Prospect Aquatic Investments Pty Ltd

Wet 'n' Wild Sydney

Transport and Accessibility Impacts (Construction and Operational)

ISSUE

ARUP

Prospect Aquatic Investments Pty Ltd

Wet 'n' Wild Sydney

Transport and Accessibility Impacts (Construction and Operational)

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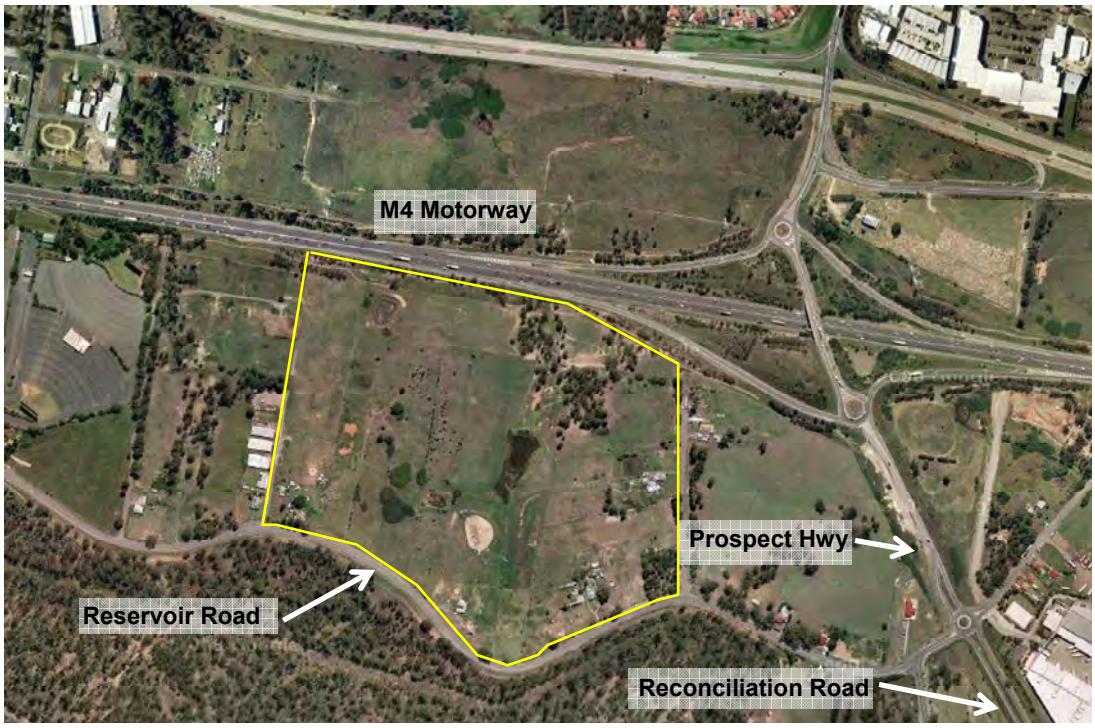
1 INTRODUCTION

Arup was commissioned by Prospect Aquatic Investments Pty Ltd (PAI) to undertake a Transport and Accessibility Impacts Assessment (Construction and Operational) for a proposed world class water theme park to be known as Wet 'n' Wild Sydney.

The 25 ha site for the development is in Prospect on Reservoir and Watch House Roads as shown on Figure 1. The site is in the ownership of the Western Sydney Parklands Trust as it falls within the boundaries of the Western Sydney Parklands. If planning approval is given and the water park is constructed, the Trust will enter into a long term lease with PAI.

The project application will be assessed as a Major Project by the Director-General of the NSW Department of Planning under Part 3A of the Environmental Planning and Assessment Act. DGRs were issued on 20 December 2010 (MP09_0190).

Figure 1 Site Location



1.1 Project Director-General's Requirements

This report responds to the project DGRs and Section 2 in particular - *Transport & Accessibility Impacts (Construction and Operational)* as reproduced below. The relevant section of this report that responds to each DGR is indicated in Table 1.

Table 1 Project DGRs – Section 2: Transport and Accessibility Impacts

DGR No.	Description	Relevant Section of Report
Introduction	Preparation of a Transport Management and Accessibility Plan (TMAP) prepared with reference to the Draft Interim Guidelines of the NSW Department of Transport and Roads and Traffic Authority, Metropolitan Transport Plan – Connecting the City of Cities, the NSW State Plan, the NSW Planning Guidelines for Walking and Cycling, the Integrated Land Use and Transport policy package, the NSW Bike Plan, Premier's Council for Active Living (PCAL) – Development & Active Living, and the RTA's Guide to Traffic Generating Development	All sections
2.1	Anticipated traffic generation of the proposed development and the distribution of it along the surrounding road network system, its impact on existing intersections and surrounding road network system particularly on the state road network system, with regard to road capacity, traffic conditions, expected impacts and any upgrade requirements.	Sections 4,5 & 6.1
2.2	Detail impacts to the capacity of the road network system accounting for the current level of service and identification of road upgrades required to maintain satisfactory levels of service to the year 2021.	Sections 5 & 6.1
2.3	Daily peak traffic movements likely to be generated from the proposed development including impact on nearby intersections and the need / associated funding for upgrading or road improvement works (if required). Key intersections to be examined /modelled include: - M4 on and off ramps/intersections to Prospect Highway; - M4 on and off ramps/intersections to Reservoir Road; - Great Western Highway and Reservoir Road; - Great Western Highway and Prospect Road; - Prospect Highway and Ponds Road; and - Prospect Highway / Reservoir Road / Reconciliation Road.	Sections 5 & 6.1
2.4	Details of the proposed access, parking provisions and service vehicle movements associated with the proposed development, including compliance with Australian Standards.	Sections 6.2, 6.3 & 6.4
2.5	Provide an analysis of potential public transport provision, walking and cycling connections within the vicinity of the proposed site and proposed measures to address accessibility to and from the site and connections to the wider region via sustainable transport modes.	Section 6.5

DGR No.	Description	Relevant Section of Report
2.6	Demonstrate how uses of the development will be able to make non-car based travel choices and identify measures to manage travel demand.	Section 6.5
2.7	Identify appropriate measures to manage the demand for travel to and from the development, in particular reduce the demand to travel to and from the development by private car (car dependency) and increase the proportion of travel by public transport, walking and cycling to increase the non-car mode share for travel to and from the site.	Section 6.5
2.8	Address the potential for implementing measures to reduce traffic impacts, including but not limited to, incentives to encourage car pooling.	Section 6.5
2.9	Address the potential for implementing a location specific sustainable travel plan, such as a Work Place Travel Plan (WTP) for workers, and / or a Travel Access Guide (TAG) for visitors of the development.	Section 6.5
2.10	Identify potential traffic impacts during the construction stage of the project, and measures to mitigate these impacts.	Section 6.6

1.2 Reference Documents

The following documents have been used as reference material for this assessment:

- Guide to Traffic Generating Developments (RTA, 2002)
- AS 2890 Parking Facilities
- AS 1742.6 Manual of Uniform Traffic Control Devices
- Blacktown Development Control Plan 2006
- NSW Government Plans, Policies and Guidelines:
    - Metropolitan Plan for Sydney 2036
    - Metropolitan Transport Plan – Connecting the City of Cities
    - NSW State Plan 2010
    - Planning Guidelines for Walking and Cycling
    - Draft Interim Guidelines on Transport Management and Accessibility Plans
    - Integrated Land Use and Transport policy package
    - Premier's Council for Active Living (PCAL) – Development & Active Living
    - Tourist Signposting
    - State Environmental Planning Policy (Western Sydney Parklands) 2009
    - State Environmental Planning Policy (Major Development) 2005
    - State Environmental Planning Policy (Infrastructure) 2007
    - State Environmental Planning Policy No. 64 – Advertising and Signage

1.3 Consultation

A meeting was held with RTA on 14 December 2010 to discuss the RTA's requirements for the Transport & Accessibility Impacts report. The RTA's requirements were subsequently detailed in a letter to Department of Planning dated 15 December 2010. The scenarios for traffic modelling were agreed at this meeting.

Cosway Australia, on behalf of PAI, have conducted extensive consultation in relation to the project. Organisations consulted include local councils, state government agencies, state and federal MPs, WSROC, special interest groups and local residents. Relevant issues or suggestions raised have been incorporated into this report.

Further details of the consultation can be found in the Environmental Assessment.

1.4 Structure of Report

This Transport and Accessibility Impact Report is structured as follows:

- Section 1 Introduction and objectives
- Section 2 Existing transport and accessibility situation
- Section 3 Description of proposed development
- Section 4 Forecast trip and traffic generation
- Section 5 Traffic modelling
- Section 6 Transport and accessibility impacts based on the relevant DGRs
- Section 7 Summary and conclusions
- Appendices

2 EXISTING TRANSPORT AND ACCESSIBILITY SITUATION

2.1 Surrounding Land Uses

The site is located in an area that is primarily undeveloped semi-rural land, with Prospect Reservoir to the south and the M4 Motorway to the north (refer to Figure 2). There is little residential development near the site. The M7 Motorway is 5km to the west of the site.

The Eastern Creek industrial area, near the interchange of the M4 and M7, is gradually developing to the west of the site.

Greystanes Estate represents a major industrial area along Reconciliation Road to the southeast of the site. Much of the Northern Employment Lands has been developed as offices, factories and warehouses and generates a considerable volume of traffic. It will be some time before the Southern Employment Lands on the former Boral Quarry site is operational for its intended use of offices, factories and warehouses.

Figure 2 Site Context

2.2 Road Network

2.2.1 Major Roads

The administrative classification of main roads in the vicinity of the site is as follows:

State Roads

- M4 Motorway
- M7 Motorway
- Prospect Highway (north of M4)

Regional Roads

- Reservoir Road (north of M4)

Local Roads

- Reservoir Road (south of M4)
- Reconciliation Road
- Watch House Road

Reservoir Road past the site, between Reconciliation Road and the M4, is a 60 km/h semi-rural two lane road as shown in Photograph 1. Watch House Road is a minor road with a cul-de-sac at its northern end.

There is currently no vehicular route through the Greystanes Estate to Greystanes or Wetherill Park. It is expected, however, that in the future Reconciliation Road will be connected to Wetherill Park.

Photograph 1 Reservoir Road Near the Site

2.2.2 Key Intersections

The capacity of a road network in an urban area is determined by the capacity of key intersections, and, for the Prospect area in particular, the performance of motorway interchanges. The key intersections/interchanges in the vicinity of the site are:

- M4 on and off ramps/intersections to Prospect Highway
- M4 on and off ramps/intersections to Reservoir Road
- Great Western Highway and Reservoir Road
- Great Western Highway and Prospect Highway
- Prospect Highway and Ponds Road
- Prospect Highway / Reservoir Road / Reconciliation Road.

The M4 on and off ramps/intersections to Prospect Highway is a full interchange providing for all movements via two roundabouts and a bridge over the M4 (refer to Figure 3). The bridge over the M4 is two lanes in each direction. The roundabouts generally have two circulating lanes with single or dual lane approaches.

The M4 on and off ramps/intersections to Reservoir Road is a limited scale interchange that provides for all movements except for citybound traffic from Reservoir Road South (refer to Figure 4). The roadway under the M4 has one lane northbound and two lanes southbound. The interchange is limited in its capacity compared to roundabout or signal controlled interchanges.

The Prospect Highway / Reservoir Road / Reconciliation Road intersection is a single lane four-way roundabout (refer to Figure 5). The majority of vehicles passing through the intersection are accessing Greystanes Estate.

Figure 3 M4 / Prospect Highway Interchange

Note: North direction is top of page

Figure 4 M4 / Reservoir Road Interchange

Note: North direction is top of page

Figure 5 Prospect Highway / Reservoir Road / Reconciliation Road Intersection

Note: North direction is top of page

2.2.3 Traffic Data

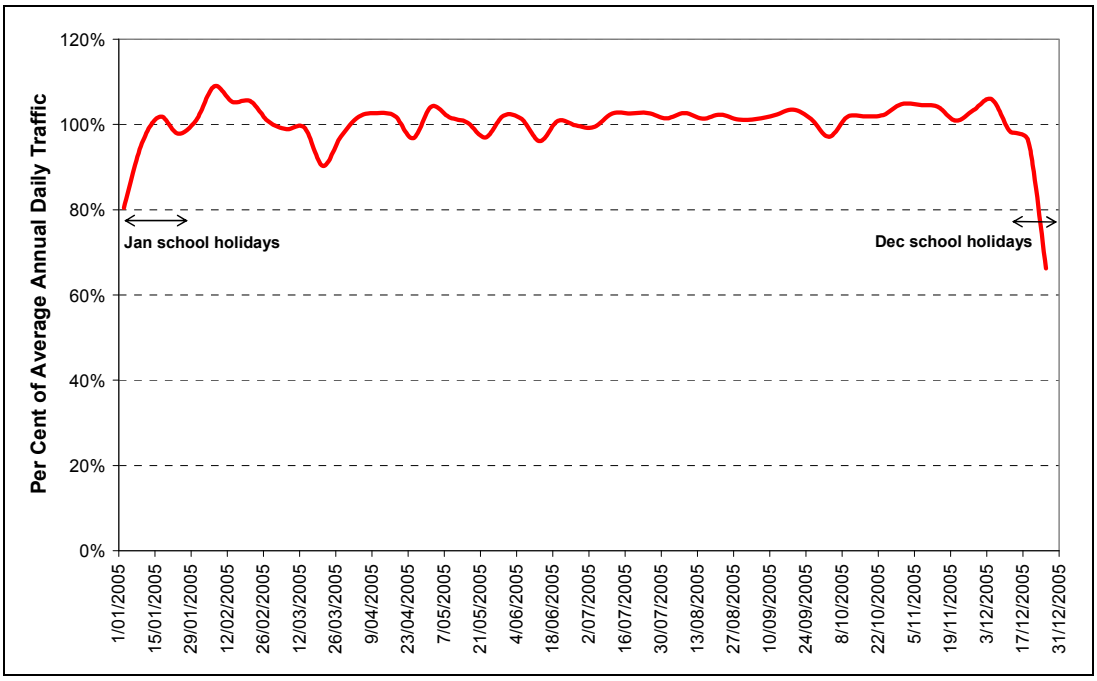
2.2.3.1 M4 Motorway

Annual Average Daily Traffic (AADT) on the M4 Motorway is approximately 120,000 AADT in the vicinity of the site (Source: RTA, 2005).

2.2.3.2 Prospect Highway

Traffic volume on the Prospect Highway, north of the M4 and Great Western Highway, is approximately 40,600 AADT (Source: RTA, 2005). Figure 6 shows the typical variation in daily traffic over a typical year at this location. Traffic volumes are relatively constant between the start of February and mid-December. During the Christmas – New Year period daily traffic flows may be 10% - 30% lower than average values. Weekday volumes are typically 25% higher than weekend volumes.

Figure 6 Typical Daily Traffic Variation – Prospect Highway



Source: RTA, 2005

2.2.3.3 Daily and Peak Hourly Flows

Automated traffic counts were undertaken by Arup on Reservoir Road and Prospect Highway between Wednesday 13 and Tuesday 19 May 2009. The daily flows are summarised in Table 2 and Table 3.

Table 2 Daily Flows – Reservoir Road West of Watch House Road

Direction	Daily Flow (vehicles)						
	Wed (13/5/09)	Thur (14/5/09)	Fri (15/5/09)	Sat (16/5/09)	Sun (17/5/09)	Mon (18/5/09)	Tues (19/5/09)
Eastbound	1,257	1,074	1,099	370	939	1,037	1,173
Westbound	1,146	1,172	1,175	359	906	1,086	1,117
Total	2,403	2,246	2,274	729	1,845	2,123	2,290

Table 3 Daily Flows – Prospect Highway North of Reservoir Road

Direction	Daily Flow (vehicles)						
	Wed (13/5/09)	Thur (14/5/09)	Fri (15/5/09)	Sat (16/5/09)	Sun (17/5/09)	Mon (18/5/09)	Tues (19/5/09)
Northbound	2,896	2,668	2,716	540	1,036	2,559	2,872
Southbound	2,916	2,910	2,883	546	1,047	2,709	2,899
Total	5,812	5,578	5,599	1,086	2,083	5,268	5,771

The data presented above shows that traffic flows are considerably lower on Reservoir Road (west of Reconciliation Road) than on Prospect Highway (north of Reconciliation Road). Average daily two-way traffic on Reservoir Road is in the order of 2,000 vehicles per day (vpd) and 4,500 vpd on Reconciliation Road.

Hourly flows for the busiest weekday of the surveyed week, Wednesday 13 May 2009, are summarised in Table 4. The highest two-way hourly volume on Reservoir Road is approximately 300 vehicles per hour.

The Saturday AM peak on the adjacent road network to the site was found to be between 11am – 12pm.

Table 4 Hourly Flows – Reservoir Road and Prospect Highway

Time Period (Wed 13 May 2009)	Reservoir Rd West of Watch House Rd				Prospect Highway North of Reservoir Rd			
	Eastbound	Westbound	Total	% of Total	Northbound	Southbound	Total	% of Total
12am - 1am	2	0	2	0.1%	12	7	19	0.3%
1am - 2am	2	3	5	0.2%	10	7	17	0.3%
2am - 3am	2	4	6	0.2%	6	4	10	0.2%
3am - 4am	2	1	3	0.1%	3	16	19	0.3%
4am - 5am	26	5	31	1.3%	16	57	73	1.3%
5am - 6am	97	12	109	4.5%	39	164	203	3.5%
6am - 7am	120	20	140	5.8%	89	289	378	6.5%
7am - 8am	259	43	302	12.6%	160	337	497	8.6%
8am - 9am	182	49	231	9.6%	155	410	565	9.7%
9am - 10am	67	35	102	4.2%	146	264	410	7.1%
10am - 11am	61	43	104	4.3%	157	185	342	5.9%
11am - Midday	55	35	90	3.7%	161	146	307	5.3%
Midday - 1pm	45	60	105	4.4%	212	164	376	6.5%
1pm - 2pm	68	65	133	5.5%	194	248	442	7.6%
2pm - 3pm	64	107	171	7.1%	279	180	459	7.9%
3pm - 4pm	43	136	179	7.4%	275	130	405	7.0%
4pm - 5pm	46	217	263	10.9%	314	95	409	7.0%
5pm - 6pm	37	201	238	9.9%	315	85	400	6.9%
6pm - 7pm	23	47	70	2.9%	161	42	203	3.5%
7pm - 8pm	11	23	34	1.4%	62	35	97	1.7%
8pm - 9pm	17	11	28	1.2%	36	22	58	1.0%
9pm - 10pm	8	12	20	0.8%	23	11	34	0.6%
10pm - 11pm	11	13	24	1.0%	46	10	56	1.0%
11pm – 12am	9	4	13	0.5%	25	8	33	0.6%
Total	**1,257**	**1,146**	**2,403**	**100.0%**	**2,896**	**2,916**	**5,812**	**100.0%**

2.2.3.4 Turning Movement Counts

Peak hour turning movement counts were undertaken by Arup at five key intersections in the vicinity of the site on Wednesday 13 May 2009 for the following time periods:

- AM weekday peak (7.00-9.00am)
- PM weekday peak (3.00-6.00pm)

The AM peak hour was found to be 8.00 – 9.00am and the PM peak hour 4.00 – 5.00pm. The results are summarised in Figure 7 and Figure 8. The data shows that the majority of traffic using the M4 interchanges has a destination north of the motorway rather than south. The Prospect Highway interchange also carries considerably more traffic than the Reservoir Road interchange.

2.3 Walking and Cycling

The roads in the vicinity of the site, particularly Reservoir Road, are semi-rural in nature and do not have footpaths. Pedestrians must walk on the road shoulder or on the grass verge. Pedestrian volumes are currently low in the area.

There are no pedestrian crossings of the M4 between the Prospect Highway and Reservoir Road interchanges. These interchanges were not designed to safely accommodate pedestrians. Reservoir Road and Prospect Highway (between Reconciliation Road and M4) do not have safe pedestrian crossing facilities in the vicinity of the site.

There are no formal cycling facilities in the vicinity of the site and therefore cyclists must generally share the road with motorised traffic.

Figure 7 AM Peak Hour Turning Movement Volumes

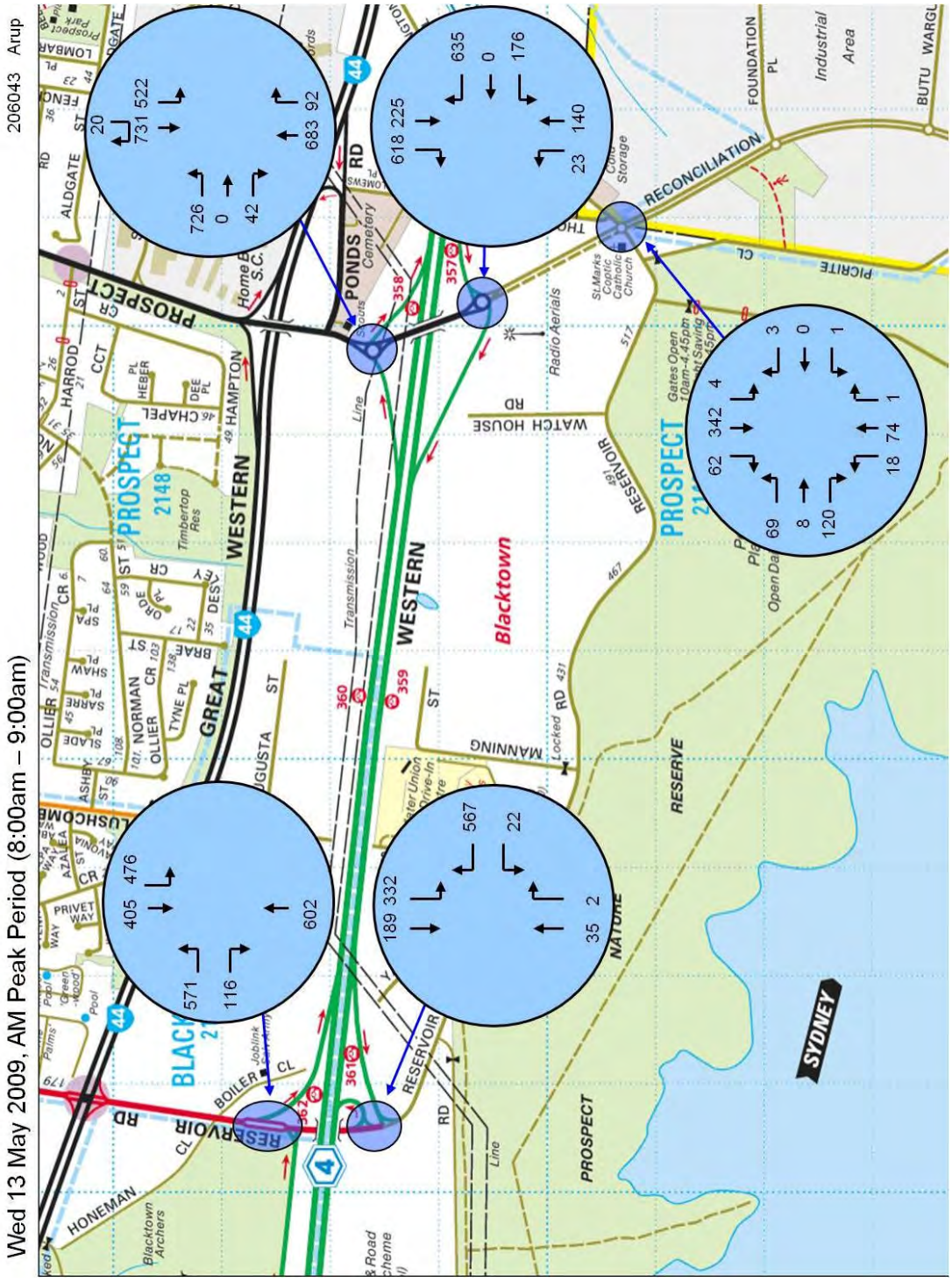
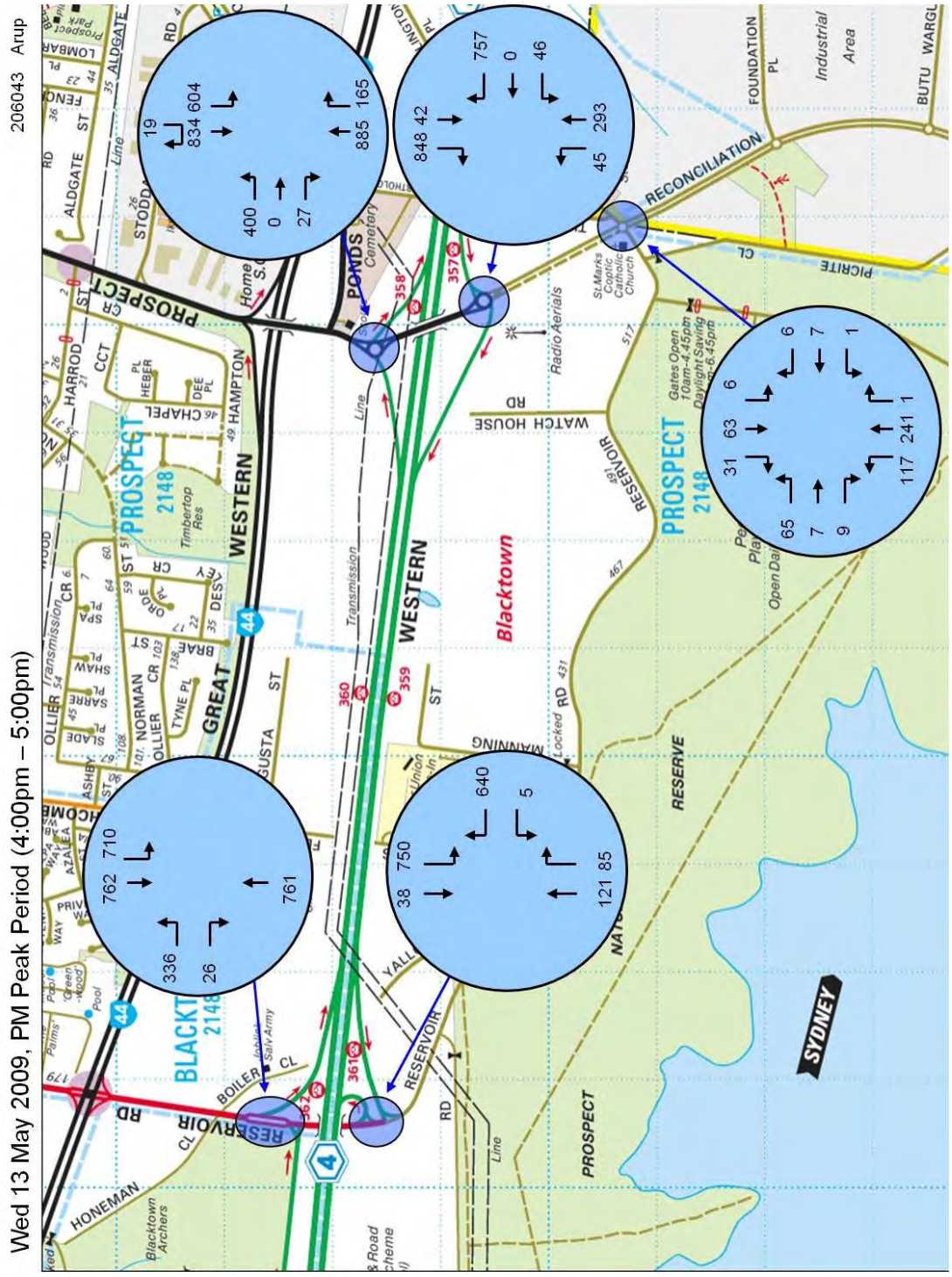


Figure 8 PM Peak Hour Turning Movement Volumes



2.4 Public Transport

The main form of public transport currently serving the site is bus route 812: Fairfield to Blacktown via The Horsley Drive, Wetherill Park, Pemulwuy and Prospect (refer to Figure 9). The nearest stop to the site is 400m to the east of Watch House Road on Reconciliation Road near Reservoir Road. The Westbus service operates Monday–Friday, between 5am-7pm, on a half hour frequency during peak periods and one hour frequency at other times. Travel time between Reservoir Road and Blacktown Station is approximately 15 minutes, and between Reservoir Road and Fairfield Station approximately 40 minutes.

Figure 9 Bus Route 812

Source: Westbus (note that only northern section of route is shown)

Other bus routes are on the northern side of the Great Western Highway and use Reservoir Road and Flushcombe Road. These services, operated by Busways, connect to Blacktown Station.

The nearest train stations are Blacktown and Seven Hills on the Western Line some 5km to the north. Interurban and local services stop at Blacktown because it is a major station. A bus interchange is located on the southern side of the station. Train services from Central to Blacktown take approximately 40-50 minutes whilst Penrith to Blacktown services take approximately 15-25 minutes.

3 DESCRIPTION OF PROPOSED DEVELOPMENT

The proposed development is a water theme park including a wave pool and various water slide rides and attractions, food and beverage outlets and other complementary facilities such as beach volleyball and beach cricket facilities, music zones and capacity for live performances, events, exhibitions, dive-in movies and family picnic spaces. It will cater for all tastes and age groups. The proposal also contains provision for administration and operational support buildings, supporting infrastructure and carparking.

The development will operate throughout the year and is expected to attract up to 920,000 visitors per year. It is anticipated to open in the summer of 2013/14. A water theme park has been identified as filling an identified gap in the NSW tourism offering.

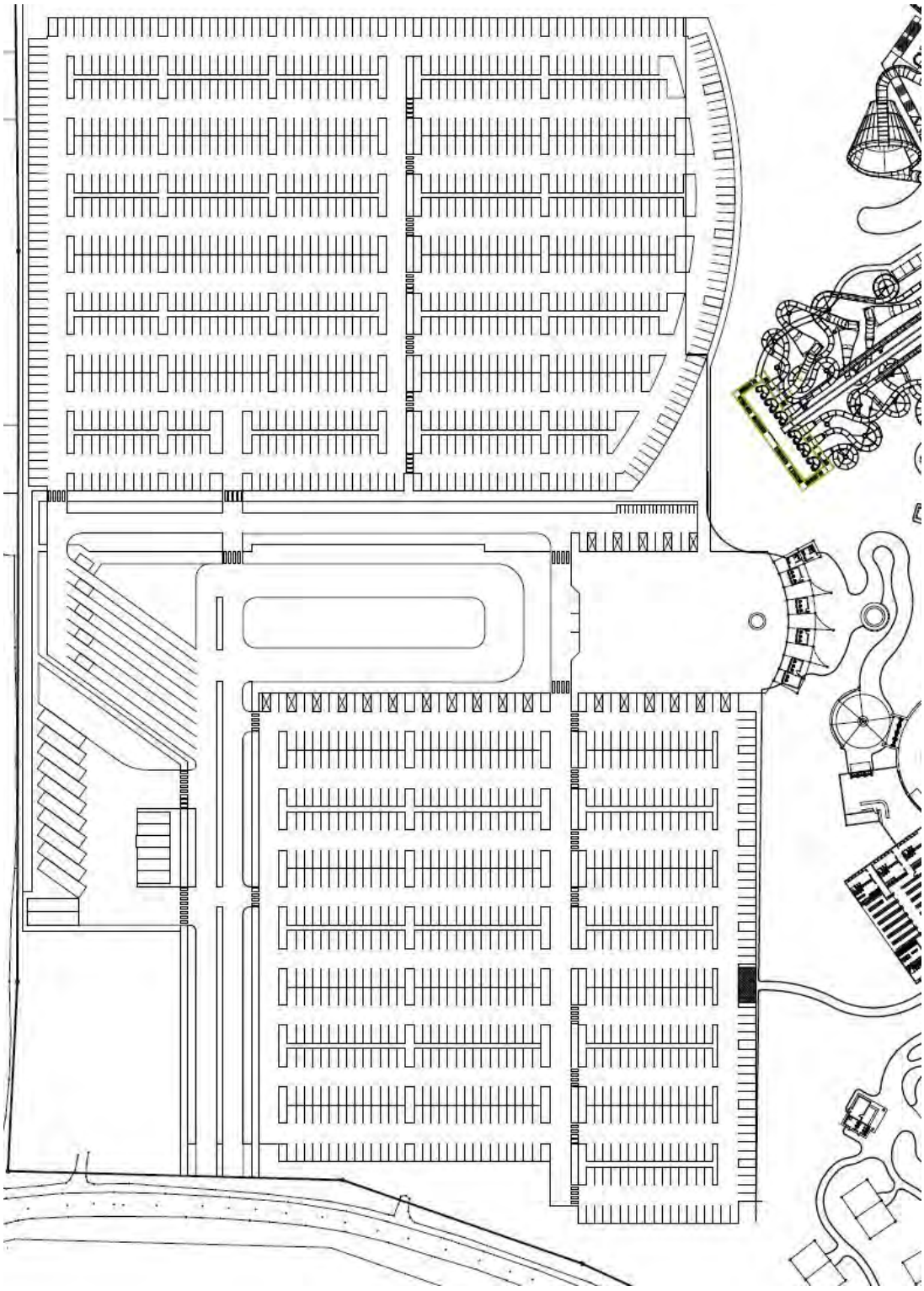
A preliminary site masterplan is shown on Figure 10 and a preliminary car park layout on Figure 11. The masterplan will be further developed during the detail design phase. The masterplan includes:

- Main theme park containing all rides, attractions and amenities in the eastern section of the site.
- Car park, including bus and coach facilities, in the western section of the site. The car park includes (refer to Figure 11):
    - vehicular drop-off area, with capacity for 15 cars/taxis and 3 buses, near the entry plaza
    - bus parking area with capacity for 12 coaches and 6 minibuses main car park with approximately 740 bays in the southern section of the car park (includes 42 disabled bays)
    - overflow car park with approximately 1,070 bays in the northern section of the car park
    - motorcycle parking for 20 cycles
    - secure bike parking near the entry plaza
- Access to the main car park via a two-way roadway from Reservoir Road including a new intersection on Reservoir Road.
- Pedestrian access to the entry plaza via the two-way roadway from Reservoir Road.
- Entry plaza, where all visitors will enter, in the centre of the development between the car park and water theme park.
- Service vehicle access from Watch House Road including a staff parking area adjacent to the administration building.

Figure 10 Preliminary Site Masterplan

Source: Whitewater, January 2011

Figure 11 Preliminary Car Park Layout



Source: Oculus, January 2011

4 FORECAST TRIP AND TRAFFIC GENERATION

4.1 Attendance Scenarios

Opening times for the development will generally be 9am to 6pm with later closing hours considered during the warmer summer months.

The development is expected to attract up to 925,000 visitors per year. Daily attendance will vary considerably from day to day throughout a typical year, due to factors such as weekday/weekend, holiday/non-holiday periods, non-daylight saving time/daylight saving time and warmer summer months/cooler winter months.

PAI developed detailed daily attendance forecasts by drawing on surveys of existing developments including Wet'n'Wild Gold Coast. Experience from Queensland has been adapted according to local Sydney conditions on the basis of factors such as daylight saving, climatic conditions and school holiday periods.

The forecast total monthly attendances are presented in Table 5. Six daily attendance scenarios have been identified as shown in Table 6 (three weekday + three weekend). Forecast typical daily attendance ranges for each of the six scenarios are presented in Table 7.

Table 5 Forecast Monthly Attendances

Month	Total per Month	Month	Total per Month
January	220,000	December	180,000
February	100,000	November	100,000
March	80,000	October	80,000
April	50,000	September	50,000
May	21,000	August	21,000
June	11,500	July	11,500
Annual Total	925,000		

Note: Monthly figures dependent on the timing of school holidays, Easter etc

Table 6 Daily Attendance Scenarios

Period		Day of Week	Days of Year	Total Days per Year	
				Number	% of Total
Off Peak	Non holidays	Weekday	1 March - 31 Oct	174	47.7%
	Non holidays	Weekend		71	19.5%
Shoulder	Non holidays	Weekday	1 Nov - 19 Dec and 27 Jan - 28 Feb	59	16.0%
	Non holidays	Weekend		23	6.4%
Peak	Holidays	Weekday	20 Dec - 26 Jan	27	7.4%
	Holidays	Weekend		11	3.0%
				365	100%

Table 7 Daily Attendance Forecasts

Period		Day of Week / Opening Hours	Forecast Daily Attendance (people)	
			Average	Typical Range
Off Peak	Non holidays	Weekday (9am – 5pm), Predominantly non-daylight saving	2,000	500 – 3,000
	Non holidays	Weekend (9am – 5pm), Predominantly non-daylight saving	3,100	1,000 – 4,000
Shoulder	Non holidays	Weekday (9am – 6pm), Daylight saving	3,600	2,000 – 7,000
	Non holidays	Weekend (9am – 6pm or 10pm), Daylight saving	6,900	3,000 – 8,000
Peak	Holidays	Weekday (9am – 11pm), Daylight saving	7,700	4,000 – 9,000
	Holidays	Weekend (9am – 11pm and to 12 midnight for special events), Daylight saving	7,700	5,000 – 9,000

Section 4.2 converts these daily attendance forecasts into people trip generation forecasts by day and hour. Section 4.3 converts these people trip generation forecasts into vehicular traffic generation forecasts.

4.2 Person Trip Generation

The RTA's *Guide to Traffic Generating Developments* states that two periods of traffic generation need to be considered when assessing the impacts of traffic generating developments:

- the peak activity time of the development itself; and
- the peak activity time of the adjacent road network.

The first of these is generally used as a basis for reviewing access to the site and driveway design requirements. The second is used to assess the effect of the development on the road system.

As described in the preceding section the trip generation of the proposed Wet 'n' Wild development will vary considerably from day to day and week to week. The peak activity time of the road network adjacent to the site occurs on weekdays in non-school holiday periods. The peak activity time of the development itself will occur on weekends and school holidays.

The RTA letter of 15 December 2010 states that the traffic assessment should model the weekday AM and PM peaks as well as Saturday AM peak.

This transport assessment is based on the "Shoulder" period described in Table 6 and Table 7 because it coincides with typical traffic conditions on the adjacent road network in non-school holiday periods.

The forecast daily attendance values presented in Table 7 have been converted to peak hour traffic generation (vehicles) by:

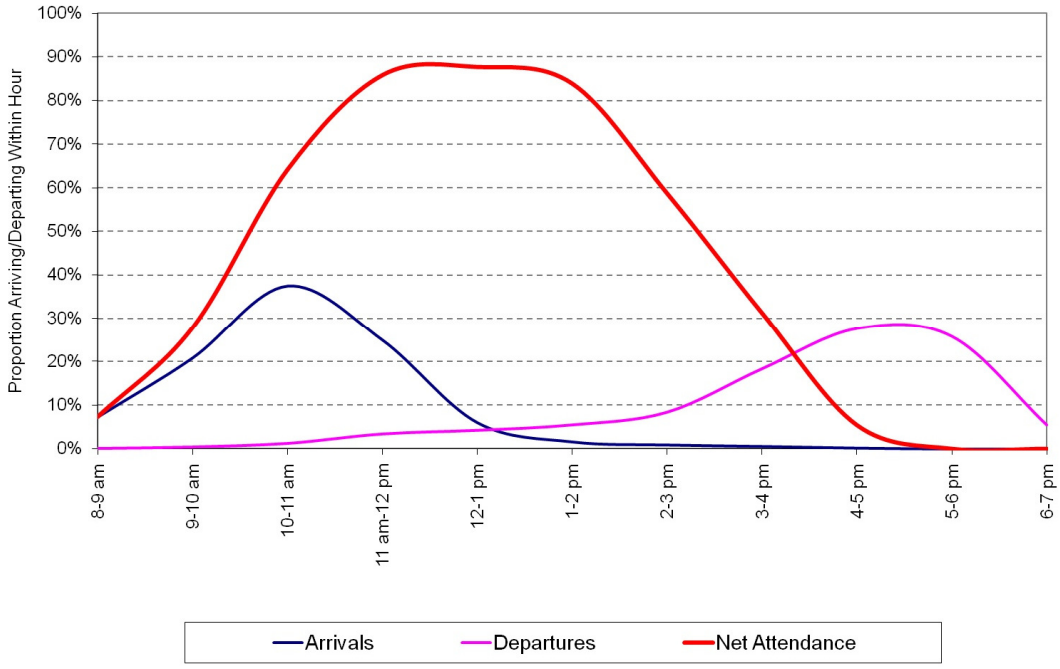
1. Applying hourly arrival/departure profiles to the daily values (Section 4.2.1)
2. Forecasting staff trip generation (Section 4.2.2)
3. Assuming vehicle mode split and vehicle occupancy factors (Section 4.3)
4. Forecasting traffic generation (Section 4.3)

4.2.1 Hourly Arrival/Departure Profiles

Forecast arrival/departure profiles for the Shoulder period have been developed as shown in Figure 12. During this time period weekend closing times may vary between 6pm and 10pm. A 6pm closing time has been used for the transport assessment because it represents the worst case situation with departures more concentrated than for a later closing time.

It is assumed that, for the Shoulder period, the weekday profile would be similar to the weekend profile. Table 8 shows the arrivals and departures in terms of proportion of total daily for the three modelled peak periods: weekday AM peak, weekday PM peak and Saturday AM peak.

Figure 12 Forecast Arrival/Departure Profile (Shoulder period)



Note: Chart represents Shoulder Period, Weekday/Weekend, 9am – 6pm opening hours

Table 8 Arrival and Departure Profile – Modelled Time Periods (Shoulder period)

% of Daily Arrivals/Departures (persons)					
Weekday AM Peak (8-9am)		**Weekday PM Peak (4-5pm)**		**Weekend AM Peak (11am-12pm)**	
Arrivals	**Departures**	**Arrivals**	**Departures**	**Arrivals**	**Departures**
7%	0	0	28%	25%	3%

4.2.2 Staff Trip Generation

It has been assumed there would be daily staff of between 100 and 300 depending on the time of year. Most staff would arrive approximately 30-60 minutes prior to park opening and leave 30 minutes after the park closing. There would also be some catering staff that would work over the lunchtime period and would not be present for the entire day. The majority of service vehicle traffic generation would occur outside park opening hours.

Staff trip generation during the modelled peak periods would be low although an allowance for some traffic has been made as described in Section 4.3.2.

4.3 Vehicular Traffic Generation

4.3.1 Vehicle Mode Split and Vehicle Occupancy

It has been assumed that on-site parking will be provided so that any visitor or staff member who chooses to drive may do so.

In July 2008, PAI conducted a traffic and parking survey of Wet 'n' Wild Water World on the Gold Coast. The survey found that 72% of people arrived by private car and the remaining 28% by bus (private tourist coaches and public bus services). Average vehicle occupancy was found to be 3.25.

Wet 'n' Wild Sydney will be served by at least one public bus service and shuttle buses to nearby rail stations as further described in Section 6.5. Despite this provision, however, it is likely that the car mode split would be higher than for the Gold Coast site. A slightly lower vehicle occupancy factor has also been conservatively assumed for this assessment.

Key mode split and vehicle occupancy assumptions are presented in Table 9.

Table 9 Mode Split and Vehicle Occupancy Assumptions

Issue	Assumption
Car Mode Split	Visitors – 85% car, 15% public transport / shuttle bus
Vehicle Occupancy	Visitors – 3.0

4.3.2 Traffic Generation

Peak hour traffic generation forecasts have been developed on the basis of the visitor arrival/departure profiles and the mode split and vehicle occupancy assumptions.

For the purposes of undertaking a conservative traffic assessment, forecast traffic in the peak direction has been increased by 10% to account for shuttle buses, other site-generated traffic and staff traffic. Furthermore, traffic in the non-peak direction has been forecast to be one-quarter of traffic in the non-peak direction (an increase on the values of Table 8), i.e:

- Weekday AM peak: "Out" traffic = 0.25 x "In" traffic
- Weekday PM peak: "In" traffic = 0.25 x "Out" traffic
- Weekend AM peak "Out" traffic = 0.25 x "In" traffic

The forecast traffic generation for the three modelled time periods, as used in the traffic modelling, is presented in Table 10.

Table 10 Forecast Traffic Generation (Shoulder period)

Traffic Generation (vehicles)					
Weekday AM Peak (8-9am)		**Weekday PM Peak (4-5pm)**		**Weekend AM Peak (11am-12pm)**	
Arrivals	**Departures**	**Arrivals**	**Departures**	**Arrivals**	**Departures**
65	16	65	262	545	136

4.3.3 Traffic Distribution

The development will attract visitors from all over the Greater Sydney Metropolitan region, although it is assumed that, on a per capita basis, visitors are twice as likely to come from within 20km of the site than from further afield. The Sydney region was divided into five sub-regions and the population determined for each on the basis of ABS 2006 Census data. The most likely approach road for each of these regions was also determined as summarised in Table 11.

Table 11 Forecast Traffic Distribution

Region	**Proportion of All Traffic**	**Proportion of All Traffic by Approach Route**			
		M4 East	**M4 West / M7**	**Prospect Hwy**	**Reservoir Road (north of M4)**
Sydney North	17.5%	13.5%	3.0%	1.0%	0.0%
Sydney CBD / East	15.0%	15.0%	0.0%	0.0%	0.0%
Sydney South	18.1%	0.0%	18.1%	0.0%	0.0%
Sydney West	11.6%	0.0%	10.6%	0.0%	1.0%
Sydney Central	37.8%	17.5%	16.3%	3.0%	1.0%
Total	100%	46%	48%	4%	2%

Note: Based on current road network without Reconciliation Road extension

The data shows that most of the vehicular traffic would use the M4 to access the water theme park with only a small proportion coming from north of the M4 on Prospect Highway and Reservoir Road.

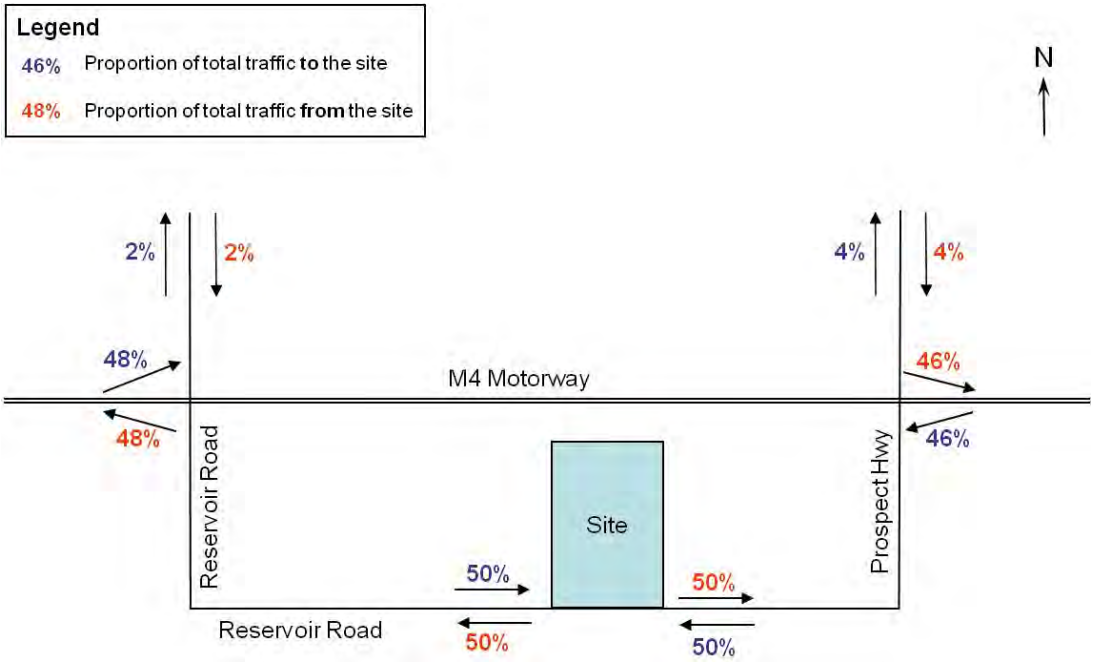
For the purposes of this assessment, it has been assumed that all traffic approaching from the M4 east of the Prospect Highway interchange would use this interchange to access the site. Similarly, all traffic approaching from the M4 west of the Reservoir Road interchange would use this interchange.

The site is located on Reservoir Road, which is not part of the main road network, and will need good, clear signage to direct motorists from roads such as the M4 and M7. Motorways in particular, with limited access points, require clear signage to major destinations. It is assumed that under the provisions of AS 1742.6 *Manual of Uniform Traffic Control Devices, Part 6: Tourist and service signs*, the water theme park would be classified as a "major tourist attraction". As such, the standard states that, "signing to major tourist attractions may be on a more generous scale than that provided for elsewhere." Indicative directional signs, for motorway exits and intersections, are presented in Figure 13.

Figure 13 Indicative Directional Signs

The assumed traffic distribution is shown graphically on Figure 14. It shows that traffic would be approximately evenly distributed between Reservoir Road east of the site and Reservoir Road west of the site.

Figure 14 Traffic Distribution Diagram



5 TRAFFIC MODELLING

5.1 Traffic Modelling Scenarios

The following three time periods were modelled:

- Weekday AM Peak (8-9am)
- Weekday PM Peak (4-5pm)
- Weekend AM Peak (11am-12pm)

The following three scenarios were modelled for the three time periods:

A. 2011 Base

B. 2011 Base + site development traffic

C. 2021 Base + site development traffic + background traffic growth

5.2 Future Road Connections

It is expected that in the future Reconciliation Road through Greystanes Estate will eventually be connected to Wetherill Park. There is currently, however, no committed timing for this new road link. There are no other committed road upgrades for the road network in the vicinity of the site.

The traffic modelling undertaken for this assessment is therefore based on the existing road network, in addition to the main site access on Reservoir Road.

The impact of future land use changes has been assessed by including an allowance for general background traffic growth.

5.3 Future Traffic Flows

5.3.1 Site Development Traffic

The forecast site development traffic, for the three modelled time periods, was described in Section 4.3 and summarised in Table 10. These values were used for both the 2011 and 2021 model years.

5.3.2 Background Traffic Growth

Model plots of the RTA's strategic EMME model, for the base year and 2021, were supplied by RTA to give an indication of possible future changes to peak hour demand on the main road network. The RTA's model is based on data contained in Transport NSW's Sydney Travel Model.

On the basis of the RTA's model the following background growth rates were assumed for the period 2011 to 2021:

- 2% per annum growth rate on roads to the south of M4 Motorway
- 1% per annum growth rate on roads to the north of M4 Motorway

These values are over and above traffic generated by the proposed development.

5.3.3 Forecast Future Traffic Flows

The forecast turning movement flows through the key intersections/interchanges in the vicinity of the site are summarised in Table 12. The values utilise the traffic generation, traffic distribution and background traffic growth forecasts described in the preceding sections of this report.

Table 12 Forecast Future Traffic Flows

Intersection		WD-AM (08:00 - 09:00)			WD-PM (16:00 - 17:00)			WE-AM (11:00 - 12:00)		
		A. 2011 Base	B. 2011 Site Devel.	C. 2021 Site Devel.	A. 2011 Base	B. 2011 Site Devel.	C. 2021 Site Devel.	A. 2011 Base	B. 2011 Site Devel.	C. 2021 Site Devel.
Prospect Hwy / M4 Northern Roundabout										
Prospect Hwy N	L	522	522	574	604	604	664	261	261	287
	T	731	734	807	834	837	920	366	387	424
Prospect Hwy S	T	683	684	752	885	895	984	342	347	381
	R	92	100	118	165	285	318	46	109	118
M4 EB Off-ramp W	L	726	726	799	400	400	440	363	363	399
	R	42	42	50	27	27	32	21	21	25
Total		**2,796**	**2,807**	**3,100**	**2,915**	**3,049**	**3,359**	**1,398**	**1,488**	**1,634**
Prospect Hwy / M4 Southern Roundabout										
Prospect Hwy N	T	225	228	273	42	45	53	113	134	157
	R	618	618	680	848	848	933	309	309	340
M4 WB Off-ramp E	L	176	206	241	46	76	85	88	339	356
	R	635	635	699	757	757	833	318	318	349
Prospect Hwy S	L	23	23	28	45	45	54	12	12	14
	T	140	148	176	293	424	483	70	138	152
Total		**1,817**	**1,858**	**2,096**	**2,031**	**2,195**	**2,440**	**909**	**1,249**	**1,368**
Reservoir Rd / M4 Northern Intersection										
Reservoir Rd N	L	476	476	524	710	710	781	238	238	262
	T	405	406	447	762	763	840	203	213	234
Reservoir Rd S	T	602	602	663	761	766	842	301	304	334
M4 EB Off-ramp W	L	571	571	628	336	336	370	286	286	314
	R	116	147	171	26	57	63	58	320	331
Total		**2,170**	**2,203**	**2,432**	**2,595**	**2,633**	**2,895**	**1,085**	**1,360**	**1,475**
Reservoir Rd / M4 Southern Intersection										
Reservoir Rd N	L	332	332	365	750	750	825	166	166	183
	T	189	222	260	38	71	78	95	367	386
M4 WB Off-ramp E	L	22	22	26	5	5	6	11	11	13
	R	567	567	624	640	640	704	284	284	312
Reservoir Rd S	T	35	35	42	121	126	150	18	20	24
	R	2	10	10	85	211	228	1	66	67
Total		**1,147**	**1,188**	**1,327**	**1,639**	**1,803**	**1,991**	**574**	**914**	**984**
Prospect Hwy / Reservoir Rd / Reconciliation Rd										
Prospect Hwy N	L	4	4	5	6	6	7	2	2	2
	T	342	342	410	63	63	76	171	171	205
	R	62	95	107	31	64	70	31	304	310
Reservoir Rd E	L	1	1	1	1	1	1	1	1	1
	T	0	0	0	7	7	8	0	0	0
	R	3	3	4	6	6	7	2	2	2
Reconciliation Rd S	L	18	18	22	117	117	140	9	9	11
	T	74	74	89	241	241	289	37	37	44
	R	1	1	1	1	1	1	1	1	1
Reservoir Rd W	L	69	77	91	65	196	209	35	103	110
	T	8	8	10	7	7	8	4	4	5
	R	120	120	144	9	9	11	60	60	72
Total		**702**	**743**	**883**	**554**	**718**	**828**	**351**	**692**	**762**

5.4 Intersection Modelling

Sidra, a computer program, was used to assess the operational performance of intersections which may be either signal, roundabout or priority controlled.

Figure 14 shows that 94% of site-generated traffic is forecast to use the M4 Motorway to access the site, from either the east or west. The forecast traffic increase through intersections north of the M4 would be less than 20 vehicles per hour or less than 1% of total traffic flow through each intersection. The following intersections have therefore been excluded from the Sidra modelling:

- Great Western Highway and Reservoir Road
- Great Western Highway and Prospect Highway
- Prospect Highway and Ponds Road

Results of the Sidra intersection analysis are presented in terms of Level of Service (LOS), which is an index of the operational performance of traffic at an intersection and is based on the average delay per vehicle. LOS ranges from A – very good to F – highly congested conditions. The LOS criteria used by the RTA in NSW is presented in Table 13.

Another common measure of intersection performance is the degree of saturation (DS), which provides an overall measure of the capability of the intersection to accommodate the traffic levels. A DS of 1 indicates that the intersection is operating at capacity, but the desirable (and practical) degree of saturation is less than 1, i.e. signals – 0.9, roundabouts – 0.85, signs – 0.8 (refer to Appendix A for a detailed description of traffic engineering terms).

Table 13 Level of Service Definitions for Vehicles (RTA NSW Method)

Level of Service	Average Vehicle Delay (seconds)	Summary
A	$d \leq 14.5$	Good performance
B	$14.5 \leq 28.5$	
C	$28.5 \leq 42.5$	Satisfactory
D	$42.5 \leq 56.5$	Operating near capacity
E	$56.5 \leq 70.5$	At capacity and may require other control mode
F	$70.5 < d$	

Results of the Sidra analysis, for the three time periods and three scenarios, is summarised in Table 14. Detailed Sidra outputs are presented in Appendix B and an electronic copy of the Sidra files will be forwarded to the RTA.

The results of the analysis show that:

- All intersections are forecast to perform at an acceptable LOS for the Weekday AM Peak and Weekend AM Peak.
- All intersections are forecast to perform at an acceptable LOS for the Weekday PM Peak with the exception of both roundabouts of the M4 / Prospect Highway Interchange.

These results are discussed in more detail in Section 6.1.

Table 14 Results of Sidra Intersection Analysis

Intersection	Control	WD/WE	Scenario	Sidra Result		
				DS	AVD (s)	LOS
Prospect Hwy / M4 Eastbound Ramps (northern roundabout)	Roundabout	WD-AM	2011: Existing	0.83	9	A
			2011: Base + development	0.83	9	A
			2021: Base + development + background	0.94	11	A
		WD-PM	2011: Existing	1.00	19	B
			2011: Base + development	1.10	58	E
			2021: Base + development + background	1.24	116	F
		WE-AM	2011: Existing	0.42	8	A
			2011: Base + development	0.48	8	A
			2021: Base + development + background	0.49	8	A
Prospect Hwy / M4 Westbound Ramps (southern roundabout)	Roundabout	WD-AM	2011: Existing	0.44	13	A
			2011: Base + development	0.46	13	A
			2021: Base + development + background	0.54	14	A
		WD-PM	2011: Existing	0.82	21	B
			2011: Base + development	1.08	44	D
			2021: Base + development + background	1.75	186	F
		WE-AM	2011: Existing	0.18	11	A
			2011: Base + development	0.29	10	A
			2021: Base + development + background	0.32	11	A
Reservoir Road / M4 Eastbound Ramps (northern intersection)	Stop	WD-AM	2011: Existing	0.32	5	N/A
			2011: Base + development	0.32	5	N/A
			2021: Base + development + background	0.35	5	N/A
		WD-PM	2011: Existing	0.41	2	N/A
			2011: Base + development	0.40	2	N/A
			2021: Base + development + background	0.44	2	N/A
		WE-AM	2011: Existing	0.16	5	N/A
			2011: Base + development	0.18	6	N/A
			2021: Base + development + background	0.18	6	N/A
Reservoir Road / M4 Westbound Ramps (southern intersection)	Give Way	WD-AM	2011: Existing	0.33	8	N/A
			2011: Base + development	0.33	8	N/A
			2021: Base + development + background	0.37	8	N/A
		WD-PM	2011: Existing	0.36	8	N/A
			2011: Base + development	0.36	9	N/A
			2021: Base + development + background	0.39	9	N/A
		WE-AM	2011: Existing	0.16	8	N/A
			2011: Base + development	0.19	8	N/A
			2021: Base + development + background	0.20	8	N/A
Prospect Hwy / Reservoir Road / Reconciliation Road	Roundabout	WD-AM	2011: Existing	0.32	8	A
			2011: Base + development	0.35	8	A
			2021: Base + development + background	0.42	8	A
		WD-PM	2011: Existing	0.25	7	A
			2011: Base + development	0.25	7	A
			2021: Base + development + background	0.31	7	A
		WE-AM	2011: Existing	0.14	7	A
			2011: Base + development	0.32	9	A
			2021: Base + development + background	0.35	9	A

Notes:

- Terminology: DS – Degree of Saturation, AVD – Average Vehicle Delay, LOS – Level of Service
- LOS for signals and roundabouts is based on average overall delay, and based on highest movement delay for priority intersections.
- Note: Weekend AM Peak (11am-12pm) was estimated to be 50% of the Weekday AM Peak (8-9am) turning movement counts on the basis of automatic count data for Prospect Highway and Reservoir Road.

6 TRANSPORT AND ACCESSIBILITY IMPACTS

6.1 Traffic Generation and Traffic Impact (DGR 2.1, 2.2, 2.3)

The forecast trip and traffic generation was described in Section 4 and the traffic modelling in Section 5. The traffic impact of the development is described below in relation to the key intersections and, where necessary, possible measures to address any identified issues are discussed.

As described in preceding sections the forecast traffic increase through intersections north of the M4 would be less than 20 vehicles per hour so these intersections have not been included in the traffic modelling.

6.1.1 M4 on and off ramps/intersections to Prospect Highway

The M4 / Prospect Highway interchange is currently performing at an acceptable level of service at all times except for the weekday PM peak, although the degree of saturation in the AM peak at the northern roundabout is greater than the desirable value.

Roundabouts generally function efficiently when flows on approaches are relatively equal, or at least if the operation of the roundabout is not dominated by a heavy through or right turn flow. In the weekday PM peak:

- Northbound traffic on Prospect Highway at the southern roundabout is subject to considerable delay because it is opposed by two major right turn flows – westbound M4 off-ramp heading on Prospect Highway towards Blacktown and westbound M4 on-ramp coming from Blacktown. These two right turn movements result in insufficient gaps in the circulating traffic stream for the southern approach.
- Southbound traffic on Prospect Highway is subject to considerable delay at the northern roundabout because the operation of this roundabout is dominated by the right turn movement onto the eastbound M4 on-ramp.

The scenario analysis confirmed that both the northern and southern roundabouts will continue to perform at a good level of service for the Weekday AM Peak and Weekend AM Peak, but will perform poorly in the Weekday PM peak. The main impact of the development during this time period will be to increase queues and delays on the northbound approach of Prospect Highway to the southern roundabout.

The current configuration of the M4 / Prospect Highway interchange limits the increase in traffic flow that can be accommodated. Various measures have been investigated to increase capacity at this location, such as part-time traffic signals on key movements. Full signalisation of the two roundabouts, in addition to widening of the bridge, is one possible solution to address current capacity constraints. The benefits of signalisation would be:

- signals generally have higher capacity than roundabouts
- ability to provide signal coordination between the northern and southern intersections
- ability to overcome existing situation where two dominant right turn flows exist at the southern intersection

Other possible options involving changes to the existing on and off-ramp arrangements may also be appropriate design solutions.

Improvements to the M4 / Prospect Highway interchange are already warranted as a result of current traffic volumes. Site-generated traffic and the extension of Reconciliation Road will increase traffic at this location increasing the need for capacity improvements.

6.1.2 M4 on and off ramps/intersections to Reservoir Road

The M4 / Reservoir Road interchange is currently performing at a good level of service at all times. The operation of this interchange is primarily a function of the operation of the two critical right turns. The right turn from the westbound M4 off-ramp is a strong movement but

is generally opposed by relatively low flows on Reservoir Road. Conversely, the eastbound M4 off-ramp has low flows although it is opposed by high flows on Reservoir Road.

The scenario analysis confirmed that both the northern and southern priority-controlled intersections will continue to perform at a good level of service for the modelled time periods in 2021 and therefore no capacity improvements are required at this location.

Although the Sidra analysis demonstrates that improvements are not required to accommodate forecast volumes, the safety and operational performance of the interchange could be improved by:

- Conversion of both the southern and northern Reservoir Road intersections from priority control to traffic signal control;
- New ramp connection to the eastbound M4 on-ramp to permit a right turn from Reservoir Road south to M4 eastbound; and
- Accommodation of right turn lanes in areas currently marked with chevron markings.

Such an upgrade would elevate the interchange to a higher order interchange but is unlikely to be considered if a significant upgrade of the M4 / Prospect Highway interchange occurs.

6.1.3 Prospect Highway / Reservoir Road / Reconciliation Road

The Prospect Highway / Reservoir Road / Reconciliation Road intersection is currently performing at a good level of service at all times. The roundabout has considerable spare capacity to accommodate additional traffic.

The scenario analysis confirmed that the intersection will continue to perform at a good level of service for the modelled time periods in 2021 and therefore no capacity improvements are required at this location.

However, if the Reconciliation Road extension were to proceed, more detailed modelling would need to be undertaken to determine the level of increase of background traffic on Reconciliation Road – Prospect Highway and the subsequent impact on performance of the roundabout.

6.2 Proposed Access (DGR 2.4)

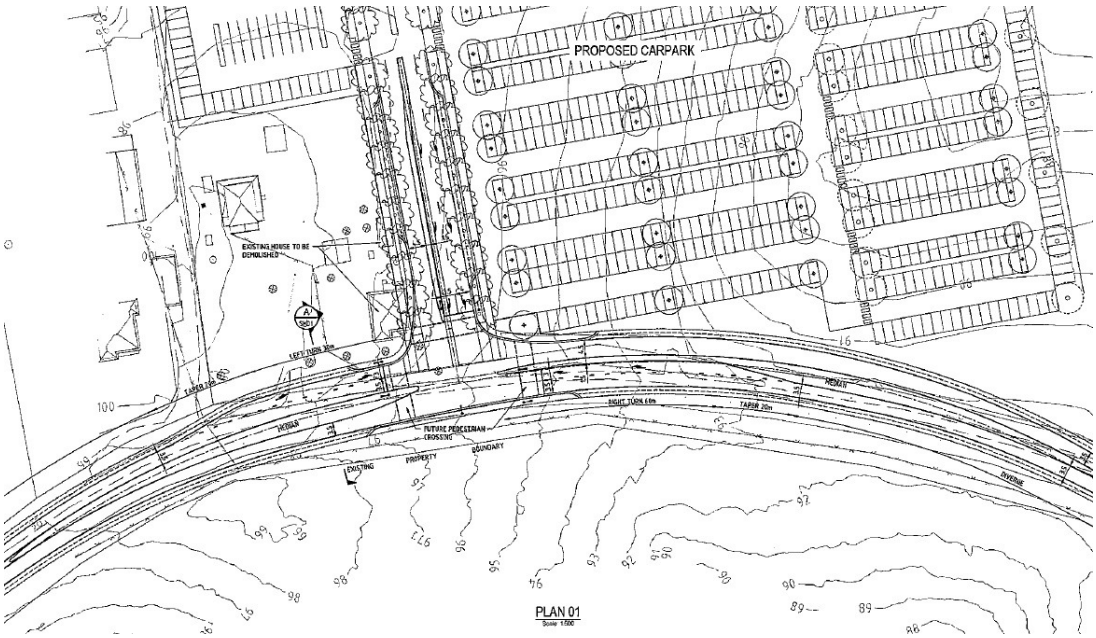
Access to the main car park, overflow car park, drop-off area and coach/minibus bus parking will be via a two-way roadway from Reservoir Road. It will include a new intersection on Reservoir Road at the south-western corner of the site. It is proposed that this intersection be signal controlled, with turning lanes, as shown in Figure 15.

The access roadway has been designed to provide considerable queuing space for vehicles exiting to Reservoir Road, and also considerable queuing space for vehicles entering the site to prevent vehicles queuing back onto Reservoir Road.

Traffic signals would provide flexibility in terms of green time allocation to accommodate short duration peak flows to/from the development. The intersection is forecast to operate at a good level of service at all time periods.

Access to the service vehicle area and staff parking area will be from Watch House Road and the Reservoir Road / Watch House Road intersection would remain priority-controlled.

Figure 15 Preliminary Layout of Reservoir Road / Site Access Intersection



6.3 On-site Car Parking (DGR 2.4)

Provision has been made for dedicated bus and coach facilities separated from parking provisions for light vehicles. The proposed number of car parking spaces is as follows:

- light vehicles 1,810 (includes 42 disabled bays)
- coaches 12
- minibuses 6
- motorcycles 20

The car park includes a vehicular drop-off area, with capacity for 15 cars/taxis and 3 buses, near the entry plaza. Secure bike parking will also be provided adjacent to the entry plaza.

Approximately 40% of the parking bays are within the main car park and the remainder in an overflow parking area.

Access to the main car park will be via a two-way roadway from Reservoir Road including a new intersection on Reservoir Road.

There are no suitable parking codes relating to the number of parking spaces required for a water theme park. Parking demand has therefore been determined using a first principles approach based on the traffic generation forecasts described earlier in this report.

The forecast peak parking demand for the modelled shoulder period is as follows:

- Weekday (Shoulder): 2,600 people at 1pm equating to parking accumulation of 740 cars
- Weekend (Shoulder): 6,000 people at 1pm equating to parking accumulation of 1,700 cars

The proposed car park would therefore have sufficient capacity to accommodate forecast peak shoulder period parking numbers.

It is possible that the demand for parking may exceed on-site supply on a small number of peak days each year. On such days, a special traffic management plan would be in operation and could involve the use of park'n'ride areas such as the nearby Drive-in theatre. This is unlikely to occur until the development has been in operation for a number of years

following the ramp-up patronage period. This will allow management time to develop a suitable traffic management plan based on actual experience of day to day operation.

The car park layout will be designed in accordance with the following Australian Standards:

- AS 2890.1 Parking Facilities, Part 1: Off-street Car Parking
- AS 2890.2 Parking Facilities, Part 2: Off-street Commercial Vehicle Facilities
- AS 2890.3 Parking Facilities, Part 3: Bicycle Parking Facilities
- AS 2890.6 Parking Facilities, Part 6: Off-street Parking for People with Disabilities

Car park bays will generally be a minimum of 5.5m long and 2.5m wide. The parking bays for people with disabilities are in accordance with the minimum requirements of AS 2890.6. Two-way aisles would be at least 5.9m in width.

6.4 Service Vehicle Movements (DGR 2.4)

Service vehicle access to the development will be from Watch House Road. The service vehicle area inside the development has been designed to accommodate a Heavy Rigid Vehicle (HRV).

Service vehicle traffic generated by the development will be due to a range of uses including deliveries, catering, waste and maintenance. Most service traffic will be scheduled to occur outside peak arrival/departure times for visitors, and outside peak periods on the surrounding road network.

6.5 Promotion of Non-car Travel Modes (DGR 2.5, 2.6, 2.7, 2.8, 2.9)

The NSW State Plan 2010 includes the following transport targets:

- Increase the proportion of total journeys to work by public transport in the Sydney Metropolitan Region to 28% by 2016 (2009 value 24%).
- Increase the mode share of bicycle trips made in the Greater Sydney region, at a local and district level, to 5% by 2016 (2009 value 1%).

The State Plan states that these targets will be met by a range of inter-related policy measures.

The existing provision for public transport, walking and cycling to the site is described in Section 2.3 and 2.4. In summary:

- The site is served by one bus route between Blacktown Station and Fairfield Station (Westbus route 812) via Reconciliation Road and Prospect Highway;
- There are no dedicated facilities for pedestrians along Reservoir Road; and
- There are no dedicated facilities for cycling in the vicinity of the site.

This current level of provision would make it difficult for users of the development to make non-car based travel choices. To improve the opportunity for non-car based travel choices the following measures will be considered, to be provided by either proponent, tourist operators or government as listed:

Proponent

- Operation of a private shuttle bus between the site and Blacktown Station and possibly other suitable stations. The service would operate on a higher frequency on weekends and during school holidays.

- Operation of a staff shuttle bus between the site and Blacktown Station to coincide with typical staff working hours.
- Provision of secure bicycle parking facilities for both visitors and workers.

Tourist Operators

- Operation of an on-demand tourist coach service between the site and major Sydney CBD hotels, hostels and Central Station.

Government

- Operation of the 812 bus service on weekends in addition to the existing weekday services.
- Construction of Blacktown Bike Plan Route 6, Prospect Reservoir to Blacktown Station, with a possible extension to Liverpool and Fairfield via the Strategic Bus Corridor.
- Inclusion of good walking and cycling facilities as part of the M4 / Prospect Highway interchange upgrade.
- Introduction of new bus services for the region once Strategic Bus Corridor No. 43, Blacktown to Wetherill Park, is completed and Greystanes Estate is further developed.

Reducing the demand and impact of travel by private car can be achieved by increasing vehicle occupancies and peak-spreading, in addition to increasing the proportion of travel by public transport, walking and cycling. The following measures will therefore be considered by the proponent to manage the demand for travel to and from the development:

- Inclusion of public transport fare as part of the entry price.
- Provision of priority parking for vehicles with three or more occupants.
- Preparation of a Travel Access Guide for visitors of the development. The guide would be prominently displayed on the water theme park's website and in promotional material.
- Preparation of a Work Place Travel Plan for workers. This would include a range of measures such as the introduction of a car share scheme and free or reduced cost public transport travel passes.

Management of the water theme park would seek to reduce the impact of trips generated by the development by spreading the spatial distribution of trips over a typical day. In particular, the departure profile of people leaving the site in the afternoon/evening would be managed. Possible measures could include:

- Staggered ticket offers according to entry time.
- Extended opening hours, particularly for the peak periods, according to demand.
- Night time events and activities such as movies and concerts.

All of the measures described in this section will contribute to managing the demand for travel to and from the development and reducing the impact of travel by private car.

6.6 Construction Traffic Impacts (DGR 2.10)

The site is ideally situated close to Sydney's motorway network and therefore trucks would have little impact on local streets. Greystanes Estate already generates a significant volume of truck traffic using Reservoir Road and Prospect Highway.

A Construction Traffic Management Plan would be produced for all demolition/construction activities once planning approval has been granted. It would detail vehicle routes, number of trucks, hours of operation, access arrangements and traffic control measures.

7 SUMMARY AND CONCLUSIONS

This report describes the existing situation, development proposal, car parking arrangements, service vehicle movements, forecast traffic generation, forecast traffic impacts and sustainable transport measures of the proposed Wet 'n' Wild Sydney development. Key findings of this transport and accessibility impacts assessment are summarised below.

Traffic Generation and Traffic Impact (DGR 2.1, 2.2, 2.3)

Daily attendance at the development will vary considerably throughout the year due to factors such as weekday/weekend, holiday/non-holiday periods, non-daylight saving time/daylight saving time, and warmer summer months/cooler winter months.

The development is unlikely to have a significant impact on the operation of the road network to the north of the M4 because most site-generated traffic will use the M4.

The traffic modelling demonstrated that both the M4 / Reservoir Road interchange and the Prospect Highway / Reservoir Road / Reconciliation Road intersection are currently performing at an acceptable level of service and will continue to do so for the year 2021 when the water theme park has been operational for some time.

The M4 / Prospect Highway Interchange is currently operating efficiently at most time periods with the exception of the weekday PM peak. Improvements as this location are therefore already warranted as a result of current traffic volumes. Site-generated traffic and the extension of Reconciliation Road will increase traffic at this location increasing the need for capacity improvements.

Proposed Access (DGR 2.4)

Access to the main car park, overflow car park, drop-off area and coach/minibus bus parking will be via a two-way roadway from Reservoir Road. It will include a new signalised intersection on Reservoir Road at the south-western corner of the site.

On-site Car Parking (DGR 2.4)

The proposed on-site parking area will accommodate approximately 1,810 cars (including 42 disabled bays), 12 coaches, 6 minibuses and 20 motorcycles, in addition to a secure bicycle parking area. The parking area will be accessed via a roadway from Reservoir Road.

The proposed car park is forecast to have sufficient capacity to accommodate peak demand on most days of the year. It is possible that the demand for parking may exceed on-site supply on a small number of peak days each year. On such days, a special traffic management plan would be in operation and could involve the use of park'n'ride areas such as the nearby Drive-in theatre.

Service Vehicle Movements (DGR 2.4)

Most service vehicle traffic will be scheduled to occur outside peak arrival/departure times for visitors, and outside peak periods on the surrounding road network. Service vehicles will use Watch House Road to access the main loading dock/deliveries area.

Promotion of Non-car Travel Modes (DGR 2.5, 2.6, 2.7, 2.8, 2.9)

To improve the opportunity for non-car based travel choices to the development, a range of measures will be considered, to be provided by either proponent, tourist operators or government, including:

- shuttle bus service between Blacktown Station and site, and Sydney CBD and site
- increased bus services on existing route 812
- improved walking/cycling facilities in the vicinity of the site

Reducing the demand and impact of travel by private car will also be achieved by increasing vehicle occupancies and peak-spreading, in addition to increasing the proportion of travel by public transport, walking and cycling. A Travel Access Guide for visitors of the development will be prepared and a Work Place Travel Plan implemented.

Management measures will also be introduced to spread the spatial distribution of trips over a typical day, including: staggered ticket offers according to entry time, extended opening hours and night time events.

All of these measures will contribute to managing the demand for travel to and from the development and reducing the impact of travel by private car.

Construction Traffic Impacts (DGR 2.10)

A Construction Traffic Management Plan would be produced for all demolition/construction activities once planning approval has been granted.

8 APPENDICES

8.1 Traffic Engineering Terms

Introduction

SIDRA is an intersection operation analysis computer package that estimates delays and queue lengths based on the traffic flow and intersection geometry.

Level of Service Definitions for Vehicles – RTA NSW Method (All Intersection Types)

Level of Service	Average Delay per Vehicle (seconds)
A	$d \leq 14.5$
B	$14.5 \leq 28.5$
C	$28.5 \leq 42.5$
D	$42.5 \leq 56.5$
E	$56.5 \leq 70.5$
F	$70.5 < d$

Note: The RTA NSW level of service definitions differ from the Austroads definitions and the US Highway Capacity Manual definitions.

Default Values

Unless otherwise stated, the following default values have been used in the analysis:

Parameter	Value
Basic saturation flow (tcu/hr)	1950 (through car units)
Critical gap (sec)	Varies according to geometry and flows
Delay definition	Overall delay (control delay with geometric delay)
Follow-up headway (sec)	Varies according to geometry and flows
Intergreen time (sec)	6
Level of service definition	Delay (NSW RTA)
Peak flow factor	0.95
Pedestrian speed (m/s)	1.11
Performance measure	Delay
Practical degree of saturation	
Signals	0.90
Roundabout	0.85
Signs	0.80
Queue type	95% back of queue

Definitions

Term	Definition
Basic saturation flow	The maximum departure (queue discharge) flow rate achieved by vehicles departing from the queue during the green period at traffic signals. Saturation Headway (seconds) is 3600 / Saturation Flow Rate (vehicles per hour). The Follow-up Headway parameter used in gap-acceptance analysis is a saturation (queue discharge) headway.
Control delay	The additional travel time experienced by a vehicle or pedestrian with reference to a base travel time (e.g. the free-flow travel time). Control Delay = Sum of Stop-Line Delay + Geometric Delay.
Critical gap	The minimum time between successive vehicles in the opposing (major) traffic stream that is acceptable for entry by opposed (minor) stream vehicles.
Degree of saturation	The ratio of arrival (demand) flow rate to capacity during a given flow period. Also known as the volume to capacity ratio.
Follow-up headway	The average headway between successive opposed (minor) stream vehicles entering a gap available in the opposing (major) traffic stream. The Follow-up Headway (seconds) is a saturation (queue discharge) headway, and the corresponding saturation flow rate (vehicles per hour) in gap-acceptance analysis is 3600 / Follow-up Headway.
Geometric delay	Delay due to physical and basic traffic control factors as experienced by a vehicle negotiating the intersection in the absence of any other vehicles (due to a deceleration from the approach cruise speed down to an approach negotiation speed, travel at that speed, acceleration to an exit negotiation speed, and then acceleration to the exit cruise speed).
Intergreen time	Duration of the clearance part of the phase corresponding to the period between the phase change point (the end of running intervals) and the beginning of the green display for the next phase (end of phase). Normally, it comprises Yellow Time and All-Red Time.
Level of service	An index of the operational performance of traffic on a given traffic lane, carriageway, road or intersection, based on service measures such as delay, degree of saturation, density and speed during a given flow period.
Peak flow factor	Ratio of the average demand flow rate in the Total Flow Period (e.g. one hour) to the demand flow rate in the Peak Flow Period (e.g. 15 minutes). This is equivalent to the more traditional term Peak Hour Factor (PHF) when the Total Flow Period is one hour
Performance measure	Factor that determines performance, usually for the purposes of optimising traffic signal cycle times, eg. delay, degree of saturation, queue, stop rate etc
Practical degree of saturation	A target, or maximum, degree of saturation that corresponds to an acceptable level of traffic performance.
Queue	A line of vehicles or pedestrians waiting to proceed through an intersection. Slowly moving vehicles or pedestrians joining the back of the queue are usually considered part of the queue. The internal queue dynamics can involve starts and stops. A faster-moving line of vehicles is often referred to as a moving queue or a platoon.
Queue type	Maximum extent of the queue relative to the stop line or give-way line during a signal cycle or gap-acceptance cycle. The last queued vehicle that joins the back of queue is the last vehicle that departs at the end of the saturated part of green interval or the available gap interval.
Stop line delay	Delay determined by projecting vehicle time-distance trajectories from the approach and exit negotiation speeds to the stop line (or give-way line), which includes the Queuing Delay and the deceleration and acceleration delay associated with the negotiation speeds.

Source: SIDRA User Guide (Akcelik & Associates, 2009)

8.2 SIDRA Outputs

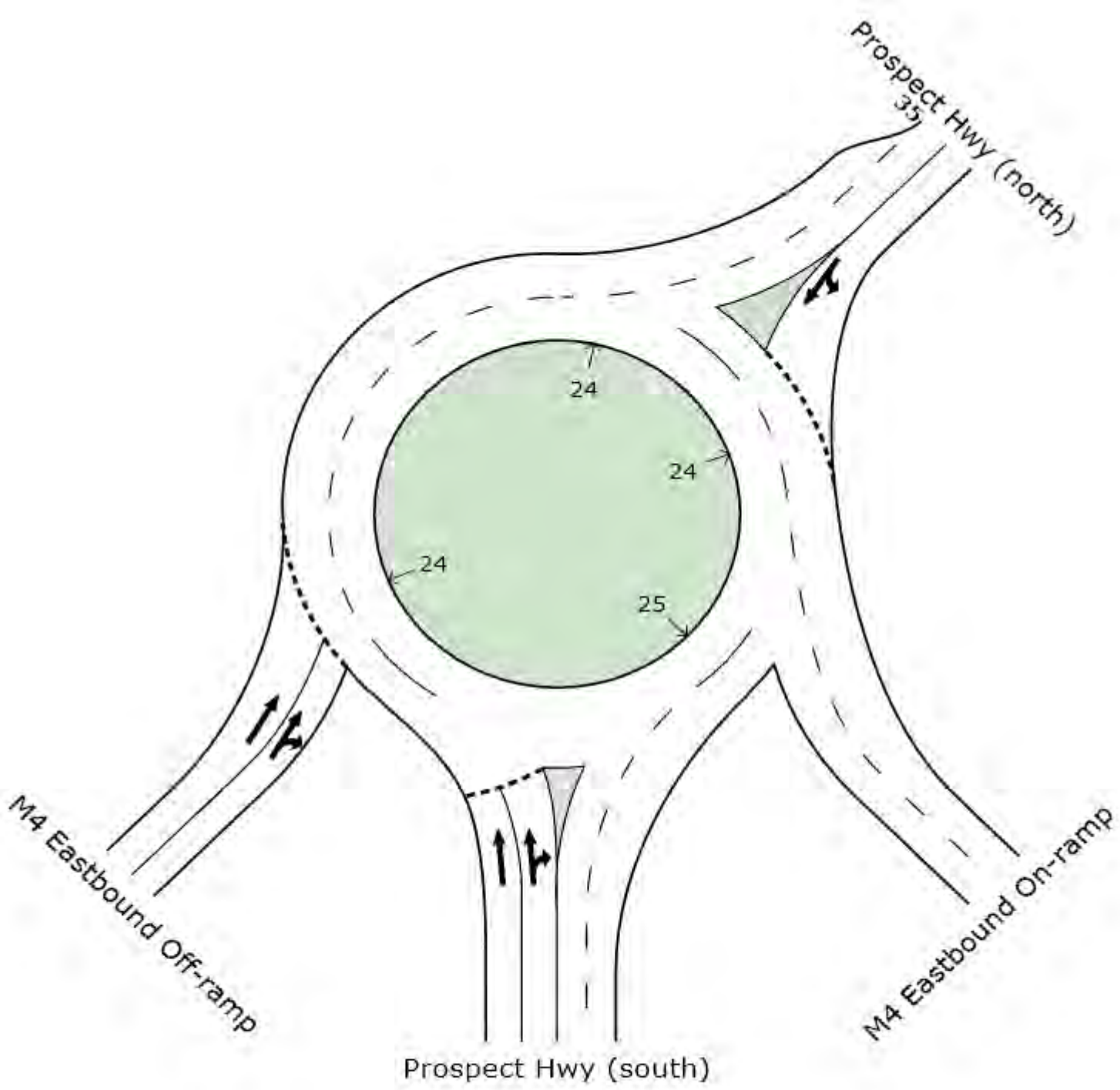
8.2.1 M4 on and off ramps/intersections to Prospect Highway – Northern Roundabout

8.2.2 M4 on and off ramps/intersections to Prospect Highway – Southern Roundabout

8.2.3 M4 on and off ramps/intersections to Reservoir Road – Northern Intersection

8.2.4 M4 on and off ramps/intersections to Reservoir Road – Southern Intersection

8.2.5 Prospect Highway / Reservoir Road / Reconciliation Road


Prospect Hwy (north)
35
24
24
24
25
M4 Eastbound Off-ramp
M4 Eastbound On-ramp
Prospect Hwy (south)

MOVEMENT SUMMARY

Prospect Hwy / M4 Eastbound On & Off Ramp
WD-AM - 2011: Existing
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Prospect Hwy (south)											
2	T	92	6.0	0.063	14.9	LOS B	0.0	0.0	0.00	0.76	51.3
3	R	683	6.0	0.354	10.2	LOS A	0.0	0.0	0.00	0.68	47.5
Approach		775	6.0	0.354	10.8	LOS B	0.0	0.0	0.00	0.69	48.0
North East: Prospect Hwy (north)											
24	L	522	6.0	0.831	7.5	LOS A	15.0	110.4	0.64	0.54	48.0
25	T	731	6.0	0.832	6.5	LOS A	15.0	110.4	0.64	0.50	48.0
Approach		1253	6.0	0.831	6.9	LOS A	15.0	110.4	0.64	0.52	48.0
South West: M4 Eastbound Off-ramp											
31	T	726	6.0	0.515	9.7	LOS A	5.9	43.8	0.78	0.70	47.1
32	R	42	6.0	0.512	17.1	LOS B	5.9	43.8	0.81	0.81	43.2
Approach		768	6.0	0.515	10.1	LOS B	5.9	43.8	0.78	0.70	46.9
All Vehicles		2796	6.0	0.831	8.9	LOS A	15.0	110.4	0.50	0.62	47.7

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

MOVEMENT SUMMARY

Prospect Hwy / M4 Eastbound On & Off Ramp
WD-AM - 2011: Base + Development
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Prospect Hwy (south)											
2	T	100	6.0	0.069	14.9	LOS B	0.0	0.0	0.00	0.76	51.3
3	R	684	6.0	0.355	10.2	LOS A	0.0	0.0	0.00	0.68	47.5
Approach		784	6.0	0.355	10.8	LOS B	0.0	0.0	0.00	0.69	48.0
North East: Prospect Hwy (north)											
24	L	522	3.0	0.831	7.5	LOS A	14.9	107.0	0.65	0.55	47.9
25	T	734	3.0	0.831	6.5	LOS A	14.9	107.0	0.65	0.51	48.0
Approach		1256	3.0	0.832	6.9	LOS A	14.9	107.0	0.65	0.53	48.0
South West: M4 Eastbound Off-ramp											
31	T	726	6.0	0.515	9.7	LOS A	5.9	43.6	0.78	0.70	47.1
32	R	42	6.0	0.512	17.1	LOS B	5.9	43.6	0.81	0.81	43.2
Approach		768	6.0	0.515	10.1	LOS B	5.9	43.6	0.78	0.70	46.9
All Vehicles		2808	4.7	0.832	8.9	LOS A	14.9	107.0	0.51	0.62	47.7

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Prospect Hwy / M4 Eastbound On & Off Ramp
WD-AM - 2021: Base + Development + Background
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Prospect Hwy (south)											
2	T	118	6.0	0.081	14.9	LOS B	0.0	0.0	0.00	0.76	51.3
3	R	752	6.0	0.390	10.2	LOS A	0.0	0.0	0.00	0.68	47.5
Approach		870	6.0	0.390	10.9	LOS B	0.0	0.0	0.00	0.69	48.1
North East: Prospect Hwy (north)											
24	L	574	3.0	0.936	10.4	LOS A	27.5	197.1	0.97	0.64	46.3
25	T	807	3.0	0.936	9.4	LOS A	27.5	197.1	0.97	0.64	45.9
Approach		1381	3.0	0.936	9.8	LOS A	27.5	197.1	0.97	0.64	46.0
South West: M4 Eastbound Off-ramp											
31	T	799	6.0	0.585	11.6	LOS A	8.3	61.4	0.86	0.77	45.6
32	R	50	6.0	0.588	19.3	LOS B	8.3	61.4	0.91	0.84	41.7
Approach		849	6.0	0.585	12.0	LOS B	8.3	61.4	0.86	0.77	45.4
All Vehicles		3100	4.7	0.936	10.7	LOS A	27.5	197.1	0.67	0.69	46.4

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Prospect Hwy / M4 Eastbound On & Off Ramp
WD-PM - 2011: Existing
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Prospect Hwy (south)											
2	T	165	6.0	0.114	14.9	LOS B	0.0	0.0	0.00	0.76	51.3
3	R	885	6.0	0.459	10.2	LOS A	0.0	0.0	0.00	0.68	47.5
Approach		1050	6.0	0.459	11.0	LOS B	0.0	0.0	0.00	0.69	48.2
North East: Prospect Hwy (north)											
24	L	604	6.0	1.002	27.4	LOS B	57.7	424.5	1.00	1.00	34.6
25	T	834	6.0	1.001	26.4	LOS B	57.7	424.5	1.00	1.00	34.7
Approach		1438	6.0	1.001	26.8	LOS B	57.7	424.5	1.00	1.00	34.7
South West: M4 Eastbound Off-ramp											
31	T	400	6.0	0.312	11.9	LOS A	4.1	30.0	0.86	0.67	45.3
32	R	27	6.0	0.314	19.2	LOS B	4.1	30.0	0.88	0.75	41.7
Approach		427	6.0	0.312	12.4	LOS B	4.1	30.0	0.86	0.68	45.1
All Vehicles		2915	6.0	1.001	19.0	LOS B	57.7	424.5	0.62	0.84	40.3

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

MOVEMENT SUMMARY

Prospect Hwy / M4 Eastbound On & Off Ramp
WD-PM - 2011: Base + Development
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Prospect Hwy (south)											
2	T	285	3.0	0.189	14.8	LOS B	0.0	0.0	0.00	0.76	51.3
3	R	895	3.0	0.459	10.1	LOS A	0.0	0.0	0.00	0.68	47.5
Approach		1180	3.0	0.459	11.3	LOS B	0.0	0.0	0.00	0.70	48.5
North East: Prospect Hwy (north)											
24	L	604	3.0	1.100	109.5	LOS F	121.1	869.2	1.00	2.87	15.0
25	T	837	3.0	1.100	108.5	LOS F	121.1	869.2	1.00	2.87	15.1
Approach		1441	3.0	1.100	108.9	LOS F	121.1	869.2	1.00	2.87	15.1
South West: M4 Eastbound Off-ramp											
31	T	400	3.0	0.307	11.8	LOS A	4.0	28.4	0.86	0.68	45.4
32	R	27	3.0	0.307	19.1	LOS B	4.0	28.4	0.89	0.75	41.8
Approach		427	3.0	0.307	12.2	LOS B	4.0	28.4	0.86	0.69	45.1
All Vehicles		3048	3.0	1.100	57.5	LOS E	121.1	869.2	0.59	1.73	24.1

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Prospect Hwy / M4 Eastbound On & Off Ramp
WD-PM - 2021: Base + Development + Background
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Prospect Hwy (south)											
2	T	318	4.0	0.211	14.8	LOS B	0.0	0.0	0.00	0.76	51.3
3	R	984	4.0	0.505	10.2	LOS A	0.0	0.0	0.00	0.68	47.5
Approach		1302	4.0	0.505	11.3	LOS B	0.0	0.0	0.00	0.70	48.5
North East: Prospect Hwy (north)											
24	L	664	4.0	1.241	232.8	LOS F	225.7	1634.2	1.00	5.07	8.1
25	T	920	4.0	1.240	231.8	LOS F	225.7	1634.2	1.00	5.07	8.2
Approach		1584	4.0	1.240	232.2	LOS F	225.7	1634.2	1.00	5.07	8.1
South West: M4 Eastbound Off-ramp											
31	T	440	4.0	0.355	14.6	LOS B	5.6	40.7	0.97	0.69	42.9
32	R	32	4.0	0.356	22.0	LOS B	5.6	40.7	1.00	0.70	39.9
Approach		472	4.0	0.355	15.1	LOS B	5.6	40.7	0.97	0.69	42.7
All Vehicles		3358	4.0	1.240	116.0	LOS F	225.7	1634.2	0.61	2.76	14.9

Level of Service (Aver. Int. Delay): LOS F. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: WE-AM - 2011: Existing

Prospect Hwy / M4 Eastbound On & Off Ramp
WE-AM - 2011: Existing
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Prospect Hwy (south)											
2	T	46	4.0	0.033	14.8	LOS B	0.0	0.0	0.00	0.76	51.3
3	R	342	4.0	0.182	10.2	LOS A	0.0	0.0	0.00	0.68	47.5
Approach		388	4.0	0.182	10.7	LOS B	0.0	0.0	0.00	0.69	48.0
North East: Prospect Hwy (north)											
24	L	261	4.0	0.420	6.2	LOS A	3.0	22.0	0.22	0.51	50.4
25	T	366	4.0	0.420	5.2	LOS A	3.0	22.0	0.22	0.42	51.2
Approach		627	4.0	0.420	5.6	LOS A	3.0	22.0	0.22	0.46	50.9
South West: M4 Eastbound Off-ramp											
31	T	363	4.0	0.266	6.7	LOS A	1.6	11.4	0.45	0.58	49.4
32	R	21	4.0	0.266	13.9	LOS A	1.6	11.4	0.45	0.89	45.3
Approach		384	4.0	0.266	7.1	LOS A	1.6	11.4	0.45	0.59	49.1
All Vehicles		1399	4.0	0.420	7.5	LOS A	3.0	22.0	0.22	0.56	49.5

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

MOVEMENT SUMMARY

Prospect Hwy / M4 Eastbound On & Off Ramp
WE-AM - 2011: Base + Development
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Prospect Hwy (south)											
2	T	109	2.0	0.076	14.7	LOS B	0.0	0.0	0.00	0.76	51.3
3	R	347	2.0	0.185	10.1	LOS A	0.0	0.0	0.00	0.68	47.5
Approach		456	2.0	0.185	11.2	LOS B	0.0	0.0	0.00	0.70	48.5
North East: Prospect Hwy (north)											
24	L	261	2.0	0.483	6.6	LOS A	3.7	26.2	0.34	0.55	49.7
25	T	387	2.0	0.483	5.6	LOS A	3.7	26.2	0.34	0.47	50.2
Approach		648	2.0	0.483	6.0	LOS A	3.7	26.2	0.34	0.50	50.0
South West: M4 Eastbound Off-ramp											
31	T	363	2.0	0.273	6.9	LOS A	1.6	11.2	0.48	0.59	49.2
32	R	21	2.0	0.273	14.0	LOS A	1.6	11.2	0.48	0.91	45.2
Approach		384	2.0	0.273	7.3	LOS A	1.6	11.2	0.48	0.61	49.0
All Vehicles		1488	2.0	0.483	7.9	LOS A	3.7	26.2	0.27	0.59	49.2

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION

MOVEMENT SUMMARY

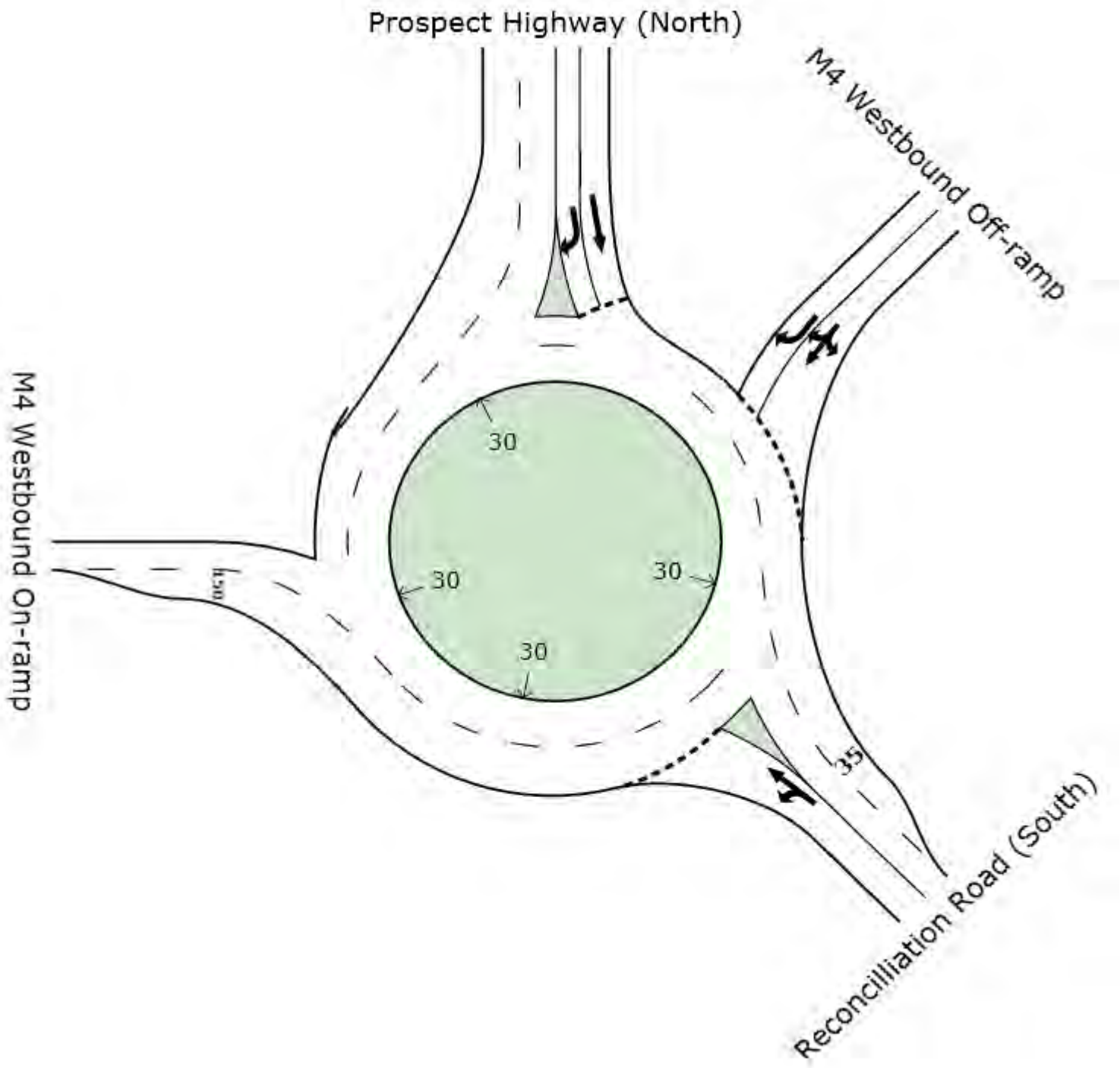
Prospect Hwy / M4 Eastbound On & Off Ramp
WE-AM - 2021: Base + Development + Background
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Prospect Hwy (south)											
2	T	118	3.0	0.078	14.8	LOS B	0.0	0.0	0.00	0.76	51.3
3	R	381	3.0	0.196	10.1	LOS A	0.0	0.0	0.00	0.68	47.5
Approach		499	3.0	0.196	11.2	LOS B	0.0	0.0	0.00	0.70	48.5
North East: Prospect Hwy (north)											
24	L	287	3.0	0.490	6.7	LOS A	4.3	30.9	0.35	0.53	49.6
25	T	424	3.0	0.490	5.7	LOS A	4.3	30.9	0.35	0.46	50.2
Approach		711	3.0	0.490	6.1	LOS A	4.3	30.9	0.35	0.49	50.0
South West: M4 Eastbound Off-ramp											
31	T	399	3.0	0.252	6.7	LOS A	1.9	13.4	0.48	0.56	49.2
32	R	25	3.0	0.253	14.0	LOS A	1.9	13.4	0.49	0.85	45.2
Approach		424	3.0	0.252	7.1	LOS A	1.9	13.4	0.48	0.58	48.9
All Vehicles		1634	3.0	0.490	7.9	LOS A	4.3	30.9	0.28	0.58	49.2

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION


Prospect Highway (North)
M4 Westbound Off-ramp
M4 Westbound On-ramp
Reconciliation Road (South)
30
30
30
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35

MOVEMENT SUMMARY

Site: WD-AM - 2011: Existing

Prospect Hwy / M4 Westbound On & Off Ramp
WD-AM - 2011: Existing
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reconcilliation Road (South)											
21	L	23	6.0	0.274	10.6	LOS A	1.9	14.0	0.81	0.87	45.1
22	T	140	6.0	0.273	16.4	LOS B	1.9	14.0	0.81	0.94	42.5
Approach		163	6.0	0.273	15.6	LOS B	1.9	14.0	0.81	0.93	42.8
North East: M4 Westbound Off-ramp											
24	L	176	6.0	0.441	9.5	LOS A	3.4	24.8	0.70	0.84	46.9
25	T	1	6.0	0.500	13.9	LOS A	3.4	24.8	0.70	0.92	44.4
26	R	635	6.0	0.441	17.3	LOS B	3.4	24.8	0.71	0.95	42.3
Approach		812	6.0	0.441	15.6	LOS B	3.4	24.8	0.71	0.93	43.1
North: Prospect Highway (North)											
8	T	225	6.0	0.158	4.4	LOS A	0.0	0.0	0.00	0.39	53.7
9	R	618	6.0	0.339	11.4	LOS A	0.0	0.0	0.00	0.69	46.7
Approach		843	6.0	0.339	9.5	LOS A	0.0	0.0	0.00	0.61	48.3
All Vehicles		1818	6.0	0.441	12.8	LOS A	3.4	24.8	0.39	0.78	45.3

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

MOVEMENT SUMMARY

Prospect Hwy / M4 Westbound On & Off Ramp
WD-AM - 2011: Base + Development
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reconcilliation Road (South)											
21	L	23	6.0	0.291	10.8	LOS A	2.0	15.0	0.82	0.88	44.9
22	T	148	6.0	0.290	16.6	LOS B	2.0	15.0	0.82	0.95	42.3
Approach		171	6.0	0.290	15.8	LOS B	2.0	15.0	0.82	0.94	42.6
North East: M4 Westbound Off-ramp											
24	L	206	6.0	0.458	9.7	LOS A	3.6	26.5	0.71	0.85	46.9
25	T	1	6.0	0.500	14.1	LOS A	3.6	26.5	0.71	0.93	44.3
26	R	635	6.0	0.457	17.5	LOS B	3.6	26.5	0.72	0.96	42.1
Approach		842	6.0	0.457	15.6	LOS B	3.6	26.5	0.72	0.93	43.1
North: Prospect Highway (North)											
8	T	228	6.0	0.160	4.4	LOS A	0.0	0.0	0.00	0.39	53.7
9	R	618	6.0	0.339	11.4	LOS A	0.0	0.0	0.00	0.69	46.7
Approach		846	6.0	0.339	9.5	LOS A	0.0	0.0	0.00	0.61	48.3
All Vehicles		1859	6.0	0.457	12.8	LOS A	3.6	26.5	0.40	0.79	45.3

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

MOVEMENT SUMMARY

Prospect Hwy / M4 Westbound On & Off Ramp
WD-AM - 2021: Base + Development + Background
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reconcilliation Road (South)											
21	L	28	6.0	0.389	13.7	LOS A	3.1	22.9	0.88	0.96	42.3
22	T	176	6.0	0.391	19.5	LOS B	3.1	22.9	0.88	1.01	40.2
Approach		204	6.0	0.391	18.7	LOS B	3.1	22.9	0.88	1.00	40.5
North East: M4 Westbound Off-ramp											
24	L	241	6.0	0.534	11.1	LOS A	4.8	35.3	0.76	0.95	45.7
25	T	1	6.0	0.500	15.5	LOS B	4.8	35.3	0.76	1.01	43.2
26	R	699	6.0	0.534	19.1	LOS B	4.8	35.3	0.77	1.03	41.0
Approach		941	6.0	0.535	17.0	LOS B	4.8	35.3	0.77	1.01	42.0
North: Prospect Highway (North)											
8	T	273	6.0	0.189	4.4	LOS A	0.0	0.0	0.00	0.39	53.7
9	R	680	6.0	0.373	11.4	LOS A	0.0	0.0	0.00	0.69	46.7
Approach		953	6.0	0.373	9.4	LOS A	0.0	0.0	0.00	0.61	48.5
All Vehicles		2098	6.0	0.535	13.7	LOS A	4.8	35.3	0.43	0.82	44.5

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

MOVEMENT SUMMARY

Site: WD-PM - 2011: Existing

Prospect Hwy / M4 Westbound On & Off Ramp
WD-PM - 2011: Existing
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reconcilliation Road (South)											
21	L	45	6.0	0.818	47.1	LOS D	12.4	91.4	1.00	1.50	25.6
22	T	293	6.0	0.823	52.9	LOS D	12.4	91.4	1.00	1.50	25.5
Approach		338	6.0	0.823	52.1	LOS D	12.4	91.4	1.00	1.50	25.5
North East: M4 Westbound Off-ramp											
24	L	46	6.0	0.479	11.6	LOS A	4.4	32.7	0.80	0.90	44.8
25	T	1	6.0	0.500	16.0	LOS B	4.4	32.7	0.80	0.95	42.5
26	R	757	6.0	0.478	19.4	LOS B	4.4	32.7	0.80	0.99	40.7
Approach		804	6.0	0.478	19.0	LOS B	4.4	32.7	0.80	0.98	40.9
North: Prospect Highway (North)											
8	T	42	6.0	0.031	4.4	LOS A	0.0	0.0	0.00	0.39	53.7
9	R	848	6.0	0.465	11.4	LOS A	0.0	0.0	0.00	0.69	46.7
Approach		890	6.0	0.465	11.0	LOS A	0.0	0.0	0.00	0.68	47.0
All Vehicles		2032	6.0	0.823	21.0	LOS B	12.4	91.4	0.48	0.93	39.3

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

MOVEMENT SUMMARY

Prospect Hwy / M4 Westbound On & Off Ramp
WD-PM - 2011: Base + Development
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reconcilliation Road (South)											
21	L	45	3.0	1.071	145.0	LOS F	44.5	319.2	1.00	2.91	12.0
22	T	424	3.0	1.084	150.8	LOS F	44.5	319.2	1.00	2.91	12.3
Approach		469	3.0	1.083	150.2	LOS F	44.5	319.2	1.00	2.91	12.2
North East: M4 Westbound Off-ramp											
24	L	76	3.0	0.484	11.5	LOS A	4.6	32.7	0.80	0.90	45.0
25	T	1	3.0	0.500	15.9	LOS B	4.6	32.7	0.80	0.95	42.6
26	R	757	3.0	0.485	19.2	LOS B	4.6	32.7	0.80	0.99	40.8
Approach		834	3.0	0.485	18.5	LOS B	4.6	32.7	0.80	0.98	41.1
North: Prospect Highway (North)											
8	T	45	3.0	0.033	4.3	LOS A	0.0	0.0	0.00	0.39	53.7
9	R	848	3.0	0.460	11.3	LOS A	0.0	0.0	0.00	0.69	46.7
Approach		893	3.0	0.460	10.9	LOS A	0.0	0.0	0.00	0.68	47.0
All Vehicles		2196	3.0	1.083	43.6	LOS D	44.5	319.2	0.52	1.27	28.5

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Prospect Hwy / M4 Westbound On & Off Ramp
WD-PM - 2021: Base + Development + Background
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reconcilliation Road (South)											
21	L	54	4.0	1.742	723.4	LOS F	178.1	1289.5	1.00	6.25	2.9
22	T	548	4.0	1.756	729.1	LOS F	178.1	1289.5	1.00	6.25	3.0
Approach		602	4.0	1.754	728.6	LOS F	178.1	1289.5	1.00	6.25	3.0
North East: M4 Westbound Off-ramp											
24	L	100	4.0	0.578	14.2	LOS A	6.5	47.2	0.86	1.04	42.6
25	T	1	4.0	0.500	18.6	LOS B	6.5	47.2	0.86	1.07	40.6
26	R	833	4.0	0.576	22.2	LOS B	6.5	47.2	0.86	1.09	38.9
Approach		934	4.0	0.577	21.4	LOS B	6.5	47.2	0.86	1.08	39.2
North: Prospect Highway (North)											
8	T	54	4.0	0.040	4.4	LOS A	0.0	0.0	0.00	0.39	53.7
9	R	933	4.0	0.506	11.3	LOS A	0.0	0.0	0.00	0.69	46.7
Approach		987	4.0	0.506	10.9	LOS A	0.0	0.0	0.00	0.68	47.1
All Vehicles		2523	4.0	1.754	186.0	LOS F	178.1	1289.5	0.56	2.16	10.5

Level of Service (Aver. Int. Delay): LOS F. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: WE-AM - 2011: Existing

Prospect Hwy / M4 Westbound On & Off Ramp
WE-AM - 2011: Existing
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reconcilliation Road (South)											
21	L	12	4.0	0.086	6.4	LOS A	0.5	3.4	0.52	0.57	48.4
22	T	70	4.0	0.086	12.2	LOS A	0.5	3.4	0.52	0.75	45.6
Approach		82	4.0	0.086	11.3	LOS A	0.5	3.4	0.52	0.72	46.0
North East: M4 Westbound Off-ramp											
24	L	88	4.0	0.177	7.0	LOS A	1.1	7.8	0.46	0.59	48.6
25	T	1	4.0	0.167	11.5	LOS A	1.1	7.8	0.46	0.73	46.0
26	R	318	4.0	0.177	14.2	LOS A	1.1	7.8	0.48	0.75	44.2
Approach		407	4.0	0.177	12.6	LOS A	1.1	7.8	0.48	0.72	45.0
North: Prospect Highway (North)											
8	T	113	4.0	0.079	4.4	LOS A	0.0	0.0	0.00	0.39	53.7
9	R	309	4.0	0.168	11.3	LOS A	0.0	0.0	0.00	0.69	46.7
Approach		422	4.0	0.168	9.5	LOS A	0.0	0.0	0.00	0.61	48.3
All Vehicles		911	4.0	0.177	11.0	LOS A	1.1	7.8	0.26	0.67	46.6

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

MOVEMENT SUMMARY

Prospect Hwy / M4 Westbound On & Off Ramp
WE-AM - 2011: Base + Development
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reconcilliation Road (South)											
21	L	12	2.0	0.164	6.9	LOS A	1.0	7.2	0.58	0.62	47.8
22	T	138	2.0	0.163	12.7	LOS A	1.0	7.2	0.58	0.77	45.2
Approach		150	2.0	0.163	12.2	LOS A	1.0	7.2	0.58	0.76	45.4
North East: M4 Westbound Off-ramp											
24	L	339	2.0	0.288	7.2	LOS A	1.9	13.4	0.51	0.63	48.7
25	T	1	2.0	0.333	11.7	LOS A	1.9	13.4	0.51	0.79	46.4
26	R	318	2.0	0.288	14.6	LOS B	1.9	13.4	0.53	0.78	43.8
Approach		658	2.0	0.288	10.8	LOS B	1.9	13.4	0.52	0.70	46.1
North: Prospect Highway (North)											
8	T	134	2.0	0.091	4.3	LOS A	0.0	0.0	0.00	0.39	53.7
9	R	309	2.0	0.167	11.3	LOS A	0.0	0.0	0.00	0.69	46.7
Approach		443	2.0	0.167	9.2	LOS A	0.0	0.0	0.00	0.60	48.6
All Vehicles		1251	2.0	0.288	10.4	LOS A	1.9	13.4	0.34	0.67	46.8

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

MOVEMENT SUMMARY

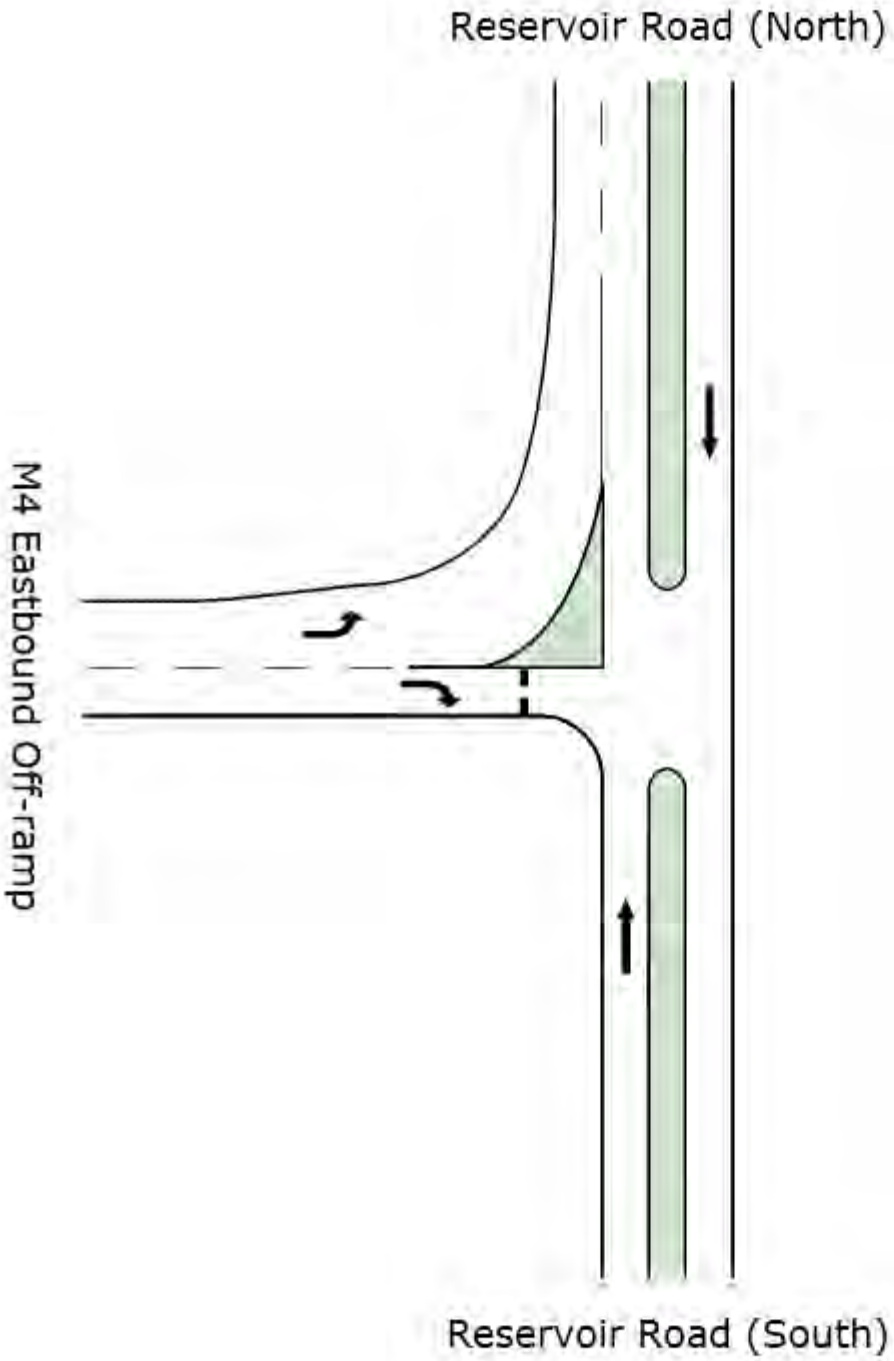
Prospect Hwy / M4 Westbound On & Off Ramp
WE-AM - 2021: Base + Development + Background
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reconcilliation Road (South)											
21	L	14	3.0	0.189	7.3	LOS A	1.2	8.6	0.61	0.65	47.5
22	T	152	3.0	0.188	13.0	LOS A	1.2	8.6	0.61	0.80	45.1
Approach		166	3.0	0.188	12.5	LOS A	1.2	8.6	0.61	0.79	45.2
North East: M4 Westbound Off-ramp											
24	L	356	3.0	0.318	7.4	LOS A	2.1	15.1	0.54	0.65	48.4
25	T	1	3.0	0.333	11.9	LOS A	2.1	15.1	0.54	0.81	46.3
26	R	349	3.0	0.318	14.9	LOS B	2.1	15.1	0.57	0.80	43.7
Approach		706	3.0	0.318	11.1	LOS B	2.1	15.1	0.55	0.72	45.9
North: Prospect Highway (North)											
8	T	157	3.0	0.106	4.3	LOS A	0.0	0.0	0.00	0.39	53.7
9	R	340	3.0	0.184	11.3	LOS A	0.0	0.0	0.00	0.69	46.7
Approach		497	3.0	0.184	9.1	LOS A	0.0	0.0	0.00	0.60	48.6
All Vehicles		1369	3.0	0.318	10.5	LOS A	2.1	15.1	0.36	0.69	46.8

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION


Reservoir Road (North)
M4 Eastbound Off-ramp
Reservoir Road (South)

MOVEMENT SUMMARY

Site: WD-AM - 2011: Existing

Reservoir Rd / M4 Eastbound Off Ramp
WD-AM - 2011: Existing
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reservoir Road (South)											
2	T	602	6.0	0.321	0.0	NA[9]	NA[9]	NA[9]	0.00	0.00	59.9
Approach		602	6.0	0.321	0.0	NA	0.0	0.0	0.00	0.00	59.9
North: Reservoir Road (North)											
8	T	405	6.0	0.216	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		405	6.0	0.216	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: M4 Eastbound Off-ramp											
10	L	571	6.0	0.321	11.4	NA[9]	NA[9]	NA[9]	0.00	0.69	58.8
12	R	116	6.0	0.065	12.2	LOS A	0.0	0.0	0.00	1.00	54.6
Approach		687	6.0	0.321	11.5	LOS A	0.0	0.0	0.00	0.74	58.1
All Vehicles		1694	6.0	0.321	4.7	NA	0.0	0.0	0.00	0.30	59.2

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.

Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).

Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

SIDRA INTERSECTION

MOVEMENT SUMMARY

Reservoir Rd / M4 Eastbound Off Ramp
WD-AM - 2011: Base + Development
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reservoir Road (South)											
2	T	602	6.0	0.321	0.0	NA[9]	NA[9]	NA[9]	0.00	0.00	59.9
Approach		602	6.0	0.321	0.0	NA	0.0	0.0	0.00	0.00	59.9
North: Reservoir Road (North)											
8	T	406	6.0	0.216	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		406	6.0	0.216	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: M4 Eastbound Off-ramp											
10	L	571	6.0	0.321	11.4	NA[9]	NA[9]	NA[9]	0.00	0.69	58.8
12	R	147	6.0	0.083	12.2	LOS A	0.0	0.0	0.00	1.00	54.6
Approach		718	6.0	0.321	11.5	LOS A	0.0	0.0	0.00	0.75	58.0
All Vehicles		1726	6.0	0.321	4.8	NA	0.0	0.0	0.00	0.31	59.1

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

SIDRA INTERSECTION

MOVEMENT SUMMARY

Reservoir Rd / M4 Eastbound Off Ramp
WD-AM - 2021: Base + Development + Background
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reservoir Road (South)											
2	T	663	6.0	0.353	0.1	NA[9]	NA[9]	NA[9]	0.00	0.00	59.9
Approach		663	6.0	0.353	0.1	NA	0.0	0.0	0.00	0.00	59.9
North: Reservoir Road (North)											
8	T	447	6.0	0.238	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		447	6.0	0.238	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: M4 Eastbound Off-ramp											
10	L	628	6.0	0.353	11.4	NA[9]	NA[9]	NA[9]	0.00	0.69	58.8
12	R	171	6.0	0.096	12.2	LOS A	0.0	0.0	0.00	1.00	54.6
Approach		799	6.0	0.353	11.5	LOS A	0.0	0.0	0.00	0.75	57.9
All Vehicles		1909	6.0	0.353	4.9	NA	0.0	0.0	0.00	0.32	59.0

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: WD-PM - 2011: Existing

Reservoir Rd / M4 Eastbound Off Ramp
WD-PM - 2011: Existing
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reservoir Road (South)											
2	T	761	6.0	0.405	0.1	NA[9]	NA[9]	NA[9]	0.00	0.00	59.9
Approach		761	6.0	0.405	0.1	NA	0.0	0.0	0.00	0.00	59.9
North: Reservoir Road (North)											
8	T	762	6.0	0.406	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		762	6.0	0.406	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: M4 Eastbound Off-ramp											
10	L	336	6.0	0.189	11.4	NA[9]	NA[9]	NA[9]	0.00	0.69	58.8
12	R	26	6.0	0.015	12.2	LOS A	0.0	0.0	0.00	1.00	54.6
Approach		362	6.0	0.189	11.4	LOS A	0.0	0.0	0.00	0.71	58.6
All Vehicles		1885	6.0	0.406	2.2	NA	0.0	0.0	0.00	0.14	59.6

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.

Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).

Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: WD-PM - 2011: Base + Development

Reservoir Rd / M4 Eastbound Off Ramp
WD-PM - 2011: Base + Development
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reservoir Road (South)											
2	T	766	3.0	0.400	0.1	NA[9]	NA[9]	NA[9]	0.00	0.00	59.9
Approach		766	3.0	0.400	0.1	NA	0.0	0.0	0.00	0.00	59.9
North: Reservoir Road (North)											
8	T	763	3.0	0.399	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		763	3.0	0.399	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: M4 Eastbound Off-ramp											
10	L	336	3.0	0.185	11.2	NA[9]	NA[9]	NA[9]	0.00	0.69	58.8
12	R	57	3.0	0.031	12.0	LOS A	0.0	0.0	0.00	1.00	54.6
Approach		393	3.0	0.185	11.3	LOS A	0.0	0.0	0.00	0.73	58.3
All Vehicles		1922	3.0	0.400	2.3	NA	0.0	0.0	0.00	0.15	59.6

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

MOVEMENT SUMMARY

Reservoir Rd / M4 Eastbound Off Ramp
WD-PM - 2021: Base + Development + Background
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reservoir Road (South)											
2	T	842	4.0	0.443	0.1	NA[9]	NA[9]	NA[9]	0.00	0.00	59.9
Approach		842	4.0	0.443	0.1	NA	0.0	0.0	0.00	0.00	59.9
North: Reservoir Road (North)											
8	T	840	4.0	0.442	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		840	4.0	0.442	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: M4 Eastbound Off-ramp											
10	L	370	4.0	0.205	11.3	NA[9]	NA[9]	NA[9]	0.00	0.69	58.8
12	R	63	4.0	0.035	12.0	LOS A	0.0	0.0	0.00	1.00	54.6
Approach		433	4.0	0.205	11.4	LOS A	0.0	0.0	0.00	0.73	58.3
All Vehicles		2115	4.0	0.443	2.4	NA	0.0	0.0	0.00	0.15	59.6

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

MOVEMENT SUMMARY

Reservoir Rd / M4 Eastbound Off Ramp
WE-AM - 2011: Existing
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reservoir Road (South)											
2	T	301	4.0	0.158	0.0	NA[9]	NA[9]	NA[9]	0.00	0.00	60.0
Approach		301	4.0	0.158	0.0	NA	0.0	0.0	0.00	0.00	60.0
North: Reservoir Road (North)											
8	T	203	4.0	0.107	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		203	4.0	0.107	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: M4 Eastbound Off-ramp											
10	L	286	4.0	0.158	11.3	NA[9]	NA[9]	NA[9]	0.00	0.69	58.8
12	R	58	4.0	0.032	12.0	LOS A	0.0	0.0	0.00	1.00	54.6
Approach		344	4.0	0.158	11.4	LOS A	0.0	0.0	0.00	0.74	58.2
All Vehicles		848	4.0	0.158	4.6	NA	0.0	0.0	0.00	0.30	59.2

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.

Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).

Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

SIDRA INTERSECTION

MOVEMENT SUMMARY

Reservoir Rd / M4 Eastbound Off Ramp
WE-AM - 2011: Base + Development
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reservoir Road (South)											
2	T	304	2.0	0.158	0.0	NA[9]	NA[9]	NA[9]	0.00	0.00	60.0
Approach		304	2.0	0.158	0.0	NA	0.0	0.0	0.00	0.00	60.0
North: Reservoir Road (North)											
8	T	213	2.0	0.111	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		213	2.0	0.111	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: M4 Eastbound Off-ramp											
10	L	286	2.0	0.156	11.2	NA[9]	NA[9]	NA[9]	0.00	0.69	58.8
12	R	320	2.0	0.175	11.9	LOS A	0.0	0.0	0.00	1.00	54.6
Approach		606	2.0	0.175	11.5	LOS A	0.0	0.0	0.00	0.85	56.7
All Vehicles		1123	2.0	0.175	6.2	NA	0.0	0.0	0.00	0.46	58.1

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

MOVEMENT SUMMARY

Reservoir Rd / M4 Eastbound Off Ramp
WE-AM - 2021: Base + Development + Background
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reservoir Road (South)											
2	T	334	3.0	0.175	0.0	NA[9]	NA[9]	NA[9]	0.00	0.00	60.0
Approach		334	3.0	0.175	0.0	NA	0.0	0.0	0.00	0.00	60.0
North: Reservoir Road (North)											
8	T	234	3.0	0.122	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		234	3.0	0.122	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: M4 Eastbound Off-ramp											
10	L	314	3.0	0.173	11.2	NA[9]	NA[9]	NA[9]	0.00	0.69	58.8
12	R	331	3.0	0.182	12.0	LOS A	0.0	0.0	0.00	1.00	54.6
Approach		645	3.0	0.182	11.6	LOS A	0.0	0.0	0.00	0.85	56.7
All Vehicles		1213	3.0	0.182	6.2	NA	0.0	0.0	0.00	0.45	58.2

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

SIDRA INTERSECTION

servoir Road (North)
N
M4 Off-ramp
Reservoir Road (South)

MOVEMENT SUMMARY

Site: WD-AM - 2011: Exisiting

Reservoir Rd / M4 Westbound On & Off Ramps
WD-AM - 2011: Exisiting
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reservoir Road (South)											
22	T	35	6.0	0.021	7.5	LOS A	0.0	0.0	0.00	0.61	49.9
23	R	5	6.0	0.021	9.9	LOS A	0.0	0.0	0.00	0.82	54.9
Approach		40	6.0	0.021	7.8	LOS A	0.0	0.0	0.00	0.64	50.6
East: M4 Off-ramp											
4	L	22	6.0	0.328	9.1	LOS A	0.0	0.0	0.00	0.58	48.4
6	R	567	6.0	0.331	8.7	LOS A	0.0	0.0	0.00	0.70	48.6
Approach		589	6.0	0.331	8.7	LOS A	0.0	0.0	0.00	0.70	48.6
North: Reservoir Road (North)											
8	T	189	6.0	0.101	7.5	LOS A	0.0	0.0	0.00	0.62	50.0
Approach		189	6.0	0.101	7.5	LOS A	0.0	0.0	0.00	0.62	50.0
All Vehicles		818	6.0	0.331	8.4	NA	0.0	0.0	0.00	0.68	49.0

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Reservoir Rd / M4 Westbound On & Off Ramps
WD-AM - 2011: Base + Development
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reservoir Road (South)											
22	T	35	6.0	0.024	7.5	LOS A	0.0	0.0	0.00	0.61	49.9
23	R	10	6.0	0.024	9.9	LOS A	0.0	0.0	0.00	0.81	54.9
Approach		45	6.0	0.024	8.0	LOS A	0.0	0.0	0.00	0.65	51.2
East: M4 Off-ramp											
4	L	22	6.0	0.328	9.1	LOS A	0.0	0.0	0.00	0.58	48.4
6	R	567	6.0	0.331	8.7	LOS A	0.0	0.0	0.00	0.70	48.6
Approach		589	6.0	0.331	8.7	LOS A	0.0	0.0	0.00	0.70	48.6
North: Reservoir Road (North)											
8	T	222	6.0	0.118	7.5	LOS A	0.0	0.0	0.00	0.62	50.0
Approach		222	6.0	0.118	7.5	LOS A	0.0	0.0	0.00	0.62	50.0
All Vehicles		856	6.0	0.331	8.4	NA	0.0	0.0	0.00	0.68	49.1

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Reservoir Rd / M4 Westbound On & Off Ramps
WD-AM - 2021: Base + Development + Background
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reservoir Road (South)											
22	T	42	6.0	0.028	7.5	LOS A	0.0	0.0	0.00	0.61	49.9
23	R	10	6.0	0.028	9.9	LOS A	0.0	0.0	0.00	0.81	54.9
Approach		52	6.0	0.028	8.0	LOS A	0.0	0.0	0.00	0.65	51.0
East: M4 Off-ramp											
4	L	26	6.0	0.366	9.1	LOS A	0.0	0.0	0.00	0.58	48.4
6	R	624	6.0	0.365	8.7	LOS A	0.0	0.0	0.00	0.70	48.6
Approach		650	6.0	0.365	8.7	LOS A	0.0	0.0	0.00	0.70	48.6
North: Reservoir Road (North)											
8	T	260	6.0	0.139	7.5	LOS A	0.0	0.0	0.00	0.62	50.0
Approach		260	6.0	0.139	7.5	LOS A	0.0	0.0	0.00	0.62	50.0
All Vehicles		962	6.0	0.365	8.3	NA	0.0	0.0	0.00	0.67	49.1

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: WD-PM - 2011: Exisiting

Reservoir Rd / M4 Westbound On & Off Ramps
WD-PM - 2011: Exisiting
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reservoir Road (South)											
22	T	121	6.0	0.112	7.5	LOS A	0.0	0.0	0.00	0.59	49.9
23	R	85	6.0	0.112	9.9	LOS A	0.0	0.0	0.00	0.79	54.9
Approach		206	6.0	0.112	8.5	LOS A	0.0	0.0	0.00	0.68	52.2
East: M4 Off-ramp											
4	L	5	6.0	0.357	9.1	LOS A	0.0	0.0	0.00	0.58	48.4
6	R	640	6.0	0.362	8.7	LOS A	0.0	0.0	0.00	0.70	48.6
Approach		645	6.0	0.362	8.7	LOS A	0.0	0.0	0.00	0.70	48.6
North: Reservoir Road (North)											
8	T	38	6.0	0.020	7.5	LOS A	0.0	0.0	0.00	0.62	50.0
Approach		38	6.0	0.020	7.5	LOS A	0.0	0.0	0.00	0.62	50.0
All Vehicles		889	6.0	0.362	8.6	NA	0.0	0.0	0.00	0.69	49.5

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Reservoir Rd / M4 Westbound On & Off Ramps
WD-PM - 2011: Base + Development
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reservoir Road (South)											
22	T	126	3.0	0.182	7.4	LOS A	0.0	0.0	0.00	0.58	49.9
23	R	211	3.0	0.182	9.7	LOS A	0.0	0.0	0.00	0.77	54.9
Approach		337	3.0	0.182	8.8	LOS A	0.0	0.0	0.00	0.70	53.2
East: M4 Off-ramp											
4	L	5	3.0	0.357	9.0	LOS A	0.0	0.0	0.00	0.58	48.4
6	R	640	3.0	0.355	8.6	LOS A	0.0	0.0	0.00	0.70	48.6
Approach		645	3.0	0.355	8.6	LOS A	0.0	0.0	0.00	0.70	48.6
North: Reservoir Road (North)											
8	T	71	3.0	0.037	7.4	LOS A	0.0	0.0	0.00	0.62	50.0
Approach		71	3.0	0.037	7.4	LOS A	0.0	0.0	0.00	0.62	50.0
All Vehicles		1053	3.0	0.355	8.6	NA	0.0	0.0	0.00	0.70	50.3

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Reservoir Rd / M4 Westbound On & Off Ramps
WD-PM - 2021: Base + Development + Background
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reservoir Road (South)											
22	T	150	4.0	0.205	7.4	LOS A	0.0	0.0	0.00	0.58	49.9
23	R	228	4.0	0.205	9.8	LOS A	0.0	0.0	0.00	0.78	54.9
Approach		378	4.0	0.205	8.8	LOS A	0.0	0.0	0.00	0.70	53.1
East: M4 Off-ramp											
4	L	6	4.0	0.400	9.1	LOS A	0.0	0.0	0.00	0.58	48.4
6	R	704	4.0	0.393	8.6	LOS A	0.0	0.0	0.00	0.70	48.6
Approach		710	4.0	0.393	8.6	LOS A	0.0	0.0	0.00	0.70	48.6
North: Reservoir Road (North)											
8	T	78	4.0	0.041	7.4	LOS A	0.0	0.0	0.00	0.62	50.0
Approach		78	4.0	0.041	7.4	LOS A	0.0	0.0	0.00	0.62	50.0
All Vehicles		1166	4.0	0.393	8.6	NA	0.0	0.0	0.00	0.69	50.3

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Reservoir Rd / M4 Westbound On & Off Ramps
WE-AM - 2011: Existing
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reservoir Road (South)											
22	T	18	4.0	0.012	7.4	LOS A	0.0	0.0	0.00	0.61	49.9
23	R	4	4.0	0.012	9.8	LOS A	0.0	0.0	0.00	0.81	54.9
Approach		22	4.0	0.012	7.9	LOS A	0.0	0.0	0.00	0.64	51.0
East: M4 Off-ramp											
4	L	11	4.0	0.164	9.1	LOS A	0.0	0.0	0.00	0.58	48.4
6	R	284	4.0	0.163	8.6	LOS A	0.0	0.0	0.00	0.70	48.6
Approach		295	4.0	0.163	8.6	LOS A	0.0	0.0	0.00	0.70	48.6
North: Reservoir Road (North)											
8	T	95	4.0	0.050	7.4	LOS A	0.0	0.0	0.00	0.62	50.0
Approach		95	4.0	0.050	7.4	LOS A	0.0	0.0	0.00	0.62	50.0
All Vehicles		412	4.0	0.163	8.3	NA	0.0	0.0	0.00	0.68	49.0

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Reservoir Rd / M4 Westbound On & Off Ramps
WE-AM - 2011: Base + Development
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reservoir Road (South)											
22	T	20	4.0	0.047	7.4	LOS A	0.0	0.0	0.00	0.57	49.9
23	R	66	4.0	0.047	9.8	LOS A	0.0	0.0	0.00	0.76	54.9
Approach		86	4.0	0.047	9.2	LOS A	0.0	0.0	0.00	0.72	53.9
East: M4 Off-ramp											
4	L	11	4.0	0.164	9.1	LOS A	0.0	0.0	0.00	0.58	48.4
6	R	284	4.0	0.163	8.6	LOS A	0.0	0.0	0.00	0.70	48.6
Approach		295	4.0	0.163	8.6	LOS A	0.0	0.0	0.00	0.70	48.6
North: Reservoir Road (North)											
8	T	367	4.0	0.193	7.4	LOS A	0.0	0.0	0.00	0.62	50.0
Approach		367	4.0	0.193	7.4	LOS A	0.0	0.0	0.00	0.62	50.0
All Vehicles		748	4.0	0.193	8.1	NA	0.0	0.0	0.00	0.66	49.9

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

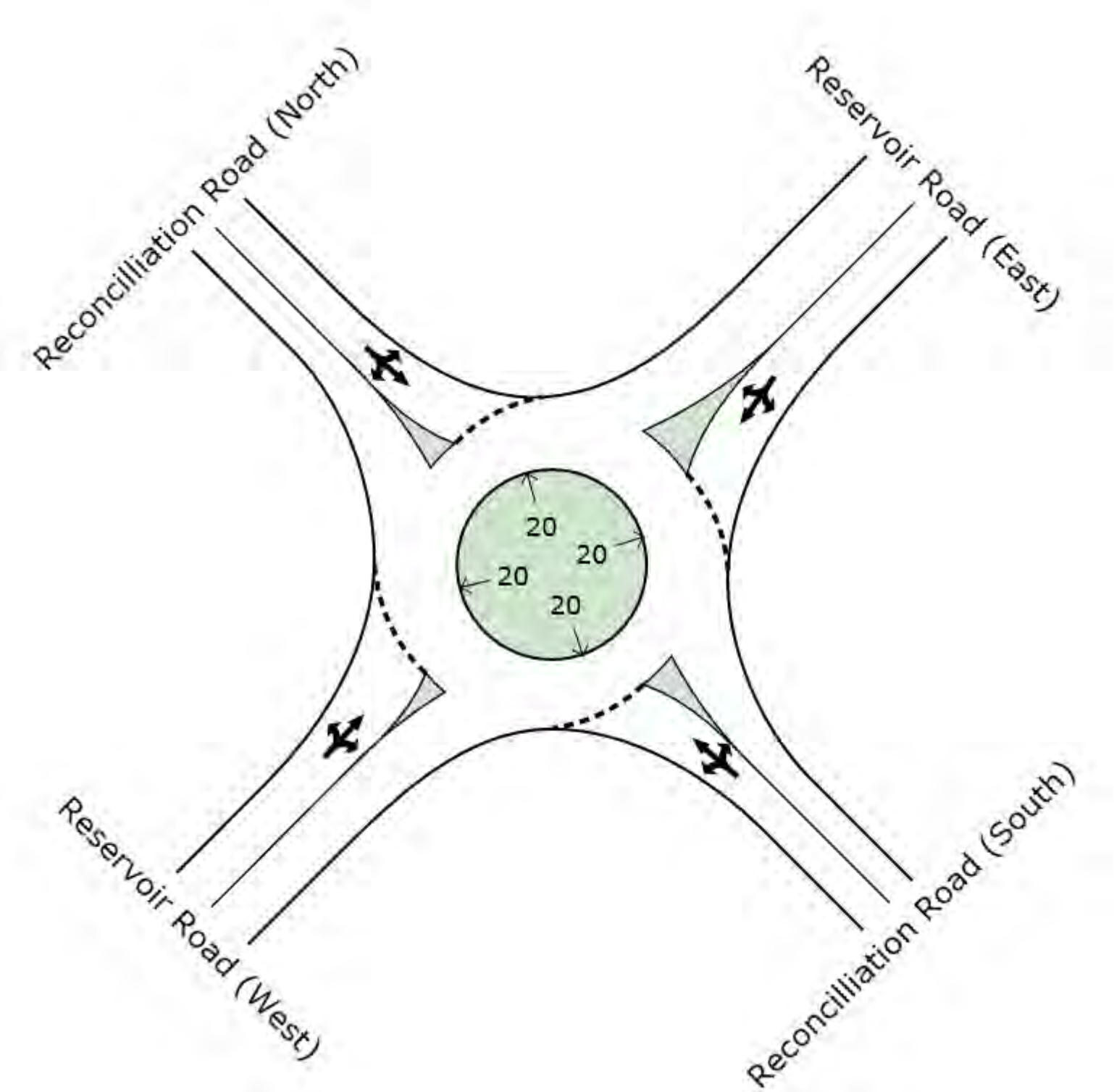
MOVEMENT SUMMARY

Reservoir Rd / M4 Westbound On & Off Ramps
WE-AM - 2021: Base + Development + Background
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reservoir Road (South)											
22	T	24	3.0	0.049	7.4	LOS A	0.0	0.0	0.00	0.58	49.9
23	R	67	3.0	0.049	9.7	LOS A	0.0	0.0	0.00	0.77	54.9
Approach		91	3.0	0.049	9.1	LOS A	0.0	0.0	0.00	0.72	53.8
East: M4 Off-ramp											
4	L	13	3.0	0.178	9.0	LOS A	0.0	0.0	0.00	0.58	48.4
6	R	312	3.0	0.179	8.6	LOS A	0.0	0.0	0.00	0.70	48.6
Approach		325	3.0	0.179	8.6	LOS A	0.0	0.0	0.00	0.70	48.6
North: Reservoir Road (North)											
8	T	386	3.0	0.202	7.4	LOS A	0.0	0.0	0.00	0.62	50.0
Approach		386	3.0	0.202	7.4	LOS A	0.0	0.0	0.00	0.62	50.0
All Vehicles		802	3.0	0.202	8.1	NA	0.0	0.0	0.00	0.66	49.9

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.


Reconcilliation Road (North)
Reservoir Road (East)
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Reservoir Road (West)
Reconcilliation Road (South)

MOVEMENT SUMMARY

Site: WD-AM - 2011: Existing

Prospect Hwy / Reservoir Rd / Reconciliation Dr
WD-AM - 2011: Existing
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reconciliation Road (South)											
21	L	18	10.0	0.076	6.8	LOS A	0.5	3.8	0.23	0.52	50.0
22	T	74	10.0	0.076	6.0	LOS A	0.5	3.8	0.23	0.45	50.6
23	R	5	10.0	0.076	11.8	LOS A	0.5	3.8	0.23	0.80	46.3
Approach		97	10.0	0.076	6.5	LOS A	0.5	3.8	0.23	0.48	50.2
North East: Reservoir Road (East)											
24	L	5	10.0	0.016	8.6	LOS A	0.1	0.7	0.52	0.59	48.1
25	T	5	10.0	0.016	7.8	LOS A	0.1	0.7	0.52	0.54	48.1
26	R	5	10.0	0.016	13.5	LOS A	0.1	0.7	0.52	0.73	45.1
Approach		15	10.0	0.016	10.0	LOS A	0.1	0.7	0.52	0.62	47.0
North West: Prospect Hwy (North)											
27	L	5	10.0	0.313	7.3	LOS A	2.4	18.2	0.35	0.56	49.3
28	T	342	10.0	0.322	6.4	LOS A	2.4	18.2	0.35	0.50	49.7
29	R	62	10.0	0.323	12.2	LOS A	2.4	18.2	0.35	0.79	46.2
Approach		409	10.0	0.322	7.3	LOS A	2.4	18.2	0.35	0.54	49.1
South West: Reservoir Road (West)											
30	L	69	10.0	0.150	6.9	LOS A	0.8	6.0	0.20	0.50	49.8
31	T	8	10.0	0.151	6.0	LOS A	0.8	6.0	0.20	0.42	50.5
32	R	120	10.0	0.150	11.7	LOS A	0.8	6.0	0.20	0.70	45.9
Approach		197	10.0	0.150	9.8	LOS A	0.8	6.0	0.20	0.62	47.3
All Vehicles		718	10.0	0.322	7.9	LOS A	2.4	18.2	0.30	0.56	48.7

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

MOVEMENT SUMMARY

Prospect Hwy / Reservoir Rd / Reconciliation Dr
WD-AM - 2011: Base + Development
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reconciliation Road (South)											
21	L	18	10.0	0.079	7.0	LOS A	0.5	4.0	0.28	0.53	49.7
22	T	74	10.0	0.079	6.2	LOS A	0.5	4.0	0.28	0.46	50.2
23	R	5	10.0	0.079	12.0	LOS A	0.5	4.0	0.28	0.79	46.3
Approach		97	10.0	0.079	6.7	LOS A	0.5	4.0	0.28	0.49	49.9
North East: Reservoir Road (East)											
24	L	5	10.0	0.017	8.8	LOS A	0.1	0.8	0.54	0.60	47.9
25	T	5	10.0	0.017	8.0	LOS A	0.1	0.8	0.54	0.55	48.0
26	R	5	10.0	0.017	13.7	LOS A	0.1	0.8	0.54	0.73	44.9
Approach		15	10.0	0.017	10.2	LOS A	0.1	0.8	0.54	0.63	46.9
North West: Prospect Hwy (North)											
27	L	5	10.0	0.357	7.3	LOS A	2.6	20.1	0.36	0.56	49.2
28	T	342	10.0	0.347	6.4	LOS A	2.6	20.1	0.36	0.50	49.6
29	R	95	10.0	0.347	12.2	LOS A	2.6	20.1	0.36	0.78	46.1
Approach		442	10.0	0.347	7.7	LOS A	2.6	20.1	0.36	0.56	48.7
South West: Reservoir Road (West)											
30	L	77	10.0	0.157	6.9	LOS A	0.8	6.4	0.20	0.50	49.8
31	T	8	10.0	0.157	6.0	LOS A	0.8	6.4	0.20	0.42	50.5
32	R	120	10.0	0.156	11.7	LOS A	0.8	6.4	0.20	0.70	45.9
Approach		205	10.0	0.156	9.7	LOS A	0.8	6.4	0.20	0.61	47.4
All Vehicles		759	10.0	0.347	8.2	LOS A	2.6	20.1	0.31	0.57	48.5

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Prospect Hwy / Reservoir Rd / Reconciliation Dr
WD-AM - 2021: Base + Development + Background
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reconciliation Road (South)											
21	L	22	10.0	0.096	7.1	LOS A	0.7	5.0	0.31	0.54	49.6
22	T	89	10.0	0.096	6.3	LOS A	0.7	5.0	0.31	0.47	50.0
23	R	5	10.0	0.096	12.1	LOS A	0.7	5.0	0.31	0.78	46.3
Approach		116	10.0	0.096	6.7	LOS A	0.7	5.0	0.31	0.50	49.8
North East: Reservoir Road (East)											
24	L	5	10.0	0.018	9.5	LOS A	0.1	0.9	0.61	0.62	47.5
25	T	5	10.0	0.018	8.6	LOS A	0.1	0.9	0.61	0.58	47.5
26	R	5	10.0	0.018	14.4	LOS A	0.1	0.9	0.61	0.74	44.4
Approach		15	10.0	0.018	10.9	LOS A	0.1	0.9	0.61	0.65	46.4
North West: Prospect Hwy (North)											
27	L	5	10.0	0.417	7.5	LOS A	3.4	26.2	0.43	0.58	48.9
28	T	410	10.0	0.420	6.7	LOS A	3.4	26.2	0.43	0.52	49.1
29	R	107	10.0	0.420	12.5	LOS A	3.4	26.2	0.43	0.78	46.0
Approach		522	10.0	0.419	7.9	LOS A	3.4	26.2	0.43	0.58	48.4
South West: Reservoir Road (West)											
30	L	91	10.0	0.189	7.0	LOS A	1.1	8.0	0.23	0.51	49.6
31	T	10	10.0	0.189	6.0	LOS A	1.1	8.0	0.23	0.43	50.2
32	R	144	10.0	0.189	11.8	LOS A	1.1	8.0	0.23	0.70	45.8
Approach		245	10.0	0.189	9.8	LOS A	1.1	8.0	0.23	0.62	47.3
All Vehicles		898	10.0	0.419	8.3	LOS A	3.4	26.2	0.36	0.58	48.2

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: WD-PM - 2011: Existing

Prospect Hwy / Reservoir Rd / Reconciliation Dr
WD-PM - 2011: Existing
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reconciliation Road (South)											
21	L	117	10.0	0.250	6.7	LOS A	1.8	14.0	0.18	0.52	50.3
22	T	241	10.0	0.250	5.9	LOS A	1.8	14.0	0.18	0.44	50.9
23	R	1	10.0	0.250	11.4	LOS A	1.8	14.0	0.18	0.81	46.4
Approach		359	10.0	0.250	6.2	LOS A	1.8	14.0	0.18	0.47	50.7
North East: Reservoir Road (East)											
24	L	1	10.0	0.011	6.5	LOS A	0.1	0.4	0.20	0.50	50.0
25	T	7	10.0	0.011	6.0	LOS A	0.1	0.4	0.20	0.42	50.6
26	R	6	10.0	0.011	11.8	LOS A	0.1	0.4	0.20	0.74	46.1
Approach		14	10.0	0.011	8.5	LOS A	0.1	0.4	0.20	0.56	48.5
North West: Prospect Hwy (North)											
27	L	6	10.0	0.069	6.6	LOS A	0.4	3.2	0.09	0.51	50.7
28	T	63	10.0	0.069	5.7	LOS A	0.4	3.2	0.09	0.42	51.6
29	R	31	10.0	0.069	11.5	LOS A	0.4	3.2	0.09	0.80	46.4
Approach		100	10.0	0.069	7.6	LOS A	0.4	3.2	0.09	0.55	49.8
South West: Reservoir Road (West)											
30	L	65	10.0	0.071	7.5	LOS A	0.4	2.8	0.33	0.56	49.1
31	T	7	10.0	0.071	6.5	LOS A	0.4	2.8	0.33	0.49	49.5
32	R	9	10.0	0.071	12.3	LOS A	0.4	2.8	0.33	0.75	45.8
Approach		81	10.0	0.071	8.0	LOS A	0.4	2.8	0.33	0.58	48.7
All Vehicles		554	10.0	0.250	6.7	LOS A	1.8	14.0	0.19	0.50	50.2

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

MOVEMENT SUMMARY

Prospect Hwy / Reservoir Rd / Reconciliation Dr
WD-PM - 2011: Base + Development
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reconciliation Road (South)											
21	L	117	5.0	0.252	6.7	LOS A	1.9	13.5	0.24	0.53	49.9
22	T	241	5.0	0.252	5.9	LOS A	1.9	13.5	0.24	0.46	50.5
23	R	1	5.0	0.250	11.5	LOS A	1.9	13.5	0.24	0.80	46.3
Approach		359	5.0	0.252	6.2	LOS A	1.9	13.5	0.24	0.48	50.3
North East: Reservoir Road (East)											
24	L	1	5.0	0.011	6.6	LOS A	0.1	0.4	0.22	0.51	49.8
25	T	7	5.0	0.011	5.9	LOS A	0.1	0.4	0.22	0.43	50.4
26	R	6	5.0	0.011	11.7	LOS A	0.1	0.4	0.22	0.74	46.1
Approach		14	5.0	0.011	8.4	LOS A	0.1	0.4	0.22	0.57	48.4
North West: Prospect Hwy (North)											
27	L	6	5.0	0.086	6.4	LOS A	0.5	4.0	0.09	0.50	50.7
28	T	63	5.0	0.086	5.6	LOS A	0.5	4.0	0.09	0.41	51.6
29	R	64	5.0	0.086	11.3	LOS A	0.5	4.0	0.09	0.77	46.4
Approach		133	5.0	0.086	8.4	LOS A	0.5	4.0	0.09	0.59	48.8
South West: Reservoir Road (West)											
30	L	196	5.0	0.176	7.3	LOS A	1.0	7.2	0.35	0.58	49.0
31	T	7	5.0	0.175	6.4	LOS A	1.0	7.2	0.35	0.51	49.4
32	R	9	5.0	0.176	12.2	LOS A	1.0	7.2	0.35	0.76	45.8
Approach		212	5.0	0.176	7.5	LOS A	1.0	7.2	0.35	0.59	48.8
All Vehicles		718	5.0	0.252	7.0	LOS A	1.9	13.5	0.25	0.53	49.5

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Prospect Hwy / Reservoir Rd / Reconciliation Dr
WD-PM - 2021: Base + Development + Background
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reconciliation Road (South)											
21	L	140	6.0	0.305	6.8	LOS A	2.4	17.5	0.27	0.53	49.8
22	T	289	6.0	0.305	6.0	LOS A	2.4	17.5	0.27	0.46	50.2
23	R	1	6.0	0.333	11.6	LOS A	2.4	17.5	0.27	0.79	46.3
Approach		430	6.0	0.305	6.3	LOS A	2.4	17.5	0.27	0.49	50.1
North East: Reservoir Road (East)											
24	L	1	6.0	0.013	6.7	LOS A	0.1	0.4	0.25	0.51	49.7
25	T	8	6.0	0.013	6.0	LOS A	0.1	0.4	0.25	0.43	50.3
26	R	7	6.0	0.013	11.8	LOS A	0.1	0.4	0.25	0.73	46.0
Approach		16	6.0	0.013	8.6	LOS A	0.1	0.4	0.25	0.57	48.2
North West: Prospect Hwy (North)											
27	L	7	6.0	0.100	6.4	LOS A	0.6	4.8	0.10	0.50	50.7
28	T	76	6.0	0.100	5.6	LOS A	0.6	4.8	0.10	0.41	51.5
29	R	70	6.0	0.100	11.4	LOS A	0.6	4.8	0.10	0.77	46.3
Approach		153	6.0	0.100	8.3	LOS A	0.6	4.8	0.10	0.58	48.9
South West: Reservoir Road (West)											
30	L	209	6.0	0.198	7.6	LOS A	1.2	8.5	0.40	0.60	48.7
31	T	8	6.0	0.200	6.7	LOS A	1.2	8.5	0.40	0.54	49.0
32	R	11	6.0	0.196	12.4	LOS A	1.2	8.5	0.40	0.77	45.7
Approach		228	6.0	0.198	7.8	LOS A	1.2	8.5	0.40	0.61	48.6
All Vehicles		827	6.0	0.305	7.1	LOS A	2.4	17.5	0.28	0.54	49.4

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Prospect Hwy / Reservoir Rd / Reconciliation Dr
WE-AM - 2011: Existing
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reconciliation Road (South)											
21	L	9	4.0	0.034	6.4	LOS A	0.2	1.5	0.13	0.52	50.6
22	T	37	4.0	0.034	5.6	LOS A	0.2	1.5	0.13	0.44	51.3
23	R	1	4.0	0.033	11.3	LOS A	0.2	1.5	0.13	0.84	46.4
Approach		47	4.0	0.034	5.9	LOS A	0.2	1.5	0.13	0.46	51.0
North East: Reservoir Road (East)											
24	L	1	4.0	0.003	7.0	LOS A	0.0	0.1	0.32	0.50	49.1
25	T	1	4.0	0.003	6.2	LOS A	0.0	0.1	0.32	0.43	49.5
26	R	2	4.0	0.003	11.9	LOS A	0.0	0.1	0.32	0.68	45.7
Approach		4	4.0	0.003	9.2	LOS A	0.0	0.1	0.32	0.57	47.4
North West: Prospect Hwy (North)											
27	L	2	4.0	0.143	6.4	LOS A	0.9	6.4	0.19	0.53	50.2
28	T	171	4.0	0.143	5.8	LOS A	0.9	6.4	0.19	0.45	50.9
29	R	31	4.0	0.144	11.5	LOS A	0.9	6.4	0.19	0.81	46.4
Approach		204	4.0	0.143	6.6	LOS A	0.9	6.4	0.19	0.50	50.1
South West: Reservoir Road (West)											
30	L	35	4.0	0.069	6.5	LOS A	0.3	2.4	0.11	0.49	50.4
31	T	4	4.0	0.069	5.6	LOS A	0.3	2.4	0.11	0.40	51.3
32	R	60	4.0	0.069	11.4	LOS A	0.3	2.4	0.11	0.71	46.2
Approach		99	4.0	0.069	9.4	LOS A	0.3	2.4	0.11	0.62	47.7
All Vehicles		354	4.0	0.143	7.3	LOS A	0.9	6.4	0.16	0.53	49.5

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Prospect Hwy / Reservoir Rd / Reconciliation Dr
WE-AM - 2011: Base + Development
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reconciliation Road (South)											
21	L	9	2.0	0.042	7.6	LOS A	0.3	2.0	0.44	0.58	48.9
22	T	37	2.0	0.043	6.8	LOS A	0.3	2.0	0.44	0.52	49.1
23	R	1	2.0	0.042	12.5	LOS A	0.3	2.0	0.44	0.78	46.0
Approach		47	2.0	0.043	7.1	LOS A	0.3	2.0	0.44	0.54	49.0
North East: Reservoir Road (East)											
24	L	1	2.0	0.004	8.0	LOS A	0.0	0.2	0.49	0.53	48.1
25	T	1	2.0	0.004	7.2	LOS A	0.0	0.2	0.49	0.48	48.2
26	R	2	2.0	0.004	13.0	LOS A	0.0	0.2	0.49	0.67	45.2
Approach		4	2.0	0.004	10.3	LOS A	0.0	0.2	0.49	0.59	46.6
North West: Prospect Hwy (North)											
27	L	2	2.0	0.333	6.5	LOS A	2.4	16.9	0.22	0.49	49.8
28	T	171	2.0	0.321	5.7	LOS A	2.4	16.9	0.22	0.42	50.4
29	R	304	2.0	0.321	11.5	LOS A	2.4	16.9	0.22	0.71	46.0
Approach		477	2.0	0.321	9.4	LOS A	2.4	16.9	0.22	0.61	47.4
South West: Reservoir Road (West)											
30	L	103	2.0	0.114	6.5	LOS A	0.6	4.4	0.13	0.50	50.3
31	T	4	2.0	0.114	5.5	LOS A	0.6	4.4	0.13	0.41	51.2
32	R	60	2.0	0.114	11.3	LOS A	0.6	4.4	0.13	0.73	46.2
Approach		167	2.0	0.114	8.2	LOS A	0.6	4.4	0.13	0.58	48.7
All Vehicles		695	2.0	0.321	9.0	LOS A	2.4	16.9	0.21	0.59	47.8

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Prospect Hwy / Reservoir Rd / Reconciliation Dr
WE-AM - 2021: Base + Development + Background
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Reconciliation Road (South)											
21	L	11	3.0	0.051	7.7	LOS A	0.3	2.4	0.45	0.58	48.8
22	T	44	3.0	0.051	6.9	LOS A	0.3	2.4	0.45	0.53	49.0
23	R	1	3.0	0.050	12.6	LOS A	0.3	2.4	0.45	0.78	45.9
Approach		56	3.0	0.051	7.1	LOS A	0.3	2.4	0.45	0.55	48.9
North East: Reservoir Road (East)											
24	L	1	3.0	0.004	8.3	LOS A	0.0	0.2	0.53	0.54	47.9
25	T	1	3.0	0.004	7.5	LOS A	0.0	0.2	0.53	0.49	47.9
26	R	2	3.0	0.004	13.2	LOS A	0.0	0.2	0.53	0.67	45.0
Approach		4	3.0	0.004	10.5	LOS A	0.0	0.2	0.53	0.60	46.4
North West: Prospect Hwy (North)											
27	L	2	3.0	0.333	6.5	LOS A	2.7	19.5	0.25	0.50	49.6
28	T	205	3.0	0.353	5.9	LOS A	2.7	19.5	0.25	0.43	50.1
29	R	310	3.0	0.353	11.6	LOS A	2.7	19.5	0.25	0.71	45.9
Approach		517	3.0	0.353	9.3	LOS A	2.7	19.5	0.25	0.60	47.4
South West: Reservoir Road (West)											
30	L	110	3.0	0.129	6.5	LOS A	0.7	5.1	0.14	0.50	50.2
31	T	5	3.0	0.128	5.6	LOS A	0.7	5.1	0.14	0.41	51.1
32	R	72	3.0	0.129	11.3	LOS A	0.7	5.1	0.14	0.72	46.2
Approach		187	3.0	0.129	8.3	LOS A	0.7	5.1	0.14	0.58	48.5
All Vehicles		764	3.0	0.353	8.9	LOS A	2.7	19.5	0.24	0.59	47.8

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION