

Transport Impact Assessment – Part 1

Como Baptist Church Redevelopment
– West Site

CW1115300



Prepared for
dem

12 March 2021

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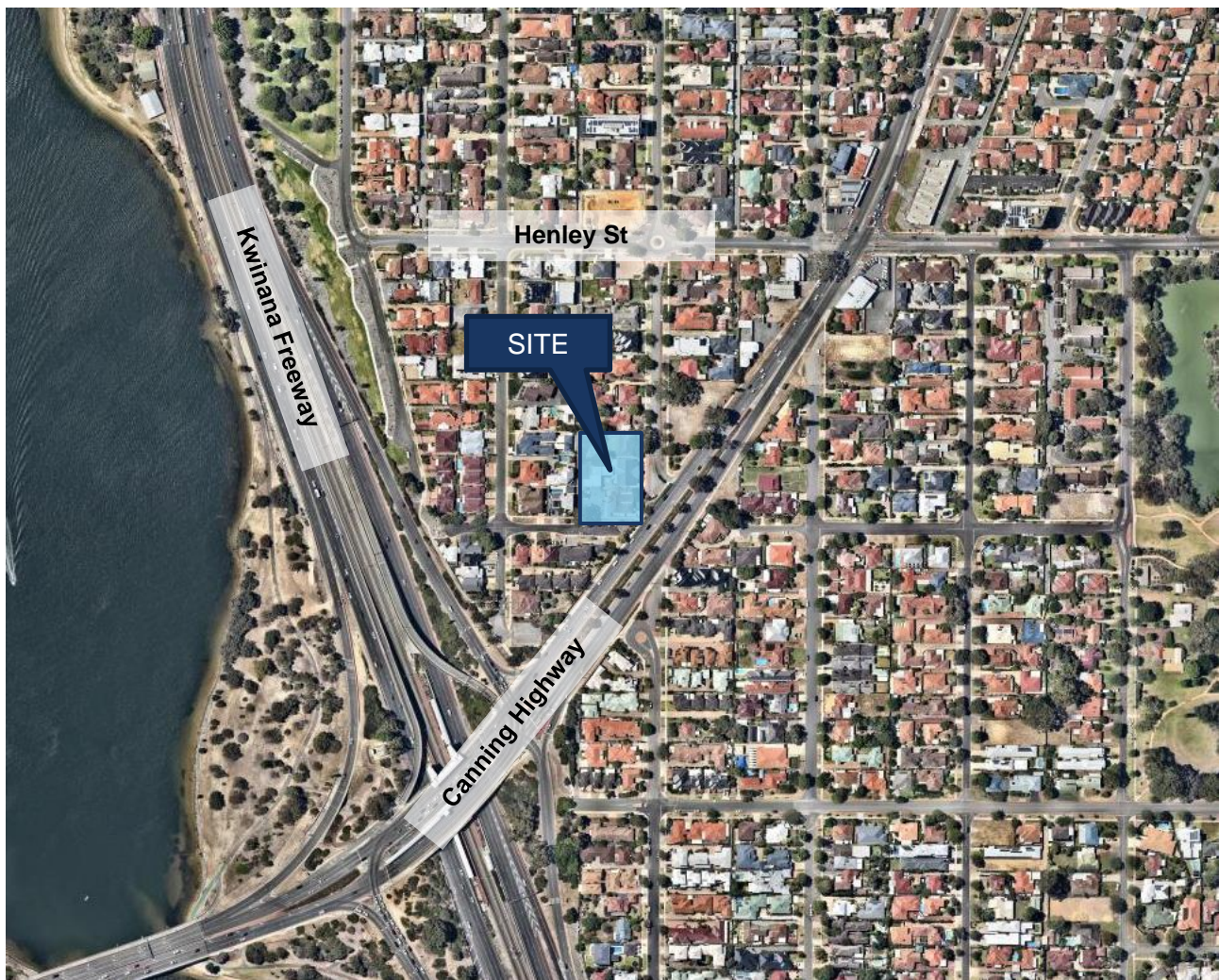
1 Introduction

1.1 Background

Cardno has been commissioned by dem (hereinafter referred to as 'the Client') to prepare a Transport Impact Assessment (TIA) for the proposed 'mixed-use' redevelopment of the Como Baptist Church (hereinafter referred to as 'the Site'). An aerial view of the Site is shown in **Figure 1-1**.

This report aims to assess the impacts of the proposed development on the adjacent road network, with a focus on traffic operations, 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 (2020)*.

Figure 1-1 Aerial View of the Site



Source: Nearmap

2 Existing Site Situation

2.1 Site Location

The proposed development is located at Lots 109, 111 & 113, Robert Street, Como, within the City of South Perth. The Site is bounded by Lily Lane to the west, Robert Street to the east, and Cassey Street to the south. Residential lots are located beyond its northern boundary, and Canning Highway runs along the southeast corner of the Site.

Within the Site boundaries, the northwest area is currently vacant lot being used as a carpark, while the northeast area is occupied by a single dwelling. The southern area of the site is currently occupied by the Como Baptist Church and the Canning Bridge Early Learning Centre (50 student capacity).

The carparks to the existing church and early learning centre are located at the south end of Robert Street, east end of Cassey Street, and at the northwest and southeast corners of the lot accessible through Lily Lane and Cassey Street.

The location of the Site is shown in **Figure 2-1**.

Figure 2-1 Site Location



Source: Nearmap

2.2 Surrounding Land Use

The City of South Perth's *Town Planning Scheme No. 6* zoning map (see **Figure 2-2**) shows that the entire Site is zoned as *Centre*, which is the same zoning for surrounding areas north of the Site and across Canning Highway. Further east and north, properties are zoned as either *Parks and Recreation (Local)* or *Residential*. Lands surrounding Kwinana Freeway and Canning Highway are under Primary Regional Roads, while lands along the Swan River are under *Parks and Recreation* for the Metropolitan Region Scheme Reserves.

Figure 2-2 Zoning Map



Source: City of South Perth's Town Planning Scheme No. 6

2.3 Existing Road Network

The layout and classification of the roads under the *Main Roads WA Road Hierarchy* surrounding the Site are presented in **Figure 2-3**.

Figure 2-3 Road Network Classification



Source: Main Roads - Road Information Mapping System

The characteristics of the surrounding road network are presented in **Table 2-1**.

Table 2-1 Road Network Description

Road Name	Road Hierarchy	Jurisdiction	No. of Lanes	No. of Footpaths	Width (m)	Posted Speed Limit (km/h)
Kwinana Freeway	Primary Distributor	Main Roads	6 (divided)	2	37.75 (incl. 13.4m train tracks and 3m bike lane)	100
Canning Highway	Primary Distributor	Main Roads	4-6 (divided)	2	30 (incl. 13.6m median)	60
Henley Street	Local Distributor	Local Govt.	2	2	10	50
Cassey Street	Access Road	Local Govt.	2	1	5.5	50
Robert Street	Access Road	Local Govt.	2	2	6.4	50
Lily Lane	Access Road	Local Govt.	1	0	4	20

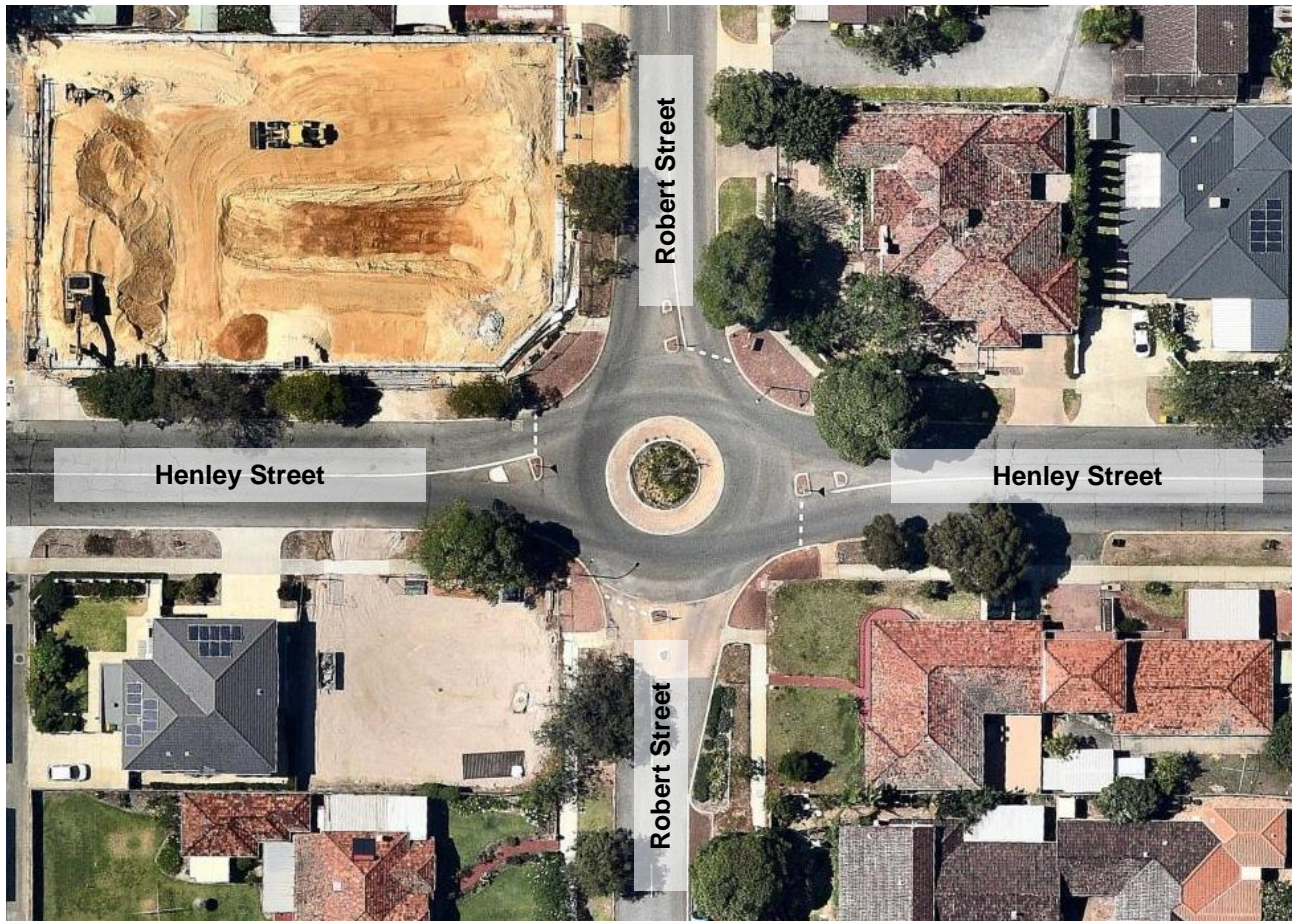
Source: Main Roads - Road Information Mapping System/Nearmap

2.4 Existing Intersections

2.4.1 Henley Street/Robert Street Intersection

This intersection is a four-legged roundabout located north of the site as shown in **Figure 2-4**. Robert Street provide access to local traffic, while Henley Street provides access to several local roads in the east-west direction.

Figure 2-4 Henley Street/Robert Street Intersection



Source: Nearmap

2.4.2 Canning Highway/Henley Street Intersection

This intersection located northeast of the Site is a four-way signal-controlled intersection with the Canning Highway as the major road (**Figure 2-5**). Left turn movements from the north and south legs are provided with high-angle slip/bypass lanes. The right turn pocket lane at the north approach is 40 metres long, while the right turn pocket lane at the south approach extends until the Kwinana Freeway/Canning Highway interchange over 400 metres south. All vehicle turning movements are allowed at the intersection, and all approaches are provided with pedestrian crosswalks.

Lockhart street intersects with Henley Street at about 10 metres from the intersection, which services about 4 residences and the 10-bay carpark for the adjacent commercial establishment.

Figure 2-5 Canning Highway/Henley Street intersection



Source: Nearmap

2.5 Existing Pedestrian / Cycle Networks

According to the 2018 City of South Perth and Town of Victoria Park's Joint Bike Plan shown in **Figure 2-6**, the Site is currently not connected to any bicycle facilities within the area. The nearest facilities to the Site are *Bicycle Lanes or Sealed Shoulders* along Henley Street and Davilak Street, and the *High-Quality Shared Paths* along Kwinana Freeway.

Figure 2-6 Existing Bike Facilities in the City of South Perth



Source: City of South Perth and Town of Victoria Park - Joint Bike Plan (2018)

2.6 Existing Public Transport Facilities

The Transperth network surrounding the site is shown in **Figure 2-7**. Four bus routes pass along the Site through Canning Highway, with the nearest bus stop located 150 metres from the Site (Canning Highway before Robert Street). The nearest bus station is located 270 metres from the Site (Canning Bridge Station), which is also serviced by the Mandurah train line.

Figure 2-7 Public Transport Facilities



Source: Transperth

The frequency of bus and train operations near the Site are shown in **Table 2-2** and **Table 2-3**.

Table 2-2 Bus Route Frequency

Bus Route	Route Description	Frequency	
		Weekdays	Saturdays
100	To Como	10-30 minutes (5:52 am to 10:59 pm)	30-60 minutes (7:22 am to 8:50 pm)
	From Como	10-30 minutes (5:55 am to 10:55 pm)	30-60 minutes (7:52 am to 9:19 pm)
101	To Como	10 minutes (6:31 am to 7:11 pm)	No Operation
	From Como	10 minutes (6:30 am to 7:19 pm)	No Operation
148	To Fremantle	No Operation	30-60 minutes (8:23 am to 6:05 pm)
	To Perth	30 minutes (5:26 pm to 7:04 pm)	60 minutes (9:09 am to 6:15 pm)
910	To Perth	5-15 minutes (4:47 am to 11:53 pm)	15 minutes (6:15 am to 11:53 pm)
	From Perth	5-15 minutes (5:47 am to 12:48 am)	15 minutes (6:21 am to 12:49 am)

Source: Transperth

Table 2-3 Canning Bridge Station Train Frequency (Mandurah Line)

Route	Frequency	
	Weekday	Saturday
To Mandurah	5-15 minutes (5:38 am to 12:23 am)	15-30 minutes (5:38 am to 2:23 am)
To Perth	5-15 minutes (5:33 am to 12:03 am)	15-30 minutes (5:48 am to 1:43 am)

Source: Transperth

2.7 Existing Traffic Volumes

Midblock traffic data within the Site vicinity are available through Main Roads' traffic map, which are summarized in **Table 2-4**.

Table 2-4 Existing Traffic Volumes

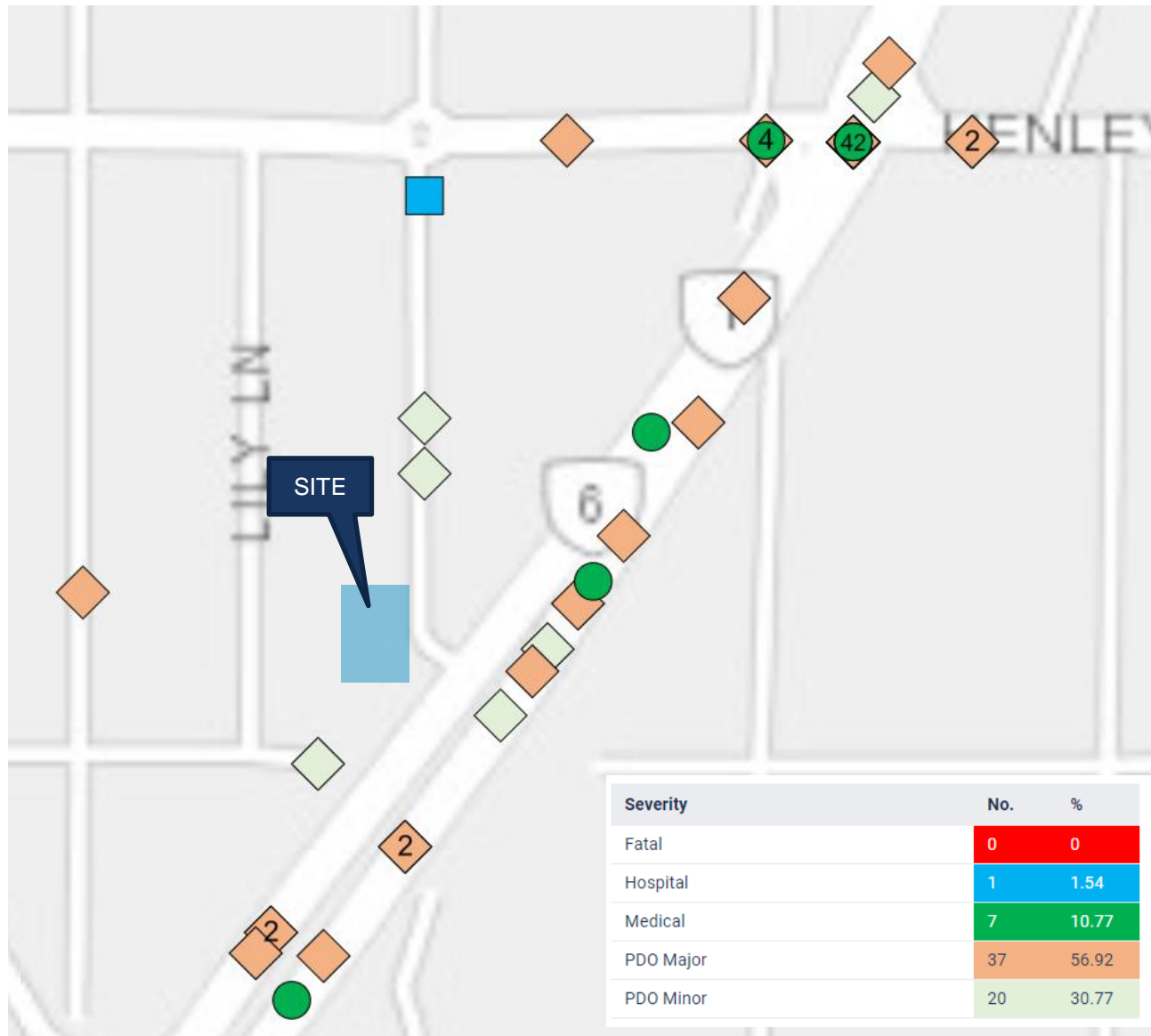
Location	Direction	Year	Volume (Mon-Sun)	%Heavy Vehicle
Canning Hwy North of Henley St (SLK 4.93)	Northbound	2018/19	18,472	No Data
	Southbound	2018/19	17,860	No Data
Canning Hwy West of Henley St (SLK 5.19)	Northbound	2018/19	20,466	No Data
	Southbound	2018/19	20,376	No Data

Source: MRWA Traffic Map

2.8 Crash Assessment

A search of the *Main Roads WA Reporting Centre* for crash data was undertaken. This search covered all recorded traffic accidents between 1 January 2015 and 31 December 2019 within a close proximity of the Site, which were plotted in **Figure 2-8**.

Figure 2-8 Crash Map



Source: Main Roads WA Crash Map

A summary of the crash data are as follows:

- There were 42 recorded crashes at the Henley Street and Canning Highway intersection
- No fatal crash was recorded near the Site.
- There was only one crash that required Hospital attention, occurred near Henley Street / Roberts Road intersection.
- Only 4 crashes were recorded along local roads with direct access to the Site (Robert Street and Cassey Street).

The number of recorded crashes leading to the Site is not considered to be excessive and it is most likely that this development will not result in any material change likely to impact road safety in the surrounding area.

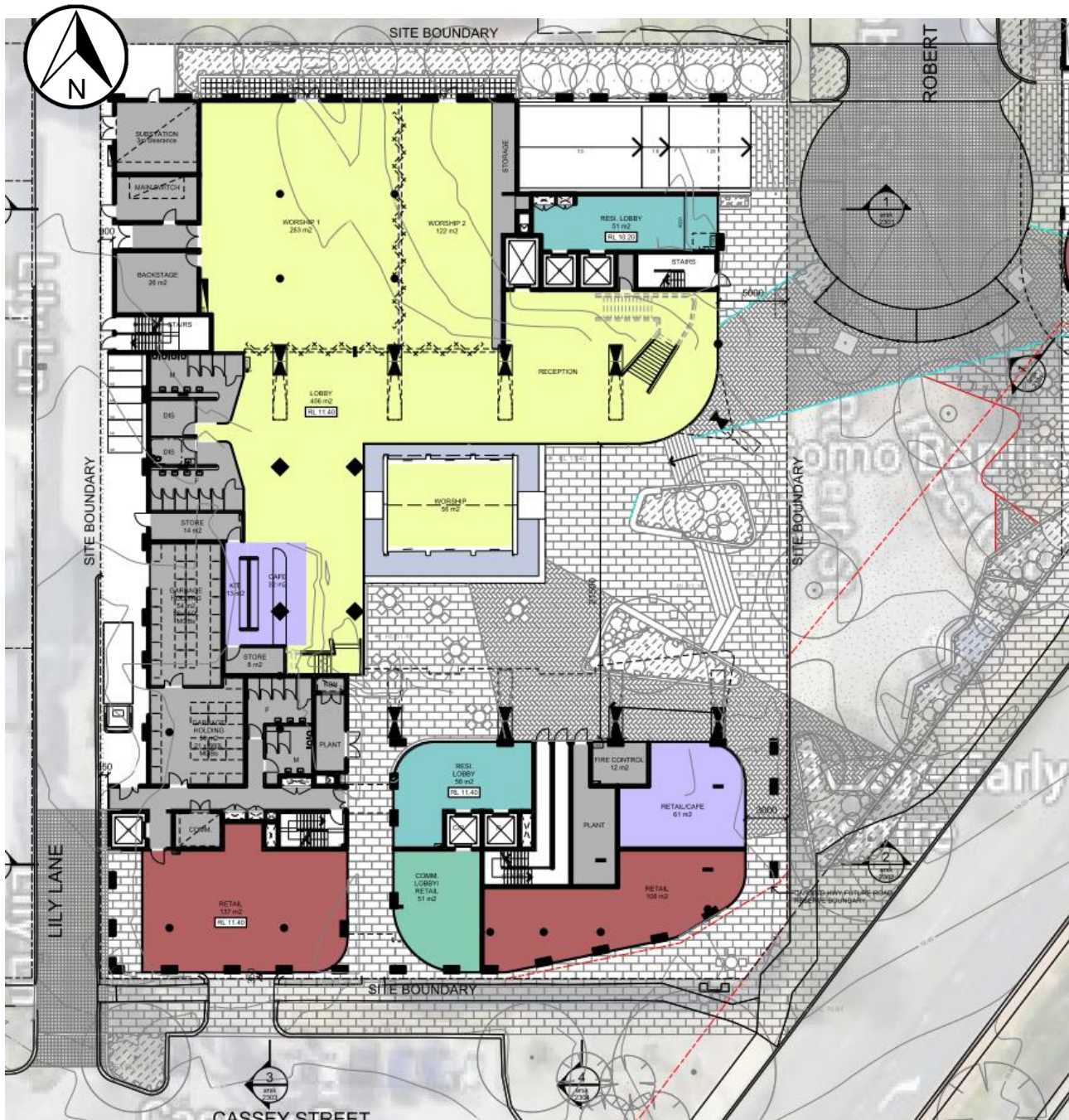
3 Development Proposal

3.1 Proposed Land Use

The proposed development is a mixed-use development which focuses on the redevelopment of the existing Como Baptist Church. The development will include place of worship, café, retail, medical centre, commercial, and several storeys of residential units. The Site's ground floor plan is shown in **Figure 3-1**.

The development plans are included in **Appendix B** of this report.

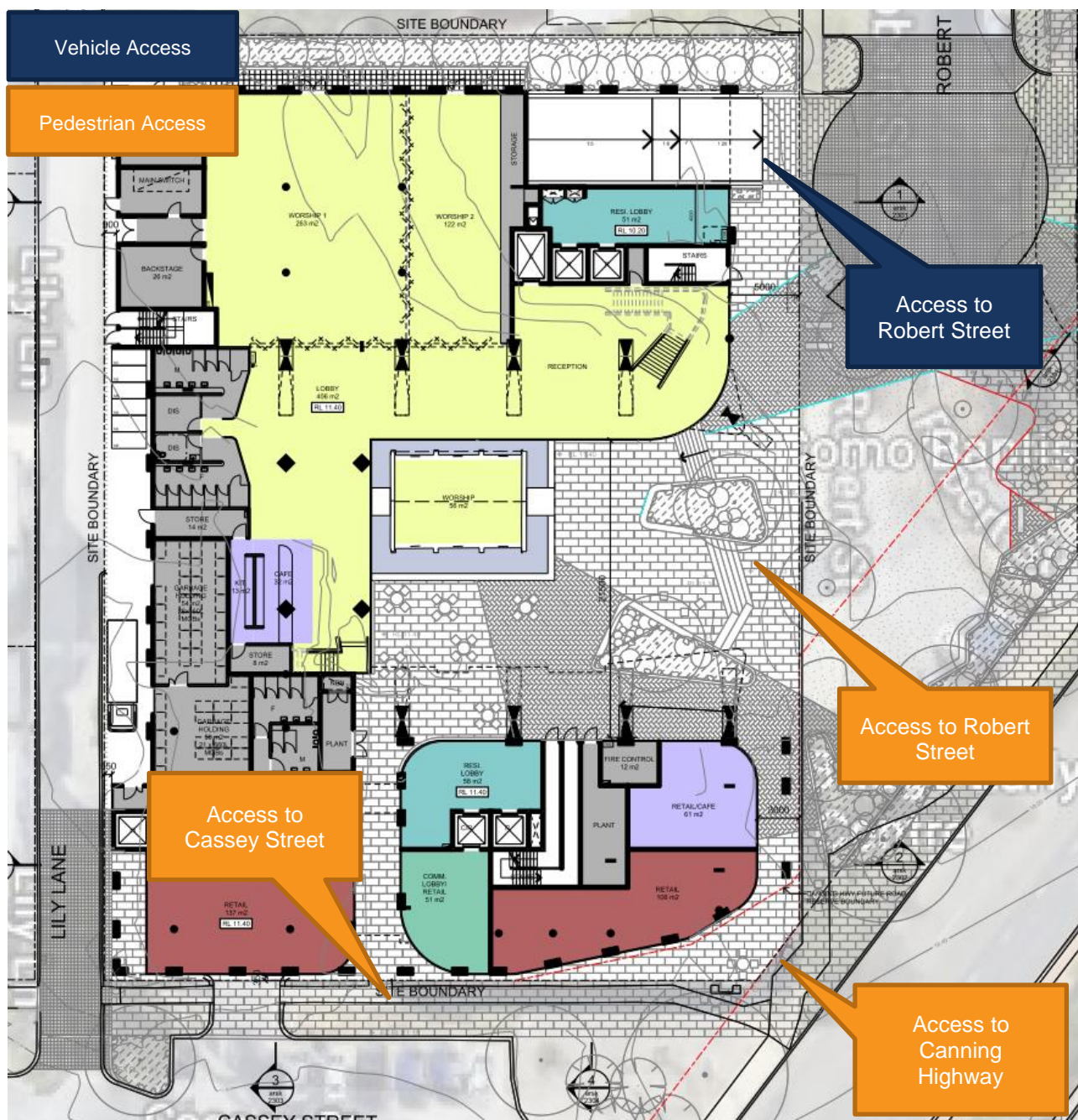
Figure 3-1 Ground Floor Plan of the Site



3.2 Access Arrangements

Vehicle access to the carpark is from Robert Street at the northeast corner of the Site. There are no full height building elements within the pedestrian sight line visual truncation area as outlined in AS2890.1 and as such, the access driveway should be considered compliant with the standards. Any landscaping proposed adjacent to the access driveway should be a species of low growing height so as to not interrupt sight lines when exiting the site. Pedestrians can access the Site from Robert Street, Canning Highway and Cassey Street via footpaths fronting the respective roads (see **Figure 3-2**).

Figure 3-2 Site Access



While there are some structural elements proposed within the south west corner of the site, some visual permeability is available between the columns to assist with pedestrian visibility. It is also proposed to treat the lower section of Lily lane as a low speed shared zone, with a differential paved pavement treatment to separate the area from the rest of the lane, and include a ramped section to ensure vehicles coming out of the lane, do so at a low and appropriate speed. The development itself is proposing to use Lily Lane predominately for service vehicles only, and this usage is expected to be infrequent. As such, the development is unlikely to contribute to any significant additional safety concerns with regard to the lane's usage.

3.3 Car Parking Provision

Canning Bridge Activity Centre Plan (CBACP) (2020) was used as reference for the car parking requirements of the development. **Table 3-1** outlines the car parking requirements of the residential and non-residential components of the development.

Table 3-1 Car parking requirements for Residential Land Use

Land Use		Yield	Units	Rate	Total	Provision
Residential	1-Bedroom	29	Dwellings	0.75 bay per dwelling	22	130
	2-Bedroom	95	Dwellings	1 bay per dwelling	95	
	3-Bedroom	12	Dwellings	1 bay per dwelling	12	
	4-Bedroom	1	Dwellings	1.25 bay per dwelling	1	
	Visitor	137	Dwellings	0.125 bay per dwelling	18	43*
	Subtotal					148
Non-Residential	Retail / Café	310	m²	1 per 50 m²	6	43* + 5**
	Commercial/Medical	530	m²	1 per 50 m²	11	
	Church Use	1500	m²	1 per 50 m²	30	
	Subtotal					47
	Total				195	178

*Visitor bays shared between residential and non-residential use

** Shared Car bays

The total car parking requirement of the development is 195 bays, including both residential and non-residential components. The development proposal provides a total of 178 parking bays, including 130 residential bays, 43 visitor bays (including 10 electrical car bays) and 5 shared bays.

The residential parking provision meets the requirements set out in CBACP. The development includes a proposal to implement a reciprocal use between residential and non-residential visitor parking. This is considered acceptable in this instance as the parking demand between non-residential visitors and residential visitors generally doesn't coincide. The majority of the parking demand for residential visitors would typically occur outside of regular business hours, when the non-residential developments are mostly closed. In addition to that, it is the Church's intention to provide regular shuttle bus / car pool service for the members and local community to travel from / to site for any Church functions / activities.

Moreover, 5 car share spaces have also been proposed for residential and non-residential uses. On-street parking bays are also proposed within the new turn around at the end of a closed Roberts Street, which could be used for short-term parking / pick-up and drop-off. These parking bays will be managed by selected Car Share Scheme Operator.

In addition to the car parking requirements, the CBACP requires motorcycle bays to be provided in accordance with *Element 18.3* and *Element 18.6* of CBACP. This is equivalent to 10 motorcycle/scooter bays, summarised in **Table 3-2**.

Table 3-2 Motorcycle Parking Requirements and Provision

Land Use	Requirements	Yield (Car bays)	Bays required	Proposed provision
Non-Residential	1 bay per 5 parking bays required	47	10	12
Residential	1 bay per 10 car bays*	148	15	

*for developments greater than 20 dwellings

A total of 12 motorcycle bays are proposed to be shared between the residential and non-residential use. It is noted that the motorcycle parking provision does not satisfy the CBACP requirements. However, a large proportion of the non-residential parking bay allocation are for church purposes, a land use that historical observations suggest is likely to attract a lesser proportion of motorbike riders.

According to the *Australian Bureau of Statistics, Motor Vehicle Census, Australia 2020*, the proportion of registered motorcycle when compare to passenger vehicles, has dropped from 8% (2015) to 7.5% (2020) which indicated a downward trend for motorcycle ownership over the years. Should this continue, the proposed motorcycle/scooter bays provision should be sufficient to accommodate the needs. Should there be a higher demand for motorcycle bays, the motorcycle parking provision can be further managed through motorcycle bay allocation for residents and a booking system for non-residential developments.

3.4 Bicycle Parking Provision

The bicycle parking provision of the proposed development meets the CBACP parking requirements as shown in **Table 3-3**. The total bicycle parking provision for the development is 196, which well exceeds the CBACP requirements. Secured undercover bicycle parking will be provided within designated areas of basement and within designated storage areas in some apartments.

Table 3-3 Bicycle Parking Requirements and Provision

Land Use	Yield	Units	Rate	Total	Provision
Residential	137	Dwellings	1 space per dwelling	137	137
Residential Visitors	137	Dwellings	1 space per 10 dwellings	14	59*
Non-Residential	2,340	m ²	1 space per 100 m ² NLA	24	
Total				175	196

*shared between residential and non-residential visitors

3.5 End of Trip Facilities

The CBACP requires the provision of certain number of end-of-trip facilities for each non-residential bicycle parking bay. **Table 3-4** shows the number of required facilities for the development.

Table 3-4 End-of-Trip Facilities Requirements

End-of-Trip Facilities	Rate	Requirement	Provided
Lockers	1 per non-residential bicycle bay	24	24
Shower (not gender-specific)	1 per 10 non-residential bicycle bays	3	4

Source: Canning Bridge Activity Centre Plan (2016)

As shown in the table, the current design satisfies the CBACP requirements for end-of-trip facilities.

3.6 Service Vehicle Provision

The proposed development will be serviced by trucks up to a Medium Rigid Vehicle (MRV) (typically 8.8m long). A truck larger than this, such as a Heavy Rigid Vehicle (HRV) (typically 12.5m) is not required to service the Site, or access Lily Lane. **Figure 3-3** shows that the swept path for a MRV can be accommodated by the service bay provided at the west boundary of the development from Lily Lane with a single reverse manoeuvre when exiting.

It is noted that currently, the City's waste service vehicles access Lily Lane with a truck size larger than or equal to vehicles required to service the site. Due to this, it is not expected that there will be any vehicle access concerns created by the development within Lily Lane.

A swept path check was undertaken at the northern end of Lily Lane where, due to the placement of a western power transformer, the lane width is at its narrowest. **Figure 3-4** shows that the lane is able to accommodate the swept path of a 10.1m waste vehicle.

Figure 3-3 MRV Swept Path

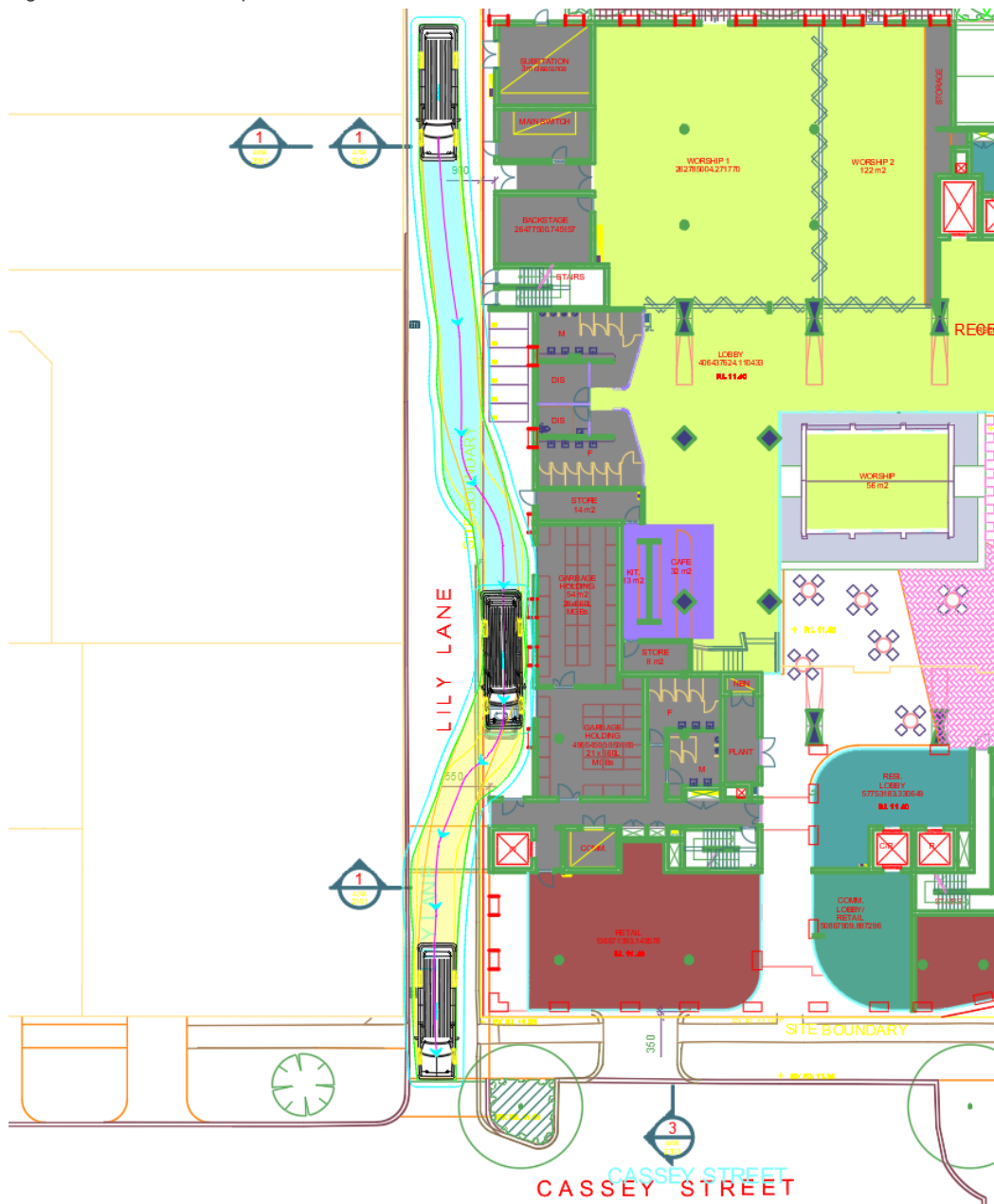
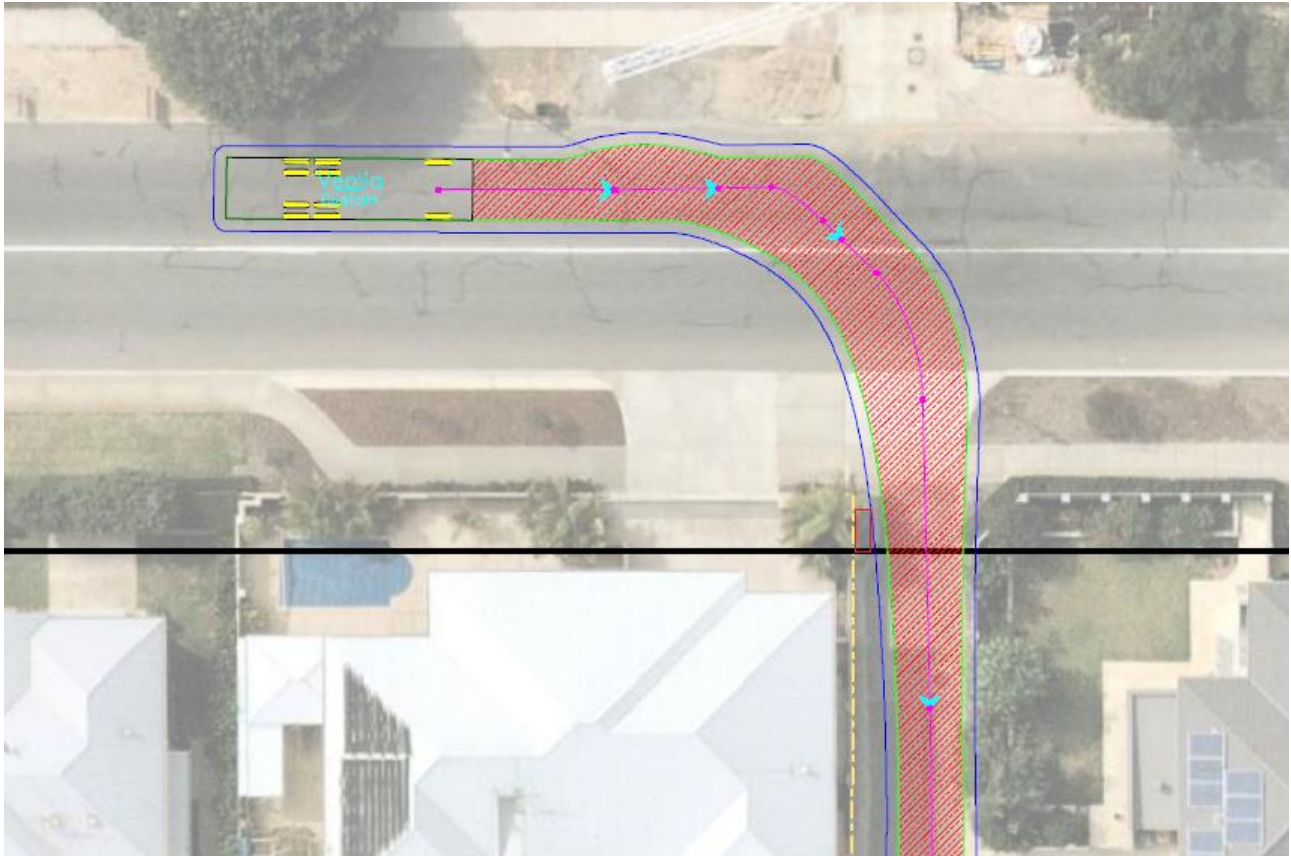


Figure 3-4 Swept Path at northern end of Lily Lane



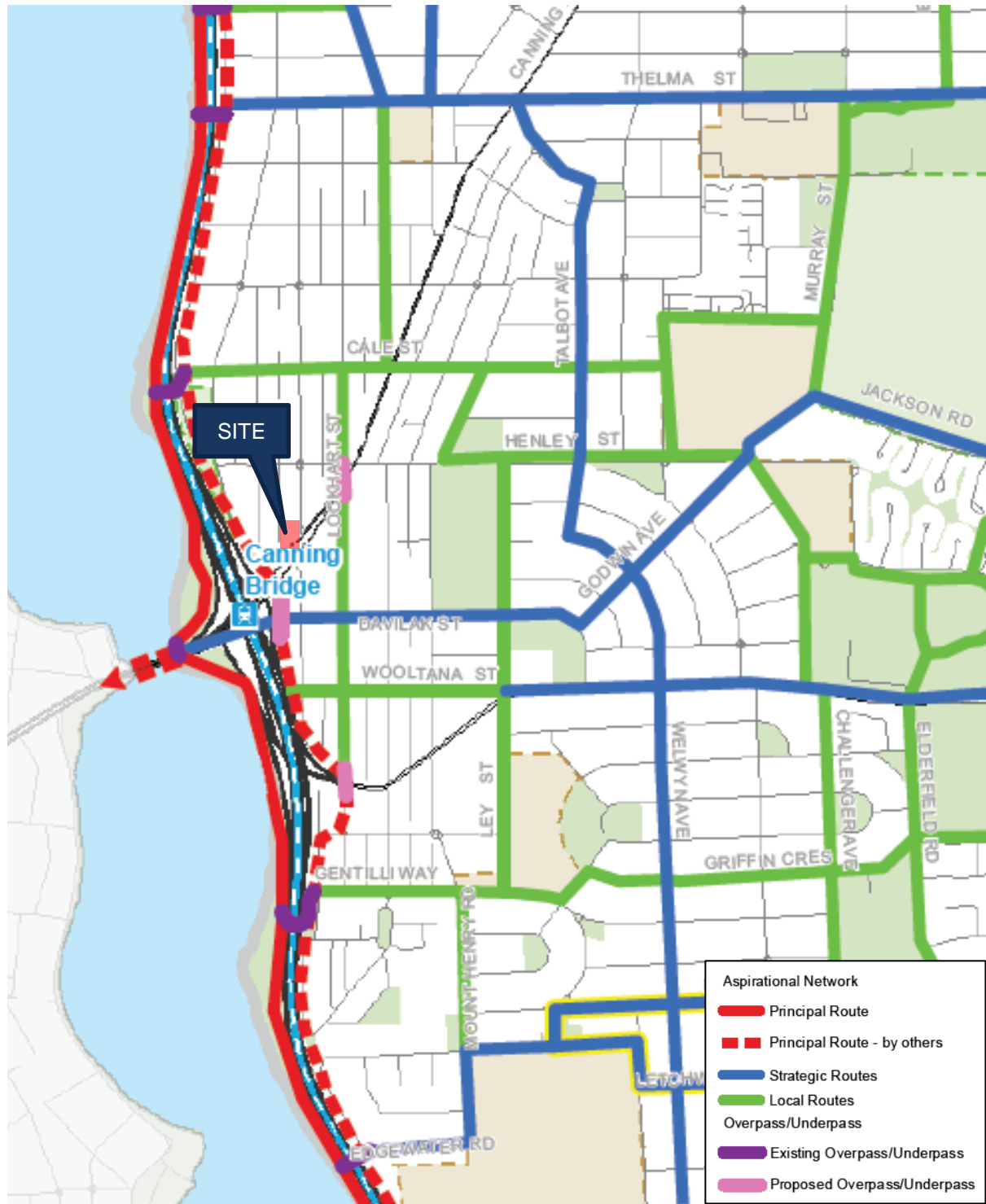
The swept path check performed satisfactorily, which was expected given that the City's waste services vehicles currently access Lily Lane to perform waste pickup, including from the existing church development within the Site. As such, no modifications are required to specifically allow servicing of the development via Lily Lane.

4 Changes to Surrounding Area

4.1 Pedestrian/Cycle Networks

The City of South Perth and the Town of Victoria Park developed a joint bike plan which was promulgated in August 2018. **Figure 4-1** shows the proposed bike facilities within the City of South Perth envisioned to be completed by the year 2050.

Figure 4-1 Proposed Bike Facilities in the Town of Victoria Park



Source: City of South Perth and Town of Victoria Park - Joint Bike Plan (2018)

4.2 Road Network

4.2.1 Canning Bridge Activity Centre Plan

The Canning Bridge Activity Centre Plan (CBACP) (2016) presented an indicative sketch of the Canning Bridge Station Interchange (see **Figure 4-2**), which proposes the conversion of Cassey Street, located along the southern boundary of the Site, to a *public transport boulevard*. This involves the extension of Cassey Street to the new bus station in the foreshore area, and the connection of the street to Canning Highway at the new intersection.

Figure 4-2 Indicative Sketch - Canning Bridge Station Interchange



Source: Canning Bridge Activity Centre Plan (2016)

The indicative cross section of a public transport boulevard is shown in **Figure 4-3**.

Figure 4-3 Indicative Cross Section - Public Transport Boulevard



Source: Canning Bridge Activity Centre Plan (2016)

Cardno contacted the PTA and was informed that the above proposal is long-term and not likely to be undertaken immediately upon completion of the Canning Bridge Station Interchange.

4.3 Public Transport Services

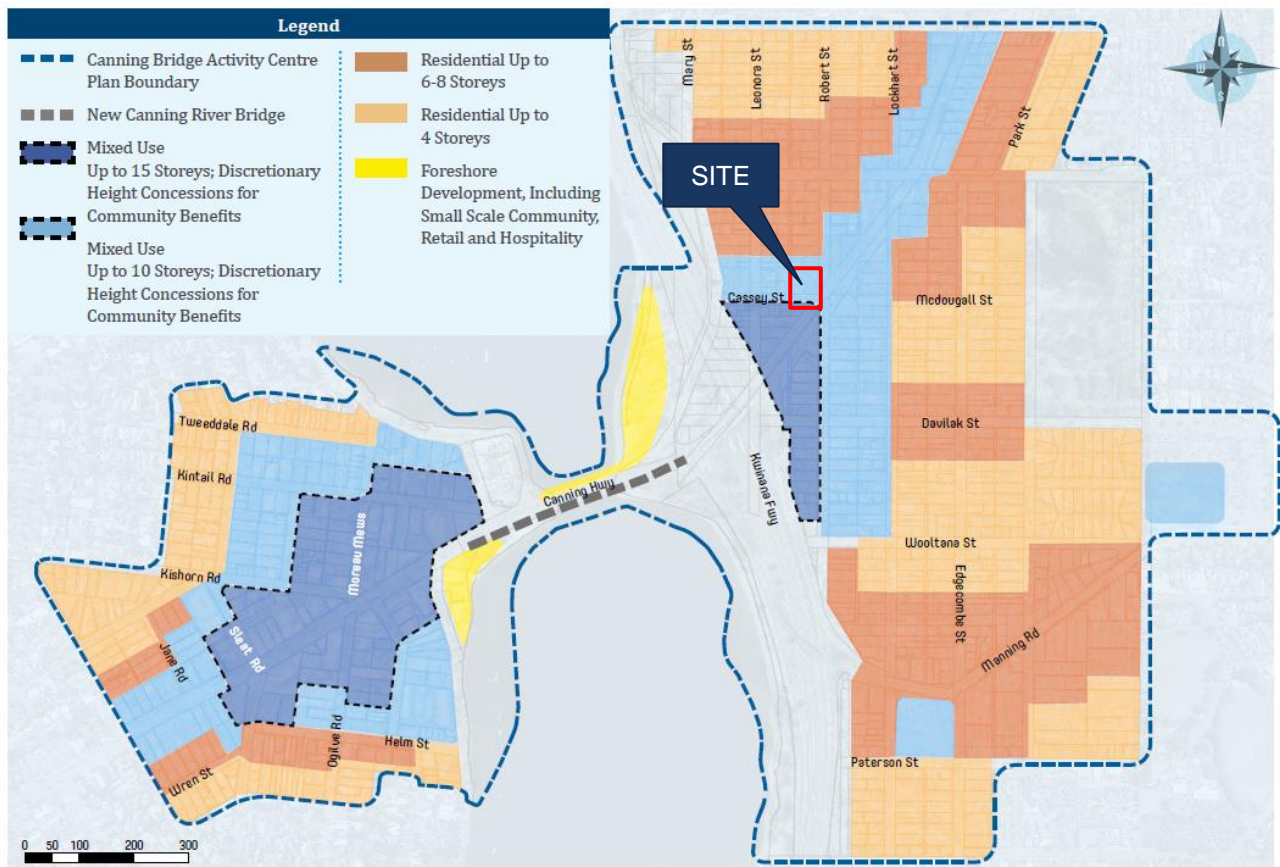
Cardno contacted the Public Transport Authority and was informed that the following changes to the public transport services is expected upon completion of the Canning Bridge Station Interchange:

- > Route 32, which originates from Elizabeth Quay Bus Station and terminates at Melville Parade/Thelma Street station, is expected to extend to the Canning Bridge Station;
- > Route 30, which currently serves Salter Point, is expected to operate between Perth and Canning Bridge Station via Labouchere Road. A different route would replace Route 30 in serving Salter Point; and
- > Route 910 will increase in frequency to compensate for the truncation of all freeway bus services at Canning Bridge Station (i.e., Routes 111, 114, 115, 150, 158, and 160).

4.4 Land Use

The Canning Bridge Activity Centre Plan (2016) details the proposed land use changes in the Canning Bridge Activity Centre, which encompasses the Site. The document describes the designation of the Site under 'mixed-use' which allows for up to 10-storey buildings, as shown in **Figure 4-4**.

Figure 4-4 Canning Bridge Activity Centre Plan Land Use, Built Form and Zones



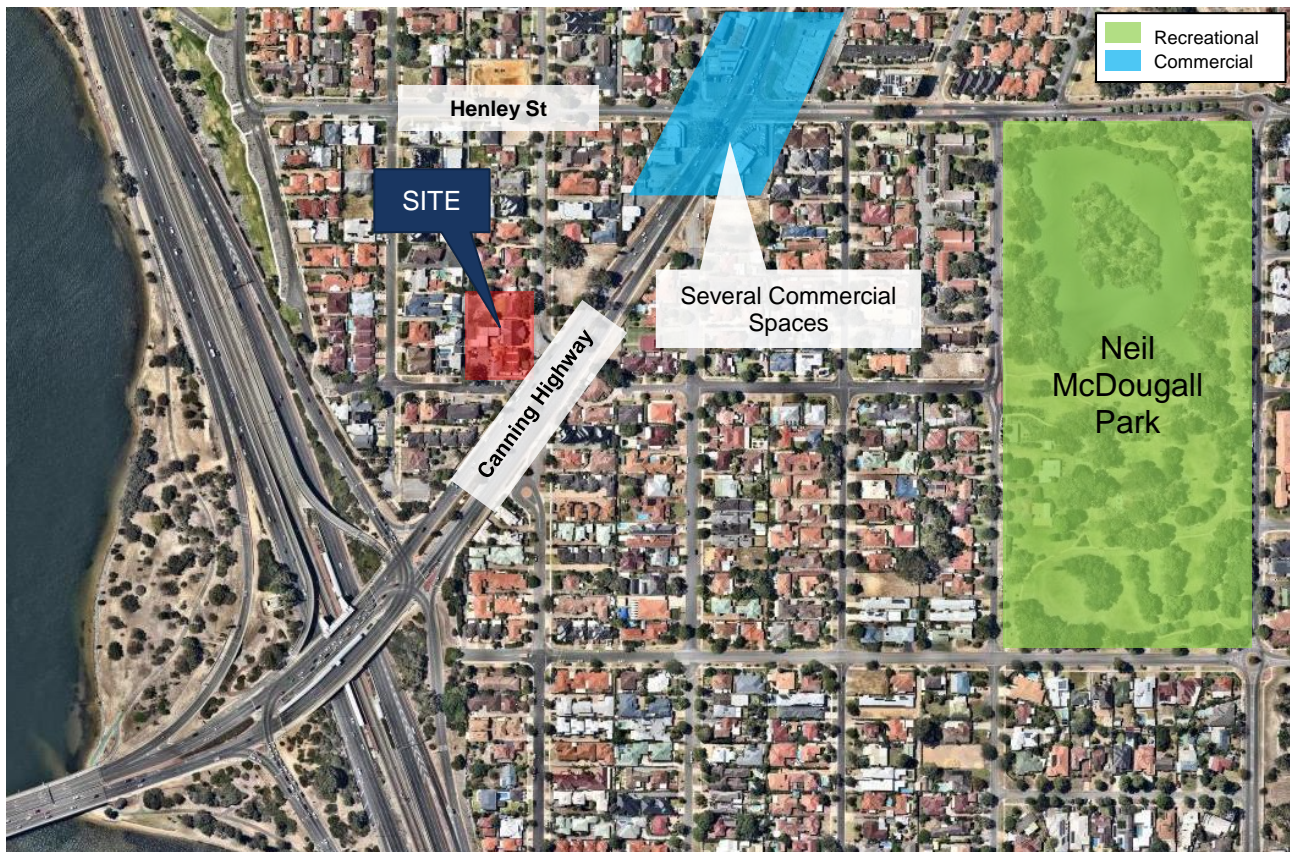
Source: Canning Bridge Activity Centre Plan (2016)

5 Integration with Surrounding Area

5.1 Surrounding Attractors/Generators

Majority of the Como area is of residential land use, which are anticipated to generate traffic for the non-residential land uses in the development. For the residential land uses in the development, the key traffic generators/attractors are the Neil McDougall Park, located east of the Site and several commercial spaces surrounding the Canning Highway-Henley Street intersection, as shown in **Figure 5-1**.

Figure 5-1 Surrounding Attractors/Generators



Source: Nearmap

5.2 Level of Accessibility

Access to the Site is anticipated to be a mix of vehicle and non-motorised modes of transport. Visitors from nearby residential areas may utilise the adequate pedestrian and cycle networks near the site, while residents and visitors from farther locations are likely to use Canning Highway and Henley Street in reaching the Site.

6 Analysis of Transport Network

6.1 Assessment Years and Time Period

Peak periods for the traffic analysis are 7:45 AM to 8:45 PM for the weekday AM peak hour and 4:45 PM to 5:45 PM for the weekday PM peak hour, which were based on the existing peak traffic flow data at various locations surrounding the Site. The Sunday peak from 11:45 AM to 12:45 PM was also included in the analysis to capture the impact on the network by the church land use within the Site. The following model scenarios have been analysed as part of this assessment:

- Scenario 1 – 2020 Existing traffic without development (Weekday AM/PM, Sunday Peak)
- Scenario 2 – 2023 Opening year traffic without development (Weekday AM/PM, Sunday Peak)
- Scenario 3 – 2023 Opening year traffic with development (Weekday AM/PM, Sunday Peak)
- Scenario 4 – 2033 10-year horizon traffic without development (Weekday AM/PM, Sunday Peak)
- Scenario 5 – 2033 10-year horizon traffic with development (Weekday AM/PM, Sunday Peak)

6.2 Modelling Assumptions

The following assumptions were made in undertaking the traffic analysis:

- > A proposed mixed-use development at Lot 469 and 471 Canning Highway, located opposite the Site, has been included in the analysis to assess the impact on the surrounding network when both developments are in full operation.
- > The percentage of heavy vehicles falling under Class 6-12 are minimal (0.3% for Canning Highway through movements) and were simply included in the Class 2-5 category in Sidra Analysis.
- > Actual signal timing was used for the base scenario, while practical cycle time of 150 seconds were used for future scenarios.
- > A growth rate of 1% per year has been applied to the Canning Highway background traffic, while no growth was applied to local roads (Henley Street and Robert Street) due to fully developed surroundings.

6.3 Trip Generation

Rates from *Institute of Transportation Engineers (ITE) "Trip Generation" 10th Edition* were utilised in calculating the potential traffic generation of the development.

Table 6-1 shows the trip generation rate, **Table 6-2** shows the directional split and **Table 6-3** shows the total trip generation.

Table 6-1 Trip Generation Rate

Land Use (Description)	Yield	Unit	Reference	Weekday AM Peak	Weekday PM Peak	Weekend Peak
Residential (Multi-family housing (mid-rise))	137	dwelling	221	0.15 / dwelling	0.41 / dwelling	0.39 / dwelling
Church	525	m ² GFA	560	0.70 / 100 m ²	0.86 / 100 m ²	10.75 / 100 m ²
Office (General Office Building-Church)	975	m ² GFA	710	1.58 / 100 m ²	1.53 / 100 m ²	0.23 / 100 m ² [^]
Medical Centre (Clinic)	530	m ² GFA	630	5.62 / 100 m ²	4.99 / 100 m ²	5.62 / 100 m ²
Wellness Centre (Health/Fitness Club)	345	m ² GFA	492	1.51 / 100 m ²	4.22 / 100 m ²	3.43 / 100 m ²
Café (Retail (food))	60	m ² GFA	WAPC	2.5 / 100 m ²	10.0 / 100 m ²	10.0 / 100 m ² [^]
Kiosk/Retail (Shopping Centre)	250	m ² GFA	820	3.23 / 100 m ²	4.53 / 100 m ²	3.00 / 100 m ²

[^]No weekend rates available, max of AM/PM used

Table 6-2 Directional Distribution

Land Use	Weekday AM Peak		Weekday PM Peak		Weekend	
	In	Out	In	Out	In	Out
Residential (Multi-family housing (mid-rise))	27%	73%	60%	40%	62%	38%
Church	54%	46%	62%	38%	0%*	100%*
Office (General Office Building)	88%	12%	18%	82%	58%	42%
Medical Centre (Clinic)	58%	42%	46%	54%	50% [^]	50% [^]
Wellness Centre (Health/Fitness Club)	46%	54%	52%	48%	49%	51%
Café	80%	20%	50%	50%	50% [^]	50% [^]
Kiosk/Retail (Shopping Centre)	54%	46%	50%	50%	49%	51%

^{*}Distribution based on the approximate peak hour of the Como Baptist Church as per Google Maps (9AM-11AM)

[^]No weekend rates available, assumed to be equal in/out distribution

Table 6-3 Total Trip Generation

Land Use	Weekday AM Peak		Weekday PM Peak		Weekend Peak	
	In	Out	In	Out	In	Out
Residential (Multi-family housing (mid-rise))	6	15	34	22	33	20
Church	2	2	3	2	0	56
Office (General Office Building)	14	2	3	12	1	1
Medical Centre (Clinic)	17	13	12	14	15	15
Wellness Centre (Health/Fitness Club)	2	3	8	7	6	6
Café	1	0	3	3	3	3
Kiosk/Retail (Shopping Centre)	4	4	6	6	4	4
TOTAL	46	38	68	66	62	105

The total trip generation was reduced by the existing trips generated by the Como Baptist Church and the Canning Bridge Early Learning Centre at the Site. The approximate reduction based on existing land use yields and ITE rates are shown in **Table 6-4**.

Table 6-4 Existing Development Yields

Land Use	Yield	Unit	Reference	Weekday AM Peak		Weekday PM Peak		Weekend Peak	
				In	Out	In	Out	In	Out
Church	200	sq.m. GFA	560	0.8	0.6	1.1	0.7	0.0	21.5
Canning Bridge Early Learning Centre	50	Students	565	20.9	18.6	19.0	21.5	3.0	2.5
TOTAL				21.7	19.2	20.1	22.1	3.0	24.0

The net trip generation of the proposed development, including the development yields of the proposed mixed-use development at Lot 469 and 471 Canning Highway, are presented in **Table 6-5**.

Table 6-5 Total Net Development Trip Generation

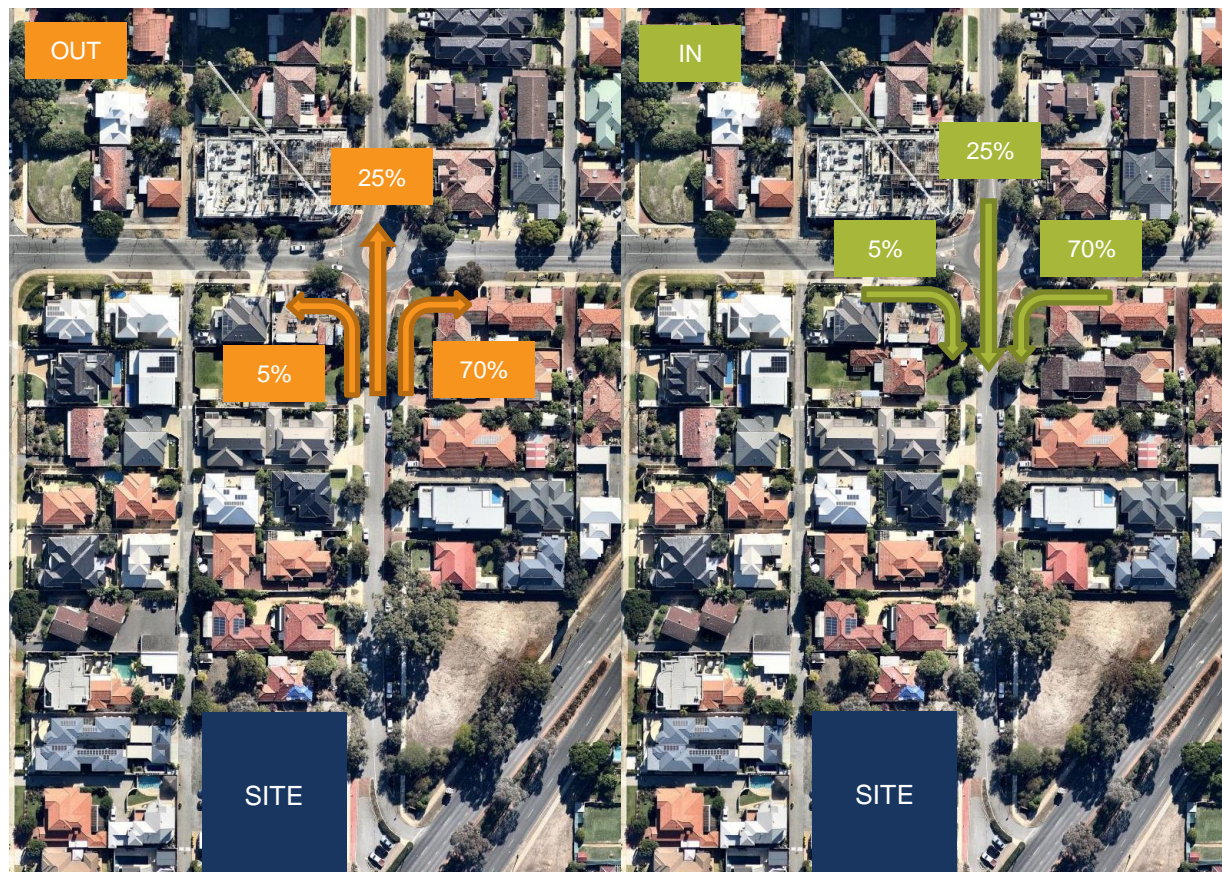
	Weekday AM Peak		Weekday PM Peak		Weekend Peak	
	In	Out	In	Out	In	Out
West Site trip generation (This TIA)	46	38	68	66	62	105
Existing Site trip generation	-22	-19	-20	-22	-3	-24
Net west site trip generation	24	19	48	44	59	81
East Site (Lot 469 and Lot 471)	32	35	49	45	27	18
Net total	56	54	97	89	86	99

It is important to note that these trip generation calculations are considered to be robust as no further reduction has been included and considering the proposed development is located within close proximity of high quality and frequency public transport facilities (Canning Bridge Station), the trip generated by the proposed development is anticipated to be lower than what is calculated.

6.4 Trip Distribution

The assumed traffic distribution for the trips generated by the developments (total of east and west sites) are shown in **Figure 6-1**. Trip distribution on the intersection of Henley Road and Canning Highway are assumed to be equal to existing turning movement distributions (based on 2016 traffic count data).

Figure 6-1 Trip Distribution (In and Out)



6.5 Intersection Performance

The identified intersections have been analysed using the Sidra analysis software. This software calculates the performance of intersections based on several input parameters, such as intersection geometry, speed limit and traffic volumes, among others. As an output, Sidra generates the Degree of Saturation (DOS), queue lengths, delays, level of service, and 95th Percentile Queue for the intersection. 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 theoretical intersection capacity is exceeded for an un-signalized intersection where $DOS > 0.80$;
- > **95% 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. An unsignalised intersection can be considered to be operating at capacity where the average delay exceeds 40 seconds for any movement; 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 6-6**.

Table 6-6 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 sec	10-15 sec
C	At or near free-flow operations	20-35 sec	15-25 sec
D	Decreasing free-flow levels	35-55 sec	25-35 sec
E	Operations at capacity	55-80 sec	35-50 sec
F	A breakdown in vehicular flow (worst condition)	≥80 sec	≥50 sec

6.6 Sidra Analysis Input

6.6.1 Intersection Geometry

All Sidra input on intersection geometry were sourced from the Nearmap image, dated 3 May 2020.

6.6.2 Speed Limit

Approach and exit cruise speeds in the models were based on the posted speed limit data obtained from the MRWA Road Information Mapping System discussed in **Section 2.3**.

6.6.3 Traffic Signal Phase Times

Signal phasing information for the Canning Highway - Henley Street intersection was obtained from the database available in the Main Roads Traffic Map website.

6.6.4 Traffic Volumes

Traffic volume data used in the analysis were obtained from the following sources:

- > Canning Highway – Henley Street intersection video count survey data (November 2016)
- > Canning Highway – Henley Street intersection SCATS data available from Main Roads' Traffic Map (November 2020)
- > Midblock counts from City of South Perth (2015 – 2019)

Calculations were undertaken to obtain turning movement volumes at intersections, as detailed below:

- > At the intersection of Canning Highway and Henley Street, turning volumes from Canning Highway (north and south approaches) are directly obtained from 2020 SCATS data (Nov 2020)
- > At the intersection of Canning Highway and Henley Street, turning volumes from Henley Street (east and west approaches) are obtained by applying turning vehicle percentage from 2016 video count survey data to 2020 SCATS data
- > At the intersection of Henley Street and Robert Street, turning volumes were obtained by applying a simple gravity model to the midblock volumes at each leg (December 2019 data). For the west leg where no midblock data is available, it is assumed that midblock volumes is 80% of the midblock volumes at the east leg

Network volumes are presented in **Figure 6-2, Figure 6-3, Figure 6-4, Figure 6-5, and Figure 6-6**. Note that %HV values in the existing scenario is assumed to be the same in the future scenario.

Figure 6-2 Traffic Flows (2020 Existing Background Traffic)

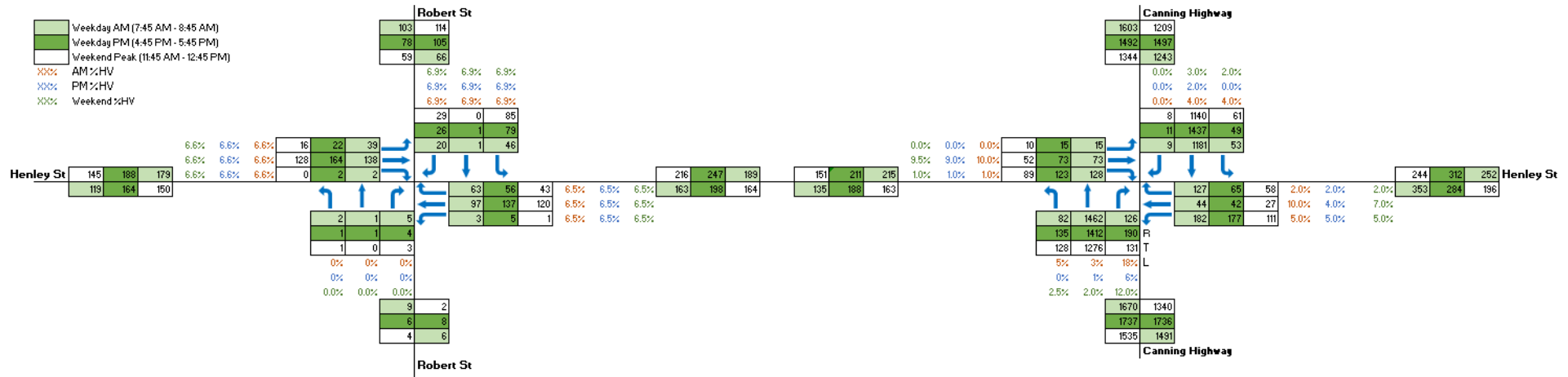


Figure 6-3 Traffic Flows (2023 Existing Background Traffic without Development)

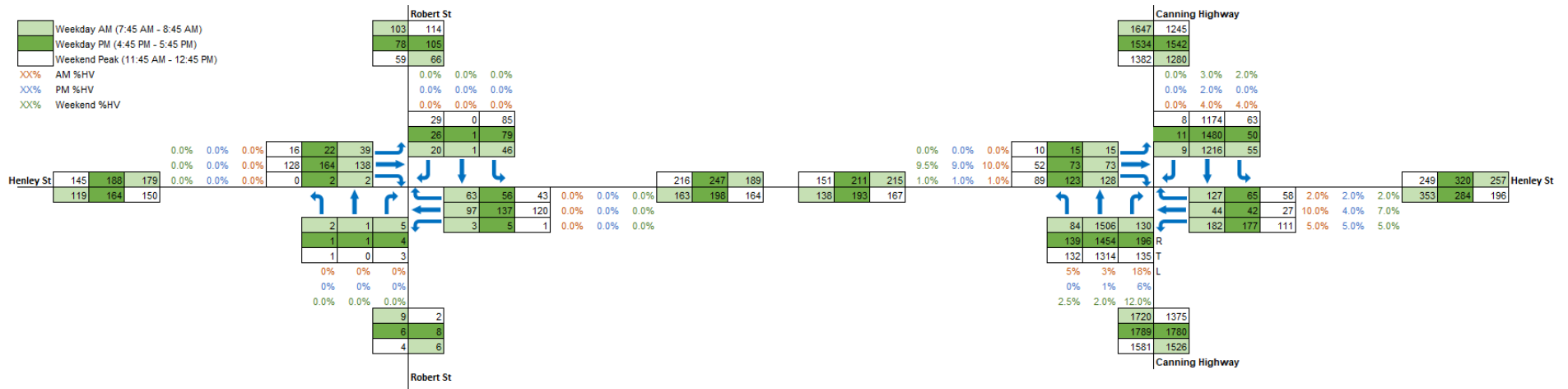


Figure 6-4 Traffic Flows (2023 Existing Background Traffic with Development)

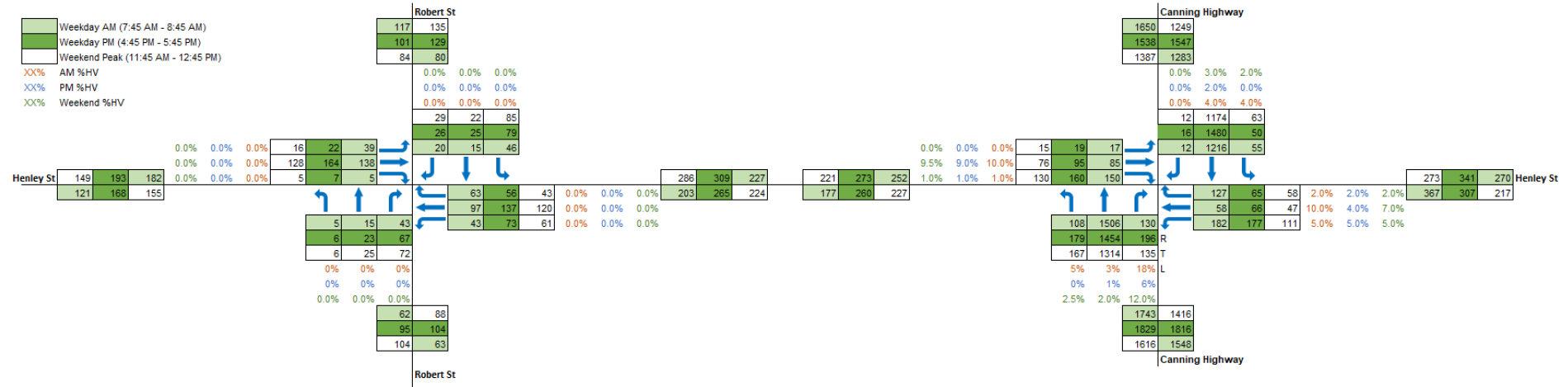


Figure 6-5 Traffic Flows (2023 Existing Background Traffic without Development)

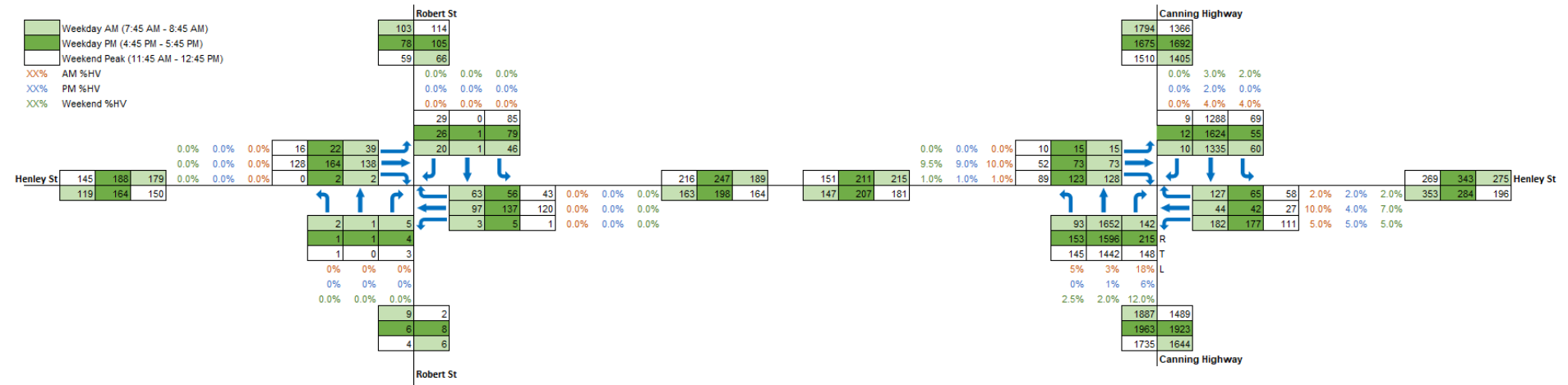
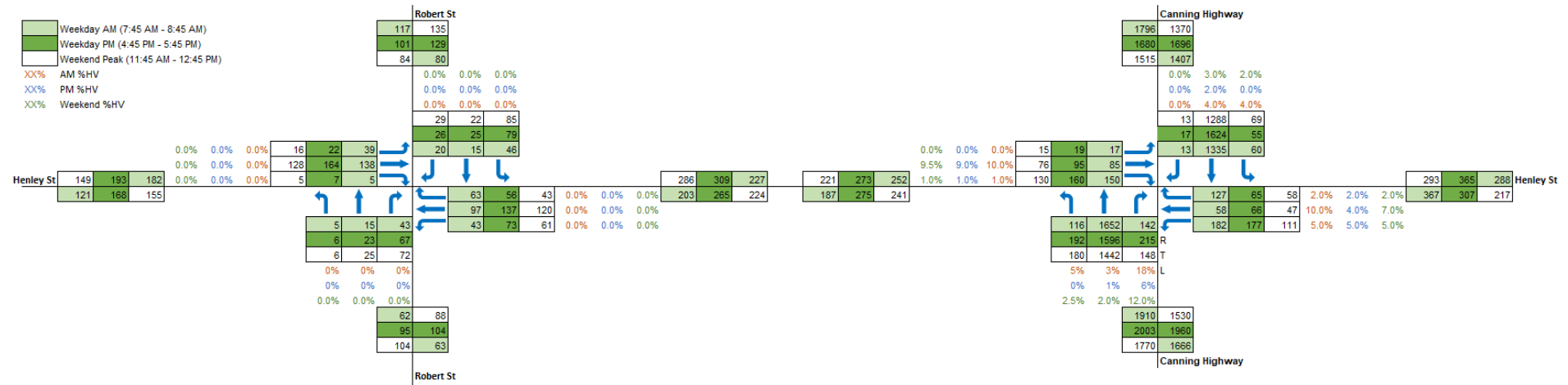


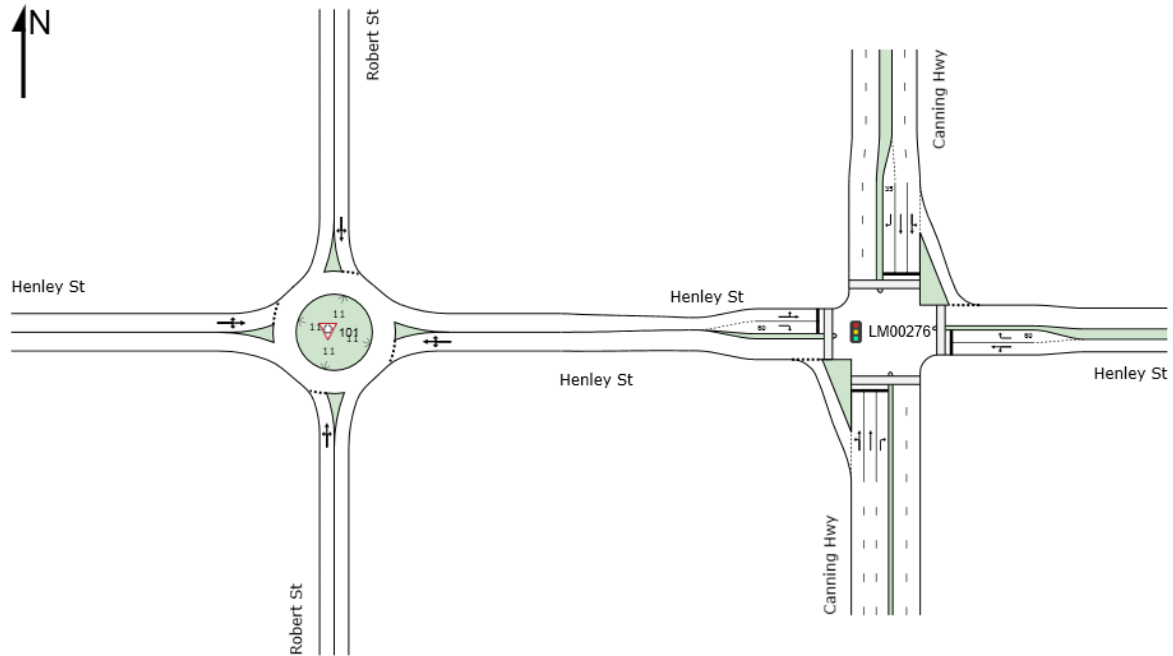
Figure 6-6 Traffic Flows (2033 Existing Background Traffic with Development)



6.7 SIDRA Analysis Results

The network layout of the intersections included in the analysis is shown in **Figure 6-7**. The intersections were selected based on the potential impact of the additional traffic generated by the proposed development.

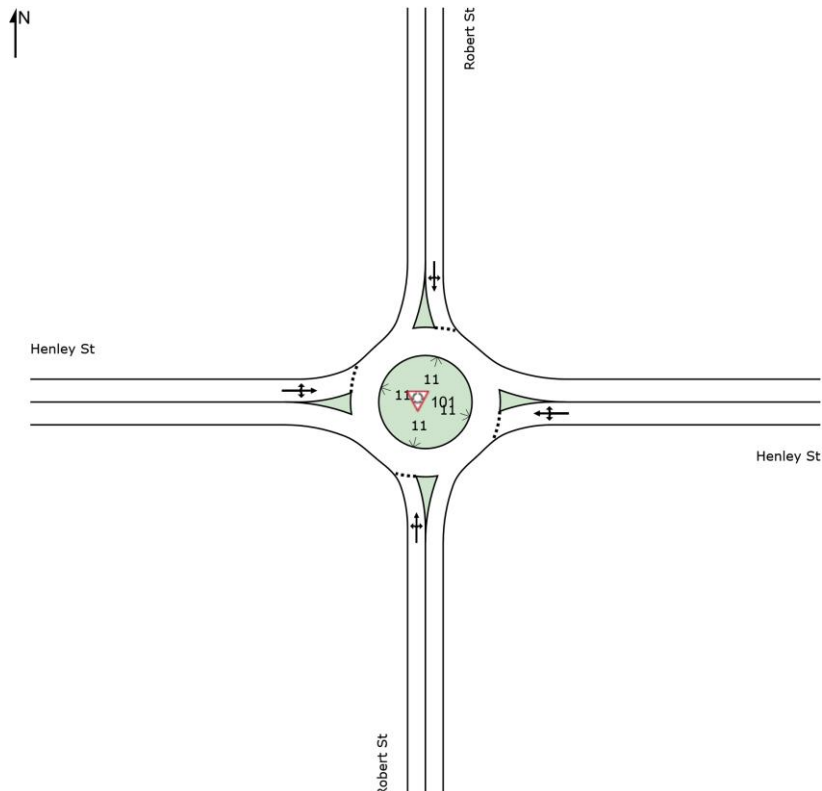
Figure 6-7 Sidra Analysis Network



6.7.2 Henley Street / Robert Street Intersection

The Sidra layout of the intersection is shown in **Figure 6-8**.

Figure 6-8 Sidra layout of Henley Street / Robert Street Intersection



The results of analysis are summarised in **Table 6-7**, showing 'All Vehicle' results (i.e., results for all vehicles passing through the intersection). Analysis results for each turning movement are presented in **Appendix C**.

Table 6-7 Sidra results for Henley Street / Robert Street Intersection – All Scenarios

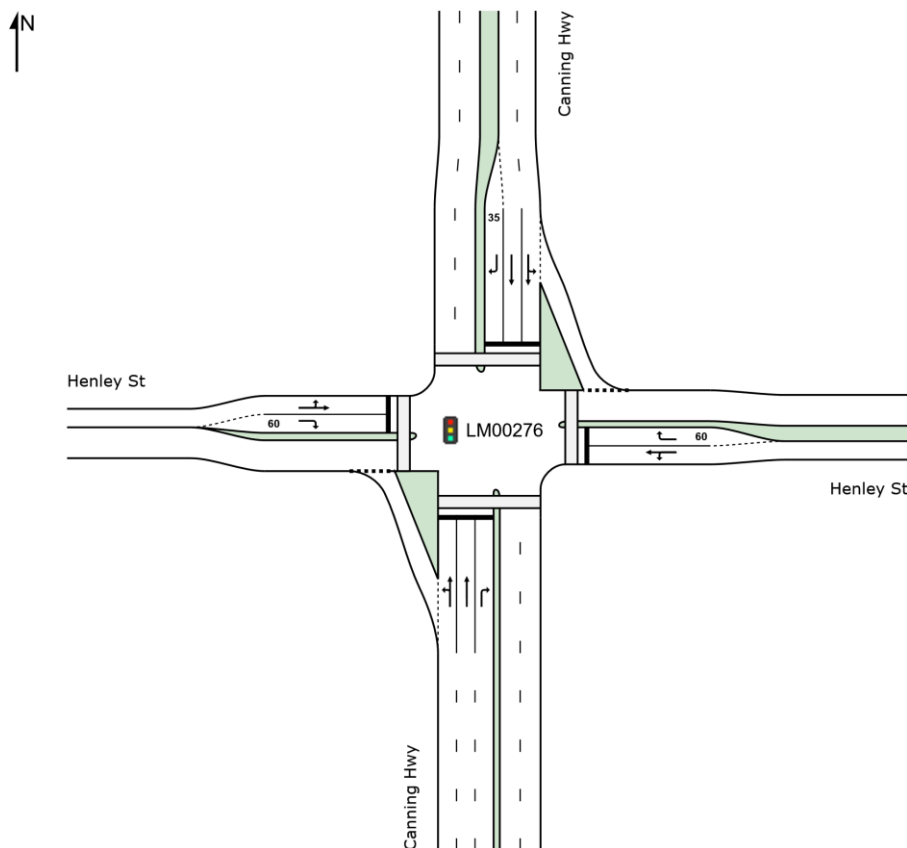
Scenario	AM				PM				Weekend			
	DOS	Delay (s)	LOS	Ave. Back of Queue (m)	DOS	Delay (s)	LOS	Ave. Back of Queue (m)	DOS	Delay (s)	LOS	Ave. Back of Queue (m)
2020 base scenario	0.148	4.6	A	2.5	0.153	4.6	A	2.6	0.127	4.5	A	1.9
2023 no development	0.148	4.6	A	2.6	0.153	4.6	A	2.6	0.127	4.5	A	1.9
2023 with development	0.197	5.0	A	2.8	0.327	5.2	A	3.1	0.180	5.2	A	2.5
2033 no development	0.152	4.6	A	2.6	0.174	4.6	A	2.6	0.127	4.5	A	1.9
2033 with development	0.205	5.0	A	2.8	0.327	5.2	A	3.1	0.180	5.2	A	2.5

The table shows that the intersection will continue to perform at an excellent level of service (LOS A) even with the additional traffic from the development.

6.7.3 Canning Highway / Henley Street Intersection

The Sidra layout of the intersection is shown in **Figure 6-9**.

Figure 6-9 Sidra layout of Canning Highway / Henley Street Intersection



The results of analysis are summarised in **Table 6-8**, showing 'All Vehicle' results. Analysis results for each turning movement are presented in **Appendix C**.

Table 6-8 Sidra Results for Canning Highway / Henley Street – All Scenarios

Scenario	AM				PM				Weekend			
	DOS	Delay (s)	LOS	Ave. Back of Queue (m)	DOS	Delay (s)	LOS	Ave. Back of Queue (m)	DOS	Delay (s)	LOS	Ave. Back of Queue (m)
2020 base scenario	0.854	39.4	D	188.2	0.971	53.1	D	309.2	0.785	31.3	C	155.3
2023 no development	0.878	41.0	D	204.6	1.000	57.2	E	338.5	0.809	31.9	C	164.6
2023 with development	0.897	42.2	D	204.5	1.007	64.4	E	368.9	0.870	36.6	D	183.6
2033 no development	0.95	44.5	D	245.0	1.098	87.8	F	479.0	0.887	36.4	D	213.3
2033 with development	0.952	51.6	D	277.1	1.126	101.4	F	506.5	0.901	39.0	D	228.2

The result indicated that the proposed developed would result in slight increase of DOS, Delay, and average back of queue distance to the existing intersection. However, the increase is insignificant, until 2033 where intersection would fail as it reaches the capacity, even without the development traffic.

6.8 Additional SIDRA Scenario (Robert Street remained Open)

To further examine the traffic impact of the development of the scenario where the existing Robert Street's left-out access onto Canning Highway remain open, the following analysis is conducted.

It is anticipated that should Robert Street remain open, providing access (left-out) onto Canning Highway, the intersection will be accessed by a small proportion of traffic leaving the Site. Vehicle accessing (coming into) the Site will continue to use Henley Street as access

For the purpose of this assessment, 20% of the egress traffic is diverted to the Robert Street / Canning Highway access. Cardno has conducted Sidra analysis for this assumption and the results indicate that the intersection will perform satisfactorily, **with Level of Service A in all scenarios.**

However, noting that when vehicles are likely to queue along Canning Highway northbound lanes to Robert Street / Canning Highway intersection, drivers are more likely to choose the exit route via Henley Street, due to the signalised Canning Highway / Henley Street intersection.

6.9 Sidra Result Summary

The results of Sidra analysis are discussed below:

- > Traffic performance at the Henley Street / Robert Street roundabout is to remain at an excellent level (LOS A) for all scenarios
- > The existing Canning Highway and Henley Street intersection is already performing at an average level of service (D) during the Am and PM peak hours.
- > The Sidra analysis results show that the additional traffic generated by the proposed development is unlikely to result in any significant impact to the surrounding road network.
- > If Robert Street remained open, the Robert Street / Canning Highway intersection will perform at an excellent level of service.

7 Conclusions and Recommendations

This Transport Impact Assessment outlines the transport aspects of the proposed development focusing on traffic operations, loading vehicle operations, access and car parking. Provided also are walking, cycling, and public transport considerations.

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

The following conclusions are regarding the proposed development:

- > The Site comprises of 137 residential apartments and ground floor commercial and community/church use.
- > Provision of sustainable transport initiatives have been proposed with 5 designated car spaces proposed for Car Share Scheme and 10 spaces fitted with Electric Car Charging equipment, which well exceeds CBACP requirements.
- > The Site has excellent access to public transport with a number of high frequency bus routes located within the vicinity of the Site. Additionally, the Canning Bridge Train Station is also located in very close proximity.
- > Walking and cycling infrastructure within the surrounding area of the Site is excellent with access to a high-quality shared path running along the riverside including a connecting route to the Kwinana Freeway PSP north and south.
- > The proposed development has been calculated to have a weekday trip generation of approximately 84 vehicles in the AM peak hour and 134 vehicles in the PM peak hour. Due to the church activity, Weekend peak traffic generation has been calculated at 167 vehicle trips. Due to the prime location close to public transport, this level of traffic generation is considered very robust.
- > The swept path assessment shows that a waste truck will be able to service the site via Lily Lane.
- > The SIDRA assessment shows that the traffic generated by the Site will have minor and insignificant impact on the surrounding intersections and road network during the assessed peaks. The Canning Highway / Henley Street intersection is currently performing at an average Level of Service.
- > Bicycle parking provision exceeds the CBACP requirements.
- > Residential car parking provision is in compliant with the CBACP requirements
- > Non-residential car parking and motorcycle parking provision are considered to meet the objectives with alternative transport initiatives provided, such as car share, shuttle bus services, additional bicycle parking facility and close proximity to high quality public transport services.
- > Overall, it is unlikely that the Site will detrimentally affect traffic safety or flow on the surrounding road network. The main traffic impacts affecting the surrounding road network will be background traffic growth which will affect the operation of some intersections along Canning Highway.
- > The SIDRA assessment was undertaken with the assumption that the southern end of Roberts Street at Canning Highway, will be closed to vehicle traffic. However, further examination has been carried out with the scenario that the existing Robert Street's left-out access onto Canning Highway remains open and the results indicate that the Roberts Street / Canning Highway intersection will perform satisfactorily, with Level of Service A in all scenarios.

APPENDIX

A

WAPC CHECKLIST

Item	Provided	Comments/Proposals
Introduction/Background		
name of applicant and consultant	Section 1	
development location and context	Section 2	
brief description of development proposal	Section 3	
key issues	N/A	
background information	Section 1	
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	Section 2	
traffic flows on surrounding roads (usually am and pm peak hours)	Section 6	
traffic flows at major intersections (usually am and pm peak hours)	Section 6	
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		
regional context	Section 2	
proposed land uses	Section 3	
table of land uses and quantities	Section 6	
access arrangements	Section 3	
parking provision	Section 3	
end of trip facilities	Section 3	
any specific issues	N/A	
road network	Section 4	
intersection layouts and controls	N/A	
pedestrian/cycle networks and crossing facilities	Section 4	
public transport services	Section 4	

Item	Provided	Comments/Proposals
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	Section 4	
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 3	
impact on surrounding roads	Section 6	
impact on intersections	Section 6	
impact on neighbouring areas	N/A	
traffic noise and vibration	N/A	
road safety	N/A	
public transport access	N/A	
pedestrian access / amenity	Section 3	
cycle access / amenity	Section 3	
analysis of pedestrian / cycle networks	N/A	
safe walk/cycle to school (for residential and school site developments only)	N/A	
Traffic management plan (where appropriate)	N/A	

APPENDIX

B

DEVELOPMENT PLANS

APPENDIX

C

SIDRA RESULTS

Transport Impact Assessment – Part 2

Como Baptist Church Redevelopment
– East Site

CW1115300



Prepared for
dem

15 March 2021

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Our report is based on information made available by the client. The validity and comprehensiveness of supplied information has not been independently verified and, for the purposes of this report, it is assumed that the information provided to Cardno is both complete and accurate. Whilst, to the best of our knowledge, the information contained in this report is accurate at the date of issue, changes may occur to the site conditions, the site context or the applicable planning framework. This report should not be used after any such changes without consulting the provider of the report or a suitably qualified person.

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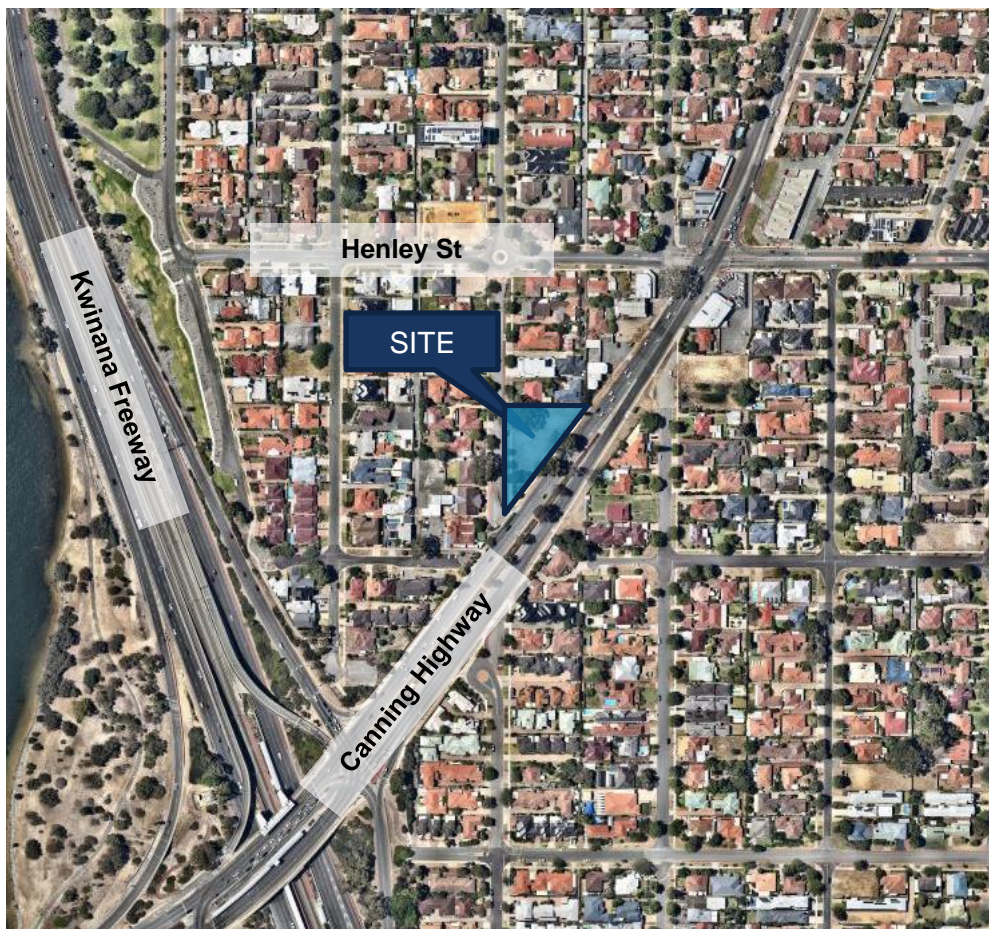
1 Introduction

1.1 Background

Cardno has been commissioned by dem (hereinafter referred to as 'the Client') to prepare a Transport Impact Assessment (TIA) for the proposed 'mixed-use' development at Lot 469 and 471, Canning Highway (hereinafter referred to as 'the Site'). An aerial view of the Site is shown in **Figure 1-1**.

This report aims to assess the impacts of the proposed development on the adjacent road network, with a focus on traffic operations, 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).

Figure 1-1 Aerial View of the Site



Source: Nearmap

2 Existing Site Situation

2.1 Site Location

The proposed development is located at Lots 469 & 471, Canning Highway, Como, within the City of South Perth. The Site is a triangular lot bounded by Robert Street to the west and Canning Highway to the southeast. Residential lots are located beyond its northern boundary.

The Site is currently vacant, with a single heritage tree at the northeast corner, which sets a 210m² no-build zone around it.

The location of the Site is shown in **Figure 2-1**.

Figure 2-1 Site Location



Source: Nearmap

2.2 Surrounding Land Use

The City of South Perth's *Town Planning Scheme No. 6* zoning map (see **Figure 2-2**) shows that the entire Site is zoned as *Centre*, which is the same zoning for surrounding areas north of the Site and across Canning Highway. Further east and north, properties are zoned as either *Parks and Recreation (Local)* or *Residential*. Lands surrounding Kwinana Freeway and Canning Highway are under Primary Regional Roads, while lands along the Swan River are under *Parks and Recreation* for the Metropolitan Region Scheme Reserves.

Figure 2-2 Zoning Map

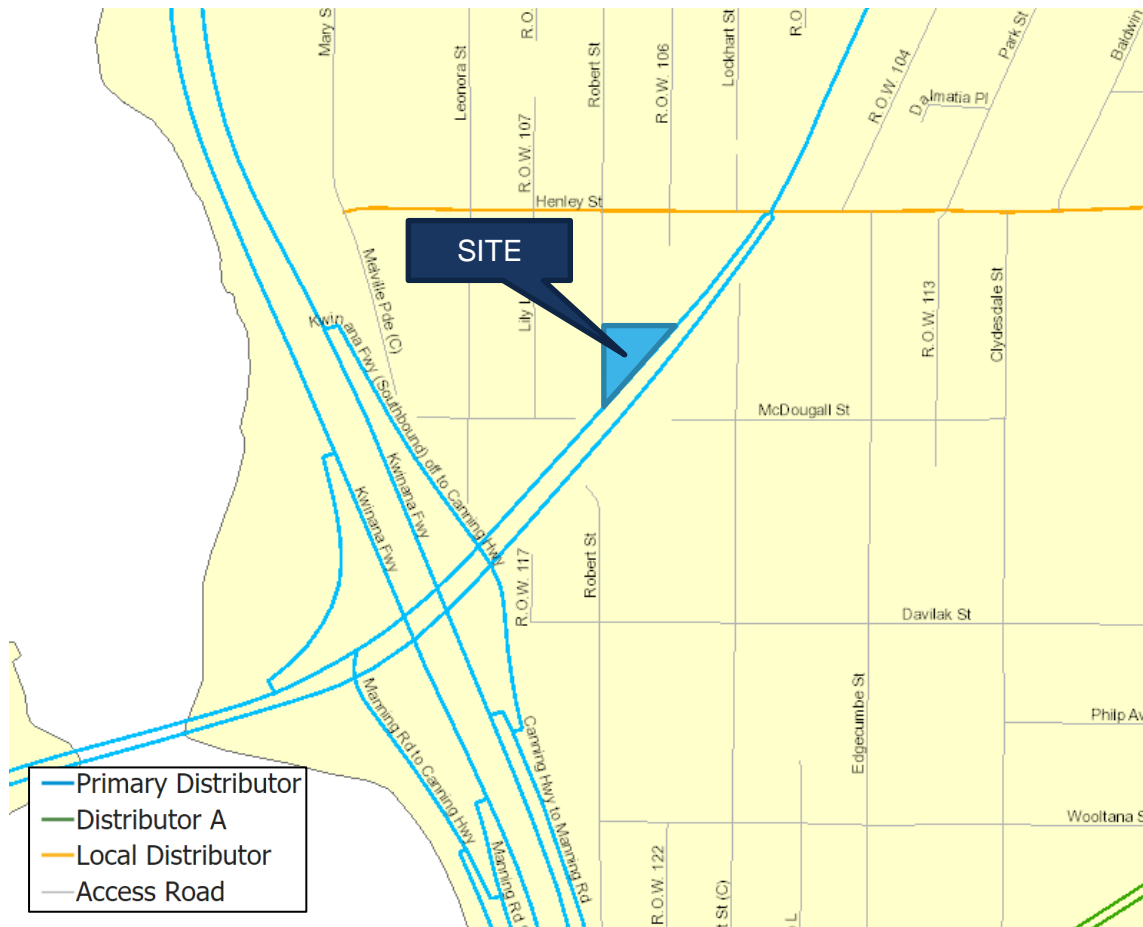


Source: City of South Perth's Town Planning Scheme No. 6

2.3 Existing Road Network

The layout and classification of the roads under the *Main Roads WA Road Hierarchy* surrounding the Site are presented in **Figure 2-3**.

Figure 2-3 Road Network Classification



Source: Main Roads - Road Information Mapping System

The characteristics of the surrounding road network are presented in **Table 2-1**.

Table 2-1 Road Network Description

Road Name	Road Hierarchy	Jurisdiction	No. of Lanes	No. of Footpaths	Width (m)	Posted Speed Limit (km/h)
Kwinana Freeway	Primary Distributor	Main Roads	6 (divided)	2	37.75 (incl. 13.4m train tracks and 3m bike lane)	100*
Canning Highway	Primary Distributor	Main Roads	4-6 (divided)	2	30 (incl. 13.6m median)	60
Henley Street	Local Distributor	Local Govt.	2	2	10	50
Robert Street	Access Road	Local Govt.	2	2	6.4	50

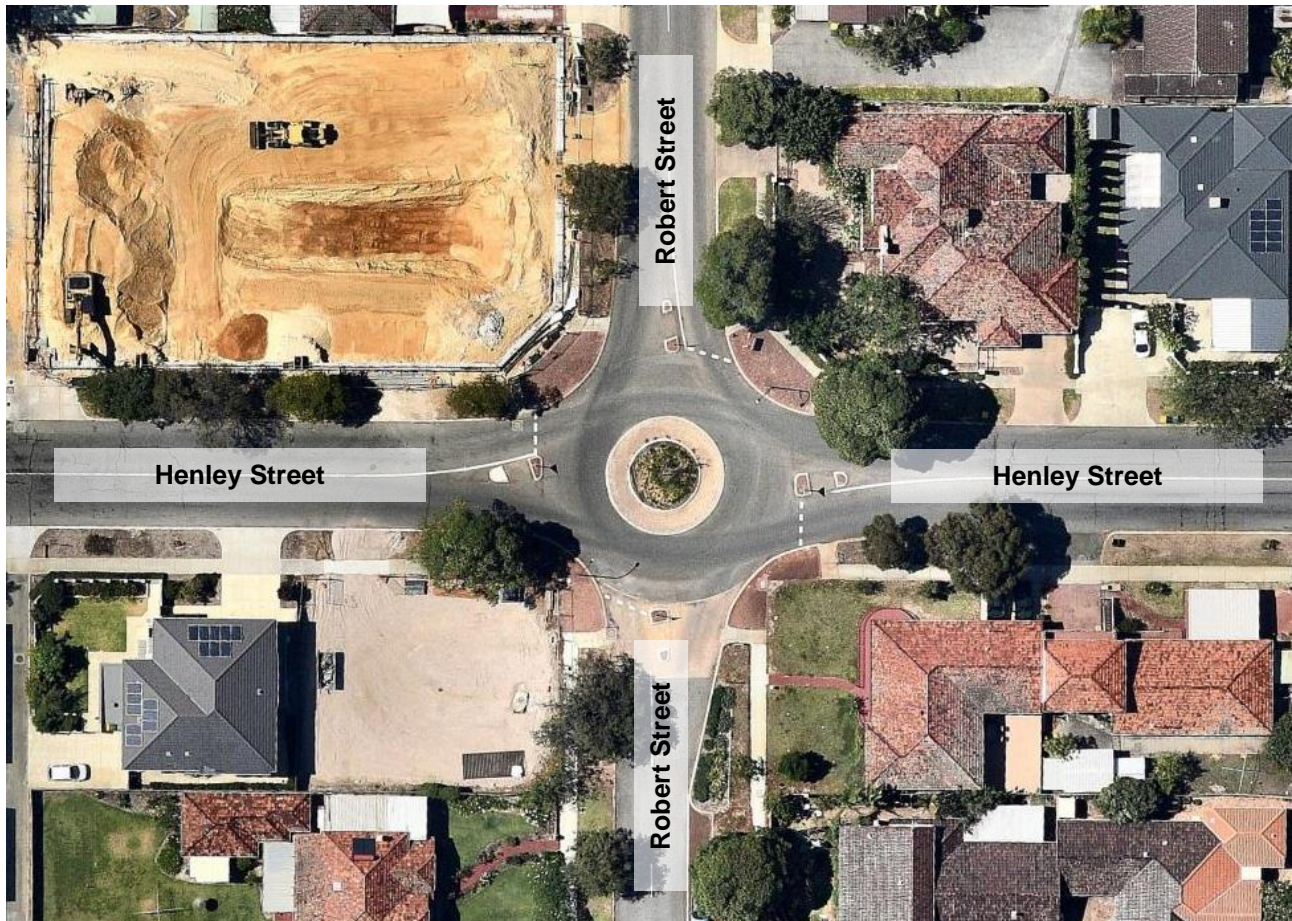
Source: Main Roads - Road Information Mapping System/Nearmap

2.4 Existing Intersections

2.4.1 Henley Street/Robert Street Intersection

This intersection is a four-legged roundabout located north of the site as shown in **Figure 2-4**. Robert Street provide access to local traffic, while Henley Street provides access to several local roads in the east-west direction.

Figure 2-4 Henley Street/Robert Street Intersection



Source: Nearmap

2.4.2 Canning Highway/Henley Street Intersection

This intersection located northeast of the Site is a four-way signal-controlled intersection with the Canning Highway as the major road. Left turn movements from the north and south legs are provided with high-angle slip/bypass lanes. The right turn pocket lane at the north approach is 40 metres long, while the right turn pocket lane at the south approach extends until the Kwinana Freeway/Canning Highway interchange over 400 metres south. All vehicle turning movements are allowed at the intersection, and all approaches are provided with pedestrian crosswalks.

Lockhart street intersects with Henley Street at about 10 metres from the intersection, which services about 4 residences and the 10-bay carpark for the adjacent commercial establishment.

Figure 2-5 Canning Highway/Henley Street intersection

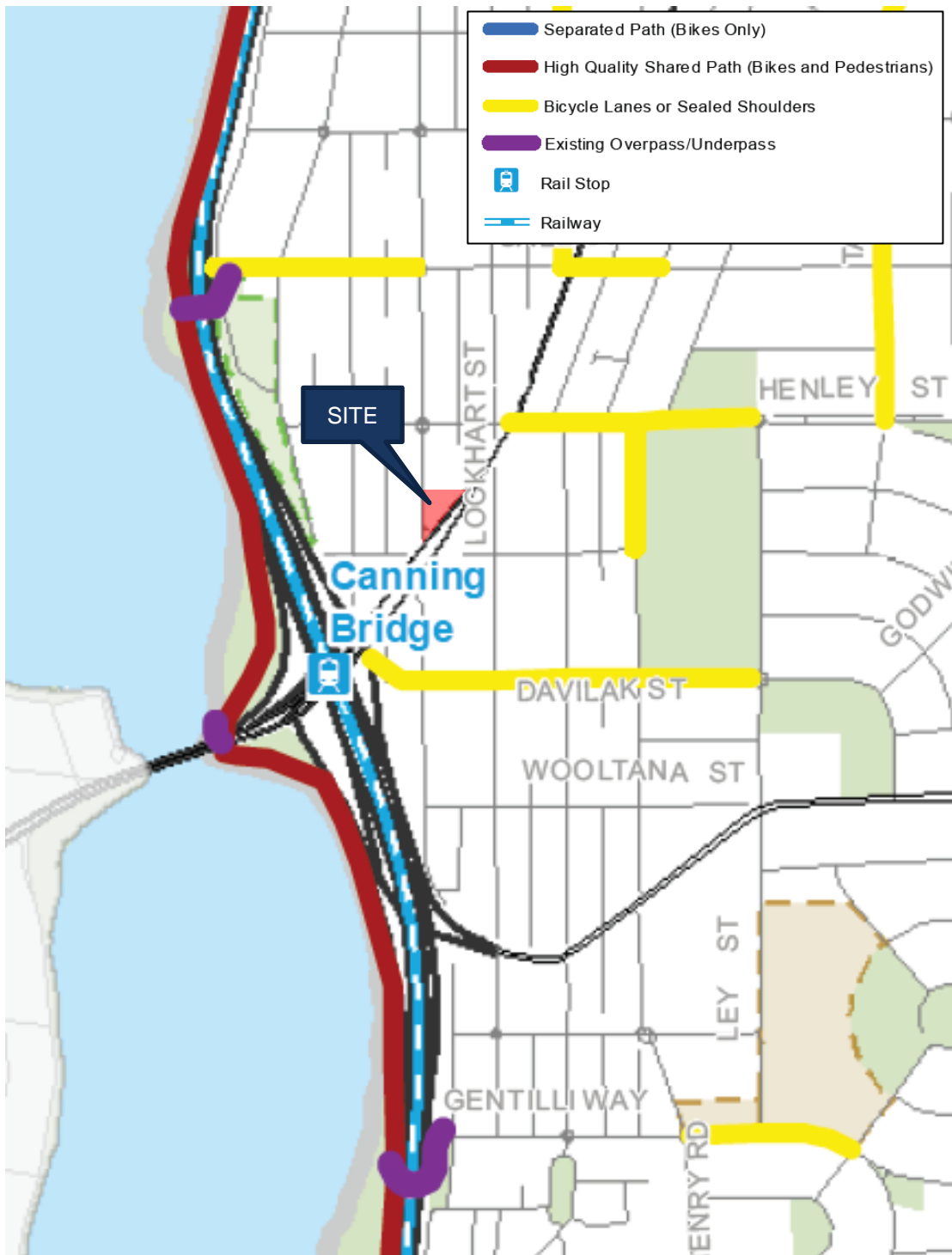


Source: Nearmap

2.5 Existing Pedestrian / Cycle Networks

According to the 2018 City of South Perth and Town of Victoria Park's Joint Bike Plan shown in **Figure 2-6**, the Site is currently not connected to any bicycle facilities within the area. The nearest facilities to the Site are *Bicycle Lanes or Sealed Shoulders* along Henley Street and Davilak Street, and the *High-Quality Shared Paths* along Kwinana Freeway.

Figure 2-6 Existing Bike Facilities in the City of South Perth

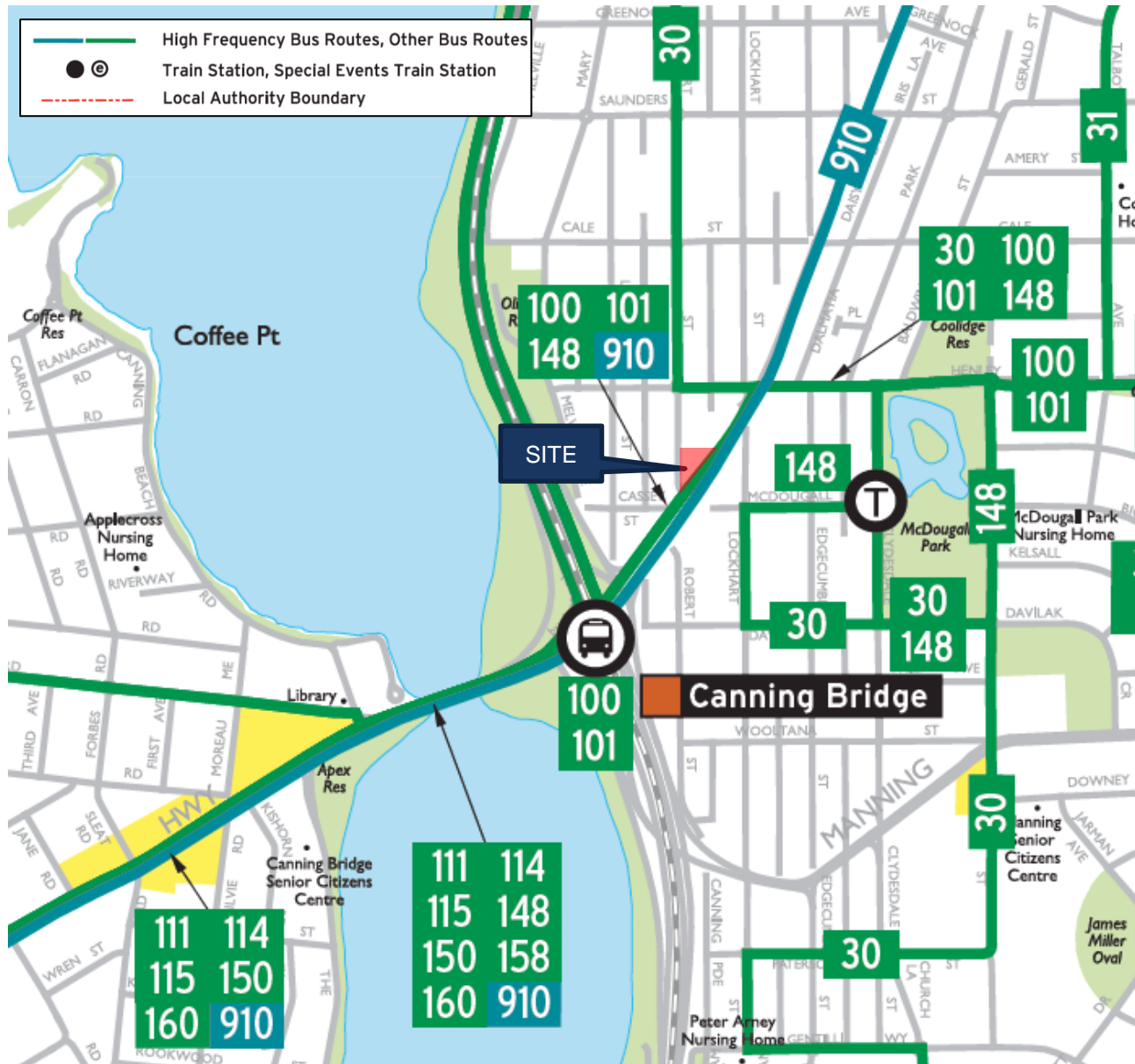


Source: City of South Perth and Town of Victoria Park - Joint Bike Plan (2018)

2.6 Existing Public Transport Facilities

The Transperth network surrounding the site is shown in **Figure 2-7**. Four bus routes pass along the Site through Canning Highway, with the nearest bus stop located just across the Site (Canning Highway before Robert Street). The nearest bus station is located 300 metres from the Site (Canning Bridge Station), which is also serviced by the Mandurah train line.

Figure 2-7 Public Transport Facilities



Source: Transperth

The frequency of bus and train operations near the Site are shown in **Table 2-2** and **Table 2-3**.

Table 2-2 Bus Route Frequency

Bus Route	Route Description	Frequency	
		Weekdays	Saturdays
100	To Como	10-30 minutes (5:52 am to 10:59 pm)	30-60 minutes (7:22 am to 8:50 pm)
	From Como	10-30 minutes (5:55 am to 10:55 pm)	30-60 minutes (7:52 am to 9:19 pm)
101	To Como	10 minutes (6:31 am to 7:11 pm)	No Operation
	From Como	10 minutes (6:30 am to 7:19 pm)	No Operation
148	To Fremantle	No Operation	30-60 minutes (8:23 am to 6:05 pm)
	To Perth	30 minutes (5:26 pm to 7:04 pm)	60 minutes (9:09 am to 6:15 pm)
910	To Perth	5-15 minutes (4:47 am to 11:53 pm)	15 minutes (6:15 am to 11:53 pm)
	From Perth	5-15 minutes (5:47 am to 12:48 am)	15 minutes (6:21 am to 12:49 am)

Source: Transperth

Table 2-3 Canning Bridge Station Train Frequency (Mandurah Line)

Route	Frequency	
	Weekdays	Saturdays
To Mandurah	5-15 minutes (5:38 am to 12:23 am)	15-30 minutes (5:38 am to 2:23 am)
To Perth	5-15 minutes (5:33 am to 12:03 am)	15-30 minutes (5:48 am to 1:43 am)

Source: Transperth

2.7 Existing Traffic Volumes

Midblock traffic data within the Site vicinity are available through Main Roads' traffic map, which are summarized in **Table 2-4**.

Table 2-4 Existing Traffic Volumes

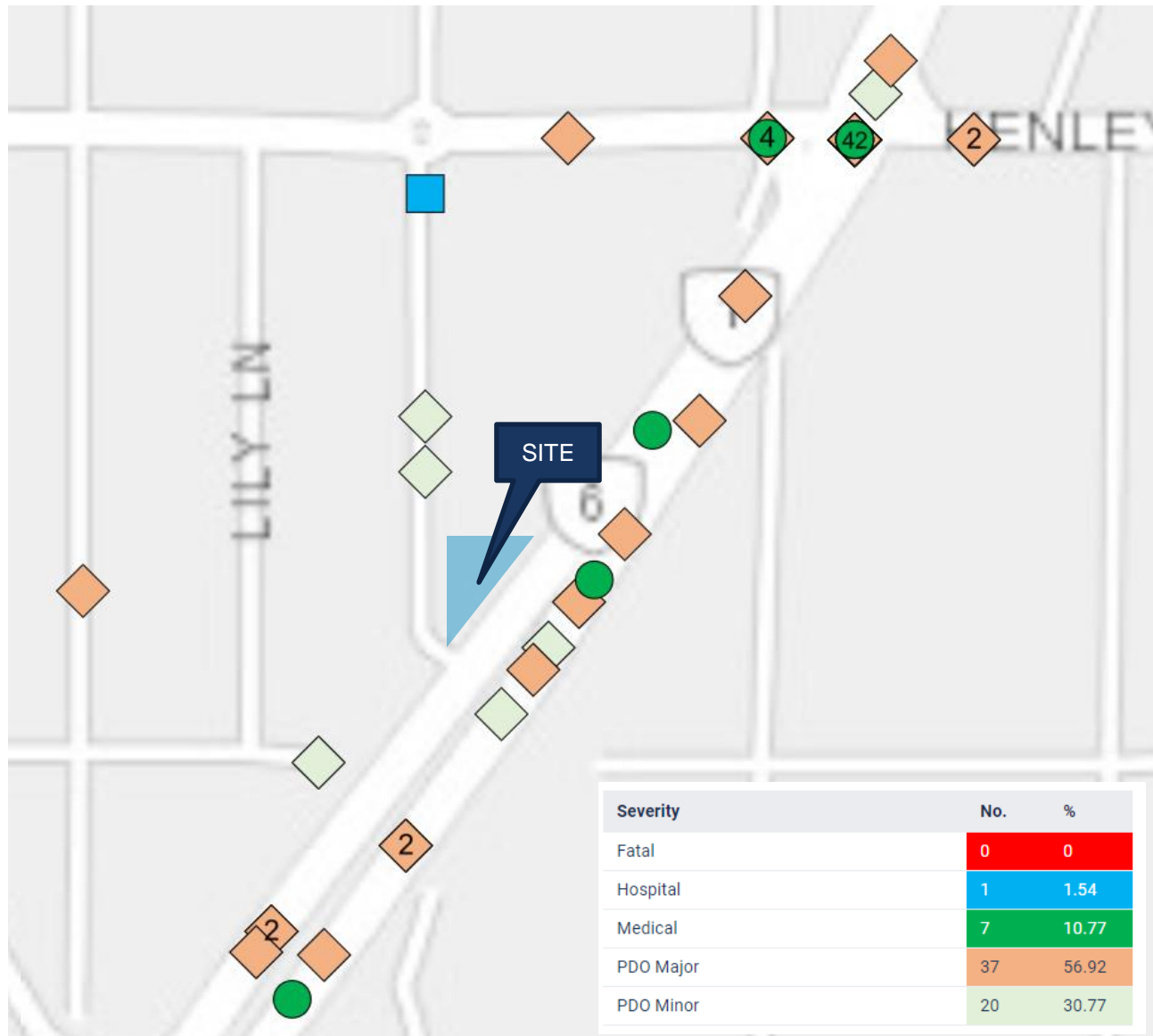
Location	Direction	Year	Volume (Mon-Sun)	%Heavy Vehicle
Canning Hwy North of Henley St (SLK 4.93)	Northbound	2018/19	18,472	No Data
	Southbound	2018/19	17,860	No Data
Canning Hwy West of Henley St (SLK 5.19)	Northbound	2018/19	20,466	No Data
	Southbound	2018/19	20,376	No Data

Source: Traffic Map

2.8 Crash Assessment

A search of the *Main Roads WA Reporting Centre* for crash data was undertaken. This search covered all recorded traffic accidents between 1 January 2015 and 31 December 2019 within a close proximity of the Site, which were plotted in **Figure 2-8**.

Figure 2-8 Crash Map



Source: Main Roads WA Crash Map

A summary of the crash data are as follows:

- There were 42 recorded crashes at the Henley Street and Canning Highway intersection
- No fatal crash was recorded near the Site.
- There was only one crash that required Hospital attention, occurred near Henley Street / Roberts Road intersection.
- Only 4 crashes were recorded along local roads with direct access to the Site (Robert Street and Cassey Street).

The number of recorded crashes leading to the Site is not considered to be excessive and it is most likely that this development will not result in any material change likely to impact road safety in the surrounding area.

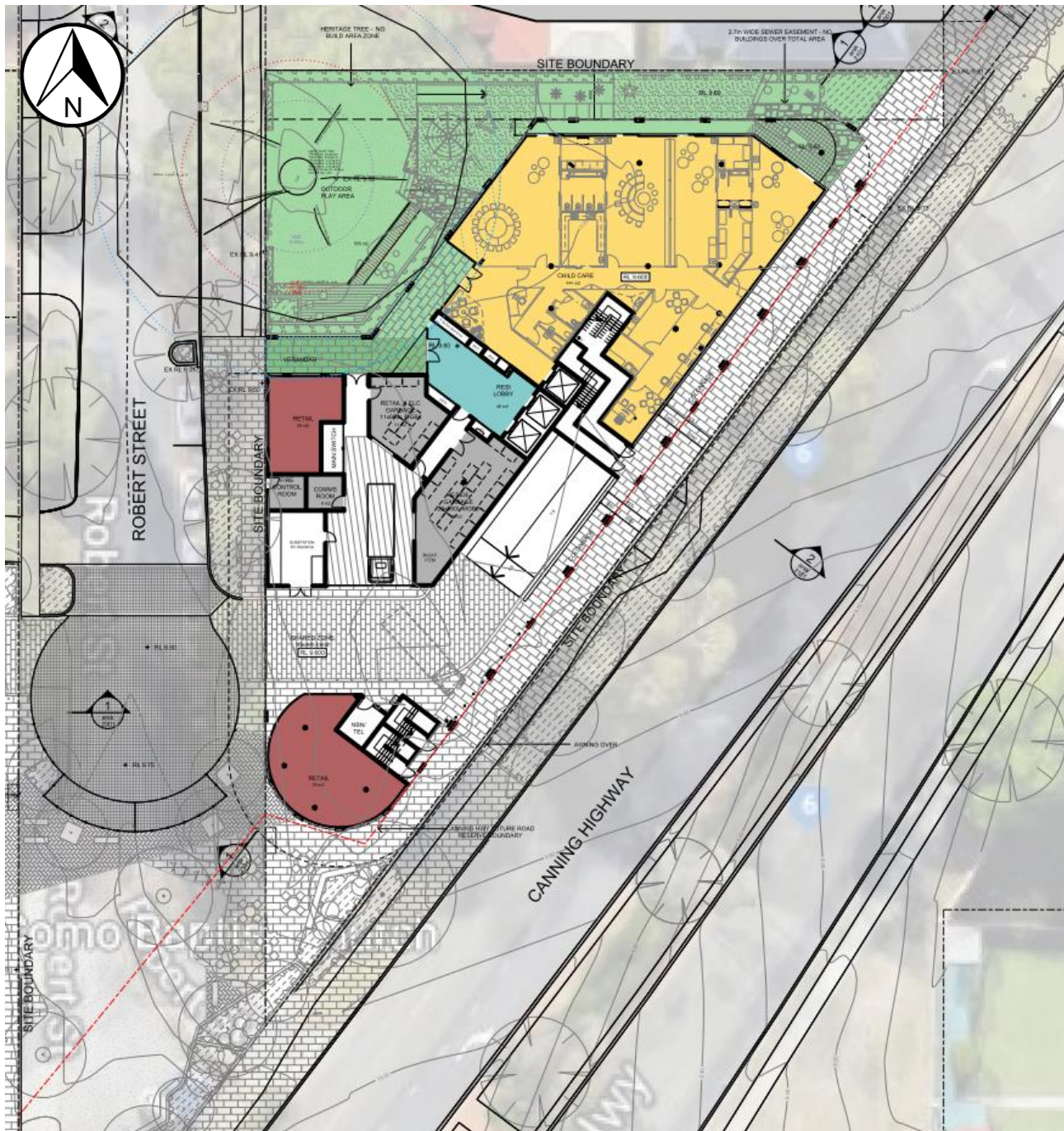
3 Development Proposal

3.1 Proposed Land Use

The proposed development is a mixed-use development which includes a child care centre, small retail and several storeys of residential units. The Site's ground floor plan is shown in **Figure 3-1**.

The development plans are included in **Appendix B** of this report.

Figure 3-1 Ground Floor Plan of the Site

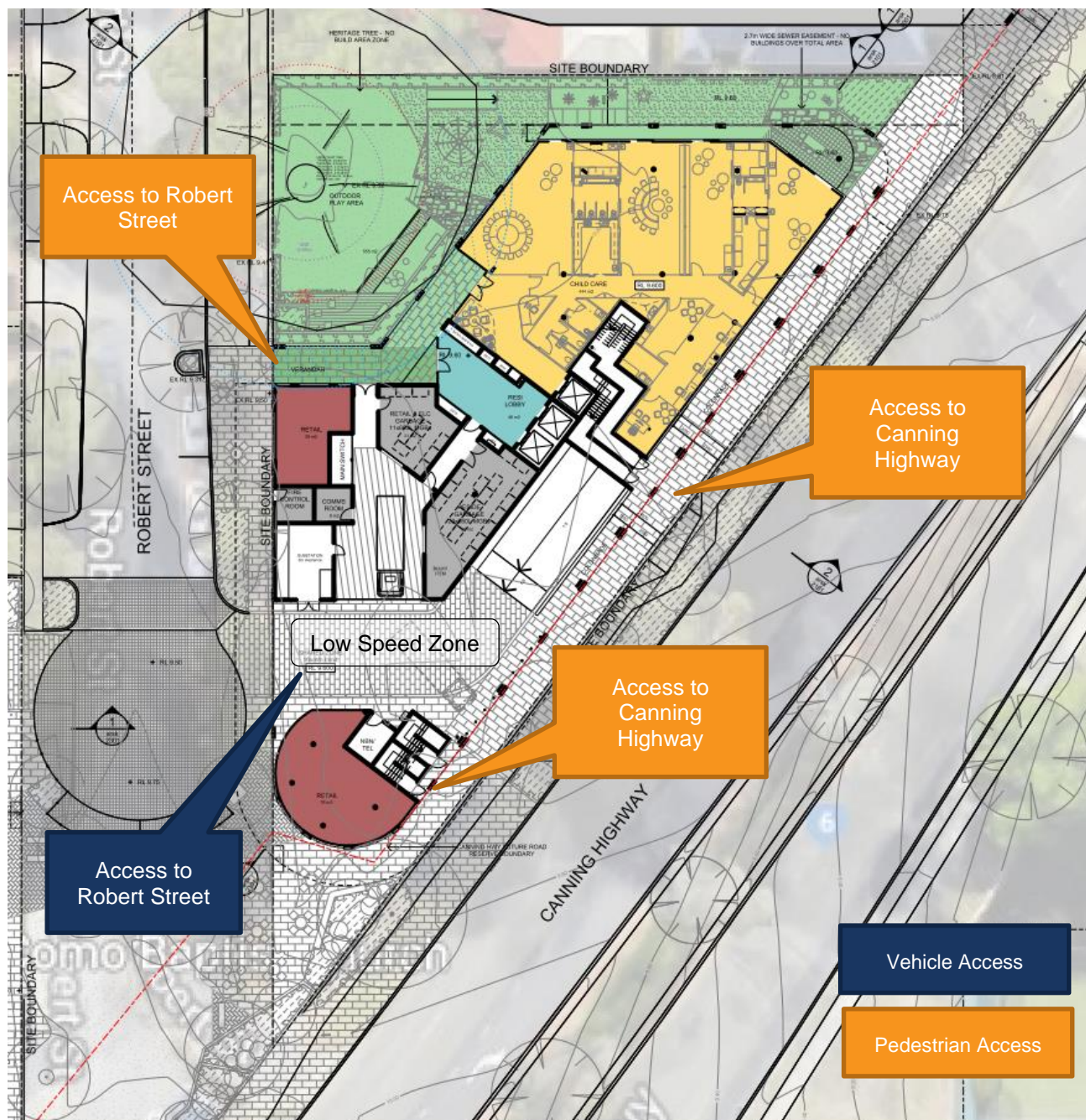


3.2 Access Arrangements

Vehicle access to the Site is from Robert Street at the southwest corner of the Site. Due to the current design and structural requirements of the building, the typical pedestrian sight line truncations have not been provided at the car park entrance. If sufficiently visually permeable elements are unable to be provided to the southern wall, it is expected that treatments such as electronic warning beacons (to alert pedestrians) be installed to warn of exiting vehicles. Similar warning beacons should also be installed internally within the building car park to alert drivers when service or waste vehicles are accessing the car park. Given that the use of service vehicles will be infrequent, will impede the driveway aisle for only seconds and likely to occur outside of peak car park access periods, the layout is unlikely to present as a significant risk to car park users.

child care centre and residential lobby may be accessed by pedestrians from the west via a veranda fronting Robert Street. There are also pedestrian accesses leading to different stairwells fronting Canning Highway (See **Figure 3-2**).

Figure 3-2 Site Access



3.3 Car Parking Provision

Canning Bridge Activity Centre Plan (CBACP) (2020) was used as reference for the car parking requirements of the development. **Table 3-1** outlines the car parking requirements of the residential and non-residential components of the development.

Table 3-1 Car parking requirements for Residential Land Use

Land Use		Yield	Units	Rate	Total	Provision
Residential	Studio	12	Dwellings	0.75 bay per dwelling	9	64
	1-Bedroom	25	Dwellings	0.75 bay per dwelling	19	
	2-Bedroom	43	Dwellings	1 bay per dwelling	43	
	3-Bedroom	7	Dwellings	1 bay per dwelling	7	
	Visitor	87	Dwellings	0.125 bay per dwelling	11	13*
	Subtotal					89
Non-Residential	Retail	120	m ²	1 per 50 m ²	3	13* + 3**
	Child Care Centre	450	m ²	1 per 50 m ²	9	
	Subtotal					12
	Total				101	80

*Visitor bays shared between residential and non-residential use

** Shared Car bays

The total car parking requirement of the development is 101 bays, including both residential and non-residential land uses. The development has proposed to provide 64 residential parking bays, 3 car share bays, and 13 visitor bays to be shared between residential and non-residential visitors (including 5 electric car bays).

Generally, the parking provision does not satisfy the statutory parking requirements set out in the CBACP. However, 18 units on Level 1 are proposed to be allocated as low-cost student accommodation and affordable housing. No parking allocation will be provided for these units, due to the close proximity to high quality / high frequency public transport.

The development has proposed to implement a reciprocal use between residential and non-residential visitor parking. This is considered acceptable as the parking demand between non-residential visitors and residential visitors doesn't coincide. The parking demand for childcare is relatively short and generally occurs during the network peak periods (8-10am & 4-6pm). The majority of the parking demand for residential visitor would occur outside of regular business hours, when the non-residential developments are generally closed. This allows for the overall parking demand to be serviced by less total parking bays than what would typically be required for each use in isolation.

Additional, 3 car share spaces have also been proposed for residential and non-residential use. On-street parking bays are also proposed within the new turn around at the end of Roberts Street. These spaces will be managed by selected Car Share Scheme Operator.

In addition to the car parking requirements, the CBACP requires one motorcycle/scooter bay per 5 car bays for non-residential use and 1 bay per 10 car bays for residential use. This is equivalent to 12 motorcycle/scooter bays. The development has proposed to provide 8 motorcycle/scooter bays, shared between residential and non-residential use.

According to the *Australian Bureau of Statistics, Motor Vehicle Census, Australia 2020*, the proportion of registered motorcycle when compare to passenger vehicles, has dropped from 8% (2015) to 7.5% (2020) which indicated a downward trend for motorcycle ownership over the years. Should this trend continue, the proposed motorcycle/scooter bays provision should be sufficient to accommodate the needs of the development. Additionally, the majority of the non-residential component of the Site consist of Childcare, which is less likely to generate any motorcycle trips to the site, further reducing the total motorcycle parking demand.

3.4 Bicycle Parking Provision

The number of bicycle parking as required by the CBACP is shown in **Table 3-2**. The total bicycle parking provision for the development is 113, which exceeds the CBACP requirements. Secured undercover bicycle parking will be provided within designated areas of basement and within designated storage areas in some apartments.

Table 3-2 Bicycle Parking Requirements and Provision

Land Use	Yield	Units	Rate	Total	Provision
Residential	87	Dwellings	1 space per dwelling	87	87
Residential Visitors	87	Dwellings	1 space per 10 dwellings	9	26*
Non-Residential	570	m ²	1 space per 100 m ² NLA	6	
Total				102	113

*shared between residential and non-residential visitors

3.5 End of Trip Facilities

The CBACP requires the provision of certain number of end-of-trip facilities for each non-residential bicycle parking bay. **Table 3-3** shows the number of required facilities for the development.

Table 3-3 End-of-Trip Facilities Requirements

End-of-Trip Facilities	Rate	Total
Lockers	1 per non-residential bicycle bay	6
Shower (not gender-specific)	1 per 10 non-residential bicycle bays	1

Source: Canning Bridge Activity Centre Plan (2016)

End-of-trip facilities are proposed at the Site located within basement level 1, also noting that the child care has internal amenities for their staff.

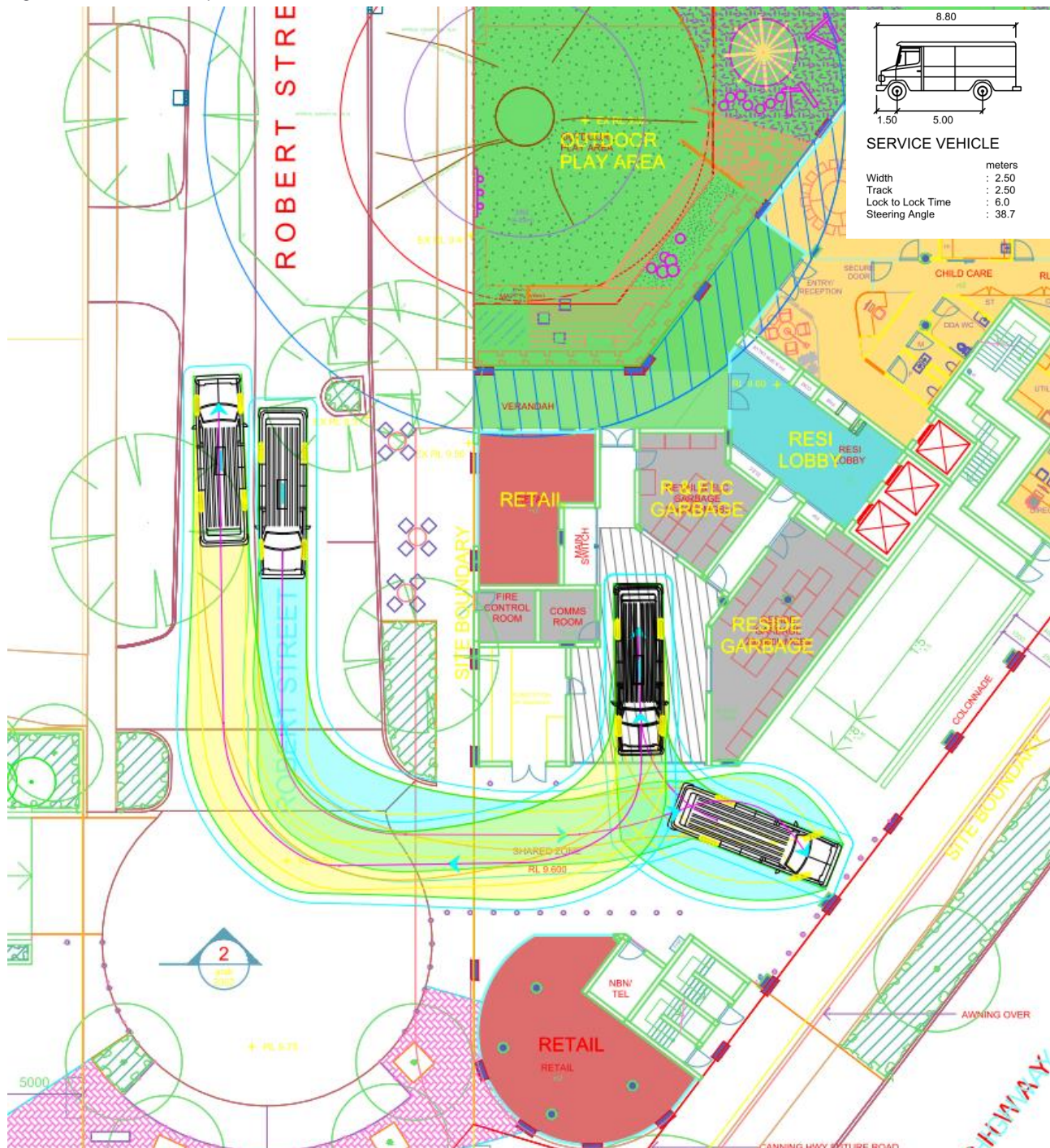
3.6 Service Vehicle Provision

Figure 3-3 shows that the swept path for an 8.8m Service Vehicle (Waste Truck) can be accommodated by the proposed access at the south boundary of the Site. It is possible for this vehicle to enter the development in forward-in manoeuvre, reverse to the loading bay next to the garbage bin store, and leave in forward-out manoeuvre.

The development will not be serviced by a vehicle larger than an MRV. During emergency where a fire truck is required to attend the Site, the fire truck will not be required to enter the Site.

During site visits, it was noted that the existing City rubbish trucks utilise an existing domestic driveway to turn around in order to service the western side of Roberts Street. It is expected that this could continue when required.

Figure 3-3 MRV Swept Path

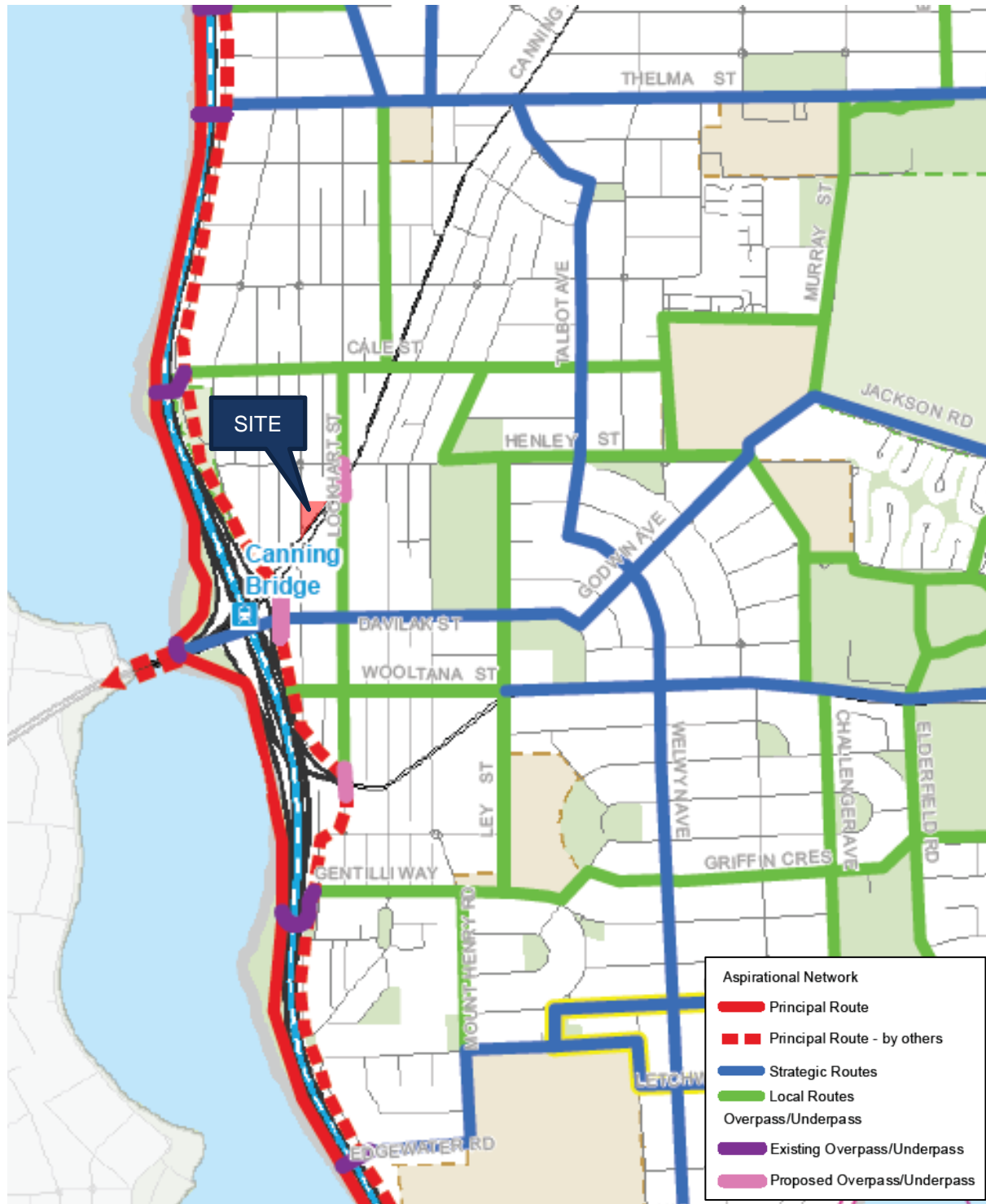


4 Changes to Surrounding Area

4.1 Pedestrian/Cycle Networks

The City of South Perth and the Town of Victoria Park developed a joint bike plan which was promulgated in August 2018. **Figure 4-1** shows the proposed bike facilities within the City of South Perth envisioned to be completed by the year 2050.

Figure 4-1 Proposed Bike Facilities in the Town of Victoria Park



Source: City of South Perth and Town of Victoria Park - Joint Bike Plan (2018)

4.2 Road Network

4.2.1 Canning Bridge Activity Centre Plan

The Canning Bridge Activity Centre Plan (CBACP) (2016) presented an indicative sketch of the Canning Bridge Station Interchange (see **Figure 4-2**), which proposes the conversion of Cassey Street, located along the southern boundary of the Site, to a *public transport boulevard*. This involves the extension of Cassey Street to the new bus station in the foreshore area, and the connection of the street to Canning Highway at the new intersection.

Figure 4-2 Indicative Sketch - Canning Bridge Station Interchange



Source: Canning Bridge Activity Centre Plan (2016)

The indicative cross section of a public transport boulevard is shown in **Figure 4-3**.

Figure 4-3 Indicative Cross Section - Public Transport Boulevard



Source: Canning Bridge Activity Centre Plan (2016)

Cardno contacted the PTA and was informed that the above proposal is long-term and not likely to be undertaken immediately upon completion of the Canning Bridge Station Interchange.

4.3 Public Transport Services

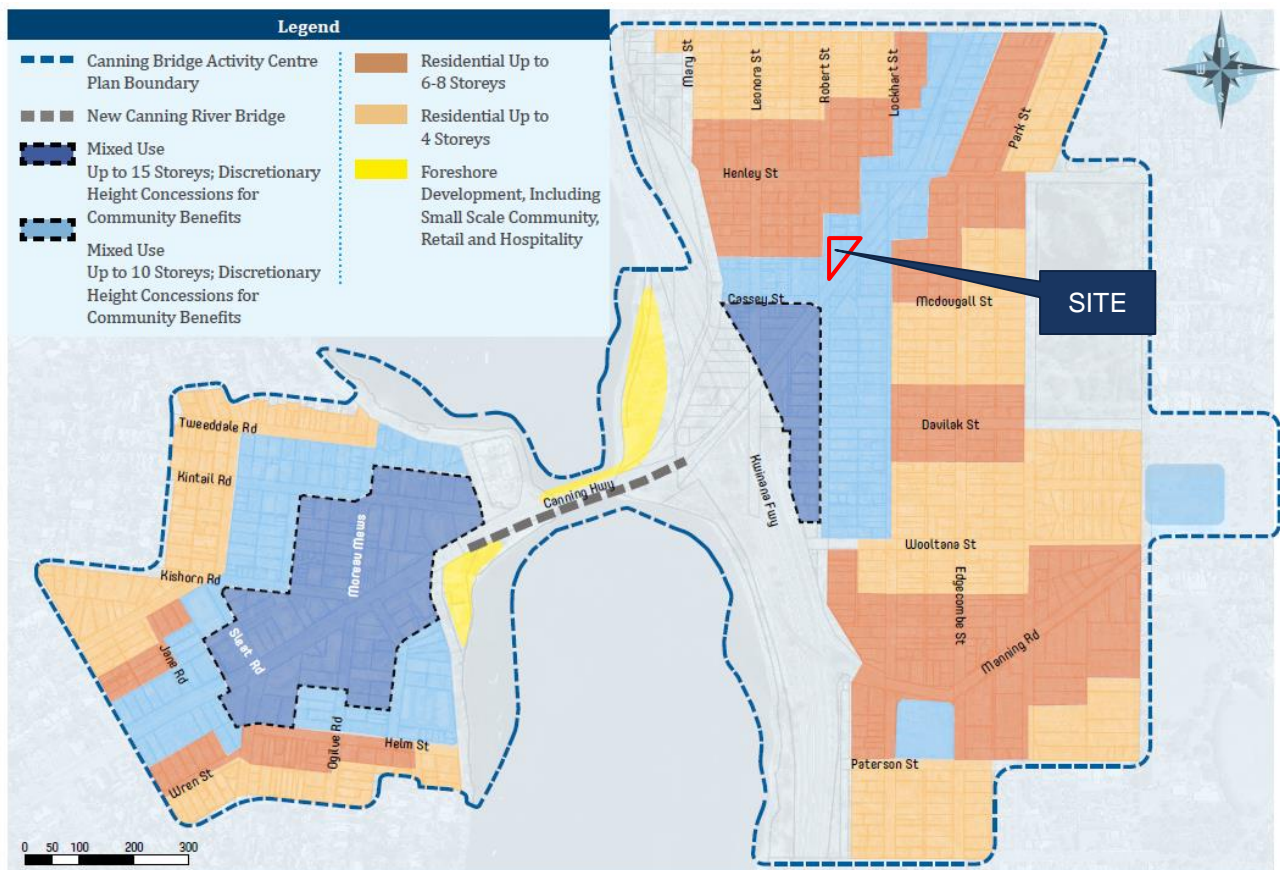
Cardno contacted the Public Transport Authority and was informed that the following changes to the public transport services is expected upon completion of the Canning Bridge Station Interchange:

- > Route 32, which originates from Elizabeth Quay Bus Station and terminates at Melville Parade/Thelma Street station, is expected to extend to the Canning Bridge Station;
- > Route 30, which currently serves Salter Point, is expected to operate between Perth and Canning Bridge Station via Labouchere Road. A different route would replace Route 30 in serving Salter Point; and
- > Route 910 will increase in frequency to compensate for the truncation of all freeway bus services at Canning Bridge Station (i.e., Routes 111, 114, 115, 150, 158, and 160).

4.4 Land Use

The Canning Bridge Activity Centre Plan (2016) details the proposed land use changes in the Canning Bridge Activity Centre, which encompasses the Site. The document describes the designation of the Site under 'mixed-use' which allows for up to 10-storey buildings, as shown in **Figure 4-4**.

Figure 4-4 Canning Bridge Activity Centre Plan Land Use, Built Form and Zones



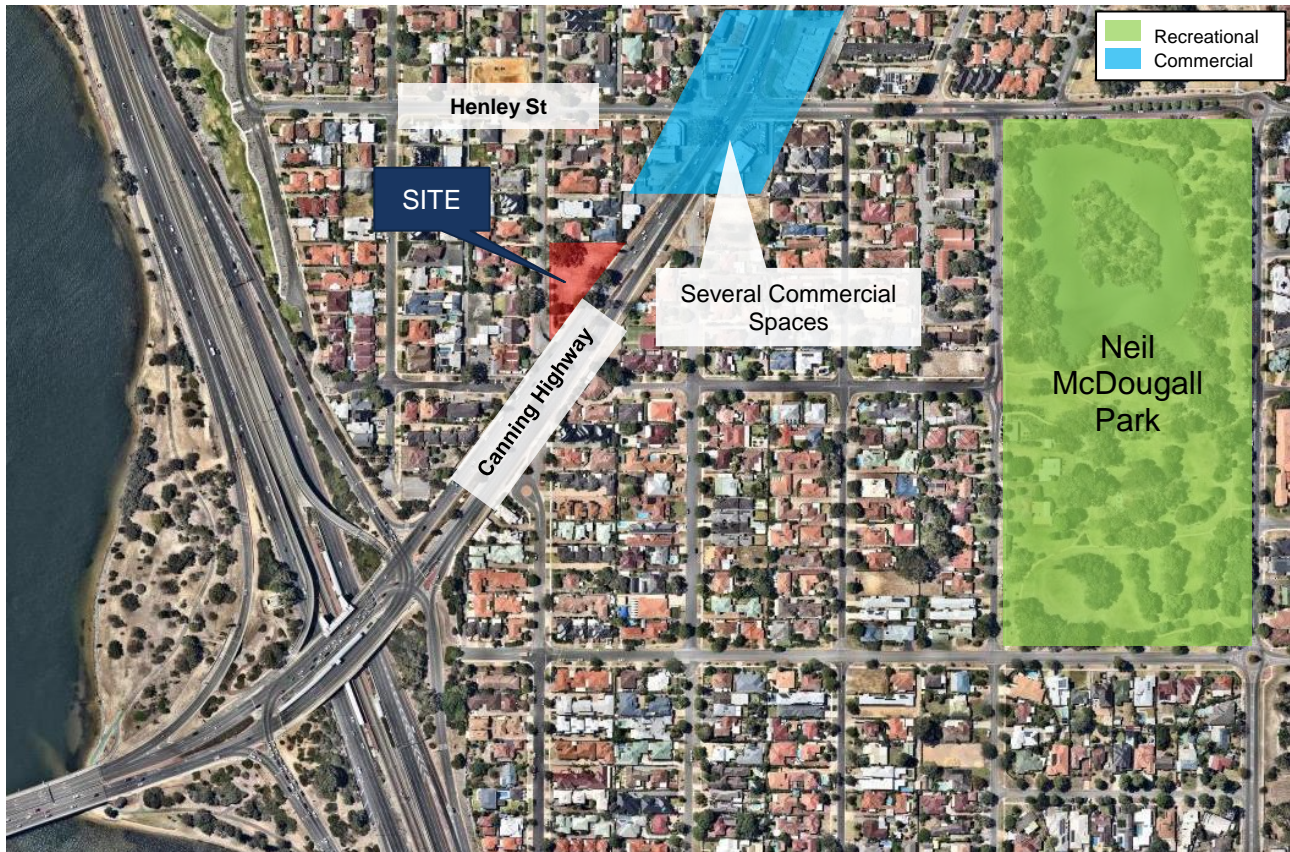
Source: Canning Bridge Activity Centre Plan (2016)

5 Integration with Surrounding Area

5.1 Surrounding Attractors/Generators

Majority of the Como area is of residential land use. The key traffic generators/attractors near the Site are the Neil McDougall Park, located east of the Site and several commercial spaces surrounding the Canning Highway-Henley Street intersection, as shown in **Figure 5-1**.

Figure 5-1 Surrounding Attractors/Generators



Source: Nearmap

5.2 Level of Accessibility

Access to the Site is anticipated to be a mix of vehicle and non-motorised modes of transport. Visitors from nearby residential areas may utilise the adequate pedestrian and cycle networks near the site, while residents and visitors from farther locations are likely to use Canning Highway and Henley Street in reaching the Site.

6 Analysis of Transport Network

6.1 Assessment Years and Time Period

Peak periods for the traffic analysis are 7:45 AM to 8:45 PM for the weekday AM peak hour and 4:45 PM to 5:45 PM for the weekday PM peak hour, which were based on the existing peak traffic flow data at various locations surrounding the Site. The Sunday peak from 11:45 AM to 12:45 PM was also included in the analysis to capture the impact on the network by the church land use within the Site. The following model scenarios have been analysed as part of this assessment:

- Scenario 1 – 2020 Existing traffic without development (Weekday AM/PM, Sunday Peak)
- Scenario 2 – 2023 Opening year traffic without development (Weekday AM/PM, Sunday Peak)
- Scenario 3 – 2023 Opening year traffic with development (Weekday AM/PM, Sunday Peak)
- Scenario 4 – 2033 10-year horizon traffic without development (Weekday AM/PM, Sunday Peak)
- Scenario 5 – 2033 10-year horizon traffic with development (Weekday AM/PM, Sunday Peak)

6.2 Modelling Assumptions

The following assumptions were made in undertaking the traffic analysis:

- > A proposed mixed-use development at Lot 109, 111 and 113 Robert Street, located opposite the Site, has been included in the analysis to assess the impact on the surrounding network when both developments are in full operation.
- > The percentage of heavy vehicles falling under Class 6-12 are minimal (0.3% for Canning Highway through movements) and were simply included in the Class 2-5 category in Sidra.
- > Actual signal timing was used for the base scenario, while practical cycle time of 150 seconds were used for future scenarios.
- > A growth rate of 1% per year has been applied to the Canning Highway background traffic, while no growth was applied to local roads (Henley Street and Robert Street) due to fully developed surroundings.

6.3 Trip Generation

Rates from *Institute of Transportation Engineers (ITE) "Trip Generation" 10th Edition* were utilised in calculating the potential traffic generation of the development.

Table 6-1 shows the trip generation rate, **Table 6-2** shows the directional split and **Table 6-3** shows the total trip generation.

Table 6-1 Trip Generation Rate

Land Use	Yield	Unit	Reference	Weekday AM Peak	Weekday PM Peak	Weekend Peak
Residential (Multi-family housing (mid-rise))	87	dwelling	221	0.15 per dwelling	0.41 per dwelling	0.39 per dwelling
Child Care Centre	450	sq.m. GFA	565	11.12 per 100 sq.m	11.82 per 100 sq.m	1.75 per 100 sq.m
Retail (shopping centre)	120	sq.m. GFA	820	3.00 per 100 sq.m	4.21 per 100 sq.m	2.79 per 100 sq.m

Table 6-2 Directional Distribution

Land Use	Weekday AM Peak		Weekday PM Peak		Weekend	
	In	Out	In	Out	In	Out
Residential (Mid-rise residential w/ 1 st floor commercial)	27%	73%	60%	40%	62%	38%
Child Care Centre	53%	47%	47%	53%	54%	46%
Retail (variety store)	54%	46%	50%	50%	49%	51%

Table 6-3 Total Trip Generation

Land Use	Weekday AM Peak		Weekday PM Peak		Weekend Peak	
	In	Out	In	Out	In	Out
Residential (Mid-rise residential w/ 1 st floor commercial)	4	10	21	14	21	13
Child Care Centre	27	24	25	28	4	4
Retail (variety store)	2	2	3	3	2	2
TOTAL	32	35	49	45	27	18

The total trip generation of the proposed development, including the development yields of the proposed mixed-use development at Lots 109, 111 & 113 Robert Street, are presented in **Table 6-4**.

Table 6-4 Total Net Development Trip Generation

	Weekday AM Peak		Weekday PM Peak		Weekend Peak	
	In	Out	In	Out	In	Out
East Site trip generation	32	35	49	45	27	18
Net west site trip generation (Lots 109, 111 & 113)	24	19	48	44	59	81
Net total	56	54	97	89	86	99

It is important to note that these trip generation calculations are considered to be robust as no further reduction has been included and considering the proposed development is located within a close proximity of high quality and frequency public transport facilities (Canning Bridge Station), the trip generated by the proposed development is anticipated to be lower than what is calculated.

6.4 Trip Distribution

The assumed traffic distribution for the trips generated by the developments (total of east and west sites) are shown in **Figure 6-1**. Trip distribution on the intersection of Henley Road and Canning Highway are assumed to be equal to existing turning movement distributions (based on 2016 traffic count data).

Figure 6-1 Trip Distribution (In and Out)



6.5 Intersection Performance

The identified intersections have been analysed using the SIDRA analysis software. This software calculates the performance of intersections based on several input parameters, such as intersection geometry, speed limit and traffic volumes, among others. As an output, SIDRA generates the Degree of Saturation (DOS), queue lengths, delays, level of service, and 95th Percentile Queue for the intersection. 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 theoretical intersection capacity is exceeded for an un-signalized intersection where $DOS > 0.80$;
- > **95% 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. An unsignalised intersection can be considered to be operating at capacity where the average delay exceeds 40 seconds for any movement; 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 sec	10-15 sec
C	At or near free-flow operations	20-35 sec	15-25 sec
D	Decreasing free-flow levels	35-55 sec	25-35 sec
E	Operations at capacity	55-80 sec	35-50 sec
F	A breakdown in vehicular flow (worst condition)	≥80 sec	≥50 sec

6.6 SIDRA Analysis Input

6.6.1 Intersection Geometry

All Sidra input on intersection geometry were sourced from the Nearmap image, dated 3 May 2020.

6.6.2 Speed Limit

Approach and exit cruise speeds in the models were based on the posted speed limit data obtained from the MRWA Road Information Mapping System discussed in **Section 2.3**.

6.6.3 Traffic Signal Phase Times

Signal phasing information for the Canning Highway - Henley Street intersection was obtained from the database available in the Main Roads Traffic Map website.

6.6.4 Traffic Volumes

Traffic volume data used in the analysis were obtained from the following sources:

- > Canning Highway – Henley Street intersection video count survey data (November 2016)
- > Canning Highway – Henley Street intersection SCATS data available from Main Roads' Traffic Map (November 2020)
- > Midblock counts from City of South Perth (2015 – 2019)

Calculations were undertaken to obtain turning movement volumes at intersections, as detailed below:

- > At the intersection of Canning Highway and Henley Street, turning volumes from Canning Highway (north and south approaches) are directly obtained from 2020 SCATS data (Nov 2020)
- > At the intersection of Canning Highway and Henley Street, turning volumes from Henley Street (east and west approaches) are obtained by applying turning vehicle percentage from 2016 video count survey data to 2020 SCATS data
- > At the intersection of Henley Street and Robert Street, turning volumes were obtained by applying a simple gravity model to the midblock volumes at each leg (December 2019 data). For the west leg where no midblock data is available, it is assumed that midblock volumes is 80% of the midblock volumes at the east leg

Network volumes are presented in **Figure 6-2, Figure 6-3, Figure 6-4, Figure 6-5, and Figure 6-6**. Note that %HV values in the existing scenario is assumed to be the same in the future scenario.

Figure 6-2 Traffic Flows (2020 Existing Background Traffic)

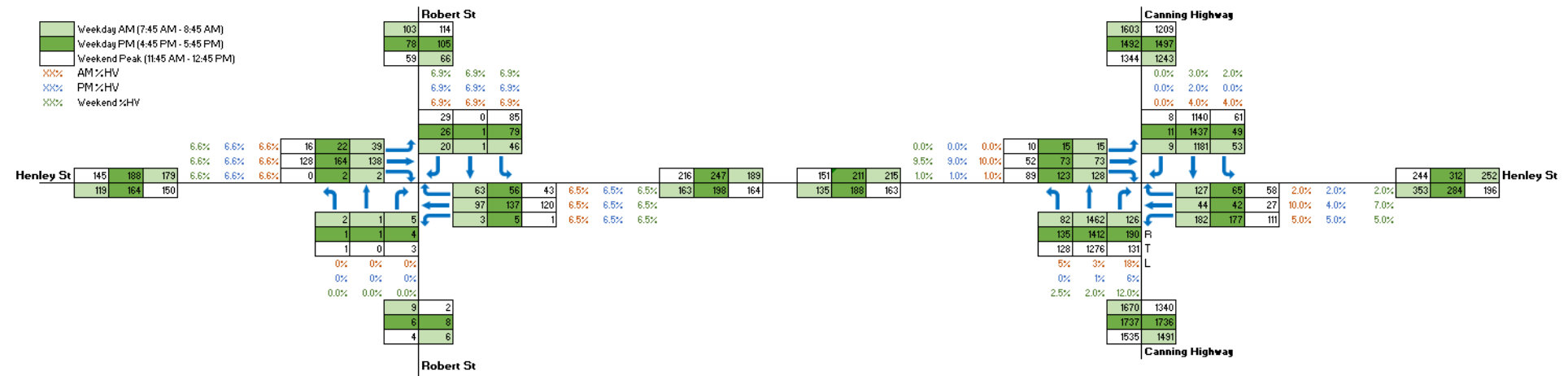


Figure 6-3 Traffic Flows (2023 Existing Background Traffic without Development)

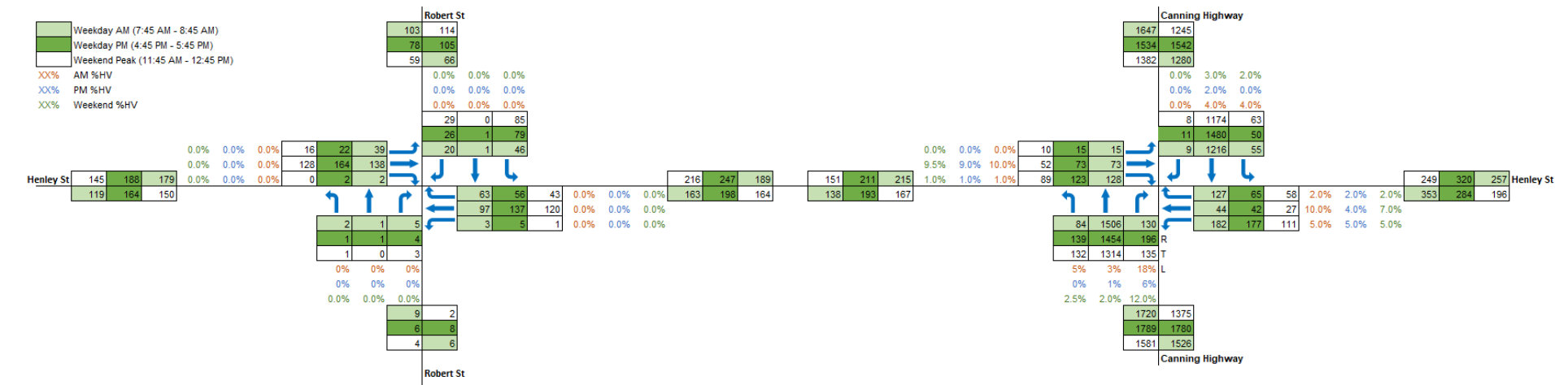


Figure 6-4 Traffic Flows (2023 Existing Background Traffic with Development)

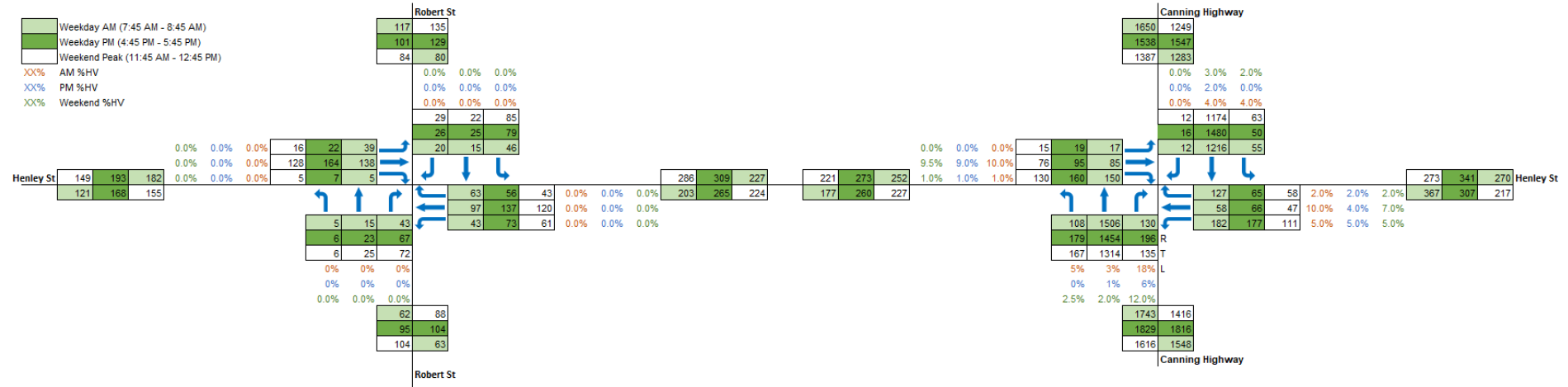
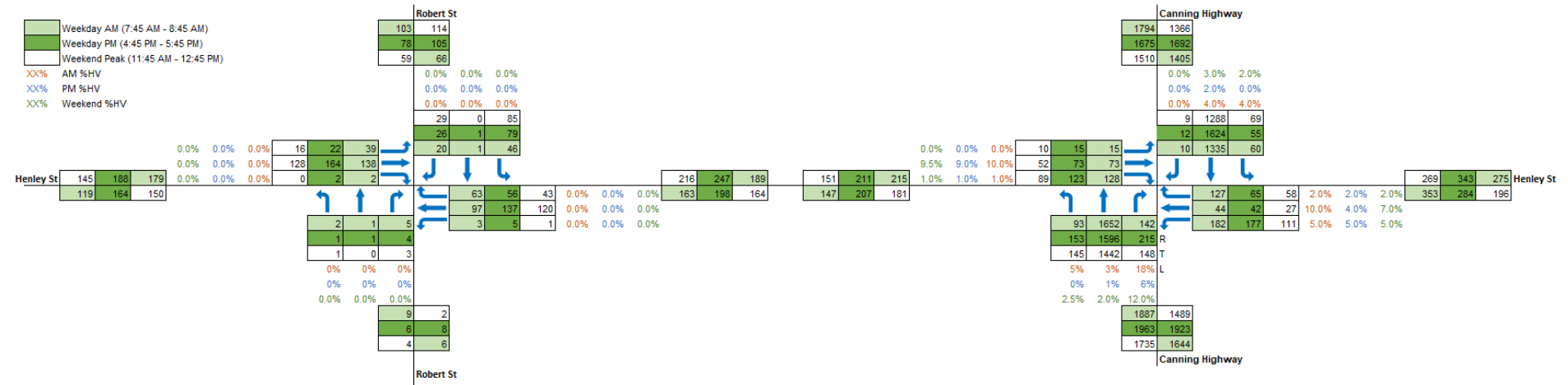


Figure 6-5 Traffic Flows (2023 Existing Background Traffic without Development)



Legend:

- Weekday AM (7:45 AM - 8:45 AM)
- Weekday PM (4:45 PM - 5:45 PM)
- Weekend Peak (11:45 AM - 12:45 PM)
- AM %HV
- PM %HV
- Weekend %HV

Henley St

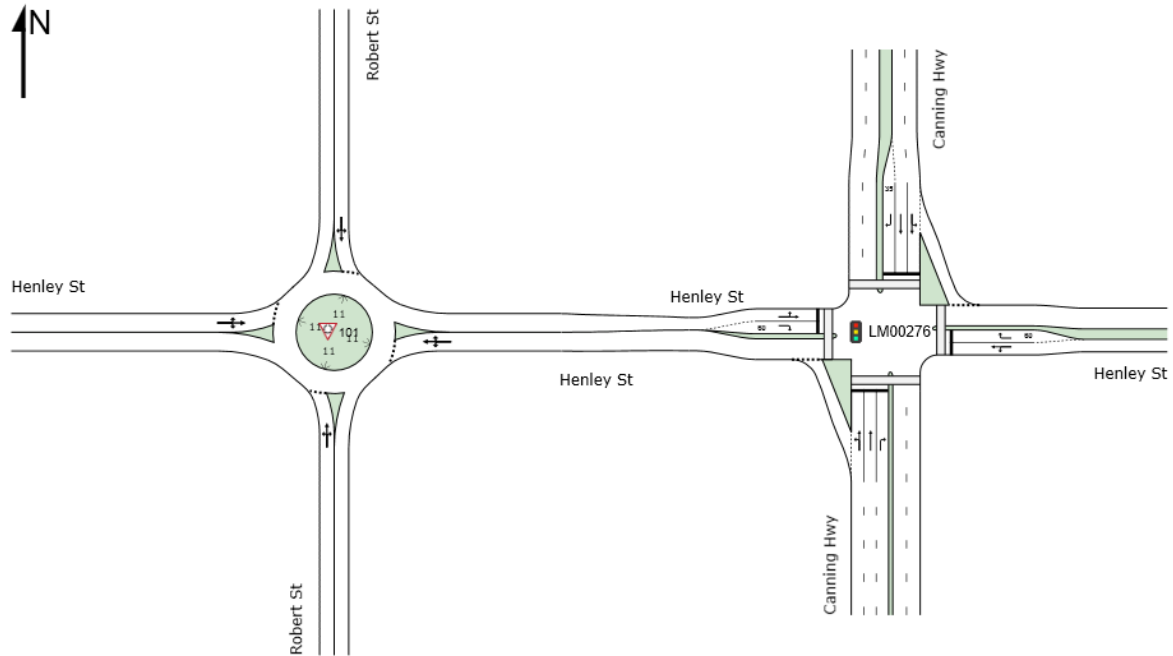
Robert St

Canning Highway

6.7 SIDRA Analysis Results

The network layout of the intersections included in the analysis is shown in **Figure 6-7**. The intersections were selected based on the potential impact of the additional traffic generated by the proposed development.

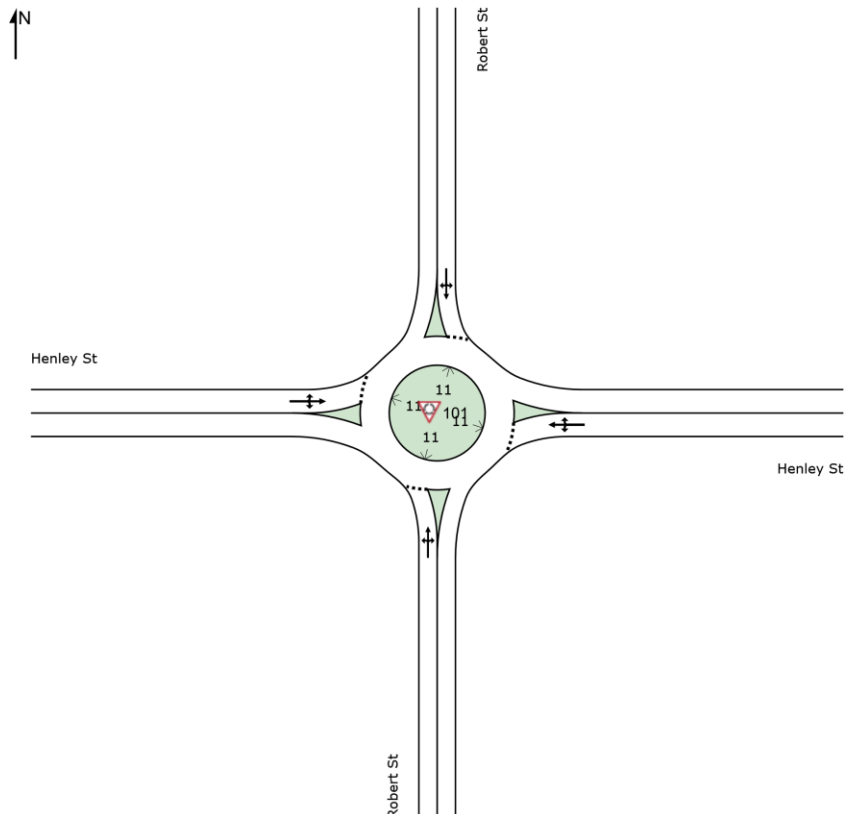
Figure 6-7 Sidra Analysis Network



6.7.2 Henley Street / Robert Street Intersection

The Sidra layout of the intersection is shown in **Figure 6-8**.

Figure 6-8 Sidra layout of Henley Street / Robert Street Intersection



The results of analysis are summarised in **Table 6-6**, showing 'All Vehicle' results (i.e., results for the entire intersection). Results for each movement are presented in **Appendix C**.

Table 6-6 Sidra results for Henley Street / Robert Street Intersection – All Scenarios

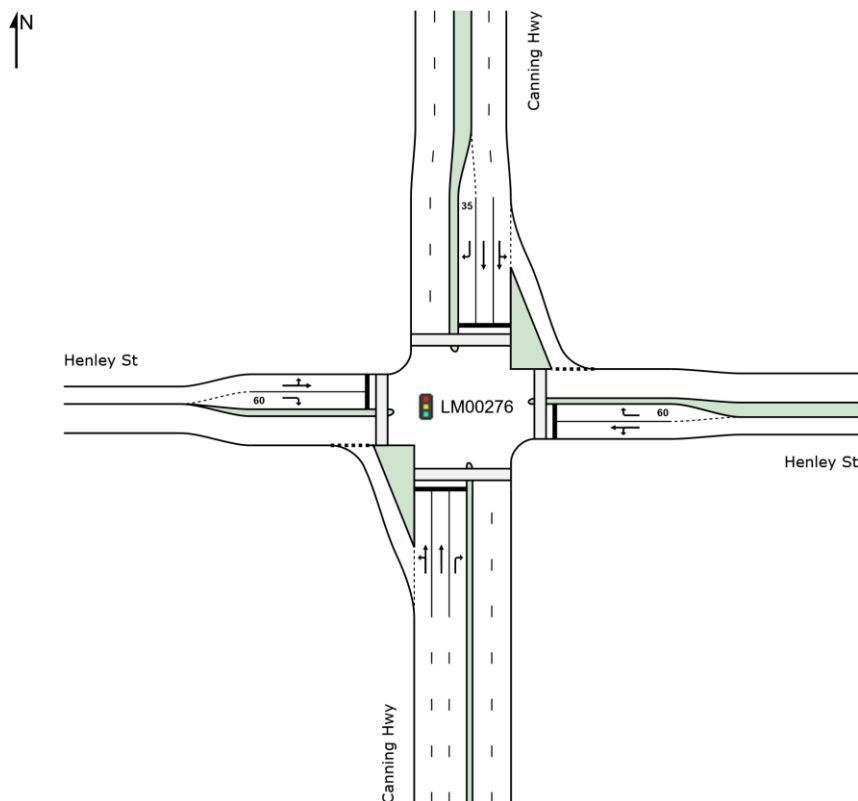
Scenario	AM				PM				Weekend			
	DOS	Delay (s)	LOS	Ave. Back of Queue (m)	DOS	Delay (s)	LOS	Ave. Back of Queue (m)	DOS	Delay (s)	LOS	Ave. Back of Queue (m)
2020 base scenario	0.148	4.6	A	2.5	0.153	4.6	A	2.6	0.127	4.5	A	1.9
2023 no development	0.148	4.6	A	2.6	0.153	4.6	A	2.6	0.127	4.5	A	1.9
2023 with development	0.197	5.0	A	2.8	0.327	5.2	A	3.1	0.180	5.2	A	2.5
2033 no development	0.152	4.6	A	2.6	0.174	4.6	A	2.6	0.127	4.5	A	1.9
2033 with development	0.205	5.0	A	2.8	0.327	5.2	A	3.1	0.180	5.2	A	2.5

The table shows that the intersection will continue to perform at an excellent level of service (LOS A) even with the additional traffic from the development.

6.7.3 Canning Highway / Henley Street Intersection

The Sidra layout of the intersection is shown in **Figure 6-9**.

Figure 6-9 Sidra layout of Canning Highway / Henley Street Intersection



The results of analysis are summarised in **Table 6-7**, showing 'All Vehicle' results (i.e., results for the entire intersection). Results for each movement are presented in **Appendix C**.

Table 6-7 Sidra Results for Canning Highway / Henley Street – All Scenarios

Scenario	AM				PM				Weekend			
	DOS	Delay (s)	LOS	Ave. Back of Queue (m)	DOS	Delay (s)	LOS	Ave. Back of Queue (m)	DOS	Delay (s)	LOS	Ave. Back of Queue (m)
2020 base scenario	0.854	39.4	D	188.2	0.971	53.1	D	309.2	0.785	31.3	C	155.3
2023 no development	0.878	41.0	D	204.6	1.000	57.2	E	338.5	0.809	31.9	C	164.6
2023 with development	0.897	42.2	D	204.5	1.007	64.4	E	368.9	0.870	36.6	D	183.6
2033 no development	0.95	44.5	D	245.0	1.098	87.8	F	479.0	0.887	36.4	D	213.3
2033 with development	0.952	51.6	D	277.1	1.126	101.4	F	506.5	0.901	39.0	D	228.2

The result indicated that the proposed developed would result in slight increase of DOS, Delay, and average back of queue distance to the existing intersection. However, the increase is insignificant, until 2033 where intersection would fail as it reaches the capacity, even without the development traffic.

6.8 Additional SIDRA Scenario (Robert Street remained Open)

To further examine the traffic impact of the development of the scenario where the existing Robert Street's left-out access onto Canning Highway remain open, the following analysis is conducted.

It is anticipated that should Robert Street remain open, providing access (left-out) onto Canning Highway, the intersection will be accessed by a small proportion of traffic leaving the Site. Vehicle accessing (coming into) the Site will continue to use Henley Street as access

For the purpose of this assessment, 20% of the egress traffic is diverted to the Robert Street / Canning Highway access. Cardno has conducted Sidra analysis for this assumption and the results indicate that the intersection will perform satisfactorily, **with Level of Service A in all scenarios.**

However, noting that when vehicles are likely to queue along Canning Highway northbound lanes to Robert Street / Canning Highway intersection, drivers are more likely to choose the exit route via Henley Street, due to the signalised Canning Highway / Henley Street intersection.

6.9 Sidra Result Summary

The results of Sidra analysis are discussed below:

- > Traffic performance at the Henley Street / Robert Street roundabout is to remain at an excellent level (LOS A) for all scenarios
- > The existing Canning Highway and Henley Street intersection is already performing at an average level of service (D) during the Am and PM peak hours.
- > The Sidra analysis results show that the additional traffic generated by the proposed development is unlikely to result in any significant impact to the surrounding road network.
- > If Robert Street remained open, the Robert Street / Canning Highway intersection will perform at an excellent level of service.

7 Conclusions and Recommendations

This Transport Impact Assessment outlines the transport aspects of the proposed development focusing on traffic operations, loading vehicle operations, access and car parking. Provided also are walking, cycling, and public transport considerations.

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

The following conclusions are regarding the proposed development:

- > The Site comprises of 87 residential apartments and ground floor commercial units.
- > Provision of sustainable transport initiatives have been proposed with 3 designated car spaces proposed for Car Share Scheme and 5 spaces fitted with Electric Car Charging equipment, which are well exceed CBACP requirements.
- > The Site has excellent access to public transport with a number of high frequency bus routes located within the vicinity of the Site. Additionally, the Canning Bridge Train Station is also located in very close proximity.
- > Walking and cycling infrastructure within the surrounding area of the Site is excellent with access to a high-quality shared path running along the riverside including a connecting route to the Kwinana Freeway PSP north and south.
- > The proposed development has been calculated to have a weekday trip generation of approximately 67 vehicles in the AM peak hour and 94 vehicles in the PM peak hour. Due to the church activity, Weekend peak traffic generation has been calculated at 45 vehicle trips. Due to the prime location close to public transport, this level of traffic generation is considered very robust.
- > The swept path assessment shows that a waste truck will be able to service the site via Robert Street.
- > The SIDRA assessment shows that the traffic generated by the Site will have minor and insignificant impact on the surrounding intersections and road network during the assessed peaks. The Canning Highway / Henley Street intersection is currently performing at an average Level of Service.
- > The bicycle parking provision well exceeds the CBACP requirements
- > Residential car parking provision (less student/affordable housing) is compliant with the CBACP requirements.
- > Non-residential car parking and motorcycle parking provision is considered to meet the objectives with alternative transport initiatives provided, such as car share, additional bicycle parking facility and close proximity to good quality public transport services.
- > Overall, it is unlikely that the Site will detrimentally affect traffic safety or flow on the surrounding road network. The main traffic impacts affecting the surrounding road network will be background traffic growth which will affect the operation of some intersections along Canning Highway.
- > The assessment was undertaken with the assumption that the southern end of Roberts Street at Canning Highway, will be closed to vehicle traffic. However, further examination has been carried out with the scenario that the existing Robert Street's left-out access onto Canning Highway remain open and the results indicate that the intersection will perform satisfactorily, with Level of Service A in all scenarios.

APPENDIX

A

WAPC CHECKLIST

Item	Provided	Comments/Proposals
Introduction/Background		
name of applicant and consultant	Section 1	
development location and context	Section 2	
brief description of development proposal	Section 3	
key issues	N/A	
background information	Section 1	
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	Section 2	
traffic flows on surrounding roads (usually am and pm peak hours)	Section 6	
traffic flows at major intersections (usually am and pm peak hours)	Section 6	
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		
regional context	Section 2	
proposed land uses	Section 3	
table of land uses and quantities	Section 6	
access arrangements	Section 3	
parking provision	Section 3	
end of trip facilities	Section 3	
any specific issues	N/A	
road network	Section 4	
intersection layouts and controls	N/A	
pedestrian/cycle networks and crossing facilities	Section 4	
public transport services	Section 4	

Item	Provided	Comments/Proposals
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	Section 4	
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 3	
impact on surrounding roads	Section 6	
impact on intersections	Section 6	
impact on neighbouring areas	N/A	
traffic noise and vibration	N/A	
road safety	N/A	
public transport access	N/A	
pedestrian access / amenity	Section 3	
cycle access / amenity	Section 3	
analysis of pedestrian / cycle networks	N/A	
safe walk/cycle to school (for residential and school site developments only)	N/A	
Traffic management plan (where appropriate)	N/A	

APPENDIX

B

DEVELOPMENT PLANS

APPENDIX

C

SIDRA RESULTS

