WALLBRIDGE GILBERT AZTEC

ACP Mooringe Pty Ltd

Plympton Residential DPA

TRAFFIC ASSESSMENT REPORT

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Revision History

Rev	Date	Issue	Originator	Checker	Approver
A	12.04.19	Draft for Client Review	JH	HSB	HSB
B	02.05.19	Revised Draft for Client Review	JH	HSB	HSB
C	30.10.19	Revised following Council Comments dated 21.10.19	JH	HSB	HSB

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Appendices

1 INRODUCTION

1.1 BACKGROUND

Wallbridge Gilbert Aztec (WGA) has been engaged to undertake a Traffic Assessment for proposed Rezoning in Plympton, SA.

A locality plan of the proposed rezoning is illustrated by the area shaded red, in Figure 1.

Figure 1: Proposed Land Rezoning, Locality Plan

1.2 PURPOSE OF THE ASSESSMENT

The purpose of this report is to provide analysis of the existing and proposed future traffic impacts that will be utilised to determine requirements and what they may be, for the proposed rezoning.

The purpose and key elements of the study are to review and assess:

- Existing traffic flow conditions on the roads adjacent to the site;
- Background traffic conditions and any programmed roadway improvements;
- The traffic impact of the proposed rezoning on the adjacent road network;
- The suitability of the access points and internal road layout for the Rezoning, and;
- Vehicle capacity, road safety, and / or traffic operational constraints for the proposal, as well as potential measures to mitigate such constraints, where appropriate.

The methodology used in this analysis has been based on the City of West Torrens Development Plan (CWTDP), City of West Torrens Transport Strategy (2009), relevant Australian Standards and Austroads guidelines.

2 PROPOSED DEVELOPMENT

The Rezoning scenario is for future residential use of the land (medium density, low rise development). Approximately 2300 square metres of new internal road network is proposed for the Rezoning, with three access points onto surrounding the local network.

The site is bounded to the north by Mooringe Avenue, to the south by Gardener Street and the west by Streeters Road, with existing development to the east of the Rezoning site. The proposed road layout of the Rezoning is shown in figure 2 – however note that the layout is only preliminary and may change during the Development Planning phase of the design and approvals process.

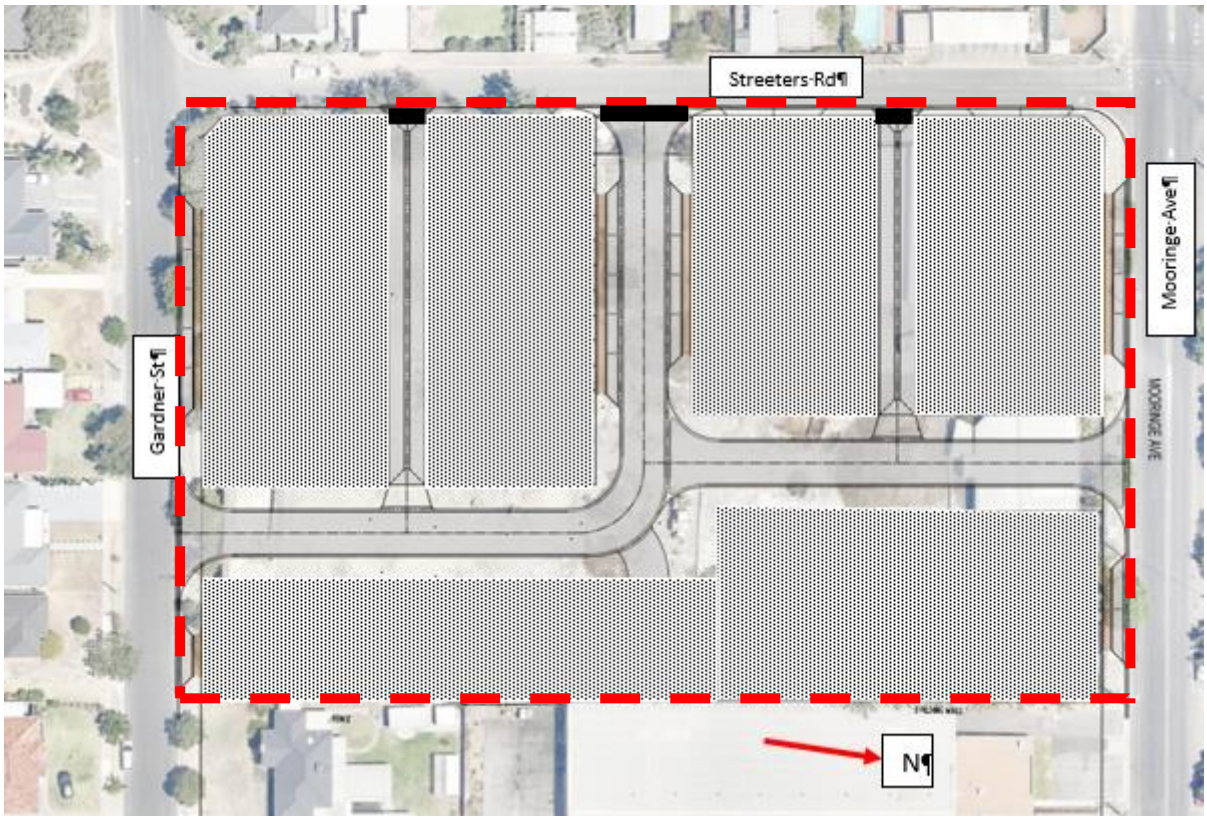


Figure 2: Proposed Rezoning Road Layout

3 EXISTING ROADWAY AND TRAFFIC CONDITIONS

3.1 EXISTING CONDITIONS

Currently the site is zoned industry land use. It has previously been used as a transport depot with warehousing and offices, and at the time of the preparation of this report the site was undergoing demolition and remediation. The proposed medium-density residential redevelopment will require rezoning of the current land use. Figure 1 indicates locations of the local road network and Figure 3 indicates the location of arterial and sub arterial connections to Mooringe Avenue in relation to the Rezoning.

3.1.1 Mooringe Avenue

Mooringe Avenue abuts the Rezoning site on the northern side and is anticipated to cater for the majority of trips to and from the Rezoning, either directly or through the adjoining local network.

The road comes under the care and control of City of West Torrens and they have defined the road hierarchy as an Urban Local Road – Major Collector in their Transport Strategy (2009). The road is also specified as a Primary Freight Route on Council's road network and frequently has general access and sometimes has restricted access vehicles using it to access the industrial areas of Camden Park and North Plympton. From our review we agree that the role and function of Mooringe Avenue aligns with a Major Collector road

Mooringe Avenue is a single lane in each direction with restricted parking both sides of the road. The road width is approximately 12m kerb to kerb. The road reserve has footpaths and mature street trees. A part time bike lane is marked east of Errington Street. The southern (westbound) side of Mooringe Avenue is operational between 8-9am on school days and the northern (eastbound) side is operational 3-4pm on school days.

Mooringe Avenue adjoins Marion Road to the east and Morphett Road to the west. Mooringe Avenue is approximately 1.6km in length, and the Rezoning site is roughly at the midpoint of Mooringe Avenue, IE 800m west of Marion Road, 800m east of Morphett Road.

A pedestrian actuated crossing (PAC) is located on Mooringe Avenue between Streeters Road and Errington Street. When the PAC is activated it assists traffic to egress Streeters Road onto Mooringe Avenue and would also assist to platoon traffic to improve gap acceptance for egress of traffic from other side roads (EG Streeters Road, Whelan Avenue) onto Mooringe Avenue.

Based on existing available data obtained from DPTI supplied counts near the Marion Road intersection, the Average Annual Daily Traffic (AADT) volumes are in the order of 10,500 VPD, with approximately 10 percent comprising of heavy vehicle traffic. AM peak hour is between 7.45 - 8.45 and PM peak hour is between 4.45 - 5.45pm. A recent turning count supports DPTI's supplied counts. The posted speed limit is 60 kph.

3.1.2 Marion Road

Marion Road connects to Mooringe Avenue at the eastern end via a signalised intersection and is anticipated to cater for the majority of trips to and from the Rezoning due to its proximity to the broader arterial road network, connectivity to the southern and northern major arterials, links to inner western Adelaide and the Adelaide CBD. Marion Road is a two-way four lane divided arterial road that falls under the care, control and management of DPTI.

Based on existing available data obtained from DPTI supplied counts the Average Annual Daily Traffic (AADT) volumes are 33,500 VPD, with approximately 5.8 percent comprising of heavy vehicle traffic. The posted speed limit is 60 kph. Turning Counts for the signalised intersection is attached to Appendix B.

3.1.3 Morphett Road

Morphett Road connects to Mooringe Avenue at the western end via an uncontrolled at grade intersection and is anticipated to cater for a smaller proportion of trips to and from the Rezoning as it is in an anti-directional position to the Adelaide CBD, but may provide reasonably direct access to shops, schools, recreational facilities and the beach. Morphett Road is a single lane in both directions. Morphett Road falls under the care and control of West Torrens Council. The posted speed limit is 60km/h. Volumes are unknown at the intersection, as a comparison AADT is 12,600 VPD with 5.5% CV south of Anzac Highway, however traffic volumes drop substantially north of Anzac Highway as the road no longer serves an arterial purpose.

3.1.4 Streeters Road

Streeters Road abuts the Rezoning site on the western side and may cater for a small proportion of trips to and from the Rezoning. The road comes under the care and control of West Torrens Council and they have defined the road hierarchy as an Urban Local Road – Local Collector in their Transport Strategy (2009) – although this only applies to Streeters Road north of Mooringe Avenue, with Whelan Road providing the continuation of the Local Collector role to the south of Mooringe Avenue.

Streeters Road south of Mooringe Avenue would be classified as an Urban Local Road – Local Street. Council has expressed a desire to limit access to the rezoning from Streeters Road adjacent to the development.

Streeters Road consists of a single lane in each direction and has street lighting on dedicated poles. Residential property is located on the west side of Streeters Road, with access provided to existing residential allotments via the road. Streeters Road has a narrow road width and verge width from the back of kerb to the site boundary and that this would need further investigation into widening, potentially acquiring land from the site to both facilitate the development and have an active interface to the street. Any potential acquisition required for road widening purposes could be dealt with during the land division stage.

The road width is approximately 6m kerb to kerb, so available on-street parking is very limited. The new development will likely require parking bans along the length of road unless indented parking is provided (requiring transfer of land to road verge). Before the site was demolished, some parking had been created within private land at the northern end of the road, where the new development is proposed to have frontage. The road reserve on the western side has footpaths and lighting, however the eastern side of the road has undergone demolition with currently no street furniture or infrastructure (construction safety fencing borders the kerbing). Streeters Road forms a 4-way intersection with Mooringe Avenue and utilises a give way treatment to reinforce Mooringe Ave as the priority road. Streeters Road forms a junction with Gardner Street and does not have traffic control measures.

Traffic data was not supplied for this road, however, a turning count confirms that the Streeters Road leg north of Mooringe Avenue, carriers substantially more traffic than the southern leg (which has very low traffic volumes). Recorded volumes are discussed further in Section 3.5. The speed limit is 50 kph.

3.1.5 Gardner Street

Gardner Street abuts the Rezoning site on the southern side and is anticipated to cater for a reasonable proportion of trips to and from the Rezoning, when considering a suitable access point to the local road network generally. The road comes under the care and control of City of West Torrens and they have defined the road hierarchy as an Urban Local Road – Local Street in their Transport Strategy (2009).

Gardner Street is a single lane in each direction and has street lighting mounted on SAPN poles. The road width is approximately 9m kerb to kerb, so street parking is currently available both sides of road. The road reserve has footpaths and mature street trees. Gardner Street adjoins/intersects Streeters Road, Errington Street and Whelan Street (roundabout).

Traffic data was not supplied for this road, however, on site observations at 5:45pm on a typical weekday indicated only low volumes adjacent to the Rezoning (approximately 100 Veh/Hr). The posted speed limit is 50 kph.

3.1.6 Errington Street

Errington Street is located to the east of the Rezoning site and is anticipated to cater for a reasonable proportion of trips to and from the Rezoning, via Gardner Street. The road comes under the care and control of West Torrens Council and they have defined the road hierarchy as an Urban Local Road – Local Street in their Transport Strategy (2009).

Errington Street is a single lane in each direction and has street lighting on dedicated poles. The road width is approximately 9m kerb to kerb and has on street parking. A part time bike lane is marked and operational between 8-9am on school days for the southbound direction and 3-4pm on school days for the northbound direction. Plympton International College is located on Errington Street to the south of the proposed rezoning. The road reserve has footpaths and mature street trees.

Errington Street forms a 4-way intersection with Mooringe Avenue and utilises a give way treatment to reinforce Mooringe Ave as the priority road. Errington Street forms a 4-way intersection with Gardner Street with give way priority to Errington Street (Gardner Street has give way treatment).

Traffic Data was not supplied for this road, however, based on the adjacent land uses we anticipate traffic volumes in the order of 2000 VPD. The posted speed limit is 50 kph.

3.1.7 Whelan Avenue

Whelan Ave is located to the west of the Rezoning site, running parallel to Streeters Road. The road comes under the care and control of West Torrens Council and they have defined the road hierarchy as an Urban Local Road – Local Collector in their Transport Strategy (2009).

Whelan Avenue is a single lane in each direction and has street lighting on SAPN poles. The road width is approximately 9m kerb to kerb and has temporary on street parking outside the hours of 9-10am and 2-3pm Monday to Friday, when a no standing zone takes effect (both sides of road). The road reserve has footpaths and mature street trees. Whelan Avenue adjoins Mooringe Avenue and is controlled by a give way treatment. Whelan Avenue also forms an intersection with Gardner Road and is controlled by a roundabout.

Whelan Avenue is anticipated to cater for a reasonable proportion of trips to and from the Rezoning, considering that the junction with Mooringe Avenue (rather than intersections for example at Errington

Street and Streeters Road) and roundabout at Gardner Street, may attract traffic due to perceived convenience by some road users.

Based on existing available data from the City of West Torrens Transport Strategy (2009), the Average Annual Daily Traffic (AADT) volumes for this road are in the order of 3000 VPD, with only a low percent comprising of heavy vehicle traffic. The posted speed limit is 50 kph.

Figure 3: General Arterial and Sub Arterial Road network layout

3.2 ROAD CRASH HISTORY

DPTI provides road crash data via Location SA Map Viewer from 2013 to 2017 (5 year crash history). Figure 4 shows the locations of recorded crashes(circled in red) in the vicinity of the Rezoning site.

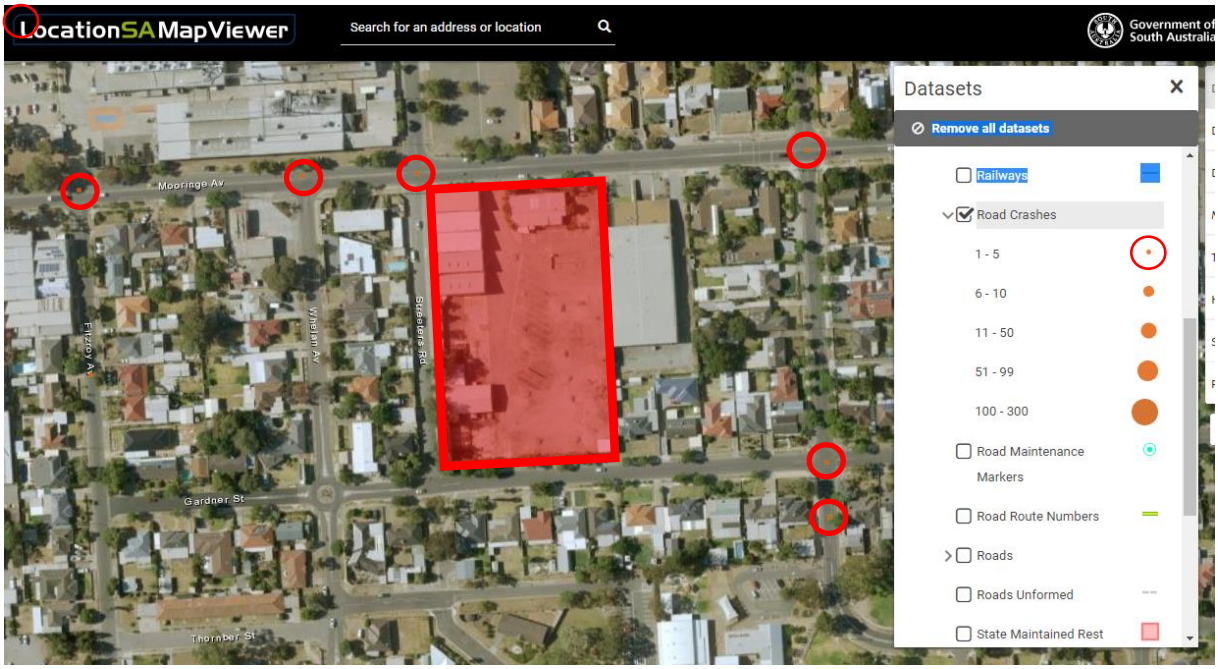


Figure 4: Location of crash(es) indicated by orange dots on plan around the highlighted development.

The local crash data is summarised below in Table 1. Only intersections with crash history between 2013-2017 are represented in the table, and separated into Serious Injury (requires hospitalisation), Injury (report of an injury usually accompanying review by doctor), and Property Damage Only (PDO). The major junctions at either end of Mooringe Ave are also considered.

Table 1: Road Crash History (2013 - 2017) – various locations, Plympton area

Mooringe Ave / Streeters Rd			
Crash Type	Serious Injury	Injury	PDO
Right Angle	1 (25%)	2 (50%)	1 (25%)
TOTAL	**4**		
Mooringe Ave / Errington St			
Crash Type	Serious Injury	Injury	PDO
Right Angle	0	0	1 (50%)
Hit Pedestrian	0	1 (50%)	0
TOTAL	**2**		
Mooringe Ave / Marion Rd			
Crash Type	Serious Injury	Injury	PDO
ALL CRASHES	0	6	8
Rear End	6 (42.9%)		
Hit Pedestrian	1 (7.1%)		
Right Turn	7 (50%)		
TOTAL	**14**		
Gardner St / Errington Rd			
Crash Type	Serious Injury	Injury	PDO
Right Angle	0	0	1 (100%)
TOTAL	**1**		
Mooringe Ave / Whelan Ave			
Crash Type	Serious Injury	Injury	PDO
Right Angle	0	0	2 (100%)
TOTAL	**2**		
Mooringe Ave / Morphett Rd			
Crash Type	Serious Injury	Injury	PDO
All crashes	0	2	14
Rear End	5 (31.25%)		
Hit Fixed Object	1 (6.25%)		
Side Swipe	1 (6.25%)		
Right Angle	7 (43.75%)		
Roll Over	1 (6.25%)		
Other	1 (6.25%)		
TOTAL	**16 (100%)**		

In summary the intersections and junctions around the Rezoning site are performing as would be expected for at grade intersections formed between local network roads and a collector road. As shown in Figure 3, all crashes occur at “conflict points” in the network (junctions or intersections where opposing movements are undertaken) with the exception of one crash on Errington Street south of the Gardener Street Intersection. No existing Black Spot Sites (where greater than 5 injury crashes/5 years are recorded) were identified in the vicinity of the Rezoning site, with the exception of Marion Road and Mooringe Avenue (discussed below).

The crash history of the intersection of Mooringe Avenue and Streeters Road is worthy of consideration as the proposed development will likely increase traffic on the Streeters Road (South) by approximately 500 VPD (discussed later in Section 5 of this report) with the majority of these volumes expected to be turning right out of Streeters Road onto Mooringe Avenue. The current intersection records on average less than one crash per year, with the predominant crash type being right-angle crashes. The predominant crash type is relatively common for an “uncontrolled” 4-way intersection, and moderate traffic volumes on Mooringe Avenue. Whilst the proportion of injury crashes is high for an urban road (75%), the lower frequency of crashes indicate that the intersection is performing adequately. It is recommended that the layout of the proposed development and landscaping observe the SISD sight line requirements as defined in Figure 9 – Austroads Guide to Road Design Part 4A – “Figure *3.2*”.

The junctions either end of Mooringe Avenue have comparatively higher crash rate histories due to their larger volumes. The Marion Road arterial road junction is performing adequately, fundamentally due to the intersection being controlled by traffic signals, although it should be noted that the proportion of injury crashes is relatively high at 43%. The site is technically a Black Spot, and would be eligible for Black Spot funding, however the responsibility for determination of treatment options and application for funding lies with DPTI.

In terms of total crashes, the Morphett Road junction has the worst performance out of those assessed, although the proportion of injury crashes is much lower than Marion Rad. The higher incidence of crashes is largely due to volumes (intersection of two sub arterial roads) which means that gap acceptance thresholds are lower, and as it is uncontrolled (give way treatment) requiring judgement from individual drivers to pick gaps (correspondingly right-angle crashes have the statistically highest crash type). Signalising of this junction would assist with both crash reductions and clearing of queues on Mooringe Avenue – however this is not part of the Transport Strategy Report (2009) or a priority for West Torrens Council.

3.3 PLANNED ROADWAY IMPROVEMENTS

Existing road geometries are relatively fixed by adjoining development and are expected to remain the same. All junctions and intersections assessed do not have any obscure intersecting geometry, however sight line impediments (such as mature vegetation, SAPN poles and boundary fencing) exist when exiting side roads onto Mooringe Avenue. Council’s Transport Strategy (2009) mentions minor widening of Streeters Road at Mooringe Avenue for left and right turn exit lanes – as discussed above, potential acquisition and land transfer to council verge could occur during the land division stage.

The report also mentions the proposed upgrade of Mooringe Avenue and Marion Road intersection to cater for B-double turning movements - the responsibility for this upgrade lies with DPTI and the timing of the upgrade is unknown. Linking of Richmond Road and Morphett Road is also mention in the Transport Strategy - if that were to occur some freight may bypass Mooringe Avenue as improved links east-west could be established to the adjacent industrial areas that are located next to the airport. The Overlay Map WeTo/1 – Transport, referred to in CWTDP is attached in the Appendix A, however there are no impacts from the overlay map that need to be considered in this Traffic Assessment Report.

The City of West Torrens is currently preparing a Local Area Traffic Management (LATM) Plan which is in Stage 2 consultation at the time this report was written, this site fits within the study area. However, the proposed LATM Plan found traffic conditions around the location of interest to be acceptable in comparison with the strategic transport plan criteria. Hence proposed LATM projects will likely not impact the Rezoning site.

3.4 EXISITING PEDESTRIAN AND CYCLIST INFRASTRUCTURE

The CWTDP indicates cycling routes (Bikedirect Network) in its overlay plans – refer Overlay Map WeTo/12 Transport in Appendix A. There are no designated "*Main Road – Bike Lane*" roads within the vicinity of the Rezoning, Mooringe Avenue is designated as a "*Secondary Road – Bike Lane*" (east of the Rezoning), as is Morphett Road.

There is an existing shared pedestrian and cyclist path that runs adjacent to Osborne Terrace, known as the Westside Bikeway – this is indicated as a "*Off Road Sealed Path*" in the Bikedirect Network. These cycling and walking (shared) facilities will likely attract patronage from the subsequent development for both recreational and commuting activities, as the path connects "off road" as far as Mile End north-easterly and Novar Gardens south-westerly. The local network would generally be used to access the Westside Bikeway via Gardner Street and Errington Street, alternatively Mooringe Avenue bike lanes connect to the Westside Bikeway at the Marion Road intersection. Other links include the footpath at the south end of Streeters Road connecting through to Myer Avenue.

As mentioned in section 3, both Mooringe Avenue and Errington Street have part time bike lanes, however they are relatively discontinuous and established to provide safer cycling links to the nearby Plympton International College.

Strava Heat Map can be used to represent cycling activity in the proximity of the proposed development - refer Figure 5. The white layer represents the highest level of cycling activity, darker blue layers indicates "moderate" cycling activity where purple is "lower" cycling volumes. It is evident that Mooringe Avenue, Morphett Road, Marion Road and the Westside Bikeway have relatively more cycling patronage than the surrounding local areas. Comparatively Cross Road, Anzac Highway and Marion Road attract much higher cycling activity.

The proposed internal road network of the development will be designed in accordance with AMCORD guideline for "Characteristics of Street Types", and Councils requirements, to cater for safe pedestrian movements and sharing the road with cyclists.

In summary, the Rezoning is relatively well connected to existing on road bicycle routes and networks that facilitate cycling.

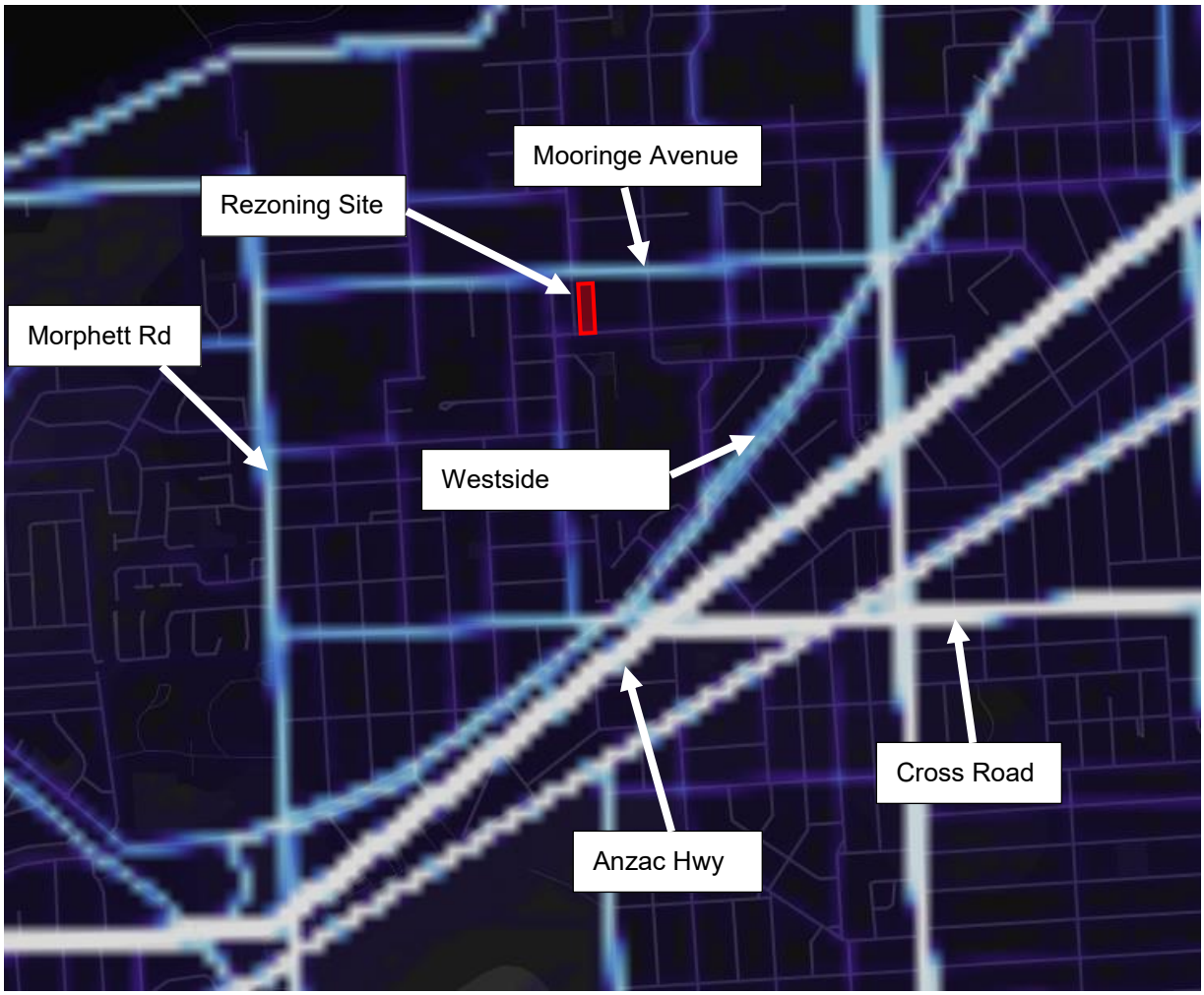


Figure 5: Strava Heat Map indicating cycling activity

3.5 EXISITING PUBLIC TRANSPORT INFRASTRUCTURE

Bus route 167 & 168 services the Adelaide CBD and Glenelg from this location. Additional bus routes (EG J7, J8 servicing between Marion and West Lakes) - and school buses utilise Mooringe Avenue. Public transport infrastructure (bus stop 12) is located adjacent to Mooringe Avenue and the Rezoning, which is located mid-block on Mooringe Avenue between Streeters Road and Errington Street. The bus stops (12 both directions & 13 eastbound only) have shelters and are well placed to service the Rezoning. Refer to Figure 6 for bus routes in the proximity of the proposed rezoning.

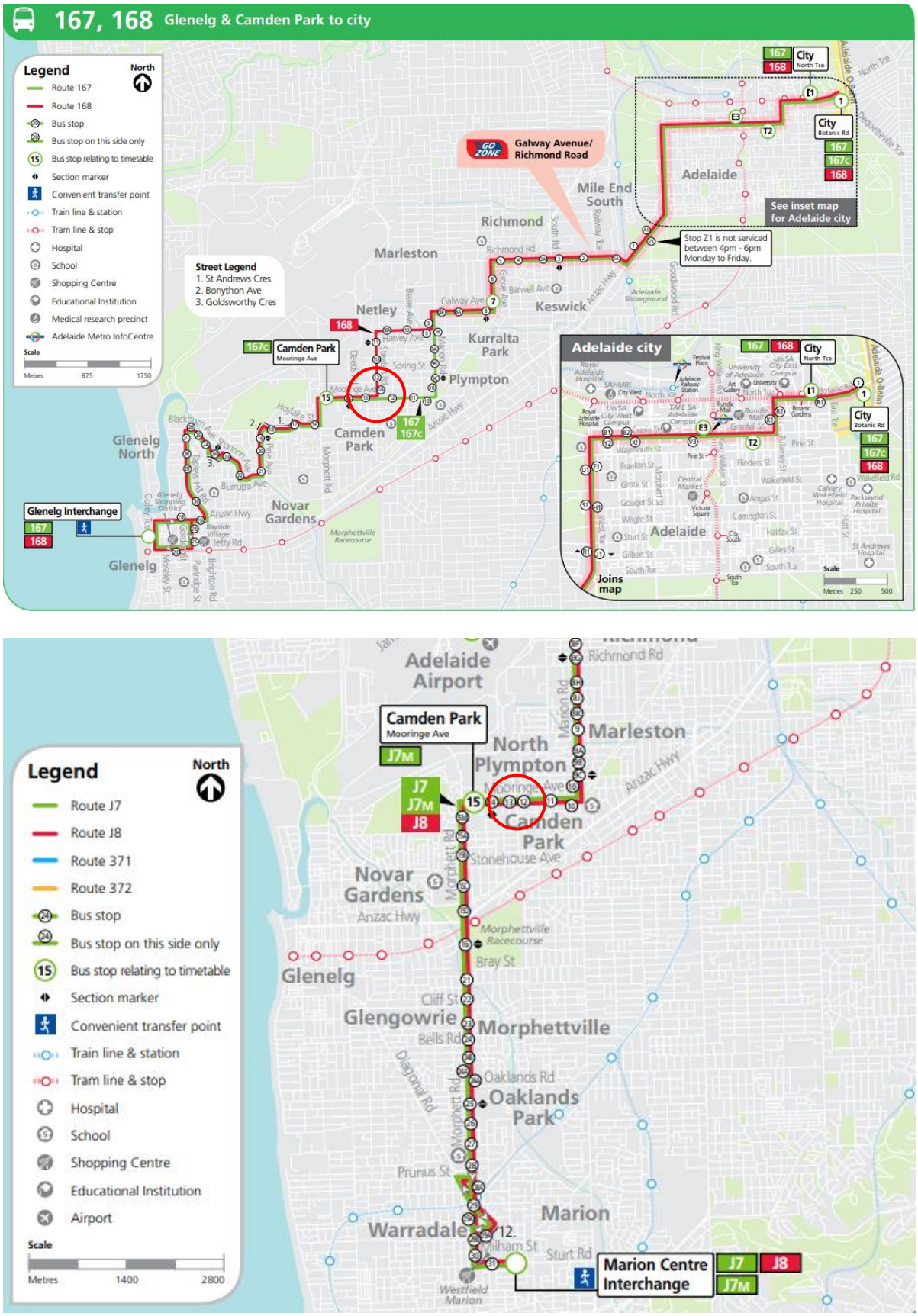


Figure 6: Bus routes in the proximity of The Rezoning

3.6 SITE SURVEY

A traffic survey of the existing 4-way intersection of Mooringe Avenue and Streeters Road was conducted on 3 April 2019, between 4:45pm and 5:45pm. This represented afternoon peak traffic during a typical weekday, coinciding with the peak hour determined from 11 hour counts conducted by DPTI on Marion Road / Mooringe Avenue Junction.

General observations were as follows:

- Weather fine, conditions clear and light (afternoon daylight saving).
- Traffic much heavier on Mooringe Avenue compared to Streeters Road.
- Traffic volumes much heavier on Streeters Road north leg, Streeters Road south leg had very low volumes.
- Relatively high right out / left in volumes on Streeters Road north leg.
- The “collector road” nature of Whelan Avenue, which terminates at Mooringe Avenue (northbound), appears to continue onto Streeters Road north leg.
- Around half a dozen cyclists were using Mooringe Avenue during the count (cyclist volume is not included in below counts).
- The remedial site work at the Rezoning site may have influenced some of the Streeters Road traffic behaviour, however the site works are not expected to be a large influence.

Table 2 represents the PM Peak hour turning count results. Figure 7 represents the recorded turn counts diagrammatically. Note that in Figure 7, where no movement recorded any volume, it is not represented on the diagram - for example there were no vehicles turning left into Streeters Road south leg during the hour of traffic survey.

Table 2: Peak Hour Site Survey Results

Road	Direction of Travel	Intersection Behaviour		
		Straight	Left	Right
Mooringe Avenue	East	334	40	0
Mooringe Avenue	West	495	0	25
Streeters Road	North	0	1	0
Streeters Road	South	2	30	83

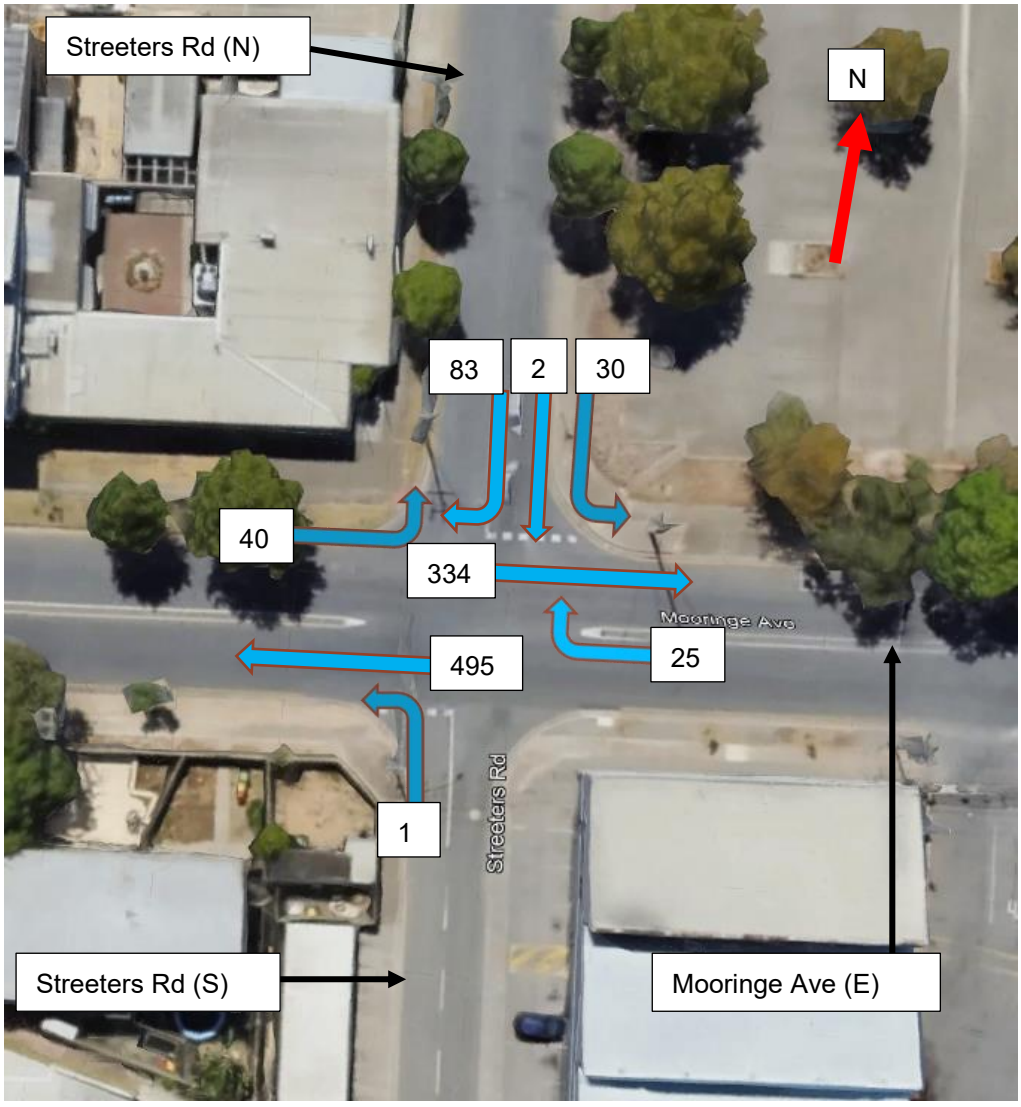


Figure 7: PM Peak Hour Site Survey Results

These results yield traffic volumes for a typical hour afternoon peak period. For the purpose of this investigation, these results are extrapolated to an hour peak period and a 10% ratio of peak hour to two-way AADT volumes is assumed. Based on this methodology, the site results yielded:

Mooringe Avenue:

- Weekday peak hour flow (two-way) = (334+495+40+25) = 894
- AADT (two-way) = 894 / 10% = 8,940
- The following commercial volumes were recorded on Mooringe Ave:
  - 12 Trucks and 4 busses westbound
  - 9 Trucks and 2 busses eastbound
  - Total Commercial Volume (CV) in peak hour = 27
  - Total CV % = 27 / 894 = 3%

Streeters Road (North Side):

- Weekday peak hour (two-way) = (2+30+83) = 115
- AADT (two-way) = 115 / 10% = 1,150
- The following commercial volumes were recorded on Mooringe Ave:
  - 2 busses (one left in, one right out)
  - Total Commercial Volume (CV) in peak hour = 2
  - Total CV % = 2 / 115 = 2%

Streeters Road (South Side):

- Weekday peak hour (two-way) = 1
- AADT (two-way) = 1 / 10% = 10
- No CV recorded on this side of Streeters Road.

The Mooringe Avenue AADT calculated from the site survey is similar to the AADT provided from DPTI (9,650 - 10,500). It is possible that Mooringe Avenue traffic volumes have reduced slightly from the early 2000's considering development is relatively established in the area already (little or no growth rate), and residents may have adopted a modal shift to alternative transport to commute to work (cycling, walking and public transport), car-pooling, and more flexible working hours allowing the commute outside of peak hour times.

In summary, during the PM traffic survey, the intersection operated relatively smoothly, with only the Streeters Road northern leg experiencing any reasonable delay due to waiting for breaks in traffic in both directions to turn right out. Mooringe Avenue flows without significant delays (sometimes right turning traffic into Streeters Roads will create a slowing of through traffic). Traffic on Mooringe Avenue (westbound) was generally travelling in platoons due to the upstream signals at Marion Road.

4 ROAD ACCESS NETWORK

4.1 STREET LAYOUT

The proposed road network for the Rezoning is represented in Figure 8 and consists of a two-way through road access street (fronting and providing access to Mooringe Avenue (1) and Gardner Street (2)) and of which two cul-de-sac access lanes with stub ends branch off. Access lanes and cul-de-sacs have been designed to provide local access only to the Rezoning – however note that the layout is only preliminary and may change during the Development Planning phase of the design and approvals process. It is possible that “out only” access onto Streeters Road could be provided from the rezoning, but this is yet to be determined.

It is recommended these lanes will need to meet the specifications outlined in the City of West Torrens Requirements. The Access Street is to meet the AMCORD requirements for an Access Street (0-300 veh/day).

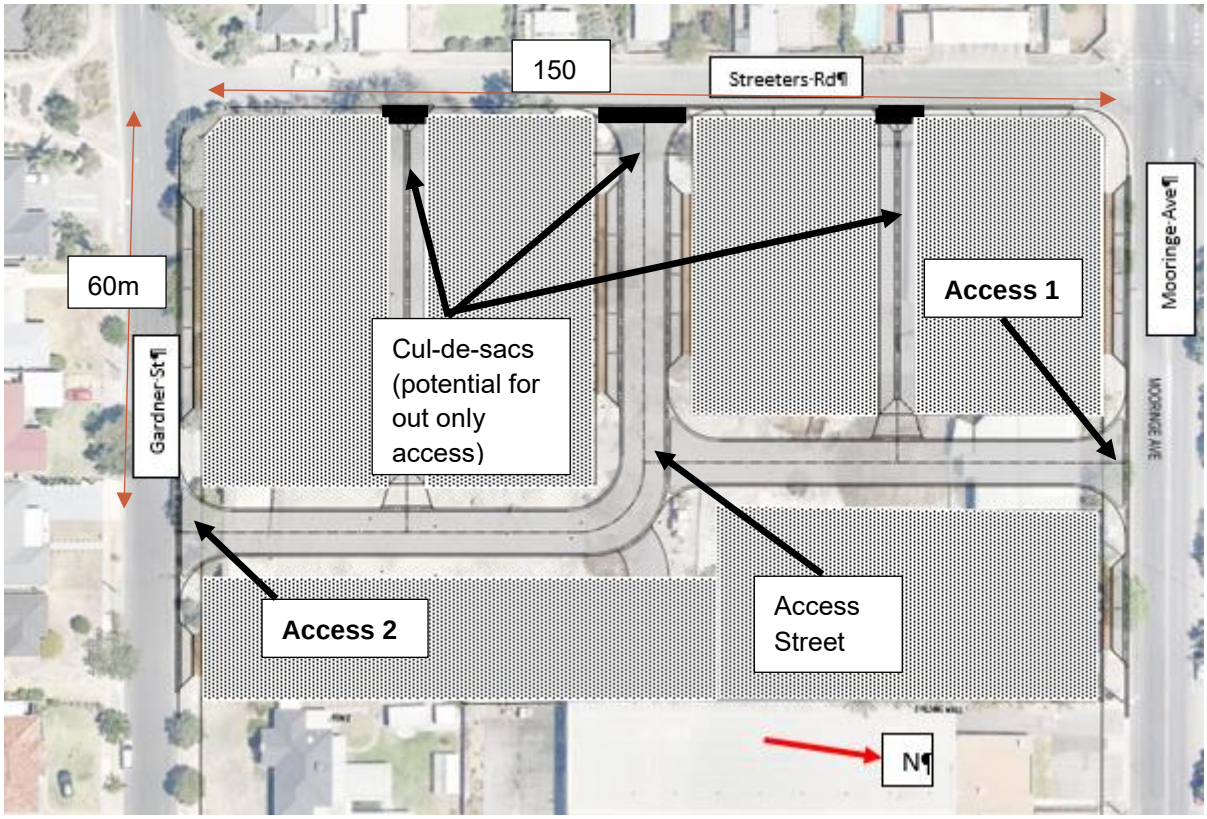


Figure 8: Internal Road Hierarchy

4.2 TRAFFIC MANAGEMENT AND ACCESS ARRANGEMENTS

The Rezoning internal road network will consider road geometry to assist in managing speed on the network and providing a safer environment.

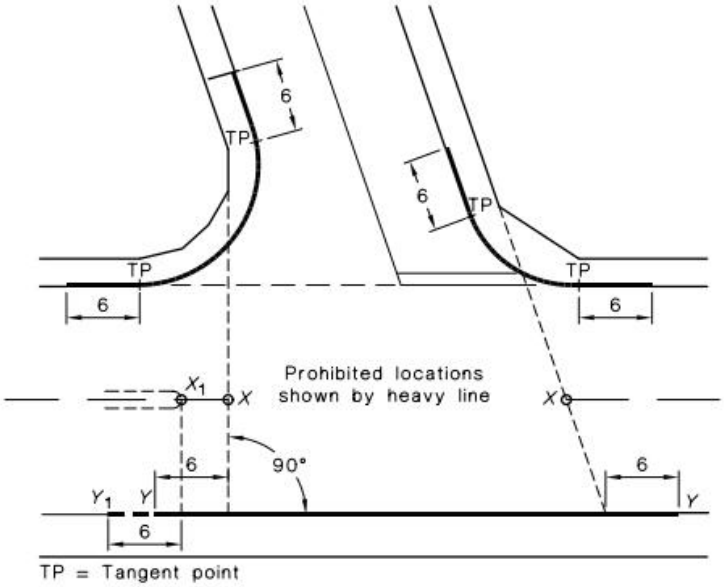
Austroads Guide to Road Design Part 4A – Geometric Design (AGRD04A-17) table 7.2 “property access considerations on urban roads” states that: for local streets it is preferred that road networks are planned and designed so that property access points are located on local streets rather than arterial roads. Low travel speed and driver expectation of interference reduces the likelihood of conflict. Potential conflict with pedestrian movement must be identified and appropriate solutions adopted. However, the low speed environment should ensure that both the likelihood of conflict and the severity of crashes are minimised.

Four-way intersections have been avoided in order to minimise the likelihood of collisions. Austroads Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections, states that unsignalised four-way intersections typically experience higher crash rates for the through movement from the minor road.

T-junctions (at right angles to the priority road) are favoured over four-way intersections and have been included at junctions between two local streets. A 90-degree intersecting angle provides the optimum sight line in both directions and the give way rule / priority is clear.

The following considerations must be made when detail designing the internal road layout for the Rezoning:

- Provide single manoeuvre turns by the design vehicle.
- Provide adequate clearance between the design vehicle’s turning path and physical constraints within the property.
- Avoid reversing movements into or out of the Rezoning, except in the case of individual single residential houses.
- Provide adequate sight distance, including pedestrians (discussed further in section 4.4).
- Minimise pedestrian / vehicle conflict areas and control vehicle speed across footways.
- Access points will not be permitted within 6m of the tangent point of the curve as indicated in AS2890.1 *Parking Facilities* Figure 3.1 (refer below Figure 9). Consideration will need to be given to placement of the access points for corner allotments, and allotments where adjacent indented parking is proposed.



NOTES:

1 Accesses to domestic driveways are excluded from the prohibition in respect of the kerb section marked *Y-Y* (see Clause 3.2.3(a)).

2 The points marked X_1 and X are respectively at the median end on a divided road and at the intersection of the main road centre-line and the extensions of the side road property lines shown as dotted lines, on an undivided road. On a divided road, dimension *Y-Y* extends to Point Y_1.

DIMENSIONS IN METRES

FIGURE 3.1 PROHIBITED LOCATIONS OF ACCESS DRIVEWAYS

Figure 9 – from AS2890.1 Parking Facilities

4.3 ON-STREET AND OFF-STREET PARKING

The City of West Torrens has determined that the rezoning will fit under Residential Medium Density Policy Area 18, and the parking requirement would be determined by PDC12 and 16, and Table WeT0/2.

PDC12 states that on-street vehicle parking should be provided at a ratio of **one car parking space for every two allotments**.

The City of West Torrens Development Plan (CWTDP), General Section, Land Division, Roads and Access (PDC16), indicates land divisions should provide space sufficient for on-street visitor car parking for the number and size of the allotments, taking account for:

- The size of proposed allotments and sites and opportunities for on-street parking
- The availability and frequency of public and community transport
- On-street parking demand likely to be generated by nearby uses.

CWTDP Table WeTo/2 indicates that 2 off-street car parking spaces are required per dwelling, one covered, one uncovered, refer to Figure 10 below.Assuming 82 dwellings for this development 164 car parking spaces are to be incorporated into the Rezoning, of which 82 are to be covered, 82 not required to be covered. There is potential for some of the uncovered parking spaces to be a combination of parking within driveways and on street parking, and this will need to be further investigated during the DPA phase.

West Torrens Council
Table Section
Table WeTo/2 - Off Street Vehicle Parking Requirements

Form of development	Number of Required Car Parking Spaces
Accommodation	
Dwelling ▪ detached ▪ semi-detached ▪ row ▪ multiple ▪ group ▪ within a residential flat building	For detached, semi detached, row dwelling and multiple dwellings to provide: 2 car parking spaces per dwelling, one of which is covered. For group dwelling and residential flat building to provide: 2 car parking spaces per dwelling, one of which is covered + an additional 0.25 car parking spaces per dwelling.

Figure 10: Table WeTo/2 Car Parking Spaces Requirement.

4.4 SIGHT DISTANCES

Austroads Guide to Road Design Part 4A – Geometric Design (AGRD04A-17) sets out requirements for minimum sight distances for intersections in Section 3. All intersections must achieve minimum approach sight distances (ASD), safe intersection sight distances (SISD) and minimum gap sight distances (MGSD). The internal junctions and new access points are shown in Figure 7 and SISD diagrammatic representation in figure 11.

The internal road network has not been assessed as part of this report, this relates to the ASD component of the analysis, which will be reviewed during the Rezoning Application Process. The proposed access points onto Streeters Road and Gardner Avenue will be assessed against the existing roads' theoretical speeds. The following parameters were adopted for sight distance calculations:

- Reaction Time, R_T = 2.0 sec (note $D_T = R_T$ + 3.0 seconds)
- Coefficient of deceleration, d = 0.36
- Critical Acceptance Time, ta = 5 sec
- Longitudinal grade, a = 0%

Figure 3.2: Safe intersection sight distance (SISD)

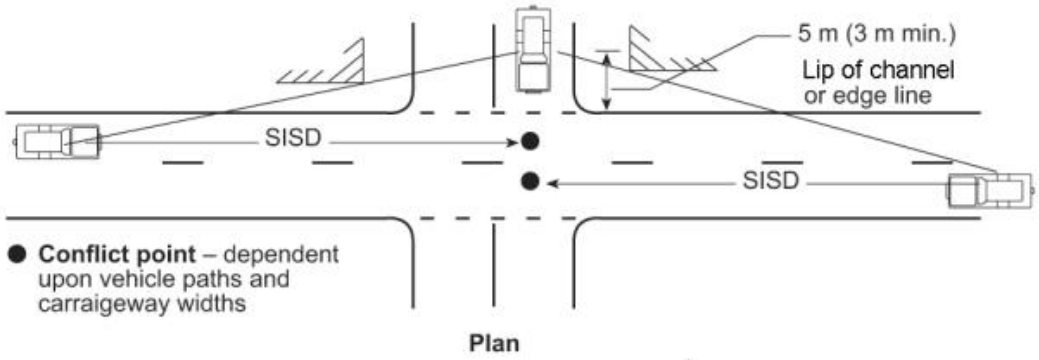


Figure 11: Austroads GTRDP4A "Figure 3.2"

4.4.1 Access Point One

Access Point One (AP1) is proposed to front Mooringe Avenue, between the two driveways of the former industrial site, 55m east of Streeters Road. Mooringe Avenue has a posted speed limit of 60 kph, this is thought to be a reasonable 85th percentile speed to adopt. The following minimum sight distances required of AP1 are:

- ASD AP1 = Not Reviewed
- SISD AP1 East and Westbound = $V \times D_T / 3.6 + V^2 / (254 \times 0.36)$

  $= 60 \times (2+3) / 3.6 + 60^2 / (254 \times 0.36) = 123m$ (in excess of 200m available both directions)

- MGSD AP1 = 83m (east and westbound) (from Table 3.6 AGRD04A-17)

All of these minimum sight distance requirements are achieved. A photo of Mooringe Ave adjacent to the Rezoning is shown in Figure 12.

Figure 12: Mooringe Avenue at the Streeters Road Intersection, looking easterly.

4.4.2 Access Point Two

Gardner Ave has a specified speed limit of 50 kph, this is thought to be a reasonable 85th % speed to adopt. The following minimum sight distances required of AP2 are:

- ASD AP2 = Not Reviewed
- SISD AP2 = 50X(2+3)/3.6+50^2/(254X0.36) = 96.8m (>100m available)
- MGSD AP2 = 69m (from Table 3.6 AGRD04A-17) (>100m available)

All sight distances requirements are achieved. A photo of Gardner Ave adjacent to the Rezoning is shown in Figure 13.

Figure 13: Gardner Street at the south eastern corner of the Rezoning looking westerly.

4.5 SUSTAINABLE TRANSPORT INFRASTRUCTURE

Sustainable transport infrastructure for pedestrians and cyclists will be provided as part of the proposed Rezoning. This is to be consistent with details of the proposed are provided below.

4.5.1 Pedestrian and Cyclist Infrastructure

The WTCDP suggests developments should provide a permeable street and path network that encourages walking and cycling through the provision of safe, convenient and attractive routes with connections to adjoining streets, paths, open spaces, schools, pedestrian crossing points on arterial roads, public community transport centres and activity centres.

Linkage to the existing Westside Bikeway shared pedestrian and cyclist path is provided through the established local road and footpath network, which is considered sufficient to cater for the expected levels of patronage.

4.5.2 Public Transport Infrastructure

The CPDP requires new developments to be integrated with existing public transport corridors. The Rezoning is relatively well serviced with existing route services and the Rezoning located midway between bus stops 12 and 13 located on Mooringe Avenue (either of these bus stops are approximately 100m from the Rezoning). Tram Stop 10 is located approximately 1km south east from the Rezoning site and could be utilised as an alternative form of public transport with an excellent frequency of services, possibly in combination with cycling or “park and ride” transport options.

5 TRAFFIC GENERATION AND DISTRIBUTION

5.1 TRIP GENERATION AND PEAK PERIOD

Adopted traffic generation rates for the proposed Rezoning have been based on the "Residential – House", and 'Residential – Medium Density Flats' contained within the RMS Guide to Traffic Generating Developments Version 2.2. They are shown in Table 3 below along with the estimated number of trips to be generated by the proposed Rezoning.

There are 82 dwellings proposed, nominated as 'Medium Density' - these have been assumed to be townhouses. The generation rates for townhouses are assumed the same as houses, and the apartment trip generation rates are assumed to fall under 'Medium Density Residential Flat Building – larger units and townhouses (three or more bedrooms)". The guideline provides a range of rates, for the purposes of sensitivity testing. The analysis will utilise the higher of the rates (in bold) which are considered to be a conservative representation of the Rezoning proposal.

Table 3: Proposed Development Traffic Generation

		Daily Trips		**Weekday Peak Hour**	
Land Use	Estimated Number of Dwellings	Rate/Dwelling	Trips	Rate/Dwelling	Trips
Townhouses	82	5.0 (minimum) **6.5 (maximum)**	410 **533**	0.5 (minimum) **0.65 (maximum)**	41 **54**

The use of the term 'trip' represents a one-way vehicular movement from one point to another but excluding the return journey. Therefore, a vehicle entering and leaving the Rezoning corresponds to two trips. The proposed Rezoning is expected to generate a total of 533 trips on a daily basis and approximately 54 trips during a weekday peak hour.

5.2 SPATIAL DISTRIBUTION OF TRIPS

The spatial distributions of traffic generated by the Rezoning/Site can be discussed separately as internal distribution within the site and the utilisation of each access point, and external distribution i.e. the interaction of traffic flow with the wider road network.

5.2.1 External Distribution

Trips generated by the Rezoning have been assumed to be distributed in two general directions – the CBD to the East via Marion Road and Glenelg to the West via Morphett Road. The assumed proportion of trips to each of these directions is shown in Figure 14 below.

It is assumed the CBD will attract majority of peak hour traffic due to the morning and evening commute for workers in the Rezoning. Local schools and the closest shopping centre are located both east (EG Kurralta Central, Hilton Plaza, Richmond Village) and west (Harbour Town, Glenelg) of the Rezoning. For the modelling it has been assumed that 85% of trips will be eastbound and 15% of trips will be westbound, which is considered to be a conservative approach for the traffic modelling that will intensify the volume of right turning vehicles out of Streeters Road South.

Figure 14: Spatial Distribution of Trips (External)

5.2.2 Internal Distribution

The Rezoning is proposed to accommodate three Access Points (APs) – discussed in Section 4.1. It is assumed that traffic within the site will opt for the closest AP by driving distance when arriving/exiting the site and make their way onto Mooringe Ave in the shortest distance possible. For the sake of modelling all trips are assumed to access the Rezoning via Streeters Road onto Mooringe Avenue, however in reality a proportion of trips will likely distribute to other parts of the local network IE Errington Street and Whelan Street via Gardner Street. In consideration of the above and also that the traffic from the industrial facility that was previously in operation at this location has not been discounted from the proposed new volumes, these modelling assumptions will result in a conservative traffic analysis.

5.3 PEAK PERIOD TRIP DISTRIBUTION

The resultant number of trips expected to be generated per AP is summarised in Table 4 based on the internal distribution of traffic and the amount of traffic generated at the north and south sides of the Rezoning.

The number of incoming/outgoing trips have been calculated based on the assumption that for residential lots in the Morning Peak, 90% of trips will be leaving the Rezoning with 10% entering the Rezoning and these ratios reversed in the Afternoon Peak Hour (this is considered to be a highly conservative estimation).

The following access point traffic proportions are assumed, based on rough area of dwellings on the site:

- AP1: 75% IE 75% of the total development will access / egress from this point;
- AP2: 25% IE 25% of the total development will access / egress from this point;

Daily trips have assumed to be 50% incoming and 50% outgoing.

Table 4: Number of Trips per Access Point

Access Point	Daily Trips IN	Daily Trips OUT	AM Peak Trips IN	AM Peak Trips OUT	PM Peak Trips IN	PM Peak Trips OUT
AP1	200	200	4	36	36	4
AP2	67	67	2	12	12	2
Total	**267**	**267**	**6**	**48**	**48**	**6**

The generated traffic at each AP has is visualised below in Figure 15 (AM Peak) and Figure 16 (PM Peak) based on the above assumptions. The generated traffic distribution onto Mooringe Avenue via Streeters Road is shown in Figure 17 (AM Peak) and Figure 18 (PM Peak).

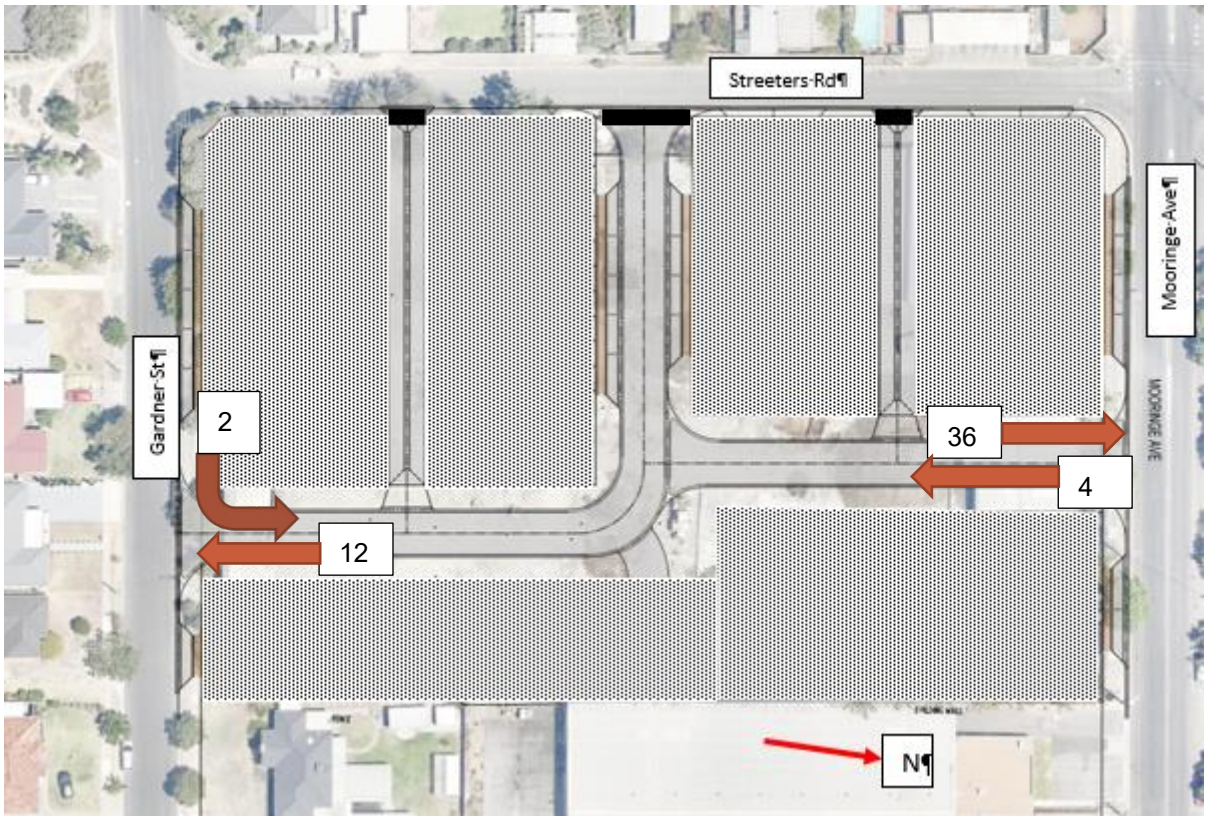


Figure 15: Internal Traffic Generation – AM / Morning Peak Hour

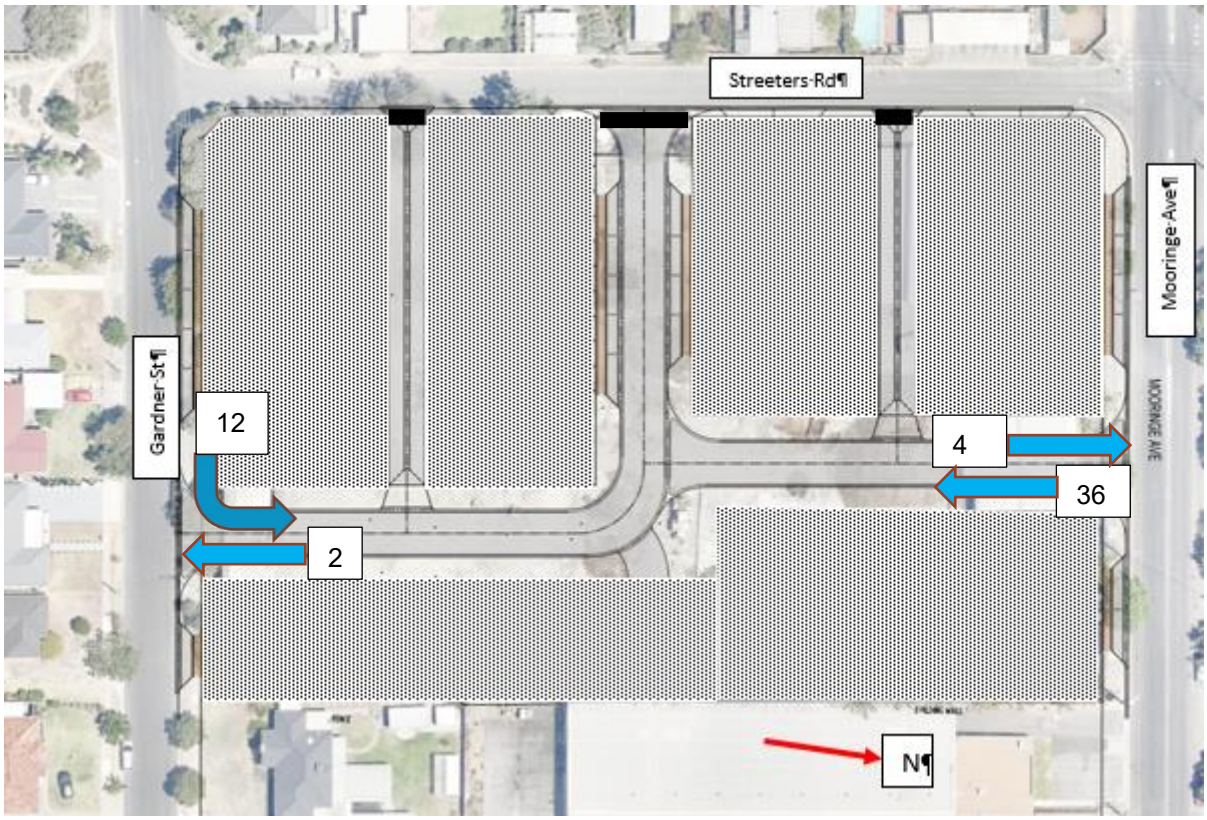


Figure 16: Internal Traffic Generation – PM / Afternoon Peak Hour

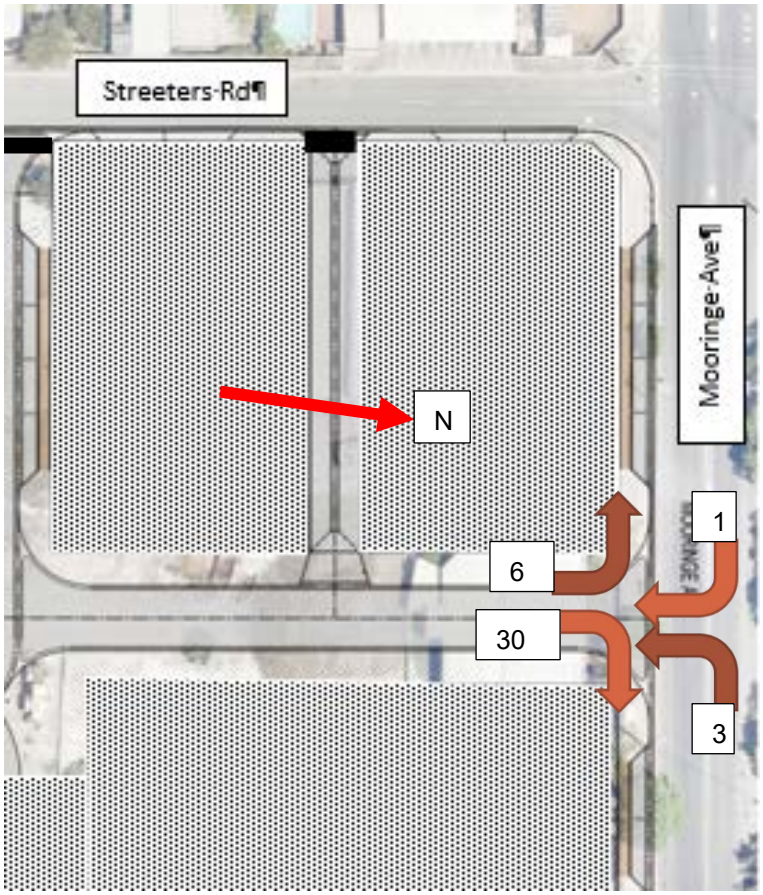


Figure 17: Development Traffic onto Mooringe Ave AM Peak

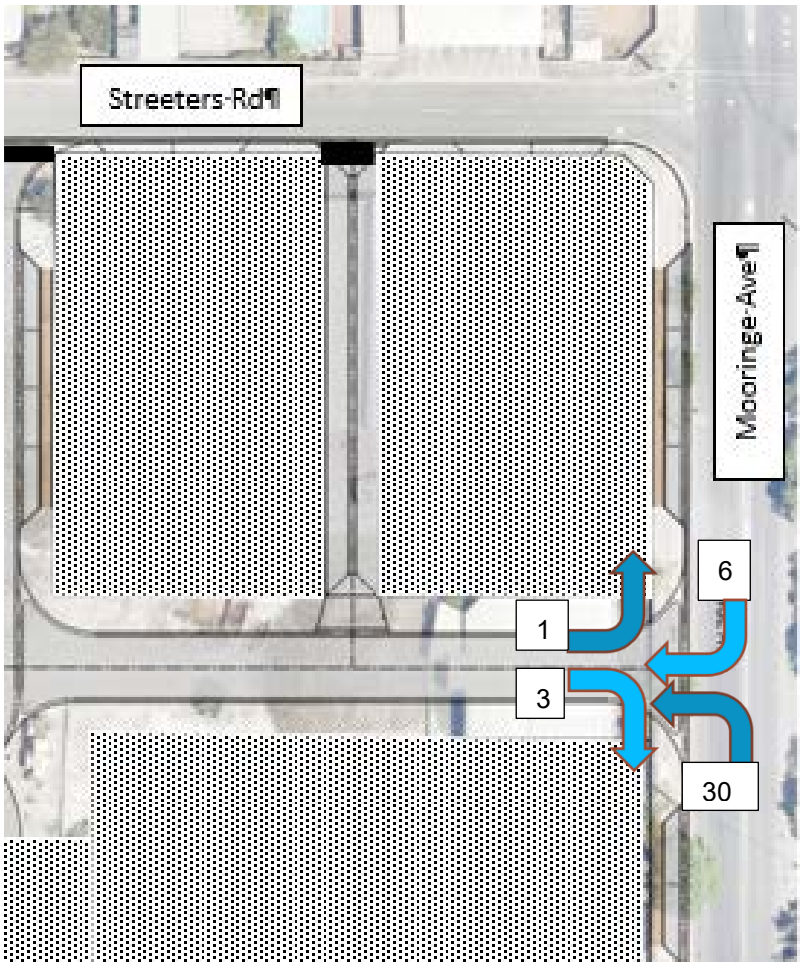


Figure 18: Development Traffic onto Mooringe Ave PM Peak

Table 5 and 6 demonstrate the new demand at the intersection of Streeters Road and Mooringe Avenue following the proposed completion of the Rezoning. The volumes are based upon the turning count undertaken on 3 April 2018, with the AM peak volumes assuming a reversal of volumes IE eastbound traffic on Mooringe Avenue in the PM peak converts to westbound traffic in the AM peak. Right turn out of Streeters Avenue (westbound) in the PM peak converts to left turn in (northbound) etc. The volumes have had the Rezoning trips added to their respective movement (represented within the brackets).

The Sidra Modelling also applies some sensitivity testing by increasing all entering volumes by 5% for all movements on all legs, both for existing and post development analysis.

Table 5: Mooringe Ave / Streeters Road AM Peak Hour proposed distribution post development

Road	Leg	Intersection Behaviour		
		Straight	Left	Right
Mooringe Avenue	West	495	83	(0+1) = 1
Mooringe Avenue	East	334	(0+1) = 1	30
Streeters Road	South	2	(0+2) = 2	(0+10) = 10
Streeters Road	North	0	25	40

Table 6: Mooringe Ave / Streeters Road PM Peak Hour proposed distribution post development

Road	Leg	Intersection Behaviour		
		Straight	Left	Right
Mooringe Avenue	West	334	40	(0+2) = 2
Mooringe Avenue	East	495	(0+10) =10	25
Streeters Road	South	0	(0+1) = 1	(0+1) = 1
Streeters Road	North	2	30	83

Table 7: Access Point 1 AM Peak Hour proposed distribution post development

Road	Leg	Intersection Behaviour		
		Straight	Left	Right
Mooringe Avenue	West	495	NA	(1+1) =2
Mooringe Avenue	East	334+30=374	(0+3) = 3	NA
Access Point 1	South	NA	6	30

Table 8: Access Point 1 PM Peak Hour proposed distribution post development

Road	Leg	Intersection Behaviour		
		Straight	Left	Right
Mooringe Avenue	West	334	NA	(0+6) = 6
Mooringe Avenue	East	495+25=520	(0+30) =30	NA
Access Point 1	South	NA	1	3

The impact of the Rezoning's generated traffic on the Mooringe Avenue / Marion Road intersection was also considered, as shown in figure 19 below.

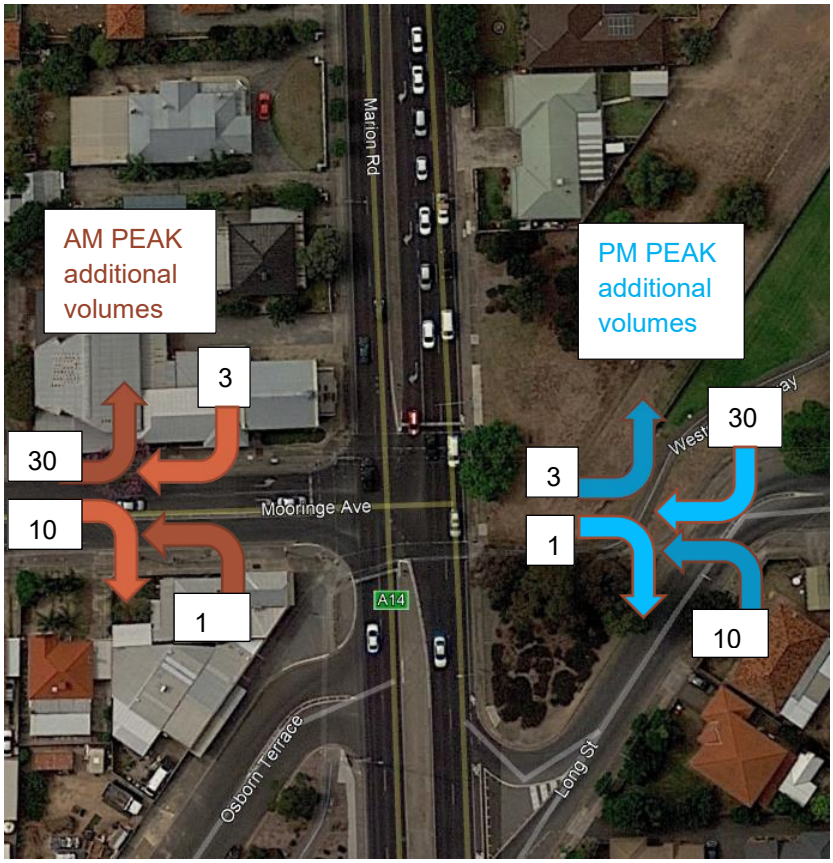


Figure 19 – Additional Trip Generation on Marion Road – AM and PM peak

Table 9: Marion Road / Mooringe Road Signals AM Peak Hour proposed distribution post development

Road	Leg	Intersection Behaviour		
		Straight	Left	Right
Mooringe Avenue	West	NA	(427+30) = 457	(223+10) = 233
Marion Road	North	854	NA	(260+3) = 263
Marion Road	South	1476	(99+1) = 100	NA

Table 10: Marion Road / Mooringe Road Signals PM Peak Hour proposed distribution post development

Road	Leg	Intersection Behaviour		
		Straight	Left	Right
Mooringe Avenue	West	NA	(206+3) = 209	(210+1) = 211
Marion Road	North	1151	NA	(257+30) = 287
Marion Road	South	992	(147+10) = 157	NA

6 DEVELOPMENT ACCESS ARRANGEMENTS

The Rezoning assessment has assumed that the three proposed access points as discussed in Section 4. These accesses will be assessed against Austroads Guide to Traffic Management Part 6 – Intersections, Interchanges and Crossings (AGTM06-17) Figure 2.26(c) and Austroads Guide to Road Design Part 4A – Unsignalised and Signalised Intersections (AGRD04A-17) to finalise the junction layouts. The existing AADT volumes can be found in Section 3.1 and generated traffic in Section 5.3.

Access Point 1 (AP1) is proposed on Mooringe Road, and caters for the highest turning volumes, therefore it is considered to be the “critical” access.

Figure 20 below suggests that with a maximum of 30 vehicles/hour turning left into the Rezoning at AP1 (exceeding the volumes for any other access point and equalling the proposed volumes at Mooringe Avenue intersection with Streeters Road), the warrant for turning facilities has been triggered for an AUL(S) for the left in movement. The dimensions for an AUL(S) for the relevant 60km/h speed zone (Mooringe Avenue), are indicated in Figure 20.

In this instance Mooringe Avenue westbound lane is already a total of 6.0m in width. The existing roadway width provides sufficient space to pass a left turning vehicle without delaying the through lane traffic, provided that this road width is maintained on Mooringe Avenue for 35m on westbound approach to AP1 (note the proposed rezoning indicates indented parking on Mooringe Avenue adjacent to the development). The offset between Streeters Road and AP1 is 55m.

Austroads Guide to Road Design Part 4 *Intersections and Crossings* discusses the minimum spacing of driveways in Appendix E Table E3. For a design speed of 60km/h the minimum spacing is 30m and desirable spacing is 40m between access points (AP1 and Streeters Road), therefore the spacing between AP1 and Streeters Road exceeds the requirement. Even when a design speed of 70km/h is adopted, 55m is indicated to be the desirable spacing.

The 55m also provides sufficient distance for a through vehicle on Mooringe Avenue heading westbound to weave between a slowing left turning vehicle into AP1, then shift laterally to the left to avoid vehicles (up to 5 queuing vehicles) right turning into Streeters Road (heading northbound). According to the Taper Equation only 20m is required (refer to Figure 21). In addition, it would be considered unreasonable to impose an Auxiliary Left Turn Treatment on this proposal at AP1, when many side roads along Mooringe Avenue have much higher levels of “left in” turning volumes.

Figure 20 below also suggests that with a maximum of 12 vehicles/hour turning left into the Rezoning at AP2, the warrant for turning facilities is not met to require a painted turn lane, until the AADT on Streeter’s Road or Gardner Street exceed approximately 6000 VPD, which is not likely to occur for the foreseeable future.

The highest volume for right in turns is a maximum of 6 vehicles/hour for AP1, this is within the Basic Auxiliary Right (BAR) level.

Basic Auxiliary Right (BAR) / Basic Auxiliary Left (BAL) treatments cannot be conveniently provided where the road is kerbed, and existing driveways are located opposite to the new access. However, Council could consider some parking bans to ensure area is free of standing vehicles around the proposed access points to undertake manoeuvring around turning vehicles.

Therefore, no junction treatments are required at proposed AP1, AP2. Some minor linemarking revisions on Mooringe Avenue could be undertaken to differentiate Access Point 1.

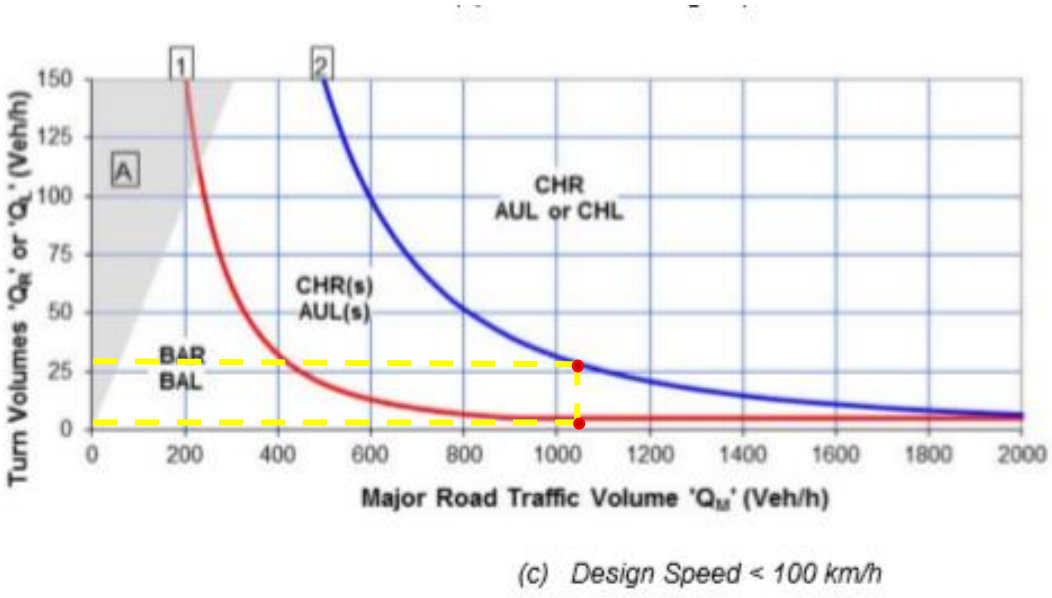
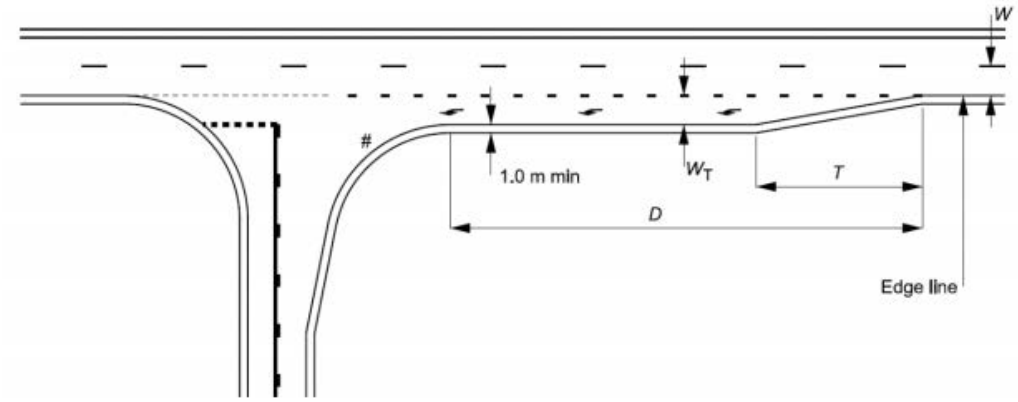


Figure 20: Major Road Turn Treatments Design Speed (suitable for urban environments)

Figure 8.3: Rural AUL(S) treatment with a short left-turn lane



Notes:

- *# For setting out details of the left-turn geometry, use vehicle turning path templates and/or Table 8.2.*
- *Approaches to left-turn slip lanes can create hazardous situations between cyclists and left-turning motor vehicles. Treatments to reduce the number of potential conflicts at left-turn slip lanes are given in AGRD Part 4 (Austroads 2017).*
- *The dimensions of the treatment are defined as follows. Values of D and T are provided in Table 8.2.*

  W = Nominal through lane width (m) (including widening for curves). For a new intersection on an existing road, the width is to be in accordance with the current link strategy.

  W_T = Nominal width of the turn lane (m), including widening for curves based on the design turning vehicle = 3.0 m minimum.

  T = Physical taper length (m) given by Equation 5 being: $T = \frac{0.33VW_T}{3.6}$

  V = Design speed of major road approach (km/h).

Source: Department of Main Roads (2006)[37].

Table 8.2: Dimensions for AUL(S) treatment on major leg

Design speed of major road approach (km/h)	Diverge/deceleration length *D* (m)[1]	Taper length *T* (m)[2]
50	15	15
60	25	15
70	35	20
80	45	20
90	55	25
100	70	30
110	85	30
120	100	35

1 *Based on a 20% reduction in through road speed at the start of the taper and a value of deceleration of 3.5 m/s² (Table 5.2). Adjust for grade using the 'correction to grade', (Table 5.3).*
2 *Based on a turn lane width of 3.0 m.*

Source: Department of Main Roads (2006)[38].

Figure 21: Dimensions for an AUL(S)

W = 6.0m (width available kerb to centreline at this location)

W_T = 3.0m

T = (0.33 X 70 X 3.0) / 3.6 = 19.25m (say 20m)

D = 35m

7 ACCESS ANALYSIS

7.1 MOORINGE AVENUE INTERSECTION STREETERS ROAD ANALYSIS

SIDRA Intersection 7.0 was utilised for the assessment the existing intersections influenced by the proposed Rezoning, for morning and afternoon peak hour periods.

Figures 21 shows the simple intersection layout that the model is based on.

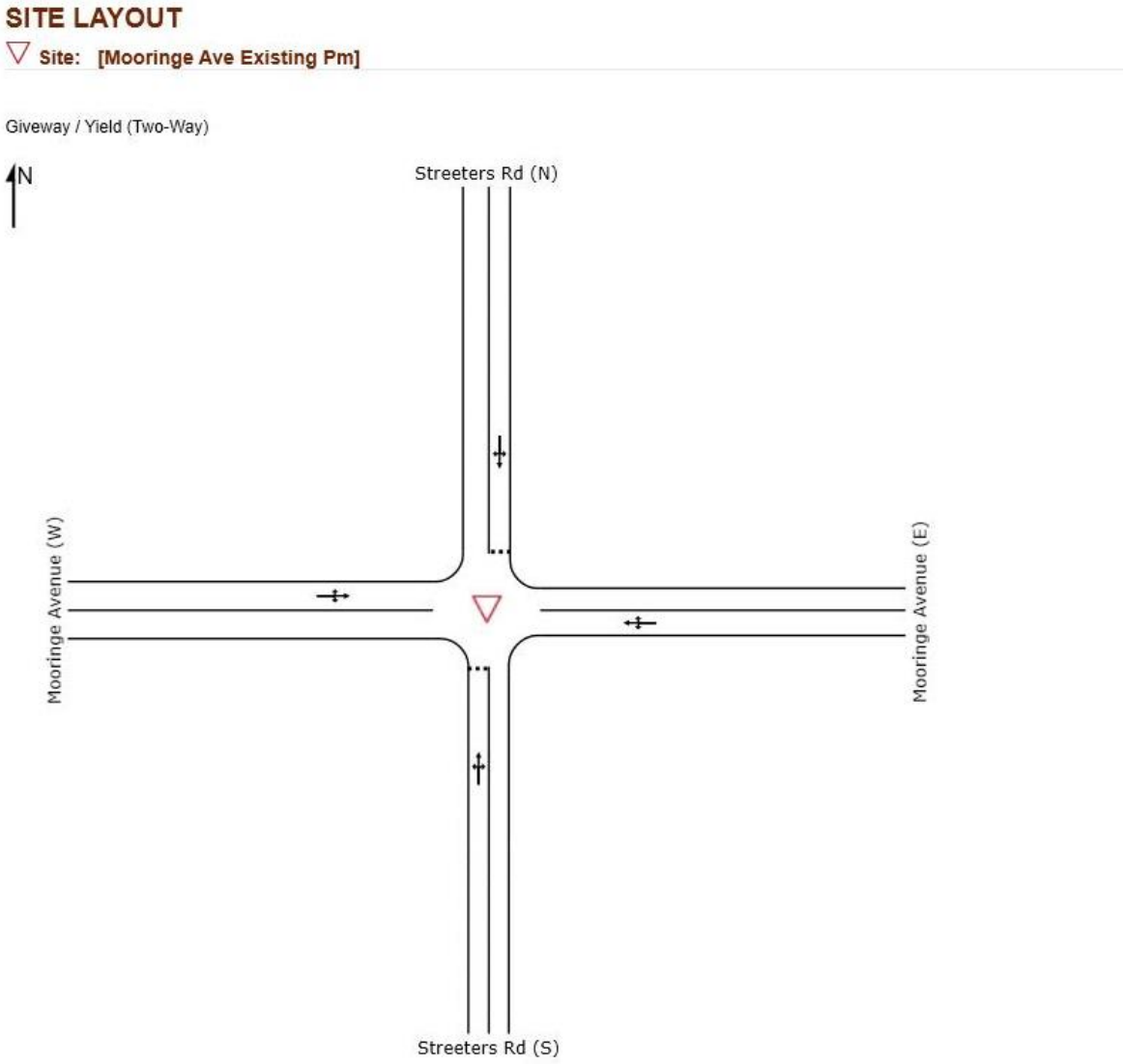


Figure 21: Diagrammatic representation of the Sidra Intersection model

Table 9 and 10 below present a summary of the pre and post development operation of the unsignalised Mooringe Avenue / Streeters Road Intersection for the morning and afternoon periods respectively.

Table 9: Summary: Morning Peak Hour (Shaded Post Development)

Lane	Degree of Saturation	Average Delay (sec)	Queue Distance (m)	Level of Service
Streeters Rd (S) Existing	0.01	10.7	0.2	B
Streeters Rd (S) Post Development	0.038	12.4	0.8	B
Mooringe Ave (E) Existing	0.210	1.3	3.4	NA
Mooringe Ave (E) Post Development	0.214	1.3	3.2	NA
Streeters Rd (N) Existing	0.158	12.3	3.7	B
Streeters Rd (N) Post Development	0.158	12.3	3.7	B
Mooringe Av (W) Existing	0.303	0.8	0.1	NA
Mooringe Av (W) Post Development	0.303	0.8	0.1	NA
Intersection Existing	**0.303**	**1.8**	**3.7**	**NA**
Intersection Post Development	**0.303**	**1.9**	**3.7**	**NA**

Table 10: Summary: Afternoon Peak Hour (Shaded Post Development)

Lane	Degree of Saturation	Average Delay (sec)	Queue Distance (m)	Level of Service
Streeters Rd (S) Existing	0.006	10.4	0.1	B
Streeters Rd (S) Post Development	0.007	10.5	0.3	B
Mooringe Ave (E) Existing	0.287	0.6	2.3	NA
Mooringe Ave (E) Post Development	0.292	0.6	2.4	NA
Streeters Rd (N) Existing	0.287	13.7	7.8	B
Streeters Rd (N) Post Development	0.286	13.6	7.7	B
Mooringe Av (W) Existing	0.199	0.7	0.1	NA
Mooringe Av (W) Post Development	0.199	0.7	0.3	NA
Intersection Existing	**0.287**	**2.1**	**7.8**	**NA**
Intersection Post Development	**0.292**	**2.1**	**7.7**	**NA**

The SIDRA analysis shows that the current average delay for the Streeters Road North Leg was around 12-14 seconds. This is commensurate with the observations on site.

The results shown in the above tables indicate the intersection would operate satisfactorily if the proposed Rezoning were to go ahead, and that the intersection adequately facilitates the relatively free flow of traffic during morning and afternoon peak periods, with only minimal queues forming in Streeters Road (south) post development, and very little change in flows for Streeters Road (north) – however the difference in intersection performance would be virtually imperceptible to road users.

In conclusion, the SIDRA analysis shows that even using a highly conservative model with all development traffic filtered through the one intersection and 5% growth applied, the performance of the unmodified local network will adequately cope with the proposed development trip generation.

7.2 MOORINGE AVENUE INTERSECTION ACCESS POINT 1 ANALYSIS

SIDRA Intersection 7.0 was utilised for the assessment the proposed access point onto Mooringe Avenue for the proposed Rezoning, for morning and afternoon peak hour periods.

Figure 22 below shows the simple junction layout that the model is based on.

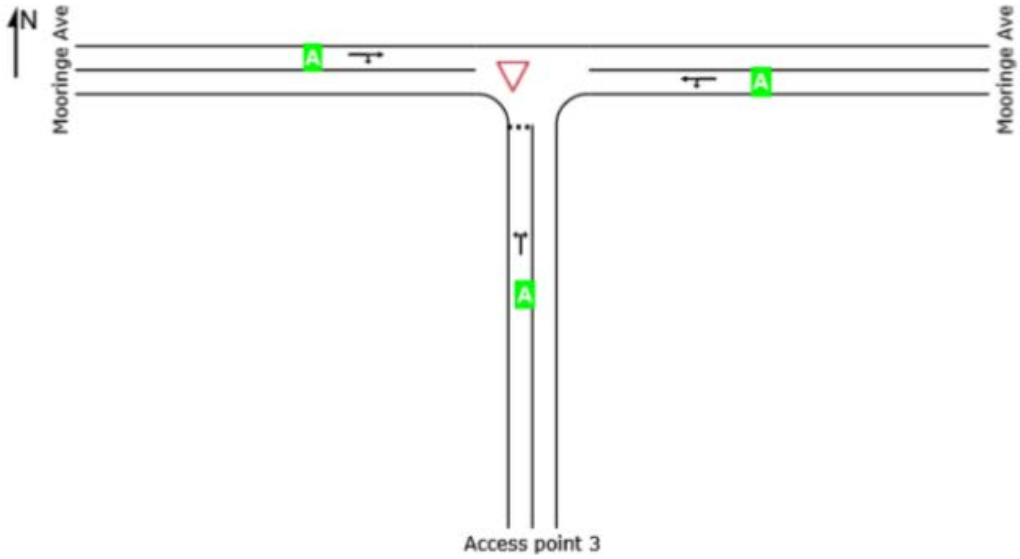


Figure 22: Diagrammatic representation of the Sidra Intersection model

Access Point 1 (AP1) was modelled for its impact on Mooringe Avenue. Table 11 & 12 show the results from SIDRA Intersection 7.0 analysis of this proposed access point.

Table 11: Summary: Morning Peak Hour

Lane	Degree of Saturation	Average Delay (sec)	Queue Distance (m)	Level of Service
Access Point 1	0.056	7.7	1.3	A
Mooringe Ave (E) Post Development	0.217	5.6	0	NA
Mooringe Ave (W) Post Development	0.272	0	0.2	NA
Intersection Post Development	**0.272**	**2.6**	**1.3**	**NA**

Table 12: Summary: Afternoon Peak Hour

Lane	Degree of Saturation	Average Delay (sec)	Queue Distance (m)	Level of Service
Access Point 1	0.005	6.8	0.1	A
Mooringe Ave (E) Post Development	0.315	5.6	0.0	NA
Mooringe Ave (W) Post Development	0.189	0.2	0.6	NA
Intersection Post Development	**0.315**	**3.4**	**0.6**	**NA**

The results of the analysis indicate that the proposed Access Point 1 onto Mooringe Avenue will operate with minimal delays to the new access point and present no expected traffic issues for Mooringe Avenue.

7.3 MOORINGIE AVENUE INTERSECTION MARION ROAD

SIDRA Intersection 7.0 was utilised for the assessment of the effects of proposed generated additional traffic from the proposed Rezoning at the Mooringe Avenue intersection with Marion Road, for morning and afternoon peak hour periods.

Figures 23 below shows the signalised junction layout that the model is based on.

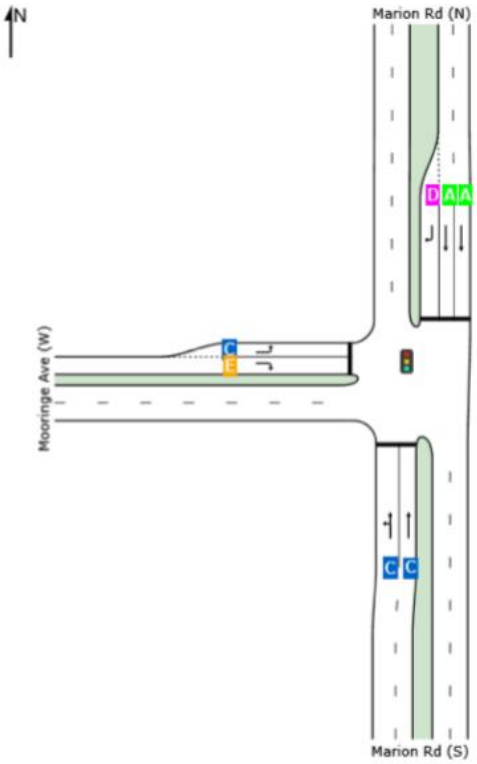


Figure 23: Diagrammatic representation of the Sidra Intersection model (Existing AM Peak LOS shown)

Table13 and 14 below present a summary of the pre and post development operation of the Mooringe Avenue / Marion Road Signalised Intersection for the morning and afternoon periods respectively.

Table 13: Summary: Morning Peak Hour (Shaded Post Development)

Lane	Degree of Saturation	Average Delay (sec)	Queue Distance (m)	Level of Service
Marion Rd (S) Existing	0.839	29.7	315.8	C
Marion Rd (S) Post Development	0.853	32.2	329.5	C
Marion Rd (N) Existing	0.328	16.4	64.4	B
Marion Rd (N) Post Development	0.691	17.1	108.8	B
Mooringe Av (W) Existing	0.832	52.3	179.6	D
Mooringe Av (W) Post Development	0.869	54.8	204.9	D
Intersection Existing	**0.839**	**29.7**	**315.8**	**C**
Intersection Post Development	**0.869**	**31.8**	**329.5**	**C**

Table 14: Summary: Afternoon Peak Hour (Shaded Post Development)

Lane	Degree of Saturation	Average Delay (sec)	Queue Distance (m)	Level of Service
Marion Rd (S) Existing	0.699	29.0	210.0	C
Marion Rd (S) Post Development	0.719	30.0	215.8	C
Marion Rd (N) Existing	0.444	13.0	100.7	B
Marion Rd (N) Post Development	0.557	13.4	104.6	B
Mooringe Av (W) Existing	0.289	42.8	90.6	D
Mooringe Av (W) Post Development	0.737	43.6	93.9	D
Intersection Existing	**0.699**	**23.3**	**210.0**	**C**
Intersection Post Development	**0.737**	**23.9**	**215.8**	**C**

The results of the analysis show that the performance of the Marion Road signalised intersection with Mooringe Avenue is only marginally affected by the increased volumes from the proposed rezoning. The greatest affects of the rezoning are shown in the AM peak, with queues on Mooringe Avenue expected to increase by 25m and Marion Road North leg by 40m. The probability of queues exceeding the allocated short left turn lane storage on Marion Road (South leg) increase from existing 50% to proposed 55% in the AM peak and from 13% to 16% in the PM Peak. However, the level of service remains the same for either leg and incurred additional delays are expected to be minimal.

8 SUMMARY AND CONCLUSIONS

The traffic assessment has provided a background on the existing conditions of the site, the likely traffic generated by the proposed rezoning and its impacts on the external road network. From the assessment, the following key findings and recommendations are summarised below:

- The proposed rezoning is proposed to amend land use from industrial to residential in the form of medium density townhouses. The Rezoning proposes an internal road access of approximately 2300 square meters of road network, accessing via two access points (Gardner Street and Mooringe Avenue). The Rezoning's internal road network still requires detail design and assessment.

- The proposed rezoning would likely increase local area traffic by around 533 vehicles per day, with around 54 vehicle trips generated during peak hour traffic.

- The majority of the Rezoning traffic will access the arterial road network directly from Access Point 1 (AP1 via Mooringe Avenue), however it is likely that some development traffic will redistribute to Whelan Avenue and Errington Street via Access Point 2 (Gardner Road), potentially lessening the volumes placed on AP1 assumed in the traffic model.

- The Rezoning has no impact on programmed road upgrades in the area, nor do any programmed upgrades impact the proposal. Given the narrow verge on Streeters Road, Council's proposal to widen Streeters Road will likely benefit traffic behaviour for the Rezoning but requires further assessment to gauge the impact on the proposal. Council has suggested that land could be provided from the subject site to enable a wider verge to be provided to accommodate future footpath and landscaping requirements.

- The existing road network flows reasonably well during peak hour, with observations indicating only minor increase in delays experienced for traffic entering Mooringe Avenue from adjacent side roads.

- Crash history indicates that crashes in the vicinity of the Rezoning are at established "conflict points" IE intersections and junctions. All intersections and junctions reviewed are considered to be performing adequately for the types of intersection and volumes experienced.

- The Rezoning site is already well serviced by existing public transport modes and reasonably good connections to cycling and pedestrian facilities and networks within the local area. Internal road network design should consider the requirements in the CWTDP for pedestrian and cyclist connectivity to infrastructure.

- The City of West Torrens has determined that the rezoning will fit under Residential Medium Density Policy Area 18, and the parking requirement would be determined by PDC12 and 16, and Table WeT0/2. In essence this requires 1 covered and 1 uncovered off-street park and 0.5 on-street parks, per dwelling.

- All sight distances are likely to be achieved for the proposed access points onto Mooringe Avenue, Streeters Road and Gardner Avenue.

- In consideration of the Austroad Guidelines, the proposed Access Points for the Rezoning do not warrant and will not require any turning treatments for Mooringe Avenue, Streeters Road or Gardner Street. The 55m separation between Access Point 1 and Streeters Road meets Austroads Guidelines.

- Traffic modelling (SIDRA) indicates that the Mooringe Avenue / Streeters Road Intersection performs to an acceptable level of service for the estimated post-development traffic flows. Traffic performance will remain similar to existing levels of service, creating only minimal delays to traffic on the minor legs of the intersection. No significant changes to the Mooringe Avenue / Streeters Road Intersection are required to cater for the traffic impacts generated by the Rezoning.

- Traffic modelling (SIDRA) indicates that the Mooringe Avenue / Access Point 1 Intersection performs to a good level of service for the estimated post-development traffic flows. Traffic flow on Mooringe Avenue will be generally unimpeded and delays to the traffic queuing out of Access Point 1 are expected to be minimal. No significant changes to the proposed Mooringe Avenue / Access Point 1 Intersection are required to cater for the traffic impacts generated by the Rezoning.

- Traffic modelling for the Mooringe Avenue / Marion Road Traffic Signals with the anticipated 54 veh/hr increase during peak times, indicated minimal impact on the performance of the signalised intersection with levels of service remaining the same.

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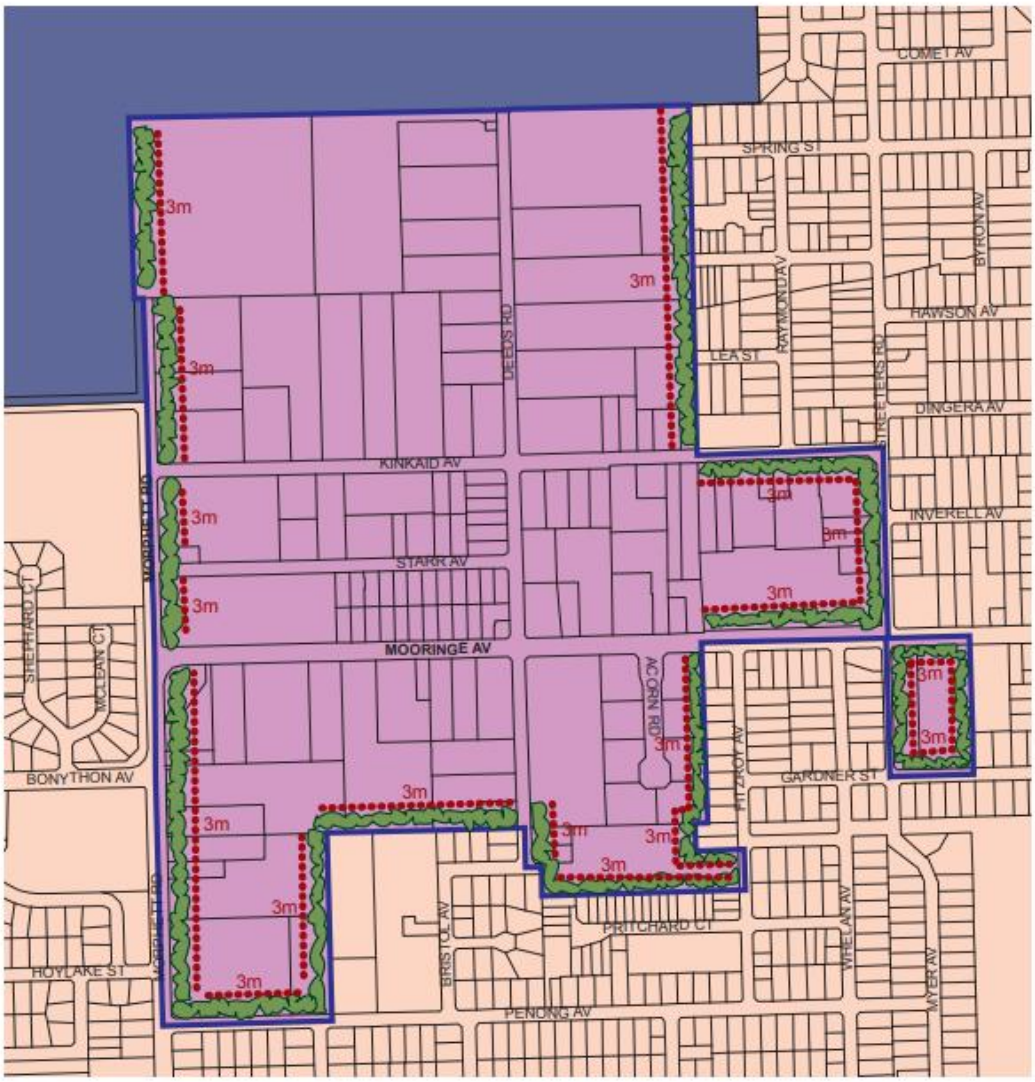
APPENDIX A

CWTDP REFERENCES



Concept Plan Boundary

Landscape Buffer

3m Building Setback

Industrial

Airport

Residential

N

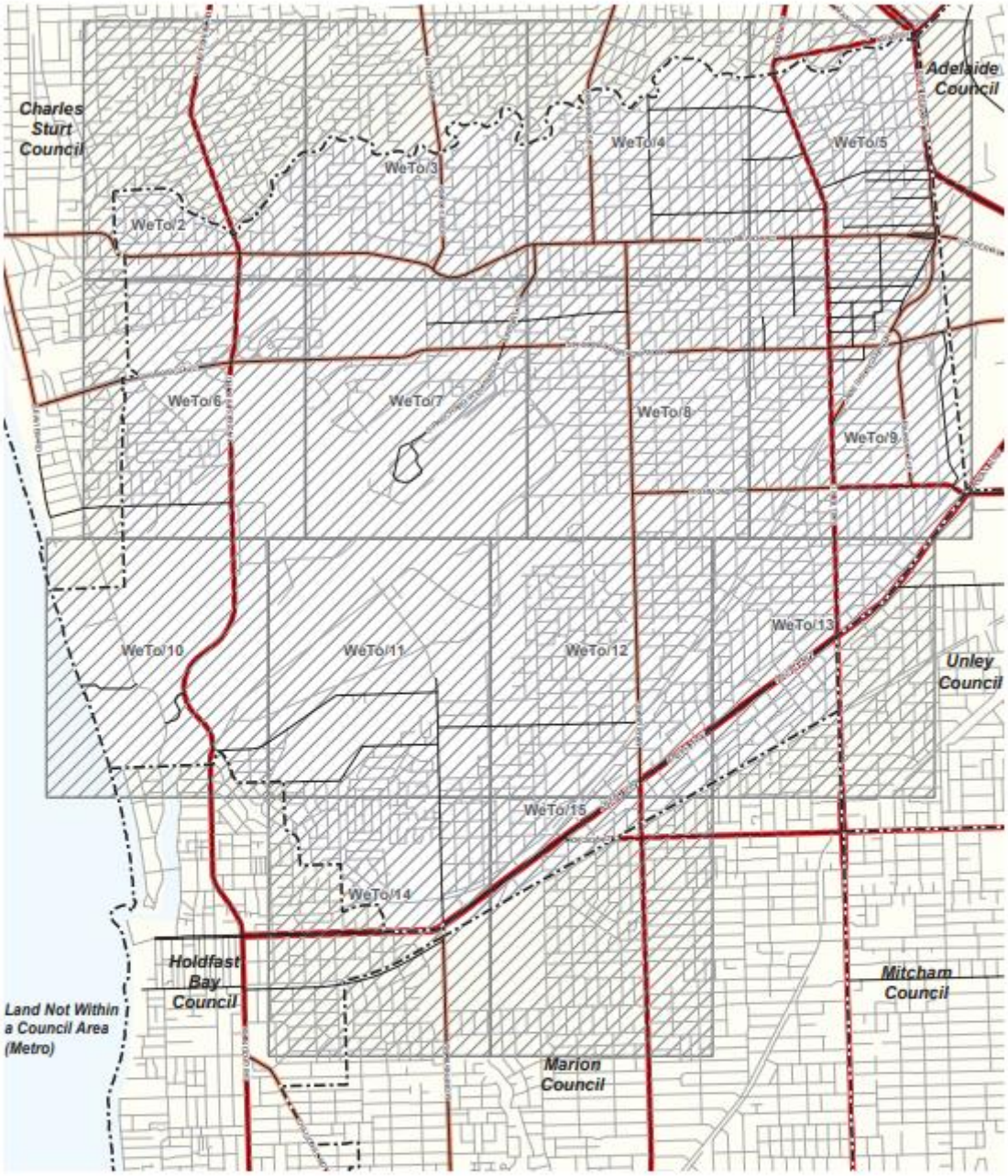
1:6,000

0 60 120 180 240 300 metres

Concept Plan Map WeTo/16

NORTH PLYMPTON / CAMDEN PARK INDUSTRY

WEST TORRENS COUNCIL
Consolidated - 12 July 2018



Overlay Map WeTo/1

TRANSPORT

Primary Arterial Roads
Secondary Arterial Roads
Development Plan Boundary

Bikedirect Network

- Secondary Road - Bike Lane
- Secondary Road
- Public Transport
- Development Plan Boundary

Overlay Map WeTo/11

TRANSPORT

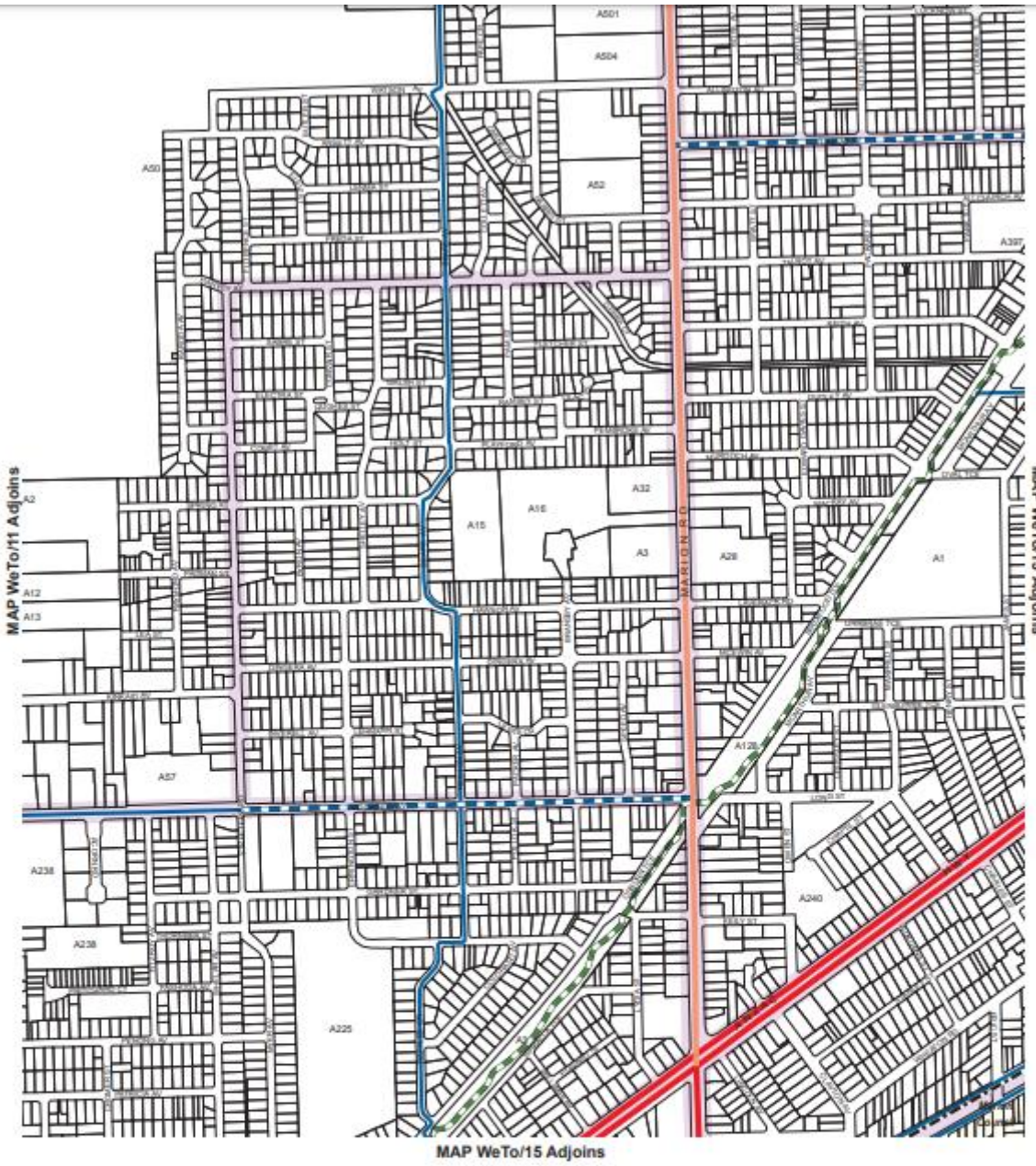
WEST TORRENS COUNCIL

Consolidated - 12 July 2018

S School
P Post Office
Railways
Local Reserves
Development Plan Boundary

Location Map WeTo/12

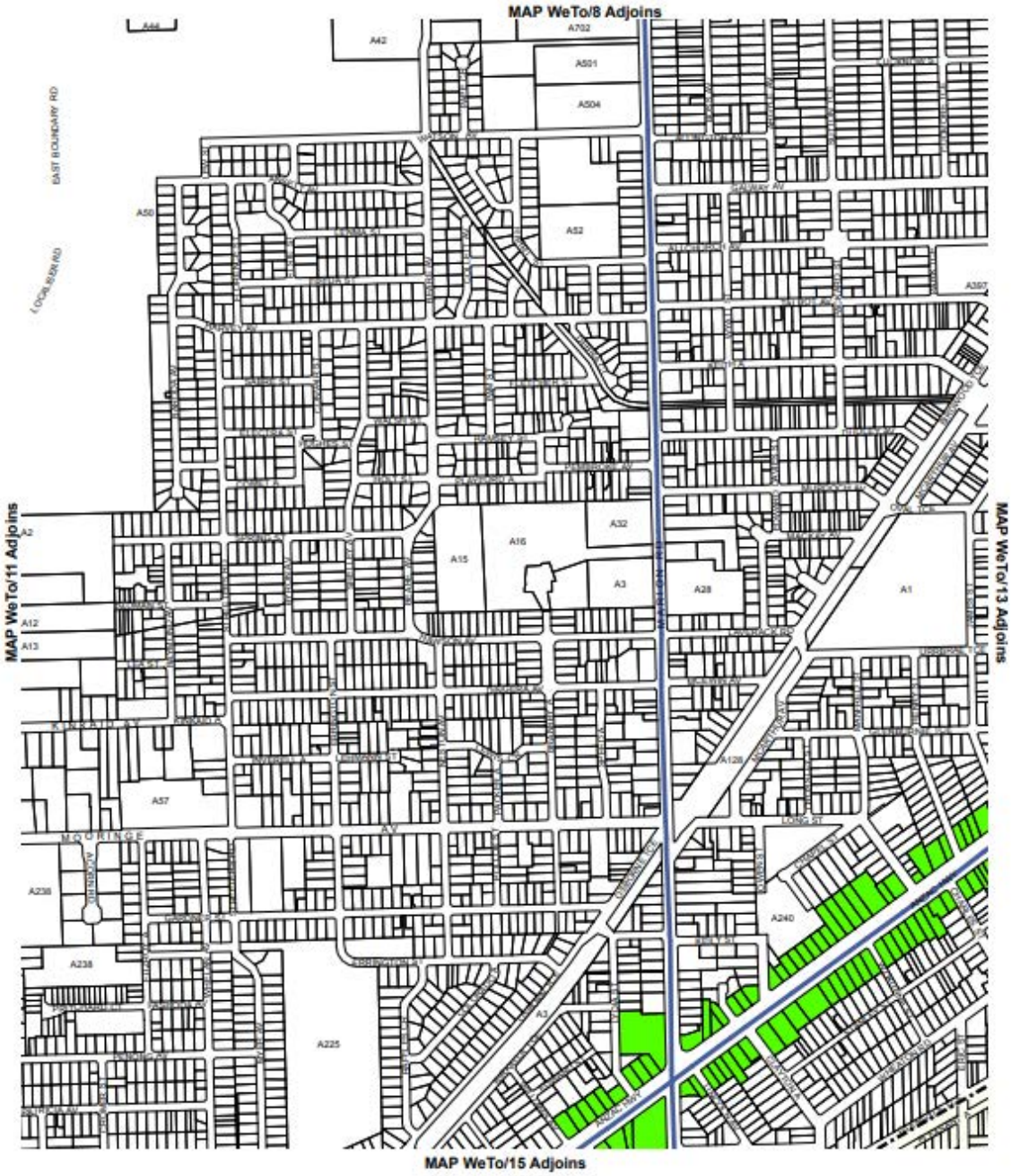
WEST TORRENS COUNCIL
Consolidated - 12 July 2018



Overlay Map WeTo/12

TRANSPORT

WEST TORRENS COUNCIL
Consolidated - 12 July 2018



Overlay Map WeTo/12

STRATEGIC TRANSPORT ROUTES

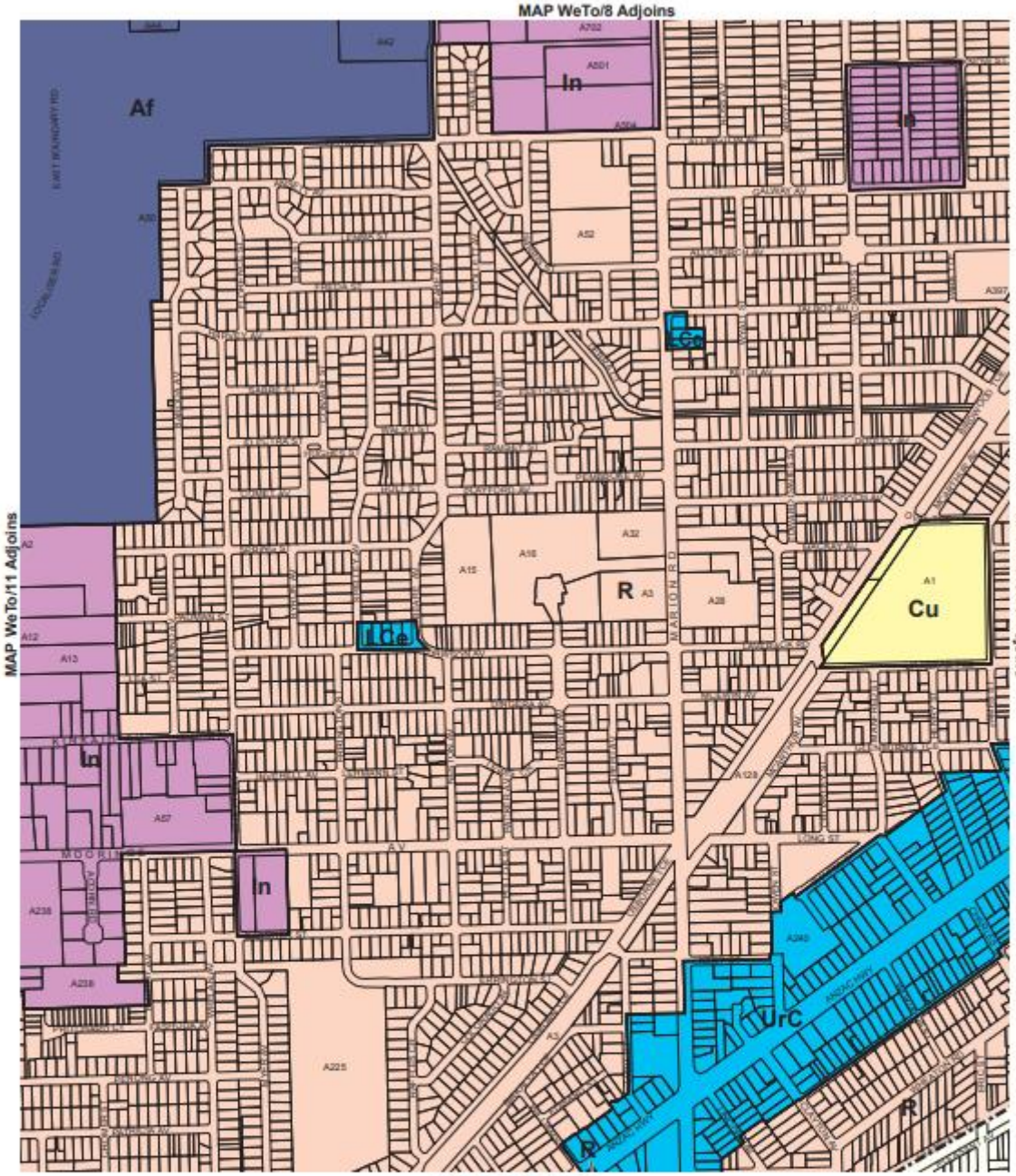
Strategic Transport Route

Strategic Transport Routes Designated Area

Development Plan Boundary

WEST TORRENS COUNCIL
Consolidated - 12 July 2018

MAP WeTo/8 Adjoins



MAP WeTo/15 Adjoins

Lamberts Conformal Conic Projection, GDA94

N

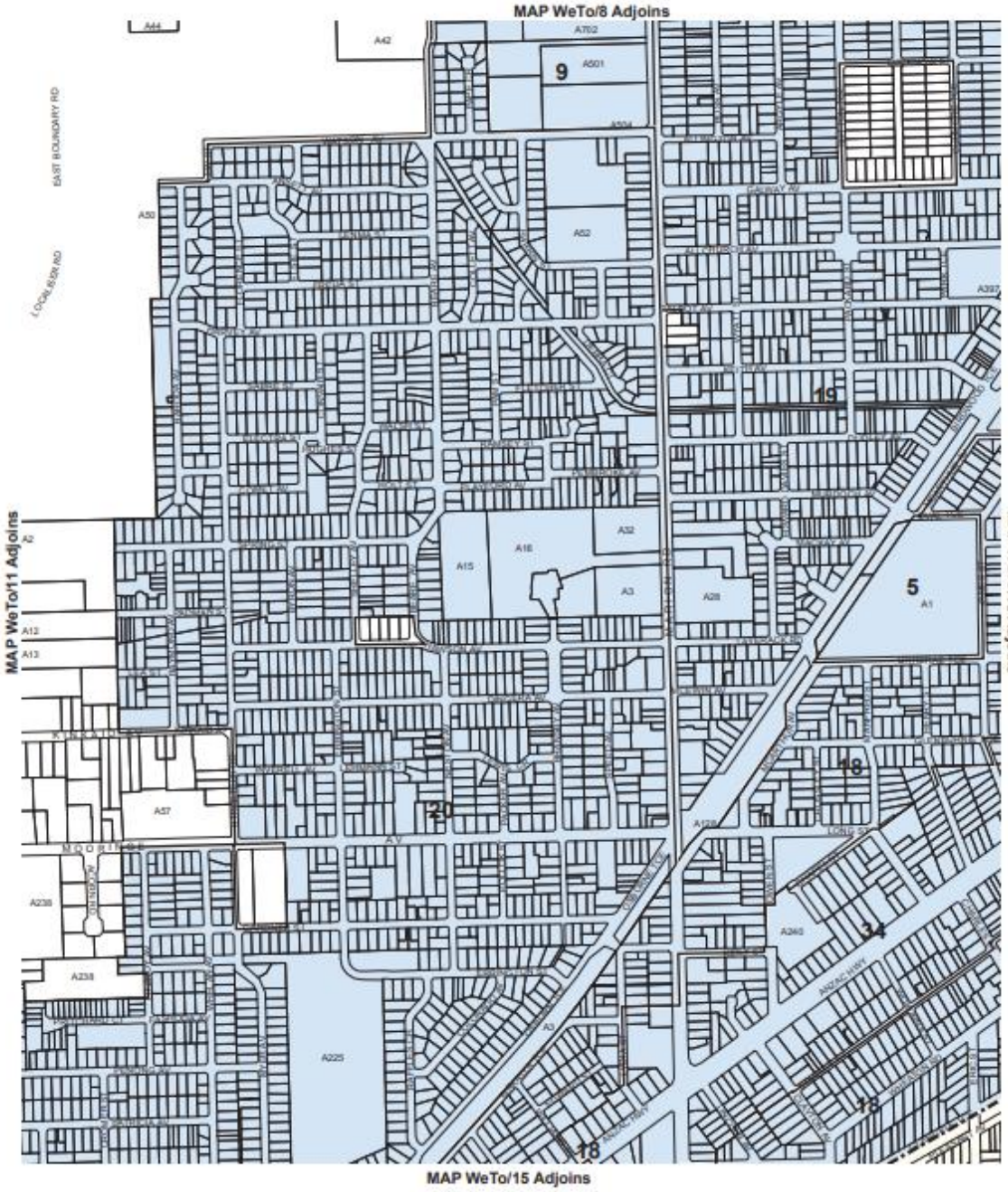
0 500 m

Zones

- Af Airfield
- Cu Community
- In Industry
- LCe Local Centre
- R Residential
- UrC Urban Corridor
- Zone Boundary
- Development Plan Boundary

Zone Map WeTo/12

WEST TORRENS COUNCIL
Consolidated - 12 July 2018



Lamberts Conformal Conic Projection, GDA94

Policy Area

18	Medium Density
19	Medium Density
20	Low Density
34	Boulevard
5	Recreation
9	Netley

N

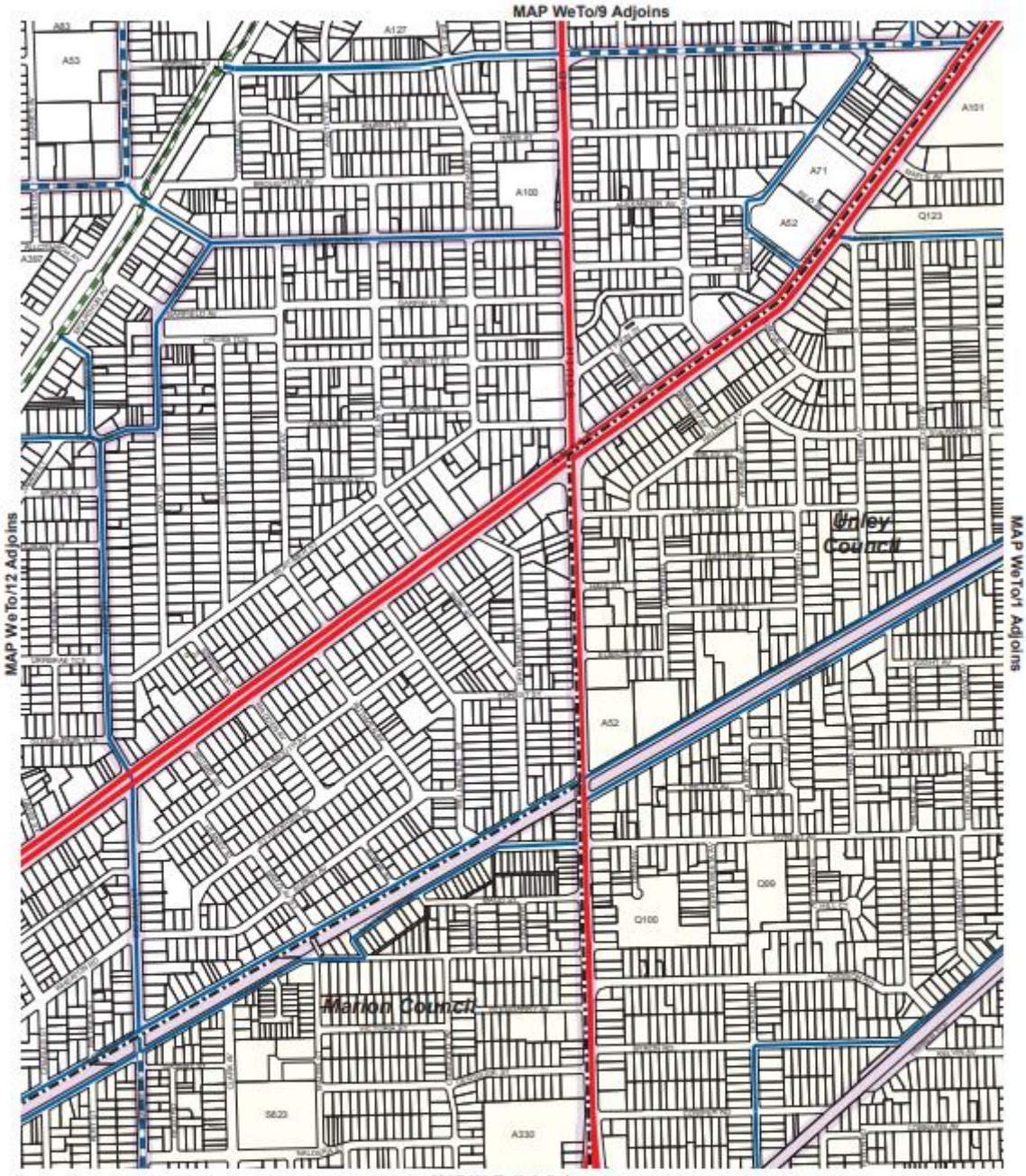
0 500 m

Policy Area Map WeTo/12

Policy Area Boundary

Development Plan Boundary

WEST TORRENS COUNCIL
Consolidated - 12 July 2018



N

0 500 m

Primary Arterial Roads

Bikedirect Network

Main Road - Bike Lane

Main Road

Secondary Road - Bike Lane

Secondary Road

Off Road Sealed Path

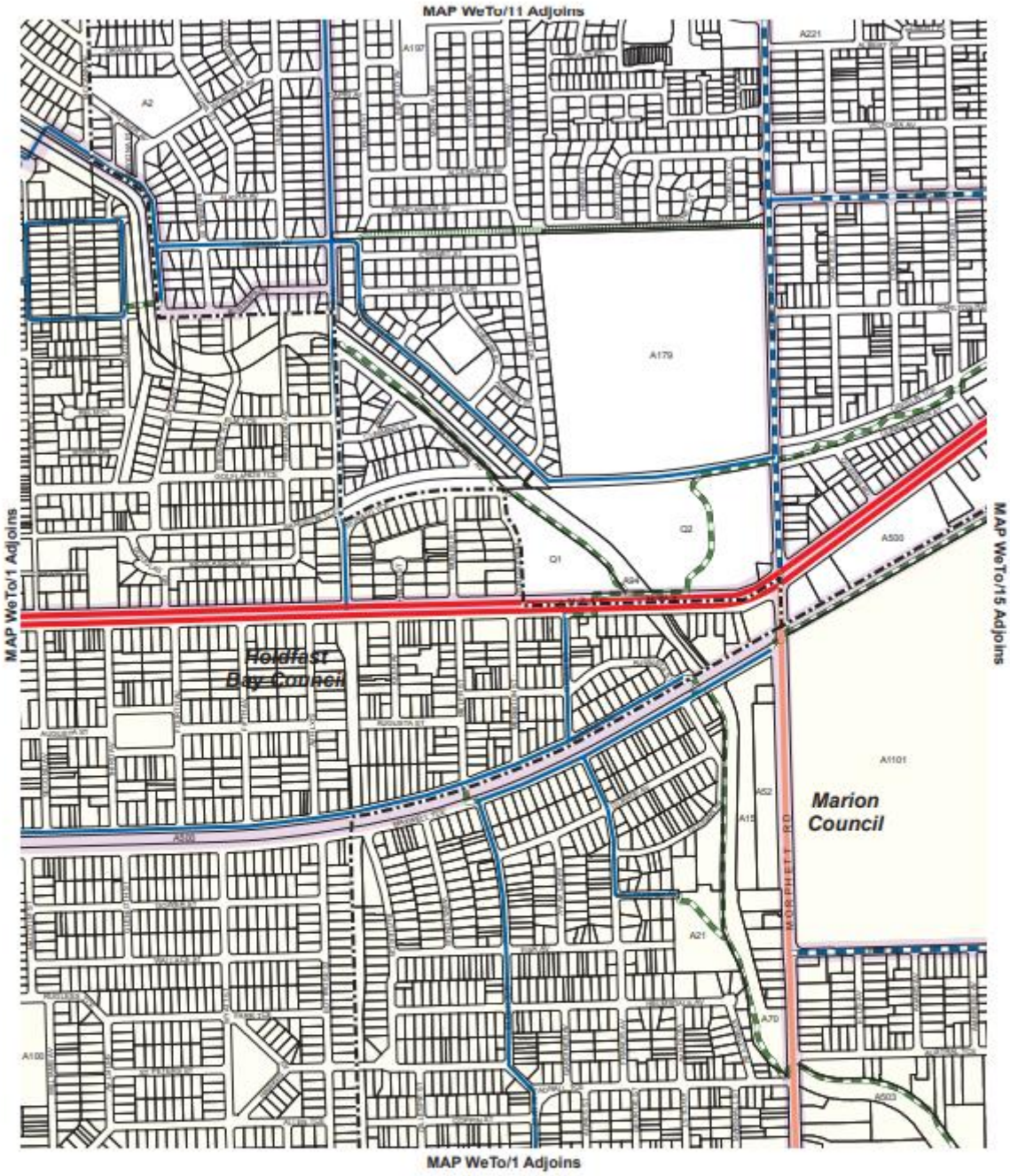
Public Transport

Development Plan Boundary

Overlay Map WeTo/13

TRANSPORT

WEST TORRENS COUNCIL
Consolidated - 12 July 2018



- Primary Arterial Roads
- Secondary Arterial Roads

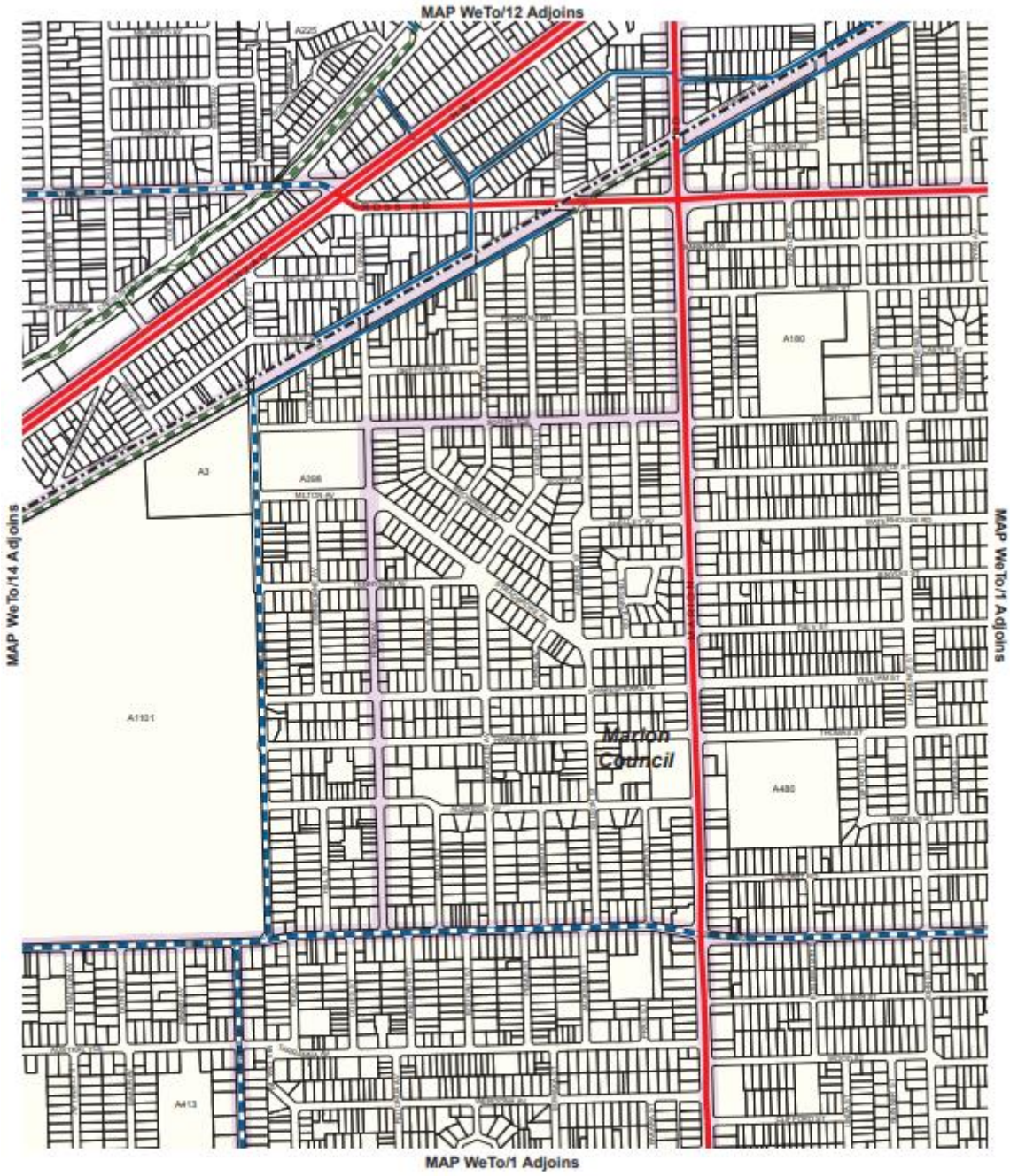
Bikedirect Network

- Main Road - Bike Lane
- Main Road
- Secondary Road - Bike Lane
- Secondary Road
- Off Road Sealed Path
- Off Road Track
- Public Transport
- Development Plan Boundary

Overlay Map WeTo/14

TRANSPORT

WEST TORRENS COUNCIL
Consolidated - 12 July 2018



N

0 500m

- Primary Arterial Roads

Bikedirect Network

- Main Road - Bike Lane
- Main Road
- Secondary Road - Bike Lane
- Secondary Road
- Off Road Sealed Path
- Off Road Track
- Public Transport
- Development Plan Boundary

Overlay Map WeTo/15

TRANSPORT

WEST TORRENS COUNCIL
Consolidated - 12 July 2018

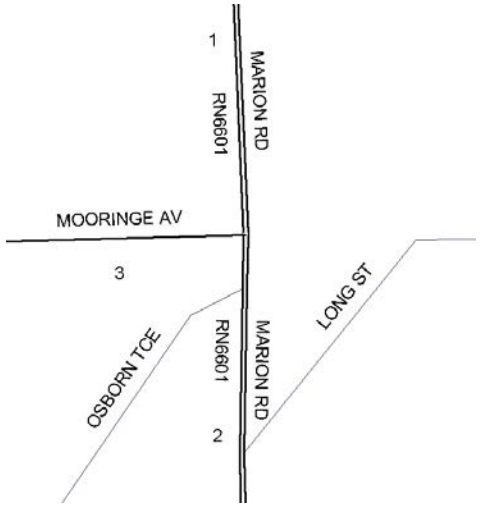
APPENDIX B

DPTI VEHICLE TURNING MOVEMENT SURVEY (2011&2017)

Department of Planning, Transport and Infrastructure
Vehicle Turning Movement Survey

Intersection of: MARION ROAD / MOORINGE AVENUE
Locality: PLYMPTON
AMG Reference: TG766285
Date of Count: 17/05/2017 Day: Wednesday
Weather: Dry Control: SIGNALS
Survey Status:

Arm	Road Number - Name
1	6601 - MARION ROAD
2	6601 - MARION ROAD
3	6598 - MOORINGE AVENUE



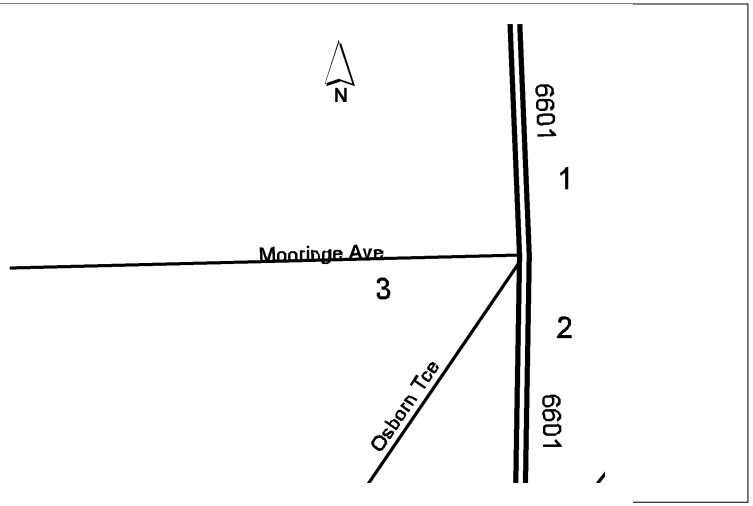
	Arm	1		2		3	
	Exit Arm	2	3 (R)	3 (L)	1	1 (L)	2 (R)
11 hour totals	Cars	**9527**	**2130**	**1249**	**10568**	**2241**	**1725**
	CV	**463**	**285**	**115**	**506**	**266**	**134**
	Total	**9990**	**2415**	**1364**	**11074**	**2507**	**1859**
AM Peak hour (08:15)	Cars	**811**	**236**	**93**	**1429**	**399**	**207**
	CV	**43**	**24**	**6**	**47**	**28**	**16**
	Total	**854**	**260**	**99**	**1476**	**427**	**223**
PM Peak hour (15:15)	Cars	**1127**	**230**	**130**	**942**	**185**	**203**
	CV	**24**	**27**	**17**	**50**	**21**	**7**
	Total	**1151**	**257**	**147**	**992**	**206**	**210**

		1	2	3
One-way Flows	11 Hour Totals	**(IN) 12405 (OUT) 13581**	**(IN) 12438 (OUT) 11849**	**(IN) 4366 (OUT) 3779**
	AM Peak Hour	**08:00 1118 08:15 1903**	**06:45 1580 08:00 1087**	**08:00 677 08:15 359**
	PM Peak Hour	**16:30 1555 15:15 1198**	**15:15 1139 16:30 1412**	**14:45 452 17:00 434**
Two-way Flows	AM Peak Hour	**08:15 3017**	**08:15 2652**	**08:00 1022**
	PM Peak Hour	**15:15 2606**	**15:15 2500**	**14:45 879**
All Vehicles	11 Hour Totals	**25986 5.8% CV**	**24287 5.0% CV**	**8145 9.8% CV**
	Estimated AADT	**33500 SF(1.00) ZF(1.29)**	**31300 SF(1.00) ZF(1.29)**	**10500 SF(1.00) ZF(1.29)**

AADT - Annual Average Daily Traffic SF - Seasonal Factor ZF - Zone Factor CV - Commercial Vehicles

Intersection of: MARION RD / MOORINGIE AVE
Intersection No: TG766285
Locality: PLYMPTON
Date of Count: 21/08/1997 Day: Thursday
Weather: Dry
Conditions: SIGNALS

Arm	Road Number - Name
1	6601 - MARION RD
2	6601 - MARION RD
3	Mooringie Ave



	Arm	1		2		3	
	Exit Ar	2	3 (R)	3 (L)	1	1 (L)	2 (R)
11 hour totals	Cars	**8920**	**2094**	**971**	**9084**	**2379**	**1341**
	CV	**513**	**319**	**89**	**452**	**324**	**94**
	Total	**9433**	**2413**	**1060**	**9536**	**2703**	**1435**
AM Peak hour (07:45)	Cars	**619**	**154**	**75**	**1493**	**447**	**162**
	CV	**54**	**20**	**8**	**48**	**31**	**9**
	Total	**673**	**174**	**83**	**1541**	**478**	**171**
PM Peak hour (16:45)	Cars	**1301**	**406**	**69**	**665**	**174**	**134**
	CV	**30**	**20**	**1**	**22**	**15**	**2**
	Total	**1331**	**426**	**70**	**687**	**189**	**136**

		1	2	3
One-way Flows	11 Hour Totals	**(IN) 11846 (OUT) 12239**	**(IN) 10596 (OUT) 10868**	**(IN) 4138 (OUT) 3473**
	AM Peak Hour	**11:00 970 07:30 2091**	**07:30 1716 11:00 883**	**07:45 649 11:00 324**
	PM Peak Hour	**16:45 1757 15:00 990**	**14:00 849 16:45 1467**	**15:00 472 17:00 506**
Two-way Flows	AM Peak Hour	**07:45 2866**	**07:45 2468**	**07:45 906**
	PM Peak Hour	**16:45 2633**	**16:45 2224**	**15:00 847**
All Vehicles	11 Hour Totals	**24085 6.7% CV**	**21464 5.3% CV**	**7611 10.9% CV**
	Estimated AADT	**30600 SF(1.00) ZF(1.27)**	**27300 SF(1.00) ZF(1.27)**	**9650 SF(1.00) ZF(1.27)**

AADT - Average Annual Daily Traffic SF - Seasonal Factor ZF - Zone Factor

APPENDIX C

SIDRA RESULTS

INTERSECTION SUMMARY

Site: [Mooringe Ave post Am]

Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	57.9	km/h	57.9	km/h
Travel Distance (Total)	1089.8	veh-km/h	1307.8	pers-km/h
Travel Time (Total)	18.8	veh-h/h	22.6	pers-h/h
Demand Flows (Total)	1078	veh/h	1293	pers/h
Percent Heavy Vehicles (Demand)	2.0	%		
Degree of Saturation	0.303			
Practical Spare Capacity	222.9	%		
Effective Intersection Capacity	3552	veh/h		
Control Delay (Total)	0.56	veh-h/h	0.67	pers-h/h
Control Delay (Average)	1.9	sec	1.9	sec
Control Delay (Worst Lane)	12.4	sec		
Control Delay (Worst Movement)	15.1	sec	15.1	sec
Geometric Delay (Average)	1.1	sec		
Stop-Line Delay (Average)	0.8	sec		
Idling Time (Average)	0.4	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.5	veh		
95% Back of Queue - Distance (Worst Lane)	3.7	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	144	veh/h	172	pers/h
Effective Stop Rate	0.13	per veh	0.13	per pers
Proportion Queued	0.11		0.11	
Performance Index	21.7		21.7	
Cost (Total)	428.91	$/h	428.91	$/h
Fuel Consumption (Total)	74.2	L/h		
Carbon Dioxide (Total)	175.5	kg/h		
Hydrocarbons (Total)	0.013	kg/h		
Carbon Monoxide (Total)	0.214	kg/h		
NOx (Total)	0.163	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	517,390	veh/y	620,867	pers/y
Delay	269	veh-h/y	323	pers-h/y
Effective Stops	68,973	veh/y	82,768	pers/y
Travel Distance	523,127	veh-km/y	627,752	pers-km/y
Travel Time	9,043	veh-h/y	10,851	pers-h/y
Cost	205,878	$/y	205,878	$/y
Fuel Consumption	35,625	L/y		
Carbon Dioxide	84,250	kg/y		
Hydrocarbons	6	kg/y		
Carbon Monoxide	103	kg/y		
NOx	78	kg/y		

MOVEMENT SUMMARY

Site: [Mooringe Ave post Am]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Streeters Rd (S)											
1	L2	2	0.0	0.038	6.7	LOS A	0.1	0.8	0.65	0.82	48.7
2	T1	2	0.0	0.038	11.7	LOS B	0.1	0.8	0.65	0.82	48.9
3	R2	11	2.0	0.038	13.7	LOS B	0.1	0.8	0.65	0.82	48.2
Approach		15	1.4	0.038	12.4	LOS B	0.1	0.8	0.65	0.82	48.3
East: Mooringe Avenue (E)											
4	L2	1	0.0	0.214	9.0	LOS A	0.5	3.2	0.15	0.06	57.2
5	T1	352	2.0	0.214	0.6	LOS A	0.5	3.2	0.15	0.06	58.8
6	R2	32	2.0	0.214	9.0	LOS A	0.5	3.2	0.15	0.06	56.5
Approach		384	2.0	0.214	1.3	NA	0.5	3.2	0.15	0.06	58.6
North: Streeters Rd (N)											
7	L2	26	2.0	0.158	7.8	LOS A	0.5	3.7	0.65	0.83	48.7
8	T1	1	0.0	0.158	11.5	LOS B	0.5	3.7	0.65	0.83	49.0
9	R2	42	2.0	0.158	15.1	LOS C	0.5	3.7	0.65	0.83	48.5
Approach		69	2.0	0.158	12.3	LOS B	0.5	3.7	0.65	0.83	48.6
West: Mooringe Avenue (W)											
10	L2	87	2.0	0.303	5.6	LOS A	0.0	0.1	0.00	0.09	57.5
11	T1	521	2.0	0.303	0.0	LOS A	0.0	0.1	0.00	0.09	59.2
12	R2	1	0.0	0.303	7.3	LOS A	0.0	0.1	0.00	0.09	57.2
Approach		609	2.0	0.303	0.8	NA	0.0	0.1	0.00	0.09	58.9
All Vehicles		1078	2.0	0.303	1.9	NA	0.5	3.7	0.11	0.13	57.9

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.

LANE SUMMARY

Site: [Mooringe Ave post Am]

Giveway / Yield (Two-Way)

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	HV						Veh	Dist				
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: Streeters Rd (S)													
Lane 1	15	1.4	392	0.038	100	12.4	LOS B	0.1	0.8	Full	500	0.0	0.0
Approach	15	1.4		0.038		12.4	LOS B	0.1	0.8				
East: Mooringe Avenue (E)													
Lane 1	384	2.0	1796	0.214	100	1.3	LOS A	0.5	3.2	Full	500	0.0	0.0
Approach	384	2.0		0.214		1.3	NA	0.5	3.2				
North: Streeters Rd (N)													
Lane 1	69	2.0	439	0.158	100	12.3	LOS B	0.5	3.7	Full	500	0.0	0.0
Approach	69	2.0		0.158		12.3	LOS B	0.5	3.7				
West: Mooringe Avenue (W)													
Lane 1	609	2.0	2008	0.303	100	0.8	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	609	2.0		0.303		0.8	NA	0.0	0.1				
Intersection	1078	2.0		0.303		1.9	NA	0.5	3.7				

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

LANE FLOWS

Site: [Mooringe Ave post Am]

Giveway / Yield (Two-Way)

Approach Lane Flows (veh/h)

South: Streeters Rd (S)

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	2	2	11	15	1.4	392	0.038	100	NA	NA
Approach	2	2	11	15	1.4		0.038			

East: Mooringe Avenue (E)

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	352	32	384	2.0	1796	0.214	100	NA	NA
Approach	1	352	32	384	2.0		0.214			

North: Streeters Rd (N)

Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	26	1	42	69	2.0	439	0.158	100	NA	NA
Approach	26	1	42	69	2.0		0.158			

West: Mooringe Avenue (W)

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	87	521	1	609	2.0	2008	0.303	100	NA	NA
Approach	87	521	1	609	2.0		0.303			

	Total	%HV	Deg.Satn (v/c)
Intersection	1078	2.0	0.303

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

LANE LEVEL OF SERVICE

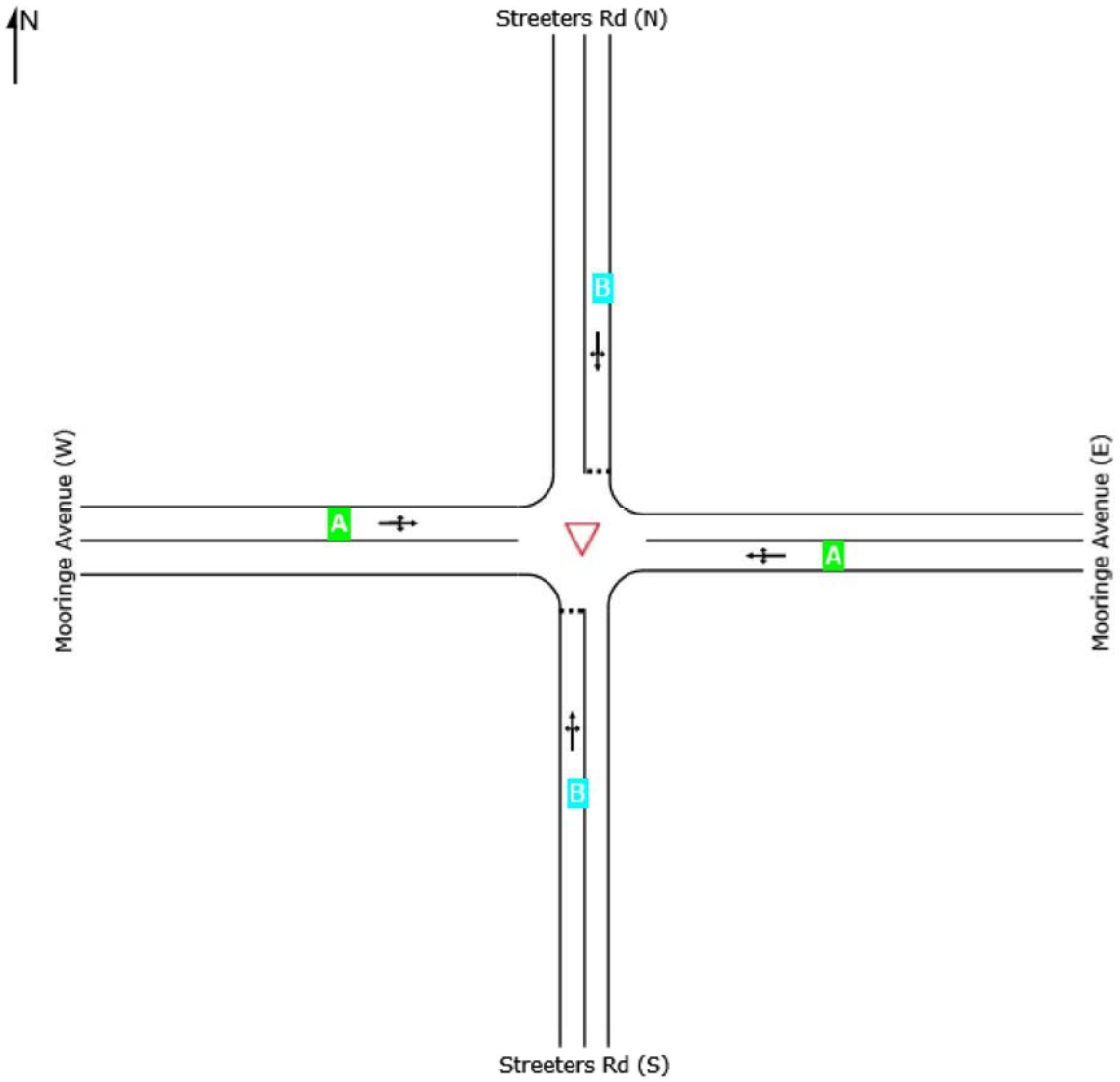
Lane Level of Service

Site: [Mooringe Ave post Am]

Giveway / Yield (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
LOS	B	NA	B	NA	NA



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

DELAY (CONTROL)

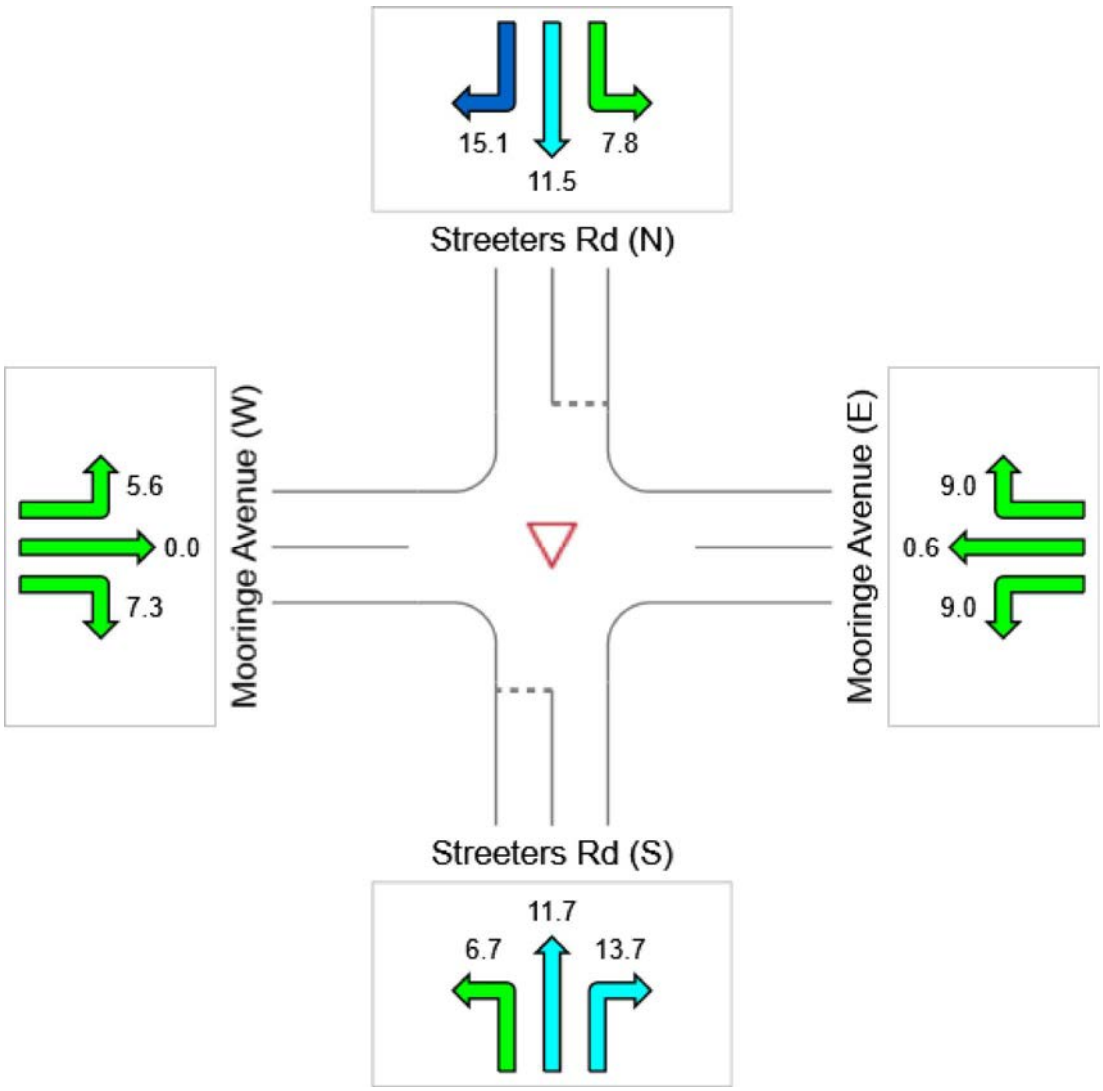
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: [Mooringe Ave post Am]

Giveway / Yield (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
Delay (Control)	12.4	1.3	12.3	0.8	1.9
LOS	B	NA	B	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab). SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

INTERSECTION SUMMARY

Site: [Mooringe Ave & New development AM]

Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	57.0	km/h	57.0	km/h
Travel Distance (Total)	1207.1	veh-km/h	1448.6	pers-km/h
Travel Time (Total)	21.2	veh-h/h	25.4	pers-h/h
Demand Flows (Total)	958	veh/h	1149	pers/h
Percent Heavy Vehicles (Demand)	1.9	%		
Degree of Saturation	0.272			
Practical Spare Capacity	259.7	%		
Effective Intersection Capacity	3516	veh/h		
Control Delay (Total)	0.70	veh-h/h	0.84	pers-h/h
Control Delay (Average)	2.6	sec	2.6	sec
Control Delay (Worst Lane)	7.7	sec		
Control Delay (Worst Movement)	8.4	sec	8.4	sec
Geometric Delay (Average)	2.5	sec		
Stop-Line Delay (Average)	0.2	sec		
Idling Time (Average)	0.1	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.2	veh		
95% Back of Queue - Distance (Worst Lane)	1.3	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	249	veh/h	299	pers/h
Effective Stop Rate	0.26	per veh	0.26	per pers
Proportion Queued	0.00		0.00	
Performance Index	22.5		22.5	
Cost (Total)	481.78	$/h	481.78	$/h
Fuel Consumption (Total)	85.1	L/h		
Carbon Dioxide (Total)	201.2	kg/h		
Hydrocarbons (Total)	0.015	kg/h		
Carbon Monoxide (Total)	0.240	kg/h		
NOx (Total)	0.189	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	459,790	veh/y	551,747	pers/y
Delay	336	veh-h/y	403	pers-h/y
Effective Stops	119,618	veh/y	143,542	pers/y
Travel Distance	579,426	veh-km/y	695,311	pers-km/y
Travel Time	10,169	veh-h/y	12,203	pers-h/y
Cost	231,256	$/y	231,256	$/y
Fuel Consumption	40,855	L/y		
Carbon Dioxide	96,592	kg/y		
Hydrocarbons	7	kg/y		
Carbon Monoxide	115	kg/y		
NOx	91	kg/y		

MOVEMENT SUMMARY

Site: [Mooringe Ave & New development AM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Access point 1											
1	L2	6	0.0	0.056	4.6	LOS A	0.2	1.3	0.03	0.56	44.8
3	R2	32	0.0	0.056	8.4	LOS A	0.2	1.3	0.03	0.56	45.4
Approach		38	0.0	0.056	7.7	LOS A	0.2	1.3	0.03	0.56	45.3
East: Mooringe Ave											
4	L2	394	2.0	0.217	5.6	LOS A	0.0	0.0	0.00	0.57	54.7
5	T1	3	0.0	0.217	0.0	LOS A	0.0	0.0	0.00	0.57	55.9
Approach		397	2.0	0.217	5.6	NA	0.0	0.0	0.00	0.57	54.7
West: Mooringe Ave											
11	T1	521	2.0	0.272	0.0	LOS A	0.0	0.2	0.01	0.00	60.0
12	R2	2	0.0	0.272	7.5	LOS A	0.0	0.2	0.01	0.00	57.7
Approach		523	2.0	0.272	0.0	NA	0.0	0.2	0.01	0.00	60.0
All Vehicles		958	1.9	0.272	2.6	NA	0.2	1.3	0.00	0.26	57.0

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.

LANE SUMMARY

Site: [Mooringe Ave & New development AM]

Giveway / Yield (Two-Way)

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: Access point 1													
Lane 1	38	0.0	679	0.056	100	7.7	LOS A	0.2	1.3	Full	500	0.0	0.0
Approach	38	0.0		0.056		7.7	LOS A	0.2	1.3				
East: Mooringe Ave													
Lane 1	397	2.0	1832	0.217	100	5.6	LOS A	0.0	0.0	Full	750	0.0	0.0
Approach	397	2.0		0.217		5.6	NA	0.0	0.0				
West: Mooringe Ave													
Lane 1	523	2.0	1920	0.272	100	0.0	LOS A	0.0	0.2	Full	500	0.0	0.0
Approach	523	2.0		0.272		0.0	NA	0.0	0.2				
Intersection	958	1.9		0.272		2.6	NA	0.2	1.3				

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

LANE FLOWS

Site: [Mooringe Ave & New development AM]

Giveway / Yield (Two-Way)

Approach Lane Flows (veh/h)									
South: Access point 1									
Mov. From S To Exit:	L2 W	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	6	32	38	0.0	679	0.056	100	NA	NA
Approach	6	32	38	0.0		0.056			
East: Mooringe Ave									
Mov. From E To Exit:	L2 S	T1 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	394	3	397	2.0	1832	0.217	100	NA	NA
Approach	394	3	397	2.0		0.217			
West: Mooringe Ave									
Mov. From W To Exit:	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	521	2	523	2.0	1920	0.272	100	NA	NA
Approach	521	2	523	2.0		0.272			
	Total	%HV	Deg.Satn (v/c)						
Intersection	958	1.9		0.272					

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

LANE LEVEL OF SERVICE

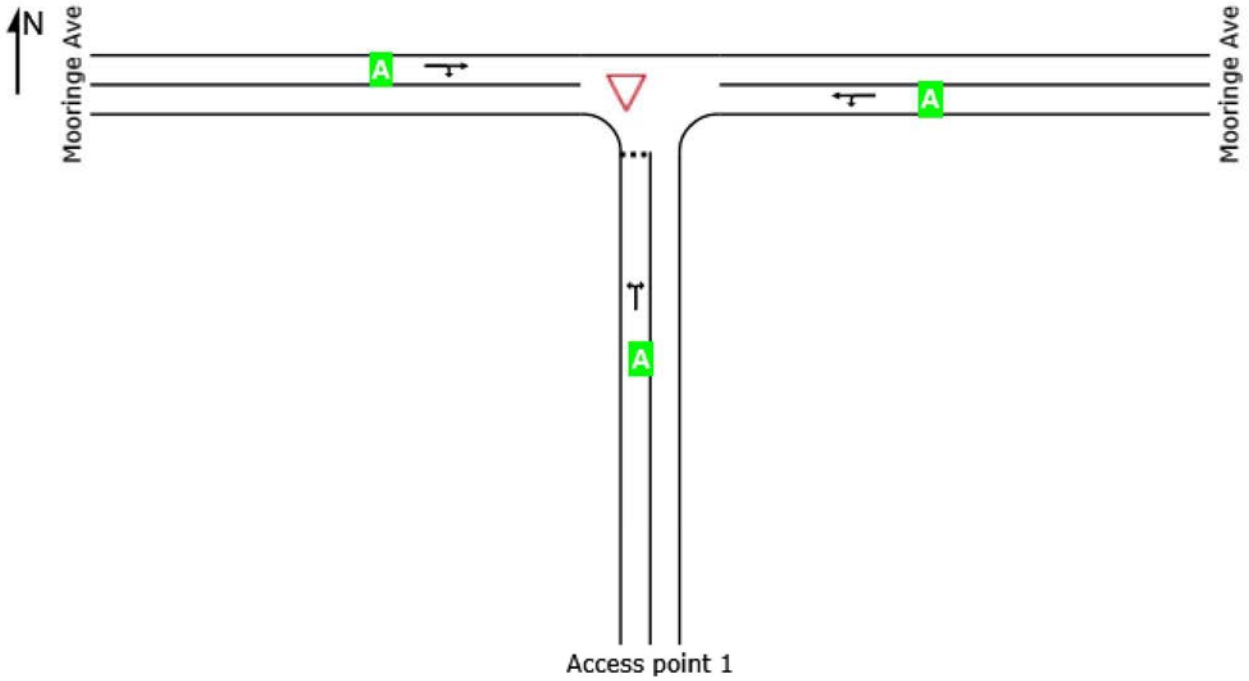
Lane Level of Service

Site: [Mooringe Ave & New development AM]

Giveway / Yield (Two-Way)

All Movement Classes

	South	East	West	Intersection
LOS	A	NA	NA	NA



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

DELAY (CONTROL)

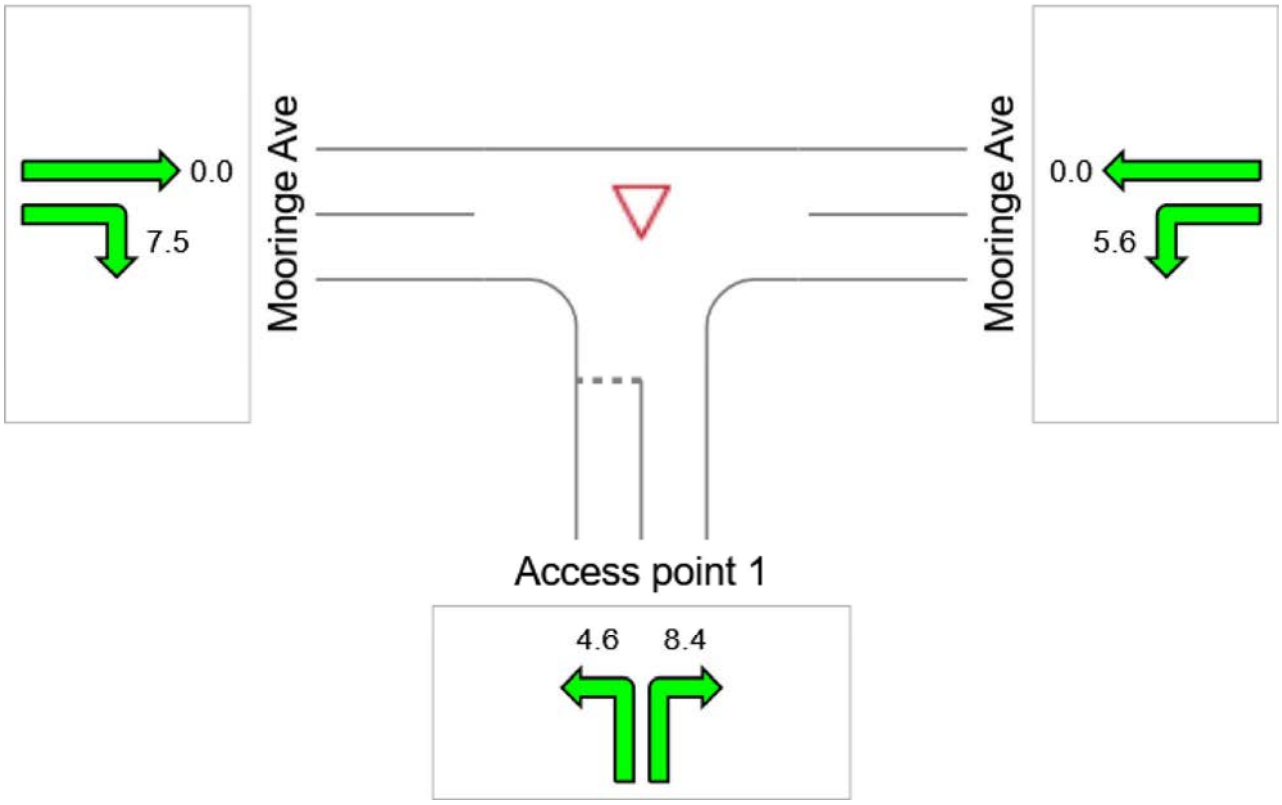
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: [Mooringe Ave & New development AM]

Giveway / Yield (Two-Way)

All Movement Classes

	South	East	West	Intersection
Delay (Control)	7.7	5.6	0.0	2.6
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab). SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

INTERSECTION SUMMARY

Site: [Mooringe Ave post Pm]

Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	57.6	km/h	57.6	km/h
Travel Distance (Total)	1089.8	veh-km/h	1307.8	pers-km/h
Travel Time (Total)	18.9	veh-h/h	22.7	pers-h/h
Demand Flows (Total)	1078	veh/h	1293	pers/h
Percent Heavy Vehicles (Demand)	2.0	%		
Degree of Saturation	0.292			
Practical Spare Capacity	180.0	%		
Effective Intersection Capacity	3693	veh/h		
Control Delay (Total)	0.64	veh-h/h	0.77	pers-h/h
Control Delay (Average)	2.1	sec	2.1	sec
Control Delay (Worst Lane)	13.6	sec		
Control Delay (Worst Movement)	15.8	sec	15.8	sec
Geometric Delay (Average)	1.1	sec		
Stop-Line Delay (Average)	1.1	sec		
Idling Time (Average)	0.6	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	1.1	veh		
95% Back of Queue - Distance (Worst Lane)	7.7	m		
Queue Storage Ratio (Worst Lane)	0.01			
Total Effective Stops	154	veh/h	185	pers/h
Effective Stop Rate	0.14	per veh	0.14	per pers
Proportion Queued	0.12		0.12	
Performance Index	22.8		22.8	
Cost (Total)	430.91	$/h	430.91	$/h
Fuel Consumption (Total)	74.2	L/h		
Carbon Dioxide (Total)	175.4	kg/h		
Hydrocarbons (Total)	0.013	kg/h		
Carbon Monoxide (Total)	0.214	kg/h		
NOx (Total)	0.162	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	517,390	veh/y	620,867	pers/y
Delay	308	veh-h/y	370	pers-h/y
Effective Stops	74,145	veh/y	88,974	pers/y
Travel Distance	523,100	veh-km/y	627,721	pers-km/y
Travel Time	9,086	veh-h/y	10,903	pers-h/y
Cost	206,835	$/y	206,835	$/y
Fuel Consumption	35,594	L/y		
Carbon Dioxide	84,177	kg/y		
Hydrocarbons	6	kg/y		
Carbon Monoxide	103	kg/y		
NOx	78	kg/y		

MOVEMENT SUMMARY

Site: [Mooringe Ave post Pm]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Streeters Rd (S)											
1	L2	1	0.0	0.007	7.5	LOS A	0.0	0.1	0.61	0.70	50.0
2	T1	1	0.0	0.007	10.6	LOS B	0.0	0.1	0.61	0.70	50.2
3	R2	1	0.0	0.007	13.3	LOS B	0.0	0.1	0.61	0.70	49.5
Approach		3	0.0	0.007	10.5	LOS B	0.0	0.1	0.61	0.70	49.9
East: Mooringe Avenue (E)											
4	L2	11	2.0	0.292	7.3	LOS A	0.3	2.4	0.08	0.04	57.6
5	T1	521	2.0	0.292	0.2	LOS A	0.3	2.4	0.08	0.04	59.3
6	R2	26	2.0	0.292	7.6	LOS A	0.3	2.4	0.08	0.04	57.0
Approach		558	2.0	0.292	0.6	NA	0.3	2.4	0.08	0.04	59.2
North: Streeters Rd (N)											
7	L2	32	2.0	0.286	7.6	LOS A	1.1	7.7	0.66	0.86	47.9
8	T1	2	0.0	0.286	12.4	LOS B	1.1	7.7	0.66	0.86	48.1
9	R2	87	2.0	0.286	15.8	LOS C	1.1	7.7	0.66	0.86	47.7
Approach		121	2.0	0.286	13.6	LOS B	1.1	7.7	0.66	0.86	47.7
West: Mooringe Avenue (W)											
10	L2	42	2.0	0.198	5.7	LOS A	0.0	0.3	0.01	0.07	57.6
11	T1	352	2.0	0.198	0.0	LOS A	0.0	0.3	0.01	0.07	59.3
12	R2	2	0.0	0.198	8.2	LOS A	0.0	0.3	0.01	0.07	57.3
Approach		396	2.0	0.198	0.7	NA	0.0	0.3	0.01	0.07	59.1
All Vehicles		1078	2.0	0.292	2.1	NA	1.1	7.7	0.12	0.14	57.6

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.

LANE SUMMARY

Site: [Mooringe Ave post Pm]

Giveway / Yield (Two-Way)

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	HV						Veh	Dist				
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: Streeters Rd (S)													
Lane 1	3	0.0	482	0.007	100	10.5	LOS B	0.0	0.1	Full	500	0.0	0.0
Approach	3	0.0		0.007		10.5	LOS B	0.0	0.1				
East: Mooringe Avenue (E)													
Lane 1	558	2.0	1911	0.292	100	0.6	LOS A	0.3	2.4	Full	500	0.0	0.0
Approach	558	2.0		0.292		0.6	NA	0.3	2.4				
North: Streeters Rd (N)													
Lane 1	121	2.0	424	0.286	100	13.6	LOS B	1.1	7.7	Full	500	0.0	0.0
Approach	121	2.0		0.286		13.6	LOS B	1.1	7.7				
West: Mooringe Avenue (W)													
Lane 1	396	2.0	2004	0.198	100	0.7	LOS A	0.0	0.3	Full	500	0.0	0.0
Approach	396	2.0		0.198		0.7	NA	0.0	0.3				
Intersection	1078	2.0		0.292		2.1	NA	1.1	7.7				

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

LANE FLOWS

Site: [Mooringe Ave post Pm]

Giveway / Yield (Two-Way)

Approach Lane Flows (veh/h)										
South: Streeters Rd (S)										
Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	1	1	3	0.0	482	0.007	100	NA	NA
Approach	1	1	1	3	0.0		0.007			
East: Mooringe Avenue (E)										
Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	521	26	558	2.0	1911	0.292	100	NA	NA
Approach	11	521	26	558	2.0		0.292			
North: Streeters Rd (N)										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	32	2	87	121	2.0	424	0.286	100	NA	NA
Approach	32	2	87	121	2.0		0.286			
West: Mooringe Avenue (W)										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	42	352	2	396	2.0	2004	0.198	100	NA	NA
Approach	42	352	2	396	2.0		0.198			
	Total	%HV	Deg.Satn (v/c)							
Intersection	1078	2.0	0.292							

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

LANE LEVEL OF SERVICE

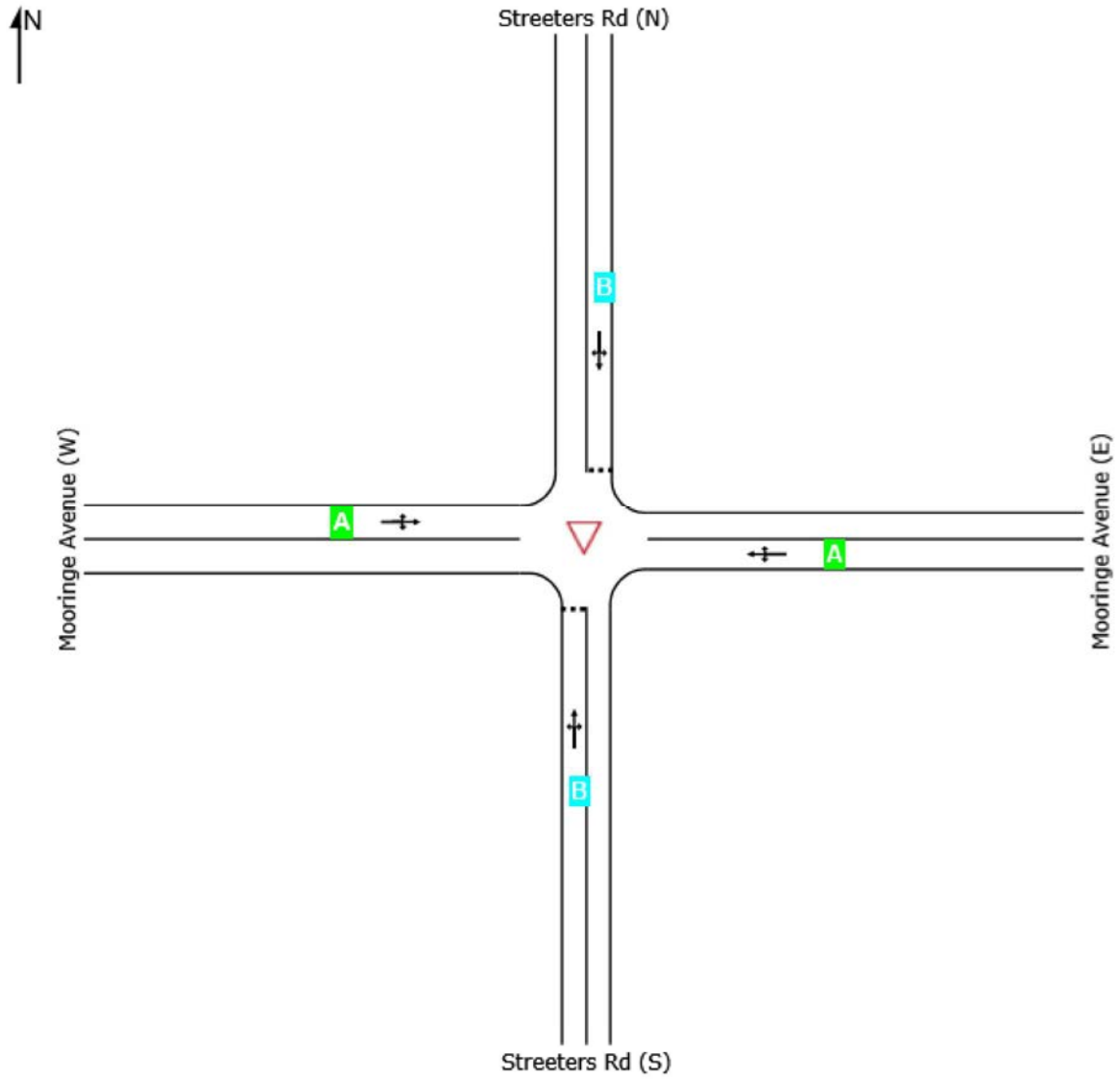
Lane Level of Service

Site: [Mooringe Ave post Pm]

Giveway / Yield (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
LOS	B	NA	B	NA	NA



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

DELAY (CONTROL)

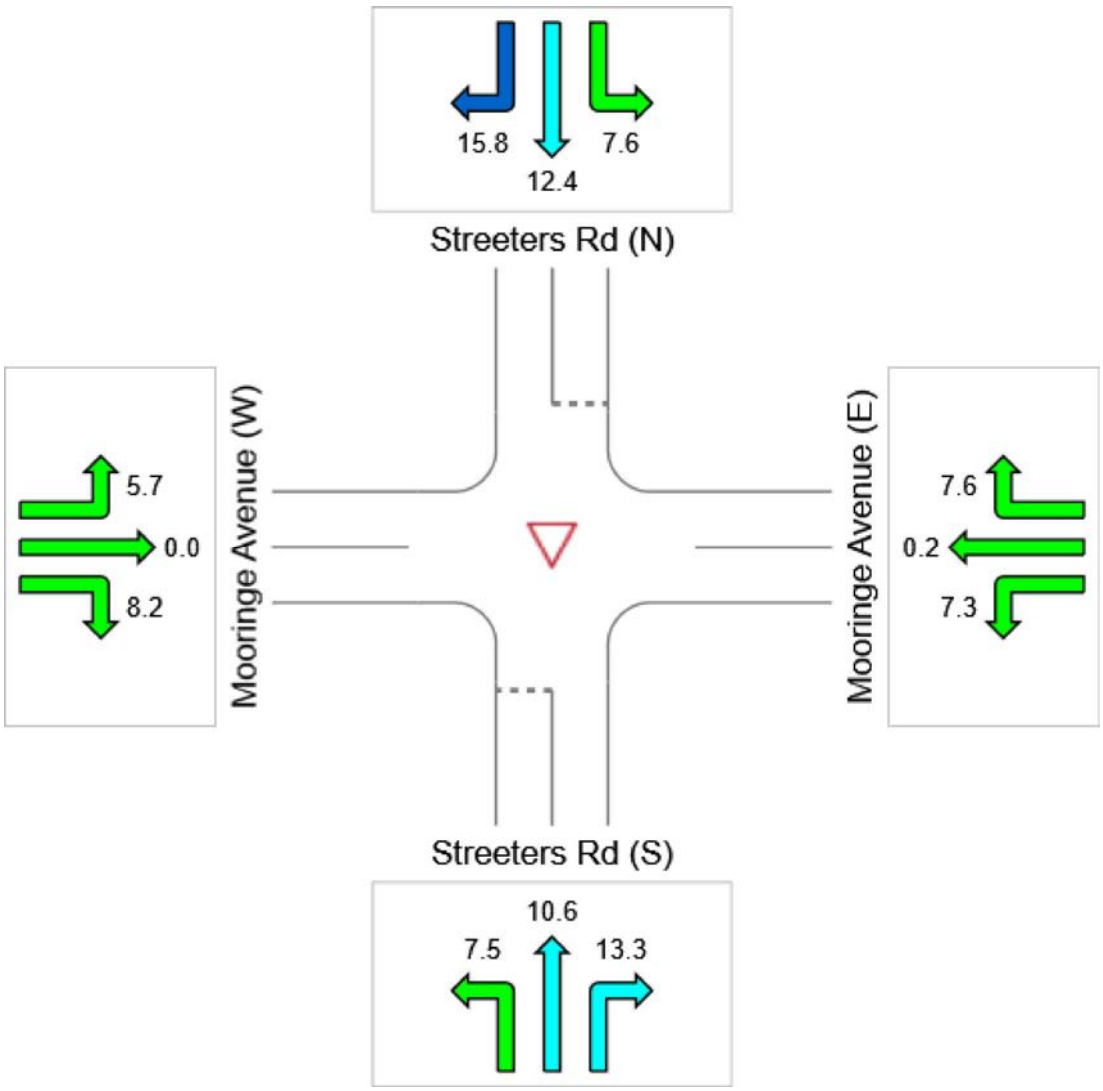
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: [Mooringe Ave post Pm]

Giveway / Yield (Two-Way)

All Movement Classes

	South	East	North	West	Intersection
Delay (Control)	10.5	0.6	13.6	0.7	2.1
LOS	B	NA	B	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab). SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

INTERSECTION SUMMARY

Site: [Mooringe Ave & New development PM]

Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	56.6	km/h	56.6	km/h
Travel Distance (Total)	1187.0	veh-km/h	1424.4	pers-km/h
Travel Time (Total)	21.0	veh-h/h	25.2	pers-h/h
Demand Flows (Total)	941	veh/h	1129	pers/h
Percent Heavy Vehicles (Demand)	1.9	%		
Degree of Saturation	0.315			
Practical Spare Capacity	211.0	%		
Effective Intersection Capacity	2986	veh/h		
Control Delay (Total)	0.89	veh-h/h	1.06	pers-h/h
Control Delay (Average)	3.4	sec	3.4	sec
Control Delay (Worst Lane)	6.8	sec		
Control Delay (Worst Movement)	8.5	sec	8.5	sec
Geometric Delay (Average)	3.3	sec		
Stop-Line Delay (Average)	0.1	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.1	veh		
95% Back of Queue - Distance (Worst Lane)	0.6	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	322	veh/h	387	pers/h
Effective Stop Rate	0.34	per veh	0.34	per pers
Proportion Queued	0.01		0.01	
Performance Index	22.6		22.6	
Cost (Total)	522.70	$/h	522.70	$/h
Fuel Consumption (Total)	87.7	L/h		
Carbon Dioxide (Total)	207.3	kg/h		
Hydrocarbons (Total)	0.016	kg/h		
Carbon Monoxide (Total)	0.247	kg/h		
NOx (Total)	0.205	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	451,705	veh/y	542,046	pers/y
Delay	426	veh-h/y	511	pers-h/y
Effective Stops	154,798	veh/y	185,758	pers/y
Travel Distance	569,767	veh-km/y	683,721	pers-km/y
Travel Time	10,065	veh-h/y	12,078	pers-h/y
Cost	250,894	$/y	250,894	$/y
Fuel Consumption	42,104	L/y		
Carbon Dioxide	99,503	kg/y		
Hydrocarbons	8	kg/y		
Carbon Monoxide	118	kg/y		
NOx	99	kg/y		

MOVEMENT SUMMARY

Site: [Mooringe Ave & New development PM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Access point 1											
1	L2	1	0.0	0.005	4.6	LOS A	0.0	0.1	0.14	0.56	45.3
3	R2	3	0.0	0.005	7.5	LOS A	0.0	0.1	0.14	0.56	45.8
Approach		4	0.0	0.005	6.8	LOS A	0.0	0.1	0.14	0.56	45.7
East: Mooringe Ave											
4	L2	547	2.0	0.315	5.6	LOS A	0.0	0.0	0.00	0.55	54.9
5	T1	32	0.0	0.315	0.1	LOS A	0.0	0.0	0.00	0.55	56.1
Approach		579	1.9	0.315	5.3	NA	0.0	0.0	0.00	0.55	54.9
West: Mooringe Ave											
11	T1	352	2.0	0.189	0.1	LOS A	0.1	0.6	0.03	0.01	59.8
12	R2	6	0.0	0.189	8.5	LOS A	0.1	0.6	0.03	0.01	57.5
Approach		358	2.0	0.189	0.2	NA	0.1	0.6	0.03	0.01	59.8
All Vehicles		941	1.9	0.315	3.4	NA	0.1	0.6	0.01	0.34	56.6

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.

LANE SUMMARY

Site: [Mooringe Ave & New development PM]

Giveway / Yield (Two-Way)

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: Access point 1													
Lane 1	4	0.0	789	0.005	100	6.8	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	4	0.0		0.005		6.8	LOS A	0.0	0.1				
East: Mooringe Ave													
Lane 1	579	1.9	1837	0.315	100	5.3	LOS A	0.0	0.0	Full	750	0.0	0.0
Approach	579	1.9		0.315		5.3	NA	0.0	0.0				
West: Mooringe Ave													
Lane 1	358	2.0	1892	0.189	100	0.2	LOS A	0.1	0.6	Full	500	0.0	0.0
Approach	358	2.0		0.189		0.2	NA	0.1	0.6				
Intersection	941	1.9		0.315		3.4	NA	0.1	0.6				

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

LANE FLOWS

Site: [Mooringe Ave & New development PM]

Giveway / Yield (Two-Way)

Approach Lane Flows (veh/h)									
South: Access point 1									
Mov. From S To Exit:	L2 W	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	3	4	0.0	789	0.005	100	NA	NA
Approach	1	3	4	0.0		0.005			
East: Mooringe Ave									
Mov. From E To Exit:	L2 S	T1 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	547	32	579	1.9	1837	0.315	100	NA	NA
Approach	547	32	579	1.9		0.315			
West: Mooringe Ave									
Mov. From W To Exit:	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	352	6	358	2.0	1892	0.189	100	NA	NA
Approach	352	6	358	2.0		0.189			
	Total	%HV	Deg.Satn (v/c)						
Intersection	941	1.9		0.315					

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

LANE LEVEL OF SERVICE

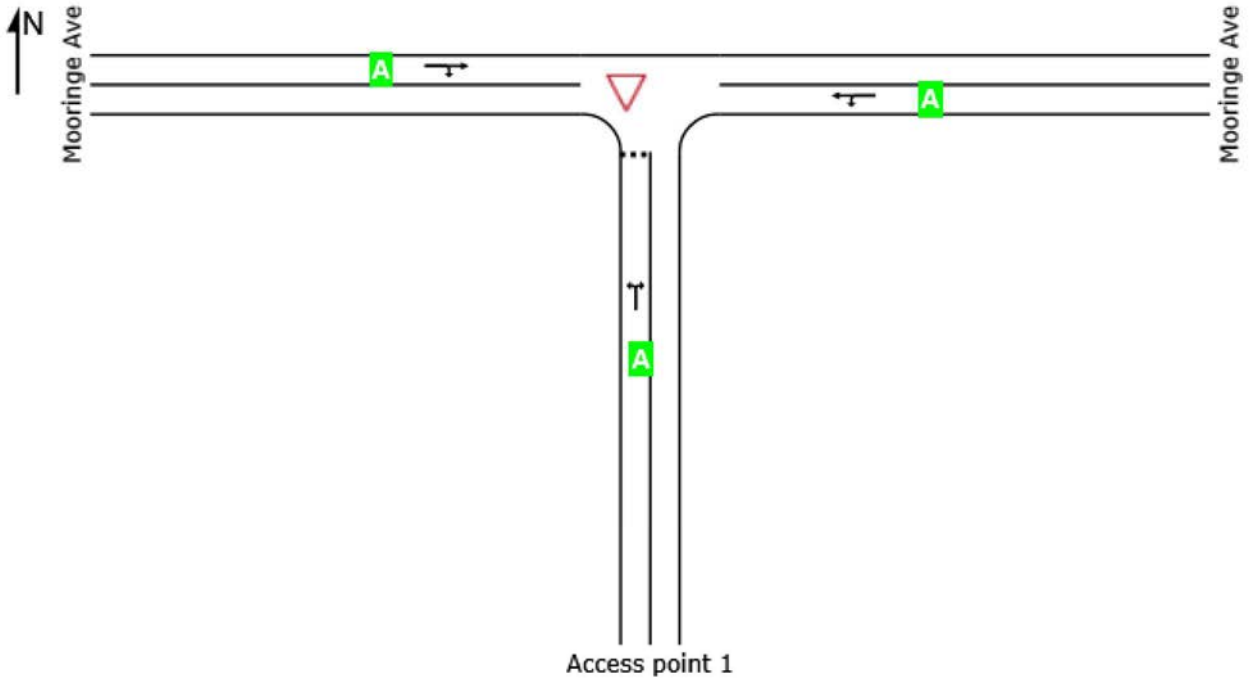
Lane Level of Service

Site: [Mooringe Ave & New development PM]

Giveway / Yield (Two-Way)

All Movement Classes

	South	East	West	Intersection
LOS	A	NA	NA	NA



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

DELAY (CONTROL)

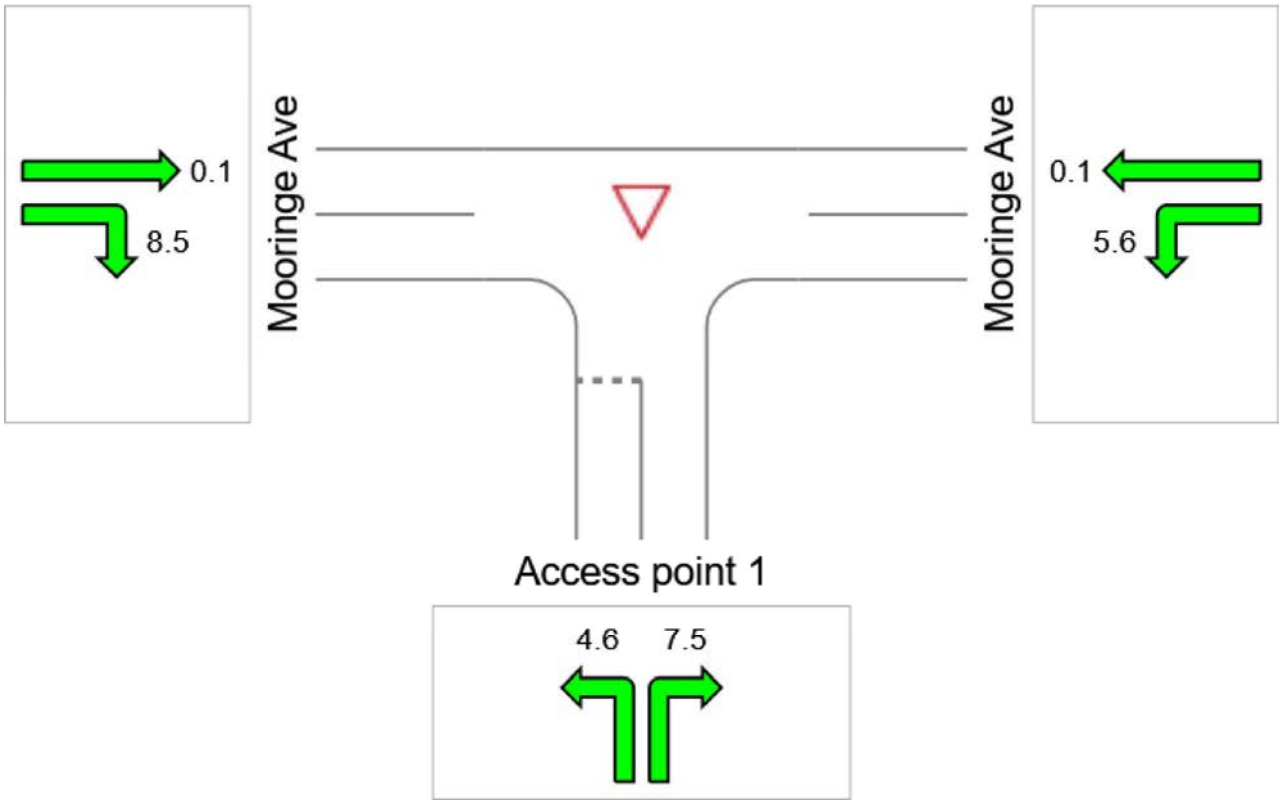
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: [Mooringe Ave & New development PM]

Giveway / Yield (Two-Way)

All Movement Classes

	South	East	West	Intersection
Delay (Control)	6.8	5.3	0.2	3.4
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab). SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

INTERSECTION SUMMARY

Site: [Mooringe & marion Rd Future Am]

Three-way intersection with "Seagull" treatment (Signals)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	34.1	km/h	34.1	km/h
Travel Distance (Total)	2538.7	veh-km/h	3046.4	pers-km/h
Travel Time (Total)	74.4	veh-h/h	89.3	pers-h/h
Demand Flows (Total)	3561	veh/h	4273	pers/h
Percent Heavy Vehicles (Demand)	4.9	%		
Degree of Saturation	0.869			
Practical Spare Capacity	3.5	%		
Effective Intersection Capacity	4096	veh/h		
Control Delay (Total)	31.49	veh-h/h	37.78	pers-h/h
Control Delay (Average)	31.8	sec	31.8	sec
Control Delay (Worst Lane)	64.9	sec		
Control Delay (Worst Movement)	64.9	sec	64.9	sec
Geometric Delay (Average)	1.8	sec		
Stop-Line Delay (Average)	30.1	sec		
Idling Time (Average)	26.1	sec		
Intersection Level of Service (LOS)	LOS C			
95% Back of Queue - Vehicles (Worst Lane)	45.7	veh		
95% Back of Queue - Distance (Worst Lane)	329.5	m		
Queue Storage Ratio (Worst Lane)	1.05			
Total Effective Stops	2763	veh/h	3316	pers/h
Effective Stop Rate	0.78	per veh	0.78	per pers
Proportion Queued	0.80		0.80	
Performance Index	281.5		281.5	
Cost (Total)	2393.76	$/h	2393.76	$/h
Fuel Consumption (Total)	313.8	L/h		
Carbon Dioxide (Total)	746.1	kg/h		
Hydrocarbons (Total)	0.068	kg/h		
Carbon Monoxide (Total)	0.786	kg/h		
NOx (Total)	1.565	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	1,709,305	veh/y	2,051,167	pers/y
Delay	15,113	veh-h/y	18,135	pers-h/y
Effective Stops	1,326,271	veh/y	1,591,525	pers/y
Travel Distance	1,218,563	veh-km/y	1,462,276	pers-km/y
Travel Time	35,733	veh-h/y	42,879	pers-h/y
Cost	1,149,002	$/y	1,149,002	$/y
Fuel Consumption	150,638	L/y		
Carbon Dioxide	358,150	kg/y		
Hydrocarbons	33	kg/y		
Carbon Monoxide	377	kg/y		
NOx	751	kg/y		

MOVEMENT SUMMARY

Site: [Mooringe & marion Rd Future Am]

Three-way intersection with "Seagull" treatment (Signals)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles												
Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Marion Rd (S)											
4	L2	105	6.0	0.853	37.2	LOS D	45.7	329.5	0.95	0.91	33.2
5	T1	1554	3.2	0.853	31.9	LOS C	45.7	329.5	0.95	0.91	32.6
Approach		1659	3.4	0.853	32.2	LOS C	45.7	329.5	0.95	0.91	32.7
North: Marion Rd (N)											
11	T1	899	5.0	0.331	5.9	LOS A	9.1	66.5	0.38	0.34	52.0
12	R2	277	10.3	0.691	53.3	LOS D	14.3	108.8	0.97	1.02	30.4
Approach		1176	6.3	0.691	17.1	LOS B	14.3	108.8	0.52	0.50	42.5
West: Mooringe Ave (W)											
1	L2	481	6.1	0.869	49.6	LOS D	27.8	204.9	0.90	0.92	31.5
3	R2	245	6.9	0.831	64.9	LOS E	15.3	113.8	1.00	0.92	23.2
Approach		726	6.4	0.869	54.8	LOS D	27.8	204.9	0.93	0.92	28.7
All Vehicles		3561	4.9	0.869	31.8	LOS C	45.7	329.5	0.80	0.78	34.1

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

LANE SUMMARY

Site: [Mooringe & marion Rd Future Am]

Three-way intersection with "Seagull" treatment (Signals)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

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: Marion Rd (S)													
Lane 1	850	3.5	996	0.853	100	32.2	LOS C	45.7	329.5	Full	192	0.0	54.7
Lane 2	809	3.2	948	0.853	100	32.2	LOS C	44.0	316.2	Full	192	0.0	50.9
Approach	1659	3.4		0.853		32.2	LOS C	45.7	329.5				
North: Marion Rd (N)													
Lane 1	452	5.0	1363	0.331	100	5.9	LOS A	9.1	66.5	Full	433	0.0	0.0
Lane 2	447	5.0	1349	0.331	100	5.9	LOS A	9.0	65.8	Full	433	0.0	0.0
Lane 3	277	10.3	401	0.691	100	53.3	LOS D	14.3	108.8	Short	130	0.0	NA
Approach	1176	6.3		0.691		17.1	LOS B	14.3	108.8				
West: Mooringe Ave (W)													
Lane 1	481	6.1	553[1]	0.869	100	49.6	LOS D	27.8	204.9	Short	70	0.0	NA
Lane 2	245	6.9	295	0.831	100	64.9	LOS E	15.3	113.8	Full	500	0.0	0.0
Approach	726	6.4		0.869		54.8	LOS D	27.8	204.9				
Intersection	3561	4.9		0.869		31.8	LOS C	45.7	329.5				

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.

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.

LANE FLOWS

Site: [Mooringe & marion Rd Future Am]

Three-way intersection with "Seagull" treatment (Signals)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Approach Lane Flows (veh/h)

South: Marion Rd (S)

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	105	745	850	3.5	996	0.853	100	NA	NA
Lane 2	-	809	809	3.2	948	0.853	100	NA	NA
Approach	105	1554	1659	3.4		0.853			

North: Marion Rd (N)

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	452	-	452	5.0	1363	0.331	100	NA	NA
Lane 2	447	-	447	5.0	1349	0.331	100	NA	NA
Lane 3	-	277	277	10.3	401	0.691	100	0.0	2
Approach	899	277	1176	6.3		0.691			

West: Mooringe Ave (W)

Mov. From W To Exit:	L2 N	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	481	-	481	6.1	553[1]	0.869	100	100.0	2
Lane 2	-	245	245	6.9	295	0.831	100	NA	NA
Approach	481	245	726	6.4		0.869			

	Total	%HV	Deg.Satn (v/c)
Intersection	3561	4.9	0.869

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

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.

LANE LEVEL OF SERVICE

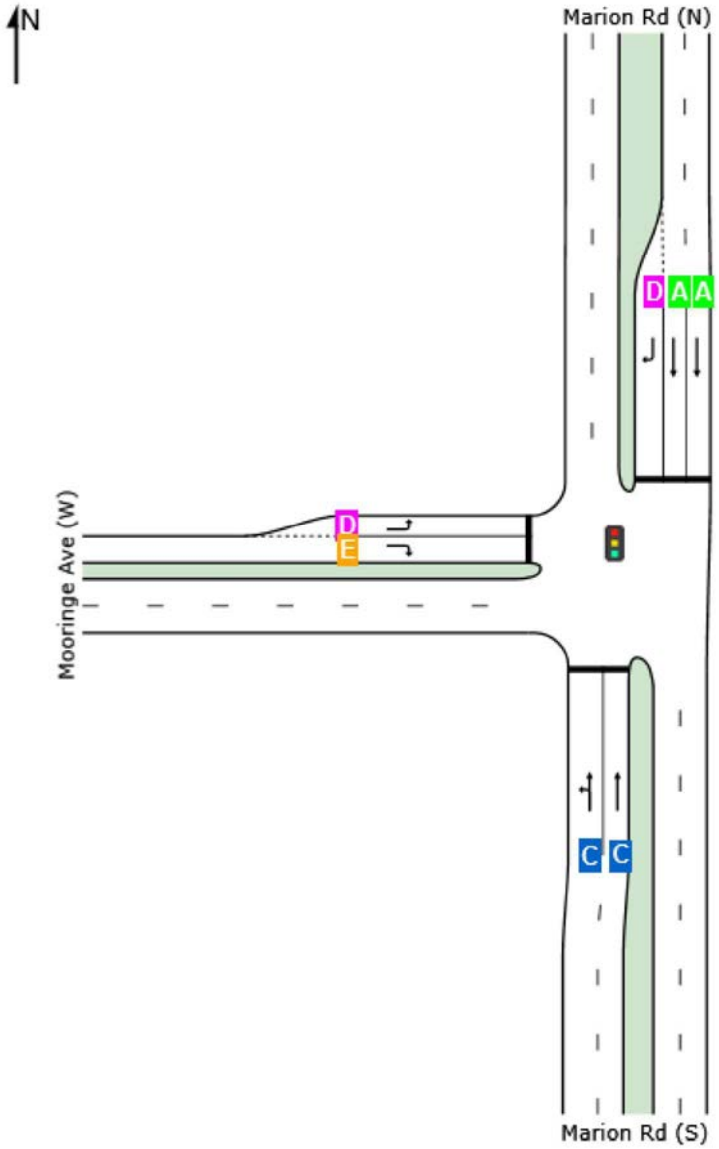
Lane Level of Service

Site: [Mooringe & marion Rd Future Am]

Three-way intersection with "Seagull" treatment (Signals)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

All Movement Classes

	South	North	West	Intersection
LOS	C	B	D	C



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.

DELAY (CONTROL)

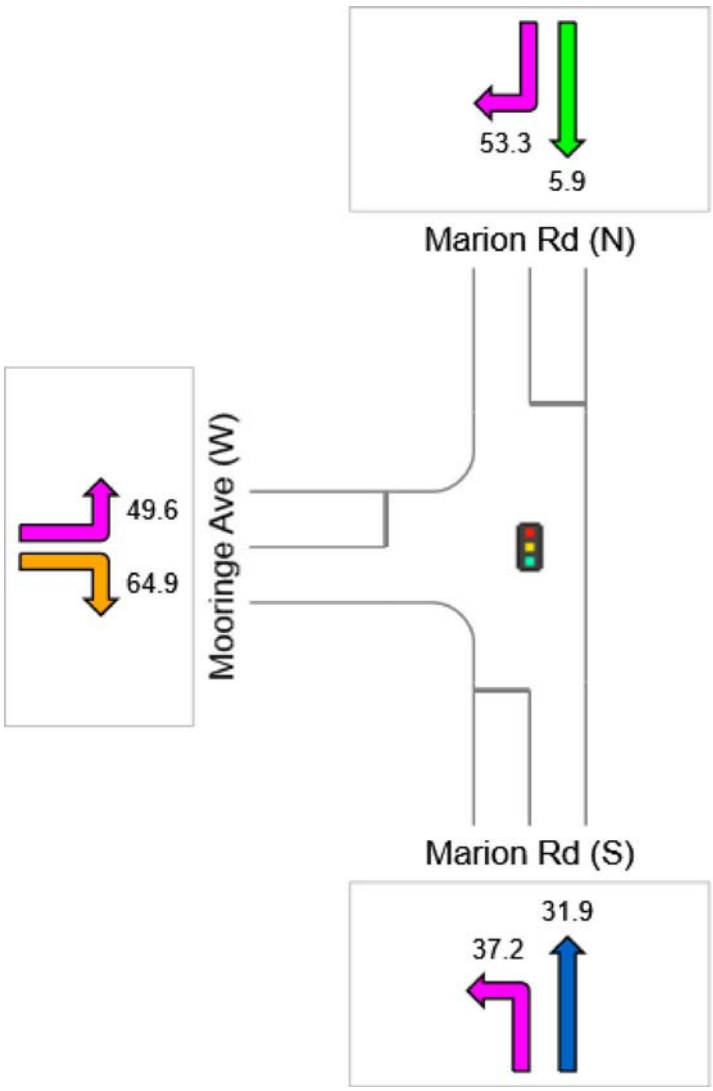
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: [Mooringe & marion Rd Future Am]

Three-way intersection with "Seagull" treatment (Signals)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

All Movement Classes

	South	North	West	Intersection
Delay (Control)	32.2	17.1	54.8	31.8
LOS	C	B	D	C



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

INTERSECTION SUMMARY

Site: [Mooringe & marion Rd Future Pm]

Three-way intersection with "Seagull" treatment (Signals)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	37.9	km/h	37.9	km/h
Travel Distance (Total)	2214.9	veh-km/h	2657.9	pers-km/h
Travel Time (Total)	58.5	veh-h/h	70.2	pers-h/h
Demand Flows (Total)	3165	veh/h	3798	pers/h
Percent Heavy Vehicles (Demand)	4.9	%		
Degree of Saturation	0.737			
Practical Spare Capacity	22.1	%		
Effective Intersection Capacity	4295	veh/h		
Control Delay (Total)	21.05	veh-h/h	25.26	pers-h/h
Control Delay (Average)	23.9	sec	23.9	sec
Control Delay (Worst Lane)	59.7	sec		
Control Delay (Worst Movement)	59.7	sec	59.7	sec
Geometric Delay (Average)	1.6	sec		
Stop-Line Delay (Average)	22.3	sec		
Idling Time (Average)	19.0	sec		
Intersection Level of Service (LOS)	LOS C			
95% Back of Queue - Vehicles (Worst Lane)	29.2	veh		
95% Back of Queue - Distance (Worst Lane)	215.8	m		
Queue Storage Ratio (Worst Lane)	0.69			
Total Effective Stops	2087	veh/h	2504	pers/h
Effective Stop Rate	0.66	per veh	0.66	per pers
Proportion Queued	0.70		0.70	
Performance Index	199.8		199.8	
Cost (Total)	1869.76	$/h	1869.76	$/h
Fuel Consumption (Total)	260.6	L/h		
Carbon Dioxide (Total)	620.4	kg/h		
Hydrocarbons (Total)	0.055	kg/h		
Carbon Monoxide (Total)	0.660	kg/h		
NOx (Total)	1.378	kg/h		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	1,519,327	veh/y	1,823,192	pers/y
Delay	10,106	veh-h/y	12,127	pers-h/y
Effective Stops	1,001,571	veh/y	1,201,886	pers/y
Travel Distance	1,063,145	veh-km/y	1,275,774	pers-km/y
Travel Time	28,078	veh-h/y	33,694	pers-h/y
Cost	897,484	$/y	897,484	$/y
Fuel Consumption	125,081	L/y		
Carbon Dioxide	297,793	kg/y		
Hydrocarbons	26	kg/y		
Carbon Monoxide	317	kg/y		
NOx	661	kg/y		

MOVEMENT SUMMARY

Site: [Mooringe & marion Rd Future Pm]

Three-way intersection with "Seagull" treatment (Signals)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Marion Rd (S)											
4	L2	165	10.8	0.719	34.9	LOS C	29.2	215.8	0.88	0.81	33.8
5	T1	1044	5.0	0.719	29.3	LOS C	29.2	215.8	0.88	0.80	33.8
Approach		1209	5.8	0.719	30.0	LOS C	29.2	215.8	0.88	0.80	33.8
North: Marion Rd (N)											
11	T1	1212	2.1	0.438	6.6	LOS A	13.7	97.7	0.43	0.39	51.2
12	R2	302	9.4	0.557	40.4	LOS D	13.8	104.6	0.89	0.96	34.3
Approach		1514	3.5	0.557	13.4	LOS B	13.8	104.6	0.52	0.50	45.2
West: Mooringe Ave (W)											
1	L2	220	10.0	0.287	27.2	LOS C	7.9	60.4	0.66	0.76	39.6
3	R2	222	3.8	0.737	59.7	LOS E	13.0	93.9	1.00	0.86	24.5
Approach		442	6.9	0.737	43.6	LOS D	13.0	93.9	0.83	0.81	31.3
All Vehicles		3165	4.9	0.737	23.9	LOS C	29.2	215.8	0.70	0.66	37.9

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

LANE SUMMARY

Site: [Mooringe & marion Rd Future Pm]

Three-way intersection with "Seagull" treatment (Signals)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

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: Marion Rd (S)													
Lane 1	615	6.6	855	0.719	100	30.8	LOS C	29.2	215.8	Full	192	0.0	15.6
Lane 2	595	5.0	827	0.719	100	29.3	LOS C	28.3	206.4	Full	192	0.0	11.5
Approach	1209	5.8		0.719		30.0	LOS C	29.2	215.8				
North: Marion Rd (N)													
Lane 1	609	2.1	1389	0.438	100	6.6	LOS A	13.7	97.7	Full	433	0.0	0.0
Lane 2	603	2.1	1374	0.438	100	6.6	LOS A	13.6	96.6	Full	433	0.0	0.0
Lane 3	302	9.4	543	0.557	100	40.4	LOS D	13.8	104.6	Short	130	0.0	NA
Approach	1514	3.5		0.557		13.4	LOS B	13.8	104.6				
West: Mooringe Ave (W)													
Lane 1	220	10.0	765	0.287	100	27.2	LOS C	7.9	60.4	Short	70	0.0	NA
Lane 2	222	3.8	301	0.737	100	59.7	LOS E	13.0	93.9	Full	500	0.0	0.0
Approach	442	6.9		0.737		43.6	LOS D	13.0	93.9				
Intersection	3165	4.9		0.737		23.9	LOS C	29.2	215.8				

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

LANE FLOWS

Site: [Mooringe & marion Rd Future Pm]

Three-way intersection with "Seagull" treatment (Signals)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Approach Lane Flows (veh/h)

South: Marion Rd (S)

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	165	450	615	6.6	855	0.719	100	NA	NA
Lane 2	-	595	595	5.0	827	0.719	100	NA	NA
Approach	165	1044	1209	5.8		0.719			

North: Marion Rd (N)

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	609	-	609	2.1	1389	0.438	100	NA	NA
Lane 2	603	-	603	2.1	1374	0.438	100	NA	NA
Lane 3	-	302	302	9.4	543	0.557	100	0.0	2
Approach	1212	302	1514	3.5		0.557			

West: Mooringe Ave (W)

Mov. From W To Exit:	L2 N	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	220	-	220	10.0	765	0.287	100	0.0	2
Lane 2	-	222	222	3.8	301	0.737	100	NA	NA
Approach	220	222	442	6.9		0.737			

	Total	%HV	Deg.Satn (v/c)
Intersection	3165	4.9	0.737

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

LANE LEVEL OF SERVICE

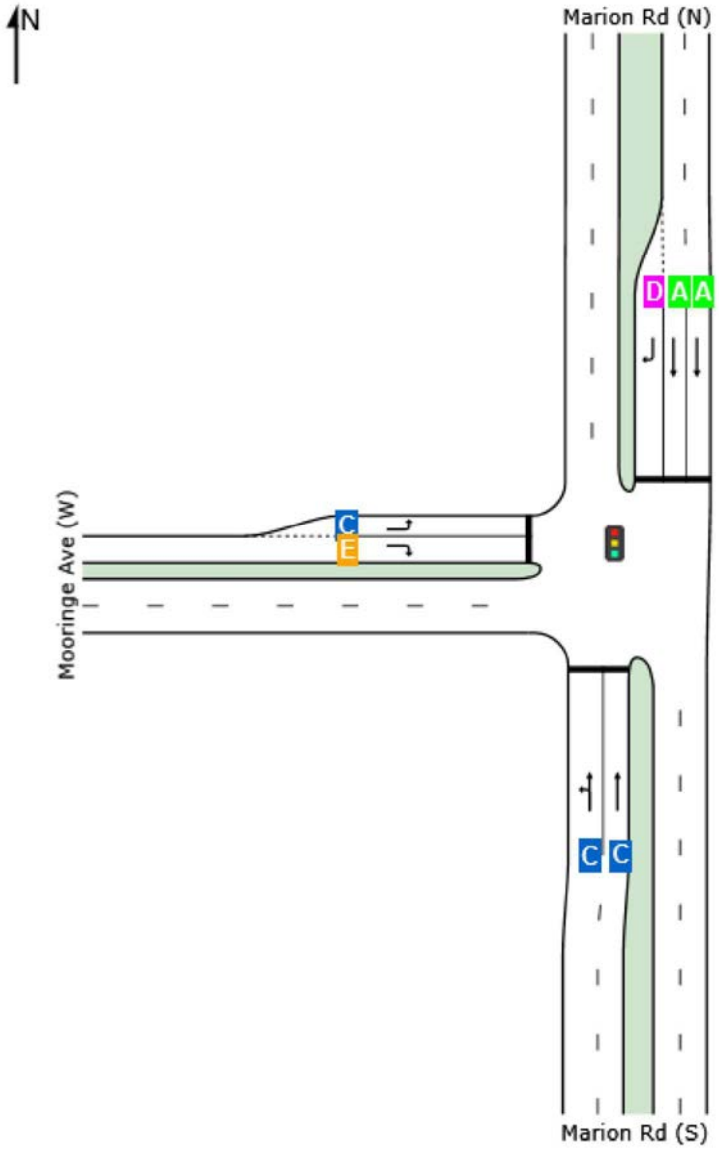
Lane Level of Service

Site: [Mooringe & marion Rd Future Pm]

Three-way intersection with "Seagull" treatment (Signals)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

All Movement Classes

	South	North	West	Intersection
LOS	C	B	D	C



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.

DELAY (CONTROL)

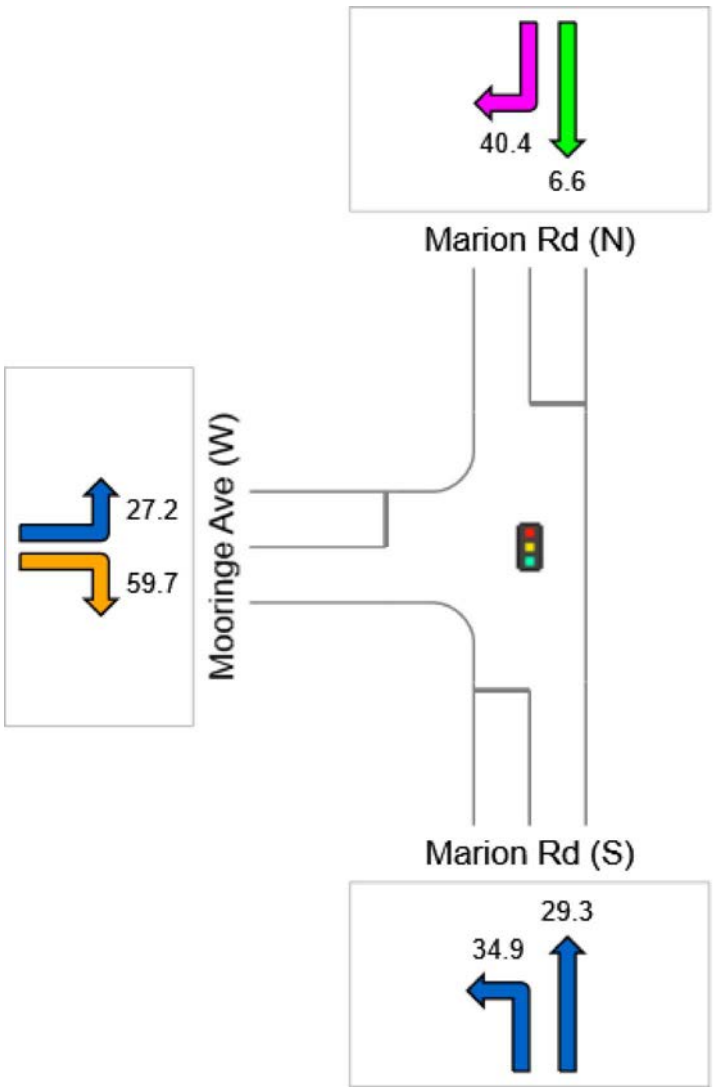
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: [Mooringe & marion Rd Future Pm]

Three-way intersection with "Seagull" treatment (Signals)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

All Movement Classes

	South	North	West	Intersection
Delay (Control)	30.0	13.4	43.6	23.9
LOS	C	B	D	C



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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