Precinct 15
Blackshaws Road
Altona North
Development / Structure Plan
Transport Assessment

transportation planning, design and delivery

14M1544000 23/03/15

GTAconsultants

Precinct 15

Blackshaws Road, Altona North

Development / Structure Plan Transport Assessment

Issue: C 23/03/15

Client: Precinct 15 Land Owners
Reference: 14M1544000
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Quality Record

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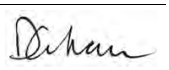
C	23/03/15	Revised Final	Alex Blackett	David Graham	David Graham	

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1. Introduction

1.1 Background

Amendment C33 to the Hobsons Bay Planning Scheme was prepared in 2007 and approved on 23 December 2008. It forms part of a review of the Industrial Land Management Strategy and Industrial Development Design Guidelines for a number of Strategic Redevelopment Areas where rezoning from industrial use is likely to occur within the municipality.

One of these areas is Precinct 15, which is an irregularly shaped piece of land located in Altona North and generally bound by Blackshaws Road to the south, New Street to the east, West Gate Freeway to the north and Kyle Road to the west.

Approval is now being sought for a Development / Structure Plan to guide the development and future use of Precinct 15. This is proposed to generally consist of its rezoning from and industrial use to a predominately residential use. The proposed development is likely to incorporate 3,000 dwellings and a mixed use area, including the potential for a neighbourhood activity centre of up to 5,550sqm of retail floor space.

GTA Consultants has been involved with the development of the Precinct 15 Development / Structure Plan over a number of years, and most recently was commissioned on behalf of the Precinct 15 land owners in June 2014 to provide traffic engineering and transport planning services regarding the Development /Structure Plan.

1.2 Purpose of this Report

This report sets out an assessment of the anticipated traffic and transport implications of the proposed rezoning and development of Precinct 15, including consideration of the:

i existing road network and traffic conditions surrounding the site
ii accessibility of the site by public and active transport modes
iii traffic generation characteristics of the proposed development
iv internal road hierarchy and proposed access arrangements for the site
v existing and future public transport facilities and provisions
vi existing and future bicycle and walking facilities and provisions
vii impact of the development proposal on the surrounding transport network.

The assessment also compares the development against the relevant sections of Clause 56 of the Hobsons Bay Planning Scheme, which includes a number of provisions made up of objectives and standards for implementation within the design of a new subdivision. The Clause states the following in respect to objectives and standards:

- *"**Objectives**. An objective describes the desired outcome to be achieved in the completed subdivision.*
- ***Standards**. A standard contains the requirements to meet the objective.*

A standard should normally be met. However, if the responsible authority is satisfied that an application for an alternative design solution meets the objective, the alternative design solution may be considered."

The relevant traffic and access areas of Clause 56 that will be considered within this report are included within the following sub clauses:

- Clause 56.01 – Subdivision site and Context Description and Design Response

- Clause 56.06 – Access and Mobility Management.

It is noted that some areas of Clause 56.01 and 56.06 are not within the realms of the expertise of traffic engineers or possible to be considered at the planning stage of the development and therefore would be assessed by the relevant consultants at the appropriate time.

It is important to emphasise that as a Development Plan is being sought in the first instance, the nominated development uses and associated access strategy for the site are still being considered and are subject to change. Accordingly, the analysis contained in this document is directed at assisting the Responsible Authority in identifying key traffic development parameters, rather than involving a comprehensive analysis of a specific design which is likely to change as development details are subsequently refined.

Nevertheless, it is anticipated that the various traffic issues which have been investigated and are documented in this report will provide necessary technical information to assist with the further assessment of the site.

1.3 References

In preparing this report, a number of references have been made, including:

- Hobsons Bay Planning Scheme
- Concept plans for the proposed draft Development Plan prepared by Tract
- traffic and car parking surveys undertaken by GTA Consultants as referenced in the context of this report
- Community Information Session on Monday 2 July 2012 at the Paxton Street Community Centre, South Kingsville
- 'Without Prejudice comments on GTA Structure Plan assessment (Draft)' issued by Hobsons Bay City Council, dated 24/08/12
- reports prepared by GTA Consultants for the Precinct 15 / Caltex site
- various technical data as referenced in this report
- an inspection of the site and its surrounds
- other documents as nominated.

2. Transport Policy

2.1 Strategic Context

There are a number of key State Government policy documents applicable to the subject land which provides guidance on appropriate land use and development. Those that are relevant in the context of transport planning are as follows:

- Plan Melbourne
- SmartRoads Policy
- Transport Integration Act (2010)

These documents along with a number of relevant policies and strategic studies are discussed below.

2.2 Plan Melbourne

The Victorian Government released the Metropolitan Planning Strategy, Plan Melbourne (The Plan) on 20 May 2014. The Plan is intended to guide Melbourne's housing, commercial and industrial development through to 2050.

The Plan includes the following key concepts to cater for the anticipated population growth:

i delivering a new 'integrated economic triangle', connecting key employment clusters, industrial precincts and economic gateways
ii protecting the suburbs by delivering density in defined locations
iii strengthening regional cities – distributing future growth to benefit all of Victoria (regional projects)
iv delivering a pipeline of large scale, city shaping infrastructure and urban renewal projects
v better use of existing assets, including increasing efficiency of road based transport and transport – land use integration
vi 20 minute neighbourhoods - places where people have access to local shops, schools, parks, jobs and a range of community services within 20 minutes of their home.

The Plan is underpinned by seven objectives and a range of supporting actions. The delivery of the Plan will be a central focus for the new Metropolitan Planning Authority, which was created in October 2013 alongside the release of the draft Plan Melbourne strategy.

The Plan identifies Altona North as an Activity Centre, which is located approximately 800m west of the site. As such, the subject site is already located proximate to a range of employment and services. This arrangement supports more efficient use of existing infrastructure and mode shift away from private vehicle use.

2.3 SmartRoads Policy

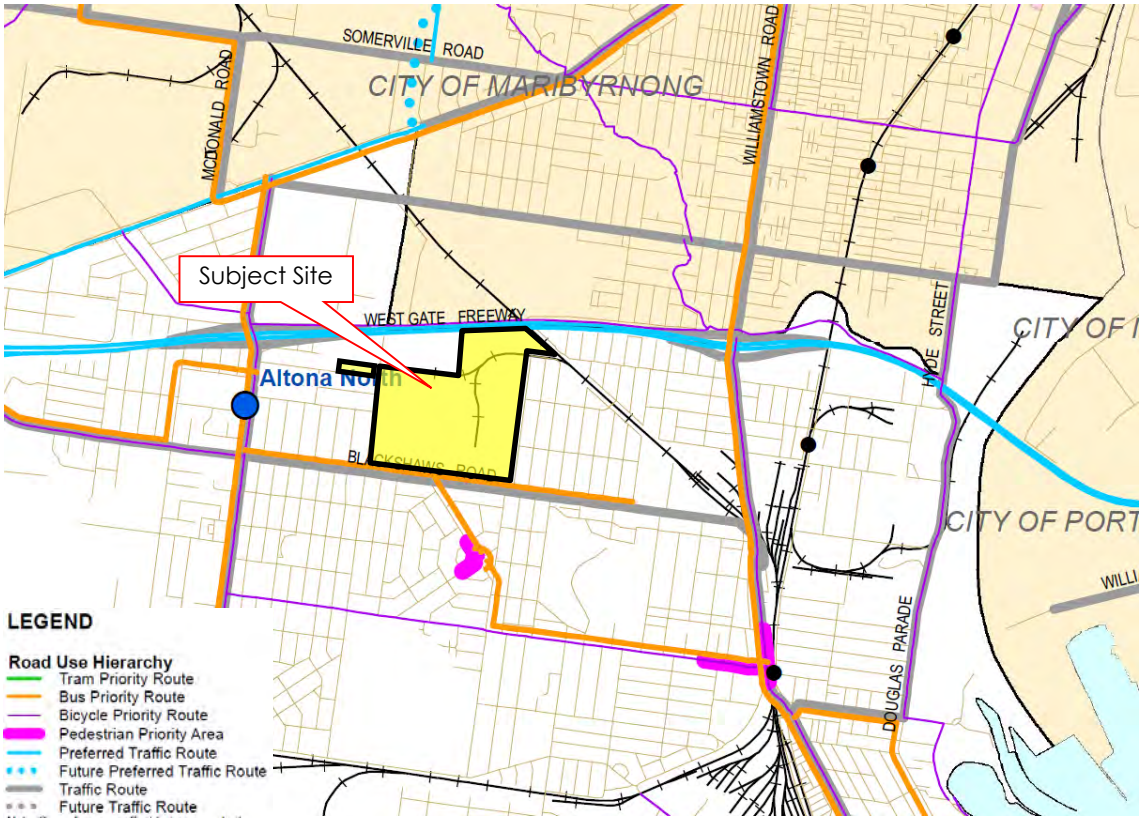
SmartRoads is a VicRoads policy which sets 'modal' priorities on the road network and underpins many of the strategies significant to the Victorian Transport Plan surrounding the issue of public transport prioritisation.

"SmartRoads is an approach that manages competing interests for limited road space by giving priority use of the road to different transport modes at particular times of the day."

All road users will continue to have access to all roads. However, certain routes will be managed to work better for cars while others will be managed for public transport, cyclists and pedestrians."[1]

The VicRoads SmartRoads Network Operating Plan for the area surrounding the subject site has been reproduced in Figure 2.1.

Figure 2.1: VicRoads SmartRoads Network Operating Plan – City of Hobsons Bay



Source: VicRoads Website (September 2014)

Figure 2.1 illustrates that Blackshaws Road, Millers Road and Melbourne Road (Williamstown Road) in the vicinity of the subject site are nominated as Other Traffic/Bus Priority routes, while the West Gate Freeway is nominated as a Preferred Traffic Route.

Based on VicRoads' website (September 2014), road use priority routes (for buses and trams) have been identified to ensure:

"Prioritise trams and buses on key public transport routes that link activity centres during morning and afternoon peak periods."

2.4 Transport Integration Act 2010

The Transport Integration Act is the primary transport statute for Victoria, and has caused significant change to the way transport and land use authorities make decisions and work together. The Act enshrines a triple bottom line approach to decision making about transport and land use.

The Act requires that all transport agencies work together to achieve an integrated and sustainable transport system, and that land use agencies such as the Department of Economic

[1] Sourced from VicRoads

Development, Jobs, Transport and Resources (DEDLTR) take account of transport issues in land use decisions. The Act has been effective to date in changing the focus of organisations that traditionally only considered a single transport mode.

The Act:

- unifies all elements of the transport portfolio to ensure that transport agencies work together towards the common goal of an integrated transport system
- provides a framework for integrated and sustainable transport policy and operations
- recognises that the transport system should be conceived and planned as a single system performing multiple tasks rather than separate transport modes
- integrates land use and transport planning and decision-making by extending the framework to land use agencies whose decisions can significantly impact on transport ("interface bodies")
- re-constitutes transport agencies and aligns their charters to make them consistent with the framework.

The Transport Integration Act forms an overarching legislative framework for transport related state planning policies and has been integrated within Clause 18 of the Victorian Planning Provisions.

2.5 State Planning Policy Framework (Clause 18 – Hobsons Bay Planning Scheme)

The State Planning Policy Framework contained within the Hobsons Bay Planning Scheme sets out a range of objectives and implementation strategies to guide development within the entire State of Victoria. Embedded within the Framework is a range of policies with the overall objective to increase the facilitation and integration of more sustainable transportation. For example:

Clause 18.01-1:

Objective:

"To create a safe and sustainable transport system by integrating land-use and transport."

Strategy:

"Develop transport networks to support employment corridors that allow circumferential and radial movements.
Plan urban development to make jobs and community services more accessible by:

- *Ensuring access is provided to developments in accordance with forecast demand, taking advantage of all available modes of transport and to minimise adverse impacts on existing transport networks and the amenity of surrounding areas.*
- *Coordinating improvements to public transport, walking and cycling networks with the ongoing development and redevelopment of the urban area.*
- *Concentrating key trip generators such as higher density residential development in and around Central Activities Districts, Principle, Major and Specialised Activity Centres on the Principle Public Transport Network.*
- *Requiring integrated transport plans to be prepared for all new major residential, commercial and industrial developments.*
- *Requiring the substantial increases in activity in employment corridors are connected to the Principle Public Transport Network.*
- *Providing routing, bus stop and interchange arrangements for public transport services in new development areas.*

- *Providing safe, convenient and direct pedestrian and cycling access to activity centres, public transport interchanges and other strategic redevelopment sites.*

Integrate public transport services and infrastructure into new development."

Clause 18.02-1:

Objective:

"To promote the use of sustainable personal transport."

Strategy:

"Encourage the use of walking and cycling by creating environments that are safe and attractive.
Develop high quality pedestrian environments that are accessible to footpath-bound vehicles such as wheelchairs, prams and scooters.
Ensure development provides opportunities to create more sustainable transport options such as walking, cycling and public transport.
Ensure cycling routes and infrastructure are constructed early in new developments."

The proposed redevelopment of Precinct 15 represents a prime opportunity to promote the visions of State Planning Policy, by encouraging mixed use development and the use of more sustainable forms of transport through the provision of suitable facilities within the site, such as sealed footpaths, shared paths and dedicated bicycle paths adjacent to the roads and through the open space areas. These facilities can be expected to be integrated with the existing active transport facilities and public transport services in the area through the following connections:

- Signalised pedestrian crossing facilities at the signalised intersections along Blackshaws Road.
- Shared path to the Federation Trail along Brunel Street and The Avenue, with there being a potential alternate more direct connection being considered via a pedestrian bridge over the railway at the northeast corner of the site.
- Shared path to Birmingham Street, as outlined in the Bay Strategic Bicycle Plan, to accommodate an off-road facility that will connect with the Spotswood Train Station.

Also, the potential for public transport bus services to travel through the site is being provided via the connector level road network should PTV chose to do so.

2.6 Local Planning Policy Framework (Clause 21.09 - Hobsons Bay Planning Scheme)

The Local Planning Policy Framework contained within the Hobsons Bay Planning Scheme sets out a range of objectives and implementation strategies to guide development with a more local focus within Hobsons Bay.

Clause 21.09 of the Hobsons Bay Planning Scheme sets out a range of objectives and implementation strategies to guide development within Hobsons Bay.

The Clause sets out a number of Transport and Mobility objectives, as follows:

- *"To provide access to, through and within the municipality by all modes of transport, including waling, cycling, public transport and private and commercial vehicles.*
- *To protect residential and other sensitive land uses from the adverse effects of vehicular traffic.*
- *To support increased use of public transport and an efficient network."*

Again, and as outlined above, Precinct 15 represents a prime opportunity to promote the visions of Local Planning Policy, by encouraging mixed use development and the use of more sustainable forms of transport through the provision of suitable facilities within the site, and integrating with the existing active transport facilities and public transport services in the area.

2.7 Strategic Studies

In addition to the policy documents outlined above, a number of strategic studies have been prepared by or on behalf of Hobsons Bay City Council and other relevant authorities over recent years. The studies which have direct relevance to Precinct 15 are discussed further as follows.

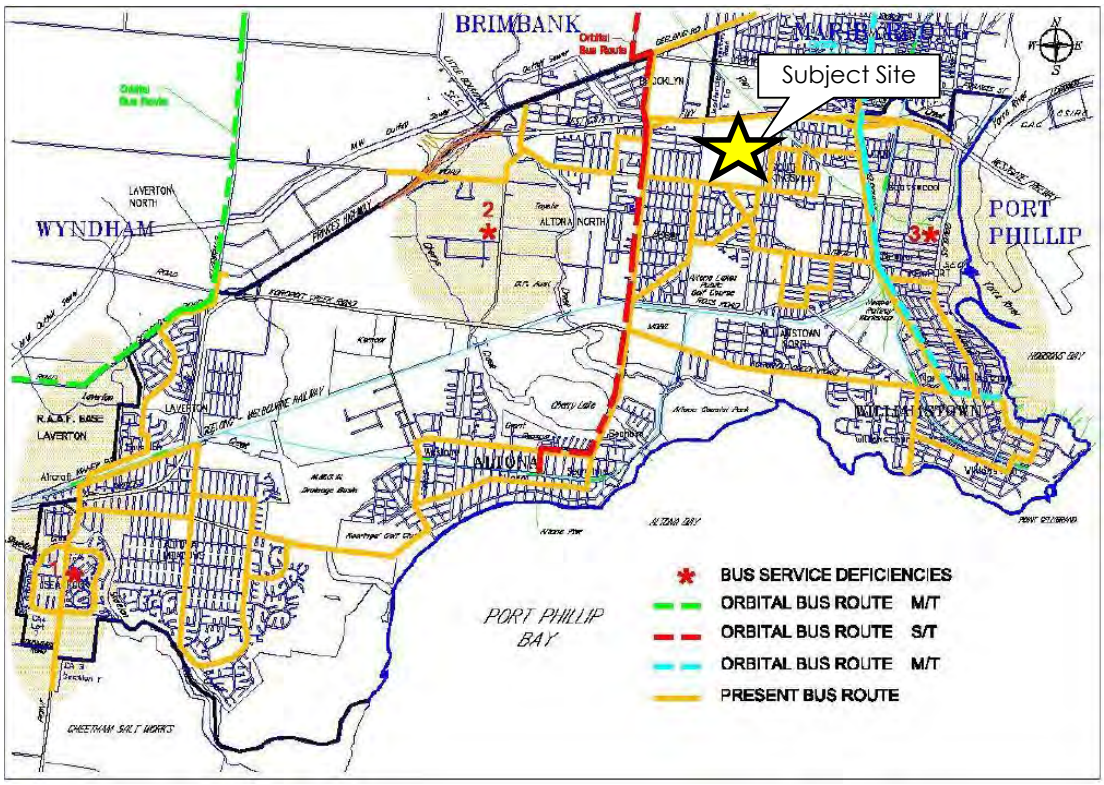
2.7.1 Hobsons Bay Integrated Transport Strategy (2008)

The Hobsons Bay Integrated Transport Strategy outlines a series of priorities and future actions within the following six key transport themes:

- planning and policy
- travel behavior
- public transport
- pedestrian and cyclists
- arterial roads & transport management
- freight management.

A number of these priorities and future actions are relevant to the roads surrounding the subject site. The most notable of these is the proposed future development of the bus services to better connect with existing railway stations and service the major employment centres, especially Williamstown, which has been identified as providing a commuter ferry service to the Melbourne CBD into the future. The existing and proposed bus services are presented within Figure 2.2.

Figure 2.2: Hobsons Bay Integrated Transport Strategy – Proposed Bus Network Improvements



2.7.2 Hobsons Bay Industrial Land Management Strategy (2008)

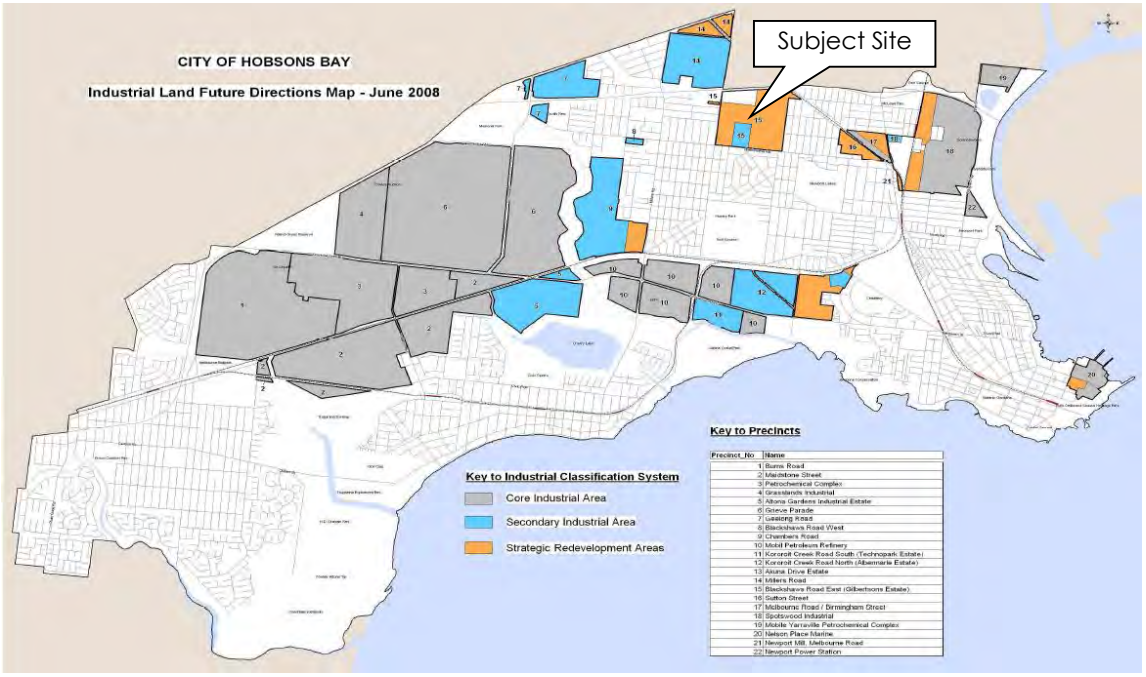
This document aims to provide a clear direction in relation to the future use and development of industrial land in Hobson Bay over the next 15 years and to set the foundation for continued development beyond that point.

The Industrial Land Management Strategy 2008 states that:

"Hobson Bay currently has 1,782 hectares of land zoned for the purpose of industry, which accounts for approximately one third of all of the land in Hobson Bay."

Figure 2.3 shows the location of the subject site within the Industrial Land Future Directions Map (June 2008), relative to the Hobson Bay Growth Area.

Figure 2.3: Industrial Land Future Directions Map (June 2008) – City of Hobsons Bay

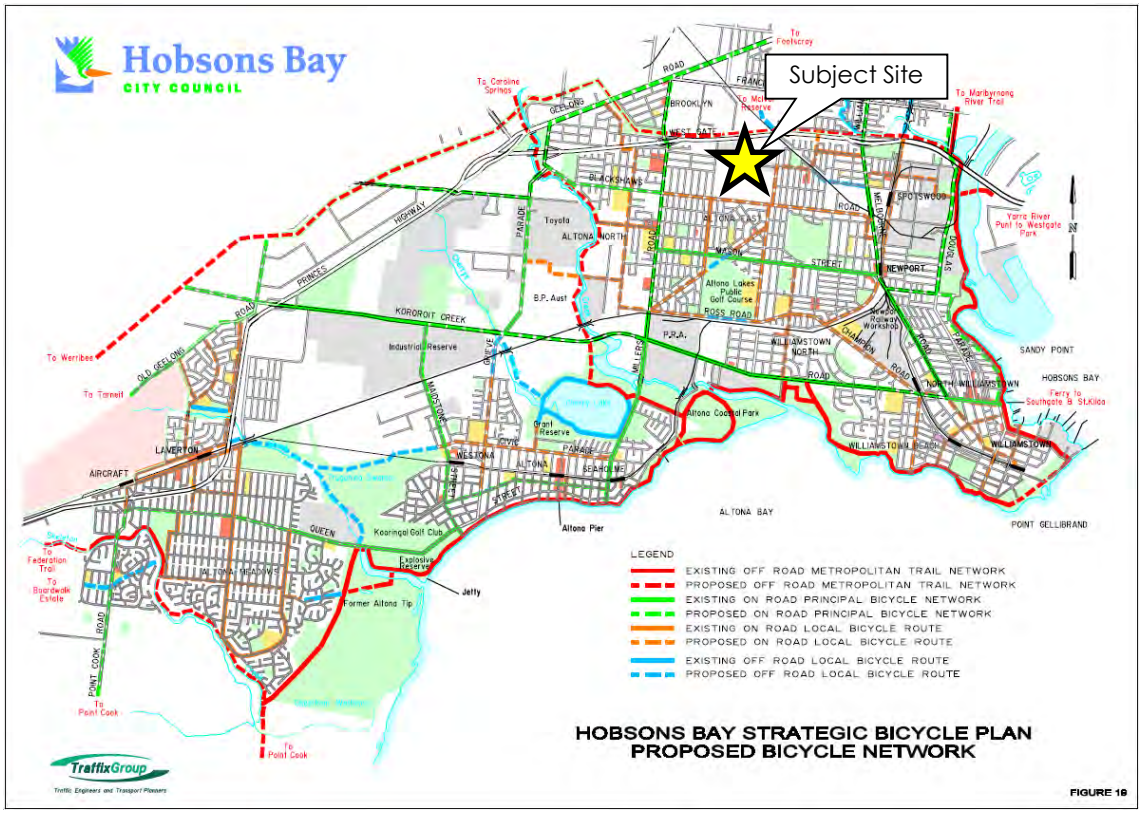


2.7.3 Hobsons Bay Strategic Bicycle Plan (2003)

The Hobsons Bay Strategic Bicycle Plan includes an Action Plan that details and sets out recommended projects in terms of their location, whether it will be part of the Principal Bicycle Network (PBN), cost estimates and funding source.

A number of the items proposed within the Action Plan are relevant to the roads surrounding the subject site. The proposed facilities on these surrounding roads are presented within Figure 2.4.

Figure 2.4: Hobsons Bay Strategic Bicycle Plan – Proposed Bicycle Network



Source: Hobsons Bay Strategic Bicycle Plan, 2003

3. Existing Conditions

3.1 Subject Site

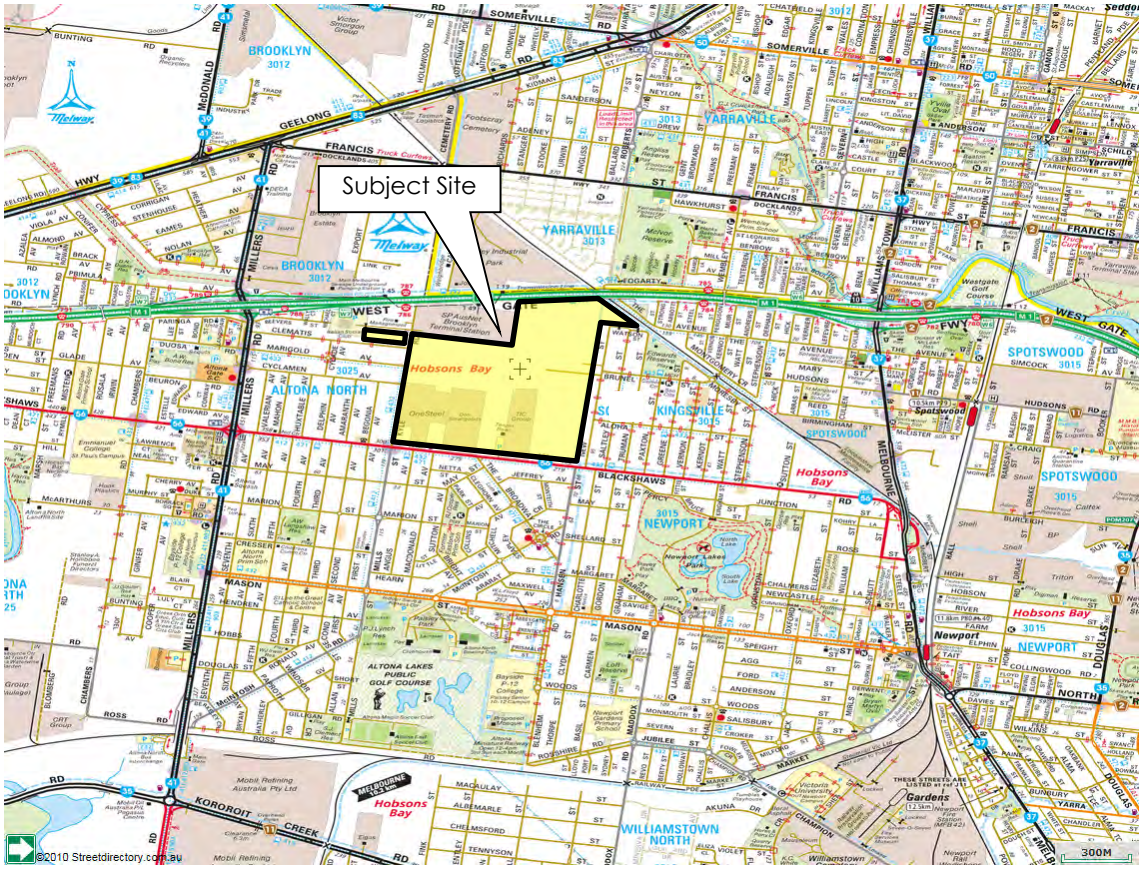
The subject site is located in Altona North and generally bound by Blackshaws Road to the south, New Street to the east, West Gate Freeway to the north and Kyle Road to the west. The site of approximately 67ha is irregular in shape and has frontages of 850m to Blackshaws Road, 640m to Kyle Road, 360m to West Gate Freeway, 190m to the freight rail line, 130m to Watson Street and 810m to New Street.

In addition, there is a separate rectangular section of the site located to the west, north of Clematis Avenue, which is approximately 4,430sqm and has a frontage of 35m to Kyle Road.

The site currently consists of a mix of large and small lots under a variety of ownerships, and is contained within Industrial 1 and 3 Zones (IN1Z & IN3Z). There is an SP Power substation located to the northwest of the site, with the surrounding land uses generally consisting of residential uses to the east, south and west, and industrial land uses to the north.

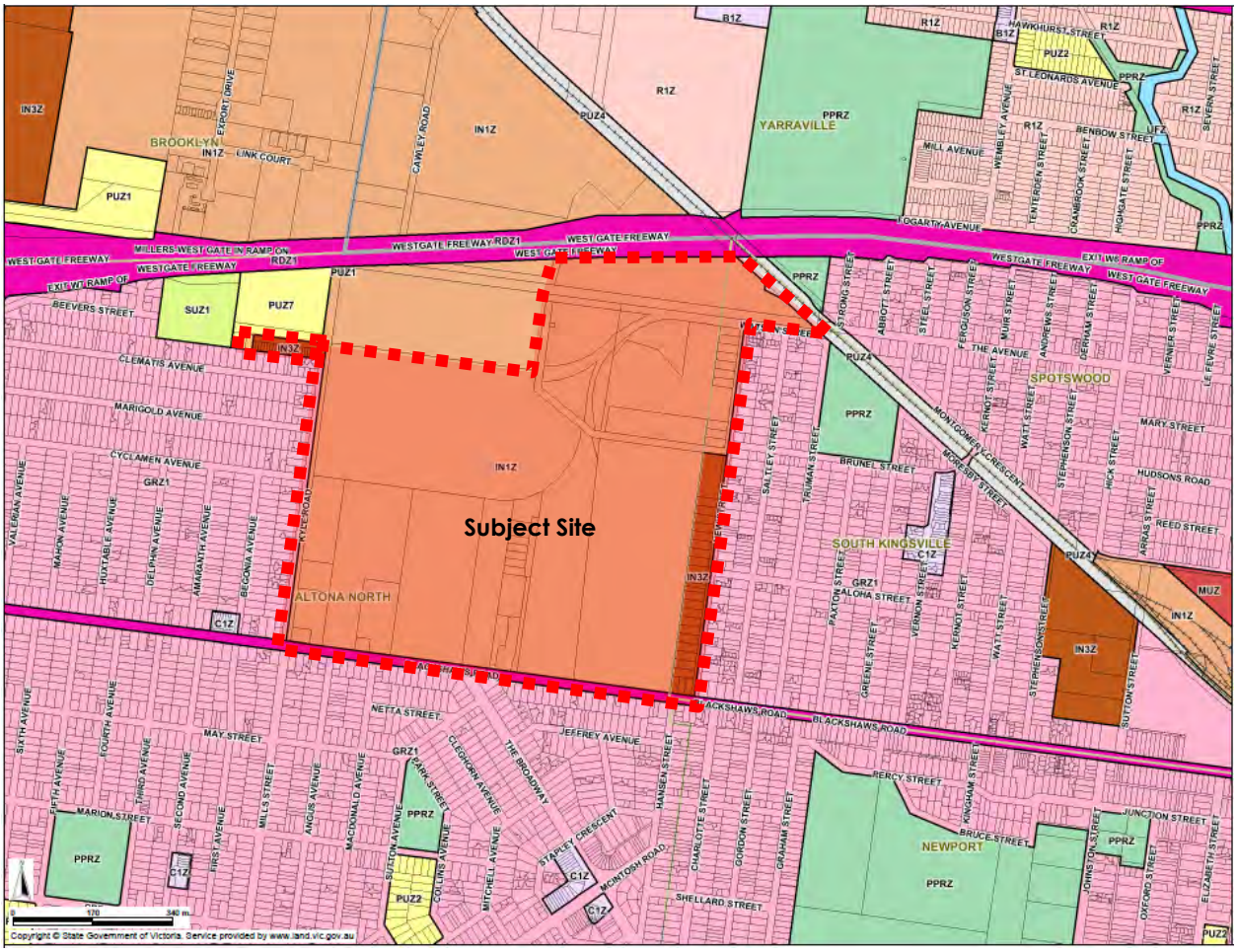
The location of the subject site and the surrounding environs is shown in Figure 3.1, and the land zoning is shown in Figure 3.2.

Figure 3.1: Subject Site and its Environs



(Reproduced with Permission from Melway Publishing Pty Ltd September 2014)

Figure 3.2: Land Zoning Map



(Reproduced from Land Channel web site September 2014)

3.2 Road Network

3.2.1 Surrounding Roads

West Gate Freeway

West Gate Freeway is a key link in Melbourne's road network both commercially and for private use. It is the major connection between the western suburbs and the Melbourne CBD, with connections to other major roads such as the Monash Freeway to the east, Princes Freeway to the West and CityLink to the north.

In the vicinity of the subject site, the West Gate Freeway functions as a freeway and is located within a Road Zone 1 in the Hobsons Bay Planning Scheme. It is a two-way road aligned in an east-west direction and configured with divided four-lane, 20 metre wide carriageways in each direction, set within a 63 metre wide road reserve (approx.).

The Williamstown Road / Melbourne Road and Millers Road interchanges are closest to the subject site, located 1.3km to the northeast and 900m northwest respectively. Sound walls have been constructed along the length of the Freeway although they are not continuous along the Precinct frontage.

Blackshaws Road

Blackshaws Road is a secondary arterial road (Road Zone 1) aligned in an east-west direction along the subject site's southern boundary, connecting Millers Road to the west with Melbourne Road to the east. Adjacent to the subject site, it is a two-way road with a 60km/h speed limit configured with a two-lane, 12.3m wide carriageway set within a 20.8m wide road reserve (approx.). Kerbside parking is permitted subject to time restrictions. Blackshaws Road carries approximately 13,200 vehicles per day[2] past the site.

New Street

New Street is a local road aligned in a north-south direction along the subject site's eastern boundary. Adjacent to the subject site, it is a two-way road with a 50km/h speed limit configured with a two-lane, 7.4m wide carriageway set within a 15.9m wide road reserve (approx.). Unrestricted car parking is permitted on both sides of the carriageway. New Street carries approximately 3,500[3] vehicles per day past the site.

Kyle Road

Kyle Road is a local road aligned in a north-south direction. Adjacent to the subject site, it is a two-way road with a 50km/h speed limit configured with a two-lane, 12.7m wide carriageway set within a 20.5m wide road reserve (approx.). Unrestricted car parking is permitted on both sides of the carriageway. Kyle Road carries approximately 2,000 vehicles per day[3] past the site.

Other Roads

Other roads of note within the vicinity of the site include the following:

- Melbourne Road - Primary arterial road to the east of the site connecting Blackshaws Road and the West Gate Freeway
- Millers Road – Primary arterial road to the west of the site connecting Blackshaws Road and the West Gate Freeway
- Hanson Street - Connector road extending south from Blackshaws Road to the west of New Street
- Mills Street – Connector road extending south of Kyle Road from Blackshaws Road.

Blackshaws Road, New Street and Kyle Road are shown in Figure 3.3 to Figure 3.6.

[2] Based on VicRoads Traffic Volume Data for Victoria, dated May 2013.

[3] Based on the peak hour traffic counts undertaken by GTA in June 2012 and assuming a peak-to-daily ratio of 8% for arterial roads and 10% for local roads.

Figure 3.3: Blackshaws Road (Adjacent to Site, looking east)

Figure 3.4: Blackshaws Road (Adjacent to Site, looking west)

Figure 3.5: New Street (Adjacent to Site)

Figure 3.6: Kyle Road (Adjacent to Site)

3.2.2 Surrounding Intersections

The following intersections exist along the frontage of the site:

- New Street / Watson Street (unsignalised T-intersection)
- New Street / Brunel Street (unsignalised T-intersection)
- New Street / Aloha Street (unsignalised T-intersection)
- Blackshaws Road / New Street (unsignalised T-intersection)
- Blackshaws Road / Hansen Street (unsignalised T-intersection)
- Blackshaws Road / The Broadway (unsignalised T-intersection)
- Blackshaws Road / Macdonald Avenue (unsignalised T-intersection)
- Blackshaws Road / Angus Avenue (unsignalised T-intersection)
- Blackshaws Road / Mills Street / Kyle Road (signalised X-intersection)
- Kyle Road / Cyclamen Avenue (unsignalised T-intersection)
- Kyle Road / Marigold Avenue (unsignalised T-intersection)
- Kyle Road / Clematis Avenue (unsignalised T-intersection).

The following other intersections of note generally connect the site to the surrounding arterial road network:

- Melbourne Road / The Avenue (signalised X-intersection)
- Melbourne Road / Hudsons Road (signalised X-intersection)
- Melbourne Road / Blackshaws Road (unsignalised T-intersection)

- Melbourne Road / Ross Street (unsignalised T-intersection)
- Millers Road / Marigold Avenue / Dousa Road (signalised X-intersection)
- Blackshaws Road / Schutt Street (unsignalised T-intersection)
- Millers Road / Blackshaws Road (signalised X-intersection)
- Millers Road / Marigold Avenue / Duosa Road (signalised X-intersection).

3.2.3 Traffic Volumes

GTA Consultants sourced VicRoads SCATS data for the Millers Road / Blackshaws Road intersection for the week commencing 21 May 2012. Subsequent surveys of left-turn slip lane movements were undertaken 5 June 2012 to determine their relative ratio to through movements, given that there are no detectors to record them. Also, phasing data and queue lengths were recorded during the PM peak hour on 17 July 2012 and the AM peak hour on 18 July 2012.

Similarly, GTA Consultants sourced VicRoads SCATS data for the following intersections for the week commencing 24 October 2012:

- Melbourne Road / The Avenue (signalised X-intersection)
- Melbourne Road / Hudsons Road (signalised X-intersection)
- Millers Road / Marigold Avenue / Dousa Road (signalised X-intersection).

Phasing data and queue lengths were recorded during the AM and PM peak hours on 6 December 2012. Also, surveys of left-turn slip lane movements were undertaken on 17 December 2012 to determine their relative ratio to through movements, given that there are no detectors to record them.

Traffic movement counts were undertaken by GTA at the following intersections between 7:30am – 9:30am and 4:00pm - 6:00pm on Tuesday 20 March 2012:

- Blackshaws Road / Schutt Street
- Melbourne Road / Blackshaws Road
- Melbourne Road / Ross Street.

Traffic movement counts were also undertaken by GTA between 7:30am – 9:30am and 4:00pm - 6:00pm on Tuesday 5 June 2012 for the below three intersections:

- Blackshaws Road / Mills Street / Kyle Road
- Blackshaws Road / Hansen Street
- Blackshaws Road / New Street.

It is unlikely that current 2014 traffic volumes would be notably different to the surveyed 2012 volumes and therefore the traffic data is still considered to be current and reliable.

From the above, the existing AM and PM peak hour traffic volumes of key intersections in the vicinity of the site are shown in Figure 3.7 and Figure 3.8, respectively.

Figure 3.7: Existing AM Peak Hour Traffic Volumes

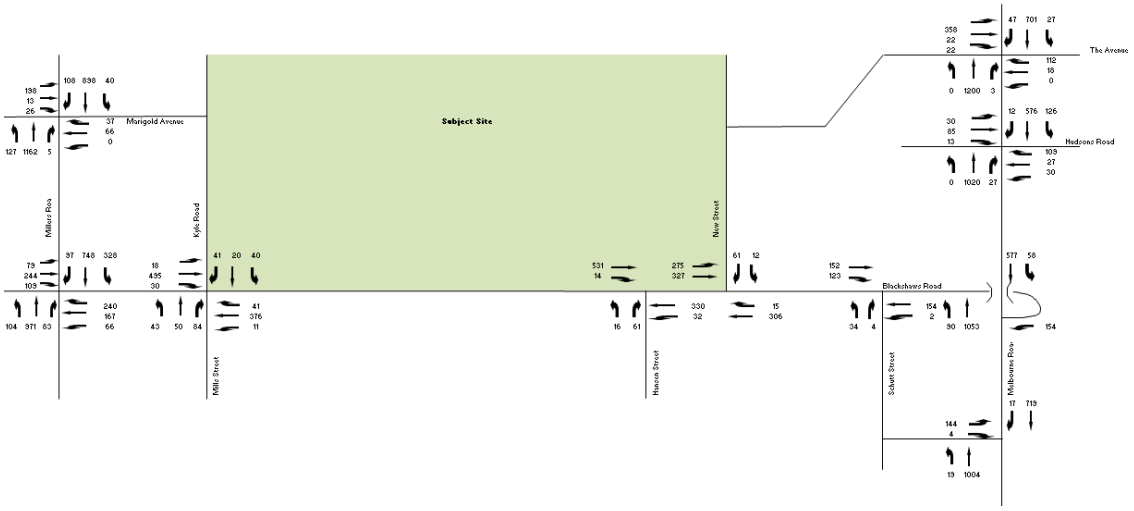
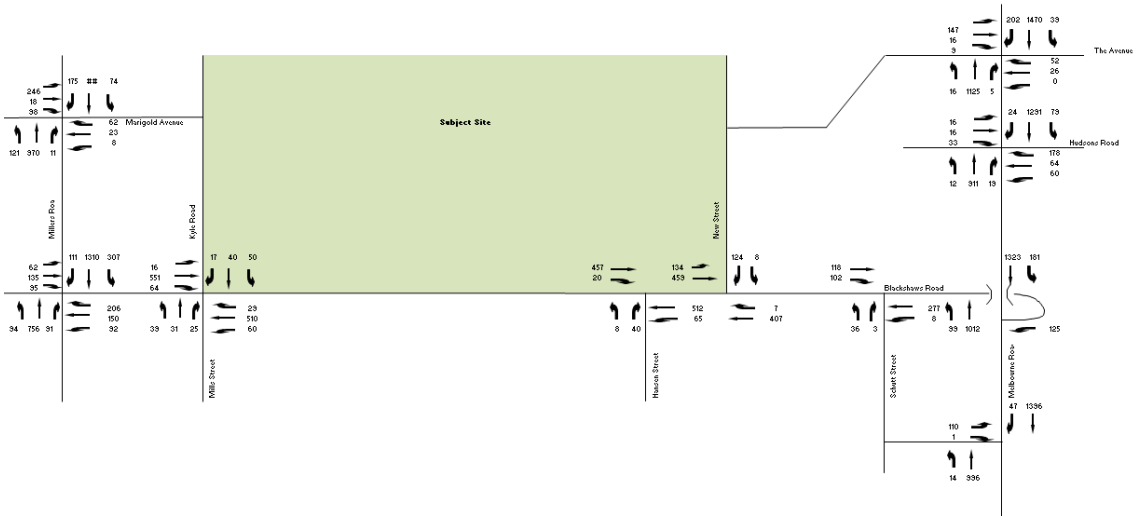


Figure 3.8: Existing PM Peak Hour Traffic Volumes



3.2.4 Intersection Operation

The operation of the following intersections have been assessed using *SIDRA INTERSECTION*[4], a computer based modelling package which calculates intersection performance:

- Melbourne Road / The Avenue
- Melbourne Road / Hudsons Road
- Melbourne Road / Blackshaws Road
- Melbourne Road / Ross Street
- Blackshaws Road / Schutt Street
- Blackshaws Road / New Street
- Blackshaws Road / Hansen Street
- Blackshaws Road / Mills Street / Kyle Road
- Millers Road / Blackshaws Road
- Millers Road / Marigold Avenue / Dousa Road.

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

The commonly used measure of intersection performance is referred to as the *Degree of Saturation (DOS)*. The DOS represents the flow-to-capacity ratio for the most critical movement on each leg of the intersection. For signalised and unsignalised intersections, a DOS of around 0.95 and 0.90 respectively, has been typically considered the practical limit, beyond which queues and delays increase disproportionately[5].

The associated models have typically adopted default settings built into the *SIDRA INTERSECTION* programme, except for the following, which have been adjusted to reflect the existing observed conditions:

- Melbourne Road / The Avenue (AM)
  - North approach signal coordination adjusted to 'Favourable'
  - South approach signal coordination adjusted to 'Favourable'
- Melbourne Road / The Avenue (PM)
  - North approach signal coordination adjusted to 'Highly Favourable'
  - South approach signal coordination adjusted to 'Favourable'
- Melbourne Road / Hudson Road (AM)
  - North approach signal coordination adjusted to 'Favourable'
  - South approach signal coordination adjusted to 'Highly Favourable'
- Melbourne Road / Hudson Road (PM)
  - North approach signal coordination adjusted to 'Highly Favourable'
  - South approach signal coordination adjusted to 'Favourable'
  - North approach right turn gap acceptance adjusted to 2.5 second follow up gap.
  - South approach right turn gap acceptance adjusted to 4.0 second critical gap.
- Millers Road / Blackshaws Road (AM)
  - North approach signal coordination adjusted to 'Highly Favourable'
  - West approach signal coordination adjusted to 'Favourable'
  - East approach signal coordination adjusted to 'Highly Favourable'
  - East approach right turn gap acceptance adjusted to 4.0 second critical gap and a 2.0 second follow up gap
- Millers Road / Blackshaws Road (PM)
  - North approach signal coordination adjusted to 'Favourable'
  - West approach signal coordination adjusted to 'Favourable'
  - East approach signal coordination adjusted to 'Highly Favourable'
- Millers Road / Marigold Avenue / Dousa Road (AM)
  - North approach signal coordination adjusted to 'Favourable'
  - South approach signal coordination adjusted to 'Highly Favourable'

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

		Intersection Degree of Saturation (X)		
		Signals	Roundabouts	Unsignalised
A	Excellent	<=0.60	<=0.60	<=0.60
B	Very Good	0.60-0.70	0.60-0.70	0.60-0.70
C	Good	0.70-0.90	0.70-0.85	0.70-0.80
D	Acceptable	0.90-0.95	0.85-0.95	0.80-0.90
E	Poor	0.95-1.00	0.95-1.00	0.90-1.00
F	Very Poor	>=1.0	>=1.0	>=1.0

- Millers Road / Marigold Avenue / Dousa Road (PM)
  - South approach signal coordination adjusted to 'Highly Favourable'

Table 3.1 presents a summary of the existing operation of the intersections, with full results presented in Appendix A of this report.

Table 3.1: Nominated Intersections – Existing Operating Conditions

Intersection	Period	Approach	DOS	Average Delay (sec)	95th Percentile Queue (m)
Melbourne Road / The Avenue	AM	Melbourne Road (south)	0.54	8 sec	85 m
		The Avenue (east)	0.43	53 sec	43 m
		Melbourne Road (north)	0.52	12 sec	45 m
		The Avenue (west)	# 0.80	25 sec	77 m
	PM	Melbourne Road (south)	0.54	11 sec	94 m
		The Avenue (east)	0.31	55 sec	20 m
		Melbourne Road (north)	# 0.75	9 sec	80 m
		The Avenue (west)	0.29	16 sec	13 m
Melbourne Road / Hudsons Road	AM	Melbourne Road (south)	# 0.75	18 sec	121 m
		Hudsons Road (east)	0.70	45 sec	37 m
		Melbourne Road (north)	0.52	25 sec	82 m
		Hudsons Road (west)	0.35	36 sec	36 m
	PM	Melbourne Road (south)	0.59	21 sec	105 m
		Hudsons Road (east)	0.87	45 sec	65 m
		Melbourne Road (north)	# 0.88	20 sec	205 m
		Hudsons Road (west)	0.64	59 sec	24 m
Melbourne Road / Blackshaws Road	AM	Melbourne Road (south)	# 0.28	1 sec	0 m
		Blackshaws Road (east)	0.16	7 sec	4 m
		Melbourne Road (north)	0.16	1 sec	0 m
	PM	Melbourne Road (south)	0.27	1 sec	0 m
		Blackshaws Road (east)	0.22	10 sec	6 m
		Melbourne Road (north)	# 0.35	1 sec	0 m
Melbourne Road / Ross Street	AM	Melbourne Road (south)	0.28	0 sec	0 m
		Ross Street (east)	0.19	0 sec	1 m
		Melbourne Road (north)	# 0.31	17 sec	8 m
	PM	Melbourne Road (south)	0.26	0 sec	0 m
		Ross Street (east)	# 0.37	1 sec	3 m
		Melbourne Road (north)	0.21	16 sec	5 m
Blackshaws Road / Schutt Street	AM	Schutt Street (south)	0.04	6 sec	1 m
		Blackshaws Road (east)	0.08	0 sec	0 m
		Blackshaws Road (west)	# 0.11	3 sec	3 m
	PM	Schutt Street (south)	0.04	7 sec	1 m
		Blackshaws Road (east)	# 0.15	0 sec	0 m
		Blackshaws Road (west)	0.10	3 sec	3 m
Blackshaws Road / New Street	AM	Blackshaws Road (east)	0.17	0 sec	1 m
		New Street(north)	0.10	11 sec	3 m
		Blackshaws Road (west)	# 0.33	3 sec	0 m
	PM	Blackshaws Road (east)	0.22	0 sec	0 m
		New Street(north)	# 0.40	20 sec	12 m
		Blackshaws Road (west)	0.32	1 sec	0 m

Intersection	Period	Approach	DOS	Average Delay (sec)	95th Percentile Queue (m)
Blackshaws Road / Hansen Street	AM	Hansen Street (south)	0.25	18 sec	6 m
		Blackshaws Road (east)	0.20	1 sec	0 m
		Blackshaws Road (west)	# 0.29	0 sec	0 m
	PM	Hansen Street (south)	0.20	21 sec	4 m
		Blackshaws Road (east)	# 0.31	1 sec	0 m
		Blackshaws Road (west)	0.25	0 sec	1 m
Blackshaws Road / Mills Street / Kyle Road	AM	Kyle Road (south)	# 0.42	38 sec	38 m
		Blackshaws Road (east)	0.39	10 sec	64 m
		Mills Street(north)	0.27	38 sec	17 m
		Blackshaws Road (west)	0.42	9 sec	73 m
	PM	Kyle Road (south)	0.28	40 sec	16 m
		Blackshaws Road (east)	0.47	9 sec	84 m
		Mills Street(north)	0.36	40 sec	16 m
		Blackshaws Road (west)	# 0.50	9 sec	86 m
Millers Road / Blackshaws Road	AM	Millers Road (south)	# 0.82	39 sec	187 m
		Blackshaws Road (east)	0.58	28 sec	64 m
		Millers Road (north)	0.63	22 sec	103 m
		Blackshaws Road (west)	0.61	35 sec	86 m
	PM	Millers Road (south)	0.63	24 sec	100 m
		Blackshaws Road (east)	0.69	33 sec	64 m
		Millers Road (north)	# 0.77	22 sec	186 m
		Blackshaws Road (west)	0.48	32 sec	42 m
Millers Road / Marigold Avenue / Dousa Road	AM	Millers Road (south)	# 0.73	14 sec	134 m
		Marigold Ave (east)	0.34	41 sec	35 m
		Millers Road (north)	0.49	16 sec	71 m
		Dousa Road (west)	0.38	32 sec	48 m
	PM	Millers Road (south)	0.59	13 sec	87 m
		Marigold Ave (east)	0.53	49 sec	34 m
		Millers Road (north)	# 0.79	24 sec	171 m
		Dousa Road (west)	0.42	42 sec	75 m

DOS – Degree of saturation, # - Intersection DOS

On the basis of the above assessment, it is clear that all of the assessed intersections in the vicinity of the site currently operate well with reasonable queues and delays on all approaches.

3.2.5 Accident Statistics

A review of the reported casualty accident history for the roads and intersections adjoining and connecting the subject site to the surrounding arterial road network has been sourced from the VicRoads CrashStats accident database. This database records all accidents causing injury that have occurred in Victoria since 1987 (as recorded by Victorian Police).

A summary of the reported accidents causing injury for the last available five year period (July 2008 to June 2013) is presented in Table 3.2 and Figure 3.9.

Table 3.2: Casualty Accident History (1 July 2008 – 30 June 2013)

Location	Accident No.		
	Fatality [1]	Serious Injury [2]	Other Injury [3]
On Millers Road b/w Clematis Ave &Marigold Ave		1	
Intersection of Millers Rd and Edward Avenue		1	
Intersection of Millers Rd and Beuron Rd		1	2
Intersection of Millers Rd & Cyclamen Ave		1	5
Intersection of Millers Rd & Dousa Rd			5
On The Avenue b/w Fogarty Ave & Strong St		1	
Intersection of Kernot St & The Avenue		1	
Intersection of Brunel St & Paxton St		1	
Intersection of Kernot St & Montgomery Crescent			1
On The Avenue b/w Andrews St & Stephenson St			1
On The Avenue b/w Derham St & Hick St			1
Intersection of Hudsons Rd & Stephenson St			1
Intersection of Williamstown Rd & Reed St		1	
On Melbourne Rd b/w Hudsons Rd & Reed St			1
Intersection of Williamstown Rd & Hudsons Rd			2
Intersection of Williamstown Rd & Mary St		2	1
Intersection of Williamstown Rd& The Avenue		2	4
Intersection of Cullen St & Mary St		1	
Intersection of Blackshaws Rd & Millers Rd		5	3
Intersection of Blackshaws Rd & Seventh Ave			2
On Blackshaws Rd b/w Mahon Ave & Fifth Ave			1
Intersection of Blackshaws Ave & Fifth Ave			1
On Millers Rd b/w Edward Ave & Blackshaws Ave			1
Intersection of Blackshaws Rd & Third Ave		1	1
Intersection of Blackshaws Rd & Second Ave			1
On Blackshaws Rd b/w Second Ave & Begonia Ave		1	
Intersection of Blackshaws Rd & Begonia Ave			1
On Blackshaws Rd b/w Begonia Ave & Kyle Rd		1	
Intersection of Blackshaws Rd & Kyle Rd			2
Intersection of Blackshaws Rd & McDonald Ave		1	
Intersection of Blackshaws Rd & The Broadway		1	1
On Blackshaws Rd b/w The Broadway & Hansen St		1	2
Intersection of Blackshaws Rd & Hansen St		1	
Intersection of Blackshaws Rd & New St			1
On Blackshaws Rd b/w New St & Charlotte St			2
Intersection of Blackshaws Rd & Charlotte St			1
On Blackshaws Rd b/w Charlotte St & Saltley St			1
On Blackshaws Rd b/w Truman St & Graham St			1
Intersection of Aloha St & Truman St			1
On Blackshaws Rd b/w Stephenson St & Johnson St		2	2
On Melbourne Rd b/w Birmingham St & Williamstown Rd		1	2
Intersection of Blackshaws Rd & Schutt St		1	
Total	**0**	**29**	**51**

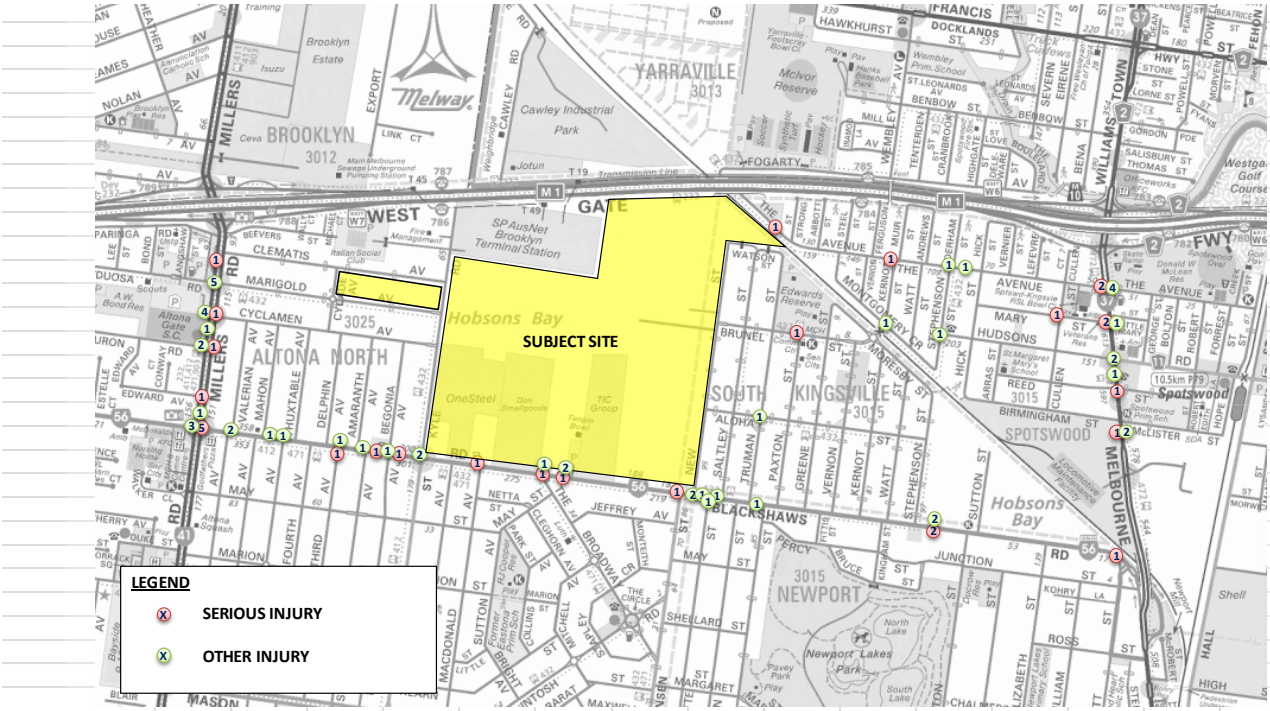
Source: VicRoads

[1] Fatality: At least one person was killed in the accident or died within 30 days as a result of the accident.

[2] Serious injury: At least one person was sent to hospital as a result of the accident.

[3] Other injury: At least one person required medical treatment as a result of the accident.

Figure 3.9: Casualty Accident History



1
1
2
2
1
1
1
29
correct

Table 3.2 and Figure 3.9 indicate that there is a moderate history of reported accidents causing injury in the vicinity of the subject site, with the intersections of Blackshaws Road / Millers Road and Melbourne Road / The Avenue recording the highest number of accidents. It is worth noting that the intersection of Melbourne Road / The Avenue has been recently upgraded to a signalised intersection and the intersection of Blackshaws Road / Millers Road is to be upgraded as part of this development. These upgrades are expected to improve the safety of each intersection.

3.3 Car Parking

Car parking (subject to various time and clearway restrictions) is generally provided on each of the roads in the vicinity of the Precinct.

GTA Consultants compiled an inventory of publicly available on-street car parking along the frontages of the subject site. The inventory identified a total of 192 on-street spaces, including 147 spaces that are unrestricted during business hours.

On-site observations indicate that current on-street car parking demands along the frontages of the subject site are generally low.

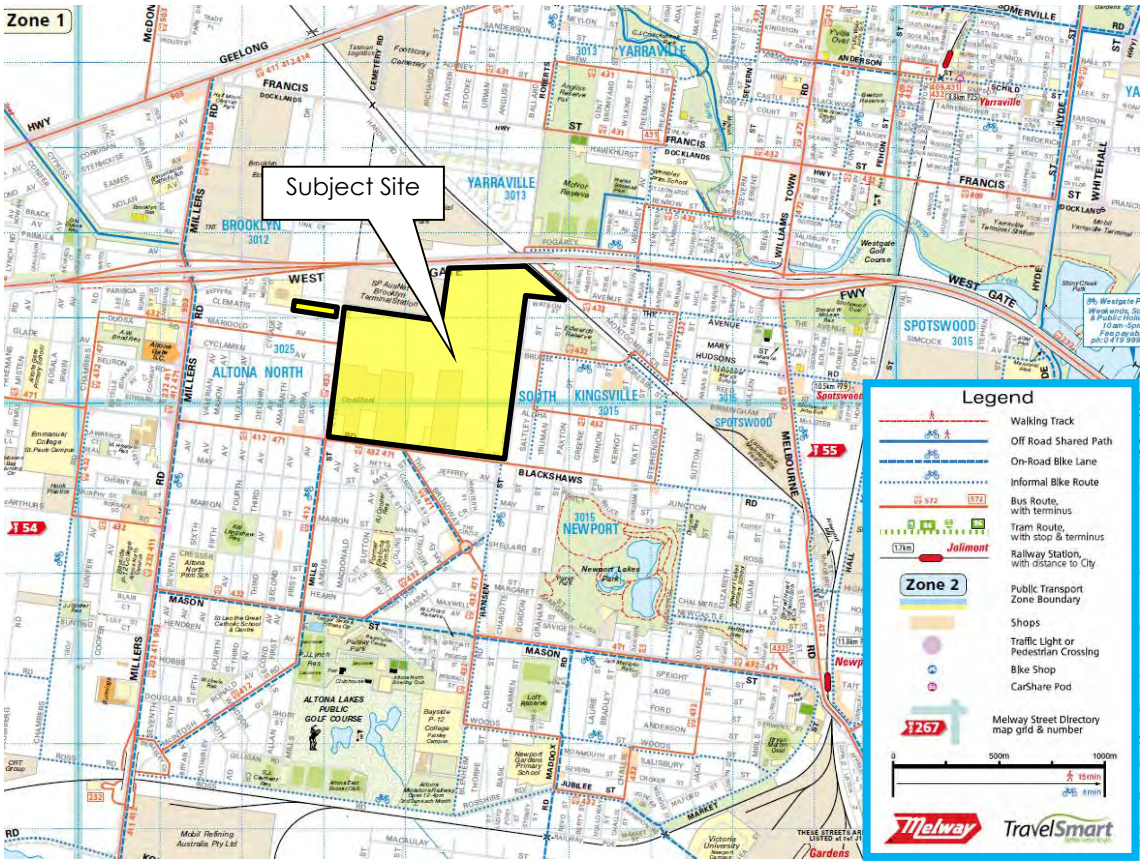
3.4 Sustainable Transport Infrastructure

3.4.1 Preamble

The subject site enjoys access to a range of existing sustainable transport infrastructure alternatives, including public transport, bicycle and pedestrian facilities. These are most clearly set out within the Hobsons Bay municipality 'TravelSmart' map, a portion of which is presented in Figure 3.10.

The sustainable transport infrastructure options surrounding the subject site are described in further detail within the following sections of this report.

Figure 3.10: Nearby Sustainable Transport Options

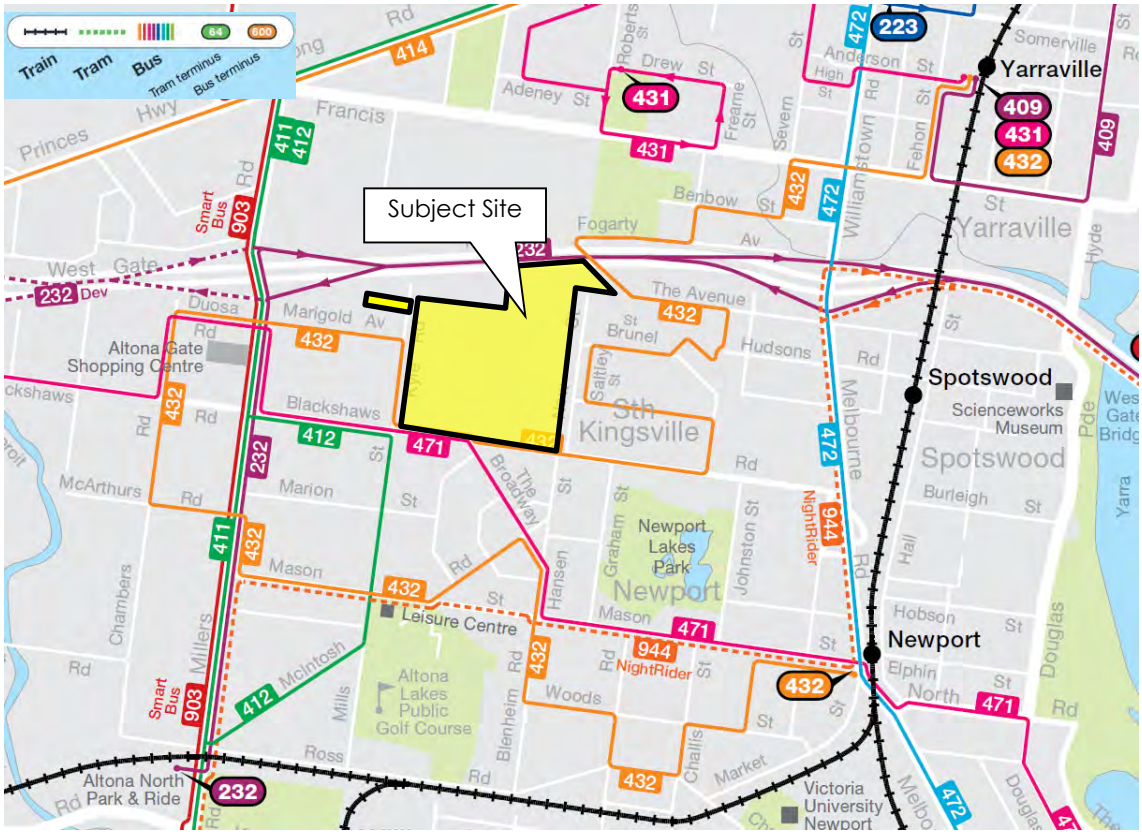


(Downloaded June 2012)

3.4.2 Public Transport

Figure 3.11 shows the subject site in relation to existing public transport services within its vicinity whilst Table 3.3 summarises the road based routes and major destinations that can be reached using these services.

Figure 3.11: Existing Public Transport Services and Stops



Source: PTV Website September 2014

Table 3.3: Road Based Public Transport Provision

Route Nos	Route Description	Distance to Nearest Stop	Significant Destinations On Route
232	Altona North – Queen Victoria Market	700m	Altona North Bus Interchange, Altona Gate S.C., West Gate Fwy, Todd Rd, Williamstown Rd, Montague St, Charles Grimes Bridge, Flinders St, Queen Victoria Market
412	Laverton – Footscray	50m	Laverton Railway Station, Victoria St, Queen St, Millers Rd, Berkeley Cr, Mills St, Blackshaws Rd, Millers Rd, Altona Gate S.C., Geelong Rd, Paisley Street
432	Newport – Yarraville	50m	Newport Railway Station, The Broadway, The Circle, Millers Rd, Marigold Av, Kyle Rd, Blackshaws Rd, Stephenson St, Aloha St, Brunel St, The Avenue, Fogarty Avenue, Wembley Av, Anderson Street, Yarraville Railway Station
471	Williamstown - Sunshine	50m	The Esplanade, Melbourne Rd to Newport Railway Station, The Broadway, The Circle, Blackshaws Rd, Altona Gate Shopping Centre, Duosa Rd, Princes Hwy, Sunshine Railway Station

It is noted that the Altona Gate Shopping Centre accommodates a major bus interchange servicing a number of bus routes as follows:

- Bus route 232 travels from Altona Gate Shopping Centre to Queen Victoria Market via the West Gate Freeway, Port Melbourne, and the Melbourne Convention Centre and along Queen Street to the markets.
- Bus routes 411 and 412 travel from Laverton to Footscray via Altona, Altona Gate Shopping Centre and West Footscray.
- Bus route 432 travels from Newport to Yarraville via Altona North, South Kingsville, Spotswood and Yarraville.

- Bus route 471 travels from Williamstown to Sunshine via Williamstown, Newport, Altona North and Sunshine West.
- Bus route 903 is a Smart Bus route and travels from Altona to Mordialloc via Sunshine, Essendon, Preston, Heidelberg, Doncaster, Burwood, Chadstone, Oakleigh and Mentone.

In addition to road based public transport, Spotswood Railway Station on the Werribee and Williamstown lines is located approximately 1.6 kilometres east of the subject site. Further, the Yarraville and Newport Railway Stations are located 2.2km and 1.9km from the subject site, respectively.

3.4.3 Pedestrian Infrastructure

Pedestrian paths are generally provided on both sides of all roads in the vicinity of the subject site. Signalised pedestrian crossings are provided at the Blackshaws Road / Mills Street / Kyle Road intersection, while a pedestrian zebra crossing, with flashing lights, is provided on Blackshaws Road between Begona Avenue and Kyle Road.

3.4.4 Cycle Infrastructure

Bicycle lanes are provided on both sides of Millers Road.

The Federation Bike Trail runs from Werribee to Brooklyn and currently terminates north of the Site. The trail will ultimately be developed along the north side of the West Gate Freeway to provide a link from the existing start / end of the trail at Millers Road to the existing shared pedestrian / cycle trail on Hyde Street in Yarraville. This will provide direct access for pedestrians and cyclists to the Melbourne CBD.

The Principal Bicycle Network (PBN) is a network of arterial cycling routes in metropolitan Melbourne. Figure 3.12 shows the PBN in the vicinity of the subject site.

Figure 3.12: PBN Routes (Purple Lines)

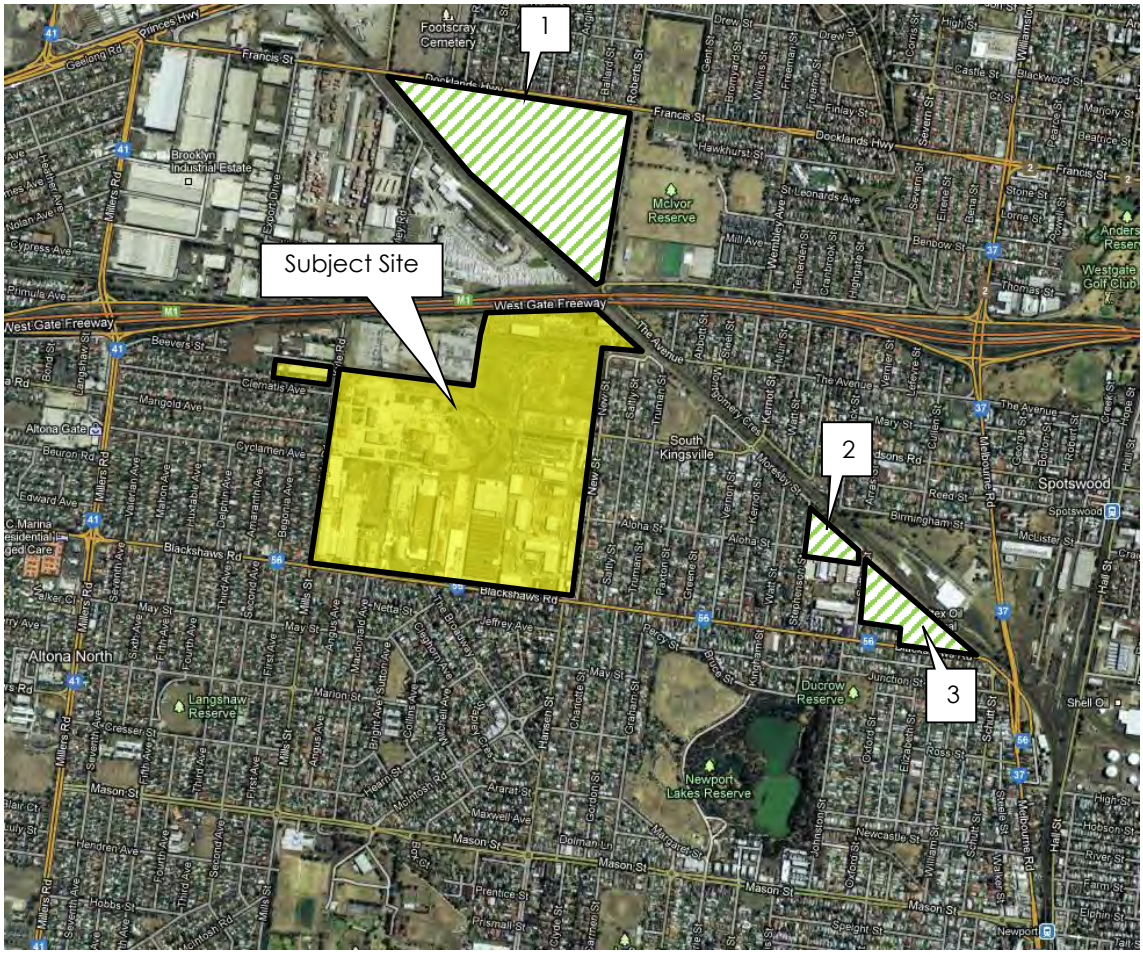
(Source: Transmaps Website September 2014)

Figure 3.12 indicates that in the vicinity of the subject site the Federation Bike Trail on the northern side of the West Gate Freeway, Melbourne Road, The Avenue, Hansen Street, Mills Road and Millers Road all form part of the PBN. This is generally consistent with Hobsons Bay Strategic Bicycle Plan (refer to Figure 2.4), except for Blackshaws Road and New Street.

3.5 Surrounding Land Use Developments

It is understood that there are a number of proposed land use changes within the vicinity of the subject site which are at various stages of development. The location of these developments are shown in Figure 3.13 and discussed in further detail below.

Figure 3.13: Nearby Development Sites



(Source: Google Maps)

1. **Bradmill Site, Francis Street, Yarraville (Approved)**

   - Potential to cater for approximately 1,500 dwellings, neighbourhood activity centre and community centre.
   - Includes a north-south collector road along the eastern side of the site between Francis Street and The Avenue.
   - Expected to provide provision for bus stops along Francis Street and the north-south collector road, as well as pedestrian and bicycle facilities throughout.
   - Development is approved and construction is expected to commence late 2014.

2. **41 - 59 Stephenson Street, South Kingsville[6]**
    - Potential to cater for approximately 250 dwellings, with no town planning process having commenced as yet.
3. **Caltex Terminal Site**
    - Potential to cater for approximately 670 dwellings.
    - The site was rezoned as per Amendment C82 of the Hobson Bay Planning Scheme subject to the application of the Design and Development Overlay Schedule 10.

It is also noted that there was an additional proposal, known as the Newport Flour Mill, which was scheduled to be heard by a Planning Panel for site rezoning. However, the rezoning has been abandoned and therefore, this site has not been considered in the traffic assessment contained within this report.

[6] Information provided by the land owners CVC Ventures Pty Ltd.

4. Land Use Concept

4.1 Land Uses

The preliminary Development / Structure Plan work completed to date anticipates the rezoning of the site to a predominantly residential use, with a mixed use zone and some public open space. The anticipated development schedule is presented in Table 4.1 and shown in Figure 4.1.

Table 4.1: Indicative Development Schedule

Use	Size
Residential	Approx. 3,000 dwellings in a mixture of densities
Mixed Use Zone	Potential for up to 5,550m^2 retail floor space (4,200m^2 supermarket + 1,350m^2 specialty retail)

Figure 4.1: Land Use Plan

Source: Tract – Land Use Plan, dated 20/03/2015

4.2 Vehicle Access Approach

4.2.1 General Approach

The general vehicle access approach for the development is to try and encourage site generated traffic to primarily access the precinct via Blackshaws Road. This is to be achieved by providing the higher capacity site accesses to Blackshaws Road, and designing the internal road network to maximise traffic movement efficiency in the north-south direction, rather than the

east-west direction. Furthermore, improvements to the level of service for motorists travelling along Blackshaws Road, especially through the intersections, have been investigated to make it more attractive to access the precinct from the surrounding arterial road network via Blackshaws Road instead of any local streets in the area.

This approach is considered to be consistent with best practice vehicle access planning and consistent with relevant Austroads Guidelines. Also, it is acknowledged that there is only limited remaining capacity within the surrounding local road network to accommodate additional traffic volumes, and that there would be significant amenity impacts on local residents in the local streets should they be relied upon in accessing the precinct.

4.2.2 Site Access Points

The precinct is bounded on three sides by existing roads and it is anticipated that access will be obtained via a number of intersections with these roads to allow the new development to seamlessly mesh in with the existing residential street network which surrounds it.

Specifically the draft Development Plan work currently envisages access to the precinct from:

i upgrades to the existing signalised intersections of Millers Road / Blackshaws Road and Blackshaws Road / Kyle Road / Mills Street
ii increased lengths of 'No Stopping' parking restrictions and introduction of dedicated right turn lanes at the Kyle Road, New Street, Hansen Street and The Broadway unsignalised intersections along Blackshaws Road
iii a new signalised intersection with Blackshaws Road towards the east of the precinct, between The Broadway and Hansen Street
iv additional unsignalised accesses from Blackshaws Road
v additional access points from Kyle Road
vi additional access points from New Street, including an upgraded intersection with Brunel Street.

Further details of these works are provided in Section 6 of this report.

4.2.3 Internal Road Network

The potential layout of the future internal road network broadly proposes a road hierarchy consisting of connector streets and access streets within the subject site to access the proposed uses and connect with the surrounding road network. Of particular note, there is an anticipated east-west connector street between Kyle Street / Cyclamen Avenue / Marigold Avenue and New Street / Brunel Street linking to a north-south connector street from the proposed signalised intersection on Blackshaws Road. These will provide efficient access with the external road network, to the internal access street network and the potential mixed use zone, while minimising the attractiveness for local vehicles to drive east-west through the site.

4.2.4 Pedestrian and Bicycle Facilities

The draft Development Plan anticipates a number of pedestrian and bicycle links through the site, through the provision of sealed footpaths, shared paths and dedicated bicycle paths adjacent to the roads and through the open space areas. Particularly strong connections will be provided to the likely mixed use zone and the 'Quarry Park' central area contemplated for significant open space.

The paths will be connected to the surrounding residential network through the signalised pedestrian crossing facilities at the proposed signalised intersections along Blackshaws Road.

Connection will be expected to be provided to the Federation Trail along Brunel Street and The Avenue, with there being a potential alternate more direct connection being considered via a pedestrian bridge over the railway at the northeast corner of the site.

Consideration is also being given to providing a connection to Birmingham Street, as outlined in the Bay Strategic Bicycle Plan, to accommodate an off-road facility that will connect with the Spotswood Train Station.

4.3 Public Transport Facilities

The proposed connector streets will be designed to accommodate potential future bus services. A bus service through the site along the central connector street would allow all dwellings to be within 400m of a bus route, in accordance with DEDJTR guidelines.

5. Existing Travel Characteristics

5.1 Preamble

Guidance on the existing travel characteristics of Hobsons Bay residents has been sought from the Victorian Integrated Survey of Travel Activity 2009 (VISTA 09) prepared by the then Department of Transport (now DEDJTR). The travel habits of residents in each of the municipalities in Melbourne and major regional centres within Victoria was collected as part of VISTA 09 and provides guidance on existing mode splits.

5.2 Existing Mode Splits

On this basis, Figure 5.1 and Figure 5.2 have been prepared to summarise the existing mode shares based on total number of trips undertaken (i.e. trips associated with work, education, retail, recreation, etc.) within the municipality of Hobsons Bay for the respective days of the week.

Figure 5.1: Existing Weekday Mode Split

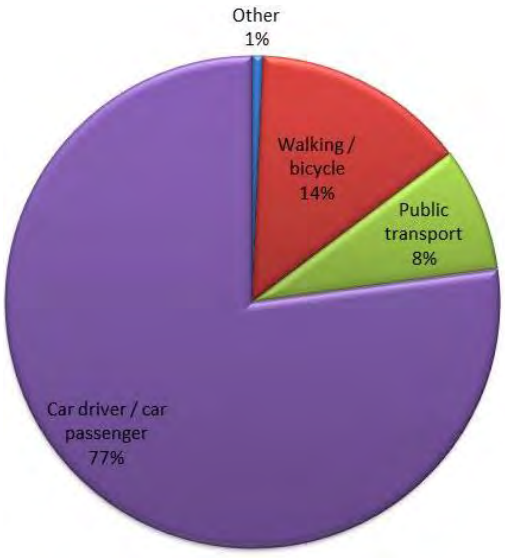
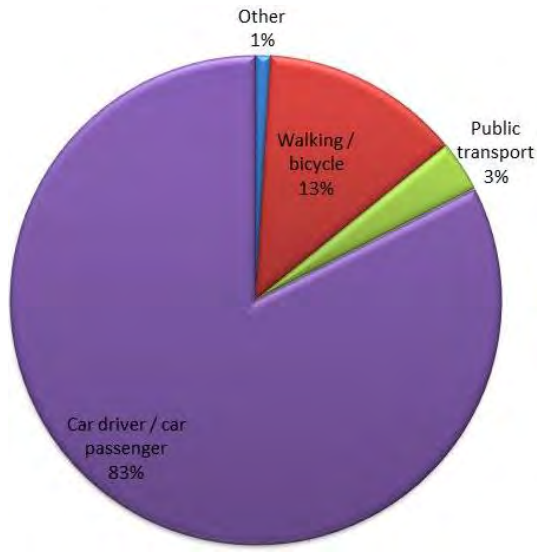


Figure 5.2: Existing Weekend Mode Split



Source: Vista 09 data

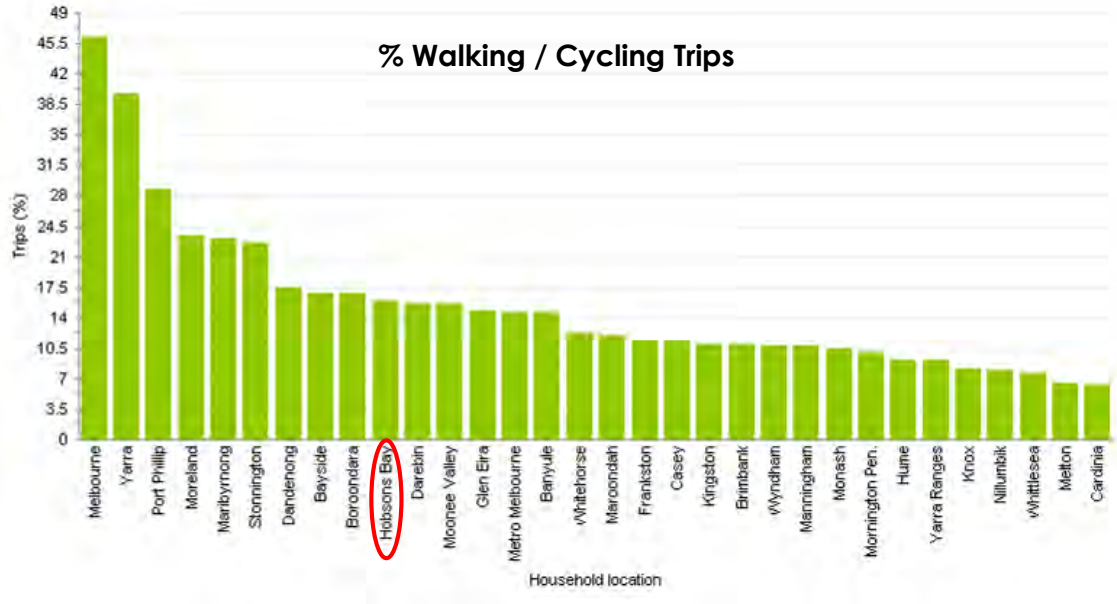
Figure 5.1 and Figure 5.2 indicate that while 77% of weekday and 83% of weekend trips undertaken within the municipality of Hobsons Bay are by car / passenger, 22% of weekday and 16% of weekend trips involve public transport, walking or cycling.

By way of comparison, Figure 5.3 to Figure 5.5 provides a summary of the existing mode share for each of: public transport, walking/cycling and car trips, for all trips made by residents living in Hobsons Bay and other municipalities in Melbourne.

Figure 5.3: Proportion of Public Transport Trips

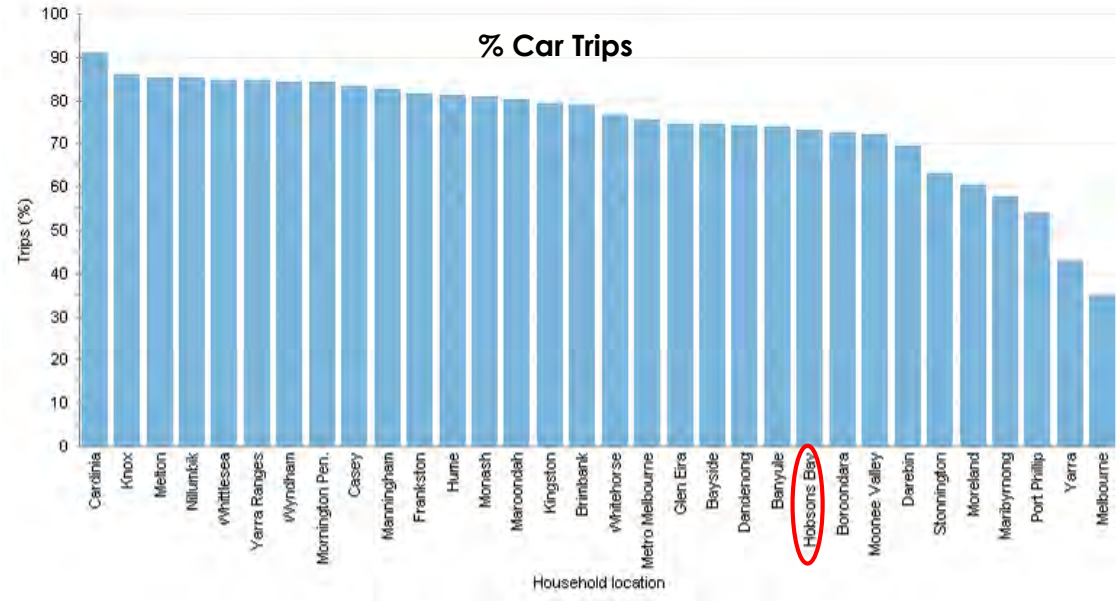
Source: Vista 07 data

Figure 5.4: Proportion of Walking / Cycling Trips



Source: Vista 07 data

Figure 5.5: Proportion of Car Trips (car as driver or passenger)



Source: Vista 07 data

From these figures the following is noted for Hobsons Bay:

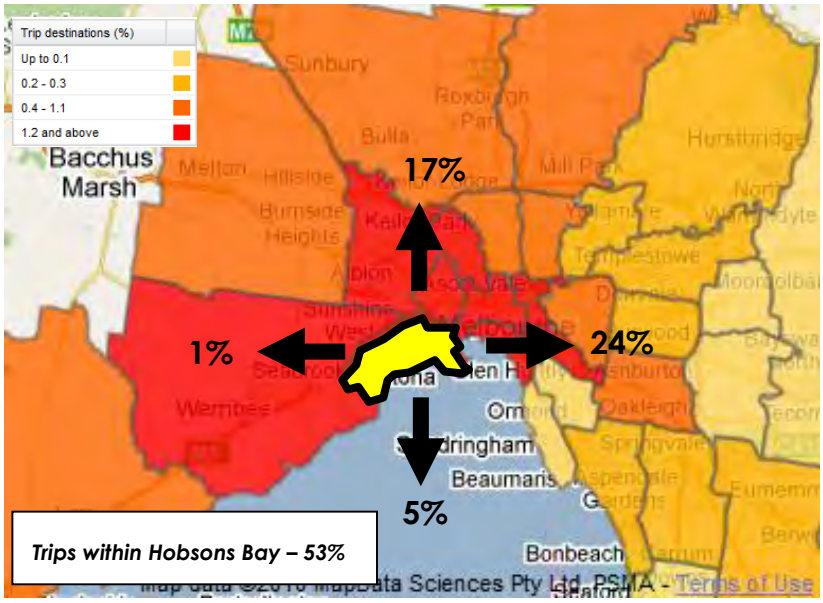
- a reasonably high proportion of public transport trips
- the tenth highest proportion of walking and cycling trips
- the tenth highest proportion of sustainable mode share (i.e. public transport, walking and cycling trips)
- the tenth lowest proportion of vehicle trips.

The reasons for this is partly due to the municipality being well located in respect to supporting public transport and active transport infrastructure, and hence generates relatively low levels of private vehicle activity and higher public transport, walking and cycle trips, but also due to its proximity to both the Footscray CAD and Melbourne CAD, and the current level of traffic congestion on the West Gate Freeway, which reduces the attractiveness of accessing these CADs through private motor vehicles.

5.3 Journey to Work

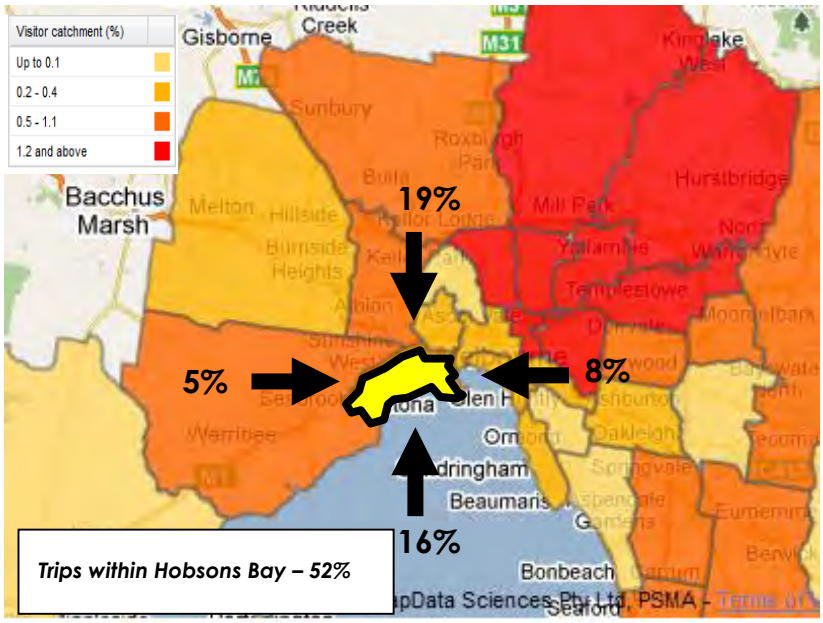
VISTA 09 also provides guidance on where people are travelling to and from. The results are summarised in Figure 5.6 and Figure 5.7, which summarise trips originating in Hobsons Bay and those finishing in Hobsons Bay, respectively.

Figure 5.6: Trips Originating in Hobsons Bay



Source: Vista 07 data

Figure 5.7: Trips Finishing in Hobsons Bay



Source: Vista 07 data

From these figures the following is noted for Hobsons Bay:

- Half of trips (approx. 50%) are originating and finishing from within the municipality.
- Almost one quarter of all trips originating from Hobsons Bay travel east towards Melbourne.
- Almost one fifth of trips to Hobsons Bay travel south from Maribyrnong and other northern municipalities.

The above distributions could be reasonably expected to exist into the future. However, noting current planning approaches is to develop a more multi-centred metropolitan Melbourne and reduce the reliance on the use of private motor vehicles. As such, it could be expected that an increased proportion of trips would be internal and with the adjacent central and major activity centres of Hobsons Bay by alternate transport modes through their progressive improvement.

6. Traffic Impact Assessment

6.1 Assessment Context

Land use planning policy in Victoria indicates that where a development site abuts (or does not abut, but may impact on) any part of a road declared as a freeway or an arterial road under the Road Management Act 2004 and if the development is expected to increase traffic movements at intersections the form part of the main road network, the development will be referred to the Roads Corporation (VicRoads).

With assessing development land use proposals, VicRoads generally requires an assessment of:

i existing road network performance
ii traffic generation rates for proposed land use
iii a "base case" assessment prior to development traffic superimposition
iv a post-development assessment
v identification of mitigation measures where necessary to minimise the impacts of the development and/or maintain, within practical limitations, the performance of the network that would have existed without the development.

The important aspect to note regarding the above is that mitigation is typically required only where necessary (not wherever an impact is generated). To determine whether such works are necessary, it is common to assess the relative impact of the proposed development and whether mitigation is practical/feasible.

Furthermore, it is VicRoads practice that the following approach is applied to the proposed access arrangements to the site and for existing road infrastructure:

- For new access arrangements direct to the site – provision is made for all access arrangements to operate safely and efficiently into the future (at least 10 years after full development).
- For existing road infrastructure - any potential adverse impacts from land use development proposals on road safety and operational efficiency are identified and, where necessary, developers provide mitigating road improvement works as part of the development costs to minimise these effects and retain within practical limitations, the level of safety and operational efficiency that would have existed without the development."

In applying the above approach to the subject site, it is expected that the site access arrangements onto Blackshaws Road need to be designed to accommodate 10 years of traffic volume growth, while the existing surrounding intersections need only be designed for the immediate post-development conditions. The traffic assessment of the subject site is accordingly not required to assess the broader impacts of surrounding development sites at existing surrounding intersections.

The traffic analysis presented within the following sections has generally been prepared as described above.

6.2 Traffic Generation

6.2.1 Residential

A single house on a standard lot in an outer metropolitan area will typically generate 8 to 10 trips per day. Closer to the Melbourne CAD the rate reduces to in the order of 3 to 6 trips per day depending on dwelling size, parking provisions and accessibility to public transport and local amenities, among other things. Peak hour rates are typically 10–12% of daily rates.

The Victorian Integrated Survey of Travel and Activity 2009 (VISTA 09) was a large-scale survey of travel activity undertaken by the Victorian Government. It found that households in Hobsons Bay made an average of 3.9 car driver trips to/from home on a typical weekday, in addition to vehicle trips to/from a house by non-residents (i.e. tradesmen, visitors, taxis etc.).

Given the proposed mix of dwelling types, the location of the subject site and the above information it can be assumed that the dwellings will each generate an average of up to 5 vehicle movements per day, including 0.5 vehicle movements in a peak hour.

This may be conservative on the high side, given the expected shift away from private car use into the future. This is on the basis of the level of development expected in the area, and the subject site's proximity and likely future accessibility to bus services and train stations, as well as the Melbourne CBD and other key employment areas.

6.2.2 Mixed Use Zone

The proposed mixed land zone is anticipated to have up to 5,550sqm of retail floor area.

In order to determine the likely traffic generation of the mixed use zone reference is made to the NSW RTA (now RMS) 'Guide to Traffic Generating Developments' rates. For shopping centres ranging in size from 0 to 10,000sqm, this guide suggests a daily vehicle generation rate of 121 movements/100sqm floor area, and an evening commuter peak hour rate of 12.5 movements/100sqm floor area.

The Guide does not specify a generation rate for the morning commuter peak hour, as shopping centres are generally not fully operational during the AM peak hour. For the purpose of this analysis it has been assumed that the AM peak hour trips will be 10% of the PM peak trips (i.e. 1.25 movements /100m^2) and will account for staff and servicing activities.

6.2.3 Traffic Generation Summary

These generation rates and the resulting traffic generation are summarised in Table 6.1.

Table 6.1: Traffic Generation Estimates

Use	Size	Traffic Generation Rate			Vehicle Movements		
		AM Peak	PM Peak	Daily	AM Peak	PM Peak	Daily
Residential	~3,000 dwellings	0.5 movements /dwelling	0.5 movements /dwelling	5 movements /dwelling	1,500	1,500	15,000
Mixed Land Zone	~5,550sqm NFA	1.21 movements /100sqm	12.5 movements /100sqm	121 movements /100sqm	67	689	6,716
Total					**1,567**	**2,189**	**21,716**

As shown in Table 6.1, adding the traffic from the two uses together results in a total traffic generation of up to 21,716 vehicle movements per day, including 1,567 vehicle movements and 2,189 vehicle movements during the AM and PM commuter peak hours respectively.

However, the above includes some 'double counting' of trips from the dwellings to the mixed use zone and vice versa, and some trips which will remain internal to the precinct. It is anticipated that approximately 1/3 of the trips generated by the mixed use zone will be from within the precinct. Similarly, in the order of 10% of the trips generated by the residential use will remain internal to the precinct (including trips to the mixed use zone). As such, the daily vehicle movements accessing the external road network is anticipated to be in the order of 17,999 movements, including 1,395 vehicle movements and 1,815 vehicle movements during the AM and PM commuter peak hours respectively.

It is also noted that there are existing industrial uses that currently operate within Precinct 15. These existing uses currently generate traffic movements in their own right and contribute to the existing traffic volumes that have been recorded in the vicinity of the site. As such, the application of the above additional traffic volumes generated by the two proposed land uses to the external road network, beyond the site access points, is considered to be conservative and on the high side.

On this basis, it is considered appropriate to discount the additional traffic volumes expected to be experienced on the external road network, beyond the site related access movements, by the level of traffic likely to be generated by the existing industrial uses. In this regard, the existing traffic volumes accessing the subject site could be expected to equate to 4.0 and 0.75 vehicle movements per car parking space currently provided on site daily and within peak traffic hours respectively. Based on aerial photography of the subject site, there are approximately 265 car parking spaces currently provided on-site. As such, there could be expected to be a total of 1,060 and 200 movements currently generated daily and in the AM and PM peak hours respectively.

Subtracting these current movements from the above anticipated additional traffic movements expected to be generated by the proposed development results in a total in the order of 15,828 additional movements per day, including 1,195 vehicle movements and 1,615 vehicle movements during the AM and PM commuter peak hours respectively, experienced by the external road network, beyond the site access points, as a result of the proposed development.

6.3 Traffic Distribution

The directional distribution and assignment of traffic generated by the proposed development within the precinct will be influenced by a number of factors, including the:

i configuration of the arterial road network in the immediate vicinity of the site
ii operation of intersections providing access between the local and arterial road network
iii distribution of households in the vicinity of the site
iv surrounding employment centres, retail centres and schools in relation to the site
v configuration of access points to the site.

In order to estimate the expected distribution of traffic generated by the Precinct, strategic modelling has been undertaken using the VITM model developed by the then Department of Transport (now DEDJTR). An indicative potential development on the site was modelled for the 2021 road network scenario, which resulted in the distributions shown in Table 6.2.

Table 6.2: Estimated Traffic Distributions

Direction	AM Peak	PM Peak
To/from west	46%	44%
To/from southwest	10%	9%
To/from southeast	8%	9%
To/from east	36%	38%

Furthermore, the directional split of traffic (i.e. the ratio between the inbound and outbound traffic movements) for the proposed and exiting peak hour traffic movements anticipated to be generated by the subject site are presented in Table 6.3.

Table 6.3: Directional Split of Traffic

Use	AM	PM
Residential (Proposed)	20% In / 80% Out	60% In / 40% Out
Mixed Use Zone (Proposed)	90% In / 10% Out	40% In / 60% Out
Industrial (Existing)	90% In / 10% Out	10% In / 90% Out

Based on the above, Figure 6.1 and Figure 6.2 have been prepared to show the estimated increase in turning movements in the vicinity of the subject property following full site development.

Furthermore, it has been assumed that of the vehicles accessing the site from the north along Millers Road, 50% will utilise Marigold Avenue and 50% will utilise Blackshaws Road. Of the vehicles accessing the site from the north along Melbourne Road, 25% will utilise The Avenue and 75% will utilise Blackshaws Road. This is considered to be reflective of the ability to access the site through the connecting local roads, their ability to accommodate the traffic volumes and expected motorist travel times to properties within the site.

Figure 6.1: AM Peak Hour Site Generated Traffic Volumes

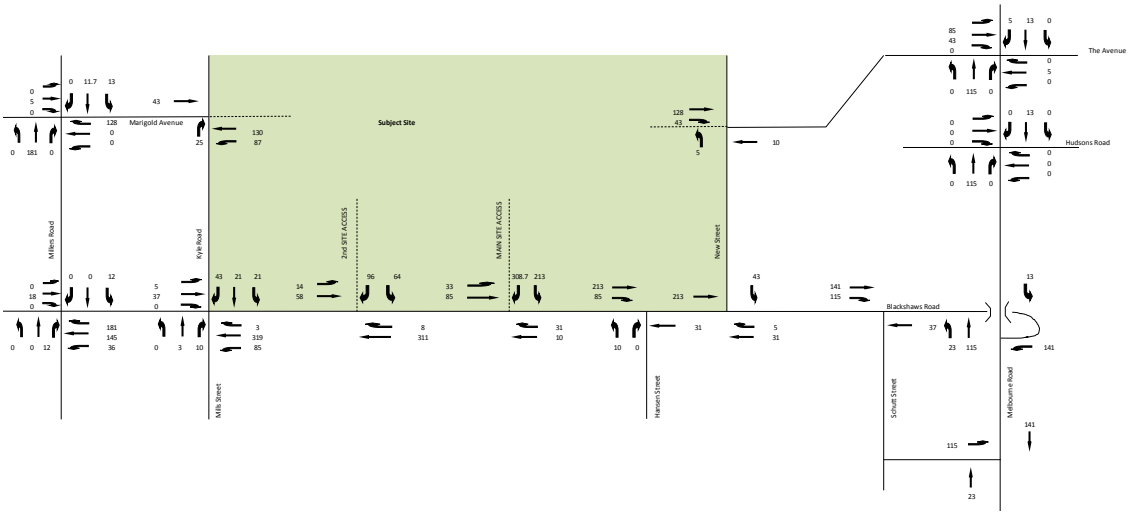
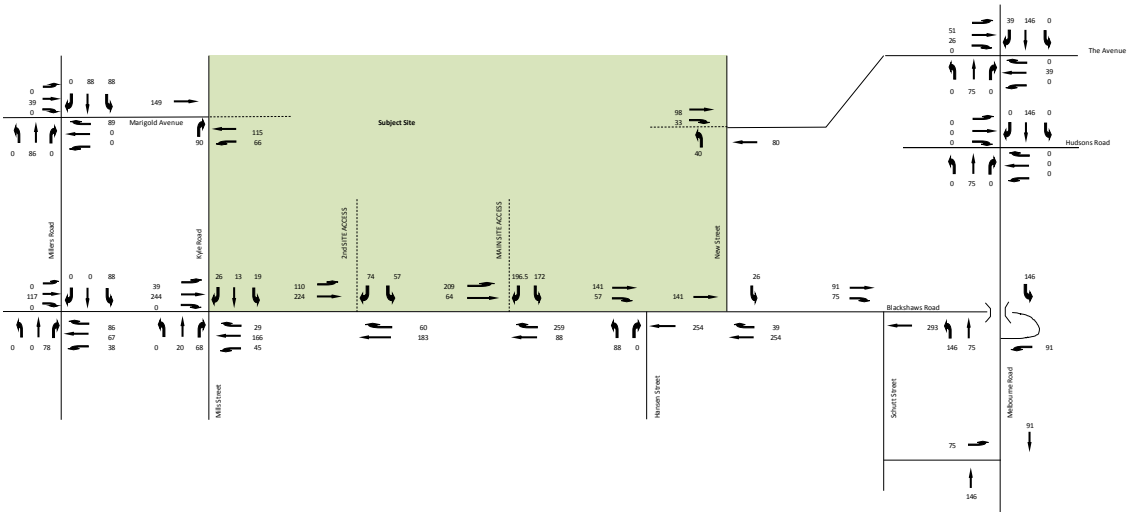


Figure 6.2: PM Peak Hour Site Generated Traffic Volumes



6.4 Other Developments

A number of other developments are proposed within the vicinity of the subject site. These developments are outlined in Section 3.5.

Adopting the same residential dwelling traffic generation rate, the estimated traffic generation of these developments is presented in Table 6.4, with the exception of the Bradmill Site, which is only expected to contribute a minimal amount of traffic to the proximate road network surrounding the subject site.

Table 6.4: Traffic Generation Estimates

Development	Size	Traffic Generation Rate		Vehicle Movements	
		Peak Hour	Daily	Peak Hour	Daily
41 - 59 Stephenson Street	250 dwellings	0.5 movements /dwelling	5 movements /dwelling	125 movements	1,250 movements
Caltex Terminal Site	670 dwellings			335 movements	3,350 movements
Total				**460 movements**	**4,600 movements**

Adopting a distribution of 60% to the east and 40% to the west along Blackshaws Road[7], there can be expected to be an additional 184 vehicle movements in the peak hours that travel past the subject site along Blackshaws Road following the full development of these other sites.

Given that these additional traffic volumes are generated by residential land uses, they are likely to have peak hour direction splits of 20% in / 80% out in the AM and 60% in / 40% out in the PM.

Based on the above, Figure 6.3 and Figure 6.4 have been prepared to show the estimated increase in turning movements in the vicinity of the subject property following full development of these other sites.

[7] This traffic distribution is consistent with the estimates adopted by the Planning Panel for C82 to the Hobsons Bay Planning Scheme.

Figure 6.3: AM Peak Hour Other Development Generated Traffic Volumes

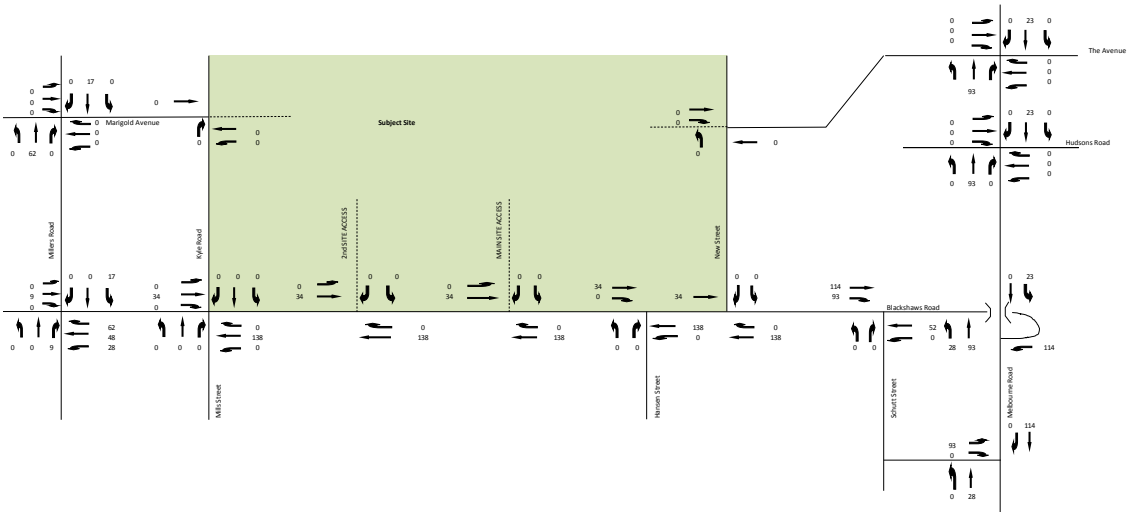
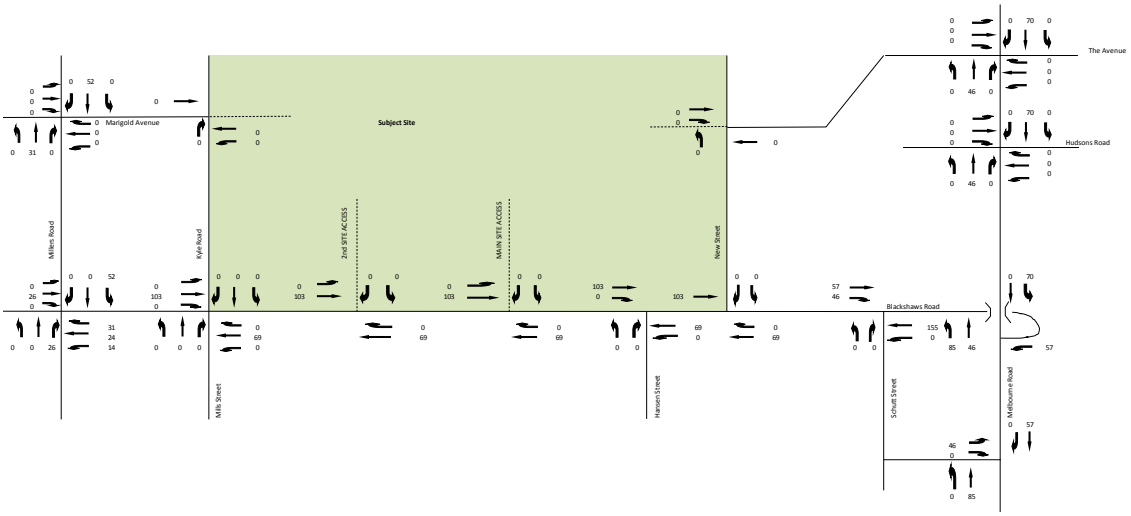


Figure 6.4: PM Peak Hour Other Development Generated Traffic Volumes



6.5 Post Development Analysis

6.5.1 Post Development Traffic Volumes

By adding the traffic generated by the subject site and the other developments within the vicinity of Blackshaws Road to the existing traffic flows or "Base Case" we can obtain the Post-Development traffic volumes. These are outlined in Figure 6.5 and Figure 6.6.

Figure 6.5: Post-Development AM Peak Hour Traffic Volumes

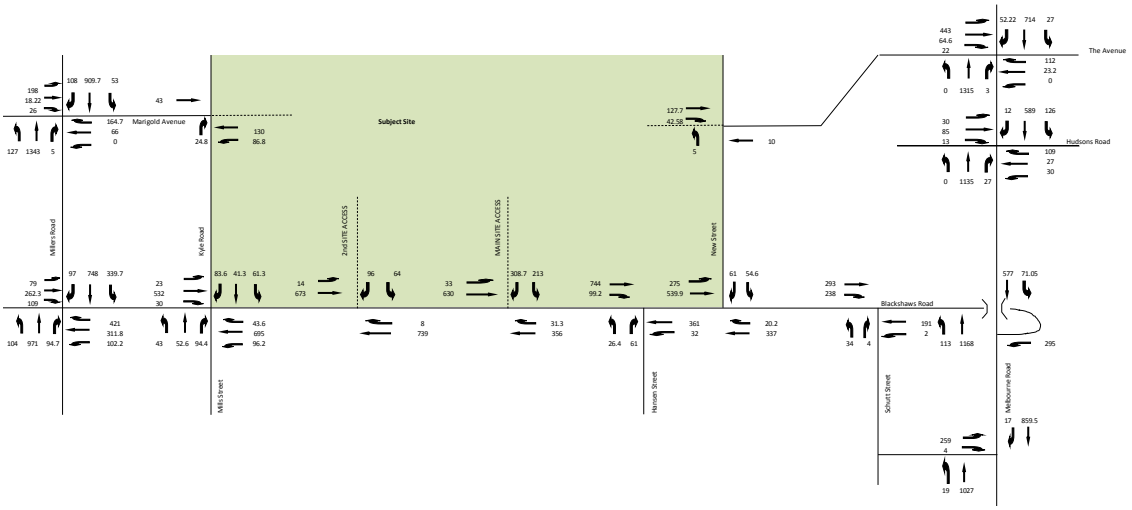
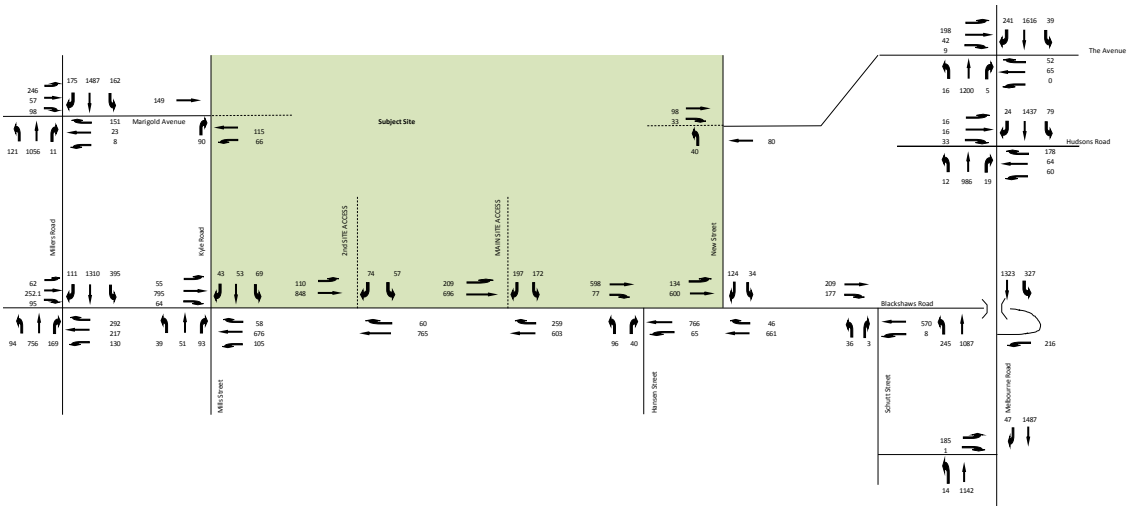


Figure 6.6: Post-Development PM Peak Hour Traffic Volumes



6.5.2 Post Development Traffic Performance

Existing Intersections

The impact of all the development traffic upon the existing intersections in the vicinity of the site was assessed using SIDRA INTERSECTION. On the basis of the turning movement estimates presented above, Table 6.5 presents a summary of the anticipated future operation of the nominated existing intersections following the full development of the site and the other developments in the area. Detailed results of this analysis are provided in Appendix B of this report.

Table 6.5: Post-Development Intersection Operation

Intersection	Period	Approach	DOS	Average Delay (sec)	95th Percentile Queue (m)
Melbourne Road / The Avenue	AM	Melbourne Road (south)	0.64	10 sec	121 m
		The Avenue (east)	0.57	58 sec	46 m
		Melbourne Road (north)	0.34	11 sec	45 m
		The Avenue (west)	# 0.95	25 sec	98 m
	PM	Melbourne Road (south)	0.60	11 sec	110 m
		The Avenue (east)	0.75	57 sec	25 m

Intersection	Period	Approach	DOS	Average Delay (sec)	95th Percentile Queue (m)
		Melbourne Road (north)	# 0.86	11 sec	105 m
		The Avenue (west)	0.41	19 sec	21 m
Melbourne Road / Hudsons Road	AM	Melbourne Road (south)	# 0.88	22 sec	181 m
		Hudsons Road (east)	0.79	47 sec	39 m
		Melbourne Road (north)	0.53	24 sec	84 m
		Hudsons Road (west)	0.35	36 sec	36 m
	PM	Melbourne Road (south)	0.60	18 sec	110 m
		Hudsons Road (east)	# 0.92	47 sec	65 m
		Melbourne Road (north)	0.92	21 sec	255 m
		Hudsons Road (west)	0.64	59 sec	24 m
Melbourne Road / Blackshaws Road	AM	Melbourne Road (south)	0.34	1 sec	0 m
		Blackshaws Road (east)	# 0.43	8 sec	18 m
		Melbourne Road (north)	0.16	1 sec	0 m
	PM	Melbourne Road (south)	0.30	1 sec	0 m
		Blackshaws Road (east)	# 0.45	12 sec	16 m
		Melbourne Road (north)	0.35	1 sec	0 m
Melbourne Road / Ross Street	AM	Melbourne Road (south)	0.30	0 sec	0 m
		Ross Street (east)	0.26	0 sec	1 m
		Melbourne Road (north)	# 0.73	22 sec	34 m
	PM	Melbourne Road (south)	0.35	0 sec	0 m
		Ross Street (east)	0.40	1 sec	5 m
		Melbourne Road (north)	# 0.62	27 sec	21 m
Blackshaws Road / Schutt Street	AM	Schutt Street (south)	0.05	8 sec	1 m
		Blackshaws Road (east)	0.13	0 sec	0 m
		Blackshaws Road (west)	# 0.31	3 sec	10 m
	PM	Schutt Street (south)	0.09	12 sec	2 m
		Blackshaws Road (east)	# 0.39	0 sec	0 m
		Blackshaws Road (west)	0.41	6 sec	14 m
Blackshaws Road / New Street	AM	Blackshaws Road (east)	0.25	1 sec	1 m
		New Street(north)	0.32	19 sec	10 m
		Blackshaws Road (west)	# 0.47	2 sec	0 m
	PM	Blackshaws Road (east)	0.39	1 sec	2 m
		New Street(north)	# 0.89	70 sec	44 m
		Blackshaws Road (west)	0.45	1 sec	0 m
Blackshaws Road / Hansen Street	AM	Hansen Street (south)	# 0.47	32 sec	13 m
		Blackshaws Road (east)	0.28	0 sec	0 m
		Blackshaws Road (west)	0.42	1 sec	3 m
	PM	Hansen Street (south)	# 0.72	44 sec	24 m
		Blackshaws Road (east)	0.48	1 sec	0 m
		Blackshaws Road (west)	0.37	1 sec	4 m
Blackshaws Road / Mills Street / Kyle Road	AM	Kyle Road (south)	0.64	45 sec	47 m
		Blackshaws Road (east)	# 0.76	11 sec	190 m
		Mills Street(north)	0.56	44 sec	39 m
		Blackshaws Road (west)	0.51	12 sec	97 m
	PM	Kyle Road (south)	0.59	45 sec	44 m
		Blackshaws Road (east)	# 0.83	23 sec	232 m
		Mills Street(north)	0.44	42 sec	27 m
		Blackshaws Road (west)	0.87	25 sec	267 m

Intersection	Period	Approach	DOS	Average Delay (sec)	95th Percentile Queue (m)
Millers Road / Blackshaws Road	AM	Millers Road (south)	0.82	40 sec	187 m
		Blackshaws Road (east)	# 1.14	109 sec	326 m
		Millers Road (north)	0.63	22 sec	103 m
		Blackshaws Road (west)	0.68	38 sec	101 m
	PM	Millers Road (south)	# 0.99	41 sec	119 m
		Blackshaws Road (east)	0.96	45 sec	123 m
		Millers Road (north)	0.97	53 sec	340 m
		Blackshaws Road (west)	0.90	55 sec	138 m
Millers Road / Marigold Avenue / Dousa Road	AM	Millers Road (south)	0.88	20 sec	227 m
		Marigold Ave (east)	# 0.94	81 sec	123 m
		Millers Road (north)	0.49	16 sec	75 m
		Dousa Road (west)	0.38	32 sec	48 m
	PM	Millers Road (south)	0.84	26 sec	185 m
		Marigold Ave (east)	0.85	64 sec	80 m
		Millers Road (north)	# 0.86	28 sec	195 m
		Dousa Road (west)	0.45	36 sec	63 m

DOS – Degree of Saturation, # - Intersection DOS

As described earlier, a DOS of around 0.95 for signalised and 0.90 for unsignalised intersections has traditionally been considered the practical limit beyond which intersection performance is unsatisfactory, as beyond this value queues and delays increase disproportionately. On this criterion, the calculated DOS suggest that the nominated intersections can be expected to operate satisfactorily following full development of the subject site and other sites in the area, except for the intersection of Millers Road and Blackshaws Road.

Given that the intersection of Millers Road and Blackshaws Road currently has a DOS of 0.82, and based on the above analysis, the DOS is expected to increase to 1.14 following full development of the site, the intersection is likely to approach its capacity, with queues and delays starting to increase disproportionally into the future.

Upon closer inspection of the SIDRA Intersection results, it is evident that the DOS of 1.14 is associated with the east approach of the intersection in the AM peak hour. In the PM peak hour the north, south and east approaches all reach a DOS above 0.95. As such, additional operational capacity is required to be provided to these approaches to achieve a suitable DOS for the intersection.

On this basis, it is recommended that the following mitigating road works be undertaken at the Millers Road / Blackshaws Road intersection prior to the occupation of any dwellings within the precinct:

- Extend the right-turn lane on the east approach of the intersection by 140m to 200m. by linemarking
- Convert the through lane on the east approach of the intersection to a through and right turn lane.
- Modify the intersection phasing to have a split phasing for the east and west approaches.

The resulting operation of the Millers Road / Blackshaws Road intersection following the implementation of the above mitigating works is presented in Table 6.6 and provided in Appendix B of this report.

Table 6.6: Modified Millers Road / Blackshaws Road Intersection –Post-Development Operation

Intersection	Period	Approach	DOS	Average Delay (sec)	95th Percentile Queue (m)
Millers Road / Blackshaws Road	AM	Millers Road (south)	0.93	58 sec	236 m
		Blackshaws Road (east)	# 0.93	50 sec	202 m
		Millers Road (north)	0.86	27 sec	119 m
		Blackshaws Road (west)	0.90	61 sec	142 m
	PM	Millers Road (south)	0.93	37 sec	114 m
		Blackshaws Road (east)	0.95	57 sec	137 m
		Millers Road (north)	0.96	58 sec	373 m
		Blackshaws Road (west)	0.98	80 sec	179 m

It is noted that the north and west approaches are expected to operate beyond a DOS of 0.95 in the PM peak hour following full development of the site, the others in the area and the proposed mitigating works. However, the resulting DOS of 0.96 and 0.98 are considered to only be marginally above the theoretical limit of 0.95, which is considered to not be uncommon for such an arterial road in an inner Melbourne location servicing the West Gate Freeway.

Proposed Access Intersections

In terms of the operation of the proposed access intersections following full development of the site and the others in the area, only the two main access intersections that permit full turning movements located along Blackshaws Road are expected to require any operational assessment.

As such, these have been assessed through *SIDRA INTERSECTION*. Table 6.7 presents a summary of the anticipated operation of the two main access intersections proposed along Blackshaws Road following the full development of the site. Detailed results of this analysis are provided in Appendix C of this report.

Table 6.7: Proposed Access Intersections – Post-Development Operation

Intersection	Period	Approach	DOS	Average Delay (sec)	95th Percentile Queue (m)
Main Site Access / Blackshaws Road (Signalised)	AM	Blackshaws Road (east)	0.46	12 sec	89 m
		Main Site Access (north)	0.60	38 sec	87 m
		Blackshaws Road (west)	# 0.62	9 sec	94 m
	PM	Blackshaws Road (east)	# 0.72	10 sec	92 m
		Main Site Access (north)	0.71	50 sec	59 m
		Blackshaws Road (west)	0.59	4 sec	29 m
2nd Site Access / Blackshaws Road (Unsignalised)	AM	Blackshaws Road (east)	0.40	0 sec	1 m
		2nd Site Access (north)	# 0.54	24 sec	15 m
		Blackshaws Road (west)	0.37	0 sec	0 m
	PM	Blackshaws Road (east)	0.44	1 sec	3 m
		2nd Site Access (north)	# 0.80	60 sec	23 m
		Blackshaws Road (west)	0.54	1 sec	0 m

DOS – Degree of Saturation, # - Intersection DOS

Table 6.7 indicates that the proposed access intersections can be expected to operate satisfactorily following full development of the site and others in the area.

The assessment typically required of the future operation of the proposed site access intersections (i.e. 10 years following their construction) is considered to have been addressed through the inclusion of traffic from the other proposed developments in the area. These other developments

are considered to represent the majority of any additional traffic volumes that could reasonable expected to be generated in the area and travel along Blackshaws Road past the site.

Surrounding Arterial Road Network

Based on the proposed vehicle access approach it is expected that the majority of the anticipated additional site generated traffic will utilise Blackshaws Road to access the surrounding arterial road network, and particularly Millers Road and Melbourne Road. While the above intersection assessments consider there to be sufficient capacity following some mitigating works to enable a suitable level of access between the precinct and the surrounding arterial road network, it is noted that there are current significant capacity constraints within the arterial network in the area, especially in accessing the West Gate Freeway in the northbound direction in the AM peak hour and southbound in the PM peak hour.

This is an existing constraint that could not be reasonably expected to be mitigated by any one development. Moreover, the level of impact this development and the others in the area will have on this existing constraint is expected to be moderate, given the traffic volumes involved. Rather, it is expected that this existing constraint will be addressed at a more macro level through initiatives implemented by Council, VicRoads, DPTLI, and other associated agencies over the medium to long-term, through such initiatives as those indicated in Section 2 of this report.

However, at a precinct level, it is recommended that suitable initiatives to provide the opportunity and encouragement of residents to use alternative transport modes be investigated to generate a significant mode shift away from the use of private motor vehicles, especially when travelling to and from employment, so the anticipated traffic generated by the developments in the area are not fully achieved.

At this point in the development of the Development / Structure Plan, such initiatives have been considered for the Precinct through the provision of suitable cycling and pedestrian facilities and access to the current bus services travelling along the frontages of the Precinct. The ability for bus services to travel through the Precinct is also provided, which should help connect potential residents to the local employment centres and train network. Further consideration of supporting and encouraging the use of alternative transport modes by potential residents of the Precinct is discussed throughout this report and is expected to be considered further within a Precinct focused Integrated Transport Plan[8] that will be prepared later in the planning process.

Surrounding Local Road Network

Whilst the site access strategy seeks to maximise the use of Blackshaws Road to access the site, it is anticipated that there will be some additional traffic that will access the site through the local roads to the east and west of the site.

In this regard, based on the analysis in Section 6.3 of this report, Table 6.8 has been prepared to summarise the likely post development traffic volumes on the local roads in the vicinity of the subject areas likely to be used to access the site.

[8] In line with Department of Transports Land Use and Development Guidelines for an integrated transport network: http://www.transport.vic.gov.au/__data/assets/pdf_file/0018/31239/PTGuidelinesLandUseDevelopment.pdf

Table 6.8: Midblock Capacity Analysis

Location	PM Peak Two-way Flows		Mid-Block Capacity [3] (vpd)
	Base Case (vpd)	Post Development (vpd)	
The Avenue	5,939 [1]	7,369	7,000
Kernot Street	5,068 [1]	6,498	7,000
Brunel Street	2,682 [2]	4,112	7,000
Hudsons Road	1,756 [2]	1,756	3,000
Marigold Avenue	1,900 [1]	3,910	3,000

[1] Based on week-long pneumatic tube count data provided by Hobsons Bay City Council for the associated streets completed in April, 2012

[2] Based on week-long pneumatic tube counts undertaken by GTA Consultants in June, 2012

[3] Source: Hobsons Bay Planning Scheme, Clause 56.06.

vpd – Vehicles per day

Table 6.8 indicates that the road network in the vicinity of the subject site currently operates with a satisfactory level of service, and will generally continue under post development conditions for the subject site and others in the area.

However, it is noted that The Avenue and Marigold Avenue could potentially operate over their indicative midblock capacities.

With regard to The Avenue, this is only expected to occur for the section between Melbourne Road and Kernot Street, which has an increased carriageway width compared to typical carriageway dimensions for a connector street, and can be expected to be able to accommodate the marginally higher daily traffic volumes than indicated within Table C1 of Clause 56.08-8 of the Hobsons Bay Planning Scheme. Also, the indicated post-development two-way daily traffic volumes are considered to be conservative on the high side, as vehicles can access Melbourne Road through other local roads, such as Hudsons Road. Furthermore, within an urban environment, the capacity of intersections is considered to be more of a constraint than mid-block volumes. This has been considered through the post-development analysis of the Melbourne Road / The Avenue signalised intersection assessment, which indicates that the intersection can be expected to operate satisfactorily with a DOS of 0.94 following full development of the subject site and others in the area.

With regards to Marigold Street, the indicated post-development two-way daily traffic volumes are considered to be conservative on the high side, as vehicles from the north can access the site through other local roads, such as Clematis Avenue and Cyclemen Avenue. Further, and as mentioned above, the intersection operation is generally considered to provide a better indication of the ability to accommodate such traffic volumes. This has been considered through the post-development analysis of the Millers Road / Marigold Avenue signalised intersection assessment, which indicates that the intersection can be expected to operate satisfactorily with a DOS of 0.94 following full development of the subject site and others in the area.

Moreover, at a more macro-level and given the current and expected levels of traffic congestion on the West Gate Freeway, there is expected to be a shift away from the use of private motor vehicles for at least commuter trips to the Melbourne CBD, and therefore the anticipated traffic volumes may not be fully realised by the proposed development in the area.

6.6 Summary

On the basis of the above discussions and analysis, it is considered that the anticipated traffic generated by the proposed rezoning and development of Precinct 15, can be accommodated by the surrounding road network under immediate post-development conditions, subject to the following mitigating road works to the existing road infrastructure:

- At the Millers Road / Blackshaws Road signalised intersection:
  - Extend the right-turn lane on the east approach of the intersection by 140m to 200m through modification to road markings and introduction of parking restrictions that at least restricts kerbside parking during the commuter traffic peaks.
  - Convert the through lane on the east approach of the intersection to a through and right turn lane by modifying the directional arrow markings.
  - Modify the intersection phasing to have a split phasing for the east and west approaches.
- Increase the lengths of 'No Stopping' parking restrictions and install line marked right turn lanes on Blackshaws Road at the unsignalised intersections with Kyle Road, New Street, Hansen Street and The Broadway,

Additionally, it will be necessary to install traffic signals at the new site access intersection to Blackshaws Road adjacent to the proposed mixed use zone and construct other site access intersections.

It is expected that the full costs of implementing the above mitigating works and the proposed access arrangements will be implemented through a Development Contributions Plan (funded by developers, Council and VicRoads) and/or conditions of a planning permit.

7. Integrated Transport Infrastructure

7.1 Preamble

As the proposal is only in the Development Plan and rezoning phase, the details are still being developed. However, eventually the development of the site will need to accord with the requirements of Clause 56 of the Hobson Bay Planning Scheme. Therefore, this section of the report assesses the proposed development against the access and mobility requirements set out within Clause 56.06 of the Planning Scheme for subdivisions.

Clause 56.06 aims to:

"achieve an urban structure where compact and walkable neighbourhoods are clustered to support larger activity centres on the Principal Public Transport Network in Metropolitan Melbourne and on the regional public transport network outside Metropolitan Melbourne.
To provide for walking (including persons with impaired mobility), cycling, public transport and other motor vehicles in an integrated manner.
To contribute to reduced car dependence, improved energy efficiency, reduced greenhouse gas emissions and reduced air pollution."

Standard C14 of the Clause requires that a plan of the layout of the neighbourhood be prepared that meets the objectives of:

- Clause 56.06-2 Walking and cycling network
- Clause 56.06-3 Public Transport network
- Clause 56.06-4 Neighbourhood street network.

Clause 56.06 divides walking and cycling facilities, public transport facilities and street network design into two areas, being Network Objectives and Detail Objectives, of which much of the latter is a matter for detailed design and therefore cannot be assessed at this stage.

7.2 Walking and Cycling

Statutory Requirements

The walking and cycling network and detailed objectives set out within Clause 56.06-2 and 56.06-5 respectively state the following:

Clause 56.06-2

- *"To contribute to community health and well-being by encouraging walking and cycling as part of the daily lives of residents, employees and visitors.*
- *To provide safe and direct movement through and between neighbourhoods by pedestrian and cyclists.*
- *To reduce car use, greenhouse gas emissions and air pollution."*

Clause 56.06-5

- *"To design and construct footpaths, shared cycle path networks that are safe, comfortably, well constructed and accessible for people with disabilities.*
- *To design footpaths to accommodate wheelchairs, prams, scooters and other footpath vehicles"*

Standards C15 and C18 set out the requirements that should be met to meet the objectives of these Clauses.

Proposed Treatments

Footpaths will generally be provided on both sides of the roads within the site. Shared paths of at least 2.5m in width are envisaged through the site within the open space areas and on one side of the connector roads. The on-road traffic volume and speed environments will generally be consistent with Figure 2.2 of the Cycling Aspects of Austroads Guides (2014). This is considered to provide a suitable level of access for pedestrians and cyclists of all abilities expected to be generated within and potential to travel through the Precinct.

To support longer trips and integrate with the broad active transport network, a connection will be provided to the eventual extension of the Federation Trail along Brunel Street and The Avenue, with a potential alternate more direct connection via a pedestrian bridge over the railway at the northeast corner of the site. This will also help support access to the proposed off-road local bicycle route along Birmingham Street and McLister Street, connecting to the Spotswood Train Station, as outlined in the Hobsons Bay Strategic Bicycle Plan (2003).

Compliance to Clause 56

The objectives of Clauses 56.06-2 and 56.06-5 are considered to be met as follows:

- A majority of lots would be within a reasonable walking distance of the following amenities:
    - Public transport - bus services currently operate along Kyle Road and Blackshaws Road with the potential for services to operate along the connector streets within the proposed development.
    - Neighbourhood shops - there is a mixed use zone proposed as part of the development, with the Altona North Major Activity Centre also proximately located to the west.
    - Public open space – suitable green belts and passive open space, including the 'Quarry Park' are been contemplated.
    - Community facilities – there are expected to be provided as part of the mixed use zone and public open spaces.
- The walking and cycling network through the subdivision is logical and generally follows the pattern of streets and public open spaces as follows:
    - Access Lanes - shared pedestrian, cycle and motor vehicle facilities on street.
    - Access Streets - shared cycle facilities on street, dedicated footpaths.
    - Connector Streets - marked cycle lanes on street and shared paths or separated bicycle paths on one side of the road where possible.
    - Public Open Spaces - shared paths through open spaces connecting to other facilities where possible.
- The walking and cycling network links into existing facilities allowing the cycling network to connect into the regional network.
- Where cul de sacs are provided, walking and cycling connections are provided where possible.
- The proposed road reservations are sufficient to provide footpaths and cycle paths in line with the requirements of Table C1 of the Clause.

7.3 Public Transport

Statutory Requirements

Clause 56.06-3 and 56.06-6 set out the public transport network and detailed design objectives for subdivisions as follows:

Clause 56.06-3

"To provide an arterial road and neighbourhood street network that supports a direct efficient and safe public transport system.
To encourage maximum use of public transport."

Clause 56.06-6

"To provide for the safe, efficient operation of public transport and the comfort and convenience of public transport users; and.
To provide public transport stops that are accessible to people with disabilities."

Standards C16 and C19 set out the standards that need to be met in relation to bus routes and the location and design of bus and tram stops.

Proposed Treatments

Provision has been made to accommodate future bus routes on the connector streets within the Precinct, with the ability to accommodate future kerbside bus stops along the east-west connector street between Kyle Road and New Street.

In combination with the surrounding existing bus routes almost the whole of the subject site would be within 400m walking distance of a bus stop if a future route operates along the connector streets.

Compliance with Clause 56

Section 2.5 of this report discusses the integrated transport network surrounding the development site from which it is apparent that public transport would be accessible to residents within the new subdivision.

Although the proposed development is considered large enough to suggest that public transport services through the site could be viable, the implementation of these services is a matter for the public transport operators and DEDJTR. However, the objectives of Clause 56.06-3 and 56.06-6 are considered to be met.

7.4 Neighbourhood Street

Statutory Requirements

Clauses 56.06.4 and 56.06-7 set out the neighbourhood street network and detail objectives and aims as follows:

Clause 56.06.4

"Provide for a direct, safe and easy movement through and between neighbourhoods for pedestrians, cyclists, public transport and other motor vehicles using the neighbourhood street network."

Clause 56.06.7

"To design and construct street carriageways and verges so that the geometry and traffic speeds provide an accessible and safe neighbourhood street system for all users."

Standards C17 and C20 set out a number of standards that should be met to achieve the aims of Clauses 56.06-4 and Clause 56.06-7.

Proposed Treatments

The proposed subdivision would connect into the existing street network at the following locations:

- A new signalised intersection with Blackshaws Road towards the east of the precinct, between The Broadway and Hansen Street.
- Additional unsignalised accesses from Blackshaws Road.
- Additional access points from Kyle Road, including an upgraded intersection with Cyclamen Avenue.
- Additional access points from New Street, including an upgraded intersection with Brunel Street.

In terms of the internal neighbourhood street network, an indicative street hierarchy is shown in Figure 7.1.

Figure 7.1: Indicative Street Network Hierarchy

Note: Subject to change at detailed design

Compliance with Clause 56

Table 7.1 assesses the proposed road hierarchy against the requirements of Clause 56.06-7 of the Hobsons Bay Planning Scheme.

Table 7.1: Proposed Road Hierarchy Details

Street Type	Target Speed	Indicative Road Reservation Width [1]	Parking Provision	Theoretical Capacity Daily Traffic Volume	Anticipated Peak Daily Traffic Volume
Access Lane	10kph	5.5m	None	300 vehicles per day	<300 vpd
Access Street – Level 1	30kph	13.5m	Kerbside parking along one side of the road	1,000 to 2,000 vehicles per day	<2,000 vpd
Access Street – Level 2	40kph	16m to 16.5m	Kerbside parking along both sides of the road	2,000 to 3,000 vehicles per day	
Connector Street – Level 1	50kph	17.4m to 24m	Kerbside or indented parking on both sides of the road	3,000 vehicles per day	6,500 vpd[3]
Connector Street – Level 2	60kph	20.4m to 27m [2]	Potential for indented parking on both sides of the road	3,000 to 7,000 vehicles per day	

[1] Minimum road reserve calculated based on minimum carriageway width and verge width set out within Table C1 of Clause 56.06 plus indented parking bay width of 2.1m plus 0.5m clearance where provided.
[2] Minimum road reservation clear of intersections with connector street level 2 and arterial roads where road reservation needs to increase to provide for turning lanes.
[3] The short section of the north-south connector street adjacent to the eastern side of the contemplated mixed use zone is expected to carry up to 7,850 vpd, but will be suitably designed to accommodate such traffic volumes.

As indicated within Table 7.1 the proposed road hierarchy accords with the minimum requirements necessary to allow carriageways, footpaths and cycle paths to be accommodated appropriate to the road type as specified within Table C1 of Clause 56.06.

It is noted that all road reservations include additional widths at intersections in order to incorporate the visibility splay requirements set out within Standard C20.

The speed targets for the internal street network would be met due to the inclusion of the following:

- network design incorporating bends as slow points
- provision of slow points or other similar suitable treatments to limit maximum leg lengths to achieve target speed.

The design of the latter would be undertaken as part of the detailed design of the street network and those that would be located on connector streets should be designed to accommodate buses.

The contemplated internal road network is anticipated to accommodate traffic volumes less than the associated road type's theoretical capacity, except for the short section of the proposed north-south connector street adjacent to the eastern side of the mixed use zone.

At this location the roadway would be expected to carry up to 7,850 vehicles per day. While this exceeds the theoretical capacity of 7,000 vehicles per day for a connector street, this section of the north-south connector street could be widened to accommodate a central median, with no kerbside parking permitted to maximise its capacity.

In addition, it is noted that no dedicated on-road bicycle lanes are proposed on the connector streets. Instead, off-road facilities are being contemplated on one side of the connector street carriageways within the road reserves, and with suitable crossing facilities they would be appropriate for the majority of potential users. Moreover, if vehicle speeds are managed appropriately on the connector streets mixed traffic conditions are considered to be appropriate

for those users that wish to cycle on the road. Furthermore, widening the carriageway to accommodate dedicated bicycle lanes is considered to be counterproductive in trying to manage vehicle speeds.

8. Car Parking

8.1 Residential Dwellings

Car parking for the proposed residential dwelling lots should be provided in accordance with the requirements of Clause 52.06 of the Hobsons Bay Planning Scheme through a minimum provision of single garages for one and two bedroom dwellings and double garages for three or more bedroom dwellings. Visitor car parking demands are expected to be able to be accommodated on-street.

8.2 Apartments

Integrated car parking facilities should be provided for any apartment buildings, with a typical on-site car parking provision of one space for one and two bedroom apartments and two spaces for three or more bedroom apartments.

Residential visitor car parking demands are expected to be able to be accommodated on-street.

Consideration could also be given to reducing the above car parking provision to help encourage the use of alternative transport modes, especially for any small one-bedroom dwellings.

8.3 Mixed Use Zone

While the specific details for approx. 5,550sqm of retail floor space within a mixed use zone have not been confirmed at this time, it is expected to include typical shop, supermarket and café uses, with the potential for some limited office and/or medical centre facilities. It is likely that a provision of in the order of 280 car spaces will be needed to be consistent with the statutory car parking rates for such land uses within Clause 52.06 of the Hobsons Bay Planning Scheme. A future permit application for the mixed use zone would include a detailed parking assessment, including the impacts of shared parking arrangements.

9. Conclusion

Based on the analysis and discussions presented within this report, the following conclusions are made:

i The proposed land uses associated with the development of the site following rezoning would be expected to generate approximately 16,888 vehicle movements per day and up to 1,700 vehicle movements per peak hour external to the site.

ii Over and above the existing traffic volumes experienced in the surrounding road network, the proposed development would distribute approximately 15,828 additional vehicle movements per day and up to 1,500 vehicles per peak hour when consideration is given to the traffic movements currently generated by the existing land uses.

iii There is sufficient capacity within the existing immediate road network to accommodate the additional traffic movements, subject to the following mitigating road works at the Millers Road / Blackshaws Road intersection:

- Extend the right-turn lane on the east approach of the intersection by 140m to 200m.
- Convert the through lane on the east approach of the intersection to a through and right turn lane.
- Modify the intersection phasing to have a split phasing for the east and west approaches.

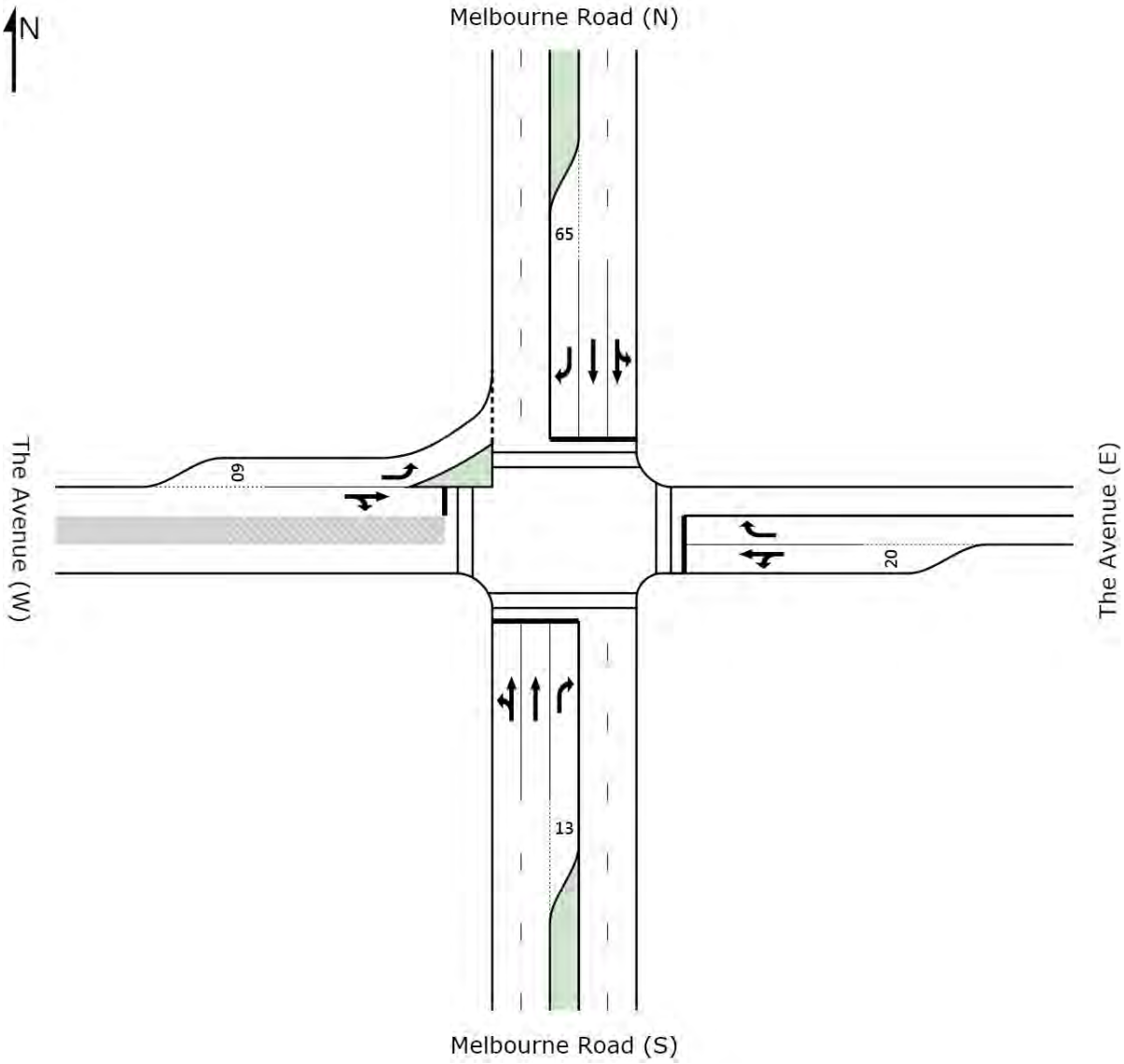
vi In addition, it is expected that increased lengths of 'No Stopping' parking restrictions and right turn lanes will need to be provided on Blackshaws Road at the intersections with Schutt Street, New Street, Hansen Street and The Broadway to improve the level of service and attractiveness of Blackshaws Road in accessing the Precinct.

iv The internal road network and access arrangements as contemplated are considered appropriate and are expected to operate safely and efficiently.

v The proposed development will be expected to include walking and cycling routes that connect all dwellings with local major trip generators and the surrounding bus services and passenger train lines. This, along with other macro-level transport conditions and initiatives, should help see a shift away from the use of private motor vehicles for at least commuter trips into the future and therefore the above anticipated traffic volumes may not be fully realised on the surrounding road network.

Appendix A

SIDRA INTERSECTION Results – Existing Conditions


N
Melbourne Road (N)
65
The Avenue (W)
60
20
The Avenue (E)
13
Melbourne Road (S)

MOVEMENT SUMMARY

Site: Melbourne Road/The Avenue - AM Peak

Melbourne Road / The Avenue

Signals - Fixed Time Cycle Time = 116 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Melbourne Road (S)											
1	L	1	0.0	0.537	16.3	LOS B	12.1	84.9	0.37	1.02	42.7
2	T	1263	0.0	0.537	8.1	LOS A	12.1	84.9	0.37	0.34	47.7
3	R	3	0.0	0.060	66.7	LOS E	0.2	1.2	0.97	0.62	21.1
Approach		1267	0.0	0.537	8.3	LOS A	12.1	84.9	0.37	0.34	47.5
East: The Avenue (E)											
4	L	1	0.0	0.206	49.5	LOS D	0.9	6.5	0.85	0.75	26.5
5	T	19	0.0	0.206	41.3	LOS D	0.9	6.5	0.85	0.59	27.0
6	R	118	0.0	0.426	54.7	LOS D	6.1	42.5	0.93	0.80	23.9
Approach		138	0.0	0.426	52.8	LOS D	6.1	42.5	0.92	0.77	24.3
North: Melbourne Road (N)											
7	L	28	0.0	0.333	16.5	LOS B	6.5	45.4	0.33	0.98	42.3
8	T	738	0.0	0.333	7.5	LOS A	6.5	45.4	0.31	0.27	48.4
9	R	49	0.0	0.515	70.3	LOS E	2.9	20.6	1.00	0.74	20.4
Approach		816	0.0	0.515	11.6	LOS B	6.5	45.4	0.35	0.32	44.5
West: The Avenue (W)											
10	L	377	0.0	0.801	22.2	LOS C	11.0	77.1	0.49	0.81	37.5
11	T	23	0.0	0.151	42.7	LOS D	2.2	15.5	0.87	0.66	25.9
12	R	23	0.0	0.151	50.9	LOS D	2.2	15.5	0.87	0.77	25.5
Approach		423	0.0	0.801	24.9	LOS C	11.0	77.1	0.53	0.80	35.7
All Vehicles		2644	0.0	0.801	14.3	LOS B	12.1	84.9	0.42	0.43	42.3

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue		Prop. Queued	Effective Stop Rate
					Pedestrian	Distance		
		ped/h	sec		ped	m		per ped
P1	Across S approach	53	49.3	LOS E	0.2	0.2	0.92	0.92
P3	Across E approach	53	18.2	LOS B	0.1	0.1	0.56	0.56
P5	Across N approach	53	49.3	LOS E	0.2	0.2	0.92	0.92
P7	Across W approach	53	17.1	LOS B	0.1	0.1	0.54	0.54
All Pedestrians		212	33.5	LOS D			0.74	0.74

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.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: Melbourne Road/The Avenue - PM Peak

Melbourne Road / The Avenue

Signals - Fixed Time Cycle Time = 111 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Melbourne Road (S)											
1	L	17	0.0	0.543	18.6	LOS B	13.4	94.0	0.45	0.99	41.1
2	T	1184	0.0	0.543	10.4	LOS B	13.4	94.0	0.45	0.40	45.1
3	R	5	0.0	0.091	61.4	LOS E	0.3	1.9	0.93	0.64	22.3
Approach		1206	0.0	0.543	10.7	LOS B	13.4	94.0	0.45	0.41	44.9
East: The Avenue (E)											
4	L	1	0.0	0.312	56.4	LOS E	1.4	9.9	0.93	0.74	24.5
5	T	27	0.0	0.312	48.2	LOS D	1.4	9.9	0.93	0.66	24.8
6	R	55	0.0	0.298	58.4	LOS E	2.8	19.8	0.95	0.76	23.0
Approach		83	0.0	0.312	55.0	LOS E	2.8	19.8	0.95	0.73	23.6
North: Melbourne Road (N)											
7	L	41	0.0	0.660	10.9	LOS B	6.6	46.0	0.18	1.03	46.8
8	T	1547	0.0	0.660	2.2	LOS A	6.6	46.0	0.16	0.15	55.7
9	R	213	0.0	0.748	59.6	LOS E	11.4	79.9	0.99	0.86	22.7
Approach		1801	0.0	0.748	9.2	LOS A	11.4	79.9	0.26	0.25	47.4
West: The Avenue (W)											
10	L	155	0.0	0.290	10.2	LOS B	1.9	13.0	0.31	0.68	46.9
11	T	17	0.0	0.134	48.7	LOS D	1.3	9.2	0.93	0.68	24.3
12	R	9	0.0	0.134	56.8	LOS E	1.3	9.2	0.93	0.74	24.0
Approach		181	0.0	0.290	16.2	LOS B	1.9	13.0	0.40	0.68	41.3
All Vehicles		3272	0.0	0.748	11.3	LOS B	13.4	94.0	0.35	0.35	44.9

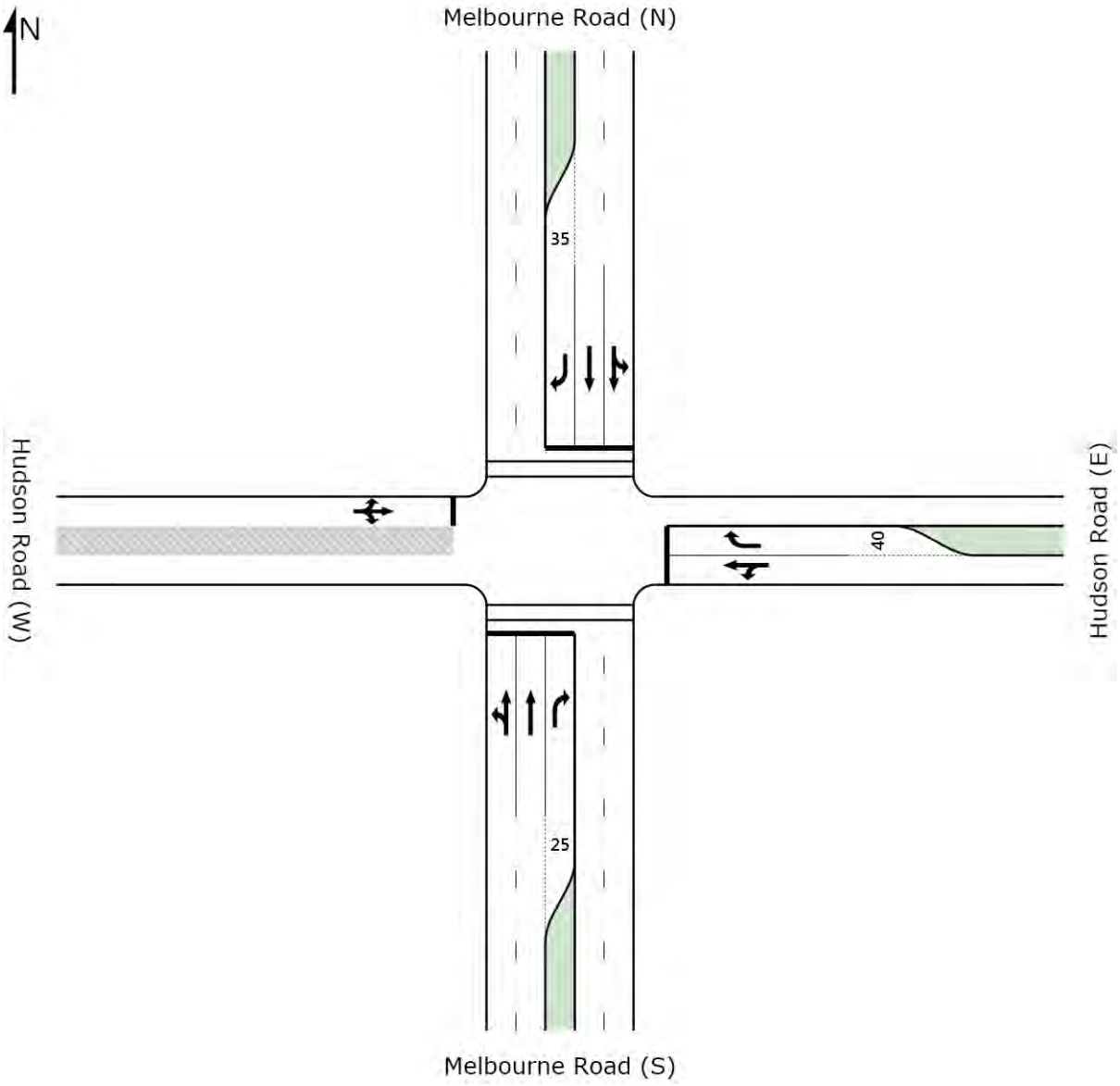
Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue		Prop. Queued	Effective Stop Rate
					Pedestrian	Distance		
		ped/h	sec		ped	m		per ped
P3	Across E approach	53	21.4	LOS C	0.1	0.1	0.62	0.62
P7	Across W approach	53	20.2	LOS C	0.1	0.1	0.60	0.60
All Pedestrians		106	20.8	LOS C			0.61	0.61

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.

SIDRA INTERSECTION


N
Melbourne Road (N)
35
Hudson Road (W)
40
Hudson Road (E)
25
Melbourne Road (S)

MOVEMENT SUMMARY

Site: Melbourne Road/Hudson Road - AM Existing

New Site
Signals - Fixed Time Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Melbourne Road (S)											
1	L	1	0.0	0.752	25.3	LOS C	17.3	121.4	0.77	0.94	37.4
2	T	1074	0.0	0.752	17.1	LOS B	17.3	121.4	0.77	0.69	38.8
3	R	28	0.0	0.230	51.8	LOS D	1.2	8.5	0.94	0.71	24.7
Approach		1103	0.0	0.752	18.0	LOS B	17.3	121.4	0.78	0.69	38.3
East: Hudson Road (E)											
4	L	32	0.0	0.086	28.1	LOS C	1.7	12.0	0.68	0.79	34.5
5	T	28	0.0	0.086	19.9	LOS B	1.7	12.0	0.68	0.53	36.1
6	R	115	0.0	0.695	55.1	LOS E	5.3	37.3	1.00	0.84	23.8
Approach		175	0.0	0.695	44.5	LOS D	5.3	37.3	0.89	0.78	26.8
North: Melbourne Road (N)											
7	L	133	0.0	0.521	31.2	LOS C	11.6	81.5	0.77	0.87	33.3
8	T	606	0.0	0.521	22.6	LOS C	11.6	81.5	0.75	0.64	35.1
9	R	13	0.0	0.102	53.2	LOS D	0.6	3.9	0.97	0.68	24.3
Approach		752	0.0	0.521	24.7	LOS C	11.6	81.5	0.75	0.68	34.5
West: Hudson Road (W)											
10	L	32	0.0	0.347	41.4	LOS D	5.1	36.0	0.90	0.81	29.0
11	T	89	0.0	0.347	33.2	LOS C	5.1	36.0	0.90	0.72	29.4
12	R	14	0.0	0.347	41.4	LOS D	5.1	36.0	0.90	0.81	29.0
Approach		135	0.0	0.347	36.0	LOS D	5.1	36.0	0.90	0.75	29.3
All Vehicles		2164	0.0	0.752	23.6	LOS C	17.3	121.4	0.78	0.70	35.1

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue		Prop. Queued	Effective Stop Rate
					Pedestrian	Distance		
		ped/h	sec		ped	m		per ped
P1	Across S approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
P5	Across N approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		106	39.2	LOS D			0.93	0.93

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.

Processed: Friday, 21 December 2012 12:31:06 PM
SIDRA INTERSECTION 5.1.13.2093

SIDRA INTERSECTION

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140708sid-14M1544000-Melbourne Road Hudson Road.sip
8000056, GTA CONSULTANTS, ENTERPRISE

MOVEMENT SUMMARY

Site: Melbourne Road/Hudson Road - PM Existing

Melbourne Road / Hudson Road

Signals - Fixed Time Cycle Time = 97 seconds (User-Given Cycle Time)

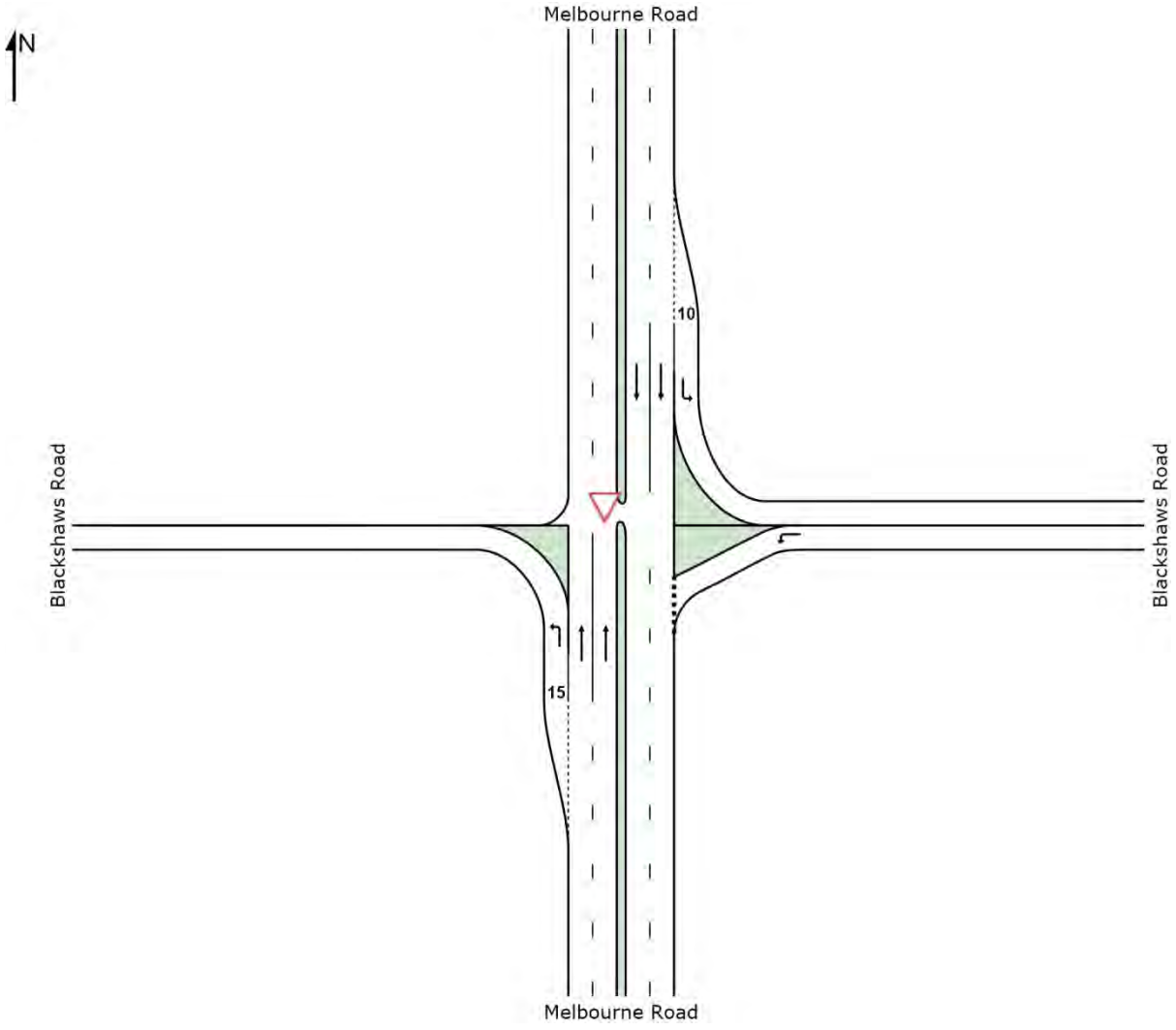
Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Melbourne Road (S)											
1	L	13	0.0	0.590	28.3	LOS C	15.0	104.9	0.70	0.94	35.3
2	T	959	0.0	0.590	20.1	LOS C	15.0	105.1	0.70	0.62	37.0
3	R	20	0.0	0.174	57.6	LOS E	0.9	6.6	0.96	0.70	23.2
Approach		992	0.0	0.590	21.0	LOS C	15.0	105.1	0.71	0.62	36.5
East: Hudson Road (E)											
4	L	63	0.0	0.208	33.3	LOS C	4.4	31.1	0.76	0.82	32.0
5	T	67	0.0	0.208	25.1	LOS C	4.4	31.1	0.76	0.62	33.1
6	R	187	0.0	0.872	56.3	LOS E	9.3	65.3	0.93	0.95	23.5
Approach		318	0.0	0.872	45.1	LOS D	9.3	65.3	0.86	0.85	26.6
North: Melbourne Road (N)											
7	L	83	0.0	0.877	27.1	LOS C	29.1	203.8	0.83	0.98	36.1
8	T	1359	0.0	0.877	18.9	LOS B	29.3	204.8	0.83	0.82	37.3
9	R	25	0.0	0.220	55.8	LOS E	1.2	8.2	0.95	0.71	23.6
Approach		1467	0.0	0.877	20.0	LOS C	29.3	204.8	0.84	0.82	36.9
West: Hudson Road (W)											
10	L	17	0.0	0.637	60.8	LOS E	3.5	24.3	1.00	0.80	22.6
11	T	17	0.0	0.637	52.6	LOS D	3.5	24.3	1.00	0.80	22.8
12	R	35	0.0	0.637	60.8	LOS E	3.5	24.3	1.00	0.80	22.7
Approach		68	0.0	0.637	58.8	LOS E	3.5	24.3	1.00	0.80	22.7
All Vehicles		2845	0.0	0.877	24.1	LOS C	29.3	204.8	0.80	0.76	34.7

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

SIDRA INTERSECTION

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140708sid-14M1544000-Melbourne Road Hudson Road.sip
8000056, GTA CONSULTANTS, ENTERPRISE


N
Melbourne Road
Blackshaws Road
Blackshaws Road
10
15
Melbourne Road

MOVEMENT SUMMARY

Site: Melbourne Road / Blackshaws Road - AM Peak Hour Existing

Melbourne Road / Blackshaws Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Melbourne Road											
1	L2	95	0.0	0.051	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
2	T1	1108	0.0	0.284	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1203	0.0	0.284	0.5	NA	0.0	0.0	0.00	0.04	59.5
East: Blackshaws Road											
4	L2	162	0.0	0.164	7.1	LOS A	0.6	4.4	0.39	0.63	52.9
Approach		162	0.0	0.164	7.1	LOS A	0.6	4.4	0.39	0.63	52.9
North: Melbourne Road											
7	L2	61	0.0	0.033	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
8	T1	607	0.0	0.156	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		668	0.0	0.156	0.5	NA	0.0	0.0	0.00	0.05	59.5
All Vehicles		2034	0.0	0.284	1.0	NA	0.6	4.4	0.03	0.09	58.9

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140930sid-14M1544000-Melbourne Road Blackshaws Road.sip6
8000056, 6017418, GTA CONSULTANTS, NETWORK / Enterprise

MOVEMENT SUMMARY

Site: Melbourne Road / Blackshaws Road - PM Peak Hour Existing

Melbourne Road / Blackshaws Road
Giveway / Yield (Two-Way)

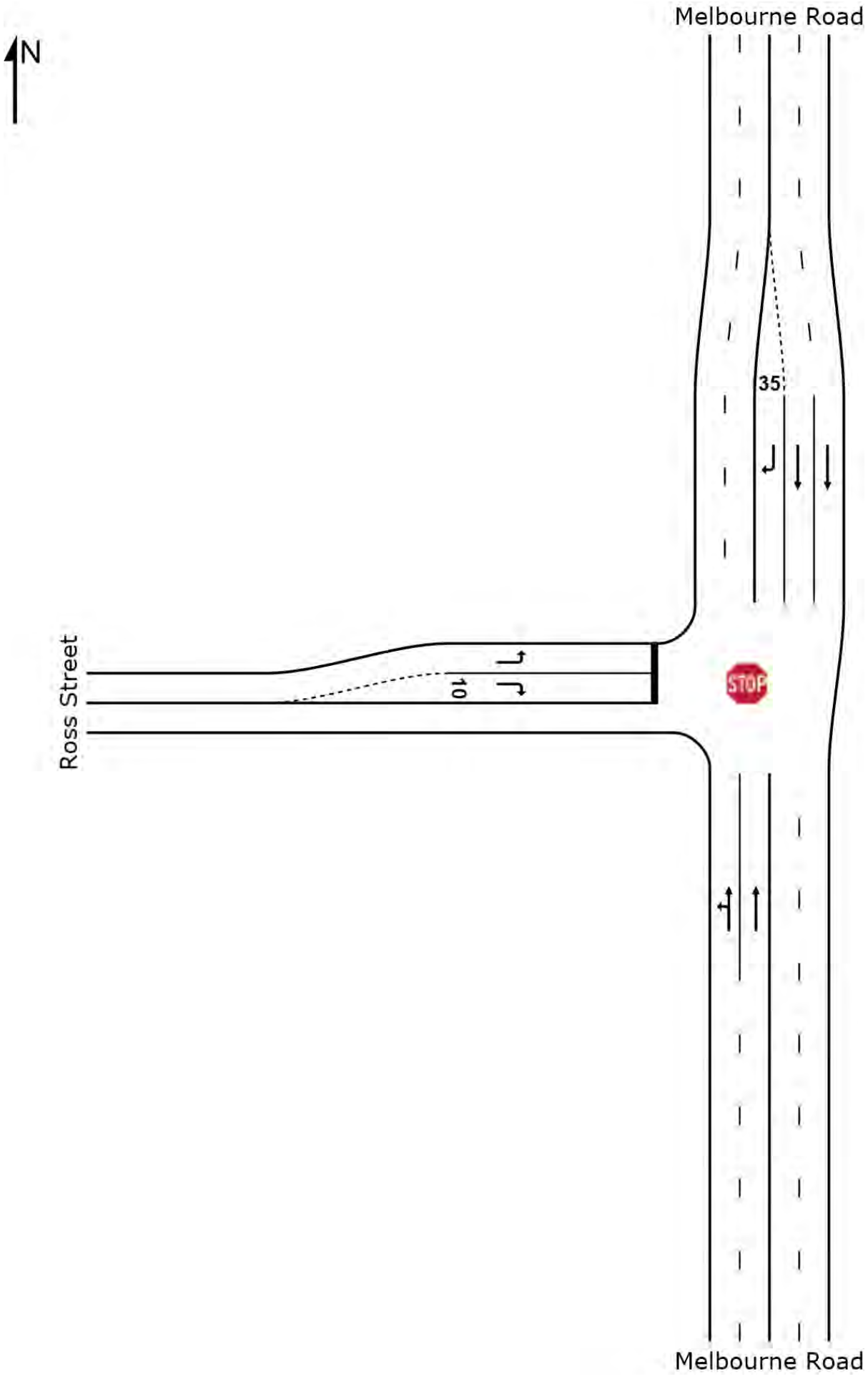
Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Melbourne Road											
1	L2	102	0.0	0.055	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
2	T1	1043	0.0	0.268	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1145	0.0	0.268	0.5	NA	0.0	0.0	0.00	0.05	59.4
East: Blackshaws Road											
4	L2	129	0.0	0.215	10.3	LOS B	0.8	5.5	0.61	0.83	50.8
Approach		129	0.0	0.215	10.3	LOS B	0.8	5.5	0.61	0.83	50.8
North: Melbourne Road											
7	L2	187	0.0	0.100	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
8	T1	1364	0.0	0.350	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1551	0.0	0.350	0.7	NA	0.0	0.0	0.00	0.06	59.3
All Vehicles		2825	0.0	0.350	1.1	NA	0.8	5.5	0.03	0.09	58.9

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140930sid-14M1544000-Melbourne Road Blackshaws Road.sip6
8000056, 6017418, GTA CONSULTANTS, NETWORK / Enterprise


N
Melbourne Road
35
Ross Street
10
STOP
Melbourne Road

MOVEMENT SUMMARY

Site: Melbourne Road / Ross Street - AM Peak Hour Existing

Melbourne Road / Ross Street
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Melbourne Road											
1	L2	20	0.0	0.276	5.6	LOS A	0.0	0.0	0.00	0.02	58.1
2	T1	1057	0.0	0.276	0.0	LOS A	0.0	0.0	0.00	0.01	59.8
Approach		1077	0.0	0.276	0.1	NA	0.0	0.0	0.00	0.01	59.8
North: Melbourne Road											
8	T1	757	0.0	0.194	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	18	0.0	0.045	13.6	LOS B	0.2	1.1	0.74	0.89	47.9
Approach		775	0.0	0.194	0.3	NA	0.2	1.1	0.02	0.02	59.6
West: Ross Street											
10	L2	152	0.0	0.305	15.2	LOS C	1.2	8.2	0.73	1.04	47.9
12	R2	4	0.0	0.074	64.4	LOS F	0.2	1.3	0.95	1.00	29.1
Approach		156	0.0	0.305	16.5	LOS C	1.2	8.2	0.74	1.04	47.1
All Vehicles		2008	0.0	0.305	1.5	NA	1.2	8.2	0.06	0.09	58.5

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140930sid-14M1544000-Melbourne Road Ross Street.sip6
8000056, 6017418, GTA CONSULTANTS, NETWORK / Enterprise

MOVEMENT SUMMARY

Site: Melbourne Road / Ross Street - PM Peak Hour Existing

Melbourne Road / Ross Street
Stop (Two-Way)

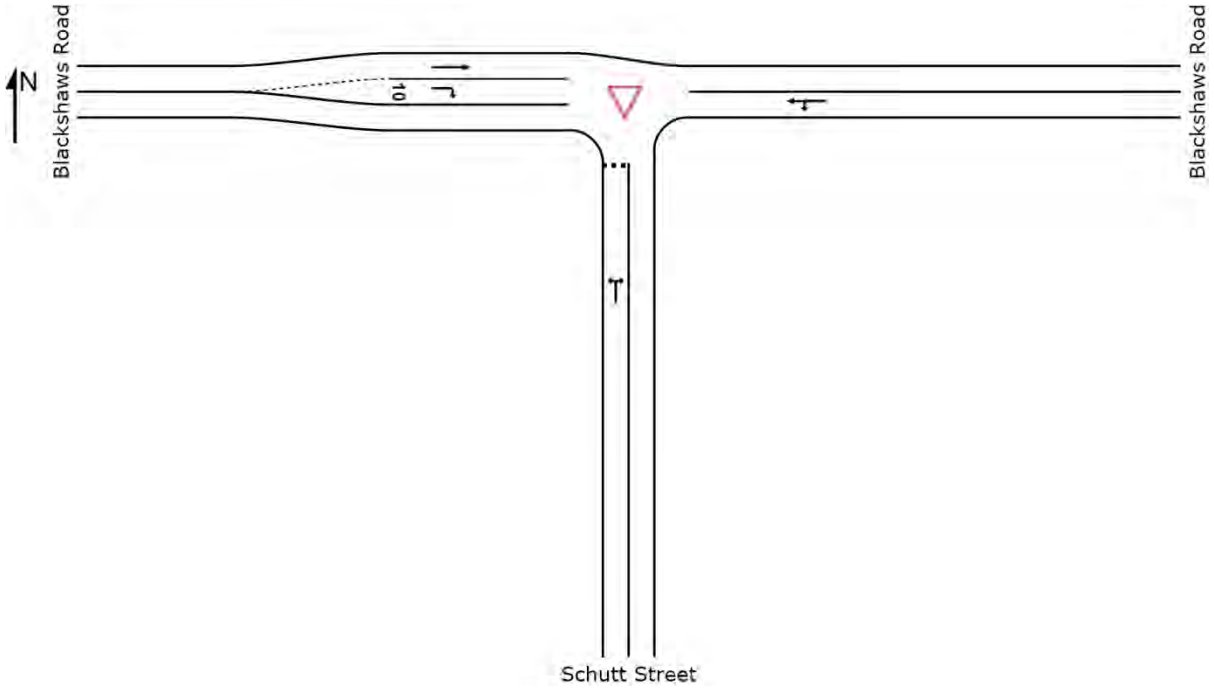
Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Melbourne Road											
1	L2	14	0.0	0.264	5.6	LOS A	0.0	0.0	0.00	0.02	58.2
2	T1	1016	0.0	0.264	0.0	LOS A	0.0	0.0	0.00	0.01	59.9
Approach		1031	0.0	0.264	0.1	NA	0.0	0.0	0.00	0.01	59.8
North: Melbourne Road											
8	T1	1424	0.0	0.365	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
9	R2	49	0.0	0.116	13.3	LOS B	0.4	2.8	0.73	0.89	48.2
Approach		1473	0.0	0.365	0.5	NA	0.4	2.8	0.02	0.03	59.4
West: Ross Street											
10	L2	112	0.0	0.214	13.9	LOS B	0.7	5.2	0.69	1.01	48.7
12	R2	1	0.0	0.092	273.3	LOS F	0.2	1.5	0.99	1.00	10.9
Approach		113	0.0	0.214	16.3	LOS C	0.7	5.2	0.69	1.01	47.2
All Vehicles		2617	0.0	0.365	1.0	NA	0.7	5.2	0.04	0.06	58.9

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140930sid-14M1544000-Melbourne Road Ross Street.sip6
8000056, 6017418, GTA CONSULTANTS, NETWORK / Enterprise


N
Blackshaws Road
Blackshaws Road
Schutt Street

MOVEMENT SUMMARY

Site: Schutt Street / Blackshaws Road - AM Peak Hour Existing

Blackshaws Road / Schutt Street
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Schutt Street											
1	L2	36	0.0	0.036	6.4	LOS A	0.1	1.0	0.27	0.56	52.8
3	R2	4	0.0	0.036	6.3	LOS A	0.1	1.0	0.27	0.56	52.3
Approach		40	0.0	0.036	6.4	LOS A	0.1	1.0	0.27	0.56	52.7
East: Blackshaws Road											
4	L2	2	0.0	0.084	5.5	LOS A	0.0	0.0	0.00	0.01	58.3
5	T1	162	0.0	0.084	0.0	LOS A	0.0	0.0	0.00	0.01	59.9
Approach		164	0.0	0.084	0.1	NA	0.0	0.0	0.00	0.01	59.9
West: Blackshaws Road											
11	T1	160	0.0	0.082	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	129	0.0	0.105	6.1	LOS A	0.4	3.0	0.28	0.59	52.4
Approach		289	0.0	0.105	2.7	NA	0.4	3.0	0.13	0.26	56.3
All Vehicles		494	0.0	0.105	2.2	NA	0.4	3.0	0.10	0.20	57.1

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140930sid-14M1544000-Blackshaws Road Schutt Street.sip6
8000056, 6017418, GTA CONSULTANTS, NETWORK / Enterprise

MOVEMENT SUMMARY

Site: Schutt Street / Blackshaws Road - PM Peak Hour Existing

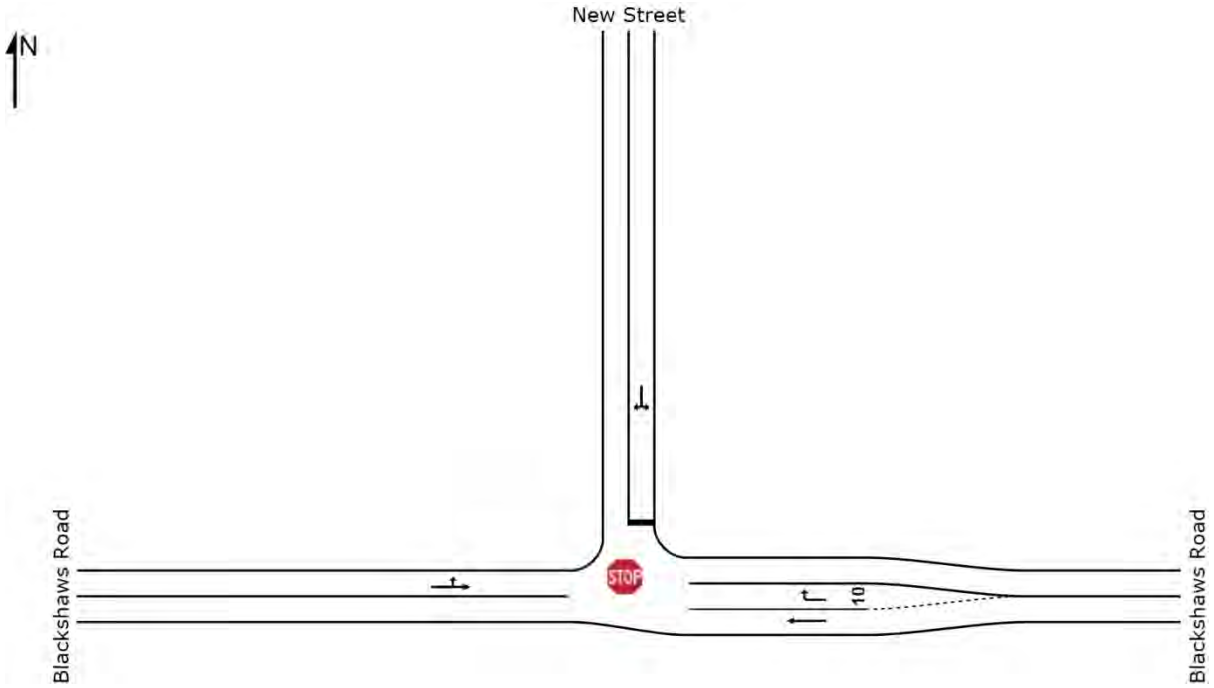
Blackshaws Road / Schutt Street
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Schutt Street											
1	L2	38	0.0	0.041	7.0	LOS A	0.2	1.1	0.38	0.61	52.4
3	R2	3	0.0	0.041	6.9	LOS A	0.2	1.1	0.38	0.61	51.9
Approach		41	0.0	0.041	7.0	LOS A	0.2	1.1	0.38	0.61	52.4
East: Blackshaws Road											
4	L2	8	0.0	0.154	5.6	LOS A	0.0	0.0	0.00	0.02	58.2
5	T1	292	0.0	0.154	0.0	LOS A	0.0	0.0	0.00	0.02	59.8
Approach		300	0.0	0.154	0.2	NA	0.0	0.0	0.00	0.02	59.8
West: Blackshaws Road											
11	T1	124	0.0	0.064	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	107	0.0	0.101	6.8	LOS A	0.4	2.8	0.39	0.64	52.1
Approach		232	0.0	0.101	3.2	NA	0.4	2.8	0.18	0.30	56.0
All Vehicles		573	0.0	0.154	1.9	NA	0.4	2.8	0.10	0.17	57.6

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140930sid-14M1544000-Blackshaws Road Schutt Street.sip6
8000056, 6017418, GTA CONSULTANTS, NETWORK / Enterprise


N
New Street
Blackshaws Road
Blackshaws Road
STOP
10

MOVEMENT SUMMARY

Site: New Street/Blackshaws Road AM Peak Exisitng

New Street / Blackshaws Road
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Blackshaws Road											
5	T1	322	0.0	0.165	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
6	R2	16	0.0	0.023	9.0	LOS A	0.1	0.6	0.55	0.73	50.5
Approach		338	0.0	0.165	0.4	NA	0.1	0.6	0.03	0.03	59.4
North: New Street											
7	L2	64	0.0	0.103	11.2	LOS B	0.4	2.7	0.52	0.93	50.3
9	R2	13	0.0	0.103	10.6	LOS B	0.4	2.7	0.52	0.93	49.9
Approach		77	0.0	0.103	11.1	LOS B	0.4	2.7	0.52	0.93	50.2
West: Blackshaws Road											
10	L2	289	0.0	0.332	5.6	LOS A	0.0	0.0	0.00	0.27	56.0
11	T1	344	0.0	0.332	0.0	LOS A	0.0	0.0	0.00	0.27	57.5
Approach		634	0.0	0.332	2.6	NA	0.0	0.0	0.00	0.27	56.8
All Vehicles		1048	0.0	0.332	2.5	NA	0.4	2.7	0.05	0.24	57.1

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140930sid-14M1544000-Blackshaws Road New Street.sip6
8000056, 6017418, GTA CONSULTANTS, NETWORK / Enterprise

MOVEMENT SUMMARY

Site: New Street/Blackshaws Road PM Peak Exisitng

New Street / Blackshaws Road
Stop (Two-Way)

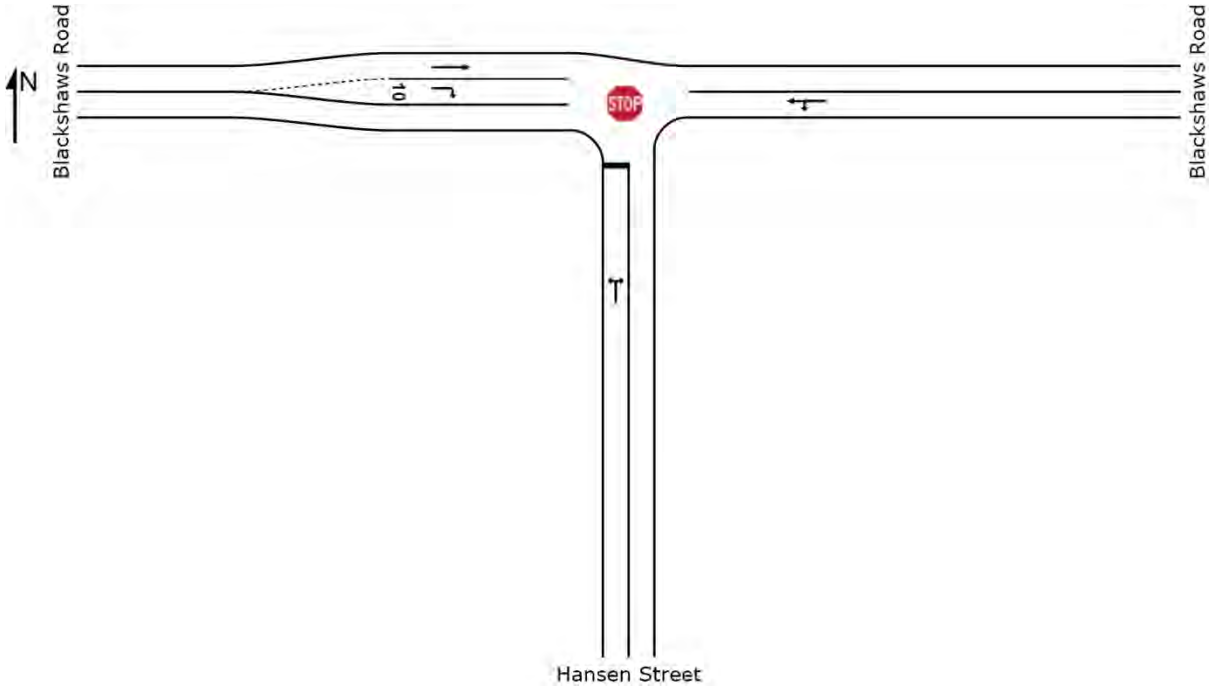
Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Blackshaws Road											
5	T1	428	0.0	0.220	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
6	R2	7	0.0	0.011	8.9	LOS A	0.0	0.3	0.55	0.69	50.6
Approach		436	0.0	0.220	0.2	NA	0.0	0.3	0.01	0.01	59.8
North: New Street											
7	L2	8	0.0	0.395	20.1	LOS C	1.7	11.6	0.80	1.07	45.2
9	R2	131	0.0	0.395	19.5	LOS C	1.7	11.6	0.80	1.07	44.9
Approach		139	0.0	0.395	19.6	LOS C	1.7	11.6	0.80	1.07	44.9
West: Blackshaws Road											
10	L2	141	0.0	0.324	5.6	LOS A	0.0	0.0	0.00	0.13	57.2
11	T1	483	0.0	0.324	0.0	LOS A	0.0	0.0	0.00	0.13	58.7
Approach		624	0.0	0.324	1.3	NA	0.0	0.0	0.00	0.13	58.4
All Vehicles		1199	0.0	0.395	3.0	NA	1.7	11.6	0.10	0.20	56.9

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140930sid-14M1544000-Blackshaws Road New Street.sip6
8000056, 6017418, GTA CONSULTANTS, NETWORK / Enterprise


N
Blackshaws Road
STOP
Blackshaws Road
Hansen Street

MOVEMENT SUMMARY

Site: Hansen Street/Blackshaws Road - AM Peak Existing

Hansen Street / Blackshaws Road
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Hansen Street											
1	L2	17	0.0	0.245	18.3	LOS C	0.9	6.0	0.71	1.00	46.2
3	R2	64	0.0	0.245	17.7	LOS C	0.9	6.0	0.71	1.00	45.8
Approach		81	0.0	0.245	17.8	LOS C	0.9	6.0	0.71	1.00	45.8
East: Blackshaws Road											
4	L2	34	0.0	0.196	5.6	LOS A	0.0	0.0	0.00	0.05	57.9
5	T1	347	0.0	0.196	0.0	LOS A	0.0	0.0	0.00	0.05	59.5
Approach		381	0.0	0.196	0.5	NA	0.0	0.0	0.00	0.05	59.3
West: Blackshaws Road											
11	T1	559	0.0	0.287	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
12	R2	15	0.0	0.015	7.1	LOS A	0.1	0.4	0.42	0.62	51.9
Approach		574	0.0	0.287	0.2	NA	0.1	0.4	0.01	0.02	59.7
All Vehicles		1036	0.0	0.287	1.7	NA	0.9	6.0	0.06	0.11	58.2

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

MOVEMENT SUMMARY

Site: Hansen Street/Blackshaws Road - PM Peak Existing

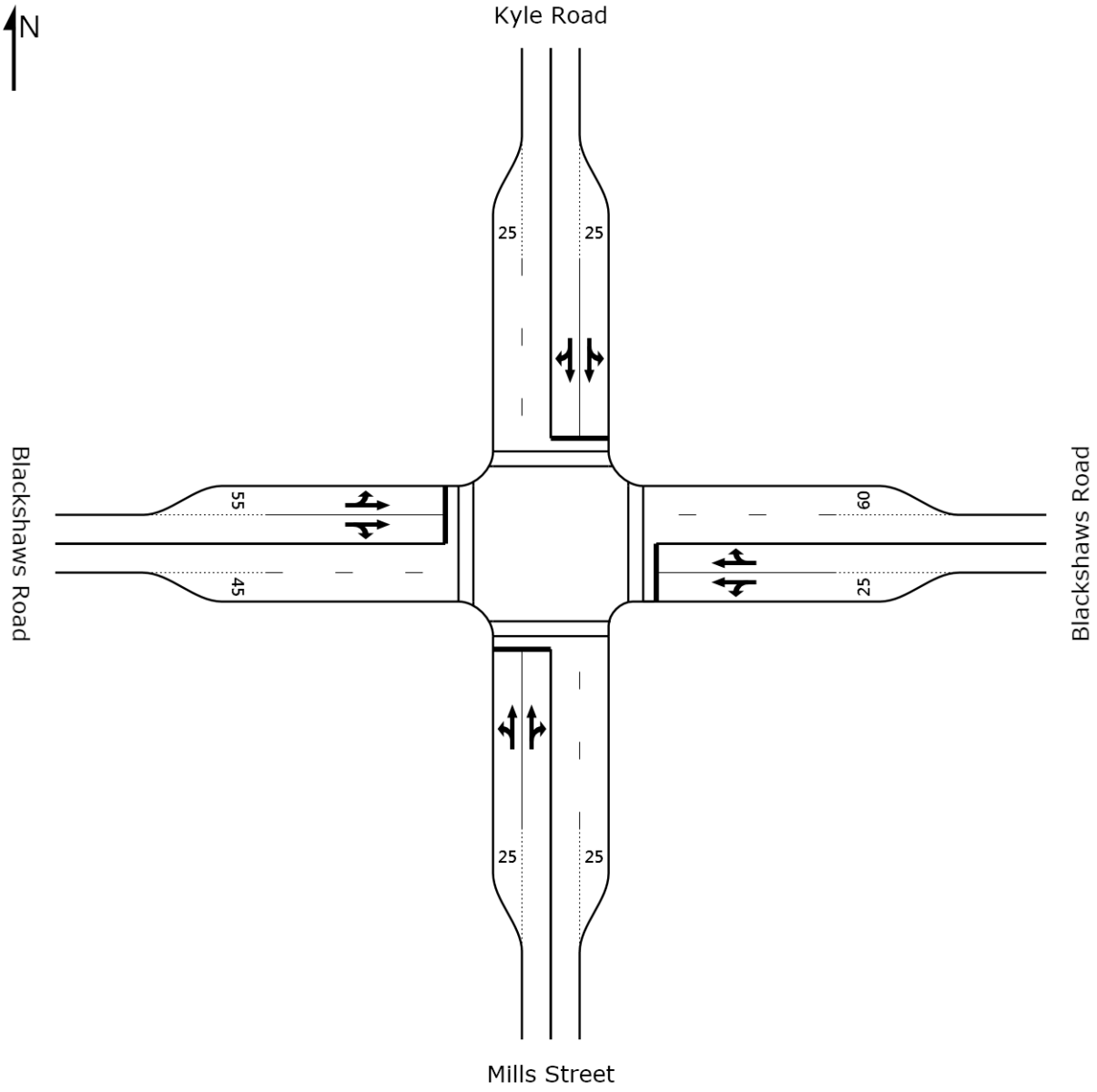
Hansen Street / Blackshaws Road
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Hansen Street											
1	L2	8	0.0	0.198	21.3	LOS C	0.6	4.4	0.79	1.01	44.6
3	R2	42	0.0	0.198	20.7	LOS C	0.6	4.4	0.79	1.01	44.2
Approach		51	0.0	0.198	20.8	LOS C	0.6	4.4	0.79	1.01	44.3
East: Blackshaws Road											
4	L2	68	0.0	0.313	5.6	LOS A	0.0	0.0	0.00	0.07	57.7
5	T1	539	0.0	0.313	0.0	LOS A	0.0	0.0	0.00	0.07	59.3
Approach		607	0.0	0.313	0.7	NA	0.0	0.0	0.00	0.07	59.1
West: Blackshaws Road											
11	T1	481	0.0	0.247	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
12	R2	21	0.0	0.030	8.8	LOS A	0.1	0.7	0.54	0.73	50.6
Approach		502	0.0	0.247	0.4	NA	0.1	0.7	0.02	0.03	59.5
All Vehicles		1160	0.0	0.313	1.4	NA	0.6	4.4	0.04	0.09	58.4

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6


N
Kyle Road
25
25
Blackshaws Road
55
45
60
25
Blackshaws Road
25
25
Mills Street

MOVEMENT SUMMARY

Site: Kyle/Mills/Blackshaws - AM Peak Existing

Kyle Road / Mills Street / Blackshaws Road
Signals - Fixed Time Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Mills Street											
1	L	45	0.0	0.292	38.5	LOS D	1.6	11.2	0.83	0.73	29.1
2	T	53	0.0	0.417	33.3	LOS C	5.5	38.3	0.90	0.74	28.9
3	R	88	0.0	0.417	41.4	LOS D	5.5	38.3	0.90	0.81	28.5
Approach		186	0.0	0.417	38.4	LOS D	5.5	38.3	0.89	0.77	28.8
East: Blackshaws Road											
4	L	12	0.0	0.119	14.3	LOS B	0.6	4.1	0.38	0.84	44.0
5	T	396	0.0	0.390	9.3	LOS A	9.2	64.2	0.54	0.47	45.6
6	R	43	0.0	0.390	17.7	LOS B	9.2	64.2	0.55	0.94	42.0
Approach		451	0.0	0.390	10.2	LOS B	9.2	64.2	0.53	0.52	45.2
North: Kyle Road											
7	L	42	0.0	0.271	38.4	LOS D	1.5	10.4	0.83	0.72	29.1
8	T	21	0.0	0.197	32.2	LOS C	2.4	16.6	0.86	0.67	29.4
9	R	43	0.0	0.197	40.4	LOS D	2.4	16.6	0.86	0.77	28.8
Approach		106	0.0	0.271	38.0	LOS D	2.4	16.6	0.85	0.73	29.0
West: Blackshaws Road											
10	L	19	0.0	0.154	14.5	LOS B	1.4	10.1	0.39	0.89	44.0
11	T	521	0.0	0.416	8.4	LOS A	10.4	73.0	0.52	0.45	46.6
12	R	32	0.0	0.416	16.9	LOS B	10.4	73.0	0.54	0.96	42.6
Approach		572	0.0	0.416	9.1	LOS A	10.4	73.0	0.51	0.50	46.3
All Vehicles		1315	0.0	0.417	16.0	LOS B	10.4	73.0	0.60	0.56	40.5

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	Across S approach	53	9.8	LOS A	0.1	0.1	0.47	0.47
P3	Across E approach	53	35.6	LOS D	0.1	0.1	0.89	0.89
P5	Across N approach	53	9.8	LOS A	0.1	0.1	0.47	0.47
P7	Across W approach	53	35.6	LOS D	0.1	0.1	0.89	0.89
All Pedestrians		212	22.7	LOS C			0.68	0.68

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.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: Kyle/Mills/Blackshaws - PM Peak Existing

Kyle Road / Mills Street / Blackshaws Road
Signals - Fixed Time Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Mills Street (S)											
1	L	41	0.0	0.281	42.3	LOS D	1.5	10.8	0.87	0.73	27.7
2	T	33	0.0	0.211	35.1	LOS D	2.3	15.9	0.89	0.69	28.5
3	R	26	0.0	0.211	43.2	LOS D	2.3	15.9	0.89	0.78	28.1
Approach		100	0.0	0.281	40.2	LOS D	2.3	15.9	0.88	0.73	28.1
East: Blackshaws Road (E)											
4	L	63	0.0	0.178	12.9	LOS B	0.9	6.1	0.34	0.70	44.2
5	T	537	0.0	0.467	7.7	LOS A	11.9	83.5	0.52	0.47	47.3
6	R	31	0.0	0.467	15.9	LOS B	11.9	83.5	0.52	0.97	43.5
Approach		631	0.0	0.467	8.6	LOS A	11.9	83.5	0.50	0.52	46.8
North: Kyle Road (N)											
7	L	53	0.0	0.361	42.5	LOS D	2.0	14.0	0.88	0.74	27.6
8	T	42	0.0	0.200	34.8	LOS C	2.3	16.1	0.89	0.68	28.8
9	R	18	0.0	0.200	43.0	LOS D	2.3	16.1	0.89	0.78	28.4
Approach		113	0.0	0.361	39.7	LOS D	2.3	16.1	0.89	0.72	28.2
West: Blackshaws Road (W)											
10	L	17	0.0	0.186	13.1	LOS B	1.7	11.9	0.35	0.93	45.3
11	T	580	0.0	0.504	7.9	LOS A	12.2	85.6	0.52	0.46	47.0
12	R	67	0.0	0.504	16.7	LOS B	12.2	85.6	0.55	0.95	42.8
Approach		664	0.0	0.504	8.9	LOS A	12.2	85.6	0.52	0.52	46.5
All Vehicles		1507	0.0	0.504	13.2	LOS B	12.2	85.6	0.56	0.55	42.7

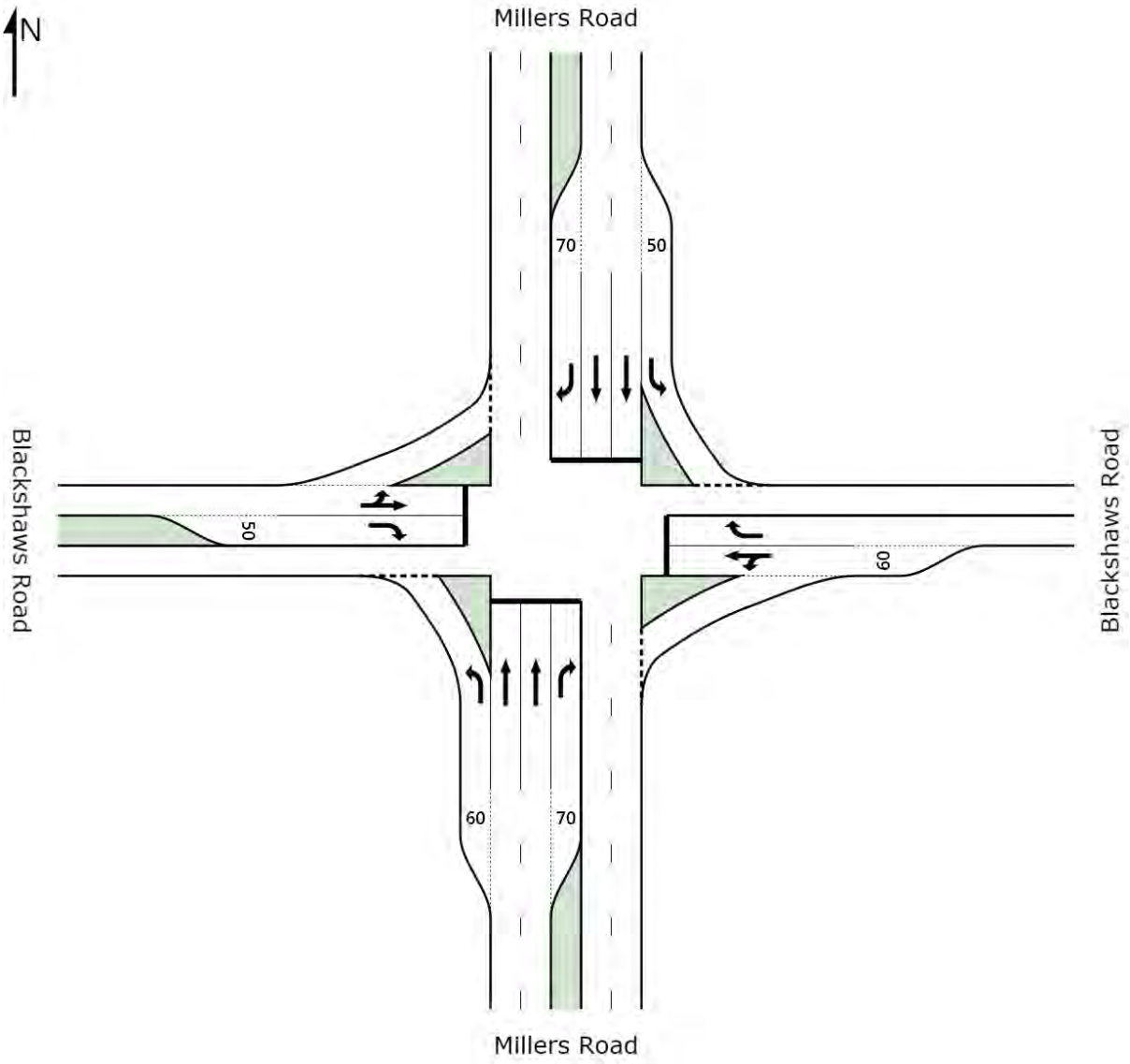
Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	Across S approach	53	8.0	LOS A	0.1	0.1	0.42	0.42
P3	Across E approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
P5	Across N approach	53	8.0	LOS A	0.1	0.1	0.42	0.42
P7	Across W approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		212	23.6	LOS C			0.68	0.68

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.

SIDRA INTERSECTION


N
Millers Road
70
50
Blackshaws Road
50
60
Blackshaws Road
60
70
Millers Road

MOVEMENT SUMMARY

Site: Millers Road/Blackshaws Road - AM Existing

Millers Road / Blackshaws Road
Signals - Fixed Time Cycle Time = 109 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Millers Road											
1	L	109	0.0	0.139	9.0	LOS A	0.9	6.1	0.22	0.65	48.1
2	T	1022	0.0	0.816	40.6	LOS D	26.8	187.4	0.99	0.94	27.1
3	R	87	0.0	0.427	58.8	LOS E	4.5	31.6	0.98	0.77	22.9
Approach		1219	0.0	0.816	39.1	LOS D	26.8	187.4	0.92	0.90	27.9
East: Blackshaws Road											
4	L	69	0.0	0.573	26.3	LOS C	6.0	41.7	0.66	0.90	35.9
5	T	176	0.0	0.573	18.5	LOS B	6.0	41.7	0.66	0.61	37.6
6	R	253	0.0	0.584	35.3	LOS D	9.2	64.4	0.85	0.81	30.5
Approach		498	0.0	0.584	28.1	LOS C	9.2	64.4	0.76	0.75	33.4
North: Millers Road											
7	L	345	0.0	0.539	10.2	LOS B	4.4	30.9	0.32	0.69	46.8
8	T	787	0.0	0.629	23.2	LOS C	14.7	102.8	0.75	0.65	35.1
9	R	102	0.0	0.499	55.1	LOS E	5.1	35.6	0.94	0.78	23.8
Approach		1235	0.0	0.629	22.2	LOS C	14.7	102.8	0.65	0.67	36.2
West: Blackshaws Road											
10	L	83	0.0	0.610	41.5	LOS D	12.3	86.0	0.84	0.96	29.0
11	T	257	0.0	0.610	33.6	LOS C	12.3	86.0	0.84	0.82	29.6
12	R	115	0.0	0.335	31.4	LOS C	3.6	25.0	0.68	0.74	32.2
Approach		455	0.0	0.610	34.5	LOS C	12.3	86.0	0.80	0.83	30.1
All Vehicles		3406	0.0	0.816	30.8	LOS C	26.8	187.4	0.78	0.78	31.6

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

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140708sid-14M544000-Blackshaws Road Millers Road.sip
8000056, GTA CONSULTANTS, ENTERPRISE

MOVEMENT SUMMARY

Site: Millers Road/Blackshaws Road - PM Existing

Millers Road / Blackshaws Road
Signals - Fixed Time Cycle Time = 110 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Millers Road											
1	L	99	0.0	0.124	9.0	LOS A	0.8	5.6	0.22	0.65	48.1
2	T	796	0.0	0.440	21.2	LOS C	14.2	99.7	0.72	0.63	36.3
3	R	96	0.0	0.630	64.3	LOS E	5.3	37.1	1.00	0.80	21.6
Approach		991	0.0	0.630	24.1	LOS C	14.2	99.7	0.70	0.65	34.9
East: Blackshaws Road											
4	L	97	0.0	0.538	30.7	LOS C	7.4	51.5	0.77	0.92	33.5
5	T	158	0.0	0.538	22.9	LOS C	7.4	51.5	0.77	0.73	34.5
6	R	217	0.0	0.685	42.1	LOS D	9.2	64.3	0.90	0.90	27.8
Approach		472	0.0	0.685	33.3	LOS C	9.2	64.3	0.83	0.85	30.9
North: Millers Road											
7	L	323	0.0	0.425	9.2	LOS A	3.1	21.7	0.26	0.67	47.8
8	T	1379	0.0	0.763	21.4	LOS C	26.5	185.8	0.78	0.70	36.0
9	R	117	0.0	0.769	66.5	LOS E	6.6	46.4	1.00	0.85	21.2
Approach		1819	0.0	0.769	22.2	LOS C	26.5	185.8	0.70	0.71	36.0
West: Blackshaws Road											
10	L	65	0.0	0.477	32.7	LOS C	6.0	41.8	0.85	0.86	32.7
11	T	142	0.0	0.477	24.8	LOS C	6.0	41.8	0.85	0.73	33.4
12	R	100	0.0	0.322	42.3	LOS D	4.3	30.3	0.88	0.76	27.8
Approach		307	0.0	0.477	32.2	LOS C	6.0	41.8	0.86	0.77	31.2
All Vehicles		3588	0.0	0.769	25.0	LOS C	26.5	185.8	0.73	0.72	34.5

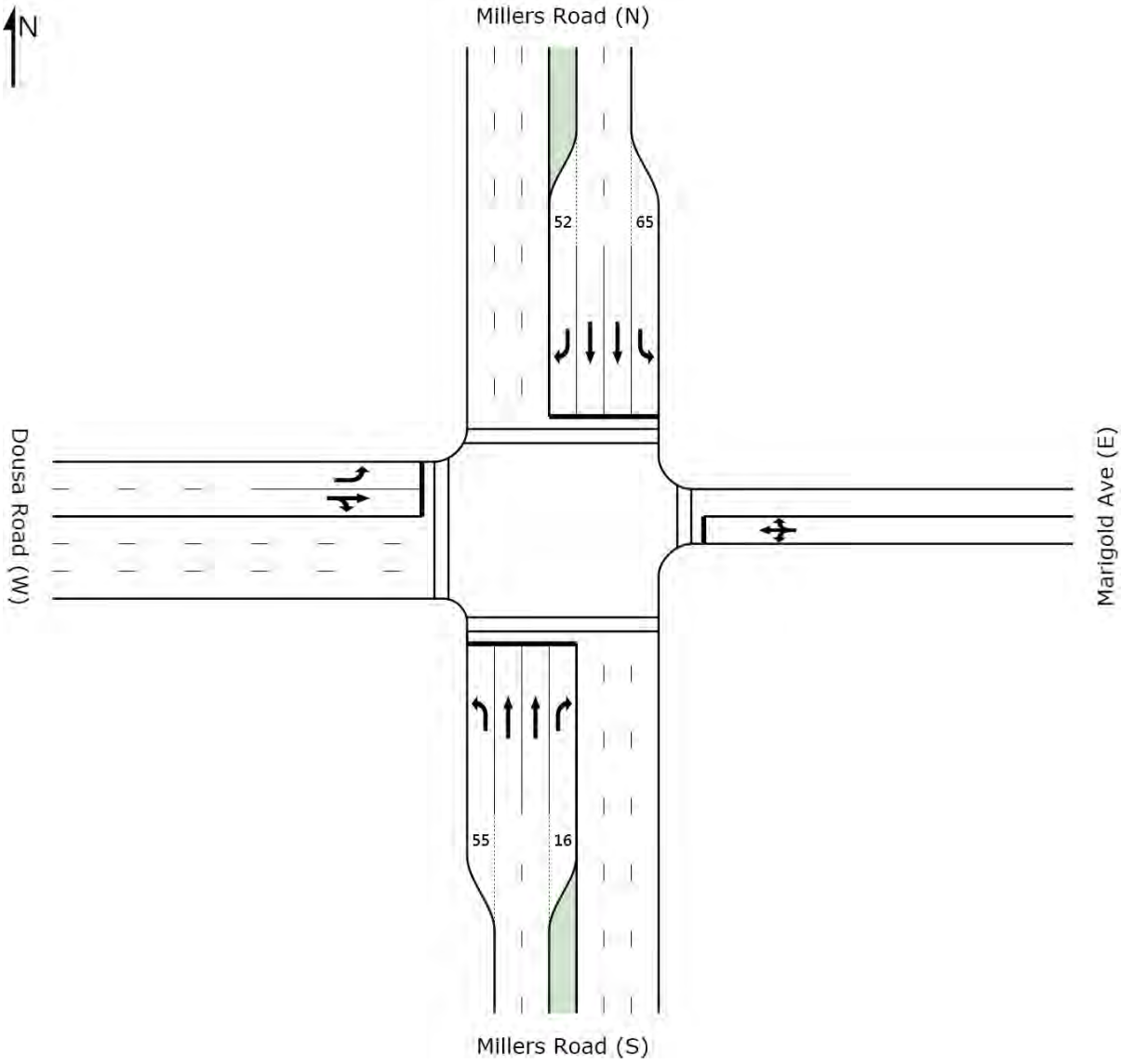
Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	Across S approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
P3	Across E approach	53	19.8	LOS B	0.1	0.1	0.60	0.60
P5	Across N approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	53	19.8	LOS B	0.1	0.1	0.60	0.60
All Pedestrians		212	34.5	LOS D			0.77	0.77

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.

SIDRA INTERSECTION


N
Millers Road (N)
52
65
Dousa Road (W)
Marigold Ave (E)
55
16
Millers Road (S)

MOVEMENT SUMMARY

Site: Millers / Marigold - AM Existing

New Site
Signals - Fixed Time Cycle Time = 109 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Millers Road (S)											
1	L	134	0.0	0.234	18.2	LOS B	2.2	15.7	0.34	0.72	40.0
2	T	1223	0.0	0.727	13.6	LOS B	19.1	133.5	0.63	0.57	41.8
3	R	5	0.0	0.074	61.0	LOS E	0.3	1.9	0.93	0.64	22.4
Approach		1362	0.0	0.727	14.2	LOS B	19.1	133.5	0.61	0.58	41.5
East: Marigold Ave (E)											
4	L	1	0.0	0.337	45.9	LOS D	4.9	34.5	0.87	0.82	27.3
5	T	69	0.0	0.337	37.8	LOS D	4.9	34.5	0.87	0.71	27.8
6	R	39	0.0	0.337	45.8	LOS D	4.9	34.5	0.87	0.81	27.3
Approach		109	0.0	0.337	40.7	LOS D	4.9	34.5	0.87	0.75	27.6
North: Millers Road (N)											
7	L	42	0.0	0.063	16.8	LOS B	0.6	4.4	0.30	0.70	41.0
8	T	945	0.0	0.448	11.2	LOS B	10.2	71.4	0.44	0.39	44.4
9	R	114	0.0	0.486	52.6	LOS D	5.5	38.4	0.93	0.78	24.5
Approach		1101	0.0	0.486	15.7	LOS B	10.2	71.4	0.49	0.44	40.9
West: Dousa Road (W)											
10	L	208	0.0	0.382	29.7	LOS C	6.8	47.8	0.84	0.80	33.0
11	T	14	0.0	0.127	38.0	LOS D	1.8	12.5	0.85	0.64	27.4
12	R	27	0.0	0.127	45.8	LOS D	1.8	12.5	0.85	0.75	27.0
Approach		249	0.0	0.382	31.9	LOS C	6.8	47.8	0.84	0.79	31.8
All Vehicles		2822	0.0	0.727	17.4	LOS B	19.1	133.5	0.59	0.55	39.4

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	Across S approach	53	46.8	LOS E	0.2	0.2	0.93	0.93
P3	Across E approach	53	20.6	LOS C	0.1	0.1	0.61	0.61
P5	Across N approach	53	46.8	LOS E	0.2	0.2	0.93	0.93
P7	Across W approach	53	25.8	LOS C	0.1	0.1	0.69	0.69
All Pedestrians		212	35.0	LOS D			0.79	0.79

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.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: Millers / Marigold - PM Existing

New Site
Signals - Fixed Time Cycle Time = 110 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Millers Road (S)											
1	L	127	0.0	0.211	17.1	LOS B	2.0	13.7	0.31	0.71	40.8
2	T	1021	0.0	0.588	11.4	LOS B	12.4	86.9	0.49	0.44	44.1
3	R	12	0.0	0.167	62.2	LOS E	0.6	4.2	0.94	0.67	22.1
Approach		1160	0.0	0.588	12.5	LOS B	12.4	86.9	0.48	0.47	43.3
East: Marigold Ave (E)											
4	L	8	0.0	0.531	51.4	LOS D	4.9	34.3	0.93	0.81	25.1
5	T	24	0.0	0.531	43.2	LOS D	4.9	34.3	0.93	0.76	25.4
6	R	65	0.0	0.531	51.2	LOS D	4.9	34.3	0.93	0.81	25.2
Approach		98	0.0	0.531	49.2	LOS D	4.9	34.3	0.93	0.80	25.2
North: Millers Road (N)											
7	L	78	0.0	0.136	16.9	LOS B	1.5	10.7	0.54	0.72	40.9
8	T	1473	0.0	0.742	20.5	LOS C	24.4	170.6	0.85	0.85	36.5
9	R	184	0.0	0.790	58.7	LOS E	9.9	69.6	0.97	0.90	22.9
Approach		1735	0.0	0.790	24.4	LOS C	24.4	170.6	0.85	0.85	34.5
West: Dousa Road (W)											
10	L	259	0.0	0.415	38.4	LOS D	10.7	74.9	0.82	0.82	29.1
11	T	19	0.0	0.414	42.4	LOS D	5.9	41.0	0.92	0.74	25.7
12	R	103	0.0	0.414	50.2	LOS D	5.9	41.0	0.92	0.80	25.4
Approach		381	0.0	0.415	41.8	LOS D	10.7	74.9	0.85	0.81	27.8
All Vehicles		3374	0.0	0.790	23.0	LOS C	24.4	170.6	0.72	0.71	35.6

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

Movement Performance - Pedestrians

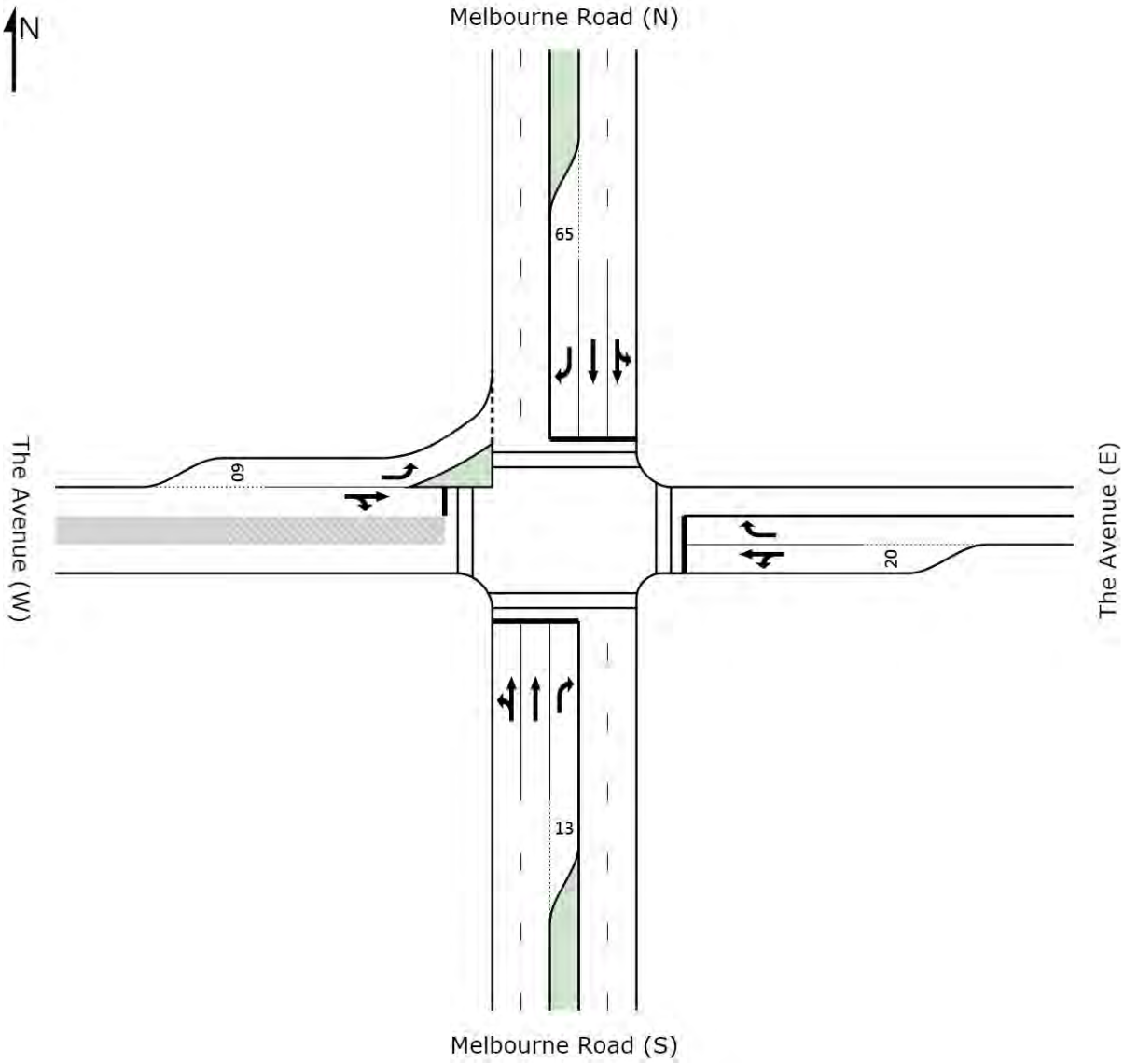
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	Across S approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
P3	Across E approach	53	19.8	LOS B	0.1	0.1	0.60	0.60
P5	Across N approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	53	24.9	LOS C	0.1	0.1	0.67	0.67
All Pedestrians		212	35.8	LOS D			0.79	0.79

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.

SIDRA INTERSECTION

Appendix B

SIDRA INTERSECTION Results – Post Development


N
Melbourne Road (N)
65
The Avenue (W)
60
20
The Avenue (E)
13
Melbourne Road (S)

MOVEMENT SUMMARY

Site: Melbourne Road/The Avenue - AM Post Dev

Melbourne Road / The Avenue

Signals - Fixed Time Cycle Time = 116 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Melbourne Road (S)											
1	L	1	0.0	0.637	17.7	LOS B	17.2	120.7	0.45	1.01	41.8
2	T	1477	0.0	0.637	9.6	LOS A	17.2	120.7	0.45	0.41	45.9
3	R	3	0.0	0.060	66.7	LOS E	0.2	1.2	0.97	0.62	21.1
Approach		1481	0.0	0.637	9.7	LOS A	17.2	120.7	0.45	0.41	45.8
East: The Avenue (E)											
4	L	1	0.0	0.270	52.6	LOS D	1.2	8.5	0.88	0.75	25.5
5	T	24	0.0	0.270	44.4	LOS D	1.2	8.5	0.88	0.62	26.0
6	R	118	0.0	0.568	60.5	LOS E	6.5	45.5	0.98	0.80	22.5
Approach		143	0.0	0.568	57.7	LOS E	6.5	45.5	0.96	0.77	23.0
North: Melbourne Road (N)											
7	L	28	0.0	0.338	16.0	LOS B	6.4	45.1	0.32	0.99	42.7
8	T	774	0.0	0.338	6.5	LOS A	6.4	45.1	0.28	0.25	49.7
9	R	55	0.0	0.342	64.3	LOS E	3.0	21.3	0.98	0.75	21.6
Approach		857	0.0	0.342	10.5	LOS B	6.4	45.1	0.32	0.30	45.7
West: The Avenue (W)											
10	L	466	0.0	0.947	19.7	LOS B	14.0	97.9	0.61	0.81	39.1
11	T	68	0.0	0.320	47.0	LOS D	4.7	32.7	0.93	0.73	24.9
12	R	23	0.0	0.320	55.1	LOS E	4.7	32.7	0.93	0.80	24.6
Approach		558	0.0	0.947	24.6	LOS C	14.0	97.9	0.66	0.80	35.7
All Vehicles		3039	0.0	0.947	14.9	LOS B	17.2	120.7	0.48	0.47	41.7

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue		Prop. Queued	Effective Stop Rate
					Pedestrian	Distance		
		ped/h	sec		ped	m		per ped
P1	Across S approach	53	52.2	LOS E	0.2	0.2	0.95	0.95
P3	Across E approach	53	18.8	LOS B	0.1	0.1	0.57	0.57
P5	Across N approach	53	52.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	53	17.7	LOS B	0.1	0.1	0.55	0.55
All Pedestrians		212	35.2	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.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: Melbourne Road/The Avenue - PM Post Dev

Melbourne Road / The Avenue

Signals - Fixed Time Cycle Time = 111 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Melbourne Road (S)											
1	L	17	0.0	0.596	19.1	LOS B	15.8	110.4	0.48	0.99	40.8
2	T	1301	0.0	0.596	10.8	LOS B	15.8	110.4	0.48	0.44	44.6
3	R	5	0.0	0.091	61.4	LOS E	0.3	1.9	0.93	0.64	22.3
Approach		1323	0.0	0.596	11.2	LOS B	15.8	110.4	0.48	0.44	44.3
East: The Avenue (E)											
4	L	1	0.0	0.746	61.9	LOS E	3.6	25.4	0.95	0.87	23.1
5	T	66	0.0	0.746	53.7	LOS D	3.6	25.4	0.95	0.82	23.3
6	R	55	0.0	0.330	60.6	LOS E	2.9	20.2	0.97	0.75	22.5
Approach		122	0.0	0.746	56.8	LOS E	3.6	25.4	0.96	0.79	22.9
North: Melbourne Road (N)											
7	L	41	0.0	0.746	11.1	LOS B	9.1	63.9	0.22	1.03	46.9
8	T	1764	0.0	0.746	2.4	LOS A	9.1	63.9	0.20	0.18	55.2
9	R	252	0.0	0.885	67.1	LOS E	15.0	105.0	1.00	0.94	21.1
Approach		2057	0.0	0.885	10.5	LOS B	15.0	105.0	0.30	0.29	46.0
West: The Avenue (W)											
10	L	203	0.0	0.405	11.0	LOS B	2.9	20.5	0.36	0.69	46.1
11	T	41	0.0	0.252	49.6	LOS D	2.6	18.0	0.95	0.72	24.2
12	R	9	0.0	0.252	57.8	LOS E	2.6	18.0	0.95	0.77	24.0
Approach		254	0.0	0.405	19.0	LOS B	2.9	20.5	0.47	0.70	39.1
All Vehicles		3756	0.0	0.885	12.8	LOS B	15.8	110.4	0.40	0.39	43.5

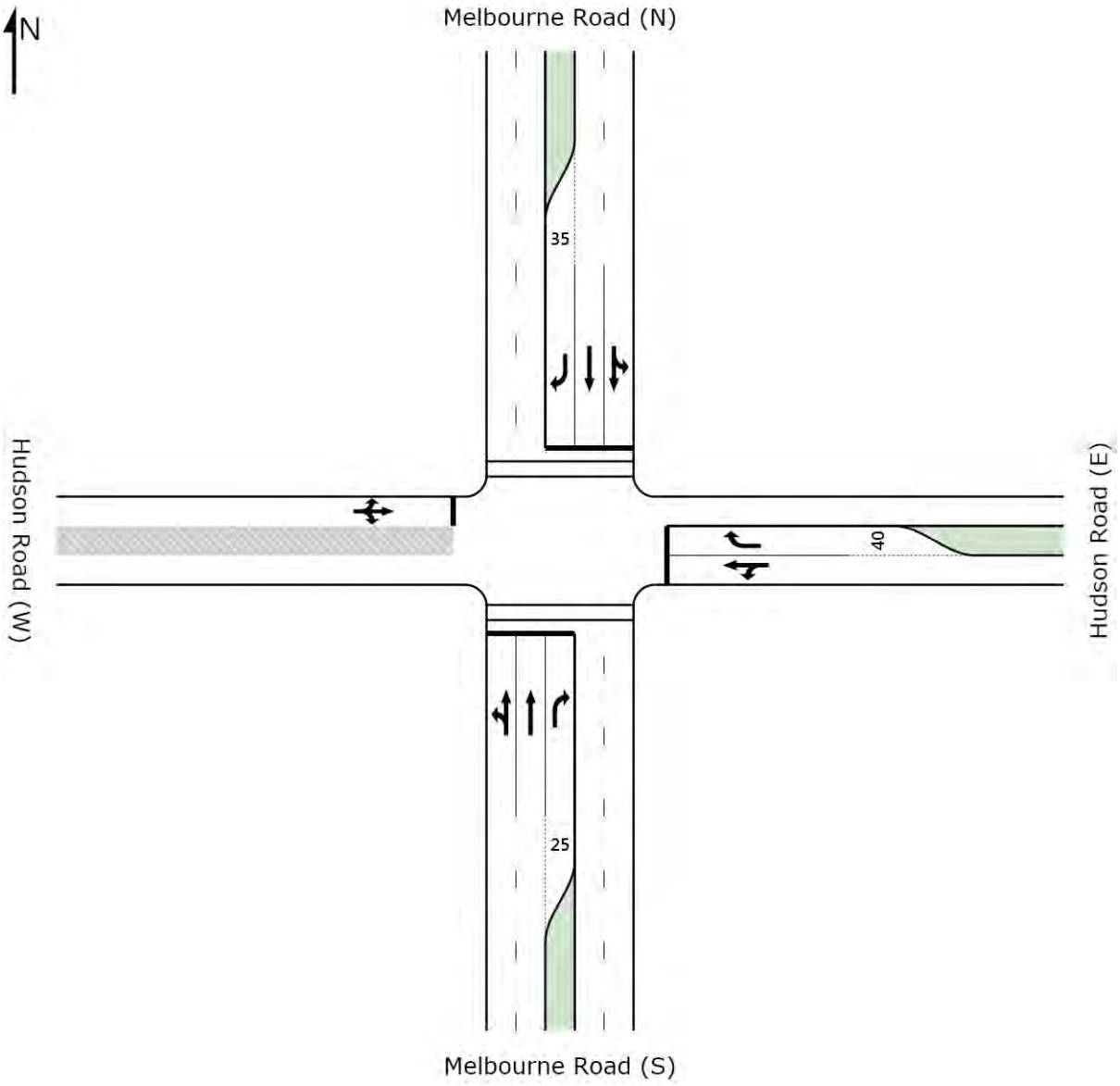
Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue		Prop. Queued	Effective Stop Rate
					Pedestrian	Distance		
		ped/h	sec		ped	m		per ped
P3	Across E approach	53	21.4	LOS C	0.1	0.1	0.62	0.62
P7	Across W approach	53	20.2	LOS C	0.1	0.1	0.60	0.60
All Pedestrians		106	20.8	LOS C			0.61	0.61

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.

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140708sid-14M1544000-Melbourne Road The Avenue.sip
8000056, GTA CONSULTANTS, ENTERPRISE


N
Melbourne Road (N)
35
Hudson Road (W)
40
Hudson Road (E)
25
Melbourne Road (S)

MOVEMENT SUMMARY

Site: Melbourne Road/Hudson Road - AM Post Dev

New Site
Signals - Fixed Time Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Melbourne Road (S)											
1	L	1	0.0	0.875	29.7	LOS C	25.9	181.2	0.89	0.99	35.0
2	T	1287	0.0	0.875	21.5	LOS C	25.9	181.2	0.89	0.87	35.7
3	R	28	0.0	0.230	51.8	LOS D	1.2	8.5	0.94	0.71	24.7
Approach		1317	0.0	0.875	22.2	LOS C	25.9	181.2	0.89	0.87	35.4
East: Hudson Road (E)											
4	L	32	0.0	0.089	28.8	LOS C	1.7	12.2	0.70	0.79	34.1
5	T	28	0.0	0.089	20.6	LOS C	1.7	12.2	0.70	0.54	35.7
6	R	115	0.0	0.794	58.4	LOS E	5.6	39.0	1.00	0.90	23.0
Approach		175	0.0	0.794	46.9	LOS D	5.6	39.0	0.90	0.82	26.0
North: Melbourne Road (N)											
7	L	133	0.0	0.530	30.4	LOS C	12.1	84.4	0.76	0.87	33.7
8	T	642	0.0	0.530	21.8	LOS C	12.1	84.4	0.74	0.64	35.6
9	R	13	0.0	0.102	53.2	LOS D	0.6	3.9	0.97	0.68	24.3
Approach		787	0.0	0.530	23.8	LOS C	12.1	84.4	0.75	0.68	35.0
West: Hudson Road (W)											
10	L	32	0.0	0.347	41.4	LOS D	5.1	36.0	0.90	0.81	29.0
11	T	89	0.0	0.347	33.2	LOS C	5.1	36.0	0.90	0.72	29.4
12	R	14	0.0	0.347	41.4	LOS D	5.1	36.0	0.90	0.81	29.0
Approach		135	0.0	0.347	36.0	LOS D	5.1	36.0	0.90	0.75	29.3
All Vehicles		2414	0.0	0.875	25.3	LOS C	25.9	181.2	0.84	0.80	34.0

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue		Prop. Queued	Effective Stop Rate
					Pedestrian	Distance		
		ped/h	sec		ped	m		per ped
P1	Across S approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
P5	Across N approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		106	39.2	LOS D			0.93	0.93

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.

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140708sid-14M1544000-Melbourne Road Hudson Road.sip
8000056, GTA CONSULTANTS, ENTERPRISE

MOVEMENT SUMMARY

Site: Melbourne Road/Hudson Road - PM Post Dev

Melbourne Road / Hudson Road

Signals - Fixed Time Cycle Time = 97 seconds (User-Given Cycle Time)

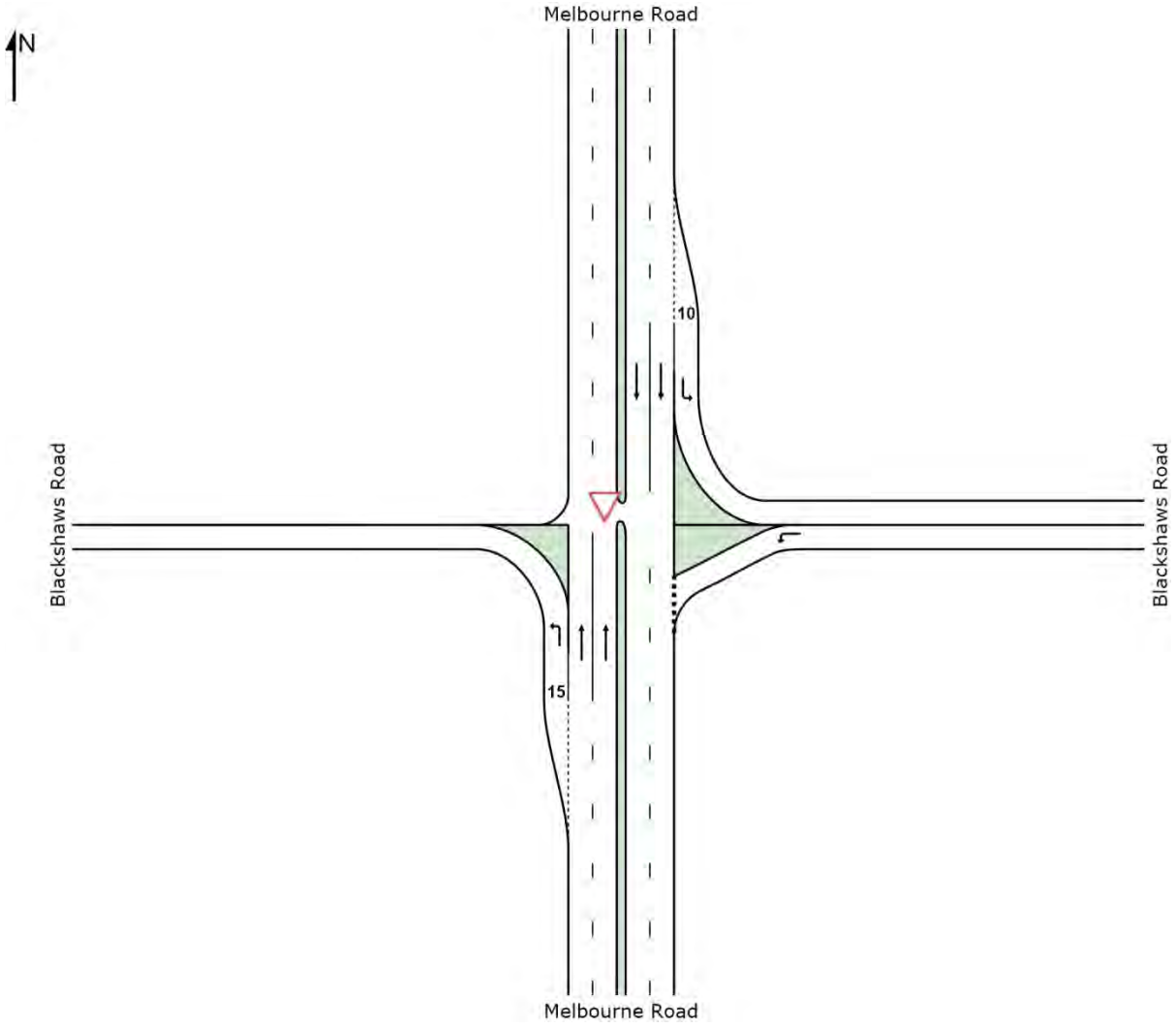
Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Melbourne Road (S)											
1	L	13	0.0	0.602	25.1	LOS C	15.6	109.0	0.65	0.95	37.1
2	T	1076	0.0	0.602	17.0	LOS B	15.6	109.1	0.65	0.58	39.2
3	R	20	0.0	0.174	57.6	LOS E	0.9	6.6	0.96	0.70	23.2
Approach		1108	0.0	0.602	17.8	LOS B	15.6	109.1	0.66	0.59	38.7
East: Hudson Road (E)											
4	L	63	0.0	0.237	36.6	LOS D	4.7	33.1	0.80	0.81	30.6
5	T	67	0.0	0.237	28.4	LOS C	4.7	33.1	0.80	0.65	31.4
6	R	187	0.0	0.920	57.2	LOS E	9.3	65.3	0.98	0.90	23.3
Approach		318	0.0	0.920	47.0	LOS D	9.3	65.3	0.91	0.83	25.9
North: Melbourne Road (N)											
7	L	83	0.0	0.919	28.4	LOS C	36.3	254.4	0.85	1.03	35.5
8	T	1576	0.0	0.919	20.2	LOS C	36.5	255.4	0.85	0.88	36.5
9	R	25	0.0	0.220	55.8	LOS E	1.2	8.2	0.95	0.71	23.6
Approach		1684	0.0	0.919	21.1	LOS C	36.5	255.4	0.85	0.88	36.2
West: Hudson Road (W)											
10	L	17	0.0	0.637	60.8	LOS E	3.5	24.3	1.00	0.80	22.6
11	T	17	0.0	0.637	52.6	LOS D	3.5	24.3	1.00	0.80	22.8
12	R	35	0.0	0.637	60.8	LOS E	3.5	24.3	1.00	0.80	22.7
Approach		68	0.0	0.637	58.8	LOS E	3.5	24.3	1.00	0.80	22.7
All Vehicles		3179	0.0	0.920	23.3	LOS C	36.5	255.4	0.79	0.77	35.1

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

SIDRA INTERSECTION

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140708sid-14M1544000-Melbourne Road Hudson Road.sip
8000056, GTA CONSULTANTS, ENTERPRISE


N
Melbourne Road
Blackshaws Road
Blackshaws Road
10
15
Melbourne Road

MOVEMENT SUMMARY

Site: Melbourne Road / Blackshaws Road - AM Peak Hour Post Dev

Melbourne Road / Blackshaws Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Melbourne Road											
1	L2	146	0.0	0.079	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
2	T1	1322	0.0	0.339	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1468	0.0	0.339	0.6	NA	0.0	0.0	0.00	0.05	59.4
East: Blackshaws Road											
4	L2	424	0.0	0.429	8.0	LOS A	2.5	17.8	0.49	0.73	52.5
Approach		424	0.0	0.429	8.0	LOS A	2.5	17.8	0.49	0.73	52.5
North: Melbourne Road											
7	L2	97	0.0	0.052	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
8	T1	607	0.0	0.156	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		704	0.0	0.156	0.8	NA	0.0	0.0	0.00	0.07	59.2
All Vehicles		2597	0.0	0.429	1.9	NA	2.5	17.8	0.08	0.17	58.1

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140930sid-14M1544000-Melbourne Road Blackshaws Road.sip6
8000056, 6017418, GTA CONSULTANTS, NETWORK / Enterprise

MOVEMENT SUMMARY

Site: Melbourne Road / Blackshaws Road - PM Peak Hour Post Dev

Melbourne Road / Blackshaws Road
Giveway / Yield (Two-Way)

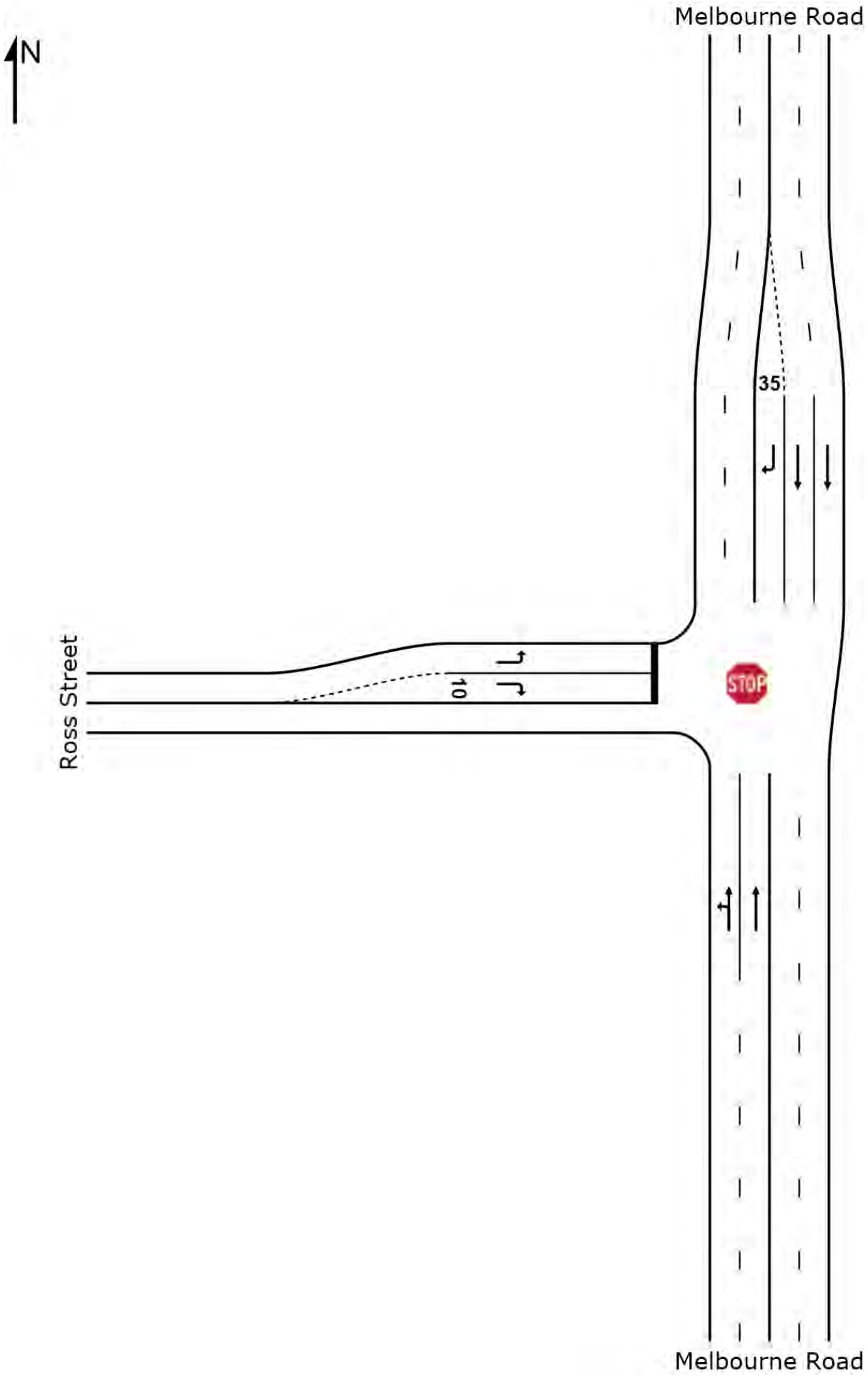
Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Melbourne Road											
1	L2	330	0.0	0.178	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
2	T1	1158	0.0	0.297	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1488	0.0	0.297	1.3	NA	0.0	0.0	0.00	0.12	58.7
East: Blackshaws Road											
4	L2	269	0.0	0.449	12.3	LOS B	2.3	15.9	0.69	0.95	49.4
Approach		269	0.0	0.449	12.3	LOS B	2.3	15.9	0.69	0.95	49.4
North: Melbourne Road											
7	L2	399	0.0	0.215	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
8	T1	1364	0.0	0.350	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1763	0.0	0.350	1.3	NA	0.0	0.0	0.00	0.12	58.7
All Vehicles		3520	0.0	0.449	2.1	NA	2.3	15.9	0.05	0.18	57.9

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140930sid-14M1544000-Melbourne Road Blackshaws Road.sip6
8000056, 6017418, GTA CONSULTANTS, NETWORK / Enterprise


N
Melbourne Road
35
Ross Street
10
STOP
Melbourne Road

MOVEMENT SUMMARY

Site: Melbourne Road / Ross Street - AM Peak Hour Post Dev

Melbourne Road / Ross Street
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Melbourne Road											
1	L2	48	0.0	0.297	5.6	LOS A	0.0	0.0	0.00	0.05	57.9
2	T1	1108	0.0	0.297	0.0	LOS A	0.0	0.0	0.00	0.02	59.7
Approach		1157	0.0	0.297	0.3	NA	0.0	0.0	0.00	0.03	59.6
North: Melbourne Road											
8	T1	1019	0.0	0.261	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
9	R2	18	0.0	0.046	13.8	LOS B	0.1	1.0	0.74	0.89	47.8
Approach		1037	0.0	0.261	0.3	NA	0.1	1.0	0.01	0.02	59.7
West: Ross Street											
10	L2	365	0.0	0.725	21.4	LOS C	4.9	34.3	0.87	1.28	44.5
12	R2	4	0.0	0.098	83.3	LOS F	0.3	1.8	0.96	1.00	25.3
Approach		369	0.0	0.725	22.1	LOS C	4.9	34.3	0.87	1.28	44.1
All Vehicles		2563	0.0	0.725	3.4	NA	4.9	34.3	0.13	0.20	56.8

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

MOVEMENT SUMMARY

Site: Melbourne Road / Ross Street - PM Peak Hour Post Dev

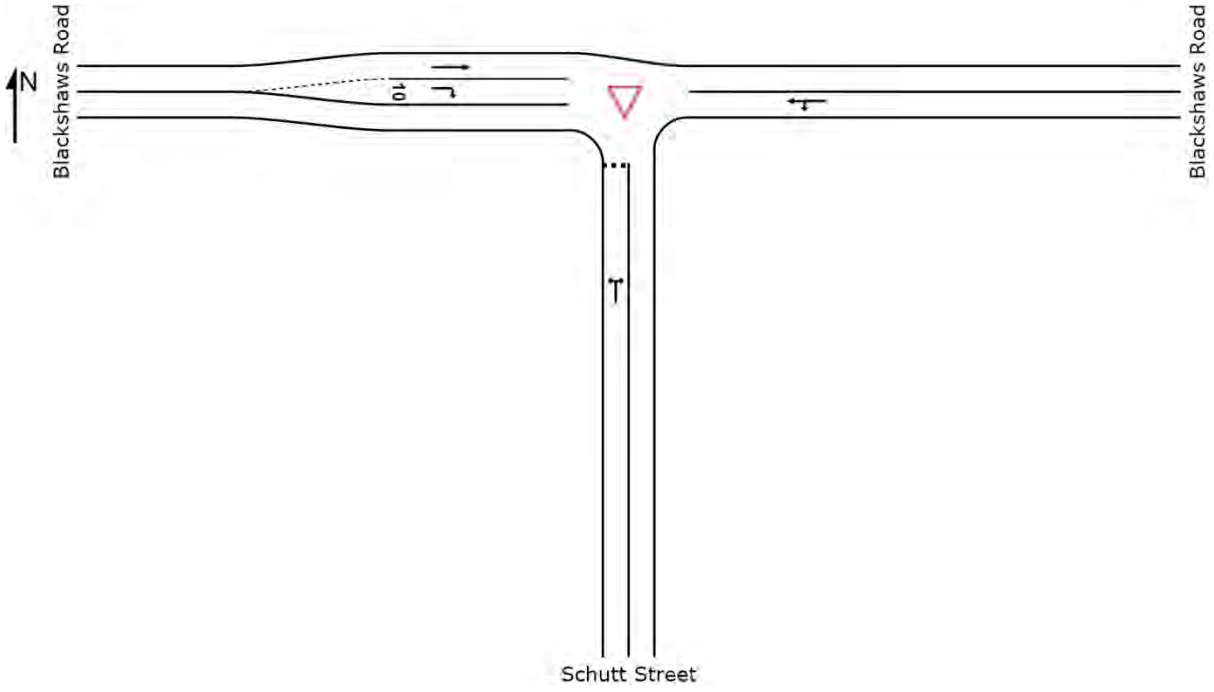
Melbourne Road / Ross Street
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Melbourne Road											
1	L2	97	0.0	0.345	5.6	LOS A	0.0	0.0	0.00	0.09	57.6
2	T1	1242	0.0	0.345	0.0	LOS A	0.0	0.0	0.00	0.04	59.6
Approach		1339	0.0	0.345	0.4	NA	0.0	0.0	0.00	0.04	59.4
North: Melbourne Road											
8	T1	1563	0.0	0.401	0.1	LOS A	0.0	0.0	0.00	0.00	59.9
9	R2	48	0.0	0.191	20.3	LOS C	0.6	4.5	0.85	0.95	44.1
Approach		1611	0.0	0.401	0.7	NA	0.6	4.5	0.03	0.03	59.3
West: Ross Street											
10	L2	226	0.0	0.615	23.0	LOS C	2.9	20.5	0.88	1.16	43.6
12	R2	1	0.0	0.279	982.4	LOS F	0.6	4.3	1.00	1.00	3.5
Approach		227	0.0	0.615	27.3	LOS D	2.9	20.5	0.88	1.16	41.5
All Vehicles		3177	0.0	0.615	2.5	NA	2.9	20.5	0.08	0.12	57.6

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6


N
Blackshaws Road
Blackshaws Road
Schutt Street

MOVEMENT SUMMARY

Site: Schutt Street / Blackshaws Road - AM Peak Hour Post Dev

Blackshaws Road / Schutt Street
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Schutt Street											
1	L2	36	0.0	0.048	7.7	LOS A	0.2	1.2	0.38	0.60	52.0
3	R2	4	0.0	0.048	7.6	LOS A	0.2	1.2	0.38	0.60	51.5
Approach		40	0.0	0.048	7.7	LOS A	0.2	1.2	0.38	0.60	52.0
East: Blackshaws Road											
4	L2	2	0.0	0.129	5.6	LOS A	0.0	0.0	0.00	0.01	58.3
5	T1	249	0.0	0.129	0.0	LOS A	0.0	0.0	0.00	0.01	59.9
Approach		252	0.0	0.129	0.1	NA	0.0	0.0	0.00	0.01	59.9
West: Blackshaws Road											
11	T1	422	0.0	0.216	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	343	0.0	0.306	6.8	LOS A	1.5	10.2	0.42	0.66	52.0
Approach		765	0.0	0.306	3.1	NA	1.5	10.2	0.19	0.29	56.1
All Vehicles		1057	0.0	0.306	2.5	NA	1.5	10.2	0.15	0.24	56.8

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140930sid-14M1544000-Blackshaws Road Schutt Street.sip6
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MOVEMENT SUMMARY

Site: Schutt Street / Blackshaws Road - PM Peak Hour Post Dev

Blackshaws Road / Schutt Street
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Schutt Street											
1	L2	38	0.0	0.086	11.7	LOS B	0.3	2.0	0.66	0.86	49.2
3	R2	3	0.0	0.086	11.6	LOS B	0.3	2.0	0.66	0.86	48.7
Approach		41	0.0	0.086	11.7	LOS B	0.3	2.0	0.66	0.86	49.1
East: Blackshaws Road											
4	L2	8	0.0	0.385	5.6	LOS A	0.0	0.0	0.00	0.01	58.2
5	T1	741	0.0	0.385	0.1	LOS A	0.0	0.0	0.00	0.01	59.8
Approach		749	0.0	0.385	0.1	NA	0.0	0.0	0.00	0.01	59.8
West: Blackshaws Road											
11	T1	267	0.0	0.137	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	224	0.0	0.405	12.9	LOS B	1.9	13.6	0.73	0.97	47.9
Approach		492	0.0	0.405	5.9	NA	1.9	13.6	0.33	0.44	53.8
All Vehicles		1282	0.0	0.405	2.7	NA	1.9	13.6	0.15	0.20	57.0

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140930sid-14M1544000-Blackshaws Road Schutt Street.sip6
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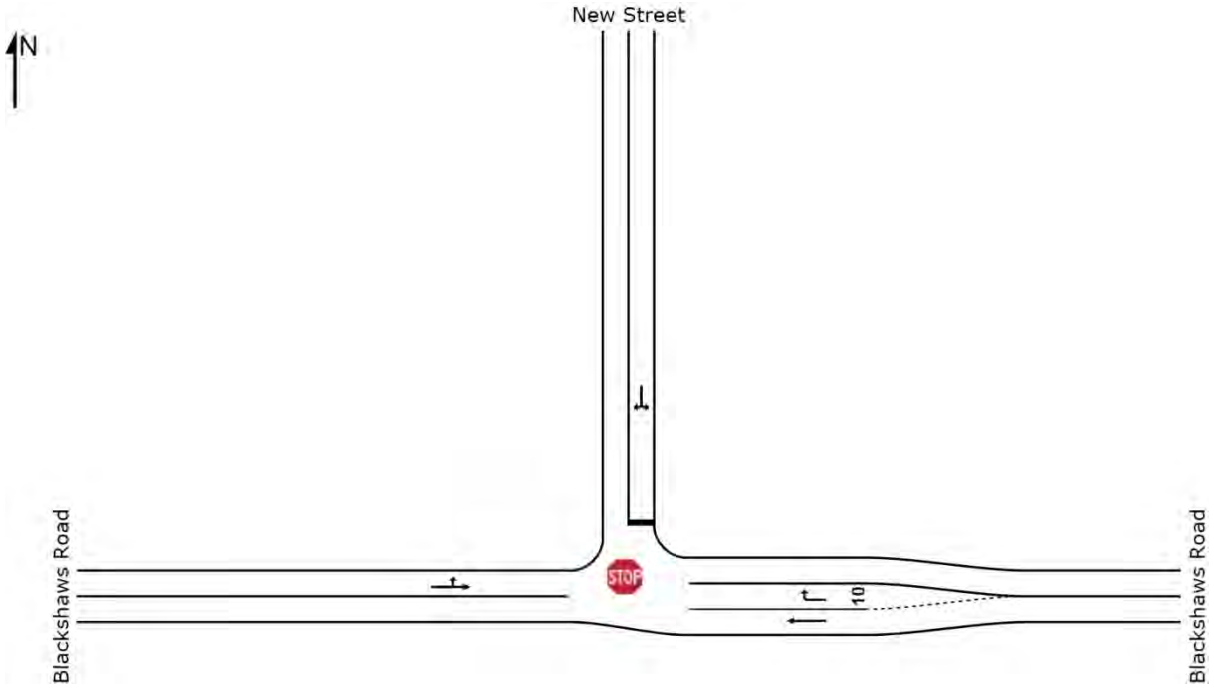
N
New Street
Blackshaws Road
Blackshaws Road
STOP
10

MOVEMENT SUMMARY

Site: New Street/Blackshaws Road AM Peak Post Dev

New Street / Blackshaws Road
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Blackshaws Road											
5	T1	491	0.0	0.252	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
6	R2	21	0.0	0.041	11.7	LOS B	0.2	1.1	0.65	0.81	48.7
Approach		512	0.0	0.252	0.5	NA	0.2	1.1	0.03	0.03	59.4
North: New Street											
7	L2	58	0.0	0.324	18.9	LOS C	1.4	9.5	0.74	1.05	45.8
9	R2	64	0.0	0.324	18.3	LOS C	1.4	9.5	0.74	1.05	45.4
Approach		122	0.0	0.324	18.6	LOS C	1.4	9.5	0.74	1.05	45.6
West: Blackshaws Road											
10	L2	289	0.0	0.465	5.6	LOS A	0.0	0.0	0.00	0.19	56.6
11	T1	602	0.0	0.465	0.1	LOS A	0.0	0.0	0.00	0.19	58.1
Approach		892	0.0	0.465	1.9	NA	0.0	0.0	0.00	0.19	57.6
All Vehicles		1525	0.0	0.465	2.7	NA	1.4	9.5	0.07	0.21	57.0

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

MOVEMENT SUMMARY

Site: New Street/Blackshaws Road PM Peak Post Dev

New Street / Blackshaws Road
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Blackshaws Road											
5	T1	753	0.0	0.386	0.1	LOS A	0.0	0.0	0.00	0.00	59.9
6	R2	46	0.0	0.086	11.4	LOS B	0.3	2.4	0.65	0.84	48.9
Approach		799	0.0	0.386	0.7	NA	0.3	2.4	0.04	0.05	59.1
North: New Street											
7	L2	33	0.0	0.887	70.5	LOS F	6.2	43.6	0.96	1.48	27.9
9	R2	131	0.0	0.887	69.9	LOS F	6.2	43.6	0.96	1.48	27.7
Approach		163	0.0	0.887	70.0	LOS F	6.2	43.6	0.96	1.48	27.8
West: Blackshaws Road											
10	L2	141	0.0	0.445	5.6	LOS A	0.0	0.0	0.00	0.10	57.4
11	T1	719	0.0	0.445	0.1	LOS A	0.0	0.0	0.00	0.10	59.0
Approach		860	0.0	0.445	1.0	NA	0.0	0.0	0.00	0.10	58.7
All Vehicles		1822	0.0	0.887	7.0	NA	6.2	43.6	0.10	0.20	53.5

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140930sid-14M1544000-Blackshaws Road New Street.sip6
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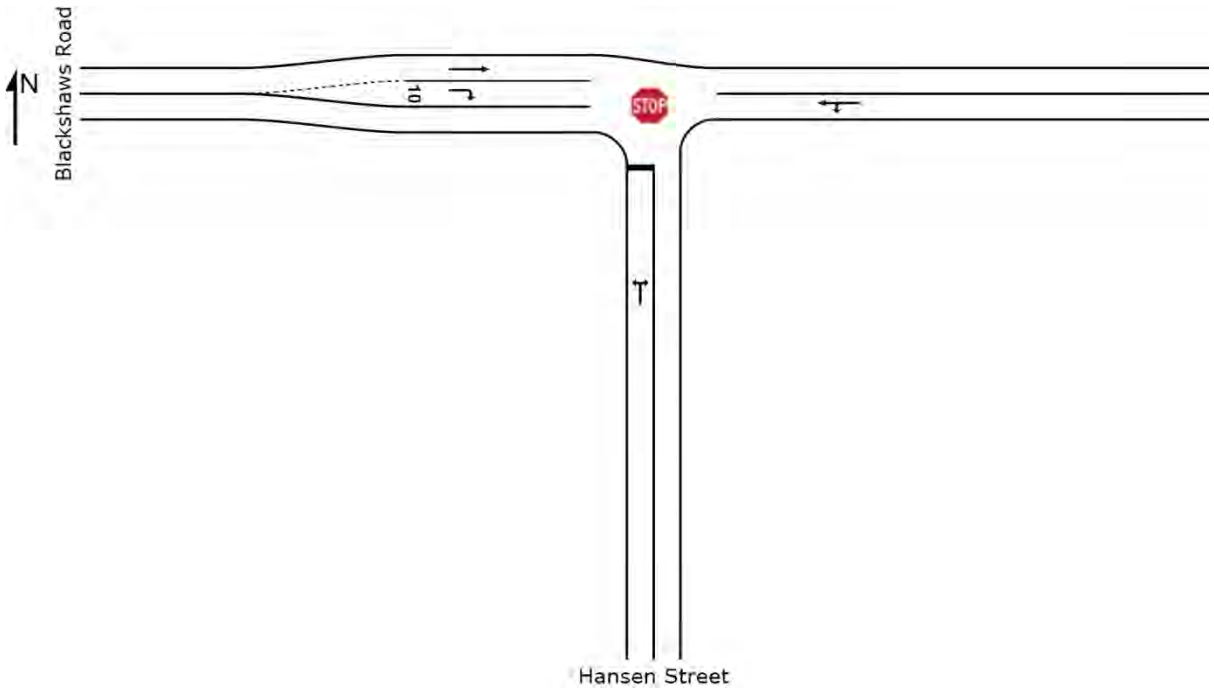
N
Blackshaws Road
STOP
Hansen Street

MOVEMENT SUMMARY

Site: Hansen Street/Blackshaws Road - AM Peak Post Dev

Hansen Street / Blackshaws Road
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Hansen Street											
1	L2	27	0.0	0.467	32.6	LOS D	1.8	12.6	0.86	1.09	39.2
3	R2	64	0.0	0.467	32.0	LOS D	1.8	12.6	0.86	1.09	38.9
Approach		92	0.0	0.467	32.2	LOS D	1.8	12.6	0.86	1.09	39.0
East: Blackshaws Road											
4	L2	34	0.0	0.283	5.6	LOS A	0.0	0.0	0.00	0.04	58.0
5	T1	516	0.0	0.283	0.0	LOS A	0.0	0.0	0.00	0.04	59.6
Approach		549	0.0	0.283	0.4	NA	0.0	0.0	0.00	0.04	59.5
West: Blackshaws Road											
11	T1	817	0.0	0.419	0.1	LOS A	0.0	0.0	0.00	0.00	59.9
12	R2	104	0.0	0.136	8.6	LOS A	0.4	3.0	0.50	0.77	50.8
Approach		921	0.0	0.419	1.0	NA	0.4	3.0	0.06	0.09	58.7
All Vehicles		1562	0.0	0.467	2.6	NA	1.8	12.6	0.08	0.13	57.3

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140930sid-14M1544000-Blackshaws Road Hansen Street.sip6
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MOVEMENT SUMMARY

Site: Hansen Street/Blackshaws Road - PM Peak Post Dev

Hansen Street / Blackshaws Road
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Hansen Street											
1	L2	97	0.0	0.715	44.6	LOS E	3.4	24.1	0.92	1.23	34.7
3	R2	42	0.0	0.715	44.0	LOS E	3.4	24.1	0.92	1.23	34.5
Approach		139	0.0	0.715	44.4	LOS E	3.4	24.1	0.92	1.23	34.7
East: Blackshaws Road											
4	L2	68	0.0	0.479	5.6	LOS A	0.0	0.0	0.00	0.04	57.9
5	T1	863	0.0	0.479	0.1	LOS A	0.0	0.0	0.00	0.04	59.5
Approach		932	0.0	0.479	0.5	NA	0.0	0.0	0.00	0.04	59.3
West: Blackshaws Road											
11	T1	717	0.0	0.368	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
12	R2	75	0.0	0.195	14.4	LOS B	0.6	3.9	0.77	0.92	47.0
Approach		792	0.0	0.368	1.4	NA	0.6	3.9	0.07	0.09	58.4
All Vehicles		1862	0.0	0.715	4.1	NA	3.4	24.1	0.10	0.15	56.0

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140930sid-14M1544000-Blackshaws Road Hansen Street.sip6
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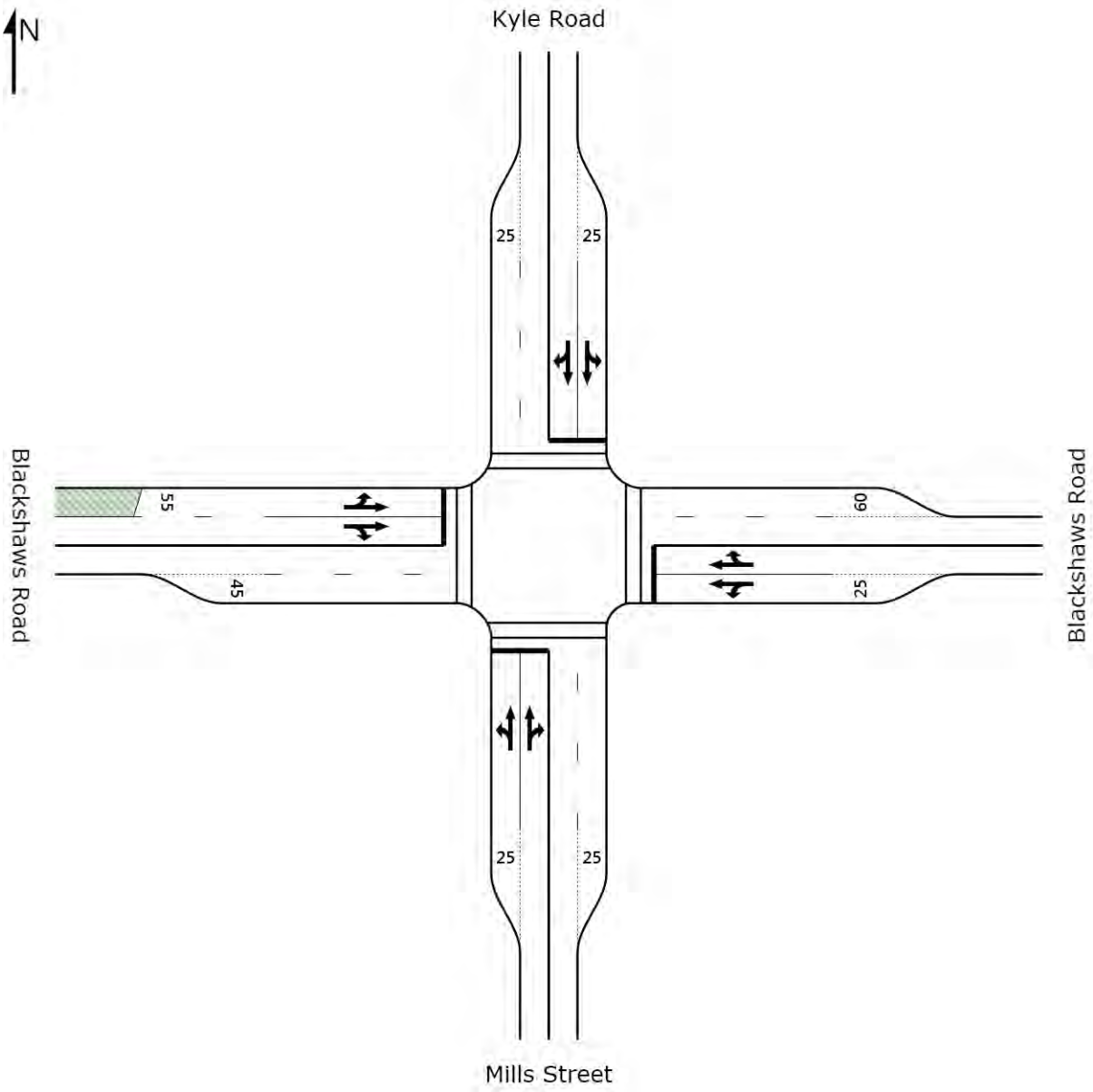

N
Kyle Road
25
25
Blackshaws Road
55
45
60
25
Blackshaws Road
25
25
Mills Street

MOVEMENT SUMMARY

Site: Kyle/Mills/Blackshaws - AM Peak Post Dev

Kyle Road / Mills Street / Blackshaws Road
Signals - Fixed Time Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Mills Street											
1	L	45	0.0	0.310	42.4	LOS D	1.7	11.9	0.88	0.73	27.7
2	T	55	0.0	0.636	40.8	LOS D	6.7	47.0	0.99	0.83	26.1
3	R	99	0.0	0.636	48.9	LOS D	6.7	47.0	0.99	0.84	26.0
Approach		199	0.0	0.636	45.2	LOS D	6.7	47.0	0.96	0.81	26.4
East: Blackshaws Road											
4	L	101	0.0	0.286	13.0	LOS B	1.4	10.0	0.35	0.71	44.1
5	T	880	0.0	0.758	10.8	LOS B	27.2	190.1	0.73	0.68	43.7
6	R	45	0.0	0.758	19.0	LOS B	27.2	190.1	0.73	0.96	41.7
Approach		1026	0.0	0.758	11.4	LOS B	27.2	190.1	0.69	0.69	43.7
North: Kyle Road											
7	L	64	0.0	0.441	42.8	LOS D	2.5	17.2	0.89	0.75	27.5
8	T	43	0.0	0.559	39.7	LOS D	5.6	39.2	0.97	0.78	26.5
9	R	88	0.0	0.559	47.9	LOS D	5.6	39.2	0.97	0.80	26.3
Approach		196	0.0	0.559	44.4	LOS D	5.6	39.2	0.95	0.78	26.7
West: Blackshaws Road											
10	L	24	0.0	0.191	13.1	LOS B	1.7	12.2	0.35	0.91	45.2
11	T	592	0.0	0.519	11.0	LOS B	13.8	96.7	0.60	0.53	43.9
12	R	32	0.0	0.519	20.5	LOS C	13.8	96.7	0.65	0.95	40.3
Approach		647	0.0	0.519	11.6	LOS B	13.8	96.7	0.59	0.56	43.7
All Vehicles		2068	0.0	0.758	17.8	LOS B	27.2	190.1	0.71	0.67	38.9

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	Across S approach	53	8.0	LOS A	0.1	0.1	0.42	0.42
P3	Across E approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
P5	Across N approach	53	8.0	LOS A	0.1	0.1	0.42	0.42
P7	Across W approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		212	23.6	LOS C			0.68	0.68

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.

Processed: Wednesday, 9 July 2014 3:52:57 PM
SIDRA INTERSECTION 5.1.13.2093

SIDRA INTERSECTION

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140708sid-14M1544000-Blackshaws Road Mills Street Kyle Road.sip
8000056, GTA CONSULTANTS, ENTERPRISE

MOVEMENT SUMMARY

Site: Kyle/Mills/Blackshaws - PM Peak Post Dev

Kyle Road / Mills Street / Blackshaws Road
Signals - Fixed Time Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Mills Street (S)											
1	L	41	0.0	0.281	42.3	LOS D	1.5	10.8	0.87	0.73	27.7
2	T	53	0.0	0.594	40.0	LOS D	6.3	44.3	0.98	0.80	26.4
3	R	95	0.0	0.594	48.2	LOS D	6.3	44.3	0.98	0.82	26.2
Approach		188	0.0	0.594	44.6	LOS D	6.3	44.3	0.96	0.79	26.6
East: Blackshaws Road (E)											
4	L	105	0.0	0.298	13.0	LOS B	1.5	10.4	0.35	0.71	44.1
5	T	762	0.0	0.834	23.5	LOS C	33.1	231.7	0.91	0.89	34.5
6	R	51	0.0	0.834	31.6	LOS C	33.1	231.7	0.91	0.99	33.9
Approach		918	0.0	0.834	22.7	LOS C	33.1	231.7	0.85	0.87	35.3
North: Kyle Road (N)											
7	L	64	0.0	0.441	42.8	LOS D	2.5	17.2	0.89	0.75	27.5
8	T	54	0.0	0.364	37.2	LOS D	3.9	27.1	0.93	0.73	27.7
9	R	42	0.0	0.364	45.4	LOS D	3.9	27.1	0.93	0.79	27.4
Approach		160	0.0	0.441	41.6	LOS D	3.9	27.1	0.91	0.75	27.5
West: Blackshaws Road (W)											
10	L	56	0.0	0.321	13.3	LOS B	3.1	21.6	0.37	0.89	44.9
11	T	928	0.0	0.871	24.4	LOS C	38.1	266.9	0.85	0.86	34.0
12	R	67	0.0	0.871	36.3	LOS D	38.1	266.9	0.94	1.02	31.6
Approach		1052	0.0	0.871	24.6	LOS C	38.1	266.9	0.83	0.87	34.3
All Vehicles		2318	0.0	0.871	26.6	LOS C	38.1	266.9	0.85	0.86	33.3

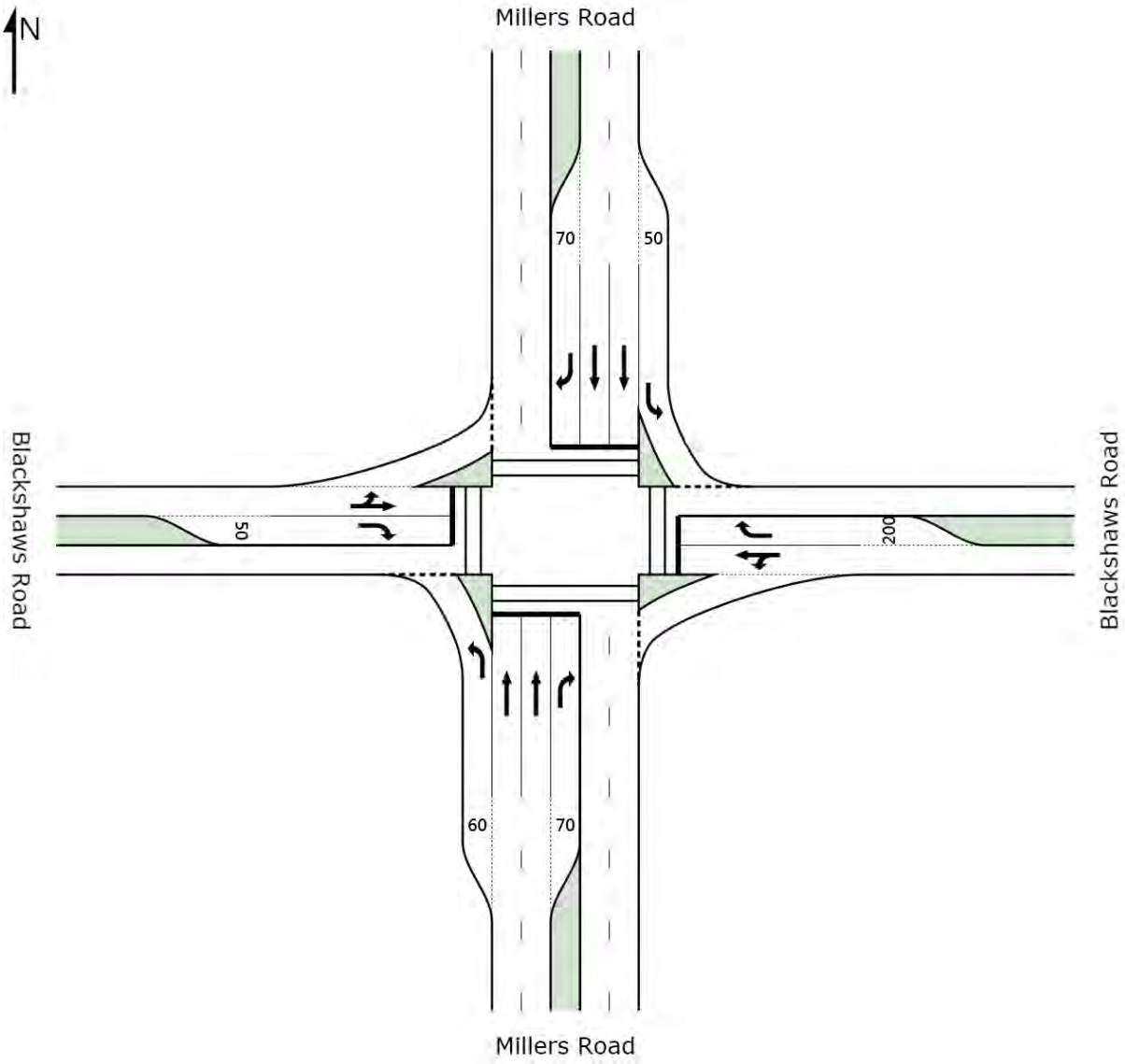
Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	Across S approach	53	8.0	LOS A	0.1	0.1	0.42	0.42
P3	Across E approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
P5	Across N approach	53	8.0	LOS A	0.1	0.1	0.42	0.42
P7	Across W approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		212	23.6	LOS C			0.68	0.68

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.

SIDRA INTERSECTION


N
Millers Road
70
50
Blackshaws Road
50
200
Blackshaws Road
60
70
Millers Road

MOVEMENT SUMMARY

Site: Millers Road/Blackshaws Road - AM Post Dev

Millers Road / Blackshaws Road
Signals - Fixed Time Cycle Time = 109 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Millers Road											
1	L	109	0.0	0.184	12.4	LOS B	1.7	12.2	0.37	0.68	44.8
2	T	1022	0.0	0.816	40.6	LOS D	26.8	187.4	0.99	0.94	27.1
3	R	107	0.0	0.525	59.5	LOS E	5.6	39.3	0.99	0.79	22.7
Approach		1239	0.0	0.816	39.8	LOS D	26.8	187.4	0.93	0.90	27.6
East: Blackshaws Road											
4	L	135	0.0	0.953	58.6	LOS E	33.3	233.3	1.00	1.17	23.7
5	T	416	0.0	0.953	50.7	LOS D	33.3	233.3	1.00	1.17	23.7
6	R	466	0.0	1.141	175.9	LOS F	46.6	326.4	1.00	1.44	10.3
Approach		1017	0.0	1.141	109.1	LOS F	46.6	326.4	1.00	1.29	14.8
North: Millers Road											
7	L	374	0.0	0.626	11.2	LOS B	5.7	39.7	0.37	0.70	45.9
8	T	787	0.0	0.629	23.2	LOS C	14.7	102.8	0.75	0.65	35.1
9	R	102	0.0	0.499	55.1	LOS E	5.1	35.6	0.94	0.78	23.8
Approach		1263	0.0	0.629	22.2	LOS C	14.7	102.8	0.65	0.67	36.2
West: Blackshaws Road											
10	L	83	0.0	0.676	45.1	LOS D	14.4	101.0	0.89	0.97	27.8
11	T	283	0.0	0.676	37.2	LOS D	14.4	101.0	0.89	0.87	28.1
12	R	115	0.0	0.403	34.8	LOS C	3.9	27.2	0.87	0.77	30.7
Approach		481	0.0	0.676	38.0	LOS D	14.4	101.0	0.88	0.86	28.6
All Vehicles		4000	0.0	1.141	51.6	LOS D	46.6	326.4	0.86	0.92	24.3

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	Across S approach	53	40.5	LOS E	0.1	0.1	0.86	0.86
P3	Across E approach	53	30.1	LOS D	0.1	0.1	0.74	0.74
P5	Across N approach	53	40.5	LOS E	0.1	0.1	0.86	0.86
P7	Across W approach	53	30.1	LOS D	0.1	0.1	0.74	0.74
All Pedestrians		212	35.3	LOS D			0.80	0.80

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.

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140708sid-14M544000-Blackshaws Road Millers Road.sip
8000056, GTA CONSULTANTS, ENTERPRISE

MOVEMENT SUMMARY

Site: Millers Road/Blackshaws Road - PM Post Dev

Millers Road / Blackshaws Road
Signals - Fixed Time Cycle Time = 110 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Millers Road											
1	L	99	0.0	0.138	9.9	LOS A	1.1	7.6	0.27	0.66	47.1
2	T	796	0.0	0.561	30.0	LOS C	17.0	119.2	0.85	0.74	31.4
3	R	200	0.0	0.987	97.2	LOS F	14.9	104.0	1.00	1.12	16.3
Approach		1095	0.0	0.987	40.5	LOS D	17.0	119.2	0.83	0.80	27.6
East: Blackshaws Road											
4	L	146	0.0	0.812	42.8	LOS D	15.6	109.2	0.93	1.05	28.4
5	T	245	0.0	0.812	35.0	LOS C	15.6	109.2	0.93	1.00	28.7
6	R	329	0.0	0.964	53.5	LOS D	17.6	123.1	1.00	0.99	24.3
Approach		721	0.0	0.964	45.0	LOS D	17.6	123.1	0.96	1.01	26.5
North: Millers Road											
7	L	463	0.0	0.775	17.8	LOS B	11.1	78.0	0.46	0.75	40.5
8	T	1379	0.0	0.972	63.5	LOS E	48.6	339.9	1.00	1.19	21.1
9	R	117	0.0	0.577	60.5	LOS E	6.1	42.7	0.98	0.79	22.5
Approach		1959	0.0	0.972	52.5	LOS D	48.6	339.9	0.87	1.06	23.9
West: Blackshaws Road											
10	L	65	0.0	0.898	66.4	LOS E	19.7	137.7	1.00	1.10	22.0
11	T	285	0.0	0.898	58.5	LOS E	19.7	137.7	1.00	1.10	22.0
12	R	100	0.0	0.355	35.2	LOS D	3.7	26.0	0.85	0.76	30.5
Approach		451	0.0	0.898	54.5	LOS D	19.7	137.7	0.97	1.03	23.5
All Vehicles		4225	0.0	0.987	48.3	LOS D	48.6	339.9	0.89	0.98	25.2

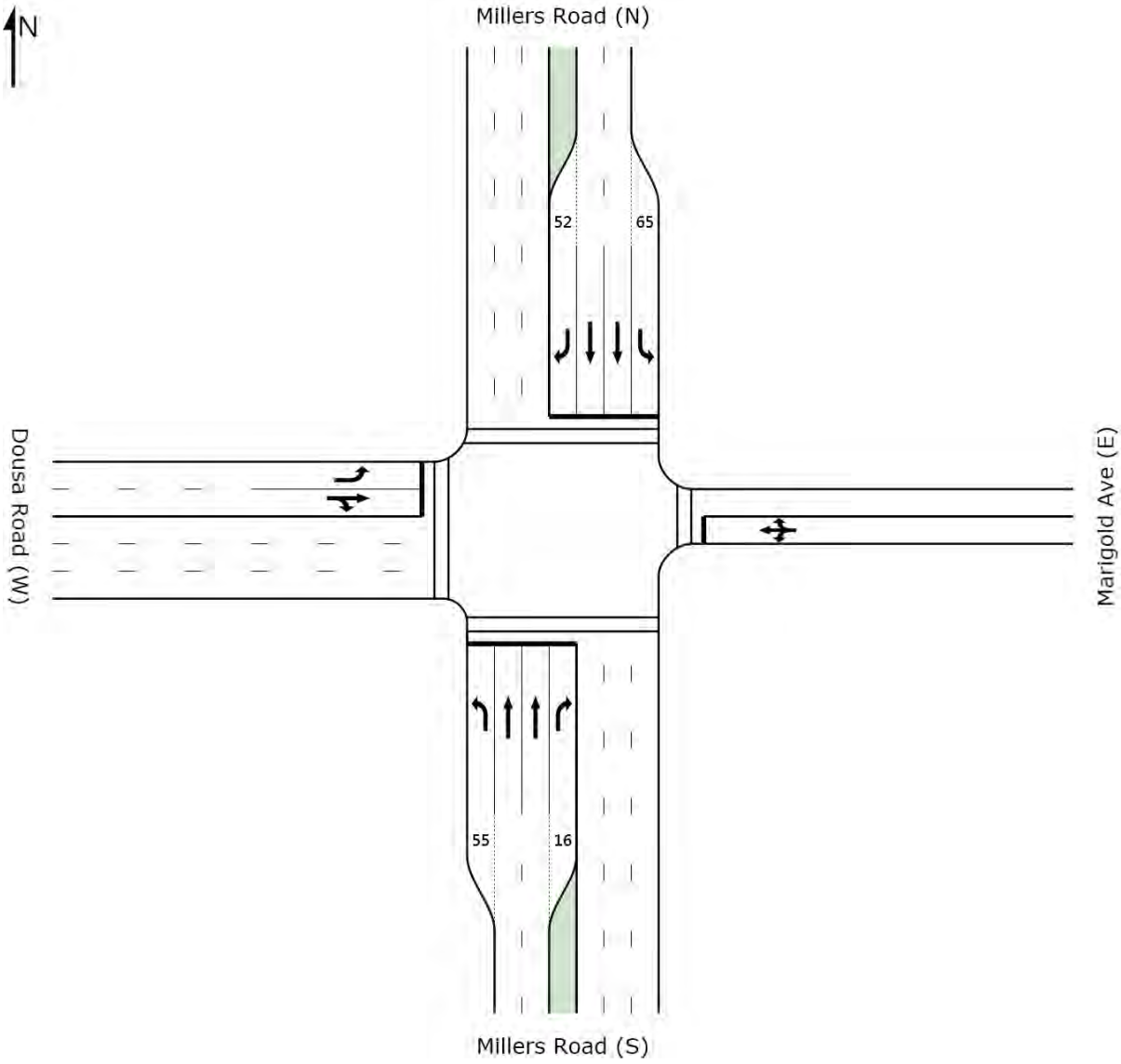
Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	Across S approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
P3	Across E approach	53	27.0	LOS C	0.1	0.1	0.70	0.70
P5	Across N approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	53	27.0	LOS C	0.1	0.1	0.70	0.70
All Pedestrians		212	38.1	LOS D			0.82	0.82

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

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140708sid-14M544000-Blackshaws Road Millers Road.sip
8000056, GTA CONSULTANTS, ENTERPRISE


N
Millers Road (N)
52
65
Dousa Road (W)
Marigold Ave (E)
55
16
Millers Road (S)

MOVEMENT SUMMARY

Site: Millers / Marigold - AM Post Dev

New Site
Signals - Fixed Time Cycle Time = 109 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Millers Road (S)											
1	L	134	0.0	0.234	18.2	LOS B	2.2	15.7	0.34	0.72	40.0
2	T	1476	0.0	0.878	19.5	LOS B	32.5	227.4	0.82	0.80	37.1
3	R	5	0.0	0.074	61.0	LOS E	0.3	1.9	0.93	0.64	22.4
Approach		1615	0.0	0.878	19.5	LOS B	32.5	227.4	0.78	0.79	37.2
East: Marigold Ave (E)											
4	L	1	0.0	0.940	83.0	LOS F	17.6	123.2	1.00	1.16	18.4
5	T	69	0.0	0.940	74.9	LOS E	17.6	123.2	1.00	1.16	18.5
6	R	174	0.0	0.940	82.9	LOS F	17.6	123.2	1.00	1.16	18.5
Approach		244	0.0	0.940	80.6	LOS F	17.6	123.2	1.00	1.16	18.5
North: Millers Road (N)											
7	L	55	0.0	0.082	16.9	LOS B	0.8	5.8	0.30	0.70	41.0
8	T	974	0.0	0.461	11.3	LOS B	10.7	74.6	0.45	0.40	44.3
9	R	114	0.0	0.486	52.6	LOS D	5.5	38.4	0.93	0.78	24.5
Approach		1142	0.0	0.486	15.7	LOS B	10.7	74.6	0.49	0.45	40.9
West: Dousa Road (W)											
10	L	208	0.0	0.382	29.7	LOS C	6.8	47.8	0.84	0.80	33.0
11	T	19	0.0	0.151	39.1	LOS D	2.1	14.4	0.86	0.66	27.1
12	R	27	0.0	0.151	47.0	LOS D	2.1	14.4	0.86	0.76	26.7
Approach		255	0.0	0.382	32.3	LOS C	6.8	47.8	0.84	0.79	31.6
All Vehicles		3256	0.0	0.940	23.8	LOS C	32.5	227.4	0.70	0.70	35.2

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	Across S approach	53	46.8	LOS E	0.2	0.2	0.93	0.93
P3	Across E approach	53	20.6	LOS C	0.1	0.1	0.61	0.61
P5	Across N approach	53	46.8	LOS E	0.2	0.2	0.93	0.93
P7	Across W approach	53	25.8	LOS C	0.1	0.1	0.69	0.69
All Pedestrians		212	35.0	LOS D			0.79	0.79

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.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: Millers / Marigold - PM Post Dev

New Site
Signals - Fixed Time Cycle Time = 110 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Millers Road (S)											
1	L	127	0.0	0.305	25.7	LOS C	3.3	22.8	0.51	0.74	35.1
2	T	1134	0.0	0.841	26.0	LOS C	26.4	184.8	0.88	0.83	33.3
3	R	12	0.0	0.135	62.2	LOS E	0.6	4.2	0.94	0.68	22.1
Approach		1273	0.0	0.841	26.3	LOS C	26.4	184.8	0.85	0.82	33.3
East: Marigold Ave (E)											
4	L	8	0.0	0.846	65.3	LOS E	11.4	79.5	1.00	1.02	21.6
5	T	24	0.0	0.846	57.1	LOS E	11.4	79.5	1.00	1.02	21.7
6	R	149	0.0	0.846	65.1	LOS E	11.4	79.5	1.00	1.02	21.6
Approach		182	0.0	0.846	64.1	LOS E	11.4	79.5	1.00	1.02	21.6
North: Millers Road (N)											
7	L	166	0.0	0.269	18.4	LOS B	3.6	25.2	0.60	0.75	39.8
8	T	1613	0.0	0.858	26.8	LOS C	27.8	194.9	0.95	1.00	32.8
9	R	184	0.0	0.720	48.4	LOS D	8.8	61.3	0.89	0.84	25.7
Approach		1963	0.0	0.858	28.1	LOS C	27.8	194.9	0.92	0.97	32.4
West: Dousa Road (W)											
10	L	259	0.0	0.320	29.8	LOS C	9.0	63.1	0.70	0.80	32.9
11	T	58	0.0	0.454	40.2	LOS D	7.6	53.1	0.91	0.75	26.6
12	R	103	0.0	0.454	48.0	LOS D	7.6	53.1	0.91	0.81	26.3
Approach		420	0.0	0.454	35.7	LOS D	9.0	63.1	0.78	0.79	30.1
All Vehicles		3838	0.0	0.858	30.1	LOS C	27.8	194.9	0.88	0.90	31.7

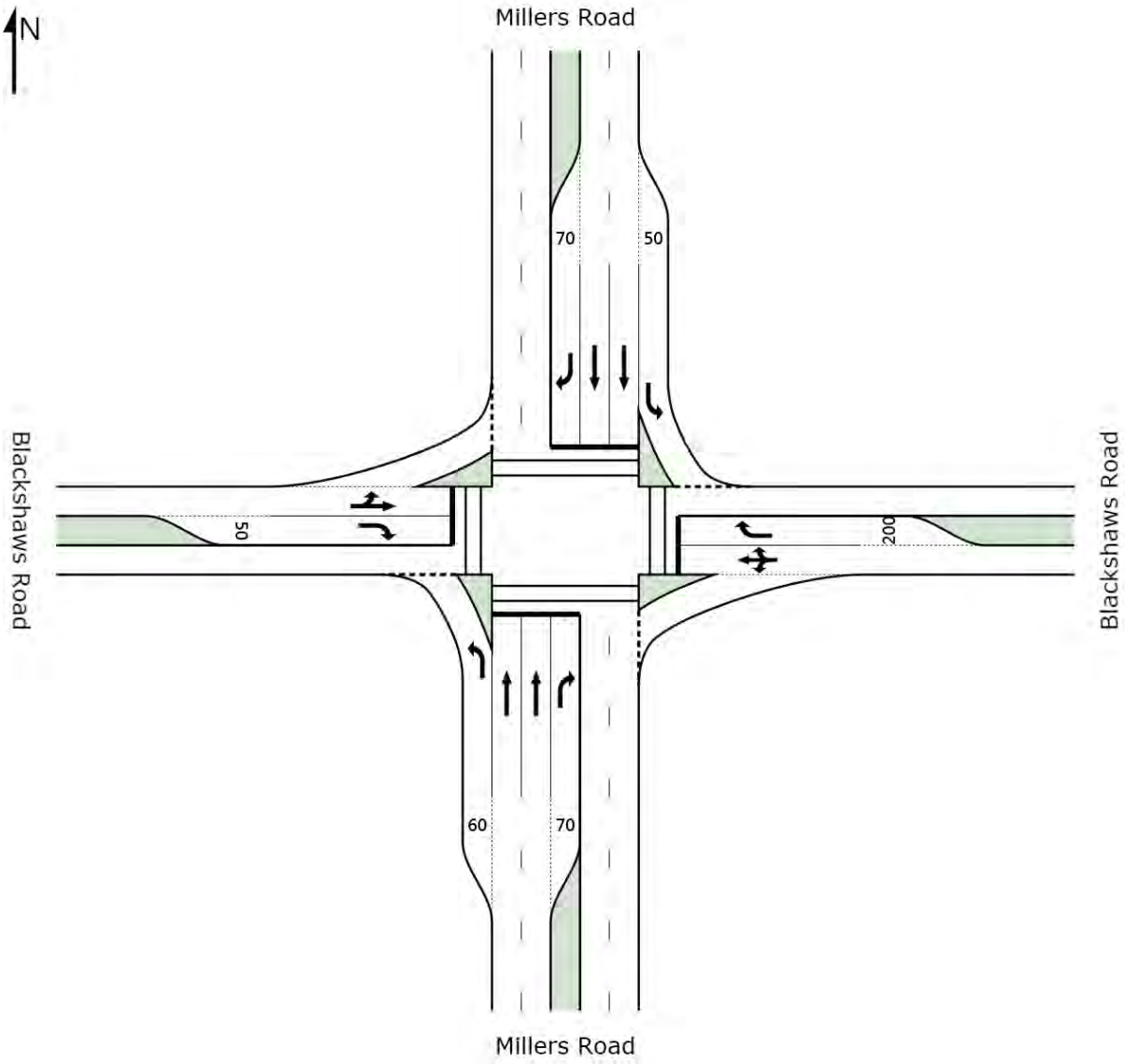
Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	Across S approach	53	46.4	LOS E	0.2	0.2	0.92	0.92
P3	Across E approach	53	27.0	LOS C	0.1	0.1	0.70	0.70
P5	Across N approach	53	46.4	LOS E	0.2	0.2	0.92	0.92
P7	Across W approach	53	32.8	LOS D	0.1	0.1	0.77	0.77
All Pedestrians		212	38.1	LOS D			0.83	0.83

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.

SIDRA INTERSECTION


N
Millers Road
70
50
Blackshaws Road
50
200
Blackshaws Road
60
70
Millers Road

MOVEMENT SUMMARY

Site: Millers Road/Blackshaws Road - AM Post Dev (Modified)

Millers Road / Blackshaws Road
Signals - Fixed Time Cycle Time = 110 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Millers Road											
1	L	109	0.0	0.172	11.6	LOS B	1.5	10.8	0.34	0.67	45.6
2	T	1022	0.0	0.930	61.1	LOS E	33.7	235.7	1.00	1.13	21.6
3	R	107	0.0	0.909	77.2	LOS E	6.8	47.5	1.00	1.00	19.2
Approach		1239	0.0	0.930	58.1	LOS E	33.7	235.7	0.94	1.08	22.4
East: Blackshaws Road											
4	L	137	0.0	0.931	41.5	LOS D	26.6	186.4	1.00	1.04	29.0
5	T	379	0.0	0.931	33.7	LOS C	26.6	186.4	1.00	1.04	29.1
6	R	508	0.0	0.931	64.4	LOS E	28.8	201.5	1.00	1.01	21.7
Approach		1024	0.0	0.931	50.0	LOS D	28.8	201.5	1.00	1.02	24.9
North: Millers Road											
7	L	375	0.0	0.554	11.4	LOS B	5.8	40.8	0.37	0.69	45.7
8	T	787	0.0	0.716	28.6	LOS C	17.0	119.3	0.85	0.74	32.1
9	R	102	0.0	0.864	67.6	LOS E	6.0	42.0	1.00	0.87	20.9
Approach		1264	0.0	0.864	26.6	LOS C	17.0	119.3	0.72	0.74	33.7
West: Blackshaws Road											
10	L	83	0.0	0.897	70.0	LOS E	20.3	142.2	1.00	1.15	21.2
11	T	283	0.0	0.897	62.2	LOS E	20.3	142.2	1.00	1.15	21.2
12	R	115	0.0	0.485	52.0	LOS D	5.3	36.8	0.88	0.78	24.7
Approach		481	0.0	0.897	61.1	LOS E	20.3	142.2	0.97	1.06	21.9
All Vehicles		4008	0.0	0.931	46.5	LOS D	33.7	235.7	0.89	0.95	25.7

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue		Prop. Queued	Effective Stop Rate
					Pedestrian	Distance		
		ped/h	sec		ped	m		per ped
P1	Across S approach	53	40.2	LOS E	0.1	0.1	0.85	0.85
P3	Across E approach	53	33.6	LOS D	0.1	0.1	0.78	0.78
P5	Across N approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	53	33.6	LOS D	0.1	0.1	0.78	0.78
All Pedestrians		212	39.1	LOS D			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.

Processed: Thursday, 25 September 2014 4:37:19 PM
SIDRA INTERSECTION 5.1.13.2093

SIDRA INTERSECTION

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140708sid-14M544000-Blackshaws Road Millers Road.sip
8000056, GTA CONSULTANTS, ENTERPRISE

MOVEMENT SUMMARY

Site: Millers Road/Blackshaws Road - PM Post Dev (Modified)

Millers Road / Blackshaws Road
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Millers Road											
1	L	99	0.0	0.130	9.8	LOS A	1.1	7.4	0.25	0.65	47.3
2	T	796	0.0	0.556	30.0	LOS C	16.3	113.8	0.75	0.65	31.6
3	R	201	0.0	0.928	79.6	LOS E	13.7	95.8	1.00	0.98	18.8
Approach		1096	0.0	0.928	37.3	LOS D	16.3	113.8	0.75	0.71	28.9
East: Blackshaws Road											
4	L	147	0.0	0.945	47.0	LOS D	19.2	134.6	1.00	1.03	26.9
5	T	246	0.0	0.945	39.1	LOS D	19.2	134.6	1.00	1.03	27.0
6	R	331	0.0	0.945	75.6	LOS E	19.6	136.9	1.00	1.02	19.6
Approach		724	0.0	0.945	57.4	LOS E	19.6	136.9	1.00	1.02	23.0
North: Millers Road											
7	L	465	0.0	0.612	15.6	LOS B	11.0	76.8	0.49	0.75	42.1
8	T	1379	0.0	0.964	71.4	LOS E	53.3	373.4	1.00	1.19	19.6
9	R	117	0.0	0.539	63.8	LOS E	6.7	46.7	0.99	0.79	21.7
Approach		1961	0.0	0.964	57.7	LOS E	53.3	373.4	0.88	1.06	22.6
West: Blackshaws Road											
10	L	65	0.0	0.975	92.8	LOS F	25.6	179.1	1.00	1.24	17.4
11	T	286	0.0	0.975	85.0	LOS F	25.6	179.1	1.00	1.24	17.4
12	R	100	0.0	0.484	57.2	LOS E	5.3	37.1	0.93	0.78	23.3
Approach		452	0.0	0.975	80.0	LOS E	25.6	179.1	0.99	1.13	18.4
All Vehicles		4233	0.0	0.975	54.7	LOS D	53.3	373.4	0.88	0.97	23.4

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

Movement Performance - Pedestrians

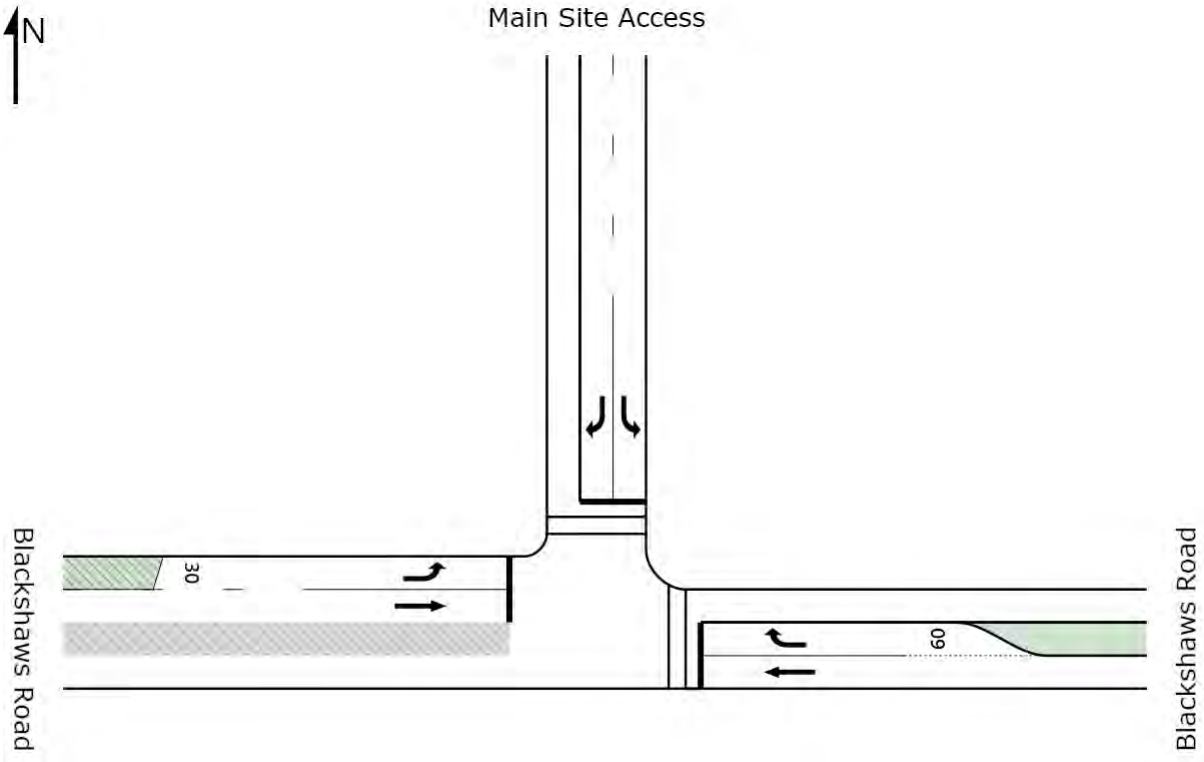
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue		Prop. Queued	Effective Stop Rate
					Pedestrian	Distance		
		ped/h	sec		ped	m		per ped
P1	Across S approach	53	54.2	LOS E	0.2	0.2	0.95	0.95
P3	Across E approach	53	28.7	LOS C	0.1	0.1	0.69	0.69
P5	Across N approach	53	54.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	53	28.7	LOS C	0.1	0.1	0.69	0.69
All Pedestrians		212	41.4	LOS E			0.82	0.82

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

SIDRA INTERSECTION

Appendix C

SIDRA INTERSECTION Results – Access Intersections


N
Main Site Access
Blackshaws Road
30
60
Blackshaws Road

MOVEMENT SUMMARY

Site: Main Site Access/Blackshaws Road - AM Peak Hour Post Dev

Main Site Access / Blackshaws Road
Signals - Fixed Time Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Blackshaws Road											
5	T	513	0.0	0.455	11.6	LOS B	12.8	89.4	0.62	0.55	43.5
6	R	31	0.0	0.091	25.3	LOS C	0.8	5.7	0.63	0.74	35.3
Approach		543	0.0	0.455	12.4	LOS B	12.8	89.4	0.62	0.56	43.0
North: Main Site Access											
7	L	224	0.0	0.418	36.4	LOS D	8.1	56.4	0.86	0.81	30.0
9	R	324	0.0	0.604	38.4	LOS D	12.4	87.1	0.92	0.84	29.1
Approach		548	0.0	0.604	37.6	LOS D	12.4	87.1	0.89	0.83	29.4
West: Blackshaws Road											
10	L	32	0.0	0.099	16.8	LOS B	0.6	4.1	0.45	0.70	41.0
11	T	698	0.0	0.619	8.4	LOS A	13.4	93.6	0.47	0.43	47.0
Approach		729	0.0	0.619	8.7	LOS A	13.4	93.6	0.47	0.44	46.7
All Vehicles		1821	0.0	0.619	18.5	LOS B	13.4	93.6	0.64	0.59	38.9

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue		Prop. Queued	Effective Stop Rate
					Pedestrian	Distance		
		ped/h	sec		ped	m		per ped
P3	Across E approach	53	28.0	LOS C	0.1	0.1	0.79	0.79
P5	Across N approach	53	11.3	LOS B	0.1	0.1	0.50	0.50
All Pedestrians		106	19.6	LOS B			0.64	0.64

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.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: Main Site Access/Blackshaws Road - PM Peak Hour Post Dev

Main Site Access / Blackshaws Road
Signals - Fixed Time Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Blackshaws Road											
5	T	699	0.0	0.496	5.7	LOS A	13.1	91.7	0.47	0.43	49.9
6	R	260	0.0	0.724	23.0	LOS C	8.1	56.9	0.63	0.86	36.7
Approach		959	0.0	0.724	10.4	LOS B	13.1	91.7	0.51	0.54	45.4
North: Main Site Access											
7	L	166	0.0	0.620	49.0	LOS D	7.2	50.3	0.99	0.82	25.5
9	R	189	0.0	0.706	50.8	LOS D	8.5	59.3	1.00	0.85	25.0
Approach		356	0.0	0.706	49.9	LOS D	8.5	59.3	0.99	0.84	25.2
West: Blackshaws Road											
10	L	211	0.0	0.473	13.3	LOS B	2.8	19.9	0.41	0.73	43.9
11	T	829	0.0	0.589	1.3	LOS A	4.1	28.6	0.12	0.11	57.2
Approach		1040	0.0	0.589	3.7	LOS A	4.1	28.6	0.18	0.24	53.9
All Vehicles		2355	0.0	0.724	13.4	LOS B	13.1	91.7	0.44	0.45	43.2

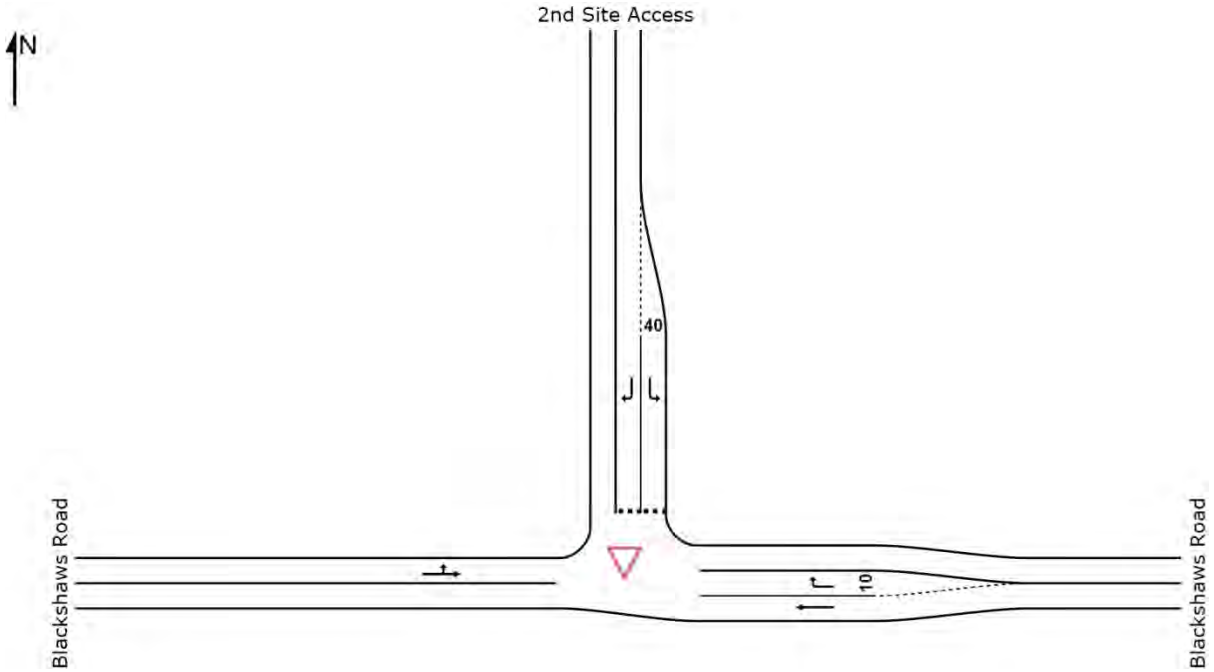
Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue		Prop. Queued	Effective Stop Rate
					Pedestrian	Distance		
		ped/h	sec		ped	m		per ped
P3	Across E approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
P5	Across N approach	53	5.7	LOS A	0.0	0.0	0.36	0.36
All Pedestrians		106	22.4	LOS C			0.64	0.64

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.

SIDRA INTERSECTION


2nd Site Access
N
40
10
Blackshaws Road
Blackshaws Road

MOVEMENT SUMMARY

Site: 2nd Site Access/Blackshaws Road - AM Peak Hour Post Dev

2nd Site Access / Blackshaws Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Blackshaws Road											
5	T1	776	0.0	0.398	0.1	LOS A	0.0	0.0	0.00	0.00	59.9
6	R2	19	0.0	0.022	8.7	LOS A	0.1	0.6	0.53	0.68	51.0
Approach		795	0.0	0.398	0.3	NA	0.1	0.6	0.01	0.02	59.6
North: 2nd Site Access											
7	L2	68	0.0	0.102	9.7	LOS A	0.4	2.8	0.59	0.79	50.6
9	R2	102	0.0	0.540	33.8	LOS D	2.2	15.3	0.92	1.07	37.6
Approach		171	0.0	0.540	24.1	LOS C	2.2	15.3	0.79	0.96	41.9
West: Blackshaws Road											
10	L2	35	0.0	0.370	5.6	LOS A	0.0	0.0	0.00	0.03	58.0
11	T1	684	0.0	0.370	0.0	LOS A	0.0	0.0	0.00	0.03	59.6
Approach		719	0.0	0.370	0.3	NA	0.0	0.0	0.00	0.03	59.6
All Vehicles		1684	0.0	0.540	2.7	NA	2.2	15.3	0.09	0.12	57.2

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140930sid-14M1544000-Blackshaws Road 2nd Access.sip6
8000056, 6017418, GTA CONSULTANTS, NETWORK / Enterprise

MOVEMENT SUMMARY

Site: 2nd Site Access/Blackshaws Road - PM Peak Hour Post Dev

2nd Site Access / Blackshaws Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Blackshaws Road											
5	T1	856	0.0	0.439	0.1	LOS A	0.0	0.0	0.00	0.00	59.9
6	R2	60	0.0	0.120	12.8	LOS B	0.4	2.8	0.75	0.90	48.3
Approach		916	0.0	0.439	0.9	NA	0.4	2.8	0.05	0.06	58.9
North: 2nd Site Access											
7	L2	56	0.0	0.127	13.2	LOS B	0.5	3.2	0.72	0.88	48.2
9	R2	72	0.0	0.798	95.7	LOS F	3.3	23.3	0.98	1.18	22.9
Approach		127	0.0	0.798	59.5	LOS F	3.3	23.3	0.87	1.05	29.8
West: Blackshaws Road											
10	L2	111	0.0	0.536	5.6	LOS A	0.0	0.0	0.00	0.06	57.7
11	T1	928	0.0	0.536	0.1	LOS A	0.0	0.0	0.00	0.06	59.2
Approach		1039	0.0	0.536	0.7	NA	0.0	0.0	0.00	0.06	59.1
All Vehicles		2082	0.0	0.798	4.4	NA	3.3	23.3	0.07	0.12	55.7

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

Project: P:\14M1500-1599\14M1544000 Lot 14, Precinct 15, Blackshaws Rd\Modelling\SIDRA\140930sid-14M1544000-Blackshaws Road 2nd Access.sip6
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