Transport Impact Assessment

Dunes Beach Resort, Mindarie Beach Reserve

Prepared for: Eco Tourism Pty Ltd

Ref: 300305092 | Date: 07 March 2024

Revision

Revision	Date	Comment	Prepared By	Approved By
01	07 March 2024	Final	LR	DH/RJC
02	26 October 2023	Café patron numbers change	LR	DH/RJC
03	07 March 2024	Site Plan modifications	LR	DH

Desmond Ho

For and on behalf of

Stantec Australia Pty Ltd

Ground Floor, 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 Eco Tourism Pty Ltd ('the Client') to prepare a Transport Impact Assessment (TIA) for the proposed development of Dunes Beach Resort ('the Site') located at 2 Quinns Road, Mindarie within the jurisdiction of City of Wanneroo.

This report aims to assess the impact of the development upon the adjacent road network. The report will focus on traffic operations, circulation, and car parking requirements.

This TIA has been prepared in accordance with the *Western Australian Planning Commission (WAPC) Transport Impact 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 subject site is located at 2 Quinns Road, within the Quinns Mindarie Coastal Node, where the Former Quinns Rocks Caravan Park was located. The site is bounded by existing hospitality venues, Surf Life Saving Club, Quinns Mindarie community centre and Quinns Road to the northwest, Land Reserve to the northeast and the beach frontage to the south and west.

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

Figure 2.1: Site Location and Its Environs

Source: Quinns Mindarie Coastal Node Parking Study 2022-2023

According to the Quinns Mindarie Coastal Node Parking Study 2022-2023, *'The City of Wanneroo Coastal Management Plan 2021, endorsed by Council at its meeting held 10 May 2022, identifies Quinns Mindarie as a District Coastal Node. However, due to its function and the associated facilities provided, Quinns Beach South would be classified as a Regional Coastal Node under the LPP 4.21.'* An extract of the Schedule 1 Table is included in **Figure 2.2**.

In December 2016, the proposed development area was assigned as a temporary overflow carpark for the increase in peak season visitors as a result of the swimming enclosure installation. The site provided 80 additional informal parking bays and as stated in the Parking Study, this temporary overflow car park has remained accessible during popular beach visitation months.

Figure 2.2: District Coastal Node Role/function

Main Role/Function		Acceptable Permanent assets within foreshore parkland	Location of Parkland and Permanent Assets	Acceptable Permanent assets located outside of foreshore parkland	Location of permanent assets outside of foreshore parkland	Acceptable temporary assets
Regional Coastal Nodes	Regional coastal nodes attract numbers of people from the local area and region. They should provide large capacity car parks, cycle tracks, toilets, showers, a cafe, parkland, lifesaving facilities and shade. Regional beaches have a relatively high level of facilities, infrastructure, commercial development and use (WAPC, 2020).	• 6x bench seating • 4x outdoor showers • 3x drinking fountain • 4x picnic table • 4x lookout shelter • 2x public ablutions • 2x change rooms • 4-5x beach access points • 5x barbecues • 4x bike racks • 8x play equipment items or nature play with sand or mulch soft fall where applicable • Adult changing facility where applicable	Foreshore parkland at regional beach to be placed at 30 year vulnerability line or landward of this location.	• Car park (250 bays) • Dual use pathway • Emergency vehicle access • Cafe • Community facility • Surf life saving club	• Car park: 50 year vulnerability line or landward of this location. • Dual use pathway: 30 year vulnerability line or landward of this location. • Cafe: 60 year vulnerability line or landward of this location.	• Nil

Source: Planning and Sustainability local Planning Policy 4.21 Coastal Assets City of Wanneroo

The Regional Coastal Node recommends a total of 250 parking bays located outside the foreshore parkland. The existing parking supply includes 282 formal parking bays and 80 temporary overflow parking bays which is summarised in **Table 2-1**.

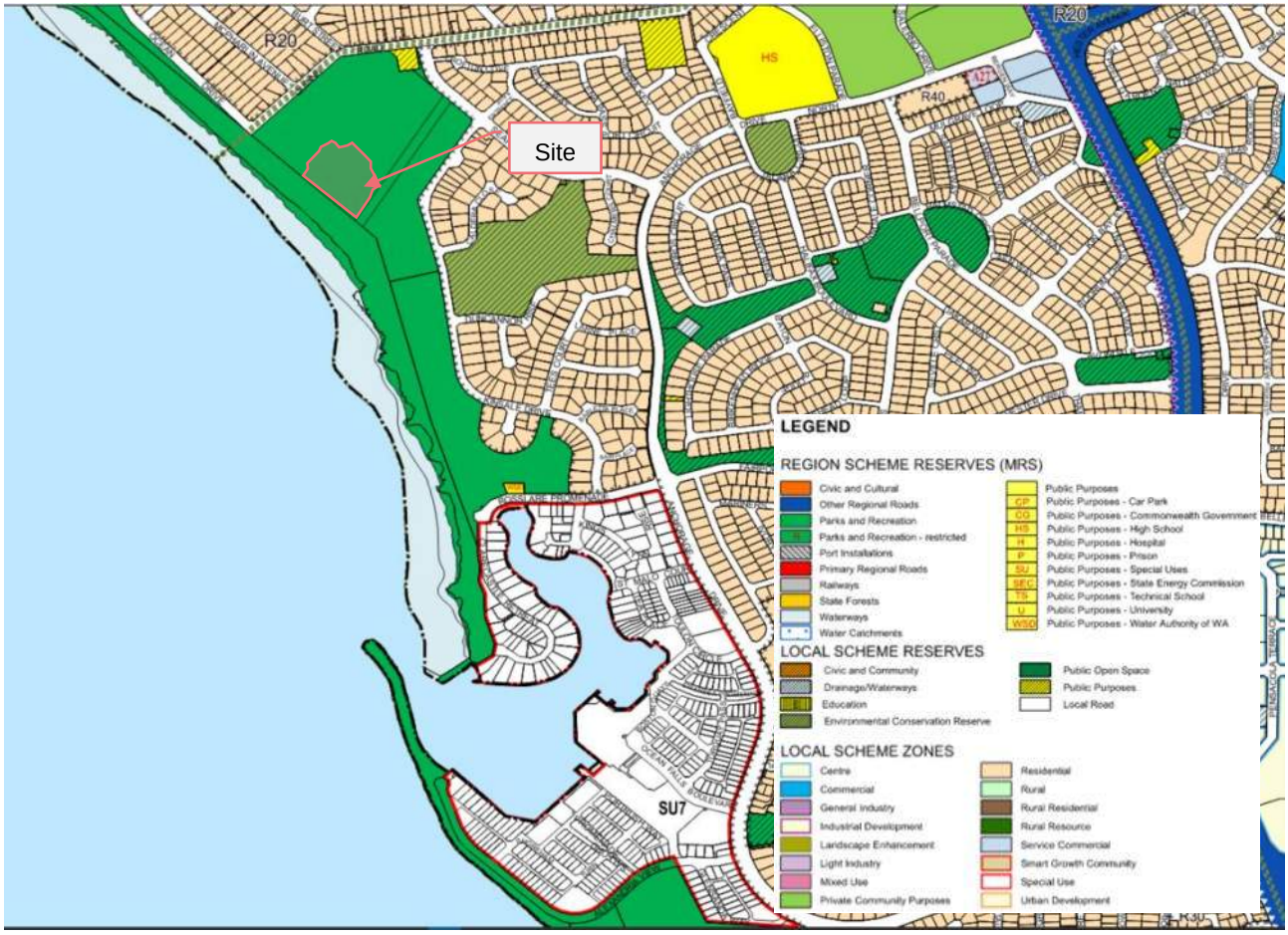
Table 2-1 Summary of existing parking bays

Type	Formal Number of bays	Temporary overflow car park
Car Park Standard Bay	259	-
ACROD bay	7	-
Motorcycle bay	4	-
On-street bay	12	-
Informal parking		80
Total number of formal bays	**282**	**-**
Total	**362**	

2.2 Surrounding Land Uses

Pursuant to the provision of the City of Waneroo *Town Planning Scheme No.2*, the Site is zoned *'Parks and Recreation*' as shown in **Figure 2.3**.The Site is surrounded by residential properties to the north and east, Parks and recreation area to the south and the beach front to the west.

Figure 2.3: Zoning map



Source: City of Wanneroo Town Planning Scheme no.2 Map 16 of 24

2.3 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 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.
- **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 the adjoining property. These are often older roads with traffic demand in excess of what was 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.

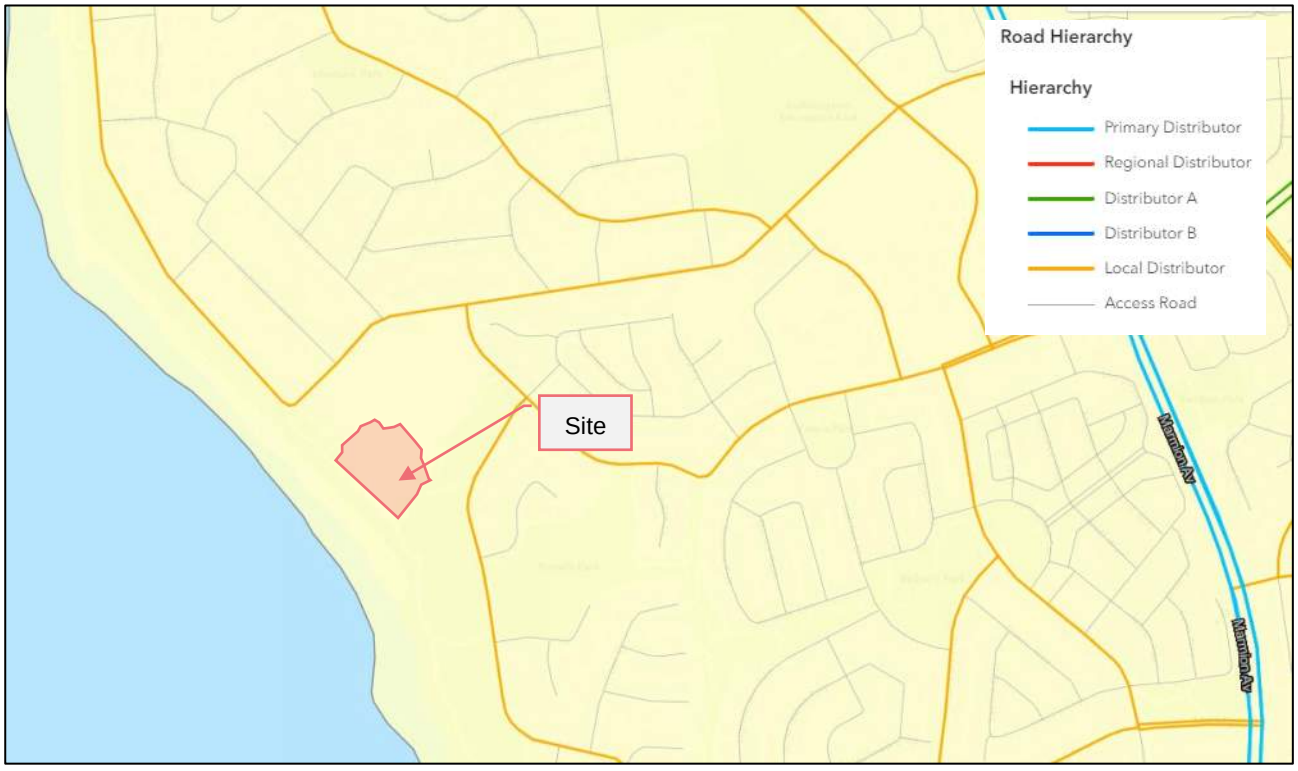
- **Access Roads (grey):** Provide access to abutting properties with amenity, safety and aesthetic aspects having priority over the vehicle movement function. These roads are bicycle and pedestrian-friendly. They are managed by Local government.

The surrounding road network characteristics are further described in **Table 2-2**, while **Figure 2.4** shows the hierarchy as per the Main Roads WA Road Information Mapping System.

Table 2-2 Road network Classification

Street Names	Road Hierarchy	Road Network				
	Road Hierarchy	**Jurisdiction**	**No. of Lanes**	**No. of Footpaths**	**Width (m)**	**Posted Speed (km/h)**
Quinns Road	Local Distributor	Local Government	2	2	7.0m	50km/h
Ocean Drive	Local Distributor	Local Government	2	2	8.0m with 2.0m median and on-street parking	50km/h
McPharlin Avenue	Access Road	Local Government	2	1	5.8m	50km/h
Burt Street	Access Road	Local Government	2	1	6.0m	50km/h
Seaham Way	Local Distributor	Local Government	2	2	9.5m	50km/h
Kinsale Drive	Local Distributor	Local Government	2	1	7.0m	50km/h

Figure 2.4: Road Hierarchy



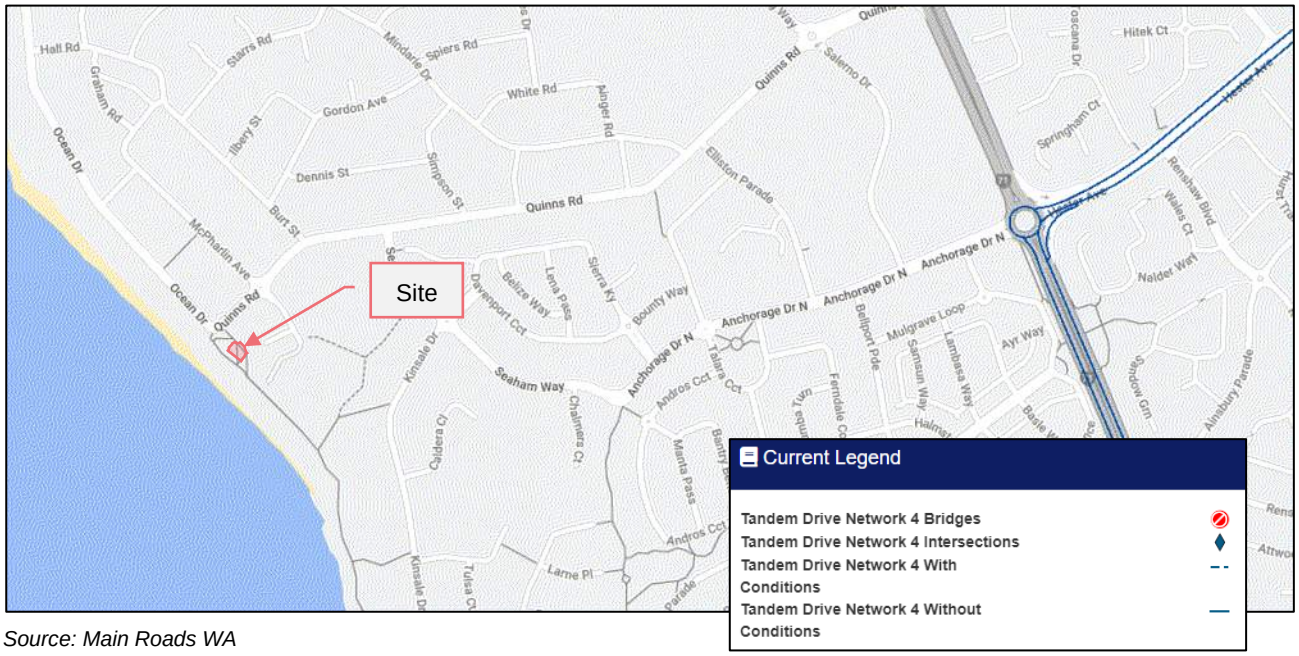
Source: Road Information Mapping System

2.4 RAV Network

The area is not included within the Main Roads Register of Approved Vehicles (RAV) network.

The closest RAV network to the site is Marmion Avenue/Hester Avenue, which is more than 2km away from the site.

Figure 2.5: RAV Network



Source: Main Roads WA

2.5 Existing Key Intersections

The following describes the intersections in close proximity to the proposed development:

- **Quinns Road/McPharlin Avenue/ Site access intersection** is located to the northeast of the site. The intersection is a 4-legged roundabout controlled as illustrated in **Figure 2.6**.

Figure 2.6: Quinns Road / McPharlin Avenue / Site Access

Source: Metromap 2023

- **Quinns Road/Burt Street intersection** is located to the northeast of the site. The intersection is T- junction with priority given to Quinns Road as illustrated in **Figure 2.7.**

Figure 2.7: Quinns Road / Burt Street intersection

Source: Metromap 2023

2.6 Existing Traffic Volumes

The existing traffic volumes on Quinns Road and Ocean Drive and the surrounding road network were sourced from the City of Wanneroo who provided traffic counts conducted in 2023. The closest counting station was Site 8226, located on Quinns Road east of Elliston Parade, approximately 1km east of the site. Traffic counting station 8161, located on Ocean Drive north of Camira way, is located approximately 1.8km north of the site. **Table 2-3** summarises the traffic count information for both sites detailing the location, date, and peak traffic volumes.

Table 2-3 Traffic count volumes

Site	Road name	Description	Start date	End date	Direction bound	Peak Count (both dir.)	At time
8226	Quinns Road	East of Elliston Parade	19/05/2023	26/05/2023	Both	747	08:00
8161	Ocean Drive	North of Camira Way	01/02/2023	08/02/2023	Both	259	09:00

Additional information for both traffic counting stations is included in **Table 2-4.** The traffic count information provided is also included in **Appendix C.**

Table 2-4 Traffic count volumes

Site	AVG. Weekday Traffic	AVG. Weekday Traffic (N/E)	AVG Weekday Traffic (S/W)	Percent Heavy Vehicles (%)	85th Percentile Speed	Mean Speed
8226	6606	3512	3094	5.7	55.8	47.4
8161	2172	1230	941	3	45.7	39.9

2.7 Crash Assessment

A crash assessment for the surrounding road network of the Site has been completed using the Main Roads WA Reporting Centre. The assessment covers all the recorded accidents over 5 years between 1 January 2018 and 31 December 2022.

As illustrated in **Figure 2.8**, two crashes were recorded in close proximity to the subject site- one Sideswipe same direction that resulted in a major property damage and one non collision that involved a trail bike and resulted in minor property damage. Both crashes took place during the daytime and on a dry surface.

Figure 2.8: Crash map

Source: Crash map 2023

From the crash assessment conducted, the following is concluded:

- A total of two crashes were recorded on the surrounding road network in the vicinity of the site.
- Both crashes resulted in property damage.
- No fatalities were reported.

Overall, it is expected that the proposed development is unlikely to have any impact on road safety in the area.

3. Public Transport Facilities

3.1 Existing Public Transport Facilities

The site is served by Transperth Bus Route 481 (Clarkson Station – Quinns Rocks via Mindarie) which travels along Burt Street and Quinns Road to the east of the site. The weekday frequency of this route varies between 10min in peak periods to 30min on non-peak hours and the service is provided between 7:00am and 11:00pm. On weekends, a service is provided every hour on Saturdays between 7:30am and 9:15pm and Sundays between 9.15am and 9.22pm. The nearest bus stop is located approximately 130m to the northeast of the site on Quinns Road as shown in **Figure 3.1**.

Figure 3.1: Existing bus service and bus stop locations

Source: PTA 2023

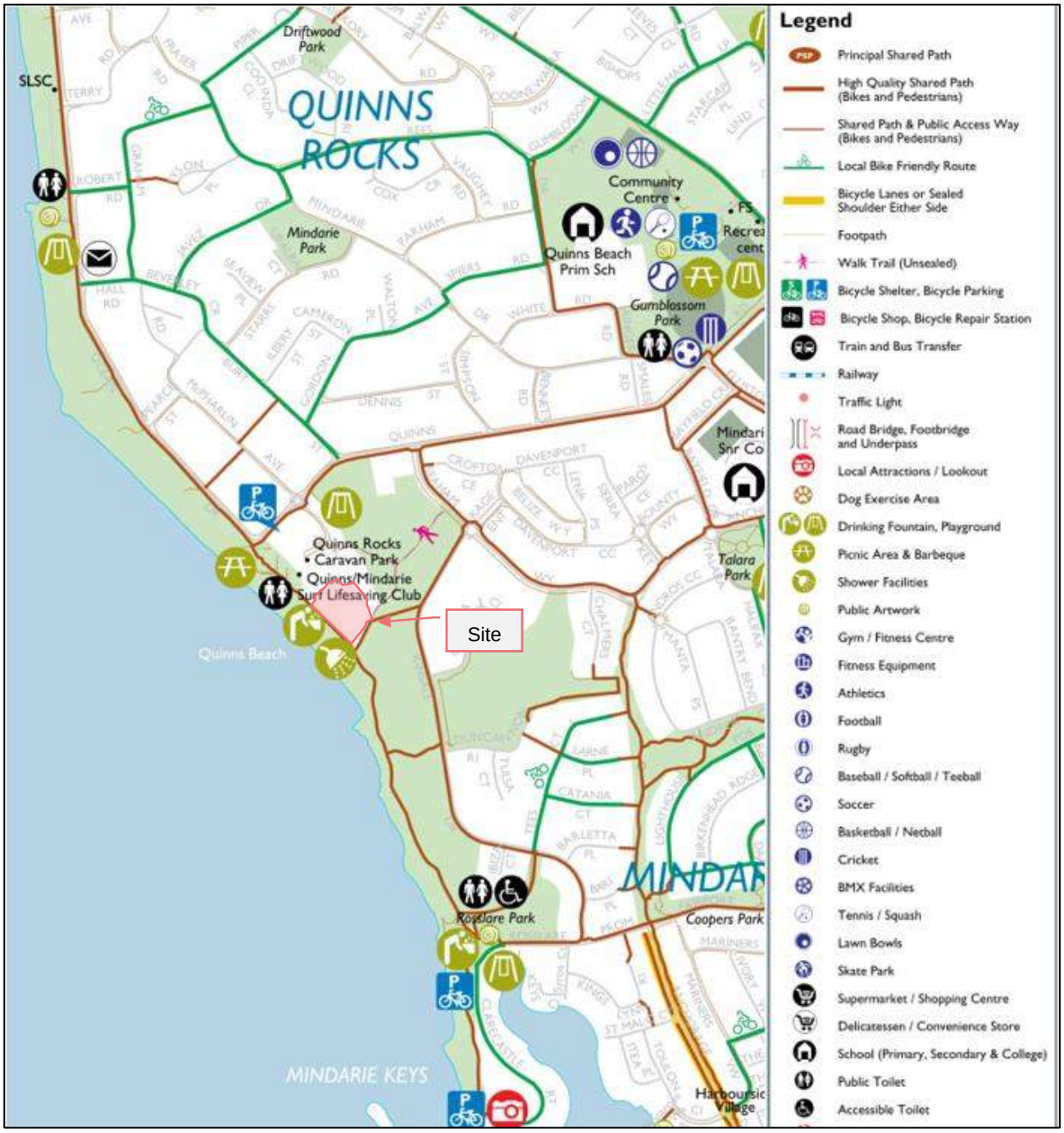
The site has limited public transport coverage since it is served by one route only, with frequencies provided every 10-30 minutes on weekdays and every hour on weekends.

4. Pedestrian/Cycle network Facilities

4.1 Existing Pedestrian/Cycle network

High quality shared paths are provided along the surrounding roads of the subject site which includes Ocean Drive, the beach frontage, Quinns Road, and Seaham Way. There are shared paths accessing the site and unsealed walk trails within the site as shown in **Figure 4.1.**

Figure 4.1: Existing Pedestrian/Cycle networks



Source: City of Wanneroo – Your move Wanneroo North Map 2023

The immediate adjacent shared path network to the subject site provides pedestrian/cyclists access as illustrated in **Figure 4.2**.

Figure 4.2: Existing Pedestrian/Cycle networks at the access of the Site

Source: Metro Map (2023)

5. Proposed Development

5.1 Proposed land Use

The proposal is for an eco-friendly resort that offers contemporary Glamping style Accommodation and various hospitality amenities. The proposed development is located within the City of Wanneroo within the Mindarie Beach Reserve. The overall layout of the proposed development on the subject Site is shown in **Figure 5.1**. **Figure 5.2** illustrates the amenities to be located within the main building. Larger versions of the site plans are provided in **Appendix B**.

The site comprises the following site-specific design components:

- Glamping accommodation – 40 tents that can accommodate up to 95 guests.
- Café – with capacity up to 140 patrons. The café will operate during the AM period only.
- Functions area – with capacity for up to 140 guests and will operate during the PM period only.
- Special events (ad hoc) –with capacity for up to 200 guests.
- 80 car parking bays including 1 ACROD bay, and
- 2 motorcycle bays.

The development will have a shared space for the Café and the functions area, which will offer different services at different times of the day as indicated above.

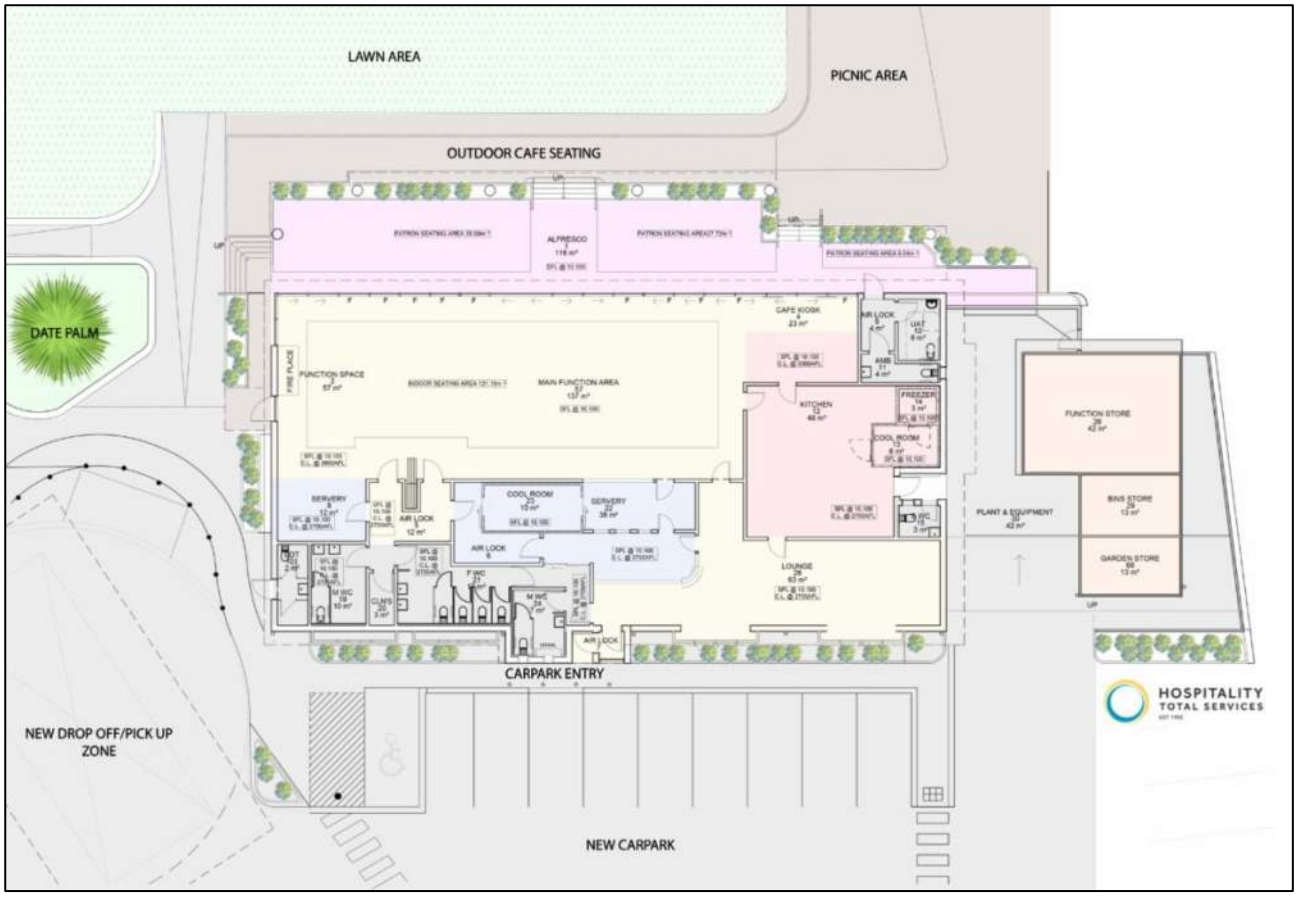
When special events are required, it is anticipated that the main building will be dedicated exclusively for this event.

The maximum capacity of the site at any one time would be up to 240 people, which includes events attendees and accommodation guests.

Figure 5.1 Layout of development

Source: Hospitality Total Services 07/03/2024

Figure 5.2 Layout of development – Main building area distribution



Source: Hospitality Total Services 07/03/2024

5.2 Access Arrangements

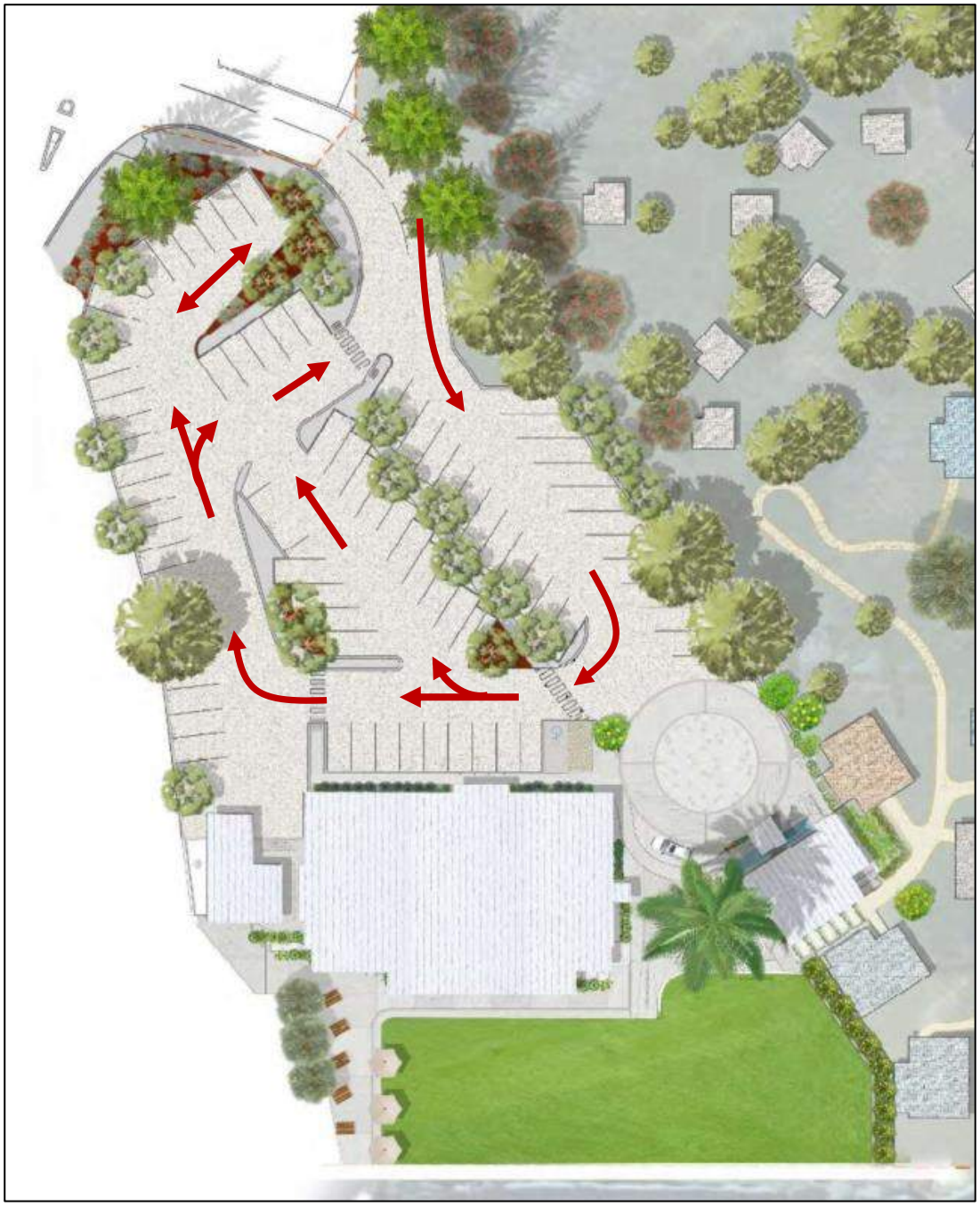
Vehicular access into the site is proposed to be via Quinns Road. The access will be shared with the existing road that provides access to the restaurants, Surf Life Saving Club and the Community centre located adjacent to the proposed development as shown in **Figure 5.3**.

Figure 5.3 Access arrangements

Source: Metromap 2024

The vehicles are anticipated to circulate internally within the proposed site in a clockwise direction as illustrated in **Figure 5.4**,.

Figure 5.4 Internal circulation



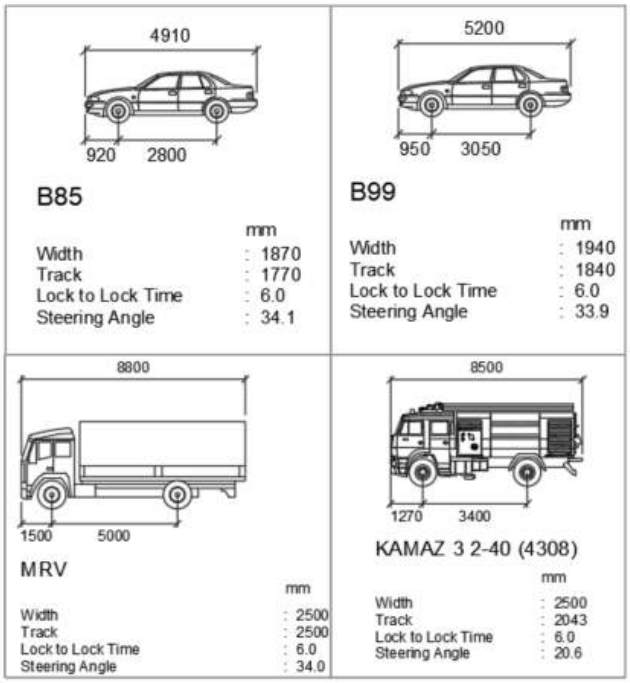
Source: Hospitality Total Services 07/03/2024

5.3 Swept Path Analysis

Swept path analysis was conducted for the vehicles illustrated in **Figure 5.5**

Larger versions of the swept path analysis are included in **Appendix D.**

Figure 5.5 Vehicles

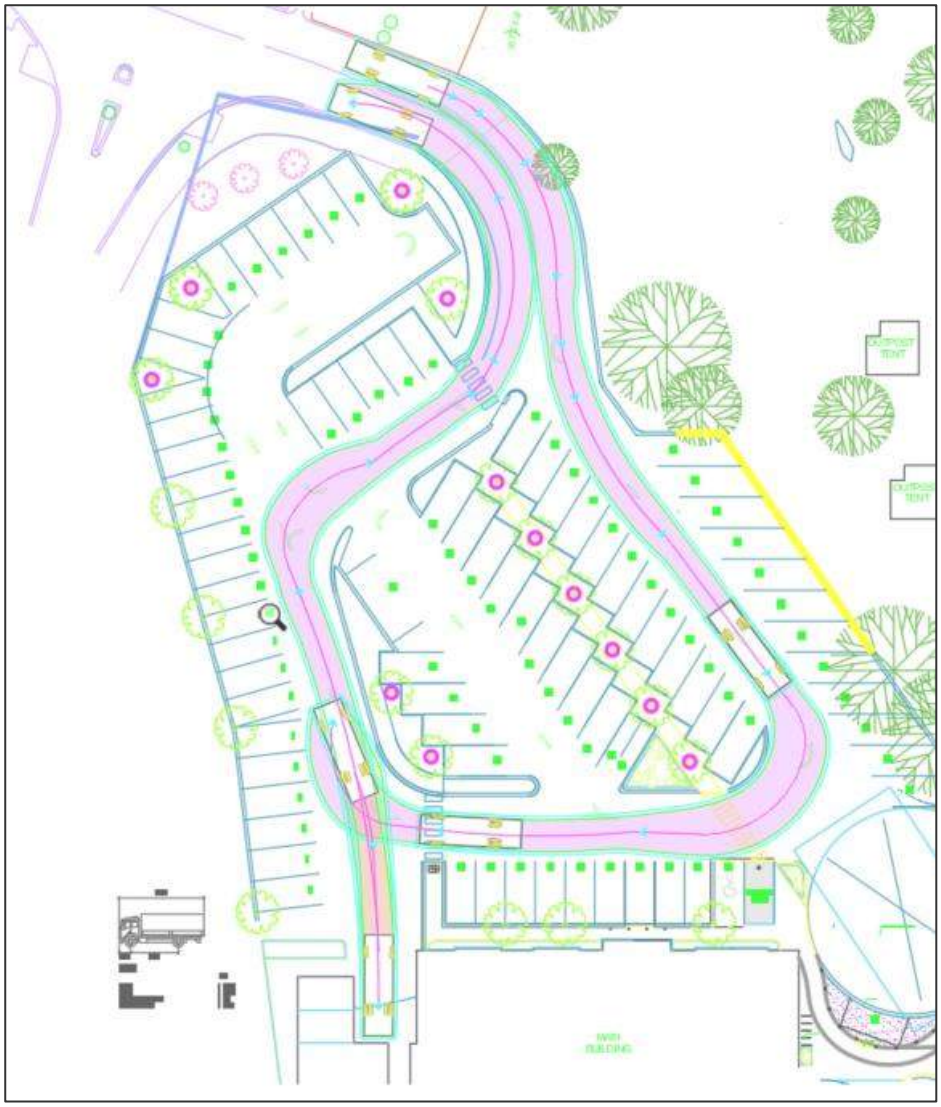


5.3.1 Provision for Service Vehicles and Waste Collection Services

Servicing for the site, including waste collection, will be undertaken via Quinns Road. It is anticipated that the vehicle will access the site and park in the service bay located in the south-western corner of the proposed development.

The analysis indicated that a MRV design vehicle it is able to adequately enter the site, manoeuvre and reverse park into the service bay and exit in a forward direction. It is anticipated that waste collection 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.

Figure 5.6 Swept path analysis MRV 8.8m vehicle

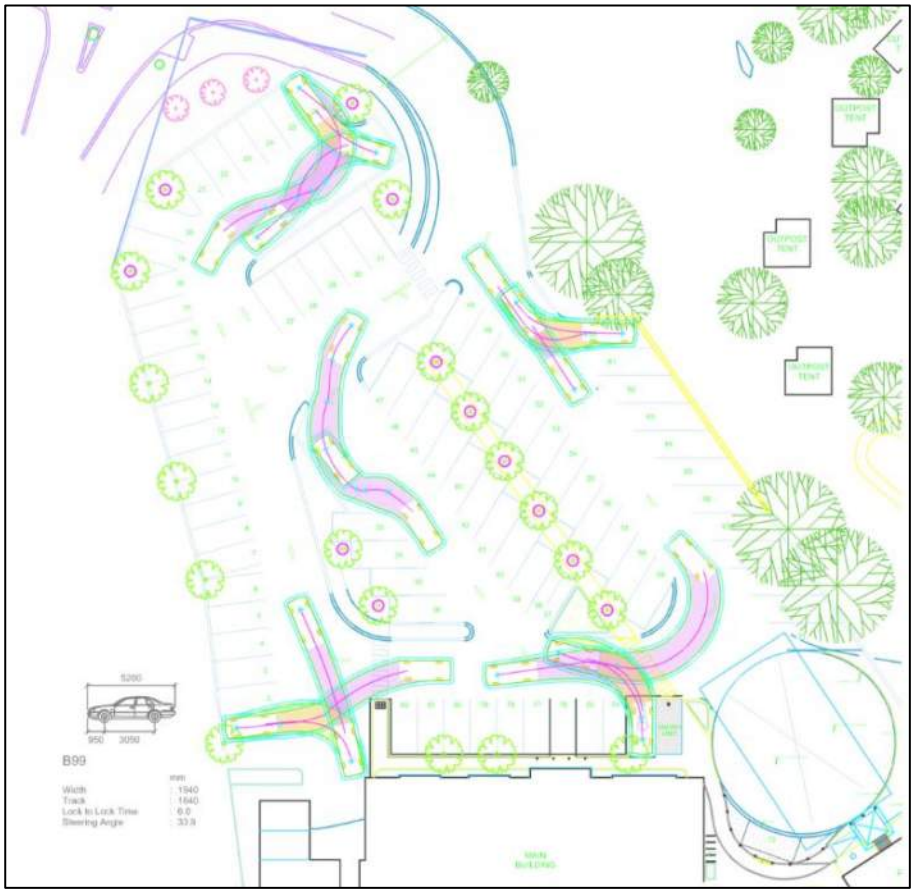


5.3.2 B85 & B99 Swept paths

A swept path analysis was undertaken for B85/B99 passenger vehicles and the analysis demonstrates that these design vehicles are able to adequately circulate, enter and exit the proposed parking bays without any encroachments as illustrated in **Figure 5.7** and **Figure 5.8**.

Figure 5.7 Swept path analysis B99 vehicle

Figure 5.8 Swept path analysis B99 vehicle

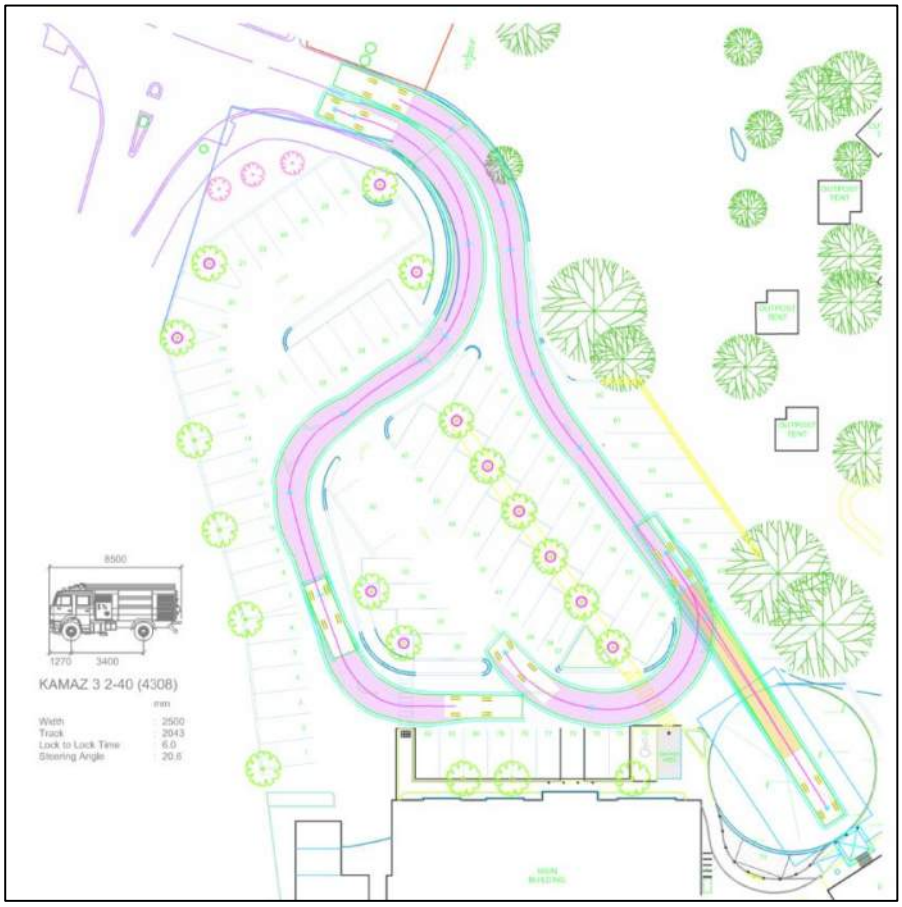


5.3.3 Fire Truck

As the site is mainly surrounded by Parks and recreation areas, an additional swept path analysis was conducted for a 8.5m Fire Truck.

It is anticipated that an 8.5m fire truck it is able to adequately enter the site, manoeuvre and park in the designated Fire Services area, reverse and exit in forward gear as illustrated in **Figure 5.9**.

Figure 5.9 Swept path analysis Fire Truck



5.4 Car Parking Requirements

Stantec has been advised by the City of Wanneroo that the car parking requirements for the proposed development are included within the *City of Wanneroo District Planning Scheme No.2 a*nd that the parking requirements for the glamping component should correspond to the 'Holiday accommodation' land use.

Table 5-1 summarises the car parking requirements for each individual land use. The maximum number of patrons that each area can accommodate determines the parking bay requirements per area.

Table 5-1 Parking requirements

Land Use	Number of on-site car parking spaces required	Proposed development	Required Parking Bays	Bays Provided
Holiday Accommodation	2 plus 1 per 2 guests	Up to 95 patrons	50	80 car parking bays including 1 ACROD bay
Cafe	1 per 4 people accommodated or 1 per 5m^2 seating area	Up to140 patrons	35*	
Function Facility	1 per 4 people accommodated	Up to 140 guests,	35	
Special Events	1 per 4 people accommodated	Up to 200	50	
Total			170 bays	80 bays

**Calculated based on the maximum capacity of the Café.*

Based on the statutory parking requirements, 170 bays are required for the site resulting in a shortfall of 90 bays. Note that these parking rates are based on requirements of each land uses in isolation and does not take into consideration the reciprocity of parking that occurs between these land uses.

As mentioned in the **Section 5.1**, the proposed land uses are expected to operate at different times throughout the day which means the parking demand profiles for each of the proposed land uses will also vary and not necessarily peak at the same time. Based on the anticipated site operation, an estimated parking demand has been calculated.

The **Reciprocity factor** considers the reciprocal use of the communal facilities by those people already parked on site. In this case, some reciprocity will occur between accommodations guests, café/functions, and special events.

Holiday Accommodation

Parking for the glamping area is expected to be in accordance with the requirements under the *City of Wanneroo District Planning Scheme No.2*.

The requirements consist of 2 parking bays plus 1 bay per 2 guests. Under a conservative analysis, a 100% occupancy has been estimated for the site. With a capacity up to 95 guests, the total parking bay requirements is 50 bays. In reality, the demand for holiday accommodation is generally seasonal related. For example, winter and summer periods will likely have lower occupation rates than spring and autumn as the extreme heat and cold during summers and winters are not ideal for glamping.

Café

The Café will operate during the AM periods only. This tenancy requires 1 parking bay per 4 people or 1 bay per 5m^2 seating area to be accommodated on site. Due to the café having a maximum capacity for up to 140 people, the parking requirements were calculated based on this, instead of the seating area which translates to 35 parking bays.

Within the surrounding area, The Portofinos Beach Bar Kitchen located on the adjacent lot and opening at 9:00am is the only place providing morning service. At this location, it is anticipated that at least 50% of the café customers are likely to be associated with the accommodation guests and people walking along the beach path; reducing the need for additional parking.

Function Facility

The Functions area shares space with the café and operates during the PM periods only. It requires 1 parking bay per 4 people to be accommodated on site. With a maximum capacity up to 140 people, the parking requirement corresponds to 35 bays.

It is anticipated that at least 30% of the function guests are likely to be associated with the accommodation guests. This has been assumed based on the location of the site, its location within the metro area and accessibility to public transport.

Special Events

When special events occur, it is anticipated that the main building will be dedicated exclusively for this event. With a maximum capacity of up to 200 guests, the requirement is 1 bay per 4 people which translates to 50 bays.

Similar to the Functions area, it is anticipated that at least 30% of the Special Events guests are likely to be associated with the accommodation. This has been assumed based on the location of the site, its location within the metro area and accessibility to public transport.

Note that the maximum capacity of the site at any one time would be up to 240 people, which includes accommodation guests.

Table 5-2 shows the estimated parking demand taking into account the abovementioned analysis. The following three (3) scenarios were assessed:

- Scenario 1: includes accommodation guests and Café operation. AM periods
- Scenario 2: includes accommodation guests and Functions area operation. PM periods
- Scenario 3: includes accommodation guests and Special Events.

Table 5-2 Estimated parking demand

Land Use	Required Parking Bays as per DPS No.2	Estimated parking demand	Scenario 1	Scenario 2	Scenario 3	Bays provided
Holiday Accommodation	50	50	50	50	50	80
Cafe	35	18 At least 50% guests from accommodation	18	-	-	
Functions	35	25 At least 30% guests from accommodation	-	25		
Special Events	50	35 At least 30% guests from accommodation	-		35	
Estimated parking bay demand			**68**	**75**	**85**	**80**

Based on the above analysis, it is concluded that the maximum number of parking spaces required by the site is estimated to be 85 bays, which occurs when special events take place and the holiday accommodation is fully occupied. This would result in a shortfall of 5 parking bays.

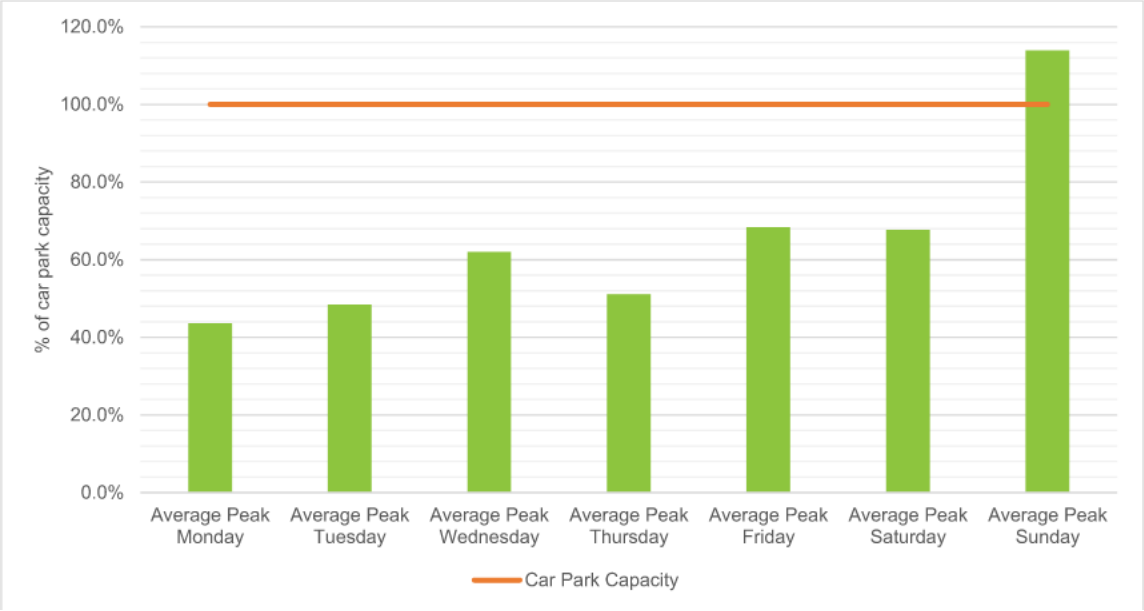
Based on the client's advice, when Special Events take place on the subject site, the City Council has noted that the northern section of the existing car park, shown in **Figure 5.10**, can be used as an overflow car park.

Figure 5.10 Overflow carparking area

Source: MetroMap 2023

Furthermore, the Parking Study conducted in 2022-2023 revealed that there is sufficient parking to accommodate all demand between Monday and Saturday; with over 30% capacity available. The parking demand on Sundays generally exceeds 90% capacity between 8:45am and 11:15am, with demand exceeding 100% capacity between 9:15am and 11:00am. **Figure 5.11** illustrates the relative car parking occupancy presented in the Parking Study.

Figure 5.11 Relative car park occupancy December 2022-January 2023



Source: Quinns Mindarie Coastal Node Parking Study 2022-2023

Based on the above, it is estimated that the proposed capacity of the site's car park is sufficient to accommodate the estimated demand in all cases except when special events are taking place.

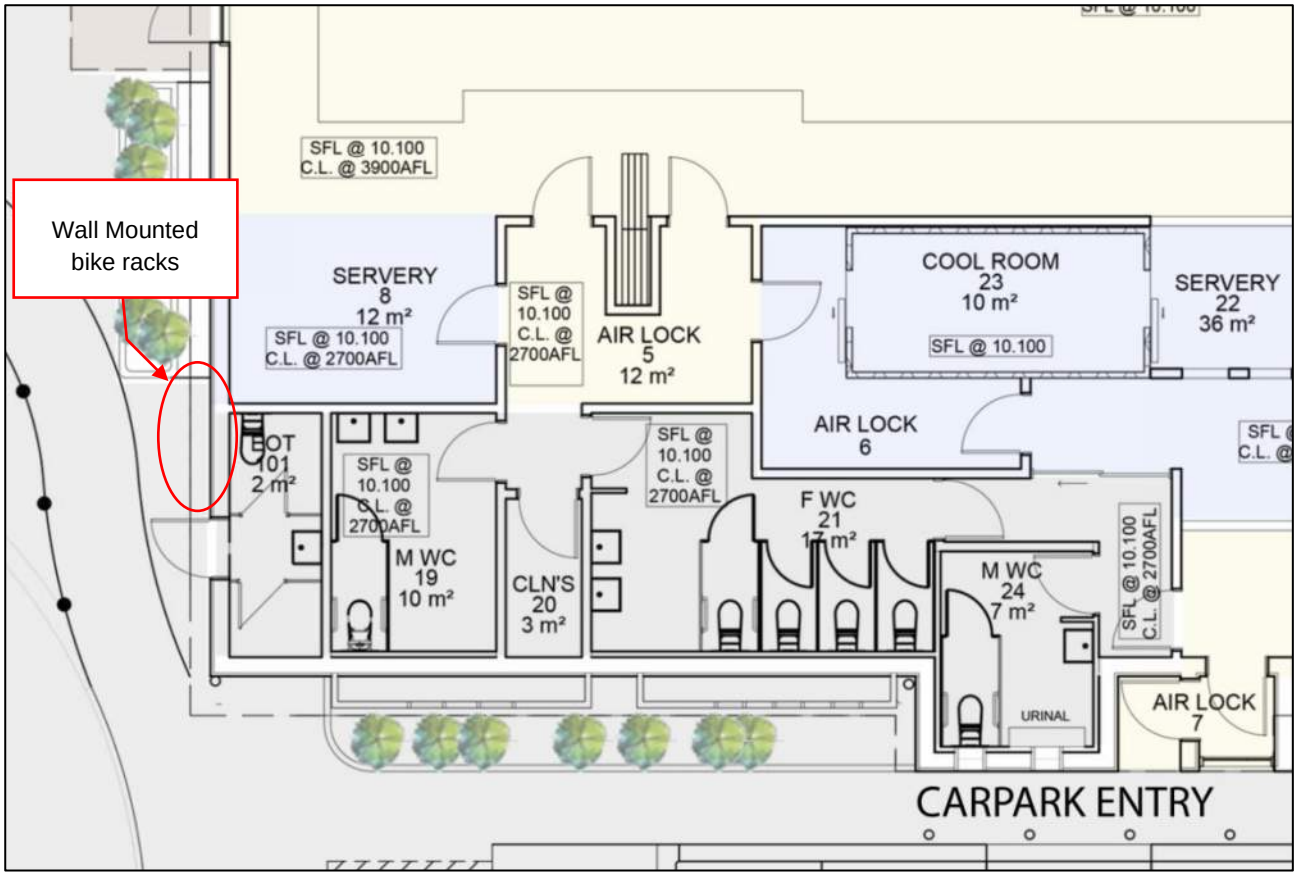
5.5 ACROD bays

For class 3 buildings that includes hotels,1 ACROD bay is required for every 100 carparking spaces in accordance with the Building Codes of Australia requirements.

5.6 Bicycle Requirements

The *City of Wanneroo District Planning Scheme No.2*. does not require bicycle parking for the proposed development. The requirements are generally considered for commercial developments and employment centres. Therefore, it is anticipated that bicycle provision is not deemed necessary. However, the development proposes to provide wall mounted bike racks with capacity to accommodate up to 16 bicycles and End of Trip Facilities as shown in **Figure 5.12**

Figure 5.12 Bike racks location



Source: Hospitality Total Services 07/03/2024

5.7 Parking Compliance

The parking compliance assessment was undertaken in accordance with AS2890.1 and AS2890.6 User Class 2 requirements and the corresponding provisions in the proposed development are presented in **Table 5-3**.

The proposed development is categorised as a Category 2 access facility.

Table 5-3 Parking Compliance

Parameter	Subcategory	Minimum Requirement	Provided	Remarks
Regular bay Width, m	Class 2 (90°&60°)	2.5	2.5 ,- 3.3	No Non-conformances identified
Regular bay Length, m	Class 2 (90°&60°)	5.4	5.4 -5.8	No Non-conformances identified
Regular bay Width, m	Class 2 (Parallel Bay)	2.1	3.2	No Non-conformances identified
Regular bay Length, m	Class 2 (Parallel Bay)	6.2	7.2	No Non-conformances identified
ACROD bay width, m		2.4	2.6	No Non-conformances identified
ACROD bay length, m		5.4	5.6	No Non-conformances identified
Shared area width, m		2.4	2.6	No Non-conformances identified
Shared area length, m		5.4	5.4	No Non-conformances identified
Aisle width, m	Class 2 (90°&60°) One-Way	5.8 for 90° & 4.6 for 60°	5.4- 6.6	No Non-conformances identified
Access width, m	Entry/Exit	3 to 5.5	9.7	No Non-conformances identified
Blind aisle extension, m		1	2.95	No Non-conformances identified

Sources: AS2890.1 (2004), AS2890.6 (2009)

6. Changes to Surrounding Network

6.1 Future Road Network Changes

Stantec contacted the City of Wanneroo with regard to planned changes to the road network including changes in pedestrian/cycling infrastructure and land uses in the vicinity of the area and was advised that:

- The City is in the process of considering Local Area Traffic Management scheme with the introduction of median islands in Quinns Road at the intersections of Seaham Way; Simpson Street; Bennett Road; Smales Road; Mindarie Drive and Elliston Parade.
- The Traffic Management Scheme for Quinns Road will be designed to be incorporated with drainage upgrade improvements and planned to be a staged approach for the construction phase.

6.2 Future Public Transport Facilities

Stantec contacted the Public Transport Authority and were advised that there are no current plans that would significantly change the bus route network or service frequency in the area.

6.3 Future Pedestrian / Cycling Network

Stantec contacted the City of Wanneroo and were advised that there are no planned changes to the pedestrian/cycling network.

The proposed development proposes to provide pedestrian pathways and cross walks to enable pedestrian movements from the overflow carparking area as shown in **Figure 6.1**.

Figure 6.1 Internal pedestrian circulation area

Source: Hospitality Total Services 07/03/2024

7. Integration with Surrounding Area

7.1 Surrounding Attractors / Generators

The site is intended to attract local residents and visitors to the City of Wanneroo.

7.2 Proposed Changes to Surrounding Land Uses

Stantec contacted the City of Wanneroo and were advised that there are no proposed changes to the surrounding land uses.

8. Analysis of Transport Network

8.1 Assessment Years and Time Period

Three assessment years as indicated below were analysed:

- Existing Condition – 2023 traffic data
- Year 2025: Assumed opening year of the development:
- Year 2035: 10-year horizon after the completion of the development.

The traffic assessment was conducted for the AM, PM, and weekend peak hour period.

8.1.1 Analysis Overview

To identify the impact of the proposed development on the surrounding road network, the intersection performance of the Quinns Road / McPharlin Avenue / Site access roundabout has been analysed using SIDRA analysis software:

8.2 Analysis assumptions

- Due to the lack of traffic counts at the intersection, the through volumes for the AM peak along Quinns Road was adopted from the Traffic counts conducted at Quinns Road East of Elliston Parade Site 8226.
- PM and Weekend volumes were calculated based on the volume rates for these peak periods recorded at the Main Roads WA traffic map site No.7056 located on Quinns Road west of Marmion Avenue. PM peak hour volumes are 4% higher than the AM peak hour, and the weekend peak hour is 22% lower than the AM peak hour flows.
- Traffic volumes from McPharlin Avenue were calculated based on the average number of dwellings that are served by the intersection.
- Traffic volumes from the existing site (two restaurants, Community Centre and Surf Club) were calculated based on the area of each establishment.
- Traffic distribution was estimated based on the location of the site and the potential origin and destination of the trips.
- A conservative annual growth of 1% was estimated for future 2025 and 2035 scenarios based on the surrounding land uses and the fact that the surrounding areas are very well developed.
- Two scenarios were considered. The one scenario included the regular operation of the site i.e., being the operation of the accommodation and café/functions area, and the other when special events take place. The special events scenario resulted in a slightly higher estimated traffic flow and hence these volumes were modelled using the SIDRA analysis software.

8.3 Traffic Generation Estimation

Trip generation has been calculated utilising trip generation rates from the *Institute of Transportation Engineers (ITE) "Trip Generation" 10th Ed, the WAPC* and first principles.

Table 8-1 provides the trip generation rates during the peak hour period, **Table 8-2** outlines the directional distribution acquired from ITE and **Table 8-3** indicates the estimated total trips to be generated by the proposed development. Note that where no weekend distribution percentages is available the directional distribution was assumed 50% in, 50% out.

Table 8-1: Trip Generation Rate – Peak hour Generator

Use	Code/Source	Yield/Unit
Campground/Recreational vehicle park	ITE/416	40 Campsites
Café (Am only)	WAPC	3,067m^2
Function (Pm only)	First principles	140 patrons
Special Events	First principles	200 patrons

Table 8-2: Directional Distribution

Use	Weekday AM Peak		Weekday PM Peak		Weekend Peak	
	In	Out	In	Out	In	Out
Campground/Recreational vehicle park	36%	64%	62%	38%	50%	50%
Café (Am only)	50%	50%	0%	0%	50%	50%
Function (Pm only)	0%	0%	100%	0%	50%	50%
Special Events	50%	50%	50%	50%	50%	50%

Table 8-3: Estimated Total Trips to be generated during the Peak hour periods

Use	Weekday AM Peak		Weekday PM Peak		Weekend Peak	
	In	Out	In	Out	In	Out
Campground/Recreational vehicle park	4	6	10	6	0	0
Café (Am only)	15	15	0	0	16	16
Function (Pm only)	0	0	42	0	21	21
Special Events	30	30	30	30	30	30

The results of the traffic volumes for the regular operation of the site and the operation under special events condition is shown in **Table 8-4**.

Table 8-4: Total Trip Generation Rate under regular operations and special events

Use	Weekday AM Peak		Weekday PM Peak		Weekend Peak	
	In	Out	In	Out	In	Out
Regular Operations	19	22	52	6	37	37
Special Events	34	36	40	36	30	30

8.4 Background and Total Traffic Flows

The estimated traffic volumes for the existing year 2023, the opening year 2025 and the 10-year future scenario 2035 are presented below as follows:

- **Year 2023:** The existing traffic volumes for weekday AM and PM peak hours are shown in **Figure 8.1**, while **Figure 8.2** shows the peak hour traffic volumes for weekends.
- **Year 2025:** The traffic volumes for weekday AM and PM peak hours for the opening year 2025 are shown in **Figure 8.3**, while **Figure 8.4** shows the peak hour traffic volumes for weekends.
- **Year 2035:** The existing traffic volumes for weekday AM and PM peak hours are shown in **Figure 8.5**, while **Figure 8.6** shows the peak traffic volumes for weekends.

Figure 8.1 Existing Traffic volumes for Weekday AM and PM Peak periods - background traffic 2023

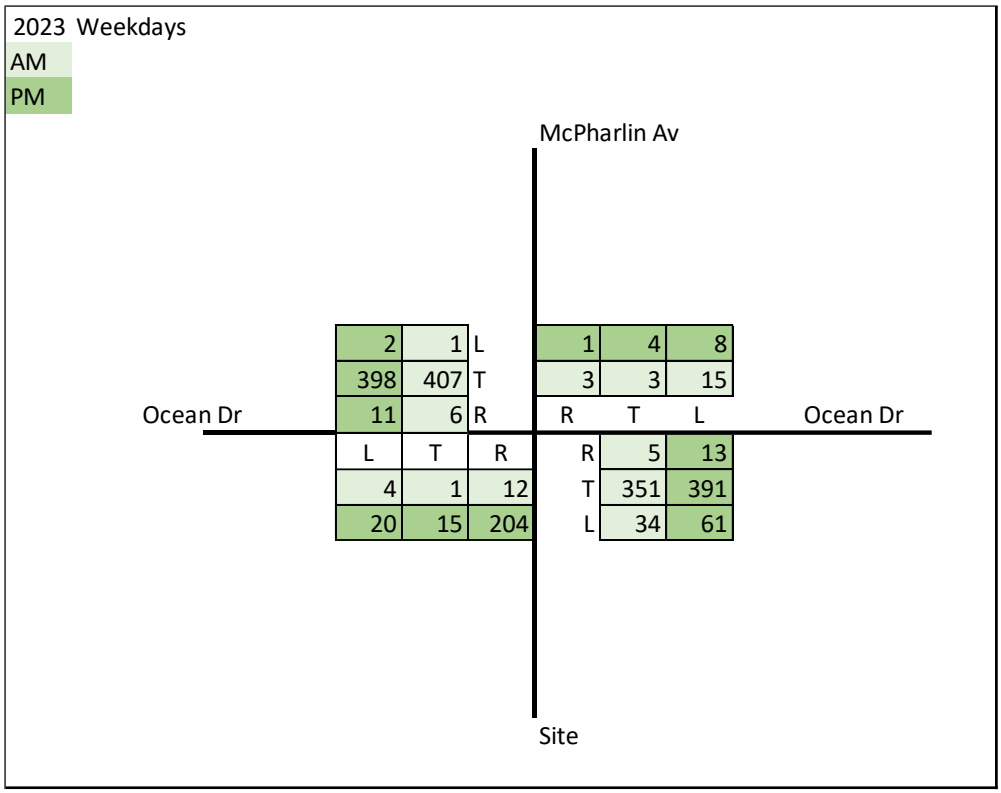


Figure 8.2 Existing Traffic volumes for Weekends AM and PM Peak periods - background traffic 2023

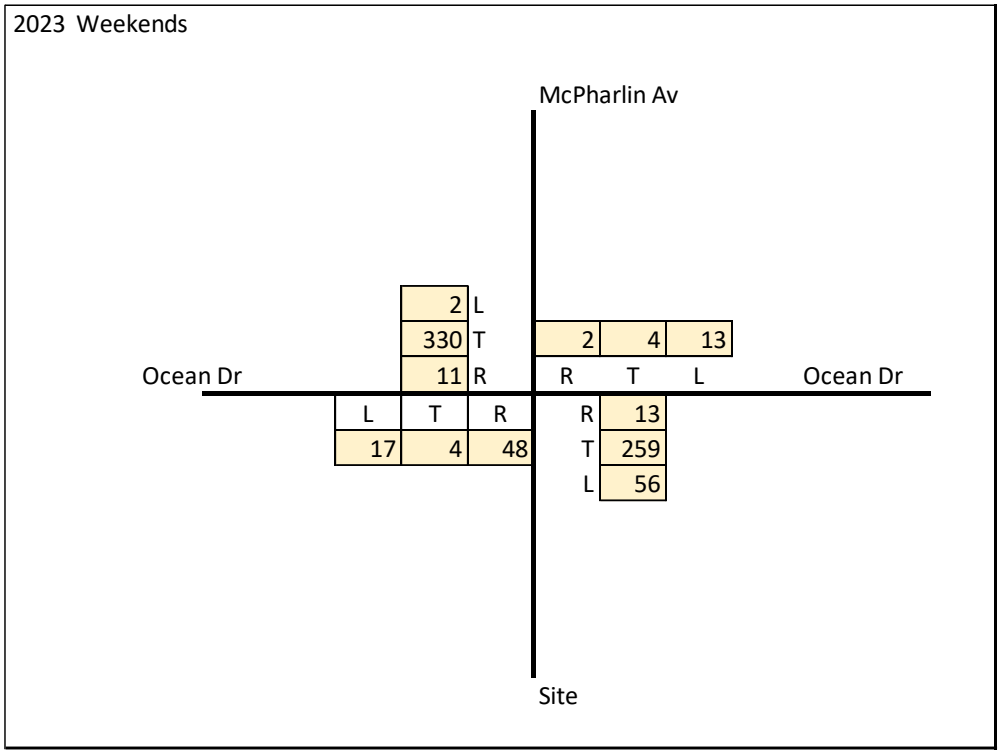


Figure 8.3 Traffic volumes for Weekday AM and PM Peak periods - Opening year 2025

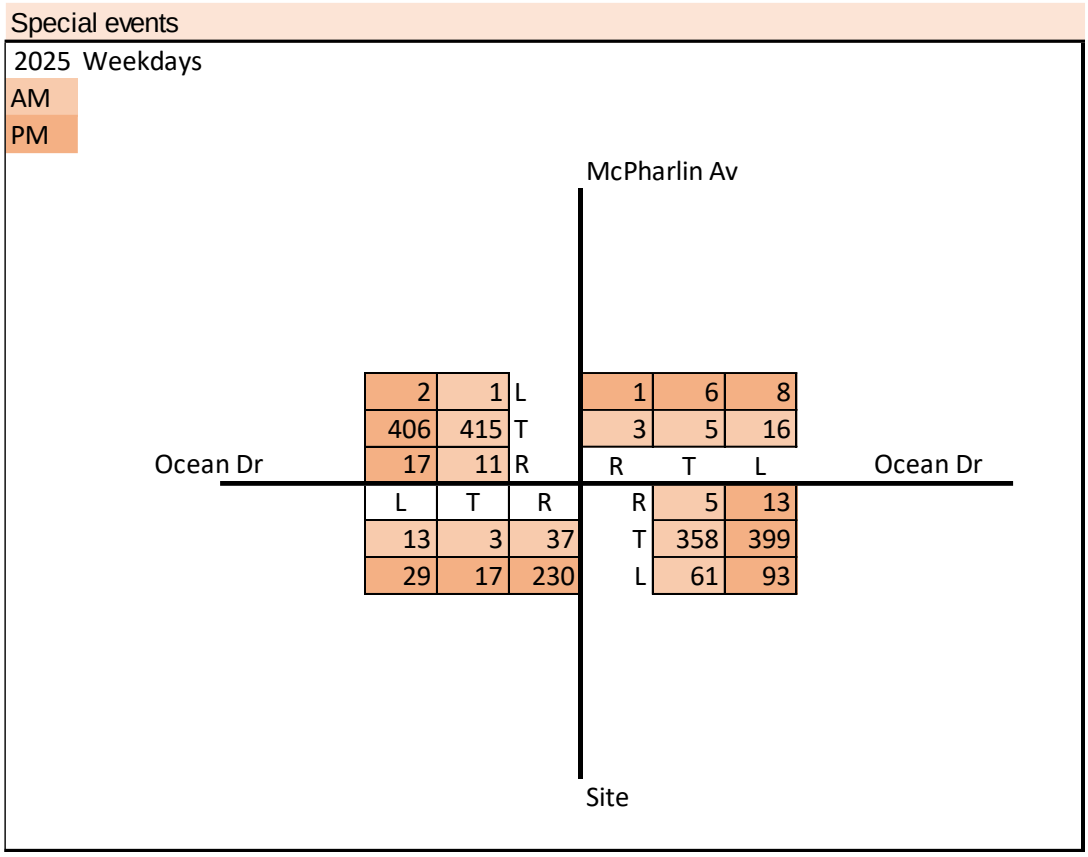


Figure 8.4 Traffic volumes for Weekends AM and PM Peak periods - Opening year 2025

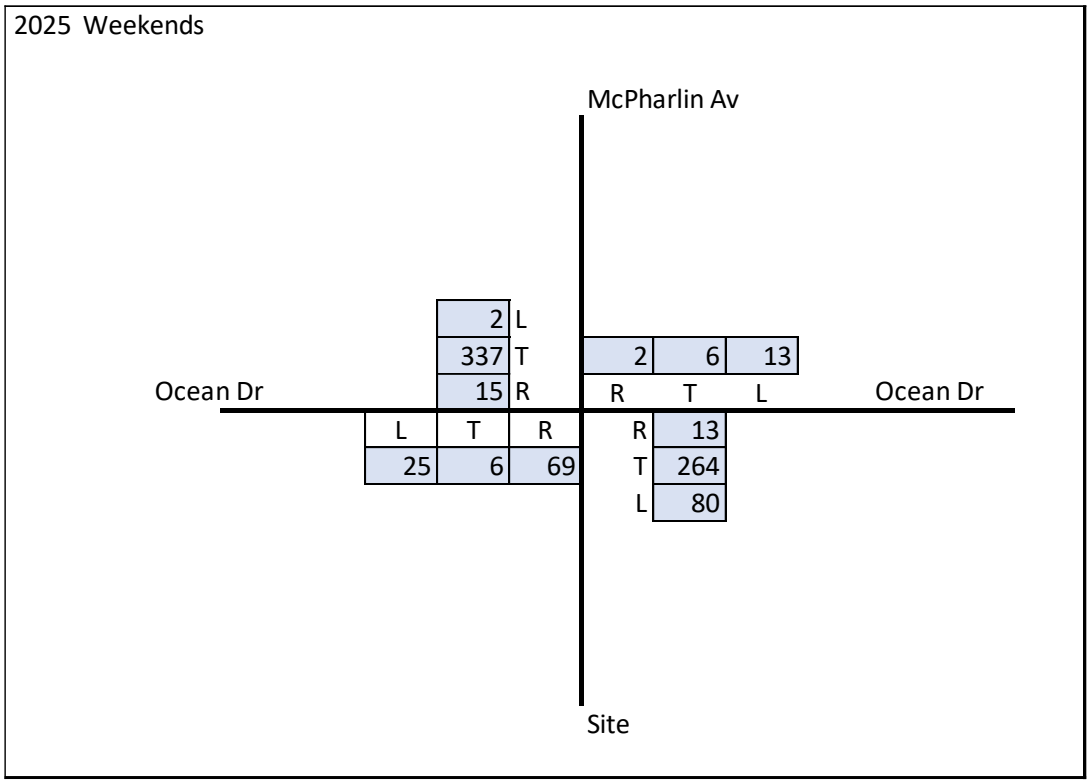


Figure 8.5 Traffic volumes for Weekday AM and PM Peak periods - 10-year scenario 2035

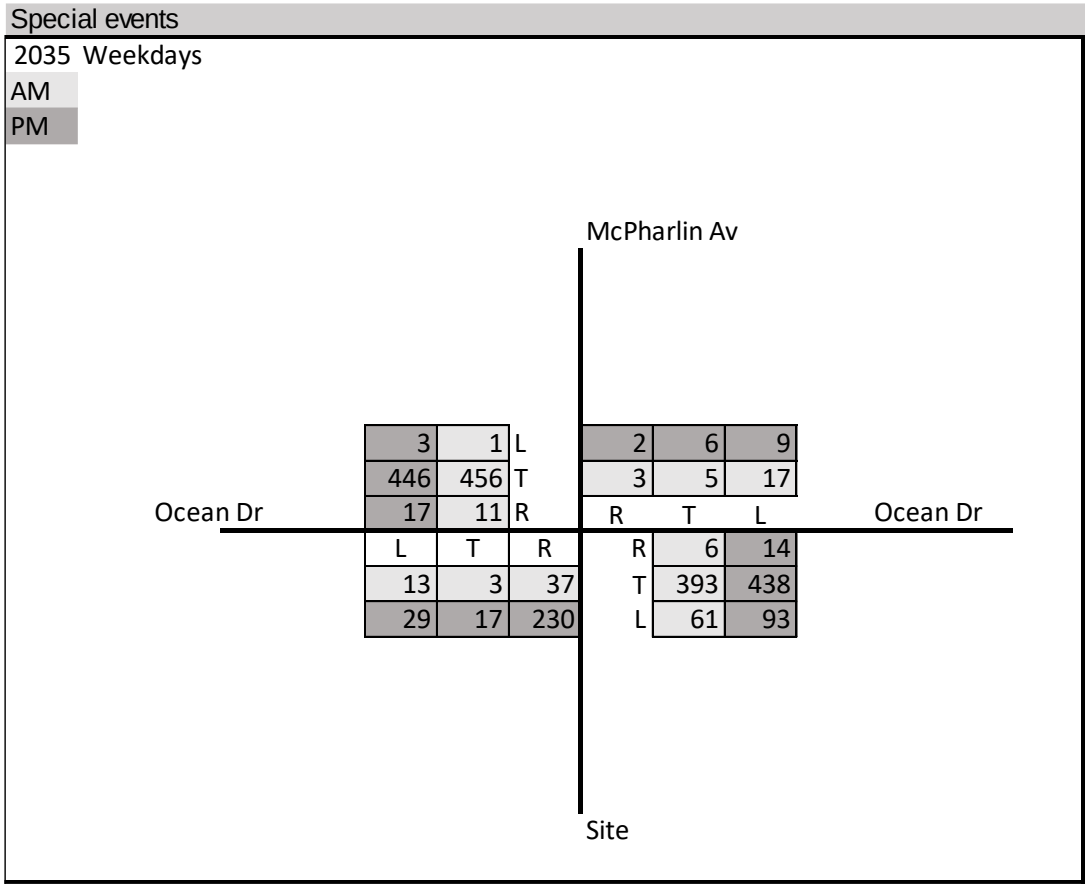
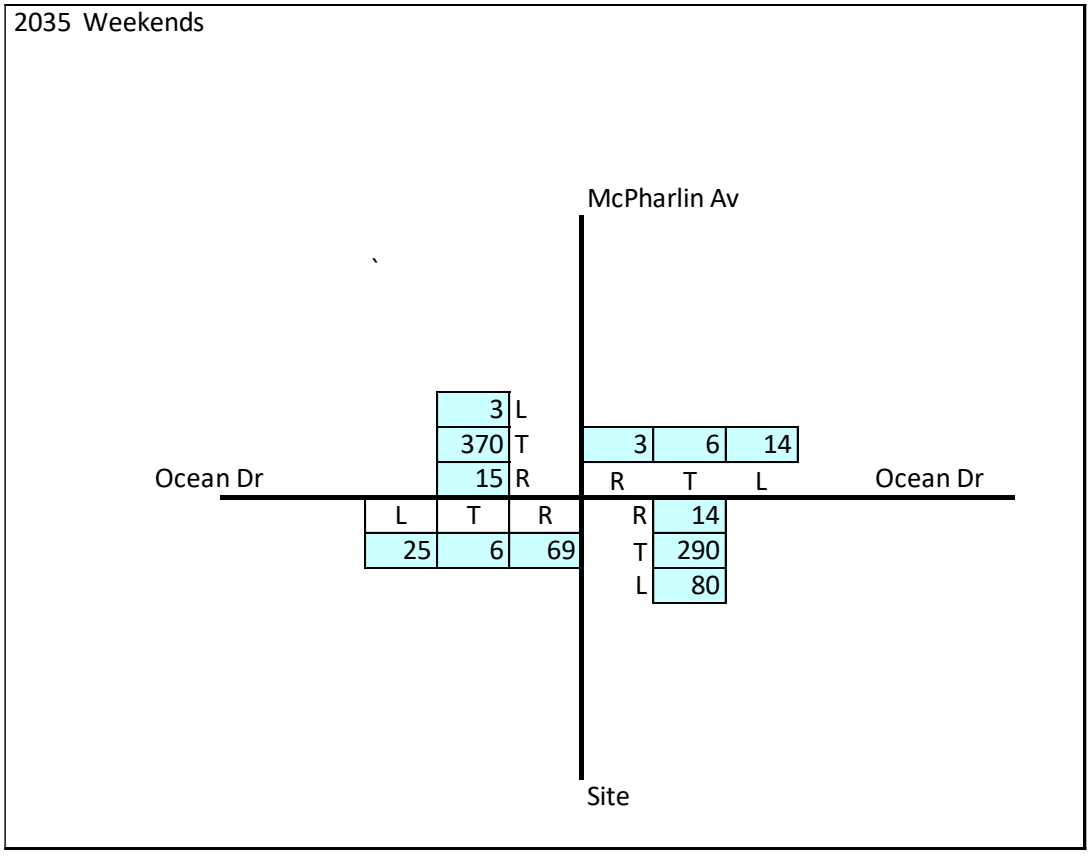


Figure 8.6 Traffic volumes for Weekends AM and PM Peak periods - 10-year scenario 2035



8.5 Intersection Performance Analysis

An assessment was conducted for the Quinns Road / McPharlin Avenue / Site access roundabout for the AM, PM and Weekend peak hour periods.

The identified intersection has been analysed using the SIDRA analysis program. This program calculates the performance of intersections based on input parameters, including geometry and traffic volumes. SIDRA outputs for each approach are presented in the form of Degree of Saturation (DOS), Average Delay, Level of Service (LOS) and 95th Percentile Queue. These characteristics 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 Degree of Saturation ranges from close to zero for varied traffic flow up to one for saturated flow or capacity. The theoretical intersection capacity is exceeded for an un-signalised intersection where DOS > 0.80;
- **95% Queue** is the statistical estimate of the queue length 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 un-signalised intersection can be considered to be operated at capacity where the average delay exceeds 40 seconds for any movement; and
- **Level of Service (LOS)** is a 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 8-5**.

Table 8-5: Level of Service (LoS) Performance Criteria

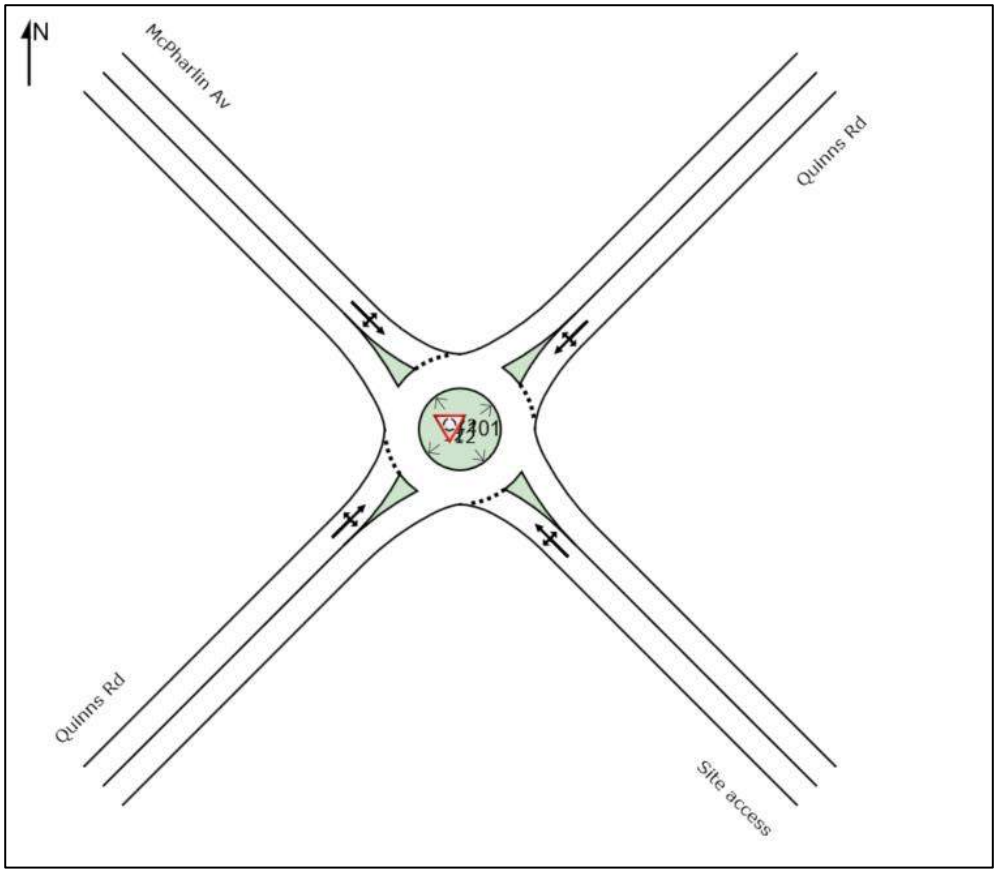
LOS	Description	Signalised Intersection	Unsignalised Intersection
A	Free-flow operations (best condition)	≤10 sec	≤10 sec
B	Reasonable free-flow operations	10-20 sec	10-15 sec
C	At or near free-flow operations	20-35 sec	15-25 sec
D	Decreasing free-flow levels	35-55 sec	5-35 sec
E	Operations at capacity	55-80 sec	35-50 sec
F	A breakdown in vehicular flow (worst condition)	≥80 sec	≥50 sec

A LOS exceeding these values indicates that the road section is exceeding its practical capacity. Above these values, users of the intersection are likely to experience unsatisfactory queueing and delays during the peak hour periods.

8.5.1 Assessment Results

Figure 8.7 shows the SIDRA layout for the Quinns Road / McPharlin Avenue / Site access roundabout.

Figure 8.7 SIDRA layout – Quinns Road / McPharlin Avenue / Site access roundabout



Assessment Results Background traffic 2023

Figure 8.8 summarises the SIDRA results for the AM, PM and weekend peak for the background traffic -existing 2023. The intersection is expected to operate at LOS A for all approaches for all peak hour periods except for the right turn from McPharlin Avenue during the PM peak which is anticipated to operate at LOS B.

Figure 8.8 Quinns Road / McPharlin Avenue / Site access roundabout- Background traffic 2023 AM. PM, and Weekend peaks

Intersection Approach	Turn	AM Peak				PM Peak				Weekend Peak			
		DOS	Delay (Sec)	LoS	95% back of queue (m)	DOS	Delay (Sec)	LoS	95% back of queue (m)	DOS	Delay (Sec)	LoS	95% back of queue (m)
Southeast: Site access	L	0.018	3.5	LOS A	0.2	0.267	4.4	LOS A	4.3	0.069	3.2	LOS A	1.0
	T	0.018	3.9	LOS A	0.2	0.267	4.7	LOS A	4.3	0.069	3.5	LOS A	1.0
	R	0.018	6.9	LOS A	0.2	0.267	7.8	LOS A	4.3	0.069	6.5	LOS A	1.0
Northeast: Quinns Rd	L	0.260	3.1	LOS A	4.7	0.313	3.2	LOS A	6.2	0.225	3.2	LOS A	3.8
	T	0.260	3.2	LOS A	4.7	0.313	3.2	LOS A	6.2	0.225	3.2	LOS A	3.8
	R	0.260	6.8	LOS A	4.7	0.313	6.8	LOS A	6.2	0.225	6.8	LOS A	3.8
Northwest: McPharlin Av	L	0.024	5.6	LOS A	0.3	0.018	6.9	LOS A	0.3	0.021	5.4	LOS A	0.3
	T	0.024	5.7	LOS A	0.3	0.018	7.0	LOS A	0.3	0.021	5.4	LOS A	0.3
	R	0.024	9.2	LOS A	0.3	0.018	10.5	LOS B	0.3	0.021	9.0	LOS A	0.3
Southwest: Quinns Rd	L	0.283	3.5	LOS A	5.3	0.406	5.1	LOS A	8.3	0.268	3.8	LOS A	4.9
	T	0.283	3.5	LOS A	5.3	0.406	5.2	LOS A	8.3	0.268	3.8	LOS A	4.9
	R	0.283	7.1	LOS A	5.3	0.406	8.7	LOS A	8.3	0.268	7.4	LOS A	4.9
All Vehicles		**0.283**	**3.5**	**LOS A**	**5.3**	**0.406**	**4.9**	**LOS A**	**8.3**	**0.268**	**3.9**	**LOS A**	**4.9**

Assessment Results opening year 2025

Figure 8.9 summarises the SIDRA results for the AM, PM and weekend peak hour periods for the 2025 opening year. The intersection is expected to continue operating at LOS A for all approaches and all peak hour periods except for the right turn from McPharlin Avenue during the PM peak hour which is expected to operate at LOS B.

Figure 8.9 Quinns Road / McPharlin Avenue / Site access roundabout- Opening year 2025 AM, PM, and Weekend peaks – Special events

Intersection Approach	Turn	AM Peak				PM Peak				Weekend Peak			
		DOS	Delay (Sec)	LoS	95% back of queue (m)	DOS	Delay (Sec)	LoS	95% back of queue (m)	DOS	Delay (Sec)	LoS	95% back of queue (m)
Southeast: Site access	L	0.057	3.7	LOS A	0.8	0.312	4.6	LOS A	5.3	0.101	3.2	LOS A	1.4
	T	0.057	4.0	LOS A	0.8	0.312	4.9	LOS A	5.3	0.101	3.6	LOS A	1.4
	R	0.057	7.0	LOS A	0.8	0.312	8.0	LOS A	5.3	0.101	6.6	LOS A	1.4
Northeast: Quinns Rd	L	0.290	3.2	LOS A	5.3	0.349	3.2	LOS A	7.3	0.250	3.2	LOS A	4.3
	T	0.290	3.2	LOS A	5.3	0.349	3.3	LOS A	7.3	0.250	3.3	LOS A	4.3
	R	0.290	6.8	LOS A	5.3	0.349	6.9	LOS A	7.3	0.250	6.9	LOS A	4.3
Northwest: McPharlin Av	L	0.028	5.9	LOS A	0.4	0.022	7.3	LOS A	0.3	0.024	5.6	LOS A	0.3
	T	0.028	5.9	LOS A	0.4	0.022	7.3	LOS A	0.3	0.024	5.6	LOS A	0.3
	R	0.028	9.5	LOS A	0.4	0.022	10.9	LOS B	0.3	0.024	9.2	LOS A	0.3
Southwest: Quinns Rd	L	0.316	3.6	LOS A	6.3	0.434	5.3	LOS A	9.1	0.287	3.9	LOS A	5.3
	T	0.316	3.7	LOS A	6.3	0.434	5.4	LOS A	9.1	0.287	4.0	LOS A	5.3
	R	0.316	7.3	LOS A	6.3	0.434	8.9	LOS A	9.1	0.287	7.5	LOS A	5.3
All Vehicles		**0.316**	**3.8**	**LOS A**	**6.3**	**0.434**	**5.1**	**LOS A**	**9.1**	**0.287**	**4.0**	**LOS A**	**5.3**

Assessment Results 10-year scenario 2035

Similar to the 2023 and 2025 assessments, it is expected that this intersection will continue operating at acceptable Levels of service for the future year 2035 design year.

Figure 8.10 Quinns Road / McPharlin Avenue / Site access roundabout- 10-year future scenario 2035 AM, PM, and Weekend peaks – Special events

Intersection Approach	Turn	AM Peak				PM Peak				Weekend Peak			
		DOS	Delay (Sec)	LoS	95% back of queue (m)	DOS	Delay (Sec)	LoS	95% back of queue (m)	DOS	Delay (Sec)	LoS	95% back of queue (m)
Southeast: Site access	L	0.059	3.9	LOS A	0.8	0.323	4.9	LOS A	5.5	0.103	3.4	LOS A	1.5
	T	0.059	4.2	LOS A	0.8	0.323	5.3	LOS A	5.5	0.103	3.7	LOS A	1.5
	R	0.059	7.3	LOS A	0.8	0.323	8.3	LOS A	5.5	0.103	6.8	LOS A	1.5
Northeast: Quinns Rd	L	0.313	3.2	LOS A	5.9	0.376	3.2	LOS A	8.1	0.268	3.2	LOS A	4.7
	T	0.313	3.3	LOS A	5.9	0.376	3.3	LOS A	8.1	0.268	3.3	LOS A	4.7
	R	0.313	6.8	LOS A	5.9	0.376	6.9	LOS A	8.1	0.268	6.9	LOS A	4.7
Northwest: McPharlin Av	L	0.030	6.2	LOS A	0.4	0.026	7.7	LOS A	0.4	0.027	5.8	LOS A	0.4
	T	0.030	6.2	LOS A	0.4	0.026	7.7	LOS A	0.4	0.027	5.9	LOS A	0.4
	R	0.030	9.8	LOS A	0.4	0.026	11.3	LOS B	0.4	0.027	9.4	LOS A	0.4
Southwest: Quinns Rd	L	0.345	3.7	LOS A	7.1	0.474	5.4	LOS A	10.4	0.314	3.9	LOS A	6.0
	T	0.345	3.7	LOS A	7.1	0.474	5.5	LOS A	10.4	0.314	4.0	LOS A	6.0
	R	0.345	7.3	LOS A	7.1	0.474	9.0	LOS A	10.4	0.314	7.5	LOS A	6.0
All Vehicles		**0.345**	**3.8**	**LOS A**	**7.1**	**0.474**	**5.2**	**LOS A**	**10.4**	**0.314**	**4.1**	**LOS A**	**6.0**

SIDRA Results Summary

A summary of the SIDRA results are as follows:

- The Quinns Road / McPharlin Avenue / Site access roundabout is expected to operate at an acceptable level of service for all scenarios.
- For the 2035 design year, all approaches are expected to operate at LOS A except for the right turn from McPharlin Avenue which is anticipated to operate ay LOS B.
- The worst degree of saturation is expected to occur during the PM peak hour for the 2035 design year.
- The longest average queue expected is 10.4m expected at the Quinns Road southern approach for the 10-year scenario 2035 during the PM peak hour.

9. Conclusions

This Traffic Impact Assessment outlines the transport aspects of the proposed Dunes Beach Resort located at 2 Quinns Road, Mindarie, under the jurisdiction of City of Wanneroo. It focuses on traffic operations, circulation, and car parking requirements.

- The site comprises:
  - 40 tents that can accommodate up to 95 guests.
  - Café that will operate during the AM period only with capacity up to 140 patrons.
  - Function area that will operate during the PM period only with capacity up to 140 guest.
  - And Special events that will operate ad hoc and will have a capacity up to 200 guests. Note that when a special event take place, the Café and Function area won't be open to the general public.
  - 80 car parking bays including 1 ACROD bay, and
  - 2 motorcycle bays.
- The site is located within the Quinns Mindarie Coastal Node and has been classified as a District Coastal Node.
- There were only two crashes registered on the surrounding road network within the last 5 years. Both crashes resulted in property damage, and it is very unlikely that the development will have a negative impact on the road safety of the area.
- The swept path analysis indicated that the expected vehicles to access the site are able to adequately enter the site, manoeuvre, park in the designated bay and exit the site in a forward direction.
- Based on the anticipated parking demand and taking into account reciprocity and site operational times, it is concluded that appropriate number of parking bays have provided to meet the parking demand of the proposed tenancies.
- The SIDRA assessment shows that the Quinns Road / McPharlin Avenue / Site access roundabout operate at an acceptable level of service for all scenarios

Overall, it is considered unlikely that the proposed development will cause any material impact to traffic operations and safety of the surrounding road network.

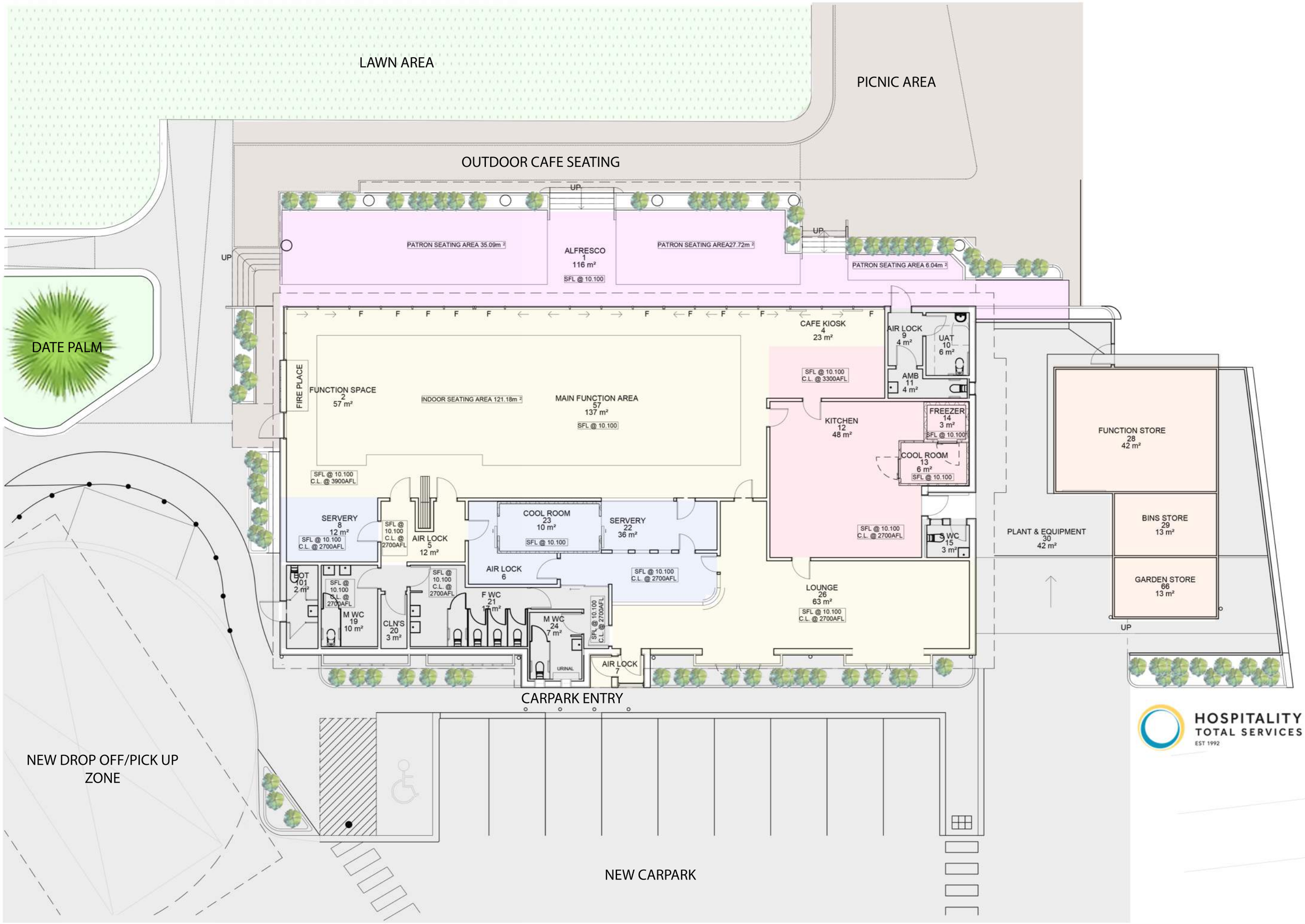
Appendix A. WAPC Checklist

Item	Provided	Comments/Proposals
Summary		
Introduction/Background		
name of applicant and consultant	Section 1	
development location and context	Section 2.1	
brief description of development proposal	Section 2	
key issues	Section 2	
Background information	Section 1.1	
Existing situation		
existing site uses (if any)	Section 2.2	
existing parking and demand (if appropriate)	Section 2.1	
existing access arrangements	Section 5.2	
existing site traffic	Section 2.6	
surrounding land uses	Section 2.2	
surrounding road network	Section 2.3	
traffic management on frontage roads	NA	
traffic flows on surrounding roads (usually am and pm peak hours)	Section 2.6	
traffic flows at major intersections (usually am and pm peak hours)	Section 2.6	
operation of surrounding intersections	Section 2.5	
existing pedestrian/cycle networks	Section 4	
existing public transport services surrounding the development	Section 3.1	
Crash data	Section 2.7	
Development proposal		
Regional context	NA	
proposed land uses	Section 5.1	
table of land uses and quantities	Section 5.1	
access arrangements	Section 5.2	
parking provision	Section 5.4	

end of trip facilities	NA	
any specific issues	NA	
road network	Section 2.3	
intersection layouts and controls	Section 2.5	
pedestrian/cycle networks and crossing facilities	Section 4	
public transport services	Section 3.1	
Integration with surrounding area	Section 7	
surrounding major attractors/generators	Section 7.1	
committed developments and transport proposals	N/A	
proposed changes to land uses within 1200 metres	7.2	
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 8.1	
time periods	Section 8.1.1	
development generated traffic	Section 8.3	
distribution of generated traffic	Section 8.1.1	
parking supply & demand	Section 5.7	
base and "with development" traffic flows	Section 8	
analysis of development accesses	Section 5.2	
impact on surrounding roads	Section 8.5.1	
impact on intersections	Section 8.5.1	
impact on neighbouring areas	NA	
traffic noise and vibration	N/A	
road safety	N/A	
public transport access	Section 6.2	
pedestrian access / amenity	Section 6.3	
cycle access / amenity	Section 6.3	
analysis of pedestrian / cycle networks	Section 4	
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 Overview

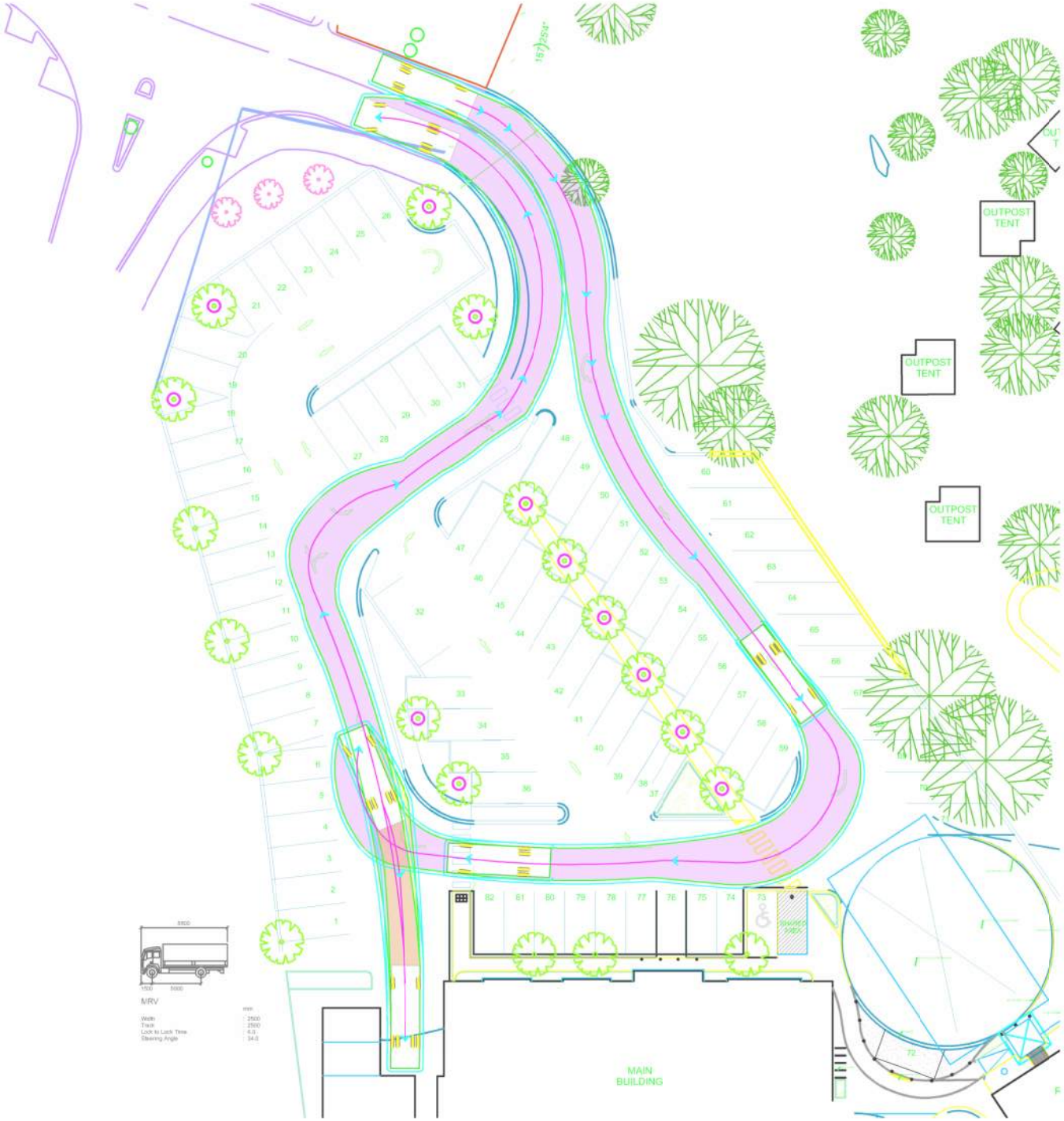

LAWN AREA
PICNIC AREA
OUTDOOR CAFE SEATING
DATE PALM
UP
PATRON SEATING AREA 35.09m ²
ALFRESCO
1
116 m²
SFL @ 10.100
PATRON SEATING AREA27.72m ²
PATRON SEATING AREA 6.04m ²
F
CAFE KIOSK
4
23 m²
AIR LOCK
9
4 m²
UAT
10
6 m²
AMB
11
4 m²
FIRE PLACE
FUNCTION SPACE
2
57 m²
INDOOR SEATING AREA 121.18m ²
MAIN FUNCTION AREA
57
137 m²
SFL @ 10.100
SFL @ 10.100
C.L. @ 3300AFL
KITCHEN
12
48 m²
FREEZER
14
3 m²
SFL @ 10.100
COOL ROOM
13
6 m²
SFL @ 10.100
FUNCTION STORE
28
42 m²
SFL @ 10.100
C.L. @ 3900AFL
SERVERY
8
12 m²
SFL @ 10.100
C.L. @ 2700AFL
SFL @
10.100
C.L. @
2700AFL
AIR LOCK
5
12 m²
COOL ROOM
23
10 m²
SFL @ 10.100
SERVERY
22
36 m²
AIR LOCK
6
SFL @ 10.100
C.L. @ 2700AFL
SFL @ 10.100
C.L. @ 2700AFL
WC
15
3 m²
PLANT & EQUIPMENT
30
42 m²
BINS STORE
29
13 m²
GARDEN STORE
66
13 m²
UP
LOUNGE
26
63 m²
SFL @ 10.100
C.L. @ 2700AFL
SOT
01
2 m²
SFL @
10.100
C.L. @
2700AFL
M WC
19
10 m²
CLN'S
20
3 m²
SFL @
10.100
C.L. @
2700AFL
F WC
21
7 m²
M WC
24
7 m²
URINAL
SFL @ 10.100
C.L. @ 2700AFL
AIR LOCK
7
CARPARK ENTRY
NEW DROP OFF/PICK UP
ZONE
NEW CARPARK
HOSPITALITY
TOTAL SERVICES
EST 1992

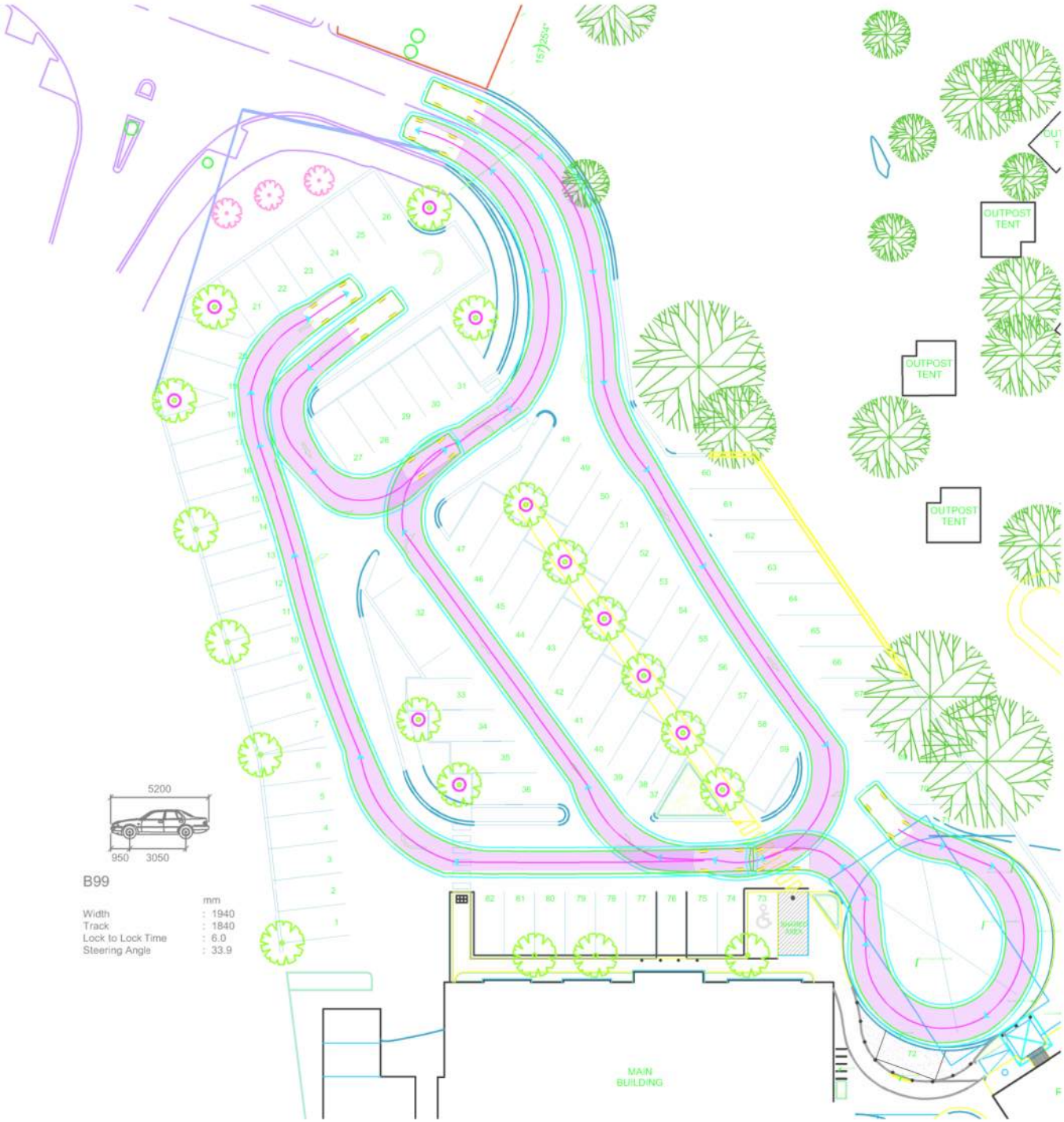
Appendix C. Traffic Counts Data

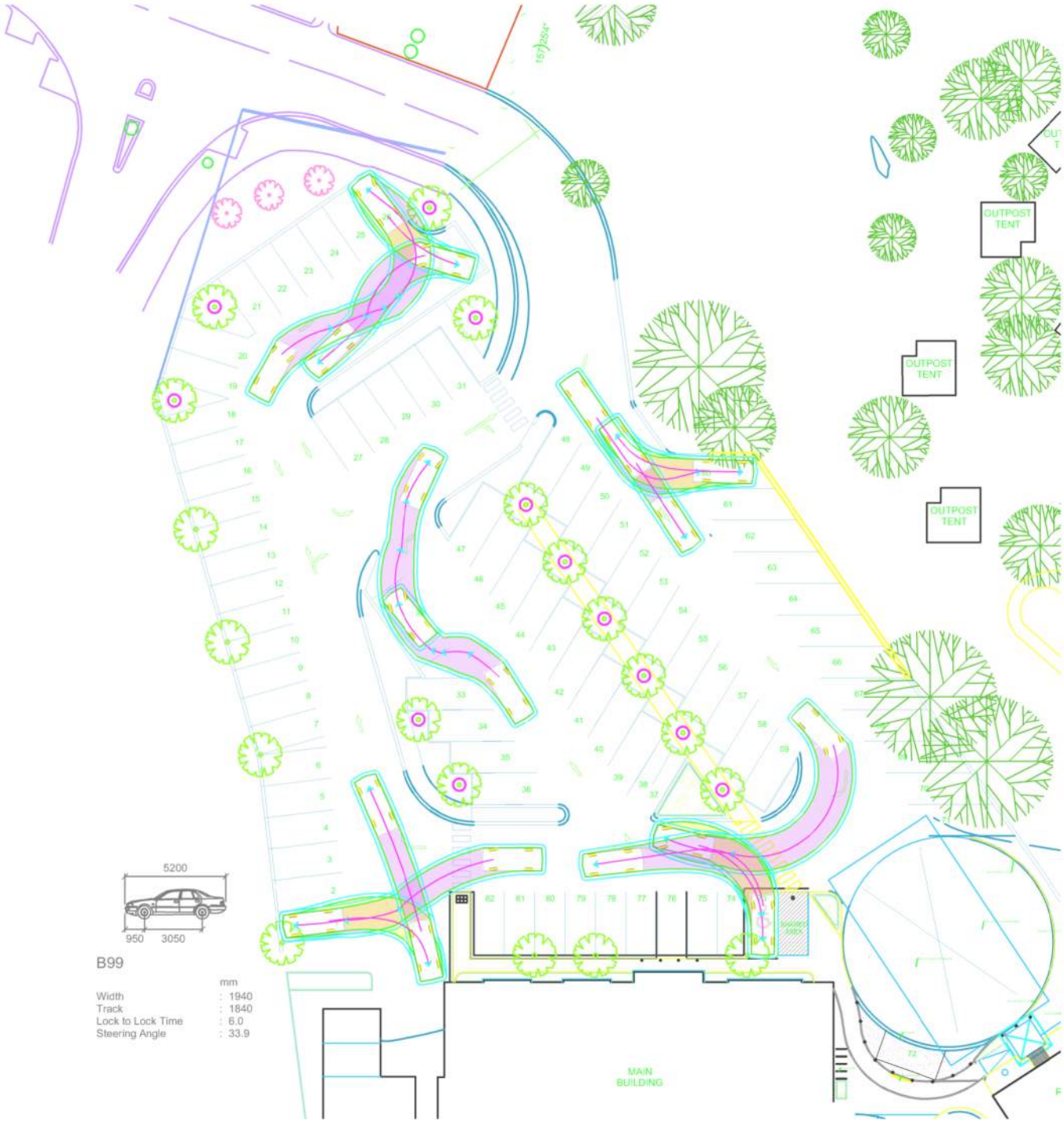
Record	Location ID.	Start Date	End Date	Last Edited Date	Road No.	Road Name	Description	Suburb	Direction Bound	Entered By/Comments	Peak Count (Both Dir.)	at Time
8226	T02772	19/05/2023	26/05/2023	29/05/2023	402	QUINNS ROAD	EAST OF ELLISTON PARADE	QUINNS ROCKS	BOTH	TY	747	0800
8161	T00680	01/02/2023	08/02/2023	09/02/2023	403	OCEAN DRIVE	NORTH OF CAMIRA WAY	QUINNS ROCKS	Both	TY	259	0900
8077	T03302	12/10/2022	19/10/2022		402	QUINNS ROAD	EAST OF BURT STREET	QUINNS ROCKS	Both	CONTRACTOR		
8076	T03301	12/10/2022	19/10/2022		402	QUINNS ROAD	WEST OF BENNETT ROAD	QUINNS ROCKS	Both	CONTRACTOR – HNO #49		
8073	T03300	12/10/2022	19/10/2022		403	OCEAN DRIVE	SOUTH OF TERRY ROAD	QUINNS ROCKS	Both	CONTRACTOR – HNO #94		
8072	T03299	12/10/2022	19/10/2022		403	OCEAN DRIVE	NORTH OF HALL ROAD	QUINNS ROCKS	Both	CONTRACTOR – HNO #74		
8071	T00477	12/10/2022	19/10/2022		403	OCEAN DRIVE	NORTH OF PEARCE STREET	QUINNS ROCKS	Both	CONTRACTOR – HNO #38		
8070	T00475	12/10/2022	19/10/2022		403	OCEAN DRIVE	NORTH OF QUINNS ROAD	QUINNS ROCKS	Both	CONTRACTOR – HNO #12		
8066	T03297	12/10/2022	19/10/2022		426	MCPHARLIN AVENUE	SOUTH OF PEARCE STREET	QUINNS ROCKS	Both	Contractor		
8051	T02772	28/07/2022	04/08/2022		402	QUINNS ROAD	EAST OF ELLISTON PARADE	QUINNS ROCKS	Both			
7997	T03150	12/07/2022	19/07/2022		402	QUINNS ROAD	SOUTH OF QUINNS ROAD	QUINNS ROCKS	Both	surfclub/ portofinos carpark		

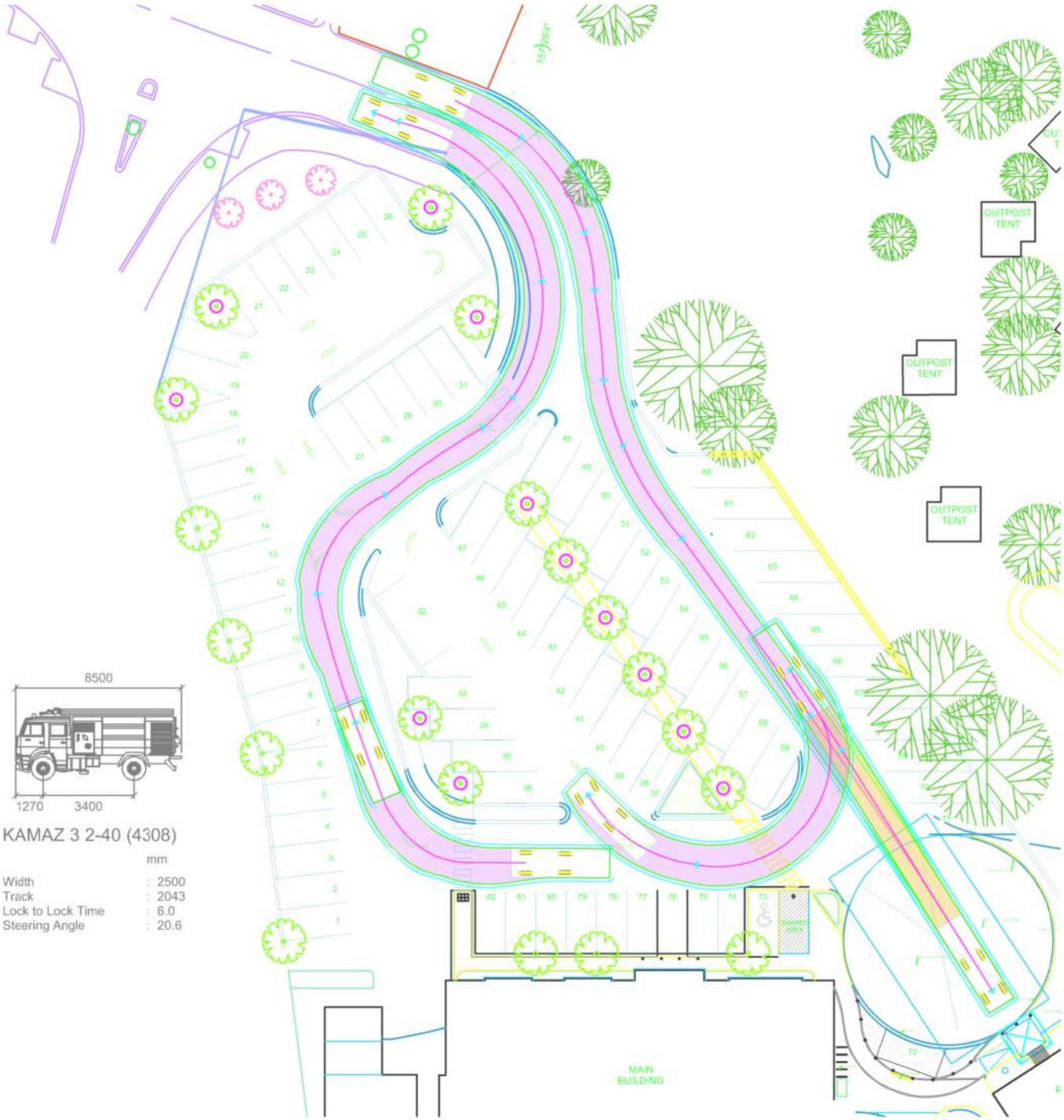
Record	Peak Count (N/E)	at Time (N/E)	Peak Count (S/W	at Time (S/W)	AVG Weekday Traffic (Both Dir.)	AVG Weekday Traffic (N/E)	AVG Weekday Traffic (S/W)	Percent Heavy Vehicles (Both Dir.)	Percentile 85th (Both Dir.)	Percentile 85th (S/W)	Mean Speed (Both Dir.)	Mean Speed (N/E)	Mean Speed (S/W)	X-Coord (Lat)	Y-Coord (long)
8226	407	800	351	800	6606	3512	3094	5.7	55.8		47.4			-31.674680	115.705492
8161	171	1500	124	900	2172	1230	941	3	45.7		39.9			-31.66271	115.690732
8077					4653	2138	2515	8	57.2		49.3			-31.676695	115.698147
8076					3318	1763	1555	6.9	60.8		52.9			-31.676353	115.701085
8073					2201	1233	967	7.7	44.6		38.4			-31.670585	115.6911
8072					2598			7.9	43.7		36.7			-31.672663	115.691315
8071					2023	1192	831	6.2	42.5		36.9			-31.675587	115.692592
8070					2061	1228	833	8.1	41.2		34.7			-31.677738	115.694517
8066					290	145	138	4.6	46.1		36.9			-31.675648	115.693933
8051					5903	3115	2788	8.3	57.6		48.6			-31.674808	115.705623
7997					976	482	494	5.1						-31.677676	115.696486

Appendix D. Swept Path


OUTPOST TENT
OUTPOST TENT
OUTPOST TENT
MAIN BUILDING
MRV


OUTPOST TENT
OUTPOST TENT
OUTPOST TENT
MAIN BUILDING
5200
950
3050
B99
mm
Width : 1940
Track : 1840
Lock to Lock Time : 6.0
Steering Angle : 33.9


OUTPOST TENT
OUTPOST TENT
OUTPOST TENT
MAIN BUILDING
5200
950
3050
B99
mm
Width : 1940
Track : 1840
Lock to Lock Time : 6.0
Steering Angle : 33.9



KAMAZ 3 2-40 (4308)

	mm
Width	: 2500
Track	: 2043
Lock to Lock Time	: 6.0
Steering Angle	: 20.6

Appendix E. SIDRA Results

MOVEMENT SUMMARY

Site: 101 [Quinns Rd / McPharlin Av / Site access AM 2023 (Site Folder: Base year 2023)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site access														
4	L2	4	0.0	4	0.0	0.018	3.5	LOS A	0.0	0.2	0.47	0.60	0.47	31.3
5	T1	1	0.0	1	0.0	0.018	3.9	LOS A	0.0	0.2	0.47	0.60	0.47	42.1
6	R2	12	0.0	13	0.0	0.018	6.9	LOS A	0.0	0.2	0.47	0.60	0.47	25.4
Approach		17	0.0	18	0.0	0.018	5.9	LOS A	0.0	0.2	0.47	0.60	0.47	28.6
NorthEast: Quinns Rd														
7	L2	34	0.0	36	0.0	0.260	3.1	LOS A	0.7	4.7	0.09	0.38	0.09	31.2
8	T1	351	3.0	369	3.0	0.260	3.2	LOS A	0.7	4.7	0.09	0.38	0.09	41.0
9	R2	5	0.0	5	0.0	0.260	6.8	LOS A	0.7	4.7	0.09	0.38	0.09	45.4
Approach		390	2.7	411	2.7	0.260	3.2	LOS A	0.7	4.7	0.09	0.38	0.09	40.5
NorthWest: McPharlin Av														
10	L2	15	0.0	16	0.0	0.024	5.6	LOS A	0.0	0.3	0.51	0.57	0.51	39.4
11	T1	3	0.0	3	0.0	0.024	5.7	LOS A	0.0	0.3	0.51	0.57	0.51	39.4
12	R2	3	0.0	3	0.0	0.024	9.2	LOS A	0.0	0.3	0.51	0.57	0.51	42.5
Approach		21	0.0	22	0.0	0.024	6.1	LOS A	0.0	0.3	0.51	0.57	0.51	39.9
SouthWest: Quinns Rd														
1	L2	1	0.0	1	0.0	0.283	3.5	LOS A	0.7	5.3	0.12	0.38	0.12	43.5
2	T1	407	3.0	428	3.0	0.283	3.5	LOS A	0.7	5.3	0.12	0.38	0.12	36.2
3	R2	6	0.0	6	0.0	0.283	7.1	LOS A	0.7	5.3	0.12	0.38	0.12	33.0
Approach		414	2.9	436	2.9	0.283	3.6	LOS A	0.7	5.3	0.12	0.38	0.12	36.2
All Vehicles		842	2.7	886	2.7	0.283	3.5	LOS A	0.7	5.3	0.12	0.39	0.12	38.0

MOVEMENT SUMMARY

Site: 101 [Quinns Rd / McPharlin Av / Site access PM 2023 (Site Folder: Base year 2023)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site access														
4	L2	20	0.0	21	0.0	0.267	4.4	LOS A	0.6	4.3	0.59	0.73	0.59	29.3
5	T1	15	0.0	16	0.0	0.267	4.7	LOS A	0.6	4.3	0.59	0.73	0.59	40.4
6	R2	204	0.0	215	0.0	0.267	7.8	LOS A	0.6	4.3	0.59	0.73	0.59	23.8
Approach		239	0.0	252	0.0	0.267	7.3	LOS A	0.6	4.3	0.59	0.73	0.59	26.1
NorthEast: Quinns Rd														
7	L2	61	0.0	64	0.0	0.313	3.2	LOS A	0.9	6.2	0.12	0.39	0.12	30.7
8	T1	391	3.0	412	3.0	0.313	3.2	LOS A	0.9	6.2	0.12	0.39	0.12	40.6
9	R2	13	0.0	14	0.0	0.313	6.8	LOS A	0.9	6.2	0.12	0.39	0.12	45.2
Approach		465	2.5	489	2.5	0.313	3.3	LOS A	0.9	6.2	0.12	0.39	0.12	39.8
NorthWest: McPharlin Av														
10	L2	8	0.0	8	0.0	0.018	6.9	LOS A	0.0	0.3	0.65	0.60	0.65	38.4
11	T1	4	0.0	4	0.0	0.018	7.0	LOS A	0.0	0.3	0.65	0.60	0.65	38.3
12	R2	1	0.0	1	0.0	0.018	10.5	LOS B	0.0	0.3	0.65	0.60	0.65	41.4
Approach		13	0.0	14	0.0	0.018	7.2	LOS A	0.0	0.3	0.65	0.60	0.65	38.6
SouthWest: Quinns Rd														
1	L2	2	0.0	2	0.0	0.406	5.1	LOS A	1.2	8.3	0.56	0.58	0.56	40.9
2	T1	398	3.0	419	3.0	0.406	5.2	LOS A	1.2	8.3	0.56	0.58	0.56	32.0
3	R2	11	0.0	12	0.0	0.406	8.7	LOS A	1.2	8.3	0.56	0.58	0.56	28.8
Approach		411	2.9	433	2.9	0.406	5.3	LOS A	1.2	8.3	0.56	0.58	0.56	32.0
All Vehicles		1128	2.1	1187	2.1	0.406	4.9	LOS A	1.2	8.3	0.38	0.53	0.38	33.7

MOVEMENT SUMMARY

Site: 101 [Quinns Rd / McPharlin Av / Site access weekend 2023 (Site Folder: Base year 2023)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site access														
4	L2	17	0.0	18	0.0	0.069	3.2	LOS A	0.1	1.0	0.43	0.62	0.43	32.0
5	T1	4	0.0	4	0.0	0.069	3.5	LOS A	0.1	1.0	0.43	0.62	0.43	42.6
6	R2	48	0.0	51	0.0	0.069	6.5	LOS A	0.1	1.0	0.43	0.62	0.43	26.0
Approach		69	0.0	73	0.0	0.069	5.5	LOS A	0.1	1.0	0.43	0.62	0.43	29.3
NorthEast: Quinns Rd														
7	L2	56	0.0	59	0.0	0.225	3.2	LOS A	0.5	3.8	0.10	0.40	0.10	30.7
8	T1	259	3.0	273	3.0	0.225	3.2	LOS A	0.5	3.8	0.10	0.40	0.10	40.6
9	R2	13	0.0	14	0.0	0.225	6.8	LOS A	0.5	3.8	0.10	0.40	0.10	45.2
Approach		328	2.4	345	2.4	0.225	3.4	LOS A	0.5	3.8	0.10	0.40	0.10	39.7
NorthWest: McPharlin Av														
10	L2	13	0.0	14	0.0	0.021	5.4	LOS A	0.0	0.3	0.50	0.55	0.50	39.8
11	T1	4	0.0	4	0.0	0.021	5.4	LOS A	0.0	0.3	0.50	0.55	0.50	39.8
12	R2	2	0.0	2	0.0	0.021	9.0	LOS A	0.0	0.3	0.50	0.55	0.50	42.9
Approach		19	0.0	20	0.0	0.021	5.8	LOS A	0.0	0.3	0.50	0.55	0.50	40.1
SouthWest: Quinns Rd														
1	L2	2	0.0	2	0.0	0.268	3.8	LOS A	0.7	4.9	0.25	0.41	0.25	42.7
2	T1	330	3.0	347	3.0	0.268	3.8	LOS A	0.7	4.9	0.25	0.41	0.25	34.8
3	R2	11	0.0	12	0.0	0.268	7.4	LOS A	0.7	4.9	0.25	0.41	0.25	31.5
Approach		343	2.9	361	2.9	0.268	3.9	LOS A	0.7	4.9	0.25	0.41	0.25	34.8
All Vehicles		759	2.3	799	2.3	0.268	3.9	LOS A	0.7	4.9	0.21	0.43	0.21	36.5

MOVEMENT SUMMARY

Site: 101 [Quinns Rd / McPharlin Av / Site access AM 2025 (Site Folder: Opening year 2025-Special Events)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site access														
4	L2	13	0.0	14	0.0	0.057	3.7	LOS A	0.1	0.8	0.49	0.64	0.49	31.1
5	T1	3	0.0	3	0.0	0.057	4.0	LOS A	0.1	0.8	0.49	0.64	0.49	41.9
6	R2	37	0.0	39	0.0	0.057	7.0	LOS A	0.1	0.8	0.49	0.64	0.49	25.2
Approach		53	0.0	56	0.0	0.057	6.0	LOS A	0.1	0.8	0.49	0.64	0.49	28.4
NorthEast: Quinns Rd														
7	L2	61	0.0	64	0.0	0.290	3.2	LOS A	0.7	5.3	0.12	0.39	0.12	30.7
8	T1	358	3.0	377	3.0	0.290	3.2	LOS A	0.7	5.3	0.12	0.39	0.12	40.7
9	R2	5	0.0	5	0.0	0.290	6.8	LOS A	0.7	5.3	0.12	0.39	0.12	45.2
Approach		424	2.5	446	2.5	0.290	3.3	LOS A	0.7	5.3	0.12	0.39	0.12	39.7
NorthWest: McPharlin Av														
10	L2	16	0.0	17	0.0	0.028	5.9	LOS A	0.1	0.4	0.55	0.58	0.55	39.2
11	T1	5	0.0	5	0.0	0.028	5.9	LOS A	0.1	0.4	0.55	0.58	0.55	39.1
12	R2	3	0.0	3	0.0	0.028	9.5	LOS A	0.1	0.4	0.55	0.58	0.55	42.3
Approach		24	0.0	25	0.0	0.028	6.3	LOS A	0.1	0.4	0.55	0.58	0.55	39.6
SouthWest: Quinns Rd														
1	L2	1	0.0	1	0.0	0.316	3.6	LOS A	0.9	6.3	0.22	0.40	0.22	42.9
2	T1	415	3.0	437	3.0	0.316	3.7	LOS A	0.9	6.3	0.22	0.40	0.22	35.1
3	R2	11	0.0	12	0.0	0.316	7.3	LOS A	0.9	6.3	0.22	0.40	0.22	31.9
Approach		427	2.9	449	2.9	0.316	3.8	LOS A	0.9	6.3	0.22	0.40	0.22	35.1
All Vehicles		928	2.5	977	2.5	0.316	3.8	LOS A	0.9	6.3	0.20	0.41	0.20	36.8

MOVEMENT SUMMARY

Site: 101 [Quinns Rd / McPharlin Av / Site access PM 2025 (Site Folder: Opening year 2025-Special Events)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site access														
4	L2	29	0.0	31	0.0	0.312	4.6	LOS A	0.8	5.3	0.61	0.75	0.61	29.1
5	T1	17	0.0	18	0.0	0.312	4.9	LOS A	0.8	5.3	0.61	0.75	0.61	40.3
6	R2	230	0.0	242	0.0	0.312	8.0	LOS A	0.8	5.3	0.61	0.75	0.61	23.6
Approach		276	0.0	291	0.0	0.312	7.4	LOS A	0.8	5.3	0.61	0.75	0.61	26.0
NorthEast: Quinns Rd														
7	L2	93	0.0	98	0.0	0.349	3.2	LOS A	1.0	7.3	0.16	0.39	0.16	30.2
8	T1	399	3.0	420	3.0	0.349	3.3	LOS A	1.0	7.3	0.16	0.39	0.16	40.1
9	R2	13	0.0	14	0.0	0.349	6.9	LOS A	1.0	7.3	0.16	0.39	0.16	44.9
Approach		505	2.4	532	2.4	0.349	3.4	LOS A	1.0	7.3	0.16	0.39	0.16	38.9
NorthWest: McPharlin Av														
10	L2	8	0.0	8	0.0	0.022	7.3	LOS A	0.0	0.3	0.68	0.62	0.68	38.1
11	T1	6	0.0	6	0.0	0.022	7.3	LOS A	0.0	0.3	0.68	0.62	0.68	37.9
12	R2	1	0.0	1	0.0	0.022	10.9	LOS B	0.0	0.3	0.68	0.62	0.68	41.1
Approach		15	0.0	16	0.0	0.022	7.5	LOS A	0.0	0.3	0.68	0.62	0.68	38.2
SouthWest: Quinns Rd														
1	L2	2	0.0	2	0.0	0.434	5.3	LOS A	1.3	9.1	0.61	0.61	0.61	40.6
2	T1	406	3.0	427	3.0	0.434	5.4	LOS A	1.3	9.1	0.61	0.61	0.61	31.6
3	R2	17	0.0	18	0.0	0.434	8.9	LOS A	1.3	9.1	0.61	0.61	0.61	28.4
Approach		425	2.9	447	2.9	0.434	5.6	LOS A	1.3	9.1	0.61	0.61	0.61	31.6
All Vehicles		1221	2.0	1285	2.0	0.434	5.1	LOS A	1.3	9.1	0.42	0.55	0.42	33.1

MOVEMENT SUMMARY

Site: 101 [Quinns Rd / McPharlin Av / Site access weekends 2025 (Site Folder: Opening year 2025-Special Events)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site access														
4	L2	25	0.0	26	0.0	0.101	3.2	LOS A	0.2	1.4	0.44	0.63	0.44	31.9
5	T1	6	0.0	6	0.0	0.101	3.6	LOS A	0.2	1.4	0.44	0.63	0.44	42.5
6	R2	69	0.0	73	0.0	0.101	6.6	LOS A	0.2	1.4	0.44	0.63	0.44	25.9
Approach		100	0.0	105	0.0	0.101	5.6	LOS A	0.2	1.4	0.44	0.63	0.44	29.3
NorthEast: Quinns Rd														
7	L2	80	0.0	84	0.0	0.250	3.2	LOS A	0.6	4.3	0.13	0.40	0.13	30.4
8	T1	264	3.0	278	3.0	0.250	3.3	LOS A	0.6	4.3	0.13	0.40	0.13	40.4
9	R2	13	0.0	14	0.0	0.250	6.9	LOS A	0.6	4.3	0.13	0.40	0.13	45.1
Approach		357	2.2	376	2.2	0.250	3.4	LOS A	0.6	4.3	0.13	0.40	0.13	39.0
NorthWest: McPharlin Av														
10	L2	13	0.0	14	0.0	0.024	5.6	LOS A	0.0	0.3	0.53	0.56	0.53	39.6
11	T1	6	0.0	6	0.0	0.024	5.6	LOS A	0.0	0.3	0.53	0.56	0.53	39.5
12	R2	2	0.0	2	0.0	0.024	9.2	LOS A	0.0	0.3	0.53	0.56	0.53	42.6
Approach		21	0.0	22	0.0	0.024	5.9	LOS A	0.0	0.3	0.53	0.56	0.53	39.9
SouthWest: Quinns Rd														
1	L2	2	0.0	2	0.0	0.287	3.9	LOS A	0.7	5.3	0.30	0.43	0.30	42.3
2	T1	337	3.0	355	3.0	0.287	4.0	LOS A	0.7	5.3	0.30	0.43	0.30	34.2
3	R2	15	0.0	16	0.0	0.287	7.5	LOS A	0.7	5.3	0.30	0.43	0.30	31.0
Approach		354	2.9	373	2.9	0.287	4.1	LOS A	0.7	5.3	0.30	0.43	0.30	34.2
All Vehicles		832	2.2	876	2.2	0.287	4.0	LOS A	0.7	5.3	0.25	0.44	0.25	35.7

MOVEMENT SUMMARY

Site: 101 [Quinns Rd / McPharlin Av / Site access AM 2035 (Site Folder: Future 10-year 2035-Special Events)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site access														
4	L2	13	0.0	14	0.0	0.059	3.9	LOS A	0.1	0.8	0.51	0.65	0.51	30.7
5	T1	3	0.0	3	0.0	0.059	4.2	LOS A	0.1	0.8	0.51	0.65	0.51	41.6
6	R2	37	0.0	39	0.0	0.059	7.3	LOS A	0.1	0.8	0.51	0.65	0.51	24.8
Approach		53	0.0	56	0.0	0.059	6.3	LOS A	0.1	0.8	0.51	0.65	0.51	28.0
NorthEast: Quinns Rd														
7	L2	61	0.0	64	0.0	0.313	3.2	LOS A	0.8	5.9	0.12	0.38	0.12	30.7
8	T1	393	3.0	414	3.0	0.313	3.3	LOS A	0.8	5.9	0.12	0.38	0.12	40.6
9	R2	6	0.0	6	0.0	0.313	6.8	LOS A	0.8	5.9	0.12	0.38	0.12	45.2
Approach		460	2.6	484	2.6	0.313	3.3	LOS A	0.8	5.9	0.12	0.38	0.12	39.7
NorthWest: McPharlin Av														
10	L2	17	0.0	18	0.0	0.030	6.2	LOS A	0.1	0.4	0.57	0.60	0.57	39.0
11	T1	5	0.0	5	0.0	0.030	6.2	LOS A	0.1	0.4	0.57	0.60	0.57	38.9
12	R2	3	0.0	3	0.0	0.030	9.8	LOS A	0.1	0.4	0.57	0.60	0.57	42.0
Approach		25	0.0	26	0.0	0.030	6.6	LOS A	0.1	0.4	0.57	0.60	0.57	39.3
SouthWest: Quinns Rd														
1	L2	1	0.0	1	0.0	0.345	3.7	LOS A	1.0	7.1	0.23	0.40	0.23	42.8
2	T1	456	3.0	480	3.0	0.345	3.7	LOS A	1.0	7.1	0.23	0.40	0.23	35.0
3	R2	11	0.0	12	0.0	0.345	7.3	LOS A	1.0	7.1	0.23	0.40	0.23	31.8
Approach		468	2.9	493	2.9	0.345	3.8	LOS A	1.0	7.1	0.23	0.40	0.23	35.0
All Vehicles		1006	2.5	1059	2.5	0.345	3.8	LOS A	1.0	7.1	0.20	0.41	0.20	36.8

MOVEMENT SUMMARY

Site: 101 [Quinns Rd / McPharlin Av / Site access PM 2035 (Site Folder: Future 10-year 2035-Special Events)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site access														
4	L2	29	0.0	31	0.0	0.323	4.9	LOS A	0.8	5.5	0.64	0.77	0.64	28.6
5	T1	17	0.0	18	0.0	0.323	5.3	LOS A	0.8	5.5	0.64	0.77	0.64	39.8
6	R2	230	0.0	242	0.0	0.323	8.3	LOS A	0.8	5.5	0.64	0.77	0.64	23.1
Approach		276	0.0	291	0.0	0.323	7.8	LOS A	0.8	5.5	0.64	0.77	0.64	25.5
NorthEast: Quinns Rd														
7	L2	93	0.0	98	0.0	0.376	3.2	LOS A	1.1	8.1	0.16	0.39	0.16	30.1
8	T1	438	3.0	461	3.0	0.376	3.3	LOS A	1.1	8.1	0.16	0.39	0.16	40.0
9	R2	14	0.0	15	0.0	0.376	6.9	LOS A	1.1	8.1	0.16	0.39	0.16	44.9
Approach		545	2.4	574	2.4	0.376	3.4	LOS A	1.1	8.1	0.16	0.39	0.16	39.0
NorthWest: McPharlin Av														
10	L2	9	0.0	9	0.0	0.026	7.7	LOS A	0.1	0.4	0.71	0.65	0.71	37.5
11	T1	6	0.0	6	0.0	0.026	7.7	LOS A	0.1	0.4	0.71	0.65	0.71	37.3
12	R2	2	0.0	2	0.0	0.026	11.3	LOS B	0.1	0.4	0.71	0.65	0.71	40.5
Approach		17	0.0	18	0.0	0.026	8.1	LOS A	0.1	0.4	0.71	0.65	0.71	37.8
SouthWest: Quinns Rd														
1	L2	3	0.0	3	0.0	0.474	5.4	LOS A	1.4	10.4	0.63	0.63	0.63	40.5
2	T1	446	3.0	469	3.0	0.474	5.5	LOS A	1.4	10.4	0.63	0.63	0.63	31.4
3	R2	17	0.0	18	0.0	0.474	9.0	LOS A	1.4	10.4	0.63	0.63	0.63	28.2
Approach		466	2.9	491	2.9	0.474	5.7	LOS A	1.4	10.4	0.63	0.63	0.63	31.4
All Vehicles		1304	2.0	1373	2.0	0.474	5.2	LOS A	1.4	10.4	0.44	0.56	0.44	33.0

MOVEMENT SUMMARY

Site: 101 [Quinns Rd / McPharlin Av / Site access weekends 2035 (Site Folder: Future 10-year 2035-Special Events)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site access														
4	L2	25	0.0	26	0.0	0.103	3.4	LOS A	0.2	1.5	0.46	0.64	0.46	31.6
5	T1	6	0.0	6	0.0	0.103	3.7	LOS A	0.2	1.5	0.46	0.64	0.46	42.3
6	R2	69	0.0	73	0.0	0.103	6.8	LOS A	0.2	1.5	0.46	0.64	0.46	25.6
Approach		100	0.0	105	0.0	0.103	5.8	LOS A	0.2	1.5	0.46	0.64	0.46	29.0
NorthEast: Quinns Rd														
7	L2	80	0.0	84	0.0	0.268	3.2	LOS A	0.7	4.7	0.13	0.40	0.13	30.3
8	T1	290	3.0	305	3.0	0.268	3.3	LOS A	0.7	4.7	0.13	0.40	0.13	40.3
9	R2	14	0.0	15	0.0	0.268	6.9	LOS A	0.7	4.7	0.13	0.40	0.13	45.0
Approach		384	2.3	404	2.3	0.268	3.4	LOS A	0.7	4.7	0.13	0.40	0.13	39.0
NorthWest: McPharlin Av														
10	L2	14	0.0	15	0.0	0.027	5.8	LOS A	0.1	0.4	0.55	0.58	0.55	39.2
11	T1	6	0.0	6	0.0	0.027	5.9	LOS A	0.1	0.4	0.55	0.58	0.55	39.2
12	R2	3	0.0	3	0.0	0.027	9.4	LOS A	0.1	0.4	0.55	0.58	0.55	42.3
Approach		23	0.0	24	0.0	0.027	6.3	LOS A	0.1	0.4	0.55	0.58	0.55	39.6
SouthWest: Quinns Rd														
1	L2	3	0.0	3	0.0	0.314	3.9	LOS A	0.8	6.0	0.31	0.43	0.31	42.3
2	T1	370	3.0	389	3.0	0.314	4.0	LOS A	0.8	6.0	0.31	0.43	0.31	34.1
3	R2	15	0.0	16	0.0	0.314	7.5	LOS A	0.8	6.0	0.31	0.43	0.31	30.9
Approach		388	2.9	408	2.9	0.314	4.2	LOS A	0.8	6.0	0.31	0.43	0.31	34.2
All Vehicles		895	2.2	942	2.2	0.314	4.1	LOS A	0.8	6.0	0.26	0.45	0.26	35.7

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