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24 June 2019

P1270 Merewether Golf Club TIA

Third Age Villages Pty Ltd
C/o Catalyst Project Consulting
110 King Street
Newcastle NSW 2300

Attn: Tim Mackiewicz

Dear Tim,

Traffic Impact Statement for the development of a Seniors Living facility and Clubhouse renovations, Merewether Golf Club, NSW.

Further to your recent correspondence, we have now completed our traffic assessment in relation to the proposed development at Merewether Golf Course. The traffic impact assessment in Table 1 has been completed in accordance with the Austroads Guidelines and the RMS Guide to Traffic Generating Developments, which provides the structure for the reporting of key issues to be addressed when determining the impacts of traffic associated with a development. This guide indicates that the use of this format and checklist ensures that the most significant matters are considered by the relevant road authority.

This assessment has been undertaken with consideration given to the SEPP (Housing for Seniors or People with a Disability) 2004 (SEPP), Newcastle City Council DCP and the requirements of the Australian Standard for Off-Street Parking AS2890.1. The subject site is located at 40 King Street Adamstown, as shown in Figure 1 below.

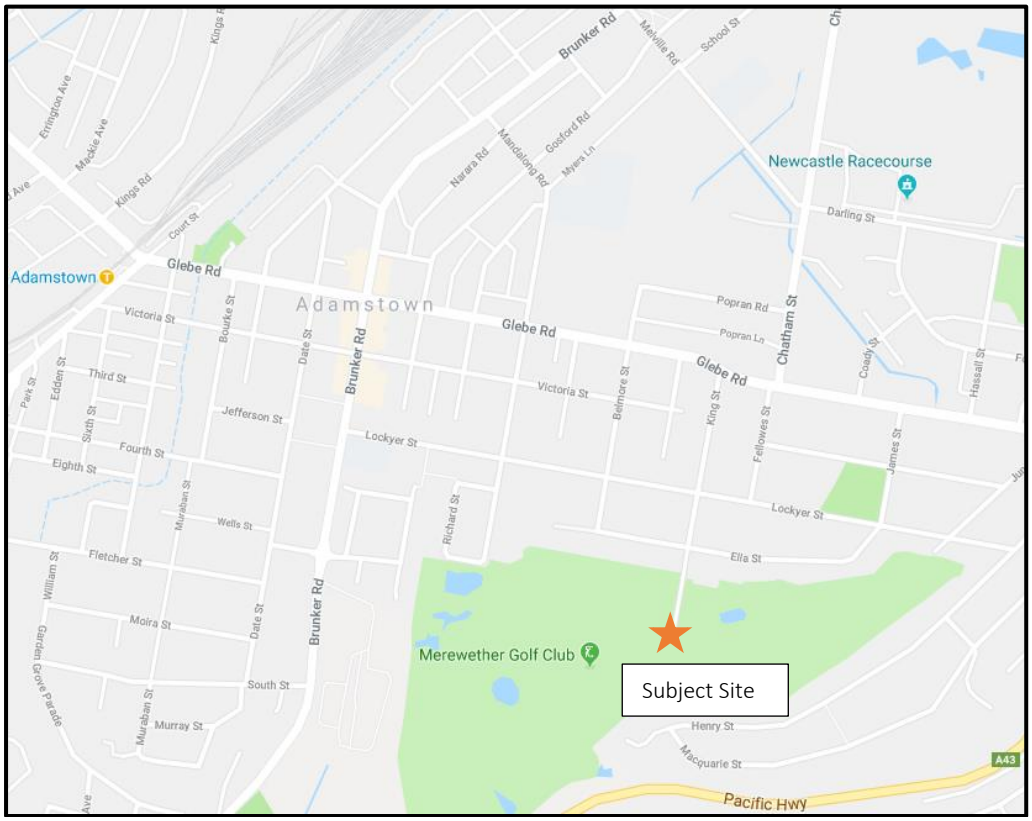

Figure 1 - Subject site in the context of the local road network

Quality Traffic Advice

Table 1 – Traffic Impact Assessment

Item	Comment
Existing Situation	
2.1 Site Location and Access	The subject site is located in Adamstown and is predominately surrounded by residential dwellings, as well as the Army Reserve Barracks (Bullecourt Barracks) along the western boundary. The subject site has primary vehicle access off King Street.
2.2.1 Road Hierarchy	The main road through the locality is **Glebe Road** which forms part of the regional road network, providing a major east-west connection between Kotara and Newcastle. Through Adamstown it generally provides one lane of travel in each direction with wide shoulders allowing for kerbside parking to each side of the road. There is street lighting provided with footpaths on both sides and a posted speed of 60km/hr through Adamstown. Glebe Road connects with King Street at a priority-controlled T-intersection allowing for all turning movements, with Glebe Road having priority. The subject site is located off **King Street** which is a local road that runs to the south of Glebe Road, with a north-south orientation. It provides no through road at its southern end, with the access driveway for the subject site being located at the dead-end. It has a pavement width in the order of 12.5 metres allowing for a single lane of travel in each direction with kerbside parking to both sides and operates under the posted speed limit of 50km/hr. Street lighting is provided along the length of the western roadside. To the north of Lockyer Street, it provides footpaths to both sides, with no footpaths provided south of Lockyer Street. King Street meets Lockyer Street at a four-way intersection, with Stop signs controlling all approaches. **Lockyer Street** is a local road, with an east-west orientation. It has very similar characteristics to that of King Street, with the exception of footpaths which are provided along both sides for its entirety.
2.2.2 Current and Proposed Roadworks, Traffic Management Works and Bikeways	No roadworks noted in the vicinity of site. It is understood that there are no roadworks or traffic management works planned in the general locality except for Council maintenance work as required. There are no formal cycling lanes along the local roads or shared pathways in the vicinity of the subject site. The Fernleigh Track is a shared pathway running between Adamstown and Belmont which is located around 1.5km to the west of the subject site. Cyclists are able to ride along the local roads to connect with this pathway and the broader cycle network. A copy of the Newcastle City Council-R1 Route through Adamstown is included in **Attachment B**.
2.3 Traffic Flows	As part of the project work Seca Solution undertook traffic surveys at the intersection of Lockyer Street and King Street, on Wednesday 26th June 2018, in order to determine the current peak hour flows in this location. The morning survey was undertaken between 7am-9.15am with the peak hour determined as 8:00am to 9:00am, whilst the afternoon survey was undertaken between 2.30pm-5.30pm with the peak hour was determined as 2:45pm to 3:45pm. The survey data is provided in **Attachment D**, with a summary of the peak hour traffic flows shown in Table 2 to follow.

<table>
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Table 2 - AM/PM peak hour flows

		AM	PM
Lockyer Street	Eastbound	191	107
(West of King Street)	Westbound	71	97
King Street	Northbound	24	35
(South of Lockyer Street)	Southbound	51	17

The highest traffic flows recorded along King Street to the south of Lockyer Street, being the route to access the golf club, were during the AM peak with 24 northbound and 51 southbound vehicles.

Traffic surveys were also undertaken at the intersection of Glebe Road and King Street on Wednesday 19th June 2019.

The morning survey was undertaken during the peak hour between 8am-9am, whilst the afternoon survey was undertaken between 2.45pm-6.00pm with the peak hour determined as 4:30pm to 5:30pm.

The survey data is provided in **Attachment D**, with a summary of the peak hour traffic flows shown in Table 3.

Table 3 - AM/PM peak hour flows Glebe Road/King Street

		AM	PM
Glebe Road	Eastbound	805	549
(East of King Street)	Westbound	502	713
King Street	Northbound	46	34
(South of Glebe Road)	Southbound	34	37

Traffic flows recorded along Glebe Road were highest to the east of King Street with the AM peak seeing two-way flows of 1307 (805 eastbound and 502 westbound). Flows in the afternoon are slightly lower at 1262vph. King Street at this location carried flows slightly higher than those recorded at the intersection of Lockyer Street.

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<tr><td>*2.3.1 Daily Traffic Flows*</td><td>

Peak hour flows typically represent in the order of 10% of the daily flows. Taking an average of the AM and PM peak periods indicates daily flows of:

- 12,850 vehicles per day on Glebe Road, east of King Street.
- 755 vehicles per day on King Street, south of Glebe Road.
- 635 vehicles per day on King Street, south of Lockyer Street.
- 2,330 vehicles per day on Lockyer Street, west of King Street.

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<tr><td>*2.3.2 Daily Traffic Flow Distribution*</td><td>

Traffic flows along King Street had a bias southbound in the AM reflecting inbound demands associated with the golf course, with the reverse in the PM. Along Lockyer Street there is a dominant flow eastbound in the AM, with flows relatively balanced in the PM.

Traffic flows along Glebe Road have an eastbound bias in the AM, with the reverse in the PM, reflecting commuter demands to/from the Newcastle CBD.

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<tr><td>*2.3.3 Vehicle Speeds*</td><td>

No speed surveys were completed as part of the study work. During the site work the majority of drivers were observed to drive at or below the posted speed

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Item	Comment
	limit given interaction with surrounding intersections. The intersection of Lockyer Street and King Street has four way stop signs which provide for traffic calming in this location.
2.3.4 Existing Site Flows	The site is currently operating as the Merewether Golf Club and generates traffic flows throughout the day associated with this use. The peak movements for golf courses generally occur on Saturdays when the traffic flows on the road network are lower than during the working week. Vehicle movements associated with the golf course during the road network peaks were counted as part of the survey, with the majority of vehicles accessing the site travelling through the intersection of King Street and Lockyer Street.
2.3.5 Heavy Vehicle Flows	Minimal heavy vehicle movements were recorded in the locality during the traffic survey at Lockyer Street/King Street, with 4 in the AM peak and 3 in the PM equating to just over 1% of the total traffic flows in each period.
2.3.6 Current Road Network Operation	King Street acts as a collector road for residential traffic in the area, as well as providing access to the golf club. The RMS Guide to Traffic Generating Development provides advice on the environmental capacity of residential collector streets, with a desired goal of less than 300 vehicles per hour and a maximum of 500 vehicles per hour. The highest two-way flows along King Street in this location of 75 vehicles in the AM peak hour are therefore well within the desired environmental capacity. Traffic flows on Lockyer Street are typically higher than on King Street. To the west of King Street they are highest in the AM peak with 191 eastbound and 71 westbound. As a collector street the two-way flows of 262 vehicles are again within the desired environmental capacity. The RMS Guide provides typical Level of Service (LoS) for urban roads based on peak hour flows per direction (Table 4.4 Guide). Glebe Road is currently operating at LoS C per this table, indicating stable traffic flow. The highest traffic flows recorded along King Street were during the AM peak with 46 northbound and 34 southbound vehicles. This is slightly higher than the flows recorded south of Lockyer Street, but remain well within the desired environmental capacity. Flows in the afternoon are lower than the morning peak. Observations on site during the peak periods show that the intersection of King Street and Lockyer Street operates efficiently, with minimal delays for vehicles. The intersection of Glebe Road and King Street also sees minimal delays and queuing for turning movements into/ out of King Street, with regular gaps in the flow of through traffic along Glebe Road. The right turn into Glebe Road can experience some delays which can cause queuing for eastbound traffic however throughout the surveys this was observed to occur infrequently, with a relatively low number of turning movements and these typically occurring without the need to stop.
2.4 Traffic Safety and Accident History	Correspondence with RMS indicates that there have been no crashes recorded at the intersection of King Street and Lockyer Street from October 2012 onwards. Given the straight alignment of the local roads in the locality of the

Item	Comment
	site and the low traffic speeds, it is considered that road safety is acceptable in this location. A review of the accident data provided for the intersection of Glebe Road and King Street (**Attachment C**) shows there have been 4 accidents recorded in the period October 2013-September 2018. Of these, 1 related to a right near collision between a vehicle turning right out of King Street and a westbound vehicle. This accident occurred in wet conditions. The remaining 3 accidents involved a vehicle going off road to the left in the proximity of the intersection, with all occuring at night. Two accidents occurred between 1am and 3am with speed determined as a factor for one of these and fatigue a factor for another. The remaining accident occurred in wet conditions. Given the high traffic volumes along Glebe Road and relativelly low number of accidents, this intersection currently provides an adequate level of safety. This is reinforced by the range of different accident types and prevalence of contributing factors for the low number recorded.
2.5 Parking Supply and Demand	
2.5.1 On-street Parking Provision	Parking is permitted along both sides of King Street, with the usual restrictions at driveways and intersections.
2.5.2 Off-street Parking Provision	The existing car park for Merewether Golf Club provides off-street parking for patrons with 138 spaces available.
2.5.3 Parking Demand and Utilisation	During the site work it was noted that the kerb side parking along both sides of King Street was not heavily utilised during the week, with residential parking generally contained on site for each lot. Demands for the off-street parking associated with the clubhouse are typically highest on a Saturday morning associated with member competitions.
2.5.4 Set down or pick up areas	There are no designated set down areas in the immediate locality of the subject site.
2.6 Public Transport	
2.6.1 Rail Station Locations	The nearest train station is located in Adamstown, 1.4 kilometres to the west of the subject site. Adamstown Station is part of the Newcastle/Central Coast Line, with regular services between Newcastle, Central Coast and Sydney.
2.6.2 Bus Stops and Associated Facilities	The following bus stops are located in the vicinity of the site, none of which provide seating or shelter: • Both sides of Glebe Road to the east of Chatham Street, approximately 550 metres walking distance from the north of the site access, serviced by route 14. • Both sides of James Street to the north of Lockyer Street, approximately 550 metres walking distance north-east of the site access, serviced by route 21. • Both sides of Brunker Road to the south of Lockyer Street, approximately 1 kilometre east of the site access, serviced by route 28.
2.6.3 Transport Services	There are 3 bus routes passing through the local area, provided by Newcastle Transport (operated by Keolis Downer). These are: **Route 14:** Newcastle to Belmont and Charlestown, via Kotara

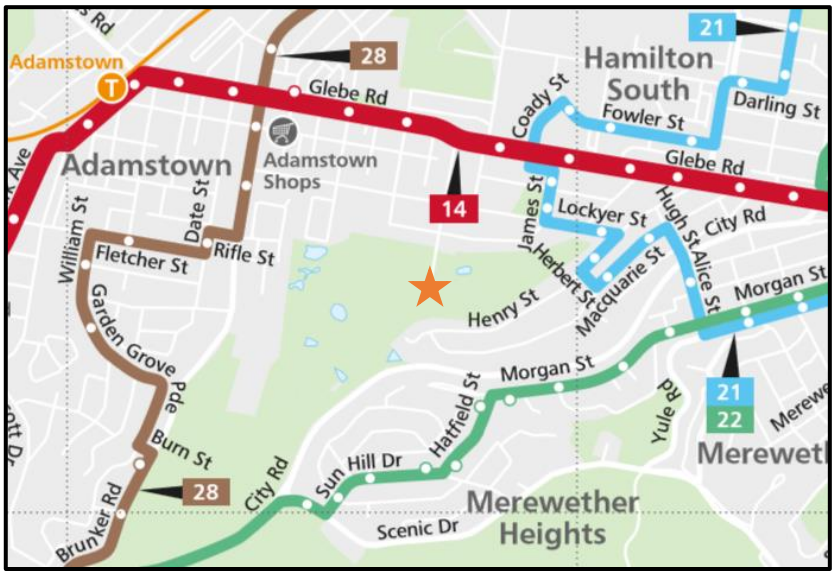
Item	Comment
	Operates 7 days a week with regular services on weekdays, every 15 minutes on average in peak periods and every 30 minutes outside of peak. On weekends and public holidays, it operates every 30 minutes on average in peak and hourly outside of the peak. **Route 21:** Newcastle Interchange to Broadmeadow, via Merewether Operates 7 days a week with services every 30 minutes on average in peak periods and hourly outside of peak periods. Less frequent services on weekends and public holidays (hourly on average). **Route 28:** Newcastle Interchange to Mount Hutton, via Broadmeadow Operates 7 days a week with services every 30 minutes on average in peak periods and hourly outside of peak periods. Less frequent services on weekends and public holidays (hourly on average). These routes are shown on Figure 2.  *Figure 2 - Bus routes through the locality of the subject site (★)*
2.7 Pedestrian Network	There are pedestrian paths along both sides of King Street between Glebe Road and Lockyer Street, however no pedestrian paths are provided along King Street between Lockyer Street and the site of the proposed development. There are also pedestrian paths provided along both sides of Lockyer Street.
2.8 Other Proposed Developments	A review of the Council DA Tracker shows that there are no other significant developments currently proposed in the vicinity of the subject site.
The Development	
3.1.1 Nature of Development	The proposal provides for a seniors living development and wellness centre, as well as modifications and expansion of the existing Merewether Golf Club facilities. The site plans are provided in **Attachment A**. **Seniors Living** The seniors living development allows for multi-level residential development with 148 Independent Living Units (ILUs) with associated parking. The apartment layouts provide:

Table 4 – Unit layouts

	1 bed	2 beds	3 beds	TOTAL
Lower Ground	2	4	-	6
Ground Floor	5	7	2	14
Level 1 – 4	16	96	-	112
Level 5	-	8	8	16
Total	23	115	10	**148**
Total Beds	23	230	30	**283**

Additional ancillary facilities to be provided on site for the use of residents, include:

- Café/Lounge/Foyer/Reception
- Arts and Crafts
- A Cinema Space
- Library
- Cellar
- Men's Shed
- Administration

Wellness Centre

A wellness centre is proposed primarily for residents and club members, however, shall be open for public use as well. It will include:

- Hydro Pool: Size = 5m x 6.4m
- Lap Pool: Size = 4.3m x 25m
- Deck Area: 169m^2
- Gym: 299^2
- Allied professional suites: 3 x 11m^2, 1 x 10m^2 = 43m^2
- Lounge: 74m^2

Golf Club

The Golf Club facilities are to be refurbished and expanded as part of the project works. This shall serve to cater for the increased use by future residents on site, as well as improve the facilities for existing members and guests.

Based on the concept plans provided, the following uses are associated with the Golf Club:

- Pro-shop/Office: 219m^2
- Change Rooms: 79m^2
- Cart Workshop: 118m^2
- Buggy Storage: 60m^2
- Admin/Reception: 138m^2
- Restaurant/Bar: 655m^2
- Outdoor Dining (deck): 967m^2
- Gaming Rooms and Outdoor Smoking Area: 96m^2
- Conference Facilities/Function Centres: 516m^2
- Boardroom/Meeting Room: 53m^2
- B.O.H Areas: 127m^2
- Bakery: 26m^2

Item	Comment
	• Admin: 25m^2 • Reception: 101m^2 The pro shop/office and golf cart workshop/storage are ancillary to the golf club and course. Similarly, the bakery would serve players and patrons and would not generate external demands in its own right. It may however service the needs of residents associated with the ILUs thus reducing the need for external trips from the site. The back of house, amenities and administration areas are excluded from traffic generating areas associated with the Club, with the licensed floor areas including the restaurant/bar, deck, gaming/smoking areas and function centres having a combined floor area of 2,234m^2.
3.1.2 Access and Circulation Requirements	The layout of the access driveway and internal circulation is to be designed in accordance AS2890 or Councils requirements, including that all vehicles be able to enter and exit the site in a forward direction. Section 26 of the SEPP requires that residents have access to facilities and services. Part c states that in the case of a proposed development on land in a local government area that is not within the Greater Sydney (Greater Capital City Statistical Area)—there is to be a transport service available to the residents who will occupy the proposed development. In summary, this transport service must be located within 400 metres of the site, be accessible by a suitable access pathway, be available for a return service at least once a day during daylight hours (Monday-Friday) and take residents to a place located within 400 metres of retail, commercial and medical services. This transport service would be provided in the form of a shuttle bus, available for use by future residents of the site.
3.2 Access	Access to the site will be via the existing driveway off King Street. This driveway shall be provided in accordance with AS2890, allowing for two-way traffic movements.
3.2.1 Driveway Location	The driveway on King Street is to remain as per the existing situation, which is located 60 metres to the south of the intersection with Lockyer Street.
3.2.2 Sight Distances	The site access is located at the dead-end of King Street, with drivers having clear visibility along King Street and into the site car park when entering and exiting the site.
3.2.3 Service Vehicle Access	**Seniors Living** For the Independent Living Units, the servicing will be primarily associated with waste management. Waste collection will be completed internal to the site via a standard Council waste collection vehicle. The internal roadways shall allow for appropriate circulation enabling the all vehicles to exit in a forward direction. Other servicing for the development would generally be undertaken by small or medium rigid vehicles or commercial vans eg HiAce which can utilise visitor parking adjacent to the site. **Golf Club** Servicing for the clubhouse can be managed in a manner consistent with the current arrangements with all deliveries contained within the site.

Item	Comment
	Emergency Vehicle Access The site layout shall be able to accommodate emergency vehicles, with the largest required being a fire appliance. Whilst most fire appliances are smaller than the largest service vehicle for the site (waste collection vehicle) and can therefore be accommodated on site, an aerial fire appliance has an overall maximum length of 12.4m and should also be able to access the site as required. *Guidelines for Emergency Vehicle Access* are published by Fire NSW and provide details of the access requirements. (https://www.fire.nsw.gov.au/gallery/files/pdf/guidelines/vehicle_access.pdf)
3.2.4 Queuing at entrance to site	The driveway access on King Street shall allow for free flow into the site, with no queuing anticipated for vehicles entering or leaving the site.
3.2.5 Comparison with existing site access	There will be no change to the location of the existing site access.
3.2.6 Access to Public Transport	The SEPP requires access to a transport service within 400 metres of the site and accessed via a suitable pathway. There are bus stops located approximately 550 metres walking distance from the site on both Glebe Road and James Street. In order to satisfy the SEPP, a shuttle bus service (minimum 10 seats) is to be provided, offering at least two services per weekday (morning and afternoon) for future residents. There is a nominated holding area for this bus adjacent to the main entry to the foyer/reception area for the ILUs. Suitable services are available at a number of centres including Westfield Kotara, Marketown in Newcastle and the Adamstown town centre. Shuttle services shall be determined in consultation with residents to provide access to a variety of shopping and medical services.
3.3 Circulation	
3.3.1 Pattern of circulation	All vehicles will be able to enter and exit the site in a forward direction. The internal roadways allow for appropriate circulation through the site, providing access to all buildings and facilities, as well as parking bays.
3.3.2 Internal Road Width	All internal parking aisles are to be designed in accordance with AS2890.1. For circulation roadways a minimum of 3 metres between kerbs is required for one-way roadways, whilst a minimum 5.5 metres is required for two-way.
3.3.3 Internal Bus Movements	Suitable access shall be required for a shuttle bus as well as courtesy buses associated with local clubs and seniors' services. For the proposed seniors living development there is no requirement for larger buses to access the site.
3.3.4 Service Area Layout	A dedicated truck loading area is provided allowing for waste collection to occur internal to the site, adjacent to the Seniors Living building. There is a further loading area located adjacent to the back of house for the Club, to cater for servicing demands associated with this use.
3.4 Parking	
3.4.1 Proposed Supply	Parking is to be provided in a mix of at grade and lower ground parking to accommodate the needs of all site users. A total of 415 spaces are proposed to cater for the range of land uses, with demand for each use discussed further in Section 3.4.4 to follow.
3.4.2 Authority Parking	**Seniors Living** The Newcastle DCP (NDCP) refers to SEPP (Housing for Seniors or People with a Disability) 2004 for parking requirements for Seniors Living

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developments. SEPP (Housing for Seniors or People with a Disability) 2004 provides the following parking requirements for independent living units:

0.5 car spaces for each bedroom (for developments provided by a person other than a social housing provider).

Private car accommodation

If parking (not being car parking for employees) is provided:

(a) car parking spaces must comply with the requirements for parking for persons with a disability set out in AS 2890, and

(b) 5% of the total number of car parking spaces (or at least one space if there are fewer than 20 spaces) must be designed to enable the width of the spaces to be increased to 3.8 metres, and

(c) any garage must have a power-operated door, or there must be a power point and an area for motor or control rods to enable a power-operated door to be installed at a later date.

Wellness Centre

The Wellness Centre shall operate in a manner similar to a gymnasium with the NDCP providing a parking rate for recreational facilities (gymnasiums) of:

Minimum 4.5 spaces per 100m^2; maximum 7.5 spaces per 100m^2

Golf Club

The NDCP provides a parking rate for clubs (registered clubs) of:

1 space per 2 staff plus 1 space per 15m^2 floor area (bar, lounge) for visitors

There is also no rate provided under recreational facilities specifically for golf courses and as such the course can be considered ancillary to the registered club.

Motorbikes and Bicycles

The NDCP provides the following parking rates for motorbikes and bicycles:

<table>
<tr><th></th><th>Motorbikes</th><th>Bicycles</th></tr>
<tr><td>Wellness Centre</td><td>1 space per 20 car spaces</td><td>1 space per 20 staff (Class 2)
1 space per 10 staff (Class 3)</td></tr>
<tr><td>Golf Club</td><td>1 space per 20 car spaces</td><td>1 space per 25m^2 bar area plus 1 space per 100m^2 lounge, beer garden (Class 2) for staff 1 space per 25m^2 bar area plus 1 space per 100m^2 lounge, beer garden (Class 3) for visitors</td></tr>
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<tr><td>3.4.3 Parking Layout</td><td>
The parking layout on site can be provided in accordance with AS2890.

Given the development shall provide Independent Living Units catering predominantly for retirees, who maintain an active lifestyle (living on a golf course) it is considered the vast majority of users shall not require parking to accommodate disabled access but rather ensure full door opening for all car
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Item	Comment
	doors. 5% of parking should however be able to be provided as disabled parking consistent with AS2890.6. This would equate to 8 spaces. The minimum parking requirement under AS2890.1 for residential parking is classified as user class 1A, which allows for 2.4 x 5.4 metre spaces with 3-point manoeuvre in/out of spaces. To cater for the Seniors Living element it is appropriate to allow for manoeuvring in/out of parking in a single movement, with clearance available for full opening of all car doors. As such the parking layout (90° angle) would need to be designed as user class 2: • Minimum 2.5 x 5.4 metre parking spaces; • Minimum 5.8 metre aisle widths (for both one-way and two-way movements); • Where parking is on one side of an aisle only and the other side is confined by a wall or high vertical obstruction, the aisle width shall be increased by 300mm; • At blind aisles, the aisle shall be extended a minimum of 1 metre beyond the last parking space. Disabled parking spaces shall be 2.4 x 5.4 metre spaces with a 2.4 x 5.4 metre shared space either next to, or between two spaces. These shared spaces may provide access for pedestrians. Parking associated with the Golf Club is classified as user class 2 (medium term parking), requiring the following for 90° angle parking: • Minimum 2.5 x 5.4 metre parking spaces. • Minimum 5.8 metre aisle widths (for both one-way and two-way movements). Where parking is on one side of an aisle only and the other side is confined by a wall or high vertical obstruction, the aisle width shall be increased by 300mm. • At blind aisles, the aisle shall be extended a minimum of 1 metre beyond the last parking space. • In car parks open to the public, the maximum length of a blind aisle shall be equal to the width of 6 spaces (plus 1 metre), unless provision is made for cars to turn around at the end and drive out forwards.
3.4.4 Parking Demand	Parking for the site has been provided to allow for Seniors Living as well as the Golf Club parking demands, ensuring parking demands for each site use does not impact upon the availability of parking for the other. **Seniors Living** The units shall provide for a mix of singles as well as couples with additional bedrooms providing space for craft and home office as well as bedrooms for visitors and grandchildren. Applying the SEPP rate to the total beds in Table 3 would see a minimum demand for 142 parking spaces associated with the Seniors Living use. The proposal allows for 185 spaces for residents, ensuring all units have a dedicated parking space with flexibility for some to have access to additional parking. Although not required under the SEPP, 27 spaces have been provided for visitors, (equivalent to a rate of 1 per 6 units) ensuring visitor parking can be accommodated on site without impacting the golf course parking needs.

Item	Comment
	Wellness Centre Allowing for an area of 480m^2 (excluding the lounge and deck areas) gives a parking demand of 22 – 36 spaces. Given the location of this use as part of a Seniors Living and Golf Club development the parking will be at the lowest end of this range, with internal demands seeing cross use of the parking on site. **Golf Club** Parking for the golf course and Club shall see peak demands during different periods, with the absolute peak for the course occurring throughout the day on Saturday (morning to early afternoon) and the Club seeing demands of an evening and later afternoon/evening for functions. Parking for patrons of the Club shall therefore mostly be shared with players golfing demands, with golfers utilising the Club facilities after their round. The parking supply for the golf course and clubhouse has been determined to ensure demands for both golfers and club patrons can be catered for on-site. In summary, the parking demands for the site would be • Clubhouse (2,234m^2 licensed area) - 149 spaces • Parking for club staff (assumed to be 40 on site) - 20 spaces • Wellness Centre - 22 spaces • Seniors Living - 142 spaces (of which 8 are to be accessible) • Seniors Living visitor parking - 27 spaces In addition to this motorbike parking for 10 bikes would be considered appropriate for the clubhouse/wellness centre. Bicycle parking should also be provided to allow for staff and visitor demands. The provision of 415 spaces across the site is therefore sufficient to cater for the above demands, whilst also catering for the shared use of parking by golfers.
3.4.5 Service Vehicle Parking	As detailed in Section 3.3.4 service areas are provided for the Senior Living development and the Club. Excluding waste collection there would be minimal demand for servicing for the proposed seniors living. Servicing demands for elements such as food deliveries, equipment servicing etc typically use small vehicles such as a Toyota HiAce which would be able to park in the at grade parking spaces provided.
3.4.6 Pedestrian and Bicycle Facilities	Appropriate pathways for pedestrian circulation are to be provided internal to the development allowing for pedestrian movement through the site. Cyclists are able to ride along the local roads in the vicinity.
Traffic Assessment	
4.1 Traffic Generation	Standard traffic generation rates provided by the RMS Guide to Traffic Generating Developments have been used as a basis for determining the future traffic flows associated with the development. **Seniors Living** For seniors living developments, using RMS rates (TDT 2013/04A), a peak generation rate of 0.4 vehicles per dwelling in the evening peak and 2.1 trips per dwelling per day is specified. Accounting for up to 150 dwellings for the subject site, this would generate 60 trips in the evening peak and 315 trips per

Item	Comment
	day. Applying a standard split of 80% inbound/20% outbound for residential developments in the PM, gives: • PM peak hour vehicle movements = 48 inbound /12 outbound Weekday morning peak hour flows would be lower than those during the evening, as the morning peak hour for seniors living developments does not typically coincide with the local network peak hour (per RMS Guide). Given the traffic surveys determined the highest flows in the locality occur in the AM peak, the above traffic generation has also been applied in the AM with the inbound/outbound split reversed (12 inbound / 48 outbound). This provides a worst-case traffic generation during the AM peak. **Wellness Centre** As discussed above, whilst the centre shall service the needs of both residents and club members and guests it shall also allow for external use. Assessing as a worst-case scenario with all traffic demands considered external, and applying the RMS Guide traffic generation rate for gymnasiums would see: • Evening peak hour vehicle trips = 9 per 100m^2 GFA • Daily vehicle trips = 45 per 100m^2 GFA Allowing for a GFA of 481m^2 gives 44 trips in the evening peak and 217 trips per day. The peak generation generally occurs between 6.00pm and 7.00pm on a weekday evening which is outside the local road network peak hour. The above flows have however been applied to the AM and PM periods, thereby being a worst-case assessment in both peak hours. Allowing for a 50/50 split gives 22 inbound / 22 outbound in the peak periods. **Golf Club** The golf course and existing Club facilities are currently operational, with the midweek peak traffic flows associated with these uses accounted for in the traffic survey data. This development is not expected to significantly change the existing external golfing demands with increased use of the course associated with future residents of the ILUs. As such, there will be no increase in traffic flows associated with the golf course. The refurbishment of the Club facilities is likely to see an increase in patronage associated with the residents of the ILUs rather than increases in external members. The refurbishments are primarily to provide for these new members as well as the existing club patrons, encouraging their ongoing attendance of the clubhouse over other competing entertainment venues. Any increase in patronage associated with visitors attending the Club will typically occur outside of the road network peak. The peak use of the Club will typically occur on Friday and Saturday evenings, associated with functions and nightly dining/entertainment demands. As such, the peak movements for the Club will occur separate to commuter demands on the local road network or trips associated with the residential component of the development (ILUs) and golf playing demands.

Item	Comment
	Therefore, the impact of the development during the midweek peak hours shall only be the additional traffic generated by the seniors living development and the Wellness Centre.
4.1.1 Daily and Seasonal Factors	Limited daily and seasonal variation expected for this development.
4.1.2 Pedestrian Movements	Given the nature of the development and its location the site is not expected to have a high demand for pedestrian nor cyclist movements external to the site.
4.2 Hourly distribution of Trips	The wellness centre/Gymnasium peak typically occurs between 6-7pm which is later than the road network peak. Demands associated with the seniors living typically coincide with the local road network peak in the PM but not in the AM. To provide a robust assessment all trips have been assigned to the local road network as if occurring during the local road peaks in both the morning and afternoon.
4.2.1 Origin / destinations assignment	Given this development shall cater predominately for retirees, future residents on site will generate external traffic demands associated with retail centres, medical service, entertainment etc. Taking into consideration the surrounding area, the Newcastle CBD, Westfield Kotara and Charlestown Square will offer key attractions. There may also be demand for day trips to the Port Stephens LGA in the north and Hunter Valley to the west. There are numerous routes to access the major roads in the area, being Brunker Road (west), Glebe Road (north) and further afield to the Pacific Highway. There are a number of local routes for traffic to disperse from the site. This shall see the distribution of traffic spread across a number of intersections, thereby lessening the impact on any one intersection. It is considered however that the key impact will be upon the intersection of Lockyer Street and King Street, with the vast majority of vehicles to pass through this intersection to access the site. For the purpose of this assessment the traffic generation outlined in Section 4.1 has all been applied through this intersection as a worst case. Taking into account the above, the following split of traffic associated with the seniors living has been allowed at the intersection of Lockyer Street and King Street: • 50% to/from the north along King Street, • 10% to/from the east along Lockyer Street, • 40% to/from the west along Lockyer Street. The Wellness Centre may generate external traffic from the local community. These trips are expected to be evenly distributed across the residential areas to the immediate east, north and west and so have been allocated to the local roads on the basis of 33% in each direction.

Item	Comment
	This therefore represents the following distribution of traffic at the intersection of King Street and Lockyer Street:

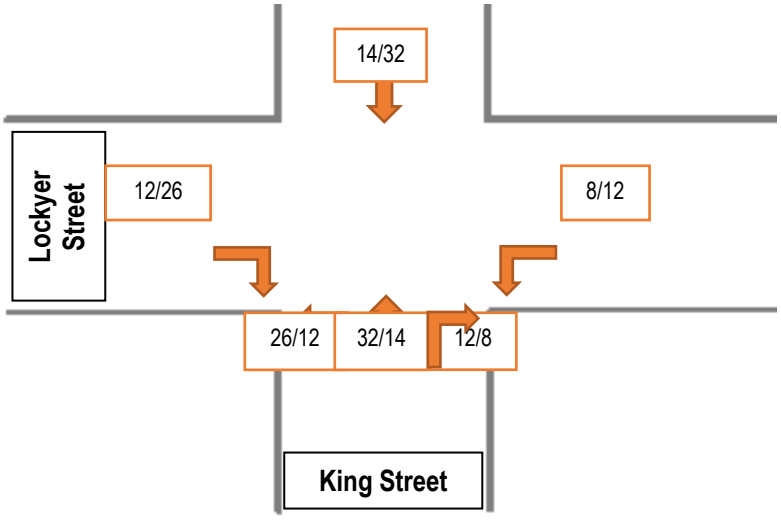


Figure 3 – Distribution of traffic at King Street and Lockyer Street (AM/PM)

Northbound traffic has also been applied to the existing flows at the intersection of Glebe Road and King Street. These movements have been distributed as per the existing eastbound/westbound splits recorded during the traffic survey.

	Inbound (AM/PM)	Outbound (AM/PM)
To/from the east	65% / 65% (9 / 23)	60% / 25% (19 / 4)
To/from the west	35% / 35% (5 / 9)	40% / 75% (13 /10)

Applying this gives the below distribution of development traffic at this intersection during the peak periods.

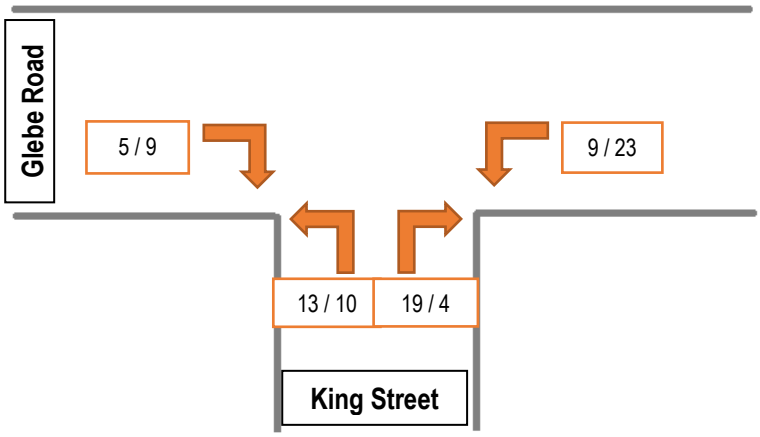


Figure 4 – Distribution of traffic at King Street and Glebe Road (AM/PM)

It is noted that during the PM the peak hours for the above intersections do not coincide, however the peak development flows determined have been applied to both to provide a robust assessment.

4.3 Impact on Road Safety	The key impact of the development will be associated with the increased traffic utilising the intersection of Lockyer Street and King Street. Correspondence

Item	Comment
	with RMS has determined there have been no accidents recorded at this intersection or the surrounding sections of road including the site access over the last 5 years, indicating the current access has worked in a safe manner. The access driveway for the subject site is located on straight section of road and offers good visibility for drivers entering and exiting the site. Drivers shall be able to safely enter and exit the site in this location. There shall therefore be a minimal impact upon road safety associated with the redevelopment of the subject site. The development will see increased turning movements at the intersection of Glebe Road and King Street. Based on observations during the traffic survey, turning movements in this location currently occur in an efficient manner, with sufficient gaps to allow for turning movements out of King Street and the right turn to occur in a safe manner with minimal delay. The additional turning movements generated by the development out of King Street can be accommodated as per the existing level of road safety, as can the left turns in. For right turns into King Street, the development shall generate an additional 9 turns during the critical PM peak period or one every 6-7 minutes. The context of the road network and high driver awareness given the number of similar intersections along Glebe Road, results in these movements being able to be accommodated as per the existing situation, with this intersection having a low accident history associated with turning movements.
4.4 Impact of Generated Traffic	
4.4.1 Impact on Daily Traffic Flows	Daily traffic flows for the Seniors Living use per the RMS Guide shall be in the order of 315 vehicles per day during the week. The daily flows associated with the Golf Club shall generally remain consistent with the current situation. The Wellness Centre could generate up to 217 trips per day per the RMS Guide, with this making no allowance for the likely demands for this facility to be internal, ie residents/club members. The future Club could see some additional demands relating to functions on Friday and Saturday evenings. The additional daily flows for the whole of development would be highest on Saturdays, when the traffic demands on the road network are lower. Whilst the RMS Guide to Traffic Generating Developments does not provide advice on assessing the capacity of a road based on daily traffic volumes, it does provide advice regarding acceptable hourly traffic volumes along a local street in terms of environmental capacity. For King Street, the maximum environmental capacity of this road would be 500 vehicles per hour. The survey data shows highest movements in the AM with 75 vehicle movements along King Street (south of Lockyer Street) while the PM movements are 52 vph. As the traffic generated by the development does not typically occur during the AM peak period the traffic in the PM on this section of King Street will be 156 vehicles including the development traffic. As a worst-case scenario, if the morning flows did occur during the road peak then the combined flows would be 179 vehicles. As such, King Street provides sufficient environmental capacity to cater for the increased demands associated with the proposed development. Similarly, the existing traffic flows along Lockyer Street (east of King Street) are 262 vehicles per hour during the AM peak period and 204 during the PM. Based on the distribution of traffic assigned, this would be increased to 242 vph in the PM, less than the current AM flows. Again, allowing for a worst case scenario,

<table>
<tr><th>Item</th><th>Comment</th></tr>
<tr><td></td><td>applying the peak seniors living traffic in the AM, traffic flows on Lockyer Street in this location would be 300 vehicles per hour as a result of the development. As such, it too will remain within the environmental capacity for this road.

For King Street south of Glebe Road traffic volumes are currently highest in the AM with 80 vehicle movements. Allowing for the development flows of 46 vehicles in this location will see King Street well within its environmental capacity in this location. Along Glebe Road (east of King Street) the critical eastbound traffic volumes in the AM shall increase from 805 vehicles per hour to 824 as a result of the development, which shall see the existing LoS C maintained.

The opportunity for traffic to be distributed along a number of routes shall see increases in traffic on surrounding roads however less than that detailed above.</td></tr>
<tr><td>4.4.2 Peak Hour Impacts on Intersections</td><td>The majority of traffic generated by the development will travel through the intersection of Lockyer Street and King Street. Observations on site show that this intersection currently works well with minimal delays and congestion given the relatively low traffic flows.

The following table may be used as an initial guide to determine the need for a detailed traffic analysis in accordance with the procedure provided in Part 3 of the Austroads Guide to Traffic Management (2009). When the volumes at an intersection are less than those shown, a detailed analysis to demonstrate that adequate capacity is available is unlikely to be necessary.
<table>
<tr><th>Major road type [1]</th><th>Major road flow (vph) [2]</th><th>Minor road flow (vph) [3]</th></tr>
<tr><td>Two-lane</td><td>400
500
650</td><td>250
200
100</td></tr>
<tr><td>Four-lane</td><td>1000
1500
2000</td><td>100
50
25</td></tr>
</table>

During the peak periods there would be an additional 104 vehicle movements associated with the proposed development impacting this intersection. Given the low existing flows there is adequate capacity for the intersection to continue to operate efficiently. As the two-way flows on Lockyer Street and King Street are both less than 250 vph, no detailed capacity analysis of this intersection is required.

The intersection of Glebe Road and King Street has been assessed using Sidra Intersection 8, with the results provided in Attachment E and a breakdown provided at the conclusion of this table. In summary the intersection will continue to operate at an acceptable standard allowing for the development flows, as well as allowing 2% per annum background growth along Glebe Road to allow for the future design horizon of 2029.

The peak movements generated by the additional development traffic for the golf club shall occur of a weekend when traffic flows on the road network are lower. It is considered the increase in traffic flows associated with the development will therefore have an acceptable impact upon the surrounding intersections.</td></tr>
<tr><td>4.4.3 Impact of Construction Traffic</td><td>The majority of construction work will be contained within the site so there will be minimal impact upon the external road network. There will be a requirement</td></tr>
</table>

Item	Comment
	for construction vehicles to access the site and traffic associated with workers. Parking associated with construction vehicles should be managed to reduce impacts on the local area. A Traffic Management Plan will be required for work on site and access controls. This will be completed as part of the detailed design process by the contractor on site.
4.4.4 Other Developments	There are no other developments currently proposed in the immediate vicinity of the subject site.
4.5 Public Transport	
4.5.1 Options for improving services	The current bus services in the vicinity of the site are adequate and allow for access to surrounding suburbs and the major centres with existing spare capacity. A shuttle bus shall be provided to support the seniors living development.
4.5.2 Pedestrian Access to Bus Stops	Currently pedestrians can walk along the road or reserve on King Street to the south of Lockyer Street, with pathways thereafter to access bus stops on Glebe Road, James Street and Brunker Road. As a shuttle bus service is to be provided for residents on site there is no improvements to pedestrian access to bus stops required.
4.6 Recommended Works	
4.6.1 Improvements to Access and Circulation	The existing access driveway for the site is to be utilised and upgraded, with this able to operate in a safe manner, as per its current use.
4.6.2 Improvements to External Road Network	None required as the future traffic flows associated with the development are within the capacity of the local road network.
4.6.3 Improvements to Pedestrian Facilities	None required.
4.6.4 Effect of Recommended Works on Adjacent Developments	No impact as no external works recommended.
4.6.5 Effect of Recommended Works on Public Transport Services	Nil
4.6.6 Provision of LATM Measures	None required
4.6.7 Funding	No external road upgrades required. All internal works will be funded by the developer.

Sidra Modelling

Glebe Road and King Street

Sidra modelling has been completed for the intersections of Glebe Road / King Street to determine its capacity to support the increase traffic demands associated with the proposed development. The following scenarios were considered in the modelling:

- 2019 Existing Situation based on 2019 surveyed traffic flows,
- 2019 Existing + Allowance for the additional traffic associated with the proposed development,
- 2029 Future Design Year with background growth allowing for 2% annual growth along Glebe Road over 10 years.

The Sidra results are provided below.

Table 5 - Sidra Results - Existing Situation 2019 (AM/PM)

Approach	Critical Movement(s)	Level of Service	Average Delay (seconds)	95% Queue (m)
Glebe Road (Westbound)	Left turn	A / A	5.6 / 5.6	0.0 / 0.0
Glebe Road (Eastbound)	Right turn	A / A	9.5 / 11.2	1.9 / 2.3
King Street	Left turn	A / A	6.8 / 8.0	0.6 / 0.9
	Right turn	B / B	19.6 / 16.6	2.8 / 0.7

The above results indicate that the intersection operates well, with the worst movement being the right turn out of King Street which operates at LoS B. The remining movements see very minimal delays and queuing during the peak hours.

Allowing for the traffic generated by the proposed development (Section 4.2.1) gives the following Sidra results.

Table 6 - Sidra Results - Existing Situation 2019 with full development (AM/PM)

Approach	Movement	Level of Service	Average Delay (s)	95% Queue (m)
Glebe Road (Westbound)	Left turn	A / A	5.6 / 5.6	0.0 / 0.0
Glebe Road (Eastbound)	Right turn	A / A	9.6 / 11.7	2.8 / 4.1
King Street	Left turn	A / A	6.7 / 8.1	1.0 / 1.2
	Right turn	B / B	21.0 / 17.3	5.0 / 1.1

Allowing for the increase in traffic demands associated with the proposed development, the intersection will continue to operate to its current standard with no change to the current level of service on any approach and very minor increases in the average delays and queuing.

Allowing for background growth of 2% per annum along Glebe Road gives the following Sidra results.

Table 7 - Sidra Results – 2029 design year with 20% growth (AM/PM)

Approach	Movement	Level of Service	Average Delay (s)	95% Queue (m)
Glebe Road (Westbound)	Left turn	A / A	5.6 / 5.6	0.0 / 0.0
Glebe Road (Eastbound)	Right turn	A / B	12.0 / 15.3	3.9 / 6.4
King Street	Left turn	A / A	7.4 / 9.7	1.1 / 1.5
	Right turn	C / B	40.2 / 26.9	8.9 / 1.8

For the future design year, allowing for 20% growth over 10 years, the intersection will continue to operate well, with the increased flows along Glebe Road seeing the right turn out of King Street operate at LoS C in the AM

peak. The remaining turning movements experience increases in the average delays and additional queuing; however, these remain within acceptable limits.

Conclusion

Overall it is concluded that on traffic, access and parking grounds there is no impediment to the approval of the proposed development. The subject site and surrounding road network have sufficient capacity to accommodate the additional traffic demands associated with the proposal.

The plans for the proposed development allow for the provision of 148 ILUs, as well as refurbishment of the existing Clubhouse and the inclusion of a Wellness Centre. The club refurbishment may see additional patronage; however it is considered the majority of any increased demand will be generated by the future residents of the ILUs which do not generate external traffic demands. Increases in patronage associated with the Club use would be of a Friday evening or weekend which shall not coincide with peak traffic demands associated with the site and will occur outside of the road network peak periods when the traffic volumes on the surrounding roads are lower than the weekday peaks.

Traffic associated with the seniors living shall typically occur outside of the AM road peak but may coincide with the PM peak whilst the Wellness Centre, assessed as a gymnasium, would typically generate its peak between 6-7pm, again outside the local peak hour (4.30-5.30pm). As a worst-case scenario, all traffic has been applied to both the AM and PM peak periods with no concessions for internal demands associated with the Wellness Centre, nor for travel to local centres by shuttle bus. Similarly, while peak hour traffic flows associated with the development have opportunities to be distributed across various routes all traffic has been assessed at the key intersection of Lockyer Street and King Street with the intersection of Glebe Road and King Street also assessed using the modelling program *Sidra Intersection 8*.

The traffic impact assessment has determined that there is no significant impact upon the local road network with key intersections able to continue to operate with minimal delays and local roads operating at similar levels of service and remaining within their environmental capacity.

The parking demands associated with the development can be accommodated on site in accordance with the Council DCP (and the Seniors Living SEPP) and as such will not impact upon the existing on-street parking in the locality. Parking provision for the site is sufficient to accommodate the range of uses across the site, ensuring availability of parking for all site users.

Please feel free to contact our office on (02) 4032 7979 should you have any further queries.

Yours sincerely

Tyler Neve

Traffic Engineer

Attachment A – Site plan

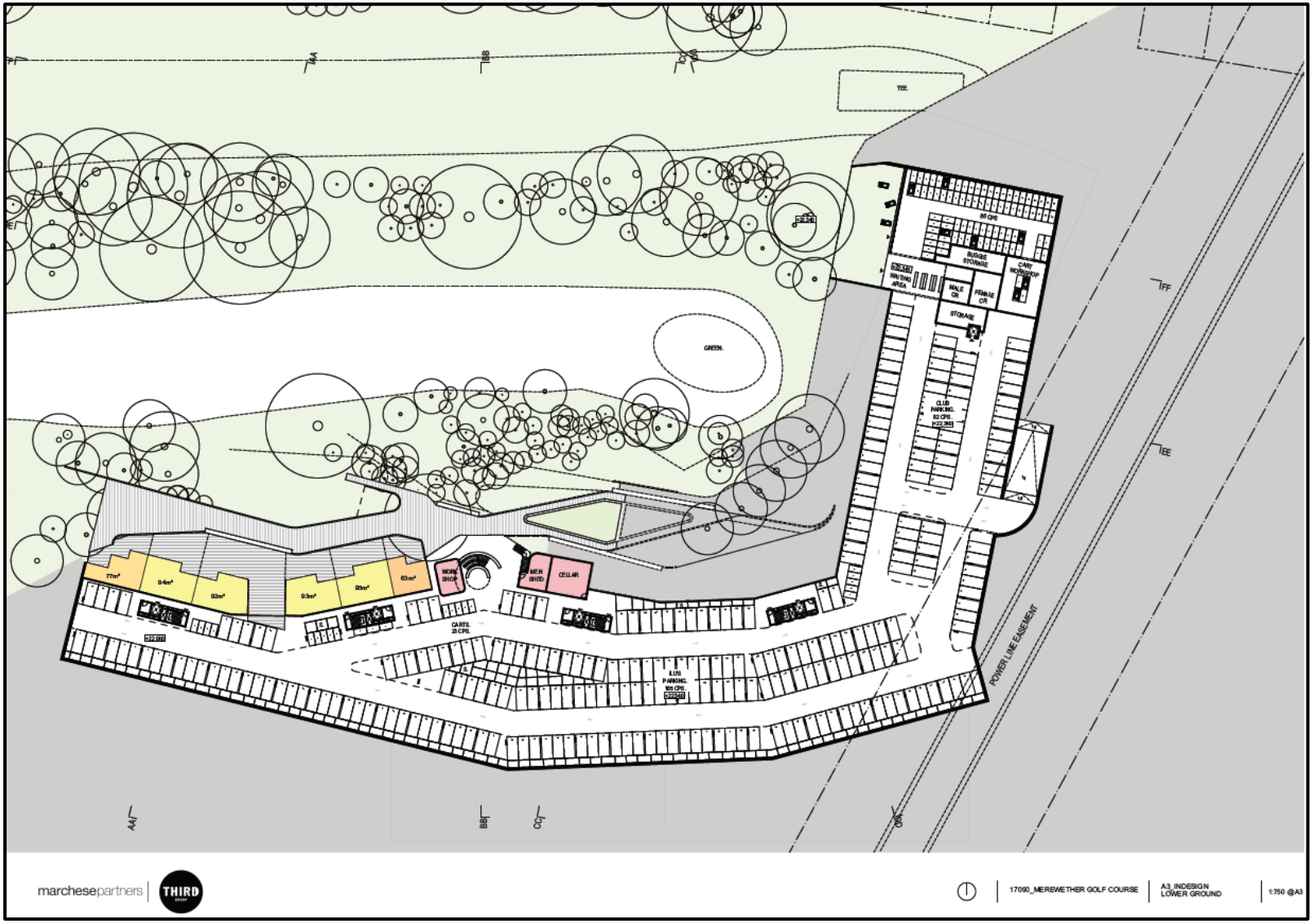
Attachment B – Cycling Route

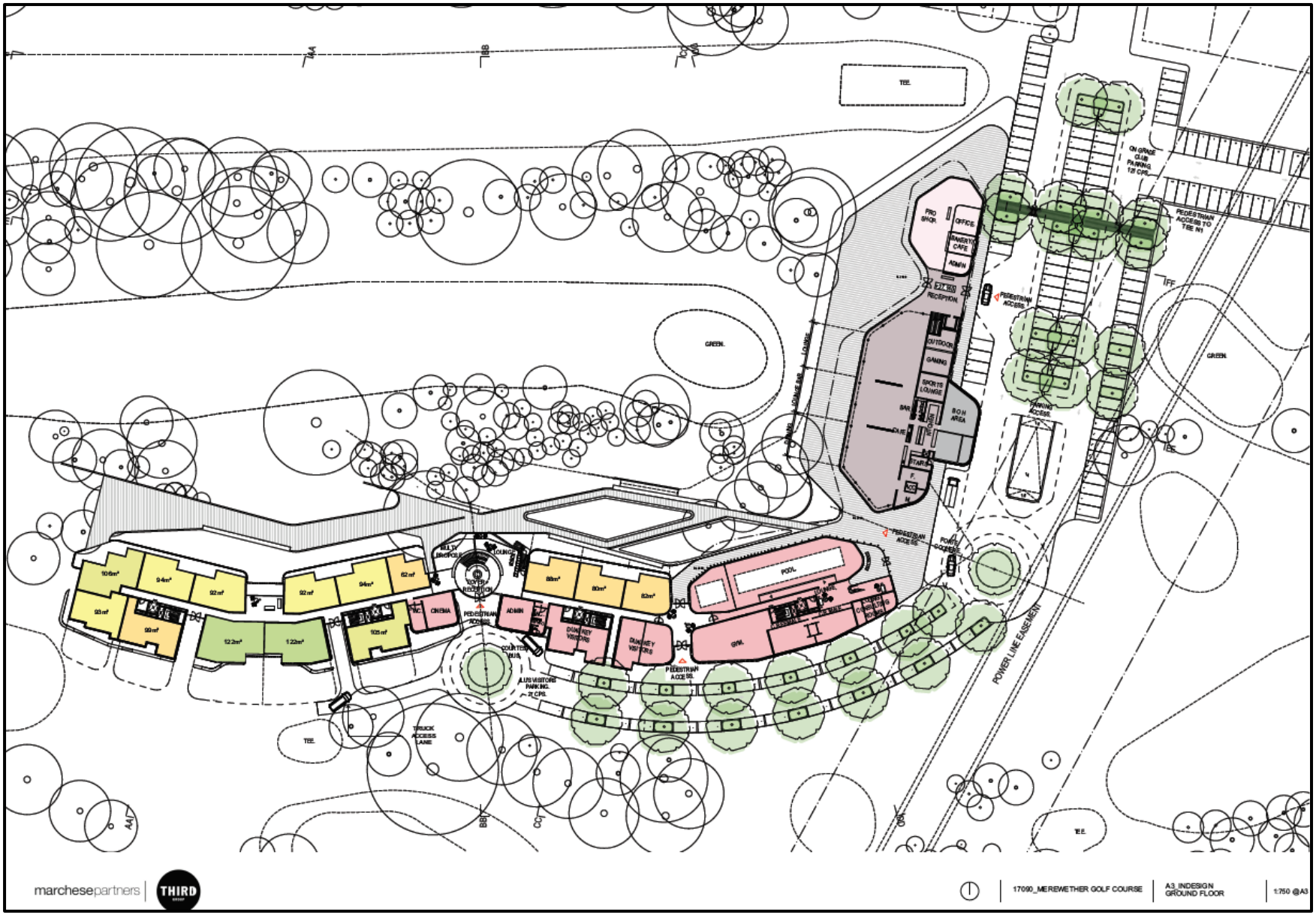
Attachment C – Accident Data

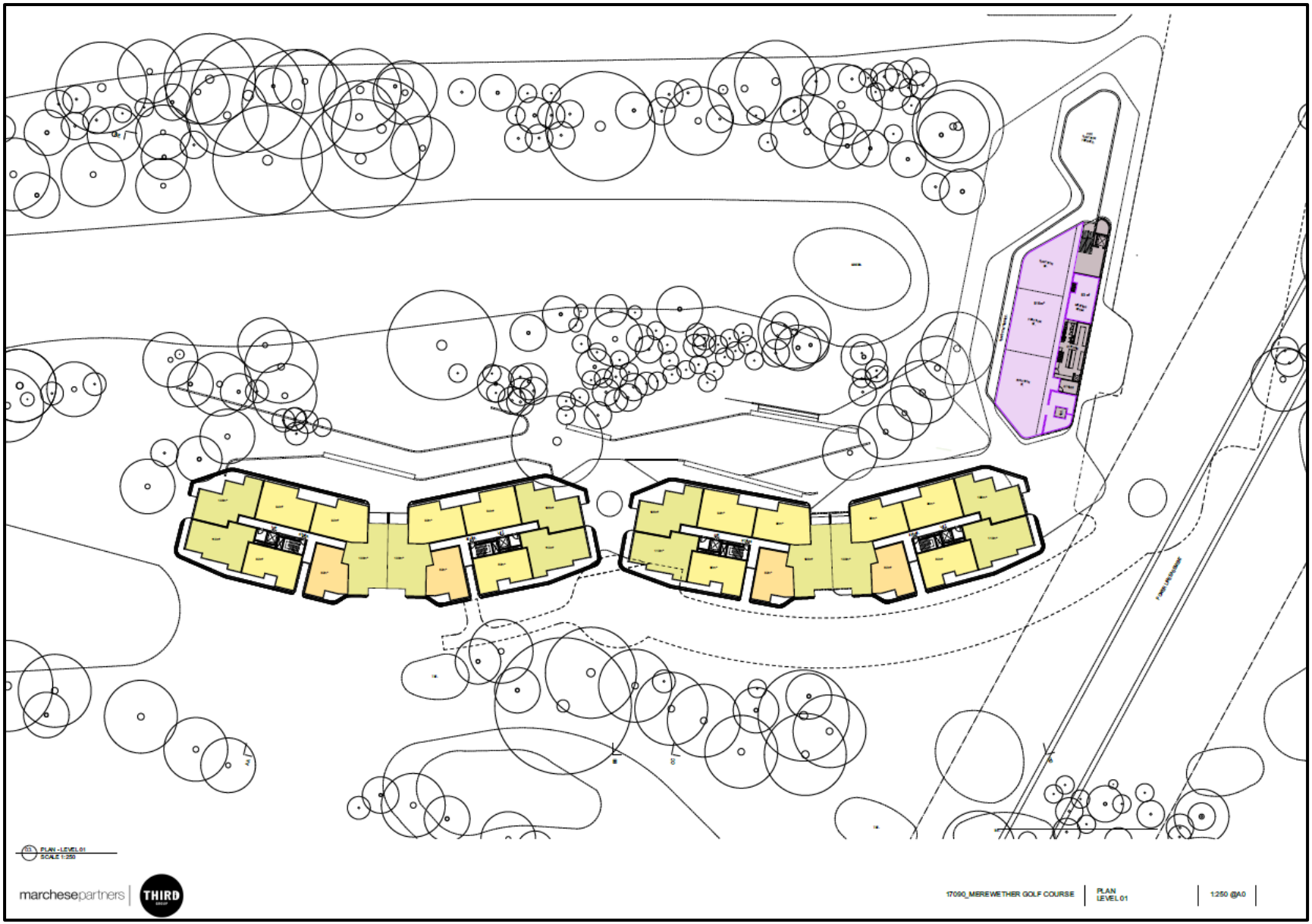
Attachment D – Traffic Count data

Attachment E – Sidra Results

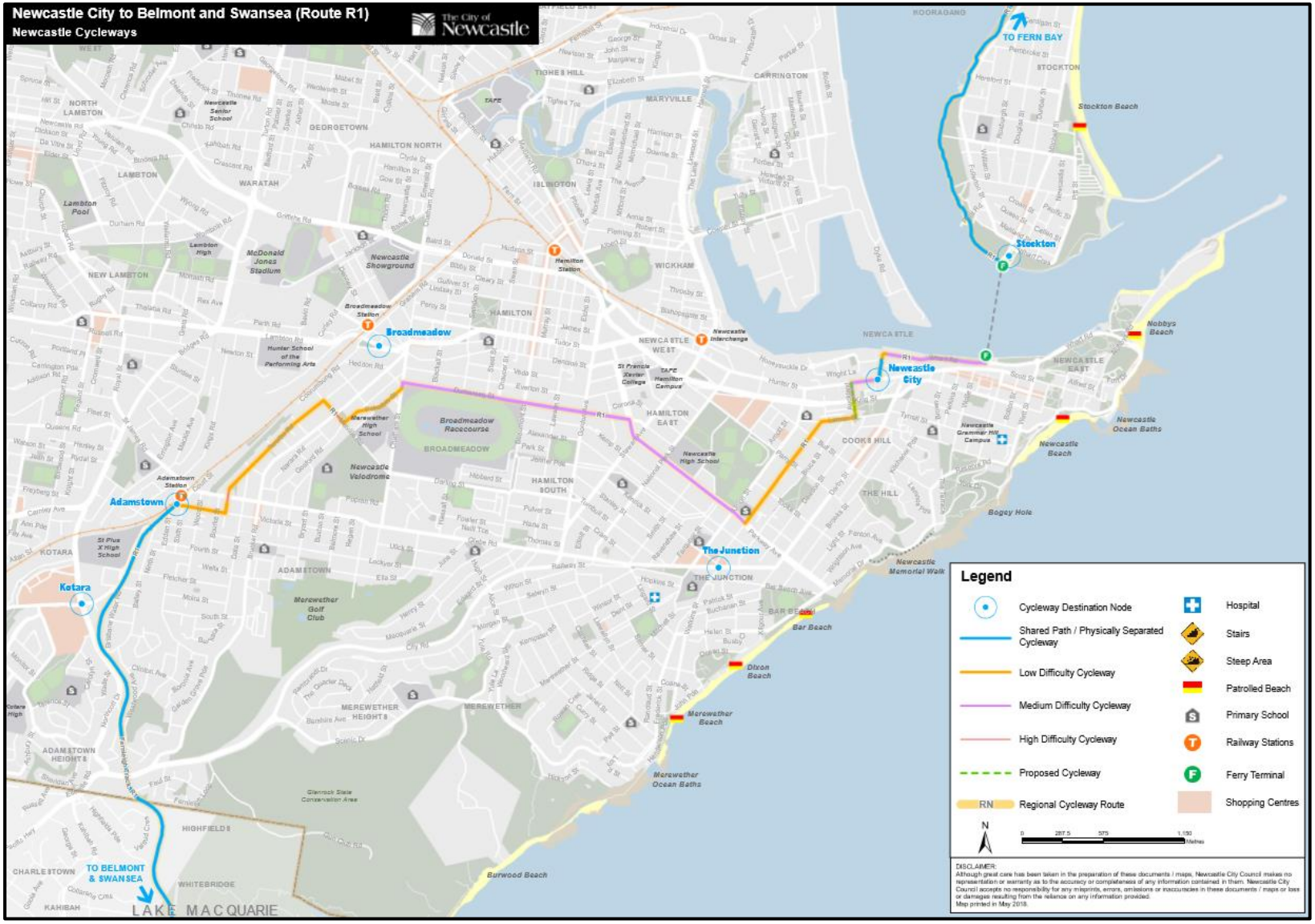
Attachment A –Site Plan



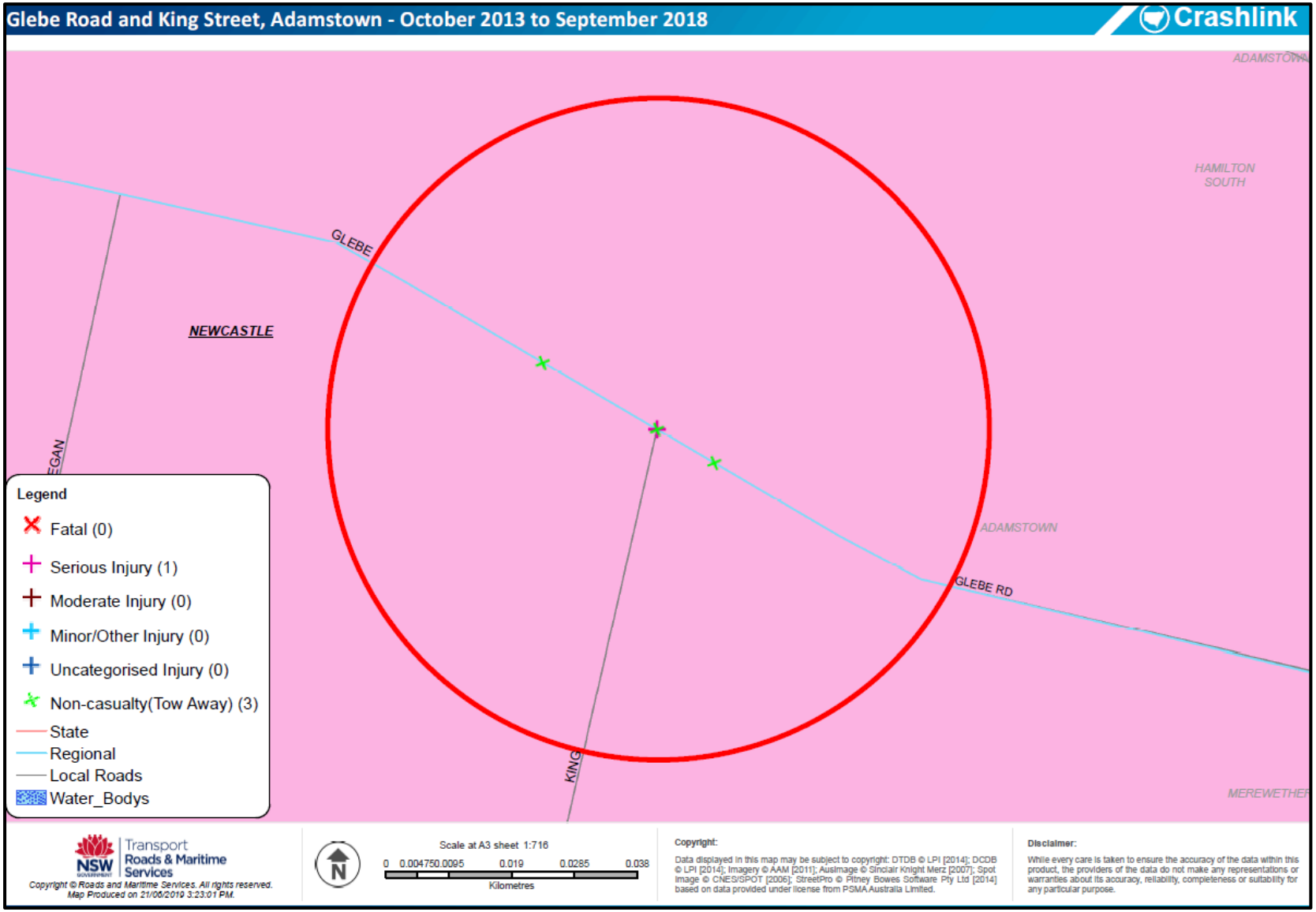

TEE
GREEN
PRO SHOP
OFFICE
RANGER'S CAFE
ADMIN
RECEPTION
OUTDOOR
GAMING
SPORTS LOUNGE
B.O.H AREA
BAR
DUE
STAIRS
LOUNGE BAR
PEDESTRIAN ACCESS
ON GRADE CLUB PARKING 120 CPS.
PEDESTRIAN ACCESS TO TEE N1
PARKING ACCESS
POWER LINE EASEMENT
POOL
GYM
DUNKIEY VISITORS
ADMIN
CINEMA
PEDESTRIAN ACCESS
COUNTRY VILLA
ALUS VISITORS PARKING. 21 CPS.
TRUCK ACCESS LANE
106m²
94m²
92m²
93m²
99m²
122m²
122m²
105m²
92m²
94m²
62m²
88m²
80m²
82m²
marchesepartners
THIRD
17090_MEREWETHER GOLF COURSE
A3_INDESIGN GROUND FLOOR
1:750 @A3


PLAN - LEVEL 01
SCALE 1:250
marchesepartners
THIRD
17090_MEREWETHER GOLF COURSE
PLAN
LEVEL 01
1:250 @A0

Attachment B – Cycling Routes



Attachment C – Accident Data



Detailed Crash Report

Transport for NSW
Centre for Road Safety

Crash No. / Data Source	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors	S F
				Natural Lighting																				
Hunter Region																								
Newcastle LGA																								
Adamstown																								
Glebe Rd																								
1096536 S	16/03/2016	Wed	09:20		at KING ST	TJN	STR	Raining	Wet	60	2	CAR	M U	N in KING ST	Unk	Turning right	NC	0	0	0	0	0		
E60532545					Daylight	RUM	13	Right near				4WD	M23	W in GLEBE RD	Unk	Proceeding in lane								
1099547 P	16/04/2016	Sat	01:00	10 m	E KING ST	TJN	STR	Fine	Dry	60	2	TRK	M U	W in GLEBE RD	60	Proceeding in lane	NC	0	0	0	0	0		F
E63328784					Darkness	RUM	71	Off rd left => obj				TRK		W in GLEBE RD	0	Parked								
1120742 P	05/10/2016	Wed	03:25		at KING ST	TJN	STR	Fine	Dry	60	1	CAR	M45	E in GLEBE RD	80	Turning right	SC	0	4	0	0	0	S	
E63818055					Darkness	RUM	81	Off left/rt bnd=>obj				Fence												
1147257 S	25/08/2017	Fri	21:05	20 m	W KING ST	2WY	STR	Raining	Wet	60	2	4WD	F20	E in GLEBE RD	Unk	Proceeding in lane	NC	0	0	0	0	0		
E396217092					Darkness	RUM	71	Off rd left => obj				WAG		E in GLEBE RD	0	Parked								

Report Totals: Crashes: 4 Fatal Crashes(FC): 0 Serious Injury Crashes(SC): 1 Moderate Injury Crashes(MC): 0 Minor/Other Injury Crashes(OC): 0 Uncategorised Injury Crashes(UC): 0 Non-Casualty Crashes(NC): 3

Killed(K): 0 Seriously Injured(S): 4 Moderately Injured(M): 0 Minor/Other Injured(O): 0 Uncategorised Injured(U): 0

Crashid dataset Glebe Road and King Street, Adamstown - October 2013 to September 2018

Note: Ordered by: Crash Date.

Crash self reporting, including self reported injuries began Oct 2014. Trends from 2014 are expected to vary from previous yrs. More unknowns are expected in self reported data.
Reporting yrs 1996-2004 & 2018 Q4 onwards contain uncategorised inj crashes.

Attachment D – Traffic Survey data

Lockyer Street/King Street

AM Survey

SECA Solution
161Scott Street
Newcastle, NSW, 2296
(02) 4032 797

Turn Count Summary

Location: King Street at Lockyer Street, Adamstown
GPS Coordinates: Lat=-32.937816, Lon=151.733130
Date: 2018-06-27
Day of week: Wednesday
Weather: Cloudy
Analyst: KS

Total vehicle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
06:59	0	0	0	0	0	0	0	0	0	0	1	0	1
07:00	0	9	3	1	5	0	1	0	0	2	6	4	31
07:15	0	3	0	2	1	2	1	2	0	3	5	1	20
07:30	0	4	1	1	6	0	2	3	1	0	14	4	36
07:45	1	5	1	1	11	1	1	4	1	3	13	2	44
08:00	0	10	2	0	12	1	2	3	1	5	31	12	79
08:15	2	3	5	1	10	1	2	2	1	6	43	10	86
08:30	2	1	3	0	14	1	0	6	1	9	33	5	75
08:45	0	5	4	0	17	0	0	6	0	7	26	4	69
09:00	2	2	0	0	5	3	1	4	0	4	14	3	38
09:15	1	2	3	1	12	2	1	1	0	1	11	1	36

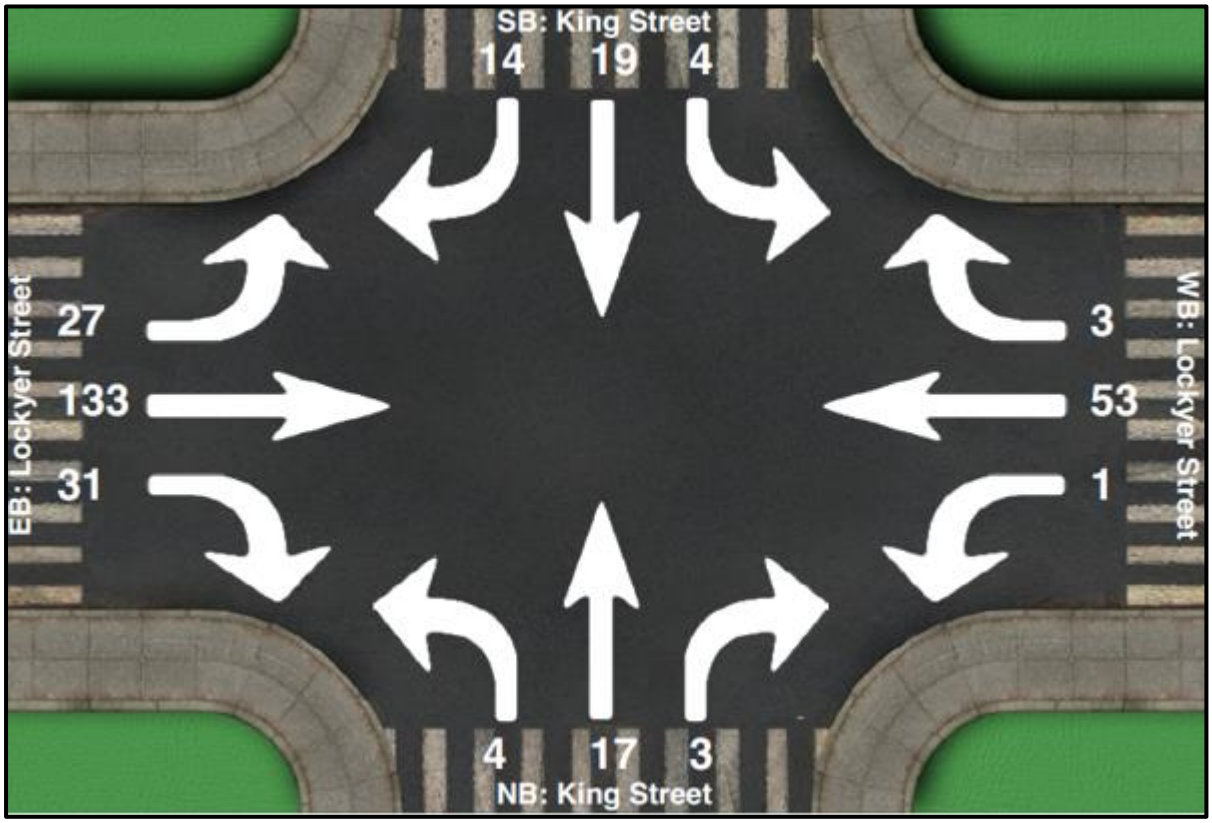
Intersection Peak Hour

08:00 - 09:00

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	4	19	14	1	53	3	4	17	3	27	133	31	309
Factor	0.50	0.47	0.70	0.25	0.78	0.75	0.50	0.71	0.75	0.75	0.77	0.65	0.90
Approach Factor	0.77			0.84			0.86			0.81			

Peak Hour Vehicle Summary

Vehicle	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	4	19	13	1	52	3	4	16	3	26	133	31	305
Truck	0	0	1	0	1	0	0	1	0	1	0	0	4



PM Survey

Seca Solution Pty Ltd
161 Scott Street
Newcastle, NSW, 2300
02 40327979

Turn Count Summary

Location: King Street at Lockyer St, Adamstown
GPS Coordinates:
Date: 2018-06-27
Day of week: Wednesday
Weather: Showers/ Overcast
Analyst: Jenny

Total vehicle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
14:29	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30	1	0	2	0	11	2	6	7	1	2	16	0	48
14:45	1	2	4	0	16	0	3	3	2	0	16	1	48
15:00	4	3	5	1	25	2	5	7	0	4	23	2	81
15:15	1	1	3	0	12	1	5	7	2	5	22	4	63
15:30	1	2	4	0	15	1	0	1	0	6	23	1	54
15:45	0	2	2	1	13	2	0	6	0	1	18	0	45
16:00	1	3	2	1	8	1	1	1	1	6	21	2	48
16:15	1	3	3	0	17	1	2	2	0	2	12	0	43
16:30	3	1	2	0	7	1	3	4	0	5	23	3	52
16:45	3	1	2	0	10	0	1	3	0	2	27	0	49
17:00	1	1	2	0	7	0	3	1	0	2	15	1	33
17:15	0	2	4	1	15	0	4	0	2	3	11	2	44
17:30	0	0	0	0	1	0	0	0	0	0	1	0	2

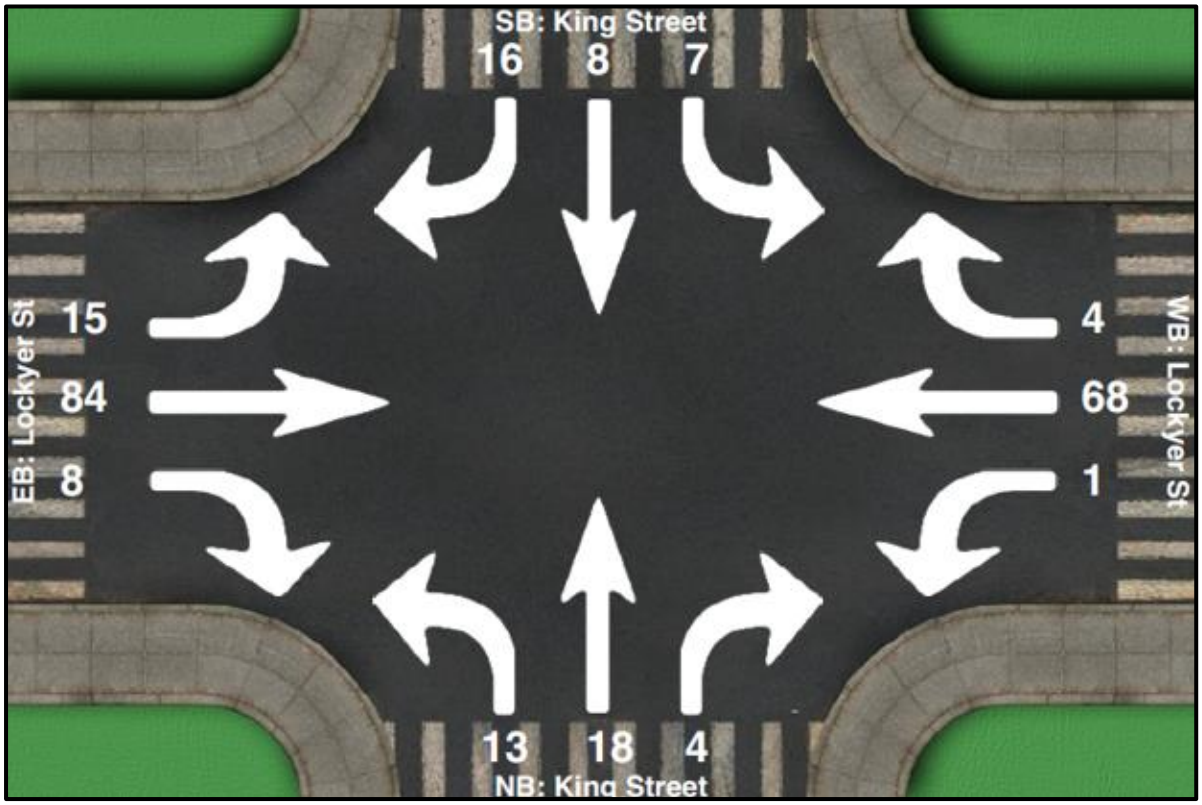
Intersection Peak Hour

14:45 - 15:45

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	7	8	16	1	68	4	13	18	4	15	84	8	246
Factor	0.44	0.67	0.80	0.25	0.68	0.50	0.65	0.64	0.50	0.62	0.91	0.50	0.76
Approach Factor	0.65			0.65			0.62			0.86			

Peak Hour Vehicle Summary

Vehicle	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	7	8	15	1	67	4	13	18	4	15	83	8	243
Truck	0	0	1	0	1	0	0	0	0	0	1	0	3
Heavy Vehicle	0	0	0	0	0	0	0	0	0	0	0	0	0



Quality Traffic Advice

Glebe Road/King Street

AM Survey

Intersection Peak Hour

08:00 - 09:00

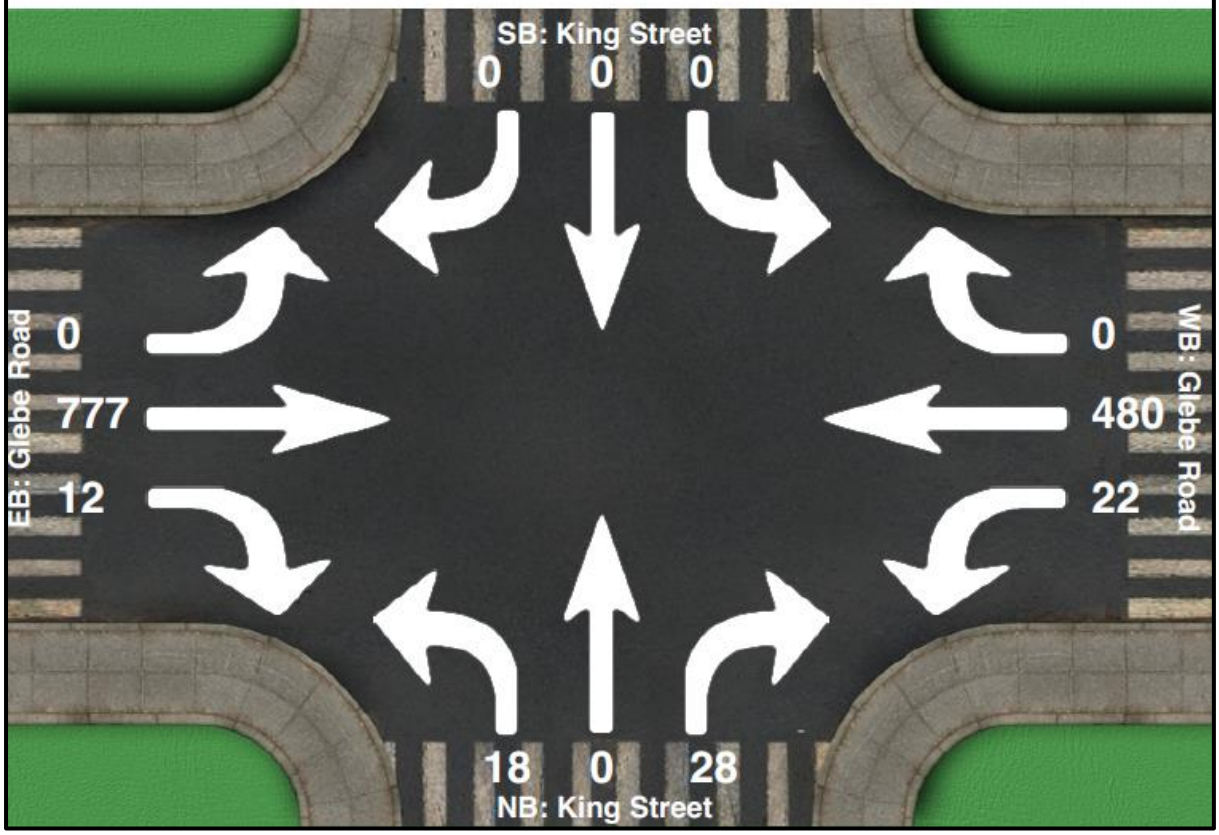
	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	0	0	0	22	480	0	18	0	28	0	777	12	1337
Factor	0.00	0.00	0.00	0.55	0.88	0.00	0.56	0.00	0.64	0.00	0.89	0.60	0.94
Approach Factor	0.00			0.91			0.61			0.90			

Peak Hour Vehicle Summary

Vehicle	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	0	0	0	22	465	0	16	0	27	0	766	12	1308
Truck	0	0	0	0	15	0	2	0	1	0	11	0	29

Intersection Peak Hour

Location: King Street at Glebe Road, Adamstown
GPS Coordinates: Lat=-32.935742, Lon=151.733838
Date: 2019-06-19
Day of week: Wednesday
Weather:
Analyst: TN



Quality Traffic Advice

PM Survey

SECA Solution
161Scott Street
Newcastle, NSW, 2296
(02) 4032 797

Turn Count Summary

Location: King Street at Glebe Road, Adamstown
GPS Coordinates: Lat=-32.935742, Lon=151.733838
Date: 2019-06-19
Day of week: Wednesday
Weather:
Analyst: TN

Total vehicle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
14:42	0	0	0	0	3	0	0	0	0	0	3	0	6
14:45	0	0	0	4	150	0	4	0	3	0	117	3	281
15:00	0	0	0	3	140	0	4	0	2	1	125	3	278
15:15	0	0	0	6	168	0	6	0	5	0	122	2	309
15:30	0	0	0	6	132	0	6	0	3	0	123	1	271
15:45	0	0	0	3	137	0	8	0	3	0	126	3	280
16:00	0	0	0	4	142	0	3	0	0	0	154	3	306
16:15	0	0	0	3	158	0	7	0	2	0	141	5	316
16:30	0	0	0	5	163	0	3	0	1	0	143	3	318
16:45	0	0	0	5	192	0	7	0	4	0	122	4	334
17:00	0	0	0	7	156	0	7	0	2	0	139	1	312
17:15	0	0	0	7	178	0	8	0	2	0	136	5	336
17:30	0	0	0	7	154	0	6	0	3	0	127	5	302
17:45	0	0	0	7	161	0	9	0	2	0	145	5	329
18:00	0	0	0	0	1	0	0	0	0	0	0	0	1

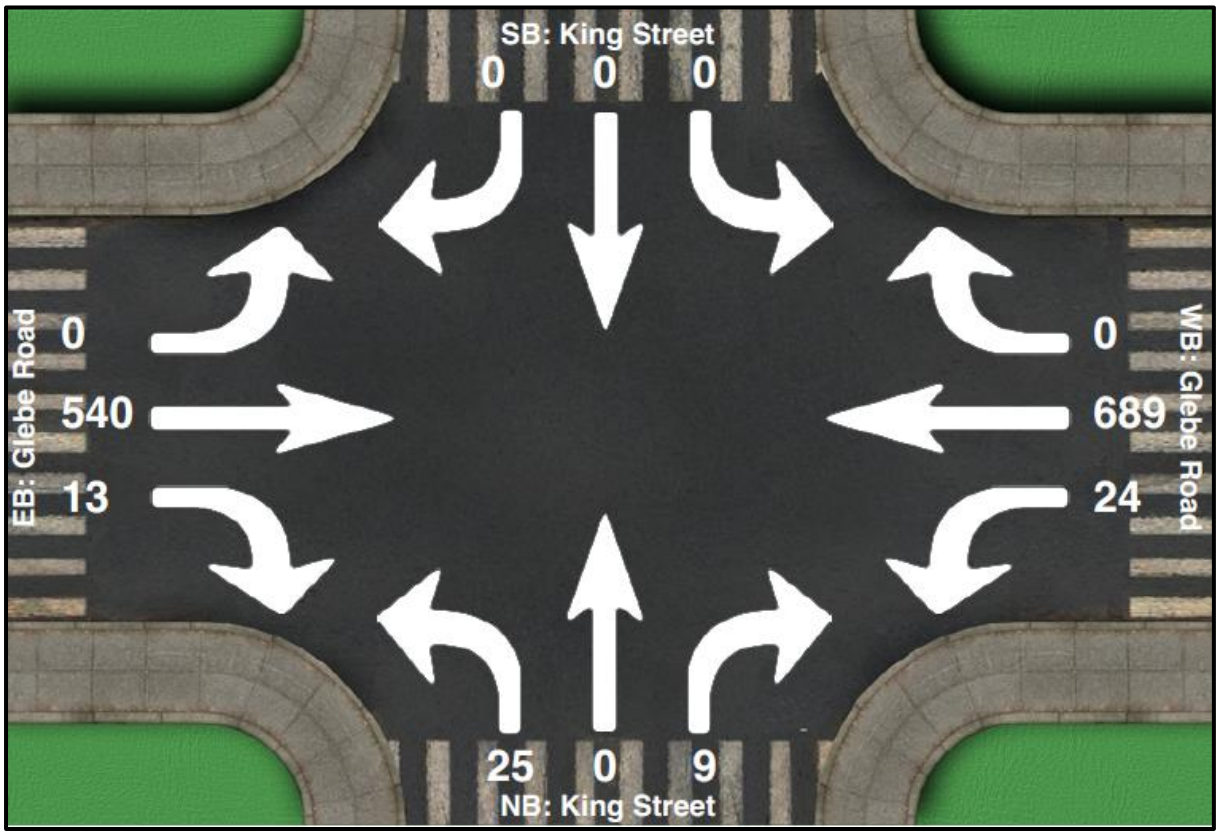
Intersection Peak Hour

16:30 - 17:30

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	0	0	0	24	689	0	25	0	9	0	540	13	1300
Factor	0.00	0.00	0.00	0.86	0.90	0.00	0.78	0.00	0.56	0.00	0.94	0.65	0.97
Approach Factor	0.00			0.90			0.77			0.95			

Peak Hour Vehicle Summary

Vehicle	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	0	0	0	24	684	0	25	0	9	0	535	13	1290
Truck	0	0	0	0	5	0	0	0	0	0	5	0	10



Quality Traffic Advice

Attachment E – Sidra Results

MOVEMENT SUMMARY

Site: 101 [2019 AM]

Glebe Road/King Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: King Street												
1	L2	19	11.1	0.021	6.8	LOS A	0.1	0.6	0.49	0.63	0.49	46.0
3	R2	29	3.6	0.137	19.6	LOS B	0.4	2.8	0.85	0.93	0.85	38.7
Approach		48	6.5	0.137	14.6	LOS B	0.4	2.8	0.71	0.81	0.71	41.0
East: Glebe Road												
4	L2	23	0.0	0.277	5.6	LOS A	0.0	0.0	0.00	0.03	0.00	57.5
5	T1	505	3.1	0.277	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
Approach		528	3.0	0.277	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.6
West: Glebe Road												
11	T1	818	1.4	0.436	0.1	LOS A	0.3	1.9	0.03	0.01	0.04	59.7
12	R2	13	0.0	0.436	9.5	LOS A	0.3	1.9	0.03	0.01	0.04	54.1
Approach		831	1.4	0.436	0.3	NA	0.3	1.9	0.03	0.01	0.04	59.6
All Vehicles		1407	2.2	0.436	0.8	NA	0.4	2.8	0.04	0.04	0.05	58.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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 is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: SECA SOLUTION | Processed: Friday, 21 June 2019 3:14:45 PM
Project: Not Saved

MOVEMENT SUMMARY

Site: 101 [2019 PM]

Glebe Road/King Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: King Street												
1	L2	26	0.0	0.036	8.0	LOS A	0.1	0.9	0.57	0.73	0.57	45.4
3	R2	9	0.0	0.037	16.6	LOS B	0.1	0.7	0.81	0.92	0.81	40.5
Approach		36	0.0	0.037	10.3	LOS A	0.1	0.9	0.63	0.78	0.63	43.9
East: Glebe Road												
4	L2	25	0.0	0.387	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	57.6
5	T1	725	0.7	0.387	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
Approach		751	0.7	0.387	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.6
West: Glebe Road												
11	T1	568	0.9	0.312	0.3	LOS A	0.3	2.3	0.06	0.01	0.07	59.4
12	R2	14	0.0	0.312	11.2	LOS A	0.3	2.3	0.06	0.01	0.07	53.7
Approach		582	0.9	0.312	0.6	NA	0.3	2.3	0.06	0.01	0.07	59.3
All Vehicles		1368	0.8	0.387	0.6	NA	0.3	2.3	0.04	0.04	0.05	59.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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 is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: Not Saved

Quality Traffic Advice

MOVEMENT SUMMARY

Site: 101 [2019 AM with development]

Glebe Road/King Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: King Street												
1	L2	33	6.5	0.035	6.7	LOS A	0.1	1.0	0.48	0.64	0.48	46.3
3	R2	49	2.1	0.229	21.0	LOS B	0.7	5.0	0.86	0.96	0.94	38.0
Approach		82	3.8	0.229	15.4	LOS B	0.7	5.0	0.71	0.83	0.76	40.7
East: Glebe Road												
4	L2	33	0.0	0.282	5.6	LOS A	0.0	0.0	0.00	0.04	0.00	57.4
5	T1	505	3.1	0.282	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.6
Approach		538	2.9	0.282	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.4
West: Glebe Road												
11	T1	818	1.4	0.441	0.2	LOS A	0.4	2.8	0.05	0.01	0.06	59.6
12	R2	18	0.0	0.441	9.6	LOS A	0.4	2.8	0.05	0.01	0.06	53.9
Approach		836	1.4	0.441	0.4	NA	0.4	2.8	0.05	0.01	0.06	59.5
All Vehicles		1456	2.1	0.441	1.2	NA	0.7	5.0	0.07	0.07	0.08	58.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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 is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101 [2019 PM with development]

Glebe Road/King Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: King Street												
1	L2	37	0.0	0.050	8.1	LOS A	0.2	1.2	0.57	0.75	0.57	45.4
3	R2	14	0.0	0.056	17.3	LOS B	0.2	1.1	0.82	0.92	0.82	40.1
Approach		51	0.0	0.056	10.6	LOS A	0.2	1.2	0.64	0.79	0.64	43.7
East: Glebe Road												
4	L2	49	0.0	0.400	5.6	LOS A	0.0	0.0	0.00	0.04	0.00	57.4
5	T1	725	0.7	0.400	0.1	LOS A	0.0	0.0	0.00	0.04	0.00	59.5
Approach		775	0.7	0.400	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.4
West: Glebe Road												
11	T1	568	0.9	0.326	0.6	LOS A	0.6	4.1	0.10	0.03	0.13	58.9
12	R2	23	0.0	0.326	11.7	LOS A	0.6	4.1	0.10	0.03	0.13	53.2
Approach		592	0.9	0.326	1.0	NA	0.6	4.1	0.10	0.03	0.13	58.7
All Vehicles		1417	0.7	0.400	1.0	NA	0.6	4.1	0.07	0.06	0.08	58.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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 is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101 [2019 AM with development+growth]

Glebe Road/King Street with 2% growth along Glebe Road
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: King Street												
1	L2	33	6.5	0.040	7.4	LOS A	0.1	1.1	0.53	0.69	0.53	45.6
3	R2	49	2.1	0.415	40.2	LOS C	1.2	8.9	0.94	1.03	1.14	30.1
Approach		82	3.8	0.415	27.2	LOS B	1.2	8.9	0.78	0.89	0.90	34.4
East: Glebe Road												
4	L2	33	0.0	0.335	5.6	LOS A	0.0	0.0	0.00	0.03	0.00	57.5
5	T1	606	3.1	0.335	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.6
Approach		639	3.0	0.335	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.5
West: Glebe Road												
11	T1	981	1.4	0.529	0.3	LOS A	0.6	3.9	0.05	0.01	0.08	59.5
12	R2	18	0.0	0.529	12.0	LOS A	0.6	3.9	0.05	0.01	0.08	53.8
Approach		999	1.4	0.529	0.5	NA	0.6	3.9	0.05	0.01	0.08	59.4
All Vehicles		1720	2.1	0.529	1.7	NA	1.2	8.9	0.07	0.06	0.09	57.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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 is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101 [2019 PM with development+growth]

Glebe Road/King Street with 2% growth along Glebe Road
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: King Street												
1	L2	37	0.0	0.064	9.7	LOS A	0.2	1.5	0.67	0.84	0.67	44.1
3	R2	14	0.0	0.094	26.9	LOS B	0.3	1.8	0.90	0.95	0.90	35.2
Approach		51	0.0	0.094	14.3	LOS A	0.3	1.8	0.73	0.87	0.73	41.0
East: Glebe Road												
4	L2	49	0.0	0.475	5.6	LOS A	0.0	0.0	0.00	0.03	0.00	57.4
5	T1	870	0.7	0.475	0.1	LOS A	0.0	0.0	0.00	0.03	0.00	59.5
Approach		920	0.7	0.475	0.4	NA	0.0	0.0	0.00	0.03	0.00	59.4
West: Glebe Road												
11	T1	682	0.9	0.394	0.9	LOS A	0.9	6.4	0.12	0.02	0.17	58.5
12	R2	23	0.0	0.394	15.3	LOS B	0.9	6.4	0.12	0.02	0.17	52.8
Approach		705	0.9	0.394	1.4	NA	0.9	6.4	0.12	0.02	0.17	58.4
All Vehicles		1676	0.8	0.475	1.2	NA	0.9	6.4	0.07	0.05	0.09	58.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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 is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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