Proposed Mixed Use Development, Lot 9501 Gaebler Road, Hammond Park

Transport Impact Assessment

Prepared for: Broad Vision Projects Pty Ltd

Ref: 300305045 | Date: 14 November 2023



Revision

Revision	Date	Comment	Prepared By	Approved By
A	13 October 2023	Draft	LL/BS	SJL
B	14 November 2023	Final	LL/BS	SJL

For and on behalf of

Stantec Australia Pty Ltd

226 Adelaide Terrace, Perth WA 6000

Acknowledgment of Country

In the spirit of reconciliation, Stantec acknowledges the Traditional Custodians of country throughout Australia and their connections to land, sea and community. We pay our respect to their Elders past and present, and extend that respect to all Aboriginal and Torres Strait Islander peoples.

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1. Introduction

1.1 Background

Stantec has been commissioned by Broad Vision Projects Pty Ltd ('the Client') to undertake a Transport Impact Assessment for a Commercial Development located at Lot 9501 Gaebler Road (the 'Site').

This report aims to assess the impact of the development on the adjacent road network. The report will focus on access, public transport, pedestrian and cycle networks, circulation, and car parking requirements.

This report has been prepared in accordance with the Western Australian Planning Commission (WAPC) *Transport Assessment Guidelines for Developments: Volume 4 – Individual Developments (2016)* and the checklist is included in **Appendix A**.

2. Existing Situation

2.1 Site Location and context

The Site is located in the suburb of Hammond Park, in the corner of Hammond Road and Gaebler Road, as shown in **Figure 2-1**. The Site is within the City of Cockburn.

Figure 2-1 Aerial Overview of the Site



Source: Metromap (base map)

2.2 Regional Context

The proposed site is located within the growing suburb of Hammond Park located approximately 24km south of the Perth CBD as shown in **Figure 2-2**, along the southern corridor of the metropolitan area. The suburb is predominantly occupied by residential dwellings, with supporting amenities such as parks, shopping centre, and school and is well connected to the Perth CBD via Kwinana Freeway and the Mandurah rail line.

Figure 2-2 Regional Context

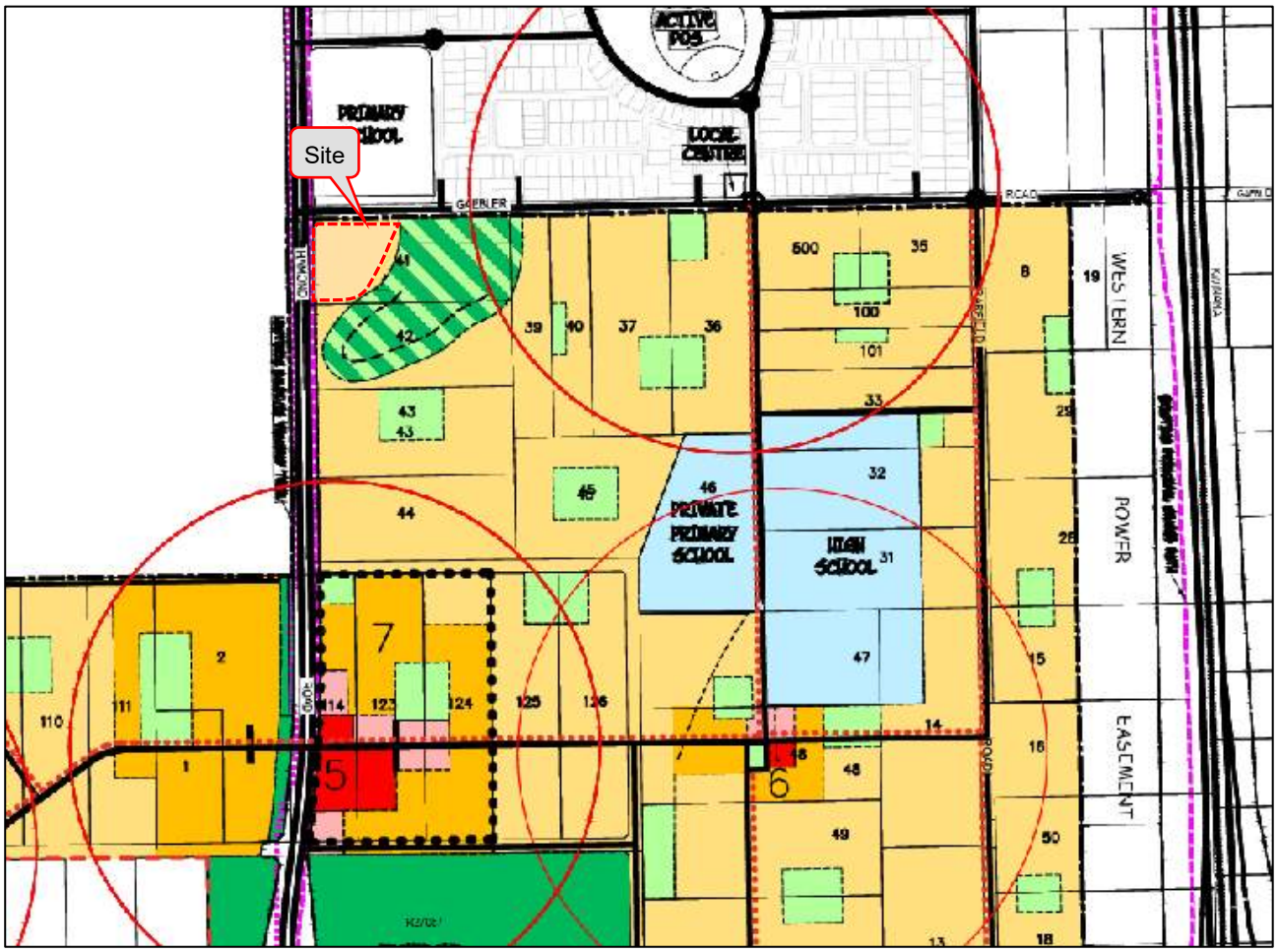


Source: Landgate (Base Map)

2.3 Local Context

The site is located within the City of Cockburn's *Southern Suburbs District Structure Plan Stage 3* (SSDSP3) covering the suburbs of Hammond Park and Wattleup as shown in **Figure 2-3.**

Figure 2-3 Southern Suburbs District Structure Plan – Stage 3

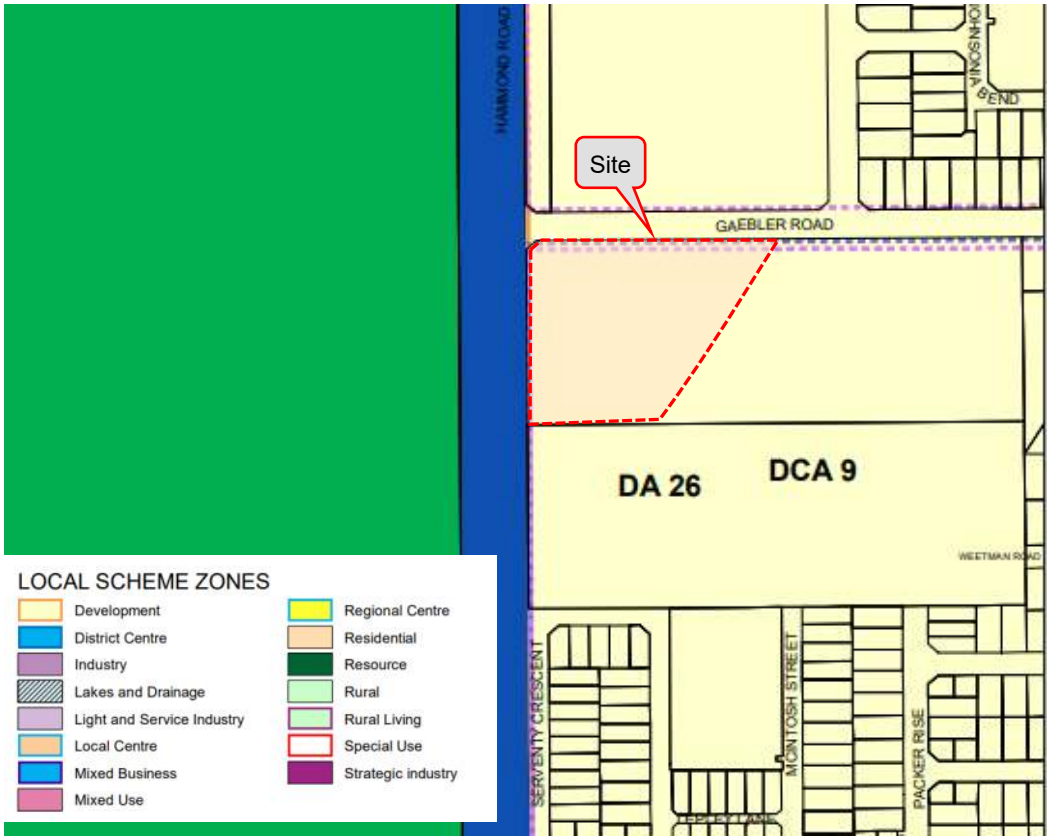


Source: City of Cockburn SSDSP3

The site is currently vacant and undeveloped. It is currently zoned as 'Development' within City of Cockburn's Town Planning Scheme 3, as shown in **Figure 2-4.**

The site is surrounded by mostly residential area to the south and east. There is a primary school (Hammond Park Primary School) to the north of the site, across Gaebler Road. The area to the west of the site is occupied by a nature reserve.

Figure 2-4 Existing Town Planning Scheme Zoning



Source: City of Cockburn's Town Planning Scheme No. 3

2.4 Existing Road Network

Road classifications are defined in the Main Roads Functional Hierarchy as follows:

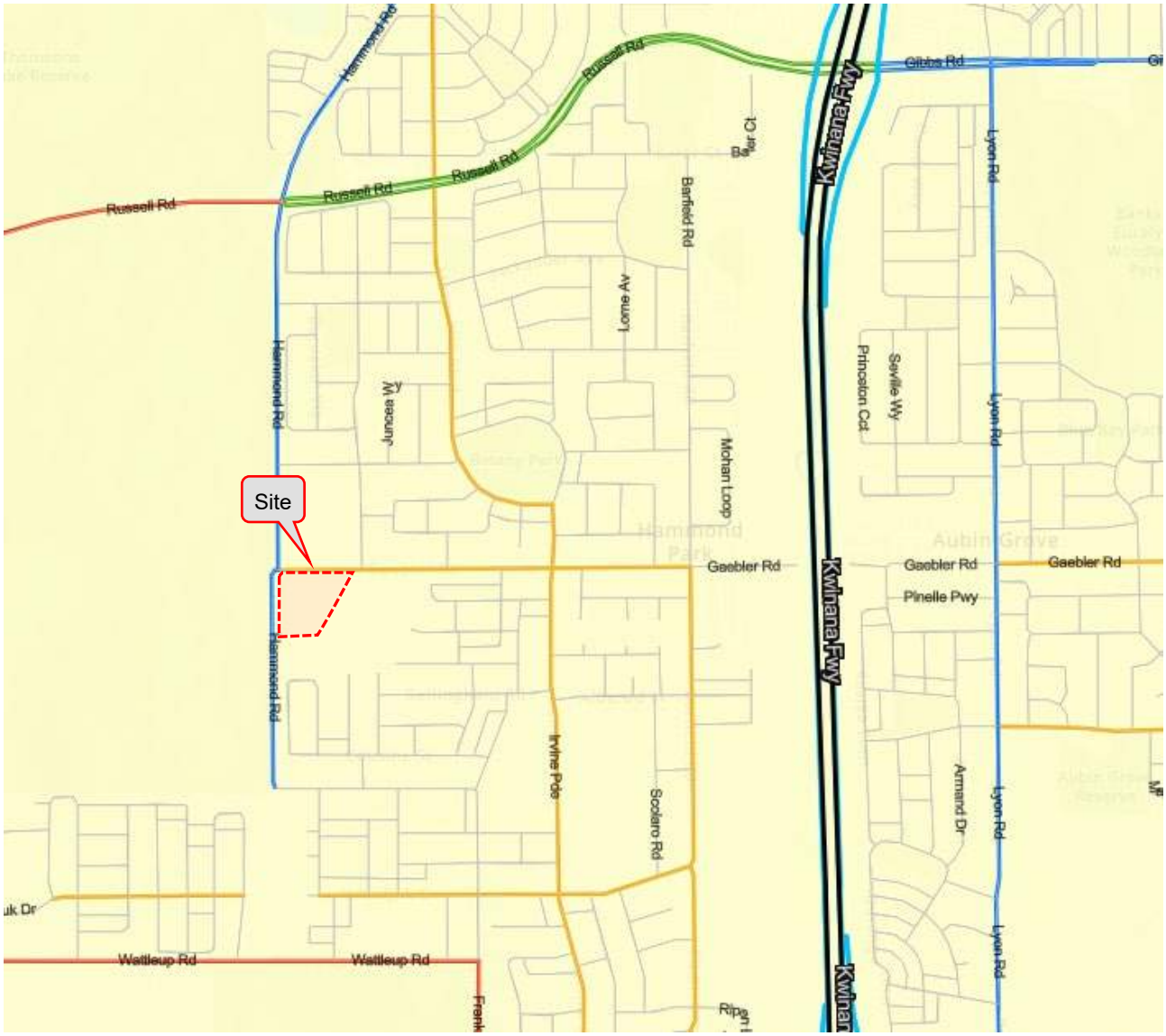
- **Primary Distributors (light blue):** Form the regional and inter-regional grid of the Main Roads WA traffic routes and carry large volumes of fast-moving traffic. Some are strategic freight routes and all are National or State roads. They are managed by Main Roads WA.
- **Regional Distributors (red):** Roads that are not Primary Distributors, but which link significant destinations and are designed for efficient movement of people and goods within and beyond regional areas. They are managed by Local Government.
- **District Distributor A (green):** These carry traffic between industrial, commercial and residential areas and connect to Primary Distributors. These are likely to be truck routes and provide only limited access to adjoining property. They are managed by Local Government.
- **District Distributor B (dark blue):** Perform a similar function to District Distributor A but with reduced capacity due to flow restrictions from access to and roadside parking alongside adjoining property. These are often older roads with traffic demand in excess of that originally intended. District Distributor A and B roads run between land-use cells and not through them, forming a grid that would ideally be around 1.5 kilometres apart. They are managed by Local Government.
- **Local Distributors (orange):** Carry traffic within a cell and link District Distributors at the boundary to access roads. The route of the Local Distributor discourages through traffic so that the cell formed by the grid of District Distributors only carries traffic belonging to or serving the area. These roads should accommodate buses but discourage trucks. They are managed by Local Government.
- **Access Roads (grey):** Provide access to abutting properties with amenity, safety and aesthetic aspects having priority over the vehicle movement function. These roads are bicycle and pedestrian friendly. They are managed by Local government.

The Site is bounded by Hammond Road to the west and Gaebler Road to the north. The surrounding road network is further described in **Table 2-1** and shows the hierarchy as per the Main Roads WA Road Information Mapping System, whilst **Figure 2-5** shows the road hierarchy.

Table 2-1 Summary of Existing Road Network

Road Name	Road Hierarchy	Jurisdiction	No. of Lanes	No. of Footpaths	Width (m)	Posted Speed (km/h)
Hammond Road (1030012)	Distributor B	City of Cockburn / WAPC	2	1 (North of Gaebler Road) 0 (South of Gaebler Road)	1.00 (North of Gaebler Road) 6.50 (South of Gaebler Road)	70 (North of Gaebler Road)
Gaebler Road (1030055)	Local Distributor	Local Government	2	2	7.00	50
Murrambidgee Drive (1031649)	Access Road	Local Government	2	2	7.30	50
Irvine Parade (1032184)	Local Distributor	Local Government	2	1	7.30	50
Russel Road (1030011)	Distributor A	Local Government	4	2	8.20 per Carriageway	70
Rowley Road (1030019)	Regional Distributor	Local Government	2	0	9.00	70

Figure 2-5 Existing Road Hierarchy



Source: Main Roads Mapping Information Centre (2023)

2.5 Existing Traffic Volumes

Existing weekday traffic volumes were obtained from data provided by the City of Cockburn for key road sections in the vicinity of the Site as shown in **Table 2-2.**

Table 2-2 Existing Weekdays Traffic Volume

Site No.	Road Name	Source	Year	Daily (vpd)	AM Peak (vph)	PM Peak (vph)	Heavy Vehicle %
1	Hammond Road (North of Gaebler Road)	City of Cockburn	2019	4,049	421	464	3%
2	Hammond Road (South of Gaebler Road)	City of Cockburn	2021	3,208	425	391	5.9%
3	Gaebler Road (East of Hammond Road)	City of Cockburn	2022	3,354	353	400	4.2%
4	Murrumbidgee Drive (North of Gaebler Road)	City of Cockburn	2019	524	125	79	15.4%

Source: City of Cockburn Traffic Count Data (Intramaps)

2.6 Existing Intersections

2.6.1 Hammond Road / Gaebler Road Intersection

Hammond Road / Gaebler Road intersection is located at the north-western corner of the site. The intersection is an existing priority-controlled intersection as shown in **Figure 2-6**. Gaebler road forms the east leg of the intersection, and curves to the north at which point the road changes name into Hammond Road. The south leg of the intersection is Hammond Road and traffic on this leg must give-way to Gaebler Road. On street parking bays are provided to the north side of Gaebler Road in front of the proposed development. The designated bays are not currently subject to any parking restrictions.

Figure 2-6 Hammond Road / Gaebler Road Intersection

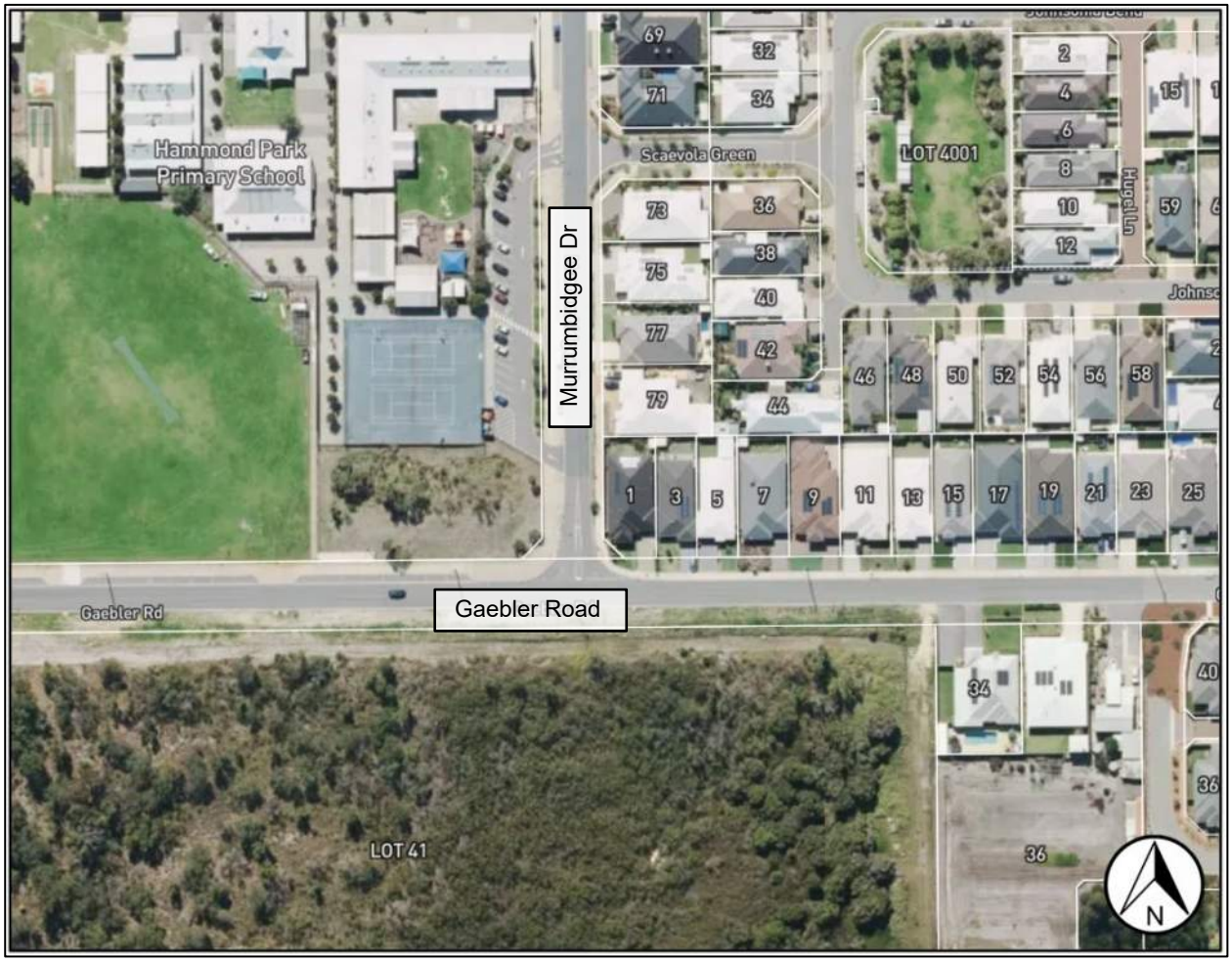


Source: Metromap (Base Map)

2.6.2 Gaebler Road/Murrambidgee Dr. Intersection

Gaebler Road / Murrambidgee Drive intersection is located near the north-eastern corner of the site. The intersection is a three-way give way control T-intersection, with Gaebler Road having traffic priority over Murrumbidgee Drive as shown in **Figure 2-7.** On street parking is provided to the north of Gaebler Road in front of the proposed development.

Figure 2-7 Gaebler Road / Murrumbidgee Drive Intersection

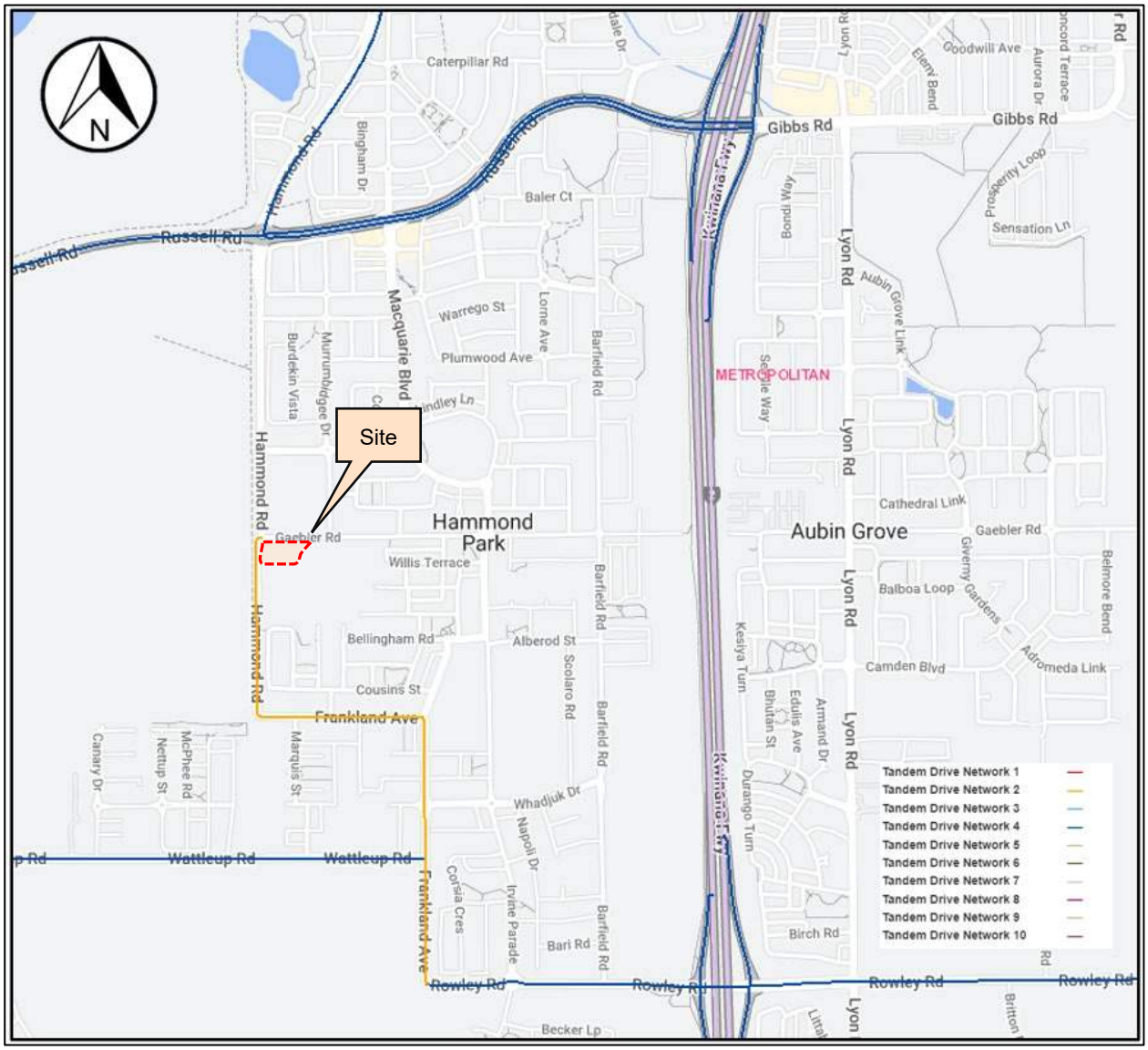


Source: Metromap (Base Map)

2.7 Existing Restricted Access Vehicles (RAV) Network

The existing RAV network is shown below in **Figure 2-8**. Most of the roads within the suburb of Hammond Park are not included in the RAV network. Hammond Road south of Gaebler Road is included in the RAV 2 network. It is assumed the City of Cockburn will revisit the RAV network conditions for Hammond Road once the duplication is completed.

Figure 2-8 RAV Network Map



Source: HVS Network

2.8 Existing Public Transport Facilities

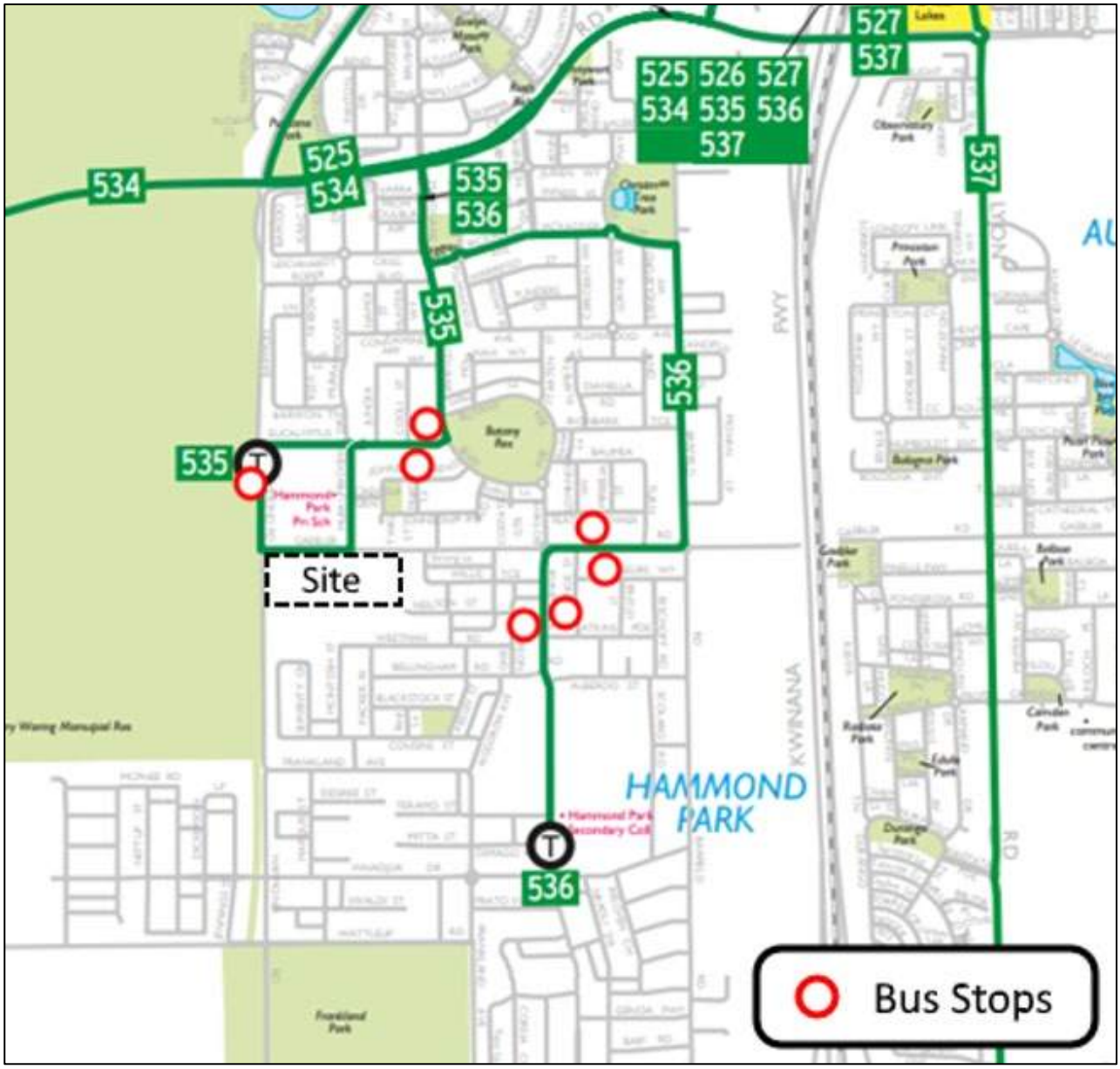
The nearest bus stops to the Site are located on Hammond Road approximately 160m to the north of Hammond Road / Gaebler Road intersection, this stop is serviced by bus route 535 and can be reached by foot via the existing footpath along the eastern side of Hammond Road, however the bus stop is located on the western side of the road and no crossing facility is provided.

Figure 2-9 below shows the bus route network in the vicinity of the site and nearest bus stops. List of other bus routes in the vicinity of the Site are shown in **Table 2-3.** These bus services provide access to Aubin Grove Station on the Mandurah rail line, where commuters can switch to rail service bound to either Perth or Mandurah.

Table 2-3 Bus Routes and Frequency

Bus Route	Route Description	Weekday Frequency	Weekend Frequency
534	Aubin Grove Station - Wattleup	1 service in the AM towards Aubin Grove Station	No Service
		1 Service in the PM towards Wattleup	
535	Aubin Grove Station – Hammond Park West	20 minutes – 60 minutes	60 minutes
536	Aubin Grove Station – Hammond Park	20 minutes – 60 minutes	60 minutes

Figure 2-9 Existing Bus Routes with Nearest Bus Stops

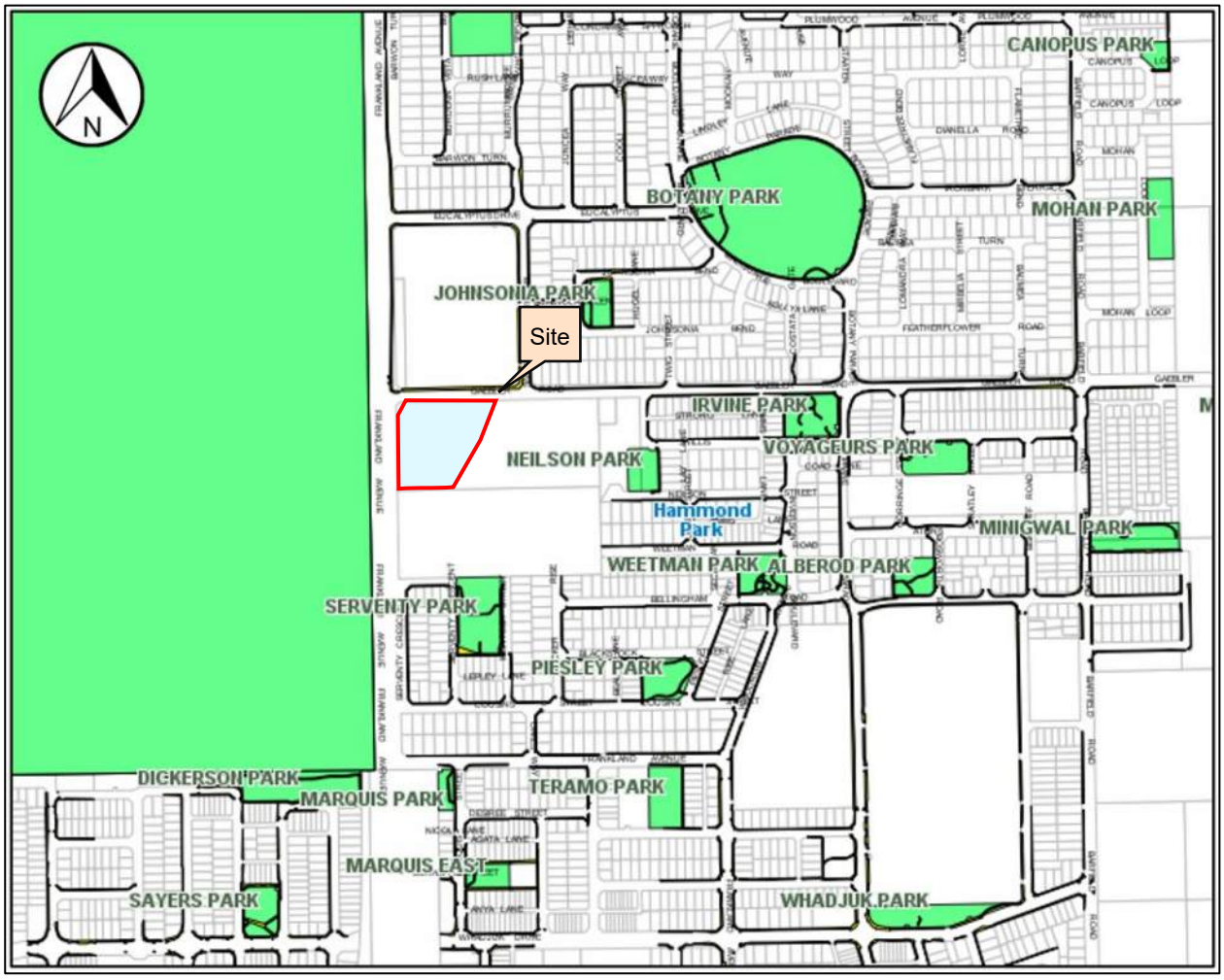


Source: Transperth Network Maps

2.9 Existing Active Transport Facilities

In the surrounding network, footpaths are provided on at least one side of important access street links. See **Figure 2-10** below for the existing path network surrounding the site.

Figure 2-10 Existing Path Network

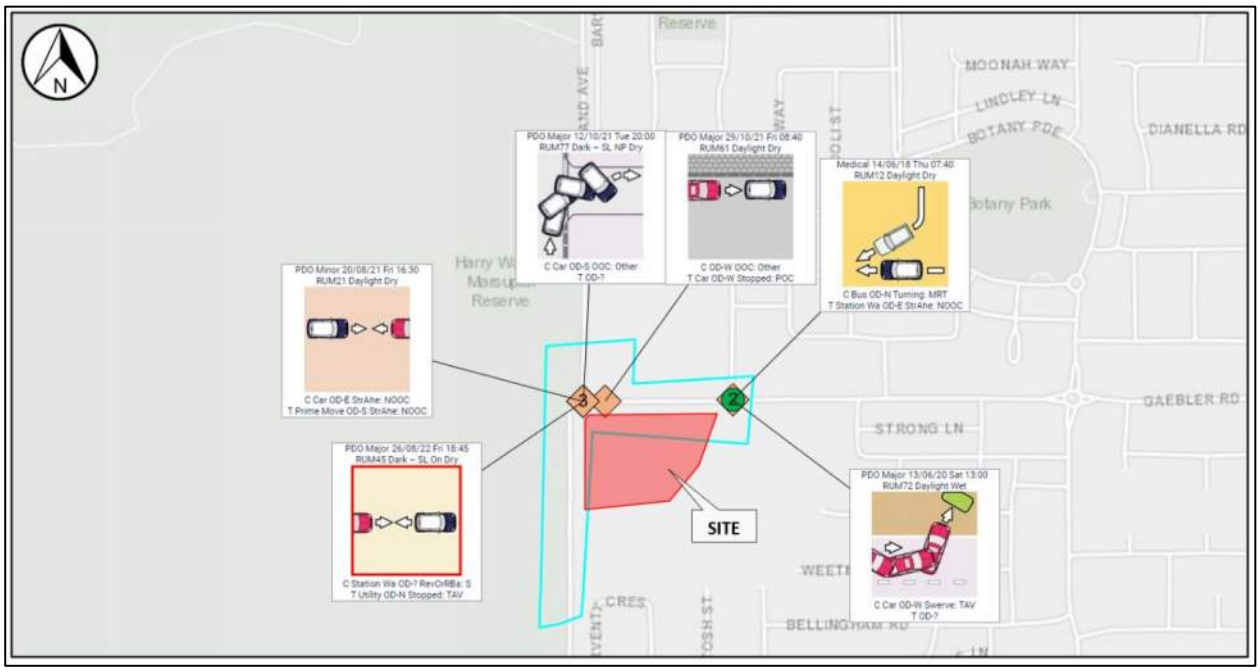


Source: City of Cockburn Intramaps

2.10 Crash Assessment

Recorded crashes along Hammond Road, Gaebler Road, and Murrumbidgee Drive with SLK 0.03, 0.20, and 5.92 were extracted from the MRWA database between 2018 and 2022. Results indicate that there are six (6) recorded incident at the area: five (5) at the intersections and one (1) along Gaebler Road. The recorded crashes are presented in **Table 2-4** to **Table 2-6**, while **Figure 2-11** illustrates the location and severity of these crashes.

Figure 2-11 Crash Location and Severity Map



Source: MRWA Crash Reporting Centre

Table 2-4 Total Crashes

Type of Crash (RUM Code)	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Right Angle	-	-	1	-	-	**1**
Hit Object	-	-	-	2	-	**2**
Head On	-	-	-	1	-	**1**
Rear End	-	-	-	1	-	**1**
Unspecified	-	-	-	-	1	**1**
Total	**0**	**0**	**1**	**4**	**1**	**6**

Table 2-5 Midblock Crashes

Type of Crash (RUM Code)	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Gaebler Rd	-	-	-	1	-	1
Total	**0**	**0**	**0**	**1**	**0**	**1**

Table 2-6 Intersection Crashes

Type of Crash (RUM Code)	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Total Crashes
Hammond Rd – Gaebler Rd	-	-	-	2	1	**3**
Gaebler Rd – Murrumbidgee Dr	-	-	1	1	-	**2**
Total	**0**	**0**	**1**	**3**	**1**	**5**

Crash data are summarised as follows:

- A total of 6 crashes were recorded within the vicinity of the Site, with no KSI crashes recorded.
- One (1) recorded right-angle crash resulted in a medical severity and occurred at Gaebler Road – Murrumbidgee Drive Intersection.
- A number of crashes were recorded at the intersection of Hammond Road and Gaebler Road. However, these crashes are likely to be mitigated with the future road upgrades.

The six (6) crashes around the Site for the past 5 years can be considered low for the proposed development to impose a substantial impact on the road network's overall safety. It is also likely that the existing unconventional intersection geometry between Gaebler Road and Frankland Avenue may have contributed to some of the intersection crashes and once the Hammond Road upgrade is completed, may result in a crash exposure reduction.

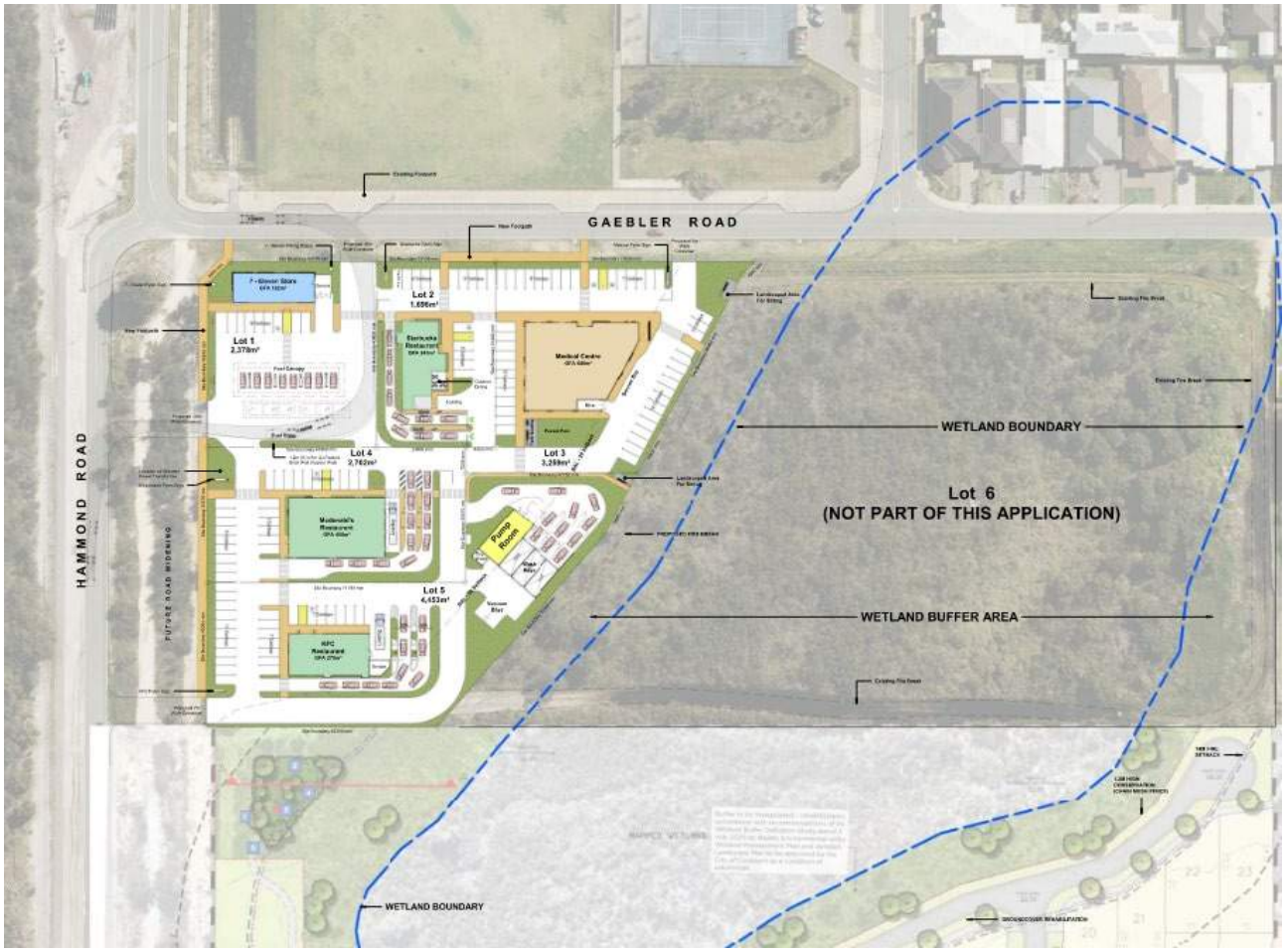
3. Development Proposal

3.1 Proposed Development

The proposed development of the site will comprise 5 lots as shown in **Figure 3-1**.

Table 3-1 provides the land uses within the proposed site. Higher resolution plans are provided in **Appendix A**.

Figure 3-1 Site Plan



Source: Meyer Shircore

Table 3-1 Proposed Land Uses within the Site

Lot No.	Land Use	Estimated Yield
Lot 1	Service Station	2,378 m^2 land area
		8 fuel points
		192 m^2 convenience store
		17 car park space
Lot 2	Fast Food (Starbucks)	1,696 m^2 land area
		245 m^2 fast food
		24 car parking space
Lot 3	Medical Centre	640 m^2 medical centre
		45 car parking space
	Car Wash	3 car wash bays 2 Vacuum bays

Lot No.	Land Use	Estimated Yield
Lot 4	Fast Food (McDonalds)	2,702 m^2 land area
		450 m^2 fast food
		37 car parking space
Lot 5	Fast Food (KFC)	4,453 m^2 land area
		270 m^2 fast food
		35 car parking space

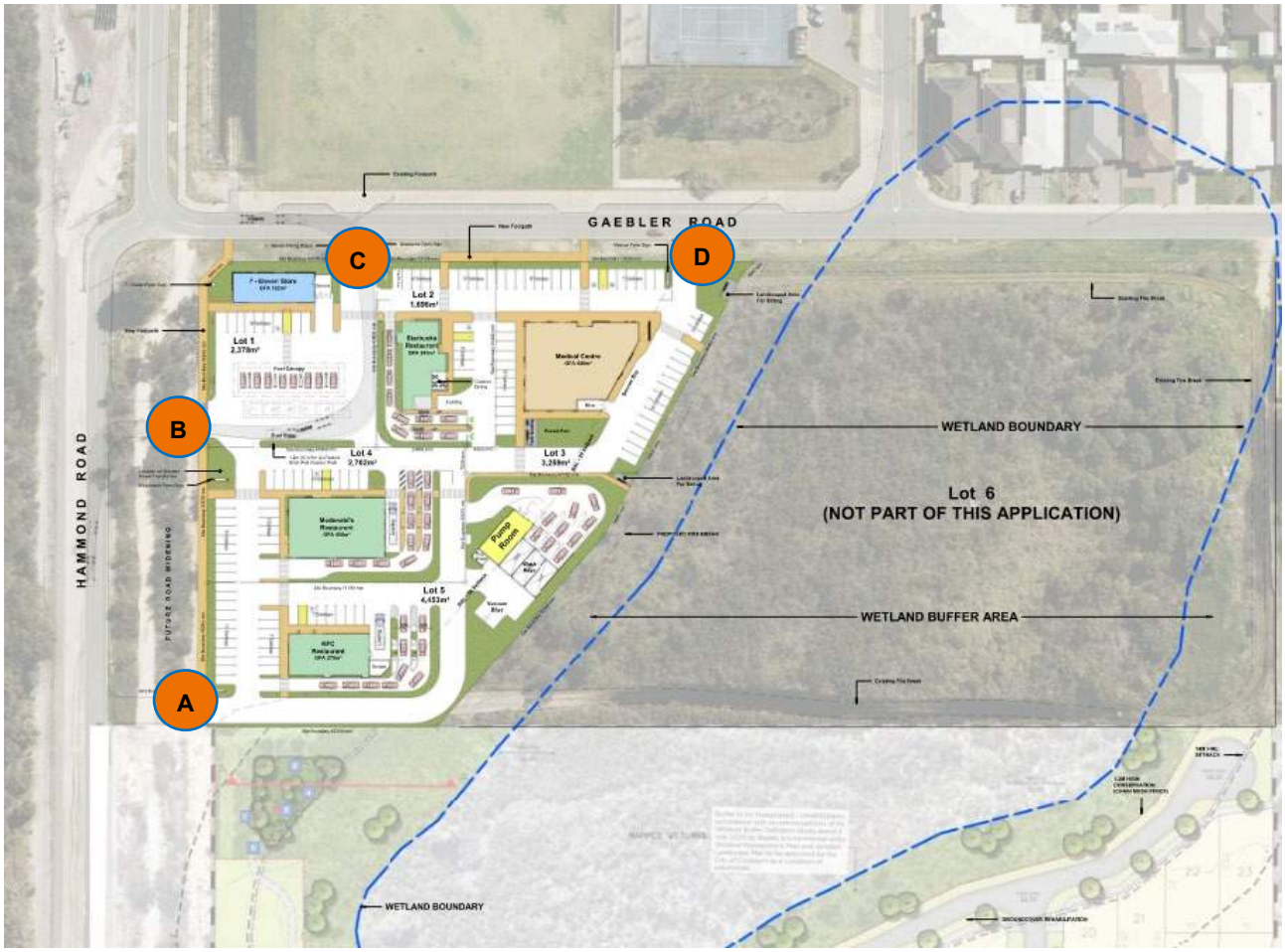
3.2 Access arrangements

Access arrangements to the site are shown below in **Figure 3-2**. There are 4 access points proposed for the development application.

- Access A – main access to/from Lot 5, fronting Hammond Road. The access will function as a full movement access until the duplication of Hammond Road. Only left in and left out movement would be permitted once Hammond Road is fully upgraded due to the raised median proposed.
- Access B – Lot 1 access to/from Hammond Road. The access will function as a full movement access until the duplication of Hammond Road. Only left in and left out movement would be permitted once Hammond Road is fully upgraded.
- Access C –Full movement is proposed at this access.
- Access D–Full movement is proposed at this access.

Stantec contacted City of Cockburn and was advised that there are plans to build a dual carriageway on Hammond Road in the next 5 years, leading to Rowley Road (pending MRWA extension) or, in the worst scenario, all the way to Wattleup Road and the larger townsite area south of this location. Consequently, it is anticipated that Hammond Road will not be fully upgraded for the opening year scenario (2025) and that right turn movements could be permitted at the sites access points.

Figure 3-2 Access Arrangements



Source: - Meyer shircore

The proposed access arrangement was designed to provide optimum vehicular circulation through the various land uses within the site. The access arrangement aims to provide individual access for each of the different land uses within thereby distributing traffic more evenly between the access points and reducing the risk of congestion at the accesses overspilling into the external road network, and minimising conflict within the internal road network.

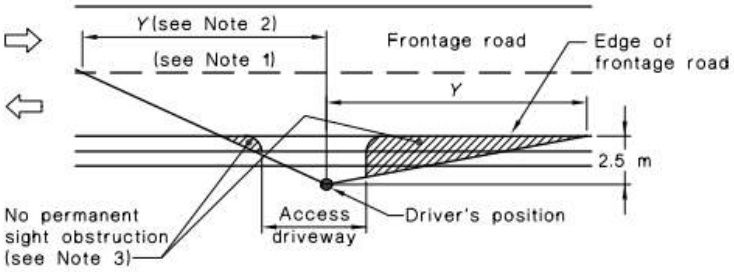
Two access points (Access B & Access C) are to be provided for the service station (Lot 1) which is a typical arrangement for a service station corner site. As a significant portion of customers entering the service station would only be passing trade for the Site on the way to their destination, the two access points could provide a more efficient traffic flow. For example, passing patrons heading southbound on Hammond Road could enter the Site via Access C and exit via Access B to continue their journey south. The two access points would also allow for the critical access for the refuelling tanker, as the tanker can enter via one access and exit via the other in one-way traffic flow.

The fast-food use (Lot 2,4 & 5) would also be benefitted by having two access, Access C and D. This would distribute traffic more evenly within the site and can provide better drive-thru traffic flow.

3.2.1 Sight Line Assessment

There are multiple sight distance assessments that can be considered and for this exercise, the requirements of AS2890.1 Off-street car parking (section 3.2.4) has been considered. AS2890.1 considers the sight distance required for a vehicle emerging from an access to be able to see and safely enter the major road. *AS/NZS 2890.1-2004 Off-street car parking Clause 3.2.4* suggests the distance requirements for a desirable 5s gap, and the minimum Stopping Sight Distance (SSD) along a frontage road, as shown in **Figure 3-3.** For a robust assessment, the higher value between the desirable 5s gap and minimum SSD was adopted for this sightline assessment.

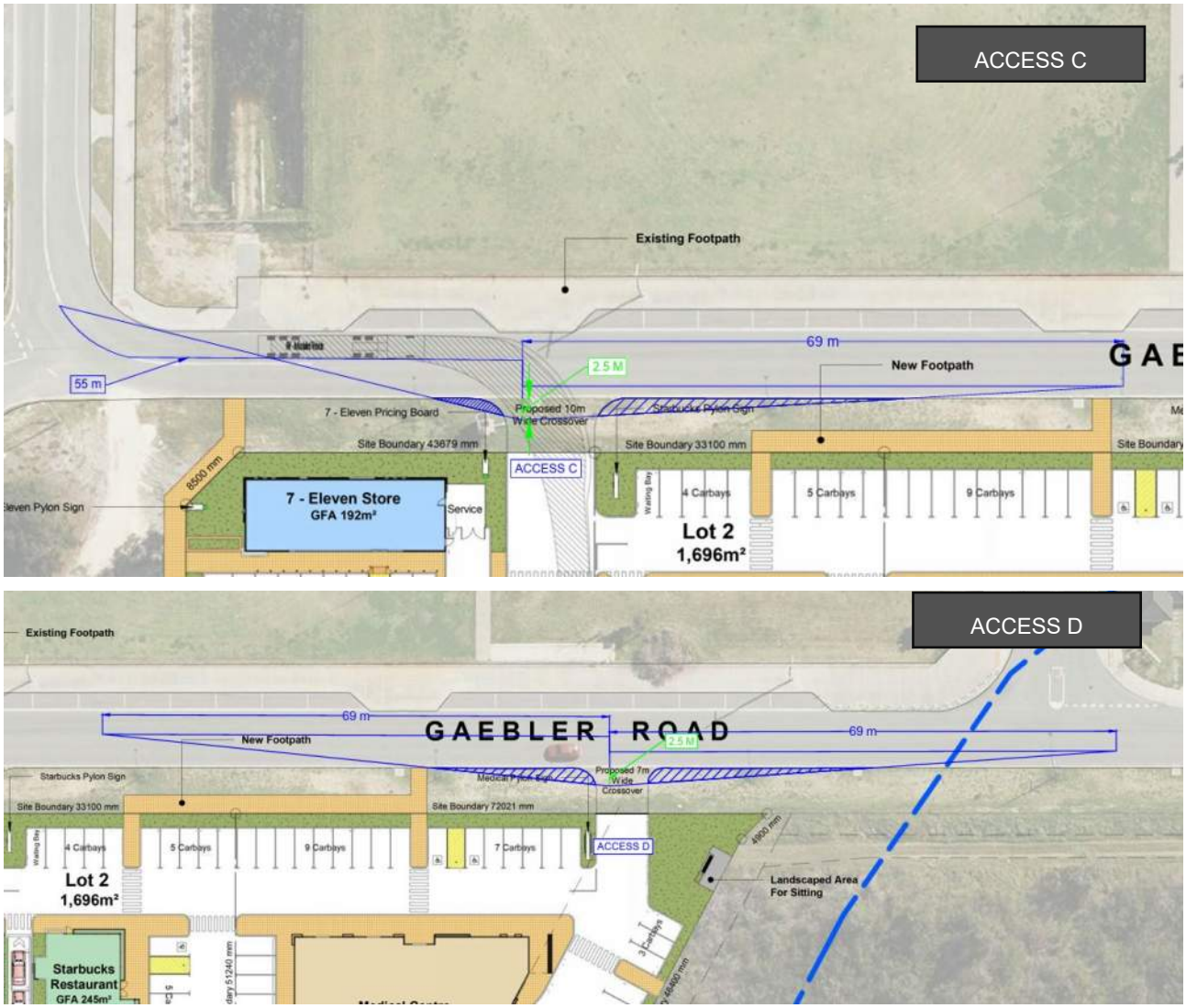
Figure 3-3 AS 2890.1-2004 section 3.2.4 figure 3.2 sight distance requirements at access driveways



Frontage road speed (Note 4) km/h	Distance (Y) along frontage road m		
	Access driveways other than domestic (Note 5)		Domestic property access (Note 6)
	Desirable 5 s gap	Minimum SSD	
40	55	35	30
50	69	45	40
60	83	65	55
70	97	85	70
80	111	105	95
90	125	130	Use values from 2nd and 3rd columns
100	139	160	
110	153	190	

For a frontage road speed of 50km/h, AS2890.1 requires a desirable 5sec gap of 69 metres measured along the major road based on a point 2.5 metres from the edge of the road. Figure 3-4 shows the sight distance assessment based on AS2890.1, indicating that Access D can achieve the required sight distance of 69m within the site frontage and the public road reserve, however, a clear distance of 55m is only achievable for Access C towards Hammond Road (measurement is conservative with the assumption that visibility over corner verge is unavailable). Although the posted speed on the frontage road is 50 km/h, the operating speed is likely to be lower due to the proximity of the Hammond Road intersection. At speeds of 40km/h, 55m equals the desirable 5 second gap requirement. AS2890.1 also recommends a minimum Stopping Sight Distance of 45m from access driveways which is easily achievable based on the assessment. The hatched area should be kept clear of any permanent obstructions.

Figure 3-4 Sightline Assessment



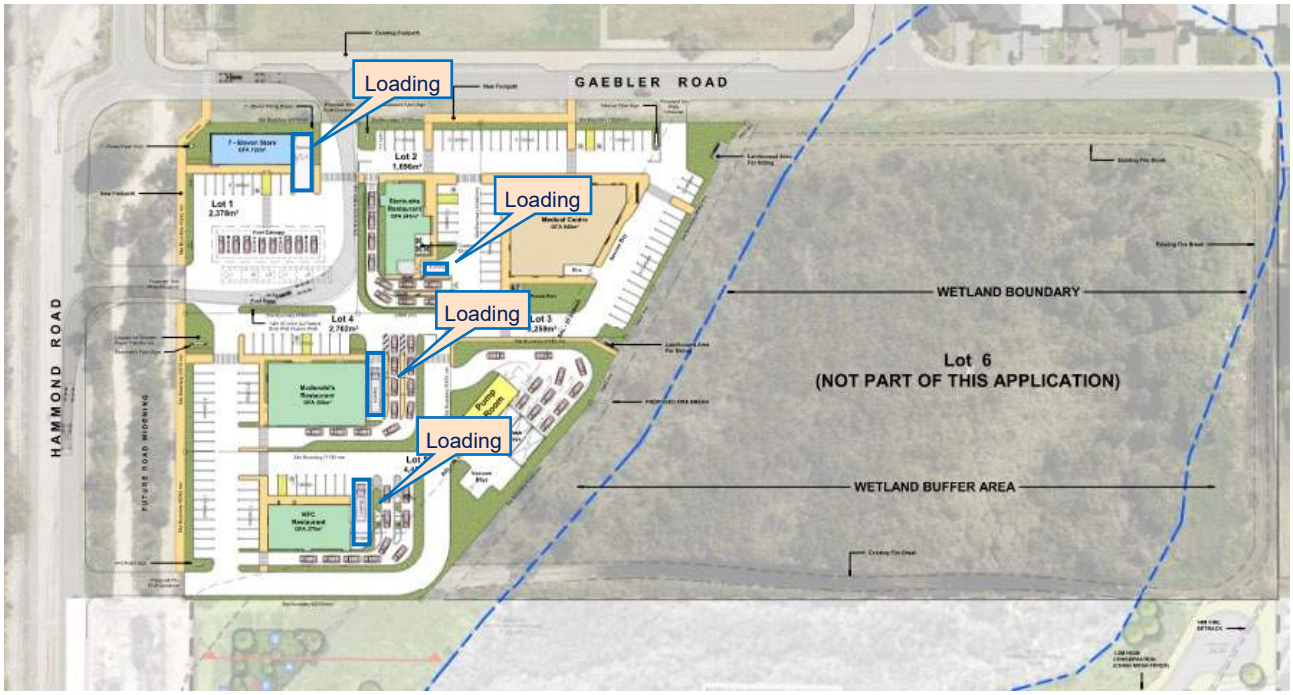
It was noted during the assessment that there is a pre-existing sight line issue with the on street parking bays along Gaebler road in front of the proposed accesses when 50km/h frontage road speed is used. There is a chance that a car coming around the bend from Hammond Road will have insufficient safe stopping sight distance if there are cars stopped on the carriageway waiting to pull into the western most parking bays.

3.3 Waste and Recycling Collection Services

The waste collection of the commercial tenancies on Site is proposed to be serviced by a private contractor, using a rear-lift waste truck. Each land use will provide their own individual service/loading bays to accommodate the service vehicles. A small tanker vehicle will require access to service the grease traps at the fast-food restaurants.

The locations of each loading/service bays are illustrated in **Figure 3-5**.

Figure 3-5 Waste Collection Area



A swept path analysis for a 10.1m waste vehicle was undertaken as shown in **Figure 3-6** and **Figure 3-7**. The analysis indicates that a waste vehicle is able to adequately enter the site, manoeuvre and park at the waste collection area to collect the waste and exit in a forward direction. Waste collections will be undertaken on-site by a private waste contractor and to be arranged to occur during off peak hours or after normal business hours to minimise disruption to traffic operations as well as minimise any impacts to staff and visitors.

A 10.5m tanker vehicle will be required to access the Site to service the used cooking oil storage units at the fast food restaurants, with swept path shown in **Figure 3-8.**

Figure 3-6 Waste Truck Swept Path – Entry

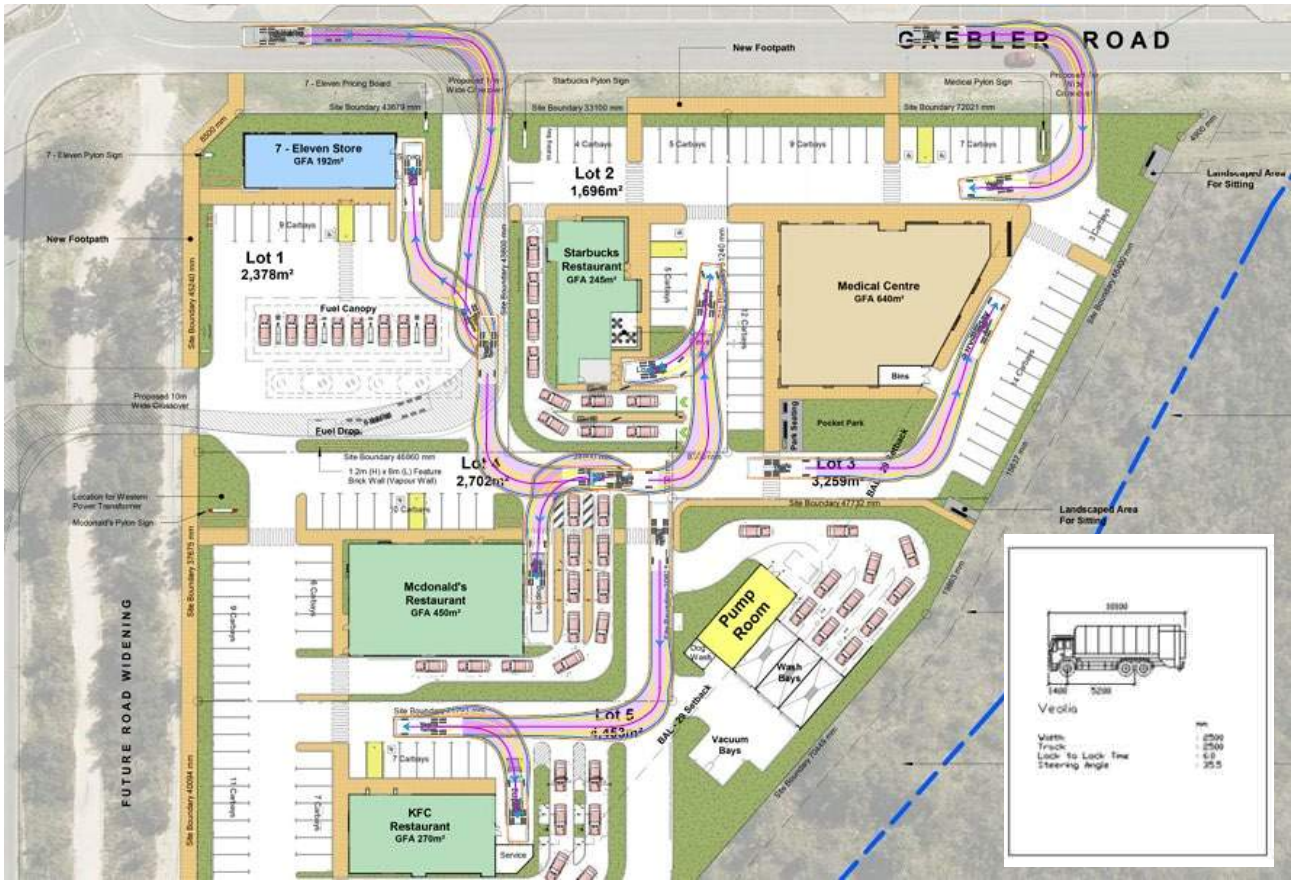


Figure 3-7 Waste Truck Swept Path - Exit

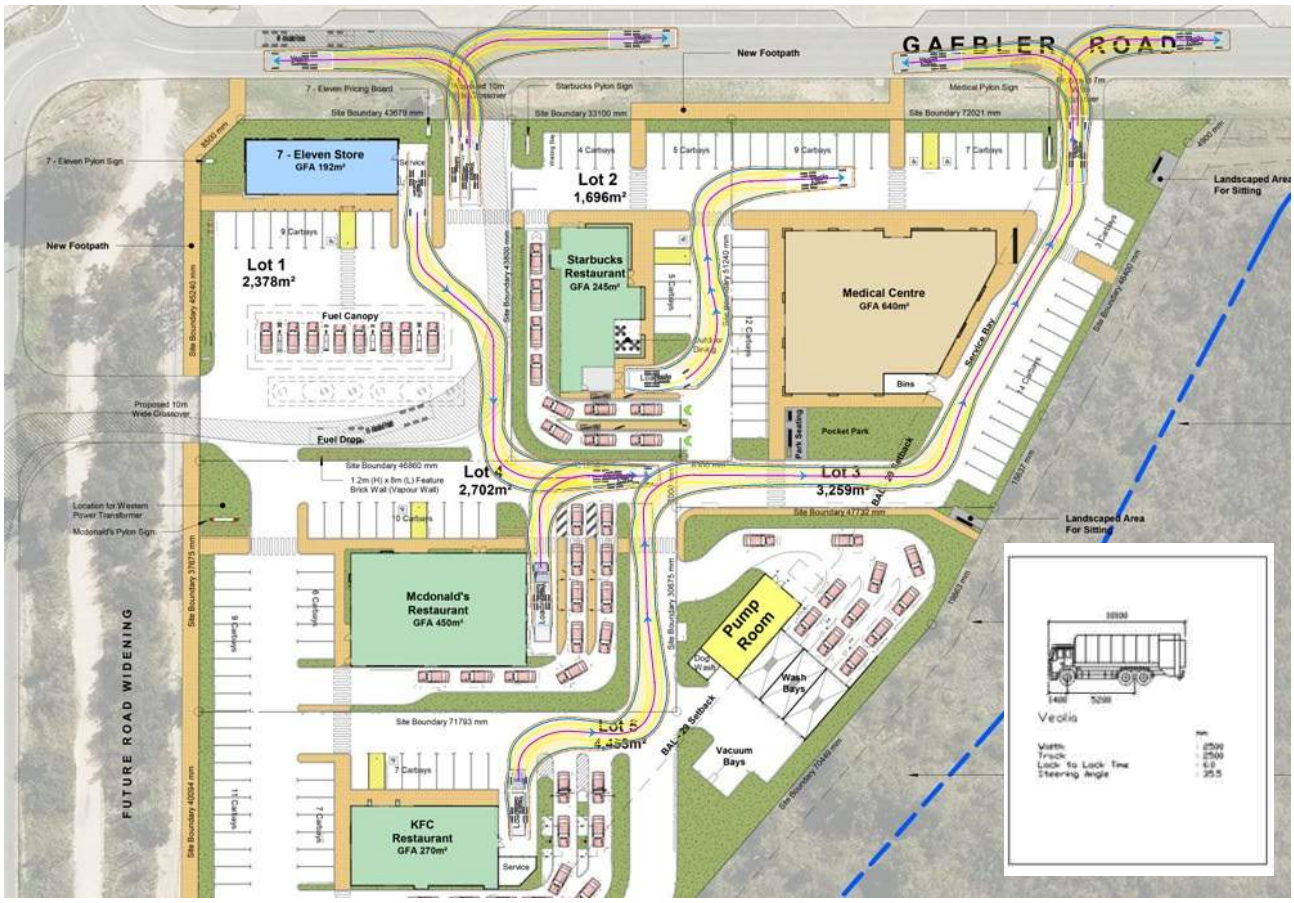
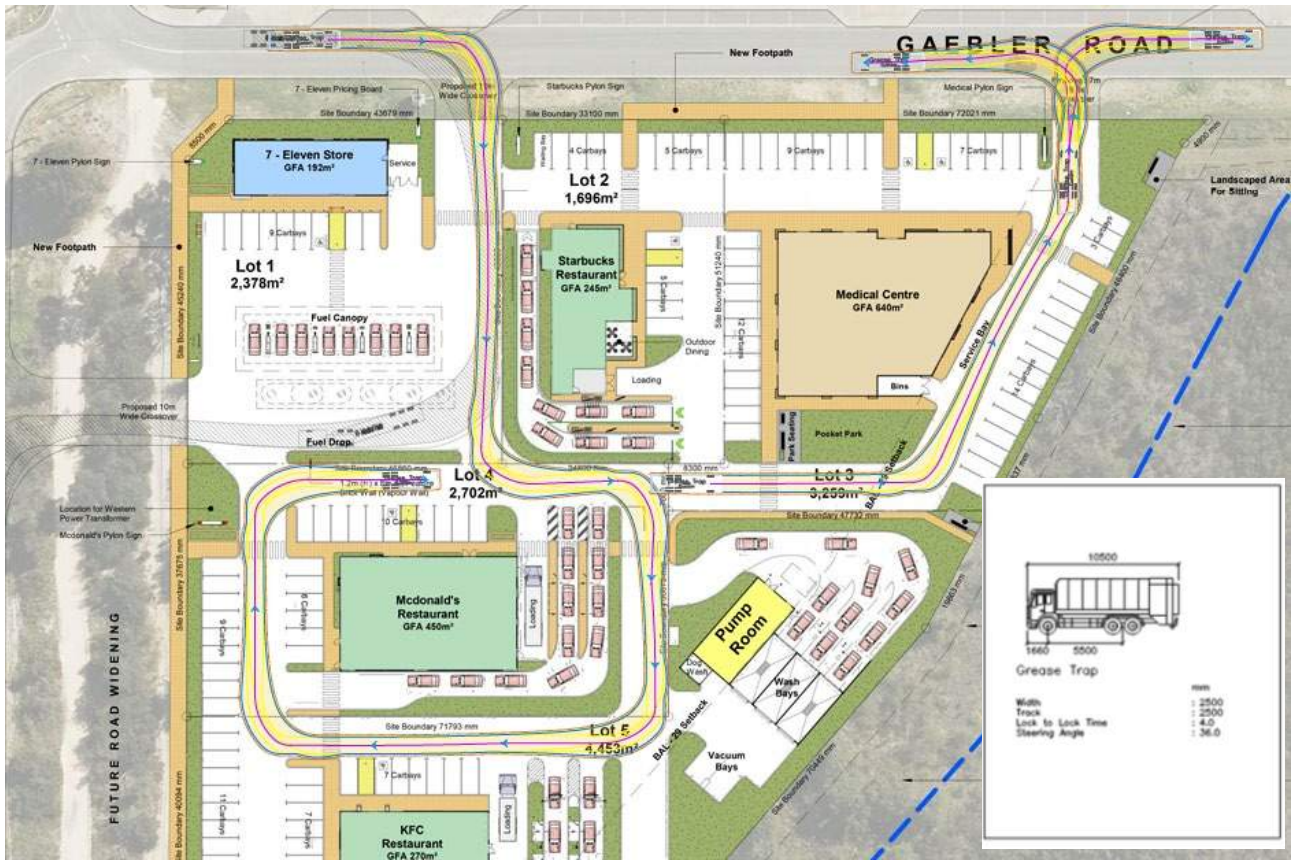


Figure 3-8 Grease Trap Vehicle Swept Path



3.4 Car Parking Requirements

The car parking requirements for the development are prescribed in the City of Cockburn Local Planning Scheme No.3. **Table 3-2** shows the car parking requirements and the on-site provision.

Table 3-2 Car Parking Requirements

Proposed Land Use	Parking Requirement	Yield	Parking Requirement		Parking Provided
Fast Food	1 per 15m^2	450+245+270 = 965 sqm	65		On Grade – 118 bays Drive Thru – 32 bays Fuel Canopy – 8 bays Vacuum Bays - 2
Medical Centre	5:1 Consulting Rooms	10 Practitioners	50		
Convenience Store	1 per 15m^2 1:1 employee plus 2:1 Service Bays	192 sqm 2 Employees	13 2	15	
Car Wash	1:1 wash bay	3 wash bays	3		
Total			**133 bays**		**160 bays**

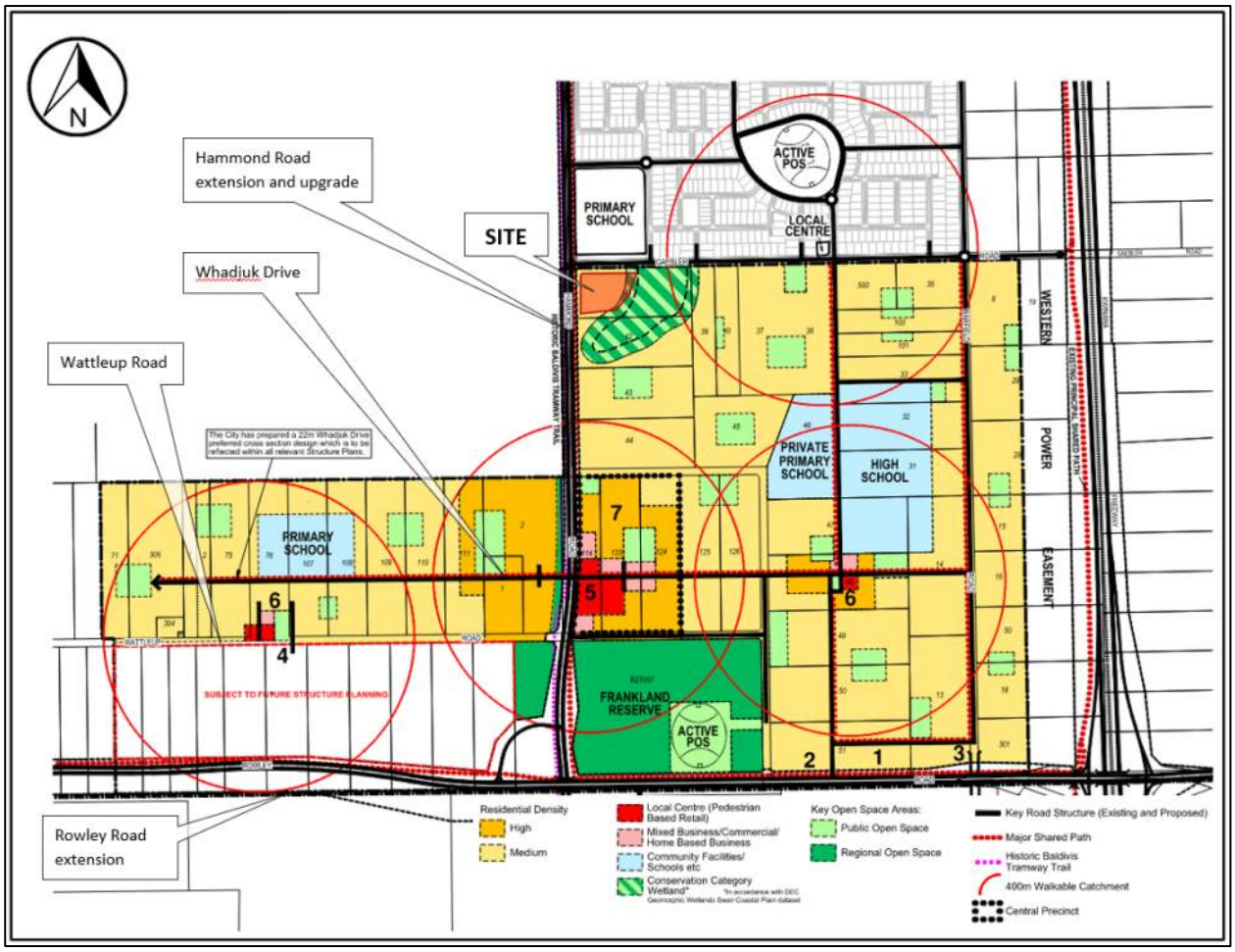
Table 3-2 indicates that a total of 118 parking bays have been provided throughout the site for various land uses. In addition to that 32 drive thru and 8 fuel canopy bays have also been provided. It is anticipated that the proposed development can cater the overall parking requirements as per LPS No.3.

4. Changes To Surrounding Transport Network

4.1 External Road Network

Figure 4-1 shows the proposed road alignments as detailed in the *Southern Suburbs District Structure Plan (SSDSP3) 2012*. The Plan also details the proposed land uses and pedestrian/cycling network.

Figure 4-1 Road Network Upgrades in SSDSP3



Source: City of Cockburn SSDSP3

4.1.1 Hammond Road

Hammond Road is planned to be extended southwards from Gaebler Road to Rowley Road. Based on the SSDSP3 map, Hammond Road is proposed to be upgraded to a dual carriageway, with two traffic lanes in each direction as shown in the concept design **(Figure 4-2).**

Figure 4-2 Hammond Road / Gaebler Road Upgrade Concept



4.1.2 Whadjuk Drive

Whadjuk Drive runs along the southern side of the suburb and is being constructed progressively as new development occurs. Once completed, the road will function as the major east-west distributor road for the southern part of the suburb. **Figure 4-3** below shows the alignment of Whadjuk Drive once completed.

Figure 4-3 Whadjuk Drive Alignment



4.1.3 Wattleup Road

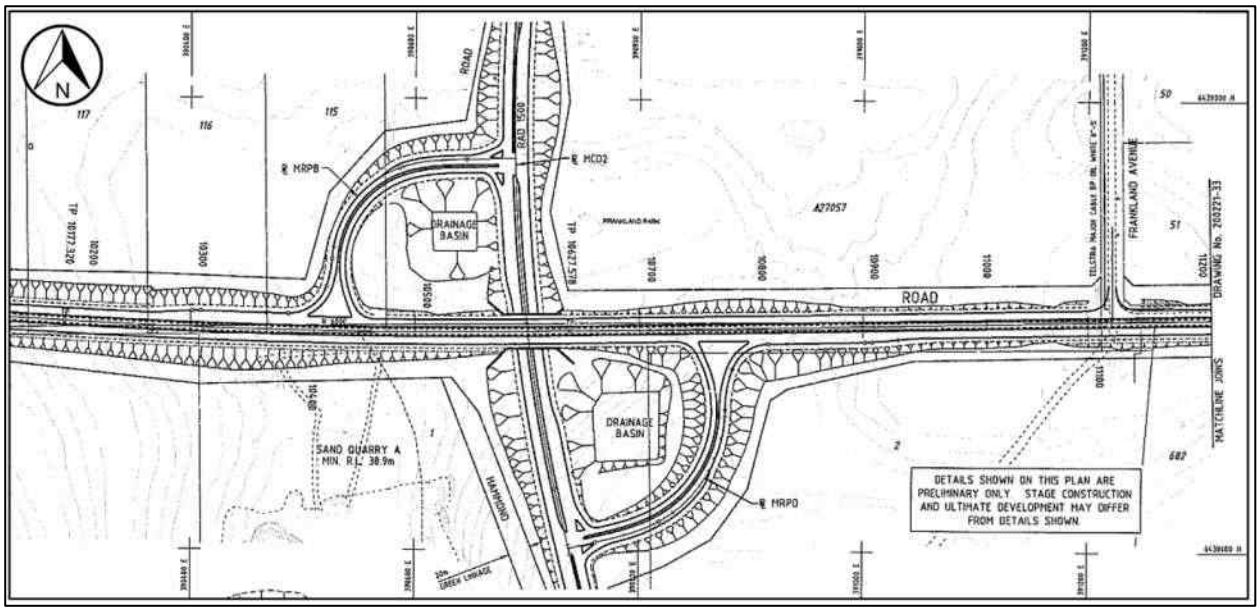
Wattleup Road is currently a significant freight route linking Kwinana Freeway with Rockingham Road. In the future, along with the residential development of the area, Wattleup Road will be downgraded into local access street as per SSDSP3. The role of freight route would be reassigned to Rowley Road, once it is extended westward.

4.1.4 Rowley Road

As per SSDSP3, Rowley Road is identified as needing to be upgraded and extended westward to Rockingham Road towards Latitude 32 industrial area and potentially the future outer harbour. In the future, Rowley Road would be the main east-west freight link as Wattleup Road would be downgraded to local access street, consistent with its future roadside environment (residential).

The intersection of Hammond and Rowley Roads is planned as a grade-separated interchange as shown in the preliminary concept proposed by Main Roads WA in **Figure 4-4**. Prior to grade separation, it is proposed that the intersection be signalised or roundabout controlled.

Figure 4-4 Rowley Road / Hammond Road Proposed Layout



Source: Main Roads (2015)

With all the planned upgrades discussed above it is anticipated that there will be an increase in traffic volumes along Hammond Road which has been taken into account in the analysis section of the report (section 6).

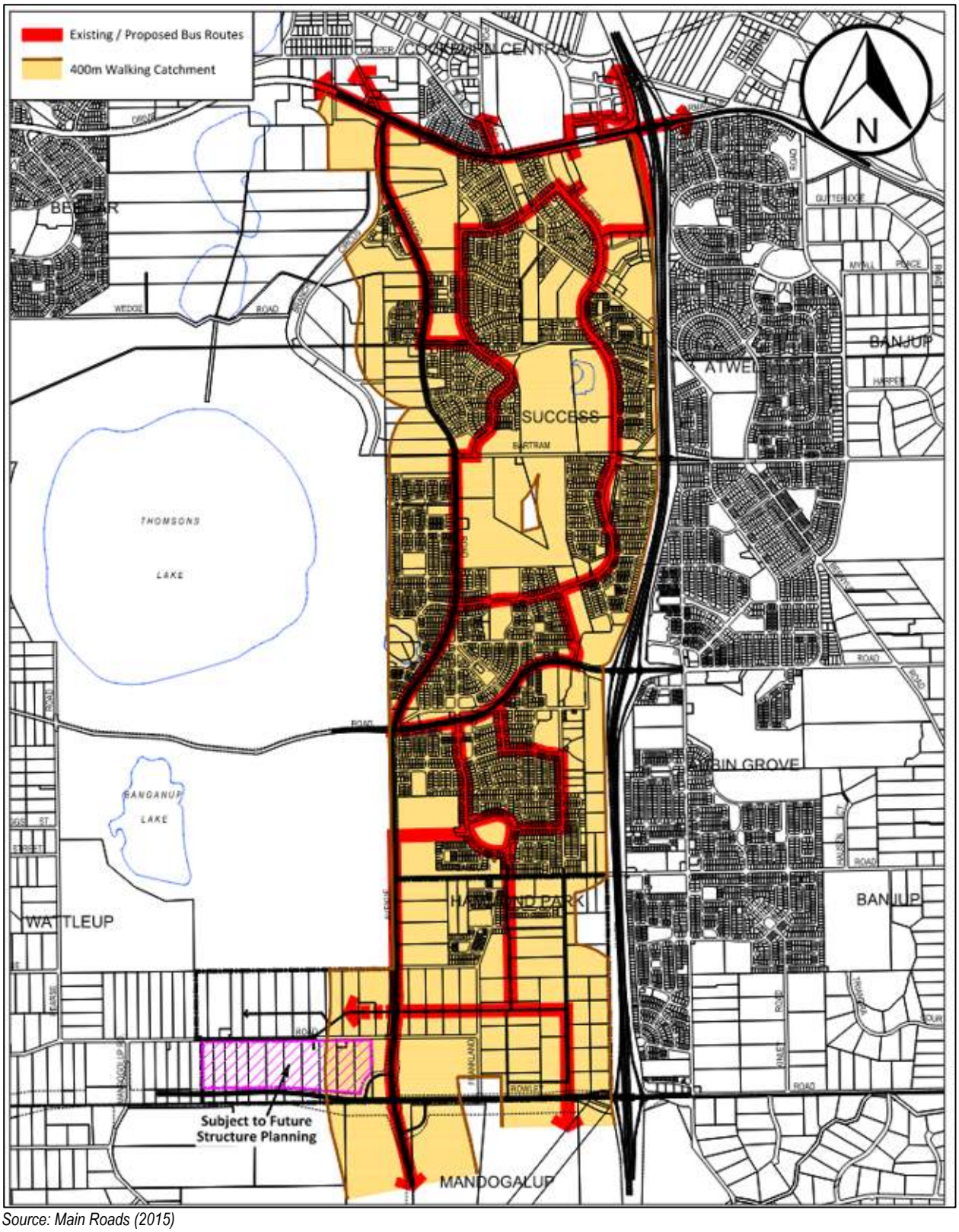
4.2 External Pedestrian / Cycle Network

As detailed in the SSDSP3, an interconnecting network of shared paths is proposed within the District Structure Plan area with the main connections being identified as Hammond Road, Rowley Road, Wattleup Road, Aubin Grove Station and the Kwinana Freeway.

4.3 Public Transport Network

The *SSDSP3* also provides information on the provision of a future bus service along Hammond Road further south from the current route (bus route 535) terminus once the road is extended. Additionally, the existing bus route that currently terminates at Hammond Park Secondary School (bus route 536) would also be extended southward. In addition, a bus route is also proposed along Whadjuk Drive. The proposed location of the future bus routes and associated walkable catchments are shown on Figure 4-5

Figure 4-5 Proposed Public Transport Routes



Source: Main Roads (2015)

5. Integration with Surrounding Area

5.1 Surrounding Attractors and Generators

As the site consists of commercial/retail land uses, it is therefore a destination and as such there would be little to no traffic from the site that would be attracted to external land uses in the surrounding area.

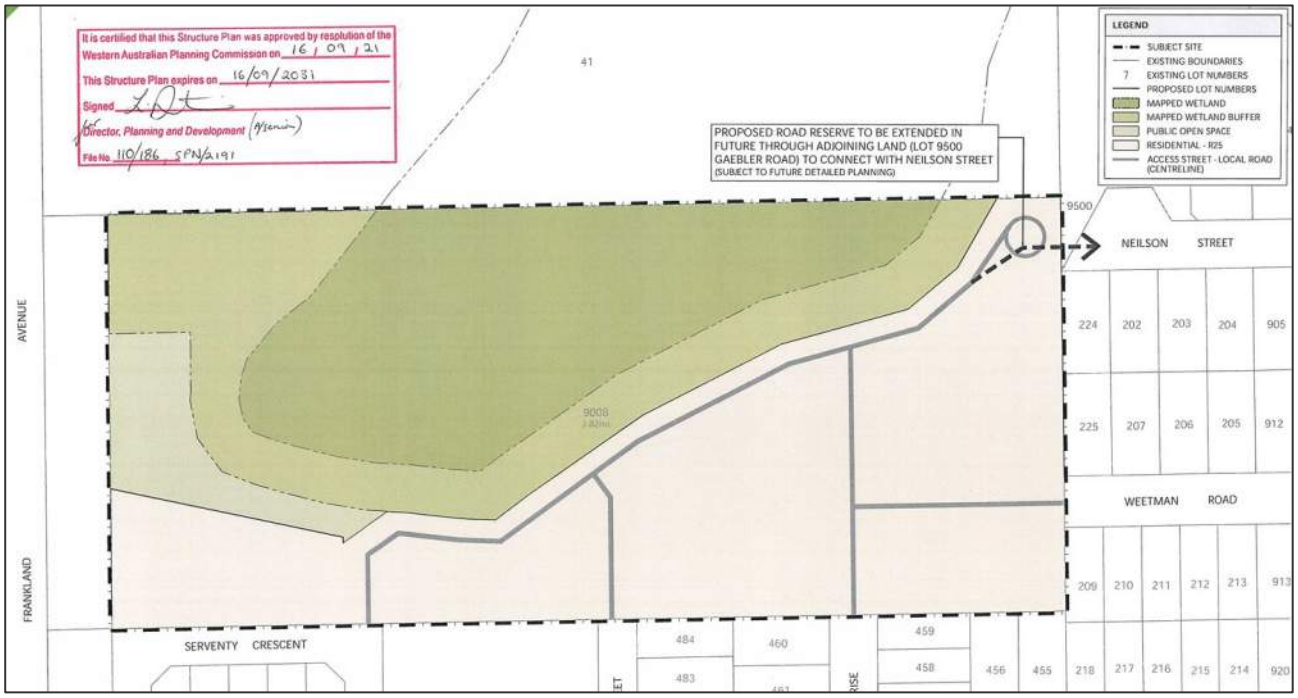
Major traffic generators would be from the surrounding residential area in the suburb of Hammond Park. These residents would visit the site to purchase food and petrol located within the site.

5.2 Proposed Changes to Surrounding Land Uses

The area surrounding the development application has mostly been developed into residential dwellings. The remaining undeveloped lots are expected to be developed into residential dwellings as well. Most of the development activity is now occurring in the southern part of the Hammond Park.

The lot immediately to the south of the development application (Lot 9008) is proposed to be developed into residential dwellings as shown in the structure plan shown in **Figure 5-1** below.

Figure 5-1 Lot 9008 Local Structure Plan



Source: Rowe Group

5.3 Accessibility To Surrounding Area

Good vehicular access to the above trip attractors is available via the existing road network within Hammond Park. Access to areas beyond the Hammond Park are provided via Hammond Road, which provides connections to neighbouring suburbs to the north. Access to Kwinana Freeway is provided via Russell Road and Rowley Road.

Bus accessibility is currently limited to route 535 and 536 and will be alleviated once road network is completed (refer Section 4.3).

Due to the nature of the development within the Site (fast food, a service station, medical centre and car wash), pedestrian and cycling trips to and from the site are expected to be limited. However, paths are available along existing roads within Hammond Park, and additional paths will be provided on the road frontages to connect to the existing path network.

6. Analysis of Transport Network

6.1 Assessment Years and Time Period

The analysis of the transport network surrounding the Site has been undertaken using SIDRA analysis software.

The assessment years used in the analysis are as follows:

- Year 2025 - Opening Year (AM and PM)
- Year 2035 - 10-year horizon after the completion of the development (AM and PM)

6.2 Analysis Overview

To identify the impact of the proposed development on the surrounding road network, the intersection performance for the following intersection has been analysed using the SIDRA analysis software tool:

> Hammond Road / Gaebler Road (future intersection layout)

> Gaebler Road / Murrumbidgee Drive

> Hammond Road / Access A

> Hammond Road / Access B

> Gaebler Road / Access C

> Gaebler Road / Access D

The weekday peak times (based on the existing traffic volumes) was identified to occur between 8:00AM to 9:00AM and 3:00PM to 4:00PM respectively during the weekday morning and afternoon peak hour periods.

The following model scenarios have been analysed as part of the assessment:

- Scenario 1 – Background 2025 (assumed opening year) + Development Traffic; and
- Scenario 2 – Background 2035 (10-year horizon) + Development Traffic.

6.3 Transport Analysis Assumptions

The following provides a list of assumptions used in this assessment.

- Based on traffic volume data provided by the city of Cockburn, a growth rate of 24% has been observed between 2019 and 2022 along Gaebler Road.
- 24% growth rate has been applied to available traffic volumes along Hammond Road to obtain 2022 volumes;
- Existing traffic volumes were obtained by applying 5% growth rate to 2022 volumes;
- The proportion of heavy vehicles was based on the Main Roads WA traffic map data and assumed to be the same for all scenarios.
- Hammond Road/ Gaebler Road intersection layout is in accordance with Metromap aerial image;
- For Scenario 1, traffic growth assumption of 5% per annum has been adopted from 2023 volumes to derive opening year background traffic volume to take account the fact that the area is a growing suburb, with the southern portion of the suburb still developing;
- For Scenario 1, Access 1 & Access 2 from Hammond Road towards the site is modelled as full movement access;
- In Scenario 2 it is assumed that Hammond Road / Gaebler Road will be upgraded as part of Hammond Road upgrade;
- Horizon year Hammond Road / Gaebler Road intersection Sidra layout modelled as per the future intersection upgrade layout provided by the city;
- For Scenario 2, a 5.00% per annum traffic growth rate is assumed along Hammond Road and Gaebler Road from existing year. However, it is anticipated that the through traffic movement along Hammond Road will be much more than the projected numbers. For most robust assessment, the through traffic movements along Hammond Road in both directions has been increased by 60% from the projected volume obtained after applying 5% growth rate from existing;

- With the Hammond Road upgrade, it is anticipated that there will be change in travel behaviour along Gaebler Road with more people expected to turn left to access freeway via Wattleup Road rather than turning right towards Hammond Road north. An increase in 30% of left turn movement is envisaged thereby reducing right turns by 30%.
- The intersection assessment was modelled as a network model using SIDRA 9 software analysis tool in accordance with Main Roads WA Operational Modelling Guidelines.
- The approach and exit speeds were based on speed limits from Main Roads WA Road Information Mapping System.
- For the purposes of this assessment passing trade trips are not included in the assessment, i.e., all trips are considered new trips

6.4 Development Trip Generation

Trip generation has been sourced from survey data undertaken by RMS New South Wales. This includes Guide to Traffic Generating Developments Updated Traffic Surveys, Trip Generation Surveys Service Stations – Analysis Report, and Trip Generation and Parking Demand Surveys of Fast Food Outlets Analysis Report. **Table 6-1** below shows the trip rates for the proposed land use, **Table 6-2** shows the directional distribution. **Table 6-3** shows the resultant trip generation.

Service station trip rates adopted are based on the average trip rates across 9 out of 10 sites surveyed in Sydney. The site being excluded is a roadhouse, which is not compatible with the proposed service station within the proposed site.

Fast food rate is based on the average surveys across McDonald's restaurants in Sydney. This is the highest generating fast-food restaurant surveyed and is therefore selected to provide a robust assessment.

For Medical centre land use ITE trip generation rate has been used. A first principal approach has been used for car wash component.

For the purposes of this assessment passing trade trips are not included in the assessment, i.e., all trips are considered new trips.

Table 6-1 Trip Generation Rate

Land Use	ITE Code/Source	AM Peak	PM Peak
Service Station	RMS	11.7 per pump	16.6 per pump
Fast Food	RMS	35.9 per 100m^2	65.4 per 100m^2
Medical Centre	ITE 630	5.62 per 100m^2	4.13 per 100m^2
Car Wash	First Principle	Avg. 10 minutes per wash	

Table 6-2 Directional Distribution

Land Use	AM Peak		PM Peak	
	IN	OUT	IN	OUT
Service Station	50%	50%	50%	50%
Fast Food	50%	50%	50%	50%
Medical Centre	80%	20%	20%	80%
Car Wash	50%	50%	50%	50%

Table 6-3 Development Trip Generation

Land Use	AM Peak		PM Peak	
	IN	OUT	IN	OUT
Service Station	47	47	66	66
Fast Food	173	173	316	316

Land Use	AM Peak		PM Peak	
Medical Centre	29	7	5	21
Car wash	18	18	18	18
Total	**267**	**245**	**405**	**421**

The land uses within the development generate a proportion of 'shared trips'. These are trips which already exist on the site for a particular land use but divert into a different land use, rather than being a new trip added to the network. A reduction of 20% has been applied as shared trips between petrol stations and fast-food units and a reduction of 40% has been applied for car wash and the net trips generated after applying the reduction is illustrated in **Table 6-4**.

Table 6-4 Net Trip Generation

Land Use	AM Peak		PM Peak	
	IN	**OUT**	**IN**	**OUT**
Service Station	37	37	53	53
Fast Food	139	139	252	252
Medical Centre	29	7	5	21
Car Wash	11	11	11	11
Total	**410**		**658**	

The proposed development is expected to generate approximately 410 trips during the AM Peak hour and 658 trips during the PM Peak hour.

6.5 Development Traffic Distribution and Assignment

Figure 6-1 to **Figure 6-6** shows the assumed trip distribution for the different land uses within the site. Majority of traffic is expected to arrive from north along Hammond Road. This assumption is based on the fact that there are currently no similar land uses in the surrounding area including north of Russell Road, and therefore the site is expected to attract some traffic from residential area north of Russell Road. Traffic from the southern area of Hammond Park would arrive mainly via Hammond Road south and Gaebler Road to a lesser extent as it has a direct connection to Rowley Road via Irvine Parade. Traffic from the eastern section of Hammond Park is expected arrive via Gaebler Road and Murrumbidgee Drive. **Figure 6-7** shows net development trips.

For Scenario 2, with the proposed upgrade of Hammond Road, Access 1 & 2 will operate as left in left out intersections and therefore the trips has been redistributed to Access C & Access D towards Gaebler Road.

Figure 6-1 Trip Distribution – Service Station (Inbound)



Figure 6-2 Trip Distribution – Service Station (Outbound)



Figure 6-3 Trip Distribution – Fast Food (Inbound)



Figure 6-4 Trip Distribution – Fast Food (Outbound)



Figure 6-5 Trip Distribution – Medical Centre & Car Wash (Inbound)



Figure 6-6 Trip Distribution – Medical Centre (Outbound)

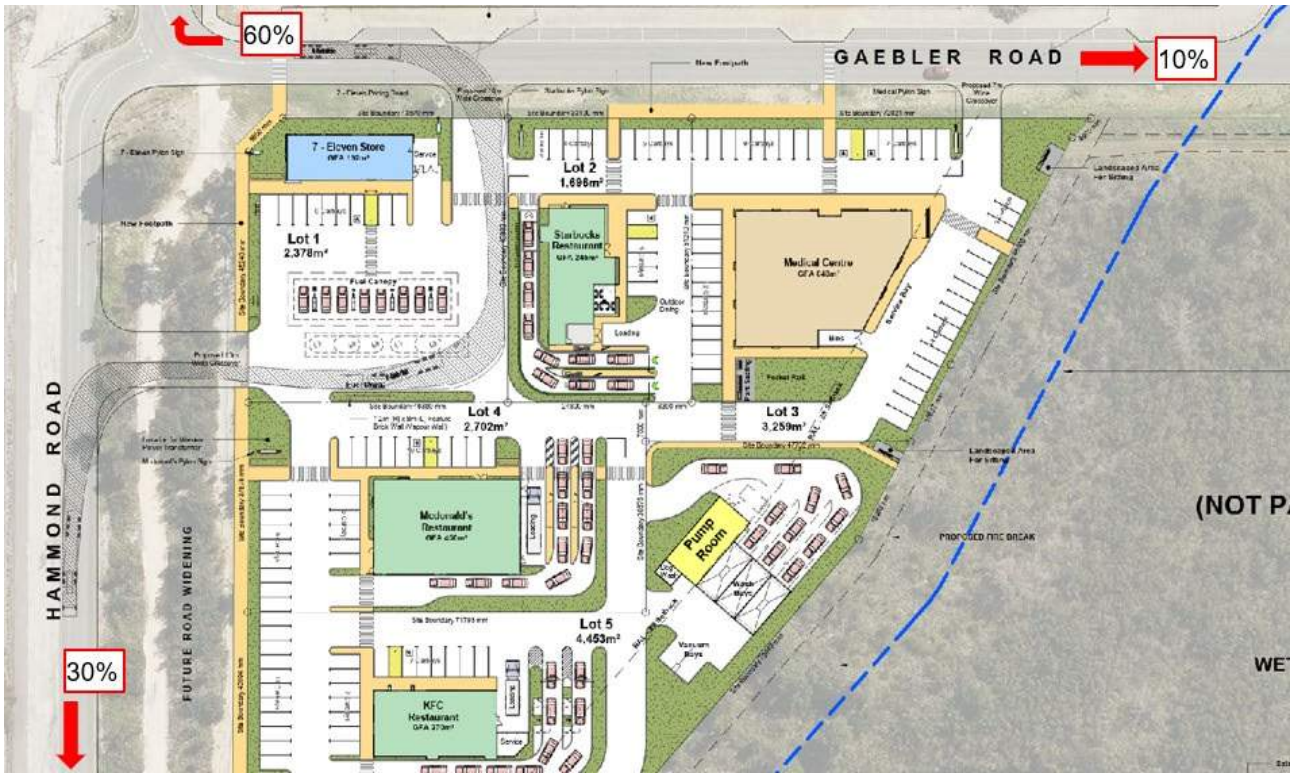
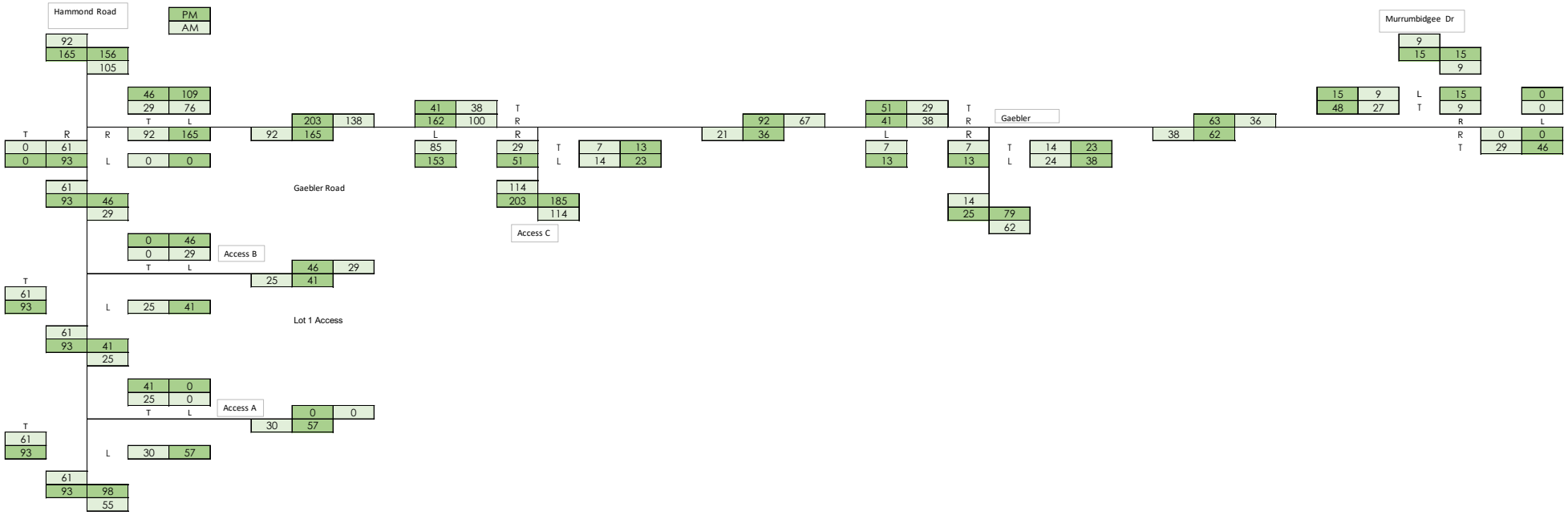


Figure 6-7 Development Trips



6.6 Background and Development Traffic

Background traffic data was sourced from available traffic data provided by the City of Cockburn. As the data provided are midblock counts, a simple gravity model has been used to derive the traffic turning movements as shown in **Figure 6-8**.

A traffic growth assumption of 5% per annum has been adopted to derive future background traffic volume to take account the fact that the area is a growing suburb, with the southern portion of the suburb still developing.

The estimated traffic volume during opening year is shown in **Figure 6-9**. It was assumed at by 2035 most significant changes in traffic volume will occur on Hammond Road (north of Gaebler Road), and Gaebler Road as part of the upgrade. **Figure 6-10** shows the traffic volumes.

Figure 6-8 Existing Traffic Volumes

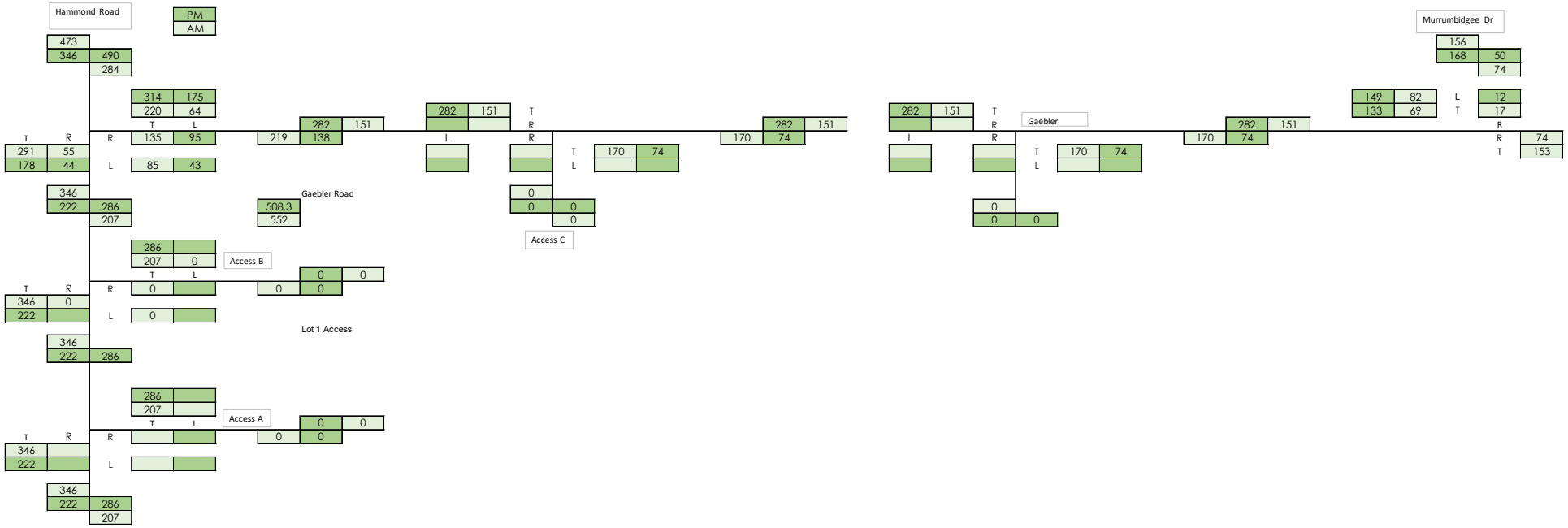


Figure 6-9 2025 + Development Traffic

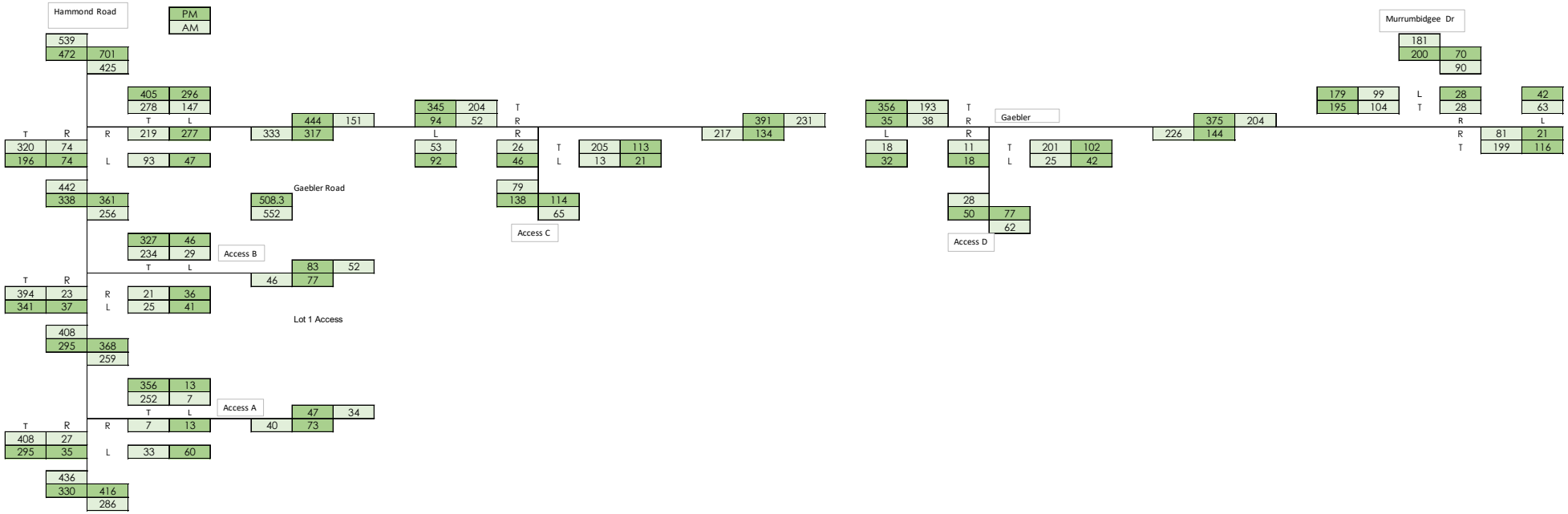
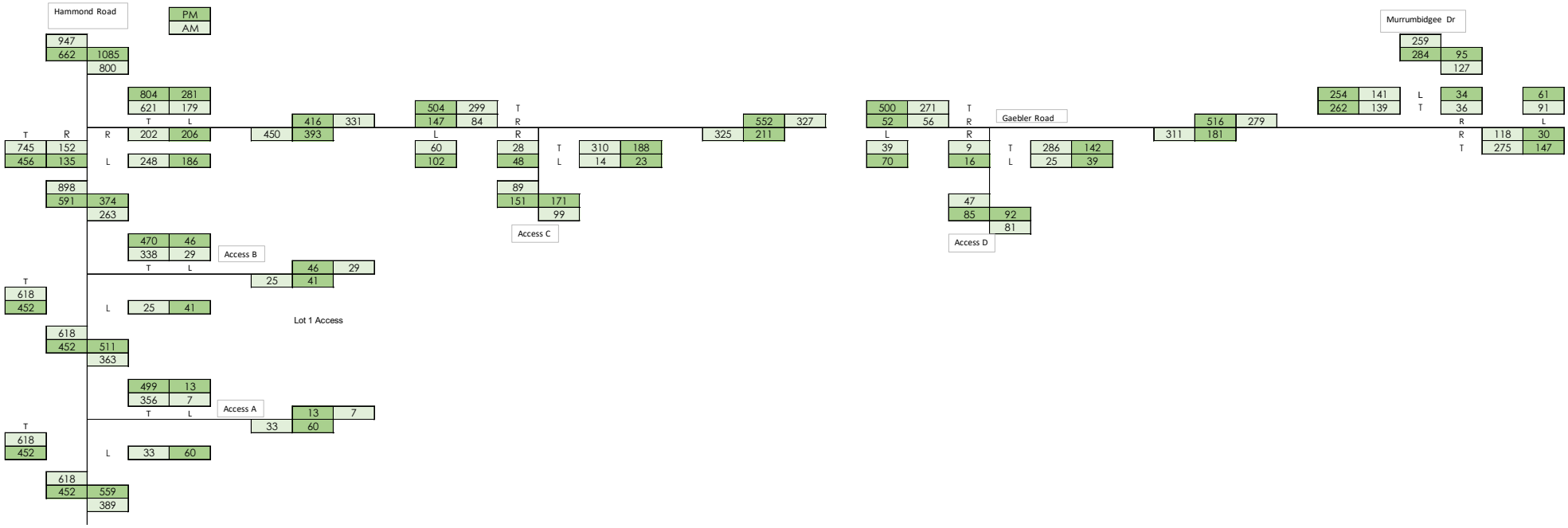


Figure 6-10 2035 + Development Traffic



6.7 Intersection Performance

6.7.1 Parameters

The subject intersections have been analysed using the SIDRA analysis program. This program calculates the performance of intersections based on input parameters, including geometry and traffic volumes. As an output SIDRA provides values for the Degree of Saturation (DOS), queue lengths, delays, level of service, and 95th Percentile Queue. These parameters are defined as follows:

- Degree of Saturation (DOS): is the ratio of the arrival traffic flow to the capacity of the approach during the same period. The DOS for an un-signalized intersection is considered critical where DOS > 0.80;
- 95th percentile Queue: is the statistical estimate of the queue length up to or below which 95% of all observed queues would be expected;
- Average Delay: is the average of all travel time delays for vehicles through the intersection; and
- Level of Service (LOS): is the qualitative measure describing operational conditions within a traffic stream and the perception by motorists and/or passengers. The different levels of service can generally be described as shown in **Table 6-5**.

Table 6-5 Level of Service (LOS) Performance Criteria

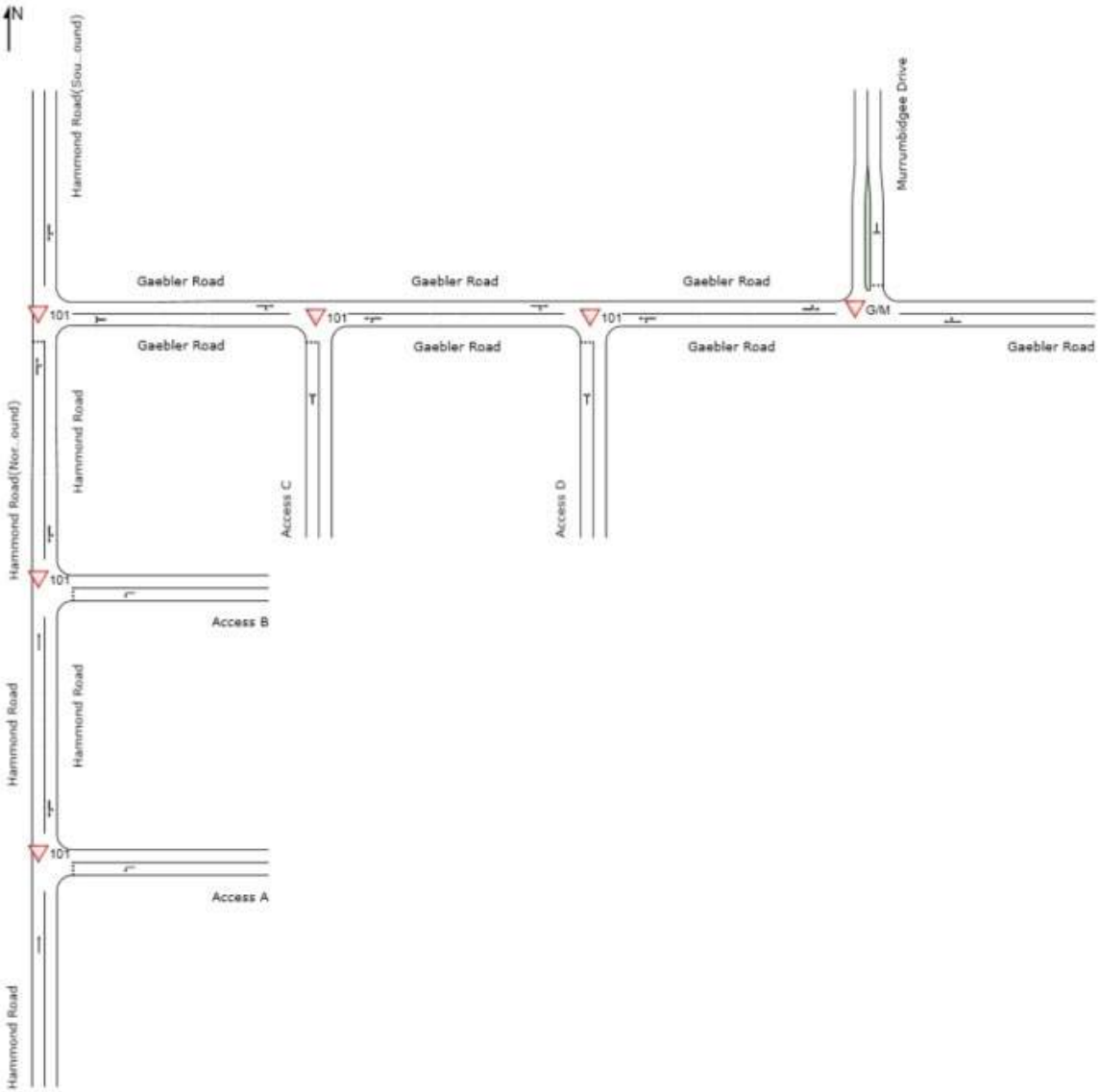
LOS	Description	Signalised Intersection	Unsignalised Intersection
A	Free-flow operations (best condition)	≤10 sec	≤10 sec
B	Reasonable free-flow operations	10 – 20 seconds	10 – 15 seconds
C	At or near free-flow operations	20 – 35 seconds	15 – 25 seconds
D	Decreasing free-flow levels	35 – 55 seconds	25 – 35 seconds
E	Operations at capacity	55 – 80 seconds	35 – 50 seconds
F	A breakdown in vehicular flow (worst condition)	≥80 sec	≥50 sec

6.8 SIDRA Analysis Results

6.8.1 Scenario 1: 2025 Background Traffic + Development Trips

Analysis has been undertaken using the SIDRA traffic analysis software. The network layout of the intersections considered in the analysis is illustrated in **Figure 6-11**. Details of the results are presented in **Appendix B**. Results for each intersection are detailed in the following sub-sections.

Figure 6-11 Sidra Network Layout (2025 Opening Year)



6.8.2 Hammond Road / Gaebler Road

The SIDRA layout of Hammond Road / Gaebler Road is shown in **Figure 6-12**. The analysis results for intersection are presented in **Table 6-6.**

Figure 6-12 Hammond Road / Gaebler Road Intersection

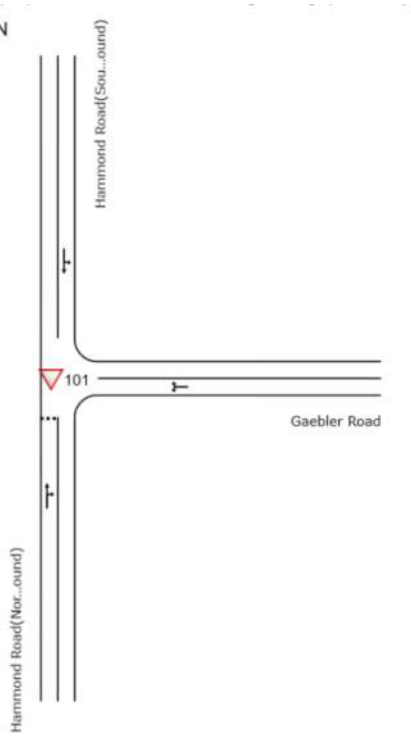


Table 6-6 Hammond Road / Gaebler Road SIDRA Results

Intersection Approach		AM peak				PM Peak			
		DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
South: Hammond Road(Northbound)	T	0.493	5.0	A	26.4	0.470	5.6	A	21.3
	R	0.493	10.8	B	26.4	0.470	18.0	C	21.3
East: Gaebler Road	L	0.273	5.6	A	10.5	0.323	6.9	A	13.4
	R	0.273	5.1	A	10.5	0.323	6.2	A	13.4
North: Hammond Road(Southbound)	L2	0.241	5.7	A	0.0	0.400	5.7	A	0.0
	T1	0.241	0.1	A	0.0	0.400	0.1	A	0.0
All vehicles		0.493	4.3	A	26.4	0.470	4.8	A	21.3

The results show that the intersection would operate satisfactorily and would be able to cater for the proposed development traffic. No significant queues and delays are expected on Hammond Road and Gaebler Road.

6.8.3 Gaebler Road / Murrumbidgee Drive

The SIDRA layout of Gaebler Road / Murrumbidgee Drive is shown in **Figure 6-13.** The analysis results for intersection are presented in **Table 6-7.**

Figure 6-13 Gaebler Road / Murrumbidgee Dr Intersection

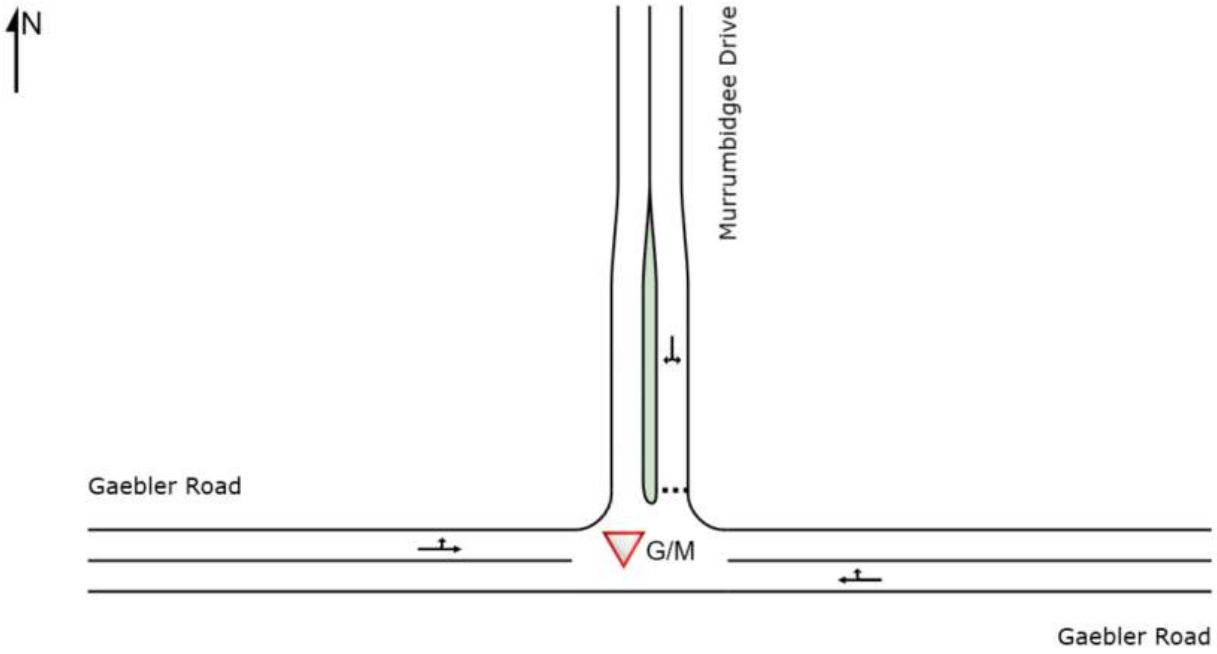


Table 6-7 Gaebler Road / Murrumbidgee Dr SIDRA Results

Intersection Approach		AM peak				PM Peak			
		DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
East: Gaebler Road	T	0.178	0.0	A	4.9	0.087	0.0	A	1.6
	R	0.178	6.5	A	4.9	0.087	8.8	A	1.6
North: Murrumbidgee Drive	L	0.087	5.0	A	2.6	0.074	5.3	A	2.1
	R	0.087	7.4	A	2.6	0.074	7.2	A	2.1
West: Gaebler Road	L	0.118	4.6	A	0.0	0.216	4.6	A	0.0
	T	0.118	0.0	A	0.0	0.216	0.0	A	0.0
All vehicles		0.178	2.6	A	4.9	0.216	2.5	A	2.1

The results show that the intersection would operate satisfactorily and would be able to cater for the proposed development traffic.

6.8.4 Hammond Road / Access A

The SIDRA layout of Hammond Road / Access A is shown in **Figure 6-14.** The analysis results for intersection are presented in **Table 6-8.**

Figure 6-14 Hammond Road / Access A Intersection

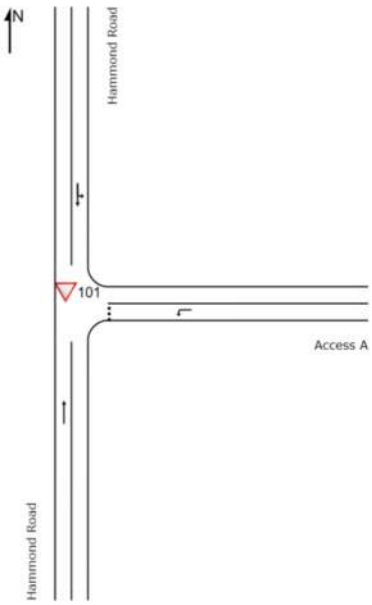


Table 6-8 Hammond Road / Access A SIDRA Results

Intersection Approach		AM peak				PM Peak			
		DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
South: Hammond Road	T	0.253	0.0	A	1.9	0.198	0.0	A	2.6
	R	0.253	7.3	A	1.9	0.198	8.6	A	2.6
East: Access A	L	0.039	3.4	A	1.1	0.078	3.9	A	2.1
	R	0.039	6.3	A	1.1	0.078	6.4	A	2.1
North: Hammond Road	L	0.144	4.6	A	0.0	0.205	4.6	A	0.0
	T	0.144	0.0	A	0.0	0.205	0.0	A	0.0
All vehicles		0.253	0.5	A	1.9	0.205	0.9	A	2.6

The results show that the access would operate satisfactorily and would be able to cater for the proposed development traffic. No significant queues and delays are expected on Hammond Road.

6.8.5 Hammond Road / Access B

The SIDRA layout of Hammond Road / Access B is shown in **Figure 6-15.** The analysis results for intersection are presented in **Table 6-9.**

Figure 6-15 Hammond Road / Access B Intersection

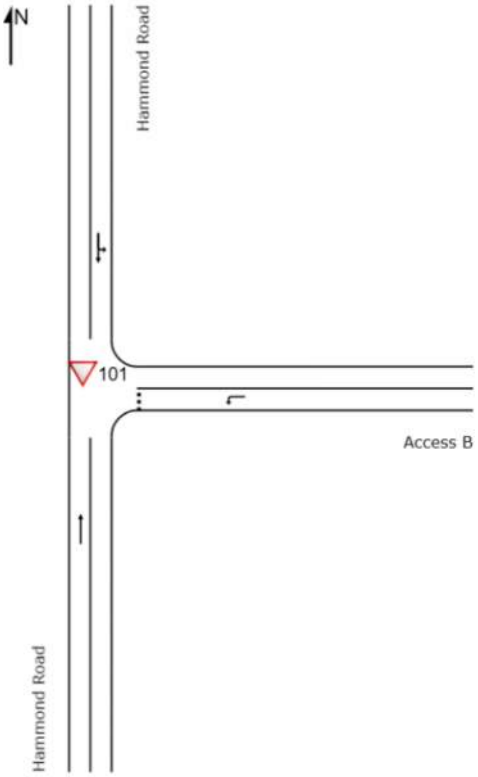


Table 6-9 Hammond Road / Access B SIDRA Results

Intersection Approach		AM peak				PM Peak			
		DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
South: Hammond Road	T	0.245	0.0	A	1.6	0.226	0.0	A	2.8
	R	0.245	7.3	A	1.6	0.226	8.7	A	2.8
East: Access B	L	0.056	3.4	A	1.4	0.102	3.8	A	2.7
	R	0.056	6.2	A	1.4	0.102	6.8	A	2.7
North: Hammond Road	L	0.147	3.0	A	0.0	0.208	3.0	A	0.0
	T	0.147	0.0	A	0.0	0.208	0.0	A	0.0
All vehicles		0.245	0.6	A	1.6	0.226	1.0	A	2.8

The results show that the access would operate satisfactorily and would be able to cater for the proposed development traffic. No significant queues and delays are expected on Hammond Road.

6.8.6 Gaebler Road / Access C

The SIDRA layout of Gaebler Road / Access C is shown in **Figure 6-16.** The analysis results for intersection are presented in **Table 6-10.**

Figure 6-16 Gaebler Road / Access C Intersection

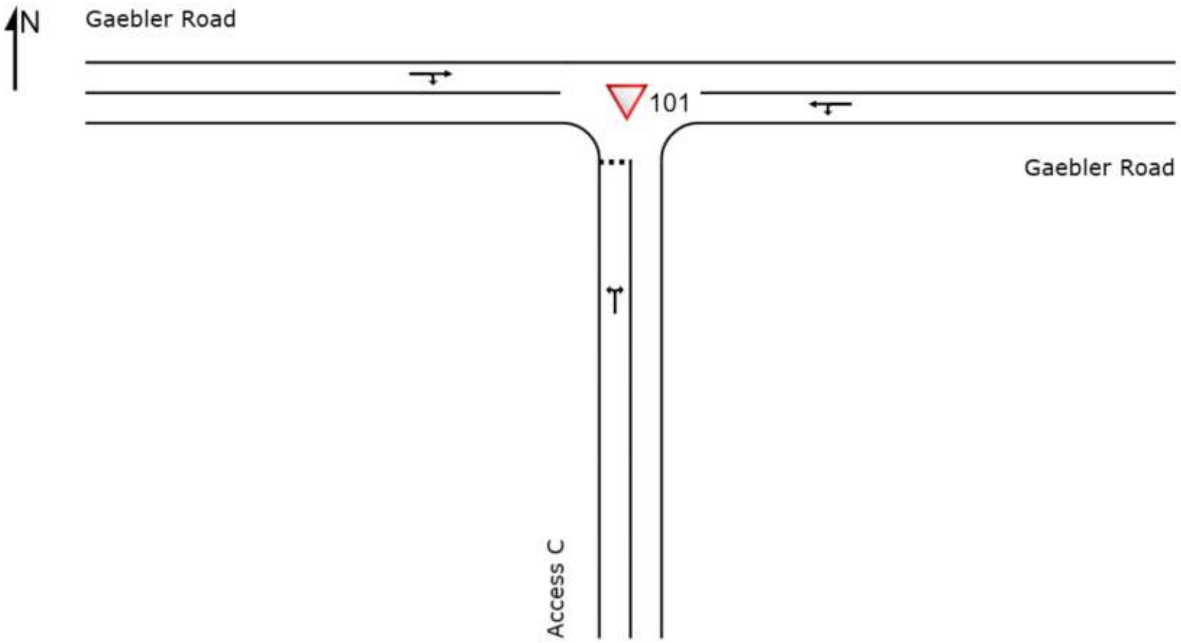


Table 6-10 Gaebler Road / Access C SIDRA Results

Intersection Approach		AM peak				PM Peak			
		DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
South: Access C	L	0.077	3.3	A	2.1	0.137	3.0	A	4.0
	R	0.077	4.7	A	2.1	0.137	5.8	A	4.0
East: Gaebler Road	L	0.126	4.1	A	0.0	0.077	4.1	A	0.0
	T	0.126	0.0	A	0.0	0.077	0.0	A	0.0
West: Gaebler Road	T	0.154	0.0	A	3.1	0.259	0.0	A	5.6
	R	0.154	5.8	A	3.1	0.259	5.1	A	5.6
All vehicles		0.154	1.2	A	3.1	0.259	1.6	A	5.6

The results show that the access would operate satisfactorily and would be able to cater for the proposed development traffic. No significant queues and delays are expected on Gaebler Road.

6.8.7 Gaebler Road / Access D

The SIDRA layout of Gaebler Road / Access D is shown in **Figure 6-17.** The analysis results for intersection are presented in **Table 6-11.**

Figure 6-17 Gaebler Road / Access D Intersection

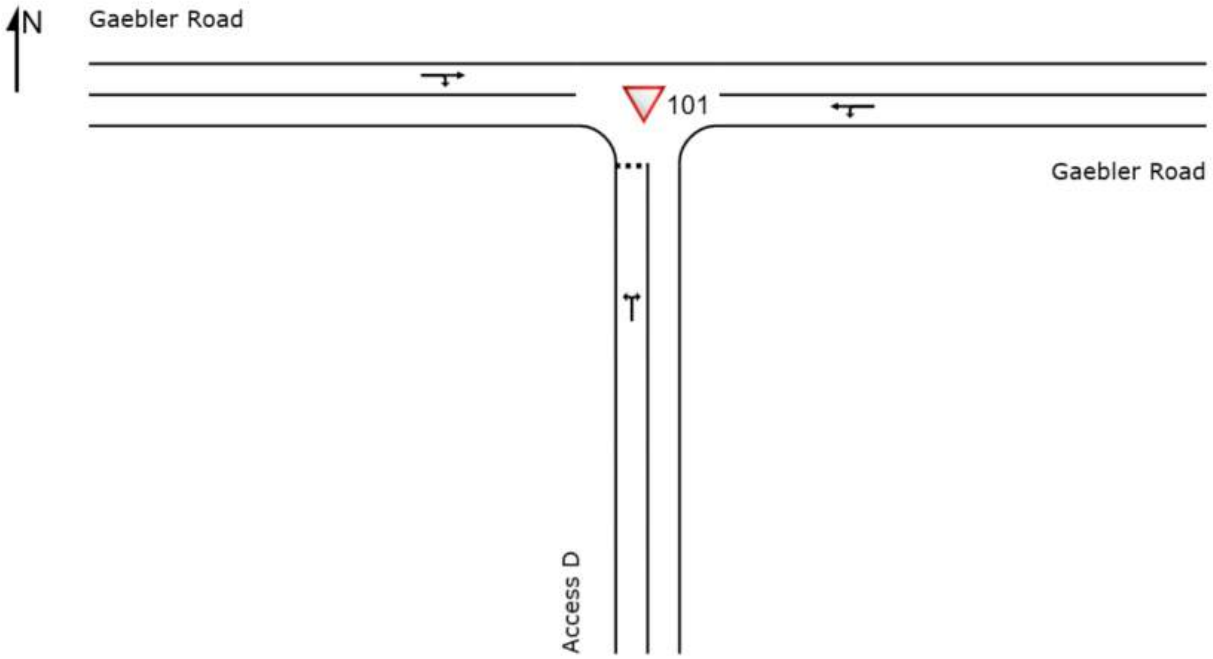


Table 6-11 Gaebler Road / Access D SIDRA Results

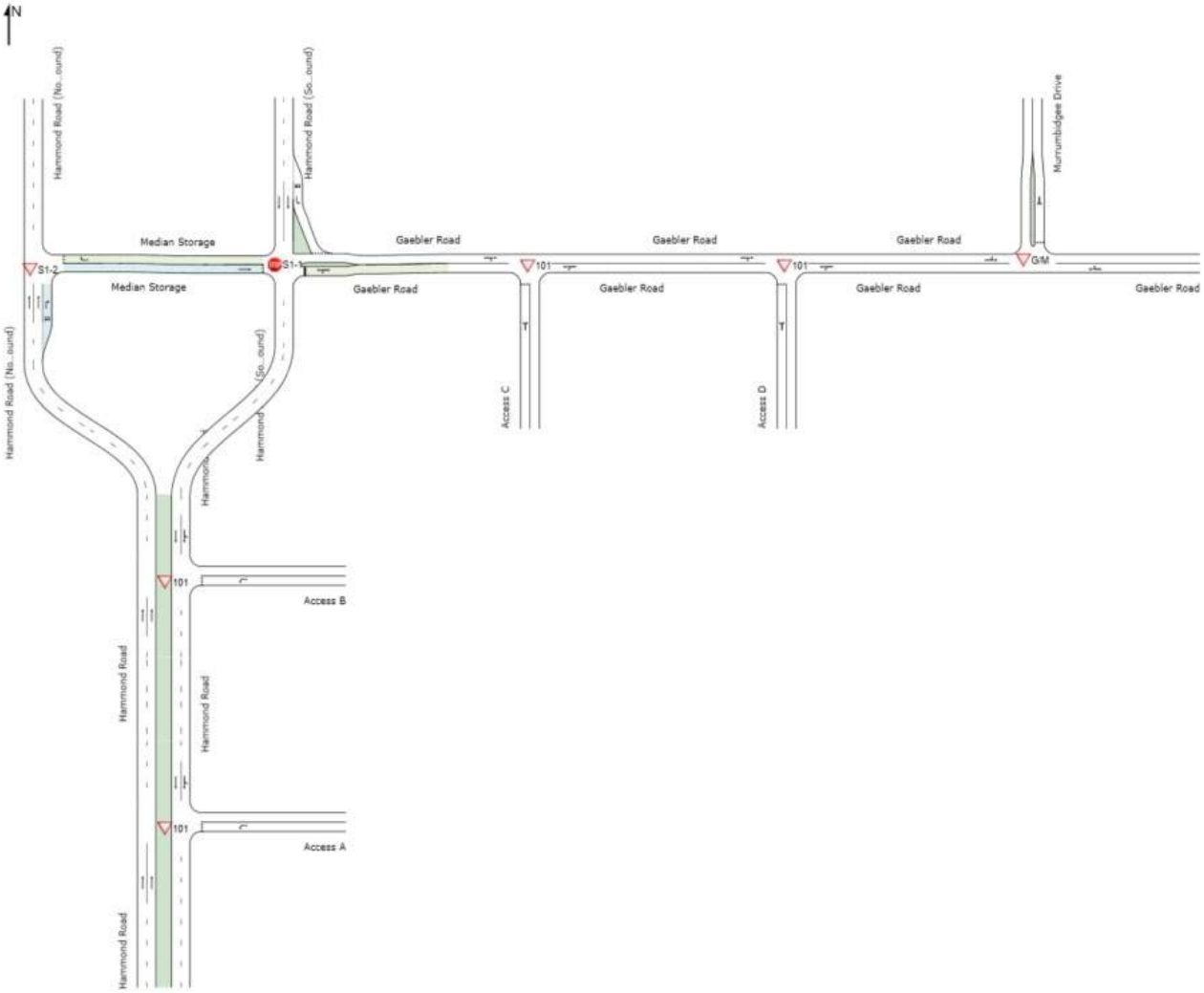
Intersection Approach		AM peak				PM Peak			
		DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
South: Access D	L	0.028	3.2	A	0.7	0.048	2.9	A	1.3
	R	0.028	4.4	A	0.7	0.048	5.0	A	1.3
East: Gaebler Road	L	0.130	4.6	A	0.0	0.083	4.6	A	0.0
	T	0.130	0.0	A	0.0	0.083	0.0	A	0.0
West: Gaebler Road	T	0.137	0.0	A	2.3	0.224	0.0	A	2.2
	R	0.137	6.1	A	2.3	0.224	5.4	A	2.2
All vehicles		0.137	0.9	A	2.3	0.224	1.0	A	2.2

The results show that the access would operate satisfactorily and would be able to cater for the proposed development traffic. No significant queues and delays are expected on Gaebler Road.

6.8.8 Scenario 2: 2035 Background Traffic + Development Trips

The assumptions considered with the upgrade of Hammond Road has been included in Section 6.3. Analysis has been undertaken using the SIDRA traffic analysis software. The network layout of the intersections considered in the analysis is illustrated in **Figure 6-18**. Details of the results are presented in **Appendix B**. Results for each intersection are detailed in the following sub-sections.

Figure 6-18 Sidra Network Layout (2035 Horizon Year)



6.8.9 Hammond Road / Gaebler Road

The SIDRA layout of Hammond Road / Gaebler Road is shown in **Figure 6-19**. The analysis results for intersection are presented in **Table 6-12.**

Figure 6-19 Hammond Road / Gaebler Road Intersection (Upgrade)

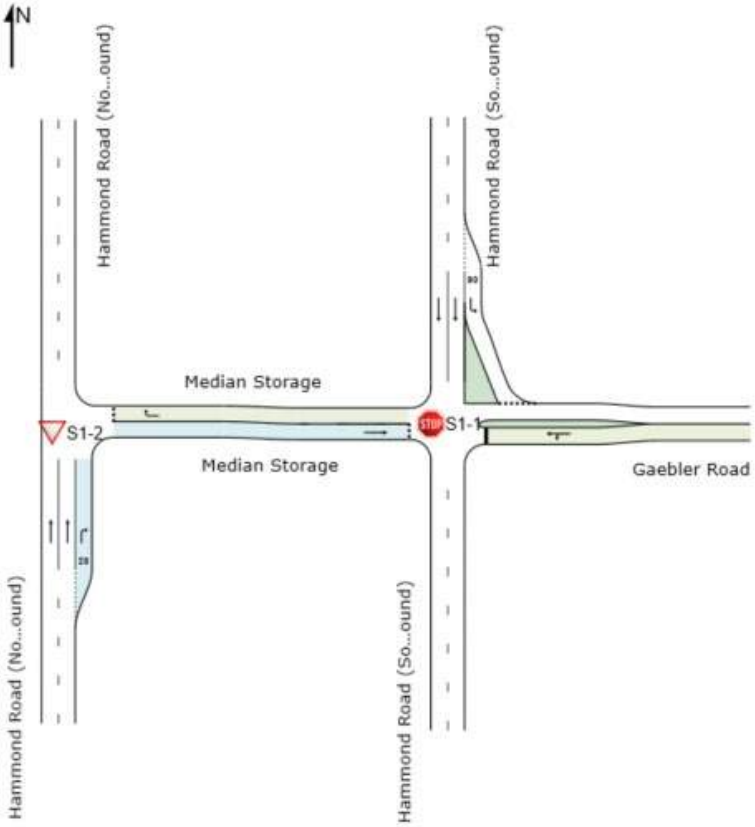


Table 6-12 Hammond Road / Gaebler Road SIDRA Results

Intersection Approach		AM peak				PM Peak			
		DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
South: Hammond Road(Northbound)	T	0.213	0.0	A	0.0	0.130	0.0	A	0.0
	R	0.296	6.3	A	5.8	0.319	7.3	A	6.7
East: Gaebler Road	L	0.708	13.8	B	56.2	0.877	25.7	D	85.6
	R	0.708	26.2	C	62.0	0.877	41.7	E	89.7
North: Hammond Road (Southbound)	L	0.156	6.4	A	5.1	0.240	6.4	A	8.5
	R	0.169	0.0	A	0.0	0.223	0.1	A	0.0

The results show that the intersection would operate satisfactorily and would be able to cater for the proposed development traffic with the proposed Hammond Road upgrade. Hammond Road and Gaebler Road shouldn't see any substantial congestion or delays.

The right turn movement from Gaebler Road towards Hammond Road north displays a 41.7sec delay during PM peak hour. The intersection is modelled as a staged crossing; hence it should be noted that the 41.7-second delay is deemed acceptable because it occurs at the two staged crossing zones.

6.8.10 Hammond Road / Access A

The SIDRA layout of Hammond Road / Access A is shown in **Figure 6-20.** The analysis results for intersection are presented in **Table 6-13.**

Figure 6-20 Hammond Road / Access A Intersection

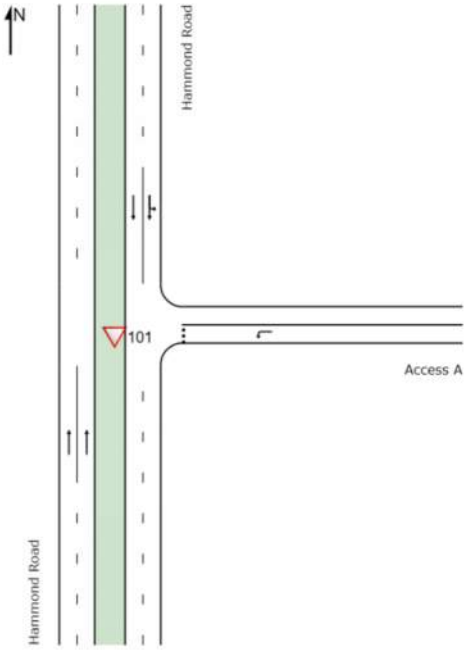


Table 6-13 Hammond Road / Access A SIDRA Results – 2035 + Development

Intersection Approach		AM peak				PM Peak			
		DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
South: Hammond Road	T	0.176	0.1	A	0.0	0.128	0.0	A	0.0
East: Access A	L	0.028	3.3	A	0.7	0.058	3.7	A	1.5
North: Hammond Road	L	0.099	4.6	A	0.0	0.139	4.6	A	0.0
	R	0.099	0.0	A	0.0	0.139	0.0	A	0.0
All vehicles		0.176	0.1	A	0.7	0.139	0.2	A	1.5

The SIDRA results shows that the overall performance of this access is expected to be within acceptable levels.

6.8.11 Hammond Road / Access B

The SIDRA layout of Hammond Road / Access B is shown in **Figure 6-21.** The analysis results for intersection are presented in **Table 6-14.**

Figure 6-21 Hammond Road / Access B Intersection

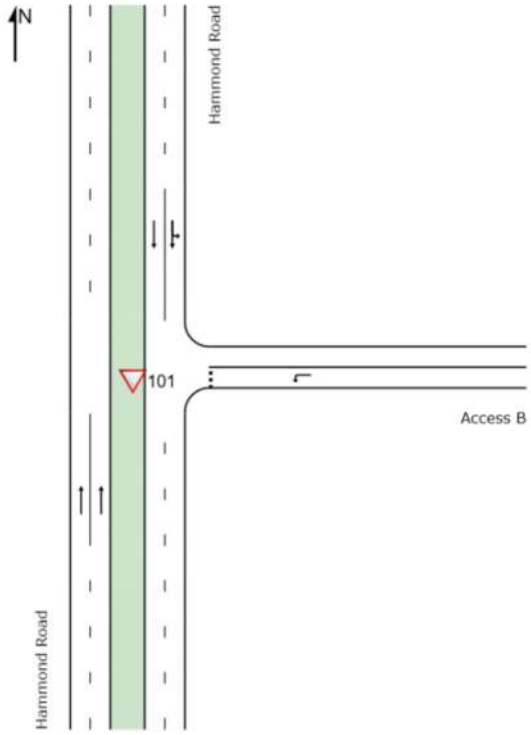


Table 6-14 Hammond Road / Access B SIDRA Results – 2035 + Development

Intersection Approach		AM peak				PM Peak			
		DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
South: Hammond Road	T	0.176	0.0	A	0.0	0.128	0.0	A	0.0
East: Access B	L	0.023	3.2	A	0.6	0.040	3.4	A	1.1
North: Hammond Road	L	0.100	3.0	A	0.0	0.140	3.0	A	0.0
	R	0.100	0.0	A	0.0	0.140	0.0	A	0.0
All vehicles		0.176	0.2	A	0.6	0.140	0.3	A	1.1

The SIDRA results shows that the overall performance of this access is expected to be within acceptable levels.

6.8.12 Gaebler Road / Access C

The SIDRA layout of Gaebler Road / Access C is shown in **Figure 6-16.** The analysis results for intersection are presented in **Table 6-15.**

Table 6-15 Hammond Road / Access C SIDRA Results – 2035 + Development

Intersection Approach		AM peak				PM Peak			
		DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
South: Access C	L	0.123	3.7	A	3.4	0.228	3.0	A	6.6
	R	0.123	6.5	A	3.4	0.228	8.9	A	6.6
East: Gaebler Road	L	0.170	4.1	A	0.0	0.091	4.1	A	0.0
	T	0.170	0.0	A	0.0	0.091	0.0	A	0.0
West: Gaebler Road	L	0.239	0.6	A	6.9	0.390	0.3	A	11.6
	R	0.239	5.3	A	6.9	0.390	4.7	A	11.6
All vehicles		0.239	1.6	A	6.9	0.390	1.9	A	11.6

The SIDRA results shows that the overall performance of this access is expected to be within acceptable levels.

6.8.13 Gaebler Road / Access D

The SIDRA layout of Gaebler Road / Access D is shown in **Figure 6-17.** The analysis results for intersection are presented in **Table 6-16.**

Table 6-16 Hammond Road / Access D SIDRA Results – 2035 + Development

Intersection Approach		AM peak				PM Peak			
		DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
South: Access D	L	0.017	3.5	A	0.4	0.033	3.0	A	0.8
	R	0.017	5.4	A	0.4	0.033	6.5	A	0.8
East: Gaebler Road	L	0.179	4.6	A	0.0	0.103	4.6	A	0.0
	T	0.179	0.0	A	0.0	0.103	0.0	A	0.0
West: Gaebler Road	L	0.183	0.3	A	2.8	0.312	0.1	A	3.0
	R	0.183	5.5	A	2.8	0.312	5.0	A	3.0
All vehicles		0.183	0.7	A	2.8	0.312	0.7	A	3.0

The SIDRA results shows that the overall performance of this access is expected to be within acceptable levels.

6.8.14 Gaebler Road / Murrumbidgee Drive

The SIDRA layout of Gaebler Road / Murrumbidgee Drive is shown in **Figure 6-13.** The analysis results for intersection are presented in **Table 6-17.**

Table 6-17 Gaebler Road / Murrumbidgrr Dr SIDRA Results – 2035 + Development

Intersection Approach		AM peak				PM Peak			
		DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)
East: Gaebler Road	T	0.258	0.7	A	8.6	0.119	0.9	A	2.9
	R	0.258	6.1	A	8.6	0.119	7.5	A	2.9
North: Murrumbidgee Drive	L	0.133	5.1	A	4.0	0.110	5.7	A	3.2
	R	0.133	9.0	A	4.0	0.110	8.4	A	3.2
West: Gaebler Road	L	0.162	4.6	A	0.0	0.298	4.6	A	0.0
	R	0.162	0.0	A	0.0	0.298	0.0	A	0.0
All vehicles		0.258	2.9	A	8.6	0.298	2.7	A	3.2

The SIDRA results shows that the overall performance of this intersection is expected to be within acceptable levels.

6.8.15 Overall SIDRA Summary

Most of the intersections, including the accesses are operating at a satisfactory capacity during Scenario 1. However, in Scenario 2, the right turn volumes from Gaebler Road towards Hammond Road north exhibit a 41.7-second delay and operate at a LOS E at the intersection of Hammond Road and Gaebler Road. It is important to acknowledge that the intersection is modelled as a staged crossing and therefore the 41.7-second delay is deemed acceptable since it occurs at the two staged crossing regions.

6.9 Interaction with Neighbouring Primary School

The site is located opposite Hammond Park Primary School, and some interaction between the site and school traffic may occur. **Figure 6-22** shows the neighbouring public school.

Figure 6-22 Neighbouring Primary School



Source: Metromap

Based on Stantec's work in providing traffic management advice to Hammond Park Primary School, the following observation were made with regards to the school traffic:

- Pick up and drop off activity mainly occur in the school northern car park on Eucalyptus Drive and the car park on Murrumbidgee Drive. There are some activities on Gaebler Road, however it is not nearly as busy as the other two car parks.
- Classes commences at 8:50 AM and end at 3:00PM. In the AM peak, school traffic would arrive steadily prior to class commencing, while in the PM peak, some parents will arrive before the classes end and be parked in available on-street parking or within the school car park. While school pick up and drop off activity would result in some congestion, it is generally short in duration and traffic condition would return to normal afterwards.

Based on the above, while the AM peak of the school and the site may coincide, it is expected that interaction between school and site traffic would be minimal, as most of the pick-up drop-off activity occurs on different roads.

In the PM peak, it is not expected that the school and site traffic would coincide. School PM peak traffic would typically start as soon as the school ends at 3:00PM and only for a short duration, while the site traffic would experience peak traffic period closer to 5:00PM-6:00PM. Therefore, no significant interaction between school and site traffic is expected in the PM peak.

Land uses within the site will have their own car parking, and therefore are not expected to utilise any of the existing on-street parking along the school frontages.

It is also important to note that another primary school is planned to be constructed in the near future within the southern area of Hammond Park (near Wattleup Road). This would reduce the catchment area of Hammond Park Primary school and may result in a reduction in overall school traffic in the vicinity of Hammond Park Primary School and the site, therefore reducing interactivity between the site and school traffic.

7. Summary and Conclusions

This assessment has been prepared in accordance with the *WAPC Transport Assessment Guidelines for Developments: Volume 4 – Individual Developments (2016)*

The following conclusions have been made in regard to the proposed site:

- The site is proposed to yield 5 lots, which will be developed into a service station, three fast-food outlets, a medical centre and car wash;
- The site proposes 2 access on Gaebler Road and 2 access on Hammond Road. Access points on Gaebler Road allows full turning movements, while access points along Hammond Road would allow for full movement before the upgrade of Hammond Road and left-in left-out only with the duplication of Hammond Road and a solid median would prevent right turn movements. The site is also proposing an easement that linking the lots within the site, providing flexibility in access and egress.
- The proposed access arrangement was designed to provide optimum vehicular circulation through the various land uses within the site. The access arrangement provides individual access for the land uses within the site, therefore distributing traffic more evenly between the access points and reducing possibility of congestion at the access that could overspill into the road network, as well as minimising conflict within the site itself.
- Analysis of the key intersections has been undertaken with the following conclusions:
  - Existing Hammond Road and Gaebler Road intersection will be able to cater for the site traffic and the estimated background traffic growth during the opening year.
  - Future upgraded Hammond Road and Gaebler Road intersection indicates that the intersection will be able to perform satisfactorily during the horizon year. During the PM peak hour the Right turn movement from Gaebler Road is showing a delay of 41.7 seconds. It should be noted that the intersection is modelled as a staged crossing and the 41.7s delay is noticed to be at the two staged crossing areas and therefore considered to be acceptable.
  - The intersection of Gaebler Road and Murrumbidgee Drive would be able to cater for the site traffic and the estimated background traffic growth.
  - All access points perform satisfactorily, with no extensive queuing and delay expected on the surrounding road network.
  - No upgrades are required as part of the proposed development, apart from the planned Hammond Road duplication and Hammond Road / Gaebler Road intersection upgrade planned by the city.
- Interaction with Hammond Park Primary School traffic in the AM and PM peak at Gaebler Road is expected to be minimal, as most of drop-off and pick-up activity does not occur at Gaebler Road. Additionally, the PM peak hour of the school and the land uses does not coincide, therefore no overlap of PM peak traffic activity would occur.

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Appendix A. WAPC CHECKLIST

Item	Provided	Comments/Proposals
Summary		
Introduction/Background		
name of applicant and consultant	Section 1	
development location and context	Section 2	
brief description of development proposal	Section 2	
key issues	Section 2	
Background information	Section 2	
Existing situation		
existing site uses (if any)	Section 2	
existing parking and demand (if appropriate)	Section 2	
existing access arrangements	Section 2	
existing site traffic	Section 2	
surrounding land uses	Section 2	
surrounding road network	Section 2	
traffic management on frontage roads	NA	
traffic flows on surrounding roads (usually am and pm peak hours)	Section 2	
traffic flows at major intersections (usually am and pm peak hours)	Section 2	
operation of surrounding intersections	Section 6	
existing pedestrian/cycle networks	Section 2	
existing public transport services surrounding the development	Section 2	
Crash data	Section 2	
Development proposal		
proposed land uses	Section 3	
table of land uses and quantities	Section 3	
access arrangements	Section 3	
parking provision	Section 3	

end of trip facilities	NA	
any specific issues	Section 2	
road network	Section 2	
intersection layouts and controls	Section 6	
pedestrian/cycle networks and crossing facilities	Section 4	
public transport services	Section 4	
Integration with surrounding area	Section 5	
surrounding major attractors/generators	Section 5	
committed developments and transport proposals	N/A	
proposed changes to land uses within 1200 metres	N/A	
travel desire lines from development to these attractors/generators	N/A	
adequacy of existing transport networks	Section 2	
deficiencies in existing transport networks	N/A	
remedial measures to address deficiencies	N/A	
Analysis of transport networks		
assessment years	Section 6	
time periods	Section 6	
development generated traffic	Section 6	
distribution of generated traffic	Section 6	
parking supply & demand	Section 3	
base and "with development" traffic flows	Section 6	
analysis of development accesses	Section 6	
impact on surrounding roads	Section 6	
impact on intersections	Section 6	
impact on neighbouring areas	Section 6	
traffic noise and vibration	N/A	
road safety	N/A	
public transport access	Section 2	
pedestrian access / amenity	Section 2	
cycle access / amenity	Section 2	

analysis of pedestrian / cycle networks	Section 2	
safe walk/cycle to school (for residential and school site developments only)	N/A	
Traffic management plan (where appropriate)	N/A	

Appendix B. SITE PLANS



SITE CRITERIA

LOT 1

1. Site Area		**2,378m²**
2. Landscaping		
a. Required Soft L/S	**10% Of Site**	**238m²**
OR	**5% + Verge**	**119m²**
b. Provided		
i. Soft		267m²
ii. Hard		85m²
	Total	**352m²**
3. Floor Area (GFA)		
a. Convenience Store		**192m²**
4. Carparking		**Carbays**
a. Cars Required	192m² @ 1/15m²	13
	1 Per Employee	2
	Total	**15**
b. Cars Provided		
i. On Grade		9
ii. Fuel Canopy		8
	Total	**17**

LOT 2

1. Site Area		**1,696m²**
2. Landscaping		
a. Required Soft L/S	**10% Of Site**	**170m²**
OR	**5% + Verge**	**85m²**
b. Provided		
i. Soft		222m²
ii. Hard		195m²
	Total	**417m²**
3. Floor Area (GFA)		
a. Fast Food		**245m²**
4. Carparking		**Carbays**
a. Cars Required	245m² @ 1/15m²	**17**
b. Cars Provided		
i. On Grade		14
ii. Drive Thru'		10
	Total	**24**

LOT 3

1. Site Area		**3,259m²**
2. Landscaping		
a. Required Soft L/S	**10% Of Site**	**326m²**
OR	**5% + Verge**	**163m²**
b. Provided		
i. Soft		477m²
ii. Hard		354m²
	Total	**831m²**
3. Floor Area (GFA)		
a. Medical Centre		**640m²**
4. Carparking		**Carbays**
a. Cars Required	10 Practitioner @ 5 Per	**50**
b. Cars Provided		
i. On Grade		**45**

LOT 4

1. Site Area		**2,702m²**
2. Landscaping		
a. Required Soft L/S	**10% Of Site**	**270m²**
OR	**5% + Verge**	**135m²**
b. Provided		
i. Soft		327m²
ii. Hard		166m²
	Total	**493m²**
3. Floor Area (GFA)		
a. Fast Food		**450m²**
4. Carparking		**Carbays**
a. Cars Required	450m² @ 1/15m²	**30**
b. Cars Provided		
i. On Grade		25
ii. Drive Thru'		12
	Total	**37**

LOT 5

1. Site Area		**4,453m²**
2. Landscaping		
a. Required Soft L/S	**10% Of Site**	**445m²**
OR	**5% + Verge**	**223m²**
b. Provided		
i. Soft		867m²
ii. Hard		108m²
	Total	**975m²**
3. Floor Area (GFA)		
a. Fast Food		**270m²**
4. Carparking		**Carbays**
a. Cars Required	270m² @ 1/15m²	**18**
b. Cars Provided		
i. On Grade		25
ii. Drive Thru'		10
	Total	**35**

Landscaping
A. Hard Landscaping
Defined as paved walkways either open or covered.
B. Soft Landscaping
Defined as vegetative landscaping.

Gross Floor Area : GFA
A. All Floor Areas on this plan are shown as GROSS FLOOR AREA. Unless otherwise noted as Nett Floor Area
B. Definition of Gross Floor Area is defined as:
i/ GROSS FLOOR AREA OF TENANCY:
Gross Floor Area of an individual Tenancy is defined as the area contained between the centre line of common tenancy walls and the outside edge of external walls.
ii/ GROSS FLOOR AREA OF A BUILDING:
Gross Flor Area of a Building is defined as the total area contained between the outside edge of external walls

COMPOSITE SITE CRITERIA

1. Site Area		
a. Lot 1		2,378m²
b. Lot 2		1,696m²
c. Lot 3		3,259m²
d. Lot 4		2,702m²
e. Lot 5		4,453m²
	Total	**14,488m²**
2. Landscaping		
a. Provided		
i.Soft		2,160m²
ii. Hard		908m²
	Total	**3,068m²**
3. Floor Area (GFA)		
a. Convenience Store		192m²
b. Food Restuarant		965m²
c. Medical Centre		640m²
	Total	**1,797m²**
4. Carparking		
a. Required		**Carbays**
Convenience Store	192m² @ 1/15m²	13
	1 Per Employee	2
Food Restuarant	965m² @ 1/15m²	65
Medical Centre	10 Prac @ 5 Per	50
	Total	**130**
b. Cars Provided		
i. On Grade		118
ii. Drive Thru'		32
iii. Fuel Canopy		8
	Total	**158**

SITE PLAN
SCALE: 1 : 500

meyer shircore architects

PROPOSED MIXED USE DEVELOPMENT

LOCATION : LOT 9501 CNR GAEBLER ROAD & HAMMOND ROAD, HAMMOND PARK
FOR : BROAD VISION PROJECTS

Member Australian Institute of Architects

DATE: OCT 2023
REVISION: SK015
SHEET: 4
SCALE: 1 : 500 @B1
PROJECT NUMBER **22-9101**

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Appendix C. SWEPT PATHS

GAEBLER ROAD

New Footpath

7 - Eleven Pricing Board

Proposed 10m Wide Crossover

Site Boundary 43679 mm

8500 mm

7 - Eleven Pylon Sign

7 - Eleven Store
GFA 192m²

Service

9 Carbays

New Footpath

Lot 1
2,378m²

Site Boundary 45240 mm

Fuel Canopy

Proposed 10m Wide Crossover

Fuel Drop

Site Boundary 46860 mm

1.2m (H) x 8m (L) Feature Brick Wall (Vapour Wall)

Location for Western Power Transformer

Mcdonald's Pylon Sign

FUTURE ROAD WIDENING

Site Boundary 37675 mm

Site Boundary 40094 mm

9 Carbays

11 Carbays

Site Boundary 43800 mm

Starbucks Pylon Sign

Site Boundary 33100 mm

Waiting Bay

4 Carbays

5 Carbays

9 Carbays

Lot 2
1,696m²

Starbucks Restaurant
GFA 245m²

5 Carbays

Loading

Outdoor Dining

Site Boundary 51240 mm

12 Carbays

Medical Pylon Sign

Site Boundary 72021 mm

7 Carbays

Proposed 7m Wide Crossover

Medical Centre
GFA 640m²

Bins

Service Bay

3 Carbays

14 Carbays

Site Boundary 46400 mm

4900 mm

Landscaped Area For Sitting

Park Seating

Pocket Park

BAL - 29 Setback

15637 mm

Lot 4
2,702m²

24800 mm

8300 mm

7000 mm

Lot 3
3,259m²

Site Boundary 47732 mm

Landscaped Area For Sitting

10 Carbays

Mcdonald's Restaurant
GFA 450m²

6 Carbays

Loading

Site Boundary 30675 mm

19863 mm

PROPOSED FIRE BREAK

Pump Room

Dog Wash

Wash Bays

BAL - 29 Setback

Vacuum Bays

Site Boundary 71793 mm

Lot 5
4,453m²

7 Carbays

6 Carbays

7 Carbays

KFC Restaurant
GFA 270m²

Service

Site Boundary 70449 mm

GAEBLER ROAD

7 - Eleven Pricing Board
Site Boundary 43679 mm
Proposed 10m Wide Crossover
Starbucks Pylon Sign
Site Boundary 33100 mm
New Footpath
Medical Pylon Sign
Site Boundary 72021 mm
Proposed 7m Wide Crossover
4900 mm
Landscaped Area For Sitting

7 - Eleven Pylon Sign
8500 mm
7 - Eleven Store
GFA 192m²
Service
Waiting Bay
4 Carbays
5 Carbays
9 Carbays
7 Carbays
Lot 2
1,696m²
New Footpath
9 Carbays
Lot 1
2,378m²
Site Boundary 45240 mm
Site Boundary 43800 mm
Starbucks Restaurant
GFA 245m²
5 Carbays
Site Boundary 51240 mm
12 Carbays
Medical Centre
GFA 640m²
Service Bay
3 Carbays
Site Boundary 46400 mm
Fuel Canopy
Outdoor Dining
Loading
Bins
Park Seating
Pocket Park
14 Carbays
Proposed 10m Wide Crossover
Fuel Drop
Site Boundary 46860 mm
1.2m (H) x 8m (L) Feature Brick Wall (Vapour Wall)
Lot 4
2,702m²
24800 mm
8300 mm
7000 mm
Lot 3
3,259m²
BAL - 29 Setback
15637 mm
Site Boundary 47732 mm
Landscaped Area For Sitting
Location for Western Power Transformer
Mcdonald's Pylon Sign
10 Carbays
Site Boundary 37675 mm
6 Carbays
Mcdonald's Restaurant
GFA 450m²
Loading
Site Boundary 30675 mm
Pump Room
Dog Wash
Wash Bays
19863 mm
PROPOSED FIRE BREAK
FUTURE ROAD WIDENING
9 Carbays
Site Boundary 71793 mm
Lot 5
4,453m²
BAL - 29 Setback
Vacuum Bays
7 Carbays
11 Carbays
7 Carbays
Site Boundary 40094 mm
KFC Restaurant
GFA 270m²
Loading
Service
Site Boundary 70449 mm

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GAEBLER ROAD
New Footpath
7 - Eleven Pricing Board
Proposed 10m Wide Crossover
Site Boundary 43679 mm
Starbucks Pylon Sign
Site Boundary 33100 mm
Medical Pylon Sign
Site Boundary 72021 mm
Proposed 7m Wide Crossover
Grease Trap
Custom
8500 mm
7 - Eleven Pylon Sign
7 - Eleven Store
GFA 192m²
Service
9 Carbays
Lot 1
2,378m²
New Footpath
Site Boundary 45240 mm
Fuel Canopy
Proposed 10m Wide Crossover
Fuel Drop
Waiting Bay
4 Carbays
5 Carbays
9 Carbays
7 Carbays
Lot 2
1,696m²
Site Boundary 43600 mm
Starbucks Restaurant
GFA 245m²
5 Carbays
Outdoor Dining
Loading
Site Boundary 51240 mm
12 Carbays
Medical Centre
GFA 640m²
Service Bay
Bins
Park Seating
Pocket Park
4900 mm
Landscaped Area For Sitting
3 Carbays
Site Boundary 46400 mm
14 Carbays
Site Boundary 46860 mm
1.2m (H) x 8m (L) Feature Brick Wall (Vapour Wall)
Lot 4
2,702m²
24800 mm
8300 mm
7000 mm
Lot 3
3,259m²
BAL - 29 Setback
15637 mm
Site Boundary 47732 mm
Location for Western Power Transformer
Mcdonald's Pylon Sign
10 Carbays
Site Boundary 37675 mm
6 Carbays
Mcdonald's Restaurant
GFA 450m²
Loading
Site Boundary 30675 mm
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Pump Room
Dog Wash
Wash Bays
Site Boundary 71793 mm
Lot 5
4,453m²
BAL - 29 Setback
Vacuum Bays
FUTURE ROAD WIDENING
9 Carbays
Site Boundary 40094 mm
11 Carbays
7 Carbays
7 Carbays
KFC Restaurant
GFA 270m²
Loading
Service
Site Boundary 70449 mm

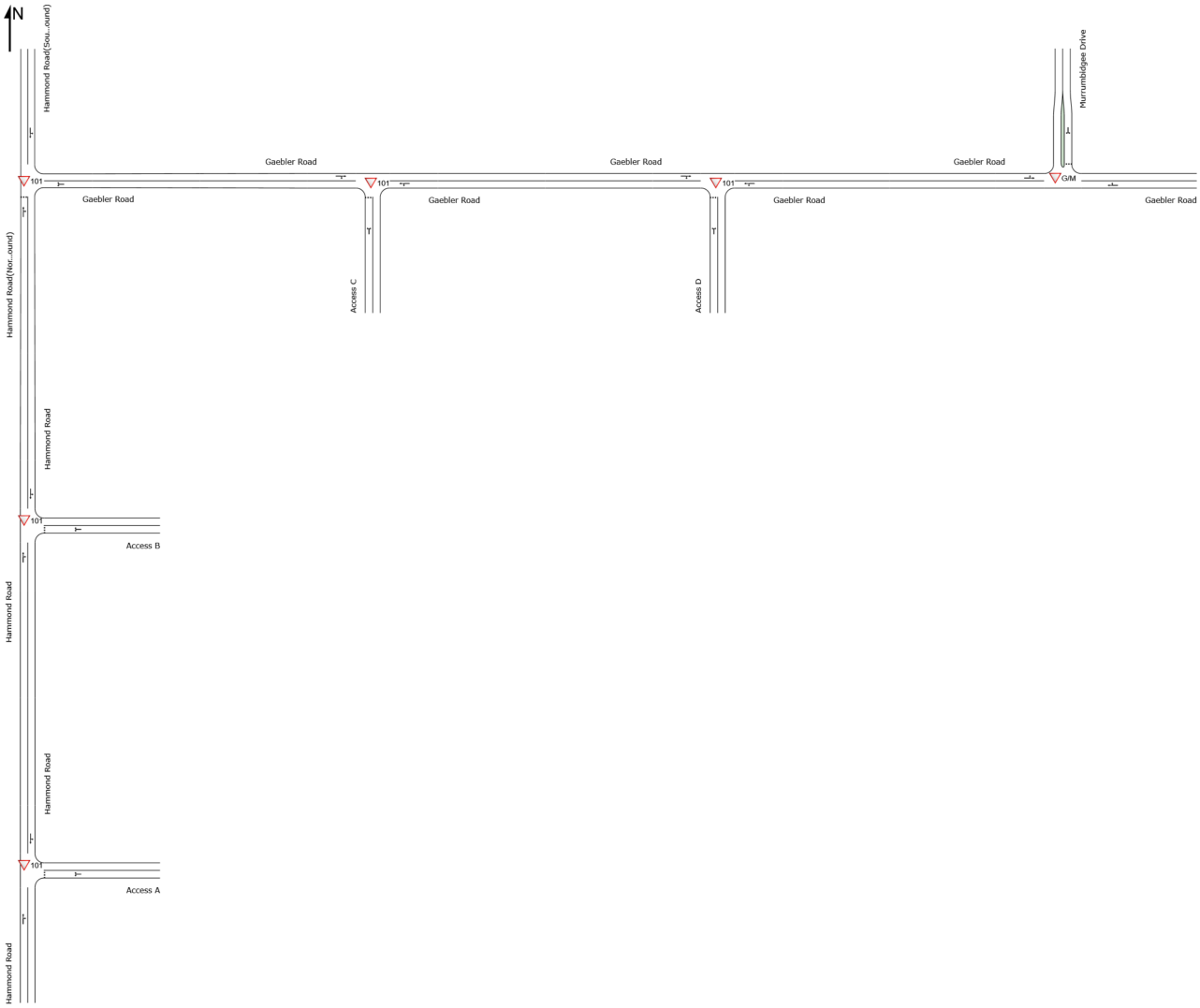
Appendix D. SIDRA RESULTS

NETWORK LAYOUT

Network: N101 [AM (Network Folder: 2025+DEV - EXISTING LAYOUT)]

New Network
Network Category: (None)

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



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
▽101	NA	Hammond Road / Gaebler Road 2025
▽G/M	NA	Gaebler/Murrumbidgee AM 2025+dev
▽101	NA	Gaebler/Access D AM 2025+dev
▽101	NA	Gaebler/Access C AM 2025+dev
▽101	NA	Hammond/Access B AM 2025+dev
▽101	NA	Hammond/Access A AM 2025+dev

MOVEMENT SUMMARY

Site: 101 [Hammond Road / Gaebler Road 2025 (Site Folder: 2025 DEV AM- EXISTING LAYOUT)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [AM (Network Folder: 2025+DEV - EXISTING LAYOUT)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Hammond Road(Northbound)															
2	T1	All MCs	337	6.4	337	6.4	0.493	5.0	LOS A	3.4	26.4	0.56	0.76	0.77	45.2
3	R2	All MCs	78	5.9	78	5.9	0.493	10.8	LOS B	3.4	26.4	0.56	0.76	0.77	16.9
Approach			415	6.3	415	6.3	0.493	6.1	LOS A	3.4	26.4	0.56	0.76	0.77	44.0
East: Gaebler Road															
4	L2	All MCs	98	3.0	98	3.0	0.273	5.6	LOS A	1.3	10.5	0.45	0.63	0.45	24.8
6	R2	All MCs	231	8.3	231	8.3	0.273	5.1	LOS A	1.3	10.5	0.45	0.63	0.45	44.5
Approach			328	6.7	328	6.7	0.273	5.3	NA	1.3	10.5	0.45	0.63	0.45	42.9
North: Hammond Road(Southbound)															
7	L2	All MCs	155	3.5	155	3.5	0.241	5.7	LOS A	0.0	0.0	0.00	0.20	0.00	56.4
8	T1	All MCs	293	3.0	293	3.0	0.241	0.1	LOS A	0.0	0.0	0.00	0.20	0.00	56.4
Approach			447	3.2	447	3.2	0.241	2.0	NA	0.0	0.0	0.00	0.20	0.00	56.4
All Vehicles			1191	5.2	1191	5.2	0.493	4.3	NA	3.4	26.4	0.32	0.51	0.39	48.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: G/M [Gaebler/Murrumbidgee AM 2025+dev (Site Folder: 2025 DEV AM- EXISTING LAYOUT)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [AM (Network Folder: 2025+DEV - EXISTING LAYOUT)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Gaebler Road															
5	T1	All MCs	209	8.3	209	8.3	0.178	0.0	LOS A	0.6	4.9	0.22	0.25	0.22	47.2
6	R2	All MCs	85	8.3	85	8.3	0.178	6.5	LOS A	0.6	4.9	0.22	0.25	0.22	46.8
Approach			295	8.3	295	8.3	0.178	1.9	NA	0.6	4.9	0.22	0.25	0.22	47.0
North: Murrumbidgee Drive															
7	L2	All MCs	66	5.6	66	5.6	0.087	5.0	LOS A	0.3	2.6	0.27	0.53	0.27	45.1
9	R2	All MCs	29	15.4	29	15.4	0.087	7.4	LOS A	0.3	2.6	0.27	0.53	0.27	43.4
Approach			96	8.6	96	8.6	0.087	5.7	LOS A	0.3	2.6	0.27	0.53	0.27	44.8
West: Gaebler Road															
10	L2	All MCs	104	5.6	104	5.6	0.118	4.6	LOS A	0.0	0.0	0.00	0.26	0.00	45.1
11	T1	All MCs	109	5.6	109	5.6	0.118	0.0	LOS A	0.0	0.0	0.00	0.26	0.00	47.5
Approach			214	5.6	214	5.6	0.118	2.2	NA	0.0	0.0	0.00	0.26	0.00	46.3
All Vehicles			604	7.4	604	7.4	0.178	2.6	NA	0.6	4.9	0.15	0.30	0.15	46.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Gaebler/Access D AM 2025+dev (Site Folder: 2025 DEV AM- EXISTING LAYOUT)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [AM (Network Folder: 2025+DEV - EXISTING LAYOUT)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Access D															
7	L2	All MCs	19	0.0	19	0.0	0.028	3.2	LOS A	0.1	0.7	0.34	0.52	0.34	20.1
9	R2	All MCs	12	0.0	12	0.0	0.028	4.4	LOS A	0.1	0.7	0.34	0.52	0.34	20.1
Approach			31	0.0	31	0.0	0.028	3.7	LOS A	0.1	0.7	0.34	0.52	0.34	20.1
East: Gaebler Road															
10	L2	All MCs	26	0.0	26	0.0	0.130	4.6	LOS A	0.0	0.0	0.00	0.06	0.00	40.2
11	T1	All MCs	212	8.3	212	8.3	0.130	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	45.8
Approach			238	7.4	238	7.4	0.130	0.5	NA	0.0	0.0	0.00	0.06	0.00	45.0
West: Gaebler Road															
5	T1	All MCs	203	5.6	203	5.6	0.137	0.0	LOS A	0.3	2.3	0.14	0.16	0.14	39.8
6	R2	All MCs	40	0.0	40	0.0	0.137	6.1	LOS A	0.3	2.3	0.14	0.16	0.14	34.9
Approach			243	4.7	243	4.7	0.137	1.0	NA	0.3	2.3	0.14	0.16	0.14	38.7
All Vehicles			512	5.7	512	5.7	0.137	0.9	NA	0.3	2.3	0.08	0.14	0.08	40.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Gaebler/Access C AM 2025+dev (Site Folder: 2025 DEV AM- EXISTING LAYOUT)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [AM (Network Folder: 2025+DEV - EXISTING LAYOUT)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Access C															
7	L2	All MCs	56	2.0	56	2.0	0.077	3.3	LOS A	0.3	2.1	0.36	0.55	0.36	19.8
9	R2	All MCs	27	2.0	27	2.0	0.077	4.7	LOS A	0.3	2.1	0.36	0.55	0.36	19.8
Approach			83	2.0	83	2.0	0.077	3.8	LOS A	0.3	2.1	0.36	0.55	0.36	19.8
East: Gaebler Road															
10	L2	All MCs	14	2.0	14	2.0	0.126	4.1	LOS A	0.0	0.0	0.00	0.03	0.00	40.0
11	T1	All MCs	216	8.3	216	8.3	0.126	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	47.4
Approach			229	7.9	229	7.9	0.126	0.2	NA	0.0	0.0	0.00	0.03	0.00	46.7
West: Gaebler Road															
5	T1	All MCs	215	5.6	215	5.6	0.154	0.0	LOS A	0.4	3.1	0.16	0.19	0.16	38.1
6	R2	All MCs	55	2.0	55	2.0	0.154	5.8	LOS A	0.4	3.1	0.16	0.19	0.16	33.5
Approach			269	4.9	269	4.9	0.154	1.2	NA	0.4	3.1	0.16	0.19	0.16	36.8
All Vehicles			582	5.7	582	5.7	0.154	1.2	NA	0.4	3.1	0.13	0.18	0.13	37.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Hammond/Access B AM 2025+dev (Site Folder: 2025 DEV AM- EXISTING LAYOUT)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [AM (Network Folder: 2025+DEV - EXISTING LAYOUT)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Hammond Road															
5	T1	All MCs	415	6.4	415	6.4	0.245	0.0	LOS A	0.2	1.6	0.06	0.07	0.06	46.2
6	R2	All MCs	24	0.0	24	0.0	0.245	7.3	LOS A	0.2	1.6	0.06	0.07	0.06	39.7
Approach			439	6.0	439	6.0	0.245	0.4	NA	0.2	1.6	0.06	0.07	0.06	45.7
East: Access B															
7	L2	All MCs	26	2.0	26	2.0	0.056	3.4	LOS A	0.2	1.4	0.43	0.58	0.43	17.1
9	R2	All MCs	22	0.0	22	0.0	0.056	6.2	LOS A	0.2	1.4	0.43	0.58	0.43	17.1
Approach			48	1.1	48	1.1	0.056	4.6	LOS A	0.2	1.4	0.43	0.58	0.43	17.1
North: Hammond Road															
10	L2	All MCs	31	2.0	31	2.0	0.147	3.0	LOS A	0.0	0.0	0.00	0.06	0.00	19.3
11	T1	All MCs	246	3.5	246	3.5	0.147	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	44.9
Approach			277	3.3	277	3.3	0.147	0.3	NA	0.0	0.0	0.00	0.06	0.00	37.2
All Vehicles			764	4.8	764	4.8	0.245	0.6	NA	0.2	1.6	0.06	0.10	0.06	41.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Hammond/Access A AM 2025+dev (Site Folder: 2025 DEV AM- EXISTING LAYOUT)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [AM (Network Folder: 2025+DEV - EXISTING LAYOUT)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Hammond Road															
5	T1	All MCs	429	6.4	429	6.4	0.253	0.0	LOS A	0.2	1.9	0.06	0.07	0.06	49.2
6	R2	All MCs	28	0.0	28	0.0	0.253	7.3	LOS A	0.2	1.9	0.06	0.07	0.06	47.5
Approach			458	6.0	458	6.0	0.253	0.5	NA	0.2	1.9	0.06	0.07	0.06	49.1
East: Access A															
7	L2	All MCs	35	0.0	35	0.0	0.039	3.4	LOS A	0.1	1.1	0.38	0.54	0.38	43.5
9	R2	All MCs	7	0.0	7	0.0	0.039	6.3	LOS A	0.1	1.1	0.38	0.54	0.38	19.5
Approach			42	0.0	42	0.0	0.039	3.9	LOS A	0.1	1.1	0.38	0.54	0.38	42.8
North: Hammond Road															
10	L2	All MCs	7	0.0	7	0.0	0.144	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	8.4
11	T1	All MCs	265	3.5	265	3.5	0.144	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.8
Approach			273	3.4	273	3.4	0.144	0.1	NA	0.0	0.0	0.00	0.01	0.00	48.6
All Vehicles			773	4.8	773	4.8	0.253	0.5	NA	0.2	1.9	0.06	0.08	0.06	48.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Hammond Road / Gaebler Road 2025 (Site Folder: 2025 DEV PM- EXISTING LAYOUT)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [PM (Network Folder: 2025+DEV - EXISTING LAYOUT)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Hammond Road(Northbound)															
2	T1	All MCs	206	6.4	206	6.4	0.470	5.6	LOS A	2.7	21.3	0.65	0.85	0.96	42.4
3	R2	All MCs	78	5.9	78	5.9	0.470	18.0	LOS C	2.7	21.3	0.65	0.85	0.96	12.7
Approach			284	6.3	284	6.3	0.470	9.0	LOS A	2.7	21.3	0.65	0.85	0.96	39.8
East: Gaebler Road															
4	L2	All MCs	49	3.0	49	3.0	0.323	6.9	LOS A	1.7	13.4	0.56	0.72	0.60	22.0
6	R2	All MCs	292	8.3	292	8.3	0.323	6.2	LOS A	1.7	13.4	0.56	0.72	0.60	43.5
Approach			341	7.5	341	7.5	0.323	6.3	NA	1.7	13.4	0.56	0.72	0.60	42.7
North: Hammond Road(Southbound)															
7	L2	All MCs	312	3.5	312	3.5	0.400	5.7	LOS A	0.0	0.0	0.00	0.25	0.00	55.5
8	T1	All MCs	426	3.0	426	3.0	0.400	0.1	LOS A	0.0	0.0	0.00	0.25	0.00	55.5
Approach			738	3.2	738	3.2	0.400	2.5	NA	0.0	0.0	0.00	0.25	0.00	55.5
All Vehicles			1363	4.9	1363	4.9	0.470	4.8	NA	2.7	21.3	0.27	0.49	0.35	48.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Hammond/Access B PM 2025+dev (Site Folder: 2025 DEV PM- EXISTING LAYOUT)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [PM (Network Folder: 2025+DEV - EXISTING LAYOUT)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Hammond Road															
5	T1	All MCs	359	6.4	359	6.4	0.226	0.0	LOS A	0.4	2.8	0.12	0.14	0.12	43.2
6	R2	All MCs	39	0.0	39	0.0	0.226	8.7	LOS A	0.4	2.8	0.12	0.14	0.12	38.1
Approach			398	5.8	398	5.8	0.226	0.9	NA	0.4	2.8	0.12	0.14	0.12	42.6
East: Access B															
7	L2	All MCs	43	2.0	43	2.0	0.102	3.8	LOS A	0.4	2.7	0.49	0.66	0.49	15.9
9	R2	All MCs	38	0.0	38	0.0	0.102	6.8	LOS A	0.4	2.7	0.49	0.66	0.49	15.9
Approach			81	1.1	81	1.1	0.102	5.2	LOS A	0.4	2.7	0.49	0.66	0.49	15.9
North: Hammond Road															
10	L2	All MCs	48	2.0	48	2.0	0.208	3.0	LOS A	0.0	0.0	0.00	0.06	0.00	19.2
11	T1	All MCs	344	3.5	344	3.5	0.208	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	44.3
Approach			393	3.3	393	3.3	0.208	0.4	NA	0.0	0.0	0.00	0.06	0.00	36.2
All Vehicles			872	4.2	872	4.2	0.226	1.0	NA	0.4	2.8	0.10	0.15	0.10	37.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Hammond/Access A PM 2025+dev (Site Folder: 2025 DEV PM- EXISTING LAYOUT)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [PM (Network Folder: 2025+DEV - EXISTING LAYOUT)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Hammond Road															
5	T1	All MCs	311	6.4	311	6.4	0.198	0.0	LOS A	0.3	2.6	0.12	0.15	0.12	48.6
6	R2	All MCs	37	0.0	37	0.0	0.198	8.6	LOS A	0.3	2.6	0.12	0.15	0.12	46.9
Approach			347	5.7	347	5.7	0.198	0.9	NA	0.3	2.6	0.12	0.15	0.12	48.4
East: Access A															
7	L2	All MCs	63	0.0	63	0.0	0.078	3.9	LOS A	0.3	2.1	0.44	0.61	0.44	43.1
9	R2	All MCs	14	0.0	14	0.0	0.078	6.4	LOS A	0.3	2.1	0.44	0.61	0.44	18.3
Approach			77	0.0	77	0.0	0.078	4.4	LOS A	0.3	2.1	0.44	0.61	0.44	42.3
North: Hammond Road															
10	L2	All MCs	14	0.0	14	0.0	0.205	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	8.4
11	T1	All MCs	375	3.5	375	3.5	0.205	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.7
Approach			388	3.4	388	3.4	0.205	0.2	NA	0.0	0.0	0.00	0.02	0.00	48.2
All Vehicles			813	4.1	813	4.1	0.205	0.9	NA	0.3	2.6	0.09	0.13	0.09	47.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Gaebler/Access C PM 2025+dev (Site Folder: 2025 DEV PM- EXISTING LAYOUT)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [PM (Network Folder: 2025+DEV - EXISTING LAYOUT)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Access C															
7	L2	All MCs	97	2.0	97	2.0	0.137	3.0	LOS A	0.5	4.0	0.31	0.51	0.31	19.3
9	R2	All MCs	48	2.0	48	2.0	0.137	5.8	LOS A	0.5	4.0	0.31	0.51	0.31	19.3
Approach			145	2.0	145	2.0	0.137	3.9	LOS A	0.5	4.0	0.31	0.51	0.31	19.3
East: Gaebler Road															
10	L2	All MCs	22	2.0	22	2.0	0.077	4.1	LOS A	0.0	0.0	0.00	0.08	0.00	38.1
11	T1	All MCs	119	8.3	119	8.3	0.077	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	43.8
Approach			141	7.3	141	7.3	0.077	0.6	NA	0.0	0.0	0.00	0.08	0.00	42.5
West: Gaebler Road															
5	T1	All MCs	363	5.6	363	5.6	0.259	0.0	LOS A	0.7	5.6	0.14	0.17	0.14	38.3
6	R2	All MCs	99	2.0	99	2.0	0.259	5.1	LOS A	0.7	5.6	0.14	0.17	0.14	33.7
Approach			462	4.8	462	4.8	0.259	1.1	NA	0.7	5.6	0.14	0.17	0.14	37.0
All Vehicles			748	4.7	748	4.7	0.259	1.6	NA	0.7	5.6	0.15	0.22	0.15	34.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Gaebler/Access D PM 2025+dev (Site Folder: 2025 DEV PM- EXISTING LAYOUT)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [PM (Network Folder: 2025+DEV - EXISTING LAYOUT)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Access D															
7	L2	All MCs	34	0.0	34	0.0	0.048	2.9	LOS A	0.2	1.3	0.27	0.49	0.27	20.2
9	R2	All MCs	19	0.0	19	0.0	0.048	5.0	LOS A	0.2	1.3	0.27	0.49	0.27	20.2
Approach			53	0.0	53	0.0	0.048	3.6	LOS A	0.2	1.3	0.27	0.49	0.27	20.2
East: Gaebler Road															
10	L2	All MCs	44	0.0	44	0.0	0.083	4.6	LOS A	0.0	0.0	0.00	0.16	0.00	36.8
11	T1	All MCs	107	8.3	107	8.3	0.083	0.0	LOS A	0.0	0.0	0.00	0.16	0.00	40.5
Approach			152	5.9	152	5.9	0.083	1.3	NA	0.0	0.0	0.00	0.16	0.00	39.2
West: Gaebler Road															
5	T1	All MCs	375	5.6	375	5.6	0.224	0.0	LOS A	0.3	2.2	0.06	0.08	0.06	44.2
6	R2	All MCs	37	0.0	37	0.0	0.224	5.4	LOS A	0.3	2.2	0.06	0.08	0.06	37.4
Approach			412	5.1	412	5.1	0.224	0.5	NA	0.3	2.2	0.06	0.08	0.06	43.3
All Vehicles			616	4.9	616	4.9	0.224	1.0	NA	0.3	2.2	0.06	0.13	0.06	40.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: G/M [Gaebler/Murrumbidgee PM 2025+dev (Site Folder: 2025 DEV PM- EXISTING LAYOUT)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [PM (Network Folder: 2025+DEV - EXISTING LAYOUT)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Gaebler Road															
5	T1	All MCs	122	8.3	122	8.3	0.087	0.0	LOS A	0.2	1.6	0.17	0.20	0.17	48.1
6	R2	All MCs	22	8.3	22	8.3	0.087	8.8	LOS A	0.2	1.6	0.17	0.20	0.17	47.3
Approach			144	8.3	144	8.3	0.087	1.3	NA	0.2	1.6	0.17	0.20	0.17	47.9
North: Murrumbidgee Drive															
7	L2	All MCs	44	5.6	44	5.6	0.074	5.3	LOS A	0.3	2.1	0.36	0.58	0.36	44.9
9	R2	All MCs	29	15.4	29	15.4	0.074	7.2	LOS A	0.3	2.1	0.36	0.58	0.36	43.0
Approach			74	9.5	74	9.5	0.074	6.1	LOS A	0.3	2.1	0.36	0.58	0.36	44.4
West: Gaebler Road															
10	L2	All MCs	188	5.6	188	5.6	0.216	4.6	LOS A	0.0	0.0	0.00	0.26	0.00	45.1
11	T1	All MCs	205	5.6	205	5.6	0.216	0.0	LOS A	0.0	0.0	0.00	0.26	0.00	47.5
Approach			394	5.6	394	5.6	0.216	2.2	NA	0.0	0.0	0.00	0.26	0.00	46.3
All Vehicles			612	6.7	612	6.7	0.216	2.5	NA	0.3	2.1	0.08	0.28	0.08	46.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

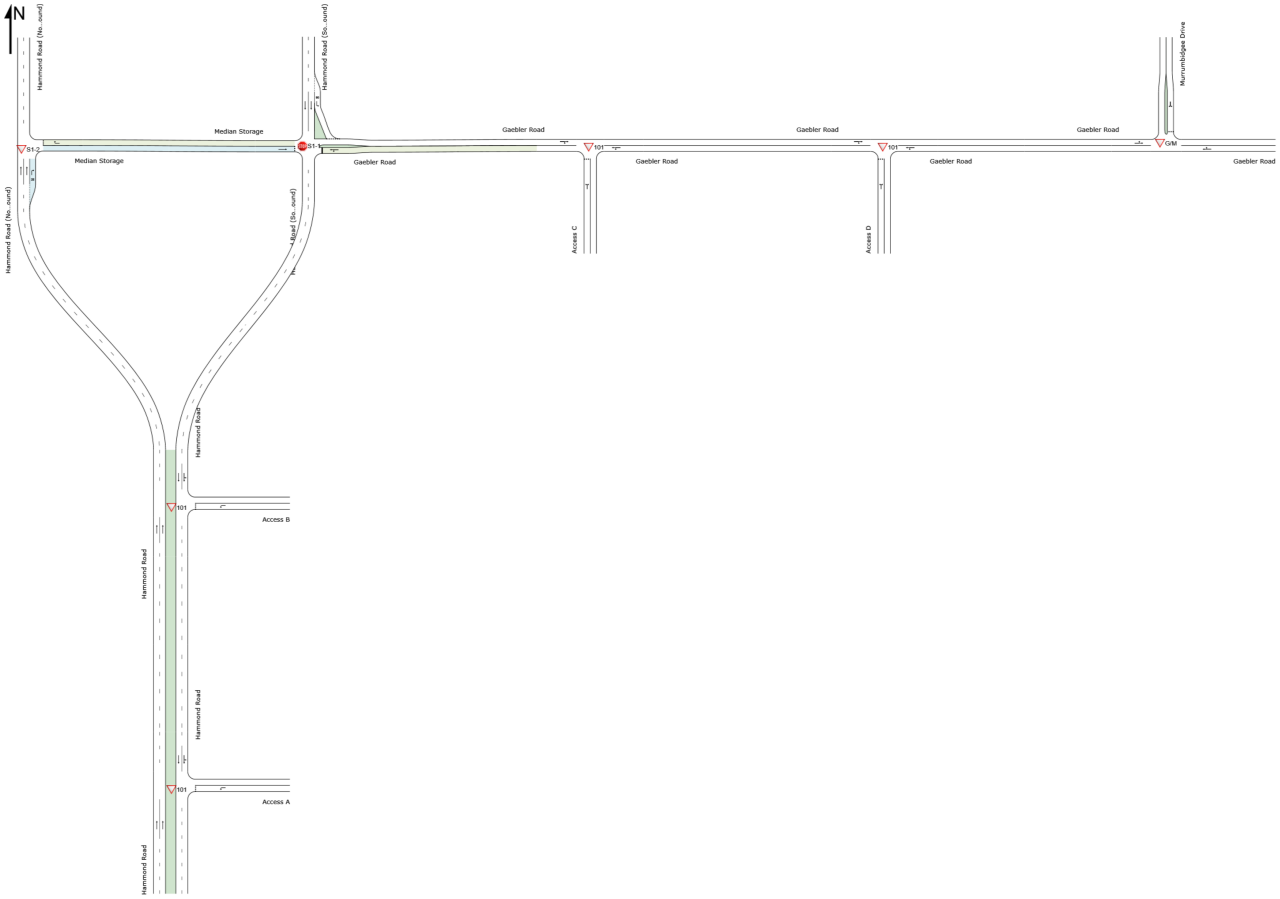
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

NETWORK LAYOUT

Network: N101 [AM (Network Folder: 2035+DEV)]

New Network
Network Category: (None)

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



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
▽S1-2	NA	Hammond/Gaebler Stage 2 AM 2035+DEV
STOPS1-1	NA	Hammond/Gaebler Stage 1 AM 2035+DEV
▽101	NA	Hammond/Access A AM 2035+DEV
▽101	NA	Hammond/Access B AM 2035+DEV
▽101	NA	Gaebler/Access C AM 2035+DEV
▽101	NA	Gaebler/Access D AM 2035+DEV
▽G/M	NA	Gaebler/Murrumbidgee AM 2035+DEV

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Project: \\au2011-ntap01_cifs02\shared_projects\300305045\technical\transportation\Modelling\CW1200307-Lot 9501 Gaebler SIDRA - V4(5% GF) - Double volume on Hammond.sip9

MOVEMENT SUMMARY

Site: S1-2 [Hammond/Gaebler Stage 2 AM 2035+DEV (Site Folder: 2035+DEV AM)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [AM (Network Folder: 2035+DEV)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Hammond Road (Northbound)															
2	T1	All MCs	784	6.4	784	6.4	0.213	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	All MCs	157	5.9	157	5.9	0.093	3.1	LOS A	0.0	0.0	0.00	0.58	0.00	26.2
Approach			941	6.3	941	6.3	0.213	0.5	NA	0.0	0.0	0.00	0.10	0.00	58.8
East: Median Storage															
1	R2	All MCs	207	8.3	207	8.3	0.293	3.5	LOS A	0.7	5.8	0.46	0.64	0.55	43.1
Approach			207	8.3	207	8.3	0.293	3.5	LOS A	0.7	5.8	0.46	0.64	0.55	43.1
All Vehicles			1148	6.7	1148	6.7	0.293	1.1	NA	0.7	5.8	0.08	0.20	0.10	54.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: S1-1 [Hammond/Gaebler Stage 1 AM 2035+DEV (Site Folder: 2035+DEV AM)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [AM (Network Folder: 2035+DEV)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Gaebler Road															
1	L2	All MCs	259	3.0	259	3.0	0.708	13.8	LOS B	7.2	56.2	0.81	1.29	1.70	11.4
2	T1	All MCs	207	8.3	207	8.3	0.708	22.7	LOS C	7.2	56.2	0.81	1.29	1.70	11.4
Approach			466	5.4	466	5.4	0.708	17.8	LOS C	7.2	56.2	0.81	1.29	1.70	11.4
North: Hammond Road (Southbound)															
3	L2	All MCs	188	3.0	188	3.0	0.156	6.4	LOS A	0.7	5.1	0.29	0.56	0.29	49.1
4	T1	All MCs	642	3.5	642	3.5	0.169	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			831	3.4	831	3.4	0.169	1.5	LOS A	0.7	5.1	0.07	0.13	0.07	57.0
West: Median Storage															
5	T1	All MCs	157	5.9	157	5.9	0.203	3.2	LOS A	0.7	5.8	0.55	0.52	0.55	10.5
Approach			157	5.9	157	5.9	0.203	3.2	LOS A	0.7	5.8	0.55	0.52	0.55	10.5
All Vehicles			1454	4.3	1454	4.3	0.708	6.9	NA	7.2	56.2	0.36	0.54	0.64	44.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 101 [Hammond/Access A AM 2035+DEV (Site Folder: 2035+DEV AM)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [AM (Network Folder: 2035+DEV)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Hammond Road															
5	T1	All MCs	647	6.4	647	6.4	0.176	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			647	6.4	647	6.4	0.176	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
East: Access A															
7	L2	All MCs	32	0.0	32	0.0	0.028	3.3	LOS A	0.1	0.7	0.27	0.50	0.27	44.1
Approach			32	0.0	32	0.0	0.028	3.3	LOS A	0.1	0.7	0.27	0.50	0.27	44.1
North: Hammond Road															
10	L2	All MCs	1	0.0	1	0.0	0.099	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	8.5
11	T1	All MCs	375	3.5	375	3.5	0.099	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			376	3.5	376	3.5	0.099	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.8
All Vehicles			1055	5.2	1055	5.2	0.176	0.1	NA	0.1	0.7	0.01	0.02	0.01	49.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 101 [Hammond/Access B AM 2035+DEV (Site Folder: 2035+DEV AM)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [AM (Network Folder: 2035+DEV)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Hammond Road															
5	T1	All MCs	647	6.4	647	6.4	0.176	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			647	6.4	647	6.4	0.176	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.9
East: Access B															
7	L2	All MCs	26	2.0	26	2.0	0.023	3.2	LOS A	0.1	0.6	0.25	0.49	0.25	22.2
Approach			26	2.0	26	2.0	0.023	3.2	LOS A	0.1	0.6	0.25	0.49	0.25	22.2
North: Hammond Road															
10	L2	All MCs	31	2.0	31	2.0	0.100	3.0	LOS A	0.0	0.0	0.00	0.08	0.00	19.1
11	T1	All MCs	348	3.5	348	3.5	0.100	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	46.5
Approach			379	3.4	379	3.4	0.100	0.2	NA	0.0	0.0	0.00	0.04	0.00	39.8
All Vehicles			1053	5.2	1053	5.2	0.176	0.2	NA	0.1	0.6	0.01	0.03	0.01	46.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 101 [Gaebler/Access C AM 2035+DEV (Site Folder: 2035 +DEV AM)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [AM (Network Folder: 2035+DEV)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Access C															
7	L2	All MCs	89	2.0	89	2.0	0.132	3.7	LOS A	0.5	3.5	0.44	0.61	0.44	18.0
9	R2	All MCs	31	2.0	31	2.0	0.132	6.6	LOS A	0.5	3.5	0.44	0.61	0.44	18.0
Approach			120	2.0	120	2.0	0.132	4.4	LOS A	0.5	3.5	0.44	0.61	0.44	18.0
East: Gaebler Road															
10	L2	All MCs	15	2.0	15	2.0	0.184	4.1	LOS A	0.0	0.0	0.00	0.03	0.00	40.3
11	T1	All MCs	294	8.3	294	8.3	0.184	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	47.8
Approach			308	8.0	308	8.0	0.184	0.2	NA	0.0	0.0	0.00	0.03	0.00	47.3
West: Gaebler Road															
5	T1	All MCs	295	5.6	295	5.6	0.239	0.0	LOS A	0.9	6.6	0.26	0.29	0.26	34.7
6	R2	All MCs	105	2.0	105	2.0	0.239	6.8	LOS A	0.9	6.6	0.26	0.29	0.26	31.5
Approach			400	4.7	400	4.7	0.239	1.8	NA	0.9	6.6	0.26	0.29	0.26	33.6
All Vehicles			828	5.5	828	5.5	0.239	1.6	NA	0.9	6.6	0.19	0.24	0.19	35.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Gaebler/Access D AM 2035+DEV (Site Folder: 2035 +DEV AM)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [AM (Network Folder: 2035+DEV)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Access D															
7	L2	All MCs	7	0.0	7	0.0	0.017	3.5	LOS A	0.1	0.4	0.43	0.57	0.43	17.5
9	R2	All MCs	7	0.0	7	0.0	0.017	5.4	LOS A	0.1	0.4	0.43	0.57	0.43	17.5
Approach			15	0.0	15	0.0	0.017	4.5	LOS A	0.1	0.4	0.43	0.57	0.43	17.5
East: Gaebler Road															
10	L2	All MCs	25	0.0	25	0.0	0.179	4.6	LOS A	0.0	0.0	0.00	0.04	0.00	40.9
11	T1	All MCs	301	8.3	301	8.3	0.179	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	46.9
Approach			326	7.7	326	7.7	0.179	0.4	NA	0.0	0.0	0.00	0.04	0.00	46.3
West: Gaebler Road															
5	T1	All MCs	285	5.6	285	5.6	0.183	0.0	LOS A	0.3	2.6	0.13	0.15	0.13	41.2
6	R2	All MCs	40	0.0	40	0.0	0.183	7.3	LOS A	0.3	2.6	0.13	0.15	0.13	35.7
Approach			325	4.9	325	4.9	0.183	0.9	NA	0.3	2.6	0.13	0.15	0.13	40.2
All Vehicles			666	6.1	666	6.1	0.183	0.7	NA	0.3	2.6	0.07	0.11	0.07	42.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: G/M [Gaebler/Murrumbidgee AM 2035+DEV (Site Folder: 2035+DEV AM)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [AM (Network Folder: 2035+DEV)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Gaebler Road															
5	T1	All MCs	288	8.3	288	8.3	0.258	0.0	LOS A	1.0	8.2	0.29	0.32	0.29	46.8
6	R2	All MCs	124	8.3	124	8.3	0.258	7.6	LOS A	1.0	8.2	0.29	0.32	0.29	46.6
Approach			413	8.3	413	8.3	0.258	2.3	NA	1.0	8.2	0.29	0.32	0.29	46.7
North: Murrumbidgee Drive															
7	L2	All MCs	96	5.6	96	5.6	0.135	5.2	LOS A	0.5	4.1	0.34	0.56	0.34	44.8
9	R2	All MCs	38	15.4	38	15.4	0.135	9.3	LOS A	0.5	4.1	0.34	0.56	0.34	42.8
Approach			134	8.4	134	8.4	0.135	6.3	LOS A	0.5	4.1	0.34	0.56	0.34	44.4
West: Gaebler Road															
10	L2	All MCs	148	5.6	148	5.6	0.162	4.6	LOS A	0.0	0.0	0.00	0.27	0.00	45.0
11	T1	All MCs	145	5.6	145	5.6	0.162	0.0	LOS A	0.0	0.0	0.00	0.27	0.00	47.4
Approach			294	5.6	294	5.6	0.162	2.3	NA	0.0	0.0	0.00	0.27	0.00	46.2
All Vehicles			840	7.4	840	7.4	0.258	2.9	NA	1.0	8.2	0.19	0.34	0.19	46.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: S1-1 [Hammond/Gaebler Stage 1 PM 2035+DEV PM (Site Folder: 2035+DEV PM)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [PM (Network Folder: 2035+DEV)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Gaebler Road															
1	L2	All MCs	195	3.0	195	3.0	0.877	25.7	LOS D	11.0	85.6	0.92	1.90	3.21	6.6
2	T1	All MCs	213	8.3	213	8.3	0.877	39.7	LOS E	11.0	85.6	0.92	1.90	3.21	6.6
Approach			407	5.8	407	5.8	0.877	33.0	LOS D	11.0	85.6	0.92	1.90	3.21	6.6
North: Hammond Road (Southbound)															
3	L2	All MCs	296	3.0	296	3.0	0.240	6.4	LOS A	1.1	8.5	0.30	0.55	0.30	49.1
4	T1	All MCs	846	3.5	846	3.5	0.223	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			1142	3.4	1142	3.4	0.240	1.7	LOS A	1.1	8.5	0.08	0.14	0.08	56.6
West: Median Storage															
5	T1	All MCs	139	5.9	139	5.9	0.233	5.2	LOS A	0.9	6.7	0.64	0.68	0.69	8.2
Approach			139	5.9	139	5.9	0.233	5.2	LOS A	0.9	6.7	0.64	0.68	0.69	8.2
All Vehicles			1688	4.2	1688	4.2	0.877	9.5	NA	11.0	85.6	0.33	0.61	0.88	41.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: S1-2 [Hammond/Gaebler Stage 2 PM 2035+DEV PM (Site Folder: 2035+DEV PM)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [PM (Network Folder: 2035+DEV)]

Staged Crossing at T Intersection Type B
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Hammond Road (Northbound)															
2	T1	All MCs	480	6.4	480	6.4	0.130	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	All MCs	139	5.9	139	5.9	0.086	3.1	LOS A	0.0	0.0	0.00	0.58	0.00	26.2
Approach			619	6.3	619	6.3	0.130	0.7	NA	0.0	0.0	0.00	0.13	0.00	58.4
East: Median Storage															
1	R2	All MCs	213	8.3	213	8.3	0.241	2.0	LOS A	0.5	4.1	0.30	0.43	0.30	44.6
Approach			213	8.3	213	8.3	0.241	2.0	LOS A	0.5	4.1	0.30	0.43	0.30	44.6
All Vehicles			832	6.8	832	6.8	0.241	1.0	NA	0.5	4.1	0.08	0.21	0.08	53.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Hammond/Access B PM 2035+DEV PM (Site Folder: 2035+DEV PM)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [PM (Network Folder: 2035+DEV)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Hammond Road															
5	T1	All MCs	473	6.4	473	6.4	0.128	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			473	6.4	473	6.4	0.128	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.9
East: Access B															
7	L2	All MCs	43	2.0	43	2.0	0.040	3.4	LOS A	0.1	1.1	0.30	0.52	0.30	21.4
Approach			43	2.0	43	2.0	0.040	3.4	LOS A	0.1	1.1	0.30	0.52	0.30	21.4
North: Hammond Road															
10	L2	All MCs	48	2.0	48	2.0	0.140	3.0	LOS A	0.0	0.0	0.00	0.10	0.00	19.0
11	T1	All MCs	482	3.5	482	3.5	0.140	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	46.1
Approach			531	3.4	531	3.4	0.140	0.3	NA	0.0	0.0	0.00	0.05	0.00	38.8
All Vehicles			1046	4.7	1046	4.7	0.140	0.3	NA	0.1	1.1	0.01	0.05	0.01	44.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 101 [Hammond/Access A PM 2035+DEV PM (Site Folder: 2035+DEV PM)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [PM (Network Folder: 2035+DEV)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Hammond Road															
5	T1	All MCs	473	6.4	473	6.4	0.128	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			473	6.4	473	6.4	0.128	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.9
East: Access A															
7	L2	All MCs	60	0.0	60	0.0	0.058	3.7	LOS A	0.2	1.5	0.34	0.54	0.34	43.7
Approach			60	0.0	60	0.0	0.058	3.7	LOS A	0.2	1.5	0.34	0.54	0.34	43.7
North: Hammond Road															
10	L2	All MCs	1	0.0	1	0.0	0.139	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	8.5
11	T1	All MCs	525	3.5	525	3.5	0.139	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			526	3.5	526	3.5	0.139	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.8
All Vehicles			1059	4.6	1059	4.6	0.139	0.2	NA	0.2	1.5	0.02	0.03	0.02	49.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 101 [Gaebler/Access C PM 2035+DEV PM (Site Folder: 2035+DEV PM)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [PM (Network Folder: 2035+DEV)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Access C															
7	L2	All MCs	161	2.0	161	2.0	0.279	3.1	LOS A	1.0	7.3	0.40	0.53	0.40	17.1
9	R2	All MCs	54	2.0	54	2.0	0.279	9.8	LOS A	1.0	7.3	0.40	0.53	0.40	17.1
Approach			215	2.0	215	2.0	0.279	4.8	LOS A	1.0	7.3	0.40	0.53	0.40	17.1
East: Gaebler Road															
10	L2	All MCs	24	2.0	24	2.0	0.113	4.1	LOS A	0.0	0.0	0.00	0.08	0.00	38.2
11	T1	All MCs	138	8.3	138	8.3	0.113	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	44.0
Approach			162	7.4	162	7.4	0.113	0.6	NA	0.0	0.0	0.00	0.08	0.00	42.8
West: Gaebler Road															
5	T1	All MCs	518	5.6	518	5.6	0.390	0.0	LOS A	1.4	11.0	0.19	0.22	0.19	36.3
6	R2	All MCs	171	2.0	171	2.0	0.390	5.6	LOS A	1.4	11.0	0.19	0.22	0.19	32.5
Approach			688	4.7	688	4.7	0.390	1.4	NA	1.4	11.0	0.19	0.22	0.19	35.1
All Vehicles			1065	4.6	1065	4.6	0.390	1.9	NA	1.4	11.0	0.21	0.26	0.21	32.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 101 [Gaebler/Access D PM 2035+DEV PM (Site Folder: 2035+DEV PM)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [PM (Network Folder: 2035+DEV)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Access D															
7	L2	All MCs	14	0.0	14	0.0	0.033	3.0	LOS A	0.1	0.8	0.39	0.53	0.39	16.8
9	R2	All MCs	14	0.0	14	0.0	0.033	6.6	LOS A	0.1	0.8	0.39	0.53	0.39	16.8
Approach			27	0.0	27	0.0	0.033	4.8	LOS A	0.1	0.8	0.39	0.53	0.39	16.8
East: Gaebler Road															
10	L2	All MCs	40	0.0	40	0.0	0.103	4.6	LOS A	0.0	0.0	0.00	0.11	0.00	38.2
11	T1	All MCs	149	8.3	149	8.3	0.103	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	42.7
Approach			189	6.5	189	6.5	0.103	1.0	NA	0.0	0.0	0.00	0.11	0.00	41.5
West: Gaebler Road															
5	T1	All MCs	528	5.6	528	5.6	0.312	0.0	LOS A	0.4	2.8	0.06	0.08	0.06	44.6
6	R2	All MCs	43	0.0	43	0.0	0.312	6.0	LOS A	0.4	2.8	0.06	0.08	0.06	37.6
Approach			572	5.2	572	5.2	0.312	0.5	NA	0.4	2.8	0.06	0.08	0.06	43.8
All Vehicles			788	5.3	788	5.3	0.312	0.7	NA	0.4	2.8	0.06	0.10	0.06	42.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: G/M [Gaebler/Murrumbidgee PM 2035+DEV PM (Site Folder: 2035+DEV PM)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Network: N101 [PM (Network Folder: 2035+DEV)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Gaebler Road															
5	T1	All MCs	154	8.3	154	8.3	0.119	0.0	LOS A	0.4	2.8	0.24	0.28	0.24	47.5
6	R2	All MCs	32	8.3	32	8.3	0.119	11.7	LOS B	0.4	2.8	0.24	0.28	0.24	46.9
Approach			185	8.3	185	8.3	0.119	2.0	NA	0.4	2.8	0.24	0.28	0.24	47.3
North: Murrumbidgee Drive															
7	L2	All MCs	64	5.6	64	5.6	0.112	5.7	LOS A	0.4	3.2	0.43	0.63	0.43	44.5
9	R2	All MCs	36	15.4	36	15.4	0.112	8.7	LOS A	0.4	3.2	0.43	0.63	0.43	42.4
Approach			100	9.1	100	9.1	0.112	6.8	LOS A	0.4	3.2	0.43	0.63	0.43	44.1
West: Gaebler Road															
10	L2	All MCs	267	5.6	267	5.6	0.298	4.6	LOS A	0.0	0.0	0.00	0.26	0.00	45.0
11	T1	All MCs	275	5.6	275	5.6	0.298	0.0	LOS A	0.0	0.0	0.00	0.26	0.00	47.3
Approach			542	5.6	542	5.6	0.298	2.3	NA	0.0	0.0	0.00	0.26	0.00	46.2
All Vehicles			827	6.6	827	6.6	0.298	2.7	NA	0.4	3.2	0.11	0.31	0.11	46.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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