Amendment C155 to the Glen Eira Planning Scheme

East Village Development, Bentleigh East
Expert Witness Report

Prepared by: GTA Consultants (VIC) Pty Ltd for Glen Eira City Council

on 22/11/19

Reference: V136085

Issue #: A

GTAconsultants

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Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	22/11/19	Final	Goran Mihic	Simon Davies	Simon Davies	

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1. INTRODUCTION

1.1. Planning History

In 2018, the Victorian Planning Authority (VPA) with the support of GTA Consultants, worked with Glen Eira City Council ('Council') in relation to ***Amendment C155 to the Glen Eira Planning Scheme***, which proposes to rezone the area affected by the Amendment, known as East Village into a Comprehensive Development Zone 2 (CDZ2).

The Amendment proposes to facilitate the use and development of land located within the East Village Comprehensive Development Plan (East Village CDP) area for commercial, retail, residential and a mixture of other land uses.

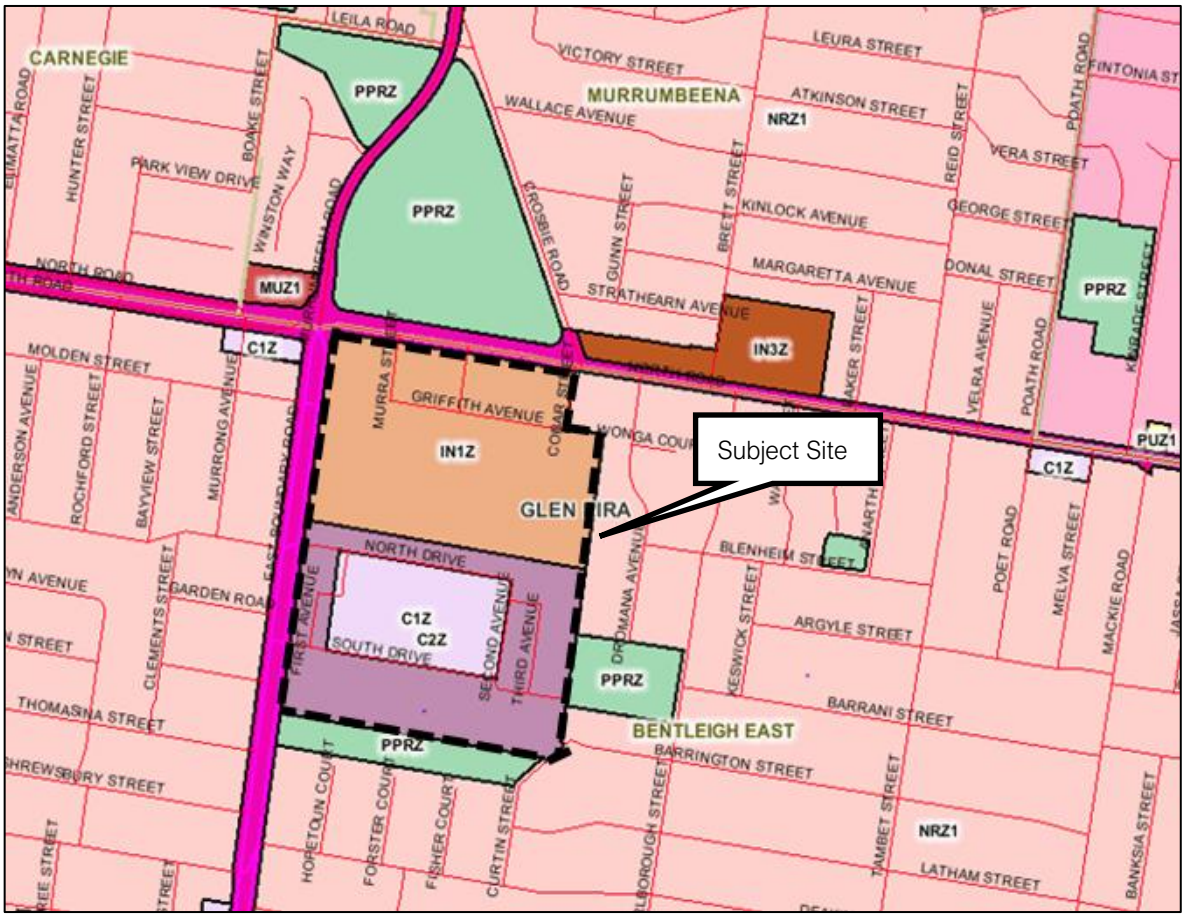
The proposed East Village precinct is located 12km south-east of Melbourne's CBD in Bentleigh East and is located on the southeast corner of the intersection of North Road and East Boundary Road. The site comprises of 24 hectares, and currently accommodates a variety of industrial and business service uses, with North Road forming the northern boundary and East Boundary Road forming the western boundary of the site.

The location of the subject site is shown in Figure 1.1, while the zoning of the site and surrounding area is shown in Figure 1.2.

Figure 1.1: Site Location Map

Reproduced from Nearmap

Figure 1.2: Land Zoning Map within and surrounding the Study Area



(Reproduced from Land Channel web site)

East Village is a significant urban renewal site, which is anticipated to ultimately accommodate approximately 3,000 new dwellings which will provide homes for approximately 6,000 residents, including 5% affordable housing. The proposal is also anticipated to generate in the order of 4,500 new jobs and is proposed to include a secondary school located along South Drive.

Given the site's historic industrial use and that it is bordered by mostly low to medium density housing, it provides a significant opportunity to improve the overall residential neighbourhood's amenity.

Planning for the Comprehensive Development Plan included the preparation of an Access and Movement Report, which was prepared by GTA (dated 19 October 2018).

GTA's Access and Movement Report, along with other supporting documents, were considered by Council at their meeting on 23 October 2018, and determined to seek authorisation from the Minister for Planning to prepare and exhibit the East Village Planning Scheme Amendment.

Furthermore, it is understood that the VPA provided Council advice throughout the preparation of the Planning Scheme Amendment, with Council supporting the advice as the proposed provisions are consistent with the overall intended outcomes sought by the VPA which include planning for a sustainable mixed-use precinct with a focus on innovative employment and education opportunities, diverse housing, sustainability, and high-quality green spaces, public places, transport and retail.

It is further understood that there are some matters which Council did not support the advice of the VPA and has subsequently made changes to the Schedule to the Comprehensive Development Zone and Comprehensive Development Plan, as follows:

- *"Overall more restrictive wording to the controls, providing more certainty to residents and Council.*
- *Inclusion of an overshadowing control over public open space.*
- *Inclusion of a traffic, parking and access impact assessment of the Cobar Street/North Road/Crosbie Road intersection.*
- *Additional application requirements for town planning applications within the precinct.*
- *An additional condition controlling residential uses in mixed use and retail areas."*

Following the public exhibition of the Amendment, officers presented a report to Council on 23 October 2019 enabling consideration of the submissions received to the Amendment and seeking a resolution to advance a particular preferred version of the controls to the Panel.

On 23 October 2019, at a Special Council meeting, Council resolved:

"That Council:

1. *receives and notes submissions received following the exhibition of Amendment C155 to the Glen Eira Planning Scheme;*
2. *notes the officer report and attachments, including Attachment 1 - Summary of Submissions/Officer Response to Submissions received to Amendment C155, and endorses for the purposes of advocacy before an independent planning panel the Council's preferred versions of the CDZ2, CDP and DCP at Attachments 2 - 5, inclusive, except that the word 'generally' be removed from the statement "a permit must be generally in accordance with the incorporated CDP and include any conditions or requirements set out in this schedule" contained in the Schedule to the CDZ.*
3. *requests the Minister for Planning to appoint an independent planning panel to consider: a. all submissions received during the exhibition period of Amendment C155; and b. the 6 late submissions received (submissions numbered 153– 158 inclusive) to Amendment C155, in accordance with Section 23 of the Planning and Environment Act 1987.*
4. *refers the submissions and the 6 late submissions to the independent planning panel for its consideration.*
5. *refers the recently received late submissions (submissions number 159 and 160), that were received since the drafting of the officer report in the published Agenda papers, to the independent panel for consideration."*

1.2. Submissions

A summary of the submissions (relating to Transport Engineering matters) received by Council is provided below:

- East Village is poorly serviced by public transport
- Signalisation of Crosbie Road/Cobar Street/North Road to occur prior to any development
- An assessment of car parking provision is required.
- The existing road network is congested. Amendment C155 will further exacerbate this issue.

- A need for a 15m setback of all structures and footpaths along North Road so that development does not hinder future widening of the roadway to accommodate segregated transit and bike lanes.

A response to each of these matters is addressed in Section 5 of my Evidence.

1.3. Expert Witness Details

Simon Davies BE (Environmental) (Hons)
Director – GTA Consultants
L25, 55 Collins Street, Melbourne
Areas of Expertise: Traffic Engineering & Transport Planning

I completed my environmental engineering degree majoring in traffic and transport with Honours at Monash University prior to commencing work with GTA Consultants in 1999 and am a member of Australian Institute of Traffic Planning and Management (AITPM) and the Victorian Planning and Environmental Law Association (VPELA).

I have over 20 years of experience in traffic and transportation planning including data collection and analysis, strategic transport planning, major and special event planning, traffic impact assessment and traffic engineering design.

I have experience in managing a variety of complex projects and regularly present expert traffic and parking evidence at the Victorian Civil and Administrative Tribunal (VCAT).

Further details of my experience are provided in Appendix A

1.4. Relationship to Applicant

I have no ongoing private or business relationship with the applicant and have been retained to provide expert witness services at this hearing for a mutually agreed fee.

1.5. Instructions & Scope of Report

GTA Consultants was commissioned by VPA in 2017 to prepare an Access and Movement Report to help guide the development of the proposed East Village precinct from a transport planning perspective.

I have now been engaged by Glen Eira City Council to prepare and present expert traffic and transport evidence at the forthcoming Panel Hearing, commencing on 2 December 2019. Prior to this engagement I had no involvement with the East Village Precinct or the preparation of the Access and Movement Report dated 19 October 2018.

Prior to preparing this evidence I was briefed by Maddocks regarding the proposal via written and oral instructions.

The evidence sets out an assessment of the anticipated traffic implications of the proposed development and the suitability of the proposed vehicle access arrangements for the proposed development.

1.6. References

In preparing this evidence, reference has been made to a number of documents including the following:

- Glen Eira Planning Scheme, including relevant overlays and clauses.
- East Village Comprehensive Development Plan prepared by the Victorian Planning Authority (VPA), dated December 2018.
- Comprehensive Development Zone (CDZ2) of the Glen Eira Planning Scheme.
- East Village Development Contributions Plan and the DCPO
- Council Officers Reports and Third Party Submissions.
- Advertised material and background reports.
- Australian Standard/ New Zealand Standard, Parking Facilities (AS2890).
- The Access and Movement Report prepared by GTA Consultants, dated 19 October 2018.
- Brief to Expert provided by Maddocks Lawyers.
- Various technical data as referenced in this report.
- An inspection of the site and its surrounds.
- Other documents as nominated.

1.7. Tests, Experiments & Assistance

In preparing this evidence, I received assistance from the following people:

Goran Mihic	Senior Consultant	BE (Tech).
Mitchell Henderson	Consultant	BE (Civil)

2. REVIEW OF EAST VILLAGE ACCESS AND MOVEMENT REPORT

2.1. Introduction

The East Village Access and Movement Report (herein referred to as GTA 2018 report) included:

- A **policy review** of relevant transport documents affecting how the area is proposed to develop into the future, and what the desired transport network should look like.
- A review of the **existing transport conditions** in the area to provide a baseline of conditions to use when assessing the likely impact of the proposal.
- A **traffic impact assessment** of the future conditions of the existing and proposed intersections to identify the performance and any required road network arrangements.
- Development of an **integrated transport response** for the site to suitably support all modes of transport with the aim to reduce the sites reliance on private car use
- Identification of the **mitigating and/or supporting transport works** that will be required to suitably support the development of East Village and its integration with the surrounding transport network.

It was anticipated that the analysis and findings from the GTA 2018 report would be used to inform the design and management of the required transport infrastructure to support the proposed development of East Village and be used to proportion the cost and responsibility of their implementation.

The GTA 2019 report included the completion of a traffic impact assessment to understand how the road network used to access East Village currently operates and how these roads are expected to operate in the future. This assessment included the collection of existing traffic data of the key intersections and analysis using network SIDRA models. Future year analysis assessed the traffic conditions at the key intersections to confirm that the site access points will be able to operate satisfactorily (noting that the broader road network is the responsibility of the Department of Transport (formerly VicRoads).

2.2. Traffic Impact Assessment

The extent of the traffic impact assessment included the following key intersections:

- North Road / Poath Road
- North Road / Cobar Street / Crosbie Road
- North Road / East Boundary Road
- North Road / Koornang Road / Tucker Road
- Murrumbeena Road / Crosbie Road / Leila Road
- East Boundary Road / North Drive

- East Boundary Road / South Drive
- East Boundary Road / Ardena Court.

In my opinion the extent of the traffic impact assessment is appropriate to consider the traffic impact of the proposed rezoning. Naturally as you move further from the site the additional traffic generated by the land continues to disperse along an increasing number of routes which reduces the impact on any particular location.

In terms of the modelling assessment completed in the Access and Movement report, the following methodology was undertaken:

- Collection of existing conditions traffic data of the key intersections used to access the subject site
- Preparation of existing AM and PM peak hour network SIDRA Models for the key intersections
- Identification of the anticipated level of additional traffic the proposed rezoning will generate given its level of development and applied them to the key intersections
- Assessment of the post development peak hour traffic conditions at the key intersections through the network SIDRA Models to identify the mitigating works required to support the proposed development of East Village
- Identifying future background traffic growth on the arterial road network and applying the growth factors to the proposed new signalised intersections
- Assessment of the future peak hour traffic conditions at the key intersections through the network SIDRA Models to confirm that the site access points will be able to operate satisfactorily (maintaining the broader road network is the responsibility of the Department of Transport).

The modelling results presented in the Access and Movement report for the post development scenario indicated that following full development of East Village that the proximate road network would not be able to suitably accommodate the anticipated level of traffic generated, with the majority of the site access and proximate intersections operating outside of an acceptable degree of saturation (DOS).

Based on the above, a suite of mitigating measures were identified to support the anticipated traffic generated by the proposed rezoning and development of East Village. Concept level plans for the identified mitigating measures were prepared using an aerial base, as shown in Appendix D in the GTA 2018 report.

2.3. Appropriateness of the Analysis

2.3.1. Overview

In my opinion the methodology that was undertaken in the GTA 2018 report to ultimately confirm the level of potential mitigating works associated with the proposed rezoning and to determine whether the proposed site access points will operate satisfactorily under post development conditions follows the typical process for a proposed rezoning application. In this respect, I am therefore satisfied with the abovementioned methodology.

2.3.2. Concept Level Design Layouts

In reviewing the concept level design layouts included in Appendix D of the GTA 2018 report, I have observed that the extent of works on North Road to the west and East Boundary Road to the south does not match the proposed mitigating measures set out in Section 5.4 and Appendix C of the GTA 2018 report. Specifically, the following variations are noted:

- The third southbound lane on East Boundary Road is required to only extend for 60m south of South Drive whereas the concept layout has the lane extending to Parkmore Road which is located approximately 400m south of South Drive.
- The third westbound lane on North Road is required to only extend for 150m west of East Boundary Road whereas the concept layout has the lane extending to Koornang Road which is located approximately 680m west of East Boundary Road.

It is recommended that the concept level design layouts be amended to reflect the proposed mitigating measures as set out in Section 5.4 of the GTA 2018 report. I have prepared an amended plan for the above alterations which is provided at Appendix B.

It is understood that the preliminary costing set out in the Development Contributions Plan are based on the concept level design layouts and as such the Development Contribution Plan costings would need to be amended accordingly to reflect the required road works.

2.4. Review of Need for Mitigating Works

2.4.1. Murrumbeena Road / Crosbie Road / Leila Road

In reviewing the proposed mitigating works and following discussions with Glen Eira City Council, I am of the opinion that the proposed signalisation of the Murrumbeena Road / Crosbie Road / Leila Road intersection should be reviewed. It is understood that the signalisation was proposed to primarily cater for the right turn from Crosbie Road into Murrumbeena Road to cater for traffic generated by the proposed development utilising Crosbie Road to access Murrumbeena Road. It is noted that the distribution did not assume any traffic arrived at East Village via Crosbie Road.

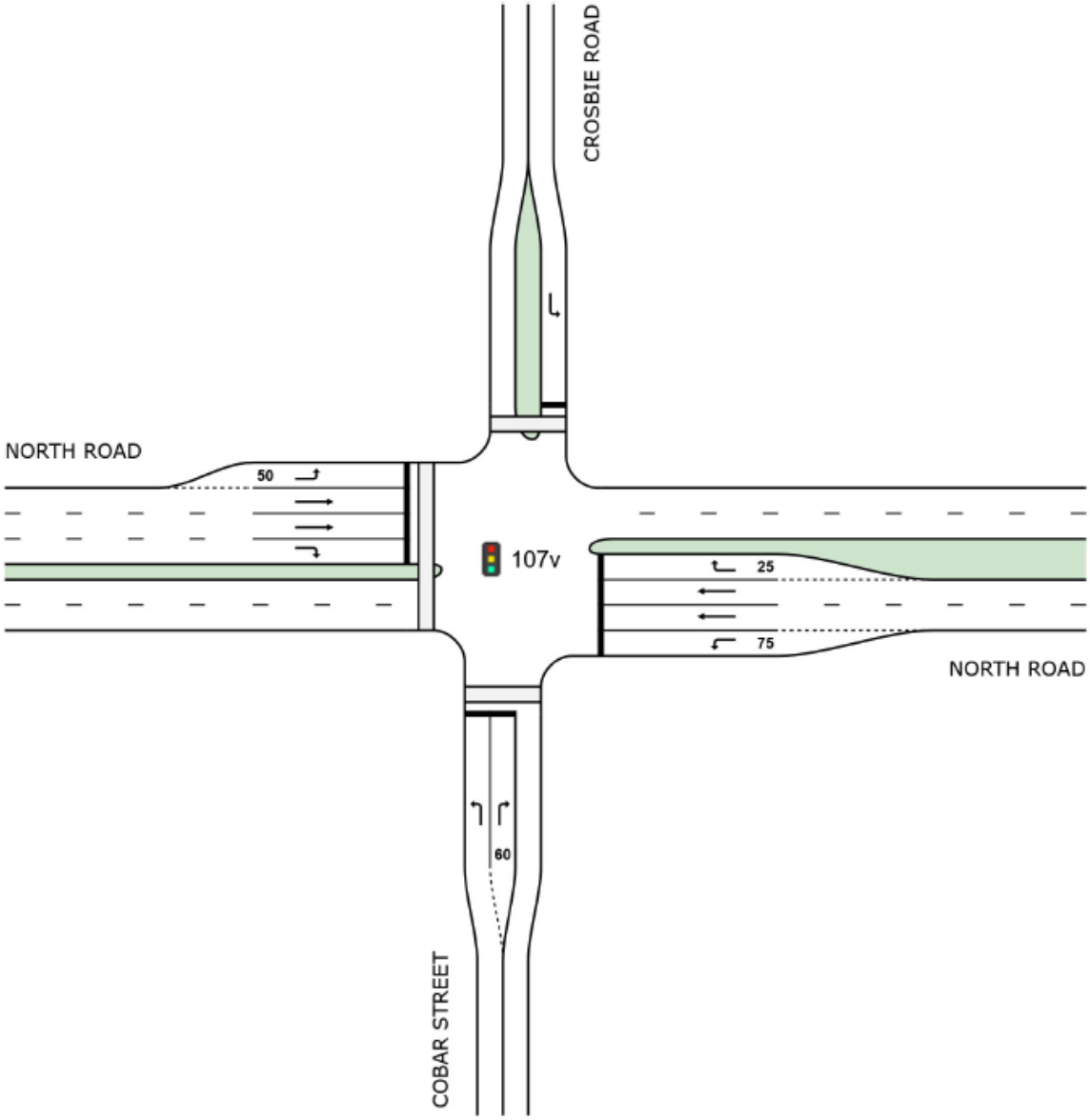
Crosbie Road is a local street which comprises 90-degree angle parking on the west side adjacent to Duncan McKinnon Reserve, parallel parking on the east side and Local Area Traffic Management devices in the form of four speed cushions along its length. It is understood that Council's preference is to minimise through traffic using Crosbie Road. It is noted that based on the SIDRA analysis included in the GTA 2018 report, the right turn from Crosbie Road into Murrumbeena Road is currently operating at capacity during the PM peak hour.

The installation of traffic signals at the Murrumbeena Road / Crosbie Road / Leila Road intersection will increase the capacity for the right turn from Crosbie Road into Murrumbeena Road. In my opinion this is likely to induce both traffic generated by East Village and potentially other 'existing' traffic to utilise Crosbie Road as an alternative for vehicles wanted to turn right from North Road into Murrumbeena Road. In my opinion this outcome should be avoided if possible.

It is my opinion that it is preferable to find an alternate solution whereby traffic generated by East Village can access the surrounding arterial road network without the need to utilise Crosbie Road.

In my opinion it would be reasonable for traffic previously assumed to travel north up Crosbie Road from Cobar Street to instead turn right into North Road to access alternate north-south routes such as Poath Road and/or Warrigal Road. I have undertaken this analysis and can confirm that the North Road / Cobar Street / Crosbie Road will continue to operate appropriately with the above change in traffic distribution with a DOS of 0.82 during the AM peak hour and 0.81 in the PM peak hour with the results provided at Appendix C. It is noted that the analysis also includes the extension of the left turn lane on North Road (east) and the provision of a left turn lane on North Road (west) as recommended in the Department of Transport submission. The intersection layout is provided below in Figure 2.1:

Figure 2.1: Alternate layout for North Road / Crosbie Road / Cobar Street intersection



Subject to the pedestrian phase across Crosbie Road not operating when traffic is turning right out of Cobar Street, it is considered that appropriate regulatory signage and linemarking would be sufficient to achieve the desired outcome of minimising additional through traffic using Crosbie Road.

Notwithstanding, it is recommended that the intersection design be modified to as far as practicable to physically discourage vehicles from travelling north up Crosbie Road to support the regulatory signage and linemarking.

2.4.2. North Road / Murra Street and North Road / Carey Street Intersections

The North Road / Murra Street and North Road / Carey Street intersections currently exist and provide localised access to the northern part of the East Village precinct. Murra Street is currently afforded left-in / left-out access only while Carey Street is afforded left-in / right-in / left-out access. Murra Street and Carey Street are identified as 'existing streets to be retained' and will be restricted to left-in / left-out access in the East Village Comprehensive Development Plan.

Primary vehicle access to East Village is to be provided via North Drive, South Drive and Cobar Street. The traffic analysis undertaken in the GTA 2018 report assumed that all site generated traffic would utilise North Drive, South Drive and Cobar Street with no additional traffic assumed to use Murra Street and Carey Street compared to existing volumes.

From a traffic engineering perspective, it is considered that East Village can be developed as envisaged without vehicle entry to the precinct provided via Murra Street or Carey Street.

Given the above, it is my opinion that the requirement to provide left turn deceleration lanes into Murra Street and Carey Street as part of the Development Contribution Plan could be reconsidered noting that North Road is controlled by the Department of Transport.

2.4.3. Other Intersection Works

In my opinion the remaining intersection works are generally considered appropriate to facilitate access to East Village and/or mitigate the anticipated traffic impact with the costs apportioned to the East Village Comprehensive Development Plan as part of the Development Contribution Plan. In particular those works comprise the following intersection upgrades:

- North Road / Cobar Street / Crosbie Road signalisation
- East Boundary Road / North Drive signalisation
- East Boundary Road / South Drive signalisation
- North Road / East Boundary Road / Murrumbeena Road mitigating works.

In relation to the North Road / East Boundary Road / Murrumbeena Road intersection there does appear to be an opportunity to extend the right turn lane on North Road east approach to extend back to back with the proposed extended right turn lane into Cobar Street. It also noted that the double right turn lanes on the North Road west approach could be further extended (as suggested by Department of Transport) but would result in reducing the length of the adjacent third westbound lane which is currently proposed to extend for 150m from the intersection before merging back to two lanes.

2.5. Service Relocation Considerations

It is my understanding that in finalising the documents for exhibition, traffic analysis was undertaken, concept layout plans on aerial photography prepared and preliminary costings were then undertaken for inclusion in the Development Contributions Plan. It is my understanding that there was no modification made to the concept layout plans following review of service relocation implications.

The area around East Village includes some significant services including a significant number of Telstra chambers along the southern footpath of North Road and a high pressure gas main that runs under the centre median of East Boundary Road.

While the unit costs for pavement works and traffic signals can be estimated with some certainty and is not dependant on the exact road alignment, service relocation costs can change dramatically depending on the exact road alignment adopted.

In reviewing the DCP costs for Intersection Projects it is noted that the estimated cost of service relocations equated to approximately $16 million which is approximately 40% of the overall delivery cost which is a significant proportion of the overall cost.

In my opinion it is critical to ensure that the DCP costs reflect as accurately as possible the anticipated costs of the required works.

While it is inevitable that some services will require relocation to facilitate the required works, in my opinion it is appropriate to refine the concept layout designs to respond to identified services and minimise the extent of service relocation as much as is practicable without impacting on the required road capacity or design standards.

Furthermore, it is my understanding that the cost estimates provided for service relocations are very preliminary in nature and are highly conservative. As such it is recommended that formal costing advice be sought from the relevant service authorities for any required service relocations for inclusion in the DCP.

3. REVIEW OF EAST VILLAGE COMPREHENSIVE DEVELOPMENT PLAN

3.1. Introduction

I have reviewed the preferred version of the East Village Comprehensive Development Plan as per Council resolution of 23 October 2019 and provide the following comments in relation to the traffic engineering and transport planning implications.

3.2. Outcomes

The Comprehensive Development Plan specifies the desired outcomes including the vision and objectives for East Village. Of particular note in relation to transport is the following vision:

> *'…It will be well-connected to local and regional services and destinations through improved pedestrian, cycle, public transport and vehicular links….'*

Objective 7 states the following:

> *'To establish an integrated transport network that reduces dependency on private vehicles, maximises access to public transport and encourages walking and cycling.'*

3.3. Implementation

In addition to the above objectives, each element of the CDP contains Requirements and Guidelines and may also include Design Guidelines.

3.3.1. Access, parking and building services

Section 2.2.4 sets out the requirements and guidelines in relation to Access, parking and building services. Having reviewed the above Recommendations and Guidelines I provide the following recommendations.

Guideline 36 (dot point 6)

While I support the guidelines provided, I note that Guideline G36 includes the following dot point:

> *'Ensure that bicycle parking is secure, convenient and readily accessible'*

It would appear that the intention of the guideline is for employee (and potentially resident) bicycle parking in which case the above guideline is considered appropriate. Naturally there will also be requirement for visitor / customer bicycle parking in the Commercial North, Commercial West, Mixed Use and Retail sub-precincts. While customer / visitor parking should be convenient and readily accessible, typically it cannot be provided in a secure location as it needs to be publicly accessible. It is recommended that the wording for this guideline be amended accordingly.

3.3.2. Integrated Transport

Section 2.3 sets out the requirements and guidelines in relation to Integrated Transport. Having reviewed the above Recommendations and Guidelines I provide the following recommendations.

Requirement 8 – 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

At the time of preparing the Comprehensive Development Plan it is understood that there was no bus route (or associated bus stops) along East Boundary Road adjacent to the site. Bus stops are now located on both sides of East Boundary Road as follows:

- Between South Drive and Bethwyn Street
- Between Molden Street and North Drive.

Given bus stops have now been constructed R8 is potentially now redundant or should be reworded to reflect the potential relocation of existing bus stops.

Guideline 46 – 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).

Given that this is a guideline rather than a requirement, I would recommend that this wording be amended to state:

> 'Direct vehicle access to connector streets and North Drive should be avoided…'.

Requirement 14 – 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…'*

The proposed street cross-sections in Section 4 include a variety of footpath widths ranging from 4.0m on North Drive, 2.0m on Local Access Street (17m) and 1.5m on Local Access Street (16m). There appears to be an inconsistency between the proposed cross-sections in Section 4 and Requirement 14. As such it is minimum desired footpath width is clarified.

Summary

Other than the above recommended amendments it is my opinion that East Village Comprehensive Development Plan appropriately addresses the transport engineering related matters.

It is also noted that it appears that a re-numbering of the Requirements is required as R8 in Section 2.3 (Integrated Transport) follows R11 in Section 2.2.6 9 (Landscape).

4. REVIEW OF SCHEDULE 2 TO CLAUSE 37.02 COMPREHENSIVE DEVELOPMENT ZONE (CDZ2)

4.1. Introduction

Schedule 2 to Clause 37.02 Comprehensive Development Zone applies to land defined by the 'East Village Comprehensive Development Plan'.

The schedule sets out specific requirements and decision guidelines for Use of Land, Subdivision and Buildings and Works. I have considered the preferred version of the Clause as per Council resolution of 23 October 2019 and provide the following comments in relation to the traffic engineering and transport planning implications.

4.2. Use of Land

A permit for use of land within the East Village Comprehensive Development Plan includes the following application requirements relating to traffic:

- *The likely effects of the use on the local and regional traffic network*
  - *The works, services or facilities required to cater for those effects so that the efficiency and safety of the traffic network is maintained; and*
  - *The proposed method of funding the required works, services or facilities.*

It is noted that the next three dot points appear to be subsections of the above but should be listed as separate dot points as opposed to a subset of 'the likely effects of the use on the local and regional traffic network' as follows:

- *The availability and capacity of the electricity, drainage, sewer water and digital networks: and*
- *Any necessary upgrades to those networks; and*
- *The proposed method of funding the upgrade works.*

The following decision guideline is also included:

- *The effect of traffic to be generated by the use on 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 effectively without signalisation.*

It is my opinion that the requirements relating to traffic engineering matters for an application for use of land within East Village is appropriate subject to the recommended editorial amendment stated above.

4.3. Subdivision

The schedule states the following in relation to Works to be provided in association with development.

Development must provide and meet the total cost of delivering the following infrastructure:

- *Connector streets and local streets;*
- *Local bus stop infrastructure where locations are agreed in writing by Public Transport Victoria;*

…

- *Local shared, pedestrian and bicycle paths along local roads, connector streets, utilities easements, local streets, waterways and within local parks including intersections and barrier crossing points;*
- *Bicycle parking;*
- *Appropriate scaled lighting along all roads, major shared and pedestrian paths and traversing the open space network;*

….

The following application requirements apply to a permit to subdivide land to the satisfaction of the responsible authority:

….

- *Plans showing the design of streets, paths, parks and any other relevant public facility or infrastructure shown in the East Village Comprehensive Development Plan, December 2018, shown in a development contributions plan, or that is necessary as a result of the development.*

…

- *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;*

…

It is my opinion that the requirements relating to traffic engineering matters for an application for subdivision within East Village is appropriate.

4.4. Buildings and works

An application to construct a building or construct or carry out works must be accompanied by the following information, as appropriate, to the satisfaction of the responsible authority:

…

- *Number of car parking spaces per dwelling and visitor car parking.*
- *Bicycle parking provision.*

- *Details of connections from any internal roads/accessways toi existing roads and means of vehicular ingress and egress from the site.*

  …

- *Plans showing the design of streets, paths, parks and any other relevant public facility or infrastructure shown in the East Village Comprehensive Development Plan, December 2018, shown in a development contributions plan, or that is necessary as a result of the development.*

  …

- *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.*
  - *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.*
- *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 following decision guidelines apply to an application for buildings and works:

…

- *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 exceeding 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 / Murrumbeena Road intersection.*
- *The provision of car parking.*

  …

REVIEW OF SCHEDULE 2 TO CLAUSE 37.02 COMPREHENSIVE DEVELOPMENT ZONE (CDZ2)

It is my opinion that the requirements relating to traffic engineering matters for an application for buildings and works subdivision within East Village is generally appropriate.

It is suggested that the second paragraph under 'Application Requirements' on page 11 of Schedule 2 to the CDZ is a replication of the first paragraph but uses slightly different terminology which could be confusing in practice.

The wording, 'as appropriate, to the satisfaction of the responsible authority' is considered important particularly in relation to the requirement to prepare a traffic, parking and access report and the specific items which are required to be included in that report. In particular, common sense will be required such that a traffic assessment of the entire precinct is not considered necessary for every permit for buildings and works within the East Village if the application is expected to have a negligible or minimal traffic impact.

If the wording of the clause includes 'as appropriate, to the satisfaction of the responsible authority' it is my opinion that this provides an appropriate mechanism to avoid unnecessary traffic analysis for low traffic generating developments.

5. RESPONSE TO SUBMISSIONS

5.1. Third Party Submissions

A number of third parties have submitted statements to Council objecting to the proposed Amendment. A summary of the objections raised is provided below:

- East Village is poorly serviced by public transport
- Signalisation of Crosbie Road/Cobar Street/North Road to occur prior to any development
- An assessment of car parking provision is required.
- The existing road network is congested. Amendment C155 will further exacerbate this issue.
- A need for a 15m setback of all structures and footpaths along North Road so that development does not hinder future widening of the roadway to accommodate segregated transit and bike lanes.

5.1.1. Public Transport Accessibility

It is acknowledged that the East Village precinct is heavily reliant on bus services with the closest railway stations being Murrumbeena Station located approximately 2km to the north and Ormond Station located approximately 2km to the west. Two bus routes operate in the immediate vicinity of the East Village precinct, with bus route 630 (Elwood - Monash University via Gardenvale & Ormond & Huntingdale Stations) operating along North Road and bus route 627 (Moorabbin Station - Chadstone Shopping Centre via Bentleigh) operating along East Boundary Road.

Bus route 627 provides a connection to Murrumbeena and Moorabbin Stations while bus route 630 provides a connection to Huntingdale, Ormond and Gardenvale Stations which provides the site with good connections to wider public transport network.

5.1.2. Signalisation of the Crosbie Road/Cobar Street/North Road Intersection

Third party submissions indicate that the Crosbie Road/Cobar Street/North Road intersection should be signalised prior to any development occurring within the East Village precinct. In light of this, I make reference to Requirement 13 in the East Village Comprehensive Development Plan which states the following:

"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 GTA 2018 report assumes that the vast majority of traffic accesses the East Village precinct via East Boundary Road. As construction of the East Village precinct will commence from the southern end of the precinct, I am of the opinion that the Crosbie Road/Cobar Street/North Road intersection can remain unsignalised until significant development occurs in the northern part of the precinct or a vehicle connection is provided to the southern part of the precinct. This is appropriate addressed within Schedule 2 to Clause 37.02 Comprehensive Development Zone by way of:

- a Decision Guideline for an application for Use of Land (dot point 5)

- an Application Requirement for the preparation of a traffic, parking and access report and a Decision Guideline (dot point 6) for an application for Buildings and Works.

It is also noted that the signalisation of this intersection cannot occur until land to the west of Cobar Street is available which will not occur until that area of the precinct develops.

5.1.3. An Assessment of Car Parking Provision is Required

Amendment C155 proposes a rezoning of land into a Comprehensive Development Zone (CDZ2) with Schedule 2 to Clause 37.02 included in the Planning Scheme. The proposed rezoning does not propose any amendments to be made to the car parking rates set out in Clause 52.06 of the Planning Scheme.

Each application within the CDZ2 will be required to address the provision of car parking to the satisfaction of the Responsible Authority. Applications for Buildings and Works are required to prepare a traffic, parking and access report which includes:

> *'An assessment of the proposed car parking provision including suitability of scale, location and capacity to service the anticipated car parking demand'.*

5.1.4. Traffic Impact on the Surrounding Road Network

Existing modelling results presented in the GTA 2018 report indicates that there is limited ability in the existing surrounding road network to accommodate any additional traffic volumes. On this basis, a number of mitigating treatments were identified to support the anticipated traffic generated by the proposed rezoning and development of East Village.

In addition, two new signalised intersections will be provided along East Boundary Road at North Drive and South Drive. Further, the Cobar Street / North Road / Crosbie Road intersection will be signalised when traffic movements generated by the precinct exceed 2,000 vehicle movements in the PM peak hour or an internal connection is provided to the southern portion of the site.

In my opinion, the mitigating works recommended in the GTA 2018 report and my recommended amendments will adequately accommodate the additional traffic movements associated with the East Village development and will facilitate safe access to the precinct.

5.1.5. Need for 15m setback on North Road

It is understood that Department of Transport has no plans for further widening of North Road adjacent to the site to facilitate segregated transit and bicycle lanes.

5.2. Department of Transport

I refer to the letter issued by the Department of Transport (DoT) to Glen Eira City Council on 21 October 2019, which provides a response to the Comprehensive Development Plan, Development Contributions Plan, Structure Plan and other background documentation relevant to the amendment.

As I understand it, DoT is supportive of the intended vision for the precinct however DoT has provided Council with a number of amendments to be incorporated in the Comprehensive Development Plan, albeit minor in nature (i.e. minor text changes).

With respect to the ***Fundamental Scope Issues*** in the letter, DoT raised issues in relation to three intersections as follows:

5.2.1. North Road / East Boundary Road / Murrumbeena Road

I agree with DoT that the extent of the third westbound lane is not required to extend as far as originally proposed and that there may be opportunity to further extend the length of the right turn lane on North Road (west approach). Notwithstanding it is noted that the GTA 2018 report did still propose an extension of the existing third westbound lane to a total length of 150m. The right turn lane could be extended as far as practicable to ensuring the North Road / East Boundary Road / Murrumbeena Road intersection operates satisfactorily following development of East Village.

As this is an existing intersection which has extensive existing over-queuing of the right turn lane on North Road, it is my opinion that the right turn lane should be extended as far as practical up to a length that can accommodate the anticipated right turn queue. As such I do not agree with the assertion that DCP should fund an extension of the right turn lane to accommodate the anticipated queue and a deceleration length of 55m.

5.2.2. North Road Cobar Street / Crosbie Road

It is acknowledged that there is an existing left turn lane from North Road into Crosbie Road. I have no objection to retaining that left turn lane to replicate the existing condition noting the proposed development is not expected to increase the traffic movements undertaken this left turn.

In relation to the left turn lane on the east approach it is my opinion that the left turn lane should be extended as far as practical up to 75m in length as required by DoT subject to review of services.

5.2.3. East Boundary Road / South Drive

In relation to the East Boundary Road/South Drive signalised intersection, DoT has indicated that the right turn deceleration lane from East Boundary Road into South Drive should be further extended by approximately 20m to satisfy the total deceleration lane length that includes storage and the deceleration lane length requirement.

I agree with the above in principle and am of the view that new signalised intersections should be designed to accommodate the anticipated queue length and the deceleration lane length requirement as far as practicable within the site constraints.

5.2.4. Technical Design Issues

With respect to the Technical Design Issues in DoT's letter, these are considered to be more detailed in nature and would be addressed at functional design stage.

6. SUMMARY OF OPINION AND OTHER STATEMENTS

6.1. Summary of Opinion

Based on the analysis and discussions presented within this evidence, the following is a summary of my opinion:

1. The East Village Movement and Access report (GTA 2018 report) appropriately addresses the transport implications of the proposed rezoning.
2. The concept layout plans included in the GTA 2018 report should be modified to reflect the intersection analysis as follows:
    - The third southbound lane on East Boundary Road is required to only extend for 60m south of South Drive whereas the concept layout has the lane extending to Parkmore Road which is located approximately 400m south of South Drive.
    - The third westbound lane on North Road is required to only extend for 150m west of East Boundary Road whereas the concept layout has the lane extending to Koornang Road which is located approximately 680m west of East Boundary Road.
3. The signalisation of the Murrumbeena Road / Crosbie Road / Leila Road intersection is not considered necessary or appropriate subject to demonstrating that development traffic can access the arterial road network without reliance upon Crosbie Road. Signalisation of this intersection would be likely to induce additional through traffic to utilise Crosbie Road as an alternative to turning right from North Road into Murrumbeena Road.
4. It is considered appropriate to convert Cobar Street exit to a separate left turn and right turn lane and redistribute traffic previously assumed to travel north up Crosbie Road to instead turn right into North Road. Analysis indicates that this intersection configuration can operate appropriately.
5. The provision of left turn deceleration lanes at Murra Street and Carey Street are not considered necessary within the DCP given that the traffic analysis assumes all traffic can access East Village via the proposed three signalised intersections. Murra Street and Carey Street are assumed to retain their existing function as local streets.
6. While it is inevitable that some services will require relocation to facilitate the required works, it is appropriate to refine the concept layout designs to respond to identified services and minimise the extent of service relocation as much as is practicable without impacting on the required road capacity or design standards.
7. It is my understanding that the cost estimates provided for service relocations are very preliminary in nature and are highly conservative. As such it is recommended that formal costing advice be sought from the relevant service authorities for any required service relocations for inclusion in the DCP along with any changes to the proposed concept plans.
8. The East Village Comprehensive Development Plan is considered appropriate noting the recommended amendments to G36, G46, R8 and R14 as set out in Section 3.3 of my Evidence.

9. Schedule 2 to Clause 37.02 Comprehensive Development Zone (CDZ2) is considered appropriate noting the recommended amendments as set out in Section 4 of my Evidence.

Accordingly, I can see no reason on traffic engineering grounds why Amendment C155 should not be recommended for approval subject to a further review of the concept layout plans and associated Development Contribution Plan costings.

6.2. Other Statements

10. No opinion provided in this evidence is provisional.
11. No questions or statements outside of my expertise have been addressed in this evidence.
12. This evidence is not incomplete or inaccurate.

Declaration

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

Simon Davies
Director

22 November 2019

A.SIMON DAVIES CURRICULUM VITAE

A

SIMON DAVIES

Director, Regional Head VIC

BE (Hons), Environmental
Monash University 1999

MY STORY

I am a transport engineer with 20 years' experience predominantly in Victoria and Queensland. Since commencing as a graduate engineer at GTA in 1999 I have developed a breadth of knowledge and experience in all facets of transport and traffic engineering. I am a project director who leads multi-disciplinary transport teams for private and public sector clients.

I have specialist skills in major event transport plan and transport impact assessments associated with statutory planning applications. I also regularly present traffic and transport engineering expert evidence at VCAT and Panels Victoria.

'I have a passion for achieving the best outcome for all stakeholders'

SELECTED PROJECT EXPERIENCE

Australian Formula 1 Grand Prix (2000 – 2019) – Melbourne
Role: Project Director
GTA has played an integral role in preparing the transport plan for the Australian Grand Prix since 1997. This has included liaising with stakeholders, superintendent and auditing of implemented treatments and trouble-shooting issues that arose during the event including providing transport and traffic advise to AGPC, Councils and road authorities. Simon has been the Project Director for the past 10 years having been involved in delivering more than 20 successful events.

Kaufland Supermarket introduction to Victoria - Melbourne
Role: Project Director
Kaufland has recently commenced operations in Australia with an application of an initial six stores in Melbourne currently being considered by an Advisory Committee. GTA was engaged to provide due diligence advice to Kaufland for each store and subsequently prepare traffic impact assessments for each site. A major challenge was the fact that Kaufland did not previously operate in Australia so the operating environment was unknown and could not be surveyed. Simon was retained to provide specialised transport engineering evidence at the Advisory Committee for the first six stores.

Herald-Sun/Citylink Run for the Kids (2006 – 2019) – Melbourne
Role: Project Director
Simon has provided advice to the Run for the Kids transport committee since its inception including providing advice regarding various iterations of the event route and the preparation of associated transport and traffic plans. This has meant intensive liaison with transport stakeholders impacted by the event route to ensure the optimum outcome is achieved for stakeholders, event participants and the wider community.

Caulfield Village Redevelopment - Melbourne
Role: Project Director
Caulfield Village is a staged mixed-use development located adjacent to Caulfield Racecourse. The project is comprised of detailed transport modelling, detailed layout and access advice and external road network mitigation works. Simon has been involved in extensive liaison and negotiation with relevant road and transport authorities and provided expert transport and traffic evidence at VCAT.

Moonee Valley Racecourse Redevelopment – Melbourne
Role: Project Director
Moonee Valley Racecourse Redevelopment comprises a mixed-use development on the site of the existing members car park and grandstand and includes the construction of a new track and grandstand. Simon was originally involved in the preparation of the Integrated Transport Plan for the masterplan and now provides advice for the individual town planning applications and temporary transport management arrangements for racecourse operations during construction.

SKILLS & EXPERTISE

- Transport Engineering
- Major Event Transport Management Planning and Design
- Construction Transport Management Planning and Design
- Peer Review and Expert Witness

MEMBERSHIPS AND AFFILIATIONS

Victorian Planning & Environmental Law (VPELA)

Australian Institute of Traffic Planning & Management (AITPM)Member/Fellow of Institution

ADDITIONAL RELEVANT EXPERIENCE

Craigieburn Town Centre – Melbourne
Role: Project Director
Craigieburn Town Centre was a major retail centre that was developed and built within what was previously a green field site with limited surrounding road infrastructure in the north of Melbourne. Simon was involved in liaison and negotiation with Council, VicRoads and PTV in relation to appropriate transport infrastructure including construction of Aitken Boulevard, bus priory treatments and interchange location/design, and the internal layout and design of the town centre. Simon continues to provide advice to the asset owner in relation to ongoing upgrades/changes to the town centre.

RMIT Graduation Parade (2015 – onwards) - Melbourne
Role: Project Director
The RMIT Graduation parade is an opportunity for all graduating students to march from the RMIT city campus in La Trobe Street along Swanston Street to Federation Square. GTA has provided advice to the organising committee including liaison with Victoria Police, Yarra Trams, VicRoads and City of Melbourne to prepare a transport plan to facilitate the event and minimise disruption to the community.

Berrybank Wind Farm - Victoria
Role: Project Director
The Berrybank Wind Farm is a proposed 79 turbine windfarm in Western Victoria. I was engaged to undertake a peer review of the transport management plan prepared for the construction of the windfarm and present expert transport evidence at Panels Victoria.

B. UPDATED CONCEPT LAYOUT PLANS

B

RESIDENTIAL

NORTH

ROAD

5.3 (E)
1.4 (E)
4.0 (E)
3.3 (E)
4.0
3.5
4.0
1.4 (E)
5.3 (E)

5.3 (E)
1.4 (E)
4.0 (E)
3.4 (E)
1.8
3.3
3.3
3.1
1.2 (E)
5.5 (E)

3.3 (E)

FOR CONTINUATION REFER TO SHEET 04

RESIDENTIAL

COMMERCIAL

MURRONG AVENUE

N

MAP REF 68/K9

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DESIGN CHECK	-
APPROVED BY	-
DATE ISSUED	20 NOVEMBER 2019

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EAST VILLAGE DEVELOPMENT
NORTH ROAD
WEST OF MURRUMBEENA ROAD
CONCEPT LAYOUT (DBYD SERVICES UNDERLAY)

DRAWING NO. V136080-04-03 SHEET 3 OF 12 ISSUE P2

DESIGN NOTES:

1. DESIGN VEHICLE - 25.0m AUSTROADS B-DOUBLE (GAZETTED B-DOUBLE ROUTE)

FOR CONTINUATION REFER TO SHEET 11

NOTE: POSSIBLE FUTURE ON-ROAD NORTH-SOUTH BICYCLE LANE FEASIBILITY TO BE INVESTIGATED AND CONFIRMED AT LATER DATE, BY OTHERS.

MURRUMBEENA ROAD

PROPOSED DEVELOPMENT

DUNCAN MACKINNON RESERVE

ROAD

NORTH

45m AND 92m STORAGE

110m STORAGE

FOR CONTINUATION REFER TO SHEET 03

FOR CONTINUATION REFER TO SHEET 05

EXISTING PROPOERTY BOUNDARY

150m STORAGE PER LANE

EAST BOUNDARY ROAD

COMMERCIAL

EAST VILLAGE (PROPOSED DEVELOPMENT)

FOR CONTINUATION REFER TO SHEET 10

MAP REF 68/K9

N

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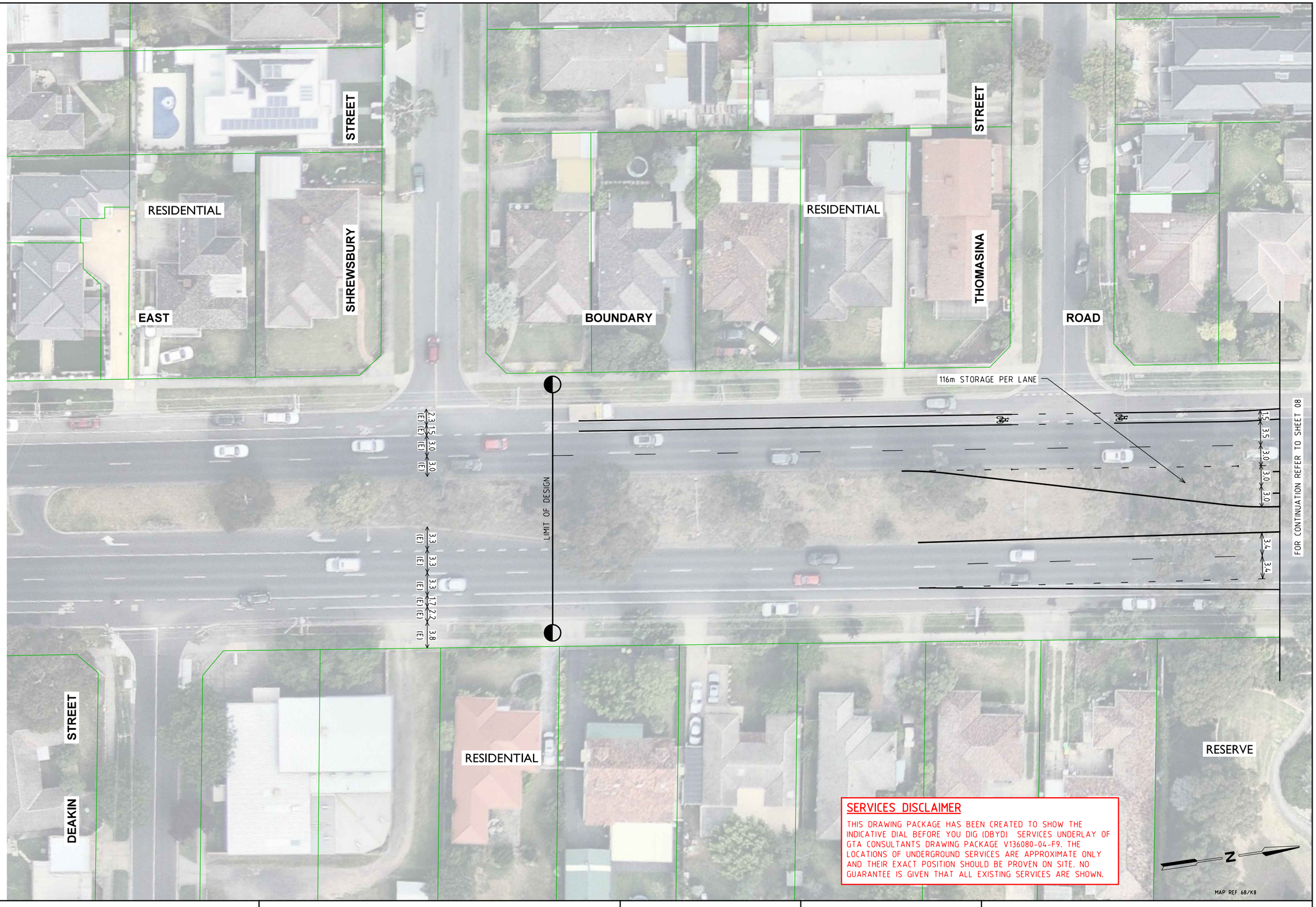
EAST VILLAGE DEVELOPMENT
NORTH ROAD AND MURRUMBEENA ROAD SIGNALISED INTERSECTION
CONCEPT LAYOUT (DBYD SERVICES UNDERLAY)

DRAWING NO. V136080-04-04 SHEET 4 OF 12 ISSUE P2



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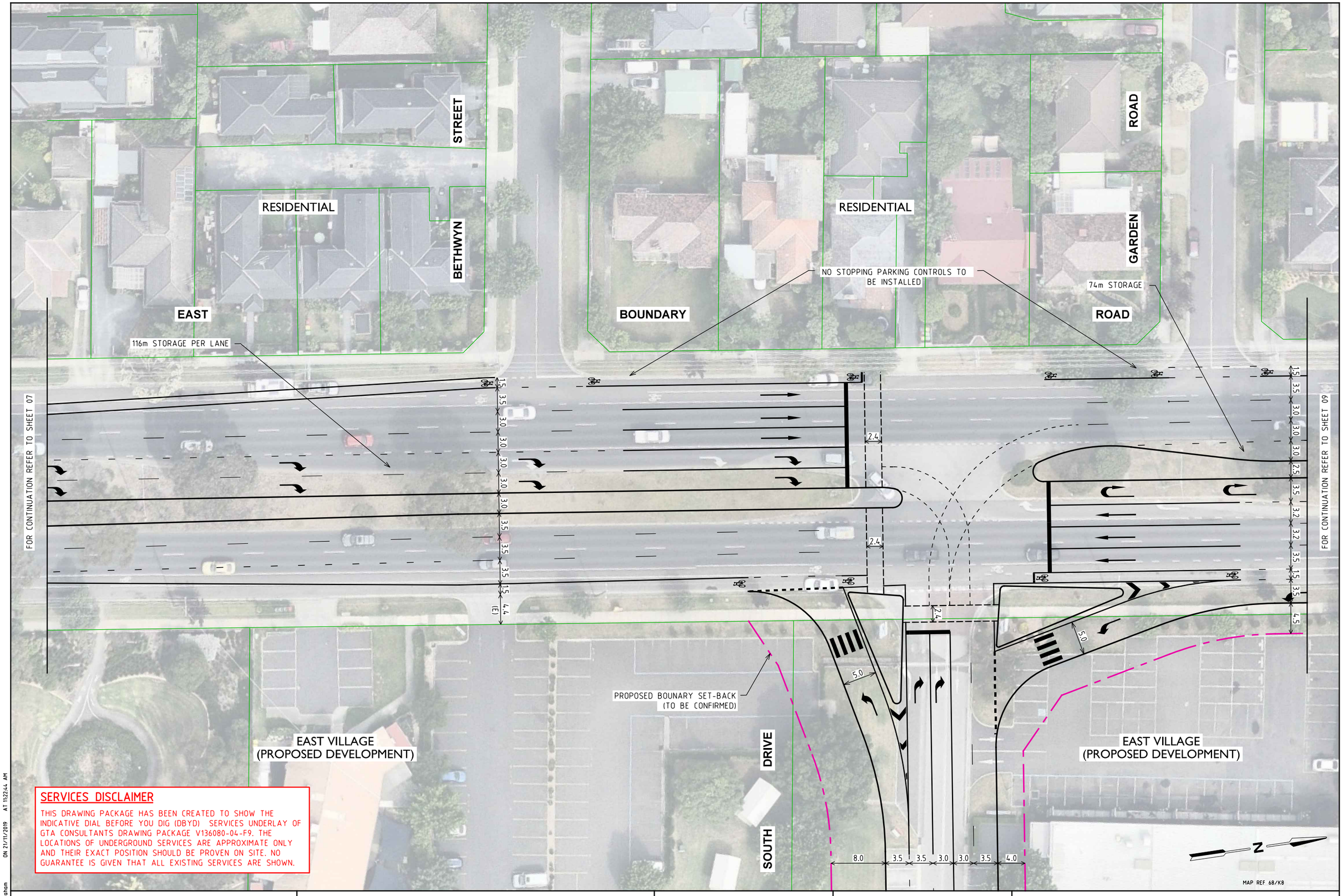
EAST VILLAGE DEVELOPMENT
EAST BOUNDARY ROAD AND DEAKIN STREET SOUTH OF SOUTH DRIVE
CONCEPT LAYOUT (DBYD SERVICES UNDERLAY)

DRAWING NO. V136080-04-07 SHEET 7 OF 12 ISSUE P2



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APPROVED BY -	DATE ISSUED 20 NOVEMBER 2019

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EAST VILLAGE DEVELOPMENT
EAST BOUNDARY ROAD AND SOUTH DRIVE
SIGNALISED INTERSECTION
CONCEPT LAYOUT (DBYD SERVICES UNDERLAY)

DRAWING NO. V136080-04-08 SHEET 8 OF 12 ISSUE P2

C. COBAR STREET / NORTH ROAD ALTERNATE SIDRA ANALYSIS

C

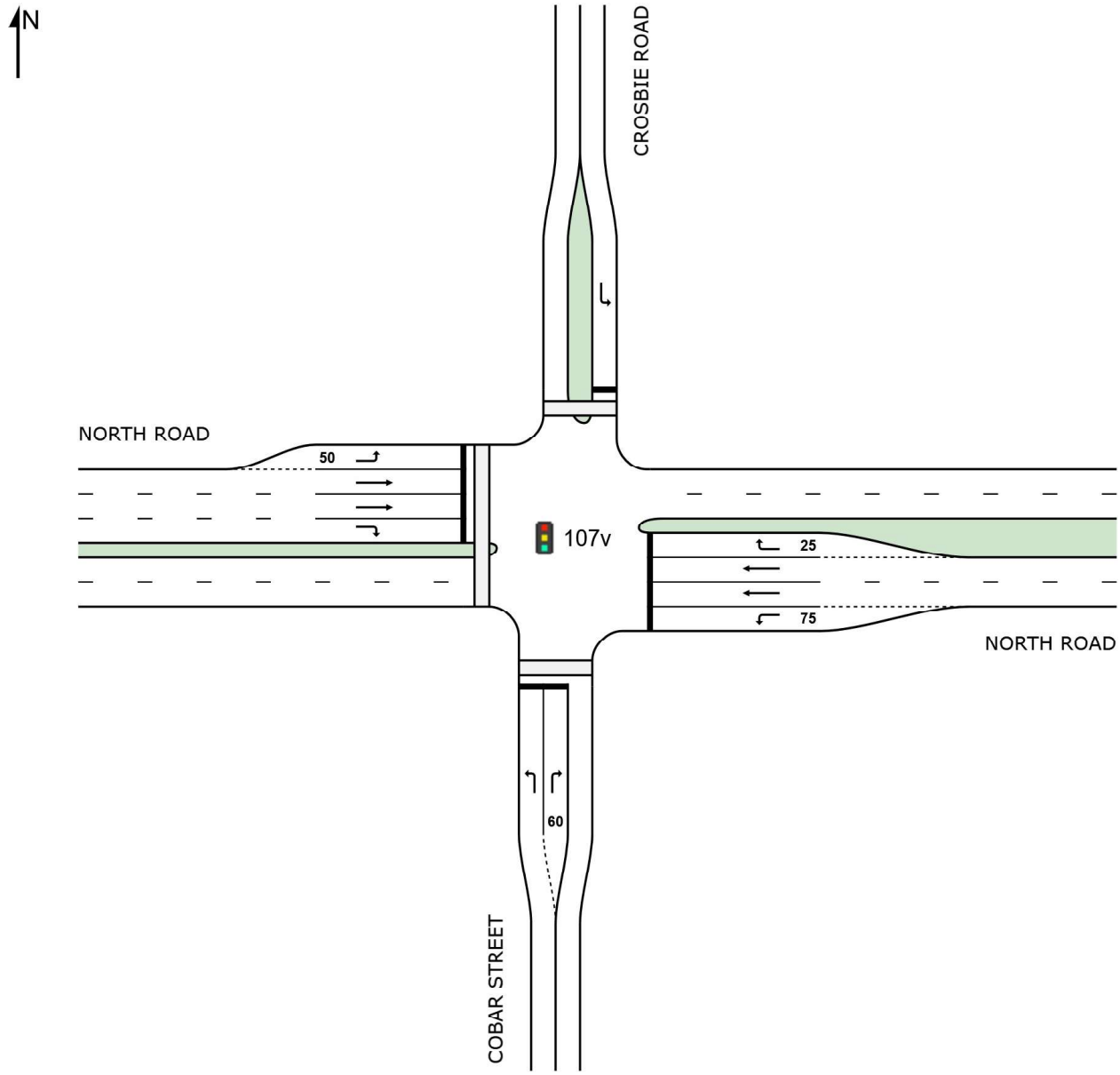
Site: 107v [7. NORTH ROAD / CROSBIE ROAD / COBAR STREET - Signals]

Network: 1 [Master Model]

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

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Opposed Turns
Reference Phase: Phase A
Input Phase Sequence: A, C, D1, D2*, D3*
Output Phase Sequence: A, C, D1, D2*
(* Variable Phase)

Site Layout



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: COBAR STREET														
1	L2	133	0.0	133	0.0	0.299	43.4	LOS D	6.7	46.8	0.86	0.75	0.86	20.7
3	R2	172	0.6	172	0.6	0.804	69.8	LOS E	11.5	81.0	1.00	0.93	1.19	16.1
Approach		304	0.3	304	0.3	0.804	58.2	LOS E	11.5	81.0	0.94	0.85	1.05	17.8
East: NORTH ROAD														
4	L2	146	1.4	146	1.4	0.108	9.2	LOS A	2.1	15.0	0.30	0.65	0.30	45.0
5	T1	1792	3.8	1792	3.8	0.821	18.4	LOS B	40.6	293.3	0.77	0.72	0.77	41.6
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	0.821	19.7	LOS B	40.6	293.3	0.75	0.71	0.75	40.9
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	0.018	11.6	LOS B	0.3	2.4	0.26	0.62	0.26	45.2
11	T1	1738	2.1	1738	2.1	0.665	14.9	LOS B	34.4	244.8	0.65	0.67	0.65	25.3
12	R2	180	0.6	180	0.6	0.791	71.3	LOS E	11.9	83.7	1.00	0.87	1.16	19.2
Approach		1941	1.9	1941	1.9	0.791	20.1	LOS C	34.4	244.8	0.68	0.69	0.69	23.5
All Vehicles		4312	2.5	4312	2.5	0.821	23.3	LOS C	40.6	293.3	0.73	0.71	0.75	32.4

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.

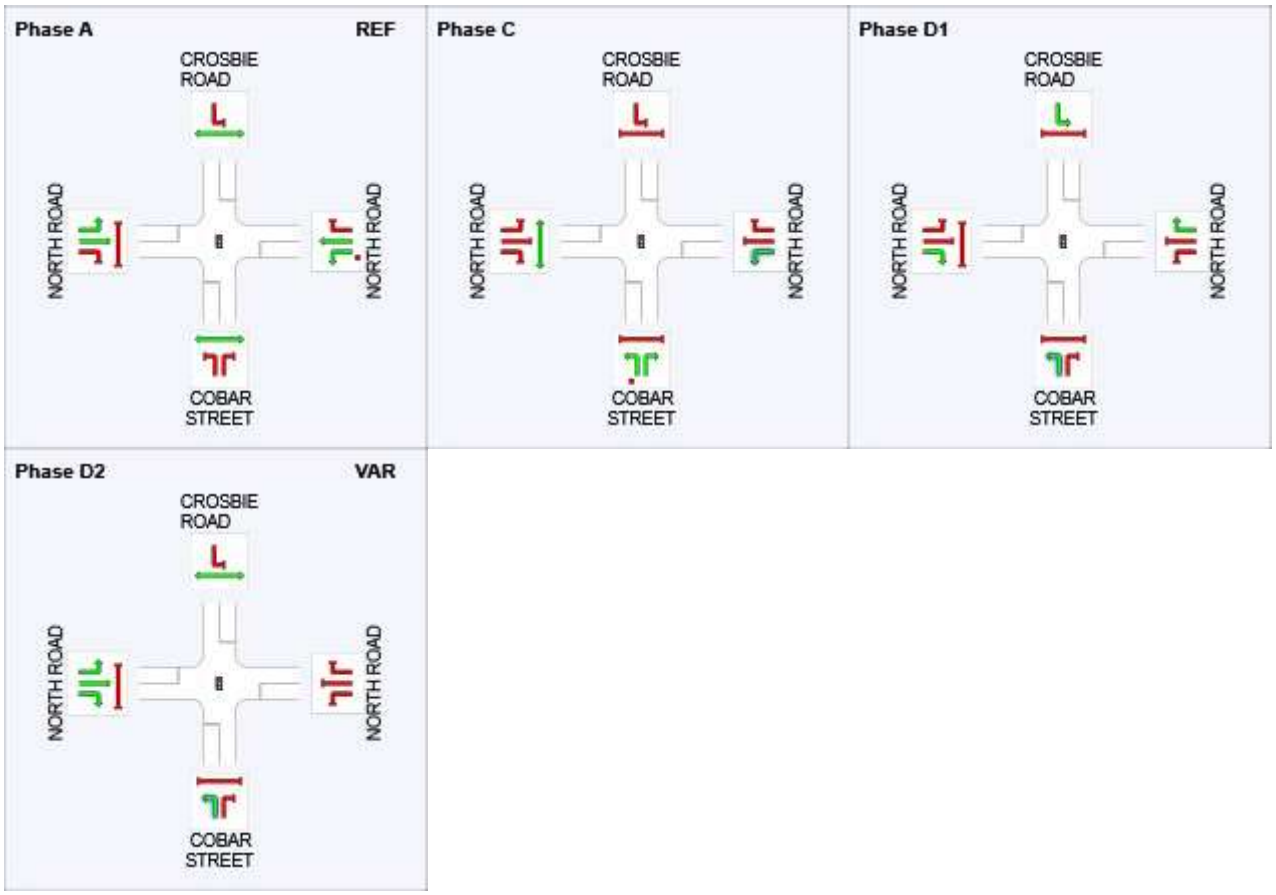
Lane Use and Performance

	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: COBAR STREET															
Lane 1	133	0.0	133	0.0	443	0.299	100	43.4	LOS D	6.7	46.8	Full	500	0.0	0.0
Lane 2	172	0.6	172	0.6	213	0.804	100	69.8	LOS E	11.5	81.0	Short	60	0.0	NA
Approach	304	0.3	304	0.3		0.804		58.2	LOS E	11.5	81.0				
East: NORTH ROAD															
Lane 1	146	1.4	146	1.4	1358	0.108	100	9.2	LOS A	2.1	15.0	Short	75	0.0	NA
Lane 2	885	3.8	885	3.8	1079[1]	0.821	100	18.2	LOS B	38.9	280.8	Full	680	0.0	0.0
Lane 3	906	3.8	906	3.8	1104[1]	0.821	100	18.6	LOS B	40.6	293.3	Full	680	0.0	0.0
Lane 4	72	0.0	72	0.0	114	0.626	100	74.0	LOS E	4.7	33.1	Short	25	0.0	NA
Approach	2009	3.5	2009	3.5		0.821		19.7	LOS B	40.6	293.3				
North: CROSBIE ROAD															
Lane 1	57	0.0	57	0.0	114	0.497	100	72.8	LOS E	3.7	25.9	Full	510	0.0	0.0
Approach	57	0.0	57	0.0		0.497		72.8	LOS E	3.7	25.9				
West: NORTH ROAD															
Lane 1	23	0.0	23	0.0	1271	0.018	100	11.6	LOS B	0.3	2.4	Short	50	0.0	NA
Lane 2	862	2.1	862	2.1	1298[1]	0.665	100	11.9	LOS B	25.7	183.3	Full	150	0.0	23.2
Lane 3	875	2.1	875	2.1	1317	0.665	100	17.7	LOS B	34.4[N4]	244.8[N4]	Full	150	0.0	50.0
Lane 4	180	0.6	180	0.6	228	0.791	100	71.3	LOS E	11.9	83.7	Full	150	0.0	0.0
Approach	1941	1.9	1941	1.9		0.791		20.1	LOS C	34.4	244.8				
Intersection	4312	2.5	4312	2.5		0.821		23.3	LOS C	40.6	293.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
N4 Average back of queue has been restricted to the available queue storage space.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

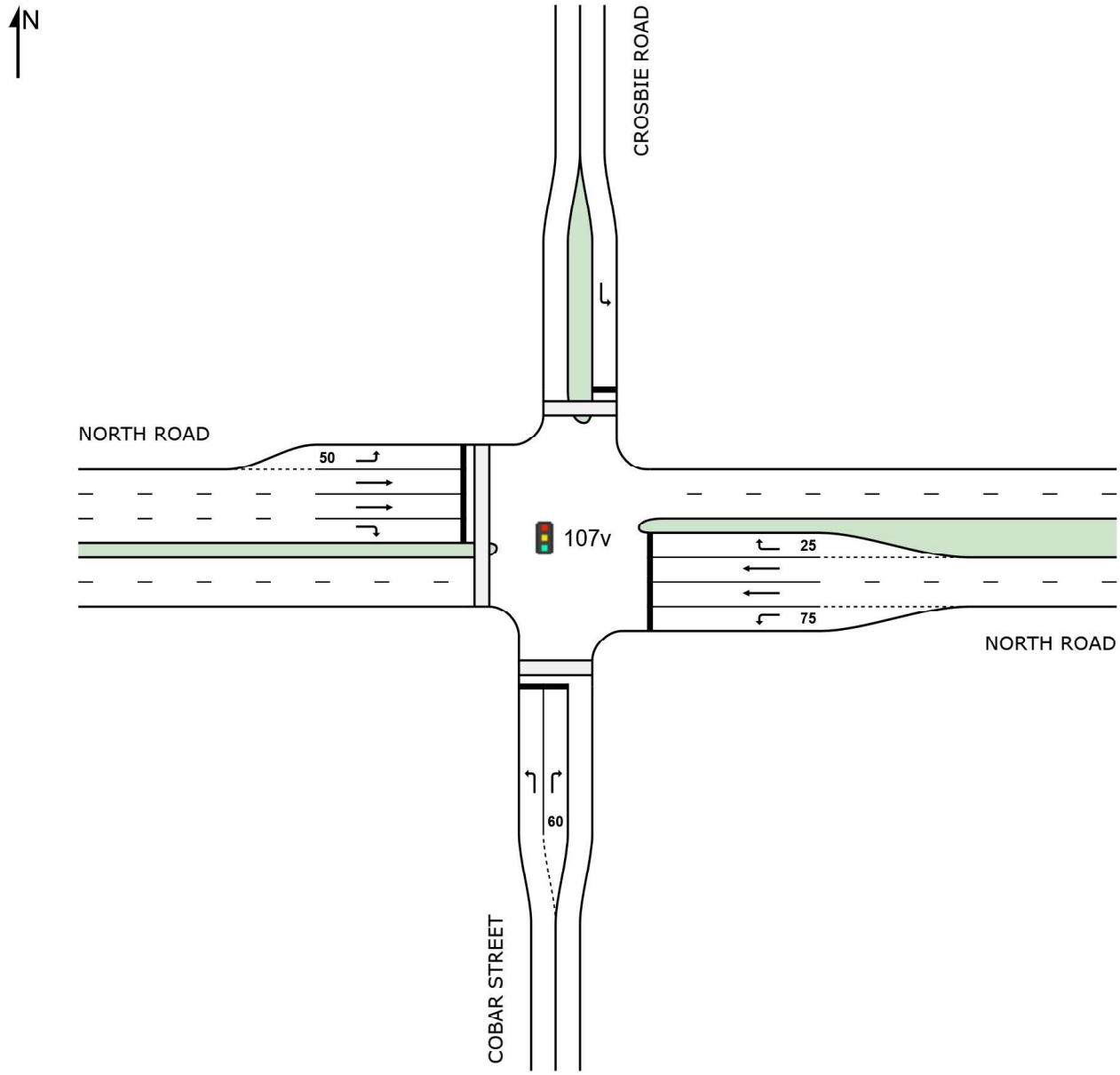
Site: 107v [7. NORTH ROAD / CROSBIE ROAD / COBAR STREET - Signals]

Network: 1 [Master Model]

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

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Opposed Turns
Reference Phase: Phase A
Input Phase Sequence: A, C, D1, D2*, D3*
Output Phase Sequence: A, C, D1, D2*
(* Variable Phase)

Site Layout



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: COBAR STREET														
1	L2	172	0.0	172	0.0	0.334	39.6	LOS D	8.3	58.0	0.84	0.76	0.84	21.6
3	R2	232	0.5	232	0.5	0.813	66.4	LOS E	15.4	108.0	1.00	0.93	1.16	16.5
Approach		403	0.3	403	0.3	0.813	55.0	LOS E	15.4	108.0	0.93	0.86	1.03	18.3
East: NORTH ROAD														
4	L2	87	2.4	87	2.4	0.065	9.0	LOS A	1.2	8.7	0.29	0.64	0.29	45.1
5	T1	1671	4.0	1671	4.0	0.802	21.2	LOS C	39.0	282.1	0.80	0.74	0.80	39.8
6	R2	64	0.0	64	0.0	0.375	67.3	LOS E	4.0	27.8	0.98	0.76	0.98	30.6
Approach		1822	3.8	1822	3.8	0.802	22.2	LOS C	39.0	282.1	0.79	0.74	0.79	39.4
North: CROSBIE ROAD														
7	L2	119	0.0	119	0.0	0.694	70.9	LOS E	7.7	54.2	1.00	0.83	1.09	18.5
Approach		119	0.0	119	0.0	0.694	70.9	LOS E	7.7	54.2	1.00	0.83	1.09	18.5
West: NORTH ROAD														
10	L2	43	0.0	43	0.0	0.038	15.8	LOS B	1.0	7.3	0.41	0.66	0.41	45.3
11	T1	1677	2.1	1677	2.1	0.721	19.1	LOS B	36.7	261.7	0.74	0.73	0.74	35.6
12	R2	177	0.6	177	0.6	0.777	70.7	LOS E	11.6	81.9	1.00	0.87	1.15	23.6
Approach		1897	1.9	1897	1.9	0.777	23.8	LOS C	36.7	261.7	0.76	0.74	0.77	32.8
All Vehicles		4241	2.5	4241	2.5	0.813	27.4	LOS C	39.0	282.1	0.79	0.75	0.81	33.0

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.

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: COBAR STREET															
Lane 1	172	0.0	172	0.0	514	0.334	100	39.6	LOS D	8.3	58.0	Full	500	0.0	0.0
Lane 2	232	0.5	232	0.5	285	0.813	100	66.4	LOS E	15.4	108.0	Short	60	0.0	NA
Approach	403	0.3	403	0.3		0.813		55.0	LOS E	15.4	108.0				
East: NORTH ROAD															
Lane 1	87	2.4	87	2.4	1348	0.065	100	9.0	LOS A	1.2	8.7	Short	75	0.0	NA
Lane 2	839	4.0	839	4.0	1047[1]	0.802	100	21.3	LOS C	39.0	282.1	Full	680	0.0	0.0
Lane 3	831	4.0	831	4.0	1036[1]	0.802	100	21.1	LOS C	38.3	277.1	Full	680	0.0	0.0
Lane 4	64	0.0	64	0.0	171	0.375	100	67.3	LOS E	4.0	27.8	Short	25	0.0	NA
Approach	1822	3.8	1822	3.8		0.802		22.2	LOS C	39.0	282.1				
North: CROSBIE ROAD															
Lane 1	119	0.0	119	0.0	171	0.694	100	70.9	LOS E	7.7	54.2	Full	510	0.0	0.0
Approach	119	0.0	119	0.0		0.694		70.9	LOS E	7.7	54.2				
West: NORTH ROAD															
Lane 1	43	0.0	43	0.0	1143	0.038	100	15.8	LOS B	1.0	7.3	Short	50	0.0	NA
Lane 2	824	2.1	824	2.1	1143[1]	0.721	100	18.8	LOS B	34.5	245.9	Full	370	0.0	0.0
Lane 3	853	2.1	853	2.1	1184	0.721	100	19.3	LOS B	36.7	261.7	Full	370	0.0	0.0
Lane 4	177	0.6	177	0.6	228	0.777	100	70.7	LOS E	11.6	81.9	Full	370	0.0	0.0
Approach	1897	1.9	1897	1.9		0.777		23.8	LOS C	36.7	261.7				
Intersection	4241	2.5	4241	2.5		0.813		27.4	LOS C	39.0	282.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
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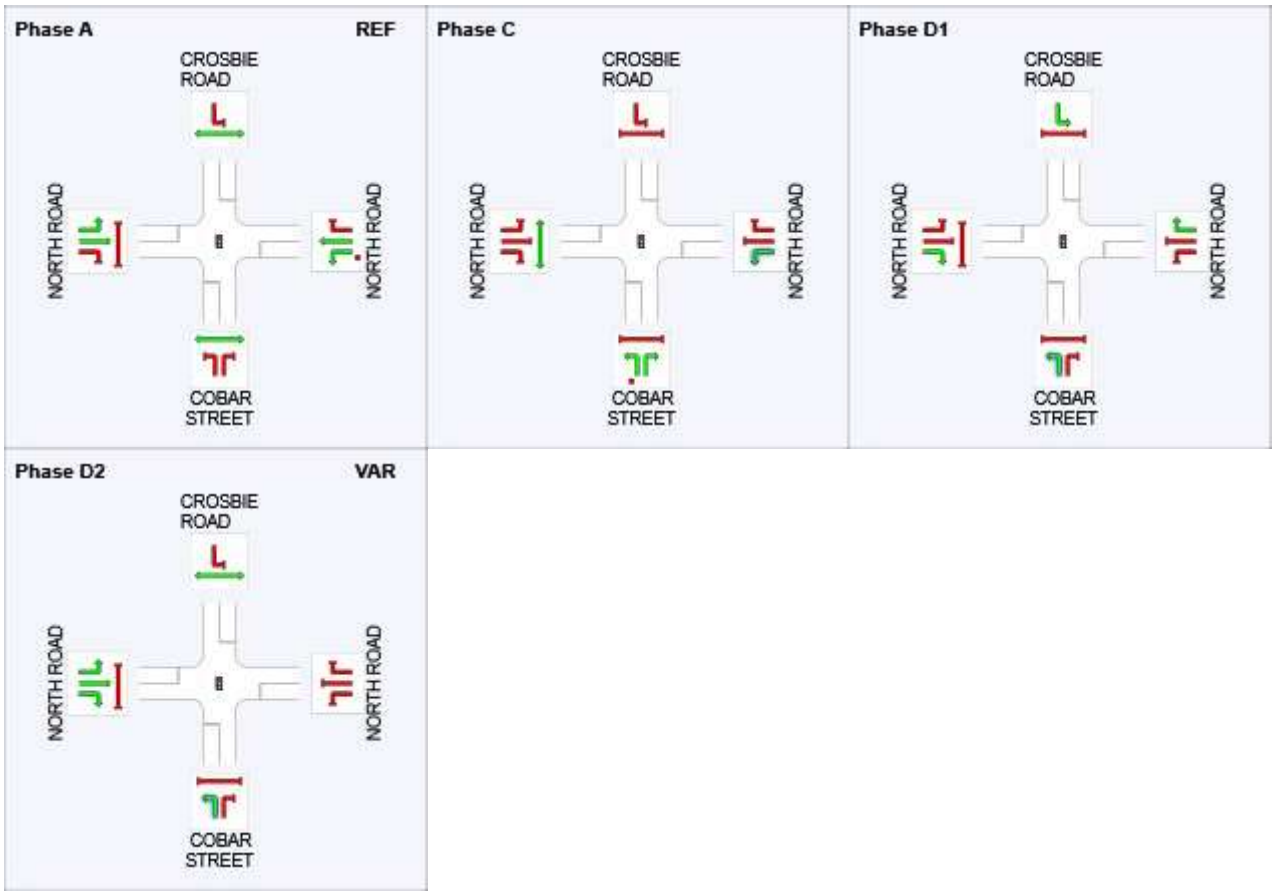

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