Planning Scheme Amendment C230, 490–500 Burwood Highway, Vermont South

Transportation Engineering Evidence

24/01/2023 **Ref: 300304377**

PREPARED FOR: Dandenong Views Pty Ltd

PREPARED BY: Stantec Australia Pty Ltd

Stantec

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1. Introduction

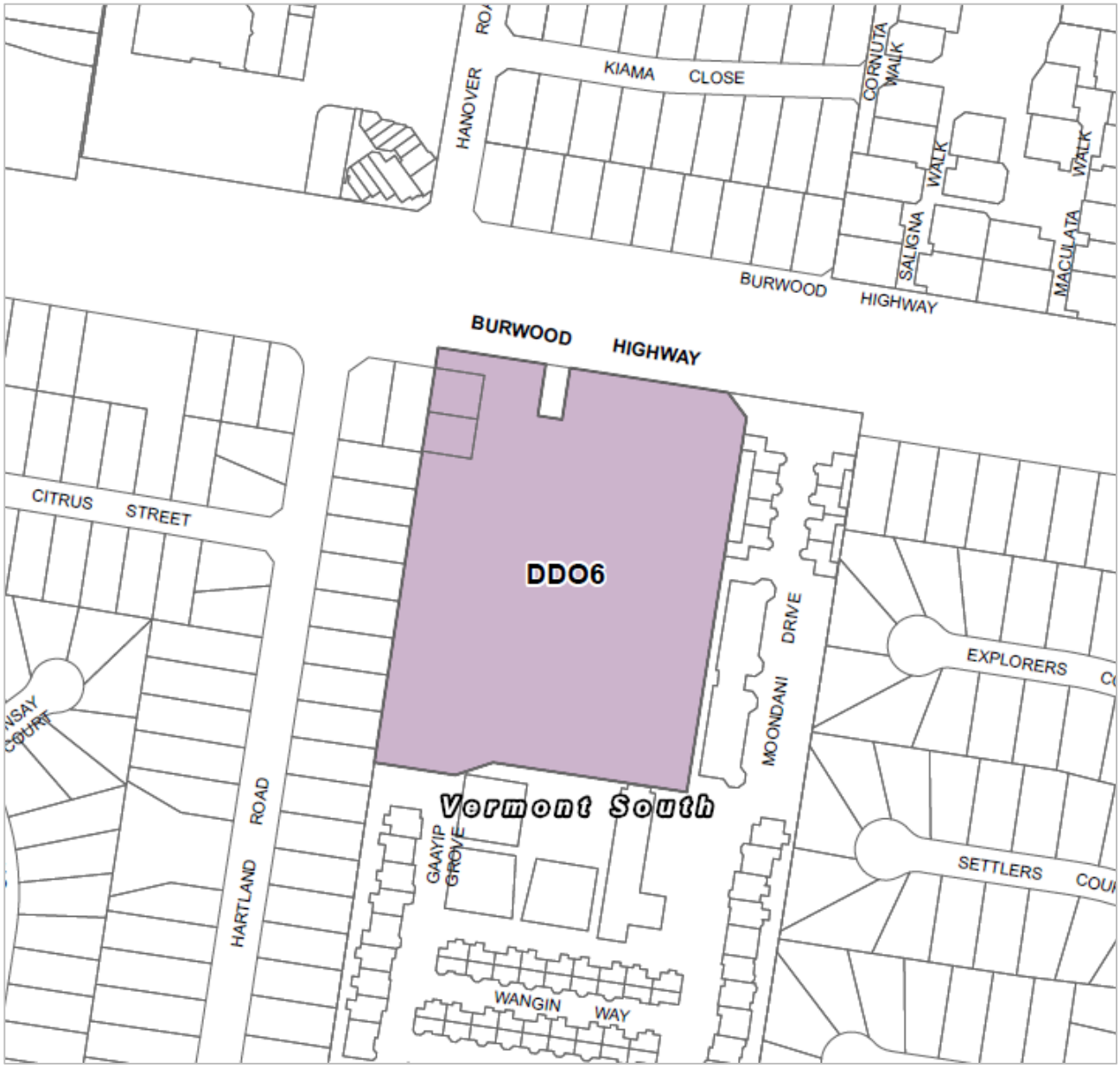
1.1 Background

Planning Scheme Amendment C230wshe (the Amendment) is being sought to the Whitehorse Planning Scheme. The Amendment relates to the land (the *'subject site'*) located at:

- 490-500 Burwood Highway, Vermont South.
- Flat 1/490-500 Burwood Highway, Vermont South.
- Flat 2/490-500 Burwood Highway, Vermont South.

The subject site is known as the former Australian Road and Research Board (ARRB) site. The subject site is identified at Figure 1.1.

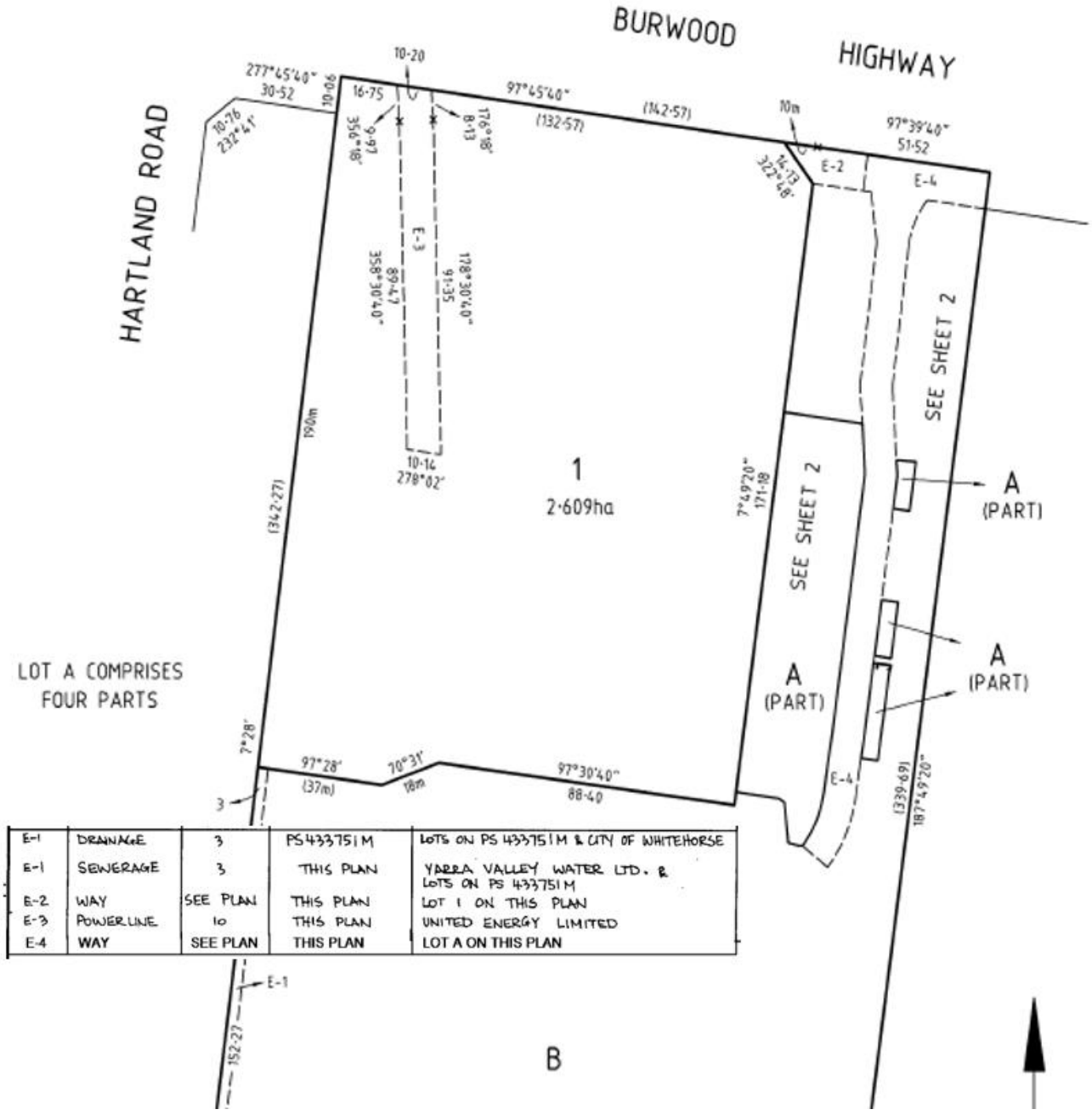
Figure 1.1: Subject Site Location



The subject site represents Lot 1 on Plan of Subdivision number 518296N and Lot 1 on Plan of Subdivision number PS433751M. The subject and its Certificate of Title particulars reveal that the lot is subject to a range of encumbrances including two Section 173 agreements the first identifiable as W826668Q and the second W826669M.

An extract from PS433751M dated 10 June 2009 is provided at Figure 1.2 for reference showing the existence of a carriageway easement in favour of Lot 1, the subject site.

Figure 1.2: Plan of Subdivision PS433751M (Extract Only)



Section 173 marked W826668Q and W826669M both include a copy of Planning Permit number WH1158 (Amended), issued by the City of Whitehorse on 12 April 2000. The issued Planning Permit contains the following requirements from the Department of Transport (formerly VicRoads). These are listed as permit notes:

"1. VicRoads advise that any development or subdivision of stage two will require:

i. All access to the shared vehicle access easement for lot one and stage two to be via the existing service road which should be extended west from its existing location;

ii. The existing entry to Burwood Highway from the service road east of the site to be closed;

iii. The creation of a road reserve consistent with the above;

iv. No future right turn movements to or from Burwood Highway will be permitted."

On these requirements, I observe the following:

a) Development on the retirement village site does not rely on the shared vehicle access easement and has sought and developed independent traffic access at a location further east (viz Moondani Drive).

b) The *'existing service road entry'* referenced in the note to the east has been closed and re-configured to provide access to the retirement village and Lot 1 consistent with that observable in the existing condition (refer Figure 3.1). An extract from Land Data showing the original configuration (circa 1981) is provided at Figure 1.3 for reference and comparison,

c) Title plans do not appear to include the creation of a road reserve in accordance with the requirements of roman numeral items (i) and (ii), and

d) The right-turn-ban requirements for traffic associated with the two lots to and from Burwood Highway has been complied with in association with the development of the retirement village and with the exhibited amendment before this Panel.

Figure 1.3: Land Data Aerial Image Extract (1981) – Burwood Highway Vermont South

The Amendment was exhibited for public comment between 2 June 2022 and 5 July 2022, upon which 43 submissions were received. These submissions were considered by Council at its meeting on 26 September 2022, where it determined to request the Minister for Planning to appoint an independent Panel to review the Amendment and consider submissions.

Subsequently, under delegation from the Minister for Planning, Kathryn Mitchell AM (Chair) and Michael Malouf have been appointed to the Panel, with the hearing set to occur between Tuesday 7 and Friday 10 February 2023.

1.2 Planning Scheme Amendment C230

1.2.1 Background

The Amendment seeks the following changes to the Whitehorse Planning Scheme:

- Amends the Local Planning Policy Framework at Clause 21.06 (Housing) by changing the map.
- Amends the Local Planning Policy Framework at Clause 22.03 (Residential Development) by changing the map.
- Rezones the land from the Transport Zone Schedule 4 (TRZ4) to the Residential Growth Zone Schedule 3 (RGZ3).
- Amends Schedule 5 to Clause 42.02 Vegetation Protection Overlay and applies it to the land.
- Inserts Schedule 10 to Clause 42.03 Significant Landscape Overlay into the Planning Scheme and applies it to the land.
- Amends the Schedule to Clause 43.01 Heritage Overlay to include reference to the updated statement of Significance, Former Australian Road and Research Board, 490–500 Burwood Highway, Vermont South – Statement of Significance (Whitehorse City Council, June 2021).
- Inserts Schedule 6 to Clause 43.02 Design and Development Overlay into the Planning Scheme and applies it to the land.
- Applies Clause 45.03 Environmental Audit Overlay (EAO) to the land.
- Amends the Schedule to Clause 72.04 to incorporate two documents, Former Australian Road and Research Board, 490–500 Burwood Highway, Vermont South – Statement of Significance (Whitehorse City Council, June 2021) and Statement of Tree Significance, 490–500 Burwood Highway, Vermont South (September 2021).
- Amends Planning Scheme maps 06DDO Design and Development, 06EAO Environmental Audit, 06SLO Significant Landscape, 06VPO Vegetation Protection and 06ZN Zones accordingly.

1.2.2 Indicative Development Yield

The Amendment will ultimately facilitate the development of the subject site for residential use. For the purposes of this evidence, an indicative development yield of 290 dwellings has been adopted, with a breakdown of dwelling typology identified at Table 1.1. The indicative development yield is consistent with that adopted in transportation engineering reporting prepared for the exhibited Amendment[1].

Table 1.1: Indicative Development Yield subject to Planning Permit Approval

Dwelling Type	No. of Bedrooms	Indicative Development Yield
Apartments	1-bedroom	55 dwellings
	2-bedroom	172 dwellings
	3-bedroom	18 dwellings
	Total	**245 dwellings**
Townhouses	3-bedroom	32 dwellings
	4-bedroom	13 dwellings
	Total	**45 dwellings**
Total		**290 dwellings**

1.2.3 Proposed Vehicle Access Arrangements

A concept plan for the development of the subject site contained within DDO6 identifies the proposed vehicle access arrangements, as follows:

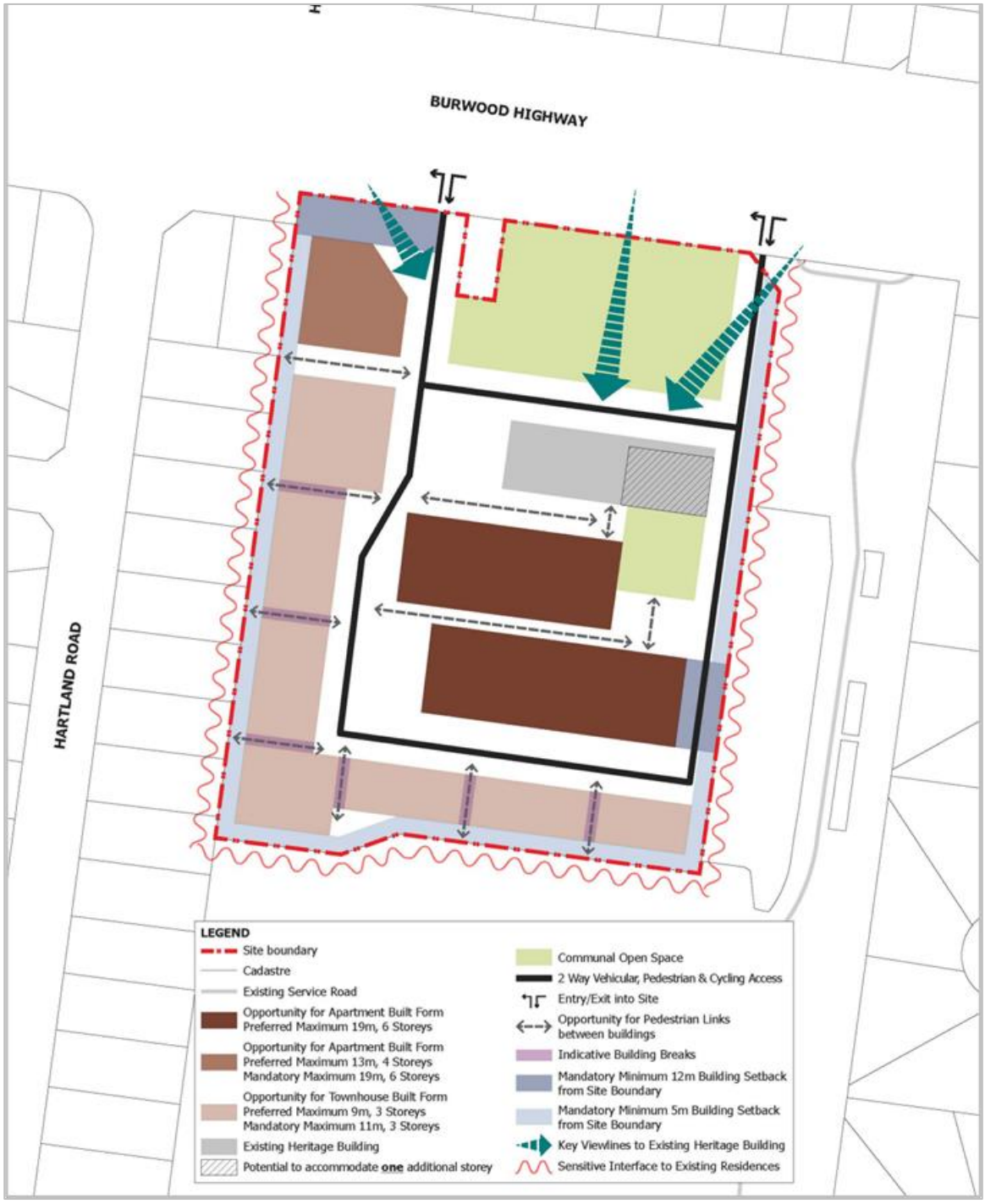
- A left-in/left-out vehicle access on Burwood Highway Service Road, located at the northeast corner of the subject site.

[1] Traffix Group Traffic Engineering Assessment Proposed Rezoning Application, 500 Burwood Highway, Vermont South, dated October 2021.

- A left-in/left-out vehicle access on Burwood Highway located close to the western boundary of the subject site.

The DDO6 concept plan is reproduced at Figure 1.4.

Figure 1.4: DDO6 Concept Plan



1.3 Expert Witness Details

John Kiriakidis BE (Civil & Computing) (Hons) MAITM, MVEPLA, MIEAust
Senior Principal Transportation Engineer – Stantec L25, 55 Collins Street, Melbourne
Areas of Expertise: Traffic Engineering & Transport Planning

I have been awarded a Bachelor of Engineering with Honours (Civil Engineering and Computing) degree from Monash University and am a Member of the Institute of Engineers Australia, Australian Institute of Traffic Planning and Management and the Victorian Planning and Environmental Law Association.

I hold over 28 years of experience in the traffic, transport and urban planning industry and am responsible for managing teams of traffic and transport planning specialists including, traffic engineers, strategic, micro, and mesoscopic modellers, active transport planners and designers.

I have a thorough understanding of federal, state and local transport planning policy and am regularly involved in complex projects.

I appear regularly at the Victorian Civil and Administrative Tribunal (VCAT) and Panels Victoria as an independent expert witness in the field of traffic and transport planning.

Further details of my experience are provided at Appendix A.

1.4 Relationship with Landowner

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

1.5 Instructions & Scope of Report

I have been engaged by the landowner through its agent to prepare and present expert transportation engineering evidence at the listed hearing.

Prior to preparing this evidence, I was briefed by Norton Rose Fulbright Australia regarding the proposal via written instructions. These instructions are provided at Appendix B.

This evidence sets out an assessment of the appropriateness of the transport related elements of the Amendment, including consideration of the following:

1. Existing traffic conditions surrounding the subject site.
2. Adequacy of the proposed vehicle access arrangements.
3. Traffic generation characteristics of an indicative development proposal.
4. Impact of the indicative development proposal traffic on the performance of the surrounding road network.

1.6 References

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

- Whitehorse Planning Scheme.
- Planning Scheme Amendment C230wshe exhibited documents.
- Public submissions received during public exhibition of the proposal.
- Traffix Group Traffic Engineering Assessment – Proposed Rezoning Application, 500 Burwood Highway, Vermont South, dated 8 October 2021.
- City of Whitehorse Council Meeting Minutes dated 13 December 2021.
- City of Whitehorse Council Meeting Minutes dated 26 September 2022.
- Department of Transport letter responding to Planning Scheme Amendment C230wshe, dated 14 July 2022.
- Austroads Guide to Road Design Part 3: Geometric Design (2021).
- Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (2021).
- Roads and Traffic Authority New South Wales Guide to Traffic Generating Developments, dated October 2002.

- Various technical data as referenced in this report.
- An inspection of the site and its surrounds.
- Other documents as nominated.

1.7 Tests, Experiments & Assistance

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

- Jason Sellars, Senior Principal Transport Engineer – BEng (Hons) MIEAust CPEng NER.
- Hans Gao, Transport Engineer – ME (Civil) (Distinct).
- Sharu Paranathan, Transport Engineer – BEng (Civil) (Hons).
- Amin Sedigh, Graduate Transport Engineer – BEng (Civil) (Hons).

2. Existing Condition

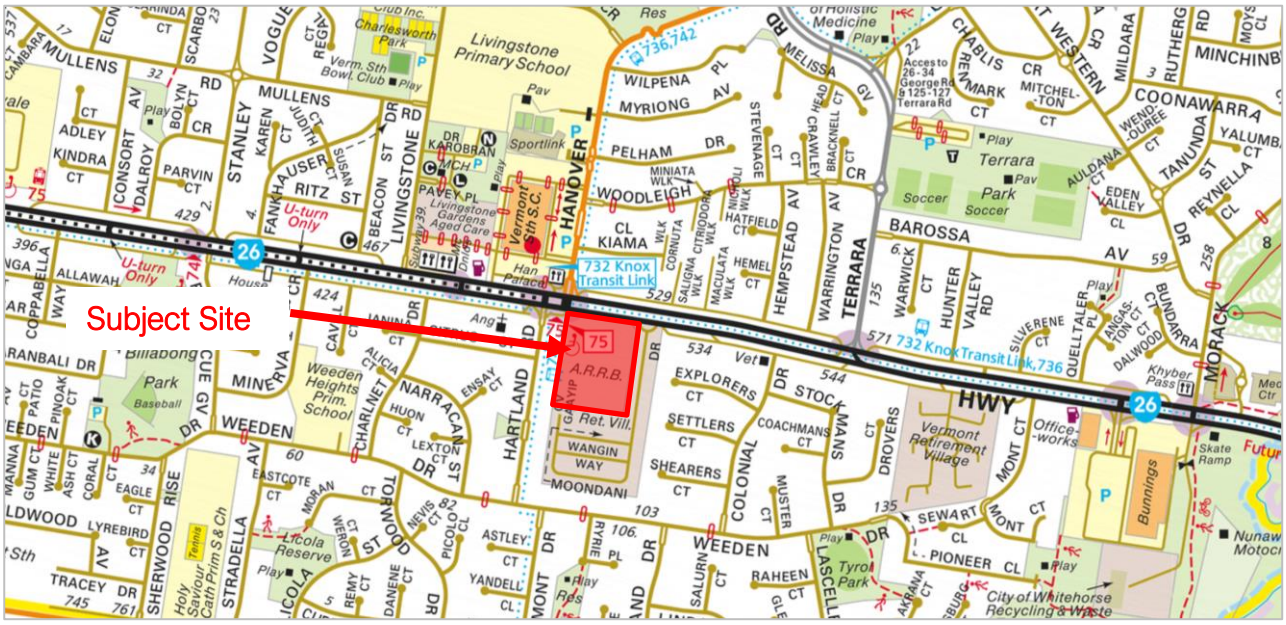
2.1 Subject Site Characteristics

The subject site is located at 490-500 Burwood Highway in Vermont South. The site is presently located within a Transport Zone Schedule 4 (TRZ4) and contains a complex of buildings formerly used by the Australian Road Research Board (ARRB). The subject site is covered by a Heritage Overlay – Schedule 23 (HO23).

The subject site is bounded by Burwood Highway to the north, the Victoria Grange Residential Community to the east and south and residential dwellings to the west.

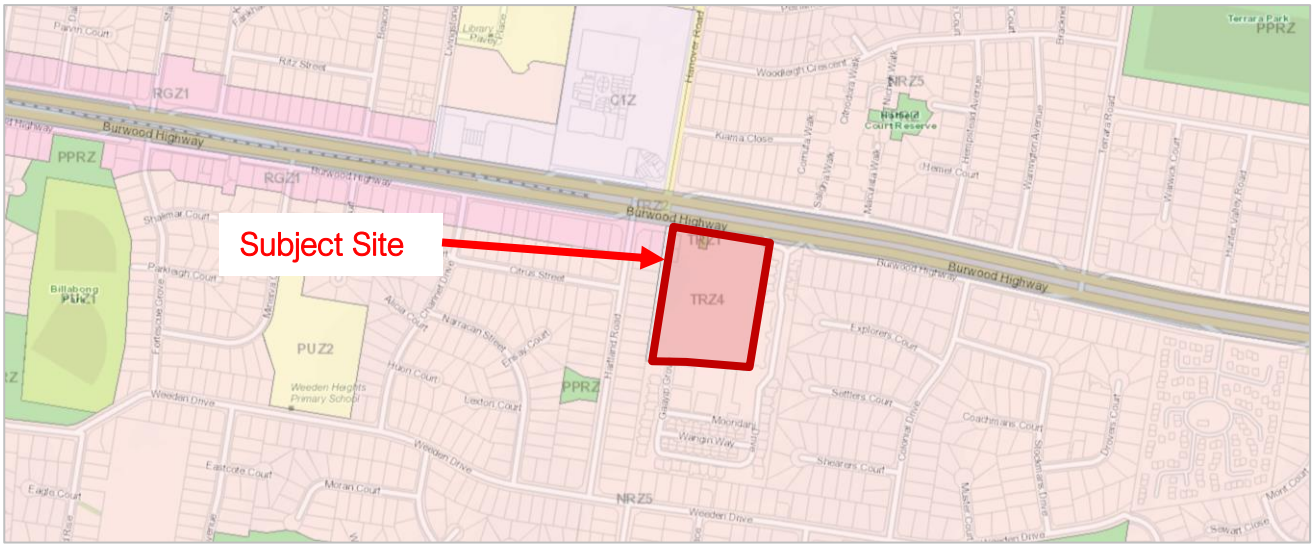
The location of the subject site and the surrounding environs is shown at Figure 2.1 and the current land use zoning is shown at Figure 2.2.

Figure 2.1: Subject Site Location and Surrounds



Source: Melway Publishing Pty Ltd

Figure 2.2: Land Use Zoning Map



Source: VicPlan

2.2 Transport Network

2.2.1 Road Network

A summary of the characteristics of each of the relevant roads in the vicinity of the subject site is provided at Table 2.1.

Table 2.1: Road Network Description

Road	Description
Burwood Highway (arterial road, DoT managed)	• Transport Zone (TRZ2 – principal road network). • Aligned in an east-west direction. • In the vicinity of the subject site, Burwood Highway provides three lanes of traffic in each direction, separated by a central median. • Service lanes are generally provided on both sides of the road, accommodating on-street parking. • Burwood Highway is set within a 60m wide road reserve (typically). • A westbound bus lane is provided on the approach to the Burwood Highway/Hanover Road/Hartland Road signalised intersection. This lane provides access to the Vermont South bus terminal. • A posted speed limit of 80km/h applies to Burwood Highway. • Footpaths are provided on both sides of the road.
Burwood Highway Service Road (westbound) providing access to Moondani Drive (local road, Council managed)	• Aligned in an east-west direction and operates one way westbound. • Accessed from Burwood Highway via a left turn deceleration lane. • Provides access to the Burwood Highway westbound carriageway via a give way arrangement.
Hartland Road (collector road, Council managed)	• Classified as a 'Collector Road' under the Whitehorse City Council Register of Public Roads. • Aligned in a north-south direction. • In the vicinity of the subject site, Hartland Road provides a single through traffic lane and a shared parking/bicycle lane in each direction, set within a 20m wide road reserve (typically). • The urban default speed limit of 50km/h applies to Hartland Road. • Footpaths are provided on both sides of the road.
Hanover Road (collector road, Council managed)	• Classified as a 'Collector Road' under the Whitehorse City Council Register of Public Roads. • Aligned in a north-south direction. • Immediately north of Burwood Highway, Hanover Road provides a single through traffic lane in each direction, set within a 20m wide road reserve (typically). • An on-road unprotected cycle lane is provided in the northbound direction. • A posted speed limit of 50km/h applies to Hanover Road. • Footpaths are provided on both sides of the road.

Road	Description
Moondani Drive (Private Road)	• Aligned in a north-south direction. • Provides access to the Victoria Grande Residential Community, with a gate restricting access to the general public. • Accessed from the Burwood Highway Service Road (westbound).

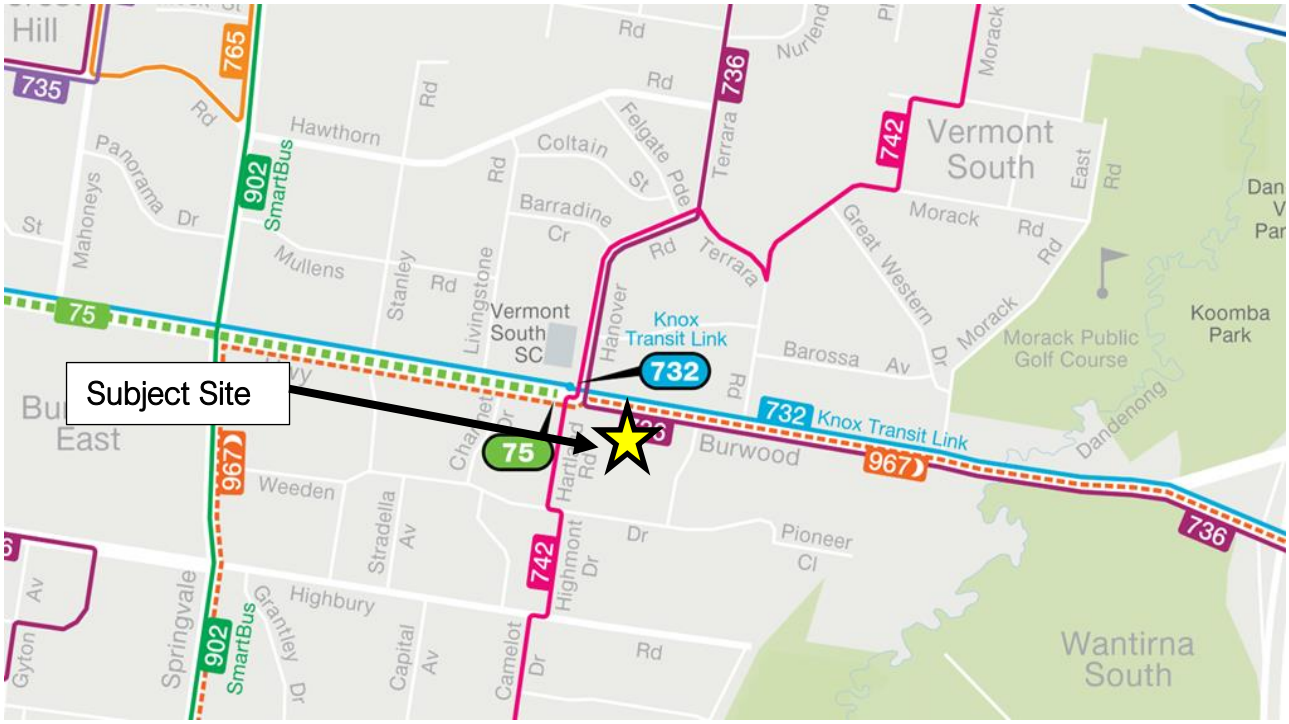
2.2.2 Public Transport

The subject site is located within a short walking distance of a range of public transport services, including bus routes along Burwood Highway and Hartland Road, and tram route 75 also along Burwood Highway. The public transport network in the vicinity of the subject site is presented at Figure 2.3 on the following page, with a summary of the services presented at Table 2.1.

Table 2.2: Public Transport Services

Mode	Service	Nearest Stop	Walking Distance
Bus	Route 732: Box Hill Station – Upper Ferntree Gully	Vermont South Tram Terminus/ Burwood Highway	150m (approx. 2 minutes walk)
	Route 967 (Night Bus): Glen Waverley Station – Croydon Station		
	Route 736: Mitcham – Blackburn	Vermont South SC/ Hanover Road	100m (approx. 2 minutes walk)
	Route 742: Ringwood – Chadstone SC	Burwood Highway/ Hartland Road	100m (approx. 2 minutes walk)
Tram	Route 75: Vermont South to Central Pier Docklands	Hanover Road/ Burwood Highway	150m (approx. 2 minutes walk)

Figure 2.3: Public Transport Network

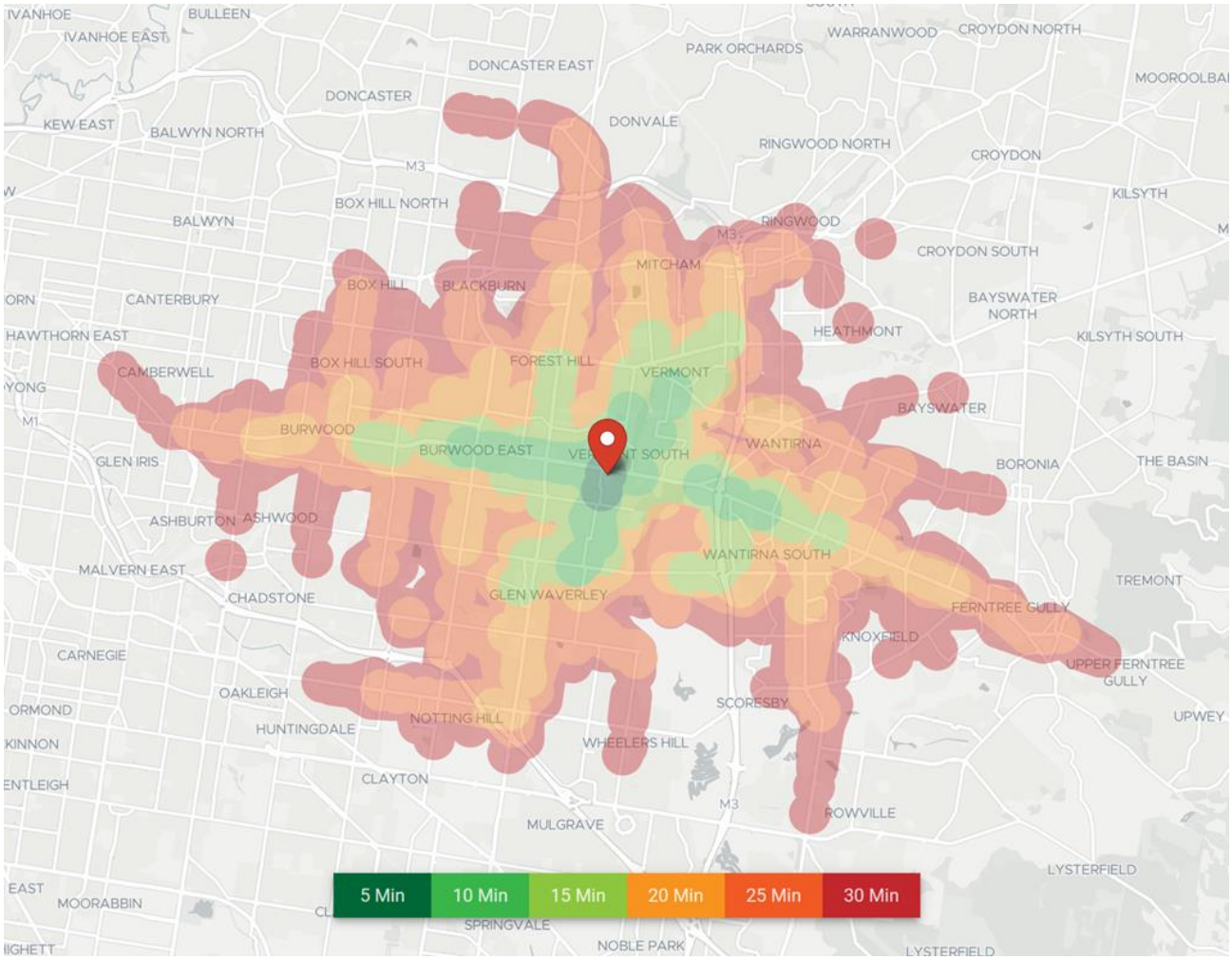


Source: Public Transport Victoria

The subject site has a Transit Score[2] of 57 (out of 100) which is representative of *'good transit'* where there are *'many nearby public transportation options'*.

The public transport catchment which is accessible within 30 minutes of the site in five to 10-minute intervals is shown at Figure 2.4. Within 30 minutes, it is possible to access areas such as Ringwood, Box Hill, Camberwell, Notting Hill, Rowville, Notting Hill and Ferntree Gully.

Figure 2.4: Public Transport Catchment (30 Minutes Travel Time)



Source: Targomo

2.2.3 Walking

The area surrounding the subject site provides a connected pedestrian network. Footpaths are generally provided on both sides of all roads proximate to the subject site.

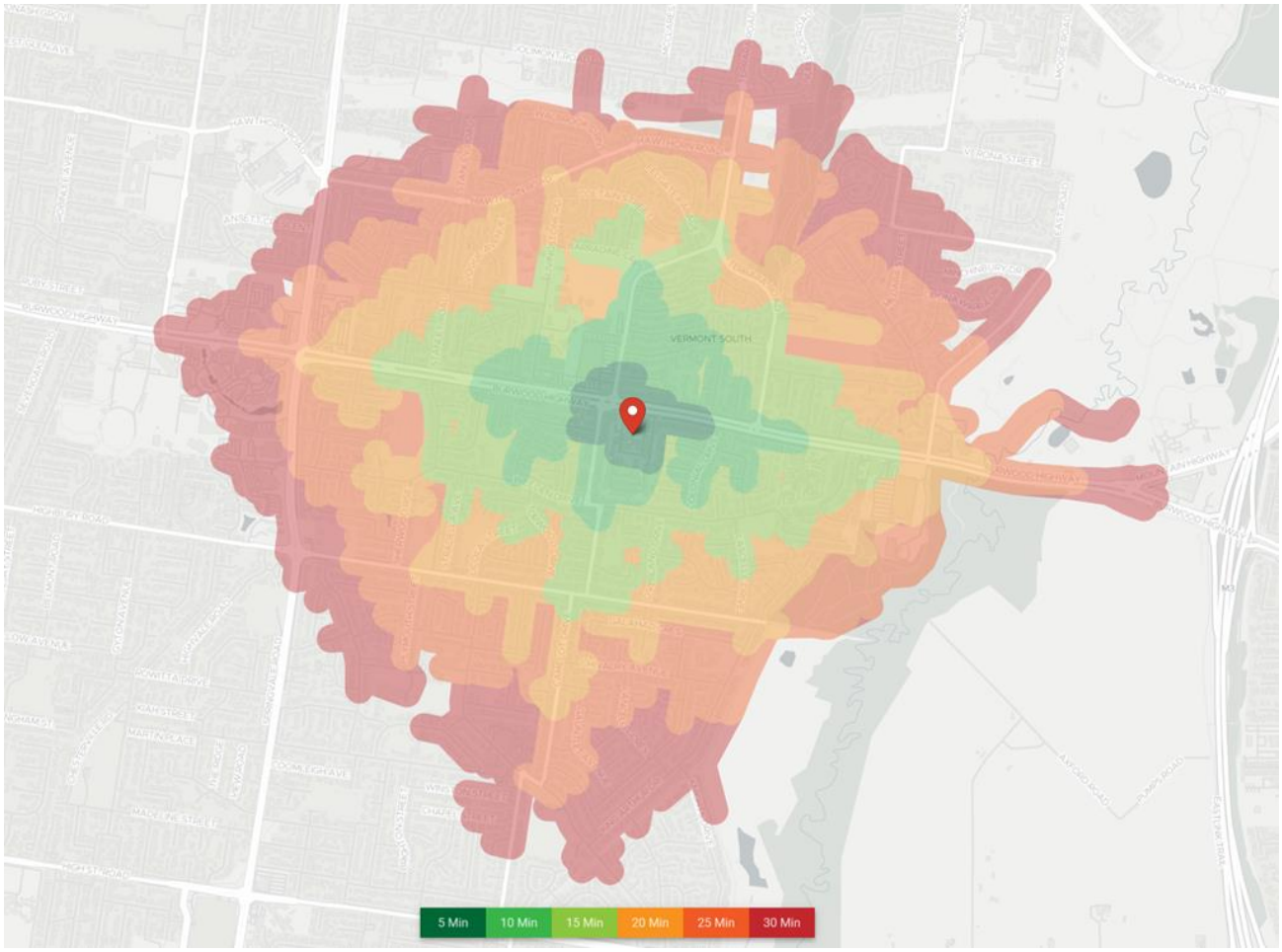
A controlled pedestrian crossing point is provided at the signalised Burwood Highway/Hanover Road/Hartland Road signalised intersection.

[2] Obtained from the Walk Score website. Transit Score is a *"…patented measure of how well a location is served by public transit. Transit Score is based on data released in a standard format by public transit agencies."* A *"usefulness"* value is assigned to "…nearby transit routes based on the frequency, type of route (rail, bus, etc.), and distance to the nearest stop on the route. The *"usefulness"* of all nearby routes is summed and normalized to a score between 0 – 100."

The Walk Score[3] for the suburb of Vermont South is 58 (out of 100) which is representative of a 'somewhat walkable location' and that 'some errands can be accomplished by foot' within the suburb. In comparison, the subject site has a Walk Score of 80 (out of 100) which is representative of a 'very walkable' location where 'most errands can be accomplished on foot'.

The available walking catchment within 30 minutes of the subject site at five to 10-minute intervals is provided at Figure 2.5. Within this catchment, it is possible to travel approximately 1.5km to 2km in all directions.

Figure 2.5: Walking Catchment (30 Minutes Travel Time)



Source: Targomo

2.2.4 Cycling

There are presently no DoT Strategic Cycling Corridor's (SCC's) located in the vicinity of the subject site.

2.3 Accident History

A review of the reported casualty accident history for the following locations relevant to the proposed vehicle access arrangements has been sourced from the VicRoads CrashStats database[4]:

- Moondani Drive and the section of the Burwood Highway Service Road providing access to Moondani Drive.
- The Burwood Highway/unsignalised U-turn facility located approximately 360m to the east of the Burwood Highway Service Road providing access to Moondani Drive.

[3] Obtained from the Walk Score website. Walk Score measures "…the walkability of any address using a patented system. For each address, Walk Score analyses hundreds of walking routes to nearby amenities. Points are awarded based on the distance to amenities in each category. Amenities within a 5 minute walk (.25 miles) are given maximum points. A decay function is used to give points to more distant amenities, with no points given after a 30 minute walk."
[4] The database records all crashes causing injury that have occurred in Victoria and categorises the crashes as Fatal, Serious or 'Other' injury crashes.

- The westbound carriageway of Burwood Highway along the frontage of the subject site
- The Burwood Highway/Hanover Road/Hartland Road signalised intersection.
- The Burwood Highway/signalised U-turn facility located to the west of Burwood Highway/Hanover Road/Hartland Road signalised intersection.

A summary of the accidents for the latest five-year crash period (November 2015 – November 2020) is presented at Table 2.3 and indicates there have been three casualty accidents within the review area during this period (including one *'serious'* and two *'other'* injury accidents). This includes one casualty accident that involved vulnerable users (i.e., pedestrian).

Table 2.3: Five-Year Casualty Crash History

Location	Month/Year	DCA	Injury Type	Description
Burwood Highway/Hanover Road/Hartland Road Intersection (Burwood Highway eastbound carriageway)	10/16	101	Serious	Struck pedestrian (pedestrian emerged from in front of parked or stationary vehicle)
Burwood Highway/Hanover Road/Hartland Road Intersection (Burwood Highway eastbound carriageway)	04/16	130	Other	Vehicles from same direction (rear end)
Burwood Highway/signalised U-turn facility located to the west of Burwood Highway/Hanover Road/Hartland Road signalised intersection.	07/19	173	Other	Off path on straight (right off carriageway into object/parked vehicle)

A review of the available casualty accident history does not reveal any identifiable trend or a frequency which would suggest an existing underlying transport safety deficiency.

3. Proposed Transport Access

3.1 Amendment Arrangements

The DDO6 concept plan shown at Figure 1.4 identifies the following proposed vehicle access arrangements to the subject site:

- A left-in/left-out vehicle access on Burwood Highway Service Road, located at the northeast corner of the subject site.
- A left-in/left-out vehicle access on Burwood Highway approximately mid-point along the sites Burwood Highway street frontage, consistent with the existing condition.

The proposed vehicle access arrangements are shown diagrammatically on aerial imagery at Figure 3.1. Figure 3.1 shows that the proposed vehicle access strategy, insofar as the location of access, is consistent with the former vehicle access strategy for the subject site.

Figure 3.1: Proposed Vehicle Access Arrangements (Aerial Image)

Source: Nearmap photography dated Saturday 3 December 2022

3.2 Adequacy of Vehicle Access Arrangements

I have reviewed the adequacy of the proposed vehicle access arrangements having regard to a range of factors, including:

- The existing configuration of roads and intersections in the vicinity of the site.
- Existing traffic activity levels including turning volumes and local street traffic demands.
- Road safety considerations including contemporary design standards.
- The indicative development traffic levels estimated to use each vehicle access and circulate on the road network
- The likely traffic performance of each vehicle access with the proposed development in place.
- The likely destination of vehicles exiting onto Burwood Highway, particularly traffic movements heading north (Hanover Road) and east (Burwood Highway).

On a prima facie basis, I have no concerns with the proposed eastern vehicle access located from within the Burwood Highway Service Road, provided that this road can accommodate the post-development traffic demands (this is discussed in further detail at Section 4 of this evidence).

I also have no material concerns with the left-in vehicle movement at the proposed western vehicle access. On the proposed left-turn exit at the proposed western access, I do expect that drivers seeking to head east on Burwood Highway or north up Hanover Road are likely to avoid this access during peak times and rely on the eastern access given that:

- The eastern access will allow drivers to join the back-of-queue (on most occasions) as opposed to compete with westbound vehicles queued during a red phase at the Burwood Highway / Hanover Road traffic signals, offering a higher and better level of service (i.e., lower traffic delay),
- A longer offset between the Burwood Highway and Hanover Road intersection stop line on the east approach will provide drivers a more comfortable weave opportunity to cross three traffic lanes and a bus lane and perform their northbound or eastbound traffic movement.

Other drivers not wishing to use the eastern access for these manoeuvres will in my view likely use the signalised right turn and U-turn facility available approximately 300m west of the subject site. Amongst other things, this facility provides direct access to the Vermont South Shopping Centre.

For modelling purposes and to ensure that traffic analysis reflects this assumption, traffic modelling presented in the following report section had assigned all northbound and eastbound traffic to the proposed eastern site access representing a conservative or *'worst case'* traffic capacity scenario for modelling of Service Road operational performance.

4. Traffic Considerations

4.1 Introduction

A detailed assessment of the impact of the indicative development traffic on the performance of the following intersections has been carried out:

- Burwood Highway/unsignalised U-turn facility located approximately 360m to the east of the Burwood Highway service road providing access to Moondani Drive.
- Burwood highway/subject site western site access.
- Burwood Highway/Burwood Highway Service Road (providing access to Moondani Drive and the subject site).
- Burwood Highway/Hanover Road/Hartland Road signalised intersection.
- Burwood Highway/Bus Interchange signalised intersection.
- Burwood Highway/signalised U-turn facility located to the west of Burwood Highway/Hanover Road/Hartland Road signalised intersection.

The assessment corridor intersections (orange circled) are identified at Figure 4.1.

Figure 4.1: Assessment of Intersections along the Burwood Highway Corridor

4.2 Existing Traffic Volumes

Existing traffic volumes for the assessment corridor were surveyed on Wednesday 14 September 2022 during the road network AM peak period (7:30am to 9:30am) and PM peak period (4:30pm to 6:30pm). The existing road network peak hours for the assessed network were determined as 8:00am to 9:00am and 5:15pm to 6:15pm.

Some minor manual adjustments have been made to the eastbound and westbound traffic volumes past the Burwood Highway Service Road (that provides access to Moondani Drive and the subject site) to match the traffic volumes arriving/departing the Burwood Highway/Hanover Road/Hartland Road signalised intersection.

The existing AM and PM peak traffic volumes for the network assessment corridor are presented at Appendix C of this evidence. The traffic volumes have been separated into light vehicle and heavy vehicle classifications. The cells highlighted in yellow represent the light vehicles and the cells highlighted in green represent the heavy vehicles.

4.3 Burwood Highway Service Road Gap Capacity Analysis

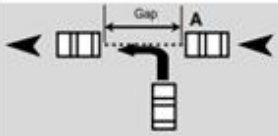
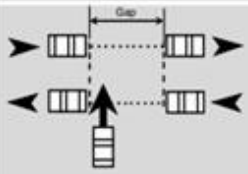
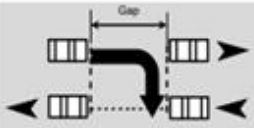
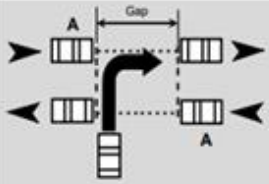
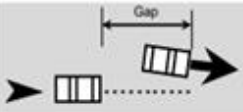
The absorption capacity of Burwood Highway for vehicles exiting left from the Burwood Highway Service Road (providing access to Moondani Drive and the subject site) has been determined through surveys carried out on Wednesday 14 September 2022. This has been done to more accurately determine the gaps available for traffic exiting the Service Road.

The absorption capacity values have been determined using a critical acceptance or lead gap of 6 seconds for the first driver and a follow-up headway or secondary driver gap of 3 seconds where more than one driver is queued to exit the Service Road. These values are consistent with (for example) a *'three-lane, one-way crossing'* movement as identified at Table 3.5 (critical acceptance gaps and follow up headways) of Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections and represent an average of those expected for a range of driving competencies including those drivers content to enter the Burwood Highway kerbside lane without seeking a gap in the middle or median lane and those wishing to be more conservative and seek gaps in more than one westbound lane. The select values exceed those listed as minimums for a left turn exit and represent the range of movements likely for traffic exiting the Service Road.

The Austroads table showing various gap acceptance parameters is reproduced at Figure 4.2 for reference.

Figure 4.2: Austroads Critical Acceptance Gaps and Follow Up Headways

Table 3.5: Critical acceptance gaps and follow-up headways

Movement	Diagram	Description	t_a[1] (sec)	t_f[2] (sec)
Left turn		Not interfering with A Requiring A to slow	14–40 5	2–3 2–3
Crossing		Two lane/one way Three lane/one way Four lane/one way Two lane/two way Four lane/two way Six lane/two way	4 6 8 5 8 8	2 3 4 3 5 5
Right turn from major road		Across one lane Across two lanes Across three lanes	4 5 6	2 3 4
Right turn from minor road		Not interfering with A One way Two lane/two way Four lane/two way Six lane/two way	14–40 3 5 8 8	3 3 3 5 5
Merge		Acceleration lane	3	2

1 t_a = critical acceptance gap (sec).
2 t_f = follow-up headway (sec).

Based on the selected critical acceptance of follow-up headway values, the weekday AM and PM peak hour gap absorption capacity of Burwood Highway for vehicles exiting left from the Burwood Highway Service Road are identified at Table 4.1 for the surveyed days.

Table 4.1: Gap Absorption Capacity of Burwood Highway from Burwood Highway Service Road

Peak Hour Period	Gap Absorption Capacity
AM Peak Hour (8:00am-9:00am)	194 vehicles per hour
PM Peak Hour (5:15pm-6:15pm)	316 vehicles per hour

The gap absorption capacity of Burwood Highway for vehicles making a U-turn at the Burwood Highway unsignalised U-turn facility located approximately 360m to the east of the Burwood Highway Service Road has also been determined through surveys carried out on Wednesday 14 September 2022.

The gap absorption capacity values have been determined using a critical acceptance gap of 7 seconds and a follow-up headway of 4 seconds. These values apply to a *'right turn from major road - across three lanes'* movement as identified earlier at Figure 4.2. The use of these values is representative of a vehicle making a U-turn from the Burwood Highway eastbound carriageway and accessing the far-left traffic lane in the westbound direction.

The weekday AM and PM peak hour gap absorption capacity values of Burwood Highway for vehicles making a U-turn are identified at Table 4.2.

Table 4.2: Gap Absorption Capacity of U-Turn Facility on Burwood Highway

Peak Hour Period	Gap Absorption Capacity
AM Peak Hour (8:00am-9:00am)	174 vehicles per hour
PM Peak Hour (5:15pm-6:15pm)	282 vehicles per hour

4.4 Estimated Traffic Generation

I have sought guidance on the traffic generation rates for the indicative residential development from the following resources:

- Roads and Traffic Authority New South Wales (RTANSW) Guide to Traffic Generating Developments dated October 2002 (the RTANSW guide). This is an industry recognised document that contains a comprehensive dataset of traffic generation rates for various land uses.
- Victorian Integrated Survey of Travel and Activity (VISTA) 2009/10.

4.4.1 RTANSW Guide

The RTANSW guide identified the following traffic generation rates for medium density residential developments:

Smaller Units (One and Two Bedrooms):

- Daily – 4 to 5 vehicle movements per dwelling.
- Weekday peak hour – 0.4 to 0.5 vehicle movements per dwelling.

Larger Units (Three or More Bedrooms)

- Daily – 5 to 6.5 vehicle movements per dwelling.
- Weekday peak hour – 0.5 to 0.65 vehicle movements per dwelling.

4.4.2 VISTA 2009/10

The VISTA data identifies a daily traffic generation rate for dwellings in the Whitehorse municipality of 5.7 vehicle movements per dwelling. A weekday peak hour traffic generation rate of 0.57 vehicle movements per dwelling is derived adopting an industry standard peak-to-daily ratio of 10%.

4.4.3 Summary

For analytic purposes, I have adopted the following traffic generation rates for the proposal:

- Daily – 6.0 vehicle movements per dwelling.
- Weekday peak hour – 0.6 vehicle movements per dwelling.

These values sit within the range of values obtained from the RTANSW guide and VISTA 2009/10 and have been used with due consideration to the dwelling typology of the indicative development and the locational characteristics of the subject site. Application of these rates to the indictive development yield of 290 dwellings results in the following traffic generation values:

- Daily – 1,740 vehicle movements per day.
- Weekday peak hour – 174 vehicle movements per hour.

4.5 Estimated Traffic Distribution

I have distributed the indicative development traffic onto the surrounding road network in proportions consistent with traffic entering and exiting the network to/from the north, south, east and west, and also having regard to the left-in and left-out restrictions of traffic entering and exiting the subject site via Burwood Highway.

The traffic distribution identified at Table 4.3 has been adopted for analysis.

Table 4.3: Indicative Development Traffic Distribution

Direction	Peak Hour	Traffic Distribution			
		North	South	East	West
Inbound	AM Peak	9%	9%	51%	31%
	PM Peak	8%	6%	35%	51%
Outbound	AM Peak	6%	7%	35%	52%
	PM Peak	6%	4%	56%	34%

I have adopted the following directional split of residential traffic entering and exiting the indicative development during the weekday AM and PM peak hours. These assumptions represent modelling Scenario #1:

- Weekday AM peak – 80% outbound movements and 20% inbound movements, with these movements split among the two access points as follows:
    - 70% of outbound movements use the eastern access and 30% use the western access.
    - 80% of inbound movements use the eastern access and 20% use the western access.
- Weekday PM peak – 30% outbound movements and 70% inbound movements, with these movements split among the two access points as follows:
    - 80% of outbound movements use the eastern access and 20% use the western access.
    - 80% of inbound movements use the eastern access and 20% use the western access.

I have separately been asked to model an alternate scenario which excludes left turn entry at the eastern traffic access location via the existing Service Road. Under this arrangement, all left-turn entry movements have been relocated to occur at the western access. For analytic purposes, this arrangement is identifiable as modelling Scenario #2.

Commentary on both modelling scenarios is provided at Section 4.8 below.

4.6 Proposed Development Traffic

The proposed development traffic volumes on the surrounding road network during the weekday AM and PM peak hours are presented at Appendix C of this evidence.

4.7 Post Development Traffic

The post development traffic volumes are derived by adding the proposed development traffic to the existing traffic volumes. The weekday AM and PM peak hour traffic volumes are presented at Appendix C.

4.8 Traffic Impact Analysis

An assessment of the impact of the indicative development traffic on the performance of the road network has been carried out using the SIDRA Intersection 9.0 computer program for traffic access Scenario's #1 and #2 described earlier.

SIDRA Intersection is a computer-based modelling package used to calculate intersection performance. The commonly used measure of intersection performance is referred to as the Degree of Saturation (DOS). DOS's of around 0.95 are typically considered the 'ideal' limit of performance for signalised intersections, with a DOS of 0.90 typically considered the *'ideal'* limit of performance for unsignalised intersections.

These following intersections have been modelled as a *'Network'* using SIDRA Intersection 9.0:

- Burwood Highway/Burwood Highway Service Road (providing access to Moondani Drive and the subject site).
- Burwood Highway/subject site western vehicle access.
- Burwood Highway/Hanover Road/Hartland Road signalised intersection.
- Burwood Highway/bus interchange signalised facility.
- Burwood Highway/signalised U-turn facility located to the west of Burwood Highway/Hanover Road/Hartland Road signalised intersection.

Given its distance from the other intersections in the assessment corridor, the Burwood Highway/unsignalised U-turn facility located to the east of the Burwood Highway service road has been assessed as an isolated intersection and independently using the SIDRA Intersection software.

Transport modelling guidance contained in the contemporary VicRoads (now DoT) 'Guidelines for Transport Impact Assessment Reports' identifies the following:

"The extent of the road network to be analysed should not necessarily be confined to that in the immediate vicinity of the proposed development site. It should generally include all intersections and all mid block locations where any traffic movement is increased by an amount of 10% or greater as a result of traffic generated by the proposed development/land use and/or resultant changes in travel patterns brought about by the proposal, and/or at any other location identified as necessary by the relevant road authority."

The indicative residential development on the subject site is estimated to increase existing traffic movement by 10% or more at the following intersections:

- Burwood Highway/Burwood Highway Service Road intersection.
- Burwood Highway/signalised U-turn facility located to the west of Burwood Highway/Hanover Road/Hartland Road signalised intersection.
- Burwood Highway/unsignalised U-turn facility located approximately 360m to the east of the Burwood Highway service road providing access to Moondani Drive.

It is not expected to increase any traffic movement at the Burwood Highway/Hanover Road/Hartland Road signalised intersection by 10% or more, and under typical assessment practices there would be no need to assess the impact of the indicative development traffic at this intersection. Regardless, the *'Network'* model has included the signalised intersection given its proximity to the subject site and the potential for queuing traffic on the Burwood Highway east approach to influence vehicle movements to and from the subject site.

The layouts adopted in SIDRA for the *'Network'* and the isolated Burwood Highway unsignalised U-turn facility are shown in the figures presented at Appendix D.

The SIDRA Intersection *'Network'* models have been calibrated to replicate observed traffic conditions on the surrounding road network. The manual adjustments that have been made to the models for calibration purposes are identified at Appendix E. The models, following these adjustments are considered *'fit-for-purpose'*.

The weekday AM and PM peak hour intersection performance of the aforementioned intersections under existing and post development traffic conditions is presented at Table 4.4 for traffic access Scenario #1. The detailed analysis results for each approach to the intersections are shown in the tables contained at Appendix F for this and Scenario #2.

Table 4.4: Existing and Post Development Performance (Intersection) – Traffic Access Scenario #1

Intersection	Peak Hour	Intersection Values			
		Existing Condition		Post Development	
		DOS	Average Queue	DOS	Average Queue
Burwood Highway/Western Signalised U-Turn Facility	AM Peak	0.56	84m	0.60	108m
	PM Peak	0.91	178m	0.95	252m
Burwood Highway/Bus Interchange Facility	AM Peak	0.52	98m	0.54	110m
	PM Peak	0.47	200m	0.49	200m
Burwood Highway/Hanover Road/Hartland Road	AM Peak	0.95	79m	0.97	74m
	PM Peak	0.96	78m	0.99	84m
Burwood Highway/Western Site Access	AM Peak	0.45	84m	0.36	84m
	PM Peak	0.51	0m	0.53	0m
Burwood Highway/Burwood Highway Service Road (Moondani Drive and Eastern Site Access)	AM Peak	0.51	136m	0.56	170m
	PM Peak	0.51	0m	0.53	1m
Burwood Highway/Eastern Unsignalised U-Turn Facility	AM Peak	0.51	5m	0.51	25m
	PM Peak	0.51	0m	0.60	11m

Based on the completed analysis, the existing road network, despite operating near its practical capacity is capable of accommodating the increases in demand forecast for the adjacent (and modelled) road network.

A review of modelled statistics indicates modest increases in the estimated demand to capacity ration (DOS) and queues.

I am satisfied that the traffic from the indicative residential development can be accommodated on the surrounding road network. Whilst there will be some impact on network performance as a consequence of the development traffic, the performance levels are below accepted practicable limits.

In addition, a review of public submissions received as part of the Amendment's public exhibition process indicates that Victoria Grange residents are concerned it will become unreasonably difficult to exit from the Service Road onto Burwood Highway post-residential development of the subject site

The analysis presented above indicates that the DOS for the Burwood Highway/Burwood Highway Service Road (Moondani Drive and Eastern Site Access) intersection increases from 0.51 to 0.56. Based on this, I am satisfied that the expected uplift in traffic as a result of a residential development of the scale contemplated under this Amendment can be accommodated without adversely impacting on safety and operation of the broader network.

This view appears to be shared by Council's Planning Officer and DoT. The Minutes of Council Meeting dated 26 September 2022 states the following under the 'Future Traffic Considerations' section:

"The concerns about access to the site are acknowledged, particularly with regard to the number of traffic movements that will be generated from future development of the site compared to the site's previous use by the ARRB. However, it should also be recognised that the access points from Burwood Highway to the Amendment site are not new. The site only has frontage to Burwood Highway and access is therefore existing and necessary. Resident access onto Burwood Highway from the site will be no different from the numerous service road exits that exist within the nearby area."

The DoT (as the Authority responsible for the management of Burwood Highway) referral response letter dated 14 July 2022 states the following:

"The Head, Transport for Victoria has considered the proposal and wishes to advise that it has no objection to the proposed Planning Scheme Amendment, and no changes to suggest."

4.9 Reactivation of Existing Use on Subject Site

The subject site was previously used by the Australian Road and Research Board (ARRB) as an administrative base as well as research, logistics and testing facility. Material contained in the Planning Report prepared for the Amendment by Tract Consultants identifies an aerial image with an identification of building use as presented at Figure 4.3.

Figure 4.3: Australian Road and Research Board Site Building Use

A review of aerial imagery suggests that the ARRB use operated with an on-site car parking provision of around 149 car spaces.

It is broadly estimated that the car parking at full capacity and treating the ARRB use solely as an office use, could have generated around 75 vehicle movements in a peak hour adopting a typical office use peak hour traffic generation rate of 0.5 vehicle movements per car parking space. The former ARRB use was also expected to generate approximately 300 daily vehicle movements, using an industry standard peak-to-daily ratio of 25% for an office land use.

5. Other Considerations

5.1 Internal Road Network

A traffic and transport control of DDO6 requires the following:

- *"Provide appropriate road width in accordance with the requirements of Clause 56.06 to ensure practical and safe vehicular movement and facilitate on-street parking."*

The indicative development is estimated to generate 1,740 daily vehicle movements. I have reviewed the breakdown of this daily traffic on the sections of road identified on the concept plan for the subject site development and compared these to the indicative daily traffic volume thresholds of the road typologies contained in Table C1 to Clause 56.06. The road typologies are identified at Table 5.1 noting that these street cross-sections represent those which would be applied to Council roads or public roads compared with those that may be developed which remain under private ownership and managed by an Owners Corporation or similar.

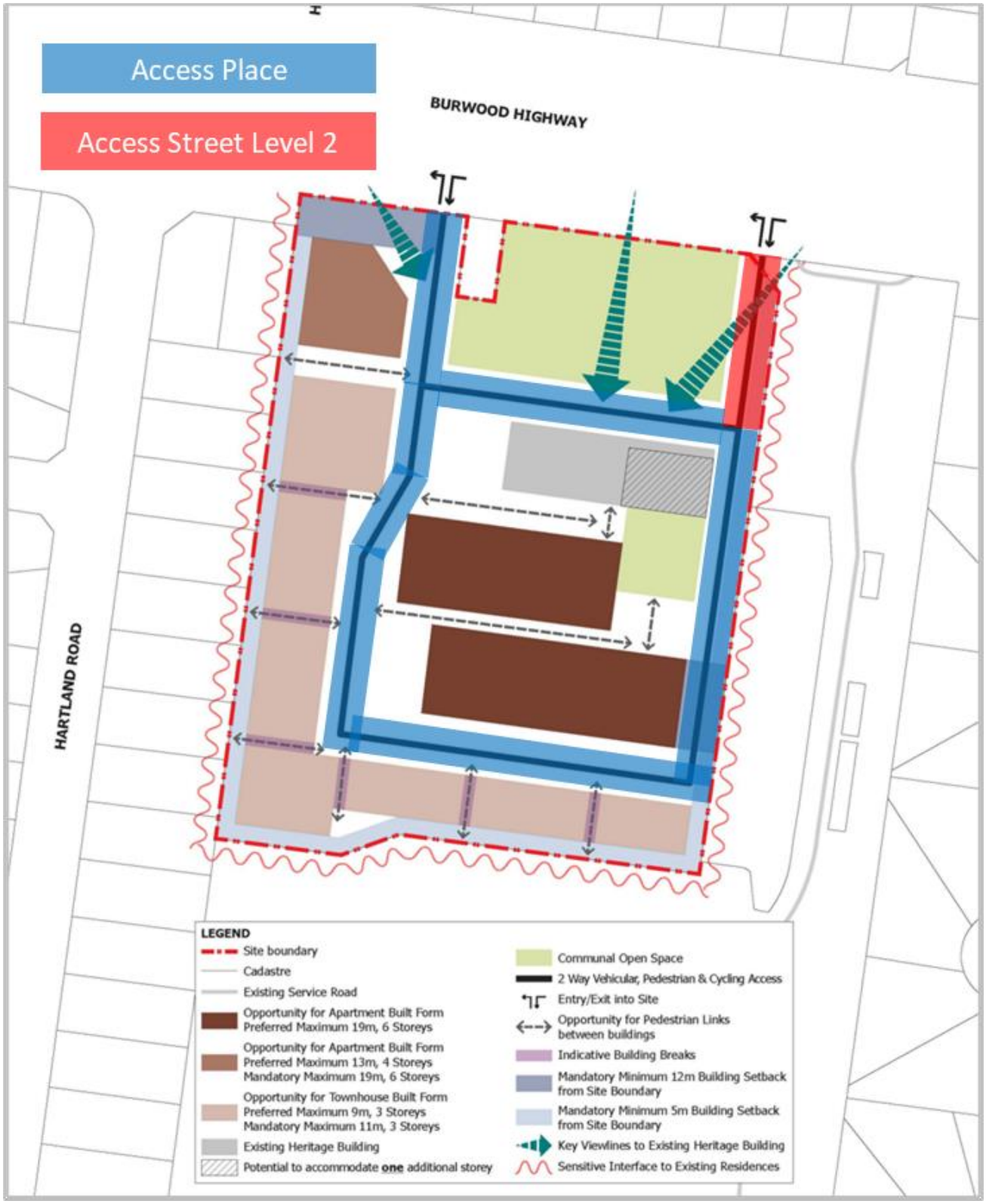
Table 5.1: Table C1 to Clause 56.06 (Council or Public) Road Typologies

Road Type	Indicative Traffic Volume Threshold	Carriageway	Road Reserve	Footpaths	Car Parking
Access Place	300vpd to 1,000vpd	5.5m	13.0m	1.5m wide footpath (one side)	Hard stand verge or kerbside (one side)
Access Street Level 1	1,000vpd to 2,000vpd	5.5m	13.5m	1.5m wide footpaths (both sides)	Hard stand verge
Access Street Level 2	2,000vpd to 3,000vpd	7.0m	16.0m	1.5m wide footpaths (both sides)	Kerbside (both sides)

vpd denotes vehicles per day.

My recommended road types for the concept layout of the subject site are identified at Figure 5.1 noting that alternate cross-sections maybe considered if the internal roads were to remain within private ownership. I am satisfied that this detail can be determined at a later stage of planning and sensibly as part of any Town Planning Permit application should the site be successfully re-zoned.

Figure 5.1: Internal Road Typologies (Recommended)



5.2 Car Parking Provision

Car parking for residents should be provided in accordance with the requirements of Clause 52.06-5 of the Whitehorse Planning Scheme unless it can be successfully demonstrated that a deviation can be justified and is warranted.

A closer review of the control(s) indicates that the subject site is located within the Principal Public Transport Network (PPTN) area of Whitehorse and Column B rates of Table 1 to Clause 52.06-5 apply. Under the Column B requirement, there is no statutory requirement to provide any visitor car parking. Not-with-standing this requirement I am of the view that the nature of the development as well as its location warrant some provision of visitor car parking.

Table C1 to Clause 56.06 of the Planning Scheme identifies an on-street car parking provision of '1 hard standing verge parking space per 2 lots' for roads classified as Access Place or Access Street – Level 1. This provision is equivalent to 0.5 car spaces per dwelling. This rate is in my experience, representative of a rate applied to residential subdivisions found in green field areas compared with infill sites such as that here and dwelling typologies which involve higher density residential housing. Accordingly, I am of the view that this rate of visitor parking is not required on the subject site as part of the development.

In comparison, a Column A assessment of Table 1 at Clause 52.06-5, involves a residential visitor car parking requirement of 0.2 car spaces per dwelling.

The RTANSW Guide recommends a visitor car parking rate between 0.14 (Metropolitan Regional CBD Centres) and 0.2 (Metropolitan Sub-Regional Centres) car spaces per apartment, and 0.2 car spaces per townhouse.

On this assessment, I am of the view that visitor car parking should be provided for any residential development of the subject site at a rate between 0.1 and 0.2 car spaces per dwelling. Any visitor car parking would be accommodated on-street and / or within satellite area(s) located around the development.

5.3 Sight Distance at Burwood Highway Service Road

On my inspection of the subject site and its surrounds, I have identified that the left turn exit from the Burwood Highway Service Road looking to the east along Burwood Highway has an available sight distance of approximately 220m measured from a point 3.0m back from the Give Way line of the service road.

The Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections states that a Safe Intersection Stopping Distance (SISD) is the minimum sight distance which should be provided on the major road at any intersection. The guide identifies a SISD for the Burwood Highway Service Road of 3.0m (minimum) back from the Give Way line by 181m looking east along Burwood Highway on the basis of a posted speed limit of 80km/h. The SISD is measured from a driver eye height of 1.1m to an object height of 1.25m.

The Austroads Guide to Road Design Part 3: Geometric Design states that a Safe Stopping Distance (SSD) is a mandatory requirement on roads. The guide identifies an SSD of 126m on roads with an 80km/h speed limit. The SSD is measured from a driver eye height of 1.1m to an object height of 0.2m.

Based on this analysis, I am satisfied that there is adequate available sight distance for drivers exiting the Burwood Highway Service Road and looking to the east along Burwood Highway which would not preclude an increase in traffic activity exiting the Service Road.

6. Response to Public Exhibition Submissions

The Planning Scheme Amendment was publicly exhibited on 2 June 2022 and was available for community review and comment until 5 July 2022. Forty-three (43) submissions were received, with the vast majority of these submitted by nearby residents, particularly from the Victoria Grange Residential Community.

I have reviewed and considered all submissions where issues around traffic and transport were raised. The vast majority of these submissions raised concern about the traffic impacts of future residents living at the subject site. In particular, many submissions from residents of the Victoria Grange Residential Community raised concern with the increase in traffic volumes associated with the proposal on the Burwood Highway Service Road, which provides access to Victoria Grange. An example of the transport concerns raised by submitters is reproduced below. This submission was submitted on behalf of the Residents of Victoria Grange Retirement Village.

"Traffic exiting from the development site at the northeast access point to Burwood Highway via the single lane service road will severely impede the ability of Victoria Grange residents to access Burwood Highway via the same service road. Victoria Grange residents (particularly during the morning peak period) already have to navigate a difficult and dangerous exit via this single lane service road to Burwood Highway as they try to find an entry gap in bumper to bumper traffic which is travelling at high speed (80 km/hr). Directing all the exiting traffic from the proposed new development site to the existing service road so that it has to merge and compete with exiting traffic from Victoria Grange can only lead to accidents and delays for the residents of both properties as they try and exit into Burwood Highway from the single lane service road. It should be noted that Victoria Grange is not just a retirement village with 111 villa and apartment dwellings and 162 residents……the site also contains an Aged Care Facility with 105 residents plus nursing and support staff. The Aged Care Facility also generates significant incoming and outgoing traffic movement from staff, visitors, service vehicles, and frequent ambulance attendance and all this traffic uses the same single lane service road to enter and exit Burwood Highway.

Amendment C230 contains a Traffic Engineering Assessment undertaken by Traffix Group but unfortunately this assessment is deeply flawed. It contains a detailed analysis of the impact of the proposed development on Burwood Highway and some other surrounding streets but when analysing the impact of the proposed entrance/exit on the northeast corner of the property into Burwood Highway via the existing service road it completely ignores the fact that there is existing traffic in the service road and the fact that this service road is the sole access (entry and exit) point for the Victoria Grange property. The additional traffic accessing the service road from the proposed development is significant…….the Traffic Assessment Report included in Amendment C230 estimates that during the morning peak period an additional 139 vehicles per hour will exit to Burwood Highway via the single lane service road .

We believe that this issue of congestion on the single lane service road could easily be addressed and we recommend that Amendment C230 be modified to require that the entry/exit road on the north east corner of the site have its own dedicated access to Burwood Highway and have no access to the existing Moondani Drive service road (which is the only access available for the Victoria Grange property)."

As seen in the submission reproduced above, the transport related concerns largely raised:

- The difficulty to exit from the Victoria Grange development onto Burwood Highway, which will be exacerbated by the development of the subject site. There was concern that this will be an issue both during construction and when residents move into the development.
- The Victoria Grange development only has one access point via the Burwood Highway Service Road, which is already highly trafficked by the Victoria Grange development, including its residents, visitors, staff and emergency vehicles.

In addition, a number of submissions requested that the subject site have its own access that is separated from the Burwood Highway Service Road and Moondani Drive.

In response to the transport related concerns raised, I have sought to consider the nature and make-up of the effected road network including reviewing the design and configuration of roads and intersections which would be most heavily relied upon by the proposal. This review includes sight distance checks, a safety record check and an analysis of the likely level of activity the proposal would generate. On this latter aspect, Section 4 of this report sets-out a detailed traffic impact assessment of likely effects of the proposal. Based on this analysis, I am satisfied that there is adequate capacity on the surrounding road network to accommodate an uplift in traffic as a result of a residential development of the scale contemplated under this Amendment.

Moreover, the traffic from the proposal including the indicative residential yield can be accommodated at the Burwood Highway/Burwood High Service Road intersection (limited to left in/left out movements) and the western access on Burwood Highway (limited to left in/left out movements) without adversely impacting on safety and operation of the broader network.

As it relates to the request for the subject site to have its own vehicle access that is separate to the Burwood Highway Service Road and Moondani Drive, the creation of an additional vehicle access onto Burwood Highway would in my view represent an undesirable outcome. The available distance between the stopline on the Burwood Highway east approach to the Burwood Highway/Hanover Road/Hartland Road signalised intersection and the Burwood Highway Service Road is approximately 120m. The presence of three vehicle access points (the western left in/left out access to the subject site, the separate vehicle access to the subject site and the Burwood Highway Service Road) will result in a number of vehicle conflicts in a short distance and an increased probability of vehicle collisions. The proposed strategy harness' the benefit of existing road features including existing deceleration lanes, consistent with contemporary design standards and principles set out in various Austroads road design and VicRoads design manual standards.

7. Summary Of Opinion and Other Statements

7.1 Summary of Opinion

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

1. A Planning Scheme Amendment C230wshe is being sought to the Whitehorse Planning Scheme, relating to the land known as the former Australian Road and Research Board (ARRB) site:
2. The Amendment will ultimately facilitate the development of the subject site for residential dwelling use. For the purposes of this evidence, an indicative development yield of 290 dwellings has been adopted.
3. A concept plan for the development of the subject site contained within DDO6 identifies the proposed vehicle access arrangements, as follows:
    - A left-in/left-out vehicle access on Burwood Highway Service Road, located at the northeast corner of the subject site.
    - A left-in/left-out vehicle access on Burwood Highway located close to the western boundary of the subject site.
4. I have no concerns with the proposed eastern vehicle access located on the Burwood Highway Service Road, given that my traffic modelling indicates that this road will be capable of accommodating the post-development traffic demands (refer Section 4 of this evidence).
5. I also have no material concerns with the left-in vehicle movement at the proposed western vehicle access. I do however have some concerns with the left-out movement from this access during the road network peak hours for residents heading to the north or to head east via a U-turn movement for the following reasons:
    - Given the proximity of the western access to the Burwood Highway/Hanover Road/Hartland Road signalised intersection and based on my observations of the performance of the signalised intersection, weekday AM peak hour traffic queues on Burwood Highway will frequently extend past the proposed western access. This queuing will prove challenging for drivers exiting onto Burwood Highway, particularly those seeking to travel north (on Hanover Road) or east (on Burwood Highway).
    - Drivers with destinations to the east will need to make a U-turn on Burwood Highway. To undertake this movement, they will be required to either:
        - Attempt to access the right turn lane on the Burwood Highway east approach to the signalised intersection, with this manoeuvre requiring the crossing of five traffic lanes (one left turn lane, three through lanes and one bus lane) within a distance of 30m immediately on exit from the subject site, or
        - Attempt to access the northernmost through traffic lane on the Burwood Highway east approach to the signalised intersection, either on exit from the subject site or on the departure side of the signalised intersection, in order to gain access to the signalised U-turn facility located to the west of the signalised intersection.
6. I do not consider either of these manoeuvres to be practicable or achievable in a safe manner during the road network peak hours. On this basis, I am of the opinion that residents of the subject site heading either north or east during the road network peak hours will do so via the proposed eastern vehicle access only, and that peak hour exit movements from the western access will only be undertaken by residents heading to the west or south.
7. I estimate that, based on the indicative development yield, future residential development at the subject site is expected to generate approximately 174 vehicle movements in each of the AM and PM peak hours and a total of 1,740 daily movements.
8. I am satisfied that the traffic from the indicative residential development can be accommodated on the surrounding road network. Whilst there will be some impact on network performance as a consequence of the development traffic, the

performance levels are below accepted practicable limits. This view appears to be shared by Council's Planning Officer and DoT.

9. The traffic modelling identifies a maximum queue of 18m for the exit from the Burwood High Service Road. This queue will largely form as a result of the indicative development traffic and will therefore extend into the subject site. This queuing is unlikely to impact on the ability for other traffic to access the Service Road or Moondani Drive.

10. The indicative development is estimated to generate 1,740 daily vehicle movements. I have reviewed the breakdown of the indicative development daily traffic volumes on the sections of road identified on the concept plan for the subject site development and compared these to the indicative daily traffic volume thresholds of the road typologies contained in Table C1 to Clause 56.06. Based on this review, I recommend that the internal road network is designed as Access Place and Access Street Level 2 road types.

11. A review of aerial imagery suggests that the ARRB use operated with an on-site car parking provision of around 149 car spaces. It is broadly estimated that the car parking at full capacity, and treating the ARRB use solely as an office use, could have generated around 75 vehicle movements in a peak hour adopting a typical office use peak hour traffic generation rate of 0.5 vehicle movements per car parking space.

12. I am satisfied that there is adequate available sight distance for drivers exiting the Burwood Highway Service Road and looking to the east along Burwood Highway.

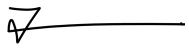
13. I am satisfied that visitor car parking should be contemplated for any residential development of the subject site at a rate between 0.1 and 0.2 car spaces per dwelling. Any visitor car parking would be accommodated on-street or within satellite areas located around the development.

7.2 Other Statements

1. No opinion provided in this evidence is provisional.
2. No questions or statements outside of my expertise have been addressed in this evidence.
3. This evidence is not incomplete or inaccurate.

Declaration

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



John Kiriakidis
Senior Principal Transportation Engineer

24 January 2023

Appendix A : John Kiriakidis Curriculum Vitae

A

John Kiriakidis
Transportation Planning & Engineering

Senior Principal Transportation
Group Leader Transport Engineering
28 years of experience · Melbourne, Australia

John possess over 28 years' experience in the traffic, transport and urban planning industry working across both the New South Wales and Victorian planning jurisdictions for both the public and private sector.

John is regularly involved in contributing, guiding and integrating land use and infrastructure proposals and their associated traffic transport planning outcomes in both strategic and statutory planning settings. His experience spans across all project area locations including infill, brownfields, greenfields and capital city areas. His reviews regularly focus on ensuring that projects are viewed through a multi-modal transport prism, actively seeking to drive mode change and productive travel behaviour which meets established and emerging strategic planning policy objectives and targets.

John is responsible for regularly guiding and managaging teams comprising a wide range of traffic and transport subject matter specialists including, traffic engineers, strategic, micro, messo and nano-simulation modellers, active transport planners and designers.

John appears at the Victorian Civil and Administrative Tribunal (VCAT), Panels Victoria and the NSW Land & Environment Court as an independent expert witness in the field of traffic and transport engineering and planning.

John has been awarded a Bachelor of Engineering with Honours (Civil Engineering and Computing) degree in from Monash University and is a Member of the Institute of Engineers Australia (MIE), Australian Institute of Traffic Planning and Management (AITPM) and the Victorian Planning and Environmental Law Association (VPELA).

EDUCATION

BE, (Hons), Civil & Comp, Monash University, Melbourne, Australia

MEMBERSHIPS

Member, Institution of Engineers Australia

Member, Victorian Planning & Environmental Law Association

Member, Australian Institute of Traffic Planning and Management Incorporated

SKILLS & EXPERIENCE

Transport engineering, planning and design with specific regard to requirements of federal, state and local strategic and statutory policy positioning.

Guidance, direction and management of subject matter experts in the field of transport planning and engineering including traffic engineers, simulation modellers, active transport planners and designers.

Communication, reporting, workshop facilitation and technical writing, including public documents, verbal and written briefings and presentations.

Interpretation and application of transport policies and plans to support integrated, multimodal transport solutions that integrate with land use planning and urban design objectives.

Independent Expert Witness in the field of transport planning and engineering.

PROJECT EXPERIENCE

TRANSPORT INFRASTRUCTURE

Suburban Rail Loop EES
Peer Review & Expert Witness

North East Link
Peer Review & Expert Witness

Westgate Tunnel
Peer Review & Expert Witness

INTEGRATED TRANSPORT PLANNING

Aitken Boulevard (E14), Northern Corridor

Gunns Gully Road Interchange, Kalkallo

Donnybrook Road, Kalkallo

Doncaster Hill Integrated Transport Plan

TRAFFIC ENGINEERING

Merrifield Industrial Sub-Division

Craigeburn Train Maintenance Facility

Goodyear Redevelopment, Thomastown

TRANSPORTATION IMPACT ASSESSMENTS

Westfield Doncaster

Westfield Knox

Westfield Southland

Tooronga Village Re-development, Glen Iris

Logis Business Park, Dandenong

Alliance Business Park, Epping

Eureka Tower

Freshwater Place

LAND USE PLANNING

Arden Macaulay (C190)

City North (C196)

MCOR Papermill Re-development

Merrifield West (Kalkallo)

Merrifield City Centre (Kalkallo)

Cloverton (Lockerbie Estate)

Melbourne Airport

Essendon Airport

Epping North East Structure Plan (450ha)

** denotes projects completed with other firms*

Appendix B : Letter of Instruction

B

13 January 2023

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+61 3 8686 6319

Email
nick.sutton@nortonrosefulbright.com

Your reference:

Our reference:
4051962

Dear Mr Kiriakidis

Whitehorse Planning Scheme Amendment C230whse Panel Hearing
Land: 490-500 Burwood Highway, Vermont South

We continue to act for Dandenong Views Pty Ltd, the owner of the Land, in respect of *Whitehorse Planning Scheme Amendment C230wshe* (**Amendment**).

We refer to your brief in this matter and provide the following instructions.

Instructions

You are instructed to:

(1) Review the briefing materials provided to you in this matter;
(2) Consider the appropriateness of the proposed Amendment, having regard to relevant traffic engineering considerations;
(3) Prepare an expert witness statement explaining your conclusions, and the reasoning and analysis by which you have reached such conclusions; and
(4) Appear before the Panel to give independent expert evidence in this matter.

Your evidence should be prepared in accordance with the requirements and duties of the **enclosed** *Planning Panels Victoria Practice Note 1 – Expert evidence.*

Please note that expert evidence is due to be filed and served by **12 noon on Monday, 23 January 2023**.

Please contact the undersigned on +61 3 8686 6319 if you have any questions regarding your instructions or require further materials.

Yours faithfully

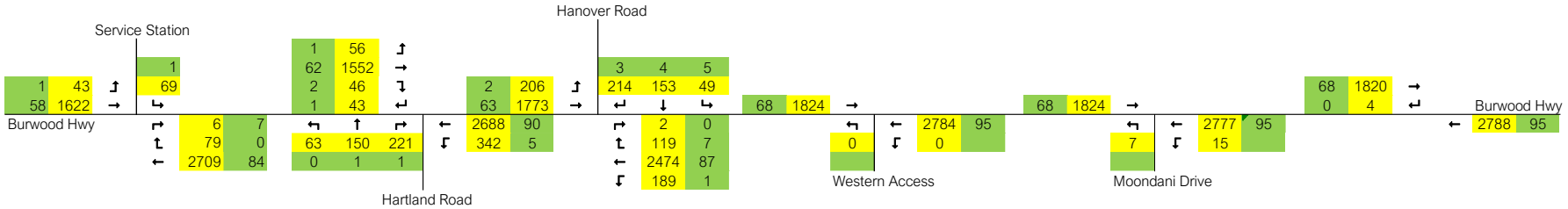
Nick Sutton
Partner
Norton Rose Fulbright Australia

APAC-#303878597-v1

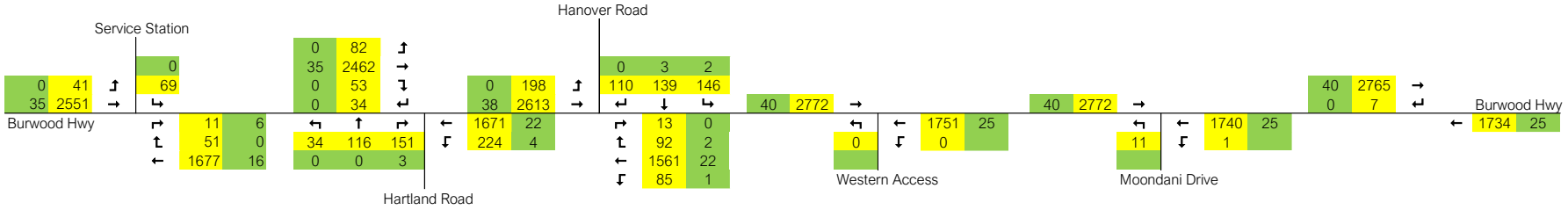
Appendix C : Peak Hour Traffic Volumes

C

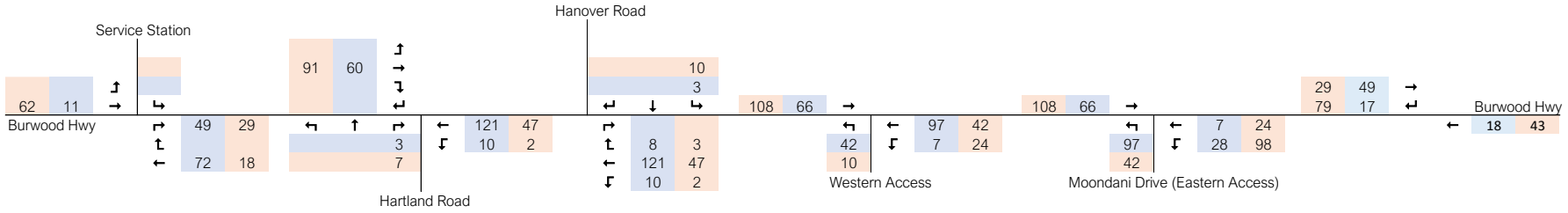
LV AM Peak - Exisiting Traffic Volumes
HV Time: 8:00 AM - 9:00 AM
Two access



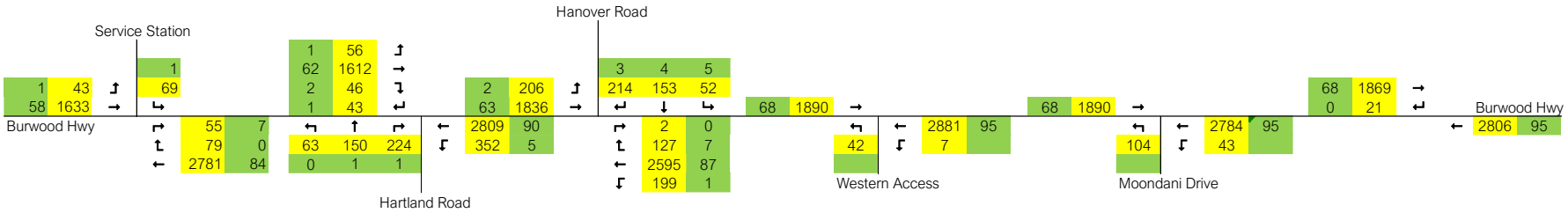
LV PM Peak - Existing Traffic Volumes
HV Time: 5:15 PM - 6:15 PM
Two access



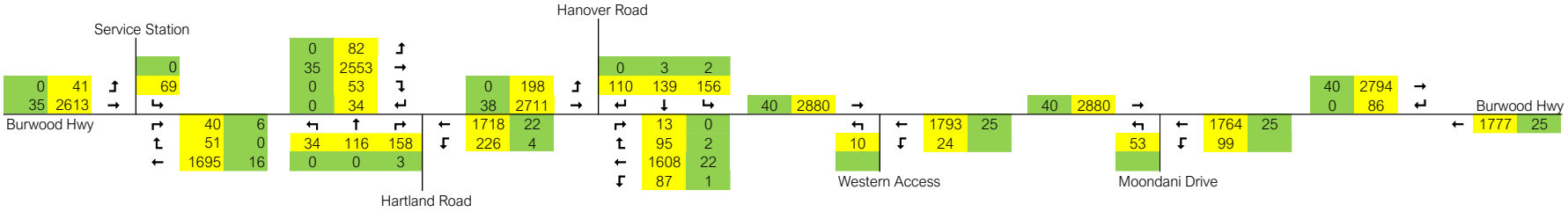
AM Additional Post Development Volume
PM Two access



LV AM Peak - Post Development Traffic Volumes
HV Time: 8:00 AM - 9:00 AM
Two access



LV PM Peak - Post Development Traffic Volumes
HV Time: 5:15 PM - 6:15 PM
Two access



Appendix D : SIDRA Network Layouts

D

SIDRA Network Layouts

Figure D.1: Network Layout

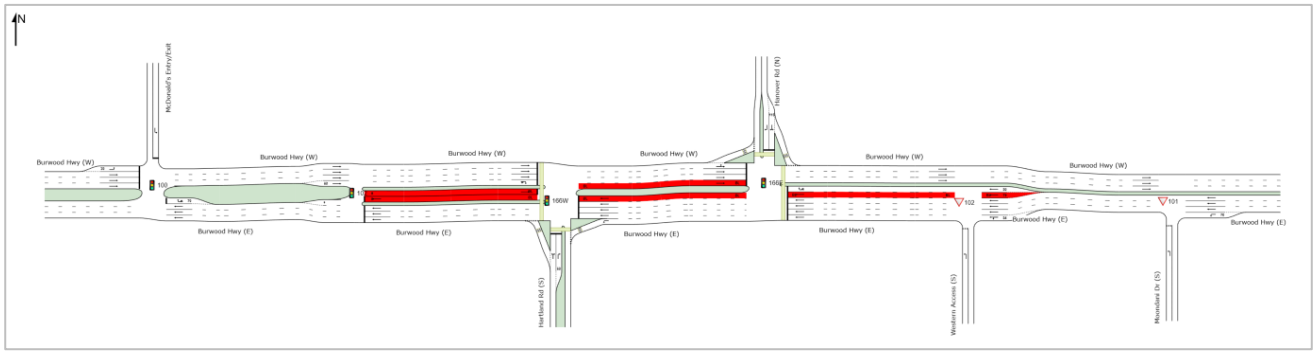
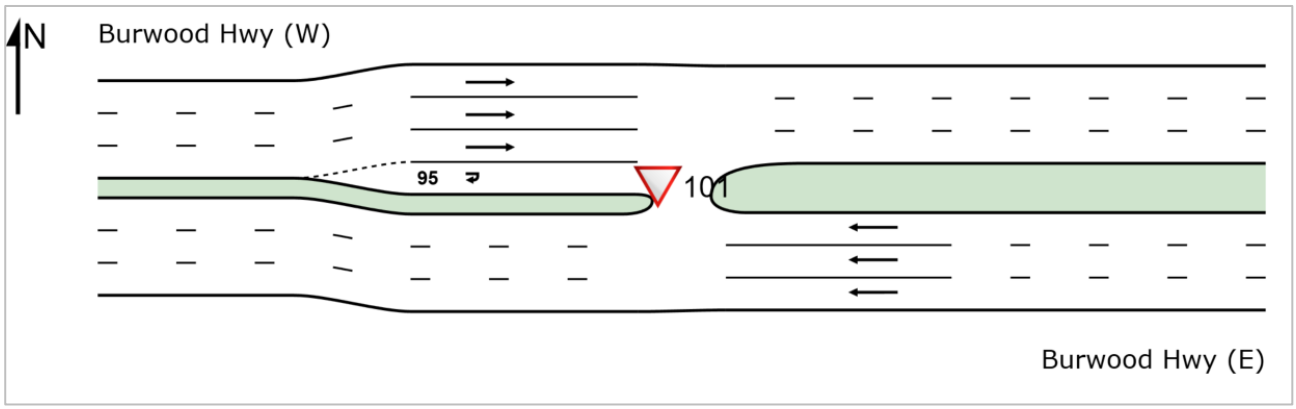


Figure D.2: Unsignalised U-turn Facility Layout



Appendix E : Manual Adjustments to SIDRA Models

A summary of the manual adjustments made in modelling of the network are detailed below in Table E.1:

Table E.1: Manual Adjustments Made to SIDRA Models

Manual Adjustment	Description
User Movement Classes	To minimize lane changes and achieve a realistic representation of existing conditions, separate user movement classes have been created for specific movements. A sperate user movement class was created for southbound volumes travelling on Hanover Road and westbound and eastbound volumes travelling on Burwood Highway that would eventually travel southbound into Hartland Road. A sperate user movement class was created for northbound volumes travelling on Hartland Road and eastbound volumes travelling on Burwood Highway that would eventually travel northbound into Hanover Road.
Peak Flow Factor	Peak Flow Factor values are required in order to estimate the flow rates for the Peak Flow Period only when actual volume data is not available as in the case of hourly volume estimates for future years. As a default, SIDRA adopts a Peak Flow Factor of 95%. Southbound and northbound user movement classes were set to a peak flow factor of 100%, to minimize difference between upstream and downstream demand flow rates (midblock flows).
Capacity Adjustment	Capacity Adjustment is a general parameter that can be used to specify capacity gain/loss relative to the estimation of SIDRA. The capacities of the left-turn exit from the Burwood Highway Service Road (providing access to Moondani Drive and the subject site) and the unsignalised U-turn facility located to the east of the subject site have been adjusted to achieve similar gap absorption capacities to those surveyed.
Gap Acceptance	The critical gap and follow-up headway for the Burwood Highway Service Road (providing access to Moondani Drive and the subject site) and the unsignalised U-turn facility located to the east of the subject site have been adjusted. The changes reflect the gap surveys.
Extra Bunching	The Extra Bunching (Site Analysis) and Extra Bunching (Network Analysis) input parameters are used to adjust the proportion of bunched vehicles in the traffic stream arriving at an approach according to the proximity of, and level of queuing at, the upstream signalised intersection. The gap survey conducted at the Burwood Highway Service Road (providing access to Moondani Drive and the subject site) and the unsignalised U-turn located to the east of the subject site were used to calculate the bunching percentage. The sum of all gaps above the respective critical headway (6 seconds for the Burwood Highway Service Road) and 7 seconds for the U-turn facility) in the AM and PM peak hour was divided by 3,600 seconds (one-hour period) to determine the bunching percentage. The calculated bunching percentages have been used in the SIDRA model.

Appendix F : Existing and Post-Development SIDRA Network Modelling Results

F

Table F.1: Existing Intersection Performance (Approach)

Peak Hour	Intersection	Approach	DOS	Average Queue
AM Peak	Burwood Highway/U-Turn Facility (Signalised)	Burwood Hwy (east)	0.54	27m
		Service Station Entry/Exit (north)	0.46	11m
		Burwood Hwy (west)	0.56	84m
		Intersection	**0.56**	**84m**
	Burwood Highway/Bus Interchange (Signalised)	Burwood Hwy (east)	0.52	11m
		Burwood Hwy (west)	0.31	98m
		Intersection	**0.52**	**98m**
	Burwood Highway/Hartland Road (Signalised)	Hartland Rd (south)	0.89	79m
		Burwood Hwy (east)	0.93	25m
		Burwood Hwy (west)	0.95	30m
		Intersection	**0.95**	**79m**
	Burwood Highway/Hanover Road (Signalised)	Burwood Hwy (east)	0.94	35m
		Hanover Rd (north)	0.75	72m
		Burwood Hwy (west)	0.80	25m
		Intersection	**0.94**	**72m**
	Burwood Highway/Western Site Access	Western Site Access (south)	0.0	0m
		Burwood Hwy (east)	0.45	84m
		Burwood Hwy (west)	0.35	0m
		Intersection	**0.45**	**84m**
	Burwood Highway/Burwood Highway Service Road	Burwood Hwy Service Dr (south)	0.04	1m
		Burwood Hwy (east)	0.51	136m
		Burwood Hwy (west)	0.35	0m
		Intersection	**0.51**	**136m**
	Burwood Highway/U-Turn Facility (Unsignalised)	Burwood Hwy (east)	0.51	0m
		Burwood Hwy (west)	0.35	5m
		Intersection	**0.51**	**5m**
PM Peak	Burwood Highway/U-turn Facility (Signalised)	Burwood Hwy (east)	0.91	25m
		Service Station Entry/Exit (north)	0.91	30m
		Burwood Hwy (west)	0.82	178m
		Intersection	**0.91**	**178m**
	Burwood Highway/Bus Interchange (Signalised)	Burwood Hwy (east)	0.31	5m
		Burwood Hwy (west)	0.47	200m
		Intersection	**0.47**	**200m**
	Burwood Highway/Hartland Road (Signalised)	Hartland Rd (south)	0.89	54m
		Burwood Hwy (east)	0.49	25m
		Burwood Hwy (west)	0.86	30m
		Intersection	**0.89**	**54m**

Peak Hour	Intersection	Approach	DOS	Average Queue
	Burwood Highway/Hanover Road (Signalised)	Burwood Hwy (east)	0.92	35m
		Hanover Rd (north)	0.84	78m
		Burwood Hwy (west)	0.96	25m
		Intersection	**0.96**	**78m**
	Burwood Highway/Western Site Access	Western Site Access (south)	0.0	0m
		Burwood Hwy (east)	0.22	0m
		Burwood Hwy (west)	0.51	0m
		Intersection	**0.51**	**0m**
	Burwood Highway/Burwood Highway Service Road	Burwood Hwy Service Rd (south)	0.04	0m
		Burwood Hwy (east)	0.31	0m
		Burwood Hwy (west)	0.51	0m
		Intersection	**0.51**	**0m**
	Burwood Highway/U-Turn Facility (Unsignalised)	Burwood Hwy (east)	0.31	0m
		Burwood Hwy (west)	0.51	1m
		Intersection	**0.51**	**1m**

Table F.2: Post Development Intersection Performance (Approach)

Peak Hour	Intersection	Approach	DOS	Average Queue
AM Peak	Burwood Highway/U-turn facility (signalised)	Burwood Hwy (east)	0.59	38m
		Service Station Entry/Exit (north)	0.51	14m
		Burwood Hwy (west)	0.60	108m
		Intersection	**0.60**	**108m**
	Burwood Highway/Bus Interchange (signalised intersection)	Burwood Hwy (east)	0.54	12m
		Burwood Hwy (west)	0.32	110m
		Intersection	**0.54**	**110m**
	Burwood Highway/Hartland Road (signalised intersection)	Hartland Rd (south)	0.92	84m
		Burwood Hwy (east)	0.95	25m
		Burwood Hwy (west)	0.95	30m
		Intersection	**0.95**	**84m**
	Burwood Highway/Hanover Road (signalised intersection)	Burwood Hwy (east)	0.97	35m
		Hanover Rd (north)	0.77	74m
		Burwood Hwy (west)	0.83	25m
		Intersection	**0.97**	**74m**

Peak Hour	Intersection	Approach	DOS	Average Queue
	Burwood Highway/Western Site Access	Western Site Access (south)	0.05	9m
		Burwood Hwy (east)	0.36	84m
		Burwood Hwy (west)	0.36	0m
		Intersection	**0.36**	**84m**
	Burwood Highway/Burwood Highway Service Road	Burwood Hwy Service Rd (south)	0.56	18m
		Burwood Hwy (east)	0.51	170m
		Burwood Hwy (west)	0.36	0m
		Intersection	**0.56**	**170m**
	Burwood Highway/U-turn facility (unsignalised)	Burwood Hwy (east)	0.51	0m
		Burwood Hwy (west)	0.36	25m
		Intersection	**0.51**	**25m**
PM Peak	Burwood Highway/U-turn facility (signalised)	Burwood Hwy (east))	0.91	35m
		Service Station Entry/Exit (north)	0.95	31m
		Burwood Hwy (west)	0.88	252m
		Intersection	**0.95**	**252m**
	Burwood Highway/Bus Interchange (signalised intersection)	Burwood Hwy (east)	0.32	5m
		Burwood Hwy (west)	0.49	200m
		Intersection	**0.49**	**200m**
	Burwood Highway/Hartland Road (signalised intersection)	Hartland Rd (south)	0.89	54m
		Burwood Hwy (east)	0.51	25m
		Burwood Hwy (west)	0.89	30m
		Intersection	**0.89**	**54m**
	Burwood Highway/Hanover Road (signalised intersection)	Burwood Hwy (east)	0.95	35m
		Hanover Rd (north)	0.87	84m
		Burwood Hwy (west)	0.99	25m
		Intersection	**0.99**	**84m**
	Burwood Highway/Western Site Access	Western Site Access (south)	0.02	1m
		Burwood Hwy (east)	0.22	0m
		Burwood Hwy (west)	0.53	0m
		Intersection	**0.53**	**1m**
	Burwood Highway/Burwood Highway Service Road	Burwood Hwy Service Rd (south)	0.19	2m
		Burwood Hwy (east)	0.31	0m
		Burwood Hwy (west)	0.53	0m
		Intersection	**0.53**	**2m**
	Burwood Highway/U-turn Facility (unsignalised)	Burwood Hwy (east)	0.31	0m
		Burwood Hwy (west)	0.60	11m
		Intersection	**0.60**	**11m**

Appendix G : Full SIDRA Modelling Results

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 230118_300304377_vcat_scenario2

Template: Layout, Lane & Phase Summary

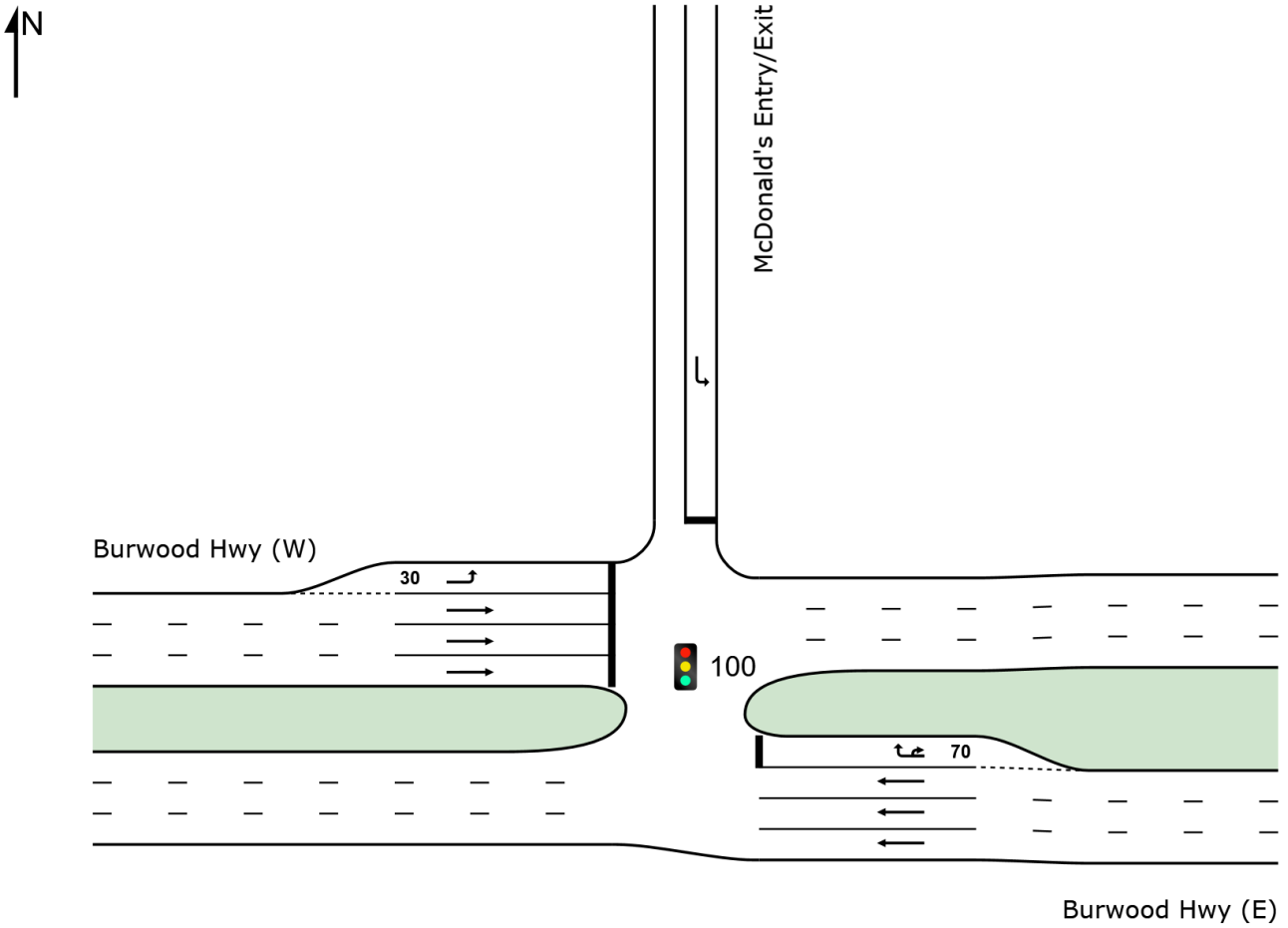
Site: 100 [0 AM Signalised U-turn (Site Folder: Existing)] Network: 1 [AM (Network Folder: Existing)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

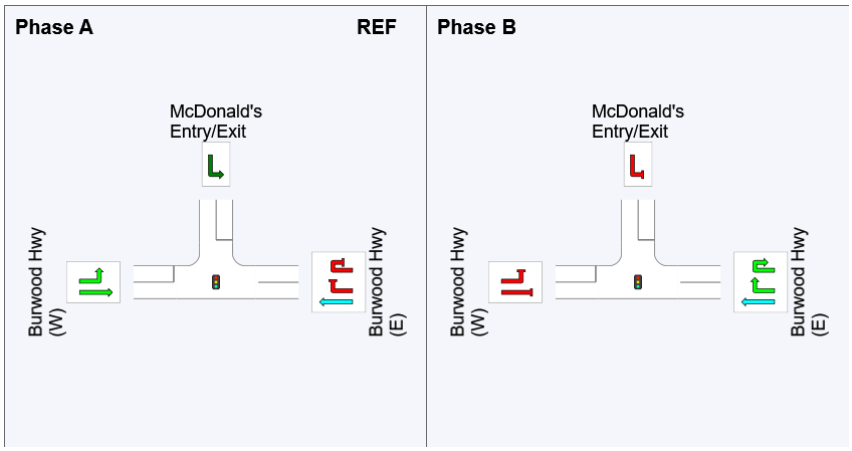
	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %

East: Burwood Hwy (E)															
Lane 1	936	3.0	936	3.0	1913	0.489	100	0.1	LOS A	0.0	0.0	Full	200	0.0	0.0
Lane 2	936	3.0	936	3.0	1913	0.489	100	0.1	LOS A	0.0	0.0	Full	200	0.0	0.0
Lane 3	930	3.9	930	3.9	1901	0.489	100	0.1	LOS A	0.0	0.0	Full	200	0.0	0.0
Lane 4	97	7.6	97	7.6	180	0.539	100	63.1	LOS E	3.6	26.7	Short	70	0.0	NA
Approach	2899	3.5	2899	3.5		0.539		2.2	LOS A	3.6	26.7				
North: McDonald's Entry/Exit															
Lane 1	74	1.4	74	1.4	162	0.455	100	18.8	LOS B	1.5	10.8	Full	500	0.0	0.0
Approach	74	1.4	74	1.4		0.455		18.8	LOS B	1.5	10.8				
West: Burwood Hwy (W)															
Lane 1	46	2.3	46	2.3	1462	0.032	100	8.3	LOS A	0.4	2.5	Short	30	0.0	NA
Lane 2	821	3.5	821	3.5	1473[1]	0.558	100	4.8	LOS A	10.9	78.8	Full	500	0.0	0.0
Lane 3	851	3.5	851	3.5	1526	0.558	100	4.9	LOS A	11.6	83.9	Full	500	0.0	0.0
Lane 4	101	12.3	101	12.3	1445	0.070	100	2.9	LOS A	0.8	6.3	Full	500	0.0	0.0
Approach	1819	3.9	1819	3.9		0.558		4.8	LOS A	11.6	83.9				
Intersection	4792	3.6	4792	3.6		0.558		3.4	LOS A	11.6	83.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	126	106
Green Time (sec)	104	14
Phase Time (sec)	110	20
Phase Split	85%	15%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

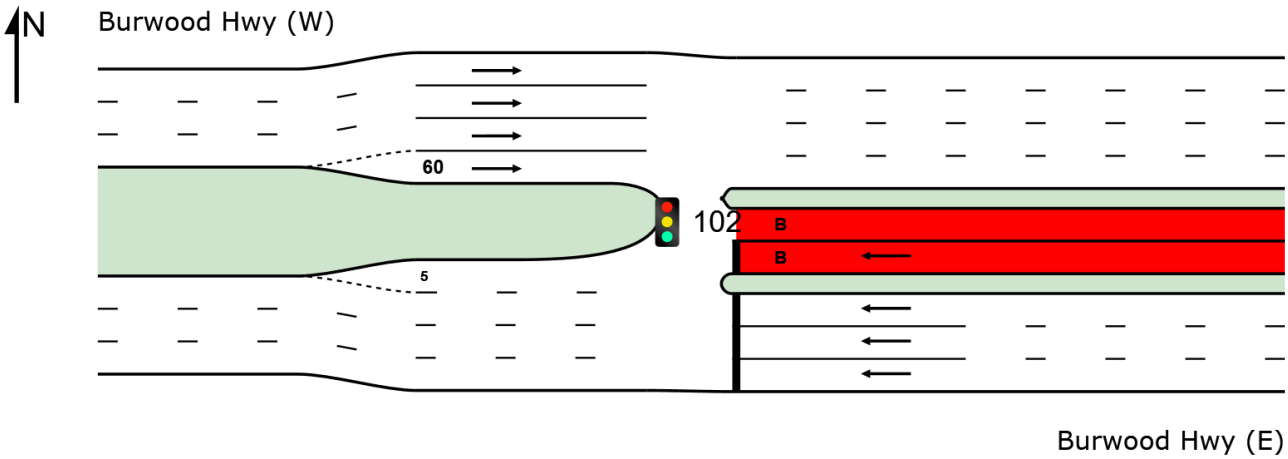
Site: 102 [1 AM Bus Interchange (Site Folder: Existing)] Network: 1 [AM (Network Folder: Existing)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

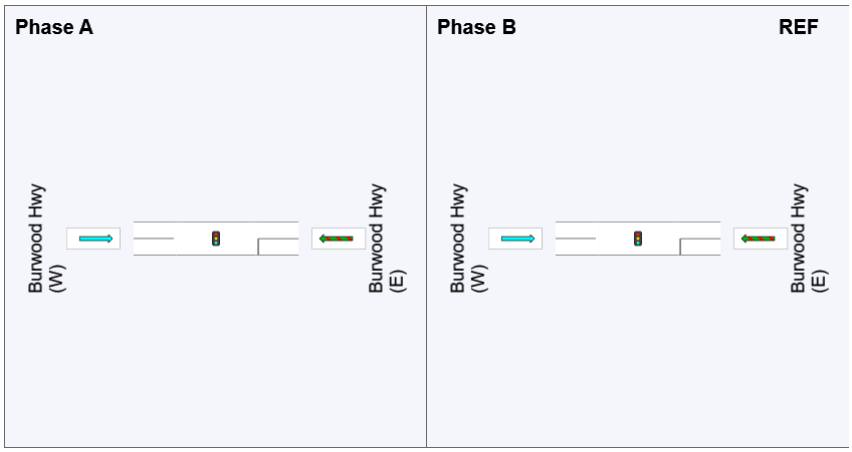
	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Burwood Hwy (E)															
Lane 1	962	3.2	962	3.2	1867	0.515	100	0.1	LOS A	1.5	10.5	Full	30	0.0	0.0
Lane 2	962	3.2	962	3.2	1867	0.515	100	0.1	LOS A	1.5	10.5	Full	30	0.0	0.0
Lane 3	962	3.2	962	3.2	1867	0.515	100	0.1	LOS A	1.5	10.5	Full	30	0.0	0.0
Lane 4 (B)	9	100.0	9	100.0	36	0.247	100	76.0	LOS E	0.4	4.9	Full	30	0.0	0.0
Approach	2894	3.5	2894	3.5		0.515		0.3	LOS A	1.5	10.5				
West: Burwood Hwy (W)															
Lane 1	586	3.8	586	3.8	1903	0.308	100	0.0	LOS A	13.6[N5]	98.2[N5]	Full	200	0.0	0.0
Lane 2	586	3.8	586	3.8	1903	0.308	100	0.0	LOS A	13.6[N5]	98.3[N5]	Full	200	0.0	0.0
Lane 3	586	3.8	586	3.8	1903	0.308	100	0.0	LOS A	13.6[N5]	98.4[N5]	Full	200	0.0	0.0
Lane 4	101	12.3	101	12.3	1806	0.056	100	0.1	LOS A	0.2[N5]	1.3[N5]	Short	60	0.0	NA
Approach	1860	4.2	1860	4.2		0.308		0.0	LOS A	13.6	98.4				
Intersection	4754	3.8	4754	3.8		0.515		0.2	LOS A	13.6	98.4				

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

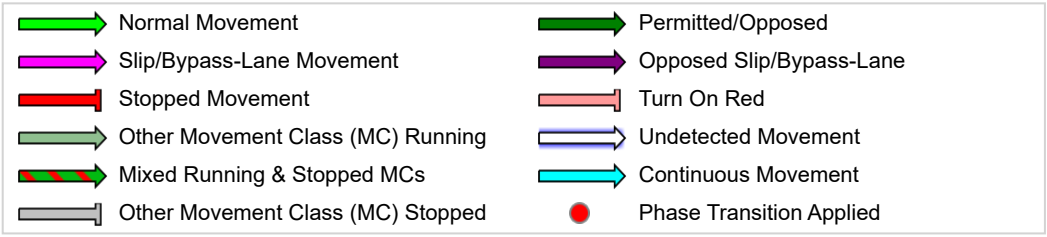
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N5 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows).

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	3	0
Green Time (sec)	124	1
Phase Time (sec)	126	4
Phase Split	97%	3%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

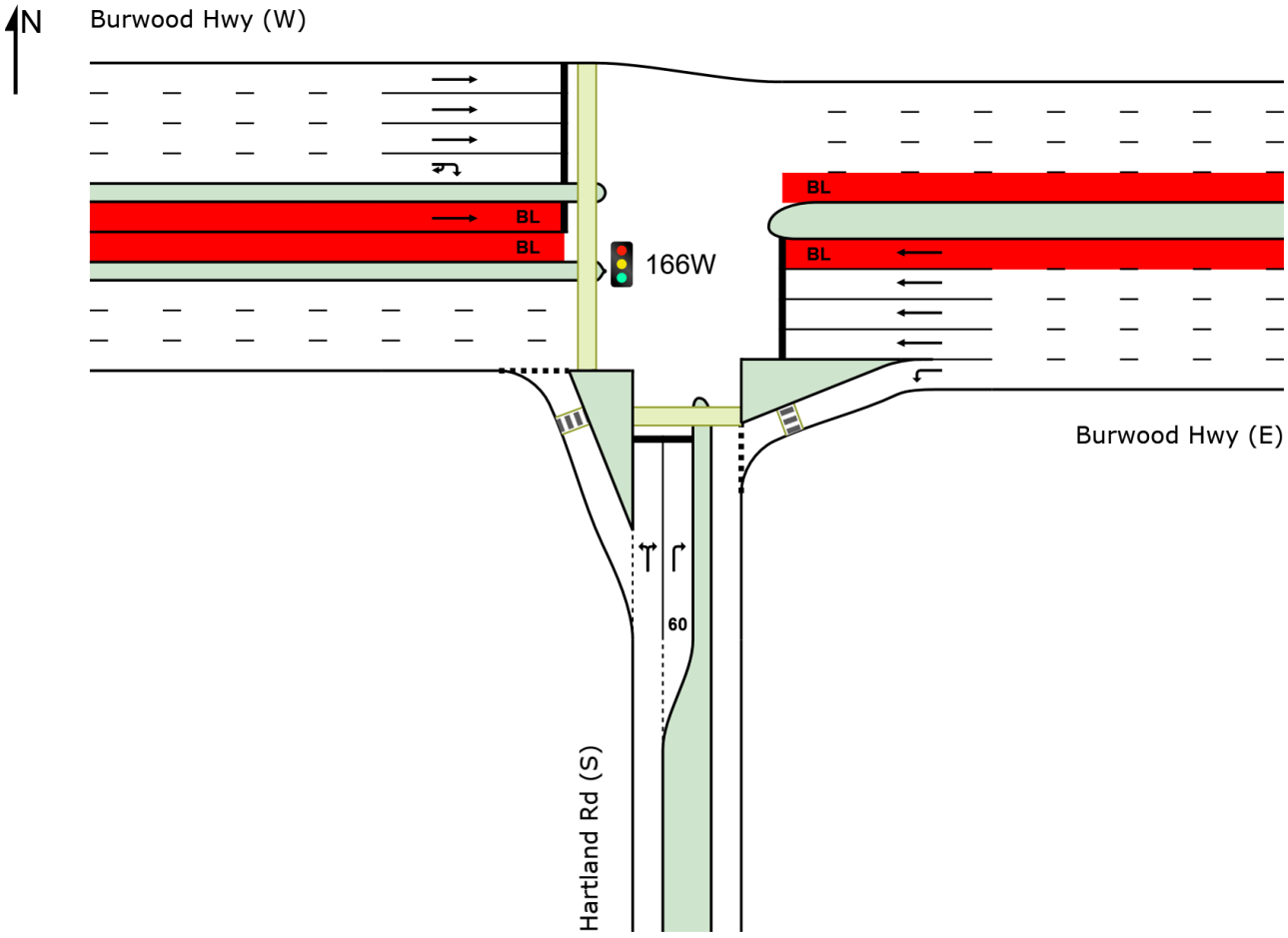
Site: 166W [2 AM Burwood Hwy - Hartland Rd (Site Folder: Existing)] Network: 1 [AM (Network Folder: Existing)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [166]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase B3
Input Phase Sequence: A, B3, C, E1, E2*, E3*
Output Phase Sequence: A, B3, C, E1, E3*
(* Variable Phase)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance (CCG)

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
Site: 166W [2 AM Burwood Hwy - Hartland Rd]															
South: Hartland Rd (S)															
Lane 1	250	0.0	250	0.0	280	0.891	100	82.6	LOS F	11.3	78.9	Full	500	-42.4[N2]	0.0

Lane 2	209	0.5	209	0.5	235	0.891	100	77.9	LOS E	9.9	69.3	Short	60	-50.0[N3]	NA
Approach	459	0.2	459	0.2		0.891		80.5	LOS F	11.3	78.9				
East: Burwood Hwy (E)															
Lane 1	365	1.4	365	1.4	1369	0.267	100	3.4	LOS A	0.4	2.5	Full	25	0.0	0.0
Lane 2	926	3.2	926	3.2	999	0.927	100	10.4	LOS B	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 3	926	3.2	926	3.2	999	0.927	100	13.6	LOS B	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 4	926	3.2	926	3.2	999	0.927	100	19.9	LOS B	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 5 (BL)	9	100.0	9	100.0	682	0.013	100	0.7	LOS A	0.0	0.1	Full	25	0.0	0.0
Approach	3152	3.3	3152	3.3		0.927		13.3	LOS B	3.5	25.0				
West: Burwood Hwy (W)															
Lane 1	586	3.8	586	3.8	849	0.690	100	30.6	LOS C	4.2[N6]	30.0[N6]	Full	30	0.0[N2]	50.0
Lane 2	586	3.8	586	3.8	849	0.690	100	30.6	LOS C	4.2[N4]	30.0[N4]	Full	30	0.0[N2]	50.0
Lane 3	586	3.8	586	3.8	849	0.690	100	30.7	LOS C	4.2[N6]	30.0[N6]	Full	30	0.0[N2]	50.0
Lane 4	92	3.3	92	3.3	96	0.953	100	90.4	LOS F	4.2[N4]	30.0[N4]	Full	30	0.0	50.0
Lane 5 (BL)	9	100.0	9	100.0	45	0.208	100	72.3	LOS E	0.4	5.2	Full	30	0.0	0.0
Approach	1860	4.2	1860	4.2		0.953		33.8	LOS C	4.2	30.0				
Intersection	5472	3.4	5472	3.4		0.953		25.9	LOS C	11.3	78.9				
Site: 166E [3 AM Burwood Hwy - Hanover Rd]															
East: Burwood Hwy (E)															
Lane 1	200	0.5	200	0.5	927	0.216	100	20.3	LOS C	4.4	30.8	Full	35	0.0	38.1
Lane 2	854	3.4	854	3.4	910	0.938	100	55.3	LOS E	4.9[N6]	35.0[N6]	Full	35	0.0	50.0
Lane 3	854	3.4	854	3.4	910	0.938	100	55.3	LOS E	4.9[N6]	35.0[N6]	Full	35	0.0	50.0
Lane 4	854	3.4	854	3.4	910	0.938	100	55.3	LOS E	4.9[N6]	35.0[N6]	Full	35	0.0	50.0
Lane 5 (BL)	9	100.0	9	100.0	682	0.013	100	12.3	LOS B	0.1	1.9	Full	35	0.0	0.0
Lane 6	135	5.5	135	5.5	164	0.821	100	73.4	LOS E	4.8[N4]	35.0[N4]	Full	35	0.0	50.0
Approach	2905	3.6	2905	3.6		0.938		53.6	LOS D	4.9	35.0				
North: Hanover Rd (N)															
Lane 1	275	3.7	275	3.7	367	0.750	100	66.8	LOS E	10.0	71.9	Short	115	-16.4[N2]	NA
Lane 2	175	1.4	175	1.4	233	0.750	100	59.8	LOS E	6.9	48.8	Full	500	-50.0[N2]	0.0
Approach	451	2.8	451	2.8		0.750		64.1	LOS E	10.0	71.9				
West: Burwood Hwy (W)															
Lane 1	648	2.3	648	2.3	809	0.801	100	21.1	LOS C	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 2	752	3.4	752	3.4	939	0.801	100	1.6	LOS A	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 3	752	3.4	752	3.4	939	0.801	100	18.2	LOS B	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 4 (BL)	9	100.0	9	100.0	45	0.208	100	1.5	LOS A	0.0	0.1	Full	25	0.0	0.0
Approach	2161	3.5	2161	3.5		0.801		13.2	LOS B	3.5	25.0				
Intersection	5516	3.5	5516	3.5		0.938		38.6	LOS D	10.0	71.9				

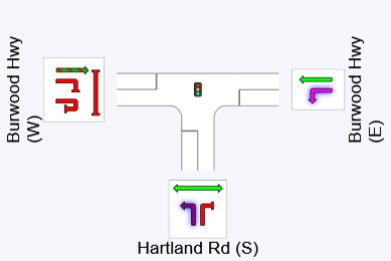
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

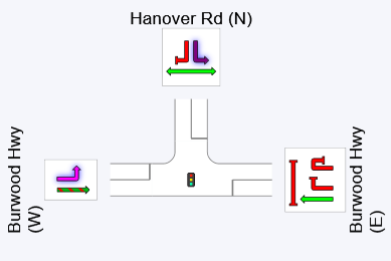
N2 Capacity Adjustment specified by user.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.
N4 Average back of queue has been restricted to the available queue storage space.

N6 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows) but average back of queue has been restricted to the available queue storage space.

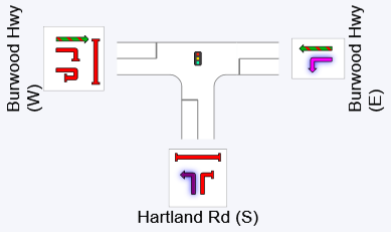
Output Phase Sequence (CCG)

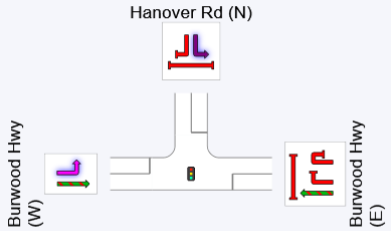
Phase A



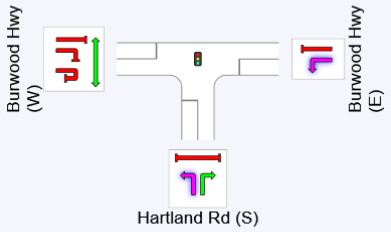


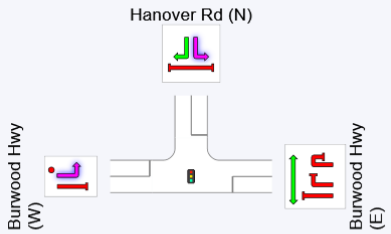
Phase B3 **REF**

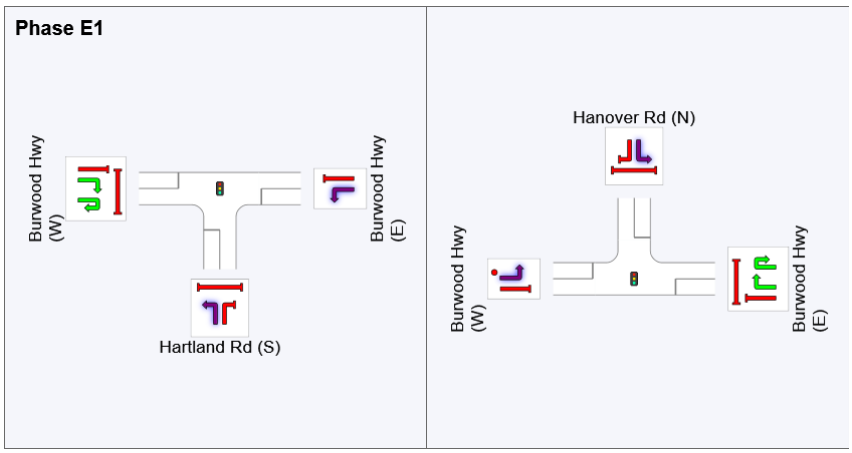


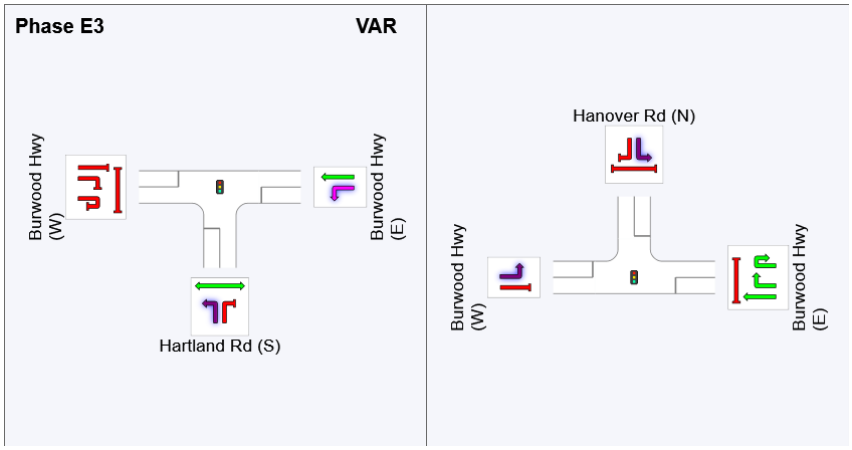


Phase C

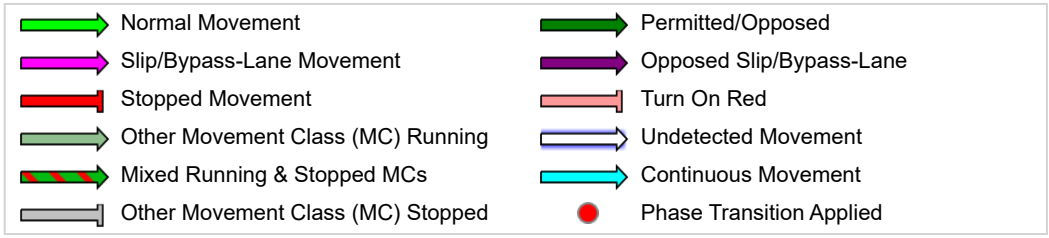








REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary (CCG)

Phase	A	B3	C	E1	E3
Phase Change Time (sec)	59	0	4	41	55
Green Time (sec)	64	2	33	8	***
Phase Time (sec)	66	6	39	15	4
Phase Split	51%	5%	30%	12%	3%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified. If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

Site: 166E [3 AM Burwood Hwy - Hanover Rd (Site Folder: Existing)] Network: 1 [AM (Network Folder: Existing)]

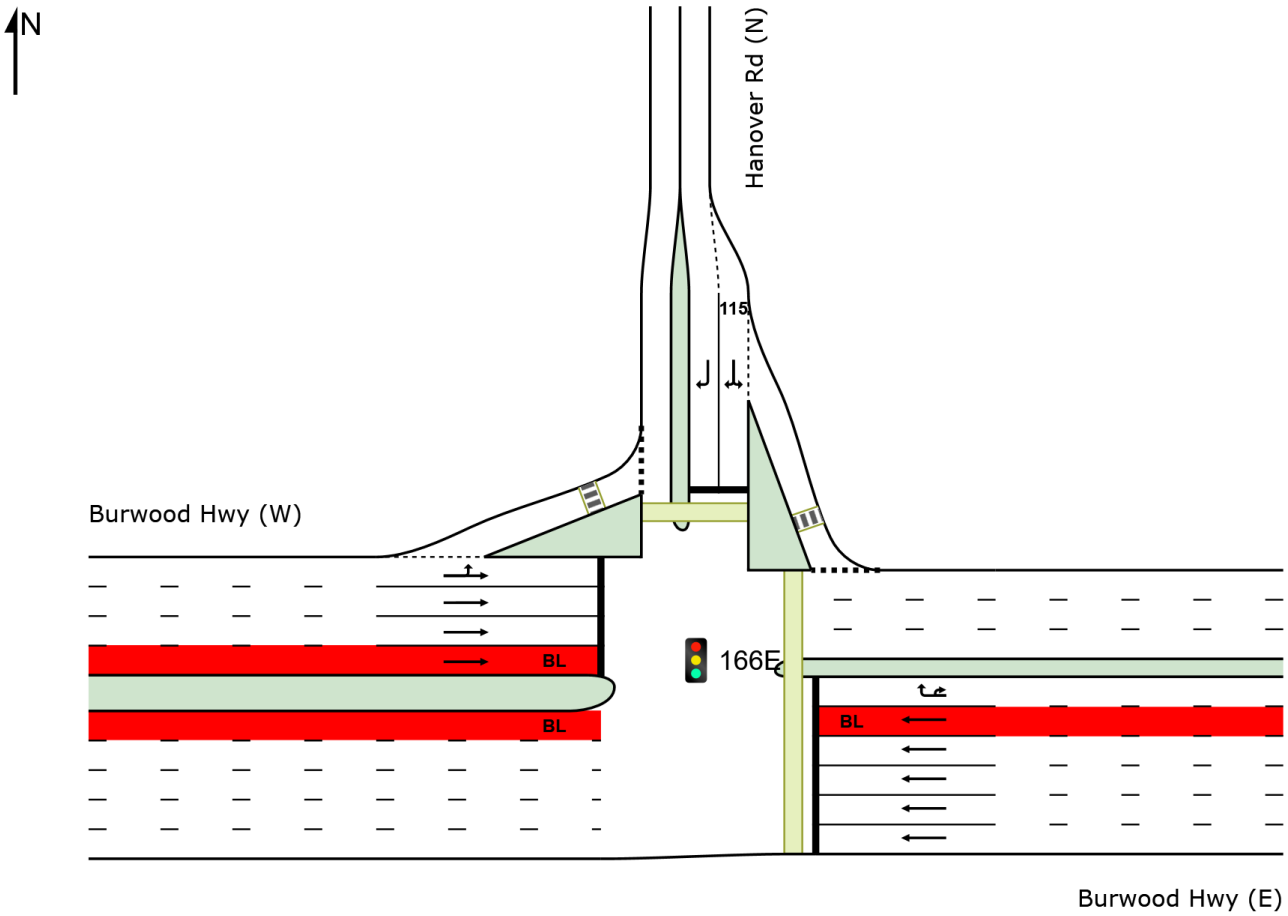
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [166]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase B3
Input Phase Sequence: A, B3, C, E1, E2*, E3*
Output Phase Sequence: A, B3, C, E1, E3*
(* Variable Phase)

Some CCG output elements have been omitted as they have already been included under other Sites belonging to the same CCG.

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



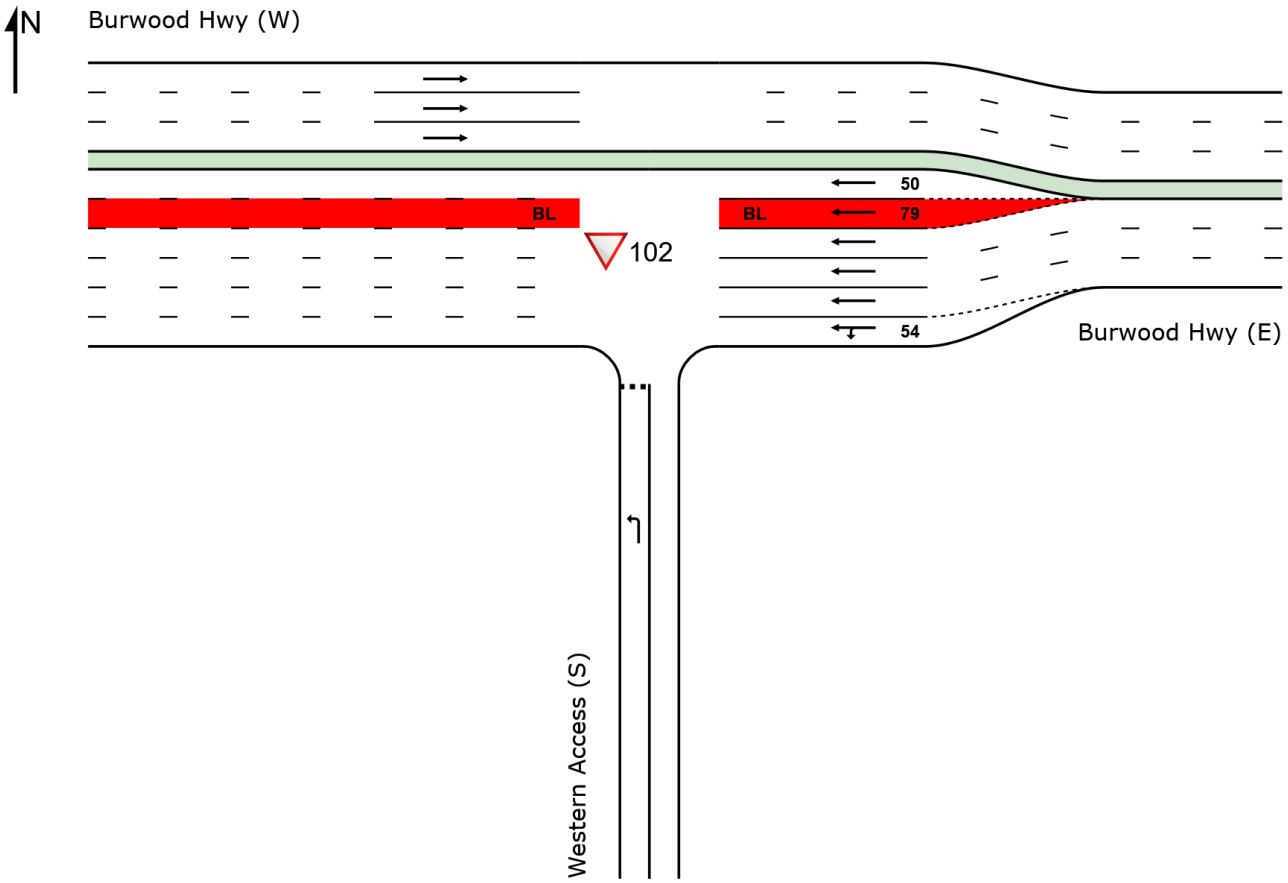
Site: 102 [4A AM Burwood Hwy - Western Access (Site Folder: Existing)]

Network: 1 [AM (Network Folder: Existing)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Western Access (S)															
Lane 1	1	0.0	1	0.0	528	0.002	100	5.7	LOS A	0.0[N5]	0.2[N5]	Full	500	-44.8[N3]	0.0
Approach	1	0.0	1	0.0		0.002		5.7	LOS A	0.0	0.2				
East: Burwood Hwy (E)															
Lane 1	202	1.0	202	1.0	1935	0.104	23[5]	0.1	LOS A	0.0	0.0	Short	54	0.0	NA
Lane 2	850	3.5	850	3.5	1907	0.446	100	0.0	LOS A	11.7[N6]	84.0[N6]	Full	84	0.0	50.0[N6]
Lane 3	850	3.5	850	3.5	1907	0.446	100	0.0	LOS A	11.7[N6]	84.0[N6]	Full	84	0.0	50.0[N6]
Lane 4	850	3.5	850	3.5	1907	0.446	100	0.0	LOS A	11.7[N6]	84.0[N6]	Full	84	0.0	50.0[N6]
Lane 5 (BL)	9	100.0	9	100.0	1182	0.008	100	0.0	LOS A	0.0	0.0	Short	79	0.0	NA
Lane 6	136	3.5	136	3.5	1907	0.071	16[7]	0.0	LOS A	0.9[N5]	6.4[N5]	Short	50	0.0	NA

Approach	2898	3.6	2898	3.6		0.446		0.0	NA	11.7	84.0				
West: Burwood Hwy (W)															
Lane 1	669	3.6	669	3.6	1905	0.351	100	0.0	LOS A	0.0	0.0	Full	35	0.0	0.0
Lane 2	669	3.6	669	3.6	1905	0.351	100	0.0	LOS A	0.0	0.0	Full	35	0.0	0.0
Lane 3	663	5.0	663	5.0	1889	0.351	100	0.0	LOS A	0.0	0.0	Full	35	0.0	0.0
Approach	2001	4.1	2001	4.1		0.351		0.0	NA	0.0	0.0				
Intersection	4900	3.8	4900	3.8		0.446		0.0	NA	11.7	84.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
7 Lane under-utilisation specified by the user
N3 Capacity Adjustment due to downstream lane blockage determined by the program.
N5 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows).
N6 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows) but average back of queue has been restricted to the available queue storage space.

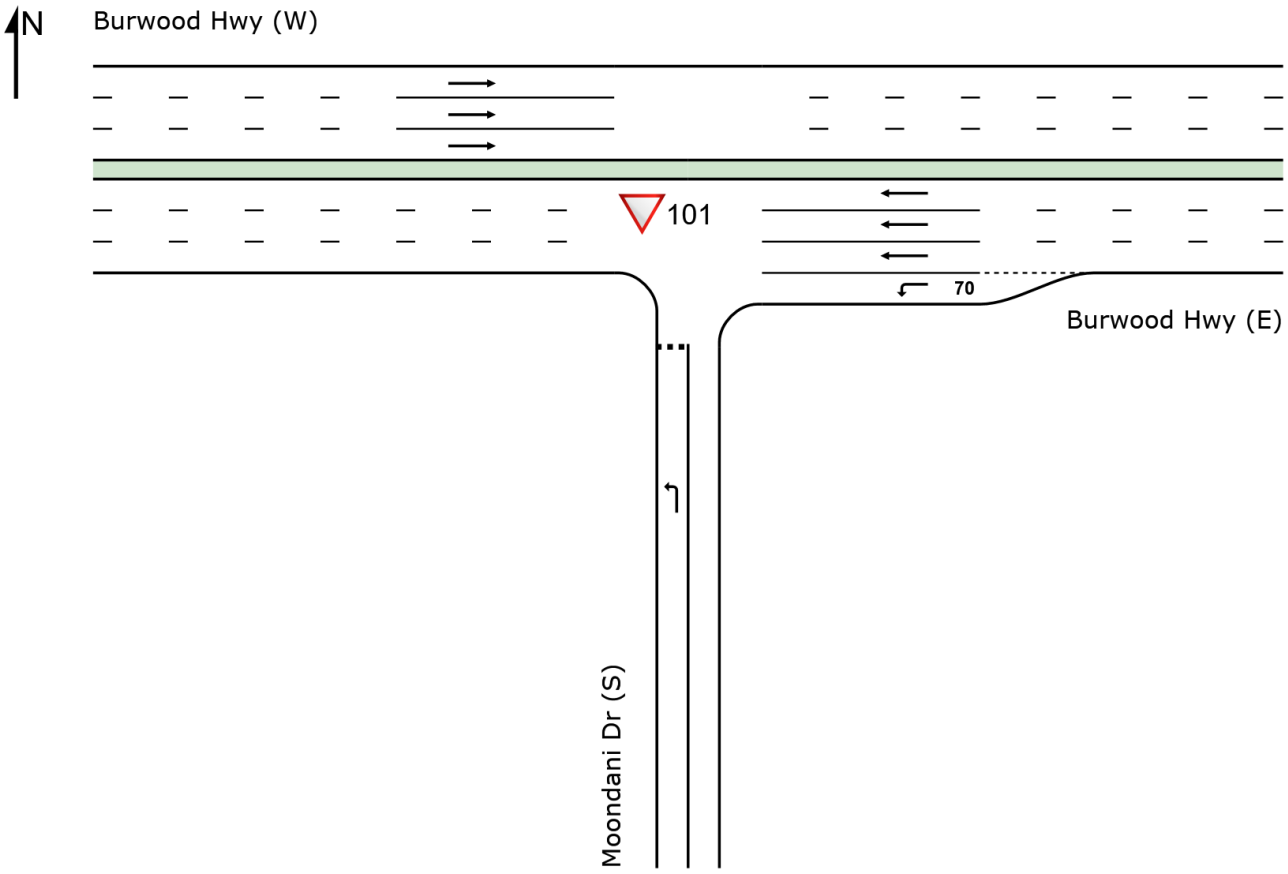
Site: 101 [4 AM Burwoood Hwy - Moondani Dr (Site Folder: Existing)]

Network: 1 [AM (Network Folder: Existing)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Moondani Dr (S)															
Lane 1	7	0.0	7	0.0	197	0.037	100	18.9	LOS C	0.1[N5]	1.0[N5]	Full	500	-26.0[N2]	0.0
Approach	7	0.0	7	0.0		0.037		18.9	LOS C	0.1	1.0				
East: Burwood Hwy (E)															
Lane 1	17	6.3	17	6.3	1778	0.009	100	7.1	LOS A	0.0	0.0	Short	70	0.0	NA
Lane 2	968	2.9	968	2.9	1914	0.506	100	0.1	LOS A	18.7[N5]	134.0[N5]	Full	360	0.0	0.0
Lane 3	964	3.5	964	3.5	1907	0.506	100	0.1	LOS A	18.7[N5]	134.8[N5]	Full	360	0.0	0.0
Lane 4	959	4.4	959	4.4	1896	0.506	100	0.1	LOS A	18.8[N5]	136.2[N5]	Full	360	0.0	0.0
Approach	2908	3.6	2908	3.6		0.506		0.2	NA	18.8	136.2				
West: Burwood Hwy (W)															
Lane 1	669	3.6	669	3.6	1905	0.351	100	0.0	LOS A	0.0	0.0	Full	84	0.0	0.0

Lane 2	669	3.6	669	3.6	1905	0.351	100	0.0	LOS A	0.0	0.0	Full	84	0.0	0.0
Lane 3	663	5.0	663	5.0	1889	0.351	100	0.0	LOS A	0.0	0.0	Full	84	0.0	0.0
Approach	2001	4.1	2001	4.1		0.351		0.0	NA	0.0	0.0				
Intersection	4916	3.8	4916	3.8		0.506		0.1	NA	18.8	136.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N2 Capacity Adjustment specified by user.
N5 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows).

USER REPORT FOR SITE

All Movement Classes

Project: 230118_300304377_vcat_scenario2

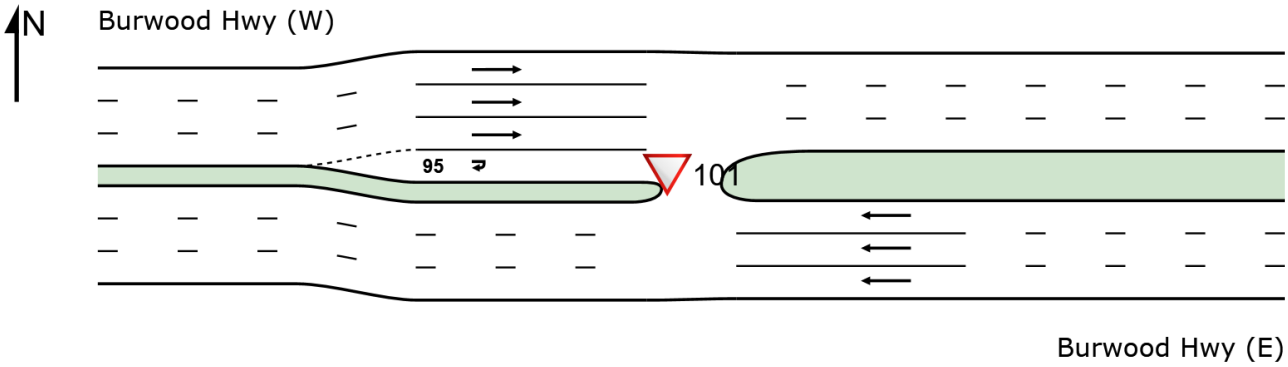
Template: Layout, Lane & Phase Summary

Site: 101 [5 AM East U-turn (Site Folder: Existing)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Burwood Hwy (E)													
Lane 1	968	2.9	1914	0.506	100	0.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	965	3.5	1907	0.506	100	0.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 3	959	4.4	1896	0.506	100	0.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	2892	3.6		0.506		0.2	NA	0.0	0.0				
West: Burwood Hwy (W)													
Lane 1	662	3.6	1905	0.348	100	0.1	LOS A	0.0	0.0	Full	360	0.0	0.0
Lane 2	662	3.6	1905	0.348	100	0.1	LOS A	0.0	0.0	Full	360	0.0	0.0
Lane 3	662	3.6	1905	0.348	100	0.1	LOS A	0.0	0.0	Full	360	0.0	0.0
Lane 4	4	0.0	86	0.049	100	571.9	LOS F	1.8	12.6	Short	95	1500.0	NA
Approach	1992	3.6		0.348		1.3	NA	1.8	12.6				
Intersection	4884	3.6		0.506		0.7	NA	1.8	12.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 230118_300304377_vcat_scenario2

Template: Layout, Lane & Phase Summary

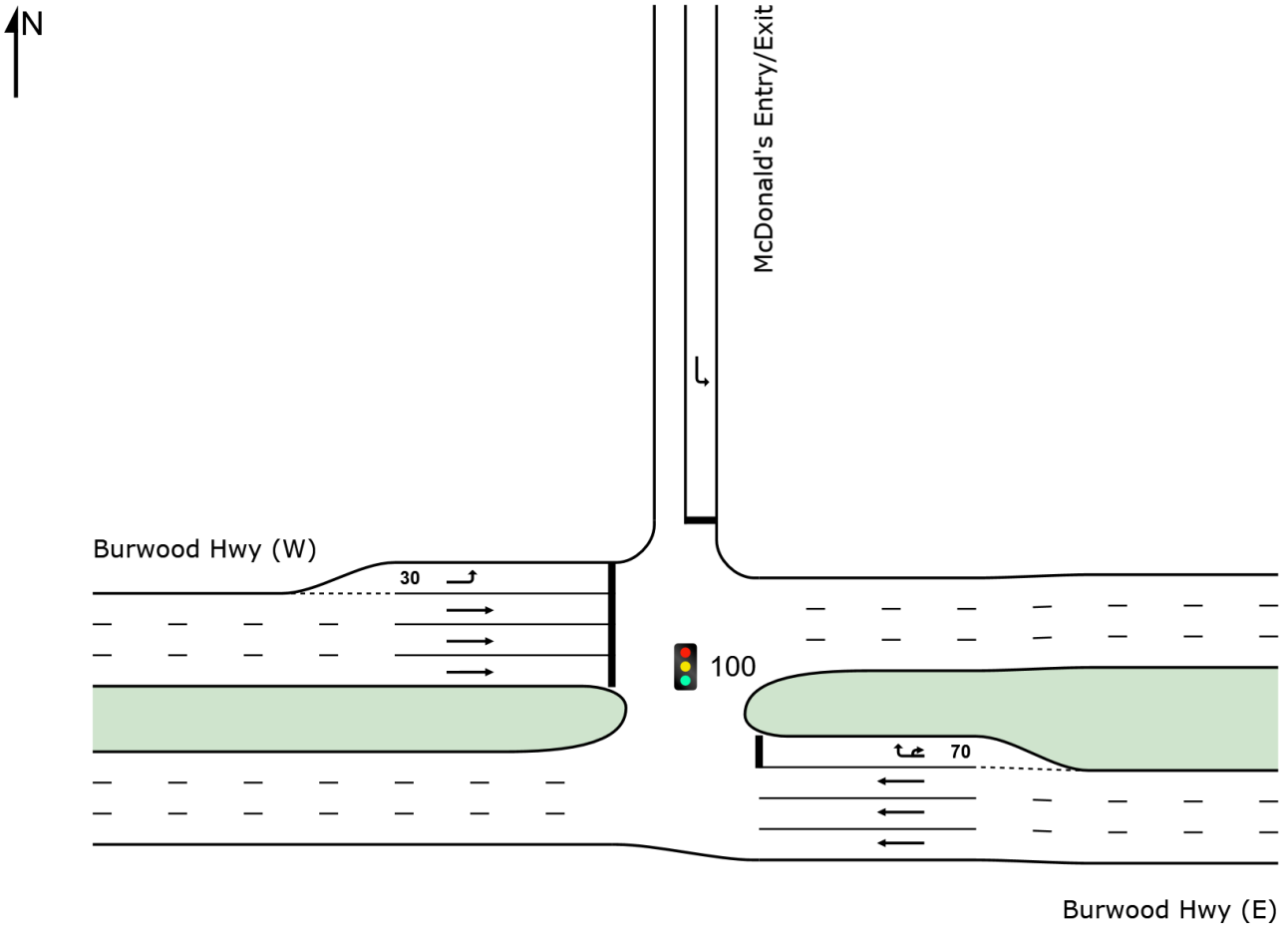
Site: 100 [0 PM Signalised U-turn (Site Folder: Existing)] Network: 2 [PM (Network Folder: Existing)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

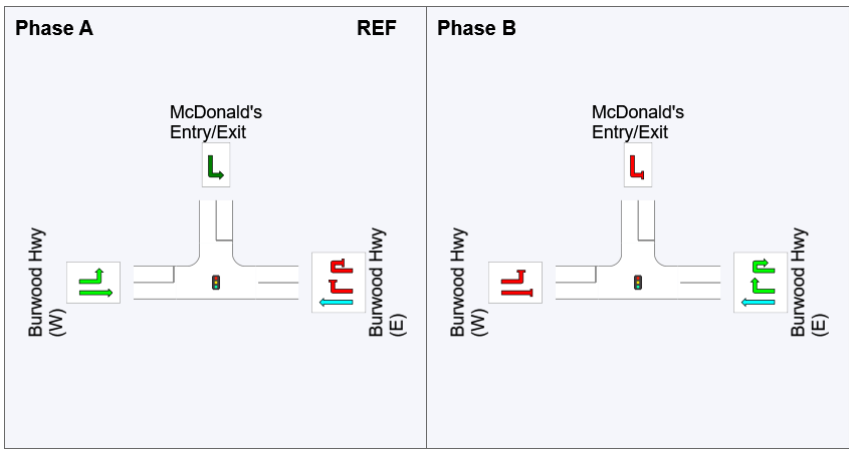
	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %

East: Burwood Hwy (E)															
Lane 1	569	0.9	569	0.9	1938	0.294	100	0.0	LOS A	0.0	0.0	Full	200	0.0	0.0
Lane 2	569	0.9	569	0.9	1938	0.294	100	0.0	LOS A	0.0	0.0	Full	200	0.0	0.0
Lane 3	563	2.5	563	2.5	1918	0.294	100	0.0	LOS A	0.0	0.0	Full	200	0.0	0.0
Lane 4	72	8.8	72	8.8	79	0.908	100	86.8	LOS F	3.3	24.5	Short	70	-20.0 N7	NA
Approach	1774	1.8	1774	1.8		0.908		3.5	LOS A	3.3	24.5				
North: McDonald's Entry/Exit															
Lane 1	69	0.0	69	0.0	76	0.907	100	106.0	LOS F	4.3	30.1	Full	500	0.0 N2	0.0
Approach	69	0.0	69	0.0		0.907		106.0	LOS F	4.3	30.1				
West: Burwood Hwy (W)															
Lane 1	43	0.0	43	0.0	1571	0.027	100	7.2	LOS A	0.3	1.8	Short	30	0.0	NA
Lane 2	1297	1.4	1297	1.4	1590 1	0.816	100	4.9	LOS A	23.0	163.0	Full	500	0.0 N2	0.0
Lane 3	1334	1.4	1334	1.4	1635	0.816	100	5.2	LOS A	25.1	177.9	Full	500	0.0 N2	0.0
Lane 4	96	9.8	96	9.8	1551	0.062	100	1.7	LOS A	0.9 N5	7.0 N5	Full	500	0.0 N2	0.0
Approach	2770	1.7	2770	1.7		0.816		5.0	LOS A	25.1	177.9				
Intersection	4613	1.7	4613	1.7		0.908		5.9	LOS A	25.1	177.9				

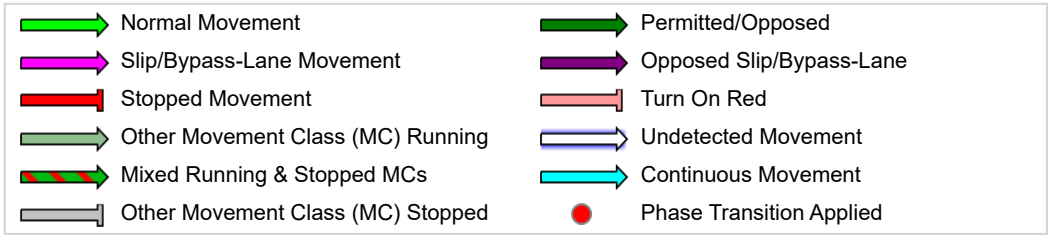
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
N2 Capacity Adjustment specified by user.
N5 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows).
N7 The capacity reduction has been determined from the queue blockage probability of a Site further downstream due to intermediate continuous lanes.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	126	112
Green Time (sec)	110	8
Phase Time (sec)	116	14
Phase Split	89%	11%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

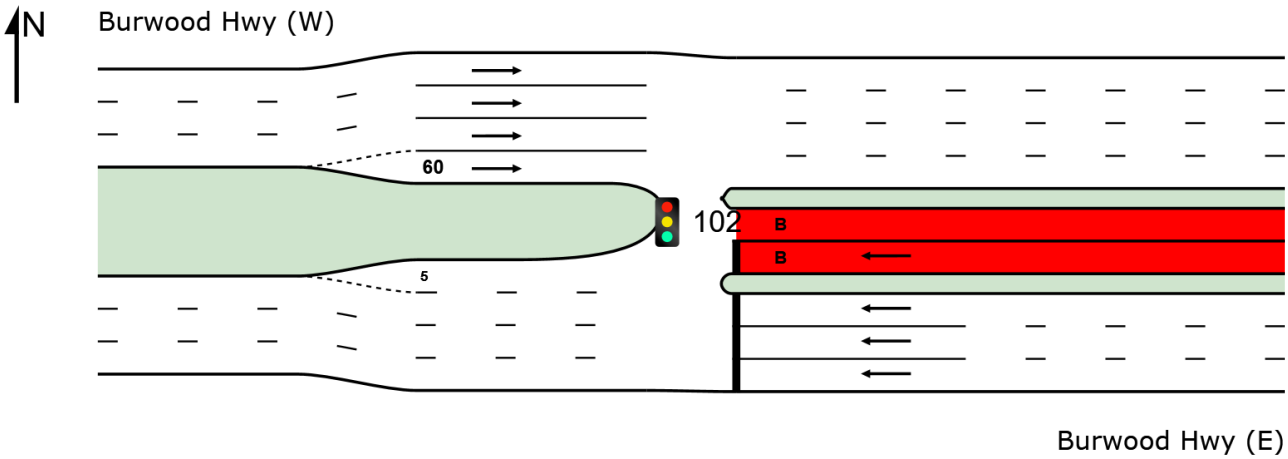
Site: 102 [1 PM Bus Interchange (Site Folder: Existing)] Network: 2 [PM (Network Folder: Existing)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

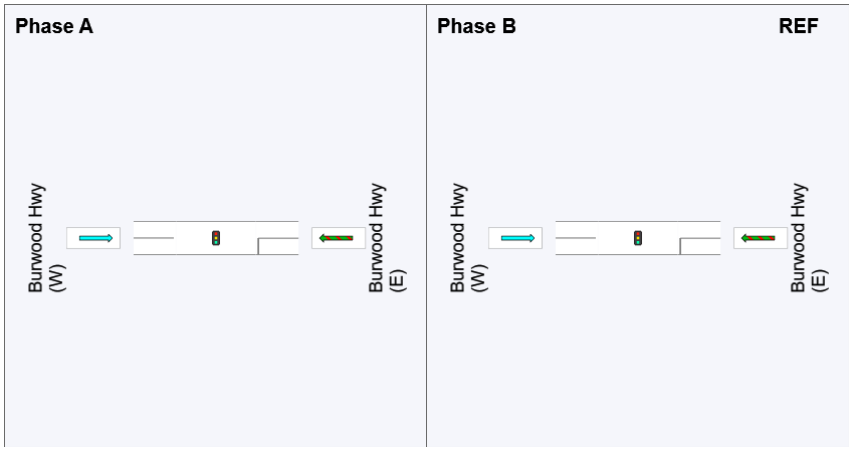
	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Burwood Hwy (E)															
Lane 1	587	1.2	587	1.2	1890	0.311	100	0.0	LOS A	0.6	4.5	Full	30	0.0	0.0
Lane 2	587	1.2	587	1.2	1890	0.311	100	0.0	LOS A	0.6	4.5	Full	30	0.0	0.0
Lane 3	587	1.2	587	1.2	1890	0.311	100	0.0	LOS A	0.6	4.5	Full	30	0.0	0.0
Lane 4 (B)	9	100.0	9	100.0	36	0.247	100	74.7	LOS E	0.4	4.9	Full	30	0.0	0.0
Approach	1770	1.8	1770	1.8		0.311		0.4	LOS A	0.6	4.9				
West: Burwood Hwy (W)															
Lane 1	905	1.4	905	1.4	1933	0.468	100	0.1	LOS A	23.1[N5]	163.5[N5]	Full	200	0.0	35.6
Lane 2	905	1.4	905	1.4	1933	0.468	100	0.1	LOS A	25.1[N5]	177.5[N5]	Full	200	0.0	38.8
Lane 3	905	1.4	905	1.4	1933	0.468	100	0.1	LOS A	28.2[N6]	200.0[N6]	Full	200	0.0	50.0[N6]
Lane 4	101	9.4	101	9.4	1144	0.088	100	0.1	LOS A	0.0	0.0	Short	60	-37.8[N3]	NA
Approach	2816	1.6	2816	1.6		0.468		0.1	LOS A	28.2	200.0				
Intersection	4586	1.7	4586	1.7		0.468		0.2	LOS A	28.2	200.0				

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

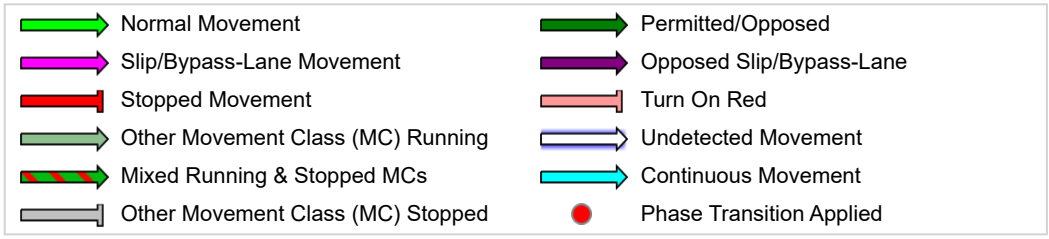
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N3 Capacity Adjustment due to downstream lane blockage determined by the program.
N5 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows).
N6 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows) but average back of queue has been restricted to the available queue storage space.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	3	0
Green Time (sec)	124	1
Phase Time (sec)	126	4
Phase Split	97%	3%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

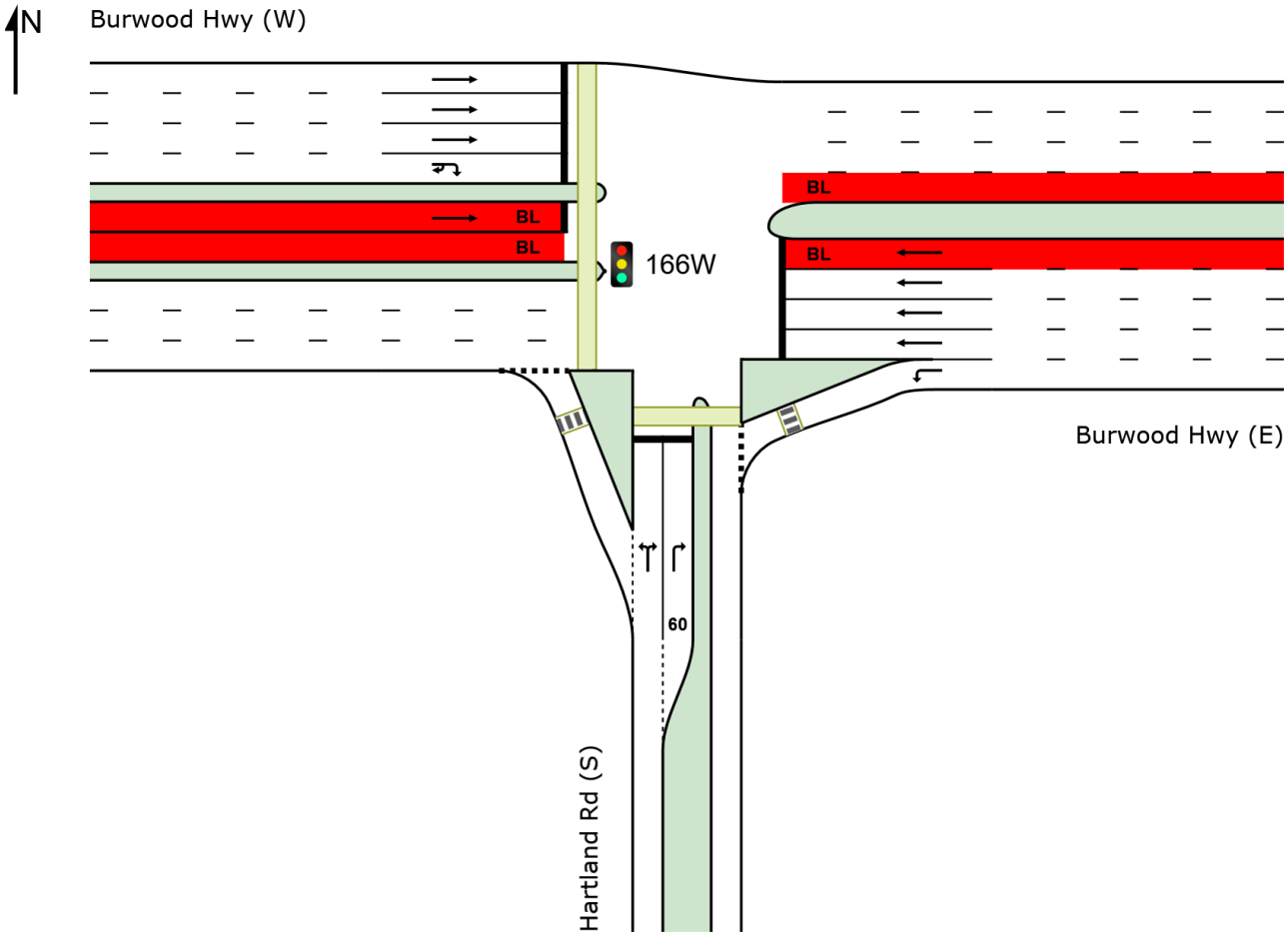
Site: 166W [2 PM Burwood Hwy - Hartland Rd (Site Folder: Existing)] Network: 2 [PM (Network Folder: Existing)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [166]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase B3
Input Phase Sequence: A, B3, C, E1, E2*, E3*
Output Phase Sequence: A, B3, C, E1
(* Variable Phase)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance (CCG)

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
Site: 166W [2 PM Burwood Hwy - Hartland Rd]															
South: Hartland Rd (S)															
Lane 1	170	0.1	170	0.1	193	0.885	100	78.3	LOS E	7.7	53.6	Full	500	-44.1[N3]	0.0

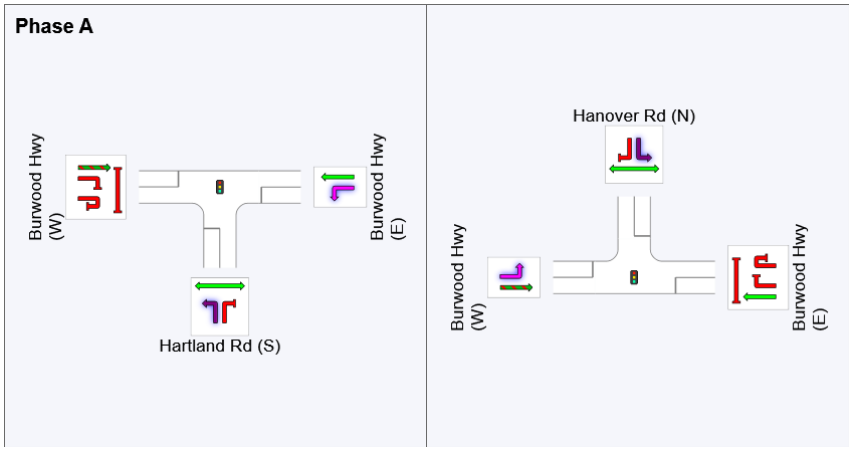
Lane 2	150	1.9	150	1.9	169	0.885	100	81.5	LOS F	7.0	49.8	Short	60	-50.0[N3]	NA
Approach	320	1.0	320	1.0		0.885		79.8	LOS E	7.7	53.6				
East: Burwood Hwy (E)															
Lane 1	240	1.8	240	1.8	1643	0.146	100	3.4	LOS A	0.2	1.6	Full	25	0.0	0.0
Lane 2	564	1.3	564	1.3	1145	0.493	100	0.8	LOS A	0.8	5.9	Full	25	0.0	0.0
Lane 3	564	1.3	564	1.3	1145	0.493	100	1.0	LOS A	1.0	7.3	Full	25	0.0	0.0
Lane 4	564	1.3	564	1.3	1145	0.493	100	8.2	LOS A	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 5 (BL)	9	100.0	9	100.0	764	0.012	100	0.6	LOS A	0.0	0.1	Full	25	0.0	0.0
Approach	1942	1.8	1942	1.8		0.493		3.3	LOS A	3.5	25.0				
West: Burwood Hwy (W)															
Lane 1	905	1.4	905	1.4	1056	0.857	100	27.5	LOS C	4.2[N6]	30.0[N6]	Full	30	0.0[N2]	50.0
Lane 2	905	1.4	905	1.4	1056	0.857	100	28.3	LOS C	4.2[N6]	30.0[N6]	Full	30	0.0[N2]	50.0
Lane 3	905	1.4	905	1.4	1056	0.857	100	57.9	LOS E	4.2[N6]	30.0[N6]	Full	30	0.0[N2]	50.0
Lane 4	92	0.0	92	0.0	114	0.805	100	75.2	LOS E	3.9	27.0	Full	30	0.0	40.1
Lane 5 (BL)	9	100.0	9	100.0	45	0.208	100	72.3	LOS E	0.4	5.1	Full	30	0.0	0.0
Approach	2816	1.6	2816	1.6		0.857		39.2	LOS D	4.2	30.0				
Intersection	5078	1.7	5078	1.7		0.885		28.0	LOS C	7.7	53.6				
Site: 166E [3 PM Burwood Hwy - Hanover Rd]															
East: Burwood Hwy (E)															
Lane 1	91	1.2	91	1.2	1057	0.086	100	14.2	LOS B	1.6	11.3	Full	35	0.0	0.0
Lane 2	528	1.4	528	1.4	1055	0.500	100	19.5	LOS B	4.9[N4]	35.0[N4]	Full	35	0.0	50.0
Lane 3	528	1.4	528	1.4	1055	0.500	100	19.5	LOS B	4.9[N4]	35.0[N4]	Full	35	0.0	50.0
Lane 4	528	1.4	528	1.4	1055	0.500	100	19.5	LOS B	4.9[N4]	35.0[N4]	Full	35	0.0[N2]	50.0
Lane 5 (BL)	9	100.0	9	100.0	764	0.012	100	8.6	LOS A	0.1	1.6	Full	35	0.0	0.0
Lane 6	113	1.9	113	1.9	122	0.923	100	85.7	LOS F	4.9[N4]	35.0[N4]	Full	35	0.0	50.0
Approach	1795	1.9	1795	1.9		0.923		23.3	LOS C	4.9	35.0				
North: Hanover Rd (N)															
Lane 1	305	1.7	305	1.7	362	0.844	100	69.7	LOS E	11.0	78.0	Short	115	0.0	NA
Lane 2	116	0.0	116	0.0	343	0.338	40[5]	55.6	LOS E	3.9	27.6	Full	500	0.0[N2]	0.0
Approach	421	1.3	421	1.3		0.844		65.8	LOS E	11.0	78.0				
West: Burwood Hwy (W)															
Lane 1	795	1.1	795	1.1	826	0.963	100	45.2	LOS D	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 2	1102	1.4	1102	1.4	1144	0.963	100	18.6	LOS B	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 3	1102	1.4	1102	1.4	1144	0.963	100	28.0	LOS C	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 4 (BL)	9	100.0	9	100.0	45	0.208	100	1.7	LOS A	0.0	0.2	Full	25	0.0	0.0
Approach	3008	1.6	3008	1.6		0.963		29.0	LOS C	3.5	25.0				
Intersection	5225	1.7	5225	1.7		0.963		30.0	LOS C	11.0	78.0				

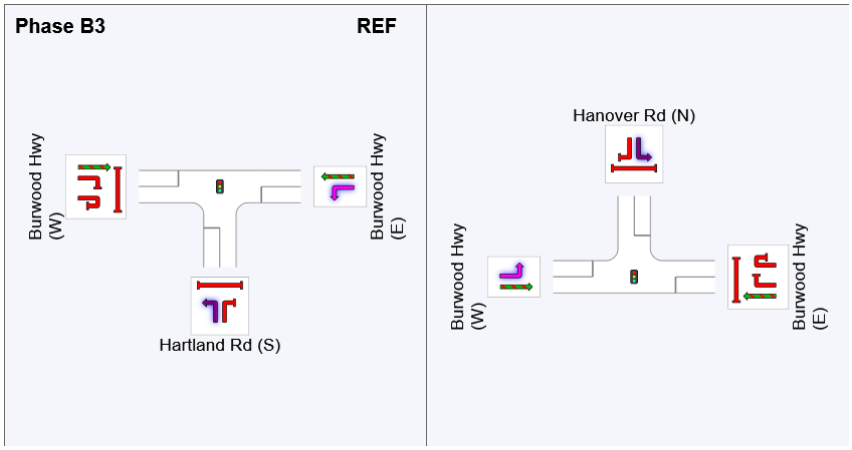
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

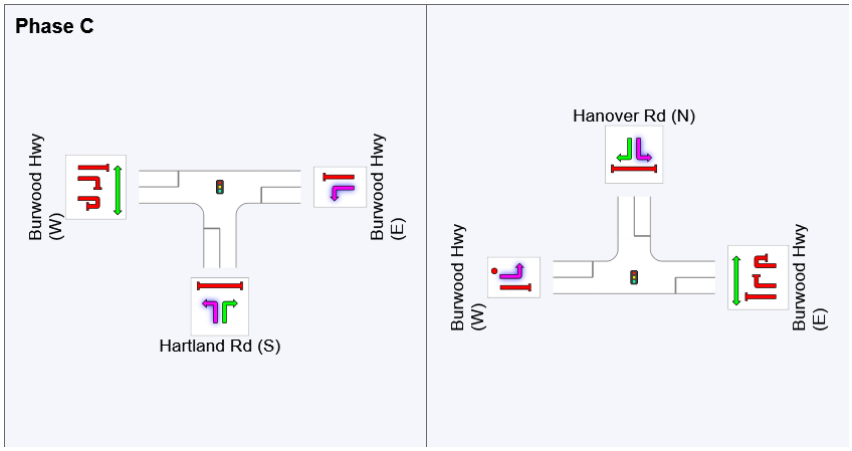
5 Lane under-utilisation found by the program
N2 Capacity Adjustment specified by user.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.

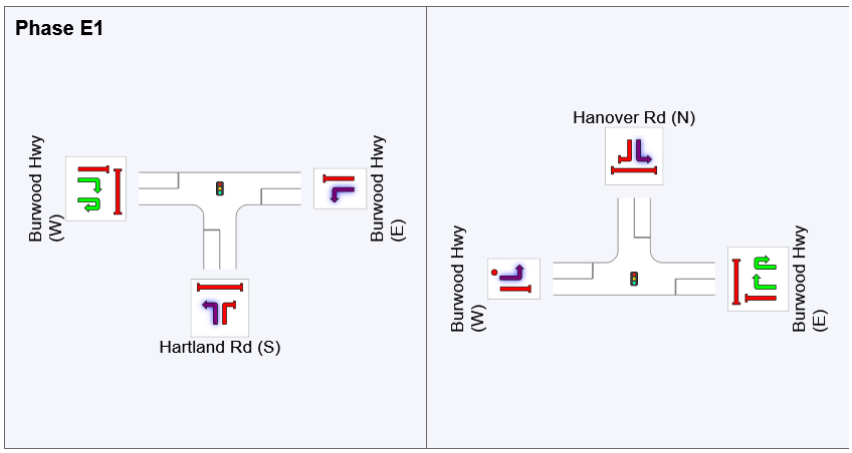
N4 Average back of queue has been restricted to the available queue storage space.
N6 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows) but average back of queue has been restricted to the available queue storage space.

Output Phase Sequence (CCG)









REF: Reference Phase
VAR: Variable Phase

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

Phase Timing Summary (CCG)

Phase	A	B3	C	E1
Phase Change Time (sec)	46	0	4	31
Green Time (sec)	77	2	24	9
Phase Time (sec)	79	5	30	16
Phase Split	61%	4%	23%	12%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 166E [3 PM Burwood Hwy - Hanover Rd (Site Folder: Existing)] Network: 2 [PM (Network Folder: Existing)]

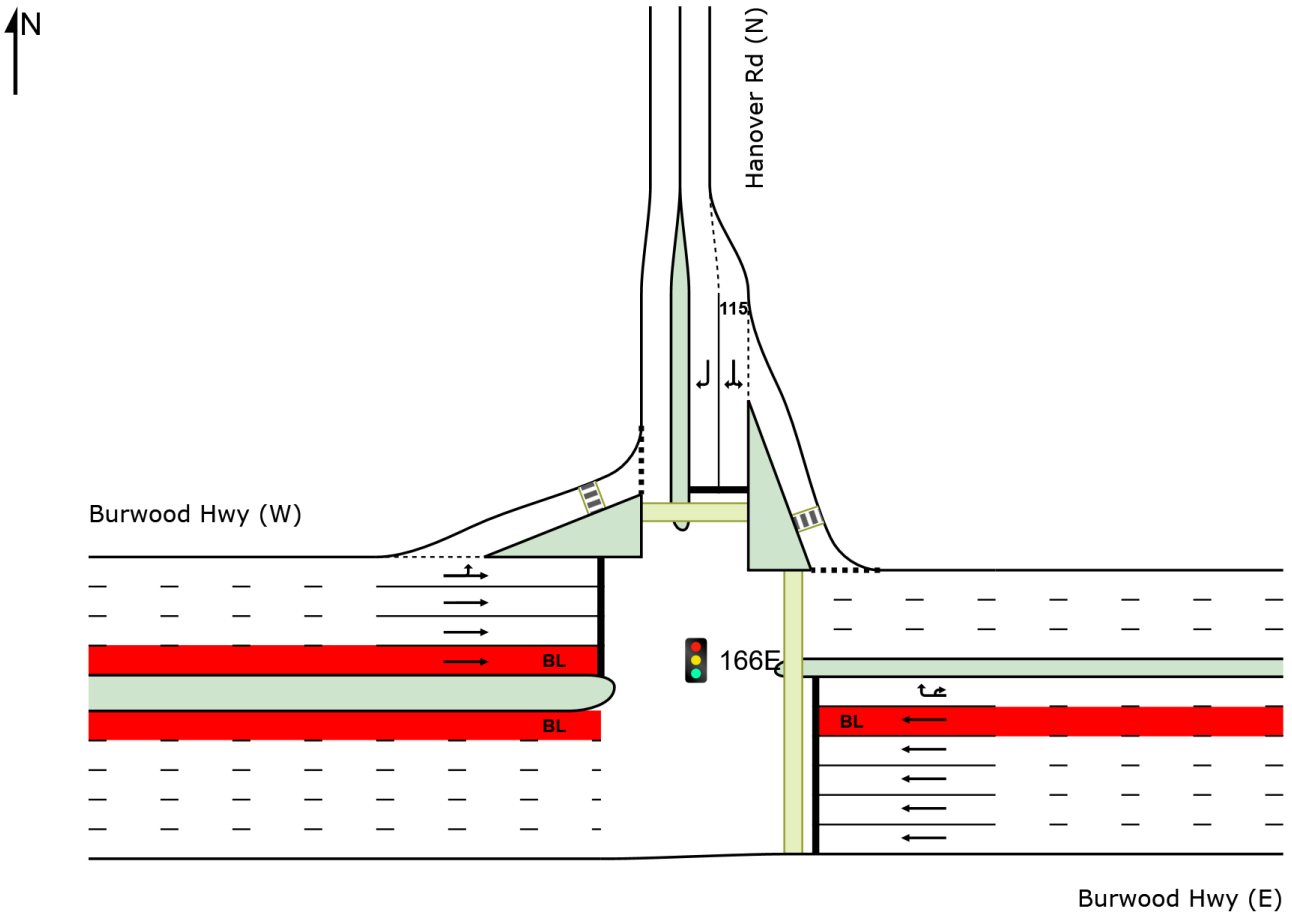
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [166]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase B3
Input Phase Sequence: A, B3, C, E1, E2*, E3*
Output Phase Sequence: A, B3, C, E1
(* Variable Phase)

Some CCG output elements have been omitted as they have already been included under other Sites belonging to the same CCG.

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



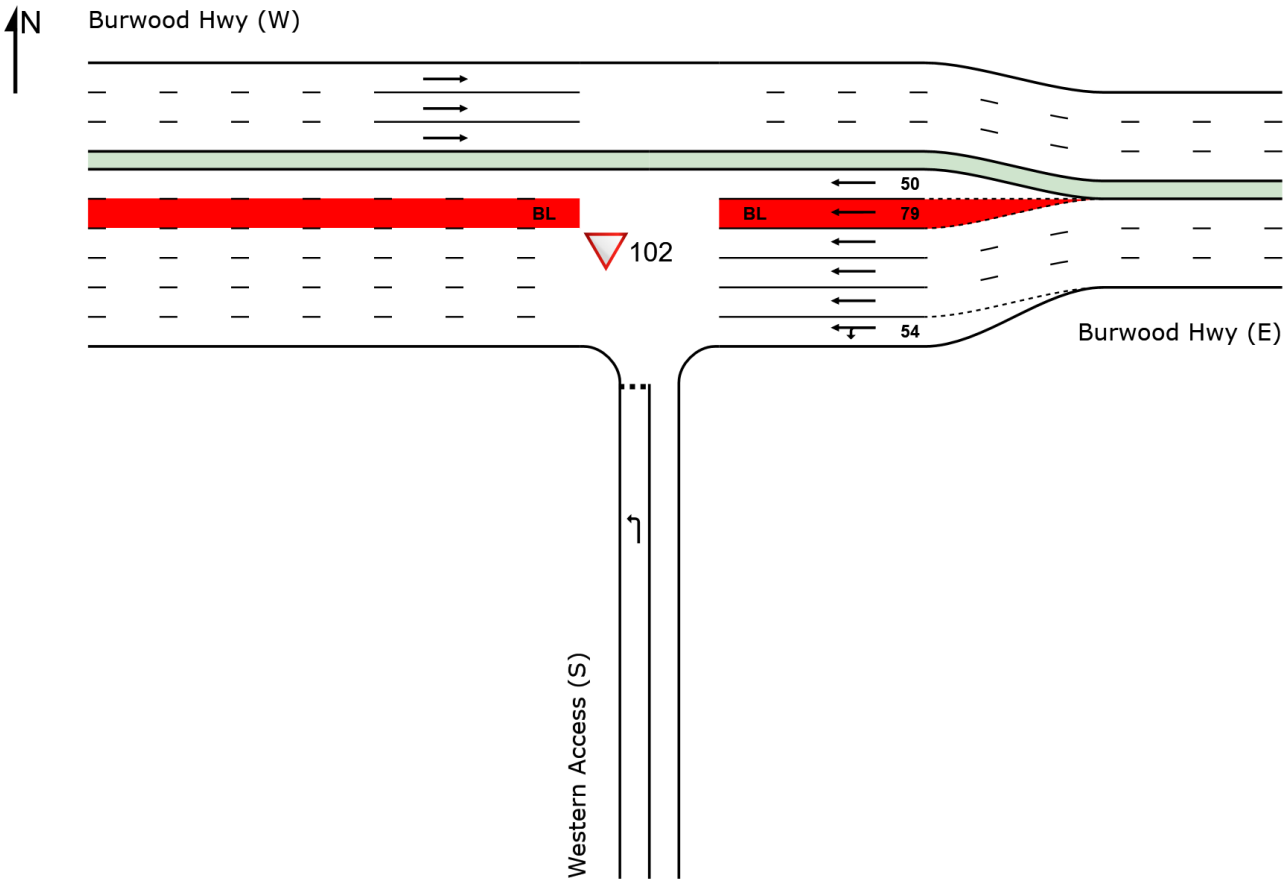
Site: 102 [4A PM Burwoood Hwy - Western Access (Site Folder: Existing)]

Network: 2 [PM (Network Folder: Existing)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Western Access (S)															
Lane 1	1	0.0	1	0.0	701	0.002	100	5.1	LOS A	0.0[N5]	0.1[N5]	Full	500	-35.5[N3]	0.0
Approach	1	0.0	1	0.0		0.002		5.1	LOS A	0.0	0.1				
East: Burwood Hwy (E)															
Lane 1	93	2.2	93	2.2	1918	0.048	100	0.2	LOS A	0.0	0.0	Short	54	0.0	NA
Lane 2	423	1.4	423	1.4	1932	0.219	100	0.0	LOS A	0.0	0.0	Full	90	0.0	0.0
Lane 3	423	1.4	423	1.4	1932	0.219	100	0.0	LOS A	0.0	0.0	Full	90	0.0	0.0
Lane 4	423	1.4	423	1.4	1932	0.219	100	0.0	LOS A	0.0	0.0	Full	90	0.0	0.0
Lane 5 (BL)	9	100.0	9	100.0	1182	0.008	100	0.0	LOS A	0.0	0.0	Short	79	0.0	NA
Lane 6	423	1.4	423	1.4	1932	0.219	100	0.0	LOS A	0.0	0.0	Short	50	0.0	NA

Approach	1792	2.0	1792	2.0		0.219		0.0	NA	0.0	0.0				
West: Burwood Hwy (W)															
Lane 1	992	1.4	992	1.4	1932	0.513	100	0.0	LOS A	0.0	0.0	Full	35	0.0	0.0
Lane 2	992	1.4	992	1.4	1932	0.513	100	0.0	LOS A	0.0	0.0	Full	35	0.0	0.0
Lane 3	986	2.4	986	2.4	1920	0.513	100	0.0	LOS A	0.0	0.0	Full	35	0.0	0.0
Approach	2969	1.7	2969	1.7		0.513		0.0	NA	0.0	0.0				
Intersection	4762	1.8	4762	1.8		0.513		0.0	NA	0.0	0.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N3 Capacity Adjustment due to downstream lane blockage determined by the program.
N5 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows).

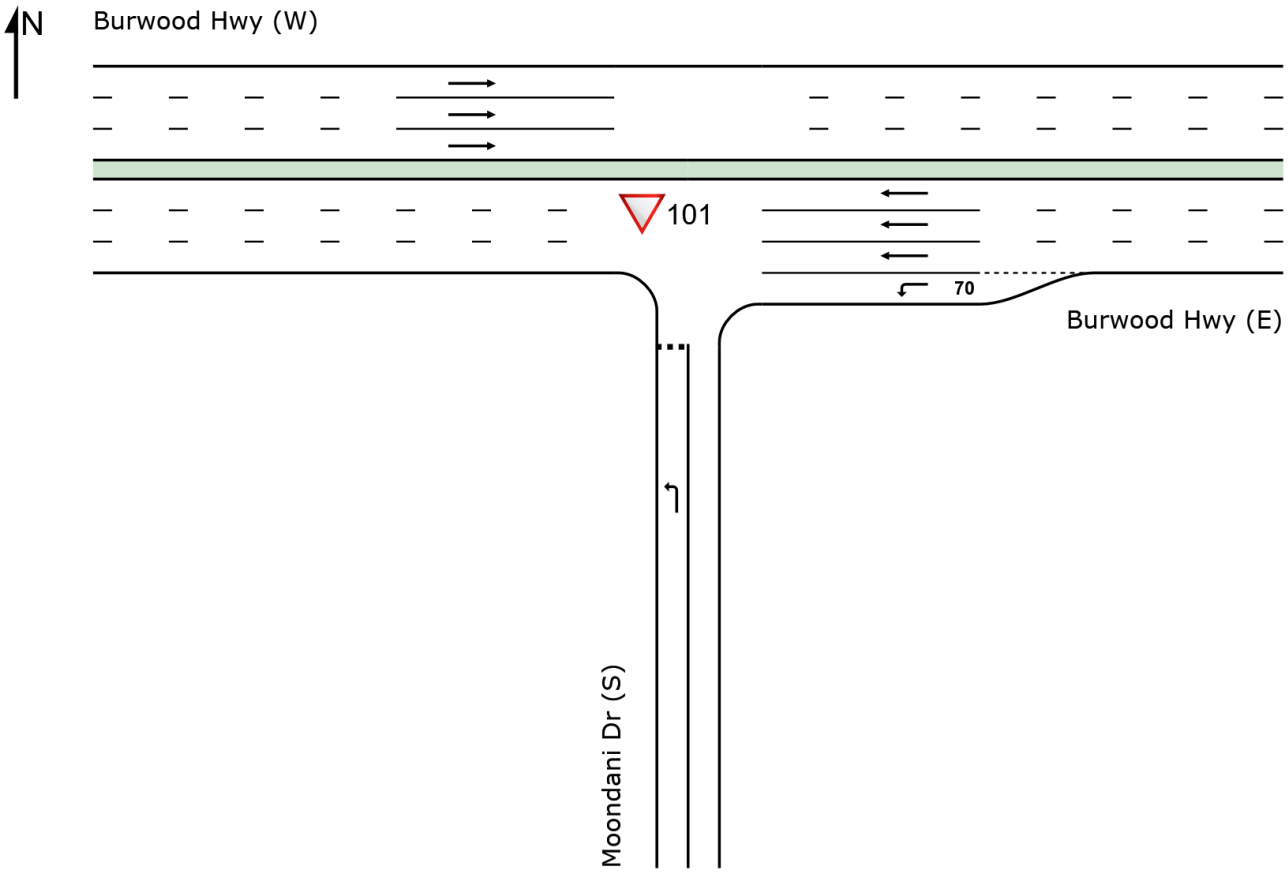
Site: 101 [4 PM Burwoood Hwy - Moondani Dr (Site Folder: Existing)]

Network: 2 [PM (Network Folder: Existing)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Moondani Dr (S)															
Lane 1	12	0.0	12	0.0	299	0.039	100	9.5	LOS A	0.0	0.3	Full	500	-50.0 N2	0.0
Approach	12	0.0	12	0.0		0.039		9.5	LOS A	0.0	0.3				
East: Burwood Hwy (E)															
Lane 1	2	50.0	2	50.0	1369	0.002	100	7.9	LOS A	0.0	0.0	Short	70	0.0	NA
Lane 2	595	1.4	595	1.4	1933	0.308	100	0.0	LOS A	0.0	0.0	Full	360	0.0	0.0
Lane 3	595	1.4	595	1.4	1932	0.308	100	0.0	LOS A	0.0	0.0	Full	360	0.0	0.0
Lane 4	589	2.9	589	2.9	1913	0.308	100	0.1	LOS A	0.0	0.0	Full	360	0.0	0.0
Approach	1781	2.0	1781	2.0		0.308		0.1	NA	0.0	0.0				
West: Burwood Hwy (W)															
Lane 1	992	1.4	992	1.4	1932	0.513	100	0.0	LOS A	0.0	0.0	Full	90	0.0	0.0

Lane 2	992	1.4	992	1.4	1932	0.513	100	0.0	LOS A	0.0	0.0	Full	90	0.0	0.0
Lane 3	986	2.4	986	2.4	1920	0.513	100	0.0	LOS A	0.0	0.0	Full	90	0.0	0.0
Approach	2969	1.7	2969	1.7		0.513		0.0	NA	0.0	0.0				
Intersection	4762	1.8	4762	1.8		0.513		0.1	NA	0.0	0.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N2 Capacity Adjustment specified by user.

USER REPORT FOR SITE

All Movement Classes

Project: 230118_300304377_vcat_scenario2

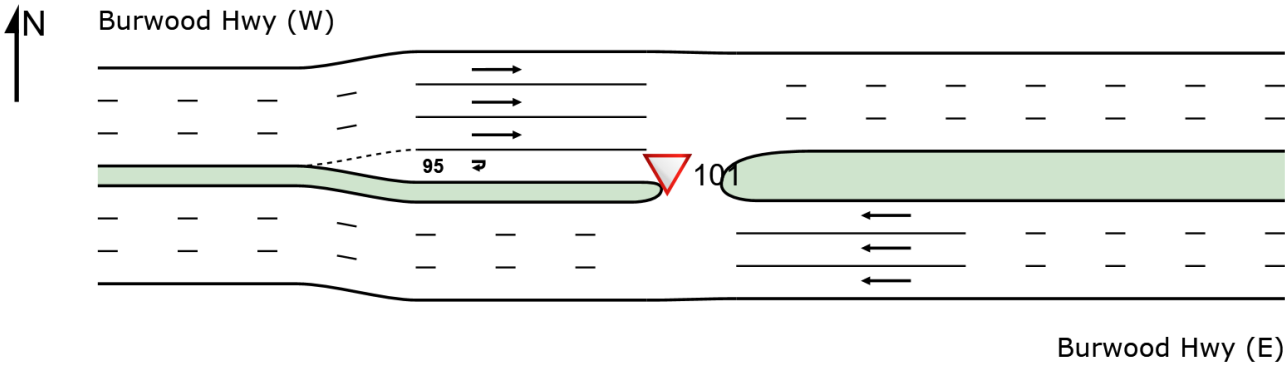
Template: Layout, Lane & Phase Summary

Site: 101 [5 PM East U-turn (Site Folder: Existing)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Burwood Hwy (E)													
Lane 1	591	1.4	1932	0.306	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	591	1.4	1932	0.306	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 3	585	2.9	1913	0.306	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	1768	1.9		0.306		0.1	NA	0.0	0.0				
West: Burwood Hwy (W)													
Lane 1	984	1.4	1932	0.509	100	0.2	LOS A	0.0	0.0	Full	360	0.0	0.0
Lane 2	984	1.4	1932	0.509	100	0.2	LOS A	0.0	0.0	Full	360	0.0	0.0
Lane 3	984	1.4	1932	0.509	100	0.2	LOS A	0.0	0.0	Full	360	0.0	0.0
Lane 4	7	0.0	161	0.046	100	39.9	LOS E	0.2	1.5	Short	95	55.0	NA
Approach	2960	1.4		0.509		0.3	NA	0.2	1.5				
Intersection	4728	1.6		0.509		0.2	NA	0.2	1.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 230118_300304377_vcat_scenario2

Template: Layout, Lane & Phase Summary

Site: 100 [0 AM Signalised U-turn - PD (Site Folder: Post Development)]

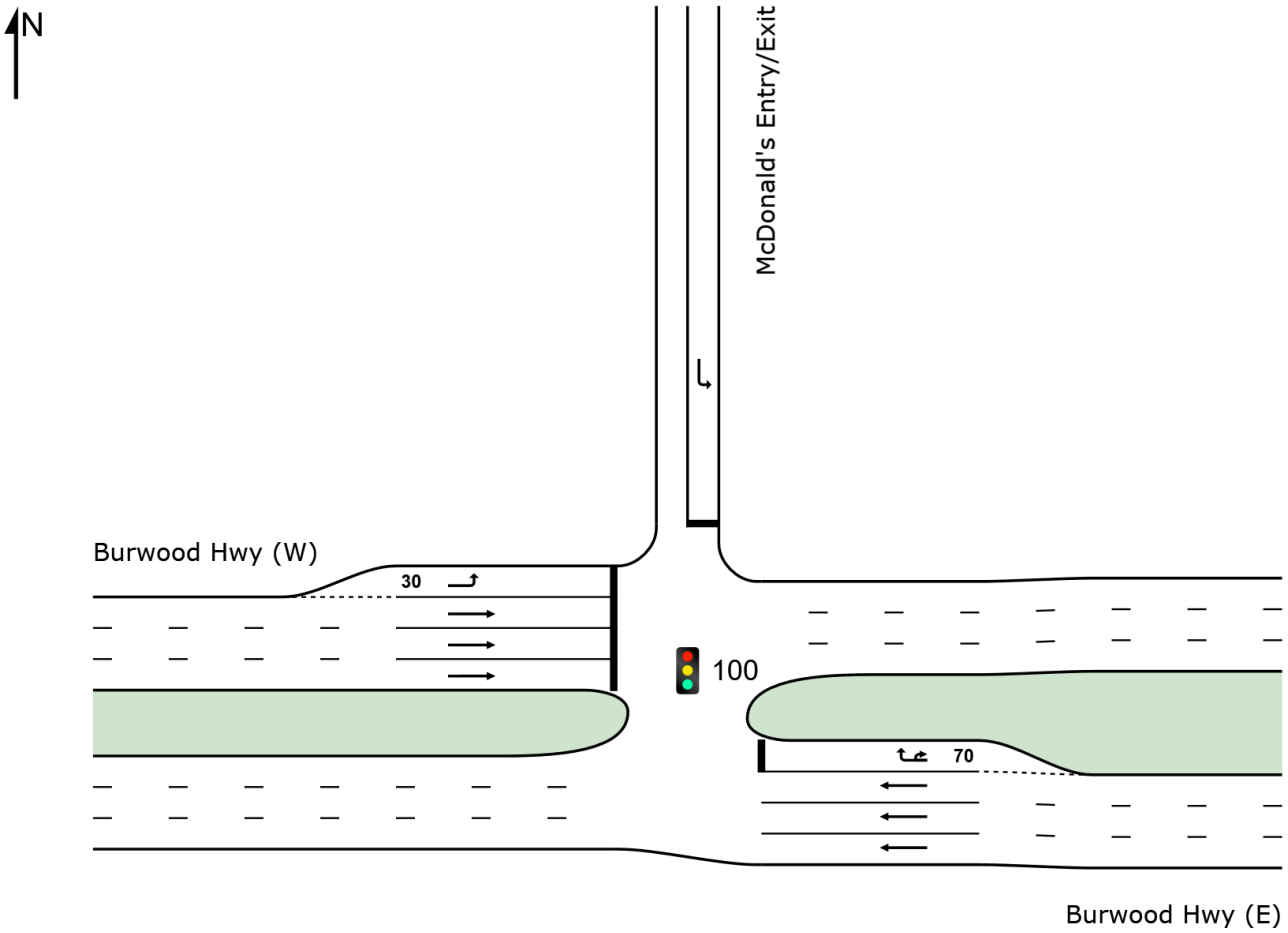
Network: 5 [AM - PD (Network Folder: Post Development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

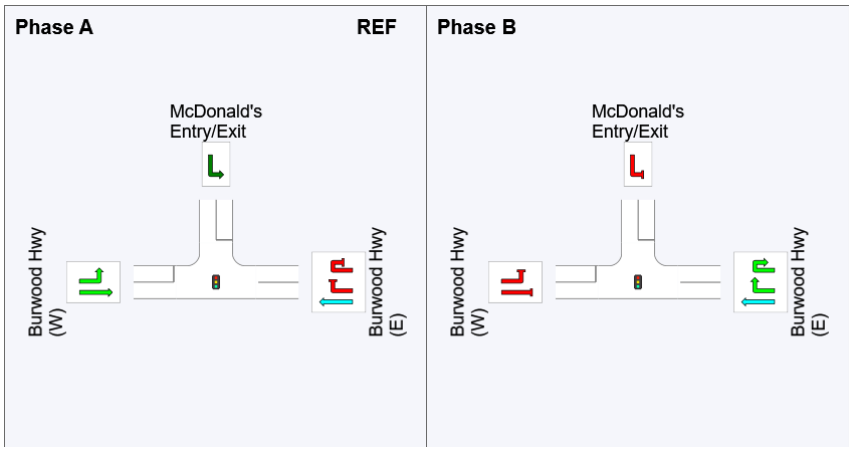
	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %

East: Burwood Hwy (E)															
Lane 1	960	2.9	960	2.9	1914	0.502	100	0.1	LOS A	0.0	0.0	Full	200	0.0	0.0
Lane 2	960	2.9	960	2.9	1914	0.502	100	0.1	LOS A	0.0	0.0	Full	200	0.0	0.0
Lane 3	954	3.8	954	3.8	1902	0.502	100	0.1	LOS A	0.0	0.0	Full	200	0.0	0.0
Lane 4	148	5.0	148	5.0	252	0.589	100	56.3	LOS E	5.2	38.1	Short	70	0.0	NA
Approach	3022	3.3	3022	3.3		0.589		2.8	LOS A	5.2	38.1				
North: McDonald's Entry/Exit															
Lane 1	74	1.4	74	1.4	145	0.508	100	27.5	LOS C	1.9	13.8	Full	500	0.0	0.0
Approach	74	1.4	74	1.4		0.508		27.5	LOS C	1.9	13.8				
West: Burwood Hwy (W)															
Lane 1	46	2.3	46	2.3	1364	0.034	100	10.0	LOS B	0.5	3.2	Short	30	0.0	NA
Lane 2	825	3.4	825	3.4	1367[1]	0.603	100	7.8	LOS A	14.0	100.9	Full	500	0.0	0.0
Lane 3	858	3.4	858	3.4	1423	0.603	100	8.0	LOS A	15.0	108.4	Full	500	0.0	0.0
Lane 4	101	12.3	101	12.3	1347	0.075	100	4.6	LOS A	1.0	8.0	Full	500	0.0	0.0
Approach	1831	3.9	1831	3.9		0.603		7.8	LOS A	15.0	108.4				
Intersection	4927	3.5	4927	3.5		0.603		5.0	LOS A	15.0	108.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	126	99
Green Time (sec)	97	21
Phase Time (sec)	103	27
Phase Split	79%	21%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 102 [1 AM Bus Interchange - PD (Site Folder: Post Development)]

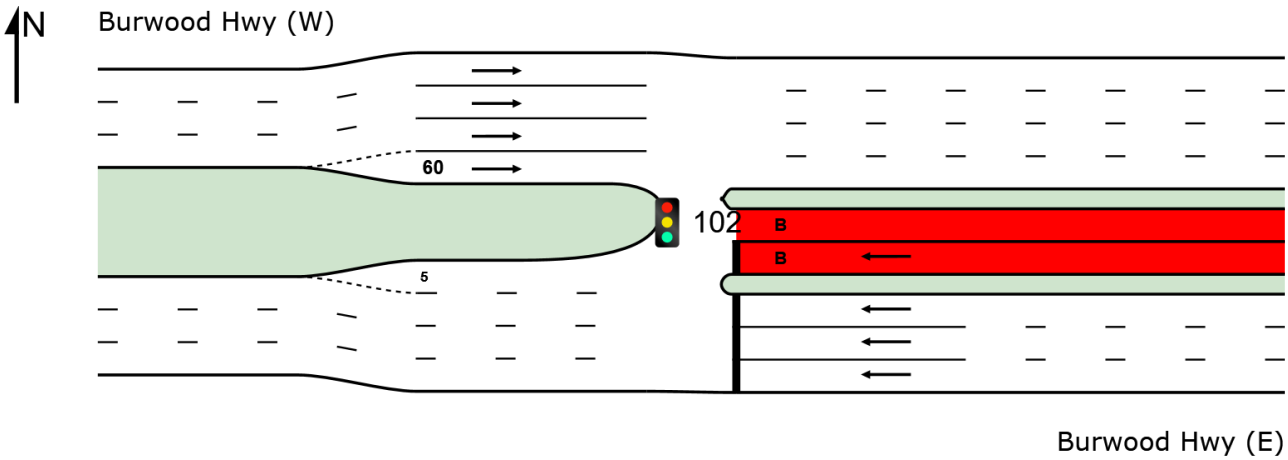
Network: 5 [AM - PD (Network Folder: Post Development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

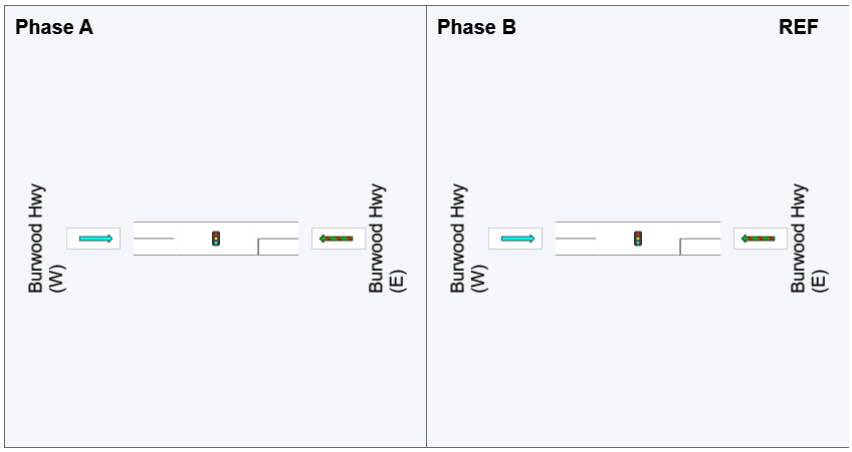
	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Burwood Hwy (E)															
Lane 1	1002	3.0	1002	3.0	1868	0.536	100	0.1	LOS A	1.6	11.5	Full	30	0.0	0.0
Lane 2	1002	3.0	1002	3.0	1868	0.536	100	0.1	LOS A	1.6	11.5	Full	30	0.0	0.0
Lane 3	1002	3.0	1002	3.0	1868	0.536	100	0.1	LOS A	1.6	11.5	Full	30	0.0	0.0
Lane 4 (B)	9	100.0	9	100.0	36	0.247	100	76.3	LOS E	0.4	4.9	Full	30	0.0	0.0
Approach	3015	3.3	3015	3.3		0.536		0.3	LOS A	1.6	11.5				
West: Burwood Hwy (W)															
Lane 1	607	3.6	607	3.6	1905	0.319	100	0.0	LOS A	14.3[N5]	103.1[N5]	Full	200	0.0	0.0
Lane 2	607	3.6	607	3.6	1905	0.319	100	0.0	LOS A	14.3[N5]	103.1[N5]	Full	200	0.0	0.0
Lane 3	607	3.6	607	3.6	1905	0.319	100	0.0	LOS A	15.3[N5]	110.4[N5]	Full	200	0.0	0.0
Lane 4	101	12.3	101	12.3	1806	0.056	100	0.1	LOS A	0.2[N5]	1.3[N5]	Short	60	0.0	NA
Approach	1924	4.1	1924	4.1		0.319		0.0	LOS A	15.3	110.4				
Intersection	4939	3.6	4939	3.6		0.536		0.2	LOS A	15.3	110.4				

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

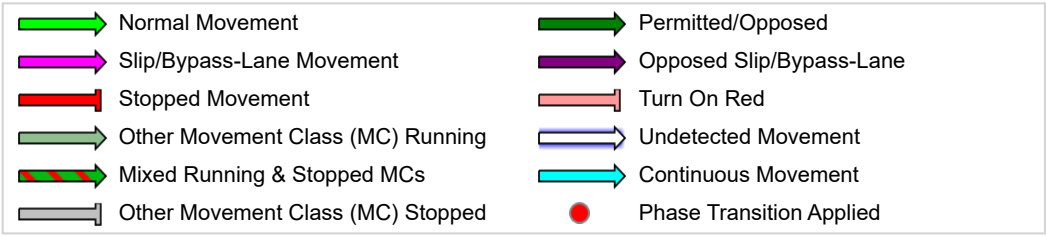
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N5 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows).

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	3	0
Green Time (sec)	124	1
Phase Time (sec)	126	4
Phase Split	97%	3%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 166W [2 AM Burwood Hwy - Hartland Rd - PD (Site Folder: Post Development)]

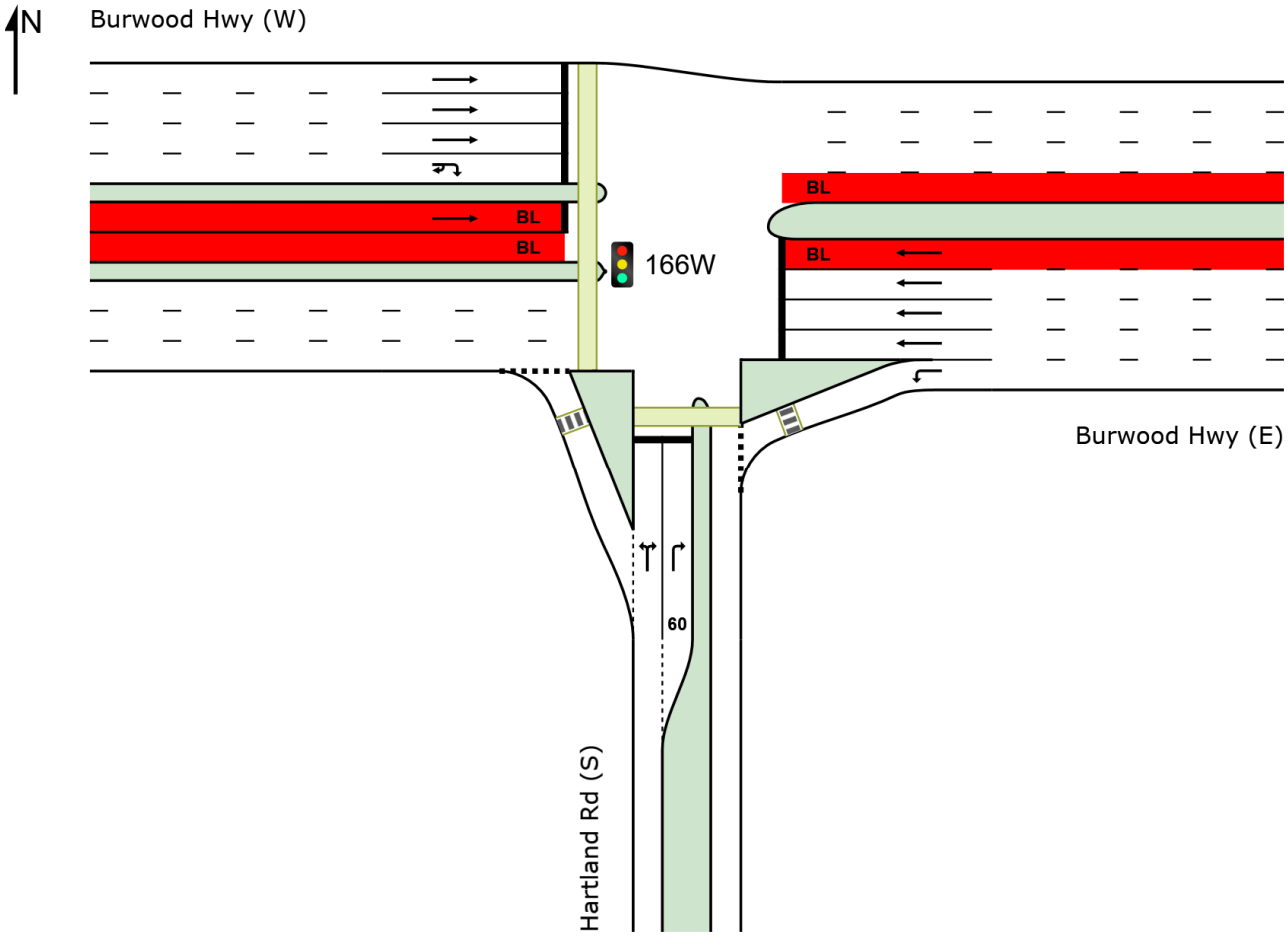
Network: 5 [AM - PD (Network Folder: Post Development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [166]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase B3
Input Phase Sequence: A, B3, C, E1, E2*, E3*
Output Phase Sequence: A, B3, C, E1, E3*
(* Variable Phase)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance (CCG)

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
Site: 166W [2 AM Burwood Hwy - Hartland Rd - PD]															
South: Hartland Rd (S)															
Lane 1	252	0.0	252	0.0	274	0.921	100	92.0	LOS F	12.0	84.4	Full	500	-42.4[N3]	0.0

Lane 2	210	0.4	210	0.4	228	0.921	100	86.4	LOS F	10.5	73.6	Short	60	-50.0[N3]	NA
Approach	462	0.2	462	0.2		0.921		89.5	LOS F	12.0	84.4				
East: Burwood Hwy (E)															
Lane 1	376	1.4	376	1.4	1369	0.274	100	3.4	LOS A	0.4	2.6	Full	25	0.0	0.0
Lane 2	966	3.1	966	3.1	1015	0.952	100	16.3	LOS B	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 3	966	3.1	966	3.1	1015	0.952	100	18.7	LOS B	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 4	966	3.1	966	3.1	1015	0.952	100	26.3	LOS C	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 5 (BL)	9	100.0	9	100.0	691	0.013	100	0.7	LOS A	0.0	0.1	Full	25	0.0	0.0
Approach	3284	3.2	3284	3.2		0.952		18.4	LOS B	3.5	25.0				
West: Burwood Hwy (W)															
Lane 1	607	3.6	607	3.6	850	0.715	100	31.2	LOS C	4.2[N6]	30.0[N6]	Full	30	0.0[N2]	50.0
Lane 2	607	3.6	607	3.6	850	0.715	100	31.2	LOS C	4.2[N4]	30.0[N4]	Full	30	0.0[N2]	50.0
Lane 3	607	3.6	607	3.6	850	0.715	100	32.6	LOS C	4.2[N6]	30.0[N6]	Full	30	0.0[N2]	50.0
Lane 4	92	3.3	92	3.3	96	0.953	100	90.4	LOS F	4.2[N4]	30.0[N4]	Full	30	0.0	50.0
Lane 5 (BL)	9	100.0	9	100.0	45	0.208	100	72.3	LOS E	0.4	5.2	Full	30	0.0	0.0
Approach	1924	4.1	1924	4.1		0.953		34.6	LOS C	4.2	30.0				
Intersection	5669	3.2	5669	3.2		0.953		29.7	LOS C	12.0	84.4				
Site: 166E [3 AM Burwood Hwy - Hanover Rd - PD]															
East: Burwood Hwy (E)															
Lane 1	210	0.5	210	0.5	942	0.223	100	19.9	LOS B	4.6	32.1	Full	35	0.0	42.0
Lane 2	894	3.2	894	3.2	925	0.966	100	66.4	LOS E	4.9[N6]	35.0[N6]	Full	35	0.0	50.0
Lane 3	894	3.2	894	3.2	925	0.966	100	66.4	LOS E	4.9[N6]	35.0[N6]	Full	35	0.0	50.0
Lane 4	894	3.2	894	3.2	925	0.966	100	66.4	LOS E	4.9[N6]	35.0[N6]	Full	35	0.0	50.0
Lane 5 (BL)	9	100.0	9	100.0	691	0.013	100	11.9	LOS B	0.1	1.9	Full	35	0.0	0.0
Lane 6	143	5.1	143	5.1	178	0.803	100	71.6	LOS E	4.8[N4]	35.0[N4]	Full	35	0.0	50.0
Approach	3045	3.4	3045	3.4		0.966		63.3	LOS E	4.9	35.0				
North: Hanover Rd (N)															
Lane 1	279	3.7	279	3.7	362	0.771	100	68.2	LOS E	10.3	74.4	Short	115	-16.4[N2]	NA
Lane 2	174	1.4	174	1.4	226	0.771	100	62.1	LOS E	7.0	49.7	Full	500	-50.0[N3]	0.0
Approach	454	2.8	454	2.8		0.771		65.9	LOS E	10.3	74.4				
West: Burwood Hwy (W)															
Lane 1	663	2.2	663	2.2	802	0.827	100	23.0	LOS C	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 2	777	3.3	777	3.3	940	0.827	100	2.8	LOS A	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 3	777	3.3	777	3.3	940	0.827	100	15.8	LOS B	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 4 (BL)	9	100.0	9	100.0	45	0.208	100	1.5	LOS A	0.0	0.1	Full	25	0.0	0.0
Approach	2227	3.4	2227	3.4		0.827		13.3	LOS B	3.5	25.0				
Intersection	5726	3.4	5726	3.4		0.966		44.1	LOS D	10.3	74.4				

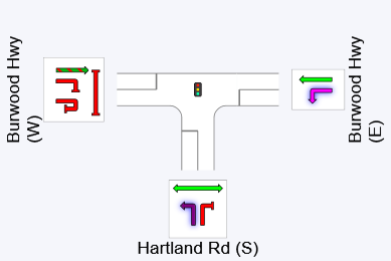
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

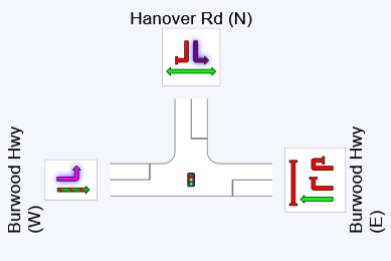
N2 Capacity Adjustment specified by user.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.
N4 Average back of queue has been restricted to the available queue storage space.

N6 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows) but average back of queue has been restricted to the available queue storage space.

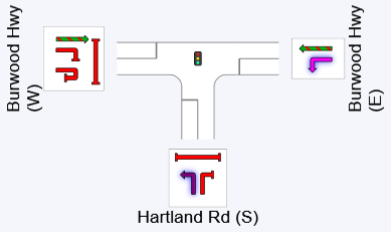
Output Phase Sequence (CCG)

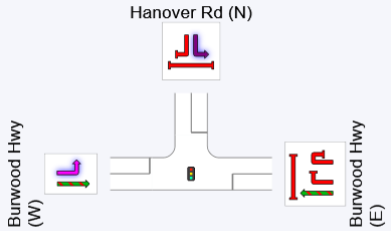
Phase A



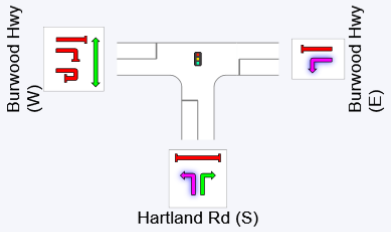


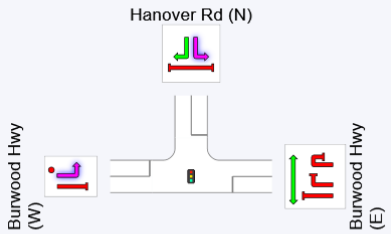
Phase B3 **REF**

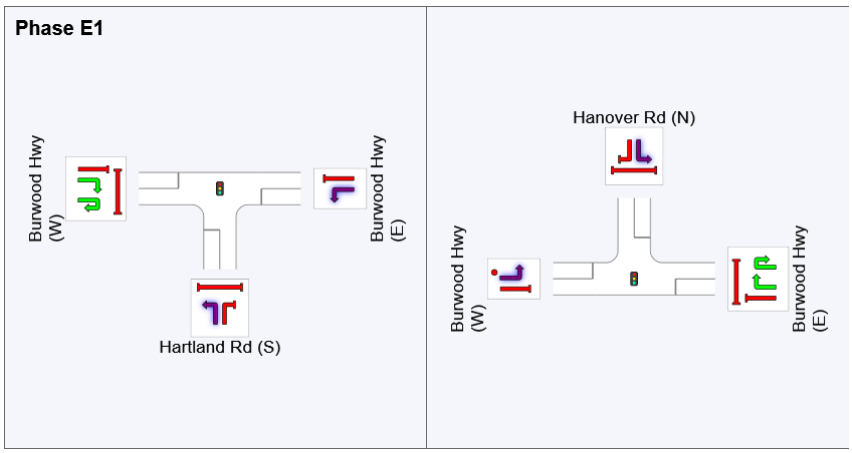


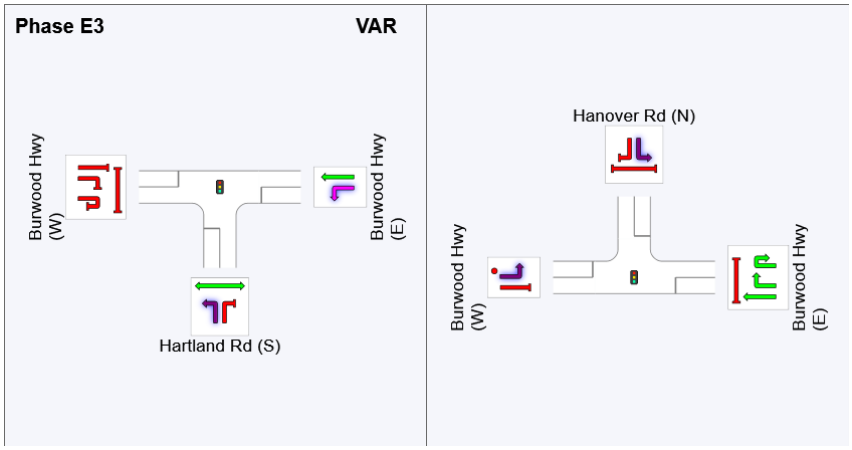


Phase C

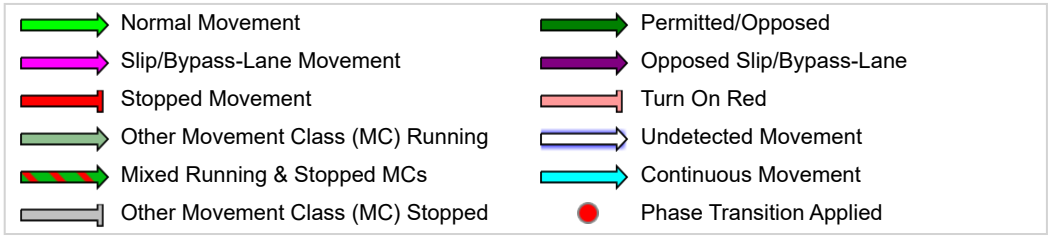








REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary (CCG)

Phase	A	B3	C	E1	E3
Phase Change Time (sec)	59	0	4	40	54
Green Time (sec)	64	2	32	8	***
Phase Time (sec)	66	6	38	15	5
Phase Split	51%	5%	29%	12%	4%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified. If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

Site: 166E [3 AM Burwood Hwy - Hanover Rd - PD (Site Folder: Post Development)]

Network: 5 [AM - PD (Network Folder: Post Development)]

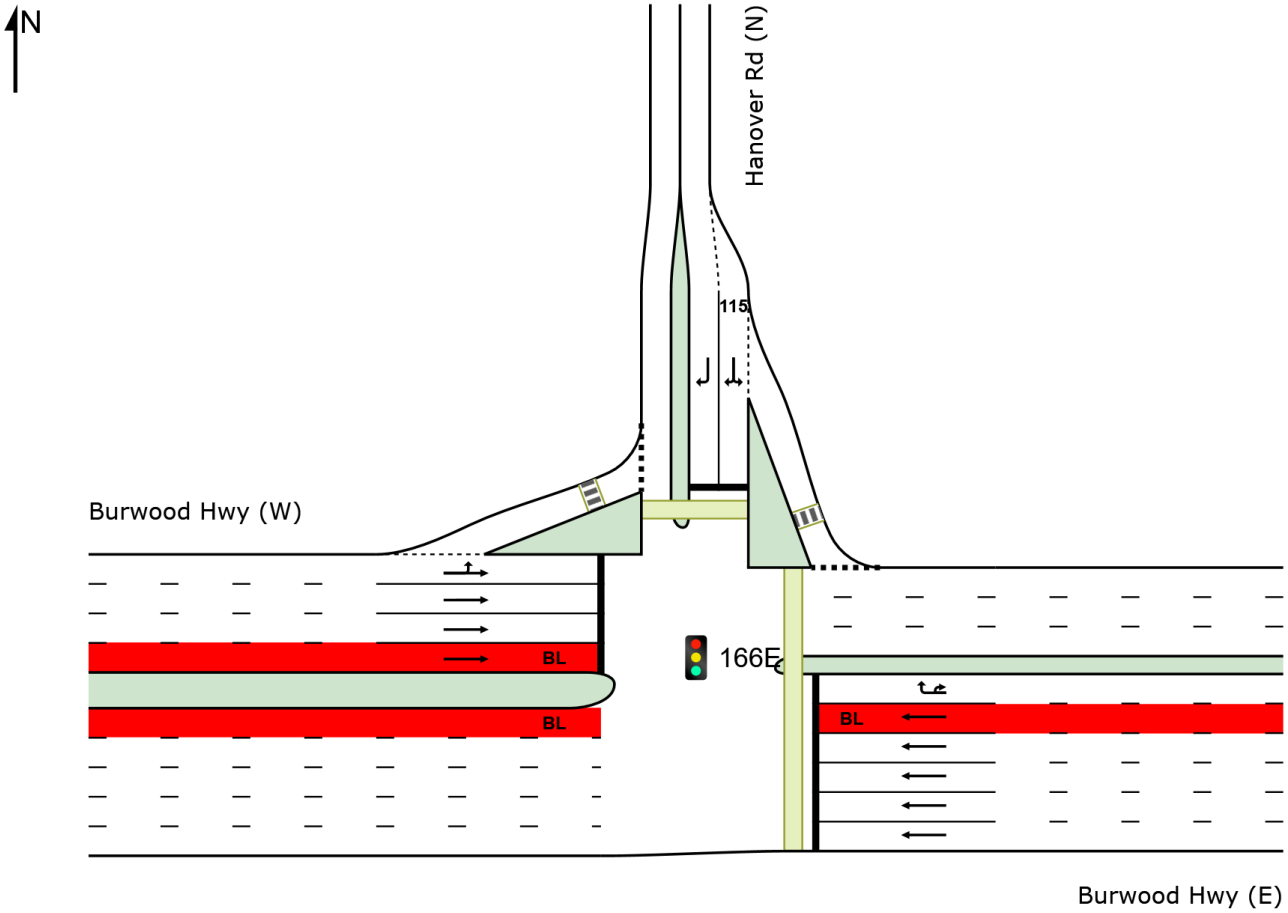
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [166]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase B3
Input Phase Sequence: A, B3, C, E1, E2*, E3*
Output Phase Sequence: A, B3, C, E1, E3*
(* Variable Phase)

Some CCG output elements have been omitted as they have already been included under other Sites belonging to the same CCG.

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



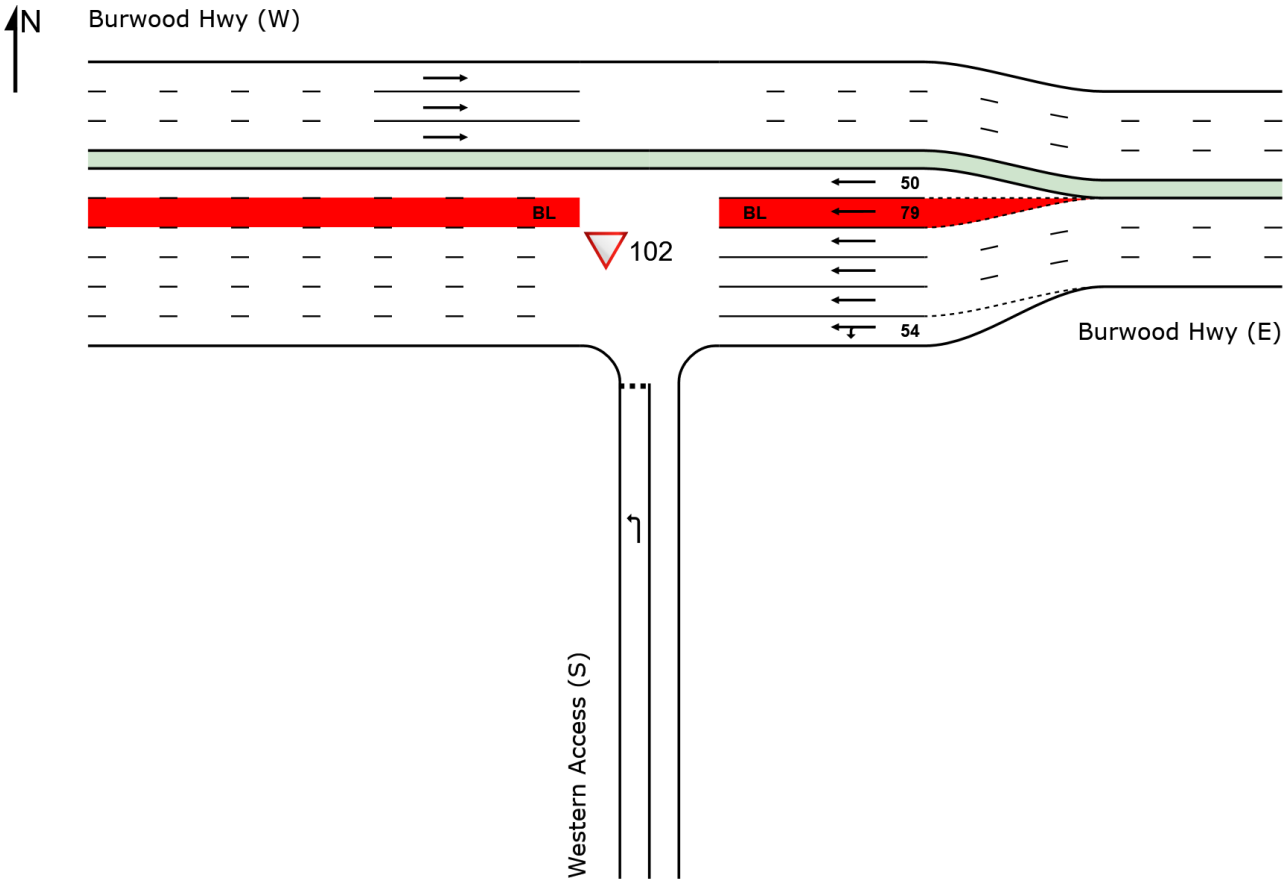
Site: 102 [4A AM Burwoood Hwy - Western Access - PD (Site Folder: Post Development)]

Network: 5 [AM - PD (Network Folder: Post Development)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Western Access (S)															
Lane 1	44	0.0	44	0.0	944	0.047	100	6.0	LOS A	1.2[N5]	8.5[N5]	Full	500	0.0	0.0
Approach	44	0.0	44	0.0		0.047		6.0	LOS A	1.2	8.5				
East: Burwood Hwy (E)															
Lane 1	219	0.9	219	0.9	1934	0.113	31[5]	0.3	LOS A	0.0	0.0	Short	54	0.0	NA
Lane 2	694	3.4	694	3.4	1908	0.364	100	0.0	LOS A	11.7[N6]	84.0[N6]	Full	84	0.0	50.0[N6]
Lane 3	694	3.4	694	3.4	1908	0.364	100	0.0	LOS A	11.7[N6]	84.0[N6]	Full	84	0.0	50.0[N6]
Lane 4	694	3.4	694	3.4	1908	0.364	100	0.0	LOS A	11.7[N6]	84.0[N6]	Full	84	0.0	50.0[N6]
Lane 5 (BL)	9	100.0	9	100.0	1182	0.008	100	0.0	LOS A	0.0	0.0	Short	79	0.0	NA
Lane 6	694	3.4	694	3.4	1908	0.364	100	0.0	LOS A	1.1[N5]	8.3[N5]	Short	50	0.0	NA

Approach	3004	3.5	3004	3.5		0.364		0.0	NA	11.7	84.0				
West: Burwood Hwy (W)															
Lane 1	692	3.5	692	3.5	1907	0.363	100	0.0	LOS A	0.0	0.0	Full	35	0.0	0.0
Lane 2	692	3.5	692	3.5	1907	0.363	100	0.0	LOS A	0.0	0.0	Full	35	0.0	0.0
Lane 3	686	4.8	686	4.8	1891	0.363	100	0.0	LOS A	0.0	0.0	Full	35	0.0	0.0
Approach	2071	3.9	2071	3.9		0.363		0.0	NA	0.0	0.0				
Intersection	5119	3.6	5119	3.6		0.364		0.1	NA	11.7	84.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
N5 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows).
N6 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows) but average back of queue has been restricted to the available queue storage space.

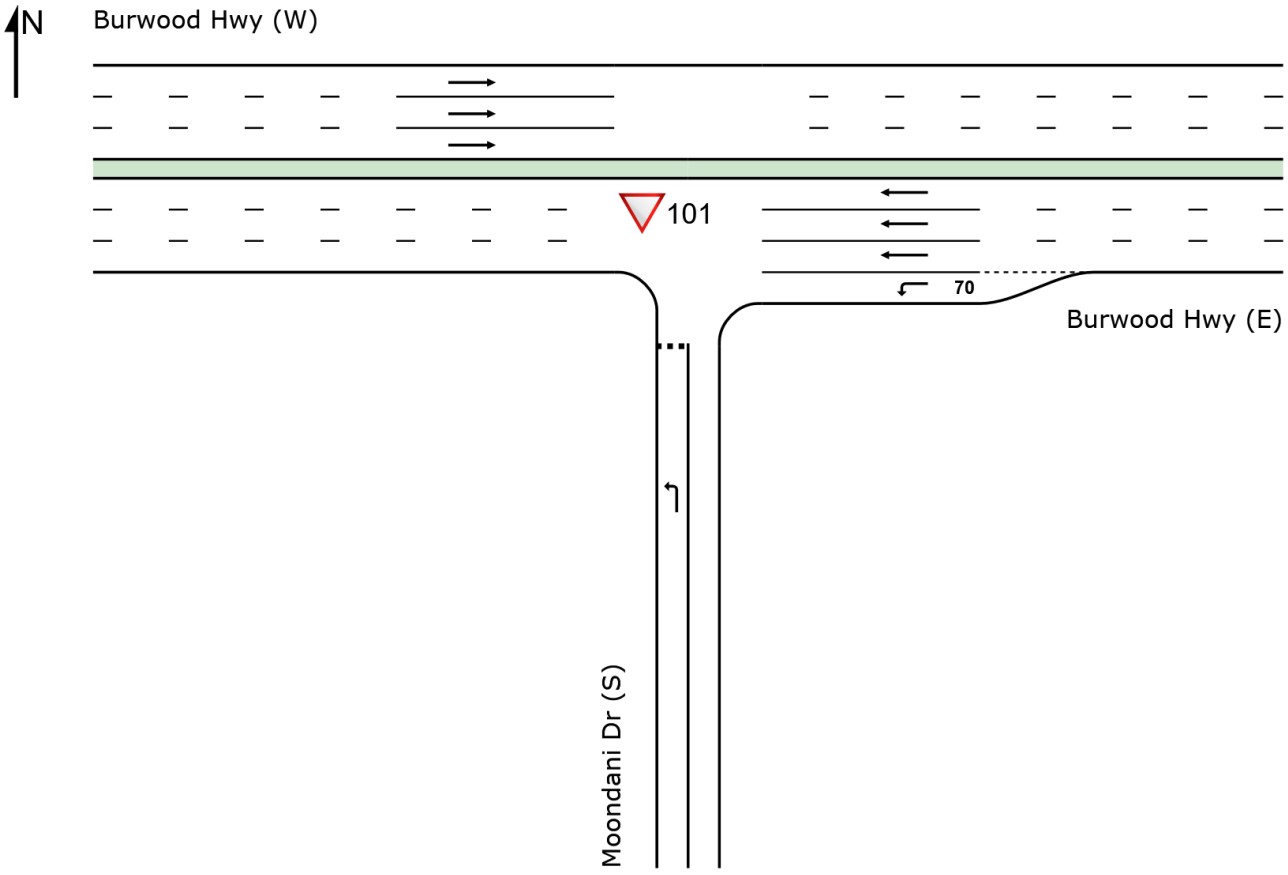
Site: 101 [4 AM Burwoood Hwy - Moondani Dr - PD (Site Folder: Post Development)]

Network: 5 [AM - PD (Network Folder: Post Development)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Moondani Dr (S)															
Lane 1	109	0.0	109	0.0	196	0.559	100	31.1	LOS D	2.5[N5]	17.5[N5]	Full	500	-26.0[N2]	0.0
Approach	109	0.0	109	0.0		0.559		31.1	LOS D	2.5	17.5				
East: Burwood Hwy (E)															
Lane 1	46	2.3	46	2.3	1828	0.025	100	7.0	LOS A	0.0	0.0	Short	70	0.0	NA
Lane 2	971	2.9	971	2.9	1915	0.507	100	0.1	LOS A	21.6[N5]	155.1[N5]	Full	360	0.0	1.3
Lane 3	967	3.5	967	3.5	1907	0.507	100	0.1	LOS A	22.3[N5]	161.1[N5]	Full	360	0.0	3.4
Lane 4	961	4.4	961	4.4	1896	0.507	100	0.1	LOS A	23.4[N5]	170.3[N5]	Full	360	0.0	4.4
Approach	2945	3.6	2945	3.6		0.507		0.2	NA	23.4	170.3				
West: Burwood Hwy (W)															
Lane 1	692	3.5	692	3.5	1907	0.363	100	0.0	LOS A	0.0	0.0	Full	84	0.0	0.0

Lane 2	692	3.5	692	3.5	1907	0.363	100	0.0	LOS A	0.0	0.0	Full	84	0.0	0.0
Lane 3	686	4.8	686	4.8	1891	0.363	100	0.0	LOS A	0.0	0.0	Full	84	0.0	0.0
Approach	2071	3.9	2071	3.9		0.363		0.0	NA	0.0	0.0				
Intersection	5125	3.6	5125	3.6		0.559		0.8	NA	23.4	170.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N2 Capacity Adjustment specified by user.
N5 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows).

USER REPORT FOR SITE

All Movement Classes

Project: 230118_300304377_vcat_scenario2

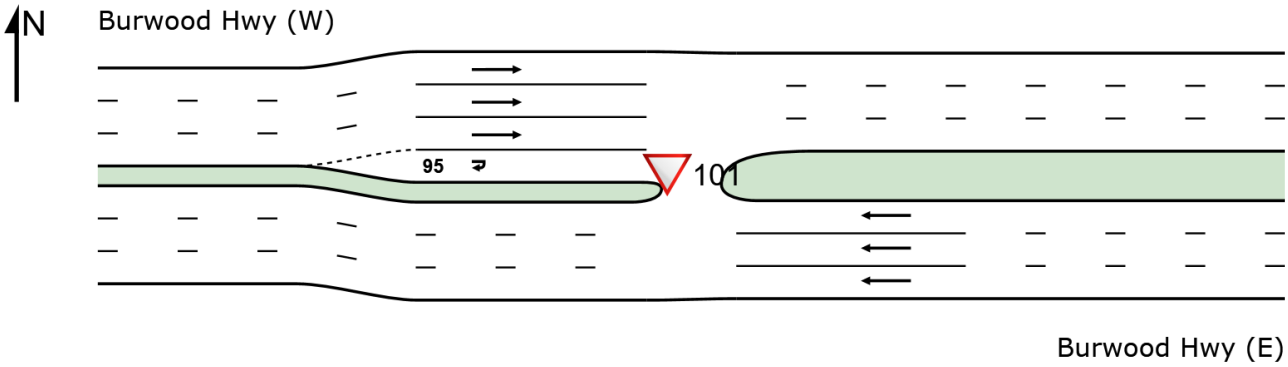
Template: Layout, Lane & Phase Summary

Site: 101 [5 AM East U-turn - PD (Site Folder: Post Development)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Burwood Hwy (E)													
Lane 1	974	2.9	1914	0.509	100	0.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	971	3.5	1907	0.509	100	0.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 3	965	4.4	1896	0.509	100	0.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	2910	3.6		0.509		0.2	NA	0.0	0.0				
West: Burwood Hwy (W)													
Lane 1	680	3.5	1906	0.356	100	0.1	LOS A	0.0	0.0	Full	360	0.0	0.0
Lane 2	680	3.5	1906	0.356	100	0.1	LOS A	0.0	0.0	Full	360	0.0	0.0
Lane 3	680	3.5	1906	0.356	100	0.1	LOS A	0.0	0.0	Full	360	0.0	0.0
Lane 4	22	0.0	96	0.230	100	569.6	LOS F	8.7	60.9	Short	95	1500.0	NA
Approach	2061	3.5		0.356		6.2	NA	8.7	60.9				
Intersection	4971	3.5		0.509		2.7	NA	8.7	60.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 230118_300304377_vcat_scenario2

Template: Layout, Lane & Phase Summary

Site: 100 [0 PM Signalised U-turn - PD (Site Folder: Post Development)]

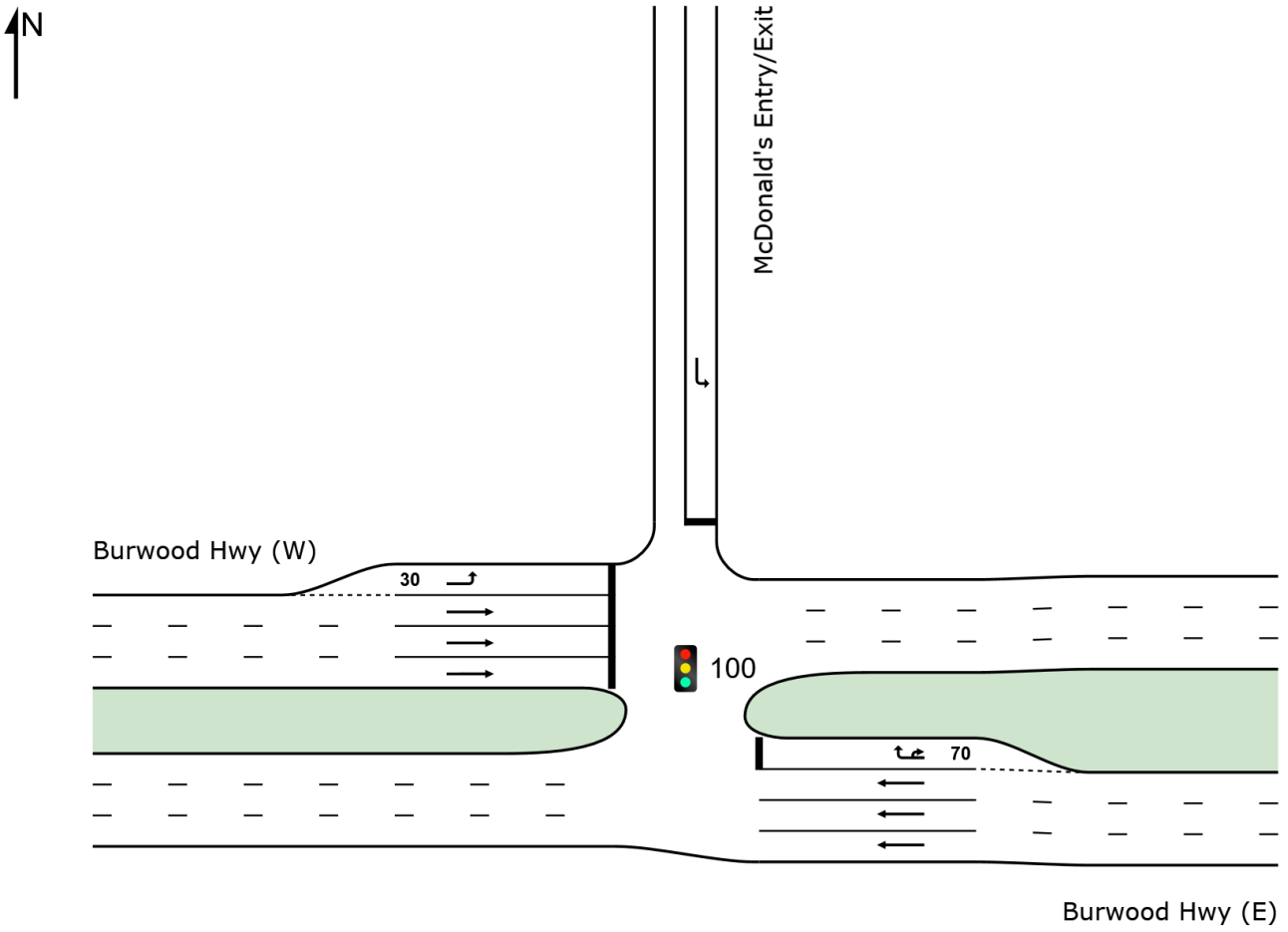
Network: 6 [PM - PD (Network Folder: Post Development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

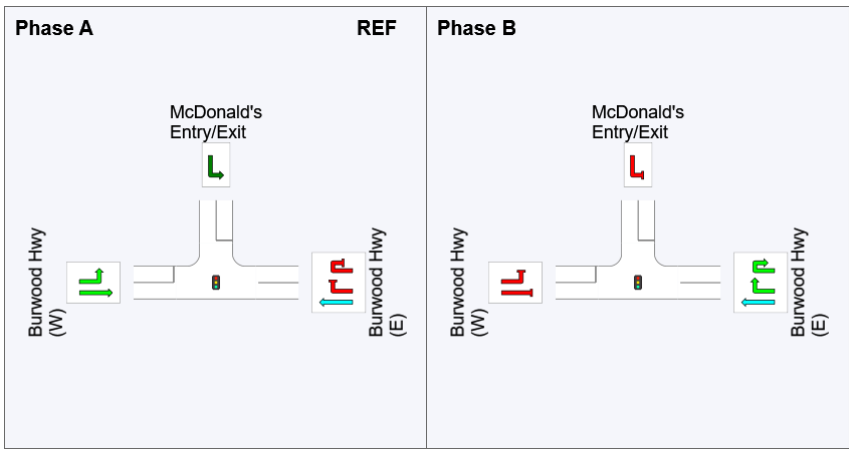
	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %

East: Burwood Hwy (E)															
Lane 1	575	0.9	575	0.9	1938	0.297	100	0.0	LOS A	0.0	0.0	Full	200	0.0	0.0
Lane 2	575	0.9	575	0.9	1938	0.297	100	0.0	LOS A	0.0	0.0	Full	200	0.0	0.0
Lane 3	569	2.5	569	2.5	1919	0.297	100	0.0	LOS A	0.0	0.0	Full	200	0.0	0.0
Lane 4	102	6.2	102	6.2	112	0.912	100	86.5	LOS F	4.7	34.7	Short	70	-32.2 N7	NA
Approach	1822	1.7	1822	1.7		0.912		4.9	LOS A	4.7	34.7				
North: McDonald's Entry/Exit															
Lane 1	69	0.0	69	0.0	73	0.951	100	123.9	LOS F	4.4	31.0	Full	500	0.0 N2	0.0
Approach	69	0.0	69	0.0		0.951		123.9	LOS F	4.4	31.0				
West: Burwood Hwy (W)															
Lane 1	43	0.0	43	0.0	1486	0.029	100	8.3	LOS A	0.3	2.3	Short	30	0.0	NA
Lane 2	1328	1.4	1328	1.4	1502 1	0.884	100	8.7	LOS A	32.3	228.4	Full	500	0.0 N2	0.0
Lane 3	1367	1.4	1367	1.4	1546	0.884	100	9.3	LOS A	35.5	251.5	Full	500	0.0 N2	0.0
Lane 4	96	9.8	96	9.8	1466	0.066	100	2.9	LOS A	8.5 N5	64.4 N5	Full	500	0.0 N2	0.0
Approach	2835	1.6	2835	1.6		0.884		8.8	LOS A	35.5	251.5				
Intersection	4727	1.6	4727	1.6		0.951		9.0	LOS A	35.5	251.5				

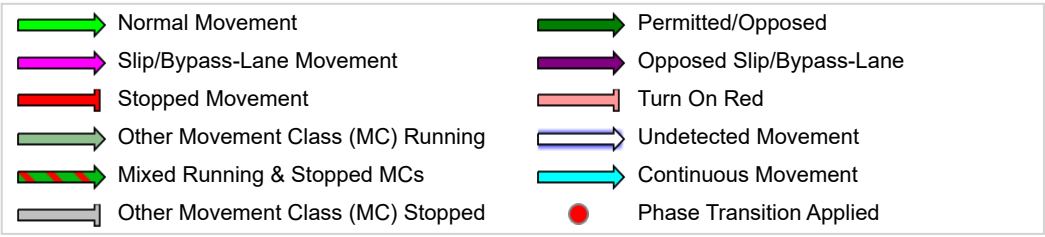
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
N2 Capacity Adjustment specified by user.
N5 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows).
N7 The capacity reduction has been determined from the queue blockage probability of a Site further downstream due to intermediate continuous lanes.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	126	106
Green Time (sec)	104	14
Phase Time (sec)	110	20
Phase Split	85%	15%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 102 [1 PM Bus Interchange - PD (Site Folder: Post Development)]

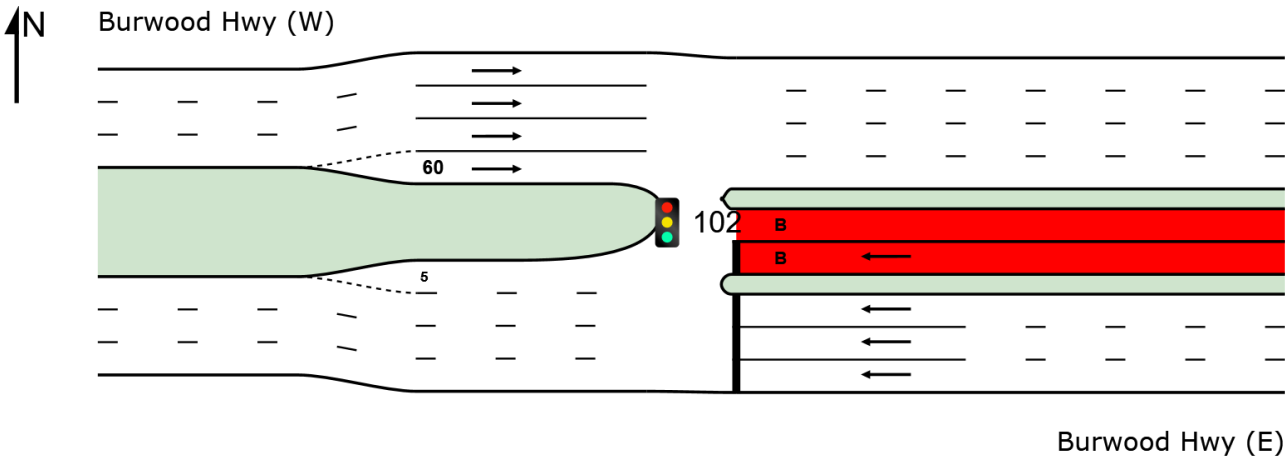
Network: 6 [PM - PD (Network Folder: Post Development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Leading Right Turn
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

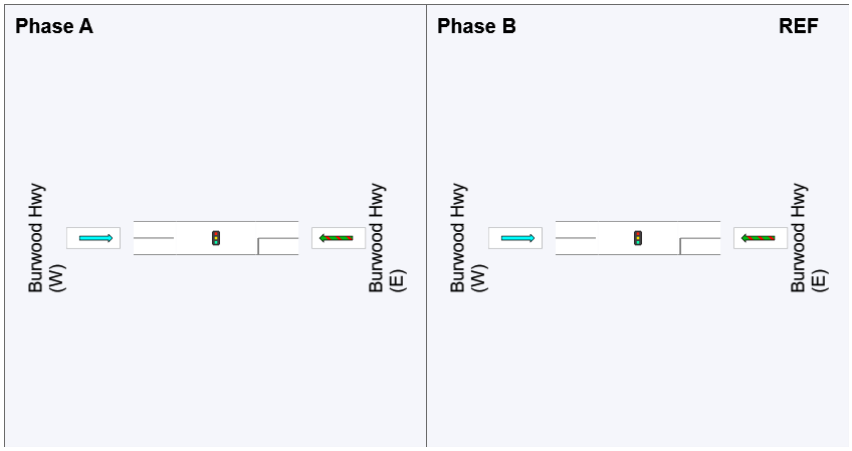
	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Burwood Hwy (E)															
Lane 1	603	1.2	603	1.2	1890	0.319	100	0.0	LOS A	0.7	4.7	Full	30	0.0	0.0
Lane 2	603	1.2	603	1.2	1890	0.319	100	0.0	LOS A	0.7	4.7	Full	30	0.0	0.0
Lane 3	603	1.2	603	1.2	1890	0.319	100	0.0	LOS A	0.7	4.7	Full	30	0.0	0.0
Lane 4 (B)	9	100.0	9	100.0	36	0.247	100	74.7	LOS E	0.4	4.9	Full	30	0.0	0.0
Approach	1817	1.7	1817	1.7		0.319		0.4	LOS A	0.7	4.9				
West: Burwood Hwy (W)															
Lane 1	937	1.3	937	1.3	1934	0.485	100	0.1	LOS A	28.3[N6]	200.0[N6]	Full	200	0.0	50.0[N6]
Lane 2	937	1.3	937	1.3	1934	0.485	100	0.1	LOS A	28.3[N6]	200.0[N6]	Full	200	0.0	50.0[N6]
Lane 3	937	1.3	937	1.3	1934	0.485	100	0.1	LOS A	28.3[N6]	200.0[N6]	Full	200	0.0	50.0[N6]
Lane 4	101	9.4	101	9.4	1144	0.088	100	0.1	LOS A	0.0	0.0	Short	60	-37.8[N3]	NA
Approach	2912	1.6	2912	1.6		0.485		0.1	LOS A	28.3	200.0				
Intersection	4729	1.6	4729	1.6		0.485		0.2	LOS A	28.3	200.0				

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

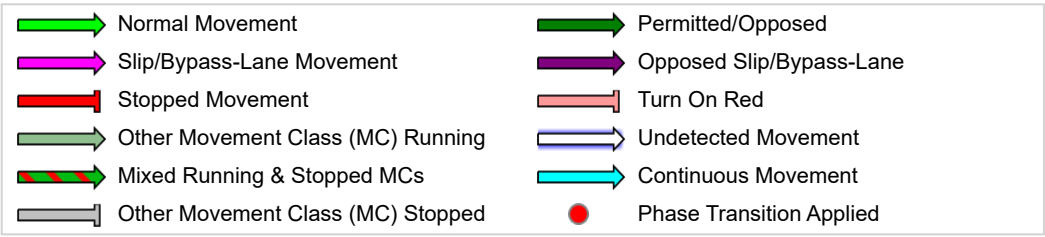
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N3 Capacity Adjustment due to downstream lane blockage determined by the program.
N6 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows) but average back of queue has been restricted to the available queue storage space.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	3	0
Green Time (sec)	124	1
Phase Time (sec)	126	4
Phase Split	97%	3%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 166W [2 PM Burwood Hwy - Hartland Rd - PD (Site Folder: Post Development)]

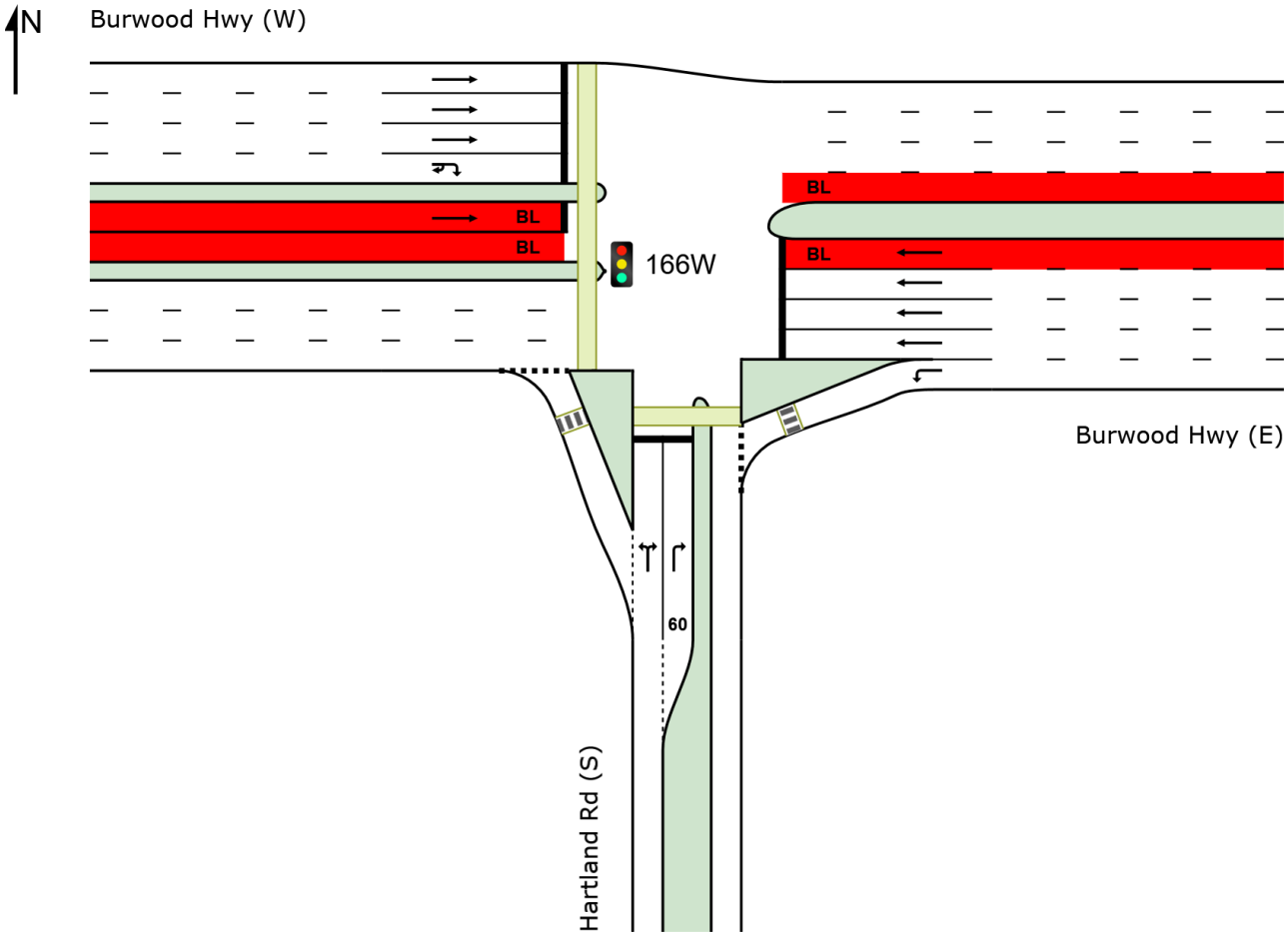
Network: 6 [PM - PD (Network Folder: Post Development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [166]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase B3
Input Phase Sequence: A, B3, C, E1, E2*, E3*
Output Phase Sequence: A, B3, C, E1
(* Variable Phase)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance (CCG)

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
Site: 166W [2 PM Burwood Hwy - Hartland Rd - PD]															
South: Hartland Rd (S)															
Lane 1	170	0.1	170	0.1	193	0.885	100	79.1	LOS E	7.7	53.9	Full	500	-44.1[N3]	0.0

Lane 2	150	1.9	150	1.9	169	0.885	100	81.5	LOS F	7.2[N5]	51.5[N5]	Short	60	-50.0[N3]	NA
Approach	320	1.0	320	1.0		0.885		80.2	LOS F	7.7	53.9				
East: Burwood Hwy (E)															
Lane 1	242	1.7	242	1.7	1643	0.147	100	3.5	LOS A	0.3	2.1	Full	25	0.0	0.0
Lane 2	580	1.3	580	1.3	1146	0.506	100	0.8	LOS A	0.9	6.2	Full	25	0.0	0.0
Lane 3	580	1.3	580	1.3	1146	0.506	100	0.9	LOS A	1.0	7.3	Full	25	0.0	0.0
Lane 4	580	1.3	580	1.3	1146	0.506	100	8.1	LOS A	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 5 (BL)	9	100.0	9	100.0	764	0.012	100	0.6	LOS A	0.0	0.1	Full	25	0.0	0.0
Approach	1991	1.8	1991	1.8		0.506		3.3	LOS A	3.5	25.0				
West: Burwood Hwy (W)															
Lane 1	937	1.3	937	1.3	1056	0.887	100	29.2	LOS C	4.2[N6]	30.0[N6]	Full	30	0.0[N2]	50.0
Lane 2	937	1.3	937	1.3	1056	0.887	100	29.8	LOS C	4.2[N6]	30.0[N6]	Full	30	0.0[N2]	50.0
Lane 3	937	1.3	937	1.3	1056	0.887	100	60.9	LOS E	4.2[N6]	30.0[N6]	Full	30	0.0[N2]	50.0
Lane 4	92	0.0	92	0.0	114	0.805	100	75.2	LOS E	3.9	27.0	Full	30	0.0	40.1
Lane 5 (BL)	9	100.0	9	100.0	45	0.208	100	72.3	LOS E	0.4	5.2	Full	30	0.0	0.0
Approach	2912	1.6	2912	1.6		0.887		41.2	LOS D	4.2	30.0				
Intersection	5223	1.6	5223	1.6		0.887		29.1	LOS C	7.7	53.9				
Site: 166E [3 PM Burwood Hwy - Hanover Rd - PD]															
East: Burwood Hwy (E)															
Lane 1	93	1.1	93	1.1	1057	0.088	100	14.2	LOS B	1.6	11.6	Full	35	0.0	0.0
Lane 2	543	1.3	543	1.3	1056	0.515	100	19.7	LOS B	4.9[N4]	35.0[N4]	Full	35	0.0	50.0
Lane 3	543	1.3	543	1.3	1056	0.515	100	19.7	LOS B	4.9[N4]	35.0[N4]	Full	35	0.0	50.0
Lane 4	543	1.3	543	1.3	1056	0.515	100	19.7	LOS B	4.9[N4]	35.0[N4]	Full	35	0.0[N2]	50.0
Lane 5 (BL)	9	100.0	9	100.0	764	0.012	100	8.6	LOS A	0.1	1.6	Full	35	0.0	0.0
Lane 6	116	1.8	116	1.8	122	0.948	100	90.8	LOS F	4.9[N4]	35.0[N4]	Full	35	0.0	50.0
Approach	1847	1.8	1847	1.8		0.948		23.8	LOS C	4.9	35.0				
North: Hanover Rd (N)															
Lane 1	316	1.7	316	1.7	363	0.869	100	72.9	LOS E	11.8	83.7	Short	115	0.0	NA
Lane 2	116	0.0	116	0.0	343	0.338	39[5]	55.6	LOS E	3.9	27.6	Full	500	0.0[N2]	0.0
Approach	432	1.2	432	1.2		0.869		68.3	LOS E	11.8	83.7				
West: Burwood Hwy (W)															
Lane 1	815	1.0	815	1.0	819	0.996	100	63.1	LOS E	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 2	1140	1.4	1140	1.4	1145	0.996	100	33.4	LOS C	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 3	1140	1.4	1140	1.4	1145	0.996	100	42.9	LOS D	3.5[N4]	25.0[N4]	Full	25	0.0	50.0
Lane 4 (BL)	9	100.0	9	100.0	45	0.208	100	1.5	LOS A	0.0	0.1	Full	25	0.0	0.0
Approach	3104	1.6	3104	1.6		0.996		44.6	LOS D	3.5	25.0				
Intersection	5383	1.7	5383	1.7		0.996		39.4	LOS D	11.8	83.7				

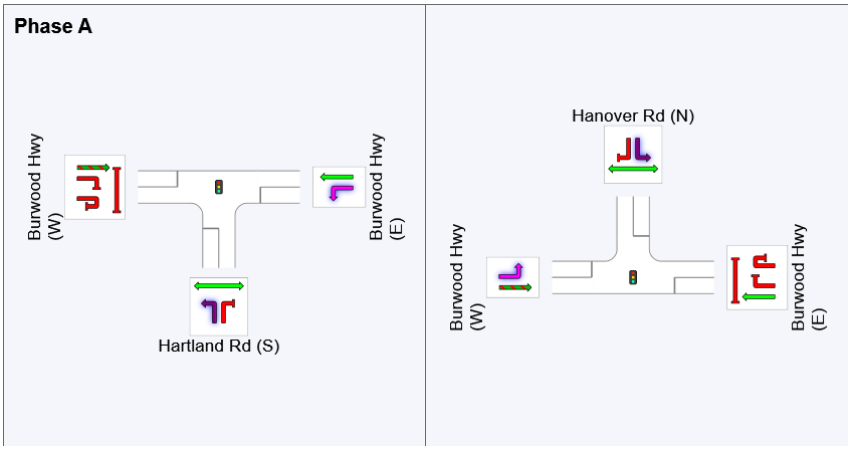
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
N2 Capacity Adjustment specified by user.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.

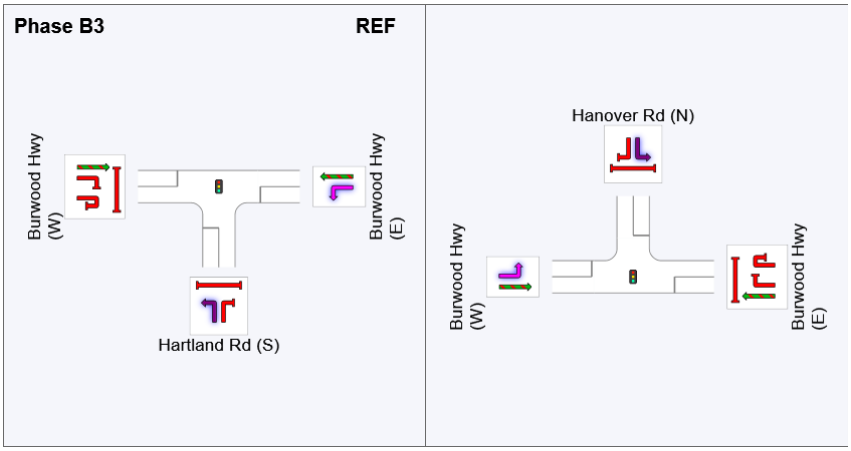
N4 Average back of queue has been restricted to the available queue storage space.
N5 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows).
N6 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows) but average back of queue has been restricted to the available queue storage space.

Output Phase Sequence (CCG)

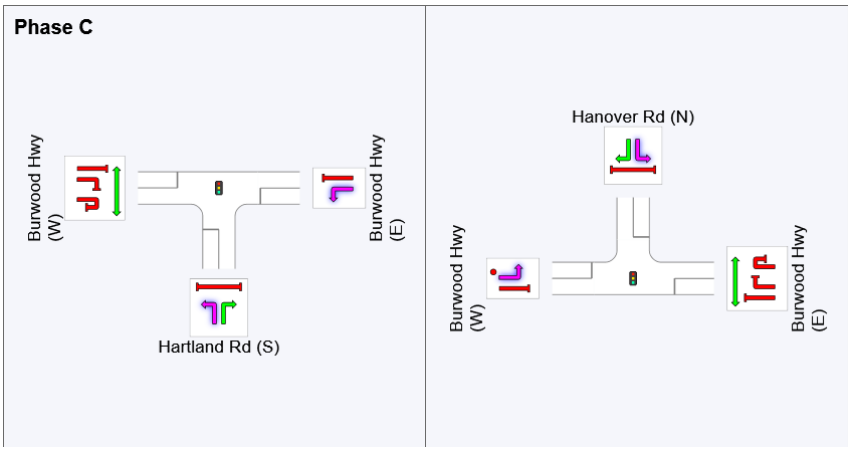
Phase A

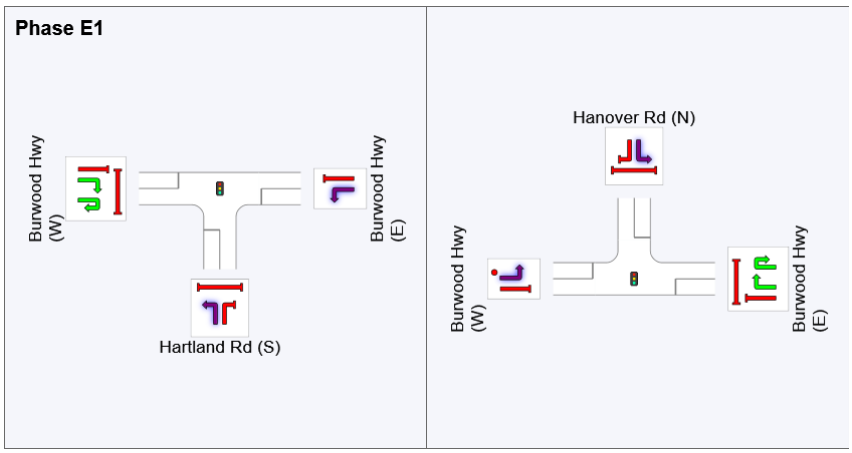


Phase B3 **REF**



Phase C





REF: Reference Phase
VAR: Variable Phase

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

Phase Timing Summary (CCG)

Phase	A	B3	C	E1
Phase Change Time (sec)	46	0	4	31
Green Time (sec)	77	2	24	9
Phase Time (sec)	79	5	30	16
Phase Split	61%	4%	23%	12%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 166E [3 PM Burwood Hwy - Hanover Rd - PD (Site Folder: Post Development)]

Network: 6 [PM - PD (Network Folder: Post Development)]

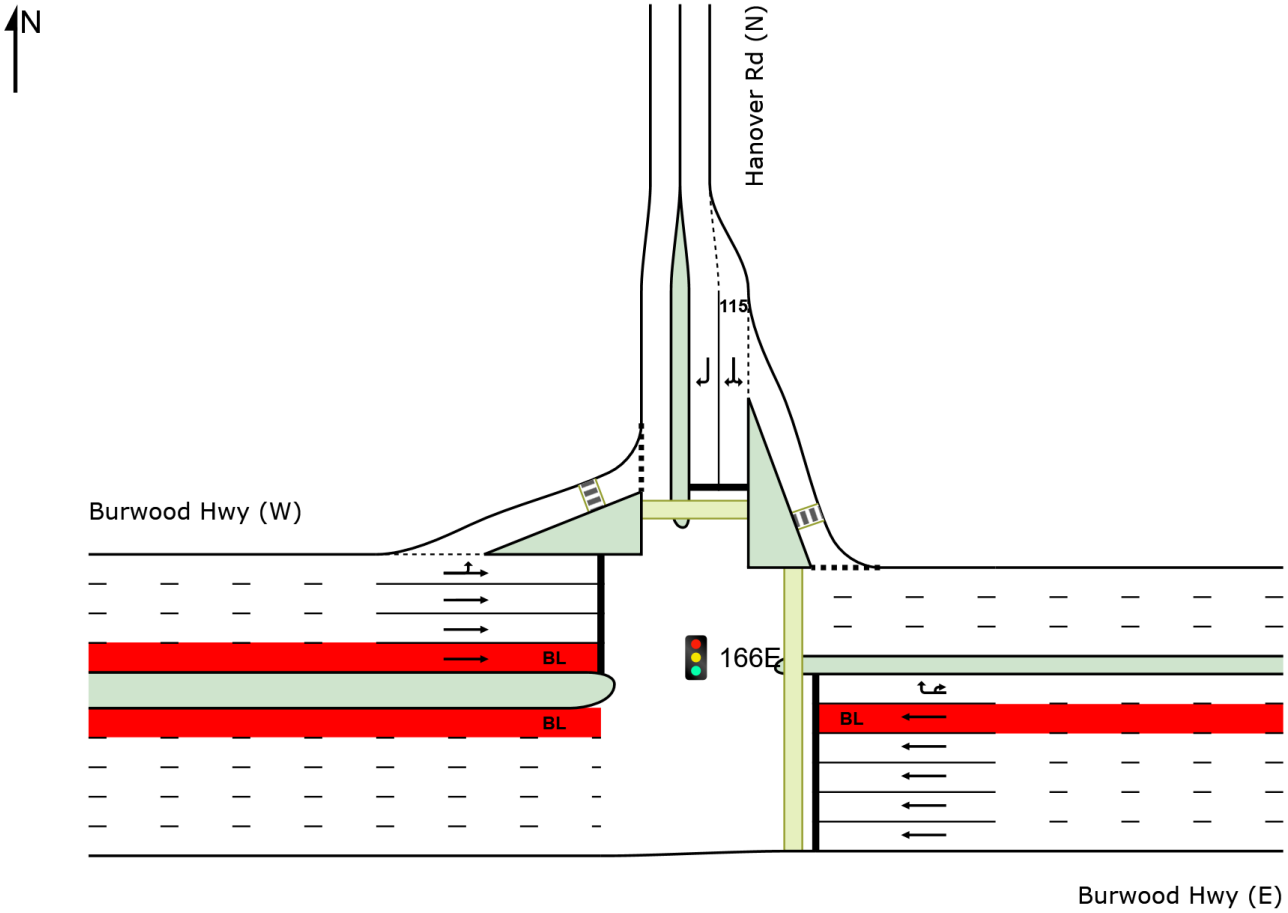
New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network User-Given Cycle Time)
Common Control Group: CCG1 [166]

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: CCG Phasing
Reference Phase: Phase B3
Input Phase Sequence: A, B3, C, E1, E2*, E3*
Output Phase Sequence: A, B3, C, E1
(* Variable Phase)

Some CCG output elements have been omitted as they have already been included under other Sites belonging to the same CCG.

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



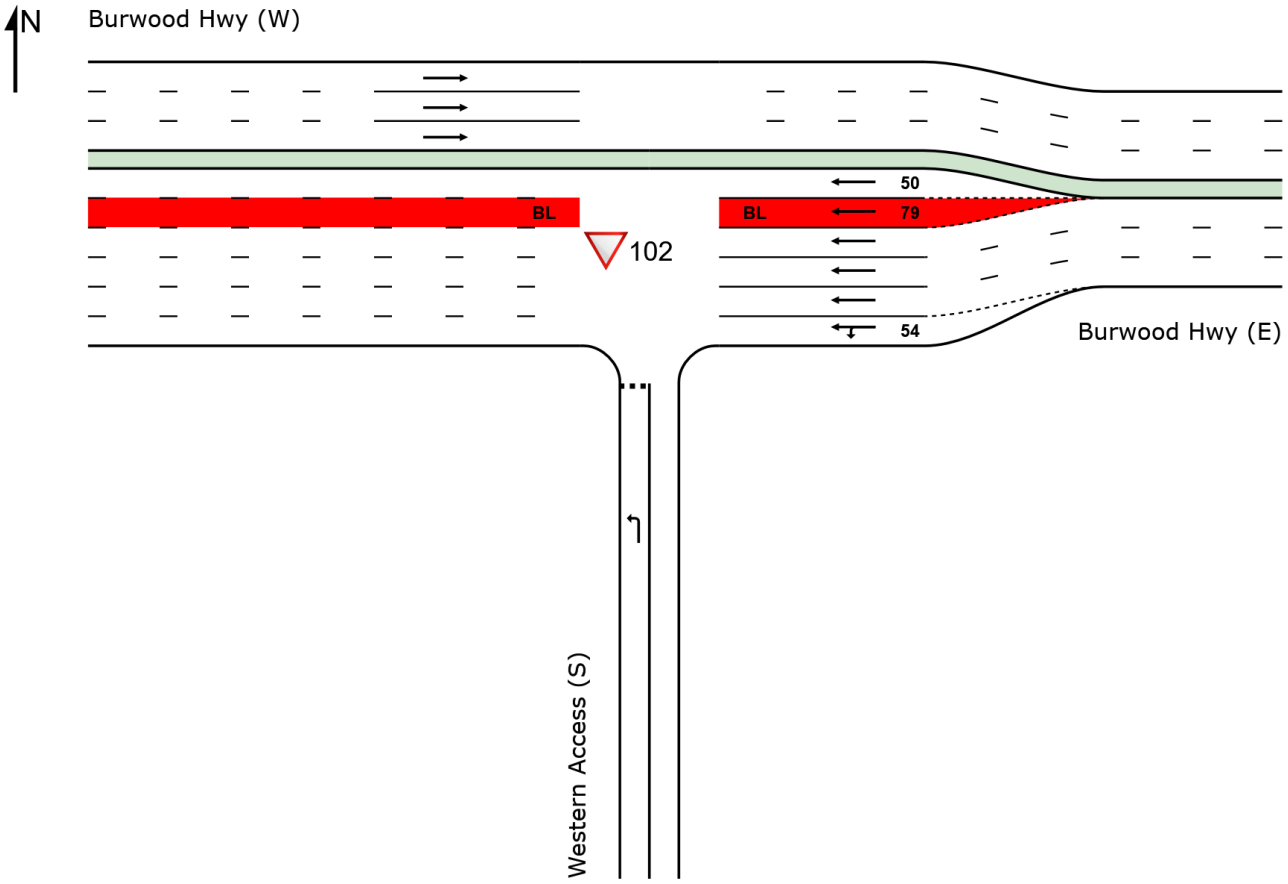
Site: 102 [4A PM Burwoood Hwy - Western Access - PD (Site Folder: Post Development)]

Network: 6 [PM - PD (Network Folder: Post Development)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Western Access (S)															
Lane 1	11	0.0	11	0.0	699	0.015	100	5.1	LOS A	0.1[N5]	0.8[N5]	Full	500	-35.5[N3]	0.0
Approach	11	0.0	11	0.0		0.015		5.1	LOS A	0.1	0.8				
East: Burwood Hwy (E)															
Lane 1	119	1.7	119	1.7	1906	0.062	100	1.5	LOS A	0.0	0.0	Short	54	0.0	NA
Lane 2	432	1.4	432	1.4	1933	0.224	100	0.0	LOS A	0.0	0.0	Full	90	0.0	0.0
Lane 3	432	1.4	432	1.4	1933	0.224	100	0.0	LOS A	0.0	0.0	Full	90	0.0	0.0
Lane 4	432	1.4	432	1.4	1933	0.224	100	0.0	LOS A	0.0	0.0	Full	90	0.0	0.0
Lane 5 (BL)	9	100.0	9	100.0	1182	0.008	100	0.0	LOS A	0.0	0.0	Short	79	0.0	NA
Lane 6	432	1.4	432	1.4	1933	0.224	100	0.0	LOS A	0.0	0.0	Short	50	0.0	NA

Approach	1858	1.9	1858	1.9		0.224		0.1	NA	0.0	0.0				
West: Burwood Hwy (W)															
Lane 1	1030	1.4	1030	1.4	1933	0.533	100	0.0	LOS A	0.0	0.0	Full	35	0.0	0.0
Lane 2	1030	1.4	1030	1.4	1933	0.533	100	0.0	LOS A	0.0	0.0	Full	35	0.0	0.0
Lane 3	1024	2.3	1024	2.3	1921	0.533	100	0.0	LOS A	0.0	0.0	Full	35	0.0	0.0
Approach	3083	1.7	3083	1.7		0.533		0.0	NA	0.0	0.0				
Intersection	4952	1.7	4952	1.7		0.533		0.1	NA	0.1	0.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N3 Capacity Adjustment due to downstream lane blockage determined by the program.
N5 Continuous Lane results determined by Back of Queue values of downstream lanes (proportional to lane movement flows).

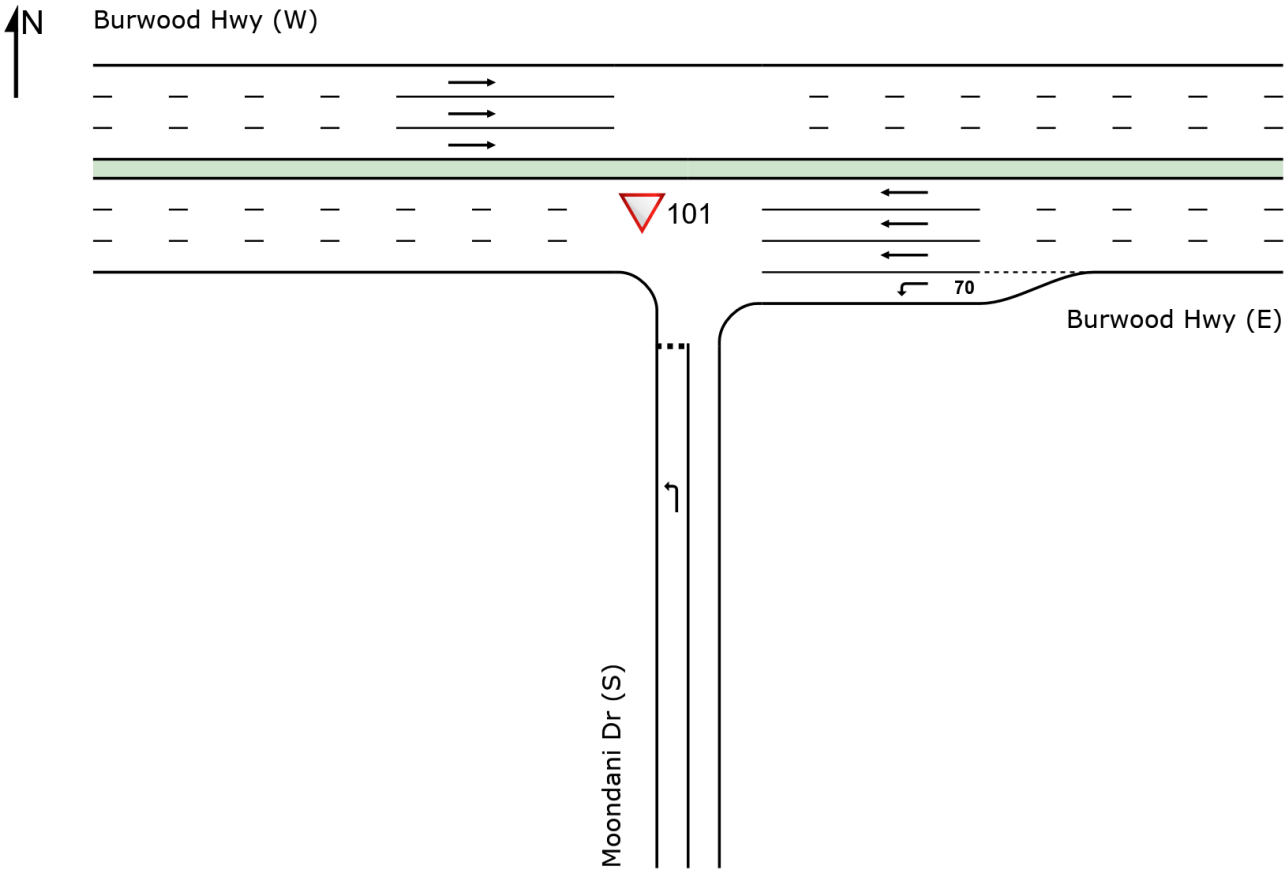
Site: 101 [4 PM Burwoood Hwy - Moondani Dr - PD (Site Folder: Post Development)]

Network: 6 [PM - PD (Network Folder: Post Development)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Moondani Dr (S)															
Lane 1	56	0.0	56	0.0	296	0.188	100	10.0	LOS B	0.2	1.4	Full	500	-50.0 N2	0.0
Approach	56	0.0	56	0.0		0.188		10.0	LOS B	0.2	1.4				
East: Burwood Hwy (E)															
Lane 1	105	1.0	105	1.0	1844	0.057	100	7.0	LOS A	0.0	0.0	Short	70	0.0	NA
Lane 2	603	1.4	603	1.4	1933	0.312	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 3	603	1.4	603	1.4	1932	0.312	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 4	597	2.9	597	2.9	1914	0.312	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	1908	1.8	1908	1.8		0.312		0.5	NA	0.0	0.0				
West: Burwood Hwy (W)															
Lane 1	1030	1.4	1030	1.4	1933	0.533	100	0.0	LOS A	0.0	0.0	Full	90	0.0	0.0

Lane 2	1030	1.4	1030	1.4	1933	0.533	100	0.0	LOS A	0.0	0.0	Full	90	0.0	0.0
Lane 3	1024	2.3	1024	2.3	1921	0.533	100	0.0	LOS A	0.0	0.0	Full	90	0.0	0.0
Approach	3083	1.7	3083	1.7		0.533		0.0	NA	0.0	0.0				
Intersection	5047	1.7	5047	1.7		0.533		0.3	NA	0.2	1.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N2 Capacity Adjustment specified by user.

USER REPORT FOR SITE

All Movement Classes

Project: 230118_300304377_vcat_scenario2

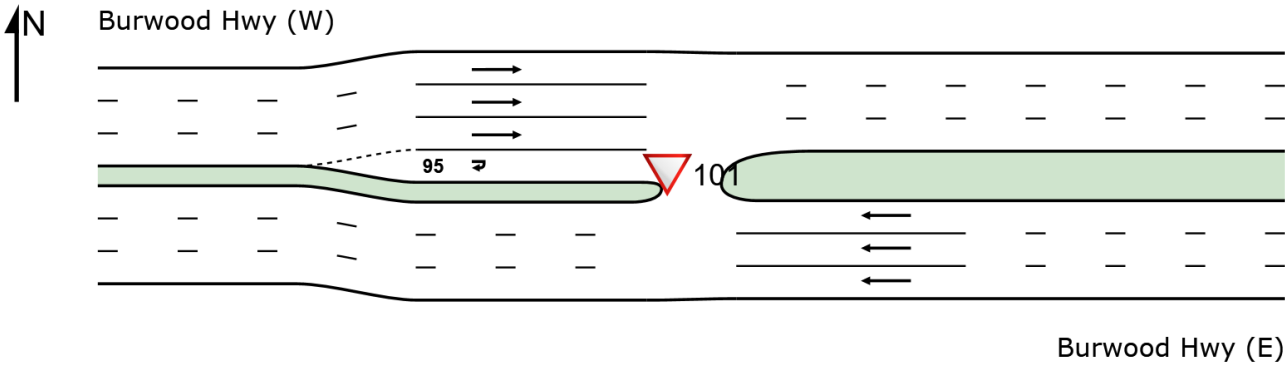
Template: Layout, Lane & Phase Summary

Site: 101 [5 PM East U-turn - PD (Site Folder: Post Development)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Burwood Hwy (E)													
Lane 1	606	1.4	1933	0.313	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	606	1.4	1932	0.313	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 3	600	2.9	1914	0.313	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	1811	1.9		0.313		0.1	NA	0.0	0.0				
West: Burwood Hwy (W)													
Lane 1	997	1.4	1932	0.516	100	0.2	LOS A	0.0	0.0	Full	360	0.0	0.0
Lane 2	997	1.4	1932	0.516	100	0.2	LOS A	0.0	0.0	Full	360	0.0	0.0
Lane 3	982	1.4	1904	0.516	100	0.2	LOS A	0.0	0.0	Full	360	0.0	0.0
Lane 4	91	0.0	151	0.598	100	64.6	LOS F	3.8	26.8	Short	95	55.0	NA
Approach	3066	1.4		0.598		2.1	NA	3.8	26.8				
Intersection	4877	1.6		0.598		1.3	NA	3.8	26.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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