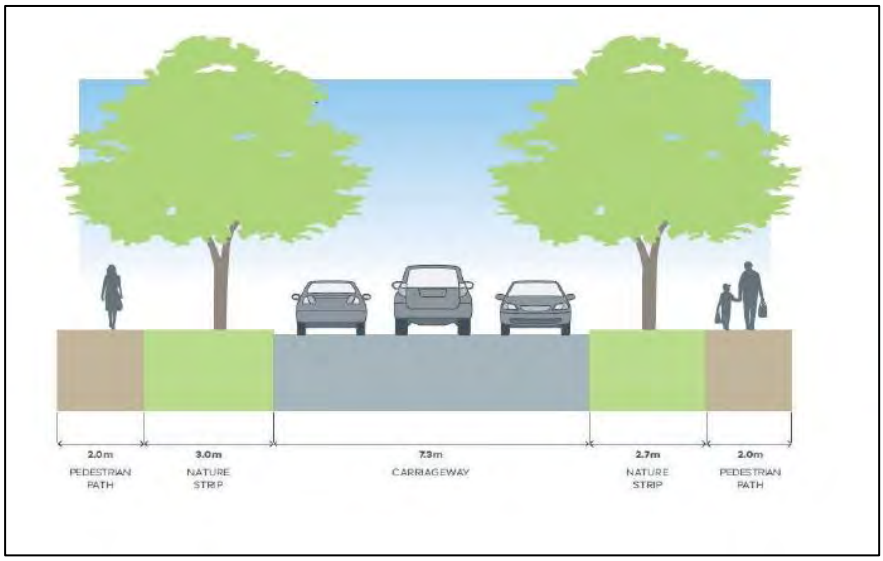


Figure 12: 17m Local Access Street

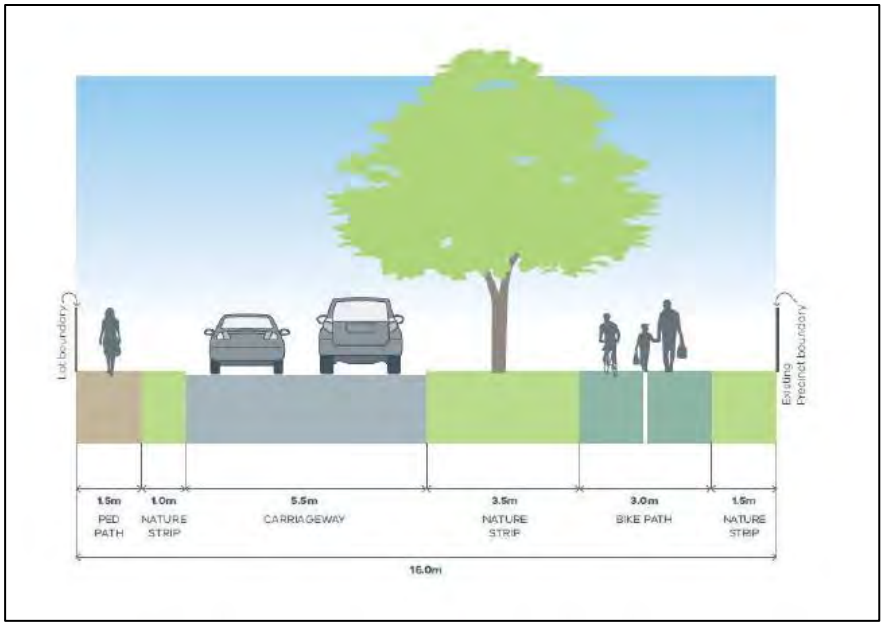


Figure 13: 16m Local Access Street with Bike Path

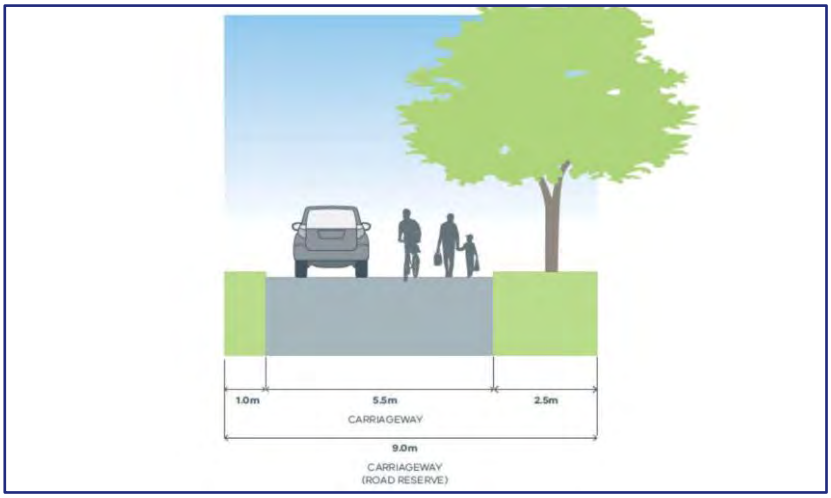


Figure 14: Access Lane (9.0m)

4.3. Development Contributions Plan – Transport Works

The East Village Development Contributions Plan (DCP) identifies the road and intersection projects that are intended to facilitate the development of the land within the precinct.

The works have been premised on analysis and plans prepared by GTA Consultants through consultation with Council and Department of Transport.

The DCP contemplates some $42 million of traffic intersection works relating to the traffic and access strategy.

The key road and intersection projects required in the DCP are summarised at Table 4 and illustrated in Figure 15 and Figure 16.

4.4. DCP Cost Apportionment

The DCP includes a cost apportionment for the Road and Intersection Projects. The apportionment is based on the GTA traffic analysis for the PM peak hour, and attributes a percentage cost for residential, retail and commercial uses.

Table 4: DCP Intersection and Road Projects, Triggers and Costings

DCP Project ID	Project Title/ Description	Indicative Provision Trigger	Cost
RD-01	Cobar St Connector 1 - Construction	Concurrent with provision of IN-3C	$733,229
IN-1C	North Rd & East Boundary Rd – Construction	Once the precinct achieves a net increase in the existing traffic volumes it generates	$6,931,914
IN-2C	Crosble Rd/ Murrumbeena Rd/ Leila Rd – Construction	At the time of delivery of IN-3C	$1,794,934
IN-3L	Cobar St & Crosbie Rd & North Rd - Land	At time of subdivision or redevelopment of adjacent site	$639,500
IN-3C	Cobar St & Crosbie Rd & North Rd - Construction	Once the traffic generated by the precinct exceeds 2.000 vehicle movements in the peak hour	$10,613,737
IN-4L	North Dr & Est Boundary Rd - Land	At time of subdivision	$238,700
IN-4C	North Dr & Est Boundary Rd – Construction	At time of subdivision	$5,876,141
IN-5L	South Dr & East Boundary Rd - Land	At time of subdivision	$480,300
IN-5C	South Dr & East Boundary Rd - Construction	At time of subdivision	$11,338,844
IN-6L	North Rd & Murra Street - Land	At time of subdivision or redevelopment of adjacent site	$204,800
IN-6C	North Rd & Murra Street – Construction	Once the land is available and traffic volumes are deemed to require the infrastructure	$1,817,111
IN-7L	North Road & Carey Street - Land	At time of subdivision or redevelopment of adjacent site	$346,500
IN-7C	North Road & Carey Street - Construction	Once the land is available and traffic volumes are deemed to require the infrastructure	$1,932,371

Figure 15: Road Project

Figure 16: Intersection Projects

5. Traffic Engineering Assessment

5.1. GTA Access and Movement Report

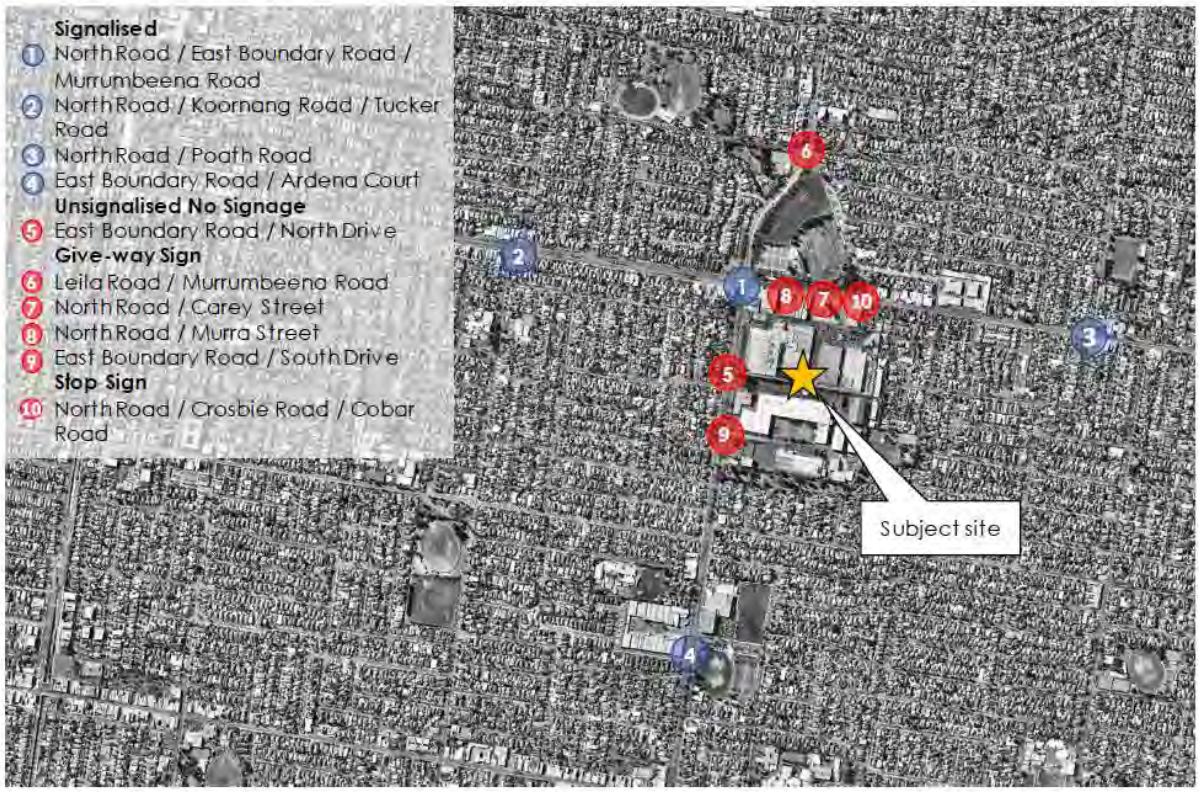
5.1.1. General

The GTA Access and Movement Report (October 2018) prepared to inform the CDP and DCP, undertook an analysis of the existing and post development conditions on the road network surrounding the precinct to identify a level of works intended to facilitate access for the precinct.

GTA utilised a SIDRA Network Model to model the operation of the network, including intersections immediately surrounding the site and providing access to the site, as well as extending this model up to the intersection of Murrumbeena Road / Leila Road / Crosbie Road at the north, North Road / Poath Road / Poet Road at the east, North Road / Koornang Road / Tucker Road at the west, and East Boundary Road / Ardena Court to the south.

An excerpt from the GTA report showing the intersections included in the model is provided in Figure 17.

Figure 3.8: Surrounding Intersections of the Site



Reproduced from Nearmap

Figure 17: GTA Traffic Network Model Extents

A summary of the assumptions / findings of the GTA are provided as follows.

5.1.2. Existing Traffic Generation and Operation

GTA undertook surveys in September 2017 for the network shown in the previous section.

Analysis of the existing operation of the network identified that:

- The existing intersections of North Road / East Boundary Road / Murrumbeena Road (signalised), and North Road / Cobar Street / Crosbie Road, are currently at capacity in both the AM and PM peak hours.
- The intersection of Leila Road / Murrumbeena Road, and East Boundary Road / South Drive, are at capacity in the PM peak hour.
- All other intersections operate within acceptable limits in the peak hours.

The site was observed to generate a total of 525 vehicle movements in the AM peak hour and 574 vehicle movements in the PM peak hour.

I am comfortable that for the purposes of the analysis for the DCP, the 'existing conditions' surveys are acceptable.

5.1.3. Traffic Generation and Distribution

Figure 18 shows an excerpt of the adopted traffic generation rates as detailed by GTA Consultants within their report.

They also adopted broad distributions of:

- 12 % inbound and 8% outbound to/from the east;
- 26% inbound and 31% outbound to/from the north;
- 20% inbound and 23% outbound to/from the west; and
- 42 % inbound and 38% outbound to/from the south.

I understand these rates and distributions were agreed with Council, DoT and VPA.

For the purposes of this analysis, I am comfortable that, on balance, the rates are acceptable.

C.4 Traffic Generation Summary

These external generation rates and the resulting traffic generation are summarised in Table C.3.

Table C.3: Total Land Use Traffic Generation Estimate

Use	Size	Traffic Generation Rate				Vehicle Movements			
		AM Peak		PM Peak		AM Peak		PM Peak	
		Ingress	Egress	Ingress	Egress	Ingress	Egress	Ingress	Egress
Commercial (office)	~80,000m²	0.97 movements /100m²	0.11 movements /100m²	0.11 movements /100m²	0.97 movements /100m²	776	88	88	776
Retail (mix)	~12,000m²	N/A		2.56 movements /100m²	3.84 movements /100m²	0		307	461
Residential	~3,100 dwellings [1]	0.08 movements /dwelling	0.30 movements /dwelling	0.23 movements /dwelling	0.15 movements /dwelling	248	930	713	465
School	800 students	0.36 movements /student	0.36 movements /student	N/A		288	288	0	
					Total	**1,312**	**1,306**	**1,108**	**1,702**

[1] 100 dwellings higher than proposed as a result of previous iterations. This is conservative on the high side as a result.

Figure 18: Excerpt of Traffic Generation Summary from GTA Report

5.1.4. Post Development Conditions

In the post development conditions, and allowing for the works identified in the DCP, the GTA model identified the intersections surrounding the site would operate within acceptable limits.

The analysis identifies the key intersection operating conditions in the peak hours as shown in the excerpt from the GTA Report in Figure 19.

In addition, GTA revised the intersection operating conditions for the site access intersections of North Drive and South Drive to allow for potential future growth on East Boundary Road. The intersections were expected to continue to operate under 'very good' conditions with Degrees of Saturation not exceeding 0.7.

Table 5.5: Post Development with Mitigating Works Operating Conditions in AM Peak

Intersection	DOS	Average Delay (sec)	95th Percentile Queue (m)
North Rd / East Boundary Rd / Murrumbeena Rd	0.87	46 sec	228 m
North Rd / Koornang Rd / Tucker Rd	# 0.96	38 sec	477 m
North Rd / Poath Rd	0.84	25 sec	349 m
East Boundary Rd / Ardena Ct	0.65	11 sec	205 m
East Boundary Rd / North Dr / George St	0.69	24 sec	194 m
Leila Rd / Murrumbeena Rd	0.79	16 sec	207 m
East Boundary Rd / South Dr	0.65	22 sec	147 m
North Rd / Crosbie Rd / Cobar Rd	0.84	23 sec	308 m

DOS – Degree of Saturation, # - Highest Network Intersection DOS

Table 5.6: Post Development with Mitigating Works Operating Conditions in PM Peak

Intersection	DOS	Average Delay (sec)	95th Percentile Queue (m)
North Rd / East Boundary Rd / Murrumbeena Rd	#0.95	55 sec	289 m
North Rd / Koornang Rd / Tucker Rd	0.86	30 sec	281 m
North Rd / Poath Rd	0.82	22 sec	334 m
East Boundary Rd / Ardena Ct	0.66	16 sec	223 m
East Boundary Rd / North Dr / George St	0.62	21 sec	155 m
Leila Rd / Murrumbeena Rd	0.90	22 sec	310 m
East Boundary Rd / South Dr	0.63	19 sec	108 m
North Rd / Crosbie Rd / Cobar Rd	0.81	28 sec	285 m

Figure 19: Excerpt of GTA Post Development Peak Hour Analysis

5.2. Assessment of Transport Infrastructure Works

5.2.1. General

I have undertaken a broad review of the GTA SIDRA Model and the analysis, and am comfortable that it is fit for purpose for determining an appropriate level of works for the precinct.

In general, I consider the level of intersection and access works which are nominated in the DCP are of an order that would be warranted by the level of development proposed on the site, subject to the following qualifications:

- The overall cost of the intersection works (and in particularly some individual intersection costings) seem significant compared with the level of works that are being delivered. This appears to be a result of some significant services relocation costs.
- In my view, there is no nexus to require the signalisation of the intersection of **Murrumbeena Road / Leila Road / Crosbie Road**.

  I understand that a key driver to signalising this intersection is around concerns relating to existing safety and capacity issues.

Upon review of the traffic distributions provided within the GTA report, the level of traffic generated to / from the south-eastern leg of the intersection is relatively low, and in my view wouldn't dictate the need to signalise that intersection as part of development of the precinct.

- There is a significant cost discrepancy between the costings for the signals at **South Drive and North Drive**, however the intersections themselves are relatively similar, with the exception of what I understand is a gas service running along the central median of East Boundary Road, at the South Drive intersection.

  I expect that a large contributor to the cost difference is the works identified as "*3 lane arrangement to continue for an additional 140m to Parkmore Road*" in the GTA plans that accompany the DCP, suggesting a three lane arrangement extending southbound on East Boundary Road.

  These works are unnecessary for development of the precinct.

- I am also advised the costings for the intersection of North Road / Murrumbeena Road / East Boundary Road (IN-01) include indicative costs associated with an extension of the western departure to provide a "3 lane arrangement to continue for an additional 500m to Koornang Road".

  These works are also unnecessary for development of the precinct.

5.2.2. Rationalisation of DCP Works

My firm has undertaken a review of the proposed intersection works in conjunction with the DCP costing sheets, as well as other information that is available, such as preliminary information relating to services locations.

Council has also provided the Landowners with the GTA SIDRA Model to test a number of rationalisations to the DCP scope.

My firm has run a number of scenarios that look to rationalise the extent of scope to provide for a more practical base of works that is cognisant of the existing constraints within the precinct.

As a result, my firm has prepared plans that rationalise the scope of work, that are intended to be substituted as the relevant DCP works. These plans are explained in detail below, and are attached at Appendix B.

IN-1 – North Road/Murrumbeena Road/East Boundary

Works are generally in accordance with the plan prepared by GTA, subject to the following amendments:

- The extension of the three lane cross-section, west to Koornang Road has been removed.
- The length of the eastern right turn lane on North Road has been extended to create a back-to-back right turn for the turn into Cobar Street.
- The length of the right turns on the western approach has been extended to 70 metres and 210 metres.

IN-2 – Leila Street / Murrumbeena Road

There is no nexus for this intersection, and accordingly it is recommended to be deleted.

IN-3 – North Road/Cobar Street/Crosbie Road

There is a Telstra pit on the south-eastern corner of the intersection of North Road / Cobar Street, which links a Telstra service running effectively along the back of kerb east-west along North Road. A cost of $3.8million is identified in the DCP associated with relocating this Telstra service.

In addition to this, and on the presumption that the intersection of Leila Road to the north is not signalised, the southern approach has been modified to discourage vehicles exiting the precinct via this intersection from being able to depart to the north.

To rationalise the cost of works at this intersection and address the desired movement restrictions, works at this intersection are described as follows in relation to the DCP exhibited plan:

- The intersection remains signalised, however to limit the widening of the road (and impact on services) it is proposed to retain the existing three lane cross-section and construct the intersection without central medians.
- The left turn deceleration lane has been removed from the eastern leg due to a high relocation cost of the Telstra pit on the south-eastern corner.
- The existing left turn lane on the western approach (into Crosbie Road) is to be retained.
- New kerb islands are provided on the southern and northern approaches to discourage through movements south to north.

IN 4 – East Boundary Road/North Drive

I am advised the Landowners intend to amend the intersection layout to address some key issues as follows:

- There is a long term lease to an anchor tenant on the land to the south of the DCP exhibited intersection (on the East Village site) which makes delivery of the current DCP intersection impractical within the next 15-20 years.
- There is also a group of significant gum trees immediately north of the DCP intersection (on the East Village site) which are proposed to be retained.
- There is a desire, for pedestrian amenity purposes, to remove left turn slip lanes at this intersection and provide sully signalised crossing points on East Boundary Road and North Drive.

Accordingly, the amended design proposes:

- A shift of the intersection to the north to allow the intersection to be delivered sooner, retain the key anchor tenant, and also retain the existing trees.
- Removal of slip lanes in and out of the site, with separate left turn lanes from the north and eastern approaches.

IN 5 – East Boundary Road/South Drive

The intersection analysis demonstrates this intersection operates with considerable spare capacity in both peaks.

There is also a gas service which runs through the centre of the median on East Boundary Road through the South Drive intersection. This gas service runs in the order of 1.0-2.0 metres to the east of the existing kerb south of the proposed intersection.

The amended plans attempt to:

- Avoid changing the central median kerb and therefore not impact on this service.
- The design also leverages off the spare capacity which is identified at the intersection to maintain only 2 through lanes in each direction on East Boundary Road.

IN-6 & 7 – North Road/Murra Street & North Road/Carey Street

The proposed works include removal of these intersection works from the DCP.

The modelling suggests there are only 5 vehicles making this left turn in either peak hour at Murra Street and 33 vehicles making this turn in either peak hour at Carey Street.

The cost to provide the left turn deceleration lane, due to services relocation and land acquisition, is ~$2million per intersection.

In my view, there is very little benefit of these left turn lanes for the cost, and therefore this is a sensible change to the scope of works.

5.2.3. Intersection Analysis

In order to support the amended intersection layouts as proposed, my firm has modified the GTA SIDRA Model to reflect the amended intersection layouts.

A summary of the results is provided in Appendix C to this report, and a comparison of the Degrees of Saturation for the key intersections for the precinct is provided in Table 5.

Table 5: Comparison of SIDRA Degrees of Saturation for Relevant DCP Intersections

Intersection	AM Peak Hour		PM Peak Hour	
	DCP Intersection DoS	Amended Layout DoS	DCP Intersection DoS	Amended Layout DoS
North Rd / East Boundary Rd / Murrumbeena Rd	0.87	0.88	0.95	0.98
East Boundary Road / North Drive	0.69	0.54	0.62	0.72
East Boundary Road / South Drive	0.65	0.76	0.63	0.81
North Road/ Crosbie Road/ Cobar Street	0.84	0.80	0.81	0.90

It can be seen from the above the changes proposed by the Landowners (and shown at Appendix B) will continue to allow intersections in the precinct to operate under acceptable conditions.

Whilst the degrees of saturation are noted to increase between the DCP analysis and the amended plan model, I am of the view that the intersections will still operate acceptably.

5.3. DCP Cost Apportionment

The current apportionment of traffic infrastructure costs is premised on the PM peak hour and does not consider the traffic generation during an AM peak hour. This approach disproportionately weights the DCP costings to the retail uses, which are generating high traffic volumes in the PM.

I am of the view that a fairer approach would be to average the AM and PM traffic volumes.

The school would continue to be excluded in the DCP apportionment.

5.4. DCP Triggers and Proposed Phasing Plan

5.4.1. Early Stages

I am instructed the first stage of development is to construct the school and South Drive, including signalisation of the intersection of South Drive and East Boundary Road.

5.4.2. DCP Triggers and Constraints

IN-1 – North Road/Murrumbeena Road/East Boundary

The current trigger in the DCP requires this intersection to be delivered *"once the precinct achieves a net increase in the existing traffic volumes it generates"*.

The school is to be developed in the first stage, and I am advised there will be 650 students from the first day of operation. I am instructed the intersection of South Drive and East Boundary Road will be delivered as part of the school project.

Adopting the GTA rate of 0.72 movements per student would equate to a total of 468 vehicle movements generated by the school from day one.

As I understand it, the school does not have a DCP requirement, and therefore I don't think it is appropriate that, whilst the school will increase traffic, the intersection of North Road and East Boundary Road is required to be delivered as part of the school.

In this regard, the trigger should be reworded to exclude the school.

Furthermore, it is unreasonable in my view to require any application that increases traffic to have to fund the improvements. It is just not feasible for a relatively small application to have to fund ~$7 million of intersection works.

I suggest a more appropriate trigger would be to require the intersection to be required when the precinct (exclusive of the school) increases any movement at the intersection by 10%, and the individual application generates more than 200 vehicles in a peak hour. I have chosen this arrangement as it is typical for VicRoads to require an analysis of an intersection when a movement is increased by 10%.

IN-3 – North Road/Cobar Street/Crosbie Road

The DCP includes a trigger for the intersection of North Road / Cobar Street / Crosbie Street that requires construction of that intersection when the precinct generates more than 2,000 vehicle movements in the peak hour.

I'm generally comfortable with this trigger, however I note as the intersection requires land from the property abutting the road at the west, there is no way of securing that land at this trigger point, and therefore this becomes an effective cap on the development of the precinct.

To this end, I think it is appropriate to continue to allow development, if that land can not be secured beyond the 2,000 vehicle cap, as long as the applicant demonstrates the intersection can continue to operate reasonably.

I note there is already wording included in the CDP (but not the DCP) that allows for more flexibility, via a quantitative approach to delivering this intersection.

Accordingly, the DCP trigger should be updated to reflect the wording proposed by the CDP to include *"unless it can be demonstrated that the local traffic network can continue to operate effectively, including the East Boundary Road / North Road / Murrumbeena Road intersection, to the satisfaction of the responsible authority."*

Table 6 provides a summary of my view on individual triggers for the other nominated traffic works.

Table 6: DCP Intersection and Road Projects, Triggers and Costings

DCP Project ID	Project Title/ Description	Proposed Trigger	Comment
RD-01	Cobar St Connector 1 - Construction	Concurrent with provision of IN-3C	No comment.
~~IN-2C~~	~~Crosble Rd/ Murrumbeena Rd/ Leila Rd – Construction~~	~~At the time of delivery of IN-3C~~	This intersection is proposed to be deleted from the scope.
~~IN-3L~~ IN-2L	Cobar St & Crosbie Rd & North Rd - Land	At time of subdivision or redevelopment of the affected land ~~adjacent site~~	This is the DoT proposed wording.
~~IN-4L~~ IN-3L	North Dr & Est Boundary Rd - Land	~~At time of subdivision~~ Once the land is available and traffic volumes are deemed to require the infrastructure, unless an alternative interim access is available.	The original wording for subdivision is unclear, as to what it relates to.
I~~N-4C~~ IN-3C	North Dr & Est Boundary Rd – Construction		

DCP Project ID	Project Title/ Description	Proposed Trigger	Comment
~~IN-5L~~ IN-4C	South Dr & East Boundary Rd - Land	~~At time of subdivision~~ Prior to occupation of the proposed school within the East Village precinct.	I understand this has been agreed with the public school as a requirement for their occupation of the site.
~~IN-5C~~ IN-4C	South Dr & East Boundary Rd - Construction	~~At time of subdivision.~~ Prior to occupation of the proposed school within the East Village precinct.	
~~IN-6L~~	~~North Rd & Murra Street - Land~~	~~At time of subdivision or redevelopment of adjacent site~~	These intersections are proposed to be deleted from the scope.
~~IN-6C~~	~~North Rd & Murra Street – Construction~~	~~Once the land is available and traffic volumes are deemed to require the infrastructure~~	
~~IN-7L~~	~~North Road & Carey Street - Land~~	~~At time of subdivision or redevelopment of adjacent site~~	
~~IN-7C~~	~~North Road & Carey Street - Construction~~	~~Once the land is available and traffic volumes are deemed to require the infrastructure~~	

5.5. Road Network and Cross-Sections

5.5.1. General

The Landowners have provided alternative cross-sections for South Drive and Local Access Streets with road reserves of 23 metres, 14.5 metres and 15.5 metres respectively.

The proposed cross-sections are shown in Figure 20 to Figure 22 with additional commentary on the appropriateness of the arrangements following.

5.5.2. Connector Street

The CDP identifies a Connector Street with a 27 metre reserve, providing 3.5 metre traffic lanes, a 3.0 metre shared bike path on one-side, 2.0 metre and 3.0 metre footpaths and separate nature strip and indented parking lanes.

The Landowners alternative cross section proposes a 23 metre reservation.

The key differences are in combining the nature strip and indented parking into one section that allows for indented parking with intermittent landscaping and providing separate 2.0 metre one-way bike paths on either side of the road.

The reduced cross-section proposed by the Landowners includes 3.5 metre traffic lanes, which are appropriate for a bus capable road, and continues to provide footpaths of similar, or larger, width than that shown in the CDP.

Accordingly, I am of the view that the alternative cross-section will provide for a comparable function for all users (ie cars, pedestrians, buses and bicycles) to the CDP proposed cross-section, but with a more rationalised arrangement.

Should there be a desire to have a single two-way shared bicycle path on one side of the road this could be co-located on one side of the road as a 3.0 metre shared path.

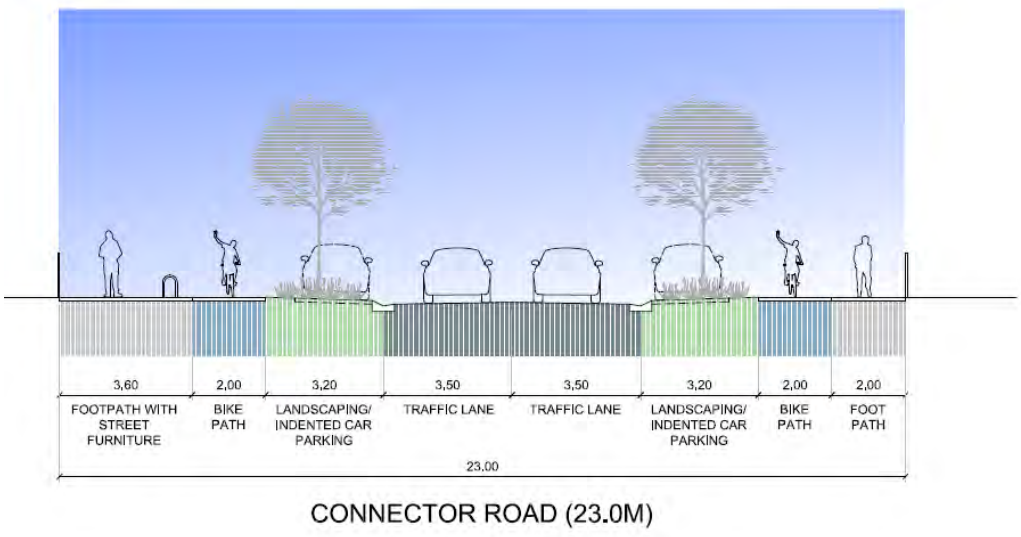


Figure 20: Landowner Proposed Connector Street Cross-section – 23 metres

5.5.3. 15.5 metre Local Access Street

I understand this cross-section is provided as an alternative to the 17 metre Local Access Street cross-section provided in the CDP.

The key difference between the Landowner proposal and this arrangement is a reduction in the nature strip widths. From a traffic and access perspective, there is no material difference in this arrangement and, therefore subject to servicing and landscaping requirements, this cross-section is acceptable from a traffic perspective.

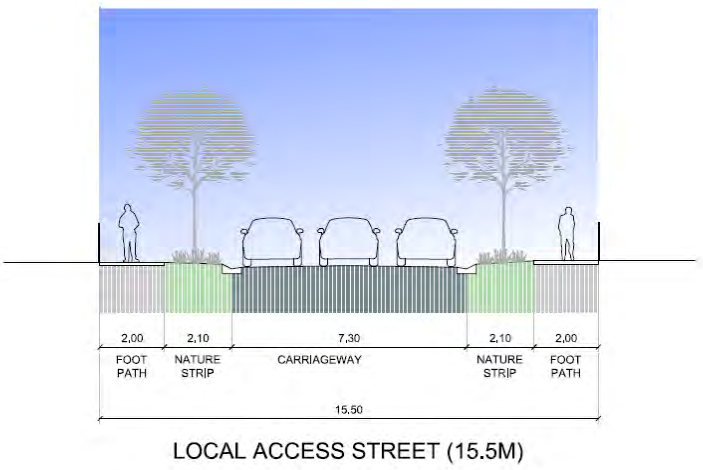


Figure 21: Landowner Proposed Local Access Street Cross-section – 15.5 metres

5.5.4. 14.5 metre Local Access Street

I understand this cross-section is provided as an alternative to the 16 metre Local Access Street cross-section provided in the CDP. It would appear to relate to a single road along the eastern boundary of the precinct, and a small extension of North Drive to the east of Cobar Street

The key difference is the removal of the bike path and replacement with a footpath.

From a vehicular and pedestrian access perspective, there is no material difference in this arrangement.

From a bicycle perspective, I do not believe there is a need for shared paths on these roads, as bicycles are proposed to be accommodated on Cobar Street, which runs parallel to the road on the eastern boundary.

Furthermore, these roads will be low speed and lower volume.

Therefore, subject to servicing and landscaping requirements, this cross-section is acceptable from a traffic perspective.

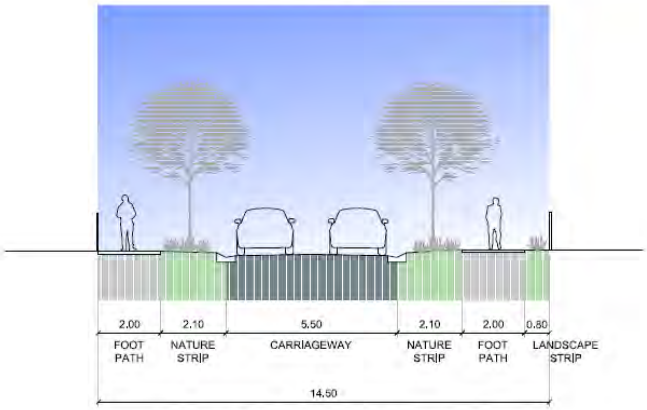


Figure 22: Landowner Proposed Local Access Street Cross-section – 14.5 metres

6. CDP Requirements and Guidelines

6.1. Requirements and Guidelines

Table 7 provides a summary of my comments on the relevant traffic requirement / guidelines.

Table 7: CDP Requirements and Guidelines and Landowner Submitted Amendments

Requirement/Guideline		Response
Access, Parking and Building Services		
G35	Loading, storage, refuse areas and building services including domestic services, utilities and waste management facilities should be concealed and integrated into building design so as not to be visible from public areas.	No comment.
G36	Buildings in the Commercial North, Commercial West, Mixed Use and Retail sub- precincts should be designed to: – Prioritise high quality streetscapes through considered parking and access design that minimises visual and physical impacts. – Prioritise vehicle parking and access from Local Access Streets (17.0m) – Maintain active land uses at street level by locating parking structures underground in basements or towards the rear of the building if above ground. – Provide vehicle access from side streets or rear laneways if available. – Minimise access and crossover widths as much as practical. – Ensure that bicycle parking is secure, convenient and readily accessible. – Separate resident and visitor entries from commercial entries, service areas, vehicle accessways and loading zones.	No comment.
G37	Buildings in the Residential East and South sub-precincts should be designed to: – Ensure that accessways and car parking structures are visually recessive and do not compromise landscaping opportunities. – Minimise the number and width of vehicle crossings and driveways, and conceal or recess garage and basement entries. – Vehicle access from side streets or rear lanes is preferred. However, if required on the primary street frontage, driveways/access ramps should	No comment.

	provide for landscaping and not dominate the front setback.	
Integrated Transport - Transport		
R8	Bus stop facilities on East Boundary Road must be located in proximity to North Drive and on the same side of the street as the town square.	It is understood that DoT has requested the removal of this guideline as there are existing bus stops on East Boundary Road.
R9	Street blocks exceeding 100m in length must provide a minimum of one pedestrian through connection.	No comment.
R10	Street blocks exceeding 200m in length must provide a minimum of two pedestrian through connections.	No comment.
R11	A connection from the south of the precinct to Cobar Street must not be made until the Cobar Street / North Road / Crosbie Road signalised intersection is constructed.	The Landowners have requested the deletion of this requirement. I am of the view that it can be deleted as the control for the signals is outlined in the DCP, and properties south of Griffith Avenue already take access from Griffith Avenue and use Cobar Street.
R12	Roads within the precinct must be constructed in accordance with the street cross-sections in Section 4 of this CDP. Where a variation to the cross-section is sought, it must be demonstrated that the variation is required for a technical reason (e.g. location of services) and that the alternative cross-section achieves the outcomes sought by the original cross-section in terms of pedestrian, cycle and vehicle movement, street-tree plantings and urban amenity, to the satisfaction of the responsible authority.	No comment.
R13	The signalisation of the Cobar Street / North Road / Crosbie Road intersection must occur prior to the traffic movements generated by the precinct exceeding 2,000 vehicle movements in the PM peak hour, unless it can be demonstrated that the local traffic network can continue to operate effectively, including the East Boundary Road / North Road / Murrumbeena Road intersection, to the satisfaction of VicRoads and the responsible authority.	The need for this is addressed as part of the DCP triggers, and therefore it is not considered necessary to require this requirement within the CDP as well.
G43	Vehicular connections directly onto North Road or East Boundary Road should be avoided other than those shown in the CDP. Interim access	No comment. I note that DoT has requested minor changes to this.

	arrangements may be provided, to the satisfaction of VicRoads.	
G44	Street networks within subdivisions should be designed to maximise the direct views to parks and key public spaces.	No comment.
G45	Maximise on-street parking and tree planting on nature strips by minimising individual direct property access for vehicles through use of rear or side loaded lots and common parking areas.	No comment.
G46	No direct vehicle access should be provided to connector streets and North Drive. Prioritise vehicle parking and access from local access streets (16.0m and 17.0m).	I agree that vehicle access should be preferred from the local access streets, but the way the guideline is written is too strong. I think the first sentence can be deleted and the guideline can simply say 'prioritise vehicle parking and access from local access streets.'
G47	Student pick-up / drop-off to the future government school should be accommodated to occur from within the precinct.	No comment.
Pedestrians and Bicycles		
R14	The design of all streets and arterial roads must give priority to the requirements of pedestrians and cyclists by providing: - Pedestrian paths of at least 1.8 metres in width on both sides of all streets and roads unless otherwise specified in this plan. - Shared paths or bicycle paths of 3.0 metres in width where shown on Plan 1 or as shown on the relevant cross sections illustrated at Appendix A or as specified in another requirement in the CDP. - Safe and convenient pedestrian and cycle crossing points of connector and local streets at all intersections and at key desire lines and locations of high amenity. - Safe pedestrian crossings of arterial roads at key intersections. - Pedestrian priority where local roads intersect with connector roads and across all car park entrances. - Pedestrian and cyclist priority crossings on all slip lanes. - Consistent line/lane marking, visual clues and signage identifying cycle priority routes.	It is unclear from a traffic engineering perspective where the minimum 1.8 metre pedestrian paths are derived. Unless in town centre locations, along school abuttals or other relevant key pedestrian routes, it would be typical to provide 1.5 metre wide pedestrian paths. This is supported by the requirements under Clause 56.06 of the Planning Scheme. It is also supported by the VPA standard road cross-sections and Austroads Guide to Road Design as a minimum width for typical footpaths. I am of the view that wider than typical footpaths should not be a requirement for all streets and arterial roads to be included in the CDP and the need for wider footpaths should be dictated by the abutting use. This should be amended to be 1.5 metres.

	- Safe and convenient transition between on-and off-road bicycle networks. All to the satisfaction of the coordinating road authority and the responsible authority.	
R15	Bicycle parking and end of trip facilities must be provided in all commercial buildings.	I acknowledge that there is a desire to encourage the provision of bicycle parking for future development, however depending on the size of individual commercial development, there is likely to be a significant range for bicycle parking demands, with some developments not likely to need (or be able) to provide some. To this end, I suggest the 'must' is substituted as a 'should'.
G48	Pedestrian movements should be prioritised by providing clear links between key destinations within the precinct.	No comment.
G49	Bicycle parking for the ~~retail~~ town centre should be clearly identifiable and provided within the Town Square ~~and should be visible from North Drive~~.	I am comfortable with the proposed Landowner changes outlined.
G50	North-south pedestrian connectivity should be provided through the school grounds.	No comment.
G51	Pedestrian priority should be given at all intersections through appropriate measures such as raised pedestrian crossings and side-street threshold treatment.	No comment.

6.2. Schedule to the Comprehensive Development Zone

With regard to traffic and parking items within the Comprehensive Development Zone, the Landowners have proposed changes to the exhibited Schedule.

I have reviewed these changes and provide commentary as follows.

> *A traffic, parking and access report which includes the following:*
> - ~~*An assessment of the total vehicle movements to and from the entire precinct during peak periods. This is to include an assessment of the precinct's existing and the proposed development traffic generation during peak AM and PM period.*~~
> - *An assessment of the likely traffic impacts associated with the proposed development, ~~including the ability of the Cobar Street / North Road / Crosbie Road intersection to function effectively without signalisation (if not already signalised), and the implications on the operation of the broader network, including the capacity of the North Road / East Boundary Road / Murrumbeena Road intersection~~.*

The need for an assessment of the likely traffic impacts associated with the proposed development would typically contemplate the information required by the first point. The DCP will set out triggers for the required works, and in that regard not every application should have to complete a traffic report that addresses the operation of Cobar Street / North Road, and the intersection of North Road / East Boundary Road. Therefore, the changes proposed by the landowners are acceptable.

- *Traffic management works which may be necessary to accommodate the predicted traffic generated by the development.*
- *An assessment of the proposed car parking provision ~~including suitability of scale, location and capacity~~ to service the anticipated car parking demand.*

Simplifying the wording of this item is appropriate.

~~*A Public Infrastructure Plan which addresses the following:*~~

- ~~*What land may be affected or required for the provision of infrastructure works;*~~
- ~~*The provision, staging and timing of road works internal and external to the land consistent with any relevant traffic report or assessment;*~~
- ~~*What, if any, infrastructure set out in the development contributions plan applying to the land is sought to be provided as "works in lieu" subject to the consent of the collecting agency;*~~
- ~~*The provision of public open space and land for any community facilities; and*~~
- ~~*Any other matter relevant to the provision of public infrastructure required by the responsible authority.*~~

It is likely that the timing and delivery of individual stages will vary, and the need for intersection works would be addressed through the traffic impact assessment report.

Having flexibility to address required infrastructure at each stage is desirable, rather than having to prepare multiple plans, or continually update plans if there are multiple stages or changes that are contemplated in similar periods.

I am comfortable that deleting this requirement is acceptable from a traffic perspective.

Decision guidelines
The following decision guidelines apply to an application for a permit under Clause 37.02, in addition to those specified in Clause 37.02 and elsewhere in the scheme which must be considered, as appropriate, by the responsible authority:

The East Village Comprehensive Development Plan, December 2018.

- *The extent that the layout and design of the new development minimises the potential for off-site impacts, including from noise, fumes, odour or vibrations, ensuring that:*
  - *existing uses are not unreasonably compromised by a new development, or*
  - *a new development is designed to address amenity impacts from, and to, existing uses.*

~~▪ *For a building associated with a residential use, whether the building is designed to effectively mitigate noise, fumes, odour, vibration and other associated amenity impacts from non-residential uses.*~~

▪ *The movement of pedestrians and cyclists, and vehicles providing for supplies, waste removal, emergency services and public transport.*

~~▪ *The effect of traffic to be generated by the development on the capacity of the local and regional traffic network, including the operation of the East Boundary Road / North Road intersection.*~~

~~▪ *Where it is demonstrated that the traffic volume generated by the precinct is approaching or exceeds 2,000 vehicles at the peak hour, the ability of the Cobar Street / North Road / Crosbie Street intersection to function effectively without signalisation and the implications on the operation of the broader network, including the capacity of the North Road / East Boundary Road / Murumbeena Road intersection.*~~

The traffic report required by the Schedule should address these issues and the DCP requirements include triggers for works which should appropriately address identifying the need for works to be delivered.

This decision guideline is not necessary and therefore deletion is acceptable.

7. Submissions

A number of submissions were received raising key traffic issues in relation to the exhibited Amendment, including those submitted by Department of Transport in its correspondence dated 21st October 2019.

I have summarised these into key issues, and listed them, along with a response, within Table 8.

Table 8: Response to Submissions

Issue	Response
General Submitters	
The road network in the vicinity of the site is currently highly congested during peak hours, typically at the area of the intersection of North Road and East Boundary Road.	The constrained operation of the surrounding intersections is acknowledged in the traffic analysis that supports the Amendment and is reflected in the extent of works proposed by the Amendment. Ultimately DoT and Council (the road managers) have agreed in-principle to a scope of works that intends to mitigate against the additional traffic generated by the Amendment.
Traffic generation from proposed redevelopment will have negative impact to the road network in the vicinity of the site and neighbouring land with increasing road congestion.	
The proposed signalised intersections at North Drive/ East Boundary Road and South Drive East Boundary Road should be delivered prior to redevelopment as these intersections are currently already experiencing traffic issues, with long delay on North Drive and South Drive during PM peak.	I understand the South Drive intersection is intended to be delivered up front as part of the school opening. With regard to the delivery of the North Drive intersection this should be linked to the need from a traffic perspective. Currently, the GTA modelling suggests this intersection operates with spare capacity in the peak hours and therefore it has some capacity to accommodate incremental growth in volumes. There will also be spare capacity at the South Drive intersection when it is signalised.
Residents within residential areas adjacent to North Road and East Boundary Road will have difficulties accessing their property due to the increase in traffic volumes on these roads.	Whilst there will be additional traffic generated to/from these roads, I do not expect that there will be a significant impact on access for nearby residents given the extent of works that is proposed to manage traffic in the area.

Issue	Response
Proposed signalised intersections on North Road and East Boundary Road is favourable only to traffic associated to the site and will disrupt external traffic travelling on these roads, having increased delay at each of the new intersections.	With the introduction of new signalised intersections, there will be additional delays to through vehicles on East Boundary Road and North Road. However, this is not an uncommon scenario in an urban environment and providing new signalised intersections will provide for the safest means of access to and from the precinct. I note it is typical for DoT to coordinate the timing and operation of the signalised intersections on each of these routes to ensure that there will be linking for through movements to manage the additional delays.
Impact on on-street parking in the vicinity of the site, specifically parking adjacent to the reserve park to the north of the site and residential areas near George Street and Crosbie Street.	Parking for individual applications will be assessed against the statutory requirements.
Bus services is the only practical and convenient public transport in the vicinity of the precinct.	Noted.
Proposed new bus route is not adequate to facilitate the size of the proposed development.	The provision and demand for a bus route will ultimately be determined by DoT, and the provision of a bus capable road through the site, to allow for a future link to the new Town Centre, is an appropriate response for the Amendment.
Current bus service frequency along North Road and East Boundary will need to be improved to facilitate the increase in population in this area.	Noted. The timing and demands for increased bus services is ultimately managed by DoT.
There is no train/tram corridor in the vicinity of the site to provide for future public transport demand.	Noted.
The increase in traffic volume is a safety issue for bicycle riders to utilise bicycle routes on East Boundary Road and surrounding road network.	Bicycle facilities along East Boundary Road will continue to be provided in the form of a separate bicycle lane. This includes improvements extending the lane to the southern approach at the North Road intersection (where it currently terminates prior to the intersection). The Amendment also includes a future shared path connection which will provide cyclists with an alternative route to/from the north through the site, off-road.

Issue	Response
Department of Transport	
Schedule 2 to Clause 37.02 Comprehensive Development Zone *Under Decision Guidelines, point 5 should be amended to read as follows:* *The effect of traffic to be generated by the use on the capacity of the local and regional traffic network, particularly in relation to the ability of ~~the~~ Cobar Street / North Road / Crosbie Road to function safely and effectively without signalisation, to the satisfaction of the Department of Transport.*	No comment.
Comprehensive Development Plan (CDP) **Page 20, Table 3: Precinct Infrastructure Plan – Public Transport Projects, Construction of bus stops on East Boundary Road / North Road** – *remove item from table as it is not specifically related to the precinct. The recently introduced route 627 that runs along Murrumbeena Road / East Boundary Road included the provision of bus stop infrastructure that would need to be retained or reinstated as part of any road upgrade works.*	No comment.
Page 16, 2.3 Integrated Transport, 2.3.1 Transport – requirements and guidelines: *R13: The signalisation of the Cobar Street / North Road / Crosbie Road intersection must occur prior to the traffic movements generated by the precinct exceeding 2,000 vehicle movements in the PM peak hour, unless it can be demonstrated that the local traffic network can continue to operate effectively, including the East Boundary Road / North Road / Murrumbeena Road intersection, to the satisfaction of the Department of Transport ~~VicRoads~~ and the responsible authority.*	The Landowners seek to remove this requirement from the CDP as infrastructure triggers are addressed within the DCP.

Issue	Response
G43: Vehicular connections directly onto North Road or East Boundary Road ~~should be avoided~~ other than those shown in the CDP are not permitted. Interim access arrangements may be provided, to the satisfaction of the Department of Transport ~~VicRoads~~. These will be subject to agreed thresholds for traffic movements onto East Boundary Road triggering the signalisation of intersections at North Drive and South Drive.	I am comfortable that this change in wording is appropriate, albeit as discussed previously, the Landowners intend to amend the triggers for the delivery of the intersections.
Development Contributions Plan (DCP) Under Intersection Projects, Table 4: Intersection Projects, provision trigger for projects IN-6L and IN-7L should be amended as follows: *At time of subdivision or redevelopment of ~~adjacent site~~ affected land.*	IN-6 and IN-7 should be removed from the scope of works and therefore this should be deleted.
North Road/East Boundary Road/Murrumbeena Road intersection (i) *Extension of the double right turn deceleration lane from North Road into East Boundary Road* *The length of the right turn lane on the west approach of the intersection should be extended to 210m… the extension of the third through lane [on the western departure] is not required beyond the extents needed for merging and should be curtailed to this point.*	I agree that the right turn lane should be extended, albeit extending the lane to provide storage and deceleration in an urban environment is not always practical, or possible. In any event, the Landowner amended concept plans show an extension of the right turn lanes to this length. I agree with DoT that the extension of the third through lane in the westbound direction is not required. This is also shown in the proposed concept plans.
(**b) North Road/Cobar Street/Crosbie Road** *A left turn deceleration lane should be added on the North Road west approach to Crosbie Road….* *The left turn deceleration lane on the east approach of the intersection from North Road into Cobar Street should be extended to 75m as per the AusRoads Guide requirement.*	It is logical to retain the existing left turn deceleration lane from the west as suggested by DoT. With regard to the left turn declaration lane on the east approach, for reasons discussed in the previous sections of my evidence, I am of the view that this left turn lane is not necessary. If it is deemed that the left turn deceleration lane is required, there is another Telstra pit located approximately 75 metres to the east of Cobar Street, and the lane length should be limited to 70 metres, to ensure that significant further cost to relocate that Telstra pit is not incurred.

Issue	Response
(**c) East Boundary Road/South Drive** *The right turn deceleration lane from East Boundary Road into South Drive should be further extended by approximately 20m …* *The concept plan illustrates that the three-departure lane arrangement along the southbound direction will be extended for additional 140m to Parkmore Road. This layout differs from the SIDRA model.*	For reasons discussed in the previous sections of my evidence, I am of the view that the reduced scope intersection works proposed by the Landowners is appropriate and the third through lane is not required at this intersection.
Technical Design Comments on Intersection Plans	The DoT submission includes a number of detailed design comments on the GTA plans. The majority of these comments are detailed design comments that are likely to be addressed in later stages of approvals for the intersections and I don't expect that they would have a material impact on the scope or cost of the DCP. Furthermore, if the Landowners amended suite of works is accepted, these comments are likely to be superseded. This can be addressed in detailed design.

8. Conclusions

Having undertaken a traffic engineering assessment of proposed Amendment C155 to the Glen Eira Planning Scheme, I am of the opinion that:

a) The GTA Traffic Assessment is a relatively sound basis to determine the level of traffic works required for development of the precinct.

b) I consider the level of intersection and access works which are nominated in the DCP are of an order that would be warranted by the level of development proposed on the site, with the following qualifications:

    a. There is no nexus to require signalisation of the intersection of Crosbie Road /Leila Road and Murrumbeena Road. Therefore, this project should be deleted as a requirement.

    b. There is no nexus for extensions of the three lane cross-sections south of South Drive on East Boundary Road, and west of East Boundary Road on North Road.

    c. Works can be rationalised as illustrated in the plans prepared by my firm to avoid significant service relocation costs.

c) The Landowners' proposed intersection plans, which are proposed to be substituted within the DCP, are an appropriate response to rationalising the cost and practical delivery of the intersection works required to support the Amendment.

d) A fairer approach to apportioning the DCP costs for the traffic infrastructure would be to average the peak hour traffic volumes across both the AM and PM peaks.

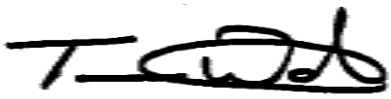
e) Amendments should be made to the DCP triggers to allow for a more flexible and practical delivery of the DCP works.

f) The Landowners' proposed road cross-sections are acceptable from a traffic perspective, albeit ultimately will be subject to Council approval as they will be handed to Council.

g) The Landowners' changes to the CDP Requirements and Guidelines, and the Schedule to the Comprehensive Development Zone, are appropriate.

h) The proposed Amendment appropriately deals with traffic and parking issues.

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



JASON LEE WALSH
DIRECTOR
TRAFFIX GROUP
22 November 2019

Appendix A

Qualifications

Name

Jason Lee Walsh - Director, Traffix Group Pty Ltd

Address

Level 28, 459 Collins Street

MELBOURNE

VICTORIA 3000

Qualifications

My educational qualifications and membership of professional associations are as follows:-

- Bachelor of Civil Engineering, Monash University
- Bachelor of Science, Monash University
- Member, Victorian Planning & Environmental Law Association

Experience

I have approximately 20 years experience in Traffic Engineering including,

- 1995-2000 at Turnbull Fenner (now Traffix Group), including short term placements at the cities of Bayside and Whittlesea,
- 2000-2011 at Grogan Richards Pty Ltd (now Cardno),
- 2011-present at Traffix Group.

Areas of Expertise

- Car parking and Traffic.
- Traffic advice and assessment of land uses and development proposals to planning authorities, government agencies, corporations and developers (including major residential, retail, food and drink, commercial, industrial, institutional and mixed use projects).
- Preparation and presentation of evidence before VCAT and Panels.

Expertise to Prepare this Assessment

My experience and expertise over the past 20 years, including involvement with varied forms of developments, qualifies me to comment on the traffic implications of the proposed development.

Instructions

I have been instructed by Planning & Property Partners Pty Ltd on behalf of Griffith Avenue Pty Ltd, Fordtrans Pty Ltd and Make 246 EBRB Pty Ltd to undertake a traffic engineering assessment and prepare an evidence statement in relation to Amendment C155 to the Glen Eira Planning Scheme.

Facts, Matters and Assumptions Relied Upon

- East Village Structure Plan 2018 - 2031.
- East Village Access and Movement Report – GTA October 2018.
- East Village Comprehensive Development Plan – VPA December 2018.
- East Village Development Contribution Plan – VPA October 2018.
- Traffix Group memorandum of 1 November 2019.
- Traffix Group memorandum of 18 November 2019.
- Landowner proposed revisions to the Future Urban Structure Plan, CDP and CDZ.
- Exhibited material.
- Submissions.
- Glen Eira Planning Scheme.
- Site inspections.
- Relevant experience.

Documents Taken into Account

See above.

Identity of Persons Undertaking Work

Jason Walsh as per the evidence statement.

Carlo Morello (Senior Associate, Traffix Group) assisted with preparation of the evidence report.

Summary of Opinions

See Conclusions section of the evidence statement.

Appendix B

Traffix Group ‘Without Prejudice’ Memoranda

Memorandum

Traffix Group

To:	Josh Dawson (Brix Property) Department of Transport Glen Eira City Council	From:	Carlo Morello (Traffix Group)
Our Ref:	G24360M-06B (WITHOUT PREJUDICE)	Date:	Friday, 1 November 2019

WITHOUT PREJUDICE - East Village– Development Contributions Plan - Proposed Extent of Traffic Infrastructure Works

Further to the recent meeting held with the Landowner Representatives and Glen Eira City Council and the subsequent meeting with Department of Transport and City of Glen Eira (25th October) we provide the following additional information relating to the extent of traffic works proposed by the East Village Development Contributions Plan, as well as additional information as requested by VicRoads.

As discussed, and following our review of the East Village CDP and DCP, the accompanying Traffic Impact Assessment prepared by GTA Consultants, and the SIDRA Intersection Models provided by GTA (which formed the basis of the DCP), we have prepared a suite of Concept Layout Plans, attached at Appendix A which detail an extent of works which we believe is a more rationalised and appropriate scope to be included in the DCP.

We note that these plans have been updated since the issue of the previous memorandum (G24360M-05).

We believe there is strong merit to rationalising the extent of works included in the DCP.

These rationalisations come, in the most part, as a result of investigating more practical design outcomes that reduce significantly high costs of services relocations whilst managing capacity needs of the network.

Others relate to the extent of works and a nexus between the development.

A discussion of each of the proposed works, and the deviation from the DCP scope, is provided in the table overleaf.

SIDRA results are also provided for information to inform the discussion in the table.

Traffix Group

DCP Intersection	DCP Scope of Works	Modified Scope of Works (change bolded and in red)	Reasoning for Modified Scope of Works
IN-1 - North Road & East Boundary Road	Second right turn lane from west (and associated works to eastern leg for alignment), realignment and extension of southern leg for bicycle lane.	Second right turn lane from west (and associated works to eastern leg for alignment), **no change to southern leg.**	We do not believe there is a nexus between East Village and the provision of the 'missing piece' of the bicycle lane on East Boundary Road to require a full realignment of the southern leg. Furthermore, the 'existing' and 'proposed + mitigating' traffic volumes provided in the GTA report suggest that development does not add any additional right turn movements to the southern approach. A comparison of the SIDRA analysis suggests that the queue length reduces from 131 to 119 metres (-12 metres) and increases from 90 to only 91 metres (+1 metres) in the AM and PM peaks respectively for the right turn. The works, however, include a significant extension to these lanes. From a traffic generation perspective, we are of the view that there is no nexus to these works associated with the East Village Precinct.
	DCP costings include '3 lane arrangement to continue for an additional 500m to Koornang Road)	DCP costings should **exclude extended 3 lane arrangement**	We understand that this note was a carry over from previous concepts in the early stages of the development of the DCP. The GTA SIDRA Model and intersection plans do not contemplate a 3 lane cross-section at the intersection of North Road/East Boundary Road. There is no capacity benefit or need contemplated in the Traffic Assessment. This extent of work is not required by the DCP and should be excluded from costings.
	Western approach double right turn lanes.	DoT has requested for an extension to the right turn lanes from the west.	We note that DoT's has requested for an extension of the right turn lanes from the west, to incorporate both the queue length and additional deceleration requirements for the right turn. The GTA model does not include any extension to the right turn lanes (other than those documented on the DCP plans) and the SIDRA suggests that whilst queues extend past the end of the lanes, the intersection still operates acceptably. It is also noted that the existing operation of this movement already shows a that queues extend past the lane length. The GTA model shows that the queue length for this movement extends only approximately 15 metres from the existing condition. It is also considered that extension of the lanes to include deceleration lengths is also not required, and given the context of the proposal, at best, the lane lengths should be set to reflect the queue length. We have undertaken a review of the possible extension of the right turn lane from the west and have incorporated this into the plans at Appendix A. This includes an extension of a single right turn lane to a total length of 180 metres, forming to a double right turn of approximately 55 metres length. This is as a result of the constraints of the existing kerb on the northern and southern sides of North Road (service roads).

DCP Intersection	DCP Scope of Works	Modified Scope of Works (change bolded and in red)	Reasoning for Modified Scope of Works
IN-2 - Crosbie Road/ Murrumbeena Road/Leila Road	Signalisation of existing intersection.	**No Works**	The existing analysis undertaken by GTA in the Traffic Impact Assessment identifies that this intersection is already at capacity in the afternoon peak hour. Proposed turn controls at the proposed signalised intersection of Cobar Street/North Road/Crosbie Road to the south-east effectively only permit a small proportion of northbound vehicles to 'exit' the precinct toward to turn right out of Crosbie Road (onto Murrumbeena Road). No other precinct-based vehicle movements will be facilitated by the signalisation of the intersection at Leila Street. We understand that there are concerns that signalisation the Leila Street intersection would encourage additional external traffic along Crosbie Road. There are alternative route options for vehicles exiting the site to the north to not use Crosbie Street. There are only some 60-70 vehicle movements per hour making this manoeuvre. Alternative routes include: • Turning right onto East Boundary Road from South Drive or North Drive (the GTA report shows a DoS of <0.7 for these intersections in both peaks) • Turning right onto Murrumbeena Road from North Drive (GTA report shows a DoS for this right turn of 0.73 in the AM and 0.62 in the PM. This would suggest that this traffic could be managed through other routes if there wasn't capacity at the Leila Road/Murrumbeena Road intersection for the precinct. To demonstrate that this is possible, we have redistributed these northbound vehicle movements. On modelling (the summaries shown at Appendix B) the SIDRA shows that the network can operate under acceptable conditions, with only relatively minor increases in Degrees of Saturation observed. However, in order to facilitate the redistribution of this traffic, the extension of right turn lanes on the southern leg of the East Boundary Road/North Road/Murrumbeena Road intersection (highlighted in the first item for IN-3 above) would be required. In this regard, if DoT and Council were accepting of the removal of the Leila Road intersection (IN-2) works from the DCP, then the applicant would be willing to accept the general scope of works identified in the GTA plans for the North Road/East Boundary Road/Murrumbeena Road intersection (IN-1), modified to include the extension of the western right turns as per the plans at Appendix A. In addition to the above, the intersection of Cobar Street/Crosbie Road/North Road (IN-3) could be modified to discourage/prevent vehicles from heading northbound from the precinct into Crosbie Road.

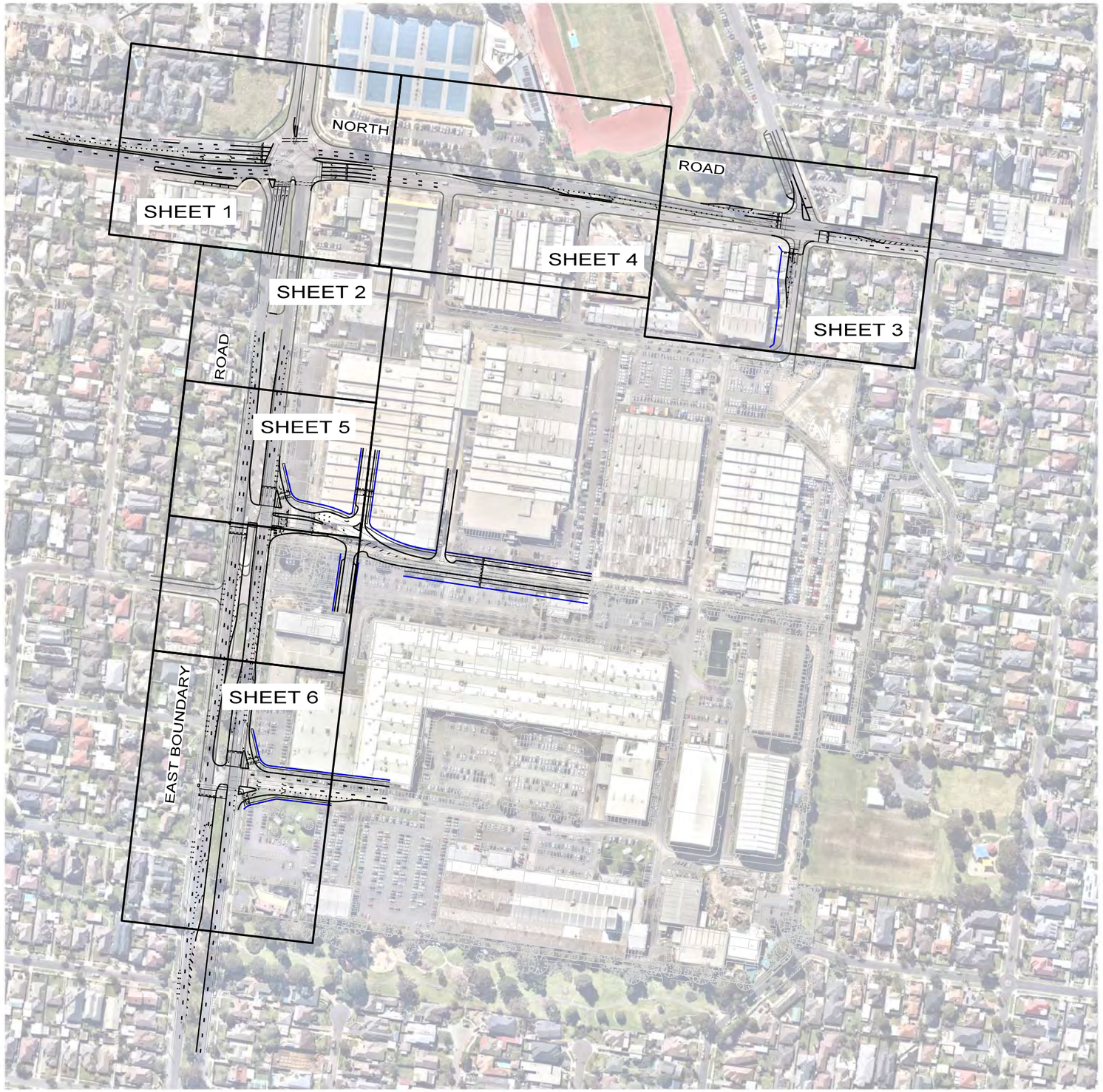
Traffix Group

DCP Intersection	DCP Scope of Works	Modified Scope of Works (change bolded and in red)	Reasoning for Modified Scope of Works
IN-3 - Cobar Street & Crosbie Road & North Road	Signalisation of existing intersection, new central medians on North Road, new left turn deceleration lane from east.	Signalisation of existing intersection**, no central medians on North Road, shared left/through lane from east.**	The cost of this intersection includes $3.8m of Telstra services relocation as a result of the realignment of the carriageways, additional left turn lane (from the east), and new central medians on North Road. To reduce this significant cost, we propose a rationalised layout that maintains the existing road cross-section and shifts the Cobar Street leg to the west slightly to avoid the Telstra pit on the south-east corner of the intersection. It also avoids impacting on the existing dwelling at No. 962 North Road. This design is consistent with the signals at North Road/Poet Road/Poath Road to the east. Capacity analysis using the GTA SIDRA Network Model, updated to reflect the amended design, shows that this intersection can continue to operate under acceptable conditions, with a Degree of Saturation of 0.91 in the PM peak hour. With regard to safety, whilst we acknowledge the desire to facilitate left turn deceleration lanes where practical, Part 6 of Austroads Guide to Traffic Management suggests that a balanced approach to determining whether turn treatments are required is appropriate. This includes consistency of treatment, traffic volumes and safety. We have reviewed CrashStats data for the past 5 years along North Road, in a westbound direction and note that there have been only two instances of rear end crashes. Both were at different locations. We also note that the intersection of North Road/East Boundary Road does not provide for a left turn deceleration lane (in the existing or DCP works) nor does the intersection to the east at Poath Road (or the majority of intersection roads to the east). Whilst we have investigated other options that consider the provision of a left turn slip lane or modified left turn deceleration lane, we expect that any major modification to the southern kerb of North Road and works in proximity to the Telstra pit will likely require services relocations, and the potential for cost savings will be significantly reduced. In this instance, it is considered that on balance, the perceived need for the left turn is offset by the high cost of the services relocation which is directly a result of pavement widening for the left turn lane and any other option would not deliver the same rationalisation in cost. Whilst detailed costings are required, on the basis of the preliminary cost sheets by GTA, we contemplate a saving of in the order of $2million may be possible.
IN-4 - North Drive / East Boundary Road	Signalised Intersection at George Street with three through lanes on East Boundary Road North and South, single right turn in and double right turn out	Signalised Intersection **shifted north of George Street with three through lanes on East Boundary Road North and South, single right turn in and double right turn out**	There is a long term lease to an anchor tenant on the land to the south of the DCP intersection (on the East Village site) which makes delivery of the current DCP intersection impractical within the next 15-20 years. There is also a group of significant gum trees immediately north of the DCP intersection (on the East Village site) which are now proposed to be retained. A shift of the intersection to the north is proposed to allow this intersection to be delivered sooner, retain the key anchor tenant and also retain the existing trees. It also provides for a greater separation between North Drive and South Drive. There will be no material change from a capacity perspective at this intersection.

DCP Intersection	DCP Scope of Works	Modified Scope of Works (change bolded and in red)	Reasoning for Modified Scope of Works
IN-5 - South Drive / East Boundary Road	Signalised Intersection with three through lanes on East Boundary Road North and South, double right turn in and double right turn out	Signalised Intersection with **two through lanes on East Boundary Road North and South**, double right turn in and double right turn out	There is an underground gas service which operates north-south through the central median of East Boundary Road. The DCP costings include $1.5m of gas relocation/protection works as well as a significant amount of other services. We understand that a portion of this is because of widening into the central median shown on the DCP plans. The GTA Assessment shows this intersection operates with a DoS of <0.65 in both peaks. To reduce the extent of widening into the central median, it is proposed to maintain only 2 lanes on East Boundary Road. Capacity analysis using the GTA SIDRA Network Model, updated to reflect the amended design, shows that this intersection can continue to operate under acceptable conditions, with a Degree of Saturation of less than 1.0 in the PM peak hour. Summaries of SIDRA can be provided to show the amended analysis here. At DoT's request, we have investigated an alternative to provide for a third southbound through lane. This sketch is provided at Appendix C. This sketch maintains the existing western kerb of the southbound carriageway (to reduce the potential for services relocation costs), but to manage the impact to the eastern road reserve boundary, will remove the left turn deceleration lane into South Drive, providing only the slip lane into South Drive. We seek DoT's comment on this arrangement.
	DCP costings include '3 lane arrangement to continue for an additional 140m to Parkmore Road)	DCP costings should **exclude extended 3 lane arrangement**	We understand that this note was a carry over from previous concepts in the early stages of the development of the DCP. The GTA SIDRA Model and intersection plans do not contemplate a 3 lane cross-section south of South Drive on East Boundary Road. There is no capacity benefit or need contemplated in the Traffic Assessment. This extent of work is not required by the DCP and should be excluded from costings.
IN-6 - North Road& Murra Street	New Left Turn Slip Lane plus land acquisition	**No Works**	The modelling suggests there are only 5 vehicles making this left turn in either peak hour. The cost to provide the left turn deceleration lane, due to services relocation and land acquisition, is ~$2million. As noted for IN-3, CrashStats does not suggest a trend of rear end crashes along North Road due to the absence of left turn deceleration lanes, and given volumes, it is considered that on balance, the perceived need for the left turn is offset by the high cost of the services relocation and property acquisition.
IN-7 – North Road & Carey Street	New Left Turn Slip Lane plus land acquisition	**No Works**	The modelling suggests there are only 33 vehicles making this left turn in either peak hour. The cost to provide the left turn deceleration lane, due to services relocation and land acquisition, is ~$2.3million. As noted for IN-3, CrashStats does not suggest a trend of rear end crashes along North Road due to the absence of left turn deceleration lanes, and given volumes, it is considered that on balance, the perceived need for the left turn is offset by the high cost of the services relocation and property acquisition.

Appendix A

Proposed Intersection Works



N MELWAY MAP REF 69 A10

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY

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

ISSUE	ISSUE DESCRIPTION	ISSUE DATE
A	COMMENTS INCORPORATED	22 OCT 2019
B	REVISED EASTERN LEG OF NORTH ROAD	25 OCT 2019
C	COMMENTS INCORPORATED	31 OCT 2019
D	COMMENTS INCORPORATED	01 NOV 2019

GENERAL NOTES
1 BASE INFORMATION FROM CLIENT FILE (5009-00-SITE PLANS-20120816.DWG) / AERIAL PHOTOGRAPH (SOURCE NEARMAP AUG 2019)
2 ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL
3 MAIN ROADS
- NORTH ROAD (SPEED ZONE 70km/h)
- EAST BOUNDARY ROAD (SPEED ZONE 70km/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 S O'KEEFE 18 OCT 2019
CHECKED/APPROVED C MORELLO 18 OCT 2019
FILE NAME G24360-B-00.dgn

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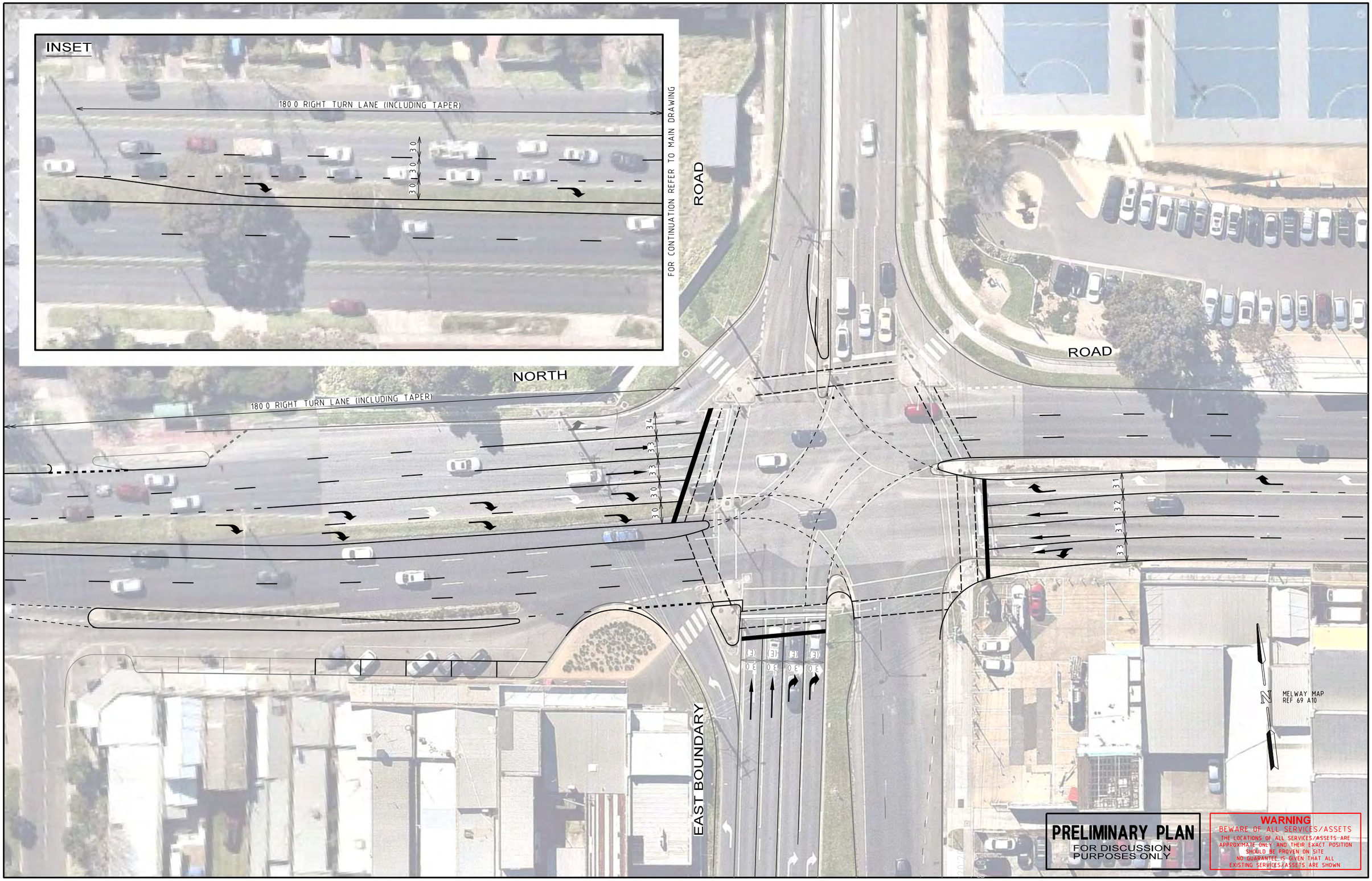
EAST VILLAGE MIXED USE DEVELOPMENT
PROPOSED INTERSECTION AND ROADWORKS
GLEN EIRA CITY COUNCIL
OVERVIEW PLAN

SCALE 1:500 (A3) 0 8.75 17.5 26.25 35
SHEET No. 0
DWG No. G24360-B-01



FOR CONTINUATION REFER TO DRAWING G24360-B-05

ISSUE	ISSUE DESCRIPTION	ISSUE DATE
A	COMMENTS INCORPORATED	22 OCT 2019
B	REVISED EASTERN LEG OF NORTH ROAD	25 OCT 2019
C	COMMENTS INCORPORATED	31 OCT 2019
D	COMMENTS INCORPORATED	01 NOV 2019

GENERAL NOTES
1 BASE INFORMATION FROM CLIENT FILE (5009-00-SITE PLANS-20120816.DWG) / AERIAL PHOTOGRAPH (SOURCE NEARMAP AUG 2019)
2 ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL
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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
S O'KEEFE 18 OCT 2019

CHECKED/APPROVED
C MORELLO 18 OCT 2019

FILE NAME
G24360-B-00.dgn

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EAST VILLAGE MIXED USE DEVELOPMENT
PROPOSED INTERSECTION AND ROADWORKS (IN-01)
GLEN EIRA CITY COUNCIL
FUNCTIONAL LAYOUT PLAN

SCALE 1:500 (A3) 0 2.5 5 7.5 10
SHEET No. 1 of 6
DWG No. G24360-B-04

FOR CONTINUATION REFER TO DRAWING G24360-B-06

FOR CONTINUATION REFER TO DRAWING G24360-B-04

ISSUE	ISSUE DESCRIPTION	ISSUE DATE
A	COMMENTS INCORPORATED	22 OCT 2019
B	REVISED EASTERN LEG OF NORTH ROAD	25 OCT 2019
C	COMMENTS INCORPORATED	31 OCT 2019
D	COMMENTS INCORPORATED	01 NOV 2019

GENERAL NOTES
1 BASE INFORMATION FROM CLIENT FILE (5009-00-SITE PLANS-20120816.DWG) / AERIAL PHOTOGRAPH (SOURCE NEARMAP AUG 2019)
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DESIGNED
S O'KEEFE 18 OCT 2019

CHECKED/APPROVED
C MORELLO 18 OCT 2019

FILE NAME
G24360-B-00.dgn

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EAST VILLAGE MIXED USE DEVELOPMENT
PROPOSED INTERSECTION AND ROADWORKS
GLEN EIRA CITY COUNCIL
FUNCTIONAL LAYOUT PLAN

SCALE 1:500 (A3) 0 2.5 5 7.5 10
SHEET No. 2 of 6
DWG No. G24360-B-05

FOR CONTINUATION REFER TO DRAWING G24360-B-03

NOTE
DESIGN TO LIMIT TELSTRA PIT RELOCATION AND AVOID ANY IMPACT TO No 962 NORTH ROAD PROPERTY

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY

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

ISSUE	ISSUE DESCRIPTION	ISSUE DATE
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D	COMMENTS INCORPORATED	01 NOV 2019

GENERAL NOTES
1 BASE INFORMATION FROM CLIENT FILE (5009-00-SITE PLANS-20120816 DWG) / AERIAL PHOTOGRAPH (SOURCE NEARMAP AUG 2019)
2 ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL
3 MAIN ROADS
- NORTH ROAD (SPEED ZONE 70km/h)
- EAST BOUNDARY ROAD (SPEED ZONE 70km/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
S O'KEEFE 18 OCT 2019
CHECKED/APPROVED
C MORELLO 18 OCT 2019
FILE NAME
G24360-B-00 dgn

Traffix Group
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Melbourne, Victoria 3000
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www.traffixgroup.com.au

EAST VILLAGE MIXED USE DEVELOPMENT
PROPOSED INTERSECTION AND ROADWORKS (IN-03)
GLEN EIRA CITY COUNCIL
FUNCTIONAL LAYOUT PLAN

SCALE 1:500 (A3) 0 2.5 5 7.5 10
SHEET No. 3 of 6
DWG No. G24360-B-02

FOR CONTINUATION REFER TO DRAWING G24360-B-04

FOR CONTINUATION REFER TO DRAWING G24360-B-02

ISSUE	ISSUE DESCRIPTION	ISSUE DATE
A	COMMENTS INCORPORATED	22 OCT 2019
B	REVISED EASTERN LEG OF NORTH ROAD	25 OCT 2019
C	COMMENTS INCORPORATED	31 OCT 2019

GENERAL NOTES
1 BASE INFORMATION FROM CLIENT FILE (5009-00-SITE PLANS-20120816.DWG) / AERIAL PHOTOGRAPH (SOURCE NEARMAP AUG 2019)
2 ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL
3 MAIN ROADS
- NORTH ROAD (SPEED ZONE 70km/h)
- EAST BOUNDARY ROAD (SPEED ZONE 70km/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
S O'KEEFE 18 OCT 2019

CHECKED/APPROVED
C MORELLO 18 OCT 2019

FILE NAME
G24360-B-00.dgn

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EAST VILLAGE MIXED USE DEVELOPMENT

PROPOSED INTERSECTION AND ROADWORKS (IN-06 AND IN-07)

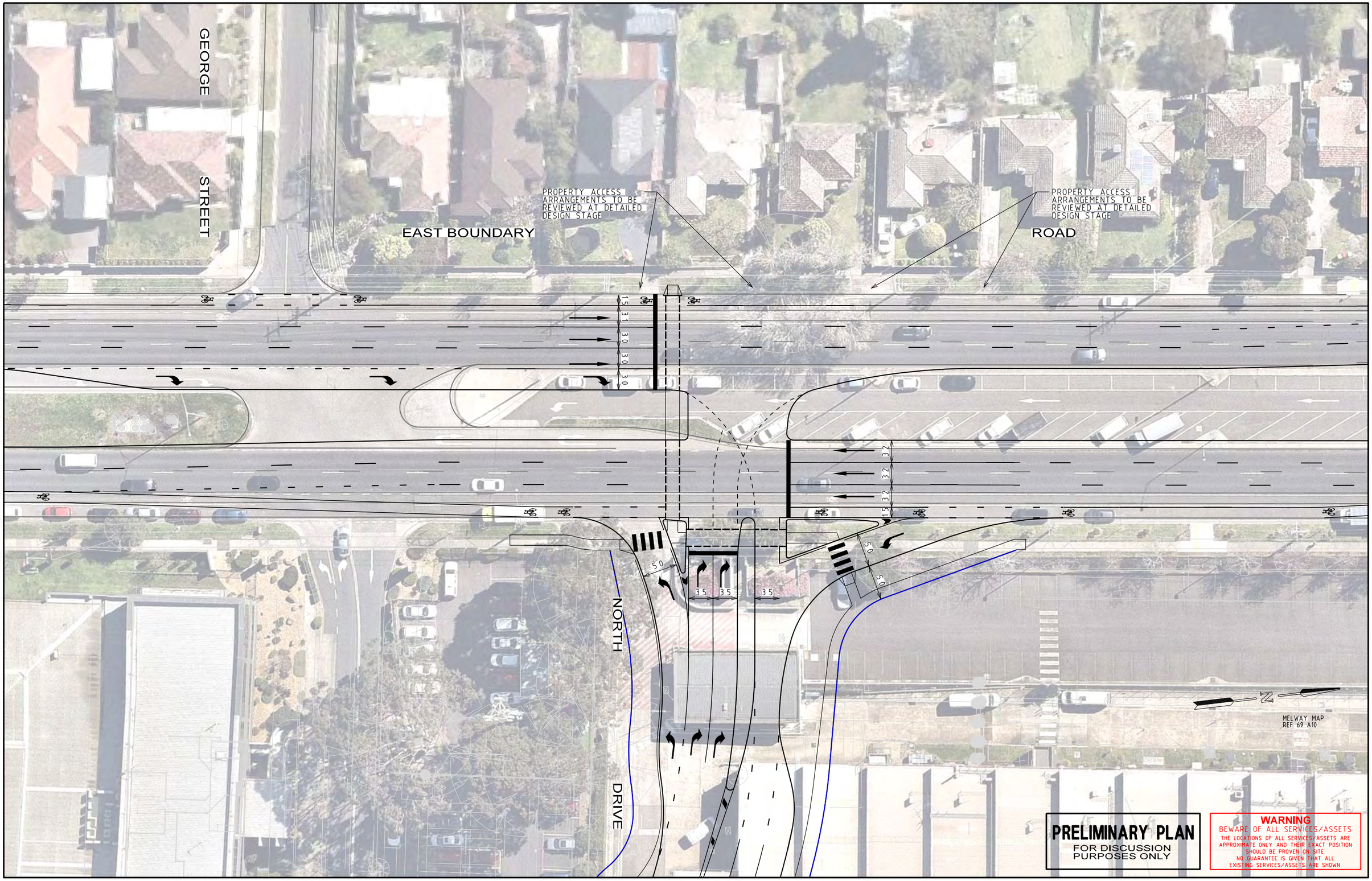
GLEN EIRA CITY COUNCIL

FUNCTIONAL LAYOUT PLAN

SCALE 1:500 (A3) 0 2.5 5 7.5 10

SHEET No. 4 of 6

DWG No. G24360-B-03



FOR CONTINUATION REFER TO DRAWING G24360-B-07

FOR CONTINUATION REFER TO DRAWING G24360-B-05

ISSUE	ISSUE DESCRIPTION	ISSUE DATE
A	COMMENTS INCORPORATED	22 OCT 2019
B	REVISED EASTERN LEG OF NORTH ROAD	25 OCT 2019
C	COMMENTS INCORPORATED	31 OCT 2019

GENERAL NOTES
1 BASE INFORMATION FROM CLIENT FILE (5009-00-SITE PLANS-20120816.DWG) / AERIAL PHOTOGRAPH (SOURCE NEARMAP AUG 2019)
2 ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL
3 MAIN ROADS
- NORTH ROAD (SPEED ZONE 70km/h)
- EAST BOUNDARY ROAD (SPEED ZONE 70km/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
S O'KEEFE 14 OCT 2019

CHECKED/APPROVED
C MORELLO 14 OCT 2019

FILE NAME
G24360-B-00.dgn

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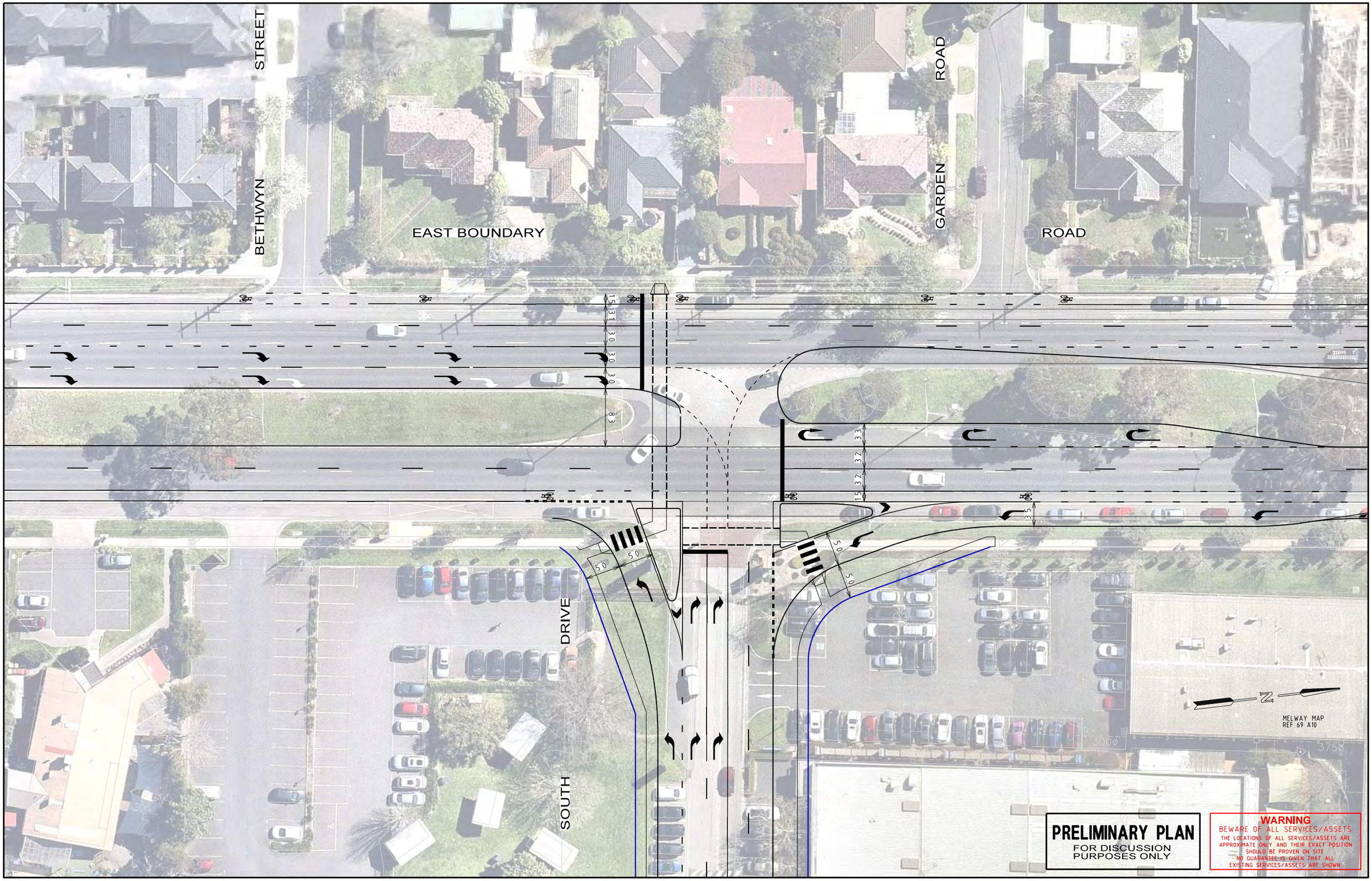
EAST VILLAGE MIXED USE DEVELOPMENT
PROPOSED INTERSECTION AND ROADWORKS (IN-04)
GLEN EIRA CITY COUNCIL
FUNCTIONAL LAYOUT PLAN

SCALE 1:500 (A3) 0 2.5 5 7.5 10
SHEET No. 5 of 6
DWG No. G24360-B-06



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ISSUE	ISSUE DESCRIPTION	ISSUE DATE
A	COMMENTS INCORPORATED	22 OCT 2019
B	COMMENTS INCORPORATED	31 OCT 2019
C	COMMENTS INCORPORATED	01 NOV 2019

GENERAL NOTES
1 BASE INFORMATION FROM CLIENT FILE (5009-00-SITE PLANS-20120816.DWG) / AERIAL PHOTOGRAPH (SOURCE NEARMAP AUG 2019)
2 ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL
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- NORTH ROAD (SPEED ZONE 70km/h)
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DESIGNED
S O'KEEFE 14 OCT 2019

CHECKED/APPROVED
C MORELLO 14 OCT 2019

FILE NAME
G24360-B-00.dgn

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EAST VILLAGE MIXED USE DEVELOPMENT
PROPOSED INTERSECTION AND ROADWORKS (IN-05)
GLEN EIRA CITY COUNCIL
FUNCTIONAL LAYOUT PLAN

SCALE 1:500 (A3) 0 2.5 5 7.5 10
SHEET No. 6 of 6
DWG No. G24360-B-07

Appendix B

SIDRA Results

AM PEAK Comparison of GTA Model & Traffix Group Functional Changes

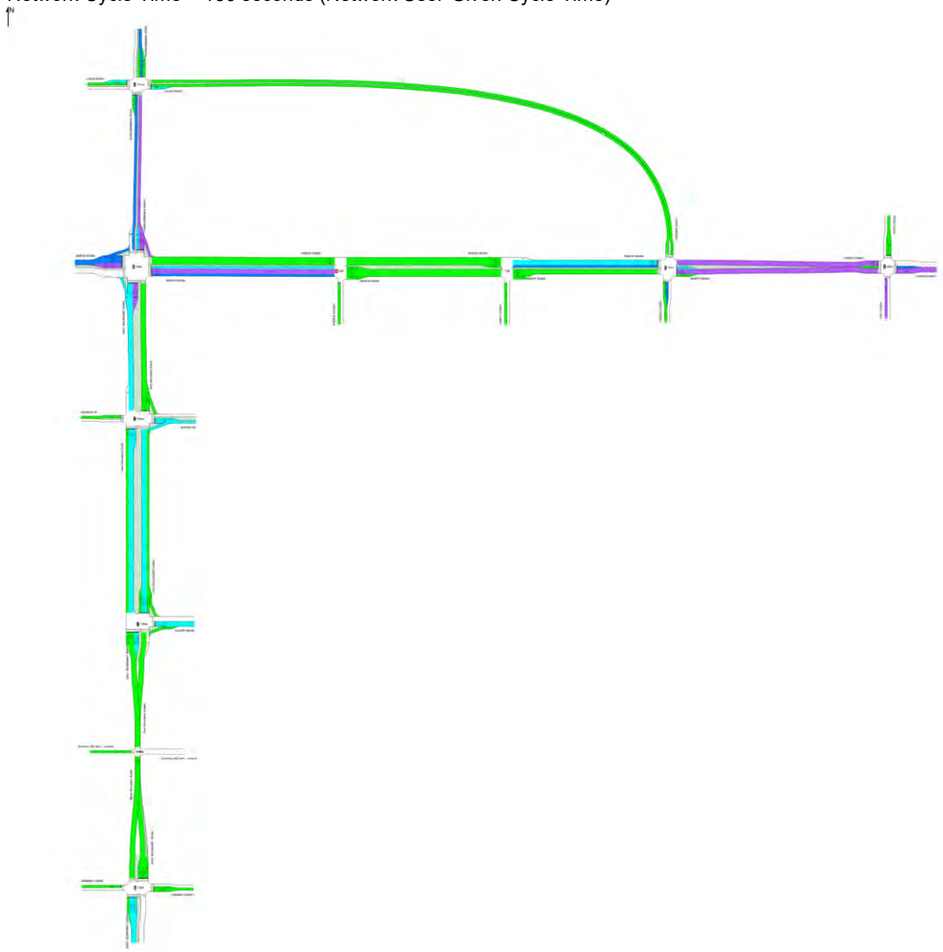
GTA Model

DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

Network: N101 [Master Model]

New Network
Network Category: (None)
Network Cycle Time = 130 seconds (Network User-Given Cycle Time)



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Traffix Group Modifications

DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

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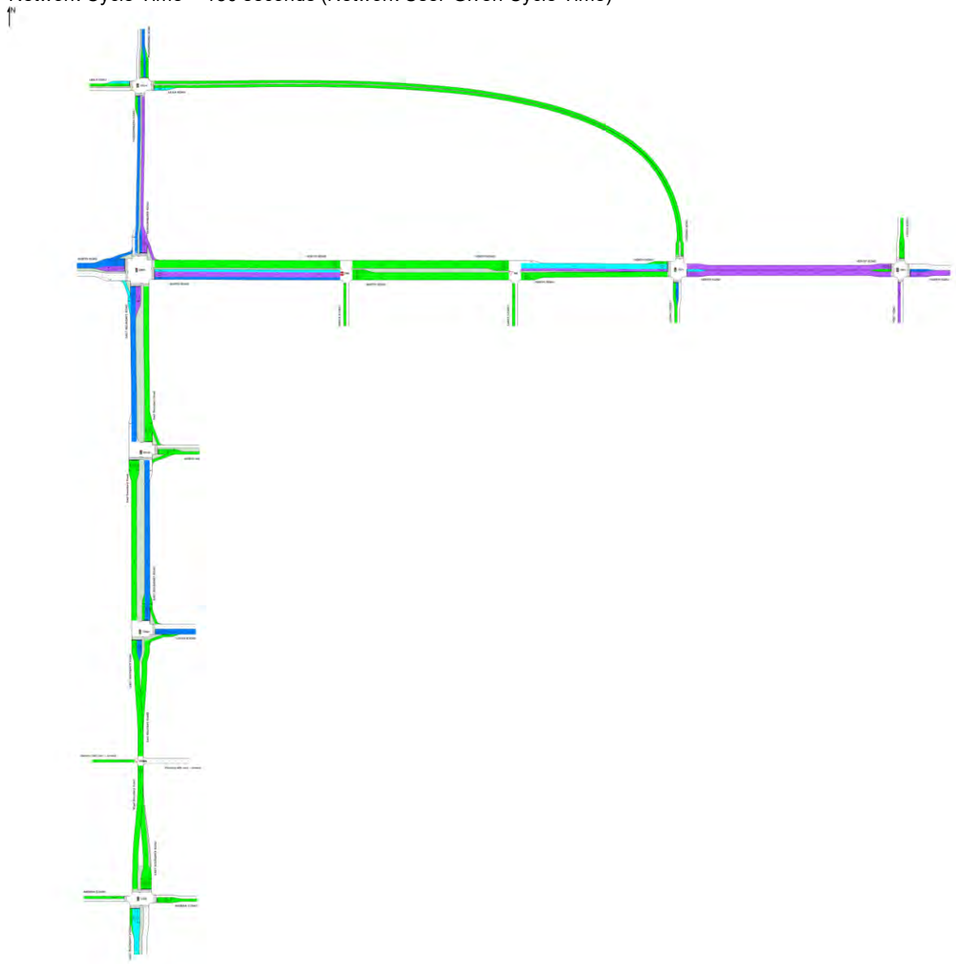
New Network
Network Category: (None)
Network Cycle Time = 130 seconds (Network User-Given Cycle Time)



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Traffix Group

PM PEAK Comparison of GTA Model & Traffix Group Functional Changes

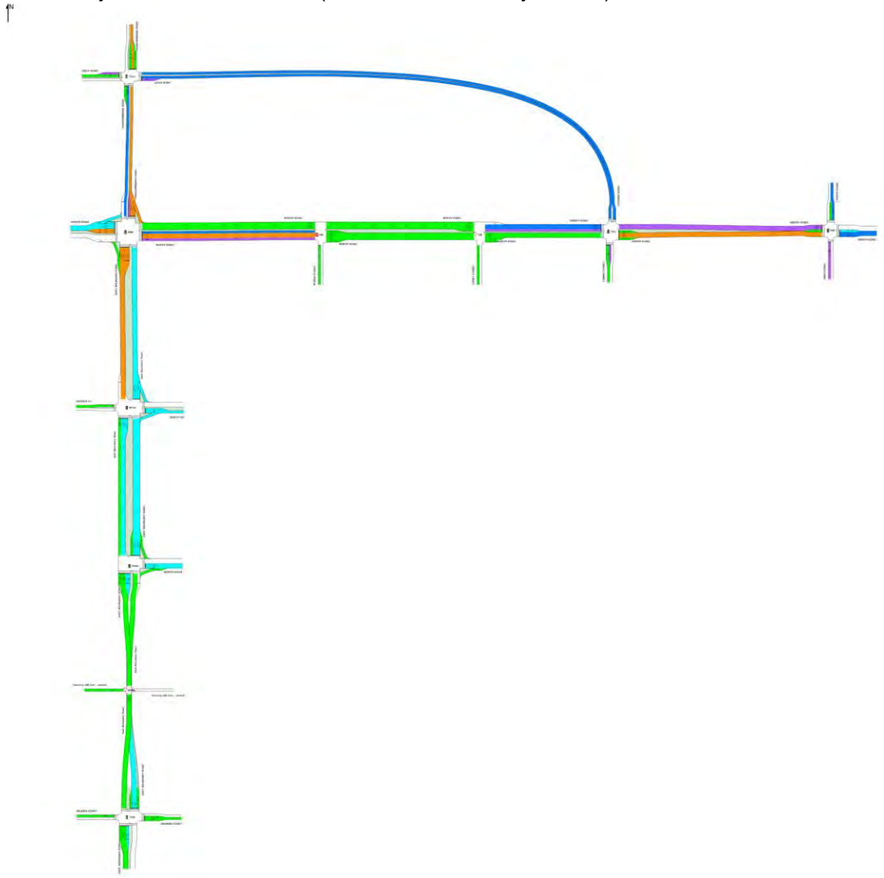
GTA Model

DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

Network: N101 [Master Model]

New Network
Network Category: (None)
Network Cycle Time = 130 seconds (Network User-Given Cycle Time)



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Traffix Group Modifications

DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

Network: N101 [Master Model]

New Network
Network Category: (None)
Network Cycle Time = 130 seconds (Network User-Given Cycle Time)

Colour code based on Degree of Saturation

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Traffix Group

AM & PM Output without use of Crosbie Road Northbound Movements

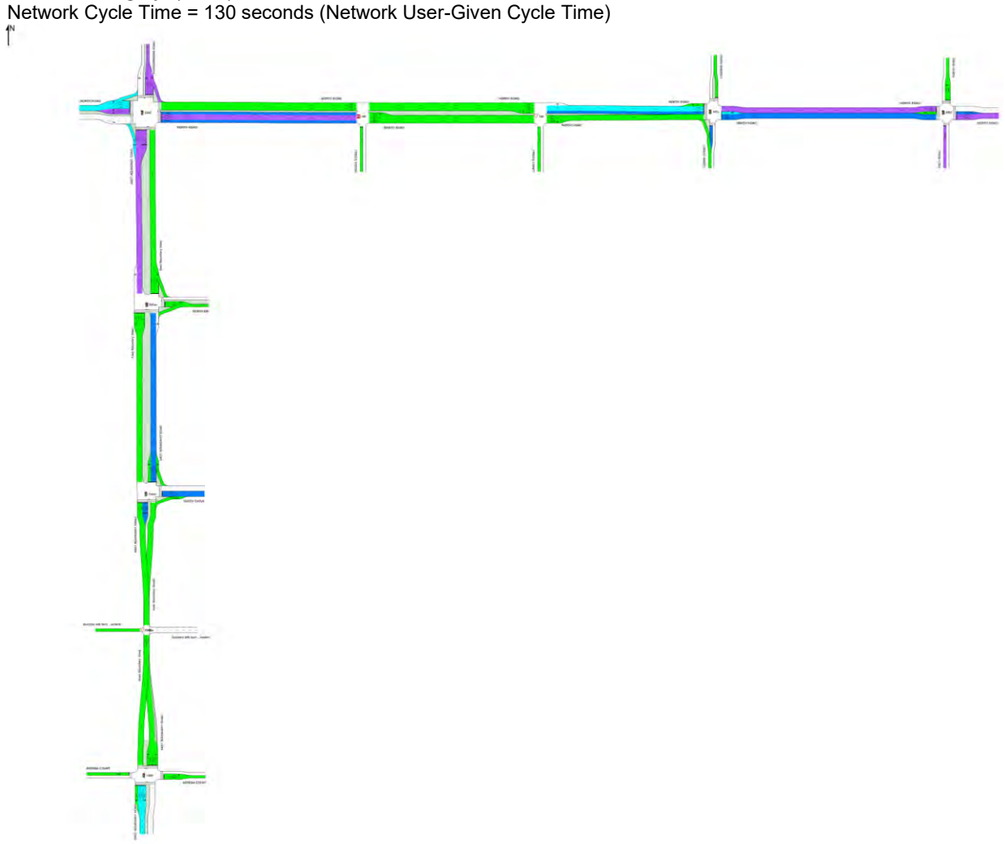
AM Peak

DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

Network: N101 [Master Model]

New Network
Network Category: (None)
Network Cycle Time = 130 seconds (Network User-Given Cycle Time)



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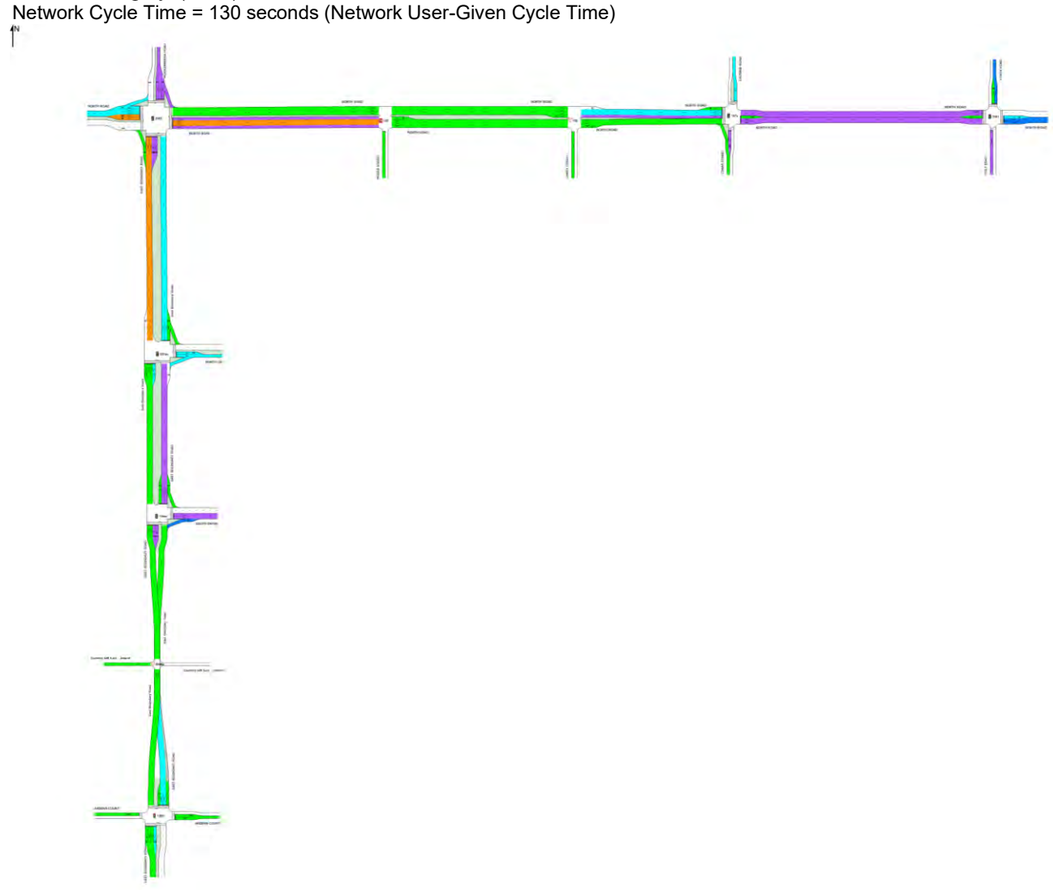
PM Peak

DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

Network: N101 [Master Model]

New Network
Network Category: (None)
Network Cycle Time = 130 seconds (Network User-Given Cycle Time)



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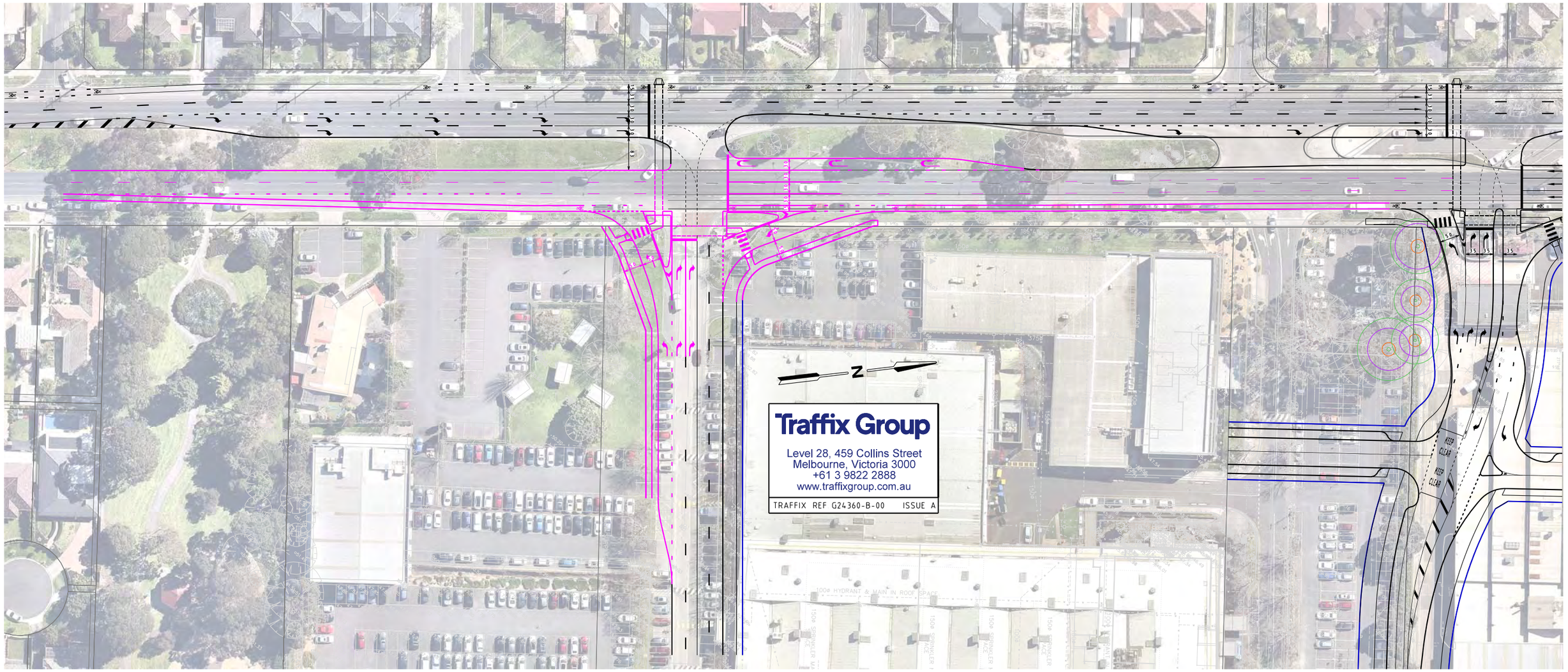
Appendix C

Sketch Designs


N
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TRAFFIX REF G24360-B-00 ISSUE A
KEEP CLEAR
KEEP CLEAR

Memorandum

Traffix Group

To:	DoT Glen Eira Council GTA Land Owners	From:	Carlo Morello (Traffix Group)
Our Ref:	G24360M-07D (WITHOUT PREJUDICE)	Date:	Monday, 18 November 2019

WITHOUT PREJUDICE - East Village– Development Contributions Plan – Updates to Extent of Traffic Infrastructure Works

Further to the recent meeting (8th November 2019), and subsequent to our previous memoranda (most recent G24360M-06 dated 1st November 2019) we provide the following summary of discussions of the meeting between the Land Owners, DoT, Council and GTA in relation to the transport infrastructure works for the above site.

IN-1 – North Road/Murrumbeena Road/East Boundary

- DoT, Land Owners and Council discussed adopting the extended right turn lane from the west to cater for additional demands, but the length of lane (and second right turn lane) was constrained by the existing cross-section and kerb separators for the service lane at the south.
  - We have further adjusted the design to extend the right turn lanes to 70 metres and 210 metres on this approach.
- GTA queried that with the above right turn extension works, what length of deceleration/merge has been modelled in the SIDRA for the departure of the left through lane from the east.
  - The GTA model had previously modelled a deceleration length of 150 metres. However the amended layout (to incorporate the right turn lane extension) will reduce this to approximately 90 metres. We have updated the SIDRA model to reflect this amendment.
- On the southern approach, the model and plans now adopt the extension of the right turns from the south and inclusion of the bicycle lane.
- DoT requested a review of the right turn from the east, given that there would be additional right turn demands, and in particular an extension of the right turn.
  - The plans and model now include an extension of this right turn lane for back to back right turns at Cobar Street.

SIDRA Summaries for the AM and PM peak are shown in Table 1. This model includes the removal of Leila Road/Crosbie Road/Murrumbeena Road intersection from the network and northbound traffic from Cobar Street (through to Leila Road) redistributed to alternative routes (ie left turn at Cobar onto North Road, then right turn into Murrumbeena Road or rights turn at North Drive or South Drive).

Whilst these results vary to those presented in the GTA report, we expect that this is in part driven as a result of reductions in lane utilisation for the left through lane on the eastern approach, due to reductions in the downstream merge length which are as a result of the requested extension to the double right turn lanes on the west approach.

Table 1: North Road/ East Boundary Road/ Murrumbeena Road – Peak Hours

	Leg	Turn	Deg. Satn	Average Delay	95% Back of Queue
AM Peak	East Boundary Rd (S)	L2	0.679	15.8	121.5
		T1	0.867	53.2	281.3
		R2	0.860	72.0	124.6
		U	0.860	72.5	115.1
	North Road (E)	L2	0.487	26.1	116.1
		T1	0.878	37.0	296.6
		R2	0.397	65.5	31.0
		U	0.397	65.9	31.0
	Murrumbeena Road (N)	L2	0.876	68.2	234.7
		T1	0.876	60.4	234.7
		R2	0.833	76.5	67.9
	North Road (W)	L2	0.685	47.5	203.3
		T1	0.685	38.7	207.9
		R2	0.876	79.8	80.8
PM Peak	East Boundary Rd (S)	L2	0.599	17.9	68.7
		T1	0.974	79.3	349.3
		R2	0.879	78.8	94.0
		U	0.879	79.2	89.4
	North Road (E)	L2	0.545	33.1	143.9
		T1	0.983	80.0	155.0
		R2	0.850	80.8	51.9
		U	0.850	81.2	51.9
	Murrumbeena Road (N)	L2	0.886	68.3	248.2
		T1	0.886	60.8	248.2
		R2	0.888	80.6	75.1
	North Road (W)	L2	0.611	40.8	190.0
		T1	0.611	32.7	197.6
		R2	0.950	88.8	164.9

IN-2 – Leila Road/Murrumbeena Road

- As discussed above, with the alternative works proposed at the intersection of North Road/East Boundary Road/Murrumbeena Road and North Road/Cobar Street/Crosbie Road, DoT are considering that this intersection could be removed from the DCP.

IN-3 – Cobar Street/North Road/Crosbie Road

- On the presumption that the proposed removal of the Leila Road/Crosbie Road/Murrumbeena Road intersection from the DCP is acceptable, DoT and Council requested a plan to show how the southern leg could be designed to physically constrain through movements from the south.
  - The plans now show physical islands creating a seagull type treatment for the left and right turns from the south. A new island is also provided on the northern departure to prevent through movements from the south. This would be supplemented by signage.
- Council raised concerns over the signals creating a potential for right turns from the east to preferentially use Crosbie Road to travel north.
  - As discussed, right turns will be fully controlled and therefore there will be limited time that is given to right turns from the east to travel north.

    Furthermore, with the potential removal of the proposed signals at Leila Road, in peak times we expect it will be difficult for vehicles to exit onto Murrumbeena Road and therefore they would be deterred from making this movement.

    It is important to note that the current proposal is not materially different from the exhibited GTA plans in the DCP, albeit the current proposal is likely to result in reduced through volumes on Crosbie Road.
- DoT raised concerns regarding the removal of central medians, and in particular the alignment of the two eastbound through lanes from the western approach and reduced lane widths from the eastern approach.
  - We have investigated whether there is an opportunity to realign the through lanes, however without the introduction of medians, we do not believe this is possible. Any works to realign either of the approaches would require a realignment of the opposing approach and modifications to kerbs on either the north or south sides (or both).

    We think it is important to note that the alignment and lane widths proposed on the Traffix Group plans are not different from those currently on-site. That is, the proposal is no worse than the existing conditions.

    By the time at through vehicles arrive at the intersection, the lanes are effectively straight (ie not directed at the opposite approach). Whilst the right turn from the east does not include a median island for its full length, an island is present when vehicles are entering the right turn lane to provide protection and guidance for this movement.

    Arguably, signalising the intersection will create a new control and would potentially provide for some improvement in safety related to the through alignments.

Accordingly, we are of the view that the intersection layout, without central medians, is an appropriate rationalisation of the intersection works at this location.

- Council and DoT noted that bicycle and pedestrian access was not shown on the plans linking the shared path route to the north.
  - The plans now show the shared path along the western side of Cobar Street, with a signalised crossing across the left turn slip lane, into the median island linking to the north.
  - From a phasing perspective, the model presumes that the signalised pedestrian movement across the left turn slip lane from Cobar Street would run predominantly with east-west pedestrian phase to allow good pedestrian connections to the north and east. In reality, if this is a staged movement then there may be additional capacity for left turn movements if there is no pedestrian demand.
  - The east-west pedestrian movement on the northern leg has been presumed to run only when the east-west through movements on North Road run (not when vehicles are exiting Cobar Street).
- DoT continued to raise concerns with regard to the left turn deceleration lane from the east, with the view that whilst the costs of services relocation were considerable there were safety benefits.

  DoT also noted that the costings may be conservatively high because of the limited information known.

  - Whilst we acknowledge the costings may be high, for the purposes of the DCP, they must be assumed as correct, and there is no alternative consideration in terms of the DCP.

    We continue to be of the view that the removal of the left turn deceleration lane is justified on the basis of this high cost, particularly when considering the existing conditions along North Road for vehicles approaching from the east.

    In reviewing the SIDRA model, we have also identified that the model is over-conservatively reducing the capacity of westbound through movements along North Road due to 'extended queues' from the intersection of North Road compounding at the intersections of Murra and Carey Streets.

    However, it can be seen that the 95th percentile queue on the eastern leg is not more than 150 metres, and the spacing between East Boundary Road and Cobar Street is approximately 400 metres. That is, there should not be any impact to capacity of this intersection due to extended queues. In this regard, we have removed the Murra and Carey Street intersections from the model to better reflect the likely operating conditions.

    The results from the updated SIDRA Model, without the left turn deceleration lane is provided in Table 2. It demonstrates that the intersection operates acceptably.

Table 2: North Road / Cobar Street Peak Hours

	Leg	Turn	Deg. Satn	Average Delay	95% Back of Queue
AM Peak	Cobar Street (S)	L2	0.782	53.2	57.9
		R2	0.833	76.2	52.2
	North Road (E)	L2	0.804	22.1	321.3
		T1	0.804	16.3	321.3
		R2	0.626	74.0	33.1
	Crosbie Road (N)	L2	0.497	72.8	25.9
	North Road (W)	L2	0.017	11.6	3.5
		T1	0.624	12.4	237.6
		R2	0.703	66.2	77.7
PM Peak	Cobar Street (S)	L2	0.660	40.0	56.2
		R2	0.870	73.8	75.4
	North Road (E)	L2	0.873	31.1	373.2
		T1	0.873	25.3	373.2
		R2	0.173	52.0	23.7
	Crosbie Road (N)	L2	0.320	53.7	45.4
	North Road (W)	L2	0.043	20.4	8.8
		T1	0.903	39.5	403.1
		R2	0.888	80.3	89.2

– With regard to DoT's perceived 'need' for the left turn deceleration lane from the east, Figure 1 and Figure 2 (over page)are extracted directly from the GTA report showing the future traffic volumes expected along North Road (including growth).

  These volumes demonstrate that the left turn from North Road into Cobar Street is only 139 vehicles in the AM peak and 83 vehicles in the PM peak. This compares to some 1781 and 1666 westbound through vehicles from in the respective peaks. That is, the left turn represents less than 8% of the through volume.

  Notably, at the East Boundary Road intersection, the left turn from the east is significantly higher, representing a much higher proportion of westbound through movements.

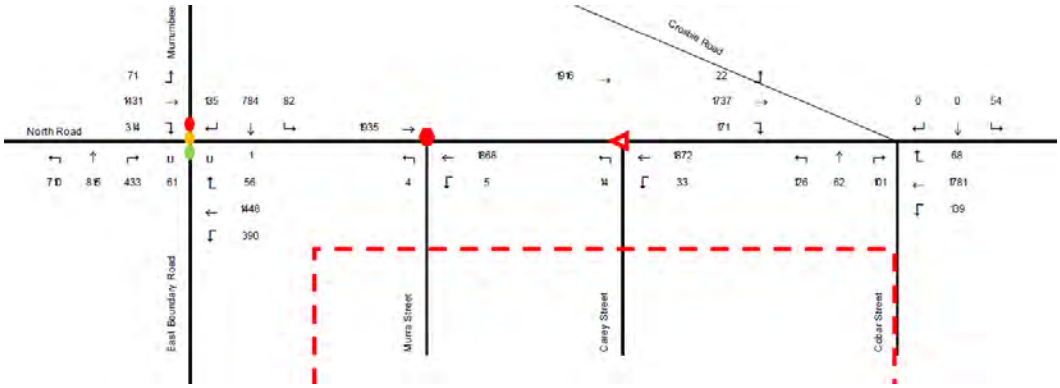

Figure 1: GTA Traffic Volumes (future including growth) for North Road - AM Peak

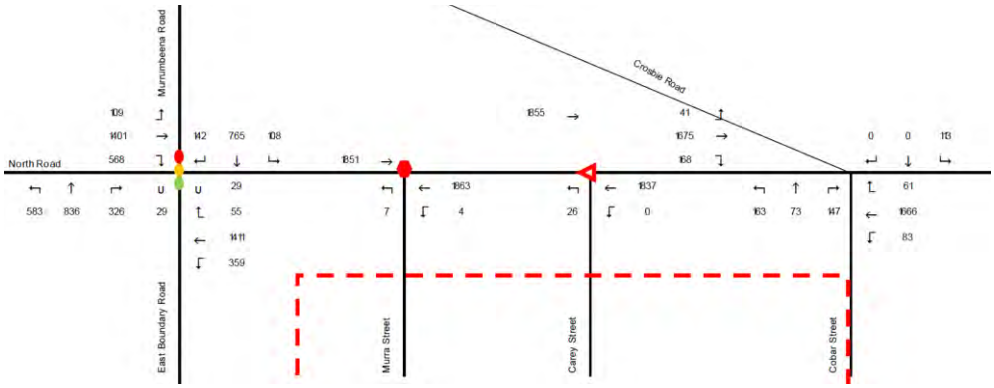

Figure 2: GTA Traffic Volumes (future including growth) for North Road - PM Peak

– To identify the capacity benefit of providing the left turn deceleration lane (as requested by DoT in their submission for 70 metres – modified for services), we have remodelled the network to include a left turn deceleration lane from the eastern leg.

  Summaries from the SIDRA are provided in Table 3 comparing the operation of the two scenarios (with and without a deceleration lane).

  Whilst there is an improvement, the cost of this improvement is considered significant.

Table 3: Comparison of North Road / Cobar Street Intersection With and Without Deceleration Lanes

	Leg	Turn	Without Deceleration Lane			With Deceleration Lane		
			Deg. Satn	Average Delay	95% Back of Queue	Deg. Satn	Average Delay	95% Back of Queue
AM Peak	Cobar Street (S)	L2	0.782	53.2	57.9	0.726	50.5	56.0
		R2	0.833	76.2	52.2	0.749	72.0	50.3
	North Road (E)	L2	0.804	22.1	321.3	0.110	9.7	16.0
		T1	0.804	16.3	321.3	0.791	16.2	275.2
		R2	0.626	74.0	33.1	0.626	74.0	33.1
	Crosbie Road (N)	L2	0.497	72.8	25.9	0.497	72.8	25.9
	North Road (W)	L2	0.017	11.6	3.5	0.017	11.4	3.4
		T1	0.624	12.4	237.6	0.631	12.0	227.5
		R2	0.703	66.2	77.7	0.703	66.2	77.9
PM Peak	Cobar Street (S)	L2	0.660	40.0	56.2	0.884	74.7	85.1
		R2	0.870	73.8	75.4	0.716	62.0	67.5
	North Road (E)	L2	0.873	31.1	373.2	0.063	8.6	8.1
		T1	0.873	25.3	373.2	0.894	32.3	377.6
		R2	0.173	52.0	23.7	0.321	64.8	27.1
	Crosbie Road (N)	L2	0.320	53.7	45.4	0.595	67.1	52.1
	North Road (W)	L2	0.043	20.4	8.8	0.038	16.2	7.5
		T1	0.903	39.5	403.1	0.804	20.6	297.7
		R2	0.888	80.3	89.2	0.888	80.3	89.2

IN-4 - East Boundary Road/North Drive

- Traffix Group raised the potential of removing slip lanes for left turn movements to/from the site at the intersection of North Drive.
  - We understand from DoT and Council discussions that this intersection is intended to be the higher 'pedestrianised' intersection, and therefore removal of slip lanes would be consistent with this arrangement.

    Accordingly, we have updated the layouts and SIDRA model to reflect this arrangement.
- Results of the SIDRA are summarised in Table 4 below based on:
  - Removal of slip lanes,
  - Retention of three through lanes in north and south directions,
  - Provision of a short left turn deceleration lane from the north.

Table 4: Peak Hour Results for East Boundary Road/ North Drive

	Leg	Turn	Deg. Satn	Average Delay	95% Back of Queue
AM Peak	East Boundary Road (S)	T1	0.473	6.1	107.5
		R2	0.535	67.5	63.8
	North Drive (E)	L2	0.497	38.5	87.0
		R2	0.524	59.0	67.7
	East Boundary Road (N)	L2	0.293	21.4	45.5
		T1	0.539	24.5	214.1
PM Peak	East Boundary Road (S)	T1	0.476	6.0	98.5
		R2	0.655	64.4	73.0
	North Drive (E)	L2	0.722	42.8	131.8
		R2	0.672	61.9	71.2
	East Boundary Road (N)	L2	0.449	23.4	68.0
		T1	0.619	24.7	239.3

- DoT requested additional information regarding the utilisation of the left turn lanes on East Boundary Road for both this intersection and for the intersection at South Drive.
  - In both peaks, the above model adopts:
    - 75% utilisation of the northern approach (southbound) left through lane
    - 48% utilisation of the southern approach (northbound) left through lane
  - We note that there is also opportunity to further reduce the through lane lengths, particularly in the northbound direction should there be a desire to retain some on-street parking.
- Council also requested a review of the southbound bicycle facility between North Drive and South Drive to see if there is an opportunity to provide a protected shared path connection along the eastern side of East Boundary Road.
  - We have reviewed this and whilst it may be possible to bring bicycles off-road at the intersection of North Drive, they would need to then return to the road at South Drive. As there is a left turn deceleration land and slip lane proposed at South Drive, there are multiple conflict points that are created for vehicles to enter and exit the road space.

    We think for the purposes of the DCP scope, that the bicycle facility should remain as an on-road lane. Council could investigate future upgrades to bicycle facilities along East Boundary Road if desired at a later date.

IN-5 - East Boundary Road/South Drive

- Traffix Group raised the potential of removing slip lanes for left turn movements to/from the site at the intersection of South Drive.
  - DoT and Council identified that this intersection is intended to be the higher vehicular based intersection and therefore retention of the slip lanes, to allow for higher left turn volumes was desirable.
- DoT raised the issue of right turn and u-turn swept path overlapping that alters the phasing of the intersection (from the GTA model).
  - Amended plans now show swept paths for the u-turn and right turning vehicles can take place simultaneously as modelled.

  SIDRA Summaries for the Traffix Group plan (two through lanes in each direction with slip lanes) is provided in Table 5 below.

Table 5: Peak Hour Results for East Boundary Road/ South Drive

	Leg	Turn	Deg. Satn	Average Delay	95% Back of Queue
AM Peak	East Boundary Road (S)	T1	0.563	9.7	163.9
		R2	0.742	59.1	123.0
		U	0.742	61.7	105.4
	South Drive (E)	L2	0.380	12.5	42.5
		R2	0.739	70.2	67.6
	East Boundary Road (N)	L2	0.195	7.4	14.2
		T1	0.755	8.8	113.1
		U	0.033	75.9	1.0
PM Peak	East Boundary Road (S)	T1	0.528	9.3	147.6
		R2	0.792	64.0	122.5
		U	0.792	67.2	100.0
	South Drive (E)	L2	0.702	29.7	136.8
		R2	0.768	71.2	71.1
	East Boundary Road (N)	L2	0.174	10.2	22.2
		T1	0.806	11.0	223.6
		U	0.327	79.0	10.0

- Based on the preceding, the amended layout is considered an appropriate scope of works attributable to the CDP area.
- It was generally agreed to remove the third through lane in both directions as per the previously presented plans, subject to the following items:
  - Further confirmation of the constraints and location of services in the centre median

- We understand service proving is being undertaken to confirm the location and impact of services. Further information can hopefully be provided in due course.

- Additional confirmation that the southbound direction, DoT requested a review of left turn volumes and comparison of the results if a third through lane were provided in the southbound direction, with a shared left turn lane, or slip lane.

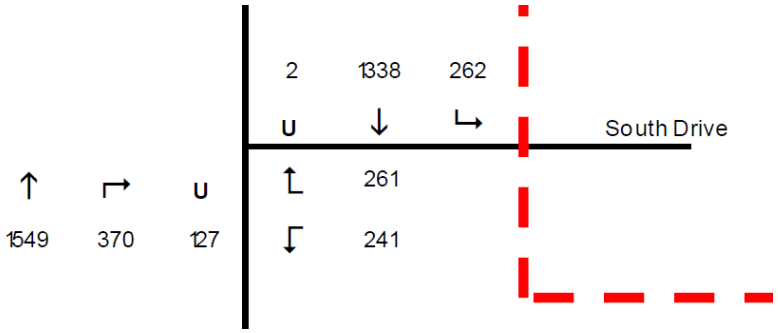

Figure 3: South Drive - GTA Modelling AM Peak Hour Volumes

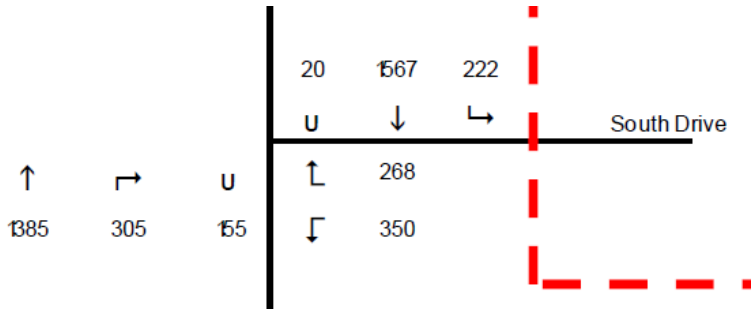

Figure 4: South Drive - GTA Modelling PM Peak Hour Volumes

SIDRA Results comparing the different scenarios of a deceleration lane with slip left turn (as proposed) vs provision of a third through lane with a slip (but no deceleration lane) vs a third shared through and left turn, with no slip lane, is provided in Table 6 for information.

We continue to remain of the view that the reduced scope arrangement, being two through lanes in each direction, with separate turn lanes will appropriately cater for the peak hour traffic generated by the proposal and should therefore be the layout that is adopted.

The intersection will operate under acceptable conditions (a DoS of around 0.8 in both peaks). Further works, including additional through lanes, at this intersection will only provide for additional capacity for the network, rather than simply facilitating access for the Development.

Table 6: Comparison of Results for East Boundary Road/ South Drive Alternative Options

	Leg	Turn	Decel & Slip			Third Thru with Slip No Decel			Third Shared Thru/Left		
			Deg. Satn	Average Delay	95% Back of Queue	Deg. Satn	Average Delay	95% Back of Queue	Deg. Satn	Average Delay	95% Back of Queue
AM	East Boundary Road (N)	L2	0.195	7.4	14.2	0.251	11.5	37.8	0.251	13.7	37.3
		T1	0.755	8.8	113.1	0.690	9.9	157.6	0.688	10.1	161.0
		U	0.033	75.9	1.0	0.033	75.9	1.0	0.033	75.9	1.0
PM	East Boundary Road (N)	L2	0.174	10.2	22.2	0.644	27.3	161.0	0.667	24.3	152.7
		T1	0.806	11.0	223.6	0.644	14.2	161.0	0.667	13.4	165.4
		U	0.327	79.0	10.0	0.327	79.0	10.0	0.327	79.0	10.0

IN-6 & 7 - North Road at Murra Street and Carey Street

- It was proposd that removal of the left turn deceleration lanes may be acceptable given the low volumes of turns at these intersections and high cost.

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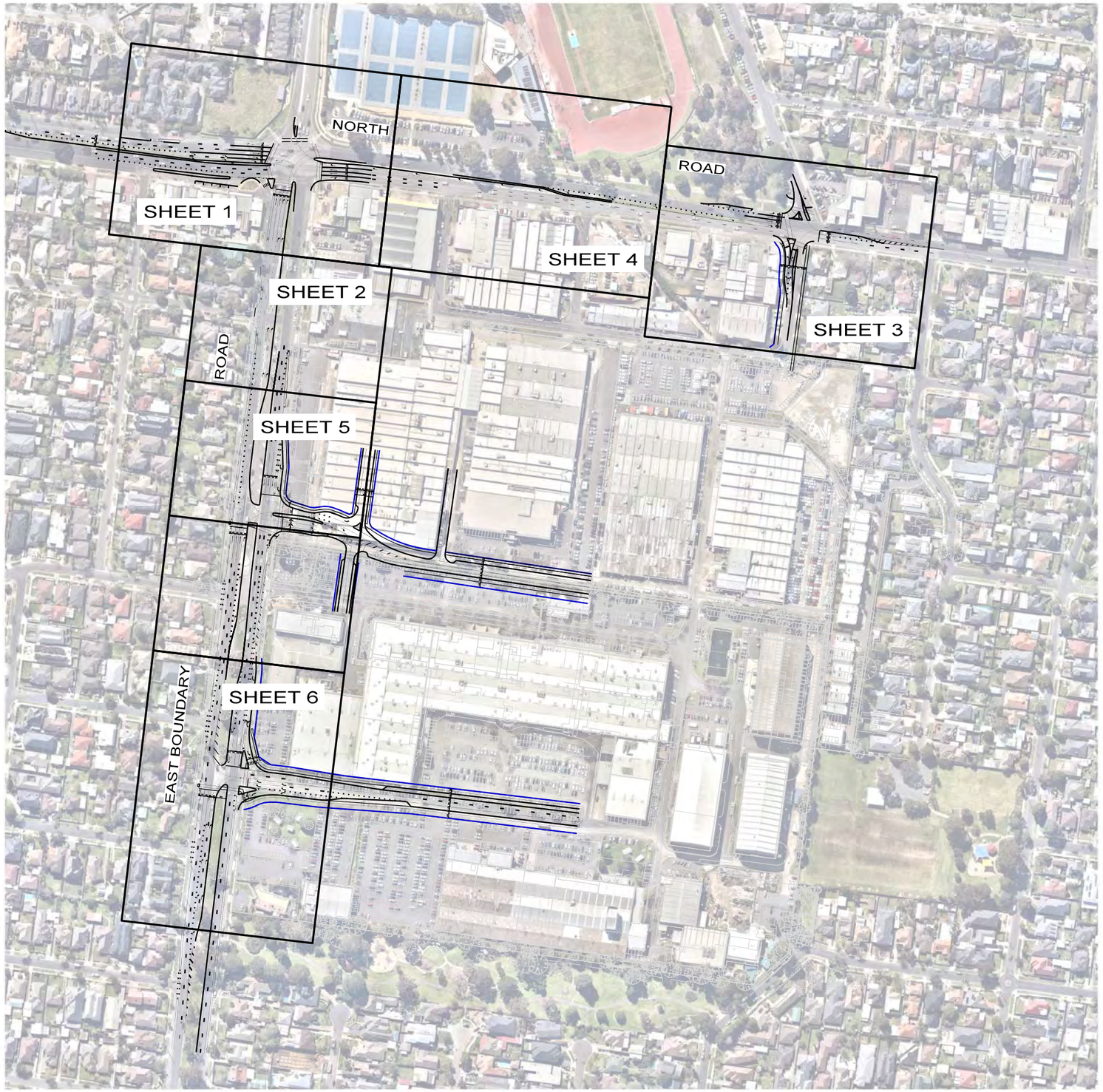
Appendix A

Updated Proposed DCP Plans

WITHOUT PREJUDICE



N MELWAY MAP REF 69 A10

PRELIMINARY PLAN
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DESIGNED S O'KEEFE 18 OCT 2019
CHECKED/APPROVED C MORELLO 18 OCT 2019
FILE NAME G24360-B-00.dgn

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EAST VILLAGE MIXED USE DEVELOPMENT
PROPOSED INTERSECTION AND ROADWORKS
GLEN EIRA CITY COUNCIL
OVERVIEW PLAN

SCALE 1:500 (A3) 0 8.75 17.5 26.25 35
SHEET No. 0
DWG No. G24360-B-01

WITHOUT PREJUDICE

INSET

FOR CONTINUATION REFER TO MAIN DRAWING

FOR CONTINUATION REFER TO INSET

NORTH

ROAD

ROAD

EAST BOUNDARY

FOR CONTINUATION REFER TO DRAWING G24360-B-03

FOR CONTINUATION REFER TO DRAWING G24360-B-05

MELWAY MAP
REF 69 A10

PRELIMINARY PLAN
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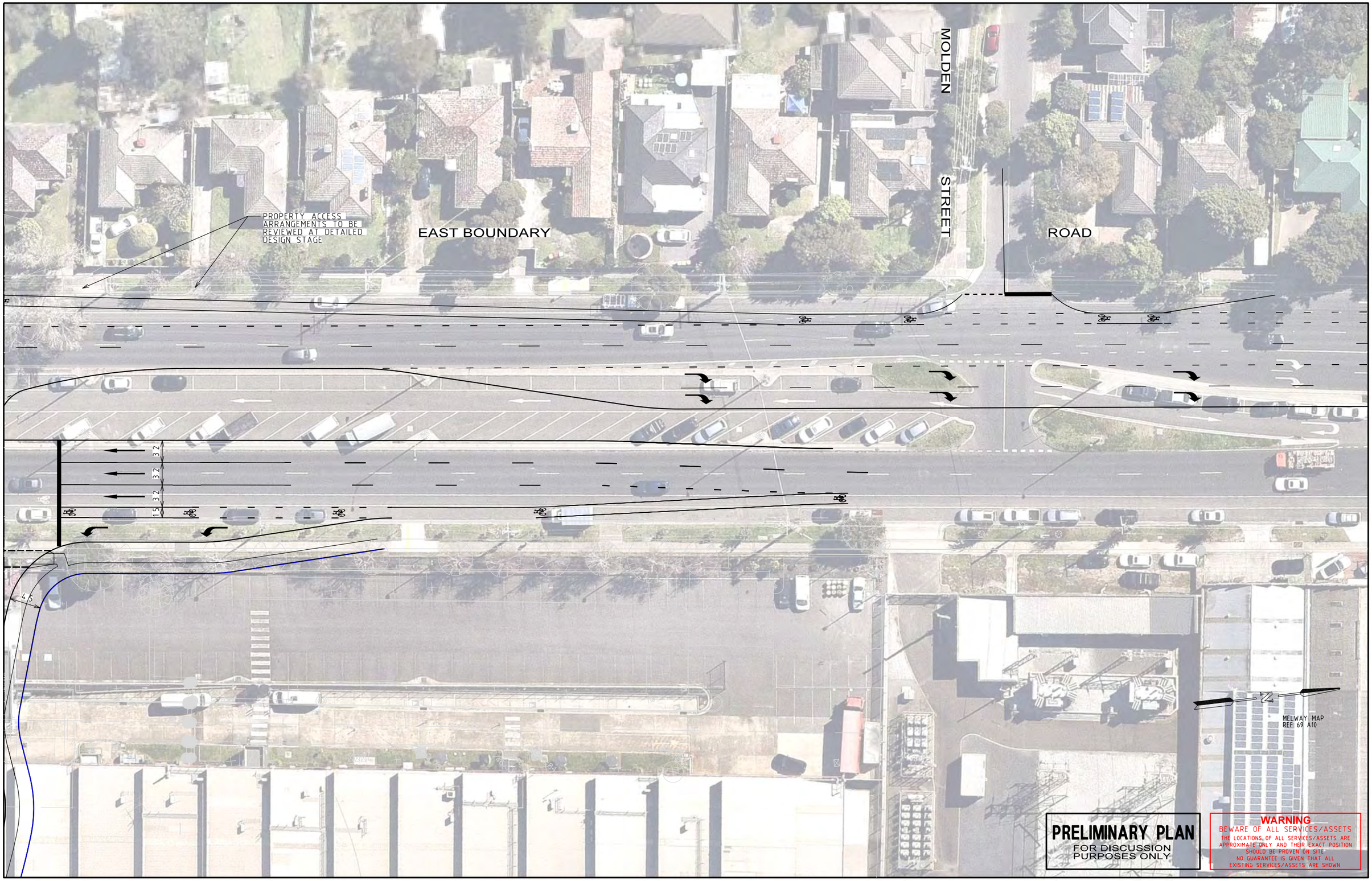
EAST VILLAGE MIXED USE DEVELOPMENT
PROPOSED INTERSECTION AND ROADWORKS (IN-01)
GLEN EIRA CITY COUNCIL
FUNCTIONAL LAYOUT PLAN

SCALE 1:500 (A3) 0 2.5 5 7.5 10
SHEET No. 1 of 6
DWG No. G24360-B-04

WITHOUT PREJUDICE

FOR CONTINUATION REFER TO DRAWING G24360-B-06

FOR CONTINUATION REFER TO DRAWING G24360-B-04



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EAST VILLAGE MIXED USE DEVELOPMENT
PROPOSED INTERSECTION AND ROADWORKS
GLEN EIRA CITY COUNCIL
FUNCTIONAL LAYOUT PLAN

SCALE 1:500 (A3) 0 2.5 5 7.5 10
SHEET No. 2 of 6
DWG No. G24360-B-05

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FOR CONTINUATION REFER TO DRAWING G24360-B-03

NORTH ROAD

CROSBIE ROAD

COBAR STREET

186 0 (INCLUDING TAPER)

45 2 (INCLUDING TAPER)

3 0 3 0 3 0 3 0 (E) (E) (E) (E)

3 0 3 0 3 0 (E) (E) (E)

20 22 4 5 20 30 30 10 30

No 962

MELWAY MAP REF 69 A10

NOTE
DESIGN TO LIMIT TELSTRA PIT RELOCATION AND AVOID ANY IMPACT TO No 962 NORTH ROAD PROPERTY

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY

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S O'KEEFE 18 OCT 2019

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C MORELLO 18 OCT 2019

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EAST VILLAGE MIXED USE DEVELOPMENT
PROPOSED INTERSECTION AND ROADWORKS (IN-03)
GLEN EIRA CITY COUNCIL
FUNCTIONAL LAYOUT PLAN

SCALE 1:500 (A3) 0 2 5 5 7 5 10
SHEET No. 3 of 6
DWG No. G24360-B-02

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FOR CONTINUATION REFER TO DRAWING G24360-B-04

FOR CONTINUATION REFER TO DRAWING G24360-B-02

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EAST VILLAGE MIXED USE DEVELOPMENT

PROPOSED INTERSECTION AND ROADWORKS (IN-06 AND IN-07)

GLEN EIRA CITY COUNCIL

FUNCTIONAL LAYOUT PLAN

SCALE 1:500 (A3) 0 2.5 5 7.5 10 | SHEET No. 4 of 6 | DWG No. G24360-B-03

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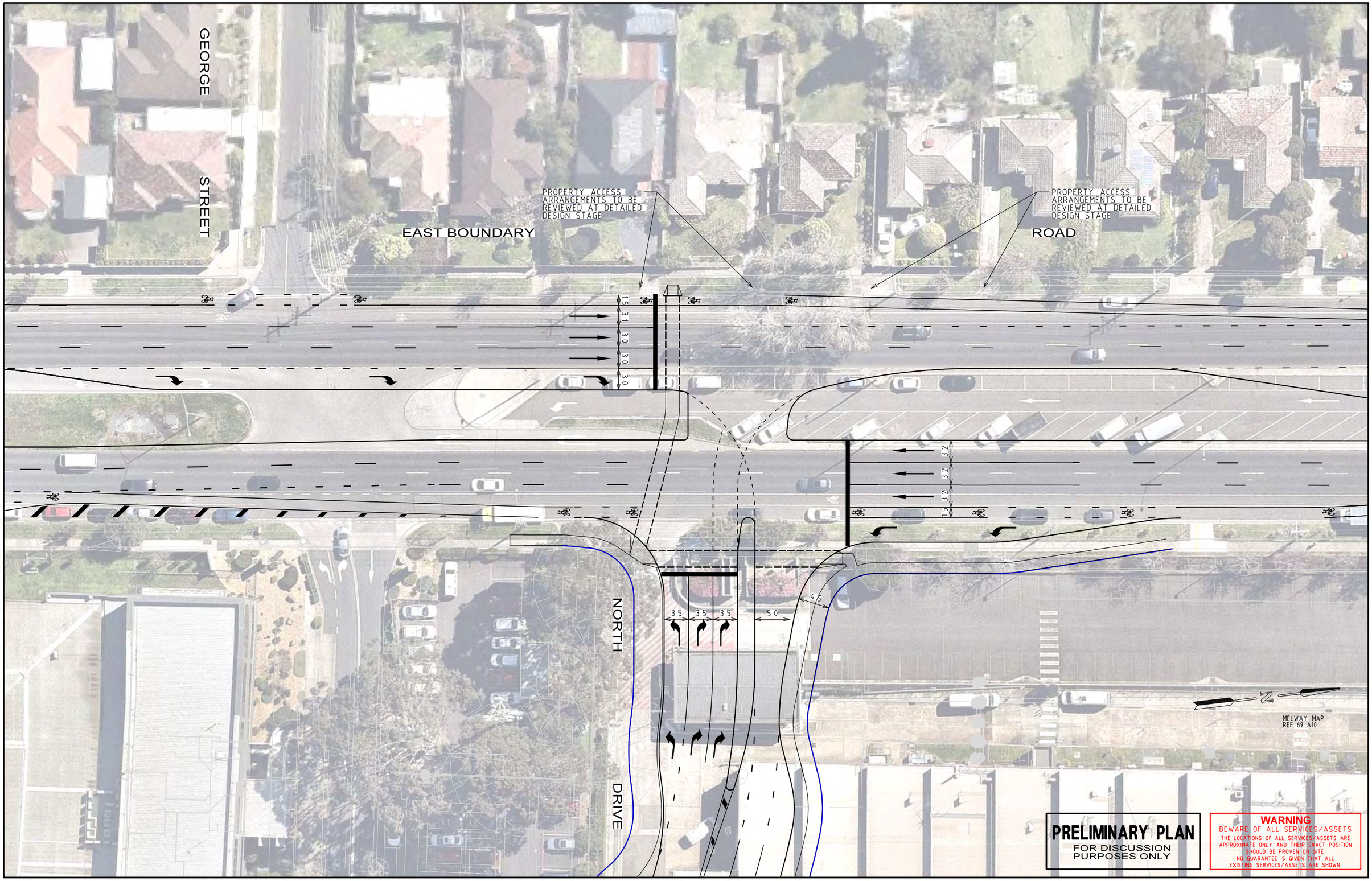

FOR CONTINUATION REFER TO DRAWING G24360-B-07

FOR CONTINUATION REFER TO DRAWING G24360-B-05

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EAST VILLAGE MIXED USE DEVELOPMENT
PROPOSED INTERSECTION AND ROADWORKS (IN-04)
GLEN EIRA CITY COUNCIL
FUNCTIONAL LAYOUT PLAN

SCALE 1:500 (A3) 0 2.5 5 7.5 10
SHEET No. 5 of 6
DWG No. G24360-B-06

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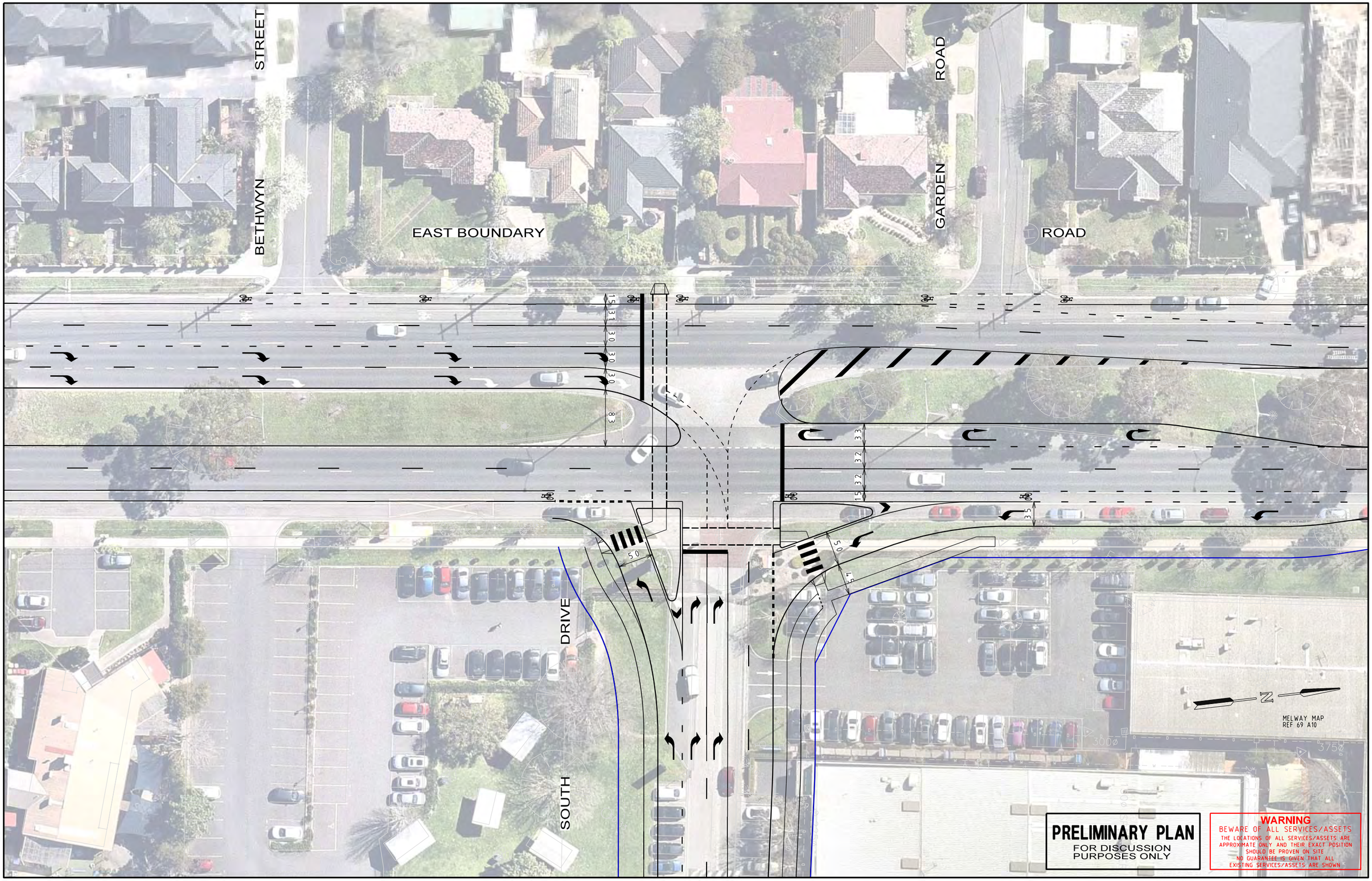

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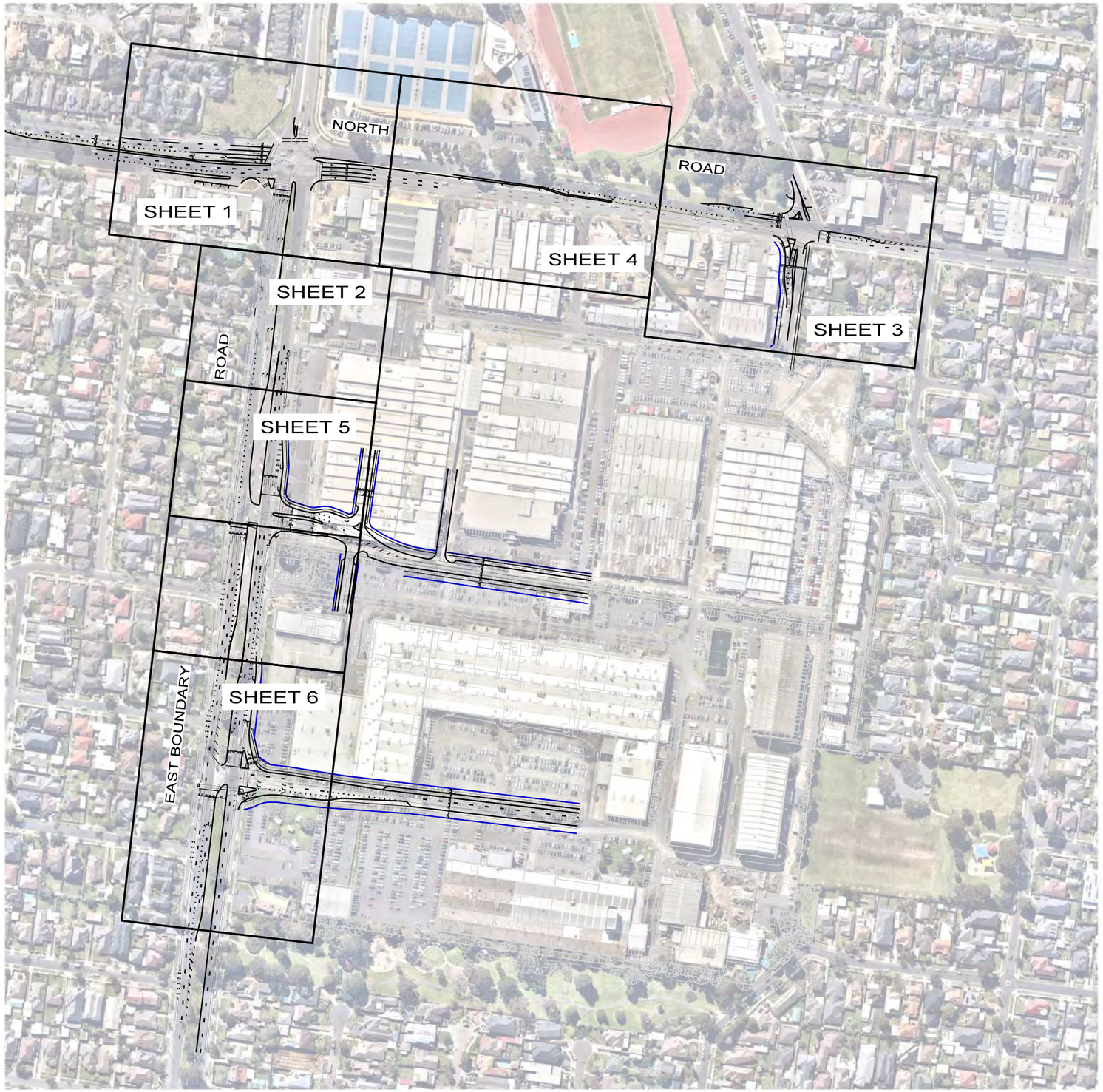
SHEET No. 6 of 6
DWG No. G24360-B-07

Appendix C

Landowners' Proposed Intersection Plans



N MELWAY MAP REF 69 A10

PRELIMINARY PLAN
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DESIGNED S O'KEEFE 18 OCT 2019
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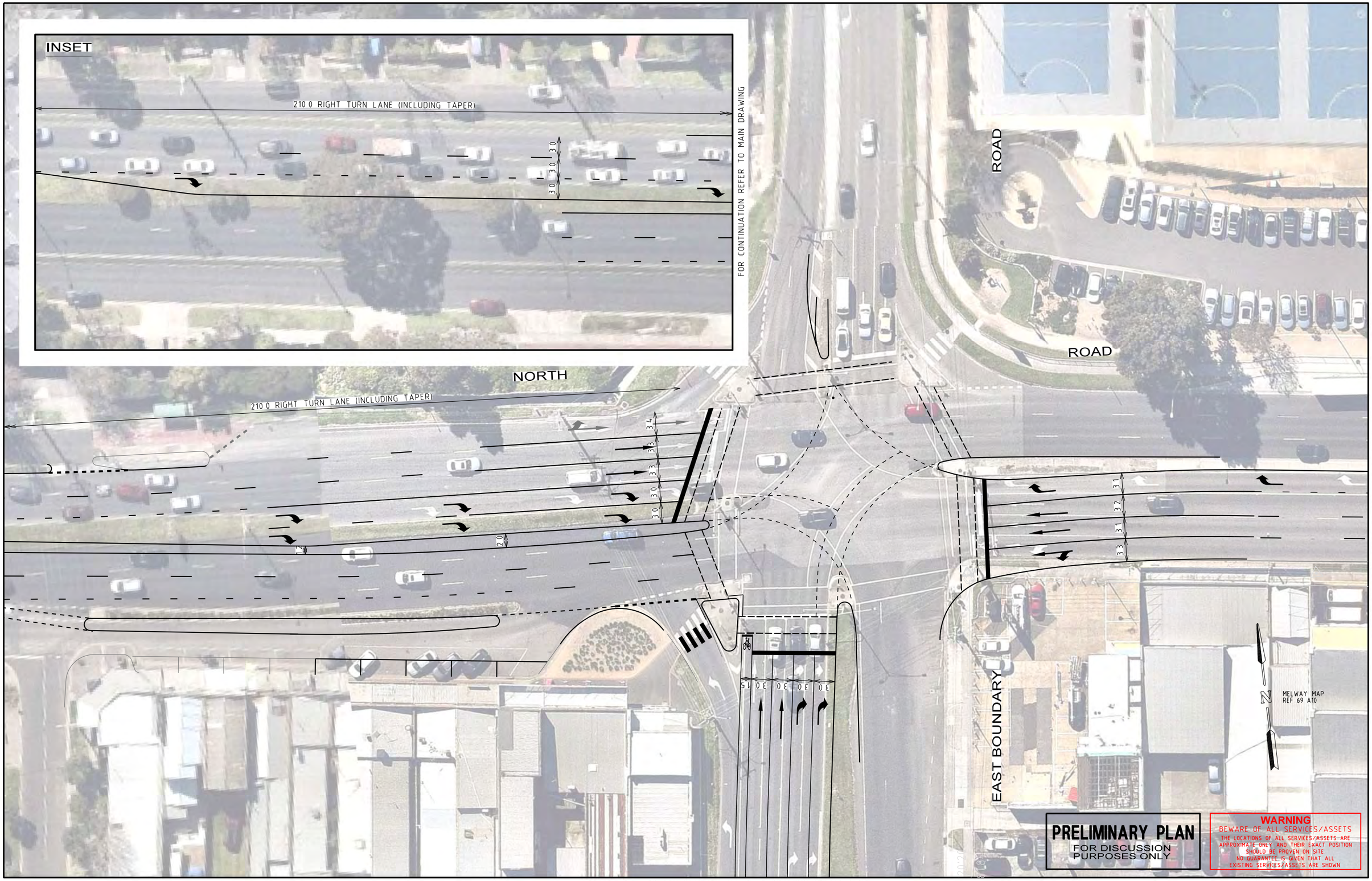
EAST VILLAGE MIXED USE DEVELOPMENT
PROPOSED INTERSECTION AND ROADWORKS
GLEN EIRA CITY COUNCIL
OVERVIEW PLAN

SCALE 1:500 (A3) 0 8.75 17.5 26.25 35
SHEET No. 0
DWG No. G24360-B-01



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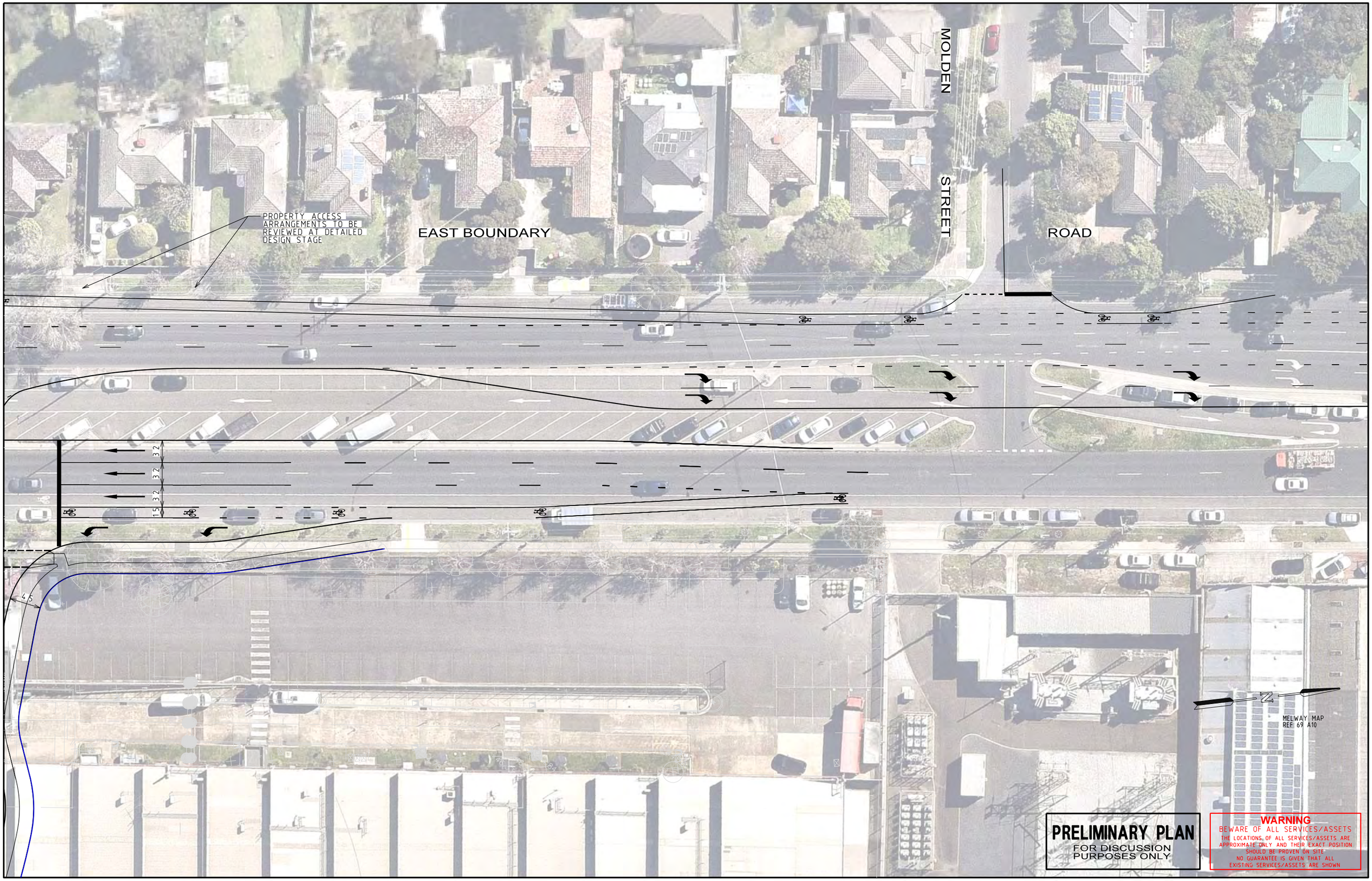
EAST VILLAGE MIXED USE DEVELOPMENT
PROPOSED INTERSECTION AND ROADWORKS (IN-01)
GLEN EIRA CITY COUNCIL
FUNCTIONAL LAYOUT PLAN

SCALE 1:500 (A3) 0 2.5 5 7.5 10
SHEET No. 1 of 6
DWG No. G24360-B-04



FOR CONTINUATION REFER TO DRAWING G24360-B-06

FOR CONTINUATION REFER TO DRAWING G24360-B-04

ISSUE	ISSUE DESCRIPTION	ISSUE DATE
B	REVISED EASTERN LEG OF NORTH ROAD	25 OCT 2019
C	COMMENTS INCORPORATED	31 OCT 2019
D	COMMENTS INCORPORATED	01 NOV 2019
E	COMMENTS INCORPORATED	13 NOV 2019
F	COMMENTS INCORPORATED	18 NOV 2019

GENERAL NOTES
1 BASE INFORMATION FROM CLIENT FILE (5009-00-SITE PLANS-20120816.DWG) / AERIAL PHOTOGRAPH (SOURCE NEARMAP AUG 2019)
2 ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL
3 MAIN ROADS
- NORTH ROAD (SPEED ZONE 70km/h)
- EAST BOUNDARY ROAD (SPEED ZONE 70km/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
S O'KEEFE 18 OCT 2019

CHECKED/APPROVED
C MORELLO 18 OCT 2019

FILE NAME
G24360-B-00.dgn

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EAST VILLAGE MIXED USE DEVELOPMENT
PROPOSED INTERSECTION AND ROADWORKS
GLEN EIRA CITY COUNCIL
FUNCTIONAL LAYOUT PLAN

SCALE 1:500 (A3) 0 2.5 5 7.5 10
SHEET No. 2 of 6
DWG No. G24360-B-05

FOR CONTINUATION REFER TO DRAWING G24360-B-03

ISSUE	ISSUE DESCRIPTION	ISSUE DATE
B	REVISED EASTERN LEG OF NORTH ROAD	25 OCT 2019
C	COMMENTS INCORPORATED	31 OCT 2019
D	COMMENTS INCORPORATED	01 NOV 2019
E	COMMENTS INCORPORATED	13 NOV 2019
F	COMMENTS INCORPORATED	18 NOV 2019

GENERAL NOTES
1 BASE INFORMATION FROM CLIENT FILE (5009-00-SITE PLANS-20120816 DWG) / AERIAL PHOTOGRAPH (SOURCE NEARMAP AUG 2019)
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- NORTH ROAD (SPEED ZONE 70km/h)
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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
S O'KEEFE 18 OCT 2019
CHECKED/APPROVED
C MORELLO 18 OCT 2019
FILE NAME
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EAST VILLAGE MIXED USE DEVELOPMENT
PROPOSED INTERSECTION AND ROADWORKS (IN-03)
GLEN EIRA CITY COUNCIL
FUNCTIONAL LAYOUT PLAN

SCALE 1:500 (A3) 0 2.5 5 7.5 10
SHEET No. 3 of 6
DWG No. G24360-B-02

FOR CONTINUATION REFER TO DRAWING G24360-B-04

FOR CONTINUATION REFER TO DRAWING G24360-B-02

ISSUE	ISSUE DESCRIPTION	ISSUE DATE
B	REVISED EASTERN LEG OF NORTH ROAD	25 OCT 2019
C	COMMENTS INCORPORATED	31 OCT 2019
D	COMMENTS INCORPORATED	01 NOV 2019
E	COMMENTS INCORPORATED	13 NOV 2019
F	COMMENTS INCORPORATED	18 NOV 2019

GENERAL NOTES
1 BASE INFORMATION FROM CLIENT FILE (5009-00-SITE PLANS-20120816.DWG) / AERIAL PHOTOGRAPH (SOURCE NEARMAP AUG 2019)
2 ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL
3 MAIN ROADS
- NORTH ROAD (SPEED ZONE 70km/h)
- EAST BOUNDARY ROAD (SPEED ZONE 70km/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
S O'KEEFE 18 OCT 2019

CHECKED/APPROVED
C MORELLO 18 OCT 2019

FILE NAME
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EAST VILLAGE MIXED USE DEVELOPMENT

PROPOSED INTERSECTION AND ROADWORKS (IN-06 AND IN-07)

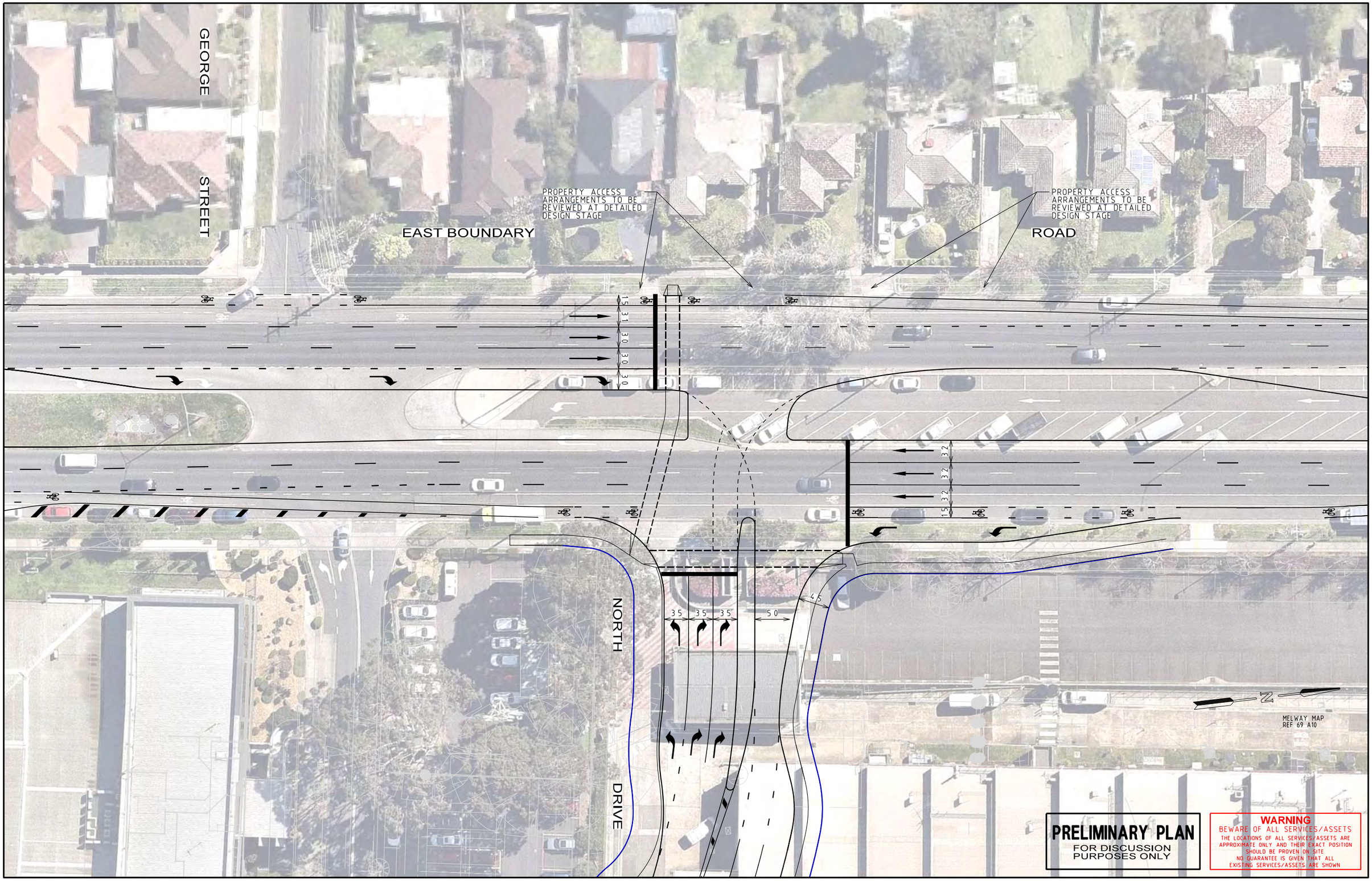
GLEN EIRA CITY COUNCIL

FUNCTIONAL LAYOUT PLAN

SCALE 1:500 (A3) 0 2.5 5 7.5 10

SHEET No. 4 of 6

DWG No. G24360-B-03



FOR CONTINUATION REFER TO DRAWING G24360-B-07

FOR CONTINUATION REFER TO DRAWING G24360-B-05

ISSUE	ISSUE DESCRIPTION	ISSUE DATE
B	REVISED EASTERN LEG OF NORTH ROAD	25 OCT 2019
C	COMMENTS INCORPORATED	31 OCT 2019
D	COMMENTS INCORPORATED	01 NOV 2019
E	COMMENTS INCORPORATED	13 NOV 2019
F	COMMENTS INCORPORATED	18 NOV 2019

GENERAL NOTES
1 BASE INFORMATION FROM CLIENT FILE (5009-00-SITE PLANS-20120816.DWG) / AERIAL PHOTOGRAPH (SOURCE NEARMAP AUG 2019)
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3 MAIN ROADS
- NORTH ROAD (SPEED ZONE 70km/h)
- EAST BOUNDARY ROAD (SPEED ZONE 70km/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
S O'KEEFE 14 OCT 2019

CHECKED/APPROVED
C MORELLO 14 OCT 2019

FILE NAME
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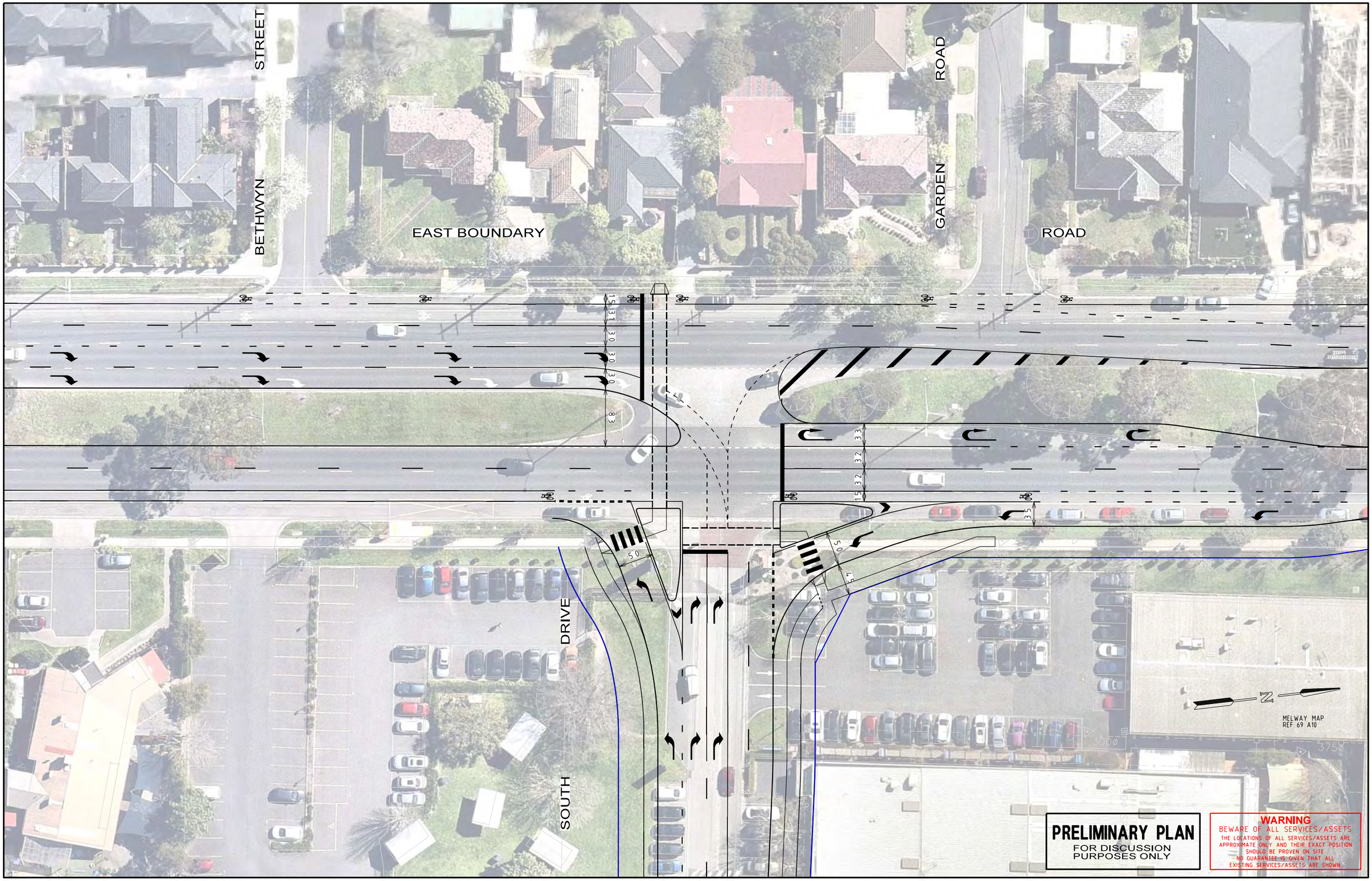
EAST VILLAGE MIXED USE DEVELOPMENT
PROPOSED INTERSECTION AND ROADWORKS (IN-04)
GLEN EIRA CITY COUNCIL
FUNCTIONAL LAYOUT PLAN

SCALE 1:500 (A3) 0 2.5 5 7.5 10
SHEET No. 5 of 6
DWG No. G24360-B-06



FOR CONTINUATION REFER TO DRAWING G24360-B-06

ISSUE	ISSUE DESCRIPTION	ISSUE DATE
B	REVISED EASTERN LEG OF NORTH ROAD	25 OCT 2019
C	COMMENTS INCORPORATED	31 OCT 2019
D	COMMENTS INCORPORATED	01 NOV 2019
E	COMMENTS INCORPORATED	13 NOV 2019
F	COMMENTS INCORPORATED	18 NOV 2019

GENERAL NOTES
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DESIGNED
S O'KEEFE 14 OCT 2019

CHECKED/APPROVED
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EAST VILLAGE MIXED USE DEVELOPMENT
PROPOSED INTERSECTION AND ROADWORKS (IN-05)
GLEN EIRA CITY COUNCIL
FUNCTIONAL LAYOUT PLAN

SCALE 1:500 (A3) 0 2.5 5 7.5 10
SHEET No. 6 of 6
DWG No. G24360-B-07

Appendix D

SIDRA Summaries

MOVEMENT SUMMARY

Site: 3560 [2. NORTH ROAD / EAST BOUNDARY ROAD / MURRUMBEENA ROAD]

Network: N101 [Master Model]

NORTH ROAD / EAST BOUNDARY ROAD / MURRUMBEENA ROAD
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival 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	Aver. No. Cycles	Average Speed km/h
South: EAST BOUNDARY ROAD														
1	L2	713	2.8	713	2.8	0.678	15.1	LOS B	16.3	116.7	0.43	0.73	0.45	52.3
2	T1	899	1.4	899	1.4	0.868	53.5	LOS D	39.8	282.1	0.97	0.93	1.09	29.0
3	R2	436	1.4	436	1.4	0.860	72.0	LOS E	17.6	124.6	1.00	0.90	1.18	13.0
3u	U	64	0.0	64	0.0	0.860	72.5	LOS E	16.3	115.1	1.00	0.90	1.19	12.9
Approach		2112	1.8	2112	1.8	0.868	45.0	LOS D	39.8	282.1	0.80	0.86	0.89	31.3
East: NORTH ROAD														
4	L2	397	2.1	397	2.1	0.487	25.8	LOS C	16.2	115.4	0.62	0.73	0.62	32.6
5	T1	1456	3.6	1456	3.6	0.877	36.5	LOS D	40.9	295.4	0.93	0.88	0.98	42.3
6	R2	71	4.5	71	4.5	0.397	65.5	LOS E	4.3	31.0	0.95	0.75	0.95	27.3
6u	U	1	0.0	1	0.0	0.397	65.9	LOS E	4.3	31.0	0.95	0.75	0.95	17.4
Approach		1924	3.3	1924	3.3	0.877	35.4	LOS D	40.9	295.4	0.86	0.85	0.90	40.5
North: MURRUMBEENA ROAD														
7	L2	85	3.7	85	3.7	0.876	68.2	LOS E	32.9	234.6	1.00	1.05	1.55	19.0
8	T1	802	1.8	802	1.8	0.876	60.4	LOS E	32.9	234.6	0.98	1.01	1.36	19.5
9	R2	140	1.5	140	1.5	0.833	76.5	LOS E	9.6	67.9	1.00	0.91	1.26	29.3
Approach		1027	1.9	1027	1.9	0.876	63.2	LOS E	32.9	234.6	0.99	1.00	1.37	21.4
West: NORTH ROAD														
10	L2	75	4.2	75	4.2	0.686	47.5	LOS D	28.5	203.6	0.92	0.86	1.24	39.2
11	T1	1437	2.1	1437	2.1	0.686	38.7	LOS D	29.2	208.2	0.90	0.81	1.01	33.5
12	R2	320	3.3	320	3.3	0.876	79.8	LOS E	11.2	80.8	1.00	0.94	1.34	21.7
Approach		1832	2.4	1832	2.4	0.876	46.3	LOS D	29.2	208.2	0.92	0.83	1.07	30.9
All Vehicles		6895	2.4	6895	2.4	0.877	45.4	LOS D	40.9	295.4	0.88	0.87	1.01	32.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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
P1	South Full Crossing	53	41.7	LOS E	0.2	0.2	0.80	0.80
P2	East Full Crossing	53	53.7	LOS E	0.2	0.2	0.91	0.91
P3	North Full Crossing	53	38.5	LOS D	0.1	0.1	0.77	0.77
P4	West Full Crossing	53	49.2	LOS E	0.2	0.2	0.87	0.87
All Pedestrians		211	45.8	LOS E			0.84	0.84

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: 107v [7. NORTH ROAD / CROSBIE ROAD / COBAR STREET - Signals]

Network: N101 [Master Model]

NORTH ROAD / CROSBIE ROAD / COBAR STREET
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival 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	Aver. No. Cycles	Average Speed km/h
South: COBAR STREET														
1	L2	145	0.0	145	0.0	0.782	53.2	LOS D	8.3	57.9	1.00	0.90	1.18	18.8
3	R2	106	1.0	106	1.0	0.833	76.2	LOS E	7.4	52.2	1.00	0.96	1.31	15.1
Approach		252	0.4	252	0.4	0.833	62.9	LOS E	8.3	57.9	1.00	0.92	1.23	17.1
East: NORTH ROAD														
4	L2	146	1.4	146	1.4	0.804	22.1	LOS C	44.6	321.3	0.79	0.76	0.83	41.4
5	T1	1792	3.8	1792	3.8	0.804	16.3	LOS B	44.6	321.3	0.76	0.72	0.78	42.8
6	R2	72	0.0	72	0.0	0.626	74.0	LOS E	4.7	33.1	1.00	0.79	1.07	29.2
Approach		2009	3.5	2009	3.5	0.804	18.8	LOS B	44.6	321.3	0.77	0.73	0.80	41.5
North: CROSBIE ROAD														
7	L2	57	0.0	57	0.0	0.497	72.8	LOS E	3.7	25.9	1.00	0.75	1.00	18.1
Approach		57	0.0	57	0.0	0.497	72.8	LOS E	3.7	25.9	1.00	0.75	1.00	18.1
West: NORTH ROAD														
10	L2	23	0.0	23	0.0	0.017	11.6	LOS B	0.5	3.5	0.37	0.64	0.37	48.4
11	T1	1738	2.1	1738	2.1	0.624	12.4	LOS B	33.4	237.6	0.65	0.67	0.65	44.2
12	R2	180	0.6	180	0.6	0.703	66.2	LOS E	11.0	77.7	0.98	0.83	1.03	24.9
Approach		1941	1.9	1941	1.9	0.703	17.4	LOS B	33.4	237.6	0.68	0.68	0.68	38.8
All Vehicles		4259	2.5	4259	2.5	0.833	21.5	LOS C	44.6	321.3	0.75	0.72	0.77	37.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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
P1	South Full Crossing	53	9.6	LOS A	0.1	0.1	0.39	0.39
P1S	South Slip/Bypass Lane Crossing	53	3.3	LOS A	0.0	0.0	0.32	0.32
P3	North Full Crossing	53	6.8	LOS A	0.1	0.1	0.32	0.32
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		211	19.7	LOS B			0.50	0.50

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: 001av [001a. EAST BOUNDARY ROAD BETWEEN NORTH ROAD AND NORTH DRIVE - Signals - Copy]

Network: N101 [Master Model]

EAST BOUNDARY ROAD BETWEEN NORTH ROAD AND NORTH DRIVE - east
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival 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	Aver. No. Cycles	Average Speed km/h
South: East Boundary Road														
2	T1	1689	0.0	1689	0.0	0.473	6.8	LOS A	16.7	117.2	0.41	0.37	0.41	34.9
3	R2	145	0.0	145	0.0	0.535	70.4	LOS E	9.3	65.2	1.00	0.81	1.00	21.4
Approach		1835	0.0	1835	0.0	0.535	11.8	LOS B	16.7	117.2	0.46	0.41	0.46	29.9
East: NORTH DR														
4	L2	265	0.0	265	0.0	0.497	38.5	LOS D	12.4	87.0	0.79	0.79	0.79	26.7
6	R2	303	0.0	303	0.0	0.524	59.0	LOS E	9.7	67.7	0.95	0.80	0.95	20.7
Approach		568	0.0	568	0.0	0.524	49.4	LOS D	12.4	87.0	0.88	0.80	0.88	23.2
North: East Boundary Road														
7	L2	205	0.0	205	0.0	0.293	21.4	LOS C	6.5	45.5	0.54	0.72	0.54	40.8
8	T1	1365	0.0	1365	0.0	0.539	24.5	LOS C	30.5	213.8	0.76	0.68	0.76	26.2
Approach		1571	0.0	1571	0.0	0.539	24.1	LOS C	30.5	213.8	0.73	0.69	0.73	29.1
All Vehicles		3974	0.0	3974	0.0	0.539	22.0	LOS C	30.5	213.8	0.63	0.57	0.63	27.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	19.4	LOS B	0.1	0.1	0.55	0.55
All Pedestrians		105	39.3	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: 104av [4a (east). EAST BOUNDARY ROAD / SOUTH DRIVE - Signals]

Network: N101 [Master Model]

Staged crossing Stage 1 (Minor Road) at three-way intersection with 5-lane major road. Major road turn lane is treated as a full-length lane.
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival 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	Aver. No. Cycles	Average Speed km/h
South: EAST BOUNDARY ROAD														
2	T1	1555	0.0	1555	0.0	0.570	10.2	LOS B	24.0	168.3	0.54	0.50	0.54	39.7
3	R2	389	0.3	389	0.3	0.690	55.5	LOS E	16.8	117.9	0.98	0.84	0.98	17.3
3u	U	134	3.1	134	3.1	0.690	58.0	LOS E	14.2	101.0	0.98	0.85	1.00	15.4
Approach		2078	0.3	2078	0.3	0.690	21.8	LOS C	24.0	168.3	0.65	0.59	0.65	27.1
East: SOUTH DRIVE														
4	L2	254	0.0	254	0.0	0.369	15.1	LOS B	7.0	48.8	0.52	0.72	0.52	40.4
6	R2	296	0.0	296	0.0	0.690	68.0	LOS E	9.4	66.1	1.00	0.83	1.06	18.9
Approach		549	0.0	549	0.0	0.690	43.6	LOS D	9.4	66.1	0.78	0.78	0.81	25.1
North: EAST BOUNDARY ROAD														
7	L2	276	0.0	276	0.0	0.197	7.5	LOS A	2.1	15.0	0.15	0.59	0.15	49.6
8	T1	1361	2.5	1361	2.5	0.680	9.6	LOS A	22.0	157.2	0.39	0.36	0.39	30.1
9u	U	2	0.0	2	0.0	0.033	75.9	LOS E	0.1	1.0	1.00	0.62	1.00	6.6
Approach		1639	2.1	1639	2.1	0.680	9.3	LOS A	22.0	157.2	0.35	0.40	0.35	36.5
All Vehicles		4266	0.9	4266	0.9	0.690	19.8	LOS B	24.0	168.3	0.55	0.54	0.56	28.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		105	59.3	LOS E			0.96	0.96

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: 3560 [2. NORTH ROAD / EAST BOUNDARY ROAD / MURRUMBEENA ROAD]

Network: N101 [Master Model]

NORTH ROAD / EAST BOUNDARY ROAD / MURRUMBEENA ROAD
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival 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	Aver. No. Cycles	Average Speed km/h
South: EAST BOUNDARY ROAD														
1	L2	614	3.3	614	3.3	0.599	17.2	LOS A	14.6	105.1	0.45	0.72	0.45	50.7
2	T1	942	1.3	942	1.3	0.974	79.4	LOS E	49.3	349.1	0.98	1.11	1.34	22.9
3	R2	343	1.8	343	1.8	0.879	78.8	LOS C	13.5	95.7	1.00	0.94	1.32	12.1
3u	U	31	0.0	31	0.0	0.879	79.2	LOS C	12.8	91.1	1.00	0.94	1.32	12.0
Approach		1929	2.0	1929	2.0	0.974	59.5	LOS E	49.3	349.1	0.81	0.95	1.05	27.1
East: NORTH ROAD														
4	L2	378	2.2	378	2.2	0.545	33.1	LOS A	21.0	150.3	0.81	0.80	0.81	28.2
5	T1	1485	3.5	1485	3.5	0.983	80.0	LOS E	59.7	430.6	0.99	1.18	1.35	28.9
6	R2	73	4.3	73	4.3	0.850	80.8	LOS C	7.2	51.9	1.00	0.91	1.35	23.9
6u	U	31	0.0	31	0.0	0.850	81.2	LOS C	7.2	51.9	1.00	0.91	1.35	14.6
Approach		1966	3.3	1966	3.3	0.983	71.0	LOS E	59.7	430.6	0.95	1.09	1.25	28.4
North: MURRUMBEENA ROAD														
7	L2	114	2.8	114	2.8	0.886	68.3	LOS C	34.8	248.2	1.00	1.07	1.56	18.9
8	T1	805	1.8	805	1.8	0.886	60.8	LOS C	34.8	248.2	0.98	1.03	1.37	19.4
9	R2	149	1.4	149	1.4	0.888	80.6	LOS C	10.6	75.1	1.00	0.97	1.38	28.5
Approach		1068	1.9	1068	1.9	0.888	64.3	LOS C	34.8	248.2	0.99	1.02	1.39	21.2
West: NORTH ROAD														
10	L2	115	2.8	115	2.8	0.611	40.8	LOS B	26.7	190.0	0.85	0.83	1.17	41.7
11	T1	1475	2.0	1475	2.0	0.611	32.7	LOS B	27.8	197.6	0.84	0.76	0.94	36.4
12	R2	598	1.8	598	1.8	0.950	88.8	LOS E	23.2	164.9	1.00	1.03	1.44	20.1
Approach		2187	2.0	2187	2.0	0.950	48.5	LOS E	27.8	197.6	0.88	0.84	1.09	30.2
All Vehicles		7152	2.3	7152	2.3	0.983	60.0	LOS E	59.7	430.6	0.90	0.97	1.17	27.5

Site Level of Service (LOS) Method: Degree of Saturation (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on degree of saturation per movement.
Intersection and Approach LOS values are based on worst degree of saturation for any vehicle movement.
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
P1	South Full Crossing	53	45.0	LOS E	0.2	0.2	0.83	0.83
P2	East Full Crossing	53	52.8	LOS E	0.2	0.2	0.90	0.90
P3	North Full Crossing	53	33.3	LOS D	0.1	0.1	0.72	0.72
P4	West Full Crossing	53	52.8	LOS E	0.2	0.2	0.90	0.90
All Pedestrians		211	46.0	LOS E			0.84	0.84

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: 107v [7. NORTH ROAD / CROSBIE ROAD / COBAR STREET - Signals]

Network: N101 [Master Model]

NORTH ROAD / CROSBIE ROAD / COBAR STREET
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival 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	Aver. No. Cycles	Average Speed km/h
South: COBAR STREET														
1	L2	172	0.0	172	0.0	0.884	74.7	LOS C	12.2	85.1	1.00	1.06	1.37	15.5
3	R2	155	0.7	155	0.7	0.716	62.0	LOS C	9.6	67.5	0.98	0.86	1.07	17.2
Approach		326	0.3	326	0.3	0.884	68.6	LOS C	12.2	85.1	0.99	0.96	1.23	16.2
East: NORTH ROAD														
4	L2	87	2.4	87	2.4	0.063	8.6	LOS A	1.1	8.1	0.27	0.64	0.27	45.3
5	T1	1754	3.8	1754	3.8	0.893	32.1	LOS C	52.0	375.8	0.88	0.89	0.97	33.9
6	R2	64	0.0	64	0.0	0.321	64.8	LOS A	3.9	27.1	0.96	0.76	0.96	31.2
Approach		1905	3.6	1905	3.6	0.893	32.1	LOS C	52.0	375.8	0.85	0.87	0.94	34.4
North: CROSBIE ROAD														
7	L2	119	0.0	119	0.0	0.595	67.1	LOS A	7.4	52.1	1.00	0.79	1.00	19.2
Approach		119	0.0	119	0.0	0.595	67.1	LOS A	7.4	52.1	1.00	0.79	1.00	19.2
West: NORTH ROAD														
10	L2	43	0.0	43	0.0	0.038	16.2	LOS A	1.1	7.5	0.42	0.66	0.42	45.4
11	T1	1763	2.0	1763	2.0	0.804	20.6	LOS C	41.8	297.7	0.79	0.77	0.79	35.6
12	R2	177	0.6	177	0.6	0.888	80.3	LOS C	12.7	89.2	1.00	0.94	1.36	22.5
Approach		1983	1.9	1983	1.9	0.888	25.8	LOS C	41.8	297.7	0.80	0.78	0.83	32.6
All Vehicles		4334	2.5	4334	2.5	0.893	32.9	LOS C	52.0	375.8	0.84	0.83	0.91	30.9

Site Level of Service (LOS) Method: Degree of Saturation (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on degree of saturation per movement.
Intersection and Approach LOS values are based on worst degree of saturation for any vehicle movement.
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
P1	South Full Crossing	53	12.1	LOS B	0.1	0.1	0.43	0.43
P1S	South Slip/Bypass Lane Crossing	53	4.2	LOS A	0.0	0.0	0.25	0.25
P3	North Full Crossing	53	13.0	LOS B	0.1	0.1	0.45	0.45
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		211	22.1	LOS C			0.52	0.52

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: 001av [001a. EAST BOUNDARY ROAD / NORTH DRIVE - Copy]

Network: N101 [Master Model]

EAST BOUNDARY ROAD BETWEEN NORTH ROAD AND NORTH DRIVE - east
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival 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	Aver. No. Cycles	Average Speed km/h
South: East Boundary Road														
2	T1	1591	0.0	1591	0.0	0.481	6.1	LOS A	14.1	99.0	0.34	0.31	0.34	39.5
3	R2	168	0.0	168	0.0	0.620	62.5	LOS B	10.2	71.6	0.99	0.81	0.99	23.9
Approach		1759	0.0	1759	0.0	0.620	11.5	LOS B	14.1	99.0	0.40	0.35	0.40	33.5
East: NORTH DR														
4	L2	365	0.0	365	0.0	0.689	40.8	LOS B	18.3	128.0	0.85	0.82	0.85	25.9
6	R2	302	0.0	302	0.0	0.633	60.1	LOS B	9.8	68.7	0.97	0.81	0.98	20.5
Approach		667	0.0	667	0.0	0.689	49.6	LOS B	18.3	128.0	0.90	0.82	0.91	23.1
North: East Boundary Road														
7	L2	282	0.0	282	0.0	0.449	22.2	LOS A	9.4	65.7	0.57	0.74	0.57	40.3
8	T1	1517	2.2	1517	2.2	0.648	24.7	LOS B	36.4	259.9	0.79	0.72	0.79	26.1
Approach		1799	1.9	1799	1.9	0.648	24.3	LOS B	36.4	259.9	0.76	0.72	0.76	29.4
All Vehicles		4225	0.8	4225	0.8	0.689	23.0	LOS B	36.4	259.9	0.63	0.58	0.63	28.6

Site Level of Service (LOS) Method: Degree of Saturation (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on degree of saturation per movement.
Intersection and Approach LOS values are based on worst degree of saturation for any vehicle movement.
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
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	19.4	LOS B	0.1	0.1	0.55	0.55
All Pedestrians		105	39.3	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: 104av [4a (east). EAST BOUNDARY ROAD / SOUTH DRIVE]

Network: N101 [Master Model]

Staged crossing Stage 1 (Minor Road) at three-way intersection with 5-lane major road. Major road turn lane is treated as a full-length lane.
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival 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	Aver. No. Cycles	Average Speed km/h
South: EAST BOUNDARY ROAD														
2	T1	1458	0.0	1458	0.0	0.528	9.3	LOS A	21.1	147.6	0.51	0.46	0.51	41.0
3	R2	321	0.3	321	0.3	0.792	64.0	LOS C	17.4	122.5	1.00	0.89	1.12	16.7
3u	U	163	2.6	163	2.6	0.792	67.2	LOS C	14.0	100.0	1.00	0.89	1.15	13.7
Approach		1942	0.3	1942	0.3	0.792	23.2	LOS C	21.1	147.6	0.63	0.57	0.66	26.2
East: SOUTH DRIVE														
4	L2	368	0.0	368	0.0	0.701	29.6	LOS C	19.5	136.4	0.93	0.88	0.93	30.9
6	R2	307	0.0	307	0.0	0.768	71.2	LOS C	10.2	71.1	1.00	0.87	1.15	18.3
Approach		676	0.0	676	0.0	0.768	48.5	LOS C	19.5	136.4	0.96	0.88	1.03	23.5
North: EAST BOUNDARY ROAD														
7	L2	234	0.0	234	0.0	0.163	8.0	LOS A	2.3	15.8	0.18	0.60	0.18	49.1
8	T1	1649	2.0	1649	2.0	0.806	10.9	LOS C	31.1	221.2	0.47	0.44	0.47	28.1
9u	U	21	0.0	21	0.0	0.327	79.0	LOS A	1.4	10.0	1.00	0.71	1.00	6.3
Approach		1904	1.8	1904	1.8	0.806	11.3	LOS C	31.1	221.2	0.44	0.46	0.44	32.3
All Vehicles		4522	0.9	4522	0.9	0.806	22.0	LOS C	31.1	221.2	0.60	0.57	0.63	26.9

Site Level of Service (LOS) Method: Degree of Saturation (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on degree of saturation per movement.
Intersection and Approach LOS values are based on worst degree of saturation for any vehicle movement.
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
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		105	59.3	LOS E			0.96	0.96

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.