

ST MARYS FREIGHT HUB

TRAFFIC AND TRANSPORT ASSESSMENT



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Issue History

Report File Name	Prepared by	Reviewed by	Issued by	Date	Issued to
P3796.001R St Marys Freight Hub Traffic and Transport Assessment	S. Daizli / A. Giyahi	D. Bitzios	D. Bitzios	15/02/2019	Pacific National
P3796.002R St Marys Freight Hub Traffic and Transport Assessment	S. Daizli	D. Bitzios	D. Bitzios	28/02/2019	Pacific National
P3796.003R St Marys Freight Hub Traffic and Transport Assessment	S. Daizli	D. Bitzios	D. Bitzios	18/04/2019	Pacific National

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EXECUTIVE SUMMARY

Background

The proposed St Marys Freight Hub will provide a local freight container distribution centre for Western Sydney. The site for the freight hub is to the south of Lee Holm Road, west of Forrester Road and north of the Main Western Rail Line. The Planning Secretary's Environmental Assessment Requirements (SEARs) for the proposal dated 23rd October 2018 includes a number of traffic and transport assessment items. The SEARs items can be aggregated into the following categories:

- operational period impacts on traffic capacity and safety;
- operational period needs and impacts associated with active transport, public transport and the need for Travel Demand Management (TDM);
- the suitability of vehicular access to the site and the ability for development traffic to manoeuvre and park within the site; and
- construction period traffic and transport impacts.

This report addresses these items.

Operational Period: Traffic Capacity and Safety Assessment

The development proposal is for a container terminal which will be operational 24 hours a day and 7 days per week. Full containers will arrive from Port Botany by freight train and will be unloaded into the terminal. They will then be collected by semi-trailers or B-doubles and distributed to customers within Sydney. Empty containers will be returned to the site. The number of truck movements is directly linked to the number of train movements and a maximum of five train paths per day in and out have been provisionally allocated for the terminal. Considering the number of containers per train, and using current rates for containers per truck, the truck trip generation has been calculated as 15 movements in and 15 movements out, coincident with the adjacent road peak hours of 8:00am to 9:00am and 4:30pm to 5:30pm. Only 40-45 staff will be on-site during the day and will start and end their shifts before the road network's AM and PM peak hours. For these reasons, staff-based traffic impacts have not been considered further and the assessment has focussed on truck trip impacts on the surrounding road network in peak hours.

The distribution of trucks to/from local areas has been based on the database of Pacific National customer locations and through identifying those customer locations that would be more effectively serviced via St Marys rather than directly via Port Botany. Also, trucks are expected to make use of approved B-double routes for access to/from the site. Eight intersections have been nominated in the SEARs for operational period capacity assessment and the truck volumes generated by the freight hub and using these intersections are summarised below:

No.	Intersection	Control Type	Development Truck Trips per Hour	% of Total Intersection Peak Hour Volumes
1	Richmond Road / Dunheved Road	Signalised	0	0%
2	Great Western Highway / Parker Street	Signalised	0	0%
3	Great Western Highway / Werrington Road / Reserve Road	Signalised	0	0%
4	Great Western Highway / Queen Street / Mamre Road	Signalised	26	<1%
5	Great Western Highway / Carlisle Avenue	Signalised	2	<0.1%
6	Mamre Road / M4 Western Motorway (south)	Signalised	2	<0.1%
7	Mamre Road / M4 Western Motorway (north)	Signalised	26	<1%
8	Great Western Highway / Glossop Street	Signalised	30	<1%

The above intersections have been analysed using SIDRA for the *2030 Base Case*, *2030 With Development Case* and *2030 With Development + 20% Case*. The year 2030 was selected as the assessment year in accordance with the *Roads and Maritime Guide to Traffic Generating Developments (2002)*, which nominates the full development year + 10 years as the assessment year for traffic impact assessments. The *2030 With Development + 20% Case* was a sensitivity test scenario requested by Roads and Maritime.

For all intersections, the Level of Service (LoS) and the Degree of Saturation (DoS) were compared between the Base Case and the With Development cases. At all intersections there was no change in intersection LoS and DoS increased by a maximum of 5%. The analysis did foreshadow potential peak traffic capacity issues at the Parker Street and the Werrington Road intersections with the Great Western Highway in the 2030 Base Case however the Freight Hub's trucks do not worsen this situation.

A road safety assessment was completed by evaluating the crash patterns identified at the eight intersections listed above against the specific turning movements that the Freight Hub's trucks will be making at those intersections. In all locations, the very small increase in truck movements at these intersections will result in a negligible change in crash likelihood and hence crash risk at these locations.

Operational Period: Alternative Transport Mode Assessment

The Freight Hub will have approximately 40-45 staff during daytime hours. On-site parking will be sufficient to accommodate staff and visitors and that there is plenty of area available to do this. Based on the location of the development and the proposed shift times, the site is unlikely to attract many (if any) active transport or public transport trips. If there was a need for site staff to walk, cycle or use or public transport to access the site, sufficient facilities are available with footpaths, cycleways, bus stops and a train station all surrounding the site. Furthermore, the office-based travel demand is considered to be too small and too diverse to warrant a workplace-specific TDM program for this development.

Site Access, Manoeuvring and Parking

Two access points are proposed for the development, namely:

- an entry only near the southern (cul-de-sac) end of Forrester Road; and
- a two-way access off Lee Holm Road.

Both access points are on roads that already carry industrial traffic and are designed to cater for these vehicles and both access locations have well in excess of the required sight distances for safe entry and exit. Swept path assessments have also been run for B-doubles and each access, and each driveway area, can be constructed to accommodate these vehicles.

Within the site, manoeuvring areas for trucks are sufficient and the proposed 98 car parking spaces and one Person With a Disability (PWD) car parking space are readily accessible, as are the additional parking spaces proposed to be formalised along the driveway off Forrester Road.

Construction Period Traffic and Transport Assessment

The construction period is expected to generate between 8-12 trucks per hour carting in materials for construction of the hardstand and driveway areas, as well as for the on-site buildings. The truck volumes are less than those expected during the operational period and would similarly be expected to have negligible impact on the surrounding road network. Also, there is sufficient room within the site to accommodate parked construction worker vehicles as well as waiting delivery trucks and these requirements can be specified as part of the Construction Traffic Management Plan (CTMP). The construction of the two access points is likely to also require Traffic Control Plans (TCPs) which would need to be created in due course.

Conclusions

Whilst the site area is relatively large, its traffic generation is not, and the maximum truck-trip generated by the site is essentially limited by the five train paths in/out being provided by Sydney Trains. The maximum of 15 trucks per hour in and 15 trucks per hour out generated by the site, when assigned to the road network, does not significantly worsen any traffic capacity or road safety conditions across the network. Also, the number of permanent staff on-site does not warrant any specific provisions related to walking, cycling and public transport, although sufficient facilities are available if they are desired to be used by staff. Both site accesses can be accommodated from industrial standard roads and the site layout accommodates on-site needs during both construction and operations.

Overall, the development will not generate any significant impacts on the surrounding traffic and transport networks and no mitigation works are warranted external to the site.

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1. INTRODUCTION

1.1 BACKGROUND

Bitzios Consulting has been engaged by Pacific National to undertake a Traffic and Transport Assessment as part of an Environmental Impact Statement for the proposed St Marys Freight Hub; an inland container terminal proposed to be located in the Penrith Local Government Area, NSW. The site is proposed to be operational 24 hours a day, 7 days a week. The site location and study area are shown in Figure 1.1.



Adapted from Google Maps and Nearmap

Figure 1.1: Site Location and Study Area

1.2 SEARS

The Planning Secretary released its revised Environmental Assessment Requirements (SEARs) for this development on 23rd October 2018. Table 1.1 details the SEARs relevant to traffic and transport considerations along with where they are addressed in this report.

Table 1.1: SEARs Items and Response Locations

SEARS Requirement	Addressed in Section
Provide a Traffic Impact Assessment (TIA) that identifies upgrades and other mitigation measures required to achieve the objective of not exceeding the capacity of the following intersections: i. Dunheved Road and Northern Road; ii. Parker Street and Great Western Highway; iii. Werrington Road and Great Western Highway; iv. Glossop Street and Great Western Highway; v. Mamre Road and Great Western Highway; vi. Mamre Road and M4 Western Motorway; vii. Carlisle Avenue and Great Western Highway; and viii. Aurora Drive and Debrincat Avenue.	Multiple sections
Take into account the Guide to Traffic Generating Development (Roads and Maritime Services). Transport for NSW should be consulted on the proposed traffic generation rates.	3.2
Provide details of the proposed access to the site, including emergency vehicle access arrangements, from the road network including intersection location, design and sight distance.	3.1, 7.1
Service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times)	7.1
Details of proposed access arrangements, including car and bus pickup/drop-off facilities and impacts on public transport, pedestrian and bicycle networks, including pedestrian crossing and refuges and speed control devices and zones.	7.1
Provide detailed plans of the proposed layout of the internal road network and parking on-site in accordance with the relevant Australian Standards.	3.1
Accurate details of the current daily and peak hour vehicle, public transport, pedestrian and cycle movement and existing traffic and transport facilities provided on the road network located adjacent to the proposed development.	3.6
Provide accurate daily and peak traffic forecasts, including vehicle, public transport, pedestrian and bicycle trips, generated by the project during construction and operation, including details of heavy vehicle transport routes to the State Road networks and types of vehicles.	(1)-3.6, 8.1
Provide an assessment of the predicted impacts of this traffic on road safety and the capacity of the road and bus network, including consideration of cumulative traffic impacts at key intersections using a traffic network traffic model pre-agreed with Transport for NSW and Roads and Maritime. Undertake detailed model analysis to confirm network operation and identify intersection upgrade requirements.	4
The impact of the proposed development on existing and future public transport infrastructure within the vicinity of the site in consultation with Roads and Maritime Services and Transport for NSW and identify measures to integrate the development with the transport network.	6.1
Include detailed plans of any proposed road upgrades, infrastructure works or new roads required for the development	Multiple sections
The adequacy of public transport, pedestrian and bicycle networks and infrastructure to meet the likely future demand of the proposed development	5
The proposed active transport access arrangements and connections to public transport services.	6.2
An assessment of road and pedestrian safety adjacent to the proposed development and the details of required road safety measures.	7.1
Measures to maintain road and personal safety in line with CPTED principles.	7.1
Consider the constructability constraints of proposed intersection upgrades such as vehicle swept paths, geometry and sight lines, and avoidance of removal of bus lanes.	7.2
Details of travel demand management measures to minimise the impact on general traffic and bus operations and to encourage sustainable travel choices and details programs for implementation.	6.3
The proposed car and bicycle parking provision, including end-of trip facilities, which must be taken into consideration of the availability of public transport and the requirements of Council's relevant parking codes and Australian Standards	6.1, 7.2

SEARS Requirement	Addressed in Section
Proposed bicycle parking facilities in secure, convenient, accessible areas close to main entries incorporating lighting and passive surveillance	7.2
In relation to construction traffic, provide assessment of cumulative impacts associated with other construction activities (if any).	8.2
In relation to construction traffic, assessment of road safety at key intersection and locations subject to heavy vehicle construction traffic movements and high pedestrian activity	2.4
In relation to construction traffic provide details of construction program detailing the anticipated construction duration and highlighting significant milestone stages and events during the construction process	8.1
In relation to construction traffic provide details of anticipated peak hour and daily construction vehicles movements to and from the site	8.1
In relation to construction traffic provide details of access arrangements of construction vehicles, construction worker to and from the site, emergency vehicles and service vehicles	8.2
In relation to construction traffic details of temporary cycling and pedestrian access during construction	8.2
Details of proposed construction vehicle access arrangements at all stages of construction and traffic and transport impacts during construction, including cumulative impacts associated with other construction activities, and how these impacts will be mitigated for any associated traffic, pedestrian, cyclists, parking and public transport, including the preparation of a draft Construction Traffic Management Plan to demonstrate the proposed management of the impact (which must include vehicle routes, number of trucks, hours of operation, access arrangements and traffic control measures for all demolition/construction activities).	8.3, 8.4, Appendix D

1.3 EARLY ENGAGEMENT PROCESS

The project team met with representatives from Roads and Maritime Services (Roads and Maritime), Transport for New South Wales (TfNSW) and Sydney Trains on the 29th November 2018. One of the purposes of this meeting was to clarify the intent of a number of the traffic and transport items contained in the SEARs and to understand the level of investigation and reporting required to respond to some of these items. After briefing the agencies on the nature of the proposal and its potential level of traffic and truck trip generation, the discussion then turned to clarification of the scope of the assessment.

Key outcomes from this meeting which have framed the scope of the assessment provided in this report included:

- the scope of the assessment nominated in the SEARs was on the basis that at the time of writing the SEARs, Roads and Maritime and TfNSW did not have a lot of detail regarding the development proposal;
- SIDRA modelling, or SIDRA network modelling for closely spaced intersections, would be sufficient to address the network modelling item in the SEARs; and
- trip generation and trip distribution estimates would need to be explained and justified.

Trip generation and distribution assumptions were subsequently submitted to Roads and Maritime and TfNSW and discussed at a meeting on the 11th January 2019.

2. EXISTING CONDITIONS

2.1 ROAD NETWORK

2.1.1 Network Structure and Major Roads

The major through traffic roads in the study area are Parker Street and Richmond Road to the west of the site, and the Great Western Highway and M4 Western Motorway to the south of the site. Nearer to the site, Mamre Road, Glossop Street, Forrester Road, Dunheved Road, Christie Street and Werrington Road provide more localised traffic collection and distribution functions.

Within the study area, the areas north of the Main Western Railway Line are linked to areas to the south by four rail bridges: via Parker Street, Werrington Road, Glossop Street and Carlisle Avenue.

The road network in the study area is illustrated in Figure 2.1.



Adapted from Google Maps

Figure 2.1: Road Network near the Site

2.1.2 Great Western Highway

The Great Western Highway is a state road running east-west linking the Blue Mountains with Sydney. For most of its length it has three lanes in each direction, with two lanes each way between O'Connell Street and Water Street. The sections between O'Connell Street and the South Creek Bridge, and east of Melbourne Street have a signposted 80km/h speed limit. The rest of this road has a signposted 60km/h speed limit including the sections near the subject site. The Great Western Highway is an approved 25-26m B-double route. A typical cross-section of the Great Western Highway is illustrated in Figure 2.2.



Source: Google Street View

Figure 2.2: Typical Cross-section of the Great Western Highway

2.1.3 M4 Western Motorway

The M4 Western Motorway is a state road with three lanes in each direction and running east-west between Strathfield and Glenbrook. Within the study area, interchanges are located at The Northern Road, Kent Road, Mamre Road and Roper Road. The M4 Western Motorway runs parallel to the Great Western Highway, has a signposted 110km/h speed limit in each direction within the study area and is an approved 25-26m B-double route. A typical cross-section of the M4 Western Motorway is illustrated in Figure 2.3.



Source: Google Street View

Figure 2.3: Typical Cross-section of the M4 Western Motorway

2.1.4 Parker Street - Richmond Road - The Northern Road

Parker Street is a state-controlled road running north-south, intersecting with the Great Western Highway at Penrith. It continues as Richmond Road in the north and intersects with Dunheved Road. Towards the south, Parker Street continues as The Northern Road and intersects with the M4 Western Motorway. All three roads have a signposted 70km/h speed limit, and Parker Street has a 40km/h school zone (8:00am-9:30am and 2:30pm-4:00pm) between Cox Avenue and Glebe Place. Parker Street has two lanes in each direction between Dunheved Road and Copeland Street, and three lanes in each direction between Copeland Street and Jamison Road. For most of the section of Parker Street within the study area, the carriageways are separated by a wide raised median. All three roads are approved 25-26m B-double routes. A typical cross-section of Parker Street is illustrated in Figure 2.4.



Source: Google Street View

Figure 2.4: Typical Cross-section of Parker Street

2.1.5 Mamre Road

Mamre Road is a state road running north-south between the Great Western Highway and Elizabeth Drive, intersecting with the M4 Western Motorway entry/exit ramps. It has two lanes in each direction, a signposted 60km/h speed limit and a 40km/h school zone (8:00am-9:30am and 2:30pm-4:00pm) extending approximately 60 metres north and south of the Saddington Street intersection. The road cross section also includes a raised median near the M4 Western Motorway interchange. Mamre Road is an approved 25-26m B-double route. A typical cross-section of Mamre Road is illustrated in Figure 2.5.



Source: Google Street View

Figure 2.5: Typical Cross-section of Mamre Road

2.1.6 Glossop Street - Forrester Road

Glossop Street is a regional road running north-south and ending at its intersection with the Great Western Highway in the south. It has two lanes in each direction with a wide raised median. In the north, Glossop Street ends at Forrester Road, which continues north to intersect with Christie Street. Forrester Road is also a regional road with two lanes in each direction and a wide raised median between Glossop Street and Christie Street. Glossop Street and Forrester Road north of Glossop Street have a signposted 60km/h speed limit, while Forrester Road south of Glossop Street has a signposted 50km/h speed limit and a 40km/h school zone (8:00am-9:30am and 2:30pm-4:00pm) north of Harris Street. Glossop Street and Forrester Road are approved 25-26m B-double routes. A typical cross-section of Glossop Street is illustrated in Figure 2.6.



Source: Google Street View

Figure 2.6: Typical Cross-section of Glossop Street

2.1.7 Dunheved Road - Christie Street

Dunheved Road and Christie Street are both regional roads running east-west, ending at Parker Street in the west. Both roads have one lane in each direction. Dunheved Road has a signposted 70km/h speed limit, while Christie Street has a signposted 60km/h speed limit within the industrial areas of St Marys. Both roads are approved 25-26m B-double routes. A typical cross-section of Dunheved Road is illustrated in Figure 2.7.



Source: Google Street View

Figure 2.7: Typical Cross-section of Dunheved Road

2.1.8 Werrington Road

Werrington Road is a regional road running north-south, intersecting with the Dunheved Road/Christie Street roundabout at its northern end and the Great Western Highway at its southern end. It has one lane in each direction and the southbound approach to the Great Western Highway widens to two lanes. The road has a signposted 70km/h speed limit between Dunheved Road and Rance Road, a signposted 60km/h speed limit between Rance Road and the Great Western Highway, and a 40km/h school zone (8:00am-9:30am and 2:30pm-4:00pm) between Gipps Street and the Great Western Highway. Werrington Road is an approved 25-26m B-double route. A typical cross-section of Werrington Road is illustrated in Figure 2.8 and the cross-section of the intersection with the Great Western Highway is shown in Figure 2.9. South of Great Western Highway, Werrington Road continues as a short local road named Reserve Road, terminating at a T-intersection with Putland Street.



Source: Google Street View

Figure 2.8: Typical Cross-section of Werrington Road



Source: Google Street View

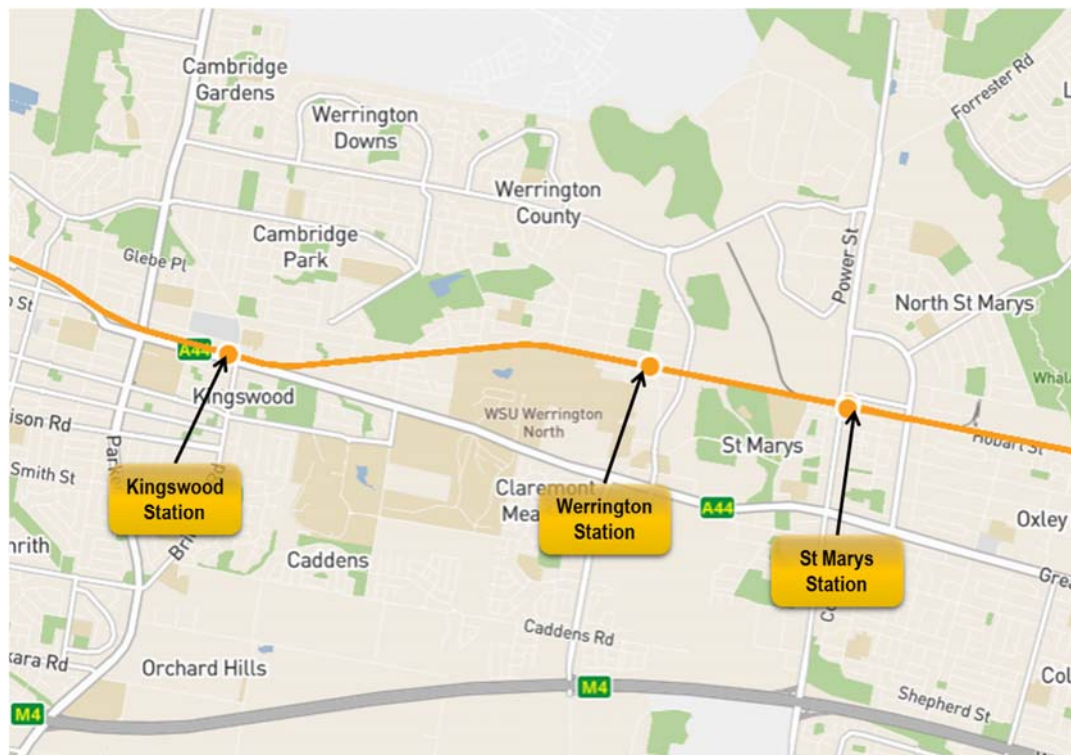
Figure 2.9: Cross-section of the Werrington Road north approach at the Great Western Highway intersection

2.2 PUBLIC TRANSPORT AND ACTIVE TRANSPORT NETWORKS

2.2.1 Rail Network

There are three railway stations within the study area; namely Kingswood, Werrington and St Marys as shown in Figure 2.10. These stations are serviced by the T1 Western Line between Emu Plains and the City via Blacktown, Parramatta and Strathfield. Services are every 15 minutes throughout the day, with higher frequencies during peak periods. Trains on the Blue Mountains Line and freight trains pass through all three stations without stopping. The railway line just east of St Marys Railway Station has four tracks. Further west, the line reduces to two tracks.

The rail junction of the former Dunheved Railway spur line is located approximately 300 metres west of the St Marys Railway Station. The two-track spur line, part of the former Ropes Crossing Railway Line, was truncated from its full length and is currently not used.



Source: <https://transportnsw.info/routes/details/sydney-trains/t1/020T1>

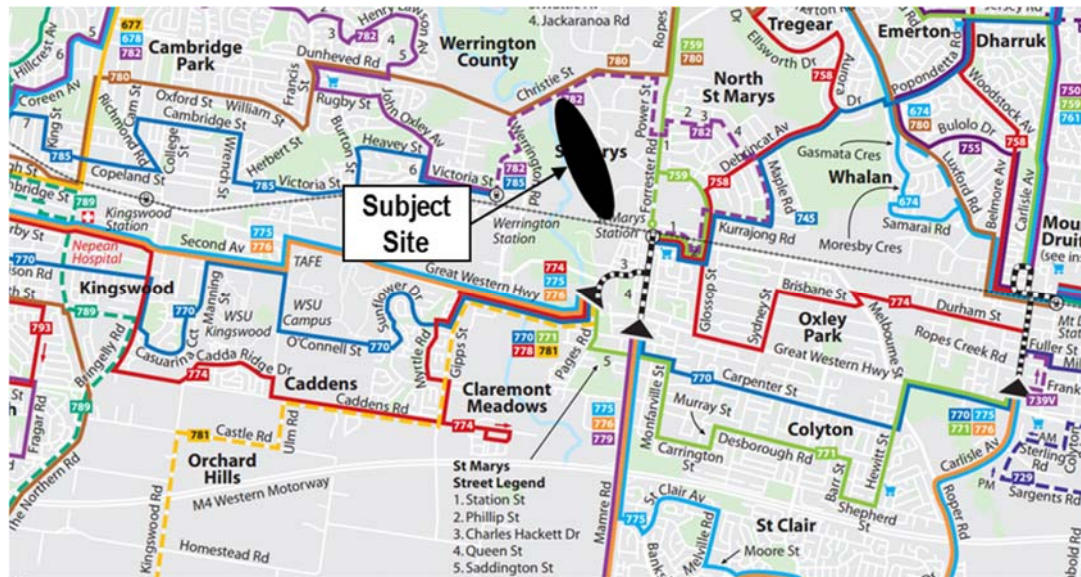
Figure 2.10: Railway Stations Within the Study Area

2.2.2 Bus Network

The study area is serviced by several existing bus routes, all operated by Busways. The bus routes are located predominantly south of the Main Western Railway Line and along the Great Western Highway and Mamre Road, around St Marys Railway Station and along Glossop Street over the railway line.

North-south bus routes travel via Parker Street, Glossop Street or Carlisle Avenue, all via bridges over the railway line. No public bus routes operate along Werrington Road over the railway line.

Bus routes within the study area are shown in Figure 2.11. Bus route destinations and of service frequencies are summarised in Table 2.1.



Source: https://busways.com.au/sites/default/files/network_maps/Region1NetworkMap030618.pdf

Figure 2.11: Bus Routes within the Study Area

Table 2.1: Bus Routes and Frequency

Route No.	Destination	Direction	Frequency
745	St Marys to Castle Hill via Stanhope Gardens	Both directions	60 mins (Monday to Saturday)
758	St Marys to Mount Druitt via Tregear & Shalvey	Both directions	30 mins (Monday to Saturday) 60 mins (Sunday and public holidays)
759	St Marys to Mount Druitt via Ropes Crossing	Both directions	30 mins (Monday to Saturday) 60 mins (Sunday and public holidays)
770	Mount Druitt to Penrith via St Marys	Both directions	30 mins (Monday to Friday) 60 mins (weekends and public holidays)
771	Mount Druitt to St Marys via Colyton	Both directions	30 mins (peak periods) 60 mins (off-peak periods)
774	Mount Druitt to Penrith via Nepean Hospital	Both directions	30 mins (Monday to Friday) 60 mins (weekends and public holidays)
775	Mount Druitt to Penrith via Erskine Park	Both directions	30 mins (Monday to Friday) 60 mins (weekends and public holidays)
776	Mount Druitt to Penrith via St Clair	Both directions	30 mins (Monday to Friday) 60 mins (weekends and public holidays)
779	Erskine Park to St Marys	St Marys to Erskine Park	30 mins (AM peak periods)
		Erskine Park to St Marys	30 mins (PM peak periods)
780	Mount Druitt to Penrith via Ropes Crossing	Both directions	10-30 mins (peak periods) 60 mins (off-peak periods)
781	St Marys to Penrith via Glenmore Park	St Marys to Penrith	3 services (AM peak)
		Penrith to St Marys	1 service (PM peak)
782	St Marys to Penrith via Werrington	Both directions	60 mins (off-peak and mid-Saturday periods)
835	UWS to Prairiewood	Both directions	30 mins (peak periods)

In addition to the above bus services, NightRide bus route N70 operates late at night, travelling along the Great Western Highway, Queen Street and Glossop Street within St Marys.

2.2.3 Walking and Cycling Networks

Formal footpaths exist along most roads within the study area, providing adequate connectivity between the site and key locations. The surrounding cycling network consists of both on-road and off-road routes, ranging from 'low difficulty' to 'high difficulty' facilities (as defined by Roads and Maritime's classification system). All cycling routes within the study area are shown in Figure 2.12. As shown in this figure, the routes surrounding the subject site do not connect directly with the wider cycling network. The facilities surrounding the site are:

- a low difficulty on-road path along Forrester Road north of Harris Street;
- a moderate difficulty on-road path along Forrester Road between Glossop Street and Christie Street, continuing along Christie Street to the South Creek Bridge; and
- a short off-road shared path along the southern side of Christie Street between the South Creek Bridge and just before Werrington Road.

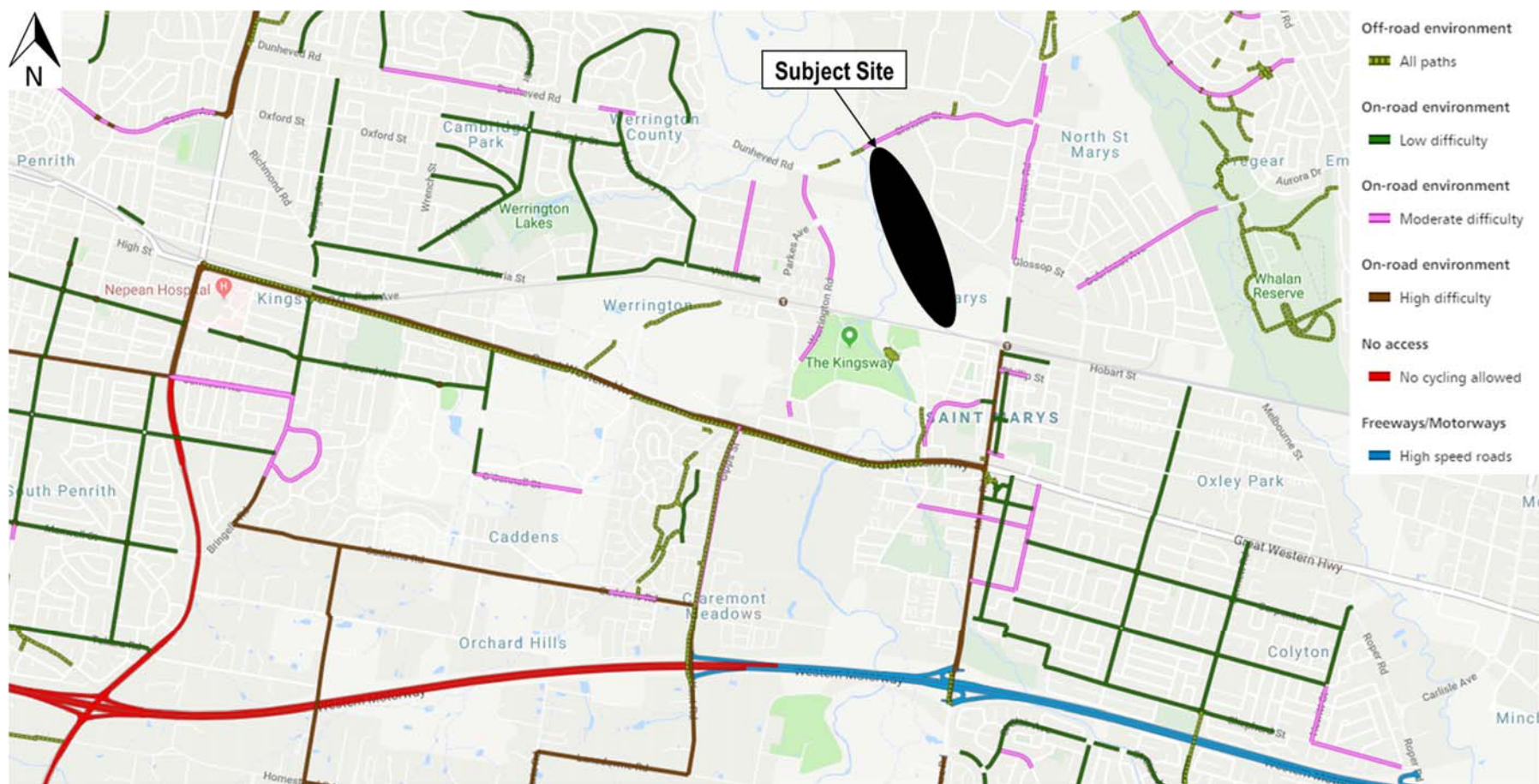
2.3 TRAFFIC VOLUMES

Traffic surveys were undertaken between 6:00am-10:00am and between 3:00pm-7:00pm on Tuesday, 20th November 2018 at the intersections identified in the SEARs and listed in Table 2.2. The intersection throughput volumes for the peak one hour in the weekday morning (AM) and evening (PM) peak periods are summarised in Figure 2.13. The highest volume peak hours identified were 8:00am to 9:00am for the AM peak and 4:30pm to 5:30pm for the PM peak. The traffic counts were also classified into light vehicles, light trucks, articulated trucks, buses, bicycles and pedestrians.

The full AM and PM peak traffic counts for each intersection are provided in Appendix A.

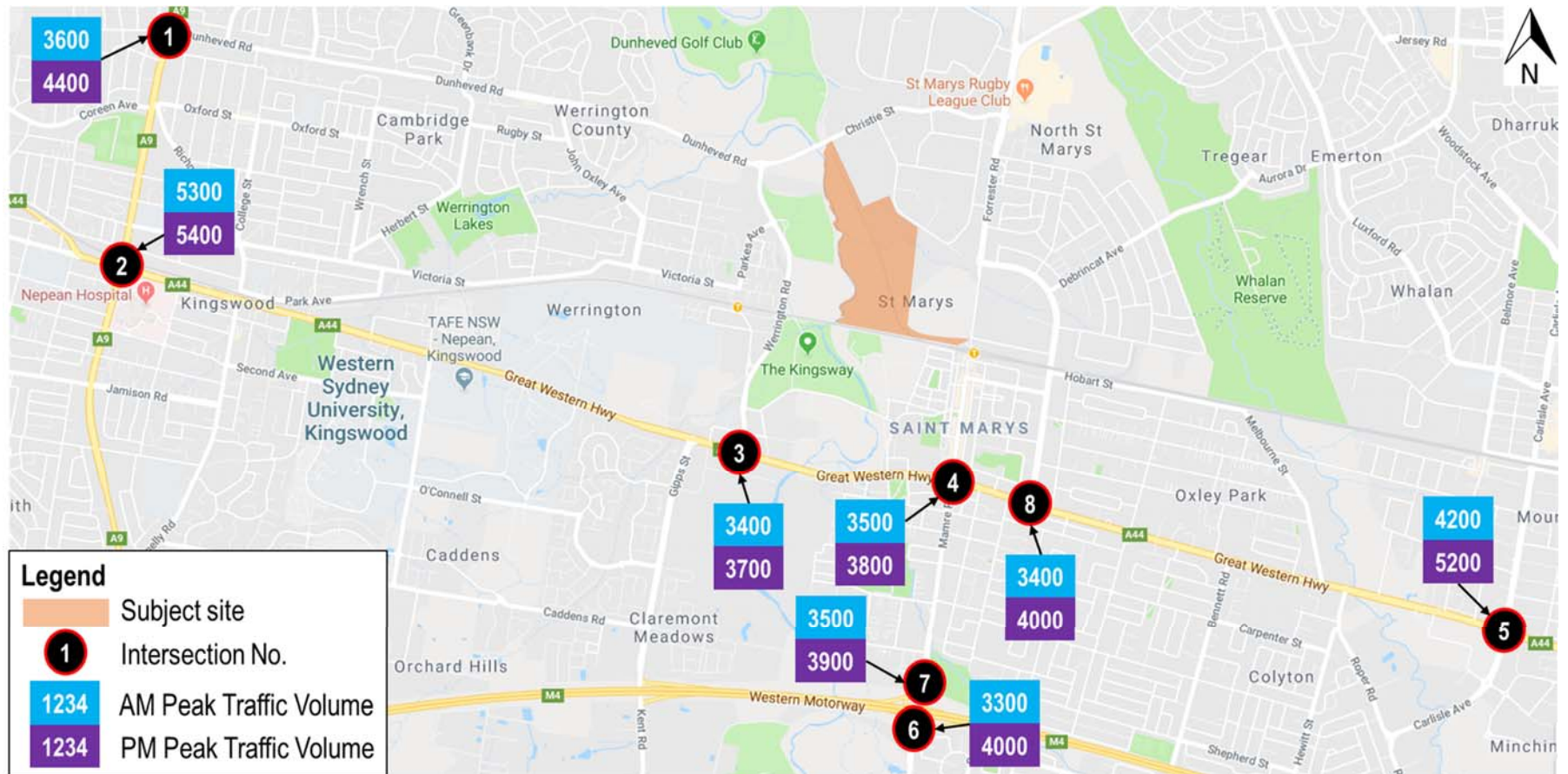
Table 2.2: Intersection Traffic Count Survey Locations

No.	Intersection	Control Type
1	Richmond Road / Dunheved Road	Signalised
2	Great Western Highway / Parker Street	Signalised
3	Great Western Highway / Werrington Road / Reserve Road	Signalised
4	Great Western Highway / Queen Street / Mamre Road	Signalised
5	Great Western Highway / Carlisle Avenue	Signalised
6	Mamre Road / M4 Western Motorway (south)	Signalised
7	Mamre Road / M4 Western Motorway (north)	Signalised
8	Great Western Highway / Glossop Street	Signalised



Source: https://www.rms.nsw.gov.au/maps/cycleway_finder

Figure 2.12: Cycleways Within the Study Area



Adapted from Google Maps

Traffic volumes have been rounded to the nearest 100 vehicles

Figure 2.13: Traffic Volumes Summary

2.4 CRASH DATA ANALYSIS

2.4.1 General Trends

The most recent five years of crash data, dated between 2013 and 2017, was obtained from Transport for NSW (TfNSW) for each of the eight intersections listed in Table 2.2 (and shown in Figure 2.13) as well as at the proposed site access points. During the five-year period, a total of 191 crashes were reported, equating to an average of 38 crashes per year. The crash data was mapped in GIS and is provided in Appendix B showing detailed information on crash severity and type (by road user movement), along with a summary list of crashes.

Figure 2.14 shows the trends in the number of crashes per year between 2013 and 2017 aggregated across all locations reviewed. The number of crashes has decreased every year and have halved from 53 crashes in 2013 to 27 crashes in 2017.

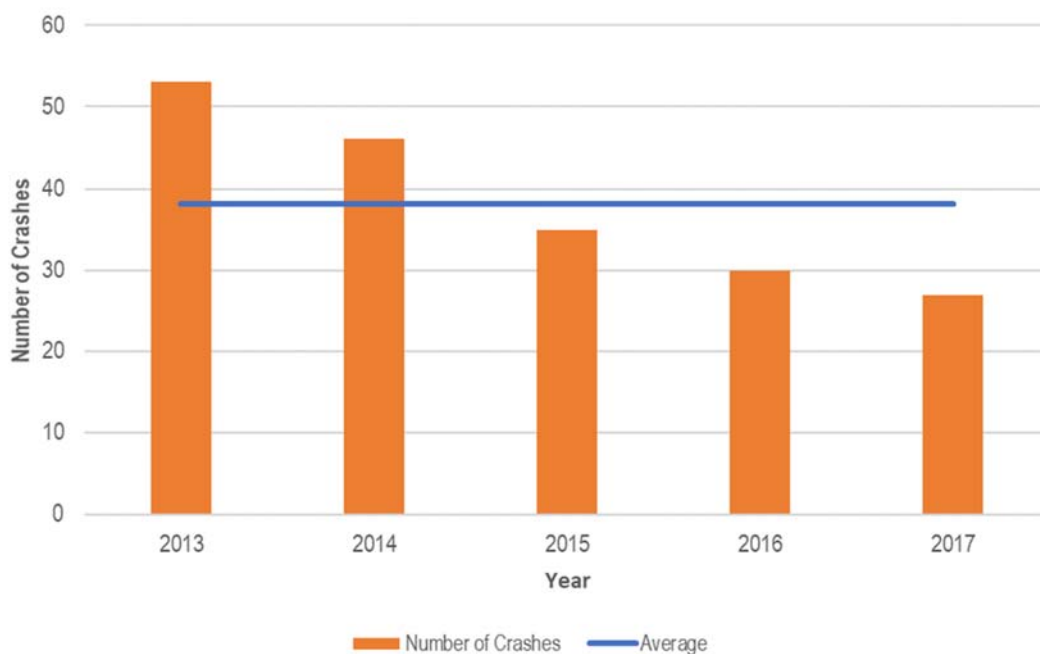


Figure 2.14: Summary of Reported Crashes between 2013 and 2017

2.4.2 Casualties

Of the 191 crashes in the five-year period ending 2017, 109 of these crashes resulted in 127 casualties. This equates to an average of 25 casualties per year. Table 2.3 summarises the crash severity and number of casualties. No person was killed while 35 people were seriously injured.

Table 2.3: Crash Severity and Number of Casualties

Crash Severity	No. of Crashes	%	No. of Casualties
Fatal	0	0%	0
Serious Injury	25	13%	35
Moderate Injury	43	23%	48
Minor/Other Injury	41	21%	44
Non-casualty (towaway)	82	43%	0
Total	191	100%	127

2.4.3 Crash Type

Table 2.4 provides a breakdown of all crash types which occurred in the study area including the number of crashes and casualties. Between 2013 and 2017, the most common type of crash was 'rear end' (77 of these reflecting 40% of all reported crashes), followed by 27 'right-through' crashes (14% of all reported crashes) and 11 'right-rear' crashes (6% of all reported crashes).

Table 2.4: Crash Type and Number of Casualties

Crash Type	No. of Crashes	%	No. of Casualties	%
Cross traffic	8	4%	0	0%
Cutting in	1	1%	2	2%
Emerging from driveway	1	1%	1	1%
From footpath	1	1%	1	1%
Head on	3	2%	1	1%
Lane change left	3	2%	2	2%
Lane change right	7	4%	1	1%
Lane sideswipe	2	1%	0	0%
Left far	1	1%	3	2%
Left near	1	1%	5	4%
Left off carriageway into object/parked vehicle	8	4%	48	38%
Left rear	2	1%	2	2%
Left turn sideswipe	2	1%	1	1%
Off carriageway left on left bend into object/parked vehicle	0	0%	26	20%
Off carriageway left on right bend into object/parked vehicle	3	2%	0	0%
Off carriageway right on left bend into object/parked vehicle	5	3%	5	4%
Off carriageway to left	1	1%	1	1%
Other opposing	2	1%	0	0%
Other same direction	10	5%	3	2%
Out of control on carriageway straight	1	1%	8	6%
Out of control on carriageway through	1	1%	0	0%
Pedestrian far side	2	1%	1	1%
Pedestrian near side	1	1%	9	7%
Rear end	77	40%	4	3%
Right far	2	1%	1	1%
Right near	11	6%	1	1%
Right off carriageway into object/parked vehicle	2	1%	0	0%
Right rear	5	3%	0	0%
Right through	27	14%	1	1%
Right turn sideswipe	1	1%	0	0%
Total	191	100%	127	100%

2.4.4 Intersection-Specific Data

Richmond Road / Dunheved Road

There was a total of 15 crashes at or near the Richmond Road/Dunheved Road intersection between 2013 and 2017. Four crashes resulted in four casualties.

The most common type of crash was 'right-through' (20%), which resulted in one casualty, followed by two 'rear end' and two 'lane change right' (both 13%). Additionally, nine crashes occurred in daylight and six in darkness.

Eleven crashes occurred at the intersection, two on Richmond Road and two on Dunheved Road near the intersection.

No crash pattern can be related to the geometry of this intersection.

Great Western Highway / Parker Street

There was a total of 35 crashes at or near the Great Western Highway/Parker Street intersection between 2013 and 2017. Twenty-one crashes resulted in 24 casualties.

The most common type of crash was 'rear end' (54%), which resulted in 14 casualties, followed by three 'cross-traffic' crashes (9%). Three crashes involved a pedestrian, resulting in two serious casualties and one moderate casualty. Additionally, 26 crashes occurred in daylight and eight in darkness.

Seventeen crashes occurred at the intersection, 11 on the Great Western Highway and seven on Parker Street within approximately 130 metres of the intersection. Crashes were evenly split across all of the intersection's approaches.

A 'rear end' crash pattern was detected at this intersection. A further analysis of 'rear end' crashes revealed that nine of them occurred right and six occurred on approach to or departure from the intersection. The majority of these vehicles were travelling westbound.

Great Western Highway / Werrington Road / Reserve Road

There was a total of 20 crashes at or near the Great Western Highway/Werrington Road/Reserve Road intersection between 2013 and 2017. Eleven crashes resulted in fourteen casualties.

The most common type of crash was 'right-through' (40%), which resulted in seven casualties, followed by six 'rear end' crashes (30%). Thirteen crashes occurred in daylight and seven in darkness.

Seventeen crashes occurred at the intersection, two on Werrington Road approaching the intersection and one approximately 40 metres east of the intersection on the Great Western Highway westbound.

A 'right-through' crash pattern was detected at this intersection. Further analysis of 'right through' crashes revealed that all occurred in the middle of the intersection. Six crashes involved vehicles travelling westbound and two eastbound, most likely caused when vehicles turned right on a red signal. All crashes occurred between 2013 and 2015.

Great Western Highway / Queen Street / Mamre Road

There was a total of 19 crashes at or near the Great Western Highway/Queen Street/Mamre Road intersection between 2013 and 2017. Twelve crashes resulted in 14 casualties.

The most common type of crash was 'rear end' (32%), which resulted in three casualties, followed by three 'cross-traffic' crashes and three 'other same direction' crashes (both 16%). Additionally, 12 crashes occurred in daylight and seven in darkness.

Thirteen crashes occurred at the intersection, five on the Great Western Highway within approximately 55 metres of the intersection and one at the Mamre Road/Sainsbury Street intersection approximately 70 metres south.

No crash pattern was detected at this intersection.

Great Western Highway / Carlisle Avenue

There was a total of 36 crashes at or near the Great Western Highway/Carlisle Avenue intersection between 2013 and 2017. Nineteen crashes resulted in 21 casualties.

The most common type of crash was 'rear end' (58%), which resulted in 12 casualties, followed by three 'off carriageway left on right bend into object/parked vehicle' crashes (8%). Additionally, 22 crashes occurred in daylight and 14 in darkness.

Twenty-seven crashes occurred at the intersection, including 13 'rear end' crashes. Five crashes occurred within approximately 80 metres east of the intersection on the Great Western Highway westbound, and three south and one north of the intersection on Carlisle Avenue.

A 'rear end' crash pattern was detected at this intersection, which has a speed limit of 80km/h. A further analysis of 'rear end' crashes revealed that 13 of them occurred at the intersection and eight occurred on approach to or on the departure from the intersection. The majority of vehicles were travelling eastbound.

Mamre Road / M4 Western Motorway

The Mamre Road/M4 Western Motorway interchange includes the Mamre Road/M4 Western Motorway north and south intersections, Mamre Road and the M4 Western Motorway on and off-ramps. There was a total of 40 crashes within this section between 2013 and 2017. Twenty-four crashes resulted in 30 casualties.

The most common type of crash was 'rear end' (40%), which resulted in 10 casualties, followed by 12 'right through' crashes (30%). Additionally, 26 crashes occurred in daylight and 14 in darkness.

Eighteen crashes occurred at the Mamre Road/M4 Western Motorway north intersection, including 10 'right-through' crashes. Three crashes occurred within approximately 80 metres north of the intersection on Mamre Road, two crashes approximately 90 metres south of the intersection on Mamre Road southbound and one crash on the M4 Western Motorway eastbound on-ramp.

Nine crashes occurred at the Mamre Road/M4 Western Motorway south intersection, including five 'rear end' crashes. Five crashes occurred within approximately 90 metres south of the intersection on Mamre Road and two crashes on the M4 Western Motorway westbound on-ramp.

Two crash patterns were detected at this interchange, namely 'rear end' and 'right-through'. A further analysis of 'right-through' crashes revealed that 10 crashes occurred at the Mamre Road/M4 Western Motorway north intersection, most likely caused when southbound vehicles turned right on a red signal. Five crashes resulted in nine serious injuries and six crashes occurred in darkness.

A further analysis of 'rear end' crashes revealed that eight of them occurred at or near the Mamre Road/M4 Western Motorway south intersection, with nearly all of them along Mamre Road in either direction. Three crashes resulted in two moderate casualties and one minor/other casualty. Six crashes occurred in daylight.

Great Western Highway / Glossop Street

There was a total of 11 crashes at or near the Great Western Highway/Glossop Street intersection between 2013 and 2017. Nine crashes resulted in nine casualties.

The most common type of crash was 'rear end' (36%), followed by two 'lane change right' crashes (18%) and all crashes resulting in six casualties. Additionally, eight crashes occurred in daylight and three in darkness.

Five crashes occurred at the intersection, including two 'rear end'. Four crashes occurred within approximately 80 metres north of the intersection on Glossop Street and one east of the intersection on the Great Western Highway westbound.

No crash pattern was detected at this intersection.

2.4.5 Near the Site Accesses

The site access points include Forrester Road/Harris Street as an entry only as well as Lee Holm Road near Maxim Place.

In these general areas, there was a total of 15 crashes recorded between 2013 and 2017. Nine crashes resulted in 11 casualties. The most common type of crash was 'right near' (40%), followed by three 'rear end' crashes (20%), all resulting in seven casualties. Additionally, nine crashes occurred in daylight and six in darkness.

Eight crashes occurred on Christie Street, including seven at its intersection with Lee Holm Road and three 'rear end' crashes, resulting in nine casualties. Five crashes occurred at the Forrester Road/Wordoo Street intersection, including four 'right-near' crashes, resulting in one casualty. One crash occurred at the Lee Holm Road/Maxim Place intersection and one at the Forrester Road/Harris Street intersection.

No specific crash patterns could be identified based on this data.

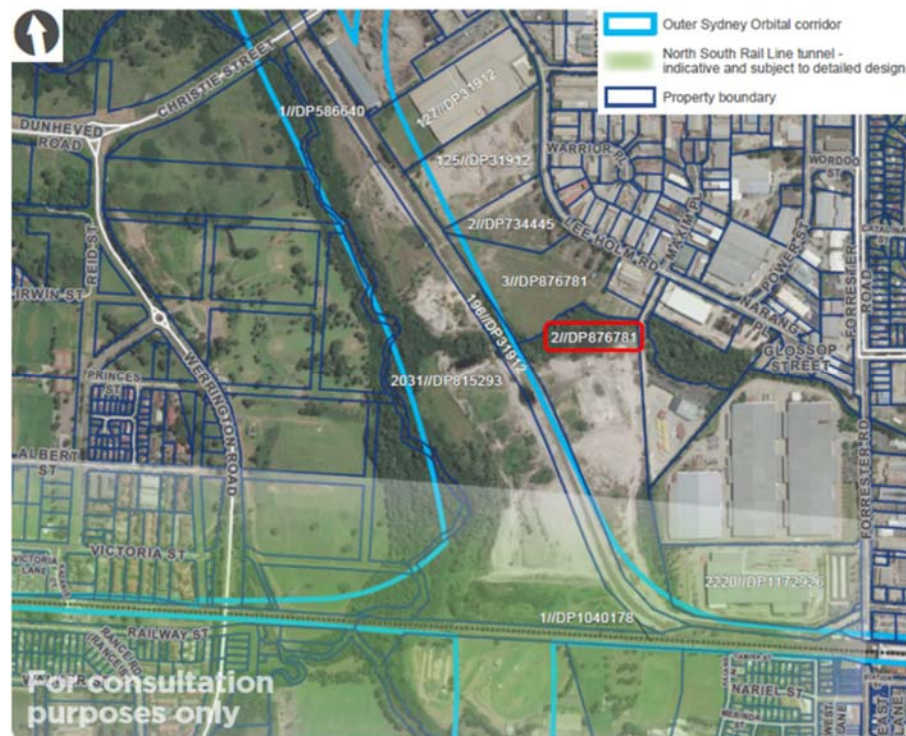
2.5 PLANNED DEVELOPMENTS AND NETWORK UPGRADES

2.5.1 Jordan Springs Development

Jordan Springs is located approximately 1.6km north of the Richmond Road/Dunheved Road intersection. The development connects to The Northern Road which continues north from Richmond Road, meaning future growth in the suburb will increase traffic volumes on the Parker Street - Richmond Road - The Northern Road corridor. A number of road and intersection upgrades have been proposed by the development.

2.5.2 Outer Sydney Orbital

TfNSW is investigating a north-south motorway and freight rail corridor between Box Hill in the north and the M31 Hume Motorway near Menangle in the south, known as the Outer Sydney Orbital. It would provide a major transport link between the North-West and South-West Growth Areas, as well as connect to the future Western Sydney Airport. Whilst still in early planning phases, the corridor is proposed to pass adjacent to the St Marys Freight Hub, as shown in Figure 2.15.



Source: Maps for consultation Outer Sydney Orbital recommended corridor (Transport for NSW, March 2018)

Figure 2.15: Outer Sydney Orbital recommended corridor through St Marys

2.5.3 North-South Rail Line

In addition to the Outer Sydney Orbital, TfNSW is also investigating a North-South Rail Line between St Marys and Macarthur/Leppington via the future Western Sydney Airport. It is proposed to be in tunnel near St Marys Railway Station and pass south of the site as shown in Figure 2.16. The North-South Rail Line will provide a major transport link between the North-West, Western Sydney Airport, South-West and Greater Macarthur Growth Areas and support future town centres along the corridor.



Source: Maps for consultation North South Rail Line & South West Rail Link Extension recommended corridors (Transport for NSW, March 2018)

Figure 2.16: North South Rail Line recommended corridor through St Marys

2.5.4 Network Upgrades

In 2016, WSP undertook traffic modelling of the broader St Marys development area, with a focus on Jordan Springs, to assess the impact on the existing road network of five new precincts due for completion in 2021. The study area was bounded by Ninth Avenue/Eighth Avenue/Palmyra Avenue in the north, Glossop Street/Forrester Road in the east, the Great Western Highway in the south and The Northern Road in the west. SIDRA modelling was also undertaken to assess the existing and future performance of key intersections. Upgrade works were identified at a number of intersections relevant to the study area for this project and these are summarised in Table 2.5. These upgrades also considered the extension of Links Road from the Dunheved Precinct to Christie Street. Upgrades were deemed not to be required at the Richmond Road/Dunheved Road and Great Western Highway/Glossop Street intersections.

Table 2.5: St Marys Development Site Intersection Upgrades Relevant to Our Study Area

Intersection	Description of Upgrades	SIDRA Layout ¹	Comments
Great Western Highway / Parker Street	115m short through lane on north approach 100m right turn bay on east approach 105m short through lane on south approach		Upgrades required for 2021. Further upgrades required for 2031.
Forrester Road / Christie Street / Boronia Road	- Installation of traffic signals - Significant upgrades on north, south and west legs		Upgrades required for 2021.
Forrester Road / Christie Street / Boronia Road	- Additional 60m left turn slip lane on north approach - Additional left turn slip lane on east approach - Additional 100m through and exit lanes on north and south legs in both directions		Upgrades required for 2031.

Intersection	Description of Upgrades	SIDRA Layout ¹	Comments
Christie Street / Lee Holm Road / Links Road Extension	- Installation of traffic signals - Duplication of Christie Street in both directions - Left turn slip lane on west approach		Upgrades required for 2021.
Christie Street / Dunheved Road / Werrington Road	- Installation of traffic signals - Duplication of Werrington Road		Upgrades required for 2026.
Christie Street / Dunheved Road / Werrington Road	- Duplication of Christie Street on east approach - Signalised left turn slip lane on south approach		Upgrades required for 2021.
Great Western Highway / Werrington Road / Reserve Road	Left turn slip lane on south approach		Upgrades required for 2026.

¹SIDRA layouts derived from the St Marys Development Site Regional Traffic Modelling Traffic and Transport Assessment (WSP, October 2017)

3. DEVELOPMENT PROPOSAL DETAILS

3.1 DEVELOPMENT DESCRIPTION

The St Marys Freight Hub proposal is for a 12-hectare road and rail inland container terminal, with a maximum operating capacity of 301,000 Twenty-Foot Equivalent Units (TEUs) per annum. The St Marys Freight Hub will receive full containers from Port Botany. Trucks will collect these full containers from the site and deliver them to businesses across Western Sydney. Empty containers will be returned to the site for return via train to Port Botany. The distribution of these containers is currently mostly undertaken via truck trips to/from Port Botany and locating this facility in Western Sydney will reduce the length of trucks on the wider Sydney road network.

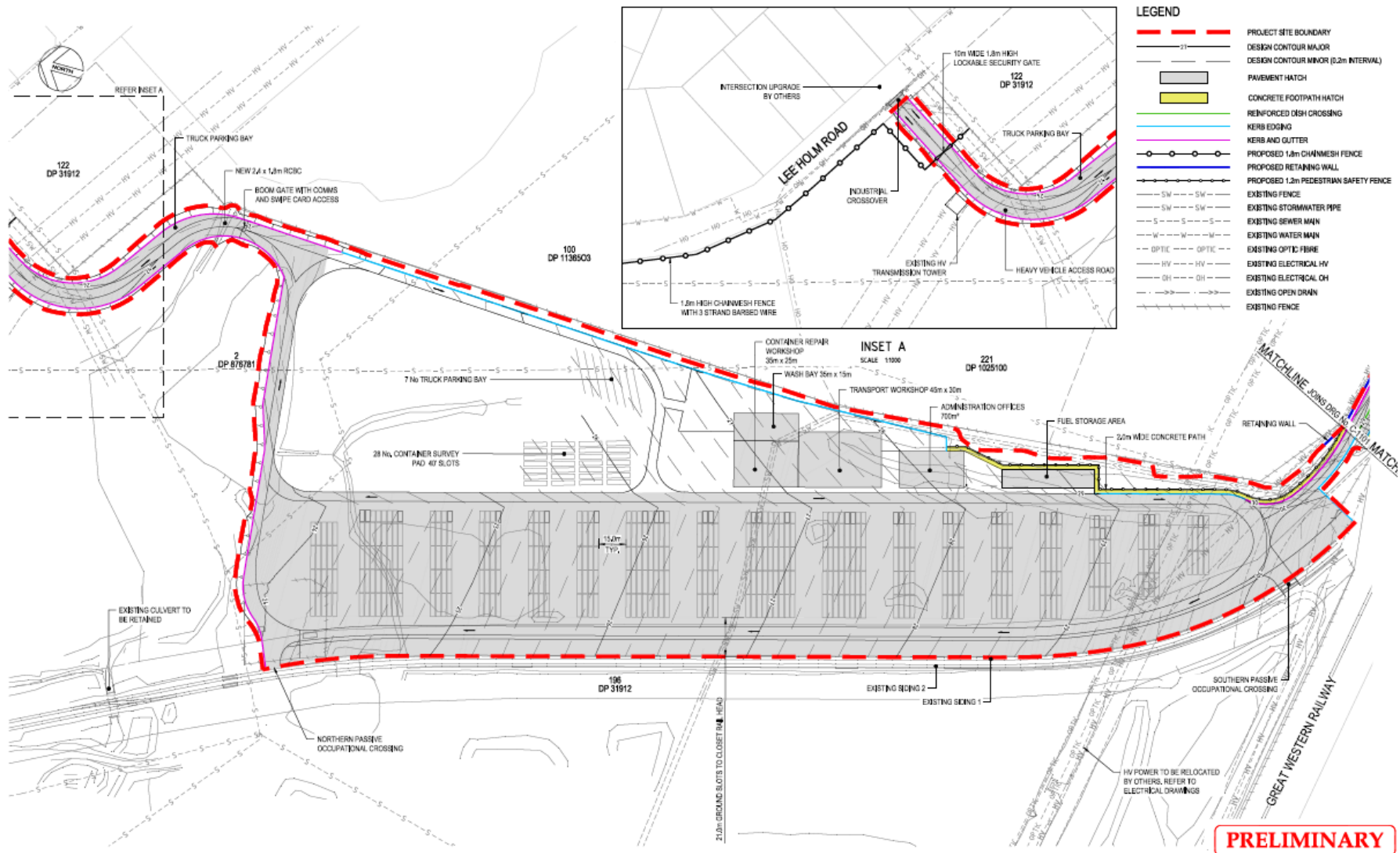
The proposed St Marys Freight Hub site is shown in Figure 3.1 and site concept plan in Figure 3.2 and Figure 3.3. The development will include:

- access roads from Forrester Road (entry only) and Lee Holm Road for cars and trucks;
- rail sidings for loading and unloading of trains accessed via the Dunheved Railway spur line which connects with the existing Main Western Railway Line;
- hardstand areas for container storage, loading and unloading;
- utilities such as drainage, potable water, fire water, power, data, security and sewerage;
- an office building and staff amenities; and
- sufficient car parking spaces to cater for the 40-45 (maximum) staff on site during the day as well as 7 truck parking spaces.



Adapted from Google Maps

Figure 3.1: Proposed St Marys Freight Hub Location and Access Roads



Source: BG&E

Figure 3.2: Proposed St Marys Freight Hub Layout – Sheet 1



Source: BG&E

Figure 3.3: Proposed St Marys Freight Hub Layout – Sheet 2

3.2 PROPOSED DEVELOPMENT OPERATING HOURS

The St Marys Freight Hub's transport operations are proposed to be 24/7 with a cease of operations from Saturday 2pm to Sunday 4am. Rail intermodal operations are also proposed to be 24/7. Empty depot operations are proposed to be 24 hours Monday to Friday and possibly Saturday 5am-12pm. The St Marys Freight Hub's proposed operating hours for staff are summarised in Table 3.1.

Table 3.1: Proposed St Marys Freight Hub Operating Hours

Section	Approx. Staff	Hours	Comments
1. Administrative/management staff per mantle deployed to St Marys	25	4am-4pm (day shift)	Office staff generally work a max 10-hour shift within the span of hours provided
	7	4pm-4am (night shift)	
2. Truck drivers starting and ending their shifts at St Marys ⁽¹⁾	55	4am-4pm (day shift)	Drivers generally work 10-12 hours per day
	35	4pm-4am (night shift)	
3. Permanent service/maintenance staff stationed at St Marys	8	Usually 5am-5pm	Staff generally work a max 10-hour shift within the span of hours provided
	2	Usually 5pm-5am	
4. Permanent terminal staff (reach stacker, forklift operators, and any other administrative/ground staff)	20	24 hours	3 equal shifts which will not be con-incident with road peak hours

(1) Will not park their cars on-site and would be expected to arrive to site by truck from their depots

3.3 TRAFFIC GENERATION CONSIDERATIONS

As shown in Table 3.1, private vehicle movements for site-based staff will occur at times which and not con-incident with the peak hours of the surrounding road network. In terms of private vehicle traffic, taking a conservative assumption that all staff will drive their own vehicles, daily two-way traffic would be approximately 124 private vehicle-movements per day with a maximum of approximately 40-45 staff vehicles on site during the day. Given the low level of staff traffic arriving during daylight hours and that this traffic will typically be outside of the road peak hours, the traffic generation calculations and traffic impact assessments at key intersection have been limited to the impacts of truck movements

3.4 TRAFFIC GENERATION CALCULATIONS

3.4.1 Step 1: Train Paths and Container Deliveries to and from St Marys

Trains will deliver full containers from Port Botany to St Marys and return empty containers from St Marys to Port Botany a maximum five times a day. There will be a maximum capacity of 87 TEUs per train and a TEU factor of 0.625 has been applied from existing ACFS Port Logistics data to account for the likely mix of 40ft and 20ft TEUs. Applying this factor results in approximately 54 boxes per train (on average) being delivered to the site per day.

The site will not be used for localised container storage associated with truck movements only. That is, full containers will arrive by train and be picked up from the site and delivered by truck to their destination. Empty containers will be picked up from surrounding locations and returned to the site and then loaded onto trains for the return trip to Port Botany.

3.4.2 Step 2: Truck Pick-ups Per Day

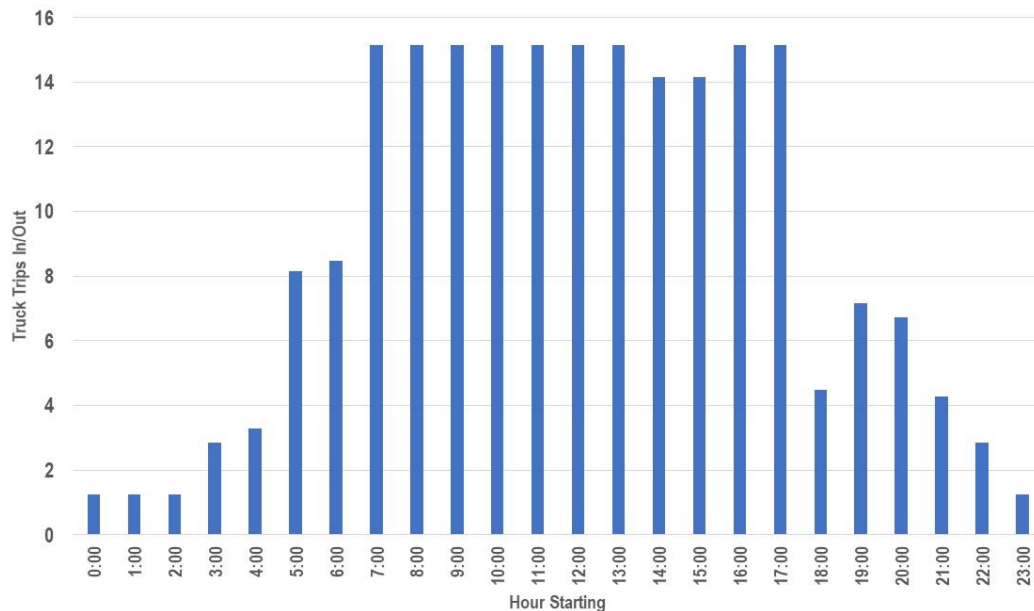
The 54 boxes per train multiplied by the maximum permissible five scheduled train trips per day equates to 272 boxes IN and 272 boxes OUT of the proposed St Marys Freight Hub per day. Based on current truck to

container ratio data, each truck will carry on average 1.25 containers using a mix of 19m semi-trailers and 26m B-doubles. This equates to approximately 218 trucks IN and 218 trucks OUT of the site per day.

It should be noted that a number of conservative assumptions have been made to generate the maximum likely traffic generation that the development is capable of producing. The conservative volumes presented below are likely to be higher than the average day site traffic generation.

3.4.3 Step 3: Daily Profile Distribution Assumptions and Peak Hour Truck Trips

The site will be a '24/7' operation and many of the container destinations will accept 'after dark' deliveries due to the nature of their businesses. To account for this, but taking a conservative approach, it has been assumed that approximately 80% of all daily trips will take place between 6:00am and 6:00pm (174 trips each way). This results in 15 trucks IN and 15 trucks OUT during both the AM and PM peaks using a uniform trip distribution profile between 6:00am and 6:00pm and aligned with efficient handling processes at the proposed St Marys Freight Hub. A relatively flat profile across the day is reasonable and common as it provides the most cost-efficient way for the business to use human resources and equipment resources across the day. The assumed daily traffic profile distribution is shown in Figure 3.4. The AM and PM peak hours for the intersections surrounding the development are 8:00am to 9:00am and 4:30pm to 5:30pm.



Source: Pacific National

Figure 3.4: Assumed Daily Traffic Profile Distribution

There will not be a significant number of employees on-site and the private vehicle arrival and departure times are highly unlikely to coincide with the road network peak hours due to the varying nature of shift times for on-site staff.

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3.6 PEAK TRAFFIC VOLUMES

Based on the calculated traffic distribution, the AM and PM peak traffic volumes calculated for each route are summarised in Table 3.2.

Table 3.2: Assumed Traffic Volume Distribution

Route (see Figure 3.6)	AM Peak		PM Peak	
	In	Out	In	Out
Red	11	11	11	11
Blue	2	2	2	2
Green	2	2	2	2
Purple	0	0	0	0
Grey	0	0	0	0

The 2018 AM and PM 'base' and 'with development' traffic volumes for each intersection for each peak one hour are summarised in Figure 3.7 and Figure 3.8. As expected, the Great Western Highway/Glossop Street intersection will have the greatest increase, with 30 additional trucks during both the AM and PM peaks, which represents an increase of 0.9% and 0.8% respectively based on 2018 traffic volumes. The Great Western Highway/Mamre Road and Mamre Road/M4 Western Motorway north intersections both increase by 26 trucks per peak hour. From the eight intersections nominated in the SEARs, the following intersections are not expected to be impacted by any additional trucks during either the AM or PM peaks:

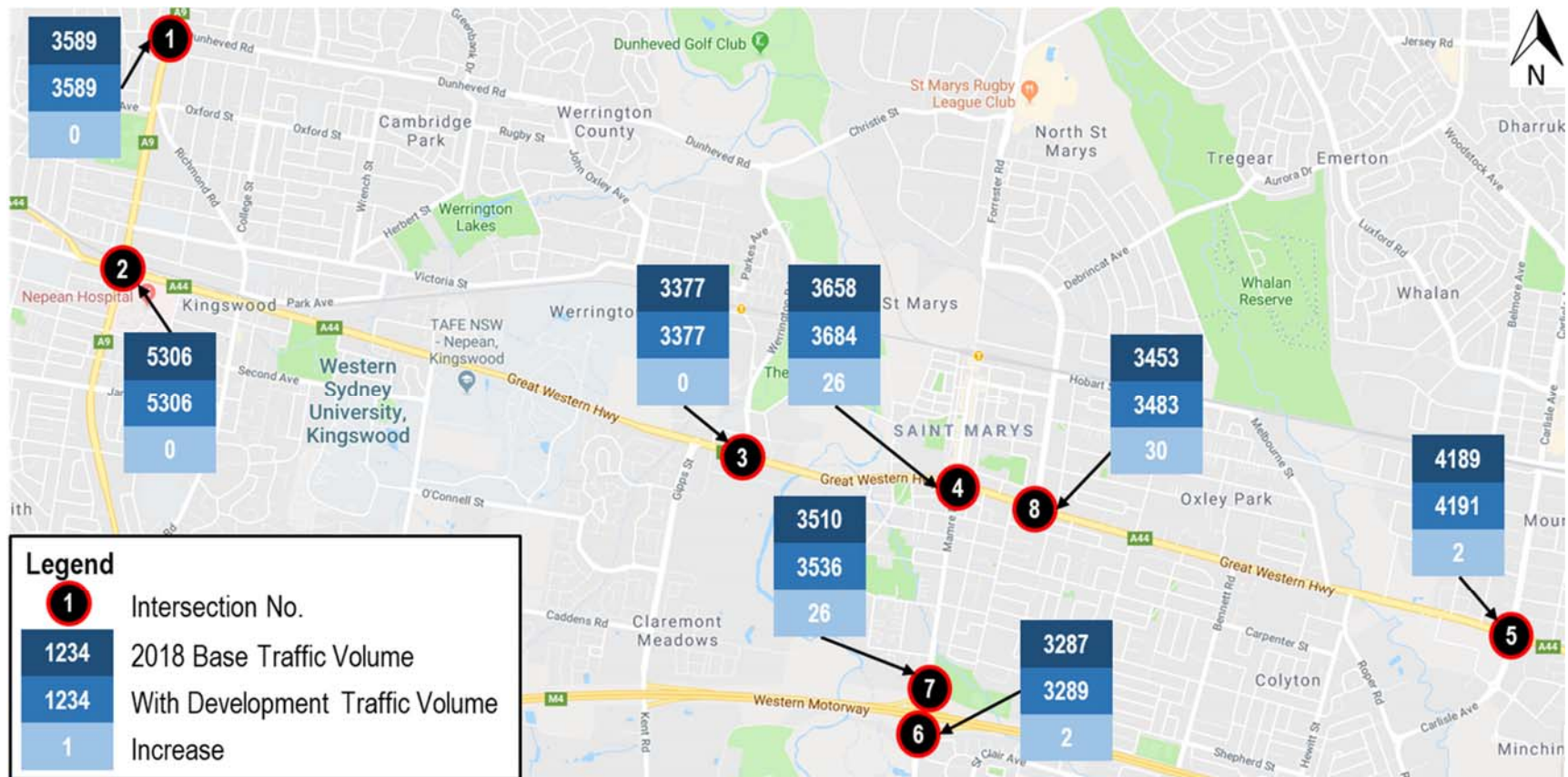
- Richmond Road/Dunheved Road;
- Great Western Highway/Parker Street; and
- Great Western Highway/Werrington Road/Reserve Road.

It should be noted that the St Marys Freight Hub will reduce the length of many truck trips that are currently accessing customers via Port Botany. It is very difficult to quantify this reduction, however, assuming that St Marys represents the centre of the market which receives its containers from Port Botany, approximately 67km per truck trip generated will be reduced on the broader network. With 436 truck trips per day, this equates to 29,212 truck-km per day removed off the regional road network or over 10 million truck-kms per annum.

Key benefits to the road network associated with this reduction include:

- contributing to reducing road congestion and improving journey times for other road users;
- reducing the extent of pavement impacts on major roads;
- reducing travel times, operating costs and hence reducing the economic impacts of freight movements;
- reducing emissions and noise on the road network.

In general, rail freight transport is three times more energy efficient and produces one-third of the emissions of road-based freight transport (<https://www.artc.com.au/move-your-freight-on-rail/environmental-benefits-of-rail/>). There are wider economic and community benefits in moving freight from road to rail for more of the freight carriage distance.

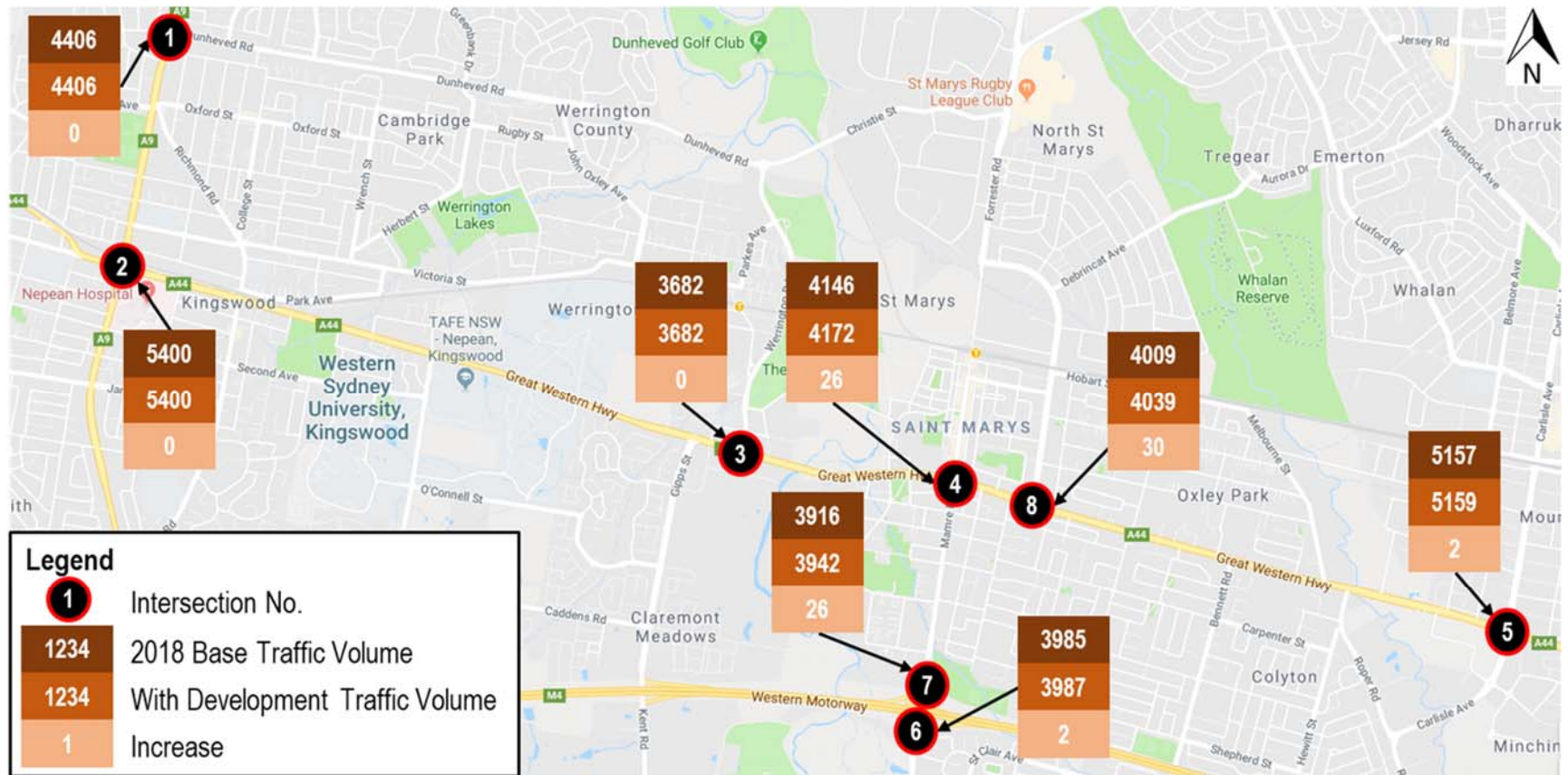


Adapted from Google Maps

Note: when distribution percentages have been applied, volumes have been rounded up

The development is not expected to be open until 2020

Figure 3.7: Development Traffic Volume Increase at Each Intersection based on 2018 AM Peak Background Data



Adapted from Google Maps

When distribution percentages have been applied, volumes have been rounded up

The development is not expected to be open until 2020

Figure 3.8: Development Traffic Volume Increase at Each Intersection based on 2018 PM Peak Background Data

4. TRAFFIC CAPACITY ASSESSMENT

4.1 METHODOLOGY

4.1.1 Intersection Modelling Software

The eight signalised intersections nominated in the SEARs were modelled using SIDRA intersection analysis software (version 8.0) to assess the operational impact of development traffic for the AM (8:00am-9:00am) and PM (4:30pm-5:30pm) peak hours.

This process involved:

- creating, calibrating and validating year 2018 Base Case models;
- factoring up 2018 traffic demands to represent 2030 traffic demands which represents a conventional 10-year assessment horizon after the expected opening year (the '2030 Base Case');
- adding the development traffic to create the '2030 With Development Case'; and
- adding 20% more development traffic as a sensitivity test as requested by Roads and Maritime to create the '2030 With Development + 20% Case'.

The Great Western Highway/Queen Street/Mamre Road and Great Western Highway/Glossop Street intersections were modelled as a network in 'SIDRA', as were the Mamre Road/M4 Western Motorway north and south intersections. Both 'SIDRA Network' models incorporate intersection offset times obtained from the Roads and Maritime LX file. All other intersections were modelled as isolated intersections. All articulated trucks were coded in the SIDRA models using SIDRA's 'Large Trucks' Movement Class, which has a vehicle length of 22 metres which appropriately represents the mix of 19m semi-trailers and 26m B-doubles.

4.1.2 Capacity Impact Criteria

Level of Service (LoS) is a measure of an intersection's operational performance and is related to the average number of seconds vehicles are delayed at an intersection or on each approach. Table 4.1 shows the standard criteria adopted by Roads and Maritime in assessing the LoS of signalised intersections.

Table 4.1: Roads and Maritime Level of Service Criteria for Signalised Intersections

Level of Service	Average Delay (sec/veh)	Traffic Signals
A	<14	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity; incidents will cause excessive delays
F	>70	Flow breakdown; forced flow

Source: Roads and Maritime Guide to Traffic Generating Developments (2002)

Degree of Saturation (DoS) is a measure of an intersection's operating capacity (volume/capacity ratio). The *Roads and Maritime Traffic Modelling Guidelines (2013)* state that the maximum practical DoS for signalised intersections should be 0.90.

Within Greater Sydney there are many signalised intersections which currently operate beyond the desirable thresholds for LoS and DoS. This is likely to be the case within the study area under background growth (i.e. the 2030 Base Case), primarily due to the level of growth in Western Sydney generally.

For this assessment, the development has been considered to introduce an impact if its truck traffic:

- results in a change in intersection LoS between the 2030 Base Case and the 2030 With Development Case; or
- results in a change in the intersection DoS between the 2030 Base Case and the 2030 With Development Case of more than 5%, and the DoS exceeds 0.90.

4.2 2018 BASE CASE

4.2.1 Intersection Volumes

Figure 4.1 shows the peak hour turning volumes at each of the eight intersections identified in the SEARs and for which SIDRA models have been created for.

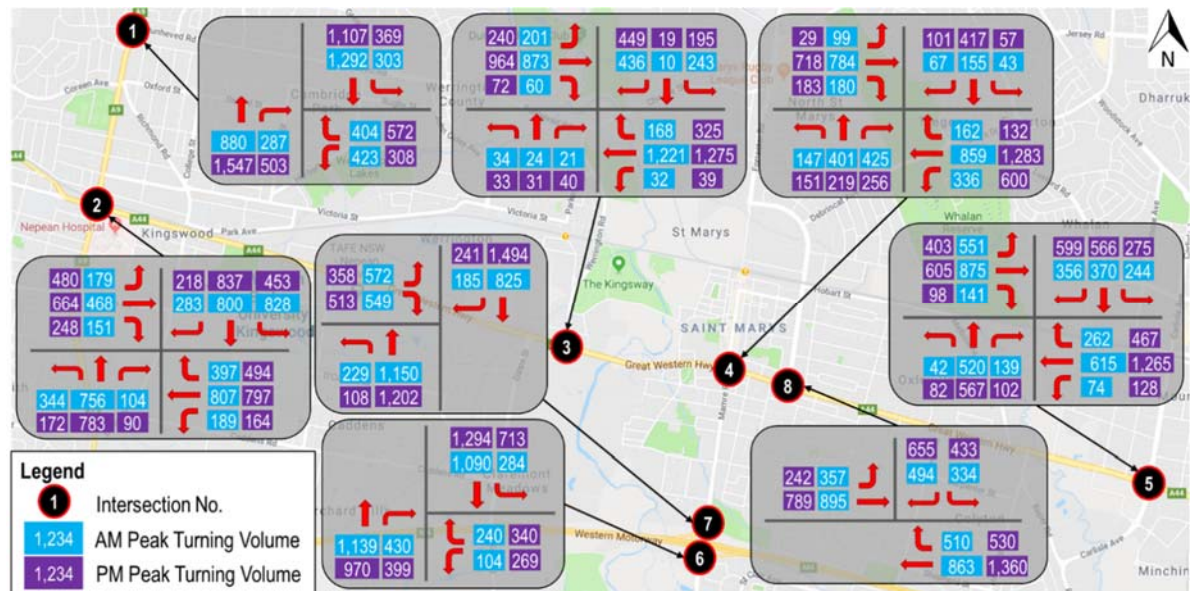


Figure 4.1: 2018 Base Case Traffic Volumes

4.2.2 Model Calibration

Year 2018 base SIDRA models were coded, calibrated and validated based on:

- 2018 traffic count surveys;
- back of queue count data;
- SCATS data and the LX file obtained from Roads and Maritime; and
- aerial imagery from Nearmap and Google Maps.

The 95th percentile queues were compared against the observed back of queue data in order to calibrate the 2018 Base SIDRA models. The queue length calibration comparison results are presented in Table 4.2.

Whilst the queues do not match precisely, which is typically not a requirement for SIDRA model calibration, the modelled queues are generally in a similar range of the observed queues and the SIDRA models are considered to be fit for the purpose of assessing the impacts of the Freight Hub's trucks on the eight intersections.

Table 4.2: 2018 Base Model Calibration Results

Intersection	Peak Period	Approach	Observed 95 th %ile Queue	SIDRA Output 95 th %ile Queue
Richmond Road / Dunheved Road	AM	North	17	20
		East	10	15
		South	12	14
	PM	North	12	20
		East	12	18
		South	15	23
Great Western Highway / Parker Street	AM	North	18	29
		East	22	29
		South	16	27
		West	12	20

Intersection	Peak Period	Approach	Observed 95 th %ile Queue	SIDRA Output 95 th %ile Queue
	PM	North	21	28
		East	16	29
		South	19	27
		West	17	22
Great Western Highway / Werrington Road / Reserve Road	AM	North	14	34
		East	18	26
		South	3	4
		West	15	21
	PM	North	18	39
		East	21	28
		South	4	5
		West	17	24
Great Western Highway / Queen Street / Mamre Road	AM	North	8	9
		East	16	22
		South	18	34
		West	13	19
	PM	North	10	21
		East	13	27
		South	16	21
		West	11	15
Great Western Highway / Carlisle Avenue	AM	North	12	21
		East	10	13
		South	11	17
		West	16	23
	PM	North	14	33
		East	11	28
		South	12	20
		West	16	18
Mamre Road / M4 Western Motorway (south)	AM	North	15	15
		East	11	6
		South	16	22
	PM	North	22	25
		East	16	10
		South	35	31
Mamre Road / M4 Western Motorway (north)	AM	North	22	19
		South	13	20
		West	12	16
	PM	North	22	31
		South	14	28
		West	17	21
Great Western Highway / Glossop Street	AM	North	17	18
		East	10	17
		West	15	24
	PM	North	13	21
		East	12	20
		West	13	13

4.2.3 Intersection Performance Summary

Table 4.3 summarises the 2018 AM and PM peak base intersection performance.

Table 4.3: Intersection SIDRA Results Summary – 2018 Base

Intersection	AM Peak				PM Peak			
	Degree of Saturation (v/c) Worst Movement	Average Delay (sec/veh)	Overall Level of Service	Longest 95th Percentile Queue (m)	Degree of Saturation (v/c) Worst Movement	Average Delay (sec/veh)	Overall Level of Service	Longest 95th Percentile Queue (m)
Richmond Road/Dunheved Road	0.79	21	B	149	0.82	23	B	161
Great Western Highway/Parker Street	0.96	47	D	230	0.88	44	D	213
Great Western Highway/Werrington Road/Reserve Road	0.88	44	D	261	0.96	48	D	285
Great Western Highway/Queen Street/Mamre Road	0.85	51	D	282	0.83	44	D	192
Great Western Highway/Carlisle Avenue	0.70	43	D	175	0.71	46	D	250
Mamre Road/M4 Western Motorway (south)	0.60	18	B	167	0.95	24	B	231
Mamre Road/M4 Western Motorway (north)	1.06	26	B	159	0.96	27	B	225
Great Western Highway/Glossop Street	0.80	35	C	181	0.83	31	C	156

The above results indicate that:

- the Great Western Highway/Queen Street/Mamre Road and Great Western Highway/Carlisle Avenue intersections currently operate below practical capacity and at a LoS D during both peaks;
- the Great Western Highway/Glossop Street intersection currently operates below practical capacity and at a LoS C during both peaks;
- the following intersections currently operate above practical capacity in one or more of their approaches, but below theoretical capacity during one peak:
 - Great Western Highway/Parker Street – AM peak;
 - Great Western Highway/Werrington Road/Reserve Road – PM peak; and
 - Mamre Road/M4 Western Motorway south and north – PM peak;
- Mamre Road/M4 Western Motorway north is the only intersection currently operating above theoretical capacity at one approach (north approach Right Turn Bay) during the AM peak;
- the Mamre Road/M4 Western Motorway south intersection currently operates at the lowest DoS during the AM peak and at an acceptable LoS B during both peaks; and
- Richmond Road/Dunheved Road is the only intersection currently operating both below practical capacity and at an acceptable LoS B during both peaks.

In general, all of the eight intersections modelled are either approaching or at their practical capacity, synonymous with traffic conditions at signalised intersections in rapidly growing areas in Western Sydney.

4.3 2030 BASE CASE ANALYSIS

4.3.1 Creating Year 2030 Traffic Volumes

The 2030 traffic demands were derived by calculating future growth rates from the Sydney Strategic Transport Model (STM) outputs provided by Roads and Maritime for each intersection approach. On some approaches in some peak periods, STM traffic volumes in 2036 were reported as being lower than year 2018 volumes, most likely due to over-capacity effects elsewhere in the network. In these situations, the approach volumes in 2030 were retained at their 2018 levels.

The 2030 Base Case and 2030 With Development scenario models use existing intersection configurations and phase times.

4.3.2 Intersection Volumes

Figure 4.2 shows the peak hour turning volumes at each of the eight intersections identified in the SEARs.

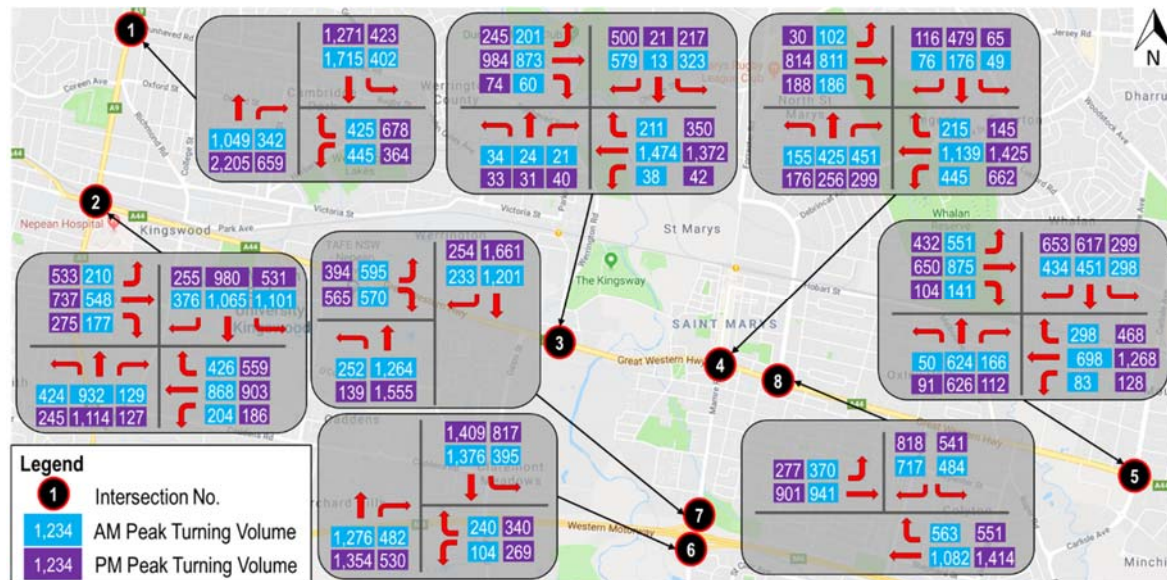


Figure 4.2: 2030 Base Case Traffic Volumes

4.3.3 SIDRA Modelling Results

Table 4.4 summarises the 2030 AM and PM peak base intersection performance results.

Table 4.4: Intersection SIDRA Results Summary – 2030 Base Case

Intersection	AM Peak				PM Peak			
	Degree of Saturation (v/c) Worst Movement	Average Delay (sec/veh)	Overall Level of Service	Longest 95th Percentile Queue (m)	Degree of Saturation (v/c) Worst Movement	Average Delay (sec/veh)	Overall Level of Service	Longest 95th Percentile Queue (m)
Richmond Road/ Dunheved Road	0.95	27	B	392	1.08	37	C	357
Great Western Highway/ Parker Street	1.10	81	F	554	1.04	67	E	453
Great Western Highway/ Werrington Road/ Reserve Road	1.22	77	F	760	1.04	56	D	414
Great Western Highway/ Queen Street/Mamre Road	0.90	54	D	322	1.01	49	D	301
Great Western Highway/ Carlisle Avenue	0.67	19	B	216	0.79	46	D	278
Mamre Road/M4 Western Motorway (south)	0.67	19	B	216	1.21	49	D	592
Mamre Road/M4 Western Motorway (north)	0.84	27	B	266	0.92	33	C	522
Great Western Highway/ Glossop Street	0.62	38	C	223	0.90	32	C	197

The above results indicate that the:

- following intersections are forecast to operate within practical capacity during one or both peaks:
 - Great Western Highway/Carlisle Avenue – both peaks;
 - Mamre Road/M4 Western Motorway (south) – AM peak; and
 - Great Western Highway/Glossop Street – AM peak;
- Great Western Highway/Parker Street intersection is forecast to operate at a LoS F during AM peak, as well as the Great Western Highway/Werrington Road/Reserve Road intersection during the AM peak;
- Great Western Highway/Parker Street intersection is forecast to operate at a LoS E during the PM peak;
- Richmond Road/Dunheved Road and Great Western Highway/Queen Street/Mamre Road intersections are forecast to operate above practical capacity, but below theoretical capacity during the AM peak; and
- Mamre Road/M4 Western Motorway south intersection is forecast to operate at the lowest DoS during the AM peak and at an acceptable LoS B during the AM peak.
- long queues will be expected along approaches with Degree of Saturation over 0.9.

It is important to note that when using SIDRA network, such as at the Mamre Road interchange with the M4 Western Motorway, some intersection performance results may improve compared to the 2018 results, but only because traffic at the other intersection(s) in the network is much worse and not releasing traffic into the better performing intersection.

4.4 2030 WITH DEVELOPMENT ANALYSIS

4.4.1 Creating Year 2030 With Development Traffic Volumes

The development traffic volumes described in Section 3.6 were added to the year 2030 Base Case traffic volumes to create the year 2030 With Development traffic volumes. Year 2030 Base Case analyses were undertaken for all eight intersections as nominated in the SEARs, however, the 2030 'With Development' analyses exclude the following intersections which will not be impacted at all by Freight Hub traffic:

- Richmond Road/Dunheved Road;
- Great Western Highway/Parker Street; and
- Great Western Highway/Werrington Road/Reserve Road.

4.4.2 Intersection Volumes

Figure 4.3 shows the peak hour turning volumes for the 2030 With Development case.

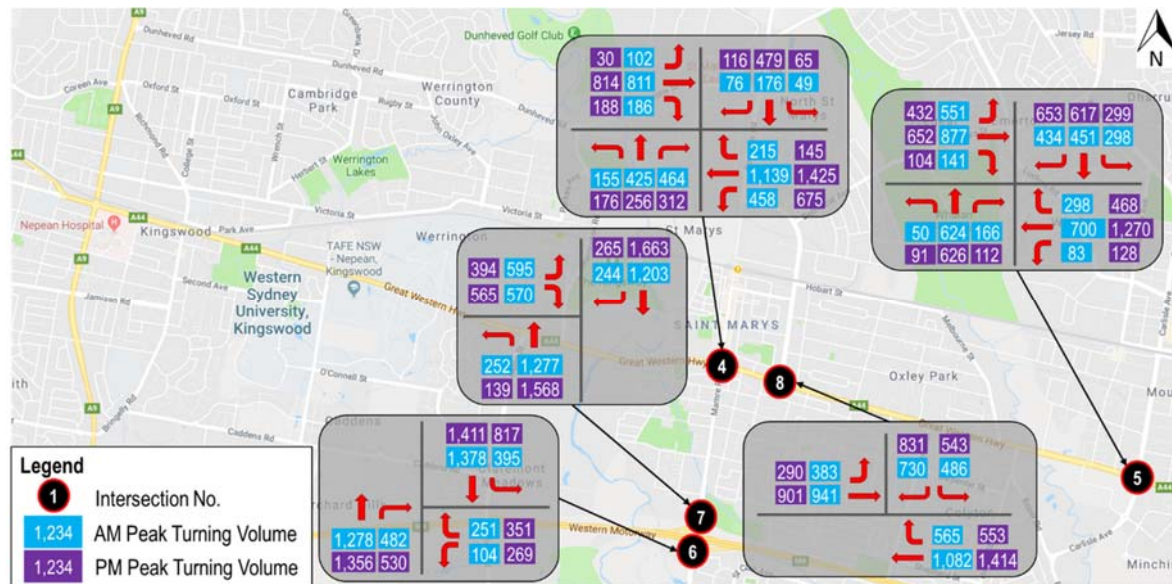


Figure 4.3: 2030 With Development Case Traffic Volumes

4.4.3 SIDRA Modelling Results

Table 4.5 summarises the 2030 With Development intersection performance for the five of the eight intersections where intersection volumes increase with the development.

Table 4.5: Intersection SIDRA Results Summary – 2030 With Development

Intersection	AM Peak				PM Peak			
	Degree of Saturation (v/c) Worst Movement	Average Delay (sec/veh)	Overall Level of Service	Longest 95th Percentile Queue (m)	Degree of Saturation (v/c) Worst Movement	Average Delay (sec/veh)	Overall Level of Service	Longest 95th Percentile Queue (m)
Great Western Highway/ Queen Street/Mamre Road	0.92	55	D	355	1.09	53	D	404
Great Western Highway/ Carlisle Avenue	0.80	44	D	199	0.79	46	D	278
Mamre Road/M4 Western Motorway (south)	0.67	20	B	218	1.21	54	D	592
Mamre Road/M4 Western Motorway (north)	0.84	28	B	274	0.95	36	C	570
Great Western Highway/ Glossop Street	0.66	39	C	230	0.90	33	C	209

The above results indicate that the:

- following intersections are forecast to operate within practical capacity during one or both peaks:
 - Great Western Highway/Carlisle Avenue – both peaks;
 - Mamre Road/M4 Western Motorway (south) – AM peak; and
 - Great Western Highway/Glossop Street – AM peak;
- Great Western Highway/Queen Street/Mamre Road intersection is forecast to operate above practical capacity, but below theoretical capacity, and at a LoS D during the AM peak; and
- Mamre Road/M4 Western Motorway south intersection is forecast to operate at the lowest DoS during the AM peak and at an acceptable LoS B during the AM peak.

With or without the development, the Great Western Highway/Queen Street/Mamre Road intersection and the Mamre Road/M4 Western Motorway interchange intersections will be expected to be operating at capacity in the 2030 PM peak.

4.5 2030 WITH DEVELOPMENT SENSITIVITY TEST

As requested by Roads and Maritime, a 2030 sensitivity test was undertaken for the five affected intersections by adding 20% more to the development traffic generation at each intersection.

Table 4.6 summarises the 2030 AM and PM peak 'with development + 20%' case intersection performance.

Table 4.6: Intersection SIDRA Results Summary – 2030 With Development + 20%

Intersection	AM Peak				PM Peak			
	Degree of Saturation (v/c) Worst Movement	Average Delay (sec/veh)	Overall Level of Service	Longest 95th Percentile Queue (m)	Degree of Saturation (v/c) Worst Movement	Average Delay (sec/veh)	Overall Level of Service	Longest 95th Percentile Queue (m)
Great Western Highway/ Queen Street/Mamre Road	0.93	56	D	357	1.11	54	D	440
Great Western Highway/ Carlisle Avenue	0.80	44	D	199	0.79	46	D	278
Mamre Road/M4 Western Motorway (south)	0.69	20	B	219	1.21	55	D	592
Mamre Road/M4 Western Motorway (north)	0.84	28	B	278	0.95	37	C	582
Great Western Highway/ Glossop Street	0.66	39	C	230	0.91	33	C	213

The 2030 With Development +20% modelling results show that all intersections will operate almost identically to the 2030 With Development Case. This is largely expected given the relatively small volumes of Freight Hub trucks compared to all other traffic at each intersection.

4.6 COMPARISON SUMMARY OF INTERSECTION OPERATIONS

Table 4.7 summarises the 2018 base, 2030 base and 2030 with development + 20% intersection average delay and LoS.

Table 4.7: Intersection SIDRA Results Summary – Average Delay and Level of Service

Intersection	AM Peak			PM Peak		
	2018 Base	2030 Base	2030 With Development + 20%	2018 Base	2030 Base	2030 With Development + 20%
Richmond Road/Dunheved Road	21 (B)	27 (B)		23 (B)	37 (C)	
Great Western Highway/Parker Street	47 (D)	81 (F)		44 (D)	67 (E)	
Great Western Highway/Werrington Road/ Reserve Road	44 (D)	77 (F)		48 (D)	56 (D)	
Great Western Highway/Queen Street/Mamre Road	51 (D)	54 (D)	56 (D)	44 (D)	49 (D)	54 (D)
Great Western Highway/Carlisle Avenue	43 (D)	44 (D)	44 (D)	46 (D)	46 (D)	46 (D)
Mamre Road/M4 Western Motorway (south)	18 (B)	19 (B)	20 (B)	24 (B)	49 (D)	55(D)
Mamre Road/M4 Western Motorway (north)	26 (B)	27 (B)	28 (B)	27 (B)	33 (C)	37(C)
Great Western Highway/Glossop Street	35 (C)	38 (C)	39 (C)	31 (C)	32 (C)	33 (C)

The above traffic capacity assessment concludes that mitigation measures due to introduction to the proposed development will not be required at any of the intersections, even with a 20% increase in assumed development traffic.

Detailed SIDRA modelling outputs are provided in Appendix C.

5. TRAFFIC SAFETY ASSESSMENT

5.1 TRUCK TURNING MOVEMENTS AT KEY INTERSECTIONS

It is expected that all B-double movements would be limited to approved B-double routes. Whilst semi-trailers could take alternative routes to the B-double to/from the site, it is unlikely that they would because the B-double routes are the most direct and efficient for accessing the motorway and highway network.

There are only three key intersections where Freight Hub truck traffic volumes exceed two trucks per hour and the traffic safety assessment has focussed on these locations. These intersections and the associated development truck turning movements are:

- Great Western Highway/Glossop Street: Most Freight Hub trucks at this intersection would be turning from north to west and from west to north on route between the site and the M4 Western Motorway Interchange;
- Great Western Highway/Queen Street/Mamre Road: Freight hub trucks would be turning from east to south and from south to east at this intersection to travel between the site and the M4 Western Motorway interchange; and
- Mamre Road / M4 Western Motorway (northern intersection): Freight Hub trucks would be turning from north to east at this intersection heading away from the Freight Hub whilst trucks heading towards the Freight Hub would be passing through the intersection from south to north.

5.2 INFLUENCES ON EXISTING CRASH PATTERNS

5.2.1 Great Western Highway / Glossop Street

There was no crash pattern evident in the review of the crash data at this intersection. Four crashes in five years occurred on the northern approach to the intersection most likely related to rear-end crashes. It is likely that the trucks from the Freight Hub will store in the centre (right turn) lane on the northern approach to make it easier to then turn left at Mamre Road. Site observations identified that this is what most drivers of larger trucks do now. Given that the right turn is a signal-controlled movement, and that there are essentially two lanes for trucks to turn into on the Great Western Highway westbound, no exacerbation of existing crash likelihood is expected to be generated by Freight Hub traffic.

Similarly, the west to north movement allows larger trucks to turn from the left-most lane in the Great Western Highway eastbound and into two northbound lanes in Glossop Street. Pavement markings observed on site show that larger vehicles make this turn within the available lanes. Freight Hub trucks are unlikely to generate any noticeable increase in crash likelihood for this movement.



Source: Google Street View

Figure 5.1: Great Western Highway to Glossop Street Left Turn

5.2.2 Great Western Highway / Queen Street / Mamre Road

Most of the crashes recorded at this intersection were right at the intersection and may be partly due to queues not clearing the intersection fast enough before the next (opposing) phase is initiated, or red-light 'running'.

For Freight Hub trucks turning left (from east to south) at this intersection, they are required to prop at the 'high angle' left turn and give way to through traffic coming from Queen Street. The intersection is wide enough and sight lines clear enough for an oncoming southbound vehicle to observe a large truck entering at this location.

For the movement from south to east, there is no specific right turn pocket and the right turn movement is shared with the through movement (see Figure 5.2). This is currently managed with Queen Street and Mamre Road each running their own signal phases such that the Mamre Road right turn and through movements occurring at the same time, with no vehicles stopped and blocking the approach lanes. Also, for the right turn from north to east large trucks have two lanes they can use to turn into within the Great Western Highway.



Source: Google Street View

Figure 5.2: Mamre Road to Great Western Highway Right Turn

The Freight Hub traffic essentially relates to one additional right turn and one additional left turn truck movement at this intersection per signal cycle; which is not expected to significant impact the crash likelihood at this location.

5.2.3 Mamre Road / M4 Western Motorway (northern intersection)

This intersection recorded 18 crashes in five years, including 10 'right-through' crashes. This is most likely due to sight line limitations for vehicles turning right onto the eastbound loop on ramp not observing the red arrow and proceeding against an oncoming northbound through vehicle on Mamre Road (see Figure 5.3).

Drivers in the Freight Hub trucks making this turn due their height above ground would have better sight lines than drivers in cars would and it is unlikely that additional right turn truck movements at this location of the scale introduced by the Freight Hub would exacerbate existing crash risks.



Source: Google Street View

Figure 5.3: Mamre Road to M4 Western Motorway On-Ramp

For the left turn from the M4 ramps onto Mamre Road northbound, truck drivers would again have a sufficient sight line to oncoming traffic for gap selection. Furthermore, the lane widths for this turn mean that trucks can turn into the left lane without disturbing northbound through traffic in the right hand through lane.

6. PUBLIC TRANSPORT, ACTIVE TRANSPORT AND TRAVEL DEMAND MANAGEMENT

6.1 PUBLIC TRANSPORT ASSESSMENT

The development will have a maximum of approximately 40-45 staff on-site during daytime hours. Most of the shift start times for office-based staff and maintenance staff will start before 6am and are unlikely to attract many (if any) public transport trips. In any case, the site has adequate access to public transport. St Marys Railway Station is located in close proximity to the site (approximately 500 metres east), with frequent services running at least every 15 minutes. Furthermore, the high number of bus routes within the study area provide a range of travel options between St Marys and several surrounding suburbs in all directions. No supporting services or stops are considered necessary due to the development. Furthermore, the development's truck volumes will not have any tangible impact on bus services or stops in the study area.

6.2 ACTIVE TRANSPORT ASSESSMENT

The development is highly unlikely to be accessed by bicycle or walking with most shifts for office-based staff and maintenance staff likely to finish or start in the early morning before 6am.

In any case, the availability of formal footpaths along most roads within the study area provide adequate connectivity between the site and key locations, including St Marys Railway Station and nearby bus stops. Whilst, the existing cycling routes immediately surrounding the site do not directly connect with the wider cycling network, additional cycling infrastructure is not warranted for this level of development, including no need for formal on-site bike storage or parking facilities or end of trip facilities.

6.3 TRAVEL DEMAND MANAGEMENT PROGRAMS

Travel Demand Management (TDM) programs are most relevant for sites which generate large volumes of private vehicle trips at similar times of the day.

The site will generate a very low volume of private vehicle trips based on the number of proposed employees, and most of this private vehicle traffic is likely to be generated outside of the peak hours and at times where there are few public transport services running and it is too dark to make walking or cycling attractive options for site-staff.

On this basis, there is considered to be no need for, or benefit arising from, a TDM program for this development.

7. SITE CONFIGURATION ASSESSMENT

7.1 ACCESS ASSESSMENT

A sightline assessment was undertaken of the Forrester Road and Lee Holm Road site access points using the *Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections*. The minimum desirable safe intersection sight distances (SISD) from the proposed access points for cars and trucks are shown in Table 7.1, Figure 7.1 and Figure 7.2.

Table 7.1: Safe Intersection Sight Distances – Cars and Trucks

Location	Design Speed Limit (Posted Speed Limit)	Safe Intersection Sight Distances	
		Cars	Trucks
Forrester Road	60km/h (50km/h) north of access	123m	134m
	20km/h (10km/h) south of access	32m	32m
Lee Holm Road	70km/h (60km/h)	151m	168m



Adapted from Nearmap

Figure 7.1: Safe Intersection Sight Distances – Forrester Road



Adapted from Nearmap

Figure 7.2: Safe Intersection Sight Distances – Lee Holm Road

At both locations, buildings are sufficiently set back and there is sufficient SISD for all approaches.

Assessment of pedestrian movements, cyclist movements and Crime Prevention Through Environmental Design (CPTED) are not relevant given the nature of the proposed freight hub development and the very low peak hour private vehicle traffic generation.

7.2 MANOEUVRING AND PARKING

A swept path analysis was undertaken of the Forrester Road and Lee Holm Road site access driveways. The assessment revealed that a 26m long B-double can enter the site via the existing crossover on Forrester Road without any impacts or widening required (see Figure 7.3) The proposed crossover on Lee Holm Road will need to be configured to cover the area as shown in Figure 7.3Figure 7.4.

B-double turning templates have also been run across the internal site configuration shown in Figure 3.2 and all manoeuvring areas have been designed to accommodate the design vehicle in each area.

A total of 98 car parking spaces and one Person With a Disability (PWD) car parking space are proposed on the site near the truck widening area, with additional bays formalised along the Forrester Road access driveway. All spaces will need to be designed in accordance with AS2890.1 and AS2890.6.

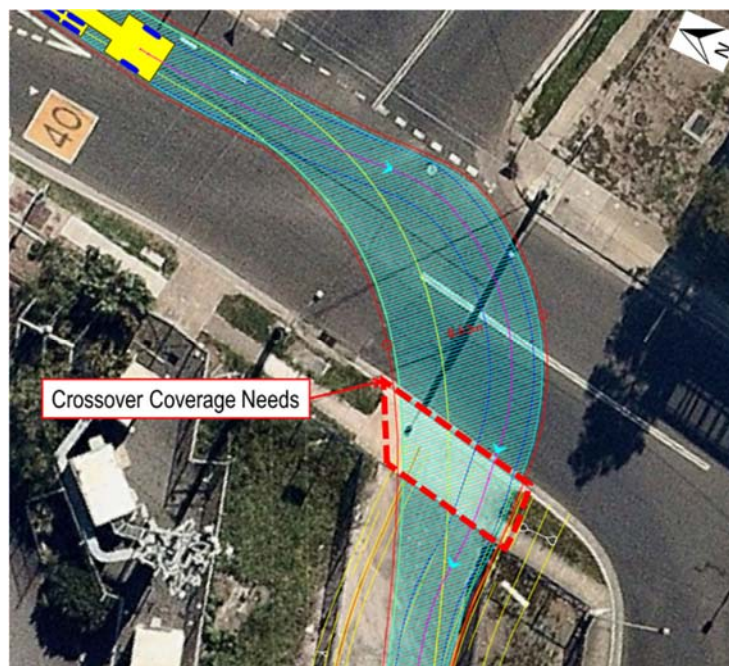


Figure 7.3: Forrester Road Access Swept Path and Access Width Needs

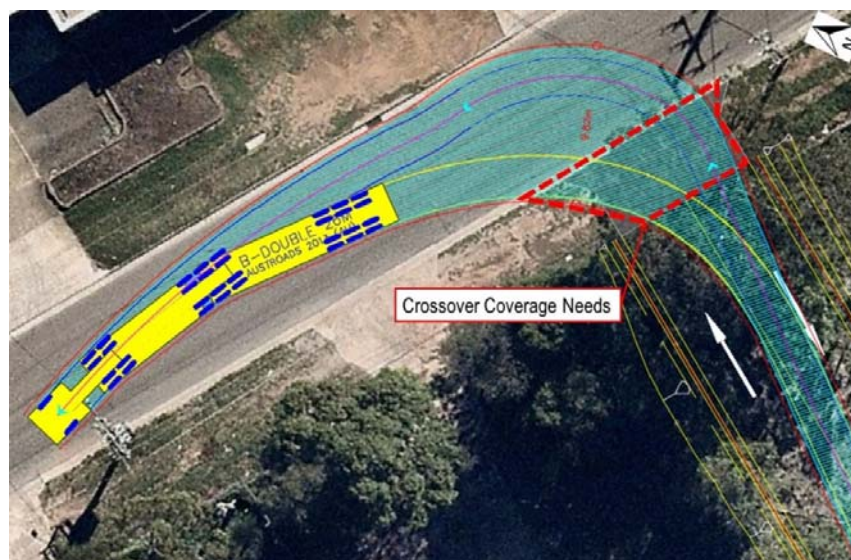


Figure 7.4: Lee Holm Road Access Swept Path and Access Width Needs

8. CONSTRUCTION PERIOD TRAFFIC ASSESSMENT

8.1 CONSTRUCTION TRAFFIC VOLUMES

The majority of the construction task involves the construction of the large concrete pads for the container storage area, as well as the approach driveways and manoeuvring areas, which are all likely to be concrete. This is not a labour-intensive task and construction traffic will primarily be related to the movement of materials to the site.

Major materials to be delivered to the site include:

- quarry product;
- asphalt;
- stormwater products;
- services products; and
- stabilisation agents.

At this stage, very little spoil will be removed from the site. All excess materials will be stockpiled on the other side of the railway line as these may be used for future stages of the development.

There will be between 4,100 and 4,500 truck movements during the entire construction period. The maximum number of movements per day is expected to be between 100 and 140. With a likely (minimum) 12-hour construction work day, the number of peak period construction trucks is likely to be less than the operation period demand.

At this stage, very little spoil will be removed from the site. All excess materials will be stockpiled on the other side of the railway line as these may be used for future stages.

8.2 CONSTRUCTION PERIOD TRAFFIC ASSESSMENT

The eight Roads and Maritime-nominated intersections assessed are currently operating below practical or theoretical capacity during both the AM and PM peaks (except for the Mamre Road/M4 Western Motorway north intersection during the AM peak) with a maximum average delay of 51 seconds (LoS D).

The projected number of daily truck movements of between 100 and 140 translates to approximately 8 to 12 trucks per peak hour which will have a negligible impact on the key intersections in the study area.

8.3 CONSTRUCTION PERIOD PARKING ASSESSMENT

It is anticipated that there will be up to 30 and 40 construction workers per day. This will peak at 80 staff when the building works overlap the pavement placement. Workers will be encouraged to travel by train to the site. Irrespective of this, the site is very large with no issues at all in being able to accommodate temporary construction-worker parking on site.

8.4 CONSTRUCTION TRAFFIC MANAGEMENT PLAN

A site-specific Construction Traffic Management Plan (CTMP) will be prepared for each work area during each stage by the Principal Contractor engaged to undertake the works. The CTMP is most appropriately created following confirmation of construction activities, staging and milestones as the development planning progresses however an 'outline' CTMP is provided in Appendix D. The CTMP will need to detail vehicle routes, numbers of trucks, hours of operation, access arrangements and traffic and pedestrian control measures for all construction activities when these details are known.

8.5 TRAFFIC CONTROL PLANS

Prior to implementation, construction traffic management measures will require the preparation of approved detailed Traffic Control Plans (TCPs) consistent with the CTMP. Each TCP should be prepared in accordance with Roads and Maritime's *Traffic Control at Works Sites Manual*. Any traffic control devices to be used during construction are also to be implemented into the TCPs in accordance with the manual.

9. CONCLUSIONS

The key findings from the Traffic and Transport Assessment for the proposed St Marys Freight Hub in relation to the SEARs are summarised as follows:

Operational Period Traffic Generation, Traffic Capacity and Traffic Safety

- The site will generate a negligible volume of private vehicle trips in the AM and PM peak hours. A maximum of approximately 40-45 office-based and maintenance/operations staff will be on-site during the day with almost all of these staff starting and ending their daytime shifts outside of road network peak hours. Even if some of these trips were co-incident with peak period conditions, this traffic has a negligible effect on operations when dispersed across all access routes to/from the site. On this basis, the traffic impact assessment has focussed on the impacts of truck trips generated by the site on the surrounding road network.
- The site will generate 218 truck entries and 218 truck exits per day, which is limited to the five available freight train paths in/out per day to the site. This equates to a maximum of 15 trucks IN and 15 trucks OUT in the AM and PM peak hours, comprising a mix of semi-trailers and B-doubles;
- Intersection analysis of the eight key intersections identified in the SEARs has revealed that the additional trucks generated by the development represent less than 1.0% of total traffic volumes at these intersections and hence have a negligible incremental impact on intersection performance at the assessment year of 2030; and
- The relatively low volume of truck turning movements generated by the site is not expected to exacerbate any prevailing crash patterns at the key intersections surrounding the site.

Public Transport, Active Transport and Travel Demand Management

- The site has a relatively small number of permanent on-site staff, will not generate many trips and many of the staff arrival and departure times will be before 6am when public transport, walking and cycling usage is minimal. The surrounding pedestrian and cycling connections, and access to public transport stops are sufficient to cater for any trips that may be generated by these modes of transport for access the site; and
- The nature of the development and the very small size of the on-site workforce suggests that Travel Demand Management programs are not warranted to be implemented.

Site Access and Site Configuration

- There are sufficient sight lines to/from the proposed access driveways which are on industrial standard roads commensurate with accommodating the semi-trailers and B-doubles generated by the site; and
- The on-site configuration accommodates the swept path of the vehicles expected and has sufficient areas for manoeuvring and parking of vehicles.

Construction Period Impacts

- The site will generate between 8-12 peak hour truck movements during the construction phase, mostly associated with the construction of on-site facilities and particularly the large concrete pad and driveway areas required. This volume of trucks is less than the expected truck traffic generation in the operational phase and like the operational period assessment findings, is not expected to introduce any significant impacts to the surrounding road system; and
- The on-site area is sufficient to accommodate the parking of construction worker vehicles and to store trucks waiting to load or unload (such as for concrete pours). There is also plenty of available room on-site for stockpiling material and little spoil is expected to be removed off-site during construction.

Overall, the development will not generate any significant impacts on the surrounding traffic and transport networks and no mitigation works are warranted external to the site.

APPENDIX A

TRAFFIC COUNT DATA



Richmond Rd SB

Dunheved Rd WB

Richmond Rd NB





[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Site ID:

1

Location:

Mann Rd/Queen St & Great Western Hwy, St Marys

Area:

03/09/2018

Period 1 Time:

8:00 AM

 to

9:00 AM

Weather:

Sunny

Period 1 Peak Hour:

8:00 AM

 to

9:00 AM

Great Western Hwy EB

Great Western Hwy WB

Mann Rd NB

Queen St SB

TDC

Traffic Data & Control

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PEAKS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			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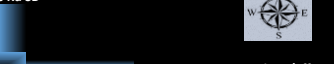
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TDC
Traffic Data & Control

TOTALS AND PEAKS																																																		
Period 2 Total		2102	51	8	5	0	4432	139	69	26	0	0	0	0	0	0	0	1012	52	15	3	0	1155	56	15	1	0	0	0	0	0	1	3384	118	61	34	0	1633	43	23	3	0	0	0	0	4	14440	6832	2309	5299
Period 2 Peak Hr		679	4	3	0	0	1266	32	12	9	0	0	0	0	0	0	0	272	7	0	0	0	300	12	4	0	0	0	0	0	0	0	954	27	13	7	0	373	4	7	0	0	0	0	0	1	3985	2005	595	1385
Time Starting	Mamre Rd SB	Mamre Rd SB	Mamre Rd SB	Mamre Rd SB	Mamre Rd SB	Mamre Rd SB	Mamre Rd SB	Mamre Rd SB	Mamre Rd SB	Mamre Rd SB	Mamre Rd SB	Mamre Rd SB	Mamre Rd SB	Mamre Rd SB	Mamre Rd SB	Cross 1	Great Western Hwy on/off ramps WB	Great Western Hwy on/off ramps WB	Great Western Hwy on/off ramps WB	Great Western Hwy on/off ramps WB	Great Western Hwy on/off ramps WB	Great Western Hwy on/off ramps WB	Great Western Hwy on/off ramps WB	Great Western Hwy on/off ramps WB	Great Western Hwy on/off ramps WB	Great Western Hwy on/off ramps WB	Great Western Hwy on/off ramps WB	Great Western Hwy on/off ramps WB	Cross 1	Mamre Rd NB	Mamre Rd NB	Mamre Rd NB	Mamre Rd NB	Mamre Rd NB	Mamre Rd NB	Mamre Rd NB	Mamre Rd NB	Mamre Rd NB	Mamre Rd NB	Mamre Rd NB	Mamre Rd NB	Mamre Rd NB	Cross 1	GRAND TOTAL	Mamre Rd SB	Great Western Hwy on/off ramps WB	Mamre Rd NB			
	Left	Left	Left	Left	Left	Through	Through	Through	Through	Through	U-turn	U-turn	U-turn	U-turn	U-turn	Pedestrians	Light Vehicles	Light Trucks (3-5)	Heavy Trucks (6-12)	Buses	Bicycles on Road	Light Vehicles	Light Trucks (3-5)	Heavy Trucks (6-12)	Buses	Bicycles on Road	Light Vehicles	Light Trucks (3-5)	Heavy Trucks (6-12)	Buses	Pedestrians	Light Vehicles	Light Trucks (3-5)	Heavy Trucks (6-12)	Buses	Pedestrians	Light Vehicles	Light Trucks (3-5)	Heavy Trucks (6-12)	Buses	Pedestrians	TOTAL	TOTAL	TOTAL	TOTAL					
15:00	87	5	0	0	0	242	12	12	12	12	0	0	0	0	0	0	56	7	2	0	0	52	7	0	0	0	0	0	0	0	208	9	4	2	0	114	5	5	0	0	0	0	0	0	853	355	153	345		
15:15	115	3	0	0	0	271	12	12	12	12	0	0	0	0	0	0	56	7	2	0	0	52	7	0	0	0	0	0	0	0	219	13	5	1	0	126	5	5	0	0	0	0	0	1	919	407	143	369		
15:30	168	8	0	1	0	262	13	13	13	13	0	0	0	0	0	0	59	8	2	1	0	63	7	0	1	0	0	0	0	0	214	9	7	7	0	120	5	2	2	0	0	0	0	0	960	458	140	362		
15:45	135	7	0	0	0	303	18	7	1	1	0	0	0	0	0	0	60	2	0	0	0	68	3	0	0	0	0	0	0	0	224	13	6	1	0	76	5	1	0	0	0	0	0	1	930	471	133	326		
16:00	149	7	2	0	0	260	11	10	2	0	0	0	0	0	0	0	68	6	2	0	0	95	3	4	0	0	0	0	0	0	195	13	8	5	0	98	9	1	0	0	0	0	0	0	948	441	178	329		
16:15	158	5	0	0	0	317	14	10	1	0	0	0	0	0	0	0	69	5	1	0	0	71	6	2	0	0	0	0	0	0	233	8	8	0	0	88	3	0	0	0	0	0	0	0	999	505	154	340		
16:30	158	7	2	1	0	279	9	5	2	0	0	0	0	0	0	0	63	4	1	0	0	85	6	1	0	0	0	0	0	0	210	5	6	4	0	99	4	2	0	0	0	0	0	0	953	463	160	330		
16:45	176	2	0	0	0	307	9	2	6	0	0	0	0	0	0	0	70	0	0	0	0	76	5	2	0	0	0	0	0	0	252	13	6	3	0	76	2	2	0	0	0	0	0	0	1009	502	153	354		
17:00	168	1	0	0	0	296	6	5	0	0	0	0	0	0	0	0	59	3	0	0	0	81	4	1	0	0	0	0	0	0	232	6	4	1	0	116	1	3	0	0	0	0	0	1	987	476	148	363		
17:15	196	0	2	0	0	353	8	3	2	0	0	0	0	0	0	0	66	3	0	0	0	78	1	0	0	0	0	0	0	0	223	2	2	1	0	91	1	2	0	0	0	0	0	0	1034	564	148	322		
17:30	139	1	1	0	0	310	9	2	1	0	0	0	0	0	0	0	77	1	0	0	0	65	2	1	0	0	0	0	0	0	247	6	1	2	0	90	0	0	0	0	0	0	0	0	955	463	146	346		
17:45	136	3	0	0	0	274	1	2	2	0	0	0	0	0	0	0	67	1	2	0	0	60	2	0	0	0	0	0	0	1	244	9	1	1	0	138	2	1	0	0	0	0	0	0	946	418	132	396		
18:00	92	1	0	0	0	269	5	4	1	0	0	0	0	0	0	0	72	3	2	0	0	71	3	1	0	0	0	0	0	0	194	5	3	1	0	131	3	2	0	0	0	0	0	0	863	372	152	339		
18:15	100	1	1	0	0	268	5	3	1	0	0	0	0	0	0	0	61	0	2	0	0	72	2	0	0	0	0	0	0	0	172	4	0	2	0	82	0	0	0	0	0	0	0	1	776	379	137	260		
18:30	67	0	0	0	0	212	4	1	1	0	0	0	0	0	0	0	57	2	0	0	0	58	0	0	0	0	0	0	0	0	170	1	0	1	0	91	2	3	0	0	0	0	0	0	670	285	117	268		
18:45	58	0	0	0	0	209	3	2	1	0	0	0	0	0	0	0	52	1	0	1	0	57	3	0	1	0	0	0	0	0	147	2	0	2	0	97	2	0	0	0	0	0	0	0	638	273	115	250		

Western Mwy EB on/off-ramps EB



12558	4121	4372	4065
3856	1197	1251	1408

Western Mwy EB on/off-ramps EB

[illegible]

[illegible]

APPENDIX B

CRASH DATA





Legend

Crash Severity



Injury



Non-casualty (towaway)

Richmond Road

Dunheved Road



Legend

Crash Type

- Vehicles from adjacent direction (intersections only)
- Vehicles from opposing direction
- Vehicles from same direction
- ◆ Overtaking
- * Off path, on straight

Richmond Road

Dunheved Road



Legend

Crash Severity

▲ Injury

● Non-casualty (towaway)

Parker Street

Great Western Highway



Parker Street

Legend

Crash Type

- ▲ Pedestrians (on foot or in toy/pram)
- Vehicles from adjacent direction (intersections only)
- Vehicles from opposing direction
- Vehicles from same direction
- * Off path, on straight
- ★ Off path, on curve or turning

Great Western Highway



Legend

Crash Severity

▲ Injury

● Non-casualty (towaway)





Legend

Crash Type

- Vehicles from adjacent direction (intersections only)
- Vehicles from opposing direction
- Vehicles from same direction
- ◆ Manoeuvring
- ✱ Off path, on straight



Legend

Crash Severity

▲ Injury

● Non-casualty (towaway)





Queen Street

Mamre Road

Great Western Highway

Sainsbury Street

Legend

Crash Type

- Vehicles from adjacent direction (intersections only)
- Vehicles from opposing direction
- Vehicles from same direction
- * Off path, on straight



Legend

Crash Severity

▲ Injury

● Non-casualty (towaway)

Carlisle Avenue

Great Western Highway

BITZIOS
-consulting

traffic engineering • transport planning

PROJECT TITLE: P3796 St Marys Inland Container Terminal EIS

FIGURE TITLE: Great Western Highway/Carlisle Avenue Crash Severity – 2013 to 2017

VERSION LOG: 001

DATE: 07/02/2019

FILE PATH: P:\P3796 St Marys Inland Container Terminal EIS\Technical Work\Mapping\Work Spaces



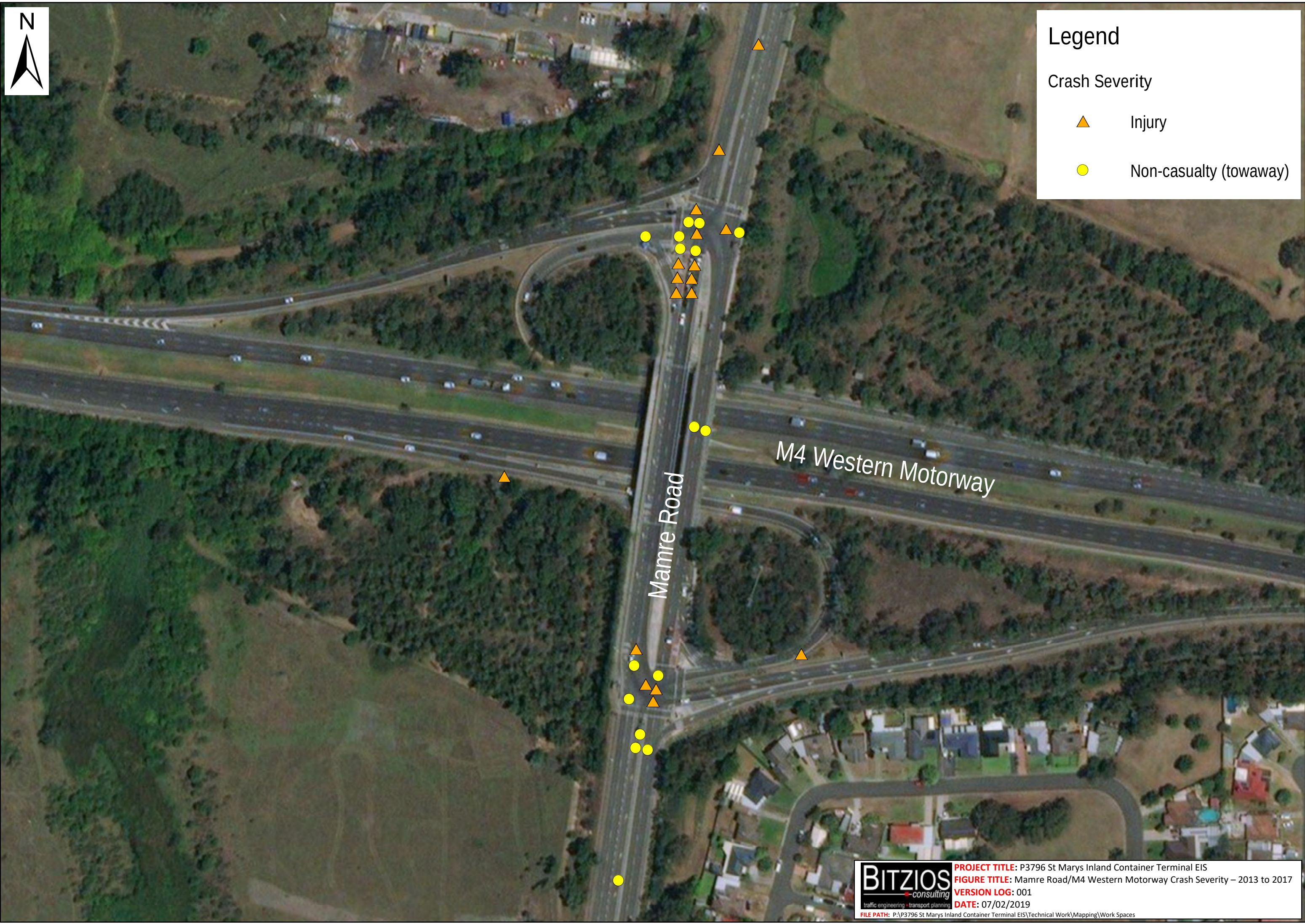
Legend

Crash Type

- Vehicles from adjacent direction (intersections only)
- Vehicles from opposing direction
- Vehicles from same direction
- * Off path, on straight
- ★ Off path, on curve or turning

Carlisle Avenue

Great Western Highway



Legend

Crash Severity

▲ Injury

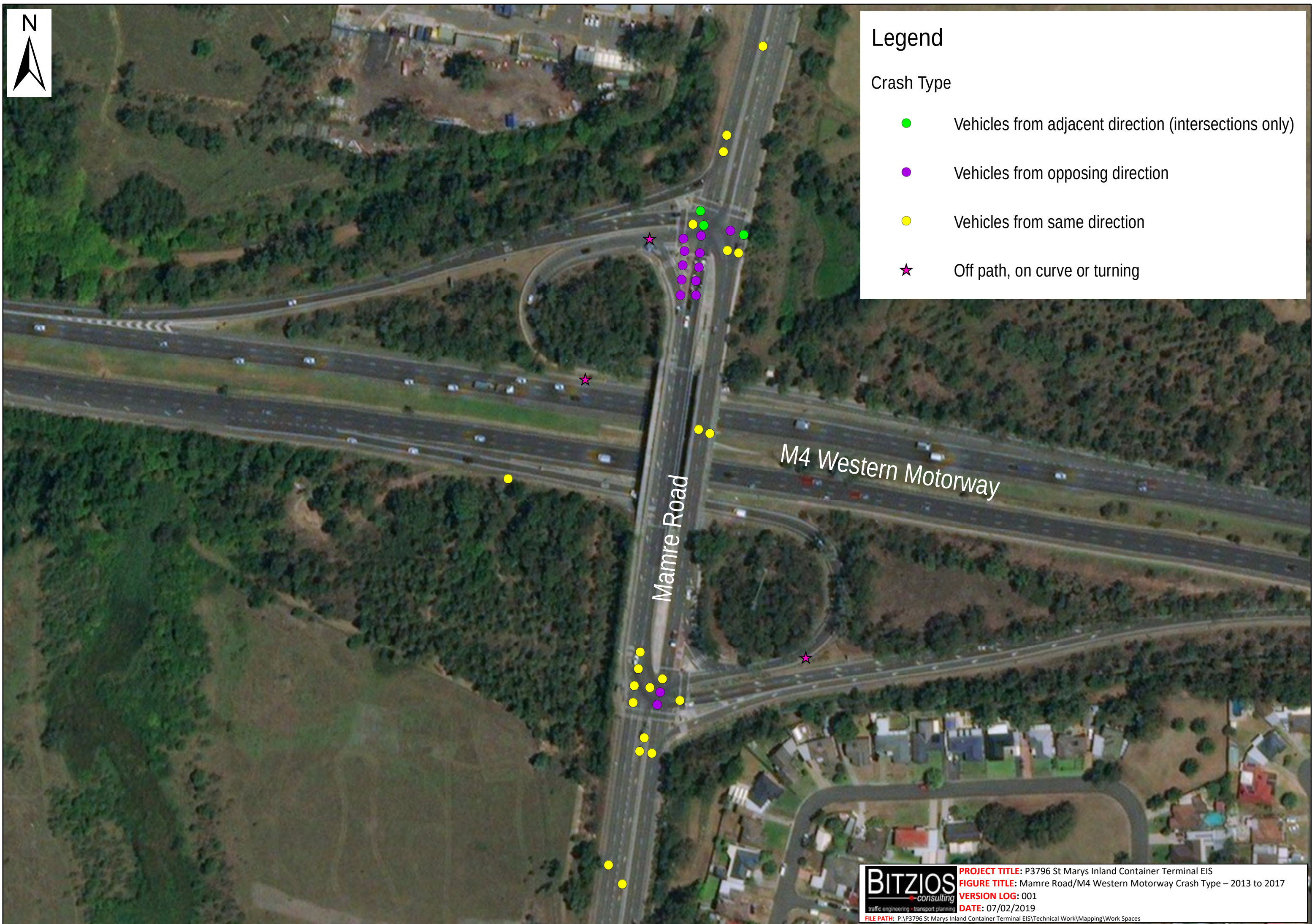
● Non-casualty (towaway)



Legend

Crash Type

- Vehicles from adjacent direction (intersections only)
- Vehicles from opposing direction
- Vehicles from same direction
- ★ Off path, on curve or turning





Legend

Crash Severity

▲ Injury

● Non-casualty (towaway)

Glossop Street

Great Western Highway



Legend

Crash Type

- Vehicles from adjacent direction (intersections only)
- Vehicles from opposing direction
- Vehicles from same direction
- ✱ Off path, on straight

Glossop Street

Great Western Highway



Christie Street

Subject Site

Lee Holm Road

Maxim Place

Forrester Road

Harris Street

Legend

Crash Severity

▲

Injury

●

Non-casualty (towaway)



Christie Street

Subject Site

Lee Holm Road
Maxim Place

Forrester Road

Harris Street

Legend

Crash Type

- Vehicles from adjacent direction (intersections only)
- Vehicles from opposing direction
- Vehicles from same direction
- ◆ Manoeuvring

Year	Crash ID	Degree of crash	RUM - code	RUM - description	Type of location	Natural lighting	Longitude	Latitude	No Killed	No Injured
2013	822674	Non-casualty (towaway)	13	Right near	T-junction	Daylight	150.7159	-33.74234	0	0
2013	827352	Serious Injury	21	Right through	X-intersection	Darkness	150.7579	-33.76833	0	1
2013	829024	Minor/Other Injury	30	Rear end	T-junction	Daylight	150.7793	-33.7714	0	1
2013	829543	Minor/Other Injury	10	Cross traffic	X-intersection	Darkness	150.8144	-33.77934	0	1
2013	830305	Minor/Other Injury	30	Rear end	T-junction	Daylight	150.7796	-33.77054	0	1
2013	830885	Non-casualty (towaway)	30	Rear end	2-way undivided	Dusk	150.771	-33.78408	0	0
2013	831257	Serious Injury	0	Ped nearside	Divided road	Daylight	150.7119	-33.75729	0	1
2013	831747	Non-casualty (towaway)	16	Left near	X-intersection	Daylight	150.7579	-33.76819	0	0
2013	832172	Moderate Injury	30	Rear end	X-intersection	Daylight	150.712	-33.75695	0	1
2013	832223	Moderate Injury	21	Right through	X-intersection	Darkness	150.8144	-33.7792	0	1
2013	834136	Serious Injury	21	Right through	X-intersection	Darkness	150.7122	-33.75687	0	1
2013	834862	Non-casualty (towaway)	30	Rear end	2-way undivided	Daylight	150.7708	-33.78545	0	0
2013	835508	Minor/Other Injury	30	Rear end	Divided road	Darkness	150.8147	-33.77929	0	1
2013	836663	Serious Injury	85	Off rt/lft bnd=>obj	Other	Darkness	150.7716	-33.78509	0	1
2013	836703	Non-casualty (towaway)	13	Right near	T-junction	Daylight	150.7761	-33.75314	0	0
2013	836720	Non-casualty (towaway)	30	Rear end	X-intersection	Daylight	150.7122	-33.75687	0	0
2013	837311	Non-casualty (towaway)	30	Rear end	Divided road	Daylight	150.7741	-33.7702	0	0
2013	837740	Non-casualty (towaway)	30	Rear end	2-way undivided	Daylight	150.7706	-33.7861	0	0
2013	838326	Non-casualty (towaway)	30	Rear end	Divided road	Dusk	150.7132	-33.75718	0	0
2013	838714	Moderate Injury	71	Off rd left => obj	Divided road	Daylight	150.7109	-33.75659	0	1
2013	839158	Non-casualty (towaway)	30	Rear end	Divided road	Daylight	150.7137	-33.7573	0	0
2013	839485	Minor/Other Injury	30	Rear end	Other	Daylight	150.7709	-33.78528	0	1
2013	840156	Non-casualty (towaway)	36	Right turn sideswipe	T-junction	Dawn	150.7159	-33.74234	0	0
2013	844530	Non-casualty (towaway)	13	Right near	T-junction	Daylight	150.7761	-33.75314	0	0
2013	844881	Non-casualty (towaway)	70	Off road to left	Divided road	Daylight	150.7114	-33.75671	0	0
2013	846999	Moderate Injury	21	Right through	X-intersection	Darkness	150.7579	-33.76833	0	1
2013	847435	Serious Injury	10	Cross traffic	X-intersection	Dawn	150.7121	-33.75686	0	2
2013	847626	Moderate Injury	54	Cutting in	2-way undivided	Daylight	150.7161	-33.74238	0	1
2013	848270	Non-casualty (towaway)	11	Right far	T-junction	Darkness	150.7159	-33.74234	0	0
2013	849014	Moderate Injury	10	Cross traffic	T-junction	Daylight	150.7795	-33.77158	0	1
2013	850154	Serious Injury	30	Rear end	Divided road	Daylight	150.7118	-33.7568	0	1
2013	851919	Serious Injury	71	Off rd left => obj	X-intersection	Darkness	150.7736	-33.76998	0	1
2013	853211	Non-casualty (towaway)	21	Right through	T-junction	Daylight	150.7159	-33.74234	0	0
2013	853581	Moderate Injury	30	Rear end	X-intersection	Daylight	150.7708	-33.78522	0	1
2013	853737	Non-casualty (towaway)	13	Right near	T-junction	Dusk	150.7761	-33.75314	0	0
2013	854131	Non-casualty (towaway)	30	Rear end	2-way undivided	Daylight	150.8143	-33.77956	0	0
2013	856306	Moderate Injury	30	Rear end	Divided road	Daylight	150.7127	-33.75706	0	1
2013	856327	Non-casualty (towaway)	30	Rear end	X-intersection	Dawn	150.7735	-33.76992	0	0
2013	856387	Non-casualty (towaway)	21	Right through	X-intersection	Daylight	150.7579	-33.76819	0	0
2013	857011	Non-casualty (towaway)	30	Rear end	Divided road	Daylight	150.771	-33.78408	0	0
2013	857100	Non-casualty (towaway)	10	Cross traffic	X-intersection	Darkness	150.7121	-33.75686	0	0
2013	857198	Moderate Injury	30	Rear end	Other	Daylight	150.7714	-33.78238	0	2
2013	1000498	Non-casualty (towaway)	30	Rear end	Divided road	Daylight	150.8145	-33.77876	0	0
2013	1001610	Non-casualty (towaway)	71	Off rd left => obj	X-intersection	Daylight	150.8145	-33.77919	0	0
2013	1002412	Non-casualty (towaway)	30	Rear end	Divided road	Daylight	150.8156	-33.77951	0	0
2013	1002732	Non-casualty (towaway)	85	Off rt/lft bnd=>obj	Other	Dusk	150.7708	-33.78323	0	0
2013	1003014	Moderate Injury	81	Off left/rt bnd=>obj	X-intersection	Daylight	150.8144	-33.77792	0	1
2013	1004181	Non-casualty (towaway)	30	Rear end	Divided road	Daylight	150.7733	-33.76992	0	0
2013	1004433	Minor/Other Injury	30	Rear end	X-intersection	Daylight	150.8143	-33.77919	0	1
2013	1007111	Non-casualty (towaway)	73	Off rd right => obj	X-intersection	Darkness	150.7734	-33.77005	0	0
2013	1008938	Moderate Injury	34	Lane change right	Divided road	Daylight	150.7712	-33.78285	0	1
2014	1009639	Non-casualty (towaway)	30	Rear end	Divided road	Daylight	150.7119	-33.75729	0	0
2013	1009748	Serious Injury	30	Rear end	Divided road	Daylight	150.8156	-33.77951	0	1
2013	1012073	Serious Injury	33	Lane sideswipe	X-intersection	Daylight	150.8146	-33.77941	0	1
2014	1012365	Non-casualty (towaway)	85	Off rt/lft bnd=>obj	X-intersection	Daylight	150.8145	-33.77924	0	0
2014	1015377	Non-casualty (towaway)	21	Right through	T-junction	Dawn	150.7711	-33.78322	0	0
2014	1015850	Moderate Injury	30	Rear end	Divided road	Daylight	150.8143	-33.77979	0	1
2014	1015863	Non-casualty (towaway)	21	Right through	X-intersection	Darkness	150.7579	-33.76819	0	0
2014	1018136	Non-casualty (towaway)	21	Right through	T-junction	Daylight	150.7711	-33.78322	0	0
2014	1021134	Non-casualty (towaway)	37	Left turn sideswipe	X-intersection	Daylight	150.7579	-33.76819	0	0
2014	1021621	Non-casualty (towaway)	81	Off left/rt bnd=>obj	X-intersection	Daylight	150.8144	-33.7792	0	0
2014	1022503	Minor/Other Injury	85	Off rt/lft bnd=>obj	Other	Daylight	150.7704	-33.78386	0	1
2014	1022533	Non-casualty (towaway)	35	Lane change left	2-way undivided	Dusk	150.7166	-33.74247	0	0
2014	1022878	Non-casualty (towaway)	30	Rear end	X-intersection	Daylight	150.8143	-33.77919	0	0

Year	Crash ID	Degree of crash	RUM - code	RUM - description	Type of location	Natural lighting	Longitude	Latitude	No Killed	No Injured
2014	1023752	Moderate Injury	71	Off rd left => obj	X-intersection	Darkness	150.8145	-33.77924	0	1
2014	1024351	Moderate Injury	30	Rear end	X-intersection	Daylight	150.8143	-33.77917	0	2
2014	1025240	Serious Injury	21	Right through	X-intersection	Daylight	150.7579	-33.76819	0	2
2014	1026026	Moderate Injury	30	Rear end	Other	Daylight	150.7113	-33.7567	0	1
2014	1026740	Non-casualty (towaway)	37	Left turn sideswipe	T-junction	Daylight	150.7761	-33.75314	0	0
2014	1027596	Non-casualty (towaway)	30	Rear end	Divided road	Darkness	150.8145	-33.77956	0	0
2014	1027649	Non-casualty (towaway)	81	Off left/r bnd=>obj	X-intersection	Daylight	150.8142	-33.77931	0	0
2014	1029839	Non-casualty (towaway)	35	Lane change left	Divided road	Daylight	150.7132	-33.75718	0	0
2014	1030767	Non-casualty (towaway)	30	Rear end	T-junction	Daylight	150.771	-33.78317	0	0
2014	1031897	Non-casualty (towaway)	21	Right through	T-junction	Daylight	150.7711	-33.78322	0	0
2014	1033049	Serious Injury	2	Ped far side	Divided road	Darkness	150.7123	-33.75632	0	1
2014	1033223	Minor/Other Injury	21	Right through	X-intersection	Daylight	150.7579	-33.76819	0	1
2014	1033987	Non-casualty (towaway)	30	Rear end	T-junction	Darkness	150.7707	-33.78524	0	0
2014	1034943	Minor/Other Injury	30	Rear end	T-junction	Daylight	150.7712	-33.78329	0	1
2014	1036505	Non-casualty (towaway)	30	Rear end	X-intersection	Darkness	150.8145	-33.7794	0	0
2014	1037536	Moderate Injury	10	Cross traffic	X-intersection	Darkness	150.7122	-33.75687	0	1
2014	1038000	Moderate Injury	13	Right near	T-junction	Dawn	150.7761	-33.75314	0	1
2014	1039700	Non-casualty (towaway)	71	Off rd left => obj	2-way undivided	Darkness	150.758	-33.76793	0	0
2014	1040099	Serious Injury	13	Right near	T-junction	Darkness	150.775	-33.76119	0	1
2014	1044382	Moderate Injury	31	Left rear	X-intersection	Daylight	150.7119	-33.75683	0	1
2014	1044914	Serious Injury	10	Cross traffic	X-intersection	Daylight	150.7735	-33.77007	0	1
2014	1045346	Non-casualty (towaway)	30	Rear end	X-intersection	Dusk	150.8143	-33.77939	0	0
2014	1046096	Moderate Injury	2	Ped far side	Divided road	Daylight	150.7113	-33.75668	0	1
2014	1046369	Moderate Injury	30	Rear end	Divided road	Daylight	150.7796	-33.77099	0	1
2014	1046999	Minor/Other Injury	30	Rear end	Divided road	Daylight	150.7123	-33.75642	0	1
2014	1048036	Non-casualty (towaway)	30	Rear end	X-intersection	Darkness	150.7122	-33.75687	0	0
2014	1048685	Moderate Injury	71	Off rd left => obj	T-junction	Daylight	150.7159	-33.74231	0	1
2014	1048739	Non-casualty (towaway)	34	Lane change right	Divided road	Daylight	150.7158	-33.74258	0	0
2014	1050699	Moderate Injury	21	Right through	T-junction	Daylight	150.7159	-33.74234	0	1
2014	1051255	Minor/Other Injury	30	Rear end	X-intersection	Daylight	150.8145	-33.77938	0	1
2014	1053225	Non-casualty (towaway)	39	Other same direction	X-intersection	Daylight	150.7735	-33.76996	0	0
2014	1054007	Minor/Other Injury	39	Other same direction	T-junction	Daylight	150.7734	-33.77072	0	1
2014	1054196	Non-casualty (towaway)	39	Other same direction	Y-junction	Darkness	150.7708	-33.78552	0	0
2014	1054447	Non-casualty (towaway)	39	Other same direction	Divided road	Daylight	150.7707	-33.78514	0	0
2014	1055311	Minor/Other Injury	30	Rear end	X-intersection	Daylight	150.7122	-33.75691	0	1
2015	1055727	Minor/Other Injury	30	Rear end	X-intersection	Dawn	150.8143	-33.77917	0	1
2015	1057565	Non-casualty (towaway)	30	Rear end	X-intersection	Daylight	150.7122	-33.75693	0	0
2015	1057611	Minor/Other Injury	32	Right rear	X-intersection	Daylight	150.8145	-33.77924	0	1
2015	1059699	Non-casualty (towaway)	30	Rear end	X-intersection	Daylight	150.7122	-33.75687	0	0
2015	1060053	Minor/Other Injury	30	Rear end	T-junction	Daylight	150.7712	-33.78328	0	1
2015	1060120	Minor/Other Injury	34	Lane change right	Divided road	Daylight	150.78	-33.77172	0	1
2015	1060859	Moderate Injury	39	Other same direction	T-junction	Daylight	150.7796	-33.7705	0	1
2015	1064923	Moderate Injury	21	Right through	X-intersection	Darkness	150.7579	-33.76819	0	1
2015	1066060	Non-casualty (towaway)	13	Right near	X-intersection	Darkness	150.8144	-33.7792	0	0
2015	1067809	Minor/Other Injury	30	Rear end	X-intersection	Daylight	150.7122	-33.75691	0	1
2015	1069150	Minor/Other Injury	21	Right through	X-intersection	Dawn	150.7579	-33.76819	0	1
2015	1072578	Moderate Injury	30	Rear end	2-way undivided	Darkness	150.7672	-33.74791	0	2
2015	1073373	Moderate Injury	20	Head on	2-way undivided	Daylight	150.7642	-33.74909	0	1
2015	1075957	Non-casualty (towaway)	71	Off rd left => obj	X-intersection	Daylight	150.7579	-33.76833	0	0
2015	1076449	Non-casualty (towaway)	30	Rear end	Divided road	Daylight	150.7584	-33.76845	0	0
2015	1076583	Minor/Other Injury	32	Right rear	T-junction	Daylight	150.7707	-33.78524	0	1
2015	1077152	Serious Injury	21	Right through	X-intersection	Darkness	150.8144	-33.77934	0	1
2015	1078084	Minor/Other Injury	32	Right rear	X-intersection	Daylight	150.7735	-33.77007	0	1
2015	1079594	Minor/Other Injury	30	Rear end	X-intersection	Daylight	150.7121	-33.75686	0	2
2015	1079889	Minor/Other Injury	30	Rear end	X-intersection	Daylight	150.712	-33.75684	0	1
2015	1079953	Non-casualty (towaway)	11	Right far	T-junction	Daylight	150.7712	-33.7832	0	0
2015	1081324	Non-casualty (towaway)	39	Other same direction	Divided road	Daylight	150.7708	-33.78552	0	0
2015	1081743	Minor/Other Injury	30	Rear end	Divided road	Daylight	150.7706	-33.78601	0	1
2015	1081816	Non-casualty (towaway)	39	Other same direction	Divided road	Daylight	150.7121	-33.75654	0	0
2015	1083471	Non-casualty (towaway)	47	Emerging from drive	T-junction	Daylight	150.7714	-33.75448	0	0
2015	1083740	Non-casualty (towaway)	30	Rear end	X-intersection	Daylight	150.8145	-33.7794	0	0
2015	1083742	Minor/Other Injury	35	Lane change left	Divided road	Daylight	150.815	-33.77951	0	1
2015	1084172	Minor/Other Injury	34	Lane change right	T-junction	Daylight	150.7795	-33.77135	0	1
2015	1087055	Moderate Injury	30	Rear end	Other	Daylight	150.77	-33.7843	0	1

Year	Crash ID	Degree of crash	RUM - code	RUM - description	Type of location	Natural lighting	Longitude	Latitude	No Killed	No Injured
2015	1087180	Moderate Injury	30	Rear end	2-way undivided	Daylight	150.758	-33.76801	0	1
2015	1087579	Serious Injury	21	Right through	T-junction	Daylight	150.7711	-33.78322	0	2
2015	1087724	Moderate Injury	30	Rear end	Divided road	Daylight	150.7732	-33.77002	0	1
2015	1087908	Non-casualty (towaway)	30	Rear end	X-intersection	Darkness	150.8144	-33.7792	0	0
2016	1092329	Non-casualty (towaway)	30	Rear end	T-junction	Daylight	150.7159	-33.74234	0	0
2015	1092432	Minor/Other Injury	20	Head on	Divided road	Daylight	150.7732	-33.76991	0	1
2015	1092562	Serious Injury	21	Right through	T-junction	Darkness	150.7708	-33.78524	0	2
2016	1092628	Minor/Other Injury	30	Rear end	Divided road	Daylight	150.7712	-33.78282	0	1
2016	1094810	Non-casualty (towaway)	34	Lane change right	Divided road	Daylight	150.7158	-33.74258	0	0
2016	1094982	Serious Injury	13	Right near	X-intersection	Daylight	150.7579	-33.76819	0	3
2016	1097025	Non-casualty (towaway)	30	Rear end	T-junction	Daylight	150.7708	-33.78524	0	0
2016	1100131	Non-casualty (towaway)	30	Rear end	X-intersection	Dawn	150.7735	-33.76996	0	0
2016	1100622	Minor/Other Injury	12	Left far	T-junction	Daylight	150.7679	-33.74761	0	1
2016	1101211	Non-casualty (towaway)	30	Rear end	X-intersection	Dusk	150.7579	-33.76819	0	0
2016	1102092	Minor/Other Injury	30	Rear end	Divided road	Daylight	150.7119	-33.75729	0	1
2016	1102921	Non-casualty (towaway)	33	Lane sideswipe	Divided road	Darkness	150.7796	-33.77099	0	0
2016	1103345	Moderate Injury	32	Right rear	T-junction	Dawn	150.7679	-33.74761	0	1
2016	1103964	Moderate Injury	30	Rear end	X-intersection	Dusk	150.8145	-33.77924	0	1
2016	1105103	Moderate Injury	21	Right through	T-junction	Darkness	150.7711	-33.78322	0	1
2016	1106588	Non-casualty (towaway)	39	Other same direction	T-junction	Dusk	150.7158	-33.7423	0	0
2016	1106673	Moderate Injury	48	From footpath	X-intersection	Daylight	150.7579	-33.76833	0	1
2016	1109128	Non-casualty (towaway)	30	Rear end	Divided road	Daylight	150.8153	-33.77945	0	0
2016	1109267	Non-casualty (towaway)	71	Off rd left => obj	Divided road	Darkness	150.7795	-33.77077	0	0
2016	1110643	Minor/Other Injury	30	Rear end	X-intersection	Dusk	150.8145	-33.77938	0	1
2016	1111657	Serious Injury	21	Right through	T-junction	Daylight	150.7711	-33.78322	0	1
2016	1116799	Minor/Other Injury	30	Rear end	X-intersection	Daylight	150.7579	-33.76819	0	1
2016	1117078	Moderate Injury	30	Rear end	Divided road	Darkness	150.7707	-33.7851	0	1
2016	1117793	Moderate Injury	29	Other opposing	T-junction	Daylight	150.7711	-33.78322	0	1
2016	1121009	Minor/Other Injury	30	Rear end	X-intersection	Daylight	150.7121	-33.75686	0	2
2016	1121121	Non-casualty (towaway)	30	Rear end	X-intersection	Daylight	150.8145	-33.77924	0	0
2016	1123352	Minor/Other Injury	30	Rear end	X-intersection	Darkness	150.8145	-33.77938	0	2
2016	1123829	Minor/Other Injury	32	Right rear	X-intersection	Darkness	150.7735	-33.76996	0	1
2016	1124029	Moderate Injury	13	Right near	T-junction	Daylight	150.7711	-33.78317	0	1
2016	1125675	Minor/Other Injury	30	Rear end	X-intersection	Daylight	150.7579	-33.76833	0	1
2017	1125806	Non-casualty (towaway)	30	Rear end	X-intersection	Daylight	150.7579	-33.76833	0	0
2017	1126260	Moderate Injury	31	Left rear	T-junction	Daylight	150.7159	-33.74234	0	1
2016	1128920	Serious Injury	21	Right through	T-junction	Darkness	150.7711	-33.78322	0	2
2017	1129017	Minor/Other Injury	30	Rear end	X-intersection	Daylight	150.7735	-33.77007	0	1
2016	1136962	Serious Injury	74	On road-out of cont.	Divided road	Daylight	150.7126	-33.75694	0	1
2017	1137134	Moderate Injury	21	Right through	T-junction	Darkness	150.7793	-33.77141	0	1
2017	1137999	Minor/Other Injury	30	Rear end	T-junction	Daylight	150.7795	-33.77158	0	1
2017	1139282	Non-casualty (towaway)	39	Other same direction	X-intersection	Daylight	150.7735	-33.76996	0	0
2017	1139813	Moderate Injury	21	Right through	T-junction	Darkness	150.7712	-33.7832	0	1
2017	1141119	Non-casualty (towaway)	85	Off rt/lft bnd=>obj	X-intersection	Darkness	150.7122	-33.75687	0	0
2017	1142029	Minor/Other Injury	30	Rear end	2-way undivided	Daylight	150.7672	-33.74789	0	1
2017	1143501	Moderate Injury	34	Lane change right	X-intersection	Darkness	150.7735	-33.77007	0	2
2017	1145066	Serious Injury	10	Cross traffic	X-intersection	Daylight	150.7735	-33.76996	0	1
2017	1145582	Moderate Injury	13	Right near	T-junction	Darkness	150.7679	-33.74761	0	2
2017	1146146	Serious Injury	21	Right through	T-junction	Dusk	150.7711	-33.78322	0	3
2017	1147046	Non-casualty (towaway)	13	Right near	T-junction	Daylight	150.7711	-33.78317	0	0
2017	1148370	Serious Injury	21	Right through	T-junction	Darkness	150.7711	-33.78322	0	1
2017	1149099	Minor/Other Injury	39	Other same direction	T-junction	Daylight	150.7679	-33.74761	0	1
2017	1151754	Non-casualty (towaway)	30	Rear end	T-junction	Darkness	150.7159	-33.7423	0	0
2017	1151802	Non-casualty (towaway)	30	Rear end	2-way undivided	Daylight	150.7674	-33.74781	0	0
2017	1152405	Serious Injury	21	Right through	T-junction	Dawn	150.7708	-33.78524	0	1
2017	1152789	Moderate Injury	88	Out of cont on bend	X-intersection	Daylight	150.8144	-33.7792	0	1
2017	1153985	Non-casualty (towaway)	21	Right through	T-junction	Darkness	150.7159	-33.74234	0	0
2017	1154352	Non-casualty (towaway)	34	Lane change right	Divided road	Darkness	150.7116	-33.75676	0	0
2017	1155545	Non-casualty (towaway)	29	Other opposing	X-intersection	Daylight	150.8144	-33.7792	0	0
2017	1156470	Moderate Injury	20	Head on	Divided road	Daylight	150.774	-33.77007	0	1
2017	1157044	Serious Injury	10	Cross traffic	X-intersection	Darkness	150.7735	-33.77007	0	2
2017	1159726	Non-casualty (towaway)	73	Off rd right => obj	Divided road	Daylight	150.7121	-33.75717	0	0
2017	1159754	Minor/Other Injury	30	Rear end	X-intersection	Daylight	150.7122	-33.75691	0	1

APPENDIX C

SIDRA MODELLING OUTPUTS



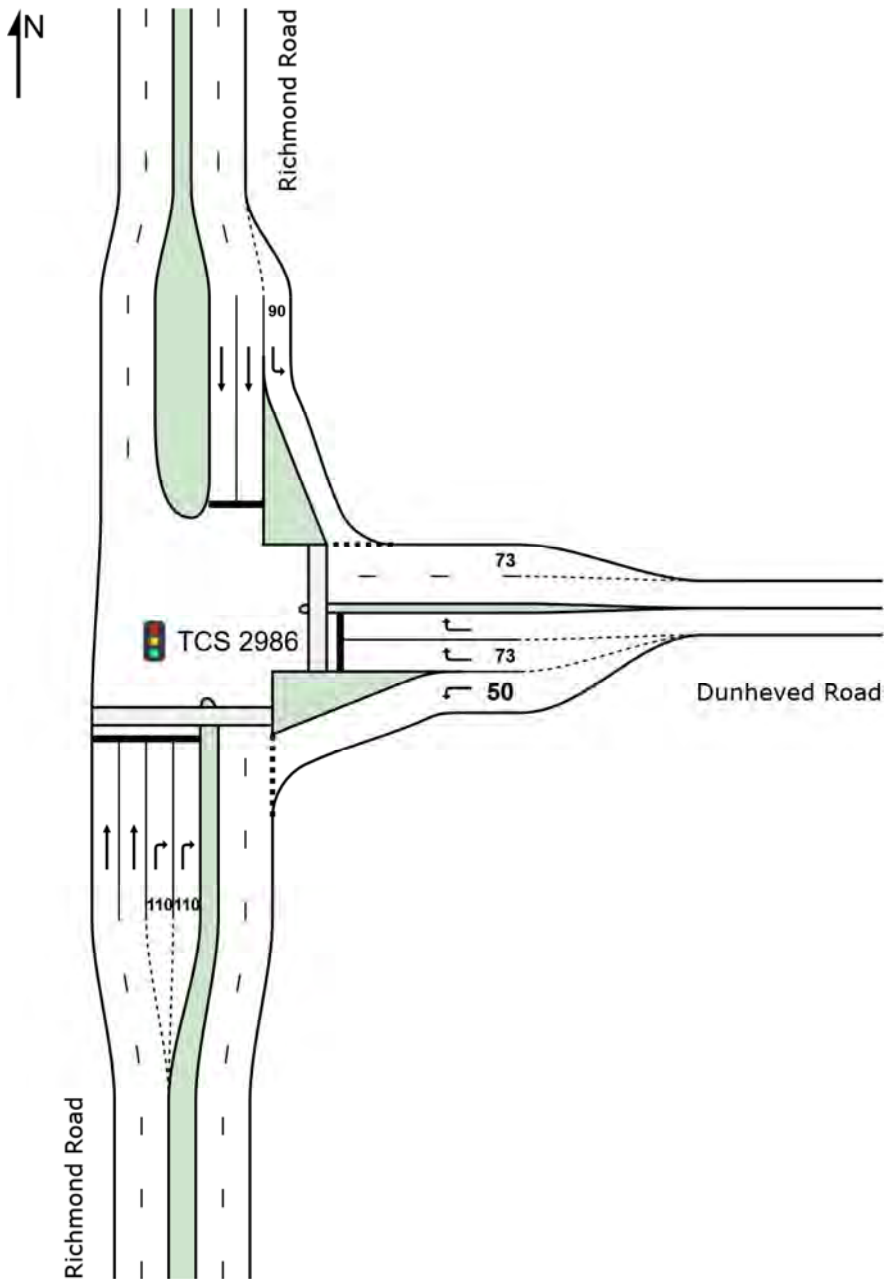
SITE LAYOUT

 **Site: TCS 2986 [101 - Richmond Road / Dunheved Road - AM Peak 2018 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated



MOVEMENT SUMMARY



Site: TCS 2986 [101 - Richmond Road / Dunheved Road - AM Peak 2018 Base]

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 129 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Richmond Road												
8	T1	926	10.3	0.303	6.4	LOS A	9.9	79.7	0.38	0.33	0.38	58.9
7	R2	302	3.8	0.793	68.1	LOS E	13.7	98.9	0.99	0.84	1.09	29.6
Approach		1228	8.7	0.793	21.5	LOS B	13.7	98.9	0.53	0.46	0.55	44.2
East: Dunheved Road												
6	L2	445	1.9	0.484	14.1	LOS A	14.7	104.5	0.61	0.79	0.61	53.3
4	R2	425	9.4	0.476	57.7	LOS E	12.1	94.9	0.95	0.81	0.95	24.7
Approach		871	5.6	0.484	35.4	LOS C	14.7	104.5	0.78	0.80	0.78	37.1
North: Richmond Road												
3	L2	319	11.2	0.235	8.6	LOS A	3.7	30.4	0.25	0.65	0.25	49.6
2	T1	1360	5.0	0.609	13.4	LOS A	19.7	148.6	0.51	0.46	0.51	50.1
Approach		1679	6.2	0.609	12.5	LOS A	19.7	148.6	0.46	0.50	0.46	50.0
All Vehicles		3778	6.9	0.793	20.7	LOS B	19.7	148.6	0.55	0.55	0.56	44.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	1	58.6	LOS E	0.0	0.0	0.95	0.95	
P2	East Full Crossing	1	58.6	LOS E	0.0	0.0	0.95	0.95	
All Pedestrians		2	58.6	LOS E			0.95	0.95	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site: TCS 2986 [101 - Richmond Road / Dunheved Road - AM Peak 2018 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 129 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

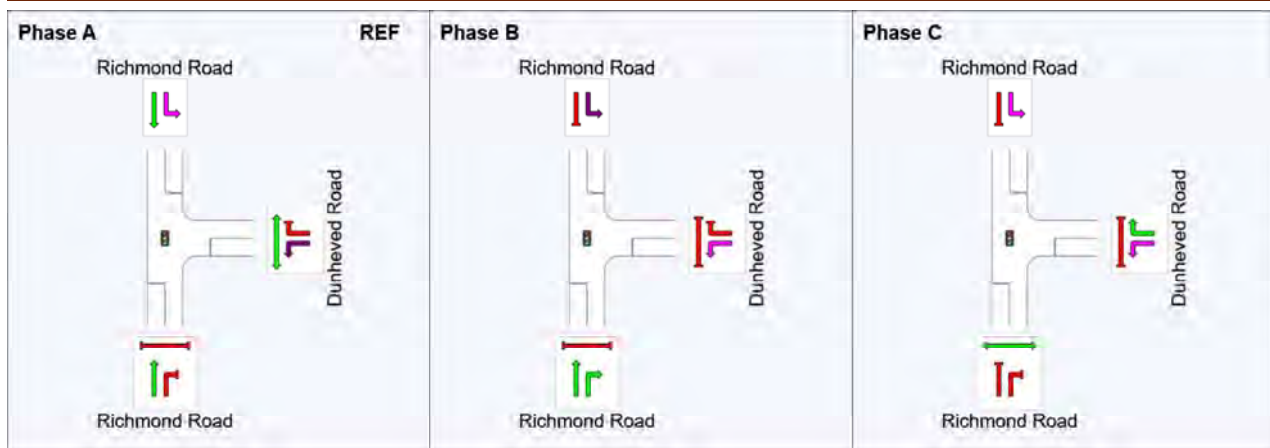
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	78	100
Green Time (sec)	72	16	23
Phase Time (sec)	78	22	29
Phase Split	60%	17%	22%

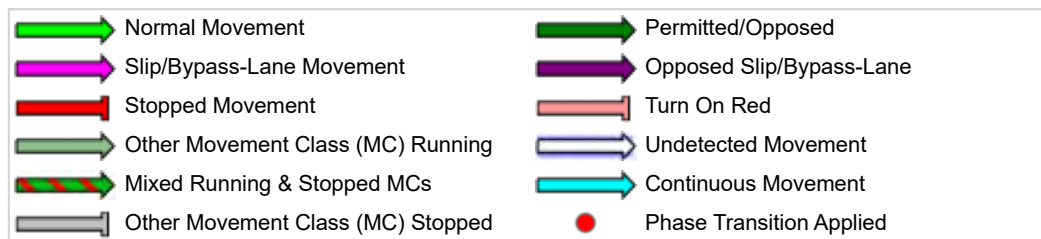
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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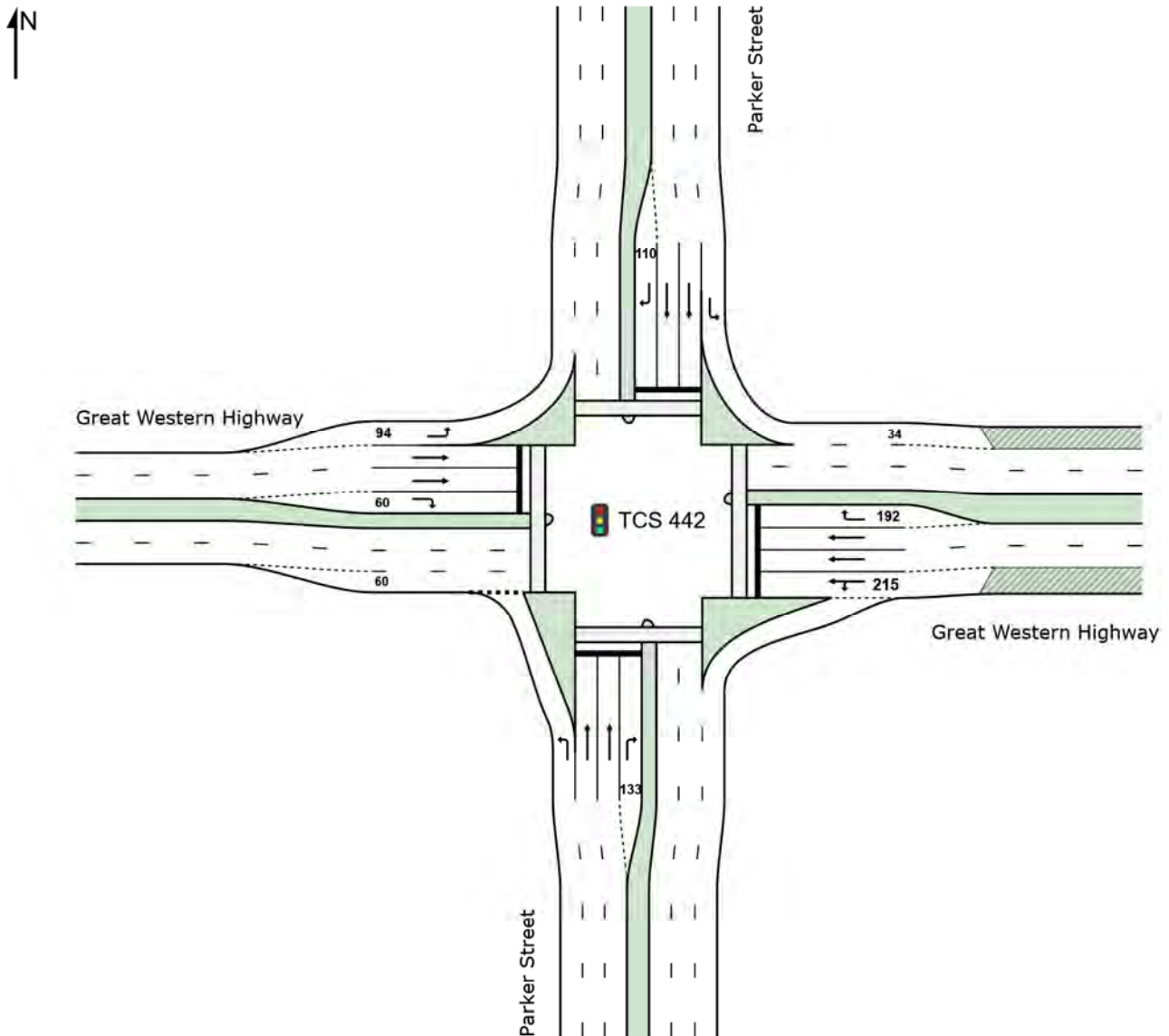
SITE LAYOUT

 **Site: TCS 442 [102 - Great Western Highway / Parker Street - AM Peak 2018 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated



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Project: P:\P3796 St Marys Inland Container Terminal EIS\Technical Work\Models\P3796.001M St Marys Inland Container Terminal EIS_2018 Base.sip8

MOVEMENT SUMMARY

 **Site: TCS 442 [102 - Great Western Highway / Parker Street - AM Peak 2018 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 143 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Parker Street												
9	L2	362	2.9	0.270	15.5	LOS B	10.3	74.2	0.48	0.73	0.48	39.7
8	T1	796	7.8	0.793	60.0	LOS E	27.0	206.7	1.00	0.89	1.05	19.2
7	R2	109	6.7	0.262	61.3	LOS E	6.6	48.7	0.91	0.77	0.91	24.0
Approach		1267	6.3	0.793	47.4	LOS D	27.0	206.7	0.84	0.83	0.87	23.3
East: Great Western Highway												
6	L2	199	5.3	0.310	36.2	LOS C	10.4	76.4	0.72	0.74	0.72	32.1
5	T1	849	2.4	0.764	50.3	LOS D	26.6	191.1	0.97	0.86	0.99	29.9
4	R2	418	8.6	0.964	72.1	LOS F	28.8	230.1	1.00	1.05	1.40	23.5
Approach		1466	4.5	0.964	54.6	LOS D	28.8	230.1	0.95	0.90	1.07	28.0
North: Parker Street												
3	L2	872	4.2	0.330	6.7	LOS A	0.0	0.0	0.00	0.57	0.00	57.3
2	T1	842	6.1	0.777	58.5	LOS E	28.6	216.2	1.00	0.87	1.03	19.6
1	R2	298	6.0	0.648	65.6	LOS E	19.3	142.2	0.99	0.83	0.99	21.4
Approach		2012	5.3	0.777	37.1	LOS C	28.6	216.2	0.56	0.74	0.58	31.5
West: Great Western Highway												
12	L2	188	6.1	0.106	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	51.7
11	T1	493	4.3	0.902	78.4	LOS F	20.2	149.2	1.00	1.04	1.31	23.4
10	R2	159	4.0	0.535	65.0	LOS E	10.3	74.4	0.96	0.81	0.96	18.4
Approach		840	4.6	0.902	59.6	LOS E	20.2	149.2	0.77	0.88	0.95	25.1
All Vehicles		5585	5.2	0.964	47.4	LOS D	28.8	230.1	0.76	0.82	0.83	27.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	113	65.9	LOS F	0.4	0.4	0.96	0.96	
P2	East Full Crossing	64	65.8	LOS F	0.3	0.3	0.96	0.96	
P1	North Full Crossing	101	65.9	LOS F	0.4	0.4	0.96	0.96	
P4	West Full Crossing	87	65.9	LOS F	0.3	0.3	0.96	0.96	
All Pedestrians		365	65.9	LOS F			0.96	0.96	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Base.sip8

PHASING SUMMARY

 **Site: TCS 442 [102 - Great Western Highway / Parker Street - AM Peak 2018 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 143 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, C, D, E, G

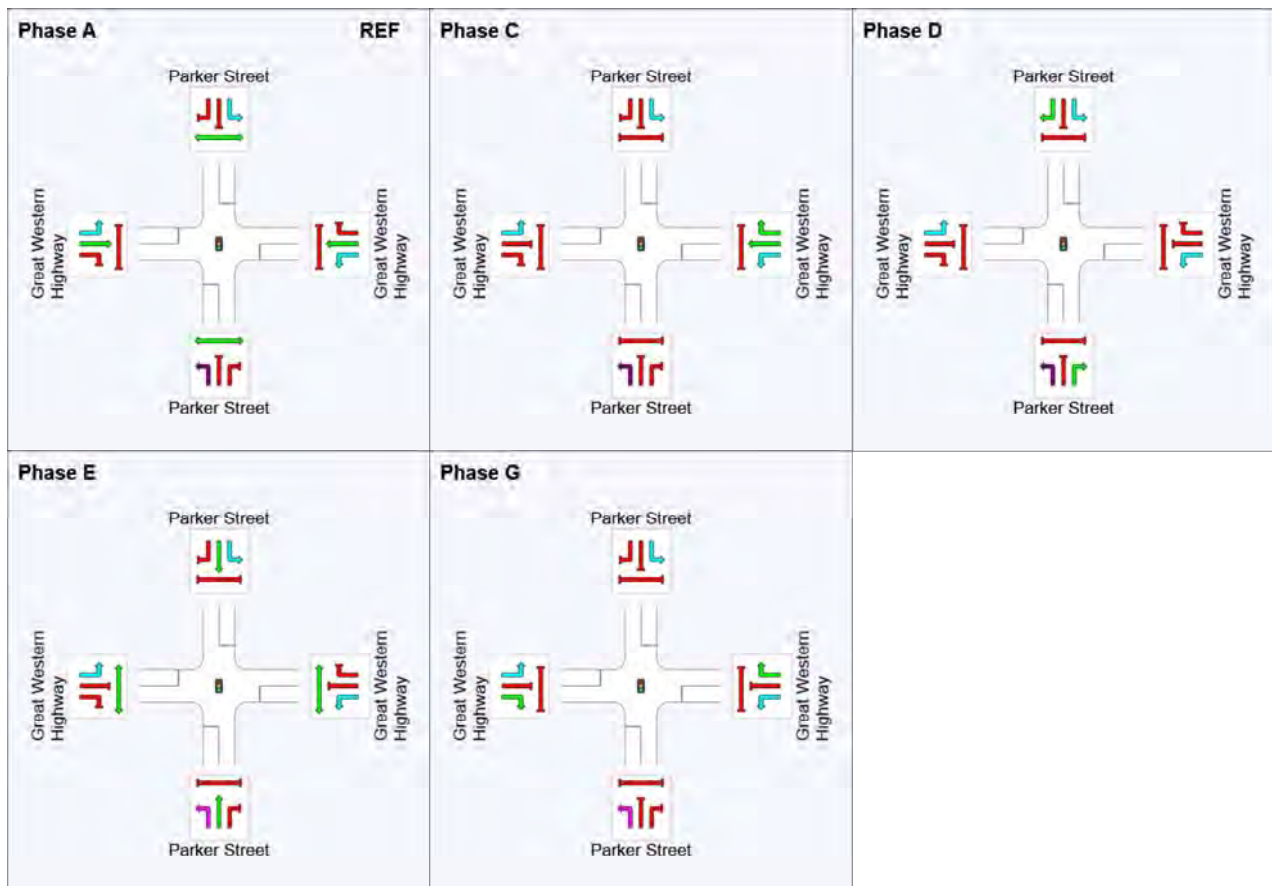
Output Phase Sequence: A, C, D, E, G

Phase Timing Summary

Phase	A	C	D	E	G
Phase Change Time (sec)	0	28	47	78	113
Green Time (sec)	22	13	25	29	24
Phase Time (sec)	28	19	31	35	30
Phase Split	20%	13%	22%	24%	21%

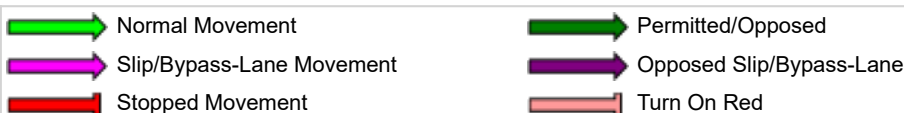
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

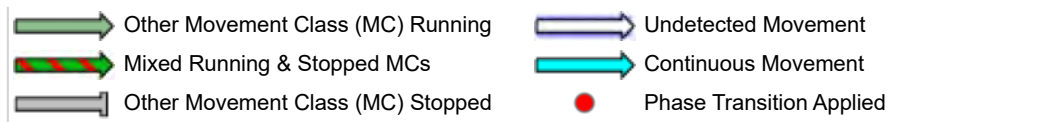
Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase





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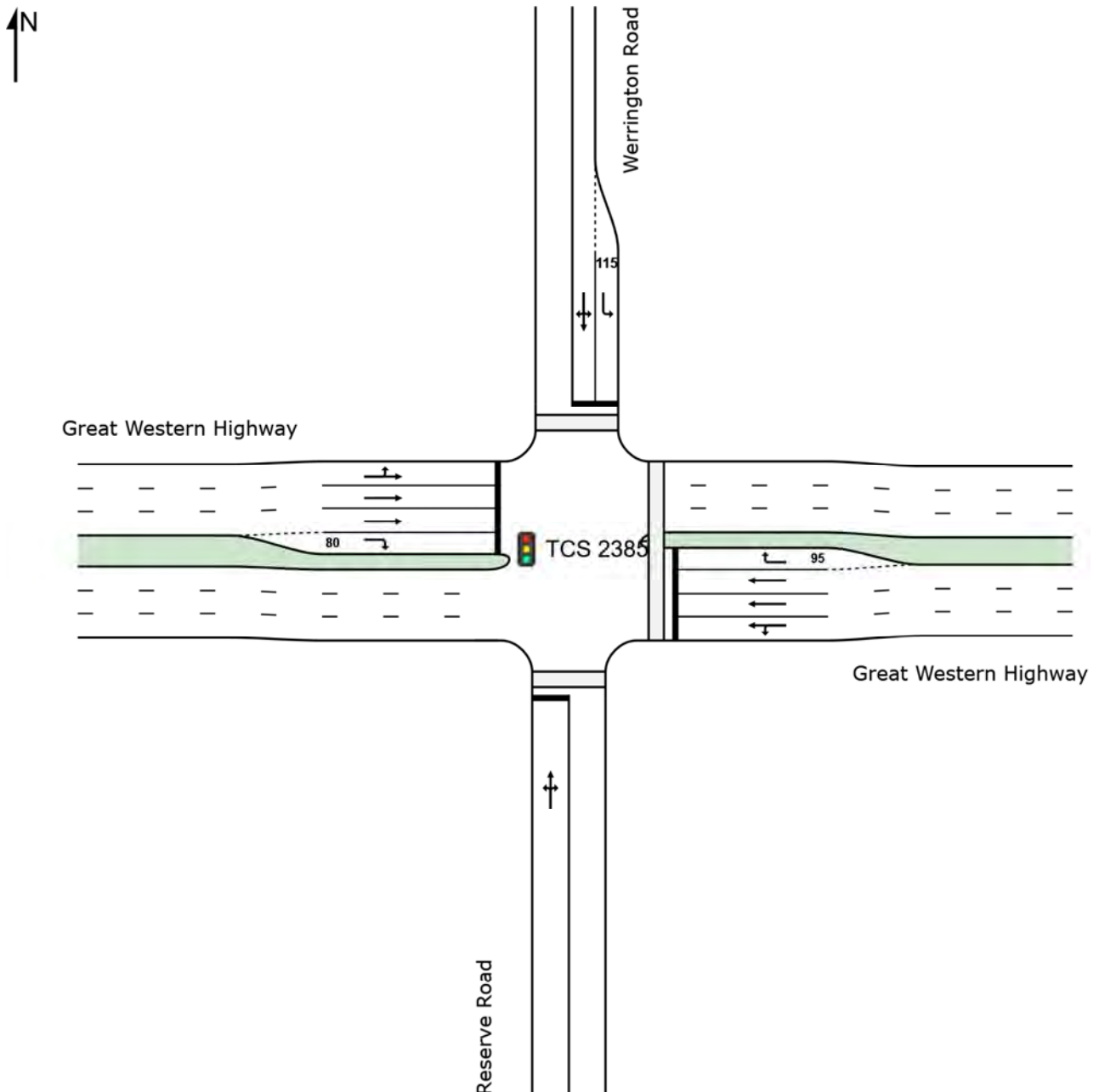
SITE LAYOUT

 Site: TCS 2385 [103 - Great Western Highway / Werrington Road / Reserve Road - AM Peak 2018 Base]

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated



MOVEMENT SUMMARY

 **Site: TCS 2385 [103 - Great Western Highway / Werrington Road / Reserve Road - AM Peak 2018 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Reserve Road												
9	L2	36	0.0	0.129	33.4	LOS C	3.6	25.6	0.67	0.68	0.67	27.7
8	T1	25	4.2	0.129	30.2	LOS C	3.6	25.6	0.67	0.68	0.67	22.5
7	R2	22	4.8	0.129	33.4	LOS C	3.6	25.6	0.67	0.68	0.67	33.3
Approach		83	2.5	0.129	32.4	LOS C	3.6	25.6	0.67	0.68	0.67	27.6
East: Great Western Highway												
6	L2	35	3.0	0.533	49.5	LOS D	25.8	186.2	0.89	0.77	0.89	30.3
5	T1	1327	3.2	0.533	42.3	LOS C	25.8	186.2	0.88	0.76	0.88	37.6
4	R2	191	7.2	0.559	68.6	LOS E	12.3	96.0	0.99	0.81	0.99	24.7
Approach		1553	3.7	0.559	45.7	LOS D	25.8	186.2	0.90	0.77	0.90	35.2
North: Werrington Road												
3	L2	256	6.2	0.264	17.1	LOS B	8.0	59.4	0.55	0.67	0.55	40.2
2	T1	11	0.0	0.882	54.1	LOS D	34.2	261.4	0.97	0.99	1.14	16.7
1	R2	459	6.0	0.882	57.4	LOS E	34.2	261.4	0.97	0.99	1.14	21.7
Approach		725	6.0	0.882	43.1	LOS D	34.2	261.4	0.82	0.88	0.93	26.7
West: Great Western Highway												
12	L2	212	8.0	0.449	48.3	LOS D	20.0	150.0	0.86	0.79	0.86	26.0
11	T1	919	4.5	0.449	41.1	LOS C	20.7	151.9	0.86	0.74	0.86	37.9
10	R2	63	3.3	0.176	64.6	LOS E	3.8	27.4	0.92	0.75	0.92	18.6
Approach		1194	5.0	0.449	43.6	LOS D	20.7	151.9	0.86	0.75	0.86	34.5
All Vehicles		3555	4.6	0.882	44.2	LOS D	34.2	261.4	0.86	0.78	0.89	33.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	4	64.1	LOS F	0.0	0.0	0.96	0.96	
P2	East Full Crossing	9	64.2	LOS F	0.0	0.0	0.96	0.96	
P1	North Full Crossing	1	64.1	LOS F	0.0	0.0	0.96	0.96	
All Pedestrians		15	64.1	LOS F			0.96	0.96	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\P3796 St Marys Inland Container Terminal EIS\Technical Work\Models\P3796.001M St Marys Inland Container Terminal EIS_2018
Base.sip8

PHASING SUMMARY

 **Site: TCS 2385 [103 - Great Western Highway / Werrington Road / Reserve Road - AM Peak 2018 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 140 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, D, E

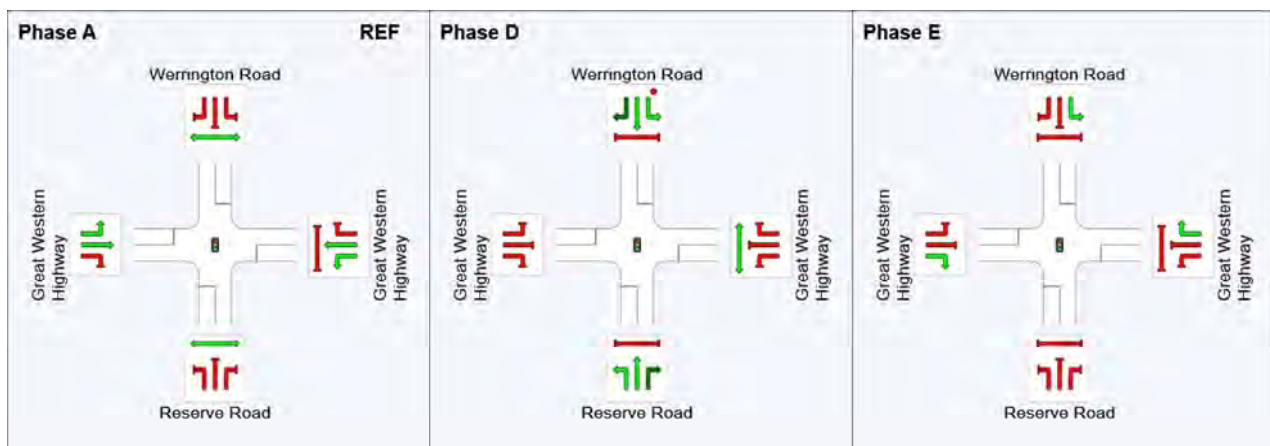
Output Phase Sequence: A, D, E

Phase Timing Summary

Phase	A	D	E
Phase Change Time (sec)	0	49	115
Green Time (sec)	43	60	19
Phase Time (sec)	49	66	25
Phase Split	35%	47%	18%

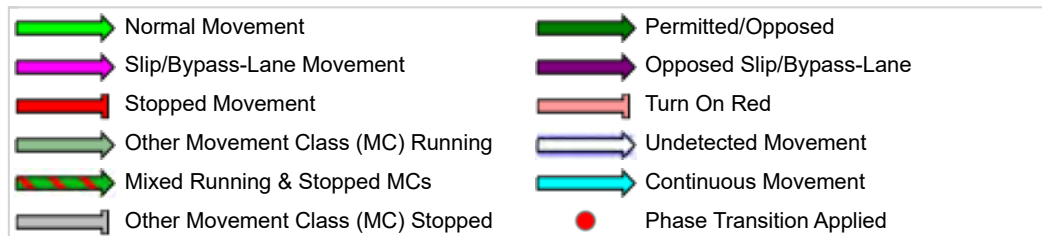
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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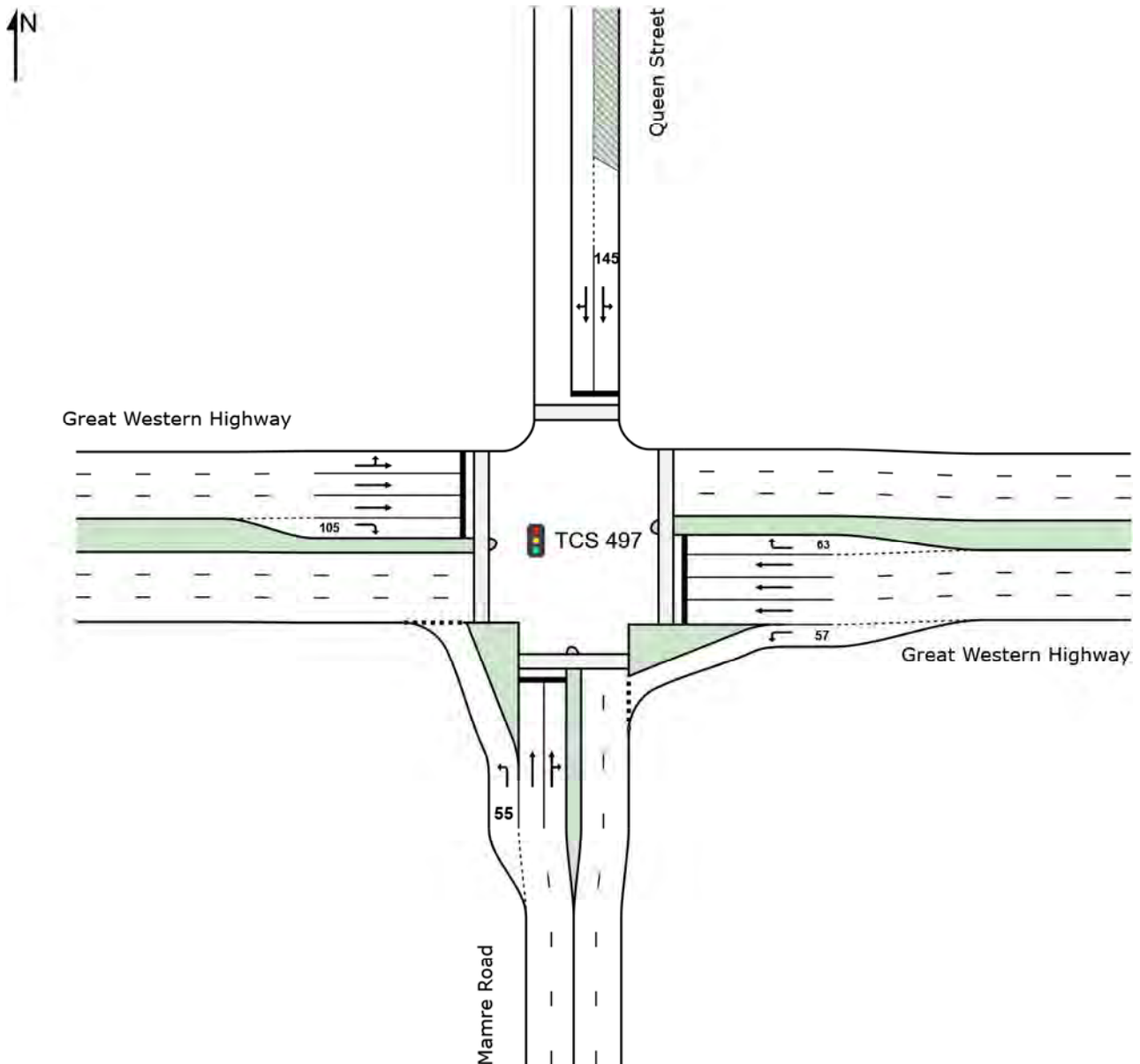
SITE LAYOUT

 Site: TCS 497 [104 - Great Western Highway / Queen Street / Mamre Road - AM Peak 2018 Base]

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated



MOVEMENT SUMMARY

 Site: TCS 497 [104 - Great Western Highway / Queen Street /  Network: [104 & 108 - AM Mamre Road - AM Peak 2018 Base]

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				
South: Mamre Road														
9	L2	155	6.8	155	6.8	0.105	11.1	LOS A	3.0	22.3	0.34	0.64	0.34	44.3
8	T1	422	2.0	422	2.0	0.849	49.6	LOS D	34.4	282.0	0.91	0.82	0.93	25.9
7	R2	447	14.4	447	14.4	0.849	62.3	LOS E	34.4	282.0	1.00	0.92	1.09	15.2
Approach		1024	8.1	1024	8.1	0.849	49.3	LOS D	34.4	282.0	0.86	0.84	0.91	23.0
East: Great Western Highway														
6	L2	354	19.9	354	19.9	0.308	9.3	LOS A	5.4	48.3	0.30	0.64	0.30	50.0
5	T1	904	3.1	904	3.1	0.739	54.9	LOS D	22.4	163.0	0.99	0.86	1.02	27.6
4	R2	171	1.9	171	1.9	0.640	72.6	LOS F	11.6	82.2	1.00	0.82	1.00	24.9
Approach		1428	7.1	1428	7.1	0.739	45.7	LOS D	22.4	163.0	0.82	0.80	0.84	30.7
North: Queen Street														
3	L2	45	0.0	45	0.0	0.478	58.8	LOS E	8.2	59.8	0.95	0.84	1.24	17.1
2	T1	163	7.1	163	7.1	0.478	56.7	LOS E	8.6	62.1	0.96	0.82	1.13	24.1
1	R2	71	1.5	71	1.5	0.478	62.1	LOS E	8.6	62.1	0.96	0.78	0.96	21.2
Approach		279	4.5	279	4.5	0.478	58.4	LOS E	8.6	62.1	0.96	0.81	1.10	22.3
West: Great Western Highway														
12	L2	104	4.0	104	4.0	0.697	57.1	LOS E	19.1	141.8	0.97	0.84	0.97	22.9
11	T1	825	5.5	825	5.5	0.697	51.5	LOS D	19.4	146.1	0.97	0.83	0.97	12.9
10	R2	189	8.3	189	8.3	0.778	72.3	LOS F	13.3	104.3	1.00	0.89	1.13	18.9
Approach		1119	5.8	1119	5.8	0.778	55.6	LOS D	19.4	146.1	0.97	0.84	1.00	15.6
All Vehicles		3851	6.8	3851	6.8	0.849	50.5	LOS D	34.4	282.0	0.89	0.82	0.92	24.2

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate	
		ped/h	sec		Pedestrian ped	Distance m		
P3	South Full Crossing	3	64.1	LOS F	0.0	0.0	0.96	0.96
P2	East Full Crossing	16	64.2	LOS F	0.1	0.1	0.96	0.96
P1	North Full Crossing	8	64.2	LOS F	0.0	0.0	0.96	0.96
P4	West Full Crossing	17	64.2	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		44	64.2	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\P3796 St Marys Inland Container Terminal EIS\Technical Work\Models\P3796.001M St Marys Inland Container Terminal EIS_2018
Base.sip8

PHASING SUMMARY

 Site: TCS 497 [104 - Great Western Highway / Queen Street / Mamre Road - AM Peak 2018 Base]  Network: [104 & 108 - AM Peak 2018 Base]

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, D, E, F

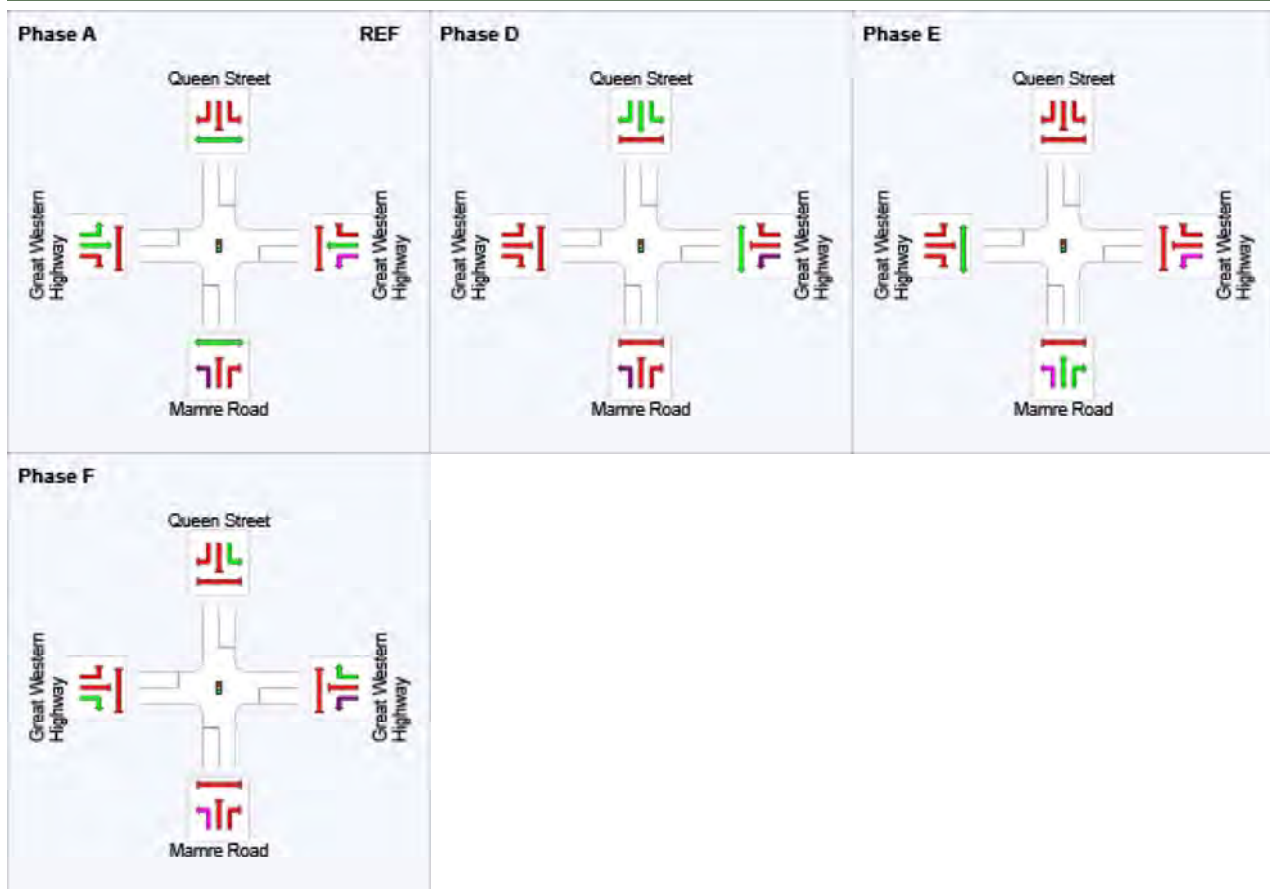
Output Phase Sequence: A, D, E, F

Phase Timing Summary

Phase	A	D	E	F
Phase Change Time (sec)	116	17	45	89
Green Time (sec)	35	22	39	21
Phase Time (sec)	41	27	45	27
Phase Split	29%	19%	32%	19%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



	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

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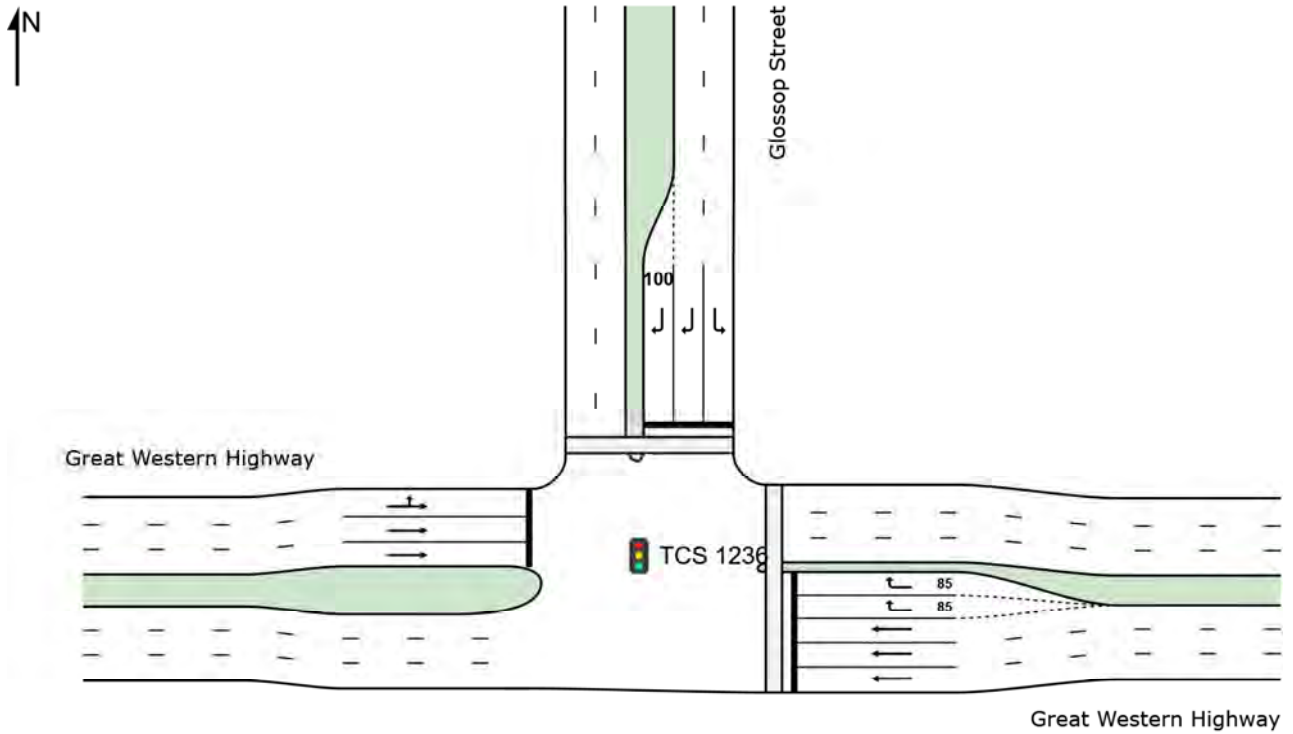
SITE LAYOUT

 **Site: TCS 1236 [108 - Great Western Highway / Glossop Street - AM Peak 2018 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated



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Project: P:\P3796 St Marys Inland Container Terminal EIS\Technical Work\Models\P3796.001M St Marys Inland Container Terminal EIS_2018 Base.sip8

MOVEMENT SUMMARY

 **Site: TCS 1236 [108 - Great Western Highway / Glossop Street - AM Peak 2018 Base]**

 **Network: [104 & 108 - AM Peak 2018 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
East: Great Western Highway														
5	T1	908	5.2	908	5.2	0.180	6.4	LOS A	7.1	53.3	0.34	0.29	0.34	49.8
4	R2	537	13.5	537	13.5	0.583	59.6	LOS E	16.5	140.1	0.96	0.83	0.96	28.6
Approach		1445	8.3	1445	8.3	0.583	26.2	LOS B	16.5	140.1	0.57	0.49	0.57	36.1
North: Glossop Street														
3	L2	352	20.1	352	20.1	0.508	35.6	LOS C	17.1	152.0	0.77	0.81	0.77	35.3
1	R2	520	10.5	520	10.5	0.802	69.0	LOS E	18.1	146.9	1.00	0.90	1.12	16.0
Approach		872	14.4	872	14.4	0.802	55.5	LOS D	18.1	152.0	0.91	0.86	0.98	23.8
West: Great Western Highway														
12	L2	376	14.3	376	14.3	0.352	31.9	LOS C	18.9	160.2	0.75	0.79	0.75	37.9
11	T1	942	5.9	942	5.9	0.352	30.6	LOS C	24.2	180.8	0.85	0.74	0.85	40.4
Approach		1318	8.3	1318	8.3	0.352	31.0	LOS C	24.2	180.8	0.82	0.76	0.82	39.7
All Vehicles		3635	9.8	3635	9.8	0.802	35.0	LOS C	24.2	180.8	0.74	0.68	0.76	34.3

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Prop. Queued	Effective Stop Rate	
P2	East Full Crossing	1	64.1	LOS F	0.0	0.0	0.96	0.96
P1	North Full Crossing	1	64.1	LOS F	0.0	0.0	0.96	0.96
All Pedestrians		2	64.1	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\P3796 St Marys Inland Container Terminal EIS\Technical Work\Models\P3796.001M St Marys Inland Container Terminal EIS_2018 Base.sip8

PHASING SUMMARY

 **Site: TCS 1236 [108 - Great Western Highway / Glossop Street - AM Peak 2018 Base]**

 **Network: [104 & 108 - AM Peak 2018 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase C

Input Phase Sequence: A, B, C

Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	33	105	0
Green Time (sec)	66	29	27
Phase Time (sec)	72	35	33
Phase Split	51%	25%	24%

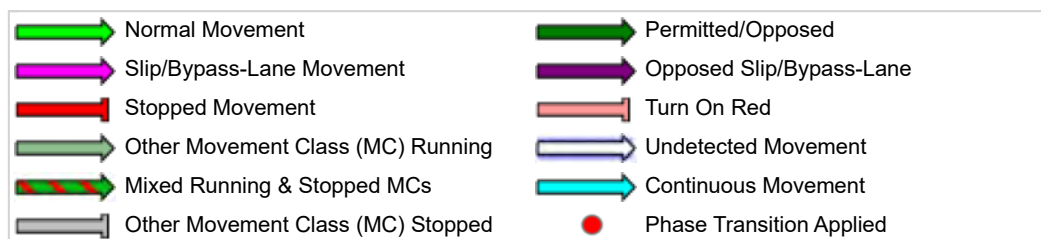
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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QUEUE STORAGE RATIO (PERCENTILE)

Ratio of the 95% Back of Queue Distance to the available queue storage distance (worst lane for the approach)

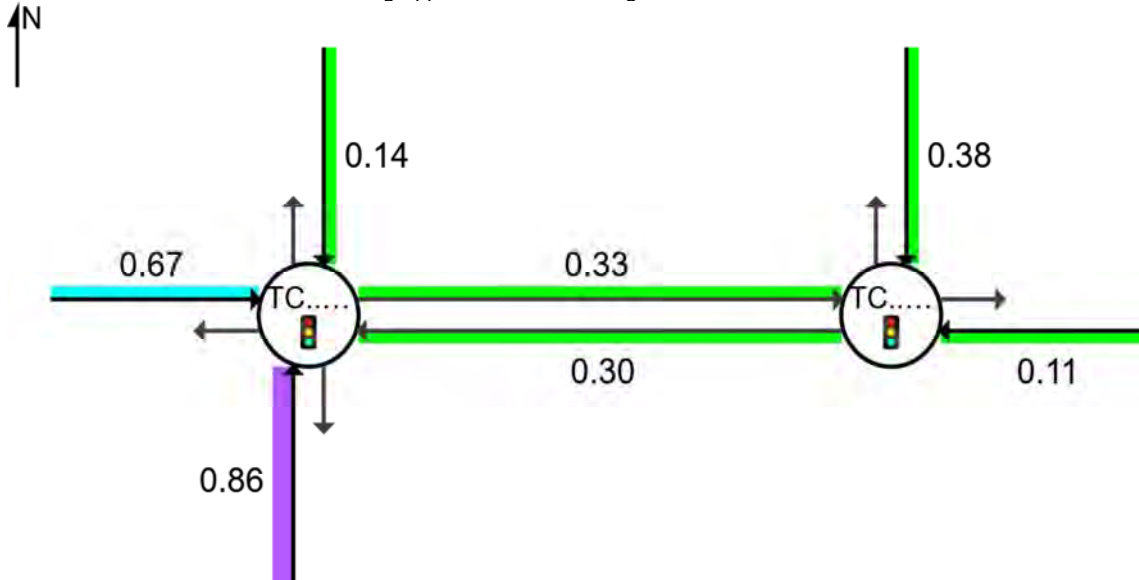
Network: [104 & 108 - AM Peak 2018 Base]

0800 - 0900

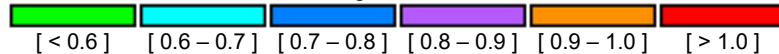
Network Category: (None)

Network Cycle Time = 140 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio



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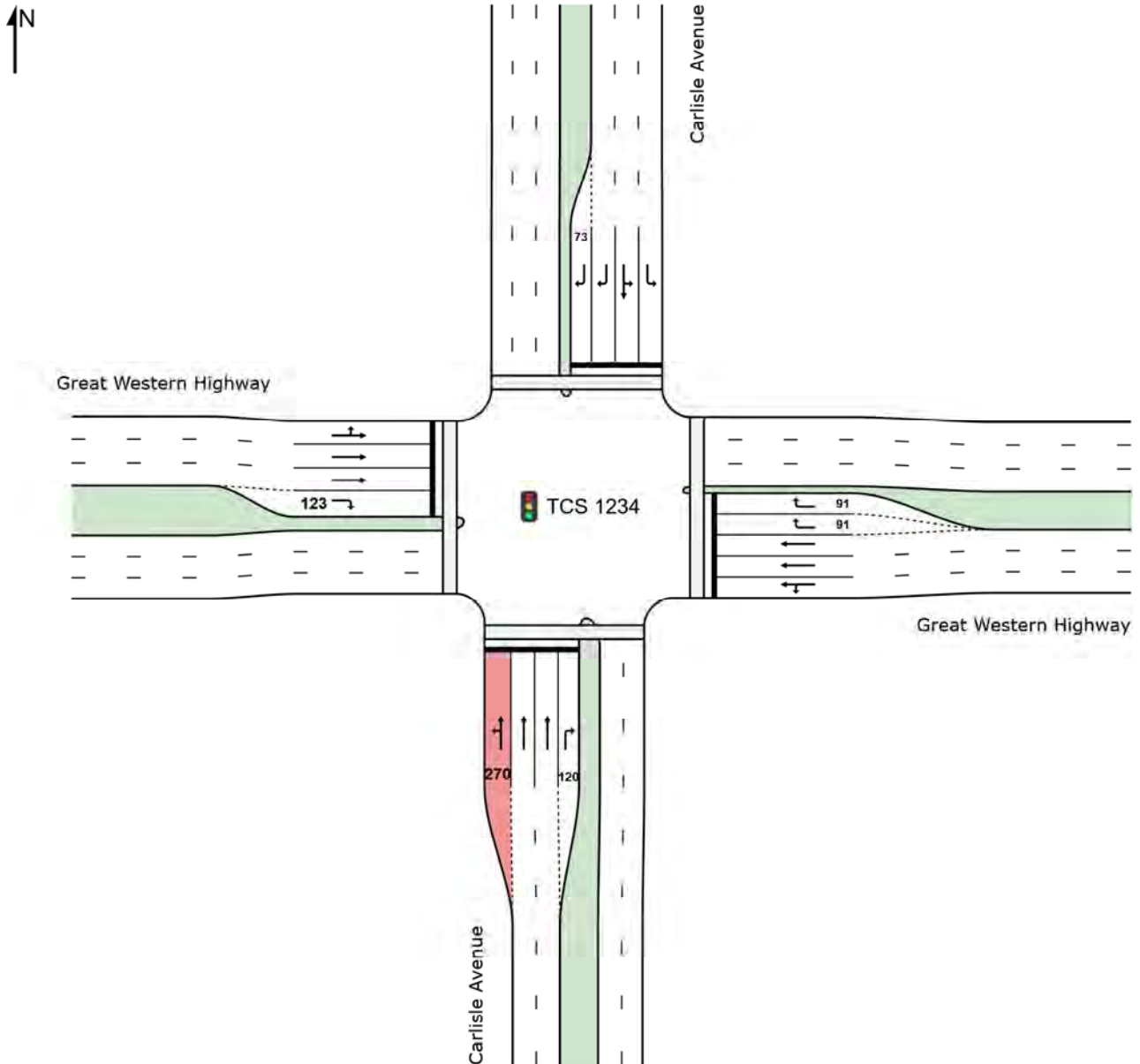
SITE LAYOUT

 **Site: TCS 1234 [105 - Great Western Highway / Carlisle Avenue - AM Peak 2018 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated



MOVEMENT SUMMARY

 **Site: TCS 1234 [105 - Great Western Highway / Carlisle Avenue - AM Peak 2018 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 142 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Carlisle Avenue												
9	L2	44	38.1	0.117	38.4	LOS C	2.3	25.9	0.84	0.71	0.84	33.4
8	T1	547	6.5	0.559	59.6	LOS E	17.1	126.4	0.97	0.81	0.97	28.4
7	R2	146	11.5	0.567	73.5	LOS F	9.8	78.2	1.00	0.79	1.00	25.4
Approach		738	9.4	0.567	61.0	LOS E	17.1	126.4	0.97	0.80	0.97	28.0
East: Great Western Highway												
6	L2	78	9.5	0.402	40.9	LOS C	11.8	91.1	0.81	0.73	0.82	37.8
5	T1	647	6.7	0.402	37.8	LOS C	12.9	97.8	0.82	0.71	0.82	43.0
4	R2	276	6.1	0.701	76.1	LOS F	9.7	71.5	1.00	0.83	1.07	28.2
Approach		1001	6.7	0.701	48.6	LOS D	12.9	97.8	0.87	0.74	0.89	37.1
North: Carlisle Avenue												
3	L2	257	5.7	0.179	30.6	LOS C	10.4	76.8	0.68	0.75	0.68	41.1
2	T1	389	6.8	0.364	42.1	LOS C	20.9	158.9	0.85	0.72	0.85	34.3
1	R2	375	5.1	0.278	36.7	LOS C	7.9	58.4	0.90	0.77	0.90	38.4
Approach		1021	5.9	0.364	37.2	LOS C	20.9	158.9	0.82	0.74	0.82	37.5
West: Great Western Highway												
12	L2	580	2.9	0.406	21.5	LOS B	16.4	118.3	0.69	0.79	0.72	47.4
11	T1	921	7.0	0.406	37.5	LOS C	23.1	174.8	0.82	0.71	0.82	43.3
10	R2	148	8.5	0.428	70.8	LOS F	9.6	77.2	0.98	0.79	0.98	25.9
Approach		1649	5.7	0.428	34.8	LOS C	23.1	174.8	0.79	0.75	0.80	42.5
All Vehicles		4409	6.6	0.701	42.9	LOS D	23.1	174.8	0.85	0.75	0.85	37.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	1	65.1	LOS F	0.0	0.0	0.96	0.96	
P2	East Full Crossing	1	65.1	LOS F	0.0	0.0	0.96	0.96	
P1	North Full Crossing	1	65.1	LOS F	0.0	0.0	0.96	0.96	
P4	West Full Crossing	1	65.1	LOS F	0.0	0.0	0.96	0.96	
All Pedestrians		4	65.1	LOS F			0.96	0.96	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Base.sip8

PHASING SUMMARY

 **Site: TCS 1234 [105 - Great Western Highway / Carlisle Avenue - AM Peak 2018 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 142 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, D, E, F, G

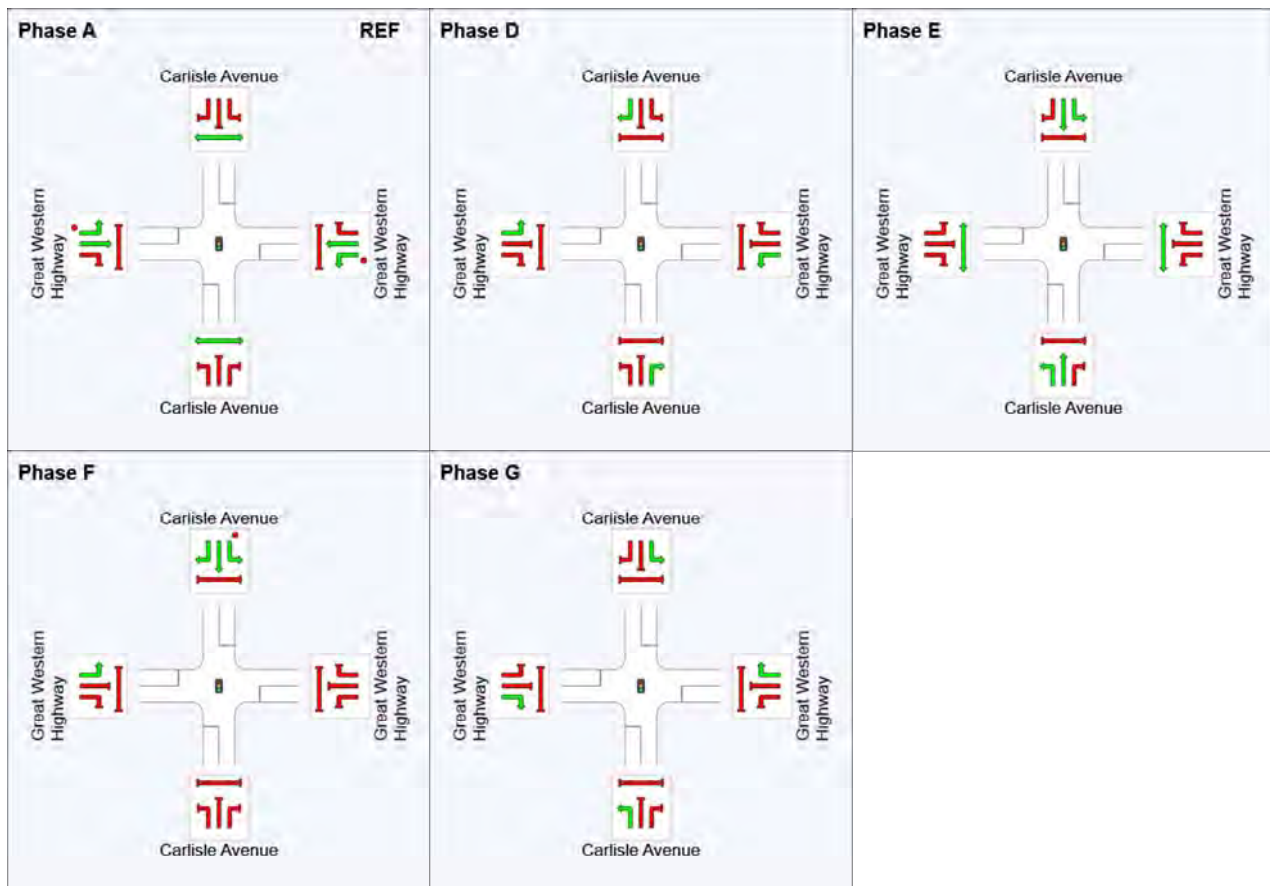
Output Phase Sequence: A, D, E, F, G

Phase Timing Summary

Phase	A	D	E	F	G
Phase Change Time (sec)	0	53	73	102	120
Green Time (sec)	47	14	23	13	16
Phase Time (sec)	53	20	28	19	22
Phase Split	37%	14%	20%	13%	15%

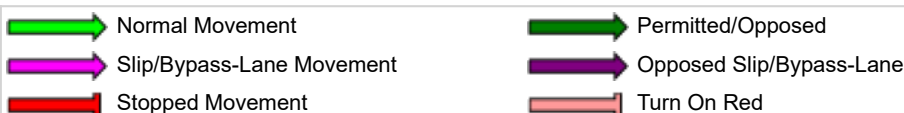
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

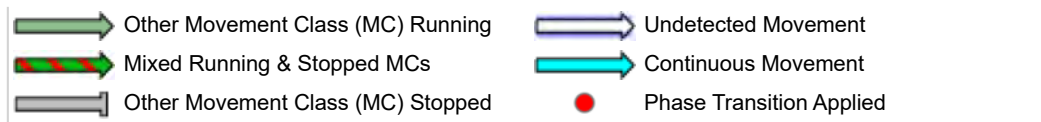
Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase





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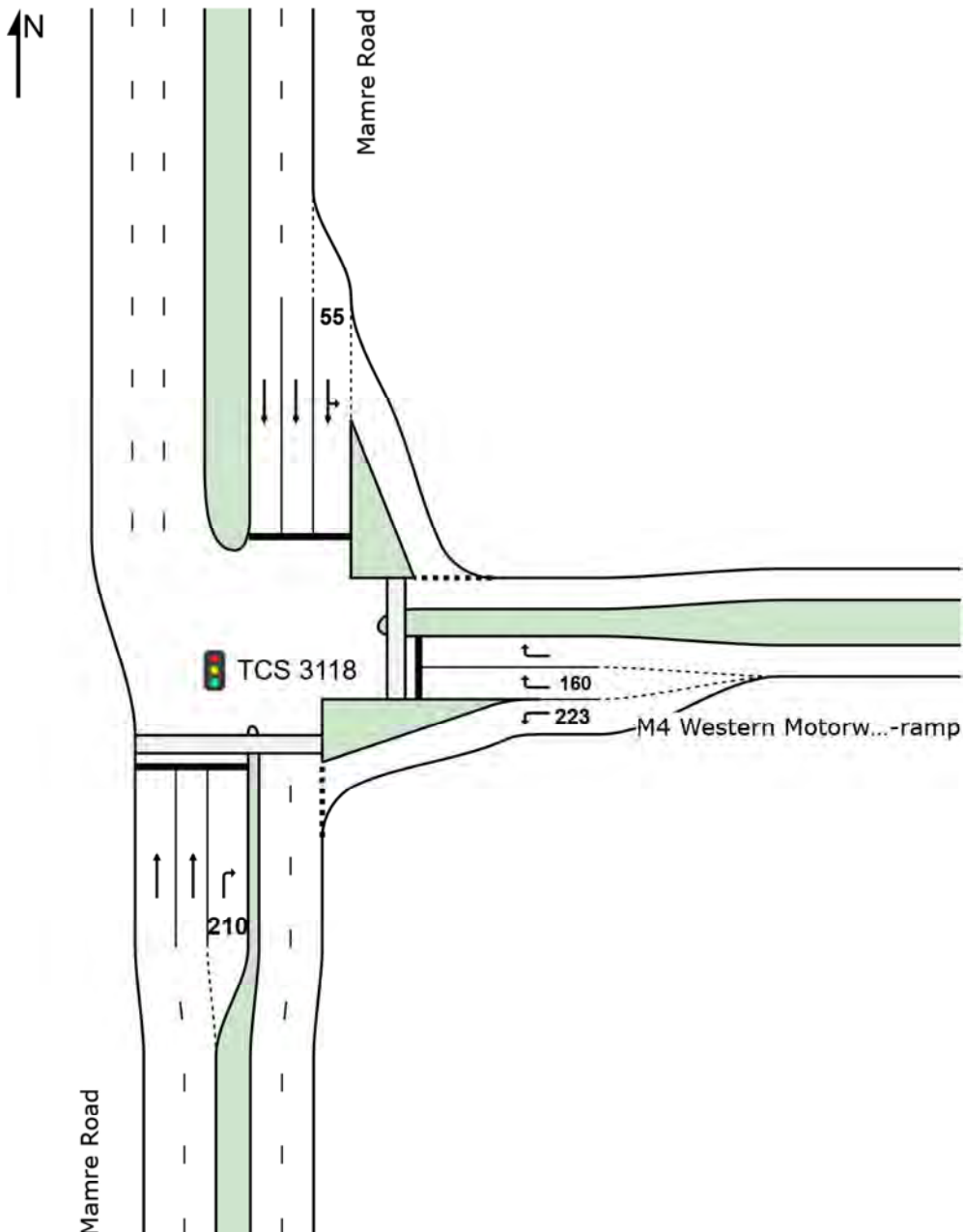
SITE LAYOUT

 Site: TCS 3118 [106 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (South) - AM Peak 2018 Base]

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated



MOVEMENT SUMMARY

 **Site: TCS 3118 [106 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (South) - AM Peak 2018 Base]**

 **Network: [106 & 107 - AM Peak 2018 Base]**

0800 - 0900

Site Category: (None)

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

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
South: Mamre Road														
8	T1	1199	5.9	1199	5.9	0.212	4.1	LOS A	9.2	70.4	0.31	0.28	0.31	49.6
7	R2	453	8.6	453	8.6	0.600	47.6	LOS D	21.8	166.8	0.96	0.83	0.96	25.4
Approach		1652	6.6	1652	6.6	0.600	16.0	LOS B	21.8	166.8	0.49	0.43	0.49	33.8
East: M4 Western Motorway Off-ramp/On-ramp														
6	L2	109	11.5	109	11.5	0.130	8.1	LOS A	1.2	10.0	0.28	0.62	0.28	50.6
4	R2	253	13.8	253	13.8	0.497	53.0	LOS D	6.4	53.0	0.96	0.79	0.96	22.2
Approach		362	13.1	362	13.1	0.497	39.4	LOS C	6.4	53.0	0.76	0.74	0.76	28.9
North: Mamre Road														
3	L2	299	9.5	299	9.5	0.180	7.4	LOS A	2.4	19.0	0.17	0.56	0.17	37.4
2	T1	1147	7.9	1147	7.9	0.480	15.2	LOS B	15.0	114.3	0.53	0.47	0.53	40.5
Approach		1446	8.2	1446	8.2	0.480	13.5	LOS A	15.0	114.3	0.46	0.49	0.46	39.6
All Vehicles		3460	8.0	3460	8.0	0.600	17.5	LOS B	21.8	166.8	0.51	0.49	0.51	35.5

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	1	49.2	LOS E	0.0	0.0	0.95	0.95
P2	East Full Crossing	1	49.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		2	49.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 Site: TCS 3118 [106 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (South) - AM Peak 2018 Base]

 Network: [106 & 107 - AM Peak 2018 Base]

0800 - 0900

Site Category: (None)

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

Timings based on settings in the Network Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

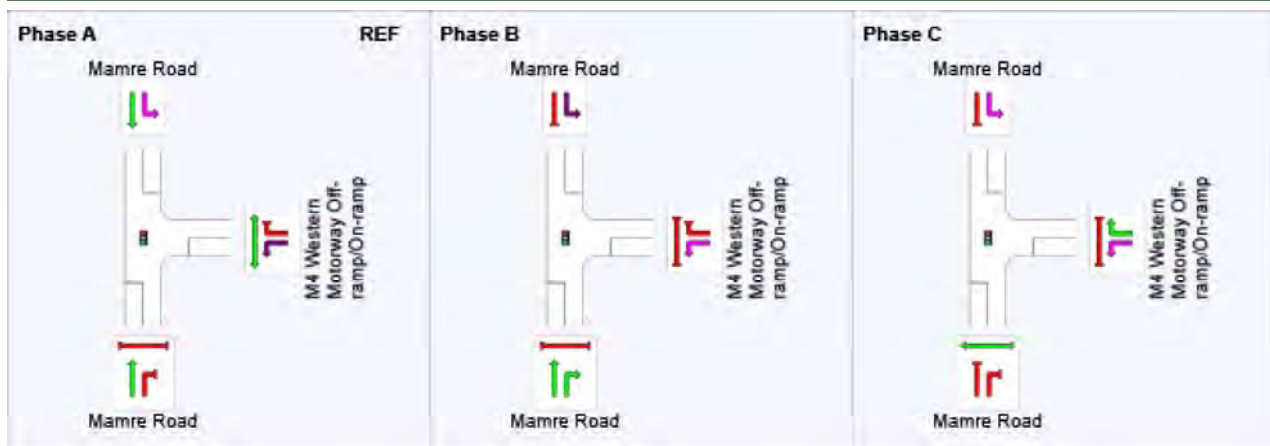
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	58	87
Green Time (sec)	54	23	17
Phase Time (sec)	60	29	21
Phase Split	55%	26%	19%

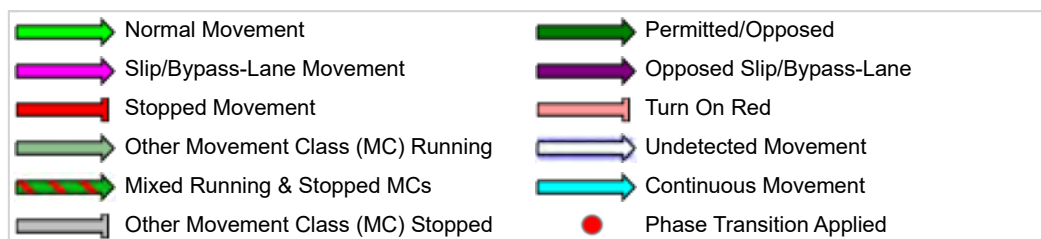
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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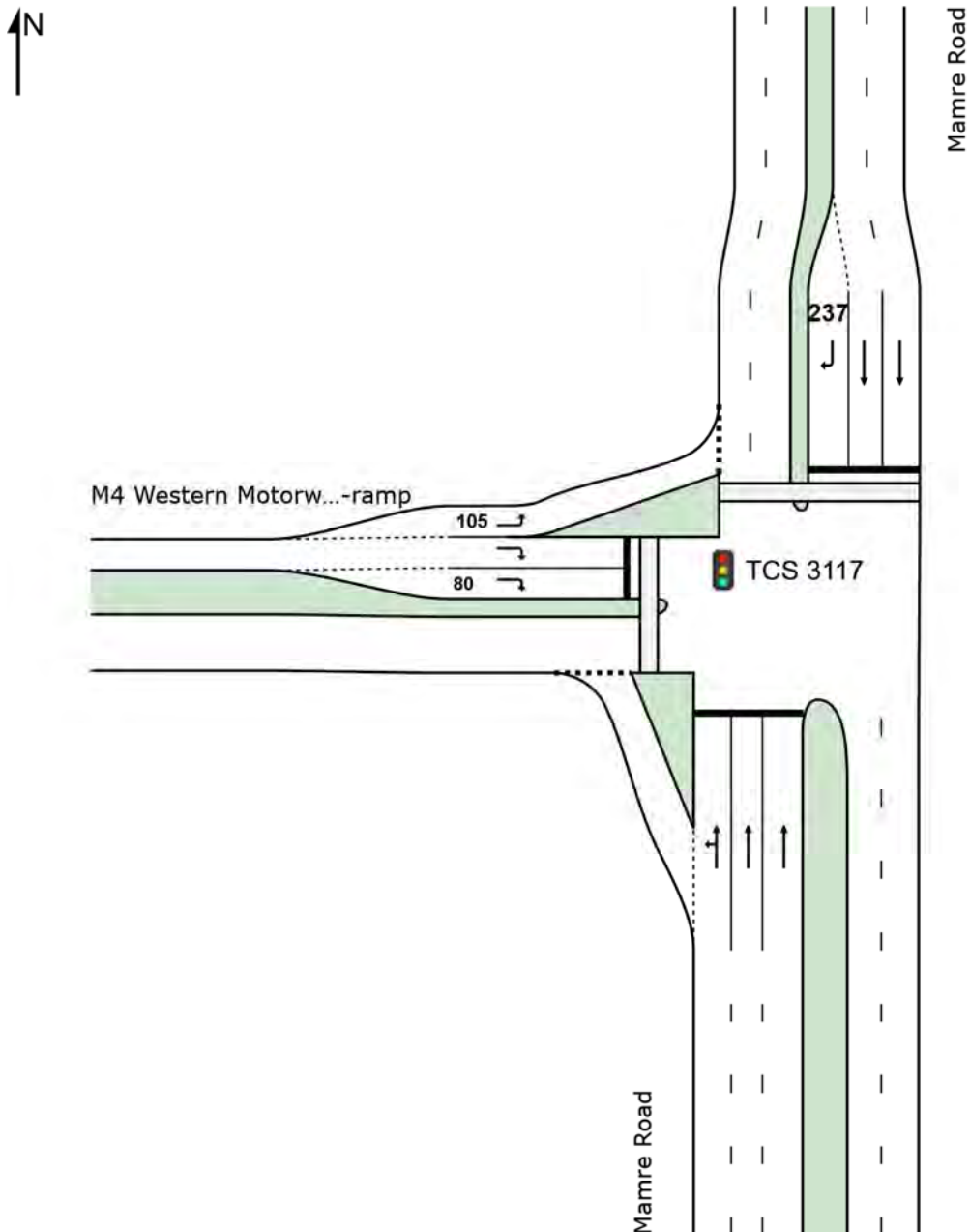
SITE LAYOUT

 Site: TCS 3117 [107 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (North) - AM Peak 2018 Base]

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated



MOVEMENT SUMMARY

 **Site: TCS 3117 [107 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (North) - AM Peak 2018 Base]**

 **Network: [106 & 107 - AM Peak 2018 Base]**

0800 - 0900

Site Category: (None)

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

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m			km/h	
South: Mamre Road														
9	L2	241	6.6	241	6.6	0.126	9.6	LOS A	4.6	36.6	0.44	0.65	0.44	36.1
8	T1	1211	7.4	1211	7.4	0.364	18.6	LOS B	20.3	155.7	0.69	0.61	0.69	36.8
Approach		1452	7.3	1452	7.3	0.364	17.1	LOS B	20.3	155.7	0.65	0.62	0.65	36.6
North: Mamre Road														
2	T1	868	8.1	868	8.1	0.540	9.2	LOS A	14.8	114.5	0.52	0.46	0.52	39.3
1	R2	195	14.6	195	14.6	1.061	141.6	LOS F	18.6	158.9	1.00	1.35	2.13	13.4
Approach		1063	9.3	1063	9.3	1.061	33.4	LOS C	18.6	158.9	0.60	0.62	0.81	22.7
West: M4 Western Motorway Off-ramp/On-ramp														
12	L2	602	3.7	602	3.7	0.653	10.4	LOS A	15.0	109.0	0.58	0.76	0.58	48.3
10	R2	578	8.4	578	8.4	0.768	52.8	LOS D	15.5	119.9	1.00	0.89	1.10	22.1
Approach		1180	6.0	1180	6.0	0.768	31.1	LOS C	15.5	119.9	0.79	0.83	0.83	33.1
All Vehicles		3695	7.4	3695	7.4	1.061	26.3	LOS B	20.3	158.9	0.68	0.69	0.75	31.3

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Prop. Queued	Effective Stop Rate	
P1	North Full Crossing	1	49.2	LOS E	0.0	0.0	0.95	0.95
P4	West Full Crossing	3	49.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		4	49.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 Site: TCS 3117 [107 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (North) - AM Peak 2018 Base]

 Network: [106 & 107 - AM Peak 2018 Base]

0800 - 0900

Site Category: (None)

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

Timings based on settings in the Network Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

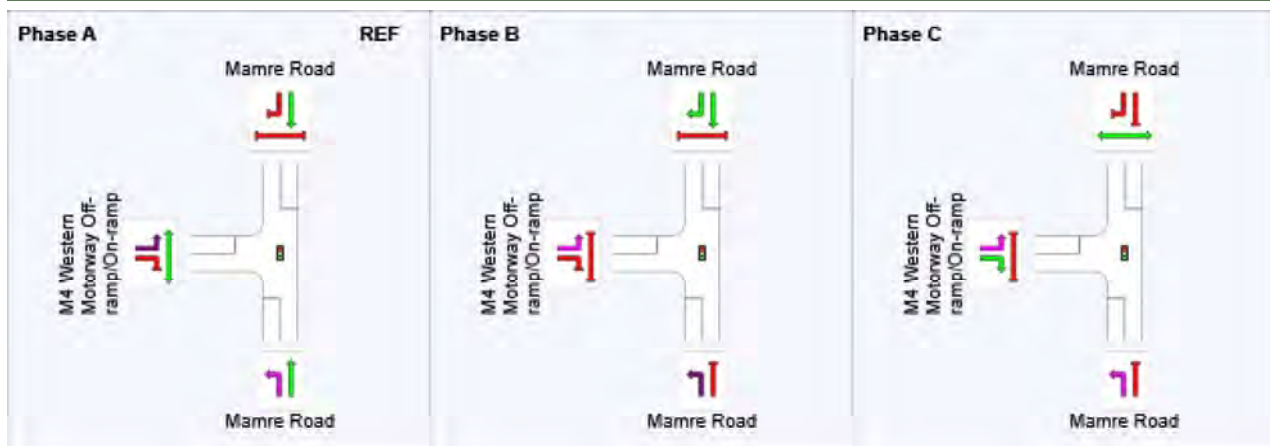
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	16	75	96
Green Time (sec)	53	15	24
Phase Time (sec)	59	21	30
Phase Split	54%	19%	27%

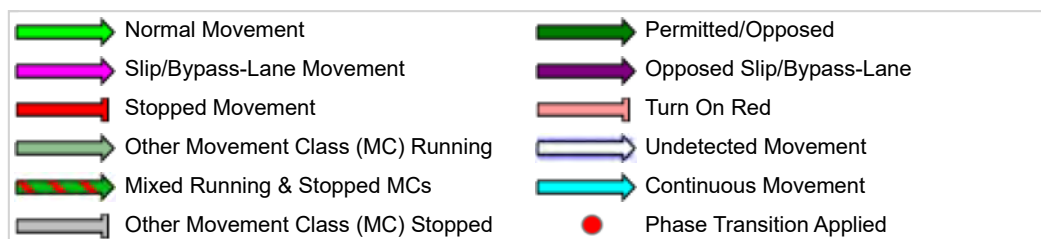
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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QUEUE STORAGE RATIO (PERCENTILE)

Ratio of the 95% Back of Queue Distance to the available queue storage distance (worst lane for the approach)

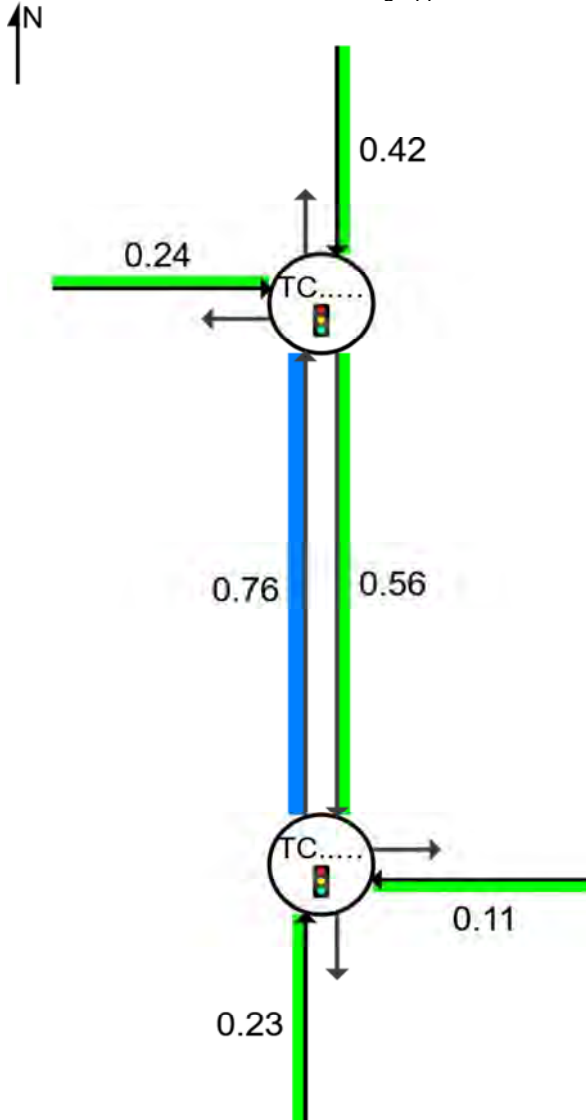
Network: [106 & 107 - AM Peak 2018 Base]

0800 - 0900

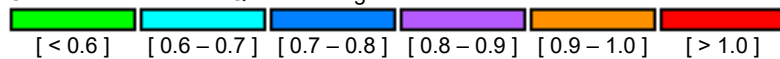
Network Category: (None)

Network Cycle Time = 110 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio



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MOVEMENT SUMMARY



Site: TCS 2986 [101 - Richmond Road / Dunheved Road - PM Peak 2018 Base]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 124 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Richmond Road												
8	T1	1628	3.1	0.424	6.7	LOS A	18.5	134.3	0.42	0.38	0.42	58.5
7	R2	529	1.2	0.820	60.6	LOS E	22.6	161.2	0.98	0.86	1.05	31.7
Approach		2158	2.6	0.820	19.9	LOS B	22.6	161.2	0.56	0.50	0.57	45.6
East: Dunheved Road												
6	L2	324	2.3	0.284	8.8	LOS A	4.4	31.5	0.29	0.68	0.29	57.6
4	R2	602	2.4	0.627	57.0	LOS E	17.6	127.1	0.97	0.82	0.97	25.0
Approach		926	2.4	0.627	40.1	LOS C	17.6	127.1	0.73	0.77	0.73	33.7
North: Richmond Road												
3	L2	388	2.7	0.177	9.9	LOS A	6.0	43.1	0.32	0.68	0.32	51.0
2	T1	1165	3.7	0.309	18.5	LOS B	19.9	145.2	0.63	0.55	0.63	45.2
Approach		1554	3.5	0.309	16.4	LOS B	19.9	145.2	0.55	0.58	0.55	46.5
All Vehicles		4638	2.9	0.820	22.8	LOS B	22.6	161.2	0.59	0.58	0.60	42.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	1	56.1	LOS E	0.0	0.0	0.95	0.95	
P2	East Full Crossing	1	56.1	LOS E	0.0	0.0	0.95	0.95	
All Pedestrians		2	56.1	LOS E			0.95	0.95	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site: TCS 2986 [101 - Richmond Road / Dunheved Road - PM Peak 2018 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 124 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

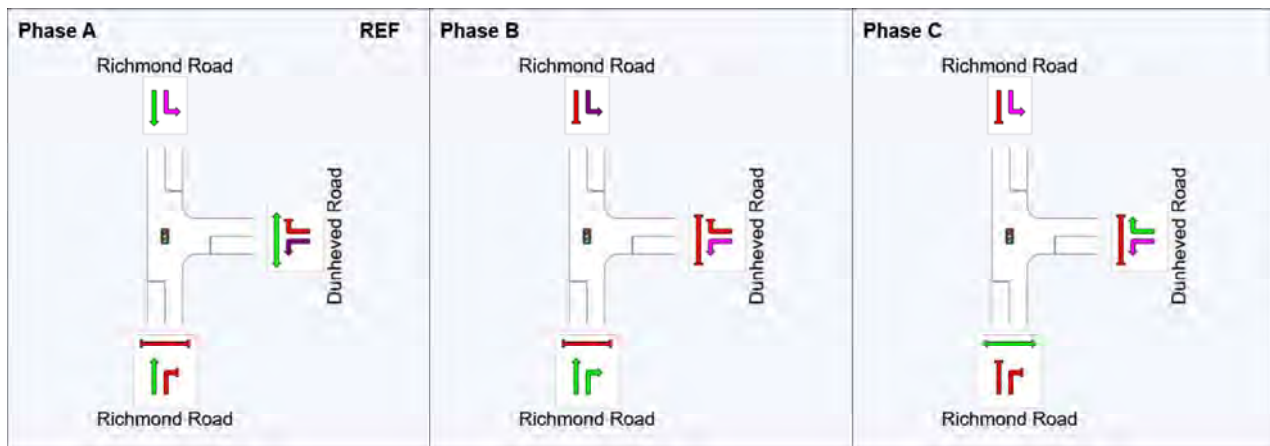
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	69	97
Green Time (sec)	63	22	21
Phase Time (sec)	69	28	27
Phase Split	56%	23%	22%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase

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

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MOVEMENT SUMMARY

 **Site: TCS 442 [102 - Great Western Highway / Parker Street - PM Peak 2018 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 125 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Parker Street												
9	L2	181	2.9	0.138	11.1	LOS A	3.0	21.9	0.34	0.67	0.34	44.2
8	T1	824	5.4	0.881	60.6	LOS E	27.4	203.4	1.00	1.00	1.20	19.1
7	R2	95	2.2	0.257	54.6	LOS D	5.0	36.4	0.90	0.77	0.90	25.7
Approach		1100	4.7	0.881	52.0	LOS D	27.4	203.4	0.88	0.92	1.04	21.9
East: Great Western Highway												
6	L2	173	2.4	0.223	44.4	LOS D	9.6	68.6	0.83	0.75	0.83	29.2
5	T1	839	3.6	0.549	46.8	LOS D	21.8	159.3	0.95	0.80	0.95	31.0
4	R2	520	3.4	0.736	55.0	LOS D	29.4	213.3	1.00	0.86	1.00	27.6
Approach		1532	3.4	0.736	49.3	LOS D	29.4	213.3	0.95	0.81	0.95	29.6
North: Parker Street												
3	L2	477	2.2	0.203	6.7	LOS A	0.0	0.0	0.00	0.57	0.00	58.0
2	T1	881	4.2	0.846	55.8	LOS D	27.7	203.7	1.00	0.95	1.12	20.2
1	R2	229	3.2	0.563	57.7	LOS E	12.9	93.5	0.97	0.82	0.97	23.3
Approach		1587	3.4	0.846	41.3	LOS C	27.7	203.7	0.69	0.82	0.76	28.6
West: Great Western Highway												
12	L2	505	3.5	0.234	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	51.7
11	T1	699	1.1	0.795	53.0	LOS D	22.7	160.8	0.99	0.90	1.08	29.2
10	R2	261	0.8	0.580	53.8	LOS D	14.4	102.3	0.96	0.82	0.96	20.9
Approach		1465	1.9	0.795	36.8	LOS C	22.7	160.8	0.64	0.76	0.68	31.8
All Vehicles		5684	3.3	0.881	44.4	LOS D	29.4	213.3	0.79	0.82	0.85	28.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	7	56.7	LOS E	0.0	0.0	0.95	0.95	
P2	East Full Crossing	13	56.7	LOS E	0.0	0.0	0.95	0.95	
P1	North Full Crossing	5	56.7	LOS E	0.0	0.0	0.95	0.95	
P4	West Full Crossing	5	56.7	LOS E	0.0	0.0	0.95	0.95	
All Pedestrians		31	56.7	LOS E			0.95	0.95	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Base.sip8

PHASING SUMMARY

 **Site: TCS 442 [102 - Great Western Highway / Parker Street - PM Peak 2018 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 125 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, D, E, G

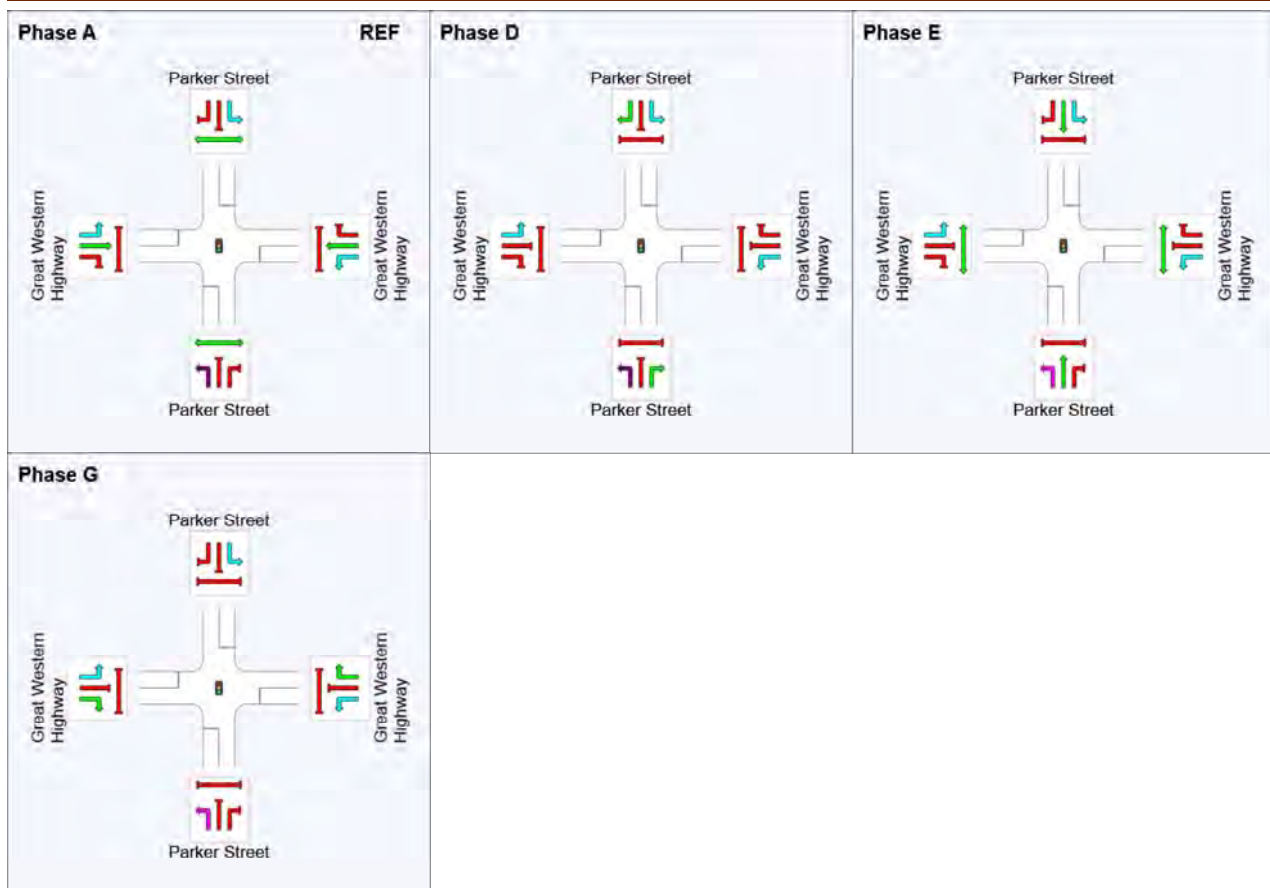
Output Phase Sequence: A, D, E, G

Phase Timing Summary

Phase	A	D	E	G
Phase Change Time (sec)	0	32	60	93
Green Time (sec)	26	22	27	26
Phase Time (sec)	32	28	33	32
Phase Split	26%	22%	26%	26%

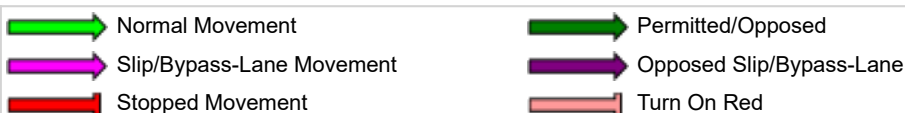
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

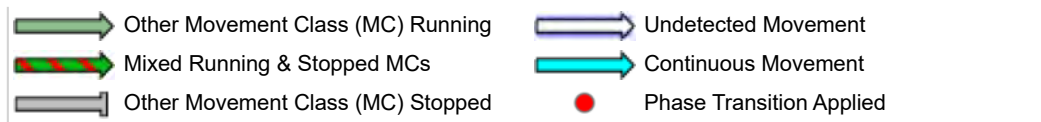
Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase





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MOVEMENT SUMMARY

 **Site: TCS 2385 [103 - Great Western Highway / Werrington Road / Reserve Road - PM Peak 2018 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 141 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Reserve Road												
9	L2	35	3.0	0.183	35.3	LOS C	4.9	34.8	0.70	0.68	0.70	26.8
8	T1	33	0.0	0.183	30.7	LOS C	4.9	34.8	0.70	0.68	0.70	25.6
7	R2	42	0.0	0.183	35.2	LOS C	4.9	34.8	0.70	0.68	0.70	33.3
Approach		109	1.0	0.183	33.9	LOS C	4.9	34.8	0.70	0.68	0.70	29.2
East: Great Western Highway												
6	L2	41	2.6	0.625	55.0	LOS D	28.4	205.1	0.94	0.82	0.94	28.2
5	T1	1342	3.0	0.625	47.7	LOS D	28.4	205.1	0.93	0.81	0.93	35.2
4	R2	342	5.5	0.618	61.0	LOS E	21.2	156.3	0.96	0.84	0.96	28.0
Approach		1725	3.5	0.625	50.5	LOS D	28.4	205.1	0.94	0.81	0.94	33.4
North: Werrington Road												
3	L2	205	3.1	0.098	15.5	LOS B	5.1	37.9	0.45	0.69	0.45	47.7
2	T1	20	0.0	0.963	52.9	LOS D	38.8	284.9	0.99	1.00	1.23	18.2
1	R2	473	4.2	0.963	57.3	LOS E	38.8	284.9	0.99	1.00	1.23	24.0
Approach		698	3.8	0.963	44.9	LOS D	38.8	284.9	0.83	0.91	1.00	28.8
West: Great Western Highway												
12	L2	253	3.3	0.426	51.7	LOS D	23.1	170.7	0.88	0.79	0.88	26.8
11	T1	1015	3.1	0.426	44.6	LOS D	23.9	172.1	0.88	0.75	0.88	36.3
10	R2	76	2.8	0.102	54.0	LOS D	4.1	30.0	0.84	0.74	0.84	21.2
Approach		1343	3.1	0.426	46.5	LOS D	23.9	172.1	0.88	0.76	0.88	33.7
All Vehicles		3876	3.3	0.963	47.6	LOS D	38.8	284.9	0.89	0.81	0.92	32.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	5	64.6	LOS F	0.0	0.0	0.96	0.96	
P2	East Full Crossing	7	64.6	LOS F	0.0	0.0	0.96	0.96	
P1	North Full Crossing	1	64.6	LOS F	0.0	0.0	0.96	0.96	
All Pedestrians		14	64.6	LOS F			0.96	0.96	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site: TCS 2385 [103 - Great Western Highway / Werrington Road / Reserve Road - PM Peak 2018 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 141 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, D, E

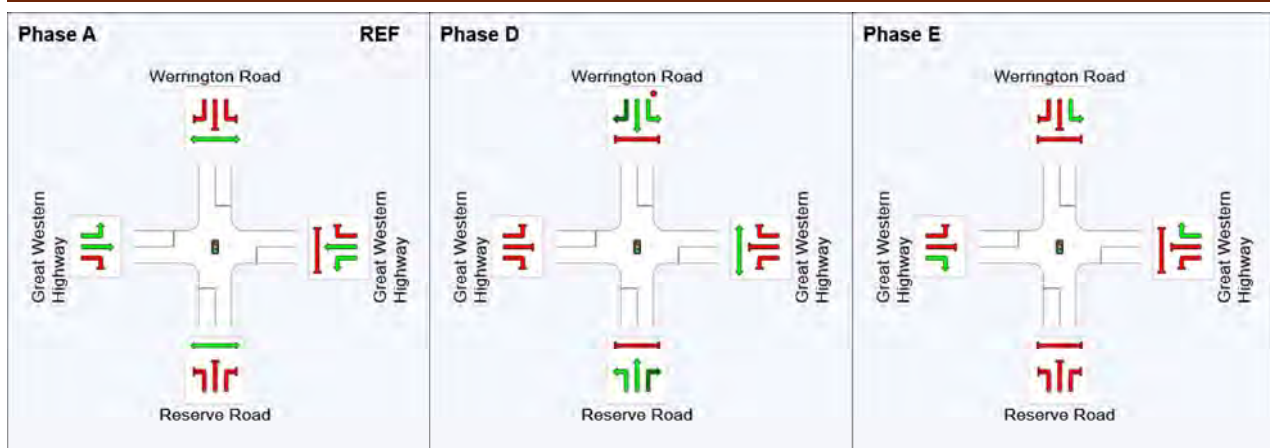
Output Phase Sequence: A, D, E

Phase Timing Summary

Phase	A	D	E
Phase Change Time (sec)	0	44	105
Green Time (sec)	38	55	30
Phase Time (sec)	44	61	36
Phase Split	31%	43%	26%

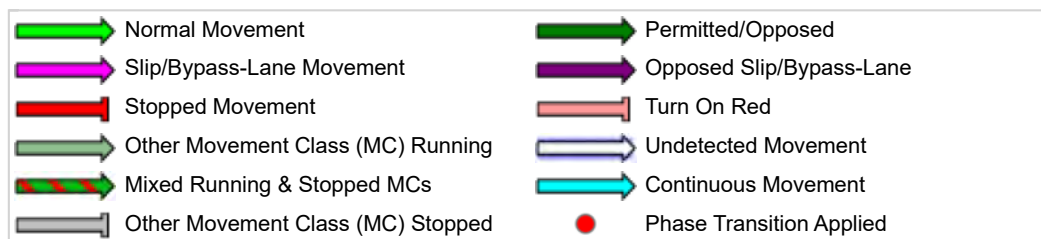
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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MOVEMENT SUMMARY

 Site: TCS 497 [104 - Great Western Highway / Queen Street /  Network: [104 & 108 - PM Mamre Road - PM Peak 2018 Base]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m			km/h	
South: Mamre Road														
9	L2	159	4.6	159	4.6	0.113	9.3	LOS A	2.5	18.7	0.29	0.63	0.29	46.1
8	T1	231	5.0	231	5.0	0.834	60.9	LOS E	21.2	185.4	0.96	0.81	0.98	23.5
7	R2	269	17.2	269	17.2	0.834	72.4	LOS F	21.2	185.4	1.00	0.91	1.14	13.5
Approach		659	9.9	659	9.9	0.834	53.2	LOS D	21.2	185.4	0.82	0.81	0.88	22.0
East: Great Western Highway														
6	L2	632	5.7	632	5.7	0.340	12.4	LOS A	14.4	111.0	0.42	0.69	0.42	47.9
5	T1	1351	2.1	1351	2.1	0.468	41.0	LOS C	26.8	192.1	0.80	0.68	0.80	32.0
4	R2	139	2.3	139	2.3	0.239	59.6	LOS E	7.6	54.3	0.85	0.76	0.85	27.3
Approach		2121	3.2	2121	3.2	0.468	33.7	LOS C	26.8	192.1	0.69	0.69	0.69	35.2
North: Queen Street														
3	L2	60	1.8	60	1.8	0.802	66.2	LOS E	20.8	147.7	1.00	0.96	1.33	16.0
2	T1	439	1.9	439	1.9	0.802	62.3	LOS E	20.8	147.7	1.00	0.95	1.23	23.1
1	R2	106	0.0	106	0.0	0.802	65.1	LOS E	20.5	145.0	1.00	0.92	1.10	20.7
Approach		605	1.6	605	1.6	0.802	63.2	LOS E	20.8	147.7	1.00	0.94	1.22	22.1
West: Great Western Highway														
12	L2	31	0.0	31	0.0	0.480	48.5	LOS D	14.6	106.1	0.87	0.75	0.87	25.2
11	T1	756	3.5	756	3.5	0.480	42.9	LOS D	14.6	106.9	0.87	0.74	0.87	14.9
10	R2	193	3.3	193	3.3	0.692	66.9	LOS E	12.8	94.6	1.00	0.84	1.03	19.9
Approach		979	3.3	979	3.3	0.692	47.8	LOS D	14.6	106.9	0.90	0.76	0.90	16.9
All Vehicles		4364	4.0	4364	4.0	0.834	43.9	LOS D	26.8	192.1	0.80	0.76	0.84	27.4

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate	
		ped/h	sec		Pedestrian ped	Distance m		
P3	South Full Crossing	7	64.1	LOS F	0.0	0.0	0.96	0.96
P2	East Full Crossing	14	64.2	LOS F	0.1	0.1	0.96	0.96
P1	North Full Crossing	1	64.1	LOS F	0.0	0.0	0.96	0.96
P4	West Full Crossing	12	64.2	LOS F	0.0	0.0	0.96	0.96
All Pedestrians		34	64.2	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 Site: TCS 497 [104 - Great Western Highway / Queen Street / Mamre Road - PM Peak 2018 Base]  Network: [104 & 108 - PM Peak 2018 Base]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, D, E, F

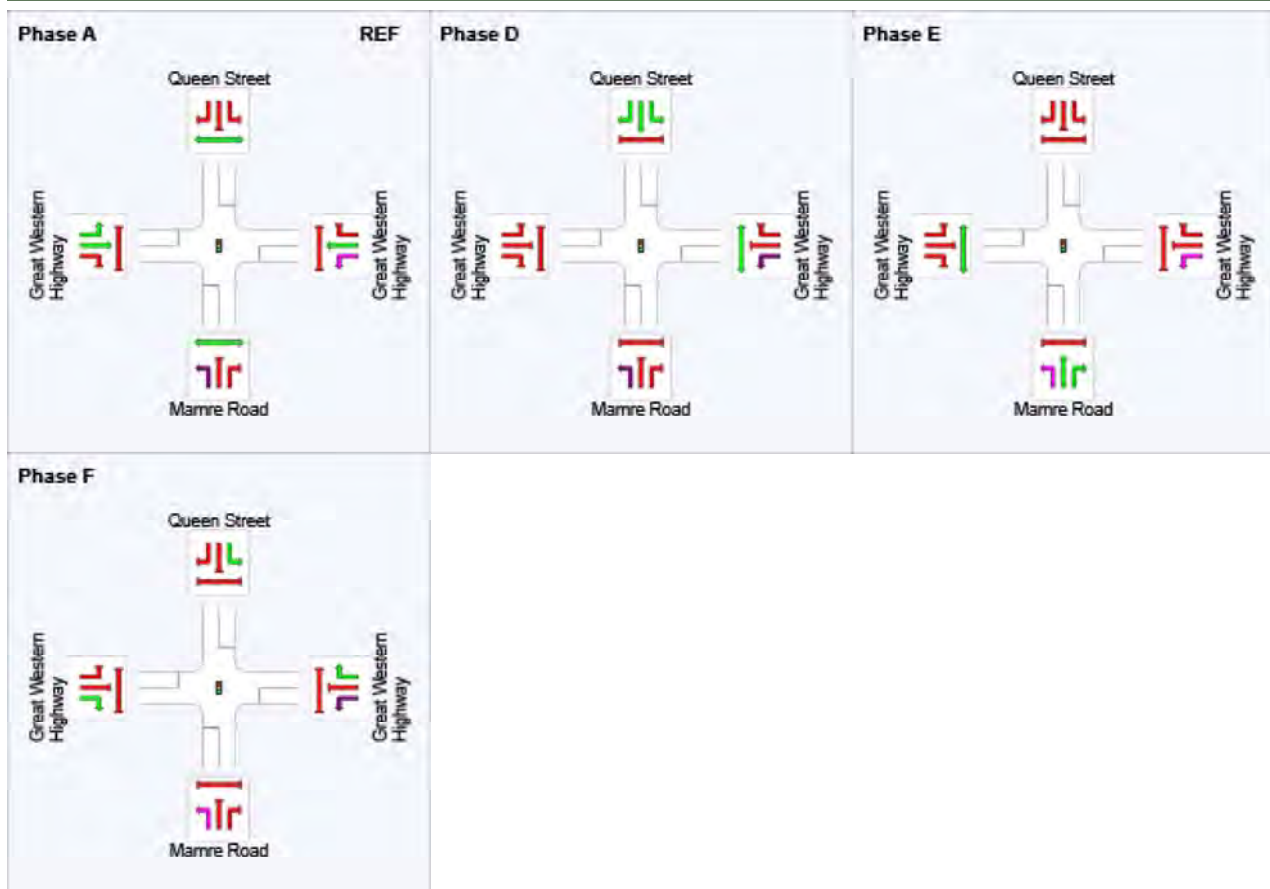
Output Phase Sequence: A, D, E, F

Phase Timing Summary

Phase	A	D	E	F
Phase Change Time (sec)	42	90	124	13
Green Time (sec)	42	28	23	23
Phase Time (sec)	48	34	29	29
Phase Split	34%	24%	21%	21%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase

 Normal Movement  Permitted/Opposed

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

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MOVEMENT SUMMARY

 **Site: TCS 1236 [108 - Great Western Highway / Glossop Street - PM Peak 2018 Base]**

 **Network: [104 & 108 - PM Peak 2018 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
East: Great Western Highway														
5	T1	1432	2.8	1432	2.8	0.463	8.3	LOS A	17.8	129.1	0.43	0.38	0.43	47.4
4	R2	558	8.7	558	8.7	0.831	70.6	LOS F	19.9	155.7	1.00	0.92	1.15	26.1
Approach		1989	4.4	1989	4.4	0.831	25.8	LOS B	19.9	155.7	0.59	0.53	0.63	35.6
North: Glossop Street														
3	L2	456	6.5	456	6.5	0.293	31.6	LOS C	19.3	146.3	0.69	0.77	0.69	37.2
1	R2	689	4.0	689	4.0	0.484	58.2	LOS E	20.5	153.6	0.94	0.82	0.94	18.1
Approach		1145	5.0	1145	5.0	0.484	47.6	LOS D	20.5	153.6	0.84	0.80	0.84	26.0
West: Great Western Highway														
12	L2	255	19.0	255	19.0	0.431	24.7	LOS B	9.9	86.7	0.49	0.66	0.49	41.6
11	T1	831	3.0	831	3.0	0.431	20.3	LOS B	12.7	92.6	0.53	0.49	0.53	45.3
Approach		1085	6.8	1085	6.8	0.431	21.3	LOS B	12.7	92.6	0.52	0.53	0.52	44.5
All Vehicles		4220	5.2	4220	5.2	0.831	30.5	LOS C	20.5	155.7	0.64	0.60	0.66	35.2

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	2	64.1	LOS F	0.0	0.0	0.96	0.96
P1	North Full Crossing	1	64.1	LOS F	0.0	0.0	0.96	0.96
All Pedestrians		3	64.1	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site: TCS 1236 [108 - Great Western Highway / Glossop Street - PM Peak 2018 Base]**

 **Network: [104 & 108 - PM Peak 2018 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase C

Input Phase Sequence: A, B, C

Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	34	106	0
Green Time (sec)	66	28	28
Phase Time (sec)	72	34	34
Phase Split	51%	24%	24%

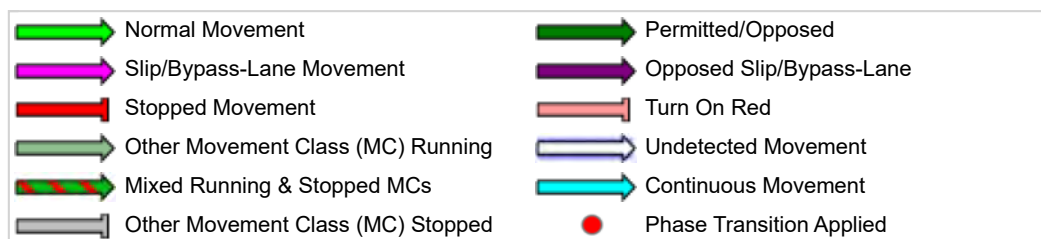
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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QUEUE STORAGE RATIO (PERCENTILE)

Ratio of the 95% Back of Queue Distance to the available queue storage distance (worst lane for the approach)

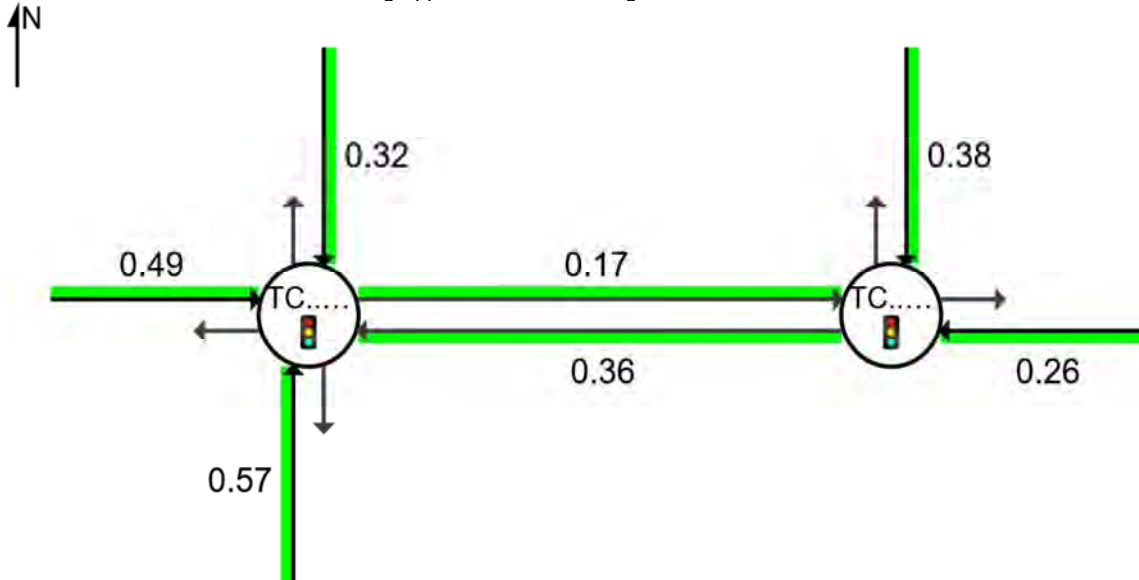
Network: [104 & 108 - PM Peak 2018 Base]

1630 - 1730

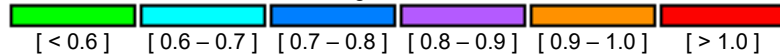
Network Category: (None)

Network Cycle Time = 140 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio



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MOVEMENT SUMMARY

 **Site: TCS 1234 [105 - Great Western Highway / Carlisle Avenue - PM Peak 2018 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 143 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Carlisle Avenue												
9	L2	86	9.8	0.164	33.3	LOS C	3.6	31.3	0.80	0.74	0.80	37.7
8	T1	597	3.4	0.714	61.8	LOS E	19.6	140.4	1.00	0.84	1.01	27.8
7	R2	107	3.9	0.486	73.8	LOS F	7.2	53.3	0.99	0.78	0.99	25.8
Approach		791	4.1	0.714	60.3	LOS E	19.6	140.4	0.98	0.82	0.98	28.3
East: Great Western Highway												
6	L2	135	3.9	0.461	48.4	LOS D	27.5	197.9	0.87	0.78	0.90	35.1
5	T1	1332	2.4	0.461	42.5	LOS C	28.4	203.9	0.87	0.75	0.87	40.7
4	R2	492	2.1	0.544	70.2	LOS E	16.0	115.1	0.99	0.81	0.99	29.5
Approach		1958	2.4	0.544	49.8	LOS D	28.4	203.9	0.90	0.77	0.91	36.8
North: Carlisle Avenue												
3	L2	289	2.2	0.180	27.5	LOS B	11.0	80.1	0.65	0.74	0.65	43.1
2	T1	596	5.8	0.509	41.9	LOS C	33.0	249.9	0.87	0.76	0.87	34.4
1	R2	631	2.8	0.416	35.9	LOS C	13.4	96.1	0.91	0.80	0.91	39.0
Approach		1516	3.9	0.509	36.7	LOS C	33.0	249.9	0.85	0.77	0.85	38.0
West: Great Western Highway												
12	L2	424	1.7	0.549	25.3	LOS B	13.0	92.4	0.77	0.83	0.83	45.2
11	T1	637	4.3	0.549	44.0	LOS D	17.6	129.9	0.89	0.77	0.89	40.1
10	R2	103	11.2	0.491	71.7	LOS F	6.9	57.0	0.98	0.79	0.98	25.6
Approach		1164	4.0	0.549	39.6	LOS C	17.6	129.9	0.85	0.80	0.88	40.1
All Vehicles		5428	3.4	0.714	45.5	LOS D	33.0	249.9	0.89	0.78	0.89	36.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	1	65.6	LOS F	0.0	0.0	0.96	0.96	
P2	East Full Crossing	1	65.6	LOS F	0.0	0.0	0.96	0.96	
P1	North Full Crossing	1	65.6	LOS F	0.0	0.0	0.96	0.96	
P4	West Full Crossing	1	65.6	LOS F	0.0	0.0	0.96	0.96	
All Pedestrians		4	65.6	LOS F			0.96	0.96	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Base.sip8

PHASING SUMMARY

 **Site: TCS 1234 [105 - Great Western Highway / Carlisle Avenue - PM Peak 2018 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 143 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, D, E, F, G

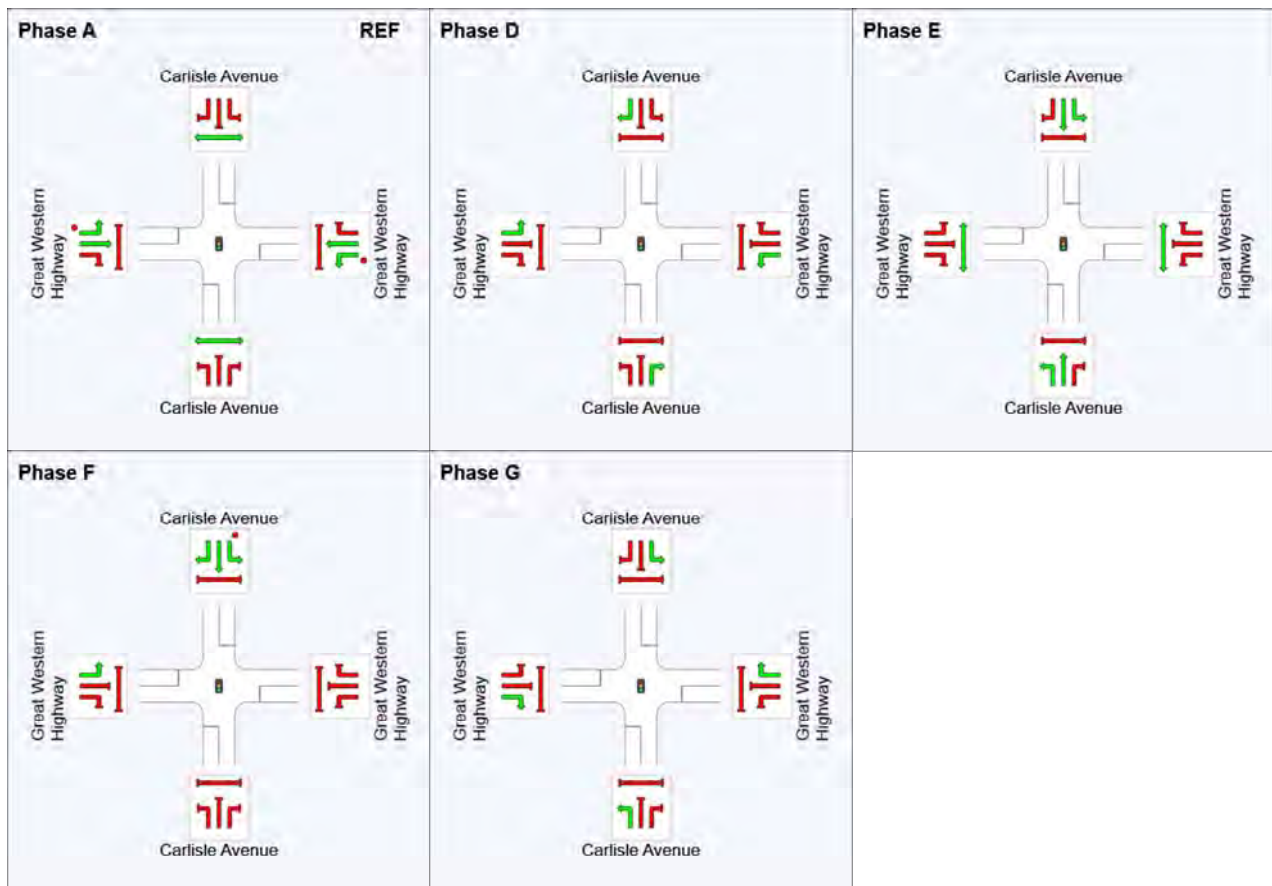
Output Phase Sequence: A, D, E, F, G

Phase Timing Summary

Phase	A	D	E	F	G
Phase Change Time (sec)	0	48	68	98	119
Green Time (sec)	42	14	24	16	18
Phase Time (sec)	48	20	29	22	24
Phase Split	34%	14%	20%	15%	17%

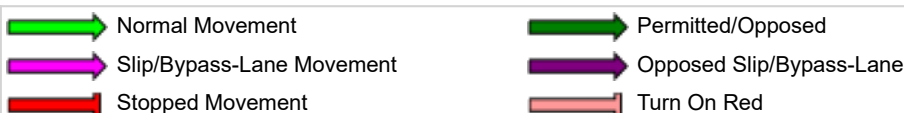
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

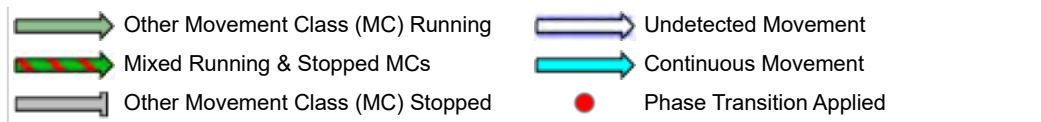
Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase





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MOVEMENT SUMMARY

 Site: TCS 3118 [106 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (South) - PM Peak 2018 Base]

 Network: [106 & 107 - PM Peak 2018 Base]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
South: Mamre Road														
8	T1	1021	5.5	1021	5.5	0.317	5.5	LOS A	10.2	77.3	0.36	0.33	0.36	46.9
7	R2	420	4.3	420	4.3	0.951	80.0	LOS F	30.7	230.9	1.00	1.04	1.41	19.9
Approach		1441	5.1	1441	5.1	0.951	27.2	LOS B	30.7	230.9	0.55	0.53	0.67	27.7
East: M4 Western Motorway Off-ramp/On-ramp														
6	L2	283	4.1	283	4.1	0.317	9.7	LOS A	4.8	34.9	0.37	0.67	0.37	49.4
4	R2	358	5.9	358	5.9	0.635	57.2	LOS E	10.2	76.1	0.98	0.82	0.99	21.2
Approach		641	5.1	641	5.1	0.635	36.2	LOS C	10.2	76.1	0.71	0.75	0.72	31.1
North: Mamre Road														
3	L2	751	2.1	751	2.1	0.377	12.7	LOS A	20.6	149.5	0.53	0.72	0.53	34.6
2	T1	1362	4.4	1362	4.4	0.528	20.1	LOS B	25.2	185.6	0.60	0.53	0.60	36.7
Approach		2113	3.6	2113	3.6	0.528	17.5	LOS B	25.2	185.6	0.58	0.60	0.58	35.7
All Vehicles		4195	4.3	4195	4.3	0.951	23.7	LOS B	30.7	230.9	0.59	0.60	0.63	32.2

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
P2	East Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		2	54.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site:** TCS 3118 [106 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (South) - PM Peak 2018 Base]

 **Network:** [106 & 107 - PM Peak 2018 Base]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

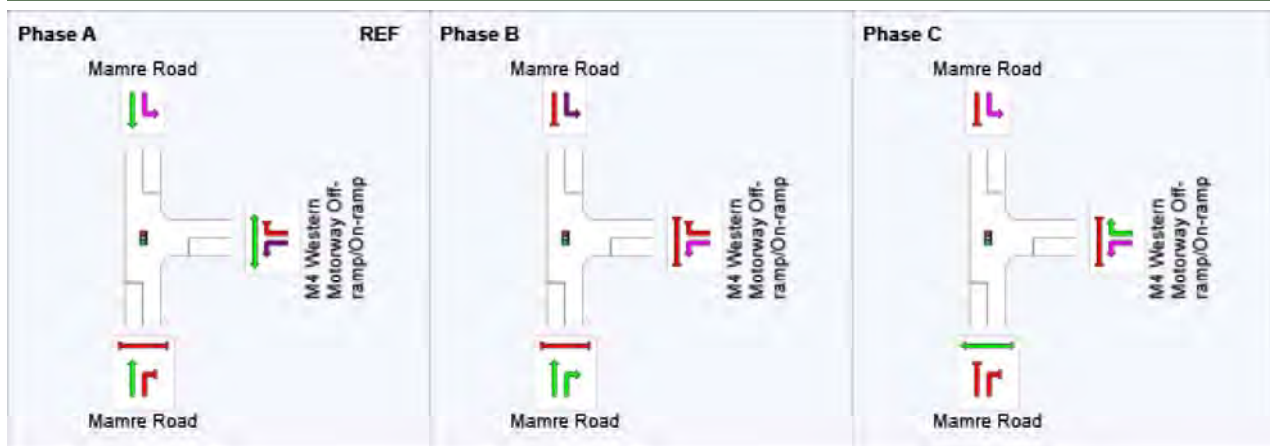
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	64	94
Green Time (sec)	59	24	20
Phase Time (sec)	65	30	25
Phase Split	54%	25%	21%

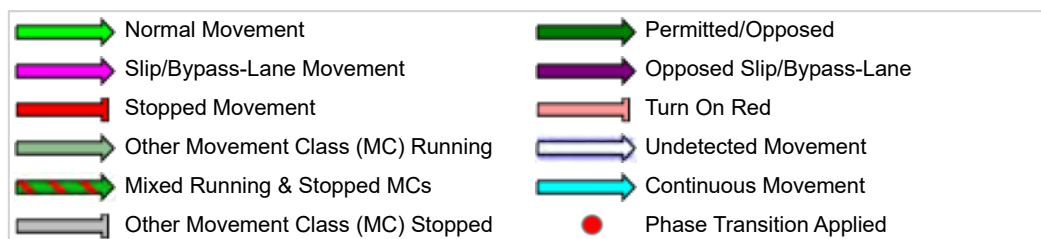
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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MOVEMENT SUMMARY

 **Site: TCS 3117 [107 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (North) - PM Peak 2018 Base]**

 **Network: [106 & 107 - PM Peak 2018 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m			km/h	
South: Mamre Road														
9	L2	114	8.3	114	8.3	0.073	9.0	LOS A	2.1	17.5	0.38	0.60	0.38	36.6
8	T1	1265	5.3	1265	5.3	0.454	24.6	LOS B	27.6	205.3	0.81	0.72	0.81	32.8
Approach		1379	5.6	1379	5.6	0.454	23.3	LOS B	27.6	205.3	0.78	0.71	0.78	33.2
North: Mamre Road														
2	T1	1573	3.1	1573	3.1	0.699	7.3	LOS A	30.7	224.9	0.51	0.47	0.51	42.2
1	R2	254	5.8	254	5.8	0.762	59.2	LOS E	14.9	114.8	1.00	0.88	1.09	22.5
Approach		1826	3.5	1826	3.5	0.762	14.5	LOS B	30.7	224.9	0.57	0.53	0.59	33.4
West: M4 Western Motorway Off-ramp/On-ramp														
12	L2	377	5.3	377	5.3	0.458	12.0	LOS A	8.7	65.1	0.49	0.72	0.49	47.0
10	R2	540	4.9	540	4.9	0.959	88.1	LOS F	20.5	151.8	1.00	1.09	1.53	15.5
Approach		917	5.1	917	5.1	0.959	56.9	LOS E	20.5	151.8	0.79	0.93	1.10	23.7
All Vehicles		4122	4.5	4122	4.5	0.959	26.9	LOS B	30.7	224.9	0.69	0.68	0.77	29.7

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Prop. Queued	Effective Stop Rate	
P1	North Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
P4	West Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		2	54.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 Site: TCS 3117 [107 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (North) - PM Peak 2018 Base]

 Network: [106 & 107 - PM Peak 2018 Base]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

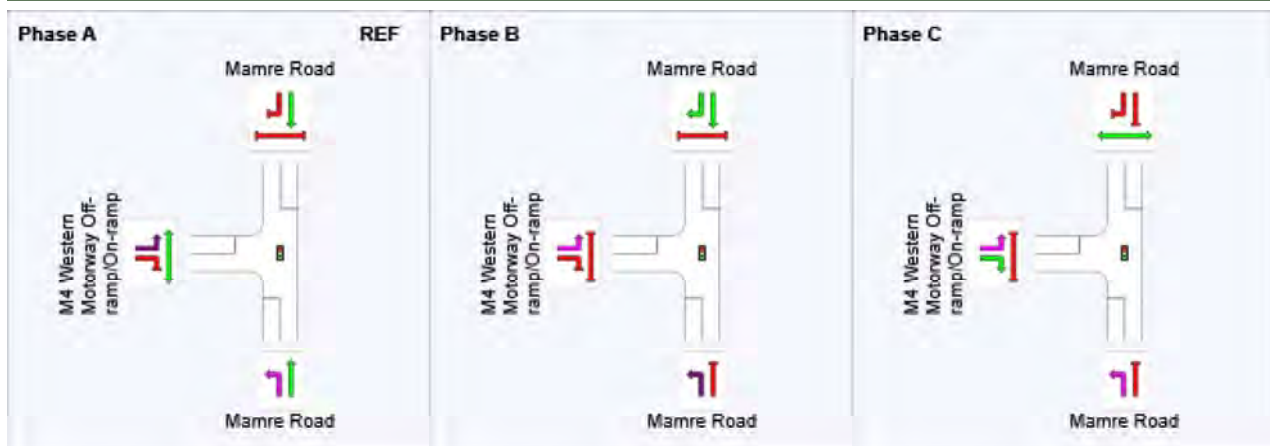
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	18	85	113
Green Time (sec)	62	22	19
Phase Time (sec)	68	28	24
Phase Split	57%	23%	20%

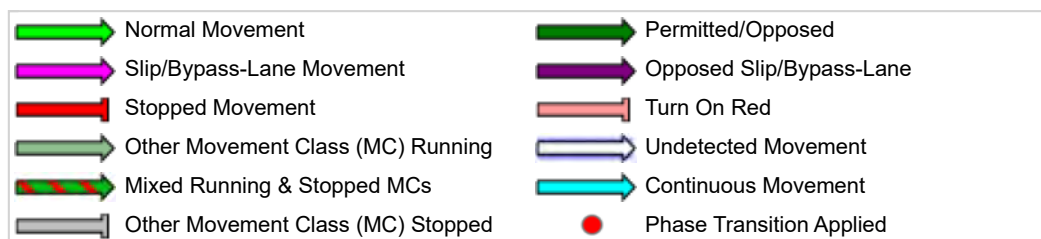
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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QUEUE STORAGE RATIO (PERCENTILE)

Ratio of the 95% Back of Queue Distance to the available queue storage distance (worst lane for the approach)

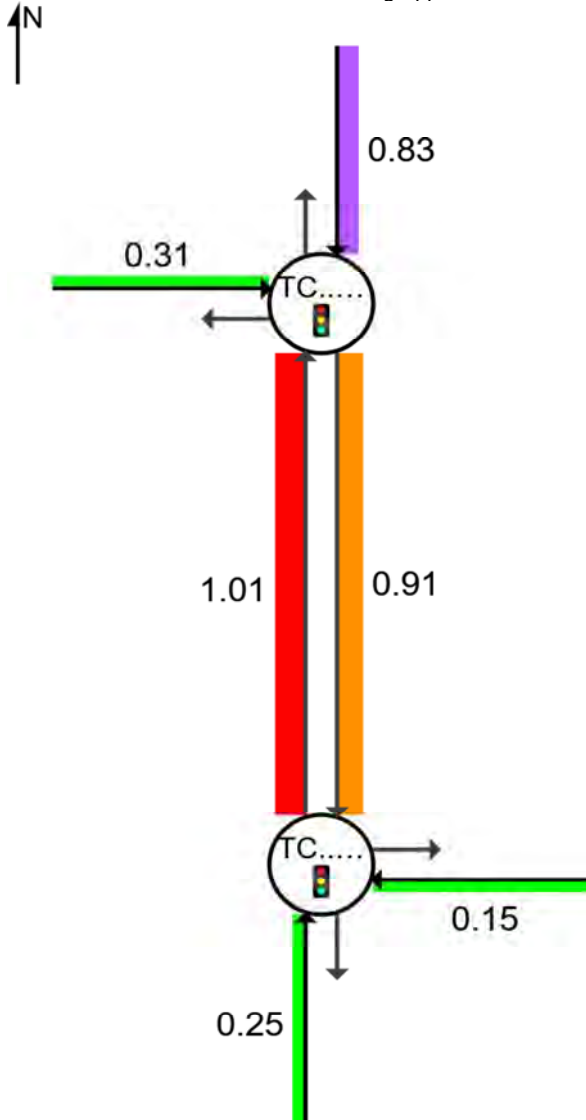
Network: [106 & 107 - PM Peak 2018 Base]

1630 - 1730

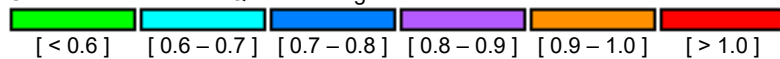
Network Category: (None)

Network Cycle Time = 120 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio



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MOVEMENT SUMMARY



Site: TCS 2986 [101 - Richmond Road / Dunheved Road - AM Peak 2030 Base]

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 129 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Richmond Road												
8	T1	1104	10.3	0.361	6.7	LOS A	12.5	100.4	0.40	0.36	0.40	58.3
7	R2	360	3.8	0.945	80.6	LOS F	19.1	137.8	0.99	0.94	1.31	26.9
Approach		1464	8.7	0.945	24.9	LOS B	19.1	137.8	0.54	0.50	0.62	41.9
East: Dunheved Road												
6	L2	468	1.8	0.564	33.4	LOS C	23.6	167.5	0.91	0.91	1.00	41.7
4	R2	447	9.2	0.512	58.0	LOS E	13.2	102.8	0.95	0.81	0.95	24.7
Approach		916	5.4	0.564	45.4	LOS D	23.6	167.5	0.93	0.86	0.98	33.1
North: Richmond Road												
3	L2	423	11.2	0.316	9.2	LOS A	6.0	49.6	0.30	0.67	0.30	48.9
2	T1	1805	5.0	0.894	23.4	LOS B	51.9	391.6	0.73	0.73	0.80	41.3
Approach		2228	6.2	0.894	20.7	LOS B	51.9	391.6	0.65	0.72	0.70	42.6
All Vehicles		4608	6.8	0.945	27.0	LOS B	51.9	391.6	0.67	0.68	0.73	39.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	1	58.6	LOS E	0.0	0.0	0.95	0.95	
P2	East Full Crossing	1	58.6	LOS E	0.0	0.0	0.95	0.95	
All Pedestrians		2	58.6	LOS E			0.95	0.95	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site: TCS 2986 [101 - Richmond Road / Dunheved Road - AM Peak 2030 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 129 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

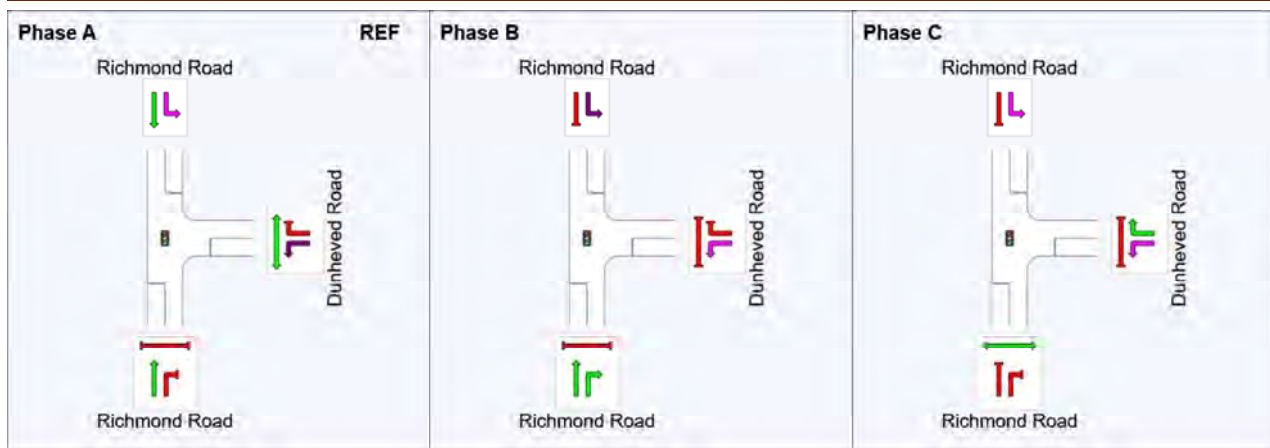
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	78	100
Green Time (sec)	72	16	23
Phase Time (sec)	78	22	29
Phase Split	60%	17%	22%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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Project: P:\P3796 St Marys Inland Container Terminal EIS\Technical Work\Models\P3796.001M St Marys Inland Container Terminal EIS_2030 Base.sip8

MOVEMENT SUMMARY

 **Site: TCS 442 [102 - Great Western Highway / Parker Street - AM Peak 2030 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 144 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Parker Street												
9	L2	446	2.8	0.354	21.9	LOS B	17.8	128.0	0.64	0.78	0.65	34.8
8	T1	981	7.8	0.999	104.4	LOS F	47.0	360.2	1.00	1.22	1.47	12.5
7	R2	136	7.0	0.327	62.5	LOS E	8.3	61.9	0.92	0.78	0.92	23.7
Approach		1563	6.3	0.999	77.2	LOS F	47.0	360.2	0.89	1.05	1.19	16.6
East: Great Western Highway												
6	L2	215	5.4	0.328	35.6	LOS C	11.1	82.0	0.72	0.75	0.72	32.4
5	T1	914	2.3	0.808	53.0	LOS D	30.0	215.6	0.99	0.91	1.04	29.1
4	R2	448	8.5	1.040	113.9	LOS F	39.0	311.2	1.00	1.17	1.67	14.9
Approach		1577	4.5	1.040	68.0	LOS E	39.0	311.2	0.95	0.96	1.17	23.2
North: Parker Street												
3	L2	1159	4.2	0.439	6.7	LOS A	0.0	0.0	0.00	0.57	0.00	57.2
2	T1	1121	6.2	1.101	170.6	LOS F	73.4	554.4	1.00	1.51	1.86	8.0
1	R2	396	5.9	0.910	81.0	LOS F	30.5	224.3	1.00	0.95	1.24	18.6
Approach		2676	5.3	1.101	86.4	LOS F	73.4	554.4	0.57	1.02	0.96	18.2
West: Great Western Highway												
12	L2	221	6.2	0.125	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	51.7
11	T1	577	4.2	1.045	138.6	LOS F	33.2	245.1	1.00	1.33	1.75	15.7
10	R2	186	4.0	0.632	66.7	LOS E	12.4	89.6	0.98	0.82	0.98	18.1
Approach		984	4.6	1.045	95.1	LOS F	33.2	245.1	0.77	1.05	1.21	18.5
All Vehicles		6800	5.2	1.101	81.3	LOS F	73.4	554.4	0.76	1.02	1.10	19.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	113	66.4	LOS F	0.4	0.4	0.96	0.96	
P2	East Full Crossing	64	66.3	LOS F	0.3	0.3	0.96	0.96	
P1	North Full Crossing	101	66.4	LOS F	0.4	0.4	0.96	0.96	
P4	West Full Crossing	87	66.4	LOS F	0.3	0.3	0.96	0.96	
All Pedestrians		365	66.4	LOS F			0.96	0.96	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Base.sip8

PHASING SUMMARY

 **Site: TCS 442 [102 - Great Western Highway / Parker Street - AM Peak 2030 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 144 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, C, D, E, G

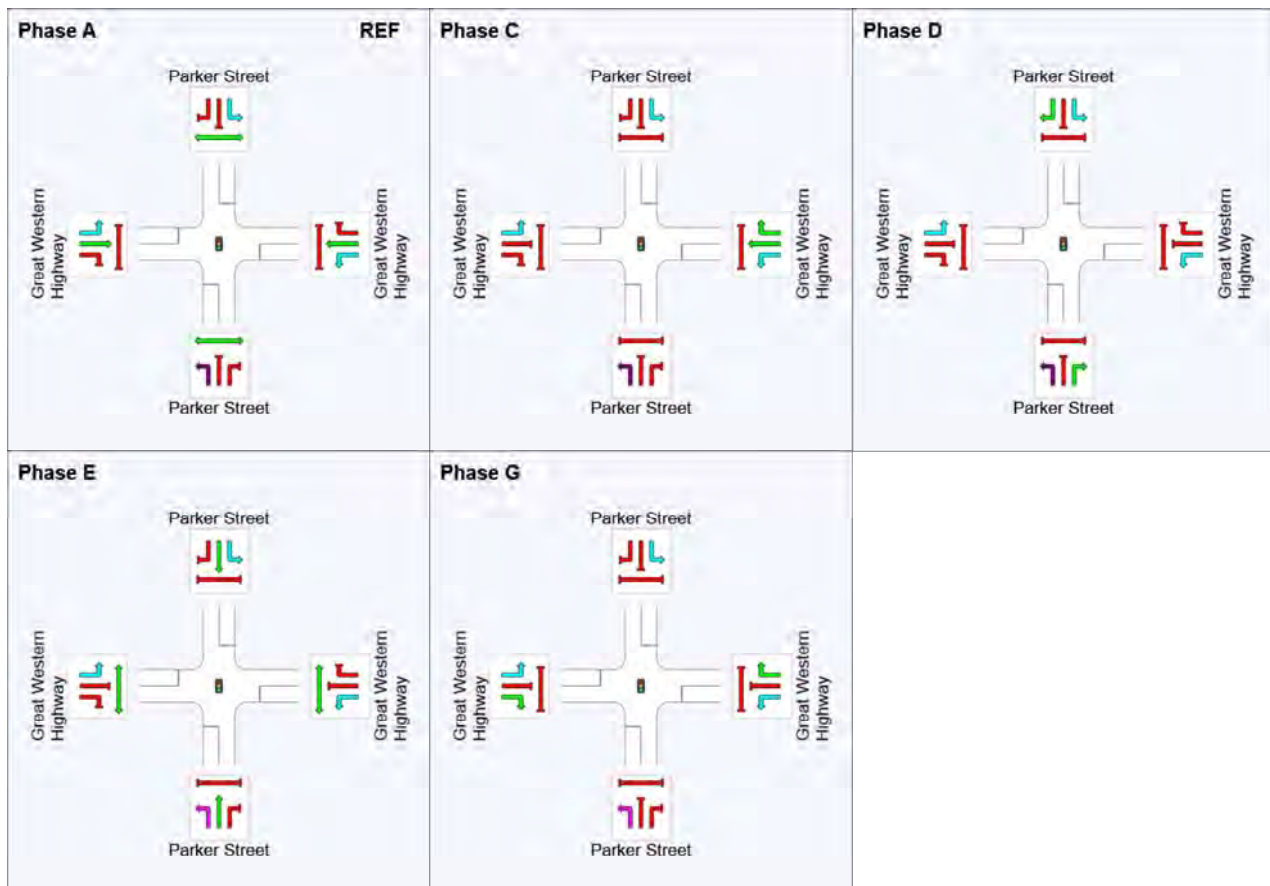
Output Phase Sequence: A, C, D, E, G

Phase Timing Summary

Phase	A	C	D	E	G
Phase Change Time (sec)	0	29	48	79	114
Green Time (sec)	23	13	25	29	24
Phase Time (sec)	29	19	31	35	30
Phase Split	20%	13%	22%	24%	21%

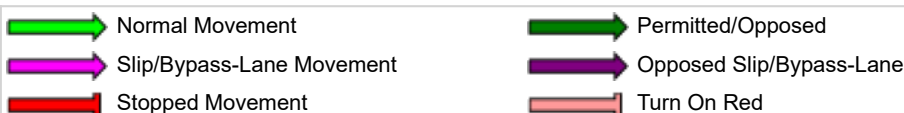
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

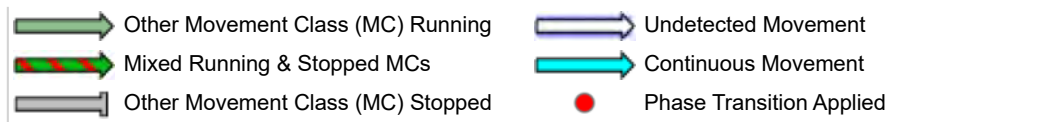
Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase





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MOVEMENT SUMMARY

 **Site: TCS 2385 [103 - Great Western Highway / Werrington Road / Reserve Road - AM Peak 2030 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 142 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Reserve Road												
9	L2	36	0.0	0.139	35.1	LOS C	3.7	26.6	0.69	0.69	0.69	26.9
8	T1	25	4.2	0.139	32.0	LOS C	3.7	26.6	0.69	0.69	0.69	21.9
7	R2	22	4.8	0.139	35.1	LOS C	3.7	26.6	0.69	0.69	0.69	32.5
Approach		83	2.5	0.139	34.2	LOS C	3.7	26.6	0.69	0.69	0.69	26.9
East: Great Western Highway												
6	L2	40	2.6	0.653	52.5	LOS D	33.2	239.8	0.93	0.82	0.93	29.1
5	T1	1552	3.2	0.653	45.0	LOS D	33.2	239.8	0.92	0.80	0.92	36.3
4	R2	222	7.1	0.661	70.7	LOS F	14.8	115.5	1.00	0.82	1.00	24.3
Approach		1814	3.7	0.661	48.3	LOS D	33.2	239.8	0.93	0.81	0.93	34.2
North: Werrington Road												
3	L2	340	6.2	0.347	17.7	LOS B	11.2	84.1	0.57	0.69	0.57	39.8
2	T1	14	0.0	1.207	258.8	LOS F	99.3	760.2	1.00	1.73	2.33	5.0
1	R2	609	6.0	1.207	262.1	LOS F	99.3	760.2	1.00	1.73	2.33	7.1
Approach		963	6.0	1.207	175.8	LOS F	99.3	760.2	0.85	1.37	1.71	10.7
West: Great Western Highway												
12	L2	212	8.0	0.456	49.5	LOS D	20.4	153.5	0.86	0.79	0.86	25.7
11	T1	919	4.5	0.456	42.2	LOS C	21.2	155.3	0.86	0.75	0.86	37.4
10	R2	63	3.3	0.178	65.7	LOS E	3.9	27.9	0.93	0.75	0.93	18.4
Approach		1194	5.0	0.456	44.8	LOS D	21.2	155.3	0.86	0.75	0.86	34.1
All Vehicles		4054	4.6	1.207	77.3	LOS F	99.3	760.2	0.89	0.92	1.09	23.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	4	65.1	LOS F	0.0	0.0	0.96	0.96	
P2	East Full Crossing	9	65.2	LOS F	0.0	0.0	0.96	0.96	
P1	North Full Crossing	1	65.1	LOS F	0.0	0.0	0.96	0.96	
All Pedestrians		15	65.1	LOS F			0.96	0.96	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site: TCS 2385 [103 - Great Western Highway / Werrington Road / Reserve Road - AM Peak 2030 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 142 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, D, E

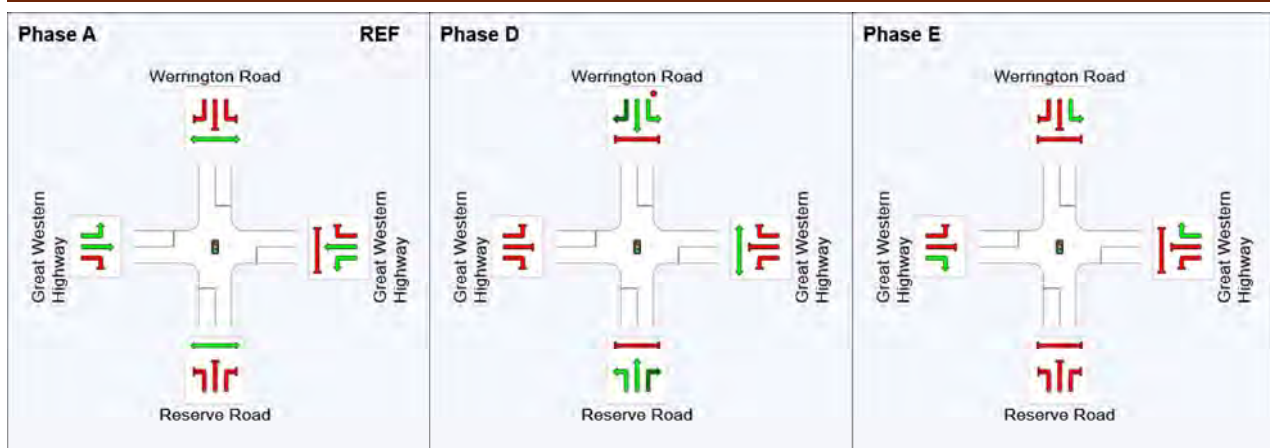
Output Phase Sequence: A, D, E

Phase Timing Summary

Phase	A	D	E
Phase Change Time (sec)	0	49	117
Green Time (sec)	43	62	19
Phase Time (sec)	49	68	25
Phase Split	35%	48%	18%

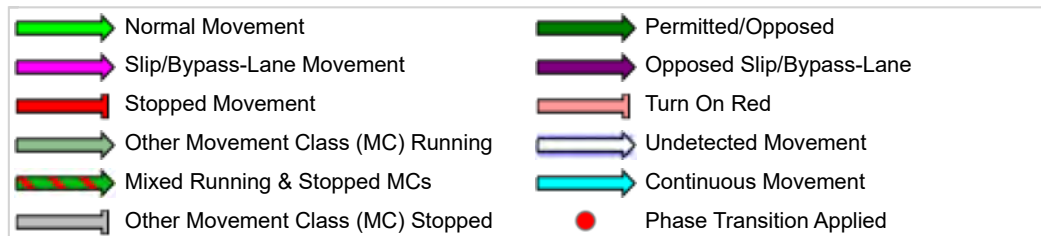
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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MOVEMENT SUMMARY

 Site: TCS 497 [104 - Great Western Highway / Queen Street /  Network: [104 & 108 - AM Mamre Road - AM Peak 2030 Base]

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m			km/h	
South: Mamre Road														
9	L2	163	6.5	163	6.5	0.121	15.9	LOS B	4.4	32.6	0.45	0.67	0.45	40.1
8	T1	447	1.9	447	1.9	0.891	50.0	LOS D	39.5	322.7	0.91	0.83	0.94	25.8
7	R2	475	14.4	475	14.4	0.891	67.3	LOS E	39.5	322.7	1.00	0.96	1.15	14.3
Approach		1085	8.1	1085	8.1	0.891	52.5	LOS D	39.5	322.7	0.88	0.86	0.96	22.2
East: Great Western Highway														
6	L2	468	20.0	468	20.0	0.409	10.8	LOS A	9.4	84.5	0.38	0.68	0.38	48.8
5	T1	1199	3.2	1199	3.2	0.902	65.6	LOS E	37.6	274.0	0.99	1.00	1.18	25.0
4	R2	226	1.9	226	1.9	0.892	79.8	LOS F	16.9	120.0	1.00	0.94	1.25	23.7
Approach		1894	7.2	1894	7.2	0.902	53.7	LOS D	37.6	274.0	0.84	0.91	0.99	28.4
North: Queen Street														
3	L2	52	0.0	52	0.0	0.846	76.2	LOS F	11.4	82.7	1.00	1.05	1.56	14.6
2	T1	185	6.8	185	6.8	0.846	73.9	LOS F	11.4	82.7	1.00	1.03	1.45	21.0
1	R2	80	1.3	80	1.3	0.846	78.9	LOS F	11.3	82.1	1.00	0.99	1.27	18.5
Approach		317	4.3	317	4.3	0.846	75.5	LOS F	11.4	82.7	1.00	1.02	1.42	19.5
West: Great Western Highway														
12	L2	107	3.9	107	3.9	0.600	50.5	LOS D	18.4	136.9	0.91	0.80	0.91	24.4
11	T1	854	5.4	854	5.4	0.600	44.9	LOS D	18.7	140.9	0.91	0.79	0.91	14.3
10	R2	196	8.1	196	8.1	0.843	77.5	LOS F	14.4	112.7	1.00	0.93	1.23	18.0
Approach		1157	5.7	1157	5.7	0.843	51.0	LOS D	18.7	140.9	0.93	0.82	0.96	16.6
All Vehicles		4453	6.8	4453	6.8	0.902	54.3	LOS D	39.5	322.7	0.88	0.88	1.01	23.7

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate	
		ped/h	sec		Pedestrian ped	Distance m		
P3	South Full Crossing	3	64.1	LOS F	0.0	0.0	0.96	0.96
P2	East Full Crossing	16	64.2	LOS F	0.1	0.1	0.96	0.96
P1	North Full Crossing	8	64.2	LOS F	0.0	0.0	0.96	0.96
P4	West Full Crossing	17	64.2	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		44	64.2	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Base.sip8

PHASING SUMMARY

 Site: TCS 497 [104 - Great Western Highway / Queen Street / Mamre Road - AM Peak 2030 Base]  Network: [104 & 108 - AM Peak 2030 Base]

0800 - 0900
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

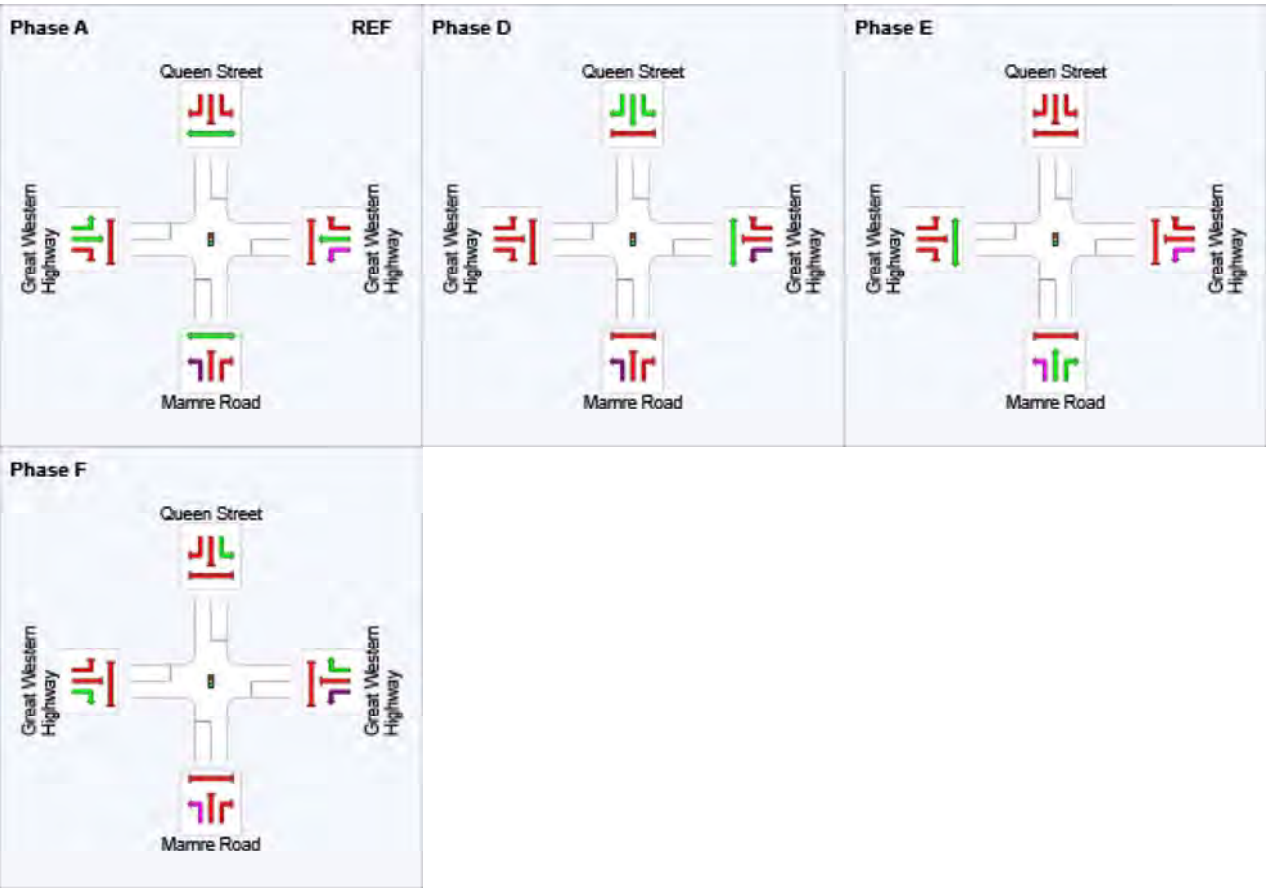
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, D, E, F
Output Phase Sequence: A, D, E, F

Phase Timing Summary

Phase	A	D	E	F
Phase Change Time (sec)	116	24	44	90
Green Time (sec)	42	14	40	20
Phase Time (sec)	48	20	46	26
Phase Split	34%	14%	33%	19%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



	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

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MOVEMENT SUMMARY

 **Site: TCS 1236 [108 - Great Western Highway / Glossop Street - AM Peak 2030 Base]**

 **Network: [104 & 108 - AM Peak 2030 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
East: Great Western Highway														
5	T1	1139	5.0	1139	5.0	0.296	17.4	LOS B	15.1	112.3	0.57	0.49	0.57	38.5
4	R2	593	13.7	593	13.7	0.615	57.4	LOS E	18.2	154.1	0.95	0.83	0.95	29.1
Approach		1732	8.0	1732	8.0	0.615	31.1	LOS C	18.2	154.1	0.70	0.61	0.70	33.4
North: Glossop Street														
3	L2	509	20.0	509	20.0	0.513	20.3	LOS B	18.5	164.5	0.58	0.77	0.58	42.3
1	R2	755	10.6	755	10.6	0.617	44.7	LOS D	21.0	170.4	0.88	0.84	0.88	21.6
Approach		1264	14.4	1264	14.4	0.617	34.9	LOS C	21.0	170.4	0.76	0.81	0.76	30.5
West: Great Western Highway														
12	L2	389	14.3	389	14.3	0.623	50.8	LOS D	24.4	207.0	0.91	0.84	0.91	31.4
11	T1	991	6.0	991	6.0	0.623	49.4	LOS D	29.9	222.9	0.99	0.86	0.99	33.7
Approach		1380	8.3	1380	8.3	0.623	49.8	LOS D	29.9	222.9	0.97	0.85	0.97	33.1
All Vehicles		4376	9.9	4376	9.9	0.623	38.1	LOS C	29.9	222.9	0.80	0.74	0.80	32.5

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Prop. Queued	Effective Stop Rate	
P2	East Full Crossing	1	64.1	LOS F	0.0	0.0	0.96	0.96
P1	North Full Crossing	1	64.1	LOS F	0.0	0.0	0.96	0.96
All Pedestrians		2	64.1	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site: TCS 1236 [108 - Great Western Highway / Glossop Street - AM Peak 2030 Base]**

 **Network: [104 & 108 - AM Peak 2030 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 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: Variable Phasing

Reference Phase: Phase C

Input Phase Sequence: A, B, C

Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	57	102	0
Green Time (sec)	39	32	51
Phase Time (sec)	45	38	57
Phase Split	32%	27%	41%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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QUEUE STORAGE RATIO (PERCENTILE)

Ratio of the 95% Back of Queue Distance to the available queue storage distance (worst lane for the approach)

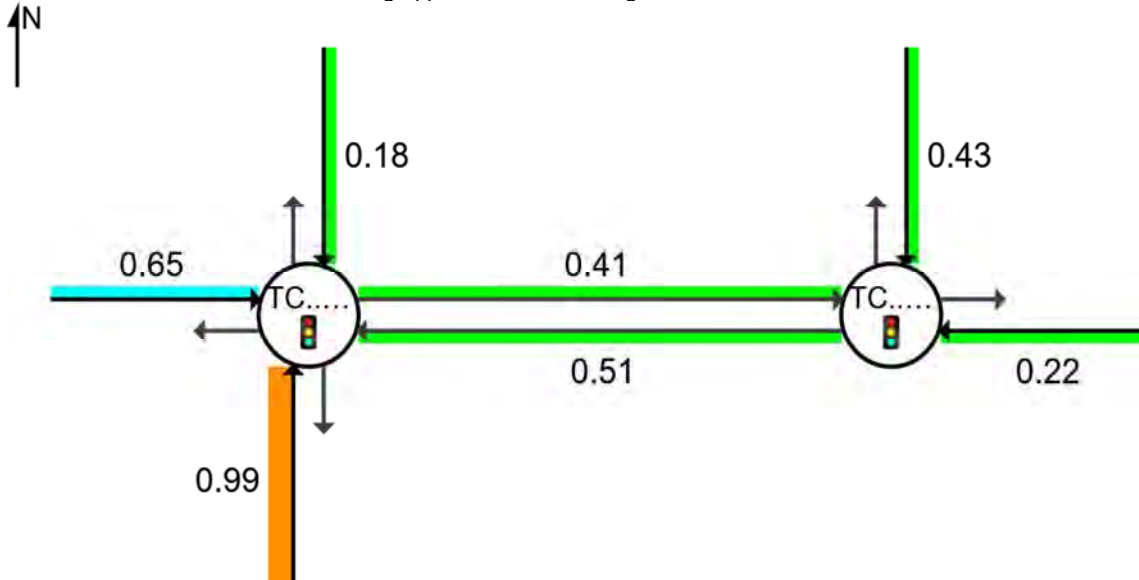
Network: [104 & 108 - AM Peak 2030 Base]

0800 - 0900

Network Category: (None)

Network Cycle Time = 140 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio



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MOVEMENT SUMMARY

 **Site: TCS 1234 [105 - Great Western Highway / Carlisle Avenue - AM Peak 2030 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 142 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Carlisle Avenue												
9	L2	53	38.0	0.141	38.7	LOS C	2.8	31.2	0.84	0.72	0.84	33.3
8	T1	657	6.7	0.671	60.8	LOS E	21.0	155.2	0.99	0.83	0.99	28.1
7	R2	175	11.4	0.678	74.8	LOS F	12.0	95.5	1.00	0.81	1.03	25.1
Approach		884	9.5	0.678	62.2	LOS E	21.0	155.2	0.99	0.82	0.99	27.7
East: Great Western Highway												
6	L2	87	8.4	0.455	42.4	LOS C	13.8	106.4	0.83	0.75	0.85	37.2
5	T1	735	6.6	0.455	38.8	LOS C	14.9	112.9	0.84	0.73	0.84	42.5
4	R2	314	6.0	0.796	79.6	LOS F	11.4	84.6	1.00	0.88	1.18	27.4
Approach		1136	6.6	0.796	50.3	LOS D	14.9	112.9	0.88	0.77	0.93	36.4
North: Carlisle Avenue												
3	L2	314	5.7	0.218	31.0	LOS C	12.9	95.4	0.70	0.76	0.70	40.9
2	T1	475	6.7	0.443	43.3	LOS D	26.2	198.5	0.87	0.75	0.87	33.9
1	R2	457	4.8	0.338	37.1	LOS C	9.8	71.9	0.91	0.78	0.91	38.2
Approach		1245	5.7	0.443	37.9	LOS C	26.2	198.5	0.84	0.76	0.84	37.2
West: Great Western Highway												
12	L2	580	2.9	0.406	21.5	LOS B	16.4	118.3	0.69	0.79	0.72	47.4
11	T1	921	7.0	0.406	37.5	LOS C	23.1	174.8	0.82	0.71	0.82	43.3
10	R2	148	8.5	0.428	70.8	LOS F	9.6	77.2	0.98	0.79	0.98	25.9
Approach		1649	5.7	0.428	34.8	LOS C	23.1	174.8	0.79	0.75	0.80	42.5
All Vehicles		4915	6.6	0.796	44.1	LOS D	26.2	198.5	0.86	0.77	0.88	36.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	1	65.1	LOS F	0.0	0.0	0.96	0.96	
P2	East Full Crossing	1	65.1	LOS F	0.0	0.0	0.96	0.96	
P1	North Full Crossing	1	65.1	LOS F	0.0	0.0	0.96	0.96	
P4	West Full Crossing	1	65.1	LOS F	0.0	0.0	0.96	0.96	
All Pedestrians		4	65.1	LOS F			0.96	0.96	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Base.sip8

PHASING SUMMARY

 **Site: TCS 1234 [105 - Great Western Highway / Carlisle Avenue - AM Peak 2030 Base]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 142 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, D, E, F, G

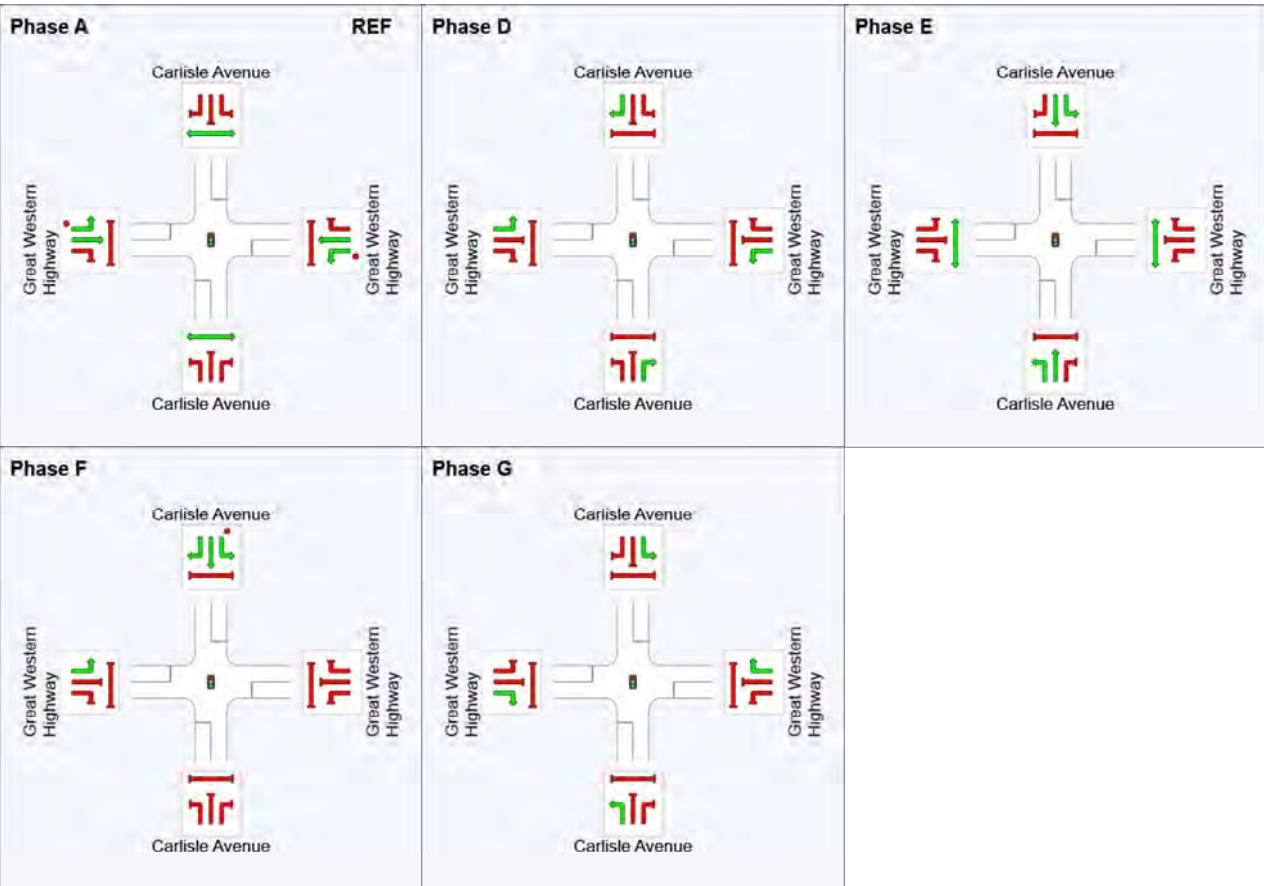
Output Phase Sequence: A, D, E, F, G

Phase Timing Summary

Phase	A	D	E	F	G
Phase Change Time (sec)	0	53	73	102	120
Green Time (sec)	47	14	23	13	16
Phase Time (sec)	53	20	28	19	22
Phase Split	37%	14%	20%	13%	15%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

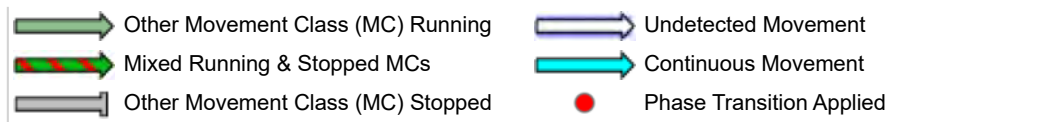
Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase





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MOVEMENT SUMMARY

 Site: TCS 3118 [106 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (South) - AM Peak 2030 Base]

 Network: [106 & 107 - AM Peak 2030 Base]

0800 - 0900

Site Category: (None)

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

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
South: Mamre Road														
8	T1	1343	6.0	1343	6.0	0.265	4.3	LOS A	11.3	86.0	0.33	0.30	0.33	49.2
7	R2	507	8.7	507	8.7	0.673	48.4	LOS D	24.9	190.9	0.98	0.85	0.98	25.3
Approach		1851	6.8	1851	6.8	0.673	16.4	LOS B	24.9	190.9	0.51	0.45	0.51	33.6
East: M4 Western Motorway Off-ramp/On-ramp														
6	L2	109	11.5	109	11.5	0.141	10.9	LOS A	1.8	14.9	0.39	0.65	0.39	48.4
4	R2	253	13.8	253	13.8	0.566	54.0	LOS D	6.7	55.0	0.97	0.80	0.97	22.0
Approach		362	13.1	362	13.1	0.566	40.9	LOS C	6.7	55.0	0.80	0.76	0.80	28.3
North: Mamre Road														
3	L2	416	9.6	416	9.6	0.254	8.8	LOS A	6.3	50.6	0.32	0.62	0.32	36.6
2	T1	1448	8.6	1448	8.6	0.668	20.9	LOS B	28.2	216.1	0.71	0.63	0.71	36.2
Approach		1864	8.9	1864	8.9	0.668	18.1	LOS B	28.2	216.1	0.62	0.63	0.62	36.3
All Vehicles		4077	8.3	4077	8.3	0.673	19.4	LOS B	28.2	216.1	0.58	0.56	0.58	34.2

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	1	49.2	LOS E	0.0	0.0	0.95	0.95
P2	East Full Crossing	1	49.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		2	49.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site:** TCS 3118 [106 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (South) - AM Peak 2030 Base]

 **Network:** [106 & 107 - AM Peak 2030 Base]

0800 - 0900

Site Category: (None)

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

Timings based on settings in the Network Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

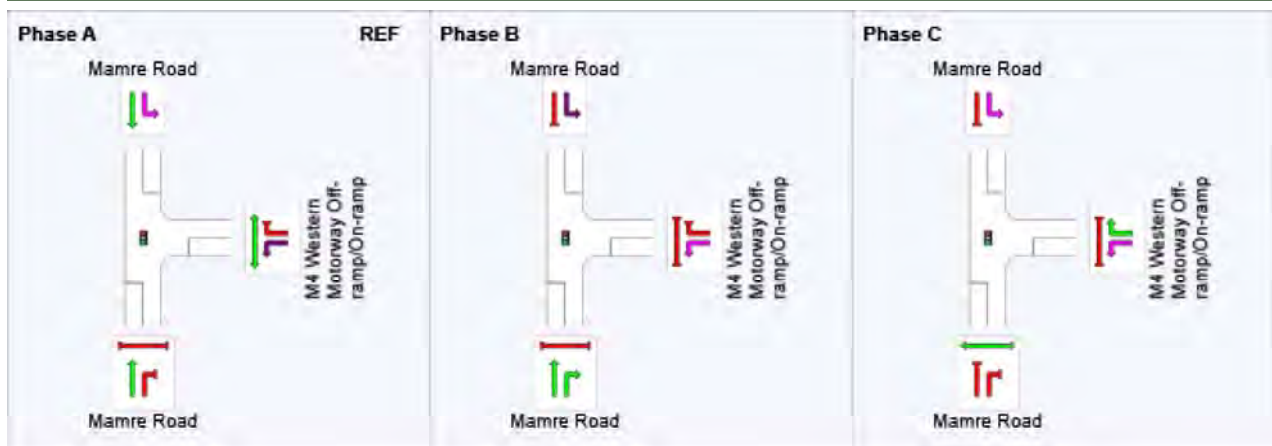
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	58	87
Green Time (sec)	54	23	17
Phase Time (sec)	60	29	21
Phase Split	55%	26%	19%

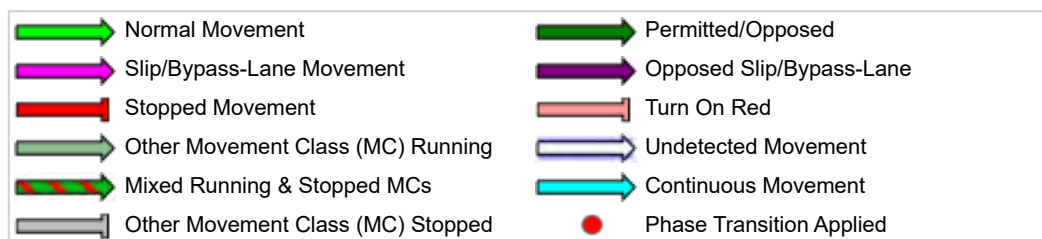
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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MOVEMENT SUMMARY

 Site: TCS 3117 [107 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (North) - AM Peak 2030 Base]

 Network: [106 & 107 - AM Peak 2030 Base]

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
South: Mamre Road														
9	L2	265	6.7	265	6.7	0.171	10.2	LOS A	5.4	43.1	0.46	0.67	0.46	35.8
8	T1	1331	7.4	1331	7.4	0.605	33.3	LOS C	29.4	224.8	0.88	0.78	0.88	28.3
Approach		1596	7.3	1596	7.3	0.605	29.4	LOS C	29.4	224.8	0.81	0.76	0.81	29.7
North: Mamre Road														
2	T1	1264	9.2	1264	9.2	0.824	14.1	LOS A	34.1	266.1	0.70	0.66	0.72	33.1
1	R2	245	14.6	245	14.6	0.608	41.8	LOS C	11.5	98.1	0.91	0.83	0.91	26.1
Approach		1509	10.0	1509	10.0	0.824	18.6	LOS B	34.1	266.1	0.74	0.69	0.75	30.3
West: M4 Western Motorway Off-ramp/On-ramp														
12	L2	626	3.7	626	3.7	0.583	10.9	LOS A	13.5	97.9	0.52	0.73	0.52	47.9
10	R2	600	8.2	600	8.2	0.839	58.0	LOS E	18.2	140.3	1.00	0.95	1.21	20.8
Approach		1226	5.9	1226	5.9	0.839	33.9	LOS C	18.2	140.3	0.76	0.84	0.86	31.9
All Vehicles		4332	7.8	4332	7.8	0.839	26.9	LOS B	34.1	266.1	0.77	0.76	0.81	30.6

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Prop. Queued	Effective Stop Rate	
P1	North Full Crossing	1	49.2	LOS E	0.0	0.0	0.95	0.95
P4	West Full Crossing	3	49.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		4	49.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site:** TCS 3117 [107 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (North) - AM Peak 2030 Base]

 **Network:** [106 & 107 - AM Peak 2030 Base]

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 110 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: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

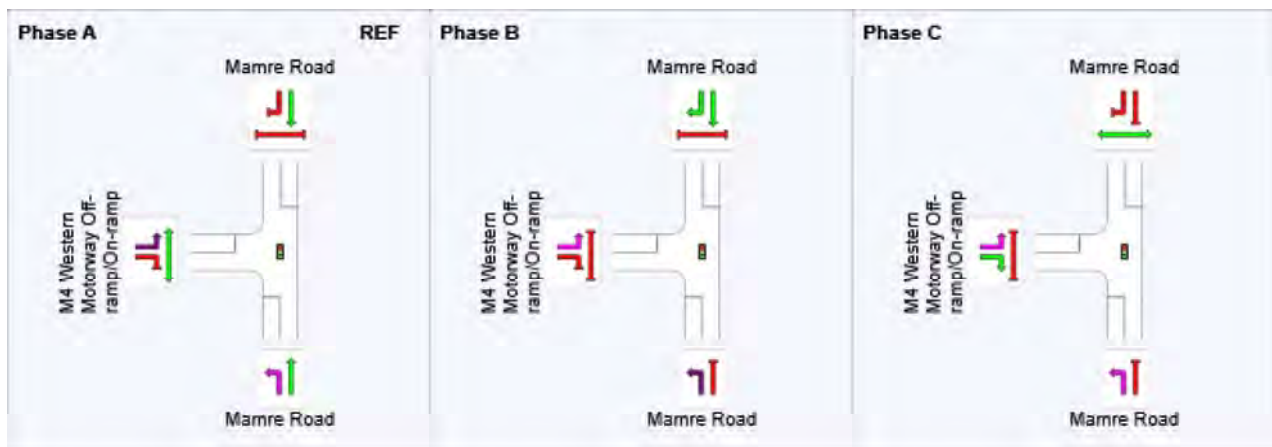
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	16	57	96
Green Time (sec)	35	33	24
Phase Time (sec)	41	39	30
Phase Split	37%	35%	27%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



QUEUE STORAGE RATIO (PERCENTILE)

Ratio of the 95% Back of Queue Distance to the available queue storage distance (worst lane for the approach)

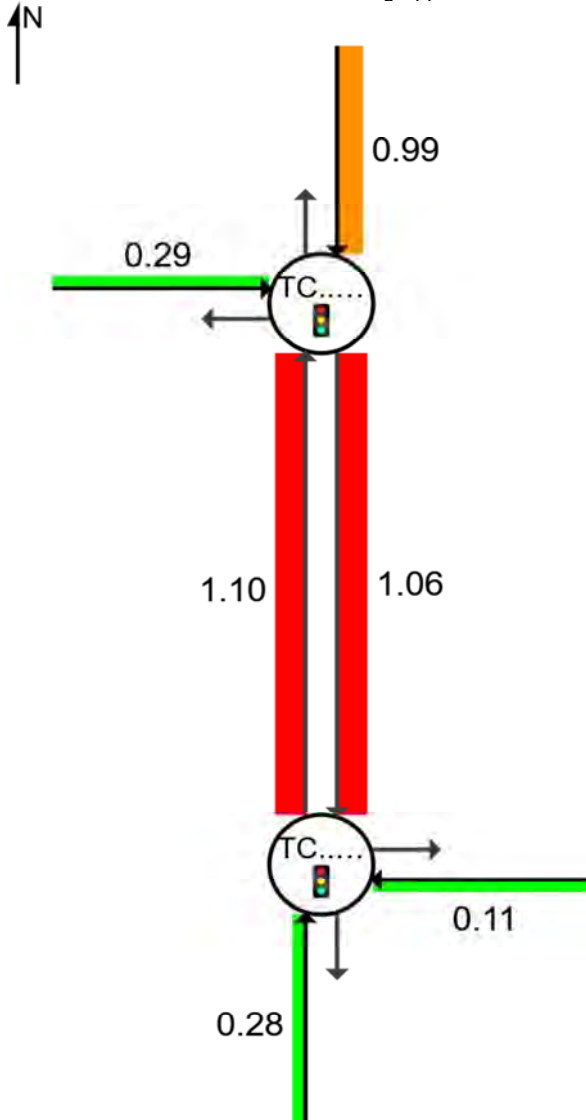
Network: [106 & 107 - AM Peak 2030 Base]

0800 - 0900

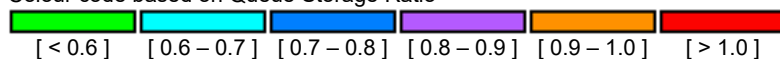
Network Category: (None)

Network Cycle Time = 110 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio



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MOVEMENT SUMMARY



Site: TCS 2986 [101 - Richmond Road / Dunheved Road - PM Peak 2030 Base]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 124 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Richmond Road												
8	T1	2132	3.1	0.586	7.8	LOS A	30.9	225.1	0.49	0.45	0.49	56.9
7	R2	694	1.2	1.075	121.6	LOS F	50.1	356.8	0.98	1.08	1.61	20.5
Approach		2825	2.6	1.075	35.7	LOS C	50.1	356.8	0.61	0.61	0.76	35.6
East: Dunheved Road												
6	L2	383	2.2	0.349	9.8	LOS A	6.9	49.4	0.37	0.70	0.37	56.7
4	R2	714	2.5	1.008	108.8	LOS F	39.0	282.0	1.00	1.07	1.64	16.1
Approach		1097	2.4	1.008	74.2	LOS F	39.0	282.0	0.78	0.94	1.20	23.9
North: Richmond Road												
3	L2	445	2.6	0.206	11.5	LOS A	8.5	61.6	0.39	0.70	0.39	49.3
2	T1	1338	3.7	0.365	19.1	LOS B	24.4	177.9	0.65	0.57	0.65	44.7
Approach		1783	3.4	0.365	17.2	LOS B	24.4	177.9	0.58	0.60	0.58	45.8
All Vehicles		5705	2.8	1.075	37.3	LOS C	50.1	356.8	0.64	0.67	0.79	34.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	1	56.1	LOS E	0.0	0.0	0.95	0.95	
P2	East Full Crossing	1	56.1	LOS E	0.0	0.0	0.95	0.95	
All Pedestrians		2	56.1	LOS E			0.95	0.95	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site: TCS 2986 [101 - Richmond Road / Dunheved Road - PM Peak 2030 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 124 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

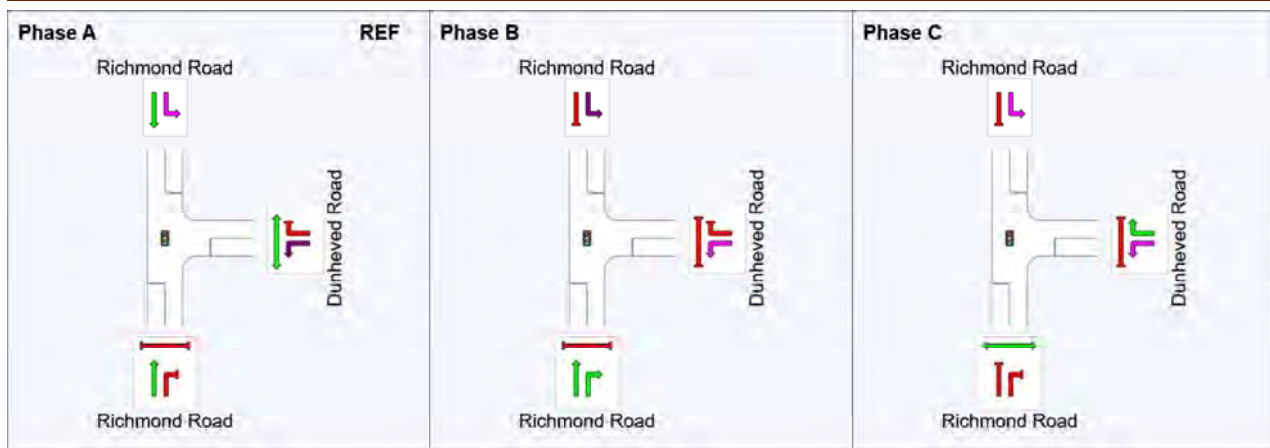
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	69	97
Green Time (sec)	63	22	21
Phase Time (sec)	69	28	27
Phase Split	56%	23%	22%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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MOVEMENT SUMMARY

 **Site: TCS 442 [102 - Great Western Highway / Parker Street - PM Peak 2030 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 133 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Parker Street												
9	L2	258	2.9	0.199	13.2	LOS A	5.7	41.1	0.41	0.70	0.41	41.9
8	T1	1173	5.4	1.044	125.3	LOS F	61.1	453.7	1.00	1.39	1.68	10.6
7	R2	134	1.6	0.383	60.2	LOS E	7.8	56.0	0.94	0.79	0.94	24.3
Approach		1564	4.6	1.044	101.3	LOS F	61.1	453.7	0.90	1.22	1.40	13.2
East: Great Western Highway												
6	L2	196	2.7	0.269	48.1	LOS D	11.7	84.0	0.85	0.77	0.85	27.9
5	T1	951	3.7	0.663	52.3	LOS D	27.2	199.1	0.98	0.83	0.98	29.3
4	R2	588	3.4	0.886	67.2	LOS E	39.7	287.5	1.00	0.92	1.13	24.6
Approach		1735	3.5	0.886	56.9	LOS E	39.7	287.5	0.97	0.86	1.02	27.5
North: Parker Street												
3	L2	559	2.3	0.238	6.7	LOS A	0.0	0.0	0.00	0.57	0.00	58.0
2	T1	1032	4.1	0.854	54.6	LOS D	35.5	261.4	0.99	0.95	1.10	20.5
1	R2	268	3.1	0.700	63.8	LOS E	16.7	120.6	1.00	0.84	1.01	21.9
Approach		1859	3.4	0.854	41.5	LOS C	35.5	261.4	0.70	0.82	0.76	28.5
West: Great Western Highway												
12	L2	561	3.6	0.260	5.7	LOS A	0.0	0.0	0.00	0.53	0.00	51.7
11	T1	776	0.9	1.044	129.3	LOS F	41.8	295.8	1.00	1.37	1.75	16.6
10	R2	289	0.7	0.826	64.8	LOS E	18.8	133.3	0.99	0.90	1.13	18.5
Approach		1626	1.8	1.044	75.2	LOS F	41.8	295.8	0.65	1.00	1.04	21.2
All Vehicles		6784	3.3	1.044	67.3	LOS E	61.1	453.7	0.80	0.96	1.04	21.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	7	60.7	LOS F	0.0	0.0	0.96	0.96	
P2	East Full Crossing	13	60.7	LOS F	0.0	0.0	0.96	0.96	
P1	North Full Crossing	5	60.6	LOS F	0.0	0.0	0.96	0.96	
P4	West Full Crossing	5	60.6	LOS F	0.0	0.0	0.96	0.96	
All Pedestrians		31	60.7	LOS F			0.96	0.96	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Base.sip8

PHASING SUMMARY

 **Site: TCS 442 [102 - Great Western Highway / Parker Street - PM Peak 2030 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 133 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, D, E, G

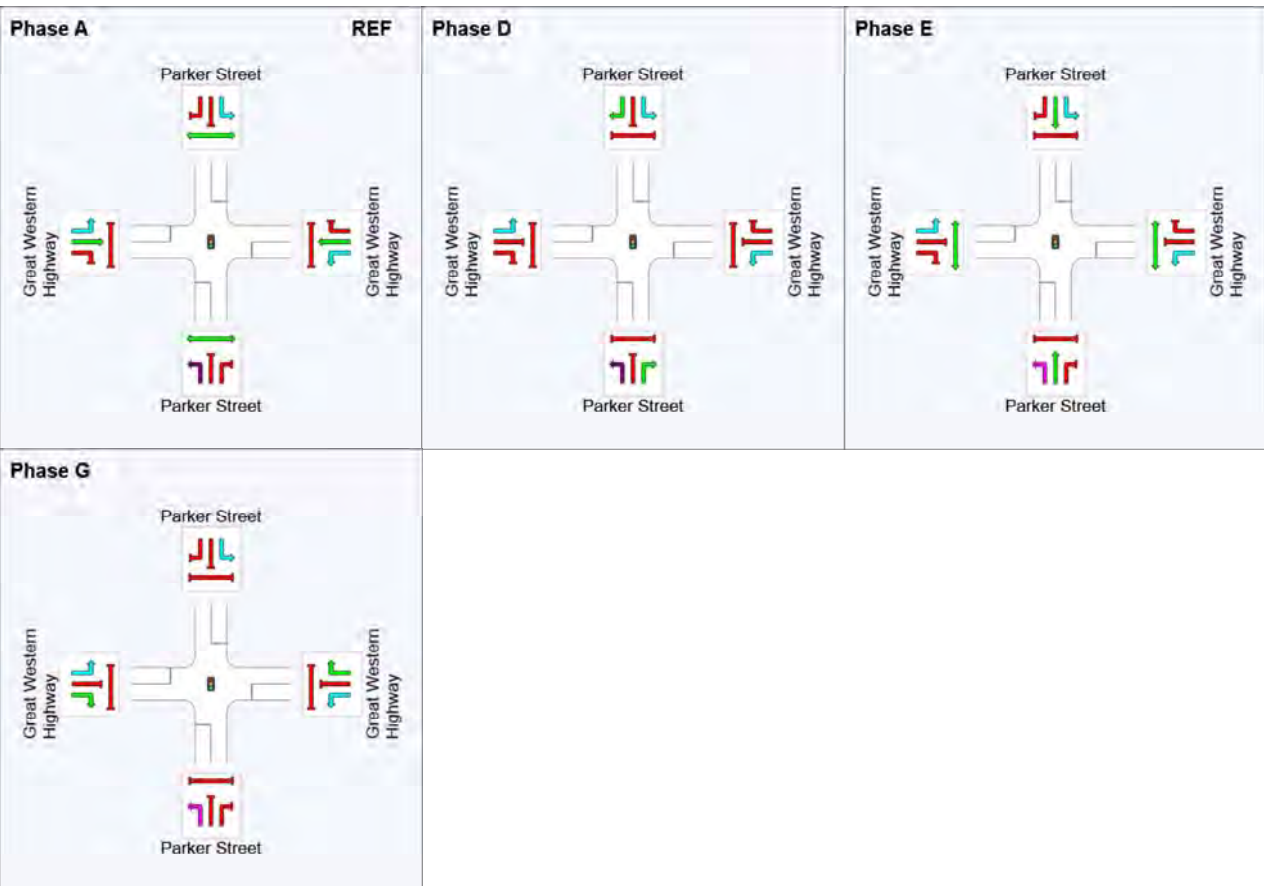
Output Phase Sequence: A, D, E, G

Phase Timing Summary

Phase	A	D	E	G
Phase Change Time (sec)	0	32	60	101
Green Time (sec)	26	22	35	26
Phase Time (sec)	32	28	41	32
Phase Split	24%	21%	31%	24%

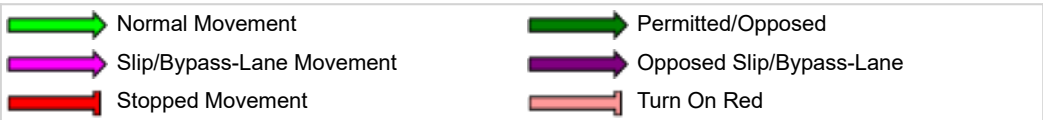
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

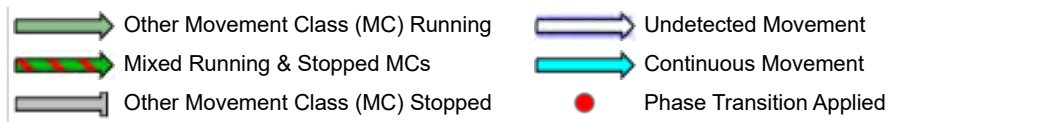
Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase





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MOVEMENT SUMMARY

 **Site: TCS 2385 [103 - Great Western Highway / Werrington Road / Reserve Road - PM Peak 2030 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 146 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Reserve Road												
9	L2	35	3.0	0.176	34.2	LOS C	4.9	34.8	0.68	0.67	0.68	27.3
8	T1	33	0.0	0.176	29.6	LOS C	4.9	34.8	0.68	0.67	0.68	26.0
7	R2	42	0.0	0.176	34.2	LOS C	4.9	34.8	0.68	0.67	0.68	33.8
Approach		109	1.0	0.176	32.8	LOS C	4.9	34.8	0.68	0.67	0.68	29.7
East: Great Western Highway												
6	L2	44	2.4	0.711	59.0	LOS E	33.5	241.4	0.97	0.85	0.97	26.9
5	T1	1444	2.9	0.711	51.5	LOS D	33.5	241.4	0.96	0.83	0.96	33.7
4	R2	368	5.4	0.760	65.5	LOS E	24.4	179.9	0.98	0.85	1.01	26.8
Approach		1857	3.4	0.760	54.4	LOS D	33.5	241.4	0.97	0.84	0.97	32.0
North: Werrington Road												
3	L2	228	2.8	0.106	15.2	LOS B	5.8	42.2	0.44	0.69	0.44	48.0
2	T1	22	0.0	1.044	96.9	LOS F	56.5	414.4	1.00	1.14	1.51	11.9
1	R2	526	4.2	1.044	101.2	LOS F	56.5	414.4	1.00	1.14	1.51	16.2
Approach		777	3.7	1.044	75.8	LOS F	56.5	414.4	0.83	1.01	1.19	20.9
West: Great Western Highway												
12	L2	258	3.3	0.451	54.6	LOS D	24.9	183.7	0.89	0.80	0.89	25.9
11	T1	1036	3.0	0.451	47.5	LOS D	25.7	185.3	0.89	0.76	0.89	35.1
10	R2	78	2.7	0.108	56.6	LOS E	4.4	32.2	0.85	0.75	0.85	20.5
Approach		1372	3.1	0.451	49.3	LOS D	25.7	185.3	0.89	0.77	0.89	32.6
All Vehicles		4115	3.3	1.044	56.2	LOS D	56.5	414.4	0.91	0.84	0.98	29.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	5	67.1	LOS F	0.0	0.0	0.96	0.96	
P2	East Full Crossing	7	67.1	LOS F	0.0	0.0	0.96	0.96	
P1	North Full Crossing	1	67.1	LOS F	0.0	0.0	0.96	0.96	
All Pedestrians		14	67.1	LOS F			0.96	0.96	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Base.sip8

PHASING SUMMARY

 **Site: TCS 2385 [103 - Great Western Highway / Werrington Road / Reserve Road - PM Peak 2030 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 146 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, D, E

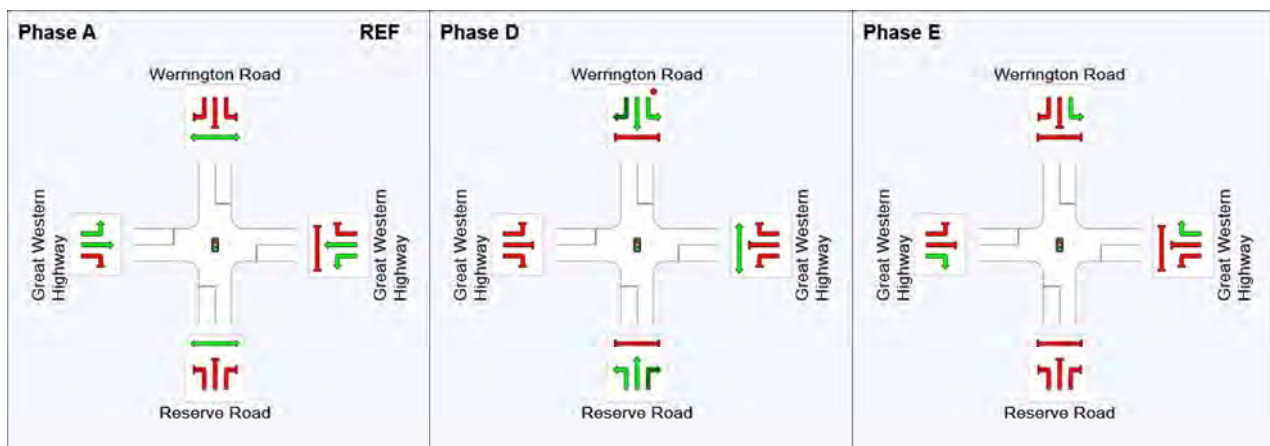
Output Phase Sequence: A, D, E

Phase Timing Summary

Phase	A	D	E
Phase Change Time (sec)	0	44	110
Green Time (sec)	38	60	30
Phase Time (sec)	44	66	36
Phase Split	30%	45%	25%

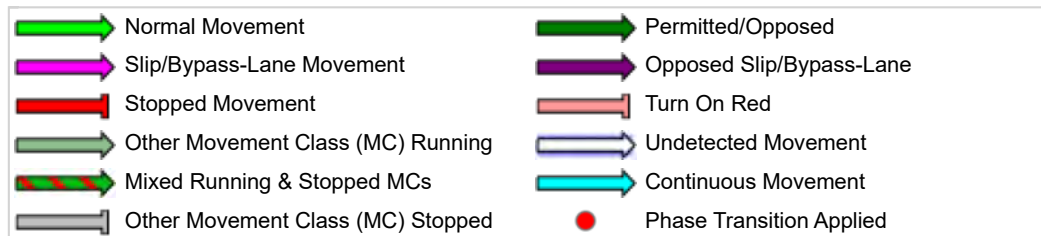
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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MOVEMENT SUMMARY

 Site: TCS 497 [104 - Great Western Highway / Queen Street /  Network: [104 & 108 - PM Mamre Road - PM Peak 2030 Base]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
South: Mamre Road														
9	L2	185	4.5	185	4.5	0.135	10.2	LOS A	3.4	24.9	0.33	0.65	0.33	45.1
8	T1	269	5.1	269	5.1	1.009	70.1	LOS E	34.7	301.3	0.97	0.86	1.08	21.8
7	R2	315	17.1	315	17.1	1.009	117.2	LOS F	34.7	301.3	1.00	1.14	1.58	9.1
Approach		769	9.8	769	9.8	1.009	75.0	LOS F	34.7	301.3	0.83	0.92	1.10	17.7
East: Great Western Highway														
6	L2	697	5.7	697	5.7	0.384	13.4	LOS A	16.8	129.9	0.44	0.70	0.44	47.2
5	T1	1500	2.2	1500	2.2	0.529	37.6	LOS C	29.8	213.7	0.76	0.65	0.76	33.2
4	R2	153	2.1	153	2.1	0.262	59.8	LOS E	8.8	62.4	0.90	0.77	0.90	27.2
Approach		2349	3.2	2349	3.2	0.529	31.9	LOS C	29.8	213.7	0.68	0.67	0.68	36.0
North: Queen Street														
3	L2	68	1.5	68	1.5	0.921	82.1	LOS F	27.8	197.5	1.00	1.12	1.54	13.9
2	T1	504	1.9	504	1.9	0.921	78.1	LOS F	27.8	197.5	1.00	1.10	1.44	20.5
1	R2	122	0.0	122	0.0	0.921	80.6	LOS F	27.2	192.4	1.00	1.08	1.31	18.4
Approach		695	1.5	695	1.5	0.921	79.0	LOS F	27.8	197.5	1.00	1.10	1.43	19.6
West: Great Western Highway														
12	L2	32	0.0	32	0.0	0.543	49.5	LOS D	16.8	122.7	0.89	0.77	0.89	25.0
11	T1	857	3.4	857	3.4	0.543	43.9	LOS D	16.9	123.5	0.89	0.77	0.89	14.7
10	R2	198	3.2	198	3.2	0.710	67.5	LOS E	13.2	97.8	1.00	0.85	1.05	19.8
Approach		1086	3.3	1086	3.3	0.710	48.4	LOS D	16.9	123.5	0.91	0.78	0.92	16.5
All Vehicles		4900	4.0	4900	4.0	1.009	49.0	LOS D	34.7	301.3	0.80	0.80	0.90	25.8

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate	
		ped/h	sec		Pedestrian ped	Distance m		
P3	South Full Crossing	7	64.1	LOS F	0.0	0.0	0.96	0.96
P2	East Full Crossing	14	64.2	LOS F	0.1	0.1	0.96	0.96
P1	North Full Crossing	1	64.1	LOS F	0.0	0.0	0.96	0.96
P4	West Full Crossing	12	64.2	LOS F	0.0	0.0	0.96	0.96
All Pedestrians		34	64.2	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Base.sip8

PHASING SUMMARY

 Site: TCS 497 [104 - Great Western Highway / Queen Street / Mamre Road - PM Peak 2030 Base]  Network: [104 & 108 - PM Peak 2030 Base]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, D, E, F

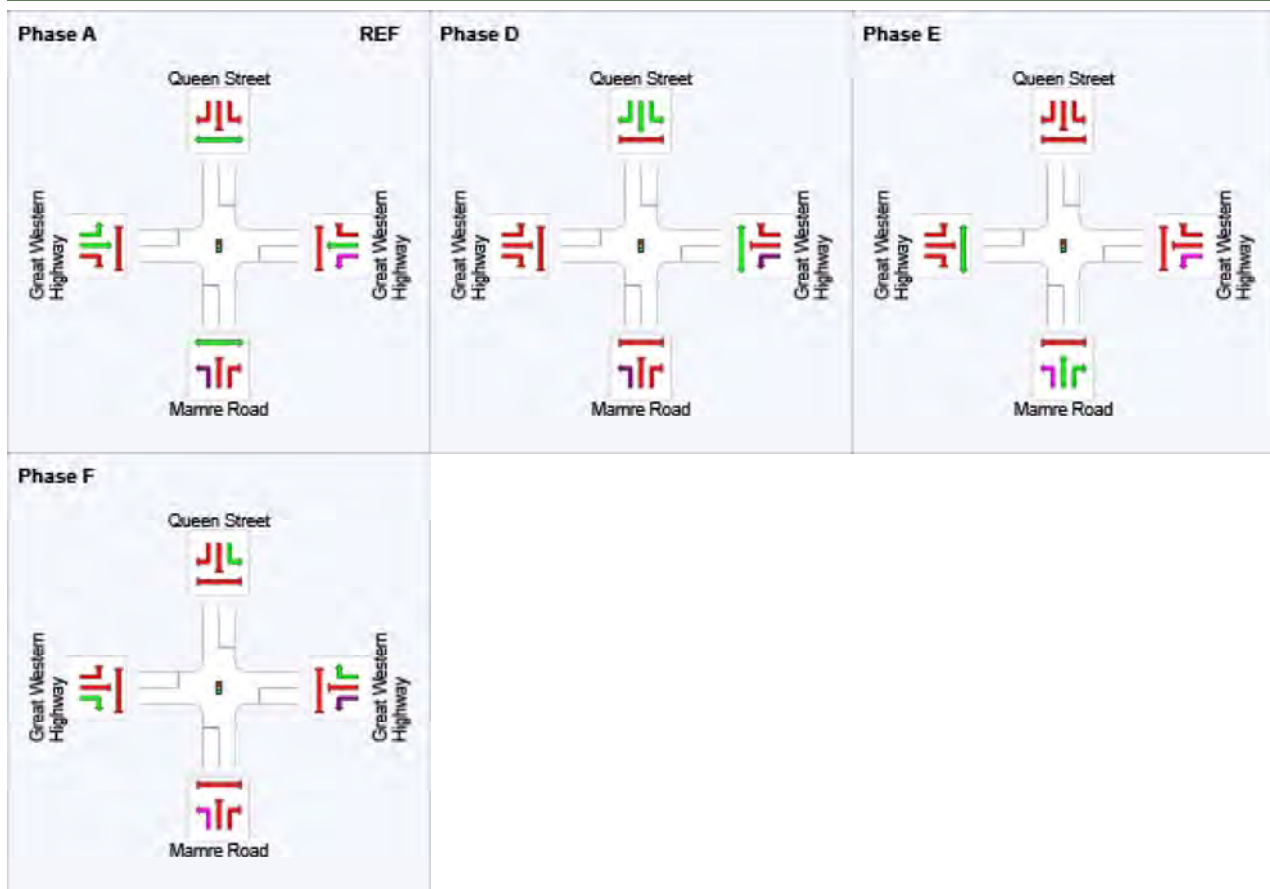
Output Phase Sequence: A, D, E, F

Phase Timing Summary

Phase	A	D	E	F
Phase Change Time (sec)	42	90	124	13
Green Time (sec)	42	28	23	23
Phase Time (sec)	48	34	29	29
Phase Split	34%	24%	21%	21%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase

 Normal Movement  Permitted/Opposed

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

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MOVEMENT SUMMARY

 Site: TCS 1236 [108 - Great Western Highway / Glossop Street - PM Peak 2030 Base]

 Network: [104 & 108 - PM Peak 2030 Base]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
East: Great Western Highway														
5	T1	1488	2.8	1488	2.8	0.481	8.4	LOS A	18.9	137.0	0.43	0.39	0.43	47.3
4	R2	580	8.7	580	8.7	0.896	79.1	LOS F	22.5	176.2	1.00	0.98	1.28	24.5
Approach		2068	4.5	2068	4.5	0.896	28.2	LOS B	22.5	176.2	0.59	0.56	0.67	34.3
North: Glossop Street														
3	L2	569	6.5	569	6.5	0.366	32.6	LOS C	25.1	190.2	0.71	0.79	0.71	36.8
1	R2	861	3.9	861	3.9	0.687	59.7	LOS E	26.4	197.1	0.97	0.84	0.97	17.8
Approach		1431	4.9	1431	4.9	0.687	48.9	LOS D	26.4	197.1	0.87	0.82	0.87	25.6
West: Great Western Highway														
12	L2	292	19.1	291	19.1	0.491	24.6	LOS B	11.5	100.7	0.50	0.67	0.50	41.6
11	T1	948	3.0	947	3.0	0.491	19.0	LOS B	14.2	103.0	0.52	0.48	0.52	46.0
Approach		1240	6.8	1237 ^{N1}	6.8	0.491	20.4	LOS B	14.2	103.0	0.51	0.52	0.51	45.0
All Vehicles		4739	5.2	4736 ^{N1}	5.2	0.896	32.4	LOS C	26.4	197.1	0.66	0.63	0.69	34.3

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P2	East Full Crossing	2	64.1	LOS F	0.0	0.0	0.96	0.96	
P1	North Full Crossing	1	64.1	LOS F	0.0	0.0	0.96	0.96	
All Pedestrians		3	64.1	LOS F			0.96	0.96	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site: TCS 1236 [108 - Great Western Highway / Glossop Street - PM Peak 2030 Base]**

 **Network: [104 & 108 - PM Peak 2030 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase C

Input Phase Sequence: A, B, C

Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	34	106	0
Green Time (sec)	66	28	28
Phase Time (sec)	72	34	34
Phase Split	51%	24%	24%

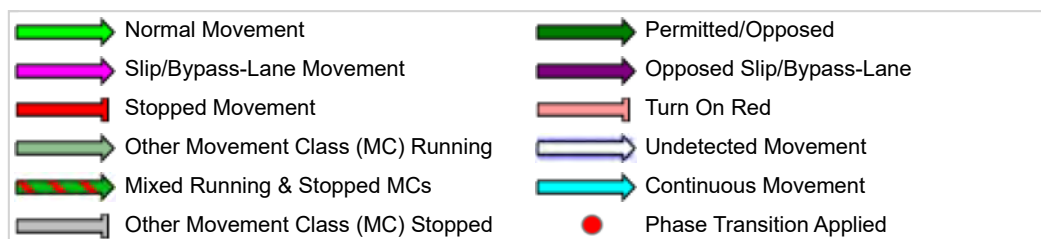
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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QUEUE STORAGE RATIO (PERCENTILE)

Ratio of the 95% Back of Queue Distance to the available queue storage distance (worst lane for the approach)

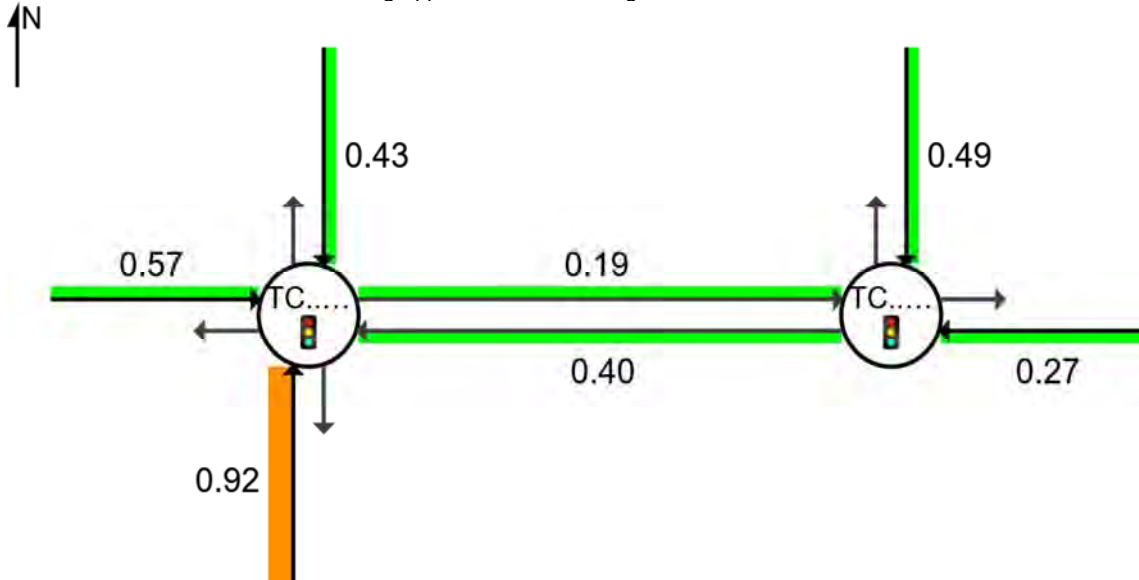
Network: [104 & 108 - PM Peak 2030 Base]

1630 - 1730

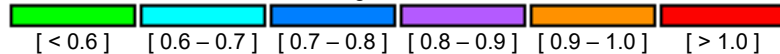
Network Category: (None)

Network Cycle Time = 140 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio



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MOVEMENT SUMMARY

 **Site: TCS 1234 [105 - Great Western Highway / Carlisle Avenue - PM Peak 2030 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 143 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Carlisle Avenue												
9	L2	96	9.9	0.185	33.5	LOS C	4.1	35.5	0.81	0.75	0.81	37.6
8	T1	659	3.4	0.787	64.5	LOS E	22.5	160.8	1.00	0.88	1.06	27.2
7	R2	118	3.6	0.532	74.1	LOS F	8.0	58.6	1.00	0.79	1.00	25.7
Approach		873	4.1	0.787	62.4	LOS E	22.5	160.8	0.98	0.86	1.03	27.7
East: Great Western Highway												
6	L2	135	3.9	0.462	48.4	LOS D	27.6	198.5	0.87	0.78	0.90	35.1
5	T1	1335	2.4	0.462	42.5	LOS C	28.4	204.4	0.87	0.75	0.88	40.7
4	R2	493	2.1	0.545	70.2	LOS E	16.1	115.4	0.99	0.81	0.99	29.5
Approach		1962	2.4	0.545	49.9	LOS D	28.4	204.4	0.90	0.77	0.91	36.8
North: Carlisle Avenue												
3	L2	315	2.0	0.196	27.6	LOS B	12.1	87.5	0.65	0.75	0.65	43.0
2	T1	649	6.0	0.555	42.7	LOS D	36.7	277.8	0.89	0.78	0.89	34.1
1	R2	687	2.9	0.453	36.2	LOS C	14.7	105.8	0.92	0.80	0.92	38.9
Approach		1652	4.0	0.555	37.1	LOS C	36.7	277.8	0.86	0.78	0.86	37.8
West: Great Western Highway												
12	L2	455	1.6	0.590	26.9	LOS B	15.2	108.2	0.79	0.85	0.87	44.3
11	T1	684	4.3	0.590	44.7	LOS D	19.1	141.7	0.90	0.79	0.91	39.8
10	R2	109	10.6	0.518	72.0	LOS F	7.3	60.2	0.98	0.79	0.98	25.5
Approach		1248	3.9	0.590	40.6	LOS C	19.1	141.7	0.87	0.81	0.90	39.7
All Vehicles		5735	3.4	0.787	46.1	LOS D	36.7	277.8	0.89	0.79	0.91	36.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	1	65.6	LOS F	0.0	0.0	0.96	0.96	
P2	East Full Crossing	1	65.6	LOS F	0.0	0.0	0.96	0.96	
P1	North Full Crossing	1	65.6	LOS F	0.0	0.0	0.96	0.96	
P4	West Full Crossing	1	65.6	LOS F	0.0	0.0	0.96	0.96	
All Pedestrians		4	65.6	LOS F			0.96	0.96	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Base.sip8

PHASING SUMMARY

 **Site: TCS 1234 [105 - Great Western Highway / Carlisle Avenue - PM Peak 2030 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 143 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, D, E, F, G

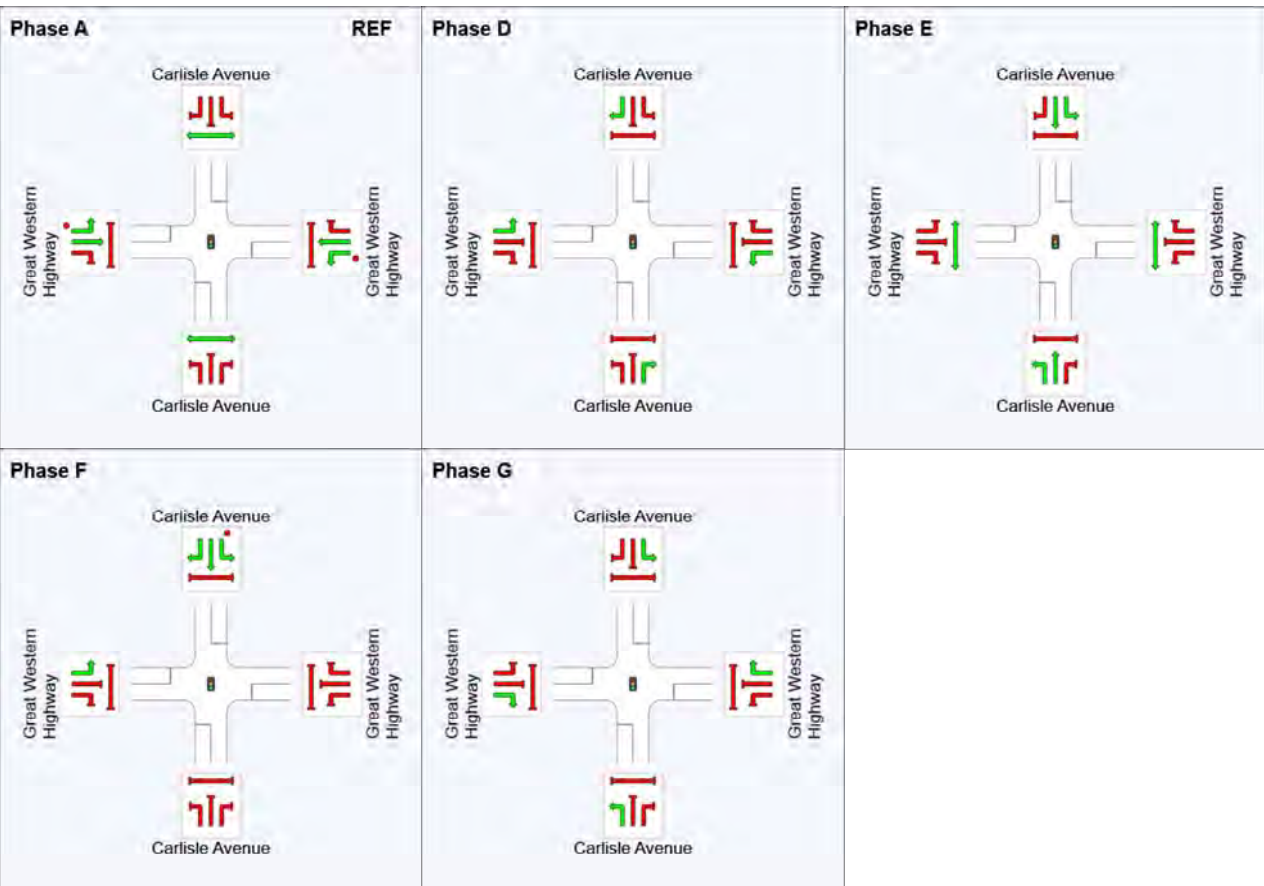
Output Phase Sequence: A, D, E, F, G

Phase Timing Summary

Phase	A	D	E	F	G
Phase Change Time (sec)	0	48	68	98	119
Green Time (sec)	42	14	24	16	18
Phase Time (sec)	48	20	29	22	24
Phase Split	34%	14%	20%	15%	17%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

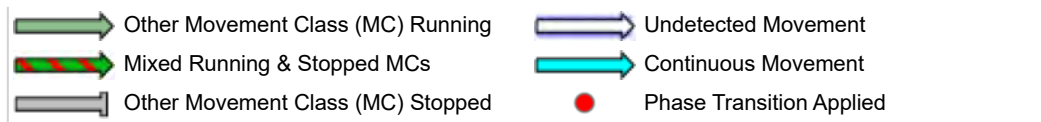
Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase





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MOVEMENT SUMMARY

 **Site: TCS 3118 [106 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (South) - PM Peak 2030 Base]**

 **Network: [106 & 107 - PM Peak 2030 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m			km/h	
South: Mamre Road														
8	T1	1425	5.5	1425	5.5	0.630	7.5	LOS A	21.1	160.1	0.51	0.48	0.51	43.3
7	R2	558	4.3	558	4.3	1.213	258.6	LOS F	78.6	592.3	1.00	1.57	2.57	8.8
Approach		1983	5.1	1983	5.1	1.213	78.2	LOS F	78.6	592.3	0.65	0.78	1.09	14.7
East: M4 Western Motorway Off-ramp/On-ramp														
6	L2	283	4.1	283	4.1	0.325	11.3	LOS A	5.7	41.2	0.43	0.69	0.43	48.1
4	R2	358	5.9	358	5.9	0.998	112.9	LOS F	16.1	120.8	1.00	1.18	1.80	13.0
Approach		641	5.1	641	5.1	0.998	68.0	LOS E	16.1	120.8	0.75	0.96	1.19	21.9
North: Mamre Road														
3	L2	860	2.1	860	2.1	0.435	15.3	LOS B	25.0	181.6	0.58	0.78	0.65	33.4
2	T1	1483	4.6	1483	4.6	0.607	22.2	LOS B	33.9	250.3	0.69	0.61	0.69	35.3
Approach		2343	3.7	2343	3.7	0.607	19.7	LOS B	33.9	250.3	0.65	0.68	0.68	34.4
All Vehicles		4967	4.5	4967	4.5	1.213	49.3	LOS D	78.6	592.3	0.66	0.76	0.91	22.4

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
P2	East Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		2	54.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site:** TCS 3118 [106 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (South) - PM Peak 2030 Base]

 **Network:** [106 & 107 - PM Peak 2030 Base]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

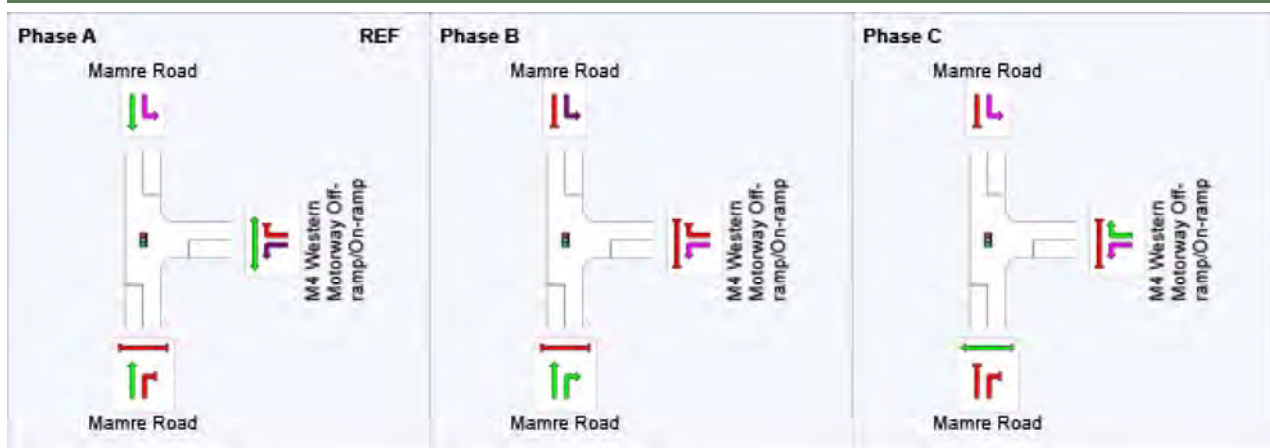
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	64	95
Green Time (sec)	59	25	19
Phase Time (sec)	65	31	24
Phase Split	54%	26%	20%

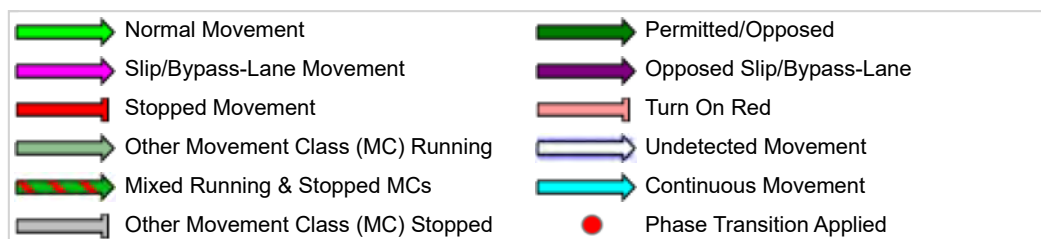
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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MOVEMENT SUMMARY

 Site: TCS 3117 [107 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (North) - PM Peak 2030 Base]

 Network: [106 & 107 - PM Peak 2030 Base]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
South: Mamre Road														
9	L2	146	7.9	146	7.9	0.103	8.6	LOS A	1.9	16.3	0.30	0.58	0.30	36.9
8	T1	1637	5.3	1637	5.3	0.713	32.3	LOS C	39.2	292.3	0.88	0.79	0.88	28.7
Approach		1783	5.5	1783	5.5	0.713	30.3	LOS C	39.2	292.3	0.84	0.78	0.84	29.4
North: Mamre Road														
2	T1	1748	3.3	1748	3.3	0.919	22.3	LOS B	71.2	521.6	0.80	0.81	0.87	26.3
1	R2	267	5.5	267	5.5	0.705	54.5	LOS D	14.9	114.3	0.98	0.85	1.01	23.4
Approach		2016	3.6	2016	3.6	0.919	26.5	LOS B	71.2	521.6	0.83	0.81	0.89	25.4
West: M4 Western Motorway Off-ramp/On-ramp														
12	L2	415	5.3	415	5.3	0.476	15.9	LOS B	12.0	89.7	0.59	0.75	0.59	44.1
10	R2	595	5.0	595	5.0	0.920	75.8	LOS F	23.4	174.1	1.00	1.03	1.39	17.3
Approach		1009	5.1	1009	5.1	0.920	51.2	LOS D	23.4	174.1	0.83	0.92	1.06	25.2
All Vehicles		4808	4.6	4808	4.6	0.920	33.1	LOS C	71.2	521.6	0.83	0.82	0.91	26.8

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate	
		ped/h	sec		Pedestrian ped	Distance m		
P1	North Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
P4	West Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		2	54.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site: TCS 3117 [107 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (North) - PM Peak 2030 Base]**

 **Network: [106 & 107 - PM Peak 2030 Base]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 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: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

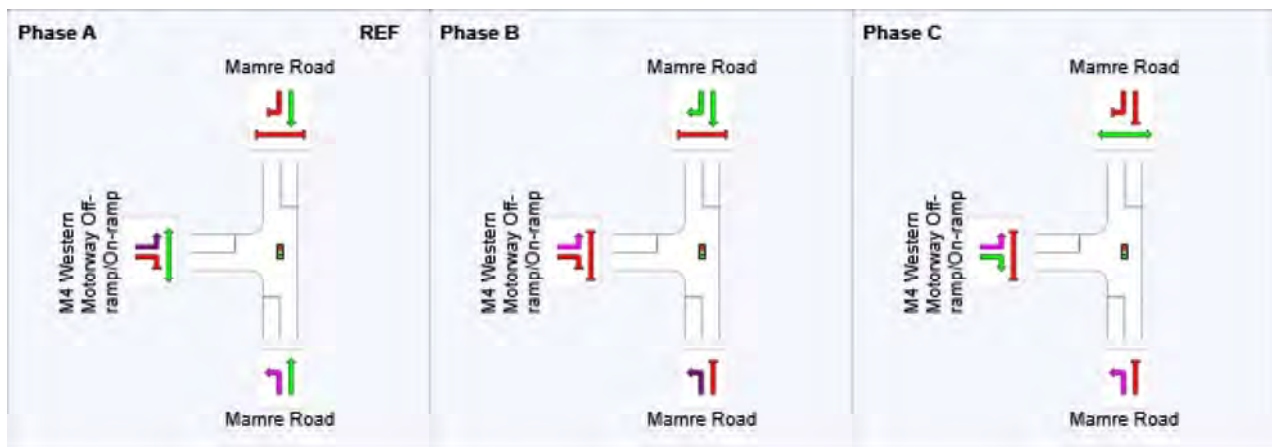
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	17	75	106
Green Time (sec)	52	25	25
Phase Time (sec)	58	31	31
Phase Split	48%	26%	26%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



QUEUE STORAGE RATIO (PERCENTILE)

Ratio of the 95% Back of Queue Distance to the available queue storage distance (worst lane for the approach)

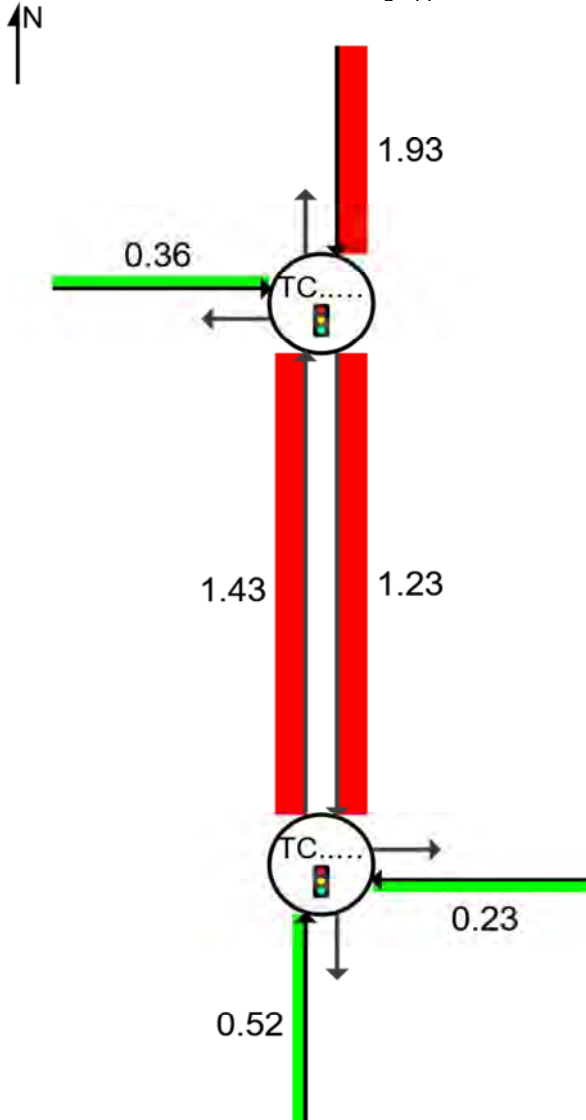
Network: [106 & 107 - PM Peak 2030 Base]

1630 - 1730

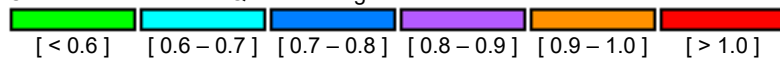
Network Category: (None)

Network Cycle Time = 120 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio



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MOVEMENT SUMMARY

 Site: TCS 497 [104 - Great Western Highway / Queen Street / Mamre Road - AM Peak 2030 With Development]  Network: [104 & 108 - AM Peak 2030 With Development]

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 141 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				
South: Mamre Road														
9	L2	163	6.5	163	6.5	0.121	16.2	LOS B	4.4	33.1	0.45	0.67	0.45	39.8
8	T1	447	1.9	447	1.9	0.908	49.9	LOS D	41.2	355.2	0.91	0.82	0.93	25.8
7	R2	488	16.8	488	16.8	0.908	71.1	LOS F	41.2	355.2	1.00	0.98	1.19	13.7
Approach		1099	9.2	1099	9.2	0.908	54.3	LOS D	41.2	355.2	0.88	0.87	0.98	21.7
East: Great Western Highway														
6	L2	482	22.3	482	22.3	0.433	10.8	LOS A	9.6	90.6	0.38	0.67	0.38	48.8
5	T1	1199	3.2	1199	3.2	0.916	69.1	LOS E	39.1	284.9	0.99	1.02	1.21	24.2
4	R2	226	1.9	226	1.9	0.899	72.1	LOS F	16.6	118.0	1.00	0.91	1.18	24.9
Approach		1907	7.9	1907	7.9	0.916	54.7	LOS D	39.1	284.9	0.84	0.92	1.00	28.1
North: Queen Street														
3	L2	52	0.0	52	0.0	0.852	77.4	LOS F	11.5	83.7	1.00	1.06	1.58	14.4
2	T1	185	6.8	185	6.8	0.852	75.0	LOS F	11.5	83.7	1.00	1.04	1.46	20.9
1	R2	80	1.3	80	1.3	0.852	79.9	LOS F	11.5	83.0	1.00	1.00	1.28	18.4
Approach		317	4.3	317	4.3	0.852	76.6	LOS F	11.5	83.7	1.00	1.03	1.43	19.3
West: Great Western Highway														
12	L2	107	3.9	107	3.9	0.604	51.1	LOS D	18.6	138.3	0.91	0.81	0.91	24.2
11	T1	854	5.4	854	5.4	0.604	45.5	LOS D	18.9	142.3	0.91	0.79	0.91	14.2
10	R2	196	8.1	196	8.1	0.849	78.7	LOS F	14.6	114.1	1.00	0.93	1.24	17.8
Approach		1157	5.7	1157	5.7	0.849	51.6	LOS D	18.9	142.3	0.93	0.82	0.97	16.5
All Vehicles		4480	7.4	4480	7.4	0.916	55.4	LOS D	41.2	355.2	0.88	0.89	1.01	23.5

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate	
		ped/h	sec		Pedestrian ped	Distance m		
P3	South Full Crossing	3	64.6	LOS F	0.0	0.0	0.96	0.96
P2	East Full Crossing	16	64.7	LOS F	0.1	0.1	0.96	0.96
P1	North Full Crossing	8	64.7	LOS F	0.0	0.0	0.96	0.96
P4	West Full Crossing	17	64.7	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		44	64.7	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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With Development.sip8

PHASING SUMMARY

 **Site:** TCS 497 [104 - Great Western Highway / Queen Street / Mamre Road - AM Peak 2030 With Development]

 **Network:** [104 & 108 - AM Peak 2030 With Development]

0800 - 0900
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 141 seconds (Network User-Given Cycle Time)

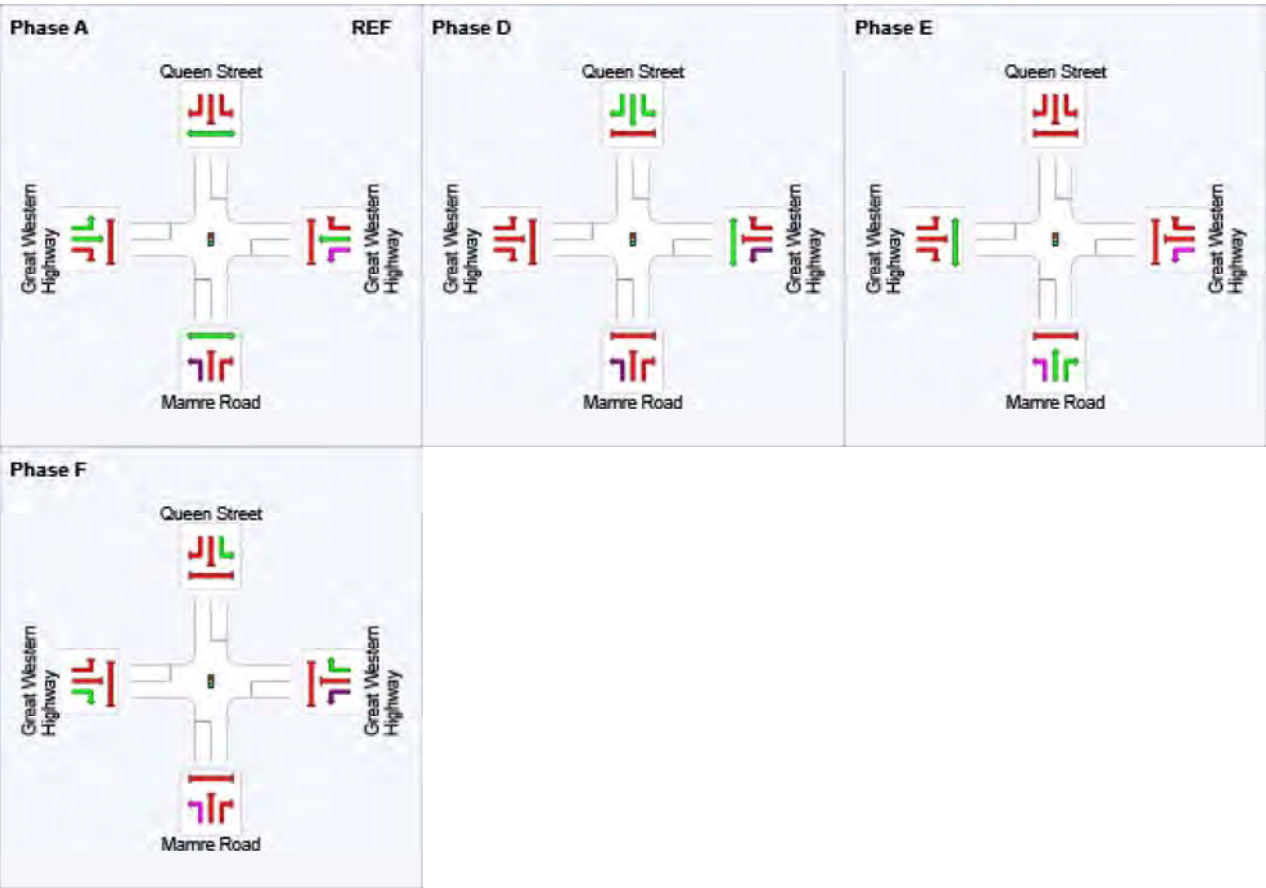
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, D, E, F
Output Phase Sequence: A, D, E, F

Phase Timing Summary

Phase	A	D	E	F
Phase Change Time (sec)	117	24	44	91
Green Time (sec)	42	14	41	20
Phase Time (sec)	48	20	47	26
Phase Split	34%	14%	33%	18%

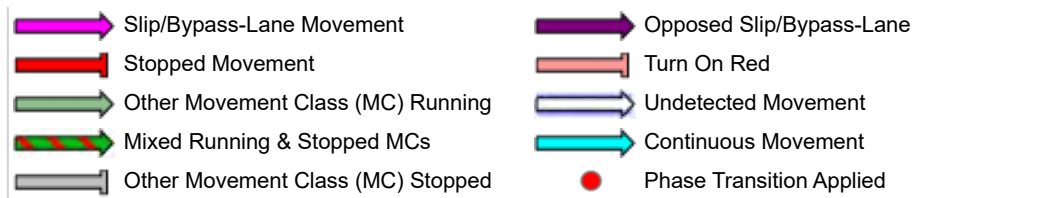
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase





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MOVEMENT SUMMARY

 **Site: TCS 1236 [108 - Great Western Highway / Glossop Street - AM Peak 2030 With Development]**

 **Network: [104 & 108 - AM Peak 2030 With Development]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 141 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %				Vehicles veh	Distance m				km/h
East: Great Western Highway														
5	T1	1139	5.0	1139	5.0	0.302	18.4	LOS B	15.6	115.9	0.58	0.51	0.58	37.8
4	R2	595	14.0	595	14.0	0.657	59.1	LOS E	18.5	157.7	0.96	0.83	0.96	28.7
Approach		1734	8.1	1734	8.1	0.657	32.4	LOS C	18.5	157.7	0.71	0.62	0.71	32.8
North: Glossop Street														
3	L2	512	20.4	512	20.4	0.516	20.2	LOS B	18.6	167.1	0.58	0.77	0.58	42.3
1	R2	768	12.2	768	12.2	0.650	44.1	LOS D	21.4	180.1	0.87	0.84	0.87	21.8
Approach		1280	15.5	1280	15.5	0.650	34.5	LOS C	21.4	180.1	0.76	0.81	0.76	30.6
West: Great Western Highway														
12	L2	403	17.2	403	17.2	0.643	51.2	LOS D	23.8	216.7	0.91	0.84	0.91	31.1
11	T1	991	6.0	991	6.0	0.643	49.7	LOS D	30.8	230.0	0.99	0.86	0.99	33.7
Approach		1394	9.2	1394	9.2	0.643	50.1	LOS D	30.8	230.0	0.96	0.85	0.96	33.0
All Vehicles		4407	10.6	4407	10.6	0.657	38.6	LOS C	30.8	230.0	0.80	0.75	0.80	32.3

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Prop. Queued	Effective Stop Rate	
P2	East Full Crossing	1	64.6	LOS F	0.0	0.0	0.96	0.96
P1	North Full Crossing	1	64.6	LOS F	0.0	0.0	0.96	0.96
All Pedestrians		2	64.6	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site: TCS 1236 [108 - Great Western Highway / Glossop Street - AM Peak 2030 With Development]**

 **Network: [104 & 108 - AM Peak 2030 With Development]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 141 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: Variable Phasing

Reference Phase: Phase C

Input Phase Sequence: A, B, C

Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	59	104	0
Green Time (sec)	39	31	53
Phase Time (sec)	45	37	59
Phase Split	32%	26%	42%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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QUEUE STORAGE RATIO (PERCENTILE)

Ratio of the 95% Back of Queue Distance to the available queue storage distance (worst lane for the approach)

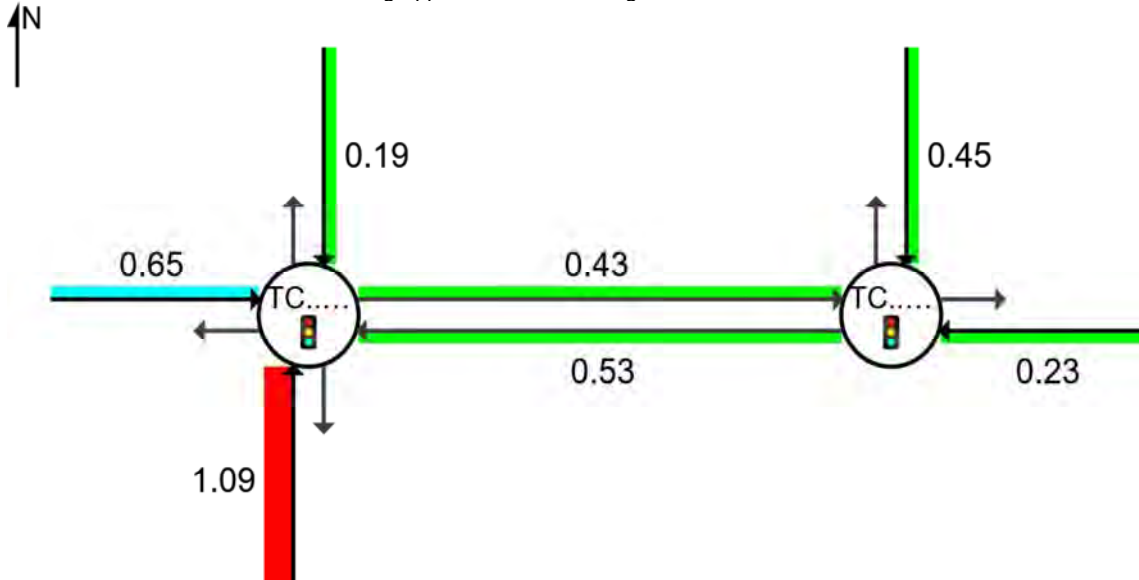
Network: [104 & 108 - AM Peak 2030 With Development]

0800 - 0900

Network Category: (None)

Network Cycle Time = 141 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



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MOVEMENT SUMMARY

 **Site: TCS 1234 [105 - Great Western Highway / Carlisle Avenue - AM Peak 2030 With Development]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 142 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Carlisle Avenue												
9	L2	53	38.0	0.141	38.7	LOS C	2.8	31.2	0.84	0.72	0.84	33.3
8	T1	657	6.7	0.671	60.8	LOS E	21.0	155.2	0.99	0.83	0.99	28.1
7	R2	175	11.4	0.678	74.8	LOS F	12.0	95.5	1.00	0.81	1.03	25.1
Approach		884	9.5	0.678	62.2	LOS E	21.0	155.2	0.99	0.82	0.99	27.7
East: Great Western Highway												
6	L2	87	8.4	0.458	42.5	LOS D	13.9	107.4	0.83	0.75	0.85	37.2
5	T1	737	6.9	0.458	38.8	LOS C	15.0	114.1	0.84	0.73	0.84	42.5
4	R2	314	6.0	0.796	79.6	LOS F	11.4	84.6	1.00	0.88	1.18	27.4
Approach		1138	6.8	0.796	50.4	LOS D	15.0	114.1	0.88	0.77	0.93	36.4
North: Carlisle Avenue												
3	L2	314	5.7	0.218	31.0	LOS C	12.9	95.4	0.70	0.76	0.70	40.9
2	T1	475	6.7	0.443	43.3	LOS D	26.2	198.5	0.87	0.75	0.87	33.9
1	R2	457	4.8	0.338	37.1	LOS C	9.8	71.9	0.91	0.78	0.91	38.2
Approach		1245	5.7	0.443	37.9	LOS C	26.2	198.5	0.84	0.76	0.84	37.2
West: Great Western Highway												
12	L2	580	2.9	0.407	21.6	LOS B	16.4	118.5	0.69	0.80	0.73	47.3
11	T1	923	7.2	0.407	37.5	LOS C	23.1	176.1	0.82	0.71	0.82	43.3
10	R2	148	8.5	0.428	70.8	LOS F	9.6	77.2	0.98	0.79	0.98	25.9
Approach		1652	5.8	0.428	34.9	LOS C	23.1	176.1	0.79	0.75	0.80	42.4
All Vehicles		4919	6.7	0.796	44.2	LOS D	26.2	198.5	0.86	0.77	0.88	36.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	1	65.1	LOS F	0.0	0.0	0.96	0.96	
P2	East Full Crossing	1	65.1	LOS F	0.0	0.0	0.96	0.96	
P1	North Full Crossing	1	65.1	LOS F	0.0	0.0	0.96	0.96	
P4	West Full Crossing	1	65.1	LOS F	0.0	0.0	0.96	0.96	
All Pedestrians		4	65.1	LOS F			0.96	0.96	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

 **Site: TCS 1234 [105 - Great Western Highway / Carlisle Avenue - AM Peak 2030 With Development]**

0800 - 0900
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 142 seconds (Site User-Given Phase Times)

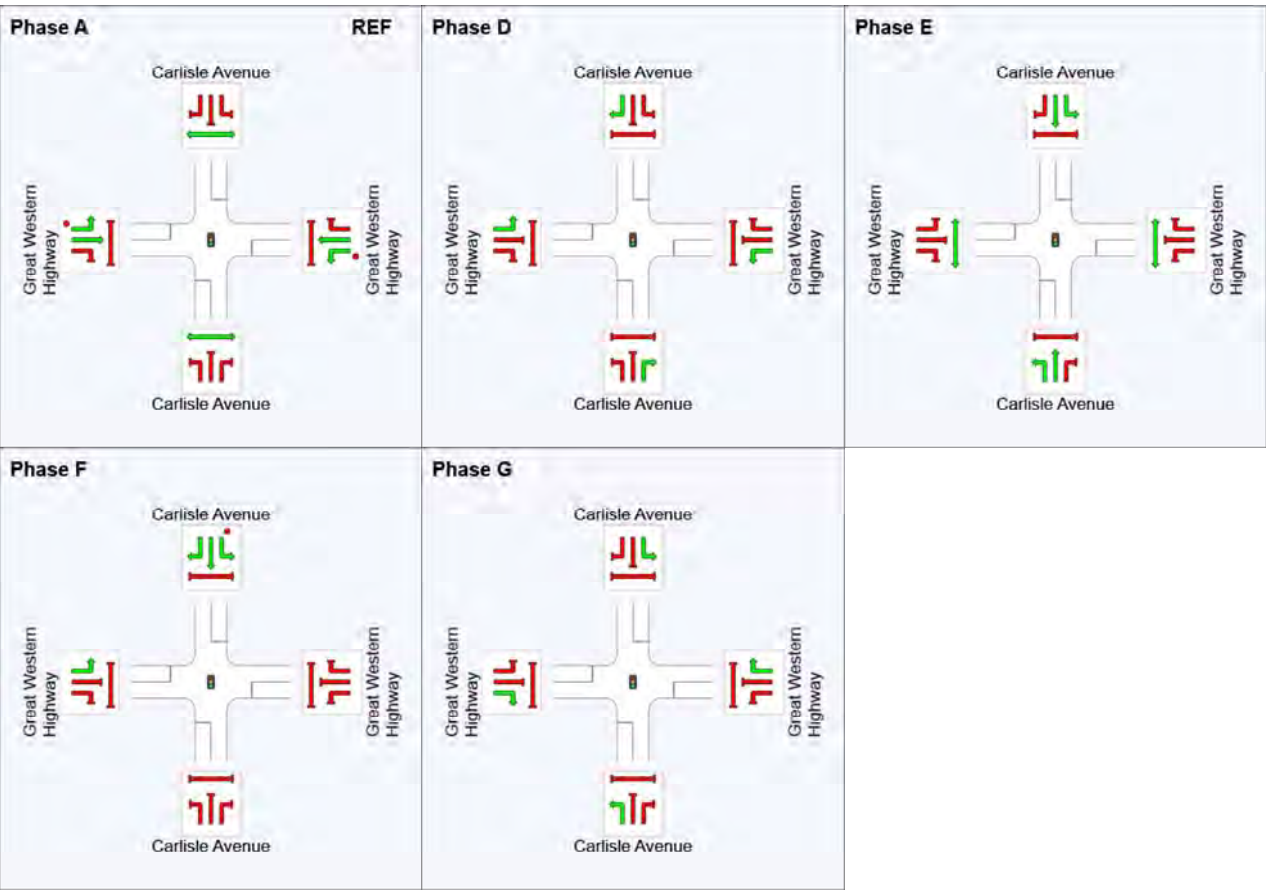
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, D, E, F, G
Output Phase Sequence: A, D, E, F, G

Phase Timing Summary

Phase	A	D	E	F	G
Phase Change Time (sec)	0	53	73	102	120
Green Time (sec)	47	14	23	13	16
Phase Time (sec)	53	20	28	19	22
Phase Split	37%	14%	20%	13%	15%

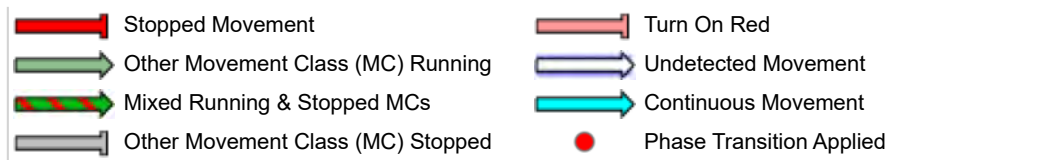
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase





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MOVEMENT SUMMARY

 **Site: TCS 3118 [106 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (South) - AM Peak 2030 With Development]**

 **Network: [106 & 107 - AM Peak 2030 With Development]**

0800 - 0900

Site Category: (None)

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

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m			km/h	
South: Mamre Road														
8	T1	1345	6.2	1345	6.2	0.280	4.4	LOS A	11.6	88.6	0.34	0.30	49.0	
7	R2	507	8.7	507	8.7	0.673	48.4	LOS D	24.9	190.9	0.98	0.85	25.3	
Approach		1853	6.9	1853	6.9	0.673	16.4	LOS B	24.9	190.9	0.51	0.45	33.6	
East: M4 Western Motorway Off-ramp/On-ramp														
6	L2	109	11.5	109	11.5	0.141	10.9	LOS A	1.8	14.9	0.39	0.65	48.4	
4	R2	264	17.5	264	17.5	0.664	56.3	LOS D	7.3	65.5	0.99	0.84	21.4	
Approach		374	15.8	374	15.8	0.664	43.0	LOS D	7.3	65.5	0.81	0.79	27.5	
North: Mamre Road														
3	L2	416	9.6	416	9.6	0.254	8.8	LOS A	6.3	50.6	0.32	0.62	36.6	
2	T1	1451	8.8	1451	8.8	0.671	21.0	LOS B	28.4	218.3	0.71	0.63	36.1	
Approach		1866	9.0	1866	9.0	0.671	18.2	LOS B	28.4	218.3	0.62	0.63	36.2	
All Vehicles		4093	8.6	4093	8.6	0.673	19.7	LOS B	28.4	218.3	0.59	0.56	34.0	

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	1	49.2	LOS E	0.0	0.0	0.95	0.95
P2	East Full Crossing	1	49.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		2	49.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site:** TCS 3118 [106 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (South) - AM Peak 2030 With Development]

 **Network:** [106 & 107 - AM Peak 2030 With Development]

0800 - 0900

Site Category: (None)

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

Timings based on settings in the Network Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

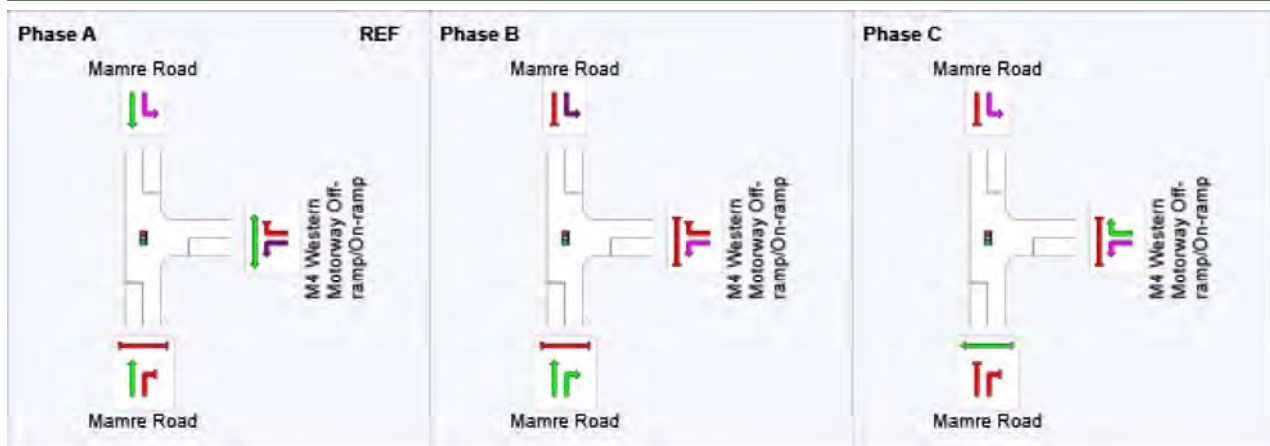
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	58	87
Green Time (sec)	54	23	17
Phase Time (sec)	60	29	21
Phase Split	55%	26%	19%

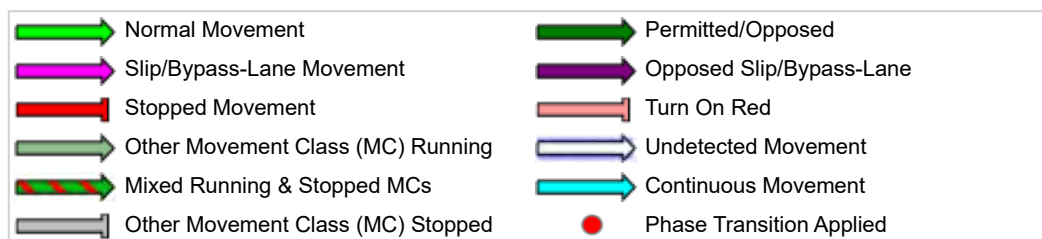
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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MOVEMENT SUMMARY

 Site: TCS 3117 [107 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (North) - AM Peak 2030 With Development]

 Network: [106 & 107 - AM Peak 2030 With Development]

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mamre Road														
9	L2	265	6.7	265	6.7	0.176	10.9	LOS A	5.7	45.9	0.48	0.67	0.48	35.5
8	T1	1344	8.3	1344	8.3	0.638	34.4	LOS C	30.4	238.0	0.90	0.79	0.90	27.8
Approach		1609	8.0	1609	8.0	0.638	30.5	LOS C	30.4	238.0	0.83	0.77	0.83	29.2
North: Mamre Road														
2	T1	1266	9.3	1266	9.3	0.830	14.6	LOS B	35.0	274.3	0.71	0.67	0.73	32.6
1	R2	257	18.4	257	18.4	0.653	41.9	LOS C	12.2	113.1	0.92	0.83	0.92	26.1
Approach		1523	10.9	1523	10.9	0.830	19.2	LOS B	35.0	274.3	0.75	0.70	0.77	30.0
West: M4 Western Motorway Off-ramp/On-ramp														
12	L2	626	3.7	626	3.7	0.577	11.1	LOS A	13.6	99.0	0.53	0.73	0.53	47.6
10	R2	600	8.2	600	8.2	0.843	58.4	LOS E	18.4	141.6	1.00	0.95	1.22	20.7
Approach		1226	5.9	1226	5.9	0.843	34.3	LOS C	18.4	141.6	0.76	0.84	0.86	31.7
All Vehicles		4359	8.4	4359	8.4	0.843	27.6	LOS B	35.0	274.3	0.78	0.77	0.82	30.2

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	North Full Crossing	1	49.2	LOS E	0.0	0.0	0.95	0.95
P4	West Full Crossing	3	49.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		4	49.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site:** TCS 3117 [107 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (North) - AM Peak 2030 With Development]

 **Network:** [106 & 107 - AM Peak 2030 With Development]

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 110 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: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

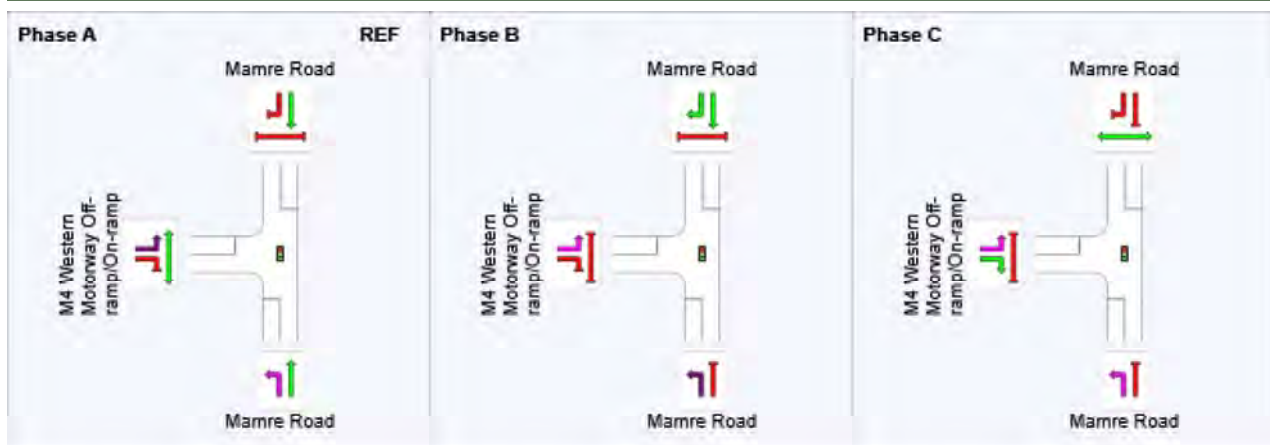
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	16	56	96
Green Time (sec)	34	34	24
Phase Time (sec)	40	40	30
Phase Split	36%	36%	27%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



QUEUE STORAGE RATIO (PERCENTILE)

Ratio of the 95% Back of Queue Distance to the available queue storage distance (worst lane for the approach)

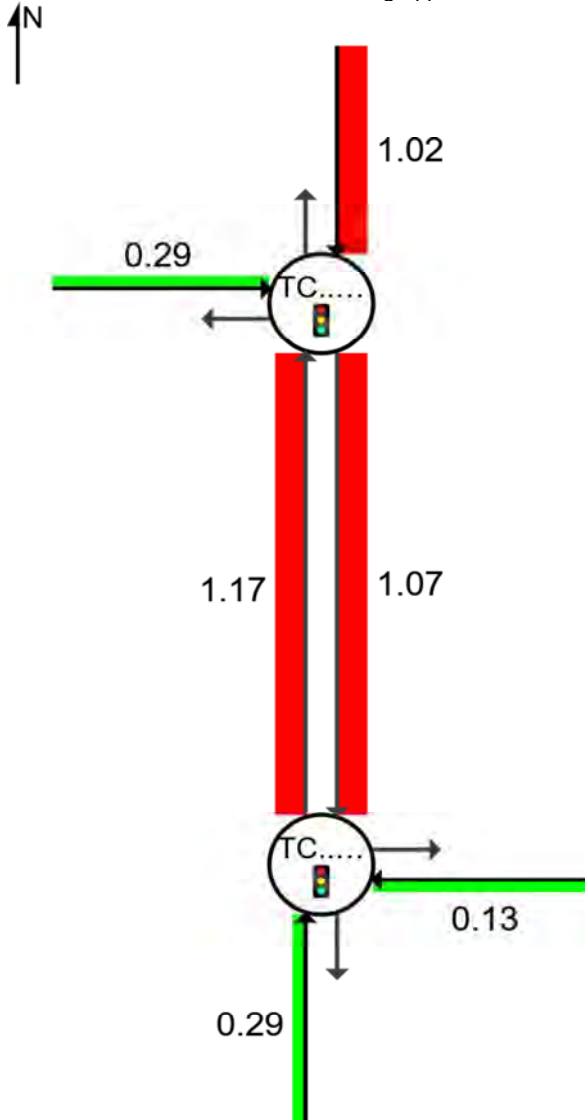
Network: [106 & 107 - AM Peak 2030 With Development]

0800 - 0900

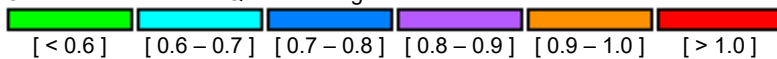
Network Category: (None)

Network Cycle Time = 110 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio



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Project: P:\P3796 St Marys Inland Container Terminal EIS\Technical Work\Models\P3796.001M St Marys Inland Container Terminal EIS_2030 With Development.sip8

MOVEMENT SUMMARY

 Site: TCS 497 [104 - Great Western Highway / Queen Street / Mamre Road - PM Peak 2030 With Development]  Network: [104 & 108 - PM Peak 2030 With Development]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m			km/h	
South: Mamre Road														
9	L2	185	4.5	185	4.5	0.135	10.2	LOS A	3.4	24.9	0.33	0.65	0.33	45.1
8	T1	269	5.1	269	5.1	1.086	78.2	LOS F	43.5	404.4	0.97	0.89	1.12	20.4
7	R2	328	20.5	328	20.5	1.086	167.6	LOS F	43.5	404.4	1.00	1.29	1.89	6.5
Approach		783	11.4	783	11.4	1.086	99.6	LOS F	43.5	404.4	0.83	1.00	1.26	14.3
East: Great Western Highway														
6	L2	711	7.6	711	7.6	0.401	14.2	LOS A	17.0	137.0	0.44	0.70	0.44	46.6
5	T1	1500	2.2	1500	2.2	0.528	36.5	LOS C	29.3	210.5	0.75	0.64	0.75	33.7
4	R2	153	2.1	153	2.1	0.262	59.8	LOS E	8.9	63.3	0.91	0.77	0.91	27.2
Approach		2363	3.8	2363	3.8	0.528	31.3	LOS C	29.3	210.5	0.66	0.67	0.66	36.3
North: Queen Street														
3	L2	68	1.5	68	1.5	0.921	82.1	LOS F	27.8	197.5	1.00	1.12	1.54	13.9
2	T1	504	1.9	504	1.9	0.921	78.1	LOS F	27.8	197.5	1.00	1.10	1.44	20.5
1	R2	122	0.0	122	0.0	0.921	80.6	LOS F	27.2	192.4	1.00	1.08	1.31	18.4
Approach		695	1.5	695	1.5	0.921	79.0	LOS F	27.8	197.5	1.00	1.10	1.43	19.6
West: Great Western Highway														
12	L2	32	0.0	32	0.0	0.543	49.5	LOS D	16.8	122.7	0.89	0.77	0.89	25.0
11	T1	857	3.4	857	3.4	0.543	43.9	LOS D	16.9	123.5	0.89	0.77	0.89	14.7
10	R2	198	3.2	198	3.2	0.710	67.5	LOS E	13.2	97.8	1.00	0.85	1.05	19.8
Approach		1086	3.3	1086	3.3	0.710	48.4	LOS D	16.9	123.5	0.91	0.78	0.92	16.5
All Vehicles		4927	4.6	4927	4.6	1.086	52.6	LOS D	43.5	404.4	0.79	0.81	0.92	24.7

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate	
		ped/h	sec		Pedestrian ped	Distance m		
P3	South Full Crossing	7	64.1	LOS F	0.0	0.0	0.96	0.96
P2	East Full Crossing	14	64.2	LOS F	0.1	0.1	0.96	0.96
P1	North Full Crossing	1	64.1	LOS F	0.0	0.0	0.96	0.96
P4	West Full Crossing	12	64.2	LOS F	0.0	0.0	0.96	0.96
All Pedestrians		34	64.2	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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With Development.sip8

PHASING SUMMARY

 **Site:** TCS 497 [104 - Great Western Highway / Queen Street / Mamre Road - PM Peak 2030 With Development]  **Network:** [104 & 108 - PM Peak 2030 With Development]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, D, E, F

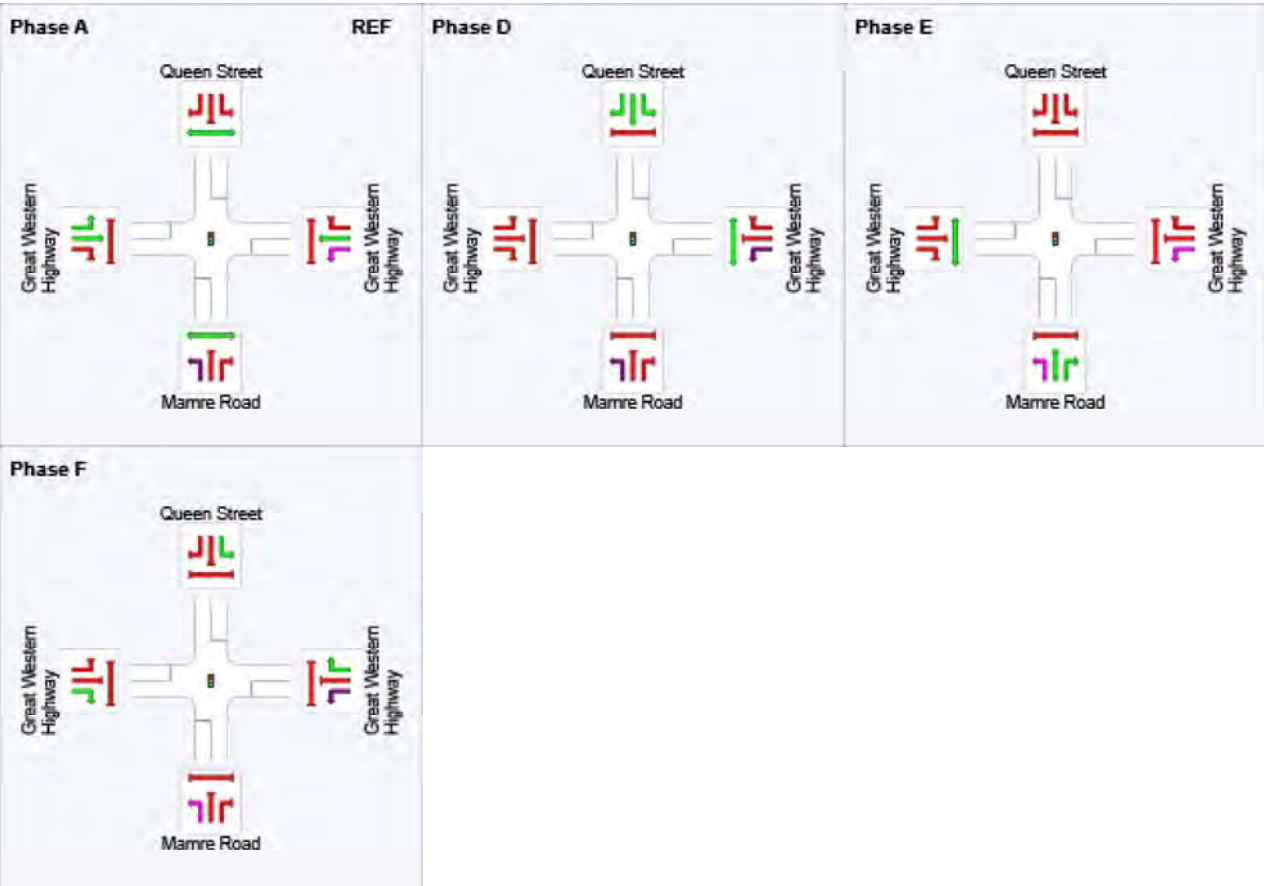
Output Phase Sequence: A, D, E, F

Phase Timing Summary

Phase	A	D	E	F
Phase Change Time (sec)	42	90	124	13
Green Time (sec)	42	28	23	23
Phase Time (sec)	48	34	29	29
Phase Split	34%	24%	21%	21%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



Normal Movement



Permitted/Opposed

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

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MOVEMENT SUMMARY

 **Site: TCS 1236 [108 - Great Western Highway / Glossop Street - PM Peak 2030 With Development]**

 **Network: [104 & 108 - PM Peak 2030 With Development]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
East: Great Western Highway														
5	T1	1488	2.8	1488	2.8	0.481	8.4	LOS A	18.9	137.0	0.43	0.39	0.43	47.3
4	R2	582	9.0	582	9.0	0.904	80.8	LOS F	23.7	186.8	1.00	0.99	1.30	24.2
Approach		2071	4.6	2071	4.6	0.904	28.8	LOS C	23.7	186.8	0.59	0.56	0.68	34.0
North: Glossop Street														
3	L2	572	6.8	572	6.8	0.369	32.7	LOS C	25.2	192.8	0.71	0.79	0.71	36.8
1	R2	875	5.4	875	5.4	0.749	60.1	LOS E	27.0	209.0	0.97	0.84	0.97	17.7
Approach		1446	6.0	1446	6.0	0.749	49.3	LOS D	27.0	209.0	0.87	0.82	0.87	25.5
West: Great Western Highway														
12	L2	305	22.8	297	22.1	0.494	25.0	LOS B	11.1	103.8	0.50	0.68	0.50	41.3
11	T1	948	3.0	931	2.9	0.494	18.6	LOS B	14.0	101.6	0.51	0.47	0.51	46.3
Approach		1254	7.8	1228 ^{N1}	7.5	0.494	20.1	LOS B	14.0	103.8	0.51	0.52	0.51	45.1
All Vehicles		4771	5.8	4745 ^{N1}	5.9	0.904	32.8	LOS C	27.0	209.0	0.66	0.63	0.69	34.1

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P2	East Full Crossing	2	64.1	LOS F	0.0	0.0	0.96	0.96	
P1	North Full Crossing	1	64.1	LOS F	0.0	0.0	0.96	0.96	
All Pedestrians		3	64.1	LOS F			0.96	0.96	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site: TCS 1236 [108 - Great Western Highway / Glossop Street - PM Peak 2030 With Development]**

 **Network: [104 & 108 - PM Peak 2030 With Development]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase C

Input Phase Sequence: A, B, C

Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	34	106	0
Green Time (sec)	66	28	28
Phase Time (sec)	72	34	34
Phase Split	51%	24%	24%

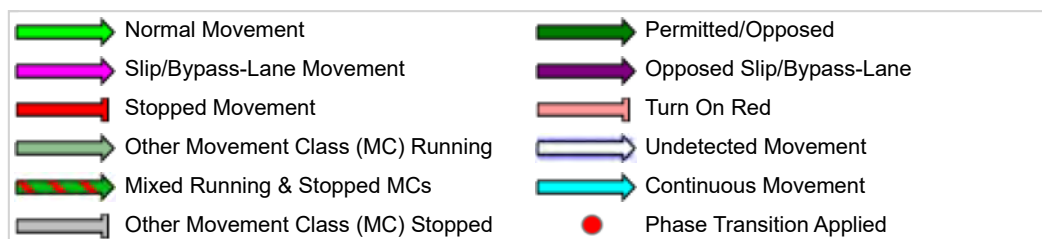
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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QUEUE STORAGE RATIO (PERCENTILE)

Ratio of the 95% Back of Queue Distance to the available queue storage distance (worst lane for the approach)

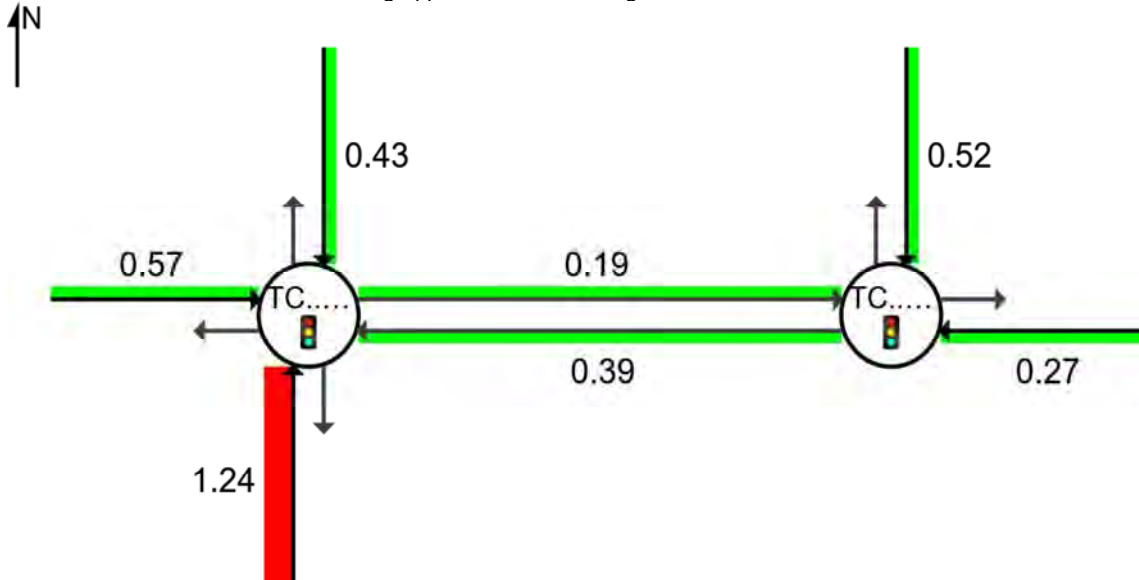
Network: [104 & 108 - PM Peak 2030 With Development]

1630 - 1730

Network Category: (None)

Network Cycle Time = 140 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio



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MOVEMENT SUMMARY

 **Site: TCS 1234 [105 - Great Western Highway / Carlisle Avenue - PM Peak 2030 With Development]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 143 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Carlisle Avenue												
9	L2	96	9.9	0.185	33.5	LOS C	4.1	35.5	0.81	0.75	0.81	37.6
8	T1	659	3.4	0.787	64.5	LOS E	22.5	160.8	1.00	0.88	1.06	27.2
7	R2	118	3.6	0.532	74.1	LOS F	8.0	58.6	1.00	0.79	1.00	25.7
Approach		873	4.1	0.787	62.4	LOS E	22.5	160.8	0.98	0.86	1.03	27.7
East: Great Western Highway												
6	L2	135	3.9	0.464	48.5	LOS D	27.7	199.8	0.87	0.78	0.90	35.1
5	T1	1337	2.5	0.464	42.5	LOS D	28.5	205.9	0.87	0.75	0.88	40.7
4	R2	493	2.1	0.545	70.2	LOS E	16.1	115.4	0.99	0.81	0.99	29.5
Approach		1964	2.5	0.545	49.9	LOS D	28.5	205.9	0.90	0.77	0.91	36.8
North: Carlisle Avenue												
3	L2	315	2.0	0.196	27.6	LOS B	12.1	87.5	0.65	0.75	0.65	43.0
2	T1	649	6.0	0.555	42.7	LOS D	36.7	277.8	0.89	0.78	0.89	34.1
1	R2	687	2.9	0.453	36.2	LOS C	14.7	105.8	0.92	0.80	0.92	38.9
Approach		1652	4.0	0.555	37.1	LOS C	36.7	277.8	0.86	0.78	0.86	37.8
West: Great Western Highway												
12	L2	455	1.6	0.594	27.2	LOS B	15.4	109.8	0.79	0.85	0.88	44.2
11	T1	686	4.6	0.594	44.7	LOS D	19.2	143.2	0.91	0.79	0.91	39.8
10	R2	109	10.6	0.518	72.0	LOS F	7.3	60.2	0.98	0.79	0.98	25.5
Approach		1251	4.0	0.594	40.7	LOS C	19.2	143.2	0.87	0.81	0.91	39.6
All Vehicles		5739	3.5	0.787	46.1	LOS D	36.7	277.8	0.89	0.80	0.91	36.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	1	65.6	LOS F	0.0	0.0	0.96	0.96	
P2	East Full Crossing	1	65.6	LOS F	0.0	0.0	0.96	0.96	
P1	North Full Crossing	1	65.6	LOS F	0.0	0.0	0.96	0.96	
P4	West Full Crossing	1	65.6	LOS F	0.0	0.0	0.96	0.96	
All Pedestrians		4	65.6	LOS F			0.96	0.96	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

 **Site: TCS 1234 [105 - Great Western Highway / Carlisle Avenue - PM Peak 2030 With Development]**

1630 - 1730
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 143 seconds (Site User-Given Phase Times)

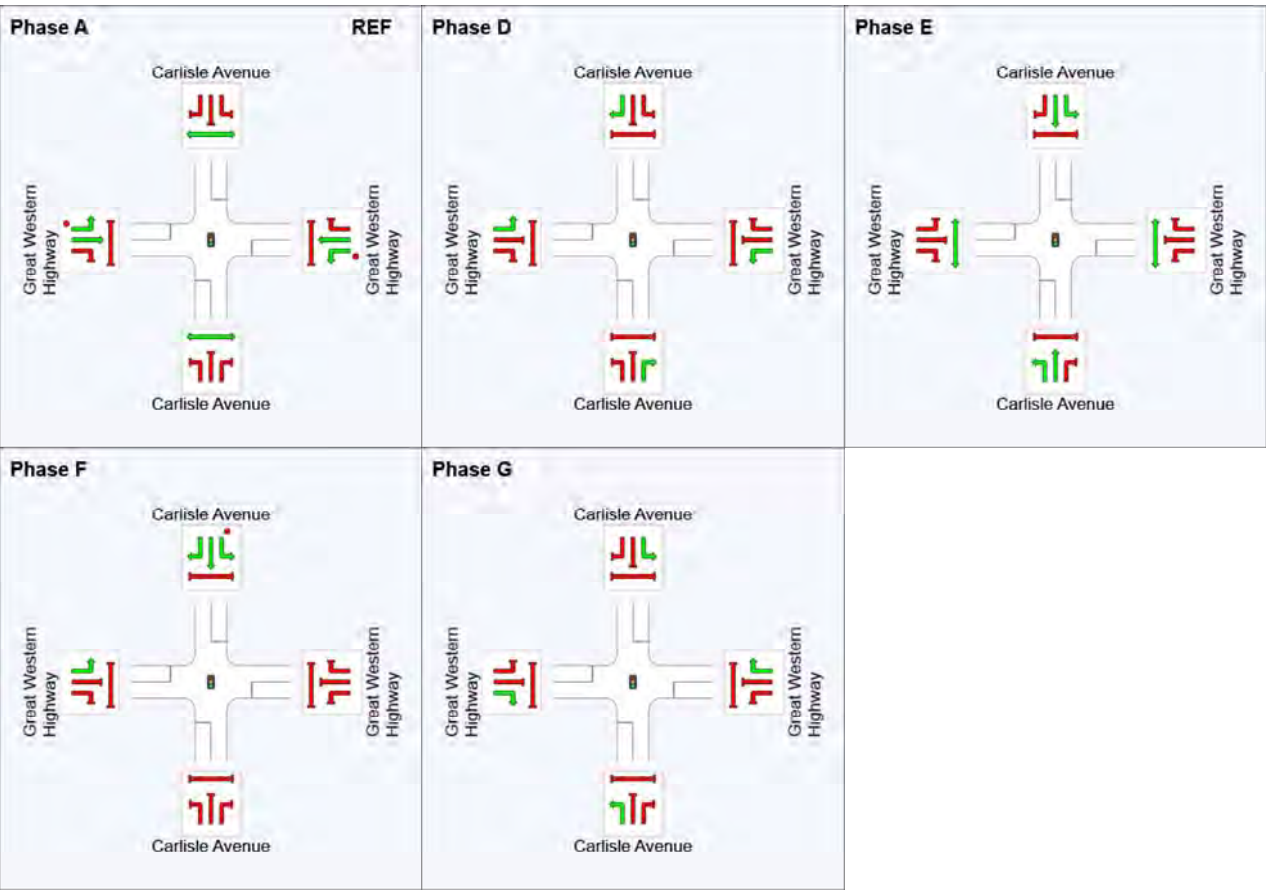
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, D, E, F, G
Output Phase Sequence: A, D, E, F, G

Phase Timing Summary

Phase	A	D	E	F	G
Phase Change Time (sec)	0	48	68	98	119
Green Time (sec)	42	14	24	16	18
Phase Time (sec)	48	20	29	22	24
Phase Split	34%	14%	20%	15%	17%

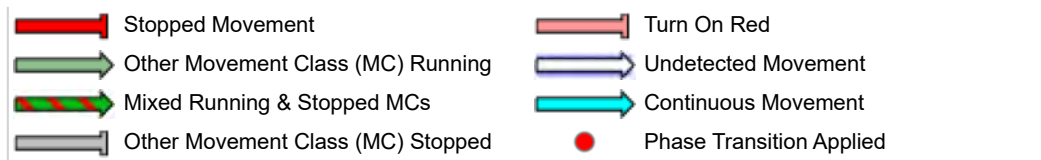
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase





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MOVEMENT SUMMARY

 **Site: TCS 3118 [106 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (South) - PM Peak 2030 With Development]**

 **Network: [106 & 107 - PM Peak 2030 With Development]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
South: Mamre Road														
8	T1	1427	5.6	1427	5.6	0.676	8.5	LOS A	23.4	177.6	0.56	0.52	0.56	41.8
7	R2	558	4.3	558	4.3	1.213	258.6	LOS F	78.6	592.3	1.00	1.57	2.57	8.8
Approach		1985	5.2	1985	5.2	1.213	78.8	LOS F	78.6	592.3	0.69	0.82	1.13	14.6
East: M4 Western Motorway Off-ramp/On-ramp														
6	L2	283	4.1	283	4.1	0.321	11.7	LOS A	5.8	42.3	0.44	0.69	0.44	47.9
4	R2	369	8.8	369	8.8	1.090	171.3	LOS F	21.3	171.6	1.00	1.36	2.20	9.0
Approach		653	6.8	653	6.8	1.090	102.0	LOS F	21.3	171.6	0.76	1.07	1.44	16.3
North: Mamre Road														
3	L2	860	2.1	860	2.1	0.439	15.3	LOS B	25.4	184.5	0.59	0.78	0.65	33.4
2	T1	1485	4.7	1485	4.7	0.623	23.0	LOS B	35.0	259.3	0.70	0.63	0.71	34.8
Approach		2345	3.8	2345	3.8	0.623	20.2	LOS B	35.0	259.3	0.66	0.68	0.69	34.2
All Vehicles		4983	4.8	4983	4.8	1.213	54.3	LOS D	78.6	592.3	0.68	0.79	0.96	21.1

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
P2	East Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		2	54.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site:** TCS 3118 [106 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (South) - PM Peak 2030 With Development]

 **Network:** [106 & 107 - PM Peak 2030 With Development]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

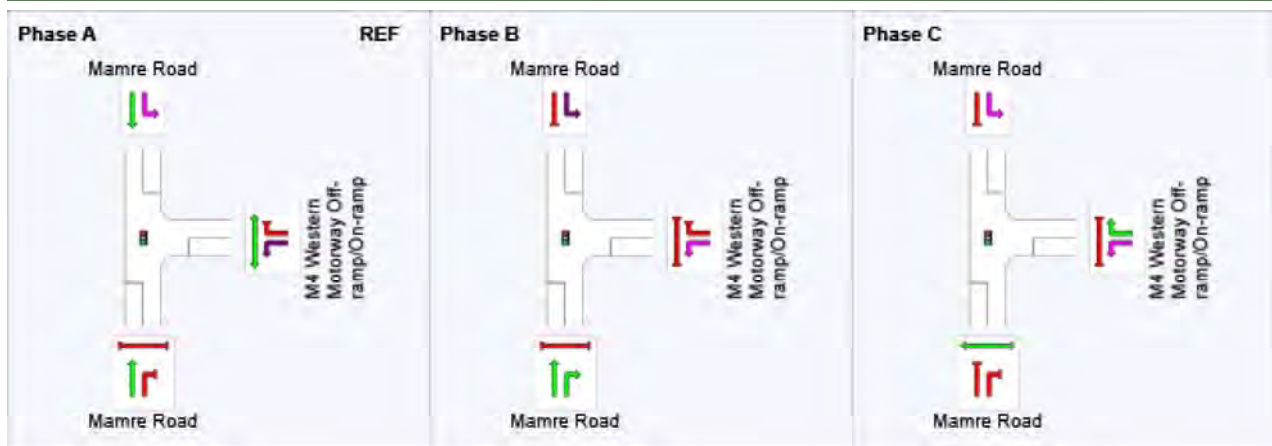
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	63	94
Green Time (sec)	58	25	20
Phase Time (sec)	64	31	25
Phase Split	53%	26%	21%

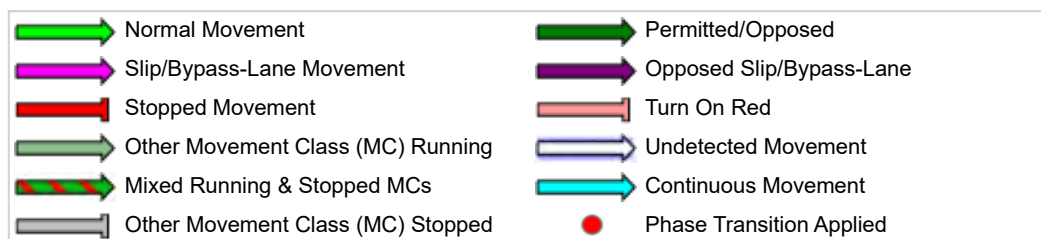
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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MOVEMENT SUMMARY

 Site: TCS 3117 [107 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (North) - PM Peak 2030 With Development]

 Network: [106 & 107 - PM Peak 2030 With Development]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mamre Road														
9	L2	146	7.9	146	7.9	0.105	9.1	LOS A	2.1	17.7	0.32	0.59	0.32	36.6
8	T1	1651	6.1	1647	6.1	0.741	33.5	LOS C	40.2	304.9	0.90	0.81	0.90	28.2
Approach		1797	6.3	1793 ^{N1}	6.3	0.741	31.5	LOS C	40.2	304.9	0.85	0.79	0.85	28.9
North: Mamre Road														
2	T1	1751	3.4	1751	3.4	0.934	25.9	LOS B	77.6	569.7	0.83	0.85	0.92	24.1
1	R2	279	9.4	279	9.4	0.749	55.7	LOS D	16.0	134.2	0.99	0.88	1.06	23.1
Approach		2029	4.2	2029	4.2	0.934	30.0	LOS C	77.6	569.7	0.85	0.85	0.94	23.8
West: M4 Western Motorway Off-ramp/On-ramp														
12	L2	415	5.3	415	5.3	0.469	16.2	LOS B	12.0	89.8	0.59	0.75	0.59	43.9
10	R2	595	5.0	595	5.0	0.945	83.3	LOS F	25.0	185.8	1.00	1.07	1.47	16.2
Approach		1009	5.1	1009	5.1	0.945	55.7	LOS D	25.0	185.8	0.83	0.94	1.11	24.0
All Vehicles		4836	5.2	4832 ^{N1}	5.2	0.945	35.9	LOS C	77.6	569.7	0.85	0.85	0.94	25.7

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	North Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
P4	West Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		2	54.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\P3796 St Marys Inland Container Terminal EIS\Technical Work\Models\IP3796.001M St Marys Inland Container Terminal EIS_2030 With Development.sip8

PHASING SUMMARY

 **Site: TCS 3117 [107 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (North) - PM Peak 2030 With Development]**

 **Network: [106 & 107 - PM Peak 2030 With Development]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 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: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

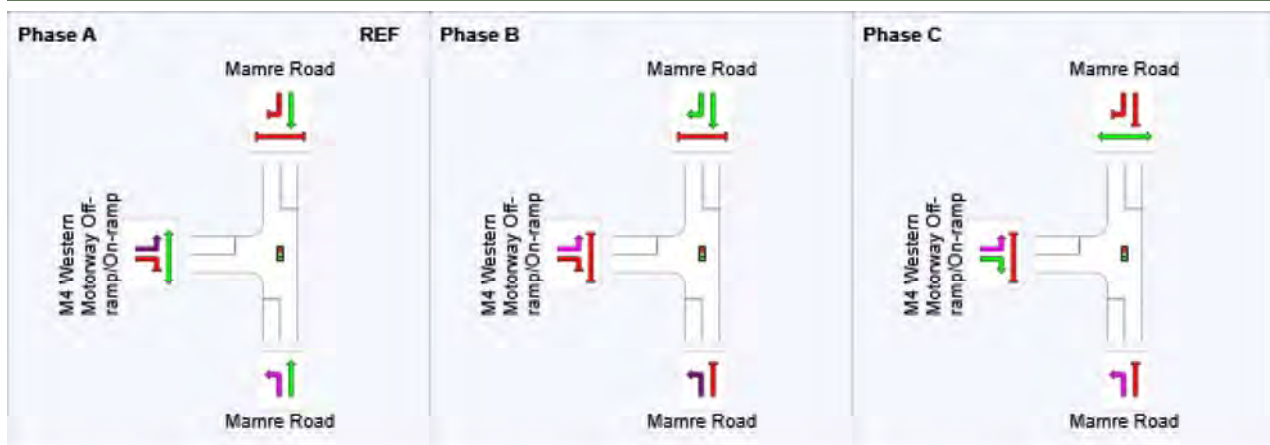
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	17	74	106
Green Time (sec)	51	26	25
Phase Time (sec)	57	32	31
Phase Split	48%	27%	26%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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QUEUE STORAGE RATIO (PERCENTILE)

Ratio of the 95% Back of Queue Distance to the available queue storage distance (worst lane for the approach)

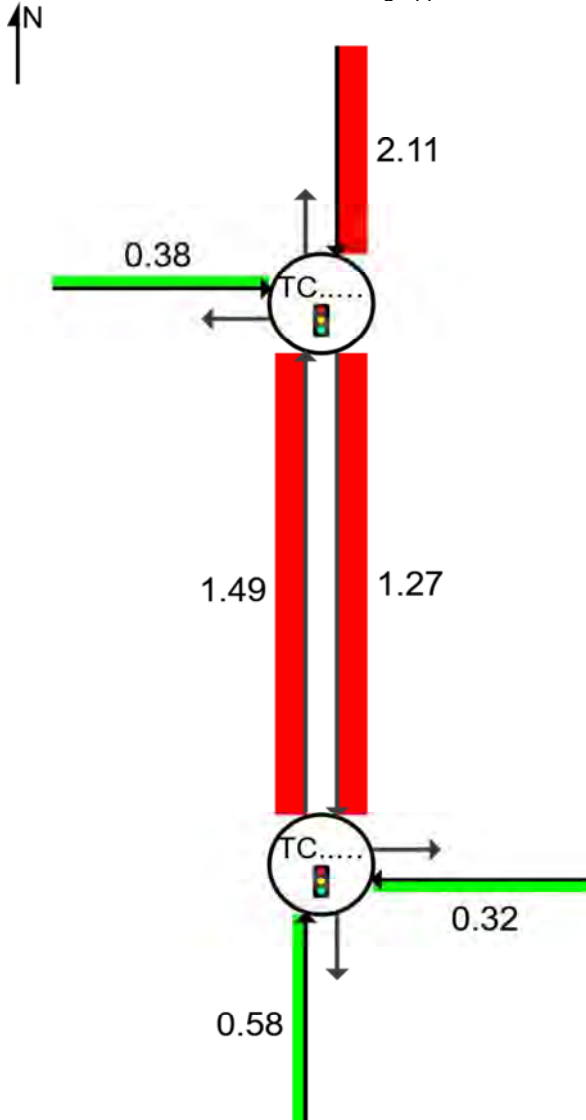
Network: [106 & 107 - PM Peak 2030 With Development]

1630 - 1730

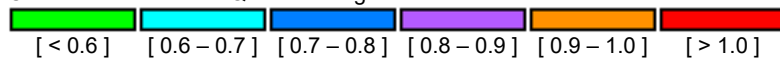
Network Category: (None)

Network Cycle Time = 120 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio



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Project: P:\P3796 St Marys Inland Container Terminal EIS\Technical Work\Models\P3796.001M St Marys Inland Container Terminal EIS_2030 With Development.sip8

MOVEMENT SUMMARY

 Site: TCS 497 [104 - Great Western Highway / Queen Street / Mamre Road - AM Peak 2030 With Development + 20%]  Network: [104 & 108 - AM Peak 2030 With Development + 20%]

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m			km/h	
South: Mamre Road														
9	L2	163	6.5	163	6.5	0.120	16.3	LOS B	4.4	33.0	0.46	0.67	0.46	39.8
8	T1	447	1.9	447	1.9	0.907	49.2	LOS D	40.8	356.7	0.91	0.82	0.93	26.0
7	R2	492	17.3	492	17.3	0.907	70.6	LOS F	40.8	356.7	1.00	0.98	1.19	13.8
Approach		1102	9.5	1102	9.5	0.907	53.9	LOS D	40.8	356.7	0.88	0.87	0.98	21.8
East: Great Western Highway														
6	L2	485	22.8	485	22.8	0.439	10.8	LOS A	9.5	90.8	0.38	0.67	0.38	48.8
5	T1	1199	3.2	1199	3.2	0.930	72.6	LOS F	39.9	290.7	0.99	1.05	1.24	23.5
4	R2	226	1.9	226	1.9	0.892	69.7	LOS E	16.3	116.1	1.00	0.91	1.18	25.4
Approach		1911	8.0	1911	8.0	0.930	56.6	LOS E	39.9	290.7	0.84	0.94	1.02	27.7
North: Queen Street														
3	L2	52	0.0	52	0.0	0.846	76.4	LOS F	11.4	82.7	1.00	1.05	1.57	14.5
2	T1	185	6.8	185	6.8	0.846	74.0	LOS F	11.4	82.7	1.00	1.03	1.45	21.0
1	R2	80	1.3	80	1.3	0.846	78.9	LOS F	11.3	82.1	1.00	0.99	1.27	18.5
Approach		317	4.3	317	4.3	0.846	75.6	LOS F	11.4	82.7	1.00	1.03	1.42	19.4
West: Great Western Highway														
12	L2	107	3.9	107	3.9	0.615	51.5	LOS D	18.7	138.4	0.92	0.81	0.92	24.1
11	T1	854	5.4	854	5.4	0.615	45.9	LOS D	18.9	142.4	0.92	0.80	0.92	14.1
10	R2	196	8.1	196	8.1	0.843	77.5	LOS F	14.4	112.7	1.00	0.93	1.23	18.0
Approach		1157	5.7	1157	5.7	0.843	51.8	LOS D	18.9	142.4	0.93	0.82	0.97	16.4
All Vehicles		4486	7.5	4486	7.5	0.930	56.0	LOS D	40.8	356.7	0.88	0.90	1.02	23.3

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate	
		ped/h	sec		Pedestrian ped	Distance m		
P3	South Full Crossing	3	64.1	LOS F	0.0	0.0	0.96	0.96
P2	East Full Crossing	16	64.2	LOS F	0.1	0.1	0.96	0.96
P1	North Full Crossing	8	64.2	LOS F	0.0	0.0	0.96	0.96
P4	West Full Crossing	17	64.2	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		44	64.2	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\P3796 St Marys Inland Container Terminal EIS\Technical Work\Models\P3796.001M St Marys Inland Container Terminal EIS_2030
With Development.sip8

PHASING SUMMARY

 Site: TCS 497 [104 - Great Western Highway / Queen Street / Mamre Road - AM Peak 2030 With Development + 20%]
  Network: [104 & 108 - AM Peak 2030 With Development + 20%]

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 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: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, D, E, F

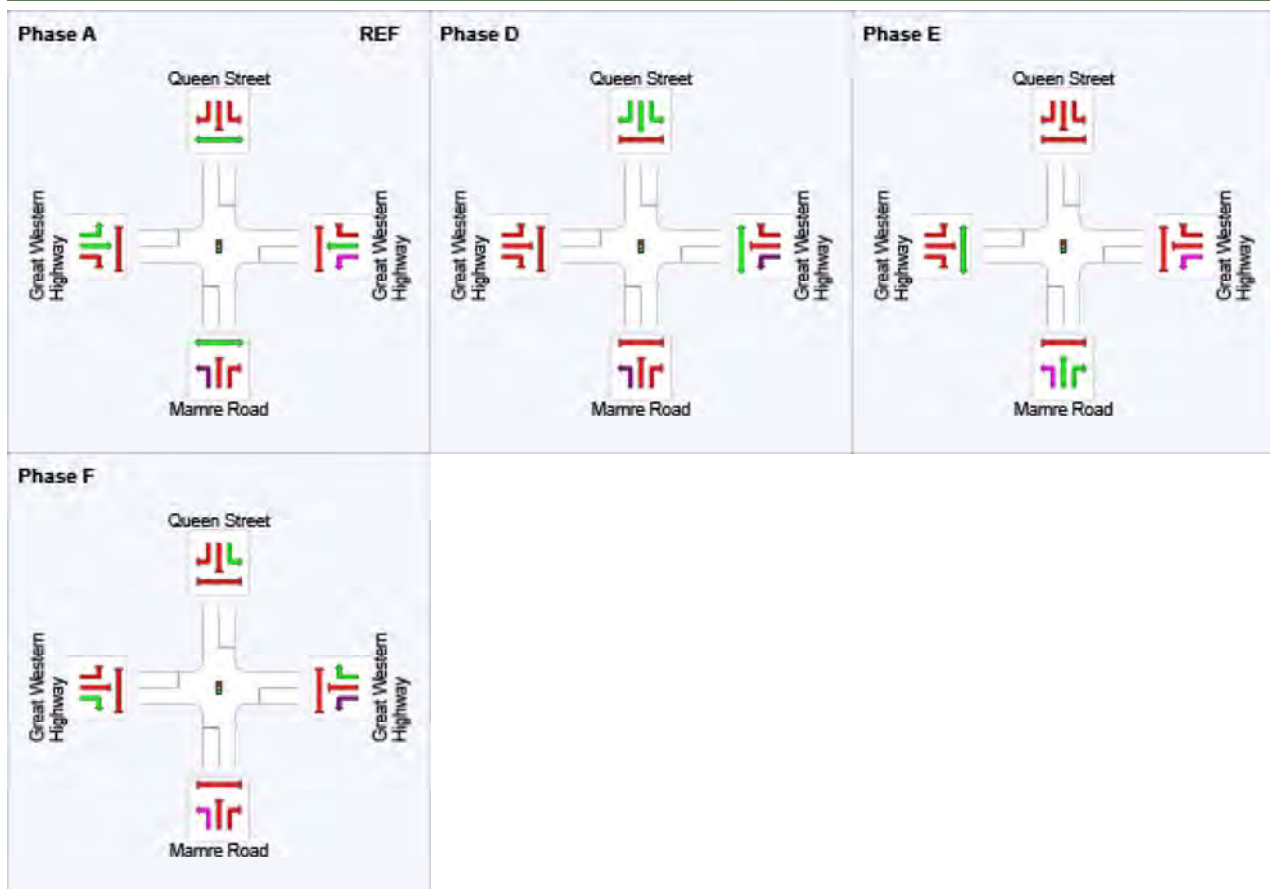
Output Phase Sequence: A, D, E, F

Phase Timing Summary

Phase	A	D	E	F
Phase Change Time (sec)	116	23	43	90
Green Time (sec)	41	14	41	20
Phase Time (sec)	47	20	47	26
Phase Split	34%	14%	34%	19%

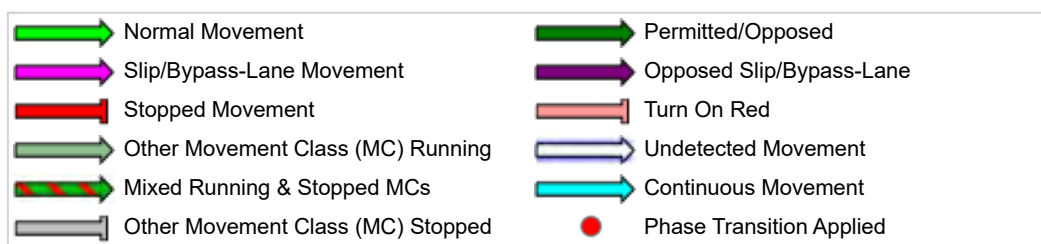
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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Project: P:\P3796 St Marys Inland Container Terminal EIS\Technical Work\Models\P3796.001M St Marys Inland Container Terminal EIS_2030 With Development.sip8

MOVEMENT SUMMARY

 **Site: TCS 1236 [108 - Great Western Highway / Glossop Street - AM Peak 2030 With Development + 20%]**

 **Network: [104 & 108 - AM Peak 2030 With Development + 20%]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
East: Great Western Highway														
5	T1	1139	5.0	1139	5.0	0.304	18.6	LOS B	15.6	115.9	0.59	0.51	0.59	37.7
4	R2	596	14.1	596	14.1	0.651	58.5	LOS E	18.5	158.8	0.96	0.83	0.96	28.8
Approach		1735	8.1	1735	8.1	0.651	32.3	LOS C	18.5	158.8	0.71	0.62	0.71	32.8
North: Glossop Street														
3	L2	513	20.5	513	20.5	0.515	19.8	LOS B	18.4	165.2	0.58	0.76	0.58	42.5
1	R2	772	12.6	772	12.6	0.655	43.6	LOS D	21.3	180.8	0.87	0.84	0.87	22.0
Approach		1284	15.7	1284	15.7	0.655	34.1	LOS C	21.3	180.8	0.75	0.81	0.75	30.8
West: Great Western Highway														
12	L2	406	17.9	406	17.9	0.659	51.6	LOS D	23.7	218.8	0.91	0.84	0.91	31.0
11	T1	991	6.0	991	6.0	0.659	49.8	LOS D	30.9	230.5	0.99	0.86	0.99	33.7
Approach		1397	9.4	1397	9.4	0.659	50.3	LOS D	30.9	230.5	0.97	0.85	0.97	32.9
All Vehicles		4416	10.8	4416	10.8	0.659	38.5	LOS C	30.9	230.5	0.81	0.75	0.81	32.4

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	1	64.1	LOS F	0.0	0.0	0.96	0.96
P1	North Full Crossing	1	64.1	LOS F	0.0	0.0	0.96	0.96
All Pedestrians		2	64.1	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\P3796 St Marys Inland Container Terminal EIS\Technical Work\Models\P3796.001M St Marys Inland Container Terminal EIS_2030 With Development.sip8

PHASING SUMMARY

 **Site: TCS 1236 [108 - Great Western Highway / Glossop Street - AM Peak 2030 With Development + 20%]**

 **Network: [104 & 108 - AM Peak 2030 With Development + 20%]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 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: Variable Phasing

Reference Phase: Phase C

Input Phase Sequence: A, B, C

Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	59	103	0
Green Time (sec)	38	31	53
Phase Time (sec)	44	37	59
Phase Split	31%	26%	42%

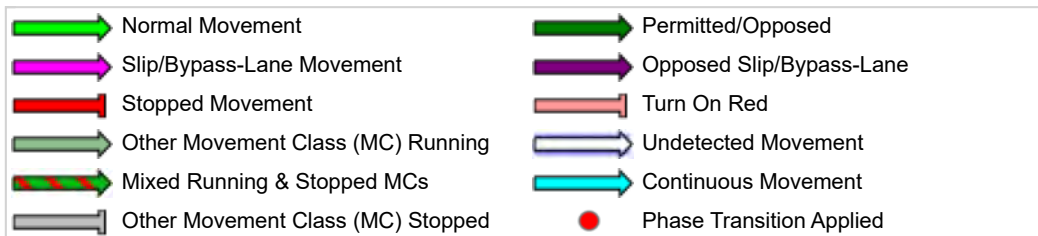
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



QUEUE STORAGE RATIO (PERCENTILE)

Ratio of the 95% Back of Queue Distance to the available queue storage distance (worst lane for the approach)

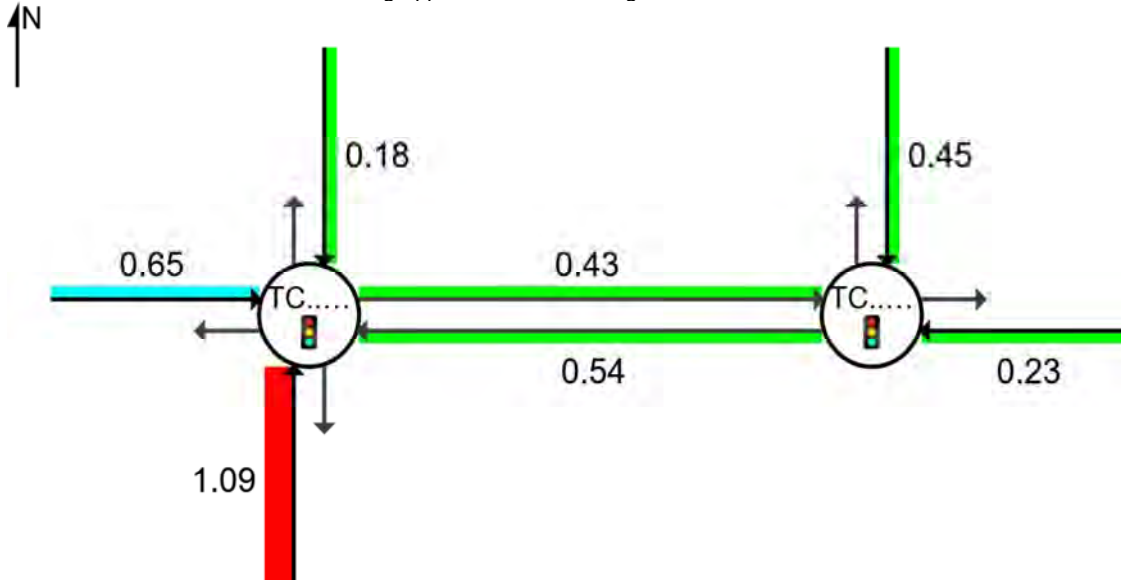
Network: [104 & 108 - AM Peak 2030 With Development + 20%]

0800 - 0900

Network Category: (None)

Network Cycle Time = 140 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio



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Project: P:\P3796 St Marys Inland Container Terminal EIS\Technical Work\Models\P3796.001M St Marys Inland Container Terminal EIS_2030 With Development.sip8

MOVEMENT SUMMARY

 **Site: TCS 1234 [105 - Great Western Highway / Carlisle Avenue - AM Peak 2030 With Development + 20%]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 142 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Carlisle Avenue												
9	L2	53	38.0	0.141	38.7	LOS C	2.8	31.2	0.84	0.72	0.84	33.3
8	T1	657	6.7	0.671	60.8	LOS E	21.0	155.2	0.99	0.83	0.99	28.1
7	R2	175	11.4	0.678	74.8	LOS F	12.0	95.5	1.00	0.81	1.03	25.1
Approach		884	9.5	0.678	62.2	LOS E	21.0	155.2	0.99	0.82	0.99	27.7
East: Great Western Highway												
6	L2	87	8.4	0.459	42.5	LOS D	13.9	107.9	0.84	0.75	0.85	37.2
5	T1	738	7.0	0.459	38.9	LOS C	15.0	114.6	0.84	0.73	0.84	42.5
4	R2	314	6.0	0.796	79.6	LOS F	11.4	84.6	1.00	0.88	1.18	27.4
Approach		1139	6.8	0.796	50.4	LOS D	15.0	114.6	0.88	0.77	0.93	36.4
North: Carlisle Avenue												
3	L2	314	5.7	0.218	31.0	LOS C	12.9	95.4	0.70	0.76	0.70	40.9
2	T1	475	6.7	0.443	43.3	LOS D	26.2	198.5	0.87	0.75	0.87	33.9
1	R2	457	4.8	0.338	37.1	LOS C	9.8	71.9	0.91	0.78	0.91	38.2
Approach		1245	5.7	0.443	37.9	LOS C	26.2	198.5	0.84	0.76	0.84	37.2
West: Great Western Highway												
12	L2	580	2.9	0.408	21.7	LOS B	16.4	118.7	0.69	0.80	0.73	47.3
11	T1	924	7.3	0.408	37.5	LOS C	23.1	176.8	0.82	0.71	0.82	43.3
10	R2	148	8.5	0.428	70.8	LOS F	9.6	77.2	0.98	0.79	0.98	25.9
Approach		1653	5.9	0.428	35.0	LOS C	23.1	176.8	0.79	0.75	0.80	42.4
All Vehicles		4921	6.7	0.796	44.2	LOS D	26.2	198.5	0.86	0.77	0.88	36.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	1	65.1	LOS F	0.0	0.0	0.96	0.96	
P2	East Full Crossing	1	65.1	LOS F	0.0	0.0	0.96	0.96	
P1	North Full Crossing	1	65.1	LOS F	0.0	0.0	0.96	0.96	
P4	West Full Crossing	1	65.1	LOS F	0.0	0.0	0.96	0.96	
All Pedestrians		4	65.1	LOS F			0.96	0.96	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

 **Site: TCS 1234 [105 - Great Western Highway / Carlisle Avenue - AM Peak 2030 With Development + 20%]**

0800 - 0900
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 142 seconds (Site User-Given Phase Times)

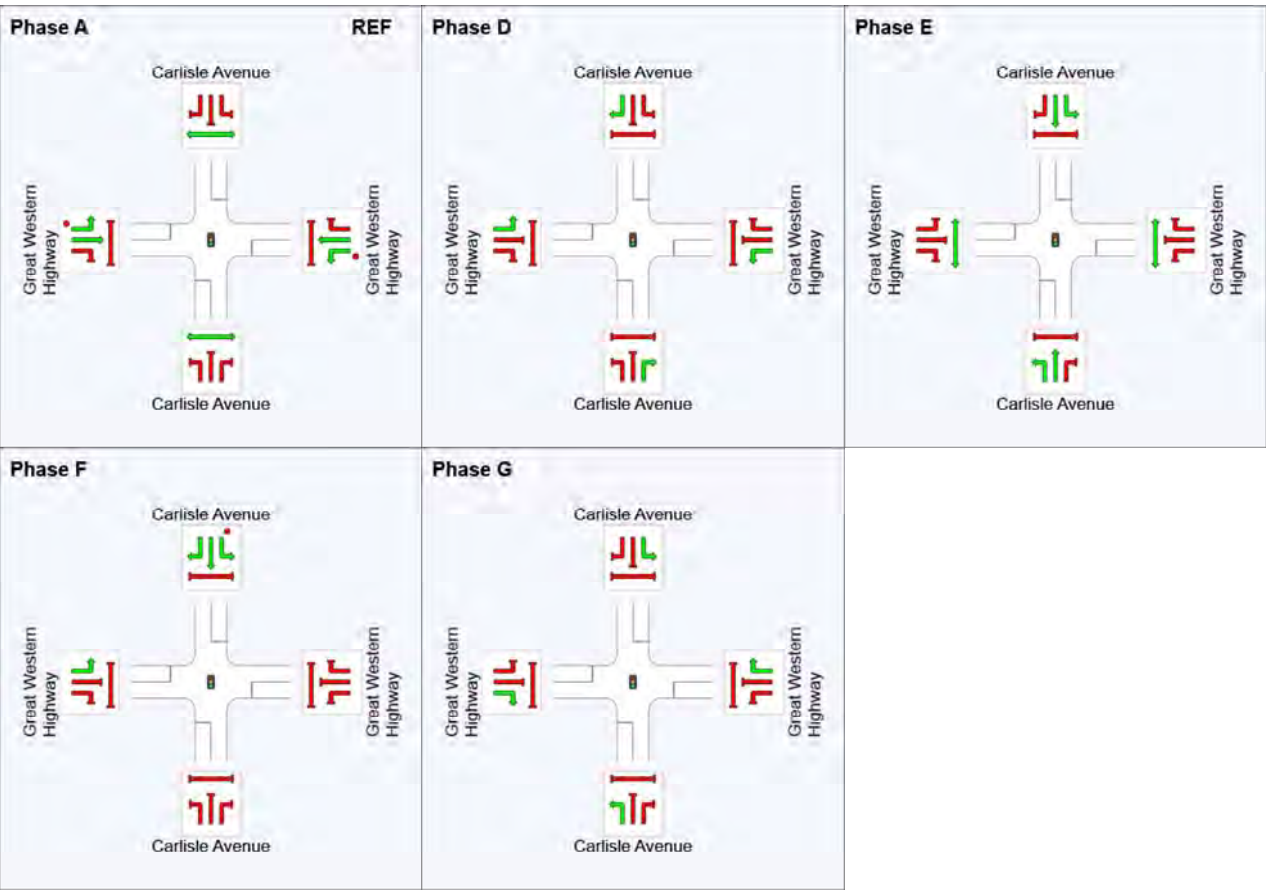
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, D, E, F, G
Output Phase Sequence: A, D, E, F, G

Phase Timing Summary

Phase	A	D	E	F	G
Phase Change Time (sec)	0	53	73	102	120
Green Time (sec)	47	14	23	13	16
Phase Time (sec)	53	20	28	19	22
Phase Split	37%	14%	20%	13%	15%

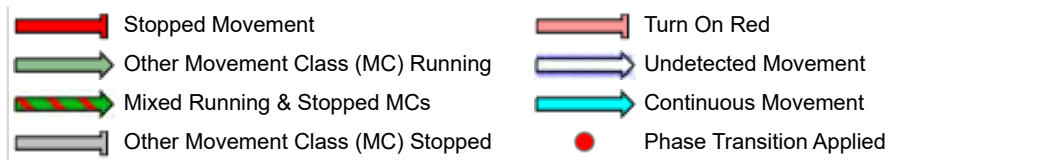
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase





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MOVEMENT SUMMARY

 **Site: TCS 3118 [106 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (South) - AM Peak 2030 With Development +20%]**

 **Network: [106 & 107 - AM Peak 2030 With Development +20%]**

0800 - 0900

Site Category: (None)

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

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
South: Mamre Road														
8	T1	1346	6.3	1346	6.3	0.287	4.4	LOS A	11.7	89.8	0.34	0.30	0.34	49.0
7	R2	507	8.7	507	8.7	0.673	48.4	LOS D	24.9	190.9	0.98	0.85	0.98	25.3
Approach		1854	6.9	1854	6.9	0.673	16.4	LOS B	24.9	190.9	0.51	0.45	0.51	33.6
East: M4 Western Motorway Off-ramp/On-ramp														
6	L2	109	11.5	109	11.5	0.141	10.9	LOS A	1.8	14.9	0.39	0.65	0.39	48.4
4	R2	266	18.2	266	18.2	0.693	57.3	LOS E	7.5	68.1	1.00	0.86	1.10	21.2
Approach		376	16.2	376	16.2	0.693	43.7	LOS D	7.5	68.1	0.82	0.80	0.89	27.3
North: Mamre Road														
3	L2	416	9.6	416	9.6	0.254	8.8	LOS A	6.3	50.6	0.32	0.62	0.32	36.6
2	T1	1452	8.8	1452	8.8	0.672	21.0	LOS B	28.5	219.2	0.71	0.64	0.71	36.1
Approach		1867	9.0	1867	9.0	0.672	18.2	LOS B	28.5	219.2	0.62	0.63	0.62	36.2
All Vehicles		4097	8.7	4097	8.7	0.693	19.8	LOS B	28.5	219.2	0.59	0.57	0.60	34.0

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate		
		ped/h	sec		Pedestrian ped	Distance m			
P3	South Full Crossing	1	49.2	LOS E	0.0	0.0	0.95	0.95	
P2	East Full Crossing	1	49.2	LOS E	0.0	0.0	0.95	0.95	
All Pedestrians		2	49.2	LOS E			0.95	0.95	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site:** TCS 3118 [106 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (South) - AM Peak 2030 With Development +20%]

 **Network:** [106 & 107 - AM Peak 2030 With Development +20%]

0800 - 0900

Site Category: (None)

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

Timings based on settings in the Network Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

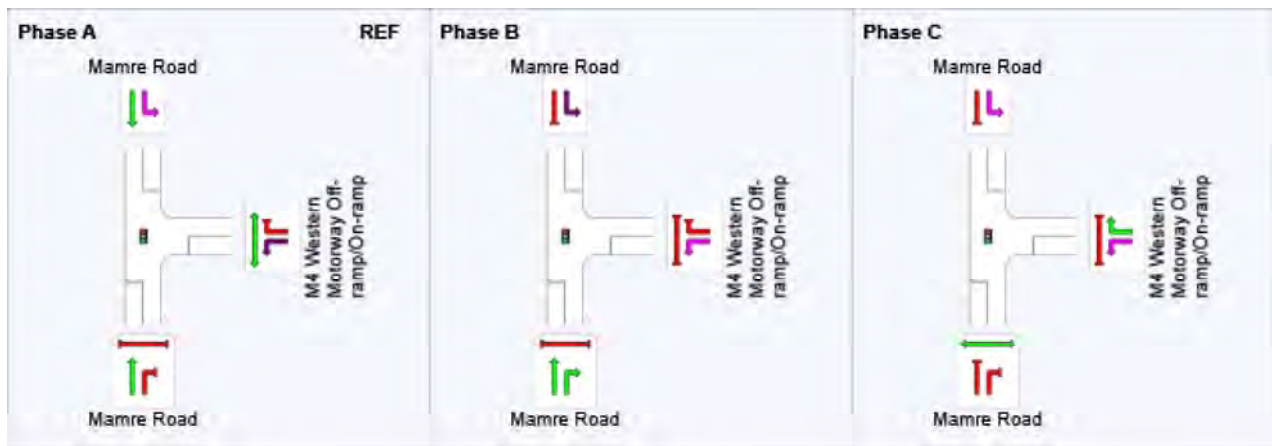
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	58	87
Green Time (sec)	54	23	17
Phase Time (sec)	60	29	21
Phase Split	55%	26%	19%

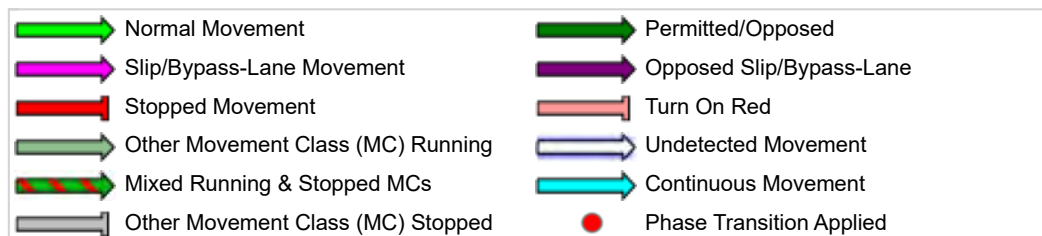
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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MOVEMENT SUMMARY

 **Site: TCS 3117 [107 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (North) - AM Peak 2030 With Development +20%]**

 **Network: [106 & 107 - AM Peak 2030 With Development +20%]**

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m			km/h	
South: Mamre Road														
9	L2	265	6.7	265	6.7	0.178	10.9	LOS A	5.8	46.0	0.49	0.68	0.49	35.5
8	T1	1347	8.5	1347	8.5	0.661	35.4	LOS C	31.0	243.7	0.92	0.80	0.92	27.4
Approach		1613	8.2	1613	8.2	0.661	31.4	LOS C	31.0	243.7	0.85	0.78	0.85	28.8
North: Mamre Road														
2	T1	1267	9.4	1267	9.4	0.833	14.9	LOS B	35.5	278.3	0.71	0.68	0.74	32.3
1	R2	259	19.1	259	19.1	0.646	41.0	LOS C	12.2	114.5	0.91	0.83	0.91	26.3
Approach		1526	11.0	1526	11.0	0.833	19.3	LOS B	35.5	278.3	0.75	0.71	0.77	29.9
West: M4 Western Motorway Off-ramp/On-ramp														
12	L2	626	3.7	626	3.7	0.572	11.1	LOS A	13.5	97.9	0.52	0.73	0.52	47.7
10	R2	600	8.2	600	8.2	0.845	58.6	LOS E	18.5	142.2	1.00	0.95	1.22	20.7
Approach		1226	5.9	1226	5.9	0.845	34.4	LOS C	18.5	142.2	0.76	0.84	0.86	31.7
All Vehicles		4365	8.6	4365	8.6	0.845	28.0	LOS B	35.5	278.3	0.79	0.77	0.82	30.1

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate		
		ped/h	sec		Pedestrian ped	Distance m			
P1	North Full Crossing	1	49.2	LOS E	0.0	0.0	0.95	0.95	
P4	West Full Crossing	3	49.2	LOS E	0.0	0.0	0.95	0.95	
All Pedestrians		4	49.2	LOS E			0.95	0.95	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site:** TCS 3117 [107 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (North) - AM Peak 2030 With Development +20%]

 **Network:** [106 & 107 - AM Peak 2030 With Development +20%]

0800 - 0900

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 110 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: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

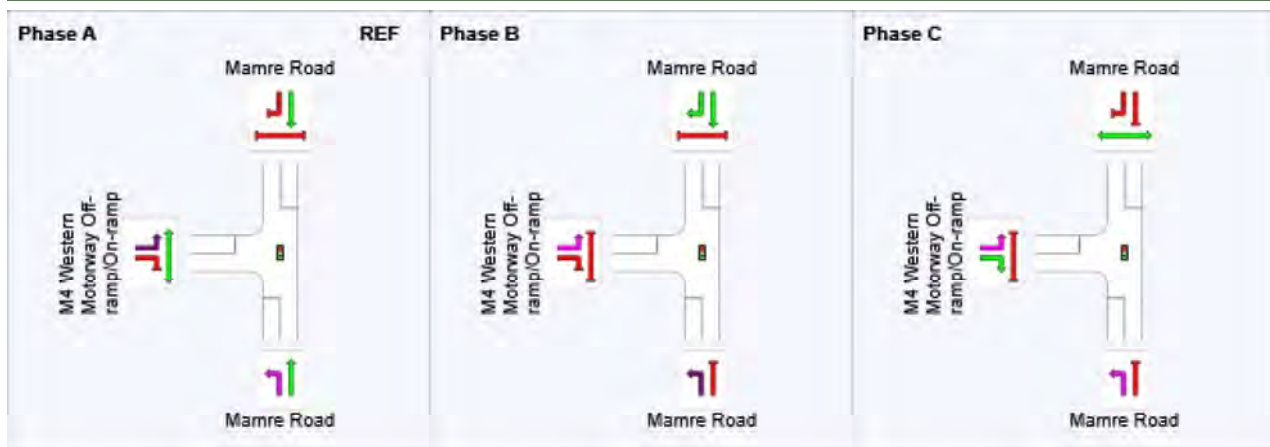
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	16	55	96
Green Time (sec)	33	35	24
Phase Time (sec)	39	41	30
Phase Split	35%	37%	27%

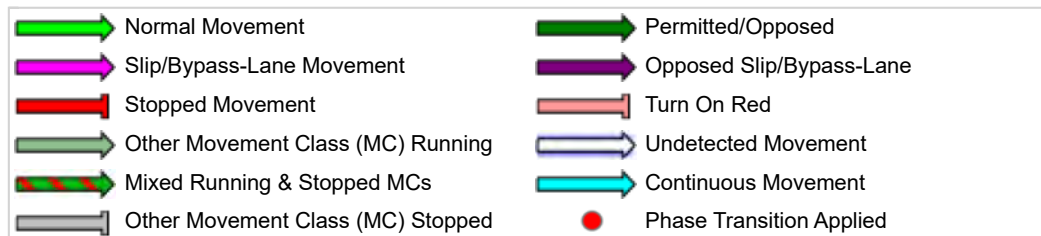
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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QUEUE STORAGE RATIO (PERCENTILE)

Ratio of the 95% Back of Queue Distance to the available queue storage distance (worst lane for the approach)

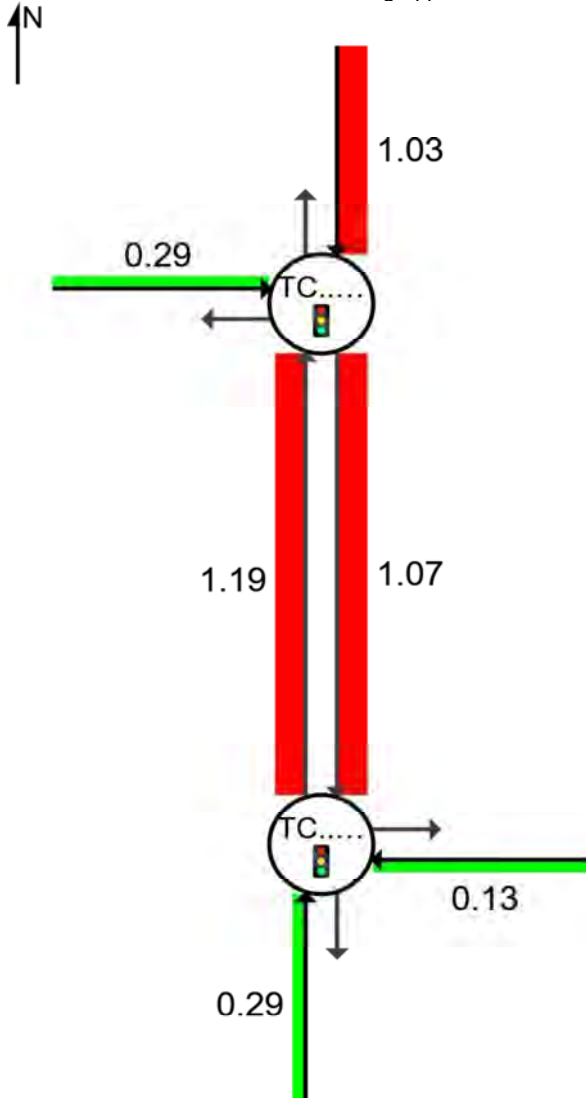
Network: [106 & 107 - AM Peak 2030 With Development + 20%]

0800 - 0900

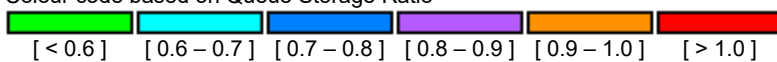
Network Category: (None)

Network Cycle Time = 110 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio



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MOVEMENT SUMMARY

 Site: TCS 497 [104 - Great Western Highway / Queen Street / Mamre Road - PM Peak 2030 With Development + 20%]  Network: [104 & 108 - PM Peak 2030 With Development + 20%]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
South: Mamre Road														
9	L2	185	4.5	185	4.5	0.135	10.2	LOS A	3.4	24.9	0.33	0.65	0.33	45.1
8	T1	269	5.1	269	5.1	1.111	82.1	LOS F	46.8	440.4	0.97	0.90	1.15	19.8
7	R2	332	21.3	332	21.3	1.111	186.6	LOS F	46.8	440.4	1.00	1.35	1.99	5.9
Approach		786	11.8	786	11.8	1.111	109.3	LOS F	46.8	440.4	0.83	1.03	1.31	13.3
East: Great Western Highway														
6	L2	714	8.0	714	8.0	0.405	14.3	LOS A	17.0	138.4	0.44	0.70	0.44	46.6
5	T1	1500	2.2	1500	2.2	0.528	36.2	LOS C	29.2	209.5	0.74	0.64	0.74	33.8
4	R2	153	2.1	153	2.1	0.262	59.8	LOS E	8.9	63.5	0.91	0.77	0.91	27.2
Approach		2366	3.9	2366	3.9	0.528	31.1	LOS C	29.2	209.5	0.66	0.66	0.66	36.4
North: Queen Street														
3	L2	68	1.5	68	1.5	0.921	82.1	LOS F	27.8	197.5	1.00	1.12	1.54	13.9
2	T1	504	1.9	504	1.9	0.921	78.1	LOS F	27.8	197.5	1.00	1.10	1.44	20.5
1	R2	122	0.0	122	0.0	0.921	80.6	LOS F	27.2	192.4	1.00	1.08	1.31	18.4
Approach		695	1.5	695	1.5	0.921	79.0	LOS F	27.8	197.5	1.00	1.10	1.43	19.6
West: Great Western Highway														
12	L2	32	0.0	32	0.0	0.543	49.5	LOS D	16.8	122.7	0.89	0.77	0.89	25.0
11	T1	857	3.4	857	3.4	0.543	43.9	LOS D	16.9	123.5	0.89	0.77	0.89	14.7
10	R2	198	3.2	198	3.2	0.710	67.5	LOS E	13.2	97.8	1.00	0.85	1.05	19.8
Approach		1086	3.3	1086	3.3	0.710	48.4	LOS D	16.9	123.5	0.91	0.78	0.92	16.5
All Vehicles		4934	4.7	4934	4.7	1.111	54.1	LOS D	46.8	440.4	0.79	0.81	0.93	24.3

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	South Full Crossing	7	64.1	LOS F	0.0	0.0	0.96	0.96
P2	East Full Crossing	14	64.2	LOS F	0.1	0.1	0.96	0.96
P1	North Full Crossing	1	64.1	LOS F	0.0	0.0	0.96	0.96
P4	West Full Crossing	12	64.2	LOS F	0.0	0.0	0.96	0.96
All Pedestrians		34	64.2	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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With Development.sip8

PHASING SUMMARY

🚦 Site: TCS 497 [104 - Great Western Highway / Queen Street / Mamre Road - PM Peak 2030 With Development + 20%]

📶 Network: [104 & 108 - PM Peak 2030 With Development + 20%]

1630 - 1730
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

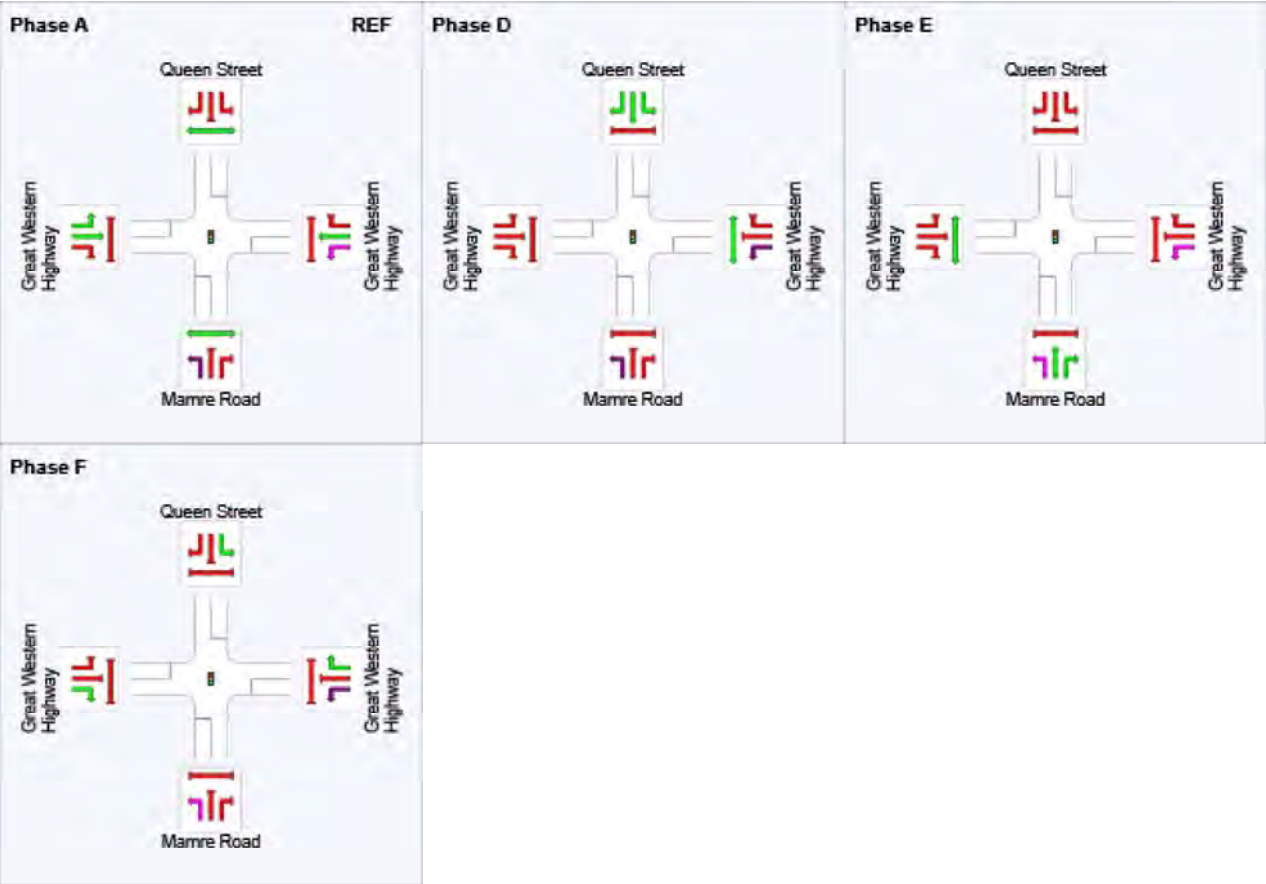
Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, D, E, F
Output Phase Sequence: A, D, E, F

Phase Timing Summary

Phase	A	D	E	F
Phase Change Time (sec)	42	90	124	13
Green Time (sec)	42	28	23	23
Phase Time (sec)	48	34	29	29
Phase Split	34%	24%	21%	21%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



	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

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MOVEMENT SUMMARY

 **Site: TCS 1236 [108 - Great Western Highway / Glossop Street - PM Peak 2030 With Development + 20%]**

 **Network: [104 & 108 - PM Peak 2030 With Development + 20%]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
East: Great Western Highway														
5	T1	1488	2.8	1488	2.8	0.481	8.4	LOS A	18.9	137.0	0.43	0.39	0.43	47.3
4	R2	583	9.2	583	9.2	0.911	82.3	LOS F	24.1	190.7	1.00	1.00	1.32	23.9
Approach		2072	4.6	2072	4.6	0.911	29.2	LOS C	24.1	190.7	0.59	0.56	0.68	33.8
North: Glossop Street														
3	L2	573	7.0	573	7.0	0.371	32.7	LOS C	25.3	194.2	0.72	0.79	0.72	36.7
1	R2	878	5.8	878	5.8	0.763	60.5	LOS E	27.3	213.0	0.97	0.84	0.99	17.6
Approach		1451	6.2	1451	6.2	0.763	49.5	LOS D	27.3	213.0	0.87	0.82	0.88	25.4
West: Great Western Highway														
12	L2	308	23.5	298	22.6	0.493	25.0	LOS B	11.0	104.3	0.50	0.68	0.50	41.2
11	T1	948	3.0	926	2.9	0.493	18.4	LOS B	13.9	100.8	0.51	0.46	0.51	46.4
Approach		1257	8.0	1224 ^{N1}	7.7	0.493	20.0	LOS B	13.9	104.3	0.51	0.52	0.51	45.1
All Vehicles		4779	6.0	4746 ^{N1}	6.1	0.911	33.1	LOS C	27.3	213.0	0.66	0.63	0.70	34.0

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	2	64.1	LOS F	0.0	0.0	0.96	0.96
P1	North Full Crossing	1	64.1	LOS F	0.0	0.0	0.96	0.96
All Pedestrians		3	64.1	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site: TCS 1236 [108 - Great Western Highway / Glossop Street - PM Peak 2030 With Development + 20%]**

 **Network: [104 & 108 - PM Peak 2030 With Development + 20%]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase C

Input Phase Sequence: A, B, C

Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	34	106	0
Green Time (sec)	66	28	28
Phase Time (sec)	72	34	34
Phase Split	51%	24%	24%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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QUEUE STORAGE RATIO (PERCENTILE)

Ratio of the 95% Back of Queue Distance to the available queue storage distance (worst lane for the approach)

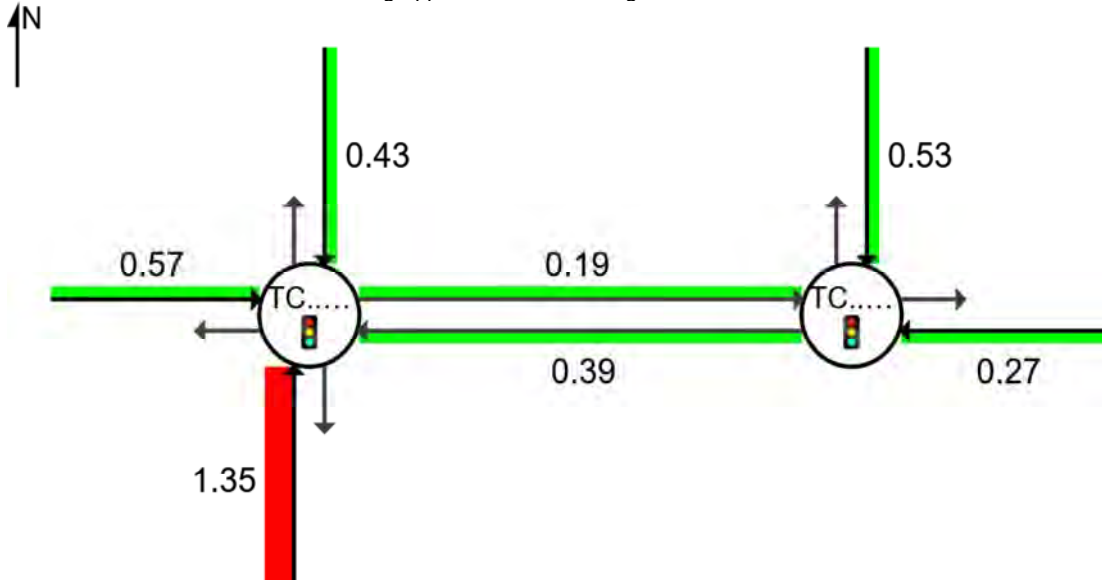
Network: [104 & 108 - PM Peak 2030 With Development + 20%]

1630 - 1730

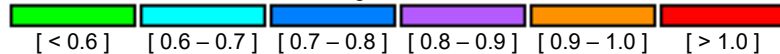
Network Category: (None)

Network Cycle Time = 140 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio



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MOVEMENT SUMMARY

 **Site: TCS 1234 [105 - Great Western Highway / Carlisle Avenue - PM Peak 2030 With Development + 20%]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 143 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Carlisle Avenue												
9	L2	96	9.9	0.185	33.5	LOS C	4.1	35.5	0.81	0.75	0.81	37.6
8	T1	659	3.4	0.787	64.5	LOS E	22.5	160.8	1.00	0.88	1.06	27.2
7	R2	118	3.6	0.532	74.1	LOS F	8.0	58.6	1.00	0.79	1.00	25.7
Approach		873	4.1	0.787	62.4	LOS E	22.5	160.8	0.98	0.86	1.03	27.7
East: Great Western Highway												
6	L2	135	3.9	0.465	48.5	LOS D	27.7	200.4	0.87	0.78	0.90	35.1
5	T1	1338	2.6	0.465	42.5	LOS D	28.6	206.5	0.87	0.75	0.88	40.7
4	R2	493	2.1	0.545	70.2	LOS E	16.1	115.4	0.99	0.81	0.99	29.5
Approach		1965	2.6	0.545	49.9	LOS D	28.6	206.5	0.90	0.77	0.91	36.8
North: Carlisle Avenue												
3	L2	315	2.0	0.196	27.6	LOS B	12.1	87.5	0.65	0.75	0.65	43.0
2	T1	649	6.0	0.555	42.7	LOS D	36.7	277.8	0.89	0.78	0.89	34.1
1	R2	687	2.9	0.453	36.2	LOS C	14.7	105.8	0.92	0.80	0.92	38.9
Approach		1652	4.0	0.555	37.1	LOS C	36.7	277.8	0.86	0.78	0.86	37.8
West: Great Western Highway												
12	L2	455	1.6	0.595	27.3	LOS B	15.5	110.6	0.79	0.85	0.88	44.1
11	T1	687	4.7	0.595	44.7	LOS D	19.2	143.9	0.91	0.79	0.91	39.8
10	R2	109	10.6	0.518	72.0	LOS F	7.3	60.2	0.98	0.79	0.98	25.5
Approach		1252	4.1	0.595	40.8	LOS C	19.2	143.9	0.87	0.81	0.91	39.6
All Vehicles		5741	3.5	0.787	46.1	LOS D	36.7	277.8	0.89	0.80	0.91	36.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P3	South Full Crossing	1	65.6	LOS F	0.0	0.0	0.96	0.96	
P2	East Full Crossing	1	65.6	LOS F	0.0	0.0	0.96	0.96	
P1	North Full Crossing	1	65.6	LOS F	0.0	0.0	0.96	0.96	
P4	West Full Crossing	1	65.6	LOS F	0.0	0.0	0.96	0.96	
All Pedestrians		4	65.6	LOS F			0.96	0.96	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

 **Site: TCS 1234 [105 - Great Western Highway / Carlisle Avenue - PM Peak 2030 With Development + 20%]**

1630 - 1730
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 143 seconds (Site User-Given Phase Times)

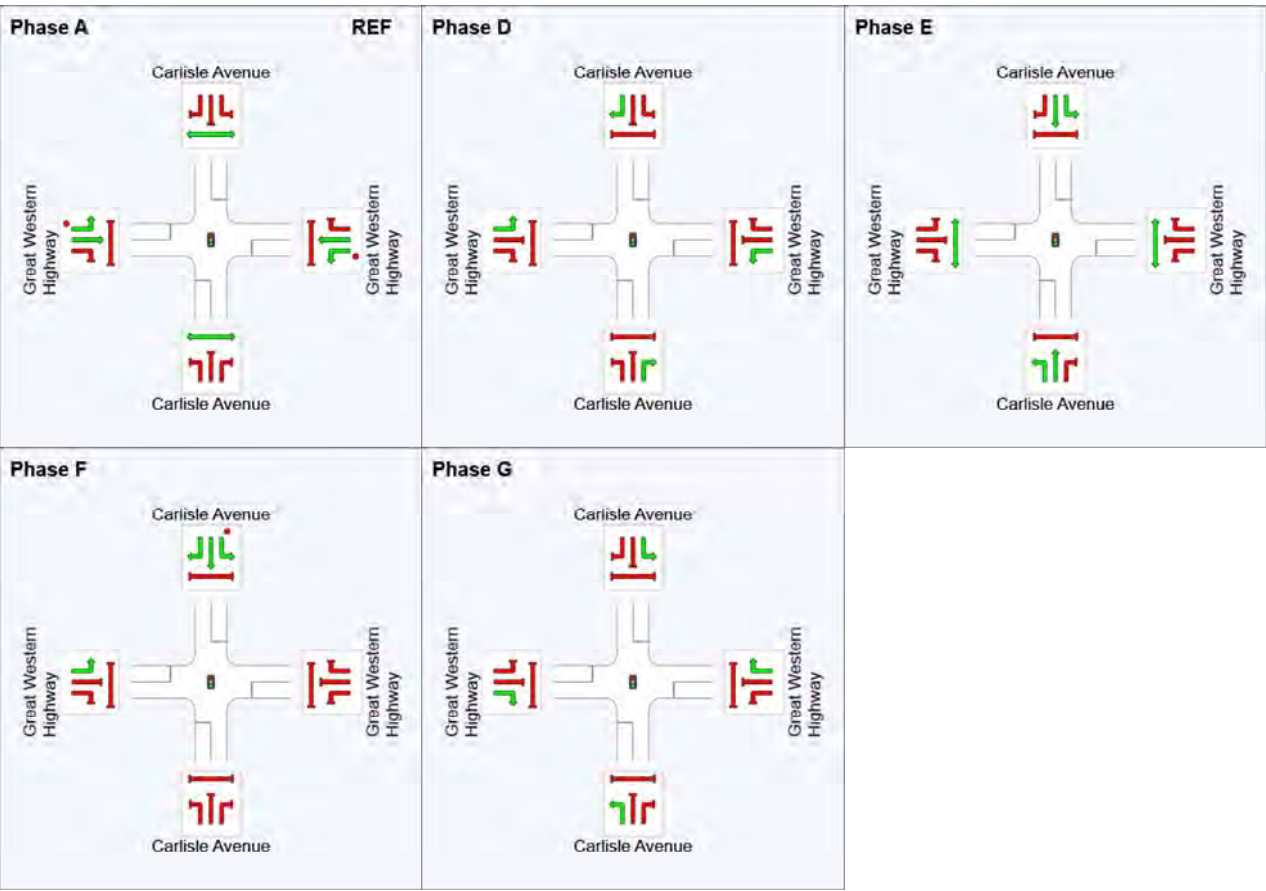
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, D, E, F, G
Output Phase Sequence: A, D, E, F, G

Phase Timing Summary

Phase	A	D	E	F	G
Phase Change Time (sec)	0	48	68	98	119
Green Time (sec)	42	14	24	16	18
Phase Time (sec)	48	20	29	22	24
Phase Split	34%	14%	20%	15%	17%

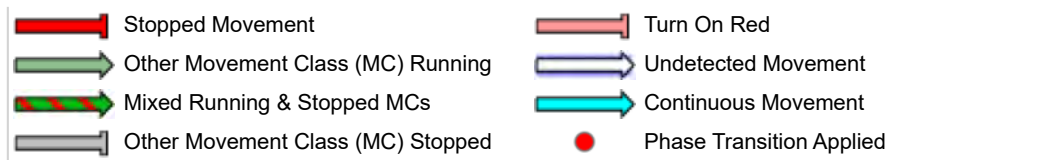
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase





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MOVEMENT SUMMARY

 **Site: TCS 3118 [106 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (South) - PM Peak 2030 With Development +20%]**

 **Network: [106 & 107 - PM Peak 2030 With Development +20%]**

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows	Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed		
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec	Vehicles veh	Distance m			km/h		
South: Mamre Road														
8	T1	1428	5.7	1428	5.7	0.675	8.5	LOS A	23.3	177.6	0.56	0.52	0.56	41.8
7	R2	558	4.3	558	4.3	1.213	258.6	LOS F	78.6	592.3	1.00	1.57	2.57	8.8
Approach		1986	5.3	1986	5.3	1.213	78.8	LOS F	78.6	592.3	0.69	0.82	1.13	14.6
East: M4 Western Motorway Off-ramp/On-ramp														
6	L2	283	4.1	283	4.1	0.321	11.7	LOS A	5.8	42.3	0.44	0.69	0.44	47.9
4	R2	372	9.3	372	9.3	1.100	178.8	LOS F	22.0	179.0	1.00	1.38	2.25	8.7
Approach		655	7.1	655	7.1	1.100	106.5	LOS F	22.0	179.0	0.76	1.08	1.47	15.8
North: Mamre Road														
3	L2	860	2.1	860	2.1	0.439	15.3	LOS B	25.4	184.5	0.59	0.78	0.65	33.4
2	T1	1486	4.8	1486	4.8	0.625	23.1	LOS B	35.2	260.9	0.71	0.63	0.71	34.7
Approach		2346	3.8	2346	3.8	0.625	20.2	LOS B	35.2	260.9	0.66	0.68	0.69	34.1
All Vehicles		4987	4.8	4987	4.8	1.213	54.9	LOS D	78.6	592.3	0.68	0.79	0.96	21.0

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	South Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
P2	East Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		2	54.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 **Site:** TCS 3118 [106 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (South) - PM Peak 2030 With Development +20%]

 **Network:** [106 & 107 - PM Peak 2030 With Development +20%]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog

Phase Times specified by the user

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

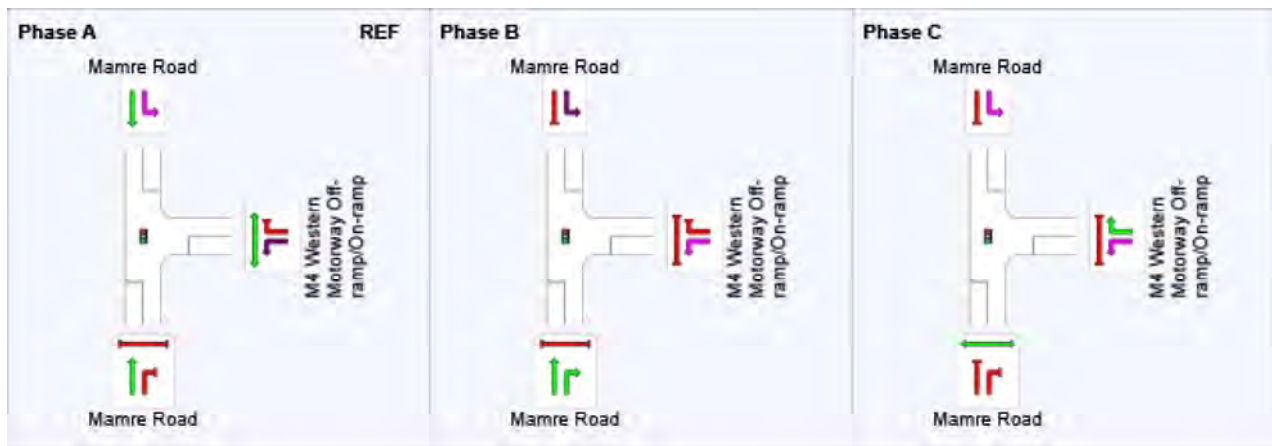
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	63	94
Green Time (sec)	58	25	20
Phase Time (sec)	64	31	25
Phase Split	53%	26%	21%

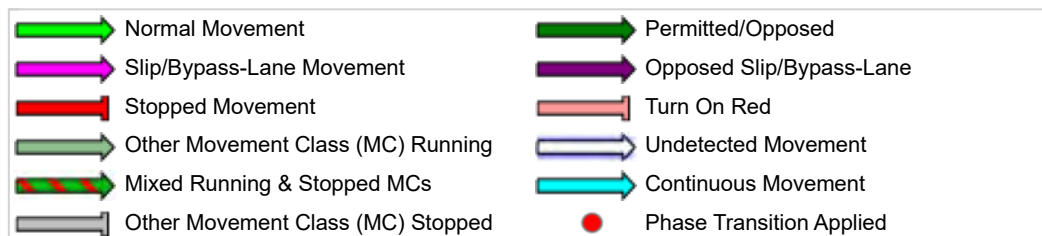
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



MOVEMENT SUMMARY

 Site: TCS 3117 [107 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (North) - PM Peak 2030 With Development +20%]

 Network: [106 & 107 - PM Peak 2030 With Development +20%]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mamre Road														
9	L2	146	7.9	145	7.9	0.104	9.1	LOS A	2.1	17.6	0.32	0.59	0.32	36.6
8	T1	1654	6.3	1641	6.3	0.740	33.5	LOS C	39.9	304.1	0.89	0.80	0.89	28.2
Approach		1800	6.4	1786 ^{N1}	6.4	0.740	31.5	LOS C	39.9	304.1	0.85	0.79	0.85	28.9
North: Mamre Road														
2	T1	1752	3.4	1752	3.4	0.937	26.8	LOS B	79.1	582.0	0.83	0.86	0.93	23.6
1	R2	281	10.1	281	10.1	0.762	56.4	LOS D	16.3	138.7	1.00	0.89	1.08	23.0
Approach		2033	4.4	2033	4.4	0.937	30.9	LOS C	79.1	582.0	0.86	0.86	0.95	23.4
West: M4 Western Motorway Off-ramp/On-ramp														
12	L2	415	5.3	415	5.3	0.469	16.2	LOS B	12.0	89.8	0.59	0.75	0.59	43.9
10	R2	595	5.0	595	5.0	0.950	84.8	LOS F	25.3	188.1	1.00	1.08	1.49	16.0
Approach		1009	5.1	1009	5.1	0.950	56.6	LOS E	25.3	188.1	0.83	0.94	1.12	23.8
All Vehicles		4842	5.3	4828 ^{N1}	5.3	0.950	36.5	LOS C	79.1	582.0	0.85	0.85	0.95	25.5

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	North Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
P4	West Full Crossing	1	54.2	LOS E	0.0	0.0	0.95	0.95
All Pedestrians		2	54.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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PHASING SUMMARY

 Site: TCS 3117 [107 - Mamre Road / M4 Western Motorway Off-ramp/On-ramp (North) - PM Peak 2030 With Development +20%]

 Network: [106 & 107 - PM Peak 2030 With Development +20%]

1630 - 1730

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 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: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C

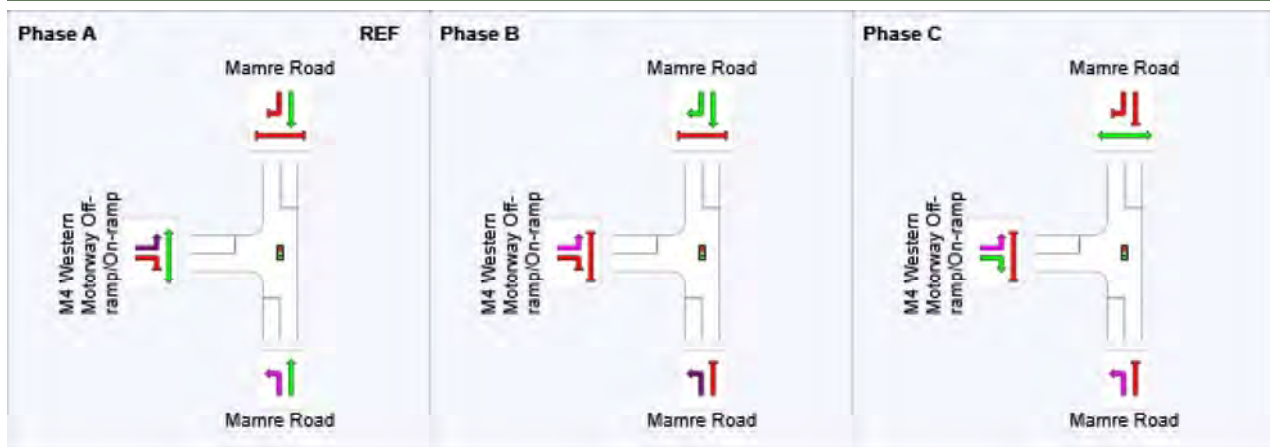
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	17	74	106
Green Time (sec)	51	26	25
Phase Time (sec)	57	32	31
Phase Split	48%	27%	26%

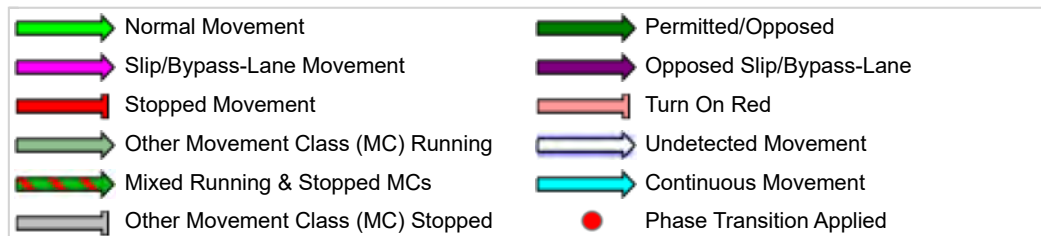
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



QUEUE STORAGE RATIO (PERCENTILE)

Ratio of the 95% Back of Queue Distance to the available queue storage distance (worst lane for the approach)

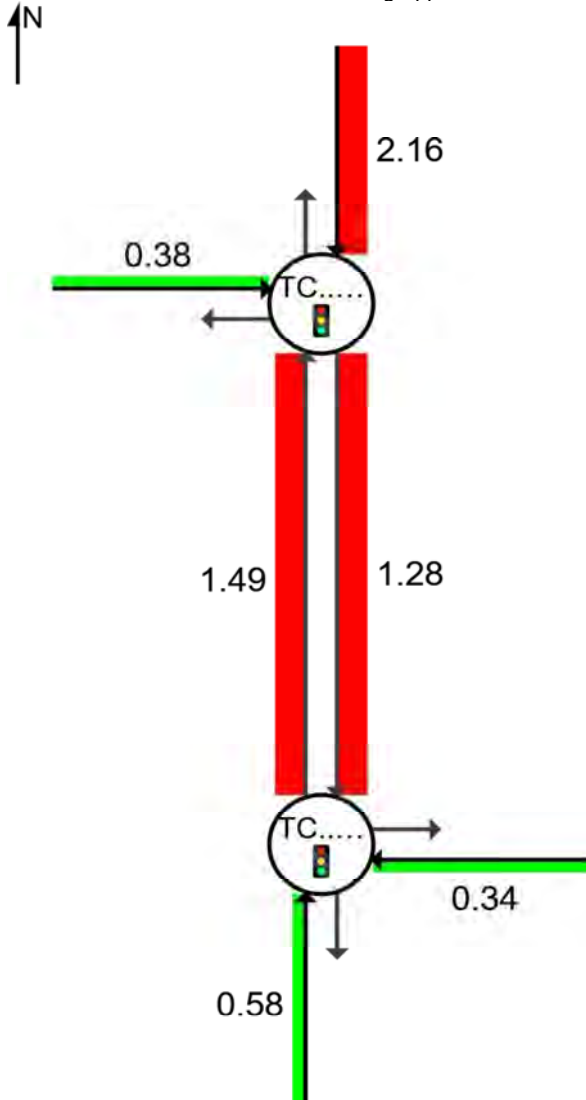
Network: [106 & 107 - PM Peak 2030 With Development + 20%]

1630 - 1730

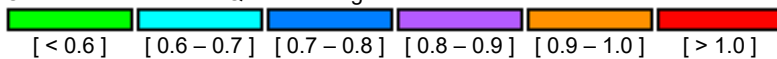
Network Category: (None)

Network Cycle Time = 120 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio



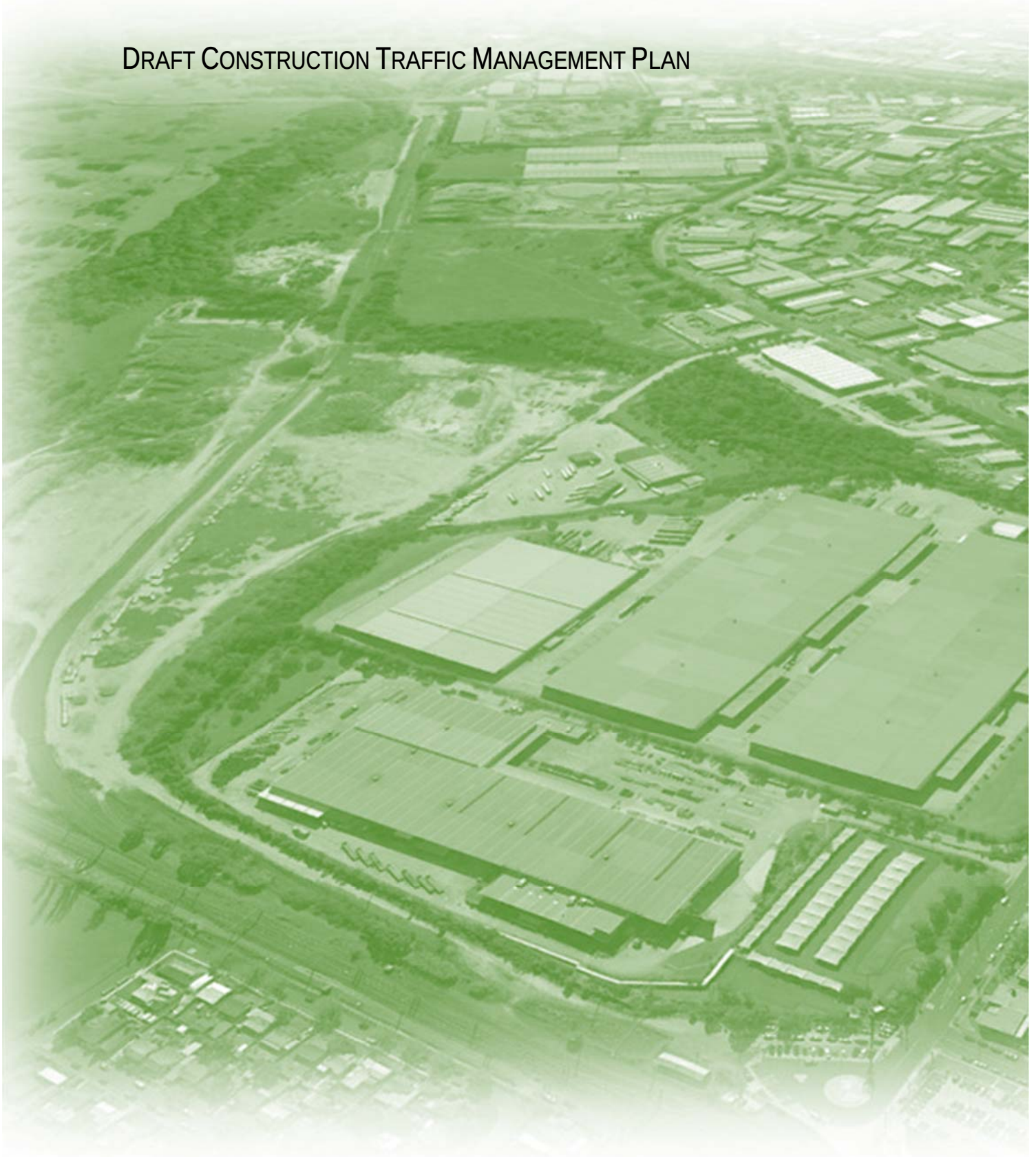
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APPENDIX D

DRAFT CONSTRUCTION TRAFFIC MANAGEMENT PLAN



ST MARYS FREIGHT HUB

DRAFT CONSTRUCTION TRAFFIC MANAGEMENT PLAN



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DOCUMENT CONTROL SHEET

Issue History

Report File Name	Prepared by	Reviewed by	Issued by	Date	Issued to
P3796.001R St Marys Freight Hub Draft CTMP	S. Daizli	D. Bitzios	D. Bitzios	28/02/2019	Pacific National
P3796.002R St Marys Freight Hub Draft CTMP	S. Daizli	D. Bitzios	D. Bitzios	18/04/2019	Pacific National

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1. INTRODUCTION

1.1 BACKGROUND

Bitzios Consulting has been engaged by Pacific National to prepare a draft Construction Traffic Management Plan (CTMP) for the St Marys Freight Hub project. This CTMP has been prepared in response to the revised Environmental Assessment Requirements (SEARs) for this development dated 23rd October 2018. The relevant part of the SEARs item is:

'Details of.....including the preparation of a draft Construction Traffic Management Plan to demonstrate the proposed management of the impact (which must include vehicle routes, number of trucks, hours of operation, access arrangements and traffic control measures for all demolition/construction activities).'

This is not a comprehensive CTMP as many of the construction techniques, the location of source materials and construction worker schedules are as yet unknown. However it is intended that this draft CTMP will provide a 'template' for contractors on this project to prepare their own CTMPs as the basis for their traffic management works for the project.

1.2 SCOPE OF THIS PLAN

The scope of this CTMP is to provide a 'high-level' overview of the St Marys Freight Hub project. As best as can be determined at this stage of the project's evolution, it provides:

- number of trucks;
- vehicle routes,
- hours of operation,
- access arrangements; and
- indicative traffic control measures.

It also describes management measures for impacts on pedestrians, cyclists, bus stops, parking and emergency response vehicles.

A more detailed site-specific CTMP is to be completed for each work area by the contractor performing the work in the subject area.

2. CONSTRUCTION DETAILS

2.1 WORK STAGES

2.1.1 General

The construction of the project is likely to be undertaken in stage. Figure 2.1 outlines the currently-anticipated stages of construction works, with a list activities in each stage provided below.



Source: BG&E

Figure 2.1: Staging of Works

Each stage of the project is to be broken up into smaller construction stages. The exact work zones will be defined when the smaller construction stages are identified.

2.1.2 Stage 1: Construction of Access Roads and Parking, Container Storage and Staff Facilities

Stage 1 is expected to involve the construction of:

- access roads from Forrester Road and Lee Holm Road;
- car and truck parking areas;
- a container area for 372 ground slots;
- reefer pads for 20 ground slots;
- a container repair and wash area;
- staff offices;
- a fuel storage area;
- a transport shed;
- crossovers between rail sidings 1 and 2 and clear standing rooms adjacent to the sidings; and
- a sedimentation basin.

2.1.3 Stage 2: Construction of Empty Container Area, Rail Siding 3 and Additional Clear Standing Rooms

This stage is expected to involve the construction of an empty container area for 209 ground slots, rail siding 3, additional rail crossovers and turnouts and clear standing rooms adjacent to the sidings.

2.2 CONSTRUCTION PERIOD AND HOURS OF OPERATION

The current timeline for the project anticipates construction commencing mid-late 2019 with the site open for operations in 2020.

At this stage the hours of operation have not been confirmed. Given the location of the site and its isolation from residential areas, it is conceivable that 24/7 construction is possible, depending on the construction completion schedule. For this assessment, a more conservative approach has been adopted where the number of truck movement are divided of a conventional 12-hours per day construction period.

2.3 TRUCK VOLUMES, ACCESS POINTS AND HAULAGE ROUTES

2.3.1 Truck Volumes

The majority of the construction-period trucks will be associated with the construction of the large concrete pads for the container storage areas, as well as the approach driveways and manoeuvring areas. This will involve the delivery of the following materials to the site:

- quarry product / road base;
- asphalt;
- stormwater products;
- services products; and
- stabilisation agents.

Very little spoil will be removed from the site. All excess materials will be stockpiled on the other side of the railway line as these may be used for future stages of the development.

There will be between 4,100 and 4,500 truck movements during the entire construction period. The maximum number of truck movements per day at peak construction activity is expected to be between 100 and 140. With a (minimum) 12-hour construction work day, the number of peak period construction trucks is likely to be in the order of 8-12 deliveries per hour, or a total of 20 two-way truck movements per hour. This would be expected to comprise primarily of 'dog and trailer' trucks.

At this stage, very little spoil will be removed from the site. All excess materials will be stockpiled on the other side of the railway line as these may be used for future stages.

2.3.2 Access Points

Access for construction traffic is proposed via entries off Forrester Road and exits via Lee Holm Road, as shown in Figure 2.2. Both roads are industrial standard roads and have well in excess of the capacity to accommodate the likely maximum 10 movements IN and 10 movements OUT per hour during peak construction activity.



Source: Google StreetView

Figure 2.2: Truck Ingress and Egress Locations

Furthermore, the entry driveway is over 300m long and will be able to accommodate over a dozen trucks queueing at a time which is well in excess of expected number of trucks waiting to enter the primary construction area.

A swept path analysis is yet to be undertaken for the largest construction vehicle as this is not known at this point. Swept paths have been run for B-Doubles as part of the operational period traffic impact assessment and have been proven to be accommodated for access to and from the site. It is unlikely that an over-sized vehicle would need to access the site but if it should be required a specific TCP for these vehicles would need to be established as part of the permit application process.

2.3.3 Haulage Routes

The contractor will need to identify the proposed haulage routes to and from the site which must be approved by the relevant authorities (i.e. Penrith City Council and Roads and Maritime). Construction and delivery vehicles should use main and arterial roads where possible, and preferably the declared B-Double routes which surround the site. The approved Restricted Access Vehicles (RAV) routes which are the preferred access routes are shown in Figure 2.3.



Source: <https://www.rms.nsw.gov.au/business-industry/heavy-vehicles/maps/restricted-access-vehicles-map/map/index.html>

Figure 2.3: Restricted Access Vehicle Routes

2.4 PLANT AND EQUIPMENT

Exact plant and equipment usage and requirements are to be determined at a later date by the contractor.

2.5 CONSTRUCTION PERSONNEL

The site is likely to accommodate 30-40 workers on average with a peak activity of approximately 80 persons on-site.

2.6 OUT OF WORKING HOURS CONTACTS

The out of working hours contacts are to be determined.

The Project Manager will be determined at a later date

3. IMPACTS ON EXISTING CONDITIONS AND MANAGEMENT MEASURES

3.1 PEDESTRIANS

3.1.1 General

Pedestrian access must be maintained during the works. Existing disability access, where provided, must be ensured, following the requirements set out in the *Disability Discrimination Act 1992*, and Disability Standards for Accessible Public Transport. Alternative services are to be considered, such as offering connections or pick-up services between destinations or bus stops. Pedestrian Management Plans (PMPs) must be created for any redirection of pedestrian movements from existing paths.

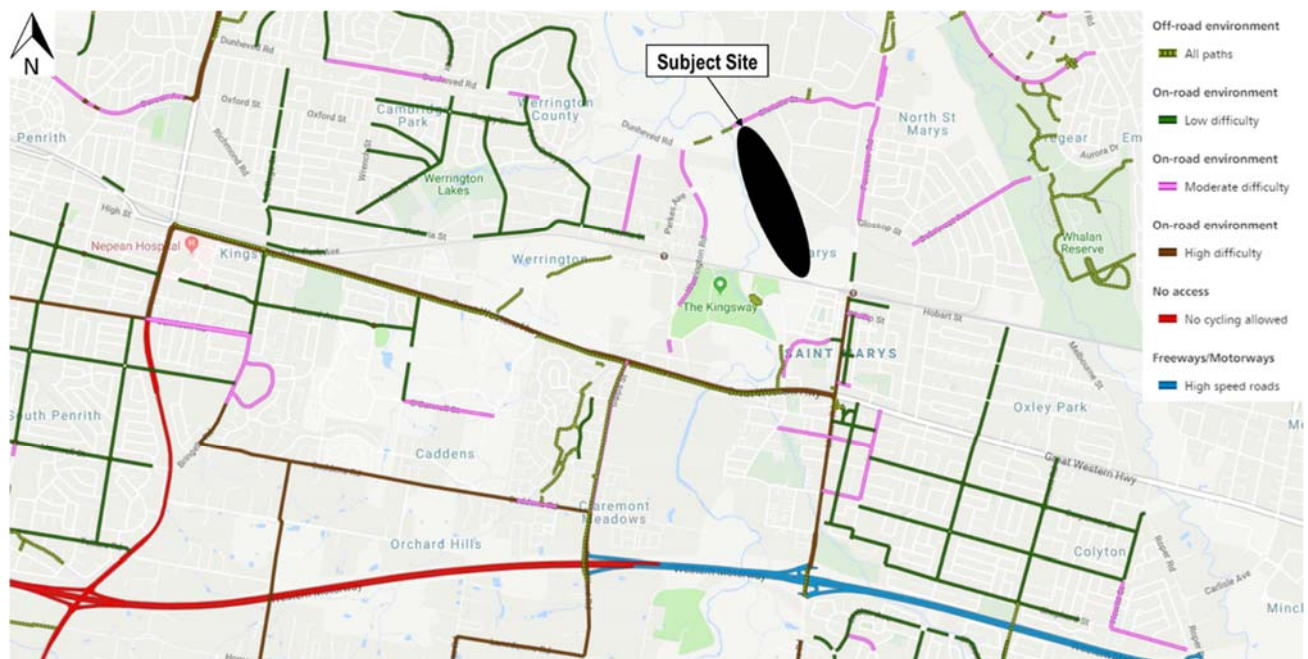
3.1.2 Access Driveway Crossing Points

The Forrester Road access is in close proximity to the St Marys Railway Station and a footpath runs across the access crossover. It is highly unlikely that many pedestrians would use this side of Forrester Road as there is a footpath on the eastern side of the road which provides a more direct connection to/from employment areas to the north. 'Footpath Closed' signage should be used in this location for the duration of construction with pedestrian diversions in place near the station stair-landing and to the north of Harris Street. The footpath on the western side of Forrester Street would need to be blocked by water-filled barriers or similar either side of the driveway where the alternative crossing points are provided in the TCP.

No footpaths exist across the Lee Holm Road access and no specific measures are warranted.

3.2 CYCLISTS

The surrounding cycling network is shown in Figure 3.1Error! Reference source not found.. There are no routes immediately surrounding the site that would be impacted by construction activities and cycling usage of Forrester Road and Lee Holm Road are minimal based on-site observations. No specific requirements are warranted.



Source: https://www.rms.nsw.gov.au/maps/cycleway_finder

Figure 3.1: Local Cycleways

3.3 TRAINS AND BUSES

St Marys Railway Station is located approximately 500 metres east of the site at the southern end of Forrester Road. It is serviced by the T1 Western Line between Emu Plains and the City via Blacktown, Parramatta and Strathfield. Services run every 15 minutes throughout the day, with higher frequencies during peak periods.

The bus stop at the southern end of Forrester Road (TSN 2760178) is serviced by four services between 6:20am and 8:02am Monday to Friday and may experience some disruption from works.

Buses and trains provide an alternative access opportunity for some construction workers although there is expected to be ample space on-site to accommodate construction worker parking.

3.4 BUS ZONE, TAXI ZONE, 5-MINUTE AND PWD PARKING

Three Taxi Zone parking spaces, 10 x 5-minute parking spaces and two Person With a Disability (PWD) parking spaces are located in the cul-de-sac at the southern end of Forrester Road outside St Marys Railway Station. Unrestricted access to the cul-de-sac should be maintained during construction. The existing Bus Zone, Taxi Zone, 5-minute and PWD parking spaces are shown in Figure 3.2.



Adapted from Nearmap

Figure 3.2: Existing Bus Zone, Taxi Zone, 5-minute and PWD Parking

3.5 CAR PARKING

Impacts to car parking along Forrester Road and Harris Street should be minimised throughout construction. The St Marys Commuter Car Park (Harris Street) and private car park accesses are not to be used by construction personnel during construction. Parking for construction workers will be provided for within the site given the sufficient available area and this should be clearly communicated to all contractors.

3.6 EMERGENCY RESPONSE

It is imperative that access to emergency vehicles be maintained during construction. Fire, ambulance and police services must be able to get to all project areas if necessary.

The nearest public hospitals are as follows:

- Nepean Hospital – Derby Street, Kingswood NSW 2747, approximately 9.9 km from the site; and
- Blacktown Hospital – 18 Blacktown Road, Blacktown NSW 2148, approximately 18.3km from the site.

The nearest ambulance station is located at 124 Ellsworth Drive, Tregear NSW 2770, approximately 3.8km from the site.

The nearest police station is St Marys Police Station, located at 38-42 King Street, St Marys NSW 2760, approximately 2.9km from the site.

The nearest fire station is St Marys Fire Station, located at 1 Marsden Road, St Marys NSW 2760, approximately 3.3km from the site.

3.7 HOLDING AREAS

There is sufficient holding area on site. There is to be no queuing or vehicle holding outside of the site. Deliveries and arrival of heavy vehicles is to be timed to ensure that queueing does not occur. Construction vehicles are not to park or block on-street parking.

3.8 SURROUNDING HAUL ROADS - DILAPIDATION SURVEY

A dilapidation survey is required for roads affected by the project. The survey must cover:

- all roads where construction occurs; and
- local roads surrounding the project area that will be utilised by construction vehicles for deliveries.

The frequency of the dilapidation survey will need to be agreed with Roads and Maritime and Penrith City Council.

4. CTMP IMPLEMENTATION RESPONSIBILITIES

4.1 IMPLEMENTATION

Traffic management for the project site will need to be in accordance with Roads and Maritime's *Traffic Control at Work Sites Manual* and modified to site-specific conditions.

4.2 MANAGERS

The responsibilities of managers are to:

- ensure that the site-specific CTMP is being correctly and safely implemented;
- correctly accredited personnel are implementing TCPs, Vehicle Management Plans and PMPs;
- ensure that the project is following the project and council-specific guidelines; and
- notify and collaborate with stakeholders, Council and transport agencies affected by the project.

Additional and more detailed responsibilities must be defined in the site-specific CTMP.

4.3 TRUCK DRIVERS

Truck drivers are to:

- always obey road rules ;
- follow the haulage routes defined in this CTMP and/or the site-specific CTMP;
- notify site contact/escort of arrival;
- follow instructions from traffic controllers to access the site or perform manoeuvres specified in a TCP;
- follow instructions from site contact/escort, including directions to nominated laydown or holding areas;
- after arriving at the nominated laydown area, exit the vehicle and remain in a pre-defined safe area while unloading of freight is being undertaken;
- once unloading of the freight has been completed, return to the vehicle and exit the site, following instructions from site contact/escort and traffic controllers. The driver is to then follow the designated haulage routes; and
- have read, understand and follow this CTMP, site-specific CTMPs and any other relevant project documentation regarding road safety and traffic management.

4.4 TRAFFIC CONTROLLERS

Traffic controllers are required to be certified with a Roads and Maritime Traffic Controller (Blue Card). They must ensure that the TCPs are implemented safely and correctly. The responsibilities of traffic controllers are to be clearly shown on the specific TCPs.

4.5 WORKER PARKING RESTRICTIONS

Workers are not to park on residential streets around the work area. Workers should use public transport where possible or use onsite parking facilities.

5. TRAFFIC CONTROL PLANS

Any changes to traffic through or around a work site or temporary hazard will require a Traffic Control Plan (TCP) that has been designed and approved by Roads and Maritime-accredited personnel with the appropriate and current qualification as outlined in Roads and Maritime QA specification G10 Traffic Management Clause 1.5.3.

A Road Safety Audit (RSA) should be undertaken of the existing road conditions and the TCPs prior to their implementation.

