Former CSIRO Site Highett

37 Graham Road, Highett
Transport Impact Assessment

Prepared by: Stantec Australia Pty Ltd for Sunkin Projects Pty Ltd
on 30/07/2021
Reference: V181370
Issue #: C

GTAconsultants now Stantec

Former CSIRO Site Highett

37 Graham Road, Highett
Transport Impact Assessment

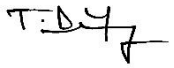
Client: Sunkin Projects Pty Ltd

on 30/07/2021

Reference: V181370

Issue #: C

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	10/11/2020	Final	Saskia Noakes	Andrew Farran	Andrew Farran	Andrew Farran
B	16/12/2020	Updated Final	Saskia Noakes	Andrew Farran	Andrew Farran	Andrew Farran
C	30/07/2021	Updated Final	Colin Roche	Andrew Farran	Tim De Young	

GTA consultants now Stantec

Melbourne | Sydney | Brisbane
Adelaide | Perth

EXECUTIVE SUMMARY

A Development Plan has been prepared for the redevelopment of the former CSIRO Site at 37 Graham Road in Highett. The Development Plan envisages in the order of approximately 1,048 dwellings, 1,000sqm community centre, 3ha Conservation Zone and 1ha of public open space (park).

The Site is located immediately south of the Highett Activity Centre. The Highett Railway Station is located approximately 100m walking distance from the north eastern corner of the site, whilst bus routes operate along the sites Graham Road frontage, as well as on Bay Road and Highett Road. Accordingly, the site has good public transport accessibility. Given the close proximity the site has good pedestrian connections to the Highett Activity Centre to the north and Southland Shopping Centre to the south east. Additionally, the site has good vehicle access to the surrounding arterial road network with access to Nepean Highway provided via Bay Road and Graham Road. However, it is acknowledged that during the road network peak periods the Bay Road / Graham Road intersection is operating at its capacity.

The Site is located in close proximity to the Highett Structure Plan which is the guiding strategic planning document for the surrounding area. The Structure Plan transport objectives include (1) the prioritisation of walking and cycling modes, (2) enhance public transport infrastructure, (3) safe and efficient vehicle movements and (4) mitigate traffic and parking impacts of population growth.

In this context and having regard for the surrounding transport environment a modal hierarchy that favours active travel modes (walking and cycling) and public transport over private vehicle travel has been identified. The Development Plan is expected to generate in the order of 800 trips by all modes, with roughly a 50:50 split between private vehicle and other trip types.

The development of the site will allow for east-west and north-south pedestrian permeability through the site which was previously not available. Footpaths are provided on both sides of each of the internal roads to cater for pedestrian movements. Resident bicycle parking will be provided at a rate of at least 1.5 times the minimum statutory requirement. It is recommended that Green Travel Plans be prepared as part of each stage of development to further encourage sustainable travel behaviour.

Resident and visitor car parking will generally be provided in accordance with Column B rates in Clause 52.06 of the Planning Scheme, noting that a reduced car parking rate for 1-bedroom dwellings is being sought. Limiting car parking for the smaller 1-bedroom dwellings will assist in suppressing traffic generation from the development and encourage alternative travel modes instead; this approach is consistent with the Highett Structure Plan objectives.

Vehicle access within the Development Plan area is proposed via a series of private roads, with vehicle easement rights provided for Council vehicles to access the Conservation Zone and Park areas. The private roads will still be designed in accordance with Clause 56.06 of the Planning Scheme (public road requirements), including two-way carriageway, footpaths on both sides and indented visitor parking.

In order to better disperse vehicle movements and consistent with the expectations of the Highett Structure Plan vehicle access is proposed via both Graham Road (x2 locations) and Middleton Street. Adequate midblock capacity exists on both these local roads to accommodate the forecast daily movements from the Development Plan. Intersection traffic modelling indicates that except for the Bay Road / Highett Road intersection, adequate capacity exists at each of the surrounding intersections to accommodate the forecast traffic movements. It is recommended that this intersection be signalised to improve its capacity, as is proposed by the Structure Plan.

CONTENTS

Appendices

Figures

Tables

1. INTRODUCTION

1.1. Background & Proposal

A Development Plan has been prepared by Clarke Hopkins Clarke for the former CSIRO Site at 37 Graham Road in Highett. The Development Plan contemplates residential (townhouse and apartments), community centre, conservation zone and public open space (park) land uses. An overview of the Development Plan is shown in Figure 1.1.

Figure 1.1: Development Plan (dated July 2021)

A summary of the indicative yields to be developed provided in Table 1.1. It is important to note that the land uses are expected to be delivered in approximately seven stages over a 5 to 10-year period and will ultimately be subject to prevailing market demands and authority approvals.

Table 1.1: Development Summary (Indicative)

Land Use / Item	Size / No.
Townhouses	76 dwellings
Apartments	972 dwellings
Community Centre	1,000 sqm
Conservation Zone	3 ha
Public Open Space [1]	1 ha

[1] Ancillary land use.

Vehicle access to the site is proposed via two connections to Graham Road and a single connection to Middleton Street, with a private road network servicing each of the individual apartment buildings and townhouses. Pedestrian access is provided via multiple locations along Graham Road, as well as via Middleton Street and to Bay Road (via the existing pedestrian path connecting to the south east corner of the site).

1.2. Consultation and RFI Response

In preparing the vehicle access strategy and the traffic analysis for the site, GTA and the project team has held various meetings with Bayside City Council (Council). The details of the pre-submission "touchpoints" are outlined in Table 1.2.

Table 1.2: Summary of Consultation

Date	Overview	Meeting Purpose and Outcome
20 November 2019	Introduction Meeting	Initial presentation of Development Plan and preliminary discussions relating to the transport strategy for the site.
17 April 2020	Updated Presentation and Further Information Meeting	An updated Development Plan was presented to Council with the high level transport strategy discussed.
18 May 2020	Transport specific meeting	Presentation of the transport strategy for the site, including midblock and intersection capacity assessments. Further clarity was requested from Council regarding traffic generation rates and potential mitigation measures.

Following the submission of the Development Plan, initial comments were provided from Council including a request for further information from the Department of Transport. These items (and responses) are reproduced in Table 1.3.

Table 1.3: Council and Department of Transport Feedback

No.	Item	Response
Council Correspondence		
53	Site Layout (Public access) - Confirmation on the mechanism to allow for continued public through access is required	Carriageway easements will be introduced to facilitate third party pedestrian and vehicle movements through the site (to be confirmed following the Development Plan approval process).
54	Site Layout - Nature strips are insufficient to allow for the likely services clear of pavements, it is unlikely that Council will take on the road in the future. If there is an expectation that Council may take on the roads in the future, it is recommended that a wider road reservation is provided with wider verges to accommodate services, etc.	The internal road network will consist of private roads. There is no intention of converting the internal roads to Council control in the future.
55	Site Layout (aged care development land opposite site) - consideration for pedestrian connections through this land to the Lyle Anderson Reserve. Review HSP connection.	A 'proposed new pedestrian crossing' is shown on the HSP to the immediate north of the main site access to Graham Road. The Development Plan has been updated to show a pedestrian link (on the subject lands) connecting to the future pedestrian crossing.
56	Site Layout - HSP indicated a pedestrian crossing across Graham Road, does not appear in DP. Review HSP	As above.
57	Car Parking Assessment - Justification of car parking rates for one-bed product of 0.86 spaces (considered high)	The transport assessment sets out a recommended car parking rate for 1-bedroom dwellings of between 0.5 and 1 spaces per dwelling. The proposed car parking rate generally aligns with the existing car ownership data of 0.9 spaces per 1-bedroom dwellings in Bayside LGA (2016 ABS Census).

No.	Item	Response
58	Traffic Assessment (Bay Road / Graham road intersection) - current proposal to ban right turn movements. Currently there is no assessment of the impact of the redistribution of traffic across the network as a result, and the potential impact to other intersections	The proposal has been updated to include signalisation of the Bay Road / Graham Road intersection accordingly it is not expected that there will be any redistribution of traffic.
59	Traffic Assessment (Bay Road / Graham road intersection) - existing right turn movement into Graham Road from Bay Road is will utilised, motorists will need to use alternative routes. - Traffic report should be updated to assess the impact of this redistributed traffic	No longer relevant.
60	Council are of the view that the material presented to date does not demonstrate this intersection should remain unsignalised	No longer relevant.
Department of Transport RFI		
1	Graham Road/ Bay Road is a Council's and DOT's intersection. Graham Road is under Council's management and is servicing an existing community. Before the Department can consider the proposed left-in/left-out restriction, it needs to be assured that Council has considered the proposal in consultation with the community, and Council is willing to make a decision on behalf of the community.	Noted.
2A	The TIAR does not demonstrate how the intersection can be designed to effectively prevent right turns while still can compatibly facilitate the 828 bus route currently doing right-in/left-out at this intersection.	The proposal has been updated to include signalisation of the Bay Road / Graham Road intersection which will maintain right turn movements at the intersection.
2B	The TIAR lacks a proper analysis of potential impacts of the left-in/left out restriction on the wider network. It is a concern about network impact that Graham Road's left-in/left-out restriction would just redistribute the existing right turn movements (including those of school bus if applicable) and additional right turn movements generated by the development to other intersections, Jackson Road for example.	The proposal has been updated to include signalisation of the Bay Road / Graham Road intersection accordingly it is not expected that there will be any redistribution of traffic.
2C	SIDRA analysis provided for Graham Road/ Highett Road has not be done properly to demonstrate the potential impacts on signal operation. The SIDRA analysis must take into account the nearby signalised intersection of Train Street/Highett Road on the west, the pedestrian operation signal and the train track operation on the east. The analysis must also be updated to reflect the potential redistribution of traffic resulted from the left-in/left out restriction (as raised in point b above).	The SIDRA analysis of the Highett Road / Graham Road intersection has been expanded to include the Train Street intersection and Pedestrian Operated Signals. The results of the updated SIDRA Network model are provided in Section 7.3.3.
2D	Giving the size of additional traffic generated from the development, the TIAR lacks an analysis of traffic impact on Nepean Highway, in particular SIDRA analysis for Highett Road/ Nepean Highway intersection.	A SIDRA model of the Highett Road / Nepean Highway / Rowans Avenue intersection has been prepared to determine the impacts of the proposed development on this intersection. The results of the SIDRA model are provided in Section 7.3.3.

1.3. Purpose & Structure of this Report

GTA Consultants was commissioned by the Applicant in October 2019 to undertake a transport impact assessment of the Development Plan.

This report summarises that assessment and details the transport impacts of the proposed Development Plan and how they are being addressed. It includes consideration of:

1. The existing conditions pursuant to the transport network in the vicinity of the site and any relevant transport or planning policy relevant to the site – ***refer to Section 2 of this report.***
2. The expected trip generation of the proposed development and the proposed transport response to best accommodate these trips on the surrounding transport network – ***refer to Section 3 of this report.***
3. The details of the proposed transport response with respect to each relevant transport mode, including:
    - Active Travel – **refer to Section 4**
    - Public transport– **refer to Section 5**
    - Loading and Waste Collection – **refer to Section 6**
    - Private vehicle arrangements including car parking and traffic impacts – **refer to Section 7 (and Appendix A and B).**

1.4. References

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

- Bayside Planning Scheme
- plans for the proposed development prepared by Clarke Hopkins Clarke
- Highett Structure Plan
- Australian Standard / New Zealand Standard, Parking Facilities (AS2890)
- traffic and car parking surveys undertaken by GTA Consultants as referenced in the context of this report
- liaison with the Department of Transport via telephone and email in July 2021
- an inspection of the site and its surrounds
- other documents as nominated.

2. EXISTING CONDITIONS

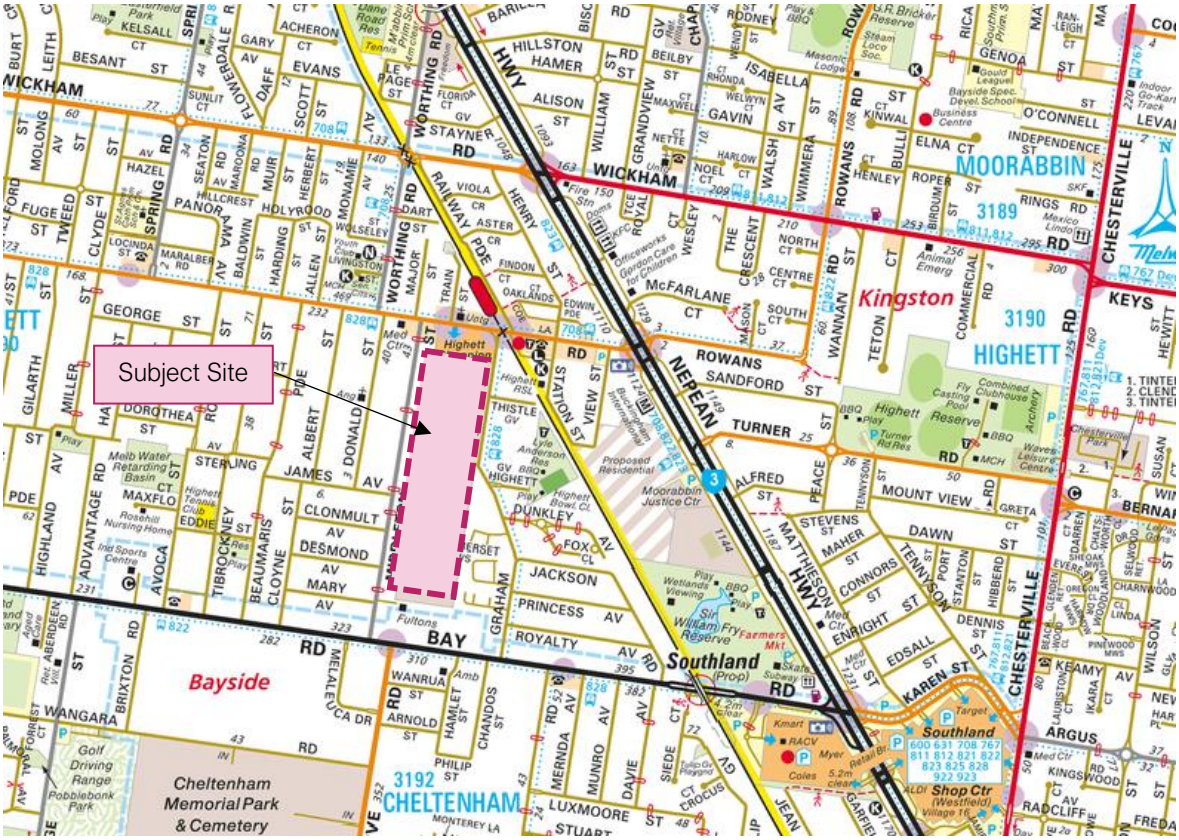
2.1. Location

The subject site is located at 37 Graham Road in Highett. The site of approximately 9.3ha has frontages of approximately 260m to Graham Road and 15m to Middleton Street. The site was previously occupied by the CSIRO and in more recent times has remained vacant as remediation works have taken place on the site.

The surrounding properties to the east and west are predominantly residential, with commercial properties generally located to the north and south of the site. The Highett Activity Centre and Highett Railway Station are located to the immediate north of the site. The Westfield Southland Shopping Centre is located approximately 800m from the southeast corner of the site.

The location of the subject site and the surrounding environs is shown in Figure 2.1.

Figure 2.1: Subject Site and its Environs



(Reproduced with Permission from Melway Publishing Pty Ltd)

2.2. Transport Network

2.2.1. Road Network

The subject site is generally bound by Bay Road to the south (separated by a row of commercial properties), Middleton Road to the west (separated by a row of residential dwellings), Graham Road to the east and a mixed use development to the north. A description of each of the surrounding roads is provided in Table 2.1.

Table 2.1: Road Network Description

Road	Classification	Description	Approximate Volume[1]	Photo
Graham Road	Local Road (Council)	• Connector road aligned in a north-south direction • Single carriageway set within a 15-metre-wide road reserve (approx.) • Parking is largely not permitted within the vicinity of the site	3,000vpd	
Middleton Street	Local Road (Council)	• Local access street aligned in a north-south direction • Single carriageway set within a 15-metre-wide road reserve (approx.) • 2hour on-street parking is permitted between 8am and 6pm. Parking is not restricted beyond these hours.	1,200vpd	
Bay Road	VicRoads	• Arterial road aligned in an east-west direction • Four lane road (2 lanes in each direction) set within a 20-metre-wide road reserve (approx.) • Parking is restricted	26,000vpd	
Highett Road	Local Road (Council)	• Connector road aligned in an east-west direction • Two lane road (1 lane in each direction) set within a 15-metre-wide road reserve (approx.)	9,000vpd	

[1] Sourced from traffic surveys commissioned by GTA in October 2019.

[1] Daily two-way volume estimate, where the surveyed peak hour is assumed to be 10% of the daily volume

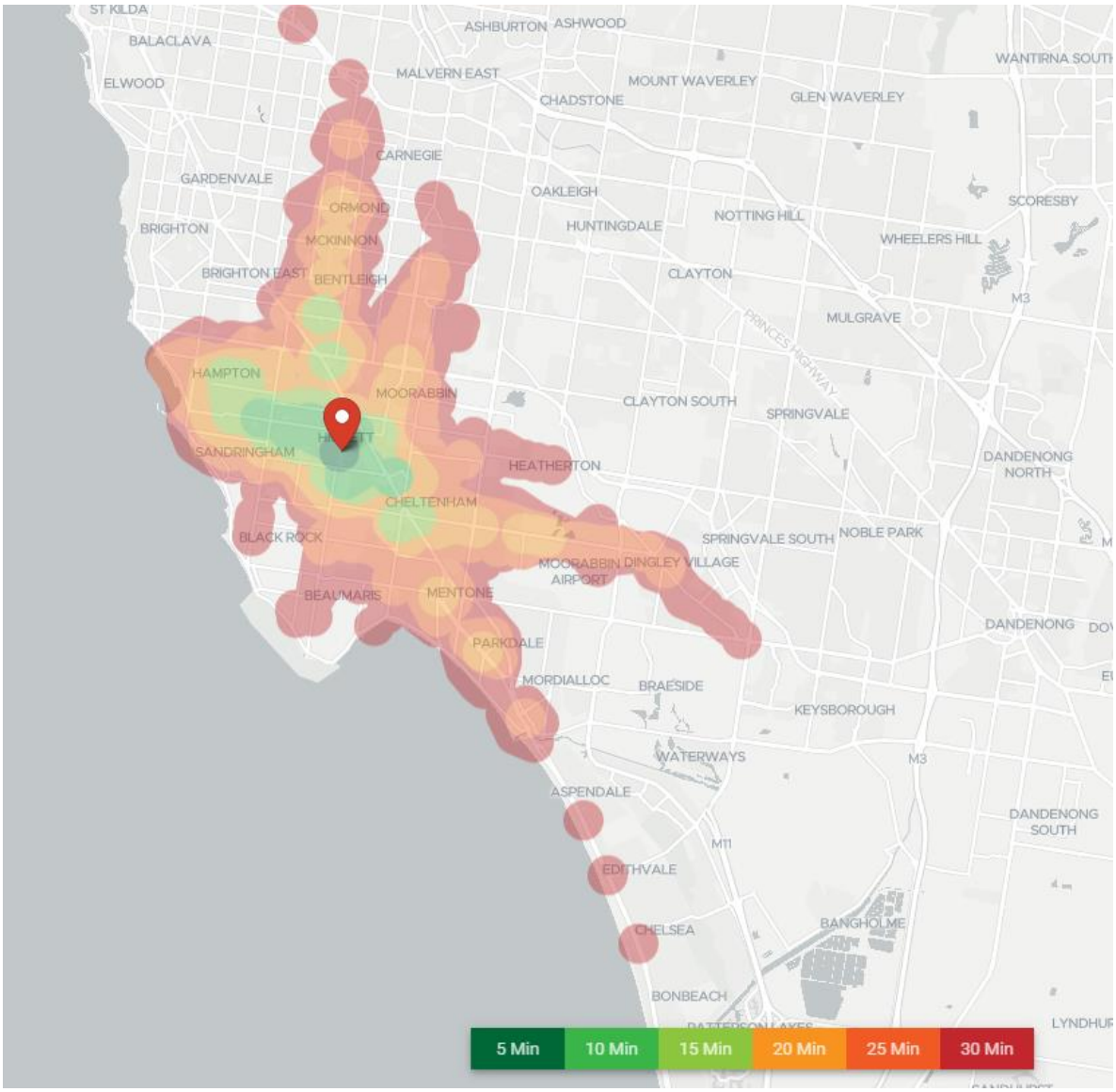
2.2.2. Public Transport Network

The site is located within short walking distance of the following public transport services:

- Highett Train Station on the Frankston Line (5-minute walk)
- Bus Route #828 (Hampton Station to Berwick Station) operates along Graham Road (2-minute walk)
- Bus Route #708 (Carrum to Hampton) operates along Highett Road (3-minute walk)
- Bus Route #822 (Chadstone SC to Sandringham) operates along Bay Road (4-minute walk).

These services provide frequent and convenient access to surrounding suburbs, the CBD and greater Melbourne through the metropolitan train network. The available public transport catchment within 30 minutes of the site, at five-minute intervals, is presented in the isochrone drawing set out at Figure 2.2 (noting that this dataset includes the walk time between the public transport service and the site and origin). Overall, this assessment illustrates that the site is reasonably well serviced by public transport, with a significant number of attractions provided within a 30-minute travel time.

Figure 2.2: Public Transport catchment departing site



The accessibility of the site by public transport can be measured by assessing its "Transit Score". The Transit Score of a site is calculated by determining the distance and "usefulness" of nearby public transit (where usefulness is defined as a combination of the frequency of services and the type of service (e.g., train, tram, or bus). The highest Transit Scores are enjoyed by locations with nearby access to heavy rail services, as these are weighted higher than other services. In this instance, the site has a score of 62 which indicates that there are "many nearby public transport options".

2.2.3. Active Travel Network

The available walking catchment within 30 minutes of the subject site at five-minute intervals, is provided in the isochrone drawing set out at in Figure 2.3. This figure indicates a walking catchment of approximately 1.5km-2km in all compass directions based on the urban structure around the site at present.

Figure 2.3: Walking Catchment surrounding site

There are limited cycling facilities in the immediate vicinity of the site. Middleton Street to the west of the site is identified as a cycling route on Bayside Cycling Trail Map, although no specific cycling facilities are provided. Reserve Street to the south of Bay Road provides on-road bike lanes in each direction.

The accessibility of the site via walking can be measured by assessing the "Walk Score" of the suburb. The Walk Score of a suburb is calculated by determining the distance required to walk from an origin to nearby amenities, whilst also assessing block sizes and intersection density to determine the permeability of an area. The site has a walk score of 81 out of 100, which infers "most errands can be accomplished on foot". This score compares to a suburb wide score of 73, indicating that the site has better active travel accessibility than the majority of the suburb.

2.2.4. Smart Roads

SmartRoads is a former VicRoads policy which sets 'modal' priorities on the road network and underpins many of the strategies significant to the operational directions that support broader strategies around land use and transport.

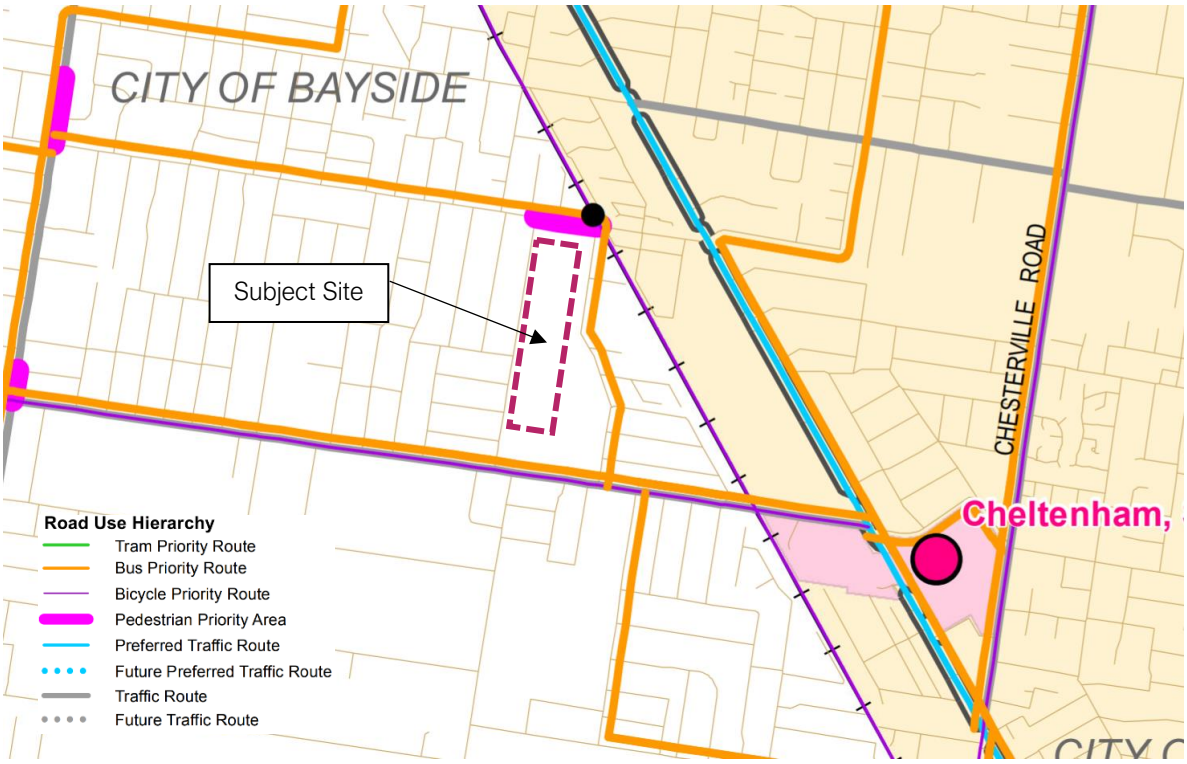
Under Smart Roads, all road users will continue to have access to all roads. However, certain routes will be managed to work better for cars while others for public transport, cyclists and pedestrians during the various peak and off-peak periods.

Smart Roads identifies the following:

- Bay Road is classified as a bus priority route, bicycle priority route and traffic route.
- Graham Road is classified as a bus priority route.
- Highett Road between the railway line and Middleton Street is classified as a pedestrian priority area and bus priority route.

The SmartRoads priorities in the vicinity of the site is reproduced in Figure 2.4.

Figure 2.4: SmartRoads – City of Bayside



2.2.5. Movement and Place

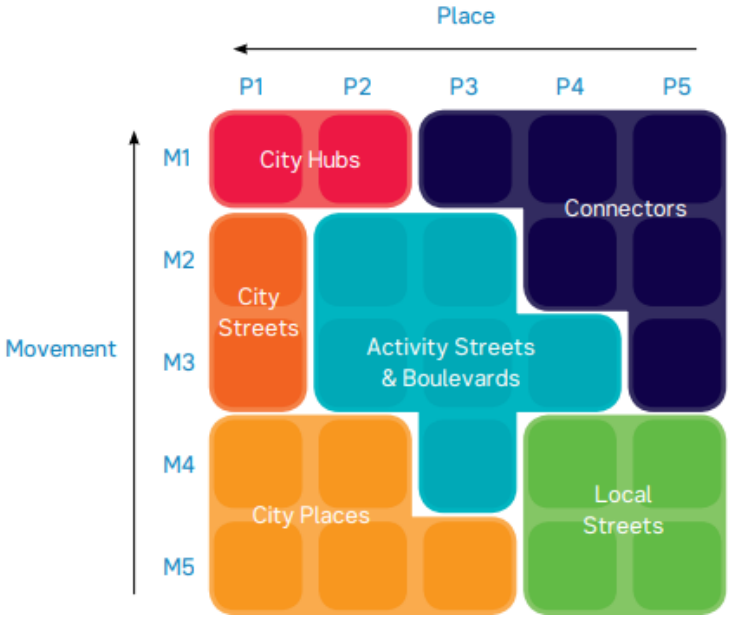
Contemporary transport planning considers the use and classification of a street in terms of the movement function it provides alongside with the place function it serves.

For major highways and arterial roads, the movement function is paramount whereas the place function is all but irrelevant. In contrast, for minor residential streets, the place function is more important, and the movement function is a lesser consideration.

The Movement and Place framework was established to replace SmartRoads and seeks to provide a consistent methodology for designing streets that are best suited to prioritising travel movement, and those where greater interaction between people and places can be encouraged. Movement and Place principles and framework are broadly illustrated in Figure 2.5.

In the immediate vicinity of the Site, it is evident that Bay Road is intended to operate primarily as a 'Connector' (not to be confused with Council's definition of a connector road), while Highett Road has a stronger place function and could be expected to operate as a ''Activity Street & Boulevard'. Graham Road and Middleton Street could be expected to operate as 'Local Streets'.

Figure 2.5: Movement and Place Framework



2.2.6. Existing Travel Behaviour

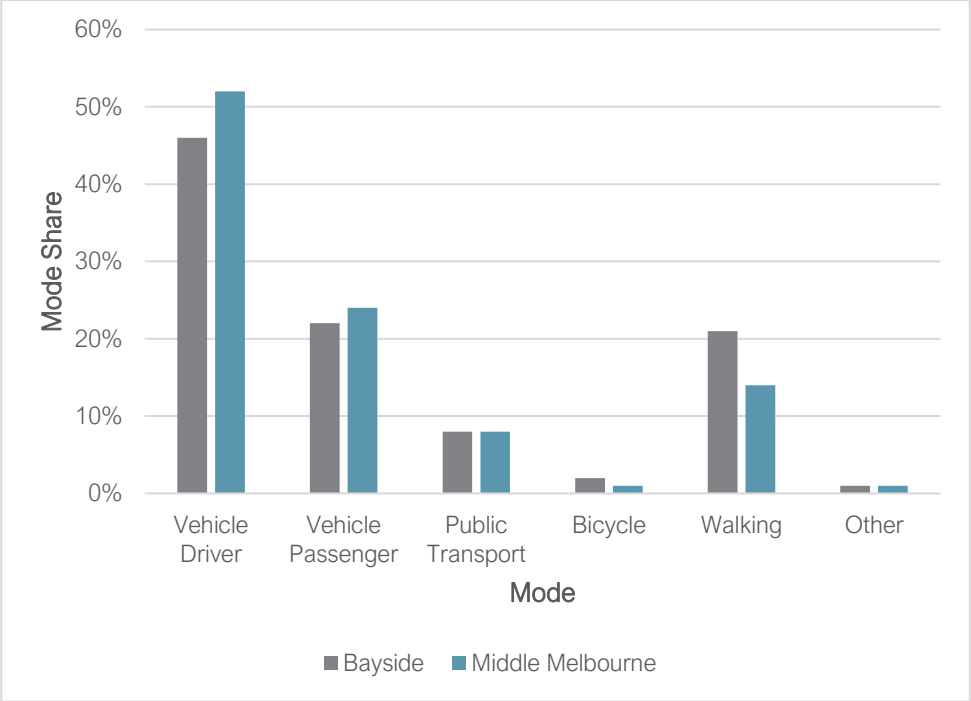
Mode share data for residents living in Victoria has been collected as part of the 'Victorian Integrated Survey of Travel and Activity' (VISTA).

The most recent data was collected by the Department of Transport in 2018. The mode share data for Bayside Local Government Area (LGA) is presented in Figure 2.6. The data has been benchmarked against all Middle Melbourne LGA's[2] and represents all trip types and not just journey to work trips.

[2] Incorporating Monash, Greater Dandenong, Whitehorse, Darebin, Moonee Valley, Manningham, Kingston, Moreland, Glen Eira, Maribyrnong, Hobsons Bay, Banyule, Knox, Boroondara, Maroondah, Brimbank and Bayside LGA's.

Figure 2.6 indicates that approximately 50% of trips in Bayside are private vehicle trips, approximately 20% vehicle passenger trips, 20% walking trips and the remaining 10% being public transport and bicycle trips. The mode share data for Bayside indicates a lower reliance on private vehicle travel compared to the remainder of Middle Melbourne, with a higher propensity for residents to walk.

Figure 2.6: VISTA Travel Data – Bayside LGA and Middle Melbourne Suburbs



(Source – VISTA Data website: https://transport.vic.gov.au/about/data-and-research/vista)

2.3. Relevant Transport Policy

2.3.1. Highett Structure Plan

The Highett Structure Plan sets out Bayside Councils strategic vision for the Highett Activity Centre. In 2006, a joint Structure Plan was previously prepared and incorporated with Kingston Council for the Highett Activity Centre. An updated Structure Plan was prepared in 2018 and is recently been considered for incorporation into the Bayside Planning Scheme (Amendment C160).

It is noted that the subject site itself is not included in the Structure Plan, however, the Structure Plan is applicable for the lands surrounding the site and therefore the Development Plan should have regard for this document.

The Structure Plan is arranged in four themes:

1. Land Use
2. Built Form
3. Access and Movement
4. Public Realm.

A summary of the four identified transport or 'access and movement' objectives and the relevant strategies associated with each are reproduced below:

"Objective 11. Prioritise walking and cycling through the Activity Centre, with a convenient, safe and connected local infrastructure network.

- *Improve pedestrian safety and amenity along Bay Road, Worthing Road, Highett Road, Train Street, Middleton Street, Graham Road and the pedestrian link along the railway line through improved lighting, smooth and level walking surfaces, safe crossing points, passive surveillance and increased amenity (greening and providing places to stop and rest).*
- *Provide pedestrian crossings at Bay Road/Graham Road intersection and near the Frankston railway line (ideally in the form of a pedestrian overpass bridge).*
- *Investigate pedestrian crossing opportunities on Graham Road, corresponding with the public link to Lyle Anderson Reserve and open space on the CSIRO site and across Highett Road at Worthing Road to improve access to the Livingston Street Community Hub.*
- *Providing bicycle facilities along Middleton Street in the form of shared lane markings in the short term and on-road bicycle lanes in the medium term. This will connect to the future on road bicycle lanes along Bay Road, provide connections to future bicycle infrastructure along Worthing and Wickham Roads and from residential areas to the surrounding bicycle network and surrounding destinations.*
- *Ensure any redevelopment of the CSIRO site provides public shared pedestrian and bicycle paths that connect Highett Road to Bay Road and Graham Road to Middleton Street.*

Objective 12. Integrate and enhance public transport infrastructure in the Activity Centre.

- Advocate to PTV for improved level of service of buses to every 10 minutes during peak times, improve access to bus stops within the Activity Centre and improve priority for buses on the surrounding road network.

Objective 13. Manage safe and efficient vehicular movement throughout the Highett Activity Centre.

- *Advocate to VicRoads to… Upgrade the Bay Road/Graham Road intersection to a signalised intersection.*
- *Provide two vehicular access points to the CSIRO site, one from Graham Road and one from Middleton Street to distribute generated traffic.*
- *Designate Graham Road as a Connector Street to reflect its current and future function as a key movement corridor within the Activity Centre.*
- *Improve safety and amenity along Graham Road. Investigate:*
    - *Indenting of existing parallel car parking north of Thistle Grove; and*
    - *Installing bus friendly speed humps at appropriate mid-block locations along Graham Road.*

Objective 14. Mitigate traffic and car parking impacts of future population growth.

- *Investigate the feasibility of requiring new developments to provide Green Travel Plans that outline alternative transport options in the local area, incentives for use of alternative transport options, and consider partnering with transport services to provide bike or car share programs.*
- *Ensure developments provide the required number of car parking spaces under the Bayside Planning Scheme."*

It is envisaged that the above overarching objectives and specific strategies will be achieved through a combination of works from Council, the Department of Transport and land owners. Accordingly, the design responses associated with the Development Plan (presented in Sections 4 to 7 of this report) seek to address a number of the items relevant to the CSIRO site, however, it is noted that it does not seek to (nor should it) address all of the above items.

The Access and Movement Plan from the Structure Plan is reproduced in Figure 2.7.

Figure 2.7: Access and Movement Plan

(reproduced from the Highett Structure Plan 2018)

2.3.2. Other Relevant Policy Documents

In addition to the above, there are numerous State and Local Government policy documents applicable to the site and surrounds which provide guidance on appropriate land use and development.

Encouraging the use of public transport, walking and cycling as modes of transport, and reducing the reliance on private car use, are central to achieving the aims of the various policy documents affecting the area and directing how it develops into the future.

An overview of the key policy documents is provided in Table 2.2.

Table 2.2: Transport Policy Overview

Document		Key Messages
Plan Melbourne (Refresh)		• Delivering a pipeline of large scale, city shaping infrastructure and urban renewal projects • Delivering a new 'integrated economic triangle', connecting key employment clusters, industrial precincts and economic gateways. • Integrating active transport development into existing and future land use to support a productive city. • Supporting 20-minute neighbourhoods by promoting local active transport choices and improving active/public transport infrastructure for the local area.
Transport Integration Act		• Victoria's principal transport statute • Establishes a framework for the provision of an integrated and sustainable transport system in Victoria • Six transport system objectives and eight decision-making principles • Establishes a triple bottom line approach – economic prosperity, social and economic inclusion, and being resource efficient and environmentally responsible
Clause 18 of Planning Scheme		• Contains a range of guidelines for transport planning • Develop integrated transport networks to connect people to jobs and services and goods to market • Promote walking and cycling when planning for new suburbs, urban renewal precincts, greyfield redevelopment areas and transit-oriented development areas (such as railway stations). • Integrate public transport services and infrastructure into new development.

2.4. Summary

Private vehicle travel is currently the dominant transport mode for movement around Highett and the surrounding areas.

However, the site has good accessibility to public transport services, including buses operating along the site's frontage and Highett Railway Station located to the north of the site. Pedestrian and cycling links are provided to surrounding land uses and key transport nodes, including Highett Activity Centre, Westfield Southland Shopping Centre and Highett Railway Station.

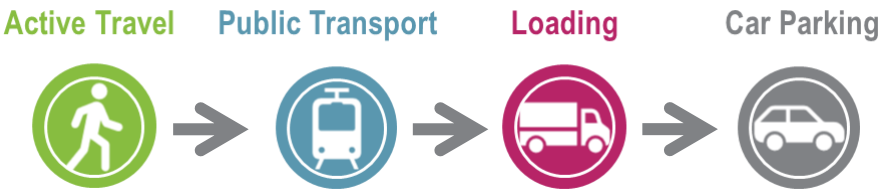
A central transport theme to many of policy documents is that encouraging the use of sustainable transport modes (and, by extension, discouraging the use of the private motor vehicle) is a critically important factor to achieving land use intensification at the site, in Bayside and other areas of Melbourne more broadly.

3. TRIP GENERATION

3.1. Preamble

As outlined earlier, a multi-modal transport approach is proposed which prioritises walking, cycling and public transport ahead of cars as a strategic means to limit the sites "transport footprint". This approach requires the adoption of a modal hierarchy in favour of walking, cycling and public transport as shown in Figure 3.1.

Figure 3.1: Proposed Modal Hierarchy

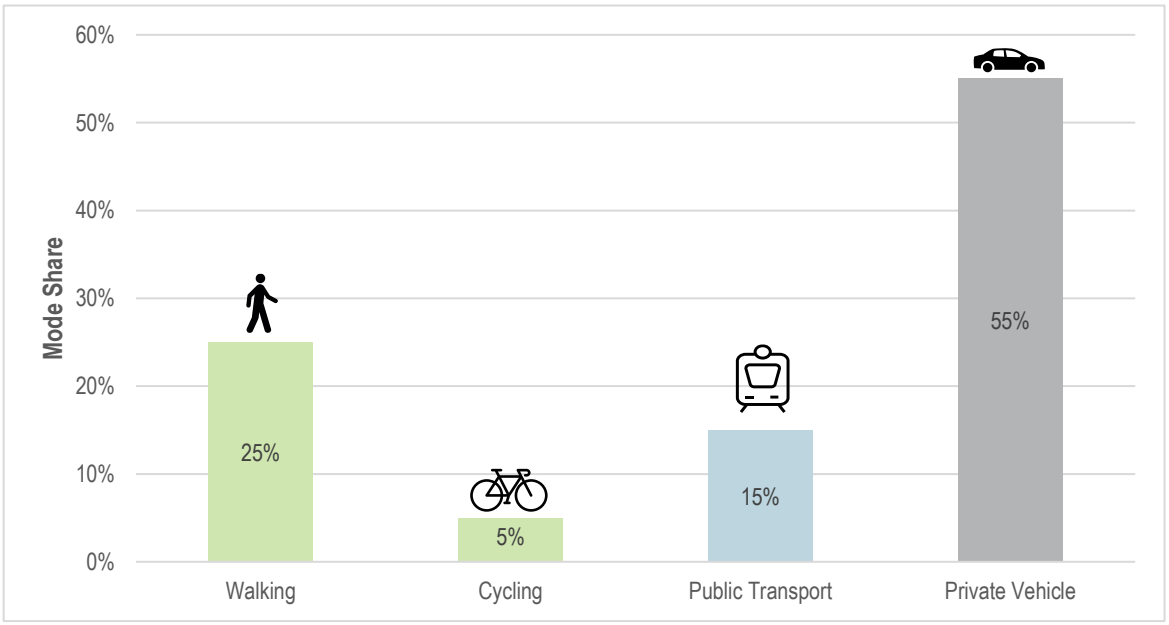


3.2. Mode Share and Trip Generation

For the purposes of the assessment in this report, mode share targets have been assumed based on the site context, Victorian Integrated Survey of Travel and Activity (VISTA) data and the modal hierarchy identified above.

The assumed mode shares are shown in Figure 3.2. The figure highlights a favouring to sustainable transport modes, albeit generally consistent with the VISTA data presented in Section. For assessment purposes the identified mode shares have been applied to the residential, community centre and conservation zone uses.

Figure 3.2: Assumed Transport Mode Split Targets



The forecast trip generation (for all transport modes) is presented in Table 3.1. The table assumes trip generation estimates sourced from the RMS ''Guide to Traffic Generating Developments' and first principles. The table indicates that the proposed development could be expected to generate in the order of approximately 800 person trips via all modes of transport in any peak hour. This estimate relates to the ultimate full Development Plan and reflects total external trips.

Table 3.1: Trips Generated by Use – Weekday Peak Hour

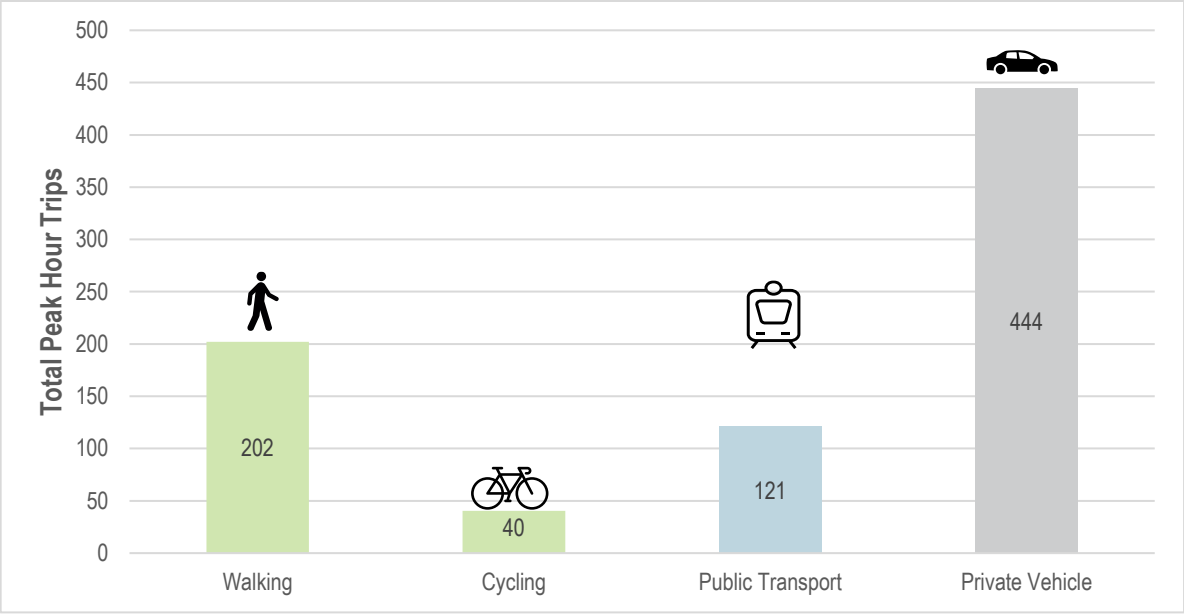
Land Use	Size	Peak Hour Trip Generation Rate	Peak Hour Trip Generation Estimate
Townhouses	76 dwellings	1.0 trips per 100sqm	76
Apartments	972 dwellings	0.65 trips per room	632
Community Centre	1,000sqm	6.0 trips per dwelling	60
Conservation Zone	3ha	-	40
Total			**808**

Using the mode split information presented above (refer to Figure 3.2), approximate travel demands by mode are presented in Table 3.2 for the weekday peak hour. The table indicates the ultimate development proposed in the Development Plan could be expected to generate in the order of 200 walking trips, 40 cycling trips, 120 public transport trips and 440 vehicle trips (inclusive of approximately 360 driver trips and 80 passenger trips assuming an average car occupancy of 1.2). The additional trips are shown graphically in Figure 3.3.

Table 3.2: Trips Generation by Mode – Weekday Peak Hour

Mode	Townhouses	Apartments	Community Centre	Conservation Zone	Total
Walking	19	158	15	10	202
Cycling	4	32	3	2	40
Public Transport	11	95	9	6	121
Private Vehicle	42	347	33	22	444
Total	**76**	**632**	**60**	**40**	**808**

Figure 3.3: Trips Generation by Mode – Weekday PM Peak Hour



[It is emphasised that the estimate of approximately 360 peak hour vehicle trips (as driver) generally aligns with the peak hour traffic generation estimate.]

4. ACTIVE TRAVEL RESPONSE

4.1. Overview

Active travel (walking and cycling) has been identified as the highest priority modes in the modal hierarchy presented in Section 3.1.

The trip generation assessment identifies that there will in the order of 200 walking trips, and 40 bicycle trips, to and from the site during the peak hour (plus approximately 120 additional pedestrian trips to surrounding public transport services).

In this context, pedestrian access and amenity is critically important to the success of the development, noting that the number of active or sustainable trips is 1:1 to private vehicle trips as driver. This importance is reflected in numerous local and state policies which seek to encourage active travel modes in place of private vehicle travel.

4.2. Development Plan Response

4.2.1. Development Plan Response #1 – Improved Pedestrian Permeability

The Highett Activity Centre Structure Plan identifies the following strategy relating to active travel permeability:

"Ensure any redevelopment of the CSIRO site provides public shared pedestrian and bicycle paths that connect Highett Road to Bay Road and Graham Road to Middleton Street."

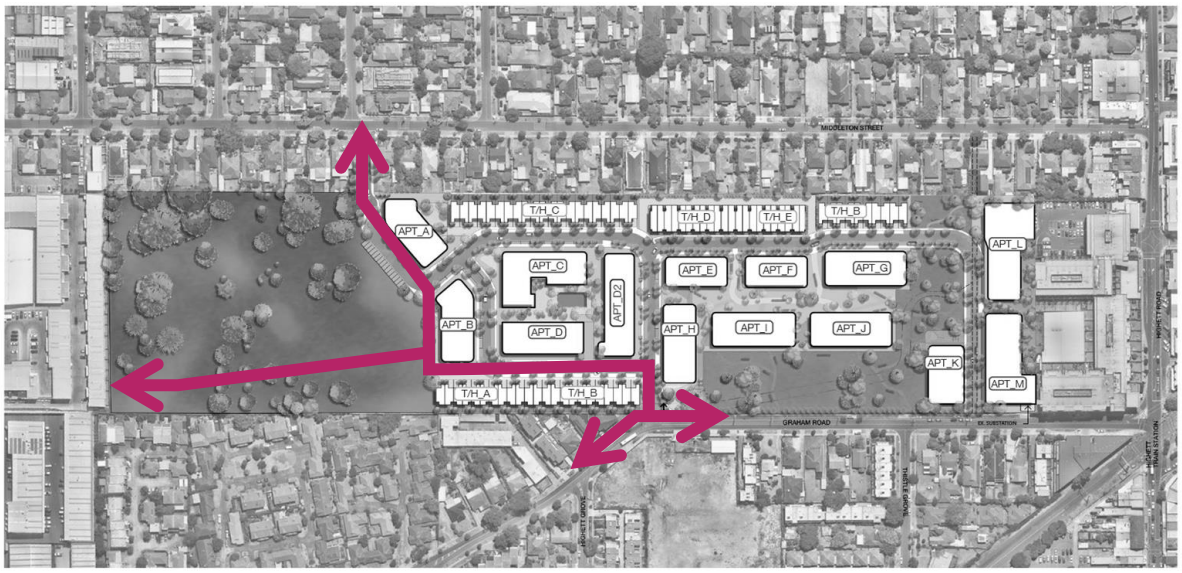
The proposed redevelopment will create new pedestrian connections both internally, and to the surrounding road network that have previously been unavailable to pedestrians.

These new links will reduce pedestrian travel times and distances between Bay Road and Highett Road (north-south) and Middleton Street and Graham Road (east-west). It will also create a more favourable pedestrian environment to walk around, with the new pedestrian links incorporating the path network to be delivered as part of the conservation zone.

The new east-west and north-south pedestrian links through the site are shown in Figure 4.1. It is noted that the alignment of the pedestrian links are, in part, governed by the existing available access locations to Middleton Street (to the west) and Bay Road (to the south).

The identified pedestrian links are generally consistent with those shown in the Highett Structure Plan (refer to Figure 2.7.)

Figure 4.1: Improved Pedestrian Permeability



4.2.2. Development Plan Response #2 – Pedestrian Priority Treatments

Pedestrian footpaths will be provided on both sides of each of the internal access streets. Further details regarding the proposed internal cross-sections are provided in Section 0.

Shared zones will be provided at key locations within the development which will further prioritise pedestrian movements over vehicles within the development. It is intended that shared zones will be provided at the following locations, shown in Figure 4.2:

- Connecting the pedestrian mews (between buildings E and H) and the communal recreational facilities.
- Connecting the two parts of the 1ha park at the northern end of the site.

Specific details regarding the design of the shared zones will be provided as part of the planning permits for the relevant stages of development.

Figure 4.2: Proposed Shared Zone Locations

4.2.3. Development Plan Response #3 – Increased Bike Parking

The statutory requirements for the provision of bicycle parking are set out in Clause 52.34 of the Bayside Planning Scheme, including the following residential requirements:

- *"Resident: In developments of four or more storeys, 1 to each 5 dwellings*
- *Visitor: In developments of four or more storeys, 1 to each 10 dwellings".*

In order to further encourage cycling as a mode of transport to and from the site, bicycle parking for the residential uses is recommended that the resident rate be provided at a minimum of 1.5 times the statutory requirement. The resident spaces will be provided in consolidated locations in car parking areas for each apartment building (ideally at ground or +/- one level from ground level) and within private garages for the townhouses.

Additionally, bicycle hoops will be provided throughout the development plan area (including at the community centre and conservation zone uses) to cater for visitor demands of the site.

4.2.4. Development Plan Response #4 – Green Travel Planning Initiatives

The Highett Activity Centre Structure Plan identifies the following strategy relating to green travel planning:

"Investigate the feasibility of requiring new developments to provide Green Travel Plans that outline alternative transport options in the local area, incentives for use of alternative transport options, and consider partnering with transport services to provide bike or car share programs."

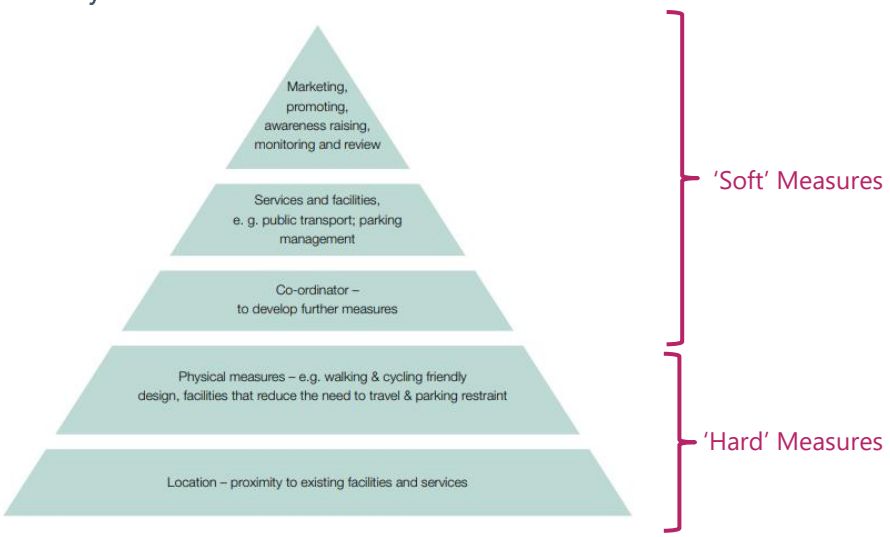
In addition to the physical measures incorporated into the design (and identified in this report), it is recommended that a Green Travel Plan be prepared for each of the development sites at the permit condition stage.

The Green Travel Plan will assist residents and visitors make informed decisions about the most efficient and sustainable transport options for travel to/from the site, with the Plan encouraging a reduction in mode share away from car (driver).

It is recommended that a Green Travel Plan Coordinator role be incorporated into the body corporate for the site.

Figure 4.3 below, reproduced from the *"Good Practice Guidelines: Delivering Travel Plans through the Planning Process"* guideline prepared by the UK Department for Transport (April 2009), illustrates how successful Travel Plans are built and indicates that a mixture of "hard" and "soft" measures are often critical to the success of a strategy in reducing the use of private motor vehicle. The specific 'soft' measures will be identified at the time of preparing the Plan.

Figure 4.3: Green Travel Plan Pyramid



4.3. Summary

The internal transport network has been developed to prioritise pedestrian movements to, from and within the site. The proposed responses to enhance active travel to and from the proposed development include:

- Enhanced pedestrian and cyclist permeability through the site (the site will no longer act as a barrier for east-west and north-south active travel but rather an enabler).
- Pedestrian footpaths will be provided on both sides of the internal private roads, with cycling movements catered for within each of the carriageways.
- Resident bike parking will be provided at least 1.5 times the minimum statutory requirement.
- Incorporate Green Travel Planning initiatives into the development.

These responses can be expected to facilitate the anticipated increase in active travel activity generated to / from and within the site.

5. PUBLIC TRANSPORT RESPONSE

5.1. Overview

The responsibility for the efficiency and quality of public transport services across Melbourne resides principally with State Government and its authorities.

The trip generation assessment identifies that there will in the order of 120 public transport trips to and from the site during the peak hour. It is envisaged that the majority of these public transport trips would be via the Highett Railway Station (approximately 100 trips) and the remainder via the local bus services in the vicinity of the site.

In this context, it is essential that the proposed development provides convenient pedestrian connections to the existing public transport facilities (bus and rail), noting that the established pedestrian network does connect the site to these services. The proposed pedestrian connections to the existing network are detailed in the previous section.

5.2. Development Plan Response

5.2.1. Development Plan Response #1 – Improved Bus Travel Times

The Highett Activity Centre Structure Plan identifies the following strategy relating to the bus network operation:

"Advocate to PTV for improved level of service of buses to every 10 minutes during peak times, improve access to bus stops within the Activity Centre and improve priority for buses on the surrounding road network."

In this respect, the traffic analysis and associated mitigation measures at the Bay Road /Graham Road intersection detailed later in this report seek to minimise delays for all vehicles (including buses) at the intersection.

Furthermore, land use intensification at locations with good public transport accessibility will increase public transport usage and reduce the reliance on private vehicle travel for residents of Bayside.

5.2.2. Network Capacity Assessment

An estimate of the site generated public transport trips on the network is presented in Table 5.1. This estimate is based on the existing public transport network and does not account for new projects such as Melbourne Metro or Suburban Rail Loop projects which will further increase the capacity of the public transport network. Overall, this estimate suggests that the relative impact of the development per service is likely to be very modest.

Table 5.1: Forecast Additional Public Transport Trips

Public Transport Mode	Forecast Additional Trips	Public Transport Services	Approximate no. of Peak Hour Services	Additional Trips per Service
Train	~100	Highett Station	12	9 passengers per train
Bus	~20	708, 822 and 828	7	3 passengers per bus

5.3. Summary

The site is located in close proximity to a number of public transport options. The services are frequent and provide convenient connections to a large part of south eastern Melbourne. The development aims to integrate the site into the surrounding area with improved pedestrian connections which will further enhance the connections to public transport.

6. LOADING / WASTE COLLECTION

6.1. Overview

Clause 65 of the Bayside Planning Scheme indicates that *"Before deciding on an application or approval of a plan, the responsible authority must consider, as appropriate: … The adequacy of loading and unloading facilities and any associated amenity, traffic flow and road safety impacts…"*. In this regard, the following presents an assessment of the proposed loading response.

6.2. Loading

Loading will occur from the internal road network to be delivered as part of the Development Plan. Specific, loading strategies will be developed for each apartment building and stage as the project is delivered. It is envisaged that loading events could occur from both the Graham Road and Middleton Street access points with loading vehicles to enter and exit the site in a forward direction.

6.3. Waste Collection

Waste collection for the residential land uses will be collected by a private contractor. It is recommended that each apartment building provides their own bin store room, or a consolidated facility where buildings are co-located.

It is envisaged that loading events could occur from both the Graham Road and Middleton Street access points.

Waste management plans will be prepared for each stage of development and will detail the number of bins required, frequency of collection, bin storage locations and waste collection vehicle accessibility.

7. PRIVATE VEHICLE RESPONSE

7.1. Overview

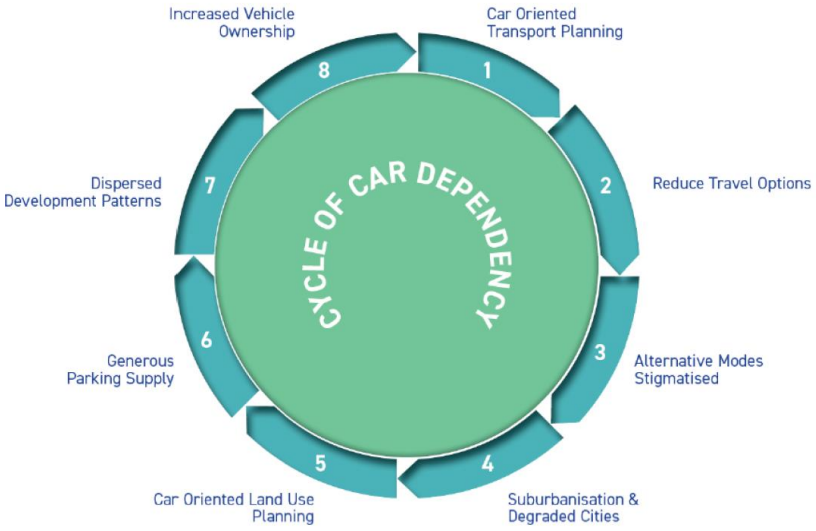
As middle and outer Melbourne continues to grow, the historic approaches to transport infrastructure and management will need to change to become more aligned with the approach typically adopted in inner suburban and CBD locations.

For the development, this will entail the adoption of a modal hierarchy which (amongst other items) encourages the use of walking, cycling and public transport as the preferred mode of travel, and reduces external traffic impacts by reducing car parking provision as far as reasonably practicable.

The trip generation assessment identifies that there will in the order of 440 trips by private vehicle to and from the site during the peak hour, including approximately 360 trips as driver and a further 80 as passengers.

This approach seeks to minimise car parking supply in line with market forces of supply and demand to reduce the quantum of traffic generated by the land use and break the cycle of car dependency (refer to Figure 7.1 below).

Figure 7.1: Cycle of Car Dependency



7.2. Car Parking Responses

7.2.1. Development Plan Response #1 – Contemporary Car Parking Provision

The Highett Activity Centre Structure Plan identifies the following strategy relating to the car parking provision:

"Ensure developments provide the required number of car parking spaces under the Bayside Planning Scheme."

The Bayside Planning Scheme imposes minimum car parking requirements on land use developments.

Rather than maximising car parking on the site, as prescribed by the planning scheme, it is proposed to limit car parking on-site to reduce traffic generation from the site. This outcome is consistent with the modal

hierarchy adopted for the site which seeks to minimise vehicle travel. Further discussion regarding this strategy is provided below under *'contemporary approach to car parking'*.

Of particular note, the above Structure Plan strategy sits underneath the following broader Structure Plan objective: which is consistent with the adopted transport approach for the site:

"Mitigate traffic and car parking impacts of future population growth."

In this respect, it is often considered that the best traffic mitigation measure is to reduce the provision of on-site car parking which in turn reduces a sites ability to generate traffic (and in turn minimise its off-site traffic impact).

Contemporary Approach to Car Parking

The standard approach to car parking provision, as prescribed by the Planning Scheme (i.e. provide a minimum), has historical origins which follow a *'predict and provide'* approach.

The Austroads 'Guide to Traffic Management Part 11 (2017)' describes this approach as a technique which readily interprets a *'parking problem'* as an issue of *'inadequate supply'*. It goes on to note that this problematic ideology is underlined by the premise that:

- *"More parking is better,*
- *Every destination should satisfy its own parking needs (minimum ratios),*
- *Car parks should never fill,*
- *Parking should always be free or subsidised or incorporated into buildings costs."*

In more recent times, the *'predict and provide'* approach has been steadily replaced by a range of travel demand management techniques which challenge historical travel behaviours and encourage mode change away (reversing the trend) from private motor vehicle travel. This approach is aligned with the sustainable transport policies summarised in Section 2 of this report.

Statutory Car Parking Requirements

Statutory requirements for the provision of car parking are set out in Clause 52.06 of the Bayside Planning Scheme, with parking rates specified in Table 1 to Clause 52.06-5. As the site is within the Principal Public Transport Network Area, the rates in Column B of the table apply to this site. An assessment of the statutory parking requirements for the development proposal is set out in Table 7.1.

Table 7.1: Statutory Car Parking Requirements

Description	Use	Size	Statutory Parking Rate	Statutory Parking Requirement
Residential Dwelling	Apartments & Townhouses	220 x 1-bedrrom 600 x 2-bedroom 218 x 3-bedroom 10 x 4-bedroom	1 space / one or two bedroom dwelling 2 spaces / three+ bedroom dwelling	1,276 spaces
	Dwelling (Visitors)	1,048 dwellings	0 spaces / dwelling	0 spaces
Community Centre		1,000sqm	Not specified	-
Conservation Zone		3ha	Not specified	-
Total				**1,276 spaces**

The above assessment anticipates the residential component of the development has statutory requirement of 1,276 spaces, noting that there is no visitor statutory parking requirement. The Community Centre and Conservation Zone uses also have no specified parking rate.

Existing Car Ownership

Further guidance regarding opportunities to reduce the car parking provision for the 1-bedroom dwellings has been sought from car ownership data contained in the 2016 Census by the Australian Bureau of Statistics (ABS). Data extracted for apartments in 2 or more storey developments indicates the following:

- 45% of studio apartment residents do not own a car
- 20% of 1-bedroom residents do not own a car.

The above car ownership data indicates that there is currently a reasonable demand for 1-bedroom housing stock without any car parking attached. The provision of some smaller 1-bedroom dwellings without car parking will also assist with affordability and allow some buyers to purchase a dwelling who may not have been able to afford one otherwise.

In addition to the above, the ABS data indicates an average car ownership for 3-bedroom dwellings of 1.5 spaces per dwelling. This data suggests a demand for 3-bedroom dwellings with car parking rates lower than the statutory minimums.

Recommended Car Parking Rates

Having regard for the statutory car parking controls, the policy context of the site and the existing car ownership data, the recommended car parking rates for adoption for the Development Plan are set out in Table 7.2.

Table 7.2: Recommended Car Parking Rates

Land Use	Rate
Residential	
• 1-bedroom dwelling	0.5 to 1.0 spaces per dwelling
• 2-bedroom dwelling	1.0 space per dwelling
• 3-bedroom dwelling	1.5 to 2.0 spaces per dwelling
• 4-bedrrom dwelling	2.0 spaces per dwelling
• Visitor parking	0 to 0.2 spaces per dwelling [1]
Community Centre	1.5 to 2.0 spaces per 100sqm (to be confirmed in conjunction with Council) [2]
Conservation Zone	10 spaces (to be confirmed in conjunction with Council)

[1] Sourced from the Column A and B rates from Clause 52.06 of the Planning Scheme.
[2] Based on car parking surveys conducted by GTA at similar facilities.

Using the rates identified above, and the development yields outlined earlier, Table 7.3 presents an assessment of the anticipated car parking demands generated by the Development Plan.

Table 7.3: Anticipated Car Parking Demands

Land Use		Size	Parking Rate	Resultant Provision		Development Plan Proposed Provision
				Lower	Upper	
Apartments	1-bedroom	220	0.5-1.0 space / dwelling	110 spaces	220 spaces	178 spaces
	2-bedroom	600	1 space / dwelling	600 spaces	600 spaces	600 spaces
	3-bedroom	147	1.5-2.0 spaces / dwelling	221 spaces	294 spaces	294 spaces
	4-bedroom	5	2 spaces / dwelling	10 spaces	10 spaces	10 spaces
Townhouses	3-bedroom	15	1.5-2.0 spaces / dwelling	23 spaces	30 spaces	30 spaces
	4-bedroom	61	2 spaces / dwelling	122 spaces	122 spaces	122 spaces
Residential Visitor		1,048	0-0.2 spaces / dwelling	0 spaces	210 spaces	~ 60 spaces
Community Centre		1,000sqm	1.5-2.0 spaces / 100sqm	15 spaces	20 spaces	19 spaces
Conservation Zone		3ha	10 spaces	10 spaces	10 spaces	10 spaces
Total				**1,111 spaces**	**1,516 spaces**	**1,323 spaces**

7.2.2. Development Plan Response #2 – Provision of Car Share

To further support reduced car parking provision, car share provides a convenient option to enable access to a car but removes the need to own a vehicle. Car share is currently a popular transport alternative in inner Melbourne suburbs where densities are higher, congestion greater and car ownership rates are historically lower.

Cars typically spend 95 per cent of their life unused, representing a very inefficient use of space and resources. Car share provides convenient access to a car for trips where alternative modes are not a viable option. Some service providers estimate that one share car can replace up to 15 private vehicles, significantly reducing the space required to store private cars and reducing the costs of purchasing and operating a car for a number of would-be owners[3].

The Development Plan does not seek to commit to a specific rate of car share vehicles, noting that any provision needs to be agreed commercially with a provider. However, this report does commit to car share being part of the transport strategy for the site. Specific car share provisions would be dealt with on a stage by stage basis.

[3] The Sharing Economy, Transport Matters, GTA Consultants http://www.gta.com.au/transportmatters/transportmatters_vol9_issue4_web.pdf

7.3. Traffic Impact Assessment

7.3.1. Traffic Generation

A summary of the anticipated peak hour and daily traffic generation from the site, based on rates obtained from various sources is presented in Table 7.4. This table indicates that the development is expected to generate in the order of 380 vehicle movements in a peak hour with 3,800 vehicle movements over the entire day.

Table 7.4: Forecast Development Traffic Generation

Land Use	Size	Traffic Generation Rates		Traffic Generation	
		Peak Hour	Daily	Peak Hour	Daily
Townhouses	76 dwellings	0.6 movements per dwelling [1]	6 movements per dwelling [2	46	456
Apartments	972 dwellings	0.3 movements per dwelling [1]	3 movements per dwelling [2]	292	2,916
Conservation Area	10 spaces	2 movements per space [3]	20 movements per space [2]	20	200
Community Centre	19 spaces	1 movement per space [3]	10 movements per space [2]	19	190
Total				**377**	**3,762**

[1] Based on traffic surveys of similar residential developments.
[2] Adopting a peak-to-daily ratio of 10%.
[3] First principles assessment.

7.3.2. Distribution and Assignment

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

1. configuration of the arterial road network in the immediate vicinity of the site
2. existing operation of intersections providing access between the local and arterial road network
3. surrounding employment centres, retail centres and schools in relation to the site
4. configuration of access points to the site.

Having consideration to the above, for the purposes of estimating vehicle movements, the following directional distributions have been assumed:

- Graham Road (north): 35%
- Graham Road (south): 35%
- Middleton Street (north): 15%
- Middleton Street (north): 15%.

The anticipated distribution and assignment of post development traffic volumes is presented in Appendix A. This includes AM and PM peak hour turning movement diagrams for the existing, additional and post development scenario.[4]

[4] The direction distribution of at the Highett Street / Nepean Highway / Rowans Avenue has been based on the existing proportion of vehicles turning into and out of the western approach of the intersection (High Street).

7.3.3. Intersection Operation

The existing and post development operation of the surrounding intersections has been assessed using *SIDRA INTERSECTION 8*, a computer-based modelling package which calculates intersection performance.

It is noted that the SIDRA analysis has been completed as follows:

- The Highett Road / Graham Road intersection has been modelled in a SIDRA Network and includes consideration of the adjacent signals at Train Street and the Pedestrian Operated Signals. The level crossing has been represented in SIDRA by including a "dummy phase" which shuts the intersection down for 33% of the peak hour.
- The Nepean Highway / Highett Road intersection is part of a complex network (Nepean Highway) but has been modelled as an isolated intersection in SIDRA. Moreover, the analysis is based on various assumptions (e.g., cycle time of 150 seconds and phase times determined by the program for existing conditions and matched under post-development conditions). The analysis presented is accordingly an approximation only.

The SIDRA results for the existing and post development operation of the surrounding intersections (no mitigating works) are presented in Table 7.5, with full SIDRA outputs also provided in Appendix B.

Table 7.5: Existing and Post Development SIDRA Intersection Operation (without Mitigation)

Peak Hour	Intersection	Existing Conditions			Post Development		
		DOS	Average Delay (sec)	95th Percentile Queue (m)	DOS	Average Delay (sec)	95th Percentile Queue (m)
AM	Bay Road / Graham Road	0.89	6	56	3.70	166	685
	Highett Road / Train Street	0.22	9	19	0.25	8	21
	Highett Road / Graham Road	0.50	27	41	0.89	35	47
	Highett Road / Pedestrian Signals	0.22	1	12	0.27	1	14
	Bay Road / Middleton Street	0.26	1	5	0.27	1	6
	Highett Road / Middleton Street	0.23	1	3	0.25	1	4
	Highett Road / Nepean Highway	0.85	34	393	0.97 [1]	36	395
PM	Bay Road / Graham Road	0.62	5	48	2.5	72	442
	Highett Road / Train Street	0.33	13	24	0.39	12	29
	Highett Road / Graham Road	0.64	28	55	0.77	33	70
	Highett Road / Pedestrian Signals	0.30	2	17	0.52	2	28
	Bay Road / Middleton Street	0.28	1	4	0.30	1	5
	Highett Road / Middleton Street	0.28	1	4	0.20	2	7
	Highett Road / Nepean Highway	0.99	51	680	1.12 [2]	56	704

[1] DOS = West approach, right turn
[2] DOS = North approach, right turn

The analysis summarised in Table 7.5 indicates that the proposed development is not expected to materially alter the operation of the surrounding intersections, other than at the following intersections:

- *The Bay Road / Graham Road intersection.* This intersection is currently operating just under its theoretical capacity limit (DOS of 0.9) which is consistent with peak hour observations which indicate that vehicles exiting Graham Road turn left despite initially seeking to undertake a right turn movement at the intersection. Under post-development conditions, the intersection operates well beyond its limit, which indicates that mitigation measures will be required at the intersection. This mitigation is discussed in Section 7.3.4 of this report.
- *The Highett Road / Nepean Highway intersection*. This signalised intersection is operating above its theoretical capacity limit (DOS of 0.95) during the PM peak hour under existing conditions. Under post-development conditions, the intersection is expected to operate with a slightly higher DOS but with very similar average delays and queues. In this context, the completion of mitigating works at this intersection as a result of the proposed development of the site is not considered to be required.[5]

7.3.4. Mitigation Works

Consistent with the direction of the Structure Plan, the signalisation of the existing Bay Road / Graham Road intersection is considered the most appropriate mitigation measure.

The adopted SIDRA layouts of this intersection is presented in Table 7.6 indicates that the Bay Road / Graham Road intersection can be expected to operate with a satisfactory level of service following the signalisation of the intersection, with the additional traffic generated by the proposed development. Moreover, the analysis indicates that the additional impact of the proposed development is relatively minor, with the DOS increasing from 0.73 to 0.80 and 0.81 to 0.88 during the AM and PM peak hours respectively with the additional development generated traffic.

[5] It is also considered appropriate to note that the proposed development generates a relatively modest level of additional traffic to this intersection, which is equal to approximately 2% of the total existing volumes through the intersection. In most instance, the completion of mitigating works for such a small increase would not be considered reasonable having regard to the principles of nexus and equity.

Figure 7.2. This layout assumes the provision of a single lane from Graham Road (given the constraints of that road reserve) and the widening of Bay Road east of Graham Road to provide two departure lanes. The provision of the two departure lanes increases the capacity of the signalised intersection although is a matter that will ultimately likely require discussions with Council and the Department of Transport.

The operation of the intersection assuming the layout shown in Figure 7.2 for existing traffic conditions and post-development conditions (with development generated traffic) is presented in Table 7.6. It is noted that the SIDRA analysis has been completed as an isolated intersection and assuming a cycle time of 90 seconds[6].

Table 7.6 indicates that the Bay Road / Graham Road intersection can be expected to operate with a satisfactory level of service following the signalisation of the intersection, with the additional traffic generated by the proposed development. Moreover, the analysis indicates that the additional impact of the proposed development is relatively minor, with the DOS increasing from 0.73 to 0.80 and 0.81 to 0.88 during the AM and PM peak hours respectively with the additional development generated traffic.

[6] The intersection has not been analysed in a Network model (including Bay Road / Reserve Road or the existing Pedestrian Operated Signals) as such analysis is not considered warranted in this instance. Notwithstanding this, it is noted that such analysis could be completed as the planning permit application stage if deemed necessary by DOT.

Figure 7.2: Bay Road / Graham Road SIDRA Layout

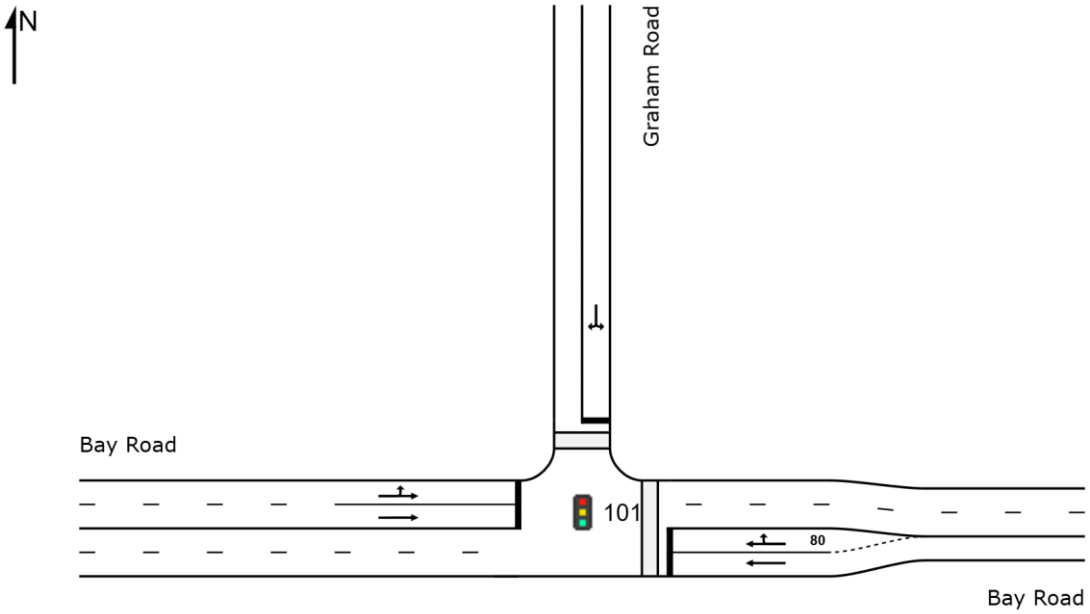


Table 7.6: Bay Road / Graham Road Signalised Intersection – SIDRA Intersection Operation

Peak Hour	Intersection	Approach	Signalised Intersection – Existing Traffic Volumes			Signalised Intersection – Post Development Traffic Volumes		
			DOS	Average Delay (sec)	95th Percentile Queue (m)	DOS	Average Delay (sec)	95th Percentile Queue (m)
AM	Bay Road / Graham Road	Bay Road (East)	0.54	5s	98m	0.61	6s	126m
			0.54	5s	58m	0.61	11s	68m
		Graham Road (North)	0.31	37s	24m	0.70	41s	55m
		Bay Road (West)	0.73	22s	159m	0.80	27s	188m
			0.73	22s	161m	0.80	27s	189m
PM	Bay Road / Graham Road	Bay Road (East)	0.63	5	125m	0.71	5s	147m
			0.63	10s	74m	0.71	23	102m
		Graham Road (North)	0.26	32s	26m	0.52	39s	40m
		Bay Road (West)	0.81	27s	194m	0.88	35s	235m
			0.81	27s	195m	0.88	35s	237m

7.3.5. Other Traffic Considerations

Site Vehicle Access

The operation of the proposed site access points to Graham Road and Middleton Road have also been assessed using SIDRA INTERSECTION software.

For assessment purposes, it has been assumed that 50% of development traffic uses the southern access to Graham Road, 20% to the northern access to Graham Road and the remaining 30% to Middleton Street. Accordingly, only the southern access to Graham Road has been modelled (noting the northern access will carry less traffic and in turn will operate better). The site access has been modelled with a shared left and right lane.

The operation of the southern site access to Graham Road under post development traffic volume conditions is presented in Table 7.7. The analysis indicates that each of the site access points are expected to operate satisfactorily with negligible queues and delays on all approaches.

Table 7.7: Site Access SIDRA Intersection Operation

Peak Hour	Intersection	Post Development		
		DOS	Average Delay (sec)	95th Percentile Queue (m)
AM	Graham Road / Site Access (south)	0.13	4	4
	Middleton Street / Site Access	0.14	3	3
PM	Graham Road / Site Access (south)	0.08	4	2
	Middleton Street / Site Access	0.07	4	1

DOS – Degree of Saturation,

Daily Traffic Volume Impacts – Midblock Capacity Assessment

The Highett Activity Centre Structure Plan identifies the following strategy relating to the vehicle access to the CSIRO site:

"Provide two vehicular access points to the CSIRO site, one from Graham Road and one from Middleton Street to distribute generated traffic."

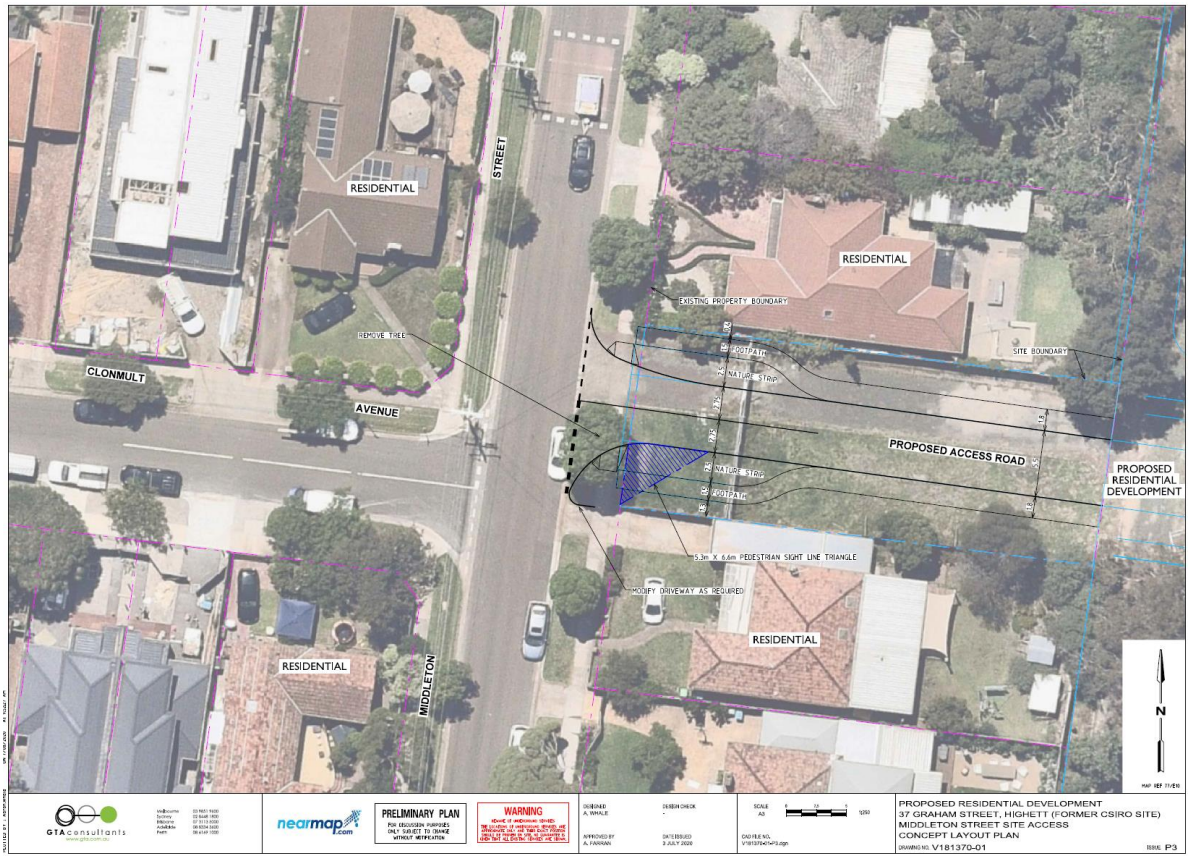
The provision of vehicle access to Graham Road and Middleton Street, rather than one or the other, disperses vehicle traffic activity more uniformly across the network. A concept level plan of the proposed vehicle access to Middleton Street is presented in Figure 7.3.

It is noted that the location of the Middleton Street vehicle access is dictated by the subject site boundaries (i.e., the limited available frontage to Middleton Street). The vehicle access has been designed to:

- Maximise the offset from Clonmult Avenue
- Maximise the offset from the existing domestic driveway to 30 Middleton Street
- Maintain appropriate sight distances to pedestrians on Middleton Street.

On balance, the benefits derived from providing vehicle access to Middleton Street outweigh any constraint resulting from the proposed site access offset from Clonmult Avenue and is considered an appropriate planning outcome.

Figure 7.3: Middleton Street Concept Layout



Having regard for the adopted vehicle access strategy, the existing, site generated and post development midblock traffic volumes on Graham Road and Middleton Street are presented in Table 7.8. The table also provides the indicative daily traffic volume thresholds for each road type, as defined by Clause 56.06 of the Bayside Planning Scheme.

Table 7.8: Midblock Capacity Assessment

Location	Daily Traffic Volumes (vpd)			Indicative Daily Traffic Volume Capacity	Consistency with Clause 56.06
	Existing	Additional (Site)	Post Development		
Graham Road (north)	3,073	+1,317	~4,390	3,000 to 7,000vpd	✓
Graham Road (south)	3,073	+1,317	~4,390	3,000 to 7,000vpd	✓
Middleton Street (north)	1,204	+564	~1,768	2,000 to 3,000vpd	✓
Middleton Street (south)	1,274	+564	~1,838	2,000 to 3,000vpd	✓

Table 7.8 indicates that each of the road links are expected to operate within their theoretical capacities following the development of the site.

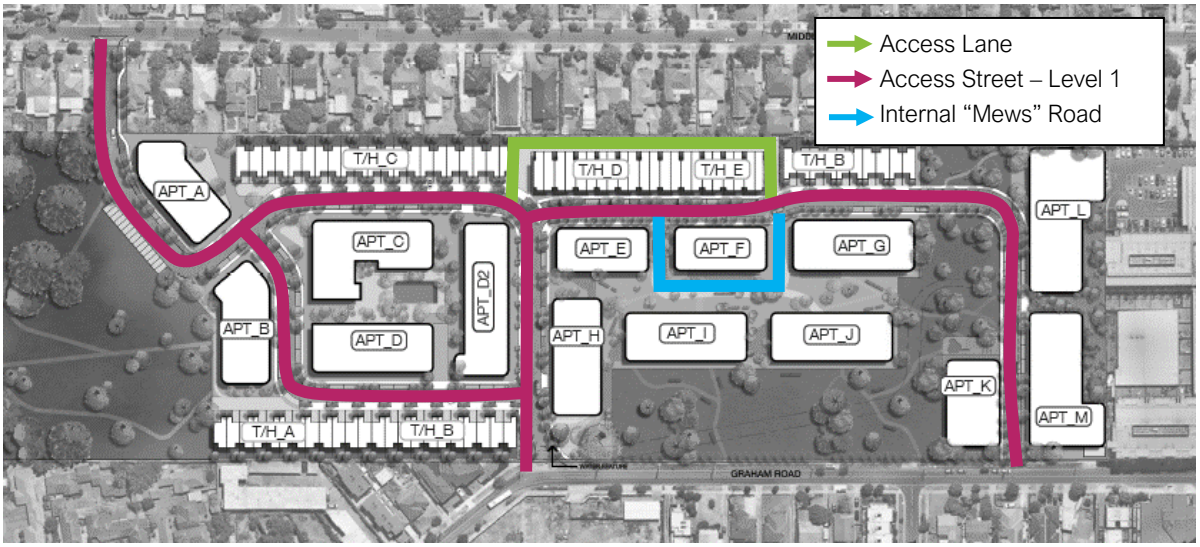
Internal Road Network

The internal road network is proposed to operate as private roads under the control and management of the body corporate. In order to maintain Council vehicle access to their assets (such as the conservation zones, community centre and the park), appropriate easement access rights will need to be provided. These detailed arrangements will be determined at the relevant planning permit stage.

Despite the adoption of private roads, each of the internal roads will be developed consistent with the dimensional requirements set out in Clause 56.06 of the Bayside Planning Scheme, noting that these requirements are more stringent than those that could be provided under the requirements of Clause 52.06 (which would otherwise apply).

In this respect, Figure 7.4 illustrates the proposed private road network hierarchy within the site. It is noted that all internal private roads within the site are relatively short in length and as a result will limit vehicle speeds through the site, the provision of additional traffic management devices (if any) will be determined at the detailed design stage.

Figure 7.4: Internal Road Hierarchy



Note: an internal 'mews' accessway is proposed to service apartment buildings E to J and will be designed in accordance with the requirements of Clause 52.06.

The proposed dimensions of the internal road network are presented in Table 7.9 and are consistent with the requirements set out in Clause 52.06 (and Clause 56.06 of the Planning Scheme).

Table 7.9: Proposed Road Cross-Sections

Street Type	Road Reservation	Carriageway Width	Verge	Car Parking Provision	Pedestrian and Cyclist Facilities	Daily Volume Threshold
Access Street – Level 1	13.5m	5.5m	8.0m	Indented parallel	1.5m both sides of carriageway	1,000 to 2,000vpd
Access Lane	5.5m	5.5m	-	None	None	Up to 300vpd

The proposed cross-sections presented above are in accordance with the minimum dimensional requirements set out in Clause 56.06. In addition, reference to the daily traffic generation estimates presented earlier indicate that each of the internal roads links will carry traffic volumes less than the maximum daily volume threshold.

The proposed 'Access Street Level 1' cross-section, which is to be adopted for the majority of the internal roadways, is shown in Figure 7.5.

Figure 7.5: Access Street Level 1 – Cross Section

Note: Indented parking is not provided along the length of the access street.

8. CONCLUSION

Based on the analysis and discussions presented within this report, the following is noted:

- The Development Plan area is to accommodate approximately 1,048 dwellings, a 1,000sqm community centre and a 3Ha Conservation Zone.
- A multi-modal transport approach which prioritises walking, cycling and public transport ahead of private vehicle travel has been adopted for the planning of the site. This will entail:
    - Improved pedestrian permeability east-west and north-south through the site.
    - Resident bicycle parking provided at 1.5 times the minimum statutory requirement.
    - Vehicle access via Graham Road and Middleton Street, which is consistent with the expectations of the Highett Structure Plan and will better disperse traffic onto the local road network.
    - An internal network of private roads, which will include traffic lanes and footpaths in each direction and indented car parking.
- The site is expected to generate up to 380 and 3,800 vehicle movements (approx.) in any peak hour and daily respectively.
- Adequate midblock capacity exists on Graham Road and Middleton Street to accommodate the site generated daily traffic demands.
- Except for the Bay Road / Graham Road intersection, adequate capacity exists at the surrounding intersections to accommodate the peak hour demands generated by the site. Signalisation of the Bay Road / Graham Road intersection has been identified as an appropriate mitigation measure to better manage both existing and post development demands at the intersection.

A. EXISTING AND FUTURE TRAFFIC VOLUME ESTIMATES

A

APPENDIX: EXISTING AND FUTURE TRAFFIC VOLUME ESTIMATES

Figure A1: Existing Traffic Volumes – AM Peak Hour

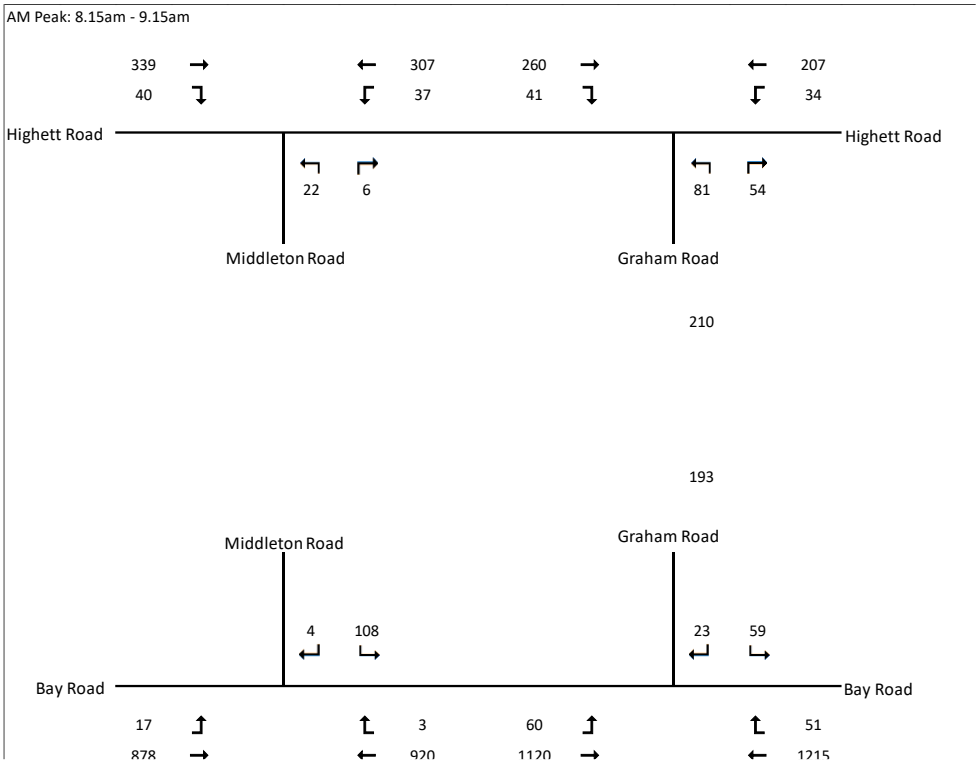
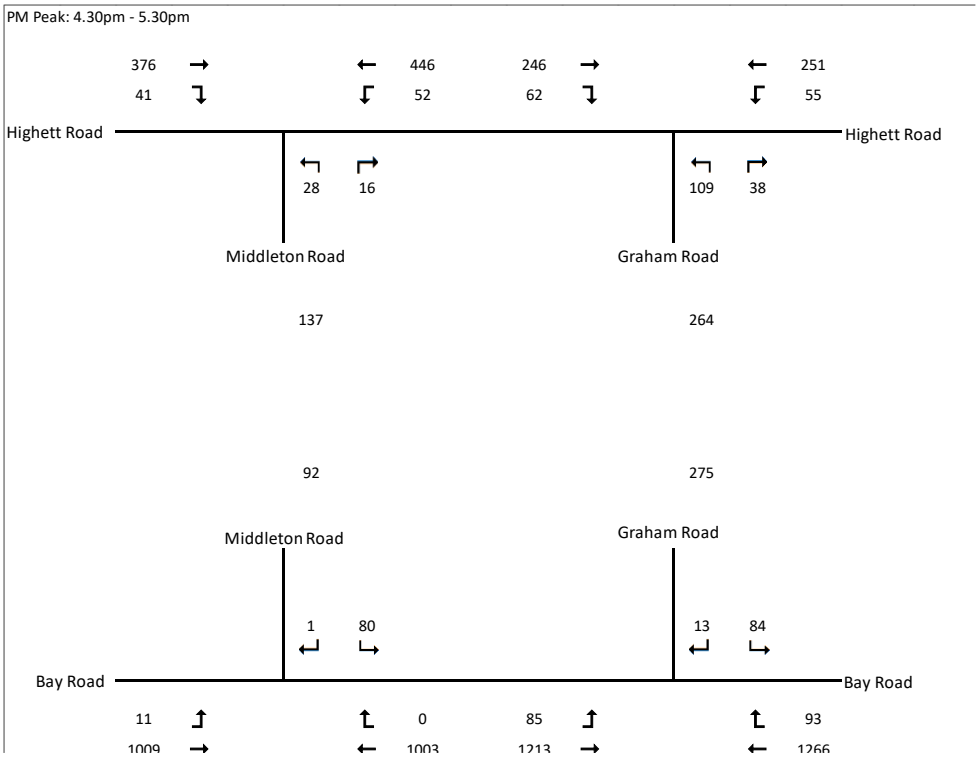


Figure A2: Existing Traffic Volumes – PM Peak Hour



APPENDIX: EXISTING AND FUTURE TRAFFIC VOLUME ESTIMATES

Figure A3: Site Generated Traffic Volumes – AM Peak Hour

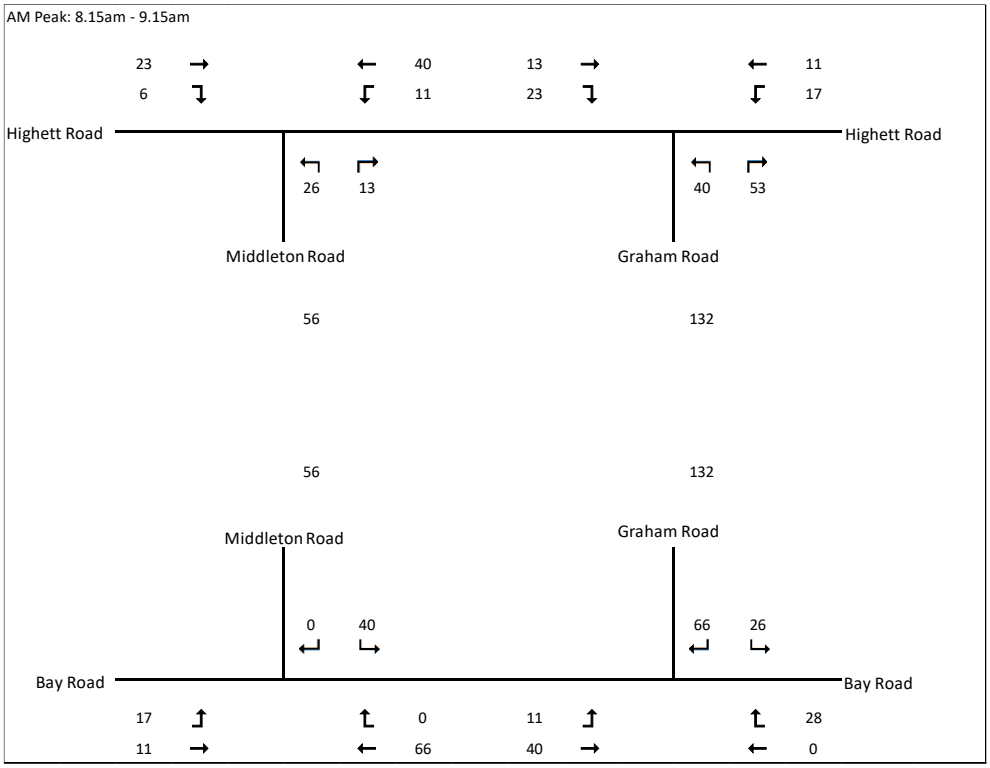
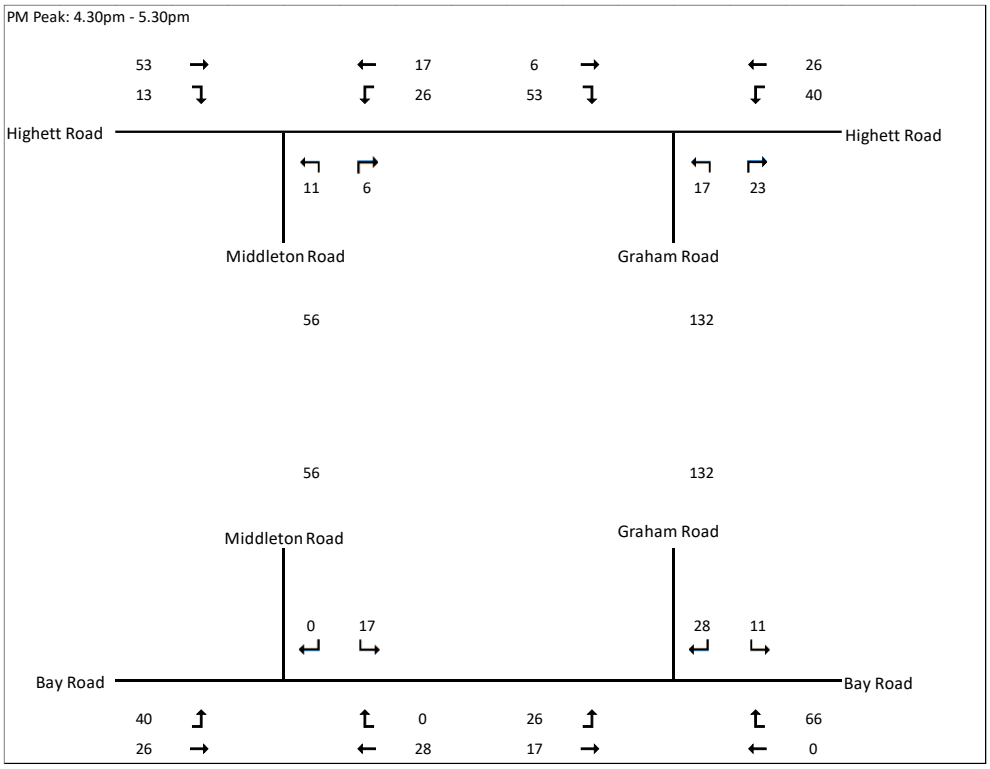


Figure A4: Site Generated Traffic Volumes – PM Peak Hour



APPENDIX: EXISTING AND FUTURE TRAFFIC VOLUME ESTIMATES

Figure A5: Post Development Traffic Volumes – AM Peak Hour

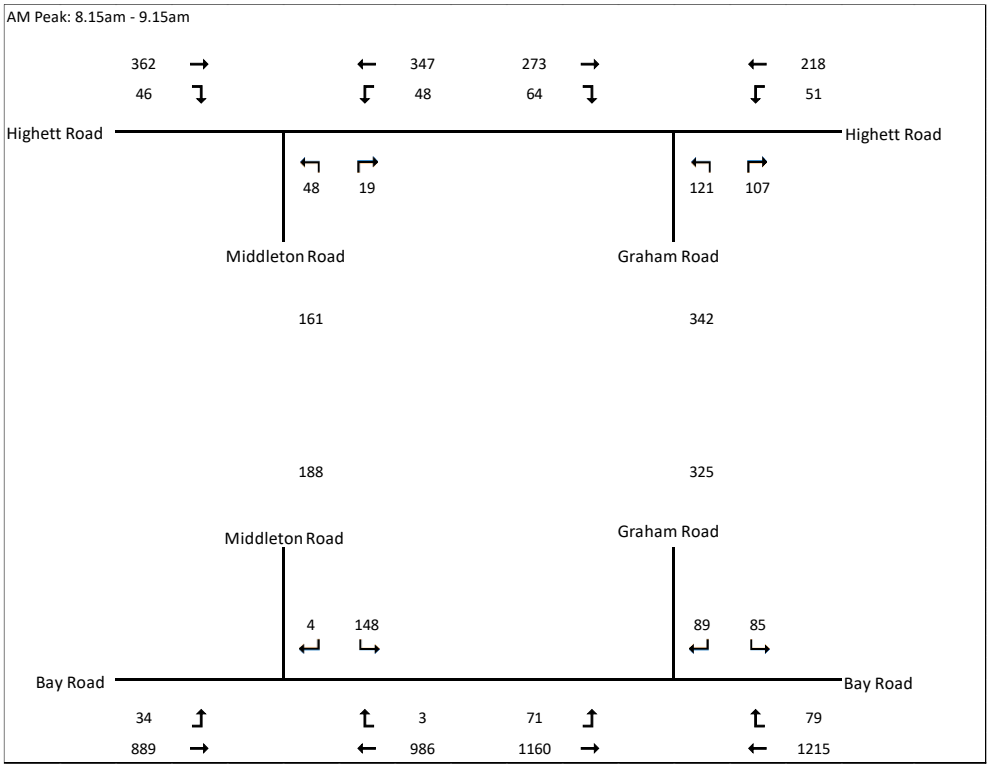
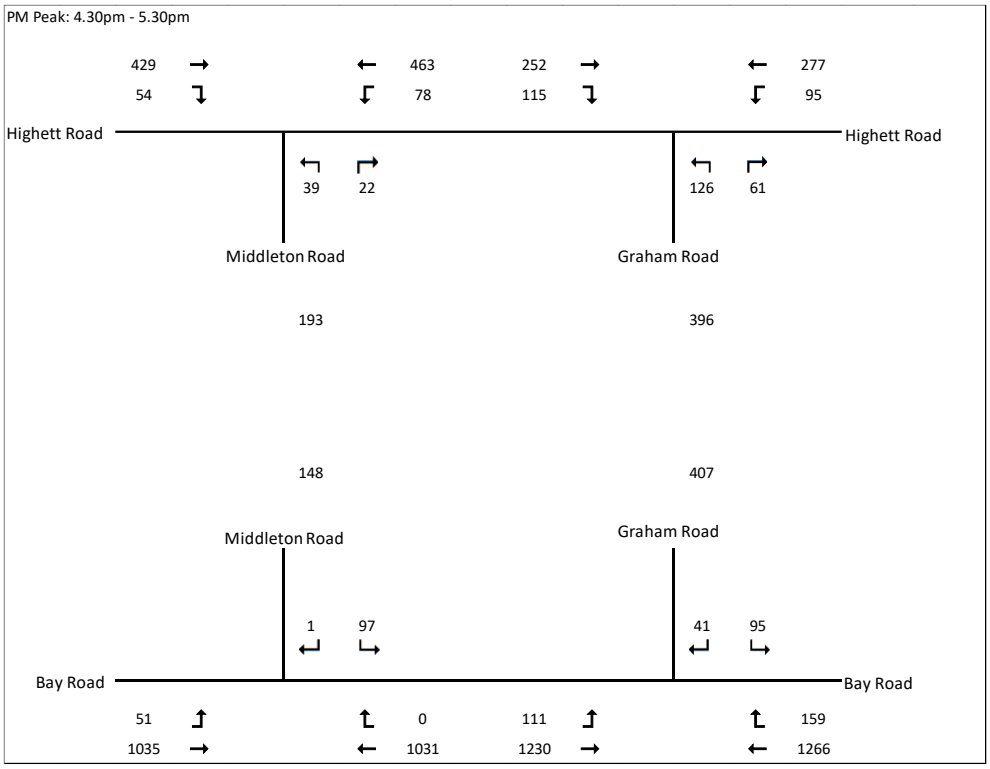


Figure A6: Post Development Traffic Volumes – PM Peak Hour



B. SIDRA INTERSECTION RESULTS

B

MOVEMENT SUMMARY

Site: 101 [AM - Bay Road & Graham Road Adj. (gap acceptance)]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Bay Road												
5	T1	1279	3.8	0.453	3.0	LOS A	7.7	55.8	0.34	0.04	0.41	55.6
6	R2	54	9.8	0.453	26.0	LOS D	7.7	55.8	1.00	0.11	1.22	46.1
Approach		1333	4.0	0.453	4.0	NA	7.7	55.8	0.36	0.04	0.44	55.0
North: Graham Road												
7	L2	62	13.6	0.890	99.6	LOS F	5.4	41.4	0.90	1.60	2.60	18.4
9	R2	24	4.3	0.890	213.6	LOS F	5.4	41.4	0.90	1.60	2.60	15.1
Approach		86	11.0	0.890	131.6	LOS F	5.4	41.4	0.90	1.60	2.60	17.5
West: Bay Road												
10	L2	63	5.0	0.332	5.6	LOS A	0.0	0.0	0.00	0.06	0.00	56.8
11	T1	1179	3.8	0.332	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.6
Approach		1242	3.8	0.332	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.4
All Vehicles		2661	4.2	0.890	6.4	NA	7.7	55.8	0.21	0.09	0.31	52.4

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

MOVEMENT SUMMARY

Site: 101 [PM - Bay Road & Graham Road Adj. (gap acceptance)]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Bay Road												
5	T1	1333	1.1	0.569	3.8	LOS A	6.7	47.5	0.19	0.06	0.28	54.9
6	R2	98	4.3	0.569	29.5	LOS D	6.7	47.5	1.00	0.31	1.52	40.2
Approach		1431	1.3	0.569	5.5	NA	6.7	47.5	0.24	0.08	0.37	53.2
North: Graham Road												
7	L2	88	3.6	0.620	31.5	LOS D	2.9	20.7	0.82	1.26	1.52	31.6
9	R2	14	0.0	0.620	157.5	LOS F	2.9	20.7	0.82	1.26	1.52	27.5
Approach		102	3.1	0.620	48.4	LOS E	2.9	20.7	0.82	1.26	1.52	31.1
West: Bay Road												
10	L2	89	0.0	0.359	5.6	LOS A	0.0	0.0	0.00	0.08	0.00	56.9
11	T1	1277	0.9	0.359	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.5
Approach		1366	0.8	0.359	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.3
All Vehicles		2899	1.2	0.620	4.6	NA	6.7	47.5	0.15	0.10	0.23	54.1

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

MOVEMENT SUMMARY

Site: 101 [AM - Post Dev - Bay Road & Graham Road Adj. (gap acceptance)]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Bay Road												
5	T1	1279	3.8	0.520	3.7	LOS A	6.9	49.8	0.24	0.06	0.33	54.9
6	R2	83	6.3	0.520	27.3	LOS D	6.9	49.8	1.00	0.23	1.40	42.4
Approach		1362	3.9	0.520	5.2	NA	6.9	49.8	0.28	0.07	0.40	53.6
North: Graham Road												
7	L2	89	9.4	3.753	2520.6	LOS F	93.7	684.9	1.00	4.18	11.14	1.4
9	R2	93	1.1	3.753	2555.7	LOS F	93.7	684.9	1.00	4.18	11.14	1.1
Approach		182	5.2	3.753	2538.5	LOS F	93.7	684.9	1.00	4.18	11.14	1.2
West: Bay Road												
10	L2	75	4.2	0.346	5.6	LOS A	0.0	0.0	0.00	0.07	0.00	56.8
11	T1	1220	3.6	0.346	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.5
Approach		1295	3.7	0.346	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.4
All Vehicles		2839	3.9	3.753	165.5	NA	93.7	684.9	0.20	0.32	0.91	13.0

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

MOVEMENT SUMMARY

Site: 101 [PM - Post Dev - Bay Road & Graham Road Adj. (gap acceptance)]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Bay Road												
5	T1	1333	1.1	0.699	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
6	R2	166	2.9	0.774	40.0	LOS E	4.0	28.7	0.96	1.24	1.99	33.7
Approach		1499	1.3	0.774	4.6	NA	4.0	28.7	0.11	0.14	0.22	53.8
North: Graham Road												
7	L2	100	2.9	2.544	1451.4	LOS F	62.1	442.4	1.00	4.26	10.48	2.3
9	R2	43	0.0	2.544	1529.4	LOS F	62.1	442.4	1.00	4.26	10.48	1.8
Approach		143	2.1	2.544	1474.9	LOS F	62.1	442.4	1.00	4.26	10.48	2.2
West: Bay Road												
10	L2	117	0.0	0.371	5.6	LOS A	0.0	0.0	0.00	0.10	0.00	56.7
11	T1	1295	0.9	0.371	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.4
Approach		1412	0.8	0.371	0.5	NA	0.0	0.0	0.00	0.05	0.00	59.1
All Vehicles		3054	1.1	2.544	71.6	NA	62.1	442.4	0.10	0.29	0.60	23.4

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

MOVEMENT SUMMARY

Site: 101 [Opt 1 - AM - Ex - Bay Road & Graham Road Adj. (gap acceptance)]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Bay Road												
5	T1	1333	3.6	0.355	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1333	3.6	0.355	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
North: Graham Road												
7	L2	86	11.0	0.143	11.9	LOS B	0.5	4.0	0.54	0.98	0.54	45.8
Approach		86	11.0	0.143	11.9	LOS B	0.5	4.0	0.54	0.98	0.54	45.8
West: Bay Road												
10	L2	63	5.0	0.332	5.6	LOS A	0.0	0.0	0.00	0.06	0.00	56.8
11	T1	1179	3.8	0.332	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.6
Approach		1242	3.8	0.332	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.4
All Vehicles		2661	4.0	0.355	0.6	NA	0.5	4.0	0.02	0.05	0.02	58.9

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

MOVEMENT SUMMARY

Site: 101 [Opt 1 - PM - Ex - Bay Road & Graham Road Adj. (gap acceptance)]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Bay Road												
5	T1	1431	1.3	0.376	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1431	1.3	0.376	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
North: Graham Road												
7	L2	102	3.1	0.172	12.0	LOS B	0.7	4.7	0.57	0.99	0.57	45.9
Approach		102	3.1	0.172	12.0	LOS B	0.7	4.7	0.57	0.99	0.57	45.9
West: Bay Road												
10	L2	89	0.0	0.359	5.6	LOS A	0.0	0.0	0.00	0.08	0.00	56.9
11	T1	1277	0.9	0.359	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.5
Approach		1366	0.8	0.359	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.3
All Vehicles		2899	1.2	0.376	0.6	NA	0.7	4.7	0.02	0.05	0.02	58.8

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

MOVEMENT SUMMARY

Site: 101 [Opt 1 - AM - Post Dev - Bay Road & Graham Road Adj. (gap acceptance) - LILO]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Bay Road												
5	T1	1362	3.8	0.364	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1362	3.8	0.364	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
North: Graham Road												
7	L2	182	9.4	0.305	12.9	LOS B	1.4	10.3	0.59	1.04	0.69	45.3
Approach		182	9.4	0.305	12.9	LOS B	1.4	10.3	0.59	1.04	0.69	45.3
West: Bay Road												
10	L2	75	4.2	0.346	5.6	LOS A	0.0	0.0	0.00	0.07	0.00	56.8
11	T1	1220	3.6	0.346	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.5
Approach		1295	3.7	0.346	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.4
All Vehicles		2839	4.1	0.364	1.0	NA	1.4	10.3	0.04	0.08	0.04	58.1

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

MOVEMENT SUMMARY

Site: 101 [Opt 1 - PM - Post Dev - Bay Road & Graham Road Adj. (gap acceptance) - LILO]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Bay Road												
5	T1	1499	1.1	0.393	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1499	1.1	0.393	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
North: Graham Road												
7	L2	143	2.9	0.238	12.2	LOS B	1.0	7.0	0.59	1.01	0.60	45.8
Approach		143	2.9	0.238	12.2	LOS B	1.0	7.0	0.59	1.01	0.60	45.8
West: Bay Road												
10	L2	117	0.0	0.371	5.6	LOS A	0.0	0.0	0.00	0.10	0.00	56.7
11	T1	1295	0.9	0.371	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.4
Approach		1412	0.8	0.371	0.5	NA	0.0	0.0	0.00	0.05	0.00	59.1
All Vehicles		3054	1.1	0.393	0.8	NA	1.0	7.0	0.03	0.07	0.03	58.5

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

MOVEMENT SUMMARY

Site: 101 [Ex-Highett Rd / Middleton St AM]

Highett Road / Middleton Street
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Middleton St - S Leg												
1	L2	23	5.0	0.037	8.3	LOS A	0.1	1.0	0.43	0.89	0.43	36.9
3	R2	6	5.0	0.037	11.9	LOS B	0.1	1.0	0.43	0.89	0.43	36.6
Approach		29	5.0	0.037	9.1	LOS A	0.1	1.0	0.43	0.89	0.43	36.8
East: Highett Rd - E Leg												
4	L2	39	5.0	0.193	3.5	LOS A	0.0	0.0	0.00	0.05	0.00	40.0
5	T1	323	5.0	0.193	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	39.8
Approach		362	5.0	0.193	0.4	NA	0.0	0.0	0.00	0.05	0.00	39.8
West: Highett Rd - W Leg												
11	T1	357	5.0	0.225	0.3	LOS A	0.4	3.1	0.13	0.06	0.13	39.6
12	R2	42	5.0	0.225	5.3	LOS A	0.4	3.1	0.13	0.06	0.13	39.4
Approach		399	5.0	0.225	0.8	NA	0.4	3.1	0.13	0.06	0.13	39.6
All Vehicles		791	5.0	0.225	0.9	NA	0.4	3.1	0.08	0.08	0.08	39.6

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

MOVEMENT SUMMARY

Site: 101 [Ex-Highett Rd / Middleton St PM]

Highett Road / Middleton Street
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Middleton St - S Leg												
1	L2	29	5.0	0.085	9.4	LOS A	0.3	2.1	0.56	0.95	0.56	36.1
3	R2	17	5.0	0.085	15.1	LOS C	0.3	2.1	0.56	0.95	0.56	35.8
Approach		46	5.0	0.085	11.5	LOS B	0.3	2.1	0.56	0.95	0.56	36.0
East: Highett Rd - E Leg												
4	L2	55	5.0	0.279	3.5	LOS A	0.0	0.0	0.00	0.05	0.00	39.9
5	T1	469	5.0	0.279	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	39.8
Approach		524	5.0	0.279	0.4	NA	0.0	0.0	0.00	0.05	0.00	39.8
West: Highett Rd - W Leg												
11	T1	396	5.0	0.254	0.5	LOS A	0.6	4.2	0.16	0.06	0.16	39.5
12	R2	43	5.0	0.254	6.6	LOS A	0.6	4.2	0.16	0.06	0.16	39.3
Approach		439	5.0	0.254	1.1	NA	0.6	4.2	0.16	0.06	0.16	39.5
All Vehicles		1009	5.0	0.279	1.2	NA	0.6	4.2	0.10	0.09	0.10	39.5

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

MOVEMENT SUMMARY

Site: 101 [PD-Highett Rd / Middleton St AM]

Highett Road / Middleton Street
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Middleton St - S Leg												
1	L2	51	5.0	0.102	8.7	LOS A	0.4	2.6	0.49	0.93	0.49	36.6
3	R2	20	5.0	0.102	13.3	LOS B	0.4	2.6	0.49	0.93	0.49	36.3
Approach		71	5.0	0.102	10.0	LOS A	0.4	2.6	0.49	0.93	0.49	36.5
East: Highett Rd - E Leg												
4	L2	51	5.0	0.221	3.5	LOS A	0.0	0.0	0.00	0.06	0.00	39.9
5	T1	364	5.0	0.221	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	39.8
Approach		415	5.0	0.221	0.4	NA	0.0	0.0	0.00	0.06	0.00	39.8
West: Highett Rd - W Leg												
11	T1	380	5.0	0.245	0.4	LOS A	0.5	3.9	0.16	0.06	0.16	39.6
12	R2	48	5.0	0.245	5.7	LOS A	0.5	3.9	0.16	0.06	0.16	39.3
Approach		428	5.0	0.245	1.0	NA	0.5	3.9	0.16	0.06	0.16	39.5
All Vehicles		914	5.0	0.245	1.4	NA	0.5	3.9	0.11	0.13	0.11	39.4

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

MOVEMENT SUMMARY

Site: 101 [PD-Highett Rd / Middleton St PM]

Highett Road / Middleton Street
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Middleton St - S Leg												
1	L2	41	5.0	0.131	9.6	LOS A	0.4	3.2	0.60	0.97	0.60	35.8
3	R2	23	5.0	0.131	17.4	LOS C	0.4	3.2	0.60	0.97	0.60	35.5
Approach		64	5.0	0.131	12.4	LOS B	0.4	3.2	0.60	0.97	0.60	35.7
East: Highett Rd - E Leg												
4	L2	82	5.0	0.304	3.5	LOS A	0.0	0.0	0.00	0.07	0.00	39.9
5	T1	487	5.0	0.304	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	39.8
Approach		569	5.0	0.304	0.5	NA	0.0	0.0	0.00	0.07	0.00	39.8
West: Highett Rd - W Leg												
11	T1	451	5.0	0.301	0.8	LOS A	0.9	6.7	0.20	0.07	0.23	39.3
12	R2	57	5.0	0.301	7.3	LOS A	0.9	6.7	0.20	0.07	0.23	39.1
Approach		507	5.0	0.301	1.6	NA	0.9	6.7	0.20	0.07	0.23	39.3
All Vehicles		1141	5.0	0.304	1.7	NA	0.9	6.7	0.12	0.12	0.14	39.3

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

MOVEMENT SUMMARY

Site: 101 [Ex-Highett Rd / Graham Rd AM]

Highett Road / Graham Road
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Graham Rd - S Leg												
1	L2	85	5.0	0.479	34.7	LOS C	4.8	35.2	0.94	0.87	1.19	29.3
3	R2	57	5.0	0.479	35.1	LOS D	4.8	35.2	0.94	0.87	1.19	28.9
Approach		142	5.0	0.479	34.9	LOS C	4.8	35.2	0.94	0.87	1.19	29.1
East: Highett Rd - E Leg												
4	L2	36	5.0	0.507	34.0	LOS C	9.6	70.0	0.90	0.76	0.90	29.9
5	T1	218	5.0	0.507	30.6	LOS C	9.6	70.0	0.90	0.76	0.90	29.8
Approach		254	5.0	0.507	31.1	LOS C	9.6	70.0	0.90	0.76	0.90	29.8
West: Highett Rd - W Leg												
11	T1	274	5.0	0.334	18.1	LOS B	7.9	58.0	0.71	0.60	0.71	33.3
12	R2	43	5.0	0.241	45.8	LOS D	1.8	13.4	0.96	0.73	0.96	26.5
Approach		317	5.0	0.334	21.9	LOS C	7.9	58.0	0.74	0.62	0.74	32.2
All Vehicles		713	5.0	0.507	27.8	LOS C	9.6	70.0	0.84	0.72	0.89	30.7

Site Level of Service (LOS) Method: Delay (SIDRA). 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
P1	South Full Crossing	53	16.9	LOS B	0.1	0.1	0.87	0.87
P4	West Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
All Pedestrians		105	28.1	LOS C			0.90	0.90

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

MOVEMENT SUMMARY

Site: 101 [PD-Highett Rd / Graham Rd AM]

Highett Road / Graham Road
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Graham Rd - S Leg												
1	L2	126	5.0	0.650	41.5	LOS D	8.8	64.4	0.96	0.99	1.49	27.8
3	R2	112	5.0	0.650	41.9	LOS D	8.8	64.4	0.96	0.99	1.49	27.4
Approach		238	5.0	0.650	41.7	LOS D	8.8	64.4	0.96	0.99	1.49	27.6
East: Highett Rd - E Leg												
4	L2	54	5.0	0.717	41.2	LOS D	12.2	89.0	0.99	0.88	1.05	28.2
5	T1	229	5.0	0.717	37.7	LOS D	12.2	89.0	0.99	0.88	1.05	28.1
Approach		283	5.0	0.717	38.4	LOS D	12.2	89.0	0.99	0.88	1.05	28.1
West: Highett Rd - W Leg												
11	T1	287	5.0	0.403	22.2	LOS C	9.3	67.7	0.78	0.66	0.78	32.2
12	R2	66	5.0	0.370	46.6	LOS D	2.9	21.0	0.97	0.75	0.97	26.4
Approach		354	5.0	0.403	26.7	LOS C	9.3	67.7	0.82	0.68	0.82	30.9
All Vehicles		875	5.0	0.717	34.6	LOS C	12.2	89.0	0.91	0.83	1.08	29.0

Site Level of Service (LOS) Method: Delay (SIDRA). 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
P1	South Full Crossing	53	17.2	LOS B	0.1	0.1	0.87	0.87
P4	West Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
All Pedestrians		105	28.3	LOS C			0.90	0.90

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

MOVEMENT SUMMARY

Site: 101 [Ex-Highett Rd / Graham Rd PM]

Highett Road / Graham Road
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Graham Rd - S Leg												
1	L2	115	5.0	0.400	29.4	LOS C	5.3	38.4	0.90	0.81	0.98	30.6
3	R2	40	5.0	0.400	29.8	LOS C	5.3	38.4	0.90	0.81	0.98	30.2
Approach		155	5.0	0.400	29.5	LOS C	5.3	38.4	0.90	0.81	0.98	30.5
East: Highett Rd - E Leg												
4	L2	58	5.0	0.646	35.4	LOS D	12.7	93.1	0.94	0.81	0.94	29.5
5	T1	264	5.0	0.646	32.0	LOS C	12.7	93.1	0.94	0.81	0.94	29.4
Approach		322	5.0	0.646	32.6	LOS C	12.7	93.1	0.94	0.81	0.94	29.5
West: Highett Rd - W Leg												
11	T1	259	5.0	0.316	18.0	LOS B	7.4	54.3	0.70	0.59	0.70	33.4
12	R2	65	5.0	0.364	46.5	LOS D	2.8	20.6	0.97	0.75	0.97	26.4
Approach		324	5.0	0.364	23.7	LOS C	7.4	54.3	0.75	0.62	0.75	31.7
All Vehicles		801	5.0	0.646	28.4	LOS C	12.7	93.1	0.86	0.73	0.87	30.5

Site Level of Service (LOS) Method: Delay (SIDRA). 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
P1	South Full Crossing	53	16.9	LOS B	0.1	0.1	0.87	0.87
P4	West Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
All Pedestrians		105	28.1	LOS C			0.90	0.90

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

MOVEMENT SUMMARY

Site: 101 [PD-Highett Rd / Graham Rd PM]

Highett Road / Graham Road
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Graham Rd - S Leg												
1	L2	133	5.0	0.585	37.1	LOS D	7.0	50.9	0.96	0.94	1.29	28.8
3	R2	63	5.0	0.585	37.4	LOS D	7.0	50.9	0.96	0.94	1.29	28.4
Approach		196	5.0	0.585	37.2	LOS D	7.0	50.9	0.96	0.94	1.29	28.6
East: Highett Rd - E Leg												
4	L2	99	5.0	0.786	40.2	LOS D	17.2	125.9	0.99	0.94	1.10	28.4
5	T1	292	5.0	0.786	36.7	LOS D	17.2	125.9	0.99	0.94	1.10	28.3
Approach		391	5.0	0.786	37.6	LOS D	17.2	125.9	0.99	0.94	1.10	28.3
West: Highett Rd - W Leg												
11	T1	265	5.0	0.324	18.0	LOS B	7.7	55.9	0.70	0.60	0.70	33.4
12	R2	120	5.0	0.669	49.2	LOS D	5.5	40.1	1.00	0.84	1.11	25.9
Approach		385	5.0	0.669	27.7	LOS C	7.7	55.9	0.79	0.67	0.83	30.6
All Vehicles		972	5.0	0.786	33.6	LOS C	17.2	125.9	0.91	0.83	1.03	29.3

Site Level of Service (LOS) Method: Delay (SIDRA). 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
P1	South Full Crossing	53	16.9	LOS B	0.1	0.1	0.87	0.87
P4	West Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
All Pedestrians		105	28.1	LOS C			0.90	0.90

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

MOVEMENT SUMMARY

Site: 101 [Ex - Bay Rd / Midleton St AM]

Bay Raod / Middleton Street
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Bay Rd - E Leg												
5	T1	968	5.0	0.256	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		968	5.0	0.256	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
North: Middleton St - N Leg												
7	L2	114	5.0	0.171	11.6	LOS B	0.6	4.6	0.52	0.97	0.52	49.9
Approach		114	5.0	0.171	11.6	LOS B	0.6	4.6	0.52	0.97	0.52	49.9
West: Bay Rd - W Leg												
10	L2	18	5.0	0.250	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	57.9
11	T1	924	5.0	0.250	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach		942	5.0	0.250	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles		2024	5.0	0.256	0.7	NA	0.6	4.6	0.03	0.06	0.03	59.2

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

MOVEMENT SUMMARY

Site: 101 [PD - Bay Rd / Midleton St AM]

Bay Raod / Middleton Street
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Bay Rd - E Leg												
5	T1	1037	5.0	0.274	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1037	5.0	0.274	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
North: Middleton St - N Leg												
7	L2	155	5.0	0.231	11.7	LOS B	0.9	6.4	0.54	0.99	0.54	49.9
Approach		155	5.0	0.231	11.7	LOS B	0.9	6.4	0.54	0.99	0.54	49.9
West: Bay Rd - W Leg												
10	L2	36	5.0	0.258	5.6	LOS A	0.0	0.0	0.00	0.04	0.00	57.7
11	T1	936	5.0	0.258	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
Approach		972	5.0	0.258	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
All Vehicles		2163	5.0	0.274	1.0	NA	0.9	6.4	0.04	0.08	0.04	59.0

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

MOVEMENT SUMMARY

Site: 101 [Ex - Bay Rd / Midleton St PM]

Bay Raod / Middleton Street
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Bay Rd - E Leg												
5	T1	1056	5.0	0.280	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1056	5.0	0.280	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
North: Middleton St - N Leg												
7	L2	84	5.0	0.141	12.3	LOS B	0.5	3.7	0.55	0.99	0.55	49.5
Approach		84	5.0	0.141	12.3	LOS B	0.5	3.7	0.55	0.99	0.55	49.5
West: Bay Rd - W Leg												
10	L2	12	5.0	0.284	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	57.9
11	T1	1062	5.0	0.284	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.9
Approach		1074	5.0	0.284	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.9
All Vehicles		2214	5.0	0.284	0.5	NA	0.5	3.7	0.02	0.04	0.02	59.4

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

MOVEMENT SUMMARY

Site: 101 [PD - Bay Rd / Midleton St PM]

Bay Raod / Middleton Street
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Bay Rd - E Leg												
5	T1	1085	5.0	0.287	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1085	5.0	0.287	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
North: Middleton St - N Leg												
7	L2	102	5.0	0.169	12.3	LOS B	0.6	4.5	0.55	1.00	0.55	49.5
Approach		102	5.0	0.169	12.3	LOS B	0.6	4.5	0.55	1.00	0.55	49.5
West: Bay Rd - W Leg												
10	L2	53	5.0	0.303	5.6	LOS A	0.0	0.0	0.00	0.05	0.00	57.6
11	T1	1089	5.0	0.303	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
Approach		1142	5.0	0.303	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.6
All Vehicles		2329	5.0	0.303	0.7	NA	0.6	4.5	0.02	0.06	0.02	59.2

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

MOVEMENT SUMMARY

Site: 101 [AM - PD - Graham Rd / Site Access]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Graham Rd - S Leg												
1	L2	29	5.0	0.078	5.6	LOS A	0.0	0.0	0.00	0.12	0.00	57.1
2	T1	117	5.0	0.078	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	58.9
Approach		146	5.0	0.078	1.1	NA	0.0	0.0	0.00	0.12	0.00	58.5
North: Graham Rd - N Leg												
8	T1	86	5.0	0.066	0.2	LOS A	0.2	1.4	0.14	0.15	0.14	58.1
9	R2	29	5.0	0.066	6.0	LOS A	0.2	1.4	0.14	0.15	0.14	55.7
Approach		116	5.0	0.066	1.7	NA	0.2	1.4	0.14	0.15	0.14	57.5
West: Site Access - W Leg												
10	L2	68	5.0	0.132	8.7	LOS A	0.5	3.7	0.27	0.90	0.27	51.4
12	R2	68	5.0	0.132	9.0	LOS A	0.5	3.7	0.27	0.90	0.27	50.9
Approach		137	5.0	0.132	8.9	LOS A	0.5	3.7	0.27	0.90	0.27	51.2
All Vehicles		399	5.0	0.132	3.9	NA	0.5	3.7	0.13	0.40	0.13	55.5

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

MOVEMENT SUMMARY

Site: 101 [PM - PD - Graham Rd / Site Access]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Graham Rd - S Leg												
1	L2	68	5.0	0.137	5.6	LOS A	0.0	0.0	0.00	0.16	0.00	56.7
2	T1	187	5.0	0.137	0.0	LOS A	0.0	0.0	0.00	0.16	0.00	58.5
Approach		256	5.0	0.137	1.5	NA	0.0	0.0	0.00	0.16	0.00	58.1
North: Graham Rd - N Leg												
8	T1	102	5.0	0.105	0.6	LOS A	0.4	3.3	0.29	0.25	0.29	56.8
9	R2	68	5.0	0.105	6.5	LOS A	0.4	3.3	0.29	0.25	0.29	54.6
Approach		171	5.0	0.105	3.0	NA	0.4	3.3	0.29	0.25	0.29	55.9
West: Site Access - W Leg												
10	L2	29	5.0	0.065	9.0	LOS A	0.2	1.7	0.34	0.90	0.34	51.1
12	R2	29	5.0	0.065	9.8	LOS A	0.2	1.7	0.34	0.90	0.34	50.6
Approach		59	5.0	0.065	9.4	LOS A	0.2	1.7	0.34	0.90	0.34	50.9
All Vehicles		485	5.0	0.137	3.0	NA	0.4	3.3	0.14	0.28	0.14	56.3

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

MOVEMENT SUMMARY

Site: 101 [AM - PD - Middleton St / Site Access]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Middleton St - S Leg												
2	T1	21	5.0	0.023	0.3	LOS A	0.1	0.7	0.20	0.26	0.20	56.9
3	R2	18	5.0	0.023	5.9	LOS A	0.1	0.7	0.20	0.26	0.20	54.6
Approach		39	5.0	0.023	2.9	NA	0.1	0.7	0.20	0.26	0.20	55.8
East: Site Access - E Leg												
4	L2	41	5.0	0.076	8.7	LOS A	0.3	2.0	0.24	0.89	0.24	51.6
6	R2	41	5.0	0.076	8.5	LOS A	0.3	2.0	0.24	0.89	0.24	51.1
Approach		82	5.0	0.076	8.6	LOS A	0.3	2.0	0.24	0.89	0.24	51.4
North: Middleton St - N Leg												
7	L2	18	5.0	0.072	5.6	LOS A	0.0	0.0	0.00	0.08	0.00	57.4
8	T1	118	5.0	0.072	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	59.3
Approach		136	5.0	0.072	0.7	NA	0.0	0.0	0.00	0.08	0.00	59.0
All Vehicles		257	5.0	0.076	3.6	NA	0.3	2.0	0.11	0.37	0.11	55.9

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

MOVEMENT SUMMARY

Site: 101 [PM - PD - Middleton St / Site Access]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Middleton St - S Leg												
2	T1	12	5.0	0.033	0.4	LOS A	0.1	1.1	0.24	0.44	0.24	55.3
3	R2	41	5.0	0.033	5.9	LOS A	0.1	1.1	0.24	0.44	0.24	53.2
Approach		53	5.0	0.033	4.7	NA	0.1	1.1	0.24	0.44	0.24	53.6
East: Site Access - E Leg												
4	L2	18	5.0	0.032	8.6	LOS A	0.1	0.8	0.20	0.90	0.20	51.6
6	R2	18	5.0	0.032	8.4	LOS A	0.1	0.8	0.20	0.90	0.20	51.1
Approach		36	5.0	0.032	8.5	LOS A	0.1	0.8	0.20	0.90	0.20	51.4
North: Middleton St - N Leg												
7	L2	41	5.0	0.068	5.6	LOS A	0.0	0.0	0.00	0.19	0.00	56.5
8	T1	85	5.0	0.068	0.0	LOS A	0.0	0.0	0.00	0.19	0.00	58.3
Approach		126	5.0	0.068	1.8	NA	0.0	0.0	0.00	0.19	0.00	57.7
All Vehicles		215	5.0	0.068	3.6	NA	0.1	1.1	0.09	0.37	0.09	55.5

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

USER REPORT FOR NETWORK SITE

Project: 210714-V181370-Highett Rd_Graham Road-Network

Template: Site Report - Combined

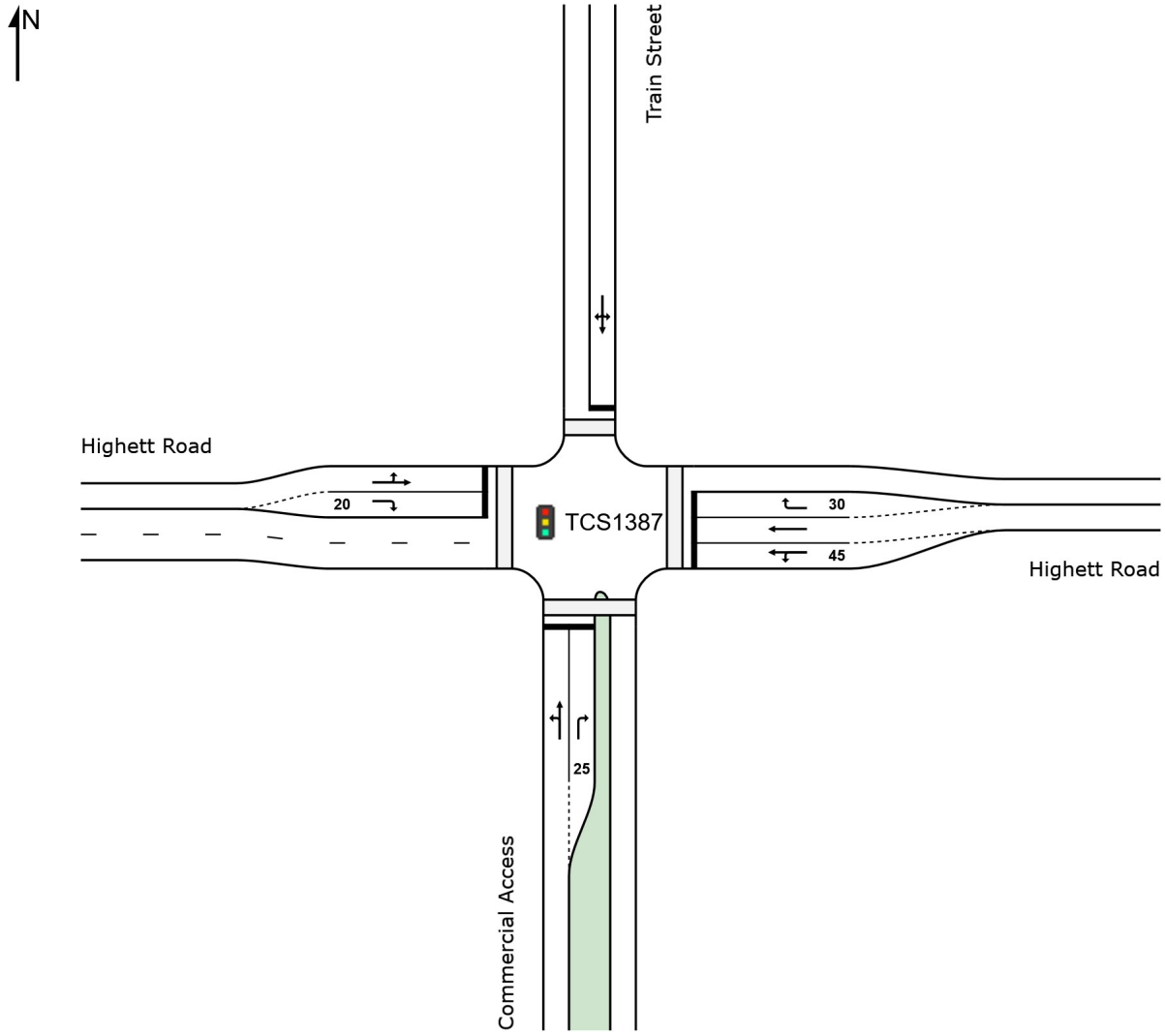
Site: TCS1387 [Ex-Highett Rd / Train Street / Commercial Access AM]

Network: 1 [Ex-Highett Road Network AM]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 90 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 D
Input Phase Sequence: A, B, D
Output Phase Sequence: A, B, D

Site Layout

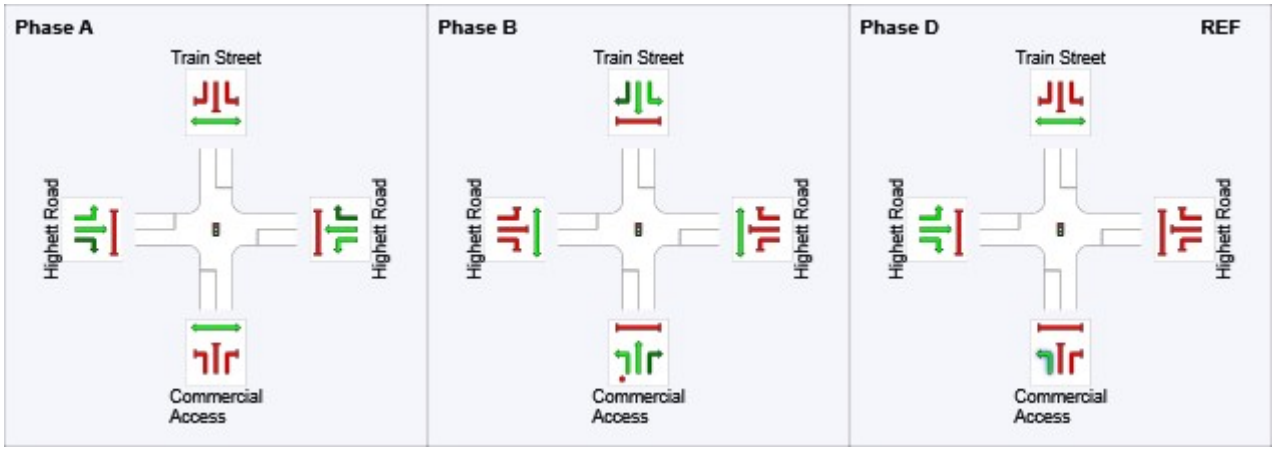


Phase Timing Summary

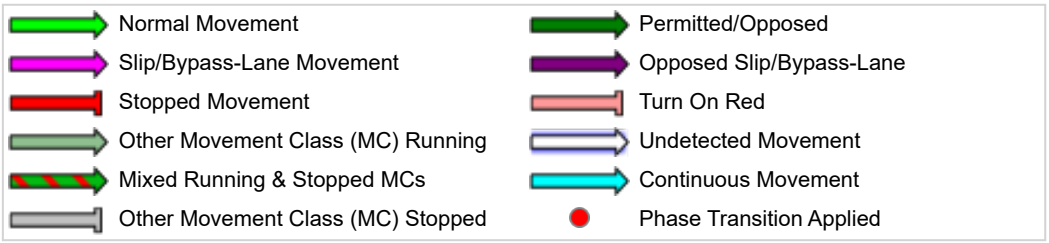
Phase	A	B	D
Phase Change Time (sec)	23	72	0
Green Time (sec)	43	12	17
Phase Time (sec)	49	18	23
Phase Split	54%	20%	26%

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



Lane Use and Performance

	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	Aver. Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Commercial Access															
Lane 1	48	5.0	48	5.0	331	0.146	100	30.9	LOS C	1.0	7.5	Full	30	0.0	0.0
Lane 2	16	5.0	16	5.0	208	0.076	100	41.0	LOS D	0.4	2.8	Short	25	0.0	NA
Approach	64	5.0	64	5.0		0.146		33.4	LOS C	1.0	7.5				
East: Highett Road															
Lane 1	178	5.0	178	5.0	880	0.203	100	6.3	LOS A	0.8	5.6	Short	45	0.0	NA
Lane 2	183	5.0	183	5.0	902	0.203	100	3.7	LOS A	0.8	5.7	Full	140	0.0	0.0
Lane 3	38	5.0	38	5.0	522	0.073	100	9.0	LOS A	0.1	1.1	Short	30	0.0	NA
Approach	399	5.0	399	5.0		0.203		5.4	LOS A	0.8	5.7				
North: Train Street															
Lane 1	27	5.0	27	5.0	211	0.130	100	40.2	LOS D	0.7	4.9	Full	20	0.0	0.0
Approach	27	5.0	27	5.0		0.130		40.2	LOS D	0.7	4.9				
West: Highett Road															
Lane 1	302	5.0	302	5.0	1363	0.222	100	5.7	LOS A	2.5	18.6	Full	500	0.0	0.0
Lane 2	71	5.0	71	5.0	825	0.086	100	9.6	LOS A	0.5	3.9	Short	20	0.0	NA
Approach	373	5.0	373	5.0		0.222		6.4	LOS A	2.5	18.6				
Intersection	863	5.0	863	5.0		0.222		9.0	LOS A	2.5	18.6				

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

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

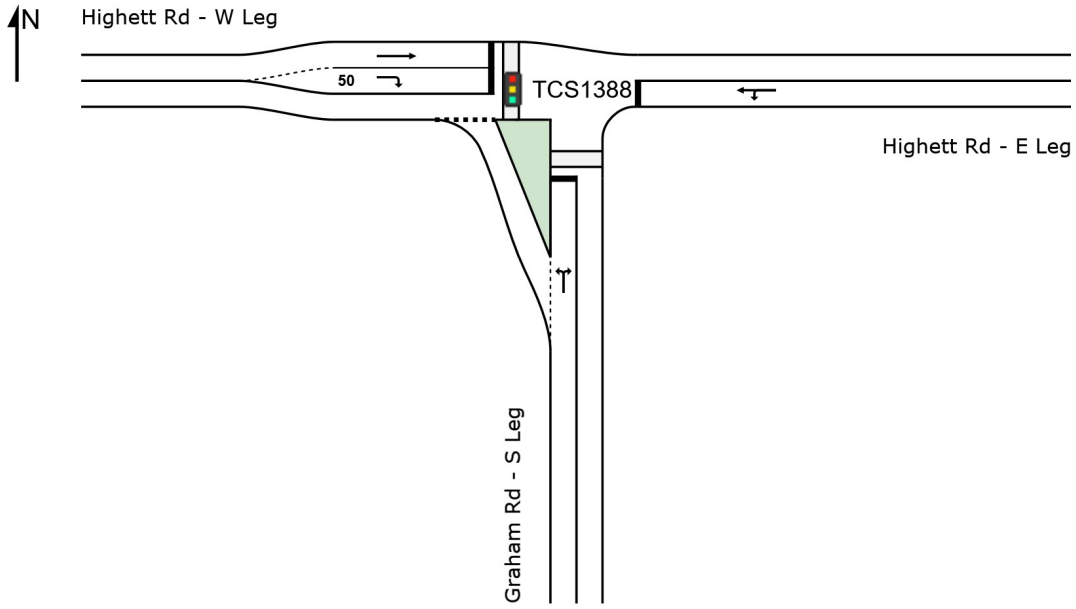
Site: TCS1388 [Ex-Highett Rd / Graham Rd AM]

Network: 1 [Ex-Highett Road Network AM]

Highett Road / Graham Road
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C, Dum
Output Phase Sequence: A, B, C, Dum

Site Layout

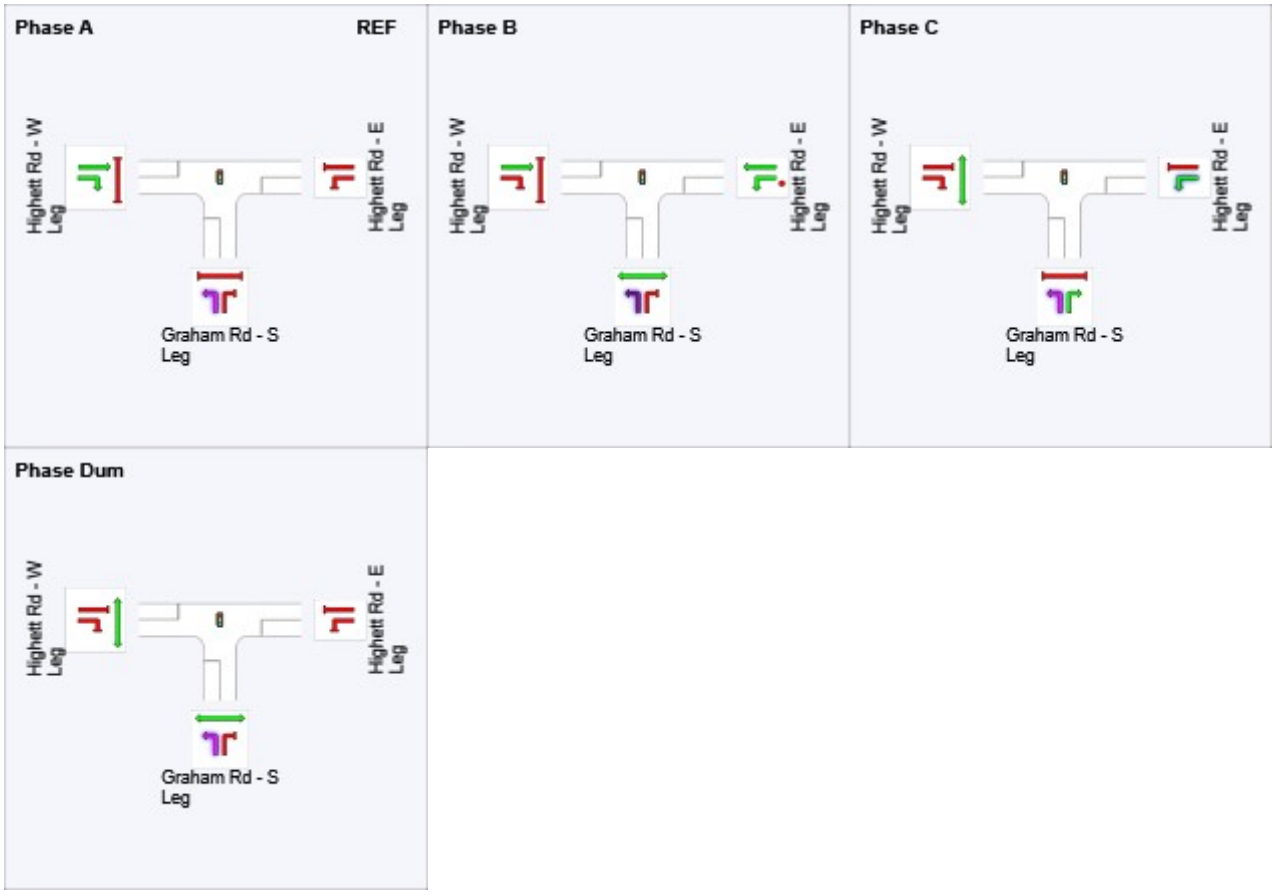


Phase Timing Summary

Phase	A	B	C	Dum
Phase Change Time (sec)	0	15	45	60
Green Time (sec)	9	24	9	24
Phase Time (sec)	15	30	15	30
Phase Split	17%	33%	17%	33%

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

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	Aver. Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Graham Rd - S Leg															
Lane 1	142	5.0	142	5.0	297	0.478	100	34.9	LOS C	3.0	21.5	Full	500	0.0	0.0
Approach	142	5.0	142	5.0		0.478		34.9	LOS C	3.0	21.5				
East: Highett Rd - E Leg															
Lane 1	254	5.0	254	5.0	506	0.501	100	29.3	LOS C	5.7	41.4	Full	70	0.0	1.8
Approach	254	5.0	254	5.0		0.501		29.3	LOS C	5.7	41.4				
West: Highett Rd - W Leg															
Lane 1	274	5.0	274	5.0	818	0.334	100	18.1	LOS B	4.6	33.5	Full	140	0.0	0.0
Lane 2	43	5.0	43	5.0	179	0.241	100	48.9	LOS D	1.2	8.7	Short	50	0.0	NA
Approach	317	5.0	317	5.0		0.334		22.3	LOS C	4.6	33.5				
Intersection	713	5.0	713	5.0		0.501		27.3	LOS C	5.7	41.4				

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

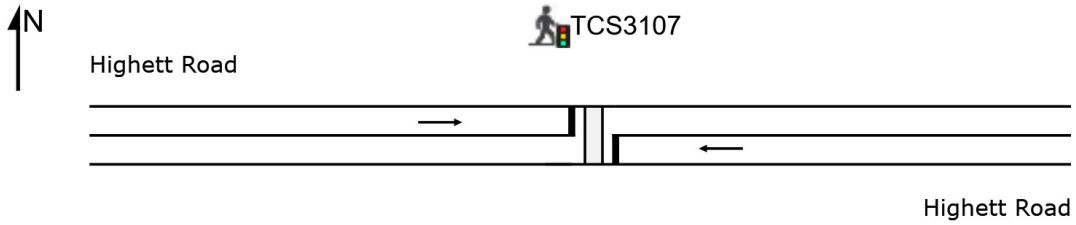
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement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

Site: TCS3107 [Ex-Highett Rd PoS AM] Network: 1 [Ex-Highett Road Network AM]

New Site
Site Category: (None)
Pedestrian Crossing (Signals) - Fixed Time Coordinated Cycle Time = 90 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: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

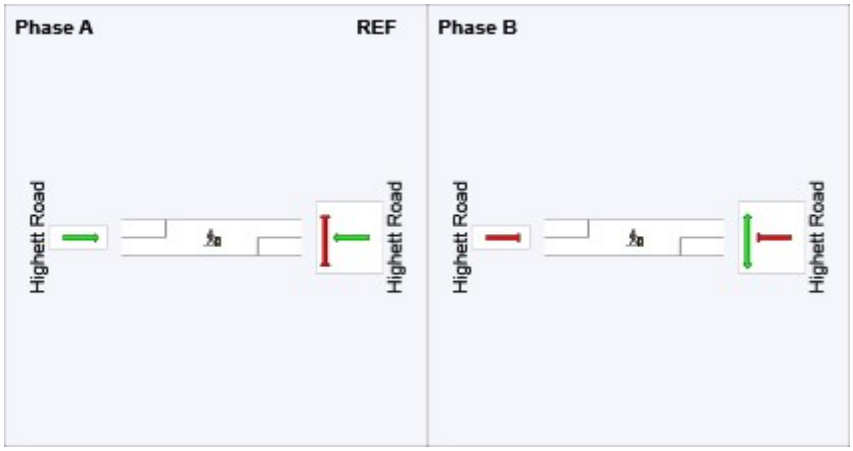


Phase Timing Summary

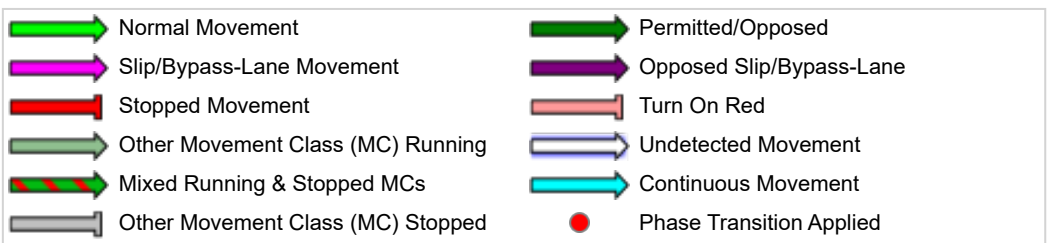
Phase	A	B
Phase Change Time (sec)	0	77
Green Time (sec)	71	8
Phase Time (sec)	76	14
Phase Split	84%	16%

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



Lane Use and Performance

	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	Aver. Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Highett Road															
Lane 1	254	5.0	254	5.0	1463	0.173	100	2.4	LOS A	1.6	11.9	Full	500	-1.8 N3	0.0
Approach	254	5.0	254	5.0		0.173		2.4	LOS A	1.6	11.9				
West: Highett Road															
Lane 1	331	5.0	331	5.0	1490	0.222	100	0.3	LOS A	0.2	1.6	Full	70	0.0	0.0
Approach	331	5.0	331	5.0		0.222		0.3	LOS A	0.2	1.6				
Intersection	584	5.0	584	5.0		0.222		1.2	LOS A	1.6	11.9				

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

N3 Capacity Adjustment due to downstream lane blockage determined by the program.

USER REPORT FOR NETWORK SITE

Project: 210714-V181370-Highett Rd_Graham Road-Network

Template: Site Report - Combined

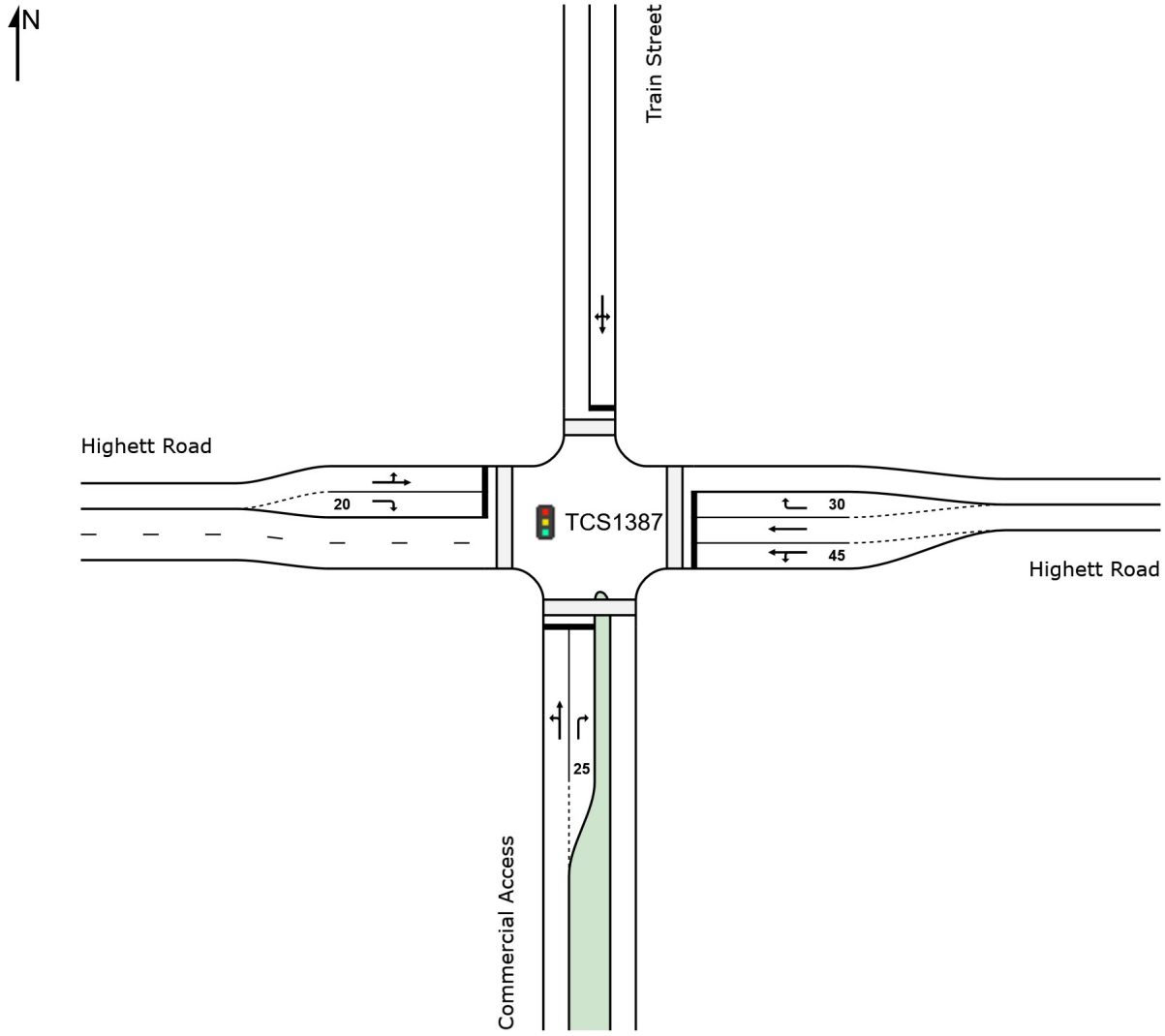
Site: TCS1387 [Ex-Highett Rd / Train Street / Commercial Access PM]

Network: 2 [Ex-Highett Road Network PM]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 90 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 D
Input Phase Sequence: A, B, D
Output Phase Sequence: A, B, D

Site Layout

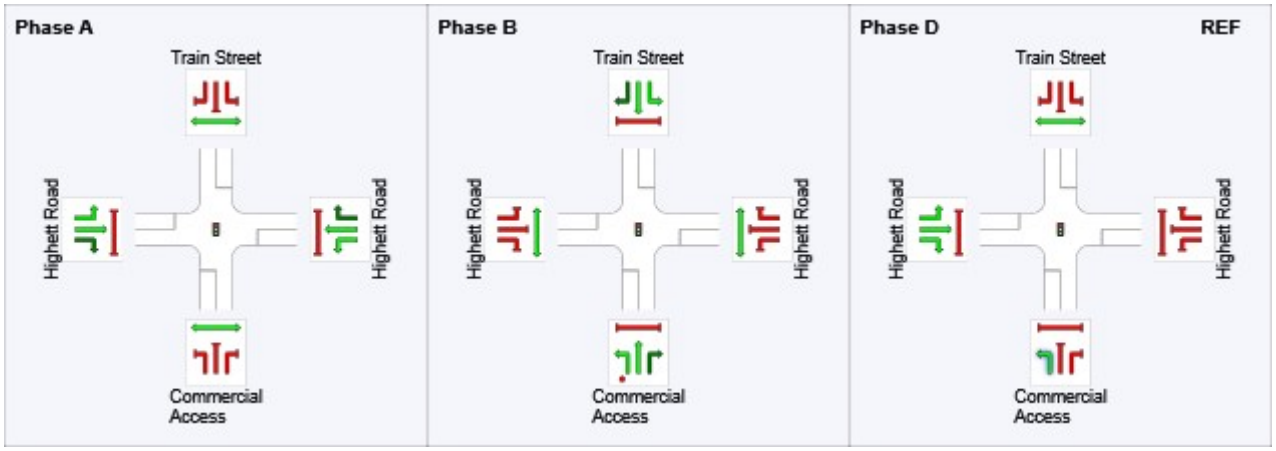


Phase Timing Summary

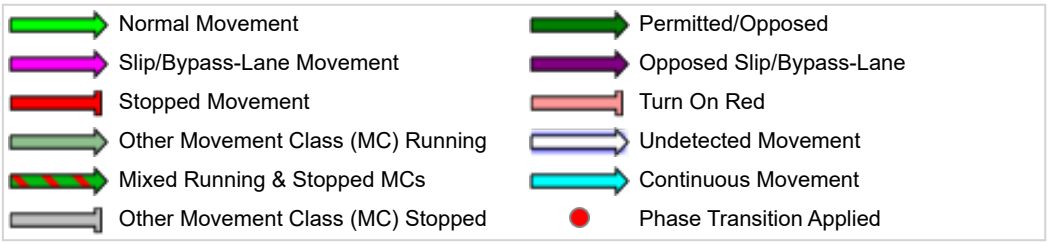
Phase	A	B	D
Phase Change Time (sec)	27	66	0
Green Time (sec)	33	18	21
Phase Time (sec)	39	24	27
Phase Split	43%	27%	30%

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



Lane Use and Performance

	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	Aver. Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Commercial Access															
Lane 1	122	5.0	122	5.0	455	0.268	100	26.8	LOS C	2.4	17.8	Full	30	0.0	2.2
Lane 2	28	5.0	28	5.0	294	0.097	100	36.3	LOS D	0.6	4.7	Short	25	0.0	NA
Approach	151	5.0	151	5.0		0.268		28.6	LOS C	2.4	17.8				
East: Highett Road															
Lane 1	224	5.0	224	5.0	673	0.332	100	11.2	LOS B	1.9	13.7	Short	45	0.0	NA
Lane 2	230	5.0	230	5.0	692	0.332	100	8.1	LOS A	1.9	14.1	Full	140	0.0	0.0
Lane 3	37	5.0	37	5.0	412	0.089	100	12.9	LOS B	0.2	1.8	Short	30	0.0	NA
Approach	491	5.0	491	5.0		0.332		9.9	LOS A	1.9	14.1				
North: Train Street															
Lane 1	42	5.0	42	5.0	291	0.145	100	35.4	LOS D	1.0	7.1	Full	20	0.0	0.0
Approach	42	5.0	42	5.0		0.145		35.4	LOS D	1.0	7.1				
West: Highett Road															
Lane 1	305	5.0	305	5.0	1029[1]	0.297	100	8.0	LOS A	3.2	23.6	Full	500	0.0	0.0
Lane 2	139	5.0	139	5.0	752	0.185	100	12.1	LOS B	1.4	10.0	Short	20	0.0	NA
Approach	444	5.0	444	5.0		0.297		9.3	LOS A	3.2	23.6				
Intersection	1127	5.0	1127	5.0		0.332		13.1	LOS B	3.2	23.6				

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

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

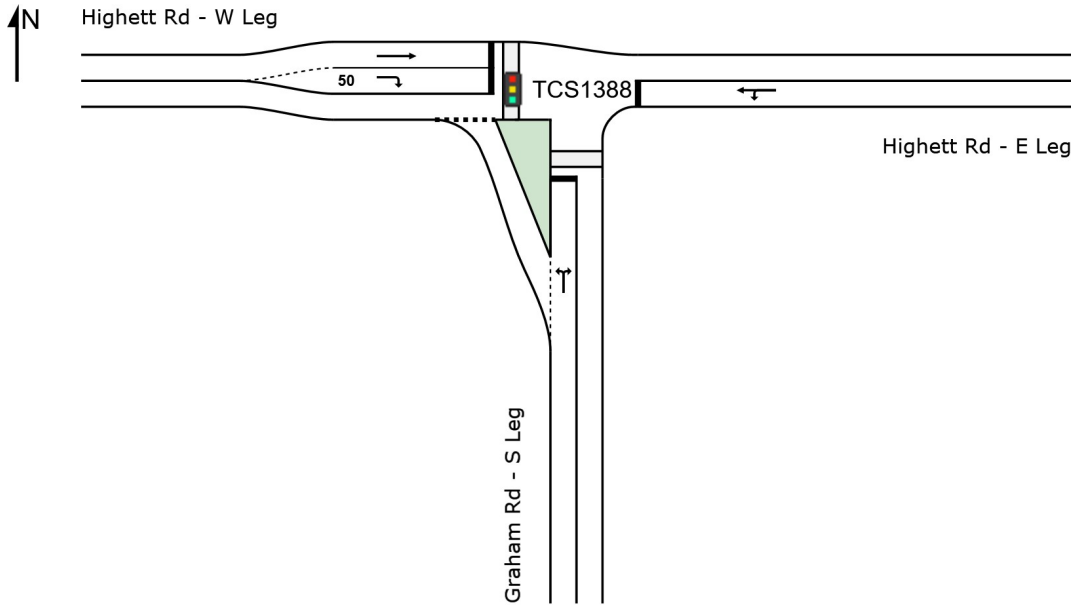
1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

Site: TCS1388 [Ex-Highett Rd / Graham Rd PM] Network: 2 [Ex-Highett Road Network PM]

Highett Road / Graham Road
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C, Dum
Output Phase Sequence: A, B, C, Dum

Site Layout

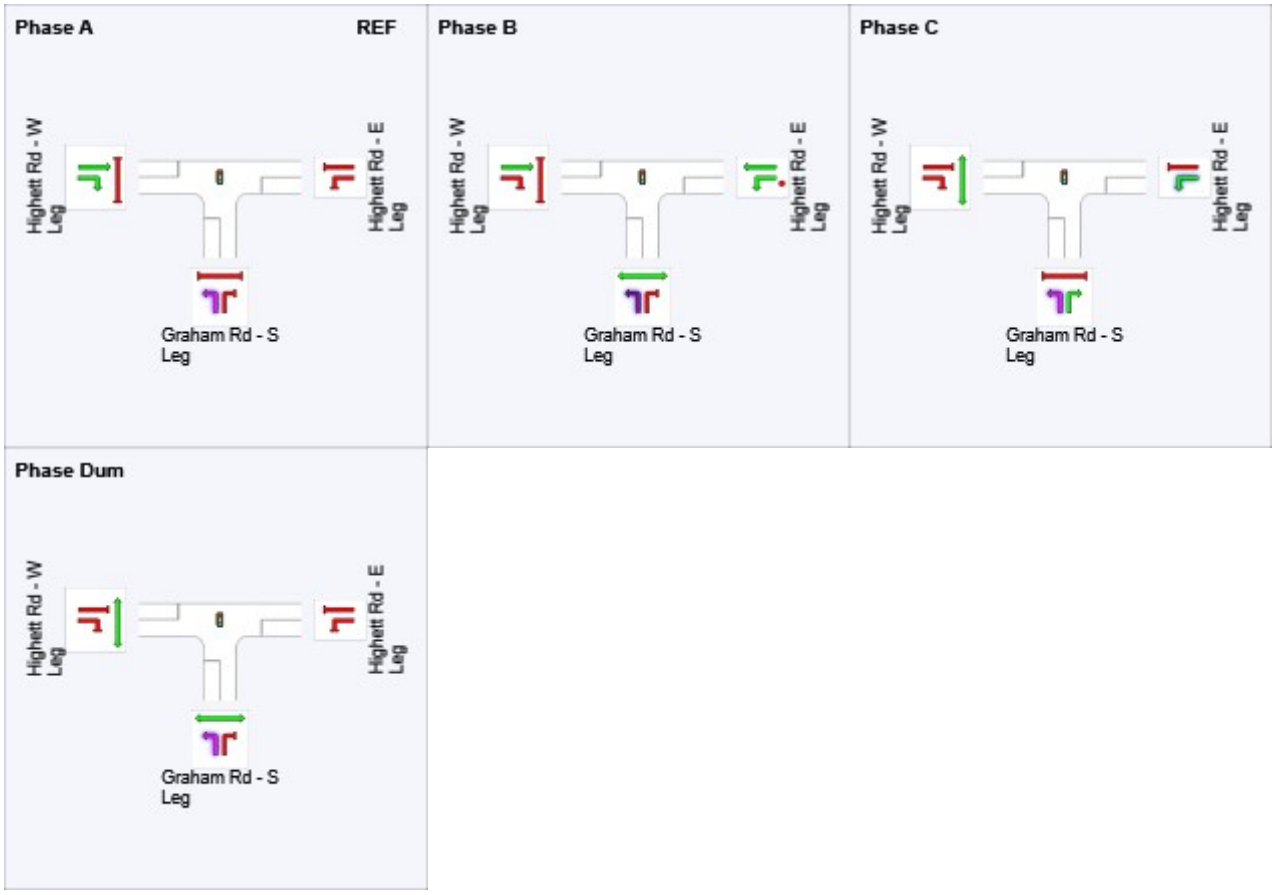


Phase Timing Summary

Phase	A	B	C	Dum
Phase Change Time (sec)	0	15	45	60
Green Time (sec)	9	24	9	24
Phase Time (sec)	15	30	15	30
Phase Split	17%	33%	17%	33%

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

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	Aver. Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Graham Rd - S Leg															
Lane 1	155	5.0	155	5.0	388	0.399	100	29.1	LOS C	3.2	23.6	Full	500	0.0	0.0
Approach	155	5.0	155	5.0		0.399		29.1	LOS C	3.2	23.6				
East: Highett Rd - E Leg															
Lane 1	322	5.0	322	5.0	508	0.635	100	30.6	LOS C	7.5	54.9	Full	70	0.0	27.5
Approach	322	5.0	322	5.0		0.635		30.6	LOS C	7.5	54.9				
West: Highett Rd - W Leg															
Lane 1	259	5.0	259	5.0	818	0.316	100	18.0	LOS B	4.1	30.2	Full	140	0.0	0.0
Lane 2	65	5.0	65	5.0	179	0.364	100	49.7	LOS D	1.8	13.2	Short	50	0.0	NA
Approach	324	5.0	324	5.0		0.364		24.3	LOS C	4.1	30.2				
Intersection	801	5.0	801	5.0		0.635		27.8	LOS C	7.5	54.9				

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

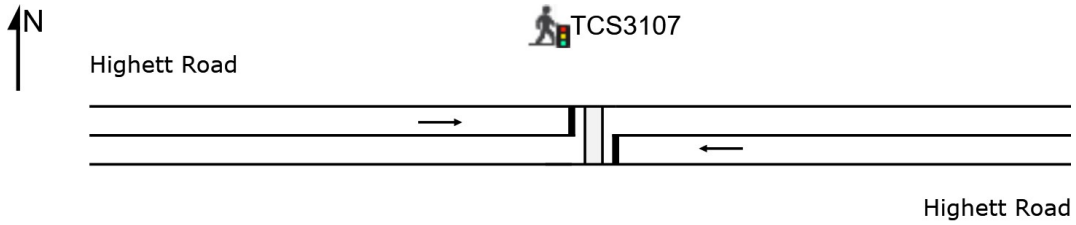
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement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

Site: TCS3107 [Ex-Highett Rd PoS PM] Network: 2 [Ex-Highett Road Network PM]

New Site
Site Category: (None)
Pedestrian Crossing (Signals) - Fixed Time Coordinated Cycle Time = 90 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: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

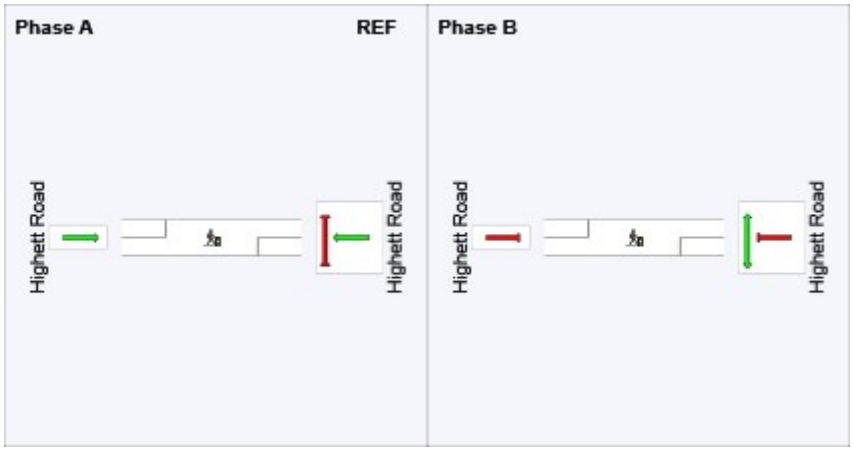


Phase Timing Summary

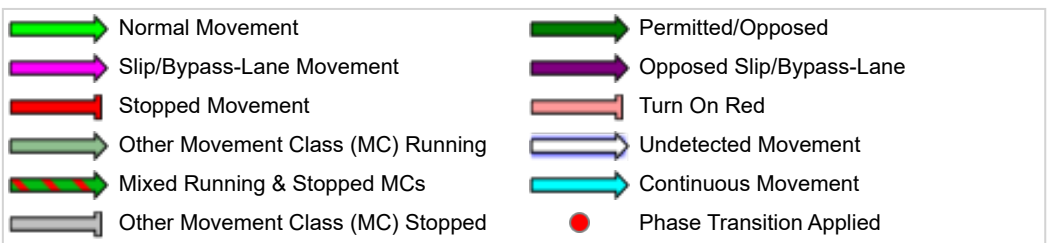
Phase	A	B
Phase Change Time (sec)	0	77
Green Time (sec)	71	8
Phase Time (sec)	76	14
Phase Split	84%	16%

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



Lane Use and Performance

	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	Aver. Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Highett Road															
Lane 1	322	5.0	322	5.0	1081	0.298	100	2.8	LOS A	2.4	17.3	Full	500	-27.5 N3	0.0
Approach	322	5.0	322	5.0		0.298		2.8	LOS A	2.4	17.3				
West: Highett Road															
Lane 1	299	5.0	299	5.0	1490	0.201	100	0.3	LOS A	0.2	1.4	Full	70	0.0	0.0
Approach	299	5.0	299	5.0		0.201		0.3	LOS A	0.2	1.4				
Intersection	621	5.0	621	5.0		0.298		1.6	LOS A	2.4	17.3				

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

N3 Capacity Adjustment due to downstream lane blockage determined by the program.

USER REPORT FOR SITE

Project: 210714-V181370-Bay Rd_Graham Rd

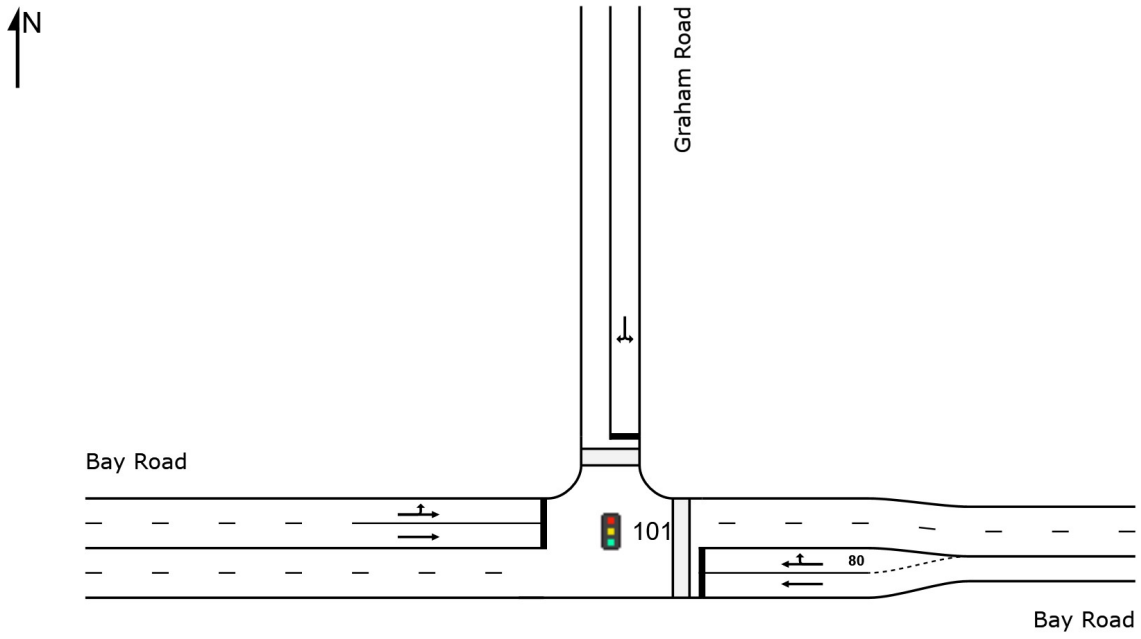
Template: Site Report - Combined

Site: 101 [Opt 3b - AM - E - Bay Road & Graham Road - Full Departure EB_FINAL]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

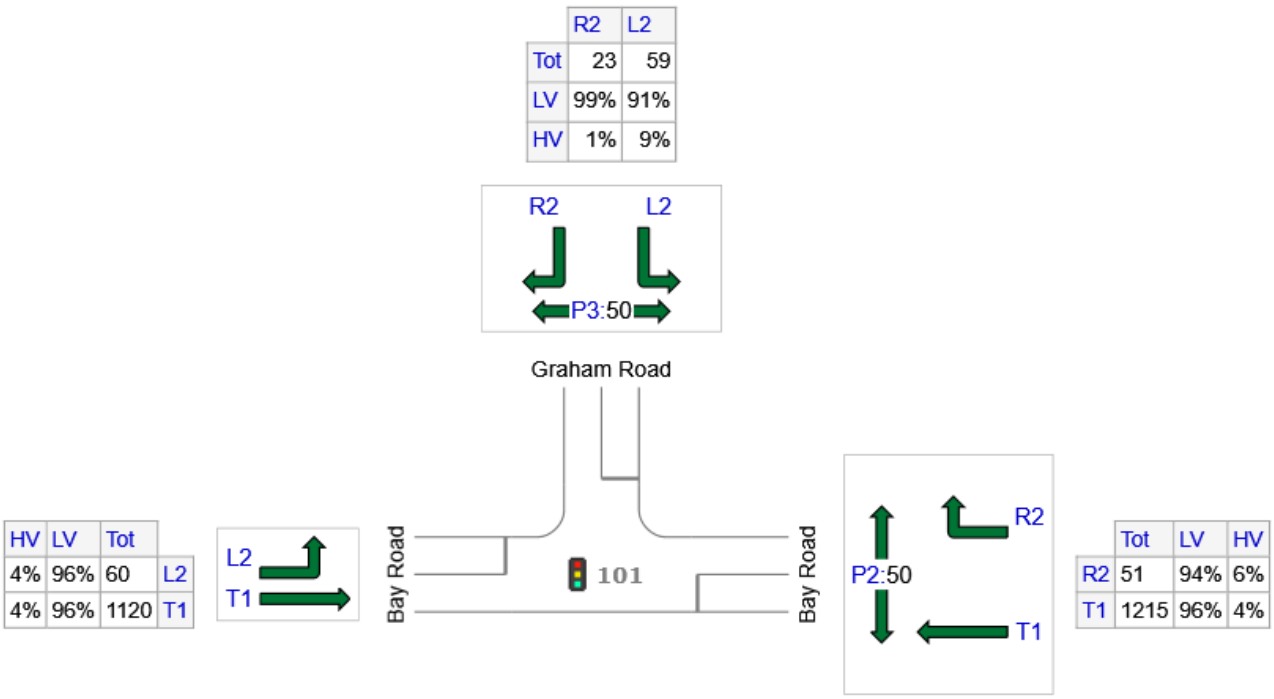
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Site Layout



Input Volumes

Volume Display Method: Total and %



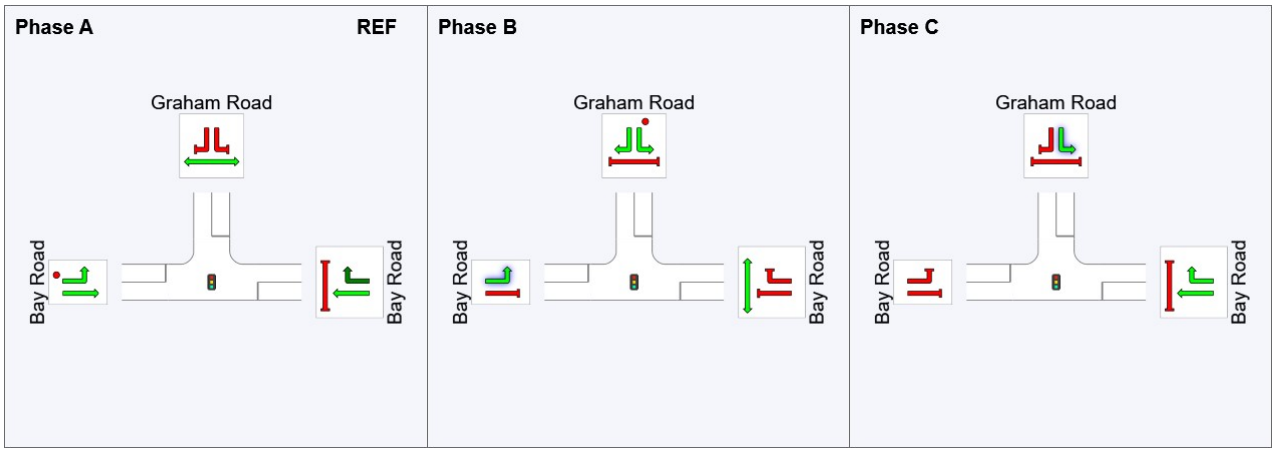
	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: Bay Road	1266	1217	49
N: Graham Road	82	76	6
W: Bay Road	1180	1137	43
Total	2528	2430	98

Phase Timing Summary

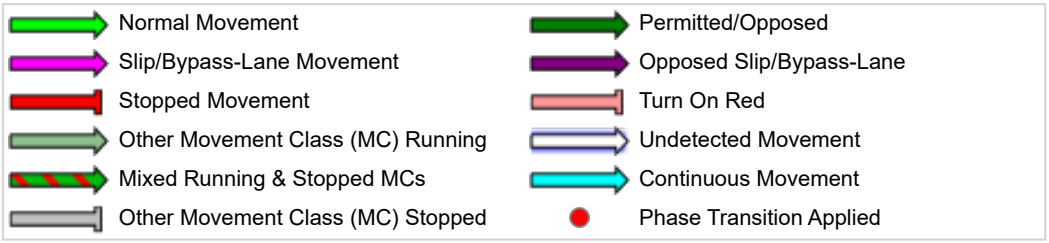
Phase	A	B	C
Phase Change Time (sec)	0	47	62
Green Time (sec)	41	9	22
Phase Time (sec)	47	15	28
Phase Split	52%	17%	31%

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



Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Bay Road													
Lane 1	782	3.8	1436	0.544	100	4.5	LOS A	13.6	98.0	Full	500	0.0	0.0
Lane 2	551	4.0	1012	0.544	100	7.0	LOS A	8.1	58.4	Short	80	0.0	NA
Approach	1333	3.9		0.544		5.5	LOS A	13.6	98.0				
North: Graham Road													
Lane 1	86	6.9	279	0.309	100	36.6	LOS D	3.2	24.0	Full	500	0.0	0.0
Approach	86	6.9		0.309		36.6	LOS D	3.2	24.0				
West: Bay Road													
Lane 1	621	3.7	854	0.727	100	21.7	LOS C	22.0	158.8	Full	260	0.0	0.0
Lane 2	621	3.6	854	0.727	100	21.5	LOS C	22.2	160.5	Full	260	0.0	0.0
Approach	1242	3.7		0.727		21.6	LOS C	22.2	160.5				
Intersection	2661	3.9		0.727		14.0	LOS B	22.2	160.5				

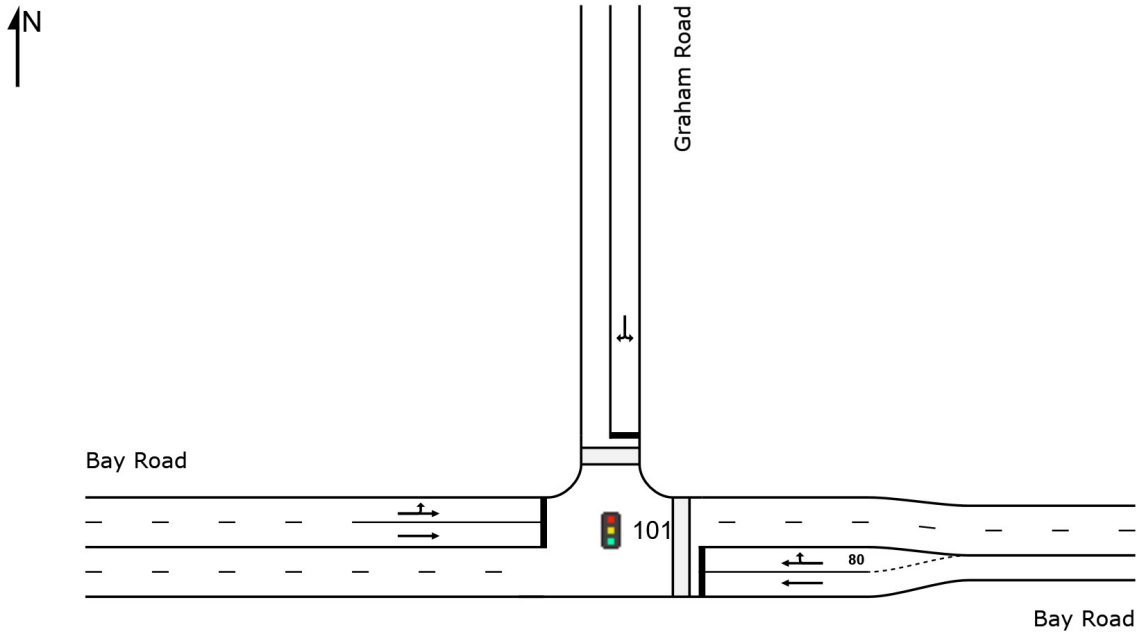
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control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

Site: 101 [Opt 3b - PM - Ex - Bay Road & Graham Road - Full Departure EB_FINAL]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

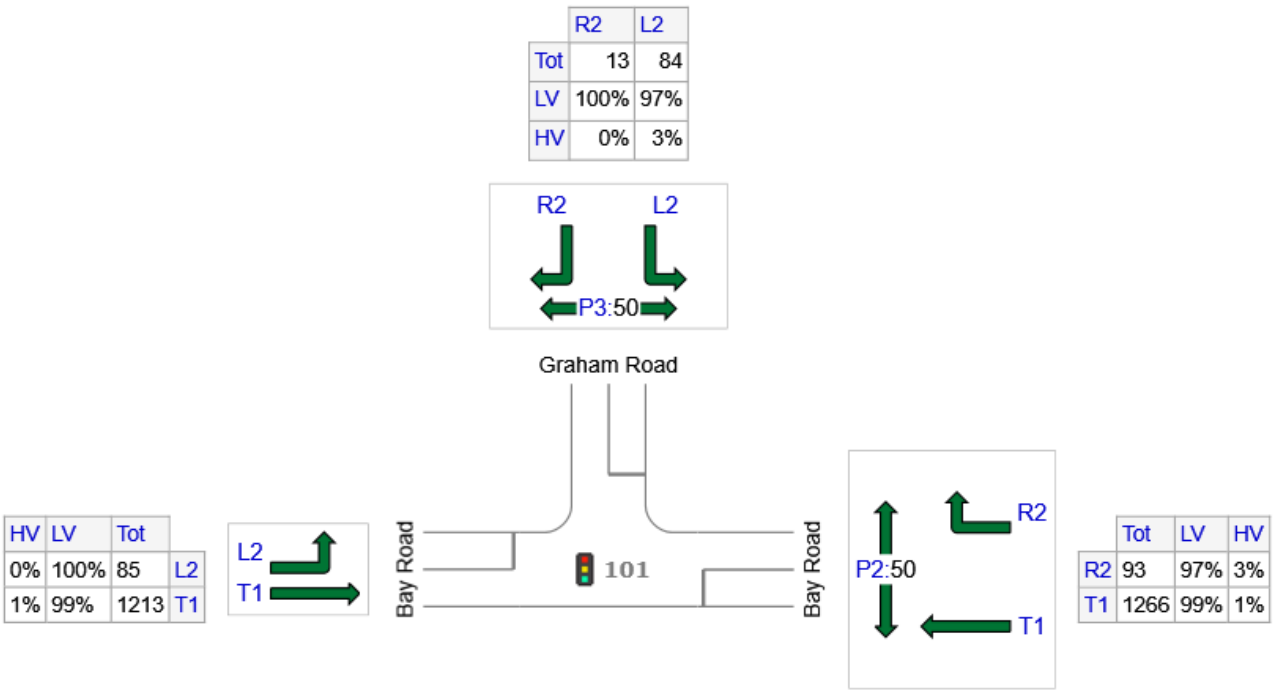
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Site Layout



Input Volumes

Volume Display Method: Total and %



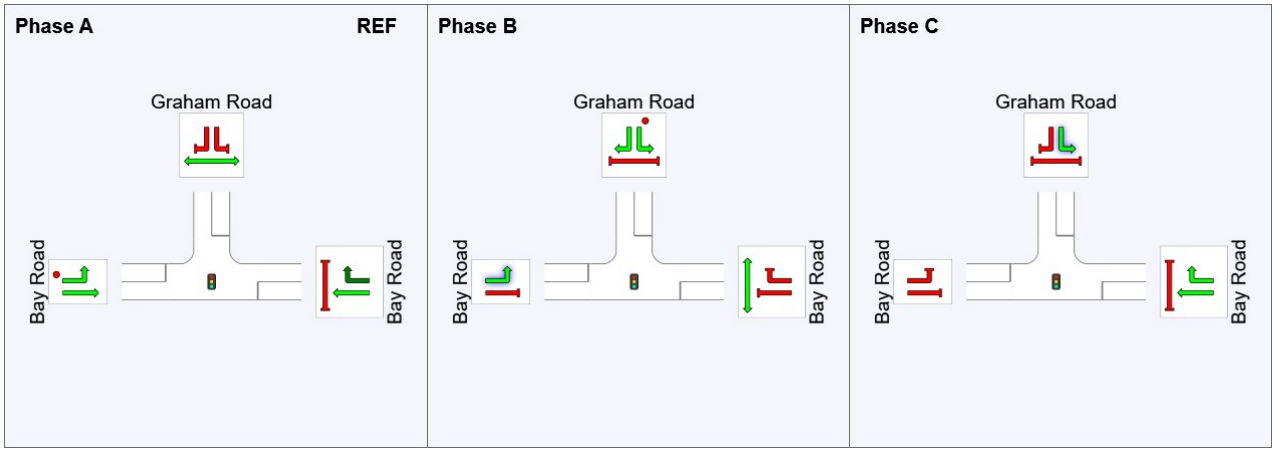
	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: Bay Road	1359	1342	17
N: Graham Road	97	95	2
W: Bay Road	1298	1287	11
Total	2754	2724	30

Phase Timing Summary

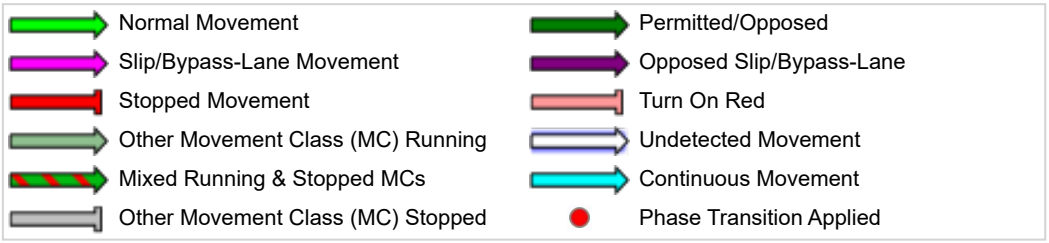
Phase	A	B	C
Phase Change Time (sec)	0	46	61
Green Time (sec)	40	9	23
Phase Time (sec)	46	15	29
Phase Split	51%	17%	32%

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



Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Bay Road													
Lane 1	914	1.1	1461	0.625	100	5.0	LOS A	17.7	125.4	Full	500	0.0	0.0
Lane 2	517	1.5	826	0.625	100	14.0	LOS B	10.4	74.0	Short	80	0.0	NA
Approach	1431	1.2		0.625		8.2	LOS A	17.7	125.4				
North: Graham Road													
Lane 1	102	2.5	398	0.256	100	32.3	LOS C	3.6	25.6	Full	500	0.0	0.0
Approach	102	2.5		0.256		32.3	LOS C	3.6	25.6				
West: Bay Road													
Lane 1	684	0.8	849	0.805	100	26.5	LOS C	27.5	193.5	Full	260	0.0	0.0
Lane 2	683	0.9	848	0.805	100	26.2	LOS C	27.7	195.3	Full	260	0.0	0.0
Approach	1366	0.8		0.805		26.3	LOS C	27.7	195.3				
Intersection	2899	1.1		0.805		17.6	LOS B	27.7	195.3				

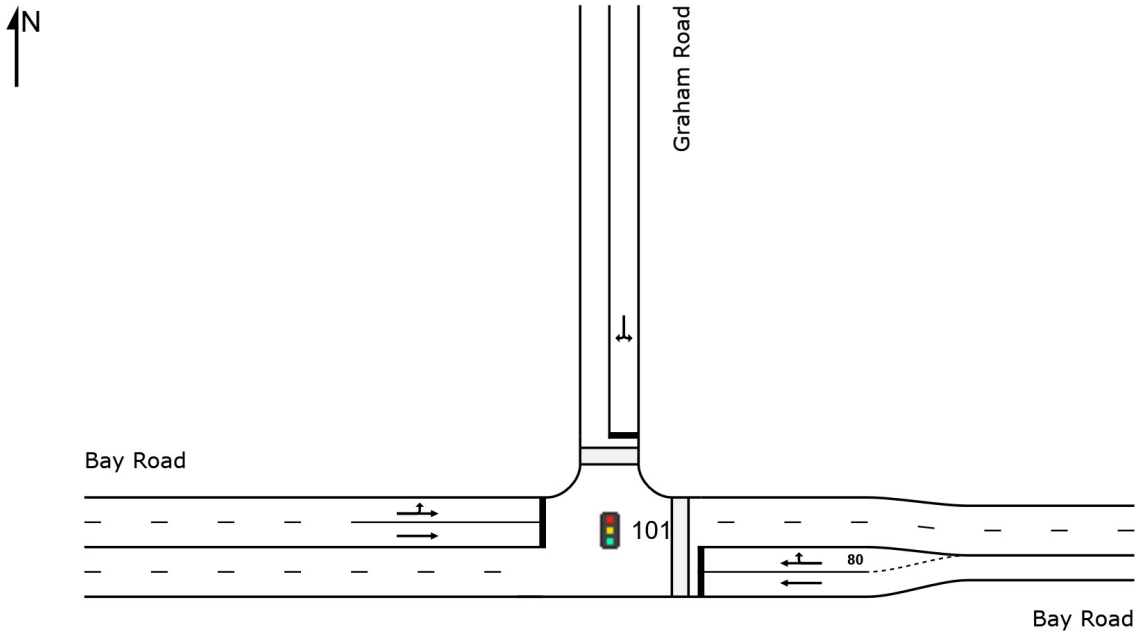
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control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

Site: 101 [Opt 3b - AM - Post Dev - Bay Road & Graham Road - Full Departure EB_FINAL]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

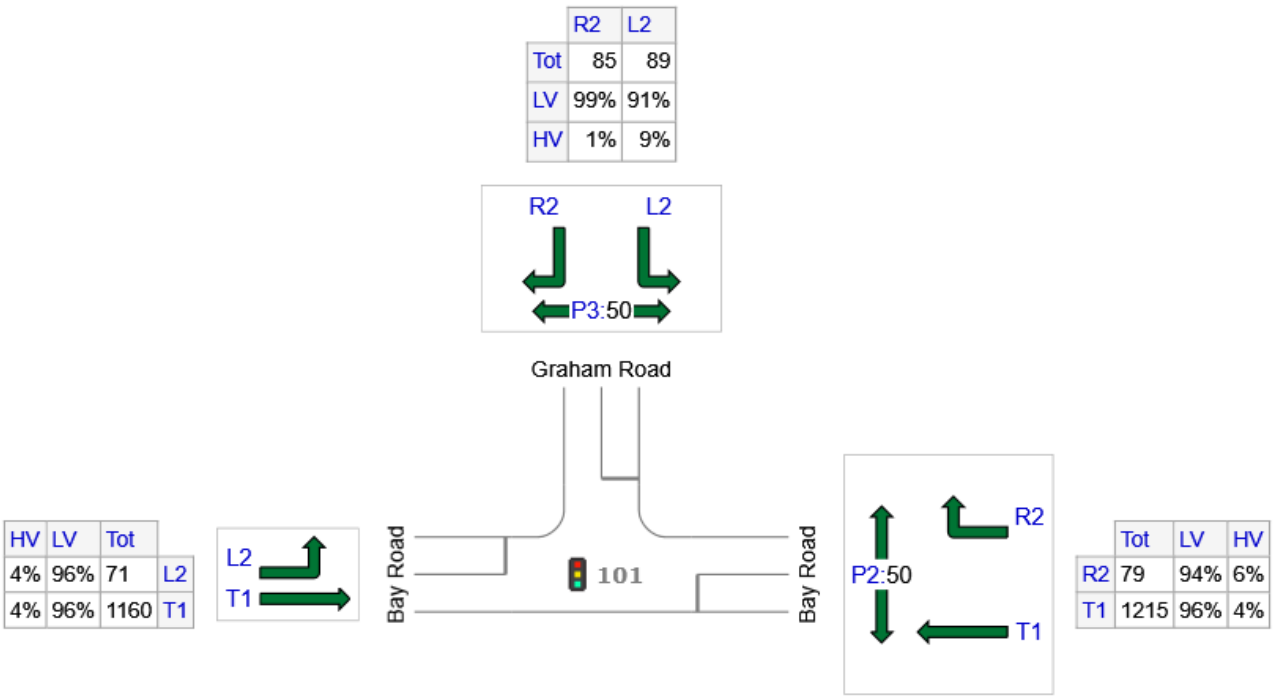
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Site Layout



Input Volumes

Volume Display Method: Total and %



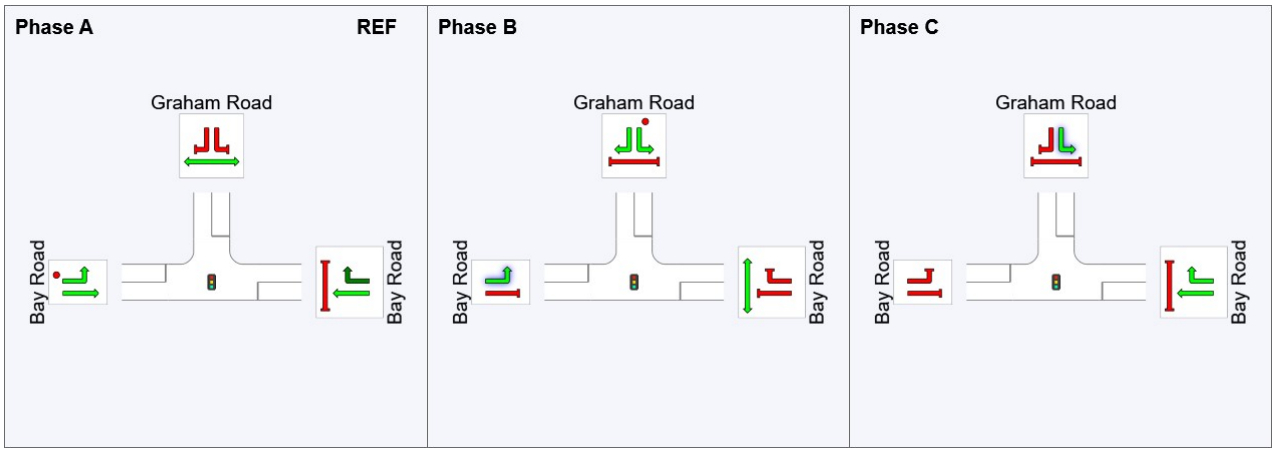
	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: Bay Road	1294	1243	51
N: Graham Road	174	165	9
W: Bay Road	1231	1186	45
Total	2699	2594	105

Phase Timing Summary

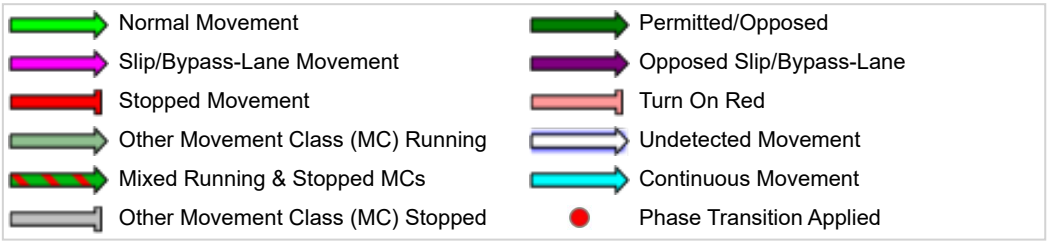
Phase	A	B	C
Phase Change Time (sec)	0	45	62
Green Time (sec)	39	11	22
Phase Time (sec)	45	17	28
Phase Split	50%	19%	31%

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



Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Bay Road													
Lane 1	854	3.8	1395	0.612	100	5.7	LOS A	17.4	125.5	Full	500	0.0	0.0
Lane 2	509	4.2	831	0.612	100	11.4	LOS B	9.4	68.4	Short	80	0.0	NA
Approach	1362	3.9		0.612		7.8	LOS A	17.4	125.5				
North: Graham Road													
Lane 1	183	5.2	263	0.696	100	40.6	LOS D	7.5	55.1	Full	500	0.0	0.0
Approach	183	5.2		0.696		40.6	LOS D	7.5	55.1				
West: Bay Road													
Lane 1	648	3.7	813	0.797	100	26.7	LOS C	26.0	187.7	Full	260	0.0	0.0
Lane 2	648	3.6	813	0.797	100	26.5	LOS C	26.2	189.2	Full	260	0.0	0.0
Approach	1296	3.7		0.797		26.6	LOS C	26.2	189.2				
Intersection	2841	3.9		0.797		18.5	LOS B	26.2	189.2				

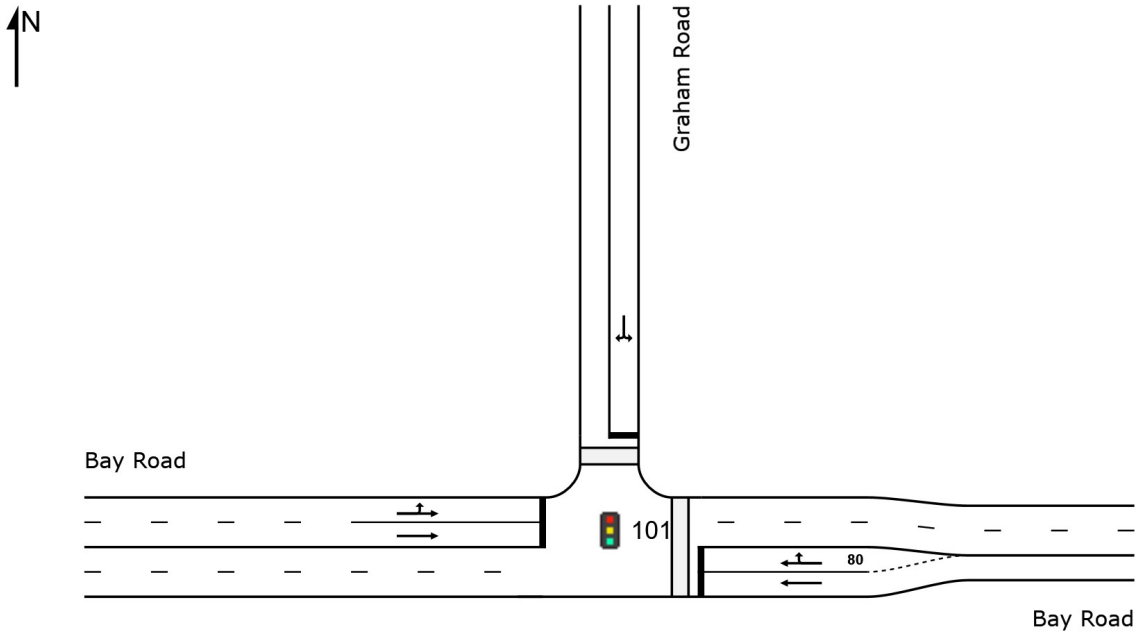
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control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

Site: 101 [Opt 3b - PM - Post Dev - Bay Road & Graham Road - Full Departure EB_FINAL]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

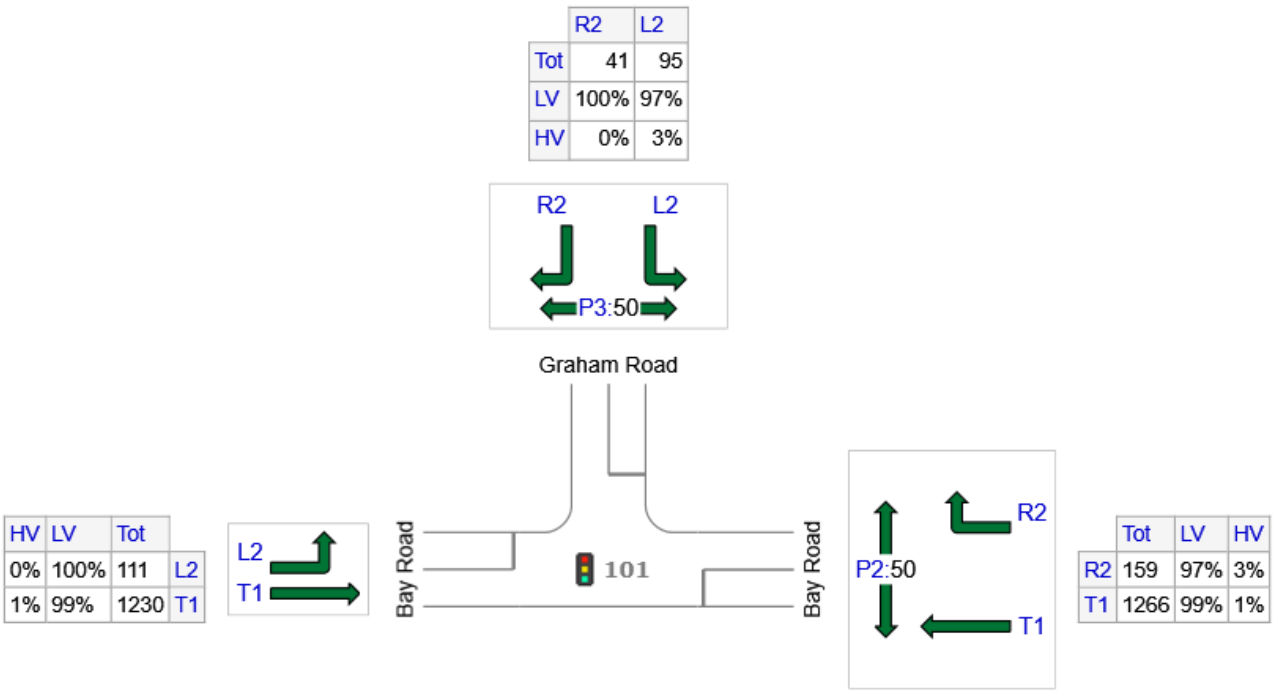
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Site Layout



Input Volumes

Volume Display Method: Total and %



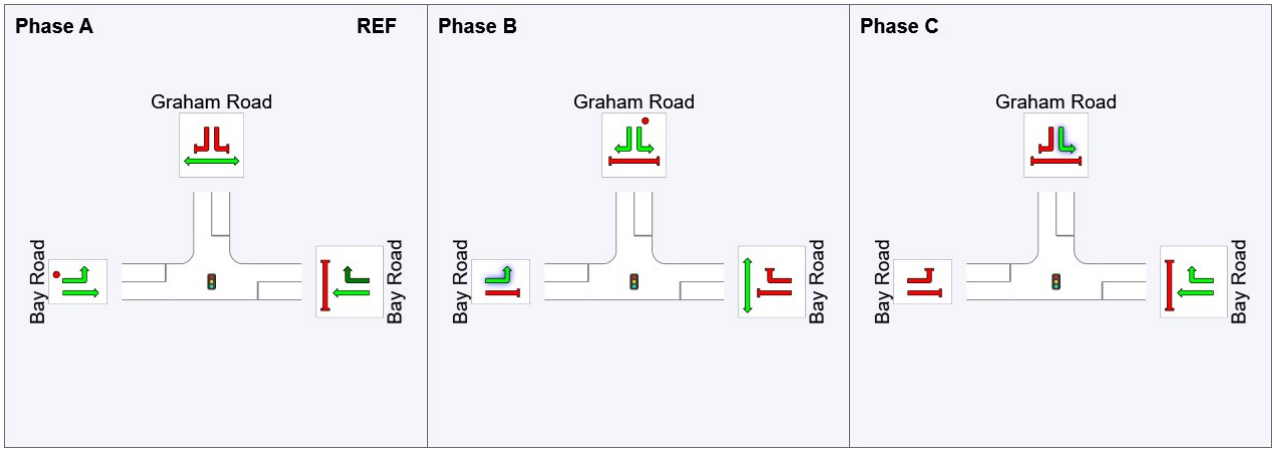
	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: Bay Road	1425	1406	19
N: Graham Road	136	133	3
W: Bay Road	1341	1330	11
Total	2902	2869	33

Phase Timing Summary

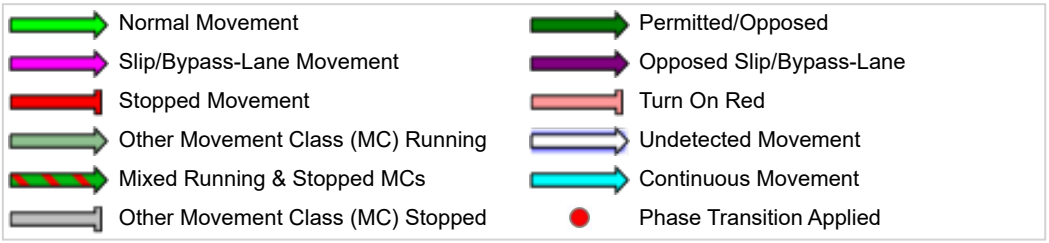
Phase	A	B	C
Phase Change Time (sec)	0	44	59
Green Time (sec)	38	9	25
Phase Time (sec)	44	15	31
Phase Split	49%	17%	34%

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



Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Bay Road													
Lane 1	988	1.1	1400	0.706	100	5.4	LOS A	20.7	146.6	Full	500	0.0	0.0
Lane 2	512	1.7	725	0.706	100	23.2	LOS C	14.3	101.9	Short	80	0.0	NA
Approach	1500	1.3		0.706		11.5	LOS B	20.7	146.6				
North: Graham Road													
Lane 1	143	2.1	277	0.517	100	38.6	LOS D	5.6	40.1	Full	500	0.0	0.0
Approach	143	2.1		0.517		38.6	LOS D	5.6	40.1				
West: Bay Road													
Lane 1	707	0.8	808	0.875	100	35.4	LOS D	33.4	235.3	Full	260	0.0	0.0
Lane 2	705	0.9	806	0.875	100	35.0	LOS D	33.6	236.9	Full	260	0.0	0.0
Approach	1412	0.8		0.875		35.2	LOS D	33.6	236.9				
Intersection	3055	1.1		0.875		23.7	LOS C	33.6	236.9				

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

USER REPORT FOR SITE

Project: 210727-V181370-Highett Rd_Nepean Hwy_Rowans-Rd

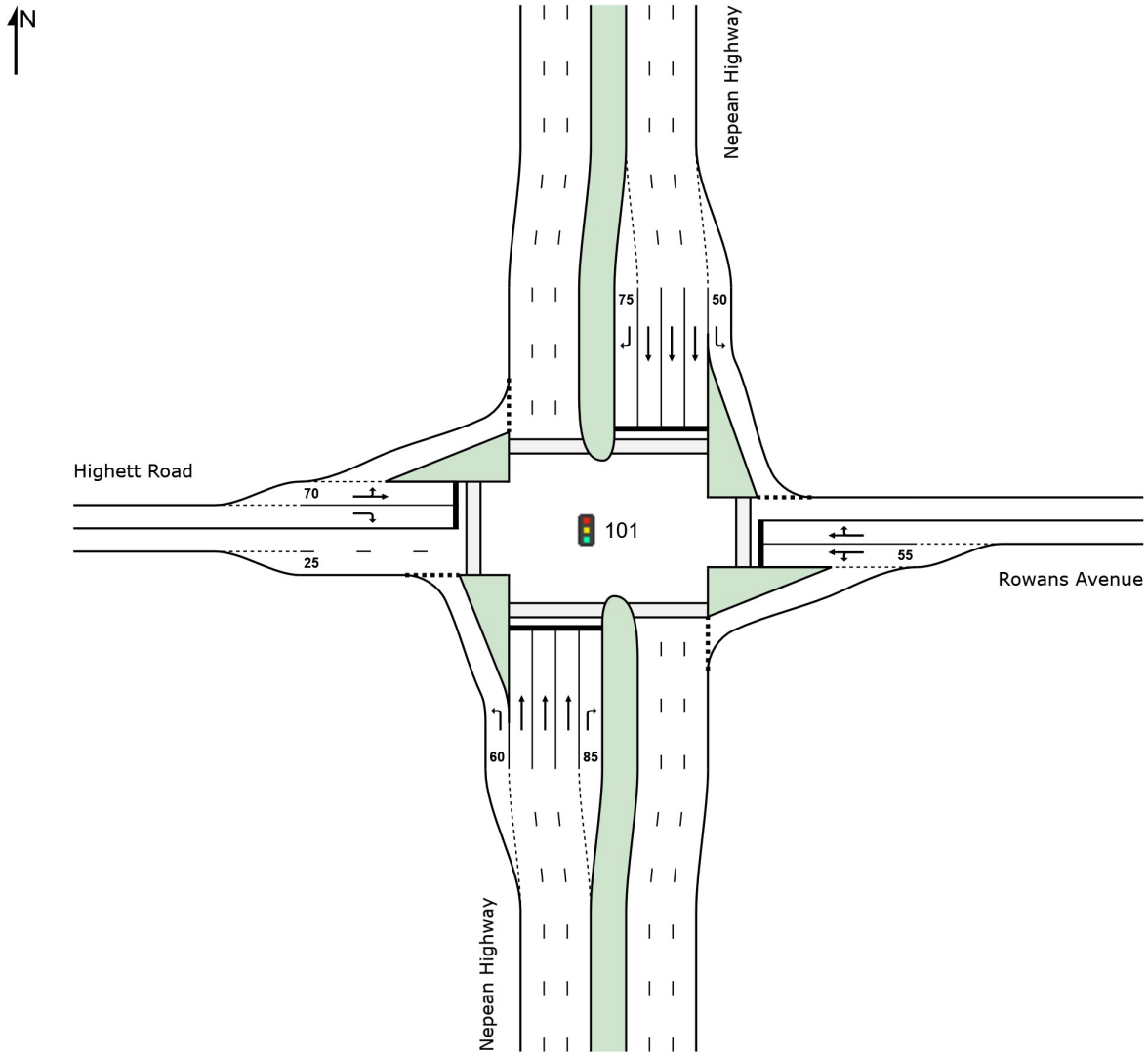
Template: Site Report - Combined

Site: 101 [AM-Ex-Nepean Hwy/Highett Rd/Rowans Ave]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

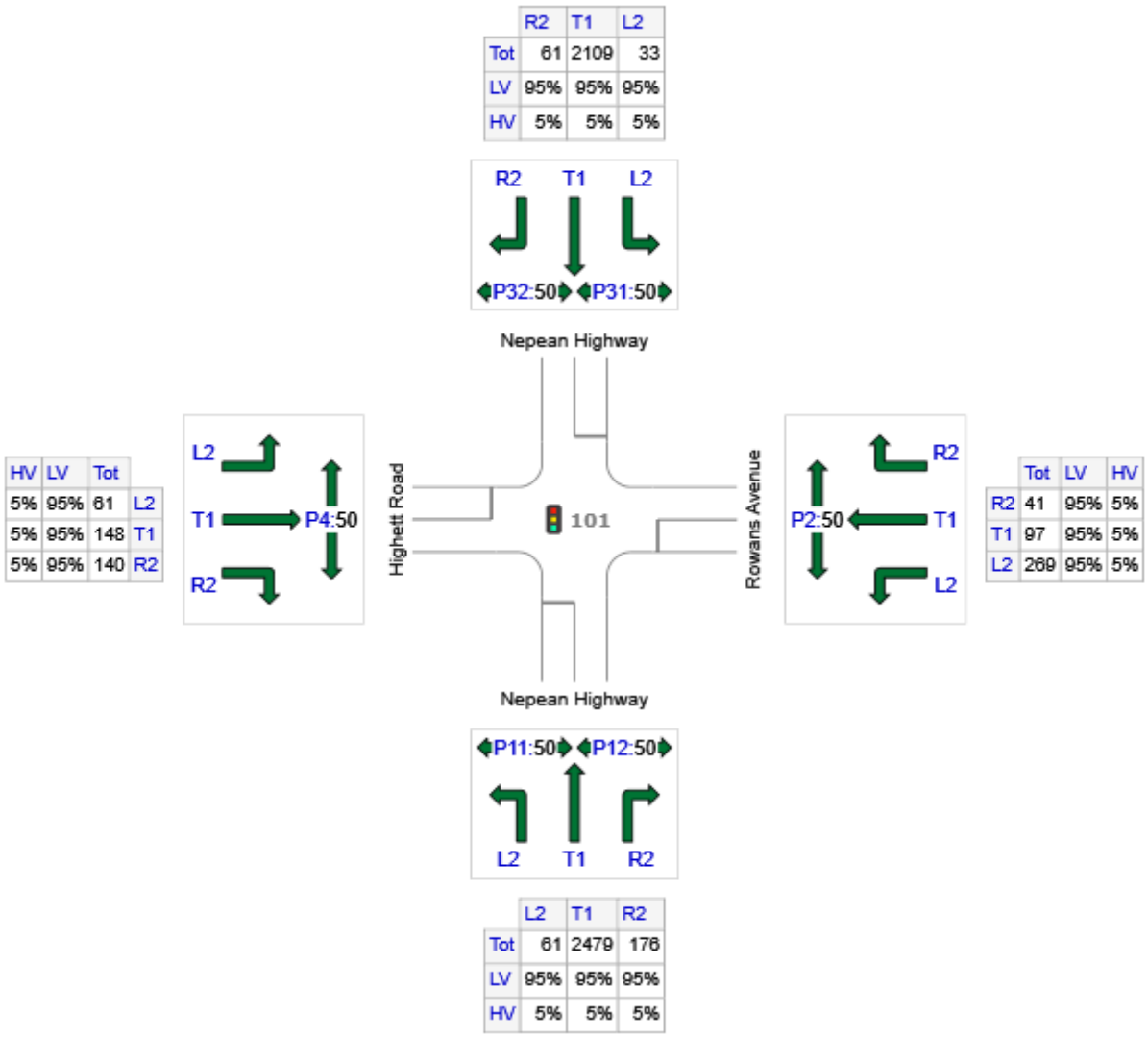
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D1, D2*, D3*
Output Phase Sequence: A, B, C, D1, D2*
(* Variable Phase)

Site Layout



Input Volumes

Volume Display Method: Total and %



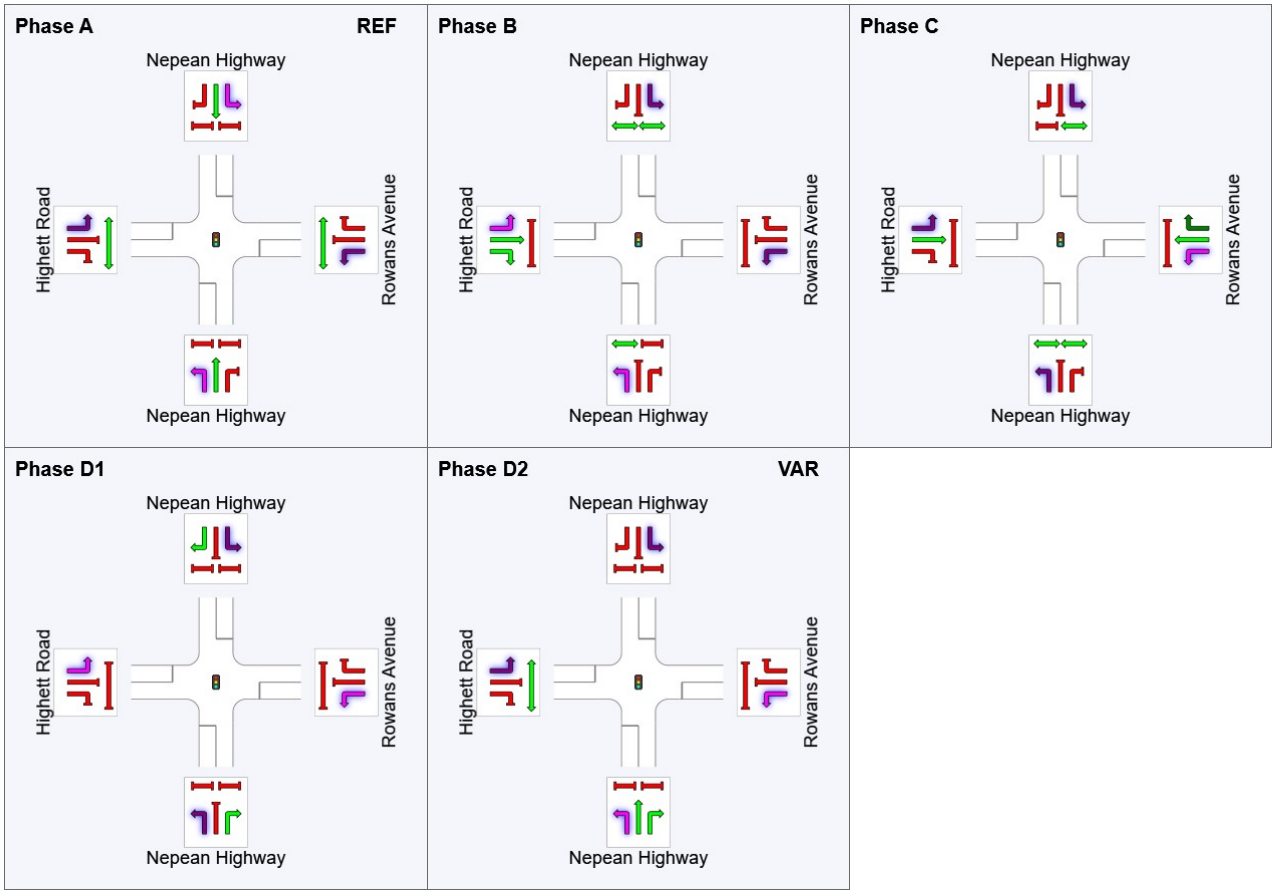
	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Nepean Highway	2716	2580	136
E: Rowans Avenue	407	387	20
N: Nepean Highway	2203	2093	110
W: Highett Road	349	332	17
Total	5675	5391	284

Phase Timing Summary

Phase	A	B	C	D1	D2
Phase Change Time (sec)	0	82	103	124	137
Green Time (sec)	76	15	15	7	7
Phase Time (sec)	82	21	21	13	13
Phase Split	55%	14%	14%	9%	9%

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

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Nepean Highway													
Lane 1	64	5.0	1499	0.043	100	7.2	LOS A	0.6	4.6	Short	60	0.0	NA
Lane 2	880	5.0	1056[1]	0.833	100	24.5	LOS C	48.0	350.7	Full	500	0.0	0.0
Lane 3	934	5.0	1121	0.833	100	25.9	LOS C	53.9	393.1	Full	500	0.0	0.0
Lane 4	796	5.0	955[1]	0.833	100	22.6	LOS C	40.1	292.5	Full	500	0.0	0.0
Lane 5	185	5.0	239	0.775	100	77.8	LOS E	13.9	101.2	Short	85	0.0	NA
Approach	2859	5.0		0.833		27.5	LOS C	53.9	393.1				
East: Rowans Avenue													
Lane 1	283	5.0	672[1]	0.422	50[5]	33.5	LOS C	15.0	109.2	Short	55	0.0	NA
Lane 2	145	5.0	171	0.848	100	82.7	LOS F	11.6	84.3	Full	500	0.0	0.0
Approach	428	5.0		0.848		50.2	LOS D	15.0	109.2				
North: Nepean Highway													
Lane 1	35	5.0	1237	0.028	100	9.1	LOS A	0.5	3.8	Short	50	0.0	NA
Lane 2	738	5.0	923[1]	0.800	100	31.7	LOS C	43.0	314.1	Full	500	0.0	0.0

Lane 3	765	5.0	957	0.800	100	32.5	LOS C	45.7	333.3	Full	500	0.0	0.0
Lane 4	716	5.0	896[1]	0.800	100	31.1	LOS C	40.9	298.8	Full	500	0.0	0.0
Lane 5	64	5.0	84	0.767	100	89.5	LOS F	5.1	37.1	Short	75	0.0	NA
Approach	2319	5.0		0.800		33.0	LOS C	45.7	333.3				
West: Highett Road													
Lane 1	220	5.0	472	0.466	100	58.8	LOS E	13.1	95.8	Short	70	0.0	NA
Lane 2	147	5.0	179	0.822	100	84.4	LOS F	11.5	83.9	Full	500	0.0	0.0
Approach	367	5.0		0.822		69.1	LOS E	13.1	95.8				
Intersection	5974	5.0		0.848		33.8	LOS C	53.9	393.1				

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

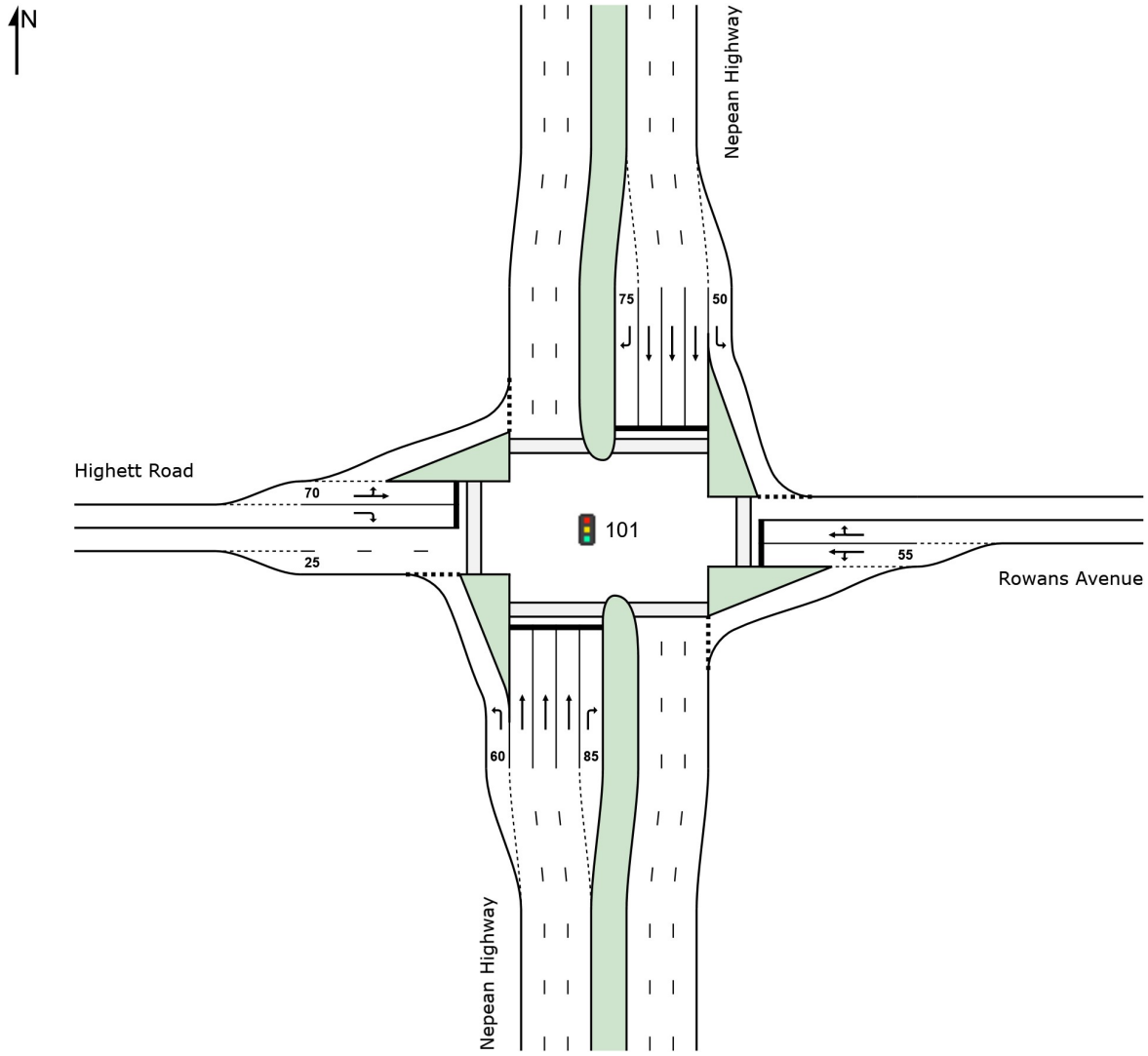
1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program

Site: 101 [PM-Ex-Nepean Hwy/Highett Rd/Rowans Ave]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

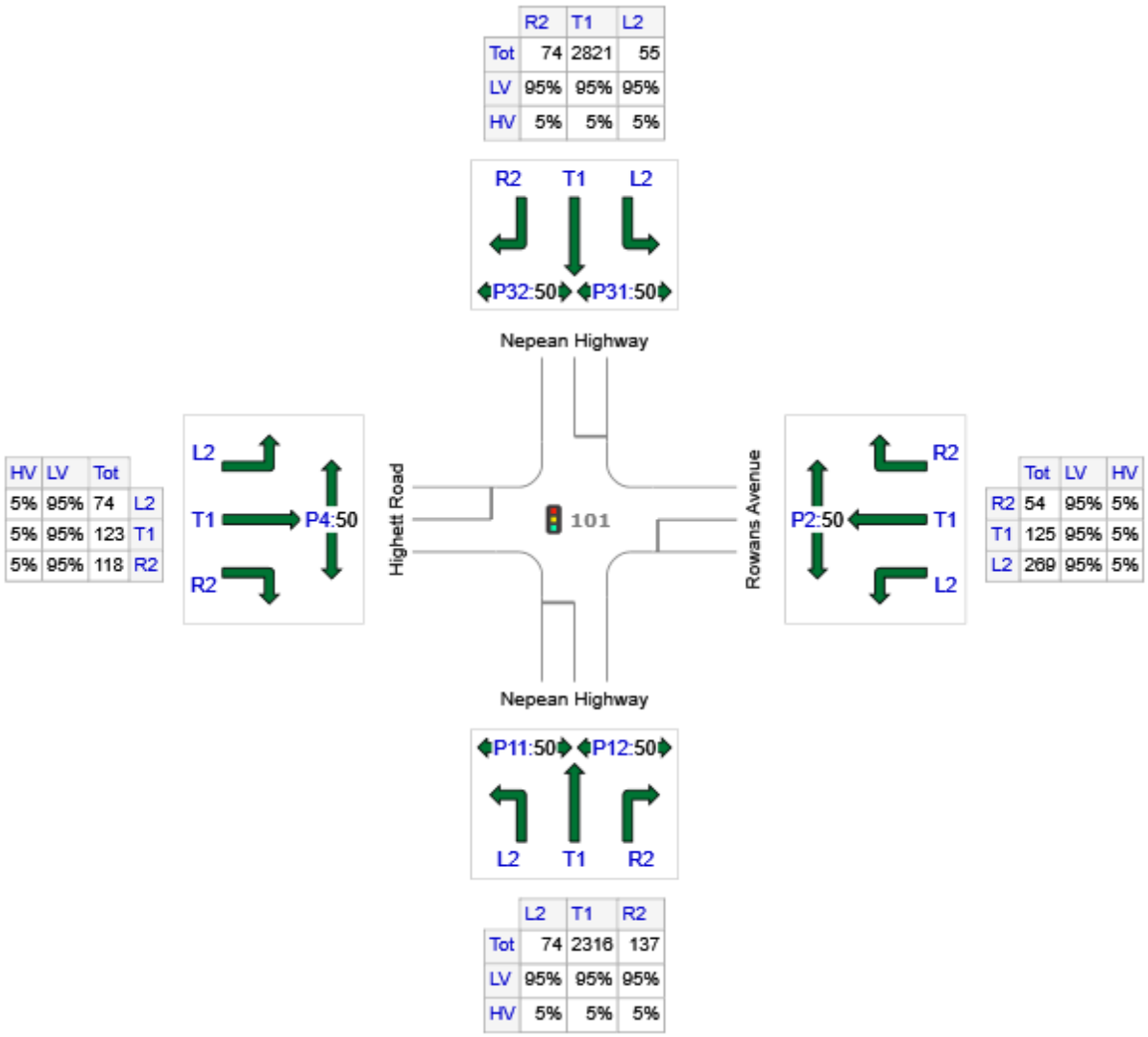
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D1, D2*, D3*
Output Phase Sequence: A, B, C, D1, D2*
(* Variable Phase)

Site Layout



Input Volumes

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Nepean Highway	2527	2401	126
E: Rowans Avenue	448	426	22
N: Nepean Highway	2950	2803	148
W: Highett Road	315	299	16
Total	6240	5928	312

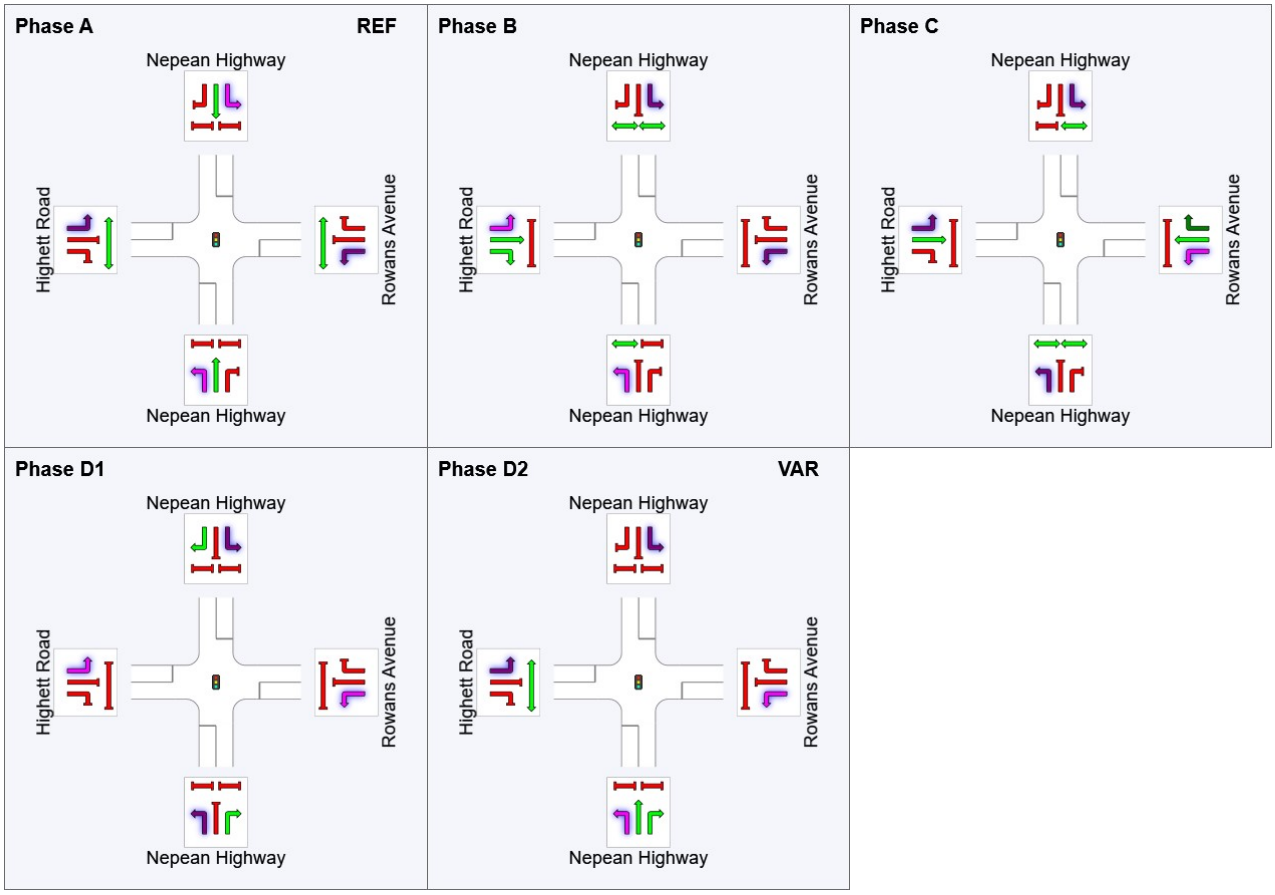
Phase Timing Summary

Phase	A	B	C	D1	D2
Phase Change Time (sec)	0	90	107	131	145
Green Time (sec)	84	11	18	8	***
Phase Time (sec)	90	17	24	14	5
Phase Split	60%	11%	16%	9%	3%

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%.

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

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

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Nepean Highway													
Lane 1	78	5.0	1456	0.053	100	7.7	LOS A	0.9	6.6	Short	60	0.0	NA
Lane 2	804	5.0	1034[1]	0.777	100	22.8	LOS C	40.8	297.8	Full	500	0.0	0.0
Lane 3	871	5.0	1121	0.777	100	24.3	LOS C	47.1	344.2	Full	500	0.0	0.0
Lane 4	763	5.0	981[1]	0.777	100	21.9	LOS C	37.3	272.0	Full	500	0.0	0.0
Lane 5	144	5.0	155	0.928	100	98.0	LOS F	12.4	90.2	Short	85	0.0	NA
Approach	2660	5.0		0.928		26.7	LOS C	47.1	344.2				
East: Rowans Avenue													
Lane 1	283	5.0	562	0.504	51[5]	50.4	LOS D	15.8	115.5	Short	55	0.0	NA
Lane 2	188	5.0	190[1]	0.994	100	116.7	LOS F	18.4	134.1	Full	500	0.0	0.0
Approach	472	5.0		0.994		76.9	LOS E	18.4	134.1				
North: Nepean Highway													
Lane 1	58	5.0	1315	0.044	100	8.1	LOS A	0.7	5.4	Short	50	0.0	NA
Lane 2	977	5.0	1006[1]	0.971	100	65.5	LOS E	85.8	626.0	Full	500	0.0	25.4

Lane 3	1027	5.0	1058	0.971	100	65.7	LOS E	93.1	679.7	Full	500	0.0	33.0
Lane 4	965	5.0	994[1]	0.971	100	65.5	LOS E	84.2	614.6	Full	500	0.0	23.7
Lane 5	78	5.0	96	0.814	100	90.0	LOS F	6.2	45.4	Short	75	0.0	NA
Approach	3105	5.0		0.971		65.1	LOS E	93.1	679.7				
West: Highett Road													
Lane 1	207	5.0	475	0.436	100	52.3	LOS D	11.7	85.1	Short	70	0.0	NA
Lane 2	124	5.0	132	0.945	100	102.6	LOS F	10.9	79.3	Full	500	0.0	0.0
Approach	332	5.0		0.945		71.1	LOS E	11.7	85.1				
Intersection	6568	5.0		0.994		50.7	LOS D	93.1	679.7				

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

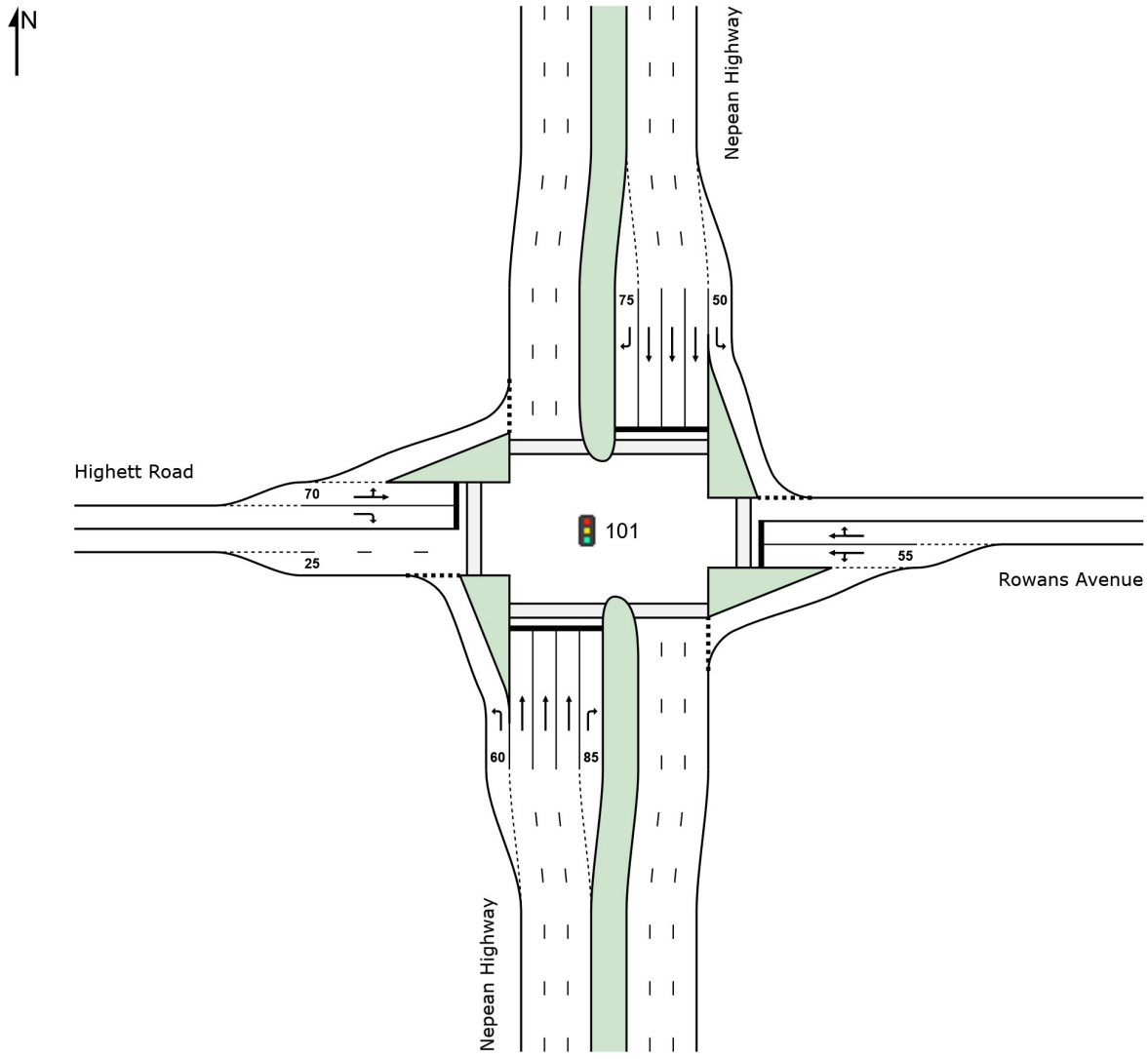
1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program

Site: 101 [AM-Post-Dev-Nepean Hwy/Highett Rd/Rowans Ave - User Given Phase Times]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)

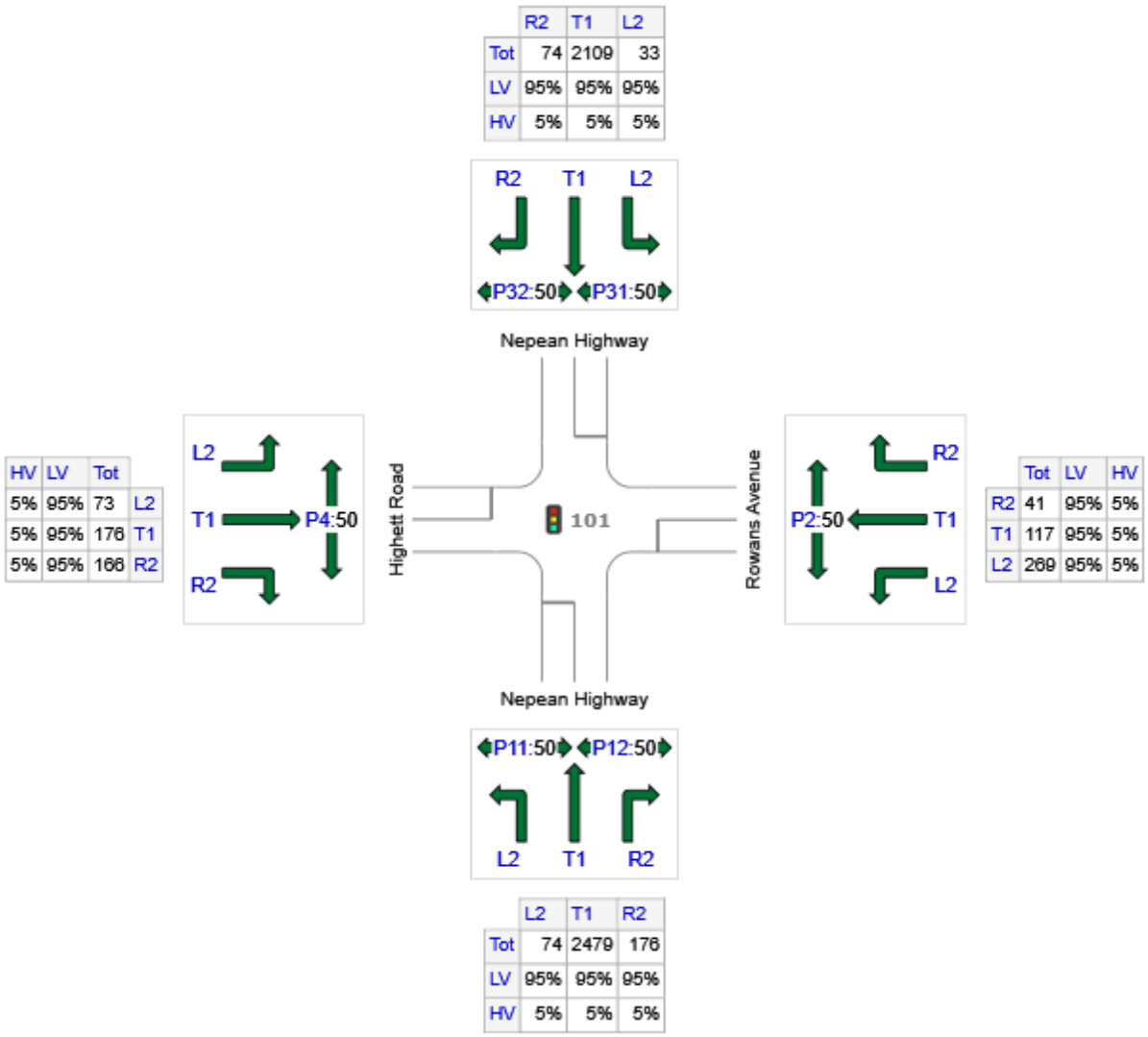
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D1, D2
Output Phase Sequence: A, B, C, D1, D2

Site Layout



Input Volumes

Volume Display Method: Total and %



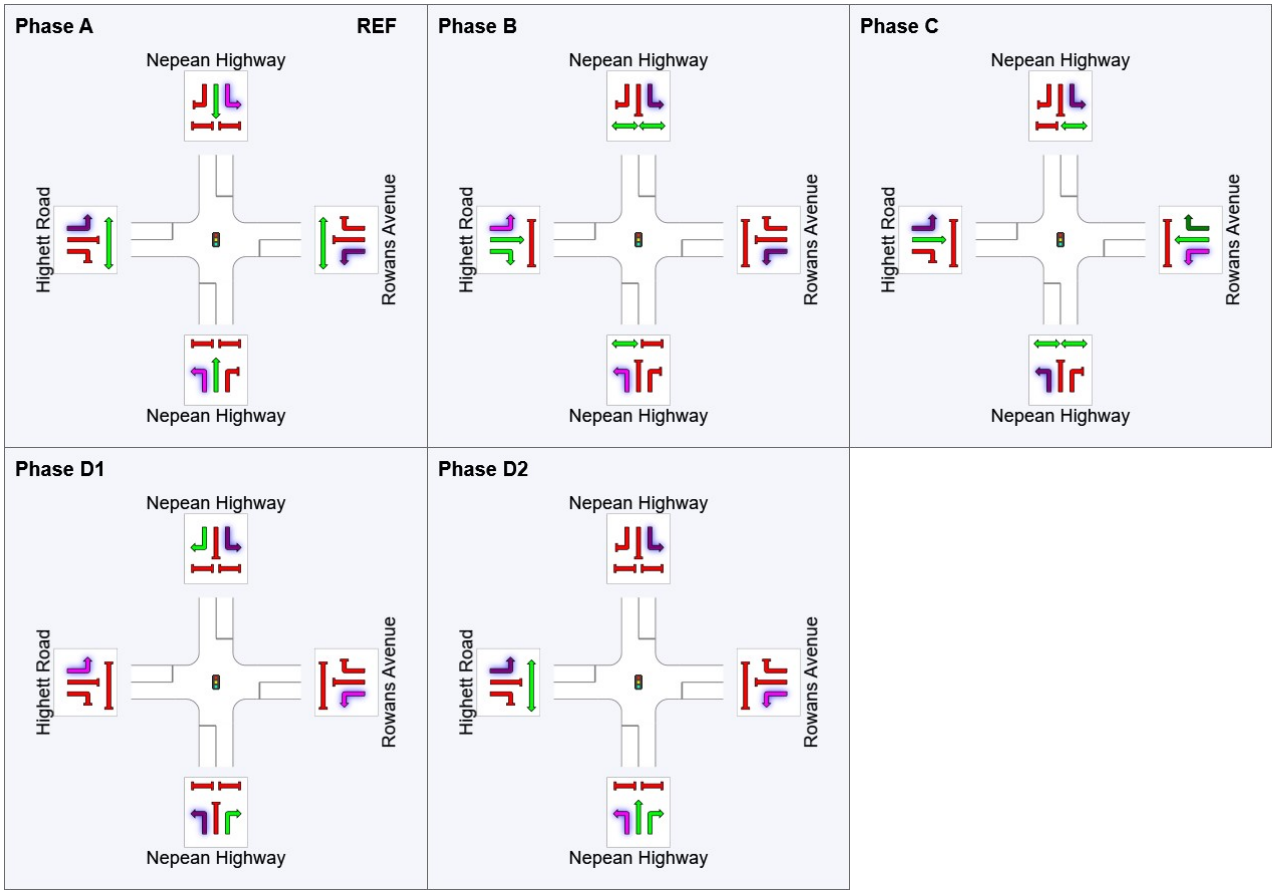
	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Nepean Highway	2729	2593	136
E: Rowans Avenue	427	406	21
N: Nepean Highway	2216	2105	111
W: Highett Road	415	394	21
Total	5787	5498	289

Phase Timing Summary

Phase	A	B	C	D1	D2
Phase Change Time (sec)	0	82	103	124	137
Green Time (sec)	76	15	15	7	7
Phase Time (sec)	82	21	21	13	13
Phase Split	55%	14%	14%	9%	9%

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

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Nepean Highway													
Lane 1	78	5.0	1470	0.053	100	7.7	LOS A	0.9	6.6	Short	60	0.0	NA
Lane 2	875	5.0	1047[1]	0.836	100	24.4	LOS C	47.5	346.8	Full	500	0.0	0.0
Lane 3	936	5.0	1121	0.836	100	25.9	LOS C	54.2	395.4	Full	500	0.0	0.0
Lane 4	798	5.0	955[1]	0.836	100	22.6	LOS C	40.3	294.2	Full	500	0.0	0.0
Lane 5	185	5.0	239	0.775	100	77.8	LOS E	13.9	101.2	Short	85	0.0	NA
Approach	2873	5.0		0.836		27.4	LOS C	54.2	395.4				
East: Rowans Avenue													
Lane 1	283	5.0	650	0.435	45[5]	37.0	LOS D	15.1	110.1	Short	55	0.0	NA
Lane 2	166	5.0	173	0.962	100	103.1	LOS F	15.1	110.4	Full	500	0.0	0.0
Approach	449	5.0		0.962		61.4	LOS E	15.1	110.4				
North: Nepean Highway													
Lane 1	35	5.0	1215	0.029	100	9.6	LOS A	0.6	4.1	Short	50	0.0	NA
Lane 2	742	5.0	923[1]	0.803	100	31.8	LOS C	43.3	316.4	Full	500	0.0	0.0

Lane 3	769	5.0	957	0.803	100	32.6	LOS C	46.0	335.8	Full	500	0.0	0.0
Lane 4	710	5.0	883[1]	0.803	100	30.9	LOS C	40.3	294.3	Full	500	0.0	0.0
Lane 5	78	5.0	84	0.931	100	101.1	LOS F	6.7	48.8	Short	75	0.0	NA
Approach	2333	5.0		0.931		33.8	LOS C	46.0	335.8				
West: Highett Road													
Lane 1	262	5.0	472	0.555	100	60.7	LOS E	15.6	114.1	Short	70	0.0	NA
Lane 2	175	5.0	179	0.974	100	111.5	LOS F	16.2	118.5	Full	500	0.0	0.0
Approach	437	5.0		0.974		81.0	LOS F	16.2	118.5				
Intersection	6092	5.0		0.974		36.2	LOS D	54.2	395.4				

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

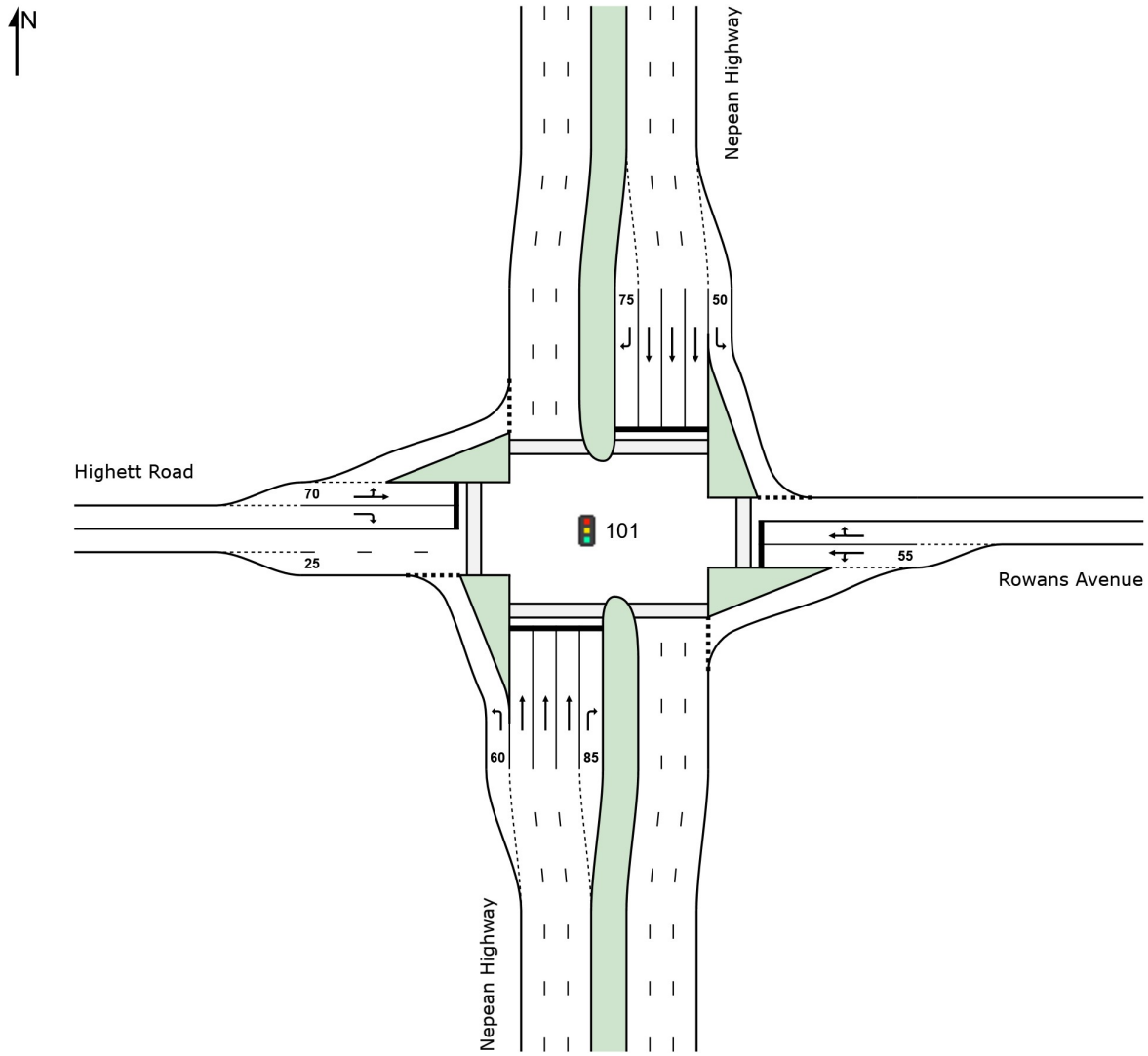
1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program

Site: 101 [PM-Post-Dev-Nepean Hwy/Highett Rd/Rowans Ave - User Given Phase Times]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)

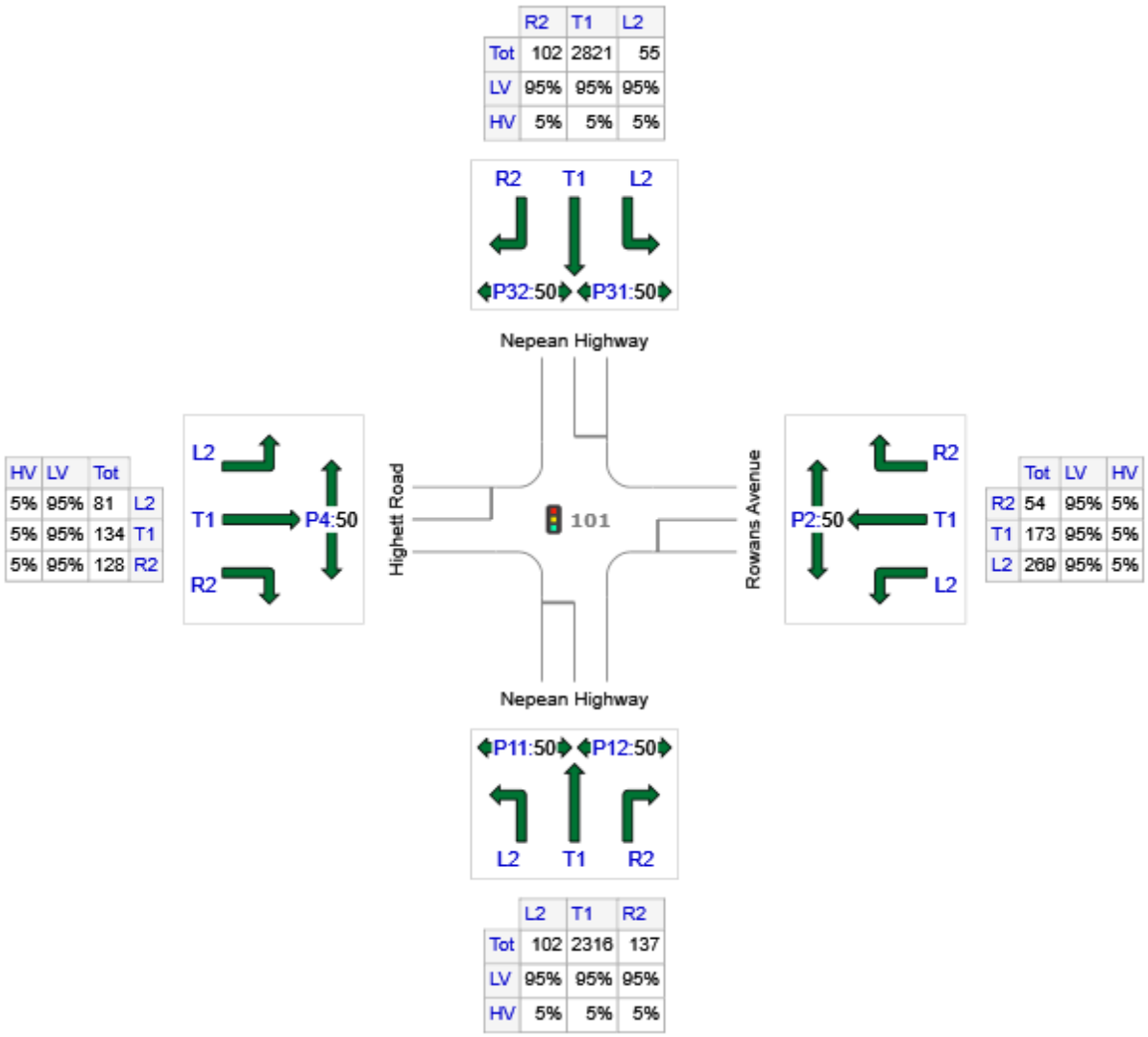
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D1, D2
Output Phase Sequence: A, B, C, D1, D2

Site Layout



Input Volumes

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Nepean Highway	2555	2427	128
E: Rowans Avenue	496	471	25
N: Nepean Highway	2978	2829	149
W: Highett Road	343	326	17
Total	6372	6053	319

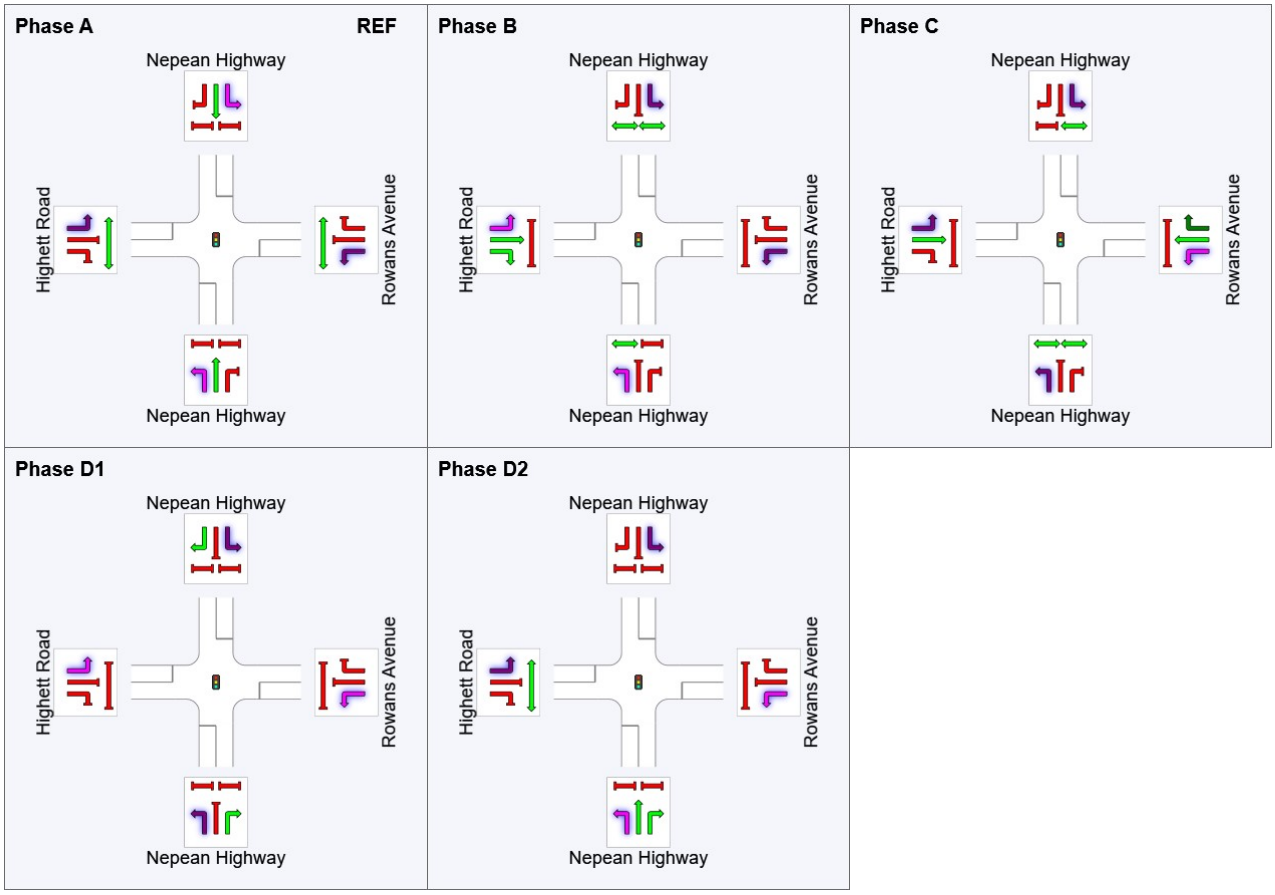
Phase Timing Summary

Phase	A	B	C	D1	D2
Phase Change Time (sec)	0	90	108	131	145
Green Time (sec)	84	12	18	8	***
Phase Time (sec)	90	17	24	14	5
Phase Split	60%	11%	16%	9%	3%

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%.

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

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

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Nepean Highway													
Lane 1	107	5.0	1439	0.075	100	8.1	LOS A	1.4	10.1	Short	60	0.0	NA
Lane 2	788	5.0	1004[1]	0.785	100	22.4	LOS C	39.4	287.5	Full	500	0.0	0.0
Lane 3	879	5.0	1121	0.785	100	24.5	LOS C	48.0	350.2	Full	500	0.0	0.0
Lane 4	771	5.0	982[1]	0.785	100	22.1	LOS C	37.9	276.9	Full	500	0.0	0.0
Lane 5	144	5.0	155	0.928	100	98.0	LOS F	12.4	90.2	Short	85	0.0	NA
Approach	2689	5.0		0.928		26.5	LOS C	48.0	350.2				
East: Rowans Avenue													
Lane 1	335	5.0	537	0.623	65[7]	54.3	LOS D	19.4	141.6	Short	55	0.0	NA
Lane 2	187	5.0	195[1]	0.959	100	101.6	LOS F	17.0	124.1	Full	500	0.0	0.0
Approach	522	5.0		0.959		71.3	LOS E	19.4	141.6				
North: Nepean Highway													
Lane 1	58	5.0	1306	0.044	100	8.2	LOS A	0.7	5.4	Short	50	0.0	NA
Lane 2	984	5.0	1006[1]	0.978	100	69.6	LOS E	88.8	648.4	Full	500	0.0	28.7

Lane 3	1035	5.0	1058	0.978	100	69.8	LOS E	96.4	704.0	Full	500	0.0	36.2
Lane 4	950	5.0	971[1]	0.978	100	69.6	LOS E	84.1	614.1	Full	500	0.0	23.7
Lane 5	107	5.0	96	1.123	100	203.6	LOS F	14.0	101.9	Short	75	0.0	NA
Approach	3135	5.0		1.123		73.1	LOS E	96.4	704.0				
West: Highett Road													
Lane 1	226	5.0	476	0.476	100	53.4	LOS D	12.7	92.8	Short	70	0.0	NA
Lane 2	135	5.0	143	0.939	100	101.0	LOS F	11.7	85.5	Full	500	0.0	0.0
Approach	361	5.0		0.939		71.1	LOS E	12.7	92.8				
Intersection	6707	5.0		1.123		54.2	LOS D	96.4	704.0				

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

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

USER REPORT FOR NETWORK SITE

Project: 210714-V181370-Highett Rd_Graham Road-Network

Template: Site Report - Combined

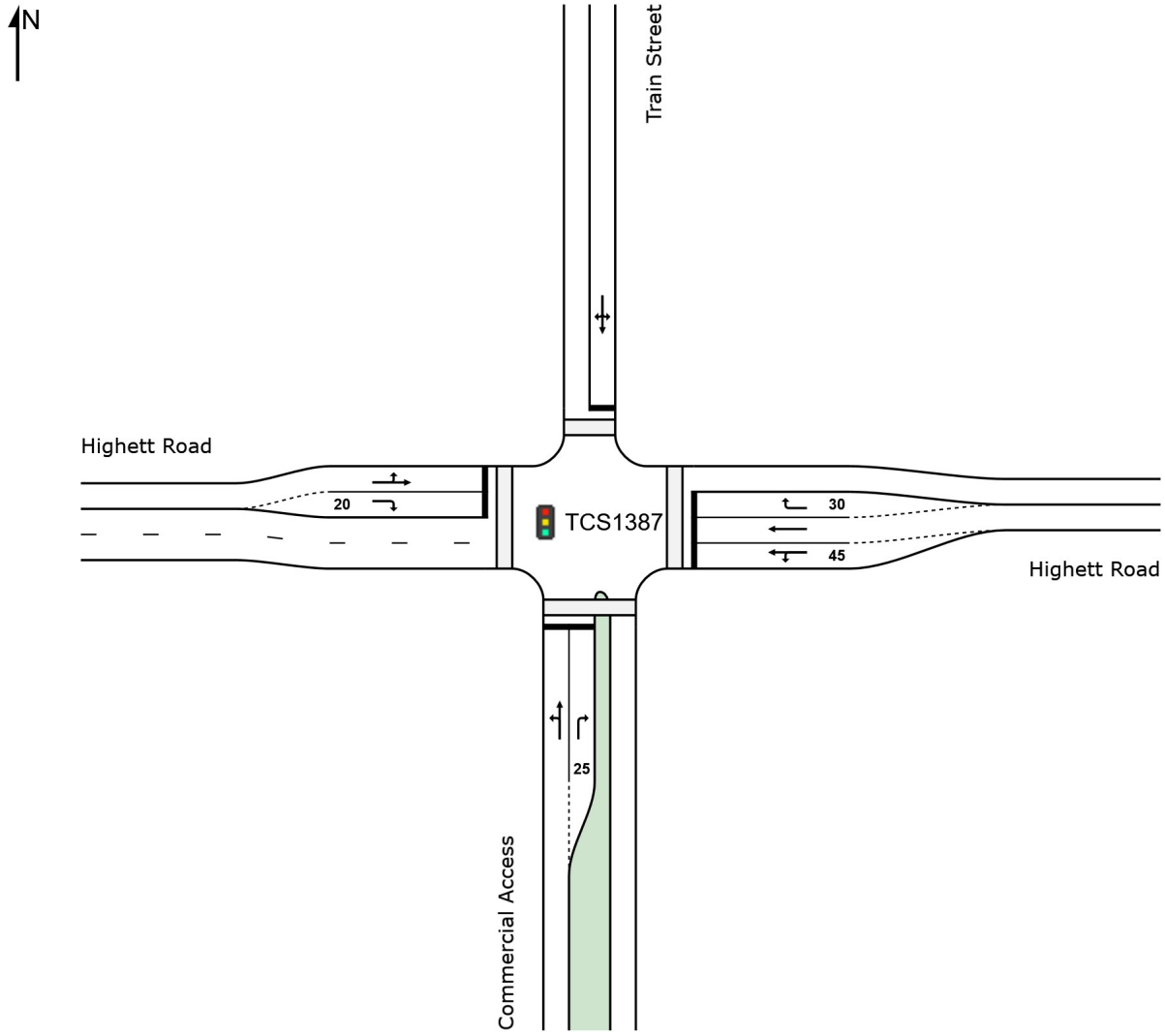
Site: TCS1387 [Post Dev-Highett Rd / Train Street / Commercial Access AM]

Network: 4 [Post Dev-Highett Road Network AM]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 90 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 D
Input Phase Sequence: A, B, D
Output Phase Sequence: A, B, D

Site Layout

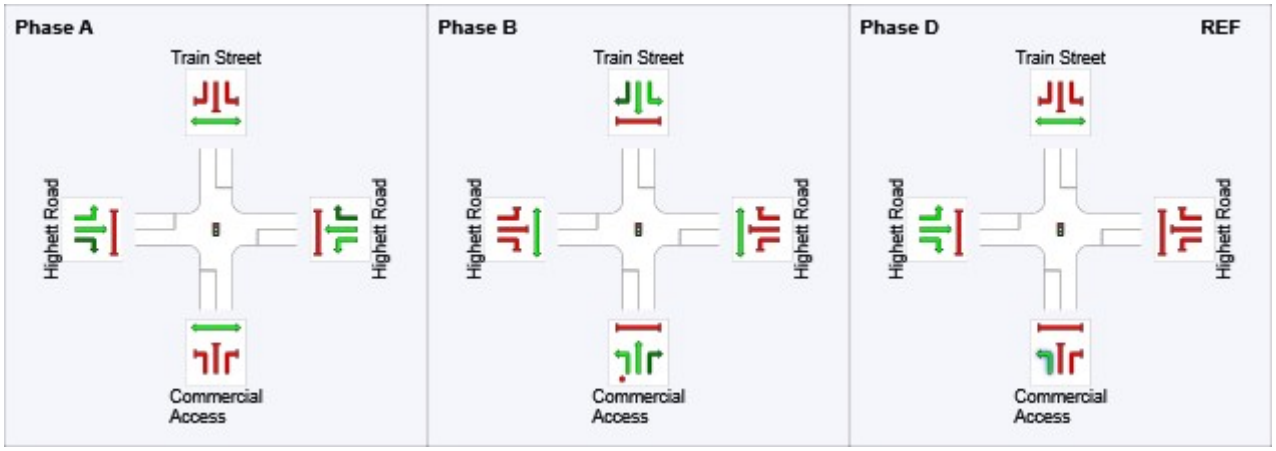


Phase Timing Summary

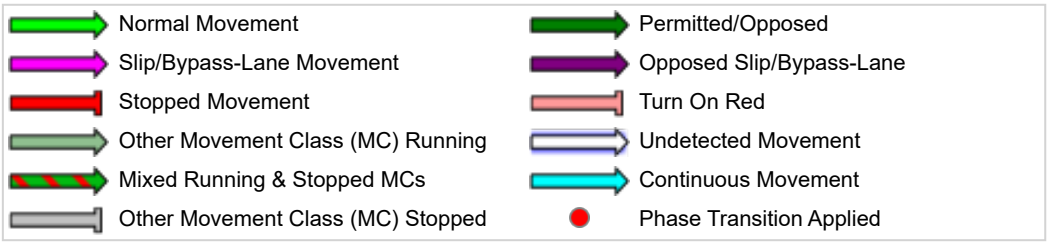
Phase	A	B	D
Phase Change Time (sec)	21	73	0
Green Time (sec)	46	11	15
Phase Time (sec)	52	17	21
Phase Split	58%	19%	23%

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



Lane Use and Performance

	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	Aver. Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Commercial Access															
Lane 1	48	5.0	48	5.0	309	0.157	100	31.9	LOS C	1.1	7.7	Full	30	0.0	0.0
Lane 2	16	5.0	16	5.0	193	0.082	100	42.2	LOS D	0.4	2.8	Short	25	0.0	NA
Approach	64	5.0	64	5.0		0.157		34.4	LOS C	1.1	7.7				
East: Highett Road															
Lane 1	205	5.0	205	5.0	945	0.217	100	5.5	LOS A	0.8	6.0	Short	45	0.0	NA
Lane 2	210	5.0	210	5.0	965	0.217	100	3.2	LOS A	0.8	6.1	Full	140	0.0	0.0
Lane 3	38	5.0	38	5.0	533	0.071	100	8.5	LOS A	0.1	1.0	Short	30	0.0	NA
Approach	453	5.0	453	5.0		0.217		4.7	LOS A	0.8	6.1				
North: Train Street															
Lane 1	27	5.0	27	5.0	193	0.142	100	41.4	LOS D	0.7	5.0	Full	20	0.0	0.0
Approach	27	5.0	27	5.0		0.142		41.4	LOS D	0.7	5.0				
West: Highett Road															
Lane 1	340	5.0	340	5.0	1386	0.245	100	5.3	LOS A	2.8	20.5	Full	500	0.0	0.0
Lane 2	71	5.0	71	5.0	789	0.089	100	9.3	LOS A	0.5	3.8	Short	20	0.0	NA
Approach	411	5.0	411	5.0		0.245		6.0	LOS A	2.8	20.5				
Intersection	955	5.0	955	5.0		0.245		8.3	LOS A	2.8	20.5				

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

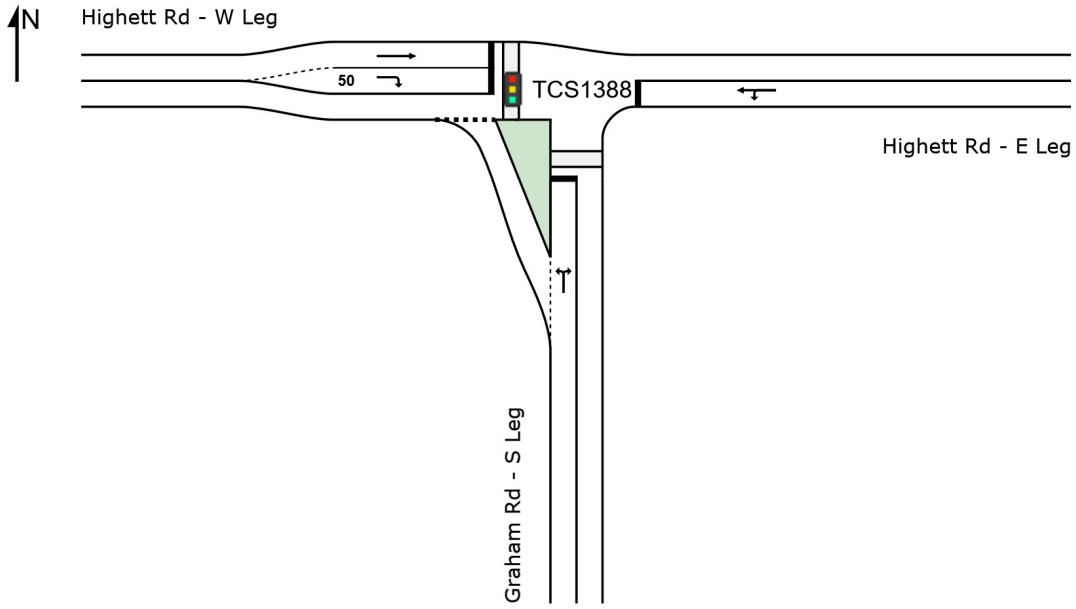
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement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

Site: TCS1388 [Post Dev-Highett Rd / Graham Rd AM] Network: 4 [Post Dev-Highett Road Network AM]

Highett Road / Graham Road
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C, Dum
Output Phase Sequence: A, B, C, Dum

Site Layout

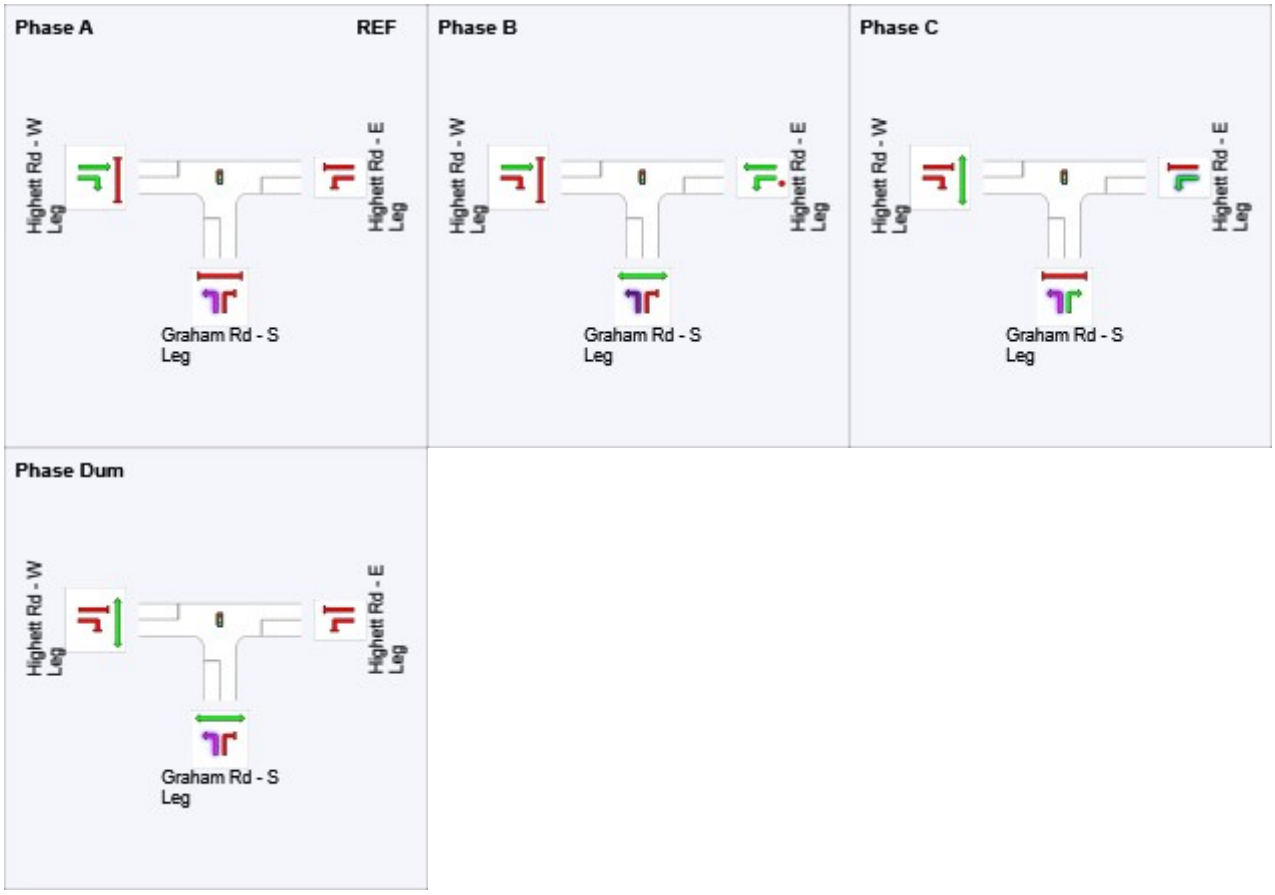


Phase Timing Summary

Phase	A	B	C	Dum
Phase Change Time (sec)	0	15	45	60
Green Time (sec)	9	24	9	24
Phase Time (sec)	15	30	15	30
Phase Split	17%	33%	17%	33%

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

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	Aver. Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Graham Rd - S Leg															
Lane 1	238	5.0	238	5.0	269	0.885	100	55.8	LOS E	6.4	46.7	Full	500	0.0	0.0
Approach	238	5.0	238	5.0		0.885		55.8	LOS E	6.4	46.7				
East: Highett Rd - E Leg															
Lane 1	283	5.0	283	5.0	508	0.557	100	29.4	LOS C	6.4	46.6	Full	70	0.0	12.6
Approach	283	5.0	283	5.0		0.557		29.4	LOS C	6.4	46.6				
West: Highett Rd - W Leg															
Lane 1	287	5.0	287	5.0	818	0.351	100	18.3	LOS B	4.9	35.6	Full	140	0.0	0.0
Lane 2	66	5.0	66	5.0	179	0.370	100	49.9	LOS D	1.8	13.5	Short	50	0.0	NA
Approach	354	5.0	354	5.0		0.370		24.2	LOS C	4.9	35.6				
Intersection	875	5.0	875	5.0		0.885		34.5	LOS C	6.4	46.7				

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

Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

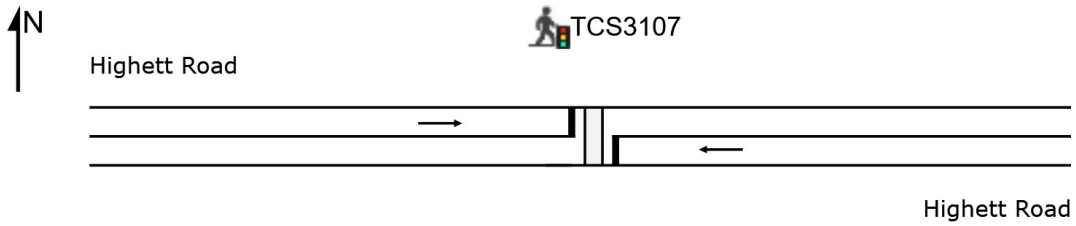
Site: TCS3107 [Post Dev-Highett Rd PoS AM]

Network: 4 [Post Dev-Highett Road Network AM]

New Site
Site Category: (None)
Pedestrian Crossing (Signals) - Fixed Time Coordinated Cycle Time = 90 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: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

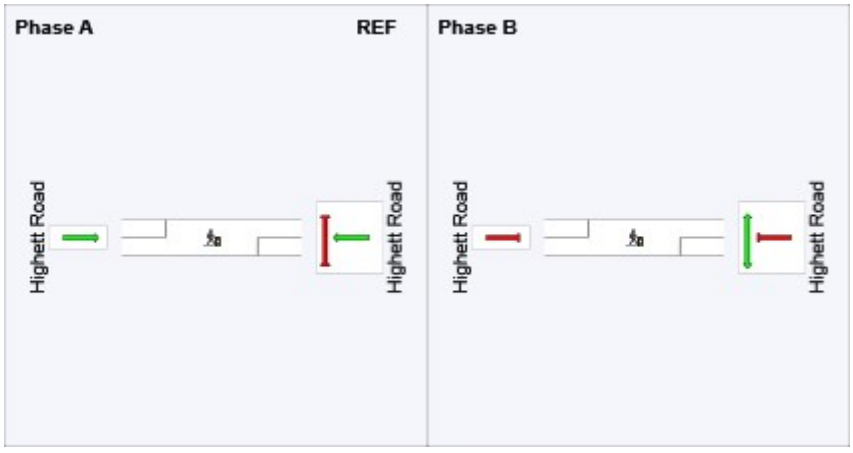


Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	77
Green Time (sec)	71	8
Phase Time (sec)	76	14
Phase Split	84%	16%

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

Other Movement Class (MC) Stopped Phase Transition Applied

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	Aver. Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Highett Road															
Lane 1	283	5.0	283	5.0	1302	0.217	100	2.6	LOS A	1.9	13.9	Full	500	-12.6 N3	0.0
Approach	283	5.0	283	5.0		0.217		2.6	LOS A	1.9	13.9				
West: Highett Road															
Lane 1	399	5.0	399	5.0	1490	0.268	100	0.3	LOS A	0.3	2.1	Full	70	0.0	0.0
Approach	399	5.0	399	5.0		0.268		0.3	LOS A	0.3	2.1				
Intersection	682	5.0	682	5.0		0.268		1.2	LOS A	1.9	13.9				

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

N3 Capacity Adjustment due to downstream lane blockage determined by the program.

USER REPORT FOR NETWORK SITE

Project: 210714-V181370-Highett Rd_Graham Road-Network

Template: Site Report - Combined

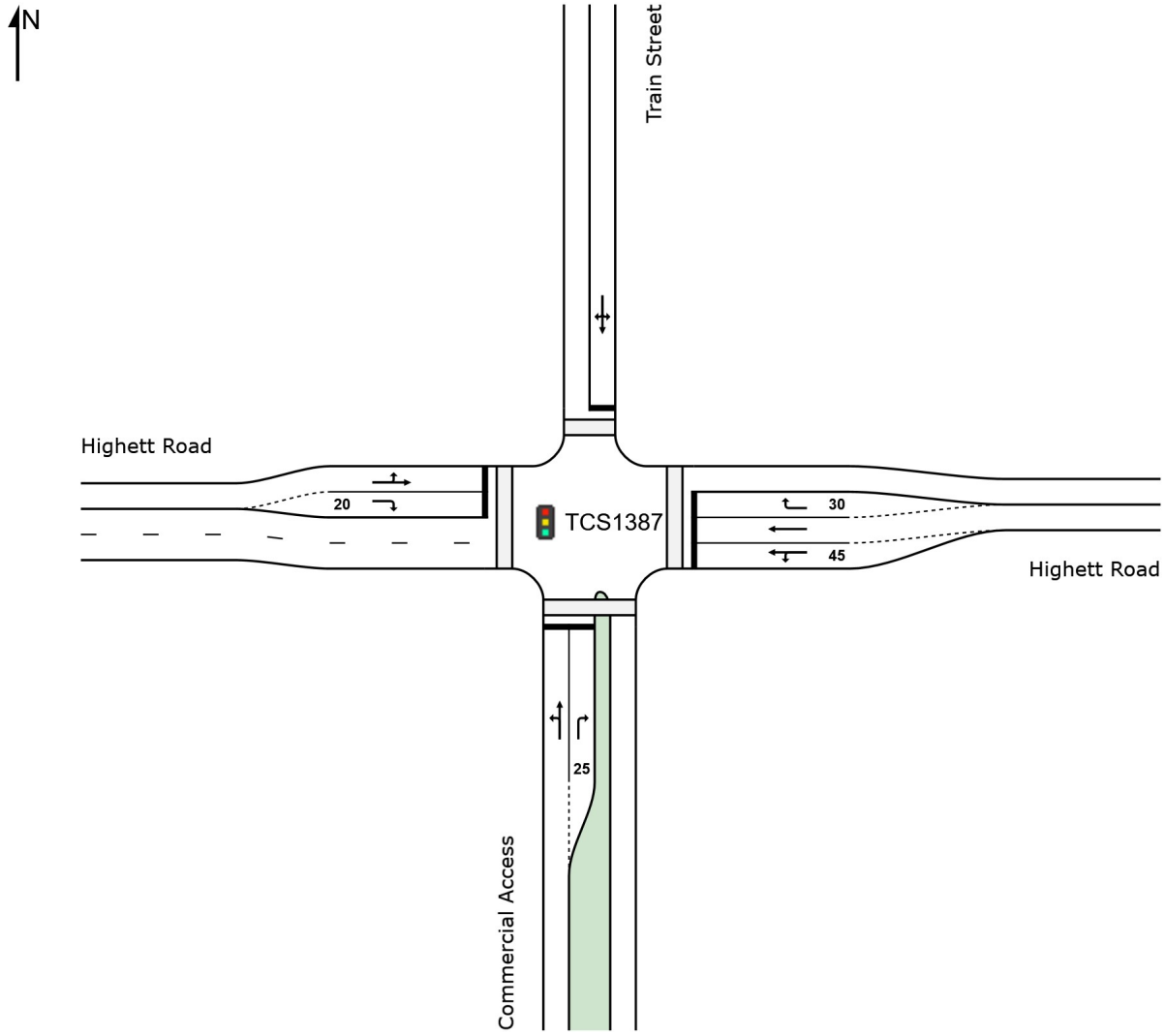
Site: TCS1387 [Post Dev-Highett Rd / Train Street / Commercial Access PM]

Network: 3 [Post Dev-Highett Road Network PM]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 90 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 D
Input Phase Sequence: A, B, D
Output Phase Sequence: A, B, D

Site Layout

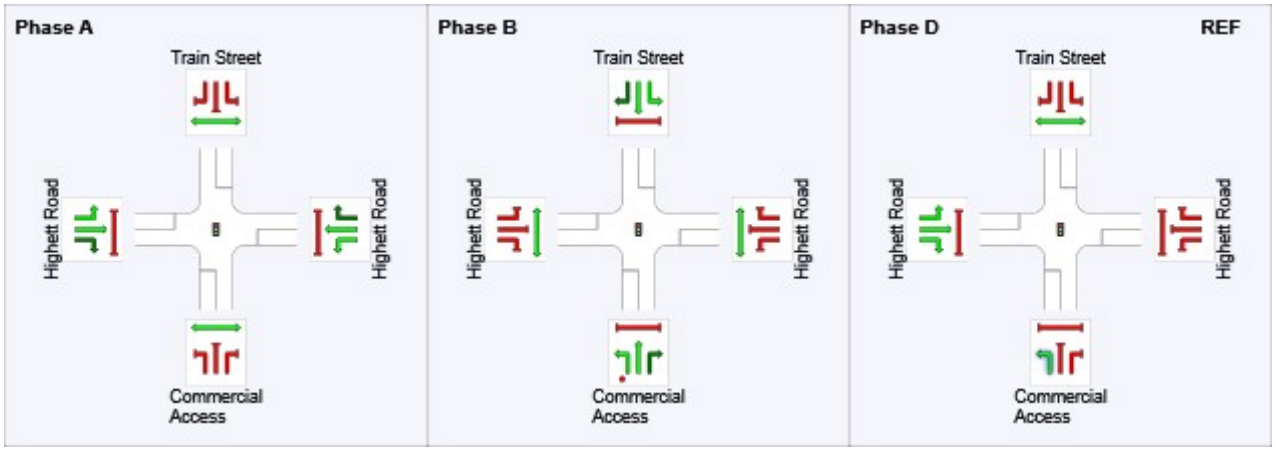


Phase Timing Summary

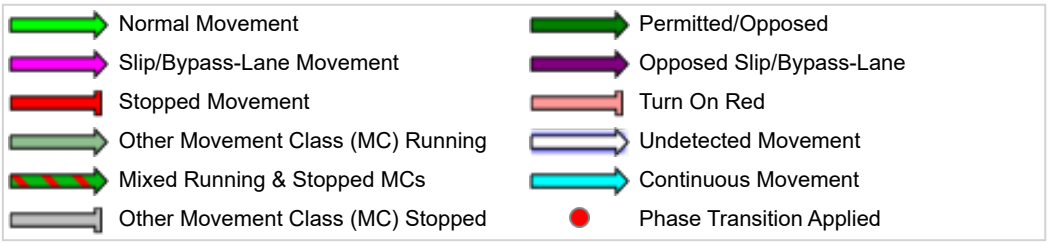
Phase	A	B	D
Phase Change Time (sec)	26	67	0
Green Time (sec)	35	17	20
Phase Time (sec)	41	23	26
Phase Split	46%	26%	29%

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



Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	Aver. Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Commercial Access															
Lane 1	122	5.0	122	5.0	434	0.281	100	27.7	LOS C	2.5	18.2	Full	30	0.0	3.9
Lane 2	28	5.0	28	5.0	279	0.102	100	37.2	LOS D	0.7	4.8	Short	25	0.0	NA
Approach	151	5.0	151	5.0		0.281		29.5	LOS C	2.5	18.2				
East: Highett Road															
Lane 1	246	5.0	246	5.0	715	0.344	100	9.4	LOS A	1.8	12.9	Short	45	0.0	NA
Lane 2	253	5.0	253	5.0	734	0.344	100	6.6	LOS A	1.8	13.3	Full	140	0.0	0.0
Lane 3	37	5.0	37	5.0	407	0.090	100	11.5	LOS B	0.2	1.5	Short	30	0.0	NA
Approach	536	5.0	536	5.0		0.344		8.2	LOS A	1.8	13.3				
North: Train Street															
Lane 1	42	5.0	42	5.0	273	0.154	100	36.5	LOS D	1.0	7.2	Full	20	0.0	0.0
Approach	42	5.0	42	5.0		0.154		36.5	LOS D	1.0	7.2				
West: Highett Road															
Lane 1	367	5.0	367	5.0	940[1]	0.391	100	7.6	LOS A	3.9	28.5	Full	500	0.0	0.0
Lane 2	139	5.0	139	5.0	738	0.188	100	11.7	LOS B	1.3	9.7	Short	20	0.0	NA
Approach	506	5.0	506	5.0		0.391		8.7	LOS A	3.9	28.5				
Intersection	1235	5.0	1235	5.0		0.391		12.0	LOS B	3.9	28.5				

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

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

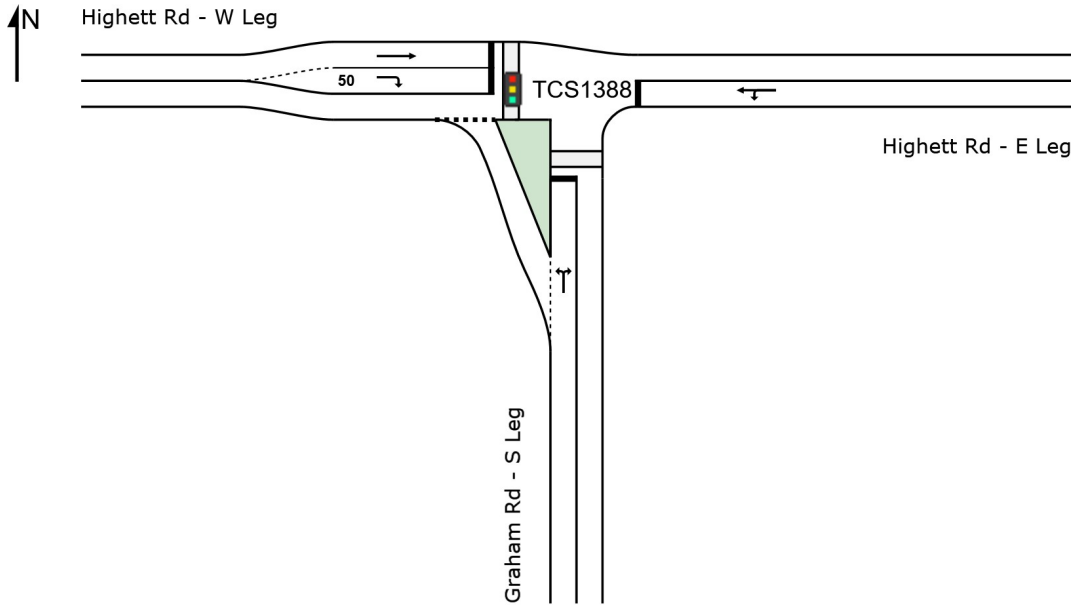
1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

Site: TCS1388 [Post Dev-Highett Rd / Graham Rd PM] Network: 3 [Post Dev-Highett Road Network PM]

Highett Road / Graham Road
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C, Dum
Output Phase Sequence: A, B, C, Dum

Site Layout

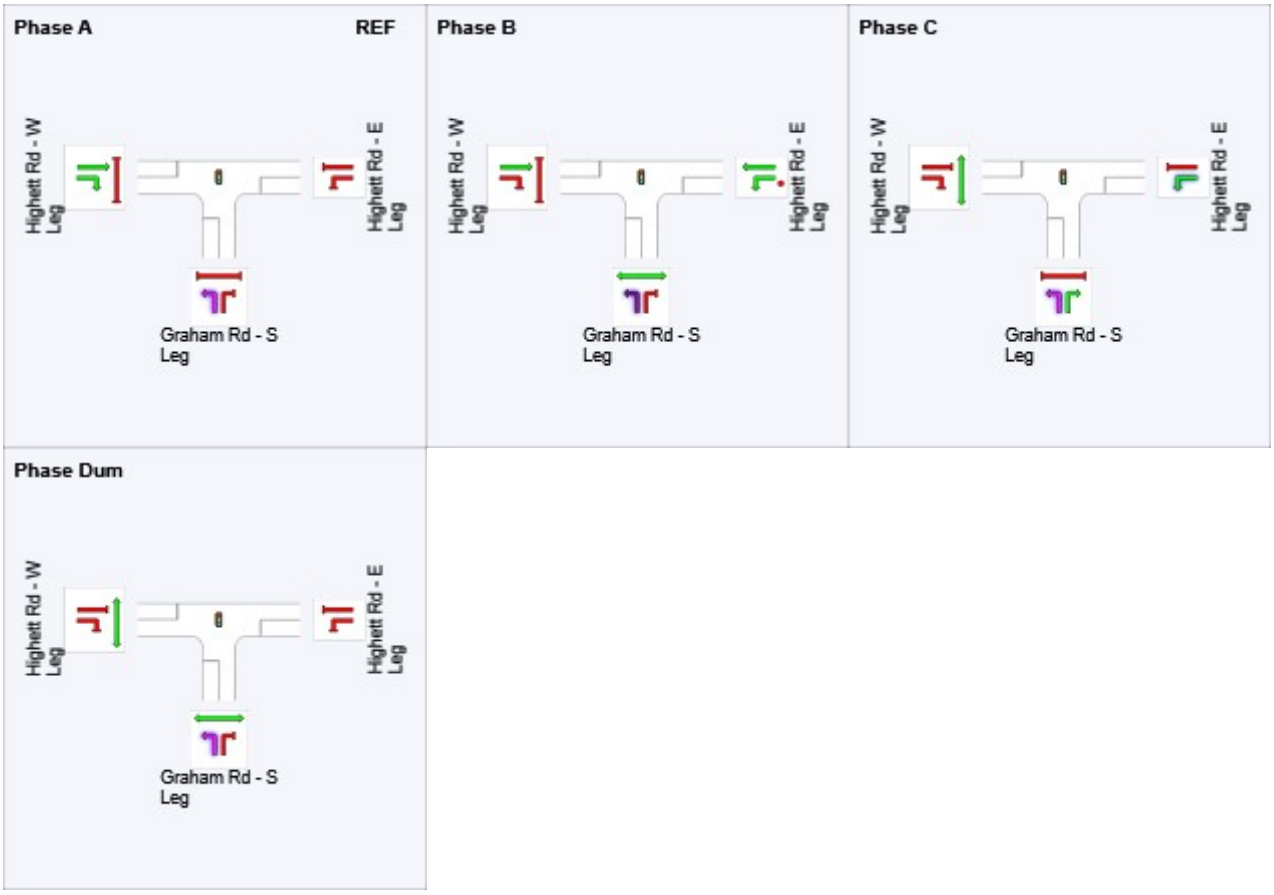


Phase Timing Summary

Phase	A	B	C	Dum
Phase Change Time (sec)	0	15	45	60
Green Time (sec)	9	24	9	24
Phase Time (sec)	15	30	15	30
Phase Split	17%	33%	17%	33%

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

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	Aver. Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Graham Rd - S Leg															
Lane 1	196	5.0	196	5.0	336	0.583	100	37.0	LOS D	4.3	31.2	Full	500	0.0	0.0
Approach	196	5.0	196	5.0		0.583		37.0	LOS D	4.3	31.2				
East: Highett Rd - E Leg															
Lane 1	391	5.0	391	5.0	510	0.765	100	34.0	LOS C	9.6[N] 4	70.0[N4]	Full	70	0.0	50.0
Approach	391	5.0	391	5.0		0.765		34.0	LOS C	9.6	70.0				
West: Highett Rd - W Leg															
Lane 1	265	5.0	265	5.0	818	0.324	100	18.0	LOS B	4.2	30.6	Full	140	0.0	0.0
Lane 2	120	5.0	120	5.0	179	0.669	100	52.3	LOS D	3.4	25.0	Short	50	0.0	NA
Approach	385	5.0	385	5.0		0.669		28.7	LOS C	4.2	30.6				
Intersection	972	5.0	972	5.0		0.765		32.5	LOS C	9.6	70.0				

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

N4 Average back of queue has been restricted to the available queue storage space.

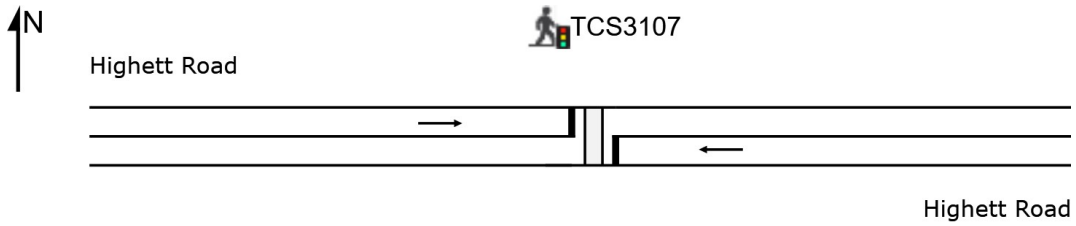
Site: TCS3107 [Post Dev-Highett Rd PoS PM]

Network: 3 [Post Dev-Highett Road Network PM]

New Site
Site Category: (None)
Pedestrian Crossing (Signals) - Fixed Time Coordinated Cycle Time = 90 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: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

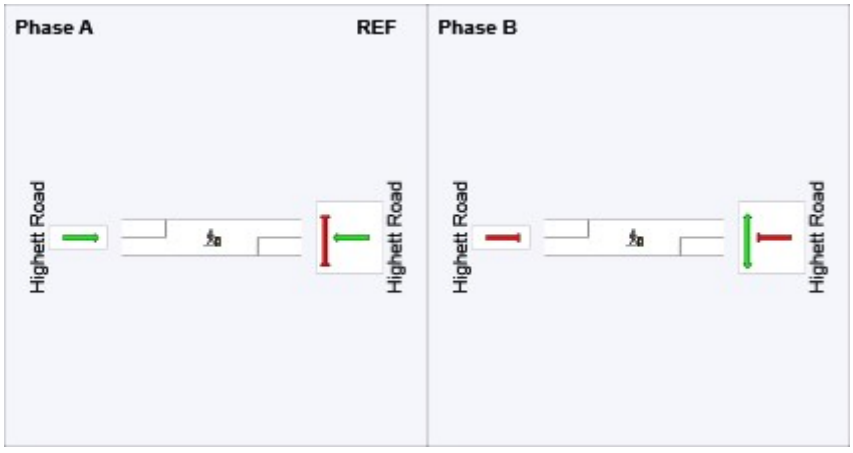


Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	77
Green Time (sec)	71	8
Phase Time (sec)	76	14
Phase Split	84%	16%

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

Other Movement Class (MC) Stopped Phase Transition Applied

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	Aver. Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Highett Road															
Lane 1	391	5.0	391	5.0	745	0.524	100	3.7	LOS A	3.8	27.8	Full	500	-50.0 N3	0.0
Approach	391	5.0	391	5.0		0.524		3.7	LOS A	3.8	27.8				
West: Highett Road															
Lane 1	328	5.0	328	5.0	1490	0.220	100	0.3	LOS A	0.2	1.6	Full	70	0.0	0.0
Approach	328	5.0	328	5.0		0.220		0.3	LOS A	0.2	1.6				
Intersection	719	5.0	719	5.0		0.524		2.1	LOS A	3.8	27.8				

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

N3 Capacity Adjustment due to downstream lane blockage determined by the program.

GTAconsultants now Stantec

www.gta.com.au