stage 1 preferred project report (part 3a) for the mixed use commercial and retail development at 2 australia avenue, homebush

prepared on behalf of capital corporation by **TRAFFIX** traffic & transport planners
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transport and accessibility impact assessment report

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1. introduction

TRAFFIX has prepared this Preferred Project Report on behalf of Capital Corporation and this follows upon the transport and accessibility impact assessment report dated October 2011, which was in support of a Stage 1 project application relating to the mixed use commercial and retail development located at 2 Australia Avenue, Homebush. The development is located within the Sydney Olympic Park Authority (SOPA) and has been assessed under their controls, as well as having regard for Auburn Council controls and the RTA's Guidelines.

This report documents the findings of our investigations and takes into account the matters raised by SOPA and the RMS.

The report is structured as follows:

- Section 2: Describes the site and its location
- Section 3: Documents existing traffic conditions
- Section 4: Describes the proposed development as amended to overcome issues as raised
- Section 5: Assesses the parking requirements
- Section 6: Assesses traffic impacts including the additional modelling
- Section 7: Discusses access and internal design aspects including the changed access arrangements
- Section 8: Presents the overall study conclusions.

This report also responds to the Director General's Requirements. In relation to Transport and Accessibility Impacts, the requirements state as follows:

- *Provide a Transport and Accessibility Impact Assessment, to be prepared in accordance with the RTA's Guide to Traffic Generating Developments and other relevant EPIs*
- *Demonstrate a minimalist on-site car parking strategy for the proposal with consideration to the accessibility of the site to public transport and mode share targets including parking provisions for shared cars, under the Sydney Olympic Park Master Plan 2030, local planning controls, RTA Guidelines and Australian Standards.*
- *Assess the implications of the proposed development for the non-car travel modes including the provision of facilities to manage travel demand, increase the use of public and non-car transport modes including pedestrian and bicycle linkages*
- *Address the potential for implementing a location specific sustainable travel plan such as a Workplace travel Plan (WTP) for workers and/or a Travel Access Guide (TAG) for visitors to the site.*
- *Prepare a Construction Traffic Management Plan (CTMP) to mitigate any potential impacts to accessibility, amenity, safety of pedestrians and cyclists during construction, including access arrangements for emergency vehicles and workers and an estimation of the number of truck movements expected during the construction phase.*

2. location and site

The site is located on the western side of Australia Avenue between Herb Elliott Avenue to the north and Figtree Drive to the south and is within Sydney Olympic Park. A commercial and retail development lies opposite the site across Herb Elliott Avenue and the Olympic Park railway station is less than 200 metres to the north-west of the site.

The site currently consists of an existing warehouse development called 'Silex Solar Pty'. It has an northern frontage of 130 metres to Herb Elliott Avenue, an western boundary of 80 metres to the neighbouring Basketball Australia Headquarters, a southern site boundary of 122 metres to a future road and an eastern boundary to Australia Avenue of length 104 metres.

There are currently two driveway crossings accessing the site from Australia Avenue. There is also a loading area on the northern side of the development which is accessed via Herb Elliott Avenue. This access driveway is approximately 8 metres wide.

A Location Plan is presented in **Figure 1**, with a Site Plan presented in **Figure 2**. Reference should also be made to the Photographic Record presented in **Appendix A**, which provides an appreciation of the general character of roads and other key attributes in proximity to the site.

Figure 1: Location

Figure 2: Site

3. existing traffic conditions

3.1 road hierarchy

The road hierarchy in the vicinity of the site is shown in **Figure 3** with the following roads of particular interest:

- The Western Motorway: an RTA State Road (MR 6004) that generally runs in an east-west direction, forming a primary arterial link between Sydney and its western suburbs. The Western Motorway runs between Strathfield in the east and Penrith in the west and carries 83,800 vpd in the vicinity of the site;
- The Great Western Highway: an RTA State Road (MR 5) that generally runs in an east west direction, following a parallel path to the Western Motorway. The Great Western Highway carries 58,700 vpd in the vicinity of the site;
- Homebush Bay Drive: a local road that generally runs in a north-south direction between Holker Street in the north and Homebush Bay Drive in the south.
- Hill Road: a local road that generally runs in a north south direction between The Great Western Highway in the south and Burroway Road in the north.
- Australia Avenue: a local road that generally runs in a north-south direction between Holker Street in the north and Homebush Bay Drive in the south. Two site accesses are currently situated on Australia Avenue.
- Herb Elliott Avenue: a local road that generally runs in an east-west direction linking Australia Avenue in the east with Olympic Boulevard in the west
- Parkview Drive : a local road that generally runs in an east-west direction linking Australia Avenue in the east with Olympic Boulevard in the west.

- Olympic Blvd: an local that runs in an north-south direction between the intersection of Kevin Coombs Avenue/Edwin Flack Avenue in the north and Sarah Durack Avenue in the south.
- Kevin Coombs Avenue a local road that generally runs in an east west direction linking Marjorie Jackson Parkway in the east and Edwin Flack Avenue in the west.
- Marjorie Jackson Pky: a local road that runs in an easterly direction from the unsignalised intersection of Australia Avenue, Kevin Coombs Avenue and Holker Bus way and traverses in a loop to intersect with the junction of Sarah Durack Avenue and Australia Avenue in the south.
- Holker Street: a local road that runs in an east-west direction between Hill Road and Silverwater Road to the southwest of site.

It can be seen from Figure 3 that the site is conveniently located with respect to the arterial and local road systems serving the region. It is therefore able to effectively distribute traffic onto the wider road network, minimising traffic impacts.

Figure 3: Road Hierarchy

3.2 general description of road environment

The Western Motorway is constructed with two 11 metre wide carriageways separated by a 15 metre wide grass divide and carries two through lanes of traffic in either direction. It forms overpasses at Hill Road and Silverwater Road and is accessed via full on and off ramps at Silverwater Road, but with only western on and off ramps at Hill Road. The Western Motorway is subject to a 90 km/hr speed zoning in the vicinity of the site.

The Great Western Highway is generally constructed with a 17 metre wide undivided carriageway and carries three lanes of traffic in either direction. The Great Western Highway forms the eastern and western approaches to four way signalised intersections with both Hill Road (and Bombay Street) and Silverwater Road (and St. Hilliers Road.) On the easterly approach to the Hill Road intersection an additional 120 metre right turn lane exists. On the easterly approach to the Silverwater Road intersection an additional two 140 metre right turn lanes exist. The Great Western Highway is subject to a 60 km/hr speed zoning.

Australia Avenue is constructed with an 18.5 metre divided carriageway and generally carries two lanes of traffic in either direction. It has a one metre wide cycle lane on either side of the carriageways. Australia Avenue forms a signal controlled intersection with Herb Elliott Avenue Parkview Drive to the north of the site.

Olympic Boulevard is constructed with a 17 metre divided carriageway carrying two lanes of traffic in either direction to the south of the give way intersection with Herb Elliott Avenue. It is subject to a 50 km/hr speed limit adjacent the site. A wide landscaped median of 4.2 metres exists between these carriageways, which extends to the nearest intersection.

Sarah Durack Avenue is constructed with an 18 metre divided carriageway carrying two lanes of traffic, in either direction and is subject to a 60 km/hr speed limit adjacent the site. A wide landscaped median of 4.5 metres exists between these carriageways, which extends to the nearest intersection. Sarah Durack Avenue forms a signal controlled intersection with Australia Avenue to the south of the site.

Herb Elliott Avenue is constructed with a 12.5 metre undivided carriageway and carries a single lane of traffic in either direction. Herb Elliott Avenue is also subject to timed parallel parking restrictions to the north of the site. A 40km/hr speed limit applies on the road.

3.3 public transport

The existing public transport that operates in the locality is shown in **Figure 4**. It is evident that the site benefits from good access to the public transport system with the following amenities provided in the Olympic Park:

- Bus services to Lidcombe, Parramatta and Chatswood via Ryde.
- Bus stops on Australia Avenue adjacent to the development and on Murray Rose Avenue adjacent to the railway station.
- The Olympic Park Railway Station is less than 200 metres to the north-west of the site from Australia Avenue. This line provides links to Lidcombe which in turn provides access to the overall metropolitan rail network.

These services will ensure a very high level of public transport accessibility.

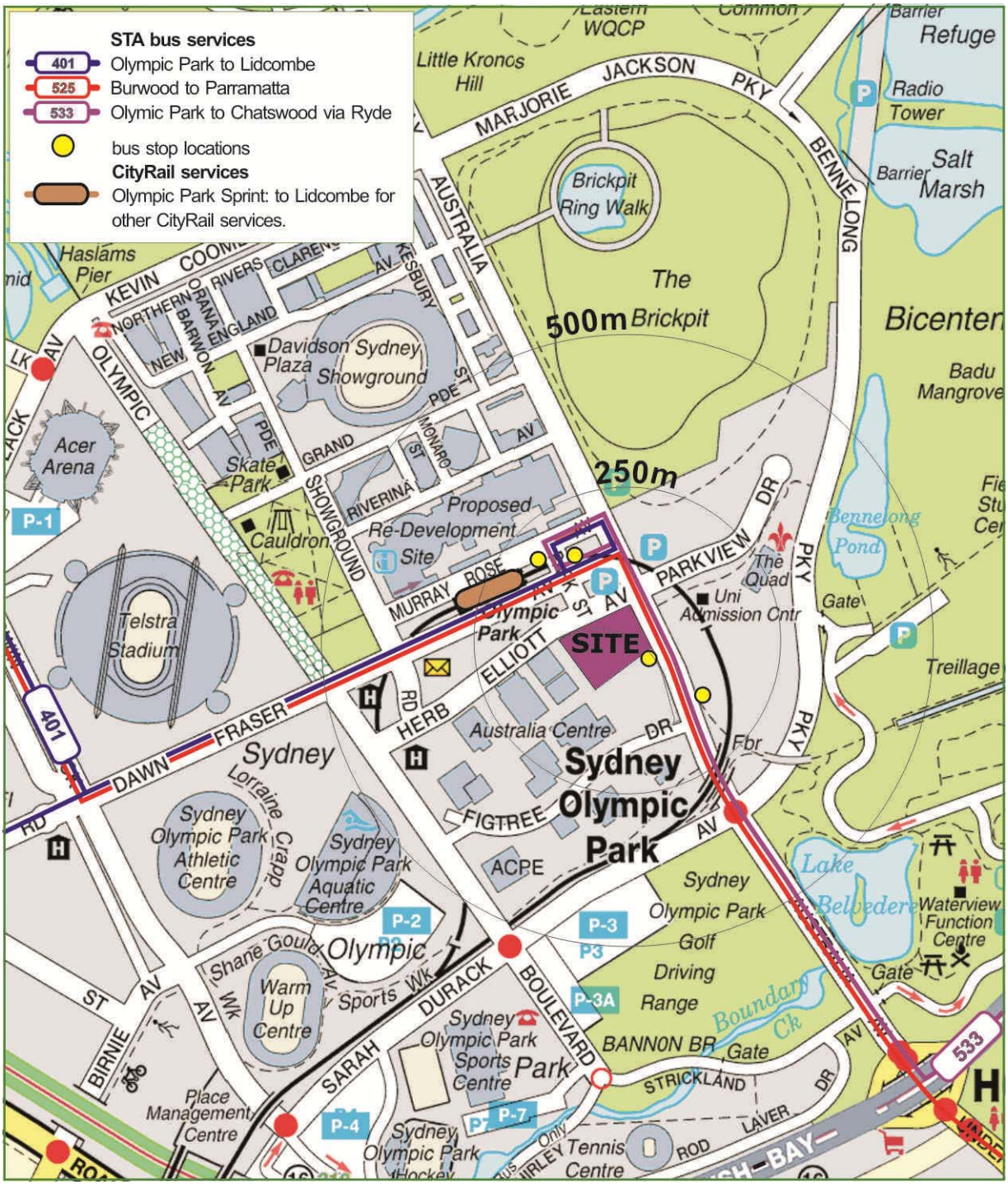


Figure 4: Public Transport

3.4 existing site generation

The existing warehouse building currently generates traffic which is accommodated in the nearby intersections as is evident from the further discussion in Section 3.5.

3.5 existing intersection performances

The scope of the analysis has been broadened to examine other intersections that are expected to be impacted and apart from the Australia Avenue, Parkview Drive and Herb Elliott Avenue, the following intersections have been identified as the most critical intersections and have also been assessed:

- Herb Elliott Avenue and Olympic Boulevard
- Australia Avenue, Kevin Coombs Avenue, Holker Street and Majorie Jackson Parkway
- Australia Avenue, Bennelong Parkway and Sarah Durack Avenue
- Hill Road and M4 Off Ramp

These surveys were undertaken between the 7-9AM and 4-6PM peak periods on Wednesday 13th October 2010. The survey for Hill Road and M4 off ramp was carried out on Thursday 1st April 2010. The results of these surveys were analysed using the SIDRA computer program to determine their performance characteristics under existing traffic conditions. The SIDRA model produces a range of outputs, the most useful of which are the Degree of Saturation (DOS) and Average Vehicle Delay per vehicle (AVD). The AVD is in turn related to a level of service (LOS) criteria. These performance measures can be interpreted using the following explanations:

DOS - the DOS is a measure of the operational performance of individual intersections. As both queue length and delay increase rapidly as DOS approaches 1, it is usual to attempt to keep DOS to less than 0.9. When DOS exceeds 0.9 residual queues can be anticipated, as occurs at many major intersections throughout the metropolitan area during peak periods. In this regard, a practical limit at 1.1 can be assumed. For intersections controlled by roundabout or give way/stop control, satisfactory intersection operation is generally indicated by a DOS of 0.8 or less.

AVD - the AVD for individual intersections provides a measure of the operational performance of an intersection. In general, levels of acceptability of AVD for individual intersections depend on the time of day (motorists generally accept higher delays during peak commuter periods) and the road system being modelled (motorists are more likely to accept longer delays on side streets than on the main road system).

LOS - this is a comparative measure which provides an indication of the operating performance of an intersection as shown below:

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

A summary of the modelled results are provided below. Reference should also be made to the SIDRA outputs provided in **Appendix D1** which provide detailed results for individual lanes and approaches.

Table 1: existing intersection performance: am and pm peak hour

Intersection Description	Period	Control Type	Degree of Saturation	Intersection Delay	Level of Service
Herb Elliott & Australia Ave	AM	Signals	0.472	17.0	B
	PM		0.451	15.6	B
Herb Elliott & Olympic Blvd	AM	Giveway	0.045	8.5	A
	PM		0.673	19.9	B
Australia Ave & Kevin Coombs	AM	Stop (Two-way)	0.040	16.1	B
	PM		0.015	14.4	A
Australia Ave & Sarah Durack	AM	Signals(Actuated)	0.976	39.7	C
	PM		1.157	35.2	C
Hill and M4 Off-Ramp	AM	Giveway	1.078	112.9	F
	PM		0.727	18.7	B

It can be seen from Table 1 that the intersections operate satisfactorily with Level of Service C or better, with the exception of intersection of Hill Road and the M4 off-ramp which is currently operating with Level of Service F during the AM peak period.

The Sidra output for 'Australia Avenue and Sarah Durack Avenue' is also consistent with the 2009 results obtained in the separate modelling undertaken by SKM on behalf of Auburn Council. Nevertheless, it is stressed that the most relevant use of this analysis is to compare the relative change in the performance parameters as a result of the proposed development. This is discussed further in Section 5.

This analysis has been provided to RMS and at the date of preparation of this report

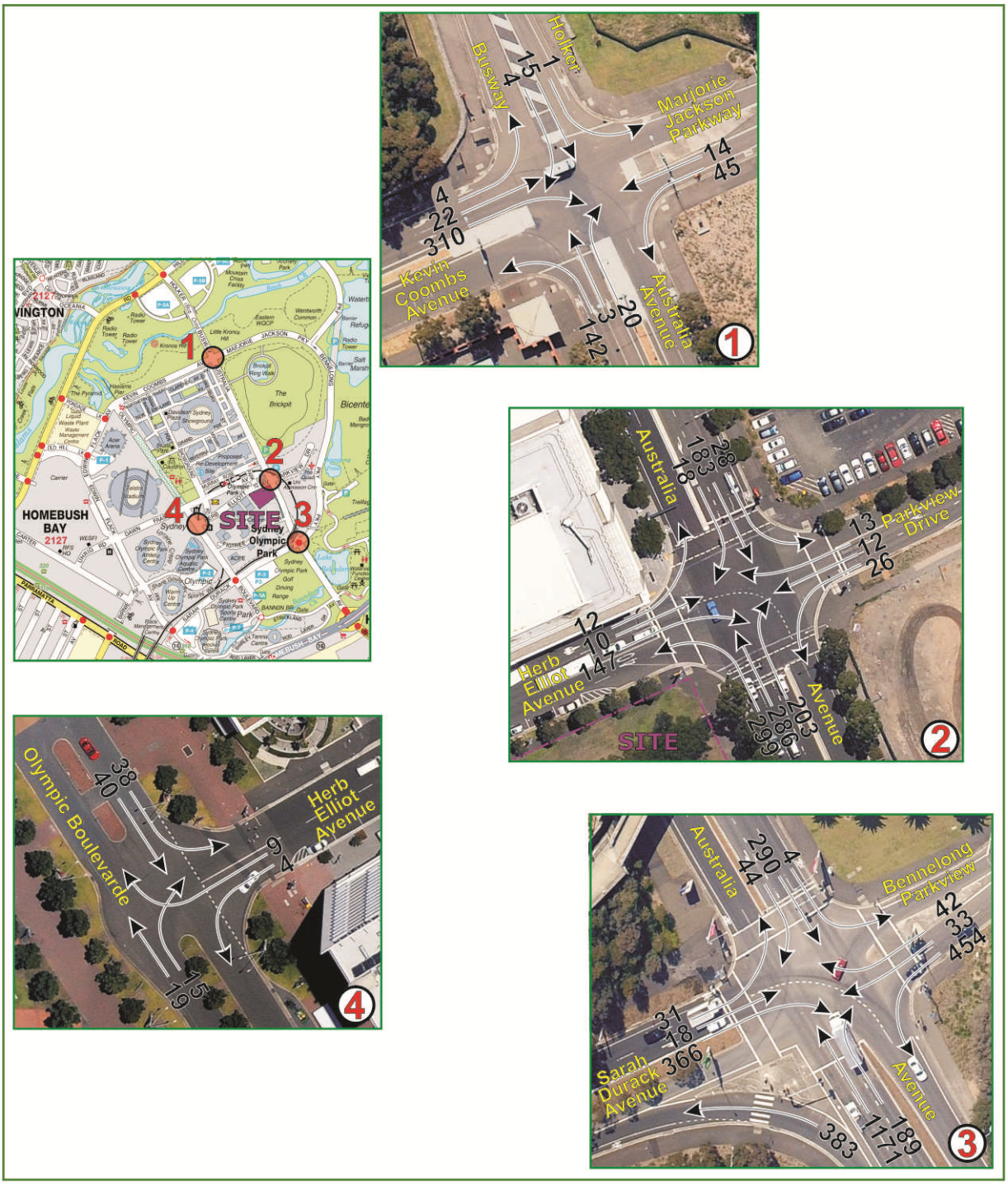


Figure 5: Existing am peak hourly traffic volumes (07.00-09.00 hrs)

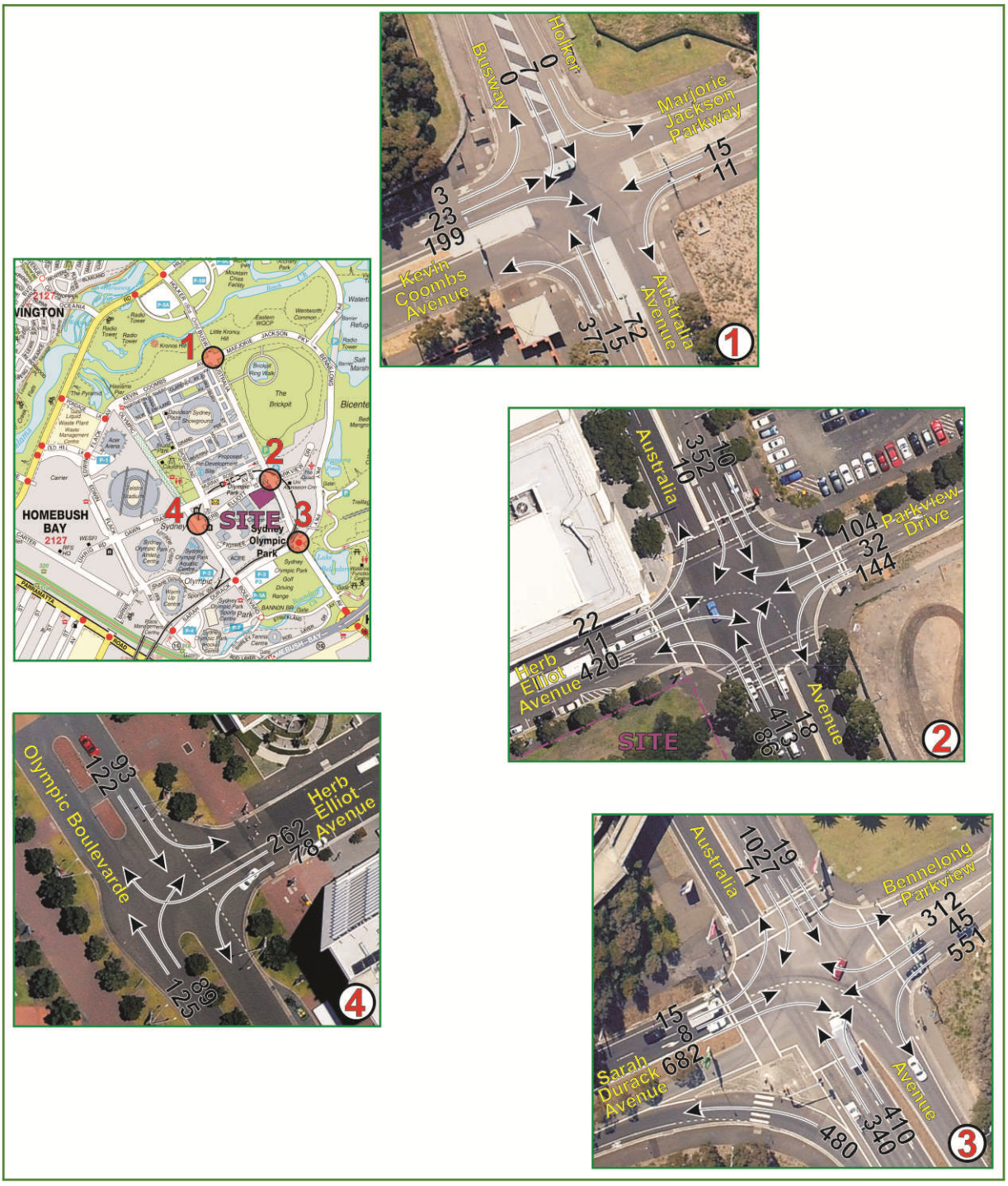


Figure 6: Existing pm peak hourly traffic volumes (16.00-18.00 hrs)

4. description of proposed development

A detailed description of the proposed development is provided in the Preferred Project Report prepared separately, of which this report forms a part. In summary, the development for which approval is now sought comprises the following components and has broken into two separate stages. The master plan for the site can be found in **Appendix B** – reduced plans. The staged development is proposed as follows:

Stage 1: Facing Australia Avenue:

- Site Preparation works including of all removal of trees and excavation;
- Construction of a 7 storey retail and commercial development with ground level retail sections and 7 levels of office units totalling an area of 16,749m^2;
- The provision of two basement level's car parking with a total of 225 parking spaces including the following:
  - 21 retail spaces
  - 202 commercial spaces;
  - 2 courier spaces

It is noted that of the above spaces, 24 are small car parking spaces (10% of all parking), while 9 disabled spaces are also included.

- Additional parking for the existing warehouse on site (66 spaces) with access from Herb Elliott Avenue and a further 19 visitor spaces with access from Australia Avenue (85 spaces in total);

Stage 2: Facing New Road 10 & Herb Elliott Avenue

- Removal of car park access ramp;
- Construction of a building facing New Road 10 with a total area of 6,713m^2 comprising of a 7 storey commercial development with ground level retail;
- The provision of 150 parking spaces for this building;

- Construction of a building facing Herb Elliot Avenue with a total area of 18,697m^2 comprising of a 7 storey commercial development with ground level café and retail;

- The provision of 145 parking spaces for the aforementioned building.

The traffic and parking impacts arising from the development are discussed in Sections 5 and 6. Reference should be made to the plans submitted separately to Council which are presented at reduced scale in Appendix B.

5. transport, traffic and accessibility

5.1 parking

The Sydney Olympic Park Authority requires parking for commercial and retail uses to be determined at the maximum rates shown in **Table 2**:

Table 2: SOPA parking rates and provision

Type	GFA	SOPA Parking Rates	Spaces Required	Spaces Provided
Stage 1 Commercial	15,269 m^2	1 space per 80m^2	191	204**
Stage 1 Retail	256 m^2	1 space per 50m^2	5	5
Stage 1 Supermarket	541 m^2	1 space per 25m^2	22	16
Stage 1 Total			218	225
Stage 2	25,410 m^2	1 space per 80m^2	318	295
		Totals	536	520

* Includes 2 courier spaces.

5.1.1 Stage 1 Parking

It is evident from Table 2 that under the SOPA Master Plan 2030, Stage 1 requires *maximum* parking of 218 spaces. In response, 223 spaces are provided, as two of the commercial spaces are courier spaces that are technically for servicing rather than parking.

Under the SOPA controls, supermarket require a parking rate of 4 spaces per 100m^2 (1/25m^2) which is also consistent with the RTA Guidelines for an 'unrestrained' situation where the supermarket follows the 'car-dependent 'model'. However it is considered that this rate is not applicable to the development without adjustment. In this regard, the supermarket is a small local (neighbourhood) facility that is smaller than those that underpin the RTA's Guideline rate and is more in the nature of a

convenience store. In this regard, the supermarkets assessed under the RMS Guideline are typically in the range between 2,000m^2 to 3,000m^2 in size, which promotes car dependency based on large average 'shops' associated with full-line 'offerings'. Conversely, the subject site benefits from close proximity to a large local catchment (including the development itself). These customers will walk to the supermarket and create no parking demand. Having regard for these particular characteristics, it is therefore considered that provision of 16 spaces for the supermarket rather than the 22 spaces indicated under the controls, is supportable. This represents a reduction of only 26% and equates to a rate of 1 space per 34m^2 which is considered supportable and will encourage walking.

In summary, the overall provision of 225 spaces (including 2 courier spaces) is considered appropriate for the proposed Stage 1 development.

5.1.2 Stage 2 Parking

The SOPA parking rate of 1 space per 80m^2 has been applied to Stage 2 of the development. It is acknowledged that the development incorporates retail/café units which would normally apply the parking rate of 1 space per 50m^2. These retail unit areas for Stage 2 are not currently available and will create a slight additional parking demand. This can be further assessed at development application (Project Application) stage for this future stage. Nevertheless, it can be seen that with a total GFA of 41,860m^2, a maximum provision of 533 parking spaces is required, without any adjustment for local factors. The development provides 514 parking spaces and as such complies with the parking controls of SOPA which are maximum requirements.

5.1.3 Summary on Parking

In summary, the provision of 520 parking spaces (compared with 536 based on the unadjusted application of SOPA's parking rates) and this will ensure that all demands will be accommodated on site for all stages, while encouraging walking and public transport use. The SOPA rates are premised upon a relatively high level of reliance on non-car modes of transport so that SOPA's and Government objectives are both met. The only concession sought relates to a slight relaxation in the supermarket parking rate which is acceptable for the reasons discussed and this approach also achieves these objectives.

5.1.4 Parking Signage

Rather than rely solely on signage, Basement Levels 1 and 2 have been redesigned to provide a design solution that is clearer and safer, with retail parking secured within a designated area on Basement Level 1. It is also noted that access to Basement Level 2 will be restricted to tenants and a boom gate is proposed with a card reader located within a central median. This will be signposted accordingly.

Notwithstanding the above, a standard condition of consent requiring that a Signage Plan to be prepared can be imposed as appropriate.

5.2 disabled parking

This disabled parking for further stages is a matter for assessment during later Project Application/s and compliance with relevant Australian Standards is proposed. As a guide based on AS 2890.6 (2009), it is reasonable to assume that 2-3% of all parking should be provided as disabled parking and this will need to be assessed in the context of future applications.

Stage 1 parking provides 9 disabled parking spaces spread across both basement levels and these spaces also comply with AS 2890.6 (2009).

5.3 motorcycle parking

Stage 1 has provided a total of 26 motorcycle spaces within basement level 1 and 2. This is considered appropriate and should satisfy the requirements of the development.

5.4 bicycle facilities

SOPA requires that commercial developments provide a minimum of 1 space per 150m^2 for staff 1 space per 750m^2 for visitors. Bicycle parking areas have been provided on both levels of basement parking. A total of 101 bicycles are provided on Basement Levels 1 and 2 which is satisfactory for

employees. It should be noted that visitors availing of bicycle facilities will not use the basement parking provided and a provision of 22 bicycle parking spaces is required. In response the development provides 20 bicycle parking spaces on ground level which is sufficient. Change-room facilities have been provided next to the bicycle parking areas which will in turn encourage sustainable transport options as specified in SOPA's Master Plan 2030.

5.5 servicing

As stated in Clause 2.2 of AS 2890.2, an 8.8m Medium Rigid Vehicle (MRV) represents the common service truck having a loading capacity of 8 tonnes. It is adopted as the design vehicle where there is significant movement of goods but provision of more than the occasional HRV or AV is not necessary. This is also consistent with AUSTROADS Guidelines.

While daily deliveries by a HRV usually occurs at a large supermarket (typically over 2,000m^2) the subject supermarket is very small at only 541m^2 and is more in the nature of a local neighbourhood shopping centre, with a high proportion of walking trips and generally with smaller average shopping 'buys', where trolley shopping is less predominant. In this regard, TRAFFIX has been involved in numerous supermarket developments where the MRV is the design vehicle and in these situations, it is common to accept a condition of consent that limits the development to this size of truck. This approach recognises site constraints that apply in many circumstances. This would also include garbage collection which would usually be undertaken by private contractor and such contractors are able to arrange collection based on the appropriate site constraints. In addition, the vast majority of supermarket deliveries will be by 6.4m SRV's and vans and these vehicles can also clearly be readily accommodated, with two small vehicles able to access the site at the same time.

In conclusion, it is considered that a Loading Dock Management Plan can be prepared in response to a suitable condition of consent, which would outline the arrangements to be adopted for all deliveries and waste collection, which is a standard condition of consent on comparable developments.

The loading dock is provided on the southern side of the development with access via Australia Avenue. It is suitable for use by a standard service vehicle as (see **Appendix C**) and as discussed with SOPA officers, there are numerous examples of small supermarkets that have been approved

and are operational with this design vehicle. In this regard, a suitable condition requiring all servicing to be limited to this design vehicle is invited.

The 'Silex' building car park has two loading docks of which one is currently in use. With the new car park layout, both loading docks remain readily accessible and relevant swept paths are also provided in **Appendix C.**

5.6 public transport usage

The proposed pedestrian connection to Olympic Park railway station and the nearby bus stops has the most significant potential to improve traffic conditions and reduce car dependency. In addition, it is expected that a Workplace Travel Plan and/or a Travel Access Guide would be prepared in support of the application at a later time. It is proposed that the Travel Access Guide will be prepared in response to a suitable condition of consent. This would include the promotion of alternate travel modes and travel demand measures including car sharing, public transport availability (bus, rail and taxi), cycle and pedestrian routes and linkages, bicycle end-user facilities and motorcycle parking. The provision of a drop-off area within the site will be of particular benefit to taxi use, which is a form of public transport.

This Travel Access Guide would address the primary objective of increasing public transport use to achieve the 40% Journey to Work public transport mode share target that is identified in Master Plan 2030.

5.7 bicycle and pedestrian linkages

Pedestrian and bicycle linkages should be provided within the site. Safe crossing opportunities are available on all major desire-lines, most importantly including the pedestrian crossing at the intersection of Herb Elliott Avenue and Australia Avenue which provides access to bus and rail services.

Australia Avenue incorporates a dedicated cycle path along its eastern and western side and connects directly to the development access. Bicycle paths are also found on Sarah Durack Avenue, Kevin Coombs Avenue and Holker Busway. It is clear that the Olympic park is well facilitated with bicycle paths and these dedicated paths along with the provision of bicycle parking bays and changing facilities will encourage employees to make use of the excellent facilities in the locality.

5.8 car share provision

It is considered that car share arrangements will form an integral part of future Project Applications and this can be conditioned. This will be prepared having regard for relevant guidelines when available. In general, a parking system such as “GoGet” is contemplated which has potential application to all non-resident land uses and this will be effective in reducing retail and commercial tenant parking demands. In this regard, as a general proposition, one “GoGet” car is able to meet the needs of many users, substantially reducing the need for a ‘designated’ car and thereby reducing parking demands. Based on the experience of “GoGet”, one shared space is equivalent to 5 ‘normal’ spaces. It is therefore recommended that consideration be given to the dedication of one or two car share spaces within the site, subject to discussion with candidate operators. The implementation of a car share policy is a matter that can be conditioned having regard for relevant guidelines in association with individual applications.

5.9 event access and closures

Events of varying scale and duration are a regular occurrence in Sydney Olympic Park. On these occasions, road closures will generally have only a minor effect on the proposed development. Specifically, the Sydney Olympic Park Master Plan 2030 and in particular ‘Figure 4.3 Event Access Plan’, identifies that Kevin Coombs Avenue, Olympic Boulevard and the northern section of Australia Avenue, which would normally be popular routes to access/depart the site, are the main closures which would affect the proposed development. Nevertheless and most importantly, the southernmost part of Australia Avenue remains open throughout the year and is the most direct route to the development for vehicles travelling from the north, south and east. Vehicles travelling from the west access Sydney Olympic Park from Hill Road and therefore will be affected by road closures. The access off Australia Avenue provides the best arrival and departure route during these events for Stage 1 of the development.

5.10 trip generation

Notwithstanding that this Project Application is for Stage 1, the opportunity has been taken to assess a worst-case scenario with full development under the master plan taking account of all stages. It is acknowledged however that the master plan for this development will be implemented in stages and subject to later Project Applications.

5.10.1 Commercial Trip Rates

The trip rate used for assessment purposes as discussed in the following section has been based on the surveys of the basement car park for Site 8a on Murray Rose Avenue which is considered to be very similar. This survey provided the following results for vehicles entering and exiting the car park:

- AM Peak: 0.4 trips/space/hr (peak 7-8am)
- PM Peak: 0.2 trips/space/hr (peak 4:15-5:15pm)

These rates have also been validated by additional surveys of Sites 6 and 7 (8 Herb Elliott Avenue) which is directly opposite the site. This site has 712 spaces (although this include retail and public parking components) but nevertheless yielded lower trip rates those obtained at Site 8a, which was therefore adopted to assess a worst case scenario. Notwithstanding that these rates are supportable, further sensitivity testing has been undertaken based on RMS trip rates in response to concerns raised by RMS and this is discussed further in Section 5.12.

5.10.2 Commercial Stage 1 and Stage 2 (Commercial Trip Generation)

Based on the trip rates obtained above from surveys, the 497 commercial parking spaces will generate trips as follows:

- AM Peak 198 trips per hour (160 in, 38 out) during the morning peak (7-8am) and;
- PM Peak 99 trips per hour (20 in, 79 out) during the afternoon peak (4:15-5:15pm).

5.10.3 Supermarket & Secondary Retail Trip Stage 1 Generation

Stage one proposes 797m^2 of retail area which comprises a supermarket, secondary retail and café. A trip rate of 3 trips per space during the critical PM peak period is appropriate and this is based on the RTA's Guideline and is also underpinned by more recent survey data. When applied to the 21 spaces allocated to these areas under the SOPA controls, these uses will therefore generate approximately 62 trips during the critical PM peak period. Trips in the AM peak will be about 20% of these trips and will relate mainly to supermarket staff arrivals. Accordingly, the retail uses in Stage 1 are predicted to generate trips as follows:

- AM Peak 18 trips per hour (9 in, 9 out) during the morning peak; and
- PM Peak 62 trips (31 in, 31 out) during the afternoon peak.

5.10.4 Combined Uses

The overall development under the master plan will be as follows:

- AM Peak 216 trips per hour (169 in, 47 out) during the morning peak (7-8am) and;
- PM Peak 181 trips (71 in, 110 out) during the afternoon peak (4:15-5:15pm).

These trips will be associated exclusively with the access driveways onto the Herb Elliott Avenue and Australia Avenue (with a left-in and left-out arrangement). It is emphasised that this level of activity is comparable to the previous generation associated with the Site 8A Murray Rose Avenue.

5.11 peak period Intersection performances

The external traffic impacts arising from the development have been based on the basis of the trip rates discussed above, with 216 veh/hr in the AM peak and 181 veh/hr in the PM peak. These trips have been distributed onto the existing road network on the basis of journey to work data and having regard for the attractiveness of available routes with the following assumed distributions:

- 38% of trips to the west via Hill Road
- 26% of trips to the north via Australia Avenue and Homebush Bay Drive

- 20% of trips to the south and 16% of trips east via Australia Avenue, Homebush Bay Drive and the Western Motorway

It should be noted that assumed travel paths have been identified separately for vehicles arriving and departing to/from the site. The intersection performance has been remodelled and the results are provided in Appendix D and summarised in Table 2.

table 2: existing plus development intersection performance: am and pm peak hour

Intersection Description	Period	Control Type	Degree of Saturation	Intersection Delay	Level of Service
Herb Elliott & Australia Ave	AM PM	Signals	0.472 0.550(0.451)	17.2(17.0) 16.0(15.6)	B B
Herb Elliott & Olympic Blvd	AM PM	Give-Way	0.064(0.045) 0.716(0.673)	8.5(8.5) 21.4(19.9)	A B
Australia Ave & Kevin Coombs	AM PM	Stop (Two-way)	0.043(0.040) 0.015	16.6(16.1) 14.7(14.4)	B B(A)
Australia Ave & Sarah Durack	AM PM	Signals(Actuated)	1.041(0.976) 1.200(1.157)	54.4(39.7) 36.5(35.2)	D (C) C
Hill and M4 Off-Ramp	AM PM	Give-Way	1.228(1.078) 0.769(0.727)	235.2(112.9) 19.9(18.7)	F B

It is evident that the traffic impacts from the proposed development have a minimal effect on the road network and the traffic modelling undertaken is based on a worst case assessment. The 213 trips generated in the AM peak and the 188 trips in the PM peak are readily accommodated with the exception of the M4 Off-Ramp which is currently operating at a level of Service F and this will continue. The actuated intersection of Australia Avenue and Sarah Durack Avenue reduces slightly to a level of service D in the AM Peak and this is primarily due to the increase in northbound vehicles. Nevertheless, it is considered that the intersection will operate satisfactorily and can accommodate the increased traffic demand. The intersection of Australia Avenue with Homebush Bay Drive has not been separately assessed as it has been extensively assessed by others; and improvements are already proposed and have been funded to provide increased capacity.

The Master Plan 2030 also identifies that a number of the intersections analysed in this report to be upgraded gradually as required. The following improvements are notable and will provide further traffic capacity, the benefits of which are not taken into account in Table 2 above.

- New M4 East Facing ramp at Hill Road; and
- Intersection upgrades for Sarah Durack/Australia Avenue, Herb Elliott Avenue/Australia Avenue and Kevin Coombs Avenue/ Australia Avenue.

5.12 further sensitivity testing

In addition to the above analysis, further sensitivity testing has been undertaken in response to the request by RMS to consider the implications of higher trip rates using RMS Guideline rates. While it is considered that this overestimates traffic generation based on more recent and relevant surveys, this further analysis has been undertaken. Specifically, further discussions have been held with RMS personnel to obtain the signal layout plan, phases and timings and the intersection has been remodelled based on this information. In addition, the 'generic' RMS trip rates of 0.8 trips/space/hr has been applied to the commercial parking spaces. This increases the commercial generation as follows:

- AM Peak 198 trips per hour increasing to 396 trips per hour; and;
- PM Peak 99 trips per hour increasing to 396 trips per hour

The intersections were reanalysed and the results are shown in **Appendix D3** which shows the 'Existing plus Development' scenario, for both peak periods. It can be seen that the intersections will operate satisfactorily under all this scenario, with the overall level of service for all intersections maintained at level of service D (or better). The most notable reduction in performance occurs at the intersection of Australia Avenue with Bennelong Parkway/Sarah Durack Avenue in the PM peak. While the level of service of D takes this intersection to capacity, there are significantly increased delays and queues southbound on Australia Avenue. Nevertheless, these increases are not accepted and it is reiterated that this outcome is based on trip rates as they are outdated, being based on surveys that are over 25 years old. More recent surveys (as well as surveys by other consultants) supports significantly lower rates, so that the previous analysis is preferred and therefore relied upon.

Finally, it is noted that the above future scenarios are based on the assumption that Stage 2 is completed and operational. In practice, this is unlikely to occur for many years due to current leasing constraints. Thus, the delays reported upon above will not occur in the short to medium term.

5.13 demolition and construction impacts

A condition is invited seeking the preparation of a detailed Demolition and Construction Traffic Management Plan. It is anticipated that all such activity will be focussed on Australia Avenue and the Plan will need to be prepared in consultation with the appointed builder. It will need to address requirements during each stage (demolition, site preparation, excavation, construction, fit-out and landscaping) and will need to include consideration of times of operation, truck access routes, site access, average truck frequencies, truck sizes, parking for construction workers, work zone requirements, pedestrian control, traffic management plans and any road occupancy applications. These are matters that cannot be addressed at this time although in principle, there are considered to be no obvious constraints to the preparation of a safe and efficient Management Plan.

5.14 site access arrangements

The development will rely on the proposed combined entry-exit driveway onto Australia Avenue. This has sufficient capacity to accommodate all entry volumes for Stage one and the entry driveway is indicated on the plans. The use of a temporary ramp is proposed as this will provide safe and direct access to the basement parking levels.

The master plan for the site also proposes an entry-exit driveway onto the Herb Elliott Avenue and this will be constructed in the future stages and will be subject to later assessment. This driveway is to be located adjacent to Park Street about 70 metres from its intersection with Australia Avenue. It is emphasised that traffic exiting the site intending to travel south, east or north will use this exit, which will therefore accommodate 62% of overall traffic with the remainder of traffic travelling to the north effectively split onto both exits. The traffic impact assessment undertaken above assumes these arrangements.

6. access and internal design

6.1 access design

The site access arrangements have been amended and now propose the delivery of the full intersection of the New Road with Australia Avenue in its ultimate format. The road has a carriageway width of 11 metres and this provides safe manoeuvrability as shown in **Appendix C**.

The proposed development would require a Category 2 Driveway onto the New Road for the carpark access under AS 2890.1 (2004), being a combined entry-exit driveway of width 6 to 9 metres. In response, the development proposes a combined entry/exit driveway of width 6.2 metres (at the property boundary) which is provided with additional splays at the kerbline. This exceeds (is superior to) the requirements of AS 2890.1 (2004). Satisfactory operation is also confirmed by the swept path analysis undertaken which is also provided in Appendix C. In addition, visual splays are provided in accordance with Figure 3.3 of AS 2890.1.

The loading dock is served by a separate driveway of width 5.1 metres and this operates safely as shown in the swept path provided in Appendix C, with forward entry and exit movement. In this regard, only one-way movement will occur along the internal roadway and this is acceptable in view of the low servicing activity and the availability of clear sight lines.

In summary, the proposed site access will operate safely and efficiently.

6.2 internal design

The internal basement car park generally complies with the requirements of AS 2890.1 (2004) and the following characteristics are noteworthy:

- The internal access ramps have a maximum gradient of 20.0% (1 in 5) and transition ramp of 2 metres in length at maximum gradient of 8.3% (1 in 12) which is compliant with the requirements of AS 2890.1 (2004);

- The service roadway into the loading area has a maximum gradient of 5% and meets the requirements of AS 2890.1 (2004);

- All internal ramps have been designed for two way flow. All ramps are constructed with a 7 metre width (in excess of the 5.5metre width required under AS 2890.1(2004)).

- Parking spaces have a minimum width of 2.4 metres and a length of 5.4 metres with all aisles varying in width and a minimum aisle width of 6.2 metres. This provision meets the requirements of User Class 1 which requires bay and aisle widths of 2.4 metres and 6.2 metres. The proposed layout is compliant and will operate satisfactorily. The 21 retail spaces are wider and are compliant for User Class 3 parking (subject to review of structural requirements at CC stage)

- Small parking spaces have a minimum width of 2.3 metres and a length of 5.0 metres and meet the requirements of AS 2890.1 (2004);

- All columns are located outside of the parking space design envelope as shown in Figure 5.2 of AS 2890.1 (2004);

- Disabled parking spaces are a minimum of 2.4 metres wide and 5.4 metres in length. The spaces also meet the layout requirements of AS 2890.6 (2009) with the shared area for all spaces provided.

- Swept path analysis has been undertaken for the existing warehouse building car park which provides access for employees and also accommodates 2 loading bays. The swept paths for these two loading bays are found in **Appendix C.**

Notwithstanding the above, it is expected that a condition of consent can be imposed requiring compliance with AS 2890.1 (2004) and AS 2890.2 (2002) and any minor adjustments which may be required (if any) can be made at a future stage. In summary, the internal design of the car park is acceptable and will provide a satisfactory standard of safety and efficiency.

7. response to DGR's

- Development traffic generation and peak traffic movements are discussed in detail in Sections 5.10, 5.11 and 5.12;

- The report has identified that the only road/intersection upgrade that is currently necessary is the intersection of M4 off ramp with Hill Road which is operating presently at a Level of Service F during the AM Peak and requires improvement even under existing conditions;

- The development incorporates a loading facility which is expected to accommodate all demands. The largest design truck is an 8.8m MRV, which is the 'standard' design truck based on AS 2890.1 (see **Appendix C** for swept path analysis). This size of truck will need to be the subject of a suitable condition of consent and should be suitable for waste collection and supermarket delivery vehicles;

- Parking is essentially provided at the SOPA rate which is a moderate level of provision (generally only 50% of the RTA's 'unrestrained' requirement in relation to the commercial use), so that parking is suppressed to a significant extent. The only concession sought is in relation to the supermarket parking, where a slight reduction is sought from 22 to 16 spaces, which is nevertheless supported for the reasons discussed;

- Bicycle storage facilities are to be provided in all Project Applications and in the case of Stage 1 PA, these are indicated on the submitted plans. The provision of these facilities along with changing facilities for users will only encourage their use and further promote a non-car transport mode. Pedestrian and bike linkages have been further analysed in Section 5.7;

- The site is very accessible to public transport as discussed in Section 5.6. It is recommended that the development will incorporate a Transport Access Guide (to be formulated under a suitable condition of consent), which will encourage use of bus and rail services; as well as bicycles, car share spaces and car pooling. It is evident that promoting alternate travel modes as discussed above supports the 'minimalist' approach to on-site car parking, based on SOPA rates. Further Bicycle facilities are proposed for the Stage 2 Project Application;

- A Construction Traffic Management Plan will be prepared in response to a suitable condition of consent as discussed in Section 5.12.

8. conclusions

In summary:

- The proposed use of the site as a mixed use commercial and retail development is considered appropriate and supportable in traffic/transport planning terms;
- The traffic generation arising from the 42,159m^2 development (inclusive of Stage 1 and Stage 2) has been assessed as a net increase over and above existing traffic conditions. The predicted increase is 213 veh/hr and 188 veh/hr for the AM and PM peak periods respectively. These trips will be split onto all available routes and can be accommodated, with moderate impacts on the surrounding road system;
- Specifically, the road network has been assessed with the overall master plan development and operates generally satisfactorily, including both site accesses and local intersections. The notable exception is the major intersection of Hill Road with the M4 off-ramp, where average delays are already unacceptable and will increase in the AM peak. This however is an existing problem;
- Sensitivity testing has also been undertaken based on a 'worst case' assumption whereby RMS trip rates are applied to the commercial component of the development. While these rates are not supported based on their outdated nature and the preference within the RMS Guidelines itself to rely on surveys of similar developments (as previously relied upon), the results nevertheless demonstrate generally satisfactory performance based on the full development of BOTH Stage 1 and Stage 2.
- With 225 off-street parking spaces for Stage 1, the development is compliant and will contain all parking demands wholly within the site.
- The proposed access driveways comply fully with the requirements of AS 2890.1 (2004).
- The proposed car park complies with the requirements of AS 2890.1 (2004). The car park has also been assessed using the computer program Auto Track, as permitted by AS 2890.1: 2004 and operates safely and efficiently;

In conclusion, the Project Application for Stage 1 development is supportable in traffic and transport planning terms, subject to appropriate conditions as discussed. Indeed, this conclusion is also relevant to the overall master plan for the site (Stage 1 and Stage 2 combined).

appendix a

photographic record

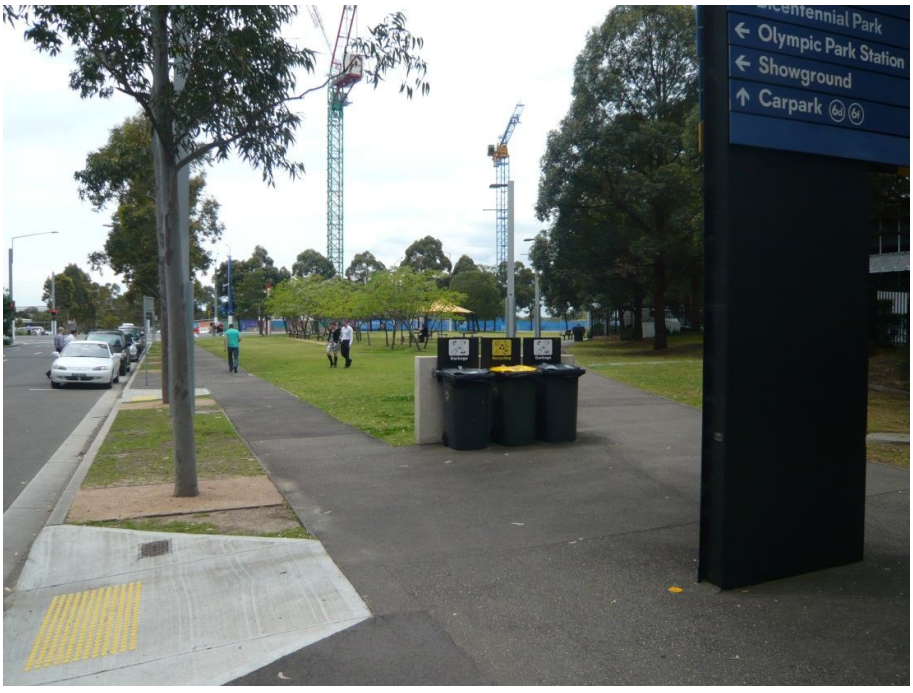
View looking east from Herb Elliott Avenue, with the proposed site to the right of the picture.

View looking south at the intersection of Australia Avenue with Herb Elliott Avenue.

View looking west across the intersection of Herb Elliott and Australia Avenue.

View looking west along Herb Elliott Avenue with site frontage on the left hand side.

View looking west along the Herb Elliott Avenue at the current entrance to the existing warehouse of ‘Silex Solar’.



View looking east from Herb Elliott Avenue at the site for stage 1 of the development.

appendix b

reduced plans

issue	amendment	date
A	ISSUE FOR DA	26.08.11
B	REVISED ISSUE	05.03.12
C	REVISED ISSUE	16.03.12
D	REVISED ISSUE	27.03.12
E	REVISED ISSUE	12.04.12
F	REVISED ISSUE	17.04.12
G	ISSUE FOR REVIEW	15.05.12
H	REVISED ISSUE	18.05.12
I	ISSUE FOR REVIEW	21.05.12
J	ISSUE FOR REVIEW	23.05.12
K	ISSUE FOR REVIEW	29.05.12
L	ISSUE FOR PPR	08.06.12

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Melbourne
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Brisbane
Shanghai

project
SITE 43/44 SYDNEY OLYMPIC PARK

drawing
GROUND FLOOR PLAN

scale	1:200@ A1	drawing no.	**DA1003**
drawn	AWL		
checked	CO	issue	**L**
project no	090086		

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Do not scale drawings. Verify all dimensions on site

issue	amendment	date
A	ISSUE FOR DA	26.08.11
B	REVISED ISSUE	05.03.12
C	REVISED ISSUE	16.03.12
D	REVISED ISSUE	27.03.12
E	REVISED ISSUE	18.05.12
F	REVISED ISSUE	23.05.12
G	REVISED ISSUE	29.05.12
H	REVISED ISSUE	30.05.12
I	ISSUE FOR PPR	08.06.12

PARKING SCHEDULE - BASEMENT LEVEL 1		
TYPE	Size	Count
BICYCLE PARKING	1800 x 600	53
CAR PARKING	2400x5400	67
CAR PARKING - DISABLED	2400x5400	4
COURIER PARKING	2400x5400	2
MOTORCYCLE PARKING	1200x2500	14
RETAIL CAR PARKING - DISABLED	2400x5400	1
RETAIL PARKING	2400x5400	20
SMALL CAR PARKING	2300x5000 small car	8

NOTES:
T = TENANT PARKING
29 RETAIL PARKING SPACES PROVIDED IS BASED ON 1452 SQM

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project
SITE 43/44 SYDNEY OLYMPIC PARK

drawing
BASEMENT LEVEL 1 PLAN

scale	1:200@ A1
drawn	AWL
checked	CO
project no	090086
drawing no.	**DA1002**
issue	**I**

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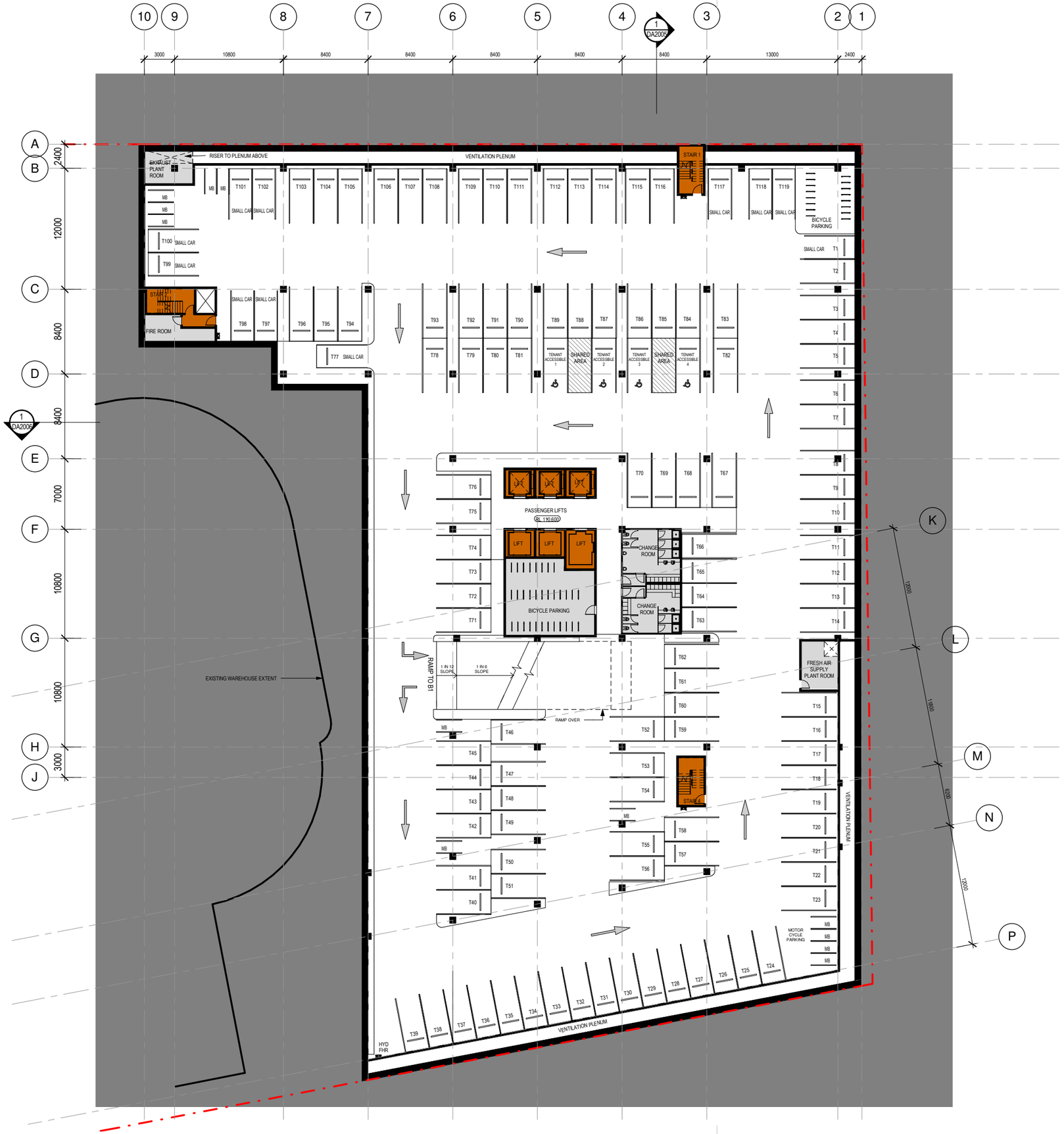

issue	amendment	date
A	ISSUE FOR DA	26.08.11
B	REVISED ISSUE	05.03.12
C	REVISED ISSUE	16.03.12
D	REVISED ISSUE	18.05.12
E	ISSUE FOR REVIEW	23.05.12
F	ISSUE FOR REVIEW	29.05.12
G	ISSUE FOR PPR	08.06.12

PARKING SCHEDULE - BASEMENT LEVEL 2		
TYPE	Size	Count
BICYCLE PARKING	1800 x 600	48
CAR PARKING	2400x5400	108
CAR PARKING - DISABLED	2400x5400	4
MOTORCYCLE PARKING	1200x2500	12
SMALL CAR PARKING	2300x5000 small car	11

NOTES:
T = TENANT PARKING

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project
SITE 43/44 SYDNEY OLYMPIC PARK

drawing
BASEMENT LEVEL 2 PLAN

scale	1:200@ A1	drawing no.	**DA1001**
drawn	AWL		
checked	CO	issue	**G**
project no	090086		

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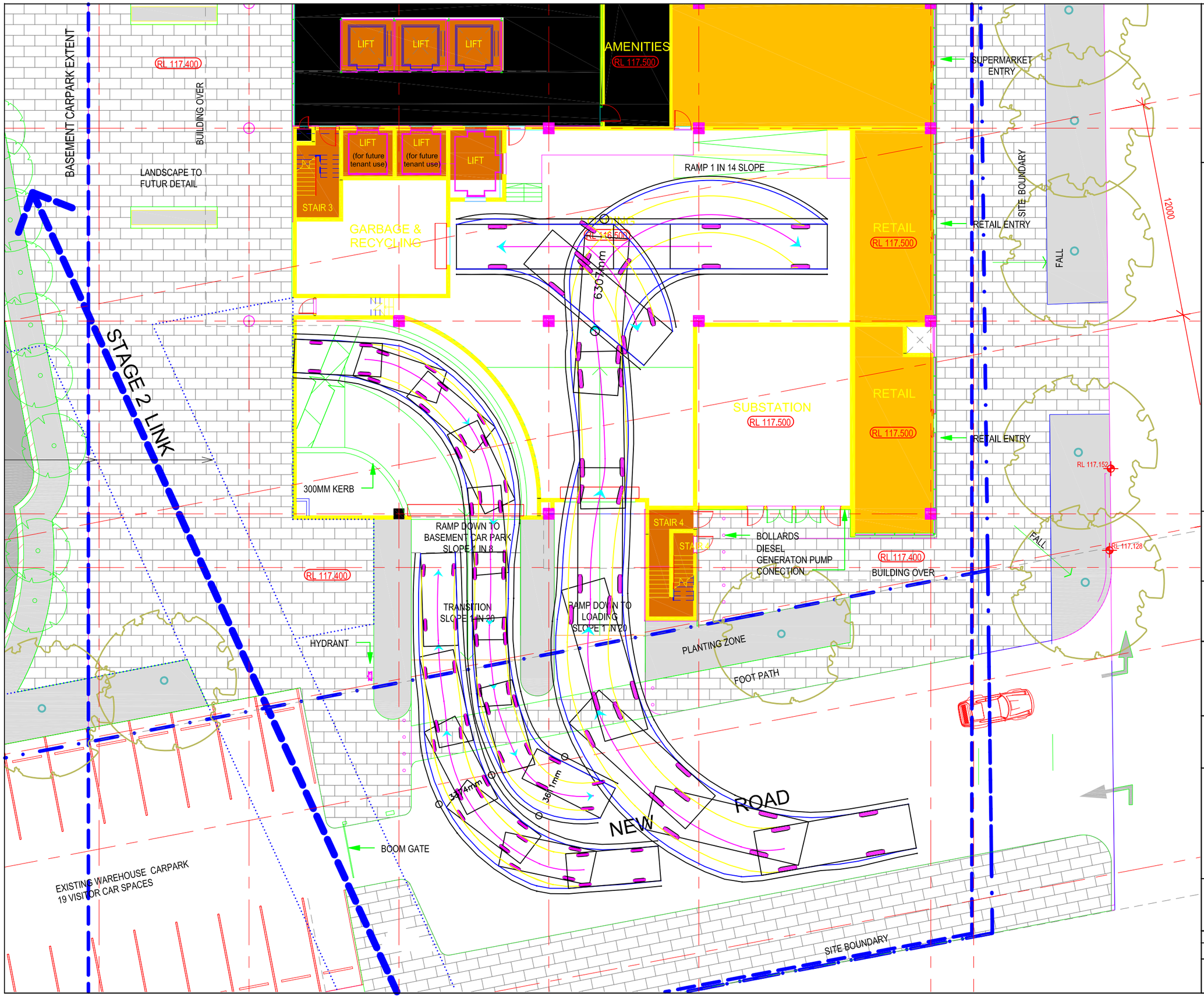
appendix c

swept path analysis



notes

This drawing is prepared for information purposes only. It is not to be used for construction.

no.	revision note	by.	date

architect

client

Capital Corporation
Suite 705, 12 Century Circuit
Baulkham Hills
NSW 2153

scale

1:200 @ A3

0m 2 4 6 8

project

Mixed Use Commercial & Retail Development
2 Australia Avenue
Homebush

drawing prepared by

TRAFFIX
traffic and transport planners

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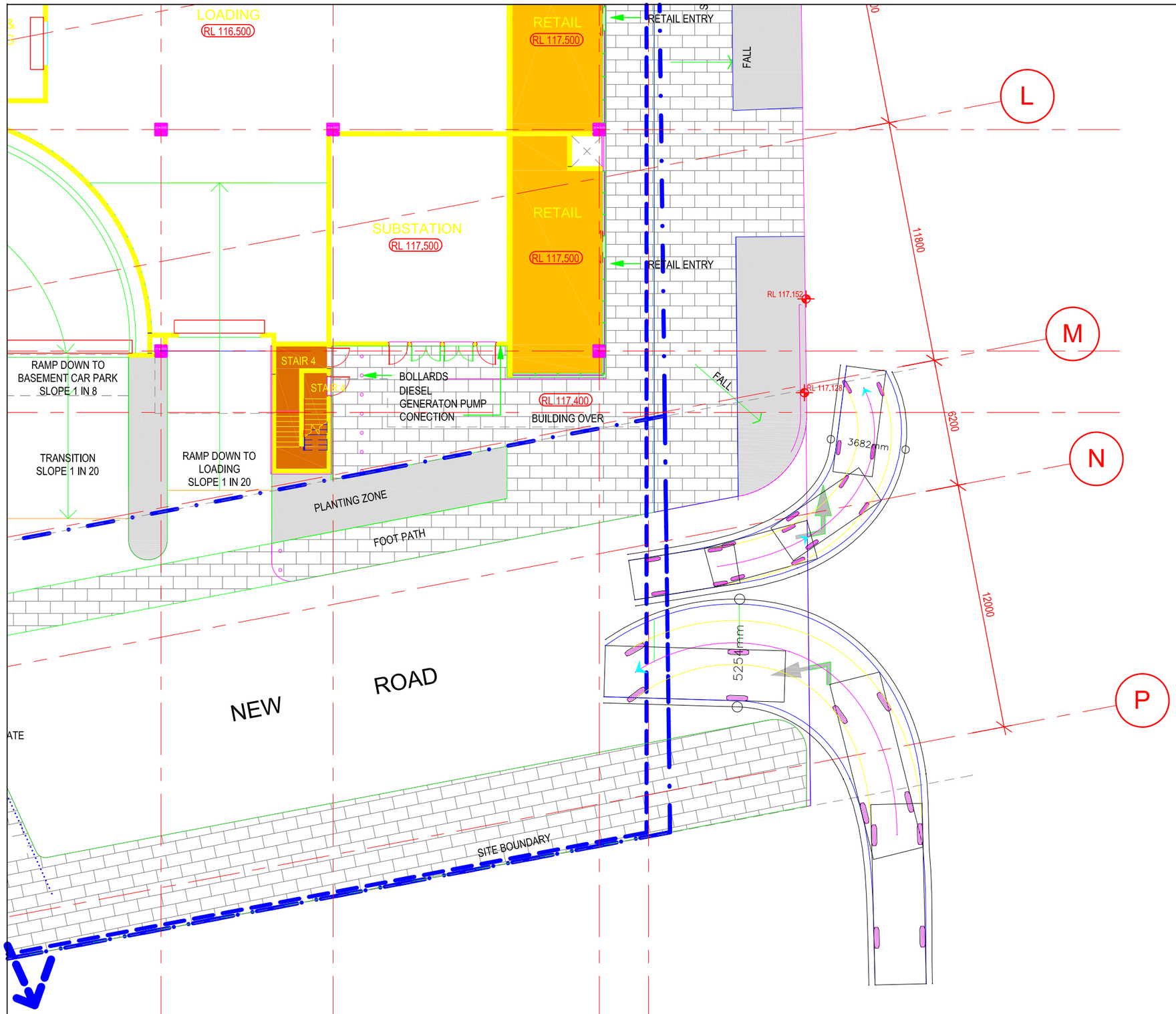
traffic & transport planners

drawing title

8.8m MRV Entry to Loading Dock and B99 / B85 Vehicles Passing at the Access Driveway

drawn:	checked:	date:
GP	-	08/06/2012

project no.	drawing phase.	drawing no.	rev
10 228	-	TX.01	-



notes

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no.	revision note	by.	date

architect

client

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Baulkham Hills
NSW 2153

scale

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project

Mixed Use Commercial & Retail Development
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Homebush

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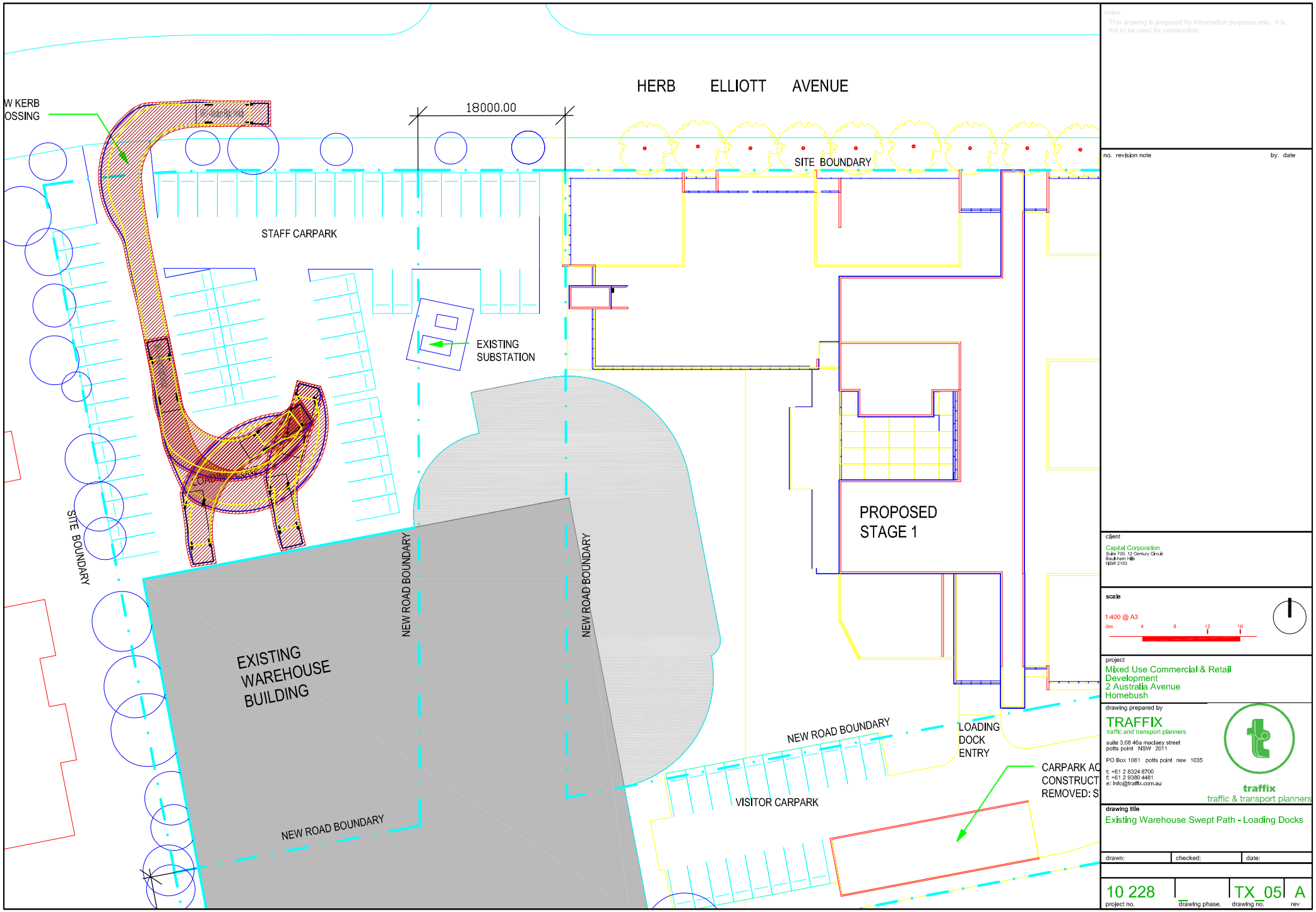
traffic & transport planners

drawing title

8.8m MRV Passing a B99 at the Site Access Intersection

drawn:	checked:	date:
GP	-	08/06/2012

project no.	drawing phase.	drawing no.	rev
10 228	-	TX.02	-



notes
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no. revision note by. date

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scale
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0m 4 8 12 16

project
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Homebush

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traffic & transport planners

drawing title
Existing Warehouse Swept Path - Loading Docks

drawn:	checked:	date:

10 228		TX_05	A
project no.	drawing phase.	drawing no.	rev

appendix d

sidra outputs

appendix d-1

existing conditions

MOVEMENT SUMMARY

Site: AM Peak Exist Australia Ave, Bennelong Pky & Sarah Durack Ave 120518

AM Peak Existing
Australia Ave, Bennelong Pky & Sarah Durack Ave
Signals - Fixed Time Cycle Time = 110 seconds (Optimum Cycle Time - Minimum Delay)

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: Australia Avenue											
1	L	383	5.0	0.214	7.8	X	X	X	X	0.60	49.8
2	T	1171	5.0	0.643	22.8	LOS B	23.4	170.9	0.81	0.73	35.2
3	R	289	5.0	0.527	22.2	LOS B	7.9	57.5	0.64	0.80	37.4
Approach		1843	5.0	0.643	19.6	LOS B	23.4	170.9	0.62	0.71	37.8
East: Bennelong Pky											
4	L	454	5.0	0.546	12.5	LOS A	9.1	66.6	0.48	0.78	44.8
5	T	33	5.0	0.643	58.7	LOS E	4.3	31.1	1.00	0.80	21.6
6	R	42	5.0	0.643	66.8	LOS E	4.3	31.1	1.00	0.80	21.6
Approach		529	5.0	0.643	19.7	LOS B	9.1	66.6	0.55	0.78	38.8
North: Australia Avenue											
7	L	4	5.0	0.162	29.0	LOS C	4.3	31.5	0.59	0.95	34.8
8	T	290	5.0	0.162	18.8	LOS B	4.4	31.8	0.59	0.50	38.1
9	R	44	5.0	0.170	24.0	LOS B	1.0	7.5	0.74	0.73	36.3
Approach		338	5.0	0.170	19.6	LOS B	4.4	31.8	0.61	0.53	37.8
West: Sarah Durack Avenue											
10	L	31	5.0	0.583	35.8	LOS C	8.6	62.4	0.90	0.82	30.6
11	T	18	5.0	0.583	27.4	LOS B	8.6	62.4	0.90	0.74	31.1
12	R	366	5.0	0.583	44.6	LOS D	8.8	64.5	0.92	0.81	27.2
Approach		415	5.0	0.583	43.2	LOS D	8.8	64.5	0.92	0.81	27.5
All Vehicles		3125	5.0	0.643	22.8	LOS B	23.4	170.9	0.64	0.72	36.2

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	8.4	LOS A	0.1	0.1	0.39	0.39
P5	Across N approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	53	22.3	LOS C	0.1	0.1	0.64	0.64
All Pedestrians		159	26.6	LOS C			0.66	0.66

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: PM Peak Exist Australia Ave, Bennelong Pky & Sarah Durack Ave 120518

PM Peak Existing
Australia Ave, Bennelong Pky & Sarah Durack Ave
Signals - Fixed Time Cycle Time = 115 seconds (Practical Cycle Time)

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: Australia Avenue											
1	L	480	5.0	0.268	7.8	X	X	X	X	0.60	49.7
2	T	340	5.0	0.272	30.3	LOS C	7.0	51.0	0.78	0.64	31.4
3	R	410	5.0	0.909	50.6	LOS D	19.7	143.6	1.00	1.00	25.2
Approach		1230	5.0	0.909	28.3	LOS B	19.7	143.6	0.55	0.75	33.5
East: Bennelong Pky											
4	L	551	5.0	0.820	42.2	LOS C	26.1	190.7	0.97	1.02	27.8
5	T	45	5.0	0.585	62.1	LOS E	3.4	24.7	1.00	0.77	21.2
6	R	12	5.0	0.585	70.3	LOS E	3.4	24.7	1.00	0.77	21.2
Approach		608	5.0	0.820	44.2	LOS D	26.1	190.7	0.97	1.00	27.0
North: Australia Avenue											
7	L	19	5.0	0.838	56.4	LOS D	29.6	216.0	0.99	0.98	24.7
8	T	1027	5.0	0.838	45.9	LOS D	29.6	216.1	0.99	0.97	25.4
9	R	71	5.0	0.245	19.0	LOS B	1.6	11.9	0.55	0.72	39.6
Approach		1117	5.0	0.838	44.4	LOS D	29.6	216.1	0.97	0.95	26.0
West: Sarah Durack Avenue											
10	L	15	5.0	0.634	25.3	LOS B	7.2	52.5	0.67	0.80	35.8
11	T	8	5.0	0.634	16.9	LOS B	7.2	52.5	0.67	0.56	37.6
12	R	448	5.0	0.634	39.2	LOS C	10.7	77.8	0.80	0.79	29.1
Approach		471	5.0	0.634	38.3	LOS C	10.7	77.8	0.79	0.79	29.4
All Vehicles		3426	5.0	0.909	37.7	LOS C	29.6	216.1	0.79	0.86	29.0

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	33.7	LOS D	0.1	0.1	0.77	0.77
P5	Across N approach	53	49.8	LOS E	0.2	0.2	0.93	0.93
P7	Across W approach	53	35.2	LOS D	0.1	0.1	0.78	0.78
All Pedestrians		159	39.6	LOS D			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: AM Peak Australia Avenue, Kevin Coomb Ave,

AM Peak
Australia Avenue, Kevin Coombs Ave,
Holker St busway & Majory Jackson Pkwy
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: Majory Jackson Pkwy											
1	L	47	6.0	0.035	8.5	LOS A	0.2	1.7	0.18	0.60	48.4
2	T	15	6.0	0.035	0.1	LOS A	0.2	1.7	0.18	0.00	55.8
3	R	1	6.0	0.035	8.0	LOS A	0.2	1.7	0.18	0.59	48.6
Approach		63	6.0	0.035	6.5	LOS A	0.2	1.7	0.18	0.46	49.9
East: Holker Street Busway											
4	L	1	6.0	0.040	15.1	LOS B	0.2	1.4	0.40	0.71	43.1
5	T	16	6.0	0.040	16.1	LOS B	0.2	1.4	0.40	0.93	42.6
6	R	4	6.0	0.040	15.6	LOS B	0.2	1.4	0.40	0.92	42.9
Approach		21	6.0	0.040	15.9	LOS B	0.2	1.4	0.40	0.92	42.7
North: Kevin Coombs Avenue											
7	L	4	6.0	0.002	8.4	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	23	6.0	0.254	0.3	LOS A	1.6	11.8	0.19	0.00	55.4
9	R	326	6.0	0.255	8.4	LOS A	1.6	11.8	0.19	0.61	48.4
Approach		354	6.0	0.255	7.8	LOS A	1.6	11.8	0.19	0.57	48.8
West: Australia Avenue											
10	L	149	6.0	0.137	11.3	LOS A	0.7	5.0	0.12	0.92	46.3
11	T	3	6.0	0.137	11.9	LOS A	0.7	5.0	0.12	0.99	45.8
12	R	21	6.0	0.044	15.8	LOS B	0.2	1.5	0.52	0.91	43.1
Approach		174	6.0	0.136	11.8	LOS A	0.7	5.0	0.17	0.92	45.9
All Vehicles		612	6.0	0.255	9.1	NA	1.6	11.8	0.19	0.67	47.8

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM Peak Australia Avenue, Kevin Coomb Ave,

PM Peak Existing
Australia Avenue, Kevin Coombs Ave,
Holker St busway & Majory Jackson Pkwy
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: Majory Jackson Pkwy											
1	L	12	6.0	0.016	8.4	LOS A	0.1	0.7	0.12	0.74	48.7
2	T	16	6.0	0.016	0.1	LOS A	0.1	0.7	0.12	0.00	57.2
3	R	1	6.0	0.016	8.0	LOS A	0.1	0.7	0.12	0.71	49.0
Approach		28	6.0	0.016	3.8	LOS A	0.1	0.7	0.12	0.33	53.1
East: Holker Street Busway											
4	L	1	6.0	0.015	13.4	LOS A	0.1	0.5	0.27	0.80	44.3
5	T	7	6.0	0.015	14.4	LOS A	0.1	0.5	0.27	0.90	43.8
6	R	1	6.0	0.015	13.7	LOS A	0.1	0.5	0.27	0.92	44.1
Approach		9	6.0	0.015	14.2	LOS A	0.1	0.5	0.27	0.89	43.9
North: Kevin Coombs Avenue											
7	L	3	6.0	0.002	8.4	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	24	6.0	0.164	0.1	LOS A	1.0	7.0	0.11	0.00	57.4
9	R	209	6.0	0.164	8.2	LOS A	1.0	7.0	0.11	0.62	48.8
Approach		237	6.0	0.164	7.4	LOS A	1.0	7.0	0.11	0.56	49.6
West: Australia Avenue											
10	L	397	6.0	0.364	11.3	LOS A	2.3	17.2	0.11	0.93	46.3
11	T	16	6.0	0.367	11.9	LOS A	2.3	17.2	0.11	0.99	45.7
12	R	76	6.0	0.127	14.1	LOS A	0.6	4.6	0.45	0.91	44.4
Approach		488	6.0	0.364	11.7	LOS A	2.3	17.2	0.16	0.92	46.0
All Vehicles		763	6.0	0.367	10.1	NA	2.3	17.2	0.14	0.79	47.3

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM Peak Australia Ave, Herb Elliot Ave & Parkview Drive

AM Peak
Australia Avenue, Parkview Drive & Herb Elliot Drive
Signals - Fixed Time Cycle Time = 50 seconds (Practical Cycle Time)

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: Australia Avenue											
1	L	315	6.0	0.472	21.5	LOS B	7.6	56.3	0.80	0.81	37.9
2	T	301	6.0	0.422	12.7	LOS A	7.2	53.0	0.78	0.66	42.1
3	R	214	6.0	0.459	23.0	LOS B	5.8	42.4	0.83	0.81	36.9
Approach		829	6.0	0.472	18.7	LOS B	7.6	56.3	0.80	0.76	39.0
East: Parkview Drive											
4	L	27	6.0	0.058	15.3	LOS B	1.0	7.2	0.66	0.69	30.8
5	T	13	6.0	0.058	10.7	LOS A	1.0	7.2	0.66	0.49	31.6
6	R	14	6.0	0.039	15.1	LOS B	0.3	2.5	0.65	0.64	30.7
Approach		54	6.0	0.058	14.2	LOS A	1.0	7.2	0.66	0.63	31.0
North: Australia Avenue											
7	L	29	6.0	0.161	19.7	LOS B	2.6	19.4	0.69	0.84	40.6
8	T	193	6.0	0.161	11.2	LOS A	2.8	20.2	0.69	0.55	43.3
9	R	19	6.0	0.066	24.3	LOS B	0.6	4.3	0.78	0.71	36.1
Approach		241	6.0	0.161	13.3	LOS A	2.8	20.2	0.70	0.60	42.3
West: Herb Elliot Avenue											
10	L	13	6.0	0.156	15.9	LOS B	2.2	16.5	0.69	0.72	30.5
11	T	11	6.0	0.157	11.3	LOS A	2.2	16.5	0.69	0.55	31.1
12	R	155	6.0	0.156	15.7	LOS B	2.2	16.5	0.69	0.70	30.5
Approach		178	6.0	0.156	15.4	LOS B	2.2	16.5	0.69	0.69	30.5
All Vehicles		1302	6.0	0.472	17.0	LOS B	7.6	56.3	0.76	0.71	37.9

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	19.4	LOS B	0.1	0.1	0.88	0.88
P3	Across E approach	53	15.2	LOS B	0.1	0.1	0.78	0.78
P5	Across N approach	53	18.5	LOS B	0.1	0.1	0.86	0.86
P7	Across W approach	53	16.8	LOS B	0.1	0.1	0.82	0.82
All Pedestrians		212	17.5	LOS B			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

PM Peak
Australia Avenue, Parkview Drive & Herb Elliot Drive
Signals - Fixed Time Cycle Time = 50 seconds (Practical Cycle Time)

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: Australia Avenue											
1	L	91	6.0	0.445	23.5	LOS B	6.8	49.8	0.84	0.84	38.0
2	T	435	6.0	0.445	15.0	LOS B	7.0	51.2	0.84	0.70	39.7
3	R	19	6.0	0.058	24.0	LOS B	0.6	4.2	0.78	0.71	36.3
Approach		544	6.0	0.445	16.7	LOS B	7.0	51.2	0.84	0.73	39.3
East: Parkview Drive											
4	L	152	6.0	0.234	14.2	LOS A	4.1	30.0	0.66	0.73	31.3
5	T	34	6.0	0.234	9.6	LOS A	4.1	30.0	0.66	0.54	32.0
6	R	109	6.0	0.292	14.0	LOS A	2.5	18.2	0.64	0.70	31.3
Approach		295	6.0	0.292	13.6	LOS A	4.1	30.0	0.65	0.70	31.4
North: Australia Avenue											
7	L	11	6.0	0.326	22.8	LOS B	4.9	36.4	0.80	0.87	39.2
8	T	371	6.0	0.326	14.4	LOS A	5.1	37.5	0.80	0.66	40.7
9	R	11	6.0	0.039	25.8	LOS B	0.3	2.5	0.81	0.69	35.2
Approach		392	6.0	0.326	14.9	LOS B	5.1	37.5	0.80	0.66	40.5
West: Herb Elliot Avenue											
10	L	23	6.0	0.450	15.6	LOS B	5.8	42.9	0.74	0.77	30.6
11	T	12	6.0	0.454	11.0	LOS A	5.8	42.9	0.74	0.63	31.2
12	R	442	6.0	0.451	16.4	LOS B	6.0	43.9	0.77	0.76	30.1
Approach		477	6.0	0.451	16.3	LOS B	6.0	43.9	0.77	0.76	30.2
All Vehicles		1707	6.0	0.451	15.6	LOS B	7.0	51.2	0.78	0.72	35.3

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	16.8	LOS B	0.1	0.1	0.82	0.82
P3	Across E approach	53	17.6	LOS B	0.1	0.1	0.84	0.84
P5	Across N approach	53	16.0	LOS B	0.1	0.1	0.80	0.80
P7	Across W approach	53	19.4	LOS B	0.1	0.1	0.88	0.88
All Pedestrians		212	17.5	LOS B			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: AM Peak Herb Elliott Ave & Olympic Blvd

AM Peak Existing
Herb Elliott Avenue & Olymkpic Blvd
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: Olympic Blvd											
2	T	20	6.0	0.023	0.3	LOS A	0.1	1.0	0.18	0.00	56.1
3	R	16	6.0	0.023	8.4	LOS A	0.1	1.0	0.18	0.71	48.9
Approach		36	6.0	0.023	3.9	LOS A	0.1	1.0	0.18	0.31	52.7
East: Herb Elliot Avenue											
4	L	4	6.0	0.016	9.1	LOS A	0.1	0.6	0.21	0.62	48.1
6	R	9	6.0	0.016	8.8	LOS A	0.1	0.6	0.21	0.58	48.3
Approach		14	6.0	0.016	8.9	LOS A	0.1	0.6	0.21	0.59	48.2
North: Olympic Blvd											
7	L	40	6.0	0.045	8.5	LOS A	0.0	0.0	0.00	0.84	49.0
8	T	42	6.0	0.045	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		82	6.0	0.045	4.1	LOS A	0.0	0.0	0.00	0.41	54.1
All Vehicles		132	6.0	0.045	4.5	NA	0.1	1.0	0.07	0.40	53.0

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM Peak Herb Elliott Ave & Olympic Blvd

PM Peak Existing
Herb Elliott Avenue & Olymkpic Blvd
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: Olympic Blvd											
2	T	132	6.0	0.153	1.1	LOS A	1.1	8.0	0.37	0.00	52.6
3	R	94	6.0	0.153	9.2	LOS A	1.1	8.0	0.37	0.75	48.6
Approach		225	6.0	0.153	4.5	LOS A	1.1	8.0	0.37	0.31	50.8
East: Herb Elliot Avenue											
4	L	82	6.0	0.673	19.9	LOS B	7.8	57.7	0.70	1.02	39.1
6	R	276	6.0	0.674	19.6	LOS B	7.8	57.7	0.70	1.11	39.2
Approach		358	6.0	0.675	19.7	LOS B	7.8	57.7	0.70	1.09	39.2
North: Olympic Blvd											
7	L	98	6.0	0.123	8.5	LOS A	0.0	0.0	0.00	0.86	49.0
8	T	128	6.0	0.123	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		226	6.0	0.123	3.7	LOS A	0.0	0.0	0.00	0.37	54.7
All Vehicles		809	6.0	0.674	11.0	NA	7.8	57.7	0.41	0.67	45.7

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Hill-M4 Off_EX-AM

Hill Rd / M4 Off-ramp
Scenario: Existing
Period: AM
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: Hill Rd (south)											
2	T	998	7.6	0.268	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		998	7.6	0.269	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: M4 Off-Ramp (west)											
10	L	500	8.4	1.078	112.9	LOS F	40.0	300.1	1.00	3.34	12.2
Approach		500	8.4	1.078	112.9	LOS F	40.0	300.1	1.00	3.34	12.2
All Vehicles		1498	7.9	1.078	37.7	NA	40.0	300.1	0.33	1.11	20.0

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 F. LOS Method for individual vehicle movements: Delay (RTA NSW).

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

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: Hill-M4 Off_EX-PM

Hill Rd / M4 Off-ramp
Scenario: Existing
Period: PM
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: Hill Rd (south)											
2	T	652	8.2	0.176	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		652	8.2	0.176	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: M4 Off-Ramp (west)											
10	L	496	10.0	0.727	18.7	LOS B	8.7	66.0	0.78	1.24	36.7
Approach		496	10.0	0.727	18.7	LOS B	8.7	66.0	0.78	1.24	36.7
All Vehicles		1147	9.0	0.727	8.1	NA	8.7	66.0	0.34	0.54	43.3

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 B. LOS Method for individual vehicle movements: Delay (RTA NSW).

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

SIDRA INTERSECTION

appendix d-2

future scenario based on surveyed trip rates

MOVEMENT SUMMARY

Site: AM Peak Exist +Dev (Survey Trip) Australia Ave, Bennelong Pky & Sarah Durack Ave 120518

AM Peak Existing +Dev (Survey Trip Rates)
Australia Ave, Bennelong Pky & Sarah Durack Ave
Signals - Fixed Time Cycle Time = 110 seconds (Optimum Cycle Time - Minimum Delay)

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: Australia Avenue											
1	L	383	5.0	0.214	7.8	X	X	X	X	0.60	49.8
2	T	1279	4.6	0.701	23.8	LOS B	26.6	193.8	0.84	0.76	34.5
3	R	289	5.0	0.535	22.5	LOS B	7.9	57.5	0.66	0.80	37.3
Approach		1951	4.7	0.701	20.5	LOS B	26.6	193.8	0.65	0.74	37.2
East: Bennelong Pky											
4	L	454	5.0	0.556	13.0	LOS A	9.8	71.5	0.50	0.79	44.3
5	T	33	5.0	0.643	58.7	LOS E	4.3	31.1	1.00	0.80	21.6
6	R	42	5.0	0.643	66.8	LOS E	4.3	31.1	1.00	0.80	21.6
Approach		529	5.0	0.643	20.1	LOS B	9.8	71.5	0.57	0.79	38.5
North: Australia Avenue											
7	L	4	5.0	0.176	29.2	LOS C	4.8	34.6	0.60	0.95	34.7
8	T	317	4.6	0.176	18.9	LOS B	4.8	34.9	0.60	0.50	38.0
9	R	44	5.0	0.176	25.5	LOS B	1.0	7.5	0.78	0.74	35.4
Approach		365	4.6	0.176	19.8	LOS B	4.8	34.9	0.62	0.54	37.6
West: Sarah Durack Avenue											
10	L	31	5.0	0.583	35.8	LOS C	8.6	62.4	0.90	0.82	30.6
11	T	18	5.0	0.583	27.4	LOS B	8.6	62.4	0.90	0.74	31.1
12	R	366	5.0	0.583	44.6	LOS D	8.8	64.5	0.92	0.81	27.2
Approach		415	5.0	0.583	43.2	LOS D	8.8	64.5	0.92	0.81	27.5
All Vehicles		3260	4.8	0.701	23.2	LOS B	26.6	193.8	0.67	0.73	35.8

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	8.4	LOS A	0.1	0.1	0.39	0.39
P5	Across N approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	53	22.3	LOS C	0.1	0.1	0.64	0.64
All Pedestrians		159	26.6	LOS C			0.66	0.66

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: PM Peak Exist+Dev (Survey Trip) Australia Ave, Bennelong Pky & Sarah Durack Ave 120518

PM Peak Existing +Dev (Survey Trip Rates)
Australia Ave, Bennelong Pky & Sarah Durack Ave
Signals - Fixed Time Cycle Time = 115 seconds (Optimum Cycle Time - Minimum Delay)

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: Australia Avenue											
1	L	480	5.0	0.268	7.8	X	X	X	X	0.60	49.7
2	T	384	4.4	0.284	28.3	LOS B	7.7	55.6	0.76	0.63	32.4
3	R	410	5.0	0.878	50.5	LOS D	19.7	143.6	1.00	1.00	25.2
Approach		1274	4.8	0.878	27.7	LOS B	19.7	143.6	0.55	0.74	33.8
East: Bennelong Pky											
4	L	551	5.0	0.860	49.8	LOS D	28.9	211.1	1.00	1.06	25.4
5	T	45	5.0	0.585	62.1	LOS E	3.4	24.7	1.00	0.77	21.2
6	R	12	5.0	0.585	70.3	LOS E	3.4	24.7	1.00	0.77	21.2
Approach		608	5.0	0.860	51.1	LOS D	28.9	211.1	1.00	1.03	24.9
North: Australia Avenue											
7	L	19	5.0	0.834	53.6	LOS D	31.2	227.3	0.98	0.98	25.5
8	T	1107	4.6	0.834	43.2	LOS D	31.3	227.5	0.98	0.95	26.2
9	R	71	5.0	0.242	18.7	LOS B	1.6	11.7	0.55	0.72	39.8
Approach		1197	4.7	0.834	41.9	LOS C	31.3	227.5	0.96	0.94	26.8
West: Sarah Durack Avenue											
10	L	15	5.0	0.662	27.5	LOS B	7.8	57.1	0.72	0.80	34.5
11	T	8	5.0	0.662	19.1	LOS B	7.8	57.1	0.72	0.60	36.0
12	R	448	5.0	0.662	40.9	LOS C	10.8	79.0	0.83	0.80	28.4
Approach		471	5.0	0.662	40.1	LOS C	10.8	79.0	0.82	0.80	28.7
All Vehicles		3550	4.8	0.878	38.2	LOS C	31.3	227.5	0.80	0.86	28.8

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	31.4	LOS D	0.1	0.1	0.74	0.74
P5	Across N approach	53	50.7	LOS E	0.2	0.2	0.94	0.94
P7	Across W approach	53	32.9	LOS D	0.1	0.1	0.76	0.76
All Pedestrians		159	38.3	LOS D			0.81	0.81

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: AM Peak Exist+Dev(Survey Trip Rates) -Aus Ave, Kevin Coomb Ave,

AM Peak -Exist+Dev (Survey Trip Rate)
Australia Avenue, Kevin Coombs Ave,
Holker St busway & Majory Jackson Pkwy
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: Majory Jackson Pkwy											
1	L	47	6.0	0.035	8.5	LOS A	0.2	1.3	0.18	0.60	48.4
2	T	15	6.0	0.035	0.1	LOS A	0.2	1.3	0.18	0.00	55.8
3	R	1	6.0	0.035	8.0	LOS A	0.2	1.3	0.18	0.59	48.6
Approach		63	6.0	0.035	6.5	NA	0.2	1.3	0.18	0.46	49.9
East: Holker Street Busway											
4	L	1	6.0	0.043	15.6	LOS B	0.2	1.2	0.41	0.70	42.7
5	T	16	6.0	0.043	16.6	LOS B	0.2	1.2	0.41	0.94	42.2
6	R	4	6.0	0.043	16.1	LOS B	0.2	1.2	0.41	0.93	42.5
Approach		21	6.0	0.043	16.5	LOS B	0.2	1.2	0.41	0.92	42.3
North: Kevin Coombs Avenue											
7	L	4	6.0	0.002	8.4	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	23	6.0	0.281	0.3	LOS A	1.5	10.7	0.19	0.00	55.3
9	R	361	6.0	0.281	8.4	LOS A	1.5	10.7	0.19	0.60	48.4
Approach		388	6.0	0.281	7.9	NA	1.5	10.7	0.19	0.57	48.8
West: Australia Avenue											
10	L	158	6.0	0.144	11.3	LOS A	0.6	4.2	0.12	0.92	46.3
11	T	3	6.0	0.144	11.9	LOS A	0.6	4.2	0.12	0.99	45.8
12	R	21	6.0	0.047	16.4	LOS B	0.2	1.3	0.54	0.92	42.6
Approach		182	6.0	0.144	11.9	LOS A	0.6	4.2	0.17	0.92	45.9
All Vehicles		655	6.0	0.281	9.1	NA	1.5	10.7	0.19	0.67	47.8

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM Peak Exist+Dev(Survey Trip Rates)- Aus Ave, Kevin Coomb Ave,

PM Peak - Exist+Dev (Survey Trip Rate)
Australia Avenue, Kevin Coombs Ave,
Holker St busway & Majory Jackson Pkwy
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: Majory Jackson Pkwy											
1	L	12	6.0	0.016	8.4	LOS A	0.1	0.6	0.12	0.74	48.7
2	T	16	6.0	0.016	0.1	LOS A	0.1	0.6	0.12	0.00	57.2
3	R	1	6.0	0.016	8.0	LOS A	0.1	0.6	0.12	0.71	49.0
Approach		28	6.0	0.016	3.8	NA	0.1	0.6	0.12	0.33	53.1
East: Holker Street Busway											
4	L	1	6.0	0.015	13.7	LOS A	0.1	0.4	0.27	0.79	44.1
5	T	7	6.0	0.015	14.7	LOS B	0.1	0.4	0.27	0.90	43.6
6	R	1	6.0	0.015	13.9	LOS A	0.1	0.4	0.27	0.92	43.9
Approach		9	6.0	0.015	14.5	LOS A	0.1	0.4	0.27	0.89	43.7
North: Kevin Coombs Avenue											
7	L	3	6.0	0.002	8.4	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	24	6.0	0.174	0.1	LOS A	0.8	6.0	0.11	0.00	57.3
9	R	223	6.0	0.174	8.2	LOS A	0.8	6.0	0.11	0.62	48.8
Approach		251	6.0	0.174	7.4	NA	0.8	6.0	0.11	0.56	49.5
West: Australia Avenue											
10	L	422	6.0	0.386	11.3	LOS A	2.1	15.2	0.11	0.92	46.3
11	T	16	6.0	0.386	11.9	LOS A	2.1	15.2	0.11	0.99	45.7
12	R	76	6.0	0.130	14.3	LOS A	0.5	3.8	0.46	0.91	44.3
Approach		514	6.0	0.386	11.7	LOS A	2.1	15.2	0.16	0.92	46.0
All Vehicles		802	6.0	0.386	10.1	NA	2.1	15.2	0.14	0.79	47.2

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM Peak Exist+Dev(Survey Trip Rates) -Aus Ave, Herb Elliot Ave & Parkview Drive

AM Peak-Exist+Dev (Survey Trip Rate)
Australia Avenue, Parkview Drive & Herb Elliot Drive
Signals - Fixed Time Cycle Time = 50 seconds (Practical Cycle Time)

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: Australia Avenue											
1	L	315	6.0	0.472	21.5	LOS B	6.0	44.1	0.80	0.81	37.9
2	T	301	6.0	0.422	12.7	LOS A	5.6	41.0	0.78	0.66	42.1
3	R	214	6.0	0.459	23.0	LOS B	4.3	31.5	0.83	0.81	36.9
Approach		829	6.0	0.472	18.7	LOS B	6.0	44.1	0.80	0.76	39.0
East: Parkview Drive											
4	L	27	6.0	0.058	15.3	LOS B	0.6	4.6	0.66	0.69	30.8
5	T	13	6.0	0.058	10.7	LOS A	0.6	4.6	0.66	0.49	31.6
6	R	14	6.0	0.039	15.2	LOS B	0.2	1.6	0.65	0.64	30.7
Approach		54	6.0	0.058	14.2	LOS A	0.6	4.6	0.66	0.63	31.0
North: Australia Avenue											
7	L	29	6.0	0.161	19.7	LOS B	1.8	13.1	0.69	0.84	40.6
8	T	193	6.0	0.161	11.2	LOS A	1.9	13.7	0.69	0.55	43.3
9	R	54	6.0	0.187	25.0	LOS B	1.1	8.0	0.81	0.75	35.7
Approach		276	6.0	0.187	14.8	LOS B	1.9	13.7	0.72	0.62	41.3
West: Herb Elliot Avenue											
10	L	21	6.0	0.188	16.1	LOS B	1.8	13.5	0.70	0.73	30.4
11	T	11	6.0	0.188	11.5	LOS A	1.8	13.5	0.70	0.56	31.0
12	R	183	6.0	0.188	15.8	LOS B	1.8	13.5	0.70	0.71	30.4
Approach		215	6.0	0.188	15.6	LOS B	1.8	13.5	0.70	0.70	30.4
All Vehicles		1374	6.0	0.472	17.2	LOS B	6.0	44.1	0.76	0.72	37.6

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	19.4	LOS B	0.1	0.1	0.88	0.88
P3	Across E approach	53	15.2	LOS B	0.1	0.1	0.78	0.78
P5	Across N approach	53	18.5	LOS B	0.1	0.1	0.86	0.86
P7	Across W approach	53	16.8	LOS B	0.1	0.1	0.82	0.82
All Pedestrians		212	17.5	LOS B			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

PM Peak-Exist+Dev (Survey Trip Rate)
Australia Avenue, Parkview Drive & Herb Elliot Drive
Signals - Fixed Time Cycle Time = 50 seconds (Practical Cycle Time)

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: Australia Avenue											
1	L	91	6.0	0.445	23.5	LOS B	5.2	38.1	0.84	0.84	38.0
2	T	435	6.0	0.445	15.0	LOS B	5.3	39.4	0.84	0.70	39.7
3	R	19	6.0	0.058	24.0	LOS B	0.4	2.7	0.78	0.71	36.3
Approach		544	6.0	0.445	16.7	LOS B	5.3	39.4	0.84	0.73	39.3
East: Parkview Drive											
4	L	152	6.0	0.234	14.2	LOS A	2.9	21.2	0.66	0.73	31.3
5	T	34	6.0	0.234	9.6	LOS A	2.9	21.2	0.66	0.54	32.0
6	R	109	6.0	0.301	14.7	LOS B	1.7	12.7	0.66	0.70	30.9
Approach		295	6.0	0.301	13.8	LOS A	2.9	21.2	0.66	0.70	31.2
North: Australia Avenue											
7	L	11	6.0	0.326	22.8	LOS B	3.6	26.4	0.80	0.87	39.2
8	T	371	6.0	0.326	14.4	LOS A	3.7	27.3	0.80	0.66	40.7
9	R	24	6.0	0.089	26.1	LOS B	0.5	3.7	0.82	0.72	35.0
Approach		405	6.0	0.326	15.3	LOS B	3.7	27.3	0.80	0.67	40.2
West: Herb Elliot Avenue											
10	L	48	6.0	0.550	16.2	LOS B	5.7	41.9	0.79	0.79	30.3
11	T	12	6.0	0.550	11.6	LOS A	5.7	41.9	0.79	0.68	30.7
12	R	526	6.0	0.550	17.1	LOS B	5.7	41.9	0.81	0.79	29.8
Approach		586	6.0	0.550	16.9	LOS B	5.7	41.9	0.81	0.79	29.9
All Vehicles		1831	6.0	0.550	16.0	LOS B	5.7	41.9	0.79	0.73	34.8

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	16.8	LOS B	0.1	0.1	0.82	0.82
P3	Across E approach	53	17.6	LOS B	0.1	0.1	0.84	0.84
P5	Across N approach	53	16.0	LOS B	0.1	0.1	0.80	0.80
P7	Across W approach	53	19.4	LOS B	0.1	0.1	0.88	0.88
All Pedestrians		212	17.5	LOS B			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: AM Peak Exist+Dev (Survey Trip Rates)- Herb Elliott Ave & Olympic Blvd

AM Peak Exist+Dev (Survey Trip Rate)
Herb Elliott Avenue & Olymkpic Blvd
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: Olympic Blvd											
2	T	20	6.0	0.023	0.4	LOS A	0.1	0.8	0.23	0.00	55.2
3	R	16	6.0	0.023	8.5	LOS A	0.1	0.8	0.23	0.71	48.8
Approach		36	6.0	0.023	4.0	NA	0.1	0.8	0.23	0.31	52.2
East: Herb Elliot Avenue											
4	L	4	6.0	0.028	9.4	LOS A	0.1	0.8	0.25	0.62	48.0
6	R	18	6.0	0.028	9.0	LOS A	0.1	0.8	0.25	0.59	48.1
Approach		22	6.0	0.028	9.1	LOS A	0.1	0.8	0.25	0.60	48.1
North: Olympic Blvd											
7	L	75	6.0	0.064	8.5	LOS A	0.0	0.0	0.00	0.78	49.0
8	T	42	6.0	0.064	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		117	6.0	0.064	5.4	NA	0.0	0.0	0.00	0.50	52.4
All Vehicles		175	6.0	0.064	5.6	NA	0.1	0.8	0.08	0.47	51.8

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM Peak Exist+Dev(Survey Trip Rates) -Herb Elliott Ave & Olympic Blvd

PM Peak Exist+Dev (Survey Trip Rate)
Herb Elliott Avenue & Olymkpic Blvd
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: Olympic Blvd											
2	T	132	6.0	0.154	1.2	LOS A	0.9	6.5	0.38	0.00	52.4
3	R	94	6.0	0.154	9.3	LOS A	0.9	6.5	0.38	0.75	48.5
Approach		225	6.0	0.154	4.6	NA	0.9	6.5	0.38	0.31	50.7
East: Herb Elliot Avenue											
4	L	82	6.0	0.741	22.5	LOS B	8.3	61.3	0.75	1.15	37.4
6	R	302	6.0	0.741	22.1	LOS B	8.3	61.3	0.75	1.21	37.5
Approach		384	6.0	0.741	22.2	LOS B	8.3	61.3	0.75	1.20	37.5
North: Olympic Blvd											
7	L	113	6.0	0.132	8.5	LOS A	0.0	0.0	0.00	0.84	49.0
8	T	128	6.0	0.132	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		241	6.0	0.132	4.0	NA	0.0	0.0	0.00	0.39	54.3
All Vehicles		851	6.0	0.741	12.4	NA	8.3	61.3	0.44	0.74	44.4

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Hill-M4 Off_EX+Dev-AM

Hill Rd / M4 Off-ramp
Scenario: Existing+Development
Period: AM
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: Hill Rd (south)											
2	T	998	7.6	0.268	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		998	7.6	0.269	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: M4 Off-Ramp (west)											
10	L	569	8.4	1.227	235.2	LOS F	78.2	586.7	1.00	5.14	6.5
Approach		569	8.4	1.228	235.2	LOS F	78.2	586.7	1.00	5.14	6.5
All Vehicles		1567	7.9	1.228	85.5	NA	78.2	586.7	0.36	1.87	11.1

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 F. 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: 111010-PM Hill-M4 Off_EX +Dev(incl supermarket)-PM

Hill Rd / M4 Off-ramp
Scenario: Existing+Development
Period: PM
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: Hill Rd (south)											
2	T	652	8.2	0.176	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		652	8.2	0.176	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
West: M4 Off-Ramp (west)											
10	L	524	10.0	0.769	19.9	LOS B	10.2	77.2	0.80	1.32	35.8
Approach		524	10.0	0.769	19.9	LOS B	10.2	77.2	0.80	1.32	35.8
All Vehicles		1176	9.0	0.769	8.9	NA	10.2	77.2	0.36	0.59	42.2

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 B. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

appendix d-3

future scenario based on RMS trip rates

MOVEMENT SUMMARY

Site: AM Peak Exist+Dev (RMS Trips) Australia Ave, Bennelong Pky & Sarah Durack Ave 120518

AM Peak Existing +Dev (RMS Trip Rates)
Australia Ave, Bennelong Pky & Sarah Durack Ave
Signals - Fixed Time Cycle Time = 110 seconds (Optimum Cycle Time - Minimum Delay)

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: Australia Avenue											
1	L	383	5.0	0.214	7.8	X	X	X	X	0.60	49.8
2	T	1369	4.3	0.735	23.8	LOS B	29.0	210.6	0.86	0.78	34.5
3	R	289	5.0	0.535	21.8	LOS B	7.7	56.4	0.65	0.80	37.7
Approach		2041	4.5	0.735	20.5	LOS B	29.0	210.6	0.67	0.75	37.1
East: Bennelong Pky											
4	L	454	5.0	0.573	13.2	LOS A	10.2	74.4	0.52	0.79	44.2
5	T	33	5.0	0.750	61.6	LOS E	4.4	32.1	1.00	0.85	21.0
6	R	42	5.0	0.750	69.8	LOS E	4.4	32.1	1.00	0.85	20.9
Approach		529	5.0	0.750	20.7	LOS B	10.2	74.4	0.59	0.80	38.2
North: Australia Avenue											
7	L	4	5.0	0.187	28.8	LOS C	5.1	37.0	0.59	0.95	34.9
8	T	344	4.2	0.187	18.5	LOS B	5.2	37.4	0.59	0.50	38.3
9	R	44	5.0	0.185	25.9	LOS B	1.0	7.4	0.80	0.74	35.2
Approach		392	4.3	0.187	19.4	LOS B	5.2	37.4	0.62	0.53	37.9
West: Sarah Durack Avenue											
10	L	31	5.0	0.583	36.3	LOS C	8.7	63.4	0.90	0.82	30.4
11	T	18	5.0	0.583	27.9	LOS B	8.7	63.4	0.90	0.74	30.9
12	R	366	5.0	0.583	44.9	LOS D	8.8	64.5	0.92	0.81	27.1
Approach		415	5.0	0.583	43.5	LOS D	8.8	64.5	0.92	0.81	27.4
All Vehicles		3377	4.6	0.750	23.2	LOS B	29.0	210.6	0.68	0.74	35.8

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	8.0	LOS A	0.1	0.1	0.38	0.38
P5	Across N approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	53	21.6	LOS C	0.1	0.1	0.63	0.63
All Pedestrians		159	26.3	LOS C			0.65	0.65

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: PM Peak Exist+Dev (RMS Trips) Australia Ave, Bennelong Pky & Sarah Durack Ave 120518

PM Peak Existing +Dev (RMS Trip Rates)
Australia Ave, Bennelong Pky & Sarah Durack Ave
Signals - Fixed Time Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

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: Australia Avenue											
1	L	480	5.0	0.268	7.8	X	X	X	X	0.60	49.7
2	T	416	4.1	0.329	32.0	LOS C	9.1	65.7	0.79	0.67	30.6
3	R	410	5.0	0.954	49.4	LOS D	19.7	143.6	0.97	0.96	25.5
Approach		1306	4.7	0.954	28.6	LOS C	19.7	143.6	0.56	0.73	33.3
East: Bennelong Pky											
4	L	551	5.0	0.869	56.9	LOS E	29.1	212.4	1.00	1.11	23.4
5	T	45	5.0	0.610	65.2	LOS E	3.5	25.9	1.00	0.78	20.6
6	R	12	5.0	0.610	73.4	LOS F	3.5	25.9	1.00	0.78	20.5
Approach		608	5.0	0.869	57.8	LOS E	29.1	212.4	1.00	1.08	23.1
North: Australia Avenue											
7	L	19	5.0	1.000	84.3	LOS F	45.3	328.1	1.00	1.22	18.7
8	T	1247	4.1	1.000	84.3	LOS F	54.9	398.2	1.00	1.27	17.6
9	R	71	5.0	0.235	18.0	LOS B	1.5	11.3	0.53	0.72	40.3
Approach		1337	4.2	1.000	80.8	LOS F	54.9	398.2	0.98	1.24	18.1
West: Sarah Durack Avenue											
10	L	15	5.0	0.723	28.7	LOS C	8.3	60.5	0.69	0.82	33.9
11	T	8	5.0	0.723	20.3	LOS B	8.3	60.5	0.69	0.59	35.4
12	R	448	5.0	0.723	43.7	LOS D	11.7	85.3	0.82	0.82	27.4
Approach		471	5.0	0.723	42.9	LOS D	11.7	85.3	0.82	0.81	27.7
All Vehicles		3722	4.6	1.000	53.9	LOS D	54.9	398.2	0.81	0.98	23.8

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	34.5	LOS D	0.1	0.1	0.76	0.76
P5	Across N approach	53	54.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	53	36.0	LOS D	0.1	0.1	0.78	0.78
All Pedestrians		159	41.6	LOS E			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: AM Peak Exist+Dev (RMS Trip Rates)-Australia Avenue, Kevin Coomb Ave

AM Peak Exist+Dev (RMS Trip Rates)
Australia Avenue, Kevin Coombs Ave,
Holker St busway & Majory Jackson Pkwy
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: Majory Jackson Pkwy											
1	L	62	4.4	0.043	8.4	LOS A	0.2	1.6	0.19	0.58	48.3
2	T	14	6.0	0.043	0.1	LOS A	0.2	1.6	0.19	0.00	55.4
3	R	1	6.0	0.043	8.0	LOS A	0.2	1.6	0.19	0.58	48.4
Approach		77	4.7	0.043	6.9	NA	0.2	1.6	0.19	0.47	49.4
East: Holker Street Busway											
4	L	1	6.0	0.037	14.9	LOS B	0.1	1.0	0.39	0.72	43.2
5	T	15	6.0	0.037	15.9	LOS B	0.1	1.0	0.39	0.93	42.8
6	R	4	6.0	0.037	15.5	LOS B	0.1	1.0	0.39	0.91	43.0
Approach		20	6.0	0.037	15.8	LOS B	0.1	1.0	0.39	0.91	42.8
North: Kevin Coombs Avenue											
7	L	4	6.0	0.002	8.4	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	22	6.0	0.246	0.4	LOS A	1.2	9.0	0.21	0.00	55.0
9	R	310	6.0	0.246	8.4	LOS A	1.2	9.0	0.21	0.61	48.3
Approach		336	6.0	0.246	7.9	NA	1.2	9.0	0.21	0.57	48.7
West: Australia Avenue											
10	L	142	6.0	0.130	11.3	LOS A	0.5	3.8	0.13	0.91	46.3
11	T	3	6.0	0.130	12.0	LOS A	0.5	3.8	0.13	0.98	45.8
12	R	81	1.5	0.164	15.8	LOS B	0.6	4.5	0.55	0.96	42.9
Approach		226	4.4	0.164	12.9	LOS A	0.6	4.5	0.28	0.93	45.1
All Vehicles		659	5.3	0.246	9.7	NA	1.2	9.0	0.24	0.69	47.3

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM Peak Exist+Dev (RMS Trip Rates)- Australia Avenue, Kevin Coomb Ave

PM Peak Existing
Australia Avenue, Kevin Coombs Ave,
Holker St busway & Majory Jackson Pkwy
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: Majory Jackson Pkwy											
1	L	79	0.8	0.051	8.3	LOS A	0.3	1.9	0.21	0.56	48.2
2	T	15	6.0	0.051	0.1	LOS A	0.3	1.9	0.21	0.00	55.1
3	R	1	6.0	0.051	8.0	LOS A	0.3	1.9	0.21	0.57	48.4
Approach		95	1.7	0.051	7.0	NA	0.3	1.9	0.21	0.48	49.2
East: Holker Street Busway											
4	L	1	6.0	0.015	13.8	LOS A	0.1	0.4	0.27	0.79	44.0
5	T	7	6.0	0.015	14.8	LOS B	0.1	0.4	0.27	0.91	43.5
6	R	1	6.0	0.015	14.0	LOS A	0.1	0.4	0.27	0.91	43.8
Approach		9	6.0	0.015	14.6	LOS B	0.1	0.4	0.27	0.90	43.6
North: Kevin Coombs Avenue											
7	L	3	6.0	0.002	8.4	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	23	6.0	0.165	0.4	LOS A	0.8	5.6	0.22	0.00	54.8
9	R	199	6.0	0.165	8.5	LOS A	0.8	5.6	0.22	0.62	48.3
Approach		225	6.0	0.165	7.7	NA	0.8	5.6	0.22	0.56	48.9
West: Australia Avenue											
10	L	377	6.0	0.358	11.5	LOS A	1.8	13.3	0.20	0.89	46.3
11	T	15	6.0	0.358	12.2	LOS A	1.8	13.3	0.20	0.97	45.7
12	R	95	4.5	0.162	14.3	LOS A	0.7	4.7	0.48	0.92	44.2
Approach		487	5.7	0.358	12.1	LOS A	1.8	13.3	0.25	0.90	45.8
All Vehicles		816	5.3	0.358	10.3	NA	1.8	13.3	0.24	0.75	47.0

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM Peak Exist+Dev (RMS Trip Rates)- Australia Ave, Herb Elliot Ave & Parkview Drive

AM Peak Exist+Dev (RMS Trip Rates)
Australia Avenue, Parkview Drive & Herb Elliot Drive
Signals - Fixed Time Cycle Time = 50 seconds (Practical Cycle Time)

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: Australia Avenue											
1	L	299	6.0	0.449	21.3	LOS B	5.6	41.4	0.79	0.81	38.0
2	T	286	6.0	0.401	12.5	LOS A	5.2	38.6	0.78	0.65	42.3
3	R	203	6.0	0.430	22.1	LOS B	3.9	29.0	0.80	0.80	37.5
Approach		788	6.0	0.449	18.3	LOS B	5.6	41.4	0.79	0.75	39.3
East: Parkview Drive											
4	L	26	6.0	0.055	15.3	LOS B	0.6	4.4	0.66	0.69	30.8
5	T	12	6.0	0.055	10.7	LOS A	0.6	4.4	0.66	0.49	31.6
6	R	13	6.0	0.037	15.1	LOS B	0.2	1.5	0.65	0.64	30.7
Approach		51	6.0	0.055	14.2	LOS A	0.6	4.4	0.66	0.63	31.0
North: Australia Avenue											
7	L	28	6.0	0.153	19.7	LOS B	1.7	12.4	0.69	0.84	40.7
8	T	183	6.0	0.153	11.2	LOS A	1.8	13.0	0.69	0.55	43.3
9	R	79	1.4	0.261	25.1	LOS B	1.6	11.6	0.83	0.77	35.5
Approach		290	4.7	0.261	15.8	LOS B	1.8	13.0	0.73	0.64	40.6
West: Herb Elliot Avenue											
10	L	20	3.6	0.200	16.1	LOS B	2.0	14.4	0.71	0.73	30.4
11	T	10	6.0	0.200	11.5	LOS A	2.0	14.4	0.71	0.57	31.0
12	R	201	4.4	0.200	15.9	LOS B	2.0	14.4	0.71	0.71	30.4
Approach		231	4.4	0.200	15.7	LOS B	2.0	14.4	0.71	0.71	30.4
All Vehicles		1360	5.5	0.449	17.2	LOS B	5.6	41.4	0.76	0.71	37.5

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	19.4	LOS B	0.1	0.1	0.88	0.88
P3	Across E approach	53	15.2	LOS B	0.1	0.1	0.78	0.78
P5	Across N approach	53	18.5	LOS B	0.1	0.1	0.86	0.86
P7	Across W approach	53	16.8	LOS B	0.1	0.1	0.82	0.82
All Pedestrians		212	17.5	LOS B			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: PM Peak Exist+Dev (RMS Trip Rates)- Australia Ave, Herb Elliot Ave & Parkview Drive

PM PeakExist+Dev (RMS Trip Rates)-
Australia Avenue, Parkview Drive & Herb Elliot Drive
Signals - Fixed Time Cycle Time = 50 seconds (Practical Cycle Time)

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: Australia Avenue											
1	L	86	6.0	0.450	23.5	LOS B	5.3	38.6	0.84	0.85	38.1
2	T	447	5.5	0.450	15.1	LOS B	5.4	39.9	0.84	0.70	39.7
3	R	18	6.0	0.054	24.0	LOS B	0.3	2.5	0.78	0.71	36.3
Approach		551	5.6	0.450	16.7	LOS B	5.4	39.9	0.84	0.73	39.3
East: Parkview Drive											
4	L	144	6.0	0.223	14.1	LOS A	2.7	20.0	0.66	0.73	31.3
5	T	32	6.0	0.223	9.5	LOS A	2.7	20.0	0.66	0.54	32.1
6	R	104	6.0	0.291	15.3	LOS B	1.7	12.4	0.68	0.70	30.6
Approach		280	6.0	0.291	14.0	LOS A	2.7	20.0	0.66	0.70	31.1
North: Australia Avenue											
7	L	10	6.0	0.310	22.7	LOS B	3.4	24.9	0.80	0.87	39.2
8	T	352	6.0	0.310	14.3	LOS A	3.5	25.8	0.80	0.65	40.7
9	R	33	1.8	0.120	26.1	LOS B	0.7	4.9	0.83	0.73	34.9
Approach		395	5.7	0.310	15.5	LOS B	3.5	25.8	0.80	0.66	40.1
West: Herb Elliot Avenue											
10	L	56	2.4	0.648	17.5	LOS B	7.5	54.0	0.84	0.84	29.7
11	T	11	6.0	0.648	12.9	LOS A	7.5	54.0	0.84	0.75	30.0
12	R	640	3.9	0.648	18.3	LOS B	7.5	54.0	0.86	0.84	29.3
Approach		707	3.8	0.648	18.2	LOS B	7.5	54.0	0.86	0.84	29.3
All Vehicles		1933	5.0	0.648	16.6	LOS B	7.5	54.0	0.81	0.75	34.2

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	16.8	LOS B	0.1	0.1	0.82	0.82
P3	Across E approach	53	17.6	LOS B	0.1	0.1	0.84	0.84
P5	Across N approach	53	16.0	LOS B	0.1	0.1	0.80	0.80
P7	Across W approach	53	19.4	LOS B	0.1	0.1	0.88	0.88
All Pedestrians		212	17.5	LOS B			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: AM Peak Exist+Dev (RMS Trip Rates)- Herb Elliott Ave & Olympic Blvd

AM Peak Exist+Dev (RMS Trip Rates)
Herb Elliott Avenue & Olymkpic Blvd
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: Olympic Blvd											
2	T	19	6.0	0.022	0.5	LOS A	0.1	0.8	0.25	0.00	54.8
3	R	15	6.0	0.022	8.6	LOS A	0.1	0.8	0.25	0.70	48.8
Approach		34	6.0	0.022	4.1	NA	0.1	0.8	0.25	0.31	52.0
East: Herb Elliot Avenue											
4	L	4	6.0	0.037	9.5	LOS A	0.1	1.0	0.27	0.62	47.9
6	R	25	2.2	0.037	9.0	LOS A	0.1	1.0	0.27	0.60	48.0
Approach		29	2.7	0.037	9.0	LOS A	0.1	1.0	0.27	0.60	48.0
North: Olympic Blvd											
7	L	99	2.3	0.075	8.3	LOS A	0.0	0.0	0.00	0.75	49.0
8	T	40	6.0	0.075	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		139	3.4	0.075	5.9	NA	0.0	0.0	0.00	0.53	51.7
All Vehicles		202	3.7	0.075	6.0	NA	0.1	1.0	0.08	0.51	51.2

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM Peak Exist+Dev (RMS Trip Rates)- Herb Elliott Ave & Olympic Blvd

PM Peak Exist+Dev (RMS Trip Rates)
Herb Elliott Avenue & Olymkpic Blvd
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: Olympic Blvd											
2	T	125	6.0	0.146	1.2	LOS A	0.8	6.1	0.38	0.00	52.5
3	R	89	6.0	0.146	9.3	LOS A	0.8	6.1	0.38	0.75	48.5
Approach		214	6.0	0.146	4.5	NA	0.8	6.1	0.38	0.31	50.8
East: Herb Elliot Avenue											
4	L	78	6.0	0.766	23.1	LOS B	9.4	68.8	0.77	1.19	37.0
6	R	330	4.8	0.766	22.7	LOS B	9.4	68.8	0.77	1.26	37.1
Approach		408	5.0	0.766	22.7	LOS B	9.4	68.8	0.77	1.25	37.1
North: Olympic Blvd											
7	L	117	4.8	0.130	8.4	LOS A	0.0	0.0	0.00	0.83	49.0
8	T	122	6.0	0.130	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		239	5.4	0.130	4.1	NA	0.0	0.0	0.00	0.41	54.0
All Vehicles		861	5.4	0.766	13.0	NA	9.4	68.8	0.46	0.78	43.8

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.