

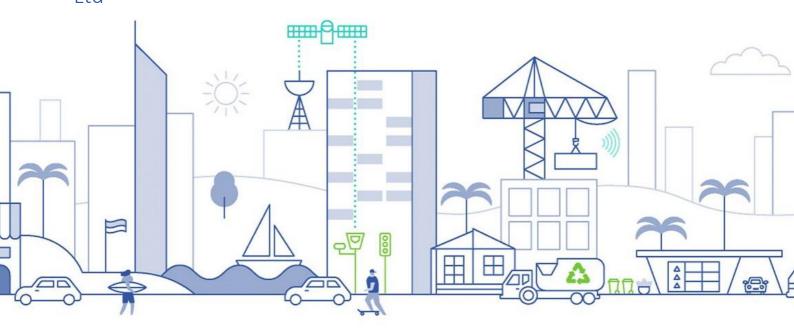
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Traffic Engineering Assessment

For Lifestyle Community

At 8 Park Avenue, Yamba

On Behalf of Hometown Australia Management Pty Ltd





About TTM

For 30 years, we've been at the centre of the Australian development and infrastructure industry. Our unique combination of acoustics, data, traffic and waste services is fundamental to the success of any architectural or development project.

We have over 50 staff, with an unrivalled depth of experience. Our industry knowledge, technical expertise and commercial insight allow us to deliver an exceptional and reliable service.

T: (07) 5514 8000 F: (07) 5514 8144

E: ttmgc@ttmgroup.com.au











Acoustics

Data

Traffic

Waste

Revision Record - 21GCT0106 RP01C

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Introduction 1

1.1 Background

TTM Consulting has been engaged by Hometown Australia Management Pty Ltd (HTA) to prepare a traffic engineering report. This report investigates the traffic impacts associated with the proposed lifestyle community.

The site has currently greenfield space and is currently unoccupied. The site has a current approval for a 21lot residential subdivision. The approved residential subdivision allotments are zoned for R3 Medium Density Residential – provide the opportunity for a number of medium density developments on the land.

The proposal seeks approval for an over 50s lifestyle community with a Development Application to be lodged with Clarence Valley Council (Council).

1.2 Scope

This report investigates the transport aspects associated with the proposed development. The scope of the transport aspects investigated includes:

- Parking supply required to cater for development demand.
- Parking layout to provide efficient and safe internal manoeuvring.
- Suitability of proposed servicing arrangements.
- Access configuration to provide efficient and safe manoeuvring between the site and the public road.
- Identification of likely traffic volumes and traffic distribution from the future development.
- Identification of likely traffic impact of development on the public road network.
- Suitability of access and internal facilities to provide for pedestrian and cyclist operation.
- Access to suitable level of public transport.

To assess the proposed transport arrangements, the development plans have been assessed against the following guidelines and planning documents:

- Clarence Valley Council's Development Control Plan 2011, specifically:
 - Residential Zones Part G Parking and Vehicular Access Controls
- Local Government (Manufactured Home Estates, Caravan Parks, Camping Grounds and Moveable Dwellings) Regulation 2005
- Australian Standard 2890
- **Austroads Guidelines**

Site: 8 Park Avenue, Yamba 5



• Institute of Public Works Engineering Australasia (IPWEA) Standard Drawings

1.3 Site Location

The site is located at 8 Park Avenue, Yamba, as shown in Figure 1.1. The property description is Lot 101 on RP1228576. The site has road frontages to Park Avenue to the east.

No formal access is currently provided to the site. TTM understands that the site is accessed via Park Avenue via an informal access. Earthworks have been undertaken since receiving approval for the 21-lot subdivision.

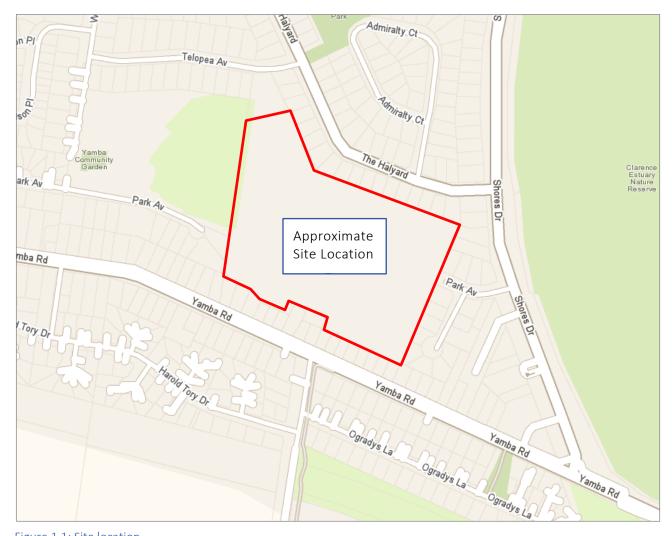


Figure 1.1: Site location





Figure 1.2: Site area

1.4 Development Profile

The proposed land uses for this development are summarised in Table 1.1.

Table 1.1: Existing and Proposed Land uses

Use	Area/Qty
Approved Use	
Medium Density Residential Subdivision	21 larger allotments
	1,800m² to 4,265m² each
Proposed Use	
Lifestyle Dwellings	136 dwellings



1.5 Access

The development plan includes the following access arrangements:

- Park Avenue (east) Access located at the eastern side of the subject site. The characteristics of this access include:
 - Road extension
 - 12.5m wide at the property boundary
- Pedestrian access to Wattle Park western side of the subject site.

1.6 Parking

The development proposal includes the following parking supply:

- 272 resident spaces (minimum single car garage per dwelling)
- 68 general/visitor bays, including:
 - 5 PWD bays and associated shared area (recommended).

Reference: 21GCT0106

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2 Existing Transport Infrastructure

2.1 The Road Network

The majority of roads in the immediate vicinity of the site are administered by Council. The hierarchy and characteristics of roads in the immediate vicinity of the site are shown below in Table 2.1.

Table 2.1: Local Road Hierarchy

Road	Speed Limit	Lanes	Classification	Road Authority
Yamba Road	60kph	2 (undivided, plus bicycle lane)	Arterial	TfNSW / CVC
Shores Drive	50kph	2 (undivided, plus parking)	Local Road	CVC
Park Avenue	50kph	2 (undivided, plus parking)	Laneway	CVC

Park Avenue has a 14m wide carriageway at the site frontage, including two through lanes with parking on both sides. The intersection of Shores Drive / Park Avenue is a basic priority controlled intersection with no dedicated turning lanes.

2.2 Road Planning

Clarence Valley Council and NSW Government are currently upgrading Yamba Road, including roundabout upgrades. The works included major road upgrades along Yamba Road near the site. TTM understand that no additional infrastructure works are proposed by CVC.

The Shores Drive / Yamba Road intersection is being upgraded to a roundabout – construction is currently underway. The new intersection layout is shown in Figure 2.1.

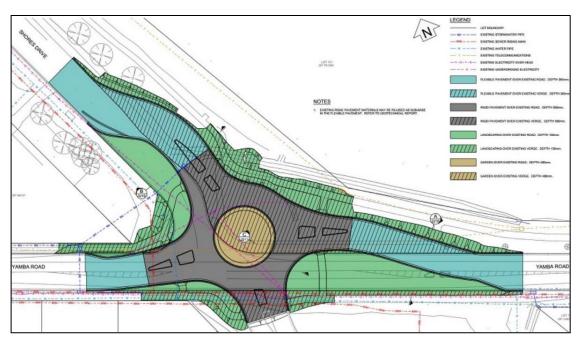


Figure 2.1: Shores Drive / Yamba Road Roundabout



2.3 Public Transport and Pedestrian Facilities

Buses

Shores Drive opposite Park Avenue (Stop ID: 246440) bus stop is located approximately 100m to the east of the site. The bus stop services the 380 bus route. This service provides connection to Yamba, Maclean and Grafton.

Pedestrians

Formal pedestrian footpaths are located on the eastern side of Shores Drive and the northern side of Yamba Road, as shown in Figure 2.2.

Cyclists

Dedicated onstreet / offstreet cycle facilities are described as:

- Cycleway along Yamba Road.
- A shared cycle footpath is along the Shores Drive.



Figure 2.2: Cycle and Pedestrian Facilities

Reference: 21GCT0106

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3 Car Parking Arrangements

3.1 Council Parking Supply Requirement

TTM have estimated the parking demand for the proposed development, based on the rates described in Council's DCP and Local Government Regulation 2005 (LGR). The estimated car parking demand is shown in Table 3.1.

The 136 lifestyle dwellings are all to be 2-bedroom dwellings.

Table 3.1: Council's Car Parking Demand

Land Use	Parking Rates (LGR)	Extent	Requirement	Provision
Self-contained dwelling	At least one resident parking space for each dwelling site		136 spaces	272 spaces
Visitor Parking	20 spaces for a manufactured home estate containing more than 105 sites, plus one additional space for each additional 7 sites (or part of a site) over 140.	136 dwellings	20 spaces	68 visitor parking inc 5 PWD 5 manager parking 6 sales parking
Total			156 spaces	340 spaces

156 parking spaces are required per the LGR requirements for the manufactured housing estate. The proposal also exceeds Council's parking requirements for multi-dwelling housing.

3.2 Car Parking Provision

The proposal includes the following car parking supply:

- 272 spaces (1 dual garage for each dwelling) minimum single car garage per dwelling.
- 68 general parking spaces, including 5 PWD, 5 manager and 6 sales spaces.

The total car parking supply include 340 spaces. The proposed car parking supply is in accordance with the required expected car parking demand.

3.3 Car Parking Suitability

Each dwelling is provided with two garaged spaces. 68 visitor car parking spaces are spread throughout the site and in excess of the required provision. TTM consider that the proposed provision is suitable for the site.

3.4 PWD Parking Provision

LGR outlines visitor parking requirements for parking for people with a disability (PWD). The parking rates and total spaces required are outlined in Table 3.2 below.

Site: 8 Park Avenue, Yamba



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Table 3.2: LGR – PWD Requirements

Building Class	Amount	Parking Demand Rate	Parking Demand	Provision
1 (Resident Spaces)	272	-	-	F2 spaces
1 (General Spaces)	68	1 space per 100 sites	1 space	53 spaces
Total			1 space	5 spaces

The minimum required PWD parking spaces as required under LGR the for the proposed development is 1 spaces. The proposal includes 5 PWD parking spaces located by the manager's office and community facilities – in accordance with the requirements outlined by the LGR.

3.5 Car Park Layout

Table 3.3 identifies the characteristics of the proposed parking area with respect to the AS2890.1 requirements. The last column identifies the compliance of each design aspect. Where compliance with AS2890.1 is not achieved, further information is provided.

Table 3.3: Parking Design Requirements

Design Aspect	Minimum AS2890.1 Standard	Proposed Provision	Compliance
Parking space length:			
– Carport	5.4m	5.4m	Compliant
General bay	5.4m	5.4m	Compliant
PWD bay	5.4m	5.4m	Compliant
Parking space width:			
– Carport	2.5m	2.5m	Compliant
 General bay 	2.5m	2.6m	Compliant
PWD bay	2.4m	2.4m	Compliant
Aisle Width:			
 Parking aisle 	5.8m	5.5m	Performance Solution
 One-way aisle 	3.0m	4.0m	Performance Solution
Parking envelope clearance – space adjacent to wall	Space 0.3m clear of wall	Space 0.3m clear of wall	Compliant
Maximum Gradient:			
PWD parking	1:40 (2.5%)	< 1:40 (2.5%)	Compliant
Parking bay	1:20 (5.0%)	< 1:20 (5.0%)	Compliant
Parking aisle	1:16 (6.25%)	< 1:16 (6.25%)	Compliant
– Ramp	1:5 (20%)	< 1:5 (20%)	Compliant
Maximum Change in Grade	1:8 (12.5%) summit	< 1:8 (12.5%) summit	Compliant
	1:6.67 (15.0%) sag	< 1:6.67 (15.0%) sag	Compliant
Height Clearance			
General Min.	2.2m (2.3m PWD)	>2.2m	Compliant
 Over PWD bay 	2.5m	None	Compliant

Site: 8 Park Avenue, Yamba



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3.5.1 Double Garages

TTM recommend that the double garages are a minimum of 5.4m wide and 6.0m long.

3.5.2 Aisle Width – 5.5m Carriageway

The 5.5m wide carriageways provide a minimum 0.5m wide clearance to the boundary and a 1m offset to building/carport. Therefore, an effective aisle width of 7.0m would be provided to the carports – which is in excess of the 5.8m required minimum.

Appropriate area would be available to accommodate suitable vehicle movements to the carports.

Additional 6.0m wide passing bays are provided throughout the 5.5m wide road network.

3.5.3 Aisle Width – 4.0m Carriageway

The 4.0m wide aisle is appropriate to accommodate one-way vehicle movements.

The 5.5m wide carriageways provide a minimum 1.3m wide clearance to the boundary and a 1m offset to building/carport. Therefore, an effective aisle width of 6.3m would be provided to the carports – which is in excess of the 5.8m required minimum.

Appropriate area would be available to accommodate suitable vehicle movements to the carports.

3.6 Bicycle Parking

Council's DCP and LDR do not provide bicycle parking rates for manufactured housing.

TTM expects that bicycle parking may be accommodated within each dwellings carport, as required by residents. This is considered to be appropriate for the proposed development.

Site: 8 Park Avenue, Yamba



4 Internal Road Network

4.1 Park Avenue (East) Access Design

The development plan includes the following access arrangements:

- Park Avenue Access located at the eastern side of the subject site. The characteristics of this access include:
 - Private road extension from end of Park Avenue.
 - 12.5m wide at the property boundary.

The internal roads would be boom gate restricted, as shown in Figure 4.1.

The roundabout is located 60m (10 vehicle queue) into the site and provides appropriate queuing. All vehicles are able to turnaround on-site.

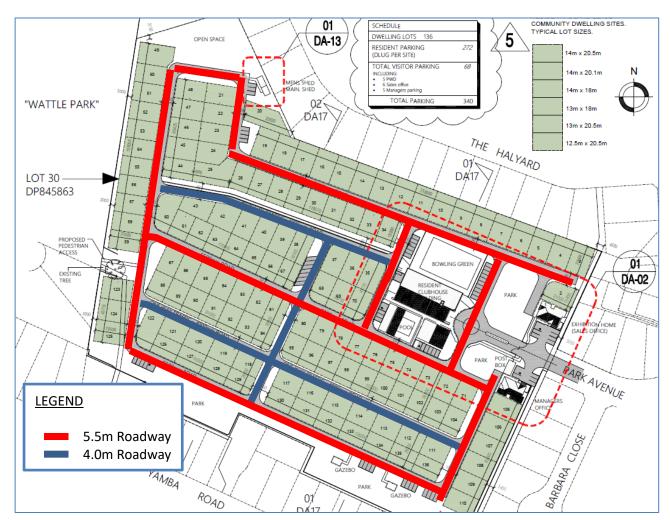


Figure 4.1: Vehicular Access



4.2 Wattle Park Pedestrian Access Design

The development plan includes the following access arrangements:

Pedestrian access to Wattle Park western side of the subject site.

This provides connectivity between the site, Yamba Community Garden and the local shops (Yamba Fair) – via Park Ave, as shown in Figure 4.2. Pedestrian connectivity is to be provided to the east via a footpath.



Figure 4.2: Pedestrian Connectivity

4.3 Internal Road Network Design

The private internal road network is to restrict access for residents, guests and staff.

The internal road network is to consist of 7m wide private road reserves, including:

- 5.5m wide two-way roadways circulation roadways.
- 4.0m wide one-way roadways laneway access.

The 5.5m and 6.0m wide roadways are suitable for two-way vehicle movements. These roads provide circulation throughout the site and are appropriate for the intended use.

The 4.0m wide roadways are capable to accommodate one-way vehicular movements. These roads provide direct access to dwellings and connection to circulation roadways. TTM consider that these roadways are appropriate as the expected trip generation is low and there would be slow traffic speeds.



5 Service Vehicle Arrangements

Council's DCP does not provide specific detail of the number and type of service bays for the development.

TTM have estimated the expected design service vehicle, based on experience. Service vehicle provisions are generally in accordance with AS2890.2.

5.1 Estimated Service Vehicle Requirements

TTM have estimated the service vehicle requirements, as shown in Table 5.1.

Table 5.1: Service Vehicle Requirements

Use	Requirement
Manufactured Housing – self-contained	Medium Rigid Vehicle (MRV) – deliveries or moving in/out
dwelling	Refuse Collection Vehicle (RCV) – refuse collection

It is expected that an 8.8m long medium rigid vehicle (MRV) would be the largest vehicle to attend the site.

The community has on-site central management that controls deliveries. Management can assist with notifying residents when deliveries / services are to occur and when access may be obstructed.

5.2 Estimated Demand

5.2.1 SRV and MRV

TTM expects that the largest regular service vehicle for the site would be a MRV - the site would operate with small rigid vehicles (SRV) and MRV.

TTM have prepared a swept path which demonstrates that an MRV can manoeuvre through the internal private road network. The swept path assessment shows that a MRV can service the site, manoeuvre and egress the site in a forward gear, shown in Appendix B.

The 5.5m internal roadway would allow a MRV to park in front of the respective dwelling for loading and unloading deliveries. i.e. a 3.0m wide passing aisle would be beside a 2.5m wide MRV. This is considered appropriate for occasional servicing.

SRV and MRV would be able to access all internal roads, as shown within the swept paths in Appendix B.

The MRV would block the 4.0m wide internal roads. Motorists would be able to see the parked MRV and access their property from the other road entry. TTM consider this outcome appropriate as larger deliveries are to be managed, occasional and only be parked for longer periods during move in/out.

TTM recommends that the splay, shown in Figure 5.1, be designed with a 3.5m to accommodate the MRV turn path.

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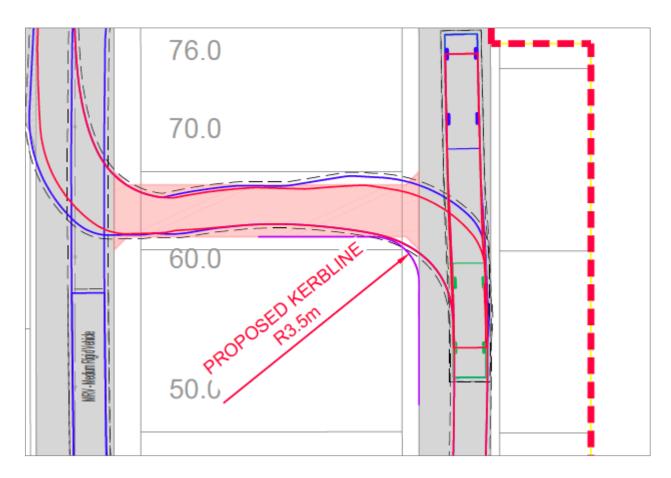


Figure 5.1: Recommended Splay

5.2.2 Refuse Collection

The site would require on-site refuse collection. TTM understands that refuse is collection via private internal collection.

HTA use private refuse servicing via a small two axle rear loading RCV – whose dimensions are between a SRV and MRV. This vehicle would be able to follow the same swept path as the MRV and is suitable to service the site.

5.3 Proposed Service Vehicle Arrangements and Their Adequacy

The site provides for SRV, private RCV and MRV servicing within the internal roadways.

The proposed development has been designed to accommodate the largest design vehicle accessing and egressing the site. It is expected that the site would operate functionally.

Site: 8 Park Avenue, Yamba



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6 Public Transport

Shores Drive opposite Park Avenue (Stop ID: 246440) bus stop is located approximately 100m to the east of the site. The bus stop services the 380 bus route. This service provides connection to Yamba, Maclean and Grafton.

The community use provides independent living arrangements – i.e. not high-care nor serviced-care living.

TTM consider that the proposed development would not generate significant public transport demand. The existing public transport facilities are considered to be suitable.

Site: 8 Park Avenue, Yamba



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7 Development Traffic Impact

7.1 Existing Site Traffic

The site has currently greenfield space and is currently unoccupied.

The site has a current approval for a 21-lot residential subdivision. The approved residential subdivision allotments are zoned for R3 Medium Density Residential – provide the opportunity for a number of medium density developments on the land.

Based on 52,849m² of allotment area – Council officer recommendations outline that the site has potential for up to 185 3-bedroom medium density residential dwellings.

TTM have assumed the expected trip generation based on the existing approval and typical residential housing trip rates.

7.2 Estimated Development Traffic Generation

The NSW Roads and Maritime Services (RMS) 'Guide to Traffic Generating Developments' updated traffic surveys 2013 recommends using specific generation rates, for planning purposes.

RMS' surveys indicate that regional dwellings generate trips at a rate of 0.71 veh/dwelling during the morning peak hour period and 0.78 veh/dwelling during the evening peak hour. This has been adopted for the existing approvals. Application of these rates to the proposed development, results in the estimate of development site traffic generation, as shown in Table 7.1.

Of note, HTA has recently undertaken a trip generation survey of the existing Teraglin Lakeshore Home Village (located in Chain Valley Bay) – containing 230 dwelling sites. The survey showed that the peak hour trip generation for residential land lease communities are:

- AM Peak 0.19 vehicle trips per site.
- PM Peak 0.14 vehicle trips per site.

TTM's assumption of 0.71 and 0.78 trips per dwelling is four to five times the actual expected trip generation and considered to be very conservative. TTM have prepared a sensitivity assessment adopting the surveyed trip generation rates, as shown in Table 7.2.

An in:out split of 20:80 for the morning peak period and 80:20 evening peak period has been assumed for the proposed development.

Site: 8 Park Avenue, Yamba



Table 7.1: Peak Hour Trip Generation

Land Use	RMS Rate	Extent	Trip Generation	In : Out Split	In : Out Trips			
Approved Development	Approved Development							
Medium Density (Morning)	0.6 trips per dwelling	185 Dwellings	111	20:80	22:89			
Medium Density (Evening)	0.6 trips per dwelling	185 Dweilings		80 : 20	89 : 22			
Proposed Development								
Manufactured Housing (Morning)	0.71 trips per dwelling	147 Dwellings	105	20:80	21:84			
Manufactured Housing (Evening)	0.78 trips per dwelling	147 Dweilings	115	80 : 20	92 : 23			
Difference (Morning)			-6		-1:-5			
Difference (Evening)			+4		+3:+1			

Table 7.2: Peak Hour Trip Generation – Sensitivity Assessment

Land Use	RMS Rate	Extent	Trip Generation	In : Out Split	In : Out Trips			
Approved Development	Approved Development							
Medium Density (Morning)	0.6 trips per dwelling	10F Dwellings	111	20 : 80	22 : 89			
Medium Density (Evening)	0.6 trips per dwelling	185 Dwellings		80 : 20	89 : 22			
Proposed Development								
Manufactured Housing (Morning)	0.19 trips per dwelling	147 Decellings	28	20 : 80	6:22			
Manufactured Housing (Evening)	0.14 trips per dwelling	147 Dwellings	21	80 : 20	17 : 4			
Difference (Morning)			-83		-16 : -67			
Difference (Evening)			-90		-72 : -18			

7.3 Daily Trip Generation

As shown in Table 7.1, the expected peak hour trip generation would be comparable with the approved development – with fewer trips in the AM peak hour and slightly higher trips in the PM peak hour.

TTM have estimated the expected daily trip generation for the proposed and approved developments, as shown in Table 7.3. TTM have assumed that the daily trip generation is 10 times the peak hour trip generation i.e. 10 times the average of AM and PM peak hour trips.

Table 7.3: Expected Daily Trip Generation

Development	AM Peak	PM Peak	Daily Trips	
Approved Development	111	111	1,110 trips	
Proposed Development	105	115	1,100 trips	
Difference			-10 trips	

The proposed development is likely to slightly reduce the daily trips to the subject site.

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7.4 Impact on the Local Road Network

The proposed development is expected to generate less traffic than the potential traffic generation of the approved use. The sensitivity assessment indicates that the proposal would generate significantly less traffic.

TTM estimates that the proposal would reduce the daily trip generation from by 10 trips, compared to the approved use.

Therefore, the proposed development would have less impact on the local road network than the approved development.

Site: 8 Park Avenue, Yamba



Road Network Performance 8

8.1 Existing Traffic

TTM have undertaken a peak hour turning movement traffic survey at Shores Drive / Yamba Road intersection on Tuesday 25 May 2021.

Of note, the intersection is being upgraded to a roundabout – construction was currently underway during the survey, with some turning movements being restricted. The right turn to and from Shores Drive was restricted at the time of survey.

The peak hour survey summary is shown in Figure 8.1. The morning peak hour was 8:15-9:15 and the evening peak hour was 2:30-3:30pm.

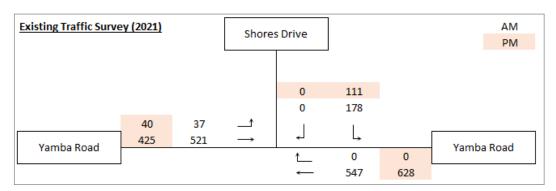


Figure 8.1: Summary of Peak Hour Traffic Movements

8.1.1 Existing Traffic Calibration

TTM have calibrated the base case (existing) turning movement volumes to account for the restricted right turning movements.

TTM expects that the through movements would be unaffected by the road works.

Council has outlined that 'All outbound traffic from Shores Dr will detour by turning left onto Yamba Rd to the Co-Op and U-turn at the roundabout to head back west along Yamba Rd.'

It is expected that some westbound traffic would be diverted along Treelands Drive and some would opt to u-turn at the Yamba Road / Golding Street roundabout. This would increase the surveyed left turn movements and through movements through the Shores Drive roundabout.

Vehicles turning right into the Shores Drive catchment would drive through the roundabout and be diverted along Treelands Drive.

Site: 8 Park Avenue, Yamba





Figure 8.2: Shores Drive / Yamba Road Diverted Traffic

TTM have assumed the following to account for these changes:

- The surveyed volumes have not been discounted to account for additional diverted turning movements.
- An AM 50:50 east/west split of traffic turning to/from Shores Drive would be seen, consistent with the existing traffic split.
- A PM 60:40 east/west split of traffic turning to/from Shores Drive would be seen, consistent with the existing traffic split.

TTM expects that these assumptions would be very conservative and represent the worst case scenario of the expected roundabout operations.

The assessed existing turning movements are shown in Figure 8.3.

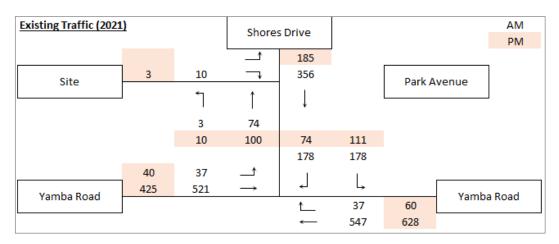


Figure 8.3: Shores Drive / Yamba Road Assessed Existing Traffic Volumes



Of note, TTM have estimated the existing traffic volumes through the Shores Drive / Park Avenue intersection. The Park Avenue and Barbara Close catchment includes 16 dwellings, corresponding to 13 vehicle trips during the peak hours – based on a trip generation rate of 0.8 trips per dwelling.

In:out splits of 20:80 for the AM peak hour and 80:20 for the PM peak hour have also been assumed -3 in : 10 out trips during the AM and 10 in : 3 out trips during the PM peak hours.

Turning movements have been based on the surrounding trip attractors and destinations described in Section 8.9 and Figure 8.11. Vehicle may likely turn left out of and right in to Park Avenue, however, these numbers are expected to be small and not likely impact the turning movement assessment.

8.2 Development Traffic Distribution and Generation

The estimated development of development generated traffic are shown in Figure 8.4 and the resulting local traffic movements are shown in Figure 8.5. The traffic distribution has been based on the expected turning movement splits. Of note, TTM have adopted the conservative trip generation outlined in Table 7.1.

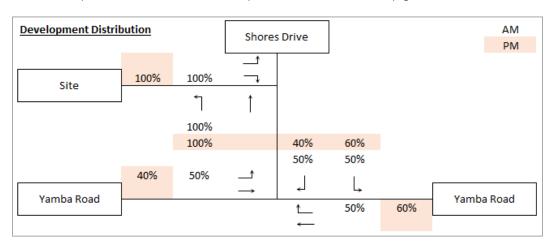


Figure 8.4: Estimated Distribution of Development Generated Traffic

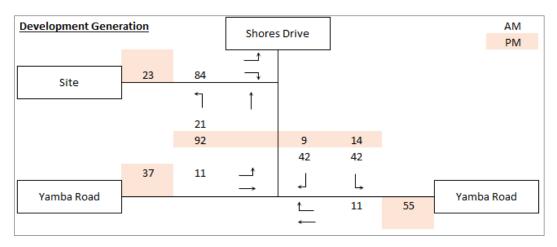


Figure 8.5: Estimated Development Traffic Generation



8.3 Background Traffic Growth

According to Profile.Id from 2013 to 2018 the estimated population of Clarence Valley LGA increased from 51,358 residents to 51,647 residents, or a 0.11% per annum compounding population growth rate.

Over the same period of time, ie 2013 to 2018, the estimated population of the Yamba profile area decreased from 6,248 residents to 6,184 residents.

The Profile.Id data shows that there has been very limited population growth within the Clarence Valley LGA and no population growth within Yamba over the past 5 years.

TTM understands that there is potential for development in the Yamba area, however, the trends over the past 5 years indicate that there is minimal growth in the Yamba area. Profile.Id indicates that the largest change in population in Yamba was an increase of 0.75% between 2017 and 2018.

A background growth rate of 3.5% has previously been requested by Council for assessments along Yamba Road.

Therefore, TTM have applied a very conservative compounding traffic growth rate of 3.5% for the through traffic along Yamba Road – to determine the background traffic at the year of completion (ie 2023) and the 10-year design horizon (ie 2033).

The traffic volumes along Shores Drive have not been increased as its catchment has been fully developed.

8.4 Opening Day (2023) Base Traffic Demands

Figure 8.6 shows the opening day (2023) base traffic demands, based on an application of an annual growth rate of 3.5% for a period of 2 years from the 2021 traffic survey volumes.

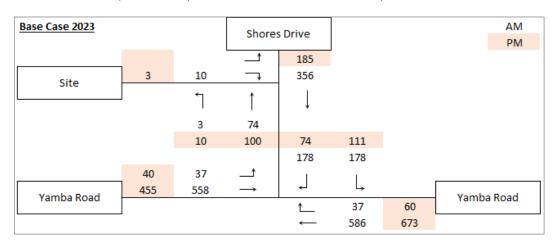


Figure 8.6: Estimated 2023 Peak Hour Traffic, Without Development (3.5% pa growth)

8.5 Opening Day (2023) Project Traffic Demands

The opening day project scenario is obtained by the addition of development traffic generation in Figure 8.5 to the base traffic volumes shown in Figure 8.6. The expected traffic movements are shown in Figure 8.7

Site: 8 Park Avenue, Yamba 25



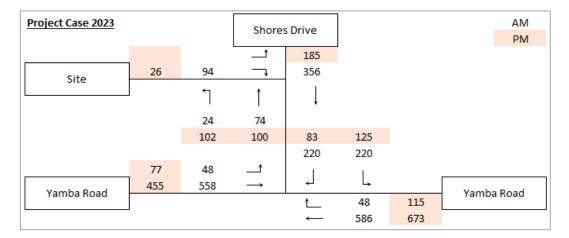


Figure 8.7: Estimated 2023 Peak Hour Traffic, With Development

8.6 Design Year (2033) Base Traffic Demands

Figure 8.8 shows the design year (2033) base traffic demands, based on an application of an annual growth rate of 3.5% for a period of 12 years (ie 10 years past an assumed 2023 completion date of the project) to the 2021 traffic volumes.

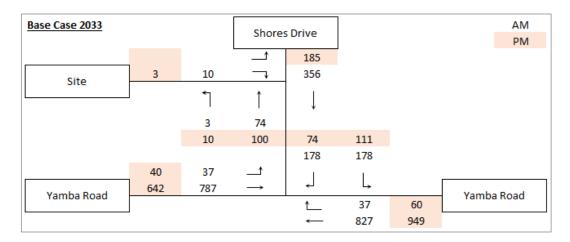


Figure 8.8: Estimated 2033 Peak Hour Traffic, Without Development (3.5% pa growth)

8.7 Design Year (2033) Project Traffic Demands

The 2033 project case scenario is obtained by the addition of expected traffic generation shown in Figure 8.5 to the base traffic volumes shown in Figure 8.8. The expected traffic volumes are shown in Figure 8.9.



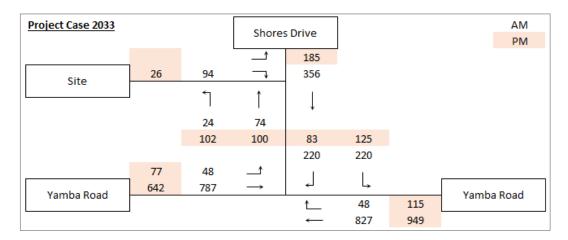


Figure 8.9: Estimated 2033 Peak Hour Traffic, With Development

8.8 Analysis of Shores Drive / Yamba Road

TTM have assessed the Shores Drive / Yamba Road intersection as a roundabout. It is understood that the roundabout is being constructed as a 4-leg roundabout. However, the southern leg is a future road connection.

The 3-leg roundabout intersection was assessed at the expected year of completion (ie 2023) and 10-year design horizon (ie 2033) with a 3.5%pa compounding growth rate. The AM and PM peak hour design traffic scenario have been assessed. The SIDRA results are summarised in Table 8.1 and detailed outputs in Appendix C.

Table 8.1: Summary of Roundabout Sidra Outputs (Shores Drive / Yamba Road Intersection)

Case	Degree of Saturation	Average Delay (s)	Level of Service	95th Percentile Critical Queue (m)		
				East	North	West
AM Peak Existing 2021	53.4%	6.7	LOS B	34.3	23.4	23.8
PM Peak Existing 2021	52.8%	5.5	LOS A	36.2	9.1	18.3
AM Peak Base Case 2023	56.9%	6.8	LOS B	38.3	25.3	26.4
PM Peak Base Case 2023	56.2%	5.5	LOS A	40.7	9.5	20.1
AM Peak Project Case 2023	61.3%	7.8	LOS B	43.2	39.5	28.7
PM Peak Project Case 2023	61.2%	5.9	LOS A	48.0	11.4	25.1
AM Peak Base Case 2033	78.2%	8.5	LOS B	86.9	43.2	49.5
PM Peak Base Case 2033	76.3%	5.8	LOS B	85.5	12.4	34.8
AM Peak Project Case 2033	84.3%	11.7	LOS C	117.1	75.5	54.4
PM Peak Project Case 2033	81.7%	6.3	LOS B	104.4	15.5	44.2

8.8.1 Analysis Conclusions

The roundabout is currently experiencing LOS A and LOS B conditions, minimal average delay and a 5-6 vehicle 95th percentile queue length. These conditions are suitable, acceptable and would be expected.



Similarly, the roundabout is expected to see LOS A and LOS B conditions, minimal average delay and a 7 vehicle 95th percentile queue length – with the proposed development during the opening year. These conditions are suitable, acceptable and would be expected.

During the design year scenarios, the roundabout may experience LOS B and C conditions, with an 9s average delay and queuing of up to 15 vehicles. The average delay and queuing within the acceptable limits and considered to be suitable.

The proposed development would increase the average delay by 3s across the intersection and increase the 95th percentile queue by 4 vehicles across one leg. The degree of saturation increases by between 5-6% during the peak periods.

Of note, this assessment has been carried out with:

- Trip generation rates four to five times what similar developments experience.
- A very high 3.5%pa background traffic growth rate, corresponding to a 40% increase of road traffic. In comparison, a more realistic background traffic growth rate of 1.0%pa corresponds to a 10.5% increase of road traffic volumes based on a conservative review of TfNSWs Travel Zone Explorer.

TTM consider that the proposed development traffic would not significantly impact the local road network.

Of note, the morning site peak hours does not generally coincide with the network peak hour. Therefore, the proposal would likely have even less of an impact on the local road network.

8.9 Park Avenue / Shores Drive

Park Avenue / Shores Drive is a standard T-intersection, as shown in Figure 8.10. Park Avenue has a 12.5m wide carriageway and Shores Drive a 10.5m wide carriageway.



Figure 8.10: Park Avenue / Shores Drive Intersection



It is expected that a majority of the traffic to/from the site would:

- Left turn from Shores Drive to Park Avenue when accessing.
- Right turn from Park Avenue to Shores Drive when egressing.

This route accesses to Yamba Road, which then provides connection to destinations i.e. shops, beach, recreation activities, food & drink and outside Yamba, as shown in Figure 8.11.



Figure 8.11: Site Access Route

It is expected that the site would generate minimal right turning movements into Park Avenue from Shores Drive. The site would not significantly impact the operations of this movement. Therefore, no additional right turning facilities / lanes would be required.

The Park Avenue / Shores Drive intersection is the intersection of a local road and a collector road – where dedicated turning facilities are generally not provided.

The existing road width and alignment would provide the intersection with a basic left turning treatment (BAL). This provision is considered to be appropriate with the low turning movement volumes outlined in Figure 8.9.



8.9.1 Analysis of Park Avenue / Shores Drive

TTM have assessed the Park Avenue / Shores Drive T-intersection.

The AM and PM peak hour base case and project case traffic scenarios from 2033 have been assessed, as described in Figure 8.8 and Figure 8.9.

Of note, the 2033 turning movements do not include background growth for the Shores Drive catchment, as it has been fully developed – aside from a handful of vacant lots. TTM have understand a sensitivity assessment, which increase all turning movements by 20%, and described in Figure 8.12. This would correspond to 1 in 5 houses being converted to a duplex. This is considered to be a conservative assumption.

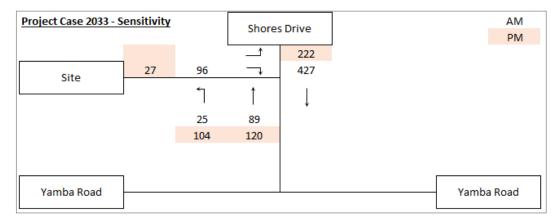


Figure 8.12: Estimated 2033 Peak Hour Traffic, With Development – Sensitivity Assessment

The SIDRA results are summarised in Table 8.2 and detailed outputs in Appendix C.

Table 8.2: Summary of T-intersection Sidra Outputs (Park Avenue / Shores Drive Intersection)

	Degree of	_	Level of Service	95th Percentile Critical Queue (m)		
	Saturation			South	North	West
AM Peak Base Case	19.9%	0.2	LOS A	0.0	0.1	0.3
PM Peak Base Case	10.4%	0.3	LOS A	0.0	0.1	0.1
AM Peak Project Case	19.9%	1.6	LOS A	0.0	0.1	3.1
PM Peak Project Case	11.6%	1.9	LOS A	0.0	0.1	0.7
AM Peak Project Case - Sensitivity	23.9%	1.5	LOS A	0.0	0.1	3.5
PM Peak Project Case – Sensitivity	12.8%	1.7	LOS A	0.0	0.1	0.8

All scenarios see a low average delay and less than 1 vehicle 95th percentile queue.

Based on the above, TTM consider that the existing Park Avenue / Shores Drive intersection is suitable and the proposed development would not have a significant impact on the local road network.

Site: 8 Park Avenue, Yamba



9 Summary and Conclusions

9.1 Development Summary

The development is to 136 dwelling sites for an over 50s lifestyle community.

Access is to be provided from Park Avenue (east) via a 12.5m wide road extension. Pedestrian access is to be

9.2 Parking Arrangements

The proposed parking supply for the site is consistent with Council and LGR accepted parking requirements. The car park layout complies with AS2890.1 requirements. Overall, TTM considers the proposed car parking arrangements for this development are adequate.

9.3 Internal Road Network

The internal private road network includes 7.0m wide road reserves with 4.0m, 5.5m and 6.0m wide carriageways. The internal road network is suitable to provide access and servicing for the site.

9.4 Service Vehicle Arrangements

Servicing for this development will be facilitated within the internal private roadways, accessed from Park Avenue. The largest design vehicle, 8.8m long MRV, can manoeuvre on site to enter and exit in a forward gear. Refuse is to be collected on-site via HTAs private refuse collection vehicle.

Overall, the proposed service vehicle arrangements are considered adequate to meet the needs of the proposed development.

9.5 Public Transport Facilities

The existing public transport facilities are suitable for the proposed development.

9.6 Impact on Surrounding Road Network

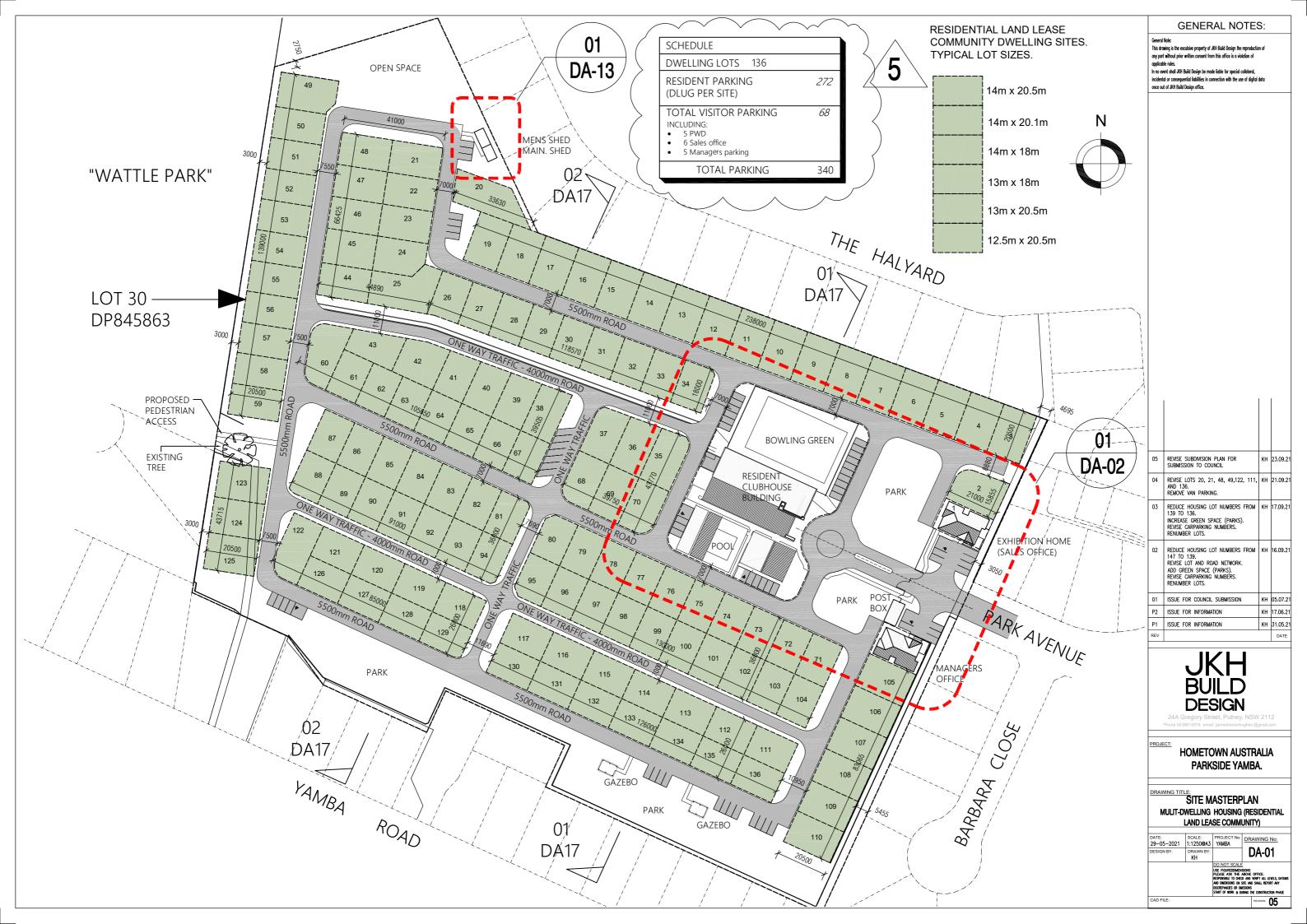
Assessment of the proposed development indicates that the development will not have a significant impact on the local road network and the upgraded Yamba Road / Shores Drive roundabout. As such, no further mitigating road works are required.

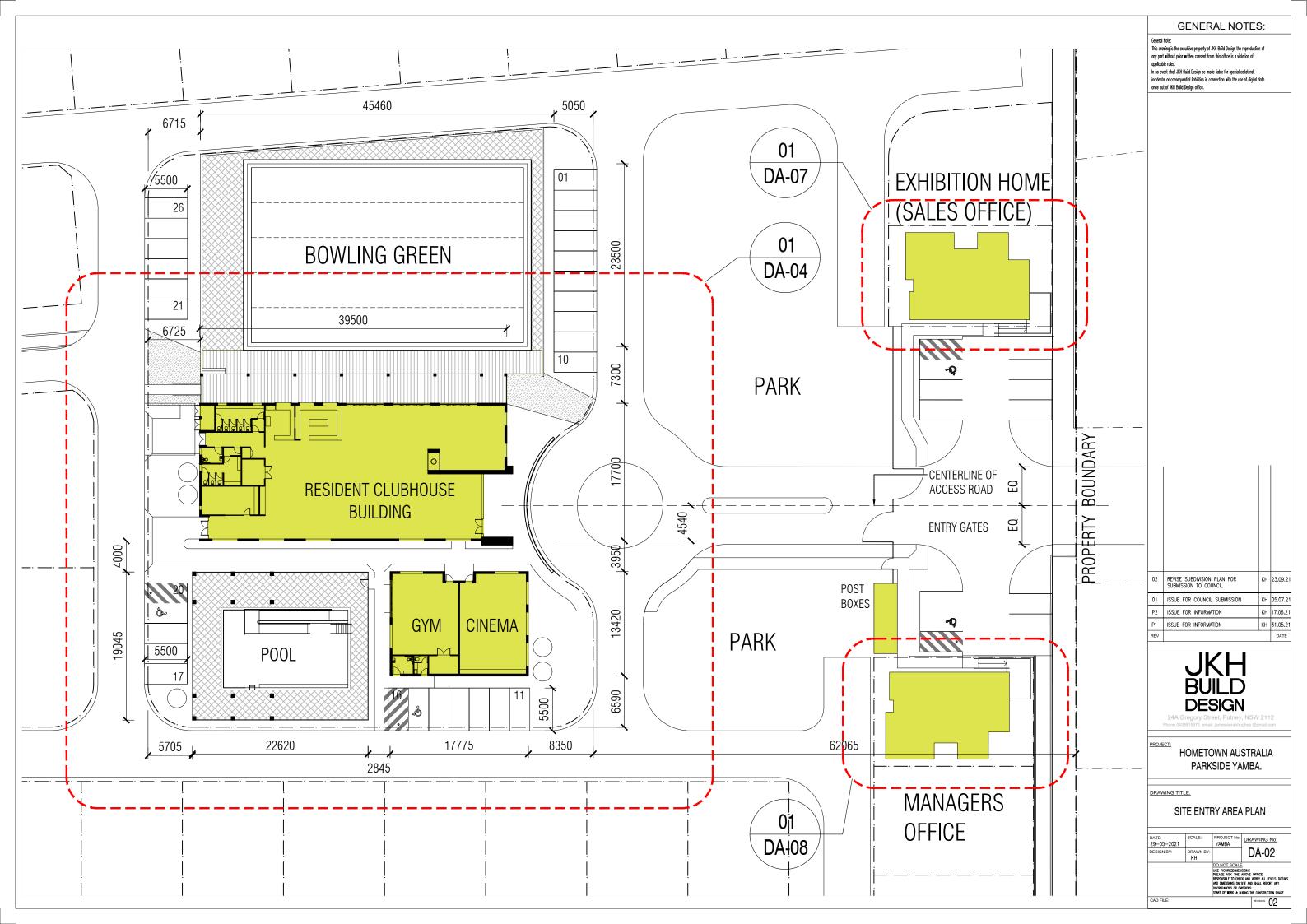
Site: 8 Park Avenue, Yamba 31

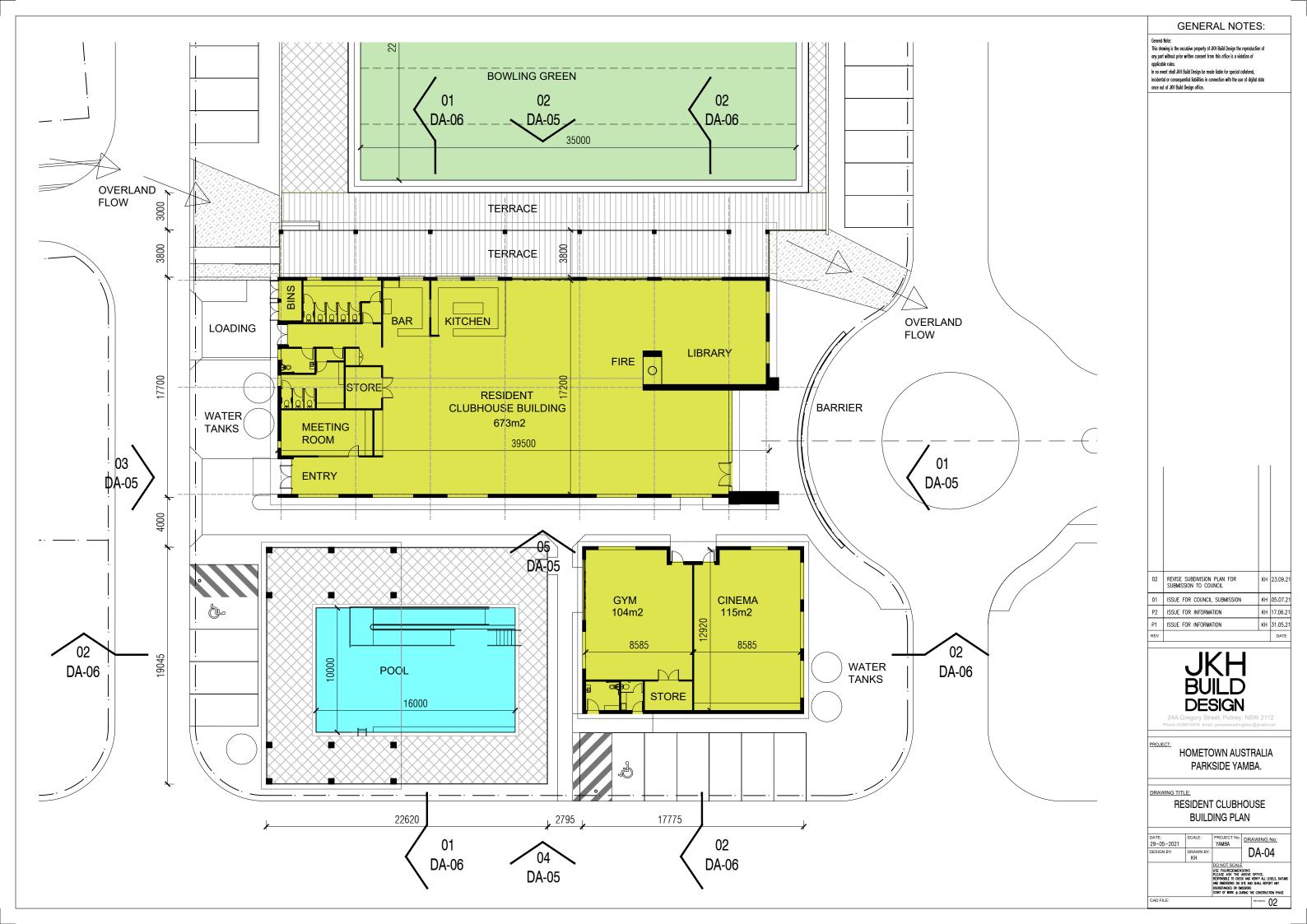


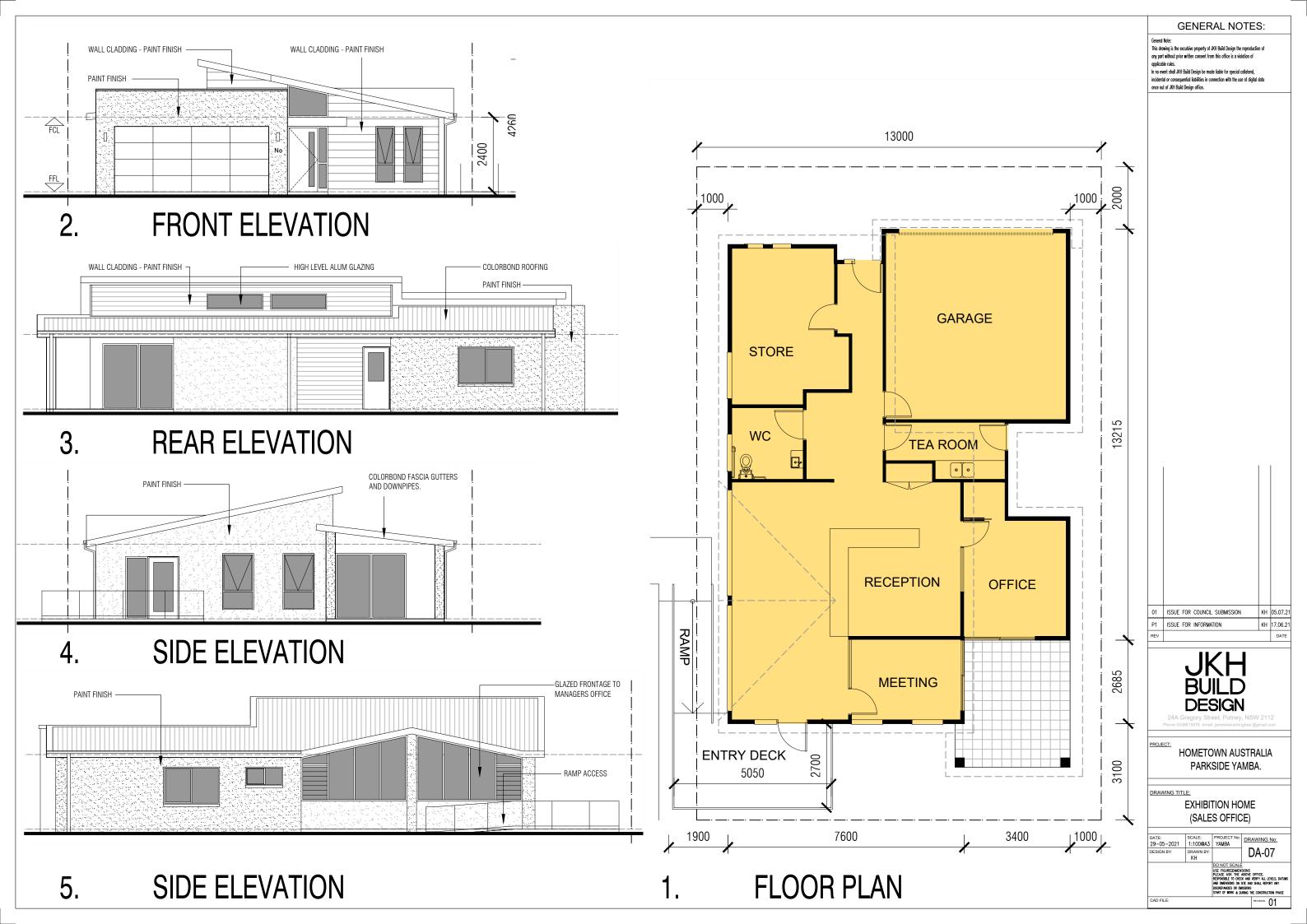
Appendix A Proposed Site Plan

Site: 8 Park Avenue, Yamba







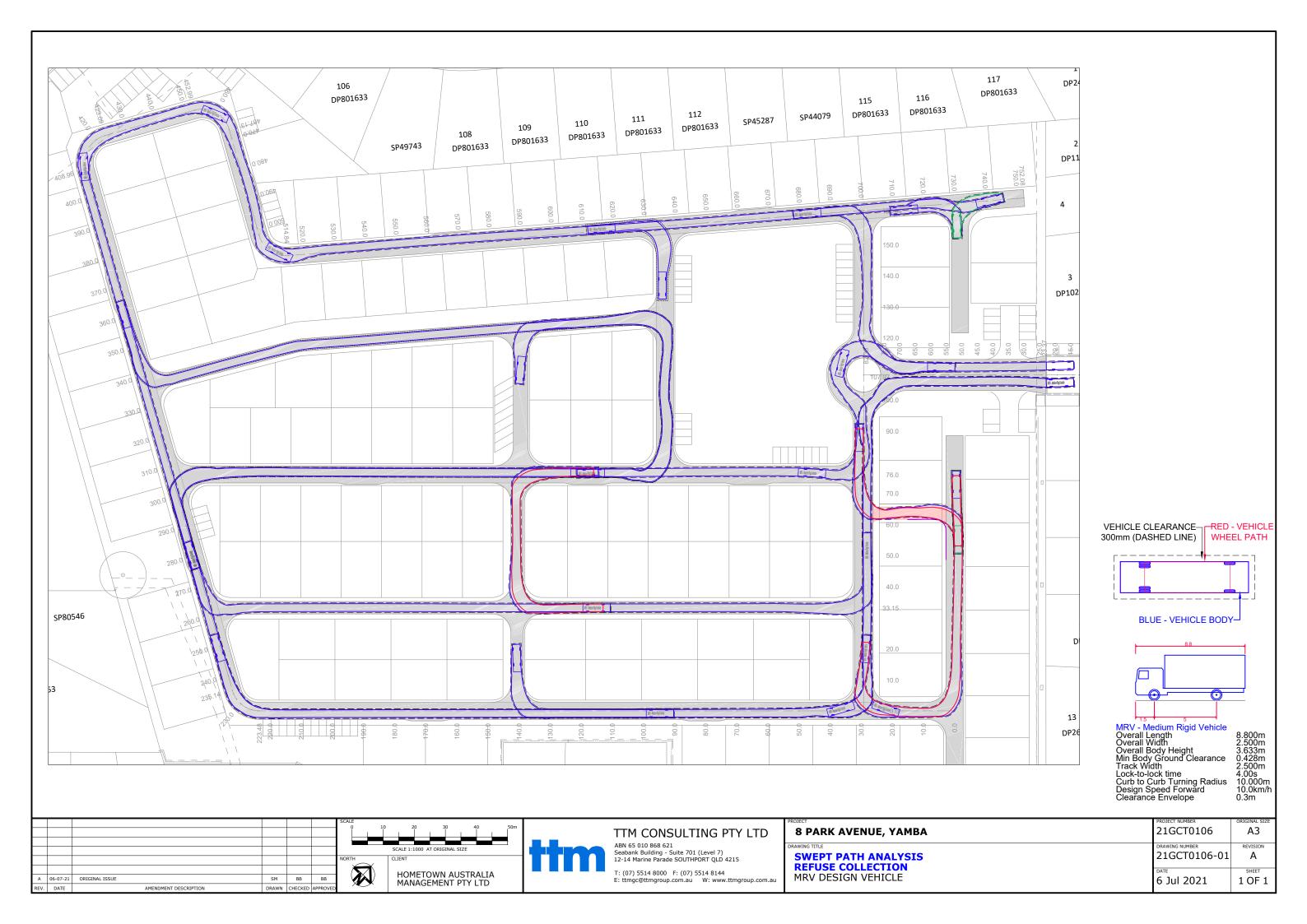


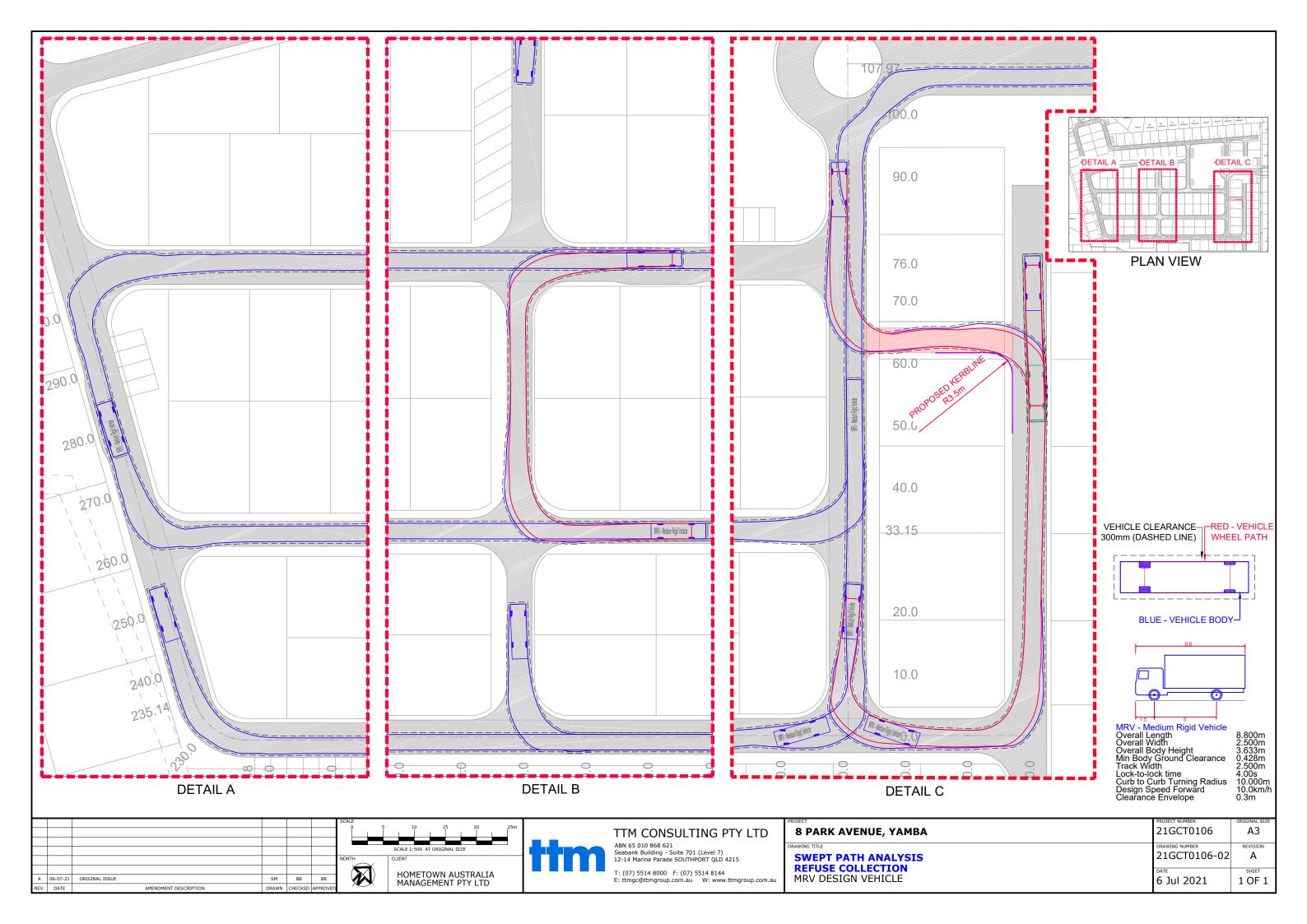


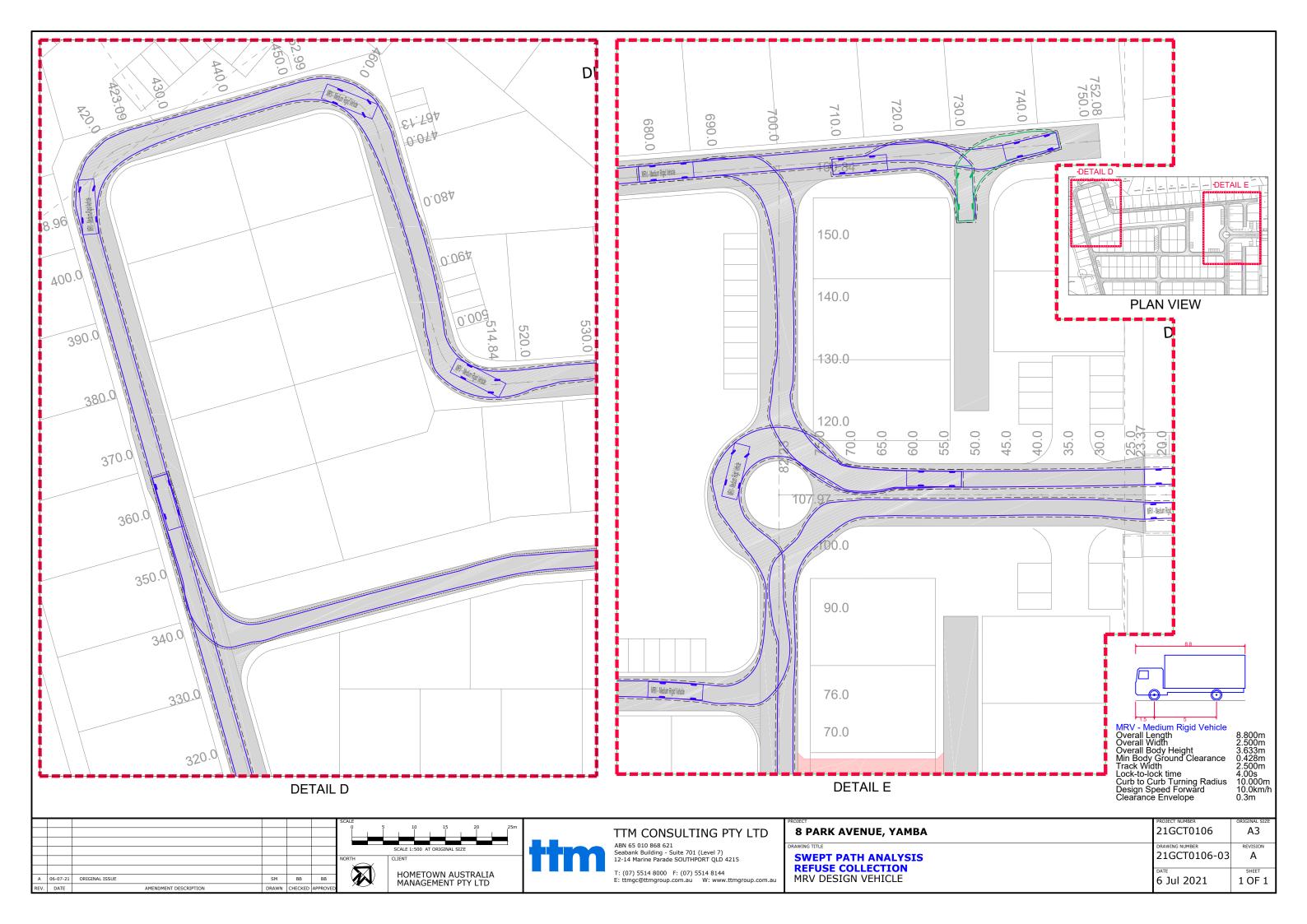
Appendix B Service Vehicle Swept Paths

Site: 8 Park Avenue, Yamba

Reference: 21GCT0106









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Appendix C SIDRA Outputs

Site: 8 Park Avenue, Yamba

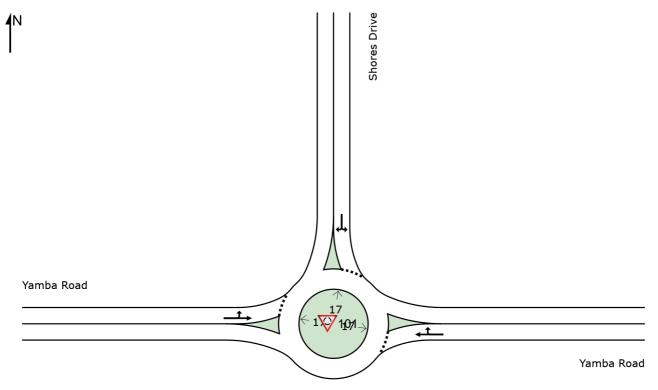
Reference: 21GCT0106

SITE LAYOUT

♥ Site: 101 [AM Peak Existing 2021 (Site Folder: General)]

21GCT0106 8 Park Avenue, Yamba Shores Drive / Yamba Road Site Category: (None) Roundabout

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



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Project: M:\Synergy\Projects\21GCT\21GCT\21GCT0106 8 Park Avenue, Yamba\6 - Analysis\21GCT0106_ShoresYamba.sip9

♥ Site: 101 [AM Peak Existing 2021 (Site Folder: General)]

21GCT0106 8 Park Avenue, Yamba Shores Drive / Yamba Road Site Category: (None) Roundabout

Lane Use	and Per	formar	nce										
	DEM FLO [Total veh/h	AND	Cap.	Deg. Satn v/c	Lane Util.	Aver. Delay sec	Level of Service	95% BA0 QUE [Veh		Lane Config	Lane Length m	Cap. F Adj. E %	
East: Yamb		/0	VCII/II	V/C	/0	300			- '''			/0	/0
Lane 1 ^d	615	5.0	1150	0.534	100	6.1	LOS A	4.7	34.3	Full	500	0.0	0.0
Approach	615	5.0		0.534		6.1	LOSA	4.7	34.3				
North: Shor	es Drive												
Lane 1 ^d	375	5.0	827	0.453	100	11.0	LOS B	3.2	23.4	Full	500	0.0	0.0
Approach	375	5.0		0.453		11.0	LOS B	3.2	23.4				
West: Yaml	oa Road												
Lane 1 ^d	587	5.0	1464	0.401	100	4.5	LOSA	3.3	23.8	Full	500	0.0	0.0
Approach	587	5.0		0.401		4.5	LOSA	3.3	23.8				
Intersectio n	1577	5.0		0.534		6.7	LOSA	4.7	34.3				

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

Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS values are based on average delay per lane.

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

Roundabout Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA Standard.

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

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

Approach	Lane Flo	ows (v	/eh/h)						
East: Yamba	a Road								
Mov. From E To Exit:	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c		Prob. SL Ov. %	Ov. Lane No.
Lane 1	576	39	615	5.0	1150	0.534	100	NA	NA
Approach	576	39	615	5.0		0.534			
North: Shore	es Drive								
Mov. From N To Exit:	L2 E	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	187	187	375	5.0	827	0.453	100	NA	NA
Approach	187	187	375	5.0		0.453			
West: Yamb	a Road								
Mov. From W To Exit:	L2 N	T1 E	Total	%HV	Cap. veh/h	Deg. Satn v/c		Prob. SL Ov. %	Ov. Lane No.
Lane 1	39	548	587	5.0	1464	0.401	100	NA	NA
Approach	39	548	587	5.0		0.401			

	Total	%HV De	g.Satn (v/c)
Intersection	1577	5.0	0.534

Merge Analysis							
Exit Lane Number	Lane Opr	cent Opposing og in Flow Rate ane % veh/h pcu/h	Critical Gap sec	Headway F	Rate	Deg. Satn [v/c	Merge Delay sec
East Exit: Yamba Road Merge Type: Not Applied							
Full Length Lane 1	Merge Anal	ysis not applied.					
North Exit: Shores Drive Merge Type: Not Applied							
Full Length Lane 1	Merge Anal	ysis not applied.					
West Exit: Yamba Road Merge Type: Not Applied							
Full Length Lane 1	Merge Anal	ysis not applied.					

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Project: M:\Synergy\Projects\21GCT\21GCT\0106 8 Park Avenue, Yamba\6 - Analysis\21GCT0106_ShoresYamba.sip9

♥ Site: 101 [PM Peak Existing 2021 (Site Folder: General)]

21GCT0106 8 Park Avenue, Yamba Shores Drive / Yamba Road Site Category: (None) Roundabout

Lane Use	and Per	formar	nce										
	DEM FLO [Total	AND	Сар.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% BA QUE [Veh	UE Dist]	Lane Config	Lane Length	Cap. F Adj. E %	
East: Yamb	veh/h a Road	70	veh/h	v/c	70	sec	_		m	_	m	70	70
Lane 1 ^d	724	5.0	1371	0.528	100	5.3	LOSA	5.0	36.2	Full	500	0.0	0.0
Approach	724	5.0		0.528		5.3	LOSA	5.0	36.2				
North: Shor	es Drive												
Lane 1 ^d	195	5.0	898	0.217	100	8.7	LOS A	1.2	9.1	Full	500	0.0	0.0
Approach	195	5.0		0.217		8.7	LOSA	1.2	9.1				
West: Yaml	oa Road												
Lane 1 ^d	489	5.0	1381	0.354	100	4.6	LOSA	2.5	18.3	Full	500	0.0	0.0
Approach	489	5.0		0.354		4.6	LOSA	2.5	18.3				
Intersectio n	1408	5.0		0.528		5.5	LOSA	5.0	36.2				

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

Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS values are based on average delay per lane.

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

Roundabout Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA Standard.

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

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

Approach	Lane Flo	ows (v	reh/h)						
East: Yamba	a Road								
Mov. From E To Exit:	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c		Prob. SL Ov. %	Ov. Lane No.
Lane 1	661	63	724	5.0	1371	0.528	100	NA	NA
Approach	661	63	724	5.0		0.528			
North: Shore	es Drive								
Mov. From N	L2	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
To Exit:	E	W							
Lane 1	117	78	195	5.0	898	0.217	100	NA	NA
Approach	117	78	195	5.0		0.217			
West: Yamb	a Road								
Mov. From W To Exit:	L2 N	T1 E	Total	%HV	Cap. veh/h	Deg. Satn v/c		Prob. SL Ov. %	Ov. Lane No.
Lane 1	42	447	489	5.0	1381	0.354	100	NA	NA
Approach	42	447	489	5.0		0.354			

	Total	%HV De	eg.Satn (v/c)
Intersection	1408	5.0	0.528

Merge Analysis							
Exit Lane Number		Percent Opposin Opng in Flow Ra Lane % veh/h pcu	te Gap	Follow-up La Headway Flo Ra sec veh	ow ate	Deg. Mir Satn Dela v/c se	y Delay
East Exit: Yamba Road Merge Type: Not Applied							
Full Length Lane 1	Merge	Analysis not appli	ed.				
North Exit: Shores Drive Merge Type: Not Applied							
Full Length Lane 1	Merge	Analysis not appli	ed.				
West Exit: Yamba Road Merge Type: Not Applied							
Full Length Lane 1	Merge	Analysis not appli	ed.				

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Project: M:\Synergy\Projects\21GCT\21GCT\0106 8 Park Avenue, Yamba\6 - Analysis\21GCT0106_ShoresYamba.sip9

▼ Site: 101 [AM Peak Base Case 2023 (Site Folder: General)]

21GCT0106 8 Park Avenue, Yamba Shores Drive / Yamba Road Site Category: (None) Roundabout

Lane Use	and Per	formar	nce										
	DEM FLO [Total veh/h		Cap.	Deg. Satn v/c	Lane Util.	Aver. Delay	Level of Service	95% BA QUE [Veh	UE Dist]	Lane Config	Lane Length	Cap. F Adj. E	
East: Yamb		70	veh/h	V/C	70	sec	_		m	_	m	70	70
Lane 1 ^d	656	5.0	1153	0.569	100	6.1	LOS A	5.2	38.3	Full	500	0.0	0.0
Approach	656	5.0		0.569		6.1	LOS A	5.2	38.3				
North: Shor	es Drive												
Lane 1 ^d	375	5.0	799	0.469	100	11.7	LOS B	3.5	25.3	Full	500	0.0	0.0
Approach	375	5.0		0.469		11.7	LOS B	3.5	25.3				
West: Yamb	oa Road												
Lane 1 ^d	626	5.0	1469	0.426	100	4.5	LOS A	3.6	26.4	Full	500	0.0	0.0
Approach	626	5.0		0.426		4.5	LOSA	3.6	26.4				
Intersectio n	1657	5.0		0.569		6.8	LOSA	5.2	38.3				

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

Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS values are based on average delay per lane.

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

Roundabout Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA Standard.

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

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

Approach	Lane Flo	ows (v	/eh/h)						
East: Yamba		vy ewe	CH/II)						
Mov. From E To Exit:	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	617	39	656	5.0	1153	0.569	100	NA	NA
Approach	617	39	656	5.0		0.569			
North: Shore	es Drive								
Mov. From N To Exit:	L2 E	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	187	187	375	5.0	799	0.469	100	NA	NA
Approach	187	187	375	5.0		0.469			
West: Yamb	a Road								
Mov. From W To Exit:	L2 N	T1 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	39	587	626	5.0	1469	0.426	100	NA	NA
Approach	39	587	626	5.0		0.426			

	Total	%HV De	eg.Satn (v/c)		
Intersection	1657	5.0	0.569		

Merge Analysis							
Exit Lane Number	Lane	Percent Opposing Opng in Flow Rate Lane % veh/h pcu/l		Headway F	low Rate	Deg. Mir Satn Dela v/c se	y Delay
East Exit: Yamba Road Merge Type: Not Applied							
Full Length Lane 1	Merge	Analysis not applied	l.				
North Exit: Shores Drive Merge Type: Not Applied							
Full Length Lane 1	Merge	Analysis not applied	.				
West Exit: Yamba Road Merge Type: Not Applied							
Full Length Lane 1	Merge	Analysis not applied	l.				

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Project: M:\Synergy\Projects\21GCT\21GCT\0106 8 Park Avenue, Yamba\6 - Analysis\21GCT0106_ShoresYamba.sip9

▼ Site: 101 [PM Peak Base Case 2023 (Site Folder: General)]

21GCT0106 8 Park Avenue, Yamba Shores Drive / Yamba Road Site Category: (None) Roundabout

Lane Use	and Per	formar	nce										
Luno oco	DEM/ FLO [Total veh/h	AND	Cap.	Deg. Satn	Lane Util.	Aver. Delay sec	Level of Service	95% BA QUE [Veh		Lane Config	Lane Length m	Cap. F Adj. E	
East: Yamb		70	VO11/11	V/ O		300			- '''			70	70
Lane 1 ^d	772	5.0	1372	0.562	100	5.3	LOS A	5.6	40.7	Full	500	0.0	0.0
Approach	772	5.0		0.562		5.3	LOSA	5.6	40.7				
North: Shor	es Drive												
Lane 1 ^d	195	5.0	870	0.224	100	8.9	LOS A	1.3	9.5	Full	500	0.0	0.0
Approach	195	5.0		0.224		8.9	LOSA	1.3	9.5				
West: Yamb	oa Road												
Lane 1 ^d	521	5.0	1384	0.377	100	4.7	LOS A	2.7	20.1	Full	500	0.0	0.0
Approach	521	5.0		0.377		4.7	LOSA	2.7	20.1				
Intersectio n	1487	5.0		0.562		5.5	LOSA	5.6	40.7				

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

Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS values are based on average delay per lane.

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

Roundabout Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA Standard.

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

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

Approach	Lane Flo	ows (v	eh/h)						
East: Yamba	Road								
Mov.	T1	R2	Total	%HV		Deg.		Prob.	Ov.
From E					Cap.	Satn		SL Ov.	Lane
To Exit:	W	Ν			veh/h	v/c	%	%	No.
Lane 1	708	63	772	5.0	1372	0.562	100	NA	NA
Approach	708	63	772	5.0		0.562			
North: Shore	es Drive								
Mov.	L2	R2	Total	%HV		Deg.		Prob.	Ov.
From N					Cap.	Satn		SL Ov.	Lane
To Exit:	Е	W			veh/h	v/c	%	%	No.
Lane 1	117	78	195	5.0	870	0.224	100	NA	NA
Approach	117	78	195	5.0		0.224			
West: Yamb	a Road								
Mov.	L2	T1	Total	%HV		Deg.	Lane		Ov.
From W					Cap.	Satn		SL Ov.	Lane
To Exit:	N	Е			veh/h	v/c	%	%	No.
Lane 1	42	479	521	5.0	1384	0.377	100	NA	NA
Approach	42	479	521	5.0		0.377			
''									

	Total	%HV De	g.Satn (v/c)		
Intersection	1487	5.0	0.562		

Merge Analysis							
Exit Lane Number	Lane Opr	cent Opposing og in Flow Rate ane % veh/h pcu/h	Critical Gap sec	Headway F	Rate	Deg. Satn [v/c	Merge Delay sec
East Exit: Yamba Road Merge Type: Not Applied							
Full Length Lane 1	Merge Anal	ysis not applied.					
North Exit: Shores Drive Merge Type: Not Applied							
Full Length Lane 1	Merge Anal	ysis not applied.					
West Exit: Yamba Road Merge Type: Not Applied							
Full Length Lane 1	Merge Anal	ysis not applied.					

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▼ Site: 101 [AM Peak Project Case 2023 (Site Folder: General)]

21GCT0106 8 Park Avenue, Yamba Shores Drive / Yamba Road Site Category: (None) Roundabout

Lane Use	and Per	formar	nce										
	DEM FLO [Total veh/h	AND	Cap.	Deg. Satn v/c	Lane Util.	Aver. Delay sec	Level of Service	95% BA QUE [Veh		Lane Config	Lane Length m	Cap. F Adj. E %	
East: Yamb		/0	VCII/II	V/C	/0	360			- '''		""	/0	/0
Lane 1 ^d	667	5.0	1089	0.613	100	6.8	LOS A	5.9	43.2	Full	500	0.0	0.0
Approach	667	5.0		0.613		6.8	LOSA	5.9	43.2				
North: Shor	es Drive												
Lane 1 ^d	463	5.0	793	0.584	100	13.6	LOS B	5.4	39.5	Full	500	0.0	0.0
Approach	463	5.0		0.584		13.6	LOS B	5.4	39.5				
West: Yaml	oa Road												
Lane 1 ^d	638	5.0	1430	0.446	100	4.6	LOSA	3.9	28.7	Full	500	0.0	0.0
Approach	638	5.0		0.446		4.6	LOSA	3.9	28.7				
Intersectio n	1768	5.0		0.613		7.8	LOSA	5.9	43.2				

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

Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS values are based on average delay per lane.

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

Roundabout Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA Standard.

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

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

Approach	Lane Flo	ows (v	eh/h)						
East: Yamba	a Road								
Mov.	T1	R2	Total	%HV		Deg.		Prob.	Ov.
From E					Cap.	Satn		SL Ov.	Lane
To Exit:	W	N			veh/h	v/c	%	%	No.
Lane 1	617	51	667	5.0	1089	0.613	100	NA	NA
Approach	617	51	667	5.0		0.613			
N. II. OI	Б.								
North: Shore	es Drive								
Mov.	L2	R2	Total	%HV		Deg.		Prob.	Ov.
From N					Cap.	Satn		SL Ov.	Lane
To Exit:	Е	W			veh/h	v/c	%	%	No.
Lane 1	232	232	463	5.0	793	0.584	100	NA	NA
Approach	232	232	463	5.0		0.584			
West: Yamb	a Road								
Mov.	L2	T1	Total	%HV		Deg.		Prob.	Ov.
From W					Сар.	Satn		SL Ov.	Lane
To Exit:	N	Ε			veh/h	v/c	%	%	No.
Lane 1	51	587	638	5.0	1430	0.446	100	NA	NA
Approach	51	587	638	5.0		0.446			
''									

	Total	%HV De	eg.Satn (v/c)			
Intersection	1768	5.0	0.613			

Merge Analysis								
Ex Lan Numbe	e Lane	Opng in Lane	Opposing Flow Rate /eh/h pcu/h	Critical Gap sec	Follow-up Headway sec	apacity veh/h	Deg. Satn [v/c	Merge Delay sec
East Exit: Yamba Road Merge Type: Not Applied								
Full Length Lane	1 Merge	Analysis r	not applied.					
North Exit: Shores Drive Merge Type: Not Applied								
Full Length Lane	1 Merge	Analysis r	not applied.					
West Exit: Yamba Road Merge Type: Not Applied								
Full Length Lane	1 Merge	Analysis r	not applied.					

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▼ Site: 101 [PM Peak Project Case 2023 (Site Folder: General)]

21GCT0106 8 Park Avenue, Yamba Shores Drive / Yamba Road Site Category: (None) Roundabout

Lane Use	and Per	formar	nce										
	DEM, FLO [Total veh/h	AND	Cap.	Deg. Satn	Lane Util.	Aver. Delay sec	Level of Service	95% BA QUE [Veh		Lane Config	Lane Length m	Cap. F Adj. E %	
East: Yamb		70	VO11/11	V/ O	,,							70	,,
Lane 1 ^d	829	5.0	1355	0.612	100	5.7	LOSA	6.6	48.0	Full	500	0.0	0.0
Approach	829	5.0		0.612		5.7	LOSA	6.6	48.0				
North: Shor	es Drive												
Lane 1 ^d	219	5.0	855	0.256	100	9.0	LOS A	1.6	11.4	Full	500	0.0	0.0
Approach	219	5.0		0.256		9.0	LOSA	1.6	11.4				
West: Yaml	oa Road												
Lane 1 ^d	560	5.0	1263	0.443	100	5.1	LOS A	3.4	25.1	Full	500	0.0	0.0
Approach	560	5.0		0.443		5.1	LOSA	3.4	25.1				
Intersectio n	1608	5.0		0.612		5.9	LOSA	6.6	48.0				

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

Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS values are based on average delay per lane.

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

Roundabout Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA Standard.

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

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

Approach	Lane Flo	ows (v	/eh/h)		·				
East: Yamba	a Road								
Mov.	T1	R2	Total	%HV		Deg.		Prob.	Ov.
From E					Cap.	Satn		SL Ov.	Lane
To Exit:	W	N			veh/h	v/c	%	%	No.
Lane 1	708	121	829	5.0	1355	0.612	100	NA	NA
Approach	708	121	829	5.0		0.612			
	5.								
North: Shore	es Drive								
Mov.	L2	R2	Total	%HV		Deg.		Prob.	Ov.
From N					Cap.	Satn		SL Ov.	Lane
To Exit:	E	W			veh/h	v/c	%	%	No.
Lane 1	132	87	219	5.0	855	0.256	100	NA	NA
Approach	132	87	219	5.0		0.256			
West: Yamb	a Road								
Mov.	L2	T1	Total	%HV		Deg.		Prob.	Ov.
From W					Сар.	Satn		SL Ov.	Lane
To Exit:	Ν	Ε			veh/h	v/c	%	%	No.
Lane 1	81	479	560	5.0	1263	0.443	100	NA	NA
Approach	81	479	560	5.0		0.443			
''									

	Total	%HV De	eg.Satn (v/c)		
Intersection	1608	5.0	0.612		

Merge Analysis								
Ex Lan Numbe	e Lane	Opng in Lane	Opposing Flow Rate /eh/h pcu/h	Critical Gap sec	Follow-up Headway sec	apacity veh/h	Deg. Satn [v/c	Merge Delay sec
East Exit: Yamba Road Merge Type: Not Applied								
Full Length Lane	1 Merge	Analysis r	not applied.					
North Exit: Shores Drive Merge Type: Not Applied								
Full Length Lane	1 Merge	Analysis r	not applied.					
West Exit: Yamba Road Merge Type: Not Applied								
Full Length Lane	1 Merge	Analysis r	not applied.					

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▼ Site: 101 [AM Peak Base Case 2033 (Site Folder: General)]

21GCT0106 8 Park Avenue, Yamba Shores Drive / Yamba Road Site Category: (None) Roundabout

Lane Use	and Per	formar	nce										
	DEM FLO [Total veh/h	AND	Cap.	Deg. Satn v/c	Lane Util.	Aver. Delay sec	Level of Service	95% BA QUE [Veh		Lane Config	Lane Length m	Cap. F Adj. E %	
East: Yamb		/0	VC11/11	V/C	/0	360			- '''		- ''	70	70
Lane 1 ^d	909	5.0	1163	0.782	100	7.9	LOS A	11.9	86.9	Full	500	0.0	0.0
Approach	909	5.0		0.782		7.9	LOSA	11.9	86.9				
North: Shor	es Drive												
Lane 1 ^d	375	5.0	622	0.602	100	18.8	LOS B	5.9	43.2	Full	500	0.0	0.0
Approach	375	5.0		0.602		18.8	LOS B	5.9	43.2				
West: Yamb	oa Road												
Lane 1 ^d	867	5.0	1489	0.582	100	4.6	LOS A	6.8	49.5	Full	500	0.0	0.0
Approach	867	5.0		0.582		4.6	LOSA	6.8	49.5				
Intersectio n	2152	5.0		0.782		8.5	LOSA	11.9	86.9				

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

Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS values are based on average delay per lane.

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

Roundabout Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA Standard.

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

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

Approach	Lane Flo	ows (v	reh/h)						
East: Yamba									
Mov. From E To Exit:	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c		Prob. SL Ov. %	Ov. Lane No.
Lane 1	871	39	909	5.0	1163	0.782	100	NA	NA
Approach	871	39	909	5.0		0.782			
North: Shore	es Drive								
Mov. From N To Exit:	L2 E	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	187	187	375	5.0	622	0.602	100	NA	NA
Approach	187	187	375	5.0		0.602			
West: Yamb	a Road								
Mov. From W To Exit:	L2 N	T1 E	Total	%HV	Cap. veh/h	Deg. Satn v/c		Prob. SL Ov. %	Ov. Lane No.
Lane 1	39	828	867	5.0	1489	0.582	100	NA	NA
Approach	39	828	867	5.0		0.582			

	Total	%HVD	eg.Satn (v/c)
Intersection	2152	5.0	0.782

Merge Analysis							
Exit Lane Number		Percent Opposin Opng in Flow Ra Lane % veh/h pcu	te Gap	Follow-up La Headway Flo Ra sec veh	ow ate	Deg. Mir Satn Dela v/c se	y Delay
East Exit: Yamba Road Merge Type: Not Applied							
Full Length Lane 1	Merge	Analysis not appli	ed.				
North Exit: Shores Drive Merge Type: Not Applied							
Full Length Lane 1	Merge	Analysis not appli	ed.				
West Exit: Yamba Road Merge Type: Not Applied							
Full Length Lane 1	Merge	Analysis not appli	ed.				

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▼ Site: 101 [PM Peak Base Case 2033 (Site Folder: General)]

21GCT0106 8 Park Avenue, Yamba Shores Drive / Yamba Road Site Category: (None) Roundabout

Lane Use	and Per	formar	nce										
	DEM FLO [Total veh/h	AND	Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% BA QUE [Veh	UE Dist]	Lane Config	Lane Length	Cap. F Adj. E %	
East: Yamb		70	ven/m	v/c	70	sec			m	_	m	70	70
Lane 1 ^d	1062	5.0	1392	0.763	100	5.6	LOS A	11.7	85.5	Full	500	0.0	0.0
Approach	1062	5.0		0.763		5.6	LOS A	11.7	85.5				
North: Shor	es Drive												
Lane 1 ^d	195	5.0	720	0.270	100	10.7	LOS B	1.7	12.4	Full	500	0.0	0.0
Approach	195	5.0		0.270		10.7	LOS B	1.7	12.4				
West: Yamb	oa Road												
Lane 1 ^d	718	5.0	1403	0.512	100	4.7	LOSA	4.8	34.8	Full	500	0.0	0.0
Approach	718	5.0		0.512		4.7	LOSA	4.8	34.8				
Intersectio n	1975	5.0		0.763		5.8	LOSA	11.7	85.5				

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

Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS values are based on average delay per lane.

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

Roundabout Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA Standard.

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

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

Approach	Lane Flo	ows (v	reh/h)						
East: Yamba	a Road								
Mov. From E To Exit:	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c		Prob. SL Ov. %	Ov. Lane No.
Lane 1	999	63	1062	5.0	1392	0.763	100	NA	NA
Approach	999	63	1062	5.0		0.763			
North: Shore	es Drive								
Mov. From N	L2	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
To Exit:	117	W 78	195	5.0		0.270	100	NA	NA
Approach	117	78	195	5.0	720	0.270	100	INA	INA
West: Yamb	a Road								
Mov. From W To Exit:	L2 N	T1 E	Total	%HV	Cap. veh/h	Deg. Satn v/c		Prob. SL Ov. %	Ov. Lane No.
Lane 1	42	676	718	5.0	1403	0.512	100	NA	NA
Approach	42	676	718	5.0		0.512			

	Total	%HVD	eg.Satn (v/c)
Intersection	1975	5.0	0.763

Merge Analysis							
Exit Lane Number	Lane Opr	cent Opposing og in Flow Rate ane % veh/h pcu/h	Critical Gap sec	Headway F	Rate	Deg. Satn [v/c	Merge Delay sec
East Exit: Yamba Road Merge Type: Not Applied							
Full Length Lane 1	Merge Anal	ysis not applied.					
North Exit: Shores Drive Merge Type: Not Applied							
Full Length Lane 1	Merge Anal	ysis not applied.					
West Exit: Yamba Road Merge Type: Not Applied							
Full Length Lane 1	Merge Anal	ysis not applied.					

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▼ Site: 101 [AM Peak Project Case 2033 (Site Folder: General)]

21GCT0106 8 Park Avenue, Yamba Shores Drive / Yamba Road Site Category: (None) Roundabout

Lane Use	and Per	formar	nce										
	DEM FLO [Total	WS HV]	Сар.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% BA QUE [Veh		Lane Config	Lane Length	Cap. F Adj. E	Block.
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
East: Yamb	a Road												
Lane 1 ^d	921	5.0	1093	0.843	100	11.1	LOS B	16.0	117.1	Full	500	0.0	0.0
Approach	921	5.0		0.843		11.1	LOS B	16.0	117.1				
North: Shor	es Drive												
Lane 1 ^d	463	5.0	605	0.766	100	26.2	LOS C	10.3	75.5	Full	500	0.0	0.0
Approach	463	5.0		0.766		26.2	LOS C	10.3	75.5				
West: Yaml	oa Road												
Lane 1 ^d	879	5.0	1447	0.607	100	4.7	LOSA	7.4	54.4	Full	500	0.0	0.0
Approach	879	5.0		0.607		4.7	LOSA	7.4	54.4				
Intersectio n	2263	5.0		0.843		11.7	LOS B	16.0	117.1				

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

Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS values are based on average delay per lane.

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

Roundabout Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA Standard.

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

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

Approach	Lane Flo	ows (v	/eh/h)						
East: Yamba		Ì							
Mov. From E To Exit:	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	871	51	921	5.0	1093	0.843	100	NA	NA
Approach	871	51	921	5.0		0.843			
North: Shore	es Drive								
Mov. From N To Exit:	L2 E	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	232	232	463	5.0	605	0.766	100	NA	NA
Approach	232	232	463	5.0		0.766			
West: Yamb	a Road								
Mov. From W To Exit:	L2 N	T1 E	Total	%HV	Cap. veh/h	Deg. Satn v/c		Prob. SL Ov. %	Ov. Lane No.
Lane 1	51	828	879	5.0	1447	0.607	100	NA	NA
Approach	51	828	879	5.0		0.607			

	Total	%HV De	eg.Satn (v/c)		
Intersection	2263	5.0	0.843		

Merge Analysis							
Exit Lane Number	Lane Opr	cent Opposing og in Flow Rate ane % veh/h pcu/h	Critical Gap sec	Headway F	Rate	Deg. Satn [v/c	Merge Delay sec
East Exit: Yamba Road Merge Type: Not Applied							
Full Length Lane 1	Merge Anal	ysis not applied.					
North Exit: Shores Drive Merge Type: Not Applied							
Full Length Lane 1	Merge Anal	ysis not applied.					
West Exit: Yamba Road Merge Type: Not Applied							
Full Length Lane 1	Merge Anal	ysis not applied.					

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Project: M:\Synergy\Projects\21GCT\21GCT\0106 8 Park Avenue, Yamba\6 - Analysis\21GCT0106_ShoresYamba.sip9

▼ Site: 101 [PM Peak Project Case 2033 (Site Folder: General)]

21GCT0106 8 Park Avenue, Yamba Shores Drive / Yamba Road Site Category: (None) Roundabout

Lane Use	and Por	formar	000										
Lane Ose	DEM, FLO [Total veh/h	AND	Cap.	Deg. Satn	Lane Util.	Aver. Delay sec	Level of Service	95% BA QUE [Veh		Lane Config	Lane Length m	Cap. F Adj. E	
East: Yamb													
Lane 1 ^d	1120	5.0	1371	0.817	100	6.1	LOSA	14.3	104.4	Full	500	0.0	0.0
Approach	1120	5.0		0.817		6.1	LOSA	14.3	104.4				
North: Shor	es Drive												
Lane 1 ^d	219	5.0	684	0.320	100	10.8	LOS B	2.1	15.5	Full	500	0.0	0.0
Approach	219	5.0		0.320		10.8	LOS B	2.1	15.5				
West: Yamb	oa Road												
Lane 1 ^d	757	5.0	1271	0.596	100	5.3	LOSA	6.1	44.2	Full	500	0.0	0.0
Approach	757	5.0		0.596		5.3	LOSA	6.1	44.2				
Intersectio n	2096	5.0		0.817		6.3	LOSA	14.3	104.4				

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

Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS values are based on average delay per lane.

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

Roundabout Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA Standard.

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

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

Approach	Lane Flo	ows (v	/eh/h)						
East: Yamba	a Road								
Mov.	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From E					Cap.	Satn		SL Ov.	Lane
To Exit:	W	Ν			veh/h	v/c	%	%	No.
Lane 1	999	121	1120	5.0	1371	0.817	100	NA	NA
Approach	999	121	1120	5.0		0.817			
North: Shore	es Drive								
Mov.	L2	R2	Total	%HV		Deg.		Prob.	Ov.
From N					Cap.	Satn		SL Ov.	Lane
To Exit:	E	W			veh/h	v/c	%	%	No.
Lane 1	132	87	219	5.0	684	0.320	100	NA	NA
Approach	132	87	219	5.0		0.320			
West: Yamb	a Road								
Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.
From W					Cap.	Satn		SL Ov.	Lane
To Exit:	Ν	Ε			veh/h	v/c	%	%	No.
Lane 1	81	676	757	5.0	1271	0.596	100	NA	NA
Approach	81	676	757	5.0		0.596			
	٠.	0.0		0.0		3.000			

	Total	%HV De	g.Satn (v/c)		
Intersection	2096	5.0	0.817		

Merge Analysis								
Ex Lan Numbe	e Lane	Opng in Lane	Opposing Flow Rate /eh/h pcu/h	Critical Gap sec	Follow-up Headway sec	apacity veh/h	Deg. Satn [v/c	Merge Delay sec
East Exit: Yamba Road Merge Type: Not Applied								
Full Length Lane	1 Merge	Analysis r	not applied.					
North Exit: Shores Drive Merge Type: Not Applied								
Full Length Lane	1 Merge	Analysis r	not applied.					
West Exit: Yamba Road Merge Type: Not Applied								
Full Length Lane	1 Merge	Analysis r	not applied.					

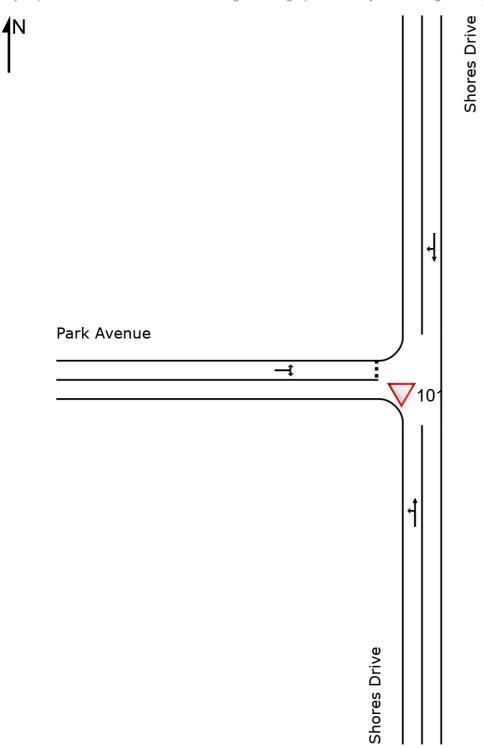
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SITE LAYOUT

▽ Site: 101 [AM Peak Base Case (Site Folder: General)]

21GCT0106 8 Park Avenue, Yamba Park Avenue / Shores Drive Site Category: (None) Give-Way (Two-Way)

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



▽ Site: 101 [AM Peak Base Case (Site Folder: General)]

21GCT0106 8 Park Avenue, Yamba Park Avenue / Shores Drive Site Category: (None) Give-Way (Two-Way)

Lane Use	and Per	formar	nce										
	DEM/ FLO¹ [Total veh/h	AND	Cap.	Deg. Satn v/c	Lane Util.	Aver. Delay sec	Level of Service	95% BA QUE [Veh		Lane Config	Lane Length m	Cap. F Adj. E %	
South: Sho		,,,	V 31 I/11	V/ O	,,							70	70
Lane 1	81	5.0	1885	0.043	100	0.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	81	5.0		0.043		0.2	NA	0.0	0.0				
North: Shor	es Drive												
Lane 1	376	5.0	1888	0.199	100	0.0	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	376	5.0		0.199		0.0	NA	0.0	0.1				
West: Park	Avenue												
Lane 1	12	5.0	830	0.014	100	7.4	LOS A	0.0	0.3	Full	500	0.0	0.0
Approach	12	5.0		0.014		7.4	LOSA	0.0	0.3				
Intersectio n	468	5.0		0.199		0.2	NA	0.0	0.3				

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

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

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

Queue Model: SIDRA Standard.

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

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

Approach	Lane Flo	ows (v	eh/h)						
South: Shore	es Drive								
Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	3	78	81	5.0	1885	0.043	100	NA	NA
Approach	3	78	81	5.0		0.043			
North: Shore	es Drive								
Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c		Prob. SL Ov. %	Ov. Lane No.
Lane 1	375	1	376	5.0	1888	0.199	100	NA	NA
Approach	375	1	376	5.0		0.199			
West: Park A	Avenue								
Mov. From W To Exit:	L2 N	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	11	12	5.0	830	0.014	100	NA	NA
Approach	1	11	12	5.0		0.014			
	Total	%HV [eg.Sat	n (v/c)					

Intersection 468 5.0 0.199

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

Merge Analysis					
Exit Lane Number	Short Percent Opposin Lane Opng in Flow Ra Length Lane m % veh/h pct	te Gap	Follow-up Lane Capacity Headway Flow Rate sec veh/h veh/h	Satn Delay	Merge Delay sec
South Exit: Shores Drive Merge Type: Not Applied					
Full Length Lane 1	Merge Analysis not applie	ed.			
North Exit: Shores Drive Merge Type: Not Applied					
Full Length Lane 1	Merge Analysis not applie	ed.			
West Exit: Park Avenue Merge Type: Not Applied					
Full Length Lane 1	Merge Analysis not applie	ed.			

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▽ Site: 101 [PM Peak Base Case (Site Folder: General)]

21GCT0106 8 Park Avenue, Yamba Park Avenue / Shores Drive Site Category: (None) Give-Way (Two-Way)

Lane Use	and Per	formar	nce										
	DEM/ FLO [Total veh/h		Cap.	Deg. Satn v/c	Lane Util.	Aver. Delay sec	Level of Service	95% BA QUE [Veh		Lane Config	Lane Length m	Cap. F Adj. E %	
South: Sho		70	VC11/11	V/C	/0	360			- '''			70	70
Lane 1	116	5.0	1880	0.062	100	0.5	LOSA	0.0	0.0	Full	500	0.0	0.0
Approach	116	5.0		0.062		0.5	NA	0.0	0.0				
North: Shor	es Drive												
Lane 1	196	5.0	1886	0.104	100	0.0	LOSA	0.0	0.1	Full	500	0.0	0.0
Approach	196	5.0		0.104		0.0	NA	0.0	0.1				
West: Park	Avenue												
Lane 1	4	5.0	1033	0.004	100	6.5	LOSA	0.0	0.1	Full	500	0.0	0.0
Approach	4	5.0		0.004		6.5	LOSA	0.0	0.1				
Intersectio n	316	5.0		0.104		0.3	NA	0.0	0.1				

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

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

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

Queue Model: SIDRA Standard.

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

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

Approach	Lane Flo	ows <u>(</u> v	reh/h)							
South: Shore										
Mov.	L2	T1	Total	%HV	Can	Deg.		Prob.	Ov.	
From S To Exit:	W	N			Cap. veh/h	Satn v/c	Util. 3	SL Ov. %	Lane No.	
Lane 1	11	105	116	5.0	1880	0.062	100	NA	NA	
Approach	11	105	116	5.0		0.062				
North: Shore	es Drive									
Mov.	T1	R2	Total	%HV		Deg.		Prob.	Ov.	
From N To Exit:	S	W			Cap. veh/h	Satn v/c	Util. 3	SL Ov. %	Lane No.	
Lane 1	195	1	196	5.0	1886	0.104	100	NA	NA	
Approach	195	1	196	5.0		0.104				
West: Park A	Avenue									
Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From W					Cap. veh/h	Satn v/c	Util. : %	SL Ov. %	Lane No.	
To Exit:	N	S			ven/n	V/C	70	70	INO.	
Lane 1	1	3	4	5.0	1033	0.004	100	NA	NA	
Approach	1	3	4	5.0		0.004				
	Total	%HV [eg.Sat	n (v/c)						

Intersection 5.0 0.104 316

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

Merge Analysis						
Exit Lane Number	Lane	Percent Opposing Opng in Flow Rate Lane % veh/h pcu/h	Follow-up Lar Headway Flo Ra sec veh	ow te	Deg. Satn [v/c	Merge Delay sec
South Exit: Shores Drive Merge Type: Not Applied						
Full Length Lane 1	Merge	Analysis not applied				
North Exit: Shores Drive Merge Type: Not Applied						
Full Length Lane 1	Merge	Analysis not applied				
West Exit: Park Avenue Merge Type: Not Applied						
Full Length Lane 1	Merge	Analysis not applied				

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▽ Site: 101 [AM Peak Project Case (Site Folder: General)]

21GCT0106 8 Park Avenue, Yamba Park Avenue / Shores Drive Site Category: (None) Give-Way (Two-Way)

Lane Use	and Per	formar	nce										
	DEM/ FLO¹ [Total veh/h	AND	Cap.	Deg. Satn v/c	Lane Util.	Aver. Delay sec	Level of Service	95% BA QUE [Veh		Lane Config	Lane Length m	Cap. F Adj. E %	
South: Sho				.,,	- 1							- / -	,,
Lane 1	103	5.0	1864	0.055	100	1.4	LOSA	0.0	0.0	Full	500	0.0	0.0
Approach	103	5.0		0.055		1.4	NA	0.0	0.0				
North: Shor	es Drive												
Lane 1	376	5.0	1887	0.199	100	0.0	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	376	5.0		0.199		0.0	NA	0.0	0.1				
West: Park	Avenue												
Lane 1	100	5.0	789	0.127	100	7.8	LOSA	0.4	3.1	Full	500	0.0	0.0
Approach	100	5.0		0.127		7.8	LOSA	0.4	3.1				
Intersectio n	579	5.0		0.199		1.6	NA	0.4	3.1				

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

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

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

Queue Model: SIDRA Standard.

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

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

Approach	Lane Flo	ows (v	reh/h)							
South: Shore	es Drive									
Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c		Prob. SL Ov. %	Ov. Lane No.	
Lane 1	25	78	103	5.0	1864	0.055	100	NA	NA	
Approach	25	78	103	5.0		0.055				
North: Shore	s Drive									
Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c		Prob. SL Ov. %	Ov. Lane No.	
Lane 1	375	1	376	5.0	1887	0.199	100	NA	NA	
Approach	375	1	376	5.0		0.199				
West: Park A	venue									
Mov. From W To Exit:	L2 N	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	1	99	100	5.0	789	0.127	100	NA	NA	
Approach	1	99	100	5.0		0.127				
	Total	%HV E	eg.Sat	n (v/c)						

Intersection 5.0 0.199 579

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

Merge Analysis					
Exit Lane Number	Short Percent Opposin Lane Opng in Flow Ra Length Lane m % veh/h pct	te Gap	Follow-up Lane Capacity Headway Flow Rate sec veh/h veh/h	Satn Delay	Merge Delay sec
South Exit: Shores Drive Merge Type: Not Applied					
Full Length Lane 1	Merge Analysis not applie	ed.			
North Exit: Shores Drive Merge Type: Not Applied					
Full Length Lane 1	Merge Analysis not applie	ed.			
West Exit: Park Avenue Merge Type: Not Applied					
Full Length Lane 1	Merge Analysis not applie	ed.			

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▽ Site: 101 [PM Peak Project Case (Site Folder: General)]

21GCT0106 8 Park Avenue, Yamba Park Avenue / Shores Drive Site Category: (None) Give-Way (Two-Way)

Lane Use	and Per	formar	nce										
	DEM/ FLO¹ [Total veh/h	AND	Cap.	Deg. Satn v/c	Lane Util.	Aver. Delay sec	Level of Service	95% BA QUE [Veh		Lane Config	Lane Length m	Cap. F Adj. E %	Prob. Block. %
South: Shor		70	V 311/11	V/ O	,,							70	70
Lane 1	213	5.0	1839	0.116	100	2.9	LOSA	0.0	0.0	Full	500	0.0	0.0
Approach	213	5.0		0.116		2.9	NA	0.0	0.0				
North: Shor	es Drive												
Lane 1	196	5.0	1885	0.104	100	0.0	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	196	5.0		0.104		0.0	NA	0.0	0.1				
West: Park	Avenue												
Lane 1	28	5.0	911	0.031	100	6.9	LOS A	0.1	0.7	Full	500	0.0	0.0
Approach	28	5.0		0.031		6.9	LOSA	0.1	0.7				
Intersectio n	437	5.0		0.116		1.9	NA	0.1	0.7				

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

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

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

Queue Model: SIDRA Standard.

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

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

Approach	Lane Fl	ows (v	reh/h)							
South: Shore										
Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	107	105	213	5.0	1839	0.116	100	NA	NA	
Approach	107	105	213	5.0		0.116				
North: Shore	s Drive									
Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c		Prob. SL Ov. %	Ov. Lane No.	
Lane 1	195	1	196	5.0	1885	0.104	100	NA	NA	
Approach	195	1	196	5.0		0.104				
West: Park A	venue									
Mov. From W To Exit:	L2 N	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	1	27	28	5.0	911	0.031	100	NA	NA	
Approach	1	27	28	5.0		0.031				
	Total	%HV [eg.Sat	n (v/c)						

Intersection 437 5.0 0.116

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

Merge Analysis							
Exit Lane Number		ercent Opposing png in Flow Rate Lane % veh/h pcu/h	Critical Gap sec	Flow Rate	acity eh/h	Deg. Satn E v/c	Merge Delay sec
South Exit: Shores Drive Merge Type: Not Applied							
Full Length Lane 1	Merge An	nalysis not applied.					
North Exit: Shores Drive Merge Type: Not Applied							
Full Length Lane 1	Merge An	nalysis not applied.					
West Exit: Park Avenue Merge Type: Not Applied							
Full Length Lane 1	Merge An	nalysis not applied.					

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V Site: 101 [AM Peak Project Case - Sensitivity (Site Folder:

General)]

21GCT0106 8 Park Avenue, Yamba Park Avenue / Shores Drive Site Category: (None) Give-Way (Two-Way)

Lane Use	and Pe	rformar	тсе										
	DEM FLO [Total veh/h		Cap.	Deg. Satn v/c	Lane Util.	Aver. Delay sec	Level of Service		ACK OF EUE Dist] m	Lane Config	Lane Length m		Prob. Block. %
South: Sho	res Drive	!											
Lane 1	120	5.0	1867	0.064	100	1.2	LOSA	0.0	0.0	Full	500	0.0	0.0
Approach	120	5.0		0.064		1.2	NA	0.0	0.0				
North: Sho	es Drive												
Lane 1	451	5.0	1888	0.239	100	0.0	LOSA	0.0	0.1	Full	500	0.0	0.0
Approach	451	5.0		0.239		0.0	NA	0.0	0.1				
West: Park	Avenue												
Lane 1	102	5.0	706	0.145	100	8.5	LOSA	0.5	3.5	Full	500	0.0	0.0
Approach	102	5.0		0.145		8.5	LOSA	0.5	3.5				
Intersectio n	673	5.0		0.239		1.5	NA	0.5	3.5				

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

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

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

Queue Model: SIDRA Standard.

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

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

Approach	Lane Flo	ows (v	/eh/h)	_				_	
South: Shor									
Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	26	94	120	5.0	1867	0.064	100	NA	NA
Approach	26	94	120	5.0		0.064			
North: Shore	es Drive								
Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	449	1	451	5.0	1888	0.239	100	NA	NA
Approach	449	1	451	5.0		0.239			
West: Park	Avenue								
Mov. From W To Exit:	L2 N	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	101	102	5.0	706	0.145	100	NA	NA
Approach	1	101	102	5.0		0.145			

	Total	%HV De	eg.Satn (v/c)
Intersection	673	5.0	0.239

Merge Analysis								
Ex Lan Numbe	e Lane			Critical Gap sec	Follow-up Headway	Capacity veh/h	Deg. Satn I	Merge Delay sec
South Exit: Shores Drive Merge Type: Not Applied								
Full Length Lane	1 Merge	Analysis no	ot applied.					
North Exit: Shores Drive Merge Type: Not Applied								
Full Length Lane	1 Merge	Analysis no	ot applied.					
West Exit: Park Avenue Merge Type: Not Applied								
Full Length Lane	1 Merge	Analysis no	ot applied.					

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V Site: 101 [PM Peak Project Case - Sensitivity (Site Folder:

General)]

21GCT0106 8 Park Avenue, Yamba Park Avenue / Shores Drive Site Category: (None) Give-Way (Two-Way)

Lane Use	and Per	formar	nce										
	DEM. FLO [Total veh/h		Cap.	Deg. Satn	Lane Util. %	Aver. Delay	Level of Service	95% BA QUE [Veh	UE Dist]	Lane Config	Lane Length	Cap. Adj. %	Prob. Block. %
South: Sho			veh/h	v/c	70	sec	_		m	_	m	70	70
Lane 1	236	5.0	1843	0.128	100	2.6	LOSA	0.0	0.0	Full	500	0.0	0.0
Approach	236	5.0		0.128		2.6	NA	0.0	0.0				
North: Shor	es Drive												
Lane 1	235	5.0	1885	0.125	100	0.0	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	235	5.0		0.125		0.0	NA	0.0	0.1				
West: Park	Avenue												
Lane 1	29	5.0	854	0.035	100	7.2	LOSA	0.1	0.8	Full	500	0.0	0.0
Approach	29	5.0		0.035		7.2	LOSA	0.1	8.0				
Intersectio n	500	5.0		0.128		1.7	NA	0.1	0.8				

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

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

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

Queue Model: SIDRA Standard.

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

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

Approach	Lane Flo	ows (v	reh/h)						
South: Shor	es Drive								
Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	109	126	236	5.0	1843	0.128	100	NA	NA
Approach	109	126	236	5.0		0.128			
North: Shore	es Drive								
Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	234	1	235	5.0	1885	0.125	100	NA	NA
Approach	234	1	235	5.0		0.125			
West: Park	Avenue								
Mov. From W To Exit:	L2 N	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	28	29	5.0	854	0.035	100	NA	NA
Approach	1	28	29	5.0		0.035			

	Total	%HV D	eg.Satn (v/c)
Intersection	500	5.0	0.128

Merge Analysis								
Exit Lane Number	Lane	Percent (Opng in F Lane % v		Critical Gap sec	Follow-up Headway	apacity veh/h	Deg. Satn I v/c	Merge Delay sec
South Exit: Shores Drive Merge Type: Not Applied								
Full Length Lane 1	Merge	Analysis n	ot applied.					
North Exit: Shores Drive Merge Type: Not Applied								
Full Length Lane 1	Merge	Analysis n	ot applied.					
West Exit: Park Avenue Merge Type: Not Applied								
Full Length Lane 1	Merge	Analysis n	ot applied.					

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